Electronic Democracy and Environmental Governance: A Survey of the States

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Abstract

Just as information technology is rapidly changing how we work, shop, and play, it is changing how we practice democracy. This paper focuses on one area where the Internet is broadening public participation in governance: the administration of environmental laws and regulations. It describes a survey of how each of the 50 states is using the Internet to provide citizens with environmental information, gather public input on agency decisions, and foster networks of interested citizens. As "laboratories for democracy," the states may be the source of ideas and experience that anticipate how environmental governance at all levels of government will change over the next decade.

The survey results suggest that electronic democracy in state-level environmental decisionmaking is in an early and experimental phase. All state environmental agencies have Web sites and most provide substantial amounts of information on-line. However, opportunities for active on-line interaction between citizens and government, as well as among citizens themselves, are quite limited. Relatively few states, for example, allow citizens to comment on proposed rules electronically. Overall, the survey suggests that it is a good time for states to learn from each other as more innovative states push the envelope of what technology allows and more cautious states continue to adopt basic features as decision-makers become convinced of their efficacy.

Key Words: public participation, electronic democracy, Internet, state government, electronic rulemaking

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Introduction

The number of U.S. households with computers has cleared the 50% mark and over 40% of all U.S. households are now connected to the Internet. Information technology is rapidly changing how we work, shop, and play. Increasingly, it is also changing how we practice democracy. Although the representative system outlined by the Constitution's framers seems to be under little threat of revolution from the electronic plebiscites envisioned by some direct-democracy enthusiasts, the Internet is changing the rules of politics, policymaking, and civic engagement in interesting and varied ways.

Intriguing anecdotes about the impact of the Internet on democracy abound. The March 2000 Arizona Democratic presidential primary was the first large-scale election using on-line voting. On the Republican side of the primaries, John McCain shocked political analysts by raising $6 million on-line. As of mid-2000, 1 million people had registered electronically to vote and another 5 million were expected before the November 2000 elections. Numerous private companies—such as Speakout.com, Voter.com, and Grassroots.com—have sprung up to solicit citizens' opinions on-line and transmit them to lawmakers. Advocacy groups have also harnessed the networking capabilities of the Internet. For example, the American Heritage Forests campaign, seeking to restrict road building in national forests, recently generated 170,000 emails to the White House.

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While electoral, legislative, and advocacy politics have grabbed many of the electronic democracy headlines, the Internet has been affecting public involvement in administrative decision-making as well. In March 2000, the U.S. Department of Agriculture (USDA) initiated what it claimed to be the first fully electronic rulemaking conducted on the Internet. In its first week, the USDA Web site received over 23,000 hits.[1] The U.S. Environmental Protection Agency's (EPA) Web site has gone from receiving around 10 million hits per month in mid-1997 to nearly 100 million hits per month in mid-2000. Indeed, it may be at the administrative level where we see some of the most interesting adaptations of traditional citizen engagement to the Internet age.

The Internet does promise something new for administrative governance. As on-line access to EPA's Toxics Release Inventory (TRI) database has made clear, the Internet can make available detailed, localized, and customized information in ways that were, for all practical purposes, impossible before. By eliminating geographical barriers, it also has the potential to allow government to reach out to, and hear from, people who would not normally participate in person. With its networking capabilities, the Internet can also connect citizens to each other, making it easier to organize and act on shared concerns.

This paper, which is part of a larger project to examine the impact of the Internet on public participation in environmental decisionmaking, focuses on how the 50 states are using the Internet to engage citizens in environmental governance at the administrative level. As "laboratories for democracy," the states may be the source of ideas and experience that anticipate how environmental governance will change over the next decade.

The basis for the paper is a state survey conducted by the authors, which sought insights into how state environmental agencies are harnessing the Internet for citizen involvement. The survey followed two steps. The first was an analysis of each state environmental agency's Web site. Using a list of features and a coding template, researchers sought to identify the extent to which state agencies had employed a variety of mechanisms to engage the public, from the provision of environmental information to opportunities for actual on-line interaction with

[1] Although they are the most common way to describe traffic on a Web site, counts of "hits" offer only a very rough insight into the number of actual visitors to a site. Depending on how a site (or a user's computer) is set up, one visit by one person may be recorded as multiple hits. Moreover, one user visiting the same site over a period of time will be recorded as multiple hits. How to interpret hit data is one of the many difficulties of understanding how participatory features of agency web sites are actually being used by the public.

agency personnel and other citizens. The second step involved a series of conversations with agency personnel in the nine states with Web sites that employed the most impressive suite of electronic participation features. These conversations were focused in terms of content but open-ended regarding the answers sought; the goal was to identify common themes regarding the deployment of electronic participation mechanisms by agencies.

The survey focused on the "supply side" of electronic participation—that is, the kinds of opportunities agencies are providing to engage citizens. It dealt far less with important "demand side" questions, such as whether more people are participating, whether new voices are being heard, or whether the digital divide means that certain voices are being excluded. These are all questions that will be tackled in our future research on electronic democracy.

