

# Commission Briefing Paper 4D-09

## Evaluation of Species Protection and Wetland Preservation Strategies and Implications for Surface Transportation Infrastructure

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### Introduction

This paper is one of a series of briefing papers prepared for the National Surface Transportation Policy and Revenue Study Commission authorized in Section 1909 of SAFETEA-LU. The papers synthesize state of the practice consensus on the issues relevant to the Commission's charge outlined in Section 1909, and will serve as background material in developing the analyses to be presented in the final report of the Commission.

The briefing summarizes key findings of recent guidance and research on species protection and wetland conservation strategies developed by FHWA and other natural resource agencies, and the National Academy of Science reports on Science and the Endangered Species Act (NAS, 1995), Wetlands (NAS, 1995b) and Compensating for Wetlands Losses Under the Clean Water Act, (NAS, 2001). There is also a separate briefing paper on the Impacts of Surface Transportation Infrastructure Development on Habitat Connectivity and Resilience which provides more detail on impacts and mitigation measures for species.

### Background and Key Findings

**Legal Requirements:** The current state of the practice with respect to wetland and species protection is driven by section 404 of the Clean Water Act (wetland protection) and the Endangered Species Act (ESA). These acts require that Federal agencies make every reasonable effort to avoid impacts to wetlands and to listed species. Complying with the requirements of both the Clean Water Act and the ESA may require transportation projects to undergo alignment changes and design modifications to avoid and minimize, or reduce, impacts to aquatic resources and species protected under the law. These changes may add additional costs to a project by requiring structural features, such as bridges, to minimize impacts to aquatic resources, additional treatment for storm water, wildlife underpasses or overpasses and numerous other measures. After appropriate design changes have been made, compensatory mitigation in the form of habitat restoration, creation or preservation may be required for any remaining unavoidable wetland impacts, and reasonable and prudent measures must be undertaken to minimize adverse effects to listed species.

**Current Approach to Addressing Impacts:** Currently, most collaboration with federal and state resource and regulatory agencies with respect to impacts of transportation projects on wetlands and species, and appropriate mitigation, occurs after transportation planning in the project development process and during the environmental analysis required by the National Environmental Policy Act (NEPA). This results in a project by project, resource by resource, approach to wetland and species preservation.<sup>1</sup>

**Costs:** Ecosystem, wildlife, and habitat considerations will continue to be issues of high general concern to the public welfare for the provision of natural goods and services, which include clean water, clean air, economic support (timber, hunting, fishing, foodstuffs), and recreational activities. Although average costs for resources mitigation on highway projects have continued at a relatively low level compared to overall project costs (normally in the range of 5 to 10 percent), costs can be expected to increase as natural resource supplies decrease and values increase in the face of continued socioeconomic development.

***Trends Toward Integrated Mitigation and Conservation Strategies:*** Federal resource, land management and regulatory agencies as well as the transportation community are developing integrated conservation strategies, emphasizing an ecosystem or watershed approach to mitigation rather than single resource conservation and mitigation. Integrated strategies also look for mitigation opportunities prior to transportation project development. This may involve looking at the needs of a particular watershed or the areas within an ecosystem most in need of protection. These approaches are based on collaboration at every level--Federal, state, local, Tribal, landowner and NGO. Actions by transportation agencies alone cannot provide the resource protection necessary to make a difference to wetland and species protection. These decisions must be integrated with the plans of land managers and resource agencies to truly improve wetland and species protection. **To be most effective, from the perspective of efficient and streamlined project delivery and costs, as well as environmental benefit, these strategies should be formulated in conjunction with the development the transportation plan, and implemented well before project development is initiated.**<sup>ii</sup>

***Impediments to Integrated Strategies:*** There is a need to develop additional public and/or private resources to provide adequate funding for the type of environmental studies and analysis that would be needed to develop and implement these integrated conservation strategies in the transportation planning process. The bulk of Federal aid highway funds are available after project initiation, and the current level of planning funding cannot begin to meet the data and analysis needs for a truly integrated conservation strategy. Therefore, many transportation agencies and metropolitan planning organizations are not able to fund these strategies and continue to rely on more traditional means of species and wetland preservation.

## **Controlling Environmental Statutes, Executive Orders, and Regulations**

Federally-funded surface transportation projects must comply with Federal environmental statutes, Executive Orders, and regulations. The environmental laws most pertinent to species and wetland issues include:

### **National Environmental Policy Act of 1969 (42 USC §§ 4321-4347)**

The Act requires Federal agencies to include a detailed statement of the environmental impact in every recommendation or report on proposals for major Federal action significantly affecting the quality of the human environment; requires Federal agencies to study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources; and requires Federal agencies to initiate and utilize ecological information in the planning and development of

resource-oriented projects. Public involvement and review as well as agency review are critical components of the NEPA process and alternative selection.

