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# Public Environmental Information in the Texas-Mexico Border: Analysis, Issues and Directions for the Future

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## Introduction

There is no disagreement that the environmental issues facing the Texas-Mexico border are significant. Added to this, the amount of information available about environmental issues is enormous. However, the fact is that information is not always fully accessible or shared among interested individuals and groups in the region. In this regard, this project has explored current environmental information sources and how information flows between and to interested parties in order to determine what future actions might be available and, subsequently undertaken, that will move the region closer towards having an integrated environmental information network.

## Objectives of the research

The overall goals of this project focused on developing a baseline for future policy discussions, and determining existing networks and flow of information with the longer-term goals of:

1) Increasing public access to environmental information;
2) Promoting an increase in bi-national sharing of information;
3) Improving public participation about environmental issues; and,
4) Promoting effective environmental education.

The degree to which these questions and concerns can be assessed are documented in this summarized final report. The entire final report itself is quite voluminous and contains a great deal of information. Nonetheless, the research objectives are laid out in sections that

reflect the way in which the project was conducted. These sections included in the final report are: Website Assessments, Organization Survey, Sources of Information, Hunt for Environmental Information and Explanations, Policy Implications and Environmental Risks.

**Research methodology/approaches**

Our approach to this problem required that we explore the issue(s) at hand from as wide of set of perspectives as possible given the available funding and the time constraints that face any research. To begin, the sheer size of the region presents certain difficulties. First, covering the entire Rio Grande valley is a difficult task that is hindered by access to some areas. Second, the geography and economic conditions of the area has led to different problems emerging across the region. Put another way, the lower portions of the Rio Grande Valley face different problems than the upper portion. In order to gain a perspective that would represent these differences, the study was conducted in two areas. In the north, or the upstream area, UTEP conducted activities in the El Paso/Ciudad Juarez region. This area is densely populated (2 million) and includes over 200 maquiladoras. The area faces a host of environmental problems, including but not limited to, air quality issues, water shortages, stormwater run-off, pollution and land-use. In the south, or downstream area, a parallel study was conducted by Border Information & Solutions Network (BISN), a sub-contractor for the project, who focused on Brownsville in Texas and Matamoras and Reynosa in Mexico. Unlike the arid desert setting of El Paso/Juarez, this area is sub-tropical and has had a long agriculture history that has brought with it a number of environmental concerns.

Both United States and Mexico communities were included to determine the extent of a "binational network" of environmental information and to see if differences obtain because of the socio-economic and development differences, including technology access, that exist between the two nations. The linkages between the two nations in the environmental arena cannot be overlooked, but how well-informed policy makers and the general public are sets the tone for deliberations among the two nations and the states involved. If they are not knowledgeable about environmental conditions on both sides of the border any attempts to manage programs and design solutions will be hampered because of the simple fact environmental media do not respect borders and thus one nation's problem simultaneously is the other nations' problem as well. Yet, most observers would agree that information exchange is not routinely undertaken and is compounded by differences and inconsistencies in data collection. Overall, it can be said we know a lot, but do not have a strategy for organizing and sharing environmental data. With this observation in mind, it was decided that in both areas, multiple methods could be used to identify how well environmental information is organized.

First, we were interested in the internet and how it is providing access to environmental information, including how "user-friendly" it is in the binational region. Websites with border relevance were assessed and categorized by their information and accessibility. Second, we explored how environmental organizations within the region provide information through a survey conducted in both the United States and Mexico in both regions of the study. Third, we assessed the set of resources available to the public that provide, in one from or another, environmental information. Fourth, we queried the public about how they obtain information through a scenario process that we called the scavenger

hunt. Lastly, we looked for explanations for present behavior and patterns related to environmental information dissemination using concepts grounded in policy analysis and network theory. From these, recommendations for future action that will advance the sharing of information were developed. The full set of findings from these activities is documented in the report that accompanies this Executive Summary and Overview. Key findings are provided herein that are indicative of the state of the art in environmental information sharing and networking in the Texas-Mexico border region.

**Problems/issues encountered**

There were two major problems in conducting the research for this project, First, the actual gathering of data seemed to require more one-on-one types of research than anticipated. Thus, these efforts required an enormous amount of time, in lieu of data gathered from a well- represented mail survey. Second, the data from Mexico was, primarily, not available and the information that was gathered was rendered too minimal to reflect an accurate representation.

