

Floods, Roads, Tigers & Bears - Oh My!

Some FHWA Perspectives on National Trends

A presentation to the
**2014 National Hydraulic
Engineering Conference**

by

Joe Krolak, P.E.

Principal Bridge Engineer

Hydraulics

Office of Bridge Technology

FHWA

22 August 2014





A Note of Thanks ...



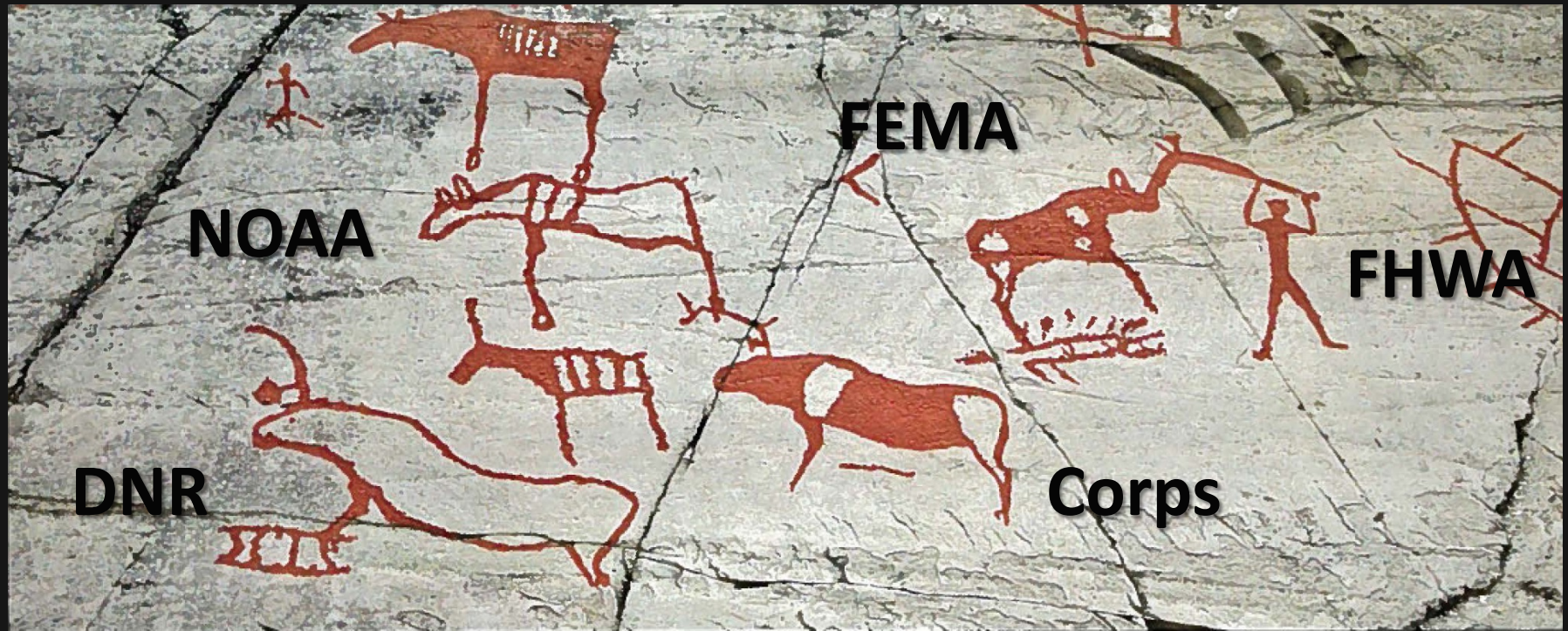
Floods, Roads, Tigers & Bears Caveats to Consider

Discussing Roads and Floods can be a
Tightrope Act!



Floods, Roads, Tigers & Bears Caveats to Consider

Approaches Still Evolving!



Floods, Roads, Tigers & Bears

Who Else is Involved?

