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Ludwik A. Teclaff

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HARMONIZING WATER RESOURCES DEVELOPMENT AND USE WITH ENVIRONMENTAL PROTECTION IN MUNICIPAL AND INTERNATIONAL LAW

LUDWIK A. TECLAFF*

MUNICIPAL LAW

The relationship of water law to the environment has gone through three phases. In the first and longest period, any protection of the environment that could be attributed to water law was an incidental by-product of legal restraints on the development of water resources *per se*. In the second period, all restraints were thrown to the winds and the law actively fostered an unbridled development of water resources without regard to the consequences for the environment. In the third period, which began little more than a decade ago, water law is being slowly and hesitantly reshaped to fit into the evolving perception of the environment as a unity in which changes in one element must be harmonized with the effects on all the other elements.

*Looking Back—The First Two Phases*¹

During the first period, law tended to preserve water usage virtually unchanged. Immemorial custom prevailed, inhibiting development and minimizing interference with surface flow as much as possible. This was exemplified in Europe by the widely accepted maxim, *aqua currit et debet currere ut currere solebat*.² In the 19th century it was embodied in the natural flow version of the riparian rights doctrine, which spread from Europe to the United States, Latin America, Africa, and parts of Asia. By discouraging consumptive uses and by limiting non-consumptive uses to riparian land, it kept the impact of water development on other elements of the environment to a minimum and made harmonization of such impact hardly necessary. This phase was by no means limited to Europe or to areas of water abundance, though perhaps it was more pronounced in them. Even in arid and semi-arid regions, where water was intensively utilized, customary law by its very nature acted as a

*Professor of Law, Fordham University School of Law.

1. See generally on historical aspects of water resources development and its relationship to the environment, Environmental Quality and Water Development (Goldman *et al.*, eds. 1973); L. Teclaff, *The River Basin in History and Law* (1967); and Teclaff, *Abstraction and Use of Water: A Comparison of Legal Regimes* 8-56 *passim* U.N. Doc. ST/ECA/154 (1972).

2. Water runs, and ought to run, as it used to run. Quoted in *Shury v. Piggot*, 81 Eng. Rep. 280, 281 (K.B. 1625).

brake on sudden changes and harsh impacts. The low level of technical efficiency and the conservatism of the law together helped to preserve a balance which had been brought about over a long period of time through the interaction of diverse elements of the environment. Moslem customary law provides typical examples.³

In the second half of the 19th century and in the more industrially advanced nations, a new phase in the relationship between water law and the environment was ushered in by large-scale and intensive development of water resources.⁴ The constraints inherent in laws which had been well adapted to low-intensity or routine utilization of past eras began to be relaxed or not enforced. While the anti-pollution constraints of the natural flow theory of the riparian rights doctrine occasionally reappeared,⁵ the Pennsylvania Supreme Court was closer to the popular opinion of the day, 1886, in *Pennsylvania Coal Co. v. Sanderson*,⁶ holding that pollution of a stream by a coal mine to the detriment of a lower riparian was a permissible use:

"... we are of opinion that mere private personal inconveniences, arising in this way and under such circumstances, must yield to the necessities of a great public industry, which, although in the hands of a private corporation, suberves a great public interest."⁷

This view helped to bring about changes in riparianism. Under the so-called reasonable use doctrine, it became, in the eastern United States, an admirable vehicle for the propagation of developmental concepts. Courts were reluctant to enjoin a use, once its social utility was established, simply because it caused pollution. At best they might award damages, thereby legalizing and perpetuating any injury inflicted on the environment.⁸ Similarly, in South Africa, the

3. No one might alter an established irrigation system or the manner or extent of exercise of the irrigation use right. Upstream land had to be irrigated before downstream land (thereby preventing waste of water in transmission); water must be returned to its normal course after use; a strip of land, or harim, was always left along canals and around wells and other water sources, and in this strip it was forbidden to dig a new well (so as not to deplete the quantity or degrade the quality of water in existing wells). See Caponera, *Water Laws in Moslem Countries* 16, 18, 21-22, F.A.O. Irrigation and Drainage Paper 20/1 (1973).

4. For a history of technical advances in water utilization, see Ackerman & Löf, *Technology in American Water Development* 221-32 (1959).

5. As in *Whalen v. Union Bag and Paper Co.*, 208 N.Y. 1, 101 N.E. 805 (1913) and *Weston Paper Co. v. Pope*, 155 Ind. 394, 57 N.E. 719 (1900), where the social benefit of the polluters' activities was set aside by the court in favor of the traditional requirement that water flow past a riparian property "without obstruction, diversion, or corruption." 57 N.E. 719, 721 (1900).

6. 113 Pa. St. 126, 6 A. 453 (1886).

7. *Pennsylvania Coal Co. v. Sanderson*, 113 Pa. St. 126, 6 A. 453 (1886). See also J. Sax, *Water Law, Planning & Policy* 422 (1968).

8. The case of *Michelson v. Leskowitz*, 55 N.Y.S.2d 831 (Sup. Ct. 1945), illustrates the weighing of equities by the courts that was inherent in the reasonable use doctrine where water pollution was involved.

riparian rights doctrine was modified by allowing water use on non-riparian land when the social interest demanded;⁹ this modification was adopted to some extent in England and Wales by the 1963 Water Resources Act.¹⁰ Obviously, non-riparian use allows water development to have an impact on larger areas.

The prior appropriation system, which became dominant in the western United States, suited developmental interests in water use even better.¹¹ By divorcing water use from land ownership, it opened water resources to a larger number of people than did the riparian rights doctrine. By giving preference to earlier over later users, it assured water to the most development-minded—those who were able to complete their projects first and fastest—and minimized interference on the part of the administration. By tying the right to private beneficial use, prior appropriation made it difficult for the user to conserve water or to pay heed to the effects of his development upon the environment, since under no circumstances could the water flow unchanged and undiminished but had to be diverted and used to the utmost. Moreover, since the right could be lost if not applied to beneficial use within a specified period of time, and since it was limited to the amount of water that could beneficially be used, the appropriator was induced to apply for far more water than he really needed, and to use it wastefully and by the most primitive means. Water conserved, either by good management or by technological improvement, was regarded as not beneficially used and might result in loss of right.¹²

Thus, the application of the beneficial use concept contributed in the western United States to overdevelopment of rivers and to a horrendous mismanagement of the resource. When the damage was sufficiently great to threaten navigation, as in California,¹³ where hydraulic mining had destroyed streams, buried large areas of fertile

9. South Africa, Water Act No. 54 of 1956, § 11(2)(2b).

10. United Kingdom, Water Resources Act 1963, c. 38. According to this Act, § 24(2), the owner of land contiguous to inland water can abstract an unlimited quantity, not only for domestic, but also for agricultural uses (excluding spray irrigation) on a holding consisting of contiguous land "with or without other land held herewith." But, determination of the extent of contiguous land is made by the administrative agencies. § 55.

11. See generally on prior appropriation, Teclaff and Teclaff, *A History of Water Development and Environmental Quality*, in Goldman *supra* note 1, at 45-48.

12. See e.g., *Blaine County Inv. Co. v. Mays*, 49 Idaho 776, 291 P. 1055 (1930) (not a beneficial use to flood land in winter so as to conserve soil moisture into growing season); *Enterprise Irr. Dist. v. Willis*, 135 Nebr. 827, 284 N.W. 326 (1939) (prevailing custom to be observed in applying water to land, not the latest and most approved scientific method),

13. For a vivid description of the damage, see *Woodruff v. North Bloomfield Gravel Mining Company*, 18 F. 753 (C.C. Cal. 1884).

farmland under mining debris, and forced cities to build high levees for flood protection, the federal government stepped in. The California Debris Commission, created in 1893 with power to grant permits for hydraulic mining, improve river navigability, and investigate reservoir sites, was the first federal agency in the water resources field with a multi-purpose objective and so became a harbinger of new trends in water management.¹⁴

The idea of using the river basin to make more efficient use of water originated at the end of the 19th century.¹⁵ The discovery of the river basin as a natural unit of water distribution and the application of this unity to the planning of water resources exploitation brought water law closer still to the needs of development. It permitted fuller utilization of water resources by linking them with a defined and self-contained area. Greatly increased demand for water made this desirable: technology made it feasible. Basin-wide planning for optimal water resources management and use became a slowly developing but constant theme. In the United States it gained momentum during the administrations of Presidents Theodore Roosevelt and Franklin D. Roosevelt, reaching a peak in the establishment of the Tennessee Valley Authority.¹⁶ The TVA was especially influential in underdeveloped areas of the world and the river basin came to be regarded as an all-purpose unit for the achievement of economic and social goals. The Damodar Valley Corporation, the Gal Oya Development Board, and the Regional Corporation of the Cauca Valley are three notable examples of this viewpoint translated into practice.¹⁷ The United Nations itself gave the concept of basin-wide planning official endorsement in 1956, when the Secretary-General declared that "river basin development is now recognized as an essential feature of economic development."¹⁸

The ultimate union of law and development was achieved in the wholly artificial management unit created by inter-basin transfer of water. Even while the river basin appeared to become universally established as a unit of water development, engineers were discovering that, given the technical means, river basin boundaries could be transgressed and units of water development created almost at will.

14. California Debris Commission Act, 33 U.S.C. § 661 *et seq.* (1970).

15. One of the pioneers in the concept of basin development was the British engineer, Sir William Willcocks, who had already planned, in 1890, the harnessing of the Nile by the Aswan Dam. Willcocks, *The Nile Reservoir at Aswan and After* 10-36 (1901).

16. Tennessee Valley Act, 16 U.S.C. § 831 (1970).

17. India, Damodar Valley Corporation, Act No. 14, Mar. 27, 1948, 6 India Code 13-33 (1956); Sri Lanka, Gal Oya Development Board, Act No. 51, Nov. 24, 1949 (Ceyl.); Colombia, Presidential Decree No. 1707, July 18, 1960 (also known as the CVC Act).

18. U.N. EcoSoc Coun., Off. Rec., 21st Sess., Annexes at 6 U.N. Doc. E/2827 (1956).

In some areas of fairly acute water shortage, planners had been turning more and more to inter-basin transfers of water over long distances and on a very big scale. There are many examples, some already in existence, some still on the drawing board. They include: the Lower Rhone-Languedoc project in southern France;¹⁹ the Texas Water Plan;²⁰ the Snowy Mountains Project in Australia;²¹ the Israeli National Water Carrier;²² the California State Water Project;²³ the half-dozen plans for combining waters of the Columbia, and even of Alaskan rivers, with those of the Colorado and other western United States rivers;²⁴ the Soviet project to divert water from the great north-flowing rivers of Siberia to the arid interior of Central Asia;²⁵ and, most recently, the Indian proposal to link the Ganga and Cauvery rivers by a 2,000-mile-long canal.²⁶

Large-scale projects find a congenial legal framework in the administrative system of water disposition, because it has two characteristics that especially facilitate such development—centralization and flexibility in decision-making. The administrative system has become dominant in water legislation since the second half of the nineteenth century, when permit systems became established in some German states and when, in Canada and Australia, the rights of riparian owners to use water without authorization were confined to domestic purposes.²⁷ It took a long time to become established in some parts of the world, such as South America. For instance, Chile did not abrogate its riparian system until 1951 and Venezuela is only

19. See Compagnie Nationale d'Aménagement de la Région du Bas-Rhône et du Languedoc, *Irrigation and Allied Projects in the Lower Rhône and Languedoc Districts of Southern France* (mimeographed, 1964).

20. Quinn, *Water Transfers—Must the American West be Won Again?*, 58 Geog. Rev. 108, 116-18 (1968).

21. Australia, Snowy Mountains Authority, *The Snowy Mountains* (pamphlet, 1963).

22. Israel, Ministry of Agriculture, *Israel's Water Economy* (pamphlet, 1973).

23. Graham, *The Central Valley Project: Resource Development of a Natural Basin*, 38 Calif. L. Rev. 588 (1950).

24. U.S. Dep't of the Interior, *Pacific Southwest Water Plan* (1963); and Quinn, *Area-of-Origin Protectionism in Western Waters* (Canada, Inland Waters Directorate, Water Planning and Management Branch) (1973).

25. Vendrov, *Water Management Problems of Western Siberia*, Sov. Geog. 13-23 (May 1964) (transl. from *Izvestiya Akademii Nauk S.S.S.R.*, 1 Ser. Geogr. 36-44 1963).

26. India, Central Water and Power Comm'n, Water Wing, *Note on National Water Grid of India* (1973).

27. See generally on administrative systems, Teclaff, *Abstraction and Use of Water*, *supra* note 1, at 17-56. On the German states, see Schmidt, *Wasserrecht*, 6 Handwörterbuch der Rechtswissenschaft 788-96 (1929). In Canada, riparian rights were reduced to domestic purposes by the Irrigation Act of 1906, Can. Rev. Stat. ch. 61, sec. 11 (1906) (in Saskatchewan and Alberta), and by the Water Act of 1909, Stat. of the Province of British Columbia, ch. 48, sec. 4 (1909) (in British Columbia). For Australia, see Vict., Water Act of 1958, Act No. 6413, § 4(1), 6, 14, 204, 8 Gen. Pub. Acts 749 (Vict. 1958), and New South Wales, Water Rights Act of 1896, 60 Vict. 20, 1 N.S.W. Stat. 1894-97 (1898).

now divesting itself of the last remnants of riparianism.²⁸ But even in the predominantly riparian eastern United States, the administrative system is found at the federal level in the congressional power to regulate and dispose of the waters of navigable streams without regard to state law or to the acquired rights of individuals.²⁹

Awakening Awareness of Environmental Damage From Waterworks

Because of the huge areas potentially affected and the sheer scale of the proposed development, the long-distance inter-basin transfers evoked particular concern over the nature and scope of changes that they would bring about in the environment. For instance, experts were alarmed by the continental North American Water and Power Alliance (NAWAPA) proposal, which involved shunting water from Alaskan rivers through Canada into western United States river systems.³⁰ An eminent hydrologist warned that NAWAPA would put new load stresses on the earth's crust, posing a danger of earthquakes, would place volumes of unfrozen water over permanently frozen ground, with the likelihood of setting off landslides, and would deliver large quantities of cold water to warmer latitudes, where it would increase evapotranspiration and bring about irreversible changes in climate.³¹ The Soviet projects for turning the Siberian rivers southward into Central Asia aroused grave doubts, especially as to the wisdom of constructing huge reservoirs in the swampy lowlands of western Siberia and north European Russia, which were already zones of excess moisture. Soviet experts pointed to the effects of some existing large reservoirs; for example, the Rybinsk reservoir was known to have brought about changes in climate and vegetation that were felt a considerable distance from its shores.³²

28. Chile, Código de Aguas, 1951, Ley No. 9.909, Diario oficial No. 21,960 (1951), 38 Recopilación de Leyes por Orden Numérico 234 (Chile 1951). Venezuela trimmed riparianism considerably by the Agrarian Reform Act of 1960 (text and English transl. in 9 F.A.O., Food and Agricultural Legislation, No. 2 (1960)), and is now completing the process in current reform of the Water Law. See Brewer-Carías, *Derecho y Administración de las Aguas y otros Recursos Naturales Renovables* 79-90, 147-54 (1976).

29. This power is derived from Congress' right to regulate interstate and international commerce, and was upheld by the U.S. Supreme Court in *Arizona v. California*, 373 U.S. 546 (1963).

30. For a description of NAWAPA, see U.S. Senate, Comm. on Pub. Works Special Subcomm. on Western Water Dev., *Western Water Dev.* 88th Cong., 2d Sess. (1964).

31. Remarks before the 1966 International Water Quality Symposium in Montreal Canada, 112 Cong. Rec. 20202, 20204 (daily ed., Aug. 29, 1966).

32. Vendrov, *A Forecast of Changes in Natural Conditions in the Northern Ob' Basin in Case of Construction of the Lower Ob' Hydro Project*, 6 Sov. Geog., No. 10, at 3 (Dec. 1965) (transl. from *Izvestiya Akademii Nauk, S.S.S.R., Ser. Geogr.* No. 5, at 37, 1965); and Vendrov, *Geographical Aspects of the Problem of Diverting Part of the Flow of the Pechora*

Inter-basin transfers are only one among many types of water development with potentially adverse impacts. As the scale of water projects generally has increased, it has become necessary to take notice of the detrimental effects of dams, reservoirs, canals and other water works which hitherto were unquestioningly accepted as being wholly beneficial. Among these detrimental effects are pollution, salinization and sedimentation, loss of wetlands through dredging and filling, loss of free-flowing rivers through flood control and channelization, damage to anadromous and other fisheries, salt-water intrusion in coastal areas, and injury to estuarine habitat and estuarine living resources through reduction of fresh-water flow. Some of the impacts are felt in the area of impoundment, some downstream from water storage and diversion projects, some along the conveyance route of the water, and some in the area of use. Where several dams and reservoirs are built in succession, the cumulation of primary and secondary effects may be damaging to a very large area. For example, the steady decline in the level of the Caspian Sea, though due in part to climatic changes, was greatly aggravated by the building of the Greater Volga project (with its seven large and several smaller reservoirs). Filtration and evaporation from the reservoir surfaces contributed to the resulting loss of stream-flow into the Sea, as did the expansion of consumptive uses, especially irrigation. Apart from the injury to navigation, to the oil industry, and to livestock farming along the Caspian shores, untold damage was caused to fisheries. The construction of these projects was estimated to have caused the loss of all the natural spawning grounds of the beluga sturgeon and the Caspian whitefish, as well as severe injury to other fish populations.³³

As one of the first areas to realize the benefits of large-scale water development projects, the United States also provides numerous examples of their adverse effects upon the environment. These are chronicled in contemporary accounts, in public hearings, and in congressional and government agency reports. The initial impact of the big reservoir projects was felt in the areas inundated by the impoundment—in loss of fertile farmland, of historic sites, and of wildlife habitat and scenic values (even though these might be replaced by other habitat and other aesthetic values). Such impacts are apt to be speedily forgotten, but the bitter battles waged over dams in the West (from Hetch Hetchy, which was the first major U.S. test

and Vychegda Rivers to the Volga Basin, 4 Sov. Geog. No. 6, at 29 (June 1963) (transl. from *Izvestiya Akademii Nauk, S.S.S.R., Ser. Geogr.*, No. 2, at 35, 1963).

