Outreach That Makes a Difference
Target Audiences for Water Education – A Research Meta-Analysis

Study-Specific Research Findings for 15 Target Audiences

This listing of study-specific Best Education Practices distills findings for specific audiences derived from the studies identified in *Outreach that Makes a Difference!* (Stevens & Andrews, 2006). They are offered here, as an **example** of research-based information available to help educators and natural resource professional use the most effective methods in working with their audiences. Additional research findings for these target audiences is available at:

http://fyi.uwex.edu/wateroutreach/changing-public-behavior/target-audience-research/

Best Education Practices are described by one or more of seven outreach themes that may concern the natural resource professional:

Outreach Themes
>	The Audience
>	Message content
>	Message delivery vehicle
>	Outreach strategy
>	Public participation
>	Supporting and motivating professionals
>	Evaluation

This summary also highlights the relationship between research findings about the outreach theme and best practices for a specific setting:

Education for:
>	The Individual
>	The Class or Group
>	Web-Based Learning
>	The Community
>	Beyond the Community

Stevens, M. & E. Andrews. 2006. Outreach that makes a difference! Target audiences for water education – A research meta-analysis. University of Wisconsin, Environmental Resources Center. Retrieved February 2006, from http://fyi.uwex.edu/wateroutreach/files/2015/12/Target-Audience-meta-analysis-March08_all_Sept12_2015.pdf

Contents

Target Audience – **Adults**

Audience Description

All people ages 20 and up. This is a catch-all group.

NOTE: Reach ing out to "adults" as a group is not preferred because there is too much variation within the group of adults to identify useful audience-specific recommendations.

Study-Specific BEPs

Best Education Practices are described by one or more of seven outreach themes that may be of interest to the natural resource professional:

Outreach Theme	Research Recommendations
The Audience	• Assess audience concerns and preferred method for receiving information prior to developing outreach or education initiatives.
Message content	No research available
Message delivery vehicle	No research available
Outreach strategy	No research available
Public participation	No research available
Supporting and motivating professionals	No research available
Evaluation	No research available

Linking Study-Specific BEPs to *Essential BEPs*

Essential BEPs provide an overview of Best Education Practices derived from education theory and other meta-analysis studies. This table shows which *Essential BEPs* are highlighted by research about **adults** as a target audience. The entire collection of *Essential BEPs* is available on the Water Outreach website.

Education for:	The learning experience:
The Individual	No relevant research findings
The Class or Group	• Is designed to focus on a targeted audience and is built on an understanding of audience skills and interests. • Is relevant to and accessible by people with diverse backgrounds and influences.
Web-Based Learning	No relevant research findings
The Community	No relevant research findings
Beyond the Community	No relevant research findings

Supporting Reference

Iams, D. R., & Marion, M. H. (1991). Reactions to alternative delivery methods. *Journal of Extension 29*(2), 4.

Target Audience – Aquaculture Business

Audience Description

Individuals who use various technologies for raising fish and shellfish for sale

Study-Specific BEPs

Best Education Practices are described by one or more of seven outreach themes that may be of interest to the natural resource professional. NOTE: Findings may have more to do with the nature of the community studied than the nature of the business. See also results reported for Ethnic Groups.

Outreach Categories	Research Recommendations
The Audience	No research available
Message content	No research available
Message delivery vehicle	No research available
Outreach strategy	• Develop a strategy that responds to the fact that the effectiveness of a new educational program may be hindered by the insular nature of communities in which producers live.
Public participation	No research available
Supporting and motivating professionals	No research available
Evaluation	No research available

Linking Study-Specific BEPs to *Essential BEPs*

Essential BEPs provide an overview of Best Education Practices derived from education theory and other meta-analysis studies. This table shows which *Essential BEPs* are highlighted by research about **aquaculture businesses** as a target audience. The entire collection of *Essential BEPs* is available on the Water Outreach website.

Education for:	The learning experience:
The Individual	No relevant research findings
The Class or Group	• Is designed to focus on a targeted audience and is built on an understanding of audience skills and interests. • Is relevant to and accessible by people with diverse backgrounds and influences.
Web-Based Learning	No relevant research findings
The Community	No relevant research findings
Beyond the Community	No relevant research findings

Supporting References

Caffey, R. H., & Kazmierczak, R. F., Jr. (1994). Factors influencing technology adoption in a Louisiana aquaculture system. *Journal of Agriculture and Applied Economics, 26*(1), 264-274.

Target Audience – Business and Industry Water Users

Audience Description

Managers and staff members who have control over services and processes that use water either directly or indirectly in a way which may change water supply or quality

Study-Specific BEPs

BEPs are described by one or more of seven focus areas that may be of interest to the natural resource professional.

Outreach Categories	Research Recommendations
The Audience	• Recognize that audiences are often already aware of important issues. Outreach materials should: ○ Emphasize a pollution-prevention practice ○ Tell audience a little about how to prevent pollution ○ Tell audience where they can obtain information about prevention. • Emphasize "place", by creating a local Board for example, has potential for broad impacts on locally identified environmental problems.
Message content	• Focus the content for outreach materials on cost savings, such as when and where pollution prevention is as cheap as or cheaper than traditional techniques. Include facts and figures. • Emphasize how easy it is to do the right thing and the impacts of not engaging in pollution prevention. • Stress benefits such as efficiency or better relations with government, for businesses not primarily concerned with public image.
Message delivery vehicle	• Provide outreach through external relationships chosen by the business, such as suppliers, trade shows, other companies, and publications to which businesses subscribe. • Encourage businesses to take advantage of external relationships such as those offered by trade associations and courses. • Reduce emphasis on information from the government except for information about tax deductions and other incentives. • Generate ongoing environmental change by initiating and coordinating pollution prevention activities through regional networks or consortia.
Outreach strategy	• Emphasize company commitment to pollution prevention activities and investment of adequate time and money. Self-assessment has produced measures of superior quality to those produced by quick-scan methods completed by a consultant. When companies invest more time in the pollution prevention project, the options produced are better tailored to the company and likely to have a more profound impact. • Be patient in your efforts to reach small businesses; small businesses are a difficult audience to reach – limited staff, busy schedules, financial constraints; many will not take the time to

Outreach Categories	Research Recommendations
	return phone calls that are considered non-essential and many do not read mailed solicitations. • For auto repair shops, provide a direct visit from an educator who provides an audit activity and information materials. • Provide staff training, and/or provide access to environmental experts for businesses not already engaged in pollution prevention activities. Aim to increase concern about liability.
Public participation	No research available
Supporting and motivating professionals	No research available
Evaluation	No research available

Linking Study-Specific BEPs to *Essential BEPs*

Essential BEPs provide an overview of Best Education Practices derived from education theory and other meta-analysis studies. This table shows which *Essential BEPs* are highlighted by research about **business and industry water users** as a target audience. The entire collection of *Essential BEPs* is available on the Water Outreach website.

Education for:	The learning experience:

The Individual	• Presents a new behavior or skill by:
	  ○ Demonstrating its similarity to a current behavior or skill
	  ○ Demonstrating ease of adoption in terms of time, effort and money

The Class or Group	• Is designed to focus on a targeted audience and is built on an understanding of audience skills and interests • Incorporates methods for assessing the value of the experience, especially as it relates to desired outcomes
Web-Based Learning	No relevant research findings
The Community	• Evolves from work with a coalition or group • Supports a person who takes responsibility for managing or leading the process • Generates and makes use of data about the local condition • Provides training to increase skills needed to accomplish goals identified by the group • Is flexible in response to both process and conditions • Builds effectiveness through linkages to other communities, partners, and resources
Beyond the Community	No relevant research findings

Supporting References

Boiarsky, G., M. Long, et al. (1999). Pollution-Prevention Information Campaigns for Small Businesses: An Audience Analysis. *The Journal of Environmental Education* **30**(3): 29-36.

de Bruijn, T. J. N. M. and P. S. Hofman (2000). Pollution Prevention in Small and Medium-Sized Enterprises. *Greener Management International* **30**: 71-82.

Lowrie, K. W. and M. Greenberg (1997). *Promoting Ground Water Pollution Prevention in Small Businesses*. Journal of the American Water Works Association **33**(1): 193-204.

McKenrick, L. L., K. Ii, et al. (2003). Helping the Auto Repair Industry Manage Hazardous Wastes: An Education Project in King County, Washington. *Journal of Environmental Health* **66**(4): 9-14.

Zipper, C. E. and J. S. Rockett (1997). Locality-Based Programming: Virginia Tech's Powell River Project. *Journal of Extension* **35**(6): 6.

Target Audience – **Local Decision Makers**

Audience Description

People who provide recognized leadership in the community whether in elected, appointed, salaried, or volunteer positions

Study-Specific BEPs

BEPs are described by one or more of seven focus areas that may be of interest to the natural resource professional.

