



CHIEF OF ENGINEERS ENVIRONMENTAL ADVISORY BOARD  
441 G STREET NW  
WASHINGTON, DC 20314-1000

To: Mr. Theodore Brown  
Chief of Planning & Policy Division  
Directorate of Civil Works

Date: April 8, 2013

Subject: Criteria for Aquatic Ecosystem Restoration

The attached paper is provided in response to a request of Major General Walsh during the EAB meeting on January 19, 2012. MG Walsh asked the Board to propose criteria to determine which aquatic ecosystem restoration projects the Corps should consider implementing. After follow up conversations with you and your staff we understood that we were to identify criteria that could be used to show where the Corps should engage in aquatic ecosystem restoration and, by implication, conditions where Corps involvement is not appropriate. The Board has discussed the role of the Corps in aquatic ecosystem restoration and has prepared the attached paper for your consideration.

Application of the four criteria described in the paper will require additional deliberation on standards or measures that could be used to determine whether a criterion is met by a project. In accordance with your directions we have not provided suggestions to guide application. If the criteria provided here are considered useful in focusing the program, members of the Board are willing to assist in developing ideas on standards or measures that could be used to assess individual projects. However, such next steps may best be conducted in collaboration with Corps personnel with more direct knowledge of the types of information that project development teams can readily provide.

Please let me know if you would like to discuss the ideas presented in the attached paper with the Board prior to the next meeting so that we can set up a conference call.

Sincerely,

A handwritten signature in black ink, appearing to read "James E. Kundell", is positioned above the typed name.

Dr. James E. Kundell, Chair  
Chief of Engineers Environmental Advisory Board

Encl:

cf: Mr. John Furry, DFO  
Dr. Bob Brumbaugh, ADFO

**Determining the Corps' Interest in Aquatic Ecosystem Restoration**  
**Chief of Engineers Environmental Advisory Board**  
**2013**

**Context**

The U.S. Army Corps of Engineers has a large backlog of projects awaiting implementation, an ever-growing commitment to operations and maintenance of aging infrastructure, and a large number of projects working their way through the planning process. Aquatic ecosystem restoration is one of the three Corps' Civil Works missions and must, therefore, compete for resources against other important missions such as navigation and flood risk reduction. As the Environmental Advisory Board (EAB) previously noted in 2005<sup>1</sup>, the Corps has a variety of authorities to pursue aquatic ecosystem restoration and these provide broad direction to the program. In the current fiscal climate, and to ensure that expectations of project sponsors are realistic and achievable, periodic revisiting of the focus of the aquatic ecosystem restoration mission under these authorities is advisable. The EAB has been requested by Corps HQ to identify criteria which can be used to focus future aquatic ecosystems restoration.

Two concepts, "ecosystem" and "systems approach," are central to the Corps' aquatic ecosystem restoration role. For this working paper, these concepts are defined as:

**Ecosystem:** An ecosystem is the dynamic and interrelating complex of plant and animal communities and their associated nonliving environment, considered as an integrated unit. Implied within this definition is the concept of structure and function unified through life processes. An ecosystem may be characterized as a viable unit of community and interactive habitat. [Planning and Guidance Notebook, Engineer Regulation 1105-2-100, 22 April 2000.]

**Systems Approach:** Water resources planning and management should be watershed in scale using systems analysis methods and tools to understand, assess, and model the interconnected nature of hydrologic systems (e.g., watersheds) and the economic and ecologic systems they support, and to identify and evaluate management alternatives from both time (life-cycle) and function (multi-purpose) perspectives. ['Sustainable Solutions to America's Water Resources Needs.' Department of the Army, Corps of Engineers Civil Works Strategic Plan 2011-2015, September 2011.]

