Service-learning in Watershed-based Initiatives: Keys to Education for Sustainability in Geography?

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ABSTRACT:
A call for combining the strengths of geographic education with environmental education to produce an ‘education for sustainability’ addresses local problems for sustainable development. A place-based approach encourages civic responsibility among students. Using service-learning to extend education beyond the classroom in this case study connected students with local clients in a watershed-based initiative. Theoretical underpinnings of service-learning for geographic education are discussed, and the case study is viewed from instructor, student, and client perspectives to identify successful outcomes and provide suggestions for those who might adopt service-learning for the first time.

Key Words: watershed districts, service-learning, White River Watershed Project

INTRODUCTION
In less than two decades since the United Nations (UN) formally began to focus world attention on ‘sustainability,’ the word has become a mantra for some and disdained by others, but, it increasingly has become part of the scientific and policy literature—although less so within geography. In 1987, the UN’s World Commission on Environment and Development (WCED) released its long-awaited report, Our Common Future. In it, WCED defined “sustainable development” as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED 1987, 43). Since that time, however, geographic literature has remained relatively mute on the subject (Eflin 2004a). A quick survey of articles from the Journal of Geography since Our Common Future was released reveals only four articles explicitly devoted to environmental education, three articles devoted to sustainability or sustainable development, and only seventeen other articles involving “environment” or “natural resources” more broadly (one of these being a reprint of William Pattison’s “The Four Traditions of Geography” for a special 75th anniversary issue). It is curious to see this apparent lack of interest in environmental education by geographers—a curious thing given the attention by Pattison to “man-land” interaction as one of the four traditions within geography (Pattison 1964). It is also curious given the attention to sustainability or sustainable development from other disciplines and within the international policy-making arena. For geographers, we need only recall the keynote address given by U.N. Secretary General Kofi Annan at the annual meeting of the Association of American Geographers in New York on March 3, 2001, when he urged us to “take advantage of [the] close affinity” of professional geographers and the United Nations, “and work together to tackle some of the gravest challenges facing the human community: climate change, the perilous state of the global environment and the long-term goal of achieving truly sustainable development” (Annan 2001, 10).

Geographic education and environmental education share many things in common, yet have remained somewhat distinct from one another. Stapp et al. (1969, 30) are frequently cited for their point that “environmental education is aimed at producing a citizenry that is knowledgeable concerning the biophysical environment and its associated problems, aware of how to help these problems, and motivated to work toward their solution.” Does geographic education as it now stands address or meet these aims? It would appear that geography could contribute effectively to this aim within environmental education by drawing on the discipline’s understanding of place and its inclusion of the human components within environments. Notably, the National Geography Standards (Geography for Life) focus on aspects of ‘man-land’ interactions to which Pattison drew attention, including essential elements of environment and society—“how human actions modify the physical environment” and “how physical systems affect human systems”—as well as some aspects of physical systems and human systems (NCGE 2005). The more these standards are incorporated within geographic education, the greater the likelihood that concepts of sustainability will also be infused.

Watershed-based education provides an excellent example of an appropriate context for integrating sustainability approaches within geographic education (Kimmel 1996). Within this context, management of the landscape following ecosystem-based models may be introduced (Eflin 2004b; Mitchell 2002).
From this lead, concepts of the sociopolitical landscape may be draped over the watershed, helping to illustrate the tension between ecosystem-based principles and conventional models of resource management, for example, decision-making power in the policy arena. As people understand the watershed in which they live, they observe how it spans political jurisdictions, adding complexity to watershed planning for sustainability. Here, too, the role of humans as active agents within a dynamic environment helps illustrate the rich tradition within geography of Pattison's "man-land" interaction (James 1972).

Yet, if these concepts are presented to students in a way that is detached from the real world where place matters, they become passive concepts and students emerge with just another set of abstract ideas. A productive college experience relies on connections being made between the real world and course content. Similarly, a healthy watershed depends on the interaction between its land, waterways, and inhabitants. Water is a resource that refuses to obey political or ideological boundaries (Duram and Brown 1999). In this way, a watershed serves as an excellent arena for place-based pedagogy. The mismatch between watershed boundaries that conform to physical geographic parameters and jurisdictional boundaries that are forced to conform to political parameters provides a rich tension to underscore place-based learning.

Sustainable communities require people with differing opinions and worldviews to communicate about issues in which each has a stake. For this reason, education for sustainability must take place in the context of civic engagement. Sustainability lends itself well to the increasing emphasis on "service-learning" in higher education because it helps students bridge local with global issues, academic with residential communities, and theory with praxis. In the detached university setting, students learn technical skills that eventually can help them become agents of community development. However, real communities are situated in historic and social contexts (Mohan 1995; Stokowski 2002). Sustainable outcomes to community problems demand technically sound, yet socially acceptable, solutions that reach across neighborhood or community boundaries. Properly employed, service-learning suits objectives for sustainability when it incorporates place-based, environmental education.

