Descending the Watershed: Rethinking the "Place" of Curriculum

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Abstract

The watershed provides a definable unit of ecology and community which can be used by educators to frame educational experiences for diverse groups of people. In this paper, a first person phenomenological approach is used to describe an expedition for teachers from the uppermost beginning of a Northern Rocky Mountain watershed to its river output at the bottom. Along the way, the landscape and experiences of the workshop participants are interpreted through principles of teaching and learning drawn from a theory of *Educating* (Gowin, 1981). The author describes key concepts such as "place," shared meaning, cultural perspectives, complexity, scale, connectedness and interdisciplinarity in the context of environmental education. The conclusions focus on the role of people and "place" in the construction of new knowledge about the environment and takes traditional curriculum theory a step beyond simple educative events.

Résumé

Le bassin versant constitue une unité écologique et communautaire qui peut être exploitée par les éducateurs pour structurer des expériences éducatives pour divers groupes de personnes. Cet article décrit une expédition d'enseignants qui les a menés de la source d'un bassin hydrographique, au sommet des montagnes Rocheuses, jusqu'à la rivière qui en découle, en aval. Cette description adopte une approche phénoménologique, centrée sur l'expérience personnelle. Tout au long du parcours, le paysage et les expériences vécues par les particpants sont interprétés à la lumière de principes d'enseignement et d'apprentissage relevant d'une théorie de l'*Éducation*

(Gowin, 1981). L'auteur clarifie des concepts clés, comme "place" (lieu), signification partagée, perspectives culturelles, complexité, échelle, relation et interdisciplinarité, dans le contexte de l'éducation relative à l'environnement. Les conclusions mettent en lumière le rôle des personnes et des "places" (lieux) dans la construction de nouveaux savoirs au sujet de l'environnement et invite la théorie traditionnelle du curriculum à aller au-delà des simples événements éducatifs.

Recently, I conducted an inservice environmental education teacher workshop in Big Sky, Montana. The theme of the workshop was new approaches to environmental education, and the focus was on teaching about watersheds. My goal was to provide the workshop participants with direct experiences through a day expedition through a discreet watershed. I wanted to discuss and learn how we can help children learn about the complexities of their surrounding ecosystem. I wanted people in the workshop to be grounded in a watershed and to ask questions that were of importance to them. I hoped that the workshop participants would then be able to look outside their classroom, or office, and see the terrain as a natural boundary within which myriad organisms try to make a successful living. Although the workshop was framed by the Greater Northern Rocky Mountains Ecosystem, at the headwaters of the Missouri River, the same issues and concepts apply to all watersheds.

Technically, watershed ecosystems are made up of numerous rivers and their drainage. They embody principles of biodiversity, which are widely recognized as the basis of life on Earth. However, the degradation of these riverine systems and the decline of watershed biodiversity continue today. One of the most basic reasons for this is that most people think of rivers as simply water flowing through a channel. This view fails to recognize important concepts of complexity and diversity that help to define the ecosystem (Pacific Rivers Council, 1993).

Our watersheds are wonderful things to consider. The processes of falling rain, flowing streams and rivers, evaporating lakes and oceans, cause every molecule of water on Earth to move through

the water cycle once every two million years. Tremendous amounts of water pass through the drainage of watersheds throughout the world. The end result is that the Earth's surface is carved into watersheds. These are a kind of familial branching, a charting of relationship, and a definition of "place." It is our home and the life that flourishes in it constitutes our community. The watershed is a "place" to go upstream, downstream, and across.

Living in the watershed is a continuing educative event (Gowin, 1981). Looking at the event itself, experiencing the watershed, is autobiographical research which discloses new perspectives on the environmental curriculum. In approaching the watershed as curriculum theory, there is precedent for autobiographical research. Susan Douglas Franzosa (1992), in her article "Authoring the Educated Self: Educational Autobiography and Resistance," states, "educational autobiographies represent an effort to displace the school to become the 'true' author of an educated self" (p. 402). Just as Franzosa treats autobiography as narrative of resistance to schools, I explore the possibility of autobiographical narrative of personal experience connected to the reality of the environment.

