The **APA Sustainable Communities Division supports planners** who are committed to planning for **sustainable communities** by **integrating all aspects of sustainability** into our work through the combined **economic, social, and ecological factors** that shape our communities.

SUSTAINABLE COMMUNITIES DIVISION

APA

Sustain

Thanks to our 2015-2016 Sustainable Communities Division Sponsors!

- Dewberry
- Farr Associates
- ICLEI
- Lehigh Valley Planning Commission
- mySidewalk by MindMixer
- Nitsch Engineering
- VHB
- WRT
- Clarion
- Teska

Division Contact Information

- **Website**: planning.org/divisions/sustainable
- **Blog** (sign up for e-bulletin): www.sustainableplanning.net
- **LinkedIn**: APA Sustainable Communities Division
- **Facebook/Twitter**: APASCD
- **Scott Turner, Division Chair**: APASCD@gmail.com

SUSTAINABLE COMMUNITIES DIVISION

APA

Sustain

Today: Smart Growth and Resilience in Coastal Communities

- **Susan Fox** - the Baldwin Group at NOAA
- **Gavin Smith** - UNC Center for the Study of Natural Hazards and Disasters & U.S. Department of Homeland Security's Coastal Hazards Center of Excellence
- **Wendy Goodfriend** - San Francisco Bay Conservation and Development Commission

SUSTAINABLE COMMUNITIES DIVISION

APA

Sustain

Smart Growth and Resilience in Coastal Communities

Susan Fox (The Baldwin Group at NOAA OCM)

APA Sustainable Communities Division Webinar

May 20

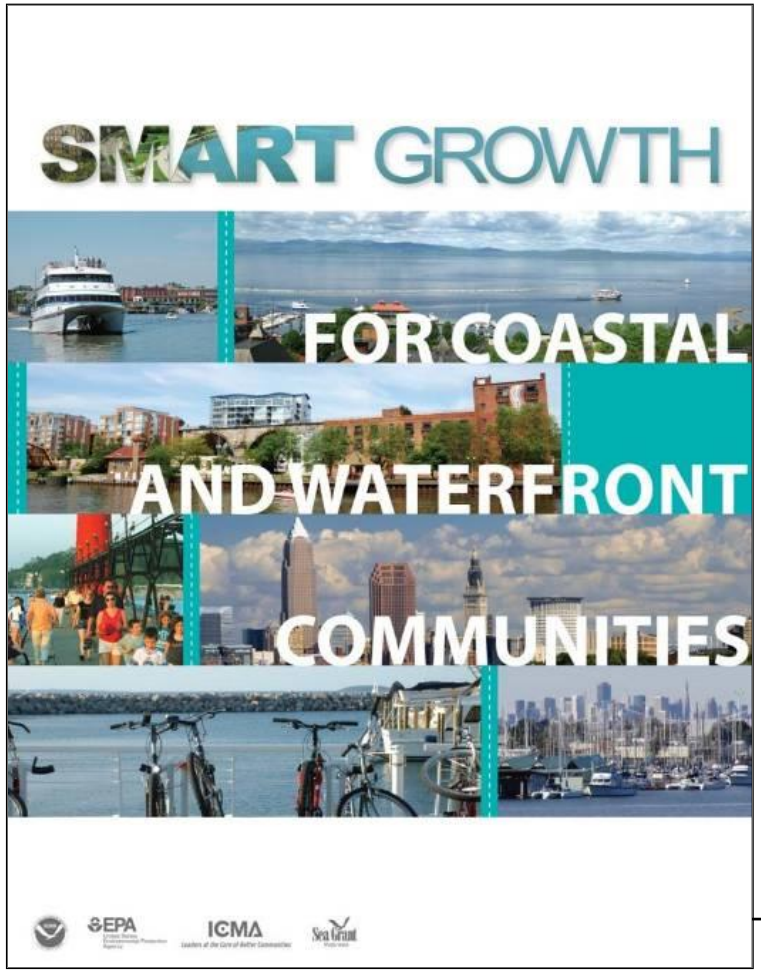
Agenda

- Introduction
- Agenda and Overview of Smart Growth and Resilience
- Hazard Mitigation
- Kinston, NC case study
- San Francisco, CA case study
- Discussion


Photo credit: Todd Marsee, MI Sea Grant


Photo credit: George Cathcart

10 Coastal & Waterfront Smart Growth Elements



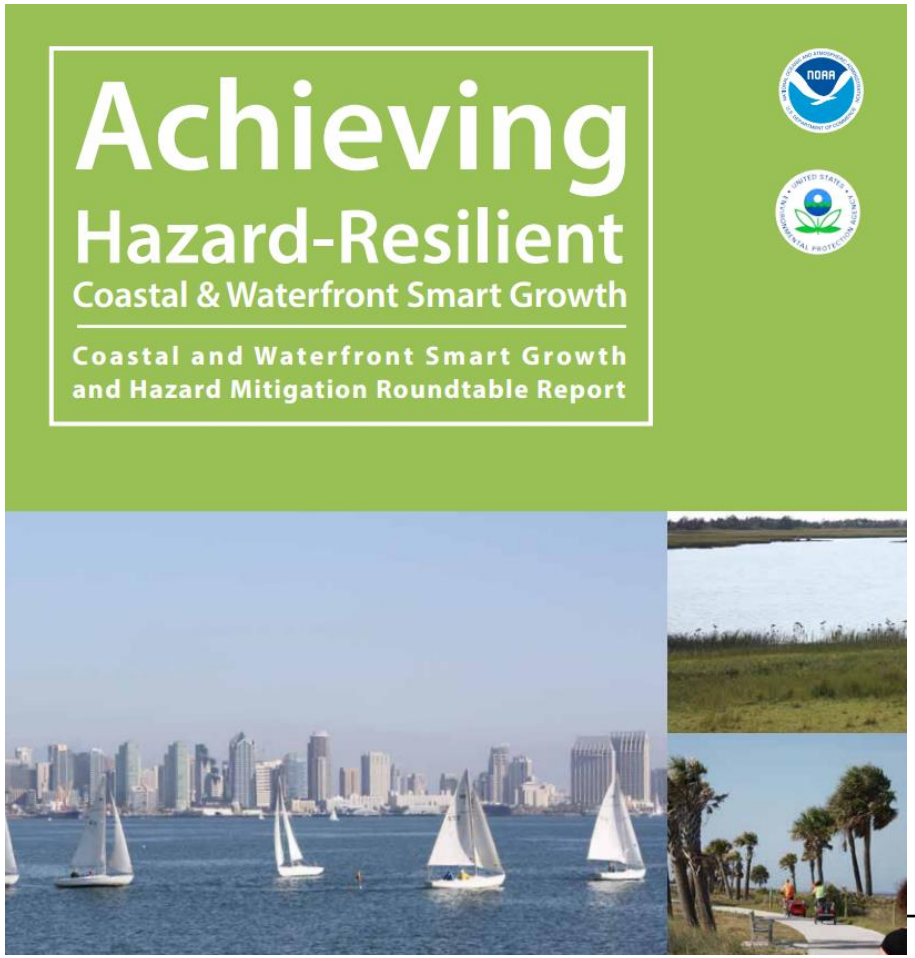
Element 4:

Create walkable communities

with visual and physical access to and along the waterfront for public use

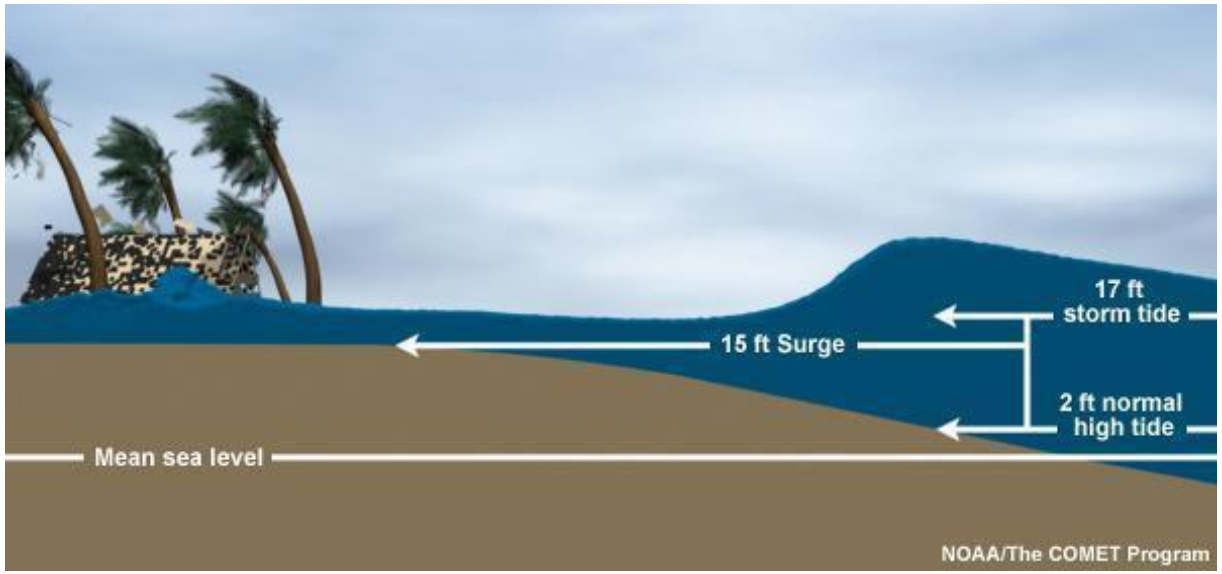

Photo credit: FEMA, Crystal Payton

What Does Hazard Resilient Smart Growth Look Like and How Do You Implement It?



