Water Outreach Education

Facilitating Access to Resources and Best Practices

Study of Provider Needs
November 2002

FINAL REPORT

Mark Stevens
Study Manager & Lead Author

Kate Reilly
Editor

Elaine Andrews
Principal Investigator

TABLE OF CONTENTS

APPENDICES

EXECUTIVE SUMMARY

INTRODUCTION

This project is a collaboration of the University of Wisconsin, Environmental Resources Center; United States Department of Agriculture (USDA) Cooperative State Research, Education, and Extension Service (CSREES); and other public and private clean and safe water partners to promote best education practices (BEPs) for water-management education and to improve access to education resources and strategies. The goal of the project is to increase the capacity of natural resource management and outreach education professionals to choose and use appropriate education techniques and resources in order to improve their ability to deliver water-management education programs. The objective is to build a BEP Web site that provides access to water outreach and education information, materials, and best education practices for these education providers to enhance their outreach and education efforts.

This study of provider needs is the first phase of an overall strategy for project evaluation that includes both formative and summative components. The study was designed and conducted to identify what resources these professionals currently use, how the project can make the resources more accessible, and how it can promote the use of best practices in water outreach education.

FINDINGS

The two groups of water outreach and education providers we surveyed at the Water Quality Coordinators' Workshop in Boise, ID, 11-12 March 2002 (the *Boise informants*) and via telephone (the *telephone informants*) were quite diverse. The percent of time they reported spending on outreach and education ranged from no more the 5% to 100%. Professionally, educationally, and to a lesser extent geographically, they represent a broad spectrum of the population of the natural resource management and outreach education professionals for whom we are conducting this project.

1. All informants use the Internet to access water outreach and education information and materials.

2. The informants rely most on their colleagues for educational materials and advice.

3. The telephone informants prefer to obtain their water education materials from national education programs, like Project WET and Project WILD, as well as from Extension and state agencies. The telephone informants favor these sources because the materials are high quality, dependable, and easy to access and use.

4. The Boise informants prefer to obtain their water education resources from Federal agencies and the Internet because they are high quality and they fill their specific needs.

5. The telephone informants work with a wide range of audiences that are primarily lay audiences (residents, landowners, homeowners, and families), nongovernmental organizations (NGOs), special interest groups, and elected/public officials among others.

6.   While the Boise informants reported working with an equally broad range of audiences, they reported working with their agency partners three times to every one time they reported working with any other audience (61% to ≤ 22%).

7.   The telephone informants prefer hands-on activities by more than two-to-one over all other instructional strategies save for lectures and presentations. The Boise informants heavily favor the use of lectures and presentations. This is their most frequently cited instructional strategy, but they also reported using group discussion, demonstrations, and hands-on activities.

8.   Both groups assess the quality of sources based on whether they are accurate, credible, and visually appealing. The telephone informants tend also to consider whether sources are relevant, easy to understand, well written, appropriate for their audience, and meet state curriculum guidelines. The Boise informants more often report checking that sources are unbiased and easy to use.

9.   Although the measures differed between the two surveys, the informants' responses suggest that they want help assessing the needs of their audiences, assessing and selecting the highest quality resources, and finding and accessing water education materials more than they want help finding the best ways to reach and involve a particular audience or finding and accessing water education materials.

10.   Fast access and easy access are the primary reasons given by the informants for using the Internet. They also reported using it because of the large volume and wide variety of available information, because they could find good material to use with specific audiences, and because they could get the material immediately.

11.   The telephone informants were less willing to spend time on any one Internet search than the Boise informants. Most telephone informants were unwilling to spend more than fifteen or thirty minutes on a search. Most Boise informants were willing to spend an hour or two on any one search.

12.   NGO sites were by far the most favored Internet sites among the telephone informants, though the telephone informants also reported using Internet search engines, state agency sites, and federal sites (U.S. Environmental Protection Agency [EPA], U.S. Geological Survey, and others). The Boise informants tend to prefer Federal sites (especially the U.S. EPA), Extension, and state natural and environmental resource agency sites.

13.   Web sites of most use and interest to the informants provide access to information they need. These sites contain quality information and are:
•   Well maintained, i.e., up-to-date, relevant, and high quality.
•   Easy to use.
•   Visually appealing.
•   Relevant to the informants' interests.
•   Credible.
•   Clearly organized.

14. The informants will not use or return to a site if it is difficult to use in any way. They find sites difficult to use when site navigation is illogical. They also find sites difficult to use when they are slow, bogged down by too much glitz, or when they contain too much text, advertising, or dead links. The informants will not use or return to a site that lacks the desired information.

15. The concept of the original proposal for this project is consistent with the needs of education providers identified in the study.

SERVICES SUGGESTED BY THE INFORMANTS

The responses of the Boise and the telephone informants suggest four services that would enhance the outreach and education efforts of education providers.

1. Facilitated communication among providers engaged in water outreach and education across the nation.

2. Easy access to repositories of credible, high quality, and up-to-date water outreach and education materials, curricula, and best education practices for professionals with outreach and education responsibilities.

3. Assurance that the Web site is always current, credible, and of high quality.

4. Links to Internet Web sites commonly accessed and used by these professionals.

The delivery of products related to the second and fourth of these services are among the goals of the current facilitation project. However, the maintenance required to keep these products up-to-date is beyond the scope of the current project.

CONCLUSIONS

The findings from this study of provider needs support the objectives of the project. The products planned for implementation by this project are consistent with what the informants told us they need and want.

The findings also contribute to our design criteria. The BEP Web site should provide best education practices and easy access to repositories of outreach and education information, materials, projects, and other links to Web sites commonly used by education providers. The BEP project, along with other projects around the country conducting outreach and education programs, should develop and contribute resources to the repositories. The resources should be easy to use and adaptable to local circumstances as well as credible, high quality, and up-to-date. The BEP project should develop the BEP Web site according to the criteria detailed in this report.

Additional funding should be sought to keep the BEP products up-to-date and to establish and maintain other means to facilitate communication among professionals and volunteers working to provide water outreach and education. The informants suggested that an E-mail list serve, E-mail newsletter, and 1-800 number to provide telephone access to staff knowledgeable in water outreach and education would improve communication among these professionals and volunteers. In addition, sufficient long-term funding should be provided to ensure that the BEP Web site maintains up-to-date information that is relevant, credible, and of high quality.

REPORT

BACKGROUND

The *Water Outreach Education—Facilitating Access to Resources and Best Practices* (BEP) project is a collaboration of the United States Department of Agriculture (USDA) Cooperative State Research, Education, and Extension Service (CSREES) and other public and private clean and safe water partners to promote best education practices (BEPs) for water-management education and to improve access to education resources and strategies. It is being conducted by staff of the University of Wisconsin, Environmental Resources Center (ERC), with Elaine Andrews as Principal Investigator, under the guidance of the project advisory team of natural resource management, outreach, and education professionals from across the country (see Appendix A for a list of the project advisory team and staff members).

PROJECT GOAL

The goal of the project is to increase the capacity of natural resource management and outreach education professionals to choose and use appropriate education techniques and resources in order to improve their ability to deliver water-management education programs. Our objective is to build a BEP Web site that provides access to water outreach and education information, materials, and best education practices to enhance the outreach and education efforts of these education providers.

The study of provider needs constitutes the first phase of an overall strategy for project evaluation that includes both formative and summative components. The evaluation strategy was developed in collaboration with our advisory team over the course of several meetings. This formative study was conducted to identify the needs of potential users and to test our assumptions about their use of Web sites. It was designed and conducted to identify what resources and best practices would be of most use to education providers. We needed to know what resources these professionals currently use, how the project can make the resources more accessible, and how it can promote the use of best practices in water outreach education.

METHODS

ERC staff developed the survey instruments for the study with guidance from the project advisory team. Because the two surveys used somewhat different instruments, only those questions common to both surveys are tallied and compared directly

The first survey was self-administered by eighteen self-selected water quality coordinators (hereafter referred to as the *Boise informants*) attending the Water Quality Coordinators' Workshop in Boise, ID, 11-12 March 2002. (See Appendix B for a description of the informant selection procedures.) This survey served both to gather data and pilot test the survey instrument. Project staff members revised the instrument, based on collected results, to delete questions that provided redundant or ambiguous results and add questions recommended by the Boise informants.

We conducted the second survey via telephone using the revised survey instrument in Appendix C. The informants were twenty-one natural resource and water education professionals and volunteers (hereafter referred to as the *telephone informants*) recommended by members of the BEP project advisory team. The second survey provides the bulk of the findings and recommendations below; we use data from the first survey where it is the same or similar to add emphasis to the results of the second survey and as a means of comparison.

FINDINGS

Informants

The water outreach and education providers we queried were quite diverse. Professionally, educationally, and to a lesser extent geographically, they represent a broad spectrum of the population of the natural resource management and outreach education professionals for whom we are conducting this project. See Appendix D for a brief description of the two groups of informants that participated in the study.

Our two surveys differed in the level of personal detail asked of the informants. We collected information on the professional, educational, and geographic characteristics of the telephone informants. We did not collect any information on the educational backgrounds of the Boise informants. In addition, because the Boise survey was self-administered, the informants could and did, in a couple of instances, choose not to identify themselves or their professional capacity. The information collected indicates that professionally, educationally, and to a lesser extent geographically, informants for these two surveys represent a broad spectrum of the population of the natural resource management and outreach education professionals for whom we are conducting this project.

The eighteen Boise informants were generally water quality coordinators who also served primarily in faculty, staff, specialist, liaison, program or project coordinator/supervisor, and administrative capacities in universities, Extension, and government agencies around the country. With only two exceptions, the telephone informants were from California, Nebraska, and Ohio.[1] Figure 1 shows the state-by-state distribution of the Boise informants; Figure 2 shows the state-by-state distribution of the telephone informants.

The two sample groups may differ in their educational profile. Some of the Boise informants were faculty and university administrators. This suggests that some of these informants hold Ph.D. degrees. The highest degree attained by any of the telephone informants is a masters' degree. The possible difference in educational profile, the difference in residential distribution around the country, and observed differences in the patterns of responses between the two samples shown below, suggest that two groups may have differed in a number of substantial ways.

Just under half (47%) of the telephone informants served as managers or coordinators either for specific resources, education programs, or for other programs and information. Just under one fifth (19%) were either extension agents or resource specialists. Just under a tenth (9%) directed organizations or resource/education centers. The remaining telephone informants included an educator, a small business owner, a youth development advisor, an agency administrator, and a water district office manager (5% each).

A majority of the telephone informants (52%) held masters' degrees as their highest degree. Thirty-eight percent of the telephone informants held a bachelors' degree as their highest degree attained. Only two informants (10%) did not have an advanced degree. Two of the informants also held additional teaching certification/credentials. Topically, eleven of twenty-one informants (52%)were educated in natural sciences (e.g. biology, environment, and natural resources).

---

[1] The two exceptions are informants from Georgia and Indiana recommended by Susan Seacrest who were participants in The Groundwater Foundation's national Groundwater Guardian program.

