Coastal Texas Protection and Restoration Project

Sharon Tirpak / Sheridan Willey / Janelle Stokes
Project Management / Planning / Environmental
USACE, Galveston District

August 2014

Discussion Topics

- Study Authority
- Meeting Goals
- Study Goals
- Threats to Region
- Regional Resources of National Importance
- Problems and Opportunities
- Integrated Lines of Protection
- Project Timeline and Methodology
- Summary
- Submittal of Comments/Ideas

Study Authorization

- WRDA of 2007 Section 4091. Coastal Texas Ecosystem Protection and Restoration, Texas.

"(a) In General.—The Secretary shall develop a comprehensive plan to determine the feasibility of carrying out projects for flood damage reduction, hurricane and storm damage reduction, and ecosystem restoration in the coastal areas of the State of Texas"

Meeting Goals

- Gather ideas for addressing coastal storm damage risk management and ecosystem restoration on the Texas coast

- Opportunity to:
  - Identify specific problems within local areas
  - Generate potential options to evaluate during feasibility
  - Establish potential partnerships

Regional Workshops and Public Scoping Meetings

- Meeting Dates/Locations:
  - August 11th – Palacios
  - August 12th – Corpus Christi
  - August 13th – South Padre Island
  - August 27th – Houston/Galveston

Consider the Following Questions:

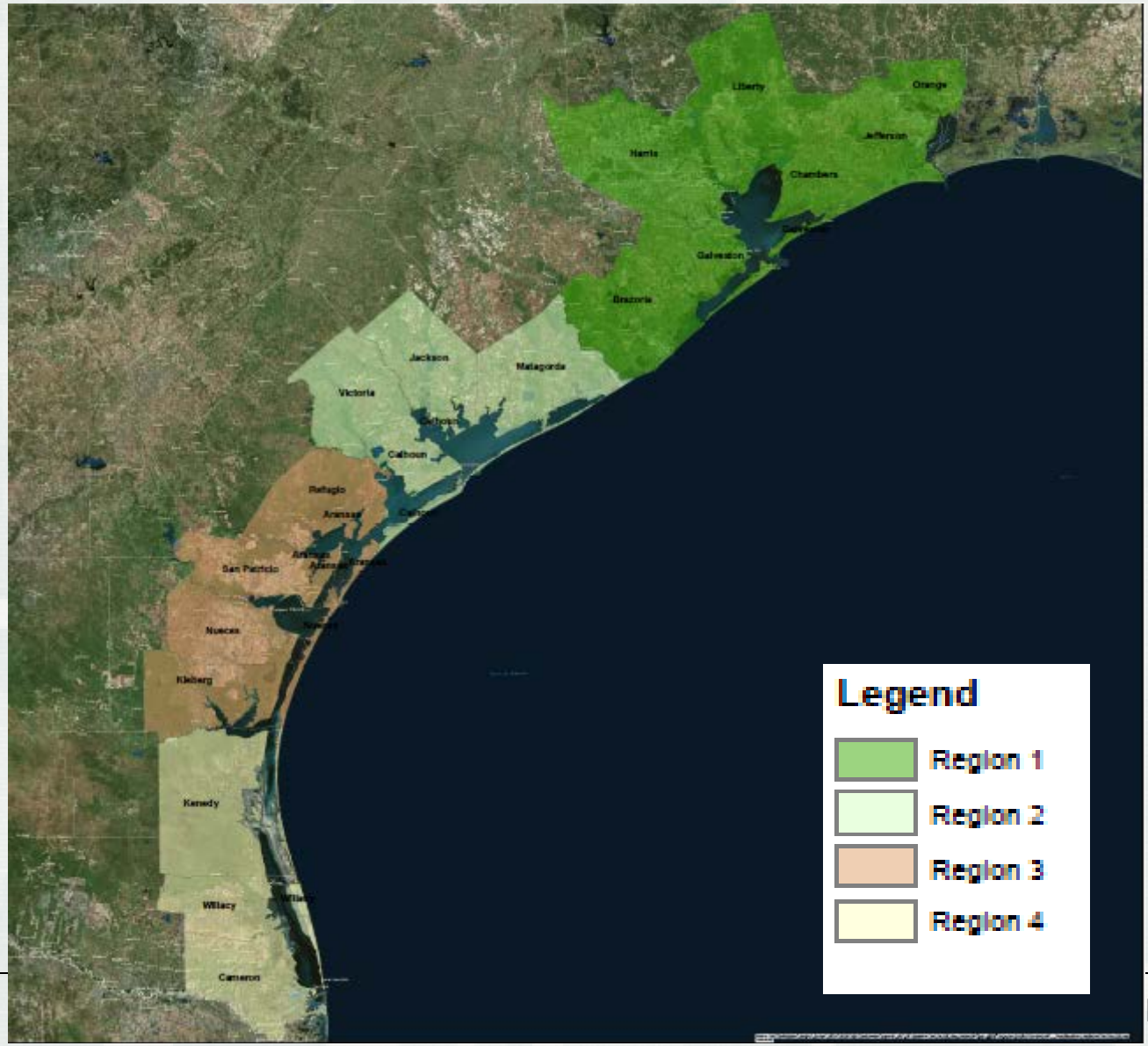
- How is your community (or agency/organization) most vulnerable to coastal storms?
- What strategy should be implemented to reduce the risk of coastal storms?
- What ecosystem restoration projects are most needed, or could be implemented to improve coastal resilience?