How communities can achieve smart growth goals while minimizing risks from natural hazards.

Flooding



- **Episodic**
  - Storm surge
  - Tsunamis
  - Inland floods
  - Shallow coastal flooding
- **Long-term**
  - Sea level rise


Typical Water Level
South Florida
Photo credit: Paul Krashefski


Seasonal Extreme High Tide
South Florida
Photo credit: Paul Krashefski

EPA Resilience Checklist

EPA United States Environmental Protection Agency

Español | 中文: 繁體版 | 中文: 简体版 | Tiếng Việt | 한국어

Learn the Issues | Science & Technology | Laws & Regulations | About EPA

Search EPA.gov

Smart Growth

Contact Us Share

- Smart Growth Home
- About Smart Growth
- Awards
- Examples of Smart Growth
- Grants and Funding
- Partnerships
- Publications
- Technical Assistance
- Tools
- Topics
- Webinars, Videos, and Podcasts
- Smart Growth in Your Community

You are here: EPA Home » Smart Growth » Planning for Flood Recovery and Long-Term Resilience in Vermont

Planning for Flood Recovery and Long-Term Resilience in Vermont

Smart Growth Approaches for Disaster-Resilient Communities

Flooding from storms affects many communities across the country, causing billions of dollars of damage annually. Climate change projections suggest that storms will likely become more frequent and stronger in many regions of the country in the future. In light of these trends, many communities want to improve disaster recovery and long-term flood resilience planning. "Flood resilience" means measures taken to reduce communities' vulnerability to flooding and support long-term recovery after a flood.

Communities throughout Vermont faced this reality when Tropical Storm Irene hit in 2011, devastating infrastructure, communities, and lives. In 2012, in the wake of Irene, the state of Vermont requested Smart Growth Implementation Assistance from EPA and the Federal Emergency Management

www2.epa.gov/smart-growth/planning-flood-recovery-and-long-term-resilience-vermont

FLOOD RESILIENCE CHECKLIST

Overall Strategies to Enhance Flood Resilience
(Learn more in Section 2, pp. 9-11 of
Planning for Flood Recovery and Long-Term Resilience in Vermont)

1. Does the community's comprehensive plan have a hazard element or flood planning section?	☐ Yes	☐ No
a. Does the comprehensive plan cross-reference the local Hazard Mitigation Plan and any disaster recovery plans?	☐ Yes	☐ No
b. Does the comprehensive plan identify flood- and erosion-prone areas, including river corridor and fluvial erosion hazard areas, if applicable?	☐ Yes	☐ No
c. Did the local government emergency response personnel, flood plain manager, and department of public works participate in developing/updating the comprehensive plan?	☐ Yes	☐ No
2. Does the community have a local Hazard Mitigation Plan approved by the Federal Emergency Management Agency (FEMA) and the state emergency management agency?	☐ Yes	☐ No
a. Does the Hazard Mitigation Plan cross-reference the local comprehensive plan?	☐ Yes	☐ No
b. Was the local government planner or zoning administrator involved in developing/updating the Hazard Mitigation Plan?	☐ Yes	☐ No

Planning Resources for Resilience

NOAA's Digital Coast

- **Communicating Exposure to Hazards**
  - Coastal County Snapshots
  - CanVis Visualization Software
- **Assessing Hazard Impacts**
  - Sea Level Rise Viewer
- **Using Green Infrastructure to Adapt to Impacts**
  - Green Infrastructure for Coastal Resilience Training

Understanding What Is Exposed to Flooding

DigitalCoast
OFFICE FOR COASTAL MANAGEMENT

Data | Tools | Topics | GeoZone Blog

Coastal County Snapshots

Overview | In Action

Get It Now

Coastal County Snapshots turn complex data into easy-to-understand stories, select a coastal county of interest and the website does the rest, providing inf more resilient to coastal hazards.

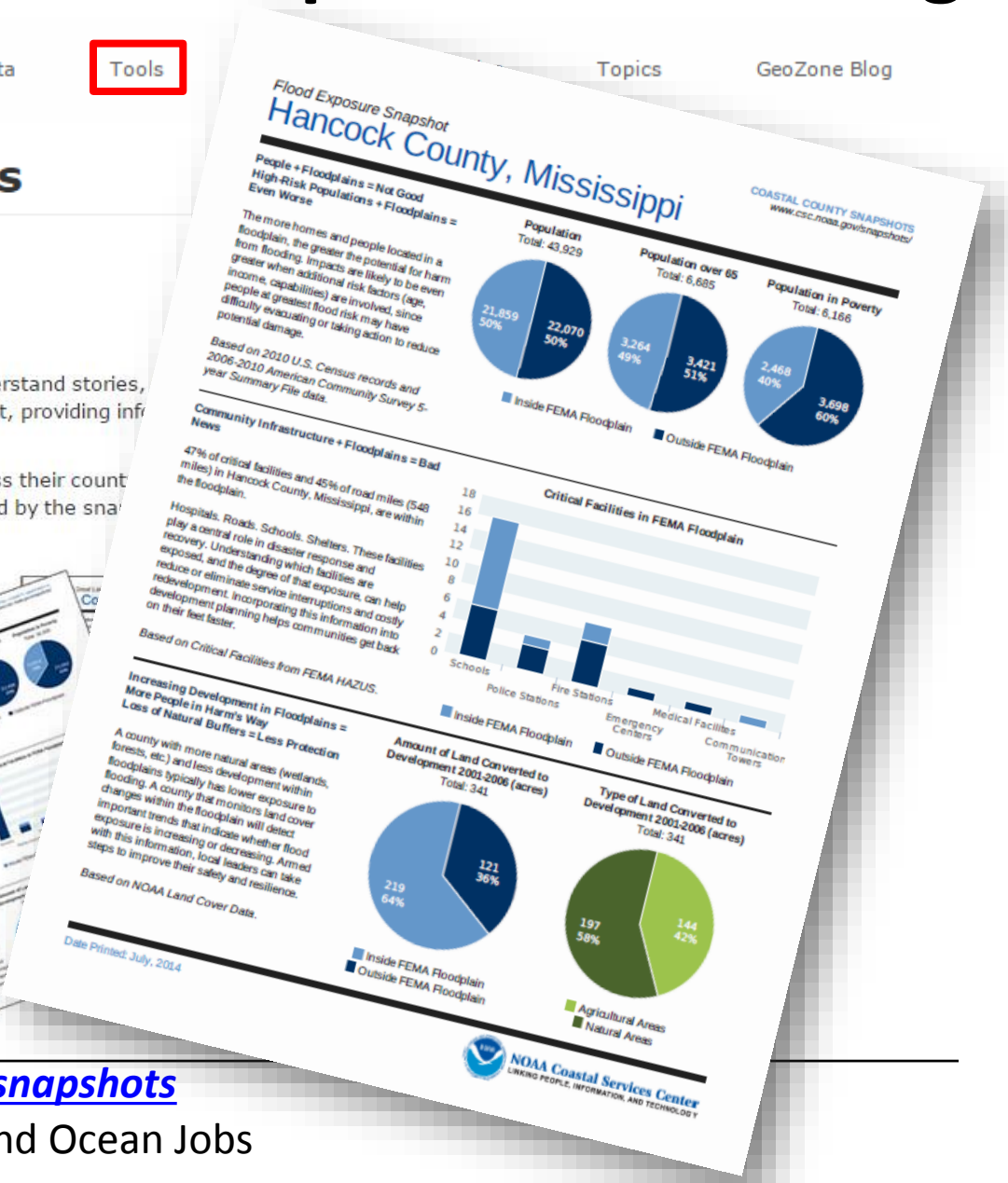
Local officials can use the snapshots as a planning tool to assess their count benefits provided by natural resources. The handouts generated by the sna working with governing bodies and citizen groups.

Features

- **Assesses** a county's exposure and resilience to flooding
- **Analyzes** a county's dependence on the ocean or Great Lakes for a healthy economy
- **Examines** the benefits a county receives from its wetlands
- **Compares** counties to each other or for regional analysis
- **Allows** users to download a PDF report for the snapshot of their choice

Current topics include:

- Flood exposure
- Wetland benefits
- Ocean and Great Lakes jobs



coast.noaa.gov/digitalcoast/tools/snapshots

Flood Exposure, Wetland Benefits, and Ocean Jobs

County Wetland Benefits Snapshot

Pamlico County, NC

Wetland Benefits Snapshot

COASTAL COUNTY SNAPSHOTS
www.csc.noaa.gov/snapshots/

Pamlico County, North Carolina

Protecting Wetlands = Coastal Communities That Are Safer, Cleaner, and More Economically Productive

Healthy wetlands provide more than just a pretty view. Wetlands are a pivotal part of the natural system, supplying tremendous benefits for coastal communities. Even small acreages can provide some level of benefit. The location, health, and size of individual wetlands also play a role. This snapshot demonstrates three key benefits of wetlands in Pamlico County.

Based on 2006 NOAA land cover.

