THERE MUST BE SOMETHING IN THE WATER: AN EXPLORATION OF THE RHINE AND MISSISSIPPI RIVERS' GOVERNING DIFFERENCES AND AN ARGUMENT FOR CHANGE

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ABSTRACT

Rivers and river basins respect no political boundaries. The governance and pollution of transboundary bodies of water, like the Rhine and Mississippi Rivers, pose many challenges for national and local governments. This article examines the governance of the Rhine River in Europe, the dramatic cleanup of the Rhine, and the governance and continued pollution problems of the Mississippi River. The U.S. federal and various state governments controlling the Mississippi River should reform the governance model to resemble the Rhine River structure in order to improve pollution control and coordination of government and other stakeholders.

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INTRODUCTION

Rivers play important roles in economies and cultures around the world. Concerns over availability of drinking water sources, siting of hydroelectric dams, and upstream pollution sources make governance of rivers and other transboundary waters increasingly important. The Rhine River was one of the world's most polluted rivers for decades, but has transformed into a much cleaner water source over the last 25 years.[1] Despite anti-pollution efforts by the U.S. government and various states, the Mississippi River continues to be very polluted and the major cause of the "dead zone" in the Gulf of Mexico, an area with depleted oxygen and little marine life.[2] The dead zone further damages an already injured

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[1] MARCO VERWEIJ, TRANSBOUNDARY ENVIRONMENTAL PROBLEMS AND CULTURAL THEORY: THE PROTECTION OF THE RHINE AND THE GREAT LAKES 72 (2000).

[2] *See* MISSISSIPPI RIVER/GULF OF MEXICO WATERSHED NUTRIENT TASK FORCE, GULF HYPOXIA ACTION PLAN 2008 FOR REDUCING, MITIGATING, AND CONTROLLING HYPOXIA IN THE NORTHERN GULF OF MEXICO AND IMPROVING WATER QUALITY IN THE MISSISSIPPI RIVER BASIN 2 (2008) [hereinafter GULF HYPOXIA ACTION PLAN 2008], http://www.epa.gov/msbasin/pdf/ghap2008_update082608.pdf.

region.[3] The Rhine River is an important example of transboundary river governance that works well and is a model that should be replicated. This article examines the application of the Rhine River model to the Mississippi River, although there are potential applications to other rivers facing pollution issues, such as the Yangtze in China or the Mekong in Southeast Asia.[4]

The governance and pollution of transboundary bodies of water like the Rhine and Mississippi Rivers pose many challenges for national and local governments. This article examines the governance of the Rhine River in Europe, the dramatic cleanup of the Rhine, and the governance and continued pollution problems of the Mississippi River. The federal government and state jurisdictions with control over the Mississippi River should adopt a governance model based on the Rhine River to improve pollution control and coordination of government and other stakeholders.

In Part I, this article examines the economic and cultural importance of the Rhine River and its major pollution challenges. It also explores the development of the river governance structure and why an approach involving improving individual nation pollution standards combined with a serious coordinated international effort was successful. In Part II, this article examines the Mississippi River and its economic and cultural importance and major pollution issues that plague the river—specifically, the hypoxia zone in the Gulf of Mexico. It also examines the development of transboundary water and river governance in the United States and why the efforts to clean up the Mississippi have had limited success. Part III explores why the Rhine River approach should be applied to the governance of the Mississippi River and some possible limitations to the approach.

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[3] *Id.*

[4] Ethan Epstein, *Brown China: The Myth of an Environmentally Friendly People's Republic*, WKLY. STANDARD, Oct. 25, 2010, at 21; Cam Mcgrath, *Finding More Fish, Between Egypt and Vietnam*, AFRICA NEWS (Cairo), Oct. 28, 2010.

I. RHINE RIVER POLLUTION & GOVERNANCE

A. ECONOMIC & CULTURAL IMPORTANCE OF THE RHINE RIVER

The Rhine River is a centrally important river in Europe.[5] It is almost 800 miles long and borders Germany, France, Switzerland, the Netherlands and Liechtenstein.[6] The Rhine River Basin encompasses over 65,000 square miles and also includes parts of Luxembourg, Austria, and Belgium.[7] The river connects the two major ports of Rotterdam, the Netherlands and Duisburg, Germany.[8] The Rhine River basin is also a densely populated area of about fifty-eight million people.[9] Approximately thirty million people rely on the Rhine for their drinking water.[10] The Rhine has long been used as a major trade and shipping route.[11] In 1815, Rhine nations negotiated an agreement to provide for free navigation of the river and to promote the use of canals along the river to facilitate shipping.[12] The Rhine was also known as the best salmon fishing river in Europe and hundreds of fisherman made their living on the "gold of the Rhine."[13] From its early use in a variety of commercial ventures, the Rhine developed into a heavy industrial and chemical manufacturing area as Europe began industrialization in the mid-to-late nineteenth century.[14] The river facilitated the transportation of goods and provided access to water for various manufacturing processes and discharge of wastes.[15] In the twentieth century, energy industries such as coal, nuclear power, natural gas and oil refineries were built

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5 VERWEIJ, *supra* note 1, at 79.

6 Pieter Huisman et al., *Transboundary Cooperation in Shared River Basins: Experiences from the Rhine, Meuse and North Sea*, 2 WATER POL'Y 83, 83–84 (2000).

7 *Id.*

8 INT'L COMM'N FOR THE PROT. OF THE RHINE, THE RHINE: A RIVER AND ITS RELATIONS 5 (Anne Schulte-Wülwer-Leidig ed., 11th ed. 2008) [hereinafter ICPR 2008 REPORT], http://www.iksr.org/fileadmin/user_upload/Dokumente _en/Rhein_08_E.pdf.

9 *Id.* at 7; Colleen P. Graffy, *Water, Water, Everywhere, Nor Any Drop to Drink: The Urgency of Transnational Solutions to International Riparian Disputes*, 10 GEO. INT'L ENVTL. L. REV. 399, 428 (1998).

10 ICPR 2008 REPORT, *supra* note 8, at 7.

11 VERWEIJ, *supra* note 1, at 79.

12 *Id.*

13 ICPR 2008 REPORT, *supra* note 8, at 6.

14 *Id.* at 3.

15 *Id.*

along the river.[16] Agricultural lands near the river also drained chemical runoff and soils into the river.[17]

The Rhine is also vastly important to individual countries in Europe. The river is particularly important to the Netherlands because it dissects and supplies water to much of the country.[18] A serious diplomatic crisis between the Netherlands and France involved a French salt mining company disposing of large amounts of salt into the Rhine.[19] The Netherlands argued that the salt emissions harmed a variety of Dutch interests, including the port of Rotterdam, water companies, and flower growers.[20] French resistance to halt the discharges resulted in the Dutch government recalling its ambassador from France.[21] Additionally, to keep their port operational, the city of Rotterdam spent significant funds to dredge the harbor of ten million cubic meters of toxic sludge every year during the 1970s and 1980s.[22]

B. POLLUTION OF THE RHINE RIVER

The River gained a reputation as the open sewer of Europe because of the pollution from industry, agriculture, and the cities and towns throughout the watershed.[23] The pollution was so bad that some northern Germans said that it was possible to develop a photograph in the

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[16] *Id.*

[17] VERWEIJ, *supra* note 1, at 79.

[18] *Id.* at 78.

[19] *Id.* at 71.

[20] *Id.* at 84.

[21] *Id.*

[22] *See* ICPR 2008 REPORT, *supra* note 8, at 8.

[23] VERWEIJ, *supra* note 1, at 71–72; Martin Koppel, *The Effectiveness of Soft Law: First Insights from Comparing Legally Binding Agreements with Flexible Action Programs*, 21 GEO. INT'L ENVTL. L. REV. 821, 827 (2009); In 1834, poet Samuel Taylor Coleridge famously wrote:

> In Köln, a town of monks and bones,
> And pavements fang'd with murderous stones
> And rags, and hags, and hideous wenches;
> I counted two and seventy stenches,
> All well defined, and several stinks!
> Ye Nymphs that reign o'er sewers and sinks,
> The river Rhine, it is well known,
> Doth wash your city of Cologne;
> But tell me, Nymphs, what power divine
> Shall henceforth wash the river Rhine?

VERWEIJ, *supra* note 1, at 109.

river.[24] Environmental problems reached a peak in the late 1960s and early 1970s.[25] It was during this time that a sixty-two mile section of the river was found to contain no oxygen.[26] As a result of the heavy pollution, millions of fish and other aquatic creatures died and completely covered the surface of the Rhine for two days.[27] Because of the river's important location in Europe, many heavy industries, including coal, steel, chemical production and auto manufacturing, are located along the river.[28] Approximately twenty percent of the world's chemicals are manufactured in the Rhine River region.[29] The area also includes industrial pollution sources such as cadmium, lead, and zinc from steel and iron production.[30] Additionally, car manufacturers, including Mercedes-Benz, Opel, and Ford, establish factories along the river or its major tributaries.[31] Agricultural runoff, fertilizer manufacture and wastewater from the population also played a major role in the pollution of the Rhine.[32] In the late 1880s, 250,000 salmon were caught annually, but by the mid-twentieth century, they had all but disappeared from the river.[33]

C. EARLY GOVERNANCE & HARD LAW[34]

1. APPROACHES TO INTERNATIONAL GOVERNANCE OF TRANSBOUNDARY WATERS

Generally, legal regimes governing international rivers, such as the Rhine, look to customary international law[35] for guidance and the

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[24] *60 Years of Rhine Cooperation*, SWISS NEWS, Sept. 1, 2010, at 9.

