SOUTHWEST COASTAL LOUISIANA

NED/NER MULTI-PURPOSE STUDY – LESSONS LEARNED

PCoP Webinar Series

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NONSTRUCTURAL MEASURES

I have worked on a study that had nonstructural recommendations

Check one box

YES

NO

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WHAT IS YOUR JOB DESCRIPTION?

Plan Formulation

Economics

Environmental

Engineering

Check one box

Other

LESSONS LEARNED (LL)

I have sought out LL on other studies to inform my current work project

Check one box

YES

NO

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STUDY BACKGROUND

- The Southwest Coastal Study:
  - Is a joint NED/NER effort
  - Covers three parishes (counties)
  - Encompasses 4,700 square miles
  - Transitioned from a legacy study to a SMART study in mid-2013
  - Has been on the bleeding edge of nonstructural policy (see Planning Bulletin PB 2016-01)
  - Recommends ~$1B in nonstructural projects and ~$2.4B in ecosystem restoration
  - Had a Chief's Report signed in July 2016

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LESSONS LEARNED – PLAN FORMULATION

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PLAN FORMULATION

- Lesson Learned: Developing a clear understanding of the physical nature of the project floodplain and distribution of structures is critical for policy application through implementation.

  - Narrow channel dominated floodplains with relatively uniform topography radiating outward from the flood source vs. broad overflow dominated floodplains with variable non-channel related topography.
  - Horizontal or vertical delineation of flood risk alternatives as the basis for formulation.
  - The nature of these conditions will have a dramatic impact on the application of policy and subsequent implementability and effectiveness of nonstructural solutions

- Bottom Line: Be sure the criteria used for formulating for structures in your alternatives (when combined with policy criteria) will provide a consistent and uniform (as opposed to random & arbitrary) implementation plan within the project area.

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PLAN FORMULATION

- Lesson Learned: Formulation approaches that are effective for developing structural storm risk management alternatives may not produce similarly reasonable nonstructural alternatives.

  - Hydrodynamic data is generally developed based on hydraulic reaches.
  - Structural alternatives can isolate or truncate reaches or groups of reaches providing a similarly changed condition for all and allowing uniform aggregation of economic data by hydraulic reach.
  - Nonstructural alternatives are driven by specific vertical elevations and therefore independent of spatial hydraulic reach delineation.
  - As a result the costs and benefits cannot be simply aggregated by hydraulic reach without additional filtering.

- Bottom Line: For nonstructural alternative development and evaluation data must be filtered vertically, by appropriate elevations, in a process generally separate from that applied to structural alternatives.

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PLAN FORMULATION

- Lesson Learned: Holding a Nonstructural Workshop was essential for formulation progress and to interpret evolving nonstructural policy.
  - HQ/OWPR/PDT members gathered for 2 days to discuss various issues
  - Cost was spread across the organization
  - Team members from RE, Env, Eng, Planning, and Econ participated
  - Helped clarify important formulation and policy issues

- Bottom Line: When there are big issues that cannot reach resolution through milestone meetings or In-Progress Reviews, it can be helpful to sit everyone down in the same room and work through differences and/or misunderstandings.

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LESSONS LEARNED – REAL ESTATE

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REAL ESTATE

- Lesson Learned: Unique real estate rights to perform structure elevations or floodproofing
  - ROE may not be sufficient for this type of work
  - There is no standard estate for this type of work
  - District needs to work with HQ to develop language for these rights

- Bottom Line: An important component of the NED plan still needs to be clarified and approved.

LESSONS LEARNED – ECONOMICS

ECONOMICS

- Lesson Learned:
  - Develop BCR and Net Benefits first for the appropriate geographical unit of analysis, and then for the individual structures.
  - Adjust structure inventory if significant damages are occurring at high probability events.
  - Collect detailed information about each structure being considered for a nonstructural alternative.

