COMPREHENSIVE DOCUMENTATION OF BENEFITS: GUIDANCE, REQUIREMENTS, AND NEW TOOLS

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U.S. ARMY

US Army Corps of Engineers®

AGENDA

- Introduction and Key Concepts
- Overview of Guidance and Related Requirements
- C BEST Tool
- Quick Look Tools
- Table of Effects
- Case Study
- Questions / Discussion

INTRODUCTION AND KEY CONCEPTS

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5 January 2021

MEMORANDUM FOR COMMANDING GENERAL, U.S. ARMY CORPS OF ENGINEERS

SUBJECT: POLICY DIRECTIVE – Comprehensive Documentation of Benefits in Decision Document

GUIDANCE AND REQUIREMENTS

ASA(CW) Memo (5Jan21) – Comprehensive Documentation of Benefits in Decision Documents

- Identify and analyze benefits in total and equally across a full array of benefit categories
- Life Safety Objective Required for all FRM and CSRM Studies
- Include a plan that maximizes net total benefits across all benefit categories in the final array
- Include a non-structural plan for FRM studies in the final array
- Include a locally-preferred plan if requested by the sponsor

GUIDANCE AND REQUIREMENTS

Planning Bulletin 2019-04 (20Jun19) – Incorporating Life Safety into Flood and Coastal Storm Risk Management Studies

- When existing dams and levees are in the study area, must include specific objectives regarding achieving Tolerable Risk Guidelines (TRGs)
- Studies that include existing or proposed levee systems and dams must include a minimum of alternative that addresses TRG 1 and TRG 4

CECW-P Memo (13Jan23) – Interim Environmental Justice Guidance for Civil Works Planning Studies

- Identify study-specific objectives and constraints to provide benefits and avoid disproportionate impacts to underserved and disadvantaged communities

Pre-pub Draft ER 1105-2-103 – Policy for Conducting Civil Works Planning Studies

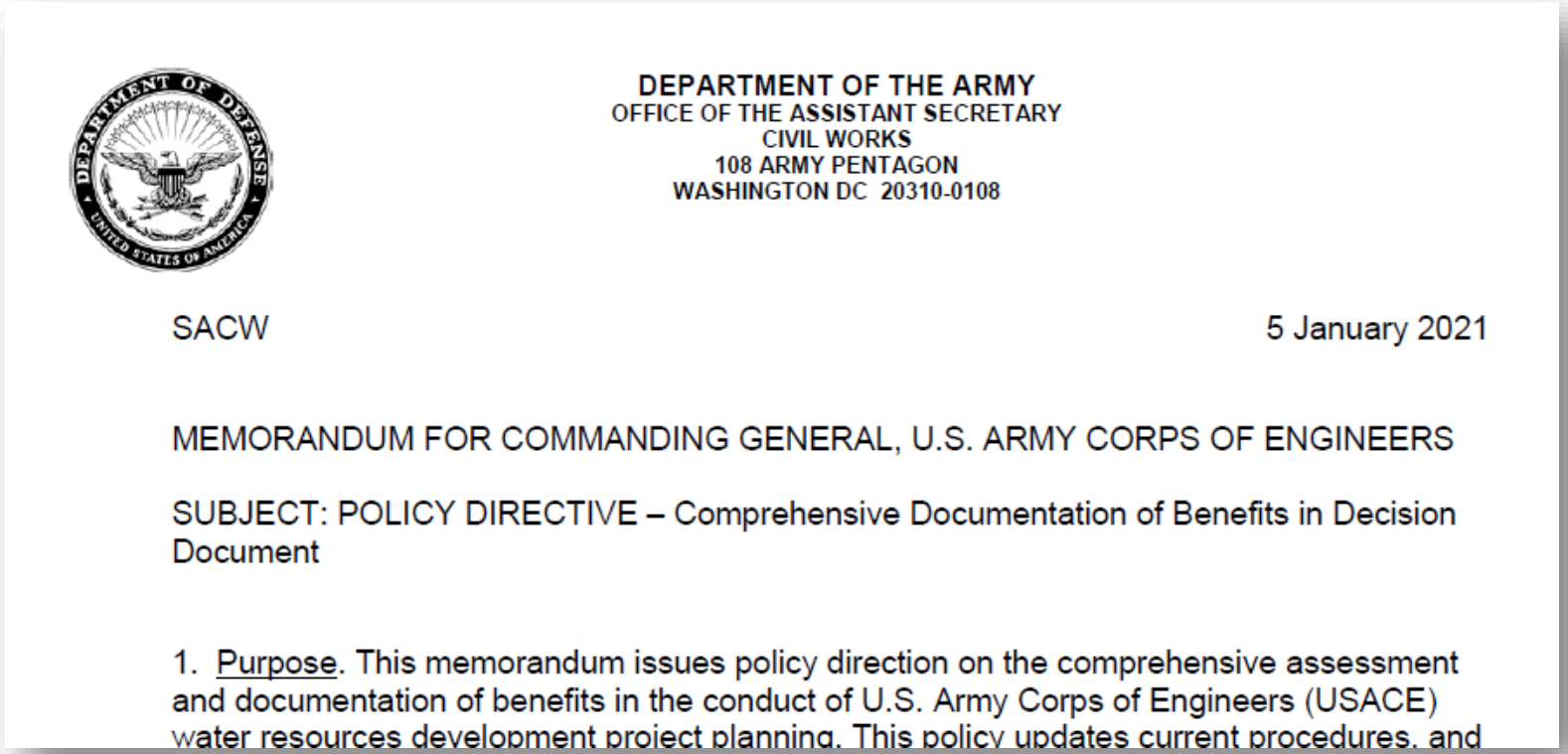
- Include the Least Environmentally Damaging Practicable Alternative (LEDPA) in the array of alternatives

C-BEST: PURPOSE AND NEED

MAX MILLSTEIN, SAD

C-BEST: Comprehensive Benefit Evaluation and Scoping Tool

- PDTs need a tool to systematically determine what effects the proposed project or action will have and should be evaluated
- Brainstorming tool
- Identify and discuss what metrics could be used to measure project effects and how those will be useful to inform decision-making



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SUBJECT: POLICY DIRECTIVE – Comprehensive Documentation of Benefits in Decision Document

1. Purpose. This memorandum issues policy direction on the comprehensive assessment and documentation of benefits in the conduct of U.S. Army Corps of Engineers (USACE) water resources development project planning. This policy updates current procedures, and

C-BEST: PURPOSE AND NEED

- C-BEST helps study teams "**bake in**" comprehensive benefits from the very start, as opposed to "**sprinkling it on**" after plan formulation is already completed.

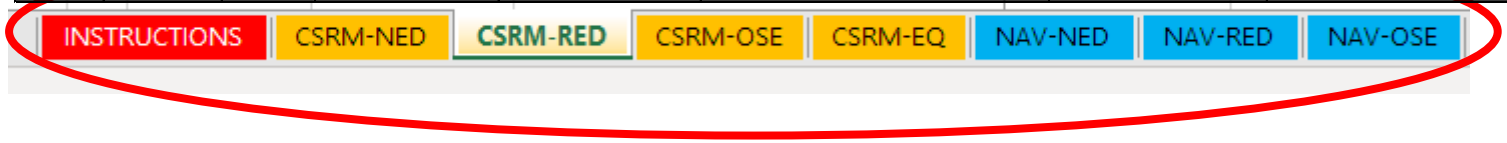
- Helps PDTs "Wrap their heads around" what kinds of benefits could potentially be claimed and how those can be measured

WHEN TO USE IT

- Use the tool early in the study process
- As early as initial scoping meeting, but before the Alternatives Milestone
- Used to inform the scope and schedule of the analysis; i.e., model reviews and certification, data needs, etc.

WHAT IS THE TOOL?

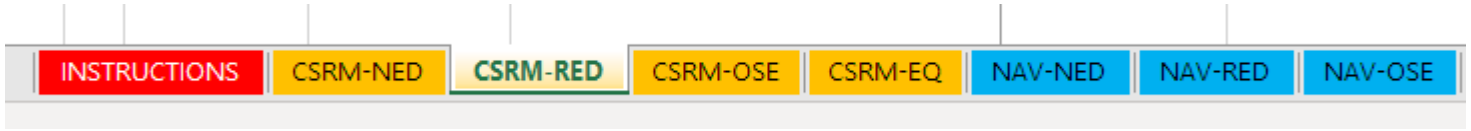
CSRM Indicators & Metrics							
Code	**National Account**	**Typical ?**	**Effect Category**	**Effect**	**Effect Description / Relationship to Project**	**Quantitative / Qualitative**	**Metric(s) / Indicator(s)**
RED-1	RED	**Y**	**Changes to Regional Economic Activity**	**Employment**	Changes to employment due to property damages and/or shorefront losses from coastal storms	Quantitative	# person years (which is equal to # people employed x number of years)
RED-2	RED	**Y**	**Changes to Regional Economic Activity**	**Income**	Changes to income due to property damages and/or shorefront losses from coastal storms	Quantitative	$ in income
RED-3	RED	**Y**	**Changes to Regional Economic Activity**	**Value Added (GSP,GRP,GMP)**	Changes to the value of output due to property damages and/or shorefront losses from coastal storms	Quantitative	$ value in GSP/GRP/GMP
RED-4	RED	**N**	**Changes to Regional Economic Activity**	**Business Revenues**	Changes to business revenue due to property damages and/or shorefront losses from coastal storms	Quantitative	$ value of business revenue or output



- Excel Spreadsheet-Based Tool
  - Color-coded
- List of Common and Not-so-common Indicators and Metrics
- One Tab for each Business Line and P&G Account
- Pre-populated List of Effects, Metrics, and Models that can be used to quantify effects.

HOW TO USE IT

1. Select your business line



2. (Together with the PDT) Go down the list of potential project effects and decide which effects will most likely be impacted by the proposed project/action.

3. Determine which metrics can be used to measure project effects, the level of effort to measure effects, and the value added to decision-making.

4. Add more effects and metrics as necessary.

FRM Indicators & Metrics							
Code	**National Account**	**Typical ?**	**Effect Category**	**Effect**	**Effect Description / Relationship to Project**	**Quantitative / Qualitative**	**Metric(s) / Indicator(s)**
OSE-1	OSE	**Y**	**Health & Safety**	**Size of the Population at Risk (PAR)**	# of people potentially impacted by riverine flood hazard	Semi-Quantitative	# people in PAR
OSE-2	OSE	**Y**	**Health & Safety**	**Life Safety Risk**	Estimation of lives lost from the riverine flood hazard	Quantitative	Estimated # of lives lost
OSE-3	OSE		**Social Connectedness**	**Community Citizen Ratings**	Potential impact from riverine flooding on citizen ratings of the community as a good place to live	Qualitative	Citizen Ratings of the community as a good place to live
OSE-4	OSE		**Social Connectedness**	**Civic Participation**	Potential impact from riverine flooding on # of civic and community organizations/ members	Quantitative	# of civic and community organizations/ members

HOW TO USE IT

4. Verify tool's default values in columns D-H
   (PDTs should modify the default values in any field to better suit their specific study.)