Study Goals

- Develop long-term comprehensive coastal plan for Texas

  - Identify potential projects that:
    - Protect lives, homes, and industry
    - Protect the nation's economy
    - Protect and restore the environment and natural resources

Study Area



U.S.ARMY

ING STRONG®

Threat to Health and Well Being

Since 1851,122 tropical storms have hit the TX Coast

Hurricane Ike (Sep 13, 2008) $29B

Tropical Storm Allison (Jun 05, 2001) $5B

Hurricane Alicia (Aug 18, 1983,) $2B

Hurricane Dolly (Jul 23, 2008) $1B

Tropical Storm Allison (Jul 23, 2008) $1B

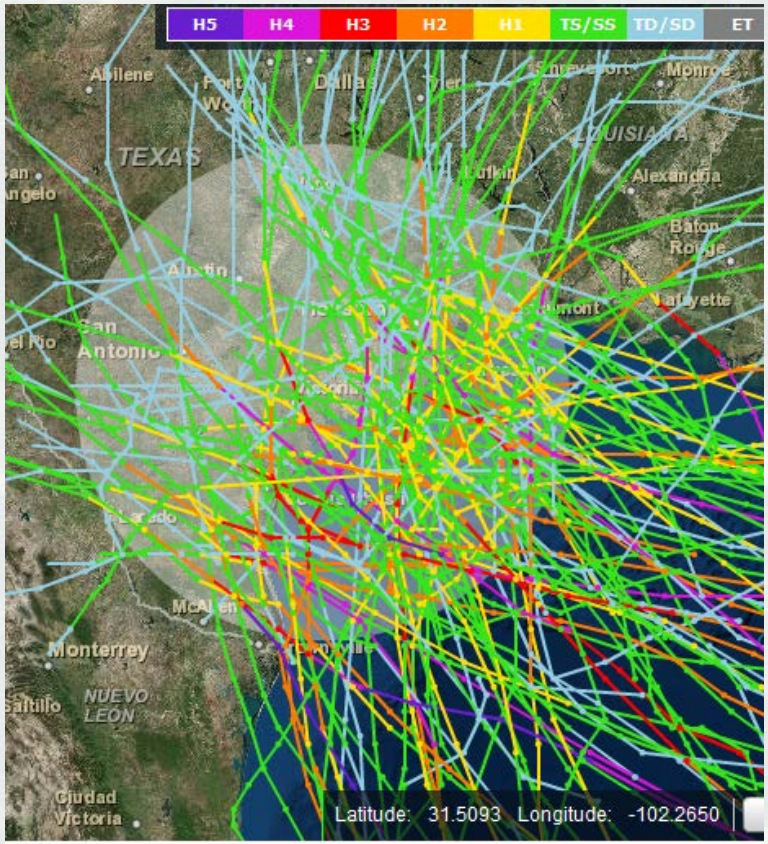
Tropical Storm Frances (Sep 13, 1998) $500M

