

TEAM PATHFINDERS CRITICAL THINK PIECE

**Incorporating The Human Cost Of
Flooding In Corps Project Analyses**

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Team Pathfinders Critical Think Piece

This critical think piece will discuss Corps policy on flood damage reduction project justification and examine the considerations of the human cost of flooding (HCoF).

National Flood Problems

- ❑ 94 Million Acres identified in 100-year flood plain
- ❑ Over 20,000 Communities flood prone
- ❑ 15% have any flood protection
- ❑ 30% of at risk structures carry flood insurance
- ❑ 25% of structures along coastlines subject to erosion over the next 60 years
- ❑ We do not have a national Flood Protection Policy

Floods and Hurricanes Have Been Around for a Long Time



They Were Part of Early North American History



And US History



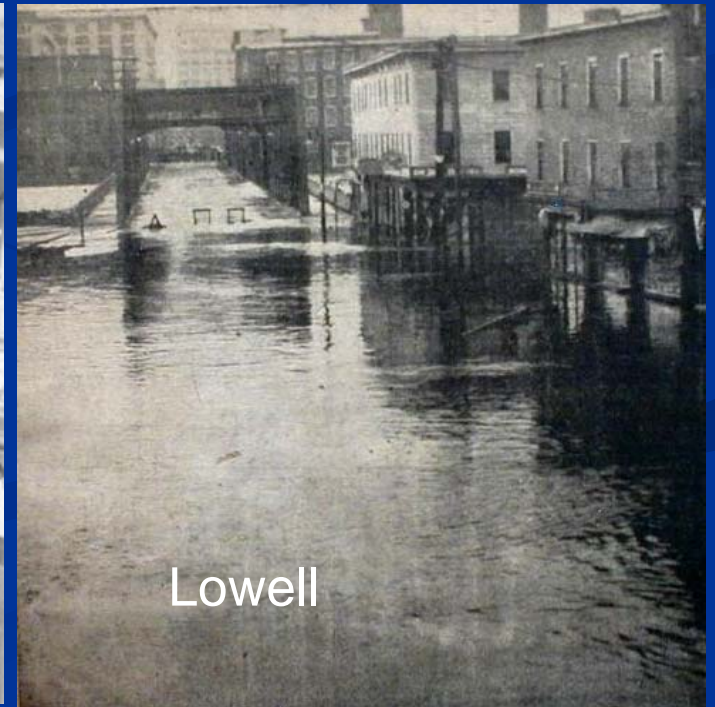
Johnstown



Greenville



Pittsburgh

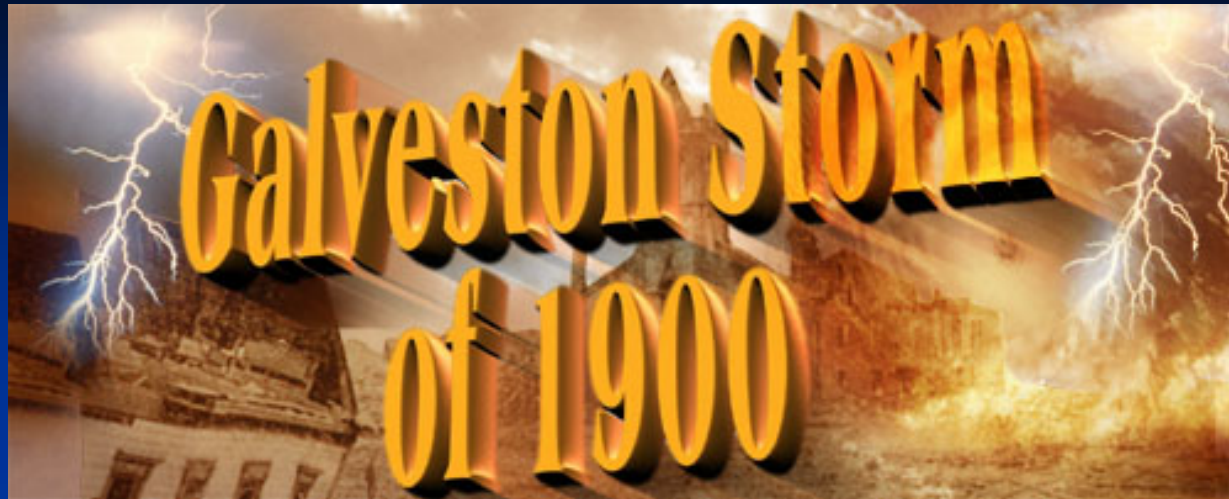


Lowell

Flooding







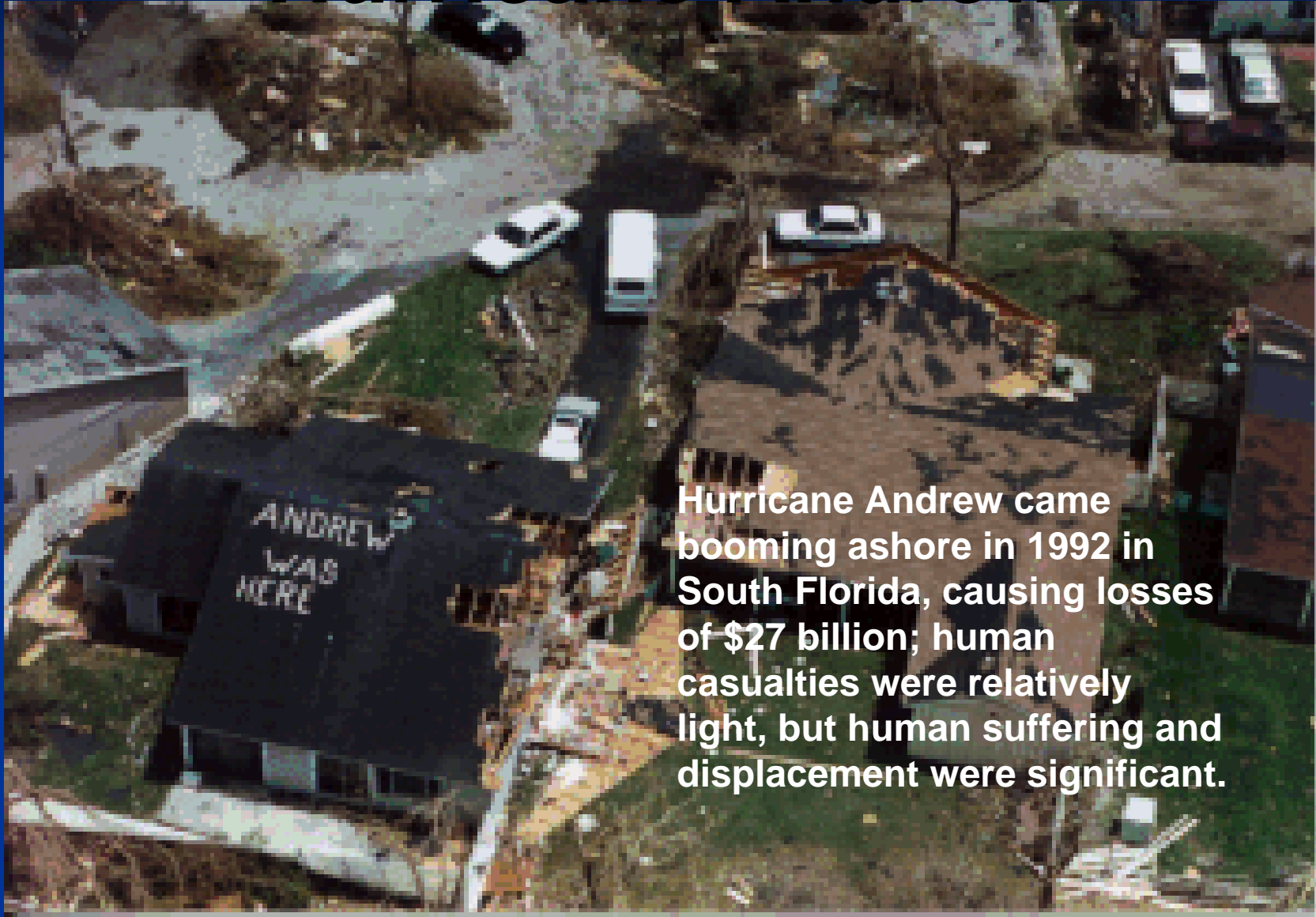
The Galveston, Texas, hurricane of 1900 remains one of the worst natural disasters in American history. More than 8,000 people perished September 8, 1900 when the Category 4 hurricane barreled into Galveston.