Initiatives to reduce water pollution in urban communities may learn well from this approach. In the case of modern environmental health, such initiatives require community solutions. This is a somewhat different perspective than in the past. Previously, regulating point source or "end of pipe" pollution achieved some success in improving water quality, because such pollutants can be traced back to their sources and the violators identified (Jones and Colby 2001). On the other hand, improving the quality of life in a watershed by reducing non-point source pollution challenges communities to build bridges that connect all who depend on the health of the watershed. The U.S. Environmental Protection Agency (EPA) has placed more emphasis recently on the latter approach, namely voluntary rather than regulatory solutions to watershed issues. Communities must wrestle with the challenging problems of reducing non-point source pollution. College students are often unfamiliar with tensions and obstacles that communities face. When students leave their hometowns for a college far away, they leave behind the familiar environment in which they may have found support. Empowering them as consultants with technical skills which they can provide to the community-as-client represents a potentially attractive avenue for service-learning in educational environment (Fearn 2001).

This context characterized a service-learning project at Ball State University. Students pursuing majors in the Department of Natural Resources and Environmental Management (NREM) spent Fall 2002 in a capstone course titled "Integrated Resource Management" thinking about and creating outreach materials to support the White River Watershed Project (WRWP), an initiative in Delaware County, Indiana. In effect, students developed materials for their client or community as part of (Fearn 2001), the WRWP Community Outreach subcommittee. Objectives of the following discussion are to:

1) describe the unique context in which one service-learning project was developed and implemented;
2) explore theories and goals of education for sustainability in the context of geographic education;
3) document successes and failures of one service-learning experience; and
4) contribute to the theoretical discourse and practical application of service-learning in university curricula.

Conceputal Underpinnings of Service-Learning

American philosopher John Dewey called the school a "living community" (Colwell 1997). Yet, as students mature beyond the K through 12 environment and pursue higher education, they become detached from the community beyond their college campuses. One mission of the liberal arts is to provide intellectual tools for integrating knowledge and situating students into the context of their world. Environmental educator David Orr (1992) makes this emphatic by arguing that "the mission of liberal arts in our time is...to develop balanced, whole persons" (100-01), by which he means "ecologically literate citizens able to distinguish health from its opposite and to live accordingly" (108). Orr's vision of educating "ecologically literate citizens" is vital to the health and well being of both the college campus and its surrounding community. For Orr, a mission of liberal education is curricula that "will equip a person to live well in a place" (102). Together, student, college, and community form a "campus compact" whereby student learning is recursive with community well being.

Service-learning emerged from this context as an increasingly important component of higher education. Service-
learning encompasses “service objectives with learning objectives with the intent that the activity change both the recipient and the provider of the service” (National Service Learning Clearinghouse 2003). Seeking to re-connect Americans with their civic responsibilities, President George W. Bush urged Americans to commit 4,000 hours to the service of others—the equivalent of two years over a person’s lifetime. To facilitate this and initiate it at an early age, the Bush administration created Students in Service to America on the premise that “[b]y serving something greater than themselves, young people will learn about their rich democratic traditions as Americans, help meet vital community needs, and become responsible and engaged citizens” (Students in Service to America 2003).

Solutions to local environmental problems are of necessity place-based. Sustainable solutions are local solutions, mutually agreed-upon by local actors in the community. College students in geography and environmental programs learn about a vast array of problems facing the natural environment, but often they are the problems of far away places or nations (Mohan 1995). Service learning requires students to look locally to examine environmental issues and to move toward personal engagement with local decision-making, in turn, “serving something greater than themselves.” Echoing Orr’s idea of the proper mission of liberal education, Boston (1998/1999, 66) emphasizes that the virtue of civic engagement and service-learning is that “being an educated person ultimately means taking charge of one’s own learning—even when you’re only 13.” By taking a place-based approach, students of any age can learn how meanings attributed to a place are socially-constructed, how environmental issues involve social dimensions of power and authority across a geographic landscape, and how local history may illuminate environmental problems (Stokowski 2002).

For educators concerned with environment and sustainability, service learning offers great potential to effect positive change among students and within local communities. The environmental disciplines—including geography, geology, and ecology, together with interdisciplinary programs in forestry, natural resources, and environmental studies—have rich traditions of field-based study; extending the concept of ‘field’ to embrace the sum total of the surrounding community makes a logical connection for the student. Pursuing sustainability requires democratizing decision-making and valuing both the local knowledge systems and those of more detached science-based systems; students are thus introduced into participatory processes that employ their skills and simultaneously meet particular needs of other people (Mitchell 2002; WRI 2003). By solving problems in ‘real world’ contexts, students grow through self-reflection and discovery, creating greater likelihoods that they will emerge as citizens who value civic participation (Westheimer and Kahne 2000). Such self-reflections become valued skills, what Smith (1983, 124) calls “an active response to the challenge of the environment.” Communities gain valuable services and two-town-grown relationships are strengthened. Most importantly, students gain experience in civic responsibility and socially responsive knowledge that integrate them into the larger fabric of their society (Altman 1996). This has benefits in geographic education; as Dorsey (2001, 124) suggests, “the issue of civic responsibility has long been a guiding theme for geography educators.”