Hurricane Celia (Aug 03, 1970) $454M

Tropical Storm Claudette (Jul 24, 1979) $400M

Hurricane Carla (Sep 11, 1961) $400M

Hurricane Allen (Aug 09, 1980) $300M



U.S.ARMY

BUILDING STRONG®

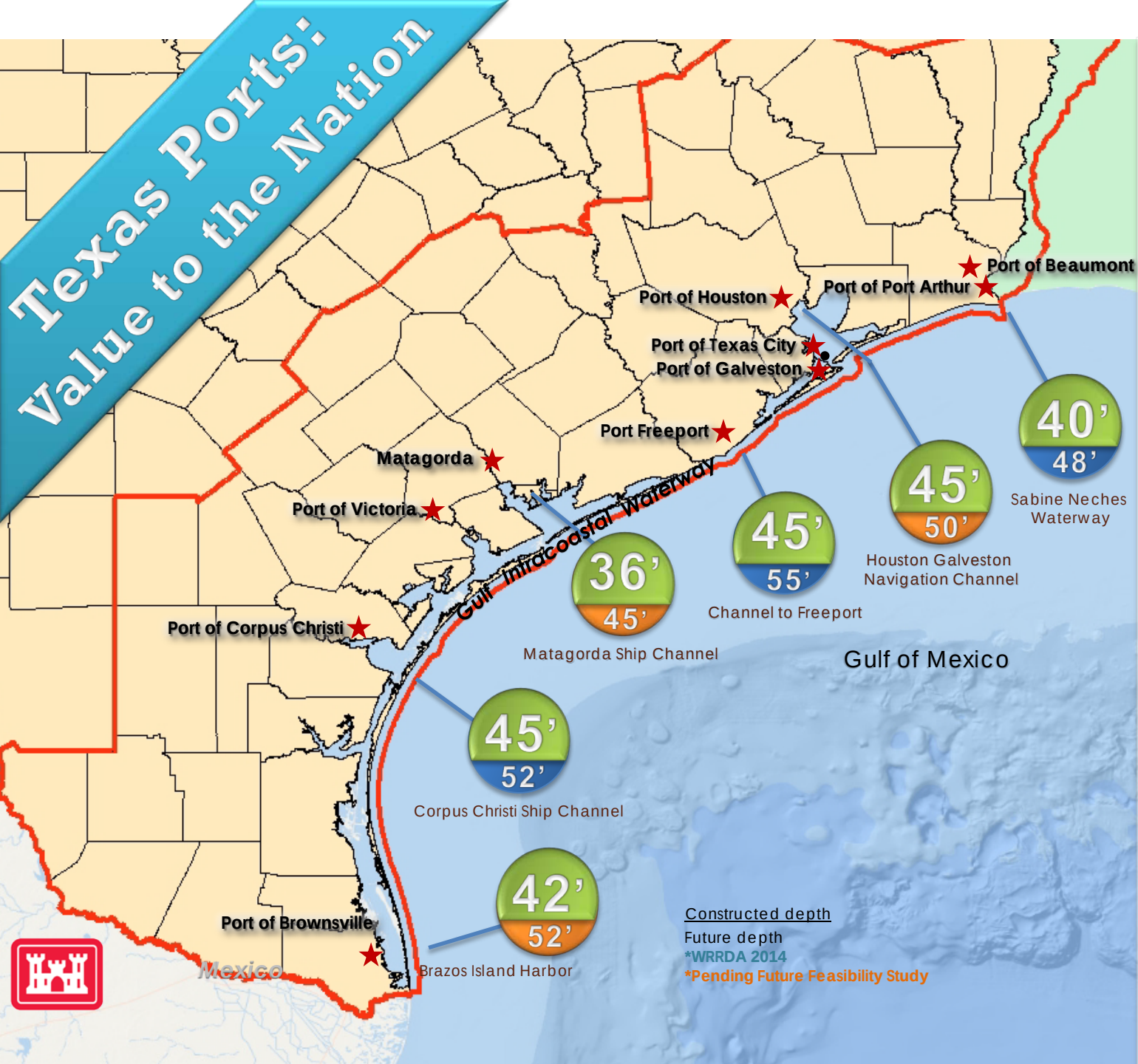
Threats to Texas Coastal Environment

- Climate change/relative sea level rise
- Loss of wetlands/habitats
- Impacts to fish and wildlife
- Erosion of the Gulf shoreline, bay shores and islands, and channel banks
- Hydrologic alterations and interruption of sediment transport
- Water quantity/quality

Regional Resources of National Importance

- 18 coastal Counties with 6.1 million residents
  - Over 24% of the State's population

- Population Centers
  - Houston/Galveston (Houston - Nation's 4th largest city)
  - Beaumont/Port Arthur
  - Freeport/Lake Jackson
  - Victoria/Port Lavaca/Bay City
  - Corpus Christi
  - Brownsville/Harlingen Area/South Padre Island



LEADING U.S. PORTS
(2012 Tonnage)

Houston (#2 – 238.2 million tons)
#1 Importing Port & #2 Total Tonnage

Beaumont (#5 – 78.5 million tons)
#1 Military Outload Port in the World

Gulf Intracoastal Waterway (73 million tons –Texas portion)
#3 Inland Waterway