33. Bobrov, *The Transformation of the Caspian Sea*, 2 Sov. 119 Geog. 47 (Sept. 1961) (transl. from *Geografiya v. Shkole*, No. 2, at 5, 1961).

of water development versus environmental quality, to Grand Canyon) fully reveal the price paid for large-scale impoundments.³⁴

Other impacts were not felt until much later, long after the dams and reservoirs were built and the planners and engineers had moved on to new projects. In 1967, for example, a Senate resolution asked the Congress to enact legislation for the establishment of sub-impoundments adjacent to Missouri River Basin reservoirs in the State of South Dakota.³⁵ Hoover Dam also required remedial "surgery" years after its inauguration. Downstream from the dam the flow of the Colorado River was reduced to about a third of its previous volume. Vegetation flourished in shallow, exposed portions of the bed, creating a swamp twelve miles by five at its most extensive, with polluted groundwater, in the area of the town of Needles, where the river dumped much of the silt load it had picked up below the dam. The result was disastrous flooding at Needles, which could only be remedied by a large dredging and levee program. Eventually, after the establishment by Congress of the Colorado River Front Work and Levee System in 1946, the entire section between Davis Dam and the Mexican border was channelized, but this in turn destroyed the Colorado Delta.³⁶

Deltas and estuaries are particularly vulnerable to environmental damage from water development works. The very existence of the Florida Everglades, a huge subtropical estuarine area, was threatened by the flood control and drainage systems of the Central and Southern Florida Project, which cut off much of the supply of seasonal surplus water that used to inundate the innumerable shallow ponds of this unique national park.³⁷ A 1970 Act of Congress, requiring that the U.S. Army Corps of Engineers to furnish enough

34. See Nash, *Rivers and Americans: A Century of Conflicting Priorities*, in Goldman, *supra* note 1, at 82-93.

35. The resolution noted that in the original development, the timber from the inundated lands was not removed and had become an "offense to man and nature," and that fluctuations in reservoir level had created mud-flats and swamps which were a "danger to man and animals, wild and domestic." The sub-impoundments were urged in order to maintain water levels in the reservoirs which:

... while only restoring but a small part of the natural beauty and cover of the shore-line, lost by the creation of said reservoirs, would cause an amount of restoration which would ameliorate the unnatural and offensive conditions now existent along said shore-line to some degree.

Senate Concurrent Resolution 2, Cong. Rec. § 4277 (daily ed., Mar. 23, 1967).

The question why there were no plans for such sub-impoundments in the original 1944 legislation authorizing the development was apparently not raised.

36. Berkman & Viscusi, *Damming the West 47-54* (Ralph Nader's Study Group Report on the Bureau of Reclamation, 1972).

37. See 113 Cong. Rec. H16362 (daily ed., Dec. 6, 1967) and H17195 (daily ed., Dec. 15, 1967), and 114 Cong. Rec. H6573 (daily ed., July 15, 1968).

water for the park from impoundments north of it, has assured the minimum deliveries necessary for the park's existence.³⁸ Nothing, however, can alter the fact that the population of wading birds inhabiting the Everglades shrank within 25 years from an estimated one and a half million to about one-third of that figure.³⁹

Much more detailed information about the kinds of damage that water development projects might inflict on estuarine areas began to be available in the briefs and reports of suits instituted by environmental organizations. An example is *Sierra Club v. Froehlke*,⁴⁰ brought on behalf of conservationists, sportsmen, shrimp fishermen and others who "derived benefit from the Trinity River, Trinity Bay and surrounding areas in their natural state," to enjoin further work on the Wallisville Project segment of the Trinity River navigation improvement scheme. The complaint emphasized that the Corps of Engineers intended to cut out 184 of the natural meanders of the Trinity and convert it into a barge canal. The construction of this project, plaintiffs were prepared to show, would:

"... destroy thousands of acres of bottomland and hundreds of thousands of trees between Fort Worth-Dallas and the Gulf of Mexico. Numerous game, fish and other wildlife will lose their habitat and perish. Industrial and population growth will be thereby encouraged in over-developed areas with resulting pollution and urban problems. Construction of the projected barge canal across Texas will concentrate heavy industry along its banks which, when considered with the trafficking of barges and boats up and down the canal, shall reduce the free-flowing Trinity River to a series of placid pools with polluted and stagnant water."⁴¹

The Wallisville Project moreover, would convert a large area of salt-water marshland into a freshwater reservoir, not only destroying the habitat of some rare and endangered species of wildlife, but causing substantial potential harm to commercial fisheries (a position in which several federal and state agencies concurred).⁴²

The environmental damage done by large-scale projects in the developing countries has only recently begun to be evaluated, but the results to date have already shown that the impacts may be even more severe, especially in the tropics, than in the, largely temperate,

38. Pub. L. No. 91-282, 84 Stat. 310 (1970).

39. Council on Environmental Quality (CEQ), Third Annual Rep't, Environmental Quality 328 (1972).

40. *Sierra Club v. Froehlke*, 359 F. Supp. 1289 (1973), *rev'd sub nom. Sierra Club v. Callaway*, 499 F.2d 982 (5th Cir. 1974).

41. 359 F. Supp. 1309 (1973).

42. *Id.*, at 1309, 1310.

developed areas of the world.⁴³ A U.N. report on integrated river basin development came to the conclusion in 1970 that:

"the environmental changes due to the construction of dams and of man-made lakes, to the creation or expansion of irrigation systems or to the draining of swamps and marshes can . . . have far-reaching effects on the health of man and animals in the regions affected."⁴⁴

There are a number of causes for these destructive impacts: the fragility of tropical ecosystems; the huge size and enormous hydro-power and irrigation potential of the rivers involved; the consequent potential for widespread dissemination of pests and diseases; pressure to produce quick results, especially in agriculture, in areas of rapidly growing population; and the transfer of technology from developed to developing countries without regard to fundamental differences in both the physical and social environment.⁴⁵

The socio-cultural effect of water-resources development on local populations has been one of the least understood and perhaps most lightly regarded of all types of impact. This has resulted largely from the fact that projects have all too often been pushed forward rapidly with outside technical and financial assistance but without any involvement of the local people in the decision-making process. As the Scientific Committee on Problems of the Environment (SCOPE) observed wryly, "most of the serious human population dislocations have occurred in tropical situations, partly because large displacement would be political suicide in some temperate areas such as France."⁴⁶

Study of socio-cultural systems in the path of such development has so far concentrated on African populations forced to relocate from the impoundment area of large dams and the hosts among whom they are resettled. It has been shown, from research on such large projects as the Kariba, Volta and Kainji dams and the Aswan

43. See Comment, *Controlling the Environmental Hazards of International Development*, 5 Ecol. L.Q. 321 (1976), and studies cited therein.

44. U.N., Dep't of Econ. and Soc. Aff., *Integrated River Basin Development: Report of a Panel of Experts*, Annex IV, at 60, U.N. Doc. E/3066/Rev. 1 (1970).

45. The secondary effects of large-scale projects, especially rapid growth in population, also contribute to the environmental damage. In 1800 Egypt had approximately one person for every acre of arable land: today, after construction of two major dams on the Nile and irrigation of millions of new acres, there are four persons for every arable acre and seventy per cent of the irrigated land is affected by water-logging and buildup of salts in the soil. See remarks of Prof. Mohammed Kassas of Cairo University and Clyde E. Houston of FAO at the symposium on irrigation of arid lands, held at Alexandria in March 1976, and reported in *New York Times*, Mar. 7, 1976, at 10, col. 1.

46. Int'l Coun. of Sci. Unions, Sci. Comm. on Problems of the Environment, *Man-Made Lakes as Modified Ecosystems* 16 (1972).

High Dam, that compulsory relocation produces great stress.⁴⁷ This is expressed in grief over lost homes and flooded burial sites and religious shrines, in anxiety over resettlement, in the undermining of local leadership, and in a cultural impoverishment when customs and rituals associated with the lost home are abandoned. Relocates tended to cling to familiar habits and institutions, and rejected or resisted the changes in agricultural techniques, land utilization, and social organization which governments attempted to introduce as part of a simultaneous area-wide development. It becomes a question, then, whether these huge projects involving large numbers of people are really worth the human and environmental injury inflicted. Lack of sufficient data, failure to take these factors into account and failure to make even a rudimentary assessment of their value have so far obscured the true costs of development. It has been suggested that if relocation is done humanely, the expenses may even exceed the cost of dam construction, and that if reasonable initial estimates were formulated, alternatives to mainstream dams would be more seriously considered.⁴⁸

Third Phase—Protection of Water Resources

Legislation against the detrimental effects of water development and use was enacted long before the era of big projects, but was initially aimed at conservation of the water resource itself, and had a bearing on other elements of the environment only insofar as these elements were affected by constraints on water development. Among the earliest efforts at protection of the water resource were pollution control laws. At a time when the outlook was thoroughly utilitarian and the aim was to reconcile conflicts between one developmental use and another, as exemplified in *Pennsylvania Coal Co. v. Sanderson*,⁴⁹ major anti-pollution laws were already in existence or in process of being drafted. England already had its Rivers (Pollution Prevention) Act of 1876,⁵⁰ and in 1899, the United States produced the Refuse Act,⁵¹ which would become, seventy years later, the kingpin of the federal drive against environmental damage to waterways from a wide variety of sources. Another important early law

47. See Scudder, Social Impacts of Integrated River Basin Development on Local Populations, UNDP/UN Interregional Seminar on River Basin and Interbasin Dev., Budapest, 16-26, Working Paper No. 30 (Sept. 1975).

48. *Id.* at 14-15.

49. *Pennsylvania Coal Co. v. Sanderson*, 110 Pa. 126, 6 A. 453 (1886), see text accompanying note 7 *supra*.

50. England and Wales, Rivers (Pollution Prevention) Act of 1876, 39 & 40 Vict., c. 75.

51. 33 U.S.C. § 407 (1970).

was the French statute of 1917.⁵² The problem with much of the older legislation was its over-generalized prohibition of pollution, which impeded enforcement. The Refuse Act, for example, lay dormant for well over half a century.⁵³

There are two basic means of pollution control: to reduce the amount of wastes discharged, either by preventing them from entering the water or treating them to make them harmless, or to increase and make more effective use of water's assimilative capacity. In modern water quality control, the reduction or elimination of the input of wastes is achieved by means of economic incentives, economic disincentives (such as effluent charges), and standards. Economic incentives take many forms, among them construction subsidies, tax advantages, and preferential price setting. Effluent charges have been around for a long time, originating in the Ruhr Basin at the turn of the century,⁵⁴ but have only recently begun to be applied on a broad scale, placing the onus of pollution squarely on the polluter. The embodiment of this concept in the polluter-pays principle was expressed in Organization for Economic Co-Operation and Development (OECD) recommendations to member countries.⁵⁵ Its strong appeal from an environmental point of view is that it has helped to internalize external costs and thereby permit a true evaluation of environmental factors in resource allocation.

Standards may be either water quality standards or effluent standards. The former (also known as ambient or stream standards) have a history almost as long as the early pollution laws; like effluent charges, they were developed in the Ruhr Basin nearly three quarters of a century ago through the classification of streams according to their use.⁵⁶ They give a general indication of the desired water quality in terms of a few parameters, but in order to meet the objectives which they set, they must be supplemented by effluent limitations either established on a case-by-case basis or given in advance for

52. France, *Loi relative aux établissements dangereux, insalubres ou incommodes*, 19 dec. 1917, *text in* 8 *Législation de la Guerre de 1914-1918*, *Recueil Général de Lois et des Arrêts* (1917).

53. In *United States v. Republic Steel Corp.*, 362 U.S. 482 (1960), the Supreme Court construed the statute as applying to any industrial waste, not merely discharges that might obstruct navigation. See Zener, *The Federal Law on Water Pollution Control*, in Dolgin and Guilbert, *Fed. Environmental L.* 682, 784-87 (1974).

54. See Kneese and Bower, *Managing Water Quality: Economics, Technology, Institutions* 244-53 (1968); also Fair, *Pollution Abatement in the Ruhr District*, in *Comparisons in Resource Management* 152-53 (Jarrett ed. 1961).

55. Organization for Economic Co-Operation and Development, *Recommendation of the Council on the Implementation of the Polluter-Pays Principle*, Nov. 14, 1974, 14 *Int'l Leg. Mat.* 234 (1975).

56. See Teclaff, *The River Basin*, *supra* note 1, at 126.

certain categories of pollution sources. Effluent limitations given for particular categories of sources tend to be primarily and directly geared to the level of available technology and only indirectly and more remotely to ambient standards.^{5 7}

The second basic means of pollution control—to increase the assimilative capacity—is a developmental use of the resource in that it involves construction of reservoirs and waterworks to store, transfer and release the large quantities of diluting water required. It has been used legitimately and successfully to prevent the poisoning of fish and to reduce the salt content of irrigation water,^{5 8} but its misuse is evident in the widespread employment of dilution to flush city sewers and substitute for effective sewage treatment.^{5 9} Just over a decade ago in the United States, it was proposed to almost double the capacity of the nation's reservoirs for water quality control,^{6 0} but later a more environmentally oriented means of pollution prevention was adopted in the shape of the Federal Water Pollution Control Act Amendments of 1972, which specifically forbid flow augmentation in lieu of pollution control by adequate treatment.^{6 1}

57. See e.g., the Federal Water Pollution Control Act Amendments of 1972, Pub. L. No. 92-500, 86 Stat. 816, which require all point-source dischargers to meet effluent standards based on best practicable control technology currently available by 1977, 33 U.S.C. § 1311(b)(1)(A) (Supp. 1974), and on best available technology economically achievable by 1983, 33 U.S.C. § 1311(b)(2)(A) (Supp. 1974). 33 U.S.C. § 1311(b)(1)(c) (Supp. 1974) relates the technology-based standards to water quality standards by requiring states to identify those waters for which the effluent limitations are not stringent enough to meet the water quality standards. The level of technology was defined in congressional debate on the FWPCA in 118 Cong. Rec. S16873 (daily ed., Oct. 4, 1972).

The principle of best available technology, as applied in Sweden, has been described as follows:

A fundamental starting point for judging a case is that an enterprise is, in principle, obliged to install *the most efficient technological devices* in use by similar enterprises either here in Sweden or abroad. In other words, advantage must be taken of all technological advances. When considering one application for exemption, the Environment Protection Board has underscored this principle, and stated that the question of anti-pollution devices shall be judged on the basis of what is technologically possible. This means that the very best technical solution must be chosen, whether it has been proved here in Sweden or elsewhere.

Sweden, Royal Ministry for Foreign Aff., Royal Ministry of Agriculture, National Environment Protection Board, Environment Protection Act . . . Information to the U.N. Conf. on the Human Environment 27-28 (1972).

58. Paszto, Recent Trends in Water Quality Management and Protection in Hungary, UNDP/UN Interregional Seminar on River Basin and Interbasin Dev., Budapest, 16-26, Working Paper No. 15, at 11 (Sept. 1975).

59. See Wollman, The Water Resources of Chile 130 (1968).

60. See Krutilla, *Is Public Intervention in Water Resources Development Conducive to Economic Efficiency?* 6 Nat. Res. J. 60, 70 (1966), citing U.S. Cong., H., Hearings Before a Subcomm. of the House Comm. on Governmental Operations on Water Pollution Control and Abatement, 88th Cong., 1st Sess. at 1244 (1964).

61. Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. § 1251 *et seq.* (Supp. 1976).

Maintenance of a minimum flow, however, as distinct from flow augmentation, is a legitimate, effective, and widely used⁶² method of pollution prevention and control; moreover, it helps protect not only the water resource *per se*, but also other elements of the environment, especially estuarine areas and aquatic living resources (including many marine fish species which spend part of their life cycle in the brackish water of estuaries).

The actual determination of desired minimum flow depends on circumstances. The British Water Resources Act, for instance, lays down no hard and fast rules, beyond requiring each water authority to determine "minimum acceptable flow" (MAF) at critical points throughout its area.⁶³ The administrative procedure is that the regional water authority and the central Water Resources Board together decide on what MAF determinations are to be made, and if they cannot agree the decision is left to the Secretary of State for the Environment.⁶⁴

The development of pollution control and of devices, such as the minimum flow concept, for the protection of the water resource was one response to an apparently ever increasing pressure on water

62. The minimum flow concept can be found in the 1963 Water Resources Act of England and Wales, United Kingdom, Water Resources 1963, ch. 38, § 19, in the French Code Rural, Art. 97-1, added by Law No. 64-1245 of 1964, and in statutes of a number of the eastern and humid mid-western states of the United States, for a discussion of these statutes and of the National Water Commission's proposals concerning establishment of minimum flows in riparian states see Clark, ed., *Waters and Water Rights*, Vol. 7, §§ 615, 615.1-615.2 (1976). In Switzerland, concessionaires for hydropower development must ensure minimum discharges over the whole or part of a year to control sedimentation and maintain the safe yield of diverted rivers. See Werenfels & Meylan, *Water Development: A European Experience*, in Goldman, *supra* note 1, 454, 456. Minimum-flow provisions specifically to protect fresh water supplies from salt water intrusion are contained in Japan, River Law, Law No. 167 of 1964, art. 1, and in the U.S. Federal Water Pollution Control Act Amendments of 1972, which authorize the Corps of Engineers, the Bureau of Reclamation, and other federal agencies to determine the need for storage to regulate streamflow to that end, 33 U.S.C. § 1251-52(b)(1-6) (Supp. 1976).