USGS —

Regulators —

Biologists —

Floodplain Managers —

Academia —

FEMA —

Corps —

US EPA & NOAA —

Communities —



Floods, Roads, Tigers & Bears

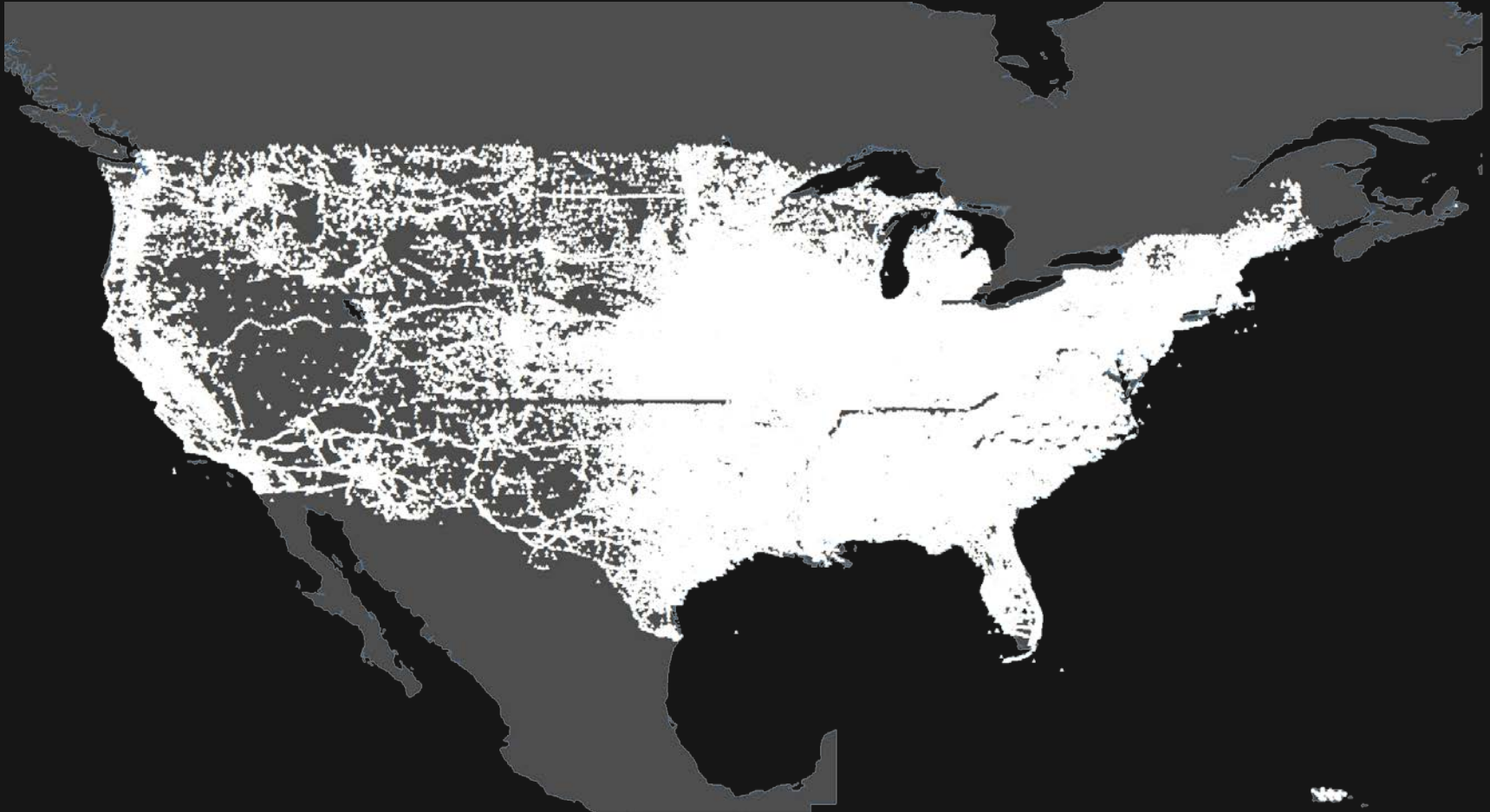
Who are FHWA's Partners?



Floods, Roads, Tigers & Bears

Why We Care – Bridges

605,000 Bridges; **465,000** over Water



Floods, Roads, Tigers & Bears

Why We Care – Road Damages



Floods, Roads, Tigers & Bears

Why We Care – Highways & Levees



Floods, Roads, Tigers & Bears

Why We Care – Coastal Areas



Floods, Roads, Tigers & Bears

Why We Care – Public Safety!



Floods, Roads, Tigers & Bears

Trends: How Did We Get Here?

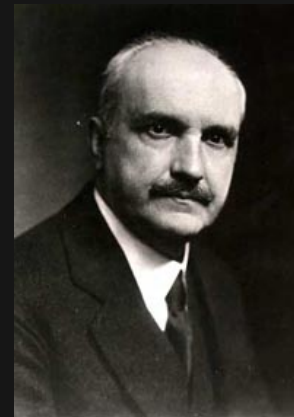
“Progress, far from consisting in change, depends on retentiveness. When change is absolute there remains no being to improve and no direction is set for possible improvement: and when experience is not retained, as among savages, infancy is perpetual. *Those who cannot remember the past are condemned to repeat it.*”

– *George Santayana*

The Life of Reason

Vol 1: Reason and Common Sense

1905-1906



Floods, Roads, Tigers & Bears History – Prior to 1966

- ❖ No Private Flood Insurance
- ❖ Government Paid For Repairs
 - Escalating Costs



Floods, Roads, Tigers & Bears

1966 – Beginning of Federal Action

A Unified National Program for Managing Flood Losses

Executive Order 11296

85th Congress, 2d Session - - - - House Document No. 465

A UNIFIED NATIONAL PROGRAM FOR MANAGING FLOOD LOSSES

COMMUNICATION

FROM

THE PRESIDENT OF THE UNITED STATES

TRANSMITTING

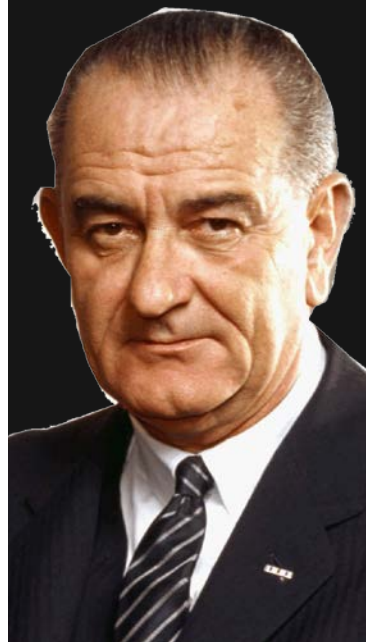
A REPORT BY THE TASK FORCE ON FEDERAL FLOOD
CONTROL POLICY



AUGUST 10, 1966.—Referred to the Committee on Public Works, and
ordered to be printed with illustrations

U.S. GOVERNMENT PRINTING OFFICE
WASHINGTON : 1966

67-221



Presidential Documents

Title 3—THE PRESIDENT

Executive Order 11296

EVALUATION OF FLOOD HAZARD IN LOCATING FEDERALLY OWNED OR FINANCED BUILDINGS, ROADS, AND OTHER FACILITIES, AND IN DISPOSING OF FEDERAL LANDS AND PROPERTIES

WHEREAS uneconomic uses of the Nation's flood plains are occurring and potential flood losses are increasing despite substantial efforts to control floods; and

