



US Army Corps
of Engineers®



THE WATER INSTITUTE
OF THE GULF®

Enhancing Benefits Evaluation for Water Resources Projects

*Policy Research to Improve the Evaluation of Nature Based Solutions in US Army
Corps of Engineers Programs*

The Water Institute of the Gulf

12/8/2023



Updated Principles, Requirements & Guidelines

- Encourages **multi-objective** analysis
- Establishes new **ecosystem services** evaluation model **with more flexible BCA**
- Establishes **six co-equal principles for water resources planning**
- Emphasizes **nonstructural** alternatives



Healthy and resilient ecosystems



Sustainable economic development



Floodplain management



Public safety

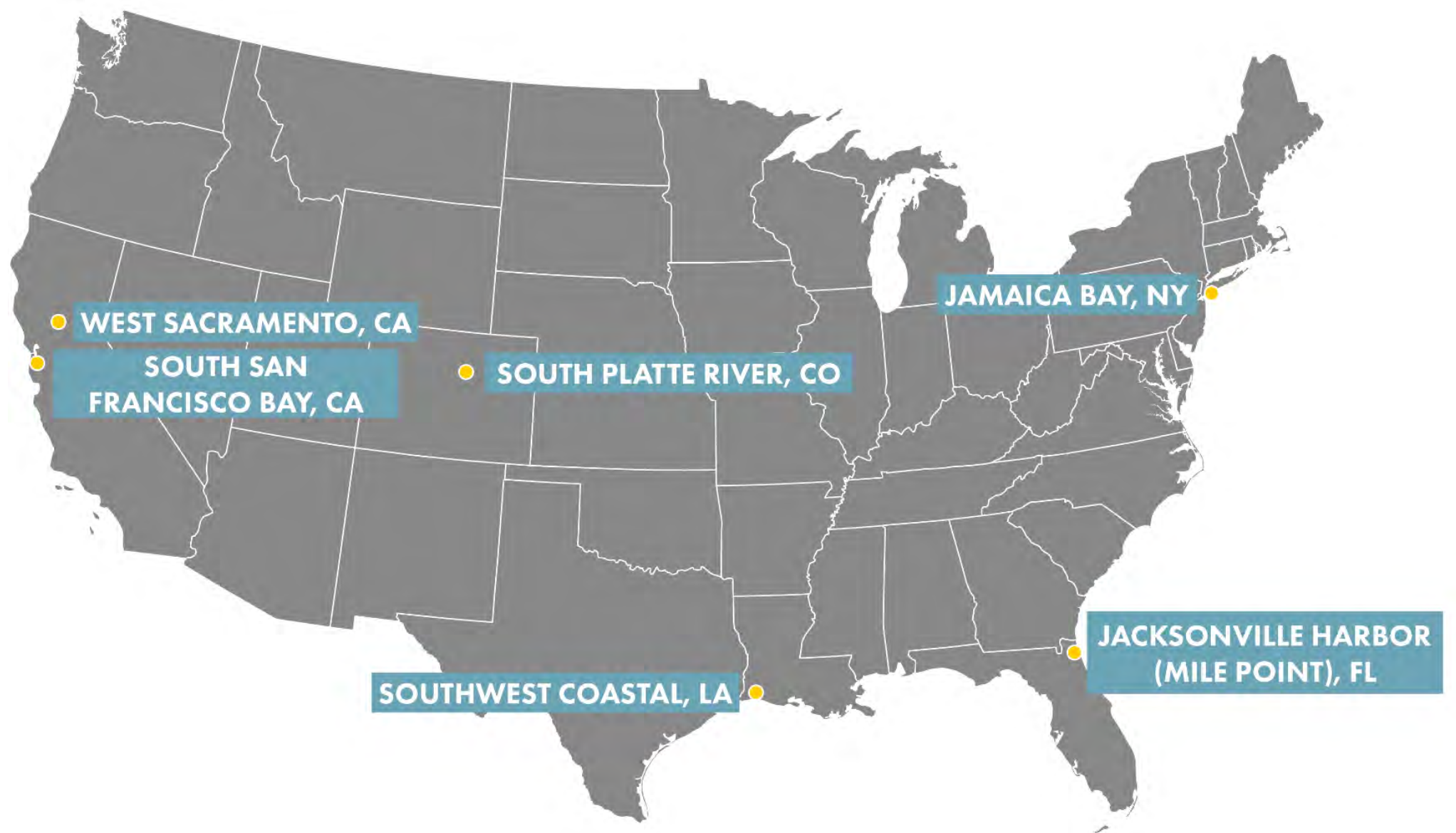


Environmental justice



Watershed approach

Case Studies Selected based on mission area, local interest, and available Data



Monetary and non-monetary Methods are Available to extend evaluation of Ecosystem services

