



US Army Corps
of Engineers®



THE WATER INSTITUTE
OF THE GULF®

ENHANCING BENEFITS EVALUATION FOR WATER RESOURCES PROJECTS

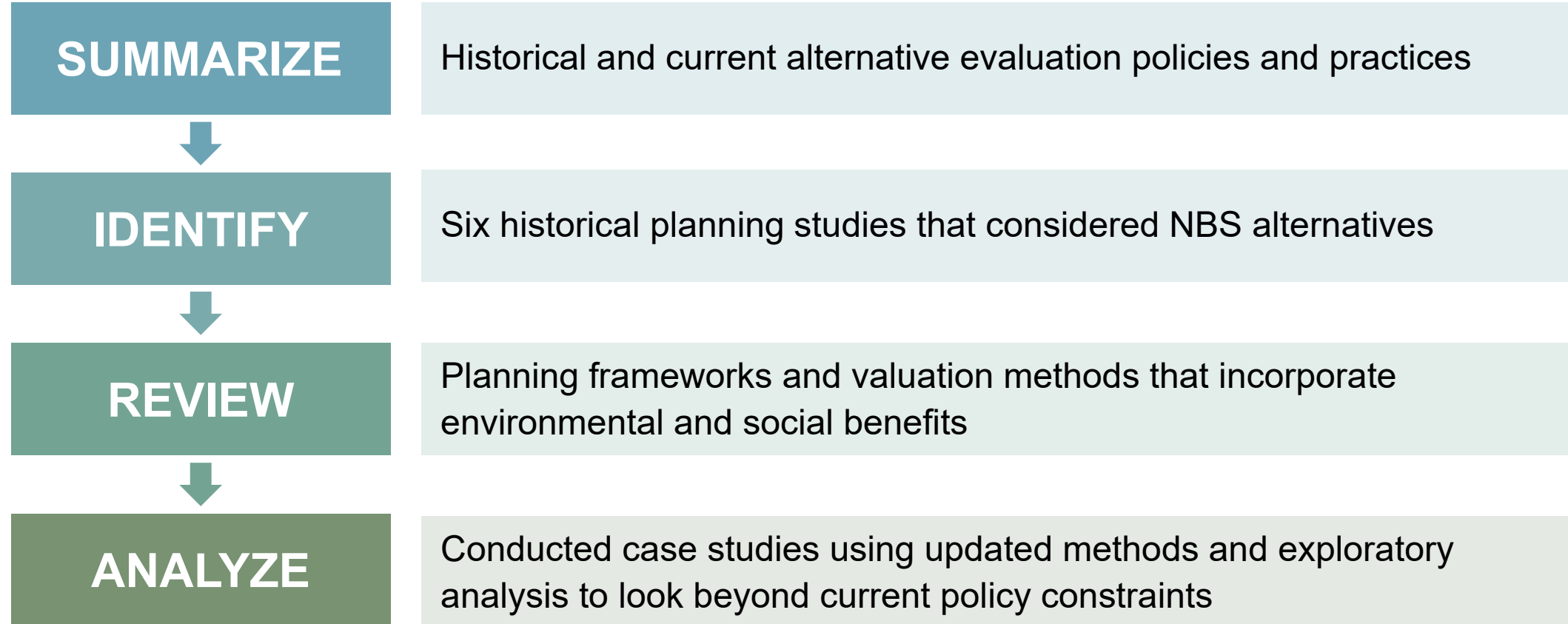
*Policy Research to Improve the Evaluation of
Nature-Based Solutions in US Army Corps of
Engineers Programs*