52%

116,436 acres
of Pamlico County's land area is wetland.

More Economically Productive: Wetlands Support Fishing Economies

Coastal wetlands provide habitat for many aquatic species that contribute to local food supplies and fishing-related industries.

In addition to providing a base for commercial fishing jobs and revenue, wetlands also support recreational and charter fishing. These economic benefits extend beyond county boundaries.

Based on 2011 ENOW and 2011 ENOW for Self-Employed Workers.

Commercial Fishing	County	State
Jobs	217	3,358
Output from businesses	$13.7 million	$151.3 million
Revenue from self-employed	$9.9 million	$90.4 million

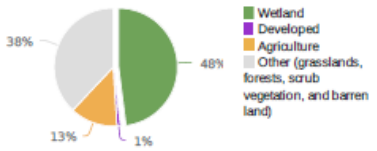
Safer: Wetlands Reduce Flood Impacts

41% (89,679 acres) of Pamlico County's land area is in the floodplain.

Wetlands located in coastal and riverine floodplains can protect people and their property, community infrastructure, and agricultural investments from floods. Wetlands act as natural sponges, holding floodwaters and lowering flood heights.

Based on Best available as of 2010 FEMA Flood Zones (100-year); 2006 NOAA land cover.

Pamlico County's Floodplain



Date Printed: July, 2014

NOAA Coastal Services Center
LINKING PEOPLE, INFORMATION, AND TECHNOLOGY

Visualizing Flooding

DigitalCoast
OFFICE FOR COASTAL MANAGEMENT

Data | Tools | Training | Stories | Topics | GeoZone Blog | Search

CanVis

Contributing Partners: NOAA Office for Coastal Management | USDA National Agroforestry Center

Overview | In Action | Support | Get It Now

Use this easy-to-use visualization tool to "see" potential community impacts from coastal development or sea level rise.

Features

- **Download** your background picture
- **Create** a vision of the future by adding objects—docks, buildings, rising water, and more—to the photo using the expansive photo objects library

Learn more.

Technical Assistance

Ask a question anytime by emailing coastal.info@noaa.gov.

Related Training

- CanVis

Related Tools

- Sea Level Rise Viewer

---

coast.noaa.gov/digitalcoast/tools/canvis

CanVis Tool

Seattle Boardwalk– Sea Level Rise – Before

Charleston Customs House – 1.5m SLR - Before

Seattle Boardwalk – Sea Level Rise – After

Charleston Customs House – 1.5m SLR - After

Visualizing and Communicating Alternatives

coast.noaa.gov/digitalcoast/tools/canvis

Planning Resources for Resilience

NOAA's Digital Coast

- **Communicating Exposure to Hazards**
  - Coastal County Snapshots
  - CanVis Visualization Software
- **Assessing Hazard Impacts**
  - Sea Level Rise Viewer
- **Using Green Infrastructure to Adapt to Impacts**
  - Green Infrastructure for Coastal Resilience Training

Visualizing Sea Level Rise and Inundation

DigitalCoast
OFFICE FOR COASTAL MANAGEMENT

Data | Tools | Training | Stories | Topics | GeoZone Blog | Search

Sea Level Rise Viewer

Contributing Partners: NOAA Office for Coastal Management

Overview | In Action | Support | Get It Now

Launch Viewer

Select a geography and use the slider bar to simulate various sea level rise scenarios (from one to six feet above the average highest tides) and the corresponding areas that would be impacted by flooding. Click the camera icons for pictures that depict how local landmarks could be affected. Additional tabs provide information about marsh impacts, nuisance flood frequency, and social and economic data.

Maps are not currently available for Alaska and Louisiana due to the accuracy of existing elevation data, the hydraulic complexity of the coast, and gaps in vertical datum transformation.

Features

- **Models** potential marsh migration due to sea level rise
- **Examines** how tidal flooding will become more frequent with sea level rise
- **Enables** access through mobile devices
- **Produces** shortened URLs for easy map sharing through email and social media
- **Provides** access to Web map services and underlying geospatial data
- **Offers** supporting documents and information on sea level rise mapping

Acknowledgments

The NOAA Office for Coastal Management acknowledges the many organizations that helped guide the development of this tool.

Videos

Tool Overview

First Time Tips

Digital Coast Webinar Series

Mapping and Visualizing Sea level Rise and Coastal Flooding Impacts
View recorded webinar

Related Data

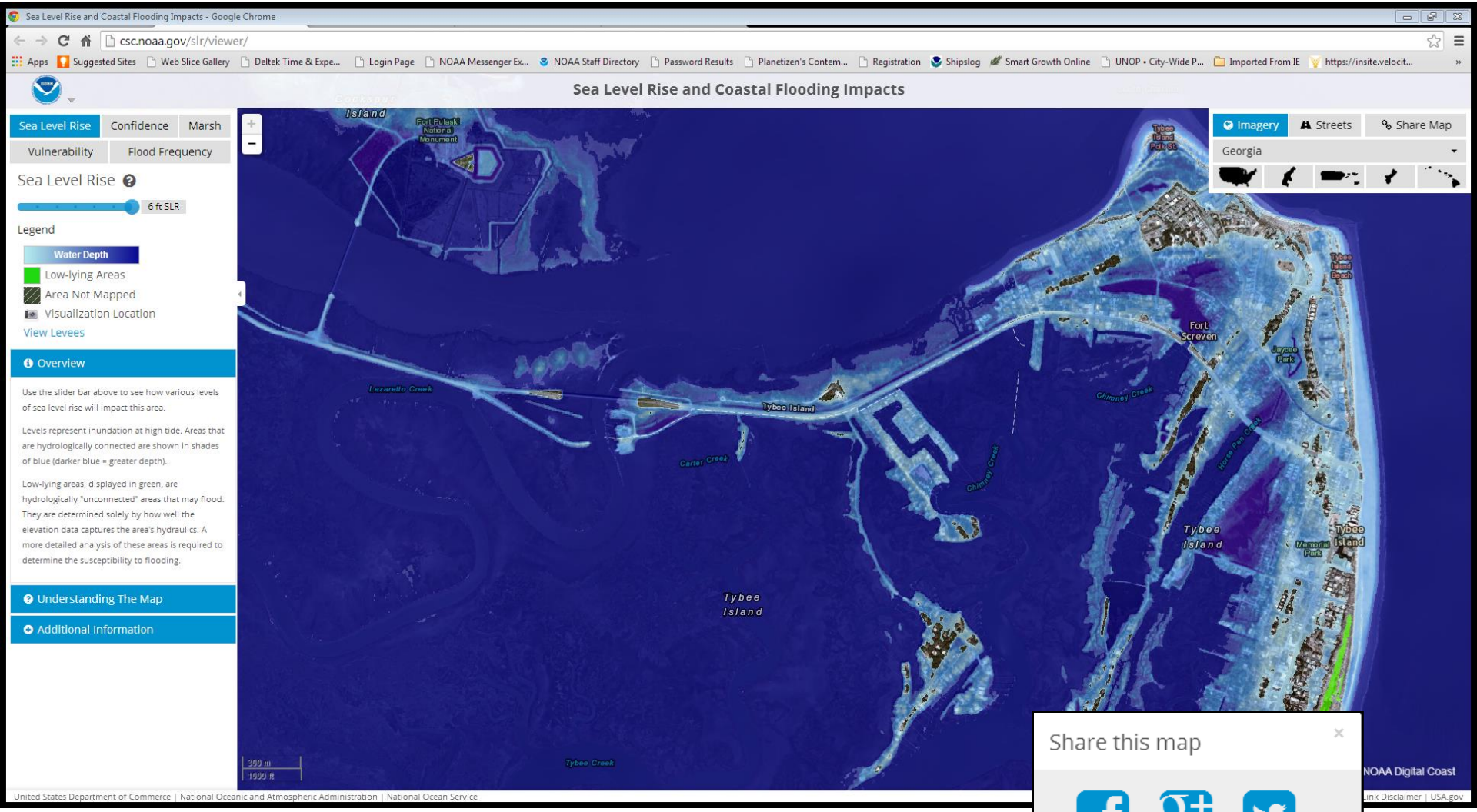
- Coastal Lidar
- Social Vulnerability Index (SOVI)

Related Training

- Climate Adaptation for Coastal Communities
- Coastal Inundation Mapping

coast.noaa.gov/digitalcoast/tools/slr/

Visualizing Sea Level Rise and Inundation



coast.noaa.gov/digitalcoast/stories/tybee

Planning Resources for Resilience

NOAA's Digital Coast

- **Communicating Exposure to Hazards**
  - Coastal County Snapshots
  - CanVis Visualization Software
- **Assessing Hazard Impacts**
  - Sea Level Rise Viewer
- **Using Green Infrastructure to Adapt to Impacts**
  - Green Infrastructure for Coastal Resilience Training