NONSTRUCTURAL PLAN UNIT OF ANALYSIS

(DEFINING THE COLLECTION OF STRUCTURES INCLUDED IN THE RECOMMENDED PLAN)

By Reach

- 90 Reaches – 63 Occupied – 11 Justified

By Community

- Urban Areas vs. Rural Areas

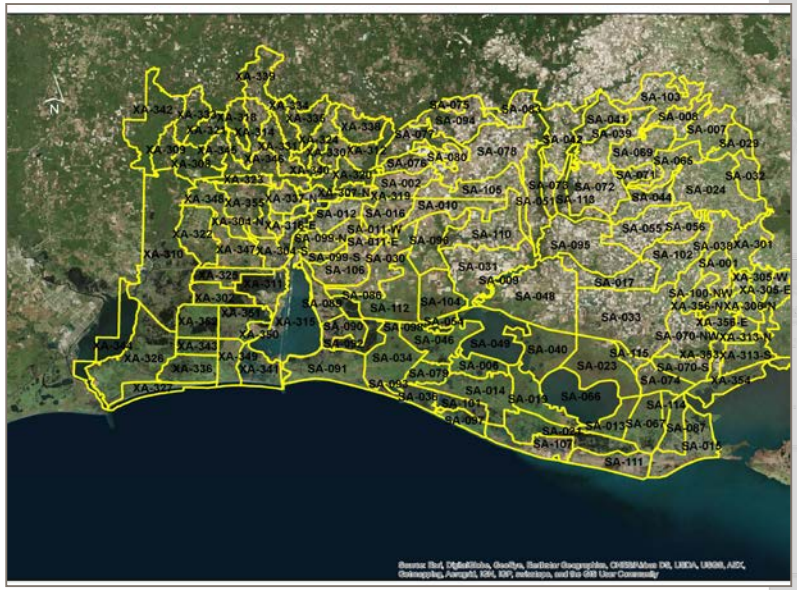
By Total Study Area

- 100-Year Floodplain

By Floodplain

- Tiered Approach within the 100-year Floodplain

By Individual Structure



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FLOODPLAIN SUMMARY OF WITHOUT-PROJECT DAMAGES

	Complete Study Area	Total 100-Year Floodplain	Tier 1 0 to 25 year Floodplain	Tier 2 25 to 50 year Floodplain	Tier 3 50 to 100 year Floodplain
Equivalent Annual					
Without Project Damages	$ 474,571	333,561	280,457	30,428	22,676
Total Number of Structures	51,857	15,667	4,952	4,216	6,499
Residential Structures	46,860	13,934	4,219	3,811	5,904
Non-Residential Structures	3,432	1,003	396	209	398
Warehouses	1,565	730	337	196	197

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EXPECTED ANNUAL DAMAGES (EAD), NET BENEFITS, AND BCR FOR EACH STRUCTURE

					Probability Event								
Struct	Station	Occupanc	Total Value	First Floor Elevation	0.99	0.2	0.1	0.04	0.02	0.01	0.005	0.002	EAD
447286	106	1STY-PIER	129.66	6.51	0.00	4.59	37.68	104.19	126.68	126.68	126.68	126.68	13.03
421116	25	PUBL	282.86	11.15	0.00	0.00	0.36	106.71	128.84	147.42	174.57	244.72	8.89
457898	139	WARE	530.80	5.06	0.00	0.68	110.44	178.35	332.72	406.31	422.01	422.01	27.48
324102	25	1STY-SLAB	189.08	11.09	0.00	0.00	1.23	99.41	102.20	120.63	134.93	178.58	7.68

Struct	Station	Occupancy Type	Total Value	First Floor Elevation	Without Alt EAD 2075	With Alt EAD 2075	Damages Reduced 2075	Damages Reduced 2025	AA Equivalent	AA Cost	Net Benefits	B/C Ratio
447286	106	1STY-PIER	129.66	6.51	13.03	0.81	12.21	7.31	9.76	5.00	4.76	1.95
421116	25	PUBL	282.86	11.15	8.89	0.99	7.90	8.04	7.97	4.54	3.43	1.76
457898	139	WARE	530.80	5.06	27.48	6.21	21.26	10.77	16.02	17.94	-1.92	0.89
324102	25	1STY-SLAB	189.08	11.09	7.68	0.85	6.83	7.14	6.98	9.60	-2.62	0.73

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ECONOMICS

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INITIAL FUTURE WITHOUT-PROJECT CONDITION DAMAGES ARE OVERSTATED

- Severe Flood Damage Adjustment
  - Structure Damage ≥ 50% for 0.04 (25-yr) ACE, then Reset First Floor Elevation = 2075 0.01 (100-yr) ACE event stage

- Used the probability-damage relationship from the HEC-FDA model to determine if 50% of the structure is damaged and the modules feature in the model to reset first floor elevations.