D	E	F	G	H
CSRM Indicators & Metrics				
Effect Category	Effect	Effect Description / Relationship to Project	Quantitative / Qualitative	Metric(s)

5. For each project effect that the PDT determines would be useful and relevant to measure, fill out columns I-M.

I	J	K	L	M
Assessment of CSRM Metric as Decision Criteria				
Relationship of Metric to Problems & Opportunities	Metric Use in Planning (Can metric be used to distinguish between alternatives or just register FWOP and Recommended Plan Impacts?)	Level of Effort to Measure (None, Low, Medium, High)	Value Added to Decision Making (None, Low, Medium, High, Critical)	Potential EJ Impacts

6. Use columns N-R to determine which models and methods are best suited to qualify and/or quantify the evaluation metrics

N	O	P	Q	R
Methods used to Qualify and/or Quantify the CSRM Metrics				
Model Option 1	Model Option 2	Model Option 3	Other Data Collection / Metric Measurement / Modeling Options	Modeling Option Notes and Limitations

EXAMPLES: CSRM-NED

CSRM Indicators & Metrics							
Code	**National Account**	**Typical ?**	**Effect Category**	**Effect**	**Effect Description / Relationship to Project**	**Quantitative / Qualitative**	**Metric(s) / Indicator(s)**
NED-1	NED	**Y**	**Damages to Property & Infrastructure**	**Flood Damages to Buildings**	Storm surge inundation damages to property from coastal storms	Quantitative	$ in damage
NED-2	NED	**Y**	**Damages to Property & Infrastructure**	**Erosion Damages to Buildings**	Erosion damage to property from coastal storms	Quantitative	$ in damage
NED-3	NED	**Y**	**Damages to Property & Infrastructure**	**Wave Attack Damages to Buildings**	Wave attack damages to property from coastal storms	Quantitative	$ in damage

EXAMPLES: CSRM-NED

CSRM Indicators & Metrics			Assessment of CSRM Metric as Decision Criteria				
Code	**National Account**	**Effect**	**Relationship of Metric to Problems & Opportunities**	**Metric Use in Planning (Can metric be used to distinguish between alternatives or just register FWOP and Recommended Plan Impacts?)**	**Level of Effort to Measure (None, Low, Medium, High)**	**Value Added to Decision Making (None, Low, Medium, High, Critical)**	**Potential EJ Impacts**
NED-1	NED	**Flood Damages to Buildings**	*Critical Importance; Primary Objective of the Project*	*Yes; Can fully evaluate differences between alternatives*	High	High	*EJ Community located within the project area will be affected*
NED-2	NED	**Erosion Damages to Buildings**	*Critical Importance; Primary Objective of the Project*	*Yes; Can fully evaluate differences between alternatives*	High	High	*EJ Community located within the project area will be affected*
NED-3	NED	**Wave Attack Damages to Buildings**	*Critical Importance; Primary Objective of the Project*	*Yes; Can fully evaluate differences between alternatives*	High	High	*EJ Community located within the project area will be affected*

EXAMPLES: CSRM-NED

CSRM Indicators & Metrics		Methods used to Qualify and/or Quantify the CSRM Metrics				
Code	**Effect**	**Model Option 1**	**Model Option 2**	**Model Option 3**	**Other Modeling Options**	**Other Modeling Option Limitations**
NED-1	**Flood Damages to Buildings**	Beach-Fx: Account for life cycle flood damages to buildings primarily in ocean front environments. Could be used on backbays in a pinch	G2CRM: Account for life cycle flood damages to buildings primarily in back bay environments. Could be used on oceanfront in a pinch		HEC-RAS + HEC-FDA; HEC-RAS + HEC-FIA; GIS + Spreadsheet	HEC-FDA/FIA: Does not automatically factor in tide, shoreline change or SLR. Is not life cycle monte carlo simulation based
NED-2	**Erosion Damages to Buildings**	Beach-Fx: Account for life cycle erosion damages to buildings			HEC-RAS + HEC-FDA; HEC-RAS + HEC-FIA; GIS + Spreadsheet	HEC-FDA/FIA: Does not automatically factor in tide, shoreline change or SLR. Is not life cycle monte carlo simulation based
NED-3	**Wave Attack Damages to Buildings**	Beach-Fx: Account for life cycle wave attack damages to buildings	G2CRM: accounts for wave contribution to total water level in damage estimates		HEC-RAS + HEC-FDA; HEC-RAS + HEC-FIA; GIS + Spreadsheet	HEC-FDA/FIA: Does not automatically factor in tide, shoreline change or SLR. Is not life cycle monte carlo simulation based

EXAMPLES: CSRM-OSE

CSRM Indicators & Metrics							
Code	**National Account**	**Typical ?**	**Effect Category**	**Effect**	**Effect Description / Relationship to Project**	**Quantitative / Qualitative**	**Metric(s) / Indicator(s)**
OSE-1	OSE	**Y**	**Health & Safety**	**Size of the Population at Risk (PAR)**	# of people potentially impacted by coastal storm hazard	Semi-Quantitative	# people in PAR
OSE-2	OSE	**Y**	**Health & Safety**	**Life Safety Risk**	Estimation of lives lost from the coastal storm hazard	Quantitative	Estimated # of lives lost
OSE-9	OSE	**N**	**Social Connectedness**	**Quality of Life Views**	Impact from coastal storms on views on quality of life	Qualitative	Views on quality of life
OSE-10	OSE	**N**	**Social Connectedness**	**Equity & Diversity Views**	Impact from coastal storms on views on equity and diversity in community	Qualitative	Views on equity and Diversity in community
OSE-11	OSE	**N**	**Social Connectedness**	**Access to Community Services**	Impact from coastal storms on change in number of community services available; change in number of residents using those services	Quantitative / Semi-Quantitative	Change in number of community services available; change in number of residents using those services
OSE-12	OSE	**N**	**Communal Identity**	**Core Values**	Impact from coastal storms on core values	Qualitative	Change in Core Values
OSE-13	OSE	**N**	**Communal Identity**	**Key Traditions**	Impact from coastal storms on key traditions	Qualitative	Change in Key Traditions

EXAMPLES: CSRM-EQ

CSRM Indicators & Metrics							
Code	**National Account**	**Typical?**	**Effect Category**	**Effect**	**Effect Description / Relationship to Project**	**Quantitative / Qualitative**	**Metric(s) / Indicator(s)**
EQ-1	EQ		**Habitat Change**	**Environmental Resource Loss**	Habitat change due to shoreline change from coastal storms and/ or sea level rise	Quantitative	Acres of Habitat; habitat units ??
EQ-2	EQ		**Habitat Change**	**T&E Species Risk**	Risk to T&E species due to habitat change from coastal storms and/ or sea level rise	Qualitative / Semi-Quantitative	High, Medium, Low, None ??
EQ-3	EQ		**Cultural Resources**	**# Cultural Resource Sites**	Risk to cultural resource sites from coastal storms and/ or sea level rise	Semi-Quantitative	# Sites impacted ??
EQ-4	EQ		**Cultural Resources**	**# Cultural Resource Buildings**	Risk to cultural resource buildings from coastal storms and/ or sea level rise	Semi-Quantitative	# cultural resource buildings impacted ??
EQ-5	EQ		**Habitat Change**	**Habitat Creation**	Habitat created due to project - e.g. ability for turtles to nest on beaches; dunes for shorebird nesting and foraging, artificial reefs, etc.	Semi-Quantitative	Acres of Habitat; habitat units (annualized)

INTEGRATING EJ / JUSTICE 40 INTO THE C-BEST AND THE PLANNING PROCESS

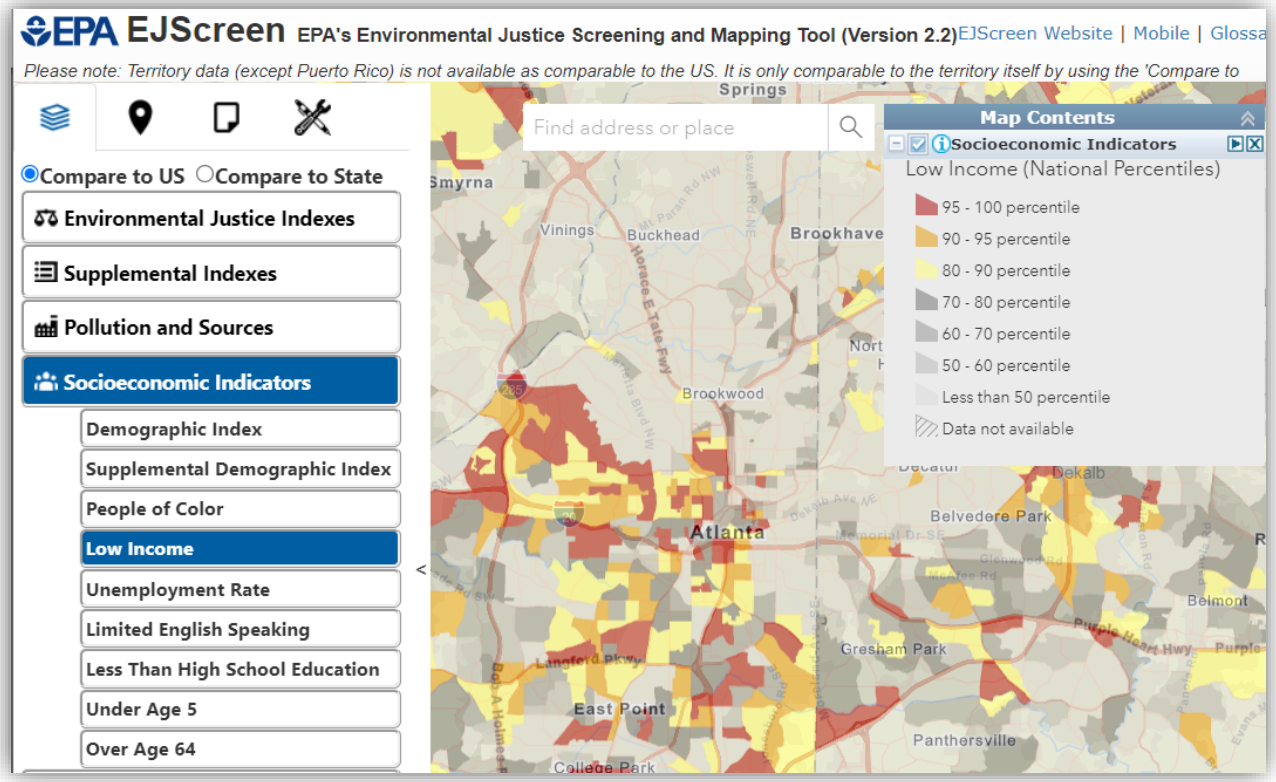
IDDN -

I. **Identify** disadvantaged communities in the project area. Use tools like the EPA's EJScreen and the CEQ's Climate and Economic Justice Screening Tool.

II. **Describe** the identified EJ communities, the specific challenges they face, and how positive or adverse project effects could be measured by a given metric. Use "Potential EJ Impacts" (Column M)

III. **Develop** opportunities and objectives to mitigate adverse effects or maximize positive effects.

IV. **Narrate** the story of the EJ groups and the expected effects of a project on them.



NEXT STEPS

- Feasibility Scoping Guide integration
- PCoP Conference
- SAD Regional planning memo

8. Limitation on Modification. Under no circumstances shall this directive be modified, supplemented, amended, or rescinded, directly or indirectly, nor shall the Corps take action not in accordance with the policies and directions herein, without the express written approval from the ASA(CW). This directive may be republished as an Engineer Circular (EC) provided that (1) the EC's content is verbatim to this memorandum, (2) the

OSE, EJ, COMPREHENSIVE BENEFITS, OH MY

Susan Durden
IWR

SUITE OF QUICK LOOK TOOLS - EXISTING MATERIALS

OSE and SV Analysis: Existing Resources (Tech Note)
https://erdc-library.erdc.dren.mil/jspui/handle/11681/44662