My watershed experiences are shaped by knowledge brought to the events as well as the knowledge of people in this workshop and the set of events which took place. The possibility of watersheds becoming one of the foundational approaches to environmental education curriculum has great relevance. Sustaining life and resources must start at the local level, with people, communities, children, and schools.

The watershed acts as a metaphor in this paper because it is treated as a conceptual archetype. It is an idea which we have some familiarity with since we all live in a watershed, and it subsumes other ideas such as complexity and interconnectedness which are important for us to consider in relation to environmental educating. To understand the meaning the metaphor creates, we must relate watershed and educating in new ways. In *Educating* (Gowin, 1981), metaphors are described as a "ferry" from known meaning to new meaning. They require us to reorganize our patterns of understanding. The use of the watershed metaphor provides a basis for disciplined conceptual learning about environmental curriculum.

The watershed has an ancient past, a dynamic present and a long future. We all live within a watershed, come in contact with it at all times. The watershed continually discloses itself to us. Thus, the subject matter necessitates a first person phenomenological rendering. In this description of my experiences, understanding, learning and insights about watersheds, I am describing key concepts and new meanings. I describe the watershed and new ideas of *Educating* (Gowin, 1981) in the context of environmental curriculum. *The key concepts are: place, shared meaning, cultural meaning, complexity, scale, connectedness, and interdisciplinarity.*

The Ascent: Emergence of "Place"

The concept of "place" is especially important today. Psychologically, socially, economically, politically and ecologically, we all define our "place" in the world. Watersheds embody "place." They are ecosystems composed of different land patches that are drained by a network of streams and comprise our landscape (Shepard, 1977). The flowing water and its associated environments are a mosaic of habitats in which matter and energy are transferred through the system. Watersheds are also home to people, and their activities, which can fragment and disconnect habitat. These activities can disrupt the flow of materials and energy (Pacific Rivers Council, 1993).

As I rise gradually in a ski gondola from the base of Big Sky, alone, I can't help wonder about the thirty people from Canada, the United States, Japan, and Mexico who have agreed to travel with me from the very beginning of the Missouri River through a small watershed in the Madison Range. What sense of "place" do they have?

My thoughts are gradually overwhelmed by the terrain which is being exposed around me. Lone Mountain ahead and Andesite Mountain behind are the remains of ancient volcanoes. Today, they are covered with snow, soon to melt and contribute to this watershed. Beyond the immediate drainage lie the Spanish Peaks and Metcalf Wilderness. They too will contribute to "place" as the waters from individual drainages join to the east, flowing into the Gallatin River, and 50 miles later joining with the Jefferson and Madison Rivers at Three Forks, to form the mighty Missouri.

The watershed which lies below is an open system because a large proportion of the materials and energy in the system are derived from the surrounding terrestrial system, yet flow outward. Disturbances in the watershed propagate downstream from the headwater sources. The protection of the sensitive headwater areas below is critical to maintaining and restoring riverine habitat and ecosystems for considerable distances downstream. In the watershed, we can never do just one isolated thing, everything we do creates an effect. Those effects are often unpredictable.

I am filled with expectation as the gondola approaches the terminal. I am confident that the teachers and administrators have looked out over this vast area and begun to feel the sense of "place" as well.

I hope they pay attention to the changes in the landscape and trees, and watch to see where the natural boundaries can be roughly defined. These transformations will guide us. The ground we will travel is a common ground, a "place" for us to talk and learn about ourselves, about this "place," and our "places."

Environmental educating is a matter of understanding "place." It is understanding the "place" in which you are. The geographical as well as the intellectual space. We may choose to stay where we are and simply enjoy it. We may want or need to move on (see Orr, 1992).

Just like the changes in the landscape below, there are boundaries in our understanding. In the "place" of the watershed, the boundaries are physical: climate, plant communities, moisture, soil type and style of life. In our knowledge there are boundaries of ignorance, understanding and misconceptions. In both cases, the boundaries are porous, permeable and arguable. Just as individual species overlap the zonation of the mountain, our personal theories and concepts overlap boundaries of correct- and mis-understandings.