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PROBABILITY-DAMAGE RELATIONSHIP

(DAMAGES IN $1,000'S)

				Probability Event							
Structure Name	Reach Name	Occupancy Type	Structure Value	0.99	0.2	0.1	0.04	0.02	0.01	0.005	0.002
110895	XA-307(283)	1STY-SLAB	157.28	30.36	67.45	88.14	144.70	144.70	144.70	144.70	144.70
111226	XA-307(283)	1STY-PIER	82.31	0.00	30.53	48.34	57.91	58.26	63.15	76.14	80.25
111229	XA-307(283)	MOBHOM	7.50	0.00	0.65	3.30	5.77	7.32	7.32	7.32	7.32
150906	SA-034(79)	1STY-SLAB	143.68	0.00	0.00	0.00	13.06	65.76	132.19	132.19	132.19
153696	XA-356(439)	1STY-SLAB	172.93	0.00	0.00	0.57	11.88	50.87	74.99	96.91	159.10

MODULE ASSIGNMENT

Struc_Name	Cat_Name	Stream_Name	Occ_Name	Station	Struc_Val	1F_Stage	Mod_Name
110901	RES	SW Coastal	1STY-PIER	283	99.81	8.36	WO_2025NoRaise
110901R	RES	SW Coastal	1STY-PIER	283	99.81	12.4	WO_2025Raise

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ECONOMICS

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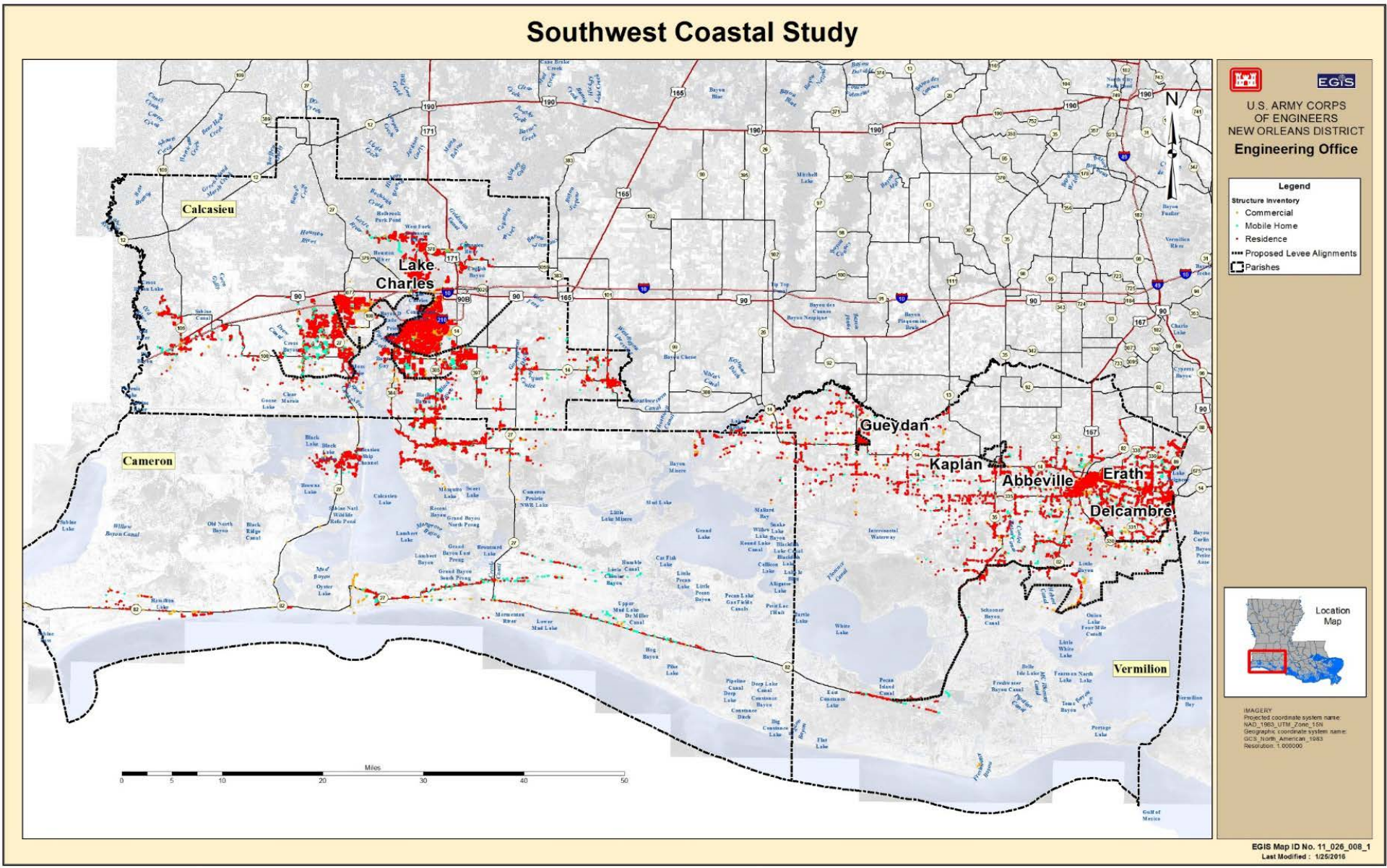
STRUCTURE INVENTORY