### **CWA, Section 404** (*33 USC § 1251 et. seq.*)

The Federal Water Pollution Control Act, known as the Clean Water Act, is a comprehensive statute aimed at restoring and maintaining the “chemical, physical and biological integrity of the nation's waters.” Primary authority for the implementation and enforcement of the Clean Water Act now rests with the US Environmental Protection Agency (EPA) and the US Army Corps of Engineers (USACE) for wetlands.

Important for wildlife protection purposes are the provisions requiring permits to dispose of dredged and fill materials into waters of the United States, including wetlands. Permit applications are evaluated by the USACE under environmental regulations known as the “404(b)(1) Guidelines” developed by EPA.

### **Executive Order 11990**

Executive Order 11990 requires Federal agencies to minimize the destruction of wetland areas. The Executive Order applies to all wetland areas regardless of their jurisdictional nature under section 404 of the CWA.

### **Endangered Species Act of 1973**

The purpose of the ESA is to protect and recover listed species and the ecosystems upon which they depend. It requires consultation when a federally-funded project might impact an endangered species or critical habitat and prohibits takings of endangered species without authorization. It is administered by the Interior Department’s U.S. Fish and Wildlife Service (FWS) and the Commerce Department’s National Oceanic and Atmospheric Administration National Marine Fisheries Service (NOAA Fisheries). The FWS has primary responsibility for terrestrial and freshwater organisms, while the responsibilities of NOAA Fisheries are mainly marine and migratory species that spend a significant part of their life cycle in salt water, such as salmon and whales.

### **Code of Federal Regulations 23 Parts 771 and 777**

Regulations located at 23 CFR 771 and 23 CFR 777 contain the FHWA requirements related to compliance with NEPA, as well as provisions for mitigation of impacts to wetlands and natural habitats for the Federal Aid Highway program.

## **Wetland and Species Conservation Strategies**

### **Strategy 1—Project-by-Project Mitigation**

Traditionally, compensatory mitigation has been carried out on a project-by-project basis; specific measures are implemented to compensate for a project's impacts at a site that is usually on or adjacent to the impact site. Project-specific compensation is usually selected based on the impact-site location, usually does not address landscape or watershed perspectives, and is generally small in scale. During the environmental review and permitting phase of project development, the project sponsor and the regulatory agencies will assess the expected impacts of the project. The applicant or project sponsor is then responsible for developing the compensation

proposal that is presented to the agencies to commit to compensation for unavoidable project impacts.

In some cases, this type of compensation may not yield the greatest benefit to an ecosystem. In 2001, the National Academy of Sciences National Research Council (NAS/NRC) recognized this shortcoming of traditional approaches to mitigation in their report titled "Compensating for Wetland Losses Under the Clean Water Act." This report states "The [NAS/NRC] committee endorses the watershed approach and finds the automatic preference for in-kind and on-site compensatory mitigation...to be inconsistent with that approach." The NAS/NRC report noted that often there are circumstances in which on-site or in-kind mitigation is not practicable nor is it environmentally preferable under a watershed approach.<sup>iii</sup> (Note: EPA indicates that this preference was never an "automatic" requirement, but was intended to be flexible).

Another form of project specific mitigation is in-lieu fees, in which the project proponent pays a predetermined amount of money per unit of impact, usually measured in acres, to a state or local government agency or their representative. The in lieu fees are collected from a number of different sources and are then used to implement compensatory mitigation, often in the form of wetland or habitat restoration projects. The difference between a bank (see discussion of wetland and habitat banks which follows) and in-lieu fee program is that the wetlands in a bank have been created and are available for sale as credit, whereas in the in lieu fee program the wetland mitigation work is not performed until after the money is collected. The in lieu fee mitigation is often accomplished by a third party, such as a nonprofit. Recently, EPA and the USACE expressed concerns regarding the greater uncertainty associated with in-lieu fee programs regarding the completion of mitigation and its adequacy to compensate for project impacts, and have proposed a phase out of the program. Nonetheless, many state DOTs have successfully used in-lieu fees to provide quality mitigation for projects.