**Research findings**

Our efforts were largely directed by some basic research questions that asked:

How available is environmentally-related information?
In what forms does this information exist?
What role does technology play in the information dissemination process?
What explanations are there for better understanding the issue of information exchanges?
What are the next steps to enhance environmental information flows?

*Website Assessments*

There is no denying that the development of the internet has had a profound effect on how information is accessed and shared. However, the internet has not been a cure-all that erases problems between information haves and have-nots. In fact, the quantity of information and the concerns for quality control have brought about new problems. To address these concerns an evaluation of 84 websites was conducted as an initial part of this project using an evaluation instrument that considered several factors including:

- Language
- Interactive abilities
- Access to other sites and data via hotlinks
- Specialized software needs
- Access to data
- Personnel listings and contact information
- Information on the Texas-Mexico border
- Level of knowledge necessary to use and understand what is presented.

Forty-five U.S.-based, thirty-one Mexican-based and eight Canadian-based websites were considered. Only 15, or less than 20 percent were in a bilingual format, a critical gap in sharing knowledge in the border. In addition, the majority are U.S.-based. The latter, we can safely say is a function of the level of sophistication in the United States internet market and level of service available, as well as a technical gap that exists between the developed and developing worlds. We also found that less than forty percent (36.9%) of the sites we assessed had border-specific knowledge and data, and over 15 percent did not carry-data or relevant knowledge per se, but served only as contact points. Despite the large set of border problems, the net is not experiencing a wave of use or web-based presentation of data from one perspective, while at the same time it is growing and presents opportunities that need to be more fully explored in the next few years, a point to which we shall return.

The information available on the sites we assessed varies. On a positive note, nearly ninety percent (86.9%) have hotlinks, enabling browsers to access other sites and sources of information. However, with this access comes the need to better organize data to insure that such links are not randomly incorporated and that links to other sources include integrity or quality control measures. Interactivity is also present in one half of the sites, an increasingly important characteristic of websites that enhances their usage, especially their educational values. However, we also found most sites did not allow for downloading data (70.2%) which limits, in some ways, the potential use of data. Given the great geographic expanse of the region and the need to have interested parties increase their communication among each other, it was sad to find that less than 50 percent (48.8%) of the sites had personnel directories that would increase access to interested parties.

Overtime, most users of the internet have become frustrated with sites that are cumbersome and difficult to use. User-friendliness has become the buzzword associated to this problem. In looking at the set of websites we found 11 to be very friendly and not requiring more than a general knowledge level, and that most sites were friendly, but required a college level knowledge. A full 20 percent were useable, but not especially friendly. While little may be said about this from a policy perspective, it is important to remember as we move forward and attempt to bring these knowledge resources closer together that ease of use to a broad range of users will be a critical factor in determining the success of the internet as a tool for policy advocates in the future.

### *Organization Survey*

As the next step, a survey was conducted in both locations. The survey explored how organizations working in the border region of Texas and Mexico access, produce and distribute information to the general public. While the general public has access to the web, the role that local organizations, both public and private, for-profit and not for profit, play in information development and dissemination, is, in many ways, still at the core of how information flows to the general public.

The survey was prepared in a bilingual format and explored issues relating to technical capabilities, organization structure, data development, production and dissemination. The surveys were collected in El Paso (21), Ciudad Juarez (24), Brownsville (23) and Matamoros (3). The survey included 34 questions and asked, in considerable detail, about information related services. Overall, the findings bring out a few key issues. First,

the majority of organizations is using generally recognized computer platforms and software, including windows formats, and maintain access to the Internet. The majority of the respondents reported that information is best provided through community meetings and government publications, however, in Mexico government entities were the primary respondents, thus somewhat over-favoring this outlet. Workshops, public hearings and news and magazine articles are also noted, suggesting that no one format is preferred and that multiple avenues exist for providing information to the public.

One of the more interesting findings was that a number of organizations (40%) were, in fact, producing their environmental education materials in-house and that 44 percent do so in a bilingual format. We also find that most groups build in a feedback mechanism and run their efforts on minimal funding and often with minimal or no assigned staffing.