Multi-Objective Decision Support Approaches

Evaluate with multiple criteria using valuation, other quantitative, and non-quantitative metrics

Non-Market Valuation Methods for Ecosystem Goods and Services

Worth (how much people would be willing to pay) is not revealed in market prices



Findings from cross-cutting analysis inform recommendations

STUDY SCOPING

ALTERNATIVES FORMULATION

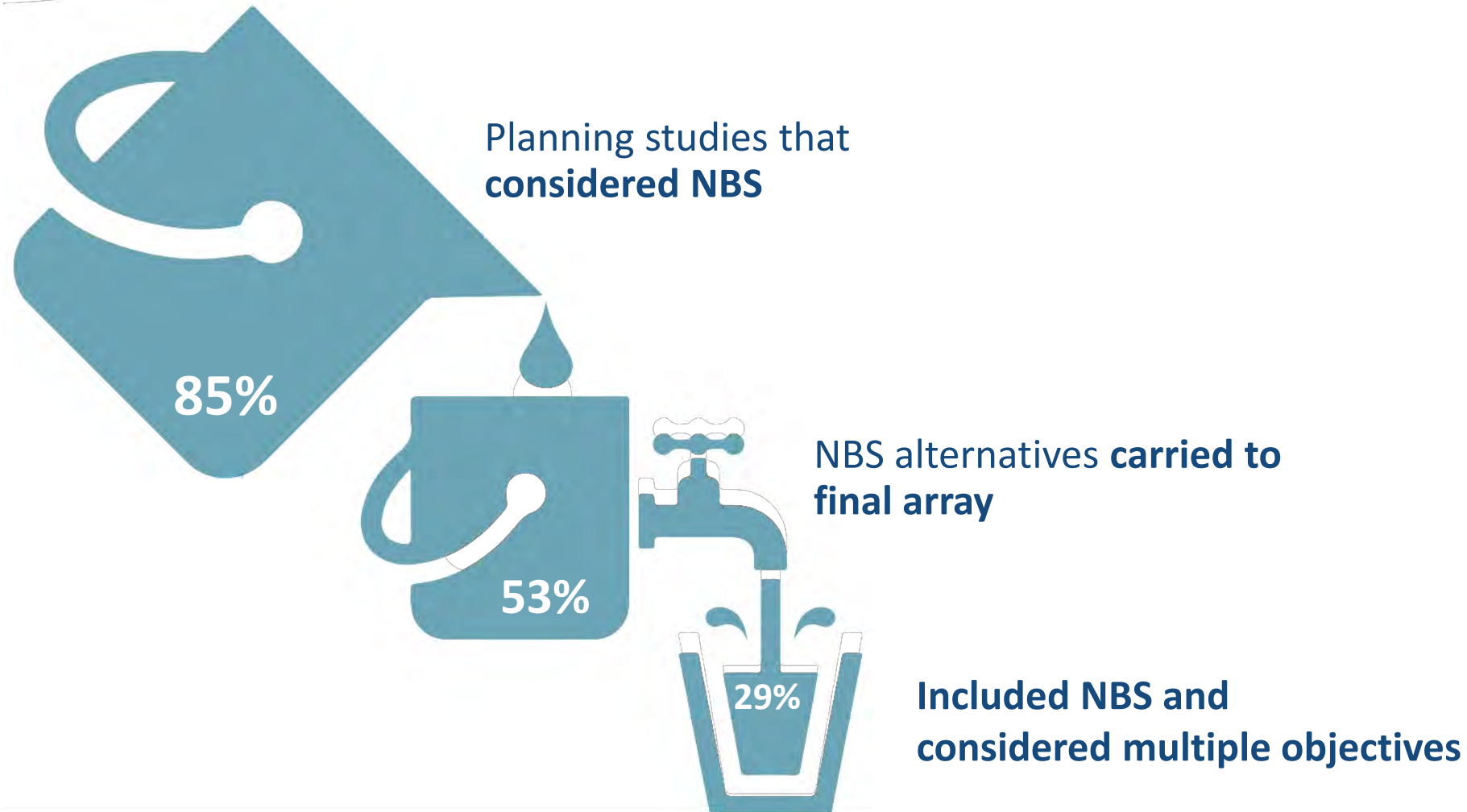
EVALUATION OF NON-MONETIZED OUTCOMES

ECOSYSTEM SERVICE VALUATION

HOLISTIC ANALYSIS ACROSS MULTIPLE GOALS