Outreach Categories	Research Recommendations
The Audience	• When designing education programs for decision makers: ○ Gather data about policy maker skills and preferences prior to designing training
Message content	No research available
Message delivery vehicle	No research available

Outreach strategy	• Provide policy makers with a link to local information sources
	• Provide strategies and practice for differentiating objective information sources from biased information sources
	• Identify and provide additional support for group-designated water "experts"
	• Design partnership development training to build understanding and skills for partnership success factors and themes identified through the Leach and Pelky (2001) meta-analysis of empirical literature. (See Table 2, p. 382 for detailed list of these associated with each factor). Focus on factors influencing partnership success:
	  ○ Maintain balance between partnership resources and scope of activity
	  ○ Pursue flexible and informal process
	  ○ Attend to alternative dispute resolution (ADR) processes
	  ○ Attend to institution analysis and development (IAD) processes

Public participation	No research available
Supporting and motivating professionals	No research available
Evaluation	No research available

Linking Study-Specific BEPs to *Essential BEPs*

Essential BEPs provide an overview of Best Education Practices derived from education theory and other meta-analysis studies. This table shows which *Essential BEPs* are highlighted by research

about **local decision-makers** as a target audience. The entire collection of *Essential BEPs* is available on the Water Outreach website.

Education for:	The learning experience:
The Individual	No relevant research findings
The Class or Group	• Is designed to focus on a targeted audience and is built on an understanding of audience skills and interests
Web-Based Learning	No relevant research findings
The Community	• Evolves from work with a coalition or group • Builds on locally existing skills and resources • Supports a person who takes responsibility for managing or leading the process and relies on quality group planning and facilitation techniques • Is flexible in response to both process and conditions • Provides training to increase skills needed to accomplish goals identified by the group • Builds effectiveness through linkages to other communities, partners, and resources
Beyond the Community	• Builds skills for flexibility and responsiveness to environmental issues and for facilitating community engagement • Offers avenues for participation which are competent, fair, and enhance involvement for all levels of responsibility

Supporting References

Berry, K. A., Markee, N. L., Stewart, M. J., & Giewat, G. R. (1996). County commissioners' water knowledge. *Water Resources Bulletin*, 32(5), 1089-1099.

Leach, W. D., & Pelkey, N. W. (2001). Making watershed partnerships work: A review of the empirical literature. *Journal of Water Resources Planning and Management*, 127(6), 378-385.

Target Audience – **Ethnic Groups**

Audience Description

A population from a specific ethnic or cultural group

Study-Specific BEPs

BEPs are described by one or more of seven focus areas that may be of interest to the natural resource professional.

Outreach Categories	Research Recommendations
The Audience	• Identify locally-specific or culturally-specific needs or problems related to water conservation and quality. These may not be what an expert would typically expect due to unique cultural or situational needs. For example, in a person-to-person outreach initiative about toxic substances in fish, African-Americans were most interested in risks to their health from eating contaminated fish. Caucasians were most interested in the levels of contamination in the fish.
Message content	• Carefully tailor the water conservation message to address the specific circumstances of the target audience.
Message delivery vehicle	No research available
Outreach strategy	• Assure that intervention programs are relevant to the cultural milieu of the subgroup. • Talk with people one-by-one about the information. • Include community members, essential service operators, environmental health workers, administrators, teachers, and regional service providers in community water conservation training programs. • Convey water conservation techniques through hands-on training and talking through questions in a workshop style. • Consider ethnic or culturally-related farm-structure differences when developing intervention strategies to bring about behavioral change. • Focus outreach to farmers on farm efficiency and productivity, whatever the social characteristics of the farm group. But pay attention to unique factors of cultural groups, as well.
Public participation	No research available
Supporting and motivating professionals	No research available
Evaluation	No research available

Linking Study-Specific BEPs to *Essential BEPs*

Essential BEPs provide an overview of Best Education Practices derived from education theory and other meta-analysis studies. This table shows which *Essential BEPs* are highlighted by research about **ethnic groups** as a target audience. The entire collection of *Essential BEPs* is available on the Water Outreach website.

Education for:	The learning experience:
The Individual	• Promotes active engagement and real world problem solving • Provides opportunities for extended effort and practice
The Class or Group	• Is designed to focus on a targeted audience and is built on an understanding of audiences skills and interests • Is relevant to and accessible by people with diverse backgrounds and influences
Web-Based Learning	No relevant research findings
The Community	• Provides training to increase skills needed to accomplish goals identified by the group • Takes place close to the location where people practice a behavior of concern
Beyond the Community	No relevant research findings

Supporting References

Burger, J. and L. Waishwell (2001). Are We Reaching the Target Audience? Evaluation of a Fish Fact Sheet. *The Science of the Total Environment*, 277: 77-86.

Napier, T. L., & Sommers, D. G. (1996). Farm production systems of Mennonite and non-Mennonite land owner-operators in Ohio. *Journal of Soil and Water Conservation*, 51(1), 71-76.

Ryan, J., Mathew, K., Anda, M., & Yuen, E. (2001). Introduction of water conservation education packages: The opportunities and constraints affecting their success. *Water Science and Technology*, 44(6), 135-140.

Sommers, D. G., & Napier, T. L. (1993). Comparison of Amish and non-Amish farmers: A diffusion/farm-structure perspective. *Rural Sociology*, 58(1), 130-145.

Also see: Aquaculture Business target audience findings (Caffey & Kazmierczak, Jr., 1994).

Target Audience – **Farmers**

Audience Description

People who work on the land to grow and produce food, animal feed, or other consumer products; and business professionals who support agricultural production

NOTE: Research identified for this target audience focused on farming practices in the central part of the North American continent, but included at least some research from all geographic areas. Few studies identified specific crop(s) relevant to the study area.

Study-Specific BEPs

BEPs are described by one or more of seven focus areas that may be of interest to the natural resource professional.

Outreach Categories	Research Recommendations

The Audience	• Collect and assess data about the following, prior to developing the outreach program:
	   o Regional audience preferences for where to get information and which source is *reliable*
	   o Adoption training methods known to be successful with the target audience.
	   o Approach and materials for training new farmers based on input from farmers
	   o Producer assessment of project BMP recommendations prior to implementing outreach program
	
	 • Consider target audience issues such as time, skill, and direct experience with saving money over time
	
	 • Acknowledge a farmer characteristic to be "averse to additional risk ". That is, a new practice or technology must not add to current risks, or it must reduce risks to productivity incurred through other practices in order to be viewed favorably.
	
	 • Assure that intervention programs are relevant to perceived needs of farmers, relevant to cultural milieu of subgroups, and relevant to specific environmental needs:
	   o Cultural and farm-structure differences must be considered when intervention strategies are developed to bring about behavioral changes among specific groups
	   o Potential Mennonite adaptors have to be convinced that adoption of conservation tillage will be profitable and not threaten the values of the collective group
	
	 • Pay attention to unique factors of cultural groups, but programs that focus on efficiency and productivity in decision-making are likely to succeed, whatever the social characteristics of the farm group

Outreach Categories	Research Recommendations

	• Create information, communication and education design to address research-based information about farmer characteristics, such as:
	  ○ Priorities: profitability of agriculture; quality of drinking water; agriculture health and safety; controlling soil erosion
	  ○ Lack of concern about threats to groundwater quality on their own property, but concerned about the problem elsewhere [relates to research findings about farmer minimization of the threat of risk when the source is familiar, voluntary, controllable]

Message content	• Make sure that participants know about the initiative and know how to participate.
	
