

# The GEM International Seminar on Watershed Management



**Since 2002, Wisconsin waters, forests, and communities have been classrooms for an annual gathering of watershed professionals from around the world to learn and share how to build healthy watersheds for a sustainable future.**

# GEM International Seminar on Watershed Management: A Five-Year Report

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College  
of Natural Resources



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## About GEM

The Global Environmental Management Education Center (GEM) in the College of Natural Resources at the University of Wisconsin-Stevens Point is a center for world-class curricula and outreach education services in natural resources and environmental management. GEM's purpose is pioneering and applying practical learning methods and technology to solve natural resource problems by linking faculty, students, and citizens worldwide. GEM serves students and stakeholders with curricula and outreach programs that are integrated and international using the tools of technology and communication to solve real world problems. GEM is building hope for the future through its work on sustainability, international programming and leadership development.



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# Seminars covered diversity of watershed issues and how practitioners attempt to prevent or solve them



Seminar participants listen as a farmer describes his irrigation practices.

Problems, impacts, and solutions discussed by participants with on-site hosts:

- o Urban storm water, draw-down and subsidence, sewage and industrial waste, amenities
- o Timber production, agricultural waste and soil erosion, irrigation
- o Rural ecotourism, boating, fishing, camping, skiing, pristine trout streams, scenic beauty
- o Navigable rivers and waterways, power generation, hydropower, dams
- o Comprehensive land use planning, shoreline development, restoration
- o Federal, state, local government regulations, citizen based organizations and private efforts in conservation
- o Safe drinking water supply and access
- o And more

A mixture of instruction and facilitated discussions engage participants on critical global and regional watershed management issues, emphasizing innovative approaches to watersheds to work across a wide range of biophysical and socioeconomic settings.

### Objectives of the GEM International Seminar on Watershed Management

- Through academic instruction, field tours, participant presentations, and facilitated discussions, the seminar aims to accomplish three major objectives: Demonstrate the viability of the watershed as a planning and management unit for sustained resources management;
- Explore the requirements necessary for institutional cooperation to meet diverse management goals by fostering partnerships, encouraging grass-roots organization, and developing environmental education strategies; and
- Apply the GEM Healthy Watersheds Model for international capacity building in watershed management to assess capacity for land use planning, and then identify approaches to build capacity.

-- from GEM Technical Report on International Seminar on Watershed Management



Seminar participants each year toured Pioneer Farm, shown above, to learn how American agriculture is addressing environmental concerns. The farm is a project of the Wisconsin Agricultural Stewardship Initiative, and serves to develop and test environmentally friendly and economically viable farming methods.

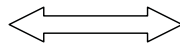
Seminar tours included national forests, where local managers explained watershed issues and the methods used to solve them.



The 2005 seminar participants pose on the steps of Wisconsin's state capitol. Visits with legislative leaders have been highlights for seminar participants each year.

**Technical Content**  
**GEM International Seminar on Watershed Management**  
 (Based upon US-EPA Watershed Academy curriculum)

