Federal Regulation of Agricultural Drainage Activity in Prairie Potholes: The Effect of Section 404 of the Clean Water Act and the Swampbuster Provisions of the 1985 Farm Bill

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Originally published in SOUTH DAKOTA LAW REVIEW
33 S. D. L. REV. 511 (1988)

FEDERAL REGULATION OF AGRICULTURAL DRAINAGE ACTIVITY IN PRAIRIE POTHOLES: THE EFFECT OF SECTION 404 OF THE CLEAN WATER ACT AND THE SWAMPBUSTER PROVISIONS OF THE 1985 FARM BILL

Draining a prairie pothole, a "wet spot" in a field, was once a relatively simple task. The only prerequisites were a neighbor's permission and the proper equipment. In no time, the "nuisance" was eliminated and valuable farmland was created. Agricultural drainage occurred at an alarming rate during the 1970's to mid-1980's. Today, less than half of the original prairie potholes remain. Draining a typical pothole may no longer be possible or economically feasible. If the pothole constitutes part of the "waters of the United States," draining it may require the approval of the U.S. Army Corps of Engineers. Additionally, draining a pothole for agricultural purposes may cause a farmer to lose his eligibility to participate in federal farm programs. This comment examines whether draining a prairie pothole requires a permit under section 404 of the Clean Water Act, reviews the economic disincentives for draining potholes provided by the swampbuster provisions of the 1985 Farm Bill, and discusses the ecological benefits derived from preserving prairie potholes and other wetlands.

INTRODUCTION

To a farmer in the upper midwestern United States, a "prairie pothole"[1] in a field is an unproductive nuisance.[2] Potholes are unpredictable—dry and tillable land one year and flooded ground the next.[3] Furthermore, these prairie wetlands create obstacles for modern farm equipment and "weeds" grow in and around the potholes.[4] By draining potholes either through a system of excavated ditches or a network of underground tiles, farmers can eliminate each nuisance and increase the productivity of their land.[5]

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1. The term "prairie pothole" denotes a small depressional wetland on the glaciated prairie region of North America. It includes a typical "wet spot" in a field. Hubbard & Linder, *Spring Runoff Retention in Prairie Pothole Wetlands*, J. OF SOIL & WATER CONSERVATION, Mar.-Apr. 1986, at 122. *See also* Luoma, *Twilight in Pothole Country*, AUDUBON, Sept. 1985, at 66, 68-69. The term "wetlands" includes swamps, marshes, bogs, and almost any other areas that are "inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." 33 C.F.R. § 328.3(b) (1987). *See also infra* notes 61-64 and accompanying text.

2. Luoma, *supra* note 1, at 72. This nuisance factor apparently plays a significant role in influencing farmers' drainage decisions. Hubbard & Linder, *supra* note 1, at 122.

3. Luoma, *supra* note 1, at 72.

4. *Id.* During the summer, a lush growth of vegetation flourishes in and around most prairie potholes. These "weeds" include cattails, bulrushes, and native bluestem grass. *See generally id.* at 71-83.

5. *Id.* at 72. Agricultural drainage may be accomplished by shaping and leveling fields and excavating channels to eliminate water that collects on the surface. A system of tiles resembling a municipal sewer collector system will effectuate the drainage of subsurface water. Often, these methods are used conjunctively.

Drainage enables farmers to bring into production land which was originally wetland and to

Draining prairie potholes was once a relatively simple task. After receiving permission from his downhill neighbor, a farmer could easily eliminate a pothole by merely digging a ditch or installing drainage tile.[6] Changing public and private views toward the conservation of these prairie wetlands, however, have resulted in federal regulation and restriction of agricultural drainage activities.[7] Today, draining a prairie pothole requires as a prerequisite close scrutiny of legal, economic, and social issues by not only the farmer who wishes to accomplish the drainage, but also the practicing attorney who advises the farmer. These issues must be resolved to determine whether a farmer can or even should drain a pothole.

The purpose of this comment is to provide farmers and practitioners with a working knowledge of section 404 of the Clean Water Act,[8] the swampbuster provisions of the Food Security Act of 1985,[9] and general social issues relevant to agricultural drainage activity in prairie wetlands. This comment begins with a brief historical background on prairie potholes.[10] The historical perspective is followed by a discussion of the primary legal issue considered in this comment, namely, whether draining a pothole requires a dredge and fill permit issued by the United States Army Corps of Engineers (Corps) pursuant to section 404 of the Clean Water Act.[11] This comment next examines the economic disincentive to drain prairie potholes under the swampbuster provisions of the 1985 Farm Bill.[12] Finally, the ecological benefits to society derived from the preservation of prairie potholes and wetland complexes as a whole are addressed.[13]

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improve the productivity of land already in production by allowing them to put land to a better use such as row crop production. In addition, drainage improves the flow of oxygen to plant roots and assists crop growth in soils that are waterlogged during part of the growing season because of their topography or their structure. Drainage may also lengthen the crop growing season in particular fields by hastening the rate at which moisture is dispersed. Davidson, *Little Waters: The Relationship Between Water Pollution and Agricultural Drainage*, 17 Envtl. L. Rep. (Envtl. L. Inst.) 10074, 10075 (1987).

6. Of course, drainage activities must also comply with state and local laws. The South Dakota statutes regulating drainage are codified at S.D. CODIFIED LAWS ANN. §§ 46A-10A-1 to 46A-10A-97 (1987). The scope of this comment is limited to federal drainage regulation. Consequently, state and local drainage laws will not be discussed.

7. Hanson, *Damming Agricultural Drainage: The Effect of Wetland Preservation and Federal Regulation on Agricultural Drainage in Minnesota*, 13 WM. MITCHELL L. REV. 135, 137 (1987); Heimlich & Langner, *Swampbusting in Perspective*, J. OF SOIL & WATER CONSERVATION, July-Aug. 1986, at 219.

8. Clean Water Act of 1977, Pub. L. No. 95-217, 91 Stat. 1566 (codified as amended at 33 U.S.C. §§ 1251-1376 (1982)). Prior of the 1977 amendments, the Act was known as the Federal Water Pollution Control Act. The 1977 amendments to the Federal Water Pollution Control Act provided that the entire Act may be referred to as the Clean Water Act. *Id.* The intent of Congress in enacting the Clean Water Act was to "restore and maintain the chemical, physical, and biological integrity of the [n]ation's waters." 33 U.S.C. § 1251 (1982).

9. Food Security Act of 1985, Pub. L. No. 99-198, 99 Stat. 1354 (codified as amended in scattered sections of 7, 16, 19, & 42 U.S.C. (Supp. IV 1986)). The conservation provisions of the Act are codified at 16 U.S.C. §§ 3801-3845 (Supp. IV 1986). Throughout the text of this article, the Farm Security Act of 1985 will be referred to as the 1985 Farm Bill.