This watershed is the "place" for traversing physical and psychological boundaries. It is the "place" where we live for the duration of the conference, travel today in the workshop and hopefully leave with deeper understanding. It is the "place" we will return to when we travel home. It is a place we will live forever.

The Summit: Sharing Meaning

As I leave the gondola, the workshop people gather together. Everyone's eyes turn to the small glacier compressed of rock and ice located just above us in the central bowl of Lone Mountain. The sun is strong and the sky blue. We gather in a circle, no one ahead, no one behind.

The ridge leading to the glacier above us is desolate. No life is apparent from this distance except for a lone hiker, silhouetted against the blue sky. Questions begin to fly through the air.

First we talk about this "place." What about the ice above, is it really a glacier? We can feel the cold air slip off the ice and roll down the slope to where we stand. How about the jumble of rocks we are standing on, where did they come from? Looking up, people begin to share their ideas. The lead is taken by people who live in this ecosystem. The natives (the people who live in this "place") begin to share their "place" with the others. Often the questions are answered with questions. Where did the rocks come from? Look above you, can you see the shear face of the cliff? That's where the rocks begin. What do you think happened here?

The workshop has taken its first step toward my goal. Educating people about watersheds is a matter of helping people educate themselves about what is important. There is no exclusive ownership of what's important. There is no ownership of everything around us. In both cases, importance and environment, it is more a matter of sharing than giving. Educating is also questioning, identifying what you don't know, what you want to know. Questions are like the markers along a trail which you can follow to your destination of new understanding.

The people from the lowlands catch their breadth and become accustomed to the altitude, and I ask the people to reflect on the trip up the mountain. As we begin our descent into the watershed, I sense the people here have been brought together, attracted by similar interests, into the workshop's pattern. Like the landscape around us, these people have their own intellectual and emotional shapes, structures, centers and edges which must be respected (Shepard, 1977).[1]

Across from me in the circle of people, our friends from Japan listen quietly, respectfully. In English their names mean "small mountain," "forest," and "base of mountain." They are here to learn and bring back new ideas and techniques to their country. Next to me a Canadian geologist, who is a specialist in measuring

snowpack, patiently listens and waits to contribute his expert knowledge about watershed drainage. And, although we now stand in a dry and arid landscape, we will soon descend to standing surface water and listen as people from coastal areas describe the wonders of our continent's wetlands.

These individuals' experiences show that the most important changes come, not from the top down but from the bottom up, from people like these. *Sharing meaning with them will bring us to deeper understanding of this "place" and the global nature of people and their relationship to the watershed.*

The Descent: Cultural Meaning

We move down the mountain. The boulders, ledges and scree (rock slides) gradually give way to soil and high alpine meadows. Here we stop to eat, rest and check-in with each other.

The meadow we have chosen is spacious, sheltered from the breeze and warmed by the sun. Except for the snow and ice high above us, there is no direct evidence of water. Yet plants abound. I can sense the presence of the water moving slowly through the ground below us, nourishing life, soon to rise and make itself more apparent. Next to me, looking down toward the ground the bright yellow flowers of glacier lilies stand. Indian Paintbrush is pointed out by another person. Another explains that the slipper shaped flowers running from purple to pink to white are called shooting stars. Legend has it that each appears whenever there is a shooting star in the sky above.

Legends and culture result from and are part of "place."[2] They are part of the watershed. These ideas begin to coalesce in our conversation. Our conversation turns to sharing where each of us comes from. We discuss various watersheds and ecosystems. People from the plains talk about the Missouri, the mighty waters moving along with life all around it, the raging flood of the summer of 1993. Yet here we sit at the headwaters, no moisture to be seen. Our lips, dry and cracking.