Income, Employment

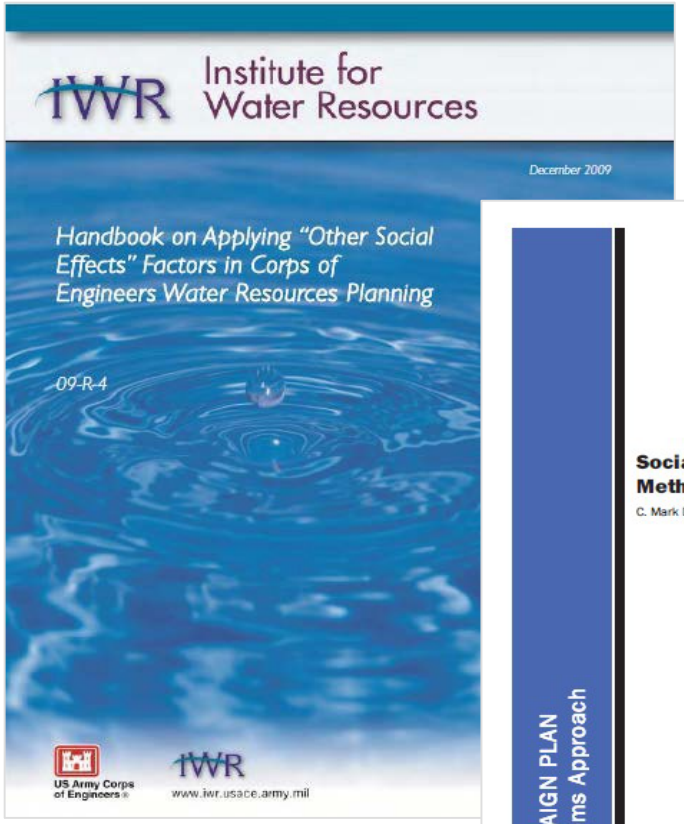
Life, Health, Public Safety

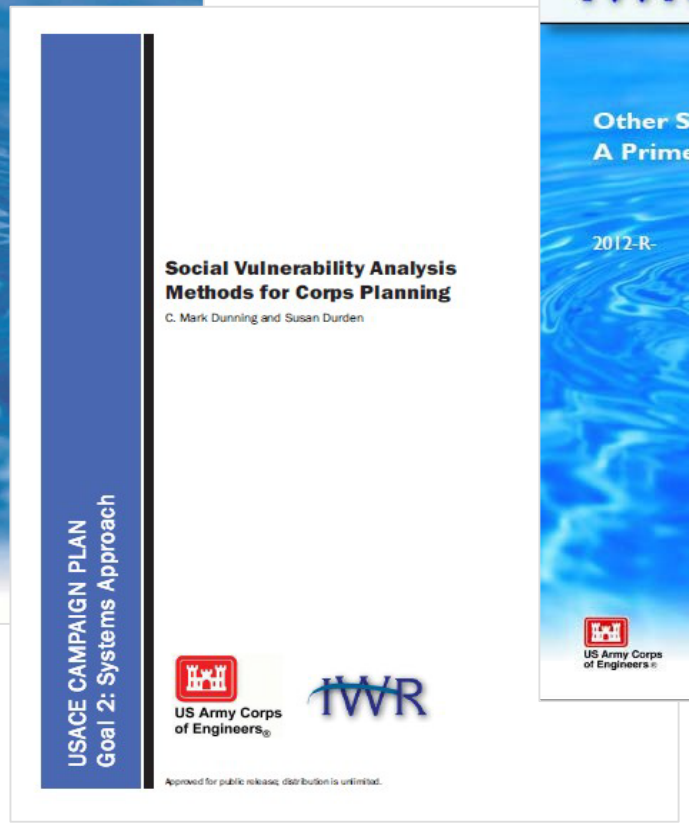
Education, Cultural, Recreation

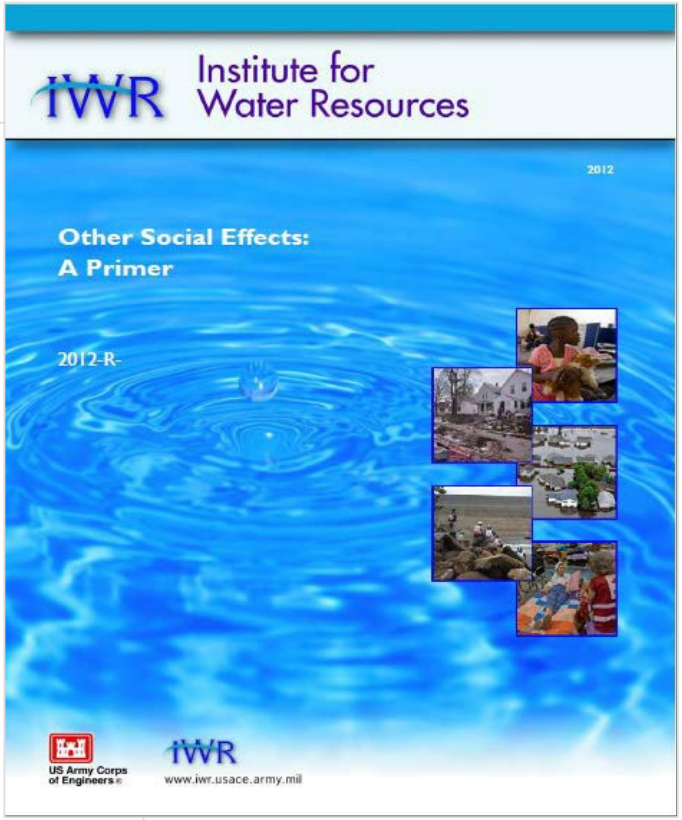
Community Cohesion

Aesthetics

Resilience







GROUND RULES

Confirmation that this is in the Federal interest

- Consideration in decision making

Consider from the beginning of study

- Not a second choice-- “don’t make NED cut”
- Not an add on
- Essential part of problem identification
  - Wrong problem=wrong solution

OSE is the big umbrella

- EJ considerations are OSE
- Socially vulnerable populations bigger group than EJ, disadvantaged
- Key component of comprehensive benefits

LOOK FORWARD
TOOLS AND TECHNIQUES

Quick Look Tools
- *Dashboard*
- Ranger
- *Comprehensive Benefits*
- *SOVI-X*

Techniques
- Monetized OSE
- Multiplier
- Benefit-Cost Equity, aka, Apples to Apples
- OSE, EJ, Risk Informed Planning

Tools, Fact Sheets, Guides for Field Use, White Papers

OSE, EJ Dashboard

How do I know if OSE, EJ is important in my project?

BLUF OSE DASHBOARD

- First Look. 10 minutes—start to finish. No Training—open and go.
- Answers: How important is OSE, EJ?

- Value Added:
  - First Look Screening
  - Direct Project Resources
  - Direct, Inform Outreach

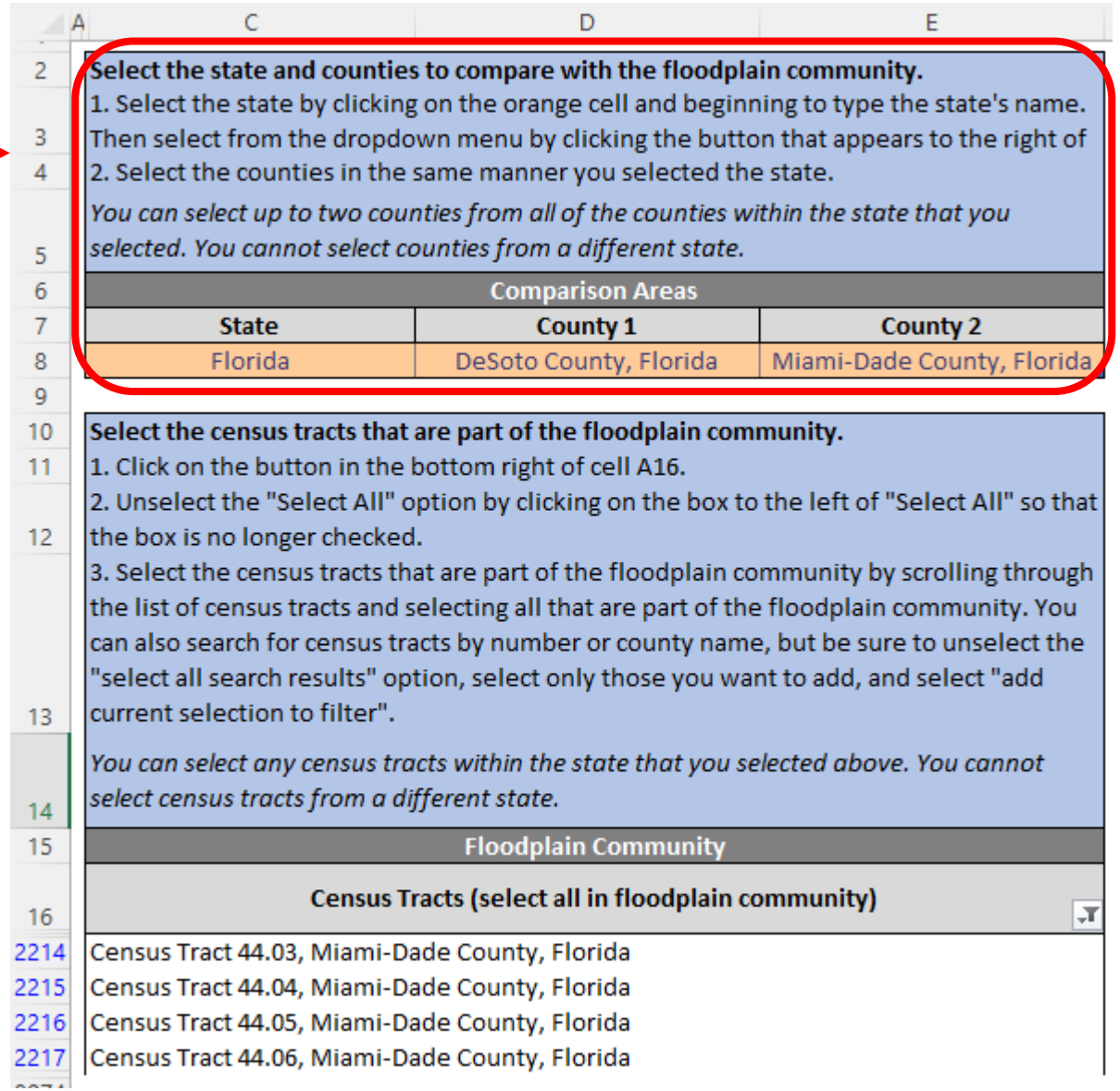
- Inputs: Current census data.
- Outputs: 9 OSE, EJ Factors (by State, County, Project)

Community Profile Dashboard

OSE Analysis Support Tool

USING THE OSE DASHBOARD

Create dashboard by selecting the state and counties that will be used as comparison areas.



Select the state and counties to compare with the floodplain community.

1. Select the state by clicking on the orange cell and beginning to type the state's name. Then select from the dropdown menu by clicking the button that appears to the right of
2. Select the counties in the same manner you selected the state.

You can select up to two counties from all of the counties within the state that you selected. You cannot select counties from a different state.

Comparison Areas		
State	**County 1**	**County 2**
Florida	DeSoto County, Florida	Miami-Dade County, Florida

Select the census tracts that are part of the floodplain community.

1. Click on the button in the bottom right of cell A16.
2. Unselect the "Select All" option by clicking on the box to the left of "Select All" so that the box is no longer checked.
3. Select the census tracts that are part of the floodplain community by scrolling through the list of census tracts and selecting all that are part of the floodplain community. You can also search for census tracts by number or county name, but be sure to unselect the "select all search results" option, select only those you want to add, and select "add current selection to filter".