The Water Institute of the Gulf

11/30/2022

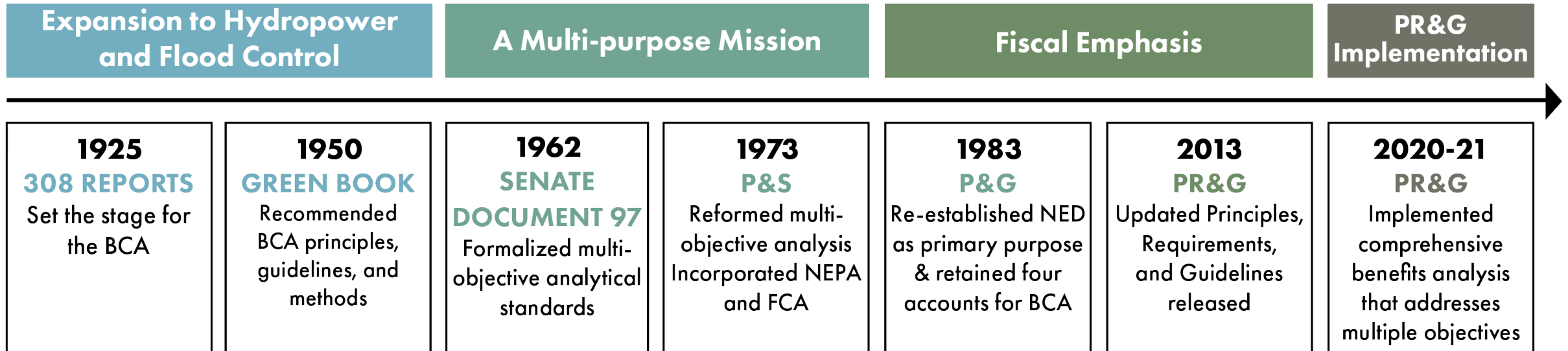


PROJECT APPROACH



USACE BENEFITS ANALYSIS HAS EVOLVED OVER TIME

POLICY FLOWCHART BCA EVALUATION



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

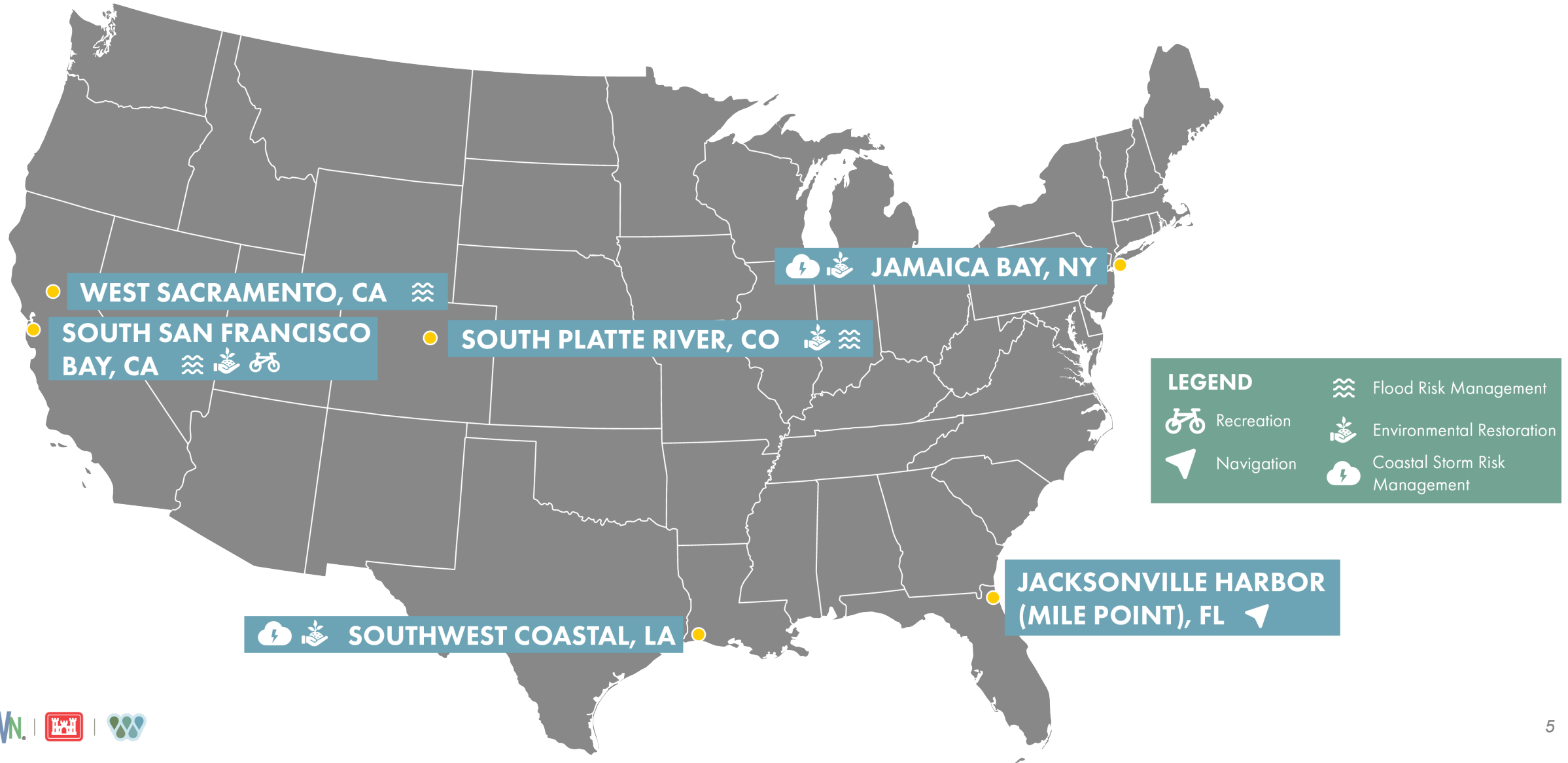


Environmental justice



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

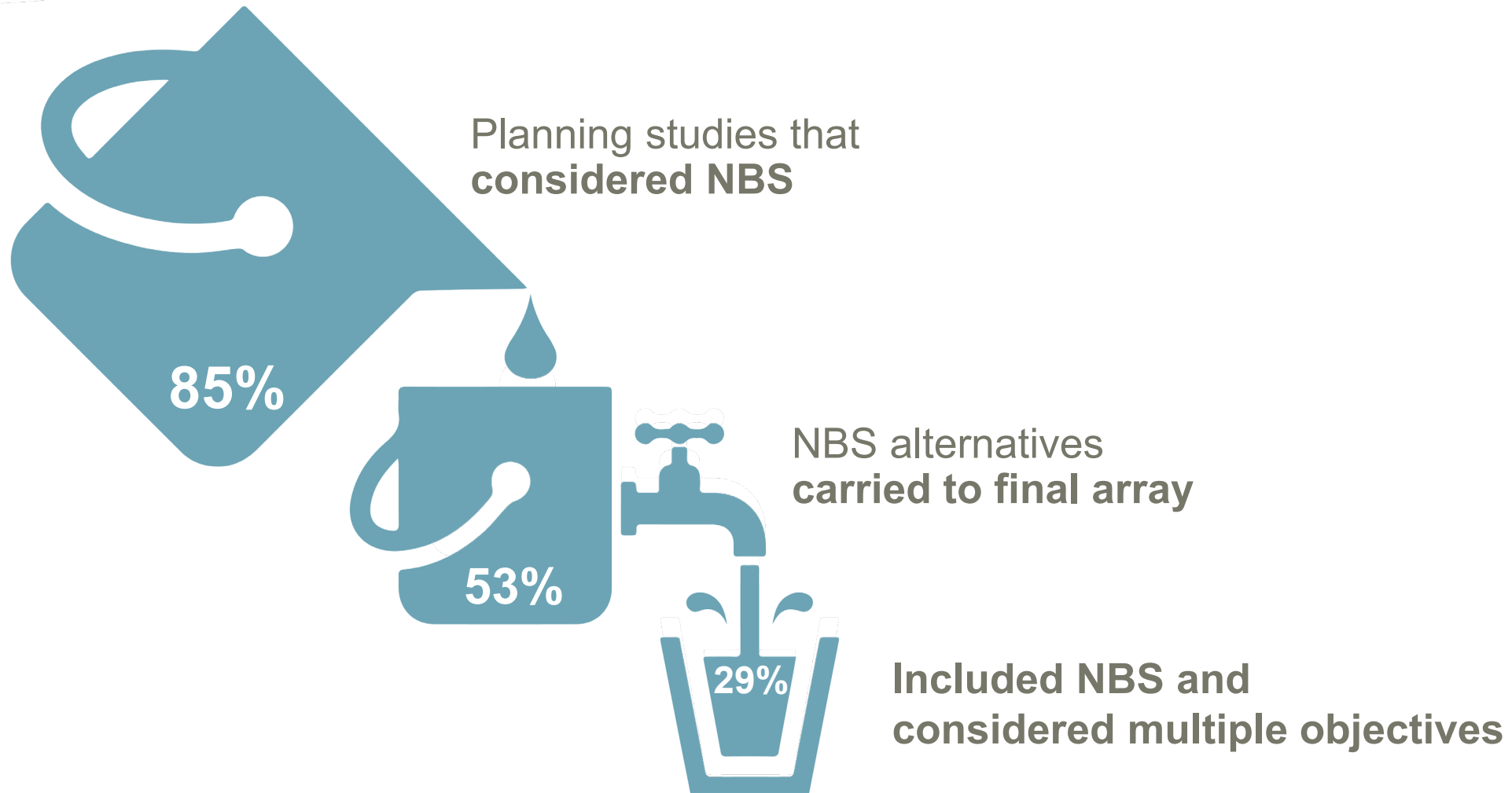
EVALUATION OF NON-MONETIZED OUTCOMES

ECOSYSTEM SERVICE VALUATION

HOLISTIC ANALYSIS ACROSS MULTIPLE GOALS