The conversation turns deeper, as if we are searching for the water that sustains the plants around us. Our Mexican workshop participants begin to contrast and compare our views of watersheds. Here we sit surrounded by apparently pristine habitat. Is this

acceptable to other people of the world? We are reminded that other countries in the world do not have the luxury to save the forests or the meadows. Natural resources are one of their keys to economic success in a world market. How can we sit here and revel in this beauty when others have no opportunity to experience the same?

People begin to shift their positions. They appear uncomfortable. Unconsciously they move into a circle, their feelings aroused. Now we can see each others' faces and look into their eyes. The colors of their skin and the colors of the mountains and the sky seem to blend into the rainbow before us. Like the rainbow derived from white light, we all share one thing: life. Today we also share our life in this watershed.

Multi-cultural educating, is a watershed issue. The watershed brings people together in a region of shared interests. Deforestation and watershed degradation are not issues of white people or people of color. They are issues of shared interests of people in the watershed ecosystem. This shared interest can be a vehicle for cooperation and shared understanding. It is a path to learning and working together. There is no watershed preference for blacks or whites. A watershed only requires if you can live in that "place" with respect.

Disconnection from the watershed, its parts and functions can lead to racial injustice. In our urban centers, which are as much a part of a watershed as this mountain, neighborhoods inhabited by the poor and people of color are often targeted for environmental degradation. Disconnection from their "place" in the watershed leads to inequality.[3] The watershed, because we all live and share it, holds the promise of environmental justice and racial equality.

Although these issues may not have been truly resolved in that high meadow of the Madison Range, it was clear to me that different colors, different voices, different cultures share interest in the future. *Watersheds throughout the world provide functional units for people of different races to share interest and meaning.*

The Overlook: Complexity

As the circle broke, the people again let gravity move them along the trail, gradually out along a rocky outcrop that seemed to take us to the edge of the mountain. Our footing was loose and everyone was necessarily careful and slow. The unsure footing caused us to focus our attention narrowly, looking down, each of us concentrating on our next step. Then, these baby steps led us to the ledge and the eagle's view of the land. We stood on a high ledge overlooking a large expanse of mountains, valleys, rivers and streams. As the eagle sees the big picture from above, the watershed spread before us.

Around us was a huge expanse of the Northern Rockies ecosystem. Overwhelming, yet like holes in our consciousness, clearcuts stood out on the hills in every direction. This is the reality of this watershed. It is far from the pristine undisturbed habitat some people think it is. For some of the people in the workshop it was the first time they had witnessed peoples' use of their national forest heritage.

Cameras came out and the documentation began. This watershed began to take on new meaning. People who live here also work here. They are invested in their future and their children's. What stood before us was their "place," their lives. We are all part of this watershed. They have the first say about the waters that will travel the Gallatin, the Missouri, the Mississippi and eventually become part of the Gulf of Mexico. We stood upstream of an entire continent. Everyone else, downstream.

What part of these peoples', our communities', education deals with issues related to upstream and downstream? What part deals with the water, trees, wildlife and people? No less jobs and biodiversity? Where do children learn that everything is connected to and intermingled with everything else, that we are all in this together? We are all in the watershed together.

Interdisciplinary education is becoming more essential for our survival everyday. We are constantly being faced with decisions which balance understanding of both natural and social sciences. Environmental concerns and issues provide a clear focus for this kind of educating. These concerns, involving natural resource management are quickly evolving in response to environmental and economic interests.

Watershed management is fast becoming a widely recognized strategy for conservation and management of our land. This

includes economic, political and cultural factors. Since our lives are based on natural ecosystems together with cultural artifacts, educating cannot avoid the interrelationships of the disciplines.

Educating about watersheds is necessarily interdisciplinary. Each watershed is made up of a complex set of ecological relationships. These relationships include natural and social sciences. Within the natural sciences the relationship of physical and biological sciences in ecology is critical. This raises the conceptual level to topics like population dynamics and energy transfer. These ecological principles are influenced by economics, politics and other social science topics. The interrelationships are more complex and dynamic than we think or can ever think.

Our challenge is to discover which connections are the strongest and the most important to us and other species. Watersheds provide a unit of study which help us focus our learning into more manageable chunks. They provide pedagogical simplicity which does not hide ecological complexity.