63. United Kingdom, Water Resources Act 1963, c. 38, as amended by Water Act 1973, c. 37.

64. See Craine, *Water Management Innovations in England* 55 (1969). In determining minimum acceptable flow, the water authority is required to consider the character of the water and its surroundings (especially its aesthetic value) and to specify a flow which must not be less than the minimum necessary to safeguard public health and to meet quantity and quality requirements of existing lawful uses. United Kingdom, Water Resources Act 1963, c. 38, § 19(5). The water authority is required also to consult with private and public water undertakers, local water agencies (such as drainage boards, navigation, harbor, and conservancy authorities), and, as appropriate, with the Minister of Transport and the Central Electricity Generating Board. *Id.* § 19(3). Prior to submission to the Secretary of State for Environment, MAF proposals are made available for public inspection. The Secretary is responsible for approval of MAFs and if he does not approve a proposal, he may direct the Water Resources Board to prepare a substitute or introduce his own proposal. MAFs are required to be reviewed on a continuing basis and amended, if necessary, at least every seven years. *Id.* § 20-21.

supplies. Another response to this pressure was to look to out-of-basin sources of surplus water instead of seeking a solution in conservation practices. But inter-basin transfers were fiercely resisted by many of the areas of so-called water surplus, whose inhabitants often felt that they were the victims of a new type of colonialism. This feeling was epitomized in a paper prepared for a water law conference in Georgia some years ago:

A third general class of allocative system, I shall, for want of a better name, describe as "empire building." The term is partly opprobrious but primarily just descriptive. This system, or lack of system, characterizes the huge distributive agencies that preside over grand inter-regional transfers, agencies such as the San Francisco Water Department, the Metropolitan Water District of Southern California, the Bureau of Reclamation, the California Department of Water Resources with its Feather River Project and California Water Plan, and a few others.⁶⁵

It was brought out also at the Western Interstate Water Conference at Corvallis, Ore., in 1965, when representatives of water-rich but economically less developed states indicated that such states would not let themselves be robbed of their patrimony by neighbors with "grandiose plans" for future growth.⁶⁶

In the international sphere, the concept of water imperialism was advanced by Henri Zurbrugg, who declared that Switzerland must not fall to the level of being a "water colony" of other European countries.⁶⁷ These tendencies were noted also by Abraham Hirsch in a study of Middle Eastern rivers:

There has been in some instances a marked surrender of sovereign rights by the upstream state in favor of facilitating utilization of the waters of the river by the downstream state. Historically, the earliest examples are those between a strong downstream state and a weak upstream state. More recently, such instances have occurred between equally strong states, among which a spirit of cooperation existed.⁶⁸

65. Gaffney, *Comparison of Market Pricing and Other Means of Allocating Water Resources*, in *Water Law and Policy in the Southeast*, Papers prepared for presentation at the Southeastern Water Law Conference, University of Georgia, Nov. 7-10, 1961, 195 at 199 (1962).

66. See *New York Times*, Aug. 8, 1965, at 32, col. 1.

67. Zurbrugg, *Aspects juridiques du régime des eaux en Suisse* 361 (1965). Zurbrugg borrowed the term "water colony" from Hartig, who used it at a meeting of the Water Law Committee of the International Law Association in reference to tendencies favorable to the interests of downstream states, *id.* at 361, n. 68.

68. Hirsch, *Utilization of International Rivers in the Middle East*, 50 *Am. J. Int'l L.* 81, 99 (1956).

Such views have found a practical parallel in the statutes of some states of the United States which restrict out-of-state or out-of-basin transfers of water. Nearly seventy years ago, in *Hudson County Water Co. v. McCarter* (1908), which concerned the planned transfer of water from the Passaic River in New Jersey to Staten Island in the State of New York, Justice Holmes upheld a state law prohibiting export of water:

... few public interests are more obvious, indisputable and independent of particular theory than the interest of the public of a State to maintain the rivers that are wholly within it substantially undiminished, except by such drafts upon them as the guardian of the public welfare may permit for the purpose of turning them to a more perfect use.⁶⁹

California law goes farther in its county-of-origin and watershed-of-origin statutes to protect waters of areas smaller than the state itself.⁷⁰ The county-of-origin statute reflects the reluctance of northern California counties to have their surplus water transferred to southern California without proper compensation. The watershed protection statute was construed by the attorney-general of California as giving priority to future uses of the areas of origin over all uses of the receiving areas to the extent that water put to beneficial use outside areas of origin can be withdrawn as area-of-origin needs and uses develop.⁷¹ Similarly, the Texas legislature passed a statute in 1965 requiring that all reasonable needs for a period of fifty years be estimated before plans for out-of-basin export of surplus water are made.⁷²

At the federal level, there have been only a few indications of any attempt to put the brakes on trans-basin diversion. The statute authorizing the Fryingpan-Arkansas Project in Colorado mandates conformity with the Colorado watershed-of-origin statute and prevents the Secretary of the Interior from using eminent domain to acquire water rights for use outside the Fryingpan basin.⁷³ The Supreme Court opinion in *Arizona v. California* (1963) upholds the power of Congress to pass legislation reserving water for future needs of states by interstate compact.⁷⁴ The Water Resources Planning Act

69. *Hudson County Water Co. v. McCarter*, 209 U.S. 349, 356 (1908).

70. Calif. Water Code § 10505 (1971) is commonly referred to as the "county-of-origin" statute. §§ 11460 and 11463 of the California Water Code are the principal operative provisions of the "watershed-of-origin" statute.

71. Construed in 25 Ops. Cal. Atty Gen. 8 (Opinion 53/298, filed Jan. 6, 1955).

72. Tex. Laws, 1965, ch. 297, § 2(b) at 588.

73. 43 U.S.C. § 616b(d) (1970).

74. *Arizona v. California*, 373 U.S. 546 (1963).

of 1965, establishing the Water Resources Council and river basin commissions, specifically declared that the act must not be construed as authorizing any of these entities to study, plan or recommend inter-basin transfers of water.⁷⁵

These measures, of course, do not in any way hinder—indeed, they foster—intrabasin development in areas of apparent surplus which may eventually be just as damaging to the environment. One means of forestalling such damage is the exclusion of certain waters from development altogether. It has been put into practice in parts of the West where scenic and recreational values made it desirable that some waters be preserved from agricultural, power, or industrial use. In Idaho, for example, the governor of the State may appropriate the waters of certain lakes and springs in trust for the people, and in Oregon, some streams that form beautiful waterfalls or are famous for fishing have been reserved from appropriation.⁷⁶ On a federal level, the Wild and Scenic Rivers Act of 1968⁷⁷ carried the concept of choice between nonproductive and productive uses a stage further by distinguishing between rivers and river valleys that were essentially untouched (wild), those that were accessible by road but largely undeveloped (scenic), and those that were readily accessible by road and already somewhat developed (recreational). Prior to passage it met with formidable opposition in Congress and in some federal agencies;⁷⁸ the initial recommendations were whittled down until only eight rivers were designated for immediate inclusion in the system. Of those designated for further study, the influential chairman of the House Committee on Interior and Insular Affairs observed, in deference to developmental interests:

We have not “locked up” these rivers. If the Corps of Engineers, for instance, wants to put a development in on any of them, all it has to do is to advise the Secretary of the Interior ahead of time and inform the Congress what the effect of its development will be. Then if Congress says OK, OK it is.⁷⁹

Third Phase—Attempts at Harmonization

Selective development of water resources already goes beyond protection of water alone in that it helps to mitigate damaging impacts

75. 42 U.S.C. § 1962-1 (1970).

76. Idaho Code Ann. §§ 67-4301-67-4311 (1973 and Supp. 1975); Ore. Rev. Stat. §§ 538.110-538.300 (1973).

77. Wild and Scenic Rivers Act of 1968, 16 U.S.C. §§ 1271-1287 (1970).

78. See generally on the history of the enactment, U.S. Code Cong. & Admin. News 3801 (1968); also Tarlock and Tippy, *The Wild and Scenic Rivers Act of 1968*, 55 Cornell L. Rev. 707 (1970), reprinted in 2 Env. L. Rev. 557 (1971).

79. See 114 Cong. Rec. 26590 (1968).

on the area of great beauty and areas primarily suited to recreational purposes or wildlife conservation. A more effective step in the overall harmonization of development with conservation is the routine inclusion of environmental protection measures in the process of planning and authorizing works that may be detrimental to the environment. In the absence of statutory mandate such inclusion may be based on an interdepartmental understanding like that between the U.S. Army Corps of Engineers and the Department of the Interior in the pre-NEPA era.⁸⁰ This agreement was an attempt to formalize cooperation between the two agencies in combating pollution and protecting the environment from adverse impacts of dredging, filling, or excavation in navigable waters.

Sometimes consideration of environmental factors in licensing may result from close cooperation between the licensing agency and the environmental protection agency, as in Sweden, between the National Environmental Protection Board (NEPB) and the Franchise Boards which authorize water projects.⁸¹ On occasion, the existing powers of the licensing agency have been reinterpreted to encompass the consideration of environmental factors. In the pre-NEPA era, for example, courts in the United States construed the responsibilities of the Federal Power Commission to include the duty to preserve wild rivers and wilderness areas, anadromous fish, and wildlife, and to protect conservation interests by ensuring that they were adequately represented—not merely to adjudicate between development and conservation.⁸²

Licensing thus becomes a powerful tool in *ad hoc* assessment of the impact of water projects and is useful in minimizing adverse environmental effects as they appear or develop after construction, when the impact of a project may have been difficult to foresee. Continuation of the work may then be predicated on the presence or absence of certain environmental effects as the project develops. In a recent California decision, for example, the grant of a water right to a large upstream diversion was made contingent upon two factors: (1) the impact of the diversion, as it proceeded in stages for some twenty years, upon estuarine water quality and other elements of the

80. District engineers of the Corps were required to coordinate their permit-granting with the Interior divisions responsible for wildlife, pollution, and parks, and if differences could not be resolved, they were referred for final decision to the topmost echelons of the two agencies acting in consultation, 33 C.F.R. § 209.120 (1969).

81. See Lundquist, *Environmental policy and administration in a unitary state: Sweden*, in United Nations, *EcoSoc, Organization and Administration of Environmental Programmes* 126, 136-37 U.N. Doc. ST/ESA/16 (1974).

82. See *Udall v. FPC*, 387 U.S. 428 (1967); and *Scenic Hudson Preservation Conference v. FPC*, 354 F.2d 608, cert. denied, 384 U.S. 941 (1965).

environment; and (2) the future development and improvement of the data base used for evaluation of the project.⁸³

The recent trend toward establishing departments or agencies entrusted with the task of environmental protection creates favorable conditions for a transition from informal to formal evaluation of environmental factors. Though they may not always have the power to prevent the construction of environmentally detrimental projects, the fact that such agencies often promote studies and set standards and that their heads have ministerial rank and take part in high-level deliberations of the government assures at least some consideration of environmental factors in the final decision.⁸⁴ This transition may be further facilitated when the environmental agency is not only entrusted with protection but also with development of all or some elements of the environment. In England and Wales, for example, the entire structure of water management, organized by river basins or groups of river basins, was absorbed into the Department of the Environment and was further consolidated by the Water Act of 1973, which created ten regional water authorities to replace the old river authorities.⁸⁵ In East Germany, the national Water Management Agency, which was created in 1969, was absorbed in 1971, together with seven regional water management authorities in the major river basins, into the Ministry of Environmental Protection and Water Management.⁸⁶ Regional decentralization notwithstanding,

83. California State Water Resources Control Board, Delta Water Rights Decision, Dec. 1379 (July 1971), concerning the application by the State Department of Water Resources and the U.S. Bureau of Reclamation for appropriative water rights from the Sacramento-San Joaquin Delta Water Supply. See also Richardson & Johnston, *Environmental Values and Water Quality Planning*, 101 Journal of the Hydraulics Division, Proceedings of the American Soc. of Civ. Eng'rs, 266-67 (Feb. 1975).

84. Most of the developed and some of the developing countries of the world now have separate environmental agencies. They include: Algeria, Argentina, Australia, Austria, Benin, Brazil, Bulgaria, Canada, Central African Republic, Chile, China, Colombia, Czechoslovakia, Denmark, Egypt, Finland, France, Gabon, German Democratic Republic, German Federal Republic, Ghana, Honduras, Hungary, Iceland, India, Indonesia, Iran, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kenya, North Korea, Kuwait, Lichtenstein, Luxembourg, Malaysia, Malta, Mauritius, Mexico, Morocco, Netherlands, New Zealand, Nigeria, Norway, Peru, Philippines, Poland, Portugal, Romania, Senegal, Singapore, South Africa, Spain, Sudan, Sweden, Switzerland, U.S.S.R., United Kingdom, United States, Upper Volta, Uruguay, Yugoslavia, and Zaire.

Those which divide environmental responsibility among various agencies and ministries include: Bahrain, Bangladesh, Botswana, Cameroon, Cyprus, Ethiopia, Greece, Iraq, Malawi, Maldives, Mongolia, Nicaragua, Niger, Pakistan, Panama, Rwanda, Sri Lanka, Swaziland, Syrian Arab Republic, Trinidad and Tobago, Turkey, Tanzania, and Zambia.

United Nations, Environment Programme (UNEP), *The State of the Environment 1976*, Report of the Executive Director 14-15 U.N. Doc. UNEP/GC/58 (Jan. 30, 1976).

85. United Kingdom Secretary of State for the Environment Order, Stat. Instr. 1970, No. 1681; Water Act, 1973, c. 37.

86. German Democratic Republic, Law of Feb. 5, 1969, Concerning the Agency for Water Management [1969], BGBI. II 129; Public Notice of Jan. 3, 1972, on the Creation of Ministries [1972], BGBI. II 18.

when the developmental and protective aspects of water management are thus consolidated in one agency, the environmental factors are at least routinely considered; this does not necessarily mean the elimination of developmental bias, despite the fact that the title of such a body contains the word "environment" or "environmental."

Assessments formally mandated by statutes or regulations stand at the apex of measures for the rational management of the environment because they command more respect and attention than the best *ad hoc* arrangements. The effect of NEPA's mandate was dramatic and apparent immediately upon passage of the Act, when the Federal Court of Appeals for the Fifth Circuit reversed a lower federal court decision that the Corps of Engineers had no power to deny a water project license on ecological grounds.⁸⁷ Some of the statutes which stipulate environmental assessment, such as the new Rumanian Environmental Code, create only a general obligation on the part of government agencies to protect the environment and to take environmental factors into consideration, without specifying how this is to be done, or even mentioning an impact statement procedure.⁸⁸ In this they differ only to a limited extent from informal departmental arrangements.

There is less discretion left to the administration in the statutes which, like NEPA, explicitly require a written evaluation of the environmental effects of proposed actions or projects. The effectiveness of these statutes from the point of view of protection depends on whether the criteria for assessment are contained in the act, explicitly or impliedly, or are left to elaboration by subsequent regulations, and the extent to which administrative decisions are subject to the scrutiny of the public or an independent watchdog agency.

In Canada, assessment and control of the environmental impact of major federal development is delegated to the federal Department of the Environment (also known as Environment Canada). The conditions of the assessment process, including the requirements for an impact statement, derive remotely from the enabling statute, having been established exclusively by the Department in regulations.⁸⁹ The

87. *Zabel v. Tabb*, 430 F.2d 199 (5th Cir. 1970), *cert. denied*, 401 U.S. 910 (1971).

88. Rumania, Law on the Protection of the Environment, June 20, 1973, no. 9, text in 19 Rev. Roum. Sci. Soc.-Sci. Jurid. 59-87 (1975). The general mandate to all government departments is contained in Art. 7, and for water protection in Art. 12.

89. The federal assessment process was instituted in May 1974. See 3 Canadian Env'tal L. News 90-91 (June 1974), on which this description was based. The Canadian Department of the Environment was established by the Government Organization Act 1971, Can. Rev. Stat. c 42 (1971). Part I of this Act, dealing with the Department, is commonly cited as the Department of the Environmental Act.

process is applied to three types of projects: those undertaken directly by the federal government, those involving federal funding, and those involving use of federal Crown lands. Objectivity and uniformity are to be assured by the Environmental Assessment Panel, whose members are taken from various disciplines represented among officials of Environment Canada, and whose main task is to issue assessment procedures and guidelines for individual government departments to use in making impact statements. In broad outline, the procedures adopted make regional committees of the Department responsible for preliminary screening to determine if impact statements are required. When an assessment is deemed necessary it is sent, after examination and comment by the regional committees, to the Environmental Assessment Panel, which may approve it or direct that additional studies be made. The whole process seems to be tightly controlled by the Department of the Environment.

