Protecting the Still Functioning Ecosystem: The Case of the Prairie Pothole Wetlands

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There is an ethical reason—a reason of patriotism—why the individual landowner should take the initiative. If we would preserve our democracy of ownership of private property, then ownership must meet its responsibilities as well as enjoy its privileges. Accompanying widely distributed ownership of private property there is individual responsibility for adjusting the conditions and uses of property to social requirements. Erosion and loss of waters is not merely an individual problem; it is a social problem created by individual conduct.

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Governments have an inescapable responsibility for the conservation and wise use of all natural resources, especially soil and water. Owners have actually merely a lifetime interest in their lands; but communities, countries, States, and the Federal Government have a perpetual interest in the preservation of this indispensable asset.

– H.S. Person[1]

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1. H.S. PERSON, LITTLE WATERS: A STUDY OF HEADWATER STREAMS & OTHER LITTLE WATERS, THEIR USE AND RELATIONS TO THE LAND (Soil Conservation Service, Resettlement Administration, Rural Electrification Administration, Nov. 1935), *reprinted in* 2 GREAT PLAINS NAT. RESOURCES J. 78, 146-76 (1997).

I. SUSTAINABLE AGRICULTURE IN AMERICA'S WORKING LANDSCAPE: FROM RIO TO THE PRAIRIE POTHOLE

The United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro initiated a discussion on how individual nations can achieve sustainability in their economic and social systems.[2] Agenda 21 of the Rio Declaration addresses agriculture, placing the need to provide food for a vast population at the heart of the goal of a sustainable agriculture.[3] Agenda 21 states:

> By the year 2025, 83 percent of the expected global population of 8.5 billion will be living in developing countries. Yet the capacity of available resources and technologies to satisfy the demands of this growing population for food and other agricultural commodities remains uncertain. Agriculture has to meet this challenge, mainly by increasing production on land already in use and by avoiding further encroachment on land that is only marginally suitable for cultivation.[4]

Although many of the specific proposals found in Agenda 21 are more relevant to developing countries, the overall emphasis is that sustainable development requires nations to: (1) increase food production in a sustainable way; (2) enhance food security; (3) implement an intelligent system of land use allocation; and (4) accomplish these three things while also developing the human resource.[5] However, even these points of emphasis are too general to serve as a useful guide for developing countries. Each participating nation must also consider whether and to what extent its agricultural production systems meet some definition of sustainability.

The Rio Declaration, insofar as it addresses agriculture, is filled with examples of internal conflicts between aspirations of meeting future demand on the one hand, and of producing food in a manner consistent with survival of natural systems on the other. It leaves

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2. *See* U.N. Conference on Environment and Development: Rio Declaration on Environment and Development, June 14, 1992, 31 I.L.M. 874 (1992).

3. U.N. CONFERENCE ON ENVIRONMENT AND DEVELOPMENT (UNCED), AGENDA 21, at 76, U.N. Doc. A/CONF. 151/4 U.N. Sales No. E.92.1.16 (1992).

4. *Id.*

5. *Id.*

many open questions.[6] Is sustainable agriculture about meeting the basic and elective nutritional needs of an exploding population, or is it about protecting the ecosystem where people reside and raise crops and animals? Are these goals reconcilable in the face of population growth and popular consumption demands, or is the reality one that requires ever more intensive production?

If the reality is not an ever more intensive agricultural production system, does the Rio Declaration provide guidance that will help achieve sustainability in the face of an ever enlarging set of users? Principle I of the Rio Declaration states that humans are "entitled to a healthy and productive life in harmony with nature."[7] It is clear that a prerequisite for this condition is a properly-fed population. However, human life may never be "in harmony with nature,"[8] if its food supply is provided by industrialized agriculture that exploits the earth's ecosystems. The Rio Declaration appears to recognize correctly that a system simply delivering a minimum acceptable food supply is not, in itself, based upon sustainable development. Rather, a sustainable system must be "in harmony with nature."[9]

A system of sustainable agricultural development requires a balance between the human need to live "healthy and productive"[10] lives and a desire to maintain the natural systems in which those lives are lived. The Rio Declaration does not address any of the specific problems presented by these countervailing needs. The Rio Declaration and its difficult questions do, however, provide a useful starting point for a discussion focusing the environmental impacts of American agricultural production.

This Article discusses the challenges presented by attempts to ensure consistency between agricultural production and ecosystem/biodiversity protection. Additionally, this Article examines mechanisms for achieving ecosystem protection. Although the notion of a sustainable agriculture provides a backdrop for

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6. *See generally* John H. Davidson, *Sustainable Development and Agriculture in the United States*, 32 Envtl. L. Rep. (forthcoming June 2002).

7. U.N. Conference on Environment and Development: Rio Declaration on Environment and Development, June 14, 1992, 31 I.L.M. 876 (1992).

8. *See id*.

9. *See id*.

10. *See id*.

analysis, this phrase seems far too general to support a meaningful discussion of how we manage real-world agriculture "on the ground." Therefore, this Article emphasizes one geographic region and one major natural resource within that region: the "Prairie Pothole"[11] systems of streams, headwaters, wetlands, glacial aquifers, and rivers of the north central United States. In addition to containing unique and vital hydrology, this area is also one small part of a vast grain production region that extends across the nation, from the Rockies eastward to the coastal plain.[12] From this "breadbasket," the nation meets its own needs for grain and forage. Additionally, the land generates surpluses sufficient to export as much as one-third of production to other nations.[13] Finally, the region is an important source of the world's principal grain reserves.[14]

This Article addresses the practical and basic issue of whether twenty-first century agriculture can be organized and managed so that it exists in harmony with surrounding ecosystems. This task poses the enormous challenge of attaining optimal levels of agricultural production without degrading or destroying surrounding ecosystems and their biodiversity. An immediate argument is that agriculture disrupts natural systems because of the very nature of the enterprise. It displaces biodiversity for crop and meat production, usually through some form of monoculture, and replaces wildlife with domestic animal stock. The occurrence of natural water and land-based ecosystems thriving in the midst of such interference may test practical credibility.

The most productive parts of the nation's grain producing regions, such as Iowa, southern Minnesota, and central Illinois, may already be categorized as biodiversity and ecosystem "sacrifice zones." These "soybean deserts" have been intensively drained, their watersheds degraded, their fields enlarged and leveled, their trees and native

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11. NATIONAL RESEARCH COUNCIL, WETLANDS: CHARACTERISTICS AND BOUNDARIES 73 (1995); *see also* John R. Luma, *Twilight In Pothole Country*, AUDUBON, Sept. 1985, at 67-84.

12. *Id*.

13. Where it is presumably needed to satisfy either human nutritional needs or additional consumer demands for food. U.S. DEP'T OF AGRICULTURE, FOOD AND AGRICULTURAL POLICY: TAKING STOCK FOR THE NEW CENTURY 36 (2002).

14. *Id*.

grasses removed, and their animals congregated.[15] Even their small rural communities are experiencing consolidation, just like their meat-producing animals.[16] To justify this result we developed unreliable statistics, keeping a one-sided ledger and tallying only the increases in gross production rather than also accounting for the loss of natural soils, flora, fauna, and hydrology.[17]

We have traded away a great deal in order to achieve vast production. This obvious fact provides a context for a close look at the Prairie Pothole because important elements of natural biodiversity remain in this part of the nation's breadbasket. An opportunity therefore still exists in this region to pursue sustainable agricultural policy. The question is whether production agriculture can co-exist with a natural hydrological system.

II. WATERSHED DEGRADATION AND LAND DRAINAGE

The casual observers of America's grain-growing landscape are easily deceived into believing that they are viewing a scene of natural beauty: uninterrupted and uniform fields of waving grain that reach the horizon or a river's edge. In reality, what they are viewing is an intensely engineered system in which farmers have drained excessive moisture from wetlands and valley floors, created drainage ditches, channelized streams and rivers, and leveled and shaped the terrain to meet the needs of intensive monocultural production.[18]

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15. *See generally* Roger Claassen et al., *Agri-Environmental Policy at the Crossroads: Guideposts of a Changing Landscape*, 794 AGRIC. ECON. REP. 2 (2001), *available at* http://purl.access.gpo.gov/GPO/LPS10870.

16. PIGS, PROFITS, AND RURAL COMMUNITIES 9-17 (Kendall M. Thru & E. Paul Durrenberger eds., 1998).

17. Person suggests:

> Not all the apparent gains of agriculture reflected in the statistics of increase of acreage and of production are genuine gains. Most of that which is gain could under wise policies and practices have been realized without such a huge sacrifice of benefits potential in water resources. In addition, . . . there has been an enormous loss of the rich soils of many of the lands that have been opened and tilled–the loss from erosion.

Person, *supra* note 1, at 127.

18. John H. Davidson, *Little Waters: The Relationship Between Water Pollution and Agricultural Drainage*, 17 Envtl. L. Rep. 10074, 10075-76 (1987).

This stage of near factory-type field management was achieved by a familiar progression but nonetheless merits a brief review. The United States gave free land to the first European settlers in Illinois, Iowa, and Minnesota.[19] These settlers created farms by clearing the native hardwood forests.[20] Early farming practices generated most of the settler's needs, from horse power and tools, to food and shelter. Over the years, constant factors in farming have included production capacity improvements, land-holdings consolidation, production specialization and intensification, replacement of labor with capital, and land drainage designed to create steady increases in the supply of tillable ground.[21] Federal and state policies promoted each of these practices, either directly or indirectly.[22]

The fundamental role land drainage has played in this process cannot be over-emphasized. A typical farm might lie in or near a river valley that is drained naturally by a series of small streams and, eventually, a river. Under natural conditions, the fields and forests adjacent to these streams contain numerous wet spots, springs, ponds, wetlands, sloughs, and headwaters. To an ambitious farmer, this natural hydrology represented an impediment to increased field production her goal became the removal, or drainage, of this surplus water. Eventually, farmers developed a system of ditches, underground pipes or tiles, and outlets to hasten the movement of water to streams and rivers.[23] Between the 1930s and 1960s, observers lauded this change as a conservationist practice and the United States directly subsidized the practice.[24] Millions of acres of wetlands and headwaters were drained at federal expense.[25] Enterprising state and local efforts drained still more.[26] In states such

19. MURRARY R. BENEDICT, FARM POLICIES OF THE UNITES STATES, 1790-1950: A STUDY OF THEIR ORIGINS AND DEVELOPMENT 3-20 (Octagon Books, 1966) (1953).

