APPENDIX C

Technical Needs Assessment for Small Public Water Systems in the Midwest

Midwest Workshop for Small Public Water Systems
St. Louis, Missouri
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The Midwest Technology Assistance Center for Small Public Water Systems (MTAC) is comprised of a consortium led by the University of Illinois and the Illinois State Water Survey, in partnership with the land grant universities of Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, Ohio, and Wisconsin. This is consistent with the area defined by Region 5 and Region 7 of the United States Environmental Protection Agency (USEPA). MTAC serves small public water systems and public systems serving Indian Tribes. The participation of each state is led by its Water Resources Research Institute (WRRI), established under authority of the Water Resources Research Act of 1964 on the campus of the land grant university as a federal-state partnership to conduct applied research and technology transfer.

MTAC was established in 1998 by a grant from the USEPA under the provisions of the 1996 Amendments to the Safe Drinking Water Act. According to that Legislation, the responsibilities of the Technology Assistance Centers shall include: “the conduct of training and technical assistance relating to the information, performance, and technical needs of small public water systems or public water

systems that serve Indian Tribes." The current projects of MTAC were outlined within the original proposal submitted to the USEPA. One of those projects, was to conduct a Technical Needs Assessment for small systems in the Midwest. This task was included in the original proposal, because MTAC felt strongly that we should focus on addressing those issues that the small systems felt were most critical in future projects. There were several specific goals that we hoped to accomplish with the Technical Needs Assessment. First of all, we sought to identify program areas and specific topics that small systems feel need to be addressed. Also, we wanted to determine what organizations the small systems used as resources to gauge where we needed to focus our cooperative efforts to do the best job of reaching the small systems. Three questions were targeted towards identifying specific training needs, the preferred mechanisms for training, and resources available to facilitate long distance learning.

The Technical Needs Assessment form was developed with input from a number of sources, including the Illinois EPA, the Illinois Rural Water Association, USEPA Region 5, the Directors of the other WRRI in the Midwest, the Illinois Section American Water Works Association, several other Technology Assistance Centers, and the Principal Investigators for MTAC's competitive grants. The intent was to produce a form that could be completed quickly and easily to increase the level of participation. A copy of the final version of the form is included in Appendix A. The mailing lists were obtained from the Safe Drinking Water Administrator for each state. The initial mailing was to random sampling of 100 systems in each of the ten states. We tried to send to a representative sampling of ground and surface water supplies, and Native American supplies in each state. This was followed by a supplemental mailing of an additional 200 forms targeted to increase the response rate in specific states, and to replace those returned as undeliverable.

We received a total of 200 responses, although some respondents did not answer all of the questions. The response rate by state is detailed in Figure 1. The first four questions were designed to help better define the system and the viewpoint of the respondent. The vast majority of the respondents were operators (73%), and most of the systems (91%) were groundwater supplies. There were only twelve surface water only systems that responded, and three systems that employed both ground and surface water. Figures 2 and 3 detail the number of wells used by groundwater systems, and the relative depth of those wells. Several respondents with more than one well gave a range rather than a specific depth for each well, and so could not be included for Figure 3. The USEPA defines small systems as those serving less than 3300. The majority (87%) of the systems that responded to this questionnaire serve less than 1500, with almost half (47%) serving populations less than 500. Figure 4 provides a graphical representation of the number of service connections. One of the challenges that face small systems is the lack of availability of staff to address system operation and maintenance problems. We found that 76% of the respondents indicated they had two or fewer full time equivalents (FTE's) to operate and maintain their systems. Staffing breakdown is provided in Figure 5. The average daily water delivery (Figure 6) was less than 100,000 gallons per day for 56% of these systems.

We asked the systems to rank, in order, their relative need over the next ten years for six general subject areas. Table 1 contains the results of their responses. This information is also illustrated in Figure 7. The responses to this question are interesting. Selection of the appropriate technology to meet their needs and managerial capacity seem to be perceived as the least urgent needs. Infrastructure

maintenance is rated as the most critical need, with financial and regulatory issues identified as being nearly as critical. Water supply issues fall somewhere between these two distinct grouping of the most and least critical topics. It interesting to note that the water supply issue has a much lower number of replies indicating moderate need (3 or 4) than the other topics except infrastructure. This is the one topic that appears to be somewhat "black and white" with the respondents.

Table 1
Long-term Need

Subject	1-(most)	2	3	4	5	6-(least)
Technology	10	17	26	33	40	37
Financial	43	38	32	33	21	9
Managerial	11	15	37	32	40	29
Regulatory	52	30	44	26	18	7
Infrastructure	54	46	22	20	30	8
Water Supply	30	30	26	10	9	66

The next question asked the small systems to evaluate their need to have specific topics addressed. They were asked to rank from 1 (critical) to 5 (unnecessary) sixteen different water supply/water quality issues. The survey results for this question are detailed in Table 2, and graphically illustrated in Figure 8.