	• Address farmer perception of risk.
	  ○ Acknowledge a farmer characteristic to be "averse to additional risk ". That is, a new practice or technology must not add to current risks, or it must reduce risks to productivity incurred through other practices in order to be viewed favorably
	  ○ Acknowledge emotional and political context of a risk message. Statements about potential agricultural chemical risks can fuel public fears. Farmers may not respond to risk messages because they view their own use of chemicals as "voluntary, familiar and controllable" whereas nonfarm consumers would view it as partially familiar, involuntary and uncontrollable
	
	• Provide information that is high quality, explains risks; and is:
	  ○ Easy to understand
	  ○ From a trusted source
	  ○ Scientifically valid
	  ○ Balanced, (gives both sides on an issue)
	  ○ Up-to-date
	  ○ Directly applicable
	  ○ Consistent with beliefs
	
	• Address economic benefits:
	  ○ Focus outreach programs on the potential of the farm practice to increase yield or otherwise improve economic benefit
	  ○ Show that profits will increase as a result of adoption of the practice
	
	• Include environmental stewardship information shown to be significant in predicting farmer adoption of new practices:
	  ○ Locally specific information about watershed risks. Farmers assess agricultural chemical risks in the context of localized situations
	  ○ Substantive local data to support claims that specific BMPs are environmentally effective and economically advantageous as compared to in-place practices
	  ○ Information about soil and water conservation benefits to be derived from adoption of precision farming techniques

Outreach Categories	Research Recommendations

	- In communication and outreach about groundwater, address:
	  o The quality of the drinking water supplies
	  o Concerns about risks of handling and applying chemicals
	  o Recognition of farm economics
	  o Evidence that contamination will affect profits
	  o Present programs or information about health and environmental risks as part of other outreach efforts rather than on their own
	
	- When persuading farmers to reduce chemical use:
	  o Show that farm chemicals are contaminating groundwater on the *individual's farm*
	  o Link to quality of drinking water on the *individual's farm*
	  o Provide alternative methods with a demonstrated outcome that has no adverse effect on profits and no more than a modest decline in yield
	
	- Focus training for new farmers on problem-solving and production agriculture skill development

Message delivery vehicle	- Use farmer-preferred sources of information and strategies for outreach about making decisions.
	
	- Sources of information that most influenced farmer views about problems associated with groundwater and agricultural chemical use were: farm magazines and newspapers; general newspapers and news on radio and television; educational/research agency reports; personal observation
	
	- Rely on farmer personal experience as more influential than education or research reports
	
	- Use the internet for training new farmers in preference to other distance education techniques
	
	- When providing information related to sustainable farming, use conventional sources of information to convey new ideas rather than start a new newsletter or organization or other new source of information.
	
	- Provide information through field days, pamphlets, farm journals, media and books. These can contribute to:
	  o More positive attitudes towards various aspects of management
	  o Greater levels of knowledge about the concepts and the practical application of those concepts
	  o Intention to carry out concepts
	  o Adoption of a wider range of BMPs

Outreach strategy	- Look to these conditions for opportunities to provide education that is more likely to be effective:
	  o Actions that improve water quality also increase profitability
	  o The producers' own water quality is at stake

Outreach Categories	Research Recommendations
	- The on-farm cost of water quality impairments are shown to be sufficiently large - Education is accompanied by training for management skills of immediate need to the producer • Provide information to farmers in three stages: - Information to stimulate farmer interest - Personal contact with farmer to provide new farming practices that are viewed as solutions to their problems - Work collaboratively and cooperatively with the farmer in the adoption of new practices • Focus on a geographic area: - Define the geographical area where environmental intervention is crucial - Focus outreach initiatives on a geographic area with a targeted audience • Involve target audience in: - Choosing and testing preferred technical approaches to solving a problem - Developing content and process for outreach activities - Participatory approaches to help identify target audience education needs and motivate participation • Support stakeholder engagement more fully by anticipating a political dimension in addition to a focus on subject matter. [This emphasizes Cervero and Wilson's (1994) democratic approach to program planning whereby adult educators talk openly about social and political aspirations of interested parties in addition to content matter objectives.] • Work with consultants: - Recognize and support education providers already in place who provide information consistent with the program goal - Train the technical professionals who support the target audience as well as specifically training the target audience about the new practice - Provide the farmer with the opportunity for continuous dialog with consultant. This outreach process has been shown to result in multiple on-farm management refinements with practices continuing even when dialog with consultants is no longer available as part of a project • Emphasize one-on-one contact. - Correlates with farmer willingness to change practices, but adoption of a new technology requires more than a personal conversation and data about the specific situation - Couple with small group and demonstration events - Work with farmers individually to determine participation level

Outreach Categories	Research Recommendations

	• Facilitate farmer-led program design and implementation that leads to:
	  o Farmer developed reasons for taking charge of environmental protection
	  o Peer development of solutions
	  o Peer assessment of potential hazards of current practices
	  o Farmers, rather than technical experts, complete environmental assessment and Action Plan
	  o Farm plan and data evaluation via peer review
	
	• Design outreach to address farmer preferred learning style
	  o Emphasize experiential learning and farmer knowledge
	  o Provide farmers with opportunities to *solve a problem* in addition to providing other standard hands-on outreach techniques such as opportunities for talking with specialists, field days, demonstrations, etc.
	  o When training new farmers, focus on problem-solving and production agriculture skill development
	
	• Use financial incentives, where possible, to facilitate behavior change:
	  o Provide information, encouragement and cash incentives to participate in or practice a new technology, but keep in mind that incentives have a weak influence on adoption
	  o Couple general outreach, information, and communication techniques with financial incentives
	
	• Recognize the role of economic factors in behavior change:
	  o Carefully design a demonstration project to meet farmer economic and other regionally specific needs
	  o Since producer income is an important predictor of BMP use, sequence audience involvement by income level. Consider a focus on low income audiences
	
	• Recognize the limits of regulation in producing behavior change:
	  o Regulation leads to adoption of specific regulated behaviors only. (e.g. the target audience performed required nitrogen test but did not apply resulting information when making decisions about nitrogen application)
	
	• Link education to production decisions to reflect the fact that operators prefer to make production decisions based on their own farm records and advice from on-farm employees.
	  o Work with operators to review farm records in order to consider potential impacts of proposed changes
	  o Increase knowledge of on-farm advisors
	  o Collaborate with many groups/organizations to convey important information
	
	• Use farm assessments:

Outreach Categories	Research Recommendations
	o To identify pollution risks when the use of an assessment tool is likely to lead to cost-effective, voluntary actions to reduce those risks o To increase the likelihood of management changes for topics addressed in the assessment work one-on-one with the farmer completing the assessment. • Encourage farmers to complete their own on-farm risk assessments rather than performing the assessment for them • Focus programs designed to facilitate adoption of precision farming techniques on farmers who: o Are relatively economically secure o Place importance on use of conservation information when making farm-level decisions o Perceive that their children will be operating their farms in the future • For sustainable agriculture education, target families with one or more of these characteristics: o Kin-mentor relationship that supports practice of sustainable agriculture o An environmental or health problem which triggers interest or motivation o Systematic on-farm experimentation o Value for prudence with resources. • Allow enough time for wide spread adoption of the demonstrated BMPs. A nine to ten-year time frame may be necessary to move from initial implementation of BMP demonstration projects to adoption.
Public participation	No research available
Supporting and motivating professionals	No research available
Evaluation	No research available

Linking Study-Specific BEPs to *Essential BEPs*

Essential BEPs provide an overview of Best Education Practices derived from education theory and other meta-analysis studies. This table shows which *Essential BEPs* are highlighted by research about **farmers** as a target audience. The entire collection of *Essential BEPs* is available on the Water Outreach website.

Education for:	The learning experience:

The Individual	• Is learner centered and consequently
	  ○ Can be adapted to individual differences in learning strategies and approaches
	  ○ Relates to personal interests and provides for personal choice and control
	  ○ Encourages the learner to set meaningful learning goals and to take personal responsibility for their own learning
	• Enables the learner to link new knowledge to their existing knowledge in meaningful ways.
	• Builds thinking and reasoning skills that learners can use to construct and apply their knowledge
	• Presents a new behavior or skill by:
	  ○ demonstrating its similarity to a current behavior or skill
	  ○ relating the new behavior to current social practices
	  ○ demonstrating ease of adoption in terms of time, effort and money
	• Provides opportunities for extended effort and practice.
	• Promotes active engagement and real world problem solving
	• Encourages the learner to set meaningful learning goals and to take personal responsibility for their own learning
	• Provides a nurturing context for learning, with attention to: cultural or group background and influences, the physical environmental, and the use of tools or practices appropriate to learner skills and abilities

The Class or Group	• Content and delivery is determined in cooperation with the target audience and stakeholders • Is designed to focus on a targeted audience and is built on an understanding of audience skills and interests • Is relevant to and accessible by people with diverse backgrounds and influences • Presents accurate and balanced information, incorporating many different perspectives • Incorporates methods for assessing the value of the experience, especially as it relates to desired outcomes • Uses creative approaches • Values life long learning
Web-Based Learning	No relevant research findings
The Community	• Takes into consideration the community as a whole, including: socio-political, economic, historical, and cultural influences • Is flexible in response to both process and conditions • Builds on locally existing skills and resources • Generates and makes use of data about the local condition • Provides training to increase skills needed to accomplish goals identified by the group • Takes place close to the location where people practice a behavior of concern • Reaches people in multiple ways • Uses creative approaches

Education for:	The learning experience:
Beyond the Community	• Values life long learning • Builds value for education as part of policy development and implementation

Supporting References

Al-Jamal, M. S., Sammis, T. W., & Ball, S. T. (2001). A case study for adopting the nitrate chloride technique to improve irrigation and nitrogen practices in farmers' fields. *Applied Engineering in Agriculture*, 17(5), 601-610.