Corpus Christi (#7 – 69 million tons)
America's Energy Port

Texas City (#11 – 56.7 million tons)
Services Largest Petrochemical Complex

Port Arthur (#23 – 30.6 million tons)
Vital Strategic Port

Freeport (#31– 22.1 million tons)
World Class LNG Facility

Galveston (#47 – 11.6 million tons)
#5 Cruise Ship Port

Matagorda to include Port of Port Lavaca and Port of Point Comfort (#48 – 11.6 million tons)
Generates Annual Business Revenues of Nearly $2 Billion

Brownsville (#69 – 5.6 million tons)
#1 Shipbreaking Port

Victoria (#78 – 4.5 million tons)
#2 Shallow-Draft Port for Domestic Crude Petroleum

Regional Resources of National Importance

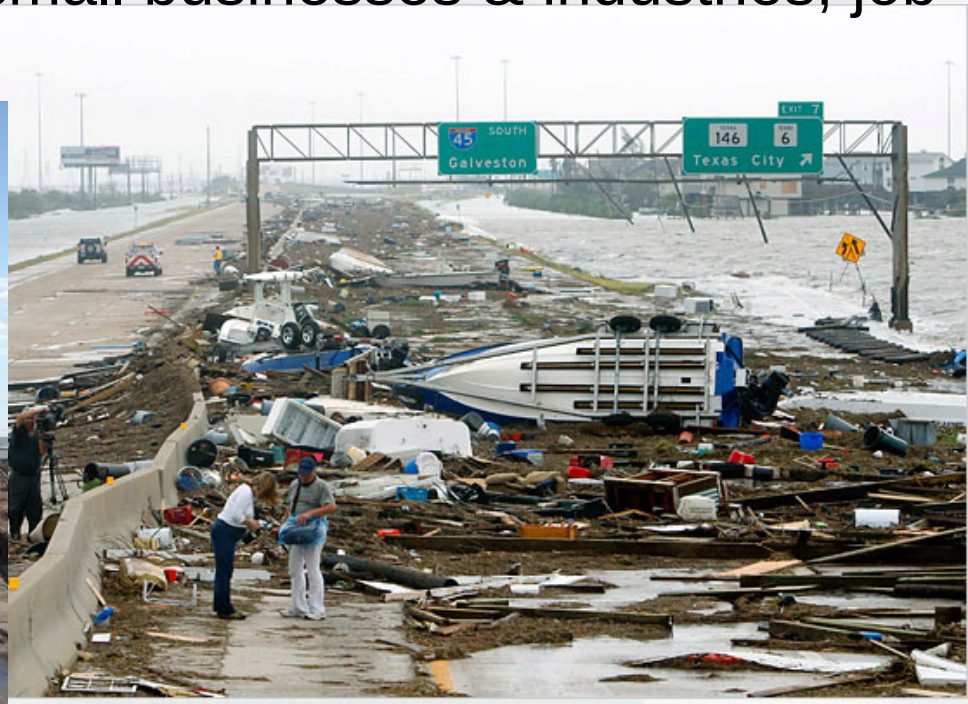
- Natural Resources
  - Bays and Rivers
    - Sabine Lake, Galveston, Matagorda, San Antonio, Aransas, Corpus Christi, Baffin, and Laguna Madre Bay systems
    - Lower portions of the Sabine, Neches, Trinity, San Jacinto, Brazos, Colorado, Guadalupe, San Antonio, Nueces, and Rio Grande Rivers
  - Beaches
    - 367miles of Gulf shoreline
  - Wetlands
    - 3.9 million acres of wetlands along Texas coast
    - 235,000 acres of sea grass
  - Coastal Prairie

