

Volume 32 Issue 3 *Summer 1992*

Summer 1992

New Directions in United States-Mexican Transboundary Environmental Management: A Critique of Current Proposals

Stephen P. Mumme

Recommended Citation

Stephen P. Mumme, New Directions in United States-Mexican Transboundary Environmental Management: A Critique of Current Proposals, 32 Nat. Resources J. 539 (1992). Available at: https://digitalrepository.unm.edu/nrj/vol32/iss3/6

This Article is brought to you for free and open access by the Law Journals at UNM Digital Repository. It has been accepted for inclusion in Natural Resources Journal by an authorized editor of UNM Digital Repository. For more information, please contact amywinter@unm.edu, Isloane@salud.unm.edu, sarahrk@unm.edu.



Stephen P. Mumme*

New Directions in United States-Mexican Transboundary Environmental Management: A Critique of Current Proposals

ABSTRACT

Recent proposals for reforming U.S.-Mexican transboundary environmental management catalyzed by the North American Free Trade Agreement negotiations depart from conventional wisdom by adopting a functional reduction approach to institutional change. This paper evaluates these new proposals' accuracy in characterizing the shortcomings of current management approaches and examines the formal and political impediments to achieving recommended changes in the present management regime. The analysis suggests that the functional enhancement approach adopted by the new Integrated Border Environmental Plan represents a more realistic and achievable approach to environmental management reform along the border.

INTRODUCTION

1991 may well go down as a watershed in United States-Mexico transboundary environmental management. Driven by intense debate over a pending North American Free Trade Agreement (NAFTA), both governmental and non-governmental critics have generated more proposals for transboundary management reform than at any time in memory, with potentially wide-ranging consequences for how the United States and Mexico cope with shared environmental problems.

These reform initiatives are inspired by the debate on Fast Track authorization in the spring of 1991, prefigured by the presidential summit of November 1990 in which presidents Bush and Salinas respectively promised to generate a comprehensive plan for managing the border envi-

^{*}Professor of Political Science, Colorado State University, Fort Collins, Colorado; Ph.D. University of Arizona, 1982; M.A. Arizona State University, 1975; B.A. Arizona State University, 1973.

ronment. The political importance of that promise became apparent during the Fast Track debate, compelling the presidents to accelerate development of the Integrated Border Environmental Plan (IBEP)¹ as the price to be paid for mollifying environmentalists. That promise, on May 1, directly inspired the IBEP First Stage Draft Plan, promulgated by the Environmental Protection Agency (EPA) and Mexico's Secretaria de Desarrollo Urbano y Ecologia (SEDUE) on August 1, 1991.² The Draft Plan, in turn, provided a formal opportunity for environmental non-governmental organizations (ENGOs) to comment and advance alternative proposals. This unprecedented set of political circumstances has attracted national attention to transboundary environmental management as never before.

At present reading, half a dozen proposals, including those the two governments placed on the table, have been advanced in one form or another. While these proposals diverge on various questions, they each contain recommendations for reforming the current bilateral regime for managing United States-Mexican transboundary environmental problems. Both national and regional environmental organizations as well as universities have participated in this process, including the Natural Resources Defense Council (NRDC), the Sierra Club, the Texas Center for Policy Studies (TCPS), the National Toxics Campaign (NTC), the Border Ecology Project (BEP), and the Udall Center for Policy Studies at the University of Arizona, among others.

These proposals vary from the past in two important ways. First they involve a wide range of players, and many nontraditional players, in transboundary environmental policymaking. Second, the proposals themselves tend to advocate radical surgery on existing mechanisms of transboundary environmental management, some going as far as to recommend wholesale reconstruction of the present transboundary environmental regime.

This paper examines these proposals with an eye to their institutional recommendations for border environmental management reform. Several criteria are employed in evaluating these proposals. The recommendations in each proposal will be evaluated in terms of:

- a. the accuracy of the proposal's characterization of current flaws in the extant institutional framework;
- formal barriers, statutory and treaty barriers, to the recommended change;
- c. political barriers to the recommended change.

^{1.} United States Environmental Protection Agency and Secretaria de Desarrollo Urbano y Ecologia, Integrated Environmental Plan for the United States-Mexican Border Area, First Stage 1992–1994, Working Draft (1991).

Id.

Before proceeding, it must be acknowledged that such an evaluation cannot be made on strictly objective bases. The proposals themselves strongly reflect normative values concerning preferred development alternatives and preferred institutional approaches. A critique of these alternatives must perforce reflect some preferences as well. The objective of this paper, however, is not to moralize about the proposed recommendations, but instead to subject the alternatives to a set of practical and political feasibility tests by way of identifying what is most useful and most strategically possible by way of institutional reform in binational environmental management. The paper concludes with an admittedly biased, but hopefully useful, set of reflections on what avenues deserve pursuing as ENGOs flex their muscles and try to shape the transboundary environmental agenda into the next century.

ENVIRONMENTALISTS' CRITIQUE OF THE EXISTING MANAGEMENT FRAMEWORK

The joint EPA/SEDUE Border Plan initiative provoked by the NAFTA debate has been instrumental in generating a number of proposals for reform by various environmental and public interest organizations.³ The critique of the present management regime on the United States-Mexican border is wide ranging, addressing substantive issues as well as institutional aspects of environmental management. In general, the various critiques find considerable shortcomings in the current management regime. The twin cornerstones of the current bilateral management system, the International Boundary and Water Commission (IBWC) and the 1983 United States-Mexico Border Environmental Cooperation Agreement (BECA) are the principal targets of criticism.