Table 2
Critical Need -Specific Issues

Subject	1 - critical	2 - important	3 - helpful	4- little need	5 - not needed
Corrosion Control (plant/distribution)	16	46	81	30	12
Corrosion Control (Lead & Copper)	14	39	57	45	25
Agrichemical Impacts (nutrients)	28	69	54	22	9
Agrichemical Impacts (pesticides)	31	66	57	20	9
Arsenic in Groundwater	22	38	47	42	31
Radionuclides in Groundwater	16	44	44	45	30
Disinfectants/Disinfection Byproducts	33	45	63	25	14
Total Coliform	33	55	65	16	14

Microbiological Issues (not coliform)	23	54	67	29	11
Emergency Response Planning	23	67	65	19	8
Organic Chemical Contamination	19	51	76	21	13
Inorganic Chemical Contamination	17	49	72	24	16
SCADA Systems	7	32	68	43	28
Consumer Confidence Reports	27	55	65	24	15
Water Conservation Plans	17	69	64	22	10
Source Water Protection Plans	34	74	61	11	5

The three issues that received the most grades of critical or important from the respondents were: Source Water Protection Plans, Agrichemical Impacts (nutrients), and Agrichemical Impacts (pesticides). This is not surprising, considering that the rural Midwest is characterized by the dominant presence of intensive row crop agriculture. Occurrences of pesticide and nitrate contamination in public water supplies are a continuous concern. Pesticide and nitrate contaminants exceeding federal standards have been detected in many public water supplies in the Midwest, predominantly in rural areas utilizing shallow ground water or surface water. Emergency Response Planning, Total Coliform, and Water Conservation Plans were also areas of concern. The topics that the respondents indicated were least critical were Supervision Control And Data Acquisition (SCADA), Arsenic, Corrosion Control (Lead and Copper) and Radionuclides. Since Arsenic and Radionuclides are problems that are fairly localized within specific geological formations, it is not surprising that they were not widely selected as significant problems across the entire Midwest region. There are nonetheless, many small Midwestern groundwater supplies that have violated the Maximum Contaminant Level for Arsenic, Radium (226Ra and 228Ra), alpha-emitters, and beta and photon emitters. The lack of interest in SCADA technology is somewhat concerning, since this is the type of technology that can enable reliable performance with realistic staffing and training requirements for small systems. Lead and Copper corrosion is an issue that has been addressed in some states, and this is probably the reason it is not a widespread issue. Nonetheless, it is a major concern in those states that have not already dealt with the issue.

The purpose of Question 7 was to assess what resources the small systems employ for answers to technical problems. We also asked whether or not the respondents accessed the web sites of the various organizations and what publications they found most helpful. Web access was fairly limited, with only the Rural Water Association (RWA), State Safe Drinking Water Administrators (SDWA) , Regional Drinking Water Program, and the American Water Works Association(AWWA) web sites being accessed by more than 20% of the respondents. The least frequently used sources for the small systems in this survey were USEPA Headquarters (only three respondents indicated this was a frequent source of information), the National Drinking Water Clearinghouse (NDWCH), the United States Department of Agriculture (USDA) Rural Utilities Service, and the National Sanitation Foundation

(NSF). This is probably not surprising since many of the resources these organizations would have for small systems would be internet-based. Figure 9 clearly shows that the RWA is the most common resource used by the small systems, with 90% of the small systems indicating it is a frequent or occasional source of technical information. The four other most common source of technical solutions listed were, in order, other utilities, consultants, the state SDWA, and the AWWA. Publications that were cited as helpful in solving technical problems were RWA publications, Water Digest, AWWA publications, NDWCH Small Flows, and Water World.

The next three questions were designed to determine education and training needs, and the best avenues for transferring the information. The first of these questions asked respondents to rank the need of specific types of training. The two types of training that were predominant favorites were Distribution System Maintenance and Water Treatment Plant Operating Procedures. There was also strong support for training on Specific Treatment Processes and Federal Regulations. The type of training deemed least useful was computer software. The results of this question are displayed in Figure 10.

Question 9 asks the small systems which training method they are most likely to employ. The method of choice appears to be a regional workshop, with home-study with a video or compact disc being the next best option. The least desirable options were long-distance learning and internet-based material. Table 3 lists the responses to this question. We suspect that the resistence to the concept of internet and electronic media training will lessen as the population at large becomes more exposed to this technology. There are very few elementary or middle school students today that will graduate high school without having experienced computer-based education enhancement and access to the internet. The emerging generation of workers will be more comfortable with this type of training. However, for now, it is very apparent that personal interaction in a workshop or conference is the predominant favorite for training.

