



National Decentralized Water Resources Capacity Development Project



State Regulators and Captains of Industry Conference Attendees, 2004

Onsite Wastewater Regulator Outreach and Coordination Project

Chase Environmental Services, Inc.
Rochelle, Illinois

November 2004

Onsite Wastewater Regulator Outreach and Coordination Project

**Submitted by
Chase Environmental Services, Inc.
Rochelle, Illinois**

NDWRCDP Project Number: WU-HT-01-16

National Decentralized Water Resources Capacity Development Project
(NDWRCDP) Research Project

Final Report, November 2004

DISCLAIMER

This work was supported by the National Decentralized Water Resources Capacity Development Project (NDWRCDP) with funding provided by the U.S. Environmental Protection Agency through a Cooperative Agreement (EPA No. CR827881-01-0) with Washington University in St. Louis. This report has been reviewed by a panel of experts selected by the NDWRCDP. The contents of this report do not necessarily reflect the views and policies of the NDWRCDP, Washington University, or the U.S. Environmental Protection Agency, nor does the mention of trade names or commercial products constitute endorsement or recommendation for use.



CITATIONS

This report was prepared by

Paul Chase
Chase Environmental Services, Inc.
3900 South Mulford Road
Rochelle, Illinois 61068-9626

The final report was edited and produced by ProWrite Inc., Reynoldsburg, OH.

This report is available online at www.ndwrcdp.org. This report is also available through the

National Small Flows Clearinghouse
P.O. Box 6064
Morgantown, WV 26506-6065
Tel: (800) 624-8301
WWCDGN220

This report should be cited in the following manner:

Chase, P. 2004. *Onsite Wastewater Regulator Outreach and Coordination Project*. Project No. WU-HT-01-16. Prepared for the National Decentralized Water Resources Capacity Development Project, Washington University, St. Louis, MO, by Chase Environmental Services, Inc., Rochelle, IL.



ACKNOWLEDGEMENTS

Appreciation is extended to the following individuals for assistance in the preparation of this report:

The late Peter J. Casey, P.E., Program Coordinator, West Virginia University
National Small Flows Clearinghouse, National Environmental Services Center

Appreciation is also expressed to the NDWRCDP for their support of this work:

Principal Investigator

Jay R. Turner, D.Sc., Washington University

Project Coordinator

Andrea L. Shephard, Ph.D.

NDWRCDP Project Steering Committee:

Coalition for Alternative Wastewater Treatment

Valerie I. Nelson, Ph.D.

Consortium of Institutes for Decentralized Wastewater Treatment

Ted L. Loudon, Ph.D., P.E.

Electric Power Research Institute

Raymond A. Ehrhard, P.E.

Tom E. Yeager, P.E.

National Onsite Wastewater Recycling Association

Jean Caudill, R.S.

National Rural Electric Cooperative Association

Steven P. Lindenberg

Scott Drake, P.E.

Water Environment Research Foundation

Jeff C. Moeller, P.E.

Members-At-Large:

James F. Kreissl

Richard J. Otis, Ph.D., P.E.

Jerry Stonebridge



ABSTRACT

Each year, since 1999, the National Small Flows Clearinghouse (NSFC) has sponsored a national conference for regulatory officials at the state level who manage or supervise decentralized wastewater programs in their respective states. During the first conference, which was held in St. Louis, Missouri in April/May 1999, a number of things became clear. First, extensive networking among the officials who attended revealed that, while the programs they managed were developed within each state without much national influence, the issues faced by those officials and their programs were much the same. Second, it became clear that the state regulators, as a group, had a potentially powerful role in influencing national policy with respect to decentralized wastewater issues.

The St. Louis conference was an unequivocal success. In post-conference evaluations, the state onsite wastewater regulators who attended unanimously expressed a desire for the forum to continue on an annual basis.

In 2001, the third State Onsite Wastewater Regulators Conference was being planned for late April in Washington, DC. The United States Environmental Protection Agency (US EPA) Office of Wastewater, which had contributed to the first two conferences, ceased the provision of monetary support. In an attempt to make up the shortfall, the NSFC approached the National Decentralized Water Resources Capacity Development Project (NDWRCDP) with a proposal. The proposal called for NDWRCDP to support the conference monetarily and allow NDWRCDP to use the conference as a means to gather input from the state regulators. Specifically, NDWRCDP would gather information about research needs that could be used to guide the funding of NDWRCDP research projects. In addition, NDWRCDP would be permitted to give a presentation to familiarize the state regulators with NDWRCDP. Three other initiatives were also a part of the original proposal. A cooperative agreement was arranged with Chase Environmental Services, Inc., NSFC's contractor for the State Onsite Wastewater Regulators Conference. After the Washington, DC conference, the original agreement was extended annually for the next three conferences, the last of which was held in Orlando, Florida in late February 2004.