The Colombian Natural Resources Code⁹⁰ and the Australian Environmental Protection Act⁹¹ explicitly provide for impact statement preparation, but leave the elaboration of its requirements to subordinate legislation. The Australian act is more detailed in that, while it entrusts the development of procedures and criteria to subsequent orders of the Governor-General, it enumerates the kinds of activities for which environmental assessment is to be made.⁹² The Order implementing the act leaves to the Minister the decision whether an impact statement is required,⁹³ and, though he must consider the factors enumerated in the Order,⁹⁴ he may dispense with preparation of an impact statement when he deems that such preparation would be against public policy.⁹⁵ The Order also permits the Minister to exempt whole classes of actions from the impact statement requirement at the request of any department or agency.⁹⁶ He seems to have almost complete discretion in the matter, especially since he may withhold from the public the grounds

90. Colombia, National Code on Renewable Natural Resources and Environmental Protection (enacted by Decree No. 2811 of Dec. 18, 1974), 11 *Diario Oficial* 145 (Jan. 2, 1975). See Cano, *Comprehensive Environmental Legislation: A Summary Review of Colombia's Environmental Code*, 1 *Env'tal Policy & Law* 177 (1976). As leader of the FAO team of technical assistance experts and advisor to the Colombian Government, Dr. Cano played a major role in the drafting of this comprehensive code.

91. Australia, Environment Protection (Impact of Proposals) Act, No. 164 of 1974, Dec. 17, 1974.

92. *Id.* § 5.

93. Australia, Governor-General, Order under Sub-section 6 (1) of the Environment Protection (Impact of Proposals) Act 1974-1975, June 20, 1975, paragraph 3.1.1.

94. *Id.* paragraph 3.1.2.

95. *Id.* paragraph 3.1.3.

96. *Id.* paragraph 11.1.

of the exemption for public interest reasons.⁹⁷ The Australian assessment process seems to be as tightly controlled by the administration as the Canadian federal one, perhaps even more so, since the Governor-General's order can only be disapproved by parliament within a limited period of time after it has been laid before the legislature.⁹⁸

NEPA not only mandates the preparation of an impact statement, but also sets both substantive⁹⁹ and procedural¹⁰⁰ criteria for the assessment process. Though they have still to be systematized in the agencies' regulations, these criteria set limits for the latitude of agency interpretations of NEPA, and contained enough substance to permit the courts to transform them into precise and binding directives.¹⁰¹ Similarly, the Ontario impact statement, in contrast to the Canadian federal environmental assessment, is mandated specifically by statute. The Ontario Environmental Assessment Act of 1975 not only enumerates activities for which impact statements may be necessary, but also sets forth in considerable detail the contents of the statement and describes the powers of the Minister and of the independent Environmental Assessment Board.¹⁰² But, like the federal regulations, it leaves the direction of the procedure and the final decisions entirely in the hands of the Minister, who may disregard the findings of the Board.¹⁰³

While the federal assessment process in Canada does not seem to have had very much influence on the provincial procedures,¹⁰⁴ in

97. *Id.* paragraph 11.5.

98. Australia, Environment Protection Act, *supra* note 97, sec. 7. For an informative discussion of the Act, see Clark, *Redcliff and Beyond: The Commonwealth Government and Environmental Planning*, 5 Adelaide L. Rev. 165 (1975); also, for a discussion of the fundamental differences between Australian and U.S. administration of natural resources, by the same author, see *Conservation and Government: Towards an Understanding of Roles*, 5 Search 241 (June 1974).

99. United States, National Environmental Policy Act of 1969, § 101(b), 42 U.S.C. § 4331(b) (1970).

100. *Id.* § 102, 42 U.S.C. § 4332 (1970).

101. See, e.g., *Calvert Cliffs Coordinating Comm. v. AEC*, 449 F.2d 1109 (D.C. Cir. 1971), *cert. denied*, 404 U.S. 942 (1972).

102. Canada, Province of Ontario, Environmental Assessment Act, ch. 69, July 18, 1975, §§ 3, 4, 5 (3), and 7-24. It may be noted that § 3(b) makes provision for future extension of the impact statement process (by proclamation of the Lieutenant Governor) to major commercial or business enterprises, activities, or plans, independently of any government involvement.

103. *Id.* §§ 12(2)(b), 24(1)(a) & (b).

104. As a matter of fact, the environmental assessment provision in the City of Winnipeg Act, Man. Stat., c. 105 (1971), was apparently patterned on NEPA and afforded the public a larger scope of enforcement than is generally accorded it in Canada. Lucas, *Legal Foundations for Public Participation in Environmental Decision-making*, 16 Nat. Res. J. 72, 95-96 (1976), quotes in support the unreported Manitoba case of *Stein v. The City of Winnipeg* (Manitoba Court of Appeal, June 10, 1974).

the United States state impact statement procedures have been patterned on and profoundly influenced by the federal statute.¹⁰⁵ One underlying assumption in NEPA, however, developed in guidelines and in the federal case law, has not been followed unvaryingly in state statutes and guidelines—that the soundness of the decision-making process is strengthened and safeguarded if it is open to public scrutiny. The courts have emphasized this aspect of the assessment process very strongly. In *EDF v. Corps of Engineers*, for example, the court declared bluntly that:

Where experts, or concerned public or private organizations, or even *ordinary lay citizens* bring to the attention of the responsible agency environmental impacts which they contend will result from the proposed agency action, then the § 102 statement should set forth these contentions and opinions, even if the responsible agency finds no merit in them whatsoever.¹⁰⁶ (Emphasis added)

Likewise, the *CEQ Guidelines* are very specific on this point. Public participation is to be encouraged at the earliest possible time; agencies are to publicize the availability of draft environmental impact statements (for example, in local newspapers or by directly notifying interested groups); copies of draft statements are to be provided without charge or at a nominal reproduction fee to organizations and individuals that request the opportunity to comment.¹⁰⁷ The *Guidelines* require agencies to actively seek out all major points of view and discuss them in the draft statement, to make meaningful reference in the final statement to the existence of any responsible opposing view not adequately discussed in the draft, and to attach all substantive comment received to the final statement, “whether or not each such comment is thought to merit individual discussion by the agency in the text of the statement.”¹⁰⁸

In most of the state statutes and guidelines public participation is less broadly conceived. The Maryland statute, for example, restricts comment to private organizations and individuals with jurisdiction by law, special expertise, or recognized interest.¹⁰⁹ In Montana, pre-draft outlines of impact statements are to be circulated to

105. For a discussion of state environmental impact statement requirements, see CEQ Fifth Annual Report 401-09 and Appendix (1974); and Trzyna, *A Comparative Review of State Environmental Impact Laws within a Federal System*, 1 *Earth L.J.* 133 (1975).

106. *Environmental Defense Fund v. Corps of Engineers*, 325 F. Supp. 749, 759 (1971).

107. CEQ, *Preparation of Environmental Impact Statements: Guidelines*, § 1500.9(d), 38 Fed. Reg. 20550, 20555 (1973).

108. *Id.* § 1500.10(a).

109. Maryland Environmental Policy Act of 1973, Ann. Code of Md. NR §§ 1-301, 1-304(b)(1) (1974).

"selected" private groups and individuals, and to those whose interests will be "significantly" affected by the proposed action.¹¹⁰ The Montana statute calls for consultation with representatives of various interests (industry, conservation organizations, labor, etc.) as "it deems advisable."¹¹¹ Some states make no provision for direct public input to the impact statement procedure,¹¹² and in one instance, at least, the matter of consultation with the public is wholly within the agencies' discretion.¹¹³

Aside from the procedures mandated under NEPA, then, public participation in the assessment process in the United States is little developed; even less participation is evidenced elsewhere. Limitation of the public's role is evident in the Australian and Ontario statutes, though both provide for notification and permit the public to make comments. According to the Australian statute, the Minister is not required to make anything public, unless he receives a written request for particular information¹¹⁴ or unless he decides, in his discretion, to direct that an inquiry be conducted.¹¹⁵ In the latter case, he appoints a commission of inquiry, which is required to make public its findings and recommendations (with certain specified exceptions), but the commission itself has discretion to prohibit or restrict publication of evidence or documents.¹¹⁶ The Administrative Procedures promulgated subsequent to the Act further emphasize the absence of a firm mandate to inform the public fully and completely: the impact statement may be suppressed from public comment in any one of three ways—after consultation between the proponent and the administration, after interdepartmental consultation, and by the Minister's own determination.¹¹⁷ Under the Ontario statute, review of an environmental impact assessment takes place before there is any public involvement at all.¹¹⁸ The Minister then gives notice of the assessment and its review "in such manner as (he) considers suitable, to the public," whereupon any person can

110. Montana Guidelines § 5(C). See Trzyna, *supra* note 105, at 148.

111. Montana Environmental Policy Act of 1971, Mont. Rev. Code, § 69-6501 *et seq.* § 69-6517 (Supp. 1975).

112. *E.g.*, Minnesota Environmental Policy Act of 1973, Minn. Stat. Ann. Ch. 116D (Supp. 1976).

113. North Carolina leaves it to the agencies to consult with the public "if deemed appropriate." North Carolina, Dep't of Administration, Implementation of the Environmental Policy Act of 1971, at 2 (Feb. 18, 1972), cited in CEQ, Fifth Annual Report, *supra* note 105, at 406.

114. Australia, Environment Protection Act, *supra* note 97, § 10.

115. *Id.* § 11(1).

116. *Id.* § 11(2), (4) and (5).

117. Australia, Governor-General, Order, *supra* note 93, para. 6.2.2., 6.2.3., and 6.2.4.

118. Canada, Ontario, Environmental Assessment Act, *supra* note 102, § 7(1)(a).

make written submissions which the Minister is bound to "consider."¹¹⁹ He must notify the authors of these written submissions of his acceptance or rejection of the statement.¹²⁰

The restrictions on public participation in the countries which have already adopted impact statement procedures may indicate that as these procedures extend to a wider circle of states the level of participation of the public will remain similar to that already established in natural resources management, that is, to associating the representatives of local interests with policies, plans and decisions in an advisory capacity and seeking comments or advice of professional or scientific bodies. In the water resources field, there are many examples of such representation, from users' associations to the Water Authorities (one-time river boards) of England and Wales, the basin authorities of France, and the hydrographic confederations of Spain.¹²¹ When we come to environmental protection, the Colombian Natural Resources Code also provides for public participation through organizations. It promotes the establishment of environmental protection associations, similar in principle to water users' associations, but including inhabitants of the area who are *not* users of natural resources as well as those who are.¹²²

Among the socialist countries, the law of the U.S.S.R. provides for honorary inspectorates, attached to local branches of the All-Russian Society for the Furtherance of Nature Conservation and Green Belts, to assist the state agencies and to allow the Society, through the inspectors, to scrutinize plans for projects affecting the preservation and regeneration of natural resources.¹²³ To what extent this input has been effective is unknown. The concept of local advisory bodies persists in the legislation of the socialist countries; the Rumanian law of 1973 establishes environmental protection commissions, made up in part of experts from various disciplines, as regional and local advisors to the National Council for the Protection of the Environ-

119. *Id.* §§ 7(1)(b), 7(2)(a), and 8.

120. *Id.* § 9.

121. See generally on public representation of these types of bodies, Johnson and Brown, *Cleaning Up Europe's Waters: Economics, Management, Policies*, Chapter VIII; Lopez, *Organización de las Comunidades de Usuarios en la República Argentina*, in *Actas y Documentos, la Conferencia Internacional de Derecho de Aguas* (Argentina, 28 Aug.-2 Sept. 1968); and Teclaff, *Abstraction and Use of Water: A Comparison of Legal Regimes* U.N. Doc. ST/ECA/154 116-19, 125-26 (1972). See also United Nations, Department of Economic and Social Affairs, *National Systems of Water Administration* U.N. Doc. ST/ESA/17 106-07, 139, 173-74 (1974).

122. Colombia, *Natural Resources Code*, *supra* note 90, art. 337.

123. U.S.S.R., *On Nature Conservation in the RSFSR*, Law adopted by the Supreme Soviet of the RSFSR, Oct. 27, 1960, *Vedomosti RSFSR* (1960), No. 40, item 586, transl. in *Soviet Statutes and Decisions* 11-23, Art. 16, at 22 (Fall 1972).

ment.¹²⁴ These experts have a voice in analyzing and reviewing administrative action in matters affecting the environment and in examining development plans.¹²⁵ Similarly, Polish town and country planning (which is regarded as the basic legal form of organizing the natural environment in that country) provides for organized public discussion and examination of plans by, *inter alia*, civic and professional organizations.¹²⁶

The role of the public does not end with providing information and comments, but may extend to a challenge of the final decision. In the United States the public's supervision of the final result of the assessment process has been guaranteed and expanded by the courts. After imposing on the federal agencies the duty to assemble and disclose relevant information, NEPA did not attempt to design an institution which would make a final decision on compliance with the assessment process and on whether the information gathered warranted proceeding with the project or abandoning it. This was left to the agencies themselves, where they had sufficient authorization, or generally to Congress and the President within their constitutional powers. The role of overseer was then successfully assumed by the general courts which used NEPA in conjunction with the Administrative Procedure Act¹²⁷ not only to review the procedural aspects of environmental decisions but also to evaluate them on the merits.¹²⁸ The courts also strengthened the hand of the public by allowing any person, who could show a mere personal stake or interest in the decision, to challenge agencies' decisions.¹²⁹

Supervision by the judiciary has not been adopted in other common law countries which have developed some impact statement procedures. The final decision tends to be left to the administration;

124. Rumania, Law on the Protection of the Environment, *supra* note 88, Art. 70.

125. *Id.* Art. 71.

126. See Brzezinski, Legal Protection of Natural Environment in Poland 38-39 (1974).

127. Administrative Procedure Act, 5 U.S.C. § 701 (1970).

128. *EDF v. Corps of Engineers*, 470 F.2d 289 (8th Cir. 1972) is credited with extending judicial review of environmental administrative decisions. In that case the court stated that, "... given an agency obligation to carry out the substantive requirements of the Act, we believe that courts have an obligation to review substantive agency decisions on the merits." *Id.* at 298. This view is supported by the Seventh Circuit in *Sierra Club v. Froehlke*, 486 F.2d 946 (7th Cir. 1973) and by the Fifth Circuit in *EDF v. Corps of Engineers*, 492 F.2d 1123 (5th Cir. 1974). But the Ninth Circuit, in *EDF v. Armstrong*, 487 F.2d 814 (9th Cir. 1973) and the Tenth Circuit in *National Helium v. Morton*, 486 F.2d 995 (10th Cir. 1971), limited the scope of review to the procedural aspects. See generally on this subject, Teclaff, *The Role of the Executive Branch in Protection of the Environment in the United States*, in *Law in the United States of America in Social and Technological Revolution* (Reports of the IX Congress of the International Academy of Comparative Law) 513, 536-40 (Hazard & Wagner eds. 1974).

129. *Sierra Club v. Morton*, 405 U.S. 727 (1972).

judicial review is either limited by statutory prohibitions or statutory grants of administrative discretion,¹³⁰ or circumscribed by restrictive interpretation of who may activate review by the courts in environmental matters.¹³¹ In non-common law countries, the exclusion of review of administrative decisions by the courts is generally more complete, and the review function may be entrusted to administrative tribunals, or may remain in the hands of higher echelons of the administration itself. For example, in East Germany a non-judicial review procedure of all administrative decisions is being developed.¹³² In Poland, appeal from administrative decisions may be made to higher echelons of the general administration.¹³³ West Germany gives the review function to administrative tribunals. There the tendency has been to refuse standing to associations, or to limit it to the assertion of very narrowly defined interests.¹³⁴ Thus,

130. See e.g. Canada, Province of Ontario, Environmental Assessment Act, ch. 69, § 18(19) (1975) which states that:

No decision, order, direction, resolution or ruling of the (Environmental Assessment) Board shall be questioned or reviewed in any court and no proceeding shall be taken in any court by way of injunction, declaratory judgment, certiorari, mandamus, prohibition, application for judicial review, quo warranto, or otherwise to question, review, prohibit or restrain the Board or any of its decisions, orders, directions, resolutions or rulings.

For Australia, see Governor-General, Order, *supra* note 93, and Clark, *Redcliff and Beyond*, *supra* note 98.

131. In Canada, in order to be accorded standing in environmental cases, plaintiffs must have suffered injury distinguishable from that of injury to the general public. In *Green v. The Queen*, 34 DLR (3d) 20, 30 (1973), the Court said, "The plaintiff, in fact, is seeking a declaration of breach of statutory trust which is not open to him—unless he has a special interest above that of the general public." Noting some signs of possible relaxation of the rule of standing in such cases as *Thorson v. Att'y Gen'l of Canada* (1974), 1 N.R. 25, 43 DLR (3d 1, 17) (1974), Lucas nevertheless states that "the old locus standi principles developed in the context of public nuisance actions, appeared to be the law" and that "under well-established principles of judicial review, courts confine review of decisions by environmental agencies to essentially procedural and jurisdictional issues." Lucas, *supra* note 104, at 95 and 97.

In Australian law, according to Benjafield and Whitmore:

The conditions which must be satisfied before a private citizen alone may sue for such an injunction (public rights) are laid down in *Boyce v. Paddington Borough Council* (1903) 1 Ch. 109. The individual citizen can sue for an injunction in the following cases only: (a) where interference with a public right involves also an interference with some private right of his own; and (b) where although an interference with a public right does not involve also an interference with such a private right, it nevertheless causes special damage peculiar to himself.