Project by project mitigation is the predominant practice today. Recent data from the USACE suggests that the majority of compensation taking place is off-site rather than on-site compensation, but it is still being developed on a project by project basis. As stated in the NAS/NRC report, the preference to determine mitigation based on individual project, and resource impacts may not result in optimal results for the environment. Continuing the practice of project by project mitigation into the future has the potential to create greater delays in transportation project implementation as resources become more rare and mitigation opportunities are more limited as a project progresses toward construction. Because of this, mitigation costs are likely to increase under a continued practice of project by project mitigation, while not delivering the most environmentally beneficial result.

### **Strategy 2—Continue to support and implement mitigation banking as a wetland preservation strategy (multiple project mitigation)**

Mitigation banking in general is the consolidation of compensatory mitigation for a number of projects at one location, with specific administrative and performance requirements. Mitigation banks often consist of hundreds of acres of wetlands that may be used to mitigate dozens or more projects. They involve the restoration, creation, enhancement, and -in exceptional circumstances-preservation of aquatic resources. Mitigation banks are established through a permitting process that includes banking agreements signed by the USACE, responsible resource agencies, and the bank sponsor. These agreements include monitoring requirements and

performance standards to determine the success of the bank. Banks can be developed by commercial interests, by non-profit organizations and by state agencies (often state DOTs). Once banks are established, transportation project impacts are “debited” from the credits in the bank. There is no need for the permittee to develop mitigation plans, monitoring schedules, or performance goals as part of a 404 application under the CWA, because these have already been developed in the establishment of the bank. This provides substantial time benefits in terms of acquiring the necessary permit and results in project streamlining while achieving sound environmental compensation.

FHWA conducted an interagency SCAN tour of wetlands mitigation programs and practices in 2004. This tour involved four federal agencies, encompassed mitigation banks, sites, and programs in eight states, and found that mitigation practices varied widely between states and regulatory jurisdictions. The SCAN tour clearly showed both the problems and, in many cases, the effectiveness of compensatory mitigation through preservation and restoration in protecting important, large tracts of high functioning wetlands. <sup>iv</sup>

### **Strategy 3--Continue to support and implement the creation of conservation or habitat banks for the protection of species (multiple project mitigation)**

Conservation (habitat) banks may include large tracts of land that contain a variety of important natural resources. These banks typically include land that is habitat for threatened and endangered species. The banks also may include land that connects important habitats for both threatened and endangered species, and economically important species such as elk. The land area may also include streams, wetlands, forests, and a variety of natural features within an ecosystem or biological community.

The land is typically preserved in its natural state or restored to a more pristine state for the benefit of wildlife. The bank is allotted a certain amount of credits that will be used as needed to offset a project’s impacts to listed species. When a transportation project encroaches on endangered species habitat, a certain number of credits are deducted from the bank’s total. When the bank has used all its credits, the conservation bank is typically converted into a preservation area through land easements or other type of legal conservation measure.

The conservation bank is established in order to preserve threatened and endangered species but also to expedite transportation project development. Conservation banks make it possible for project proponents to complete their conservation needs through a “debit” of credits from the conservation bank, thereby eliminating the need to develop a conservation plan for each and every transportation project which is determined to be likely to adversely affect a particular protected species (project by project approach). The conservation banks allow for proposed mitigation to be located in an already agreed upon area approved by the resource agencies during the banks’ establishment. The conservation bank expedites the relevant permit approval process and represents a cost savings--both in time and in avoidance of design changes late in project development, which can be required when impacts are mitigated on a project by project basis. The conservation banks allow for proposed mitigation to be located in an already agreed upon area approved by the resource agencies during the banks’ establishment. The conservation bank expedites the relevant permit approval process and represents a cost savings--both in time and in

avoidance of design changes late in project development, which can be required when impacts are mitigated on a project by project basis.

#### **Strategy 4 - Support and Promote Integrated Planning and Conservation Strategies**

Integrated conservation strategies emphasize an ecosystem approach to mitigation rather than single resource conservation and mitigation. Thus, strategies are implemented to protect wetlands, endangered species, wildlife, and other natural resources together as an ecosystem. In order to be effective these integrated strategies must be based on integrated planning.

Integrated planning is a process that provides for shared information on resource plans, areas needing special protection, land use plans, and species preservation plans during the development of transportation plans. This information exchange is well in advance of current processes, which are based on project by project environmental review. Identification of important natural resources at the local level during the transportation planning phase will assist in avoiding potential conflicts between transportation and natural resources before project alignments are set. It also allows for looking at impacts of the transportation plan at a larger scale, based on a watershed or ecosystem approach. This is the optimal time to determine the most advantageous mitigation, to include local land use agencies in supporting needed mitigation, and to meet multiple goals. For example, a transportation agency may need to provide mitigation for habitat impacts, while a resource agency is looking for funding partnerships to purchase land in the region to protect a species. The transportation agency could cooperate with the local resource agency to provide the needed funding to protect the habitat in advance of its project impacts, rather than waiting until the project is closer to construction and the opportunity may have been lost because the resource agency was unable to secure the needed funding.