Would this happen today? It's possible. Even though there have been great advances in weather forecasting and protective measures have been put in place, many people in the United States live in high risk areas.



REMOVING DEAD BODIES TO THE BARGES FOR BURIAL AT SEA

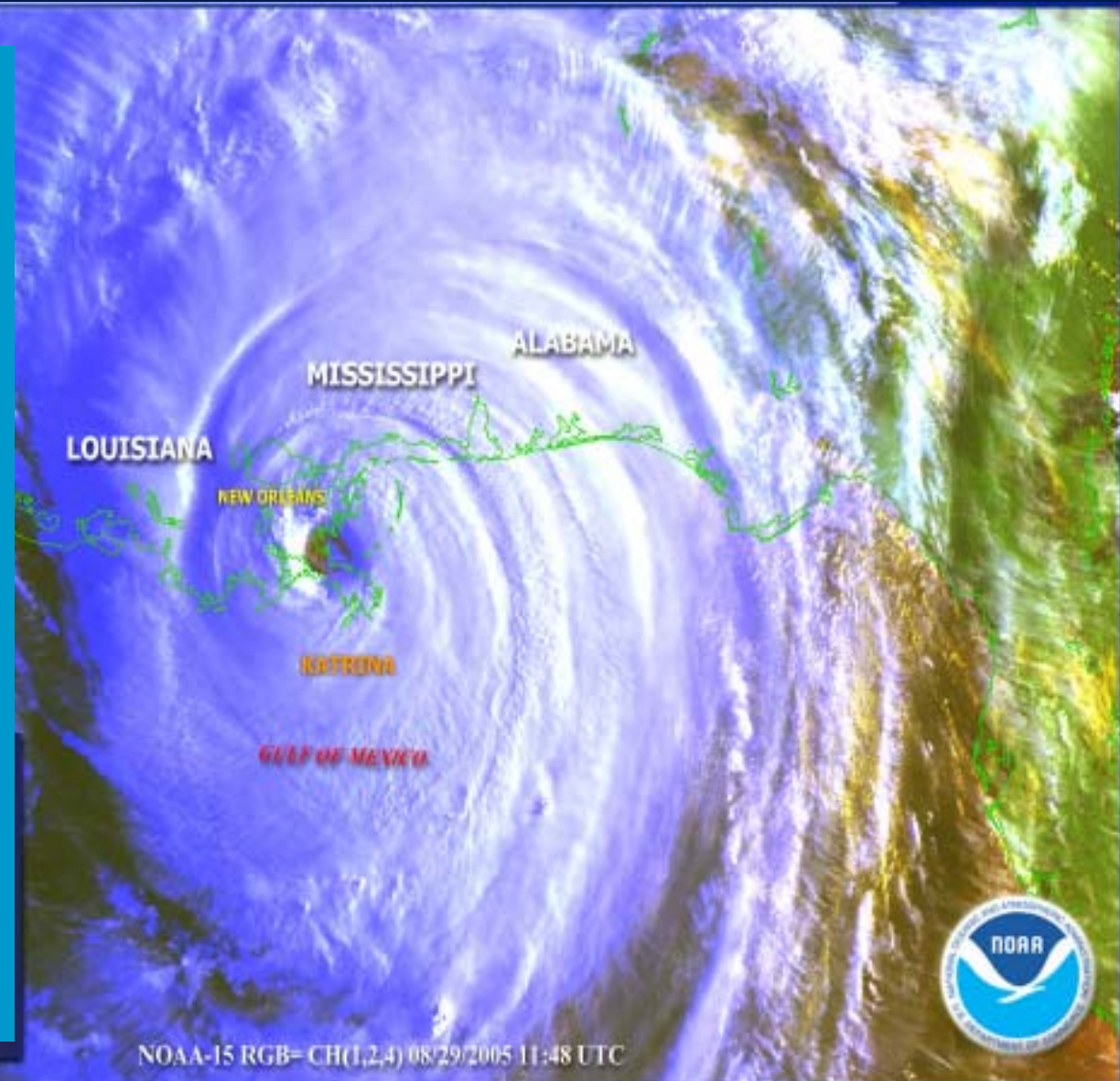
Hurricane Andrew



Hurricane Andrew came booming ashore in 1992 in South Florida, causing losses of \$27 billion; human casualties were relatively light, but human suffering and displacement were significant.