Four of the informants (19%) had degrees in education (one bachelors' and three masters'). Four others had advanced degrees in less topically relevant areas.
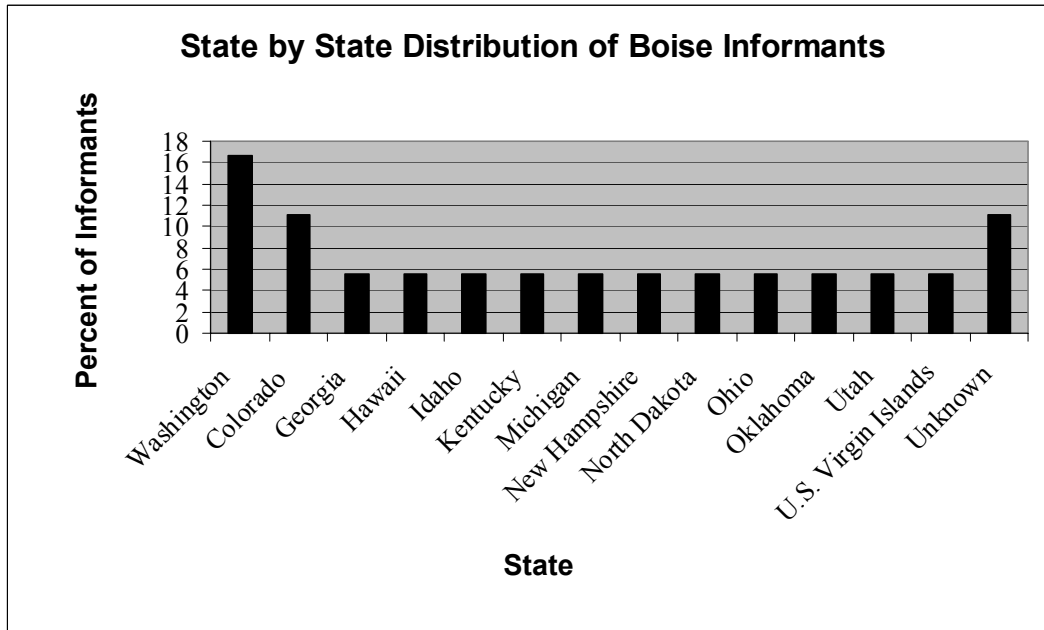

Figure 1. This figure shows the distribution of Boise informants across the country. Three informants worked in Washington State, two worked in Colorado. One informant each worked in the other listed states and the U.S. Virgin Islands. Two informants did not provide any identifying information.
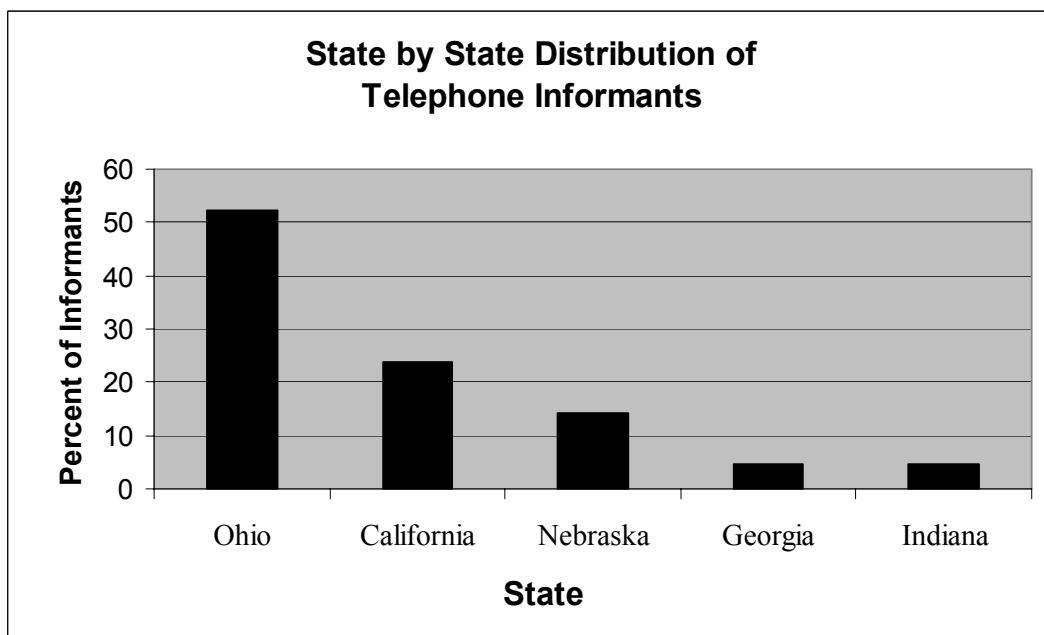

Figure 2. This figure shows the distribution of telephone informants across the country. One informant each worked in Georgia and Indiana.

The time spent on outreach and education varied considerably within the two groups of informants. The distribution of time spent also differed between the groups (see Figure 3). One third (35%) of the telephone informants spent no more than 20% of their time on out reach and education.[2] Just under a third (29%) spent between 61% and 80% of their work time on outreach and education.[3] The remaining telephone informants were spread over the other three remaining quintiles (21%-40%, 41%-60%, and 81%-100%).[4] More of the Boise informants tend to spend higher percentages of their time on outreach and education. Over three quarters (77%) of the Boise informants reported spending at least half their time on outreach and education.

Audiences
The informants gave two general descriptions of their water outreach and education audiences. The first distinguished between adult and youth audiences. The second gave more specific descriptions of the various adult audiences to which the informants direct their outreach and education. The informants were free to mention as many audiences as they wished. As shown in Figure 4, there was a near even split between informant attention to adult and youth audiences among the telephone informants. The Boise informants specifically reported working with youth more than adults as a separate category. Because the survey was open ended and self-administered, the Boise informants most likely considered youth as an interest group much the same way they thought of the agency partners. They did not distinguish adults as a group; rather, they distinguished the interest groups among adults. The list of adult audiences is less clear in its distinctions. Where adults and youth are mutually exclusive, residents, homeowners, landowners, producers/farmers, etc. are not. These were the distinctions made by the various informants, but whether a landowner is also a resident, homeowner and/or a producer/farmer is not clear.

What can be gleaned from these figures is that besides youth, lay people are the audience most often mentioned by the informants in the telephone interviews (86%). These are residents, landowners, and homeowners, and families. The Boise informants reported working most with their agency partners (61%). The audience mentioned by the telephone informants with the second greatest frequency is that comprised of special interest groups and environmental/ conservation nongovernmental organizations (NGOs) (38%). Elected/public officials (24%), teachers/educators (14%), producers/farmers, businesses and industries, Extension and agency partners, (10% each) round out the list of audiences that were mentioned by more than one telephone informant. The Boise informants mentioned all of these except families. They also mentioned working with Native-American interests (17%). Eight other audiences were mentioned by only one informant each in the telephone survey. These were: municipal staff, natural resource professionals, advisory boards and steering committees, local planning commissions, conservation districts, media, faith-based organizations, and water service customers.

---

[2] One of these informants reported working only half time. Of that, 25% (about five hours a week) is spent on outreach and education.

[3] One of these informants reported spending 2%-4% of his time in formal education settings and 70% in informal educations settings such as in meetings, phone calls, office visits, and planning workshops).

[4] At the time of the interview, an informant was in the development stage of her project. At the time she was not spending any time doing outreach and education, but anticipated her outreach and education time would jump to about a third of her work time within the next three months.
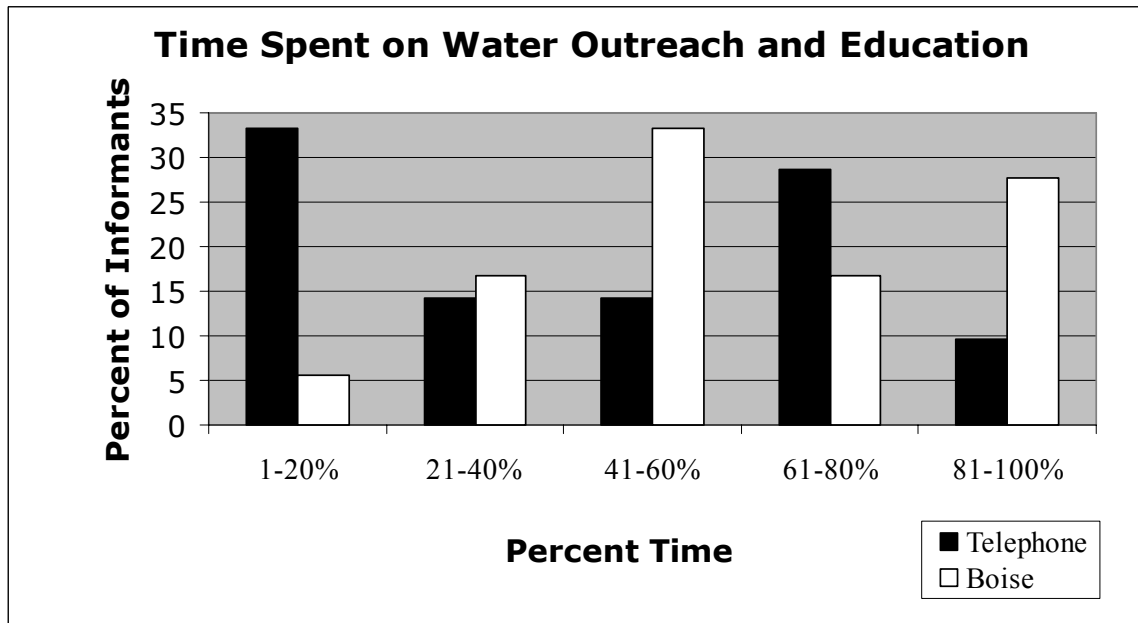

Figure 3. Percent of total work time informants reported working on outreach and education.
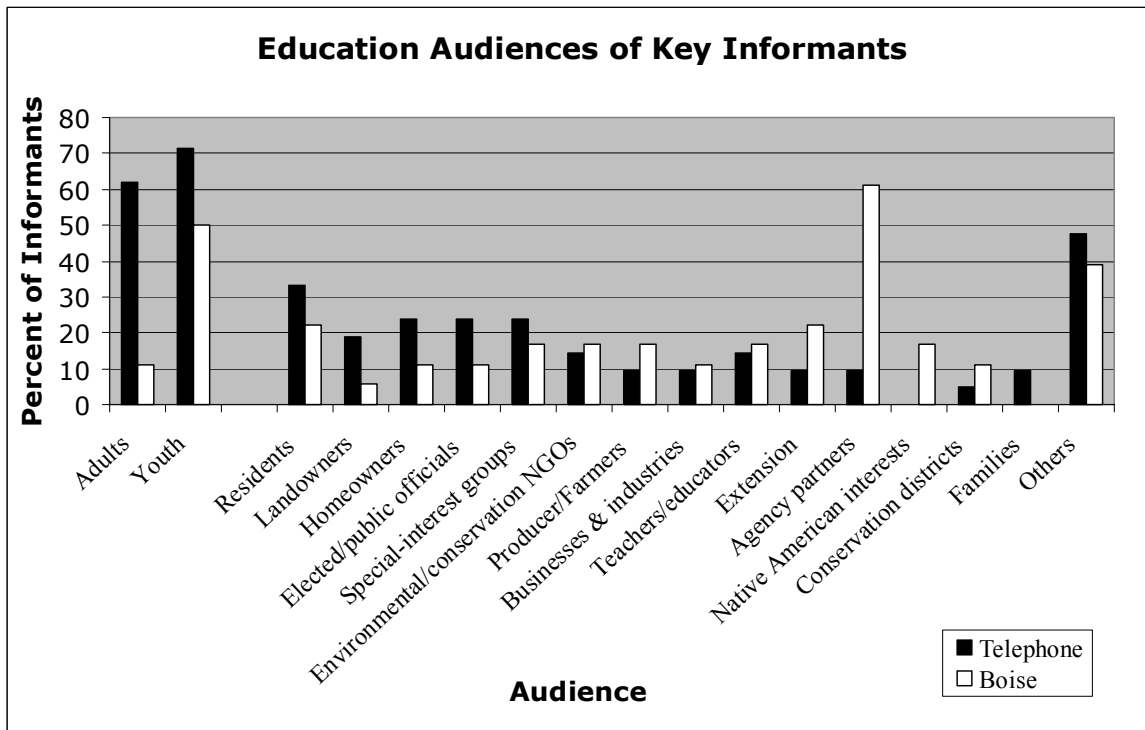