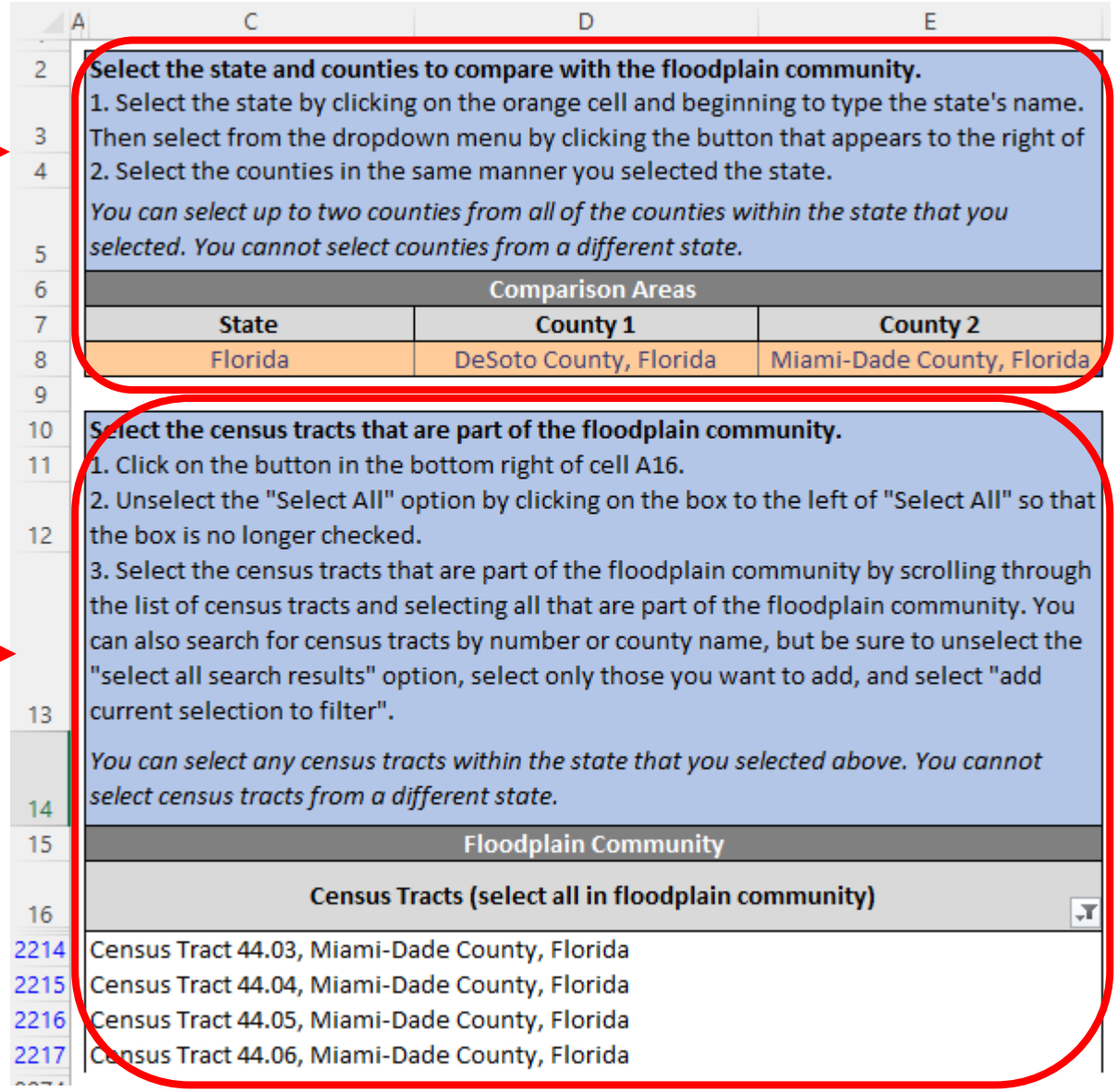
You can select any census tracts within the state that you selected above. You cannot select census tracts from a different state.

Floodplain Community
Census Tracts (select all in floodplain community)
Census Tract 44.03, Miami-Dade County, Florida
Census Tract 44.04, Miami-Dade County, Florida
Census Tract 44.05, Miami-Dade County, Florida
Census Tract 44.06, Miami-Dade County, Florida

USING THE OSE DASHBOARD

Create dashboard by selecting the state and counties that will be used as comparison areas.

Then select the census tracts within the floodplain (FP) community



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Census Tract 44.06, Miami-Dade County, Florida

Community Profile Dashboard

OSE Analysis Support Tool

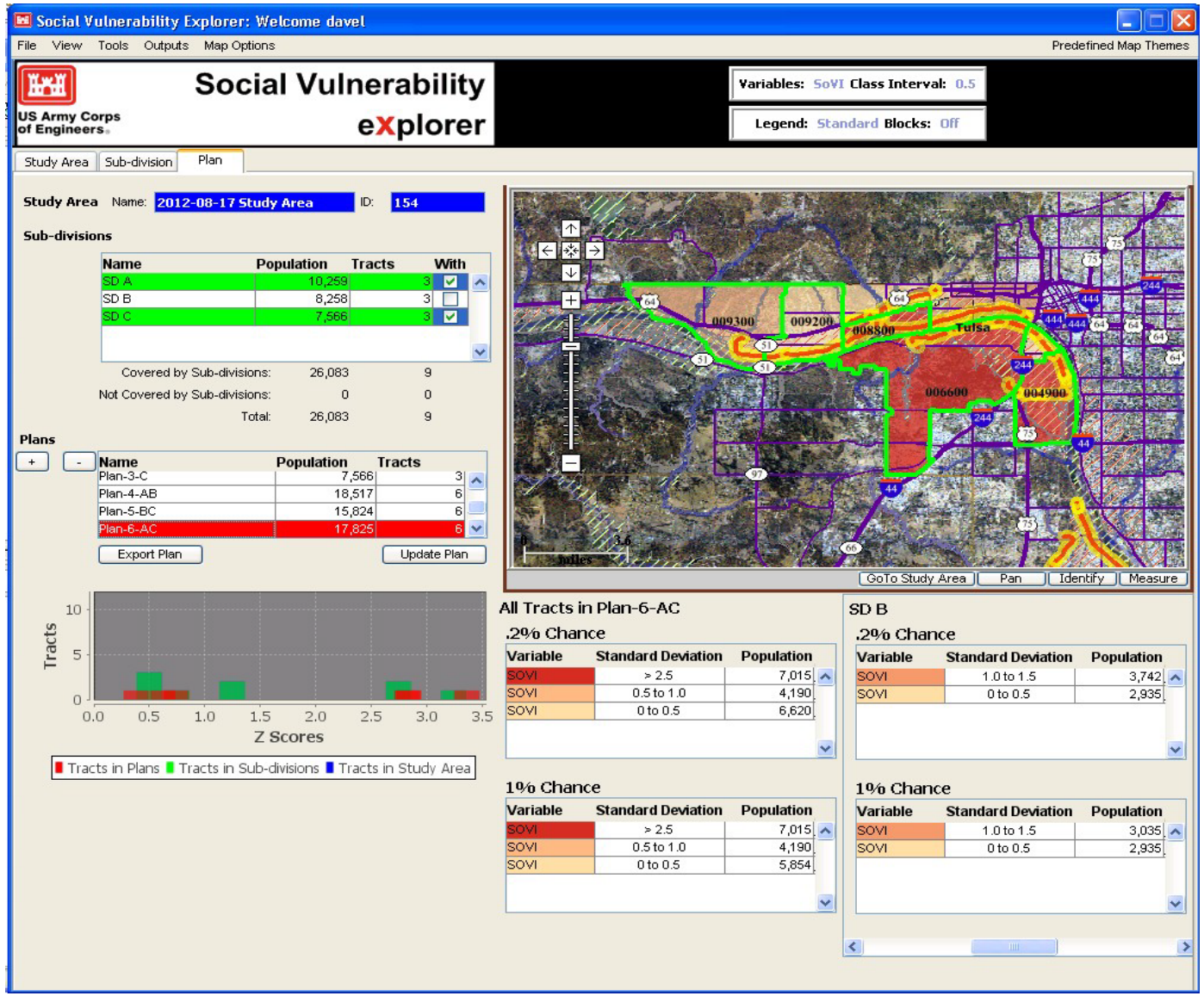
OSE DASHBOARD DATA SOURCES

Census Data Table Name	Census Data Table Number	Downloaded Data
Age and Sex	S0101	2019: ACS 5-Year Estimates Subject Tables
Selected Housing Characteristics	DP04	2019: ACS 5-Year Estimates Data Profiles
Race	B02001	2019: ACS 5-Year Estimates Detailed Tables
Hispanic or Latino Origin	B03003	2019: ACS 5-Year Estimates Detailed Tables
Poverty Status in the Past 12 Months	S1701	2019: ACS 5-Year Estimates Subject Tables
Limited English-Speaking Households	S1602	2019: ACS 5-Year Estimates Subject Tables

OSE DASHBOARD: CALCULATIONS BASED ON CENSUS DATA ARE DONE AUTOMATICALLY AND PRESENTED IN DETAIL TO THE USER AS REFERENCE IF NEEDED

Variable	Comparison Areas			Floodplain Community Census Tracts				
	State	County 1	County 2	Total	Tract 1	Tract 2	Tract 3	Tract 4
	Florida	DeSoto County, Florida	Miami-Dade County, Florida	Floodplain Community	Census Tract 44.03, Miami-Dade County, Florida	Census Tract 44.04, Miami-Dade County, Florida	Census Tract 44.05, Miami-Dade County, Florida	Census Tract 44.06, Miami-Dade County, Florida
Total Population	20,901,636	36,903	2,699,428	12,089	3,739	2,085	3,713	2,552
Hispanic or Latino	5,346,684	11,649	1,848,925	7,622	2,586	1,389	2,463	1,184
Black or African American Alone	3,359,031	4,634	469,202	759	215	0	418	126
American Indian and Alaska Native alone	59,320	31	5,101	0	0	0	0	0
Asian alone	571,276	83	43,152	226	14	11	103	98
Native Hawaiian and Other Pacific Islander alone	12,653	41	790	0	0	0	0	0
Some other race alone	625,079	584	107,096	3,395	1,111	521	1,212	551
Two or more races	572,021	451	45,587	423	193	111	76	43
Minority	5,199,380	5,824	670,928	4,803	1,533	643	1,809	818
% Hispanic or Latino	26%	32%	68%	63%	69%	67%	66%	46%
% Black or African American Alone	16%	13%	17%	6%	6%	0%	11%	5%
% American Indian and Alaska Native alone	0%	0%	0%	0%	0%	0%	0%	0%
% Asian alone	3%	0%	2%	2%	0%	1%	3%	4%
% Native Hawaiian and Other Pacific Islander alone	0%	0%	0%	0%	0%	0%	0%	0%
% Some other race alone	3%	2%	4%	28%	30%	25%	33%	22%
% Two or more races	3%	1%	2%	3%	5%	5%	2%	2%
% Minority	25%	16%	25%	40%	41%	31%	49%	32%
Total Housing Units	9,448,159	15,189	1,024,194	9,181	2,573	2,234	2,234	2,140
Occupied Housing Units	7,736,311	12,072	883,372	6,446	1,906	1,228	1,790	1,522
Limited English Households	535,402	1,369	221,470	2,012	533	535	678	266
Poverty Status Determined Population	20,481,252	35,018	2,661,642	11,781	3,431	2,085	3,713	2,552
Below Poverty Level	2,870,487	9,399	455,005	2,583	769	663	921	230
Population 60 years and over	5,550,437	10,295	581,463	2,258	575	649	654	380
Population 5 and under	1,128,214	1,861	157,980	721	178	151	248	144
Mobile home	840,074	4,703	12,638	36	12	0	0	24
No vehicles available	489,240	831	91,296	2,619	838	495	868	418
Built 1939 or earlier	199,169	353	37,285	1,735	882	277	521	55
% Limited English Households	6.9%	11.3%	25.1%	31.2%	28.0%	43.6%	37.9%	17.5%
% Below poverty level	14.0%	26.8%	17.1%	21.9%	22.4%	31.8%	24.8%	9.0%
% Population 60 years and over	26.6%	27.9%	21.5%	18.7%	15.4%	31.1%	17.6%	14.9%
% Population 5 and under	5.4%	5.0%	5.9%	6.0%	4.8%	7.2%	6.7%	5.6%
% Mobile home	8.9%	31.0%	1.2%	0.4%	0.5%	0.0%	0.0%	1.1%
% No vehicles available	6.3%	6.9%	10.3%	40.6%	44.0%	40.3%	48.5%	27.5%
% Built 1939 or eariler	2.1%	2.3%	3.6%	18.9%	34.3%	12.4%	23.3%	2.6%

SOVI-X
SOCIAL VULNERABILITY INDEX EXPLORER



SOVI-X KEY ACTIONS

1. Assemble SVA base map, “parent area”
2. Delineate “study area” boundaries
3. Create SoVI for study area
4. Identify relevant “sub-areas” (i.e. reaches, neighborhoods, etc.)
5. Create table of “population at risk” under “without project” and “with project” assumptions for study area/sub-areas
6. Export relevant information to planning documents

DRILLING DOWN TO BETTER UNDERSTAND SOCIAL VULNERABILITY CHARACTERISTICS OF PAR

Study Area:	Plan-6-AC					
			1% Chance Flood		.2% Chance Flood	
Population			Without	With	Without	With
Total:	26,083		5,970	17,059	6,677	17,825
1% Chance Flood:	23,029					
.2% Chance Flood:	24,502					
Vulnerability Index	Class Breaks					
	Low	High				
SoVI	2.5			7,015		7,015
SoVI	2.0	2.5				
SoVI	1.5	2.0				
SoVI	1.0	1.5	3,035		3,742	
SoVI	0.5	1.0		4,190		4,190
SoVI	0	0.5	2,935	5,854	2,935	6,620
SoVI	-0.5	0				
SoVI	-1.0	-0.5				
SoVI	-1.5	-1.0				
SoVI	-2.0	-1.5				
SoVI	-2.5	-2.0				
SoVI		-2.5				