NONSTRUCTURAL MEASURES

- Elevating residential structures

- Flood proofing non-residential structures

- Localized storm surge risk reduction measures around warehouses

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STRUCTURE-RAISING COSTS

(DOLLARS PER SQUARE FOOT IN 2015 PRICE LEVEL)

Ft. Raised	1-Sty Slab	2-Sty Slab	1-Sty Pier	2-Sty Pier	Mobile Home
1	74.52	82.62	65.88	72.90	36.72
2	74.52	82.62	65.88	72.90	36.72
3	76.14	84.24	68.58	75.60	36.72
4	78.84	89.64	68.58	75.60	36.72
5	78.84	89.64	68.58	75.60	44.82
6	80.46	91.26	70.20	77.22	44.82
7	80.46	91.26	70.20	77.22	44.82
8	83.16	93.96	71.82	78.84	44.82
9	83.16	93.96	71.82	78.84	44.82
10	83.16	93.96	71.82	78.84	44.82
11	83.16	93.96	71.82	78.84	44.82
12	83.16	93.96	71.82	78.84	44.82
13	85.86	99.36	73.44	80.46	44.82

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LESSON LEARNED ECONOMICS SUMMARY

- Benefits and costs were based on structures that were economically justified on an individual basis within the 25-year floodplain.

- A severe damage adjustment was applied to the future condition structure inventory based on input from the Nonstructural Workshop (HQ, Division, District).

- Detailed structural information was useful in determining the benefits and costs of the nonstructural measures on an individual structure basis.

LESSONS LEARNED – ENVIRONMENTAL

ENVIRONMENTAL

Lessons Learned:

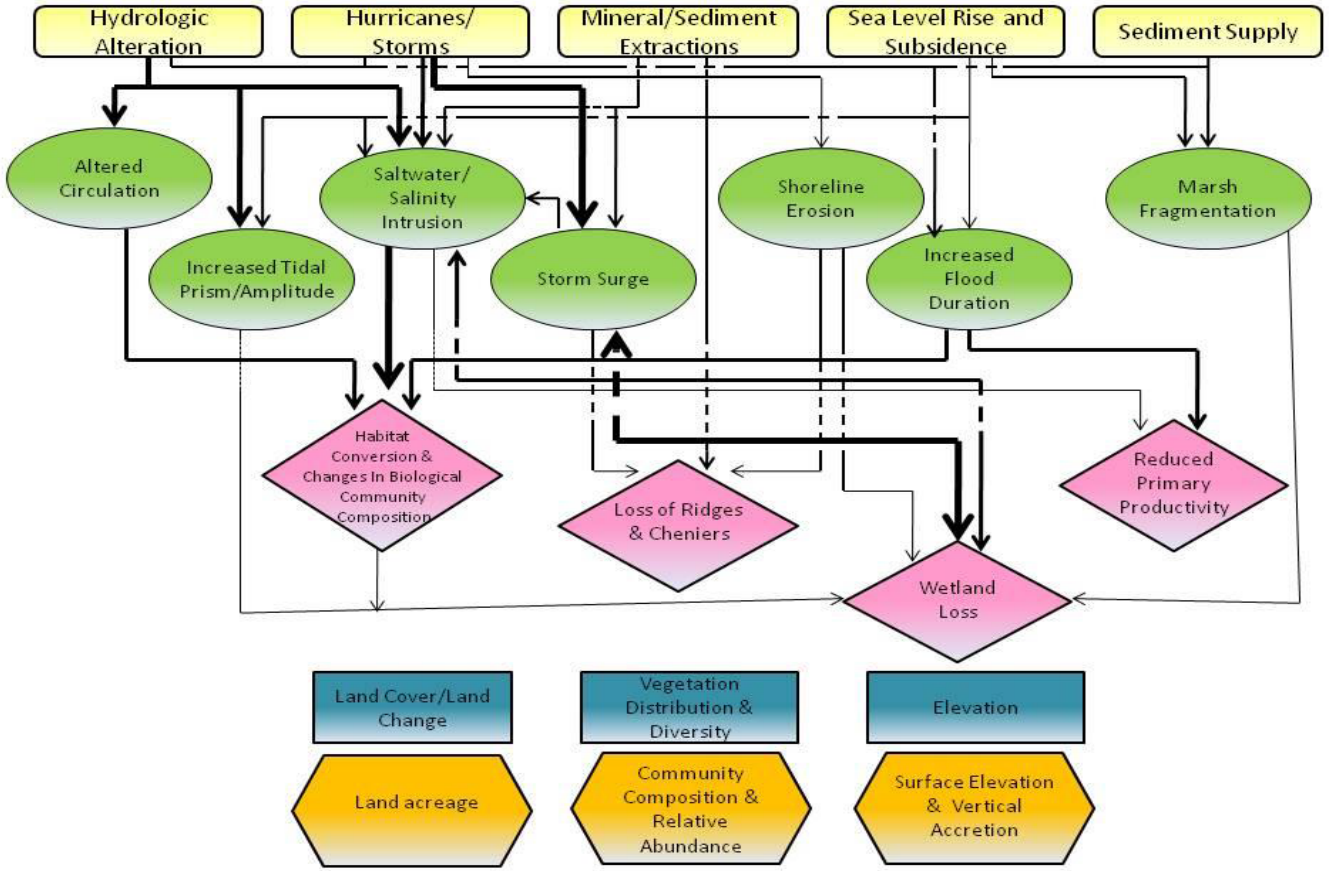
- Conceptual Ecological Model – As soon as possible, develop a CEM to help understand the dynamic human and natural ecosystem interactions, identify important processes, facilitate communication, and provide a scientific framework for restoration and, later, for developing a monitoring plan for ecological success.