Figure 4. This figure shows the percentage of telephone and Boise informants conducting outreach and education for specific audiences. There are two types of distinctions made between audiences in this figure. The first is the distinction between adult and youth audiences. The second distinguishes more specific adult audiences. The category *Others* represents all the audiences that were mentioned only once in the survey responses.
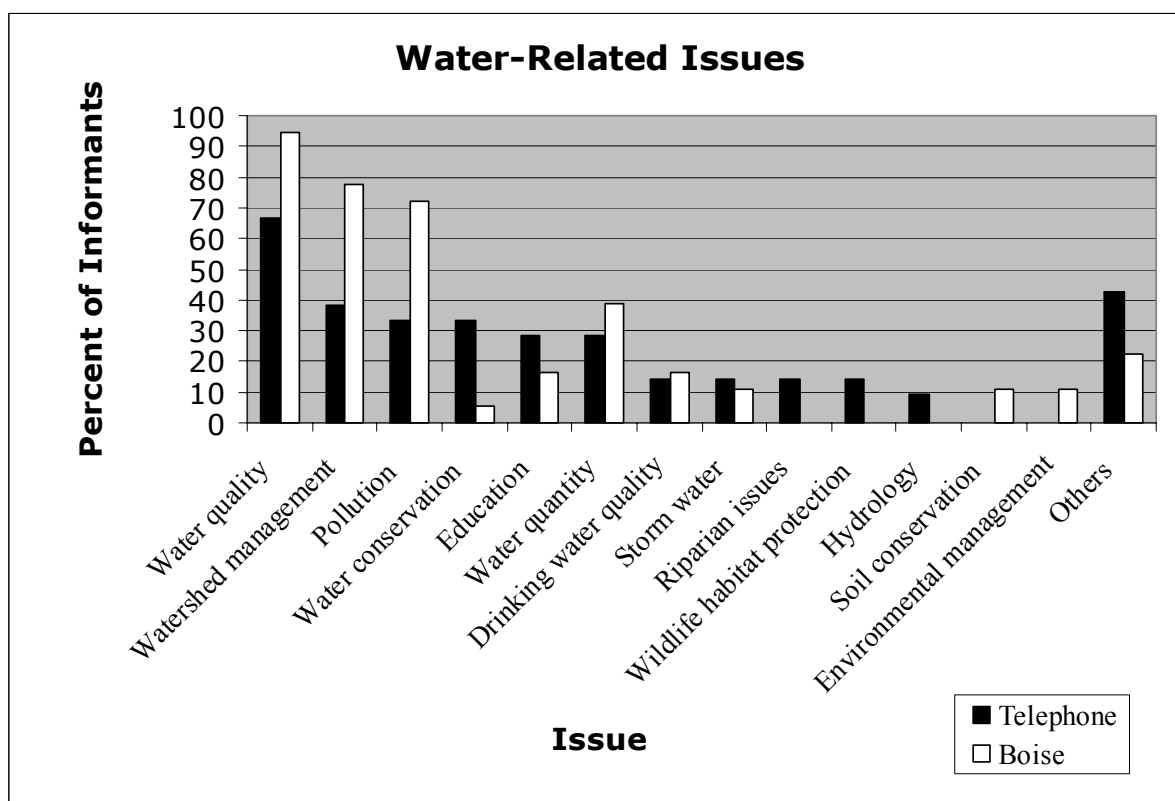
Figure 5. This figure shows the number of informants that reported working on specific water-related issues. The category *Others* represents all the water-related issues mentioned only once in the interviews. The question specifically asked: "What types of water-related issues do you work on?"

Issues

The informants could mention as many issues as they wished. They often mentioned water quality directly, but also talked about water quality in terms of watershed management, pollution, and/or the quality of drinking water specifically (see Figure 5).[5] Water quantity issues were mentioned directly or in terms of water conservation. This general water issue was the second most frequently mentioned. Education, hydrology, riparian issues, storm water, and wildlife habitat protection received mention as issues of interest by multiple informants. Seven other issues received mention by one telephone informant each. Labeled collectively as *Others*, these are: Flood safety management, water law, fishing, aquatic wildlife, wetlands, dam-related issues, and restoration.

Although the informants mentioned a wide variety of issues, water quality (the combination of water quality, watershed management, and pollution) was mentioned far more often than any other issue. The Boise informants reported a higher concentration on water quality issues than the telephone informants.

---

[5] The informants spoke of pollution most often in terms of non-point source pollution.

Instructional Strategies

Figure 6 displays the instructional strategies favored by the telephone and Boise informants. The telephone survey presented the informants with an open-ended query. The Boise survey presented this question with the closed-ended choice of lectures & presentations, demonstrations, hands-on activities, group discussions, and action/service projects. This difference in the two surveys may account for the big difference in the range of strategies reported by the two groups of informants. Three Boise informants mentioned on-line instruction as an additional strategy. The Boise informants heavily favor the use of lectures and presentations (94%), but also use group discussion (78%), demonstrations (72%), and hands-on activities (72%). The telephone informants report a greater reliance on hands-on activities by more than two-to-one over all other strategies (71% to $\leq 33\%$) save for lectures and presentations (48%). Appendix E is a list of education strategies and preferences compiled from the conversational responses obtained in the open-ended telephone survey.

Sources of Information

Both surveys asked two questions that distinguished between two types of sources. The first question attempted to determine whom the informants turned to for help. The second attempted to identify nonhuman sources that the informants looked to for aid in their outreach and education. The open-ended nature of the questions allowed the responses to blur this distinction.
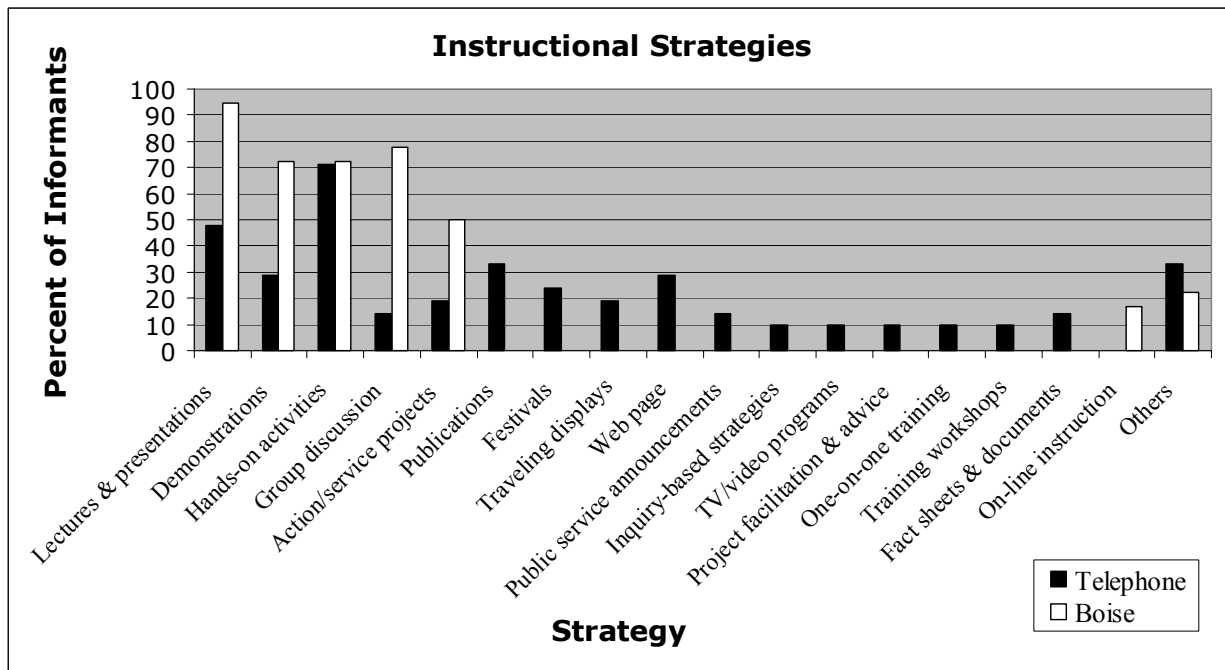

Figure 6. This figure shows the instructional strategies favored by the telephone and Boise informants in response to the question: "What instructional strategies do you regularly use in your outreach and education?" The telephone survey asked this as an open-ended question. The Boise survey asked this question as a closed-ended choice of lectures & presentations, demonstrations, hands-on activities, group discussions, and action/service projects. This difference in the two surveys accounts for the big difference in the range of strategies reported by the two groups of informants.