Hurricane Katrina

- More than 1,300 dead and many more missing
- Estimated \$100 billion in damages
- 41 miles of levees/floodwalls severely damaged
- 128 miles of levees/floodwalls minor damage
- 732,000 acre-ft floodwater removed (including Hurricane Rita)







Bay St. Louis - South Beach Blvd - BEFORE



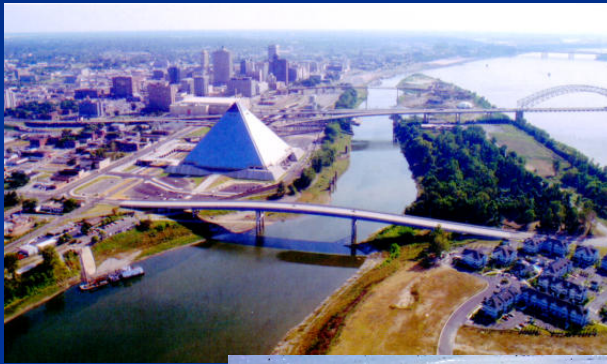
Bay St. Louis - South Beach Blvd - AFTER

The Corps' current role



- Reconstruction
- New Construction
- Floodplain Management
- Etc.

The Corps' Flood Damage Reduction Infrastructure Has Provided Protection to Millions