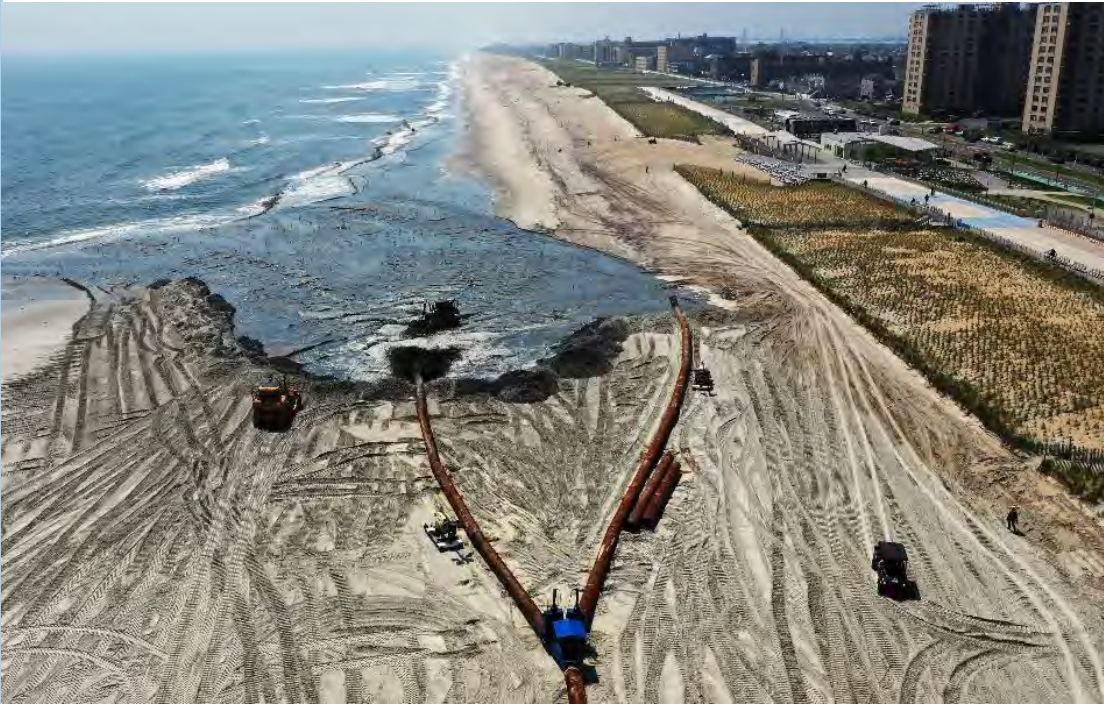


SCOPING WITHIN MISSION AREAS LIMITS NBS OPPORTUNITIES





Use integrated, multi-objective approach to scope planning studies



Sky shot of ongoing East Rockaway Inlet Dredging Project, NY (Photo by Christopher / USACE Image Gallery)



Rockaway Beach Boardwalk

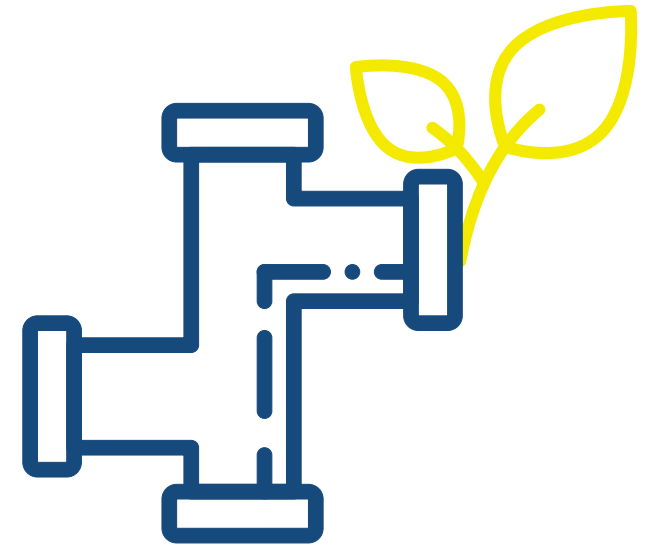


NBS Options Are Often Excluded During Alternative Formulation

Alternatives developed **independently**
for different objectives

Formulation based on **fundamentally different approaches**
(NBS vs. traditional infrastructure)