Figures 7 and 8 show the contacts and sources relied upon by the informants. Because of the blurred distinction between contacts and sources, they contain some identical responses and some responses that are different. The primary reliance on colleagues dominates the messages that emerge from this question. A greater percentage of Boise informants and a greater percentage of the telephone informants reported relying on colleagues as opposed to any other single contact/source (83% and 48 % respectively) (see Figure 7). In both surveys, government resources were the second most frequently reported contact/source (61% and 48 % respectively). Figure 8 shows that a greater percentage of the Boise informants rely on Federal government resources (61% to 24%). A greater percentage of the telephone informants rely on state agencies (29% to 17%). A disproportionate percentage of Boise informants relied on the Federal agencies (61%) as opposed to state agencies (17%). Similar percentages (24% and 29% respectively) of the telephone informants reported relying on federal and state agencies (see Figure 8). The telephone informants relied more on NGOs and Extension than those completing the Boise informants (see both Figures 7 & 8).
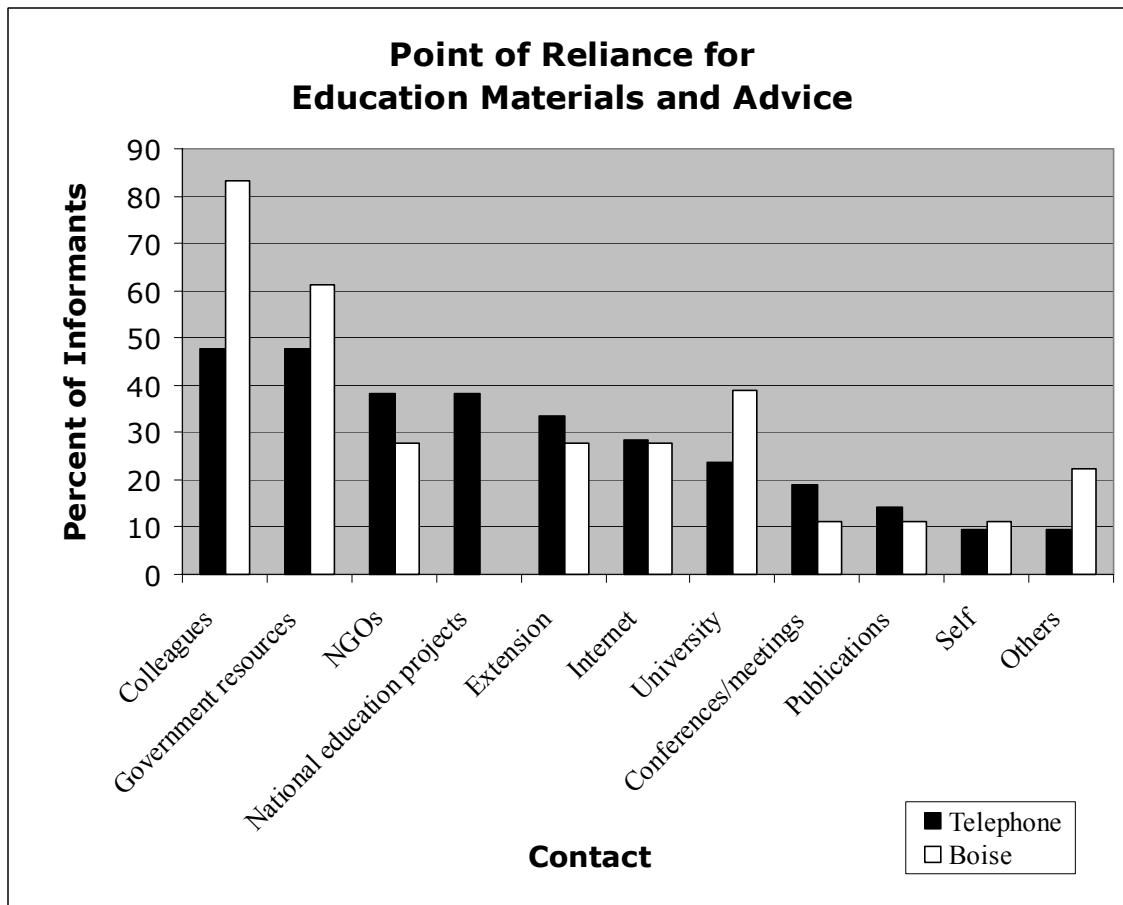

Figure 7. We asked: "On whom do you rely when you need new education materials or advice on how to approach your water outreach and education?" intending to identify human resources. The open-ended nature of the question allowed the identification of nonhuman resources. This is reflected in the mix of contact types.

Figures 7 and 8 also reveal a pronounced difference in the informants' use of national education programs. Both groups of informants reported some use of all mentioned except the national education programs. Thirty-eight percent of the telephone informants in Figure 7 and 43% in Figure 8 reported relying on national education project materials such as the products of Project WET and Project WILD. None of the Boise informants reported relying on these materials.

The telephone informants mentioned Project WET and Project WILD when responding to a number of questions besides the two displayed in Figures 7 and 8. The materials from these national education programs appear to fully satisfy a number of the outreach and education needs of these informants. The telephone informants gave the following reasons for their high regard of these materials. The materials:

- Are easy to access.
- Are easy to use, i.e. they are ready to use right out of the box without additional research or preparation.
- Contain a very wide range of material from which the informants can pick to meet to meet their outreach and education needs.
- Use hands-on education strategies favored by the informants.
- Contain all the necessary handouts.
- Do not require purchase of special equipment. They even have instructions for users to make their own equipment.
- Correlate to state education standards.
- Are adaptable.
- Contain clear objectives.
- Are concise.
- Are laid out simply.
- Are road tested and dependable.

The informants for both surveys offered several reasons why they prefer the sources they identified as their favorites (see Figure 9). The telephone informants mentioned ease of access and use (48% each); dependability (33%); quality (33%); direct communication (35%), which is the combination of colleagues (19%) and being able to talk directly to the source (14%); relevance (24%); and adaptability (14%) as reasons for favoring certain sources. More than twice as many (56%) of the Boise informants mentioned quality than any other reason for favoring specific sources. The next most frequently mentioned reason for Boise informants' preferences was that the source filled specific needs (28%). Ease of use and relevance were also each mentioned by more than 20% of the Boise informants. The telephone informants tend to prefer sources that are easy to access, easy to use, and dependable; the Boise informants tend to prefer quality sources that fill specific needs.
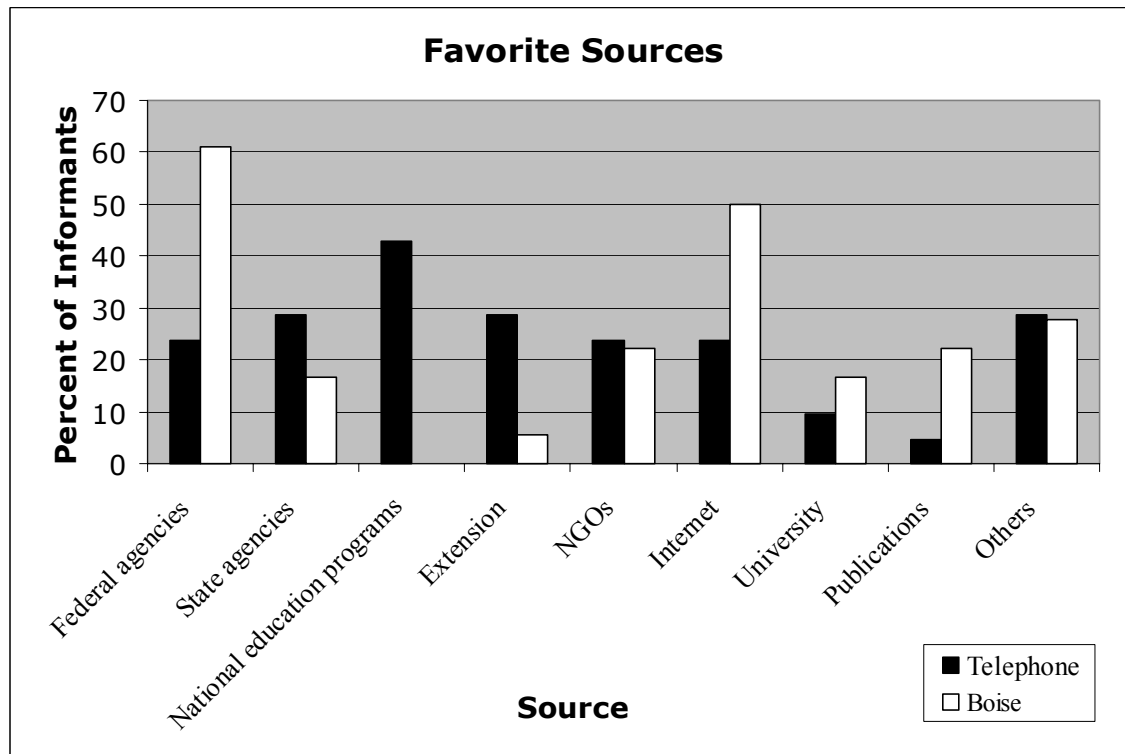
Figure 8. This figure shows the responses to our question: "What are your favorite sources for water education materials?" We asked the question intending to identify nonhuman sources.

Criteria for Source Assessment

The informants for both surveys use several criteria to assess the quality of new water outreach and education materials and practices. Figure 10 shows the distribution of responses by the informants for the various criteria. Where ease of use was frequently mentioned as a reason for the telephone informants' preferences for the favorite sources, it has minimal affect on their assessment of the quality of outreach and education materials and practices. The telephone informants mentioned the appropriateness of the material for their audiences most often (62%) as a criterion for assessing the quality of education material and practices. Between 19% and 45% of these informants also expect the material they use to be relevant (43%), accurate (38%), credible, (33%), easy to understand (29%), well written (19%), visually appealing (19%), and to meet state curricula guidelines (19%). The Boise informants rely on fewer criteria to assess the quality of education material and practices. The criteria of quality mentioned most frequently by the Boise informants were that the material be credible (56%), accurate (39%), and unbiased (33%).

We asked the two sets of informants how important it was for them to have help in several aspects of their preparation for conducting water outreach and education. Their responses (shown in Figures 11 and 12) cannot be displayed in one, joint figure because we changed the response scale for this question between conducting the survey in Boise and conducting the telephone survey. The Boise survey asked if it was *Critical*, *Very important*, *Important*, or *Not important* for the informants to have help in specified areas. This scale is biased toward a positive ranking of *importance*. Three of the four response options rank *importance* positively. Only one allows a
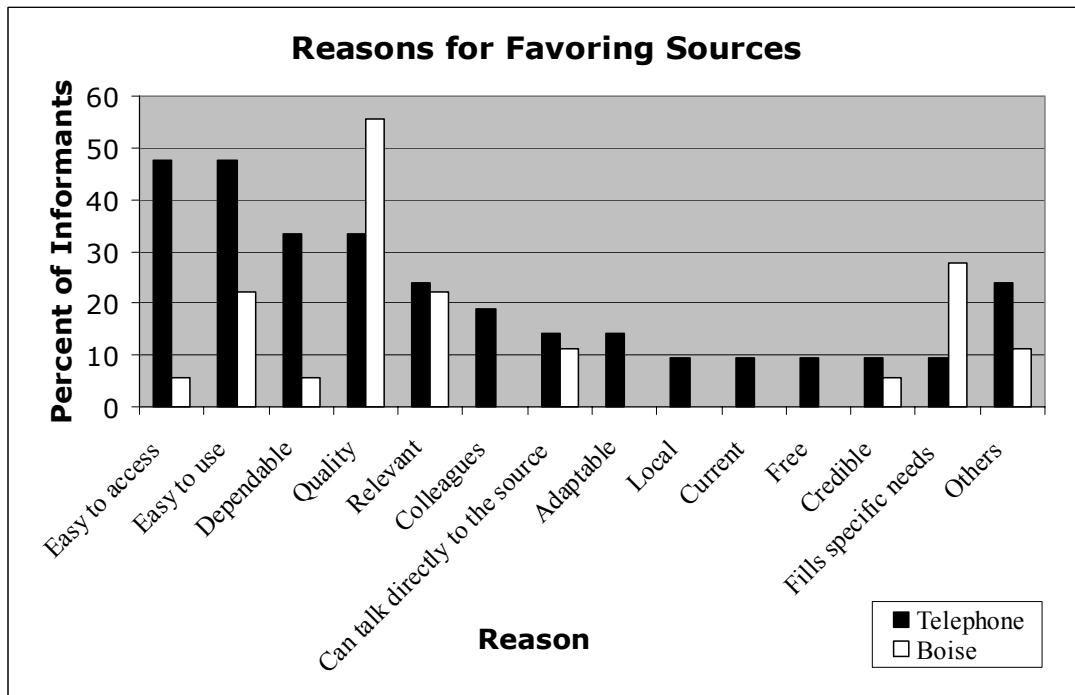
Figure 9. The informants for both surveys offered a number of reasons why they preferred their favorite sources. More than a third of the telephone informants mentioned ease of access and use, dependability, and quality as reasons for their preferences for specific sources. The key reason for the Boise informants was quality.
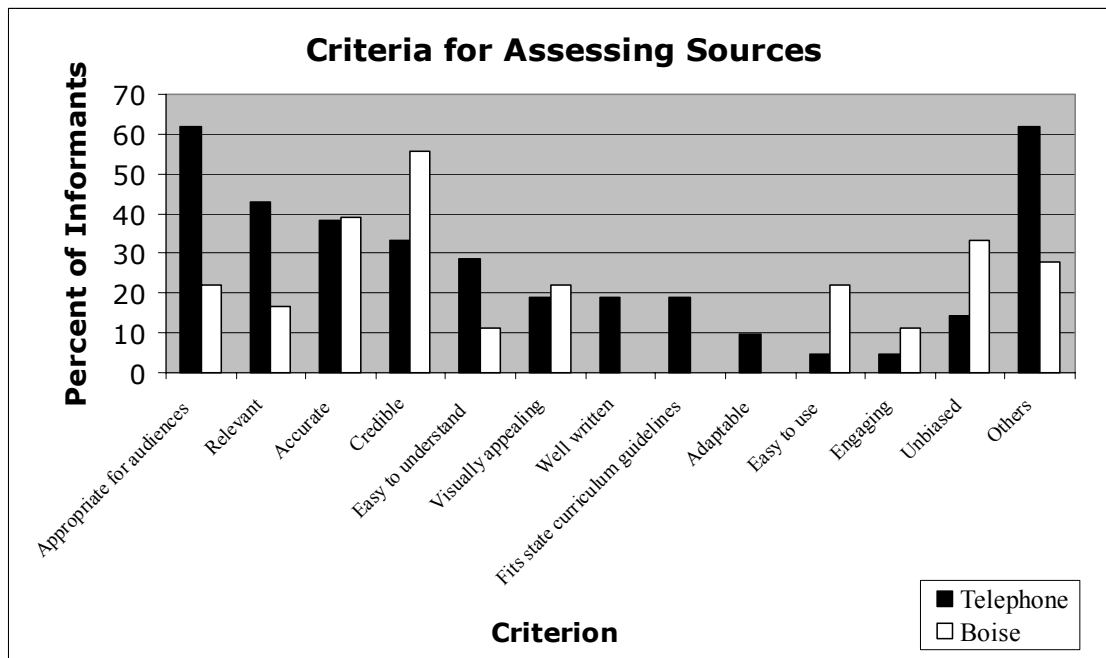

