



**Midwest Technology Assistance Center  
for  
Small Public Water Systems**

**USEPA Grant# X829218-01**

**2002 Annual Progress Report  
(January 1 - December 31, 2002)**



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The Midwest Technology Assistance Center (MTAC) was established October 1, 1998 to provide assistance to small public water systems throughout the Midwest via funding from the United States Environmental Protection Agency (USEPA) under section 1420(f) of the 1996 amendments to the Safe Drinking Water Act. This report summarizes progress made for 2002.

MTAC is a cooperative effort of the ten states of the Midwest (congruent with USEPA regions 5 and 7), led by the Illinois State Water Survey and the University of Illinois. The Director of their Water Resources Institute coordinates the participation of each state in MTAC. John Braden and Kent Smothers were the Principal Investigators for this project. Kent Smothers serves as the Managing Director of the Center, and is responsible for conducting routine activities with the advice and council of John Braden. Dr. Richard E. Warner has been actively involved as an advisor to MTAC in his role as Director of the Illinois Water Resources Center at the University of Illinois.

### **FY01 Projects**

#### **Competitive Grants**

MTAC has funded four competitive grants from this FY01 fiscal cycle. The project title and principal investigators for the four successful proposals are listed below, with a brief synopsis of activities and progress to date. All of these proposals underwent an external review, and were approved as suitable topics by the USEPA. The project updates included below were provided by the project Principal Investigators as indicated.

***Arsenic in Illinois Groundwater:  
Implications for Non-Community Water Supplies***

Steve Wilson  
Illinois State Water Survey (ISWS)

## PROJECT GOALS

The new arsenic rule, which lowers the Maximum Contaminant Level (MCL) for arsenic from 50  $\mu\text{g/L}$  to 10  $\mu\text{g/L}$ , will include for the first time non-community, non-transient public water supplies. This change in regulations will affect 450 of the approximately 3950 non-community supplies in Illinois that are regulated by the Illinois Department of Public Health (IDPH). These facilities, such as schools and small businesses, will have a difficult time meeting the new standard if their groundwater supply should be over the acceptable limit for arsenic because of the prohibitive costs of treatment, monitoring and reporting.

The goals of this proposed project are:

- I. To help characterize the occurrence of arsenic in non-community groundwater supplies statewide;
- II. To evaluate the chemical conditions and well construction details of each data point to determine what characteristics affect the dissolution of arsenic in groundwater;
- III. To evaluate the potential costs for those non-community supplies whose results indicate that additional treatment will be required to meet the new USEPA standard for arsenic of 10  $\mu\text{g/L}$ ;
- IV. To evaluate the effectiveness of two cost effective arsenic testing kits that could be used by extension, school, and environmental groups to provide a low-cost screening for arsenic in water samples as well as provide an educational tool to promote public awareness of arsenic in groundwater;
- V. To contribute to a central database of arsenic data that includes the historical sampling results from the laboratories of the IDPH, Illinois Environmental Protection Agency (IEPA), and ISWS as well as the results of the 250 wells that would be sampled as part of this study.

## PROGRESS

### **Task 1. Selection of non-community wells to sample for arsenic (in progress).**

The IDPH currently samples about 250 of the 450 non-community, non-transient public water supplies routinely every 3 years for inorganic constituents. These facilities represent all of the schools in Illinois that provide their own water supply. The other 200 supplies that fall under the new federal arsenic standard have no historic arsenic sample results.

201 facilities were identified as being non-transient, non-community supplies that use groundwater wells for their water supply. Those sites were compared to the ISWS well records to determine which of the facilities had an existing well log. 59 of the facilities had well information listed in the ISWS database files. This list of 59 was then evaluated further to determine if the data contained a geologic record for the well and to determine if the well was completed in a confined or unconfined aquifer. Unconfined wells, where oxygen is available to the groundwater system, will likely have no or very little arsenic present in the groundwater. Under these conditions, the arsenic is precipitated out of the water. After evaluating the logs and dismissing those wells that either didn't have an adequate

geologic record of the well boring or that were in unconfined aquifers, we were left with 46 sites in our initial list.

It is possible that a few logs exist in the IDPH files for the systems and we will be going to the IDPH to determine if any additional logs are available. Those that we find and meet the above mentioned criteria would be added to the list of facilities being sampled. We are now reviewing the list of transient sites and we will create a subset of facilities that have well logs for determining the rest of the facilities to sample.

### **Task 2. Contacting the Facilities/Pre-Sampling Preparation/Distribution of Sample Kits (in progress)**

The IDPH developed a letter that they sent to the 46 facilities with information about the project and what their role in the effort would be. They were sent in late November/early December so the Public Service Laboratory (PSL) waited until after the New Year to begin sending kits to the facilities. To date, there have been 15 kits mailed to the facilities and one sample has been returned. The PSL plans to begin sending out 3-4 kits a day until all are mailed, beginning the week of February 3<sup>rd</sup>.

The kits contain the standard PSL sets of bottles as well as an additional 250ml bottle for the testing of the “arsenic test kits”.

### **Task 3. Sample Analysis (Public Service Lab) (in progress)**

The sample the PSL has received to date is currently being analyzed.

### **Task 5. Sample Analysis (Arsenic Test Kits) (in progress)**

One of the test strip methods we hope to use requires 250 ml of sample, which would take our entire sample. We have discussed this with the PSL and they will use a 500ml bottle for all future sample sets. For the 15 already sent, we will be able to use spare sample from the PSL bottles to allow us to get the 300ml we need for the two tests (50 plus 250).

We have analyzed the one sample that has come in.

### **Task 6. Contribute Data to a Central Database of Arsenic Levels in Groundwater and Wells (in progress)**

The review of the files has been rewarding. We discovered that many of the non-transient wells, though not sampled for arsenic, have been sampled for a wide variety of other constituents. These constituents include a suite of inorganics and metals, as well as about 10 pesticides. These data will be useful in evaluating the background chemistry of the sites and will be added to the ISWS database.

### **Tasks 4 and 7. (Not yet begun)**

***Guide to Developing a Source Water Protection Plan:  
Interactive Training Tool for Illinois Water Systems***

Kevin Kundert and Gretchen Rupp  
Montana State University

The project began on September 1, 2002. Activities conducted since then were:

- ▶ Primary content materials were collected from the appropriate Illinois agencies and contacts. These included several PDF documents provided by Anthony Dulka, P.G. of the Illinois EPA Source Water Protection Program Sub Unit, Groundwater Section and links provided by Joseph Mitchell of the Illinois Non-Community Drinking Water Program.
- ▶ A five-step process was adopted for Illinois and permission was obtained from Pennsylvania for the reuse and modification of their content material, especially the Source Water Protection template. Mark Mitchell, Source Water Protection Specialist with the Illinois Rural Water Association started the modification process and expects to complete it in January 2003. The original template used in Pennsylvania was a modified version of the Montana six-step process. Each refinement is making a better document.
- ▶ A video was reviewed for possible inclusion as a media source. This may be used for part of the case-study of Peoria, Illinois. Lower impact methods to deliver video are being analyzed to minimize the bandwidth resources needed by the user. Requiring a plugin to play video was one limitation of the previous SWP projects. We are able to play the video in Macromedia Flash format now, which is already a requirement of the program. No additional software will be required for the CD. A plugin for Flash 6 will be necessary for the web version; this can be downloaded from the web at no cost.
- ▶ We have fallen about a month behind schedule. We plan to make up that time by using the services of contract media developers.
- ▶ A presentation of the CD-ROM version is our goal for a spring conference in Illinois. We plan to present at either the Illinois Section AWWA Annual Conference or the Illinois Rural Water Annual Conference.

***Development of Financial Benchmarks for Small Water  
Systems Using Annual Financial Reports***

Janice A. Beecher, PhD  
Beecher Policy Research, Inc.

This project was delayed in onset due to the relocation of the Principal Investigator and delays in paperwork. A possible advantage of the delay is the increased availability of data for some of the states in the study.

At this time, we have:

- Identified key data sources (public utility commissions financial reporting data).
- Assembled available literature, particularly on benchmarking approaches.
- Conducted project planning to assign tasks and begin data collection.

We are not invoicing labor hours for this project period. During the next quarter, our efforts will be concentrated on data collection and initial analysis.