10. *See infra* notes 14-21 and accompanying text.

11. *See infra* notes 22-111 and accompanying text. *See also* 33 U.S.C. § 1344 (1982).

12. *See infra* notes 112-29 and accompanying text. *See also* 16 U.S.C. §§ 3821-3823 (Supp. IV 1986).

13. *See infra* notes 130-61 and accompanying text.

HISTORICAL BACKGROUND

When the last glacier retreated from the upper midwestern plains some 12,000 years ago, it left behind a table of fertile sediment pocked with millions of shallow, saucer-like depressions.[14] These prairie potholes provided habitat for, among others, flocks of whooping cranes and Canada geese and vast herds of bison. With the development of agriculture, much of the wildlife habitat was replaced by farmland.[15]

The conversion of the prairie potholes began shortly after the first white settlers came to the northern prairie. Although the early pioneers valued the wetlands as a source of water and hay for livestock, some of the shallowest potholes were soon ditched out of existence.[16] Major ditching efforts, however, were rare because of the heavy handwork required to cut ditches through the glacial moraine.[17]

As more of the native prairie was broken and farming operations expanded, farmers came to consider the potholes as unproductive nuisance land.[18] The advent of modern farm machinery such as tractors and scrapers enabled farmers to easily carve channels in the prairie, thereby draining the potholes and eliminating each "nuisance."[19] Although the drainage of potholes, marshes, and sloughs effectively created new land for crop production, it literally destroyed hundreds of thousands of acres of prairie wetlands.[20] Today, less than half of the original prairie potholes remain.[21]

SECTION 404 OF THE CLEAN WATER ACT

Overview

Section 404 of the Clean Water Act[22] regulates the discharge of dredged

14. Luoma, *supra* note 1, at 70.
15. *Id.* at 70-72.
16. *Id.* at 72.
17. *Id.*
18. *Id.*; Hubbard & Linder, *supra* note 1, at 122.
19. Luoma, *supra* note 1, at 72.
20. Draining prairie potholes effectively creates new farmland by eliminating the uncertainty of wet and dry cycles. *Id.* Eighty-seven percent of all wetland losses are attributable to converting wetlands for agricultural purposes. Madsen, *Wetland Restoration: A Pilot Project*, J. OF SOIL & WATER CONSERVATION, May-June 1986, at 159.
21. Most of the shallow wetlands in Iowa and southern Minnesota were drained by 1930. Luoma, *supra* note 1, at 75. Extensive drainage in Iowa has destroyed an estimated 95 percent of the state's wetlands. Hubbard & Linder, *supra* note 1, at 122. Additionally, it has been estimated that by 1985, nearly 90 percent of Minnesota's historical wetland acreage was drained and dry. Half of North Dakota's original prairie wetlands were gone by the mid-1970's. Subsequently, an estimated 140,000 acres of North Dakota's prairie potholes have been drained. Luoma, *supra* note 1, at 72, 75. Of Nebraska's Rainwater Basin wetlands, less than 10 percent remain. Baldwin, *Wetlands: Fortifying Federal and Regional Cooperation*, 29 ENVIRONMENT, Sept. 1987, at 16, 17. No figures are available for Montana and South Dakota.

At the time the United States was settled, the wetland acreage for the nation exceeded 215 million acres. No more than 99 million acres remained by the mid-1970's, a loss of 54 percent. Madsen, *supra* note 20, at 159. Between the mid-1950's and the mid-1970's, wetlands were drained at a rate of 460,000 acres each year. As many as 1.1 million acres of wetlands may have been converted annually between the mid-1970's and 1982. Heimlich & Langner, *supra* note 7, at 219.

22. Clean Water Act of 1977, Pub. L. No. 95-217, 91 Stat. 1566 (codified as amended at 33 U.S.C. §§ 1251-1376 (1982)).

and fill materials[23] into the "waters of the United States."[24] Under section 404, the United States Army Corps of Engineers (Corps) is responsible for issuing dredge and fill permits.[25] The permits are issued only upon compliance with Environmental Protection Agency (EPA) guidelines.[26] Without such a permit, any discharge of dredged or fill material from a point source[27]

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23. The terms "dredged material" and "fill material" are defined in the Corps regulations implementing the section 404 permit program. *See* 33 C.F.R. pt. 323 (1987). "Dredged material" is any material that is "excavated or dredged from the waters of the United States." 33 C.F.R. § 323.2(c) (1987). "Fill material" is any material primarily used to replace "an aquatic area with dry land" or to change "the bottom elevation of a waterbody." 33 C.F.R. § 323.2(e) (1987).

24. The term "waters of the United States" means:

(1) All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

(2) All interstate waters including interstate wetlands;

(3) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:

(i) Which are or could be used by interstate or foreign travelers for recreational or other purposes; or

(ii) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or

(iii) Which are used or could be used for industrial purpose by industries in interstate commerce;

(4) All impoundments of waters otherwise defined as waters of the United States under the definition;

(5) Tributaries of waters identified in paragraphs (a) (1) through (4) of this section;

(6) The territorial seas;

(7) Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) (1) through (6) of this section.

33 C.F.R. § 328.3(a) (1987).

25. 33 U.S.C. § 1344 (1982). *See infra* notes 34-67 and accompanying text discussing the Corps' jurisdiction over waters of the United States.

26. 33 U.S.C. § 1344(b) (1982). The Secretary of the Army must specify each site at which dredged or fill material is to be deposited. The specification of these sites must be accomplished through the application of guidelines developed by the EPA in conjunction with the Corps. The Corps is statutorily obligated to follow these guidelines. *Id.*

The guidelines are found at 40 C.F.R. pt. 230 (1987) and must be used to evaluate the physical, chemical, and biological impact of the dredged or fill material on the aquatic ecosystem into which the material is discharged. 40 C.F.R. § 230.1 (1987). In the event that application of the guidelines alone prohibits issuance of a section 404 permit, the Corps can override the guidelines on the basis of economic detriment to navigation. 33 U.S.C. § 1344(b) (1982). The power of the Corps to override the guidelines, however, is subject to the ultimate authority of the EPA to veto all section 404 permits. 33 U.S.C. § 1344(c) (1982).

