

**USGS/NSTA Earth Science Materials
Increasing Effectiveness of Regional Earth Science Education**

**FOCUS GROUP STUDY
USGS WATER POSTERS – LARGE ORDER SURVEY**

SUMMER 1999

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BASED ON SURVEYS AND FOCUS GROUP SESSIONS MANAGED BY

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USGS/NSTA Earth Science Materials

Increasing Effectiveness of Regional Earth Science Education

EXECUTIVE SUMMARY

This report summarizes recommendations from two national surveys and two focus groups. Both the surveys and the focus groups were designed to provide an assessment of the USGS water posters, other USGS earth science education materials, and future education resource needs. One national survey was sent to USGS State Representatives and the other to individuals who ordered 50 or more water posters at one time. Focus groups were organized to provide reactions from formal and non-formal education organizations in the Madison, Wisconsin area. Surveys and focus groups were conducted during the summer of 1999.

The results of the surveys and focus groups were summarized and analyzed separately, but they are reported together here to give a fuller sense of the quality and usefulness of current materials and the heartfelt need for new resources. While questions from the survey and focus group sessions were not identical and were not intended to be combined, results from the two projects are strikingly similar.

- Survey results summarize comments from 65% of the USGS State Representatives and 67% of the groups which ordered 50 or more poster copies, at any one time.
- Focus group participants provided comments based on education experiences with youth in the upper elementary or middle school age group (grades 4 - 8). Participants included 8 teachers in the formal educator group and 11 educators in the non-formal educator group.

Overall – both survey and focus groups were enthusiastic about the water poster series. All USGS materials and the NSTA guide to USGS water posters were highly rated by educators. Recommendations for improvement and ideas for new education materials demonstrate both the depth of need and confidence in USGS to produce education materials that educators want to use.

Both survey and focus group participants expressed a need for:

- Localized education materials, using or linking to local maps, watershed maps and photos (i.e. they expressed a preference for “realistic” information to complement education objectives)
- Posters accompanied by more details about how to use them, using the USGS Teacher Packet format
- An ecosystem focus for new education materials
- Inter-active education activities and resources
- Videos or power point presentations on a variety of earth science and ecosystem topics

Key Survey Results:

- Posters are used primarily as an attractive hand-out to individuals and educators at a wide variety of events
- Posters are considered invaluable by respondents who would even be willing to pay for bulk orders of posters, if necessary
- Respondents could use a variety of other materials – particularly, hands-on activities; outreach kits; demonstration materials; and career education resources
- Respondents would like USGS and web site promotion items to give away at events

Key Focus Group Results:

- Improve organization of web site to make resources more accessible
- Emphasize use of the Teacher Packet format for providing materials
- Adapt materials to meet particular needs of non-formal educators (laminated or suited for use in the outdoor environment, provide quick overview or conclusion activities, show link to field experiences, use real models or localized information)
- Provide additional posters or packets focusing on the functioning of natural systems
- Provide realistic education materials and reference or relate all materials to local concerns (a good role for the state USGS office)
- Increase emphasis on open-ended and student directed activities. Emphasize or reference science process skills.
- Educators liked the focus group setting as a way of learning from each other about the value and uses of USGS and NSTA materials.
- Educators would like USGS or other designated professionals to work with them more directly to improve their understanding of materials and how to use them.

BACKGROUND

The United States Geological Survey has been involved in developing and promoting youth education about water for the last decade or more. Water is one of four divisions in USGS: the others are Geological, Mapping, and Biological Resources. Each Division produces its own educational materials including numerous maps, fact sheets and information guides that teachers and leaders can use for background material or that the students, themselves, can use to answer questions or to satisfy their curiosity.

In this decade, USGS has worked to expand contact with teachers and youth groups by working with other organizations and using popular formats. Two new resources are provided through the Internet and by the USGS Water Resources Education Initiative (WREI). USGS Internet resources include collections of fact sheets and scientific reports on scientific information, information search strategies, field data, and “The Learning Web” which walks teachers or youth through USGS Internet resources that can be used along with sample education activities.

WREI products or programs include: the water poster series (including educational activities on wetlands, water use, wastewater treatment, navigation, ground water, water quality, oceans, watersheds, and hazardous waste), Water Resources Professional’s Outreach Notebooks, Children’s Water Festivals, Groundwater Guardian, curriculum materials, and has worked in cooperation with a number of other organizations to publicize and distribute water education information. The National Science Teachers Association (NSTA) works in cooperation with USGS to deliver selected water education posters to teachers and has developed a teacher’s guide series to accompany the posters.

As the primary organization for developing and managing data about earth science, USGS continues to consider avenues for making their information available to educators and to the general public. To further that goal, this report summarizes recommendations from two national surveys and two local pilot focus groups. Both the surveys and the focus groups were designed to provide an assessment of the USGS water posters, other USGS earth science education materials, and future education resource needs.

One national survey was sent to USGS State Representatives and the other to individuals who ordered 50 or more water posters at one time. Focus groups were drawn from the Dane County, Wisconsin area. The first focus group was conducted to elicit reactions from educators in upper elementary through middle school education institutions; the second to elicit reactions of non-formal educators. Surveys and focus groups were conducted during the summer of 1999.

PROCEDURES – THE NATIONAL SURVEYS

Survey Goals

Two surveys, of large order customers (those who ordered 50 or more posters at one time) and USGS State Representatives, were designed to improve USGS understanding of who uses USGS water posters, how the posters are used, and what other materials poster users would like to have. Survey questions were selected through discussion with Steve Vandas, USGS Office of Education and Outreach, Denver. Questions were formulated to provide more information about how posters were distributed, poster use and satisfaction, and future needs. Sample surveys are included in Appendix A.

Survey Participants and Questions

Two, somewhat different, surveys were designed. One for the 48 USGS State Representatives representing the 50 US states and one for the 157 organizations which ordered 50 or more posters at a time, any time since the posters first became available in 1991.

Categories of organizations which placed “large orders” included:

- federal agencies
- state agencies
- local agency
- utility
- school/university
- non-profit
- private/profit

Survey questions formulated for USGS State Representatives:

1. Have you ordered any of the USGS water posters?
2. Could you use the USGS water posters to support your public education initiatives?
3. What other materials could you use to support your public education initiatives?
4. Why did you order the USGS water posters?
5. After you received your USGS water poster order, what happened to the posters?
6. Have you attempted to gather feedback about poster use or satisfaction?
7. Would you order this type of educational material again?
8. Would you be willing to pay for poster copies and how much?

Survey questions formulated for those who ordered 50 or more posters:

1. Who are you? (federal agency, state agency, local or regional conservation agency, local government office, utility, school/university, non-profit, private/profit)
2. How did your organization publicize poster availability to your clientele?
3. After you received your USGS water poster order, what happened to the posters?
4. Have you attempted to gather feedback about poster use or satisfaction?
5. Why did your agency order the posters?
6. How would you modify the water posters?
7. Which aspect of the maps [*misnomer for posters*] do you find the most useful in reaching your educational goals?¹
8. What other materials could USGS develop to support your education goals?
9. Would you order this type of educational material again?
10. Would you be willing to pay for poster copies and how much?

Survey Distribution and Management

Surveys were mailed August 1999. Every survey was identified by a number. Returned surveys were checked against a master list of identification numbers. A second mailing went to missing responses in September 1999.

Survey questions were coded. Responses were entered into one of two data bases by code.

Survey Results

A summary of survey results is provided in this report under Results (p. 10). Comments about how posters were distributed, poster use and poster satisfaction are summarized in Table 1. Respondent feedback about potential modifications for the posters is included in Table 2 along with focus group recommendations. Future needs identified by survey respondents are included in Table 3 along with future needs identified by the focus groups. Detailed results from the Poster Surveys are reported in Appendices B and C.

PROCEDURES – THE FOCUS GROUPS**Focus Group Goals**

USGS would like to assess how educators want to use USGS resources in the next five years. To help collect data about educator preferences, USGS funded the development of a focus group manual that regional professionals can use to gather information from local educators. To create the focus group manual, a focus group procedure – described in this

¹Due to accidental use of the term “map” when referring to the water posters, responses to this question were not included in the survey summary or recommendations.

report – was developed and pilot tested by the University of Wisconsin - Environmental Resources Center during the summer of 1999. The resulting recommended procedure for using a focus group to gather regional information is provided in, “USGS Focus Group Manual: Increasing Effectiveness of Regional Earth Science Education, with Help from a Focus Group.”

Goal for the pilot focus group effort:

The University of Wisconsin - Environmental Resources Center will assist the United States Geological Survey (USGS) and the National Science Teachers Association (NSTA) to review USGS youth water education efforts to better enable USGS and NSTA plan for future youth water education initiatives.

The specific goal was to identify the future water education needs of formal and non-formal educators by answering three basic questions:

- **Accessibility** – What is the participant’s primary or preferred method of accessing new educational materials
- **Format** – Given a choice of a variety of educational materials, which format do participants find most applicable to their classroom/teaching situation?
- **Content** – What earth science topics would participants like to see the USGS concentrate efforts for developing new materials?

Focus group questions formulated from the specific goal:

1. You are about to look for new educational materials for an earth science program. How do you go about finding these materials?
2. Which of these materials [*from a selection provided to participants*] would you use when putting together an earth science program, how would you use them and why did you chose them?
3. How could you use these web sites [*from sites provided to participants*] as educational tools?
4. Now that we have looked at the printed materials and the web site, think about your earth science needs for the next 5 years.
 - a. What earth science subjects would you like addressed?
 - b. What formats would you prefer?
 - c. How would you like to access these materials?

Materials Reviewed by Focus Groups

While USGS provides many earth science education materials, the recommended two-hour time limit for the focus group required that participants review and discuss a limited number of sample materials. In advance of the focus group session, participants received copies of the following materials. They were asked to familiarize themselves with these materials and bring them to the focus group session.

Focus Group Review Materials:

- USGS Water Poster Series, middle school level
 wetlands, water use, wastewater treatment, navigation, ground water, water quality, oceans, watersheds, and hazardous waste
- USGS Teacher Packets, middle school level
 Map Adventures
 Global Change
 Caves
- USGS Fact Sheets
 USGS Tracks Acid Rain
 USGS Programs in Wisconsin
 Mercury Contamination of Aquatic Ecosystems
 Flood and Flood Plains
- USGS web sites
 These sites were: *Real Time Data*, <water.usgs.gov/realtime.html>; *USGS Learning Web*, <www.usgs.gov/education/>; and *Water Science for Schools*, <ga.water.usgs.gov/edu/>
- National Science Teacher guides to the USGS Water Poster Series
 Water Matters: Water Resources Teacher's Guide, Volume 1.

Focus Group Participant Selection

Two pilot focus group sessions were conducted, to respond to USGS interest in knowing how both formal (teachers) and non-formal (educators in a non school teaching scenario, i.e., naturalists, state and federal agency educators) feel about USGS educational materials. Since upper elementary and middle school educators are the specific target of the USGS materials being evaluated, participants were selected from educators who work with this age group.

The goal for the pilot focus groups was to identify 8-10 participants, from the Madison, Wisconsin area, purposely selected to represent their peer group. Ultimately, there were 8 participants in the formal educator group and 11 participants in the non-formal educator group. Group selection was constructed to avoid overly dominant personalities and to include participants from a variety of schools or educational sites. Attention to group composition was intended to alleviate peer pressure and let people speak more freely without pressure from their coworkers. Participants were offered a \$50 stipend and a collection of USGS and NSTA earth science education materials as an honorarium for participation.