### ***Arsenic Removal in Water Treatment Facilities: Survey of Geochemical Factors and Pilot Plant Experiments***

Dr. Thomas R. Holm, Dr. Walt Kelly, and Steve Wilson  
Illinois State Water Survey

#### **Water Treatment Plant Survey**

We have contacted approximately 20 water utilities for permission to collect samples and to gather information on their treatment processes. We are getting the acid-cleaned bottles and other materials ready for sampling. The Waste Management and Research Center (WMRC) will analyze the samples. The WMRC chemists have indicated that, because of their sample load, they would like to wait until March to collect the samples. Coordination with the laboratory is critical because of the instability of As speciation.

We recently developed a Standard Operating Procedure (SOP) for another project in which we collected water samples from water treatment plants that use Mahomet Aquifer water. One of the PIs will accompany the sampling crew on the early sampling trips to make sure they understand and follow the SOP and to see if any changes to the SOP are needed.

#### **Water Treatment Experiments**

We performed a series of experiments in which water containing As(III) and Fe(II) was pumped through a column containing manganese greensand. The water in the reservoir was sparged with N<sub>2</sub> to lower the dissolved O<sub>2</sub> concentration (DO) and avoid oxidation of Fe(II). (The Fe(II) was supposed to be oxidized in the column.) In the first three experiments the background electrolyte was KCl and the pH was adjusted to ~6. In these experiments there was no noticeable oxidation of Fe(II), i.e., there was no color formation in the reservoir. Arsenic removal was fairly good in these experiments, with the initial effluent containing less than 10 µg L<sup>-1</sup>, the new MCL. In the fourth experiment, the pH was adjusted to ~7, in the range of values we measured in the Mahomet Aquifer. Although the water in the reservoir had been sparged for more than two hours and the DO was less than 0.3 mg L<sup>-1</sup>, a yellow color formed in the reservoir within minutes of adding the Fe(II) salt. We changed two things for experiments 5 and 6. First, we reconfigured the system so that a Fe(II) solution was mixed with water from the reservoir immediately before the water entered the column. There was no Fe

oxidation/precipitation in experiments 5 and 6. Second, we controlled the pH using a  $\text{CO}_2/\text{HCO}_3^-$  buffer, the same buffer system as in natural water systems. For 1 mM  $\text{NaHCO}_3$ , which corresponds to an alkalinity of  $50 \text{ mg L}^{-1}$  as  $\text{CaCO}_3$ , the As concentration in the column effluent increased from  $\sim 10 \text{ } \mu\text{g L}^{-1}$  to  $15\text{-}20 \text{ } \mu\text{g L}^{-1}$  in the first 90 minutes and then remained fairly constant. For 10 mM  $\text{NaHCO}_3$  the As concentration in the effluent increased from  $\sim 18 \text{ } \mu\text{g L}^{-1}$  to  $25\text{-}28 \text{ } \mu\text{g L}^{-1}$  in the first hour. The higher effluent As concentrations for the higher alkalinity value are consistent with adsorption experiments.

The column was back-washed and treated with  $\text{KMnO}_4$  between experiments. This is known as intermittent regeneration. Because the effluent As concentrations exceeded the MCL, there seems to be little point in continuing the experiments with intermittent regeneration. In the next experiments we will add  $\text{KMnO}_4$  upstream of the column. This is known as continuous regeneration.

## **Outreach Activities**

### ***Long Distance Learning***

Robert Whitworth  
Director, ERTC-SIUE

The Environmental Resources Training Center at Southern Illinois University, Edwardsville conducted three distance learning training sessions sponsored by MTAC. These workshops addressed topics related to disinfection using chloramines, including: determining the correct chlorine to ammonia ratio, preventing loss of residual, proper sampling technique, total coliforms, and the cause and effects of nitrification in the distribution system. The first course was simultaneously telecast to three community colleges (Southern Illinois University - Edwardsville, Rend Lake Community College, and John A. Logan Community College) in southern Illinois on April 8, 2002, the second was simultaneously telecast to five community colleges (SIUE, Parkland Community College, John Wood Community College, and Lincolnland College) in central Illinois on May 13, 2002, and the last was simultaneously telecast to three community colleges (SIUE, Elgin Community College, Highland Community College, and Kishwaukee College) in northern Illinois on June 24, 2002. The total attendance at these sessions was 32 operators. Course evaluation was very positive, of the 23 individuals that responded to the questionnaire all but three evaluated the instructors as very good or good and all but one gauged the level of presentation to be at the right level and indicated they would recommend it to another operator. We have enclosed a copy of the summary of the evaluations submitted by course attendees in Appendix A. We were disappointed with the overall attendance for these training sessions. We will be working with ERTC on any future joint training efforts to inform small system operators and managers well in advance of the training sessions. We intend to send mailings on a quarterly basis to operators in Illinois to alert them to whatever training opportunities are coming up in their area. Hopefully, this will increase attendance for future events.

### ***Development of a Workshop to Introduce Small Drinking Water Systems Managers to Financial Benchmarking***

Tom Bik, Dr. Ben Dziegelewski

Southern Illinois University, Carbondale

Progress on Schedule Tasks during this work period:

Progress on the workshop project was delayed during this work period due to a variety of health problems with the project personnel. A *six-month extension has been requested* in order to allow the project team to conduct the four test workshops, solicit feedback, and prepare the final project report and final drafts of workshop materials. Recent work on project tasks is summarized below.

Task 1.

Collect and evaluate workshop materials that are currently being used for financial training in small communities.

Output 1. Brief bibliography of available training materials and resources. The bibliography will be included in introduction to workshop workbook.

Report on Task 1. Task 1 is 95% complete. Additional materials have been added to the bibliography. The draft bibliography has been completed and reviewed. Final changes will be made following feedback from workshop participants.

Work remaining: Collect suggestions for changes from workshop evaluation forms. Prepare final draft for workbook.

Task 2:

Identify and contact government agencies and non-governmental organizations working in rural water supply to assess interest in benchmark workshops and opportunities to “piggy-back” workshop with scheduled events.

Output 2. Brief report of the results of contacts, and a calendar of potential workshop host venues.

Report on Task 2. Task 2 is 50% complete. The delay in the completion of the curriculum materials prevented the workshops from being presented in conjunction with the Winter small system meetings which had been previously identified. The Illinois American Water Works Association and the Missouri Department of Natural Resources Technical Assistance Program will be hosting workshops in March 2003. These workshops will be targeted for piggy-backing. Two other Spring venues will need to be identified and the organizers contacted.

Work remaining: Workshop dates need to be coordinated with currently scheduled events. The report of contacts and venues needs to be prepared.

Task 3:

Prepare initial workshop curriculum, PowerPoint presentations, participant workbooks, and evaluation procedures.

Output 3. Trainer's 3-ring binder containing workshop materials.

Report on Task 3. Task 3 is 90% complete. Draft versions of the workbook and PowerPoint presentations have been prepared. These materials need to be duplicated and distributed to several technical assistance providers who have agreed to provide a review. The evaluation forms and procedures have not yet been developed.

Work remaining: Duplicate and distribute drafts of the PPTs and workbook for review. Design evaluation forms. Incorporate reviewer suggestions and complete final drafts of materials. Have copies of the materials duplicated for use in the workshops (the 3-ring binder will not be used; workbooks will be spiral-bound).

Task 4:

Schedule and implement four workshops (minimum). Conduct post-workshop evaluations and adjust training materials based upon the feedback from participants.

Output 4. Brief written report of each workshop, describing changes made to curriculum and materials as the result of workshop comments and experiences.

Report on Task 4. No workshops have yet been scheduled or conducted.

Task 5:

Prepare final version of all workshop materials.

Output 5. All workshop materials will be revised after the final workshop and produced in both paper and electronic format.

Report on Task 5. Pending completion of workshops.

Task 6:

Prepare and submit final report.

Output 6. The final report will describe the workshop experiences and feedback from participants, and include copies of all workshop materials.

Report on Task 6. Pending completion of workshops.

Project Principal Investigators have indicated they hope to have at least three of the proposed four workshops completed by March this year.