Ashby, J. A., *Beltran*, J. A., Guerrero, M. d. P., & Ramos, H. F. (1996). Improving the acceptability to farmers of soil conservation practices. *Journal of Soil and Water Conser*vation, 51(4), 309-312.

Bosch, D. J., Cook, Z. L., & Fuglie, K. O. (1995). Voluntary versus mandatory agricultural policies to protect water quality: Adoption of nitrogen testing in Nebraska. *Review of Agricultural Economics*, 17(1), 13-24.

Cameron-Howell, K. (1992, 13-17 September 1992). Factors leading to permanent adoption of best management practices in South Dakota rural clean water program projects. Paper presented at the *National RCWP Symposium, 10 Years of Controlling Agricultural Nonpoint Source Pollution: The RCWP Experience*, Orlando, FL.

Contant, C. K., & Young, C. L. (1990). *Evaluating the effectiveness of field demonstration programs*. Ames, IA: Iowa State University Extension.

Cooper, D., Giebink, B., & Olson, K. (1995, 5-8 March 1995). Water quality education to protect Minnesota's Anoka sand plain aquifer. Paper presented at the Clean Water—Clean Environment—21st Century: Team Agriculture—Working to Protect Water Resources, Kansas, MO.

Feather, P. M., & Amacher, G. S. (1994). Role of information in the adoption of best management practices for water quality improvement. *Agricultural Economics*, 11(2-3), 159-170.

Grudens-Schuck, N. (2000, December 2000). A qualitative study of the influence of farm leaders' ideas on a sustainable agriculture education program. Paper presented at the 27th Annual National Agricultural Education Research Conference, San Diego, CA.

Holsman, R. H., & Krueger, D. (2002). The long and short of groundwater education for Michigan farmers. Journal of Extension, 40(1).

Knox, D., Jackson, G., & Nevers, E. (1995, 5-8 March 1995). Farm*a*Syst: A partnership program to protect water resources. Paper presented at the Clean Water—Clean Environment—21st Century: Team Agriculture — Working to Protect Water Resources, Kansas City, MO.

Kraft, S. E., Lant, C., & Gillman, K. (1996). WQIP: An assessment of its chances for acceptance by farmers. *Journal of Soil and Water Conservation*, 51(6), 494-498.

Kromm, D. E., & White, S. E. (1991). Reliance on sources of information for water-saving practices by irrigators in the high plains of the U.S.A. *Journal of Rural Studies*, 7(4), 411-421.

Lanyon, L. E., Kiernan, N.-E., & Stoltzfus, J. H. (1996). Evaluating barriers to participation by fertilizer and agricultural chemical dealers in a federal water quality project. *Journal of Natural Resources and Life Sciences Education*, 25(2), 160-165.

Lefko, S. A., Rice, M. E., & Pedigo, L. P. (1999). Producer perceptions and pest management practices in iowa alfalfa. *Journal of Production Agriculture*, 12(2), 257-263.

Mullan, P. B., Gardiner, J. C., Rosenman, K., Zhu, Z., & Swanson, G. M. (1996). Skin cancer prevention and detection practices in a Michigan farm population following an educational intervention. *The Journal of Rural Health*, 12(4), 311-320.

Murray, H., & Butler, L. M. (1994). Whole farm case studies and focus groups: Participatory strategies for agricultural research and education programs. *American Journal of Alternative Agriculture*, 9(1 and 2), 38-44.

Napier, T. L., & Bridges, T. (2002). Adoption of conservation production systems in two Ohio watersheds: A comparative study. *Journal of Soil and Water Conservation*, 57(4), 229-235.

Napier, T. L., & Johnson, E. J. (1998). Awareness of operation future among landowner-operators in Darby creek watershed of Ohio. *Journal of Soil and Water Conservation*, 53(4), 353-357.

Napier, T. L., & Johnson, E. J. (1998). Impacts of voluntary conservation initiatives in the Darby creek watershed of Ohio. *Journal of Soil and Water Conservation*, 53(1), 78-84.

Napier, T. L., Robinson, J., & Tucker, M. (2000). Adoption of precision farming within three Midwest watersheds. *Journal of Soil and Water Conservation*, 55(2), 135-141.

Napier, T. L., & Sommers, D. G. (1996). Farm production systems of Mennonite and non-Mennonite land owner-operators in Ohio. *Journal of Soil and Water Conservation*, 51(1), 71-76.

Nelson, D. R., & Trede, L. D. (2000, December 2000). Educational needs of beginning farmers in Iowa as perceived by providers of agricultural education. Paper presented at the 27th Annual National Agricultural Education Research Conference, San Diego, CA.

Nowak, P., O'Keefe, G. J., Bennett, C., Anderson, S., & Trumbo, C. (1997). *Communication and Adoption of USDA water quality demonstration projects* (Evaluation Report). Washington, DC: USDA, CSREES.

Padgitt, S. C. (1989). *Farm practices and attitudes toward groundwater policies: A statewide survey* (No. IFM 3). Ames, IA: Iowa State University Extension.

Padgitt, S. C. (1990). *Monitoring audience response to demonstration projects: Baseline report: Des Moines County* (No. IFM 8). Ames, IA: Iowa State University Extension.

Petrzelka, P., Korsching, P. F., & Malia, J. E. (1996). Farmers' attitudes and behavior toward sustainable agriculture. *The Journal of Environmental Education*, 28(1), 38-44.

Petrzelka, P., Padgitt, S. C., Connelly, K., & Miller, R. (1995). *Model farms demonstration project final report: A case study in promoting integrated crop management* (No. Sociology Extension Report 95-3). Ames, Iowa: University Extension, Iowa State University.

Petrzelka, P., Padgitt, S. C., & Miller, R. (1994). Farming practices and attitudes in iowa: 1988 to 1992 report on a statewide survey (No. Sociology Extension Report 94-5). Ames, Iowa: University Extension, Iowa State University.

Pompelli, G., Morfaw, C., English, B. C., Bowling, R. G., Bullen, G. S., & Tegegne, F. (1997). Farm operators' preferences for soil conservation service information: Results from three Tennessee watersheds. *Journal of Production Agriculture*, 10(3), 472-476.

Rhodes, H. M., Leland, L. S., Jr., & Niven, B. E. (2002). Farmers, streams, information, and money: Does informing farmers about riparian management have any effect? *Environmental Management*, 30(5), 667-677.

Ribaudo, M. O., & Horan, R. D. (1999). The role of education in nonpoint source pollution control policy. *Review of Agricultural Economics*, 21(2), 331-343.

Salamon, S., Farnsworth, R. L., Bulluck, D. G., & Yusuf, R. (1997). Family factors affecting adoption of sustainable farming systems. *Journal of Soil and Water Conservation*, 52(4), 265-271.

Shepard, R. L. (1999). Making our nonpoint source pollution education programs effective. *Journal of Extension*, 37(5).

Sommers, D. G., & Napier, T. L. (1993). Comparison of Amish and non-Amish farmers: A diffusion/farm-structure perspective. *Rural Sociology*, 58(1), 130-145.

Stanley, J. W. (1992, Sept 13-17, 1992). The key to successful farmer participation in Florida's rural clean water program. Paper presented at the National RCWP Symposium: 10 years of controlling agricultural nonpoint source pollution, the RCWP experience, Orlando, Florida.

Trede, L. D., & Miller, K. S. (2000, December 2000). Assessing the learning styles of Iowa farmers. Paper presented at the 27th Annual National Agricultural Education Research Conference, San Diego, CA.

Tucker, M., & Napier, T. L. (2001). Determinants of perceived agricultural chemical risk in three watersheds in the Midwestern United States. *Journal of Rural Studies*, 17(2), 219-233.

Target Audience – Government Agency and University Extension Professionals

Audience Description

Planners and outreach educators who work for government or a land grant university and lead water-related outreach initiatives with groups

Study-Specific BEPs

BEPs are described by one or more of seven focus areas that may be of interest to the natural resource professional.

Outreach Categories	Research Recommendations
The Audience	No research available
Message content	No research available
Message delivery vehicle	No research available
Outreach strategy	• Test the audience at the beginning of the workshop to improve instructor ability to enhance subsequent learning • Professionals recommend use of two-way communication methods, particularly door-to-door contact, where possible. These methods are more successful in soliciting participation for watershed planning initiatives than one-way communication (information) methods. • Professionals recommend use of participatory, watershed-based planning as an effective technique for building public awareness and interagency coordination.
Public participation	• Professionals recommend that most effective use of public participation is to accomplish watershed plan goals and is less effective with other planning steps. • Watershed-based, participatory planning can be helpful in making watershed data publicly available and in establishing plan legitimacy.