**Principles & Concepts Experiences**

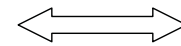


**Exemplified in ISWM Field**

Principles of Watershed Approach and Value of Working at Watershed Level: <ul style="list-style-type: none"> <li>o <i>Sustainable healthy aquatic ecosystems</i></li> <li>o <i>Ecosystem services and benefits to human societies</i></li> <li>o <i>Watershed as natural management unit</i></li> </ul>	<ul style="list-style-type: none"> <li>✓ Annual orientation lecture by Tom Davenport (US-EPA Region 5) on Principles of Watershed Management</li> <li>✓ Introduction to EPA Water train website and opportunity to study US approach to watershed management</li> <li>✓ Orientation to Wisconsin water basins and WI-DNR management units</li> <li>✓ Walking tour of downtown Milwaukee three watersheds (Milwaukee, Menomonee, Kinnickinnic Rivers)</li> </ul>
Watersheds are Natural Systems that Provide Substantial Benefits to People and Environment when kept in Good Condition: <ul style="list-style-type: none"> <li>o <i>Protecting in-stream flows and watershed ecology</i></li> <li>o <i>Stream corridor structure</i></li> <li>o <i>Indicator species of healthy watersheds</i></li> <li>o <i>Understanding lake ecology</i></li> <li>o <i>Wetland functions and values</i></li> </ul>	<ul style="list-style-type: none"> <li>✓ Milwaukee Cleaner River Project to restore natural meanders and flood plain of downtown rivers</li> <li>✓ Riveredge Nature Center Sturgeon Project to restore natural fisheries population in Milwaukee River</li> <li>✓ Waterfront property redevelopment in Watertown on Rock River, Neenah; and Menasha and Appleton waterfronts on Fox River (Superfund Cleanup Site)</li> <li>✓ Tour Chain of Lakes near Waupaca and meet WI Lakes Association members and UW-Extension support staff</li> </ul>
Describe both Natural and Human-induced Changes in Watersheds and Compare Normal Changes to Changes of Concern: <ul style="list-style-type: none"> <li>o <i>Population growth impacts on watershed health</i></li> <li>o <i>Positive effects of aquacultures</i></li> <li>o <i>Nonpoint sources of water pollution</i></li> <li>o <i>Invasive species</i></li> <li>o <i>Human alteration of global Nitrogen cycle</i></li> <li>o <i>Nutrient pollution of coastal estuaries by major river systems</i></li> </ul>	<ul style="list-style-type: none"> <li>✓ Yaharra River Watershed through Madison impacted by excessive groundwater pumping</li> <li>✓ Preservation of the Necedah Wildlife Refuge for water fowl breeding including Whooping Crane</li> <li>✓ Mississippi River nutrient loading from Midwestern farmland operations in Wisconsin and neighboring states; eventual discharge into Gulf of Mexico.</li> <li>✓ Restoration efforts to bring back the Golden Trout in tributaries of Lake Superior</li> </ul>

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**Exemplified in ISWM Field**

How Watershed Planning, Monitoring and Assessment are Important First Steps toward Solving Problems: <ul style="list-style-type: none"> <li>o <i>Introduction to watershed planning process</i></li> <li>o <i>Overview of watershed monitoring</i></li> <li>o <i>Water resource assessment</i></li> </ul>	<ul style="list-style-type: none"> <li>✓ Lake Michigan water quality monitoring by UW-Milwaukee Great Lakes Water Institute</li> <li>✓ Meeting with Long Lake Preservation Association in Washburn County to discuss land use planning for healthy watersheds</li> <li>✓ Citizen water monitoring program in Door County of Green Bay beaches</li> <li>✓ UWSP Water and Environmental Analysis Laboratory drinking water analysis for homeowners and sample analysis for watershed research projects</li> </ul>
How Watershed Management Challenges such as Urban Runoff, Cropland Management, Forestry and other issues are Addressed by Techniques that Reduce Environmental Impacts: <ul style="list-style-type: none"> <li>o <i>Agricultural management practices for water quality protection</i></li> <li>o <i>Forestry Best Management Practices</i></li> <li>o <i>Stream corridor restoration tools</i></li> <li>o <i>Drinking water source protection</i></li> <li>o <i>Applying ecological principles to management of national forests</i></li> <li>o <i>Ecological principles of managing land use</i></li> </ul>	<ul style="list-style-type: none"> <li>✓ Pioneer Farm Project at UW-Platteville to apply and monitor best management practices to cropland, barnyards, feedlots and hog facilities</li> <li>✓ Discovery Farms Initiative on working family farms to reduce environmental impacts through better management</li> <li>✓ Visit working farms and talk to farmers about management practices that maintain profit while protecting water quality</li> <li>✓ Meet Menominee Nation forest managers and discuss sustainable forest harvesting techniques and value-added forest products marketing</li> <li>✓ Tour Chequamegon National Forest to see multiple-use management strategies and reforestation efforts</li> </ul>
Human Element of Watershed Management—Social Issues, Communications, Relevant Laws and Regulations: <ul style="list-style-type: none"> <li>o <i>Effective outreach to communities in watershed</i></li> <li>o <i>Federal legal authority for watershed protection</i></li> <li>o <i>Water in changing world</i></li> <li>o <i>Economics of sustainability</i></li> <li>o <i>School education programs on water</i></li> </ul>	<ul style="list-style-type: none"> <li>✓ Meeting with Wisconsin State Legislature Natural Resources Committee and state agency heads who manage Department of Justice, Department of Agriculture, Trade &amp; Consumer Protection, and Department of Natural Resources Water Division</li> <li>✓ Two GEM Wingspread Conferences: Healthy Watersheds: A Model for Local Capacity Building (2004); and Planning for Land Use and Healthy Watersheds (2006)</li> </ul>

# A classroom as big as a state

Wisconsin is rich in water resources. More than 15,000 inland lakes dot the landscape and 50,000 miles of streams and rivers meander through forests, fields and urban areas. With Lake Superior on the northern border and Lake Michigan on the east Wisconsin boasts 1,750 square miles of estuaries and bays and 1,017 miles of shoreline on two Great Lakes. Much of the western border is defined by North America's greatest river—the Mississippi River.