Overall, the survey results suggest that electronic democracy in state-level environmental decisionmaking is in an early and experimental phase. All state environmental agencies have Web sites, and most states seem to be well along in providing environmental information to their citizens. Opportunities for on-line interaction with government and among citizens, however, are quite limited. Overall, it appears to be a good time for states to learn from each other about how to employ basic participatory features and to experiment more broadly with on-line engagement. In our discussions with state agency personnel, a number of themes emerged that are relevant to this effort:

- pressure for increased on-line participation comes from inside and outside of agencies, but successful on-line initiatives require strong support from senior management;
- several states are making their Web sites more interactive, although concerns about interactivity have emerged;
- on-line notice and comment rulemaking is emerging as a key interactive feature and on-line input is being treated the same as off-line input;
- on-line initiatives are increasing pressure for bureaucratic integration and creating pressure to prioritize spending within agencies;
- there is quite a bit of enthusiasm about on-line initiatives but little systematic evaluation of them; and
- agencies are increasingly realizing the need to promote their Web sites to the public.

The discussion that follows deals first with the Web site survey and then with the conversations with agency personnel. The final section draws conclusions from the study.

Web Site Survey

The survey examined the Web site of each state's environmental protection agency. Of particular interest were opportunities for on-line access; that is, the ability of the public to do on-line what they had in the past only been able to do in person, on the phone, via mail, or not at all. Each Web site was reviewed for eight elements, separated into two categories. The first five elements cover information provision—that is, the one-way presentation of information from the agency to the public. These elements were:

- on-line access to laws and regulations,
- on-line access to information on general environmental problems,
- on-line access to information on state environmental conditions,
- on-line access to information on regulated facilities and toxic releases, and
- information about opportunities for on-line and off-line public participation.

The second category was interactive participation, which refers to the ability of the public to interact on-line with agency personnel as well as with other citizens. The interactive elements examined were:

- the opportunity for citizens to provide input to the agency on-line,
- the ability to comment on regulations on-line, and
- the ability to communicate with other citizens on-line.

For each state, the review and evaluation process took about two hours. It focused exclusively on environmental agencies, which went by a variety of names including departments of environmental protection (DEP), conservation (DEC), quality (DEQ), management (DEM), and ecology. (For a complete list of agency Web sites, please refer to Appendix A.) In cases where the environmental agency was part of a larger agency—of natural resources or health, for example—we assessed only the environmental division's portion of the Web site. For each site, the review and evaluation process focused on the main home page and each page immediately accessible by a link from the home page. Opportunities for on-line participation observed on these first two levels were investigated at greater depth. States were given a score of high,

medium, or low for each of the eight elements discussed above (Appendix B describes these scores in detail).

To check the quality of the data, state Webmasters were sent an email describing the project along with results of the survey for their state.[2] They were asked to review the information and respond with any changes or additional information. After a week, a follow-up email was sent. Thirty-three responses were received, for a response rate of 66%. Data reported on the remaining Web sites are based only on the initial survey. Information from the survey is current as of March 2000.

The results of the Web site survey are shown in Table 1. States are ordered by the quality of their Web site, according to our criteria. The following sections present the elements reviewed in detail.

[2] In the cases where no Webmaster was identified, the email was sent to either a "comments", "feedback", or "info-request" link.

Table 1. Survey Results for State Environmental Department Web Sites

Scores: ●=High ◒=Med ○=Low **State**	**Access to laws and regulations**	**Access to information on environmental problems**	**Access to information on state environmental conditions**	**Access to information on regulated facilities and toxic releases**	**Access to information about opportunities for public participation**	**Opportunity to provide input**	**Ability to comment on regulations**	**Ability to communicate with other citizens**
Pennsylvania DEP	●	●	●	●	●	◒	●	●
Washington DEE	●	●	●	●	●	◒	●	○
Oregon DEQ	●	●	●	●	●	◒	●	○
Minnesota PCA	●	●	●	●	◒	◒	●	○
Ohio EPA	●	●	●	◒	●	◒	●	◒
South Dakota DENR	◒	●	●	●	●	◒	●	○
Wisconsin DNR/EPD	●	●	●	●	◒	◒	●	○
California EPA	●	●	●	◒	●	◒	●	○
Missouri DNR/EQ	●	●	●	◒	◒	◒	●	○
Texas NRCC	●	●	●	●	●	◒	◒	○
Tennessee DEC	●	◒	●	◒	●	◒	●	○
New York DEC	●	●	●	●	◒	◒	◒	○

Scores: ●=High ◒=Med ○=Low **State**	**Access to laws and regulations**	**Access to information on environmental problems**	**Access to information on state environmental conditions**	**Access to information on regulated facilities and toxic releases**	**Access to information about opportunities for public participation**	**Opportunity to provide input**	**Ability to comment on regulations**	**Ability to communicate with other citizens**
Vermont ANR/DEC	●	●	●	◒	◒	◒	●	○
Indiana DEM	●	◒	●	●	◒	◒	◒	○
Montana DEQ	●	●	●	◒	◒	◒	●	○
Florida DEP	●	◒	●	◒	◒	◒	○	●
Arizona DEQ	●	◒	●	●	◒	◒	◒	●
Utah DEQ	◒	●	●	●	◒	◒	●	○
Louisiana DEQ	◒	●	●	●	◒	◒	◒	○
Maryland DE	◒	●	●	◒	●	◒	●	○
Michigan DEQ	●	●	●	●	○	◒	◒	○
Virginia DEQ	●	◒	●	◒	●	◒	◒	○
Alaska DEC	●	●	◒	◒	◒	◒	●	○
Colorado DPHE	●	◒	◒	◒	◒	◒	◒	●
New Jersey DEP	◒	●	●	●	◒	◒	◒	○
Illinois EPA	◒	◒	●	●	◒	◒	◒	○

