

Education – An Essential Ingredient for Successful Water Management

Opening Keynote Address

Kevin Coyle, President
National Environmental Education & Training Foundation
Washington, D. C.
president@neetf.org

The principle of using best management practices (BMPs) to conserve and improve natural resources is well established and time-honored in the resource field. It makes complete sense to take proven, exemplary approaches to land and water management and offer them as models for others. The BMP tradition helps millions of practitioners in agriculture, forestry, soil and water management and related fields to avoid “wheel reinvention.” BMPs include outstanding methods, technologies and even rules of conduct. Importantly, they capture the state of the art and help the larger public understand how it too can contribute to water and natural resource management.

So can the BMP concept be extended to education by establishing a new set of “BEPs,” best *education* practices for water? The quick answer is yes. If properly implemented, BEPs would likely become a significant and much-needed help in water resource management throughout the United States and elsewhere. That is because there is a growing body of evidence that education works in a practical sense and produces results both by itself and as an added measure in the larger natural resource and water management arenas. The signs are good that water management BEPs will become critically important.

For starters, we will need more of a focus on education because water management principles and practices are more complex today than they were 30 years ago and that complexity is rapidly increasing as scientists understand more about natural systems. Today’s water management, for example, requires a grasp of watershed functions, geomorphology, nutrient transmission, seasonal flow regimes, surface and groundwater interfaces, patterns of polluted run-off, riparian resource and wetlands absorption and more. Land managers may already have a significant grasp of many of these subjects but the future will require more public help to keep up. That is where BEPs come in.

Secondly, more complex and intense surface and ground water dynamics at urban-rural interface place an additional burden on urban-dwelling people to more effectively share water resources with agricultural and natural resource managers and vice versa. In many areas of the nation, balancing water consumption in the home, on the lawn and in business has never been so important. The reverse is true too. Rural land managers must better understand and mitigate their impact on urban water quality and quantity including

potential pollution of drinking supplies, seasonal flow reductions, intensifying flood impacts and more.

Finally, nationwide population growth and redistribution will require more understanding of how truly finite our freshwater supplies are in America and throughout the world. To balance human needs with the needs of nature and establish more sustainable levels of water consumption will require greater per-capita knowledge of water resource basics and these can be well conveyed through water BEPs. But, the very idea of BEPs introduces a threshold question. How much will water education actually work to improve management?

How Are We Doing On Environmental Knowledge and Literacy?

From 1996 through 2002, the National Environmental Education & Training Foundation (NEETF) and the international survey research firm of Roper examined the state of simple environmental knowledge or awareness among adult Americans. The surveys (see www.neetf.org) found that, while awareness of environmental subjects is high and most people express significant support for environmental protection, their actual knowledge of environmental subjects is relatively low. Lack of environmental knowledge and literacy is most pronounced with regard to meaningful comprehension of the cause/effect relationships implied in watershed management, ecosystem conservation, wetlands management, water supply, drinking water systems and so on.

This means a major hurdle for BEPs is that few Americans grasp that rainwater picking up pollutants on and running off the land and into our water bodies is the leading form of water pollution today. There are two main reasons for this lack of knowledge. First, people of all ages have learned that industry is the leading pollution source. But, this is mostly old news held over from the decades of the 1960s and 1970s. Secondly, having an understanding of run-off also means knowing a modicum of information about the cause/effect relationships between rainfall, land management, water flow patterns and water quality. This raises the specter of whether those who work in the professional environmental field overestimate how much people actually know and, therefore, do not take enough time to review and educate them on fundamentals including drainage and spatial relationships, ecological sensitivities and such simple facts as drinking and irrigation supplies can sometimes become polluted. Also, in rural areas, there can be a higher level of understanding of watershed, water supply and water quality issues but the difference in knowledge and awareness between urban and rural residents is negligible.

Three Levels of Environmental Learning: Three Kinds of Impact

An examination of research on the efficacy of environmental information, education and outreach indicates that there are at least three levels at which people come to grasp environmental subjects and there are three kinds of results from that knowledge. They are as follows:

The “Awareness Level”

Environmental “awareness” basically means a person has “heard of” an environmental topic, knows it is a public concern, but actually knows very little else of its details. Public knowledge and opinion research shows that many people (some 50% to 85%) have awareness of several main environmental subjects but it rests on weak foundations and lacks depth. The key reason so many people are aware of environmental subjects is the media’s broad reach. A majority of Americans have, for example, heard of air and water pollution issues, loss of species and habitat, solid waste disposal problems and more. Such awareness has little effect on behavior but is often a powerful aid to public understanding of simple topics. Simplified information can often foster misunderstanding of the more complicated subjects, however. The key public benefit from widespread environmental awareness is public support for the government and large companies to regulate or invest in environmental improvements.