Figure 10. These are the responses to our question: "What criteria do you use to assess the quality of new water outreach and education materials and practices?"
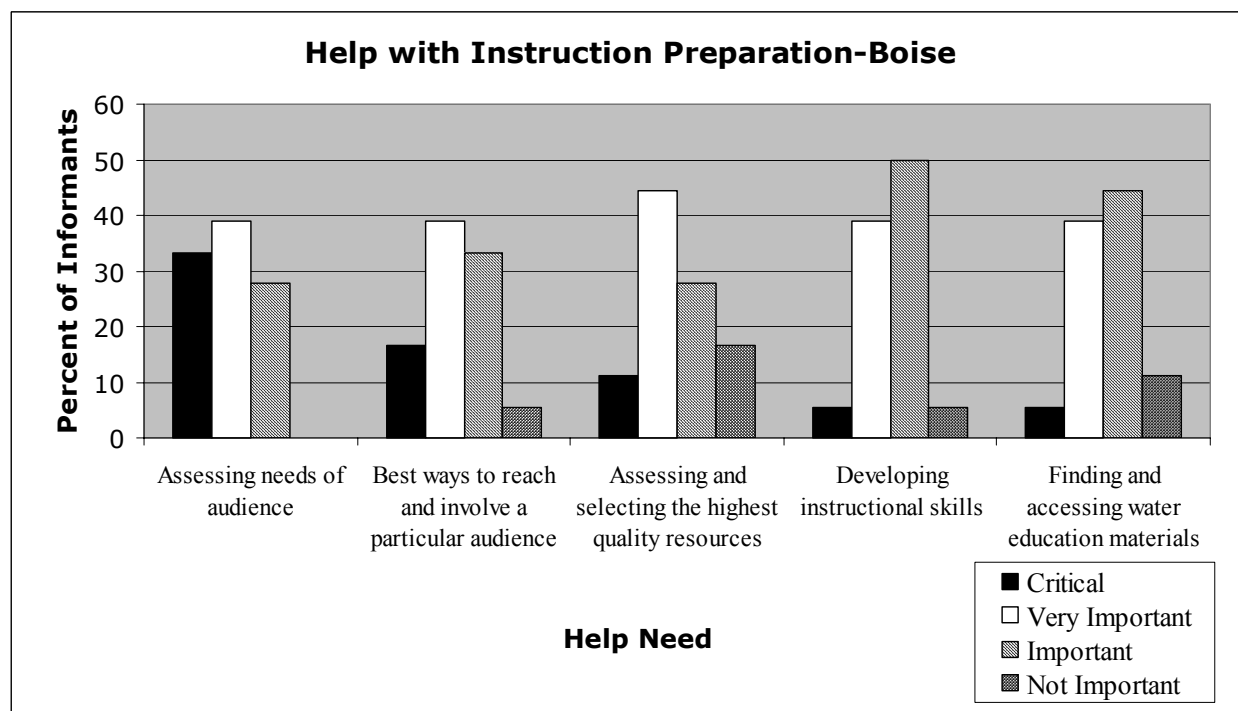
Figure 11. This figure displays how important it was for the Boise informants to have help in several aspects of their preparing to conduct water outreach and education. Their responses were captured using the biased four-point scale shown at the bottom of the figure.

negative ranking of *importance*. We created an alternative scale before conducting the telephone survey that we believe is more balanced. The informants were asked if it was *Critical*; *Important*; *Useful*; *Nice, if they had the time*; or *Not necessary* to have help. The Boise responses appear in Figure 11; the responses of the telephone informants are in Figure 12.

Between 80% and 100% of the responses to the series of question displayed in Figure 11 indicated that it was *Important*, *Very important*, or *Critical* to have help in the described area. Because the scale is biased the most reliable aspects of these responses are the extremes. Looking at just the percentages of *Critical* and *Not important* responses suggest that the informants value help assessing the needs of their audience but have less use for help assessing and selecting the highest quality resources and finding and assessing water education materials.

Because the responses in Figure 12 are based on a more balanced scale, we consider the message that emerges from the responses to be more reliable. Here too the message is that the majority of informants (71%) find it *Critical* (38%) or *Important* (33%) to have help in assessing the needs of their audiences. The telephone informants also appear to value help in assessing and selecting the highest quality resources (86% overall said *Critical* [24%], *Important* [24%], or *Useful* [38%]), and finding and accessing water education materials (66% overall said *Critical* [14%] or *Important* [52%]). Although a smaller percentage of informants considered it *Critical* (10%), the largest percentage (91%) of informants considered it at least *Useful* to have help in finding the best ways to involve a particular audience. The telephone informants were most split in their expressions of their value of help in developing their instructional skills. In this case close to a

third (29%) of the informants considered it merely *Nice, if they had the time* (24%) or *Not necessary* (5%) to have help developing their instructional skills. These results suggest that assistance to those preparing for outreach and education should be prioritized to first help them assess the needs of their audiences, then to help them find and access water educational materials and to assess and select the highest quality resources.

Internet Use
All of the Boise informants and all of the telephone informants reported using the Internet when they needed education materials and resources. The more frequent reasons given for using the Internet appear in Figure 13. The predominant reasons for both groups of informants are fast and easy access (48% and 43% respectively for the telephone informants, 28% and 44% for the Boise informants). Nearly a third (29%) of the telephone informants reported using the Internet because of the large volume of available information. Nearly a quarter (22%) of the Boise informants also reported using the Internet because they find a wide variety of available information and because they find good material to use with specific audiences. A similar percentage (19%) of the telephone informants reported using the Internet because of the wide variety of available information. The same percentages of the telephone informants also reported using it because it is good place to start screening for information, and because they can often get materials immediately from Web sites on the Internet.
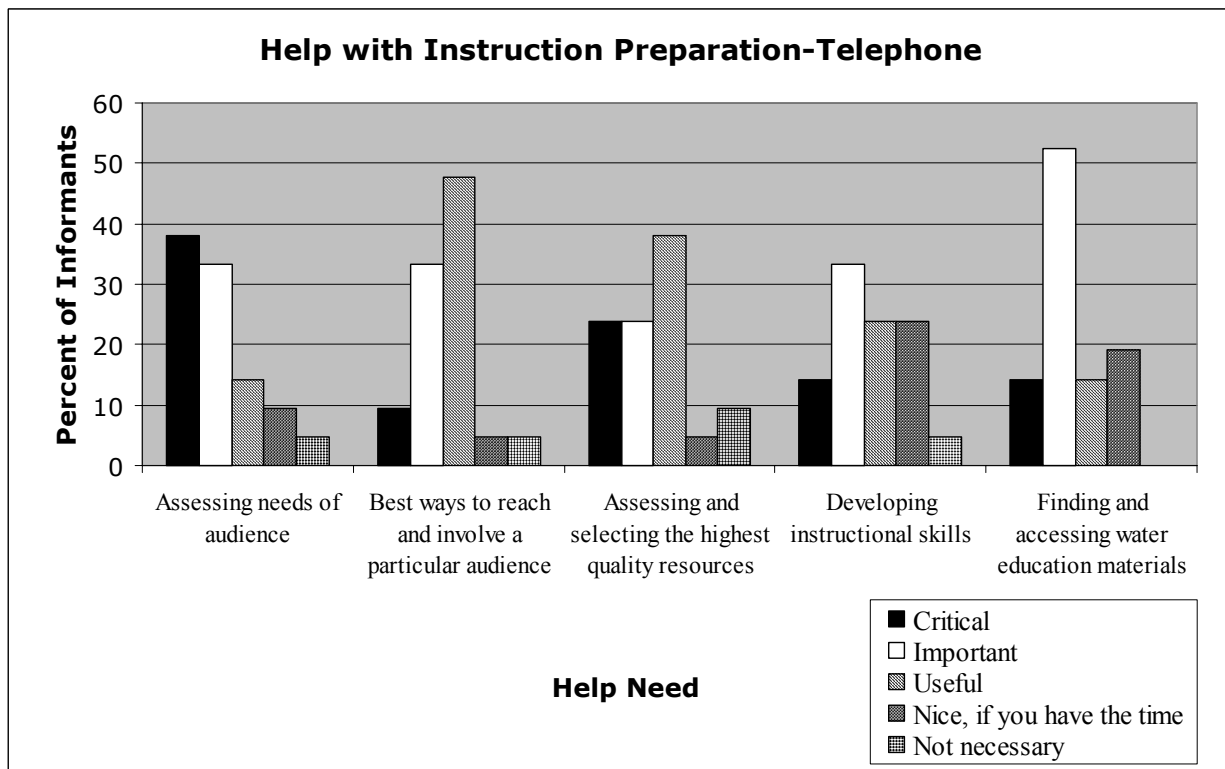

