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The Economics of Environmental Regulation by Licensing: An Assessment of Recent Changes to the Wetland Permitting Process

ABSTRACT

Recent changes to the federal wetland permitting process increase the time and effort required of applicants to obtain needed permits. Using a combination of survey and government data, the cost of the reform is calculated at over $300 million annually. This cost is shown to be large relative to the number of wetland acres affected. It is also argued that these changes to the wetland permitting process are inefficient in that they fail to discriminate among wetlands of different quality. Further, it is observed that other, non-regulatory federal programs protect wetlands at a fraction of the cost of the reform package, raising questions about the consistency of the licensing program with other governmental efforts. Finally, this article addresses the issues of federalism and inter-governmental relations raised by the changes.

I. INTRODUCTION

Issuing licenses to pollute is a common means of regulating environmental quality. Discharge permits authorized by the Army Corps of Engineers (the Corps) under the Clean Water Act are a prime example of this type of policy; other examples are found in the areas of air quality, pesticide use, and endangered species regulation to name just a few.[1] This article examines the economics of a recent federal decision to protect environmental quality by increasing the time and effort required of applicants to obtain such a license.

At a general level, licensing requirements can impose significant costs on project developers and consumers. These costs result from the need to conduct scientific investigations, negotiate with the issuing agency over the conditions of the permit, and redesign the proposed project based on

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1. For a comprehensive survey of environmental licensing programs, see generally Terry Davies, *Reforming Permitting*, Resources for the Future, (2001), *available at* http://www.rff.org/reports/PDF_files/reformingpermitting.pdf.

the agency's decision. The costs of obtaining a permit are often hidden and thus more difficult to measure than the costs of direct interventions such as environmental taxes or technology requirements (in the latter case, costs can be measured by reference to market prices).

Licensing programs also raise the question of how the investigative resources of the government should be allocated among permit applications. For example, are there easily observable aspects of proposed activities that the government can use to trigger a higher degree of scrutiny, or will all proposals receive the same degree of attention? This question is significant since the economic cost of obtaining a license is directly related to the effort the government spends reviewing the proposal.[2] Another important aspect of licensing is its cost-effectiveness or efficiency relative to other means of improving environmental quality.

Wetland permitting is an appropriate and timely example with which to illustrate the economics of environmental regulation by licensing. In the past several years, the federal government has undertaken important reforms of the wetland permitting process by altering the terms and conditions of many types of permits.[3] We consider in detail one such change to the federal permitting program: the elimination of the most frequently issued wetland permit, National Wetland Permit 26 (NWP 26)—the permit covering activities affecting "headwaters and isolated waters"—and its replacement with other, stricter permits collectively known as the "replacement package."

This article analyzes the economic efficiency of eliminating NWP 26 and assesses whether it is an effective means of protecting wetlands. One significant change embodied in the replacement package is a reduction in the threshold triggering intensive federal review of proposed projects. Increased oversight means that the time and effort needed to obtain a wetland permit will increase. Simple calculations show that the replacement of NWP 26 with stricter wetland permits will increase the cost of permit preparation alone by more than $100 million annually and may impose total costs well in excess of $300 million annually. The costs of the regulation will be borne by many groups, including local governments, homebuyers, developers, and even the federal government itself.

Of course, a reform is not inefficient simply because it is expensive, and much of the remainder of this article is devoted to assessing the efficiency of eliminating NWP 26. One influential economic principle relevant to environmental policy is that governments should meet their policy objectives at the lowest possible cost to society. This minimal notion

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2. An important, and under-researched, aspect of the cost of a licensing program is the degree to which it delays the activity in question.

3. *See* Issuance of Nationwide Permits; Notice, 67 Fed. Reg. 2,020. (Jan. 15, 2002).

of efficiency suggests that governmental resources should be targeted at the most problematic areas and that policy alternatives should be examined with an eye toward selecting the minimum-cost intervention. The set of permits replacing NWP 26 does not fare well on this score. First, the reform is indiscriminate in that it abolishes use of the nationwide permit program for projects affecting more than some unknown cutoff number of acres and does not differentiate among projects based on the characteristics of the affected landscape.[4] Surely the government can differentiate between wetlands of different environmental productivity and more fully scrutinize projects proposed in sensitive areas. Further, other federal programs exist to protect and enhance the nation's stock of wetlands at far lower cost than the elimination of NWP 26. This observation raises questions about the consistency of the replacement package with other federal programs.

Another interesting aspect of the cost of regulation that is often overlooked in environmental economics is the resulting delay in completing the project. Relying on a detailed survey of wetlands permit applicants and a review of how the Army Corps of Engineers compiles its own statistics, this article demonstrates that Corps figures significantly underestimate the true time needed for an applicant to complete the wetlands permitting process. Indeed, requiring an individual as opposed to a nationwide permit adds nearly one and a half years to the time needed to prepare and negotiate a wetland development permit. Again, this delay is indiscriminate in that the Corps' replacement package will require an individual permit based on size alone, and without regard for the biological productivity, uniqueness, or sensitivity of the wetlands affected.

A further area of concern is how the new wetland permitting requirements will affect the relationships between levels of government. The replacement package will insert the Corps of Engineers into water quality and land use planning, an area where state and local governments have traditionally had primacy. For example, if the Corps determines that a state's water quality planning efforts are not "adequate," the Corps will step in and impose its own requirements. In this respect, the replacement package also obscures lines of responsibility among federal agencies, particularly between the Army Corps of Engineers and the Environmental Protection Agency, which has had primary federal responsibility for oversight of state water quality planning efforts.

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4. *See* Final Notice of Issuance of Modification of Nationwide Permits, 65 Fed. Reg. 12,818 (Mar. 9, 2000). The acreage limit applies to all new NWPs except NWP 41, Reshaping Existing Drainage Ditches, which is intended to authorize projects benefiting the aquatic environment. *See id.* at 12,825.

II. WETLANDS PERMITTING

Section 404(a) of the Clean Water Act authorizes the U.S. Army Corps of Engineers to issue permits for the discharge of dredged or fill material into "waters of the United States."[5] Section 404(b) requires the U.S. Environmental Protection Agency (EPA), "in conjunction with the Corps," to promulgate environmental guidelines that control the Corps' permitting decisions.[6]

The Corps and the EPA claim jurisdiction over all areas that qualify as "wetlands" as defined by the Corps' 1987 Wetlands Delineation Manual. They also claim jurisdiction over areas they deem to be "other waters," as long as the wetlands or other waters have the potential to affect interstate commerce.[7] Isolated bodies of water, such as dry washes in desert regions, are claimed to potentially affect commerce because a migratory bird traveling across state lines could land on them.[8] There are no minimum size requirements for an area to be deemed a water of the United States, and, under the Wetland Delineation Manual used by federal agencies, an area may qualify as a jurisdictional wetland even if it never has water on it.[9] Moreover, the Corps and the EPA claim the authority to regulate ditches, miniscule depressional areas, and other ephemeral landscape features resulting from human activity.[10]

The Corps' regulatory program is administered through 38 district offices, each of which handles applications in areas assigned to each office. The districts are organized into 11 division offices that, in turn, report to Corps headquarters at the Chief of Engineers' office in Washington, D.C. In addition, for each individual permit decision and many NWPs, the Corps consults with the Fish and Wildlife Service, the EPA, the National Marine Fisheries Service (NMFS), state fish and game agencies, state water quality agencies, and state and federal cultural resource offices.[11]

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5. 33 U.S.C. § 1344(a) (1994). *See also* Permits for Discharges of Dredged or Fill Material into Waters of the United States, 33 C.F.R. § 323.1 (2001).

6. 33 U.S.C. § 1344(b) (1994).

7. Definition of Waters of the United States, 33 C.F.R. § 328 (2001).

8. *See* Final Rule for Regulatory Programs of the Corps of Engineers, 51 Fed. Reg. 41,206, 41,217 (Nov. 13, 1986).

9. *See* U.S. ARMY ENGINEERS WATERWAY EXPERIMENT STATION, U.S. ARMY CORPS OF ENGINEERS, TECHNICAL REP. NO. Y-87-1, USACE WETLANDS DELINEATION MANUAL (1987), *available at* http://www.saj.usace.army.mil/permit/87manual/pdf.

10. *See* Final Rule for Regulatory Programs of the Corps of Engineers, 51 Fed. Reg. 41,206, 41,217 (Nov. 13, 1986).

11. *See* Final Notice of Issuance and Modification of Nationwide Permits, 65 Fed. Reg. 12,818 (Mar. 9, 2000).