Table 3
Training Options

Training Method	1-Very likely	2-Likely	3-Unlikely
Regional workshop/conference	93	66	18
Long-distance learning (community college)	21	53	95
Home-study course (written)	18	73	64
Home-study course (electronic/CD)	31	53	72
Home-study course (videos)	46	77	47
Internet-based educational material	25	46	98

We asked each of the respondents to indicate whether or not they had access to FAX

machines, computers, email, and the internet. The vast majority of these individuals had access to FAX machines and computers. In fact, it is interesting to note that more had access to computers (88%) than FAX machines (85%), with more than half of the individuals having access to computers both at home and work. This is an encouraging sign for the future potential of electronic or internet-based training, education, and software for small systems. This is bolstered by the fact that some 77% of the respondents indicated that they could utilize the internet, and more than 65% have an email address. The challenge is in making these individuals more comfortable in utilizing the technology available to them.

The last question asked the small systems to relate to us what type of assistance they felt it was most critical for the Technology Assistance Centers to provide. The were a variety of responses, but there were four subjects that were clearly where the majority of these individuals felt they needed assistance. First of all, financial issues were the greatest concern. This was primarily the need for assistance is finding and accessing grants or low interest loans, but several stated they could use help in structuring rates and long-term financial planning. The next greatest need was identified as help in staying current with, and understanding, federal regulations that apply to small systems. Operations and maintenance issues and education and training were the other two most frequent needs cited by this group. Several respondents stressed the need for local, face-to-face training workshops.

The information we have been able to gather thus far from this survey has identified several key needs and strategies for providing assistance to small drinking water systems. However, the assessment of the infomation is not complete at this time. We plan to study the results in greater detail, and post a complete report on our web site at http://mtac.sws.uiuc.edu/ this summer.