Critique of the IBWC

The IBWC has taken the brunt of environmentalists' criticism of the extant management approach. The Commission, which traces its roots to earliest boundary commissions established after the Treaty of Guadalupe Hidalgo in 1848, with modern foundation in the 1944 United States-Mexican Water Treaty, is the only officially constituted binational agency with a mandate for resolving binational disputes over territorial limits, water allocation, sewage and sanitation, and, arguably, water quality

^{3.} S. Lewis, M. Kaltofen, & G. Ormsby, Border Trouble: Rivers in Peril (1991); M. Kelly, Facing Reality: The Need for Fundamental Change in Protecting the Environment along the United States-Mexican Border (1991); H. Ingram, Integrated Environmental Plan for the Mexico-United States Border (1991); J. Ward, Comments of the Natural Resources Defense Council on the Integrated Environmental Plan for the United States-Mexico Border Area (1991); D. Kamp, Testimony: EPA-SEDUE Integrated Border Environmental Plan Public Hearing, 1991.

questions of a binational character.⁴ The Commission also enjoys limited jurisdiction over groundwater allocation and, arguably, quality under Minute 242, a binational agreement of the IBWC reached in 1973.⁵

The thrust of environmentalist criticism of the IBWC centers on 1) its ambiguous mandate in the sphere of water quality management, 2) perceived stodginess, or conservatism, in responding to environmental pressures, 3) and the structure of its decisionmaking procedures and perceived resistance to participation and influence by environmental organizations. On the first point, for example, a National Toxic Campaign report entitled Border Trouble: Rivers in Peril observes that in the sphere of water quality regulation "the EPA has left virtually all monitoring and enforcement to state authorities or the IBWC."6 The report goes on to note, "there is considerable confusion and disagreement over what agency in the United States bears the responsibility for addressing transboundary pollution." Mary Kelly, Director of the Texas Center for Policy Studies, observes, "it is unclear whether Article 3 of the 1944 Treaty, regarding 'border sanitation problems' gives the IBWC authority to deal with toxic industrial or agricultural wastewaters that are not discharged through a sewage system, since 'sanitation' generally refers to domestic sewage."8

Criticism of the Commission has also centered on the second point, the issue of its responsiveness to water quality problems. According to the National Toxics Campaign, "activists and state officials along the border have become increasingly frustrated by the lack of federal intervention. State officials assert that these pollution problems have become too large for local authorities to handle. And remarkably, when state officials do attempt to engage in surveillance of pollution that originates

^{4.} For background on the IBWC see: Eldrige, A Comprehensive Approach to United States Mexico Border Area Water Management, 4 S.W. Rev. Mgmt. & Econ. 89–101 (1985); J. Mueller, Restless River: International Law and the Behavior of the Rio Grande (1975); Timm, Some Observations on the Nature and Work of the International Boundary and Water Commission, United States and Mexico, 15 Soc. Sci. Q. 1 (1932); Jamail and Mumme, The International Boundary and Water Commission as a Conflict Management Agency in the United States-Mexico Borderlands, 19 Soc. Sci. J. 45 (1982); Mumme, Regional Power in National Diplomacy: The United States Section of the International Boundary and Water Commission, 14 Publius 115 (1984); Mumme, Engineering Diplomacy: The Evolving Role of the International Boundary and Water Commission in United States-Mexico Water Management, 1 J. of Borderlands Stud. 73 (1986); Mumme & Moore, Agency Autonomy in Transboundary Resource Management: The United States Section of the International Boundary and Water Commission, United States and Mexico, 30 Nat. Resources J. 661 (1990); Piper, Two International Waterways Commissions: A Comparative Study, 6 V. J. Int'l. Law 98 (1965); Smedresman, The International Joint Commission (United States and Canada) and the International Boundary and Water Commission (United States and Mexico): Potential for Environmental Control Along the Boundaries, 6 N.Y.U. J. Int'l. L. and Pol. 499 (1973).

^{5.} Minute No. 242, Permanent and Definitive Solution to the International Problem of the Salinity of the Colorado River, August 30, 1973, United States—Mexico, 24 Stat. 1969, T.I.A.S. No. 7708

^{6.} Lewis, Kaltofen, & Ormsby, supra note 1, at 26.

^{7.} Id. at 28.

^{8.} Kelly, supra note 3, at 15.

across the border, they are reprimanded by federal agencies such as the IBWC, who assert they are beyond their jurisdictional rights." 9

Justin Ward, spokesman for the NRDC, in his criticisms of the EPA/SEDUE Draft Integrated Environmental Plan, observes:

[M]oreover, the draft does not address the documented limitations of the United States-Mexico International Boundary and Water Commission (IBWC). For instance, the discussion of the 'IBWC achievements in solving water quality issues' (pp. III–16, 21) overlooks the Commission's historic failure to confront 'complex and hazardous problems of industrial discharges, toxic wastes, groundwater mining and contamination, and air pollution.' 10

Mary Kelly, in turn, notes that,

IBWC has been praised for its successful management of surface reservoirs along the boundary and for its resolution of boundary disputes. Recently, however, it has become clear that the structure of IBWC and its tendency to move cautiously are inadequate to the task of managing the exploding water quality problems along the United States-Mexico border.

IBWC has been very slow to exercise water quality functions. In 1979, under a directive from Presidents Carter and Lopez-Portillo, the IBWC adopted Minute 261, relating to 'border sanitation problems.' Article 3 of the 1944 Treaty provides that the two governments shall give 'preferential attention to the solution of all border sanitation problems.'

This cumbersome process has several limitations. First, IBWC can proceed at its own discretion and is not required to respond to problem situations. IBWC has chosen, for whatever reasons, to move quite slowly on those problems it has taken on. Second, there is no mandate in either the 1944 Treaty or Minute 261 that IBWC conduct advance planning to determine what treatment works are likely to be necessary in the future. Rather, the IBWC has tended to look into solutions only after serious problems have arisen and political pressure at the state or federal level has been applied. One startling example of this lack of advance planning is the absence of any sewage flow projections versus capacity availability in the draft IBEP. 11

^{9.} Lewis, Kaltofen, & Ormsby, supra note 1, at 28.

Ward, supra note 3, at 9.

^{11.} Kelly, supra note 3, at 15-19.

The most severe criticism, however, has been levied on the third point, namely, the IBWC's relatively closed approach to public participation in its decisionmaking. Helen Ingram, Director of the Udall Center for Studies in Public Policy, notes,

The IBWC, which has been given significant oversight over border water issues in the plan, has worked well in the past when problems required engineers and could be solved structurally. The increasing complexity of today's environmental problems, however, is a direct result of more complex human problems. Historically the IBWC has narrowly interpreted its mandate, and there is little evidence to suggest that the organization will be comfortable in open consultation with nongovernmental organizations, with broad gathering and interpretation of demographic and social data, and projections of environmental consequences of land use decisions. The IBWC's penchant for secrecy is antithetical to the public participation component of the border plan. ¹²

Mary Kelly, in similarly trenchant terms, argues, "the [IBWC's] process fails to involve state and local governments in any formal role. These entities have to depend solely on IBWC willingness to engage in informal consultations or to respond to pressure from the respective federal government." ¹³

She goes on to say,

The IBWC is also a very closed agency. The opportunity for public participation is extremely limited and there is a great reluctance to disclose information to the public. The 1944 Treaty does not mandate public participation in the operations of the IBWC. In fact, it is silent on public participation in IBWC decisionmaking and on public access to information by the Commission. When TCPS requested information from the IBWC United States Section on public participation in Commission meetings, the IBWC responded that: "The meetings of the Commission are diplomatic communications of an international nature and therefore are not open to the public" . . . This approach contrasts greatly with the 1909 Boundary Waters Treaty, which established the International Joint Commission (IJC) 14

^{12.} Ingram, supra note 1, at 5.