Figure 12. This figure represents the expressed needs of the telephone informants for help with preparing for water outreach and education. It is based on the five-point scale shown at the bottom of the figure. The scale is more balanced than the one used in the Boise survey.
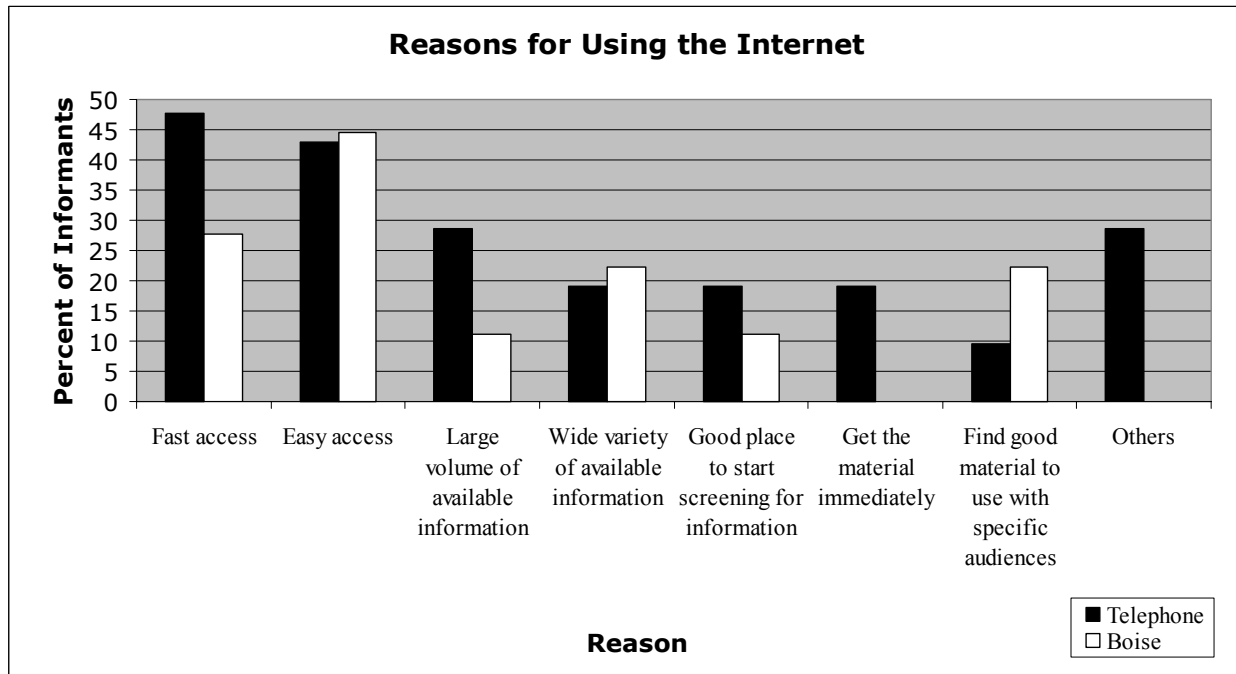
Figure 13. This figure shows the reasons for Internet use given by the telephone and Boise informants.

Time Spent
The informants vary considerably in the amount of time they spend and are willing to spend on any one search of the Internet (see Figure 14). The majority of the telephone informants (76%) spend no more than 30 minutes in any one search. A slightly smaller percentage (72%) of these informants are even willing to take that long to search for what they need on the Internet. Few (5%-10%) of these informants take or are willing to take an hour or two for any one search of the Internet. A majority (50%-72%) of the Boise informants reported spending and being willing to spend up to one or two hours in any one search of the Internet. In general the Boise informants report spending more time and being willing to spend more time on any one search of the Internet than the telephone informants.

Favored Web Sites
As shown in Figure 15, the sites that these two groups of informants tend to prefer also differ substantially. The biggest difference was in the relative use of NGOs (nongovernmental organizations). More than six times the percentage of telephone informants reported using of sites maintained by NGOs than the percentage of Boise informants (71% to 11%). The percentage of telephone informants who reported using Internet search engines was three times that of the Boise informants (33% to 11%). Greater percentages of telephone informants also reported using state natural/environmental resources sites (29% to 22%), other state sites (29% to 11%), and the U.S. Geological Survey site (24% to 11%). Greater percentages of Boise informants reported using Web sites maintained by the U.S. EPA (44% - 29%), other Federal agency sites (38% to 18%), Extension sites (33% to 18%). In general, Boise informants tend to prefer the use of Federal government agency and Extension sites; the telephone informants tend to prefer the sites of NGOs, state agency sites, and Internet search engines.

Figure 16 shows some reasons why the telephone informants prefer the sites that they do. The reasons are quite diverse. No one reason was common among the informants. Eight reasons were mentioned by 10% to 25% of the informants. Thirteen others were each mentioned by only one informant. We did not ask the Boise informants why they favored certain Internet Web sites.

Web-Site Design
We asked three questions of the telephone informants to get an idea of how a Web site might be designed to appeal to professionals with water outreach and education responsibilities. We asked what initially attracts the informants to a Web site, what keeps them coming back to a site, and what turns them away. Figures 17, 18, and 19 display their responses.

As shown in Figure 17, the dominant reasons the telephone informants are attracted to new sites are that they contain the information they need (52%) and they are easy to use (48%). This does not come as a surprise, but it does emphasize the importance of clearly defining the needs of education providers and their audiences. Appendix F lists information needs of the informants. It was compiled from conversational responses obtained in the open-ended telephone survey. The list is not necessarily definitive, but it can serve as a starting point for ensuring that the products we develop meet the needs of our audience for water outreach and education information, materials, and best education practices. About half of the informants want Web sites to provide easy access to and use of needed information, but smaller percentages of the informants also identified an array of characteristics that tend to attract them to a site.
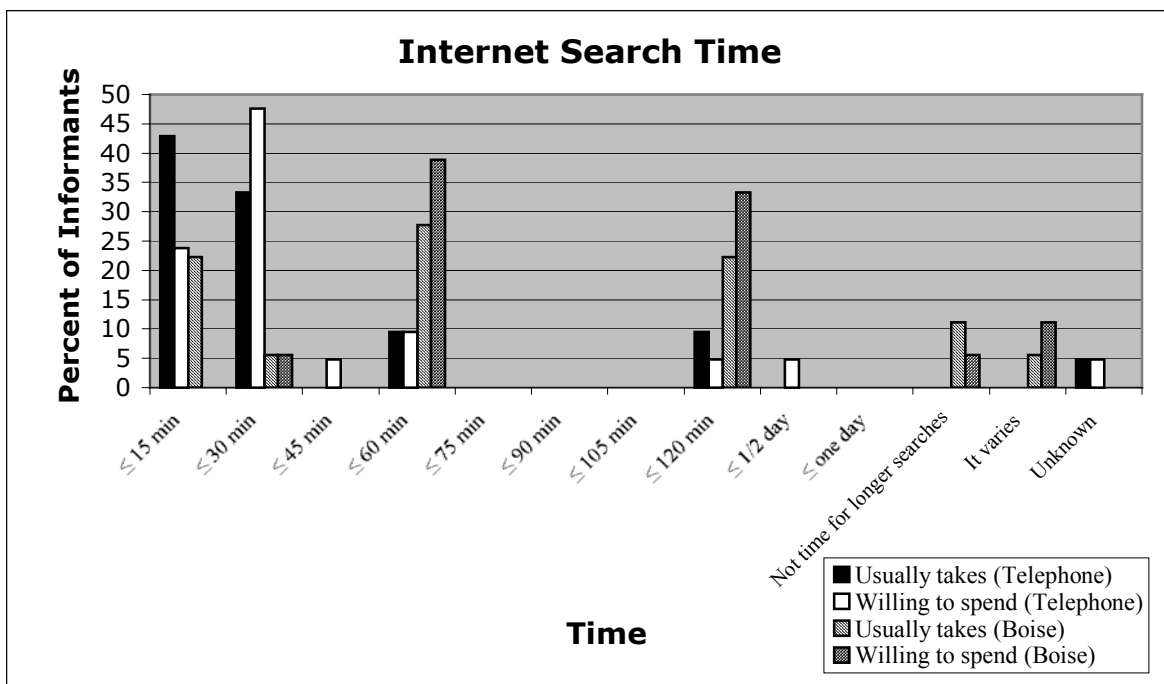

Figure 14. This figure shows the time it usually takes and the time the informants are willing to spend conducting Internet searches for water outreach and education information, materials, and practices. One Boise informant wrote anonymously that if (s)he can't find the information without a lot of trouble, (s)he won't look on the Internet. However, the Boise informants generally spend more and are willing to spend more time searching on the Internet.

Figure 18 displays the site characteristics that telephone informants said would make them inclined to revisit Web sites. No characteristics dominate this list. More informants (48%) gave the presence of up-to-date information as a reason to return to a site than any other reason. About a third (29%) of the informants said that the information needed to be relevant for them to return to a site. Again, the informants tend to want sites that are easy to use and contain quality information. These and the remaining characteristics could be used as criteria for constructing a Web site that will attract repeat users from among those using the Internet to access and use water outreach and education information, materials, and practices.
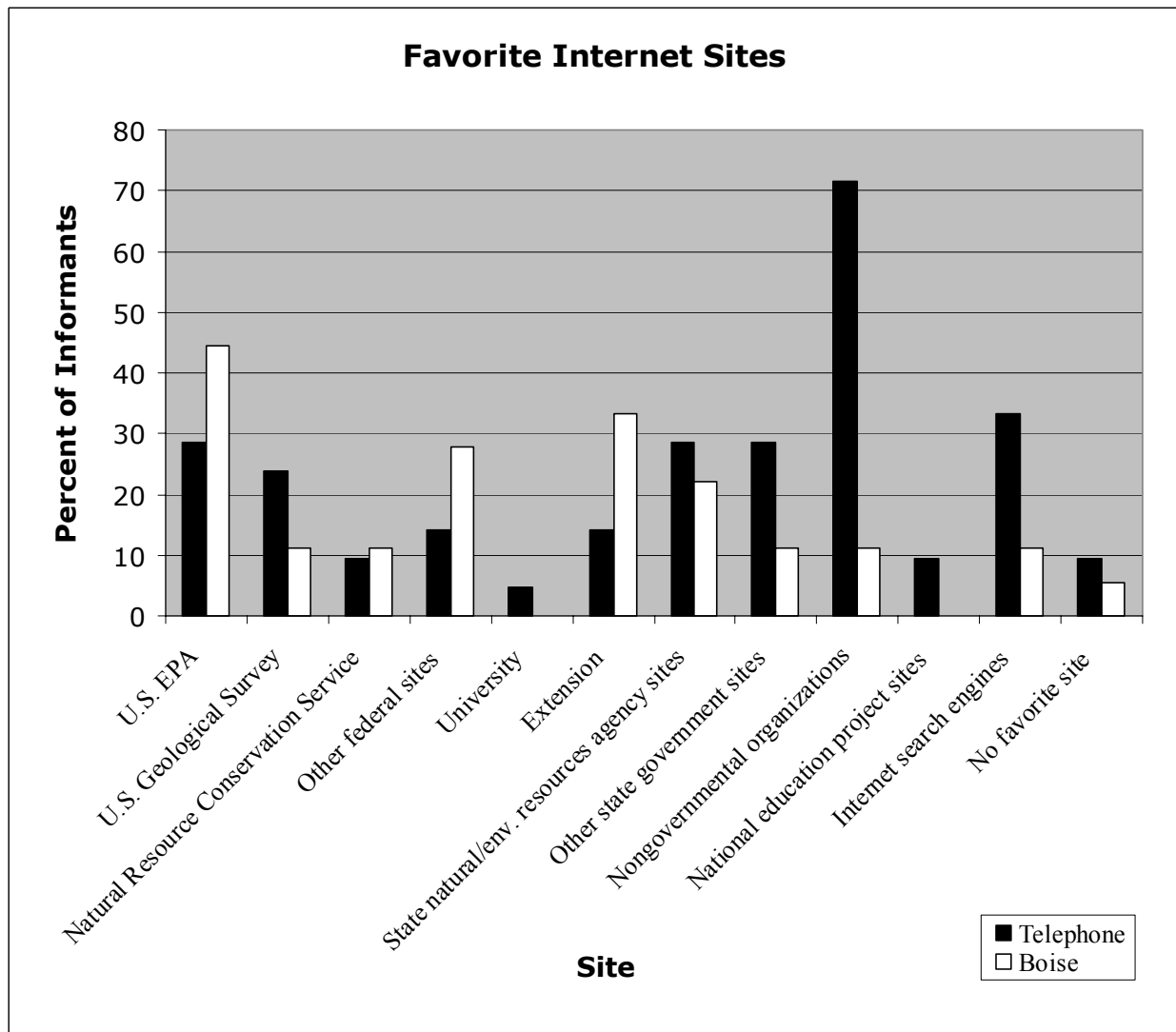

Figure 15. This figure shows the Internet Web sites favored by the two groups of informants. The Boise informants more often reported favoring the use of Federal government agency and Extension sites; the telephone informants reported a preference for state agency sites, the sites of nongovernmental organizations (NGOs), and Internet search engines.