Regional Resources of National Importance

- Natural Resources (cont)
  - Threatened and Endangered species/critical habitat
    - 328 sq miles of Whooping Crane critical habitat
    - 380,000 acres of Piping plover critical habitat
    - Swimming and nesting sea turtles
  - Essential Fish Habitat (EFH)
    - Most of the coastal fringe is designated EFH for shrimp, drum, snapper, mackerel, crab and other species
  - Commercial and recreational fisheries
    - Oysters/shrimp
    - Sport fishing

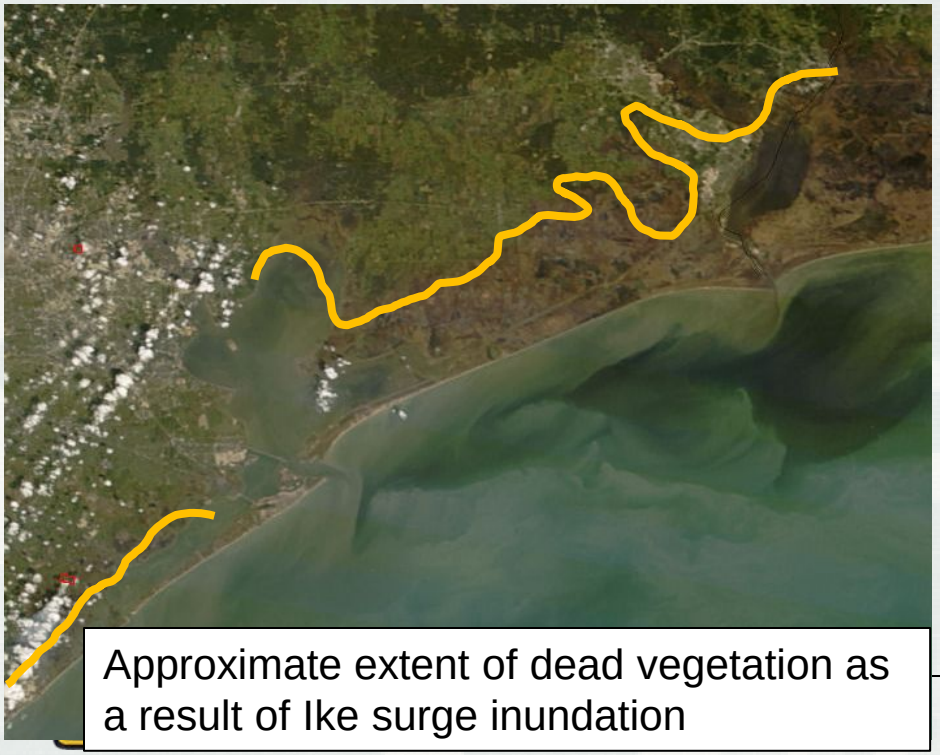
Problem: Coastal Storm Damage Risk

- Loss of life
- Destruction of infrastructure
  - Homes, roads, businesses, industry
- Economic impact to region and Nation
  - Closure of ship channels; small businesses & industries; job loss