Supporting and motivating professionals	• Design communication and professional development opportunities for outreach educators that will motivate them to implement a priority program because:
	  o They understand the program
	  o It is clear that they are supported by their organization and resources are made available.
	  o They have a choice to participate
	  o The program fits their job description
	  o The program has social significance
	  o The program is part of work in a team

Evaluation	No research available

Linking Study-Specific BEPs to *Essential BEPs*

Essential BEPs provide an overview of Best Education Practices derived from education theory and other meta-analysis studies. This table shows which *Essential BEPs* are highlighted by research about **government agency/university Extension professionals** as a target audience. The entire collection of *Essential BEPs* is available on the Water Outreach website.

Education for:	The learning experience:
The Individual	• Is learner centered, and consequently: o Assesses the learner in order to set appropriately high and challenging standards • Provides a nurturing context for learning, with attention to: cultural or group background and influences, the physical environment, and the use of tools or practices appropriate to learner skills and abilities.
The Class or Group	• Content and delivery is determined in cooperation with the target audience and stakeholders • Is facilitated by quality instructors who have been trained in effective teaching methods and are supported by the program sponsor
Web-Based Learning	No relevant research findings
The Community	• Evolves from work with a coalition or group • Builds on locally existing skills and resources • Reaches people in multiple ways
Beyond the Community	• Builds value for education as part of policy development and implementation • Builds skills for flexibility and responsiveness to environmental issues and for facilitating community engagement

Supporting References

Duram, L. A. and K. G. Brown (1999). Assessing Public Participation in U.S. Watershed Planning Initiative*s. Society and Natural Resources* **12**(5): 455-467.

Gerakis, A. (1998). Evaluating Adult Groundwater Education. *The Journal of Environmental Education* **30**: 1.

Miller, D. R. and M. F. Smith (1991). Who Participates? And Why? *Journal of Extension* **29**(3).

Target Audience – **Homeowners**

Audience Description

People who have ownership and responsibility for care and maintenance of property on which their home is located

Study-Specific BEPs

BEPs are described by one or more of seven focus areas that may be of interest to the natural resource professional.

Outreach Categories	Research Recommendations
The Audience	• Identify the need for education or outreach based on audience characteristics (e.g. understanding of the problem, socio-economic characteristics) and/or details about the specific local environmental concern
Message content	No research available
Message delivery vehicle	No research available
Outreach strategy	No research available

Public participation	• Engage the "community of interest" in checking information about a local environmental condition (such as excess nutrients in water)
	  ○ Gather data about local environmental condition
	  ○ Relate data to expectations about needs
	  ○ Change practice recommendations to reflect results
	  ○ Develop data to show environmental improvements that result from following recommended practices

Supporting and motivating professionals	No research available
Evaluation	• Effectiveness of education program delivery can be tested through comparison of changes in nitrate, nutrients and bacteria in runoff.

Linking Study-Specific BEPs to *Essential BEPs*

Essential BEPs provide an overview of Best Education Practices derived from education theory and other meta-analysis studies. This table shows which *Essential BEPs* are highlighted by research about **homeowners** as a target audience. The entire collection of *Essential BEPs* is available on the Water Outreach website.

Education for:	The learning experience:
The Individual	• promotes active engagement and real world problem solving

Education for:	The learning experience:
The Class or Group	• Is based on and shaped by some form of needs assessment and use of a planning model • Is designed to focus on a targeted audience and is built on an understanding of audience skills and interests • Incorporates methods for assessing the value of the experience, especially as it relates to desired outcomes
Web-Based Learning	No relevant research findings
The Community	• Evolves from work with a coalition or group • Generates and makes use of data about the local condition • Provides training to increase skills needed to accomplish goals identified by the group
Beyond the Community	No relevant research findings

Supporting References

Dietz, M. E., Clausen, J. C., Warner, G. S., & Filchak, K. K. (2002). Impacts of Extension education on improving residential stormwater quality: Monitoring results. *Journal of Extension*, *40*(6), 10.

Mechenich, C., & Shaw, B. H. (1994). Chemical use practices and opinions about groundwater contamination in two unsewered subdivisions. *Journal of Environmental Health*, *56*(6), 17-22.

Schwartz, J. J., Waterman, A. B., Lemley, A. T., Wagenet, L. P., Landre, P., & Allee, D. J. (1998). Homeowner perceptions and management of private water supplies and wastewater treatment systems. *Journal of Soil and Water Conservation*, *53*(4), 315-319.

Shay, K. H. (2003). *Grow green: How to have a healthy landscape and healthy kids, dogs, birds, and water*. Nonpoint Source Pollution Information and Education Programs Conference, Chicago, IL.

Varlamoff, S., Florkowski, W. J., Jordan, J. L., Latimer, J., & Braman, K. (2001). Georgia homeowner survey of landscape management practices. *HortTechnology, 11*(2), 326-331.

Target Audience – Households

Audience Description

Personal space of individuals and families

Study-Specific BEPs

BEPs are described by one or more of seven focus areas that may be of interest to the natural resource professional.

Outreach Categories	Research Recommendations
The Audience	No research available

Message content	• Adapt language and appearance of notification materials to reflect the diversity of those being notified and the literacy level of the group.
	 • Explain the exact nature of the water quality problem.
	 • Make a recommendation for action and provide explicit instructions for how to take action without too much investment of time or money.
	 • Indicate personal risk when risks exist.
	 • Address each goal – change in attitudes, knowledge, behavior intentions, or behavior – because there is no evidence that changes in one area, such as attitudes, will have an impact on changes in another, such as behavior change.
	 • Phosphorus public information campaigns need:
	   o Clear simple messages
	   o Sufficient media exposure to outline the seriousness of the collective problem
	   o Some sort of feedback to the target audience about impact of behavior changes
	   o To create an atmosphere of social pressure and the feeling that people can do more

Message delivery vehicle	• Train the person who serves as the agency interface with the public to assure that citizens are fully informed about options. • Promote resources through sources the audience considers credible.

Outreach strategy	• Use multiple channels of communication.
	 • Provide the following when focusing on environmentally responsible behavior:
	   o An opportunity to demonstrate a commitment.
	   o A demonstration or model of desired action.
	   o An opportunity to set goals or respond to goals, including use of prompts.
	   o Feedback on progress toward preferred environmental change.
	 • If providing explanatory materials by mail to residents from communities engaged in watershed planning, find ways to encourage individuals to engage. Keep in mind that only residents *who take the time* to review materials are likely to

Outreach Categories	Research Recommendations
	demonstrate knowledge mastery and an inclination to apply results. • Feel confident about choosing to communicate through major public media and education campaigns because, if each goal is specifically addressed, they can have a demonstrable effect on attitudes, knowledge, behavior intentions, and behavior change.
Public participation	No research available
Supporting and motivating professionals	No research available
Evaluation	• Use a "water demand" mathematical model to provide feedback to citizens and to demonstrate the effect of community water conservation outreach programs. • Maintain records describing which specific outreach programs were initiated to address which specific community environmental concerns and/or audiences in order to have sufficient data to interpret evaluation results.

Linking Study-Specific BEPs to *Essential BEPs*

Essential BEPs provide an overview of Best Education Practices derived from education theory and other meta-analysis studies. This table shows which *Essential BEPs* are highlighted by research about **households** as a target audience. The entire collection of *Essential BEPs* is available on the Water Outreach website.

Education for:	The learning experience:
The Individual	• Is learner centered, and consequently encourages the learner to set meaningful learning goals and to take personal responsibility for their own learning • Enables the learner to link new knowledge to their existing knowledge in meaningful ways • Promotes active engagement and real world problem solving • Provides a nurturing context for learning, with attention to: cultural or group background and influences, the physical environment, and the use of tools or practices appropriate to learner skills and abilities • Provides opportunities for extended effort and practice
The Class or Group	• Is facilitated by quality instructors who have been trained in effective teaching methods and are supported by the program sponsor • Incorporates methods for assessing the value of the experience, especially as it relates to desired outcomes • Is designed to focus on a targeted audience and is built on an understanding of audience skills and interests
Web-Based Learning	No relevant research findings
The Community	• Generates and makes use of data about the local condition • Reaches people in multiple ways • Provides participants with feedback about the results of their actions
Beyond the Community	No relevant research findings

Supporting References

Dwyer, W. O., Leeming, F. C., Cobern, M. K., Porter, B. E., & Jackson, J. M. (1993). Critical review of behavioral interventions to preserve the environment: Research since 1980. *Environment and Behavior*, *25*(3), 275-321.

Gamon, J., Roe, R., & Campbell, S. M. (1994). Evaluation of the use of water quality videotapes by county Extension offices in Iowa. *Journal of Applied Communications, 78*(2), 13-22.