20. *Id*.

21. *Id*.

22. TIMOTHY SEARCHINGER, FOOD FOR THOUGHT: THE CASE FOR REFORMING FARM PROGRAMS TO PRESERVE THE ENVIRONMENT AND HELP FAMILY FARMERS, RANCHERS AND FORESTERS 32-33 (Envtl. Def., 2001).

23. U.S. DEP'T OF AGRICULTURE, ECONOMIC RESEARCH SERVICE, FARM DRAINAGE IN THE UNITED STATES: HISTORY, STATUS AND PROSPECTS 110-16 (Misc. Pub. No. 1455, 1987) [hereinafter FARM DRAINAGE IN THE UNITED STATES].

24. *Id*.

25. *Id*.

26. *Id*.

as Iowa, Minnesota, and Illinois, rich and complex hydrologic systems were converted into huge expanses of tillable fields.[27] This federal subsidy program is comparable in scope and effect to the Western Irrigation Reclamation Program and created what must be the world's most consistent and extensive system of dryland (not irrigated) field agriculture.[28] The resulting conversion of watershed land to agricultural, industrial, and urban use, however, only accelerated the process of degradation that had been initiated by field drainage.[29]

Today, the federal government is less likely to subsidize field drainage.[30] Policy has changed in favor of discouraging wetland conversion, and lawmakers have found other uses for funds previously dedicated to land drainage. The process of drainage continues, however, at the initiative of private landowners, a fact made possible by new technologies that substantially reduce the costs of installing field drainage. Many other factors also continue to stimulate the practice. Farmers who grow commodities receive government support payments, in part, on the basis of the acreage dedicated to commodity production.[31] This practice encourages land conversion. Low commodity prices in the marketplace as well as high production costs also encourage landowners to exploit every option in order to maximize their efficiency and increase overall production. As landholdings are consolidated, fencerows are removed and fields are enlarged, leading landowners or corporate managers to seek efficiencies by altering drainage patterns that were acceptable in the period of smaller farms and more diverse production. In sum, there is an ongoing industrialization of field agriculture analogous to the industrialization that has occurred in the meat growing industry. Such industrialization is the source of the accelerating threat to the wetlands in farm country.

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27. U.S. DEP'T OF AGRICULTURE, ECONOMIC RESEARCH SERVICE, FARM DRAINAGE IN THE UNITED STATES: HISTORY, STATUS, AND PROSPECTS 1455 (Misc. Pub. 1987).

28. *Id*. at 16-17.

29. *See generally* A. Dan Tarlock, *Putting Rivers Back In The Landscape: The Revival of Watershed Management in the United States*, 6 HASTINGS W.-NW. J. ENVTL. L. & POL'Y 167, 168 (2000).

30. FARM DRAINAGE IN THE UNITED STATES, *supra* note 23, at 1.

31. SEARCHINGER, *supra* note 22, at 4.

The widespread acceptance of field drainage led directly to two factors that remain with us today. First, landowner's expect an entitlement to develop watershed lands without regard to the impact on the hydrologic system.[32] Second is the development of, and reliance upon, a comprehensive system of flood management and river control structures.[33]

The retention of waters in field and forest was an important function of the natural system of wetlands and headwaters. Among its many benefits, this retention process held back spring snowmelt and runoff, thereby reducing flooding and high waters in receiving streams and rivers.[34] Generally, however, floods are permitted to encroach upon low-lying lands adjacent to the regular channels and these flood plains are clothed with vegetation suitable to their environment. Of course, once these lands no longer retained water, rivers exceeded their natural capacities and flooding was the inevitable consequence, particularly during the spring.

Downstream lands flooded as a result and led to demands that someone control the streams and rivers. The federal government heeded this call with vigor and ample resources.[35] The response took many forms.[36] The U.S. Department of Agriculture (USDA) developed a program of small dams, stream straightening, and channelization for smaller streams and watersheds, which converted thousands of miles of winding natural streams into deep, straight, and sterile ditches.[37] The USDA reserved its big work for river systems

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32. Tarlock, *supra* note 29, at 170.

33. *See generally* William A. Hillhouse, *The Federal Law of Water Resources Development*, *in* FEDERAL ENVIRONMENTAL LAW 844-51 (Erica L. Dolgin & Thomas G. P. Guilbert eds., 1974).

34. Person states:

> In Nature there is not, for instance, special provision for prevention of floods, either on the little waters which concern us here, or on great rivers and their major tributaries. On the whole they are accepted. But under undisturbed natural arrangements floods apparently have a lower crest because of retardation of flow, and the amount of water in streams is greater during dry seasons than it otherwise would be.

Person, *supra* note 1, at 109.

35. *Id*.

36. *See infra* notes 37-38 and accompanying text.

37. HOUSE COMM. ON GOVT. OPERATIONS, STREAM CHANNELIZATION: WHAT FEDERALLY FINANCED DRAGLINES AND BULLDOZERS DO TO OUR NATION'S STREAMS, H.R. REP. NO. 93-530, at 12 (1973).

where the agency undertook an "intensive, structural, multiple-purpose river basin water project development in the name of scientific conservation."[38] Development of these systems, along with the enormous political institutions required to support them, has dominated watershed activity in the United States for most of the last sixty to seventy years.[39] In net effect, these activities have led to widespread degradation of the watersheds. Presuming that nature must be improved for human benefit, these changes have left behind diminished ecosystems and a loss of biodiversity. The government and farmers continue to prefer such systems, despite our increasing awareness of their negative consequences for watershed management.

III. THE CHALLENGE OF BIODIVERSITY PROTECTION IN A PRIVATELY-OWNED WORKING LANDSCAPE

Privately owned farms and forests constitute nearly seventy percent of the land in the contiguous United States.[40] In the northern plains, where the Prairie Pothole region is found the percentages are even greater.[41] A large majority of the land in South Dakota is privately owned, and most of it is devoted to some form of agricultural production.[42] Biodiversity must ultimately be managed in the context of just such a privately-owned working landscape. About half of the animals protected in the United States by the Endangered Species Act (ESA) rely on private and state land for at least eighty percent of their habitat.[43] Heavy reliance on public land ownership, sometimes called the "ghetto approach" to conservation,[44] ignores the predominance of privately-owned land. Moreover, these states must balance the goals of biodiversity protection with the practical needs and aspirations of private landowners if they desire to protect species of flora and fauna.

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38. Tarlock, *supra* note 29, at 169.
39. *Id*.
40. SEARCHINGER, *supra* note 22, at 15.
41. For example, in Nebraska less than two percent of the land is public.
42. 11 THE NEW ENCYCLOPAEDIA BRITANNICA 40 (1992).
43. SEARCHINGER, *supra* note 22, at 15.
44. *See, e.g.*, David Farrier, *Conserving Biodiversity On Private Land: Incentives for Management or Compensation for Lost Expectations?* 19 HARV. ENVTL. L. REV. 303, 317 (1995).

IV. THE PRAIRIE POTHOLE AS A CRITICAL OPPORTUNITY FOR BIODIVERSITY PROTECTION IN A WORKING LANDSCAPE

The Prairie Pothole region of the northern Great Plains is one of the most extensive and valuable freshwater resources in the world.[45] These resources are surpassed in the United States perhaps only by the Great Lakes and the Everglades. Unlike the latter two, however, the importance of the Prairie Pothole is not broadly appreciated, possibly because the region itself is thinly populated. Whereas the Everglades cover 13,000 square miles,[46] the Prairie Pothole region encompasses 300,000 square miles in the United States and Canada.[47]

Wetlands in this region function as habitat for wildlife and produce more than two-thirds of all North American ducks.[48] The wetlands also retain run-off waters,[49] sediments, and pollutants.[50] The wetlands interact with groundwater and thereby play a role in protecting the quality and quantity of water used in homes, farms, ranches, and industry in the region and beyond. Most of these wetlands are small, temporary, and typically hold open water for only a few weeks after spring runoff and for short periods of time after heavy precipitation events.[51]

The Prairie Pothole begins somewhere north of the Missouri River where that great stream separates Nebraska from South Dakota.[52] The region to the north through South Dakota and Minnesota contains perhaps 17,000 miles of gently flowing headwater wetlands that create, and are tributaries to, prairie streams and rivers. These wetlands have a soft gradient that results in slight surface and sub-surface flows that gradually cumulate until they are the surface flows of tributary streams. Through the "Coteau" region shared by North

45. WILLIAM J. MITSCH & JAMES G. GOSSELINK, WETLANDS 57-59 (2d ed. 1993).
46. *Id*. at 53.
47. *Id*. at 54.
48. *Id*. at 59.
49. For a detailed case study of the economic value of prairie wetlands as a flood control device, see Thomas M. Power & Ernie Niemi, *An Economic Evaluation of Flood Control Alternatives in the Vermillion River Basin, South Dakota*, 3 GREAT PLAINS NAT. RESOURCES J. 3 (1998).
50. MITSCH & GOSSELINK, *supra* note 45.
51. *Id*. at 54.
52. *Id*. at 57-59.

Dakota, South Dakota, and Minnesota, the land gradually becomes more level, and the prevalent headwater wetlands change to isolated depressional potholes. Although the depressional potholes give the region its name, agricultural activity most immediately threatens the nondepressional sloped headwater wetlands of the area.