Transportation planning in conjunction with natural resource and land use agencies' plans will identify vital natural and cultural resources within an area. The resources can be mapped and shared among the transportation planning and natural resource agencies. With the shared knowledge among transportation and natural resource officials, ecologically important resources can be avoided in the transportation planning process, thereby avoiding costly delays to project development while ensuring natural resource conservation. In addition, environmental mitigation opportunities can be determined in the planning stage in order to appropriately mitigate unavoidable impacts to the environment and streamline the environmental review process. Further, early collaboration and agreement by resource agencies, transportation agencies and other stakeholders on important resources to avoid, as well as the determination of appropriate, multiple project mitigation, will provide the necessary predictability with respect to resource protection and mitigation needed for the streamlined development of infrastructure projects.

Integrated planning should ultimately result in at least two important and closely related conservation strategies, the watershed approach and the ecosystem based mitigation.

A watershed is the area that drains to a common waterway, such as a stream, lake, estuary, wetland, or the ocean. Watersheds can be divided into smaller and smaller geographic areas that drain into correspondingly smaller rivers and streams.

A watershed approach to mitigation identifies problem areas within the watershed such as poor water quality, flooding problems, or lack of wetland buffers. A watershed plan is typically developed by local resource and planning agencies and can be done cooperatively with Federal agencies. Mitigation activities performed to compensate for impacts within a specific watershed plan are directed towards correcting deficiencies within the watershed as identified by the plan. For example, to compensate for some wetland areas impacted by a road widening project, wetland areas may be restored at upstream locations to filter runoff water prior to entering the stream. The plan has been approved by the agencies involved and therefore the proposed mitigation has already been determined to be the appropriate course of action. An existing watershed plan would expedite highway project approval by eliminating the need for review and revision of proposed mitigation options. Watershed plans typically involve proposed improvements to aquatic resources such as lakes, streams, and wetlands.

The ecosystem based approach to developing infrastructure projects is outlined in detail in the publication, *Eco-Logical: An Ecosystem Approach to Developing Infrastructure Projects*.<sup>v</sup> *Eco-logical* was written and signed by eight Federal agencies, including FHWA. It stresses interagency collaboration in the planning process to identify and attempt to avoid valuable ecological resources and to identify environmental mitigation opportunities to benefit a particular ecosystem rather than implementing mitigation simply because of legal obligations without much regard for the overall environmental value. Instead of looking at wetland mitigation and species mitigation as separate activities, ecosystem-based mitigation agreements look at these and other resource functions of the ecosystem holistically and look for synergistic opportunities, adding a cumulative value to these systems. By encompassing wetland and upland habitat into a complete mosaic, strategically located within a landscape and/or watershed, ecosystem-based mitigation will enable the protection of ecological functions, values, and processes that are believed to be most important for the regional ecosystem. The result will be knowledgeable decision making on the placement of transportation projects and environmental mitigation that truly benefits the ecosystem.

The watershed or ecosystem approaches need to be fully coordinated and supported by agencies with jurisdiction over local land use decisions in order to be sustainable. These approaches are based on collaboration at every level--Federal, state, local, Tribal, landowner and nongovernmental organizations. Actions by transportation agencies alone cannot provide the resource protection necessary to make a difference to wetland and species protection. These decisions must be integrated with the plans of land managers and resource agencies to truly improve wetland and species protection. As one of the recommendations of the National Research Council report, *Assessing and Managing the Ecological Impacts of Paved Roads* states: “*Transportation agencies should continue to expand beyond their historical roles as planners and engineers, increasing their roles as environmental coordinators and stewards. Increased collaboration to promote integrated planning is needed so that efforts can support mutual, societal objectives. This collaboration should include federal, state, and local resource management interests. Incentives such as funding and technical support, are needed to help planning agencies, resource agencies, non-governmental groups, and the public to better understand ecological structures and functions and to interact cooperatively.*”<sup>vi</sup>

### **Implications for Surface Transportation Infrastructure**

The patterns of land use and development established over the past years combined with the increasing demand for improved transportation facilities will continue to impact wetlands and species. As habitats are further fragmented and watersheds become impaired, transportation infrastructure will have to be sited and designed to more fully address conservation of the important remaining resources, ecosystem integrity, hydrologic permeability, water quality, habitat connectivity, and improved performance of wetland mitigation sites. In cases where existing facilities are being expanded or rehabilitated, increased use of retrofits may be required to improve degraded environmental conditions resulting from past designs that did not adequately consider environmental needs.