Employers for participants in the focus group for **formal educators** were:

Cambridge Elementary, Cambridge
Marshall Early Learning Center, Madison
Netherwood Knoll Elementary, Oregon (2)
St. Francis Xavier, Cross Plains
Viroqua Elementary, Viroqua
Westby High School, Viroqua
Wingra School, Madison

Employers for participants in the focus group for **nonformal educators** were:

Aldo Leopold Nature Center
Dane County Land Conservation Department
Girl Scouts
International Crane Foundation (2)
Madison Metropolitan School District - Cherokee Marsh
Olbrich Botanical Garden (2)
University of Wisconsin Arboretum and Middleton Cross Plains School District (2)
Wisconsin Department of Natural Resources (volunteer monitoring)

Developing and confirming the participant list was very time-consuming. USGS professionals or other educators considering this approach will need to allow considerable time for this aspect of the project. Ideally, the participant list should be finalized at least one month prior to the focus group date. Participants for these pilot groups were being finalized up until a few days before each session.

It took about 40 hours work time (one person, full time equivalent) to gather participants for each focus group. Steps included:

- identify schools and groups to solicit for participants - calling other professionals, organizations, and schools to identify potential sources of participants, checking phone book listings for private schools and youth groups
- develop a solicitation strategy - direct mail, email lists, phone calls
- develop candidate response materials, how the candidate communicates his/her interest in participating
- carry out the solicitation
- follow-up to encourage those that received materials to share them with appropriate candidates
- communicate with candidates who respond to assure they understand the opportunity and to confirm their interest
- final confirmation of candidates and focus group arrangements

Focus Group Procedure

Focus group procedure and interpretation was based on recommendations from two resources: *Focus Groups: A Tool for Understanding Community Perceptions and Experiences* by L. Butler, C. Dephelps, and R. Howell, a Western Regional Extension Publication, WREPO128, 1995 and *Focus Groups. A Practical Guide for Applied Research* by Richard A. Kreuger, Newbury Park, CA: Sage Publications., 1988.

To conduct the discussions, we used two room set-ups: a computer laboratory and an additional room with tables and chairs. The computer laboratory had one computer available for each participant's use. The classroom had space to set-up tables in a square shape with chairs around the perimeter. This set-up was designed to facilitate eye contact among the participants and the interviewer. In the classroom, tables for refreshments and for extra copies of the materials being evaluated were also available.

Participant comments were recorded on a flip chart placed at the front of the room, in a position easily viewed by all participants, and in hand-written notes taken by two members of the planning team. Recorders sat on opposite sides of the room at their own table (not part of the participant table). Focus group sessions were also recorded on audio tape (with permission of participants).

To conduct the interview, a script was prepared. The purpose of a script is to provide the interviewer with all the words and information needed to conduct the focus group session. Slight changes were made to the script to make it more appropriate for either formal or non-formal educators. Each focus group was conducted by the same interviewer.

As recommended, the focus group session was limited to 2 hours (Butler, Dephelps and Howell, 1995). Time allotments were included in the script and on a posted agenda to ensure the interview session was kept to 2 hours. To help the interviewer keep on schedule, one of the recorders was designated as a time keeper who notified the interviewer about time lengths.

The script used for the focus group sessions was prepared using the format recommended by Butler, Dephelps and Howell, 1995 as a model. (A sample script including modifications needs identified through the pilot sessions is provided in the "USGS Focus Group Manual." Appendices F and G include exact questions used for the pilot sessions along with a tabulation of responses.) The Butler, Dephelps and Howell format was modified slightly with the following results.

Focus group script outline:

- Greetings/welcome
- Introductions
- Purpose (Put on Big Sheet of Paper for All Participants to See)
- Context: Overview, Background, Participants' Selection, Their Roles, and Roles of Team
- Review Activities for the next 2 Hours, Ground Rules (time duration, method of discussion, recording, turn-taking, breaks, confidentiality)
- Questions 1 - 4 (including probes)
- Summary (re-stating of main ideas gathered to assure accuracy)
- Conclusions, expressions of appreciation, plans for data analysis and presentation, distribution of evaluations and other forms.

At the end of the interview session, participants were asked to fill out a form, including summary questions and personal information. The study team wanted to learn how much preparation the participants did before the focus group session (approximately 2 1/2 hours) and wanted to give participants an opportunity to comment on the interview process. In addition, the personal information was used to guarantee that the participants could receive their stipend.

Focus Group Results

A summary of focus group results is provided in this report under Results (p. 10). Respondent feedback about potential modifications for posters, packets, NSTA guides and the USGS Web Site is included in Table 2 along with survey recommendations. Future needs are included in Table 3 along with future needs identified by survey respondents. Detailed summaries of Focus Group sessions are reported in Appendices D and E.

RESULTS – Surveys and Focus Groups

Survey and focus group responses are summarized by question in Tables 1, 2, and 3.

Table 1 – Poster distribution, Use and Satisfaction

Table 2 – Recommendations for Changes or Improvements to Earth Science Education Materials

Table 3 – Suggestions for New Earth Science Education Materials

SURVEY RESULTS

Survey results summarize comments from two surveys: one to USGS State Representatives and one to groups which ordered 50 or more poster copies at any one time (large order groups). Sixty-five per cent of USGS State Representatives responded and sixty-seven per cent of large order groups responded.

! Who uses the posters:

- Federal agencies were the largest group (65%) of respondents ordering bulk copies of the posters. Remaining respondents were more or less equally distributed among state agencies, non-profit organizations, local government, schools/universities and other similar groups.
- Posters are distributed, primarily, to:
 - a school district or local school (81% of USGS State Reps/75% of large order groups)
 - individuals at events (52% of USGS State Reps/68% of large order groups)
- Approximately one-third of respondents reported distributing posters to:
 - state agencies (39% of USGS State Reps/27% of large order groups)
 - citizen organization or private group (35% of USGS State Reps/34% of large order groups)
 - a local agency (26% of state offices/27% of large orders).
- A noteworthy effort was conducted by UNESCO which provided posters to Ministries or Commissions in over 100 countries.

! How are the posters used:

- Most respondents used posters to support public education initiatives.
- The greatest use of posters was to distribute them at talks, fairs, or demonstrations (94% of USGS State Reps/76% of large order groups) and to use as a supplement to education packets they supply (71% of USGS State Reps/74% of large order groups).
- About half of respondents also used the posters as a teaching tool (42% of USGS State Reps/49% of large order groups).
- Responses to questions about the quality of the posters was uniformly enthusiastic. However, very few respondents attempted to formally gather feedback (13% of USGS State Reps/17% of large order groups). Evidence of satisfaction was based on informal feedback.
- About 10% of large order respondents would like to see the posters slightly modified to make the drawings less complicated and more realistic.

! Willingness to pay for posters:

- Most respondents (63% of USGS State Reps/60% of large order groups) were willing to pay something for poster copies. Comments indicated that respondents felt that posters were worth paying for (“they are priceless”), but suggested that USGS charge for large orders only.
- Even \$.10/poster was considered too high a price, with less than half of respondents finding a cost choice (\$.10, \$.25, or \$.50 per poster) with which they could agree.
- ☆ Recommend that USGS consider continuing to provide small orders (less than 100 to one address) for free or for a small service charge (\$5). Larger orders could be sold at \$10/hundred.

! Future needs:

- Poster users provided an extensive list of suggestions about other educational materials they could use. Suggestions echoed those made by the focus group and are summarized in more detail with the focus group results. See *Table 2 – Recommendations for Changes or Improvements* and *Table 3 – Suggestions for New Earth Science Education Materials*.

FOCUS GROUP RESULTS**Design and Length**

Participants enjoyed the focus group experience. Many felt that participation in the group, was a good way to learn more about education materials and learn about or meet others who could help them in their job. All participants, except two, felt that two hours was an appropriate length of time. Many participants felt that they could have talked for more than 2 hours, but liked the “focus” that the two hour limit provided.

Comments included:

“Enjoyable - appreciate interest in our concerns and needs. Anxious to see report and how our input is used.”

“It was well planned; good questioning.”

“Very neat idea. Wish we had more of this type of activity among our peers in science.”

“This was rewarding in itself - Good luck!”

“Materials more valuable after group discussion”

“I’m glad I got to be a part of the focus group. It gave me an opportunity to gain greater insight into available materials and meet people who can help with my job.”

“. . . we could have said more, but after 2 hours people may have become impatient and lost focus.”

“I felt the time limit kept the goal of a focus group - to be focused. The time could be adjusted slightly, but increased time allows for diversions, which may not be effective for such a group.”

“Time keepers kept us on track. We could have talked more, but feel 2 - 2.5 hours was appropriate.”

“. . . it was well facilitated.”

“. . . the facilitator kept the group moving. We could have spent more time, given the diverse group.”

“I think with more time, either in one session but preferably in two sessions, where you could give more thought to topics and come back with more ideas particularly after hearing other’s comments.”

Key Findings

Key findings from the focus groups are reported below according to five categories synthesized from responses to specific focus group questions.² A summary by question is provided in Tables 2 and 3.

! All materials were seen as excellent resources by teachers, but need modification for non-formal educators

- Overall USGS and NSTA materials were designed for in-class use, and are not readily useful or appropriate for field use or out-of-classroom use.
- Teachers found all materials useful for developing a classroom earth science unit.
- Both teachers and nonformal educators identified the Teacher Packets as the most preferred format of all the materials reviewed.
- Nonformal educators liked the map packet, in particular, because map education is important and because they liked the layout, arrangement, and design of the packet.
- Nonformal educators liked the posters because they are colorful and synthesize ideas.
- Nonformal educators would use materials: as reference and to encourage use by teachers so they can provide classroom activities complementary to field or out-of-class activity.

! Educating educators about materials

- Use a focus group format as one way to introduce educators to materials and to others teaching about these topics.
- Publicize materials.
- Emphasize use of materials as reference materials for educators or their students: for developing “extensions,” extra credit or learning stations; as an easy to modify resource to fit class goals; as a rich source of school or classroom library materials.
- USGS contacts can visit schools to: to publicize education resources, to facilitate discussion groups among teachers about how to apply materials to classroom objectives, and to provide training on use and application of web site information

! Revising materials

- When choosing or revising format for materials, consider the special needs of the nonformal educators (topics, outdoor use, activity ideas for outdoors, materials that supplement hands-on experiences).
- Produce action-oriented materials, those that help kids figure out what they can do, for specific topics such as wetlands, floods.
- Develop a teacher packet format to accompany each of the posters in the poster series.

²This report follows recommendations for analyzing focus group results provided by *Focus Groups. A Practical Guide for Applied Research* by Richard A. Kreuger, Newbury Park, CA: Sage Publications., 1988.

- Localize materials, or note local contacts and resources. This can be done at the state level.
- Improve accessibility to web site resources through improved design. Respond to educator critiques of web site design through application of a web page evaluation strategy referenced on the EETAP web site. The evaluation publication is available at <http://www-comdev.ag.ohio-state.edu/eetap/index.html>

! Learning about educator and user needs

- To learn about 4-H staff priorities and material needs, conduct a special 4-H focus group, perhaps at the annual national 4-H conference.
- To learn about youth preferences for appearance of materials, conduct several focus groups with youth.

! New materials, formats and access

- Educators are excited by these earth science education resources and the potential for new materials. Detailed ideas are listed in Table 3.

Common Themes Found in Survey and Focus Group Results

Overall – both survey and focus groups were enthusiastic about the water poster series. All USGS materials and the NSTA guide to USGS water posters were highly rated by educators. Recommendations for improvement and ideas for new education materials demonstrate both the depth of need and confidence in USGS to produce education materials that educators want to use.