Accessing data is also critical for ascertaining the degree to which a viable network exists. When asked what were the best locations for the general public to access information, universities, public libraries, environmental education/resource facilities and government agencies topped the lists. Surprisingly, while newspapers and the mass media have, historically, proven to be the most utilized sources of information in numerous studies, there value in the border environment is viewed as being considerably lower. One explanation for this may be the role that universities assume in an area that has low education levels and also the fact that in Mexico, in particular, and to a lesser extent on the United States side, government plays a major role as a function of the political system and a high reliance on government programs in health and infrastructure.

Organizational collaboration about environmental issues was strongly desired by nearly 90 percent of the respondents (88.9%) primarily to avoid duplication and to better share information. The needs of the region are great and every effort to better coordinate more, and compete less, can be viewed as critical to improving efforts on both sides of the border is a theme repeated in both locations.

Overall, it can be said that little difference was exhibited in the two locations of the study. Moreover, efforts to coordinate would seem to be well accepted by most entities. Yet, resources to actually coordinate, either money or personnel, are limited and will continue to play a role in restricting opportunities.

### *Sources of Information*

One of the key issues in determining the extent of a network and the way in which information flows to the general and special interest publics is by reviewing the available sources (see Part III, VII. IV. and Part V, IX. Appendices D. – G of Final Report). In both locations we developed extensive lists of entities that develop and disseminate environmental information. These lists include: special interest; utilities; the mass media; and, educational institutions, among others. These are indicative of the fact that there are multiple outlets that exist by which to provide or find information. Yet, there is another side to this which was not fully explored by this study, namely who does the public most often rely upon to obtain information and who do they trust among competing providers of information. A host of other studies[1] have explored this issue and concur that the public's reliance on one or more sources of information does not always correlate with their trust in those sources. To this end, we are aware that the general public relies heavily on the mass media, primarily TV

news and newspapers, and that in low income and heavy Hispanic areas radio also plays a prominent role. Yet, trust remains highest in magazines and newspapers versus television. And, it is well-documented that individuals more often than not rely and trust those sources with whom they have political aligned and or who support their ideological views. In the border region political parties are not strong and the issue of the environment, like in many other locations, has become bipartisan. Thus, it may be that this inclination in other locations may not play out the same way in the border region and the networks that exist in other places may take a less political form. Future research into this issue is required and is critical to long-term policy development.

### *Hunt for Environmental Information*

In order to obtain a perspective of how the "typical" citizen might obtain information about environmental issues, we developed a hypothetical situation "scavenger hunt" type of survey, entitled the *Hunt for Environmental Information,* and asked members of the community to tell us how they would go about obtaining information. Our scenario focused on exposure of a family member to a dangerous substance or material. While we only had 36 participants in this activity we found relative consistency among them. One third of the voluntary participants were somewhat angered by our attempt to try to measure their ability to acquire information. A lack of knowledge was generally visible in the participants, but a segment of college students who were involved pursued a number of sources, including clinics, websites, manufacturers hotlines and the like. Our experience leads us to point out that these findings are not unexpected.[2] A younger cohort, such as college students, has been exposed to environmental education throughout their primary and secondary education in the U.S., and to a lesser degree in Mexico. Consequently, they are beginning a search for information based on a higher initial knowledge set and a greater proclivity to support environmental actions. By contrast older individuals who did not receive similar training are apt to find frustration in accessing environmental information, a fact clearly visible in the Hunt for Environmental Information survey.

### *Explanations and Policy Implications*

#### *Network Theory*

The basic concern or focus of this study considered the degree to which linkages or a network exists with regard to environmental information in the border region. Network theory has been an off-again, on-again approach in the social sciences that examines relationships between individuals and groups about specific issues or groups of issues. Yet, despite that it is seldom employed, it seemed appropriate to our goals. Our analysis based on network theory is interesting. First, it is clear that the two regions are not closely linked, which may be a function of geography and the nature of the issues within each region – an agriculture economy and its by-products in the southern reach of the Rio Grande and industrial conditions in the north. Also, no links to Laredo/Nuevo Laredo, a middle reach even emerged. Thus it appears that sub-networks are in existence and act independently. Secondly, the networks are weak. They include an attentive public that has been attracted to environmental concerns, but the public-at-large is not fully incorporated into environmental activities. The most elegant explanation of this lays in the region's socio-economic status.