Sloped headwater wetlands are at greater risk partly because depressional wetlands were the paradigm for the region when wetlands definitions, determinations, and delineations were first formulated. Moreover, they do not enjoy the well-publicized, more apparent, importance of depressional wetlands in wildfowl migrations.[53]

Sloped headwater wetlands are those that lie between two hill, or any gradient, where the hills slope downwards toward each other and then level out. While both depressional and sloped headwater wetlands are important for water quality, sediment control, denitrification, nutrient uptake, groundwater recharge, wildlife habitat, water conservation, and flood control, sloped headwater wetlands serve as the source tributaries for prairie rivers. These wetlands also function as important wildlife travel corridors, particularly for amphibians, reptiles, and insects. Many birds nest in them, and others use them for cover in all seasons. They augment low flows to downstream aquatic life and release water gradually, well into the dry season. In the Prairie Pothole, as elsewhere, the sloped headwater wetlands contribute materially to the survival of federal and state listed endangered and threatened species.

Sloped headwater wetlands exhibit typical wetland characteristics. Like depressional wetlands, they may be permanent, semi-permanent, seasonal, or temporary. They have hydric soils and support hydrophytic vegetation. They have saturated soils beneath them, but the water held by the soil moves slowly downhill because of their gradient. Seasonal and temporary sloped wetlands briefly manifest surface hydrology only during spring runoff and after major runoff events. They rarely show prolonged inundation and ponding,

53. For example, the *National Food Security Act Manual* published by the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) mentions the existence of sloped headwater wetlands but devotes all discussion of examples to depressional wetlands.

although they may be found in conjunction with depressional wetlands.

Sloped headwater wetlands are particularly vulnerable. They are linear by definition and often run for long distances through otherwise cultivable fields. Landowners view them as a particular nuisance because these wetlands divide fields. Additionally, because they yield their water to downstream flows, headwater wetlands are inclined to lose surface water rapidly in dry years and are therefore susceptible to agricultural cultivation early in the season. Thus, a landowner may actually grow crops in headwater wetlands in drier years or, at least mow-off or spray the wetland vegetation later in the summer. The effect of such practices are cumulative.

Because of the absence of vegetation in the following year, the headwater will yield its water quickly and at a faster rate, with predictable results: (1) the land will dry more rapidly than before and therefore will likely be cultivated again; and (2) the increased rate of runoff will start to erode the land and begin the first stages of "cutting" an erosion ditch. These ditches are a common site in hilly farm country and are the sad result of headwater wetland destruction. Although wetter years may intervene and hydrophytic vegetation will reappear, drier years will return and the process of degradation will continue. Meanwhile, the farmer is increasingly frustrated when using machinery of an unprecedented size, which makes it difficult to execute a turn to avoid wet ground or a degrading ditch. Moreover, the farmer feels pressured to produce more to maximize his own income. The more industrialized the farm operation, the greater the nuisance of sloped headwater wetlands.

The landowner may propose a "remedial" measure to deal with these wetlands. A typical response is to bury a continuous line of perforated pipe, or tile, parallel to each side of the sloped headwater. If the surface erosion is severe, the landowner may hope that the subsurface pipe will gather and channel water underground and reduce the eroding effect of the accelerated surface runoff that was caused by the disruption of the wetland. The landowner can then contour the area to allow cultivation as part of the surrounding field. The tile will assure that the headwater is dry every year to allow for cultivation and "farming through." Regardless of the incentives involved, tiling is often the last step in the destruction of the wetland.

The destructive effect of this practice does not end at the landowner's property line. Sloped headwater wetlands, being linear, run down a slope across many fields and farms. When one landowner drains a wetland, the velocity of the flowing water increases, assuring that a process of degradation will begin on the next field down the slope. The cumulative "domino effect" of this process of headwater wetland destruction is enormous and is the pivotal first step in degradation of the larger watershed.

V. PRACTICAL DIFFICULTIES INHERENT IN PROTECTING A WETLAND RESOURCE ON PRIVATE LANDS

It is worthwhile to review some of the many factors that make it so difficult to protect and sustain wetland resources on private land because these factors distinguish the problem from many others where regulatory and systems management approaches have met with at least partial success. For wetland regulation, the benefits to the public, or costs avoided by the landowner, are not related in any apparent way to human health. Nor are the benefits of wetland protection easily perceived. Even when the loss of many wetlands leads to some clearly observable public problem, such as floods or droughts, the public rarely appreciates the connection to wetland loss. In other words, though all members of the public broadly share the benefits of wetland protection, most will not understand that the protection makes a meaningful contribution to their well-being.[54]

Both the benefits and costs of wetland protection occur in small, almost undetectable increments. Incrementalism, whether it occurs in

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54. William H. Rodgers, Jr. says it best:

> In the regulation of wetlands, as with most environmental regulation, the benefits are broadly shared while the costs are concentrated, assuring an angry loser class with a distinct desire to set things right. The situation also is one where the conduct condemned used to be praised—it was called land reclamation—and this reversal of professed values obviously leaves strong pockets of resistance. There is more—the benefits of wetlands protection are often incremental, sometimes marginally invisible, and are not linked to human health, all considerations raising the ante of adequate justification; and as the regulation creeps inland the assumptions about protecting the public commons shift to expectations of private entitlement—in maintaining the farm, building the home, and improving the ranch.

WILLIAM H. RODGERS, JR., 2 ENVIRONMENTAL LAW: AIR AND WATER 183 (1986).

the form of direct acts of pollution or in the form of misuse of a natural resource, poses one of the most difficult problems in the administration of natural resources law and policy. It is one thing to regulate a large pollution source, such as an electric power generating facility for example, and quite another to police numerous small fires in rural areas. It is one thing to regulate wetland conversion by a large scale residential and commercial land developer operating near an urban area or large river, and quite another to attempt to control uncountable acts of small wetland elimination occurring across a vast rural landscape.[55] The net result for the environment will be the same. One can certainly make an argument that the acts cannot ultimately be distinguished as a practical matter, but they must be distinguished.

To an extent not sufficiently appreciated, incrementalism, particularly the type that field agriculture produces, is at the heart of the non-point-source pollution issue.[56] Sediments and associated pollutants enter streams and rivers from a vast number and variety of agricultural sources. No one notices or considers important the majority of these sources because they are not sufficiently large.[57]

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> The waters to which we shall here give attention are little waters—rainfall, water in the soil, rivulets that flow off the land, creeks and other headwater streams, ponds, and small lakes–not great rivers and their major tributaries . . . In the aggregate these little waters are of immense importance. They create the big rivers and lakes. As they are controlled and made to behave, so in considerable measure will the tributaries of big rivers be controlled and made to behave.

Person, *supra* note 1, at 94.

> It is . . . largely by acts which decrease absorption, infiltration, and the ground-water store, and which accelerate run-off, that Man has seriously disturbed natural arrangements and harmed himself.

Id. at 96.

> But only too frequently in matters of this sort, what is immediately beneficial to the individual and even to the society of which he is a member when only a few engage in the practice, may, when many engage in the practice become harmful to the whole and therefore by reaction ultimately to the individual.

Id. at 113.

56. ROBERT V. PERCIVAL ET AL., ENVIRONMENTAL REGULATION: LAW, SCIENCE & POLICY 752 (3d ed. 2000).

57. The problem of a large number of dispersed nonpoint sources of pollution has been present since the Clean Water Act of 1972 was enacted. Then, EPA considered it infeasible to regulate pollution generated by runoff. The agency argued in court that it could not be expected

The sum of these pollutants, however, creates one of this nation's most significant water pollution problems.[58] In fact, the acts of wetland drainage are very often the same acts that create a nonpoint source of pollution, as sediments and other pollutants which a wetland would naturally retain enter the receiving waterway.

The nature of the incremental polluter presents a challenge to the "polluter pays" principle.[59] Unless there is a control at the point of manufacture or distribution, as with small appliances, it is very difficult to place the true cost on the polluter.[60] Typically, societies allow the costs of incremental acts to cumulate until there is a concentrated and visible crisis and then intervene with public funds. This is the case with wetland drainage.[61] The normal course is to tolerate many acts of individual drainage until a flood occurs or a watershed is degraded, at which stage the government intervenes with large water resource development projects paid for by society at large.[62]

In contrast to the benefits of wetland protection, the short-run costs are concentrated on the private landowner who, along with

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to "instruct each individual farmer on his farming practices." Natural Res. Def. Council v. Costle, 568 F.2d 1369, 1380 (D.C. Cir. 1977). Clearly, the number of nonpoint sources in a watershed may run into the thousands, and each polluter is making only a marginal contribution to the pollution as a whole. In one way or another most pollution control statutes deal categorically with the small source. *See, e.g.*, 40 C.F.R. § 262.70 (2000) (exempting, as a practical matter, disposal by farmers of pesticide waste containers).

58. In general, so-called general permits or nationwide permits, recognized under 16 U.S.C. §§ 402 and 403 of the Clean Water Act, are permits for small incremental acts of pollution.

59. The polluter pays principle means, simply, that the cost of clean-up or prevention of environmental damage should be borne by the polluter. While seldom referred to specifically in the language of legislation, it is the guiding principle of many leading pollution control statutes in the United States, including the CWA, Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), and the Solid Waste Disposal Act. For a thorough discussion of the polluter pays principle, see Jonathan H. Adler, *Free & Green: A New Approach to Environmental Protection*, 24 HARV. J.L. & PUB. POL'Y 687-90 (2001).

60. *See* Hillhouse, *supra* note 33. Flood control is a principle component of most dam and channelization projects constructed by the Corps of Engineers and USDA. The costs are borne by the federal treasury, although the sources of flooding are, in part, due to actions by landowners in the flood area.