^{13.} Kelly, supra note 3, at 15.

Kelly, supra note 3, at 16–17.

Kelly's criticisms are echoed by Dick Kamp, who recommends that,

The role of IBWC-CILA must be clarified to either allow for much broader public participation in IBWC planning and activities or to greatly limit their mandate to sanitation control issues. The latter is probably preferable, but the addressing of shared water supply issues is a very high and unaddressed priority in the IBEP and IBWC had been very closed to public participation in the United States. ¹⁵

These criticisms of the Commission lead to various recommendations for reform ranging from prescription that IBWC "aggressively promote transboundary cooperation" to recommendations such as Kamp's, above, that would limit IBWC's authority over sanitation issues. The most radical solution is advanced by TCPS which recommends "removal of IBWC's lead jurisdiction on water quality problems in border area rivers and underground water and transfer of that jurisdiction to a new binational agency that is open to public participation and accountable to border area governments." ¹⁶

Much of the environmentalist critique is familiar to veteran observers of United States-Mexico transboundary environmental management. What is most interesting about the recommendations which follow the environmentalists' critiques of the IBWC is the emphasis on functional reduction. This approach is genuinely new in discussions of the Commission's role, functions, and performance in transboundary environmental management. In the past, critics of the Commission centered their reform proposals on enhancements to the current management functions of the Commission, not subtractions.¹⁷ Underlying that approach was at least a tacit assumption that the IBWC, while imperfect, represented an unusually well institutionalized approach to transboundary environmental problem solving that could be incrementally molded to address a substantial range of transboundary environmental questions. Clearly, that has changed. Emboldened by the NAFTA debate, and frustrated with the pace of border reform, environmentalists are now ready to take on the whole edifice of transboundary environmental management with unprecedented zeal for functional reduction. Before examining the merits of their criticisms and recommendations in greater detail, however, let us look at the second dimension of the current round of arguments for institutional change in United States-Mexico transboundary environmental management.

^{15.} Kamp, supra note 3, at 2-3.

^{16.} Kelly, supra note 3, at 17.

^{17.} See, for example, Utton, Overview, 22 Nat. Resources J. 744-45 (1982).

Critique of the 1983 La Paz Agreement

While specific criticisms have been levied at the IBWC, environmentalists aim broadly at reform of the present environmental management regime. A substantial concern is the perceived inadequacy of the 1983 United States-Mexico Border Environmental Cooperation Agreement (BECA), ¹⁸ also known as the La Paz Agreement, which establishes a regular consultative framework for addressing binational environmental problems. Criticisms of BECA range across a spectrum of concerns, including, most prominently, 1) frustration with its noncomprehensive, incremental approach to managing discrete problems, 2) a perception of weak enforcement of BECA's existing Annexes (subsidiary agreements), inadequate enforcement mechanisms, and inadequate interagency coordination under BECA, 3) inadequate allowances for public representation and participation in planning and decisionmaking under BECA, and 4) inadequate access to information under BECA.

On the first point, environmentalists are frustrated with the framework agreement as such, noting that BECA lacks treaty status and only amounts to a binational consultative framework rather than a comprehensive set of commitments to address the spectrum of binational environmental problems. TCPS's Mary Kelly argues:

[T]he La Paz Agreement is an executive level agreement, which unlike a Treaty, does not require approval by the United States Senate. The Agreement generally does not contain specific timetables for action or commitments of funds or other resources to border environmental problems. Instead, the Agreement contains a series of relatively vague promises for cooperative action on the border environment . . . ¹⁹

On the second point, enforcement, environmentalists are particularly critical. The NRDC's Justin Ward observes, "the current framework in both the United States and Mexico is poorly equipped to deal with international environmental enforcement." The National Toxics Campaign, detailing a wide range of specific toxic and hazardous substances abuses along the border, comments with specific reference to the maquiladora industry:

A United States-Mexico Treaty, the La Paz Agreement, requires all industries that import chemicals to Mexico to ship any resulting chemical wastes back to the coun-

^{18.} Agreement on Cooperation for the Protection and Improvement of the Environment in the Border Area, Aug. 14, 1983 United States-Mexico, T.I.A.S. No. 10827 [hereinafter, Border Environmental Cooperation Agreement].

^{19.} Kelly, supra note 3, at 18.

^{20.} Ward, supra note 3, at 9.

try of origin. Yet according to EPA records of 1988, fewer than one percent of maquiladoras reported sending hazardous wastes back to the United States.²¹

The TCPS, in turn, notes that,

The Agreement leaves many areas to be addressed through separately negotiated 'Annexes' . . . The Annexes do provide some basis for addressing more specific problems. Nevertheless, with the exception of Annex IV on copper smelter emissions reductions, there has been little binational action to control pollution sources in the border region. Rather, the Annexes generally provide for consultation, notification, or exchange of information.²²

Environmentalists also fault the BECA for failing to make adequate provisions for including the public in planning and decisionmaking, and for inadequate provisions for informing the public on environmental issues. The Udall Center's Helen Ingram comments,

The La Paz Agreement was a clear improvement over previous bilateral arrangements because it involved state government in working groups. But the groups involved in making border environmental decisions need to be expanded to include city and county governments, nongovernmental organizations, and academic institutions on both sides of the border. . . A forum reflecting the multitude of interests along the border should have the ability to examine the data and to recognize emerging threats to environmental quality, and to monitor and track the implementation of regulations. ²³

TCPS's Mary Kelly also observes that BECA's Article 16 "greatly limits public availability of technical information obtained 'through the implementation' of the Agreement." These criticisms are echoed by Dick Kamp who calls for a transborder public disclosure/right to know program for United States and Mexican agencies involved in environmental affairs. 25

On the basis of such criticisms, several of the more activist environmental organizations have lobbied for BECA's wholesale replacement by a treaty level mechanism providing for a new administrative system

^{21.} Lewis, Kaltofen, & Ormsby, supra note 1, at 1.