WHEREAS national and regional studies of areas and property subject to flooding indicate a further increase in flood damage potential and flood losses, even with continuing investment in flood protection structures; and

WHEREAS the Federal Government has extensive and continuing programs for the construction of buildings, roads, and other facilities and annually disposes of thousands of acres of Federal lands in flood hazard areas, all of which activities significantly influence patterns of commercial, residential, and industrial development; and

WHEREAS the availability of Federal loans and mortgage insurance and land use planning programs are determining factors in the utilization of lands:

NOW, THEREFORE, by virtue of the authority vested in me as President of the United States, it is hereby ordered as follows:

SECTION 1. The heads of the executive agencies shall provide leadership in encouraging a broad and unified effort to prevent uneconomic uses and development of the Nation's flood plains and, in particular, to lessen the risk of flood losses in connection with Federal lands and installations and federally financed or supported improvements. Specifically:

(1) All executive agencies directly responsible for the construction of Federal buildings, structures, roads, or other facilities shall evaluate flood hazards when planning the location of new facilities and, as far as practicable, shall preclude the uneconomic, hazardous, or unnecessary use of flood plains in connection with such facilities. With respect to existing Federally owned properties which have suffered flood damage or which may be subject thereto, the responsible agency head shall require conspicuous delineation of past and probable flood heights so as to assist in creating public awareness of and knowledge about flood hazards. Whenever practical and economically feasible, flood proofing measures shall be applied to existing facilities in order to reduce flood damage potential.

(2) All executive agencies responsible for the administration of Federal grant, loan, or mortgage insurance programs involving the construction of buildings, structures, roads, or other facilities shall evaluate flood hazards in connection with such facilities and, in order to minimize the exposure of facilities to potential flood damage and the need for future Federal expenditures for flood protection and flood disaster relief, shall, as far as practicable, preclude the uneconomic, hazardous, or unnecessary use of flood plains in such connection.

Floods, Roads, Tigers & Bears

1968 – Flood Insurance Act

- ❖ National Flood Insurance Program
- ❖ Basic Floodplain Management Policies
- ❖ Established Water Resources Council (WRC)
- ❖ 100-year flood established as standard
 - Gilbert White (1911-2006)
 - “Father” of floodplain management
 - “Floods are an act of God, but flood losses are largely an act of man ...”
 - Pulled 100-year value out of the air

Floods, Roads, Tigers & Bears

1975 – GAO Report to Congress

National Attempts to Reduce Losses from Floods by Planning for and Controlling Uses of Flood-Prone Lands

- ❖ Federal agencies do not adequately evaluate flood hazards in their programs.
- ❖ Many agencies do not have or properly implement their flood-related procedures.
- ❖ Executive Order 11296 has had limited effect in reducing flood losses due to lack of implementing procedures
- ❖ Among agencies that do have procedures have limited compliance



REPORT TO THE CONGRESS

National Attempts To
Reduce Losses From Floods By
Planning For And Controlling
The Uses Of Flood-Prone Lands