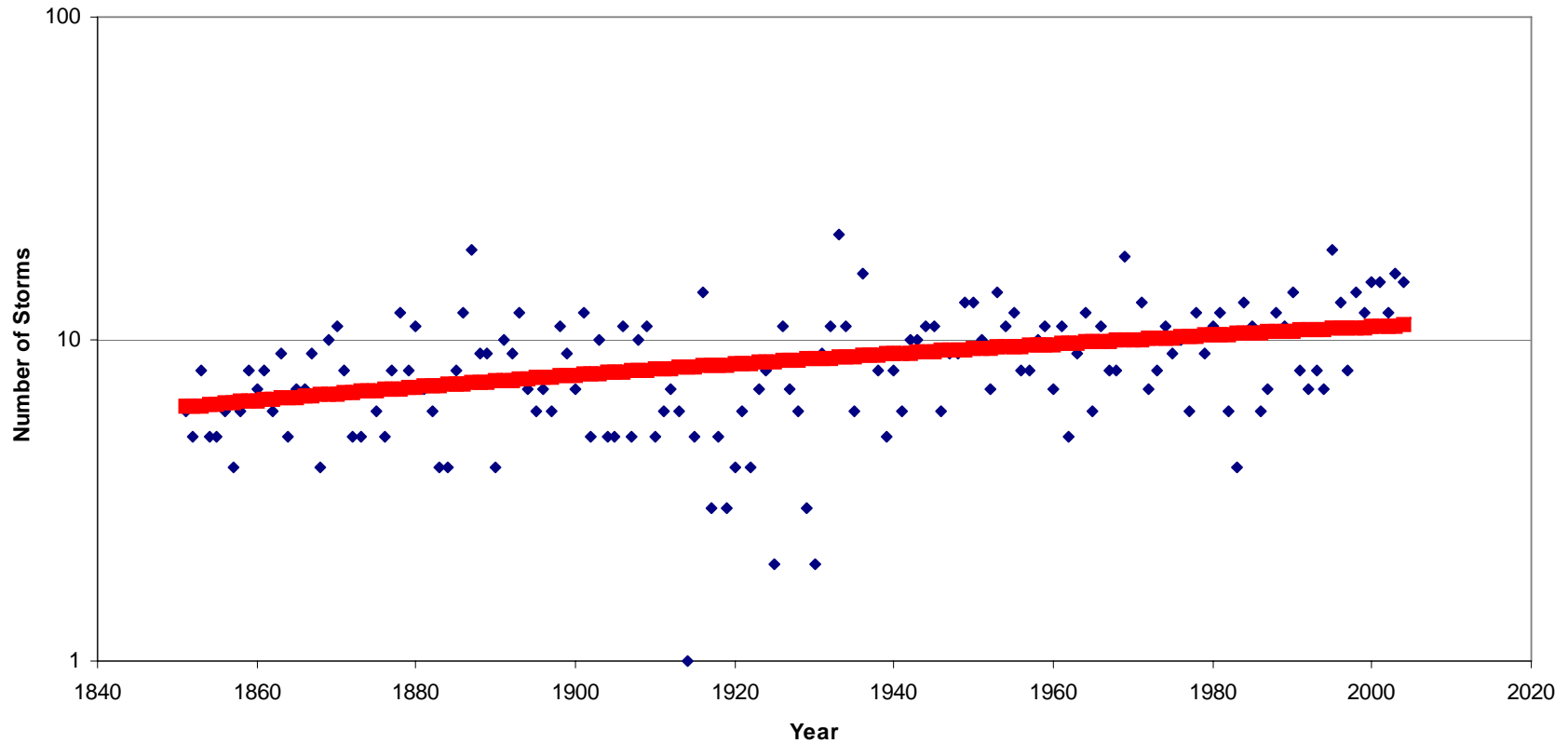


But ...We Have Not Solved the Flood Challenge

- 70 Years of “Flood Control”
or “Flood Damage Reduction”
- 38 Years of Flood Insurance
- Increasing Flood Damages
 - Average annual losses -
\$6 Billion (BK)
- Inadequate Protection
- Inadequate Maintenance



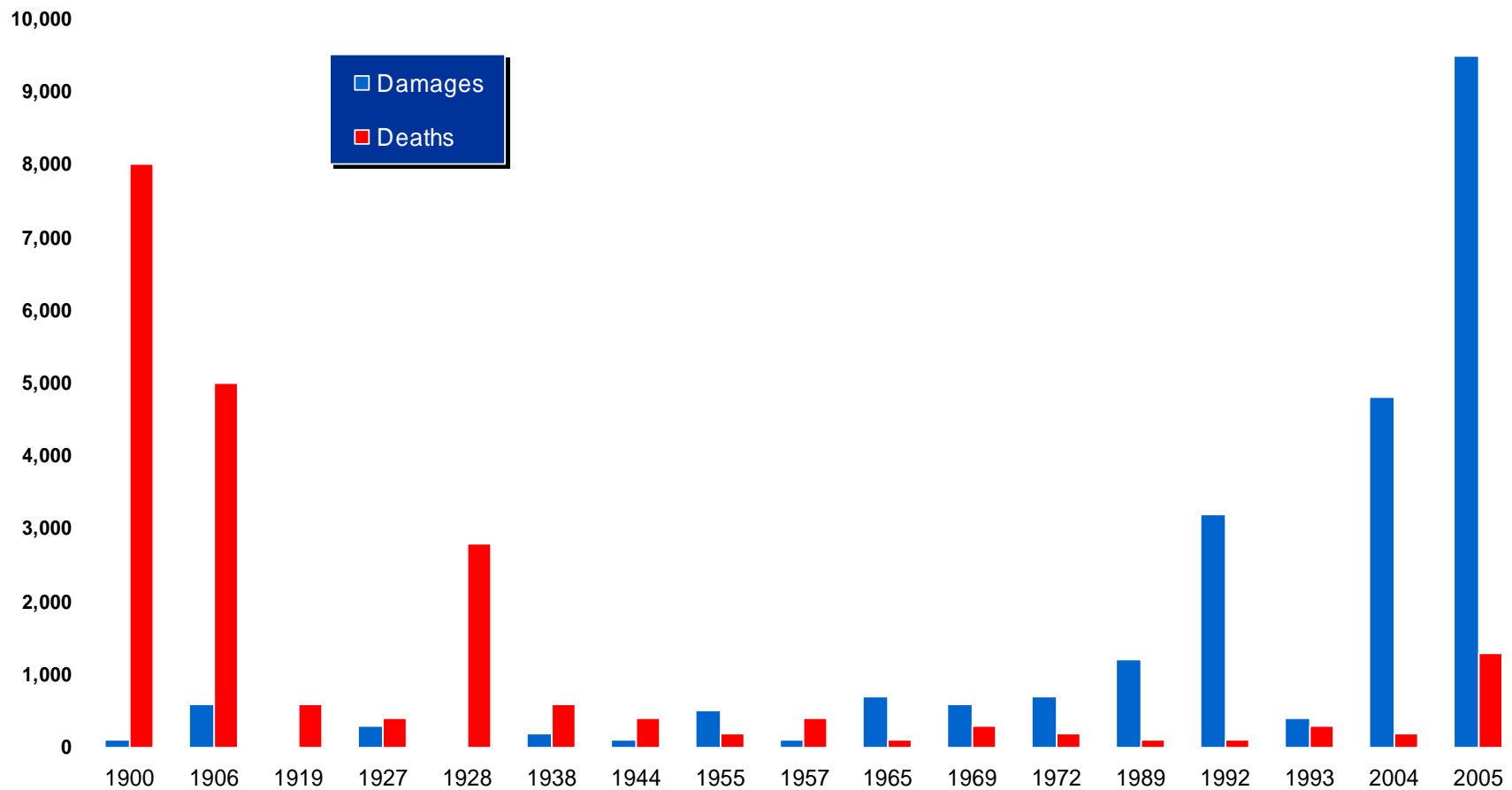
Number of Atlantic Hurricanes by Year
(Log Scale Chart)