The border region remains one of the poorest in the United States. Subsequently, those who reside in the region are struggling to meet their most basic needs – food and shelter. Numerous studies have shown that the public's interest in environmental concerns rise only as a result of direct exposure to a problem or with income.[3] The latter results in many residents of the region simply not having interest in the environment as part of their individual and/or group agenda. Moreover, without basic education, a factor also prevalent in the region, these individuals cannot participant at the level of discussion that prevails about environmental issues.

As a result, the environmental information that does exist is based in government or quasi-government institutions and special interest groups that have the mandate and/or wherewithal to participate in environmental issues. Thus, even despite numerous and significant efforts to enhance the public's role, it remains problematic and environmental information is more likely to be exchanged among elites in government and special interest groups than among the general public. The network then becomes more narrowly defined and must expand based on other criteria that will overcome some of the region's endemic problems of poverty, including a rise in income and education levels. However, these problems become a double-edged sword in a region where the economy is based on comparative advantage of low labor costs that by continental standards has led to the region's growth. Thus, unless a shift in the economic base occurs, which would result in a majority of positions being significantly higher levels, the region is left with a damned-if-you-do-damned-if you don't option. For instance, education and income could increase and lead to out-migration, or damned if you don't, leaving the status-quo in tact and the set of contemporary problems in-place.

*Policy Perspectives*

In order to address the policy questions that arise out of the need for enhanced information sharing in the border region, we operate under the assumption that knowledge about the general public's opinions concerning contemporary issues is important to the health of a democracy, and that the public has the ability to understand issues and participate in them fully. In addition, this view assumes that the public has the capacity to deal with complex issues, such as those associated with the environment, particularly if there is adequate motivation.[4]

This school of thought is particularly important to risk management and the efforts that accompany that effort, that include information dissemination, inasmuch as the scientific and technical nature of the program should not become a screen behind which activities are conducted outside the public interest.[5] As greater concern for informing the public has brought about fundamental change in much of the way government does business, an interactive exchange process is required in order to exchange information among individuals, groups and institutions, not only within nations but, across national boundaries where resources are shared.[6] As former-EPA Administrator William Reily noted while leading a major public-interest group, conflict and confusion over risk questions is primarily an inability to get the position or preferences of one or more groups understood.[7] Thus, an important first step is to involve the general public -- the body politic-- into the process. While the era of town hall meetings is all but forgotten except in a few places in the nation, communitarianism--the energizing of communities to work out their own futures, with people

coming together to express their concerns, to set the agenda and take action-- is achievable.[8] While it inconceivable to include everyone in the policy process, either as a result of geographic restrictions or lack of interest on the part of many or because of the differences that obtain when two nations share resources, the opinions of the community are, in many ways, the fundamental building block for bridging the gap between the technical elite, political elite, activists, and the general public. Put another way, an understanding of public policy issues requires a database about the public, in the same way that a political candidate explores the electoral atmosphere. Therefore, the public policy process cannot proceed without some knowledge of the general public.

In this regard, our knowledge of the level of knowledge that exists among the general public is scant and existing networks do not seem to be aimed at a broad segment of the population. Instead, an attentive and activist segment, in cooperation with the science and technical community, are the major users, subsequently beneficiaries are not broadly distributed among the general public. Unlike other areas that are more affluent, efforts to increase the public's knowledge and subsequent participation in environmental issues will take a greater effort and involve a different set of distributors. Put simply, the network's inherent weakness requires genuine creativity and new thinking that, most probably, should build on those grass roots efforts that have registered success. If, as Amory Lovins argues, "ordinary people are qualified and responsible...",[9] they are likewise responsible for demanding that their views are regularly and routinely incorporated into issue analysis, but it may well be that they have been so disenfranchised and outside the policy process for so long that they need a near-literal hand-holding.