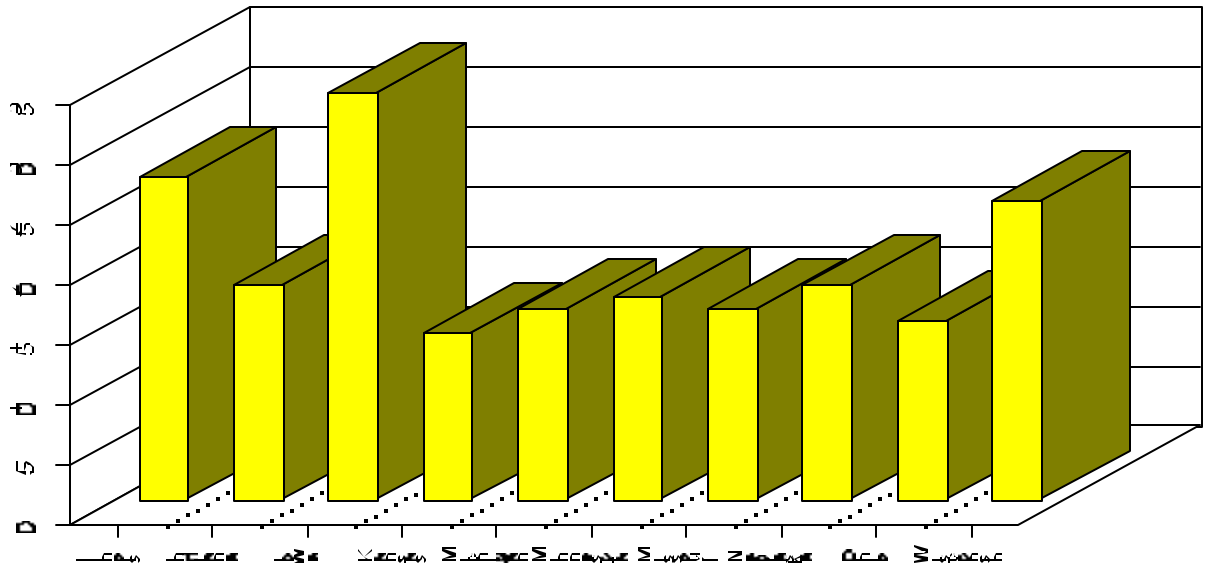


Figure 1
State Response Rate

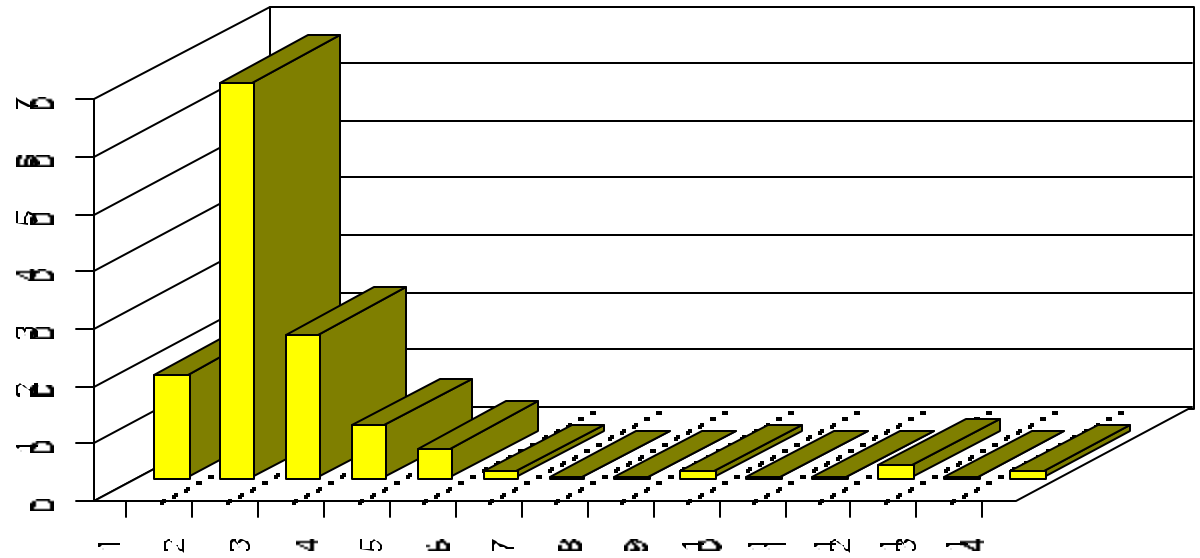


Figure 2
Number of Wells Available

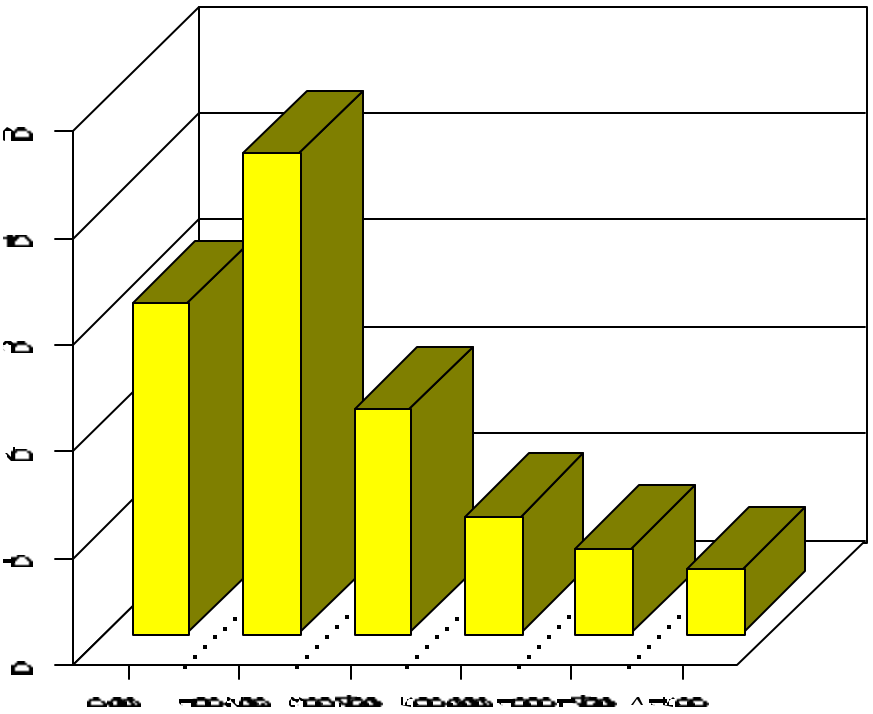


Figure 3

Well Depth (ft.)