The Clean Water Act authorizes two different types of permits: general and individual permits.[12] General permits are streamlined permits that are issued nationwide (nationwide permits or NWPs) or regionally (regional general permits or RGPs) for activities that have only minimal individual and cumulative impacts. NWPs authorize minor activities, provided that the entity conducting the project complies with the conditions contained in the Federal Register statement. Examples of activities covered by NWPs include minor road crossings, utility line backfills, and bank stabilization projects. Before the elimination of NWP 26, more than 80 percent of Corps permitting activity under Section 404 involved activities covered by general permits.[13]

Prior to its elimination in 2000, NWP 26 was the most commonly used general permit and allowed discharges of dredged or fill material into "headwaters and isolated waters," provided that they affect no more than three acres of waters of the United States or 500 linear feet of streambed and meet other stringent conditions.[14] Headwaters are defined as "non-tidal streams, lakes, and impoundments that are a part of a surface system tributary to interstate or navigable waters of the United States with an average flow of less than five cubic feet per second." Isolated waters are "non-tidal waters of the United States that are not part of a surface tributary system to interstate or navigable waters of the United States and are not adjacent to interstate or navigable waters."[15] In the 14 months prior to June 30, 1998, the Corps authorized 8790 activities under NWP 26. These activities impacted 3423 acres and 377,070 linear feet of waters of the United States, for which applicants provided 13,354 acres of mitigation.[16]

Activities involving more than minimal impacts or not covered by a general permit are authorized by individual permits in which the Corps evaluates an applicant's specific proposal. Most individual permits are authorized through a standard process that requires public notice and a high degree of scrutiny of the proposed project. A handful of individual permits are issued as Letters of Permission, which do not require site-specific public notice.[17]

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12. *See* 33 U.S.C. § 1344 (1994).

13. *See* REGULATORY BRANCH, U.S. ARMY CORPS OF ENGINEERS, SECTION 404 OF THE CLEAN WATER ACT AND WETLANDS: SPECIAL STATISTICAL REPORT 5 (1995). [hereinafter SPECIAL STATISTICAL REPORT].

14. *See* Final Notice of Issuance and Modification of Nationwide Permits, 65 Fed. Reg. at 12,818.

15. *Id.*

16. *See* U.S. Army Corps of Engineers, Nationwide Permit 26 Mitigation Report, May 1, 1997–June 30, 1998 (on file with author).

17. *See id.*

The Corps encourages applicants contemplating large projects to meet with it and, often, other agencies for a "pre-application consultation."[18] The idea is that, with the benefit of the Corps' and agencies' views, the applicant will be able to prepare a permit application that addresses the agencies' concerns about the applicant's project or the specific site. After an application is submitted, the Corps determines whether it is "complete." Anecdotal evidence indicates that few applications are considered complete when filed, and thus the Corps will require further information or drawings from the applicant. Once the Corps determines that an application is complete, it starts running the clock on its "permit evaluation" time (*i.e.*, the time from the day the application is deemed complete to the day the Corps reaches a decision).[19]

Under the regulations, the Corps must issue a public notice of the application within 15 days after the application is deemed complete and must reach a final decision on the application within 60 days.[20] In practice, these deadlines are seldom met. The public notice describes the applicant's proposal and the likely environmental consequences and requests comments from federal and state governmental agencies and members of the public. After the comment period ends, the applicant may respond to agency and public comments. Considering this information, and conducting its own analysis, the Corps issues a decision document. If the decision is to authorize a project, then the Corps issues an unsigned permit. The Corps is free to attach conditions to the permit; such conditions are often the subject of negotiation between the applicant and the Corps before the applicant accepts the permit. If the applicant accepts the permit, he or she signs it and returns it to the Corps for the Corps' official signature. The permit then becomes effective.

The main issues that must be resolved before an individual permit is issued include the following:

- Whether the applicant has a practicable alternative that would avoid impacts to waters of the United States and whether unavoidable impacts have been minimized,
- Whether the mitigation proposal adequately compensates for any adverse impacts of the project,
- Whether the project will contribute to significant degradation of the aquatic ecosystem,
- Whether the state is satisfied that the project is consistent with state water quality standards and coastal zone management plans, and

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18. 33 C.F.R. § 325.1(b) (2001).
19. SPECIAL STATISTICAL REPORT, *supra* note 13, at 4.
20. *See* 33 C.F.R. §§ 325.2(a)(2), 325.2(d)(3) (2001).

- Whether the project is contrary to the public interest.

According to Corps and EPA policy, the first two issues must be handled according to a process called "sequencing" in which the applicant must establish that all practicable steps have been taken to avoid and minimize adverse impacts before the Corps or other agencies will consider the mitigation proposal.[21] Consistent with the Corps' no net loss policy, the applicant must fully compensate for unavoidable impacts to wetlands.

On March 9, 2000, the Corps issued its final notice that it was eliminating NWP 26 and creating five new NWPs, modifying six existing NWPs, modifying nine NWP general conditions, and adding two new general conditions.[22] New permits were issued for the following activities: Residential, Commercial, and Institutional Developments (NWP 39); Reshaping Existing Drainage Ditches (NWP 41); Recreational Facilities (NWP 42); Stormwater Management Facilities (NWP 43); and Mining Activities (NWP 44).[23] The new NWPs are activity-specific and apply in all non-tidal waters of the United States, with the exception of non-tidal wetlands adjacent to tidal waters. Modifications have been made to the following existing permits: Maintenance (NWP 3), Outfall Structures and Maintenance (NWP 7), Utility Line Activities (NWP 12), Linear Transportation Crossings (NWP 14), Stream and Wetland Restoration Activities (NWP 27), and Agricultural Activities (NWP 40).[24]

The new and modified NWPs contain stricter limits on the number of affected wetland acres than the NWPs they replace. That is, under the replacement package, more activities will fall outside the new terms and will thus require individual permits. The acreage limit for most of the new and modified NWPs is one-half of an acre.[25] In addition, the Corps has established a pre-construction notification threshold of one-tenth of an acre for most of the new and modified NWPs, meaning that the Corps' District Engineer must be notified if the proposed project exceeds this limit.[26]

In addition to the new and modified permits, the changes to the accompanying permit general conditions are also significant. The new

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21. 33 C.F.R. § 325.2(d)(3).

22. *See* Final Notice of Issuance and Modification of Nationwide Permits, 65 Fed. Reg. 12,819, 12,819-99 (Mar. 9, 2000). The proposed change was described in detail in July 1999. *See* Proposal to Issue and Modify Nationwide Permits; Notice, 64 Fed. Reg. 39,252 (July 21, 1999). This proposal followed two earlier versions of the replacement permit package. *See* Proposal to Issue and Modify Nationwide Permits, 63 Fed. Reg. 36,040 (July 1, 1998); Proposal to Issue and Modify Nationwide Permits, 63 Fed. Reg. 55,095 (Oct. 14, 1998). General conditions are permit conditions that apply to all NWPs.

23. *See* Final Notice of Issuance and Modification of Nationwide Permits, 65 Fed. Reg. at 12,885-86.

24. *See id.* at 12,885.

25. *See id.* at 12,818.

26. *See id.* at 12,819.

General Condition 26, Fills Within the 100-Year Floodplain, prohibits the use of certain NWPs to authorize permanent, above-grade fills in waters of the United States within the 100-year floodplain.[27] As a result, stormwater management ponds (authorized through NWP 43), which are intended to manage drainage and limit flooding and are normally located at low elevations in the landscape, cannot be positioned in the floodplain.

Moreover, the Corps has altered General Condition 9, Water Quality Certification. Under the new regime, the Corps will evaluate whether a state's water quality requirements are adequate, and, if they are found wanting, impose its own requirements.[28] Further, for any project in the vicinity of open water, the Corps will now require "vegetated buffers" with a normative width of 25 to 50 feet on each side of the water.[29] The new General Condition 9 also mandates that all projects include a method for stormwater management, but this does not explain how the Corps' stormwater management requirement will relate to stormwater management requirements under state and local law.[30]

The alterations to General Condition 21, Management of Water Flows, require that neither upstream nor downstream areas be subject to more than minimal flooding or dewatering after construction of the project and during the operation of the project.[31] How these conditions will relate to state and local stormwater management programs and flood control programs is not discussed. The Corps has also adopted a new General Condition 25, Designated Critical Resource Waters, prohibiting the use of certain NWPs in designated critical resource waters, defined to include areas designated as "critical habitat" for threatened or endangered species.[32] New General Condition 26, Impaired Waters, restricts the use of NWPs in waters of the United States designated under Section 303(d) as impaired due to nutrients, low dissolved oxygen, sedimentation, habitat alteration, suspended solids, flow alteration, turbidity, or loss of wetlands.[33] This new general condition prohibits the use of NWPs to authorize discharges of material resulting in the loss of more than one acre of impaired waters.[34]

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27. NWPs not allowed in the 100-year floodplain include NWPs 29, 39, 40, 42, 43, and 44. *See id.* at 12,879.

28. *See id.* at 12,862.

29. *See id.* at 12,896.

30. *See id.* at 12,894.

31. *See id.* at 12,897.