Scores: ●=High ◒=Med ○=Low **State**	**Access to laws and regulations**	**Access to information on environmental problems**	**Access to information on state environmental conditions**	**Access to information on regulated facilities and toxic releases**	**Access to information about opportunities for public participation**	**Opportunity to provide input**	**Ability to comment on regulations**	**Ability to communicate with other citizens**
Connecticut DEP	●	●	●	○	◒	◒	◒	○
Rhode Island DEM	●	◒	●	◒	◒	○	◒	○
New Mexico ED	●	◒	●	◒	◒	◒	◒	○
Kentucky DEP	●	●	◒	◒	◒	◒	◒	○
Maine DEP	●	●	◒	◒	◒	◒	◒	○
West Virginia DEP	●	◒	◒	●	◒	◒	◒	○
Georgia DNR/EPD	◒	◒	●	●	◒	◒	◒	○
Delaware DNREC	◒	●	◒	●	◒	◒	◒	○
Massachusetts DEP	◒	◒	◒	◒	◒	◒	●	○
New Hampshire DES	◒	●	●	●	○	◒	○	○
Wyoming DEQ	●	◒	◒	●	○	◒	◒	○
Idaho DEQ	●	◒	◒	◒	◒	○	●	○
Oklahoma DEQ	●	◒	◒	◒	◒	◒	◒	○
Arkansas DEQ	◒	◒	◒	◒	◒	◒	●	○

Scores: ●=High ◒=Med ○=Low **State**	**Access to laws and regulations**	**Access to information on environmental problems**	**Access to information on state environmental conditions**	**Access to information on regulated facilities and toxic releases**	**Access to information about opportunities for public participation**	**Opportunity to provide input**	**Ability to comment on regulations**	**Ability to communicate with other citizens**
Mississippi DEQ	◒	◒	◒	◒	◒	◒	◒	○
North Dakota DH/EHS	●	◒	●	◒	○	◒	○	○
Nevada DEP	●	◒	◒	◒	○	◒	◒	○
North Carolina DENR	●	◒	◒	◒	○	◒	◒	○
South Carolina DHEC	●	◒	◒	◒	○	◒	◒	○
Nebraska DEQ	●	◒	◒	◒	◒	○	○	○
Iowa DNR/EPD	◒	◒	◒	◒	●	◒	○	○
Hawaii DH/EHD	●	◒	◒	◒	○	◒	◒	○
Kansas DHE	◒	●	◒	◒	○	◒	○	○
Alabama DEM	◒	○	◒	○	○	◒	○	○

Information Provision

As the Internet becomes an ever more integral part of society, people increasingly expect to be able to access information on-line. The availability of environmental information on-line not only allows citizens to learn more about their environment, but it can provide information they need to take action to limit environmental degradation or protect their own health. Additionally, the availability of some types of information—such as data about the environmental performance of companies—has been a powerful complement to traditional regulation in motivating firms to reduce pollution. The five elements related to information provision are presented below, as well as a description of how states fared with each.

On-line access to laws and regulations

This element deals with on-line information about, and on-line access to, federal and state environmental laws and regulations. States fared very well with this criterion—70% of them received a high score, which means they have full on-line text of both laws and regulations. Some sites provide the opportunity to search for specific laws and regulations. The remaining states have at least state environmental regulations on-line, or provide a link to the state's legislative site. The Texas Natural Resources Conservation Commission (TNRCC) goes a step further by having a "Rules Tracking Log,"[3] which is a downloadable file with comprehensive information on the status of rules and regulations, plus a link for tracking legislation. Similarly, the Washington State Department of Ecology provides a "WAC Track,"[4] which allows the public to subscribe to a list to be automatically notified twice a week by email of all new postings on the department's "Laws and Rules" page.[5]

On-line access to information on general environmental problems

This element refers to easy on-line access to information on environmental problems and pollutants. The fact that 50% of states scored high and 48% of the states scored medium on this category shows that this is another area where states are doing a relatively good job. States with a

[3] http://www.tnrcc.state.tx.us/oprd/rulelog.html

[4] http://www.wa.gov/ecology/leg/wactrack/wactrack.html

[5] http://www.wa.gov/ecology/leg/laws-etc.html

high score have information on many environmental media (air and water pollution, solid waste, etc.), often with a discussion of the sources of pollutants and their potential health effects. States scoring medium have information on a less comprehensive set of environmental problems. The Louisiana Department of Environmental Quality's Web site is a good example of a high scoring site: it has a "Facts Sheets" page linked to useful information on air pollutants, lead, groundwater, household hazardous material, water issues, recycling and solid waste, and mercury.[6]

On-line access to information on state environmental conditions

State environmental conditions include current information, such as ambient air quality readings, and other state-specific environmental information, such as watershed information and fish consumption advisories. Sixty percent of the states scored high in this category because they provide easy access to current on-line information on a variety of state and local conditions, as well as information on many environmental media. For example, the Washington State Department of Ecology's Web site has maps and links to all of the state watersheds, with water quality information about each.[7] It also has a database (SEDQUAL[8]) available that contains sediment quality data for Puget Sound and allows for query and analysis.[9] Furthermore, the site has very current ambient data on air pollution and excellent river, stream, and lake monitoring information.[10] The New Jersey Department of Environmental Protection's Web site has comprehensive information and real-time data on a wide variety of air pollutants,[11] as well as a link to an interactive ozone-simulation program called "Smog City," which demonstrates how individual choices, environmental factors, and land use contribute to air pollution.[12]