^{22.} Kelly, supra note 3, at 19.

^{23.} Ingram, supra note 3, at 5.

^{24.} Kelly, supra note 3, at 19.

^{25.} Kamp, supra note 3, at 3-4.

endowed with greater enforcement powers and improved public accountability systems.

TCPS, for instance, proposes,

[T]he 1983 La Paz Agreement should be renegotiated and elevated to treaty level. The agreement should be revised to more directly involve state and local government representatives and to allow for public participation and access to information in both countries. In addition, the vague commitments in the current agreement should be revised to provide for specific timetables and actions. Elevating the agreement to treaty status would help ensure enforceability and follow-through on the obligations undertaken...

A new binational agency to deal with transboundary natural resource and environmental problems in the United States/Mexico border area should be created as part of any free trade agreement. This agency could have authority for monitoring and enforcement in a variety of transboundary environmental and natural resource areas, including groundwater management, hazardous substances control, emergency response and contingency planning, water pollution and air pollution. The governing board of the new agency should include representatives of state and local governments and community organizations on both sides of the border.²⁶

The BEP adopts a similar approach, but centers its recommendations on drafting an improved Integrated Border Environmental Plan (IBEP) that effectively amends the BECA framework. Among BEP recommendations are: the negotiation of a new environmental treaty with Mexico which, at minimum, invests the IBEP with treaty status; extending the jurisdiction of the IBEP to encompass areas beyond BECA's 100 kilometer reach on either side of the border; and the creation of binational councils at the local and regional levels which, in turn, would constitute an "integrated border environmental council" legally empowered to meet with EPA and SEDUE on a regular basis "to identify problems, seek funding and resources, and generally be a partner in the effective implementation of the plan—including monitoring and enforcement where possible—on a local/regional level." 27

The NRDC takes a somewhat broader, trinational, approach. It recommends the creation of a new North American Commission on Trade and Environment with a comprehensive mandate to address NAFTA-

^{26.} Kelly, supra note 3, at 19-20.

^{27.} Kamp, supra note 3, at 2.

related problems throughout the United States, Mexico, and Canada. Such a commission should be composed of governmental and nongovernmental experts from all three signatories to the NAFTA. It should be empowered to hear complaints from governments, non-governmental organizations, and citizens regarding the failure of any signatory to enforce its own environmental standards or applicable international norms on trade-related activities. ²⁸ The NRDC notes:

The Commission should investigate allegations of poor enforcement and should issue findings and recommendations to the NAFTA parties. The Commission would serve an important function by calling attention to problem areas; it should also be given limited powers to enjoin polluting activities that violate applicable standards. The Commission should also make recommendations on needed improvements in national policies to prevent any country from gaining competitive trade advantages through comparatively weak standards of enforcement.

Experience with other international monitoring and compliance regimes illustrates basic elements that should govern institutional reforms under the border plan and related processes. These elements include a positive role for nongovernmental organizations, provisions for extensive monitoring and penalizing compliance lapses, participation of impartial experts within compliance review and enforcement, and full disclosure of documents and proceedings.²⁹

In sum, the pattern of critique and recommendations with respect to the 1983 Border Environmental Cooperation Agreement demonstrates a tendency to jettison BECA in favor of an alternative treaty. Recommendations currently range from functional expansion under the La Paz Agreement, ³⁰ to potential revisions of the treaty itself, ³¹ to more rejectionist approaches. ³² Of the various critiques of the La Paz Agreement, those of the BEP and TCPS are the most extensive. Both view the La Paz Agreement as essentially obsolete, lacking mechanisms for adequate participation and enforcement of environmental norms and programs agreed upon by the two countries, and lacking sufficient standing in law (since it is an executive agreement). As for the recommended alternatives of those who would reject the agreement, these range from a North American Environ-

^{28.} Ward, supra note 3, at 10-11.

^{29.} Ward, supra note 3, at 11.

^{30.} Lewis, Kaltofen, & Ormsby, supra note 3.

^{31.} Ingram, supra note 3.

^{32.} Ward, supra note 3; Kelly, supra note 3; Kamp, supra note 3.

mental Commission³³ to inclusion of a new agreement—perhaps the IBEP itself—as part of NAFTA,³⁴ to reaching a separate treaty on bilateral environmental management.³⁵

The Recommendations: A Critical Appraisal

As noted above, a distinctive feature of the range of reform proposals generated by the Free Trade Agreement and IBEP discussions is the emphasis on functional reduction or rejection of extant arrangements for managing transboundary environmental problems. The most critical proposals share several basic tendencies: 1) a concern with "comprehensive environmental management," 2) a concern with administrative integration and coordination, 3) a concern for effective enforcement, and 4) a concern for enhanced participation by nontraditional actors (e.g., local governments, nongovernmental organizations, and academic organizations) and better access to information. Virtually all these proposals are highly skeptical of, if not preferring to reject, several basic features of environmental management which are part of the extant arrangement, namely, 1) incrementalism, 2) ad hoc planning, 3) multi-institutionalism and overlapping jurisdictions.

Unquestionably, the current "conjuncture" brought about the joint presidential initiatives in trade and environmental planning provides an unprecedented opportunity for policy reform. In this environment, it may be politically feasible to move more dramatically in the direction of "comprehensive environmental management" than ever before. Understandably, this is what environmental organizations strive to achieve, for it optimizes the potential for environmental protection and natural resource conservation.

Even so, it is a useful exercise to step back from the situational aspects of the present "conjuncture" and reflect on what the barriers and drawbacks might be in pursuing the "functional reduction/institutional excision" approach to environmental reform along the border. Several critical questions need to be asked, or faced, by advocates of radical surgery on the institutional apparatus for transboundary environmental management. At minimum, we should ask, is radical surgery politically feasible? Second, would radical surgery contribute to strengthened institutional management of environmental problems along the border? Third, are there alternative courses of action which can produce reasonable results—functional enhancement, for instance, within the present institutional context?

^{33.} Ward, supra note 1.

^{34.} Ward, supra note 1; Kelly, supra note 1; Kamp, supra note 1.

^{35.} Kamp, supra note 1; Kelly, supra note 1.