Problem: Coastal Storm Damage Risk

- Environmental impact
  - Erosion of shoreline, beach and dune systems
  - Loss of wetlands
  - Impacts to wildlife



Approximate extent of dead vegetation as a result of Ike surge inundation

BUILDING STRONG®

Negative Ecosystem Impacts

- Storm surges erode shorelines, dunes and beaches that protect marshes and important habitat from the Gulf
- Surge floods are slow to drain from fresh and salt marshes, stressing vegetation and resulting in marsh loss
- Surge flooding may inundate swamps for extended periods, resulting in loss of forested wetlands and important habitat
- Sediment brought by the surge smothers oyster reef
- Storm surge kills fish and wildlife

Inundation of San Bernard NWR marsh post-Ike (Wilson, 2008)

Saltwater burned marsh, Big Boggy NWR (Wilson, 2008)

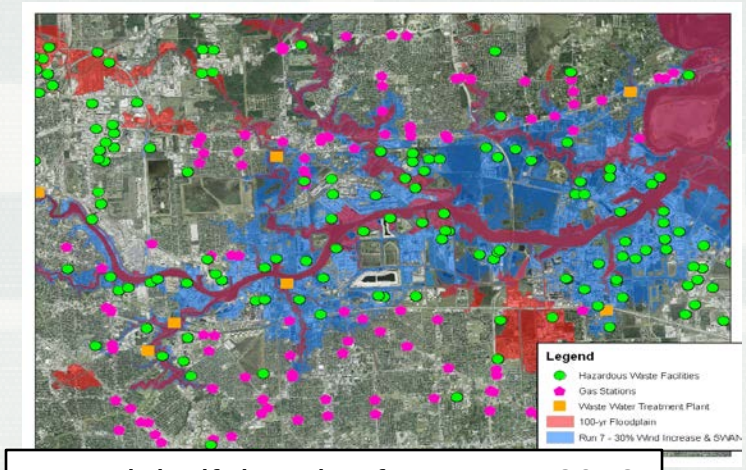
Positive Ecosystem Impacts

- Storm overwash deposits maintain the natural development of barrier islands
- Storms deposit sediment on beaches and within marshes behind the shore, nourishing sediment starved areas
- Storm currents shape existing estuarine landforms, bays and bottoms
- Nutrient-rich storm surge waters benefit fisheries and increase recruitment of game fish species

Follets Island-a trangressive barrier island

Problem: Environmental

- Small-scale spills of hazardous materials can be widespread
- Flooding of tank farms can damage tanks and release contents, affecting human health, property, fish and wildlife and contaminating habitat



Hanadai Rifai, Univ of Houtson, 2012 SSPEED Center Conference

Murphy Oil Spill – Hurricane Katrina

Opportunities: Coastal Storm Damage Risk Management

- Protect homes, infrastructure, businesses, industry
  - Encourage resilient communities/smart development in coastal zone
  - Structural solutions: levees, flood walls

Opportunities: Storm Damage and Flood Risk

- Non-structural solutions:
  - Elevation of homes; relocations; buyouts
  - Setbacks/stricter building codes
  - Storm water management

Opportunities: Storm Damage and Flood Risk

- Protect Natural Resources
  - Restore shoreline, beach and dune systems
    - Re-vegetate dune systems
    - Beneficial use of dredged material