32. *See id.* at 12,898.

33. *See id.* at 12,875.

34. *See id.*

III. SECTION 404 REGULATION IN CONTEXT: WETLANDS LOSSES AND GAINS OVER THE YEARS

Wetlands regulation is a central area of environmental policy, owing both to the environmental importance of wetlands and the controversial economic consequences of wetlands protection. Wetlands are a vital part of the nation's natural resource base as they provide fish and wildlife habitat as well as numerous other benefits, including flood control, water quality enhancement, recreation opportunities, and groundwater recharge.[35] Historic losses of wetland acreage have severely diminished the quantity and quality of the remaining stock of wetlands. Yet, Section 404 regulates more than just wetlands. It also reaches dry washes, ditches, and countless "other waters" deemed by the agencies to qualify as "waters of the United States."[36]

Economic analysis has historically supported the case for federal and state intervention to protect wetlands. There is a growing body of economic research on the role of the government and effective governance.[37] Economists hold to the basic premise that society seeks to attain efficient outcomes wherein resources are allocated such that individuals are collectively as satisfied as possible, subject to technological and resource availability constraints. Assessment of the benefits and costs of alternative resource allocations must take into account all activities of all sectors of society so that they include the costs and benefits of private production and consumption, government activities, and environmental amenities.

These economic principles have been used to support and rationalize environmental regulations in general, and wetland regulation in particular. To the extent that wetlands are public goods (*i.e.*, provide benefits to the general public from which individuals cannot be excluded), standard arguments suggest that they will be inefficiently provided for in an unregulated private market equilibrium. Those who would fill wetlands for private purposes will, in the absence of any government intervention,

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35. *See* Virginia Carter, *Wetland Hydrology, Water Quality and Associated Functions, in* NATIONAL WATER SUMMARY ON WETLAND RESOURCES 2425 (Judy D. Fretwell et al. eds., 1996); Ted Williams, *What Good Is a Wetland?*, AUDUBON Nov.–Dec. 1996, at 42-53; WILLIAM J. MITSCH & JAMES G. GOSSELINK, WETLANDS (1993); Donald E. Kroodsma, *Habitat Values for Nongame Wetland Birds, in* WETLAND FUNCTIONS AND VALUES: THE STATE OF OUR UNDERSTANDING 320 (Philip Greeson et al. eds., 1978).

36. Definition of Waters of the United States, 33 C.F.R. § 328 (2001).

37. This research is being conducted in the fields of public finance, *see* JEAN-JACQUES LAFFONT, FUNDAMENTALS OF PUBLIC ECONOMICS (John P. Bonin & Helene Bonin trans., 1988), and recently relies on modern techniques of game theory. *See* JEAN-JACQUES LAFFONT & JEAN TIROLE, A THEORY OF INCENTIVES IN PROCUREMENT AND REGULATION (1993).

fill them until the private marginal cost of filling equals its marginal benefit. If wetlands are a public good, filling imposes marginal costs on others that are not reflected in private marginal costs, and there will be too much impact relative to what is socially desired. Economists have argued that regulation is needed to ensure that private marginal costs reflect public values (this principle is often referred to as "incentive compatibility").

For these reasons, the Clinton Administration followed the first Bush Administration in adopting a "no net loss" policy that attempts to correct, and even reverse, the longstanding downward trend in wetland acreage. This section reviews the available evidence on wetlands decline and discusses the reasons for wetlands losses. Reviewing this evidence provides a valuable context within which to evaluate the announced changes in Corps permitting policy.

A. Historical Trends in Wetland Acreage

The contiguous 48 states are currently endowed with about half of the stock of wetlands existing prior to European settlement of the United States.[38] Toward the end of the nineteenth century, farmers had already exploited the stock of easily accessible cropland and began cultivation of wetlands previously ignored. To encourage this activity, Congress gave 64.9 million acres of wetlands to 15 states in the Swampland Acts of 1849, 1850, and 1860.[39] Congress was encouraging states to reclaim wetlands by constructing levees and drains to reduce flooding and eliminate mosquito-breeding areas. States transferred nearly all of the granted lands to private owners who converted wetlands to private uses.[40] Since then, federal programs (some of which continue to this day) have provided incentives for wetland conversion. Such programs include those that subsidize agriculture; support reservoir construction for flood control, irrigation, and hydroelectric power; build and maintain highway projects; provide flood disaster relief and flood insurance; subsidize forestry; and establish grazing policies on federal land.[41]

The federal role in flood control dates mainly to the 1870s when the U.S. Army Corps of Engineers began re-channeling the Mississippi River.[42] Flooding in the 1940s prompted Congress to enact the Flood Control Act of

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38. Press Release, U.S. Fish & Wildlife Serv., Wetlands Loss Slows, Fish and Wildlife Service Study Shows (Sept. 17, 1997) (on file with author).

39. RALPH E. HEIMLICH ET AL., DEPT. OF AGRIC. & ECON. RES. SERV., WETLANDS AND AGRICULTURE: PRIVATE INTERESTS AND PUBLIC BENEFITS (1998) [hereinafter HEIMLICH].

40. *See id.* A direct consequence of this policy is that over 80 percent of all wetlands are today in private ownership.

41. *See id.*

42. *See id.* at 24.

1944, which authorized the Corps to construct major drainage and flood control channels.[43] Many dormant drainage districts in the Mississippi Valley were reactivated at this time to exploit the benefits of the newly enhanced flood control infrastructure for agricultural drainage.[44] Prompted by floods in the early 1950s, additional drainage outlets were constructed and utilized by farmers.[45] Between 1929 and 1974, flood control projects were completed that affected 4.5 million acres in the Lower Mississippi alluvial plain.[46]

The U.S. Department of Agriculture (USDA) has also contributed actively to the decline of the nation's stock of wetlands. Drainage inventories in 1906 and 1922 classified over 75 million acres as wetlands with potential for agricultural production.[47] Beginning in the Great Depression and continuing until the 1970s, the USDA provided cost-sharing assistance to farmers for draining wetlands.[48] In 1953, Congress linked flood control and drainage when the Federal Watershed Protection and Flood Prevention Act directed the Corps and USDA to construct drainage channels in cooperation with state and local governments.[49]

The Act authorized the USDA to plan and construct watershed improvements.[50] The Soil Conservation Service, predecessor to the Natural Resources Conservation Service (NRCS), provided technical assistance to farmers and cost sharing for ditches and subsurface drains to convey water away from fields. The Soil Conservation Service also began straightening stream channels to provide more efficient outlets for drainage.[51]

Federal assistance to drain wetlands for production of subsidized crops significantly expanded agricultural production. The predictable result of these (and other) federal programs was to reduce the stock of the nation's wetlands. This problem was especially severe with respect to agriculture. In the period from 1954 to 1974, 87 percent of the wetlands lost annually were converted to cropland.[52] As a result of these past federal policies and of changing attitudes toward the environmental services provided by wetlands, those who own or manage wetlands today face significant burdens.

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43. *See* Pub. L. No. 78-534, 58 Stat. 445 (1944) (current version at 16 U.S.C. § 460d (1994)).
44. *See* HEIMLICH, *supra* note 39, at 24.
45. *See id.*
46. *See id.*
47. *See* HEIMLICH, *supra* note 39, at 25.
48. *See id.*
49. *See* 16 U.S.C. §§ 1001-1008 (1994 & Supp. V 1999).
50. *See* HEIMLICH, *supra* note 39, at 25.
51. *See id.*
52. *See* Econ. Research Serv., U.S. Dep't of Agric., *Conservation and Environmental Policy: Questions and Answers, at* http://www.ers.usda.gov/briefing/conservationandenvironment/questions/consenvwet1.htm (last updated Dec. 19, 2000).

B. Recent Trends in Wetland Loss

Both the Department of the Interior and the Department of Agriculture maintain inventories that produce estimates of the nation's existing wetlands acreage and rates of wetland gains and losses. The National Wetlands Inventory, maintained by the Fish and Wildlife Service (FWS), generates information at 10-year intervals on the categories, extent, and status of the nation's wetlands and deepwater habitat. The National Resources Inventory (NRI), maintained by the Natural Resources Conservation Service (NRCS), is an inventory of land cover and use, soil erosion, prime farmland, wetlands, and other natural resource assets on nonfederal lands in the United States. The National Resources Inventory has been conducted at five-year intervals to determine the conditions and trends in the use of soil, water, and related resources nationwide and statewide.[53]

The National Wetlands Inventory and the National Resources Inventory are used to estimate the nation's wetland acreage. The most recent figure according to both inventories is over 100 million acres in the contiguous 48 states.[54] Each inventory uses sampling methods. Unfortunately, the two inventories use different sampling techniques and their estimates cover different time periods. The inventories have also used different land cover and land use classifications for the causes of wetland decline.[55]

Despite their methodological differences, both inventories support the conclusion that the nation's wetland acreage is stabilizing. The National Wetlands Inventory statistics indicate that the net loss rate from 1985 to 1995 in the contiguous 48 states was less than 0.11 percent per year. The National Resources Inventory figures indicate that the rate of net loss between 1982 and 1992 was slightly lower at 0.07 percent per year.[56] These net loss rate figures represent a dramatic decline compared to previous decades. For example, the U.S. Fish and Wildlife Service concluded that the rate of loss in the period from 1985 to 1995 was 60 percent lower than that

53. *See* U.S. GEN. ACCOUNTING OFFICE, PUB. NO. GAO/RCED-98-150, WETLANDS OVERVIEW: PROBLEMS WITH ACREAGE DATA PERSIST (1998). [hereinafter WETLANDS OVERVIEW].