On-line access to information on regulated facilities and toxic releases

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[6] http://www.deq.state.la.us/misc/factsheets.stm

[7] http://www.wa.gov/ecology/eils/wrias/index.html

[8] http://www.wa.gov/ecology/sea/smu/sedqualfirst.htm

[9] http://www.wa.gov/ecology/eils/mar_sed/msm_intr.html

[10] http://www.wa.gov/ecology/eils/#air

[11] http://www.state.nj.us/dep/airmon/

[12] http://www.sonomatech.com/smogcity/

This element deals with on-line access to information about regulated facilities in the state, including chemical companies, landfills, underground storage tanks, and Superfund sites. Forty percent of the states received high scores and 56% scored medium. States that scored high have localized data on regulated facilities and on-line access to their own version of the TRI. States receiving medium scores have information on regulated facilities available only on an aggregated statewide basis, with either no TRI data or a link to EPA's version. States that fared well on this criterion also often have databases of regulated facilities that are searchable by county, city, or zip code. For example, the Oregon Department of Environmental Quality (DEQ) has an up-to-date database called the Water Quality Facility Information System that allows the user to search DEQ's Source Information System for National Pollutant Discharge Elimination System permits.[13] This site also provides the opportunity to download the complete Environmental Cleanup Site Information (ECSI) dataset, which has information about sites with known or suspected hazardous substance contamination.[14]

On-line access to information about opportunities for public participation

While this element belongs in the information provision section, it serves as a bridge to the next section on interactive public participation. It concerns on-line information for facilitating and encouraging public participation, including information about:

- how to process Freedom of Information Act (FOIA) requests;
- opportunities to sign up for an email listserv that notifies citizens about participatory opportunities;
- opportunities to join volunteer groups on-line;
- public participation links (particularly on the homepage); and
- general information on public participation, including an explanation of the rulemaking process and directions to submit written comments.

Twenty-two percent of states scored high on this category because their sites provide easy access to thorough, encouraging information about ways to participate, while the majority

[13] http://waterquality.deq.state.or.us/SISData/FacilityHome.asp

[14] http://www.deq.state.or.us/wmc/cleanup/ecsiq&a.htm

(58%) of states scored medium because their sites have only limited information that is scattered and hard to find.

The Oregon DEQ Web page has a "public participation" link on its homepage, as well as on several divisional pages.[15] The DEQ homepage links to lists of meetings hearings, and notices; agendas for the Environmental Quality Commission's meetings; and a calendar of advisory committee meetings. The TNRCC Web site also has an entire "Citizens" page devoted to public participation, with many links to information about environmental problems and how to participate in decisionmaking.[16]

Interactive Public Participation

While on-line information provision is an important element in enhancing public participation in environmental decisionmaking, the Internet also has the potential to provide a platform for interactive public participation where citizens can communicate on-line with each other as well as with agency staff. This type of interactivity has the potential to increase the number of people who participate in environmental decisionmaking and create new networks among citizens. The next section presents the three interactive elements examined, and discusses states with interesting examples of on-line public interaction.

Opportunity for citizens to provide on-line input on environmental policies/issues

The first level of interactive participation is the opportunity for the public to send feedback and comments to agencies—to make their voices heard on-line. It does not include opportunities to send formal comments on proposed regulations, which is covered separately below. States received a high score in this category if they provide an opportunity for the public to comment on specific policies; an example would be an opinion survey. States received a medium score if they have a general "comments" or "feedback" link not associated with any particular policy issue. No state satisfied the criteria for "high," but 94% satisfied the criteria for medium. Three states scored low because they do not provide an opportunity for citizens to submit input on-line.

Ability to comment on-line on regulations

[15] http://www.deq.state.or.us/od/pp/pp.htm

[16] http://www.tnrcc.state.tx.us/citizens.html

This element concerns whether the public can comment on proposed regulations on-line. States received a high score if their site provides the opportunity for the public to submit comments on proposed regulations on-line via email or a Web-based form. A state scored medium if it has a list and dates of opportunities to submit written or oral, but not electronic, comments. Only 36% of states received a high score. Fewer than half (50%) of the states scored medium, and 14% scored low.

Most states that accept comments on-line do not appear to be actively encouraging the public to do so. The Arkansas Department of Environmental Quality's Web site is one of the few sites with links on the homepage directing visitors to opportunities for commenting on regulations electronically.[17] The Arizona Department of Environmental Quality (ADEQ), in contrast, acknowledges on its Web site that it "does not currently recommend the use of email as a means to submit formal comments."[18] However, ADEQ is accepting informal comments to the rule development section on an experimental basis.

Ability to communicate on-line with other citizens

The last element is the ability to post and read comments from other citizens, through a bulletin board, a live "chat," or some other forum. States that scored high have some type of bulletin board or conferencing ability. For example, Pennsylvania has a number of on-line discussion areas, including the "Your 2 Cents" feature, which allows people to post and respond to emails on any environmental topic.[19] However, according to agency personnel, this discussion area has been somewhat of a disappointment, as it has not received the usage that was expected.