In all other cases the individual citizen cannot sue alone, but must join the Attorney-General.

Benjafield and Whitmore, *Principles of Australian Administrative Law* 224 (1971).

132. Sand, *The Socialist Response: Environmental Protection Law in the German Democratic Republic*, 3 Ecol. L.Q. 451, 466 (1973).

133. Tarasiewicz, *Przepisy prawne w gospodarce wodnej* 87 (1975).

134. See Reh binder, *German Law on Standing to Sue* 9, 11, 15 (IUCN Environmental Law Paper No. 3 1972).

even a system which permits a wide latitude to public participation in hearings *prior* to administrative decisions,¹³⁵ severely restricts any public input once the decision has been taken.

Third Phase—Quantification

The slow progress of institutionalization and the continuing reliance on less formal assessment of environmental impacts is caused in large part by difficulty in quantifying these impacts and comparing them with economic benefits. Experience in the United States underscores the complexity of including environmental factors in orthodox cost-benefit analysis.

The principle that benefits of projects must exceed costs was originally established in the Flood Control Act of 1936.¹³⁶ It was elaborated in a Bureau of the Budget circular in 1952,¹³⁷ requiring all water development agencies to use the same guidelines and standards, and although new guidelines were established a decade later (in Senate Document 97 of 1962)¹³⁸ which did not mandate this positive monetary ratio, the principle continued to be an informal Bureau of the Budget requirement throughout the 1960's.¹³⁹ To the original planning objectives of the 1936 Flood Control Act (national economy, regional development, and the well-being of people), the 1962 Senate Document added a fourth—"preservation" of the environment, but this objective was honored in the breach rather than in the observance.

NEPA changed that. Within twelve months of its passage, Congress gave the Corps of Engineers new directives for water development planning. The River and Harbor Act of December 31, 1970, required

135. See McCaffrey and Burhenne-Guilmin, *The Use of Law in Environmental Conservation: a Survey of Legal Responses to Selected Problems*, in U.N., Dep't of Econ. and Soc. Aff., Organization and Administration of Environmental Programmes U.N. Doc. ST/ESA/16, 109, at 122 (1974).

136. Flood Control Act of 1936, 33 U.S.C. § 701(a) (1970).

137. U.S. Bureau of the Budget, *Reports and Budget Estimates Relating to Federal Programs and Projects for Conservation, Development or Use of Water and Related Land Resources* (1952).

138. U.S. Cong., Senate, *Policies, Standards and Procedures in the Formulation, Evaluation, and Review of Plans for Use and Development of Water and Related Land Resources*, Senate Doc. No. 97, 87th Cong. (1962).

139. See Coy *et al.*, *Critique of Water Resources Council's Proposed Principles and Standards for Planning Water and Related Land Resources*, in Goldman, *supra* note 1, 478, at 479. Typically, in the early 1960s, the benefit-cost ratio of national waterways in the United States was 3.17:1, but certain earlier projects greatly exceeded this positive ratio, e.g. the Gulf Coast section of the Intracoastal Canal, which, in 1955, had a ratio of 14.8:1. See *Sierra Club v. Froehke*, 359 F. Supp. 1289, at 1365 (S.D. Tex. 1973), citing correspondence between the Intracoastal Canal Association of Louisiana and Texas and the Fort Worth District Engineer.

the promulgation of guidelines to assure that possible adverse economic, social, and environmental effects relating to any proposed Corps project were fully considered.¹⁴⁰ But the Corps appeared unable or unwilling to come to grips with the problem of quantifying environmental costs. In its regulations, published in February 1972, it stated that, "Normally, the use of detailed project cost figures should be avoided, but general cost comparisons may be used to illustrate the environmental, economic, or social trade-offs necessary to achieve objectives."¹⁴¹ It was frank to give the reason for lack of detailed quantification in a contemporary impact statement, "... the present state of the art does not afford a basis for quantifying environmental amenities and project benefits in the same economic terms."¹⁴² The district court in *Sierra Club v. Froehlke* rejected this reasoning and directed the Corps of Engineers to supply definite policy guidelines, regulations or standards with regard to methods for quantifying environmental amenities.¹⁴³ The demand was exceptionally strict; the federal Court of Appeals for the Fifth Circuit overruling the district court, generally disapproved of this directive,¹⁴⁴ in keeping with an earlier decision in which it declared that NEPA could not be construed as commanding an agency "to develop or define any general or specific quantification process."¹⁴⁵

The Fifth Circuit approach had been adopted earlier by the Council on Environmental Quality in its attempt to come to grips with precise accounting for the environmental consequences of economic development in general, and by the Water Resources Council for the consequences of water development and use in particular.¹⁴⁶ The Water Resources Council's *Principles and Standards*

140. River and Harbor Act of 1970, 84 Stat. 1818.

141. 37 Fed. Reg. § 7(c) 2526 (1972).

142. Corps of Eng'r, U.S. Dep't of the Army, Environmental Impact Statement, Wallisville Lake, Trinity River, Tex. (Dec. 13, 1971), at 94, quoted in *Sierra Club v. Froehlke*, 359 F. Supp. 1289, 1365-66 (S.D. Tex. 1973).

143. 359 F. Supp. 1289, 1383 (S.D. Tex. 1973). The court pointed out that, in the meantime, and until such techniques and guidelines could be worked out:

If the Congress were to decide upon some arbitrary benefit-cost ratio below which a project would not be considered, only the more meritorious and more urgently needed public works projects would survive close examination and be authorized. . . .

Id. at 1381.

144. *Sierra Club v. Froehlke, rev'd sub nom. Sierra Club v. Callaway*, 499 F.2d 982, 991 (5th Cir. 1974).

145. *EDF v. Corps of Engineers*, 492 F.2d 1123 (5th Cir. 1974).

146. CEQ, Preparation of Environmental Impact Statements: Guidelines, 40 C.F.R. § 1500.8 *et seq.*; Water Resources Council, *Principles and Standards for Planning Water and Related Land Resources*, 38 Fed. Reg. 24778 (Sept. 10, 1973).

The CEQ Guidelines direct that:

Sufficient analysis of . . . alternatives and their environmental benefits, costs

for *Planning Water and Related Land Resources* retains quantitative and monetary cost-benefit analysis for economic factors in evaluating water projects, but abandons it, at least for the time being, for environmental factors. Though failing to provide numerical values for environmental factors, they treat them on a par with economic factors. The alternative plans, which are mandated for each water project following NEPA, are to be formulated with national economic development and protection of the environment as twin objectives. In each plan, the beneficial and adverse effects on the national economy and environment must be accounted for. In addition, for each plan, the beneficial and adverse effects on regional development and social well-being should be shown. In all, then, the plan should show four separate accounts, some of them in quantitative and monetary terms, some not. *The Principles and Standards* do not mention that the ratio of economic benefits to costs must be more than one. Thus, it would seem that a plan with an adverse ratio could be recommended due to the impact of environmental considerations. They also update the discount rate, equating it to the interest government pays on its borrowing, which favors projects requiring a lesser capital outlay.

The *Principles and Standards* require environmental effects to be presented in descriptive and qualitative analysis, stating that:

To the extent possible . . . beneficial or adverse effects will be displayed in terms of relevant physical and ecological criteria or dimensions, including the appropriate qualitative dimensions.¹⁴⁷

Then they proceed to outline in great detail the factors which should go into such description.¹⁴⁸

and risks should accompany the proposed action through the agency review process in order not to foreclose prematurely options which might enhance environmental quality or have less detrimental effects. . . .

. . . In each case, the analysis should be sufficiently detailed to reveal the agency's comparative evaluation of the environmental benefits, costs and risks of the proposed action and each reasonable alternative . . . ,

and that:

. . . agencies that prepare cost-benefit analyses of proposed actions should attach such analyses, or summaries thereof, to the environmental impact statement, and should clearly indicate the extent to which environmental costs have not been reflected in such analyses.

40 C.F.R. § 1500.8(a)(4) and (8).

147. Water Resources Council, *Principles and Standards*, *supra* note 146, Standards I. (H)(1), 38 Fed. Reg. 24808.

148. Elements of the environment to be described include (depending on the circumstances): (a) open and green space, wild and scenic rivers, lakes, beaches, shores, mountains and wilderness areas, estuaries, and other areas of natural beauty; (b) archeological, historical, biological and geological resources and selected ecological systems; (c) the quality of water, land, and air resources. For each element, the method of describing the impact is

While these descriptive methods for environmental assessment were being perfected, efforts were also made to produce quantitatively more precise tools. For example, in the Battelle system, developed for the Bureau of Reclamation, a well-assorted and balanced team of experts developed the numerically expressed relative weights of seventy-eight parameters that describe the environment.¹⁴⁹

An earlier and equally well-known method developed by Leopold, of the U.S. Geological Survey, uses a matrix system.¹⁵⁰ On the horizontal axis are registered 100 generally identified actions which cause environmental impact, and on the vertical axis 88 generally identified environmental characteristics. The resulting matrix, with 8,800 cells, links proposed actions with environmental characteristics. The Leopold system has been criticized as a "check list" approach that invites the assumption that all parameters have been included; such an assumption might prevent a careful on-site analysis.¹⁵¹

Using the same data base with different evaluation systems, it is perfectly possible to come up with completely different evaluations

given. In the case of estuaries, for example, their size or measure should be presented in terms of surface acreage, shoreline mileage, marshland acreage and shoreline mileage, and water quality. The analysis should then include a description of their biological significance as a nursery, breeding, and feeding ground for fish and wildlife, followed by an enumeration of the anticipated improvements, such as accessibility and public amenities. After that, measures for protection and preservation of the environment—physical, legal, and special—are defined. *Id.* 1 (H)(4), at 24809-24816.

149. The parameters are grouped in eighteen environmental components which, in turn, are included in four categories—ecology, environmental pollution, esthetics, and human interest. They are stated for the evaluation of all projects in the hope of obtaining a more uniform and objective procedure. As an example, the aquatic components which are part of the category "Ecology" are composed of such parameters as commercial fisheries, natural vegetation, pest species, sport fish, and water fowl. The final product of the analysis, the environmental impact, is obtained by multiplying a parameter's weight by its environmental quality. The environmental quality is derived from environmental estimates (the raw or basic data) through the use of a value function which relates the various levels of parameter estimates to the appropriate levels of environmental quality. Dee *et al.*, Environmental Evaluation System for Water Resource Planning, Final Report to Bureau of Reclamation, U.S. Dep't of the Interior (Jan. 31, 1972).

150. Identification of impacts is made by tracing a slash in each cell where interaction between proposed actions and the environmental characteristic may occur. In each identified cell the magnitude of the impact is determined numerically on a scale of 1-10 and registered above the slash, while the importance of the impact is similarly registered below the slash on a scale of 1-10. Impacts are determined by the investigator. Actions are divided into 11 groups, such as modification of regime, land transformation, etc., and characteristics into five classes—physical and chemical characteristics, biological characteristics, cultural factors, ecological relationships, and others. Leopold *et al.*, A Procedure for Evaluating Environmental Impact, U.S. Geological Survey Circular No. 645 (1971).

151. For an analysis of the Leopold matrix system and other methodologies, including the Battelle index value model, see Warner and Bromley, Environmental Impact Analysis: A Review of Three Methodologies (1974).

for the same project alternatives and project area. Moreover, in any given system it is difficult to avoid subjective evaluation of basic data; much depends upon who makes the data input and how it is done.¹⁵²

INTERNATIONAL LAW

Reconciling Conflicting Water Uses

The environmental impacts of water development and use are not confined within political frontiers: some of the most detrimental effects have occurred outside state jurisdiction.¹⁵³

Like national water laws, international water law was concerned throughout most of its history with the protection of water uses and interests across frontiers, through the regulation of water exploitation in general and water pollution in particular. Any benefit to the environment as a whole was merely incidental. At first these uses and interests were confined to limited areas close to the frontier and a number of treaties were concluded throughout the 19th century and the first quarter of the 20th to protect the regime of frontier waters and their banks.¹⁵⁴

152. The Battelle study, for example, relies heavily on the existing literature and on current monitoring activities of government agencies, especially in developing value functions for water quality. It emphasizes the use of trained personnel in a number of disciplines, and in field testing of the system great stress was laid on team, as opposed to individual, evaluation and on evaluation of the project area more than once.

153. Some notable examples of adverse transboundary impacts of water development and use are the effect of the Aswan High Dam on Mediterranean fisheries, the Colorado salinity problem, and the pollution of the Rhine. See George, *The Role of the Aswan High Dam in Changing the Fisheries of the Southeastern Mediterranean*, in *The Careless Technology* 164 (Farvar & Milton eds. 1972); Brownell and Eaton, *The Colorado River Salinity Problem with Mexico*, 69 Am. J. Int'l L. 255 (1975); and van Hoogstraten, *La Salinité du Rhin et le Tribunal de Rotterdam*, 1 Env'tal Pol. & L. 73 (1975).

154. See e.g., Treaty on Boundaries Between Their Majesties the King of Prussia and the King of the Low Countries, Oct. 7, 1816, 3 Martens Nouveau Recueil 54-55, U.N. Legis. Ser., Legislative Texts and Treaty Provisions Concerning the Utilization of International Rivers for Other Purposes Than Navigation ST/LEG./SER.B./12 (1963), at 737 [hereinafter cited as U.N. Legis. Ser.]; Treaty for the Regulation of Abstraction of Water from the Meuse Between Belgium and the Netherlands, May 12, 1863, 1 Martens Nouveau Recueil Général 120 (ser. 2), U.N. Legis. Ser. 550; Agreement Between Switzerland and the Grand-Duchy of Baden Concerning the Navigation of the Rhine from Neuhausen to Below Basle, May 10, 1879, (1878-89) 4 Recueil Officiel des Lois et Ordonnances de la Confédération Suisse 339 (ser. N), U.N. Legis. Ser. 776; Additional Act of May 26, 1866, to the Treaties of Delimitation Determining Boundaries, concluded Dec. 2, 1856, Apr. 14, 1862, and May 26, 1866, between France and Spain, 9 Clercq, Recueil des Traités de la France 544, U.N. Legis. Ser. 672; Agreement Between Her Majesty the Queen-Empress and His Serene Highness the Elector-Palatine, May 13, 1779, 2 Martens Recueil 671 (2d ed.).

See also, Agreement Between the Netherlands and France for Determining the Boundary Between a Certain Part of the Colonies of Surinam and French Guyana, Sept. 30, 1915, 18 Legemans, Recueil des Traités et Conventions Conclus par le Royaume des Pays-Bas 504, U.N. Legis. Ser. 228; Treaty Between Germany and Poland for the Settlement of Frontier

As the need for cooperation and the capacity to inflict injury grew, the function and areal scope of water treaties grew also; they developed into instruments either to allocate water between co-basin states or to provide for joint development of the resource and the sharing of benefits. An example of the former is the Indus Waters Treaty of 1960.¹⁵⁵ Within a comparatively short time after the division of the Indian sub-continent, cooperation in water resources administration was achieved, despite the imposition of a political frontier across the formerly unified system of the Punjab canals. Through the efforts of the World Bank, whose plan became the basis of the 1960 agreement, the basin's waters were apportioned according to geographical location, the three eastern branches of the system going to India, and the three western ones to Pakistan.¹⁵⁶ They are developed separately, but continuous cooperation is assured through the establishment of the Permanent Indus Commission and the machinery for settlement of disputes.¹⁵⁷

Joint development, with sharing of benefits, is found in the Columbia River Treaty of 1961.¹⁵⁸ Under the so-called downstream benefit theory—that an upstream riparian should share in the advantages which its storage facilities make possible for a downstream riparian—Canada receives half of the power generated in the United States with the help of Canadian storage facilities and may sell this power to the United States if there is no immediate market for it in Canada.¹⁵⁹ The United States also undertakes to pay Canada for flood control provided by the latter's storage facilities.¹⁶⁰

Parallel with the growth of conventional water law, there arose the conviction that customary rules also governed the use of water and thereby protected the water-connected interests of neighboring states. This was strongly expressed by the Montevideo Declaration:

Questions, Jan. 27, 1926, Dziennik Ustaw 930, 64 L.N.T.S. 165; Peace Treaty Between Lithuania and the Russian Socialist Federal Republic, July 12, 1920, 3 L.N.T.S. 126; Treaty of Peace Between Latvia and the Russian Socialist Federal Republic, Aug. 11, 1920, 2 L.N.T.S. 214; Peace Treaty Between Poland, Russia and the Ukraine, Mar. 18, 1921 Dziennik Ustaw 819, 6 L.N.T.S. 129.

155. Indus Waters Treaty Between the Government of India, the Government of Pakistan, and the International Bank for Reconstruction and Development, Sept. 19, 1960, 419 U.N.T.S. 126.

156. See summary of the 1954 Proposal of the International Bank for Reconstruction and Development, in Fisher, *La Banque Internationale Pour la Reconstruction et le Développement et l'Utilisation des Eaux du Bassin de l'Indus*, 6 Ann. Française de Dr. Int'l 669, 671-73 (1960).

157. Indus Waters Treaty, arts. 8 and 9, 419 U.N.T.S. 144.

158. Treaty with Canada Relating to Cooperative Development of the Water Resources of the Columbia River Basin, 15 U.S.T. 1555, T.I.A.S. No. 5638, 542 U.N.T.S. 244.

159. *Id.* arts. 5 & 8, 15 U.S.T., at 1560, 1562.

160. *Id.* art. 6, 15 U.S.T. 1555, at 1560-61.