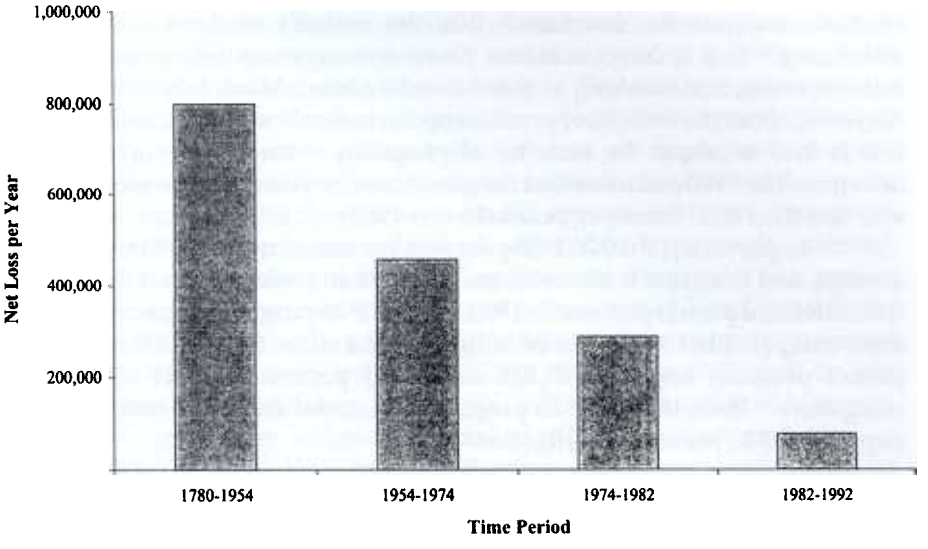
54. *See id.* at 10.

55. *See id.* at 9.

56. *See id.* at 10. The NWI reports a base acreage of 100.9 million acres, a gross loss of 3.357 million acres, a gross gain of 2.146 million acres, and a net loss of 1.211 million acres between 1985 and 1995. The NRI reports a base acreage of 112 million acres, a gross loss of 1.561 million acres, a gross gain of 0.769 million acres, and a net loss of 792,600 acres between 1982 and 1992.

reported for the period between the mid-1970s and the mid-1980s.[57] Figure 1 shows U.S. wetland loss rates since the 1780s.[58]

Wetland Loss Rates in the United States: 1780 to 1992



The FWS and NRCS figures differ in their assessments of which types of economic activity place the most pressure on wetland acreage. For example, the FWS reported that agricultural activities were responsible for the loss of over 1.4 million acres of wetlands between 1985 and 1995, which is more than four times the gross loss attributed to agriculture by NRCS. Further, NRCS attributes 886,000 acres of gross loss to development activities between 1982 and 1992, which is more than an order of magnitude greater than the gross loss attributed to development by the FWS.[59]

Complicating this situation is the fact that the EPA has pointed out problems with both inventories.[60] EPA officials have raised concerns about the quality of the underlying data, the agencies' quality control procedures,

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57. *See* THOMAS E. DAHL & CRAIG E. JOHNSON, DEP'T OF INTERIOR, STATUS AND TRENDS OF WETLANDS IN THE COTERMINOUS UNITED STATES: MID-1970S TO MID-1980S (1991).
58. *See* HEIMLICH, *supra* note 39, at 81-84.
59. *See* WETLANDS OVERVIEW, *supra* note 53, at 10.
60. *See id.* at 11.

the dates of the aerial photography used, and the analytic methods utilized to develop the national estimates. The U.S. General Accounting Office has also raised questions about the consistency of the agencies' use of important terms such as "protection," "rehabilitation," "improvement," "enhancement," and "creation" in measuring the status of wetlands and in describing their various accomplishments.[61]

Notwithstanding these limitations, all available data and analytic methods support the conclusion that the nation's wetland acres are stabilizing.[62] This is direct evidence that the current regulatory system is self-correcting and working in the desired fashion. Much less is known, however, about the sources of pressure on the nation's wetlands, and hence less is known about the benefits of programs intended to curb these activities. The FWS estimates that the gross loss of wetlands to development was less than 9000 acres per year between 1985 and 1995.[63]

Importantly, the NWP 26 program generated net gains in wetland acreage, and the gains it achieved are higher than those achieved through the individual permit process. In 1998, the NWP 26 program impacted 2974 acres and provided 6304 acres of mitigation; the entire Section 404 general permit program impacted 15,528 acres and provided 15,531 acres of mitigation.[64] Thus, the NWP 26 program accounted for 19 percent of 404 impacts and 40 percent of mitigation.

IV. COST OF THE REPLACEMENT PACKAGE

The permits replacing NWP 26 have stricter acreage limitations, thus forcing more activities to be permitted under the individual permit process. The most obvious economic effect of the replacement package is to increase the time and effort required to obtain a wetland permit. Before describing these impacts, however, it is important to illustrate the performance of the pre-reform permitting program. In particular, it is vital to have an accurate measure of the relative and absolute costs of general and individual permits before assessing the incremental costs of eliminating NWP 26.

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61. *See id.*
62. *See id.*
63. *See id.*
64. *See* U.S. Army Corps of Engineers, General Permit Verifications–1998 (on file with author).

A. Survey Design and Summary Statistics

In September 1999, we conducted a detailed examination of 103 individual and nationwide permit applications to understand their relative costs and to gain a better understanding of the timing of the permit process than is available from government data. A list of permitted projects was obtained from the National Association of Counties (since county governments conduct the vast majority of road maintenance, flood control, and stormwater management work) and from phone interviews with private developers and wetlands consultants. The data collection process entailed much more than just a typical survey: applicants participating in the study were asked to gather historical data on employee time spent preparing and negotiating the permit and expenditures on outside experts such as biologists and engineers (these experts are more frequently employed to help prepare individual rather than nationwide permits). Information was collected on the parameters of the project (*i.e.*, project description, project size in acres, acres of waters of the United States in the project area, acres of waters of the United States impacted by the proposed activity, wetland acres impacted). Data were also collected on the parameters of the regulatory process (*i.e.*, individual or nationwide permit, dates of regulatory milestones, final decision, amount and type of mitigation required). With regard to the timing of the approval process (or regulatory milestones), applicants were asked to compile information on three dates: the date at which permit preparation began, the date at which the application was submitted to the Corps, and the date a decision was received from the Corps.

Summary statistics from the resulting data set confirm that the sample was representative of the entire set of wetlands permits in many important respects. The final data come from a roughly even mix of private and public applicants (52 percent public agency applicants and 48 percent private). The projects included in the sample reflect the wide range of activities covered by NWP 26: school construction, quarry expansion, sediment containment, home building, street improvements, and flood control. The distribution of the projects according to acres impacted and total project acreage is also representative of national totals: the mean project size in our sample was 1.95 acres and the mean wetland acres impacted was 0.23.[65] Projects in our sample had an approval rate of over 90 percent, consistent with national figures.[66]

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65. These figures are close to the national averages reported in U.S. ARMY CORPS OF ENGINEERS, COST ANALYSIS FOR THE 1999 PROPOSAL TO ISSUE AND MODIFY NATIONWIDE PERMITS (2000) [hereinafter COST ANALYSIS].

66. *See* SPECIAL STATISTICAL REPORT, *supra* note 13, at 5.

Two-thirds of the applications in our sample concerned projects in western states and were submitted to Corps district offices in Fort Worth, Texas; Los Angeles, California; Omaha, Nebraska; Portland, Oregon; Sacramento, California; and San Francisco, California. The remainder of the permits in our sample concern projects in eastern or mid-western states and were submitted to district offices in Asheville, North Carolina; Chicago, Illinois; Mobile, Alabama; Norfolk, Virginia; Raleigh, North Carolina; Rock Island, Illinois; and Wilmington, Delaware. This western focus is also representative of the NWP 26 program.