SCOPING WITHIN SEPARATE MISSION AREAS LIMITS NBS OPPORTUNITIES





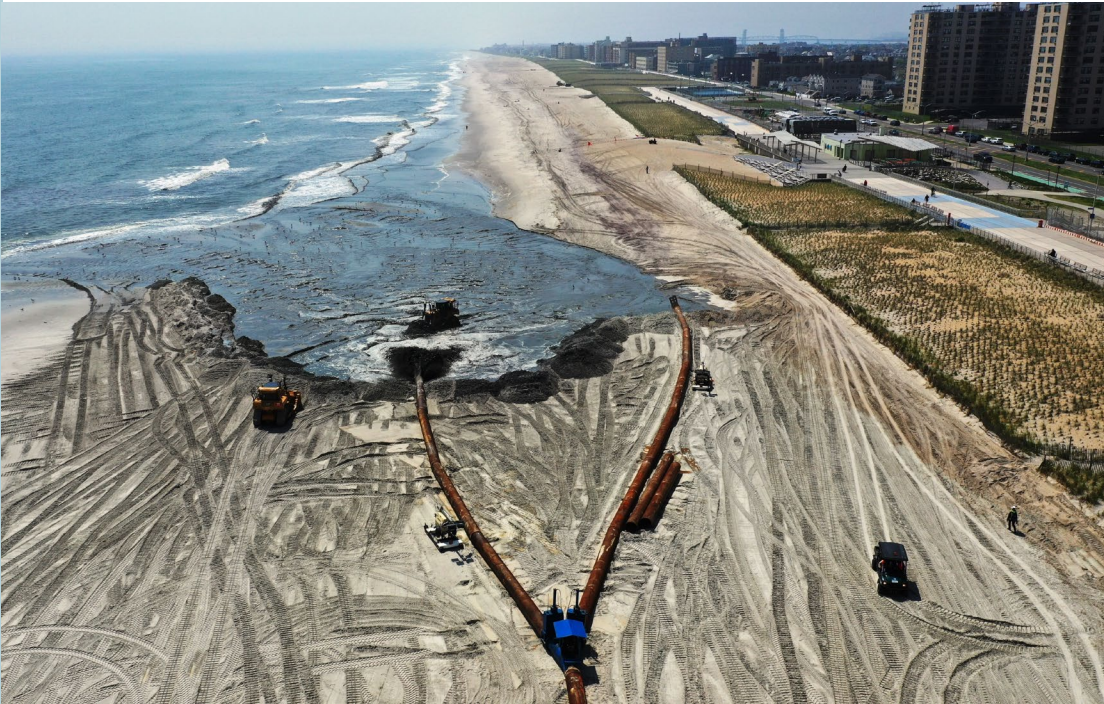
CASE STUDY **JAMAICA BAY**





RECOMMENDATION

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

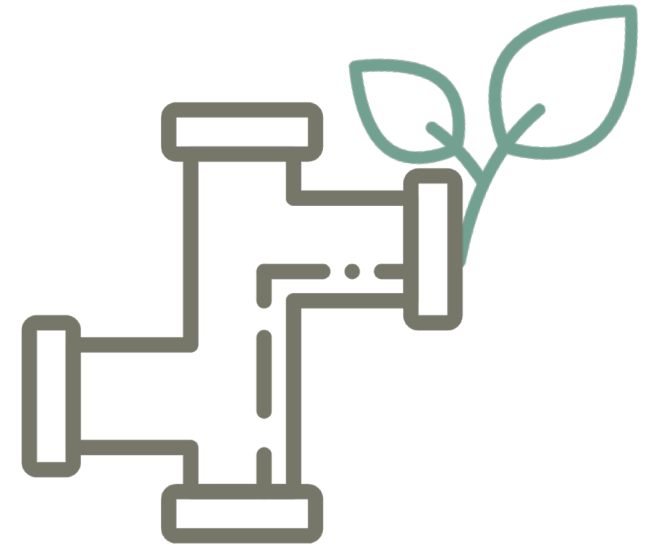


NBS OPTIONS ARE OFTEN EXCLUDED DURING ALTERNATIVE FORMULATION

Alternatives developed **independently for different objectives**

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

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