The EPA Administrator may prohibit or withdraw specification, or deny or restrict the use of any defined area as a disposal site for dredged or fill material. The Administrator, however, must first determine that the discharge of dredged or fill material will have an unacceptable adverse effect on municipal water supplies, shellfish beds and fishing areas, or wildlife or recreational areas. *Id.*

In addition to the EPA guidelines, the Corps' regulations themselves identify eighteen general policies for evaluating section 404 permit applications. The eighteen general policies which govern the review of all permit applications are: (1) public interest review; (2) effect on wetlands; (3) fish and wildlife; (4) water quality; (5) historic, cultural, scenic and recreational values; (6) effect on limits of territorial sea; (7) consideration of property ownership; (8) activities affecting coastal zones; (9) activities in marine sanctuaries; (10) other federal, state or local requirements; (11) safety of impoundment structures; (12) floodplain management; (13) water supply and conservation; (14) energy conservation; (15) navigation; (16) environmental benefits; (17) economics; and (18) mitigation. 33 C.F.R. §§ 320.4(a)-(r) (1987).

27. A "point source" is a specific point of origin of discharges containing pollutants. 33 U.S.C. § 1362(14) (1982). The term "pollutant" includes "dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materi-

is prohibited unless the discharge results from normal farming activities, including minor drainage.[28]

Because the term "waters of the United States" encompasses not only traditionally navigable waters[29] but also areas that are inundated or saturated by surface or ground water,[30] draining a prairie pothole may require a section 404 permit. The permit requirement, however, will be imposed only if the pothole supports a prevalence of vegetation normally adapted for life in saturated soil conditions[31] and the drainage activity involves depositing dredged or fill material into the pothole.[32] Additionally, if draining a pothole constitutes only minor drainage within the course of an ongoing farming operation, the drainage activity will be exempt from the permit requirement.[33]

Corps Jurisdiction Over Waters of the United States

The threshold question in determining if a section 404 permit is required for a particular project, especially draining a prairie pothole, is whether the

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als, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water." 33 U.S.C. § 1362(6) (1982).

28. 33 U.S.C. § 1344(f)(1)(A) (1982). In addition to discharges of dredged and fill material from normal farming activities, section 404 also exempts from the permit requirement discharges from other categories. These other categories include: (1) maintenance of currently serviceable structures; (2) construction or maintenance of farm or stock ponds or irrigation ditches, or maintenance of drainage ditches; (3) construction of temporary sedimentation basins on a construction site which does not involve a discharge into navigable waters; (4) construction or maintenance of farm or forest roads or temporary roads for moving mining equipment; and (5) activities regulated by statewide programs approved under 33 U.S.C. § 1288(b)(4) to control minor discharges through best management practices. 33 U.S.C. §§ 1344(f)(1)(B)-(F) (1982).

Normal farming activities include plowing, seeding, cultivating, and minor drainage. 33 C.F.R. § 323.4(a)(1)(i) (1987). "Plowing" includes all forms of primary tillage necessary to break up or stir the soil in preparation for the planting of crops. The term does not include the redistribution of soil, rock, sand, or other surface materials in a manner which changes any area of the waters of the United States. 33 C.F.R. § 323.4(a)(1)(iii)(D) (1987). The term "seeding" means the sowing of seed and placement of seedlings to produce farm crops. It includes the placement of soil beds for seeds or seedlings on established farms. 33 C.F.R. § 323.4(a)(1)(iii)(E) (1987). "Cultivating" is a method of physical soil treatment utilized on established farms to aid and improve the growth, quality, or yield of crops. 33 C.F.R. § 323.4(a)(1)(iii)(A) (1987). "Minor drainage" is narrowly defined as the "discharge of dredged or fill material incidental to connecting upland drainage facilities to waters of the United States, adequate to effect the removal of excess soil moisture from upland crop lands." *Id.* It does not include the construction of any canal, ditch, or other waterway which drains or otherwise significantly alters a stream, lake, swamp, bog, or any other wetland area. Nor is minor drainage associated with the immediate or gradual conversion of a wetland species to an upland species not typically adapted to life in saturated soil conditions, or conversion from one wetland use to another. Minor drainage activities are also limited to established farming operations. 33 C.F.R. § 323.4(a)(1)(iii)(C) (1987).

29. Navigability has been defined by the United States Supreme Court to include: (1) waters which are navigable in fact when they are used, or are susceptible of being used, in their ordinary condition, to transport interstate or foreign commerce (The Daniel Ball, 77 U.S. (10 Wall.) 557, 563 (1870)); (2) waters which were used in the past to transport interstate or foreign commerce, even though they are neither presently used nor are capable of such use (Economy Light & Power Co. v. United States, 256 U.S. 113, 123-24 (1921)); and (3) waters which are susceptible to such use in their ordinary condition with reasonable improvements (United States v. Appalachian Power Co., 311 U.S. 377, 408-10, 416 (1940)).

30. *See infra* note 52 and accompanying text.

31. *See infra* notes 57-60 and accompanying text.

32. Fisher, *Minnesota Water Management Law and Section 404 Permits: A Practitioner's Perspective*, 7 HAMLINE L. REV. 249, 250 (1984). *See also infra* notes 57-60 and accompanying text.

33. *See infra* notes 90-111 and accompanying text.

proposed activity will be conducted in "waters of the United States." The dredge and fill permit program enacted by Congress in the Federal Water Pollution Control Act Amendments of 1972[34] prohibited discharging pollutants[35] into navigable waters without a permit.[36] The term "navigable waters" was defined as "waters of the United States."[37] Although congressional intent was to give the term navigable waters "the broadest constitutional interpretation unencumbered by agency determinations which have been made or may be made for administrative purposes,"[38] the Corps declined to extend the jurisdiction of the permit program beyond prior definitions of navigability.[39]

The Corps' refusal to extend the geographic scope of the section 404 permit program beyond the traditional definitions of navigability was challenged in *Natural Resources Defense Council, Inc. v. Callaway*.[40] The *Callaway* court recognized that Congress, in enacting the Federal Clean Water Act Amendments of 1972, intended to exercise "federal jurisdiction over the nation's waters to the maximum extent permissible under the Commerce Clause of the Constitution."[41] Accordingly, the court held that the term "navigable waters" was not to be limited to traditional tests of navigability for purposes of the Clean Water Act.[42] The court further ordered the Corps to promulgate revised regulations "clearly recognizing the full regulatory mandate" of the Act.[43] By requiring the Corps to expand the geographic scope of the section 404 permit program to include waters having no connection to navigation, the court's ruling set the stage for the evolution of the section 404 permit program into a "vehicle for wetlands protection."[44]

In response to the court's order, the Corps issued interim final regulations on July 25, 1975.[45] The regulations expanded the definition of "navigable waters" to include not only waters traditionally considered navigable in fact but also "other waters" such as intermittent rivers, streams, tributaries, and perched wetlands that are not contiguous or adjacent to traditionally naviga-

34. Federal Water Pollution Control Act Amendments of 1972, Pub. L. No. 92-500, 86 Stat. 816 (codified as amended at 33 U.S.C. §§ 1251-1376 (1982)).