[25] VERWEIJ, *supra* note 1, at 79.

[26] *Id.*

[27] *Id.* at 79–80.

[28] *Id.* at 79.

[29] *Id.*; Koppel, *supra* note 23, at 827.

[30] STEFAN ANDERBERG ET AL., OLD SINS: INDUSTRIAL METABOLISM, HEAVY METAL POLLUTION, AND ENVIRONMENTAL TRANSITION IN CENTRAL EUROPE 63 (2000).

[31] *Id.* at 52–53.

[32] *Id.* at 68–71.

[33] Huisman, *supra* note 6, at 88.

[34] "Hard law" describes binding and enforceable commitments including conventions or treaties. In contrast, "soft law" is a term generally used by international lawyers to indicate general principles that are agreed to by nations or international bodies without a specific enforceable commitment from the nations or international body. BRYAN A. GARNER, A DICTIONARY OF MODERN LEGAL USAGE 815 (2d ed. 1995).

source of law on liability standards.[36] There are four major classical international legal approaches that countries may draw upon when determining who is liable for water pollution: limited territorial sovereignty, absolute territorial sovereignty, absolute territorial integrity, and community theory.[37] The limited territorial sovereignty approach argues that an individual state has an "affirmative obligation not to allow major pollution to cross its borders."[38] A number of international agreements support this approach, including the Stockholm Declaration on the Human Environment of 1972 and the Helsinki Rules on the Uses of the Waters of International Rivers.[39]

Advocates of absolute territorial sovereignty, by contrast, tend to be from upstream states, rather than from downstream states.[40] This approach argues that states can do whatever they wish to the water within their territory without regard for other states.[41] The opposite of the absolute territorial sovereignty theory is absolute territorial integrity, which states that downstream states have a right to the continuous flow of water from the river without alteration to the amount of flow or the quality of the water.[42] Finally, the community theory approach argues for viewing the water in a basin as one entity.[43] Advocates of this theory believe that the best way to manage a river is to manage the system without regard to various territorial boundaries.[44] These theories provide context for the approaches of Rhine nations over the last several hundred years.

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[35] Customary international law refers to the beliefs and practices of a particular social and economic system that are so important and intrinsic to the system that the practices are treated as if they were actually binding law. These are generally unwritten and passed down through generations. GARNER, *supra* note 34, at 241.

[36] Astrid Boos-Hersberger, Note, *Transboundary Water Pollution and State Responsibility: The Sandoz Spill*, 4 ANN. SURV. INT'L & COMP. L. 103, 111 (1997).

[37] *Id.* at 111.

[38] *Id.* at 112.

[39] *Id.*; United Nations Conference on the Human Environment, Stockholm, Swed., June 5–16, 1972, *Stockholm Declaration on the Human Environment*, 11 I.L.M. 1416, 1420 (June 16, 1972); International Law Association, *Helsinki Rules on the Uses of the Waters of International Rivers*, art. 1, at 484 (Aug. 1966).

[40] Boos-Hersberger, *supra* note 36, at 113.

[41] *Id.*

[42] *Id.*

[43] *Id.*

[44] *Id.*

2. CREATION OF THE INTERNATIONAL COMMITTEE FOR THE PROTECTION OF THE RHINE

The first attempts to manage the Rhine River in Europe began as early as 1449.[45] Formal governance of the Rhine began with the 1815 at the Peace Conference of Vienna.[46] During that conference, the Central Commission for the Navigation of the Rhine ("CCNR") was founded to maintain free navigation of the river, promote economic uses such as shipping, and develop a canal system.[47] The Dutch began raising environmental concerns about the river to the CCNR after World War II.[48] In 1950, the Netherlands, Luxembourg, Germany, France, and Switzerland created the International Commission for the Protection of the Rhine ("ICPR").[49] The ICPR's administrative headquarters and staff are located in Koblenz, Germany.[50] Commissioners on the ICPR are high-level government officials from the signatory countries and representatives from the European Community, which became a party to the ICPR in 1976.[51] The president of the commission rotates among the member nations, but the executive secretary of the commission is always from the Netherlands.[52] The Commission meets annually and countries bring delegations for a series of meetings concerning finances and ICPR goals.[53] There are also a number of working groups and expert scientific groups to address environmental and other issues.[54] These working groups include national experts from each of the member countries.[55]

In 1963, the Bern Convention on the Protection of the Rhine reconstituted the ICPR, allowing the organization could take official

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[45] Koppel, *supra* note 23, at 827.

[46] *See* VERWEIJ, *supra* note 1, at 79.

[47] *Id.*

[48] *Id.* at 80.

[49] *Id.*; *see also* SWISS NEWS, *supra* note 24, at 9.

[50] VERWEIJ, *supra* note 1, at 80; *see also Secretariat*, INT'L COMM'N FOR THE PROT. OF THE RHINE, http://www.iksr.org/index.php?id=120&L=3 (Dec. 27, 2010).

[51] VERWEIJ, *supra* note 1, at 80.

[52] *Id.*

[53] *Id.*

[54] *Id.*

[55] *Id.*

actions, including issuing reports and holding international conferences.[56] The Bern Convention set out the official tasks of the ICPR, requiring it to "(a) report on the state of the environment of the Rhine; (b) to propose international policy solutions to the Rhine's ecological problems; (c) to hold regular international consultations; and (d) to monitor and partly implement any intergovernmental agreements that have been reached."[57] After the reorganization of the ICPR, it began to take more formal actions and establish major treaties.

3. FORMAL GOVERNANCE—THE CHEMICAL AND CHLORIDES CONVENTIONS

In 1976, the ICPR finalized its first major agreements, the Convention on the Protection of the Rhine Against Chemical Pollution and the Convention on the Protection of the Rhine Against Chlorides (hereinafter the Chemical and Chlorides Conventions).[58] The Chemical and Chlorides Conventions were signed by all of the Rhine nations as well as the European Union.[59] The goal of these treaties was to decrease the emissions of hazardous chemicals and salts into the river.[60] However, implementing these treaties proved challenging. The ICPR was tasked with developing a list of prohibited toxic and hazardous chemicals.[61] Although the Commission initially identified eighty-three substances for emission regulation, emission standards were only developed for three chemicals—quicksilver, tetrachloride, and cadmium.[62] The implementation of the Chlorides Convention faced particular resistance in France, where the treaty was not even introduced in parliament for several years.[63] The resistance was the result of well-organized opposition from representatives from the Alsace region, home to a salt mine responsible for thirty-five to forty percent of salt emissions into the Rhine.[64]

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[56] *Id.*; *see also* Thomas Bernauer et al., *Reducing Pollution of the River Rhine: The Influence of International Cooperation*, 5 J. OF ENV'T & DEV. 389, 390 (1996).

[57] VERWEIJ, *supra* note 1, at 80.

[58] *Id.* at 80–81; Koppel, *supra* note 23, at 829.

[59] Koppel, *supra* note 23, at 829.

[60] VERWEIJ, *supra* note 1, at 83–84.

[61] *Id.* at 83.

[62] *Id.*

[63] *Id.* at 84.

[64] *Id.*

From 1976 through 1986, environmental protection measures were being enacted in all of the ICPR member nations, but the Rhine continued to suffer.[65] The regulations in individual countries varied widely.[66] According to Marco Verweij, who has written extensively on the transboundary environmental problems impacting the Rhine, the hierarchical system controlling the interactions of the member nations made international cooperation impractical.[67] During the summer of 1986, officials from the Netherlands' Ministry of Transport, Public Works, and Water Management tried to meet with their German counterparts to discuss issues surrounding the Rhine.[68] The German officials refused to meet because of the poor relations between government officials and differing approaches to regulating pollution discharge levels in the river.[69] Governance of the river was at an impasse.

D. MODERN GOVERNANCE & A NEW APPROACH

1. DEVELOPMENT OF THE RHINE ACTION PLAN

The dynamics of relations among Rhine River nations changed after a severe industrial accident on November 1, 1986, when an intense fire broke out in an industrial area near Basel, Switzerland.[70] The fire, later known as the Sandoz incident,[71] was centered on an agricultural chemical warehouse, and in combating the fire, firefighters sprayed millions of gallons of water onto the warehouse.[72] The amount of water used to fight the fire was so large that existing catch basins could not contain the runoff, and the water spilled over into the Rhine.[73] A number of chemicals were released into the Rhine as a result of the inadequate water catch pools including insecticides, a benzene compound, and a

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[65] *See id.* at 88–89.

[66] *Id.* at 88.

[67] *Id.* at 88–89.

[68] *Id.* at 89–90.

[69] *Id.* at 90.

[70] Boos-Hersberger, *supra* note 36, at 104–05.