Integrated approaches **screened out early** when
objectives considered separately





OPPORTUNITY

FORMULATE ALTERNATIVES TO MEET **MULTIPLE** **OBJECTIVES**



Confluence Park, Denver, CO



Non-Monetary Benefit Estimation

Environmental & social metrics can often be estimated using **existing USACE tools**

Scientific, community, and expert knowledge can augment USACE tools for more complete evaluation





OPPORTUNITY

EVALUATE
ALTERNATIVES
WITH **METRICS**
FROM ACROSS
ALL PR&G
GUIDING
PRINCIPLES



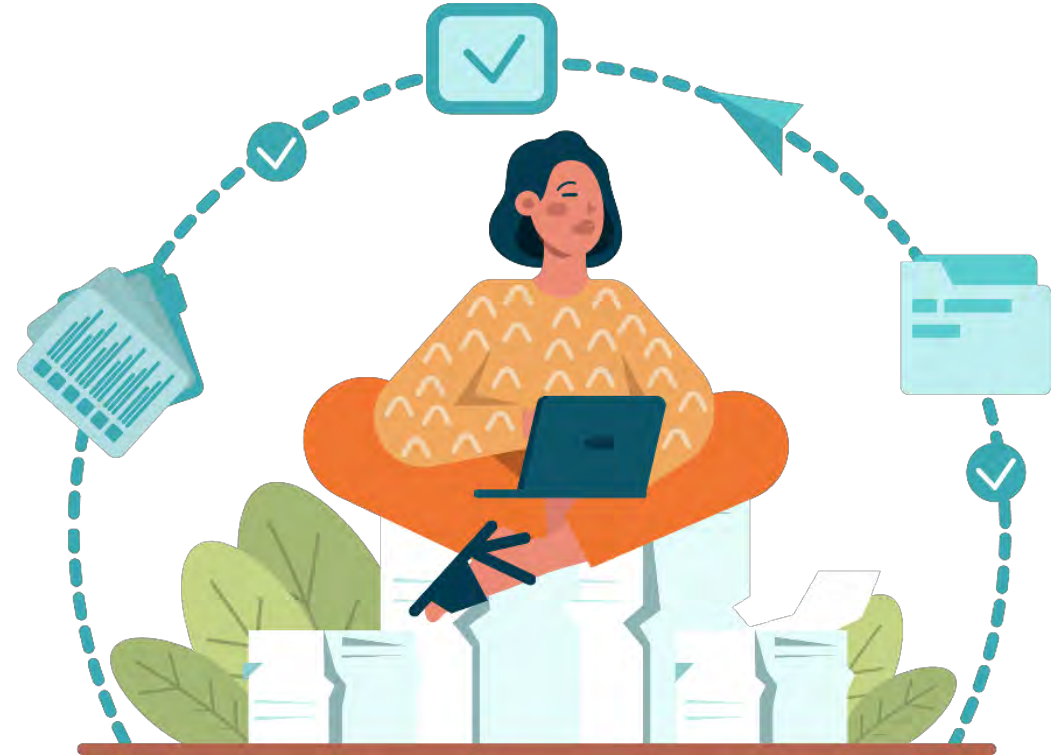
Cameron Parish Shoreline Restoration, Louisiana (Photo from CPRA)



Existing Methods can Enable More Comprehensive Valuation

Methods are available to estimate monetized benefits from ecosystem services, including some already in use by USACE

Benefit transfer (use of data from existing sources) allows broader valuation of NBS benefits in the BCA





OPPORTUNITY

DEVELOP USACE GUIDANCE, RESOURCES, AND TOOLS FOR MONETIZING A BROADER RANGE OF BENEFITS

e.g., **recreational** use day values

e.g., value of **preserving limited dredge disposal capacity** through beneficial use of dredged material