Florida, Colorado, and Arizona were the only other states that scored high on this element (90% of the states scored low, with no opportunity to communicate with other citizens). The Florida Department of Environmental Protection (DEP) site has a feature called "Web Conferencing,"[20] which provides an on-line forum for the public to post and read comments on various topics. The Pollution Prevention Division of Colorado's Department of Public Health and the Environment has an email forum where the public can receive and post messages.[21] In

[17] http://www.adeq.state.ar.us

[18] http://www.adeq.state.az.us/lead/oac/rules.html#email

[19] http://www.dep.state.pa.us/wwwboard/your_2_cents/your_2_cents.html

[20] http://www.dep.state.fl.us/confs/webconf.htm

[21] http://www.coloradop2.org/email.htm

1999, the division also held an electronic town meeting that was described as a "computer aided, interactive discussion" about pollution prevention.[22] Arizona has an "Exchange Center", where members of the Partnership for Pollution Prevention—mainly regulated industries rather than the general public—can share information on pollution prevention initiatives.[23] As with Pennsylvania's on-line discussion area, the ADEQ Webmaster noted that the response to this exchange center has been underwhelming.

Interviews With Environmental Agency Personnel

To understand what issues state environmental agencies are facing as they develop on-line public participation mechanisms, we spoke with agency staff from nine states that received the highest scores for the quality of their Web sites' on-line public participation features. These were California, Michigan, Minnesota, Montana, New Jersey, Oregon, Pennsylvania, Texas, and Washington (please see Appendix A for state Web site addresses and Appendix C for the names of staff interviewed). The questions were general and open-ended in nature, and were designed to gain an understanding of what agency personnel felt were the advantages, disadvantages, and barriers to fostering on-line participation. Many of those interviewed were agency Webmasters or worked in information management departments. The results of the conversations are grouped below under headings outlining the main themes that emerged.

1. The pressure for increased on-line participation has come from internal and external forces, but successful on-line initiatives require strong support from senior management.

States initiated on-line participation in response to both internal and external pressure. In some states, the push came from the regulated community exerting pressure to have permitting information available on-line. For example, in 1995, a TNRCC staff member received calls from regulated firms on a weekly basis asking why an on-line bulletin board was not up to date. The regulated community was interested in more information being available on-line because it reduced transaction costs and made the permitting process more transparent. In general, pressure from the general public has been somewhat lower, but several agency staff felt that having some information available spurred public interest, leading to greater demand.

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[22] http://www.coloradop2.org/sprfrm.htm

[23] http://www.adeq.state.az.us/environ/waste/capdev/p2/exchange/index.html

In other cases the increase in on-line information availability and opportunities for interactive public participation was motivated by internal agency factors. The Pennsylvania Department of Environmental Protection (DEP), for example, improved its Web site in 1995 in reaction to criticism that the agency was not open enough in sharing information and involving the public in decisionmaking. Pennsylvania Governor Ridge, the DEP Commissioner, and senior management saw the blossoming of Internet technology as a way to improve the image of the beleaguered agency.

Regardless of what motivates agencies to initiate on-line participation, interviewees felt that strong high-level support was critical to success. In the Pennsylvania case, there was high-level support from the beginning. In many cases, however, the push for on-line participation came from front-line personnel who then needed to promote it internally. At the Minnesota Pollution Control Agency, for example, the impetus for developing on-line initiatives came primarily from front-line staff who interacted with the public on a regular basis. The most common advice interviewees gave to other state Webmasters in such situations was to garner strong understanding and support from senior management because of the need for time, money, and staff resources.

2. Several states are making their Web sites more interactive, although concerns about interactivity have emerged.

Many states are experimenting with greater levels of interactivity between citizens and agencies and among citizens themselves. For example, TNRCC is considering having on-line chats on their Web site, and the Pennsylvania DEP is planning on introducing more live Web chats and having conferences via the Internet. Although the Washington Department of Ecology does not yet have the capability for on-line discussion groups, they have a budget proposal for a pilot project in a regional office.

Despite interest in real-time interaction, some interviewees mentioned concerns about resource and control issues. An individual at Minnesota's PCA noted that unless their budget grows, an on-line chat option is unlikely due to the high maintenance required. However, in the past, PCA has worked within the confines of budget and staff restraints by partnering with another state agency (Office of Administrative Hearings) to provide for on-line comments and response regarding a proposed feedlot rule change. Staff from both California's EPA and Michigan's DEQ felt that an on-line chat would not be worth the time and resources needed. They were not sure what such a feature would accomplish and felt it would generate too many comments, making the process hard to keep up with.

Many interviewees commented on the impersonal nature of electronic communication compared to face-to-face communication. Because one cannot see facial expressions or hear a person's tone of voice on-line, some felt that comments could be more easily misconstrued. Moreover, some felt that the perceived anonymity of the Internet might lead people to say things they would not ordinarily say in person or on the phone.

Other interviewees were concerned about legal issues related to public involvement on-line. For example, some felt it was difficult to determine what constitutes an open meeting on the Internet. A TNRCC staff member pointed out that under the Texas open meetings rules for teleconferences, if one line goes down, the whole meeting is considered invalid. These rules have potentially important implications for Internet connections with an on-line conference.