CASE STUDY

SOUTH PLATTE RIVER & TRIBUTARIES, CO



South Platte River, Denver, CO; Photograph courtesy of city and county of Denver



RECOMMENDATION

FORMULATE
ALTERNATIVES TO
MEET **MULTIPLE**
OBJECTIVES



Confluence Park, Denver, CO



EXISTING TOOLS CAN SUPPORT 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



[illegible]



RECOMMENDATION

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





CASE STUDY JACKSONVILLE HARBOR, MILE POINT, FL



Mile Point Construction (Photo by Mark Bias)



RECOMMENDATION

**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
dredged material disposal capacity**
through beneficial use



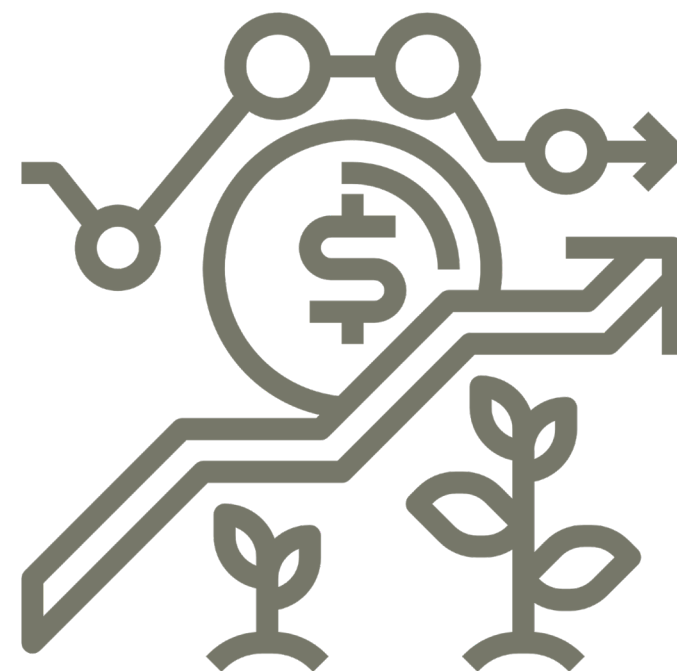
Piping Plover Habitat in Superior, Wisconsin, United States
Photo by Sam Hansen, St. Louis River Alliance



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** given decisions made during scoping, screening, and formulation





CASE STUDY WEST SACRAMENTO



West Sacramento Project Levee Construction (U.S. Army Photo/Todd Plain)