Multiagency

BY THE COMPTROLLER GENERAL
OF THE UNITED STATES

RED-75-327

MARCH 7, 1975

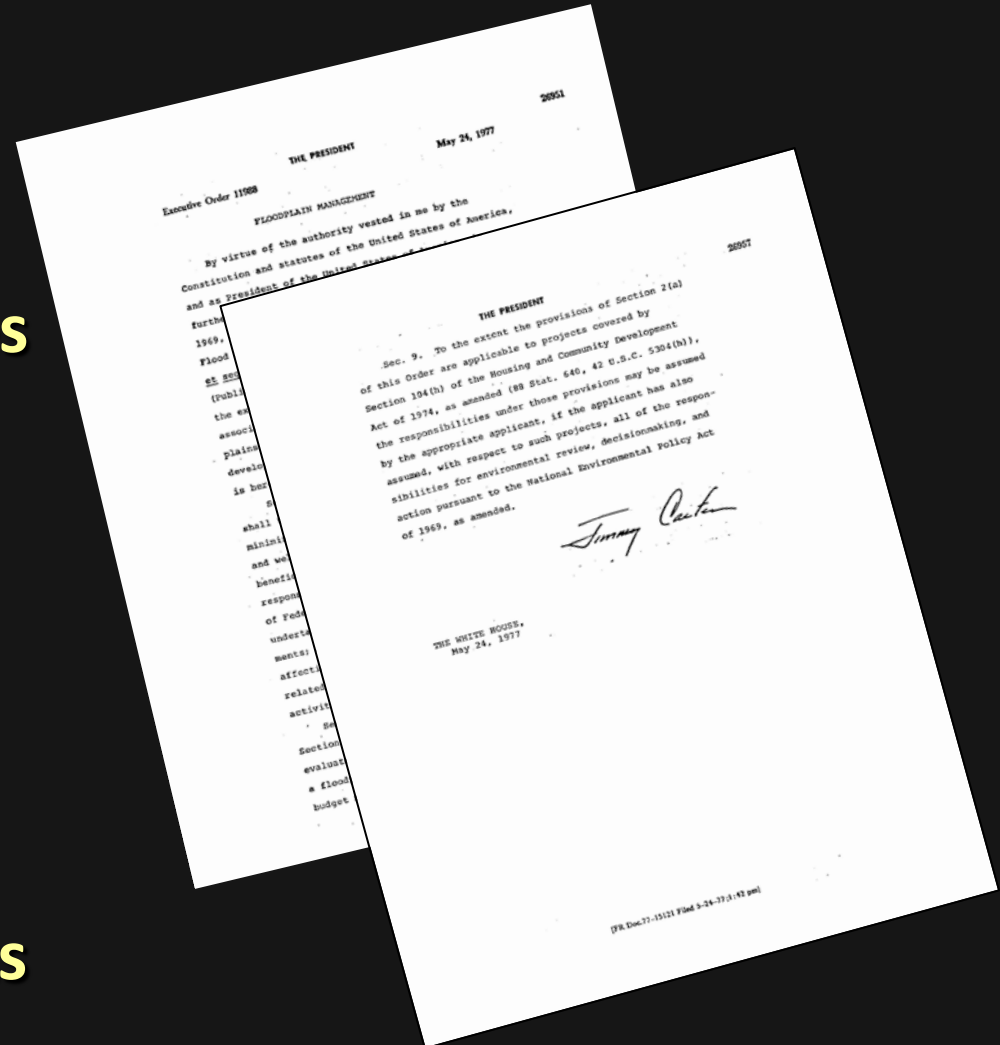
Floods, Roads, Tigers & Bears

1977 – Executive Order 11988

❖ Federal Agencies **must** develop floodplain management policies to:

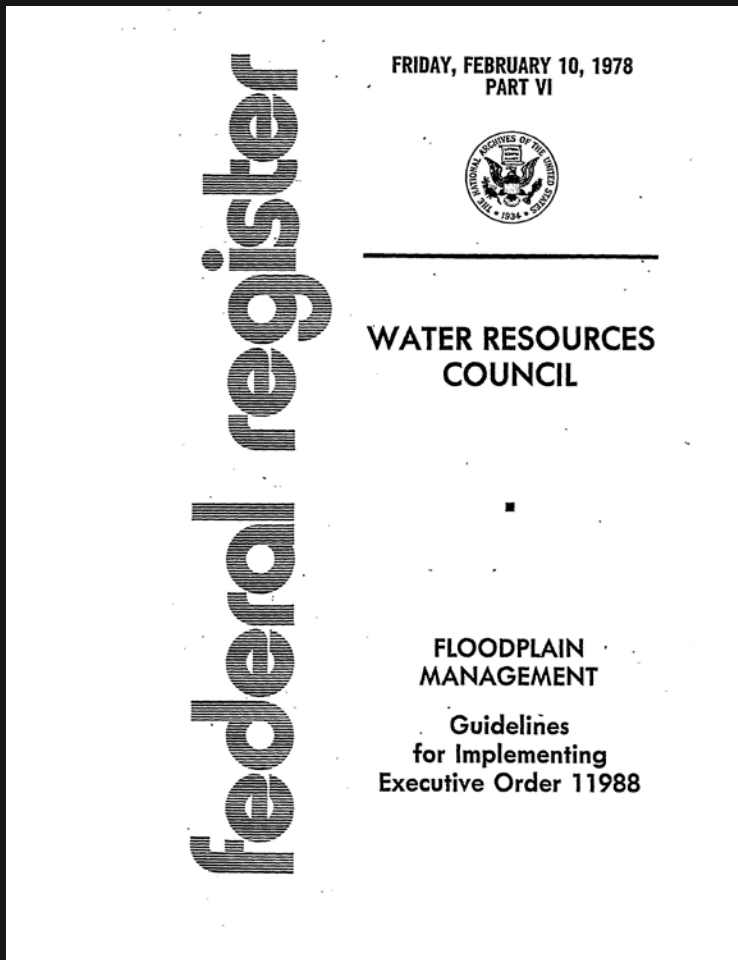
- Reduce Flooding
- Minimize Impact of Flooding
- Restore or Preserve Floodplain Values

❖ NEPA & FIA elements



Floods, Roads, Tigers & Bears

1978 – WRC issues “Guidelines”



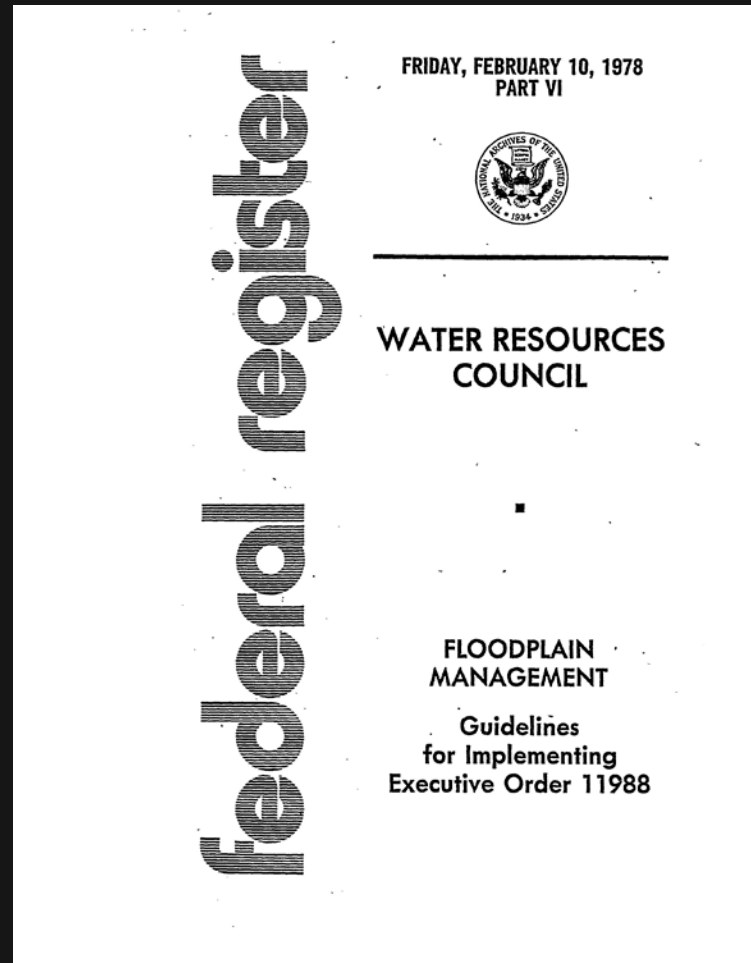
Floodplain Management Guidelines for Implementing E.O. 11988