[71] *Id.* The fire was known as the Sandoz incident because Sandoz, a Swiss chemical and pharmaceutical manufacturer, owned the warehouse where the fire broke out. *Id.* Sandoz merged with another company in 1996 and became Novartis. *Company History*, NOVARTIS, http://www.novartis.com/about-novartis/company-history/index.shtml (last visited Oct. 23, 2011).

[72] Boos-Hersberger, *supra* note 36, at 105–06.

[73] *Id.* at 106.

variety of other toxic chemicals.[74] After the fire and chemical spill, thousands of fish and birds littered the banks of the river.[75] About a month and a half after the incident, the Swiss Federal Institute for Water Resources and Water Pollution Control reported that almost all of the fish and organisms that fed the fish were dead.[76]

In the aftermath of the spill, the ICPR and member countries' approach to governing the Rhine was discredited.[77] Environmental protestors demonstrated in cities across the Rhine River region.[78] A headline from *The Economist* read "Europeans do it to each other."[79] The ICPR commissioners convened shortly after the accident to address the damage.[80] After the meeting, leaders of the Dutch Ministry of Transport, Public Works, and Water Management hired a private consulting group, McKinsey-Amsterdam, to develop a framework for a new international agreement to address the Rhine's serious ecological issues.[81]

McKinsey-Amsterdam focused on a few major tasks. First, the consulting group interviewed top water pollution experts from all of the member nations to identify which pollutants deserved the highest priority in the cleanup of the Rhine.[82] The substances that were most frequently mentioned would form the first list of pollutants to address and ban.[83] Additionally, the consultants focused on finding a symbol of restoration and improved quality of the river.[84] They determined that the overarching goal of the plan should be to restore salmon to the river by the year 2000.[85] The final component of the McKinsey-Amsterdam report was that international regulation should be minimal and informal.[86] The plan called for non-binding reports regarding goals for cleanup of the river to be issued by the ICPR, rather than a formal treaty making process setting out the specifics of regulation.[87] After the plan was developed by

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74 *Id.* at 105–06.
75 *Id.* at 106.
76 *Id.*
77 VERWEIJ, *supra* note 1, at 90.
78 *Id.* at 91.
79 *Id.*; *Europeans Do It to Each Other*, ECONOMIST, Nov. 15, 1986.
80 VERWEIJ, *supra* note 1, at 91.
81 *Id.* at 92.
82 *Id.* at 93.
83 *Id.*
84 *Id.*
85 *Id.*
86 *Id.*
87 *Id.*

McKinsey-Amsterdam, it became the basis of the Rhine Action Plan ("RAP") adopted by the ICPR on October 1, 1987.[88]

The RAP was approved unanimously and contained three broad goals, but no binding commitments for individual nations.[89] First, the RAP aimed to restore salmon and other higher-level species to the Rhine by 2000.[90] Second, the RAP would secure the continued use of the river as a drinking water source.[91] And third, the RAP would clean up the chemically polluted and heavy metal-laced sediment in the river.[92] These overarching goals provided the backdrop for the agreement, but the ICPR also developed a number of quantitative sub-goals in order to achieve the RAP's aims.[93] The sub-goals included a fifty percent reduction of priority hazardous emissions by 1995, the reconstruction of salmon spawning grounds, and "fish passages" around the dams in the river.[94]

The RAP was an important and successful program. It is important to note that prior to the adoption of the RAP, individual nations and their industries began the important process of adopting some effluent standards to clean the river.[95] Thanks to the combination of ICPR member nations' activities and the cooperation and focus of the ICPR, the goals of the program were met five years ahead of schedule.[96] The soft law approach taken by the RAP allowed individual countries to develop and calibrate their approach to cleanup.[97] It was more effective than a specific binding treaty would have been.[98] Emissions of the identified priority substances decreased by about seventy percent by the end of 1994.[99] An advanced warning system was in place to provide better notification of spills along the river.[100] Salmon and other important species returned to the river for the first time in decades.[101] The RAP

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88 *Id.* at 94.

89 *Id.*

90 *Id.* Salmon spawning grounds were destroyed by a combination of agricultural, industrial, urban development, and the presence of dams in the river. *Id.*

91 *Id.*

92 *Id.*

93 *Id.*

94 *Id.* at 94–95.

95 *See Id.* at 114–15; Marco Verweij, *Why Is the River Rhine Cleaner than the Great Lakes (Despite Looser Regulation)?*, 34 LAW & SOC'Y REV. 1007, 1014–15 (2000).

96 VERWEIJ, *supra* note 1, at 95.

97 Koppel, *supra* note 23, at 825.

98 *Id.*

99 VERWEIJ, *supra* note 1, at 95.

100 *Id.*

101 *Id.*

approached the river system holistically and more in line with the community theory of customary law.[102] However, it is important to restate that the RAP was not a formal, binding treaty, but an agreement with overarching goals and flexibility for individual nations to develop mechanisms to meet specific targets.[103] The RAP stimulated development of national water policies in all member nations.[104] It was implemented quickly because of coordination and friendly relationships between government representatives at the ICPR.[105]

2. CONVENTION ON THE PROTECTION OF THE RHINE

Beginning in 1994, the ICPR has moved toward a more streamlined governance structure to reflect the institutional changes in the RAP.[106] Prior to the RAP, the ICPR had around eighteen different working groups, expert groups and subcommittees.[107] After implementation of the RAP, the ICPR had only three permanent working groups and two ad hoc groups.[108] In addition to streamlining the organization, the ICPR began working on an interim agreement, the Convention on the Protection of the Rhine, signed in January 1998.[109] The final version of the Convention on the Protection of the Rhine was adopted in April 1999.[110] The Convention on the Protection of the Rhine[111] takes a governance approach that is similar to, and an extension of, the RAP.[112] The overarching goals of this agreement are "sustainable development of the Rhine; further improvement of the ecological state;

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[102] *See id.* at 94.

[103] *Id.* at 97.

[104] *See id.* at 96.

[105] *Id.*

[106] *Id.* at 97.

[107] *Id.*

[108] *Id.*

[109] *Id.* at 103.

[110] INT'L COMM'N FOR THE PROT. OF THE RHINE, CONVENTION ON THE PROTECTION OF THE RHINE (Apr. 12, 1999), *available at* http://www.iksr.org/fileadmin/user_upload/Dokumente_en/convention_on_tthe_protection_of__the_rhine.pdf.

[111] Though the agreement is called a 'convention,' it does not contain specific, binding commitments for individual member nations. The agreement sets the general goals for the convention, describes the tasks of the commission, and allows individual nations to withdraw from the convention or receive extensions to implement any goals. *Id.* at art. 3, 8, 18, and 11(4).

[112] *See* VERWEIJ, *supra* note 1, at 105.

holistic flood protection. . .; and the preservation, improvement and restoration of natural habitats and of the natural stream function."[113]

The negotiations leading up to the Convention on the Protection of the Rhine were also marked by the increased involvement of a variety of non-governmental organizations ("NGOs").[114] The ICPR and member nation governments began to include NGOs because NGOs were generally supportive of Rhine cleanup policies and often added helpful suggestions for more holistic ecosystem management.[115] Observer status was offered to groups, including environmental groups, industry and agricultural associations, and water supply companies, allowing these groups to play a larger role in the continued improvement of the river.[116]

3. RHINE 2020—UPDATING THE GOVERNANCE OF THE RIVER

In 2001, the commissioners of the ICPR adopted a new program, Rhine 2020, for continued improvement of the river's ecosystem and water quality.[117] Rhine 2020 is a comprehensive plan that expands on the structure of the Convention on the Protection of the Rhine.[118] Rhine 2020 has four important targets.[119] First, the program aims to improve ecosystems up and down the river and connect habitats.[120] Second, Rhine 2020 focuses on prevention of flooding and greater protections from floods for downstream countries.[121] Third, the program emphasizes improving water quality further, so that individuals will feel comfortable bathing in the river.[122] Finally, Rhine 2020 targets improving the groundwater quality in the basin.[123]

Additionally, the ICPR set out a number of specific targets within the general goals and outlined a number of instruments and

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[113] *Id.*
[114] *Id.* at 103–05.
[115] *Id.* at 104.
[116] *Id.*
[117] CONFERENCE OF RHINE MINISTERS 2001, RHINE 2020: PROGRAM ON THE SUSTAINABLE DEVELOPMENT OF THE RHINE 3 (Karin Wehner trans., 2001), *available at* http://www.iksr.org/fileadmin/user_upload/Dokumente_en/rhein2020_e.pdf.
[118] *Id.*
[119] *Id.* at 6–7.
[120] *Id.* at 6.
[121] *Id.*
[122] *Id.* at 7.
[123] *Id.*

mechanisms to be used in implementing Rhine 2020.[124] These instruments include implementing voluntary agricultural agreements,[125] agreements between individual water users or user groups, encouraging the involvement of local interest groups, and regularly organized discussion groups in different regions to address emerging or continuing problems.[126] Rhine 2020 also recommends the use of pilot projects for habitat restoration in different areas and linking those projects to facilitate information exchange.[127] The plan also sets interim goals, particularly regarding the flood control provisions of the program.[128] The Rhine 2020 plan aims to build on the success of the last twenty years and to continue to restore the Rhine River.