In consequence, no state may, without the consent of the other riparian state, introduce into water courses of an international character, for the industrial or agricultural exploitation of their waters, any alteration which may prove injurious to the margin of the other interested state.¹⁶¹

It is doubtful whether this stricture, amounting to a power of veto by one state over the fluvial projects of another, ever became anything more than a recommendation. Subsequent statements on the scope of the right of states to use the waters of international river basins drop all mention of such a veto and accept, as a rule of law, the belief that states are entitled only to an equitable portion of the water resources of a basin or of the benefits from their development. Thus, the Salzburg Declaration of the Institute of International Law states that, "Every state has the right to utilize waters which traverse or border its territory. . .,"¹⁶² and that, "If the States are in disagreement over the scope of their rights of utilization, settlement will take place on the basis of equity. . . ."¹⁶³ The Helsinki Rules of the International Law Association emphasize the equitable allocation of water resources even more forcefully, "Each basin state is entitled, within its territory, to a reasonable and equitable share in the beneficial use of the waters of an international drainage basin. . . ."¹⁶⁴ The arbitral award in the Lake Lanoux case stresses that any unilateral water development of shared water resources must take account of the interests of other riparian states.¹⁶⁵

Protection Against Pollution

As the menace of water pollution increased, rules for water distribution had to be supplemented by rules concerning pollution, and the latter assumed an ever more important role in protecting the water resources of neighboring states. Other elements of the environment were protected only incidentally.

161. Seventh Int'l Conf. of Am. States, Declaration on Industrial and Agricultural Use of International Rivers, art. 2, text in 28 Am. J. Int'l L. 59 (Supp. 1934).

162. Utilization of Non-Maritime International Waters, Resolution Adopted by the Institute of Int'l Law at Salzburg, 3-12 Sept. 1961, art. 2, 49(2) *Annuaire de l'Institut de Droit International* 370 (1961).

163. *Id.* art. 3.

164. Helsinki Rules on the Uses of the Waters of International Rivers, art. IV, Int'l L. Ass'n, Rep't of the 52nd Conf. held at Helsinki, Aug. 17-20, 1966, 477-533 (1967).

165. Lake Lanoux Case (France v. Spain), 24 I.L.R. 101, 138-39 (1957):

The Tribunal is of the opinion that, according to the rules of good faith, the upstream State is under the obligation to take into consideration the various interests involved, to seek to give them every satisfaction compatible with the pursuit of its own interests, and to show that in this regard, it is genuinely concerned to reconcile the interests of the other riparian State with its own.

In conventional international water law, frontier treaties may have implied a prohibition against water pollution, but specific provisions to deal with the problem did not appear until rather late in the 19th century.¹⁶⁶ They dealt with particular aspects of pollution such as its effect on fisheries,¹⁶⁷ or, like the Boundary Waters Treaty of 1909 between the United States and Canada,¹⁶⁸ they were limited to one article prohibiting pollution altogether. This kind of prohibition was no more effective than similar provisions in municipal law—which began to appear at about the same time¹⁶⁹—as evidenced by the worsening condition of the Great Lakes.

The realization that existing law was inadequate to deal with the Great Lakes pollution led to the forging of more effective measures. The task of finding a solution to that problem was periodically entrusted, from 1912 onward, to the International Joint Commission (IJC), U.S.-Canada.¹⁷⁰ The Commission's detailed and comprehensive report on the Connecting Channels Reference, submitted in 1950, introduced the concept of standards into international water law.¹⁷¹ After that, provisions stressing the need for uniform standards began to find their way into international water treaties. For instance, the 1963 convention concerning pollution of the Rhine empowered the Rhine Commission to recommend protective measures, which, however, must still be approved by all parties.¹⁷² Nearly a decade later, the Ministerial Conference of the parties to that Convention, held at The Hague in October 1972, instructed the

166. See Manner in 3 Whiteman, Digest of Int'l L. 1043-44 (1964).

167. Convention Between the Grand Duchy of Luxembourg and Prussia Concerning the Regulation of Fisheries in Boundary Waters, Nov. 5, 1892, Martens, Nouveau Recueil (2d ser.) t. XXIV, 1899, at 153, U.N. Legis. Ser. 716; and Convention Between the Republic of France and the Swiss Confederation to Regulate Fisheries in Frontier Waters, Mar. 9, 1904, 33 Martens Nouveau Recueil 501 (2d ser.), U.N. Legis. Ser. 701.

168. Treaty Between U.S. and Great Britain Relating to Boundary Waters and Questions Arising Along the Boundary, Jan. 11, 1909, 36 Stat. 2448, T.S. 548, U.N. Legis. Ser. 260. Art. IV of the Treaty states that "the waters herein defined as boundary waters and waters flowing across the boundary shall not be polluted on either side to the injury of health or property on the other."

169. E.g., Refuse Act of 1899, 33 U.S.C. § 407 *et seq.* (1970).

170. For a history of these efforts, see Bilder, *Controlling Great Lakes Pollution: A Study in U.S.-Canadian Environmental Co-Operation*, in Law, Institutions, and the Global Environment 294, at 300-19 (Hargrove ed. 1971).

171. Rep't of the Int'l Joint Comm'n (U.S. and Canada) on the Pollution of Boundary Waters 169-70 (1951), summarized in Lester, *Pollution*, in The Law of International Drainage Basins 89, at 104-05 (Garretson *et al.* eds. 1967).

172. Convention of Apr. 29, 1963, between France, the Federal Republic of Germany, Luxembourg, the Netherlands, and Switzerland [1963], Tractatenblad van der Koninkrijk der Nederlanden, No. 104; text in [1974] Beiträge zur Umweltgestaltung B7, Internationales Umweltrecht—Multilaterale Verträge, No. 963: 31/1.

Rhine Commission to draw up a list of prohibited substances.¹⁷³ Similarly, the 1969 draft of the European Convention on Protection of Fresh Water Against Pollution states in Art. 2 that, "Contracting States . . . (a) wherever possible, agree to establish and maintain standards of quality for the waters of an international drainage basin extending over their territories."¹⁷⁴

Whereas these conventions merely postulate the establishment of standards, the 1972 U.S.-Canadian agreement on Great Lakes pollution, reached after several years of investigation by the I.J.C. and lengthy negotiation, sets elaborate standards or purity objectives for various pollutants and activities. It also obligates the parties to implement these objectives through national legislation,¹⁷⁵ a large step from the single general article in the Boundary Waters Treaty.

Parallel with the development of conventional provisions, there proceeded the search for an adequate formulation of general anti-pollution rules. From equitable apportionment of beneficial use of the waters of international river basins, which it accepted as a rule of law, the International Law Association deduced a pollution prohibition,¹⁷⁶ but only to the extent that such pollution impaired another state's beneficial use and did not deprive the polluting state of its own beneficial utilization. The Comment to Article X of the Helsinki Rules states:

Certainly, a diversion of water that denies a co-basin State an equitable share is in violation of international law. A use that causes pollution to the extent of depriving a co-basin State of an equitable share stands on the same basis. By parallel reasoning, a State that

173. *The Conventional Law of the Environment*, in International Environmental Law 25, 35 (Teclaff, Brown, & Utton eds. 1974).

174. Text in Council of Europe, Consultative Assembly, Report on a Draft of the European Convention on the Protection of Fresh Water Against Pollution (Rapporteur: M. Housiaux), Doc. 2561, May 12, 1969, at 5.

175. U.S.-Canada, Great Lakes Water Quality Agreement, Apr. 15, 1972, 23 U.S.T. 301, T.I.A.S. 7312, 11 Int'l Leg. Mat. 694 (1972).

176. Helsinki Rules, *supra* note 169, arts. IX, X and XI. Article X provides that:

1. Consistent with the principle of equitable utilization of the waters of an international drainage basin, a State
 - (a) must prevent any new form of water pollution or any increase in the degree of existing water pollution in an international drainage basin which would cause substantial injury in the territory of a co-basin State, and
 - (b) should take all reasonable measures to abate existing water pollution in an international drainage basin to such an extent that no substantial damage is caused in the territory of a co-basin State.
2. The rule stated in paragraph 1 of this Article applies to water pollution originating
 - (a) within the territory of the State, or
 - (b) outside the territory of the State, if it is caused by the State's conduct.

engages in a use or uses causing pollution is not required to take measures with respect to such pollution that would deprive it of equitable utilization.¹⁷⁷

This admirable attempt at formulating a broad anti-pollution rule in a restatement of international water law¹⁷⁸ suffers from a lack of elasticity precisely because it was made part and parcel of a coherent and logical system. Under the Helsinki Rules pollution deriving from an otherwise reasonable and equitable use might conceivably do serious environmental damage before resulting in an injury substantial enough to deprive another state of its equitable share. This could happen to a state which did not make much use of a river and, because of a primitive economic base, did not plan to use it in the near future. Such a situation would not occur if, instead of applying the principle of equitable apportionment, the duty to cease polluting arose as soon as one co-basin state's activities caused noticeable pollution in parts of the river basin under the jurisdiction of other states. This duty is consistent with trends in municipal law. For example, the Federal Water Pollution Control Act Amendments establish as a national goal the cessation of all pollutant discharges into United States navigable waters by a given date, 1985.¹⁷⁹

Though absent from the Helsinki Rules, the duty to agree on standards or quality objectives is fast gaining a prominent place in the definition of anti-pollution rules. The International Law Association recognized this duty in its formulation of rules for control of marine pollution,¹⁸⁰ as did the Organization for Economic Co-Operation and Development (OECD) and the Council of the European Communities in their respective Recommendations on transfrontier pollution and the polluter-pays principle.¹⁸¹

A distinction in treatment between existing and future pollution was made in the Helsinki Rules and retained in the I.L.A.'s marine pollution rules.¹⁸² However, this distinction is absent from such recent conventional formulations as the single text of the proposed

177. *Id.* at 499.

178. For a critical appraisal of the Helsinki Rules, see Utton, *International Water Quality Law*, 13 Nat. Res. J. 282 (1973).

179. Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C.A. § 1251 *et seq.* (Supp. 1974).

180. Int'l L. Ass'n, N.Y. Conf. (1972), Declaration on Marine Pollution of Continental Origin, Art. III (a), Proceedings 102 (1974).

181. Organization for Econ. Co-Operation and Dev., Council Recommendations on Principles Concerning Transfrontier Pollution, Nov. 14, 1974, Annex, Title B, 1(b), 14 Int'l Leg. Mat. 242, 244 (1975); European Communities, Council Recommendations on the Application of the Polluter-Pays Principle, Nov. 7, 1974, 14 Int'l Leg. Mat. 138-39 (1975).

182. Helsinki Rules, *supra* note 169, Art. X; Int'l L. Ass'n, Declaration on Marine Pollution, *supra* note 180.

convention on marine pollution, drafted at the 1975 Geneva meeting of the Law of the Sea Conference.¹⁸³

Responsibility for Water Pollution

Rules that establish the responsibility of states for water pollution are evolving more slowly than the controls *per se*. Not that this responsibility could be denied in theory, since it stems from general principles, such as *neminem laedere*, or abuse of right, or neighborliness.¹⁸⁴ But rules that would permit application of these vague, abstract principles to concrete situations are still relatively undeveloped. The Helsinki Rules, which attempted to formulate this responsibility,¹⁸⁵ rely for authority on two cases—the *Corfu Channel* case¹⁸⁶ and the *Trail Smelter Arbitration*.¹⁸⁷ The first pertains to damage caused by mining a strait and is generally considered to establish responsibility of states for damage done by activities on their territory of which they had or should have had knowledge.¹⁸⁸ The other is more in point, since it pertains to pollution, though to air, not water. In that case, the arbitral tribunal, assessing damage caused by a Canadian smelter to U.S. citizens, stated as a general rule that no state has the right to use, or permit the use of, its territory so as to cause injury in or to the territory of another state.¹⁸⁹ This opinion is sometimes quoted to support strict liability of states for pollution.¹⁹⁰ However, it would seem that since the *Trail Smelter Arbitration*, like the *Corfu Channel* case, predicates responsibility on knowledge, it can hardly be an authority for strict liability. If strict liability is developing, as it seems to be, its vehicle is conventions dealing with pollution.¹⁹¹

183. U.N., Third Conf. on the Law of the Sea, Informal Single Negotiating Text, Part III, May 6, 1975, U.N. Doc. A/C.62/WP.8(III). Article 4 states that:

States shall take all necessary measures consistent with this Convention to prevent, reduce and control pollution of the marine environment from any source using for this purpose the best practicable means at their disposal and in accordance with their capabilities, individually or jointly, as appropriate, and they shall endeavor to harmonize their policies in this connection.

184. On the applicability of these principles to water law, see Teclaff, *The Impact of Environmental Concern on the Development of International Law*, 13 Nat. Res. J. 357 (1973).

185. Helsinki Rules, *supra* note 169, Article XI.

186. *Corfu Channel Case* (United Kingdom v. Albania) [1949], I.C.J. 4.

187. *Trail Smelter Case* (United States v. Canada), 3 U.N.R.I.A.A. 1905 (1938 & 1941).

188. See Teclaff, *International Law and the Protection of the Oceans from Pollution*, 40 Fordham L. Rev. 529, 545 (1972).

189. *Trail Smelter Case*, *supra* note 187, at 1965.

190. See Goldie, *International Principles of Responsibility for Pollution*, 9 Colum. J. Transnat'l L. 283, 306-07 (1970).

191. See Teclaff, *supra* note 188, at 547.

There is little doubt that, in view of the slow evolution of customary international law, the difficulty of making the law more precise, and the rapidly growing need for specific and effective rules to deal with pollution in general and responsibility of states in particular, development will proceed through conventions. As an example of the interplay between the processes, the 1960 frontier treaty between the German Federal Republic and the Netherlands clearly establishes responsibility for damage to water-connected interests within the territory of the other party, though limiting it to instances where the other party's objections to projects affecting waters are disregarded.¹⁹² The 1969 Draft of the European Convention on the Protection of Fresh Water Against Pollution went much further than any treaty in force and permitted individuals to recover damages from the state on whose territory pollution originates.¹⁹³ However, bowing to the objections of the Committee of Ministers of the Council of Europe that the provisions concerning state liability departed too far from existing international law,¹⁹⁴ these provisions were dropped from the later draft, retitled European Convention for the Protection of International Watercourses Against Pollution.¹⁹⁵

192. Treaty Between the Kingdom of the Netherlands and the Federal Republic of Germany Concerning the Course of the Common Frontier, the Boundary Waters, Real Property Situated Near the Frontier, Traffic Crossing the Frontier on Land and Via Inland Waters, and Other Frontier Questions, Apr. 8, 1960, Netherlands [1960], *Tractatenblad*, No. 68, U.N. Legis. Ser. 757. Art. 63 states that:

- (1) If one of the Contracting Parties, notwithstanding the objections raised by the other Party, acts in violation of its obligations under this Chapter or arising under any of the special agreements to be concluded as provided in article 59, thereby causing damage within the territory of the other Contracting Party, it shall be liable for damages.
- (2) Liability for damages shall arise in respect only of such damage as was sustained after the objections were raised.

193. Draft European Convention on the Protection of Fresh Water Against Pollution, *supra* note 174, at 8. Art. 7, para. 1, states that:

Any person who suffers damage in any Contracting State arising from water pollution in any other Contracting State shall be entitled to compensation in accordance with the provisions of this chapter, provided that, where standards of water quality have been adopted under paragraph 2(a) of Article 2 for the international drainage basin concerned, compensation shall be recoverable only in respect of such damage as shall be caused in contravention of such standards.

Art. 8 provides that:

The liability for compensation contemplated by Article 7 shall attach to the Contracting State in whose territory any water pollution arises whether wholly or in part.

194. Coun. of Europe, Comm. of Ministers, Doc. CM (70) 134 (Oct. 27, 1970), in U.N. Gen. Assembly, Int'l L. Comm'n, Legal Problems Relating to the Non-Navigational Uses of International Watercourses, Supp. Rep't 250 U.N. Doc. A/CN.4/1974 (II) (1974).

195. Text in U.N. Doc. A/CN.4/1974 (III), at 251 *et seq.* (1974).

Notice of Pollution and Other Damage to Water Uses

While considerable progress has been made in recent years, as we have noted, to protect water resources from damage inflicted by water development itself, this progress has tended to be more pronounced in the mitigation or alleviation of harmful effects than in their prevention. To prevent damage, the first step is possession of the necessary information by the interested parties. For that purpose, a state which undertakes a water project should have sufficient data, give notice of its plans to all the states that could be adversely affected, and should itself be able to obtain all necessary information and comments pertaining to potentially harmful effects outside its jurisdiction.

Treaties often specify what information a party is obliged to supply other parties about its water projects, how it must do this, and whether consent of the other parties is required. Some treaties obligate states merely to furnish information. For example, the Senegal River Statute of 1964 requires basin states to provide information and to submit to the inter-state Committee for the basin those projects which might appreciably modify the regime, navigability, conditions of agricultural or industrial exploitation, water quality, and flora and fauna of the river.¹⁹⁶ Also, the 1969 Draft of the European Convention on the Protection of Fresh Water Against Pollution provides that contracting states shall:

- (c) inform the other contracting states about standards in force under paragraph (a);
- (d) from time to time inform and consult with other contracting states concerned, about the usages of such waters.¹⁹⁷

Other treaties, such as the Treaty of Aachen of 1816 between Prussia and the Netherlands,¹⁹⁸ one of the oldest frontier waters agreements, require consent of co-basin states. More recently, and for a larger expanse of water, the requirement of notice and consent can be found in the Convention Concerning Pollution of Lake Constance of 1960 between Baden-Wurttemberg, Bavaria, Austria and Switzerland.¹⁹⁹ In the frontier treaty between the German Federal

196. Art. 3. Text in André, *L'Évolution du Statut des Fleuves Internationaux D'Afrique Noire*, 19 Rev. Jurid. et Pol. (Indépendance et Coopération) 285, 299 (1965).