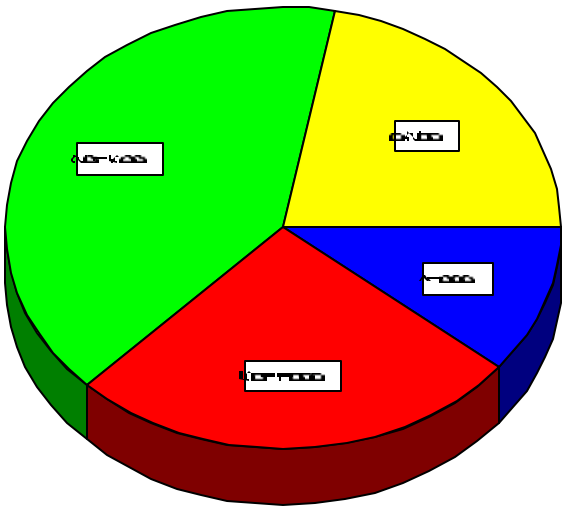


Figure 4
Number of Service Connections

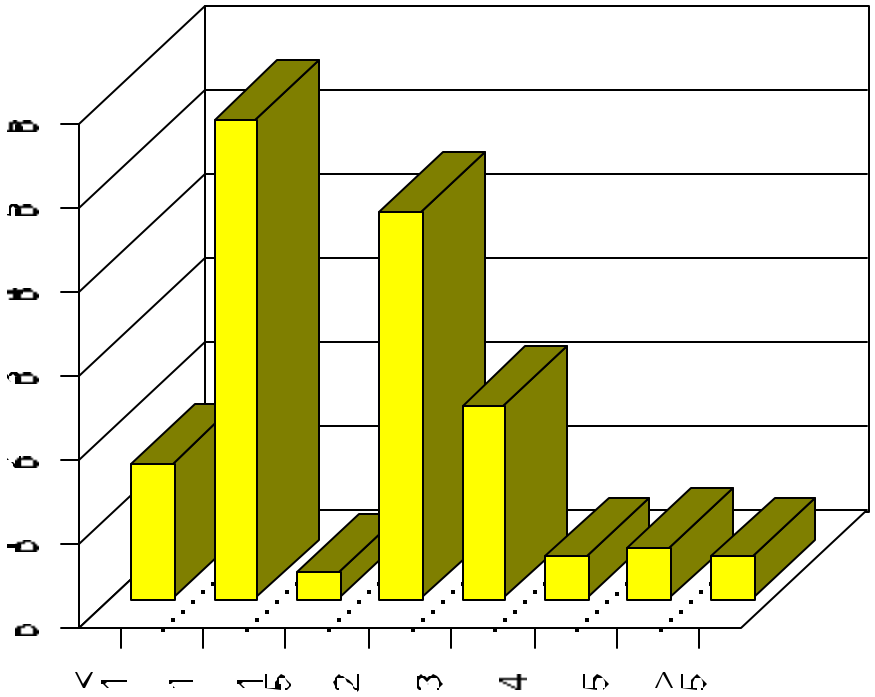


Figure 5

Staff Levels (FTE's)

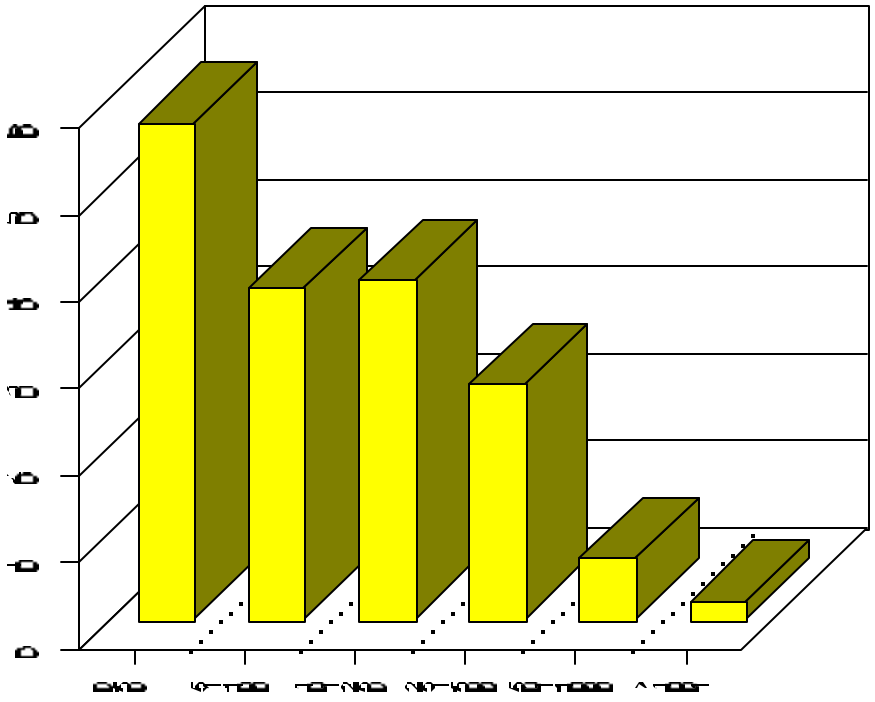


Figure 6
Average Daily Water Delivery (10^3 gallons)