***Emergency Response Planning Guide Workbook***

Laurie Papanos  
Illinois Sections AWWA

This product has been completed and delivered. MTAC mailed copies of the product to various organizations and assistance providers in Illinois and around the Midwest. We also provided USEPA Region 5 with some copies of this product. Sahba Rouhani, the Capacity Development Coordinator for Region 5, requested an additional 50 copies of the CD-ROM and workbook to supply to all of the Native American Communities in the Midwest. So long as funds are available, we will continue to provide this product at no cost to those that request it. We mailed a copy of this product to USEPA upon taking delivery, but we have included an additional copy in this packet.

***Bacteria Speciation CD-ROM and Workbook***

Laurie Papanos  
Illinois Sections AWWA

Articles and resource information from project author, Ellen Storment have been received and it is currently being compiled into a workbook format by Teri Ard, Ph.D., M.S. from the Institute of Paper Science and Technology, B.S. from the University of Washington. Teri expects to have a draft for approval by end of February and final completion of project by March 31<sup>st</sup>. We had originally anticipated delivery of this project by no later than 12/31/02. However, there was a delay in the scheduled start of this project due to unanticipated problems on the part of the ISAWWA. In addition, since all three of these CD-ROM/workbook projects rely heavily on volunteers for much of the work, meeting deadlines has proved to be problematic. We may need to review how projects like this are structured in the future to prevent this from occurring again. I would like to note that the completed product above dealing with Emergency Planning has been very well received, and I am optimistic that the final two projects will prove worth the wait.

***Self-Evaluation CD-ROM and Workbook***

Laurie Papanos  
Illinois Sections AWWA

Final 250 questions will be entered by end of January totaling over 1500 questions that compile the Self Evaluation Project. Report writing programming is completed. Volunteer committee will review question tree during February and after changes final program will be completed. Anticipated completion date is end of March. We had originally anticipated delivery of this project by no later than 12/31/02. However, there was a delay in the scheduled start of this project due to unanticipated problems on the part of the ISAWWA. In addition, since all three of these CD-ROM/workbook projects rely heavily on volunteers for much of the work, meeting deadlines has proved to be problematic. We may need to review how projects like this are structured in the future to prevent this from occurring again. I would like to note that the completed product above dealing with Emergency

Planning has been very well received, and I am optimistic that the final two projects will prove worth the wait.

**All three above projects** - It was decided to develop a programming tool that could be used for all three of these projects. The programming tool is an Authorware engine attached to an Access Database. This will allow for recording of infinite information and developing question trees based upon previous answers. This will give greater flexibility to the CDs and also allow for easier updates without additional programming.

### ***Capacity Development/Emergency Planning Workshops***

MTAC/IRWA

MTAC sponsored two small system workshops presented by the Illinois Rural Water Association on Emergency Preparedness. These were two-day workshops, with MTAC presenting an evening session on the Benchmark Investigation of Small Water System Economics, the Emergency Response Planning CD, and an overview of current and future MTAC activities. The first workshop was presented at the Rend Lake State Resort in southern Illinois on November 7-8, 2001, and the second was held at the Starved Rock State Lodge in northern Illinois on December 5-6, 2001. This training was approved by the Illinois Environmental Protection Agency. There were a total of approximately 50 attendees, who each received 14 and half contact hours for training purposes.

## **FY02 Projects**

### **Competitive Grants & Applied Research**

#### ***Competitive Grants:***

MTAC issued a Request for Proposals (RFP) in August 2002. The complete RFP is available at the following address: [http://mtac.sws.uiuc.edu/mtacdocs/MTAC\\_RFP2002.pdf](http://mtac.sws.uiuc.edu/mtacdocs/MTAC_RFP2002.pdf). MTAC received a total of nine proposals from several different states. These proposals underwent a rigorous peer review process, with each proposal having a minimum of three reviewers. The highest rated proposals were selected. Copies of each of the successful proposals are included in this packet. We have listed the title, institution, and principal investigators for the proposals that were selected for funding below. Since these projects are just starting, we did not require that they submit a quarterly report for inclusion in this document. However, one of the projects has already started work in anticipation of receiving funding and we have included that information.

***Development of Sulfur-Limestone Autotrophic Denitrification Processes for Treatment of Nitrate-Contaminated Groundwater in Small Communities***

Dr. Tian C. Zhang  
University of Nebraska-Lincoln at Omaha

***Interactive Guides to Creating Source Water Protection Plans  
for Region V Public Water Supplies***

Kevin Kundert  
Montana State University

***The Effects of Different Modes of Coagulation as Pretreatment  
to Membrane Filtration for Drinking Water Production in Small  
Systems***

Dr. Isabel C. Escobar  
University of Toledo

***Development of Low-Cost Treatment Options for Arsenic Removal  
in Water Treatment Facilities***

Gary R. Peyton and Dr. Thomas R. Holm  
Illinois State Water Survey

Progress for this period has been in three areas: 1) finding a graduate student to work on the project, 2) literature survey, and 3) preliminary calculations.

Graduate Student: We have contacted Benito Marinas in Environmental Engineering and he recommended a student, William Martin, who has just been admitted for the Spring semester, but did not yet have funding. He has a B.S. in Chemical Engineering from Purdue followed by 7 years of military experience as an engineer. We contacted him and he is interested and will be in town soon to begin school. We also asked Benito about an advisor for the student, preferably one that would be interested in being involved with the project, and he suggested Timm Strathmann, who is joining the faculty in March. He is an environmental chemist, who worked with Alan Stone at Johns Hopkins on his PhD, which he received a little over a year ago. His thesis examined the link between Iron (II) speciation and rates of carbamate pesticide reduction in anaerobic aquatic systems. He has a good deal of experience in the areas of reaction kinetics, chemical speciation, iron redox chemistry, anaerobic processes, and metal and ligand adsorption on mineral surfaces. He is currently finishing up a postdoc working with Satish Myneni and Francois Morel at Princeton, where they are using X-ray absorption and infrared spectroscopies to look at metal complexation by humics and simple organic acids in aqueous systems. This looks like a promising combination and a good fit with the PIs experience.

Literature Survey: This has been underway since notification that the project would be funded. This is an active research area. We need to examine what has already been done, and gather information and rate constants for optimization calculations. A summary will be prepared once the bulk of the survey has been completed.

Preliminary Calculations: In order to narrow the possible research avenues, calculations are

being carried out to determine the behavior of oxidizing systems in natural water, using methods previously developed in the Oxidation Research Laboratory at the Water Survey. Since hydroxyl radical is a prime candidate for the oxidant of choice, the extent to which other water components interfere with oxidation of arsenic by scavenging hydroxyl radical is of interest, as it will determine optimum treatment conditions. This phase is not completed, but so far the results indicate that it should be possible to develop a cost-effective process.

An additional benefit has come out of these calculations, which indicate that carbonate radical, formed by the scavenging of hydroxyl radical by bicarbonate (alkalinity), may be as effective as hydroxyl radical for arsenic oxidation, and be more efficient, since carbonate radical is much less reactive than hydroxyl radical with the other scavengers in the system, and is therefore more selective for arsenic than is hydroxyl radical. This illustrates the utility of kinetic calculations for determining the objectives of some of the initial experiments. These calculations and their results will be described in more detail in a later report.

Tasks for the next quarter include bringing the graduate student on board, acclimating him to the project, the team, and the lab, and performing initial experiments, guided by more calculations.

### ***Applied Research:***

Most of these projects were not scheduled to start until January, so there is no activity to report for most. However, some of them have already had considerable progress and their quarterly update submitted to MTAC is included. For those that were not active during 2002, we have included a brief review of the project scope.

### ***Applied Research: Assessment of Capacity Needs for Rural Water Supply in the Midwest***

Tom Bik, Dr. Ben Dziegelewski  
Southern Illinois University, Carbondale

Progress on Schedule Tasks during the second quarter working period:

***Task 1:*** *Collect relevant water use and explanatory variable data, projections of explanatory variable data, and design capacity data.*

Report on Task 1. This task is still only about 70% complete, because of changes in the research approach that were necessary because of inconsistent and unavailable data.

### Water-Use Data

All of the components of the 1985, 1990, and 1995 public supply deliveries and withdrawals data were reviewed for data completeness, consistency over time, and relationship to exogenous variables. Those data that appeared to be inconsistent or erroneous were identified and put into tables

for each state. These tables were then sent to the USGS water use coordinators from each state for review.