Green Infrastructure for Coastal Resilience Training

Understand ecological, economic, and societal benefits

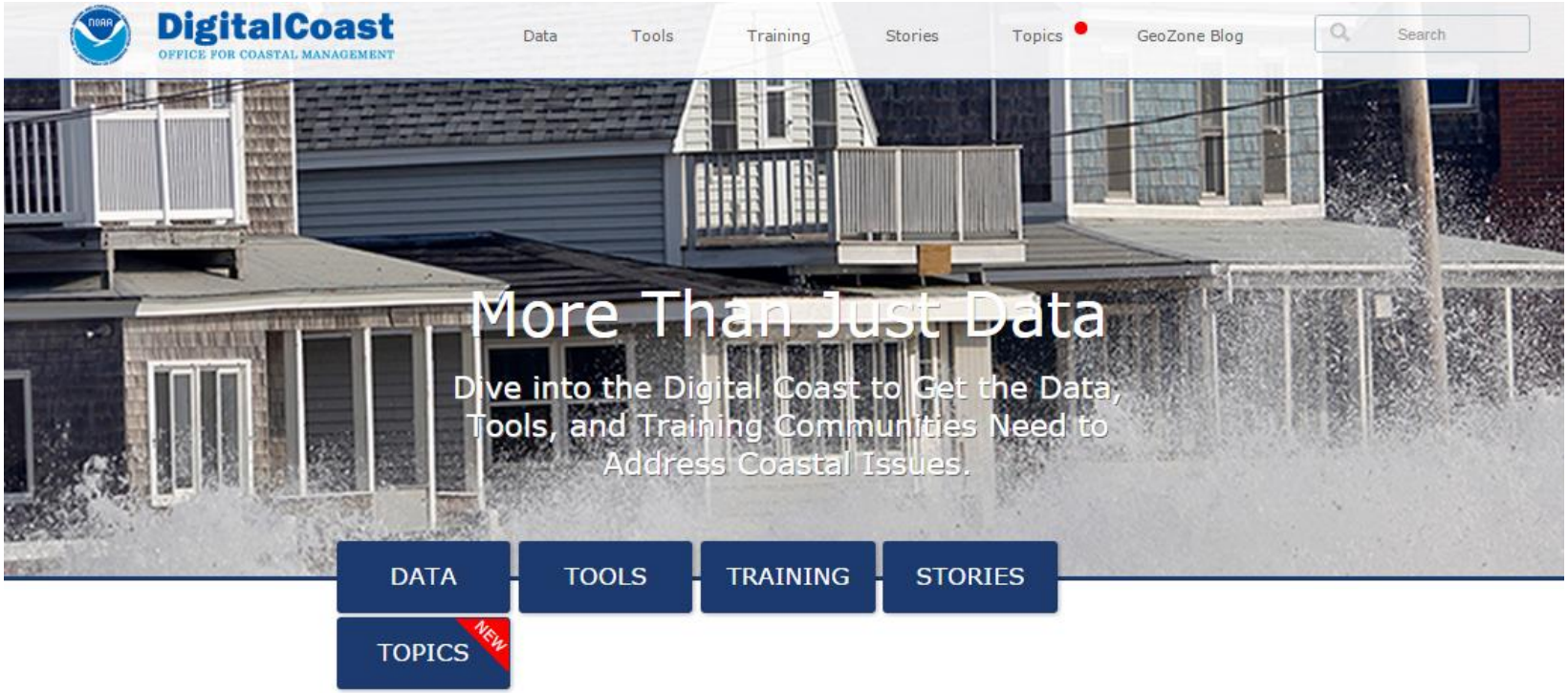
Understand the role in making coastal communities more resilient to natural hazards.

Identify new or existing planning processes for integrating green infrastructure techniques

Identify local green infrastructure applications

www.csc.noaa.gov/digitalcoast/training/green

Digital Coast



What is the Digital Coast?

This NOAA-sponsored website is focused on helping communities address coastal issues and has become one of the most-used resources in the coastal management community. The dynamic Digital Coast Partnership, whose members represent the website's primary user groups, keeps the effort focused on customer needs.

Learn more in our About section, or just dive in. And please provide feedback as often as possible. Hearing from you is what makes the Digital Coast work.

Learn More about the Digital Coast

About Contributing Partners Watch the Video

Top: Data Tools Training Stories

1. Coastal Lidar
2. Coastal Change Analysis Program
3. Economics: National Ocean Watch
4. Electronic Navigational Charts
5. Emergency Response Imagery

coast.noaa.gov/digitalcoast/

Partnerships Keep It Real

- American Planning Association
- Association of State Floodplain Managers
- Coastal States Organization
- National Association of Counties
- National Estuarine Research Reserve Association
- National States Geographic Information Council
- The Nature Conservancy
- Urban Land Institute
- NOAA

For Additional Questions

Susan Fox

susan.fox@noaa.gov

Dr. Gavin Smith

gavin_smith@unc.edu

Wendy Goodfriend

wendy.goodfriend@bcdc.ca.gov

Scott Turner, Division Chair

APASCD@gmail.com

coastal & waterfront

SMARTGROWTH

ELEMENTS

- Mix land uses
- Take advantage of compact design
- Provide a range of housing choices
- Create walkable communities
- Foster distinctive, attractive communities
- Preserve open space & critical environmental areas
- Direct development toward existing communities
- Provide a variety of transportation options
- Make development decisions predictable & fair
- Encourage community & stakeholder collaboration

GETTING STARTED | RESOURCES | CASE STUDIES

Smart Growth principles compared: Smart Growth principles compared to coastal and waterfront smart growth elements.

Coastal and Waterfront Smart Growth report

NOAA and EPA's report on "*Achieving Hazard-Resilient Coastal & Waterfront Smart Growth*" presents ideas shared by smart growth and hazard mitigation experts related to building hazard-resilient coastal communities.

DEVELOPMENT at the WATER'S EDGE

Coastal and waterfront communities have a distinctive

COASTAL and WATERFRONT CHALLENGES and OPPORTUNITIES

SMART GROWTH APPROACHES

How can smart growth strategies help coastal and waterfront

coastalsmartgrowth.noaa.gov/

Stronger Housing, Safer Communities: Strategies for Seismic and Flood Risks

Wendy Goodfriend

San Francisco Bay Conservation and Development Commission's Adapting to Rising Tides Program

Dana Brechwald

Association of Bay Area Governments' Resilience Program

Why focus on housing and communities?

- Recovery after a major hazard event depends on whether people are able to stay in their homes
- To improve recovery we need to better understand which housing and communities are most at risk
- Knowing these risks informs the selection of resilience and recovery strategies and helps make the case for taking action

bcdc

ABAG ASSOCIATION OF BAY AREA GOVERNMENTS

Collaborative by design:

Project Leads
ABAG's Resilience Program
BCDC's ART Program

Advisory Committee
Experts in hazards, housing, and community vulnerability

Bay Area Stakeholders
Local agency staff, decision makers, non-profits, academics, interested community members

Strategy Consultant
AECOM

Funders
USGS, US EPA
FEMA, CA SGC

bcdc

ABAG
ASSOCIATION OF BAY AREA GOVERNMENTS

Housing and Community Vulnerability

Conducted a regional assessment to better understand the vulnerability of housing and communities and identify potential consequences on existing communities and in areas projected to grow

Three hazards

- Ground Shaking >= MMI XIII
- Liquefaction, moderate to high
- Current 100-year flood zone and future flooding with sea level rise (24, 36, 48 inches)

bcdc

ABAG
ASSOCIATION OF BAY AREA GOVERNMENTS

Fragile Housing

Structural housing types that are likely to be damaged if exposed to ground shaking, liquefaction, or flooding

Eight housing types

- Single family cripple wall
- Single family house over garage
- Unreinforced masonry
- Multi-family cripple wall
- Multi-family weak story or open front
- Multi-family non-ductile concrete
- Insufficient foundation for liquefaction
- All housing types

bcdc

ABAG ASSOCIATION OF BAY AREA GOVERNMENTS

Communities at Risk

Individuals, households and neighborhoods with characteristics that make them less able to prepare, respond or recover