BUILDING STRONG®

Opportunities: Ecosystem Restoration

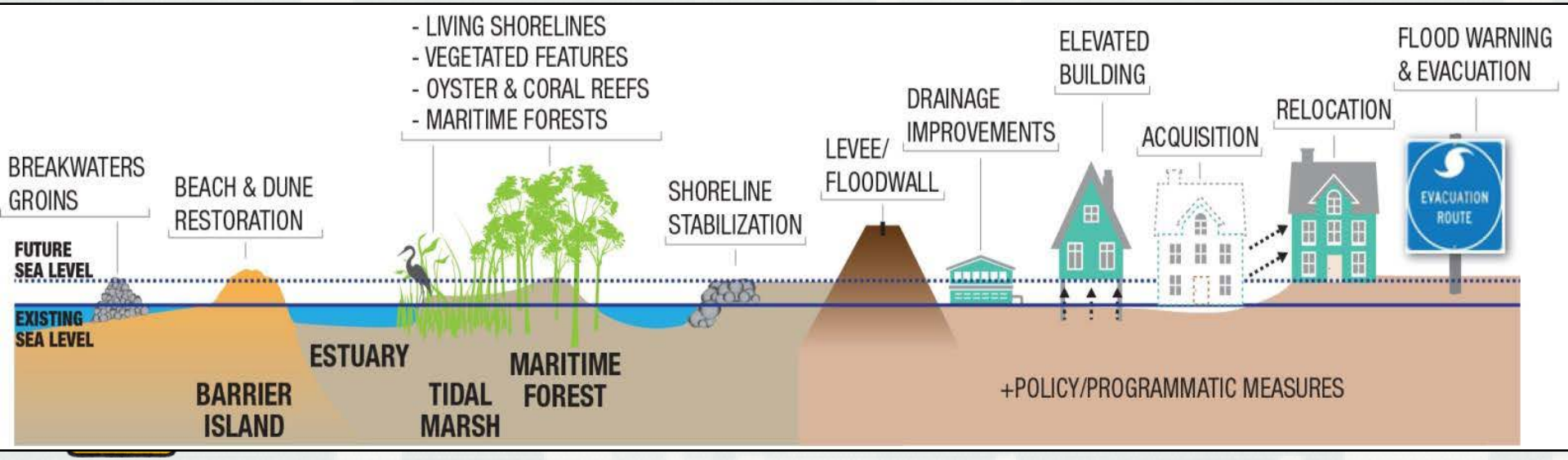
- Restore wetlands/create living shorelines

- Protect commercial and recreational fisheries
  - Oyster beds
  - Shrimp
  - Sport fishing

- Protect and restore
  - Fisheries and wildlife
  - Habitat

Integrated “Lines of Protection”

- Multiple lines – combination of natural and structural features
- Increasing levels of protection from offshore to inshore



Examples of Integrated Lines of Protection

- Low surge protection
  - Offshore breakwaters
  - Reduce waves and coastal erosion

Examples of Integrated Lines of Protection

- Low/medium surge protection
  - Marsh, beach and dune restoration

Examples of Integrated Lines of Protection

- High surge protection
  - Seawalls/flood gates
  - Protect developed areas from storm surges
  - Prevent storm surge from entering coastal inlets and bays

Examples of Integrated Lines of Protection

- High surge protection
  - Levees/flood walls
  - Block storm surge from moving inland