The EAB has identified four criteria which could be used to identify projects suitable for Corps involvement. The discussion presented here focuses on the rationale for the criteria, rather than the specific descriptions of which project characteristics might be considered in determining

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<sup>1</sup> [http://www.usace.army.mil/Portals/2/docs/Environmental/RestorationAuthorityGaps\\_final\\_12-1-05.pdf](http://www.usace.army.mil/Portals/2/docs/Environmental/RestorationAuthorityGaps_final_12-1-05.pdf)

whether the criteria are met. Putting the following four criteria into action to shape the future of the aquatic ecosystem restoration program will require further work and refinement. The EAB believes that these concepts together identify a unique Corps role in the restoration of the nation's aquatic ecosystems and recommends that Corps assist the EAB in developing the next steps needed to allow their use in project and program development, such as what metrics to use to measure compliance with the criteria and details of how the criteria could be used to assess specific projects.

## **Criteria**

### ***Criterion 1: Projects should address restoration using an ecosystem approach.***

In developing the criteria, EAB members reviewed the ecosystem restoration missions of several other federal agencies and found that most missions focus on individual species or habitats. In contrast, the Corps is charged with 'aquatic ecosystem restoration' and, thus, the scope of the Corps' restoration mandate is unique among federal agencies. The Corps' approach needs to be broader than single species or habitat-specific measures. Individual Corps projects might address the needs of special status species or include measures to control invasive species, for example, but these projects must be undertaken in the context of ecosystem benefits (i.e., the benefits to the ecosystem as a whole<sup>2</sup>). The EAB recommends that the 'ecosystem approach' be considered central to the Corps aquatic ecosystem restoration mission and that all Corps projects must meet this criterion.

An ecosystem approach (see Definitions p. 1) should focus on integration and the way in which structure, function, and dynamic processes work together to produce meaningful outcomes for significant resources.<sup>3</sup> The interrelationships are essential: habitats do not have value unless they are occupied by organisms and habitat use by organisms requires that they be viable in all life history stages. The physical and biological processes enabling habitat use are also essential.

The ecosystem approach to restoration also conforms to the systems approach (see Definitions p. 1) advocated in the Civil Works Strategic Plan. The systems approach shifts the focus of decision-making from individual and sometimes isolated projects to an interdependent system, and from local or immediate solutions to regional and long-term solutions that consider the entire life-cycle of projects. The ecosystem and systems approaches require a broad, holistic view of restoration.

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<sup>2</sup> Besides ecosystem benefits, aquatic ecosystem restoration projects provide ecosystem services, defined as values to humans derived from ecosystem processes, but ecosystem services are not an element of this criterion.

<sup>3</sup> The Planning Guidance Notebook identifies significant resources as those that are technically, institutionally, or publicly recognized as having substantial non-monetary value from either an ecological, cultural or aesthetic standpoint.

***Criterion 2: Projects should demonstrate sustainable major ecosystem benefits.***

The EAB urges that, consistent with the Civil Works Strategic Plan and the Environmental Operating Principles, all Corps ecosystem restoration activities seek sustainable solutions. The objective should be to provide ecosystem benefits that continue for many decades. To achieve this long-term improvement, aquatic ecosystem restorations projects must be planned to provide robust ecosystem benefits in the face of uncertain futures, and be resilient in the face of inevitable natural disturbances such as floods and droughts.

This criterion requires that projects be both sustainable and that they provide major ecosystem benefits. These two aspects of a restoration project are related. For example, the National Research Council (NRC) stated in 1992 that:

the committee believed very strongly that the spatial and temporal scope of most restoration efforts was far too small. Moreover, the committee felt that all too many environmental decisions, including those involving restoration, had been made in a fragmented fashion unlikely to produce a self-maintaining aquatic ecosystem integrated into the larger ecological landscape.<sup>4</sup>

The outcome of the aquatic ecosystem restoration project and its influence on natural resources must be of a sufficient scale to warrant commitment of Corps resources. Outcomes may be considered for Corps engagement if they are expected to result in sustained major ecosystem effects, e.g., the outcome contributes substantially to an ecosystem's natural productivity or it has a landscape-scale effect on processes that provide benefit to an array of native fish or wildlife.