These diverse and bountiful water resources and Wisconsin's long history of multiuse management of its natural resources make Wisconsin an ideal setting for the GEM International Seminar on Watershed Management.

GEM has hosted this field-based seminar annually since 2002, with major funding provided by the US Forest Service. In the first five years nearly 90 international participants from 37 different nations completed the seminar. These mid- and senior-level watershed managers each brought a unique perspective and background to the ISWM. Together they forged a strong, collaborative learning environment.

The educational method is that of field tours and site visits. The seminar covers much of the state. It begins each year in Milwaukee, on the shore of Lake Michigan. The travel itinerary varies from year to year to take advantage of opportunities available, but always includes a broad spectrum, from urban issues of water supply and waste disposal, to rural issues with agricultural runoff and groundwater impacts, to multi use issues in and near forested areas, where commercial timber interests and tourists impact watersheds in different ways.

This field-based learning required considerable institutional cooperation

to meet diverse management goals and foster partnerships, development of grassroots organizations, and creative environmental education strategies, which was showcased to the benefit of the ISWM participants. Various watershed management models are applied in Wisconsin to empower lake associations, resource user groups (sports men and women), private land owners, and local governmental units that work with state and federal resource agencies. Of equal importance to the participants are the models brought to the seminar by the participants themselves. Evening seminar sessions offered opportunity for each participant to talk about his or her home watershed projects and to bring new strategies into the learning process.

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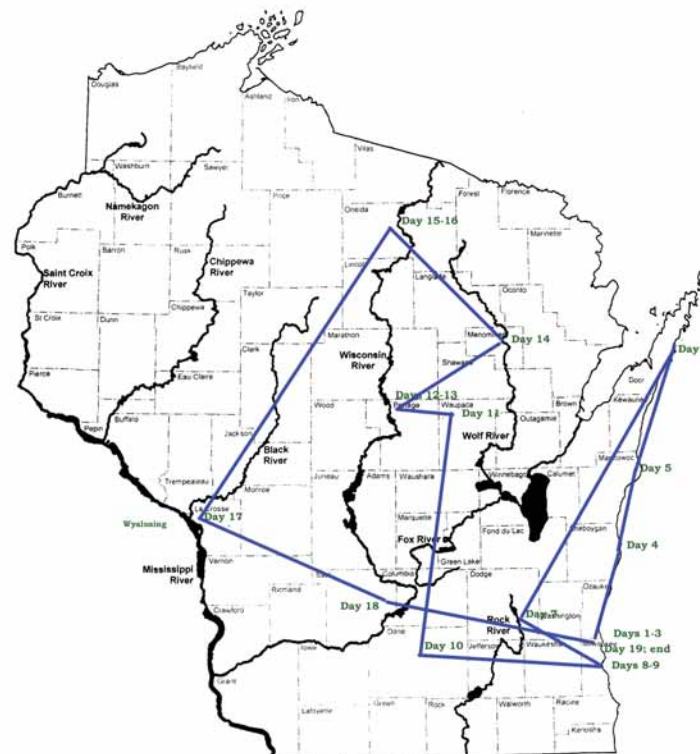
Seminar participants each make a presentation to the group about their work in their own country. A 2003 participant is shown here.



Lake Superior, one of two Great Lakes on Wisconsin borders, is shown at sunset in this 2005 photo.

The GEM ISWM tour covers the entire state of Wisconsin from Milwaukee on the shore of Lake Michigan, to the Fox Valley between Appleton and Green Bay, to the lake country of northern Wisconsin and the Chequamegon National Forest, northward to the National Seashore on Lake Superior and the Apostle Islands, back down to the Mississippi waterway in La Crosse, the southern un-glaciated rolling hills of the Lower Wisconsin River watershed, and the Wisconsin State Capital situated on a peninsula between Lakes Mendota and Monona, which are connected by the Yahara watershed and drained by the Rock River.