The feedback received from the coordinators acknowledged USGS' own concern for the quality of some of the data. In particular, the coordinators were skeptical of the public supply delivery data. We were referred to the USGS regional coordinator who informed us that there had been so many problems with the delivery data that the USGS had decided to no longer require that this information be collected or reported for the 2000 inventory.

Because of the problems with the existing USGS delivery data and its unavailability for the 2000 inventory, the public supply models will need to be developed using only the more aggregate "public supply withdrawal" data as the dependent variable. Numerous other data sets were collected and tested in modeling exercises in order to search for a variable that could take the place of the delivery data in explaining the "commercial and industrial" components of public supply withdrawals.

USGS also informed us that there continue to be problems with the 2000 inventory and that the release deadline has again been pushed back and the official release is now not expected until late Spring. However, USGS offered the project team the opportunity to perform a quality review of the data from the six states involved in the "Assessment of Capacity Needs" project. This will benefit USGS while allowing the project to move forward with the development of water demand models.

#### County water system "capacity" data

Data on the community water systems in each county had originally been solicited from the USEPA in order to estimate the available system capacity in each county. However, the data received from USEPA contained records of both active and inactive systems and was therefore unusable. USEPA was also unable to provide us with information on water system capacity.

Primacy agencies in all six states were therefore contacted and process of data collection began again. Complete community water system data has now been received from Michigan, Indiana, and Wisconsin. Most of the data from Ohio is already available, our data request from Illinois is being processed, and we are waiting for a response from Minnesota. Some measure of water system capacity is available for four of the five states that have responded.

The use of public supply water withdrawals as the dependent variable will cause a lack of correspondence between water-use data and explanatory variables. This is because of the cross-county flows between systems that sell water across county borders. In order to account for cross-county flows, a county grouping procedure was designed to group those counties that are connected by direct or indirect water purchase. This grouping process is based on the data on water sellers and buyers that have been obtained from state primacy agencies. This grouping process has been completed for three states.

#### Forecast Data

Numerous state and federal agencies were contacted to obtain projection of data used as variables in the state models. County-level projections for population and employment for several forecast years were located.

Work remaining

- Review the preliminary 2000 water-use data from USGS; add data to modeling database after review/revision.
- Obtain complete water system data and prepare county groupings for remaining states.
- Prepare projections for remaining model variables; interpolate available projections for forecast years.

***Task 2: Develop state-specific water use models for public supply use.***

Report on Task 2. Numerous preliminary modeling runs have been made using the 1985, 1990, and 1995 data. Runs were conducted using the data from all of the counties in USEPA Region 5 and for individual states in the Region. Unfortunately, these modeling exercises were inconclusive, largely because of problems with the data. Modeling runs will be suspended until the 2000 water-use data becomes available. Once the 2000 data is included in the model, the procedures necessary to adjust for data inconsistencies will be implemented.

Work remaining

- Final models will be prepared after the 2000 data becomes available.

***Task 3: Model verification through in-sample prediction of water-use.***

Report on Task 3. Work has not yet begun on Task 3.

Work remaining

In-sample predictions will not be prepared until the 2000 water-use data become available and the water demand models have been developed.

***Task 4: Prepare county-level forecasts***

Report on Task 4. Work has not yet begun on Task 4.

Work remaining

- Complete preparation of forecast data sets.
- Prepare forecasts as soon as models become available.

***Task 5: Determination of county water supply capacity***

Report on Task 5. This task is approximately 30% complete.

The inability of USEPA to provide capacity data has required us to seek out water system capacity data from the primacy agencies in each state. However, because the collection of capacity data is not federally mandated, there is no consistent measure of capacity in all states. Consequently,

the reporting of “capacity” and the resulting analysis will differ slightly in each state, and one state has acknowledged that it will be completely unable to provide capacity data in an electronic format. These differences will be carefully documented in the final report.

The determination of county capacity will be estimated by summing the capacity of individual systems in each county. In the case of counties that are grouped by cross-county flows, the demand forecast and capacity assessment will be calculated for the counties as a group.

Work remaining

- Collect remaining data from state primacy agencies
- Determine cross-county flows in each state and groupings of counties
- Identify the relevant capacity measure for each state
- Calculate current capacity for each county and group of counties

#### ***Task 6: Preparation of Deliverables***

Report on Task 6. This task is approximately 10% complete. Several sections of the draft final report have been prepared. Some of the available data have been entered into ArcView GIS software and the templates of the maps of each state that will appear in the final report have been prepared.

Work remaining

The project completion report, forecasting database, journal article, and project review for Water Sense all remain to be completed.

#### ***Applied Research: Control of Microbial Contaminants and Biological Agents in Small Systems***

Benito Marinas  
University of Illinois, Urbana

The project is a directly funded project with the University of Illinois Civil and Environmental Engineering Department, and will include three major tasks: (1) review of literature; (2) performance of experimental studies for candidate technology assessment; and (3) development of recommendations for integrated control strategies. Options for combating microbial contaminants and biological agents will be evaluated, and experiments will be conducted to determine their effectiveness using surrogates such as *Bacteriophage* MS-2 viruses or *Bacillus subtilis* spores. Potential control technologies include chemical and ultraviolet disinfection in addition to membrane processes. This study is intended as precursor to a field study. Products will include a technology brief accessible to small system operators and managers on the MTAC web site, a final report of project results to MTAC, and submission to a peer-reviewed journal.

#### ***Applied Research: *Cylindrospermopsis raciborskii****

ERTC, Biology Department  
Southern Illinois University, Edwardsville

This is a directly funded project with the Environmental Resources Training Center (ERTC) at Southern Illinois University - Edwardsville. *Cylindrospermopsis* is a toxin producing blue-green alga that has been identified in Indiana and Missouri waters. This blue-green alga does not form a surface layer of material as most blue-green algae, but clusters in a layer several feet from the surface. This project will contact all small surface water treatment facilities to inform them about *Cylindrospermopsis*, and instruct them in the proper sampling and preservation techniques. Systems will be encouraged to submit samples for differentiation. ERTC (with the assistance of the SIU-E Biology Department) will identify algae to determine if *Cylindrospermopsis* is present in Illinois. ERTC will prepare a final report and submit it to MTAC for publishing on their web site and inclusion in the annual report. Confirmation of whether or not *Cylindrospermopsis* is present will help small systems evaluate whether or not they need to alter their management or treatment practices to effectively deal with this potential problem.

## **Outreach Activities**

We have initiated the funding process for these projects and expect work to begin soon. Listed below is a brief description of each of the projects we will be funding.

**Vulnerability Assessment of Water Utilities for Small Communities** This is a cooperative project with the Environmental Resources Training Center (ERTC) at Southern Illinois University - Edwardsville. ERTC will perform a minimum of two vulnerability assessments for local water treatment facilities, and develop a workshop designed to assist small public water systems with evaluating their own water system security. Knowledge gained in conducting the two vulnerability assessments will be used to enhance existing information for the workshop course material. The 7.5-hour workshops will be offered at least six times in various locations throughout the state of Illinois. The workshop will be initiated and advertised by ERTC through their established network and any brochures, agenda, or training material will have the ERTC and MTAC logos displayed. Expected attendance is 15-20 small system operators or managers per workshop. Attendees will be offered 0.75 CEU's or 7.5 operator certification training credits upon request. It is expected that this workshop will greatly enhance the knowledge and ability of attendees to conduct vulnerability assessments in their own systems. Registration fees will be applied to reduce project costs and to offset the cost of issuing CEU's and operator certification training credits. Any program income generated will comply with the rules set forth in 40 CFR 30.24.