4. WHY MODERN GOVERNANCE OF THE RHINE WORKED

There are a number of key reasons why the RAP and subsequent agreements resulted in the cleanup of the Rhine River. Chief among them are improved pollution control laws that regulated water quality in individual nations, the ICPR and other groups' monitoring of the water quality and river system, and the social pressures and international cooperation spurred by the Sandoz incident.[129] The ICPR continues to play an important role in the governance of the river; today its focus is on monitoring and eliminating pharmaceuticals and cosmetics that are present in the water.[130]

Individual Rhine River nations and industries within those countries began to implement improved pollution control measures in the mid-1980s.[131] Industries started voluntarily reducing their emissions by more than the levels required by the ICPR, reflecting a general public consensus that there was a pollution problem with the river.[132] Additionally, after the Sandoz spill, the ICPR's governance structure was

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[124] *Id.* at 21.

[125] Voluntary agricultural agreements focus on reducing the amount of nitrogen and chemical insecticides and herbicides applied to crops. For example, in Switzerland, voluntary agreements between farmers and the government focus on integration of agricultural production by using less intense, organic farming methods. *Id*. at 21, 27.

[126] *Id.* at 21.

[127] *Id.*

[128] *Id.* at 22.

[129] *See* VERWEIJ, *supra* note 1, at 110–11.

[130] SWISS NEWS, *supra* note 24, at 9.

[131] VERWEIJ, *supra* note 1, at 114–15.

[132] *Id.*; Verweij, *supra* note 95, at 1026.

revised through the RAP and subsequent agreements to facilitate cleanup and rehabilitation of the Rhine, as well as manage the river as an ecosystem.[133] The continuing coordination and permanent contact between Rhine River nations and the ICPR was of critical importance to the restoration of the River and successful implementation of the agreements.[134] Through the ICPR, Rhine River nations built consensus around broad goals for the ecosystem.[135] The agreements allowed governments and industry flexibility in achieving water quality improvements and habitat restoration based on the tools and mechanisms available to them.[136] Though the interactions between different stakeholders were certainly contentious, it was much less adversarial than the system that exists for governing various U.S. watersheds.[137] Cleanup of the Rhine River is not entirely the result of the ICPR, the RAP and subsequent agreements, but the functional structure of ICPR governance played a key role.[138] The public and member nations' desire for river cleanup, coupled with the coordination, goal-setting, and monitoring role of the ICPR contributed to the Rhine being vastly more clean.[139]

II. MISSISSIPPI RIVER POLLUTION & GOVERNANCE

A. ECONOMIC & CULTURAL IMPORTANCE OF THE MISSISSIPPI RIVER

The Mississippi River is one of the most important rivers in the United States. It is 2,340 miles long and supports a basin of over 1.15 million square miles.[140] The river borders Minnesota, Wisconsin, Iowa, Illinois, Missouri, Kentucky, Tennessee, Arkansas, Mississippi and Louisiana.[141] In addition to the Mississippi itself, the river basin includes

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[133] VERWEIJ, *supra* note 1, at 117.

[134] *See, e.g.*, Peter H. Sand, *Lessons Learned in Global Environmental Governance*, 18 B.C. ENVTL. AFF. L. REV. 213, 265 (1991).

[135] VERWEIJ, *supra* note 1, at 94.

[136] *Id.* at 94, 97.

[137] Verweij, *supra* note 95, at 1027.

[138] VERWEIJ, *supra* note 1, at 117.

[139] Today, German officials cite the cooperation between government agencies, industry, citizen action groups, and the general public as the most important aspect of environmental protection. Wannapa Khaopa, *Green Lessons from Germany*, NATION (Thai.), Dec. 15, 2010.

[140] J.C. KAMMERER, U.S. GEO. SURVEY, WATER FACT SHEET: LARGEST RIVERS IN THE UNITED STATES 1–2 (1990), *available at* http://pubs.usgs.gov/of/1987/ofr87-242/pdf/ofr87242.pdf.

[141] *Id.* at 1.

several other major American river systems: the Missouri-Platte River Basin, the Ohio-Tennessee River Basin, and the Arkansas-White-Red River Basin.[142] The Mississippi and the tributaries comprising the river basin drain approximately 41 percent of the land area of the continental United States, ultimately draining thirty-one states.[143] This is the second largest drainage area of any river basin in the world.[144] Approximately twenty-seven percent of the U.S. population lives in the drainage area.[145] About eighteen million people get their drinking water from the Mississippi River Basin.[146] The basin is also home to over fifty percent of America's farmland, including row crops like corn and soybeans.[147]

Additionally, the Mississippi River serves an important role in the U.S. economy. It has been used as a major commercial route since the early 1800s transporting cotton, agricultural products, timber and coal.[148] Billions of dollars worth of cargo are transported along the river every year.[149] The dead zone,[150] caused by pollution from the river, occurs in an area home to 30 percent of U.S. fisheries with 70 percent of annual shrimp production and 60 percent of annual oyster production.[151] These industries account for $2 billion in annual sales and $1.1 billion in income for the over 50,000 people who are employed there.[152] Over half

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[142] GULF HYPOXIA ACTION PLAN 2008, *supra* note 2, at 3.

[143] Scott Siff & David Mears, *The Mississippi River Basin: A National Treasure, a National Challenge*, 12 TUL. ENVTL. L.J. 293, 295 (1999); NAT'L RESEARCH COUNCIL COMM. ON CLEAN WATER ACT IMPLEMENTATION ACROSS THE MISS. RIVER BASIN, IMPROVING WATER QUALITY IN THE MISSISSIPPI RIVER BASIN AND NORTHERN GULF OF MEXICO: STRATEGIES AND PRIORITIES 6 (2010) [hereinafter NRC, WATER QUALITY IN THE MISSISSIPPI], *available at* http://www.nap.edu/catalog/13029.html.

[144] Siff & Mears, *supra* note 143, at 296.

[145] *Id.*

[146] *Id.*

[147] *See* Sarah White, *Gulf Hypoxia: Can a Legal Remedy Breathe Life into the Oxygen Depleted Waters?*, 5 DRAKE J. AGRIC. L. 519, 520 (2000); David Malakoff, *Death by Suffocation in the Gulf of Mexico*, 281 SCIENCE 190, 190 (1998).

[148] *See* Siff & Mears, *supra* note 143, at 296–297.

[149] Mary L. Belefski & Larinda Tervelt Norton, *Hypoxia in the Gulf of Mexico: A Historical and Policy Perspective*, 12 TUL. ENVTL. L.J. 331, 334 (1999).

[150] *See* discussion *infra* Part II.B.

[151] NAT'L RESEARCH COUNCIL COMM. ON THE MISS. RIVER AND THE CLEAN WATER ACT, MISSISSIPPI RIVER WATER QUALITY AND THE CLEAN WATER ACT: PROGRESS, CHALLENGES AND OPPORTUNITIES 60 (2008) [hereinafter NRC, MISSISSIPPI RIVER & THE CWA]; Endre Szalay, Comment, *Breathing Life into the Dead Zone: Can the Federal Common Law of Nuisance Be Used To Control Nonpoint Source Water Pollution?*, 85 TUL. L. REV. 215, 219 (2010).

[152] Szalay, *supra* note 151, at 219; GARY LOCKE ET AL., NAT'L MARINE FISHERIES SERV., U.S. DEP'T OF COMMERCE, FISHERIES ECONOMICS OF THE UNITED STATES, 2008, at 118 (2010),

of farm receipts generated in the U.S. are located in the basin, along with one-third of all farm related jobs.[153] In addition to agricultural production, billions of dollars are spent on recreation on or along the river.[154]

Further, the basin area hosts many important ecological habitats. The river and its wetlands are home to ducks, geese, other waterfowl, fish, and shellfish.[155] According to Dr. David Lodge of the Notre Dame Center for Aquatic Conservation, the Mississippi River system is the source of the richest biodiversity in North America.[156] The River's biodiversity has inherent importance, but also supports people who hunt and fish for recreation or their livelihood.[157]

One measure of the importance of the Mississippi River to the nation is to consider the number of important historical figures and events involving the river. [158] From the Lewis and Clark expedition of the early 1800s to Mark Twain's writings about life on the Mississippi River to the development of City of New Orleans, the Mississippi River is a central character in American life and culture.[159] Stories with the Mississippi River as a backdrop or central player are as fundamental to Americans as other stories of our founding and growth as a nation.[160]

B. POLLUTION OF THE MISSISSIPPI RIVER

The water in the Mississippi River suffers from a variety of types of pollution, but the most prominent source of pollution is from nonpoint sources, such as agricultural runoff.[161] Nonpoint source pollution refers to effluents that make their way into watersheds from farms, feedlots, parking lots, forests, or any source that is not a direct pipe or canal

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available at http://www.st.nmfs.noaa.gov/st5/publication/econ/2008/FEUS%202008%20ALL.pdf.

153 White, *supra* note 147, at 520.

154 Belefski & Tervelt Norton, *supra* note 149, at 334.

155 *Id.*

156 Ian Frazier, *Fish Out of Water: The Asian Carp Invasion*, THE NEW YORKER, Oct. 25, 2010, at 66, 73.

157 *Id.* at 72.