The characteristics shown in Figure 19 that turn the informants away from Web sites garnered stronger collective responses overall. More than 40% of the informants will not tolerate illogical or difficult site navigation (52%) and slow responses (43) by the site. More than 25% of the informants will not revisit a site if it is too glitzy (33%), difficult to use (29%), lacks the desired information (24%), has links that do not connect to the promised site (19%), or if there is too much textual information filling the site (19%), too much advertising (19%), irrelevant and outdated information (19%) or provides biased or simply bad information (14% each). The characteristics that turn informants away from Web sites could be combined with the characteristics listed in Figures 17 and 18 to form a powerful set of criteria that supplements current professional standards for the design of Web sites.

LIMITATIONS OF THE STUDY

The study is limited in two major ways. The sample sizes of eighteen (N = 18) for the Boise survey and twenty-one (N = 21) for the telephone survey are quite small relative to the number of natural resource professionals with outreach and education responsibilities that we hope to reach nation-wide. In addition to being small, the samples were not random. We arrived at the nonrandom samples in two ways. We allowed the informants in the Boise survey to self-select. The approximately seventy-five conference attendees were primarily water quality coordinators from around the country. The informants responded at their own initiative to our general invitation to all conference attendees. We used recommended-contact and snowballing methods
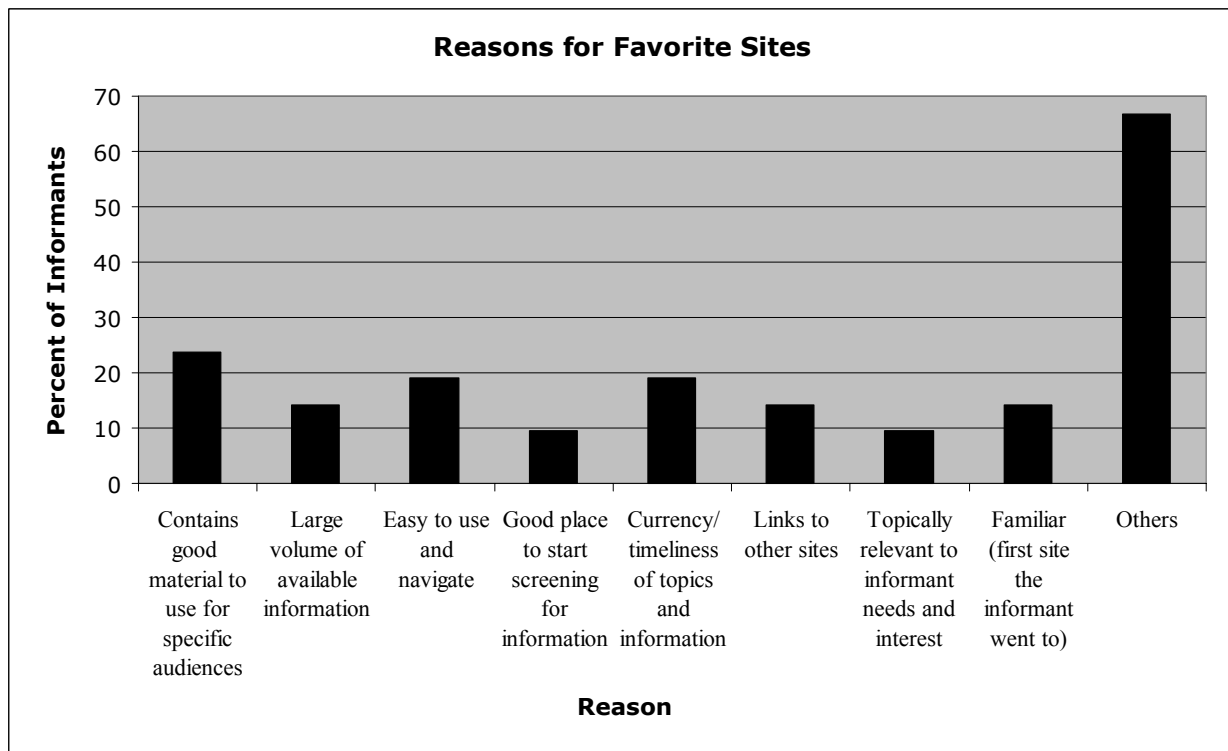

Figure 16. This figure displays the reasons given by the telephone informants for their Internet Web site preferences. The reasons are diverse, and there is no concentration of preference among the informants. We did not ask the Boise informants their reasons for favoring certain Internet Web sites.

of sampling for the telephone survey. We contacted the telephone informants at the recommendation of less than half of the project advisory team members. Three of the original twenty-two contacts for the telephone survey recommended an additional six informants in response to our initial contact for a total of twenty-eight contacts. Another of the original contacts completed the survey in Boise and was not contacted for the telephone survey. We queried twenty-one contacts via telephone. Figure 2 shows the strongly biased state-by-state distribution of these informants. Ninety percent of the informants came from three states. The nonrandom nature of the two sampling methods defies the assumption of normal distribution underlying most parametric statistical methods.

The use of the term *source* in our surveys was unintentionally equivocal. The informants could interpret it in two, equally valid ways. A *source* could be the repository of materials and information, such as an Internet Web site, an agency, or a colleague, or it could be the material itself. We do not know from the informants' identification of their favorite sources, their reasons for favoring those sources, nor the criteria they use for evaluating the sources, whether they were evaluating the repositories or the materials. This adds a degree of ambiguity to our interpretation of their responses to the *source* questions; however, the information gained remains quite valuable.
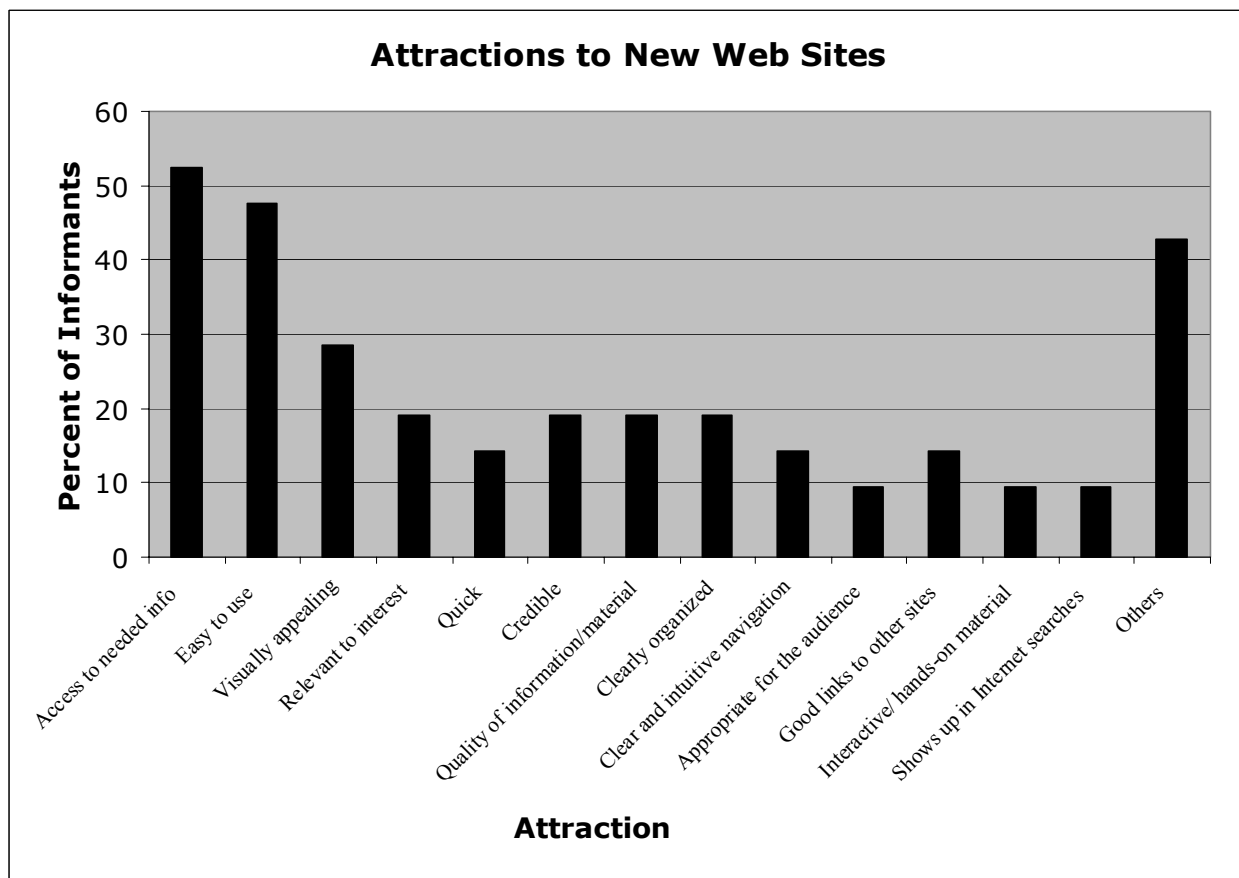

Figure 17. This figure shows the characteristics that attract the telephone informants to new Web sites. The informants gave these characteristics in response to our question: "What attracts you to a Web site?"

