

A PIANC Standard of Practice for Performing Initial Assessments of Environmental Effects for Navigation Infrastructure Projects

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USACE-ERDC-EL
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Transportation Research Board
Conference
Washington, DC
26 June 2012



US Army Corps of Engineers
BUILDING STRONG®



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Background

- Procedures already developed to assess environmental risks for navigation and port infrastructure projects
- Methodology lacking for identifying stressors and pathways contributing to environmental impacts early in the project
- A new standard of practice being developed by PIANC EnviCom WG 143 providing a transparent method for performing the initial assessment process for navigation and port infrastructure projects



Purpose

Identify and describe the stressors and pathways of potential environmental effects, from the possible external driving forces, and the likely environmental resources that might be affected by navigation and infrastructure projects

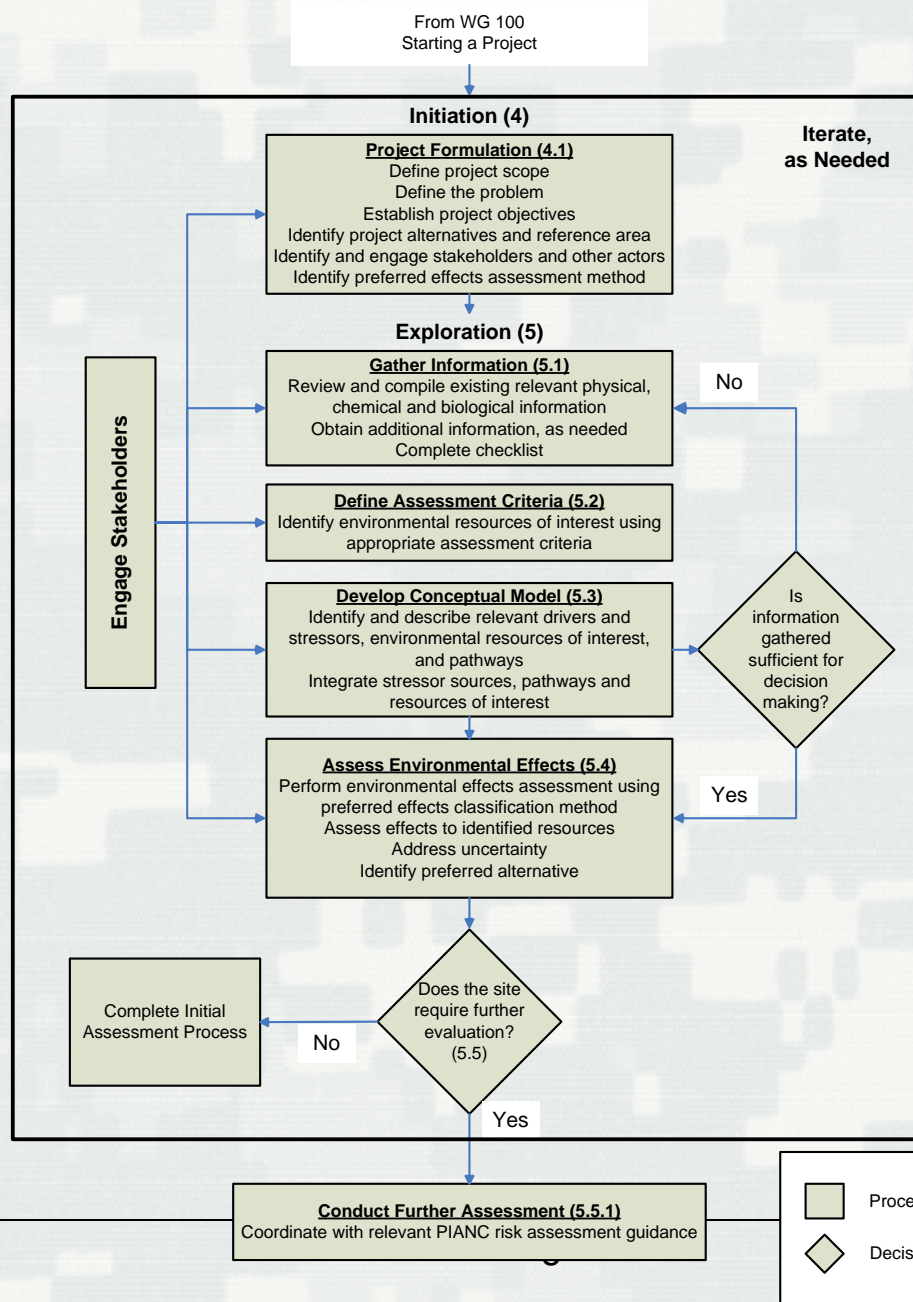


Scope

- Projects related to navigation and infrastructure include but are not limited to maintenance and new work dredging, port and harbor development and construction of waterways, locks, canals, quays, breakwaters, jetties, and groins
 - ▶ Terminals, berthing facilities, barge flotilla areas, turning basins
- Identifies aspects of navigation and infrastructure projects that need in-depth investigation
- Identifies the need to investigate possible alternatives early in the project