...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

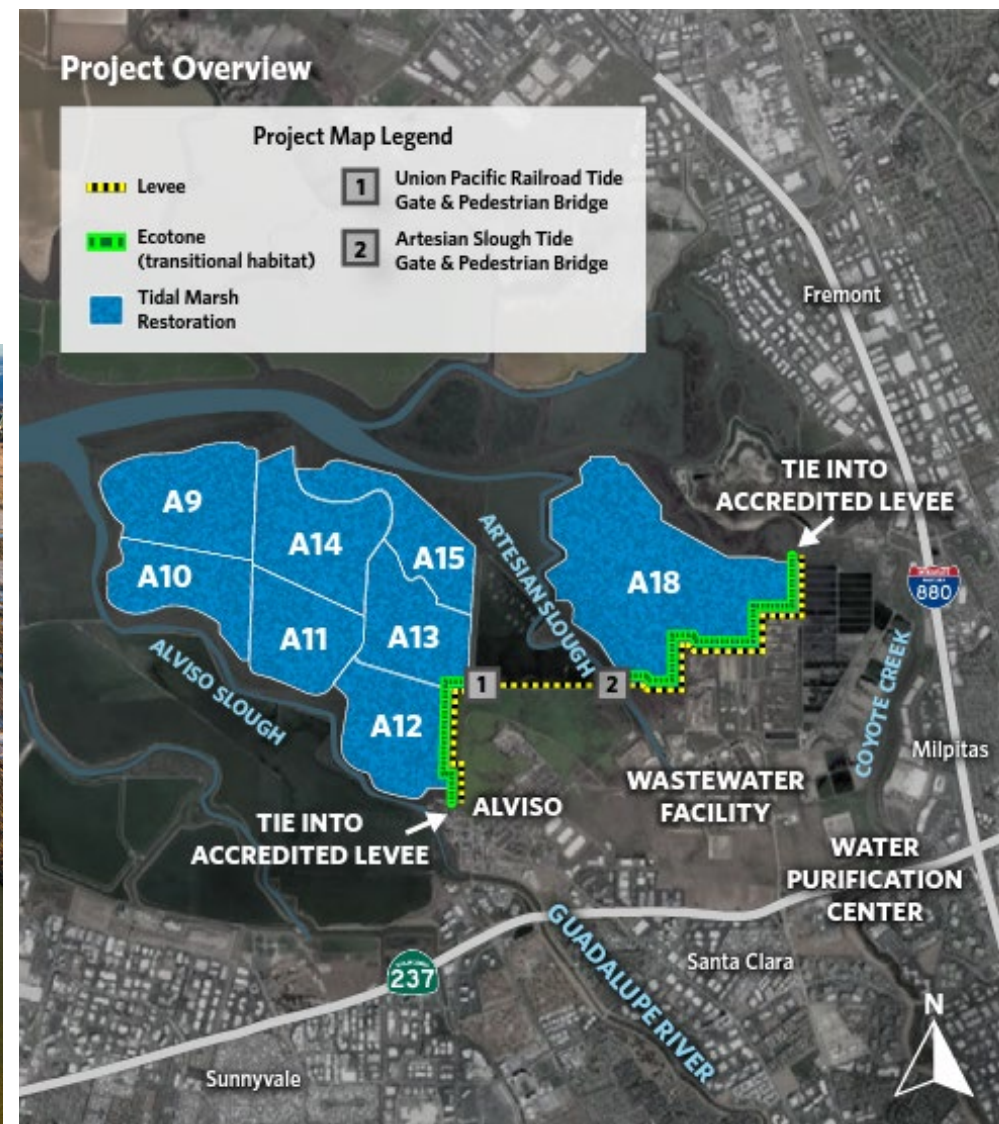




CASE STUDY SOUTH SAN FRANCISCO BAY SHORELINE



Photo by Chris Benton





RECOMMENDATION

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

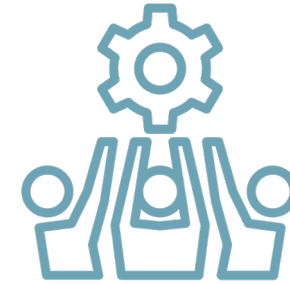


Levee spanning a tidal marsh in Alviso, California. USACE image.

WHAT'S NEXT?



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



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