3. On-line notice and comment is emerging as a key interactive feature of agency Web sites, and on-line input is being treated the same as off-line input.

In the past two years, just over 19% of the total comments submitted on proposed regulations to Pennsylvania's DEP were submitted by email. Seventeen other states also allow on-line comments on proposed regulations.

Many states that do not already accept on-line comments are thinking about doing so in the future. The Washington Department of Ecology is planning on having a database application that will manage public comments on proposed rules and draft documents, including the publication of a response summary at the end of the process. The Montana Department of Environmental Quality is also working on accepting public comments on regulations on-line.

Interviewees discussed the perceived benefits of accepting on-line comments, including the ability to respond more quickly and accurately, the reduction of costs related to paperwork, and an increase in public access to the regulations. Downsides mentioned include an initial increase in costs for hardware, software, and technical training, more pressure on the staff to respond, the loss of ideas generated by open discussions at public hearings, and the potential to disenfranchise those populations without access to the Internet.

The general consensus of staff in those state agencies that had on-line initiatives was that on-line communication was being treated the same as off-line communication. Oregon's DEQ, for example, treats emails the same as written comments, although the agency places caveats on its site noting that there is a chance that the email might get lost or not delivered. One respondent commented that a chain of similar emails is treated in the same way as a form letter signed by many people. States that currently accept emailed comments are still required to print them out

for the record. A staff member from New Jersey's DEP noted that there is a need to move away from a predominant "paper mindset."

4. On-line initiatives are increasing pressure for bureaucratic integration and the prioritization of spending.

Because divisions within an agency generally serve bureaucratic purposes that are obscure and largely irrelevant to the public, increased on-line interaction with the public is forcing agencies to coordinate across internal departments and among various state agencies. One of the interviewees' principal recommendations was for agencies to create "seamless" Web sites by breaking down barriers among programs and ensuring that all of the different divisions and programs work in the same way.

In spite of aspirations toward integration, the Web survey showed that divisional Web pages within one agency could vary considerably in terms of quality. New Jersey's Department of Environmental Protection (DEP), for example, allows on-line comments on proposed regulations, but not in any coordinated fashion across programs. Each program within the department has been doing its own way, with some allowing emailed comments while others do not. Currently the agency is trying to coordinate this process, but some divisions have been reluctant to allow emailed comments because of a lack of staff and resources.

Integration in New Jersey, however, may come from a higher source. With a push from the governor's office, the state recently launched a new statewide Web site that they anticipate turning into a "citizen portal" Web site, where the public can have easy access to state government information and services. The goal is for information technology staff from the various state agencies to work together to create a more seamless system for the public to use.

Going on-line is creating new pressures for prioritization as well as integration. Agencies are seeking to balance the desire to provide as much information as possible to as many people as possible with limited time and resources available to do it. TNRCC is currently struggling with this conflict. While some Web initiatives improve efficiency and reduce the need for staff, others increase services to citizens and require additional staff and money. A TNRCC staff member commented that it would be useful to have some guidance on priorities from the state leadership. Should the agency focus on reducing the paperwork burden for the regulated community, improving public access to the decisionmaking process, or making more information available on environmental conditions? If the priority is to increase services, then additional resources will most likely be needed. But even if the priority is to improve efficiency, some

initial investment will still be needed to build systems and implement the business process changes.

Agencies need to ensure that they have appropriate mechanisms in place to handle increases in on-line information requests. For example, after the media highlighted the issue of malformed frogs in the state, the Minnesota PCA was overwhelmed with on-line reports from citizens, because it lacked adequate staff or resources to handle the volume of reports. Washington's Department of Ecology has actually diverted resources from traditional off-line participation to on-line initiatives.

5. There is quite a bit of enthusiasm about on-line initiatives but little systematic evaluation of them.

Most of the advantages of on-line participation mentioned by the respondents involved increased efficiency. David Hess, Pennsylvania DEP's executive deputy secretary for policy and communications, felt that the amount of information available and the ease with which it can be accessed has increased dramatically with the Internet. For example, the Pennsylvania DEP Web site receives an average of 10,000 hits per day. The Internet allows people who often can not make it to public hearings or who do not hear about them to log on and participate without having to leave their homes. The Internet also allows agency staff to respond more quickly; one agency staff member commented that it was easier to handle and manage email comments than public hearing comments because the email comments were already in written electronic form.

In spite of the expressed advantages of going on-line, states have done little formal evaluation to determine how much of a difference increased information access and interactivity has made for the public and the regulated community. Many states have data on Web site "hits" but do not go further than that. In fact, there are significant barriers to collecting additional information. For example, some states are hesitant to use "cookies" to track users because they perceive it as an invasion of the public's privacy.

TNRCC and the Minnesota PCA have tried to do surveys of Web users but found it very difficult to get valid results because of problems with response rates and the self-selection of respondents. Some agencies have received informal feedback on their on-line initiatives. TNRCC has heard from its stakeholders that commenting is easier on-line, but the agency does not know if they are attracting new people. Staff from Minnesota PCA sometimes try to solicit feedback on the agency's on-line features at public hearings. Several states mentioned that

agency staff who work on the "front line" and interact most often with the public know the demand best, and would be able to at least informally evaluate initiatives.