158 Siff & Mears, *supra* note 143, at 298.

159 *Id.*

160 "The face of the water, in time, became a wonderful book . . . which told its mind to me without reserve, delivering its most cherished secrets as clearly as if it had uttered them with a voice. And it was not a book to be read once and thrown aside, for it had a new story to tell every day." MARK TWAIN, LIFE ON THE MISSISSIPPI 63 (John Seelye ed., Oxford Univ. Press 1990) (1883).

161 Belefski & Tervelt Norton, *supra* note 149, at 334; NRC, MISSISSIPPI RIVER & THE CWA, *supra* note 151, at 18.

leading to a watershed.[162] According to the National Research Council's[163] recent report on water quality in the Mississippi River, most water resource managers believe that nonpoint source pollution is a more serious threat to water quality than traditional point source pollution.[164] Scientists attribute about sixty percent of water quality degradation in the Mississippi to agriculture.[165] Increasing use of fertilizer containing nitrogen and phosphorous in the Midwest[166] results in increased levels of those chemicals in the river due to fertilizer runoff.[167] Human activities, such as farming, produce sixty percent of the fixed nitrogen that is put on land every year.[168] Not all of this nitrogen is absorbed into the soil—about twenty percent of it washes into rivers like the Mississippi.[169]

The fertilizer runoff from agriculture causes the development of harmful algal blooms in the Gulf of Mexico.[170] As algae decompose, it deprives large areas of ocean of oxygen and produces potent toxins.[171] When organisms cannot breathe in water due to lack of oxygen in an area, the area suffers from hypoxia.[172] According to marine biologists and other scientists, oxygen levels as low as those which exist in the Gulf of Mexico inhibit the survival and reproduction of marine life.[173] Hypoxic areas are commonly called dead zones.[174] In addition to the oxygen

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[162] NRC, WATER QUALITY IN THE MISSISSIPPI, *supra* note 143, at 1.

[163] The National Research Council (NRC) is part of the National Academies, which include the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. The NRC was founded in 1916 and provides independent advice and information to the federal government about science and technology policy. NRC, WATER QUALITY IN THE MISSISSIPPI, *supra* note 143, at iii.

[164] NRC, WATER QUALITY IN THE MISSISSIPPI, *supra* note 143, at 1.

[165] White, *supra* note 147, at 523.

[166] In a 2009 study, the U.S. Geological Survey found that the highest yields of phosphorus and nitrogen were in watersheds in Illinois, Indiana, Missouri, and northern Kentucky. Dale M. Robertson et al., U.S. Geological Survey, *Incorporating Uncertainty into the Ranking of SPARROW Model Nutrient Yields from Mississippi/Atchafalaya River Basin Watersheds*, 45 J. AM. WATER RESOURCES ASS'N 534, 542 (2009).

[167] R. Eugene Turner & Nancy N. Rabalais, *Changes in Mississippi River Water Quality This Century*, 41 BIOSCIENCE 140, 140 (1991).

[168] White, *supra* note 147, at 522.

[169] *Id.*

[170] Belefski & Tervelt Norton, *supra* note 149, at 335.

[171] White, *supra* note 147, at 521.

[172] Belefski & Tervelt Norton, *supra* note 149, at 334.

[173] *Id.* at 334–35.

[174] White, *supra* note 147, at 519.

deprivation, fish, birds, dolphins, other sea creatures, and humans can ingest harmful algae and become seriously ill.[175]

Concern over hypoxia has increased since major flooding in 1993 in midwestern states washed large quantities of chemicals and nutrients from agriculture, other industry and cities into the river.[176] The flooding in 1993 doubled the size of the hypoxia zone, and it has only grown since that time.[177] Studies show that there is a clear correlation between the quantity of fertilizer applied to a farmer's field and the amount of phosphorus and nitrogen pollution in rivers and other water bodies.[178] High levels of nitrogen and other pollutants also pose a serious risk to human health, requiring cities to build expensive facilities to clean up drinking water.[179] Scientists are most concerned over hypoxia's negative impacts on food chains and ecosystems, growing algal blooms that kill marine life, the impact on both recreational and commercial fisheries, and the economy of the region.[180]

The rapid expansion of the hypoxia zone demonstrates the seriousness of the pollution problem in the Mississippi River. Hypoxia in water systems across the United States has increased thirty times since 1960.[181] The Gulf of Mexico hypoxic zone, the second largest such area in the world, presents a number of challenges to the ecosystem in the Gulf of Mexico and serious concerns to human health.[182] In 2007, the hypoxia zone was the size of the state of Massachusetts, about 7,900 square miles.[183] It grew by almost 2,000 square miles from 1999 to 2007.[184] This year due to the massive flooding on the Mississippi River,

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[175] Harmful Algal Blooms and Hypoxia: Formulating an Action Plan: Hearing Before the Subcomm. on Energy and Env't of the H. Comm. on Sci. and Tech., 111th Cong. 26 (2009) (statement of Robert E. Magnien, Dir., Ctr. for Sponsored Coastal Ocean Research, Nat'l Ctrs. for Coastal Ocean Sci., Nat'l Oceanic and Atmospheric Admin., U.S. Dep't. of Commerce).

[176] Belefski & Tervelt Norton, *supra* note 149, at 337.

[177] *Id.*

[178] Siff & Mears, *supra* note 143, at 300.

[179] In 1991, Des Moines spent $4 million on a facility to improve drinking water quality by removing nitrogen from the water supply. NRC, WATER QUALITY IN THE MISSISSIPPI, *supra* note 143, at vii.

[180] Belefski & Tervelt Norton, *supra* note 149, at 338.

[181] Harmful Algal Blooms and Hypoxia: Formulating an Action Plan, *supra* note 175, at 25.

[182] Harmful Algal Blooms and Hypoxia: Formulating an Action Plan: Hearing Before the Subcomm. on Energy and Env't of the H. Comm. on Sci. and Tech., 111th Cong. 37 (2009) (statement of Suzanne E. Schwartz, Acting Dir., Office of Wetlands, Oceans, and Watersheds, U.S. Envtl. Prot. Agency).

[183] GULF HYPOXIA ACTION PLAN 2008, *supra* note 2, at 14.

[184] *Id.*; Belefski & Tervelt Norton, *supra* note 149, at 335.

the hypoxia zone will grow to its largest size since measurement began, between 8,500 and 9,400 square miles.[185] The size of the hypoxia zone, combined with the recent oil spill makes the Gulf of Mexico an increasingly important ecosystem to protect and restore.[186] But decreasing the size of the hypoxia zone in the Gulf requires serious cleanup efforts in the Mississippi River Basin.

C. DEVELOPMENT OF RIVER GOVERNANCE IN THE UNITED STATES

1. EARLY RIVER GOVERNANCE

Governance of rivers and waterways in the United States is very fragmented and involves many overlapping jurisdictions, interests, and laws.[187] There are some basic principles of common law that the federal courts apply to cases involving water disputes along with federal and state regulations.[188] First, as long as there are no interstate compacts or direct congressional actions on the matter, the federal common law doctrine of equitable apportionment controls and determines how water resources should be divided.[189] The U.S. Supreme Court interpreted equitable apportionment to mean adherence to the water rights regimes of the states involved in the dispute and preserving existing uses of the water.[190] Another common law doctrine applied is the federal public trust doctrine, which preserves the public's right to use the waters for commerce, navigation, and fishing.[191] Finally, the common law doctrine of federal reserved rights allows that in certain circumstances, the federal government has water rights superior to the rights of an individual state.[192]

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[185] Amy Wold, *Larger 'Dead Zone' Feared: Gulf Phenomenon Could Set Record*, ADVOC. (Baton Rouge), June 15, 2011, at A1.

[186] *Id.*

[187] Robin Kundis Craig, *Climate Change, Regulatory Fragmentation, and Water Triage*, 79 U. COLO. L. REV. 825, 833–34 (2008).

[188] *Id.* at 836–37.

[189] *Id.* at 837.

[190] *Id.*; Nebraska v. Wyoming, 325 U.S. 589, 618 (1945).

[191] Kundis Craig, *supra* note 187, at 837; Shively v. Bowlby, 152 U.S. 1, 11–14, 26 (1894); Ill. Cent. R.R. Co. v. Illinois, 146 U.S. 387, 435–37 (1892); Smith v. Maryland (The Volant), 59 U.S. 71, 74–75 (1855); Martin v. Waddell's Lessee, 41 U.S. 367, 383–88 (1842).

[192] Kundis Craig, *supra* note 187, at 838; *see, e.g.*, Arizona v. California, 530 U.S. 392, 408–09, 418–19 (2000) (upholding claims from a tribe to water from the Colorado River in the face of an interstate compact allocating the water).