B. Cost of Permit Preparation

With regard to the cost of preparing a wetlands permit, individual permit applications are much costlier to prepare than nationwide applications both in terms of internal staff time and outside experts. The mean individual permit application in our sample costs over $271,596 to prepare (ignoring the cost of mitigation, design changes, costs of carrying capital, and other costs), while the cost of preparing a nationwide permit application averages $28,915.[67] Of course, these figures are not directly comparable since the typical individual permit is needed for a larger project than the typical nationwide permit. Fortunately, it is possible to correct for this phenomenon.

The acreage of waters of the United States impacted by a project has a statistically significant effect on the cost of both nationwide and individual permit preparation costs. Utilizing the survey data, we determined a statistical relationship between these factors for both types of permits. For individual permits, application costs were measured as $43,687 plus $11,797 for each acre of impact. For nationwide permits, costs were measured as $16,869 plus $9285 for each acre of waters of the United States impacted.[68] Thus, permitting costs have statistically significant fixed and variable components and permits are more expensive to obtain for larger projects.

Considering these relationships, it is possible to determine the marginal impact of the Corps' replacement package on the cost of obtaining a permit. In particular, we wish to determine the increase in permit preparation costs resulting from the Corps' proposal to switch some applications from nationwide to individual permits. The survey asked respondents to report the overall size of their projects, a criterion the Corps' uses to evaluate eligibility for nationwide permits. Using the general rule

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67. The range of NWP costs was between $2000 and $140,076; the median cost was $11,800. The range of IP costs was between $7000 and $1,530,000; the median was $155,000.

68. Interestingly, we did not discover a statistically significant relationship between the size of the project, measured various ways, and the length of time it takes an applicant to prepare an application and receive a decision from the Corps.

that an applicant can only use a nationwide permit if the project affects less than one-half of an acre of waters of the United States, we find that 58 percent of the NWP-authorized projects in our sample would have required individual permits under the Corps' proposal. Utilizing the estimated relationship between acres impacted and individual permit preparation costs discussed above, we find that preparation costs for these projects that would switch from NWP to IP would roughly double (from $28,915 to $59,719, a difference of $30,804). Note again that this figure does not include the cost of mitigation (or in lieu of fees), design changes, or the costs of carrying capital for several extra months, but is simply the additional cost of preparing an individual permit application.

C. Time Needed to Obtain a Permit

Another important dimension of the wetlands permitting program is the time involved to prepare a permit and receive a decision from the Corps. According to the Corps of Engineers, it takes far longer for an applicant to receive a decision on an individual permit than on a nationwide permit. In particular, the Corps asserts that it takes 127 days for a decision on individual permits and 16 days to receive a decision on a nationwide permit.[69] These statistics demonstrate that a shift from the nationwide to the individual permit process will have serious consequences for the applicant, but this is only part of the story. With regard to the length of the permitting process, we queried applicants about three dates: the date the applicant began compiling information needed to submit an application, the date on which the application was submitted to the Corps, and the date on which a final decision was received. These time periods were then broken down between individual and nationwide permits. The results are displayed in Table 1.

Table 1: Time to Prepare and Obtain a 404 Permit

	Days to Prepare Application (1)	Days from Submission of Application to Decision (2)	Days from Completed Application to Decision (3)	Total Calendar Days (1+2)
Survey				
Individual	383	405		788
Nationwide	184	129		313
Difference	199	276		475
Corps Statistics				
Individual			127	
Nationwide			16	
Difference			111	

69. *See* SPECIAL STATISTICAL REPORT, *supra* note 13, at 5.

Nationwide permits in our sample took an average of 313 days to obtain—far longer than the few weeks implied by the Corps' public accounting.[70] The main reason for the discrepancy is that the Corps only counts the time from the date that it deems an application to be complete until it reaches a decision. This accounting ignores the time needed to prepare the application, which comprises the majority of the total permitting time required for both nationwide and individual permits. The applicants in our sample also indicated that it took an average of 788 days (or two years, two months) from the time they began preparing the application to the time they received an individual permit, of which 405 days elapsed after the application was submitted to the Corps' office.[71] One implication of this finding is that it actually takes an applicant 475 extra days to obtain an individual as opposed to a nationwide permit. Thus, eliminating NWP 26 will result in a longer approval process for many projects and will likely delay the completion of many more projects. These delay costs are in addition to the extra permit preparation costs described earlier.

D. Cost to the Federal Government

To measure the cost to the federal government of eliminating NWP 26, it is necessary to first develop a baseline with which to compare the two programs. In fiscal year 1994, there were more than 48,000 Section 404 applications (including general permit verification requests and pre-construction notifications) sent to the Corps for authorization.[72] Eighty-two percent of these applications were authorized through general permits.[73] During a 14-month period ending on September 30, 1998, the Corps authorized 8790 activities through NWP 26.[74] Thus, this single permit accounts for around 15 percent of all activities permitted by the Corps under Section 404.

Because it reduces permit evaluation time relative to individual permits, the NWP program conserves resources at the Corps of Engineers and quickens the permitting process for minimal impact projects. The budgetary and time costs flowing from the elimination of NWP 26 are substantial. Shifting large numbers of permit applications from the "general" to the "individual" category will increase Corps workloads. There are two outcomes of this change. Corps budgetary requirements will increase if permit evaluation times are to be kept at current levels; however,

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70. The range was from 11 to 1867 calendar days from initiation of the paperwork to obtaining a final Corps decision. The median was 196 calendar days.

71. The range was from 209 to 1884 calendar days. The median was 726 days.

72. *See* SPECIAL STATISTICAL REPORT, *supra* note 13, at 5.

73. *See id.*

74. *See* Nationwide Permit 26 Mitigation Report, *supra* note 16.

if the Corps' regulatory budget is not increased, permit evaluation time will increase.

We will now assess the size of the budget increase necessary to keep permit evaluation times at their current levels. Two components of the replacement permit package are key with respect to budgetary impacts. First, the new General Condition 26 eliminates the use of most general permits in the 100-year floodplain. Second, the replacement permits have lower acreage ceilings above which applicants are required to obtain an individual permit. An April 1999 survey of public agencies and private companies indicated that 60 percent of all Section 404 applications were in the 100-year floodplain.[75] The survey concluded that 58 percent of applications would trigger the acreage limitations imposed on the use of NWPs. Assuming that 60 percent of NWP 26 applications are in the 100-year floodplain or are covered by the sliding-scale acreage limitations, then 4500 activities annually will be switched from NWP to individual permits.[76]

Assume that the Corps takes roughly 110 extra days to evaluate and process each individual permit as opposed to a general permit, and assume that each Corps worker handles six individual permit applications at a time.[77] Under these conditions, the replacement package will require that the Corps hire roughly 450 workers just to keep evaluation times at current levels. Suppose that average employee compensation (including benefits) and other related expenses (*e.g.*, office space, furniture, phone, and fax expenses, etc.) are $75,000 per year. Then the total budgetary impact of eliminating NWP 26 is $34 million every year. This figure represents nearly a 30 percent increase in the Corps' proposed FY 2003 regulatory budget of $151 million.[78]

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75. Coalition on Permitting Efficiency, Discussion Draft, Survey Methodology and Results: Section 404 Permit Applications in the 100-year Floodplain, Apr. 16, 1999 (unpublished paper, on file with author).

76. 8790 authorizations in 14 months implies roughly 7,500 authorizations in a representative 12 month period. 60 percent of this number is 4500. This estimate corresponds closely with the Corps' assertion that the replacement package will result in an additional 4429 individual permit applications per year. *See* Final Notice of Issuance and Modification of Nationwide Permits, 65 Fed. Reg. 12,818, 12,820 (Mar. 9, 2000).

77. The 110-day assumption is consistent with the Corps' own assertion that it takes 111 extra days to process an individual application (127 – 16 = 111). If there are 1300 members of the Corps regulatory staff and they process 12,000 individual permit applications per year, then the average worker processes over 11 IP applications per year. Assuming that each takes 127 work days to process and there are 210 work days in a year, then it follows that the typical worker handles seven applications at a time.

78. *Complete Statement of The Honorable Mike Parker, Assistant Secretary of the Army (Civil Works) Before the Subcomm. on Energy and Water Dev., Comm. on Appropriations*, at 9 (Feb. 22, 2002) (on file with author).

E. Cost to Applicants

1. State and Local Governments

It is important to bear in mind that public agencies, particularly at the state and local level, also apply for wetland permits to carry out vital services such as road construction and maintenance; managing stormwater; and building schools, hospitals, and prisons. The changes to NWP 26 will require an adjustment period for local public agencies and will result in a new equilibrium that is much more costly to them. Project costs will increase as agencies rely more on outside experts (consultants, engineers, etc.) to obtain needed permits, increase their planning horizon to anticipate delays, and have less flexibility to devise and implement creative and timely solutions to public works problems. The replacement package will also delay construction, maintenance, and development activities affecting waters of the United States.