Both survey and focus group participants expressed a need for:

- Localized education materials, using or linking to local maps, watershed maps and photos (i.e. they expressed a preference for “realistic” information to complement education objectives)
- Posters accompanied by more details about how to use them, using the USGS Teacher Packet format
- An ecosystem focus for new education materials
- Inter-active education activities and resources
- Videos or power point presentations on a variety of earth science and ecosystem topics

TABLE 1 – SURVEY RESULTS: Poster Distribution, Use and Satisfaction

GROUP	POSTER DISTRIBUTION	POSTER USE, ORDERED . . .	POSTER SATISFACTION	COST
USGS State Representatives Survey	<ul style="list-style-type: none"> • 81% of respondents gave the posters to a school district or local school • 52% of respondents gave posters to individuals • 39% of respondents gave posters to a state agency for their use with educators • 35% of respondents gave posters to a citizen organization or private group • 26% of respondents gave posters to a district or local agency 	<ul style="list-style-type: none"> • 100% ordered USGS water posters to support public education initiatives • 94% to distribute at talks, fairs or demonstrations • 71% to use as a supplement to educational packets they supply • 42% to use as a teaching tool • 26% for a customer gift • 19% as a reference tool for clients 	<ul style="list-style-type: none"> • 100% of respondents would order this type of educational materials again • 13% of respondents tried to gather feedback about customer satisfaction, but no one provided details about findings 	<ul style="list-style-type: none"> • 63% of respondents would be willing to pay for poster copies • only half of the respondents indicated an amount that they would be willing to pay – 23% would be willing to pay \$.10/poster; 13%, \$.25/poster, 7% \$.50/poster • comments indicate that people would prefer that posters remain free of charge, but would be willing to pay something for a large quantity order or for any quantity if local funds were available

GROUP	POSTER DISTRIBUTION	POSTER USE, ORDERED . . .	POSTER SATISFACTION	COST
<p>Organizations which placed large orders for USGS water posters – Survey</p> <p>Respondents from:</p> <ul style="list-style-type: none"> • fed agency, 65% • state agency, 10% • non-profit org., 8% • local gov, 5% • school/univ, 5% • all others, 7% <p>(utility, local agency, regional government, UNESCO)</p>	<ul style="list-style-type: none"> • 75% of respondents gave the posters to a school district or local school • 68% of respondents gave posters to individuals • 34% of respondents gave posters to a citizen organization or private group • 27% of respondents gave posters to a state agency or Education Ministries. (UNESCO provided to Ministries or Commissions in over 100 countries.) • 27% of respondents gave posters to a district or local agency 	<ul style="list-style-type: none"> • 76% to distribute at talks, fairs or demonstrations • 74% to use as a supplement to educational packets they supply • 49% to use as a teaching tool • 17% as a reference tool for clients • 15% sited a variety of uses: visitor or customer gift, distribution to public or visitors, use with teacher education courses 	<ul style="list-style-type: none"> • 98% of respondents would order this type of educational materials again • 17% of respondents tried to gather feedback about customer satisfaction • 20% of respondents described feedback responses, even if they did not solicit responses. ALL responses were enthusiastically positive. Wetland, watershed and water resource posters were specifically sited for their usefulness. 	<ul style="list-style-type: none"> • 60% of respondents would be willing to pay for poster copies • only half of the respondents indicated an amount that they would be willing to pay – 29% would be willing to pay \$.10/poster; 16%, \$.25/poster, 6% \$.50/poster • comments indicate that posters are worth paying for (“they are priceless”), but people would prefer that maps remain free of charge because funding is so limited and so many posters are needed at one time; many thought they would be willing to pay something for a large quantity order; some respondents were willing to pay to buy one copy

TABLE 2 – Recommendations: for Changes or Improvements

Group	Posters	Packets	NSTA guides	USGS Web Site	Fact Sheets
Formal Educator Focus Group	<ul style="list-style-type: none"> • Provide posters in a simplified form, sized for seat-work. • Include real photos or maps of communities to make them more useful. 	<ul style="list-style-type: none"> ☆ Preferred format of all the materials reviewed • Include state level information. • The cave packet teaching strategy, which involved students through questions, was cited as a particularly strong resource. • Make education materials look as much like real life as possible (for example: people should represent the diversity of the population, maps should look like the maps that kids see -- in color, not in black and white). 	<ul style="list-style-type: none"> • Strengthen by providing more open-ended, student-directed activities. 	<ul style="list-style-type: none"> • Provide a site map and other organizing techniques to improve ease of use. • Provide specific front page links to elementary or middle school lesson plans and activities. • Explain any measurements and units of measure used on the web site. • Provide a web page “tie-in” to current events. • Provide an opportunity for students to email questions to experts. • Use web site for simulating earth science dynamics. For example, demonstrate what happens to ground water when an area becomes built-up. 	<ul style="list-style-type: none"> • Fact sheets were seen as a rich source of school or classroom library materials.
Nonformal Educator Focus Group	<ul style="list-style-type: none"> • Prefer posters that illustrate functioning of the natural system. • Simplify for short programs. • Reference or relate materials to local concerns. • Laminate or otherwise package materials to be used outdoors. 	<ul style="list-style-type: none"> • Simplify for short programs • Reference or relate materials to local concerns. • Laminated or otherwise package materials to be used outdoors. 	<ul style="list-style-type: none"> • No changes recommended 	<ul style="list-style-type: none"> • Provide a site map and other organizing techniques to improve ease of use. • Facilitate web site practice and group discussion for nonformal educators. • Improve design so that it is easy for nonformal educators to: <ul style="list-style-type: none"> -- Ask youth to predict what they will see when they get to the field. -- Compare filed data to data available on the web site. -- Accumulate information about a site before or after a field visit. 	<ul style="list-style-type: none"> • No changes recommended

USGS/NSTA Earth Science Materials FOCUS GROUP STUDY AND SURVEYS– SUMMER 1999

Group	Posters	Packets	NSTA guides	USGS Web Site	Fact Sheets
Organizations which placed large orders for USGS water posters – Survey State USGS Representatives were not asked to suggest improvements	<ul style="list-style-type: none"> • 79%, keep as is • 11%, modify by making the drawings less complicated • 9%, modify by making the drawings more realistic • Other* 	<ul style="list-style-type: none"> • No question 	<ul style="list-style-type: none"> • No question 	<ul style="list-style-type: none"> • No question 	<ul style="list-style-type: none"> • No question

***OTHER COMMENTS ABOUT POSTERS:**

- Add high school edition
- Consider upgrading the Jr. High version to more “realistic” drawings
- Supply examples/experiments
- Put title and age-group for which each map is intended in the upper right hand corner
- Fold consistently; embed hidden water related images that can turn the poster into a game (aka “Where’s Waldo”)
- Do one general poster instead of a grade school or middle school edition; make interpretive text rather than technical text
- Have posters show management practices (take the cow out of water, and fence in)
- Provide Spanish version
- Complement existing posters by using other related environmental topics

TABLE 3 – SUGGESTIONS: For New Earth Science Education Materials

Group	New Materials	Format	Access
<p>Formal Educator Focus Group</p>	<ul style="list-style-type: none"> • Information on a wide variety of topics: water, air, land, pollution, recycling, climate change, volcanoes, spectacular events, land use, human geography and careers. • Dynamic information: connections between people, animals and the environment, examples of how problems get solved, changes over time of ecology and the environment, how the scientific method affects decision-making, and ability to compare data between countries, a seasonal web site - changes with the season. • Materials that link earth science to real people. • Resources that help kids connect to a world view, to understand how our behaviors affect the globe. 	<ul style="list-style-type: none"> • Project oriented materials, especially which address community service and careers. • Interactive materials where kids create theories, collect data and coordinate with experts. • Videos and documentaries on subjects listed under new materials. • Prefer the teaching packets and want web links to the packets. 	<ul style="list-style-type: none"> • Send materials directly to teachers rather than to principals. • Provide and fund networking opportunities, teacher training to use materials and access earth science study equipment. • Improve visibility for USGS materials via a visit from a USGS staff person, information about how to get the materials, and information about what is available • Maintain access to printed materials even though web based materials were very popular.

Group	New Materials	Format	Access
Nonformal Educator Focus Group	<ul style="list-style-type: none"> • Materials about GIS resources and how to use them for education. • A community focus for materials -- link to people's actions, history, culture, uses of water, human impacts on the environment, planning, wastewater • Subject matter resources about -- wetlands hydrology, how chemicals get into the environment, the importance of the water table and how actions affect it, local maps • Would like materials to include activities for the outdoors, such as a section on orienteering. 	<ul style="list-style-type: none"> • Formats useful for the out-of-classroom or out-of-doors: plastic coated, smaller size for filed use, folded. 	<ul style="list-style-type: none"> • No new ideas or changes were recommended

Group	New Materials	Format	Access
USGS State Office Representatives Survey	<ul style="list-style-type: none"> • Use or want a variety of materials (Noted examples: any and all materials; topics of interest: earthquakes, volcanoes, water, ecology; materials for younger audiences; update existing materials; materials for college level audience) • Career opportunities materials • Explanation of USGS • Groundwater pamphlet (manual for grades 6-8) and other materials like this, such as one on water quality • Hands-on activity ideas (for Open House and other opportunities) • Short videos (including environmental issues, hydrology, careers) • Adult oriented water posters • Posters for children that encourage more repetition of learning (connect the dot, word search) • Demos of surface water issues (similar to the groundwater model) • Outreach kit (like the one provided by the WV office) containing various lessons on water issues, biology, mapping and geology GIS applications, brochures and easy to use CDs 	<ul style="list-style-type: none"> • Pamphlets • Fact sheets • Teacher packets • Manuals for teaching earth science topics to grades 6-8 • Videos - short • Spanish language materials • Bookmarks (describing mission, website, available resources, water facts) • Volunteer poster • Stickers (water facts) • Items for children with USGS logo (pencils, bookmarks, book covers) Web-based materials 	<ul style="list-style-type: none"> • Nothing specific mentioned, but survey results indicate that some people had trouble getting things they wanted or didn't know that certain items existed. • For example, when asked what other materials they could use, one person responded that they wanted all 9 water posters (even though they presumably already knew how to get them). Another wanted USGS to develop a groundwater demonstration model. (These models are readily available around the country).

Group	New Materials	Format	Access
<p>Organizations which placed large orders for USGS water posters – Survey</p>	<ul style="list-style-type: none"> • List of teaching requirements for existing materials • Lesson plans for water quality (like the 6-8 groundwater manual) • Videos targeted to K-12 - groundwater, surface water, water quality, tsunami, earthquake, field activities, walk through posters • Instruction/activity packets on the poster themes, but with more instruction oriented approach, simple, easy to use (like the caves, mapping and global change packets) • Other posters - groundwater, nonpoint source pollution, coastal habitats, barrier islands, generic water cycle poster or chart, biodiversity • Materials on other topics - ecology unit and support materials, stream flow gauging/ measurement for K-12, surface water, careers • Maps - watershed maps for the average person, a series of water maps geared to the state • Materials for specific age-groups - for college-age groups from whom we hope to recruit potential hydrologists, technical resources for secondary educators/students, soils/dirt education materials for elementary grades 	<ul style="list-style-type: none"> • Videos targeted to K-12 • CD-ROM water resource content with interactive education, programs, games • Slides, power point, or video explaining basic geology, water, earth science concepts • Interactive displays on the World Wide Web • Resource guides, videos, lesson plans • More posters • More maps • Wetlands poster in Spanish • Overheads for educators • Supplies for substitute teachers (portable) 	<ul style="list-style-type: none"> • Development of a comprehensive listing of available materials, accessible by schools • Re-print out of stock pieces • Annual National Water Resource Summary • Promotion piece with information such as the web site address and details (such as a bookmark)

APPENDIX A

Water Poster Survey Forms

Water Poster Survey for USGS State Office Representatives
USGS Water Poster User Survey

USGS Water Poster User Survey

WETLANDS: Water



Survey coordinated by:

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Environmental Resources Center

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Madison, WI 53706-1562
Phone: 608-262-0020 Fax: 608-262-2031

INVITATION

Date: September 13, 1999
To: Organizations who have ordered USGS water posters
From: Elaine Andrews, Environmental Resources Center
Re: Reminder - USGS water poster series user survey

Dear Friends:

Your organization has been identified as one which placed a "large order" for USGS water posters sometime in the last several years. By taking a few minutes to respond to this survey, you can help us to better understand how to distribute these valuable posters more effectively. You may have ordered any of nine different water posters. A sample portion of the wetland poster has been copied onto the cover of this survey packet. The topics covered by the other posters include biodiversity, watersheds, acid rain or hazardous materials, water use, wastewater treatment, oceans or navigation, ground water and water quality.