Water Emerges: Scale

As we continue to descend the mountain through the drainage, somewhat overwhelmed by the complexity of our lives, we arrive at tree line. We move into a cooler moist environment. The ground is soft and luxuriant with plant growth. From above we are shaded from the sun by trees. Signs of animals, elk scat and the claw marks of porcupines on trees, are connected by well worn animal paths. We feel closer to wildlife and talk of bears begins to enter the conversation. Although we are in the middle of grizzly bear country, it is unlikely we will encounter any today. The thought of such an encounter sends shivers up the spine of some of the participants. For some, this is their first wildness experience.

We all need to know more about how these systems work at large scales which can accommodate both people and bears. We need to find ways to connect wild zones with wild zones whenever possible. This means honoring the natural connections of watersheds. The Greater Yellowstone system, in which we stand, relies on this recognition.

As we follow the elk tracks we descend to a low wetland. Here the water rises from the ground. It is the available water which

draws wildlife to this "place." These are the pristine headwaters of the great rivers of our continent. The water rising into the wetland spills over an edge of rock and forms a stream. The stream rushes, driven by the force of gravity toward the sea.

Riparian vegetation on both sides of this stream provides shade, helping to maintain temperatures conducive to native biodiversity (Miller, 1994). Leaves and woody debris feed the water with nutrients for growth of aquatic plants and food and shelter for the insects upon which fish feed. The debris also contributes to slowing the water velocity and deflecting its course. These riparian areas are vital structural components of the watershed.

Like the water that rises from the ground and the riparian ecotone surrounding them, my thoughts move toward the realization that this water and land will help sustain lives throughout the country. The workshop participants stand at the origin of cool clear water, the headwaters of the Missouri, which will join with the Mississippi and flow to the Gulf of Mexico. The workshop people comment on their own watersheds, many of which contribute water that joins with the water of this stream. They are, in fact, part of the same watershed! The scale is incredible; small watersheds throughout North America contribute to continental drainage. These contribute to world circulation patterns. This brings deeper meaning to the slogan, "We should think globally and act locally." Acting locally is, in fact, acting globally, if we consider our action within the watershed.

Like watersheds, educating is a matter of scale. It is a matter of intellectual space from the broad inclusiveness of philosophy and theory to the specific event centeredness of facts and concepts (Gowin, 1981).[4] Scale plays an important part in our understanding and learning. A fact derived from direct experience may be just a small part of our conceptual framework. How high are we now? 9,437 feet! What part does that play in our understanding of the experience and "place" of this watershed? On a facts scale it may be small. Other levels of understanding like "place" and cultural understanding may constitute bigger intellectual space. Yet facts and theories are a part of this "place." They help define the "place." Learning is often a matter of conceptual scale within the "place" we live.[5]

Watersheds provide both intellectual and geographical scale to educating.

The Stream: Connectedness

I urge the group to move on from the cascading water at the edge of the wetland and down the slope along the course of the stream. The wind is beginning to pick up and clouds are gathering overhead. If I am not mistaken, the workshop is to experience a Northern Rockies early Fall snow squall.

As we descend, our original stream is joined by numerous other trickles and contributions of water from the mountain. From all appearances this appears a biologically healthy watershed which contains evidence of biodiversity, productivity, nutrient and chemical cycling, and evolutionary processes that are adapted to the climatic and geologic conditions of the region. Like the branches of a tree or the capillaries and blood vessels in our body, small dendritic patterns of the streams contribute to larger streams and rivers of water throughout North America. Small patterns of biodiversity lead toward larger evolutionary processes. Smaller scale connects to larger scale.

Like those patterns of water, the workshop is made up of many small streams of individual meaning which all contribute to the river of understanding and shared meanings we establish with each other.