35. *See supra* note 27.

36. 33 U.S.C. § 1311 (1982).

37. 33 U.S.C. § 1362(7) (1982).

38. S. REP. NO. 414, 92nd Cong., 2d Sess. 144, *reprinted in* 1972 U.S. CODE CONG. & ADMIN. NEWS 3668, 3822.

39. The regulations affecting the section 404 permit program limited the Corps' jurisdiction to "those waters of the United States which are subject to the ebb and flow of the tide, and/or are presently, or have been in the past, or may be in the future susceptible for use for purposes of interstate or foreign commerce." 33 C.F.R. § 209.102(d)(1) (1975). *See also supra* note 29 discussing traditional definitions of navigability.

40. 392 F. Supp. 685 (D.D.C. 1975).

41. *Id.* at 686. *See also* United States v. City of Fort Pierre, S.D., 747 F.2d 464, 465 (8th Cir. 1984); United States v. Tilton, 705 F.2d 429, 431 (11th Cir. 1983); United States v. Lambert, 695 F.2d 536, 538 (11th Cir. 1983); United States v. Akers, 651 F. Supp. 320, 322 (E.D. Cal. 1987).

42. *Callaway*, 392 F. Supp. at 686.

43. *Id.*

44. Blumm, *The Clean Water Act's Section 404 Permit Program Enters Its Adolescence: An Institutional and Programmatic Perspective*, 8 ECOLOGY L.Q. 409, 417 (1980).

45. 40 Fed. Reg. 31,320 (1975).

ble waters.[46] "Wetlands" were defined as areas that were "periodically inundated and . . . normally characterized by the prevalence of vegetation that requires saturated soil conditions for growth and reproduction."[47]

Final regulations were promulgated by the Corps on July 19, 1977.[48] Since that time, the scope of section 404 geographic jurisdiction has remained essentially unchanged. The 1977 regulations further expanded the geographic scope of the section 404 permit program by replacing the term "navigable waters" with "waters of the United States."[49] Under the current regulatory program, the broad range of regulable "waters of the United States" includes: waters that are traditionally navigable; interstate waters and wetlands; and isolated intrastate lakes, rivers, streams, wetlands, sloughs, prairie potholes, and natural ponds.[50]

The 1977 regulations also refined the term "wetlands" by eliminating the reference to periodic inundation.[51] The present definition of "wetlands" includes any areas that are "inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a *prevalence* of vegetation *typically adapted* for life in saturated soil conditions."[52]

The significance of the Corps' eliminating the reference to periodic inundation in its definition of wetlands is illustrated by the United States Supreme Court's decision in *United States v. Riverside Bayview Homes, Inc.*[53] The Court concluded that frequent flooding or inundation of an area by an adjacent body of water was not essential to the determination of an area's status as a wetland.[54] Looking to the plain language of the Corps regulations, the Court reasoned that the definition of wetlands included areas that are saturated with ground or surface water as well as areas that are flooded by an adjacent body of navigable water.[55] If the saturated condition of an area adequately supports wetland vegetation, the saturation is sufficient to bring such an area within the category of wetlands.[56]

Basing a wetlands determination on whether an area adequately supports vegetation normally adapted to saturated soil condition, however, can be problematical. In *Avoyelles Sportsmen's League, Inc. v. Alexander (Avoyelles II)*,[57]

46. Hanson, *supra* note 7, at 165.
47. 33 C.F.R. § 209.120(d)(2)(h) (1976).
48. 42 Fed. Reg. 37,122 (1977).
49. 42 Fed. Reg. 37,144 (1977).
50. 33 C.F.R. §§ 323.2(a) & 328.3 (1987). The Corps' definition of the term "waters of the United States" mirrors the definition in the EPA's section 404(b)(1) guidelines. *See* 40 C.F.R. § 230.3(s) (1987).
51. 33 C.F.R. § 323.2(c) (1978). The present definition of the term "wetlands" under the Corps regulations is identical to the EPA's definition. *Compare* 33 C.F.R. §§ 323.2(a) & 328.3(b) (1987) (Corps definition) *with* 40 C.F.R. § 230.3(t) (1987) (EPA's definition).
52. 33 C.F.R. §§ 323.2(a) & 328.3(b) (1987) (emphasis added).
53. 474 U.S. 121 (1985).
54. *Id.* at 129. *See also* Bailey v. United States Army Corps of Engineers, 647 F. Supp. 44 (D. Idaho 1986).
55. *Riverside Bayview Homes*, 474 U.S. at 129-30 (*citing* 33 C.F.R. § 323.2 (1985)).
56. *Riverside Bayview Homes*, 474 U.S. at 129-30.
57. 511 F. Supp. 278 (W.D. La. 1981).

a federal district court in Louisiana addressed the regulation's requirement that wetland vegetation be "typically adapted for life in saturated soil conditions."[58] The court concluded that the requirement encompasses all vegetation except those species which are intolerant of such conditions.[59] The court, however, found that such tolerant vegetation or aquatic species must dominate the wetland to the extent that "purely upland, intolerant or nonaquatic species" are virtually excluded.[60] Under *Avoyelles II*, the presence of a substantial growth of intolerant species arguably precludes the prevalence of tolerant vegetation. An area that does not support vegetation adapted to saturated soil conditions to the nearly total exclusion of intolerant species, therefore, will not constitute a wetland.

The Corps' expansive jurisdiction over the waters of the United States encompasses many, although not all, prairie wetlands. Prairie potholes are of widely varying types. The largest and deepest potholes are semipermanent basins often retaining water throughout several years in succession.[61] These potholes undoubtedly fall within the scope of section 404 jurisdiction by virtue of their being flooded and the inability of nonaquatic vegetation to survive in standing water.[62] Shallow potholes are not as easy to categorize. These potholes are seasonal and regularly dry up by late spring.[63] While the soils of some of these temporary potholes may remain adequately saturated to support some wetland vegetation throughout the growing season, the potholes arguably do not constitute part of the waters of the United States unless the wetland vegetation almost completely excludes upland plant species.[64]

A particular prairie pothole's status as part of the waters of the United States will depend upon the vegetation and the condition of the soil in the pothole. If the Corps ever asserts its jurisdiction over a pothole as part of the waters of the United States, a challenge to that assertion of jurisdiction will require complex soil, vegetation, and hydrological analyses.[65] Consequently, the services of a biologist and a hydrologist will become essential.[66] Since both the landowner and the Corps will employ their own experts, disagreements over the methodology for identifying plant species, the probable impact of proposed drainage activity, and even the physical boundaries of the pothole will be inevitable and may lead to prolonged litigation.[67]

Activities Regulated by Section 404

Section 404 permits are required only for point source discharges of

58. *Id.* at 290.
59. *Id.*
60. *Id.* at 291.
61. Luoma, *supra* note 1, at 71.
62. *See generally supra* notes 53-60 and accompanying text.
63. Luoma, *supra* note 1, at 71.
64. *See generally supra* notes 53-60 and accompanying text.
65. Fisher, *supra* note 32, at 299.
66. *Id.* at 299-300.
67. *Id.* at 300.

dredged or fill material into the waters of the United States.[68] A section 404 permit is not required for drainage activities that do not deposit or spill materials into the area being drained.[69] While the statutory language of section 404 clearly prohibits the addition of materials to the waters of the United States absent a permit, the following cases illustrate the breadth of activity that may be regulated.