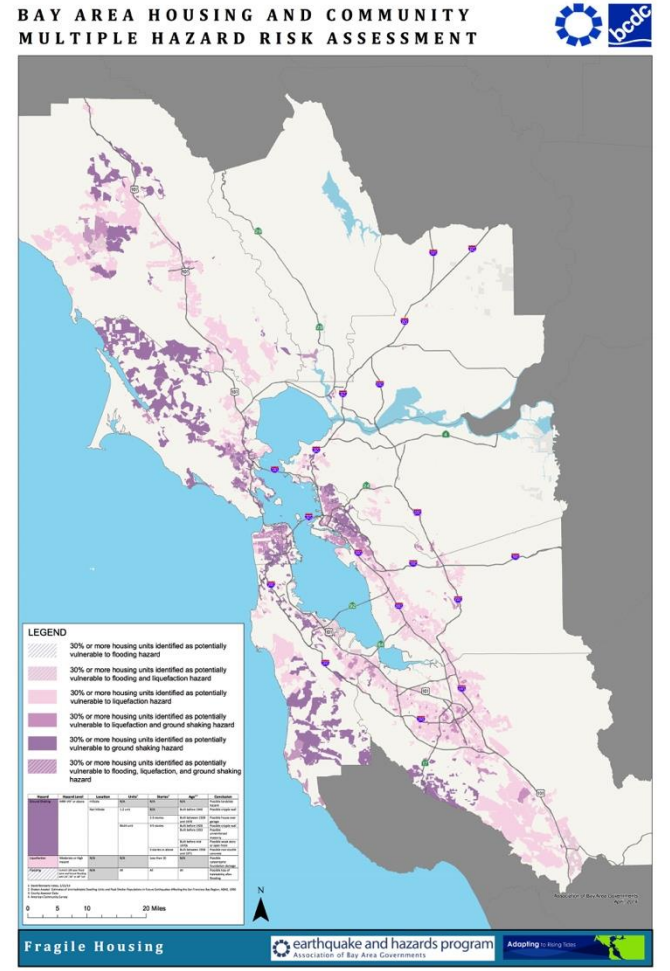
Ten community characteristics

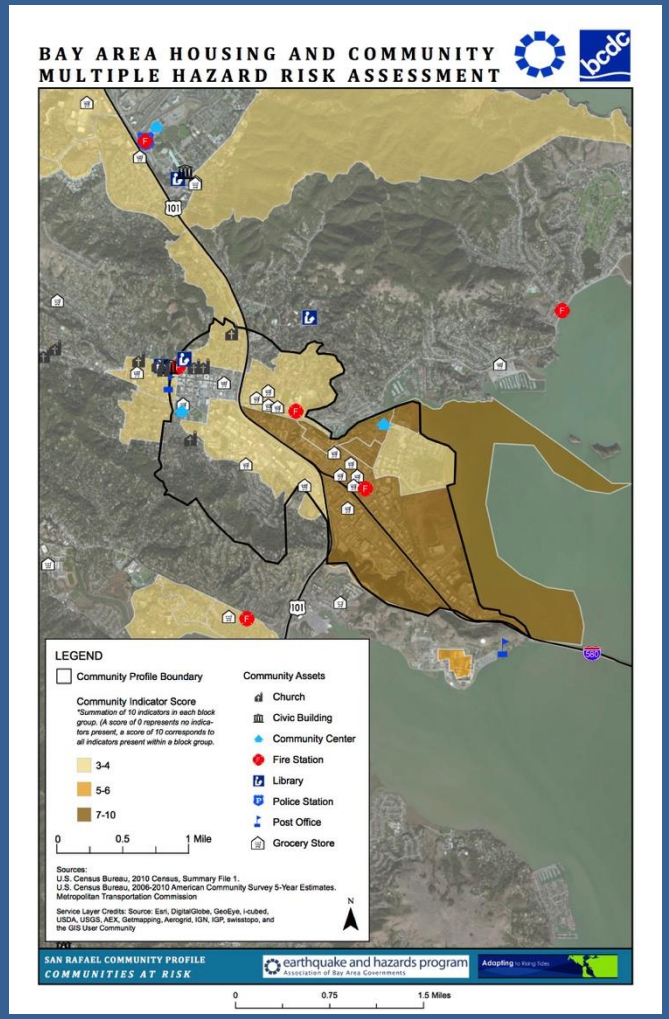
- Age
- Education
- Household income
- Race/culture
- Non-English speakers
- Home ownership
- Housing cost burden
- Transit dependence
- Transportation cost burden

bcdc

ABAG ASSOCIATION OF BAY AREA GOVERNMENTS

The assessment was conducted at two scales: regional and community





bcdc

ABAG
ASSOCIATION OF BAY AREA GOVERNMENTS

Findings of the assessment:

- Housing is generally built to life safety rather than shelter-in-place standards
- Most foundations cannot withstand liquefaction
- Most Bay Area houses cannot withstand any amount of flooding

Findings of the assessment:

- Housing affordability is an existing challenge that will make recovery more difficult
- Renters have a limited ability to improve the resilience of the housing they live in
- Many community members have limited or inadequate information about hazards

bcdc

ABAG
ASSOCIATION OF BAY AREA GOVERNMENTS

Housing and Community Strategies

A suite of 40 risk reduction strategies to help the region meet resilience, sustainability, prosperity, and equity goals

Address existing housing and communities, and new or redeveloped housing in future growth areas

bcdc

ABAG
ASSOCIATION OF BAY AREA GOVERNMENTS

Types of strategies:

- State-led strategies, such as improved mapping, guidelines and education
- Region-led strategies to address regional and cross-jurisdictional issues
- Locally-led strategies to:
  - Reduce development in high hazard areas
  - Retrofit fragile housing
  - Improve standards for new construction
  - Manage flood hazards at different scales
  - Prepare for post-disaster recovery
  - Coordinate with non-profit and community organizations

bcdc

ABAG
ASSOCIATION OF BAY AREA GOVERNMENTS

Stronger Housing, Safer Communities project webpage

- Hazards
- Housing Vulnerability
- Community Vulnerability
- Community Profiles
- Strategies
- Financing Mechanisms
- Summary report
- Technical report
- Strategies manual

resilience.abag.ca.gov/projects/stronger_housing_safer_communities_2015/

bcdc

ABAG ASSOCIATION OF BAY AREA GOVERNMENTS

Strategies Manual

CONTENTS

bcdc

ABAG ASSOCIATION OF BAY AREA GOVERNMENTS

Strategies Manual

CHAPTER 3

HOW TO USE THE STRATEGIES

Choosing which strategies to use

Strategies are designed to be responsive to the vulnerability types identified and analyzed, choosing which strategies to use is most easily approached through the following steps, using table 3-1:

- Identify which vulnerability you want to address - natural hazards, housing vulnerability, or community vulnerability.
- Identify the key finding that most closely matches your risk
- Choose which specific indicator you'd like to address
- Identify your "short list" of strategies that meet your specific vulnerability concerns

Note: Many strategies address multiple vulnerabilities and will appear more than once in the strategy selection table.

Once an initial strategy list is identified, users can view the overview and summary table for each strategy in Chapter 4.

To most efficiently reduce vulnerability:

Strategies to address hazard risks should be considered first

Understanding hazards and avoiding high hazard areas is fundamental to resilience.

Strategies to address housing vulnerability should be considered next

Keeping housing intact immediate reduces the vulnerability of its residents, even if other community vulnerability indicators are present.

Strategies to address community vulnerability should be considered last

The following tables reflect this order of priority.

Users may also look at the strategy list at the beginning of Chapter 4 to identify applicable strategies. The summary table is organized by scale and grouped into similar strategy types to provide a snapshot of how the strategies fit together in relationship to one another.

HAZARDS

Key consideration to address	Indicator to address	Strategies to consider
Hazards will have significant impacts on communities that live in high hazard areas	Ground shaking (MMI XIII or above)	Strategy 1: Complete seismic hazard mapping of urban and urbanizing areas Strategy 2: Evaluate current guidelines and the "state of practice" for mapping, evaluating and mitigating seismic hazards, particularly multi-hazard areas Strategy 11: Develop locally-specific seismic hazard maps *Also see strategies for "Any hazard" below*
	Moderate to high liquefaction	Strategy 1: Complete seismic hazard mapping of urban and urbanizing areas Strategy 2: Evaluate current guidelines and the "state of practice" for mapping, evaluating and mitigating seismic hazards, particularly multi-hazard areas Strategy 11: Develop locally-specific seismic hazard maps *Also see strategies for "Any hazard" below*
	Current and future flooding	Strategy 5: Establish a cooperative shoreline management program Strategy 31: Incorporate sea level rise guidance within the capital planning process *Also see strategies for "Any hazard" below*
	Any hazard	Strategy 6: Develop guidelines for the siting and design of transit-oriented development to reduce seismic and flood risks Strategy 10: Host a regional "Smart and Safe" growth design competition Strategy 12: Increase protection of critical facilities and lifelines in high hazard areas Strategy 13: Reduce or prohibit development in the most hazardous areas while ensuring equity and beneficial use of these areas Strategy 14: Establish overlay zoning districts to help facilitate safe and smart new development Strategy 15: Establish a Transfer of Development Rights program to redirect development from high hazard areas to preferred, low hazard areas Strategy 34: Create a pre-disaster rebuild and recovery plan Strategy 35: Revise local plans and development codes to allow temporary land uses to facilitate and expedite post-disaster recovery

Table 3-1: Strategy selection table

bcdc

ABAG ASSOCIATION OF BAY AREA GOVERNMENTS

Strategies Manual

STRATEGY SNAPSHOT

State-Led Strategies — Page

State *Region* *Local*

1. Complete seismic hazard mapping of urban and urbanizing areas

Encourage the California Geological Survey (CGS) to complete mapping of seismic hazard zones for the portions of the Bay Area that are not currently mapped or in the process of being mapped with priority given to urban and urbanizing areas.

Lead			**Scale of Benefit**		
State	Region	Local jurisdiction	**Region**	Community	Resident
Target Development Type		**Hazard Addressed**			
Existing	**New**	**Ground Shaking**	**Liquefaction**	Flooding	
Community Vulnerability Addressed				**Vulnerable Housing Type Addressed**	
Age	Language & Ethnicity	Cost Burdened	Housing Tenure	Access to Resources	**Single or Two Family**	**Multi-family**	**Cripple Wall**	**Soft story or House over garage**
Action Categories					
Evaluation	Program/ Operation	**Plans and Policies**	Codes, Regulations, and Ordinances	Coordination	Education/ Outreach
Prerequisite Strategies			**Other Related Strategies**		
None			Strategy 2: Evaluate current guidelines and the "state of practice" for mapping, evaluating and mitigating seismic hazards, particularly multi-hazard areas		

Description

The 1990 Seismic Hazard Mapping Act requires the State Geologist and CGS to prepare maps of seismic hazard zones, identifying the areas that are susceptible to strong ground shaking, earthquake-induced landslides, liquefaction, or other ground failures. The Act also requires that the areas susceptible to tsunami and seiches be included in these maps when appropriate hazard information and funding are available to complete this work. In addition, the 1972 Alquist-Priolo Earthquake Fault Zoning Act requires CGS to establish earthquake fault zones around the surface traces of active faults and issue appropriate maps of these fault zones.