61. MITSCH & GOSSELINK, *supra* note 45, at 519-22. The authors state that "wetlands influence regional water-flow regimes. One way they do this is to intercept storm runoff and store storm waters, thereby changing sharp runoff peaks to slower discharges over longer periods of time." *Id*. at 519.

62. A complete example of this process is described in Power & Niemi, *supra* note 49.

others in a similar position, are likely to form a distinct and vocal group.[63] This class does not see the costs as small or merely incremental, and it is not easily persuaded that individual decisions to drain small wetlands are harmful to the public. Indeed, the class is more likely to be convinced that its actions contribute to the public good by enhancing economic productivity. To put it another way, the true costs are spread across the long term and are not easily perceived at the time of decision.

To complicate matters further, the conduct that wetland protection efforts inevitably condemn as harmful was recently seen as praiseworthy land "reclamation."[64] It was promoted by every level of government, from the local 4-H farm youth organizations and land grant agricultural colleges to the U.S. Department of Agriculture.[65] Moreover, the political and other institutions which have supported the elimination of wetlands are difficult to reform and they resist evidence which tends to show that wetland protection delivers valuable services to the community and region.[66]

Landowners tend to see wetland conversion as an entitlement, similar in some respects to the right of a senior water right holder under a western state's prior appropriation system.[67] As with water rights, a key ingredient of the right for the holder of the property or entitlement is use of the land without regard to adverse environmental impacts.[68] This sense of entitlement is powerful, particularly when voiced at the local level. The argument is even more forceful when it is tied to strong societal values such as the need to allow small farms and businesses to survive, to encourage entrepreneurship, and to invest in capital. Although it is attractive to believe that this attitude

63. *See supra* note 54 and accompanying text.

64. FARM DRAINAGE IN THE UNITED STATES, *supra* note 23, at 2.

65. *See* Tarlock, *supra* note 29, at 167 ("For most of this century, . . . natural resources policies and laws have promoted watershed degradation.").

66. *See, e.g.*, SEARCHINGER, *supra* note 22, at 32 (where the author states "efforts to map wetlands accurately were suspended in 1995, even though reports by USDA personnel from nearly all states reveal that existing maps greatly understate the extent of wetlands"). Further examples are in: ENVIRONMENTAL DEFENSE FUND AND WORLD WILDLIFE FUND, HOW WET IS A WETLAND? THE IMPACTS OF THE PROPOSED REVISIONS TO THE FEDERAL WETLANDS DELINEATION MANUAL (1992).

67. The comparison is explored in SARAH F. BATES ET AL., SEARCHING OUT THE HEADWATERS: CHANGE AND REDISCOVERY IN WESTERN WATER POLICY 3-13 (1994).

68. Tarlock, *supra* note 29, at 170.

is on the wain, it may be gaining strength, because as agricultural landholdings and production entities concentrate, field agriculture increasingly adopts factory-type approaches and the land is viewed, more than ever, as a mere commodity.[69] Of course, land has always been a commodity in the sense that it is a subject of investment. Property rules recognize a right to develop and improve land.[70] In traditional American agriculture, however, that sense of entitlement was muted by a culture that viewed the land of small farms as having unique status. That view is now in the clear minority.[71] In the hands of large landholders, who are frequently heavily leveraged and organized as business corporations, emphasize the commodity character of land.

Landowners in areas where wetlands still exist also tend to look at "drained" areas, such as those in Minnesota, Illinois, and Iowa, and feel that there is a lack of fairness.[72] After all, the U.S. government subsidized drainage in those places and subsequently discourages it in places such as the Prairie Pothole.[73] The lesson is a recurring one and emphasizes the difficulty of halting a popular subsidy program. It does not take long for a subsidy to be viewed as an entitlement.

A reasonably large industry has developed around agricultural land drainage in this context, and its continuing prosperity is dependent upon a ready supply of new projects. In farm country, such as the Prairie Pothole, where undrained wetlands remain, contractors are ubiquitous and seek business aggressively, often door-to-door. The contractors are also influential with both state and national legislators and skilled in the ways of administrative agencies.

Wetland regulation also runs into resistance because it is viewed as a type of land-use control, a governmental activity that customarily resides at the local level.[74] Since wetland regulation may be

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69. Eric T. Freyfogle, *Property Rights, the Market and Environmental Change in Twentieth Century America*, 32 Envtl. L. Rep. 10255 (2002).

70. *Id*.

71. *Id*. at 10256.

72. Gil Gullickson, *Little Grouse on the Prairie*, THE DAKOTA FARMER 27, 35-36.

73. *Id*. at 55.

74. The distinction between wetland regulation and water pollution discharge permitting under the Clean Water Act is a fine one. The former may be viewed as a form of land use classification, or zoning, whereas the latter is merely "regulation."

implemented by agencies which are strangers to local government, such as the USDA, the U.S. Army Corps of Engineers (CORPS) or, in some cases, state water resource allocation agencies, the agencies are often regarded as "outsiders" in local processes. If the justifications offered by a regulating agency are based on goals which transcend municipal boundaries, there is further reason for resistance. This conditional highlights the fact that the wetland drainage problem only becomes visible at the watershed level. However, local government is not typically organized by watershed and, as a result, there is not an accepted political voice from that level.[75] Most watersheds are broken up into numerous political institutions, such as counties, towns, and special districts which are inclined to side with their constituents, namely, the complaining private landowners.[76] There is no voice for the watershed. The history of attempts to create regional or watershed political institutions with political viability is replete with failure.[77]

VI. LEARNING FROM ECOSYSTEM MANAGEMENT—MANAGING THE TOTAL PACKAGE

As previously mentioned, there is a close and inevitable correlation between efforts to protect endangered and threatened species and efforts to protect the wetland resource. The two issues are never far apart because at least one-third of all endangered species rely heavily on wetlands.[78] For years, the agency responsible for enforcing the mandates of the ESA, the U.S. Fish and Wildlife Service (Agency), protected listed species on a species-by-species basis.[79] It focused on the survival of specific numbers of individual

75. *See* text *infra* note 127.

76. *See* text *infra* note 97

77. Robert W. Adler, *Addressing Barriers to Watershed Protection*, 25 ENVTL. L. 973, 975-76 (1995).

78. MITSCH & GOSSELINK, *supra* note 45, at 517-18 (where the authors state: "Although wetlands occupy only about 3.5 percent of the land area of the United States, of the 209 animal species listed as endangered in 1986, about 50 percent depend on wetlands for survival and viability.").

79. U.S. FISH AND WILDLIFE SERVICE, AN ECOSYSTEM APPROACH TO FISH AND WILDLIFE CONSERVATION: AN APPROACH TO MORE EFFECTIVELY CONSERVE THE NATION'S BIODIVERSITY (Mar. 1994).

flora and fauna rather than on the larger context which gave rise to the endangerment in the first place. This began to change in 1994 when the Agency announced that henceforth its regulatory and other functions would be guided by the concept of ecosystem management, which requires that the total habitat be managed, not just the small species-by-species segments.[80] As stated in the Agency's announcement:

> Species will be conserved best not by a species-by-species approach but by an ecosystem conservation strategy that transcends individual species. The future for endangered and threatened species will be determined by how well the agencies integrate ecosystem conservation with the growing need for resource use.
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> * * *
>
> [The agencies shall] [d]evelop and implement recovery plans for threatened and endangered species in a manner that restores, reconstructs, or rehabilitates the structure, distribution, connectivity and function upon which those listed species depend. In particular, these recovery plans shall be developed and implemented in a manner that conserves the biotic diversity (including the conservation of candidate species, other species that may not be listed, unique biotic communities, etc.) of the ecosystems upon which the listed species depend.[81]

Although this administrative change may appear slight at first glance, it in fact represents a major shift in how the ESA is applied. As the regulatory focus shifts from the specific species-by-species approach to one which examines the overall well-being of the

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80. *Id*.

81. Endangered and Threatened Wildlife and Plants: Notice of Interagency Cooperative Policy Regarding the Role of State Agencies in Endangered Species Act Activities, 59 Fed. Reg. 34274 (July 1, 1994). *See generally* U.S. FISH AND WILDLIFE SERVICE, MAKING THE ESA WORK BETTER: IMPLEMENTING THE 10 POINT PLAN . . . AND BEYOND (June 1997) (outlining a new policy direction for the U.S. Fish and Wildlife Service); Jamie Rappaport Clark, *The Ecosystem Approach from a Practical Point of View*, 13 CONSERVATION BIOLOGY 679 (1999) (explaining the benefits of the econsystem approach); R. Edward Grumbine, *What Is Ecosystem Management?* 8 CONSERVATION BIOLOGY 27 (1994) (explaining ecosystem management).

surrounding ecosystem, the potential scope of authority is broadened. It requires that resource management decision-making, including plans for endangered and threatened species, be centered around the concept of ecosystem functions rather than avoiding risk to specific species. J.B. Ruhl aptly summarizes this development: "Each species is part of a dynamic, co-adapted assemblage of species dependent on and interacting with the surrounding habitat. It is that total package that must be managed, not just some bits and pieces."[82]

The underlying question of ecosystem management is that if disequilibrium is the norm, what is there to do about it? The message for administrators, policy-makers, and lawyers is that biological sciences, including ecology, have changed dramatically since they were incorporated into environmental law during the 1970s and 1980s. In the 1960s, the science of ecology rested upon the idea of ecosystem equilibrium.[83] It was a deterministic science "more descriptive than integrative."[84] In law it led to the suggestion that "qualitative environmental standards could provide the administrative coherence historically lacking in natural resources policy."[85] It is this idea that may prove to be in error.