In *Avoyelles Sportsmen's League v. Alexander (Avoyelles I)*,[70] environmental, wildlife, and sports organizations brought an action to compel the Corps to require private landowners to obtain permits for land-clearing operations on 20,000 acres of Louisiana wetlands.[71] The landowner's attempt to convert the wetlands for soybean production involved the use of bulldozers and ditch excavating equipment to clear timber and vegetation, fill small sloughs, and level the land.[72] The landowners also burned trees and other vegetation and disced the ashes into the land.[73] Materials that did not burn were buried.[74] The district court unequivocably concluded that the equipment used to clear the land, fill the sloughs, and excavate the ditches was a point source.[75] The court further held that "clearing the land of trees and vegetation . . . constitute[d] a discharge of dredged material" into waters of the United States requiring a section 404 permit.[76]

The district court's decision that the land-clearing activities fell within the jurisdictional scope of section 404 was affirmed by the Court of Appeals for the Fifth Circuit.[77] The appellate court, however, concluded that the landowner's activities involved redepositing materials rather than merely removing vegetation.[78] By reasoning that the word "addition" in the regulatory definition of "discharge" included "redeposit," the Court of Appeals found that the district court correctly determined that the landowner's activities constituted a discharge.[79] The court, however, noted that any suggestion made by the

68. 33 U.S.C. § 1344(a) (1982). *See supra* note 27 for a definition of the term "point source." *See supra* note 23 for the definitions of the terms "dredged" and "fill" materials. A "discharge" of dredged or fill material is the addition of such materials into the waters of the United States. 33 C.F.R. §§ 323.2(d) & (f) (1987).

69. Fisher, *supra* note 32, at 301; Hanson, *supra* note 7, at 167.

70. 473 F. Supp. 525 (W.D. La. 1979).

71. *Id.* at 527.

72. *Id.* at 528.

73. *Id.*

74. *Id.*

75. *Id.* at 532. *See also* United States v. Tull, 615 F. Supp. 610 (D.C. Va. 1983), *aff'd* 769 F.2d 182 (4th Cir. 1985), *rev'd on other grounds*, 107 S. Ct. 1831 (1987); United States v. Weisman, 489 F. Supp. 1331 (D.C. Fla. 1980); United States v. Holland, 373 F. Supp. 665 (M.D. Fla. 1974).

76. *Avoyelles I*, 473 F. Supp. at 532. The court reasoned that since wetlands are defined in terms of the vegetation they support, the vegetation in a wetland is part of the waters of the United States. Consequently, clearing vegetation from a wetland constitutes a discharge of dredged material. *Id. But see infra* note 80 and accompanying text.

77. Avoyelles Sportsmen's League, Inc. v. Marsh (Avoyelles III), 715 F.2d 897, 924 (5th Cir. 1983), *rev'd on other grounds*, 786 F.2d 631 (5th Cir. 1986). *Avoyelles II* involved a determination of whether the area was indeed a wetland. *See supra* notes 54-57 and accompanying text.

78. *Avoyelles III*, 715 F.2d at 923.

79. *Id.* at 925. The court also agreed with the district court's finding that discing ashes, burying unburned material, and leveling the land for the primary purpose of converting a wetland for agricultural production constituted a discharge of fill material. *Id.* at 924-25.

district court that the term "discharge" included the mere removal of vegetation or other materials was "pure dicta."[80]

The Fifth Circuit Court of Appeals indicated the legal limits to the expansive *Avoyelles I* decision in *Save Our Wetlands, Inc. v. Sands*.[81] Like *Avoyelles I*, the controversy in *Save Our Wetlands* involved redepositing trees and vegetation in a wetland.[82] The trees and vegetation were cut down as part of the land-clearing activities required to clear a corridor through wetlands along the Mississippi River for the construction of electric transmission lines.[83] The court held that the land-clearing activities required to clear the utility corridor did not constitute a discharge of dredged or fill material even though the activities included redepositing trees and vegetation in a wetland.[84] The court was persuaded by the fact that the trees and vegetation were deposited in windrows where they were allowed to naturally deteriorate, rather than burned and disced into the ground to "change the bottom elevation of a waterbody."[85] Since the land-clearing activities were conducted merely to facilitate the construction of an electric transmission line and not to permanently convert the wetland area to agricultural land, the court ruled that the activities did not require a section 404 permit.[86]

Section 404 most clearly regulates the discharge of dredged or fill material into the waters of the United States.[87] A discharge, however, is not limited to the addition of new or foreign materials to regulable waters. Redepositing materials that originate in regulable waters may also require a section 404 permit if the purpose for redepositing the materials is to alter the current status of the wetland area.[88]

Unless an activity conducted in waters of the United States involves the deposit or redeposit of materials into such "waters," a section 404 permit is not required.[89] Therefore, the Corps may be unable to regulate drainage or excavation activities conducted in a prairie pothole as long as no material is deposited in the pothole. Draining a prairie pothole, however, is usually accomplished by digging a ditch and depositing the excavated material in the pothole. This method of drainage requires only a shallow ditch since depositing the excavated material in the pothole raises its bottom elevation. If the excavated material was not deposited in the pothole, a deeper ditch would be needed to achieve the same result. Because a deeper ditch may be more expensive and may not be as accessible as a shallow ditch, the costs and inconvenience created by draining a pothole in this manner may outweigh the benefits derived from the drainage.

80. *Id.* at 923.
81. 711 F.2d 634 (5th Cir. 1983).
82. *Id.* at 637.
83. *Id.*
84. *Id.* at 647.
85. *Id.*
86. *Id.*
87. *See supra* notes 68-69 and accompanying text.
88. *See supra* notes 70-80 and accompanying text.
89. *See supra* notes 68-69 and accompanying text.