Figure 1. Initial Assessment Process Flowchart (31 May 2012)



Working with Nature

- Incorporates PIANC's Working with Nature philosophy focusing on:
 - ▶ Achieving project objectives in an ecosystem context rather than assessing the consequences of a predefined project design
 - ▶ Identifying win-win solutions rather than simply minimizing ecological harm
- Working with Nature advocates the following steps:
 - ▶ Establish project need and objectives
 - ▶ Understand the environment
 - ▶ Make meaningful use of stakeholder engagement; identify win-win options
 - ▶ Prepare project proposals/design to benefit navigation and nature



Initiation Phase

■ Project Formulation

- ▶ **Define project scope** - Identify the information needed to complete the initial assessment
- ▶ **Define the problem** – Develop problem statement that identifies the essential elements of the problem and explicitly defines the problem
- ▶ **Establish project objectives** – Identify the fundamental project objectives to develop a structured decision making process
- ▶ **Define project alternatives** – Develop a list of alternatives that represents the range of potential choices the decision makers will have for pursuing the stated objectives
- ▶ **Identify reference locations** - To evaluate project alternatives via comparisons with a reference location or baseline alternative
- ▶ **Engage stakeholders and other actors** – Identify who needs to be a part of this process
- ▶ **Identify preferred effects assessment method**



Engaging Stakeholders

- Developing a process to engage stakeholders is needed to ensure a successful project
- Stakeholder involvement should start early to promote transparency and ensure the assessment proceeds effectively, efficiently and credibly
- Effective stakeholder engagement involves active stakeholder participation at appropriate points in the assessment process rather than as passive recipients of the results
- To meet challenges, get the participation right



Exploration Phase

- Gather information
- Define assessment criteria and indicators
- Develop conceptual model
- Define project alternatives
- Assess environmental effects
- Case Studies
 - ▶ Sand hunger
 - ▶ Port expansion



Information Gathering - Checklist

- Identifies potential environmental resources in project area and potential for the project to cause adverse effects
- Checklist organized by the description of the:
 - ▶ Project area
 - ▶ Environment potentially affected by the project
 - ▶ Construction and maintenance related operations

Description of Project Area	
Project Attribute	Description
Project and Adjacent Infrastructure Areas <ul style="list-style-type: none"> • Project boundaries (e.g., water catchment, airshed) • Location, size, general layout (using maps, drawings, etc.) • Geographic siting (e.g., estuary, river, marine inlet, embayment, protected coast, or engineered coastline) • Other relevant project area attributes 	
Biological Environment of project and adjacent areas <ul style="list-style-type: none"> • Flora • Fauna • Rare and endangered species • Habitat type(s) (wetland, mangrove, estuary, coral reefs, seagrass beds, etc.) • Sensitive or protected habitats (e.g., parks and preserves) • Species of commercial or recreational importance • Current or potential nuisance species • Other biological attributes, as appropriate 	



Environmental Indicator - Defined

A measurable feature that provides useful information on ecosystem status, quality or trends and the factors that affect them



Environmental Indicators

- Pressure Indicators - Direct and indirect pressures impacting the environment (human activities)
 - ▶ Marine transportation patterns
 - ▶ Human population growth (sprawl)
 - ▶ Invasive species introduction rates
 - ▶ Land use change



Environmental Indicators

- State Indicators - Physical, chemical and biological conditions of nature and human health and welfare
 - ▶ Chemical concentrations in environmental media (abiotic and biotic)
 - ▶ Wildlife population levels (e.g., bird counts)
 - ▶ Disease rates
 - ▶ Abundance, deformities, and reproductive success of key wildlife species

- ▶ Climate change - Water temperature, fish migration timing, precipitation rates, water level, ice coverage



Environmental Indicators

- Response Indicators - Societal actions undertaken to improve or protect ecosystems
 - ▶ Pollution regulations
 - ▶ Habitat restoration
 - ▶ Use of clean technologies
 - ▶ Remediation of contaminated media
 - ▶ Nutrient loadings