Since the 1960s, the science of ecology has rejected the concept of ecosystem equilibrium.[86] It is now clearly understood that theories embracing succession and climax vegetation are wrong and they have since been replaced by disequilibrium theory.[87] Law and policy have been slow to keep up with science. According to Bosselmann and Tarlock, equilibrium has been replaced with the idea that "system disturbances are both predictable and random," and "[c]hange and instability are the new constants . . . [a]t best, ecosystems can be managed rather than restored or preserved, and management will consist of a series of risky experiments."[88]

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82. J.B. Ruhl, *Ecosystem Management, The ESA, and the Seven Degrees of Relevance*, 14 NAT. RES. & ENV'T, Winter 2000, at 156, 158-59.

83. Fred P. Bosselmann & A. Dan Tarlock, *The Influence of Ecological Science On American Law: An Introduction*, 69 CHI.-KENT L. REV. 847, 867 (1994).

84. *Id*.

85. *Id*.

86. *Id*.

87. *Id*.

88. *Id*. at 869-70.

Management, of course, can be over-emphasized. Many observers seem to conclude that an emphasis on non-equilibrium functioning necessitates an inquiry into how to "manage" ecosystems.[89] It is as possible, however, to reject human tampering with *processes* as with specific conditions. Ecosystem scientists are quick to suggest that function and process should be protected first.[90] For example, some have suggested that it may be better to protect the *function* of fire as a natural phenomenon rather than to protect a stretch of forest from it.[91] Others suggest that it may be better to protect the *function* of river flow than to protect particular pieces of riparian ground from encroachment.[92] In other words, we might consider protecting a *function* or *process* in a manner very similar to the way we protect a particular piece of ground such as Yosemite Park or the Big Muddy National Wildlife Refuge. Thus, ecosystem scientists will argue that ". . . environmental and land management decisions must be centered around the concept of ecosystem functions."[93]

Ecosystem management presents the problem of scientific uncertainty and risk. How are natural resources to be managed when the only certainty is uncertainty, and when all choices involve risk? One leading conservation biologist suggests some rules that ought to apply when managing resources at the ecosystem level:

> Maintaining viable ecosystems is usually more efficient, economical, and effective than a species-by-species approach.
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> * * *
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> Biodiversity is not distributed randomly or uniformly across the landscape. In establishing protection priorities, focus on 'hot spots.'
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> * * *
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> Ecosystem boundaries should be determined by reference to ecology, not politics.

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89. *See, e.g.*, Jamie Rappaport Clark, *The Ecosystem Approach from A Practical Point of View*, 13 CONSERVATION BIOLOGY 679 (1999).
90. Ruhl, *supra* note 82, at 157.
91. *Id*.
92. *Id*.
93. *Id.*

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> Ecosystem health and integrity depend on the maintenance of ecological processes.
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> * * *
>
> Human disturbances that mimic or simulate disturbances are less likely to threaten species than are disturbances radically different from the natural regime.
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> * * *
>
> Ecosystem management requires cooperation among agencies and landowners and coordination of inventory, research, monitoring, and management activities.[94]

VII. LEARNING FROM WATERSHED MANAGEMENT

Although science took until the 1960s to conclude that ecosystems require holistic management if biodiversity is to be protected, we have known for nearly a century that in order to avoid degradation of streams and rivers and to achieve efficiency in their use, management must occur at the watershed level.[95] Recognition of the desirability of watershed management, however, has not yet led to its widespread adoption.[96] In 1935, H.S. Person, an early spokesperson for the

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94. Reed F. Noss, *Some Principles of Conservation Biology, As They Apply to Environmental Law*, 69 CHI.-KENT L. REV. 893, 904-07 (1994); *see also* Judy L. Meyer, *The Dance of Nature: New Concepts in Ecology*, 69 CHI.-KENT L. REV. 875 (1994); REPORT TO THE WESTERN WATER POLICY REVIEW COMM'N, AQUATIC ECOSYSTEM SYMPOSIUM (W.L. Minckley ed., 1997).

95. Adler, *supra* note 77, at 975-76.

96. Z.J.B. PLATER ET AL., ENVIRONMENTAL LAW AND POLICY: A COURSEBOOK ON NATURE, LAW AND SOCIETY 319 (Supp. 1994):

> An interesting development in regional environmental management is the recent emphasis on watershed management. Managing natural resources on a watershed basis has been attempted frequently over the past century and its current incarnations take many forms. The watershed may not always be the optimum 'problem-shed' for management purposes. Moreover, current watershed management proposals rarely confront the fundamental problem that land-use authority in the United States most often resides at the local level, whereas most environmental problems transcend municipal boundaries. It remains to be seen whether watershed management will be a misleading buzzword or a genuine innovation in land-use and natural resources management.

nascent U.S. Soil Conservation Service (SCS), writing in support of headwater management and protection, said that " . . . [t]he program of any drainage area must be comprehensive; must take into consideration the entire area, and must include all the things to be done, each in its proper relations to the others, as required by the problem of the area."[97] He then went on to set-out all of the elements of an effective watershed plan.[98]

In fact, watershed management was at the heart of the SCS's original proposals for addressing the severe erosion, soil loss, water pollution, and stream degradation that had become so visible during the Dust Bowl era.[99] The SCS responded to the Dust Bowl emergency with energy and creativity. It possessed a strong sense of mission. Among the many reforms initiated at the time was an effort to manage resources along watershed lines.[100] In that era, SCS adopted the soil conservation district model to foster a local approach to the soil erosion problem.[101] The SCS provided technical service, advice and money.[102] In exchange, each state enacted enabling legislation along the lines of the Standard State Soil Conservation District Law that the SCS had drafted.[103] The resulting soil conservation districts were created by a majority of the land owners and tenants in a proposed district.[104] States passed legislation and soil conservation districts were created.[105] As long as they were an essential conduit for federal subsidies, they prospered.[106] The districts failed, however, as an experiment in watershed management and the

97. Person, *supra* note 1, at 145.

98. *Id.* at 145-47.

99. For the full history, see BENEDICT, *supra* note 19, at 375; R. BURNELL HELD & MARION CLAWSON, SOIL CONSERVATION IN PERSPECTIVE (1965); FREDERICK R. STEINER, SOIL CONSERVATION IN THE UNITED STATES (1990).

100. MILBURN LINCOLN WILSON, THE PREPARATION OF THE STANDARD STATE SOIL CONSERVATION DISTRICTS LAW 25-27 (U.S. Dep't. of Agriculture, Soil Conservation Service (Feb. 1990)).

101. *Id*.

102. The best account of the history of conservation's institutional history in the United States is presented in Craig L. Williams, *Soil Conservation and Water Pollution Control: The Muddy Record of The United States Department of Agriculture*, 7 B.C. ENVTL. AFF. L.J. 365 (1979).

103. WILSON, *supra* note 130, at 28.

104. *Id*. at 379-80.

105. Williams, *supra* note 102, at 376-78.

106. *Id*.

reasons for that failure can help us to develop a more effective approach to ecosystem and watershed management. The SCS believed that the two essential characteristics of the proposed local soil conservation districts was that they were organized politically along watershed lines and that they were granted sufficient police power to allow enactment and enforcement of effective land use controls for the purpose of natural resource protection throughout the watershed.[107] The concept followed the template of Euclidean zoning.[108] The proposed district would first develop a comprehensive plan for natural resources protection in the watershed, and would enforce the plan through specific laws that deferred to state police power.[109] The federal government then provided all of the technical and scientific resources necessary, along with a reliable supply of financial support for conservation improvements undertaken by private landowners.[110] Regretfully, only a few districts succeeded.[111]

State legislatures adopted the proposed enabling laws, but excluded the two essential ingredients of watershed-wide organization and police power.[112] Even today, however, few contest that the original recommendation from SCS remains the ideal and the continuing goal of watershed management.[113]

The early efforts at watershed management by the SCS are partially replayed in the nonpoint source control efforts of the federal Clean Water Act (CWA).[114] Congress recognized in 1972 that land use controls and watershed management had an inevitable role to play in any effective nonpoint source control program.[115] In describing the section 208 area wide waste treatment management plan, the CWA provided that a plan should contain procedures and methods "including land use requirements" to control nonpoint sources.[116] In the 1987 amendments to the CWA, Congress

107. *Id*.
108. *Id*.
109. *Id*.
110. *Id*.
111. *Id*. at 381.
112. *Id*.
113. *Id*.
114. 33 U.S.C.A. §§ 1288-1289, 1329 (2001).
115. Williams, *supra* note 102, at 365-66.
116. 33 U.S.C. § 1288(b)(2)(F) (2001).

consistently required that states identify enforcement methods.[117] Congress did not, however, mention land use controls specifically.[118] In distributing non-point source control grant money, however, the U.S. Environmental Protection Agency (EPA) has the authority to give preferred states that intend to "control" particularly difficult or serious nonpoint pollution.[119] Furthermore, in the 1987 amendments required that state non-point source management plans shall "to the maximum extent practicable," be developed and implemented on a watershed-by-watershed basis.[120]

While watershed management failed when its goal was the organization and control of private land management practices, it flourished when its goal was economic development centered around construction of large dams and reservoirs by the United States.[121] The idea was that multipurpose, basin wide water resources development, if federally planned and financed, could stimulate economic development by combining flood control, municipal water supply, irrigation, hydroelectric power generation, recreation, and water quality improvement, all within one massive project.[122] An ample supply of publicly owned power was always an important part of such proposals and most regions of the nation now have "multiple purpose" projects.[123]

The unity of the river basin served as an organizing focus only so long as the purpose was maximum development of the water resource with federal money. In that situation, states and local governments willingly acquiesced in the face of huge federal water development agencies such as the Corps and the Department of the Interior.[124] Eventually, however, the development mission was concluded. The federal development agencies remained, however, in order to

117. 33 U.S.C. § 1329(b)(2)(A) (2000).

118. *Id*.

119. *Id*. § 1329 (2000).

120. *Id*. § 1329(b)(4).

