Executive Order 266

The Future of Floodplain Management in North Carolina
Presenters

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DPS – Emergency Management
Historic North Carolina Flood Events:

Great Flood of 1916
Historic North Carolina Flood Events:
The Deluge of 1940
Historic North Carolina Flood Events:

Hurricane Hazel 1954
History of Floodplain Management

• The National Flood Insurance Act (NFIA) and the National Flood Insurance Program (NFIP) were created in 1968.
• NFIP administered by the Federal Emergency Management Agency (FEMA)
• NFIA was “retooled” in 1973 by the Flood Disaster Protection Act to increase participation.
• NFIP introduces the Community Rating System (CRS) in 1990.
History of Floodplain Management

• Additional penalties, programs, and policies were enacted in 1994 under the National Flood Insurance Reform Act.

• In 2012, the Biggert-Waters amendment attempted to eliminate subsidies and grandfathering, as well as shift policies to actuarial rates.

• Most provisions of Biggert-Waters were repealed under the Homeowners Flood Insurance Affordability Act (HFIAA) in 2014.

• HFIAA limits annual increases for policy premiums and imposes occupancy-based surcharges and other fees.
Floodplain Management in NC

- FEMA
  - Code of Federal Regulations 44 CFR Parts 59 & 60
  - FEMA Regional Offices I-X

- DPS-EM – Hazard Mitigation
  - Floodplain Mapping & Management

- Local Jurisdictions
- State Construction
- Local Ordinance
  - Executive Order (EO) 123

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Historic North Carolina Flood Events:

Hurricane Floyd 1999
Historic North Carolina Flood Events:

Hurricane Matthew 2016
Historic North Carolina Flood Events:

Hurricane Florence 2018
Billion-Dollar Disasters on the Rise

1980-2022 United States Billion-Dollar Disaster Event Cost (CPI-Adjusted)

- 2020 ($114.3B)
- 2012 ($150.3B)
- 2021 ($155.3B)
- 2005 ($253.5B)
- 2017 ($373.2B)
- 2022 ($165.0B)
- Average ($57.6B)

Updated: January 10, 2023
*Costs not included for Central and Eastern Winter Storm and Cold Wave (December 2022)

Event statistics are added according to the date on which they ended.

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EO266 Creation

EO80 – NC’s Commitment to Address Climate Change

- NC Climate Risk Assessment and Resiliency Plan
- NC Climate Change Interagency Council
- Agencies to incorporate climate adaptation and resiliency into their policies
NC Climate Risk Assessment and Resiliency Plan

- Analyzed historical data and projected climate trends
- Identified areas of vulnerability of State infrastructure, assets and programs
- Provides a framework to guide future state action.
- Establish an Interagency Resilience Team.

EO123
What’s Wrong with EO123?

- Outdated. Last updated in 1990.
- Freeboard requirements not in accordance with current recommendations.
- Does not discourage or prevent new development in the floodplain.
- Sea Level Rise is not addressed.
What does EO266 ask us to do?

• NCDOA, in consultation w/ NCDEQ, NCDOT, NCEM & NCORR shall update EO123 as follows:
  • Reduce construction in the floodplain to the greatest extent feasible.
  • Minimize flood damage to state-owned assets.
  • Consider the impacts of sea level rise and climate change.
  • Support natural hydrologic conditions and the beneficial services provided by natural infrastructure.
  • Expand policy to state-funded construction to the extent feasible and permitted by law.
Tackling the Problem...

EO266 Primary Committee

- EO123 Deficiencies Chair: SCO
- Sea Level Rise Chair: NCEM
- Enforcement in Zone X Chair: DOT
- State Funded Projects Chair: SCO
- Nature-Based Infrastructure Chair: DEQ

Relevant State Agency and Public Stakeholder Input
Terms and Definitions:

• Zone X (unshaded) – Area of minimal flood hazard, usually above the 500-year flood elevation. Currently unregulated.

• Zone X (shaded) – Area of moderate flood hazard, usually between limits of 100-year and 500-year flood. Currently unregulated.

• Zone AE – Has a 1% annual chance of flooding and coincides with the 100-year floodplain. Regulated.

• Floodway – Highly Regulated.
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• Floodway – Highly Regulated.

• Synchronize EO266, ASCE24, and NC Model Ordinance.
• Update Zone AE requirements per EO266.
• Integrate Coastal A-zones.
• Incorporate non-encroachment zones.
• Define “substantial improvement / repair” construction window.
• Delineate buoyancy safety factors.
• Clarify wet and dry floodproofing requirements and applicability.
• Incorporate § 143-215.54 into EO266 base language.
Construction in Zone AE

Western Carolina University
Construction in Zone AE
Construction in Zone AE
Construction in Zone AE

EO123

• Construction not limited
• Buildings must be elevated or floodproofed.
• Flood permits and elevation certificates required.
• Freeboard = 2’-0”

EO266

• Not permitted
• Variance process for:
  • Functionally dependent structures
  • Historic structures
  • Conditions of “exceptional hardship”
  • Appurtenant structures
• If variance is granted, development must comply with all other aspects of EO266.
• Freeboard = 3’-0” to 4’-0”.
Non-Encroachment Zones

NCDNCR Lake James State Park
Non-Encroachment Zones
Non-Encroachment Zones

**EO123**

- No special requirements defined
- 44 CFR 60.3(c)(10) minimum requirements apply
- In the absence of a regulatory floodway, water surface elevation of the base flood may not increase more than 1-foot at any point.