**Distance Learning Special Topics Workshops** This is a cooperative project with the Environmental Resources Training Center (ERTC) at Southern Illinois University - Edwardsville. ERTC will present two small water system workshops, each of them to be offered three times at four different community colleges or universities simultaneously. Following is a tentative list of sites for hosting the workshops: Rend Lake College, Olney Central College, John A. Logan College, Shawnee Community College, Southern Illinois University, John Wood Community College, Lincoln Land Community College, Parkland College, Highland College, Kishwaukee College, and Elgin Community College. The first

series of 3 hour workshops will be offered starting April 2003 and will address Arsenic. The second series of workshops will be offered in fall 2003, and will address whatever MTAC, ERTC, and IEPA agree is the most pressing training need of small systems at that time. This will allow us flexibility to react to changing or developing issues. The workshop will be initiated and advertised by ERTC through their established network and any brochures, agenda, or training material will have the ERTC and MTAC logos displayed. Expected attendance is 10-15 small system operators or managers per workshop. Attendees will be offered 0.25 CEU=s or 2.5 operator certification training credits upon request. Registration fees will be applied to reduce project costs and to offset the cost of issuing CEU=s and operator certification training credits. Any program income generated will comply with the rules set forth in 40 CFR 30.24.

**Disinfection Profiling Workshops** This is a cooperative project with the Environmental Resources Training Center (ERTC) at Southern Illinois University - Edwardsville. There will be three 7.5-hour workshops on disinfection profiling in surface water systems. This will include instruction on calculating contact time, graphical profiles, calculating *Giardia lamblia* inactivation, etc. This should aid operators handling surface water and/or groundwater supplies under the influence of surface water in completing the disinfection benchmark requirements, LT1SWTR, filter assessment and the Comprehensive Performance Evaluation. The workshops will be offered in early 2003. The workshop will be initiated and advertised by ERTC through their established network and any brochures, agenda, or training material developed will have the ERTC and MTAC logos displayed. Any available USEPA training materials on this subject will be incorporated in the workshop. Expected attendance is 10-15 small system operators or managers per workshop. Attendees will be offered 0.75 CEU=s or 7.5 operator certification training credits upon request. Registration fees will be applied to reduce project costs and to offset the cost of issuing CEU=s and operator certification training credits. Any program income generated will comply with the rules set forth in 40 CFR 30.24.

**Source Water Protection CD=s** The FY01 MTAC work plan called for the production of an interactive source water protection CD to aid systems in the development of source water assessment and protection plans. This will supplement that project by producing 2000 additional CD=s for distribution in Illinois and surrounding states.

## **Information Dissemination** (Ongoing for both FY01 and FY02)

The MTAC web site has seen a steady flow of traffic and downloads since its redesign last year. During 2002, the web site had almost 90,000 hits with more than 15000 user sessions. This was an average of 42 user sessions per day. There were close to 20,000 downloads during the year. We have included a more detailed analysis of web traffic for this quarter in Appendix B.

MTAC has been in contact with the National Drinking Water Clearinghouse (NDWC), and we are currently negotiating details for NDWC to assist in disseminating information regarding some of our

Competitive Grants for both the FY01 and FY02 Work Plans. These agreements should be in place by spring 2003.

Kent Smothers attended the Illinois American Water Works Association annual conference in Springfield, Illinois on March 21, 2002. He was an invited speaker during the regulatory session (organized by the Illinois Environmental Protection Agency), where he presented an overview of MTAC activities and future plans. There were several hundred attendees at the session.

We have discussed with USEPA the possibility of holding a National Technical Assistance Center (TAC) Workshop in conjunction with another national meeting such as AWWA or the USEPA Source Water Protection meeting. MTAC is willing to participate and help with any expenses involved for securing display space or meeting rooms. MTAC participated in a conference call with USEPA and the TACs during December to discuss this and other issues. The group consensus seemed to be that the Annual AWWA meeting would be the appropriate venue. MTAC is participating in hosting a booth at the meeting with some of the other TACs.

We have decided the logistics and expense involved in the production of a quarterly newsletter outweigh the benefit. MTAC proposes as an alternative the mass mailing of post cards to announce any upcoming training or the availability of any new products. These will be mailed to technical assistance providers and small water system operators and managers throughout the Midwest, or statewide, as appropriate. This will allow us to reach all of the target audience as opposed to a much smaller mailing list for a more elaborate newsletter. The first postcard mailing will be sent as soon as an updated mailing list is obtained from the IEPA. We anticipate this will be completed before the end of February.

Kent Smothers attended part of a regional capacity development meeting in Chicago, Illinois on October 30<sup>th</sup>, and talked with Capacity Development Coordinators for USEPA Regions III (Ghassan Khaleed), V (Sahba Rouhani), and VII (Bob Dunleavy), as well as the Small Systems Coordinator for Region V (Chuck Pica). Subsequent to this meeting, MTAC forwarded several of their publications and products the USEPA Region 5. As mentioned earlier, Ms. Rouhani requested an additional 50 copies of the Emergency Response Planning CD-ROM and workbook to supply to all of the Native American communities in Region 5.

MTAC was a supporting sponsor of the Illinois Water 2000 Conference. Kent Smothers was also an invited speaker, where he presented an overview of MTAC activities and future plans. The conference was very well attended, with over 200 water professionals present. The keynote speaker was Robert Hirsch, Associate Director for Water, U.S. Geological Survey. Other speakers of note were Robert Wayland III, Director of the USEPA Office of Wetlands, Oceans, and Watersheds, and Brent Manning, Director of the Illinois Department of Natural Resources. The PI for an MTAC funded study on Arsenic (Steve Wilson) also gave a talk at the conference on the work being done on Arsenic in Illinois. We have included a copy of the conference program and agenda for your reference.

## **Staffing**

**(Ongoing for both FY01 and FY02)**

Dr. John Braden is one of the Principal Investigators for the MTAC proposal, and continues to actively participate in Center activities. Dr Richard E. Warner has assumed Dr. Sparks' responsibilities as the new Illinois Water Resources Center Director, and will serve as an advisor to MTAC. Dr. Warner should be added to list of Principal Investigators in the next grant from USEPA. The Administrative Coordinator for the program is still Rhonda Griffet. The part-time WEB administrator, Kevin Merrifield, continues maintenance of the site with assistance and input from Kent Smothers. Dan Webb is providing computer and technical support. Kent Smothers continues to serve as Managing Director, and remains in contact with local and regional regulatory officials and technical assistance groups concerning MTAC activities.

## Appendix A

### Long Distance Learning Workshop Attendee Evaluation



SOUTHERN ILLINOIS UNIVERSITY  
EDWARDSVILLE

July 18, 2002

Kent Smothers  
MTAC  
II State Water Survey  
2204 Griffith Drive  
Champaign, IL 61820

Dear Mr. Smothers,

The Environmental Resources Training Center (ERTC), has provided three distance learning training sessions entitled, "Special Topics in Water Treatment." These workshops discussed disinfection with chloramines, correct ratio of chlorine to ammonia dosage, prevention of loss of chlorine residual, total coliforms, sampling, nitrification and its effects on water quality in the distribution system.

The first course was offered April 8, 2002, and was simultaneously telecast to three community colleges in southern Illinois. The second course was offered on May 13, 2002, and was simultaneously telecast to five community colleges in central Illinois. The third course was offered on June 24, 2002, and was simultaneously telecast to three community colleges in northern Illinois. All three telecasts originated from Southern Illinois University at Edwardsville.

The total attendance for all three training sessions was 32. An overall course evaluation sheet is attached for your review, to include participating student remarks.

The capacity of the technology of distance learning has far reaching potential. The Environmental Resources Training Center anticipates more interest and operator participation in future distance learning training sessions, as popularity increases.

Sincerely,

A handwritten signature in black ink that reads "Robert A. Whitworth". The signature is written in a cursive style with a large, sweeping flourish at the end.