Political Feasibility of Functional Reduction

The most radical of the proposals above all aim at some form of functional reduction with respect to the roles and functions of the IBWC and the La Paz framework agreement. My own, hopefully well considered view, is that advocates of functional reduction will encounter serious, and likely insurmountable, political resistance to achieving these reforms. This is not a value judgment about what "ought" to be, it is a devil's advocate judgment concerning the difficulties of achieving functional reduction. Let us consider the case of the IBWC first, and the La Paz Agreement second.

IBWC. The fundamental problem with an approach which reduces the powers and functions of the commission is that it runs afoul of one of the most cohesive political alliances ever fashioned in defense of a natural resource entitlement in the United States. The IBWC's current jurisdictions and functions in the sphere of environmental management principally derive from interpretation of Article 3 of the 1944 United States-Mexico Water Treaty³⁶ which mandates that IBWC have jurisdiction over all "border sanitation problems."

It is important to reflect on what this means. It means that the IBWC's mandate to address water quality problems is anchored in a treaty level document, which invests the commission with greater authority than that found in lesser international agreements to which the United States is party, and domestic legislation. It is the nature of the 1944 Treaty mandate, however, that is most interesting in this case. The 1944 Water Treaty is mainly concerned with apportioning water resources—or, put another way, rationing entitlements—on the major transboundary watercourses, the Rio Grande and Colorado Rivers. The treaty itself was put together with great difficulty and is a contender for the most politically complicated international water agreement ever agreed upon by United States states.³⁷ The critical nature of this document in apportioning interstate and binational water resources on the Colorado River, in particular, makes it an unusually difficult agreement to revise. If anything, the difficulty of undertaking a revision has intensified due to rising demands on the water stock of border rivers and interstate negotiations aimed at reallocating water within the Colorado River watershed. It is precisely this long-standing historical linkage of water quality management to water allocation both within the United States proper and between the United States and Mexico that makes any revision to the 1944 Water Treaty such a delicate political undertaking.

^{36.} Treaty regarding Utilization of Waters of Colorado and Tijuana Rivers and of the Rio Grande, February 3, 1944, United States-Mexico, Stat. 1219, T.S. No. 994 [hereinafter 1944 Water Treaty].

^{37.} See, N. Hundley, Dividing the Waters (1966).

This, of course, does not mean that a revision to the 1944 Water Treaty, stripping IBWC of its water quality management functions, is inconceivable. The key, however, is finding a way to do so without jeopardizing national and binational water entitlements. The least risky approach would be to simply employ the channel of the IBWC itself, through its minutes, to reduce its functional involvement. The commission itself would hardly champion this approach, but functional reduction could be accomplished without altering the Treaty per se. Altering the Treaty as such is more risky. Currently the initiative to revise the 1944 Water Treaty is coming from nongovernmental and academic organizations interested in better transboundary management, and not from the state-level organizations which carry the most clout in influencing their congressional delegations in this respect. The state governments will inevitably weigh the merits of working within the present arrangement for transboundary management of the environment against the risks associated with opening up the 1944 Water Treaty. If the past may be taken as even a partial guide to the future, one would need to be skeptical of the states' readiness to amend the 1944 Treatv.³⁸

At present, United States border and basin states might be tempted to consider a reduction of the IBWC's functions under certain conditions. One essential condition is that Mexico not attempt to amend its treaty entitlement to water on the two rivers, or strengthen its claim to water quality on those rivers. Another, less essential, but important condition is maintaining the IBWC's mandate to manage water allocation and reclamation functions under the 1944 Treaty. If these conditions are met, then it might be possible to create a package of institutional and economic incentives whereby the United States and Mexico would transfer the Commission's water quality functions to some other, perhaps newly created, agency.

La Paz Agreement

From a political standpoint, the two countries are likely to find it much easier to amend or replace the La Paz Agreement, since this agreement is basically a nation to nation executive protocol. While it is grounded in domestic political bargains in the United States, it is not linked to any allocative or distributive principle which might generate the perception of great risk should it undergo revision, nor would revision as

^{38.} Recently, the Governor of the state of Colorado fired his two senior water advisors for merely suggesting that new proposals for rationing water entitlements in the Colorado River basin be reviewed. See, Sleeth, Dismissal Stuns Engineer, Denver Post 2-C (February 16, 1992); Romer fired engineer to help river compact, Rocky Mountain News 39 (February 16, 1992). This traditional reluctance to risk any aspect of a state's position in the complex entitlement system along the Colorado River is an indication of how difficult it will be to change the 1944 Water Treaty.

an executive agreement require the approval of two-thirds of the United States Senate.

All that changes, of course, should the two countries seek to elevate the La Paz Agreement, or any substitute, to treaty status. While a detailed analysis is beyond the scope of the present paper, it is by no means clear that the complex regulatory questions raised by such a treaty initiative could be resolved to the satisfaction of the affected states or win the financial support of other United States states who, depending on the funding formula, might well be expected to subsidize environmental amelioration along the United States-Mexico border.

Such a treaty may also prove difficult to achieve due to resistance from Mexico. Proponents of reform³⁹ are strong advocates of a freedom of information/full public disclosure rule within any agreement. Such freedom of information rules run fully against the grain of past Mexican public administration and are bound to be controversial there. ⁴⁰ It is doubtful whether the Mexican government will accede to such reforms in the present political climate.

Strengthening Institutional Management

Debate over alternative institutional approaches should be guided, in part, by the consideration of whether the proposed course of action contributes towards or diminishes institutionalized management of environmental problems and conservation of natural resources in the border region. While any discussion of the institutional impacts of the various functional reductionist recommendations is hypothetical at best, several considerations must be borne in mind.

First, the record of institution building in managing problems in United States-Mexican affairs has been spotty at best for the better part of two centuries of bilateral relations. It is instructive, particularly from a functionalist perspective, to note that since the Treaty of Guadalupe Hidalgo, the two countries have achieved only one treaty level agreement establishing a permanent organization to manage a functional arena of public policy, and that happens to the IBWC. While a number of other commissions have been created by executive agreement to cope with problems ranging from trade to immigration, these have been temporary, or semi-permanent bodies, often of a more explicitly political character, which lacked the capacity for functional enhancement or institutional growth.

^{39.} See, Kamp, supra note 3; Kelly, supra note 3.

^{40.} For discussion of this point, see, R. Camp, Intellectuals and the State in Twentieth-Century Mexico 179 (1985); Poitras, Welfare Bureaucracy and Clientele Politics in Mexico, 18 Admin. Sci. Q. 21–22 (1973).