The project objectives were easily met. NSFC received ongoing funding for the conference and NDWRCDP participated in four different state regulators conferences. Of the three other deliverables, only one, a survey of decentralized wastewater stakeholder groups, was completed. The other two projects were discontinued and the funding was shifted from them to support the state regulators conference in Newport, Rhode Island in March 2002.



EXECUTIVE SUMMARY

Chase Environmental Services (CES), the National Small Flows Clearinghouse (NSFC), and the State Onsite Regulators Alliance (SORA) were charged with establishing a communication link between the NDWRCDP Project Steering Committee (PSC) and the regulatory community to:

- Keep the regulatory community informed of new developments in the decentralized wastewater field as a result of NDWRCDP efforts
- Obtain timely input from the regulatory community to assist the PSC in planning program activities

Activities were to include:

- A presentation on the NDWRCDP and facilitated discussion on research needs priorities between state regulators and NDWRCDP PSC representatives at the 2001 National Onsite Wastewater State Regulators Conference in Washington, DC
- An investigation of the feasibility of a national roundtable conference that would include
 - NDWRCDP, national wastewater-related associations, the onsite wastewater regulatory community, and other related organizations
 - Ongoing interactions with the NSFC State Regulators Advisory Committee to obtain feedback on NDWRCDP research objectives and project progress

The original project called for two additional activities; however, funding was shifted from these activities to expand NDWRCDP participation in the following annual National Small Flows Clearinghouse State Onsite Wastewater Regulators Conferences:

- Third Annual National Small Flows Clearinghouse State Onsite Wastewater Regulators Conference, Washington, DC, April 17–21, 2001
- Fourth Annual National Small Flows Clearinghouse State Onsite Wastewater Regulators Conference, Newport, Rhode Island, March 20–23, 2002
- Fifth Annual National Small Flows Clearinghouse State Onsite Wastewater Regulators Conference, North Las Vegas, Nevada, March 24–28, 2003
- Sixth Annual National Small Flows Clearinghouse State Onsite Wastewater Regulators Conference, Orlando, Florida, February 23–27, 2004

In the last two contract extensions, the project also included delivery of conference proceedings in interactive CD-ROM format. Finally, the bulk of the funding provided by NDWRCDP was to be used to offset conference expenses, primarily stipends paid to state regulators and the agencies they represented for attendee travel and lodging expenses. During the state regulators conferences, NDWRCDP also participated in concurrent Captains of Industry conferences.

Washington, DC, 2001

James Kreissl and Valerie Nelson, NDWRCDP steering committee members, gave presentations to the state regulators and manufacturers at the Washington, DC conference. They both also participated in break out sessions that resulted in the crafting of six issue papers. These issue papers were later presented before US EPA officials and published by the NSFC (Chase and Casey 2001b).

Newport, Rhode Island, 2002

NDWRCDP was well represented on the conference agenda at Newport, Rhode Island. Project Coordinator Andrea Shephard provided an overview of NDWRCDP and researchers funded by NDWRCDP provided presentations. The funded researchers included: Tibor Banathy of California State University-Chico, Lorraine Joubert of the University of Rhode Island, and Pio Lombardo of Lombardo Associates, Inc. in Massachusetts. Two publications were produced following this conference, including a report based on analysis of conference evaluation survey forms (Chase 2002) and an interactive CD-ROM of the conference proceedings (Chase *et al.* 2002).

North Las Vegas, Nevada, 2003

Valerie Nelson represented the NDWRCDP at the North Las Vegas conference by presenting and participating in many discussion sessions during the conference. As with the Newport conference, a report based on analysis of evaluation surveys (Chase 2003a) and conference proceedings on CD-ROM (Chase 2003b) were produced.

Orlando, Florida, 2004

In Orlando, the conference agenda included two NDWRCDP presentations, including a summary report by project coordinator Andrea Shephard and a research report by Tom Groves of the New England Interstate Water Pollution Control Commission on an NDWRCDP-funded research project on technology transfer. As with the two previous conferences, a report based on analysis of evaluation surveys (Ebelherr 2004) and conference proceedings on CD-ROM (Chase *et al.* 2004) were produced.