- ❖ Specifically cited in the E.O.
- ❖ Eight Step Process

*Federal agencies required to
base their Floodplain process
using these Guidelines*

Floods, Roads, Tigers & Bears

1978 – WRC Guidelines



Floods, Roads, Tigers & Bears

1978 – WRC Guidelines

Critical Action – any activity for which
even a slight chance of flooding **would**
be too great

- ❖ **Defined by 500-year floodplain**
- ❖ **Part of eight step process**

Floods, Roads, Tigers & Bears

1978 – WRC Guidelines: Critical Actions

“Key questions:

- ❖ If flooded, would the proposed action create an *added dimension* to the disaster as could be the case for liquefied natural gas terminals and facilities producing and storing highly volatile, toxic, or water-reactive materials?
- ❖ Given the flood warning lead-time available, would the occupants of buildings such as hospitals, schools, and nursing homes be insufficiently mobile to avoid loss of life and injury?
- ❖ Would essential and irreplaceable records, utilities, and/or emergency services be lost or become inoperative if flooded?

If the answer to questions such as these is “yes”, an alternative location **MUST** be sought completely outside the larger floodplain.”

Floods, Roads, Tigers & Bears

1978 – USDOT/FHWA Response

“The Guidelines assume that the decision making process involves a single large flood plain and a proposed action at a location on that large flood plain.”

This WRC decision making process is inappropriate for general application in determining highway design and location. Highway actions are proposed and approved as section projects between logical termini and, as such, traverse numerous flood plains of various size and relevance.

Since flood plains can only be entirely avoided for those rare projects located on watershed boundaries, a “no-build” alternative is the only alternative to an attachment of even minimal impact ... There is no consideration to avoidance of all base flood plains with a highway action is not feasible ...”

Floods, Roads, Tigers & Bears

Significant Encroachment

❖ “Significant” NEPA term

- Consistent with requirement to apply NEPA within the EO 11988

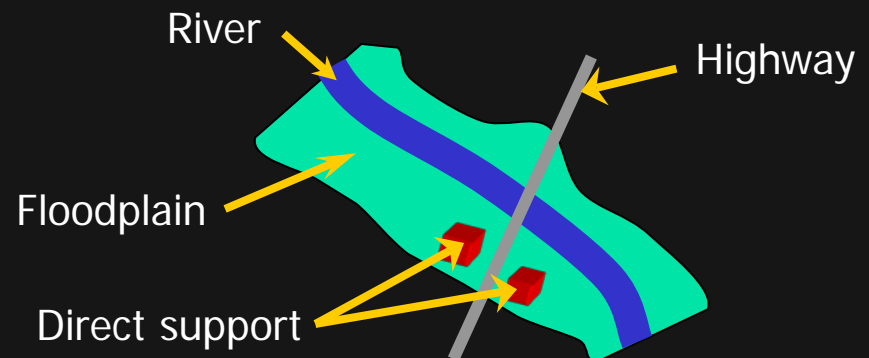
❖ Interruption of transportation facilities used for

- Emergency vehicles
- Evacuation traffic

❖ Risk

- Consequences of flooding
- Loss of life or property damage

❖ Impact on floodplain values



Floods, Roads, Tigers & Bears 1979 – USDOT & FHWA compliance

❖ 23 CFR 650 A

■ FHWA Regulation

❖ DOT Order 5650.2

■ All other USDOT modes

87878 Federal Register / Vol. 44, No. 228 / Monday, November 26, 1979 / Rules and Regulations

DEPARTMENT OF TRANSPORTATION
Federal Highway Administration
23 CFR Part 650

Location and Hydraulic Design of Encroachments on Flood Plains

ACTION: Final rule.

SUMMARY: The FHWA is revising its existing flood plain regulation. The revisions include criteria for flood plain actions taken under programs administered by the FHWA and implement provisions of Executive Order 11988 of May 24, 1977, and DOT Order 5650.2 of April 26, 1979.

EFFECTIVE DATE: This rule is effective November 15, 1979. However, highway sections may be processed without the formal coordination and studies required by §§ 650.108 through 650.113, where the draft environmental impact statement (EIS) has been filed with the Environmental Protection Agency (EPA) prior to October 26, 1979, and the final EIS for this draft EIS is filed with EPA prior to April 26, 1980.

FOR FURTHER INFORMATION CONTACT: Mr. Frank L. Johnson or Mr. Philip L. Thompson, 202-472-7900, Office of Engineering (HNG-51); Mr. Irwin L. Schneider, 202-426-4900, Office of the Chief Counsel (HCC-40); Federal Highway Administration, 400 Seventh Street, SW, Washington, D.C. 20590. Office hours are from 7:45 a.m. to 4:15 p.m. ET, Monday through Friday.

SUPPLEMENTARY INFORMATION: The FHWA is revising its existing flood plain regulation to include provisions required by Executive Order (E.O.) 11988 - Floodplain Management, which are not addressed in other FHWA regulations. The existing regulation (23 CFR Part 650, Subpart A) was originally published at 39 FR 36331 on October 9, 1974. This revision will codify the policies and procedures contained in Volume 6, Chapter 7, Section 3, Subsection 2, of the Federal-Aid Highway Program Manual.

Pursuant to Executive Order 11988, the Department of Transportation (DOT) published at 44 FR 24678 on April 26, 1979, its policies and procedures on protection and management of flood plains (DOT Order 5650.2). This revision is consistent with those policies and procedures.

*This document is available for inspection and copying as prescribed in 49 CFR Part 1, Appendix D.