That cannot be taken, in itself, as a argument against the functional reductionists, since functional reduction is generally accompanied by preference for a treaty level commitment to transboundary environmental management. As seen above, however, the political likelihood of realizing such a treaty is slim. If that, indeed, is the case, then the risks of functional reduction are increased by the generally poor bilateral record of binational institution building.

Second, political conditions in both countries work against institution building in bilateral relations. In the United States, a federal system of government increases the difficulty of forging the broad gauged coalitions that are necessary for empowering executive action in diplomatic affairs. ⁴¹ In Mexico, a tradition of de facto political centralism and strong executism are blunted by term limitations on presidential office—the sexenio, or single nonrenewable six year incumbency—which creates an unusual degree of administrative disruption and discontinuities in implementation and enforcement of formal rules. ⁴² In the United States, the problems of forging bilateral institutions tend to be centered on the input side of the political process, or policy formulation dimension of the political process. In Mexico, the problems of institution building are centered on the output side of the system, or implementation side of the policy process. Such fundamental differences in political procedures are barriers to creating and sustaining strong cooperative binational institutions.

Third, fundamental differentials in economic development, even assuming the arguable benefits of free trade over the long term, are impediments to binational institution building. For the foreseeable future, Mexico is likely to lack the assets to commit to all dimensions of environmental amelioration and enforcement along the border. It must be borne in mind that Mexico has, historically, committed more resources to environmental improvement in border areas than in most parts of its interior, largely due to United States pressures for environmental remediation and regulation in the border zone. Even so, there are practical limits to Mexico's capacity to invest in these functions in the near to medium term, and very likely in the long term. As Roberto Sanchez argues, Mexico conceptualizes environmental management and prioritizes its needs differently than the United States.⁴³

Mexico has, and is likely to continue to give, border environmental remediation a lower priority than activists in the border region would like. Its resource limitations and policy preferences thus function as a basic

^{41.} Bath, The Emerging Environmental Crisis along the United States-Mexico Border in Changing Boundaries in the Americas 120 (L. Herzog, ed. 1992).

^{42.} On this point, see, M. Grindle, Bureaucrats, Politicians, and Peasants in Mexico 164–72 (1977); Report of the Bilateral Commissions on the Future of United States-Mexican Relations, The Challenge of Interdependence: Mexico and the United States 26–27 (1989).

^{43.} R. Sanchez, El Medio Ambiente como Fuente de Conflicto en la Relacion Binacional Mexico-Estados Unidos 113–114 (1990).

constraint on rapid or dramatic jumps in institutional commitments to environmental improvement.

In sum, enduring obstacles litter the path toward improvement in United States-Mexican environmental management. It is precisely these kinds of considerations that should make reformers wary of efforts which center on functional reductionism, or efforts to remake existing institutional arrangements along the border. Notwithstanding their flaws, current institutional arrangements have the virtue of having been achieved in the face of these constraints and representing compromises that are essentially compatible with the diplomatic limitations arising from each nation's polity and economy.

Alternative Courses of Action

If radical surgery on border institutions is politically difficult, as it is, and institutionally risky, as it is, are there alternative courses of action? The answer here is clearly yes. While approaches in this vein fall within what might be called the "conventional wisdom" of transboundary environmental management, it is worth considering at least what is possible in this realm.

IBWC. It is useful here to examine the IBWC's general capabilities as well as what can be done in several of the "problem areas" identified by critics of the commission's management approach. We shall consider the general issues of functional development and reduction, the problems of planning, enforcement, and participation in the area of water quality.

First, it is worth noting that the nature of the commission's mandate in the realm of water quality is elastic. It is grounded in an interpretation of the 1944 Water Treaty, carefully extrapolated over the years. Such agreements, while limited in scope, do have considerable force. What is more, they remain malleable within the present institutional and political context. This, of course, is a point of contention with critics who argue that the commission's performance is inadequate. However, there is nothing in the present institutional context which formally prevents the two governments from proceeding with further interpretation of the treaty by mutual consent. Indeed, either functional development or functional reduction is possible through this process, bypassing the need to resort to treaty amendment to achieve change in water quality management.

It is useful to consider what might be possible within the present institutional arrangement in responding to concerns of the commission's critics. Critics note that the commission has command of its agenda and has no imperative to engage in comprehensive planning, or to anticipate long range occurrences and needs in water quality management along the border. While it is true that the commission has some discretion in practice, the critics have overdrawn this point. In fact, there is nothing in the

1944 Treaty document which would prevent the two governments from conferring on the commission a planning mandate of this type. In fact, it is well within the two governments' reach to interpret the language of the treaty's Article 24, Section A to require such a planning component. Article 24, Section A empowers the IBWC "to initiate and carry on investigations and develop plans for the works which are to be constructed or established in accordance with the provisions of this and other treaties or agreements in force between the two countries dealing with boundaries and international waters."⁴⁴ At this juncture, the two government's have not deemed fit to pursue such a course, though the IBEP's water quality/water conservation and wastewater implementation plans set out in Section V.11-23 do contemplate increased long range planning in these substantive issue-areas.⁴⁵

In the case of enforcement, the critics are correct when they argue that IBWC has not been greatly engaged in enforcing various agreements. Such lassitude in enforcement, however, is not a problem which can be attributed to faults in the treaty as such. On contrary, it is more a reflection of the inherent diplomatic constraints associated with binational environmental management. Under the 1944 Water Treaty, the IBWC is endowed with administrative responsibility on a case-by-case basis and must rely on domestic agencies and courts of each government to actually implement its findings with respect to the parties' compliance.

While the commission's leadership has in the past resisted taking on a more aggressive regulatory role for the agency, there is nothing in the 1944 Water Treaty which would otherwise prevent the two governments from reaching a subsidiary agreement, or minute, as the commission's journals are known, conferring additional regulatory powers on the commission in the domain of water quality management. Language in Article 24, Section C delegates to the IBWC the power, "in general to exercise and discharge the specific powers and duties entrusted to the commission by this and other treaties and agreements in force between the two countries, and to carry into execution and prevent the violation of the provisions of those treaties and agreements. The authorities of each country shall aid and support the exercise and discharge of these powers and duties, and each commissioner shall invoke when necessary the jurisdiction of the courts or other appropriate agencies of his country to aid in the execution and enforcement of these powers and duties."

Such general language is open to further elaboration and specification. By mutual agreement the two nations could stipulate that the com-

^{44. 1944} Water Treaty, supra note 33.