**EO266**

- Will be treated like regulatory floodway.
- Planned development, when combined with a fully developed fringe, may not rise water surface elevation in Non-Encroachment Zone
- NO RISE
Substantial Improvement / Repair

ASU Rankin Science Building
Substantial Improvement / Repair
Substantial Improvement / Repair

**EO123**

- < 50% of the building’s market value: Unregulated but SCO will push for compliance with current standards when feasible.
- > 50% of the building’s market value: Entire building must comply with current floodplain management standards.
- Improvement / repairs not tracked.

**EO266**

- Same as EO123 except...
- Improvement / repairs will be tracked on a 6-year cycle.
- *Full compliance* with current floodplain management standards will be more difficult under EO266.
Ad-Hoc #2: Sea Level Rise

• How much sea level rise should be considered?
• What data source should be used?
• How can sea level rise inundation data be communicated to end users?
• How should current FIRMS and future sea levels be combined?
• How will sea level rise change coastal A and V zones?
How much sea level rise?

Possible pathways for future sea level rise

- High
- Intermediate-high
- Intermediate
- Observed trend
- Intermediate-low
- Low

NOAA Climate.gov, adapted from Sweet et al., 2022
Incorporating Sea Level Rise

NCDNCR USS Battleship North Carolina
Incorporating Sea Level Rise
Incorporating Sea Level Rise

- Freeboard
- 4ft Sea Level Rise
- Base Flood Elevation
- Finished Floor Elevation
- Sea Level Rise
- 100-yr Base Flood Elevation (BFE)
- Original Finished Grade
Incorporating Sea Level Rise
Incorporating Sea Level Rise
Incorporating Sea Level Rise (SLR)

EO123
- SLR not considered
- BFE + Freeboard
- Battleship: 9ft + 2ft. Minimum Finished Floor Elevation of 11’-0”.

EO266
- Areas inundated by sea-level rise now regulated.
- Areas adjacent to inundation currently under review.
- BFE + SLR + Freeboard
- Battleship: 9ft + 4ft + 4ft. Minimum Finished Floor Elevation 17’-0”.
Ad-Hoc #3: Expanding into Zone X

• How do we incorporate shaded Zone X?
• Can we reasonably incorporate flood prone areas in an unshaded Zone X?
• Will either have a meaningful impact on State insurance rates?
Construction in Shaded Zone X

NCDOT Port of Wilmington

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Construction in Shaded Zone X

Legend
- Chance Flood Hazard
- Contained In Structure, 1%
- Annual Chance Flood Hazard Conditions
- Zone AE: Floodway, 1%
- Annual Chance Flood Hazard Conditions: Floodway, 1% Future Conditions Contained In Channel: Floodway
- Zone AE: Community Encroachment Area, 1%
- Annual Chance Flood Hazard Conditions: Community Encroachment Area
- 0.2% Annual Chance Flood Hazard Contained In Channel, 0.2% Annual Chance Flood Hazard
- Zone X: 1% Future Conditions, 1% Future

Flood Information
- Flood Zone: 0.2% Annual Chance Flood Hazard
- Flood Source: Atlantic Ocean
- Base Flood Elevation: N/A
- 10 Year Flood Elevation: N/A
- 25 Year Flood Elevation: N/A
- 50 Year Flood Elevation: N/A
- 100 Year Flood Elevation: N/A
- 100 Year Future Conditions: N/A
- 500 Year Flood Elevation: 12 ft

County: New Hanover
Political Area: City Of Wilmington
CID: 370171
Panel: 3116

Flood Risk Information
- FIS Reports
- Engineering Models
- Map Export
- Data Export
Construction in Shaded Zone X

**EO123**
- Construction not limited

**EO266**
- Not permitted
- If variance is granted, development must comply with all other aspects of EO266.
- Finished floor elevated to more stringent of:
  - Nearest adjacent 100-yr floodplain BFE + 4’-0” freeboard
  - 500-yr flood elevation
Ad-Hoc #4: State Funded Projects

- EO123 applies to State Property. Can EO226 be expanded to include all stated funded projects?
- Do we have the legal authority? Is this currently allowed?
- If it is not allowed, what are the next steps toward incorporation?
- If it is allowed:
  - How is the requirement communicated?
  - How will it be enforced during design and permitting?
  - How will conformance be ensured during construction?
State Funded Projects

Alamance Community College
Alamance Community College
State Funded Projects
State Funded Projects

**EO123**
- Must comply with local floodplain ordinance
- Construction typically not limited

**EO266**
- No change... For now.
- If new laws are written...
  - Must comply with more restrictive of local ordinance and EO266.
  - Construction in the floodplain will be limited
  - Enforcement by local jurisdiction and possibly State entities.
Ad-Hoc #5: Nature Based Infrastructure

• Focus #1: At-risk coastal areas and shorelines.
• Focus #2: Areas subject to urban pluvial flooding due to extreme precipitation events.
• Focus areas may not be tied to the mapped floodplain.
• How can fundamental design considerations be fairly integrated into a regulatory text?
• When should natured based infrastructure be considered.
Carteret Community College Living
Carteret Community College Living
Natured Based Infrastructure

EO123
- No requirements
- Not included

EO266
- Provide options and considerations for including nature-based infrastructure to reduce flood risk
- Encourage incorporation of nature-based solutions into project/site design
Questions, Comments, Concerns...

- **EO123 Deficiencies**
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- **Sea Level Rise**
  - Chair: NCEM
  - Eryn Futral, AICP, CFM, CZO
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- **Enforcement in Zone X**
  - Chair: DOT
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- **State Funded Projects**
  - Chair: SCO
  - Michael Ali, PE
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- **Nature-Based Infrastructure**
  - Chair: NCORR
  - Marlena Byrne
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Thank You!

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