Please mail the completed survey to the address above by **September 24**, using the enclosed stamped and self-addressed envelope. If your organization has already returned a survey to us, please indicate this on the enclosed survey and send it to us.

Thanks for your help!!!

Elaine Andrews
Environmental Resources Center
Phone: (608)262-0142
e-mail: eandrews@facstaff.wisc.edu

PERSON COMPLETING THIS FORM _____
NAME OF ORGANIZATION _____
ADDRESS _____
PHONE _____ FAX _____ E-MAIL _____

1. Who are you? (circle the title which best describes your organization)
 - A. federal agency
 - B. state agency
 - C. local or regional conservation agency
 - D. local government office
 - E. utility, what type _____
 - F. school/university
 - G. non-profit
 - H. private/profit
 - I. other, name _____

2. How did your organization publicize poster availability to your clientele? (*circle all that apply*)
 - A. no publicity
 - B. newsletter/newspaper article
 - C. information distribution mailing list
 - D. posters were mailed directly to a targeted audience
 - F. electronic communications
 - G. advertisement
 - H. letter or publicity mailing
 - I. other, what _____

3. After your organization received your USGS water poster order, what happened to the posters?
(*respond to all that apply and circle number of requests if known*)
 - A. Kept them for interagency use.
 - Gave them to the following:** (circle all that apply)
 - B. State agency, which one(s)? Number of requests made?
 - i. (name) _____ made:
 - a. 1 request
 - b. multiple requests
 - ii. (name) _____ made:
 - a. 1 request
 - b. multiple requests
 - C. District/local agency, which one(s)? Number of requests made?
 - i. (name) _____ made:
 - a. 1 request
 - b. multiple requests
 - ii. (name) _____ made:
 - a. 1 request
 - b. multiple requests
 - D. School district/local school, which one(s)? Number of requests made?
 - i. (name) _____ made:
 - a. 1 request
 - b. multiple requests
 - ii. (name) _____ made:
 - a. 1 request
 - b. multiple requests
 - E. Citizen organization/private group, which one(s)? Number of requests made?
 - i. (name) _____ made:
 - a. 1 request
 - b. multiple requests
 - ii. (name) _____ made:
 - a. 1 request
 - b. multiple requests
 - F. Individuals, describe the circumstance. Number of requests made?
 - i. (event) _____ made:
 - a. 1 request
 - b. multiple requests

- ii. (event) _____ made:
 a. 1 request
 b. multiple requests
- G. Other, who/what? Number of requests made?
 i. (name) _____ made:
 a. 1 request
 b. multiple requests
4. Have you attempted to gather feedback about poster use or satisfaction? (Circle yes or no)
 A. Yes No
 B. If feedback was gathered, please describe the overall response:
5. Why did your agency order the posters? (Circle all that apply)
 A. to distribute at talks, fairs, or demonstrations
 B. as a supplement to educational packets supplied by my agency
 C. as a teaching tool for agency professionals to use
 D. for a customer gift
 E. as a reference tool for adults
 F. other _____
6. How would you modify the water posters? (Circle all that apply)
 A. keep as is
 B. modify by:
 i. make drawings less complicated
 ii. reduce size
 iii. make words more readable
 iv. use more realistic drawings instead of cartoon format
 v. other _____
7. Which aspect of the maps do you find the most useful in reaching your educational goals? (Circle one)
 A. color map
 B. activities on back of map
 C. black and white map
 D. use of map with the activities on back
8. What other materials could USGS develop to support your education goals?
9. Would you order this type of educational material again? (Circle yes or no)
 Yes No
10. Would you be willing to pay for poster copies and how much? (Circle yes or no)
 A. Yes No
 B. How much? (Circles one)
 i. \$.10 per copy
 ii. \$.25 per copy
 iii. \$.50 per copy
 iv. other \$_____ per copy

Water Poster Survey for
USGS State Office Representatives

WETLANDS: Water



Survey coordinated by:

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Environmental Resources Center

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Madison, WI 53706-1562
Phone: 608-262-0020 Fax: 608-262-2031

INVITATION

Date: September 13, 1999

To: USGS State Office Representatives

From: Elaine Andrews, Environmental Resources Center

Re: Reminder - USGS water poster series survey

Dear Friends:

The USGS education and outreach office would like to know more about the use of its water poster series. By taking a few minutes to respond to this survey, you can help us to better understand how to distribute these valuable posters more effectively. You may have ordered any of nine different water posters. A sample portion of the wetland poster has been copied onto the cover of this survey packet. The topics covered by the other posters include biodiversity, watersheds, acid rain or hazardous materials, water use, wastewater treatment, oceans or navigation, ground water and water quality.

Please mail the completed survey to the address above by **September 14**, using the enclosed stamped and self-addressed envelope. If your office has already returned a survey to us, please indicate this on the enclosed survey and send it to us.

Thanks for your help!!!

Elaine Andrews
Environmental Resources Center
Phone: (608) 262-0142
e-mail: eandrews@facstaff.wisc.edu

- E. Citizen organization/private group, which one (s)? Number of requests made?
- i. (name) _____ made:
 - a. 1 request
 - b. multiple requests
 - ii. (name) _____ made:
 - a. 1 request
 - b. multiple requests
- F. Individuals, describe the event. Number of requests made?
- i. (event) _____ made:
 - a. 1 request
 - b. multiple requests
 - ii. (event) _____ made:
 - a. 1 request
 - b. multiple requests
- G. Other, who/what? Number of requests made?
- i. (name) _____ made:
 - a. 1 request
 - b. multiple requests

6. Have you attempted to gather feedback about poster use or satisfaction? (Circle yes or no)
- A. Yes No
 - B. If feedback was gathered, please describe the overall response:

7. Would you order this type of educational material again? (Circle yes or no)
- Yes No

8. Would you be willing to pay for poster copies and how much? (Circle yes or no)
- Yes No

- B. How much? (Circle one)
- i. \$.10 per copy
 - ii. \$.25 per copy
 - iii. \$.50 per copy
 - iv. other \$_____ per copy

APPENDIX B

USGS Water Poster Survey

Poster use by USGS State Office Representatives

*Conducted by the University of Wisconsin – Environmental Resources Center
On behalf of the USGS Education and Outreach Office, Denver, Colorado
August 1999*

Survey background

Survey was constructed based on information needs identified by Steve Vandas, USGS Office of Education and Outreach, Denver. Survey was mailed to USGS State Representatives, August 1999. A second mailing went to missing responses in September 1999.

Survey participants

The USGS Denver Education and Outreach Office identified 48 contacts representing the 50 US states.

- 71% (34 contacts) responded.
- 65% (31 contacts) provided usable answers to survey questions.
 - 1 contact gave an elementary school address (instead of an agency address), responses are not included in the results
 - 2 contacts returned a blank survey explaining that others in their office had received the survey and replied.

[A different survey, a User Survey, was mailed to 157 organizations which ordered 50 or more posters any time since the posters first became available in 1991. Some state USGS contacts also received this survey because it was passed on to them by the original recipient. This led to some confusion about who should complete which survey. Directions were clarified for several state representatives who called or emailed to get further explanation.]

USGS state use of USGS Posters

USGS EDUCATION INITIATIVES

RESPONDENT ANSWERS (N=31)

1. Have you ordered any of the USGS water posters? Yes = 100% (N=31)

USGS EDUCATION INITIATIVES

RESPONDENT ANSWERS (N=31)

2.	Could you use the USGS water posters to support your public education initiatives?	Yes = 100% (N=31)	
3.	What other materials could you use to support your public education initiatives?	<i>81% RESPONSE: Many provided multiple responses.</i>	N=25
		Use or want a variety of materials (Noted examples: any and all materials; topics of interest: earthquakes, volcanoes, water, ecology; materials for younger audiences; update existing materials; materials for college level audience)	5
		Career opportunities materials	2
		Explanation of USGS	1
		Teacher packets	2
		Groundwater pamphlet (manual for grades 6-8) and other materials like this, such as one on water quality	2
		Pamphlets, fact sheets	1
		Hands-on activity ideas	1
		Youth activity ideas (for Open House and other opportunities)	1
		Short videos (including environmental issues, hydrology, careers)	3
		All 9 water posters	1
		Adult oriented water posters	1
		Posters for children that encourage more repetition of learning (connect the dot, word search)	1
		Demos of surface water issues (similar to the groundwater model)	1
		Physical model to demonstrate ground water flow	1
		Outreach kit (like the one provided by the WV office) containing various lessons on water issues, biology, mapping and geology	1
		GIS applications, brochures and easy to use CDs	1
		Spanish language materials	1
		Bookmarks (describing mission, website, available resources, water facts)	2
		Volunteer poster	1
		Stickers (water facts)	1
		Items for children with USGS logo (pencils, bookmarks, book covers)	1
		Web-based materials	1

4. Why did you order the posters? (respondents circled all that applied)

PURPOSE	RESPONDENT ANSWERS (N=31)
To distribute at talks, fairs, demonstrations	94% (N=29)
As a supplement to educational packets supplied by USGS	71% (N=22)

PURPOSE	RESPONDENT ANSWERS (N=31)	
As a teaching tool for agency professionals	42%	(N=13)
For a customer gift	26%	(N=8)
As a reference tool for clients	19%	(N=6)
Other	15%	(N=5) open house, teachers (2), schools, teaching tool

Water Poster Distribution

5. After you received your USGS water poster order, what happened to the poster?
(respondents circled all that applied)

DISTRIBUTED POSTERS TO:	REQUESTS/ ORGANIZATION (N=31)	
Kept for interagency use and/ or gave out	35% (N=11)*	*Author's note: meaning of % response is unclear; this question was not easy to see on the page, as a result of the survey format, and/or may have been perceived as redundant, due to question wording
Gave to a state agency	39% (N=12)	Examples Single time: NH Project WET, HI Dept of Ed. Multiple times: IL EPA and DNR, IN Dept.of Env. Mgmt., IN Dept. of Natural Resources, ME BEP (?), ME Geologic Survey, MI Dept. of Env. Quality, NY Dept. of Env. Conserv., PA several agencies, Puerto Rico Aquaduct and Sewer Authority, Puerto Rico Ed Dept., MT Water Center, TX Water Develop Bd., TX Natural Res. Conserv. Comm.
Gave to a district/ local agency	26% (N=8)	Examples Single time: AZ Hydrological Society Multiple times: Agencies throughout IL, NY Water Planners, agencies throughout PA, Puerto Rico Dept. of Nat. Res., MS Cooperative Ext. Service, Puerto Rico Dept. of Natural Resources, Puerto Rico Env. Quality Bd., TX Springhills water mgmt.dist., AK Kenai Borough, TX Brazos River Authority, TX Red River Authority
Gave to a school district/ local school	81% (N=25)	Examples Multiple times: Many schools throughout IL; Indianapolis Public School; KY numerous elementary/middle schools; ME Farrington, Hodgkins, and private southern ME area schools; DE East Dover Elementary; NH several schools and teachers; NY several school science fairs, teacher workshops; PA several schools/districts; WV Piedmont Elementary; MS many local schools; PR more than 20 private schools and universities; IA local schools; MT Helena District Schools; NE Children's Groundwater Festival; SD Rapid City District Schools; TX Austin, San Antonio, Ft. Worth, Harris County, and Friendswood ISD's ; WY Torrington-Trail Elementary; AK several local schools; AZ Van Horne elementary Schools; AR several schools