The other choice we face, if the public is lacking the requisite training and background necessary for understanding complex technical policy questions, is that those in a position to compete on the technical and scientific levels required by the issues are, as a result of the canons of democratic society, the representatives of the public, whether activists, specifically chosen to represent a set of interests, a.k.a., plurism[10] or elites well-versed in the issues or policy makers holding roles as a result of expertise or electoral victory.[11] However, this would only perpetuate the existing network and, consequently, not enhance the public's role. Thus, the position of the general public becomes the baseline for further action by citizens groups, public institutions and individuals, consistent with the idea of communitarianism. By contrast the option is that a gap increases away from the community in favor of a policy elite.

Yet, we argue that reliance on a technical or activist elite is not in the best interest of the border community, despite the short-term reality that the arena is so dominated. Additionally, in an era of knowledge explosion, the efficacy of developing public input is challenging, requiring an understanding of who is trusted and distrusted in a particular issue arena,[12] even when the issue is highly politicized. To date, identification of trusted sources is hampered by technological and cultural dimensions unmatched in almost any locale. Thus, future steps require we consider what are the most trusted and most relied upon sources of information about the environment so that we may increase our capabilities and the public's subsequent capacity to address environmental concerns.

Because of the complex technological and scientific aspects of policy issues facing citizens, especially in post-industrial societies today, demands for more public participation and citizen action is heightened in nearly every instance,[13] and mandated in others as the

result of policy changes such as the National Environmental Policy Act (NEPA). While this is primarily American in its focus, it does suggest that as a nation like Mexico increases its support for environmental regulation and control, as evidenced by the NAFTA side-accords on the environment, among other actions, the public role can be enhanced through participation, thereby reducing public ignorance, and creating increased salience which the general public attaches to a particular issue.

Our experience suggests that even with a broad level of interest in the environmental activities and belief in the efficacy of the public participation process does not manifest itself in individual citizen actions. A vast majority of the public never attend or participate in a public meeting and believe that government officials do not desire their participation in the decision making process. There remains a small segment of the population who has actively participated through meetings, public workshops, and the like. In contrast to those who believe in public participation and citizen action, but fail to exercise their opportunity to get involved, this small, albeit important component of the population, believe it is important to voice their opinions and preferences. In general, it is viewed as not being rational for individuals to participate in the decision making process either by voting or becoming knowledgeable, hence producing "rational ignorance" about the issues at hand.[14] Because of the time involved and the myriad pressures on already complex lives that symbolize post industrial society, it is not rational to incur the costs of obtaining information about all public policy issues. As a result, there is broad reliance on elected officials and experts, a.k.a. elite, and activists serving in behalf of interested, yet less-devoted group members, a.k.a. pluralism. If, however, individuals come to believe the stakes are high enough, the costs of obtaining information and participating in a particular public policy issue are lessened. In this condition, which exists for a small, yet important part of the population, rational ignorance is not operational, and participation is in evidence. It is at this level, regardless of how hard it may be to identify these individuals, that networks, indeed already exist and need to be better identified and linked more closely. In this regard, data base development for data base sake, results in one more clearinghouse that services those already in the policy process. Instead, we need to find methods for expanding existing networks in the region. Key to this is database development for identified or specified policy purposes and expansion into the most likely venues for dissemination for the current generation, and, let us add, the next generation. More than likely, the internet and mass media in its variety of forms will dominate this future.

### *Environmental Risks: An Opportunity?*

Risk assessment is a multi-disciplinary method that involves the input of both the hard and soft sciences and is, in large part, a product of actions that result in stimulating the policy process. As such, it relies heavily on the information available to those adversely impacted by any variety of activities. "Hard" and "soft" versions of risk assessment provide variations for systematically investigating potential risks. While hard versions rely on probabilistic statements and quantifiable dimensions associated with risks, the soft version is based on the premise that risk is multi-dimensional and represents the confluence of public values and attitudes and underscores information exchanged within the public domain.[15] This soft ranking is more impressionistic than expert rankings and incorporates the qualities of

uncertainty, lack of information, and fears prevalent among the general public. A cursory view of this soft approach, which exists widely through methods employed by survey research, would suggest a straight-forward approach. Simply put, ask people their probability estimates of an event and compare it to the best estimates of the science community.[16] However, the range of cross-cutting effects on public perceptions of risk and the dynamic nature of public opinion, coupled with the problems of public comprehension of complex policy questions quickly clouds the horizon.[17] In addition, the political process often seems to overwhelm the contributions of science to risk activities. Realizing this, Freudenberg contends that risk assessment "calls for input from the social and behavioral sciences..." and, in particular, their "...contribution is generally seen to lie in the area of risk communication, risk perception, and risk management."[18] The ability to manage through a network that is more inclusive of both the general public, versus activists and experts/elites, and has more geographic links throughout the region is a first step in the management of risk and its subsequent or parallel communication to the general public or vice-a-versa.