Since provisions of this regulation will be implemented by State highway agencies which receive Federal-aid highway funds, the provisions are in the form of general policy and requirements. Specific procedures to satisfy this regulation will be established by highway agencies within the framework of their environmental action plans (23 CFR Part 795, Process Guidelines for the Development of Environmental Action Plans) and design policy. Review for compliance with this regulation will be accomplished by FHWA division offices located in each State.

In preparing this regulation, the FHWA consulted with the U.S. Water Resources Council (WRC), the U.S. Council on Environmental Quality (CEQ), and the Federal Insurance Administration (FIA), now in the Federal Emergency Management Agency (FEMA).

Advisory material in the WRC Floodplain Management Guidelines for Implementing E.O. 11988 (43 FR 6030) was considered in drafting this regulation. The decisionmaking process set forth in the Guidelines, as an explanation of the Executive Order's provisions, is not the same as procedures normally applicable to programs administered by the FHWA. The Guidelines assume that the decisionmaking process involves a single large flood plain and a proposed action at a location on that large flood plain. With this premise, the following WRC decisionmaking process steps appear workable: (1) Determine if proposed action is in the base flood plain; (2) provide early public review; (3) identify and evaluate alternatives to locating in the base flood plain; (4) identify impacts of proposed action; (5) minimize impacts, restore and preserve flood plain values; (6) reevaluate alternatives; and (7) make findings and provide public explanation.

This WRC decisionmaking process is inappropriate for general application in making highway location and design decisions. Highway actions are processed and reviewed as sections or projects between logical termini and, as such, cross numerous flood plains of varying size and importance. Since flood plains can only be entirely avoided for those rare projects located in a watershed boundary, the "no-build" alternative is the only alternative to an encroachment of even minimal size. If a specific flood plain or series of flood plains are avoided, encroachment at other locations or other flood plains by necessity become involved. Therefore, the avoidance of all base flood plains is not feasible for most highway actions.

Except for locations on a watershed boundary and the "no-build" solution, alternative locations under consideration will involve flood plains. For proposed highway actions on flood plains, the decision process involves comparing various highway alternatives and their related significant impacts, choosing an alternative, minimizing the impacts of the chosen alternative, and restoring and preserving the impacted flood plain values. This process includes the alternative of avoiding any action by withdrawing the proposed project. The decision generally is not whether the highway should be located in or out of the base flood plain, but rather which series of flood plains to impact if the "no-build" alternative is not a viable alternative. To support the resulting decision, § 650.113 of the revised regulation requires that base flood plain impacts be identified for all alternatives. If this identification reveals that an "action on the base flood plain" (encroachment) will cause unusually adverse impacts, the action will be termed a "significant encroachment" and require special attention. This includes a requirement in § 650.113 that such actions will not be approved unless the FHWA finds that the proposed significant encroachment is the "only practicable alternative."

A significant encroachment, as defined in this proposed regulation, contemplates construction or flood-related impacts which involve significant risk, flood-plain environmental impact, or potential interruption or termination of a vital transportation facility. The application of this definition in highway location and design will avoid the significant adverse effects due to occupancy and alteration of flood plains and will allow for the thorough consideration of all relevant highway actions.

Disposition of Major Comments

A notice of proposed rulemaking for this regulation was published for comment in the Federal Register at 43 FR 60298 on December 27, 1978, and a docket was established with a closing date of February 28, 1979. Thirty-six parties submitted comments: 23 from State highway agencies, 4 from county agencies, 3 from State environmental agencies, 2 from other Federal agencies, 2 from consultants, 1 from a Senator, and 1 from the Federal agencies (WRC, CEQ and FIA) which were identified in E.O. 11988 for consultation with other Federal agencies in issuing or amending regulations to implement E.O. 11988.

Numerous comments expressed concern that the regulation would increase redtape, project costs, and

Department of Transportation
Office of the Secretary
Washington, D.C.

ORDER
DOT 5650.2
4-23-79

SUBJECT: FLOODPLAIN MANAGEMENT AND PROTECTION

- PURPOSE.** This Order prescribes policies and procedures for ensuring that proper consideration is given to the avoidance and mitigation of adverse floodplain impacts in agency actions, planning programs, and budget requests.
- AUTHORITY.** This Order is issued pursuant to the following statutes and executive order:
 - The National Environmental Policy Act of 1969 (NEPA) (P.L. 91-190) establishes a national policy to, among other things, "...promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man..." NEPA requires preparation of an environmental impact statement (EIS) for any major Federal action significantly affecting the quality of the human environment. DOT 5610.1B, Procedures for Considering Environmental Impacts, of 9-30-74, Attachment 2, paragraph 11, requires that information on flood hazards, if relevant, be included in the EIS.
 - The National Flood Insurance Act of 1968, Title XIII of the Housing and Urban Development Act of 1968 (P.L. 90-448, 8-1-68), provides previously unavailable flood insurance protection to property owners in flood-prone areas. Section 1302(c) of the Act stipulates that "the objectives of a flood insurance program should be integrally related to a unified national program for flood plain management..."
 - Executive Order 11988 - Floodplain Management, promulgated on 5-24-77, links the need to protect lives and property with the need to restore and preserve natural and beneficial floodplain values. Federal agencies are directed to avoid conducting, allowing, or supporting

DISTRIBUTION: All Secretarial Offices
All Operating Elements

GPI: Office of Environment and Safety

Floods, Roads, Tigers & Bears

FEMA was not “Pleased”



Floods, Roads, Tigers & Bears

Bridge Owners were not “Pleased”



Floods, Roads, Tigers & Bears

“Our Job was Done”