The overall effect of some responses may be unrepresentatively diffuse because the response options offered in the survey instruments were open ended. The diffusion of responses occurred in a couple of ways. First, the informants provided responses to some questions that would logically apply to other questions as well, but did not provide the same responses to these related questions. Furthering the diffusion of responses, the patterns of inclusion and exclusion differed among informants. For example, the issue of credibility came up as a reason for a source being a favorite, a criterion for assessing the quality of new water education material, a reason for being attracted to a Web site, and a reason for returning to a Web site. While credibility was mentioned quite often, because the informants were not uniform in their application of this response to the applicable questions, its overall signal in the survey results is relatively small. Diffusion may also occur in the absence of cues to possible responses. We can assume that the informants' responses reflected what was most pressing on their recollection at the moments of their responses. Were they privy to the responses of their peers, they may have expressed agreement with responses they did not give themselves. Alternatively, were they to choose from a given set of responses, they might also tend to express greater agreement than they did in the two surveys. The difference in the concentration of responses to the question of instructional strategies in Figure 6 provides a graphic example. By providing all informants with the same set of options, a close-ended survey might provide a stronger, but narrower signal of needs and desires.
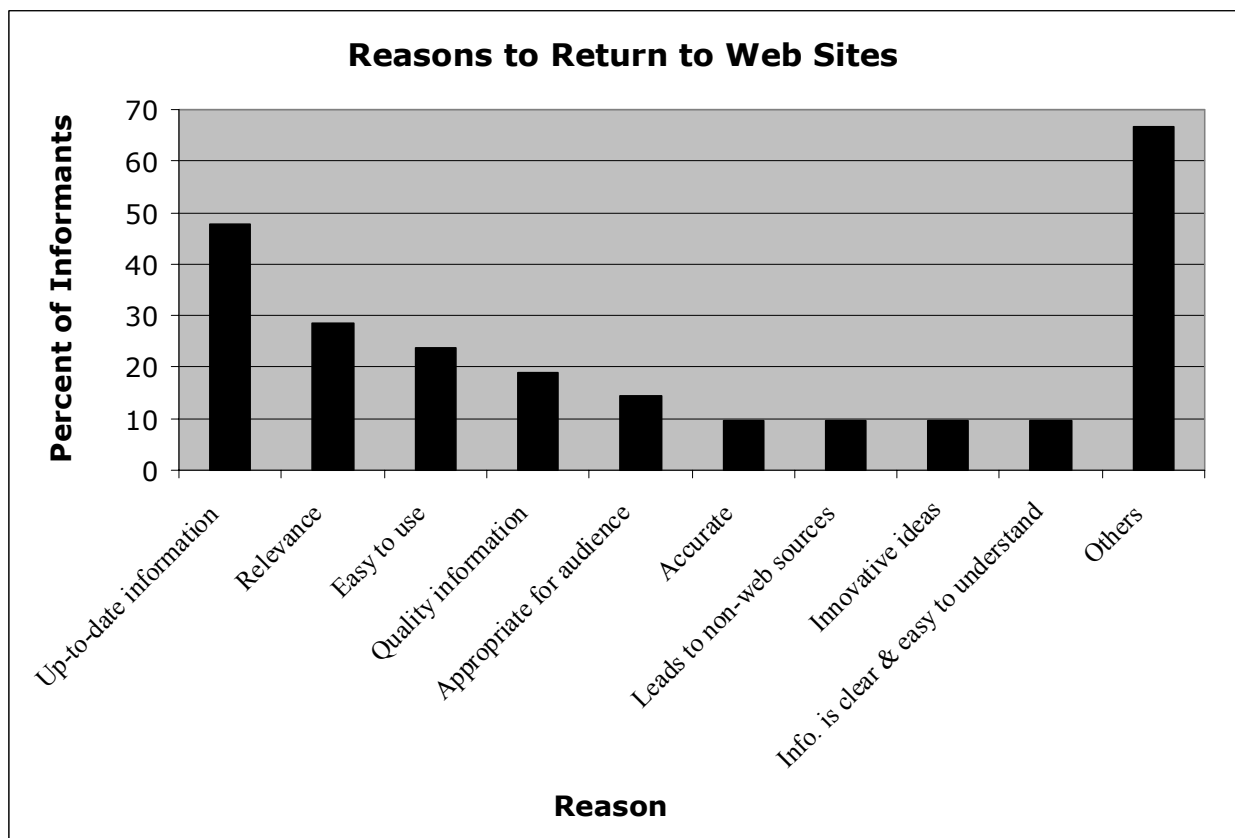

Figure 18. This figure shows the Internet Web-site characteristics that the telephone informants gave in response to our question: "What would keep you coming back to particular site?"
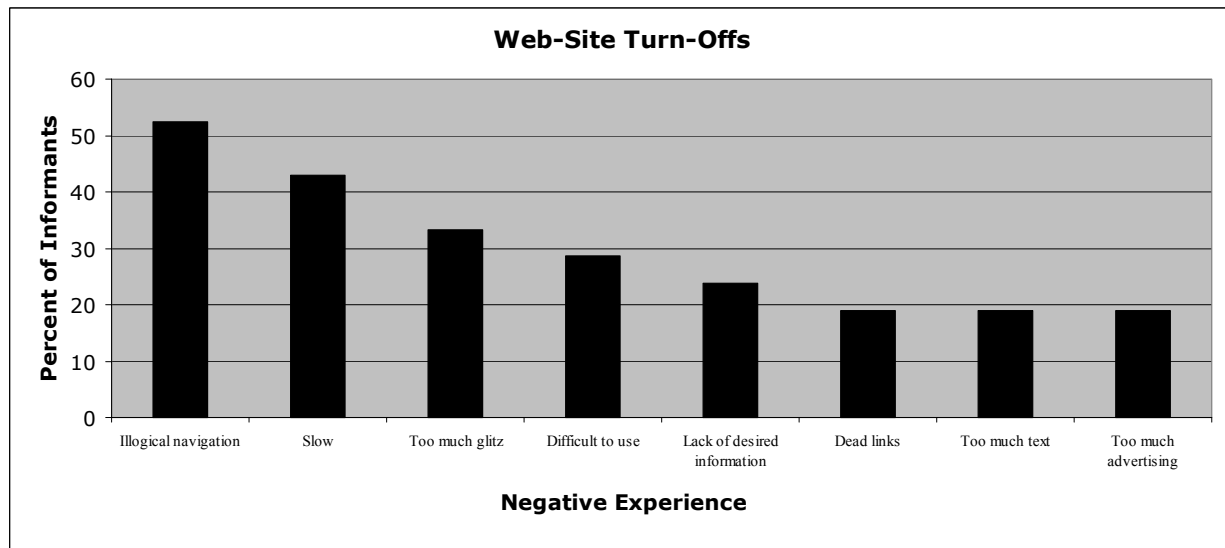
Web-Site Turn-Offs

Figure 19. These are the characteristics provided by the informants in response to our question: "What turns you away from a particular site?" These characteristics and those provided in Figures 17 and 18 can be used as a set of criteria for designing and implementing a Web site for use by professionals preparing to conduct water outreach and education.

SERVICES SUGGESTED BY THE INFORMANTS

The responses provided by the Boise and the telephone informants suggest four services that would enhance the outreach and education efforts of education providers.

1. *Facilitated communication among providers engaged in water outreach and education across the nation.*

One of the most effective ways to distribute information is through existing networks of communication (Gardner and Stern 1996, 91). The informants confirmed this tenet. They said that they often look first to their colleagues for help in locating what they need. This is usually done by telephone or E-mail. Current and future national facilitation projects should provide four mechanisms for facilitating this kind of communication among professionals and volunteers across the nation with water outreach and education responsibilities.

- List serve. A nation-wide list-serve for professionals with water outreach and education responsibilities would facilitate networking among these professionals. Local and statewide examples of this type of network currently operate in pockets around the country, e.g. the Ohio Watershed Network and the Environmental Educators Council of Ohio.
- E-mail newsletter. An E-mail newsletter that focuses on sharing experiences with the use of curricula, materials, and activities for water outreach and education is another means of linking professionals and volunteers with water outreach and education responsibilities. The California Water News is one example of a regional level electronic newsletter. In this example the topics are primarily about water-related legislation and litigation.

- Web-site links to local projects. Some local projects have records of successful water-related material and program implementation. Several informants expressed a desire for information on successful education projects around the country. One informant specifically suggested creating a Web-based list of all the different types of water management, education, and outreach programs. Each listing would connect to a second list of specific projects around the country with a history of program success in that specific area. Each item in this second list would link to the local site describing the successful project materials and implementation and providing personal contact information allowing direct access to colleagues with experience and expertise in the specified program area.

- Links to sources that do not require the Internet. These would include the telephone numbers and mailing addresses of knowledgeable individuals involved with local projects listed on the Web site. It would also include a 1-800 number for contacting the organization responsible for managing the Web site and, if different, the organization responsible for managing the outreach/education materials and best practices included on the site.

2.   Easy access to repositories of credible, high quality, and up-to-date water outreach and education materials, curricula, and best education practices for professionals with outreach and education responsibilities

This is a core concept of the *Water Outreach Education: Facilitating Access to Resources and Best Practices* project. The study suggests that the ideas of the proposal remain consistent with the needs of education providers. It provides more detailed input on the needs and preferences of education providers. For instance, the informants said that they need information and materials that are easy to access and easy to use. The informants expressed a collective need for help assessing the needs of their audiences, assessing and selecting the highest quality resources, and finding and accessing water education materials. They also provided additional user-based criteria for designing the BEP Web site. These are identified in the **Web-Site Design** subsection of this report (starting on page 18) and Figures 16-19. The BEP Web site should provide easy access to repositories of water outreach and education materials, curricula, and best education practices that meet the needs and conform to the standards expressed by the informants in the **Sources of Information** and **Criteria for Source Assessment** subsections starting on page 10.

3.   Assurance that the Web site is always current, credible, and of high quality.

Credible information is a key to attracting people's attention (Gardner and Stern 1996, 90). We did not ask specific questions about the credibility of information. However, the informants said repeatedly that they need credible, high quality, and up-to-date information and materials that they can trust. To remain viable and trusted, the Web site and related links must be maintained and updated frequently. This is not a task for special projects. It is a crucial function that demands a delegation of responsibility and a long-term commitment of funds sufficient to ensure the maintenance of information so that the Web site and related links are continuously current, credible, and of high quality.

4.   *Links to Internet Web sites commonly accessed and used by these professionals*

All informants use the Internet to access water outreach and education information and materials. Most of them identified sites they prefer for accessing this type of information. These sites are listed in Appendix G, and should be included in the BEP Web site created in meeting the objectives of our project. In addition, the patterns of site preferences among the informants shown in Figure 15 and identified in the *Favored Web Sites* subsection starting on page 17 give us the information necessary to prioritize our provision of links to agency, organization, and project Web sites around the country.

The delivery of products related to the second and fourth of these services are among the goals of the current facilitation project. However, the maintenance required to keep these products up-to-date is beyond the scope of the current project.

CONCLUSIONS

Our research suggests that nearly all water resource education providers use the Internet to some extent to find and access education materials, information, and best practices. This is by far the strongest message that can be drawn from our study of natural resource professionals with water outreach and education responsibilities. It justifies our focus on providing Internet-based tools to help them best fulfill their water outreach and education responsibilities. However, we must use the results of our study with some caution.

The results cannot be statistically generalized to the entire population of water outreach and education providers. The small sample size and nonrandom sampling methods defy assumptions on which such generalizations must be based. Too, the use of an open-ended survey may diffuse the signal of informants' needs and concerns. While we cannot generalize the results of this study to all water resource education providers, the results do provide a sample of needs and desires held by some members of our target audience.

The results provide a picture of what some of the potential users of our products need and want for outreach education information, materials, best education practices, and support. The products to be delivered by this project will temporarily meet some of the service needs identified by the informants. However, additional funding should be sought to keep these products up to date and to establish and maintain other means to enhance and facilitate communication among professionals and volunteers working to provide water outreach and education to target audiences.

Assuming that our informants are not unique, we can take their input as an indication of the needs and desires of a portion of the target audience. In that alone, our project planning and the resulting product development will be more informed and more likely to meet the needs of our target audience than had we not performed the study.

REFERENCE

Gardner, Gerald T., and Paul C. Stern. 1996. *Environmental Problems and Human Behavior*. Boston: Allyn and Bacon.