Itineraries varied from year to year depending on time constraints and availability of instructors from cooperating agencies and organizations for the study tour, and to take advantage of unique opportunities each year. The Wisconsin map below presents the route covered by seminar participants in 2006.



## 2002 and 2003 Seminar highlights

A tour in Coon Valley, in southwestern Wisconsin, was the major highlight of the 2002 schedule, the inaugural year for ISWM. James Radtke, Vernon County Resource Agent, led the Coon Valley tour as one of his final job duties before retirement. The group visited a farm couple who had been, in 1937, among the original cooperators to adopt conservation methods that eventually saved the landscape in this region. Besides strip cropping and contour plowing they moved the cattle off the steep slopes and allowed the forest to recover. The reforestation and crop practices ended the erosion problems that buried lowlands with runoff soil silt in the early 1930s. This was the first USDA Soil and Water Conservation District in the nation and a landmark success story featured in National Geographic magazine. Radtke presented the couple with a framed copy of the magazine's cover picture (December, 1995, <http://lwdc.org/index.htm>) of their farm site in the valley to the farm couple, who still lived there. The ISWM group walked the valleys and viewed old concrete drop boxes that allowed flood waters to drop in elevation without cutting deep gullies. These structures have grown over with forest plants and illustrate the benefits of forest restoration. The international participants appreciated viewing historic pictures of the damaged landscape and walking on the same land after restoration. It gave them hope for similarly damaged landscapes in their home countries.

One of the highlights of the 2003 seminar was a boat tour of the Apostle Islands on Lake Superior. The seminar participants hiked on one of the outer islands and visited an old restored fishing camp. The US Park Service guide explained how the commercial fishing industry has been affected by invasive species and over-fishing of some commercial species. The tourist industry has brought a new source of revenue to the Apostle Islands and National Lakeshore on the mainland.



The 2003 seminar group poses for a group photo at Schmeckle Reserve, a nature center on the University of Wisconsin-Stevens Point campus.



GEM Director Victor Phillips, right, presents a diploma to a 2003 International Seminar participant.



Participants in the 2003 seminar canoed the Plover River, which flows through Stevens Point. The river's watershed is a municipal drinking-water source and the community has made efforts to limit development to preserve water quality.

## 2004 Seminar highlights

A significant event during the 2004 seminar tour was the trip to UW-Platteville and its Pioneer Farm, which is part of the Discovery Farms Initiative in Wisconsin to solve agricultural pollution problems (<http://www.uwplatt.edu/pioneerfarm/index.html>). Tom Hunt, Pioneer Farm Director, and Laura Wood spoke to the group on farm management and the phosphorous index. Dave Owens spoke on water monitoring equipment and Mike Penn on the "watershed approach" to farm management. The group toured the barns, swine house, cropland and beef cattle rotational pasture network. They observed the automatic water sampling stations on the land and talked to the data managers on how the samples are collected for laboratory analysis at UWSP.



In southwestern Wisconsin, seminar participants learned about issues along the Mississippi River, an important shipping route for the Midwest. A seminar participant engages his group in discussion, above. Locks and dams, such as the one shown below, make river navigation possible on the upper Mississippi.

The seminar tour continued to LaCrosse for the annual visit to the Coon Valley watershed in Vernon County and a Mississippi River tour from Wyalusing State Park managers. An unusual opportunity was thrilling for most of the seminar participants when they took a helicopter flight over the river. Kol Vathana observed that the Mississippi River backwaters looked a lot like the Mekong Delta in his home country of Cambodia. Jean Brennan, of USAID, gave an excellent PowerPoint show of the seminar tour that year and added Kol Vathana's digital movie of his helicopter ride.