Public agencies have fixed budgets, and increasing the cost of construction and maintenance activity draws resources away from other competing uses. In this sense, the Corps' replacement of NWP 26 can be viewed as an unfunded federal mandate. Local governments can respond to the increase in costs by increasing taxes, which is unlikely, or by reducing the number or quality of projects undertaken by state and local public agencies.

Also troubling are the implications of the elimination of NWP 26 for public safety. By raising the cost of doing business, the replacement permit package will mean that some public sector projects will not be completed. Increases in permit processing time will also have an effect. Particularly in the northern part of the country, the window of opportunity to perform maintenance is limited by weather conditions, and processing delays may prevent agencies from conducting maintenance work in a timely manner. This conflict leads to further deterioration of important infrastructure and exposes the public to additional risks. For example, road and highway maintenance agencies may delay performing needed road repairs by a year or more, which increases risks to travelers. Flood control agencies may delay performing maintenance work, which increases the risk of flooding. Thus, the elimination of NWP 26, which is intended to benefit the environment, may considerably increase risks to humans and the environment.

Increasing the cost of wetland regulation by replacing NWP 26 will reduce the flexibility of local agencies to design new projects as they strive to avoid wetland impacts altogether. The Corps is thereby creating incentives that lead to more congestion and a sub-optimal configuration of infrastructure as agencies attempt to keep permitting costs under control. For example, higher regulation costs result in reduced road capacity and poor placement of roads, both of which inflate the private cost of travel.

These impacts can be serious, as the following example illustrates. Suppose that a local agency cannot use the most direct route for a road and instead builds a longer road to skirt a wetland. This response imposes potentially large private costs. Suppose that the more circuitous route raises average commute time by just six minutes per day and 100,000 people use the affected road. This single change implies that the environmental regulation increases travel time by 10,000 hours per day. At an average opportunity cost of $10/hour, which is quite conservative, changing road placement costs commuters $100,000 per day.

2. *Private Sector*

There are several aspects of the replacement permit package that will increase the costs of private sector activities. The cost of obtaining a permit will compound as more activities will require an individual permit and more activities require pre-construction notification. Even with major additions to the Corps' regulatory staff, the time needed to obtain a Section 404 permit will be prolonged as a result of eliminating NWP 26. Further, the costs of compliance will increase as a result of lengthened processing time and new permit requirements (*e.g.*, for upland buffers).

Individual permits cost far more than general permits, both in money and time. Individual permits often require an applicant to hire outside experts, such as biological consultants and specialized engineers to perform environmental and engineering analyses, and require much more extensive negotiations with the Corps than general permits require.

Another important component of cost is the impact of the permitting changes on the timing of the development process. Even with substantial growth in funding for Corps regulatory activities, switching applications from general to individual permits will delay the development process and increase the capital outlays of applicants. The Corps admits that the time needed to process an individual application will increase, but it has declined to quantify this impact, saying only that the increase in permit processing time "will be substantial."[79]

The actual delay is more than just the time needed for the Corps to respond to the application. In many cases, developers can only operate in good weather and need to subcontract portions of the overall project. Prolonging the Corps' evaluation time may make a current construction season a total loss. Delay and mounting uncertainty will increase the cost of capital to developers and, by extension, the price of housing.

Other aspects of the Corps' proposal will increase the cost of obtaining a Section 404 permit and may make some projects technically or

79. Notice of Proposal to Issue and Modify Nationwide Permits, 64 Fed. Reg. 39,369 (July 21, 1999).

economically infeasible. Consider, for example, General Condition 9, Water Quality, which requires that, to the maximum extent practicable, vegetated buffers planted with native species be established adjacent to "open waters" in the "vicinity" of the "project."[80] The buffer requirement is not based on any showing that the project affects the open waters or that buffers are the most effective way to redress any adverse impacts to open waters. Rather, they are an unvarying obligation of the permittee, limited only by the "maximum extent practicable" requirements.[81] The normative size of the buffer is from 25 to 50 feet on each side of the open water.[82] This requirement sets aside significant amounts of land, which provide little or no financial return, and may make some proposed activities infeasible.

The changes to the wetland permitting process will increase the marginal cost of private development by raising the cost of preparing and negotiating the permit, by delaying the development process, and by upping the amount of resources that must be set aside for wetlands protection. The incidence of such an increase in cost is well understood by economists. Raising the cost of permitting imposes costs on developers, which are passed through to homebuyers and other customers in the form of higher housing prices. Higher costs also reduce the amount of housing and other structures produced by developers in an economic equilibrium.

3. Measuring the Incremental Cost of Obtaining a Wetland Permit

Consider first the increased cost of preparing a Section 404 permit to the entity preparing the permit (developer, local government, etc).[83] Our survey indicates that the average NWP-authorized activity would cost roughly $31,000 more to permit if authorized by the Corps on a project-specific basis. If 60 percent of activities previously authorized under NWP 26 require individual permits under the replacement package, then just the additional costs of preparing wetlands permits amounts to over $140 million annually. Note that this figure does not include the cost of proposed design features such as vegetated buffers, the cost of the new water quality planning requirements, or the delay costs.

This survey-based evidence is consistent with more aggregate calculations. The total value of private and public construction and development activity is $760 billion annually.[84] Recent survey evidence suggests that wetlands permitting averages 0.15 percent of this amount.[85]

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80. *See* Final Notice of Issuance and Modification of Nationwide Permits, 65 Fed. Reg. 12,819, 12,893 (Mar. 9, 2000).

81. *See id.* at 12,894 (Mar. 9, 2000).

82. *See id.*

83. Note that these costs may be passed on to some degree to final consumers.

84. *See* COUNCIL OF ECONOMIC ADVISERS, 1999 ECONOMIC REPORT OF THE PRESIDENT (1999).

85. *See* Interview with Susan Asmus, National Association of Home Builders (Nov. 1999).

If residential and public sector construction activity is two-thirds of the value of all activity permitted under Section 404, then over $1.7 billion is spent each year by the private and public sectors obtaining wetlands permits for residential and public sector activities. If 80 percent of all 404 applications are authorized through general permits and individual permits are twice as expensive to obtain as general permits, then an average individual permit costs roughly $30,000 more to prepare than a nationwide permit. Note that this calculation is quite close to the results of our survey. If 60 percent of all former NWP 26-authorized projects require individual permits under the Corps' proposal, then the additional permit preparation cost is over $130 million annually.

Since these are rough calculations and consider only one aspect of the actual cost of the Corps' proposal, it is helpful to compare the results of a different approach. A National Association of Home Builders survey reveals that all aspects of the Section 404 permitting process taken together add $400 to the price of an average new home.[86] Viewed another way, the survey concludes that costs imposed by Section 404 requirements are 0.16 percent of total homebuilding costs and 0.4 percent of total development costs. If 15 percent of new homes must obtain 404 permits, then the average cost of obtaining a 404 permit is $2667 per home requiring a permit.[87] If an individual permit is twice as expensive to obtain as a nationwide permit and 80 percent of new home 404 permits are nationwide, then an NWP adds $2223 to the price of a new home and an IP adds $4446.

Suppose that there are 1.5 million new homes constructed per year, that 20 percent of the new homes needing 404 permits receive NWP 26 permits, and that 60 percent of these switch from general to individual permits.[88] Then the Corps' proposal adds $60 million per year to the price of new housing. If 20 percent of NWP 26 permits issued each year are for residential projects, and if these projects are representative of overall costs, then, by this method, the total cost impact of the Corps' proposal is over $300 million annually.[89] Clearly, the Corps must do more work to assess the costs of its replacement package. At this point, however, it is evident that the elimination of NWP 26 will significantly increase the cost of obtaining a wetland permit.

Of course, these calculations do not factor in the cost of delay, defined as the increase in total project costs resulting from the longer time

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86. *See id.* (The survey also shows that wetland permitting costs are 0.4 percent of development costs, which are 43 percent of the total cost of a new home).

87. *See id.*

88. Press release, U.S. Bureau of the Census, Bureau of the Census Announced that Privately Owned Housing Starts Were at a Seasonally Adjusted, Annualized Rate of 1.6 Million Units in November, 1999 (Dec. 17, 1999) (on file with author).

89. *See* Nationwide Permit 26 Mitigation Report, *supra* note 16.

it takes an applicant to receive an individual versus a nationwide permit. The survey data discussed above indicate that the magnitude of the delay is large. In particular, an individual permit takes 475 days more to prepare and receive than does an NWP (199 extra days to prepare the application and 276 extra days to receive approval once the application is submitted).[90] If 60 percent of former NWP 26 applications are shifted to individual permits and the rest remain as nationwide permits, then the average permit application will be delayed by 285 days, or well over 9 months, from the time permit preparation begins, and by 175 days, or nearly 6 months, once the application is submitted.