A review of the service-learning literature reveals that its outcomes are often small but positive, affecting student growth in the areas of interpersonal skills and confidence, personal efficacy and self esteem, elimination or reduction of socio-cultural stereotyping, increased moral reasoning and personal and social responsibility, and developing a sense of commitment to the future (Eyler 2000; Jones 2002; Stukas et al. 1999). Stronger impacts are cultivated when service-learning components are directly linked with coursework, when students are encouraged to reflect on their learning and involvement with community, and when ethnic or cultural diversity is central in service-learning (Eyler 2000; Eyler and Giles 1999; Jones 2002; Mabry 1998). While most of its literature centers on the effect of service-learning on students, some evidence suggests that service-learning has positive impacts for faculty, their institutions, and surrounding communities (Eyler et al. 2001).

While accounts describing service-learning projects are abundant in the literature, relatively little has been written to develop a background of theory regarding the practice. The educational philosophy of John Dewey is the starting point for most theoretical literature (Giles and Eyler 1994). Dewey, a founder of American pragmatism, held that learning is “situational”; hence for knowledge to be usable through recall and application it has to be acquired in a situation; otherwise it is segregated from experience and is forgotten or not available for transfer to new experiences. This means that acquisition as well as application of knowledge is dependent on the context, a key element of which is the interaction in the situation” (Giles and Eyler 1994: Reflection, para. 7).

This is precisely what field-oriented, place-based learning emphasizes: the context of knowledge is situational and is best apprehended through investigation in place (Gruenewald 2003). This underlying motive for service-learning has informed and drives most efforts in the field since the term was coined in 1967 by Robert Sigmon and William Ramsey (Giles and Eyler 1994). More recently, theoretical positions have been articulated that go beyond Dewey (Warren and Sakofs 1995). These include developing foundations in cognitive psychology and social theory (Cone and Harris 1996), critical pedagogy (Deans 1999), and educational assessment (Bringle and Hatcher 2000). Some work is based on field research (Carver 1997), while others are centered on epistemology (Liu 1995; Richman...
A very small body of literature is emerging that integrates service learning in the context of geographic education (Dorsey 2001; Fearn 2001; Mohan 1995).

Watershed Education as a Bridge

Using a local watershed as a focus for service-learning enriches geographic education by integrating human and physical geography concepts (Kimmel 1996). Here, students can explore the history of geographic thought and the development of geographic theory. For example, Paul Vidal de la Blache held that “there was a need to focus attention on the close relationships between man and his immediate surroundings (milieu) by studying small homogeneous areas,” what the French call pays (James 1972, 246-47). James notes that “the French pays is roughly the equivalent of the connotation of [the German] landschaft as an extent of territory” (p. 246); however, Vidal opposed the idea of equating natural regions with drainage basins, an idea promoted by French geographer Phillippe Buache (James 1972). While this debate continues—some favoring ‘ecoregion’ and others favoring watershed—over a century after Vidal, the watershed is among the most frequently used spatial units of analysis in an ecosystem approach to resource management (MacKenzie 1996; Mitchell 2002). Stressing the watershed as a framework for geographic education reinforces geographic theory with sociospatial reality. Stoddart (1986) writes that “organism and ecosystem are of interest as alternative approaches to a central theme in geographical inquiry: that of the relationship of man and environment in area” (231). He goes on to clarify this:

the ecosystem concept has four main properties which recommend it in geographical investigation. First, it is monistic: it brings together environment, man and the plant and animal worlds within a single framework, within which the interaction between the components can be analyzed...the emphasis is not on any particular relationship, but on the functioning and nature of the system as a whole....Secondly, ecosystems are structured in a more or less orderly, rational and comprehensible way... Third, ecosystems function: they involve continuous through-put of matter and energy....Fourthly, the ecosystem is a type of general system, and possesses the attributes of general systems (Stoddart 1986, 250, 251, and 254).

Using a watershed as an organizing principle for geographic education within a service-learning context can make strong connections for students between environment and society principles and reinforce the “central theme of geographical inquiry” stressed by Stoddart. Everyone depends on water in their daily lives, and they are therefore dependent on the hierarchical and organizational structuring of ecosystems via the hydrological cycle. Throughputs of matter and energy that may be disrupted by human interference within a watershed illustrate clearly the concept of ‘system.’ The study of water resources in this context is a community-based concept with issues that arise regarding management that are specific to a landscape and steeped in sense of place. Providing fresh water for human use requires sound resource management decisions that will be made by future graduates entering their careers. Water resources are challenged by growing populations that will demand more water for household, agricultural, and industrial use. The World Bank estimates that by 2025 two-thirds of the human population will live in water-scarce or water-stressed regions. Millions suffer from waterborne illnesses and those fortunate to avoid such diseases must treat local water at treatment plants or in their homes, or import water. Water pollution and degradation of critical lands around water sources stress the very treatment facilities designed to clean water for individual use (WRI 2000).