Floods, Roads, Tigers & Bears

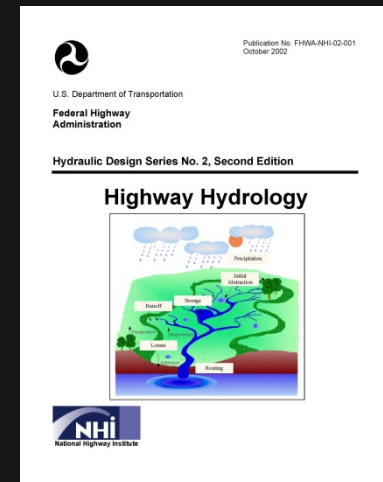
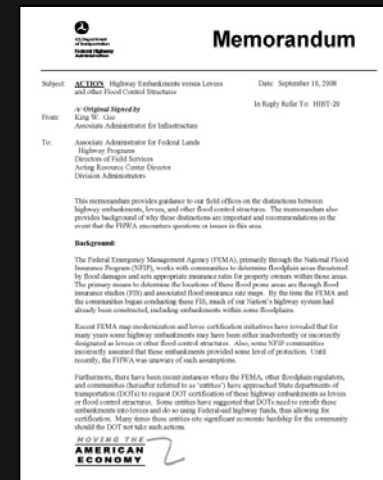
Status Quo – 1982 to present

❖ FHWA Floodplain Program

- Alignment with NEPA on projects
- 200,000 Bridges built using Regulation
- Integrated in State DOT & AASHTO

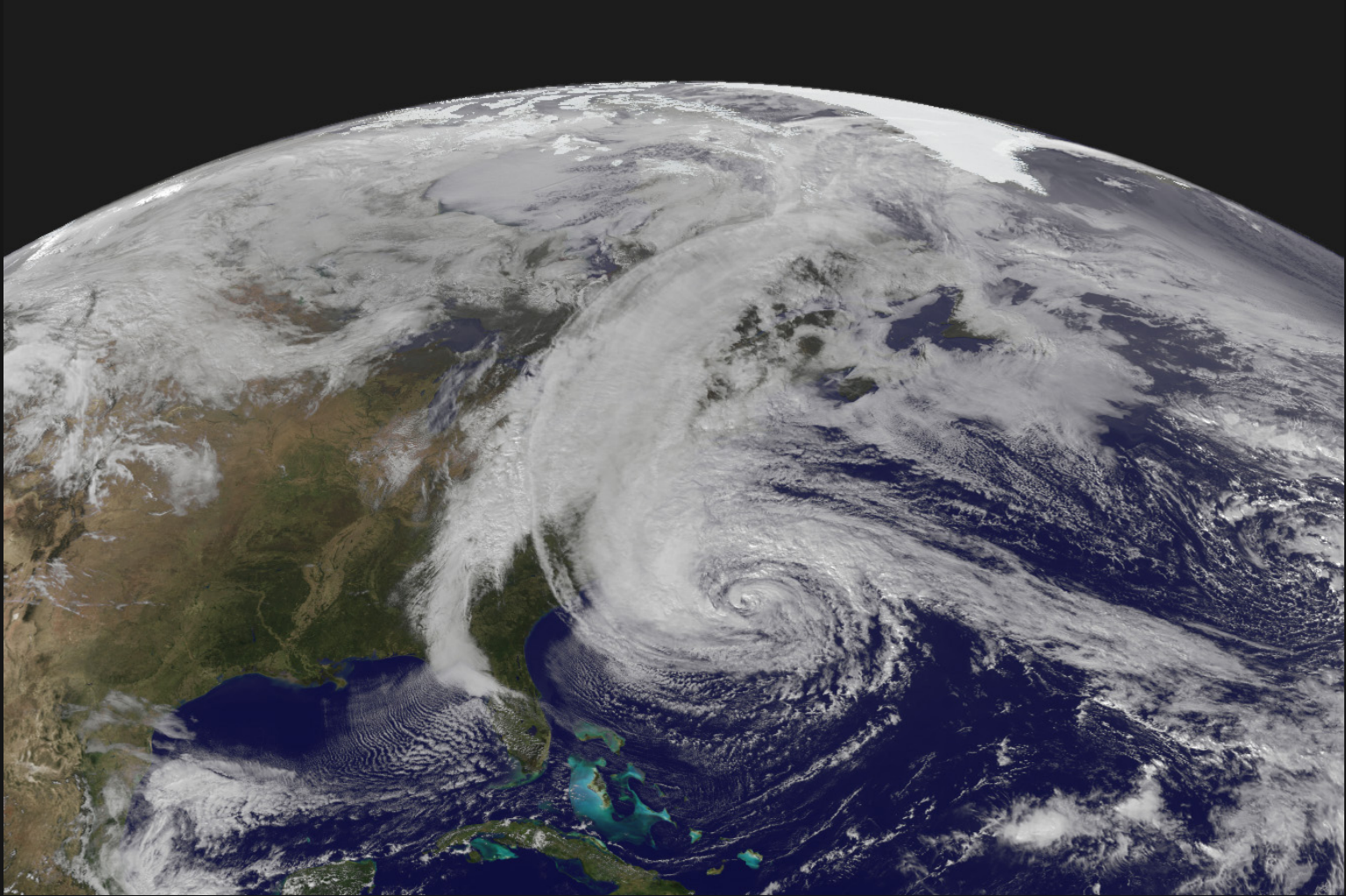
❖ More Recent Developments

- White House
 - Revived Federal Interagency Floodplain Management Task Force (FIFM-TF)
 - Revisiting EO 11988