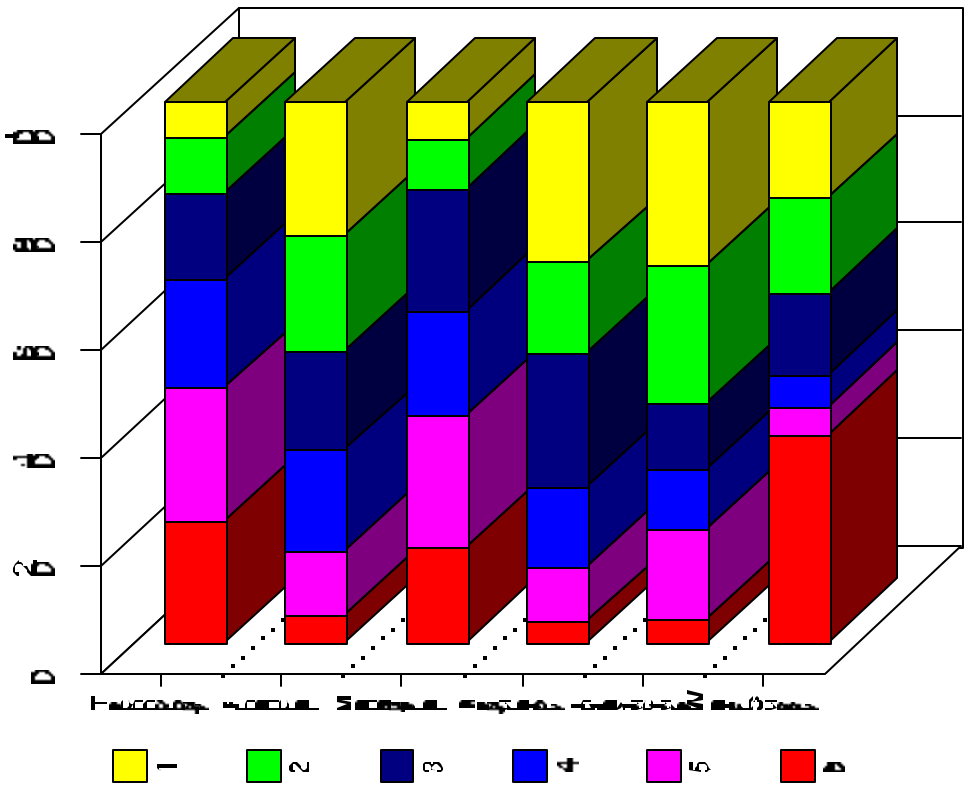


Figure 7
Long-Term Needs (% total)