Proposed development or major renovations of existing development in mapped hazard zones are required to perform site specific geotechnical investigations prior to receiving construction permits or approval of subdivisions. When hazards are identified in these reports, the proposed design must take measures to mitigate their effects. Cities and counties are also required

bcdc

ABAG ASSOCIATION OF BAY AREA GOVERNMENTS

Online strategy selection tool

Strategies for Seismic and Flood Risks

Once vulnerabilities were identified, the next step was to consider how these vulnerabilities could be reduced. A suite of implementation strategies were developed to help local jurisdictions reduce the vulnerability of housing and populations in the areas identified through the analysis, and to plan for future growth in a way that minimizes new vulnerability

To view these strategies and decide which strategies are most useful for your jurisdiction using our interactive strategy selection tool, click here.

Stronger Housing, Safer Communities Strategies

Once your community is familiar with your own unique vulnerabilities, you can easily identify strategies that address these vulnerabilities. Strategies are designed to be responsive to the vulnerability types identified and analyzed, choosing which strategies to use is most easily approached through the following steps:

- First, identify who the lead should be: the state, the region, or the local jurisdiction.
- Then, identify the vulnerability type you'd like to address: community vulnerability, fragile housing, or hazards.
- Last, choose which hazard you'd like to address: ground shaking, liquefaction, flooding, or any hazard.

The result will be a tailored list of strategies that address the specific criteria you've identified within your community. You can download the PDFs and use these strategies to guide Hazard Mitigation Planning, General Planning, and policy and program decisions.

Note: Many strategies address multiple vulnerabilities and will appear more than once in the strategy selection table.

Select a lead: Local

Select a vulnerability type: Community Vulnerability

Select a hazard: Any

Submit Clear Form

Housing Strategies Results

Local: Community Vulverability: Any

19. Require hazard disclosure for renters (PDF)

36. Develop and implement a shelter-in-place program (PDF)

37. Improve the resilience of rental units and ensure they are re-built after loss or damage due to a natural disaster (PDF)

38. Protect housing affordability during recovery (PDF)

39. Create a community capacity inventory (PDF)

40. Disseminate best available hazard and climate risk information through community-based organizations and non-traditional partners (PDF)

Back

bcdc

ABAG ASSOCIATION OF BAY AREA GOVERNMENTS

37. Improve the resilience of rental units and ensure they are re-built after loss or damage due to a natural disaster

Adopt new policies, and strengthen existing policies, to improve the resilience of available rental units, and develop policies to ensure that rental units damaged during a natural disaster are replaced in kind (with a similar number/type) during rebuilding and recovery rather than being converted to owner-occupied properties.

Lead			**Scale of Benefit**		
State	Region	**Local Jurisdiction**	Region	Community	**Resident**
Target Development Type		**Hazard Addressed**			
Existing	**New**	**Ground Shaking**	**Liquefaction**	**Flooding**	
Community Vulnerability Addressed				**Vulnerable Housing Type Addressed**	
Age	Language & Ethnicity	Cost Burdened	**Housing Tenure**	Access to Resources	**Single or Two Family**	**Multi-family**	Cripple Wall	Soft story or House over garage
Action Categories					
Evaluation	**Program/ Operation**	Plans and Policies	**Codes, Regulations, and Ordinances**	Coordination	Education/ Outreach
Prerequisite Strategies			**Other Related Strategies**		
None			Strategy 16: Create a fragile housing inventory Strategy 17: Develop and implement a soft story retrofit program Strategy 18: Develop and implement a cripple wall retrofit program		

Description

This strategy recommends jurisdictions adopt policies to improve the resilience of available rental units and require that rental housing that has been damaged or destroyed by a natural disaster is replaced in kind. During post-disaster rebuilding efforts, rental housing that is significantly damaged is often demolished and rebuilt as for-sale or owner-occupied properties (e.g., condominiums), reducing the number of rental units available. This is largely because building owners find owner-occupied properties more profitable than rentals, and allows them to make a profit without continued upkeep or investment in the building. However, not only does this displace renters from their existing communities, but also drives up rents in the remaining rental units, making it more difficult for medium, low, or very low income renters to return to their communities (see Strategy #38, Protect housing affordability during recovery). Wholesale loss of rental units can significantly alter the cultural, racial, income, and age diversity of a community. This strategy takes a two-pronged approach: avoid the loss of rental units by mitigating the potential damage of rental units through retrofitting, and requiring that rental housing that is damaged and demolished due to

Stronger Housing, Safer Communities: Strategies for Seismic and Flood Risks

resilience.abag.ca.gov/projects
stronger_housing_safer_communities_2015/

Wendy Goodfriend
wendy.goodfriend@bcdc.ca.gov
www.adaptingtorisingtides.org

Dana Brechwald
danab@abag.ca.gov
resilience.abag.ca.gov

bcdc

ABAG
ASSOCIATION OF BAY AREA GOVERNMENTS

Creating Sustainable and Disaster Resilient Communities

COASTAL HAZARDS CENTER

NOAA and the American Planning Association - Sustainable Communities Division

Gavin Smith, Ph.D., AICP
Research Professor
University of North Carolina at Chapel Hill
Department of City & Regional Planning

Executive Director
Department of Homeland Security Coastal Hazards Center of Excellence

Director
Department of Homeland Security
Coastal Resilience Center of Excellence

http://coastalhazardscenter.org

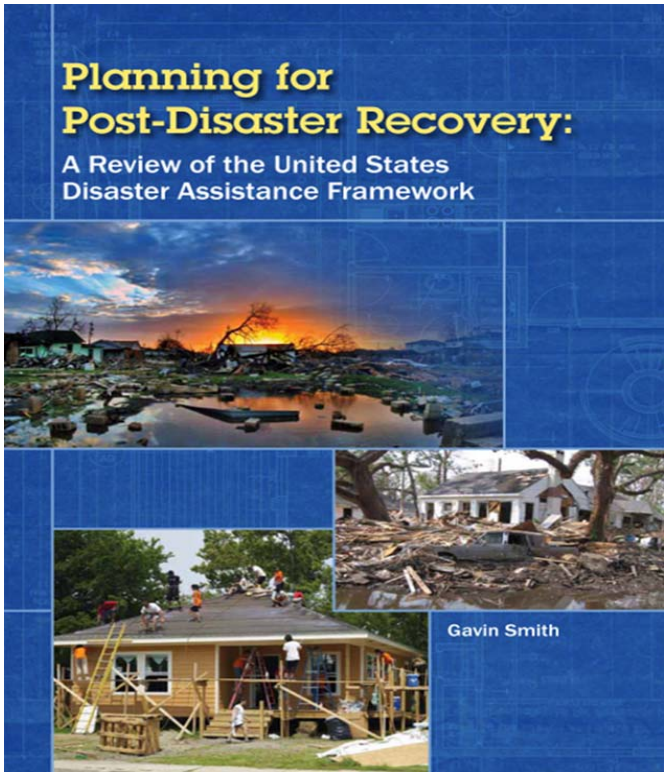
Research Lead: The University of North Carolina at Chapel Hill

Education Lead: Jackson State University, Mississippi

Presentation Overview

COASTAL HAZARDS CENTER

- **Hazard Mitigation and Disaster Recovery Context**
- **Disaster Resilience**
  - **Barriers and Opportunities**
- **Role and Importance of Planning**
- **Kinston, North Carolina Case Study**
  - **Linking Sustainability, Smart Growth, and Disaster Resilience**
- **Natural Hazards Risk Management and Climate Change Adaptation**



Disaster Recovery and Hazard Mitigation Context

COASTAL HAZARDS CENTER

- **Disasters Uncover/Expose Pre-Event Conditions**
  - Hazard vulnerability, including socially vulnerable populations
  - Planning culture (varied application to risk reduction and disaster recovery efforts; planner/emergency manager divide)
  - Unsustainable development

- **Disaster as "Opportunity"**
  - Incorporation of sustainable development principles (resilience)
  - Incorporation of hazard mitigation/risk reduction
  - Equity/social justice
  - Opportunity for whom?

- **Importance of Planning**
  - Temporal Dimension: Speed versus deliberation, pre- and post-disaster recovery planning; land use and hazard mitigation
  - Governance, resource distribution

- **Maximize use of Existing and Emerging Policies, Programs and Plans**
  - Disaster Mitigation Act of 2000
  - National Disaster Recovery Framework
  - National, state or local adaptation policy? (Glavovic and Smith 2014)
  - Local advocacy

Disaster Resilience

COASTAL HAZARDS CENTER

- "Designed in advance to anticipate, weather and recover from the impacts of natural or terrorist hazards"
- "…built on principles derived from past experience with disasters"
- Comprised of "networked social communities and lifeline systems"
- "…adapting and learning from disasters"
- "…strong and flexible (rather than brittle and fragile)"
- "…new development is guided away from known high hazard areas and their vulnerable existing development is relocated to safe areas"
- "…buildings are constructed or retrofitted to meet code standards based on hazard threats"
- "…natural environmental protective systems are conserved to maintain valuable hazard mitigation functions"
- "…governmental, non-governmental, and private sector organizations are prepared with up-to-date information about hazard vulnerability and disaster resources, as linked with effective communication networks, and are experienced in working together (Godschalk 2003, pp. 136-137).