Collection of data bases for data base collection purposes without consideration of what can be done with data on a region-wide level will not take us far and while it will help to document problems, the record of the past decade indicates we have not really accomplished much in the way of enhancing data useage through policy development. In this regard, while risks abound, we are not systematically moving forward in a way that marks the use of information that is useful for solving more than small problems in one location. In the arena of air, water, soils and food, piecemeal approaches will not lead us to an information network that require large concentrations of resources, thus the risks we have discovered must be linked regionally, not locally, to gather the political momentum that will develop long-term support from those levels of government that are able to come to the table. Without this "networking," risk perceptions, unlike probability estimates of hard risk analysis, will be based on fears, feelings of unfairness and a feeling that no control exists among one or more segments of society affected by some activity resulting in a series of fruitless activities that will settle few, if any, disputes and policy versus pushing it forward.

Regardless, of our best efforts, there remains a problem in the study of risks perceptions, namely that social scientists have found that people tend to ignore highly destructive hazards, such as living in a flood plain (evidence the flood along the riparian lands of the Mississippi and its tributaries in the past five years), a hurricane-prone barrier island (seen in Hurricane Hugo, 1989; Andrew, 1993; Erin and Opal, 1995) or on a major earthquake fault (California, 1993; 1994). Additional voluntary risks such as driving an automobile, smoking or improper diet are rationalized as providing greater benefits than costs.[19] Wildavsky and Dake[20] suggest that some individuals accept and in fact seek high risk, but in general we feel laypersons are most likely to base their perceptions on what they have seen or hear, or concur with others with whom they concur on the majority of issues.[21] Recalling what one has heard also allows for simplification of complex issues and allows for association with some recognized source of expertise (i.e., the media, elected officials, university researchers).[22] Overall, public perceptions may not be rationally derived, but this does not mean they are incorrect,[23] nor does it mean they are not real policy problems that risk assessment and risk management programs can dismiss. Yet, until that can be addressed systematically and in the broadest regional context possible, risks will continue to be outside our routine information dissemination efforts, and will sporadically come to the fore (i.e., the Sierra Blanca

controversy). Instead, as we discover risk, we must develop forward thinking, little of which is apparent in information that is available in the region or in most discussions. Moving information into a future thinking mode would do well in moving the multiple agenda of environmental problems forward versus reactive approaches on which there is an easy political escape that we are over-reliant upon.

## Conclusions

This project has provided a preliminary view into the pattern of information in the region and we feel leads us to ask more questions than provide answers. It demonstrates that the public has not been fully incorporated into information, and that activism remains in the hands of a small group and overly in the hands of a technical elite, especially in Mexico. Concerns that policy and decision makers must recognize and address, include diversity which may result in a classic clash over the proper role of information, its access and its use. This perspective differs in the United States and Mexico, as the federal presence in policy varies in each regime. Consequently, demands for regional autonomy on both sides provides as avenue for moving forward, but this will not be done without considerable resistance from centralized environmental agencies in Mexico City and Washington.

A number of issues also muddy the waters. Public source reliance in addressing complicated policy issues, and the degree to which these sources are trusted by the general public, appear inconsistent. While identification of the most trusted information sources may assist in efforts to educate the public, the identification of information providers and to what degree they are trusted are also important for policy and decision makers in order to enhance their ability to maximize the information dissemination processes.[24]

In addition, the policy process is loaded with cases and issues where recognized controversy exponentially has expanded into ideological and political stalemate or gridlock resulting in a lose-lose situation. Recognizing the potential conflict to the border region as a result of high-levels of perceived risks, debates about the proper future mission of the facility and the complications compounded by other issues, such as growth in the maquiladoras, is paramount. Individual forces preferring one set of alternatives over another can be expected to join through collective action not only to economize their efforts, but to use their collective clout to speak-out for their view of the "public interest" and to dominate, when the information flows. Opposing forces will be made up of sets of individuals who also hold like attitudes and characteristics, a fact documented throughout the extant literature of public policy and public opinion.[25]