During the summer of 2001, Chase Environmental Services and the National Small Flows Clearinghouse conducted an investigation into the feasibility of a national roundtable conference. Organizations with an interest in decentralized wastewater issues were contacted and surveyed about their interest in such a conference. A report detailing the findings of the investigation was produced (Chase and Casey 2001a).

An ongoing additional benefit for the NDWRCDP as a result of this project is access to various NSFC dissemination mechanisms. The methods of dissemination include the listservs setup for regulators and manufacturers, article postings in the *Small Flows Quarterly*, the web site, the news listserv, and product advertising and distribution.



TABLE OF CONTENTS

1	INTRODUCTION	1-1
2	PROJECT TASKS AND BENEFITS	2-1
	Project Task A—Coordinate NDWRCDP Sponsorship and Participation in the National Small Flows Clearinghouse State Onsite Wastewater Regulators Conferences	2-1
	Third Annual State Onsite Wastewater Regulators Conference (Washington, DC, 2001)	2-1
	Fourth Annual Onsite Wastewater State Regulators and the Second Annual Captains of Industry Conferences (Newport, 2002)	2-1
	Fifth Annual Onsite Wastewater State Regulators and the Third Annual Captains of Industry Conferences (North Las Vegas, 2003)	2-2
	Sixth Annual Onsite Wastewater State Regulators and the Fourth Annual Captains of Industry Conferences (Orlando, 2004)	2-2
	Additional Conferences and Recognition	2-3
	Project Task D—Investigate the Feasibility of a National Roundtable Conference on Onsite/Decentralized Wastewater Issues.....	2-3
	Additional Project Benefits	2-3
3	DISCUSSION AND CONCLUSIONS	3-1
	Identified Research Needs	3-2
4	REFERENCES	4-1
A	PUBLICATIONS	A-1



LIST OF TABLES

Table 3-1 Correlation Between Research Needs Identified by the State Regulators and NDWRCDP-Funded Projects	3-3
---	-----



1 INTRODUCTION

The Onsite Wastewater Regulator Outreach and Coordination Project originally included four project tasks:

- **Task A**—Chase Environmental Services, Inc. (CES) will provide a one-hour presentation time slot at the National Small Flows Clearinghouse (NSFC) Onsite Wastewater State Regulators Conference in Washington, DC, April 2001. The NDWRCDP will select the speaker. In addition, CES will provide a break-out session during this conference where NDWRCDP will have an opportunity to garner input from various state regulators concerning the NDWRCDP research agenda and suggested future NDWRCDP-funded projects.
- **Task B**—CES will identify and arrange for representatives of the state onsite wastewater regulators group to attend a meeting of the NDWRCDP project investigators.
- **Task C**—As needed, CES will arrange for regulatory input for various current and proposed NDWRCDP funded projects.
- **Task D**—CES will investigate the feasibility of a national roundtable conference that will include the NDWRCDP, national wastewater related associations, the onsite wastewater regulatory community, and other related organizations. A report of this investigation will be delivered to NDWRCDP no later than June 1, 2001.

Over time, the project was amended to reflect the project description outlined in the Executive Summary section. Tasks B and C were discontinued and the funds were reallocated to an expanded project Task A. The expanded Task A included NDWRCDP participation in the 2002 Onsite Wastewater State Regulators Conference and Captains of Industry Conference in Newport, Rhode Island.

The project tasks outlined in the project description were successfully completed and accepted by the Regulatory Reform Subcommittee of the NDWRCDP. To quote: “The subcommittee is pleased with the results of your project and the exposure the NDWRCDP received at both the 2001 and 2002 NSFC State Onsite Regulators Conferences. The conferences were very beneficial.”

The project was extended for two additional years with the primary activity being Task A. Specifically, the contract extensions required NDWRCDP to participate in the North Las Vegas conference in 2003 and the Orlando conference in 2004—both of these activities were successfully executed. Additional activities included the delivery of the post-conference evaluation reports (Chase 2003a; Ebelherr 2004) and conference proceedings interactive CD-ROMs for both conferences (Chase 2003b; Chase *et al.* 2004).