These statements, merely scratching the surface of global water issues, paint a grim picture. But not all news is bad; geographic educators do not need to present only a doom and gloom picture for their students. We can point to successes, too. Many attempts at curbing pollution have succeeded. The Clean Water Act was passed in 1972 and the Safe Drinking Water Act was passed in 1974 (Jones and Colby 2001). Regulation regarding point source or ‘end of pipe’ pollution has been particularly successful in reducing water pollution. This pollution can be attributed to one point and traced back to a source. It is fairly easy to identify violators. Although legal battles can be long and costly, point source pollution is being controlled. Its counterpart, non-point source pollution, is not so easy to reckon with. It is commonly defined as diffuse sources such as runoff from parking lots, urban landscapes, farm fields, and suburban lawns. Everyone contributes to non-point source pollution in some way because non-point source pollution includes anything washed into a water source from urban areas (e.g., oil, gravel, salt, trash), agricultural areas (e.g., pesticides, fertilizers, animal wastes), and suburban areas (e.g., oil, soaps, herbicides). Thus one of the challenges in watershed management is that it is anonymous, ubiquitous, with no single culprit to blame. Non-point source pollution also comes from naturally occurring erosion, plant debris, or floods making it much more difficult to hold any single party accountable for their impacts. Because non-point pollution is caused by all members in a community, its solution must by necessity be community-based.

Watershed management attempts to look beyond the traditional political boundaries of communities. Jones and Colby (2001) suggest that watershed management is but one example within a growing trend toward more community-based initiatives and that this growth is unprecedented in America’s history. They estimate that over
3,600 watershed groups are active in the United States. These initiatives seek solutions to problems that cannot be solved by centralized government alone. Federal and state agency-based regulation is not enough; watershed management considers the land use of hydrologically-defined areas and attempts to maintain water source health for the good of all stakeholders. Ideally, it considers all potential land uses, including wildlife habitat, and attempts to balance them for sustainable use. Working on a watershed level for sustainable outcomes requires acknowledging environmental, economic, and social equity concerns of communities. As watersheds have unique political, social, and economic climates in the communities involved, so must local solutions be uniquely suited to those communities.

What challenges are posed by this type of model? Foremost is the necessity of building a network of stakeholders. Local community members wanting to improve a watershed need to build bridges with other community members, and also with state and federal agencies. However, people often distrust government involvement in community initiatives. On the one hand, environmental groups may view government as unwilling to champion environmental quality sufficiently. On the other hand, economic development stakeholders may view government as too concerned with environmental protection (Jones and Colby 2001). Forming partnerships between these stakeholders is thus an ongoing challenge. There are differences in social power and environmental attitudes across the geographic landscape, an important idea for students to realize. Yet coordination is imperative. Watershed solutions require active participation of all sectors of society and equal access to information from government agencies all the way to elementary schools. A necessary prelude to watershed management planning is an effective education and outreach mission.

**Case Study: The White River Watershed Project**

Concerned citizens in Delaware County, Indiana, teamed with the county's Soil and Water Conservation District to write a successful funding proposal through an EPA program called Section 319 (of the Clean Water Act). This program is geared toward non-point source pollution, which requires community-driven, non-regulatory solutions to effect change. In 2001, Delaware County received Section 319 funding to bring together local stakeholders for three years to write a watershed management plan for three sub-watersheds. The initiative is known as the White River Watershed Project (WRWP).

The WRWP Section 319 grant was restricted to Delaware County, situated approximately 75 miles from Indianapolis. The watershed under WRWP's purview is part of the Upper White River, officially listed as an 8-digit watershed. Its headwaters originate in an adjacent county to the east. From Delaware County, the river drains to the southwest, combining with the Lower East Fork of the White River (also an 8-digit watershed) before draining into the Tippecanoe River. One of the unique features of this watershed project was its focus on three sub-watersheds, selected from the fourteen that make-up the Upper White River watershed (Fig. 1). These three spatial units of analysis have unique social, political, and cultural landscape issues and were selected to be representative of the entire watershed. The potential was high for local stakeholders to see how these landscapes vary and to see how that critically affects the feasibility of watershed management plans.

Delaware County has rich soils that support row crop production (with corn and soybeans dominant), so one of the sub-watersheds (Killbuck Creek/Mud Creek) was selected for its agricultural character. The county also comprises a small metropolitan area that supports diversified industries (heavy and light manufacturing) as well as a thriving medical services industry and a state college, all concentrated in the county seat at Muncie. The second sub-watershed (Buck Creek/Macedonia Creek) was selected to reflect these urban elements of place. Municipal water supply for the city is managed with intake from the White River and with backup drinking water supply stored in a reservoir southeast of the city. This reservoir was considered to be vital for regional planning for the future and therefore was the reason that the third sub-watershed (Prairie Creek/Cunningham Creek) was selected. Currently, it is somewhat protected by green space that surrounds the reservoir, but it is also under pressure for up-scale residential development. The upshot is that mixed land uses throughout the White River watershed are affected by diverse groups of stakeholders, each with its own characteristic impacts on water quality.

![Figure 1. The three sub-watersheds of the Upper White River Watershed, Delaware County, Indiana selected for study.](source: Modified from a map produced by the Delaware County Office of Geographic Information, Muncie, Indiana. Used with permission.)
Steps involved in watershed planning include: (1) analyzing water quality; (2) assessing its quality; (3) identifying stakeholders; and (4) building partnerships (Jones and Colby 2001). Steps 3 and 4 are keys to bringing the community together to formulate common goals. Section 319 grants stipulate using voluntary, community-driven approaches in developing watershed management plans. The challenge then becomes how to involve citizen input from the community to help drive the watershed planning process. WRWP’s goal was to develop management plans for three sub-watersheds. To accomplish this, community involvement was very important. Local community members, being closest to their environment, are ideally the best people to identify solutions that will work in their communities and be sustained in the future. Because Section 319 grants use voluntary, community-based approaches, a large part of any watershed initiative involves outreach and education efforts to reach different target audiences in the watershed area.