121. Hillhouse, *supra* note 33, at 844-51.

122. William Goldfarb, *Watershed Management: Slogan or Solution?* 21 B.C. ENVTL. AFF. L. REV. 483, 487 (1994). Issues of watershed management are elaborated upon at Robert W. Adler, *Addressing Barriers to Watershed Protection*, 25 ENVTL. L. 973 (1995).

123. Hillhouse, *supra* note 33, at 847.

124. *See, e.g.*, JOHN E.THORSON, RIVER OF PROMISE, RIVER OF PERIL: THE POLITICS OF MANAGING THE MISSOURI RIVER 76 (1994).

administer their creations and left the states largely in the position of bystanders.[125] The national agenda changed and the management agencies were charged with bringing their unwieldy dams and powerhouses into compliance with statutes such as the ESA and the National Environmental Policy Act (NEPA).[126] The Corps also became a water project permitting agency.[127]

In theory, these federal agencies that were charged with watershed-wide management authority were in the best position to implement watershed management to protect and restore natural resources.[128] The problem is that the original goal of "maximum development" has been achieved and the agencies have very little flexibility with which to restore ecological integrity. The Missouri River may be the nation's longest river, draining the largest watershed, but it has only about 170 miles of waters that even remotely resemble those traveled by Lewis and Clark.[129] The rest is devoted to straightened channels or reservoirs.[130] The river has been consumed and degraded by "maximum development," and while the Corps may be organized along watershed lines and enjoy legal authority to manage for ecosystem management, it has little practical opportunity.[131] Despite this history, however, the concept of watershed management remains with us as both an opportunity and an imperative.

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125. *Id*. at 163-65.
126. 42 U.S.C.A. §§ 4321-4370 (2001).
127. 33 U.S.C.A. § 1344 (2001).
128.

> Navigation, flood control, major hydropower, regional irrigation and reclamation, and other great land and water regulation problems are already the concern of the Federal Government and of cooperating States. . . Many of the problems which appear on the larger streams, such as extremes of flood crests, extremes of low-water flow, and siltation of reservoirs, are complicated and increased by neglect of regulation and control of headwaters and even of run-off on tilled and grazed lands.

Person, *supra*, note 1, at 175-76.

129. U.S. ARMY CORPS OF ENGINEERS, REVISED DRAFT ENVIRONMENTAL IMPACT STATEMENT, MASTER WATER CONTROL MANUAL, MISSOURI RIVER 3-1-3-9 (Aug. 2001).
130. *Id*.
131. *Id*.; *see also* A. Dan Tarlock, *The Missouri River: The Paradox of Conflict Without Scarcity,* 2 GREAT PLAINS NAT. RES. J. 1 (1997).

VIII. THE TOOLS FOR WETLAND PROTECTION

Section 404 the CWA projects a broad public interest "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters."[132] The Corps is authorized to issue permits for the discharge of dredged or fill material into waters of the United States under section 404 and to issue "general permits" for categories of similar activities that have minimal environmental effect, considered either as individual activities or cumulatively.[133] In addition to issuing permits and enacting regulations under section 404,[134] the Corps publishes non-binding Regulatory Guidance Letters (RGLs).[135] The EPA is authorized to simultaneously develop guidelines which also serve as prerequisites to permit issuance.[136]

The term "wetlands" is not defined in the CWA, but has been defined similarly in regulations by both the Corps[137] and EPA.[138] The EPA apparently possesses the final authority to define the existence and extent of wetlands,[139] while the Corps has the final authority to determine whether a proposed activity requires a permit; that is, whether it constitutes a "discharge of dredged or fill material."[140] In the Corps' regulations, "wetlands" are defined to mean "those 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. Wetlands generally include swamps, marshes, bogs, and similar areas."[141]

The U.S. Supreme Court upheld the definition in *United States v. Riverside Bayview Homes, Inc*.[142] The Court considered hydrophytic

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132. 33 U.S.C. § 1251 (2000).
133. *Id*. § 1344(e).
134. 33 C.F.R. §§ 320-330 (2000).
135. *See, e.g.*, U.S. Army Corps of Engineers, Clarification of the Phrase 'Normal Circumstances' As It Pertains To Cropped Wetlands, (Regulatory Guidance Letter, Sept. 26, 1990), *reprinted at* 21 Envtl. L. Rep. 35271 (1990).
136. 33 U.S.C. § 1344(b) (2000). For the guidelines, see 40 C.F.R. §§ 230-233 (2000).
137. 33 C.F.R. § 328.3(b) (2000).
138. 40 C.F.R. § 230.3(t) (2000).
139. Opinion of the U.S. Attorney General (Sept. 5, 1979).
140. 33 U.S.C. § 1344(a) (2000).
141. 33 C.F.R § 328.3(B) (2000).
142. 474 U.S. 121 (1985).

vegetation, hydric soils, and hydrology to be key factors.[143] The "under normal circumstances" language of the regulation prevents a landowner from defeating regulatory jurisdiction through action that defeats one or more of the three defining criteria. In other words, if wetland criteria would have been present but for the activity of the landowner, a wetland can be found to exist.

The process of determining whether a wetland exists in a specific location is at the very heart of the matter. The 1987 Wetland Delineation Manual guides the Corps and EPA in this process.[144] The Corps makes jurisdictional determinations available that are valid for three years.[145] The Corps has also created an administrative appeals process that applies to jurisdictional wetland determinations.[146]

Section 404 regulates the discharge of dredged or fill material.[147] Activities that do not involve such discharges, even if destructive of wetlands, are not within the purview of that section. The definition of "discharge" has been interpreted broadly in some cases to draw in a variety of activities.[148] Accordingly, this is an area of continuing controversy and litigation.

Section 404 exempts certain activities from regulation, including normal farming and timbering activities that are part of an established, ongoing operation.[149] The exemptions are self-implementing and are policed through normal enforcement mechanisms.[150] All potential exemptions are subject to a "recapture" clause,[151] which provides that exemptions are disallowed if (1) the purpose of the proposed activity is to bring wetlands and other waters into a new use, and (2) the flow or circulation of such waters may be

143. *Id.* at 130-31.

144. U.S. Army Corps of Engineers, Wetland Delineation Manual (1987).

145. RGL 90-6, Expiration Dates for Wetlands Jurisdictional Delineations (Aug. 14, 1990), *reprinted in* 58 Fed. Reg. 17210 (1993).

146. Final Rule Establishing an Administrative Appeal Process for the Regulatory Program of the corps of Engineers; Final Rule, 65 Fed. Reg. 16486 (Mar. 28, 2000) (to be codified at 33 C.F.R. pts. 320, 326, 331).

147. 33 U.S.C. § 1344(h) (2000).

148. "Dredged Material" is excavated or dredged from waters of the United States. 33 C.F.R. § 323.2(c) (2001). For example see Save Our Cmty. v. United States E.P.A., 971 F.2d 1155 (5th Cir. 1992).

149. 33 U.S.C. § 1344(f) (2000).

150. *Id*.

151. *Id*. § 1344(f)(2).

impaired or if the reach of those waters are reduced.[152] Generally, however, the courts construe section 404 permit exemptions narrowly.[153] An activity must satisfy the exemption provision to be exempt from permitting requirements and avoid the recapture provision.[154] The burden of proof rests with the party claiming the exemption.[155]

Discharges that are not exempt or authorized by a nationwide permit require individual 404 permits.[156] The substantive element in the permitting process is the "public interest review,"[157] consideration of the Guidelines,[158] and the satisfaction of other statutory authority, such as the ESA and NEPA.[159] The "public interest review" covers the broadest possible range of factors and encompasses economic, social, and environmental considerations.[160] The ad hoc balancing process focuses on the relative extent of the public and private need for the proposed work. It also considers alternative locations or methods to accomplish the project objective and the extent and permanence of the proposal's benefits and detriments.[161]

General and nationwide permits are authorized on a national, state, or local basis.[162] The purpose is to give the Corps flexibility in the administration of the permit process and to avoid the need for individual permits where similar categories of filling activities would only have minimal cumulative environmental impacts.[163] The Corps has enacted more than forty nationwide permits.[164] The critical point is that nationwide permits operate to pre-approve small interventions

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152. *Id*.

153. *See* United States v. Cumberland Farms of Connecticut, Inc., 647 F. Supp. 1166 (D. Mass. 1986), *aff'd* 826 F.2d 1151 (1st Cir. 1987), *cert. denied*, 484 U.S. 1061 (1988).

154. United States v. Brace, 41 F.3d. 117 (3d Cir. 1994), *cert. denied*, 515 U.S. 1158 (1995).

155. *See, e.g.*, United States v. Huebner, 752 F.2d. 1235 (7th Cir. 1985), *cert. denied*, 474 U.S. 817 (1985).

156. 33 U.S.C. § 1344 (2000).

157. 33 U.S.C. § 1344 (2001).

158. 33 U.S.C. § 1344(b) (2000).

159. *Supra* note 126.

160. 33 C.F.R. § 320.4 (2001).

161. *See, e.g.*, Slagle v. United States, 809 F. Supp. 704 (D. Minn. 1992).

162. 33 U.S.C. § 1344(e) (2000).

163. 33 U.S.C. § 1344(e)(1) (2000).

164. Final Notice of Issuance and Modification of Nationwide Permits, 65 Fed. Reg. 12818 (Mar. 19, 2000).

in the wetland resource, such as single-home constructions where the harm is limited to a smaller acreage.