2 PROJECT TASKS AND BENEFITS

After amendment, the Onsite Wastewater Regulators Outreach and Coordination Project involved only Tasks A and D. This chapter provides detailed information about these project tasks and the benefits associated with each.

Project Task A—Coordinate NDWRCDP Sponsorship and Participation in the National Small Flows Clearinghouse State Onsite Wastewater Regulators Conferences

The NDWRCDP was represented at the following conferences.

Third Annual State Onsite Wastewater Regulators Conference (Washington, DC, 2001)

The Third Annual State Onsite Wastewater Regulators Conference (with concurrent Captains of Industry Conference) was held at the Double Tree Hotel, Arlington, Virginia on April 17–21, 2001 and at United States Environmental Protection Agency (US EPA) headquarters on April 20, 2001. There were 41 regulators from 31 states and one province, 15 representatives from 11 manufacturing companies, and six US EPA officials in attendance. The NDWRCDP was acknowledged as a co-sponsor of the conferences and given time to address both meetings and participate in the discussions. Valerie Nelson and Jim Kreissl, NDWRCDP steering committee members who represented the NDWRCDP, attended.

Presentations on the NDWRCDP program of research and investigative studies were made to the manufacturers on April 19, and to the regulators on April 21. The breakout sessions, in which both Valerie Nelson and Jim Kreissl participated, resulted in the crafting of six (five regulatory and one industry) issue papers. These issue papers were presented to US EPA officials, including Mike Cook, Director, Office of Wastewater Management, on April 20 and later published in the conference proceedings by the NSFC (Chase and Casey 2001b).

Fourth Annual Onsite Wastewater State Regulators and the Second Annual Captains of Industry Conferences (Newport, 2002)

The Fourth Annual Onsite Wastewater State Regulators and the Second Annual Captains of Industry Conferences were held in Newport, Rhode Island at the Hyatt Regency Newport on March 20–23, 2002. There were 55 regulators from 34 states and two provinces, 24 representatives from 18 manufacturing companies, and six US EPA officials in attendance.

Additional Conferences and Recognition

NDWRCDP played a significant role in the State Onsite Regulators Alliance (SORA) Conferences and was acknowledged and recognized as a major contributor to the conferences from the podium, through signage, and in print. NDWRCDP participation was also recognized in articles in the Summer 2001 and 2002 issues of the *Small Flows Quarterly* (Falvey and Makne 2001; Falvey 2002).

Project Task D—Investigate the Feasibility of a National Roundtable Conference on Onsite/Decentralized Wastewater Issues

During the summer of 2001, Chase Environmental Services and the NSFC investigated the feasibility of a national roundtable conference. National organizations with an interest in onsite and decentralized wastewater issues were identified, contacted, and surveyed about their interest in such a conference.

Twenty-seven organizations were identified, and a four-question survey was developed to elicit responses related to agenda topics and venue for the investigation. Twenty-three of the organizations surveyed responded and 20 of those (plus one maybe) indicated an interest in and willingness to attend an NDWRCDP-sponsored roundtable meeting.

The responses indicated a widespread interest among national organizations in meeting to discuss national onsite and decentralized wastewater issues, but little consensus on the issues, timing, or venue. A report detailing the findings of the investigation was produced (Chase and Casey 2001a).

Additional Project Benefits

An additional benefit of this project was that the NDWRCDP was permitted access to the NSFC State Regulators' Listserv and the Manufacturers' Listserv.

The Regulators' Listserv was established after the first state regulators conference in St. Louis in 1999. This listserv enables state regulators to interact through e-mail and keeps state regulators informed through notices and postings. Contacts for regulators in all 50 states and two provinces are available. In most cases, these officials are at the policy-making level.

The Manufacturer's Listserv was initiated after the first Captains of Industry Conference in Washington, DC in 2001. While not as active as the Regulators' Listserv, it provides access for the NDWRCDP to manufacturing representatives. Over the course of this project, NDWRCDP posted a number of notices on these listservs.

NDWRCDP posted notices on the NSFC News Listserv, which currently has more than 950 entries, and also posted notices on the NSFC web site, which has more than 10,000 different users each month. NDWRCDP products are currently advertised on the NSFC web site and in the products catalog and are marketed by the NSFC. These initiatives are ongoing.



3 DISCUSSION AND CONCLUSIONS

The success of this project extends beyond achieving the contract deliverables, which were process-oriented. The outcomes provide a better basis for evaluating the achievement of the project's underlying goals.