The Normal Farming Activities Exemption to the Section 404 Permit Requirement

Section 404 exempts from the permit requirement discharges of dredged or fill material from normal farming activities such as minor drainage.[90] Minor drainage is narrowly defined in the Corps regulations as "the discharge of dredged or fill material incidental to connecting upland drainage facilities to waters of the United States, adequate to effect the removal of excess soil moisture from upland cropland."[91] Minor drainage activities are exempt from the permit requirement only if such drainage activities do not convert waters of the United States to other uses such as agricultural production.[92] If it is determined that the *primary* purpose of a particular drainage activity is to convert an area of the waters of the United States to a different use or that the flow or circulation of such waters may be impaired or their reach reduced, the drainage activity will require a permit even though conducted as part of an established farming operation.[93]

In *United States v. Akers*,[94] the Ninth Circuit Court of Appeals considered whether a farmer's constructing a dike, excavating a ditch, and leveling ground in 2,889 acres of wetlands were permissible under the normal farming activities exemption to the permit requirement.[95] The court concluded that the exemption did not apply since the wetlands had "never been subjected to any established upland farming operation."[96] Because upland farming represented a new operation in the wetlands, the activities required to bring the wetlands into agricultural production were necessarily precluded from the normal farming activities exemption.[97]

The First Circuit Court of Appeals also narrowly construed section 404's normal farming activities exemption in *United States v. Huebner*.[98] In *Huebner*, the defendant farmer plowed and removed the wetland vegetation from three reservoirs on his property and leveled the dikes in the reservoirs in preparation for planting barley.[99] The farmer also used excavating equipment to dig a new ditch and to clean and deepen existing ditches.[100] The court held that these activities were not exempt under the Clean Water Act's permit process under section 404(f).[101] The court concluded that Congress intended that

90. 33 U.S.C. § 1344(f)(1) (1982). Other farming activities exempted from the section 404 permit requirement include plowing, seeding, and cultivating. *Id. See also supra* note 28.

91. 33 C.F.R. § 323.4(a)(1)(iii)(C)(*l*)(*i*). The construction and maintenance of upland (dryland) ditches and tiles incidental to the planting, cultivating, protecting, or harvesting of crops does not involve a discharge of dredged or fill material into waters of the United States, and as such never requires a section 404 permit. *Id. See also supra* note 28.

92. 33 U.S.C. § 1344(f)(2) (1982).

93. *Id.* (emphasis added).

94. 785 F.2d 814 (9th Cir. 1986).

95. *Id.* at 816-17. The farmer constructed a three-mile long dike bisecting the wetlands. The effect of the structure was to keep water out of part of the wetland. *Id.* at 817.

96. *Id.* at 819. *See also* 33 C.F.R. § 323.4(a)(1)(ii) (1987).

97. *Akers*, 785 F.2d at 819.

98. 752 F.2d 1235 (7th Cir. 1985).

99. *Id.* at 1241.

100. *Id.* at 1242.

101. *Id. See also* 33 U.S.C. § 1344(f) (1982).

section 404(f) exempt only "narrowly defined activities . . . which cause little or no adverse effects either individually or cumulatively" and which do not convert areas of water into dry land or impede circulation or reduce the reach and size of the water body.[102] Relying on the language in section 404(f)(2), the court focused on the results of the farmer's drainage activities as it affected the surrounding wetlands.[103] The court held that even if the farmer's activities had qualified under the exemptions in section 404(f)(1), the restrictions of section 404(f)(2) still applied.[104] Under section 404(f)(2), the drainage activity required a Corps permit because it brought an area of wetland into a new use, thereby reducing the reach of the waters.[105]

In *Avoyelles I*, the district court also considered the scope of discharge activities that qualify under section 404's exemption for normal farming activities.[106] The court determined that the exemption was limited to activities that would "occur on a continuing basis as part of an ongoing farming . . . operation."[107] Because no farming operation was possible in the wetland until after the land was cleared, the landowner's activities were not normal farming activities.[108] The district court's interpretation of section 404(f) was affirmed by the Fifth Circuit Court of Appeals.[109] The court further noted that reading section 404(f)(1)(A) together with section 404(f)(2) provides a "narrow exemption for agricultural . . . activities that have little or no adverse effect on the nation's waters."[110] Because the landowners activities "virtually destroyed the wetlands,"[111] the discharges were not exempt from section 404 permit requirements.

The drainage activity allowed in prairie wetlands is limited even under the normal farming exemption. Depositing dredged or fill material in potholes is permissible, but only to the extent that it is incidental to the construction, cleaning, and maintenance of upland drainage networks. Furthermore, these "upland drainage activities" can only be implemented if the pothole, as part of the waters of the United States, is not converted to agricultural production, the circulation of its waters in not impaired, or the reach of its waters is not reduced.

THE SWAMPBUSTER PROVISIONS OF THE FOOD SECURITY ACT OF 1985

Overview

Like section 404 of the Clean Water Act, the swampbuster provisions of

102. *Huebner*, 752 F.2d at 1240-41. *See also* 33 U.S.C. § 1344(f) (1982).
103. *Huebner*, 752 F.2d at 1242. *See also* 33 U.S.C. § 1344(f)(2) (1982).
104. *Huebner*, 752 F.2d at 1242. *See also* 33 U.S.C. §§ 1344(f)(1) & (2) (1982).
105. *Huebner*, 752 F.2d at 1242.
106. *Avoyelles I*, 473 F. Supp. at 531.
107. *Id.* at 535.
108. *Id.*
109. *Avoyelles III*, 715 F.2d at 925.
110. *Id.* at 926.
111. *Id.* at n.46.

the Food Security Act of 1985[112] also regulate drainage activities in prairie wetlands. The swampbuster provisions, however, do not regulate by requiring a permit for drainage activities. Instead, the provisions discourage converting prairie potholes and other wetlands for agricultural production by essentially imposing economic sanctions on the farmers who expand their acreage under cultivation by converting wetlands for agricultural purposes.[113]

The swampbuster provisions were enacted, in part, to preserve the nation's wetlands and to curb production of surplus commodities.[114] Previously, farmers were allowed to include newly converted wetlands as part of the base acreage on which their eligibility for various federal farm programs was determined.[115] By increasing the size of their bases, farmers could increase their government payments.[116] This policy encouraged the conversion of wetlands and contributed to commodity surpluses which depressed crop prices.[117] The swampbuster provisions reverse the negative impact of the old policies by denying federal agricultural benefits to farmers who convert wetlands to croplands.