- Integrated Coastal Risk Reduction – Integrated human and natural systems require an integrated NED and NER approach to coastal storm damage risk reduction and ecosystem restoration.

- Define Key Terms – Ensure that key terms are defined, understood, and used in the same way among and between different disciplines, the PDT, and the VT.

CONCEPTUAL ECOLOGICAL MODEL

Lesson Learned: develop a CEM as early as possible!



Bottom Line: the CEM is a crucial tool for simultaneously learning about, monitoring, and managing an ecosystem.

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INTEGRATED COASTAL RISK REDUCTION

Lesson Learned: integrated or coupled human – natural systems require consideration of coupled NED and NER approaches.

Bottom Line: reduce risks and increase human & ecosystem resilience by combining natural, nature-based, nonstructural, and structural measures.

*"Coastal Risk Reduction and Resilience" 2013 Civil Works Directorate http://www.corpsclimate.us/ccacrrr.cfm

DEFINE KEY TERMS

"PROGRAMMATIC NEPA DOCUMENT" VS "A PROGRAM"

Lesson Learned: Define key terms early in the study.

"Programmatic" NEPA reviews*:

Provides a broad or high-level NEPA review that assesses environmental impacts of proposed policies, plans, ***programs***, or projects for which subsequent actions will be implemented based on a PEA or PEIS or based on subsequent NEPA reviews tiered to the PEA or PEIS.

"Program"

Programmatic NEPA review can, but is not limited to, assessment of "programs".

Bottom Line: Avoid confusion and potential delays because word choice from one discipline is not necessarily defined or interpreted the same in other disciplines, whether at the PDT, or VT levels.

*CEQ 2014 Memo "Effective Use of Programmatic NEPA Reviews"
https://www.whitehouse.gov/administration/eop/ceq/initiatives/nepa/programmatic-reviews

**http://www.usace.army.mil/Missions/Civil-Works/

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LESSONS LEARNED – HEADQUARTERS PERSPECTIVE

HEADQUARTERS

- Lessons Learned:
  - Having multidisciplinary workshop meetings to walk through implementation plan (i.e. nonstructural). Needs all level involvement and must be structured.
  - Develop overall strategy for large scale projects where features are not dependent on each other. Helps with overall recommendation on why here, why now?
  - Defining key terms early (i.e. regulatory floodway, etc.).
  - Do not rush to a draft report to meet a milestone.

CONTACTS

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Project Management
Team Lead: PJ Varnado

Real Estate
Team Lead: Judi Gutierrez

Questions?

Type questions in the chat box.
We will answer as many
as time allows.

This webinar will be posted to the
Planning Community Toolbox:
http://www.corpsplanning.us

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