Trend line indicates increasing overall number of storms per year since 1850.*

** Does not include record breaking year of 2005.*

U.S. Natural Disasters that Caused the Most Death and Damage to Property



Current Corps Policy

- Principles and Standards - 1965
- Principles and Guidelines for Water and Related Resources Implementation Studies (P&G) – Water Resources Council (1983)
- Established the National Economic Development Account (NED) for project justification
- Also allows for EQ, RED, and OSE accounts

Guidance Beyond Ned

- The Water Resources Development Act (1986)
 - “...*the well-being of the people of the United States...and the prevention of the loss of life...*”
- The National Environmental Policy Act (1969)
- Collaborative planning draft interim implementation procedures (2006)
- Congress directs Corps not to apply traditional NED Analysis to Hurricane Katrina alternative analysis

**What is the Human Cost of
Flooding...How do we
quantify it??**

HCoF Categories

- Number of lives saved
- Cost to society due to loss of wage earner
- Cost of displacement
 - Disruption to family structure
 - Disruption of business
- Cost of medical treatment
 - Increased illness/injury/disabilities
- Social impacts
 - Increased divorce rate
 - Increased child abuse/neglect



Disruption to family structure



Human cost of business disruption



Overcapacity and strain on surviving infrastructure/services





Post Office



Hospital in Biloxi



Library

Costs involving reduction of bio-hazards (water and air pollutants)