The Swampbuster Provisions

Generally, any farmer who produces an agricultural commodity on a wetland, including a prairie pothole, converted after the effective date of the 1985 Farm Bill becomes ineligible for a broad range of United States Department of Agriculture (USDA) financial assistance.[118] The farmer's ineligibility extends to all crops he produces during the crop year that the wetland was put into crop production.[119] Additionally, the loss of program eligibility applies to

112. Food Security Act of 1985, Pub. L. No. 99-198, 99 Stat. 1504 (codified as amended in scattered sections of 7, 16, 19, & 42 U.S.C. (Supp. IV 1986)).

113. *See infra* notes 118-20 and accompanying text.

114. 7 C.F.R. § 12.1(b) (1988). Other purposes for which the provisions were enacted include protecting the nation's long term capability to produce food and fiber, reducing sediment, and improving water quality. *Id.*

115. U.S. DEP'T OF AGRIC., *Swampbuster: A Provision of the 1985 Food Security Act* (1986) (brochure available at local Agricultural Stabilization and Conservation Service (ASCS) and Soil Conservation Service (SCS) offices).

116. *Id.*

117. *Id.*

118. 16 U.S.C. § 3821 (Supp. IV 1986). An "agricultural commodity" is any crop planted and produced by annually tilling the soil. 7 C.F.R. § 12.2(a)(1) (1988).

The swampbuster provisions went into effect on December 23, 1985. 16 U.S.C. § 3821 (Supp. IV 1986). If a farmer converts a wetland for agricultural production, he becomes ineligible to receive benefits under the following USDA farm programs: (1) price and income supports; (2) farm storage facility loans; (3) crop insurance; (4) disaster payments; (5) Farmers Home Administration loans; (6) Commodity Credit Corporation storage payments; and (7) other programs under which the USDA makes commodity-related payments. *Id.*

Farmers who apply for any of the USDA farm programs listed above must certify in writing that they are not producing crops on land that has been converted from wetlands since December 23, 1985. U.S. DEP'T OF AGRIC., *Conservation in the 1985 Farm Bill: Swampbuster* (Dec. 1986) (fact sheet available at local Agricultural Stabilization and Conservation Service (ASCS) and Soil Conservation Service (SCS) offices).

A prairie pothole may be excluded from agricultural production because of its soil type and the vegetation it sustains. *See infra* notes 122-24 and accompanying text.

119. 16 U.S.C. § 3821 (Supp. IV 1986).

crops produced on *all* of the farmer's land holdings.[120]

The effectiveness of the swampbuster provisions in deterring the drainage or conversion of wetlands for crop production depends on commodity prices. If prices rise one year, a farmer may be willing to risk the loss of federal farm program benefits by raising crops on a converted wetland during that year. The farmer can regain eligibility for federal agricultural payments in the year he withdraws the wetland from crop production.[121]

Definition of Wetlands Under the Swampbuster Provisions

The swampbuster provisions define "wetlands" in broad terms that closely resemble the Corps' definition of wetlands for purposes of section 404.[122] "Wetlands" are defined as areas saturated or inundated long enough during the growing season to support a prevalence of hydrophytic vegetation adapted to hydric soils.[123] Because the USDA's present definition of "wetlands" requires a prevalence of hydrophytic vegetation typically adapted for life in hydric soils, the presence of a substantial growth of nonhydrophytic vegetation arguably precludes an area from wetland status.[124] Areas, such as shallow prairie potholes, that are unable to support a dominant growth of hydrophytic vegetation could be drained without a loss of eligibility for federal farm program benefits.

Exemptions to the Swampbuster Provisions

The swampbuster provisions set forth a number of exemptions. Exempted from the application of the provisions are wetlands converted prior to the 1985 Farm Bill,[125] artificial wetlands,[126] and wet areas created by irrigation systems.[127] An additional exemption may be more problematic depending on its interpretation.

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120. *Id.*

121. *Id.*

122. With the exception of the references to "hydric soils" and "hydrophytic vegetation" in the USDA's definition of "wetlands," the terminology of the USDA's definition is identical to that in the Corps' definition. *Compare* 7 C.F.R. § 12.2(a)(28) (1988) (USDA's definition of "wetlands") *with* 33 C.F.R. § 328.3(b) (1987) (Corps' definition of "wetlands").

123. 7 C.F.R. § 12.2(a)(28) (1988). The text of the definition reads as follows:

> "Wetland," except when such term is part of the term "converted wetland," means land that has a predominance of hydric soils and that is inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of hydrophytic vegetation typically adapted for life in saturated soil conditions[.]

Id.

The term "hydric soils" includes soil, that in its "undrained condition, [is] saturated, flooded, or ponded long enough during a growing season to develop an anaerobic condition that supports the growth and regeneration of hydrophytic vegetation." 7 C.F.R. § 12.2(a)(15) (1988). The term "hydrophytic vegetation" means "plants growing in water or in a substrate that is at least periodically deficient in oxygen during a growing season as a result of excessive water content." 7 C.F.R. § 12.2(a)(16) (1988).

124. *See supra* notes 57-60 and accompanying text.

125. 16 U.S.C. § 3822(a)(1) (Supp. IV 1987).

126. 16 U.S.C. § 3822(a)(2) (Supp. IV 1987).

127. 16 U.S.C. § 3822(a)(3) (Supp. IV 1987).

In years of officially declared drought, farmers may produce crops on wetlands if such agricultural activity is possible as a result of the naturally dry conditions.[128] The farmers will not become ineligible for federal farm program benefits if the farmers do not conduct any activity, such as improving drainage, that destroys a natural wetland character.[129] Since many prairie wetlands dry up during a drought period, the limits of the exemption depend upon the term "natural wetland characteristic." The most telltale natural wetland characteristic is a wetland's natural hydrophytic vegetation. Under the exemption, a farmer could plow and plant a prairie pothole in the early spring before grasses appear and not alter the pothole's hydrophytic vegetation.

SOCIAL BENEFITS OF PRAIRIE POTHOLES

Wetlands, including prairie potholes, provide a variety of private and public benefits that are irretrievably lost when wetlands are drained.[130] These highly productive ecosystems are essential habitat for numerous fish and wildlife species.[131] In addition to providing many ecological services and recreational opportunities, wetlands produce renewable resources.[132] Although these benefits have been reasonably well documented, they are not easily measured in monetary terms.[133] Private benefits are more easily measured, but assessing the proportion of the return solely attributable to wetlands may be difficult.[134] Despite these problems, the values of prairie potholes are real and need to be balanced against possible gains from agricultural production.[135] This balancing is especially important in light of the existing surplus in agricultural production capability.[136]

Wildlife Value

Many wildlife species are considered wetland species.[137] An even larger

128. 16 U.S.C. § 3822(a)(4) (Supp. IV 1987).