DISTRIBUTED POSTERS TO:

REQUESTS/ ORGANIZATION (N=31)

Gave to a citizen organization/ private group	35% (N=11)	Examples Single time: NH Audubon Society Multiple times: IN environmental groups, IN Hispanic Center, NY Girl Scouts and Boy Scouts, PA presentations to public and school-aged children, TX Austin Nature Center, AK Anchorage Waterways Council, AK Assoc. of Mining Engineers
Gave to individuals	52% (N=16)	Examples Multiple times: IL many school teachers at fairs; IN Earth Week; NH Children's Water Festival; NY Watershed Weekend; drinking water expos; PA festivals, Earth Day; WISWEIO conferences; GA fairs and conferences; MS annual Aqua Fair; TX Boy Scouts, Girl Scouts, troop leaders, teachers - used with internet field trip sponsored by NASA, TWDB, TPWD; WY State Children's Festival; AK Outdoor Week; AZ teachers
Other	29% (N=9)	Examples Multiple times: IL general public; ME mostly teachers for workshops; WI staff members giving talks at schools; AL Legacy/environmental education group; MS Bureau of Land Mgmt.; PR more than 10 foreign countries (individuals and government); SC USGS Open House, District Office; NE available on magazine rack; TX Learning Tree in Round Rock

Feedback about Poster Use and Satisfaction

6. Have you attempted to gather feedback about poster use or satisfaction?

Yes, 13% (N=4)

No, 84% (N=26)

No Response, 3% (N=1)

Respondents were asked to describe response to any feedback attempt, but no one provided any results.

Ordering Materials in Future

7. Would you order this type of educational material again?

Yes, 100% (N=31)

No, 0%

8. Would you be willing to pay for poster copies and how much?

PAY CHOICES

PERCENT WHO AGREE (N=30)

Would be willing to pay for poster copies

63% (N=19)

Would **not** be willing to pay for poster copies

33% (N=10)

Would be willing to pay \$.10/copy	23% (N=7)
Would be willing to pay \$.25/copy	13% (N=4)
Would be willing to pay \$.50/copy	7% (N=2)
Other	7% (N=2) Comments: \$.05/copy; \$.10/map ok in limited numbers; small or individual orders could be free, but it would be ok to charge for large quantities; prefer that maps remain free; willing to pay if local funds are available

iwu sgssurre1

APPENDIX C

USGS Water Poster Survey

Poster use by organizations which placed “large orders”

*Conducted by the University of Wisconsin – Environmental Resources Center
On behalf of the USGS Education and Outreach Office, Denver, Colorado
August 1999*

Survey background

Survey was constructed based on information needs identified by Steve Vandas, USGS Office of Education and Outreach, Denver. Survey was mailed to identified participants, August 1999. A second mailing went to missing responses in September 1999.

Survey participants

The USGS Denver Education and Outreach Office identified 157 organizations which ordered 50 or more posters at a time, any time since the posters first became available in 1991.

Categories of organizations which placed “large orders” included:

- federal agencies
- state agencies
- local agency
- utility
- school/university
- non-profit
- private/profit

Respondents:

- 67% (105 contacts) surveys were returned.
 - 8% (12 contacts) envelopes were returned by Post Office, “Return to Sender”
 - (1 contact) was a double
 - (1 contact) did not recall ordering posters and did not complete the survey
 - (1 contact) replied that the WY Water Resources Center was closed and did not complete the survey; would like to receive summary of survey results
 - (1 contact) indicated that responses were included in USGS state education contact survey
- 57% (89 contacts) provided usable answers to survey questions.

Although the survey was sent to all organizations which placed orders for 200 or more posters, it was not possible to assure a high percentage response. Some surveys were returned because the address was out of date with no available forwarding address. Also - at the same time that this survey was sent, a related, but different, survey was mailed to the USGS State Representative. In some cases, the USGS person who placed the large order was also the USGS State Representative. In other cases, the USGS person who received the survey forwarded it to the USGS State Representative. As a result, some state

representatives reported receiving 3 surveys. Although state representatives were conscientious about asking which survey they should respond to, we were not successful in making sure that ALL knew to respond to both the “larger order” survey and the “state representative” survey, if appropriate.

Organization background information

1. Who are you?

TYPE OF ORGANIZATION	% OF RESPONDENTS (N=88)*	
Federal agency	65% (N=57)	1 agency also designated the non-profit category
State agency	10% (N=9)	
Local or regional conservation agency	2% (N=2)	
Local government office	3% (N=3)	
Utility	5% (N=4)	1 utility also designated government office, 2 utilities also designated the school/university category
School/university	5% (N=4)	
Non-profit organization	8% (N=6)	
Private/profit organization	0%	
Other, name:	2% (N=2)	Regional government, UNESCO

*Organizations were asked to choose the title that fit them best. Percent responses were based on the most likely category. Second choice designations are listed as a comment.

2. How did your organization publicize poster availability to your clientele? (respondents circled all that applied)

PUBLICITY STRATEGY	PERCENT USING THIS STRATEGY (N=89)
No publicity	21% (N=19)
Newsletter/ Newspaper article	16% (N=14)
Information distribution mailing list	9% (N=8)
Posters were mailed directly to a targeted audience	26% (N=23)
Posters were given away in various circumstances	87% (N=77) + 10 mentions in comments section

PUBLICITY STRATEGY	PERCENT USING THIS STRATEGY (N=89)
Electronic communications	12% (N=11) + 4 mentions in comments section
Advertisement	2% (N=2)
Letter or publicity mailing	4% (N=4)
Other, what	27% (N=24) Teacher's conference give-away, Web site notice (4), given to other agencies for their distribution, available at Public Information Center/Visitor's Center, posters given to teachers when we visited classrooms to make environmental education presentations, conference hand-out, word of mouth, Water Festival, Farm Days, attend organization/association/agency functions, posters included in Water Resource Trunks, Project WET workshops, teaching tool in wetland courses, used in school environmental education program, part of teacher workshop kit, posters given to all teachers in school

Water Poster Distribution

3. After you received your USGS water poster order, what happened to the poster?
(respondents circled all that applied)

DISTRIBUTED POSTERS TO:	REQUESTS/ ORGANIZATION (N=88)
Kept for interagency use	20% (N=18)
Gave to a state agency	27% (N=24) Examples Single time: NY Project WET; ID Dept. of Water Res. Multiple times: MD Dept. of Natural Res., local schools and colleges; WA Office of Env. Ed., Dept of Ecology; IN Dept. of Natural Res., Dept. of Env. Mgmt.; MO Dept of Natural Res., Dept. of Conservation, University Extension; ND State Water Commission, Parks and Recreation, Dept. of Health; NY Dept. of Env. Conservation; IA Dept. of Natural Res.; NC Div. of Water Res.; AL Geologic Survey; IL Dept. of Nat. Res., Env. Prot. Agency; MN Dept. of Ag., Dept. of Health; UNESCO Education ministries and UNESCO National Commissions in over 100 countries
Gave to a district/ local agency	20% (N=18) Examples Multiple times: WA Purce Co. SW Mgmt., Clallam Co. Dept. Comm. Develop.; CO Boys and Girls Clubs; NY Water Planners; IA various municipal water supply agencies; NV Clark Co. Library; NC subdistrict offices of USGS; IL many county and municipal agencies such as Durage Co. and the City of Urbana; Districts and Div of Army Corps; Army Corp in Los Angeles, Detroit, Baltimore; ND Soil Conservation Districts, NRCS regional offices, county stormwater resource boards; MN Watershed Dist., Soil Water Conserv. Dist.; GA local library; OH various sites

DISTRIBUTED POSTERS TO:

REQUESTS/ ORGANIZATION (N=88)

Gave to a school district/ local school

75% (N=66)

Examples

Single time: SD School of Mines and Technology
 Multiple times: WI Shorewood Hills Elem, distributed as part of field trip to municipal well and discuss. of groundwater; WA Tacoma School Dist.; IN various parochial schools; OH various schools; MO various school dist.; ND various schools; NY science fairs and workshops at several schools; IA various schools (too many to list); NV Clark Co. School Dist.; NC various schools; NH several schools throughout the state; AK Juneau school system; CO Durango Ignacio Cortez; KS Newton school classes; KY/IN various grade and middle schools; AL Tuscaloosa City and county Schools; SD School of Mines and Tech.; FL various school and career day presentations; IL various schools; TX when staff go out to schools they usually take posters

Gave to a citizen organization/ private group

34% (N=30)

Examples

Single time: NH Audubon Society
 Multiple times: WA Tacoma Stream Team, Citizens for Healthy Bay; MS various; ND Science Center, zoos, environmental scout camps, learning centers, bible camps, 4-H camps; NY Girl and Boy Scouts; NC Natural History Museum Science Fair; CO Children's Water Fairs, 3 Soil Conservation Districts for annual 5th grade festival; IL Rotary, Izaak Walton League, Boy Scouts, Kiwanis; MN Lake associations, Eco Education; GA Girl Scouts; WEF member organizations to distribute at NSTA shows; KY Harrod Creek and Floyds Fork Watersheds

Gave to individuals

68% (N=60)

Examples

Single time: SD Western SD Water Festival
 Multiple times: MD class presentations by employees; WI science night at Shorewood Hills Elementary; WA Tacoma students and teachers; IN Indianapolis Earth Day, various fairs and environmental events; MO private citizens, teachers; ND Teachers Convention, teaching and technology conference; IA classroom aides; NC home schooling students and parents, Earth Day open house, Boy/Girl Scout Leaders; NH watershed week drinking water expos; CO Boeing Earth Day; AL people who request them; NE visitors; CA to professionals attending a water related convention; FL events like St. Johns River clean-up; CA USGS Open Houses; IL citizens to learn basics on water resources, students of varying ages for use in class projects; UT State Fair; TX Earth Day Exhibits/Water Sourcebook Teacher Training sessions; EPA Reg 10 home educators; NE Children's Groundwater Festival, Earth Wellness Day

Other

28% (N=25)

Examples

Multiple times: WA private citizens; OH posters are available at outreach-type events for teachers and students; IA given away at local and state WDR Children's Water Festivals; KS Boy Scouts; IL foreign agencies, water resource agencies; TX nature centers, scout troops, summer camps; GA environmental groups, clubs, organizations; CO distributed as handouts at a conference; ID BLM private individuals and teachers; MN home school educators; KY City Hall Dept. fair at local mall

Feedback about Poster Use and Satisfaction

4. Have you attempted to gather feedback about poster use or satisfaction?

Yes, 17% (*N*=15)

No, 80% (*N*=71)

No Response, 3% (*N*=3)

Respondents were asked to describe response to any feedback attempt.