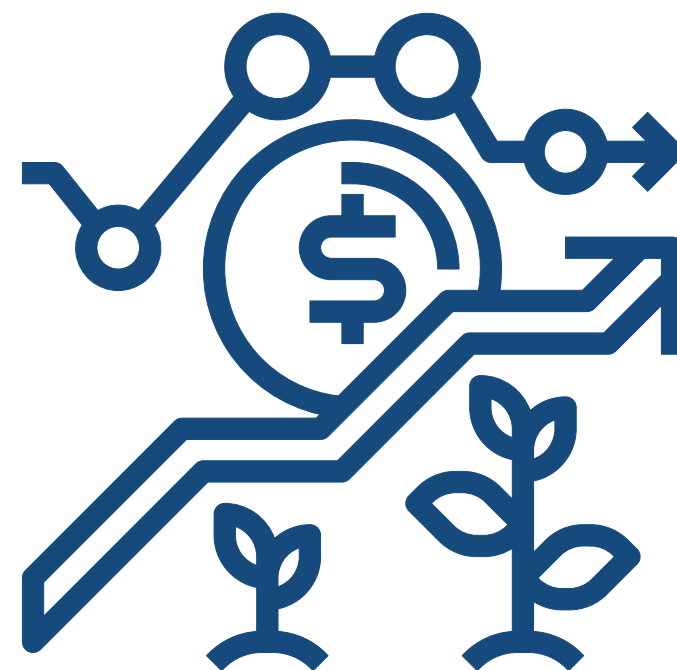
Piping Plover Habitat in Superior, Wisconsin, United States
Photo by Sam Hansen, St. Louis River Alliance



monetizing Ecosystem Service benefits Improved BCA Analysis...

Inclusion of **additional benefits** may increase the benefit-cost ratio

Improvements in BCA ratio generally not enough to **change alternative rankings**





...BUT Multi-Objective Analysis is
Necessary To Capture All Benefits

Benefits exist that cannot be fully captured
by monetary value

Including non-monetary metrics provides
more complete evaluation

More fully addressing multiple objectives
is likely to change rankings and elevate NBS
options