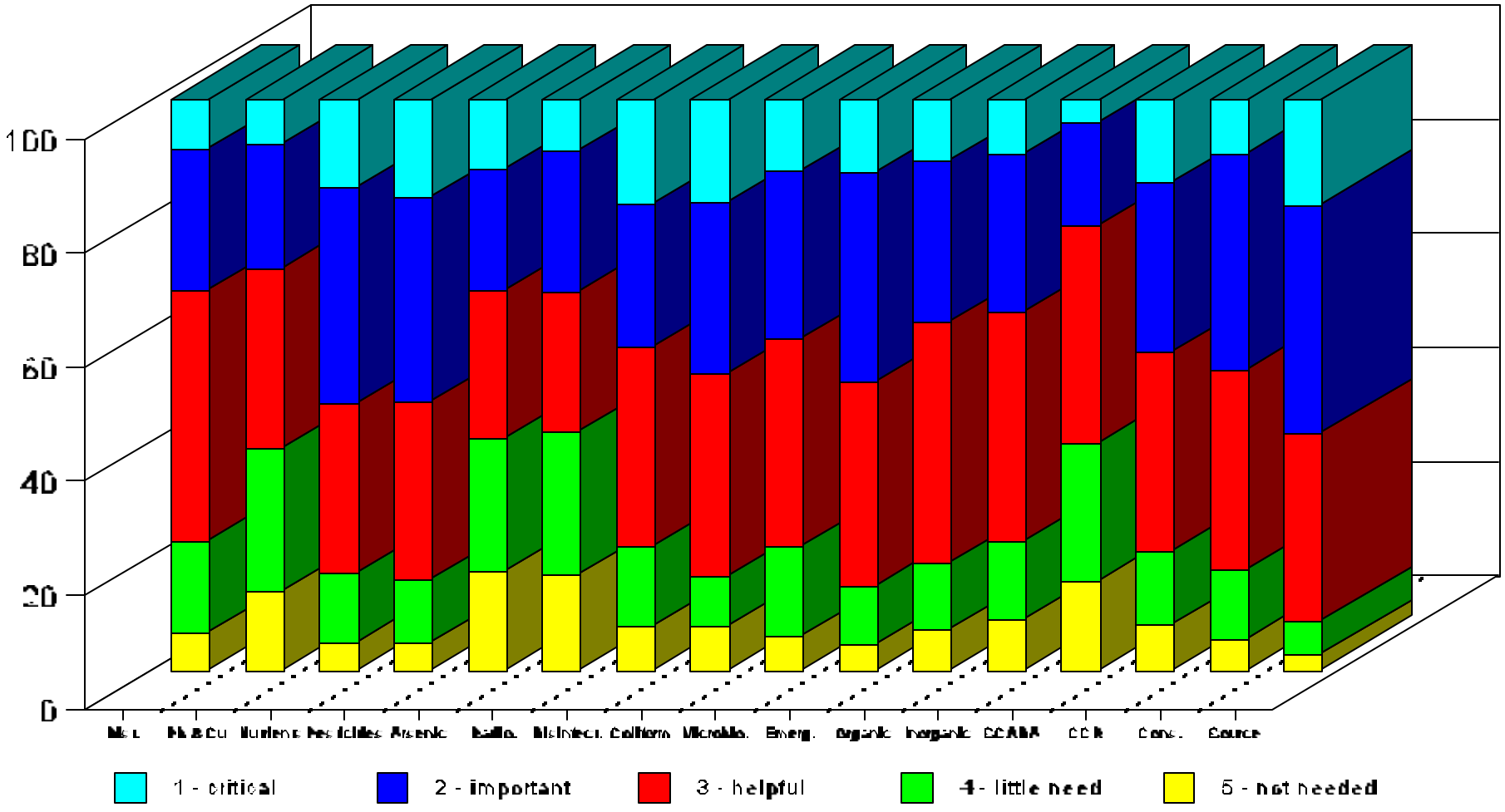
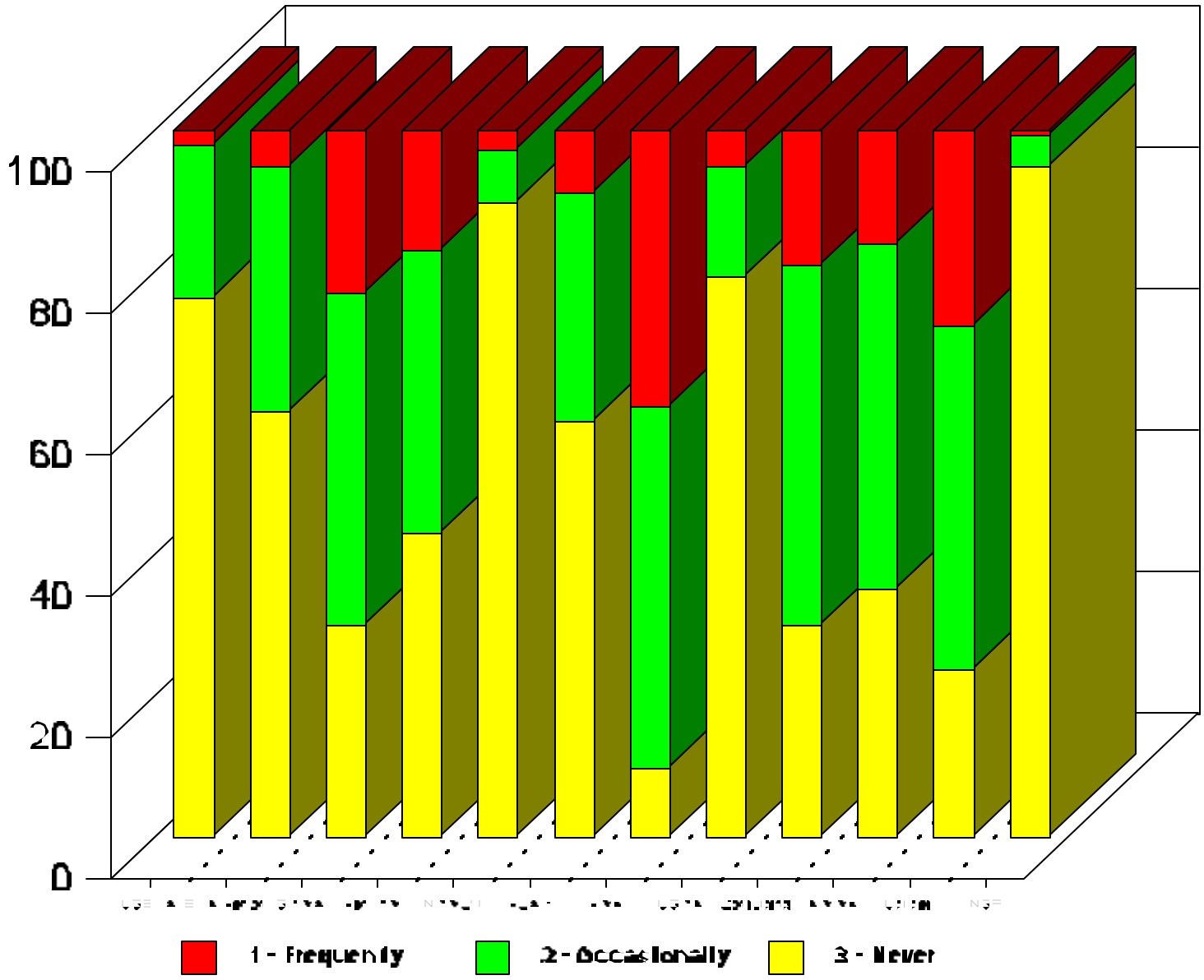