All of these mitigation strategies will require greater financial resources to be devoted to constructing and maintaining transportation projects if projects are to be designed, built and operated in a manner that does not further degrade, and hopefully will enhance wetlands and wildlife habitat affected by the project. For example, additional structural modifications and features may be needed to allow species to cross highways or prevent them from entering the highway, or bridges may need to replace culverts to minimize impacts to wetlands. Although average costs for resources mitigation on highway projects have continued at a relatively low level compared to overall project costs (normally in the range of 5 to 10 percent), costs can be expected to increase as natural resource supplies decrease and values increase in the face of continued socioeconomic development. In particular, this level might be expected to increase over the next 50 years in critical resource areas. Average current costs of wetland mitigation have been estimated at between forty and sixty million dollars per year in the Federally-funded highway program. Costs of conservation measures for the Endangered Species Act have ranged from approximately 10 million to 25 million dollars a year in the Federally-funded highway program, based on reported costs from State Departments of Transportation and Federal Lands Highway Divisions (FHWA, Annual ESA Cost Reports). The cost for ESA conservation measures may be less than the actual cost because many states do not report the cost of special design features that are incorporated into projects, such as structures and alignment changes.

As discussed above, resource avoidance, minimization and compensation can be most effective in terms of cost, efficiency, and environmental benefit, if planned and implemented ahead of project development. In order to effectively do that, important natural resources such as wetlands and habitat for endangered and declining species need to be considered in the transportation planning process. SAFETEA-LU section 6001 requires consultation with resource and land management agencies in the development of the transportation plan as well as “a discussion of potential environmental mitigation activities and potential areas to carry out these activities, including activities that may have the greatest potential to restore and maintain the environmental functions affected by the plan.” This requirement is an initial step toward an integrated planning approach. The integrated planning approach is a collaborative approach that uses resource inventories, plans, mapping, and the expertise of resource agencies and local governments to coordinate transportation plans with land use and other resource plans. Valuable ecological resources are identified early in the planning stages so that transportation proposals can avoid or minimize adverse impacts to the environment.

To make the consultation, collaboration, and mitigation actions effective and sustainable, more financial resources would be needed in planning to conduct environmental studies, to develop GIS mapping capabilities, resource inventories and other tools that can be used to determine the overall impacts of the plan and how these can best be mitigated. Funding would also be needed to support the development of partnerships among stakeholders, and to provide for dedicated staff at transportation agencies and resource agencies. Developing partnerships is time and cost intensive, but is necessary in order to establish shared goals for an ecosystem, evaluate alternative approaches to delivering transportation projects and protecting the environment, and developing performance measures to be used to determine when adaptive management is needed. There is a need to develop additional public and/or private resources to provide for the studies, research, tools and training for both resource and transportation agencies, needed to make a transition from an approach that addresses environmental concerns on a project by project basis to one that looks holistically at the broad implications to the environment of transportation, land use and resource plans, and develops mitigation accordingly.

## Endnotes

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<sup>i</sup> Brown, J. W. et al. 2006. *Ecological: An Ecosystem Approach to Developing Infrastructure Projects*. Washington DC: U.S. Department of Transportation, Federal Highway Administration.

<sup>ii</sup> Federal Highway Administration. 2005. *Integrated Planning Workgroup Report*, Executive Order 13274, Environmental Stewardship and Transportation Infrastructure Reviews, US Department of Transportation, Federal Highway Administration  
<http://www.dot.gov/execorder/13274/workgroups/integratedpl.htm>

<sup>iii</sup> Brown, J.W, et al. 2006. *Ecological: An Ecosystem Approach to Developing Infrastructure Projects*. Washington DC: U.S. Department of Transportation, Federal Highway Administration

<sup>iv</sup> Federal Highway Administration. 2005. *Results of the FHWA Domestic Scan of Successful Wetland Mitigation Programs*. Washington DC: U.S. Department of Transportation, Federal Highway Administration

**This paper represents draft briefing material; any views expressed are those of the authors and do not represent the position of either the Section 1909 Commission or the U.S. Department of Transportation.**

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<sup>v</sup> Brown, J.W, et al. 2006. *Ecological: An Ecosystem Approach to Developing Infrastructure Projects*. Washington DC: U.S. Department of Transportation, Federal Highway Administration.

<sup>vi</sup> National Research Council. 2005. Assessing and Managing the Ecological Impacts of Paved Roads. Washington DC: The National Academy Press.