Delay costs have numerous sources. Developers must carry capital and bear labor and other operating expenses for longer periods of time. Carrying capital for longer periods of time increases interest expenses and results in lost alternative investments. Moreover, the increased regulatory uncertainty associated with the replacement package will increase the cost of borrowing to developers. These higher interest rates further increase capital outlays and raise the price of housing.

V. PERMITTING IN RELATION TO OTHER WETLAND PROTECTION POLICIES

In a complete cost-benefit analysis of a regulation, the analyst compares the cost of the intervention with the monetary value of its benefits. Measuring the benefits of environmental regulations is notoriously difficult (and controversial, even among economists), and we will avoid it in this study. Instead, we will consider a simple notion of efficiency: whether the Corps' replacement package is the lowest-cost way to achieve a desired level of health of the nation's wetlands.

A. Benchmark for Cost-Efficiency Analysis

We first develop a benchmark for cost-efficiency by calculating the cost of the replacement package per wetland acre affected. Recall that NWP 26 was designed to authorize activities with minimal individual *and cumulative* impacts on wetlands. Not surprisingly, the likely effect of eliminating NWP 26 on wetland acres appears to be modest, particularly in relation to the large costs imposed on the regulated community. In 1998, the NWP 26 program authorized activities impacting roughly 3,000 wetland acres.[91] Assuming that the replacement package alters the design of projects affecting all of this acreage and assuming that the economic cost of

90. *See supra* Table 1.

91. *See* Nationwide Permit 26 Mitigation Report, *supra* note 16.

eliminating NWP 26, including the increased cost of federal regulation, is $300 million annually, then it follows that the total cost amounts to over $100,000 *per acre affected.*

In reality, the implicit cost of wetland conservation embodied in the permitting reform is much higher than $100,000 per acre. Eliminating NWP 26 and forcing projects to be approved via the more arduous individual permit process only protects wetlands to the extent that the new program catches "mistakes" allowed under the old program, namely projects that were permitted and should not have been. Most of the criteria by which the Corps is planning to approve or disapprove projects remain unchanged, with the exceptions detailed earlier. Thus, most submitted projects were approved under the old program, and most will be approved under the new program. Suppose that five percent of the projects permitted under the old rules were approved in error. Then the permitting changes impose a cost of over $100,000 on all acres affected by the program but amount to a cost of over $2 million *per acre conserved* that would have been altered under the old permitting program.[92] It is obviously worth ascertaining if this is the most efficient way to protect the nation's wetlands.

B. Cost of Non-Regulatory Programs

Governments are constantly challenged to meet their objectives at minimum cost. Thus, it is important to consider whether there are other programs that can protect wetlands at less than the implicit cost of conserving them by tightening the requirements for obtaining a discharge permit.

There are a number of active programs by which the federal government is acquiring land to add to the stock of the nation's wetlands. The North American Wetlands Conservation Act established a Wetlands Trust Fund in 1989 and established the North American Wetlands Conservation Council to approve wetland restoration activities.[93] The Act has stimulated more than 960 projects in 49 states, which collectively have restored more than 8.5 million acres of wetlands.[94]

The Wetlands Reserve Program (WRP) is a voluntary program directed at wetlands on private property. Congress created the WRP with the Food, Agriculture, Conservation and Trade Act of 1990, as amended by the 1996 Farm Bill.[95] The NRCS administers the program in consultation

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92. $100,000 per acre affected divided by a .05 error rate equals 2 million.

93. North American Wetlands Conservation Act, 16 U.S.C. §§ 4401-4412 (1994).

94. *See* Ducks Unlimited, *NAWCA, at* http://www.ducks.org/conservation/nawca.asp (last visited Apr. 29, 2002).

95. *See* 16 U.S.C. § 3837 (1994 & Supp. V 1999).

with the Farm Service Agency and funding for the WRP comes from the Commodity Credit Corporation. Landowners choosing to participate in the WRP may sell a conservation easement or enter into a cost-share restoration agreement with the USDA to restore and protect wetlands. The landowner voluntarily limits future use of the land, yet retains ownership. The landowner and NRCS jointly develop a plan for the restoration and maintenance of the land. The program offers landowners three options: permanent easements, 30-year easements, and restoration cost-share agreements of a minimum 10-year duration. Nationwide, over 990,000 wetland acres have been enrolled in the program since 1990.[96]

The federal government is not the only entity attempting to preserve and restore wetlands: private conservation organizations such as The Nature Conservancy, the Trust for Public Lands, the Isaac Walton League, and Ducks Unlimited have also contributed significantly to wetland conservation. For example, since its founding in 1937, Ducks Unlimited has conserved more than 10 million acres.[97]

With regard to the cost of these various measures, economists have noted a basic dichotomy between programs intended to conserve existing wetlands and those attempting to restore lands that were previously wetlands. In particular, economists have found that restoration of wetlands is usually much less expensive than conservation.[98] Protection of existing wetlands is more expensive than restoration because there is a large supply of former wetlands that are only marginally suited to economic uses. Wetlands that are profitable to develop or have a high level of agricultural productivity, by contrast, can be quite expensive to conserve.

One illustration of this principle is the relatively high cost of the Swampbuster program; the mean cost of conservation under this program is $2215 per acre, with a range of $519 to $4316 per acre.[99] Even the conservation efforts of private groups are generally more expensive than restoration efforts. For example, The Nature Conservancy's costs of wetland conservation averages $1306 per acre.[100] A recent study by the Economic Research Service calculated the costs of conserving wetlands through programs that acquire partial interests in land and restore wetlands.[101] The mean costs of conservation under these programs range from $250 to $1300

96. *See* Testimony of Dr. Katherine R. Smith before the Comm. on Agriculture, Nutrition & Forestry (Feb. 28, 2001) (on file with author).

97. *Statement of Dr. L.J. Mayeus, President of Ducks Unlimited, at* www.ducks.org/about/index.asp (last visited Apr. 29, 2002).

98. *See* HEIMLICH, *supra* note 39, at 55.

99. *See id.*

100. *See id.*

101. *See id.*

per acre. The study also concludes that the WRP achieves restoration at around $600 per acre.[102]

The per acre costs of wetlands enhancement by any of these measures is low relative to the cost of conserving wetlands by modifying the federal permitting system. Further, programs that acquire full or partial interests in land, or result in cooperative agreements with landowners, directly protect and enhance wetlands. The changes to the wetlands permitting system merely alter the process by which applications are reviewed. Most permit applications will still be approved, and wetlands filled, now that NWP 26 is eliminated.

C. Agency Flexibility and Fine Tuning of Regulation

Economists have argued that the efficiency of environmental regulation depends on agencies' flexibility and their capacity to adjust to varying circumstances. There is immense variability of weather conditions, economic performance, and ecosystem characteristics across locations. Therefore, if government regulation is to reflect differences in benefits and costs, it should be adjusted to specific conditions. Efficient regulation will achieve the same environmental quality improvement at the same cost across locations. One form of regulation that may be especially inefficient is a complete ban on certain activities. For example, proposed complete bans of pesticides have been shown to be very inefficient, and the use of differentiated pesticide regulation has been shown to achieve similar environmental improvements at a much lower cost.[103]

A quantitative assessment of environmental amenities, such as wetlands, requires that a distinction be made among wetlands of different quality. A recent study by Babcock and others assesses the Conservation Reserve Program (CRP) and suggests that conservation policies that do not discriminate between lands that vary in their environmental amenities are likely to be highly inefficient.[104] The study used the National Resources Inventory to weigh the contribution of various lands to conservation objectives (*e.g.*, reduced soil erosion, conservation of native plants, creation of wildlife habitat). Babcock and his coauthors found that the initial design of the CRP, which aimed to maximize enrolled acreage with a given budget without discrimination among lands of different characteristics, attained less environmental quality improvement than an approach targeting lands

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102. *See id.*

103. *See* David Zilberman, et. al., *The Economics of Pesticide Use and Regulation*, 253 SCIENCE 518, 518 (1991); David L. Sunding. *Measuring the Marginal Cost of Nonuniform Environmental Regulations*, AM. J. AGRIC. ECON. 1098, 1098-107 (1996).

104. Bruce Babcock et al., *Targeting Tools for the Purchase of Environmental Amenities*, 73 LAND ECON. 325, 336-37 (1997).

with the *highest ratios of environmental amenities per dollar spent.* Policy simulations conducted as part of the study show aggregate quality losses of more than 20 percent when the uniform targeting approach is used instead of the optimal approach.[105]

Interviews with public agencies and private developers conducted during this study suggest that one of the major flaws of the current permitting process is the lack of discrimination between wetlands of varying qualities.[106] The lack of discrimination by regulators among wetlands of different qualities might have been justified in the past by technological constraints and cost considerations. The disregard of functional differences in the proposed permitting process is less understandable given the recent advances in remote sensing, geographic information systems, and spatial statistical inference.