The nationwide permitting process was substantially revised in 2000.[165] Five new nationwide permits authorize: (1) residential, commercial and institutional activities that would affect up to one-half acre of non-tidal waters, including wetlands; (2) reshaping existing drainage ditches in non-tidal waters, restricted to the minimum area necessary and provided that the activity does not change the existing location or size of the ditch; (3) construction of passive recreational facilities that would disturb up to one-half acre of non-tidal waters or 300 linear feet of streambed; (4) stormwater management facilities that involve construction on up to one-half acre in non-tidal waters; and (5) mining activities affecting up to one-half acre of non-tidal waters, including the area affected by certain support activities.[166] The Corps also modified six existing nationwide permits authorizing: (1) maintenance activities; (2) outfall structures and maintenance; (3) utility line activities; (4) linear transportation crossings; (5) stream and wetland restoration activities; and (6) agricultural activities.[167]

A. Swampbuster

Swampbuster is a supplementary wetlands protection program that limits the conversion of wetlands on agricultural land. It originated with the Food Security Act of 1985[168] (FSA) and is administered by the Department of Agriculture through the NRCS and the Agricultural Stabilization and Conservation Service (ASCS).[169] Important modifications to Swampbuster were made in the Federal Agricultural Improvement and Reform Act of 1966.[170] The key requirement of this legislation is that any person who drains or fills

165. *Id*.
166. *Id*.
167. *Id*.
168. Pub. L. No. 99-108, 99 Stat. 1504 (1985). The Swampbuster provisions are codified at 16 U.S.C. §§ 3821-3824 (2000), and the basic regulations can be found at 7 C.F.R. § 12 (2000).
169. The Agricultural Stabilization and Conservation Service (ASCS) has been renamed the Farm Service Agency, but its core function—administration of farm price and income support payments—remain the same.
170. Pub. L. No. 104-127, 110 Stat. 888 (1996) (codified at 16 U.S.C. § 3821 (2000)).

converted wetlands in order to produce an "agricultural commodity"[171] is ineligible for price supports or payments, loans, crop insurance, or disaster payments related to such production.[172] The Corps, NRCS, EPA, and Agency operate pursuant to a Memorandum of Agreement relating to the delineation of wetlands on agricultural lands under Swampbuster and section 404.[173] In essence, if the wetland is on "agricultural lands" NRCS will do the delineation and the Corps will accept the result.[174] The NRCS has its own manual governing the delineation of wetlands, known as the *Farm Security Act Manual*.[175]

Although there is consistency among the physical definitions of wetlands used by the various agencies, including NRCS, Swampbuster exempts a variety of areas meeting those definitions.[176] Thus, an actual wetland is not considered a wetland under Swampbuster if: (a) conversion to agricultural use by "manipulation" began prior to 1985;[177] (b) it is artificially created; (c) it is a "wet area" created by an irrigation system; or (d) if a natural condition such as drought makes production by normal agricultural practices possible.[178] The agency usually refers to these as "prior converted" wetlands.[179] Wetlands that were manipulated for agricultural use but still satisfy hydrology criteria continue to be subject to regulation under section 404, as do wetlands that were merely cropped under natural conditions but not manipulated.

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171. An "agricultural commodity" is "any crop planted and produced by annual tilling of the soil, including tilling by one-trip planters, or sugarcane." 7 C.F.R. § 12.2(a)(1) (2000).

172. 16 U.S.C. § 3821. Although initially the ineligibility applied only for the crop year in which the conversion took place, the program was strengthened in 1990 and now applies to all subsequent years as well. 16 U.S.C. § 3821(b).

173. Memorandum of Agreement Concerning the Delineation of Wetlands for Purposes of Section 404 of the Clean Water Act and Subtitle B of the Food Security Act ("Delineation MOA").

174. *Id*.

175. U.S. DEP'T OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE, NATIONAL FOOD SECURITY ACT MANUAL (NFSAM) (3d. ed. 1996). The NFSAM is amended periodically. The recent amendment is "Amendment 5," July 2000.

176. 16 U.S.C. § 3822.

177. *See, e.g.*, Von Eye v. United States, 92 F.3d 681 (8th Cir. 1996) (describing the alteration of hydrology, filling and/or removal of wetland vegetation).

178. 16 U.S.C. § 3822(b)(2) (2000); 7 C.F.R. § 12.5(b) (2000).

179. 33 C.F.R. § 328.3(a)(8) (2000).

NRCS is responsible for wetland delineations under Swampbuster. The ASCS establishes eligibility for agricultural subsidies and evaluates the applicability of the exemptions from the program. Each agency has appeals processes.[180]

B. The Process

An office of the Corps prepared the following chart. It succinctly describes the process facing the owner of agricultural lands.

<table>
<tr><td colspan="5">Are you a USDA program participant?
(USDA program participants are required to document their intent to manipulate wet areas on Form AD-1026 at the local USDA Consolidated Farm Service Agency office).</td></tr>
<tr><td colspan="2">YES
Do you have a “certified wetland determination”?</td><td colspan="3">NO
Is the activity you plan an agricultural land?</td></tr>
<tr><td>YES</td><td>NO</td><td>YES</td><td colspan="2">NO
Contact the Corps of Engineers for a wetland delineation</td></tr>
<tr><td>⇩</td><td colspan="2">Contact NRCS for a wetland delineation; then ⇩</td><td colspan="2"></td></tr>
<tr><td colspan="3">Is the area prior converted cropland (PC) or non-wetland (NW)?</td><td colspan="2"></td></tr>
<tr><td>YES
No 404 permit required—verify that the planned activity will maintain your USDA program eligibility.</td><td colspan="3">NO
Is the activity exempt from the permit requirement under CWA 404(f)? Most normal farming activities are exempt.</td><td></td></tr>
<tr><td></td><td>YES
No 404 permit required—verify with the Corps of Engineers. Consult with NRCS to assure compliance with Swampbuster.</td><td>NO
Section 404 permit require; consult with the Corps of Engineers as to whether a general or individual permit applies. Consult with NRCS to assure compliance with Swampbuster.</td><td colspan="2"></td></tr>
</table>

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180. 7 U.S.C. 6991-7001 (2001); 7 C.F.R. § 614 (2001).

181. Sacramento District Corps of Engineers, *at* http://spk.usace.army.mil/cespk-co/regulatory/SM.html (last visited Feb. 19, 2002).

IX. THE NEED TO CONSIDER THE WATERSHED CONTEXT IN THE PRAIRIE POTHOLE

After centuries of an official policy of wetland elimination, many, especially in the scientific community, now perceive wetlands as a significant source of benefits to the economy, the community, and the ecosystem. In areas where wetlands are a feature of the hydrologic system, protection is seen as the better, perhaps only, way to manage ecosystems. Unlike some other regional natural resources management schemes, such as watershed management, wetland protection, at least as practiced in the Prairie Pothole, seems to generate conflict and defeat consensus. Whereas watershed management has been used elsewhere in order to bring stakeholders together in search of common ground, wetland protection has served to divide.

The question then is, "What strategies are available to protect the Prairie Pothole from the incremental degradation that agricultural history and current observations tell us is likely to occur?" As a means of promoting protection of the Prairie Pothole, traditional legal tools operate on an ad hoc basis, and without apparent consideration of the resource as a whole.

A. Endangered Species Act

The ESA does not seem to be a strong tool for resource protection where an ecosystem, despite substantial human intervention, has not reached crisis stage. The case of Pyramid Lake provides an example. There, two endangered species of fish were listed. The species' survival required major and enduring modifications to the prevailing federal irrigation regime and was the catalyst for cooperation among stakeholders. It also developed experimental watershed solutions. This highlights a shortfall with ESA: it is not sufficiently strong enough to deal with ecosystems that are not in visible crisis, or where vocal and influential constituency is lacking. The ESA's "wait for a crisis" approach severely limits its ability to protect ecosystems that suffer minor, but recurring and incremental, degrading acts. While

such ecosystems can be at risk of eventual collapse, the ESA's structure renders ESA powerless to address their slow decline until they reach a visible state of crisis.[182]

B. Swampbuster

The purpose of Swampbuster is unclear. On the one hand, it may be one part of an economic policy that deters commodity farmers from increasing the amount of land in production during a period when Congress is protecting those farmers from the effects of low commodity prices resulting from over production.[183] On the other hand, Swampbuster may be Congressional acknowledgement that wetlands are a valuable part of the nation's water system and that preservation of the wetland resource is national policy.

Swampbuster is, however, subject to a number of exemptions and is administered in a manner which, in practical effect, creates a "second-line" of exemptions.[184] The statute operates on a case-by-case basis and decides preservation wetland-by-wetland.[185] The procedure seems to exhibit the same deficiencies of the ESA administration prior to the adoption of ecosystem management by the Agency.[186] When a decision is made on a particular wetland, which is often small and isolated from a major river or human settlement,

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182. ESA's principal jurisdiction is over threatened and endangered species and the assumption is when a species reaches a point where the agency is concerned, there is a crisis. Until that point, the agency lacks the power to intervene affirmatively.

183. The statute does not declare a single affirmative purpose behind swampbuster. Most observers conclude that the single purpose is wetland preservation, but the alternative purpose—transferring additional funds to commodity farmers during a time of oversupply undoubtedly was a force behind enactment. The farm programs have a long history of paying farmers to "set-aside" or "idle" lands in order to achieve a reduction in harvests without doing economic harm to producers. *See* Benedict, *supra* note 19, at 303; FREDERICK R. STEINER, SOIL CONSERVATION IN THE UNITED STATES: POLICY AND PLANNING 15, 18, 19 (1990).

184. *See, e.g.*, John H. Davidson & Philip P. Chandler, *The Minimal Effects Exemption and the Regulation of Headwater Wetlands Under Swampbuster, With a Coda on The Theme of SWANCC*, 31 Envtl. L. Rep. 11417 (2000).

185. The prohibition applies to the act of converting a wetland, and the agency makes that determination on a case-by-case basis. The statute does not provide for the agency to consider a broad water resource, such as a watershed, and establish priorities for wetland protection.

186. *See* text *supra* notes 78-79.

consideration is not given to the role of that wetland within the larger ecosystem.[187] The drainage, however, is permanent.