197. Draft European Convention on the Protection of Fresh Water Against Pollution, *supra* note 174, Art. 2(2)(c) and (d).

198. Boundary Treaty Between Their Majesties the King of Prussia and the King of the Netherlands, Oct. 7, 1816, 3 Martens N.R. 54-55, U.N. Legis. Ser. 737.

199. Art. 1, para. 3 of this treaty states:

En particulier, les Etats riverains se communiqueront mutuellement, *en temps opportun*, les projets d'utilisation d'eau dont la réalisation pourrait porter atteinte aux intérêts d'un autre Etat riverain en ce qui concerne le maintien de

Republic and the Netherlands of the same year,²⁰⁰ the consent requirement is comparatively diluted. Though Article 57 goes beyond notice and requires periodic consultation, Article 62 permits execution of a project to continue after objection has been raised if suspension would seriously endanger the interests of the party executing the project.²⁰¹

There is still no agreement as to whether the duty of notice and consultation exists in customary international law. The Helsinki Rules merely urge states to furnish data, without making it a legal duty,²⁰² whereas the Salzburg Declaration of the Institute considers it a duty at least to give notice before undertaking works or utilization of waters.²⁰³ Earlier, the Second International Conference on Communication and Transit (1923) declared that:

If a Contracting State desires to carry out operations for the development of hydraulic power which might cause serious prejudice

la salubrité des eaux du lac de Constance. Ces projets ne seront réalisés qu'après avoir été discutés en commun par les Etats riverains, à moins qu'il n'y ait péril en la demeure ou que les autres Etats n'aient consenti expressément à leur exécution immédiate. (Emphasis added)

Feuille fédérale de la Confédération Suisse, 113ème année, 1961, Vol. 1, p. 1171, U.N. Legis. Ser. 438, at 439.

200. See note 192 *supra*.

201. *Id.* Art. 62, which states that:

- (1) Each of the Contracting Parties shall be obligated, pending the conclusion of the deliberations of the Permanent Boundary Waters Commission or, as the case may be, of the deliberations between the two Governments, to suspend the execution of any measures planned by it to which objections have been raised by the other Party, unless the other Contracting Party consents to some other arrangement.
- (2) Paragraph 1 shall not apply if a Party to this Agreement cannot suspend the execution of the measures objected to without seriously endangering its interests. The rights of the other Contracting Party shall not be affected thereby.

For a more complete survey of pertinent treaties, see Bourne, *Procedure in the Development of International Drainage Basins: The Duty to Consult and to Negotiate*, 10 Can. Y.B. of Int'l L. 212-34, 222 (1974); and Teclaff, *The River Basin in History and Law* 105-12 (1967).

202. The Helsinki Rules, *supra* note 169, Art. 29, recommends:

With a view to preventing disputes from arising between basin States as to their legal rights or interest, it is recommended that each basin State furnish relevant and reasonable available information to the other basin States concerning the waters of a drainage basin within its territory and its use of, and activities with respect to such waters.

203. The Salzburg Declaration, *supra* note 167, arts. 4 and 5 declares:

No state can undertake works or utilization of the waters of a watercourse or hydrographic basin which seriously affects the possibility of utilization of the same waters by other states except on condition of assuring them the enjoyment of the advantages to which they are entitled under Art. 3, as well as adequate compensation for any loss or damage.

Works or utilization referred to in the preceding article may not be undertaken except after previous notice to the interested state.

to any other Contracting State, the States concerned shall enter into negotiations with a view to the conclusion of agreements which will allow such operations to be executed . . .²⁰⁴

and the Montevideo Declaration of 1933 stated:

In international rivers having a successive course, the works of industrial or agricultural exploitation performed shall not injure free navigation on them, but on the contrary, try to improve it insofar as possible. In this case, the State or States planning the construction of the works shall communicate to the others the result of the studies made with regard to navigation, to the sole end that they take cognizance thereof. . . .²⁰⁵

In 1973, in its revised draft propositions on the law of international rivers, the Asian-African Legal Consultative Committee insisted that:

A state which proposes a change of the previously existing uses of the waters of an international drainage basin that might seriously affect utilization of the waters by another co-basin state, must first consult with the other interested co-basin states. . . .²⁰⁶

Thus, the formulation in the Helsinki Rules notwithstanding, it would seem that the requirement of previous notice has entered the stream of international customary law, at least when substantial injury is inflicted on the utilization of water resources of co-basin states.²⁰⁷

Protection of the Environment as a Whole and Duty of Notice

Duty to give notice extends beyond damage to water resources in instruments concerned with the protection of the environment as a whole, incidentally adding weight to the requirement of notice in water law proper. The question of exchange of environmental information was laid before the Stockholm Conference on the Human Environment, whose Recommendations were approved by a

204. Second Int'l Conf. on Communication and Transit (held at Geneva, 1923), Convention Relating to the Development of Hydro-electric Power Affecting More than One State, Dec. 9, 1923, art. 4, 36 L.N.T.S. 83.

205. Montevideo Declaration, *supra* note 161, art. 8.

206. Asian-African Legal Consultative Comm., Report of the Fourteenth Session, New Delhi, Jan. 10-17, 1973, at 7-14, Proposition X, text in U.N. Doc. A/CN.4/1974 (II), at 230 (1974).

207. This view is supported by Bourne, *Procedure in the Development of International Drainage Basins*, 22 U. Toronto L.J. 172, 204-06 (1972). See also Utton, *International Water Quality Law*, 13 Nat. Res. J. 283, 306 (1973), who says:

However, reasonableness would require prior notice and consultation. A riparian, to satisfy minimal standards of reasonableness, must notify coriparians who might be adversely affected by proposed developments or activities.

resolution of the U.N. General Assembly and reiterated in the subsequent declarations of that body dealing with the development of natural resources.²⁰⁸

Preparatory documents of the Conference recommended that the principle be upheld:

That nations agree that when water resources activities are contemplated that may have an environmental effect on another country, the other country be notified well in advance of the activity envisaged.²⁰⁹

This was clear recognition on an international plane of the necessity to consider environmental factors other than water, and to give notice, when planning the development of water resources. Had this recommendation been accepted by the Conference and, subsequently, by the General Assembly in the wording proposed, it could have established a legal duty. However, the text was weakened during the Conference by the Brazil and Uganda amendments which, taken together, read as follows:

... the following principles should be considered by the states concerned *when appropriate* ... (Brazil)

... that nations agree that when *major* water resources activities are contemplated that may have a significant environmental effect on another country, the other country be notified well in advance of the activity. (Uganda)²¹⁰

The General Assembly did not change this wording. The principle now establishes no legal duty: at best it remains a recommendation to be followed at the discretion of the states concerned.

In contrast, two later declarations of the General Assembly adopted strictly mandatory language. On January 15, 1974, the General Assembly passed a resolution on cooperation in the field of the environment concerning natural resources shared by two or more states, in which it stated that "cooperation between countries sharing such natural resources and interested in their exploitation must be developed on the basis of a system of information and prior consultation within the framework of the normal relations existing between

208. 27 U.N., Gen. Assembly, Res. 2996 (1972). For the declarations on natural resources, see *infra*, notes 211 and 212.

209. Recommendation 159 in U.N. Doc. A/C.48/7, Environmental Aspects of Natural Resources Management, Subject Area II, F, Considerations for Action.

210. The Brazilian amendment was contained in A/C.48/C.2/CRP.14. The Uganda amendment was proposed at the Plenary session of June 15, 1972, U.N. Doc. A/C.48/CRP.12/Add. 1. (Emphasis added).

them."²¹¹ Again, in the resolution which embodies the Charter of Economic Rights and Duties of States, Article 3 states:

In the exploitation of natural resources shared by two or more countries, each state *must* cooperate on the basis of a system of information and prior consultations in order to achieve optimum use of such resources without causing damage to the legitimate interest of others.²¹²

The most recent multilateral and bilateral agreements concerned with the environment follow the Stockholm Conference in their insistence on notice and consultation, reinforcing the argument for the emergence of their obligatory character. For example, the Final Act of the Helsinki Conference on Security and Co-operation in Europe of 1975 proclaims that:

The participating States are resolved that cooperation in the field of the environment will be implemented in particular through:

...

consultations on various aspects of environmental protection, as agreed upon among countries concerned, especially in connection with problems which could have international consequences.²¹³

Bilateral treaties that stress notice and cooperation include the environmental agreements concluded by the United States with the U.S.S.R. and the German Federal Republic,²¹⁴ and the Canada-United States agreement of 1975 on exchange of information concerning weather modification activities.²¹⁵

Responsibility for Environmental Damage

The Stockholm Conference Declaration confirmed, in positive terms denoting obligation, the responsibility of states for environmental damage to other states through activities on their territory, and this, of course, includes activities concerned with water development. Principle 21 of the Declaration asserts that:

States have, in accordance with the Charter of the United Nations

211. 28 U.N., Gen. Assembly Res. 3129 (1974), 13 Int'l Leg. Mat. 232 (1974) (Emphasis added).

212. 29 U.N., Gen. Assembly Res. 3281 (1975), 14 Int'l Leg. Mat. 251 (1975).

213. Conf. on Security and Co-Operation in Europe, Final Act, Helsinki, Aug. 1, 1975, at 104-05, 14 Int'l Leg. Mat. 1292, 1309 (1975).

214. U.S.-Federal Republic of Germany, Agreement for Cooperation in Environmental Affairs, May 9, 1974, *text in* 70 Dep't of State Bull. 673 (June 17, 1974); U.S.-U.S.S.R., Agreement on Cooperation in the Field of Environmental Protection, May 23, 1972, 11 Int'l Leg. Mat. 761 (1972).

215. Canada-U.S., Agreement on the Exchange of Information on Weather Modification Activities, Mar. 26, 1975, 14 Int'l Leg. Mat. 589 (1975).

and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states or of areas beyond the limit of national jurisdiction.²¹⁶

Principle 21 goes beyond a mere recommendation, which most of the Stockholm Report undoubtedly does not, to extend the responsibility of states for damage to the environment caused by water development, strengthening the responsibility for damage to water resources in the process. The opening statement, which announces that the Conference, through the Declaration, "states the common conviction,"²¹⁷ can be interpreted as an acceptance by the participating states of those parts of the Declaration which were couched in positive, obligatory form as binding legal rules. Furthermore, the Stockholm Report, containing the Declaration, was confirmed by the General Assembly.²¹⁸ As a rule, a General Assembly declaration is not binding, but when it contains a statement of general rules of conduct its adoption means that these rules, if stated in obligatory form, are accepted as the expression of existing law, at least by those states which did not vote against the declaration. Voting on such a declaration means consensus on the rules contained in it, which then becomes the basis of their binding force.²¹⁹

Responsibility for environmental damage through water development does not have to rely on the binding character of the Stockholm Declaration, however. Principle 21 of the Declaration simply gave precision to, and permitted application to the environment of, the general rules inherent in the principles of *neminem laedere, sic utere tuo*, abuse of right, and the prohibition on use of state territory to the detriment of other states. To be applicable to a particular

216. U.N., Gen. Assembly, Report of the United Nations Conference on the Human Environment held at Stockholm, 5-16 June 1972 U.N. Doc. A/C.48/14 (1972) (hereinafter cited as Stockholm Report), at 5.

217. *Id.* at 4.

218. The importance of Principle 21 was expressly recognized by the U.N. Gen. Assembly's Second Comm. in Draft Resolution III of its Report, which states:

Recalling principles 21 and 22 of the Declaration . . . concerning the international responsibility of States in regard to the human environment,

Bearing in mind that those principles lay down the basic rules governing the matter,

Declares that no resolution adopted at the twenty-seventh session of the General Assembly can affect principles 21 and 22. . . .

See U.N. Conf. on the Human Environment, Report of the Second Committee, U.N. Doc. No. A/8901 (1972). This was adopted by 27 U.N. Gen. Assembly Res. 2996 (1972).

219. See generally Asamoah, The Legal Significance of the Declarations of the General Assembly of the United Nations 24-25 (1966).

situation, these principles need more specific rules. Principle 21 is a more specific rule, performing in this respect a function similar to that performed, according to some commentators, by the Universal Declaration of Human Rights *vis-à-vis* the provisions on human rights contained in the U.N. Charter, which were considered too vague to be binding. It was argued that, though the Human Rights Declaration itself was not binding, it became so in conjunction with the provisions of the Charter, which needed only sufficient precision to bring out their binding character.²²⁰

Responsibility for environmental injury is further elaborated in the Recommendations of the OECD²²¹ and in the 1974 Stockholm Convention on the Protection of the Environment.²²² All have the limitation, however, that they are confined to the effects of water pollution, which is only one aspect of the environmental damage that can be caused by exploitation of water resources. The OECD Recommendations advocate the polluter-pays principle and the right to sue on a non-discriminatory basis in the state where the pollution originated, thus eliminating one of the stumbling blocks to implementing liability for pollution pinpointed by a former member of the ICJ, Judge Read.²²³ The Stockholm Convention actually prescribes a non-discriminatory right to seek redress before the courts and administrative agencies of the country from which the pollution comes.²²⁴

220. On human rights, see Wright, *National Courts and Human Rights*, 45 Am. J. Int'l L. 62 (1951), who says:

In view of these divergencies in American practice, it is fortunate that the courts have before them the Universal Declaration of Human Rights as a guide to the interpretation of Article 56 in the Charter. While not a treaty, the Declaration is of great interpretative value, manifesting the opinion of the United Nations as to the scope of human rights and fundamental freedoms.

Id. at 77. See also Ezejiakor, *Protection of Human Rights Under the Law* 88 (1964).

221. OECD, Council Recommendations, Titles C and D, *supra* note 181.

222. Convention on the Protection of the Environment between Denmark, Finland, Norway, and Sweden, Feb. 19, 1974, 13 Int'l Leg. Mat. 591 (1974).

223.

It was the general opinion of the lawyers concerned at the time that the British Columbian courts would be compelled to refuse to accept jurisdiction in suits based on damage to land situated outside of the province. Apart, therefore, from the practical difficulty confronting some hundreds of claimants in bringing suit in a foreign forum, there was the moral certainty that they would lose.

Read, *The Trail Smelter Dispute*, 1 Can. Y.B. Int'l L. 213, 222 (1963).

224. Art. 3 states that:

Any person who is affected or may be affected by a nuisance caused by environmentally harmful activities in another Contracting State shall have the right to bring before the appropriate Court or Administrative Authority of that State the question of the permissibility of such activities, including the question of measures to prevent damage, and to appeal against the decision of

International Environmental Impact Statements

International environmental law is not only affirming and strengthening the need for adequate exchange of information between neighboring states concerning the possible impact of their water development on the environment and the responsibility for injury caused by such impact, but is also gradually forging rules for total assessment of transboundary environmental impacts, including the effects of water use and development. A beginning was made at the Stockholm Conference which, in its Report, goes well beyond exchange of information. Recommendation 60 suggests that audits of projects be conducted jointly by the United Nations and the states concerned even before they are completed,²²⁵ and Recommendation 61, which is quite close in language to NEPA, urges:

... that the Secretary-General, in cooperation with governments concerned, and the appropriate international agencies, provide that pilot studies be conducted in representative ecosystems of international significance to assess the environmental impact of alternative approaches to the survey, planning and development of resource projects.²²⁶

These recommendations are concerned with environmental effects in general (which, by implication, include water uses), but the need for assessment of the environmental impact of water development and use in particular is stressed in the section of the Report pertaining to water resources. Recommendation 51(c) asserts the need for assessment of environmental effects of existing water uses and, conversely, Recommendation 48 focuses attention on the necessity to control side effects of the exploitation of natural resources on water and water uses.²²⁷

the Court or the Administrative Authority to the same extent and on the same terms as a legal entity of the State in which the activities are being carried out. The provisions of the first paragraph of this Article shall be equally applicable in the case of proceedings concerning compensation for damage caused by environmentally harmful activities. The question of compensation shall not be judged by rules which are less favorable to the injured party than the rules of compensation of the State in which the activities are being carried out.

Stockholm Convention, *supra* note 222, at 592.

225.

It is recommended that the Secretary-General, in cooperation with governments concerned and the appropriate international agencies, arrange for systematic audits of natural resource development projects in representative ecosystems of international significance to be undertaken jointly with the governments concerned after, and where feasible before, the implementation of such projects.

Stockholm Report, *supra* note 216, at 37.

226. *Id.* at 38.

227. *Id.* at 32-33. Recommendation 51(c)(v), moreover, would promote, "Joint study of

The recommendations, like NEPA, do not mandate any course of action once the information is gathered and assessment of the impact made, nor do they presume to give anyone the right of final approval or disapproval of environmentally significant programs. However, when the interests of other states are not properly considered and substantial damage occurs, there is a responsibility to the injured state, in accordance with Principle 21 of the Stockholm Declaration which, as noted above,²²⁸ crystallizes general rules of international law on this subject.