The effectiveness of the regulatory process has improved as it has become quantitative, with well-defined and measured data. Cost-benefit analysis can provide sound assessment of whether or not to execute a project. If agencies lack the capacity to obtain direct market evaluation of environmental amenities (which is usually the case), then the criteria of consistency should be applied in evaluating projects. Namely, the value of environmental amenities implied by existing activities and regulations can be used as a benchmark in new project evaluation. Values of wetland preservation, as implied by existing regulations and market activities, can be used as a benchmark for evaluation in new proposed projects. Protecting wetlands by reforming the permitting process appears to be an expensive way to achieve given improvements in environmental quality as compared to other policies.

VI. FEDERALISM AND EFFICIENT GOVERNANCE

The elimination of a streamlined permit like NWP 26 also raises economic questions about the division of government responsibilities. First, the replacement permit package raises issues of the efficient allocation of responsibility among levels of government. Second, aspects of the change raise questions about the appropriate level of detail to include in federal regulations.

Even in those situations where federal agencies have proper oversight responsibility, it is desirable that they not be engaged in minute details of execution. Federal agencies should focus their attention on major water quality problems that are of national concern, coordinate state

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105. *See id.*

106. Informal telephone interviews with 14 city and county engineers, private developers, and Hood control officials (Aug.–Sept. 1999).

regulations when there are spillovers, and oversee environmental regulations at the state and local level, but let local agencies deal with the day-to-day details of implementation.[107] This is not often the case. Frequently, the Corps has hands-on regulatory control of local projects that have only minimal (or no) national impact, and the distance between the decision makers and the operators in the field leads to delayed, and sometimes erroneous, decisions. It seems that even the current system may benefit from devolution and increased autonomy for local agencies.

The replacement permit package will increase the Corps' power over water quality and even land use decisions. Some aspects of the replacement package demonstrate that it seeks to alter the balance between federal and state governments and insert direct federal control into areas where it has not been exercised previously. For example, the existing General Condition 9, Water Quality Certification, simply ensures that the Corps has determined that the state has issued (or waived) water quality certification for the proposed project.[108] The new General Condition 9, Water Quality, alters the focus of the condition from ensuring that the state has certified that the project meets water quality requirements to establish new conditions that may or may not be consistent with state regulations.[109] The Corps states that the purpose of the modified General Condition is to ensure that the project will have "minimal adverse effects on the aquatic environment, especially by preventing or reducing adverse effects to downstream water quality and aquatic habitat."[110] The Corps thus appears to be second-guessing the state by asserting authority to impose its own water quality conditions.

These observations are related to another economic concern: the regulations are too detailed and impose specific performance requirements regardless of the circumstances in which a permittee operates. Again, the new General Condition 9 is a good illustration of the problem. The vegetated buffer requirement that is central to the Corps' new water quality focus is an example of micro-management and will impose significant costs

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107. For the principle that governments should have responsibilities over public goods whose geographic scope is the same as their jurisdiction, see, e.g., ROBERT COOTER, THE STRATEGIC CONSTITUTION (2000).

108. *See* Final Notice of Issuance, Reissuance, and Modification of Nationwide Permits, 61 Fed. Reg. 65,874, 65,907(Dec. 13, 1996).

109. *See* Final Notice of Issuance and Modification of Nationwide Permits, 65 Fed. Reg. 12,818, 12,893 (Mar. 9, 2000).

110. Notice of Proposal to Issue and Modify Nationwide Permits; Notice, 64 Fed. Reg. 39,369 (July 21, 1999); Notice of Proposal to Issue and Modify Nationwide Permits; Notice, 64 Fed. Reg. 39,252, 39,338 (July 21, 1999).

on local public agencies and private developers.[111] Further, the Corps now requires that the buffer should be planted with native species, and if exotic species are present, they must be removed. Consider the potential impact on a flood control agency with responsibility to construct and maintain a flood control system in natural and artificial water bodies. These agencies do not usually own the upland areas immediately adjacent to the streams in which they work. But the new general condition requires them to control and enhance these areas nonetheless.

Beyond the obvious question of how these requirements redress impacts attributed to the activities for which the Corps is issuing permits, it is important to ask whether they should be spelled out in a national regulation at all. Or, should these types of requirements be left to state water quality control boards and local land use planning agencies?

Another aspect of effective governance is striking a balance between agencies' specific concerns and the overall coherence of regulation from the perspective of the public. State and local agencies as well as developers undertaking a project with wetland impacts are often required to interact with a multitude of regulatory agencies to obtain approval for even minor activities. Government statistics bear out this assertion. In 1997, at least 36 federal agencies conducted wetlands-related activities; funding for these activities totaled $787 million and involved 4308 full-time employees.[112] There is already substantial regulatory and programmatic clutter in the area of wetlands.

Effective governance aims to streamline regulation and set coordinated policies that reduce the burden of regulation and minimize the number of points of interaction between government and the regulated community. Replacing NWP 26 makes the regulatory process more complex and fragmented by broadening the Corps' role in the area of water quality regulation, an area in which the EPA has traditionally been the lead federal agency.

VII. CONCLUSIONS

Issuing licenses to pollute or degrade environmental quality is an important tool of environmental regulation. In general, licensing programs may impose significant costs on the regulated community; however, these costs are less obvious and can be more difficult to measure than the costs

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111. *See* Final Notice of Issuance and Modification of Nationwide Permits, 65 Fed. Reg. at 12,818, 12,890.

112. *See* WETLANDS OVERVIEW, *supra* note 53, at 2-8. In the same report, the GAO also noted that six agencies (the Corps, USDA's Farm Service Agency and NRCS, Interior's Fish and Wildlife Service, Commerce's NMFS and the USEPA) accounted for 70 percent of the funding and 65 percent of the staff.

imposed by direct interventions such as environmental taxes or technology requirements. There is also the question of how the investigative resources of the government are allocated, and whether there exist obvious aspects of proposed activities that the government can use to trigger a higher degree of scrutiny. Another interesting aspect of licensing is its cost-effectiveness or efficiency relative to other environmental policies.

The case considered in this article is the set of recent changes to the federal wetlands permitting program known collectively as the "NWP 26 replacement package." This case is significant since wetlands policy is a key component of the nation's environmental protection and enhancement strategy, and it is important that wetlands regulation, including permitting requirements, be as effective as possible. Public intervention has already helped stabilize and even reverse the downward trend of the loss of the nation's stock of wetlands. When contemplating the replacement package, it is important to consider its cost, its environmental benefits, and whether it squares with commonly-accepted principles of good governance, including cost-effectiveness, consistency among government programs, and allocation of responsibility among levels of government.

Our study shows that the proposed permitting changes are a major federal action. The elimination of NWP 26 could impose costs well in excess of $300 million per year, or over $100,000 per acre affected, and much more for each acre actually conserved. The costs of the regulation will be borne by many groups, including homebuyers, developers, local governments, and even the federal government itself. Because developers and governments pass on cost increases to consumers and taxpayers, average citizens will end up paying most of the bill for this change in policy. Further, it is likely that the changes to the wetland permitting program will end up degrading the quality of local government service by making it more difficult to perform maintenance and construction activities.

Environmental economists frequently advocate that governments should meet their environmental objectives at minimum cost. The elimination of NWP 26 fails this test. First, the policy is indiscriminate in that it prohibits use of streamlined nationwide permits for headwaters and isolated waters based solely on the size of the project and the number of affected wetland acres, and not on the characteristics of the affected area. It may be wise for Congress to appropriate additional funds to invest in technology to enable the Corps to discriminate among wetlands of varying quality. In this way, the Corps can more effectively target its human resources toward the most vulnerable and biologically important areas. Further, there are other, non-regulatory programs that protect and enhance the nation's stock of wetlands at far lower cost than the elimination of NWP 26. This observation raises questions about the consistency of the replacement package with other federal initiatives.

Another aspect of licensing cost that is often overlooked in assessments of environmental policies is the delay caused by regulation. Relying on a review of how the Corps compiles its own statistics and a detailed survey of wetlands permit applicants, we argue that published Corps figures vastly understate the true time needed for an applicant to complete the wetlands permitting process. Indeed, we find that shifting a project from a nationwide to an individual permit adds nearly one and a half years to the time needed to prepare and negotiate a wetland development permit. Again, this delay is indiscriminate in that the Corps' replacement package will require an individual permit based on the size of the project alone, and not on the biological productivity, uniqueness, or sensitivity of the affected wetlands.

A further area of concern is how eliminating NWP 26 will affect the relationships between levels of government. The replacement package will insert the Corps of Engineers into water quality and land use planning, an area where state and local governments have traditionally had primacy. Further, the replacement package, particularly language in the new general conditions, obscures lines of responsibility among federal agencies, particularly between the Corps of Engineers and the Environmental Protection Agency, which has had primary federal responsibility for oversight of state water quality planning efforts. The replacement package will result in more complex and fragmented regulation, where just the opposite is desired.