*I hope we shall keep on sharing ideas on watershed management and land use planning and other related issues. You are all great and committed people. Keep on with the good spirit of helping the environment and the world.*

*Best regards,  
Dr. Thomas Gyedu-Ababio  
Krugier National Park  
South Africa*

In the past 30 years there has been a 50 per cent decline in populations of freshwater species, the fastest rate of decline as compared with species living in marine and forest ecosystems.  
—WWF International



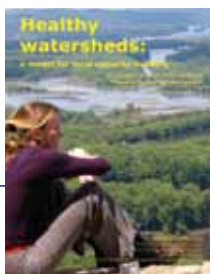
# GEM International Conference on Local Capacity Building for Healthy Watersheds

Wingspread Conference Center,  
Racine, Wisconsin  
June 24-26, 2004

The 2004 GEM International Seminar on Watershed Management included participation in the GEM International Conference on Local Capacity Building for Healthy Watersheds. In addition to the ISWM participants, this conference drew government officials, university faculty and professionals from non-government organizations. The capacity-building model developed at the conference is being used in at least 10 countries, and continues to be refined and improved through ongoing collaboration and communication between conference and seminar participants.



Conference delegates, above, take a break from discussions at the Wingspread Conference Center. The conference *Proceedings*, right, has been widely distributed to conference delegates, International Watershed Seminar participants from all years, government and non-government organizations, and universities. The *Proceedings* is also published online at <http://www.uwsp.edu/cnr/gem/InternationalWatershed/PDF/Wingspread.pdf>



'The purpose of this conference was to develop a local capacity building model for healthy watersheds that can be adapted for use successfully in any region of the world. The results of the conference affirm and offer a clear interpretation of how local communities can prepare themselves to manage the watershed in which they live and depend upon for a productive and healthy economy, ecological biodiversity, food production and safe drinking water. The generalized model developed for local capacity building

will be a useful road map for planning how land and water may be utilized for the greatest benefit by people living in diverse locations worldwide. Thirty-nine professional water managers from 17 different countries participated in the conference and contributed to these proceedings to offer advice on how the model could be applied in their home regions.'

-- from Executive summary of the 2004 Wingspread conference *Proceedings*



The conference featured regional breakout sessions in which delegates discussed the capacity-building model in light of their region's particular challenges and assets.

Water problems are more related to mismanagement than scarcity. Up to 50 per cent of urban water and 60 per cent of water used in agriculture is wasted through leaks and evaporation.

—United Nations Environment Programme (UNEP)

# 2005 Seminar Highlights

The first two days of the 2005 seminar were spent in Milwaukee with a look at the rapidly changing Milwaukee River Watershed improvements hosted by Janette Marsh, Region 5 US-EPA Associate Director of International Watersheds and Sustainable Development. Russell Lafayette, US-EPA Region 9 Hydrologist and Water Quality Program Manager made a presentation on regional water quality and quantity issues. Mike Chaveas of the USFS-IP greeted the group and talked about the International Program. Tom Davenport (US-EPA Region 5

International Watershed Scientist) gave the evening keynote address at the first dinner party. On the second day the group toured the Milwaukee River restoration areas and observed how natural rivers are restored in a large urban area.



Participants in the 2005 International Seminar pose for a group photo at an overlook above the Mississippi River in southwest Wisconsin.

Later, the watershed seminar tour moved on to the annual Menominee Reservation visit to see sustainable forestry practices of a Native American tribal council, and then to the Chequamegon National Forest to see multiple use techniques for watershed management in a large protected area.

The 2006 watershed seminar traveled to Ashland and the Lake Superior National Lakeshore to visit the largest freshwater lake in the Great Lakes system. The highlight of that northern exposure was an overnight at Telemark Lodge with members of the Wisconsin Association of Lakes (WAL). The association was hosting its annual conference and the international watershed managers got a firsthand look at a property owners' event to promote wise stewardship of lake waters and shoreland. Carlos Andrade gave a presentation on watershed management in his home country of Angola, which the WAL members enjoyed.



Tiffany Lyden, a University of Wisconsin Extension Service lake specialist, explains a water-quality monitoring tool to seminar participants during a tour of the Chain of Lakes in Waupaca County.



Seminar participants enjoy a mid-day meal at a national forest picnic area.

Some 1.1 billion people in developing countries have inadequate access to water, and 2.6 billion lack basic sanitation

— United Nations Human Development Report 2006

## 2006 Seminar Highlights

After leaving Milwaukee, the 2006 watershed seminar tour moved to Manitowoc near Green Bay and visited the Blue Harbor Convention Center and the two Discovery Farms near Sheboygan. Earthworms are causing a problem in cropland where drainage tile has been laid. The worms like to burrow down to the drainage pipes and move laterally as on a highway. That seems harmless enough but the worm tunnels allow fertilizers and pesticides to follow the worms into the pipes in just a few minutes from the time of application. The chemicals go out into drainage ditches and eventually the navigable streams.