Without formal evaluation mechanisms, rating the performance of different on-line initiatives has been difficult. The available anecdotal data are not always encouraging. Oregon's Department of Environmental Quality Webmaster said that the agency receives only about seven emails a month on its feedback link. Pennsylvania DEP's "Your 2 Cents"[24] discussion area, mentioned earlier, has not seen as much traffic as had been expected.

6. Agencies are increasingly realizing the importance of marketing to particular audiences.

Several agency staff pointed out the need to market their Web sites more often and better target their audiences. In drawing the public to their sites, agencies are competing for public attention with the likes of Amazon and eBay. Some agencies use daily news clips and an on-line weekly newsletter to attempt to sustain interest in their sites. The Pennsylvania DEP has implemented one of the most interesting strategies—it runs real-time pictures of peregrine falcons nesting on its building.[25] The falcon site received over 12 million hits from all over the world in five weeks (which the agency admitted was unusually high).

Agencies are also paying more attention to how people use their sites so that they can target Web features to particular users. Florida DEP has found, for example, that its Web conferencing feature has been fairly successful with business groups interacting with DEP staff, but it has been less successful in getting the general public involved. Washington's Department of Ecology is planning to tailor its on-line information to the particular audiences who use it most.

Conclusion

State agencies appear to be in an early, experimental phase in deploying the Internet to engage citizens on environmental issues. It was encouraging that environmental departments in all 50 states have Web sites. Many of these have been developed in the last couple of years, and many agencies are planning to expand and improve their sites. Overall, states seem more

[24] http://www.dep.state.pa.us/wwwboard/your_2_cents/your_2_cents.html

[25] http://www.dep.state.pa.us/dep/falcon/

advanced, and more comfortable, with providing environmental information to their citizens than they are in providing opportunities for on-line interaction. Relatively few agencies have quality opportunities for interactive electronic public involvement, and some agency staff expressed reservations about increased interaction.

In addition to providing new ways to communicate with the public, on-line initiatives are changing the demands placed on bureaucracies. Providing a seamless face to the public increases pressure for internal coordination and cooperation. Dealing with constrained bandwidth and other resources causes agencies to prioritize within and among different programs. Externally, the demands of various stakeholders—the general public, environmental non-profit groups, the regulated community, and legislators—are forcing agencies to be strategic in their use of resources for on-line efforts.

Perhaps as a result of these prioritizing efforts, engaging citizens on-line appears to be a considerably lower agency priority than streamlining processes aimed at the regulated community. Permitting information, business assistance centers, and the like typically overshadow on-line participation features. In some cases, even the interactive features at least partially designed to engage the public are mainly being used by regulated firms.

In spite of the cautious approach many states are taking, there appears to be consensus among agency staff that the Internet is a dynamic and efficient way of communicating with the public. Agency personnel mentioned a number of advantages and efficiencies associated with engaging people on-line rather than off-line. The enthusiasm about participation, however, has not been met with much rigorous evaluation to see whether it is warranted. Beyond counting the number of hits on a Web site and conducting some surveys, there has been little systematic analysis of who is participating electronically and why.

Our conversations with agency staff members indicate that the use of the Internet by state environmental agencies to facilitate improved public participation will continue to increase. Innovative states will continue to push the envelope of what technology allows and more cautious states will adopt basic features as decisionmakers become convinced of their efficacy. Now is the time for states to take stock of their own efforts and learn from each other about best practices as they deal with an increasingly wired public.

Appendix A: State Environmental Agency Web Sites

Alabama Department of Environmental Management (http://www.adem.state.al.us)

Alaska Department of Environmental Conservation (http://www.state.ak.us/dec/home.htm)

Arizona Department of Environmental Quality (http://www.adeq.state.az.us/)

Arkansas Department of Environmental Quality (http://www.adeq.state.ar.us/)

California Environmental Protection Agency (http://www.calepa.ca.gov/)

Colorado Department of Public Health and Environment (http://www.cdphe.state.co.us/)

Connecticut Department of Environmental Protection (http://dep.state.ct.us/)

Delaware Department of Natural Resources and Environmental Control (http://www.dnrec.state.de.us/)

Florida Department of Environmental Protection (http://www.dep.state.fl.us/)

Georgia Department of Natural Resources, Environmental Protection Division (http://www.ganet.org/dnr/environ/)

Hawaii Department of Health, Environmental Health Division (http://www.state.hi.us/health/eh/index.html)

Idaho Department of Environmental Quality (http://www2.state.id.us/deq/)

Illinois Environmental Protection Agency (http://www.epa.state.il.us/)

Indiana Department of Environmental Management (http://www.ai.org/idem/index.html)

Iowa Department of Natural Resources, Environmental Protection Division (http://www.state.ia.us/government/dnr/organiza/epd/index.htm)

Kansas Department of Health and Environment (http://www.kdhe.state.ks.us/)

Kentucky Department for Environmental Protection (http://www.nr.state.ky.us/nrepc/dep/dep2.htm)

Louisiana Department of Environmental Quality (http://www.deq.state.la.us)

Maine Department of Environmental Protection (http://www.state.me.us/dep)

Maryland Department of the Environment (http://www.mde.state.md.us/)

Massachusetts Department of Environmental Protection (http://www.magnet.state.ma.us/dep/)

Michigan Department of Environmental Quality (http://www.deq.state.mi.us/)

Minnesota Pollution Control Agency (http://www.pca.state.mn.us/netscape4.html)