129. *Id.*

130. *See* Bardecki, *What Value Wetlands?*, J. OF SOIL & WATER CONSERVATION, May-June 1984, at 166-69; Heimlich & Langner, *supra* note 7, at 221-22. Although this discussion pertains to wetlands generally, many characteristics and functions of wetlands can be attributed to prairie potholes.

131. Heimlich & Langner, *supra* note 7, at 221.

132. *Id.*

133. *Id.* The highest values per wetland acre generally are for ecological functions. In 1984, these values were estimated as high as $6,225 per acre. Factors taken into account in estimating the values of wetlands include sediment accretion, flood control, water quality enhancement, and waste assimilation. *Id.* at 222.

134. *Id.* The private economic benefits derived from wetlands as a whole stem from the harvest of fish and shellfish ($1.1 billion), the value of unfinished pelts from furbearing animals ($295 million), and the value of standing timber in wetland forests ($8 billion). *Id.*

135. *Id.* at 221.

136. Tripp & Dudek, *The Swampbuster Provisions of the Food Security Act of 1985: Stronger Wetland Conservation If Properly Implemented and Enforced*, 16 Envtl. L. Rep. (Envtl. L. Inst.) 10120, 10122 (1986).

137. The extensive list includes muskrats, otters, minks, beavers, and a host of waterfowl such as herons, egrets, cranes, ibises, ducks, and geese. Heimlich & Langner, *supra* note 7, at 221.

number of upland species are occasional wetland users.[138] For these species, wetlands may not be essential to their survival, but the presence of wetlands allows larger populations and wider ranges.[139] The wetlands are frequently used as breeding and nursery areas.[140] In addition, they provide food, escape cover, and winter protection.[141]

Waterfowl are most closely associated with wetlands. The prairie pothole country of the northern plains is the most important breeding area in the lower forty-eight states.[142] These prairie wetlands are the perfect duck nursery.[143] Although the pothole country holds only one-tenth of North America's wetlands, it produces one-half to two-thirds of the continent's ducks.[144] One-fifth of all waterfowl production can be attributed to this pothole region.[145]

Hydrologic Value

Flood Control. Wetland drainage has been implicated as a contributing factor to the increase in the frequency of flooding in some regions including the northern plains.[146] Left in their natural state, however, some wetlands may actually inhibit flooding.[147] Essentially, these wetlands act as sponges.[148] They store flood waters during periods of peak flows.[149] During low periods in streamflow, wetlands allow the stored water to gradually seep out.[150]

Groundwater Recharge. By retaining runoff, wetlands contribute to the maintenance of water tables.[151] Recharge of shallow groundwater aquifers, the top of which is the water table, generally occurs in areas such as wetlands where water is ponded.[152] Water that has accumulated in wetlands eventually filters down to underground aquifers, thereby recharging the groundwater supply.[153] Not all wetlands, however, are groundwater recharge areas.[154] Certain soils restrict the passage of water more than others. Therefore, the ability of a wetland's soil to allow the penetration of water is determinative of

138. Bardecki, *supra* note 130, at 166.
139. *Id.*
140. *Id.*
141. *Id.*
142. Heimlich & Langner, *supra* note 7, at 221.
143. Luoma, *supra* note 1, at 71. The small prairie wetlands are of widely varying types. They range from shallow seasonal wetlands to more permanent wetlands with shoreline vegetation. Together, they form wetland complexes, each type serving a distinct phase in the nesting, breeding, and brood-rearing cycles of waterfowl. *Id.*
144. *Id.*
145. Heimlich & Langner, *supra* note 7, at 221.
146. Hubbard & Linder, *supra* note 1, at 122.
147. Heimlich & Langner, *supra* note 7, at 221; Baldwin, *supra* note 18, at 17. *Cf.* Bardecki, *supra* note 130, at 166-67 (the role an individual wetland plays in flood control depends on the size, location, soil, and topography of the wetland).
148. Bardecki, *supra* note 130, at 166.
149. Heimlich & Langner, *supra* note 7, at 221; Bardecki, *supra* note 130, at 166.
150. Heimlich & Langner, *supra* note 7, at 221; Bardecki, *supra* note 130, at 166.
151. Hubbard & Linder, *supra* note 1, at 122; Baldwin, *supra* note 21, at 17.
152. Hubbard & Linder, *supra* note 1, at 122.
153. *Id.*
154. *Id.*; Bardecki, *supra* note 130, at 167.

the wetland's value as a groundwater recharge area.[155]

Water Quality. Wetlands improve water quality by acting as a natural filter.[156] They trap suspended sediments and remove plant nutrients and certain chemicals from water.[157] Certain wetland plants and organic soils even remove toxic pollutants through absorption.[158] Because the capacity of wetlands to absorb such pollutants is limited, overloading these ecosystems with contaminants may cause them to deteriorate.[159]

Recreational and Aesthetic Values

Although the economic value of wetlands has been questioned, the importance of wetlands as an outdoor recreational resource has not. Recreational activities such as hunting and fishing are highly dependent on the wildlife produced by wetlands.[160] Wetlands also provide nonconsumptive recreational activities such as hiking, camping, birdwatching, nature study, and photography.[161]

Because much of the recreational value of wetlands is derived from their aesthetic value, the two values are difficult to separate. An individual is free to explore in wetlands, relying only on his own resources. The wetlands impart a feeling of immensity of broad, open space. They provide a calm, natural beauty—a beauty that requires an appreciative eye.[162]

CONCLUSION

Section 404 of the Clean Water Act and the swampbuster provisions of the Food Security Act of 1985 were enacted to preserve wetlands, such as prairie potholes, from being converted to agricultural use. Both regulatory measures, however, provide vehicles though which drainage can be accomplished if it is economically logical for a farmer to do so. Arguably, draining a singular prairie pothole will not impair the public benefits of the nation's wetlands. The cumulative effect of such numerous piecemeal changes in the nation's wetlands over the previous one hundred years, however, presents a strong argument that draining prairie potholes should be allowed only in limited situations.

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155. Bardecki, *supra* note 130, at 167.
156. Heimlich & Langner, *supra* note 7, at 221.
157. *See* Bardecki, *supra* note 130, at 167-68.
158. Heimlich & Langner, *supra* note 7, at 221; Bardecki, *supra* note 130, at 168.
159. Heimlich & Langner, *supra* note 7, at 221; Bardecki, *supra* note 130, at 168.
160. *See supra* notes 137-44 and accompanying text (discussing wildlife and waterfowl). Five of the ten most important recreational marine fish landed in 1979 were dependent upon coastal wetlands. Inland wetlands provide ideal spawning and feeding grounds for freshwater fish. Heimlich & Langner, *supra* note 7, at 221.
161. *Id.*
162. *See generally* Luoma, *supra* note 1.