Harding, A. K., & Anadu, E. C. (2000). Consumer response to public notification. *Journal of the American Water Works Association, 92*(8), 32-41.

Howard, J., & McGregor, D. (2000). Reducing nutrient enrichment of waterways through public education: A tale of two cities. *Environmental Conservation, 27*(4), 351-358.

Michelsen, A. M., McGuckin, J. T., & Stumpf, D. (1999). Nonprice water conservation programs as a demand management tool. *Journal of the American Water Resources Association, 35*(3), 593-602.

Poe, G. L., van Es, H. M., vanderBerg, T., & Bishop, R. (1998). Do participants in well water testing programs update their exposure and health risk perceptions? J*ournal of Soil and Water Conservation, 53*(4), 320-325.

Wagenet, L. P., Pfeffer, M. J., Sutphin, H. D., & Stycos, J. M. (1999). Adult education and watershed knowledge in upstate New York. *Journal of the American Water Resources Association, 35*(3), 609-621.

Watson, R. K., Murphy, M. H., Kilfoyle, F. E., & Moore, S. M. (1999). An opportunistic field experiment in community water conservation. *Population and Environment, 20*(6), 545-560.

Target Audience – **Landowners**

Audience Description
People who own property and use it for residential, recreational, forestry, or agricultural purposes. People who work the land, such as farmers or loggers, are described as separate target audiences.

Study-Specific BEPs
BEPs are described by one or more of seven focus areas that may be of interest to the natural resource professionals.

Outreach Categories	Research Recommendations

The Audience	• In landowner or renter situations:
	  o Determine which role is primarily responsible for water quality or conservation decisions
	  o Identify factors that may influence the person who could take action
	  o Understand "opportunity costs" and social norms relative to the content or practice focus of the outreach
	• Identify characteristics of landowners that could influence interest in conservation practices
	• Match the information technology delivery mechanism to the computer work style of the landowner. How does the landowner already use the computer the landowner?

Message content	• Keep the message simple • Include information that shows how the message affects landowners personally and what specific actions landowners can take to improve the situation • Acknowledge landowner interest and concern for the quality of their land • Be aware of the boundary between education and advocacy • Emphasize local elements of control • Link conservation, stewardship, and watershed topics to a particular place on the owner's land • Provide clear information about goals and plans for land parcels • Provide regular feedback about how well goals and plans have been achieved
Message delivery vehicle	• Provide agriculture landowners with written materials in addition to whatever other communication methods are selected • Trusted individuals can deliver messages effectively
Outreach strategy	• Base your program design on specifically identified needs • Base the outreach or education process on mutual understanding, trust, and respect that leads landowners to choose to comply because they see it in their best interest • Emphasize an "integrated" program that provides a continuum of information, communication, and education resources • Engage audience in planning

Outreach Categories	Research Recommendations

	• Tap into indigenous knowledge of local land stewards, especially since recommended, best-bet practices may have uncertain results in local application
	• Use a variety of outreach methods, with each targeted at specific, desired behaviors
	• Plan for the time it takes to adopt new ideas
	• Be aware of the boundary between education and advocacy
	• Be aware of the larger political issues and contexts in which water quality outreach and education take place (such as legislative requirements).
	     o Identify and communicate potential areas for measurable change
	     o Emphasize local elements of control

Public participation	• Create opportunities to build landowner participation in the activities of landowner groups • Provide groups with training to help develop leadership and organization skills
Supporting and motivating professionals	No research available
Evaluation	• Make time for continuous evaluation in order to best determine next steps • Provide clear information about goals and plans • Provide regular feedback about how well goals and plans have been achieved

Linking Study-Specific BEPs to *Essential BEPs*

Essential BEPs provide an overview of Best Education Practices derived from education theory and other meta-analysis studies. This table shows which *Essential BEPs* are highlighted by research about **landowners** as a target audience. The entire collection of *Essential BEPs* is available on the Water Outreach website.

Education for:	The learning experience:
The Individual	• Is learner centered, and consequently encourages the learner to set meaningful learning goals and to take personal responsibility for their own learning
The Class or Group	• Is designed to focus on a targeted audience and is built on an understanding of audience skills and interests • Content and delivery is determined in cooperation with the target audience and stakeholders • Presents accurate and balanced information, incorporating many different perspectives • Incorporates methods for assessing the value of the experience, especially as it relates to desired outcomes
Web-Based Learning	No relevant research findings
The Community	• Evolves from work with a coalition or group • Takes into consideration the community as a whole, including: socio-political, economic, historical, and cultural influences • Builds on locally existing skills and resources • Is flexible in response to both process and conditions

Education for:	The learning experience:
	• Provides training to increase skills needed to accomplish goals identified by the group • Takes place close to the location where people practice a behavior of concern • Builds effectiveness through linkages to other communities, partners, and resources • Reaches people in multiple ways • Provides participants with feedback about the results of their actions
Beyond the Community	No relevant research findings

Supporting References

Cobourn, J., & Donaldson, S. (1997). Reaching a new audience. *Journal of Extension*, *35*(1), 5.

Constance, D. H., Rikoon, S. J., & Ma, J. C. (1996). Landlord involvement in environmental decision-making on rented Missouri cropland: Pesticide use and water quality issues. *Rural Sociology*, *61*(4), 577-605.

Curtis, A., & DeLacy, T. (1995). Evaluating landcare groups in Australia: How they facilitate partnerships between agencies, community groups, and researchers. *Journal of Soil and Water Conservation, 50*(1), 15-20.

Force, D., & Bills, N. (1989). Participation in the CRP: Implications of the New York experience. *Journal of Soil and Water Conservation*, *44*(5), 512-516.

Howell, J. L., & Habron, G. B. (2004). Agricultural landowners' lack of preference for Internet Extension. *Journal of Extension*, *42*(6), 10.

Johnson, S. E., & Jacobs, H. M. (1994). Public education for growth management: Lessons from Wisconsin's farmland preservation program. *Journal of Soil and Water Conservation, 49*(4), 333-338.

Newton, B. J. (2001). Environmental education and outreach: Experiences of a federal agency. *BioScience, 51*(4), 297-299.

Ransley, L. (2003). The outreach continuum: Moving participants from information to action. Paper presented at the Nonpoint Source Pollution Information and Education Programs, Chicago, IL.

Voege, H., & Wagner, N. (1997). How do forest landowners learn? A study of resource agency/landowner interaction in northern California. Sacramento: Prepared for the California Department of Forestry and Fire Protection by The Training Source.

Wolf, A. T. (1995). Rural nonpoint source pollution control in Wisconsin: The limits of a voluntary program? *Water Resources Bulletin*, *31*(6), 1009-1022.

Target Audience – **Loggers**

Audience Description

People who are employed in the commercial logging industry

Study-Specific BEPs

BEPs are described by one or more of seven focus areas that may be of interest to the natural resource professional.

Outreach Categories	Research Recommendations
The Audience	No research available
Message content	No research available
Message delivery vehicle	No research available
Outreach strategy	• Provide training with a clear goal, geared toward the needs of a target audience. • Require locally extensive training, which has been shown to increase peer group awareness and implementation of skills in a study with a small sample group.
Public participation	No research available
Supporting and motivating professionals	No research available
Evaluation	No research available

Linking Study-Specific BEPs to *Essential BEPs*

Essential BEPs provide an overview of Best Education Practices derived from education theory and other meta-analysis studies. This table shows which *Essential BEPs* are highlighted by research about **loggers** as a target audience. The entire collection of *Essential BEPs* is available on the Water Outreach website.

Education for:	The learning experience:
The Individual	• Has a clear purpose with tightly focused outcomes and objectives • Assess the learner in order to set appropriately high and challenging standards • Provides opportunities for extended effort and practice
The Class or Group	• is designed to focus on a target audience and is built on an understanding of audience skills and interests
Web-Based Learning	No relevant research findings
The Community	No relevant research findings
Beyond the Community	No relevant research findings

Supporting References

Davis, C. T., & Clatterbuck, W. K. (2003). Role of Tennessee Master Logger Program in implementation of best management practices on non-industrial private forests. *Southern Journal of Applied Forestry, 27*(1), 36-40.

Shaffer, R. M., & Meade, G. S. (1997). Evaluation of harvest planning training. *Forest Products Journal, 47*(7/8), 69-71.

Target Audience – Recreational Water Users

Audience Description

Adults and youth who engage in fishing, boating, and other recreational activities on or near bodies of water

Study-Specific BEPs

BEPs are described by one or more of seven focus areas that may be of interest to the natural resources professional.