^{45.} United States Environmental Protection Agency and Secretaria de Desarrollo Urbano y Ecologia, Integrated Environmental Plan for the United States-Mexico Border Area, First Stage 1992–1994 (1992).

^{46. 1944} Water Treaty, supra note 33.

mission undertake direct inspections rather than rely on other domestic agencies, and confer on the IBWC specific powers in relation to other domestic agencies.

In the case of participation, the critics are clearly on target in faulting the commission for failing to respond effectively to emerging demands along the border or include nontraditional actors, such as NGOs in its planning process. This is a legitimate criticism and is grounded in the 1944 Water Treaty which is silent on the question of public participation. Articles 2 and 24 treat the commission's formal meetings as diplomatic occurrences, thus reinforcing a pattern of confidentiality and secrecy with respect to deliberations and the management of information resources. 47 Here again, however, the commission's behavior could be altered by mutual government agreement without recourse to treaty amendment. Language in Article 2 or 24 could be interpreted to require the commission to consult, provide information to the public, and conduct public hearings or other for wwhich would admit public input in its decisionmaking. In particular, Article 24, Section A, quoted above, could be interpreted to require consultation or hearings with nontraditional organizations.

In sum, the various critics tend to overlook the inherent opportunities of the IBWC framework in favor of more dramatic change. Yet the political possibilities of reaching such an extension of the IBWC's authority following the proven if frustrating pathway of functional enhancement are actually more favorable to reform.

THE LA PAZ AGREEMENT

The La Paz Agreement likewise provides a flexible mechanism for reaching binational agreement on international environmental issues. While critics are correct in arguing that a binational treaty would be far superior to the present framework, the real chances for obtaining such a treaty are, in this analyst's opinion, slim. It is useful, then to consider what might be done within the present framework.

The bulk of the criticism of the La Paz Agreement is similar in form to charges levied at the IBWC. Critics are concerned with the 1) incremental, ad hoc character of reaching concrete agreements; 2) lack of enforcement provisions built into the La Paz administrative structure coupled to the administrative weaknesses of the executive agreement itself; 3) limitations on information and participation inherent in the framework; and 4) poor coordination among the various agencies in each country with mandates in this field. Such criticisms are valid. The key question is, if a

treaty cannot be reached, can progress yet be made under the La Paz Agreement? The short answer is yes, it can.

On the first point, there is little real chance of avoiding an incremental, ad hoc approach to transboundary environmental management if the present structure of the La Paz document is maintained. The intent of the La Paz Agreement was precisely to allow a great deal of flexibility to the member governments in selecting approaches to transboundary environmental management. Within the structure of the La Paz Agreement, however, it is possible to coordinate and link the various provisions of its subsidiary agreements in a manner that would approximate a more comprehensive approach to transboundary management. In effect, this is what the IBEP process is aiming at. While this solution is—to purloin a term from decisionmaking theorist Herbert Simon—a "satisfying" approach, environmentalists should seriously explore its possibilities as a second best, but more achievable approach towards comprehensive binational environmental planning.

Let us turn to the question of enforcement. Enforcement under the 1983 agreement is almost entirely a function of whatever mechanisms are built into its subsidiary "Annexes," as the implementing agreements are called. If adequate enforcement is not built into the annex, it is not likely to be realized. This is the necessary, if not the sufficient, condition. On the other hand, the La Paz Agreement does not preclude vigorous enforcement. While some critics seem to believe it is itself an obstacle, it is only an obstacle insofar as it is compared to the ideal objective of a binational treaty. To view the agreement this way may be a case of letting the perfect become the enemy of the good. The challenge confronting the environmental organizations is to hold their governments accountable, to ensure that these enforcement arrangements are written into the annexes agreed upon. The agreement also functions as a more flexible document. While a formal treaty would undoubtedly be a stronger instrument for enforcement, it also lacks flexibility. Under the current arrangement, subsidiary agreements are more amendable, more reversible. There are some virtues in that.

With respect to the issue of participation and access to information, the La Paz Agreement does not preclude further elaboration and extension of guarantees of participation and access to non-traditional constituencies. This is a crucial and necessary modification without which the agreement will fail to satisfy border constituencies and the prospects for more effective management will diminish. Under the present arrangement stipulated in Article 9 of the agreement, states and municipalities may be invited to participate in the meetings of the National Coordinators as well as representatives of "international governmental or nongovernmental organizations." To date, state representatives have been included

^{48.} Border Environmental Cooperation Agreement, supra note 17, Article 9.

in the four working groups under the agreement. Article 9 could, however, be interpreted in a subsequent annex to permit regular participation by nontraditional actors.

Some movement in this direction is contemplated by the IBEP plan released in February 1992. Under the IBEP First Stage (1992–94) provisions, Border Environmental Plan Public Advisory Committees (BEP-PACs) are to be chartered in Mexico and the United States for the purpose of advising their respective national environmental agencies on border problems.⁴⁹ These groups are "encouraged by SEDUE and EPA to meet periodically, freely exchange ideas, and make joint recommendations to both SEDUE and EPA."50 The BEPPACs, according to EPA officials, will operate on the national, regional, and municipal levels to advise BECA's National Coordinators on environmental problems. 51 The plan also encourages the development of sister city intergovernmental advisory groups at the municipal level to help advise on nonurban environmental programs, as well as the involvement of people-to-people binational community groups in promoting public awareness of environmental issues. 52 Finally, the plan provides that, "State and local environmental agencies will be invited to provide their extensive knowledge, expertise, and resources to the plan by encouraging their involvement and participation in the binational Work Groups constituted by SEDUE and EPA pursuant to the 1983 Border Environmental Agreement. Particularly on the United States side, state and local governments play a significant role in carrying out federal mandates; therefore, their direct and active involvement is essential."53

Environmentalists have criticized the IBEP's provisions for expanded participation on grounds that the plan is at minimum unclear on just how the BEPPACs' advice would be incorporated into actual planning activities, that the process directs advise to EPA and SEDUE, each of which suffers from limited enforcement and regulatory authority, and that BEPPAC membership is based on a process of nominations and EPA/SEDUE selection rather than local election. ⁵⁴ Whether the BEPPACs and related provisions of the plan provide an adequate mechanism or not, however, considerable elaboration of the participatory opportunities available to border organizations is possible within the 1983 agreement's language.