Aside from the common law, the governance of rivers and waterways began as a way to regulate navigation and commerce in *Gibbons v. Ogden*.[193] This case provided that the federal government had authority over navigable waters because of the Constitutional power to regulate interstate commerce.[194] Control over the navigable waterways fell to the U.S. Army Corps of Engineers, the Army's construction and engineering division.[195] The River and Harbor Act of 1899 was one of the earliest enactments regulating navigable waters in the United States.[196] Congress gave strong federal authority to the Corps of Engineers to govern navigable waterways, promote transportation, and control flooding.[197]

2. DEVELOPMENT OF OTHER RIVER GOVERNANCE MECHANISMS

The Mississippi River is governed by a variety of laws aside from the River and Harbor Act.[198] Important among them are the Resource Conservation and Recovery Act ("RCRA"),[199] the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"),[200] the Clean Air Act ("CAA"),[201] the Safe Drinking Water Act ("SDWA"),[202] and the Endangered Species Act ("ESA").[203] However, the most important regulation is the Clean Water Act ("CWA"), which almost entirely replaced the system of federal common

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[193] Gibbons v. Ogden, 22 U.S. (9 Wheat.) 1, 3, 9–12, 22–28 (1824) (holding that the power to regulate commerce includes the power to regulate navigation and the navigable waters).

[194] Kundis Craig, *supra* note 187, at 839; U.S. CONST. art. I, § 8, cl. 3.; *Gibbons*, 22 U.S. at 1, 3, 9–12, 22–28.

[195] Sandra Zellmer, *A Tale of Two Imperiled Rivers: Reflections from a Post-Katrina World*, 59 FLA. L. REV. 599, 612 (2007).

[196] *Id.*

[197] *Id.*

[198] Siff & Mears, *supra* note 143, at 301–02.

[199] Siff & Mears, *supra* note 143, at 301; 42 U.S.C. §§ 6901–6907 (2006) (addresses the disposal of solid wastes, reduction of the amount of waste generated, and conservation measures).

[200] Siff & Mears, *supra* note 143, at 301; 42 U.S.C. §§ 9601–9675 (2006) (created to address the classification and clean up of hazardous waste sites).

[201] Siff & Mears, *supra* note 143, at 301; 42 U.S.C §§ 7401–7671q (2006) (addresses air quality and point source pollution and emitters).

[202] Siff & Mears, *supra* note 143, at 301–02; 42 U.S.C. §§ 300f–300j-26 (2006) (created to assure a clean and safe drinking water supply).

[203] Siff & Mears, *supra* note 143, at 302; 16 U.S.C. §§ 1531–1544 (2006) (protects endangered species and their habitats from extinction and promotes conservation).

law described above.[204] The CWA shifted the primary focus of water regulation from navigation to the emission of pollutants.[205] It is administered by the U.S. Environmental Protection Agency ("EPA") and was enacted to restore and maintain the "chemical, physical and biological integrity of the Nation's waters."[206] The CWA created the National Pollution Discharge Elimination System ("NPDES"),[207] which prohibits discharge of pollutants into the nation's waters without a permit.[208] This discharge permit system focused on pollution emitted from particular sources, such as industrial factories or municipal waste treatment plants.[209] However, nonpoint source pollution, including agricultural runoff from fertilizers, is exempt from enforcement under the CWA, though states are required to identify problems from nonpoint sources and establish a plan to manage those issues.[210] Though the EPA sets the NPDES standards, the CWA also allows individual states and tribal governments to create their own water quality laws, which must be at least as stringent as the federal regulations.[211] This has led to fragmentation in quality standards across the country.[212] Further, Congress included provisions in the CWA allowing the EPA to delegate implementation authority to individual states and tribal governments.[213]

Through the CWA and other regulations mentioned above, the Mississippi River, or certain stretches of the river, comes under the

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[204] The U.S. Supreme Court found that Congress had occupied the field in water regulations through the Clean Water Act. City of Milwaukee v. Illinois, 451 U.S. 304, 317 (1981) ("Congress has not left the formulation of appropriate federal standards to the courts through application of often vague and indeterminate nuisance concepts and maxims of equity jurisprudence, but rather has occupied the field through the establishment of a comprehensive regulatory program supervised by an expert administrative agency.").

[205] Gregory L. Sattizahn, *The Ebb and Flow of the Clean Water Act: Redefining Clean Water Act Jurisdiction After SWANCC*, GREAT PLAINS NAT. RESOURCES J., Spring 2004, at 1, 3.

[206] 33 U.S.C. 1251(a) (2006); Siff & Mears, *supra* note 143, at 301–02.

[207] The NPDES effluent limits are technology-based standards, set by statute or EPA regulations, which require emitters to use the best available technology to control the pollution. This allows the regulations to become more stringent as the technology for pollution control improves. Siff & Mears, *supra* note 143, at 302.

[208] Siff & Mears, *supra* note 143, at 302.

[209] *Id.*

[210] *Id.* at 303.

[211] *Id.* at 303–04.

[212] Jon Cannon, *Choices and Institutions in Watershed Management*, 25 WM. & MARY ENVTL. L. & POL'Y REV. 379, 387 (2000).

[213] Siff & Mears, *supra* note 143, at 304.

jurisdiction of nine federal agencies: the EPA,[214] the Army Corps of Engineers, the U.S. Coast Guard, the Fish and Wildlife Service, the National Park Service, the Bureau of Reclamation, the Bureau of Land Management, the Forest Service, and the National Oceanic and Atmospheric Administration.[215] In addition to these agencies, the ten states bordering the Mississippi also have a stake through their own implementation and regulation activities, including their own environmental or water quality agencies and various tribal governments.[216] Because of the various jurisdictions and stakeholders involved, cooperation is essential to addressing environmental problems in the Mississippi River. Unfortunately, efforts to coordinate the various agencies and stakeholders have been piecemeal, unfocused and without enough coordination due to the fragmented governance structure.[217]

3. MODERN MISSISSIPPI RIVER BASIN GOVERNANCE

Beginning in 1997, the federal government has attempted to address pollution issues in the Mississippi River Basin through a more cooperative approach.[218] Vice President Al Gore on the twenty-fifth anniversary of the CWA, directed federal agencies to refocus on the original goals of the CWA and shift their focus to the water quality of watersheds across the country.[219] The EPA also emphasized the importance of the watershed as the basis for managing water resource issues.[220] In 1997, the Mississippi River/Gulf of Mexico Watershed Nutrient Task Force was established to focus on water quality and develop plans for improvement.[221]

In 1998, Congress provided statutory authorization to the task force to conduct a scientific assessment of the problem and develop an

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[214] In addition to the Washington, D.C. agency headquarters, the EPA has 10 regional offices that are responsible for the states in their region. The Mississippi River runs through or borders 10 states that fall into four EPA region offices—regions 4, 5, 6 and 7. *See Where you live: EPA Regional Map*, U.S. EPA http://www.epa.gov/epahome/whereyoulive.htm (last updated June 24, 2011).

[215] Siff & Mears, *supra* note 143, at 306.

[216] *Id.* 306–07.

[217] NRC, WATER QUALITY IN THE MISSISSIPPI, *supra* note 143, at 5; Kundis Craig, *supra* note 187, at 867.

[218] Siff & Mears, *supra* note 143, at 311–12.

[219] *Id.*

[220] Kundis Craig, *supra* note 187, at 867.

[221] NRC, WATER QUALITY IN THE MISSISSIPPI, *supra* note 143, at 7.

action plan.[222] The task force created an Action Plan in 2001 with the goal of decreasing hypoxia in the Gulf of Mexico to less than 3,000 square miles by 2015.[223] The task force updated this plan in 2008, emphasizing goals, including decreasing the hypoxia area, restoring and protecting waters in the river basin, and improving the quality of life for communities and economies throughout the basin.[224] The 2008 plan also retains the goal of decreasing the hypoxia area to fewer than 3,000 square miles by 2015, but includes a disclaimer that this goal is impossible to achieve.[225] The task force's 2008 plan does not use quantitative effluent goals and relies on individual states to create their own programs without having specific targets.[226] Though the plan is well intentioned, it does not represent a comprehensive or truly coordinated effort.[227]

Confusingly, also in 1998, the EPA authorized additional efforts separate from the task force—the Clean Water Action Plan and the Mississippi River Basin Initiative.[228] The Clean Water Action Plan emphasized the importance of improving water quality, strengthened federal, state, tribal and local government quality standards, unified natural resource management, and improved information sharing.[229] The Mississippi River Basin Initiative focused on enforcement actions in the watershed.[230] At an event in September 1998, U.S. Attorney General Janet Reno stated, "To those who think that they can get away with illegally polluting our River, we say this: we will work together at all

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[222] *Id.*

[223] GULF HYPOXIA ACTION PLAN 2008, *supra* note 2, at 9.

[224] *Id.*

[225] *Id.* The text of the disclaimer is as follows: "The Task Force understands the difficulty of meeting the 2015 goal so is therefore including a revision that takes into account the uncertainty of the task but attempts to maintain momentum and progress achieved to date. As such, at this time, the Task Force accepts the advice of EPA's Science Advisory Board on this topic... The 5,000 km2 target remains a reasonable endpoint for continued use in an adaptive management context; however, it may no longer be possible to achieve this goal by 2015...it is even more important to proceed in a directionally correct fashion to manage factors affecting hypoxia than to wait for greater precision in setting the goal for the size of the zone. Much can be learned by implementing management plans, documenting practices, and measuring their effects with appropriate monitoring programs." (EPA Science Advisory Board 2008, 2). *Id.*

[226] NRC, WATER QUALITY IN THE MISSISSIPPI, *supra* note 143, at 14.