Outreach Categories	Research Recommendations

The Audience	• Use direct surveys and interviews to gauge public opinion as opposed to relying on "representative" stakeholders (direct representation may highlight factors not previously considered or lead to unexpected interests or concerns)
	
	• Gauge public preference at an early stage of planning and design, or at least at the point where possible options are being considered
	
	• In designing outreach to encourage *participation* in outdoor recreation programs, attend to:
	  o Individual and socio-economic characteristics of participants (age, gender, income, education) as they relate to their participation in outdoor activities
	  o Participant engagement in environmental behavior, rather than their attitudes about the environment
	
	• In designing outreach programs that strive to *link environmental concern with recreational behaviors*, attend to social factors that influence the choice of activity and the interpretation given the recreational experience

Message content	• Segment information content, to address differences in target audience interests
Message delivery vehicle	• Provide one-on-one communication with a person engaged in the targeted activity to enhance the knowledge they gain and their interest in acquiring more information

Outreach strategy	• To increase ownership and empowerment, design programs with a strong emphasis on:
	  o Combining: a) field activities; b) curriculum activities; c) family and community involvement
	  o Multi-faceted experiences, which are more likely to lead to an increase in skills, knowledge and motivation than education which includes only one of the above elements.
	
	• To produce long-term changes in behavior:
	  o Provide comprehensive training in the set of variables correlated with measurable changes in environmentally-related behavior, including:

Outreach Categories	Research Recommendations
	- environmental sensitivity - knowledge about ecology - in-depth understanding of aquatic environmental issues - a sense of personal investment in specific environmental issues - knowledge of environmental action strategies - skills in using environmental action strategies - an internal locus of control - intentions to act - Provide continued application and reinforcement of content - View the behavior-change process as one that takes place over an expanse of time, in a combination of formal and non-formal settings, within the context of a supportive social environment - Design programs to: - Establish an explicit set of objectives - Target outcomes for specific audiences - Provide direct experience relevant to the objective - Provide authentic experience, similar to what the participant will experience in their personal life - Provide an opportunity to practice the target behavior - Provide learning opportunities before and after the field activities to optimize knowledge gain - Develop program design and content to adhere to guiding principles for boating, fishing, and aquatic stewardship education. The program: - Is learner-centered - Constitutes a continuous and lifelong process for individuals, families, and diverse social groups - Considers aquatic resources in their totality, including natural, built, technological, and social aspects (e.g. economics, politics, cultural-historical, moral, aesthetic) - Provides participants with opportunities to engage in the valuing process (i.e., choosing, affirming, and acting) as it relates to programs, program activities, and their own growth and development - Follows the principles of inclusion with regard to program participation by minorities and people with disabilities - Begins with goals and objectives that relate to appreciation and awareness, expands to include both knowledge and skills, and culminates in personal responsibility and responsible behavior - Builds upon local, state, and national partnerships to support the development, implementation, and evaluation of programs as well as to support stewardship of the resource - Relies on a variety of systematic and continuous approaches to the assessment of participants and evaluation of programs so as to improve and eventually validate those programs

Outreach Categories	Research Recommendations
	○ Supports, engages in, and makes use of the scientific, social, educational, and other forms of research that have a bearing on programs ○ Recognizes the critical role and the need to adequately support ongoing professional development for all personnel associated with these efforts and programs, including those suggested or implied in the above principles - In designing outreach programs that strive to *link environmental concern with recreational behaviors* vary program goals to reflect differences in commitment among experienced and active anglers, ex anglers, inactive anglers, and non anglers
Public participation	No research available
Supporting and motivating professionals	No research available
Evaluation	No research available

Linking Study-Specific BEPs to *Essential BEPs*

Essential BEPs provide an overview of Best Education Practices derived from education theory and other meta-analysis studies. This table shows which *Essential BEPs* are highlighted by research about   as a target audience. The entire collection of *Essential BEPs* is available on the Water Outreach website.

Education for:	The learning experience:
The Individual	- Is learner-centered, and consequently: ○ Relates to the individual's level of physical, intellectual, emotional, and social development ○ Relates to personal interests and provides for personal choice and control ○ Encourages the learner to set meaningful learning goals and to take personal responsibility for their own learning - Promotes active engagement and real world problem solving - Enables the learner to link new knowledge to their existing knowledge in meaningful ways - Builds thinking and reasoning skills that learners can use to construct and apply their knowledge
The Class or Group	- Is based on and shaped by some form of needs assessment and use of a planning model - Is designed to focus on a targeted audience and is built on an understanding of audience skills and interests - Content and delivery is determined in cooperation with the target audience and stakeholders - Is relevant to and accessible by people with diverse backgrounds and influences
Web-Based Learning	No relevant research findings
The Community	- Takes into consideration the community as a whole, including: socio-political, economic, historical, and cultural influences - Generates and makes use of data about the local condition
Beyond the Community	No relevant research findings

Supporting References

Burger, J., & Waishwell, L. (2001). Are we reaching the target audience? Evaluation of a fish fact sheet. *The Science of the Total Environment*, *277*, 77-86.

Fedler, A. J. (2001). An examination of the relationship between recreational boating and fishing participation and aquatic resource stewardship. Alexandria, VA: Recreational Boating & Fishing Foundation.

Fedler, A. J. (2001). Fishing, boating, and aquatic stewardship education: Framework and best practices recommendations. In A. J. Fedler (Ed.), *Defining best practices in boating, fishing, and stewardship education* (pp. 4-17). Alexandria, VA: The Recreational Boating and Fishing Foundation.

Holsman, R. H. (2001). *What works: Documenting standard practices for aquatic resource education*. U.S. Fish and Wildlife Service – Region 5.

House, M., & Fordham, M. (1997). Public perceptions of river corridors and attitudes towards river works. *Landscape Research*, *22*(1), 25-44.

Pflugh, K. K., Shaw, J. A., Yacovelli, E., & Hagen, L. V. (1995, April). *Community-based educational outreach to at-risk urban anglers.* Paper presented at the Second Marine and Estuarine Shallow Water Science and Management Conference, Atlantic City, NJ.

Siemer, W. F., & Knuth, B. A. (2001). Effects of fishing education programs on antecedents of responsible environmental behavior. *Journal of Environmental Education*, *32*(4), 23-29.

Target Audience – Students, Higher Education

Audience Description
Students engaged in post-secondary, formal education

Study-Specific BEPs
BEPs are described by one or more of seven focus areas that may be of interest to the natural resource professional.

Outreach Categories	Research Recommendations
The Audience	No research available
Message content	No research available
Message delivery vehicle	No research available
Outreach strategy	• Use simulation games to help increase participant flexibility in making choices • Design training to provide students with work in teams on a practical experience with interdisciplinary participants
Public participation	No research available
Supporting and motivating professionals	No research available
Evaluation	No research available

Linking Study-Specific BEPs to *Essential BEPs*
Essential BEPs provide an overview of Best Education Practices derived from education theory and other meta-analysis studies. This table shows which *Essential BEPs* are highlighted by research about **students in higher education** as a target audience. The entire collection of *Essential BEPs* is available on the Water Outreach website.

Education for:	The learning experience:
The Individual	• Promotes active engagement and real world problem solving • Enables the learner to link new knowledge to their existing knowledge in meaningful ways • Builds thinking and reasoning skills that learners can use to construct and apply their knowledge. • Allows a learner to interact and collaborate with others on instructional tasks.
The Class or Group	No relevant research findings
Web-Based Learning	No relevant research findings
The Community	No relevant research findings
Beyond the Community	No relevant research findings

Supporting References

Dresner, M. (1989/90). Changing energy end-use patterns as a means of reducing global-warming trends. *The Journal of Environmental Education*, *21*(2), 41-46.

Ryder, B. A., & Swoope, K. S. F. (1997). Learning about riparian rehabilitation: Assessing natural resource and landscape architecture student teams. *Journal of Natural Resources and Life Sciences Education*, *26*(2), 115-119.

Target Audience – **Students, K-12**

Audience Description

Youth engaged in formal, elementary and secondary education programs

Study-Specific BEPs

BEPs are described by one or more of seven focus areas that may be of interest to the natural resource professional.