Figure8
CriticalIssues-SpecificIssues



Figure

9

TechnicalResources

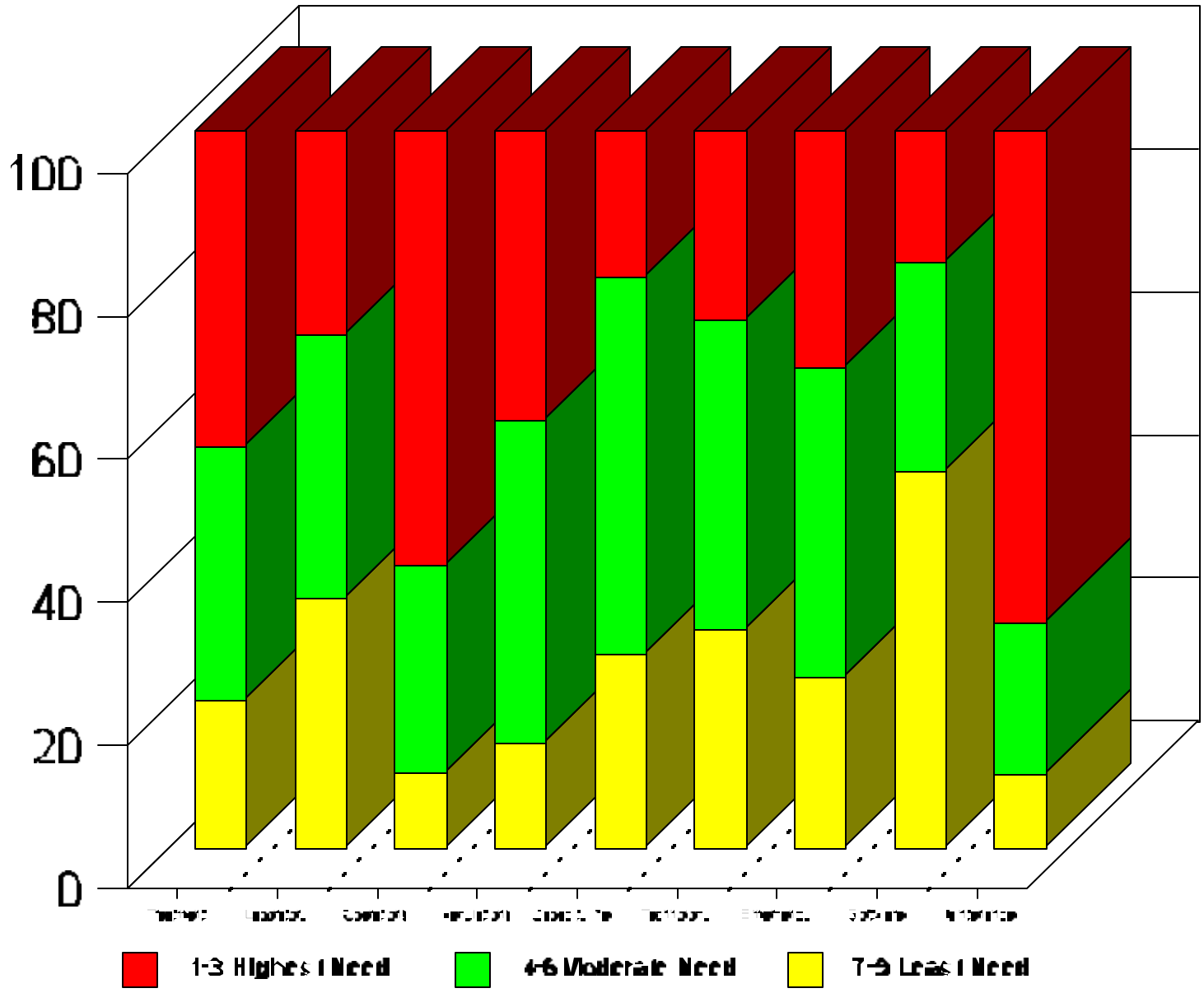


Figure10
TrainingNeeds