Barriers to Resilience (Tim Beatley, 2006)

COASTAL HAZARDS CENTER

- **Low importance given to hazards vulnerability**
- **Limited ability or willingness to confront big issues looming in the future**
- **Limited resources and competing priorities**
- **Limited and weak planning systems**
- **Short decision-making time frames**
- **Concerns about protecting property rights**
- **Perceptions of upfront costs associated with resiliency measures**

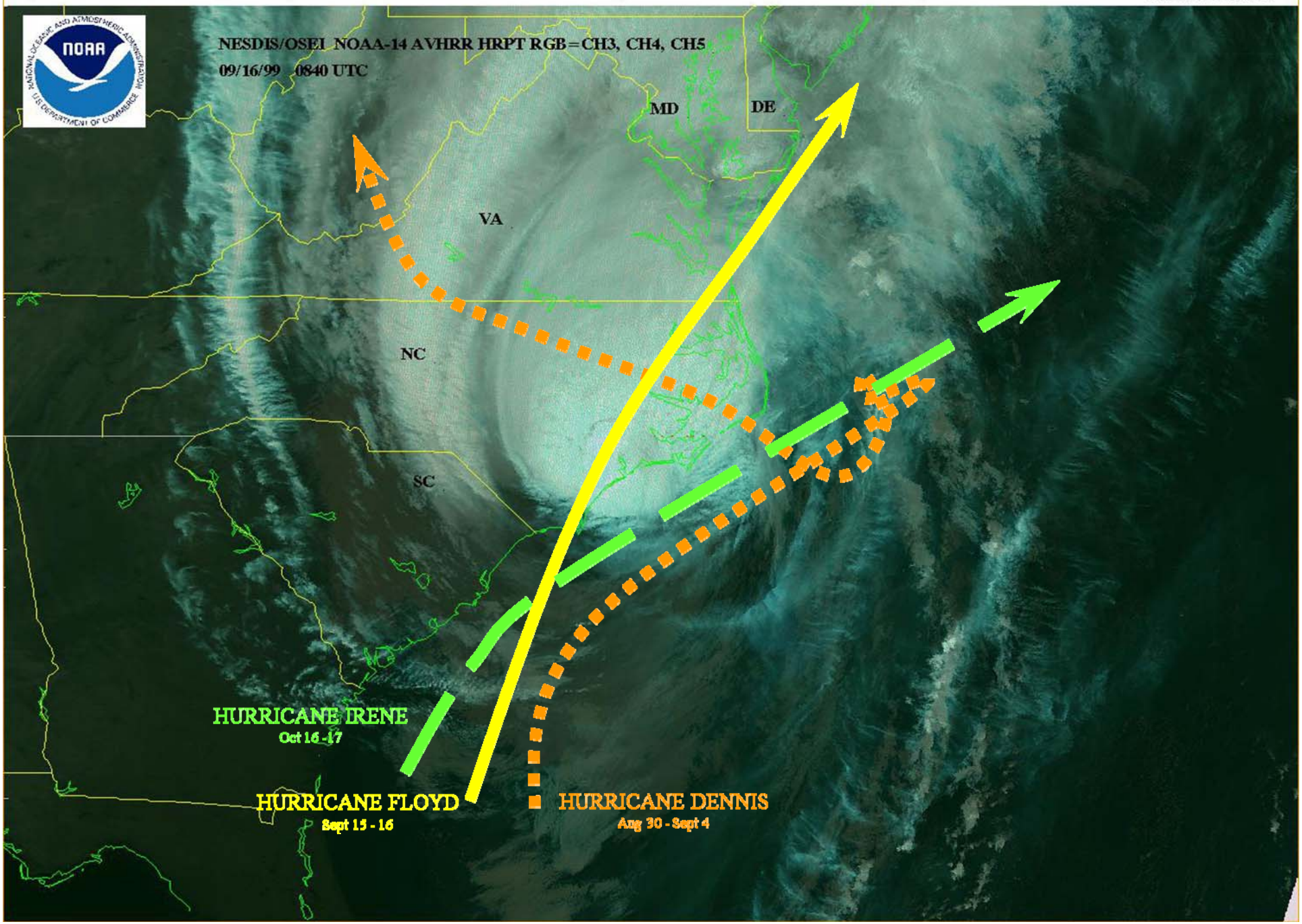
Ideas for Overcoming Barriers to Resilience (Tim Beatley 2006)

COASTAL HAZARDS CENTER

- **Integrate hazard reduction and resilience into community projects with strong community support**
- **Insert references to future vulnerability into current policy and planning**
- **Find creative ways to make resilience visible and tangible**
- **Build and support local constituents for resilience**
- **Employ existing land use tools and community planning techniques**

Hurricane Floyd at 4:40 AM EDT, about 2 hours after making landfall near Cape Fear NC. Wind gusts to 135 knots were measured at the shore. Floyd is expected to continue on a northeasterly course and maitain minimal hurricane strength as it crosses the Delmarva Peninsula.

CREDIT: NOAA



Hurricane Floyd North Carolina Recovery Programs

COASTAL HAZARDS CENTER

- **836 Million Dollars (22 state programs – State Rainy Day Fund)**
  - **Floodplain Mapping Program**
  - **State Acquisition and Relocation Fund**
  - **Acquisition of hog farms and junkyards**
  - **State match to federal grant programs**

- **No State Recovery Plan**

Acquisition and Elevation of Flood-Prone Housing and Infrastructure

COASTAL HAZARDS CENTER

- **Hurricane Fran and Floyd**
  - **6,000 homes acquired**
  - **800 homes elevated**
- **State Acquisition and Relocation Fund**
- **Infrastructure Relocation**
  - **Wastewater Treatment Plants**
  - **Schools**
  - **Critical Public Facilities**
- **Land Use Integration Varied**

Research Lead: The University of North Carolina at Chapel Hill

Education Lead: Jackson State University, Mississippi

The Complexity of Hazard Mitigation Choices

COASTAL HAZARDS CENTER

Research Lead: The University of North Carolina at Chapel Hill

Education Lead: Jackson State University, Mississippi

A U.S. Department of Homeland Security Center of Excellence

Kinston, North Carolina: The Value of Pre-Event Planning and the Speed and Quality of Disaster Recovery

COASTAL HAZARDS CENTER

- **Grants Management (Hurricane Fran and Floyd)**
  - **Acquisition/Relocation Strategy**
- **Mitigation and Sustainable Recovery Planning (social, economic, and environmental themes)**
- **Planning by Objectives**
  - **Clear the Floodplain**

Buyouts in Kinston, North Carolina

COASTAL HAZARDS CENTER

- **Hurricane Fran (1996): 362 Homes**
  - **Funding Sources**
    - **HMGP**
    - **HUD Disaster Recovery Initiative**
    - **State Acquisition and Relocation Fund**
  - **1 year to develop application**
- **Floyd (1999): 795 Homes**
  - **Pre-disaster project ready to submit**
  - **Application approved 1 week after Hurricane Floyd**

Hazard Mitigation and Sustainable Recovery in Kinston, North Carolina

COASTAL HAZARDS CENTER

- **Disasters as a Window of Opportunity**

- **Kinston Pre - Fran (fact base)**
  - **Dilapidated Housing Stock/Economically Distressed**
  - **Lack of Affordable Housing**
  - **Shortage of Skilled Labor**

- **Post - Fran Kinston**
  - **Develop Recovery Alternatives/Multi-Objective Planning**
  - **Maximize Federal and State Grant Money**
  - **Use of Local Resources**
  - **Application of Codes, Standards, and Land Use Techniques**
  - **Comprehensive Relocation Effort (housing and infrastructure policies; projects)**

Hazard Mitigation and Sustainable Recovery

COASTAL HAZARDS CENTER

- **Housing and Employment Leading People to Success (HELPS)**
  - **Lenoir Co. Community College**
  - **Housing Construction, Deconstruction and Rehabilitation**
  - **Welfare to Work**