***Criterion 3: Projects should achieve ecosystem benefits primarily through modification of hydrologic and geomorphic processes.***

The NRC in 2004<sup>5</sup> recommended: "The Corps' primary environmental mission should be to restore hydrologic and geomorphic processes in large river and coastal systems." In coming to this conclusion the NRC noted: "Defining the restoration mission and restoration measures in ecologically meaningful hydrologic terms can link the Corps' efforts in this new realm to its traditional areas of expertise in hydrology and engineering."

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<sup>4</sup> National Research Council. 1992. Restoration of Aquatic Ecosystems: Science, Technology, and Public Policy Committee on Restoration of Aquatic Ecosystems: Science, Technology, and Public Policy. National Academies Press, Washington DC.

<sup>5</sup> National Research Council. 2004. U.S. Army Corps of Engineers, Water Resources Planning: A New Opportunity for Service. Coordinating Committee, Committee to Assess the U.S. Army Corps of Engineers Methods of Analysis and Peer Review for Water Resources Project Planning. Water Science and Technology Board. National Academies Press, Washington DC.

In contrast to many agencies working on restoration, the Corps' expertise is on the hydrologic and geomorphic character of natural systems. Therefore, it is appropriate that the Corps focus on the physical dynamics of aquatic ecosystems in their restoration projects. This emphasis was identified previously by the EAB in 2006<sup>6</sup> when the Board suggested that the objective of Corps ecosystem restoration planning should be "to restore sustainable natural hydrologic and geomorphic processes, in so far as they affect native communities and associated functions, that have been disrupted and/or degraded and that have resulted in significant environmental, economic or social problems and conflicts."

***Criterion 4: The Corps should engage in aquatic ecosystem restoration where there is a recognized federal role in the problem requiring restoration action or there is national recognition of the ecosystem problems to be addressed.***

The Corps should preferentially engage in aquatic ecosystem restoration projects that provide benefits beyond the single state or local level. The Commerce Clause of the Constitution<sup>7</sup> recognizes that interstate issues are federal in nature. Aquatic ecosystem restoration projects on water bodies that cross state boundaries or address watershed issues that affect or are affected by water resources in more than one state are, thus, considered of federal concern. Benefits to migrating birds would typically fall in this category, as birds migrate across state boundaries.

There is also a federal role for the Corps in projects with a direct association with existing water management practices and/or historic, ongoing, or expected Corps activities. For example, Section 1135 of the Water Resources Development Act of 1986, as amended, provides the authority to modify existing Corps projects to restore the environment and construct new projects to restore areas degraded by Corps projects. This authority recognizes that the Corps has a role in restoration relative to ongoing or past effects of its existing projects. The NRC (2004) also notes that directing the Corps ecosystem restoration to focus on hydrologic processes (Criterion 3) "directs attention to the management and operation of existing projects. Further, the concept of restoration mission and restoration measures requires that the Corps place its restoration program in the broader context of federal, state, and local programs." Thus, both statute and independent experts have recognized the Corps will have a central role on aquatic ecosystem restoration projects that are related to its existing projects.

Finally, in exceptional cases a restoration project within a single state might provide such significant benefits that it would be in the federal interest to complete it. In some cases, this national interest might be identified by statute or Executive Order (e.g., Endangered Species Act, Invasive Species Executive Order 13112). Another indication of the federal interest would be a multi-agency (including federal agencies) comprehensive watershed or basin plan developed in

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<sup>6</sup> [http://www.usace.army.mil/Portals/2/docs/Environmental/ebpm\\_mar07.pdf](http://www.usace.army.mil/Portals/2/docs/Environmental/ebpm_mar07.pdf)

<sup>7</sup> [The Congress shall have Power] to regulate Commerce with foreign Nations, and among the several States, and with the Indian tribes.

support of federal priorities. Examples of single-state ecosystem restoration programs that would meet the federal interest criterion include the Everglades and San Francisco Bay/Sacramento Delta restoration programs.