Several community members initially became involved. The WRWP hired a full-time coordinator to form and work with a Steering Committee composed of community volunteers. The Steering Committee helped to conduct decision-making to collect water quality data and write watershed management plans. Areas of additional expertise important to good decision-making were identified and three subcommittees formed to provide that expertise, divide the labor, and generate ideas. Each represents a different level of the project: (1) Geographic Information Systems (GIS); (2) Monitoring; and (3) Community Outreach. Student involvement began with Community Outreach efforts and extended to water quality monitoring and GIS.

The Monitoring subcommittee was comprised of volunteers to oversee water quality monitoring and data collection. A separate grant funded four graduate students and one professor to collect data that supplemented work by the county’s Bureau of Water Quality, which was responsible for water monitoring for WRWP. Watershed data collected by Ball State University is cross-referenced with the Bureau of Water Quality data; graduate students used the data as the basis for their graduate theses. These data helped to drive the creation of watershed management plans for the three sub-watersheds.

Student participation was greatest with the Community Outreach subcommittee, and this is where service-learning was predominant. Students applied their ingenuity to create materials for use by the Community Outreach subcommittee to reach target audiences for the project. In this sense, students created products for a real client—the ultimate goal of service-learning. As a result, their learning experiences produced real-world deliverables as products of their coursework.

Students from two majors were involved with the Community Outreach subcommittee. During Summer 2002, a graduate Public Relations class in the Journalism Department prepared a strategic plan that identified target audiences for WRWP so that later students could pursue materials designed to reach those target groups. These students characterized six target audiences: farmers, environmental organizations, children, political leaders, business leaders, and the general public.

Identifying these audiences better positioned the Community Outreach subcommittee to think about designing outreach materials. One committee member who regularly instructs a capstone course for the Department of Natural Resources and Environmental Management (NREM) proposed involving his students in community outreach to serve the subcommittee’s goal. During Fall 2002, fourteen undergraduate and five graduate students were brought together to think about and create outreach materials for the WRWP. In effect, they were serving a client—the Community Outreach subcommittee—by producing ideas for targeted materials for community outreach efforts. At the end of the semester, the NREM students presented their projects to the Community Outreach subcommittee, the Steering Committee, and community members. Students addressed the target audiences previously identified and identified new target audiences and materials for them. Through their interaction with WRWP committee members, students learned that their ideas mattered to people in the local community and that their learning process was situated in the context of real world problems. These students were no longer merely passive recipients of knowledge; they were moving toward becoming active agents of change.

The remainder of this article examines the student involvement in this community-based initiative, assessing what worked well and what could have gone better. The main focus is a critical assessment and critique of the process of employing community outreach as an objective for student involvement in environmental learning. Three different perspectives are examined through the role each played in the service-learning project, giving three important ‘voices’ to one shared experience: the instructor, the students, and the community client.

**Expectations and Outcomes: The Instructor’s Perspective**

*Expectations.* The NREM capstone in Integrated Resource Management synthesizes the practice of resource management, emphasizing its socio-cultural context. Students are assigned a semester project to apply skills they acquire from the course. To incorporate a service-learning component, the instructor approached the WRWP coordinator to offer her a ‘troupe’ of students for community outreach. This represented the first involvement by either the instructor or the WRWP coordinator with service-learning; this introduced opportunities for successes as well as for mistakes and misdirections to occur. The instructor brought questions about student achievement to the project. Specifically, how would students engage with the local community; acquire ‘real world’ experience; apply discipline-specific skills; gain greater appreciation for the integrative concepts that stem from watershed-based learning; and understand how resource management is
embedded within society.

The WRWP coordinator began the project by giving a guest lecture during the first week of the semester. This was followed by examining results from the graduate class in Public Relations and the target audiences they had identified. To ground this background in theory of community-based social marketing, a professor from the Business College gave a guest lecture, and students read an article to reinforce the place-based outcomes of the public relations class. With this background, the class project was contextualized. Students were then asked to identify one or more practical applications that they could develop to engage the community and help target audiences gain greater understandings of non-point source pollution and its role in water quality. The students were to apply their technical expertise about water and environmental quality to help citizens of Delaware County become well acquainted with how their daily lives affect or are affected by the quality of the watershed. Such community outreach was believed to be a key to equip the community for effective decision-making about watershed management.

Outcomes. Outcomes of the service-learning project included group-based and individual interactions with community members. An ice-breaker to connect students with the community involved a weekend luncheon that brought together leaders from the region’s environmental organizations to discuss common watershed-based issues. Student engagement with participants created connections that became important as the project unfolded and helped reduce students’ initial timidity about getting actively engaged with the community.

A notable outcome was the creation of a Youth Environmental Council (YEC) organized by an undergraduate and co-sponsored by two community organizations. The YEC gathered youth in grades 6 through 12 to discuss environmental issues and conduct community service, including a cleanup of a nature sanctuary. YEC continued after the semester project ended; the student organizer continued in his unpaid role, launching a YEC website and receiving a seed-grant from a community foundation to underwrite some expenses. His experience contributed greatly to his later entry into a graduate teaching program.