The two purposes of providing NDWRCDP access to the state regulators conferences were to:

1. Familiarize regulators with NDWRCDP and research regulators' funds
2. Gather input from state regulators on research needs

To address the first purpose, eight NDWRCDP presentations provided at four separate conferences fully familiarized state regulators who attended with project activities. NDWRCDP's research agenda after the Washington, DC conference reflected the research needs identified at that conference and at subsequent conferences, which demonstrates fulfillment of the second purpose.

Andrea Shephard, NDWRCDP Project Coordinator, addressed the second purpose in her presentation at the February 2004 Orlando conference. Her presentation demonstrated that the NDWRCDP Project Steering Committee (PSC) valued the input from the state regulators and partially prioritized the scoping, solicitation, and selection of research projects based upon the state regulators' input. In reviewing the projects submitted under the NDWRCDP's open request for proposal (RFP), the PSC looked favorably upon research project proposals that addressed the priority issues raised by state regulators.

NDWRCDP's research agenda after the Washington, DC conference (NDWRCDP 2002) reflects many of the research needs identified in a white paper prepared by the state regulators and presented to US EPA at a session held April 20, 2001 (Chase and Casey 2001b). For example, one of the questions asked in the white paper was "What methods can be used to assess the hydraulic capacity of a site for a larger and clustered Wastewater Soil Absorption System (WSAS)?" NDWRCDP funded a research project conducted by the Colorado School of Mines in January 2003 called "Hydrogeological Evaluations for Larger Cluster and High Density Wastewater Soil Absorption Systems." Another research need identified in the white paper read, "What is the effectiveness of pathogen retention during passage through the vadose zone? Quantify the survival and transport of pathogens in saturated soil." In October 2002, the Oregon Department of Environmental Quality began an NDWRCDP-funded project called, "Coliphage Attenuation in Onsite Wastewater Treatment Systems, and Coliphage Transport in Receiving Groundwaters."

Note that the research needs identified by the state regulators represent one of several sources of input gathered by the NDWRCDP to guide the training, research, and development agenda. Several early NDWRCDP projects that articulated related research needs were underway before the regulators developed the white papers.

Identified Research Needs

A complete list of the correlation between research needs identified by the state regulators and NDWRCDP-funded projects is provided in Table 3-1. The table contains 10 examples of research needs identified in white papers that correspond with 15 NDWRCDP-funded research projects.

The research needs expressed in the white papers are widely recognized and are emphasized as specific needs by the state regulators. The fact that research needs from the white papers were addressed by NDWRCDP following the request for input suggests that this project fulfilled the needs of both state regulators and NDWRCDP. Several representatives of the PSC stated that this project was “some of the best money spent by the NDWRCDP,” which best summarizes this project’s success.

Table 3-1
Correlation Between Research Needs Identified by the State Regulators and NDWRCDP-Funded Projects

Identified Research Need	NDWRCDP-Funded Project	Description
<p>Treatment Performance/Efficiency. What methods can be used to estimate the contribution of new or existing Wastewater Soil Absorption Systems (WSAS) to pollutant loads in a watershed?</p>	<p>Quantifying Site-Scale Processes and Watershed-Scale Cumulative Effects of Decentralized Wastewater Treatment Systems</p> <p><i>Cooperating Institution:</i> Colorado School of Mines</p> <p><i>Principal Investigator:</i> Robert Siegrist</p> <p><i>Project Identifier:</i> WU-HT-00-27</p>	<p>This project involves developing and testing a methodology for assessing the water quality impacts of decentralized wastewater systems (including individual and cumulative effects) on local water supply wells and downstream receiving waters.</p>
<p>Fate and Transport of Pathogens. Until the fate and transport of pathogens is understood, our effect on the environment and the steps required to ensure its protection will not be fully comprehended. With the advent of new onsite technologies in wastewater treatment, many manufacturers are asking for reductions, such as leach-field size and/or isolation distances or higher loading rates. These claims are based on the quality of the effluent that is produced by the advanced treatment system. In most cases, it is expected to meet or exceed the quality of effluent produced by conventional systems. But what type of pathogen treatment is achieved with conventional systems? Is an acceptable degree of treatment provided with conventional systems and traditional leach-field sizes and isolation distances? Pathogens—What is the effectiveness of pathogen retention during passage through the vadose zone? Quantify the survival and transport of pathogens in saturated soil.</p>	<p>Coliphage Attenuation in Onsite Wastewater Treatment Systems and Coliphage Transport in Receiving Ground Waters</p> <p><i>Cooperating Institution:</i> Oregon Department of Environmental Quality</p> <p><i>Principal Investigator:</i> Rodney Weick and Steve Hinkle</p> <p><i>Project Identifier:</i> WU-HT-03-05</p>	<p>This research expands upon the scope of work in the La Pine National Community Decentralized Wastewater Demonstration Project to include research on coliphage attenuation during onsite wastewater treatment and on subsequent transport in groundwater. This research is complemented by evaluating the suitability of common wastewater compounds as tracers of coliphage transport.</p>