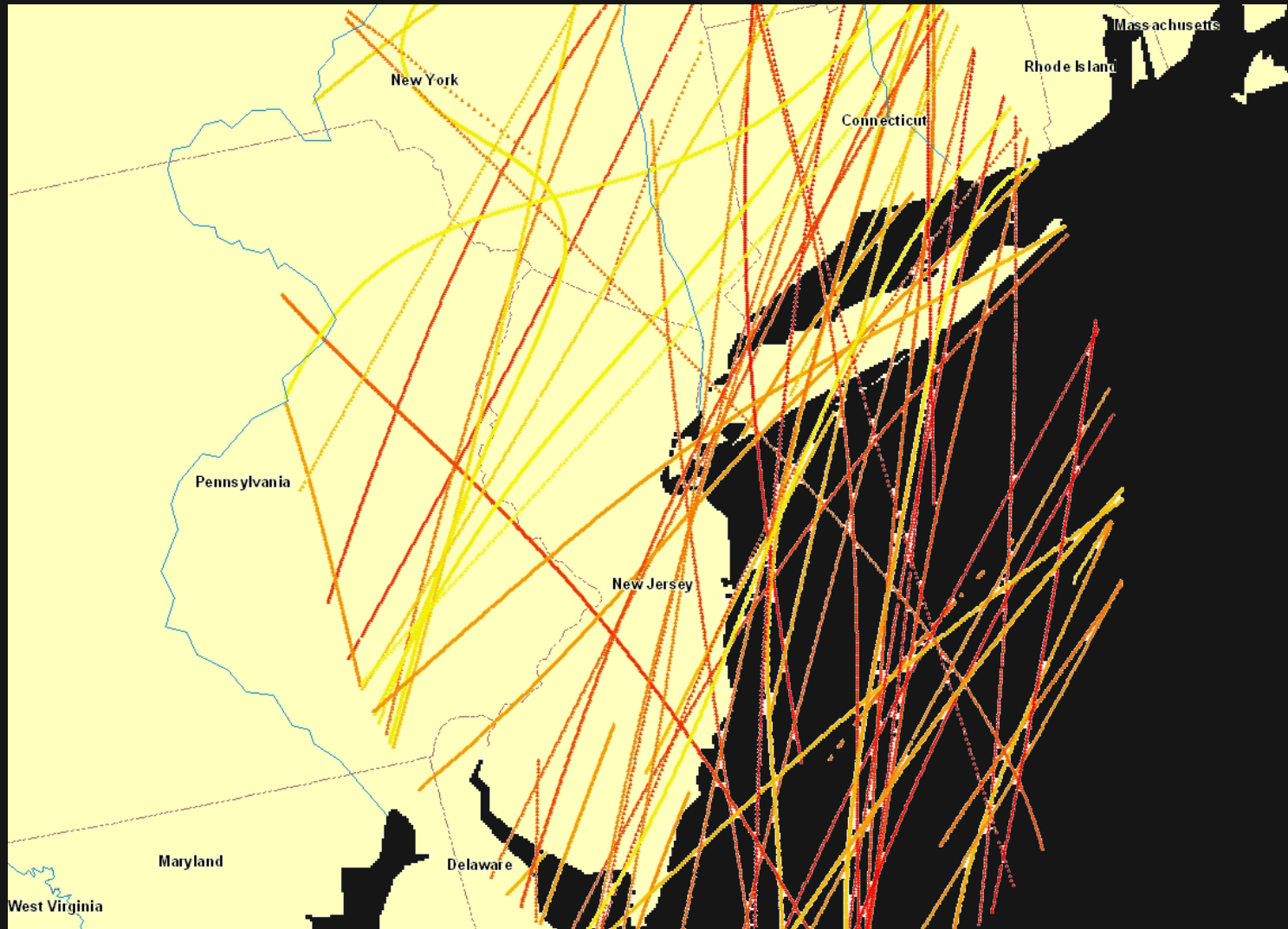
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End of Status Quo?



Floods, Roads, Tigers & Bears

Sandy – Climate Changes?!?



Floods, Roads, Tigers & Bears

Sandy - Floodplains - Federal Response

❖ Sandy Supplemental (Public Law 113-2)

- \$60 billion in emergency relief

❖ Hurricane Sandy Rebuilding Task Force

- Hurricane Sandy Rebuilding Strategy
 - April 4, 2013, all federally funded Sandy-related rebuilding projects must meet a consistent flood risk reduction standard for structures
 - Advisory Base Flood Elevations

❖ Climate Action Plan

- Directs agencies to “update their flood-risk reduction standards”
- Resiliency and Climate Change

Floods, Roads, Tigers & Bears Good Enough?

NOAA —

Regulators —

Biologists —

Floodplain Managers —

FEMA
NO WAY DUDE!

Corps —

US EPA —

Communities —



Floods, Roads, Tigers & Bears Not Good Enough!

❖ Mitigation Framework Leadership Group

- Federal Flood Risk Management Standard
- More expansive than **risk reduction** standard

❖ Federal Flood Risk Management Standard

- Subgroups
 - Science – led by NOAA
 - Policy – led by Corps
 - Stakeholders – led by FEMA
- Principles
 - Anticipate a Changing Environment.
 - Implement a Transparent and Inclusive Process
 - Encourage and Support Regional Resilience

Floods, Roads, Tigers & Bears

Are We Done Yet?

❖ Survey on Federal EO 11988 compliance

- Similar to 1975 GAO Report to Congress

❖ Incorporate into Practice?

- New Executive Order?
- Implementing Guideline update?
 - Applying Federal flood standards to additional Federal activities and actions
 - “Critical Action” revisited
- Other?
 - Development of material for NSC and White House review

Floods, Roads, Tigers & Bears Heck No!

USDOT can not discuss internal Federal
deliberative issues



*(but this presentation might help “inform”
others about future trends)*

Floods, Roads, Tigers & Bears

What's Next?

"We have top people working on it right now, Dr. Jones"



Questions?

*Thank
You!*