			1% Chance Flood		.2% Chance Flood	
Population			Without	With	Without	With
Total:	26,083		5,970	17,059	6,677	17,825
1% Chance Flood:	23,029					
.2% Chance Flood:	24,502					
Vulnerability Index	Class Breaks					
	Low	High				
SoVI	3.0			1,620		1,620
SoVI	2.0	3.0		5,395		5,395
SoVI	1.0	2.0	3,035		3,742	
SoVI	0	1.0	2,935	10,044	2,935	10,810
SoVI	-1.0	0				
SoVI	-2.0	-1.0				
SoVI	-3.0	-2.0				
SoVI		-3.0				
Race and Poverty +	3.0					
Race and Poverty +	2.0	3.0		2,316		3,082
Race and Poverty +	1.0	2.0		2,531		2,531
Race and Poverty +	0	1.0	5,970	8,674	6,677	8,674
Race and Poverty +	-1.0	0		3,538		3,538
Race and Poverty +	-2.0	-1.0				
Race and Poverty +	-3.0	-2.0				
Race and Poverty +		-3.0				
Urban/Rural II	3.0					
Urban/Rural II	2.0	3.0				
Urban/Rural II	1.0	2.0		5,180		5,946
Urban/Rural II	0	1.0	5,970	11,879	6,677	11,879
Urban/Rural II	-1.0	0				
Urban/Rural II	-2.0	-1.0				
Urban/Rural II	-3.0	-2.0				
Urban/Rural II		-3.0				
Wealth -	3.0					
Wealth -	2.0	3.0				
Wealth -	1.0	2.0				
Wealth -	0	1.0	5,970	17,059	6,677	17,825
Wealth -	-1.0	0				
Wealth -	-2.0	-1.0				
Wealth -	-3.0	-2.0				
Wealth -		-3.0				
Age +	3.0					
Age +	2.0	3.0				
Age +	1.0	2.0		3,538		3,538
Age +	0	1.0	4,260	8,674	4,967	8,674
Age +	-1.0	0	1,710	2,531	1,710	2,531
Age +	-2.0	-1.0		2,316		3,082
Age +	-3.0	-2.0				
Age +		-3.0				
Hispanic +	3.0					
Hispanic +	2.0	3.0				
Hispanic +	1.0	2.0	1,710		1,710	
Hispanic +	0	1.0	1,325	8,674	2,032	8,674
Hispanic +	-1.0	0		8,385		9,151
Hispanic +	-2.0	-1.0	2,935		2,935	
Hispanic +	-3.0	-2.0				
Hispanic +		-3.0				
High Pop. Households +	3.0					
High Pop. Households +	2.0	3.0				
High Pop. Households +	1.0	2.0				
High Pop. Households +	0	1.0		7,015		7,015
High Pop. Households +	-1.0	0	5,970	7,728	6,677	7,728
High Pop. Households +	-2.0	-1.0				
High Pop. Households +	-3.0	-2.0		2,316		3,082
High Pop. Households +		-3.0				

Status

- Doing Refresh
- Beta version received late July
- Technical Team Testing

Rollout

- 1st quarter FY 24
- Available by request Sept 2023

Quick Look
Comprehensive Benefits Tool

How-To-Use

PURPOSE OF THE COMPREHENSIVE BENEFITS TOOL

Provides planners with a **simple** and **easy** way to compare alternative plans across multiple user-defined criteria (e.g., NED impacts, impacts to EJ communities).

Evaluate measures or plans for each account (NED, RED, OSE, & EQ) **early in the planning process**.

Existing data

Any metric

USACE Six-Step Planning Process

Step 1: Identifying problems and opportunities

Step 2: Inventorying and forecasting conditions

Step 3: Formulating alternative plans

Step 4: Evaluating alternative plans

Step 5: Comparing alternative plans

Step 6: Selecting a plan

*January 2021 U.S. Army Corps of Engineers (USACE) Policy Directive—*Comprehensive Documentation of Benefits in Decision Document*

USING THE TOOL
STEP 1: DEFINE PLANS

Note: Detailed instructions are provided throughout the tool.

Define Plans: Describe the plans that are being considered. *You must input at least 2 plans, and as many as 10 plans can be specified. You must input the plans beginning with the "Plan 1" row.*
1. In the "Short Description" column, provide a short description of the plan (suggested no more than 15 characters). *The text you enter into the "Short Description" field will become the identifying descriptor of the plan on all other tabs.*
2. In the "Detailed Description" column, provide a detailed description of the plan that provides enough information for another person to understand the plan's distinguishing features.

	Short Description	Detailed Description
Plan 1	3ft Raise current	3-foot raising of currently protected area
Plan 2	7ft Raise current	7-foot raising of currently protected area
Plan 3	3ft Raise expanded	3-foot raising of expanded area
Plan 4	7ft Raise expanded	7-foot raising of expanded area
Plan 5	7ft Raise other	7-foot raising with protection for areas of induced damages

Define the plans that are being considered. Include a description of each plan. This will likely include a without project scenario, as well as alternative plans that have been developed. Up to 10 plans can be specified.

USING THE TOOL
STEP 2: DEFINE CRITERIA

Define the criteria that you are using to compare the plans, including which account the criteria most appropriately fits within. These criteria are user-specified and can be anything that the user has identified as important based on specific project considerations. Note that in order to use the tool, you must already have quantified how each plan performs in relation to the criteria you specify.

	Account	Detailed Description	Desired Outcome	Desired Outcome Code
Criterion 1	NED	1st Cost of Construction	Minimize positive value	3
Criterion 2	RED	Tax Revenue Increase	Maximize positive value	1
Criterion 3	OSE	EJ Rank	Minimize positive value	3
Criterion 4	EQ	HUs Created	Maximize positive value	1

USING THE TOOL
STEP 3: DATA ENTRY

Enter the quantitative information you have associated with each plan.
Data can be on different scales.
The data must be numerical or ordinal rankings.
The tool normalizes the data can be compared in a meaningful way.

TABLE 1		Criterion 1 NED	Criterion 2 RED	Criterion 3 OSE	Criterion 4 EQ
Plan 1	3ft Raise current	71,735,251	11,632,500	4	16,500
Plan 2	7ft Raise current	121,949,927	57,105,000	5	19,000
Plan 3	3ft Raise expanded	93,255,826	12,160,500	3	15,675
Plan 4	7ft Raise expanded	143,470,502	59,697,000	2	18,050
Plan 5	7ft Raise other	157,817,552	61,600,500	1	15,200
Desired Outcome		Minimize positive value	Maximize positive value	Minimize positive value	positive value

Don’t have a measurable quantitative input for a criterion? That’s OK! You can rank order the plans as shown in the OSE column.

THE MAGIC (DATA TRANSFORMATIONS & CALCULATIONS)

The tool transforms the user-entered criteria data into a series of variables on a 0-1 scale (all calculations done “behind-the-scenes”).

TABLE 1	
Plan 1	3ft Raise cu
Plan 2	7ft Raise cu
Plan 3	3ft Raise ex
Plan 4	7ft Raise ex
Plan 5	7ft Raise ot
Desired Ou	

Table 2 converts the values entered in Table 1 based on th
conversions made are below.

Desired Outcome	Conversi
Maximize a positive value	None. Nu
Maximize a negative value	Absolute
Minimize a positive value	Reciproca
Minimize a negative value	Absolute

TABLE 2		Criterio NED
Plan 1	3ft Raise current	1.39
Plan 2	7ft Raise current	8.20
Plan 3	3ft Raise expanded	1.07
Plan 4	7ft Raise expanded	6.97
Plan 5	7ft Raise other	6.34

Table 3 normalizes the numbers in Table 2 so that the values that are initially entered in Table 1, which are based on different scales, can be compared in a meaningful way.
The values are normalized by calculating the percent of the total sum of the criteria values.

TABLE 3		Criterion 1 NED	Criterion 2 RED	Criterion 3 OSE	Criterion 4 EQ
Plan 1	3ft Raise current	1.00E+00	0.00E+00	6.25E-02	3.42E-01
Plan 2	7ft Raise current	2.45E-01	9.10E-01	0.00E+00	1.00E+00
Plan 3	3ft Raise expanded	5.77E-01	1.06E-02	1.67E-01	1.25E-01
Plan 4	7ft Raise expanded	8.33E-02	9.62E-01	3.75E-01	7.50E-01
Plan 5	7ft Raise other	0.00E+00	1.00E+00	1.00E+00	0.00E+00

Using the Tool
STEP 4: Choose Weights

Choose the weights for each of the criteria. Choosing the weights for each criterion is a subjective exercise that should be done by someone familiar with the goals of the project and the concerns of the community. The weights may have a significant impact on the results of this analysis. To assess how different weighting schemes influence the results, you can perform a sensitivity analysis (see Step 6).

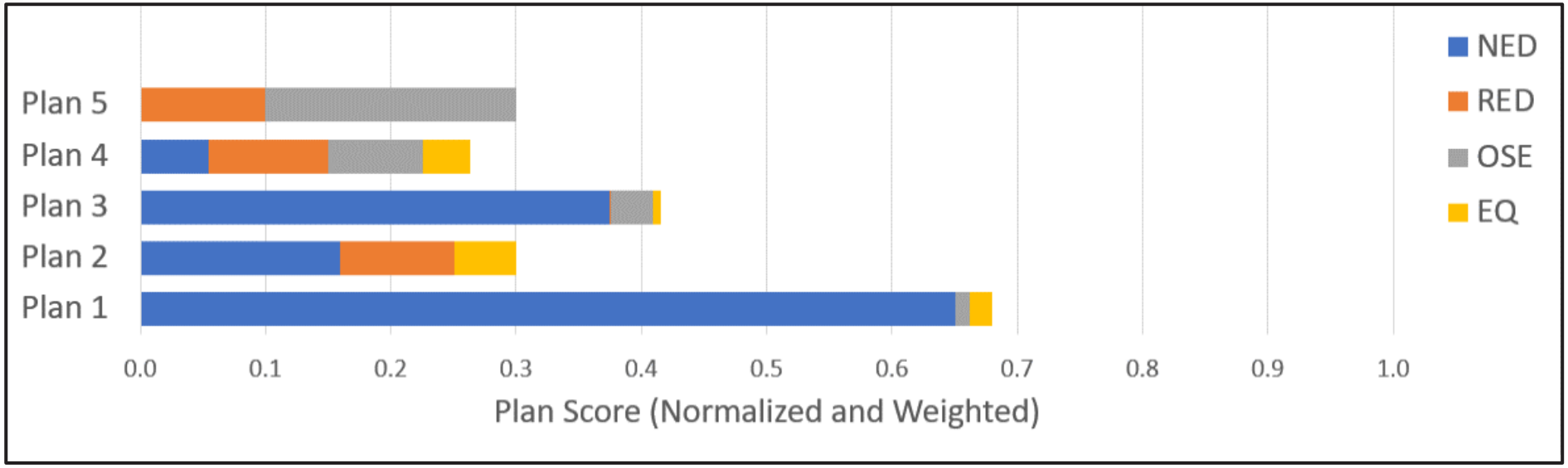
Weighting Table	Total (must be 100%)	Criterion 1 NED	Criterion 2 RED	Criterion 3 OSE	Criterion 4 EQ
Weights	100%	65%	10%	20%	5%

USER TIP

The weights can either be **chosen directly by the user**, or the user can use the **Weighting Worksheet** directly within the tool to analytically calculate the weights.

Using the Tool
STEP 5: Interpret Data

Weighting Table	Total (must be 100%)	Criterion 1 NED	Criterion 2 RED	Criterion 3 OSE	Criterion 4 EQ
Weights	100%	65%	10%	20%	5%



Interpreting the data

Which plan has the highest overall score and makes the greatest contribution to comprehensive benefits?

The weights can have a significant impact on which plan has the highest overall score. It is important to perform a sensitivity analysis to assess how different weights may affect the results.