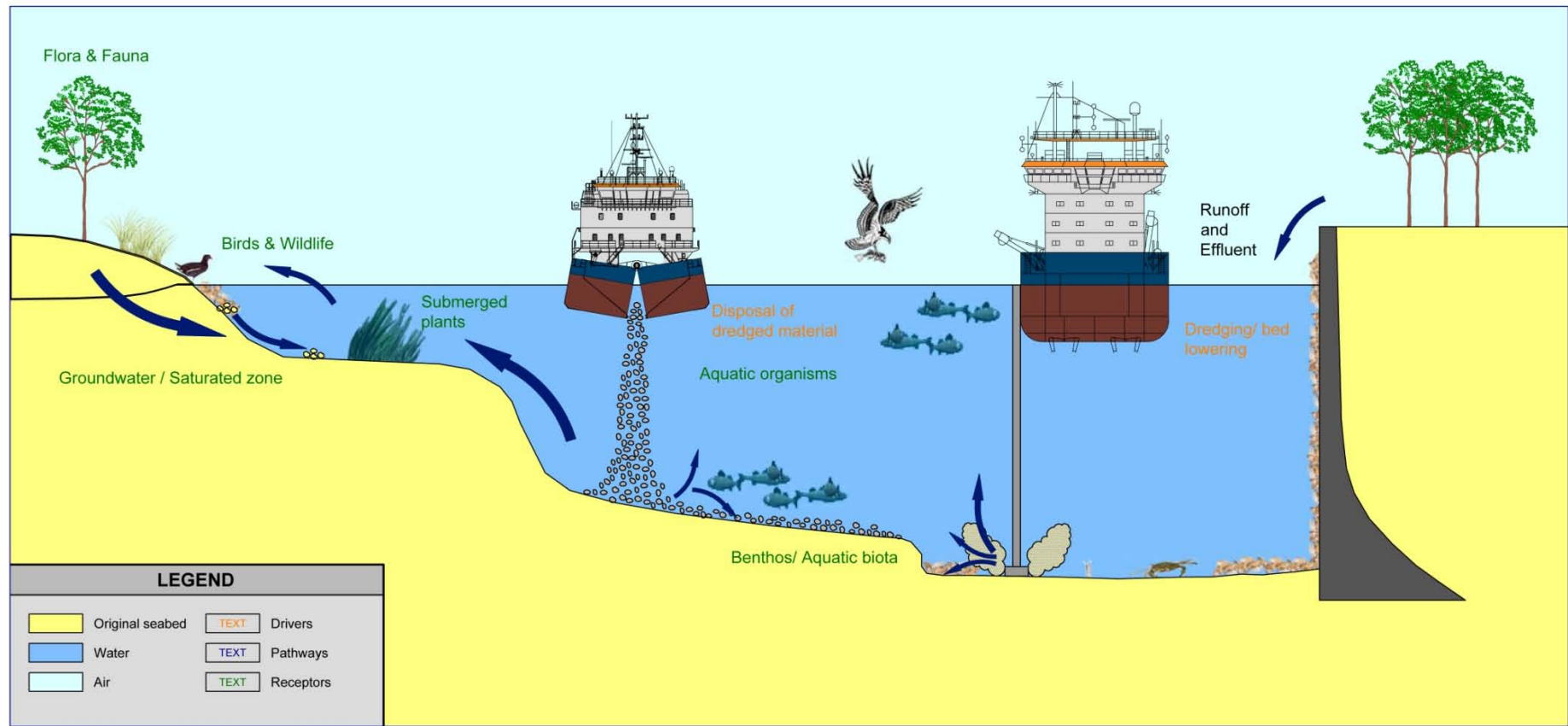


Conceptual Models

- Projects may result in stressors being placed on the ecosystem - these stressors must be identified
- Pathways as links between stressors and environmental receptors
- Conceptual models required to fully support the initial environmental assessment
- Communicate the rationale behind the selection and integration of stressors, pathways and receptors
- Developing example conceptual models



Example Conceptual Model



Assess Environmental Effects

- Multi Criteria Analysis
- Modified URE Method
- Socio-economic Cost Benefit Analysis
- Cost Efficiency Analysis



Uncertainty

- Acknowledgment and treatment of uncertainty key elements
- Addressing uncertainty:
 - ▶ Should be consistent with the overall scope and purpose of the initial assessment
- Initial assessments conducted in data-poor environments
 - ▶ Much of the information required to quantify uncertainty may be lacking
- Characterize the types, sources, extent and magnitude of substantial uncertainties consistent with available data
- Communicate nature, magnitude and implications of uncertainties to decision makers and stakeholders



Summary

- Develops understanding of project components and their effects on the environment
- Engages stakeholders early and often
- Uses conceptual models to illustrate pathways from stressors to the environment
- Develops assessment of environmental impacts
 - Investigates and evaluates possible alternatives
- Is compatible with Working with Nature philosophy
- Reduce lead times to project execution



Take Home Points

- Early communication with stakeholders prerequisite for success
- Indicator selection – quantification critical
- Lessons, not limits, should drive indicator use