## Recommendations for further research

Based upon the study data, the overall environmental information network is weak, sporadic and not well understood in the border region. In response to these factors, the following prescriptions are recommended:

- Knowledge of trust in sources of environmental information needs to be documented.
- Realize that the internet and other sources are likely to emerge quickly as the mechanism for linking or networking the region.
    - The technology gap in Mexico can be expected to close quickly.

    - Technology will close the geographic problem and allow for more region-wide solutions.
    - Sharing information must become routine.
- Risk perception and risk communication knowledge in the region must be better understood.
- A policy-oriented clearinghouse that assists in developing protocols for information collection and dissemination must be developed.
- Policy-orientations must be region-wide and future-oriented.
- SES realities should become a secondary focus resulting in one or more actors taking on a disproportionate burden in problem solving and information dissemination.
- Generational support for environmental protection must be built upon using youth interest in the environment as a key conduit for information dissemination.
- Bi-lingualism should be a non-issue simply a matter of presenting information.

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**Benefit of research project**

This research project provided an opportunity for two students to be involved in a binational issue that benefits their individual study program. Also, the project's research and analysis efforts provided heuristic value for future research.

**References**

[1] Conary, Janet. S. and Dennis L. Soden. 1996. "Science as Reflected in Public Images: Nuclear Issues and Symbolism," in Dennis L. Soden (ed.), *At the Nexus: Science and Public Policy*. New York, NY: Nova. Science Publishers; Soden, Dennis L. 1990. *Managing Florida's Coastal Resources: Technical Complexity and Public Attitudes*. Gainesville, FL: Florida Sea Grant College; Pierce, John C. and Nicholas P. Lovrich. 1986. *Water Resources, Democracy and the Technical Information Quandary*. Millwood, NY: Associated Faculty Press.

[2] Steel, Brent S. and Dennis L. Soden. 1989. "Acid Rain Policy in Canada and the U.S.: Attitudes of Citizens, Environmental Activists and Legislators," *Social Science Journal*, Vol. 26 (1): 27-44.

[3] Steel, Brent S., Dennis L. Soden and Rebecca L. Warner. 1990. "The impact of Knowledge and Values on Perceptions of Environmental Risk to the Great Lakes, " *Society and Natural*

*Resources*, Vol. 3: 331-348; Soden, Dennis L. 1990. *Managing Florida's Coastal Resources: Technical Complexity and Public Attitudes*. Gainesville, FL: Florida Sea Grant College.

[4] Oppenheimer, Joe A. 1985. " Public Choice and Three Ethical Properties of Politics," *Public Choice,* 45: 241-255.

[5] Breed, Warren. 1971. *The Self-guiding Society*. New York, NY: The Free Press; Etzioni, Amitai. 1968. *The Active Society*. New York, NY: The Free Press.

[6] Bath, Richard C. Ronald Ketter and Dennis L. Soden. 1998. "Ecosystems Management in Border Regions: Finger-pointing through Scientific Management or the Tragedy of the Commons Revisited,? In Dennis L. Soden, Berton L. Lamb and John R. Tennert (eds.), *Ecosystems Management; A Social Science Perspective.* Dubuque, IA: Kendall-Hunt Publishing Co.; National Research Council. 1989. *Improving Risk Communication*. Washington, DC: National Academy Press.

[7] Reilly, William. 1987. "Foreword," in Proceeding of the First National Conference on Risk Communication. Washington, DC, vii.

[8] Rivlin, Alice. 1994. "Rationalism and Redemocratization: Time for a Truce," in in Adam M. Finkel and Dominic Golding (eds.), *Worst Things First?* Washington, DC: Resources for the Future.

[9] Lovins, Amory. 1977. *Soft Energy Paths*. Cambridge, MA: Ballinger.