Other students were inspired by 2002 being named the Year of Clean Water launched a two-fold initiative with local K through 12 educators. First, they contacted fourth and fifth grade teachers at an elementary school on one of the watershed tributaries. These students were invited to teach a unit about watersheds to their classes. NREM students created and demonstrated two clever hands-on activities. One used a kiddy play pool as an impromptu watershed model in which the kids modeled pollutant discharges with safe foodstuffs (cocoa, gelatin, lemonade powder, and salad oil) and watched what happened as ‘rain’ (water sprayed from a hand-held sprayer) washed the contaminants ‘downstream.’ A second activity placed children in groups of two or three with part of a map of a fictitious watershed; the children made land use decisions along the river, then the groups assembled their map like a jigsaw puzzle and discussed likely sources of pollutants and their effects on the watershed. An indicator of success for this activity was a request by the fourth grade teacher that NREM students return in coming years to conduct the same or similar learning activities.

Second, the NREM student team invited elementary school children to conduct water quality sampling at a site along the White River on National Water Monitoring Day (October 18, 2002). The NREM students prepared themselves by attending state-sponsored water monitoring workshops, then gathered supplies (hip waders, collection nets, monitoring kits, invertebrate identification charts, and other gear). On Water Monitoring Day, they gathered at the site for engagement with local children. Although only one child participated, the local newspaper caught wind of the event and requested a short news story—to be written by the child with mentoring by a college student—and a photograph; these were printed the following week in the Youth Empowerment section of the newspaper. The student team and child participant nonetheless gathered the vital water quality information, which was posted to the Year of Clean Water website for its national database.

Other NREM students worked with agricultural stakeholders or tried to produce outreach materials for the community in general. Three foreign-exchange graduate students visited local farmers and then produced a series of brochures for them about best management practices; this built an unintended ‘bridge’ by connecting international as well as vocational cultures that helped instill a heightened sense of cultural diversity. Other students created additional community outreach artifacts: a traveling exhibit aimed at early grade school children; a merit badge program; and a T-shirt with “10 things to know about watersheds” printed on the back; an environmental network among local faith-based organizations; and a calendar with watershed images and information. Finally, the outreach efforts of NREM students were documented by a student who produced a digital video that included interviews with students and community members, while another student compiled a CD-ROM containing all of the students’ products as a final deliverable to the community client.

Reflections. On reflection, the instructor was disappointed that many NREM students shunned direct involvement with the community. This stemmed in part from his limited experience using community outreach as a tool to supplement classroom learning. A vital lesson learned was the need to plan carefully and organize well in advance when using service-learning. Despite what seemed to be adequate preparation and involvement with the WRWP coordinator and Community Outreach subcommittee, clear lines of communication were missing between client and class, as well as clear directions for students to follow in making community connections. As Dorsey (2001, 125) notes:
Relationships between universities and community agencies take time to develop, and thorough planning is necessary to foster valid scholarly learning. The local agency or community organization must be well suited to the needs of the university class or research group, and vice-versa.

On this basis, it is clear that instructors who wish to employ service-learning must build strong networks with community members first, rather than ‘turn students loose,’ expecting them to build their own bridges to connect with the community. Jones (2002) provides some guidance in this, noting that we need to be realistic about service-learning: it has potential for positive, negative, and neutral outcomes. She cautions that “the underside of service learning is not just about students’ inability to ‘get it’ or to process new experience, but also about our inability to anticipate comments, understand where students are in their developmental process, and acknowledge complex issues” (Jones 2002, 14). In other words, instructors using service-learning must be very attentive to all phases of the project—from its inception with the community client through the individualized learning needs of students. In short, it is a tall task for the instructor, and service-learning should not be approached lightly.

One additional note: Natural Resources and Environmental Management students were not expected to succeed in having their project creations actually implemented in the community in order to receive a grade. They were encouraged to strive for creating outreach materials that could be implemented and were given extra credit where their creations met with community success and were adopted. This seemed appropriate for service-learning, since it seems unfair to expect that lasting bridges will be built between community and college within one semester. Prototypes might have to suffice.

**Expectations and Outcomes: The Students’ Perspectives**

**Expectations.** Students who begin the class in Integrated Resource Management have completed most of their undergraduate course work, but rarely have been exposed to local community issues. As seniors or graduate students, they are most ripe for encounters with community-based education. They are trained in their field of study, have gained basic skills from core curriculum courses, and have begun to think about possible careers and their roles as professionals. They have both valuable skills to offer and a great deal to learn from experience working within a community. However, if most of their conventional roles as students have been as passive learners, the needs and expectations of a community-based project must be made very clear from the start: active engagement in the role of learning is essential.

**Outcomes.** Students immersed in an academic and theoretical structure typically do not expect to be challenged to apply what they know to a greater community issue outside the classroom, unless they are engaged in an internship. This project required students to forge relationships with members of the surrounding community. NREM students were expected to use their knowledge of resources and develop good communication, research, and technological skills for use outside of the classroom. An adapting student perspective and skill set was an invaluable experience.