The ecological significance of this watershed is accentuated here in the headwater reaches. The small streams we walk along are vulnerable to human disturbance because they respond dramatically and rapidly to changes to the riparian areas and surrounding watershed. These headwaters provide high levels of water quality and quantity, sediment control, nutrients, and woody debris for downstream reaches of the watershed. Intermittent and ephemeral headwater streams are therefore important contributors to the entire watershed. These small streams serve as critical ecological areas for riverine systems and important refuges for biodiversity. The fact that these headwaters will eventually connect with the ocean reminds us that everyone is downwind or downstream from everybody.

The sounds of the water are a welcome change from the upper elevation. The water swirls around downed wood and spills over rocks. Talking is not so evident among the group now. People are

listening to the sounds of the mountain: earth, air and water. These people are establishing connections with this watershed at many levels. Their memories will be full of words and ideas as well as the sounds and feeling of their time with each other in this "place."

We can see the snow moving across the valley. The sky is a steely gray and the temperature is dropping. I turn to the group and urge them to stay together. The snow that appears inevitable now will contribute to the flow of water in this watershed. It will also propel us quickly on our way toward the foot of the mountain.

The watershed provides extraordinary detail to fill in the broader generalization that comes from both John Muir and 8th century Chinese Buddhist philosophers, "everything is connected."

Big Sky: Interdisciplinarity

The snow now falls around us and the group moves closer together. Ahead we see the buildings, condominiums, parking lots and lights of the Big Sky Ski Resort. This is our destination. We follow the first streams and walk towards their confluence with other streams in the watershed. The resort takes on new meaning. When we left it was the site of the conference. Now it is people's first major development in the watershed. Learning the context of this "place" gives everything new meaning.

New meaning leads to new questions. We follow the stream to a large pond, beautiful as it sits between condos, hotel, conference buildings, restaurants and shops. This is no natural event. Here Big Sky has stored water so it can be pumped back up the mountain to make snow during the fall, winter and spring. This is the first diversion of the Missouri watershed. The people who make this their ski destination are thankful. The people below, who live in the big meadow, downstream, are not so sure.

Human activities such as these degrade America's riverine systems and biodiversity in a variety of ways. The cumulative effect of any impacts is referred to as ecosystem simplification: huge reductions in the life-supporting complexity and diversity of watersheds. As complexity is reduced, the system's ability to repair itself after natural and human caused disturbances erodes, leaving

many systems and species seriously harmed or extinct, and with reduced ability to perform ecological functions.

The creation of reservoirs alters stream ecology. Impounded water drowns vegetation and even plants above the water line die when their root zones are flooded. Damage varies according to reservoir storage and release cycles. The more water stored, the more downstream flows are decreased. Because of the large surface area of reservoirs, evaporation rates are increased, concentrating salts in the stored water. Sediments gradually fill reservoirs, reducing the storage capacity.

When we alter the watershed to meet our needs or wants, we should choose the method that does the least possible harm to us and other living things. Educating in the context of a watershed, means that respect for living organisms and the land guides our work and play. Here in this watershed, policy guidelines are more based on economics than respect for life and the land.

Who governs this land? Much of this water begins on public lands and ends up here to make snow, to ski, to make money. More questions arise. Who has the right to use this water? For what purposes? How many times do you think this water can be collected, converted into artificial snow and reused after it melts and travels back down the hill?

Within this watershed there are people who want to live and work here. Logging, mining, hunting, fishing and skiing are all part of the mix. And don't forget, bear, elk and eagles. The watershed is home to all of these and more. All dependent on the physical, geological and biological components and processes which make it up. It is a complex ecological system integrating both natural and social sciences. *The only valid educative approach to teaching and learning about the complexity of the watershed, this "place" our home and community, is the interdisciplinary curriculum.*[6]

Conclusion

Our descent in the watershed began as pure and pristine glacial runoff. Beautiful high alpine surroundings gave way to forests. The forests gave way to logging. And, as the water rose from the

ground and flowed downstream, it gave way to a reservoir and its pumps and finally a trip back up the hill to become artificial snow.