^{49.} Environmental Protection Agency and Secretaria de Desarrollo Urbano y Ecologia, supra note 40.

^{50.} Id. at V-47.

^{51.} R. Kiy, Comments made during briefing for Border States' Educational Project at the Environmental Protection Agency, Washington, D.C. (May 2, 1992).

^{52.} Id. at V-46.

^{53.} Id. at V-46.

^{54.} Kelly, supra note 3; Kamp, supra note 3.

With respect to access to information, the present arrangement under the La Paz Agreement, as Mary Kelly observes, ⁵⁵ does vest discretion as to the dissemination of such information in the National Coordinators. Article 16 states "such information may be made available to third parties by mutual agreement of the parties to this agreement." ⁵⁶ There is nothing in this language which would prevent the parties to the agreement from extending full access to information to third parties (nontraditional actors) in a supplementary annex, however. In fact, the new IBEP does commit the two countries to a program of expanded access to information on environmental conditions and regulations along the border, providing that,

SEDUE and EPA will develop educational and information programs about the Border environmental plan ... ⁵⁷

SEDUE and EPA will publish a SEDUE/EPA approved English language translation of the 1988 Mexican Comprehensive General Ecology Law, the regulations and technical norms or standards developed to implement the law, and such other Mexican and United States laws, regulations, standards and guidance as SEDUE and EPA deem appropriate. The relevant United States laws, regulations, standards and guidance will be translated into Spanish. These publications will be regularly updated.⁵⁸

SEDUE and EPA will jointly arrange for the publication of triennial environmental indices and data on the border area. SEDUE and EPA will seek establishment of requirements for public availability of data on emissions and effluents of pollutants and other elements of a right-to-know program in the border area. ⁵⁹

This commitment falls well short of the kind of broad-gauged access to technical data and administrative information border environmentalists would like to have, but does mark a point of departure in enhancing the availability of vital information which will assist environmental groups in holding government agencies accountable and identifying and monitoring important environmental trends. What is more, it illustrates that a good deal, in fact, can be accomplished extrapolating more broadly from the language of BECA's Article 16.

^{55.} Kelly, supra note 3.

^{56.} Border Environmental Cooperation Agreement, supra note 17, art. 16.

^{57.} United States Environmental Protection Agency and Secretaria de Desarrollo Urbano y Ecology, *supra* note 40, at V-48.

^{58.} Id. at V-48.

^{59.} Id. at V-49.

Finally, critics have expressed concern with the lack of interagency coordination, overlapping jurisdictions, and jurisdictional ambiguities contained in the present approach. Viewed strictly from the perspective of administrative efficiency, such conflicts and ambiguities are certainly inefficient and suboptimal in allocating resources to administrative objectives. It bears noting that the IBEP regards this issue as a considerable problem and emphasizes the need for better interagency coordination in the planning process, though it falls short on specifying how that might be accomplished in the many issue areas at stake. ⁶⁰

The La Paz document, however, does allow the two countries to move towards greater rationalization of their administrative approaches. A variety of problems will continue to arise, however, due to the structure of binational relations. Some problems arise simply as a function of federalism in the United States and the differences in administrative approaches to environmental management at the level of the various states. Similar dynamics are now occurring in Mexico as its government moves to decentralize certain aspects of environmental administration and law. Other problems arise due to the varying administrative capacities of the various agencies of the two federal governments. The IBWC is a good case in point with its special mandate in the area of water quality. Despite these structural difficulties in United States-Mexican relations, incremental refinements can be stipulated through annexes to the La Paz Agreement.

The current arrangement is not all to the worst, however. While we are far from having a perfectly rationalized administrative structure for dealing with all transboundary environmental and natural resource management issues, there is a good deal of redundancy built into the system. Redundancy, in the form of overlapping jurisdiction, is frequently an excuse for inaction, but it may also provide a choice of pathways to address complex problems, problems that are complex politically as well as technically. Again, the challenge to environmental critics is to define the need for better administrative coordination and to hold the governments accountable at various levels.

CONCLUDING REMARKS

The purpose of this paper has been two-fold, to delineate the range of views of current critics of the United States-Mexico environmental management regime as well as proposals for change, and to argue that

^{60.} For a brief discussion of this point, see, J. Rich, Planning the Border's Future: The Mexican-United States Integrated Border Environmental Plan (1992); Texas Center for Policy Studies, A Response to the EPA/SEDUE Integrated Border Environmental Plan (March 1992).

there are useful alternatives to the radical surgery some critics presently support as the solution to transboundary environmental management. The current round of criticism and debate on the extant management regime has been extraordinarily refreshing and contributed a great deal of useful "new thinking"—with apologies to Sen. Gary Hart—on what should be done.

While there is much that merits serious consideration in environmentalists' criticisms of the current management approach, one should remain skeptical of the prospects for reaching a bilateral environmental treaty, or including all but the most elementary principles of environmental responsibility in a forthcoming NAFTA. Should these objectives fail to materialize, environmental organizations must be prepared to take advantage of the current institutional framework and other suboptimal reforms such as those contemplated in the IBEP.

The thrust of these remarks tilt away from the functional reduction approach in favor of the more traditional approach of functional enhancement to existing institutions. It is obvious that should radical surgery fail, there is much to be done in the context of the present institutional framework. Critics have not yet taken the IBWC's framework seriously, or attempted to generate an effective coalition for changing its behavior. That is the essential prerequisite. The IBWC's mandate does provide for substantial elaboration, but the political pressure must first be directed in the right channels.

Similarly, the La Paz Agreement, with all its imperfections, offers considerable latitude for change. Indeed, from a political standpoint, there are far fewer obstacles to its revision or replacement than to achieving a treaty. The current IBEP, while flawed in many respects, essentially adopts this approach. It is fundamentally a functional enhancement document of the traditional sort. While one may agree with a great many of the specific charges levied at the shortcomings of the IBEP, the plan is designed to fit within the present framework of extant management arrangements and build incrementally upon them. As such, it offers more achievable opportunities and goals than many of its critics.

In sum, this paper argues for taking another look at what is possible within the current management regime with an eye towards extending and institutionalizing that regime in the interest of both nations and the border environment. There is no doubt that economic integration will accelerate and place the border environment under greater stress. If environmentalists cannot persuade their governments to adopt a comprehensive regime, they must utilize the remaining options effectively. Fortunately, the current level of executive attention in the context of the progress of the past decade affords a variety of options for functional development in environmental management.