Robert Whitworth  
Director, ERTC-SIUE



SOUTHERN ILLINOIS UNIVERSITY  
EDWARDSVILLE

Course Evaluation

Name of Course: Distance Learning-- "Special Topics in Water Treatment"

Location: (1) SIUE, Rend Lake, John A. Logan Community College

(2) SIUE, Parkland, John Wood, Olney, Lincolnland Colleges

(3) SIUE, Elgin, Highland, Kishwaukee Colleges

Date(s): (1) April 8, 2002 (2) May 13, 2002 (3) June 24, 2002

Instructor(s): Robert Whitworth, Robert Miller, Barb Woods

A. How many miles (one-way) did you travel for this course? Between 1 and 125 miles

Preferred location (if any): \_\_\_\_\_

B. Would you recommend this course to another operator?

Yes      No

Number of Responses      21      1

C. What is your opinion of each of the following items?

1. The time allocated to the course?

Not Enough      About Right      Too Much

Number of Responses                23          

2. Level of material presented in the course?

Too Basic      About Right      Too Advanced

Number of Responses      1      22          

3. Training Aids (overheads, slides, models, demonstrations, etc.) used in the course?

Quality      Very Good      Good      Fair      Poor

Number of Responses      5      10      7      2

Environmental Resources Training Center  
 Edwardsville, IL 62026  
 Course Evaluation

4. Reference materials (books, worksheets notes, etc.) used for the course?					
Quality	<u>Very Good</u>	<u>Good</u>	<u>Fair</u>	<u>Poor</u>	
Number of Responses	<u>4</u>	<u>12</u>	<u>5</u>	<u>  </u>	<u>  </u>
5. Hands-on practice exercises and/or laboratories?					
Quality	<u>Very Good</u>	<u>Good</u>	<u>Fair</u>	<u>Poor</u>	<u>Don't Need</u>
Number of Responses	<u>1</u>	<u>5</u>	<u>  </u>	<u>  </u>	<u>12</u>
					<u>Not Used, But Should Be</u>
					<u>2</u>
6. The instructor's presentation?					
	<u>Very Good</u>	<u>Good</u>	<u>Fair</u>	<u>Not Good</u>	
Number of Responses	<u>10</u>	<u>10</u>	<u>3</u>	<u>  </u>	<u>  </u>

Remarks about the instructor/presentation:

7. In what way do you feel this course could be improved?
- Presentation very informative
  - Both speakers don't cover the same material
  - Barb needs emphasis on teaching; Miller did a good job explaining coliforms
  - Miller makes a very relaxed atmosphere
  - Need course material in hand
  - Need reference material in hand
  - Instructors did fine with practice, we will all do better, but very hard to see, to follow material and keep up if you get behind
  - This is a good class for CEU's
  - Bob Miller explained in lay terms, very relaxed
  - Practice with the visuals more, I do like its capabilities & reaching out to other people/operators throughout the state
  - More in depth presentation on ammonia residual and affects with chlorine THHM control, methods, etc in large distribution systems
  - Use more graphics
  - Send out worksheets, course notes

Environmental Resources Training Center  
Edwardsville, IL 62026-1075  
Course Evaluation

8. Please list other courses or subjects which would be of interest to you and which you would recommend the ERTC develop and present.
- Backflow preventer knowledge and installation
  - Source water containment
  - Wastewater short schools, like you have for water, (a two day seminar)
  - Advanced water treatment at ERTC, not Aurora or Bloomington. Although I already have my Class A Water, I hear other operators complain they will not go because it is too far.
  - Variable speed drive control for pumps & motors, applications
  - Radio telemetry uses and product line
  - Updates on new EPA rules and enhanced surface water rules
  - Class B water certification course
  - Types of treatment processes (ex. Green sand, lime softening, nitrate removal, etc.)
  - Wastewater
  - Class C
  - Groundwater
  - Courses for the operators license ABCD
  - Classes designed, especially geared towards the licensing
  - Turbidity
  - Flocculation
  - Lime softening

## Appendix B

### **MTAC Web Report 2002** **MTAC 2002**

Prepared By:

**Kevin Merrifield**  
**Illinois State Water Survey**  
on 6/3/2003, 13:21:55

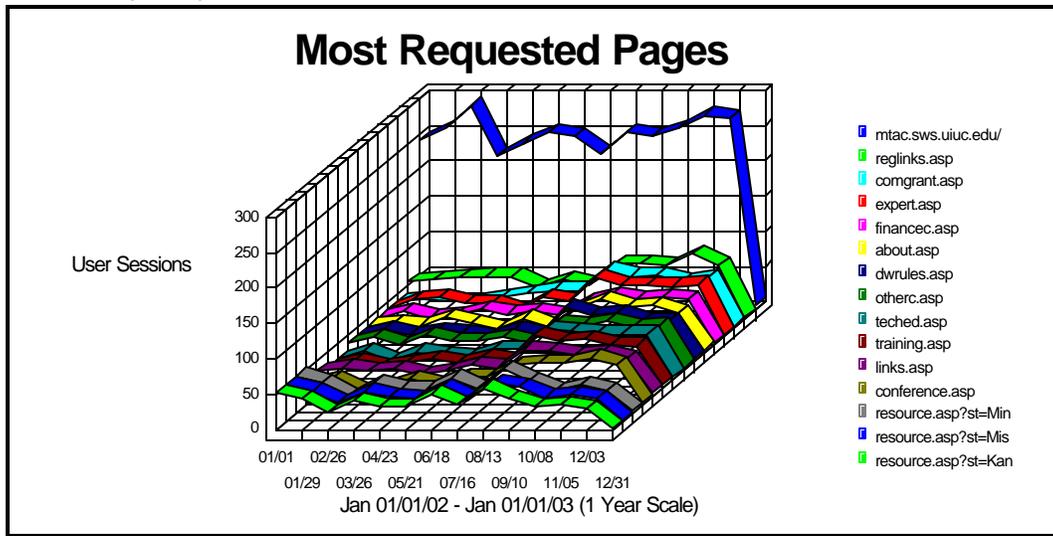
## General Statistics

The User Profile by Regions graph identifies the general location of the visitors to your Web site. The General Statistics table includes statistics on the total activity for this web site during the designated time frame.

General Statistics	
Date & Time This Report was Generated	Wednesday February 05, 2003 - 14:59:54
Timeframe	01/01/02 00:00:00 - 01/01/03 00:00:00
Number of Successful Hits for Entire Site	88,406
Number of User Sessions	15,455
Average Number of Hits Per Day	242
Average Number of User Sessions Per Day	42
Average User Session Length	00:11:33
Number of Unique Users	5,607
Number of Users Who Visited Once	4,406
Number of Users Who Visited More Than Once	1,201

## Most Requested Pages

This section identifies the most popular web site pages and how often they were accessed. The average time a user spends viewing a page is also indicated in the table.

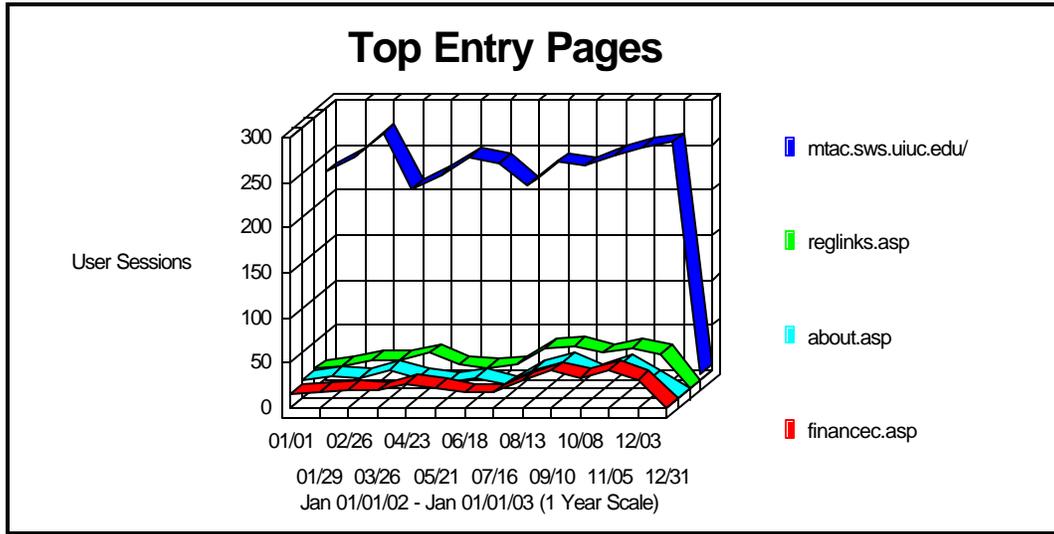


Most Requested Pages					
	Pages	Views	% of Total Views	User Sessions	Avg. Time Viewed
1	MTAC - Home <a href="http://mtac.sws.uiuc.edu/">http://mtac.sws.uiuc.edu/</a>	3,795	16.96%	3,274	00:03:03
2	MTAC - Regulatory Agency Links <a href="http://mtac.sws.uiuc.edu/reglinks.asp">http://mtac.sws.uiuc.edu/reglinks.asp</a>	920	4.11%	840	00:02:29
3	MTAC - Competitive Grants Awards <a href="http://mtac.sws.uiuc.edu/comgrant.asp">http://mtac.sws.uiuc.edu/comgrant.asp</a>	796	3.55%	711	00:02:04
4	MTAC - Expert List <a href="http://mtac.sws.uiuc.edu/expert.asp">http://mtac.sws.uiuc.edu/expert.asp</a>	777	3.47%	742	00:03:16