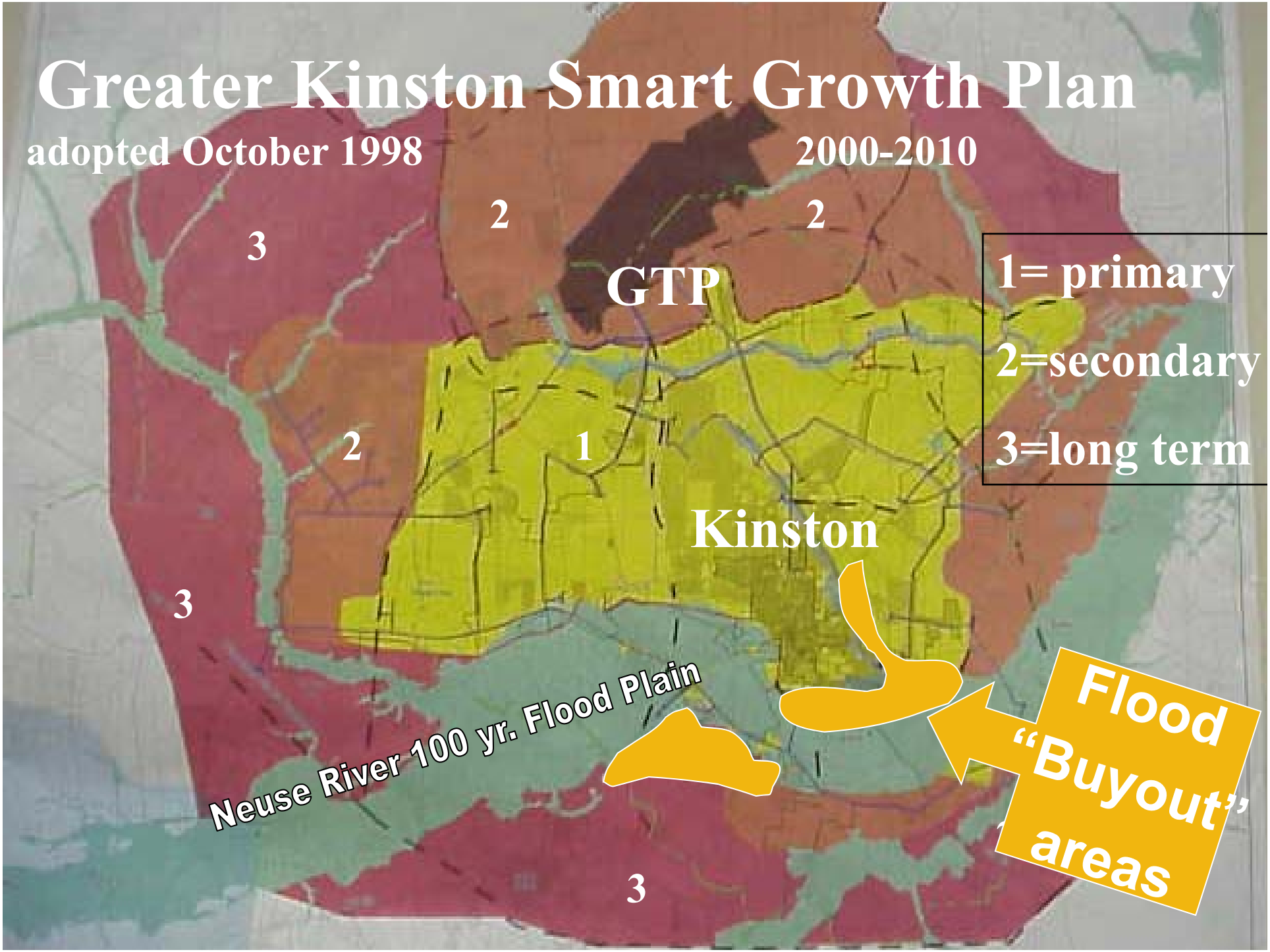
- **Call Kinston Home**
  - **Community Revitalization**
  - **Desirable Place to Live**
  - **Revitalize Established Neighborhoods**
  - **New Affordable Housing**
  - **Moving Disaster Victims From the Floodplain to New Homes in the City**

Hazard Mitigation and Sustainable Recovery

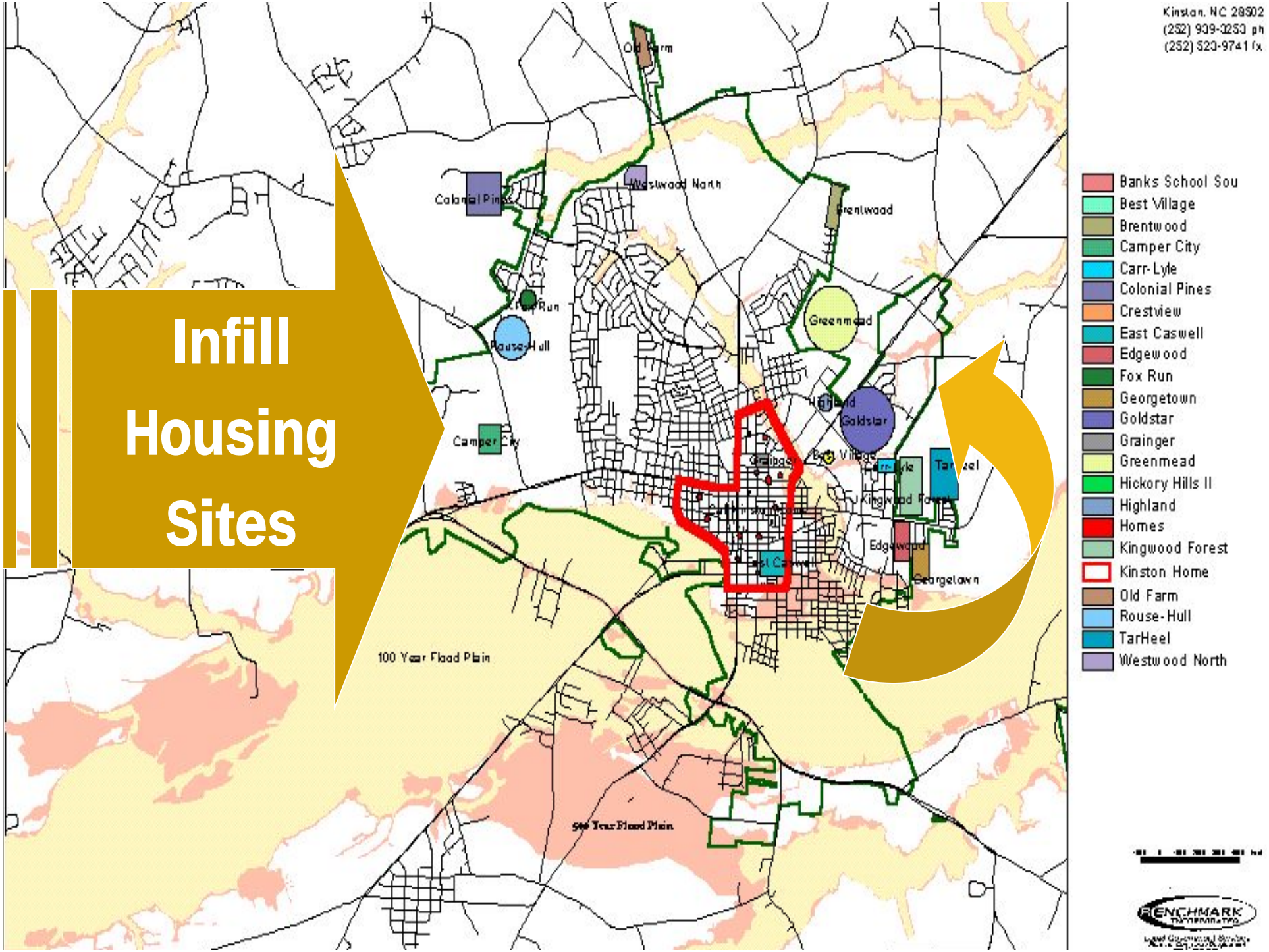
COASTAL HAZARDS CENTER

- **Planning Implementation Tools (policies)**
  - **Floodplain Engineering Study (improved delineation of floodplain/fact base)**
  - **Interim Prohibition of New Construction in Floodplain**
  - **No Rebuilding of Substantially Damaged Structures in Floodplain**
  - **Increased Elevation Standards**
  - **Development of Floodplain Conservation Easements**

- **Kinston's Smart Growth Plan (vision)**
  - **Adopted October 1999 – 1 month after Floyd**
  - **Linked to Disaster Recovery Funding (implementation)**
  - **In-fill Development**
  - **Reuse of Existing Structures**
    - **Housing**
    - **Schools**


Greater Kinston Smart Growth Plan
adopted October 1998
2000-2010
3
2
2
GTP
1= primary
2=secondary
3=long term
2
1
Kinston
3
Neuse River 100 yr. Flood Plain
Flood "Buyout" areas
3

Infill Housing Sites



Summary: Hazard Mitigation and Sustainable Disaster Recovery Outcomes

COASTAL HAZARDS CENTER

- **Relocating an estimated 1,750 residents from special flood hazard areas to higher ground**
- **Replacing lost tax base via infill development**
- **Addressing loss of potential tax base by reinvestments elsewhere within the city**
- **Creating open space and enhancing recreational opportunities**
- **Removing sewer lines & facilities from floodplain (Waste water treatment plant relocation)**
- **Improving water quality in Neuse River**

Research Lead: The University of North Carolina at Chapel Hill

Education Lead: Jackson State University, Mississippi

Applying Lessons from Natural Hazards Planning (hazard mitigation and disaster recovery) to Climate Change Adaptation

COASTAL HAZARDS CENTER

- **Improved Use of Existing Planning Tools and Processes**
  - **Pre-Event Planning (hazard mitigation and disaster recovery)**
  - **Land Use Planning Tools / Spatial Orientation**
  - **Scenario-Based Planning / Temporal Dimension**
- **Incorporating Land Use Techniques (tools and process) Among the Most Effective / Underutilized in Hazard Mitigation and Recovery**
- **Planners as Coalition Builders and Boundary Spanners**
  - **Poor Coordination between Planners and Emergency Managers / Design Professionals**
  - **Integrating Risk Reduction, Sustainable Development, Resilience and Adaptation**
- **Planning Process – Disasters as Conflict/Altruism**
  - **Dispute Resolution, Policy Dialogue, Negotiation, Facilitation**