The “Personal Steps Level”

This involves the kind of simple and practical environmental knowledge needed by an individual to take pro-environment steps in the home, the workplace or as a consumer. It comes partially through schools and the media and also through government and company outreach programs. It can also come from consumer education (such as labeling or advertising). Information on personal environmental actions or steps encourages recycling, saving water, reducing waste, economizing on fuels and purchasing more environmentally friendly products. Research shows that environmentally informed Americans *can* absorb and *will* take many personal steps to help maintain the quality of the environment at home, work and in their community. The same research indicates that a person who is thus informed is anywhere from 10% to 50% more likely to act more environmentally. But, serious environmental educators are also quick to caution that such behavior change is fairly temporary and while effective information and education programs can change many people’s behavior it will not be all that durable. It is also important that the actions people are asked to perform are within ongoing activities such using water, gasoline, electricity or shopping. This type of knowledge needs constant updating and reminders.

Common Ingredients for Personal Steps Education

- Small changes in ongoing behaviors
- Very little “dot connecting”
- A sense of “togetherness”

Even still, NEETF estimates that instructing more people more frequently, on a broader scale on such simple personal steps could quickly bring about a \$75 billion annual environmental improvement in saved water, energy and improved health.

The “Environmental Literacy Level”

In the past three decades, the environmental education field has defined environmental literacy as knowing and underlying principles and being able to analyze and apply them.

The field distinguishes media or other information and outreach programs from true environmental education (EE).

○ **Youth foundations** – Recent examinations of the state of environmental literacy find that a small percentage of the public is prepared for the complex environmental issues and decisions of the future. At least part of this shortfall is due to the status of environmental education in school. Simply put, EE has not achieved “core subject” status in most of our schools. Though EE is a popular elective and supplemental effort in more than half of our schools, there is too little of it that actually gets delivered and it is poorly sequenced so that environmental learning does not effectively accumulate. We need to offer students a sufficient amount of sequenced environmental education to let them absorb and retain the basic definitions and principles of environmental science and systems and to learn how actually apply those principles. It would be a major breakthrough if a majority of students could reach this level by the time they complete high school. For water BEPs this would mean providing a basic knowledge of watershed science, management and related resource fundamentals.

○ **Adult leadership literacy** – All people in the home, workplace and community impact the environment including water resources. Research shows, however, that leaders in business, government and civic affairs lack basic environmental literacy and often either ignore environmental impacts and opportunities or address them solely through intuition.

Community leaders, in particular, need to be environmentally literate. They number in the tens of millions and are constantly making decisions on every aspect of community life from land development policy, to education, to waste removal. It is vitally important for adults in key positions and professions such as business, health and education to make sound decisions about the environmental impacts of their decisions. We need mature and well-developed environmental literacy for a majority of those 30 million adults who comprise America’s community and professional leaders -- what our research partner Roper refers to as community “influentials.”

By influentials, Roper means the one out ten people living in American communities who get actively involved. They sit on planning boards and education boards, and participate in civic events. They are members of the PTA and the Lions clubs and countless other civic organizations and they are natural leaders in their towns and neighborhoods who are looked up to and respected by others. Importantly many of these community influentials are highly curious and avid self-teachers and learning about the environment is among their interests. In part that is because nearly one half of community influentials fall into what Roper classifies as the most environmentally disposed members of the public – the True Blue Greens. They are naturally civic-minded, educated and willing to speak out for environmental management and stewardship in their communities. Further good news for achieving environmental literacy is the fact that the remaining group of influentials is also predisposed toward environmental management and protection.

Implications for BEP Program Design For Literacy

The above construct suggests a few basic “pointers” on how to create BEPs for water. We suggest that educators ask themselves a few simple questions about what and how they are teaching:

Can we achieve improved water management without stronger education?