20% (*N*=18) provided comments:

(Comments provided by state. Semi-colon separates user comments)

NY, very positive from teachers, parents, students

NC, did not solicit comments, but received positive feedback

CO, quite pleased in schools; excellent; did not solicit comments - but on occasion teachers would call for one more poster, especially liked wetland, watershed and water resource posters

AL, posters were appreciated by everyone we talked with about them - they were especially useful in school classrooms; very positive

CA, did not solicit comments - but feedback is positive; did solicit comments - educators thought they were excellent tools and visuals for all ages, especially liked the narratives

TX, upper elementary had most enthusiastic response

GA, excellent response

MN, verbal feedback, very positive responses, always want the full set for classroom walks

DE, poster was a great tool in teaching the watershed concept

OH, did not solicit comments, but received positive feedback

VA, did not solicit comments, but received positive feedback

WI, teachers enthusiastically agreed that the posters would be useful in the classroom

UNESCO, overall response was very enthusiastic

5. Why did you order the posters? (respondents circled all that applied)

PURPOSE	RESPONDENT ANSWERS (<i>N</i> =89)
To distribute at talks, fairs, demonstrations	76% (<i>N</i> =67)
As a supplement to educational packets supplied by my agency	74% (<i>N</i> =65)
As a teaching tool for agency professionals	49% (<i>N</i> =43)
For a customer gift	6% (<i>N</i> =5)
As a reference tool for clients	17% (<i>N</i> =15)
Other	9% (<i>N</i> =8) Examples: visitor gift, distributed at teacher training workshops (2), distribution to general public, visitor information center, Project WET workshops, teaching tool for teachers, for use with education courses

6. How would you modify the water posters? (respondents circled all that applied)

SUGGESTED MODIFICATIONS	RESPONDENT ANSWERS (N=80)
Keep as is	79% (N=63)
Modify by making the drawings less complicated	11% (N=9) + 1 comment
Modify by reducing the size	1% (N=1)
Modify by making the words more readable	3% (N=2)
Modify by using more realistic drawings instead of a cartoon format	9% (N=7)
Other modification suggestions:	15% (N=12) Comments: add high school edition; consider upgrading the Jr. High version to more “realistic” drawings, otherwise very effective; supplying examples/experiments in differing complexities; I find it difficult to differentiate between the maps, suggest you use USGS visual ID, put title and age-group for which it is intended in the upper right hand corner (2), fold consistently; embed hidden water related images that can turn the poster into a game (aka “Where’s Waldo”); do one general poster instead of a grade school or middle school edition; make interpretive text rather than technical text; have posters show management practices (take the cow out of water, and fence in), nice to have Spanish version; less “busy;” complement existing posters by using other related environmental topics

7. Which aspect of the maps do you find the most useful in reaching your educational goals?

[Responses to this question were not included in the survey report due to ambiguity in question wording. While conducting both the survey and the focus groups, we found that many users occasionally called the water posters, “maps”. While, in person, it was clear which USGS materials were intended, it is not clear that the wording of this question referred to the posters. However, it could be assumed from the answers to this question, that respondents really liked having black and white copies of educational materials. Presumably these were copied for local uses.]

MOST USEFUL ASPECTS OF POSTER	RESPONDENT ANSWERS (N=85)
Color map	22% (N=19)
Activities on back of map	7% (N=6)
Black and white map	86% (N=56)
Use of map with activities on back	5% (N=4)

Feedback about Future Needs for Education Materials

8. What other materials could USGS develop to support your education goals?
44% (N=39) responded

MATERIALS	NUMBER OF MENTIONS
List of teaching requirements for existing materials	1
Videos targeted to K-12 - groundwater, surface water, water quality, tsunami, earthquake	3
Updated video of field activities	1
Lesson plans for groundwater	2
CD-ROM water resource content with interactive education programs/games	1
Instruction/activity packets on the poster themes, but with more instruction oriented approach, simple, easy to use (like the caves, mapping and global change packets)	2
Lesson plans for water quality (like the 6-8 groundwater manual)	1
Development of a comprehensive listing of available materials, accessible by schools	1
More on surface water	1
Material for college-age groups from whom we hope to recruit potential hydrologists	1
Bookmarks	2
A series of water maps geared to the state	1
Slides, power point, or video explaining basic geology, water, earth science concepts	1
Interactive displays on the World Wide Web	1
Videos that walk through the posters	1
Generic water cycle poster or chart	2
Resource guides, videos, lesson plans	1
Wetlands poster in Spanish	1
Re-print out of stock pieces	1
Curriculum/activity book on streamflow gaging/measurement for K-12	1
Annual National Water Resource Summary	1
Biodiversity poster	1
Technical resources for secondary educators/students	1
Other posters - groundwater, nonpoint source pollution, coastal habitats, barrier islands	1

MATERIALS	NUMBER OF MENTIONS
Soils/dirt education materials for elementary grades	1
Promotion piece with information such as the web site address and details	1
Watershed maps for the average person	1
Overheads for educators	1
Supplies for substitute teachers (portable)	1
Materials related to careers	1
Ecology unit and support materials	1

Ordering Materials in Future

9. Would you order this type of educational material again?

Yes, 98% (N=87)

No, 0%

No Response, 2% (N=2)

10. Would you be willing to pay for poster copies and how much?

PAY CHOICES	PERCENT WHO AGREE (N=86)
Would be willing to pay for poster copies	60% (N=52)
Would not be willing to pay for poster copies	38% (N=33)
Would be willing to pay \$.10/copy	29% (N=25)
Would be willing to pay \$.25/copy	16% (N=14)
Would be willing to pay \$.50/copy	6% (N=5)
Other	2% (N=2)

Comments about cost:

\$1.00/copy; ability or interest in paying is unknown at this time; fee for large quantities ordered is appropriate, small or individual orders could be free; important to keep costs low so we can continue to provide free of charge; \$7.50/set and/or quantity discounts; would pay if necessary and if budget permitted, some of the schools where the posters were distributed would be unable to pay, this is one of the reasons the posters were so well accepted; federal office paper work for paying is too difficult and procurement time is too long (5); if they were priced low enough, the educators would purchase them; as an individual, I would pay; our agency made an inter-agency transfer of funds (\$10,000) for as many posters as could be obtained for that amount; they are priceless; we did pay for the posters; as parent, \$ 0.25 - 0.50 ok, poster should be in "Consumer Information Catalog;" free is a much stronger incentive to use them; NRCS has no discretionary funds, but SCD's

may consider a purchase if necessary in future; couldn't afford do use them if there was a cost, or would have to be very selective in distribution; would pay only if we had a grant; cost would be passed along to attendees receiving Project WET and WILD; I would distribute less widely if I had to pay for them; we gave them away, can't pay for our 600+ schools and 1700+ teachers; limited funding; would be willing to pay but do not have funds; would be worth a lot more, but we need a lot of them to give to teachers; would pay, but would prefer to have the "free;" if paid \$ 0.50/copy, would not order so many topics; we are changing to web-based resources

Additional comments (overall):

Please continue producing the posters; the layout on the back is great for copying; teachers really enjoy the activities; kids like the cartoon format and the "busyness" of the pictures (reminds them of "Where's Waldo?"); some of the questions are really not geared to a USGS office, perhaps a separate questionnaire would be applicable to USGS and another for other agencies; ship the water resources professional outreach notebooks to WET coordinators for review; send list of USGS educational publications to WET coordinators; keep using USGS pubs, "What is Water?" Groundwater and the Rural Homeowner;" love your work, keep it up and keep making the posters available; we love these posters; great reference to help people remember what they have seen during the tour

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APPENDIX D

Focus Group Summary

Formal Educators

This summary was developed from a detailed analysis of the focus group discussions, found in Appendix F.

PARTICIPANTS

Cambridge Elementary, Cambridge
Marshall Early Learning Center, Madison
Netherwood Knoll Elementary, Oregon (2)
St. Francis Xavier, Cross Plains
Viroqua Elementary, Viroqua
Westby High School, Viroqua
Wingra School, Madison

PARTICIPANT PREPARATION

In preparation for the focus group session, participants spent an average of 1.46 hours reviewing printed materials and .94 hours reviewing suggested web sites. Only 1 participant had ever participated in a focus group before.

QUESTION 1 - How do you find new materials?

Teachers gather information about a topic by accessing a wide variety of resources. When developing an earth science program, teachers mainly find their materials through their own initiative, by getting direction from others to find additional resources and by networking with peers. Teachers will go to a variety of persons and agencies to get educational materials and will use printed and electronic methods. Teachers take the initiative to develop their own background or understanding of a topic through review of materials and information collected at libraries, agencies, organizations and bookstores. Teachers also rely on peers, workshops, conferences, available curricula and web sites for new ideas.

For teachers, information about curricula resources needs to be available through conferences, web sites and catalogs. USGS needs to make materials visible in the educational community. Personal contacts are used frequently by teachers, therefore a local USGS contact could be a very effective way of publicizing materials. This contact could also be available to local schools for on-site programs. USGS could make an 800 number available for publication orders. Relying only on web site, downloadable materials may limit the availability of materials for teachers.

QUESTION 2 - Which materials, how, why this one?

All of the USGS educational materials were favorably received by the teachers. Teachers described all materials reviewed as important reference materials and were pleased with the variety. Out of the selection of posters, packets, fact sheets and the NSTA book, packets were most commonly chosen for use in putting together an earth science unit.

Teachers would use any of the materials included in the focus group discussion as reference materials for themselves or their students. They would use the posters, packets and fact sheets for developing “extensions,” extra credit or learning stations. Teachers were able to visualize several ways to use the posters and packets in their units, especially by modifying them to fit class goals. For example, teachers said that posters “fit in” with their wetlands and water units. Map packets complement the class mapping unit. Fact sheets were seen as a rich source of school or classroom library materials.

An activity on the water supplies poster (the activity was not identified) and the cave packet teaching strategy which involved students through questions were cited as particularly strong resources.

The posters and NSTA book, although considered useful by the teachers, received a variety of criticisms/suggestions. The poster style was liked by some teachers and not by others. Comments included, “make them more realistic” and “they are too generic, all white people.” Some felt the NSTA book was “too teacher directed” and small group work was “not rich and meaningful enough.” They felt it was not up to date in its teaching method. On the other hand, the facts presented in the NSTA book were considered helpful and “nice to have all in one place.”

Teachers would be more likely to use posters and packets if they include real photos or maps of communities to make them more useful. Teachers recommend that education materials look as much like real life as possible (for example: people should represent the diversity of the population, maps should look like the maps that kids see -- in color, not in black and white)¹. NSTA books could be strengthened by providing more open-ended, student-directed activities. Posters would get greater use if they were provided for students in a simplified form, sized for seat-work. Packets would get greater use if state level information was included.

QUESTION 3 - Web site evaluation

Teachers found the web site to be a valuable tool in developing their earth science program. Group discussion about how the resource could be used proved to be a highly valued activity at the focus group session. USGS state offices should consider providing opportunities for teachers to learn about the web site resources together and brainstorm potential uses. Most frequently mentioned benefits were: as a general resource about water for teachers and students; for specific example activities -- water cycle, glacial valley, and the scenarios for Cape Cod, the Everglades and Los Angeles; and for the interactive investigation opportunities provided by the “real-time” site.

¹Responses from mothers in a focus group on breast feeding indicated a similar preference for education materials that featured photos of real people, rather than actors or illustrations. (Linda Inglis, Best Start Social Marketing at the National Education Association of Families and Consumer Science, November 1999.) Since youth are the end-users of USGS materials, it would be informative to interview youth to determine if they shared this preference also.

Teachers had some difficulty navigating around the site, trying to find relevant pages. Teachers would be more likely to use the web site if a site map and other organizing techniques were provide to improve ease of use. Teachers recommended a headline page with new news and actions and a “search” site on the home page. Teachers had trouble finding any lessons plans and also could not locate lesson plans for their grade. They recommended specific front page links to elementary or middle school activities.

Teachers also had several content suggestions for the web page. They would like to see some kind of “tie-in” to current events, such as to issues with the Everglades or how wetlands affect flooding and flow rates. Since formulating questions is a key education goal, teachers also recommended providing an opportunity for students to email questions. Teachers suggested that the web site also provides a good opportunity for simulating earth science dynamics, such as what happens to ground water when a site becomes built-up. Teachers would like any measurements and units of measure used on the site to be better explained.