USING RESULTS

- **Compare Plans based on Comprehensive Benefits:** Potential contributions of alternative plans can be quickly assessed. Teams can screen plans in order of their contributions.
- **Engagement with Stakeholders:** Varying the weights of the criteria enables the team to show stakeholders a range of possibilities.
- Communicating with stakeholders and providing transparency.
- **Identify the Comprehensive Benefits Plan:** Identifies the plan that makes the greatest contribution in a simple and straightforward manner.

Notes

- This tool is a stripped down and simplified version of the multi-criteria decision analysis family of tools
- The tool normalizes the data entered by the user, which are based on different scales, so it can be compared in a meaningful way.

LOOK FORWARD
TOOLS AND TECHNIQUES

Quick Look Tools
- *Dashboard*
- Ranger
- *Comprehensive Benefits*
- *SOVI-X*

Techniques
- Monetized OSE
- Multiplier
- Benefit-Cost Equity, aka, Apples to Apples
- OSE, EJ, Risk Informed Planning

Tools, Fact Sheets, Guides for Field Use, White Papers

TABLE OF EFFECTS

TIM FLEEGER, NWD

The 2023 pre-publication draft ER 1105-2-103 (Policy for Conducting Civil Works Planning Studies) lays out specific expectations for the Table of Effects, including the performance of the alternatives against the following fields:

Four formulation and evaluation criteria:
- effectiveness,
- efficiency,
- acceptability,
- completeness

Federal Objectives:
- Maximize economic development,
- avoid unwise use of floodplains and flood prone areas,
- protecting and restoring the functions of natural systems

Guiding Principles:
- Healthy and Resilient Ecosystems,
- Sustainable Economic Development,
- [wise use of] Floodplains,
- Public Safety,
- Environmental Justice and Equity,
- Watershed Approach

Metrics Organized by four P&G Criteria:
- NED
- RED
- OSE
- EQ

Other evaluation criteria

The Study Objectives

Identify All required alternatives

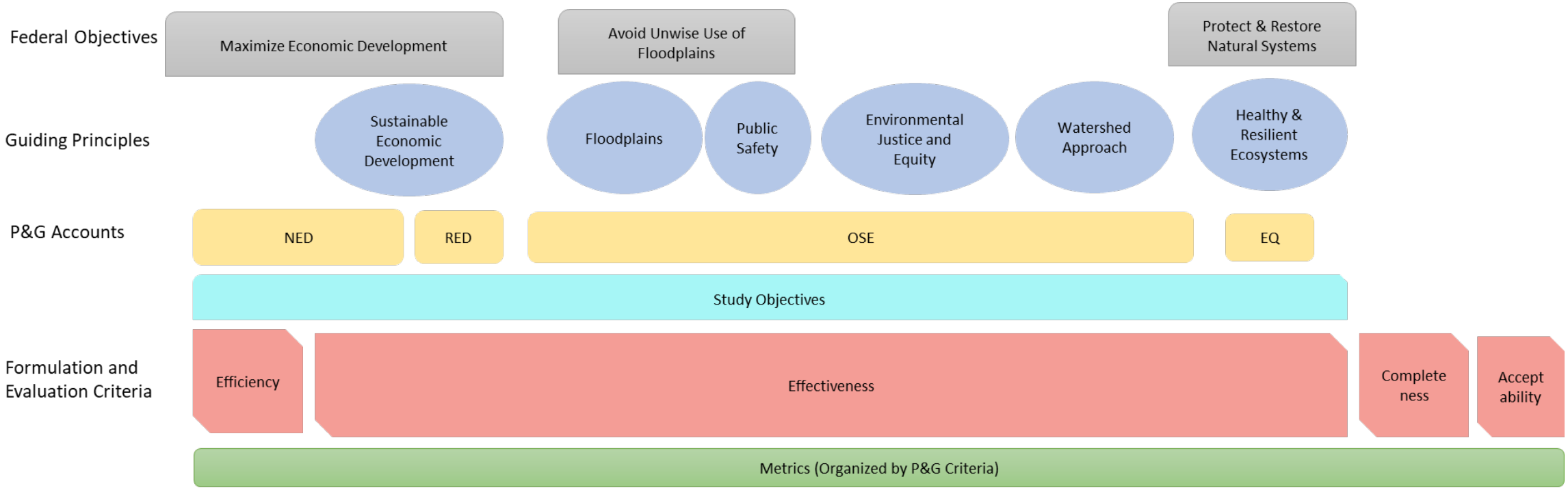
Document uncertainty in the metrics

OUR APPROACH

- Review the new EC and the relevant details around the new / existing requirements
- Identify connections and relationships amongst the requirements
- Develop examples and see how they might be utilized for different mission areas
- Provide teams with a variety of options that may be useful for different studies

RELATIONSHIPS

- The **Federal Objectives** (WRDA 2007) sit at the highest level and **Metrics** are to assess the degree to which they are met
- The **Guiding Principles** (CEQ 2013) are largely connected to the Federal Objectives but also bring in some new elements of consideration for planners
- Benefits and Costs (**Metrics**) are to be identified, measured and characterized using the **P&G Accounts**
- Plans are to be formulated and **evaluated** (**Metrics**) using the **Four Criteria**
- **Metrics** are used to evaluate the performance of alternatives in meeting the **Study Objectives**



EXAMPLES

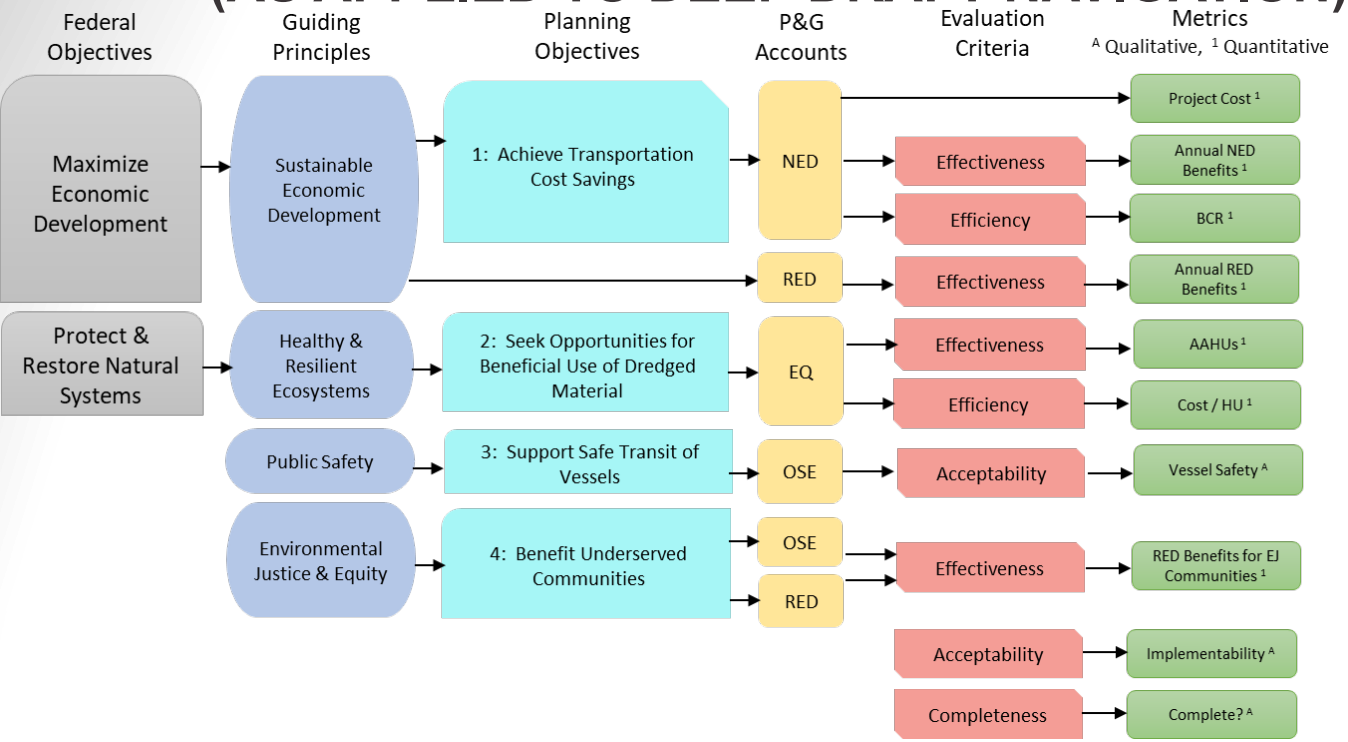
- Developed four approaches using different mission areas as examples
- Any approach could be used for any mission area, the idea is to give teams options so they have flexibility
- May also need to develop some instructions to go along with each one of the approaches to ensure teams understand them and how to utilize them
- Instructions and example documents will be posted soon!

EXAMPLE 1 – STACKED TABLE (AS APPLIED TO FLOOD RISK MANAGEMENT)

Federal Objectives	***Maximize Econonic Development***					***Avoid Unwise Use of Floodplains and Flood Prone Areas***		***Protect and Restore Natural Systems***				
Guiding Principles	**Sustainable Economic Development**					**Floodplains**	**Public Safety**	**Healthy and Resilient Ecosystems**	**EJ / Equity**	**Watershed Approach**		
Planning Objectives (See Table X)	Obj 1	Obj 1	Obj 1	Obj 4	Obj 5	Obj 2	Obj 2	Obj 3	Obj 6	Obj 7		
P&G Accounts	*NED*	*NED*	*NED*	*NED*	*RED*	*OSE*	*OSE*	*EQ*	*OSE*	*OSE*		
Formulation / Evaluation Criteria		*Efficiency*	*Effectiveness*			*Effectiveness*		*Effectiveness*	*Effectiveness*	*Effectiveness*	*Completeness*	*Acceptability*
Metrics	Cost	BCR	Annual NED Benefits	Recreation Benefits	Annual RED Benefits	Structures at Risk	Life Safety Risks Reduced	ER Benefits	EJ Benefits	Comprehensive ness of Plan	Accounts for Necessary Investments	Implement ability	Satisfaction
No Action Alternative													
Alternative 1: Economic Focus [E]													
Alternative 2: Environmental Focus [L N]													
RECOMMENDED - Alternative 3: Sponsor Requested [P]													
Alternative 4: Life Safety Focus [S]													
Alternative 5: Balanced Plan [T]													

Plan identification: [T] Total Net Benefits, [E] NED Plan, [L] LEDPA, [N] Non-Structural Plan, [P] Locally Preferred Plan, [S] Life Safety Plan (meets TRG 1 and 4)

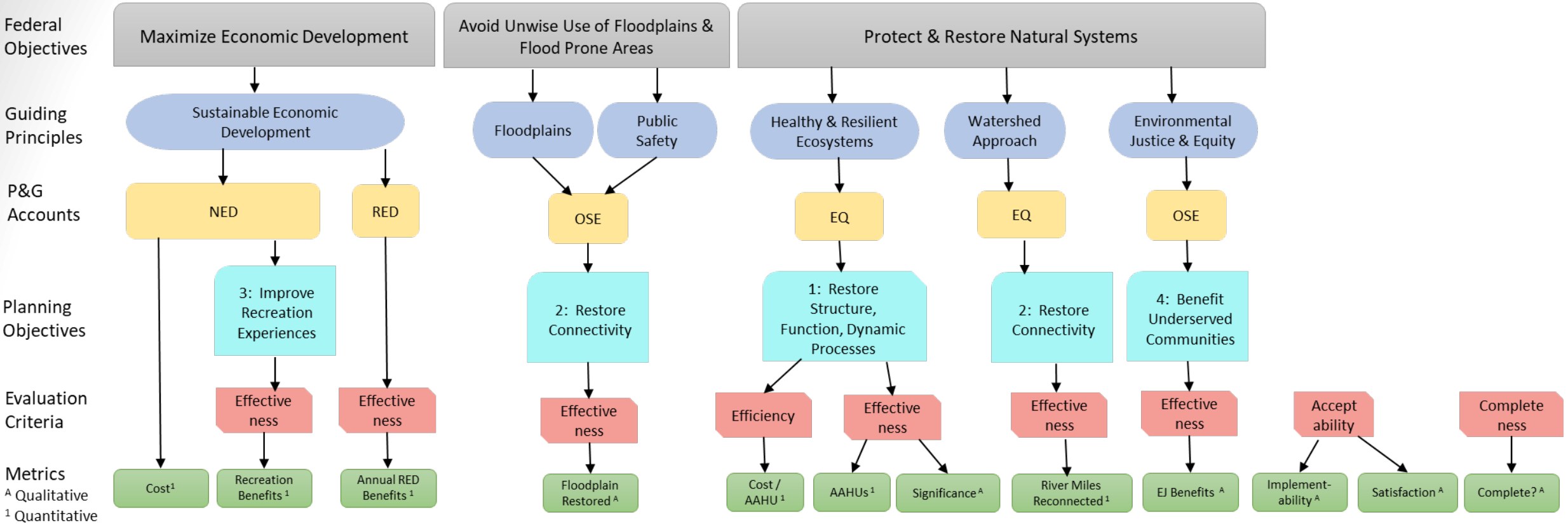
EXAMPLE 2 – METRICS TABLE WITH HORIZONTAL RELATIONAL DIAGRAM (AS APPLIED TO DEEP DRAFT NAVIGATION)