Mississippi Department of Environmental Quality (http://www.deq.state.ms.us/)

Missouri Department of Natural Resources, Division of Environmental Quality (http://www.dnr.state.mo.us/deq/homedeq.htm)

Montana Department of Environmental Quality (http://www.deq.state.mt.us/)

Nebraska Department of Environmental Quality (http://www.deq.state.ne.us/)

Nevada Division of Environmental Protection (http://www.state.nv.us/ndep/index.htm)

New Hampshire Department of Environmental Services (http://www.des.state.nh.us/)

New Jersey Department of Environmental Protection (http://www.state.nj.us/dep/)

New Mexico Environment Department (http://www.nmenv.state.nm.us/)

New York State Department of Environmental Conservation (http://www.dec.state.ny.us/index.htm)

North Carolina Department of Environment, Health, and Natural Resources (http://www.enr.state.nc.us/)

North Dakota Department of Health, Environmental Health Division (http://www.health.state.nd.us/ndhd/environ/index.htm)

Ohio Environmental protection Agency (http://www.epa.state.oh.us/)

Oklahoma Department of Environmental Quality (http://www.deq.state.ok.us/)

Oregon Department of Environmental Quality (http://www.deq.state.or.us/)

Pennsylvania Department of Environmental Protection (http://www.dep.state.pa.us)

Rhode Island Department of Environmental Management (http://www.state.ri.us/dem/)

South Carolina Department of Health and Environmental Control (http://www.state.sc.us.dhec/)

South Dakota Department of Environment and Natural Resource (http://www.state.sd.us/denr/denr.html)

Tennessee Department of Environment and Conservation (http://www.state.tn.us/environment/index.html)

Texas Natural Resource Conservation Commission (http://www.tnrcc.state.tx.us/)

Utah Department of Environmental Quality (http://www.eq.state.ut.us/)

Vermont Agency of Natural Resources/Department of Environmental Conservation (http://www.anr.state.vt.us/dec/dec.htm)

Virginia Department of Environmental Quality (http://www.deq.state.va.us/)

Washington State Department of Ecology (http://www.wa.gov/ecology/)

West Virginia Division of Environmental Protection (http://www.dep.state.wv.us/)

Wisconsin Department of Natural Resources (http://www.dnr.state.wi.us/environment.html)

Wyoming Department of Environmental Quality (http://deq.state.wy.us/)

Appendix B: Criteria for Scores

1. On-line access to laws and regulations

High = listing and full text of both laws and regulations; and/or searchable

Medium = available on-line, but scattered by division; or good information about one and not the other (laws vs. regulations, etc.)

Low = only a few or none available on-line/can't find

2. On-line access to information on general environmental problems = general information on environmental problems, pollutants (source, health effects, etc.)

High = Information on many environmental media, with health effects, etc.

Medium = Information on a few media

Low = No information/can't find

3. On-line access to information on state environmental conditions = current information such as ambient air quality readings, and other state-specific environmental information (watershed information, fish consumption advisories, etc.)

High = Easy access to on-line information on variety of state and local conditions, many media, up-to-date

Medium = Statewide information, harder to find, only a few media

Low = No information/can't find

4. On-line access to information on regulated facilities and toxic releases

High = State's own toxic release information (as opposed to link to EPA's TRI data), and/or easy access to local data about regulated facilities, companies, landfills, etc.

Medium = Link to EPA's Envirofacts, etc., statewide information (not available on a local level, or local information hard to find)

Low = no information/can't find

5. On-line access to information about opportunities for public participation

High = Easy access to thorough, encouraging information about ways to participate (opportunity to join on-line) (sending comments, joining volunteer groups, etc.)

Medium = Some information but scattered, hard to find

Low = No information/can't find

6. Opportunity for citizens to provide input on environmental policies/issues

High = Can comment and review others' comments

Medium = Can email Webmaster, "comments" or "feedback" link on homepage about policy, separate from comments on the Web site

Low = No opportunity to comment/can't find

7. Ability to comment on-line on proposed regulations

High = Can email comments (all or some divisions), and/or review others' comments

Medium = List and dates of opportunities to submit written or oral, not electronic comments

Low = No opportunity/can't find

8. Ability to communicate on-line with other citizens = ability to post and read comments, have a live "chat" with other citizens, etc.)

High = Some type of bulletin board/conferencing with much use

Medium = Some type of bulletin board/conferencing with not much use

Low = No opportunity to communicate with other citizens/can't find

Appendix C: State Agency Staff Interviewed

Jeni Cram
Webmaster
Oregon Department of Environmental Quality

Marcia Danab
Public Affairs
Oregon Department of Environmental Quality

David Hess
Executive Deputy Secretary, Office of Policy and Communications
Pennsylvania Department of Environmental Protection

George Jaegers
Supervisor, Hardware/Software
New Jersey Department of Environmental Protection

Irene Kropp
Director of Information Resources Management
New Jersey Department of Environmental Protection

Bob Monn
Information Resources
Washington Department of Ecology

Greg Nudd
Web Architect
Texas Natural Resource Conservation Commission

Phil Oppenheim
California Environmental Protection Agency

Dan Rapkoch
Communications Manager
Montana Department of Environmental Quality

Ken Silfven
Press Secretary
Michigan Department of Environmental Quality

Andrea Wieland
Web Designer
Minnesota Pollution Control Agency