

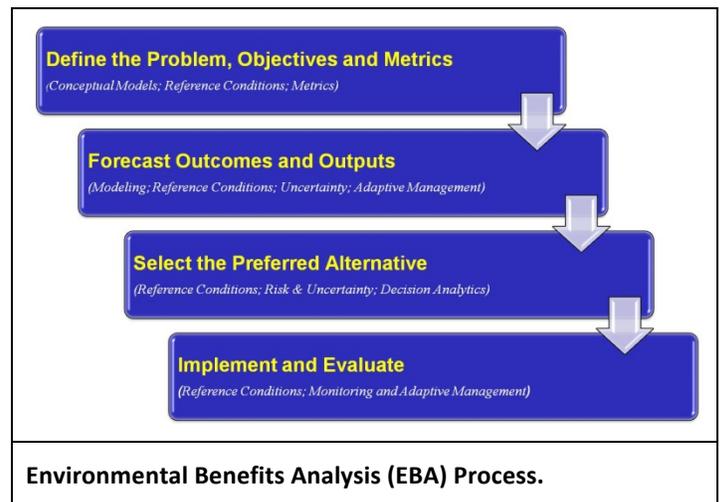
Environmental Benefits Analysis

Capability

Environmental benefits analysis (EBA) is that part of the planning process necessary to determine the benefits of a project in terms of one or more metrics chosen to reflect valued ecosystem attributes. EBA can be regarded in terms of four primary phases: 1) a qualitative phase aimed at understanding the problems and opportunities, 2) a quantitative phase wherein benefits are computed, 3) the decision phase in which the benefits are considered relative to costs and other factors, and 4) a "benefits confirmation" phase involving post project monitoring and adaptive management. Several steps are required, some of which are not exclusive to EBA, and their relationship to the Corps' six-step planning process.

The basis for establishing environmental benefits for ecosystem restoration is an evaluation of the change in quantity and/or quality of an ecosystem over time relative to a Future Without-Project (FWOP) condition. These changes and the resulting outputs are quantified using ecological production functions. Although current practice follows this framework, our research was aimed at improving EBA practice in several ways, and focuses on the topics below.

- **Ecological Understanding.** The relationships between the hydrologic, geomorphic and biologic characteristics of ecosystems are the foundation for effective ecosystem restoration and the assessment of the benefits thereof. The manipulation of these relationships through engineering practices forms the basis for the Corps of Engineer's ecosystem restoration mission.
- **Objectives and Metric Selection.** The quality of assessments and evaluations rest on the choice of metrics used to compare alternatives and evaluate the results of investments. Objectives and benefits generally extend beyond habitat improvements, and a more comprehensive accounting of restoration benefits is desirable.
- **Modeling and Forecasting.** Practitioners should embrace modeling and related techniques associated with forecasting of ecosystem condition(s) and quantifying benefits expected from implementation of plans formulated to cause or contribute to ecosystem state changes.
- **Uncertainty and Risk.** Good EBA practice requires the recognition, identification, characterization, and explicit consideration of uncertainty and associated risks.
- **Reference Concepts.** Reference concepts are important to understanding ecosystem condition and can be used to establish a "target" for restoration. Reference conditions can also be used as a means of indexing ecosystem quality and can serve as a means for quantifying benefits.
- **Adaptive Management.** Adaptive management practices, if embraced and exercised during a project's planning and lifecycle activities, can significantly improve the potential for realizing restoration benefits and decrease potential for making regretted decisions.
- **Documentation.** An accurate and thorough but concise accounting of the EBA is necessary to effectively convey information to decision makers.



Applications(s)

Case Studies and related documents can be found at: <http://cw-environment.usace.army.mil/eba/case.cfm>.

Features

Tools and related documents can be found at: <http://cw-environment.usace.army.mil/eba/tools.cfm>.

Get it Here

All related resources can be found at the Civil Works Environment Gateway, <http://cw-environment.usace.army.mil/eba/index.cfm>

Fact Sheet: Environmental Benefits Analysis Program

Other Products:

- EBA Glossary
- April 2010 Briefing to Environmental Advisory Board
- April 2011 Briefing to ASA(CW)
- February 2012 Presentation to Planning Associates
- Relating the Corps Six-Step Planning Process to EBA Phases and Activities
- Model Library <http://cw-environment.usace.army.mil/model-library.cfm?CoP=Restore&Option=Start>

Webinars: EBA Overview

Documentation and References

Fischenich, J. C., McKay, S. K., Miller, S. J., Price, D. L., Pruitt, B., Skaggs, L., Suedel, B., Tazik, D. A Framework for Science-Based Environmental Benefits Assessment

Convertino, M., Suedel, B. C., Linkov, I., Vogel, J., Valverde, J., Fischenich, J. C. (2012). EMRRP-ER-14: An Illustrative Case Study of the Application of Uncertainty Concepts and Methods for Ecosystem Restoration

Fischenich, J. C., Vogt, C. (2012). EMRRP-EBA-10: The Application of Adaptive Management to Ecosystem Restoration Projects

Fischenich, J.C. Stream Restoration Benefits

McKay, S. K., Linkov, I., Fischenich, J. C., Miller, S. J., Valverde, L. J. EMRRP-EBA-16: Ecosystem Restoration Objectives and Metrics

Miller, S. J., Pruitt, B. A., Theiling, C. H., Fischenich, J. C., Komlos, S. B., (2012). EMRRP-EBA-12: Reference Concepts in Ecosystem Restoration and EBA: Principles and Practices

Pruitt, B. A., Miller, S. J., Theiling, C. H., Fischenich, J. C. (2013). EMRRP-EBA-11: The Use of Reference Ecosystems as a Basis for Assessing Restoration Benefits

Suedel, B. C., Valverde, L. J., Vogel, J., Linkov, I., Fischenich, J. C., Bridges, T., Plumley, M. (2012). EMRRP-EBA-15: Application of Risk Management Concepts and Methods for Ecosystem Restoration: Principles and Best Practice

Swannack, T. M., Fischenich, J. C., Tazik, D. J. (2012). ERDC/EL TR-12-18: Ecological Modeling Guide for Ecosystem Restoration and Management

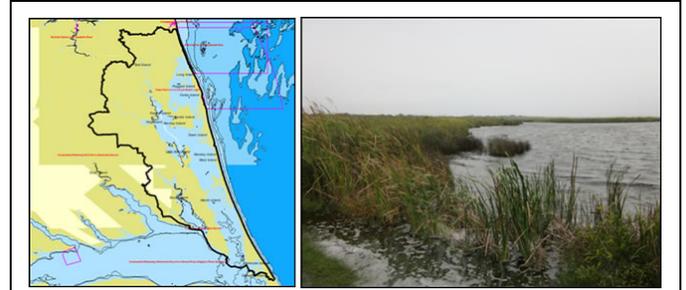
Other related technical documents can be found at: <http://cw-environment.usace.army.mil/eba/reports.cfm?Option=Title>.

Point of Contact

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Related USACE CoPs: Planning, Ecosystem Restoration/ECs: EC 1105-2-412, Planning : Assuring the Quality of Planning Models

Category: environmental benefits analysis, planning, objectives, metrics, ecosystem restoration, modeling, adaptive management



Currituck Sound is a large estuary located in northeastern North Carolina and southeastern Virginia and is part of the Albemarle-Pamlico National Estuary. Thin barrier islands separate the Sound from the Atlantic Ocean, and the system receives saline inputs primarily through the southern entrance to the Sound. In the last 50-100 years, significant changes have taken place in the Sound, and the health of the ecosystem has declined considerably..