The tour continued north to Door County above Green Bay. An interesting tour of Whitefish Dunes State Park followed a presentation by Karen Reymore, Executive Director of the Door County Chamber of Commerce, and Vinni Chomeau, Door County Land and Water Conservation District, on land use planning for healthy beaches and protection of drinking water aquifers. Mike and Mary Standish demonstrated beach monitoring procedures followed by community volunteers to keep track of water pollution. The seminar participants climbed the Peninsula State Park tower to get a panoramic view of Green Bay and the peninsula.

Another tour highlight was a stop southeast in Watertown, in a small community on the Rock River southeast of Madison. Many people there possess a strong conservation ethic regarding the river that passes through their town. The Rock River Coalition is one of the most effective watershed citizen groups in the state and a terrific model for the international seminar participants. Many coalition members turned out to meet the seminar participants and “talk shop” over a fine organic lunch in the country and a horse drawn wagon tour of the farm. That evening more community members were invited to a private home to meet the visitors from overseas. It was one of the best hospitality experiences over the five years of hosting this seminar.

Unclean water and poor sanitation are the world's second-biggest killer of children.  
— United Nations Human Development Report 2006



On a Door County observation tower overlooking Green Bay of Lake Michigan, seminar participants discuss watershed management issues.



Participants travel to the next tour site.



2006 Seminar participants listen to a presentation in the Chequamegon National Forest.

## Future of GEM ISWM series

- o Enhanced global exchange of watershed management strategies and solutions via USAID portal hosted by GEM
- o Feature presentation on one of the world's most strategic watersheds—the Panama Canal; GEM invited to help partners develop and offer a Panama Watershed Academy
- o Bi-lingual Spanish interpretation for Latin American and other Spanish-speaking participants
- o Online learning component for UWSP credit or non-credit certificate
- o Expanded field tours to include both “water-rich” Wisconsin and “water-challenged” Texas

GEM was invited to host the US Agency for International Development web portal on watershed management (<http://www.rmportal.net/>). Jean Brennan and Rose Hessmiller came to UWSP to conduct a hands-on training session for seminar participants in the 2006 ISWM group on how to access and use the portal. GEM and ISWM participants have already made use of the portal to share the draft proceedings from the 2006 Wingspread Conference and post other watershed-related information. All of the GEM ISWM participants now have a dedicated website within USAID to expedite sharing of information and advice with their colleagues worldwide.

*I'd like to thank all of you for the great efforts you make and for your hospitality during our visit. I think that the conference and the training course that you arrange is unique and has a great benefit for every person in the course. Thank you all for your kindness and I hope that we can establish joint research works together in the future.*

*Best Regards,  
Dr. Ayed Salama  
Hebron University  
Palestine*

# GEM International Conference on Planning for Land Use and Healthy Watersheds

September 25-27, Wingspread Conference Center, Racine, Wisconsin

The 2006 GEM International Seminar on Watershed Management included participation in the GEM International Conference on Planning for Land Use and Healthy Watersheds. Conference discussions focused on how to implement the Healthy Watersheds Model developed at the 2004 International Conference on Local Capacity Building for Healthy Watersheds.

Conference proceedings are being published in hard copy and online at the GEM website, [gem.uwsp.edu](http://gem.uwsp.edu).



By 2030, over 60% (nearly 5 billion people) of the world's population will be living in urban areas. As a result, competing demands from domestic, commercial, industrial and peri-urban agriculture are putting enormous pressure on freshwater resources.  
—UNESCO World Water Assessment Programme

Conference delegates met in breakout sessions to develop ways to put into action the GEM Healthy Watersheds Model.



*Yes,  
I think that your particular genius (apart from your unruffled good nature) is your ability to include everyone, to acknowledge them, and to value them. That's in large measure why these group visits are so successful - nobody feels patronized, and everyone ends up feeling that they have been listened to and have contributed.*

*Professor Jay O'Keefe  
Institute for Water Research, Rhodes University  
Grahamstown, South Africa.*

Less than one per cent of the world's surface or below-ground freshwater is accessible for human use.  
—United Nations Environment Programme (UNEP).