The Stockholm Conference set up a broad and rather vague framework, which the United Nations Environment Programme (UNEP) in Nairobi, itself a result of the recommendations of the Conference, has assumed the task of filling in. From its own initial reports, UNEP's role is seen to be not unlike that of the Council on Environmental Quality in the United States. The CEQ helps federal agencies to fulfill their duties under NEPA through guidelines and standards which, though not mandatory, are highly persuasive, the more so because they embody pertinent rulings of the courts. In much the same way, UNEP proposes to develop codes, guidelines and standards for the use of states and international agencies.

Addressing the problem of technical expertise, the Executive Director of UNEP urged that a program of training and assistance be established for officials of the developing countries to acquaint them more fully with "the techniques and principles to be used for the assessment of environmental impact as an integral part of the formulation and implementation of development plans and projects."²²⁹ His recommendations concerning natural resources shared by two or more states contain in embryo a number of the concepts currently in use in the preparation of impact statements—the timing of the statement; the information to be included in it; the arrangements for review and consultation; and the filing of the information

the causes and symptoms of problems related to water resources, taking into account the technical, economic, and social considerations of water quality control." *Id.* at 33. Recommendation 48 requires that:

... Governments, and the Secretary-General in cooperation with the Food and Agricultural Organization of the United Nations and other United Nations organizations concerned, as well as development assistance agencies, take steps to ensure international cooperation in the research, control and regulation of the *side effects* of national activities in resource utilization where these affect the *aquatic resources of other nations*. . . . *Id.* at 32 (emphasis added).

228. See notes 221-29 *supra* and accompanying text.

229. Report of the Executive Director, UNEP, Co-Operation in the Field of the Environment Concerning Natural Resources Shared by Two or More States, at 46, para. 94(b) U.N. Doc. UNEP/GC/44 (1975).

with an independent agency which would, in turn, disseminate it to interested parties.²³⁰

The impact statement concept was specifically elaborated within UNEP in the Draft Principles of Conduct prepared by Ambassador Arnaud of Argentina on natural resources shared by two or more states.²³¹ Article 7 requires the transmission of pertinent information to enable the state concerned to make an environmental assessment, and Article 9 provides for joint assessment of the intended activity if a co-sharing state requests it, thus putting the onus of impact evaluation equally on the state undertaking the activity. The Working Group, at its meeting in January 1976, accepted the requirement of environmental assessment but hedged by modifying the language to include the phrases "as far as practicable" and "significantly affecting the environment."²³² The logical next step is recognition that the requirement to assess transboundary environmental impacts is not only desirable but has become a duty and an obligation.

The practical results of these elaborate recommendations are still limited, but the impact statement has begun to appear in international agreements. In the 1974 agreement between the United States and the German Federal Republic it is a form of cooperation, not a binding obligation.²³³ An agreement on use of the lower Mekong Basin requires presentation to other basin states of a detailed study of all possible detrimental environmental effects of the mainstream project proposed.²³⁴ This is surely equivalent to an environmental

230. *Id.* at 43, para. 87(d). See also Report of the Governing Council of the United Nations Environment Programme on the Work of its Third Session, Nairobi, 17 April-2 May, 1975, at 82-86, U.N. Doc. UNEP/GC/55 (1975), and Decision 44 (III) at 124-25.

231. U.N. UNEP, Intergovernmental Working Group of Experts on Natural Resources Shared by Two or More States, Nairobi, 12-23 January 1976, *Draft Principles of Conduct*, working paper submitted by H.E. Ambassador D. Vicente Guillermo Arnaud, U.N. Doc. UNEP/IG.2/3 (1975).

232. U.N. UNEP, Governing Council Fourth Session, Nairobi, 30 Mar.-14 Apr., 1976, Report of the Intergovernmental Working Group of Experts on Natural Resources Shared by Two or More States on the Progress Made at its First Meeting Held in Nairobi from 12 to 22 January 1976, at 7 U.N. Doc. UNEP/GC/74 (1976), p. 7. The pertinent section reads as follows:

States should, as far as practicable, make environmental assessments before engaging in any activity with respect to a shared natural resource which may create a risk of significantly affecting the environment of another State or States sharing that resource.

233. U.S.-Federal Republic of Germany, Agreement for Cooperation in Environmental Affairs, arts. II (F) and III (C), text in 70 Dep't State Bull. 673, 674 (1974).

234. Comm. for Co-Ordination of Investigations of the Lower Mekong Basin, Joint Declaration of Principles for Utilization of Waters of the Lower Mekong Basin, Vientiane, Jan. 31, 1975. Art. XVII provides that:

The Basin State or States, whether territorial or not, which undertake the project shall present well in advance to the other Basin States for formal

impact statement. The Informal Single Negotiating Text of the Law of the Sea Conference explicitly requires a statement of assessment of the impact of activities in the sea on the marine environment.^{2 3 5} However, since it uses qualifying terms such as: "reasonable grounds," "may cause," "substantial pollution," and "as far as practicable," the language of this text is weaker than that of the Mekong Declaration.

Though the concept of environmental assessment and of the impact statement is finding its way into bilateral and multilateral agreements, as long as this remains infrequent it is municipal law that must play the more important role, not only in mitigating transboundary effects of water projects, but also in establishing the impact statement as a rule of law through consistent state practice. Even before such a rule is established, it may be argued that, since there exists an international duty of notice, such duty implies the obligation to transmit the impact statement whenever it is mandated by municipal law in cases of transboundary or foreign effects of domestic projects. Thus, though still a rule of municipal law, the environmental impact statement then acquires a transnational character through its transboundary or foreign effect and becomes an important, though still not internationally mandated, aspect of the international duty of notice and information.

In the United States, NEPA itself mandates seeking international cooperation in environmental assessment^{2 3 6} and filing impact statements if projects with transboundary or foreign effects are major federal actions.^{2 3 7} Though NEPA does not require communication

agreement prior to the project implementation a detailed study on all possible detrimental effects including short and long-term ecological impacts which can be expected within the territory of other Basin States as a result of the proposed mainstream project. The procedures and amounts of damages compensation shall be included in the above study.

235. U.N., Third Conf. on the Law of the Sea, Informal Single Negotiating Text, pt. III, art. 15, at 5 U.N. Doc. A/C.62/WP.8/PART III (1975). This reads:

When States have reasonable grounds for expecting that planned activities under their jurisdiction or control may cause substantial pollution of the marine environment, they shall, as far as practicable, assess the potential effects of such activities on the marine environment and shall communicate reports of the results of such assessments in the manner provided. . . .

236. National Environmental Policy Act, 42 U.S.C. § 4332(F) (Supp. 1976).

237. 42 U.S.C. § 4332(C) (1970). Among U.S. federal agencies which have filed impact statements on transboundary or foreign projects are the Department of State, the Department of Defense, and the Department of Transportation. See Appelbaum, *Controlling the Environmental Hazards of International Development* (comment), 5 Ecol. L.Q. 321, 347 n.154 (1976). In the water resources field, impact statements have been prepared, for example, for the Colorado River International Salinity Control Project, affecting Mexico. See Council on Environmental Quality, Environmental Quality, Fifth Annual Report 392 (1974); also 102 Monitor No. 8, 61 (1974).

of impact statements to foreign governments, once such a statement has been filed and opened to public scrutiny, it has become accessible outside the United States. This is perhaps why the impact statement procedures of some of the agencies with an international sphere of activity deviate from those of a purely domestic character, especially as to full disclosure. The regulations for the International Boundary and Water Commission, United States-Mexico, for example, provide that impact statements should not "normally include statements with respect to positions other than the optimum position of the United States in any ensuing negotiation or discussion."²³⁸

Much, of course, depends on the character of the agency. For example, the draft procedures of the Agency for International Development (AID),²³⁹ which are directed towards projects and activities wholly outside the United States, reflect the nature of its relationship with recipient countries. No restraints are placed on disclosure of information, except material classified or administratively controlled.²⁴⁰ Copies of an assessment are to be furnished to the host government and consultations are to be held between AID staff and the host government on the results and significance of a completed assessment before a project is authorized.²⁴¹ Where activities are not country-specific, the draft environmental impact statement must be circulated via AID's overseas Missions to affected governments for information and comment.²⁴² In addition, where the potential effects of a development are likely to extend beyond the frontiers of a recipient country, AID is required to urge the recipient country to consult with its neighbor(s) in advance of a project approval and to negotiate "mutually acceptable accommodations."²⁴³ Moreover, recipient countries have an input to the assessment process, since the procedures require collaboration "to the maximum extent possible" in obtaining data, conducting analyses and considering alternatives.²⁴⁴ Where baseline data and trained local personnel are lacking, it is the AID Missions' duty to "en-

238. International Boundary and Water Commission, U.S. and Mexico, Operational Procedures, § 17(a), 39 Fed. Reg. 9868, 9874 (Mar. 14, 1974). This may have been modified by the Commission's 1976 Regulations for Compliance with the Freedom of Information Act, 41 Fed. Reg. 8474 (Feb. 27, 1976).

239. For draft procedures of the Agency for Int'l Development, see 41 Fed. Reg. 12896 (Mar. 29, 1976).

240. *Id.* § VI C13, 41 Fed. Reg. 12900. Or where "emergency circumstances or considerations of foreign policy" make it necessary to modify review procedures. *Id.* at § VII.

241. *Id.* at § VI D.

242. *Id.* at §§ VI D and VII.

243. *Id.* § VI C13.

244. *Id.* § VI B.

courage and be responsible to host-country requests for training or technical assistance."²⁴⁵ These impact statement procedures of AID illustrate how municipal law, through its extraterritorial reach, in favorable circumstances, may be shaping not only the mutual relationships of individual countries but international law itself.

CONCLUSIONS

The era when water resources could be developed in comparative isolation, with little regard for the effect on other elements of the environment, is finally coming to an end, both on a national and on an international plane. In the United States, the year 1969 may be taken as marking the close of a period of more than 60 years when optimal development of all water resources was sufficient justification for any project. During that period the concept of the river basin was launched as an areal unit for maximizing the use of water and, in some instances, other resources as well. It was then, too, that the idea of the valley authority as a super-agency for the development of all resources of the river basin was conceived, and in a few cases implemented. But this all-embracing basin administration had very limited success. The separate and often isolated water resources agency remained the dominant institutional form until the recent revival of multipurpose resources agencies on a much larger scale than the valley authorities.

The idea of environmental super-agencies (which include water in their scope) appeared almost simultaneously at the end of the 1960s in several countries—notably the United States, Great Britain, and Sweden. These institutions differ from the valley authorities by the emphasis on protection in their mandate, and, incidentally, they tend to create conditions which facilitate the transition from an informal to a formal process of assessment of the environmental impacts of water development and use.

In the United States, institutionalization of environmental assessment through the legally mandated requirement of an environmental impact statement was done through the National Environmental Policy Act (NEPA). The concept has already spread to Canada and Australia and has been accepted in Colombia. However, in those countries public participation in the actual process of environmental assessment has not, so far, been allowed to reach the same level as in the United States. Supervision by the public in the United States has been assured through the enlarged scope of judicial review of administrative actions. But, the very success of this control might have

245. *Id.* § VI B.

impeded the search for firmer foundations for environmental protection than the rather volatile public opinion.

This success of the courts, and perhaps, also, the specter of a super-agency, may have lurked behind the rejection of special environmental tribunals by the *President's Report to Congress on the Advisability of Establishing an Environmental Court System*.²⁴⁶ The rejection was supported not only by most of the federal agencies, but also by the major environmental associations which were quite pleased with the role so far played by the courts and obviously preferred the benevolent devil they knew to one they didn't know. In addition, the belief that the courts are not now, and are not likely to be, overburdened by environmental litigation played a major part in the lack of enthusiasm for special environmental tribunals.

Countries accustomed to special tribunals could use them to give more efficient protection to the environment. This applies especially to countries which already have special water tribunals, such as Italy and South Africa.²⁴⁷ These courts have an insight into administrative decisionmaking through their role in administration of waters. In addition to subject expertise, they are less formal in their proceedings, therefore speedier where speed is essential.²⁴⁸ A drawback of special tribunals, though perhaps to a lesser extent than ordinary courts, is that their supervision of protection of the environment can only be *ad hoc* and discontinuous.

The environmental assessment process could perhaps be assured adequate public participation and, at the same time, be sheltered from the ups and downs of public support through establishment of an independent watchdog agency which would review the environmentally significant decisions of other agencies on its own initiative or at the instance of concerned individuals.²⁴⁹ When appropriate, it

246. Report of the President, Acting Through the Attorney General, on the Feasibility of Establishing an Environmental Court System (mimeogr. 1973). See especially Chapter VII, summarizing the more significant factors in the analysis leading to this recommendation.

247. Italy, Royal Decree No. 1775 of 1933, arts. 147-210; South Africa, Water Act, Act No. 54 of 1956 (as amended to 1969), § § 35-55.

248. For example, in the procedure before the Italian water court, pleading can be either oral or written. Testimony is also either oral or written, and the evidence, as well as the manner in which it can be prescribed, are within the discretion of the judge. Intervention in the proceedings is open to anybody who has an interest in the case, until the stage at which evidence is being taken, and there is only one appeal from interlocutory and final decisions. See Teclaff, *Abstraction and Use of Water, of Legal Regimes* 202 U.N. Doc. ST/ECA/154 (1972).

249. Such an institution was outlined, for example, in the Fundamental Principles contained in the brief presented by the Canadian Environmental L. Ass'n to the Ontario Government in October 1973 in response to government proposals for an assessment procedure; see notes 118-20 *supra* and accompanying text. Principle 2, regarded by the Association as the most important element in the environmental assessment process, stated that:

could, on its own initiative, bring environmental suits before special tribunals or ordinary courts. The right of an individual to bring a complaint before such a watchdog agency would have to be limited so as to be manageable. Proper procedural safeguards could ensure this, and a good example of the type of entity appropriate is the European Human Rights Commission, which accepts individual complaints against governments.²⁵⁰ Several thousand such complaints have been received, but most of them were rejected on procedural grounds and only a handful were admitted for examination on the merits.²⁵¹ Fear that the creation of such an agency would lead to caprice and arbitrariness might be alleviated by allowing limited recourse from its decisions to the courts on these grounds.

In the United States, NEPA does not give the right of veto to any agency, not even to the Council on Environmental Quality, but in rare instances other environmental statutes do give one agency a veto over the acts of another. An example is the Ocean Dumping Act of 1972, which gives the EPA a veto over decisions of the Corps of Engineers concerning the dumping of dredged material.²⁵² If the view of the District Court for the Southern District of Texas in *Sierra Club v. Froehlke*—that the opinion of the agency with the most expertise in the subject should be binding on the agency preparing the impact statement²⁵³—were to be accepted as a correct interpretation of NEPA, it might be a first step toward the eventual emergence of a watchdog agency.

On an international level, the general rules that have evolved for the protection of the environment either are directly applicable to water development or are accelerating the evolution of international water law itself. While uncertainty continues as to whether international water law requires notification of changes in the water regime

The creation of an independent, powerful environmental review board is a prerequisite to public confidence in the new procedures.

The powerful and independent review board, which would sit at all times, in essence like a court, would give clear substance to the often-expressed view regarding the importance of environmental concerns. A mechanism which would still make the Board responsible to the elected representatives would also be available through the legislature.

2 Canadian Env. L. News 129 (1973) (emphasis added).

250. European Convention for the Protection of Human Rights and Fundamental Freedoms, signed at Rome, Nov. 4, 1950, 213 U.N.T.S. 221, art. 25.

251. In 1971, the European Commission on Human Rights reported 431 applications registered, of which 395 were inadmissible, 16 were referred to respondent governments for their views, 15 were adjourned, and 11 were declared admissible. 19 Y.B. Eur. Conv. on Human Rights 393 (1971), at 279.

252. 33 U.S.C.A. § 1413(c) (Supp. 1974).

253. *Sierra Club v. Froehlke*, 359 F. Supp. 1289, 1348-49 (1973).

that may affect waters in a neighboring state,²⁵⁴ a requirement of notice of any activities (including water projects) that may bring about transfrontier environmental impacts is almost routinely included in the pronouncements of international bodies and in international agreements dealing with the environment.²⁵⁵

The restatement in the Stockholm Conference principles of state responsibility for transfrontier environmental injury provides a more solid foundation for international responsibility for water pollution than any deductions from the principle of *neminem laedere* or the pronouncements of international tribunals in cases not connected with water pollution. Furthermore, precise implementation rules pertaining to responsibility for water pollution, including non-discrimination and access to foreign courts, are being defined in declarations and treaties concerned with pollution in general.

Finally, the international environmental impact statement was recommended by the Stockholm Conference for adoption by states as part of conventional environmental law. The development of impact assessment rules has become one of the aims of UNEP and the requirement of an impact statement has already been included in the proposals for the Law of the Sea treaty.²⁵⁶ Once it leaves the twilight zone to become a rule of general international environmental law—which is a matter of time only, since it is both reasonable and necessary—it will also become part and parcel of international water law. In the meantime, provisions requiring an environmental impact statement should be included in all restatements of international water law and, as a matter of course, in new water treaties.

Perhaps the most far-reaching effect of environmental concern on international water law is not the evolving impact statement requirement; it may be the gradual municipalization of international water law and, vice versa, the gradual internationalization of municipal water law. What seem to be emerging, with the impact statement as their principal tool, are rules pertaining to environmental effects in general, and to environmental effects of water development and use in particular, wherever they are felt. The road is a long one yet, but the first steps have been taken.

254. See notes 201-12 *supra* and accompanying text.

255. See notes 213-20 *supra* and accompanying text.

256. See note 240 *supra* and accompanying text.