Metrics	Cost	Annual NED Benefits		BCR		Annual RED Benefits	RED Benefits for EJ Communities	AAHUs		Cost / HU	Vessel Safety		Completeness	Implementability
Scenarios		*Forecast A*	*Forecast B*	*Forecast A*	*Forecast B*			*Forecast A*	*Forecast B*		*Forecast A*	*Forecast B*		
No Action Alternative														
Alternative 1: Deepening														
Alt 1a: -56 feet														
Alt 1b: -57 feet [E]														
Alt 1c: -58 feet														
Alternative 2: Deepening (-57 ft) + Widening														
Alternative 3: Deepening, Widening and Beneficial Use of Dredged Material														
Alt 3a: - 56 feet [L]														
Alt 3b: -57 feet [T]														
Alt 3c: -58 feet [P] *(Recommended)*														

Plan identification: [T] Total Net Benefits, [E] NED Plan, [L] LEDPA, [P] Locally Preferred Plan

EXAMPLE 3 – METRICS TABLE WITH VERTICAL RELATIONAL DIAGRAM (AS APPLIED TO ECOSYSTEM RESTORATION)



Metrics	Cost	AAHUs	Significance of Outputs	Cost/ AAHU	River Miles Reconnected	Floodplain Restored	Recreation Benefits	Annual RED Benefits	EJ Benefits	Implementability	Satisfaction	Completeness
No Action Alternative												
RECOMMENDED - Alternative 1: Aquatic Habitat Focus [R L]												
Alternative 2: Floodplain Habitat Focus												
Alternative 3: Recreation Focus [P]												
Alternative 4: Balanced Plan [T]												

Plan identification: [T] Total Net Benefits, [R] NER Plan, LEDPA, [P] Locally Preferred Plan

EXAMPLE 4 – MULTIPLE TABLES (AS APPLIED TO COASTAL STORM RISK MANAGEMENT)

Formulation and Evaluation Criteria - Narrative Discussion of Each

	No Action	Alternative 1: Economic Focus [E]	Alternative 2: Non-Structural [LN]	Alternative 3: Life Safety Focus [T]	RECOMMENDED - Alternative 4: Balanced Approach [M]
Completeness					
Acceptability					
Effectiveness					
Efficiency					

Plan identification: [M] Maximize Net Benefits, [E] NED Plan, [L] LEDPA, [N] Non-Structural Plan, [T] Life Safety Plan (meets TRG 1 and 4)

Objectives Table - Federal Objectives, Guiding Principles, and Planning Objectives - Qualitative Assessment

Federal Objectives	Guiding Principles	Planning Objectives	No Action	Alternative 1: Economic Focus [E]	Alternative 2: Non-Structural [LN]	Alternative 3: Life Safety Focus [S]	RECOMMENDED - Alternative 4: Balanced Approach [TP]
Maximize Economic Development	Sustainable Economic Development	Objective 1: Reduce economic damages associated with coastal storms					
Avoid Unwise Use of Floodplains and Flood Prone Areas	Floodplains Public Safety	Objective 2: Reduce life safety risks associated with Coastal Storms					
Protect and Restore the Function of Natural Systems	Healthy and Resilient Ecosystems	Objective 3: Improve aquatic ecosystems to the extent practicable					
	Environmental Justice and Equity	Objective 4: Benefit EJ Communities in the study area					

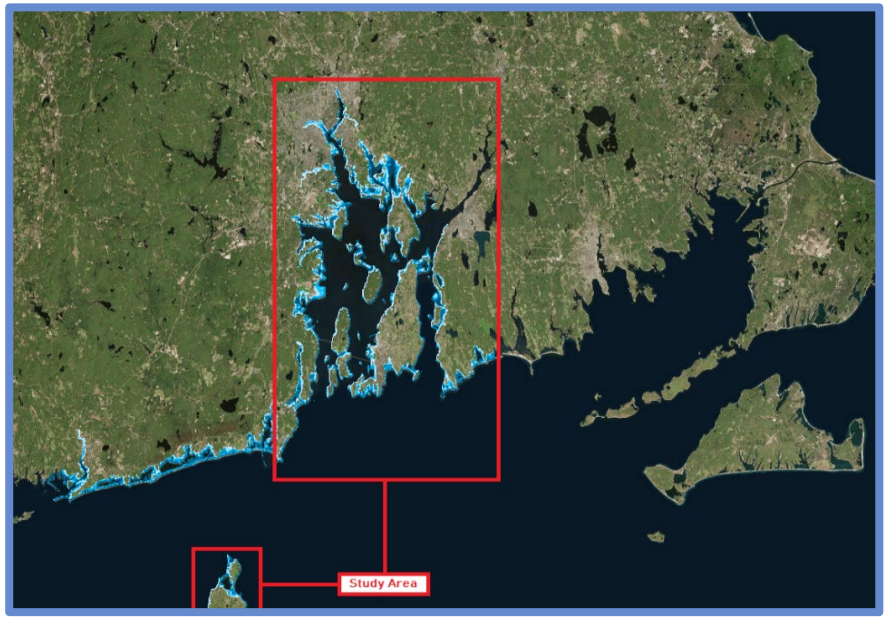
Metrics Table - P&G Accounts, Quantiative Metrics

ALTERNATIVES		No Action			Alternative 1: Economic Focus [E]			Alternative 2: Non-Structural [LN]			Alternative 3: Life Safety Focus [T]			RECOMMENDED - Alternative 4: Balanced Approach [M]		
Sea Level Rise Scenarios		**Low**	**Medium**	**High**	**Low**	**Medium**	**High**	**Low**	**Medium**	**High**	**Low**	**Medium**	**High**	**Low**	**Medium**	**High**
P&G Accounts	**Metrics**															
	Cost															
National Economic Development	Annual NED Benefits (Obj.1)															
	BCR															
	Annual Recreation Benefits (Obj. 1)															
Regional Economic Development	Annual RED Benefits															
Environmental Quality	ER Benefits (Obj. 3)															
	Environmental Effects															
Other Social Effects	Life Safety Risks Reduced (Obj.2)															
	EJ Benefits (Obj. 4)															

Rhode Island Coastline CSRM Feasibility Study

JANET COTE, NAE

- Tiered from the North Atlantic Coast Comprehensive Study (NACCS).
- Point Judith to the Massachusetts Stateline and comprises portions of Block Island
- Covered more than **457 miles** of coastline **19 municipalities**.
- Experiences extensive inundation from storm surge due to **low-lying topography, densely populated residential and commercial areas, and extensive low-lying infrastructure.**
- Considered Structural (Floodwalls, Surge Barriers and bulkheads), but none were justified.
- Developed a completely non-structural TSP



Rhode Island Coastline CSRM Feasibility Study

	Structures Justified Using NED Benefits	Structures Justified using OSE/EQ Benefits	Community Groups Justified Using NED Benefits
TSP - Prior to Cost Increases	**533** *(323 Res, 210 Non-Res)*	**0**	**14**
RP - Inclusion of Cost Increases	**290** *(117 Res, 173 Non-Res)*	**149** *(146 Res, 3 Non-Res)*	**7**

- Significant Study Cost Increases. Primary causes were Supply Chain Issue, Labor Costs, Fuel Prices.
- Reconsidered the comprehensive benefits analysis that had been completed
- Identified three separable elements supported by EQ and OSE benefits
  - Wickford Historic District
  - 3 socially vulnerable/EJ communities
  - Critical Infrastructure

Alternative	NED[1] ($)	RED[2] ($)	OSE			EQ		
			Value	Pros	Cons	Value	Pros	Cons
Wellington Perimeter (Newport)	-672,000	122M	1	◆Maintains communities, local roads and utilities.	◆Localized Benefits ◆Does not protect socially vulnerable communities.	1	No Significant Beneficial Impacts	◆Effects to aesthetics
Warren River Surge Barrier (Upper)	-14,030,000	2B	1	◆Maintains communities, local roads and utilities.	◆Localized Benefits ◆Does not protect socially vulnerable communities.	-3	No Significant Beneficial Impacts	◆Effects to wetlands and fish passage.
Warren River Surge Barrier (Lower)	-9,165,000	1.9B	1	◆Maintains communities, local roads and utilities.	◆Localized Benefits ◆Does not protect socially vulnerable communities.	-3	No Significant Beneficial Impacts	◆Effects to wetlands and fish passage ◆Located adjacent to an Audubon Sanctuary ◆Impacts to Native American burial site.
Providence Harbor Bulkhead	N/A	N/A	2	◆Maintains communities, local roads and utilities. ◆Located in a vulnerable community	◆Localized Benefits ◆Does not protect socially vulnerable communities.	2	◆Minimizes HTRW releases to Providence River	No Significant Detrimental Impacts
Middle Bridge Protection (Narragansett)	-4,184,000	437M	1	◆Maintains Communities	◆Localized Benefits ◆Does not protect socially vulnerable communities.	-3	No Significant Beneficial Impacts	◆Effects to wetlands, eelgrass, and fish passage. ◆Located near a wildlife sanctuary.
NS - Plan A	3,220,000	473M	2	◆Benefits on regional scale ◆Maintain communities ◆Includes some vulnerable communities	◆Does not reduce risk for local roads and utilities.	1	No Significant Beneficial Impacts	No Significant Detrimental Impacts
NS - Plan B	2,130,000	599M	2	◆Benefits on regional scale ◆Maintain communities ◆Includes all vulnerable communities	◆Does not reduce risk for local roads and utilities.	1	No Significant Beneficial Impacts	No Significant Detrimental Impacts
NS - Plan C	130,000	79M	1	◆Benefits on regional scale ◆Maintain communities ◆Considers future access to critical services and utilities	◆Highest residual risk of NS plans. ◆Does not reduce risk for local roads and utilities. Plans	1	No Significant Beneficial Impacts	No Significant Detrimental Impacts