[227] *Id.*

[228] Siff & Mears, *supra* note 143, at 312–15.

[229] *Id.*

[230] *Id.* at 315–16.

levels of government to find you, prosecute you and make you clean up the mess you've made."[231]

In 2009, the U.S. Department of Agriculture ("USDA") established its own effort to address pollution in the Mississippi River Basin called the Mississippi River Basin Healthy Watersheds Initiative.[232] The program is set to run for four years and will focus on water quality and better management of nutrients such as nitrogen and phosphorus.[233] The program is being implemented in all ten of the states that border the Mississippi River, and in Indiana and Ohio as well.[234] The program's tenets include voluntary implementation of "conservation practices that avoid, control, and trap nutrient runoff; improve wildlife habitat; and maintain agricultural productivity."[235] The National Research Center identifies some major challenges for the USDA's initiative, including establishing a water quality monitoring system and identifying overarching goals to measure the success of the initiative.[236] Despite efforts to focus and coordinate the cleanup of the river basin, the current approach to the governance of the Mississippi River is inadequate and not suited to the pollution problems impacting the Gulf of Mexico.[237]

The continuing growth in the size of the dead zone in the Gulf of Mexico demonstrates that current coordination and government efforts are not working to decrease the pollution impacting the river.[238] The CWA lacks authority to regulate the nonpoint source agricultural pollution that is the prime cause of the growth of the dead zones.[239] Agricultural interests lobby their representatives in Congress, the USDA, and the EPA to maintain an exemption for nonpoint source pollution.[240]

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[231] Press Release, U.S. EPA, Reno and Browner Announce Shell Oil Will Help Clean Up the Mississippi River (Sept. 9, 1998), *available at* http://www.justice.gov/opa/pr/1998/September/411enr.htm; Siff & Mears, *supra* note 143, at 317.

[232] NRC, WATER QUALITY IN THE MISSISSIPPI, *supra* note 143, at 2.

[233] *Id.*

[234] *Id.* at 10.

[235] U.S. DEP'T OF AGRIC., MISSISSIPPI RIVER BASIN HEALTHY WATERSHEDS INITIATIVE 1, http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS//nrcs143_008142.pdf (last visited Nov. 12, 2011).

[236] NRC, WATER QUALITY IN THE MISSISSIPPI, *supra* note 143, at 10.

[237] *Id.* at vii.

[238] Bart Jansen, *Dead Zones' on the Rise in Coastal Waters*, GANNETT NEWS SERVICE, Sept. 7, 2010.

[239] Siff & Mears, *supra* note 143, at 303; Malakoff, *supra* note 147, at 194.

[240] Charles Duhigg, *Health Ills Abound as Farm Runoff Fouls Wells*, N.Y. TIMES, Sept. 18, 2009, at A1.

Within the federal government, agencies, including the EPA, do not communicate with each other enough to enable better coordination.[241] Finally, the general public and corporations have not engaged in voluntary cleanup efforts of major U.S. bodies of water, like the Mississippi, nor put serious pressure on state or federal governments to do so.[242]

III. APPLICATION OF RHINE RIVER LESSONS TO THE MISSISSIPPI RIVER

A. WHY REVAMPING MISSISSIPPI RIVER GOVERNANCE IS KEY

Though the CWA gives the EPA and state, local, and tribal governments the authority to regulate pollution sources, the current structure is ill suited to regulate nonpoint source agricultural pollution, and the lack of a coordinating structure is compromising efforts to clean up the river.[243] Current efforts to promote interagency collaboration and coordination have failed to produce water quality improvements in the Mississippi River or in the Gulf of Mexico's dead zone.[244] Water quality monitoring across the basin is uneven and not well coordinated.[245]

In order to produce change in the water quality, the EPA, USDA and other federal agencies should work with state, local and tribal governments to create a more action-oriented approach.[246] Like the ICPR's work with the Rhine River, Mississippi River stakeholders should create a true center for coordination to identify overarching goals for the river basin, collect important data, and establish numeric water quality criteria.[247] The EPA and USDA should lead a Mississippi River Water Quality Center, similar to the proposal from the National Research Council of the National Academies, and bring all of the separate agency

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[241] *See* NRC, WATER QUALITY IN THE MISSISSIPPI, *supra* note 143, at 17. "There is a clear need for federal leadership in system-wide monitoring of the Mississippi River. The EPA should take the lead…." *Id.*

[242] VERWEIJ, *supra* note 1, at 186–89.

[243] NRC, WATER QUALITY IN THE MISSISSIPPI, *supra* note 143, at vii; Kundis Craig, *supra* note 187, at 867.

[244] NRC, WATER QUALITY IN THE MISSISSIPPI, *supra* note 143, at 3.

[245] *NAS Panel Crafts Roadmap for EPA to Cut Mississippi Nutrient Levels*, WATER POL'Y REP., Jan. 5, 2009.

[246] NRC, WATER QUALITY IN THE MISSISSIPPI, *supra* note 143, at 3.

[247] *Id.*

efforts under one umbrella.[248] The coordination center should work with state, local and tribal governments to develop a basin-wide approach to focus on regulating nutrient and sediment levels in the river.[249] A new effort in the Mississippi River basin will likely require Congressional authorization, not to mention sustained political and financial[250] support from the Administration and Congress.[251]

A new Mississippi River Water Quality Center should focus on quantitative measures for water quality.[252] When developing the RAP, the ICPR identified a number of overarching goals and numerous sub-goals focusing on quantitative means to measure progress in water quality.[253] Establishing numeric criteria for nitrogen and phosphorus levels in the Mississippi River Basin will force states to develop plans to specifically meet the numbers or total maximum daily load levels.[254] These numeric criteria will act as a driver for the EPA, other federal agencies, and the various state, local and tribal governments to start implementing further changes in upstream states.[255] This method would still allow individual states some flexibility in their approach to meeting these goals,[256] but by establishing an actual numeric goal, states would be more focused than they are currently.[257] Using specific quantitative goals could also help states and other government entities propose technical solutions and bring entities with similar solutions together.[258]

An ICPR-Rhine-style approach has been implemented with some success in other parts of the United States, including the Chesapeake Bay

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[248] I*d.* at 17–18.

[249] *See Id.* at 8.

[250] Over the last 10 years, funding from the EPA for the Great Lakes and Chesapeake Bay's water quality programs has been four and five times as much as funding for the Mississippi River basin. Campbell Robertson, *Gulf of Mexico Has Long Been Dumping Site*, N.Y. TIMES, July 30, 2010, at A1.

[251] NRC, WATER QUALITY IN THE MISSISSIPPI, *supra* note 143, at 4; Jeffrey P. Featherstone, *Existing Interstate Compacts: The Law and the Lessons*, 4 TOL. J. GREAT LAKES' L. SCI. & POL'Y 271, 282 (2001).

[252] NRC, WATER QUALITY IN THE MISSISSIPPI, *supra* note 143, at 11–12.

[253] VERWEIJ, *supra* note 1, at 94–95.

[254] NRC, WATER QUALITY IN THE MISSISSIPPI, *supra* note 143, at 12.

[255] *Id.* at 13; Numeric criteria are also supported by environmental interest groups. *Jackson Downplays Chance EPA Sets Mississippi River TMDL Soon*, INSIDE EPA, Oct. 1, 2010.

[256] Cooperative between the federal government and the states gives states greater incentives and opportunity for policy experimentation. Robert V. Percival, *Environmental Federalism: Historical Roots and Contemporary Models*, 54 MD. L. REV. 1141, 1175 (1995).

[257] NRC, WATER QUALITY IN THE MISSISSIPPI, *supra* note 143, at 13.

[258] Belefski & Tervelt Norton, *supra* note 149, at 354.

and the Ohio River Valley.[259] The governors of Maryland, Virginia, Pennsylvania, the mayor of the District of Columbia, and the EPA administrator established the Chesapeake Bay Program ("CBP") in 1983.[260] The CBP now also includes Delaware, New York, and West Virginia.[261] The program successfully identified water quality problems from sediment and nutrients, set science-based water quality standards, and established a comprehensive water quality-monitoring program.[262] The CBP has helped reduce coordination costs among the member states.[263] The CBP has a multi-tiered structure, which involves federal, state, and local governments and NGOs from regional and local watershed, helps coordinate efforts at multiple scales and ensure that decisions are made at the correct level.[264] The various NGOs help by participating, monitoring, informing, and mobilizing the public.[265]

Another example of an ICPR-Rhine-style approach is in the Ohio River Valley.[266] In 1948, Congress approved the establishment of the Ohio River Valley Water Sanitation Committee ("ORSANCO") by Illinois, Indiana, Kentucky, New York, Ohio, Pennsylvania, Virginia, and West Virginia.[267] ORSANCO has explicit authorization to set interstate water quality standards and receives funding from the EPA.[268] The Commission originally focused on treatment of municipal wastewater and industrial discharges before entering the Ohio River.[269] ORSANCO coordinates policies among its various states, tracking and sharing water quality data, and collaborating with stakeholders in state and local governments, academia, public interest groups, and the agricultural community.[270] ORSANCO has numeric standards for

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[259] NRC, WATER QUALITY IN THE MISSISSIPPI, *supra* note 143, at 14–15; OHIO RIVER VALLEY WATER SANITATION COMM., A WATERSHED YEAR: 2009 ANNUAL REPORT (2009) [hereinafter ORSANCO Report], http://www.orsanco.org/images/stories/files/annualReport/2009orsancoannualreport.pdf.