Outreach Categories	Research Recommendations
The Audience	• Use a test or an advance activity to learn information about students, in order to enhance the likelihood of an increase in student knowledge about a specific water topic through presentation of the topic in a way which is interesting and relevant to students and builds motivation to learn

Message content	• Carefully determine what is important for students to know and why before presenting classroom activities focusing on a specific water topic
	• Build student environmental stewardship motivation and competencies by focusing on the characteristics of environmentally responsible behavior:
	   o Knowledge of issues
	   o Skill in actions
	   o Knowledge of ecology and actions
	   o Group locus of control
	   o Intention to act
	   o Environmental sensitivity
	   o Personal responsibility
	   o Individual locus of control

Message delivery vehicle	No research available

Outreach strategy	• Use multiple methods to introduce specific concepts. Repeat concepts throughout the education experience
	• Structure activities at a field site in order to increase knowledge gain, but apply structured activity with care in order to avoid reducing motivation
	• Provide activities:
	   o With a real problem to solve
	   o That enable students to respond to a real-world or authentic challenge
	   o That enable students to demonstrate mastery through a public presentation
	• Incorporate field-based experiences and service-learning as significant components of environmental stewardship programs that focus on building environmentally responsible behavior among students

Public participation	No research available
Supporting and motivating professionals	No research available

Outreach Categories	Research Recommendations
Evaluation	No research available

Linking Study-Specific BEPs to *Essential BEPs*

Essential BEPs provide an overview of Best Education Practices derived from education theory and other meta-analysis studies. This table shows which *Essential BEPs* are highlighted by research about **K-12 Students** as a target audience. The entire collection of *Essential BEPs* is available on the Water Outreach website.

Education for:	The learning experience:

The Individual	• Has a clear purpose with tightly focused outcomes and objectives
	• Is learner centered, and consequently
	   o Can be adapted to individual differences in learning strategies and approaches
	   o Assesses the learner in order to set appropriately high and challenging standards
	   o Encourages the learner to set meaningful learning goals and to take personal responsibility for their own learning
	   o Enables the learner to link new knowledge to their existing knowledge in meaningful ways.
	• Provides opportunities for extended effort and practice
	• Builds on positive emotions, curiosity, enjoyment, and interest
	• Promotes active engagement and real world problem solving

The Class or Group	• Uses creative approaches • Builds environmental literacy • Builds from key principles underlying environmental education
Web-Based Learning	No relevant research findings
The Community	No relevant research findings
Beyond the Community	No relevant research findings

Supporting References

Fortner, R. W., & Lahm, A. C. (1990). Research program outreach into the classroom: An estuarine research reserve initiative. *Journal of Environmental Education*, *21*(4), 7-12.

Fortner, R. W., & Mayer, V. J. (1991). Repeated measures of students' marine and Great Lakes awareness. *Journal of Environmental Education*, *23*(1), 30-35.

Milton, B., & Cleveland, E. (1995). Changing perceptions of nature, self and others: A report on a park/school program. *Journal of Environmental Education*, *26*(3), 32-39.

Zint, M., Kraemer, A., Northway, H., & Lim, M. (2002). Evaluation of the Chesapeake Bay Foundation's conservation education programs. *Conservation Biology*, *16*(3), 641-649.

Target Audience – Teachers

Audience Description

Professionals who provide a structured education experience for youth at the elementary and secondary education levels

Study-Specific BEPs

BEPs are described by one or more of seven focus areas that may be of interest to the natural resource professional.

Outreach Categories	Research Recommendations

The Audience	• Recognize that issues and context for different geographic regions impact educator and natural resource manager priorities for the relative importance of selected concepts, skills, and values
	• Tie water and water resource education to local values and needs of:
	  o The geographic region
	  o Educator identified priorities
	  o Natural resource manager identified priorities
	• Determine whether teachers can implement topics. Check if:
	  o They have knowledge about the topics
	  o They have a place to fit the topic in their curriculum
	• Understand the roots of the environmental management problem and select your target audience based on a specific need. For example, if economic activity is most closely associated with the environmental problem, outreach initiatives should relate to the needs and interests of the target audience engaged in the economic activity

Message content	• Water and water resource education has a distinct body of knowledge described by topics categorized as concepts, skills, and values or emotions. Water science and management knowledge has been organized by Brody (1995) and others.
Message delivery vehicle	• Develop, promote, and/or disseminate pre-developed materials, hands-on activities and grade level appropriate software about priority water topics

Outreach strategy	• Educate teachers about innovations in curricula to ensure that they are implemented
	• Encourage and support use of a community-based curriculum based on water monitoring. (This type of curriculum has been shown to be highly acceptable among teachers and to provide professional satisfaction.)
	• Encourage teachers to include the following elements in their environmental education programs:
	  o Flexible curriculum
	  o Collaborative learning environments
	  o Students' bearing the consequences of the behavior
	  o Teacher competency in listening and questioning
	  o Diverse instructional strategies

Outreach Categories	Research Recommendations
	o Resourcefulness in accessing resources o Creativity, especially in knowledge of how to do without, o Facilitation skills o Ability to make connections o Understanding of local-to-global connections o Ability to integrate curricula o Using personal/student strengths/passions o Experiential teaching orientation o Cooperative and inclusive learning o Nurturing a sense of place o Consistent can-do vision o Infectious passion for EE and teaching in general o Humor in the classroom o Practice of environmentally responsible behavior o Risk taking o Recharging oneself
Public participation	No research available

Supporting and motivating professionals	• Provide teachers with substantial support, to better enable them to build water supply and management topics into their curricula, by:
	  o Building teacher self confidence in understanding water concepts that are less familiar to them
	  o Helping teachers figure out how to integrate water topics into their regular curriculum
	  o Providing teachers with new science skills and pedagogical knowledge to build self confidence
	  o Providing teachers with the following, to assure that they can successfully implement a curriculum:
	    ▪ Supportive curriculum resources
	    ▪ Training to support thorough understanding of scope and content objectives
	• Provide teacher training that is: hands-on, intense, comprehensive, and includes work in the field. A successful training could:
	  o Include an introduction to the watershed topic(s), water quality testing, use of equipment, hands-on instruction, introduction to inquiry-based learning, introduction to and use of field-based science investigations, and related science and career topics
	  o Assure availability of any resources required for the training
	  o Include practice training activities designed to match the situation where teachers will apply the activities
	  o Provide professional development in: student initiatives, action research, interdisciplinary approaches, and help with barriers to program implementation

Evaluation	• Document information and outreach work to help improve ability to assess the relationship between outreach and outcomes and to exchange materials and knowledge with others • Evaluate progress toward clearly defined objectives • Apply an evaluation strategy which helps educator to identify reasons and consequences for training outcomes

Linking Study-Specific BEPs to *Essential BEPs*

Essential BEPs provide an overview of Best Education Practices derived from education theory and other meta-analysis studies. This table shows which *Essential BEPs* are highlighted by research about **teachers** as a target audience. The entire collection of *Essential BEPs* is available on the Water Outreach website.

Education for:	**The learning experience:**
The Individual	- Enables the learner to link new knowledge to their existing knowledge in meaningful ways. - Provides a nurturing context for learning, with attention to: cultural or group background and influences, the physical environment, and the use of tools or practices appropriate to learner skills and abilities - Provides opportunities for extended effort and practice.
The Class or Group	- Is facilitated by quality instructors who have been trained in effective teaching methods and are supported by the program sponsor - Is based on and shaped by some form of needs assessment and use of a planning model - Content and delivery is determined in cooperation with the target audience and stakeholders - Builds environmental literacy, especially for knowledge of environmental processes and systems - Builds from key principles underlying environmental education - Incorporates methods for assessing the value of the experience, especially as it relates to desired outcomes
Web-Based Learning	No relevant research findings
The Community	- Takes into consideration the community as a whole, including: socio-political, economic, historical, and cultural influences - Provides training to increase skills needed to accomplish goals identified by the group
Beyond the Community	No relevant research findings

Supporting References

Beiswenger, R., Sturges, E. L., & Jones, R. (1991). Water education in Wyoming: Assessing educators' knowledge of water topics and their use in the elementary curriculum. *Journal of Environmental Education*, *23*(11), 24-29.

Brody, M. (1995). Development of a curriculum framework for water education for educators, scientists, and resource managers. *The Journal of Environmental Education*, *26*(4), 18-29.

Dijksterhuis, O. W. (1996). Environmental education: A tool for coastal management? A study of the Caribbean region. *Coastal Management*, *24*(4), 339-353.

Fackler, R. (2003). Kentucky nonpoint source partnerships for excellence in water quality education. Paper presented at the Nonpoint Source Pollution Information and Education Programs Conference.

Fortner, R. W., & Corney, J. R. (2002). Great Lakes educational needs assessment: Teachers' priorities for topics, materials, and training. *Journal of Great Lakes Research*, *28*(1), 3-14.

May, T. S. (2000). Elements of success in environmental education through practitioner eyes. *The Journal of Environmental Education*, *31*(3), 4-11.

Talsma, V. (2001). The rouge education project: Challenges of implementation. *The Journal of Environmental Education*, *32*(3), 26-30.

Wood, B. B. (2001). Stake's countenance model: Evaluating an environmental education professional development course. *The Journal of Environmental Education*, *32*(2), 18-27.