Energy was high at first and students generated some really great ideas, but this stage is often the easy part of planning. One of the reasons that some students found it difficult to initiate projects was because the client—the Community Outreach subcommittee—was just beginning to set its own goals as the course began. Although some students found goals of the WRWP that matched their own, others fell short of the course goals because the students could not make connections between their work and the long-term needs of their client. Hence, student commitment to the community varied, with some undertaking work closer to their ‘comfort zones’ while others rose to the challenge and reached out to connect with community members and contacts.

For the students, this service-learning experiment provided them with unique experiences to develop applicable and necessary skills in resource management while working with a client. This task seemed daunting to some; disciplinary skills learned within a formal university institution are often far removed from needs of surrounding communities. Most students attend college for four years or more and may even live in the college town most, if not all, of the time. However, if they are not invested in the community and do not consider the college town their home, they often perceive that the town and the university are separate entities.

**Reflections.** Students felt that they would have benefited from learning about the White River’s historical role in the development of the local community. More guest speakers together with an immersion in local history, may have provided them with greater sense of place that would have increased their investment in the community project. Exposure to history and socio-cultural diversity of a specific place can help to broaden students’ perspectives on the scope of outreach projects, which demands a thorough integration of local knowledge and multiple stakeholder views. One drawback for the class was lack of guidance by the client. The Community Outreach subcommittee provided weak explanations of its needs. A few students attended committee meetings, but rapport was lacking between the Community Outreach subcommittee and students.

The service-learning project was a learning experience, above all. Students were exposed, no matter how abruptly, to real situations and local conditions like those they will experience throughout their careers. The course challenged students to step beyond the familiar and communicate with people with very different concerns. It is apparent
that this same hands-on and community-based approach is necessary to engender connection to place and create a positive working relationship between (traditionally) technocratic scientists and managers and the everyday citizen (Mitchell 2002). Top-down resource management is something of the past for the White River Watershed Project. Agencies, students, and community members all found themselves in unfamiliar waters where communication and clear purpose was needed. Rebuilding relationships between those in positions to serve the community and the people who put them there are critical steps for community-based, voluntary watershed management.

**EXPECTATIONS AND OUTCOMES: THE COMMUNITY OUTREACH SUBCOMMITTEE PERSPECTIVE**

**Expectations.** Members of the WRWP Community Outreach subcommittee were at a stage in their development where they were uncertain about what directions to take with outreach and education initiatives. They were certain only about specific deliverables expected through Section 319 grants, namely a quarterly newsletter, field days, and sub-watershed tours throughout the project. Besides these specifics, other initiatives were open to debate. When Integrated Resource Management students became involved, the subcommittee envisioned that outreach materials would be created by students in the Ball State University class, but never explicitly specified to the students what those materials should be.

The Community Outreach subcommittee had broad, open-ended ideas with intangible qualities relating to outreach goals. They wanted to reach farmers, school-aged children, urban residents, and others with messages about protecting environmental quality in watersheds. What those messages should be was never clearly articulated, either among themselves or to the students. On reflection, the subcommittee acted as a client with ill-defined goals, hoping that the students as consultants would develop tangibles such as brochures, flyers, or other materials that could be used to reach target audiences.

**Outcomes.** Several members of the Community Outreach subcommittee and others from the Steering Committee attended the final class presentations. They observed several possible products for use in outreach with target audiences in the community. The students showed their products, including a grade school unit on watersheds; brochures for farmers; a calendar, stickers, and T-shirts advertising the project; a map locating optimal locations for informational flyers; and a mascot named “Shelly the Turtle” as well as other ideas. Despite apprehensions on the part of students and instructor, community members expressed deep gratitude for the students’ efforts.

One outcome was that the Community Outreach subcommittee was given ideas for target audiences that they had not previously identified. For example, one student developed ideas for Boy Scouts, demonstrating how the merit badge for soil conservation could be related directly with watershed education. Whether or not the students achieved success by involving a large number of local citizens in watershed-based education, they contributed significantly to ways in which the Community Outreach subcommittee approached its mission.

**DISCUSSION AND CONCLUSIONS**

It is important to celebrate successes in a service-learning experiment such as this one, as well as assess weaknesses or things that could have gone better. One success to be reiterated is that students were immersed in a real-world environmental issue and exposed to political processes and social complexities that surround these issues. Students learned through their brief interactions with their clients that individuals on the same side of an environmental issue do not always agree on strategies for action. Often, there is some degree of uncertainty about directions to take to achieve goals.

Students also were exposed to the need for building bridges between stakeholders. Gradually, many students came to see themselves as stakeholders, alongside the Community Outreach subcommittee members. Communication needed to bridge these two groups. This same principle applies to watershed projects in general. Members of a local community need to build bridges with government agency personnel whom they may have mistrusted in the past. Local government agencies such as the Soil and Water Conservation District work with local community members and stakeholder groups, in this case encouraging local initiatives across three sub-watersheds, with differing social and political climates. At the same time, these county-level conservation districts are accountable to state and federal government agencies.

As government representatives, agency personnel have to ensure that local initiatives are aligned with broader regional and national policy goals (Jones and Colby 2001). Thus the stakeholders bring many expectations and hopes to the decision-making table. It was hoped that students could witness these types of interactions and processes by working through the WRWP. It was also hoped that students would gain an appreciation for the kind of volunteer efforts that go into watershed projects. Most people participating in the WRWP are volunteers and only one person is a paid staff member. In the WRWP, students witnessed a large volunteer effort around an environmental issue.