Costs involving biological entities— treatment for disease-carrying insects

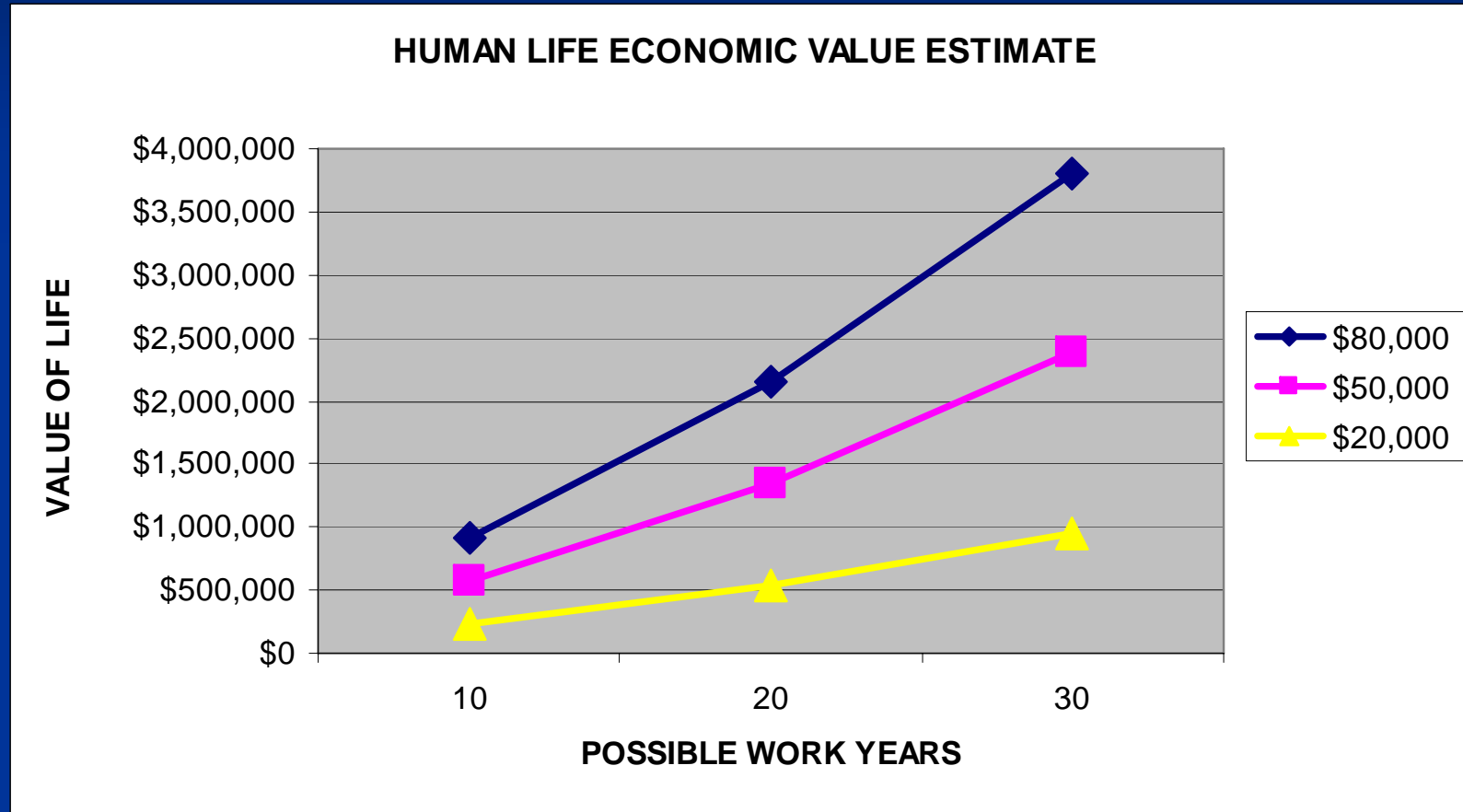




How Do We Value Human Life?

- WILLINGNESS TO PAY MODEL
- LOSS OF EARNING POTENTIAL FOR AN INDIVIDUAL
- EXAMPLES:
 - OXFAM International -- \$2.40/Based on cost to purchase sufficient bullets to kill an opponent in Baghdad
 - U.S. EPA -- \$3.7 million/EPA calculated based on increase in pay provided to workers in higher risk jobs
 - U.S. DOT -- \$3 million/Loss of life through traffic signals
 - U.S. Courts – Human capital model; \$ Value varies by income and age

Human Life Value Calculator



<http://www.dinkytown.net/java/HumanLifeValue.html>

**Where to include the HCoF
in Corps Analyses...What
are the implications?**

Where to account for it...

- We always consider the no-action alternative
 - Leave HCoF in OSE account
 - Advantages – easy, status quo, not controversial
 - Disadvantages – lack of true and complete economic analysis, leaves public at risk, no account for changing climate conditions, failure to learn from past lessons (Katrina)

Where to account for it...

- Leave in OSE, but truly weigh it!



NED + OSE

■ Advantages

- Provide greater level of protection than NED alone
- Increase in non-structural projects (easier to justify)
- Not a radical change
- Increase flood

■ Disadvantages

- Increases cost
- Who pays for it?
- Recommending projects with lower benefits to cost ratios
- Little support from ASA(CW) and OMB

OSE Over NED



OSE Over NED

■ Advantages

- Protection/
environmental justice
- Easier to justify non-
structural projects
- Not a radical change
(Section 202)
- Increase flood hazard
awareness
- Watershed based

■ Disadvantages

- Ability to pay analysis
- Recommending
projects with lower
benefit to cost ratios
- Potential BCR less
than 1; requiring
Congressional
authorization
(individually or
programmatically)

Include HCoF in NED

■ Advantages

- Accounts for all benefits and costs
- Should provide the correct level of protection
- Environmental justice
- Leads to better decisions on Federal expenditures

■ Disadvantages

- Monetizing human life is controversial
- Seemingly radical change from norm
- Increase cost of projects—more projects to be built
- How to prioritize projects
- Changes justification threshold?

Recommendations?

- HCoF must be seriously considered; current Corps analysis could be improved
- Team recommends inclusion of HCoF in NED
- If a national flood policy is developed, HCoF will need to be included.
 - The same methodologies for computing benefits and costs across the board for all Federal agencies

**Meanwhile, back on the
Farm...**



The public waits...



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