The watershed we visited in this workshop is similar to and different from every other watershed in the world. Like all watersheds it embodies its own sense of *"place,"* unique and in transition. Like all watersheds it contains *complexity* beyond understanding, minuscule as well as infinite. This watershed is part of the *connectedness* of all water, land, and life. It provides *scale*, size, and dimension to experience and learning.

The watershed as an educational event is integral to our survival. If civilization is to sustain in the future, it will be based on the *meaning* we give to life and our ability to share our *cultural meaning* with people who are different from us. Eventually we will have to negotiate new meanings. Meaning will always be contextual. New meaning will always be based on understanding and learning. The watershed is the "place" to begin sharing meaning, creating new meanings and negotiating meaning for the future.

As an educative event, the watershed goes beyond our previous conceptualizations. The watershed enlarges the sense of what an educative event is. It includes who I am in relation to it. It places importance on other people who are within the watershed, their relationship to each other, the land and me. Focusing on the role of knowledge, concepts, and facts loses the people and what it means to be a person.

This paper brings the role of people and "place" to bear on the construction of new knowledge about the environment and takes curriculum theory another step beyond the educative event. It necessitates the integration of various disciplines in meaningful curriculum.

This work concludes that scientific knowledge of water, land and soil is an important piece of the watershed and life. But it is not all there is! It suggests that environmental education curriculum needs to open up to new epistemological questions. Among them, What does it mean to know "place"? What does knowledge of people have to do with knowledge of "place"? How does "place" define home and community?

Educating people for the future in the watershed means helping to empower them to make positive decisions and promote equality and justice for living things. The facts of our lives are

embodied in the land, in our "place," each from a watershed. As social, ecological and cultural meanings flow before us, like the water in a stream in your watershed, remember, we all live downstream.

We can strive together to make the watershed, and subsequently the world a better "place" to live, not because we are afraid of the future, but because we respect the past, present and future. The water that flows through the watershed and ties our lives together exemplifies the timelessness of our relationships in the watershed. Our water is a gift from the past. It is essential for life in the present and will be passed on to the future.

From the tiniest rivulet at the crest of the ridge, to the main trunk of the river approaching the lowlands, the watershed is all one "place." It is our home and community. Educating in the watershed means we should help people get to know, care about, and defend their "place" on the earth.

Notes

[1] Paul Shepard (1977) explains that personal knowledge is a consequence of psyche and particular land forms. He argues that terrain structure is a model for patterns of cognition. Therefore knowledge of a place (where you are, where you live and your place in the watershed) is intertwined with the knowledge of who you are. Landscape shapes mindscape.

[2] In a recent community forum at Montana State University (January 25, 1995) entitled "Educating for Ecologically Sustainable Culture: A Shared Future," C. A. Bowers made a strong argument for inclusion of culture in modern educational practices. He described the role of schools in educating for an ecologically unsustainable future based on the myths of progressive change and individual autonomy. He suggests the role of culture in education is to help children learn about the ecological limits within which they live and the interconnections of people to society.

[3] In the Spring, 1994 edition of *Environmental Action*, we are reminded that industrial centers, factories, low cost housing, minimum wage and people of color are all too frequently a

common mix in the landscape of the United States of America. Here we are reminded of our responsibility to address racial, economic and ecological injustice in educational practice. Our rivers, lakes and streams often play an important role in these communities and thus the watershed joins us together.

[4] D. Bob Gowin (1981) presents the epistemological Vee, which guides the construction of new knowledge. In this heuristic device he emphasizes the role of the event from which we collect facts and make records. Similarities and differences in facts lead to concepts which are then in turn used to review the event. This is the basis of his event centered epistemology.

[5] David Orr (1992) makes a strong argument for place and scale. He defines place by human scale: a house-hold, neighborhood, community, forty acres, one thousand acres." Unfortunately, he stops short of identifying an ecological and psychological unit of scale suitable for educating such as a watershed.

[6] Possibly the quintessential interdisciplinary ecological work of modern culture is Thoreau's *Walden Pond*. David Orr (1992) describes this work as a "mosaic of philosophy, natural history, geology, folklore, archeology, economics, politics, education and more" (p. 125).

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