OPPORTUNITY

APPLY TRANSPARENT
**MULTI-CRITERIA DECISION
ANALYSIS** AS THE PRIMARY
APPROACH FOR ALTERNATIVE
RANKING AND SELECTION

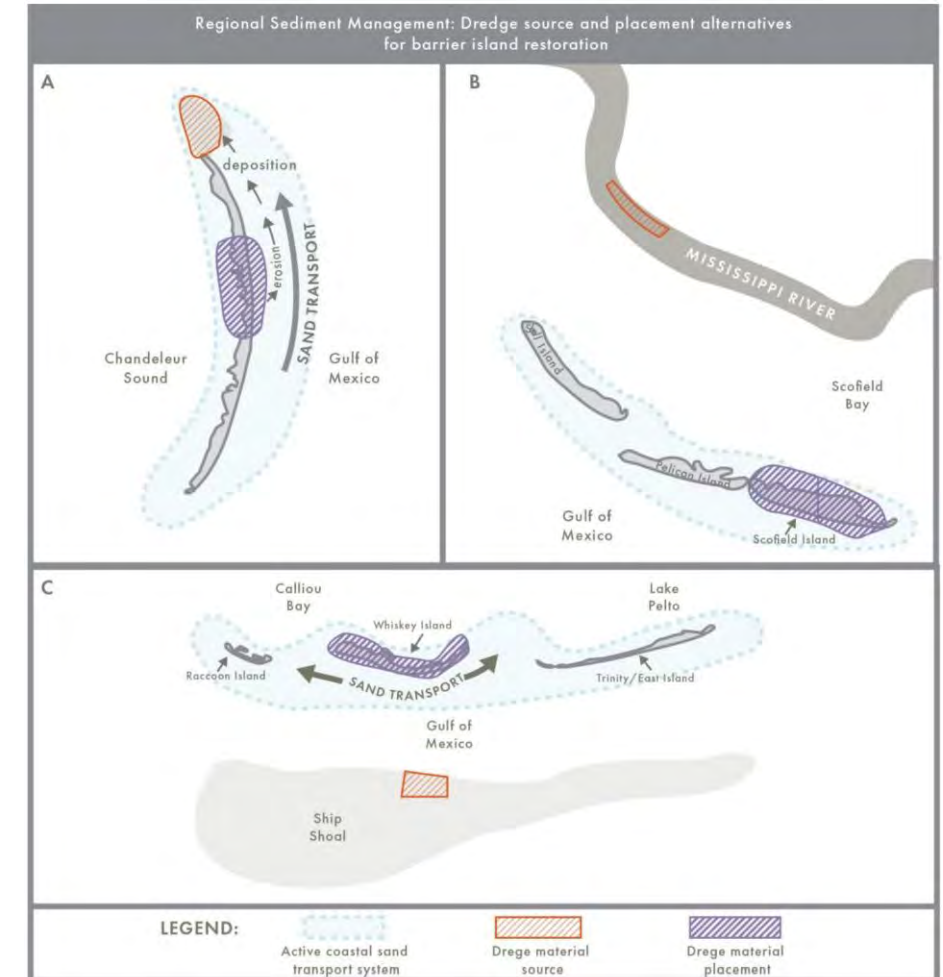
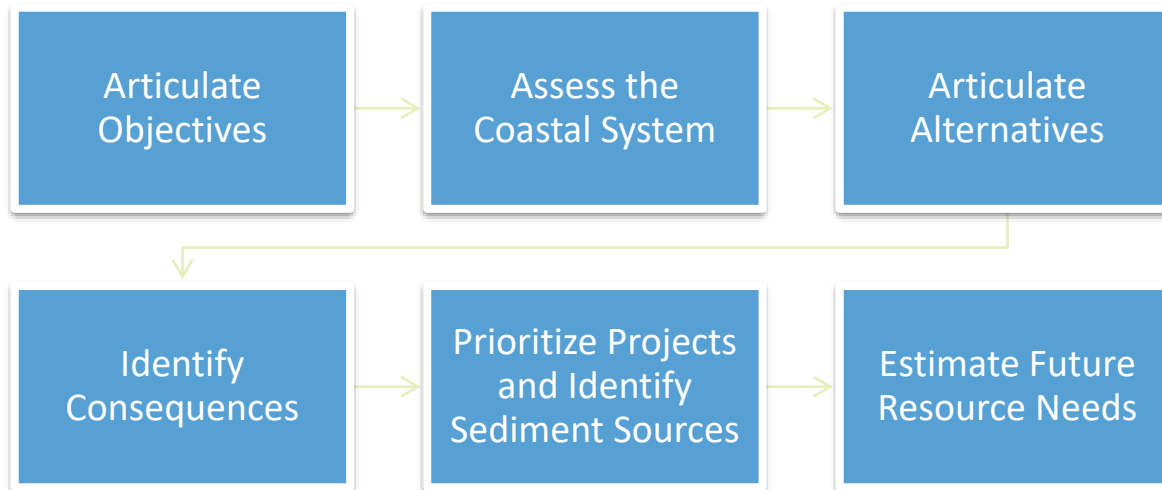


Levee spanning a tidal marsh in Alviso, California. USACE image.

EXAMPLE: REGIONAL SEDIMENT MANAGEMENT

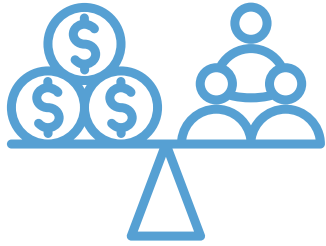
Use of multi-objective decision analysis
(Structured Decision-Making)

Multi-entity engagement to support
regional EWN across stakeholders

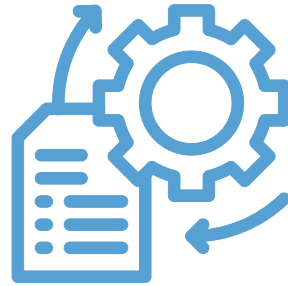


Evaluation of dredge material source and placement locations within a Regional Sediment Management approach

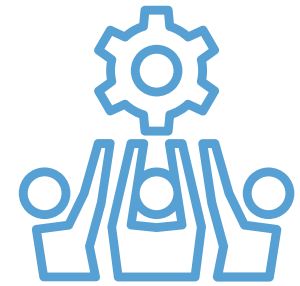
What's Next?



Case study extension
to focus on **social
outcomes and equity**



USACE rulemaking to
implement the PR&G



**Practical
implementation
guidance and support
for USACE
practitioners**