<b>Most Requested Pages</b>					
	<b>Pages</b>	<b>Views</b>	<b>% of Total Views</b>	<b>User Sessions</b>	<b>Avg. Time Viewed</b>
5	MTAC - Environmental Finance Centers <a href="http://mtac.sws.uiuc.edu/financec.asp">http://mtac.sws.uiuc.edu/financec.asp</a>	701	3.13%	670	00:03:14
6	MTAC - About MTAC <a href="http://mtac.sws.uiuc.edu/about.asp">http://mtac.sws.uiuc.edu/about.asp</a>	697	3.11%	660	00:02:41
7	MTAC - Drinking Water Legislation Links <a href="http://mtac.sws.uiuc.edu/dwrules.asp">http://mtac.sws.uiuc.edu/dwrules.asp</a>	682	3.04%	645	00:02:48
8	MTAC - Drinking Water Centers <a href="http://mtac.sws.uiuc.edu/otherc.asp">http://mtac.sws.uiuc.edu/otherc.asp</a>	674	3.01%	656	00:03:27
9	MTAC - Technical Education Links <a href="http://mtac.sws.uiuc.edu/teched.asp">http://mtac.sws.uiuc.edu/teched.asp</a>	647	2.89%	604	00:03:23
10	MTAC - Training <a href="http://mtac.sws.uiuc.edu/training.asp">http://mtac.sws.uiuc.edu/training.asp</a>	638	2.85%	602	00:02:45
11	MTAC - Links <a href="http://mtac.sws.uiuc.edu/links.asp">http://mtac.sws.uiuc.edu/links.asp</a>	610	2.72%	588	00:02:16
12	MTAC - Conference Information <a href="http://mtac.sws.uiuc.edu/conference.asp">http://mtac.sws.uiuc.edu/conference.asp</a>	550	2.45%	534	00:02:58
13	MTAC - Resources by State <a href="http://mtac.sws.uiuc.edu/resource.asp?st=Minnesota">http://mtac.sws.uiuc.edu/resource.asp?st=Minnesota</a>	516	2.3%	512	00:05:11
14	MTAC - Resources by State <a href="http://mtac.sws.uiuc.edu/resource.asp?st=Missouri">http://mtac.sws.uiuc.edu/resource.asp?st=Missouri</a>	513	2.29%	509	00:05:07
15	MTAC - Resources by State <a href="http://mtac.sws.uiuc.edu/resource.asp?st=Kansas">http://mtac.sws.uiuc.edu/resource.asp?st=Kansas</a>	512	2.28%	509	00:04:35
16	MTAC - Resources by State <a href="http://mtac.sws.uiuc.edu/resource.asp?st=Indiana">http://mtac.sws.uiuc.edu/resource.asp?st=Indiana</a>	507	2.26%	505	00:04:27
17	MTAC - Resources by State <a href="http://mtac.sws.uiuc.edu/resource.asp?st=Michigan">http://mtac.sws.uiuc.edu/resource.asp?st=Michigan</a>	502	2.24%	498	00:05:35
18	MTAC - Emergency Planning CD <a href="http://mtac.sws.uiuc.edu/watercd/">http://mtac.sws.uiuc.edu/watercd/</a>	496	2.21%	453	00:03:01
19	MTAC - Contact MTAC <a href="http://mtac.sws.uiuc.edu/contact.asp">http://mtac.sws.uiuc.edu/contact.asp</a>	472	2.1%	460	00:04:08
20	MTAC - Native American Links <a href="http://mtac.sws.uiuc.edu/native.asp">http://mtac.sws.uiuc.edu/native.asp</a>	467	2.08%	441	00:01:51
	<b>Sub Total For the Page Views Above</b>	15,472	69.14%	N/A	N/A
	<b>Total For the Log File</b>	<b>22,416</b>	<b>100%</b>	<b>N/A</b>	<b>N/A</b>

## Top Entry Pages

This section identifies the first page viewed when a user visits this site. This is most likely your home page but, in some cases, it may also be specific URLs that users enter to access a particular page directly. The percentages refer to the total number of user sessions that started with a valid Document Type. If the session started on a document with a different type (such as a graphic or sound file), the file is not be counted as an Entry Page, and the session is not counted in the total.

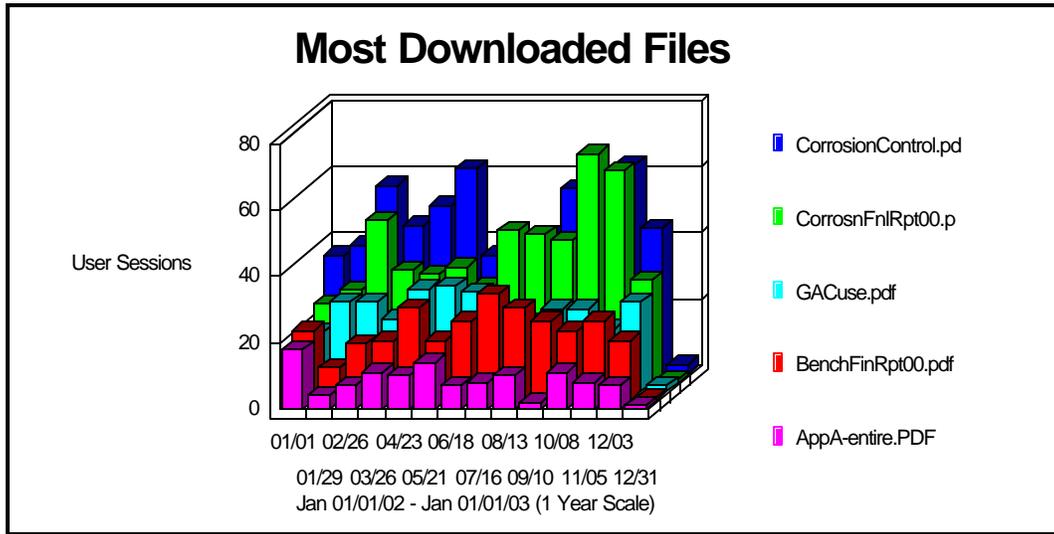


Top Entry Pages			
	File	% of Total	User Sessions
1	MTAC - Home <a href="http://mtac.sws.uiuc.edu/">http://mtac.sws.uiuc.edu/</a>	28.01%	3,143
2	MTAC - Regulatory Agency Links <a href="http://mtac.sws.uiuc.edu/reglinks.asp">http://mtac.sws.uiuc.edu/reglinks.asp</a>	3.99%	448
3	MTAC - About MTAC <a href="http://mtac.sws.uiuc.edu/about.asp">http://mtac.sws.uiuc.edu/about.asp</a>	2.99%	336
4	MTAC - Environmental Finance Centers <a href="http://mtac.sws.uiuc.edu/financcec.asp">http://mtac.sws.uiuc.edu/financcec.asp</a>	2.98%	335
5	MTAC - Drinking Water Centers <a href="http://mtac.sws.uiuc.edu/otherc.asp">http://mtac.sws.uiuc.edu/otherc.asp</a>	2.84%	319
6	MTAC - Expert List <a href="http://mtac.sws.uiuc.edu/expert.asp">http://mtac.sws.uiuc.edu/expert.asp</a>	2.8%	315
7	<a href="http://mtac.sws.uiuc.edu/default.ida">http://mtac.sws.uiuc.edu/default.ida</a>	2.7%	303
8	MTAC - Resources by State <a href="http://mtac.sws.uiuc.edu/resource.asp?st=Minnesota">http://mtac.sws.uiuc.edu/resource.asp?st=Minnesota</a>	2.67%	300
9	MTAC - Native American Links <a href="http://mtac.sws.uiuc.edu/native.asp">http://mtac.sws.uiuc.edu/native.asp</a>	2.64%	297
10	MTAC - Resources by State <a href="http://mtac.sws.uiuc.edu/resource.asp?st=Kansas">http://mtac.sws.uiuc.edu/resource.asp?st=Kansas</a>	2.62%	294
11	MTAC - Resources by State <a href="http://mtac.sws.uiuc.edu/resource.asp?st=Michigan">http://mtac.sws.uiuc.edu/resource.asp?st=Michigan</a>	2.62%	294
12	MTAC - Resources by State <a href="http://mtac.sws.uiuc.edu/resource.asp?st=Missouri">http://mtac.sws.uiuc.edu/resource.asp?st=Missouri</a>	2.58%	290