Freeport Hurricane Protection System

Texas City Levee
Hurricane Ike Aftermath

Examples of Ecosystem Restoration


Oyster Reef Restoration – photo courtesy TNC

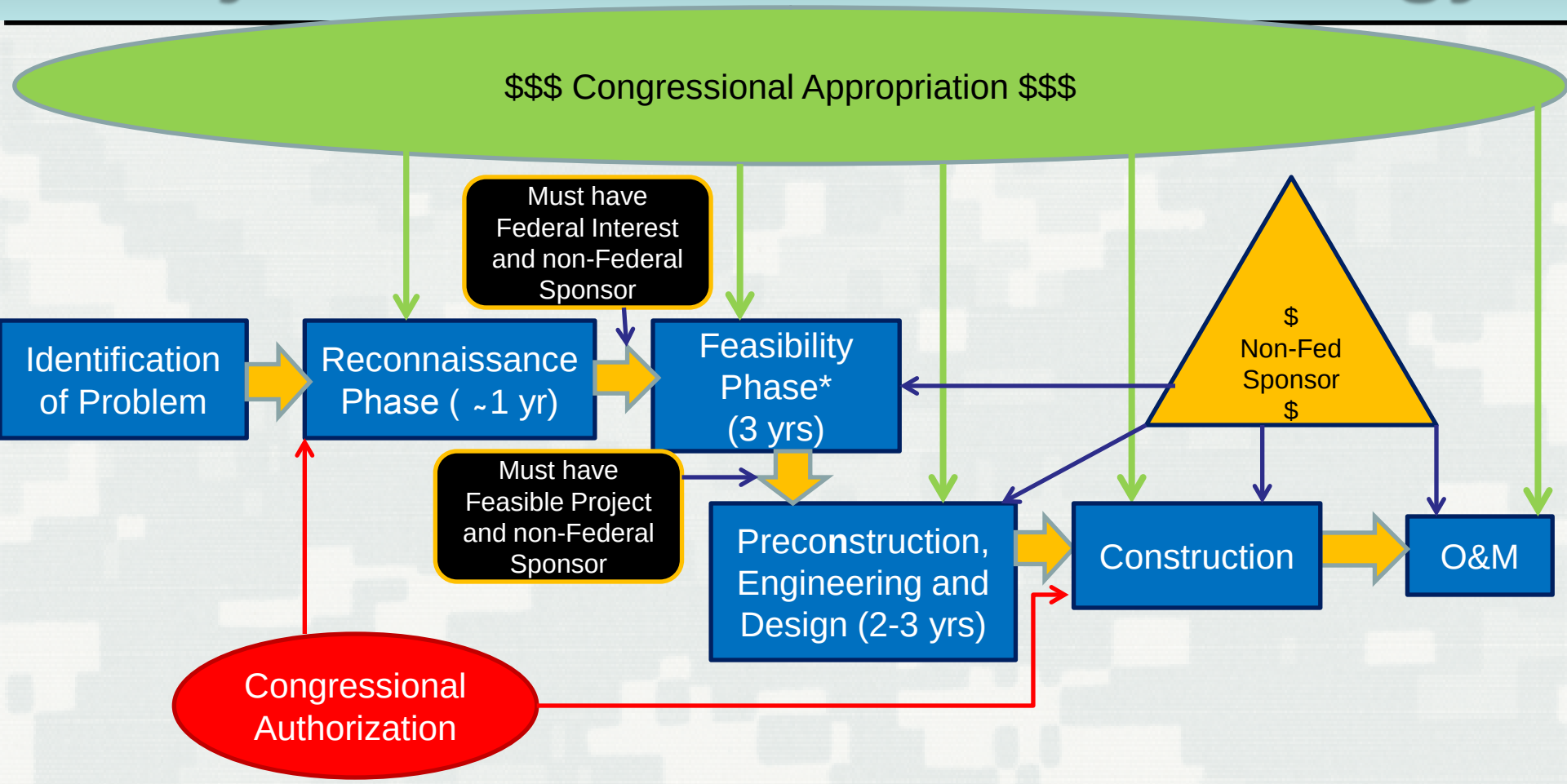

Marsh Restoration – Neches River


GIWW– Matagorda Bay
Nourishment of bird habitat at Sundown Island

Bird Island Creation – Galveston Bay

Shoreline Protection –
GIWW in Jefferson Co (courtesy TNC)

Project Timeline and Methodology



*Feasibility Phase includes **alternatives analysis and NEPA compliance** to determine best plan to provide an environmentally sustainable solution which provides economic value to the nation

Summary

- Gathering ideas for addressing coastal storm risk management and ecosystem restoration in Coastal Texas Region
- Opportunity to:
  - Identify specific problems within local areas
  - Generate potential options to evaluate during feasibility
  - Establish potential partnerships
- Non-Federal Sponsor: ????
  - If no Sponsor is identified – the study does not progress to the feasibility phase

Submittal of Comments/Ideas

Comments/ideas due by Sept 26, 2014

Send written comments to:

District Engineer, Galveston District
U.S. Army Corps of Engineers
Attn: Coastal TX Protection and Restoration Study
CESWF-PEC-TN
P.O. Box 1229
Galveston, Texas 77553-1229

Send e-mails to: Janelle.S.Stokes@usace.army.mil

Project website: http://www.swg.usace.army.mil/