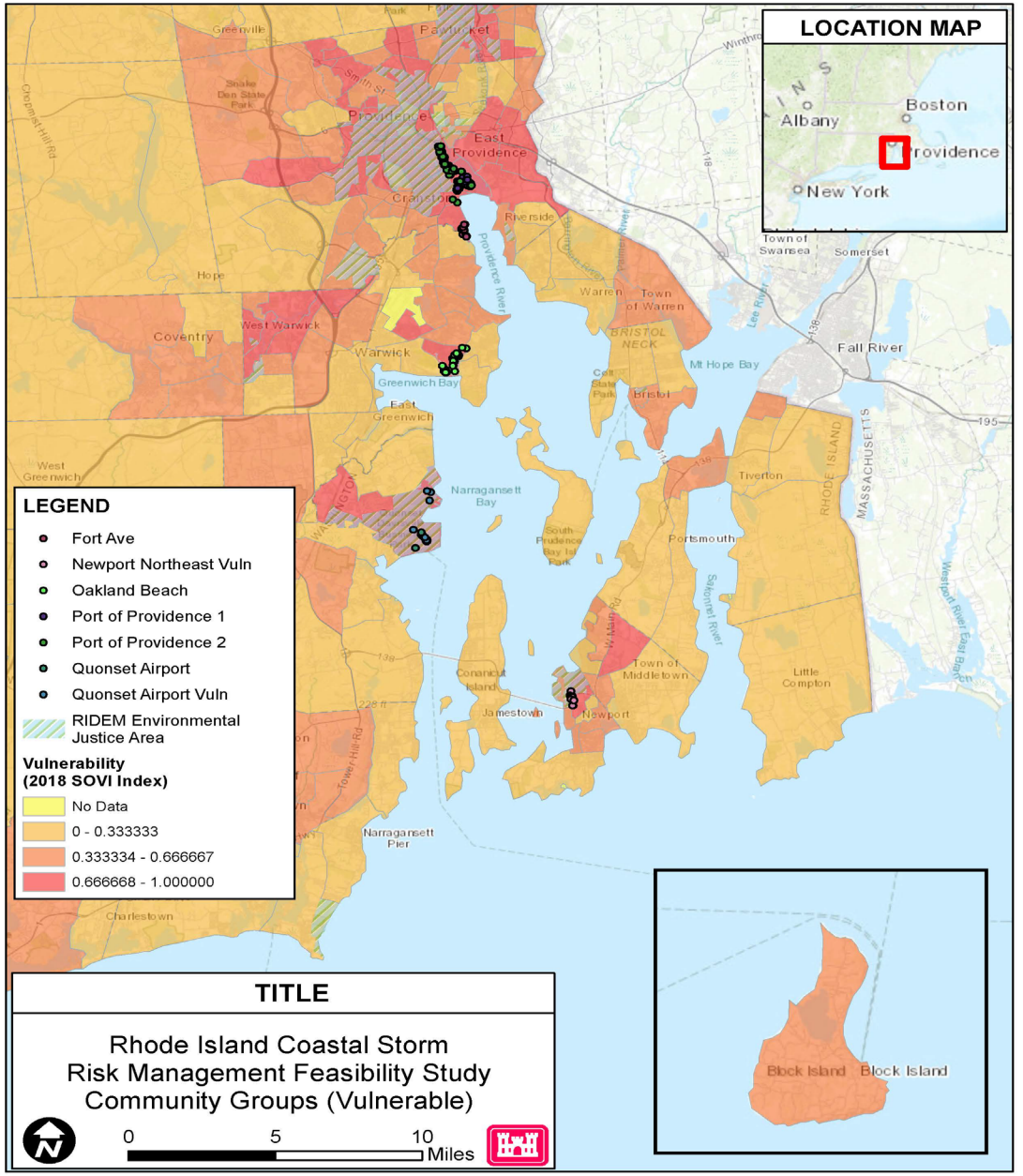
SOCIALLY VULNERABLE COMMUNITIES

Used social vulnerability index (SOVI), from the centers for disease control (CDC) to identify socially vulnerable communities.

CDC SVI ranks each census tract on 15 social factors, including poverty, lack of vehicle access, and crowded housing, and groups them into four (4) related themes: socioeconomic status, household composition, race/ethnicity/language and housing and transportation.

Considered environmental justice areas using the Rhode Island Department of Environmental management maps.

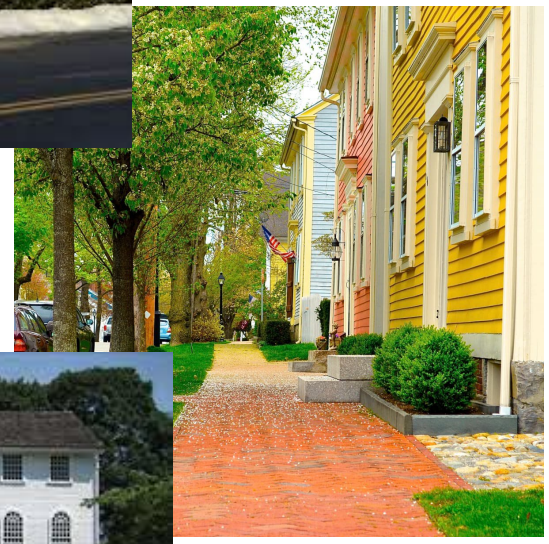
Due to cost increases, most of the EJ/socially vulnerable communities were not supported with NED benefits.



HISTORIC DISTRICT - WICKFORD

- Wickford historic district is a unique cultural resource
  - listed on the national register of historic places
    - one of the oldest preserved colonial villages in the country, established in 1709.
    - Intact, original context of wide streets and waterside terrain of a late 18th-early 19th century town (west side of Narragansett bay).
    - Largest collection of owner-occupied colonial and federal period homes in the nation.
    - Unique seaside village with shops, restaurants and homes.

- The community has experienced flood damages due to coastal storms
  - threats from rising seas and storm surge with projections of sea level rise as much as 6 feet in the next 100 years.
  - Village lost power and basements were flooded during hurricane sandy.



CRITICAL INFRASTRUCTURE

Critical Infrastructure in the Study Area

- Over 800 CI identified within the study area; approximately 75 within the 100-year floodplain

- The USACE didn't have an established way to calculate NED benefits for CI. So many facilities were not justified with NED benefits.

Critical Infrastructure	
Type	Number
Schools	2
Police/Fire	3
Nursing Home/ Assisted Living	2
Electric	5
Sewer	18

OSE AND EQ BENEFITS

Element	Benefits
Wickford Historic District	**OSE BENEFITS** - Provides a community and cultural identity for the area. - Promotes economic vitality by supporting a vibrant tourist industry. - Provides employment opportunities in and around the historic district. - Supports recreational activities including site-seeing, dining, and shopping. *Reduces flooding risk to a nationally significant historic district, which is listed on the National Register of Historic Places, *Maintains a unique research opportunity for students and scholars who can study the neighborhood as a whole and document changes over time, and how this can be applied elsewhere **EQ BENEFITS** - Manages coastal storm risk to a unique historic resource from future flood damage.
Socially Vulnerable/ Environmental Justice Communities	**OSE BENEFITS** - A more equitable distribution of pre-disaster risk reduction opportunities to all communities that are vulnerable to coastal flooding, - Maintain community cohesion, identity and resiliency by avoiding displacement of residents, - Protect and increase the resiliency of the existing stock of affordable housing, - Maintain the economic vitality of the communities and the residents by protecting assets before the next natural disaster, - Supports physical health and safety of residents of socially vulnerable communities by preparing people for the impacts of natural disasters, improving access to resources and increasing resiliency of the community. - Reduce the immediate and long-term impacts of natural disasters on vulnerable communities by protect the limited financial assets of community members. - Meets the requirements of EOs 12898 and 13390 and addressed the directives of the current administration.

OSE AND EQ BENEFITS

Element	Benefits
Critical Infrastructure	**<u>OSE BENEFITS</u>** ***Nursing Homes/Assisted Living*** - Supports Physical Health and Safety by providing safe housing for the most vulnerable members of the community. - Supports regional healthcare by providing specialized on-site medical and nursing care to residents of the facility. - Manages coastal storm risk to a socially vulnerable population by providing housing to the elderly. - Supports community identify by providing a community for the residents of the facilities. - Provides recreational activities for the residents of the facilities. - Provides employment opportunities to the community. ***Sewer Pump Stations*** - Promotes human health and safety by collecting and treating sewage and wastewater from residential and commercial facilities. - Provides a municipal service to the community by collecting and treating sewage and wastewater. ***Electric Power Infrastructure*** - Provides electricity to the surrounding homes and businesses within the surrounding community. Consistent electrical service is essential to the health and welfare of the community and to a functioning economy. - Large disruptions in the electrical supply would result in the disruption of vital services, including water supply, emergency and health services, and could lead to social unrest. **<u>EQ BENEFITS</u>** ***Sewer Pump Stations*** **-** Manages coastal storm risk to aquatic resources, recreational opportunities (e.g., swimming, beaches, fishing), and commercial and recreational shellfish harvests by reducing the potential for untreated sewage releases into local waterways. - Promotes human health and safety by collecting and treating sewage and wastewater from residential and commercial facilities.

NED Exception

LESSONS LEARNED FROM THE NED EXCEPTION EXPERIENCE

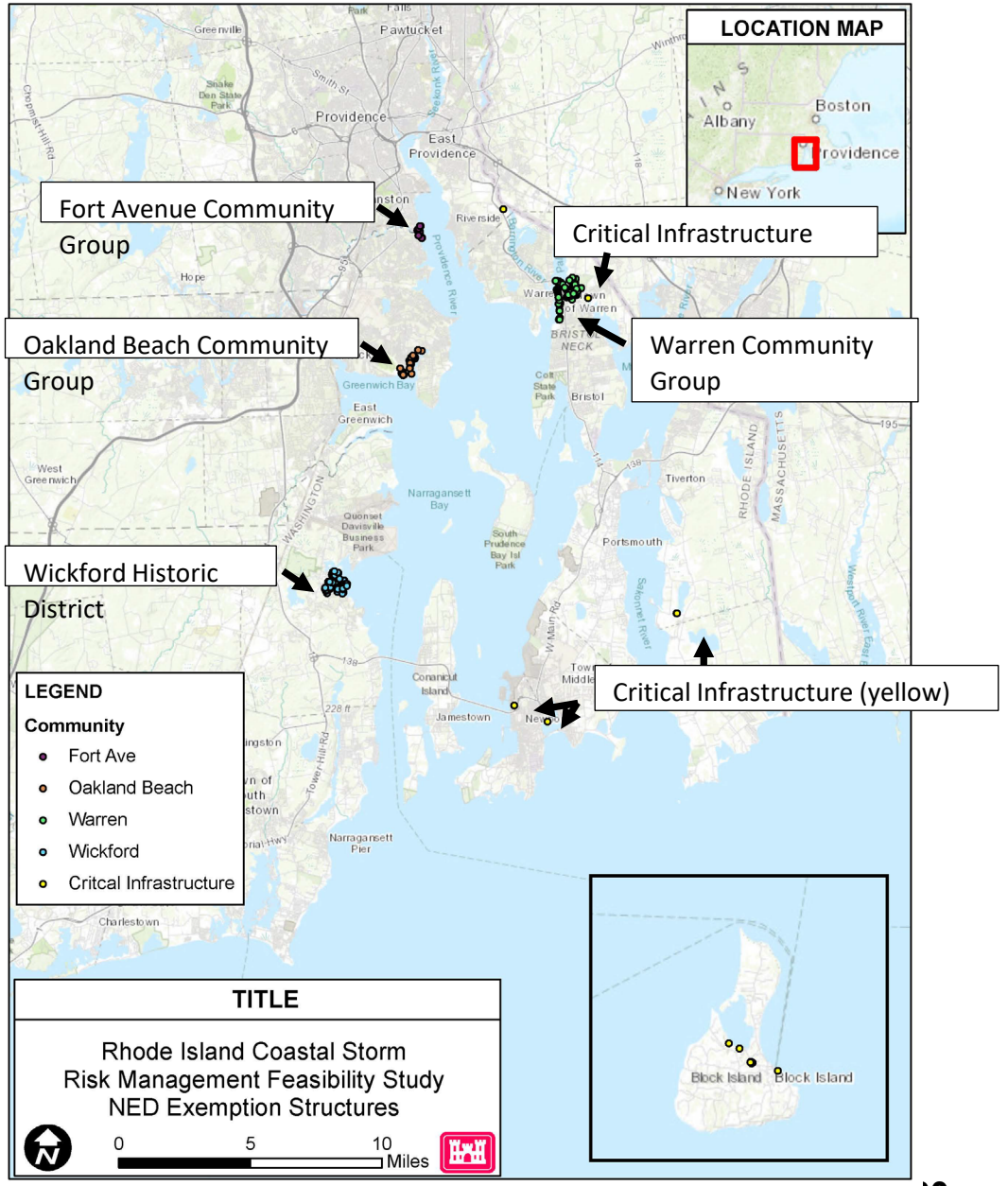
It took a very long time to complete the process. From transmittal to division to ASA approval took 5-6 months. Start early!!

Issue with change in FY and any time we had to reassess costs.

The USACE needs to develop a better way to assess NED benefits of critical infrastructure.

New process. Will need to explain it clearly to reviewers.

Required significant study to provide support for exception, especially OSE benefits.



QUESTIONS?