C. Clean Water Act

Section 404 of the CWA is relevant in the Prairie Pothole principally in those situations where conversion is for non-farm purposes.[188] By agreement, however, NRCS makes the delineation according to its manual.[189] Again, the determination is made on a wetland-by-wetland basis. In situations where the Corps requires an individual permit, the "public interest" standard provides for consideration of impacts on the ecosystem, wildlife, and other environmental values. By contrast, most farm country projects will evade this standard because they come within the relative protection of general or nationwide permits.[190]

In practice, the exemption of non-point sources of pollution from the regulatory sections of the CWA weighs heavily on farm country. Every wetland drainage project is also a new and permanent source of non-point runoff which will ultimately join with other such projects and burden receiving waterways.

D. National Environmental Policy Act

NEPA may serve to fill a potential gap. Some argue that when an agency administers a permitting program which leads to a number of small, similar permits, an environmental impact analysis should be required in order to evaluate the cumulative effects of the permits.[191] The Corps has, for example, recognized this obligation in the riparian

187. *See supra* note 185.

188. Because the majority of framers in the region rely upon participation in the federal farm programs, the Swampbuster provisions are not called upon. If, however, a farmer is willing to accept disqualification from federal farm programs in order to drain a wetland, he or she will remain exposed to section 404 permitting by the Corps. If it is agricultural land that is being converted, however, the delineation will be carried out by NRCS staff rather than by staff from the Corps. Memorandum of Agreement Concerning the Delineation of Wetlands for Purposes of Section 404 of the Clean Water Act and Subtitle B of the Food Security Act (Jan. 1994).

189. *Id*.

190. 33 C.F.R. § 320.4(a) (2001).

191. *Id.* § 1344(e).

zone of the Missouri River.[192] There, numerous requests by developers for section 404 permits to support stabilization of banks near housing developments have the potential, in small increments, to create a channelized river.[193]

X. MUST SUCCESSFUL WATERSHED AND ECOSYSTEM MANAGEMENT IN THE PRAIRIE POTHOLE AWAIT A COLLAPSE OF THE RESOURCE?

If we can agree that practicing ecosystem management along watershed lines is the best way to protect the Prairie Pothole, how do we begin the process? An examination of watershed case studies provides a clue: there is in almost every case a precursor stage of aggressive and innovative public interest litigation, sometimes using NEPA, Superfund, or ESA.[194]

In 1997, the Western Water Policy Review Commission (Commission) surveyed cooperative watershed efforts in the western United States.[195] The Commission reported on many active and promising initiatives, and in nearly every case the initial effort could be traced to some crisis in resource management which threatened either judicial intervention, potential financial or significant economic, disruption of access to a natural resource.[196] Water quality problems, Superfund locations, and endangered species were the issues most likely to bring stakeholders to the table. The panel reported only one case, the McKenzie River in Oregon, where a watershed program was undertaken without duress.[197] The reporters observed: "It is somewhat surprising that the lack of a local crisis did not hinder the formation or early work of the [McKenzie Watershed] Council, which has generally been blessed with abundant funding and

192. 40 C.F.R. § 1508.25 (2001).

193. U.S. Army Corps of Engineers, Omaha District, Planning Branch, Scope of Work: Programmatic Environmental Impact Statement, Section 33 Bank Stabilization Program (Sept. 28, 1999).

194. *Id*.

195. BETSEY RIEKE & DOUG KENNEY, RESOURCE MANAGEMENT AT THE WATERSHED LEVEL: AN ASSESSMENT OF THE CHANGING FEDERAL ROLE IN THE EMERGING ERA OF COMMUNITY-BASED WATERSHED MANAGEMENT: REPORT TO THE WESTERN WATER POLICY REVIEW COMMISSION 51 (1997).

196. *Id*.

197. *Id*.

the active participation of essential parties."[198] Other than this single exception, the pattern clearly indicates an important gap in state and federal environmental law and policy. Our laws await a crisis, whether it be an imperiled specie, a degraded watershed, a Superfund site, or development of industrial agriculture in a sensitive ecosystem. Once a crisis exists, stakeholders representing the successful economic operators may be willing to participate in a watershed or other cooperative venture as a means of warding off more severe sanctions, such as judicial intervention. Until such a threat exists, however, there is no incentive to participate.

XI. HOW ARE WE TO PROTECT THE FUNCTIONING RESOURCE?

It is likely that phrases such as "watershed management," "sustainability in agriculture," and "ecosystem management" are in fact, synonymous.[199] The terms describe a system that allows useful human activities to proceed in harmony with the surrounding natural systems. The "watershed" component reminds us that the system must be organized to reflect the natural character of the surrounding world, which in most cases will be the watershed. The "sustainability" component reminds us that the system must not use a one-sided ledger and that it must account for the needs of future generations of people *and* natural systems. "Ecosystem management" reminds us that humans are part of a dynamic, natural system which needs the freedom to function, even if humans, along with creatures and plants, must adapt to changes in the world. When we interfere with natural systems, as we always do in the field of agriculture enterprise, we must foster the natural process that allow ecosystems to adapt.

Perhaps these phrases are not adequately descriptive even when combined; perhaps we have just replaced three vague concepts with one that is equally vague! What is suggested here is that the three

198. Rieke & Kenney, *supra* note 195, at 22.

199. Goldfarb associates "watershed management" with words like "sustainability," which carry strong and hortatory meanings, "but lack descriptive specificity." Goldfarb, *supra* note 122, at 483. In *Conference Report*, 4 U. DENVER WATER L. REV. 539, 540 (2001), the reporter emphasizes that ". . . watershed management is essentially ecosystem management at the watershed level . . . ."

phrases, taken together, provide a starting point. From that starting point, we must determine how to initiate an ecosystem protection program in wetland hydrology, such as the Prairie Pothole. The reports of sustained, functioning watershed efforts are not encouraging.[200] They suggest that until the resource or ecosystem collapses or until some interested parties initiate litigation to enforce a legal requirement, such as those found in ESA, CWA, Swampbuster or NEPA, there is little reason for others to volunteer.[201] In fact, the threat of judicial enforcement seems to be the common ingredient. Where there is an ecosystem in actual crisis, the threat of litigation or loss of a productive resource may be an inevitable part of the mixture and will serve a useful purpose if it brings the various watershed stakeholders to the table. Where, however, as in the case of the Prairie Pothole, the hydrologic resource is threatened but is still functioning and resilient; where the list of endangered and threatened species is not yet great; where the degrading activities are dispersed and incremental; and where the human population does not include willing and able media spokespersons, there is a no apparent strategy for resource protection. Doremus observed that,

> Species are not eligible for protection under the ESA until they are demonstrably threatened or endangered. If the goal is (as the ESA proclaims) recovery of species to a level no longer requiring protection, waiting until species reach this dire situation makes neither scientific nor economic sense. By the time a species reaches the point where it is known to be endangered or threatened, recovery may require extremely expensive measures, and may be impossible even if vast sums are expanded.[202]

Of all the existing environmental laws, the NEPA alone deals with the issue.[203] As interpreted by the courts and in the regulations of the

200. Rieke & Kenney, *supra* note 195.
201. *Id*.
202. Holly Doremus, *Patching the Ark: Improving Legal Protection of Biological Diversity*, 18 ECOLOGY L.Q. 265, 316 (1991).
203. 42 U.S.C. §§ 4332(A), (B), and (C)(vi) (2001).

Council of Environmental Quality, when an agency is charged with a series of small but similar decisions, it may become necessary to prepare a cumulative EIS to assess the overall results.[204] Thus, in areas like the Prairie Pothole, the NRCS should consider the overall impacts of the manner in which it is administering the Swampbuster. Even then, once that is done, there is no legal obligation to alter the program in a substantive way.

The element that the current policy lacks, and which might serve to avert crisis in the Prairie Pothole, is the integration of watershed planning into existing wetland protection laws.[205] Searchinger has laid out this suggestion in great detail, but it bears re-examination.[206] Building on the ideas of the pioneers in the early Soil Conservation Service, a "watershed wetland plan" should be a required precursor to individual wetland permit and drainage decisions. The plan should "identify existing wetlands within a watershed or sub-watershed, and distinguish those deserving preservation under almost all circumstances from those which might be developed with specific mitigation requirements."[207]

It is critical to recognize, for example, that the Prairie Pothole's 17,000 miles of sloped headwater wetlands are linear, and that their function of connectivity must be preserved. A full plan must therefore be in place before any decisions authorizing wetland destruction are made.

The advantages of this approach are numerous. First, it is scientifically sound and assures that protection issues are addressed long before a crisis arises. Delineations would occur in advance and avoid the current contentious and inefficient process of case-by-case delineation. All landowners would have advance knowledge of their situation, and the wetland development permit process would be eased in qualifying areas. Importantly, restoration could be built into the plan as well.

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204. 40 C.F.R. § 1508.7 (2001).

205. Timothy D. Searchinger, *Wetlands Issues 1993: Challenges and A New Approach*, MD. J. CONTEMP. LEGAL ISSUES 13, 58 (1993).

206. *Id*.

207. *Id*. at 59.

At it's core, the Searchinger proposal is a contemporary recognition that the early SCS attempt to get soil conservation districts organized along watershed lines, operating pursuant to plans premised in sound science and using police power authority to implement and enforce the plan, was valid.[208] One goal of the early SCS concept was to assure the orderly use and preservation of natural resources within the context of a functioning private working landscape.[209] It was further sought to avoid conflict, nuisance, and resource abuse by anticipating issues rather than waiting for crisis or resource collapse.[210] The goals were valid then and are now more important than ever. Whether this or some other reform is adopted, it is clear that current environmental law and policy does not address the issue of how to protect our still healthy and functioning ecosystems from certain degradation.

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208. *See* text *supra* notes 47-53.
209. *See* text *supra* notes 100-13.
210. *See* text *supra* note 108.