[260] NRC, WATER QUALITY IN THE MISSISSIPPI, *supra* note 143, at 14.

[261] *Id.*

[262] *Id.* at 15.

[263] Cannon, *supra* note 212, at 399.

[264] *Id.*

[265] *Id.*

[266] ORSANCO REPORT, *supra* note 259, at 3.

[267] *Id.*

[268] Featherstone, *supra* note 251, at 273.

[269] ORSANCO REPORT, *supra* note 259, at 6.

[270] *Id.* at 8.

pollutants, including arsenic and chlorine.[271] Beginning in 2009, the Commission began working with the Electric Power Research Institute, an industry group, to start a water quality trading program for point source and nonpoint source pollutants such as nitrogen and phosphorus from fertilizers.[272] The goal of the trading program is to reduce the nutrients released into the Ohio River that eventually flow into the Mississippi.[273] If the involvement of ORSANCO in the nutrient trading program is successful, it may demonstrate a mechanism that can be implemented in the broader Mississippi River Basin.

The National Research Center identifies a number of elements that an ICPR-Rhine-style approach to the Mississippi River could include: establishing interim and longer-term goals for water quality in the river, establishing mechanisms to measure progress, data collection and reporting, cooperation and agreement among stakeholders about accountability and assessing milestones, and establishing a timeline for achieving goals.[274] The EPA is the federal agency best positioned to lead the effort because of its responsibility to regulate interstate waters and water quality.[275] As Richard Lazarus noted in The Making of Environmental Law, "Not only is a broader overview needed, accounting for the full spatial and temporal dimensions of the matter, but failure to pursue such an overview is likely to result in an approach that is at best ineffective and at worst unwittingly destructive because of unanticipated consequences."[276] The EPA must use its position to actually coordinate and lead interagency efforts, rather than relying on initiatives and plans with few tangible goals.

Establishing a new water quality center based on the ICPR-Rhine or ORSANCO model is an alternative to the traditional mechanisms used by the EPA under the current authority of the CWA.[277] The new center could also include NGOs, industry, and agricultural

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[271] OHIO RIVER VALLEY WATER SANITATION COMM'N, POLLUTION CONTROL STANDARDS 10–11 (2010 Revision) [hereinafter ORSANCO Pollution Standards], *available at* http://www.orsanco.org/images/stories/files/pollutionControl Standards/docs/2010standardsfinal.pdf.

[272] *Industry Group Developing First-Time Regional Nutrient Trading Plan*, WATER POL'Y REP. Oct., 26, 2009.

[273] *Id.*

[274] NRC, WATER QUALITY IN THE MISSISSIPPI, *supra* note 143, at 16.

[275] *Id.* at 17.

[276] Kundis Craig, *supra* note 187, at 884; RICHARD J. LAZARUS, THE MAKING OF ENVIRONMENTAL LAW 33 (2004).

[277] Featherstone, *supra* note 251, at 282.

groups. Part of the center's mission should be increasing public awareness about nonpoint source pollution and the importance of water quality for the environmental and economic health of the Mississippi River Basin. Though industry and agriculture groups have opposed efforts to regulate nutrient pollution in the past, involving them in a trading scheme similar to ORSANCO's efforts may be a more workable approach. Additionally, viewing the pollution problems in the Gulf of Mexico as a Mississippi River Basin problem and providing support through an interstate water quality entity can provide the coordination and policy changes necessary for water cleanup.

B. DISCUSSION & RESPONSE TO POSSIBLE LIMITATIONS

Regulation of the Mississippi River has proved very challenging and will continue to be challenging under a new framework. It is important to consider some very real obstacles and differences between the Rhine and Mississippi Rivers that may impact achieving improvements in water quality in the Mississippi.

First are the inherent differences between the river systems. The Rhine River covers a much smaller geographic area than the Mississippi and has fewer governmental stakeholders.[278] However, relations between the Rhine River nations were often very contentious, just as relationships between various state and federal actors in the U.S. are contentious.[279] Further, throughout the 1990s, the ICPR worked to involve more parties in their processes, including NGOs.[280] More input and collaboration for the Rhine River did not weaken the effectiveness of the ICPR.[281] Though the geographic size of the Mississippi River Basin is much larger than the Rhine, it is within one country and does not face the challenges posed by navigating interactions between nine sovereign nations and the European Union.

Additionally, the source of pollutants being regulated is different. When the RAP was implemented, it focused more on point source pollutants[282] from factories, rather than the agricultural runoff and

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[278] Huisman, *supra* note 6, at 83; ICPR 2008 REPORT, *supra* note 8, at 5.

[279] Verweij, *supra* note 95, at 1027.

[280] VERWEIJ, *supra* note 1, at 103–05.

[281] *60 Years of Rhine Cooperation*, *supra* note 24, at 9.

[282] VERWEIJ, *supra* note 1, at 95.

sediments impacting the Mississippi.[283] This type of pollution is easier to target for cleanup than agricultural runoff. The Mississippi River Basin drains over half of America's vast farmlands and the primary mechanism for water regulation in the U.S. effectively does not regulate nonpoint source pollution.[284] However, it is important to note that, though the sources of pollutants are different, key characteristics of the Rhine cleanup are based on the coordination of the impacted nations and their efforts to set and implement specific goals.[285]

Further, there are important differences in the philosophies of stakeholders, particularly private industry and the general public. Much of the reason that the RAP was able to achieve important goals so quickly was because of the efforts of private industry in Europe to implement water pollution control technology.[286] In contrast, in the U.S., many private actors challenge the CWA and other water quality regulations in court, increasing the time needed to implement programs.[287] Failing to take more definitive action because of the possibility of lawsuits would maintain a status quo that continues to poison the Gulf of Mexico and further harm the economy of the region.[288] Further, agricultural lobby groups pose a particular challenge in the U.S.[289] But ORSANCO's nutrient trading scheme involves industry and agricultural groups, and may prove to be a model to involve those entities, rather than face them in an courtroom.

Additionally, the lack of concern by the general public is an important challenge. In Europe, the Sandoz incident was a focusing event and caused an increased concern about the health of the River.[290] The recent spill in the Gulf of Mexico caused some public focus on water quality and economic consequences, but the focus was not on the nutrient problems described above.[291] The current efforts to clean up the Mississippi warrant some changes in order to increase the likelihood that the River will be restored and the hypoxia zone will shrink, but it may

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[283] Belefski & Tervelt Norton, *supra* note 149, at 334; NRC, WATER QUALITY IN THE MISSISSIPPI, *supra* note 143, at 1.

[284] Siff & Mears, *supra* note 143, at 303.

[285] VERWEIJ, *supra* note 1, at 110–11.

[286] Verweij, *supra* note 95, at 1026–27.

[287] *Id.*

[288] GULF HYPOXIA ACTION PLAN 2008, *supra* note 2, at 14.

[289] Duhigg, *supra* note 240, at A1.

[290] VERWEIJ, *supra* note 1, at 90.

[291] "[P]eople still believe that the gulf is big enough to absorb [pollution]." Robertson, *supra* note 250, at A1.

take a broader crisis to stir the public to action.[292] Finally, with respect to a transboundary environmental problem such as governing the Mississippi, it is the role of the federal government to intercede, act as an arbiter, and develop a solution.[293]

CONCLUSION

Finding a workable solution to river governance is important because of the transboundary nature of rivers and their importance to economies and cultures. Governing a river like the Rhine or the Mississippi is challenging because of the necessary involvement of many agencies and levels of government and the complexity of regulating pollution effluents. The example of the Rhine River shows that coordination between those levels of government, private industry and NGOs can result in a much cleaner body of water. The United States has struggled with the governance of the Mississippi over the last several decades, and it is increasingly important that the EPA and other stakeholders develop a comprehensive plan. There are more effective ways to govern transboundary waters than the methods currently employed to govern the Mississippi. It will require intense and immense effort from all parties to change the current path. It will also require the general public to focus to some degree on water quality. But the devastation in the Gulf of Mexico in recent years requires no less. The lessons from the waters of the Rhine can be applied here for the benefit of those who depend on the waters of the Mississippi and Gulf of Mexico.

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[292] "The experience of the 1980s and 1990s cautions against expecting the states to initiate water policy reform without the pressure of a crisis…. To provoke change, there must be tangible and relatively immediate consequences to inaction, and nothing galvanizes political will like a crisis." David H. Getches, *The Metamorphosis of Western Water Policy: Have Federal Laws and Local Decisions Eclipsed the States' Role?*, 20 STAN. ENVTL. L.J. 3, 59–60 (2001) (footnotes omitted).

[293] Henry H. Butler & Jonathan R. Macey, *Externalities and the Matching Principle: The Case for Reallocating Environmental Regulatory Authority*, 14 YALE L. & POL'Y REV. (SYMPOSIUM ISSUE) 23, 61 (1996).