[10] Pluralism may be viewed as responsiveness based on the notion that groups can best represent the concerns of the general public. Activists, the manifestation of pluralism, representing organized interests in society serve on behalf of the general public because the general public abstains from active involvement, and, thus represents interests and serve as an indispensable half-way house in American democracy (Orr, 1979: 1041; Olson, 1965; Truman, 1951).

[11] Elite theory suggests effective government must give way to well-informed decision makers who can serve and act on behalf of an ill-informed and often irrational mass public (Kriesberg, 1949; Glen, 1972; Presthus, 1974). More recently, the lack of understanding about technical issues has also suggested a role for elite representation in the policy process (Ophuls, 1977: 158-161), especially in conjunction with risk analysis (Hornstein, 1994: 150-151; Belzer, 1994: 171).

[12] Freudenberg, William R. and Eugene A. Rosa (eds.). 1984. *Public Reaction to Nuclear Power*. Boulder, CO: Westview Press; Freeman, D. 1974. *Technology and Society*. Chicago, IL: Markham.

[13] National Research Council. 1989. *Improving Risk Communication*. Washington, DC: National Academy Press; Steger, Mary Ann E., John C. Pierce, Nicholas P. Lovrich and Brent S. Steel. 1988. "Information Source Reliance and Knowledge Acquisition: Canadian/U.S. Comparisons Regarding Acid Rain," *Western Political Quarterly Journal*, Vol. 41 (4): 747-764; Peterson, James C. (ed.). 1984. *Citizen Participation in Science Policy*. Amherst, MA: The University of Massachusetts Press.

[14] Downs, Anthony. 1957. *An Economic Theory of Democracy*. New York, NY: Harper and Row.

[15] Finkel, Adam M. 1994. "Should We---and Can We---Reduce the Worst Risks First?," in Adam M. Finkel and Dominic Golding (eds.), *Worst Things First?* Washington, DC: Resources for the Future.

[16] National Research Council. 1989.
[17] Conary and Soden, 1996; National Research Council, 1989: 226-228; Pierce and Lovrich, 1986.
[18] Freudenburg, William R. 1988. "Perceived Risk, Real Risk: Social Sciences and the Art of Probabilistic Risk Assessment," *Science*, Vol. 242: 44-49.
[19] English, Mary R. 1992. *Siting Low-Level Radioactive Waste Disposal Facilities: The Public Policy Dilemma*. New York: Quorum Books; Zeckhauser, Richard J. and W. Kip Viscusi. 1990. "Risk within Reason, " *Science*, Vol. 248: 559-564; Rothman, Stanley and Robert Licther. 1987. "Elite Ideology and Risk Perception in Nuclear Energy Policy, " *American Political Science Review*, Vol. 24: 883-904.
[20] Wildavsky, Aaron and Karl Dake. 1990. Theories of Risk Perception: Who Fears What and Why?," *Daedulus*, Fall: 41-66.
[21] Steel, Brent S. and Dennis L. Soden. 1989; Lovrich, Nicholas P., John C. Pierce and Annabel Cook. 1979. "Public Policy, Public Opinion and the Technical Information Quandary," in William J. Grenny (ed.), *Utilizing Scientific Information in Environmental Quality Planning*. Minneapolis, MN: American Water Resource Association.
[22] Freudenburg, William R.1993. "Risk and Recreancy: Weber, the Division of Labor, and the Rationality of Risk Perceptions," *Social Forces*, Vol. 71 (4): 909-932; Lindell, Michael K. and Ronald W. Perry. 1990. "Effects of the Chernobyl Accident on Public Perceptions of Nuclear Plant accident Risks," *Risk Analysis*, Vol. 10 (4):485-497; Slovic, Paul. 1987. "Perceptions of Risk," *Science*, Vol. 236: 280-285; Slovic, Paul. Baruch Fischhoff, and Sarah Lichtenstein. 1979. "Rating the Risks," *Environment*, Vol. 21 (3):14-20, 36-39.
[23] Rothman and Lichter, 1987.
[24] Soden and Conary, 1991: 364.
[25] Kuklinski, J.H., D.S. Metlay and W.D. Kay. 1982. "Citizen Knowledge and Choice on the Complex Issue of Energy Policy, "*American Journal of Political Science*, Vol. 26: 615-642; Lovrich, et al., 1979.