Education will be a greater part of our water management future (not less) because of the growing need to address polluted run-off from its many sources, handle intensifying competition between rural and urban water needs, and lessen the impact of individual consumer activity on water quality and quantity. Moreover, as the American economy shifts toward smaller average enterprises a larger number of private sector companies are impacting water resources without the same level of knowledge, training and expertise as larger counterpart companies.

Does the information to be imparted require simple awareness or deeper education?

Many environmental education programs err by assuming that the learner automatically understands underlying principles and definitions such as “watershed,” “run-off,” “non-point source pollution,” “riparian zones” and “flow regimes.” A well-developed program will spell out these basic concepts and display them in ways that the learner can understand them and eventually apply them. While it may seem obvious, those teaching BEPs for water resources must be keenly aware of the need to tailor their educational delivery and levels of detail to effectively accomplish the instructional task. It is critical that BEPs be appropriately adjusted to the complexity of the water subject being considered. Educators often overestimate what their students actually know by way of background and basic principles. An example would be for a lesson plan covering watersheds to fail to adequately explain the definition of a watershed or to depict the relationship of rainfall to the overall catch basin. Another example might be to discuss the water quality opportunities presented by maintaining riparian strips while assuming (incorrectly) that students already understand the filtering effect of streamside vegetation on run-off.

Do the BEPs that are delivered adhere to other basic rules of pedagogy?

These would include providing a sufficient amount of instruction time, providing sequenced delivery of basic principles so they build upon each other, and recognizing that knowledge accumulates over time.

BEPs will also require careful use of sound instructional materials including ample use of graphics and forms of visual presentations. Visuals are particularly helpful in setting out complex causal relationships. Another way to effectively teach causal connections is through stories. Storytelling as a general rule is a highly effective tool for education.

Does the instruction teach skills and application?

A significant aspect of environmental and natural resource education is its implied relationship with application in the real world. Many educational subjects are presented for their knowledge value alone. Many BEPs will contain specific education regarding skill development and application.

Will BEPs aim at community leaders or “influentials”?

For those skeptics who wonder if measurable results really ever come from environmental education programming, recent research offers some answers and tremendous hope. It shows, for example, that the environmentally informed person is anywhere from 5% to 90% more likely to engage a set of pro-environment activities (water and energy saving, recycling, green consumerism) than a person who is not informed on the environment. A simple 5% reduction in the amount of water used in the average home would save Americans more than \$14 billion on their water bills and make millions of acre feet of water available for other uses including fish and wildlife management.

In addition to seeking measurable impacts on a majority of the adult public, certain Roper-defined segments of the adult population may offer the brightest hope of all. Notable among these are what Roper calls the community “influentials.” They are the one in ten adult Americans who are effective (usually volunteer) leaders in our communities. They are members of parent-teacher organizations, Lion’s clubs, volunteer fire departments and civic associations. They sit on town councils and planning boards and are active in their communities.

Roper finds that the environment matters to the community influentials. Some 78% of them, for example, think that businesses should also consider what is good for society and not just what is good for profit. Influentials have in fact been pushing government and business hardest to improve the environment. A majority (52%) believes that laws to protect the environment have not gone far enough and many of them seem ready to do more than recycle their trash. They say they would pay more for green products such as autos, gasoline and electricity.

Percentage of Influentials who are *moderately* or *very* interested in a topic (Keller, 2004):

- | | |
|---------------------------|-----|
| • News and Current Events | 96% |
| • Environment | 92% |
| • Fitness and Health | 87% |
| • Nature and Animals | 87% |

Roper feels these influentials have untapped potential as change agents on many public issues including the environment. They are early-adopters of many environmentally considerate products and practices, and exhibit a true openness to learning about the environment. They are curious and deliberate seekers of information and, with a stronger base of environmental literacy, could have an exponential effect on the stewardship of

our communities, ecosystems, air and water. Some 74% attended a public meeting on town or school affairs (compared to 16% for the total public). Fully 50% served on a committee of a local organization (7% for the general public), 40% wrote a letter to the editor (6% for the general public, 35% were active members of groups trying to influence public policy (5% for the general public) and 31% made a speech (4% for the general public). Other research underscores that Influentials are highly active in their communities by being among the core of people who volunteer. More than 60% of Influentials engage in volunteer work in a typical month.

In addition to reaching the general public and school students, BEPs targeted toward community influentials would have a lasting effect on their ultimate success and implementation.

References

Keller, E and Berry J. (2004) *The Influentials*, New York, NY The Free Press