QUESTION 4 - Earth Science Education Materials Needed in the Future

New materials. Teachers would like:

- Information on a wide variety of topics: water, air, land, pollution, recycling, climate change, volcanoes, spectacular events, land use, human geography and careers.

- Dynamic information: connections between people, animals and the environment, examples of how problems get solved, changes over time of ecology and the environment, how the scientific method affects decision-making, and ability to compare data between countries, a seasonal web site - changes with the season.

- Links to real people.

Formats. Teachers would like:

- Project oriented materials, especially which address community service and careers.

- Interactive materials where kids create theories, collect data and coordinate with experts.

- Videos and documentaries on subjects listed above.

- Resources that help kids connect to a world view, to understand how our behaviors affect the globe.

Access. Teachers prefer:

- The teaching packets and web links to the packets.

- To get materials sent to them directly, rather than to principals.

- Provide and fund networking opportunities, teacher training to use materials and access earth science study equipment.

- Improved visibility for USGS materials via a visit from a USGS staff person, information about how to get the materials, and information about what is available.

- Not all teachers have easy access to the Internet, so printed materials should still be available. If teachers do have computers in their classrooms, the computers or their access to the Internet may be too slow to allow use of USGS web site activities during class time.

OVERALL

- Make materials more visible in the educational community. Publicize materials. While most focus group participants had seen the posters, they were unaware that other reviewed materials and web site were available.
- Personal contacts are used frequently by teachers, therefore a local USGS contact could be a very effective way of publicizing materials.
- Make an 800 number available for publication orders (??). Relying only on web site, downloadable materials may limit the availability of materials for teachers.
- Emphasize use of materials as reference materials for educators or their students: for developing “extensions,” extra credit or learning stations; for modifying to fit class goals; as a rich source of school or classroom library materials. reference materials for themselves or their students.
- Benefits of the web site were: as a general resource about water for teachers and students; for specific example activities -- water cycle, glacial valley, and the scenarios for Cape Cod, the Everglades and Los Angeles; and for the interactive investigation opportunities provided by the “real-time” site.
- Formal educators would be more likely to use the web site if a site map and other organizing techniques were provide to improve ease of use. Teachers recommended a “search” site on the home page and a headline page with new news and actions.
- Teachers had trouble finding any lessons plans and also could not locate lesson plans for their grade. Teachers recommended specific front page links to elementary or middle school activities.
- Teachers would like any measurements and units of measure used on the site to be better explained.
- Provide a web page “tie-in” to current events, such as to issues with the Everglades or how wetlands affect flooding and flow rates.
- Since formulating questions is a key education goal, teachers also recommended providing an opportunity for students to email questions to experts.
- The web site provides a good opportunity for simulating earth science dynamics, such as what happens to ground water when a site becomes built-up.

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APPENDIX E

Focus Group Summary Nonformal Educators

This summary was developed from a detailed summary of the focus group discussion, found in Appendix G.

PARTICIPANTS

Aldo Leopold Nature Center
Dane County Land Conservation Department
Girl Scouts
International Crane Foundation (2)
Madison Metropolitan School District - Cherokee Marsh
Olbrich Botanical Garden (2)
University of Wisconsin Arboretum and Middleton Cross Plains School District (2)
Wisconsin Department of Natural Resources (volunteer monitoring)t

PARTICIPANT PREPARATION

In preparation for the focus group session, ten participants spent an average of 1.67 hours reviewing printed materials and .975 hours reviewing suggested web sites. One person did not receive materials ahead of time due to confusion about their agreement to participate. Six participants had participated in a focus group before.

Nonformal educators participating in this session, were a diverse mix - reflecting the diversity of nonformal educators. In general, the nonformal educators were less “comfortable” about being asked to participate in a focus group about the USGS/NSTA materials. The facilitator often had to tease out information. Some participants wondered if they were the “right” person. Often, when participants answered focus group questions, they put themselves into the vantage point of a teacher, instead of their own position. This discomfort is most probably the result of the fact that neither the USGS nor the NSTA materials were designed with the needs of the nonformal educator in mind. The nonformal educators had to “stretch,” to figure out constructive suggestions.

It should be noted that no 4-H staff were present for the focus group, even though learning about 4-H audience needs was a priority. The Dane County 4-H staff did not see the focus group materials or activity as a priority. A Sauk County 4-H camp staff planned to attend, but was unable to attend due to a last minute camp emergency. USGS and/or NSTA may want to set up a special focus group for 4-H agents, perhaps at the annual national conference, to get a better idea of 4-H priorities and design needs. Other work conducted by the University of Wisconsin Environmental Resources Center (GREEN/Give Water A Hand community involvement study) indicated that 4-H volunteer leaders were more likely to want or use the materials. A 4-H focus group discussion should address questions about volunteer leader needs.

QUESTION 1 - How do you find new materials?

Most common methods of those mentioned:

Take initiative to look for information and resources in a variety of places (such as personal library, textbook, reference publications) or ask an expert or peer.

Less common:

Review available activity books or web site

Least common:

Respond to advertising or go to a conference or workshop

Conclusions:

For nonformal educators, providing activity books and information via the library, internet or expert are most likely to meet needs. It is important to feature or publicize the availability of an expert or an information resource.

QUESTION 2 - Which materials, how, why this one?

Overall USGS and NSTA materials were designed for in-class use, and are not readily useful or appropriate for field use or out-of-classroom use.

Nonformal educators would use materials:

As background or reference.

To give to or encourage use by teachers so they can provide classroom activities complementary to field or out-of-class activity.

As a springboard to summarize a program or make connections to local versions of an illustrated activities (especially applies to poster use).

Nonformal educators choose materials because:

All materials provide up to date information.

Would choose the posters because they are colorful and synthesize ideas.

Would choose the map packet because map education is important and because they liked the layout, arrangement, and design of the packet. Nonformal educators said that the packets were useful and accessible.

Would choose the NSTA book because it provides information all in one place and it is easy to understand.

Nonformal educators would be more likely to use materials if:

Materials referenced or related to local concerns.

Materials were laminated or otherwise packaged to be used outdoors.

Materials were simplified so that they could be used in short programs.

Conclusions:

Nonformal educator found USGS and NSTA earth science education materials attractive and useful as a background resource or as a reference to give to teachers. But they would need the formats to be revised if they were going to use them as part of a field or out-of-classroom resource.

QUESTION 3 - Web site evaluation

Nonformal educators would use the web site as a reference for field activities and as a way of choosing which materials to get in hard copy. They would also use it to:

- Ask youth to predict what they will see when they get to the field.
- Compare filed data to data available on the web site.
- Accumulate information about the site before or after the field visit.

Nonformal educators would be more likely to use the web site if a site map and other organizing techniques were provide to improve ease of use. Web site practice and group discussion motivated nonformal educators to say that they would use the site again.

QUESTION 4 - Earth Science Education Materials Needed in the Future

New materials. Nonformal educators would like:

- Materials about GIS resources and how to use them for education.
- A community focus for materials -- link to people's actions, history, culture, uses of water, human impacts on the environment, planning, wastewater
- Subject matter resources about -- wetlands hydrology, how chemicals get into the environment, the importance of the water table and how actions affect it, local maps

Revise or adapt current materials. Nonformal educators:

- Need formats useful for the out-of-classroom or out-of-doors: plastic coated, smaller size for filed use, folded.
- Would like materials to include activities for the outdoors, such as a section on orienteering.
- Prefer posters that illustrate functioning of the natural system

RECOMMENDATIONS TO STATE USGS OFFICES

1. Provide state or localized versions of national education materials.
2. Be available for in-person visits for professional development for: teachers/schools, professional groups such as a science teachers association, nature center educators, 4-H volunteer training
3. Provide on-site demonstrations of web site or work with county conservation departments to provide local demonstrations.

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APPENDIX F

Analysis of Focus Group responses Formal Educators

Question 1

This question may be a hypothetical situation for you: You are about to look for new educational materials for your earth science unit next year. How do you go about finding these materials?

Note: Focus group answers were separated into two categories for analysis: 1) How do you find materials and 2) From whom or where do you get the materials?

1) How do you find new educational materials for your earth science unit?

- ▶ Individual initiative for the purpose of developing their own background or understanding
books, call people, organizations, resource centers, bookstores, own collection of materials, current events, professional development, field trips, go outside
- ▶ Get direction from others to find additional resources
librarians, professors in field, peers
- ▶ Networking with peers
conferences, informal discussions, workshops
- ▶ Respond to organization advertising information/workshops
Organizations, teacher workshops, teacher conventions, conferences
- ▶ Review available curricula and web sites
OTIS project, simulations, catalogs, mailings

2) From whom or where do you get educational materials?

These answers are from a “brainstorming” session with no weighting of the answers. During the non formal session, answers were weighted for relative importance.

<u>PRINTED</u>	<u>ELECTRONIC</u>	<u>PERSON</u>	<u>AGENCIES/ORGS</u>
▶personal collection	▶web sites	▶UW professor	▶field trip
▶bookstore	▶Internet	▶other teachers	▶Env. Ed. resource center at Arboretum
▶books (4)	(through help from a librarian)	▶colleagues	▶DNR and other local agencies
▶text/trade books		▶husband	▶UW
▶current events		▶experts at agencies	▶teacher’s conventions and organizations
▶news		▶local experts	▶workshops offered by organizations
▶periodicals		▶networking groups	▶local agencies
			•organizations

Question 2

Which of these materials would you use when putting together an earth science unit, how would you use them and why did you choose them?

Note: Participants were responding to materials mailed to them plus additional materials provided for review 10 minutes before responding to the question. Most participants spent time reviewing the new materials. The new materials were four additional teacher packets: *Map Adventures*, *Exploring Maps*, *Global Change and Exploring Caves*. Materials mailed to them were: *Water Matters - Water Resources Teacher's Guide Vol. 1 with six posters*; "What Do Maps Show" teacher packet; a set of fact sheets.

Which materials would you use?

- ▶All, for own reference (3)
- ▶Overheads in teacher packets
- ▶Map unit
- ▶Map adventures packet, liked three views of same map
- ▶Map to compare to own town
- ▶Global change packets - liked because there were simple activities
- ▶Poster and NSTA guide, for background
- ▶Wetlands poster, ties in with school unit

Miscellaneous comments:

- ▶Impressed with variety of materials
- ▶Noted that materials are free so yes would use them

How would you use the materials?

Note: The following responses arose from the general discussion. Non formal educators were asked to address each type of material separately.

General Comments

- ▶For reference
- ▶For extensions - extra credit
- ▶At learning stations

Posters

- ▶Pre trip reference to sewage treatment plants, i.e., the posters
- ▶Ties in with WI water unit
- ▶Take picture of town's water supply and put over the poster
- ▶Fits with "Talking Earth" book
- ▶Break into smaller sections as suggested on back of posters

NSTA booklet

- ▶Background info
-

Teacher Packet

- ▶ Make own map
- ▶ Liked three different maps of same area, useful for different learning styles (different maps)
- ▶ Use as an introduction, then do local maps
- ▶ Use as a mini unit

Fact Sheets

- ▶ Good references/supplements (3)
- ▶ Good teacher resource
- ▶ Put in instructional materials center (3)
- ▶ Good for enrichment/extension for high level students
- ▶ Have students send to get own copies
- ▶ Would order all as textbook for self

Why did you choose these materials?

Note: The following responses arose from the general discussion. Non formal educators were asked to address each type of material separately.

Posters

- ▶ Activity - demonstration about usable water supplies is interesting
- ▶ Value of water activity is good

Teacher Packet

- ▶ Liked three views. Useful for different learning styles
- ▶ The Cave/Map packets for younger students have corresponding storylines and were “strong” materials because they involved students throughout via questions to the student

Recommended Improvements

Note: We did not specifically ask for recommended improvements. These comments were provided without prompting.