Top Entry Pages			
	File	% of Total	User Sessions
13	MTAC - Resources by State <a href="http://mtac.sws.uiuc.edu/resource.asp?st=Indiana">http://mtac.sws.uiuc.edu/resource.asp?st=Indiana</a>	2.38%	268
14	MTAC - Competitive Grants Awards <a href="http://mtac.sws.uiuc.edu/comgrant.asp">http://mtac.sws.uiuc.edu/comgrant.asp</a>	2.26%	254
15	MTAC - Conference Information <a href="http://mtac.sws.uiuc.edu/conference.asp">http://mtac.sws.uiuc.edu/conference.asp</a>	2.09%	235
16	MTAC - Resources by State <a href="http://mtac.sws.uiuc.edu/resource.asp?st=Wisconsin">http://mtac.sws.uiuc.edu/resource.asp?st=Wisconsin</a>	2.03%	228
17	MTAC - Resources by State <a href="http://mtac.sws.uiuc.edu/resource.asp?st=Illinois">http://mtac.sws.uiuc.edu/resource.asp?st=Illinois</a>	1.99%	224
18	MTAC - Drinking Water Legislation Links <a href="http://mtac.sws.uiuc.edu/dwrules.asp">http://mtac.sws.uiuc.edu/dwrules.asp</a>	1.96%	221
19	MTAC - Emergency Planning CD <a href="http://mtac.sws.uiuc.edu/watercd/">http://mtac.sws.uiuc.edu/watercd/</a>	1.88%	211
20	MTAC - Resources by State <a href="http://mtac.sws.uiuc.edu/resource.asp?st=Ohio">http://mtac.sws.uiuc.edu/resource.asp?st=Ohio</a>	1.86%	209
	<b>Total For the Pages Above</b>	<b>75.97%</b>	<b>8,524</b>

### Most Downloaded Files

This section identifies the most popular file downloads for the site. If an error occurred during the transfer, that transfer is not counted.



Most Downloaded Files				
	File	No. of Downloads	% of Total Downloads	Session Downloads
1	<a href="http://mtac.sws.uiuc.edu/mtacdocs/workshop/CorrosionControl.pdf">http://mtac.sws.uiuc.edu/mtacdocs/workshop/CorrosionControl.pdf</a>	4,484	21.85%	627
2	<a href="http://mtac.sws.uiuc.edu/mtacdocs/CorrosionFnIRpt/CorrosnFnIRpt00.pdf">http://mtac.sws.uiuc.edu/mtacdocs/CorrosionFnIRpt/CorrosnFnIRpt00.pdf</a>	4,483	21.85%	531

<b>Most Downloaded Files</b>				
	<b>File</b>	<b>No. of Downloads</b>	<b>% of Total Downloads</b>	<b>Session Downloads</b>
3	<a href="http://mtac.sws.uiuc.edu/mtacdocs/workshop/GACuse.pdf">http://mtac.sws.uiuc.edu/mtacdocs/workshop/GACuse.pdf</a>	2,259	11.01%	328
4	<a href="http://mtac.sws.uiuc.edu/mtacdocs/BenchFinRpt/BenchFinRpt00.pdf">http://mtac.sws.uiuc.edu/mtacdocs/BenchFinRpt/BenchFinRpt00.pdf</a>	1,976	9.63%	284
5	<a href="http://mtac.sws.uiuc.edu/mtacdocs/AppendixA-Benchmark/AppA-entire.PDF">http://mtac.sws.uiuc.edu/mtacdocs/AppendixA-Benchmark/AppA-entire.PDF</a>	853	4.15%	118
6	<a href="http://mtac.sws.uiuc.edu/mtacdocs/workshop/BenchMark.pdf">http://mtac.sws.uiuc.edu/mtacdocs/workshop/BenchMark.pdf</a>	812	3.95%	222
7	<a href="http://mtac.sws.uiuc.edu/mtacdocs/workshop/TechAssistNativeAm.pdf">http://mtac.sws.uiuc.edu/mtacdocs/workshop/TechAssistNativeAm.pdf</a>	671	3.27%	257
8	<a href="http://mtac.sws.uiuc.edu/mtacdocs/MTAC_RF P2001.pdf">http://mtac.sws.uiuc.edu/mtacdocs/MTAC_RF P2001.pdf</a>	565	2.75%	144
9	<a href="http://mtac.sws.uiuc.edu/mtacdocs/MTAC_RF P2002.pdf">http://mtac.sws.uiuc.edu/mtacdocs/MTAC_RF P2002.pdf</a>	438	2.13%	141
10	<a href="http://mtac.sws.uiuc.edu/mtacdocs/workshop/CDpresentation.pdf">http://mtac.sws.uiuc.edu/mtacdocs/workshop/CDpresentation.pdf</a>	427	2.08%	125
11	<a href="http://mtac.sws.uiuc.edu/mtacdocs/EmPlanFinRpt/EmrgPlngFinRpt00.pdf">http://mtac.sws.uiuc.edu/mtacdocs/EmPlanFinRpt/EmrgPlngFinRpt00.pdf</a>	343	1.67%	170
12	<a href="http://mtac.sws.uiuc.edu/mtacdocs/TechNeedsAssess.pdf">http://mtac.sws.uiuc.edu/mtacdocs/TechNeedsAssess.pdf</a>	328	1.59%	197
13	<a href="http://mtac.sws.uiuc.edu/mtacdocs/MTACwebAR.pdf">http://mtac.sws.uiuc.edu/mtacdocs/MTACwebAR.pdf</a>	275	1.34%	163
14	<a href="http://mtac.sws.uiuc.edu/mtacdocs/MiniConference01.pdf">http://mtac.sws.uiuc.edu/mtacdocs/MiniConference01.pdf</a>	271	1.32%	164
15	<a href="http://mtac.sws.uiuc.edu/mtacdocs/AppendixB-Corrosion/Corrosion.PDF">http://mtac.sws.uiuc.edu/mtacdocs/AppendixB-Corrosion/Corrosion.PDF</a>	243	1.18%	130
16	<a href="http://mtac.sws.uiuc.edu/mtacdocs/MTACFY2000BriefDescRpt.PDF">http://mtac.sws.uiuc.edu/mtacdocs/MTACFY2000BriefDescRpt.PDF</a>	191	0.93%	115
17	<a href="http://mtac.sws.uiuc.edu/mtacdocs/NatAmFinRpt/NatAmFinRpt00.pdf">http://mtac.sws.uiuc.edu/mtacdocs/NatAmFinRpt/NatAmFinRpt00.pdf</a>	180	0.87%	91
18	<a href="http://mtac.sws.uiuc.edu/mtacdocs/workshop/TechNeeds.pdf">http://mtac.sws.uiuc.edu/mtacdocs/workshop/TechNeeds.pdf</a>	175	0.85%	112
19	<a href="http://mtac.sws.uiuc.edu/mtacdocs/qf/ChlorinesEffect.pdf">http://mtac.sws.uiuc.edu/mtacdocs/qf/ChlorinesEffect.pdf</a>	126	0.61%	93
20	<a href="http://mtac.sws.uiuc.edu/mtacdocs/AppendixE-WebPage/Mtacyr.PDF">http://mtac.sws.uiuc.edu/mtacdocs/AppendixE-WebPage/Mtacyr.PDF</a>	112	0.54%	86
	<b>Total For the Files Above</b>	<b>19,212</b>	<b>93.63%</b>	<b>N/A</b>