This first experiment with service-learning involving the instructor and the White River Watershed Project provided the client with some tangible benefits, the most notable of which was fostering a culture of interaction between and mutual respect among community leaders and students as-consultants. An important outcome of the first phase of the WRWP—developing a management plan—was the receipt of EPA funding for a second phase—implementation of the plan. When the first phase funding ended and second phase began, a new project director was hired in 2004 to move the WRWP toward this implementation. One measure of success of the previous outreach efforts by NREM students engaged in a service-learning mission...
for the watershed initiative was that the instructor was invited back to devote another class to continue the community outreach in 2006. The WRWP Steering Committee is reviewing ideas to provide direction for outreach and education priorities, and NREM students will be placed more clearly in the role of consultants to serve the client’s needs.

In Phase II of the WRWP, the implementation phase, a greater emphasis will be placed on advertising the cost-share programs for conservation efforts on private land. Thus, the outreach and education efforts will be more narrowly focused than in Phase I of the project, in which students had to consider broad-based education campaigns. While students will still be asked to think about building general awareness in the community, Phase II will stress the need to focus an educational campaign on landowners who are critical to land stewardship impacting the watershed. Students in the service-learning project will grapple with the real-life questions of how to move a project forward from research phase to implementation phase and how communication strategies change as a community project changes over time.

Students bring many things to community projects. Two of these are youthful energy and creativity. They may also bring an air of objectivity. Students may be able to see the forest for the trees, because they are not involved with intimate details and debates within politicized committees. NREM students had successes in this process: they demonstrated creativity, they took brave steps outside traditional confines of the classroom, and they demonstrated initiative. It is important that future service-learning projects acknowledge successes as well as opportunities missed. One question to address when designing a sustainable community-based learning curriculum is how the interaction will lead to active construction of ideas and behavior paradigms of behavior among students. Students may come to such experiences with high levels of understanding of natural resources, ecosystem functioning, and a global perspective of issues backed by theories and a basic understanding of the large-scale conflicts between perspectives. Students form opinions on the basis of abstract and detached thought and discussion. They often make assumptions about problems in an abstract sense, which colors their solutions to those problems. Finally, students bring with them the tools of an academic discipline including its language, theory, and a familiarity with academic discourse. By contrast, community members are connected with local problems in more tangible ways. They are not necessarily detached from the causes and effects of watershed problems and may not come to the experience with the same “tools.” Whose responsibility is it to “bridge the gap”? What are the students’ responsibilities in community outreach? How can the instructor best prepare students for these responsibilities? This place-based learning experiment opened wide questions such as these for considering projects in future semesters.

A community-based curriculum integrates theory with case studies, providing students opportunities to apply theory in real-world settings. Dewey’s emphasis on the “school as a living community” and Orr’s belief that higher education’s purpose is to create “ecologically literate citizens” are not without challenges for implementation. If higher education is to “equip a person to live well in a place” (Orr 1992, 102), then it must build bridges that are firmly rooted to that place in order that students may find their way across.

**Recommendations for the Future**

This service-learning experience provided a foundation of lessons learned to build upon for future class projects. One important lesson was that place-based service-learning has a vital role in a capstone course in Natural Resources and Environmental Management. Dorsey (2001, 127) noted this, saying that “courses in natural resource management, or resource conservation, for example could be well suited for partnerships with municipal, county or state-managed natural resource departments.” One outcome in support of this has been an ongoing, continual involvement between project leaders for the county-level WRWP and instructors at Ball State University. For geography educators who are considering a first-time use of service-learning, the construction of knowledge that builds on this pedagogy is an important element in defense of its adoption. Dorsey (2001, 131) continues,

> If pragmatism were to gain ground as a legitimate theoretical underpinning for geographic education and research, university faculty, students, and community organizations could certainly profit via service-learning or projects as the one described here.

Some recommendations are provided. First, to the extent possible, a bridge needs to be built early between the students and the community stakeholders, that is, clients for student projects. In doing so, the hope is that expectations can be mutually agreed upon and negotiated. Second, students need to have ongoing interaction with the community client to ensure both appropriate learning as well as delivery of quality service. It is not enough to have a two-way street to unify stakeholders unless it is traveled in both directions. Check-points throughout the semester help students and community members create a shared experience; for example, clients could be present at the proposal stage for students, a mid-point of the semester, and for the final project presentations. Third, it may be helpful for students to have time to reflect on their experiences; in this case study, a reflective journal was required for each student, with the instructor providing timely responses. The students’ voices in this paper allowed the student’s perspective to be heard and explored. As students discuss shared experiences, they are able to process what and how they learned throughout the process. Dorsey (2001, 124)
adds that “experiential learning in geography may expand upon the reflection process to include questions asking where problems exist or where solutions might be best applied.” Some student leaders may emerge, as they did in this project, to serve as sounding boards and as peers in the classroom. Finally, repeated and ongoing references to geographic concepts should be provided by the instructor to reinforce the context of why service-learning is being employed in geographic education. For us, using the place-based emphasis to reinforce environmental studies in the context of historically-contextualized sociopolitical space helps address the need to provide students with an education for sustainability.

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