Posters

- ▶ Make more real/too fanciful/prefer real maps-photos
- ▶ Too generic - all white people
- ▶ Posters too busy for ADD children
- ▶ Don't draw kids attention when posted passively
- ▶ Simplify with fewer colors but some kids like colors
- ▶ Each student could have own poster, smaller version for each student to study along
- ▶ Prefer real maps or photos of communities

Teacher Packet

- ▶ For the version for younger children, would like a list of story books to accompany
- ▶ Want local maps - or how to get them

- ▶ Want specifics about state
- ▶ Prefer colored maps, black and white maps are not like real maps
- ▶ Talk about map bias (maps are not a totally accurate representation)
- ▶ With Global Change packet - do activity with local habitats as well as coral reef, rainforest etc.

NSTA booklet

- ▶ Small group work not rich and meaningful enough
- ▶ Confused with page 22 direction on graphing - inconsistencies
- ▶ There are laundry lists with no explanation
- ▶ Too teacher directed
- ▶ Extensions should be much richer, open ended
- ▶ Journal idea was a nice start but then got scattered
- ▶ Wetland research was informative
- ▶ Wetland research activity could be more meaningful simulation
- ▶ Needs water testing activity
- ▶ Back of poster info better than NSTA guide info
- ▶ copyright is 1994 - needs updating (outlier)

Fact Sheets:

_____ no comments

Question 3 Web Site Evaluation. Sites evaluated were:

<http://water.usgs.gov/realtime.html>; <http://www.usgs.gov/education/>; and <http://ga.water.usgs.gov/edu/>

How could you use these web sites as educational tools?

Note: Participants were given 10-15 minutes to review the web sites before answering the question.

General comments

- ▶ Use as browsing tool - have students explore and report what they discovered (2X)
- ▶ Use as resource for self
- ▶ Use with video projector for class (2X)
- ▶ Like having all water info on one site
- ▶ Look at Learning Web, good place to see what is available
- ▶ Teachers can mark sites - set up activities

Comments about Activities

_____ Several activities were specifically mentioned

- ▶ Water Cycle Activity - very in depth; have students read and do activity
- ▶ Glacial Valley Activity - interactive, hands-on
- ▶ Liked Cape Cod, Everglades, and Los Angeles scenarios
- ▶ Prediction idea good (where? - in one of the scenarios?)

Learning Web

- ▶ Good for teachers to get info from
- ▶ Good reference

Real Time

- ▶ Compare local school generated data with web site data
- ▶ Look at changes in different section of waterway
- ▶ Students could predict impacts of weather, used results in class throughout the year, looked at bad weather effects on screen
- ▶ Good for use with local creeks
- ▶ Could track a stream and then go see it
- ▶ Used data to investigate impacts of droughts

How would you improve the USGS web site?

General comments

- ▶ Have capability of students sending in questions
- ▶ Would like current events tie-in, such as issues with the Everglades
- ▶ Hard to find lesson plans/can't tell what is a lesson plan
- ▶ Should have a headline page - new news, actions
- ▶ Should have a site map page including directing to middle school or elementary specific activities
- ▶ Put "search" on home page for better access
- ▶ Make pages interactive for kids
- ▶ Simulations would be good, ex: what happens to groundwater when building
- ▶ Wetland info; help students understand how wetlands affect flooding and flow rates

Real Time

- ▶ Have a way to compare data with data from other countries
- ▶ Would like local data about conditions which affect flooding
- ▶ Need a more convenient way to find how to measure flow information

Question 4

Now that we have looked at the printed materials and the web site, think about your earth science needs for the next five years. What earth science subjects would you like addressed?

- ▶ Water
- ▶ Air
- ▶ Land
- ▶ Pollution
- ▶ Recycling
- ▶ People, animals, environment connections - diversity (2X)
- ▶ Field methods

- ▶Examples of how problems get solved, Success stories
- ▶Before and after - see benefits of changes over history
- ▶History of ecology - see how quality has changed
- ▶Land use - DDT, use scientific methods and how it affects decision making
- ▶Real situations
- ▶Careers - tell how to get speakers
- ▶Links to real people - email addresses
- ▶Climate change - compare statistics to other countries, link to international info
- ▶Volcanoes/physical geography, spectacular events and their predictability
- ▶Human geography
- ▶Energy use by state

What formats would you prefer? How would you like to access these materials?

Formats

- ▶Anything where kids create theories, collect data, coordinate with experts
- ▶Videos, documentaries
- ▶More directing kids to the big picture, world view not just United States - help kids see how our behaviors fit global picture
- ▶Project oriented - combine community service and careers

Access

- ▶Packets quicker than Internet right now
- ▶Note within printed materials where to access specific pages - make links between packets and www
- ▶Teacher convention booth - how to get USGS info
- ▶Send information to teachers not principals
- ▶Funding for teacher training and access to equipment
- ▶Networking with other schools/levels
- ▶Need to educate/train teachers for using materials
- ▶Chat room (2X)
- ▶Seasonal web site - looking at seasons around the world
- ▶USGS person to visit schools
- ▶More info on publicity of USGS materials

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APPENDIX G

Analysis of Focus Group responses Nonformal Educators

Question 1 (broken into two subquestions)

How do you get educational materials? [state exact question]

- ▶ Individual initiative to help decide what to do/what to use
hands on resources, got to library (2), personal library, internet (2), textbooks, own experiences, current events/newspaper, citations in publications, gift shops, book store, go outside and collect
- ▶ Get direction from others to find additional resources
librarians, professors in field, husband is a geology expert, UW Extension agent, WI Geological and Natural History Survey, UW Geology Museum
- ▶ Networking with peers
- ▶ Respond to organization advertising information/workshops for teachers
- ▶ Review available curriculum and web sites
hands-on activity books, pictures/posters

Who/Where do you get educational materials? (Participants were asked to identify sources, then prioritize them 3=high, 1=low. All votes were counted.)

<u>PRINTED</u>	<u>ELECTRONIC</u>	<u>PERSON</u>	<u>AGENCY/ORG</u>	<u>OUTDOORS</u>
•Educational materials (5)	•Web sites/ internet search (11)	•Public library - reference librarians (3)	•Research library (10-11)	•Material in environment (3)
•Activity books (10)		•Contacts in field (22)	•UW Extension (1)	
•Current events (1)				

Question 2

Which materials would you use?

Not discussed, per se. Recommend revising procedure to ask this question after separate discussion of each item.

Miscellaneous comments:

- Focus group helped educators to focus on possible uses
- One participant doesn't use poster a lot
- Teacher packet chosen because it links to natural resource fundamentals

How would you use they materials?

NSTA booklet

- ▶Use as a resource, useful background info
- ▶Suggest to teacher as pre/post trip material
- ▶Use if teacher is using it
- ▶Onsite activities spark ideas (2X)
- ▶As part of traveling trunk program
- ▶Would go to activities section first (unanimous)
- ▶Would use maps and chapter that connect to outdoor experiences

Posters

- ▶Cup up poster - give to small groups to discuss then bring groups together again and show interconnectiveness
- ▶Start with wetlands poster
- ▶Use with programs on water cycles
- ▶Make plenty of copies for classroom
- ▶Springboard for making maps of local watershed
- ▶Springboard for small group discussions about water use. Use posters to bring it together
- ▶Take real pictures and put on poster in correct area to help connect small area to big area - nature center bog to river or lake

Teacher Packet

- ▶Could pick and choose activity sheets
- ▶Too complex for short outdoors programs but would like to know if teacher uses it with class (2x)
- ▶For ideas about maps and 5 geological concepts
- ▶Would adapt packet to local area (2x)
- ▶Like idea of studying maps
- ▶Link to Olympics in Salt Lake City

Fact Sheets

- ▶To answer questions from teachers and students
- ▶Good references for planning
- ▶Would use statistics and background info in specific situations (3x)
- ▶Liked that they are available on internet and paper (group split on this) (2x)
- ▶Others save/file paper copies (2x)
- ▶Use when developing curriculum
- ▶As catalyst for more research (study)

Why would you use these materials?

Posters

- ▶ Because wetland poster showed natural functions without humans
- ▶ Liked design
- ▶ Very colorful - use to fit concepts together
- ▶ Adults like them as aid for synthesizing ideas
- ▶ Like activities

NSTA booklet

- ▶ Up-to-date information
- ▶ Info all in one place (2x)
- ▶ Clear, concise easy to read
- ▶ Emphasis on local community
- ▶ Statistics are valuable

Teacher Packet

- ▶ Like layout of packet
- ▶ Maps are important foundation for interpreting information
- ▶ Poster shows different map styles

Fact Sheets

- ▶ Like up to date information
- ▶ Reference

Recommended Improvements

Posters

- ▶ Put in book form - easier to grasp everything

Teachers Packets

- ▶ Local maps wanted (3x)
- ▶ Some maps are hard to read
- ▶ Could us an orienteering section
- ▶ Laminated copies for outdoor use would be helpful

NSTA booklet

- ▶ Some did not know book connected to poster series
- ▶ Others thought it connected well to the poster series
- ▶ Visual picture of 1 million liters and other amounts would be helpful

Fact sheets

- ▶ Date them (check on this)
- ▶ Not at kids reading level (maybe do some at kids level)

Question 3 Web Site

How would you use?

General comments

- ▶ Opened eyes to use of internet (would like workshop)
- ▶ Follow up resource for visiting groups (4x)
- ▶ Link own center's web site to this one
- ▶ User friendly
- ▶ 6 of 11 participants would go back and use site in the next year
- ▶ One participant said the sites did not pertain to programs she does (Girl Scouts)

Activity Section

- ▶ Liked challenge questions
- ▶ Teachers could use online quizzes to see what they should focus on

Real Time

- ▶ As reference for field activities with kids, compare field data with web site data for accuracy check, adds credibility to youth activity
- ▶ Hydro graphs good - look at rainfall runoff - would relate peak flows to local land uses
- ▶ Can know what to expect at streams when visiting them
- ▶ How fluctuation flows affect biota
- ▶ Access site to get info about stream before visiting it

Improvements needed

General comments

- ▶ Flow chart of where everything is (2x), so many sites are embedded, must visit multiple sites to find
- ▶ One person liked unstructured arrangement
- ▶ Need to describe what units of measurement mean - unfamiliar to people
- ▶ Hard to find lesson plans
- ▶ No activities to do away from computer
- ▶ Hard to find activities
- ▶ USGS could put counting system to determine which pages are more popular
- ▶ Items should be dated
- ▶ Clear index of site needed

Question 4

What science subjects would you like addressed?

- ▶ GIS
- ▶ Wetland hydrology
- ▶ What children can do to solve problems/make a difference

- ▶Info on current research/how kids might get involved in research - what are new questions that need to be answered
- ▶How chemicals go into environment and affect humans - link to health problems
- ▶Human impacts on quality of earth
- ▶Flooding
- ▶Water use - water level table - understand how actions affect this
- ▶Regional planning - population growth - low impact development
- ▶Global issues
- ▶Watersheds
- ▶Urban planning
- ▶Wastewater issues
- ▶Big picture down to local level
- ▶Links to social studies, human history, policy, i.e. the way people use water
- ▶Communities, people, peoples actions

Formats/Access

- ▶Smaller size for field use
- ▶Plastic coated
- ▶Folding works in field use
- ▶Activities for outdoors
- ▶Experiments, layers of GIS info
- ▶Local maps
- ▶Internet preferred
- ▶GIS technology - layering of info - referring to map use, how to use
- ▶Also have hard copies of everything because computers break down
- ▶Internet access important - can print out before ordering to see if you really want materials
- ▶Go to local USGS office to pick up materials
- ▶Local library

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