Table 3-1
Correlation Between Research Needs Identified by the State Regulators and NDWRCDP-Funded Projects (Cont.)

Identified Research Need	NDWRCDP-Funded Project	Description
<p>Fate and Transport of Pathogens: Hydraulics. What methods can be used to assess the hydraulic capacity of a site for larger and clustered WSAS?</p>	<p>Hydrogeological Evaluations for Larger Cluster and High-Density Wastewater Soil Absorption Systems <i>Cooperating Institution:</i> Colorado School of Mines <i>Principal Investigator:</i> Eileen Poeter <i>Project Identifier:</i> WU-HT-02-45</p> <p>Field Evaluations for Large Cluster Wastewater Soil Absorption Systems <i>Cooperating Institution:</i> North American Wetlands Engineering <i>Principal Investigator:</i> Scott Wallace <i>Project Identifier:</i> WU-HT-03-32</p>	<p>This project will produce a report that identifies and discusses appropriate hydrogeological investigations and analysis methods for siting and design of large cluster and high-density wastewater soil absorption systems. In addition to addressing field investigative methods, appropriate modeling tools and the costs and benefits associated with the various methods of investigation will be examined.</p> <p>The objective of this effort is to determine the accuracy and applicability of the information gathered through different field techniques as applied to the problem of WSAS mounding. Hydraulic failure is recognized as a leading cause of premature WSAS failure (Sherman <i>et al.</i> 1998). Mathematical models are recognized as a potential solution to this design problem (Siegrist <i>et al.</i> 2000) but are not established as a tool for WSAS designers due to a lack of understanding and field calibration.</p> <p>This project will measure actual mounding and then different sets of field data will be input into the models recommended by the Colorado School of Mines (CSM) as being appropriate for the hydrogeologic setting. The relative accuracy of the model predictions versus actual mounding will be used to evaluate the appropriateness of the field investigative method.</p>

Table 3-1

Correlation Between Research Needs Identified by the State Regulators and NDWRCDP-Funded Projects (Cont.)

Identified Research Need	NDWRCDP-Funded Project	Description
<p>Nutrient Contamination. Knowledge of the fate of wastewater nutrients in groundwater following onsite treatment has been problematic for state regulators. If contaminate levels can be measured or calculated, having adequate treatment technologies is even more problematic. In the last decade, valuable research has been conducted on nutrient contamination; however, dissemination of these results has been limited to the literature. Certification of adequate treatment technologies through a universally-accepted approval protocol is another issue. As a result, research needs exist for nitrate-nitrogen as a groundwater pollutant with public health implications and phosphorus as a limiting nutrient in watershed enrichment. Specific research questions related to performance include: What site characteristics affect the long-term performance of nutrient removal from Domestic Wastewater Treatment Systems (DWTS)?</p>	<p>Micro Scale Evaluation of Phosphorous Removal: Task I. Phosphorus Geochemistry in Soils Handbook</p> <p>Cooperating Institution: Lombardo Associates, Inc.</p> <p>Principal Investigator: Pio Lombardo</p> <p>Project Identifier: WU-HT-03-21</p>	<p>The objectives of this project are to document the current understanding of phosphorus (P) geochemical processes and address: (1) sources of P; (2) soil removal mechanisms for the removal of P; (3) site conditions that adversely impact P removal; (4) P removal under saturated soil conditions; and (5) long-term P removal at locations subject to high hydraulic loading associated with cluster systems or high-density individual systems. The objectives also include revising the Research Project Identification developed by Gold and Sims (2001) by: (a) updating and/or revising the research needs presented by Gold and Sims; (b) identifying new needs; and then (c) prioritizing the integrated list.</p>
<p>Soil Clogging. What is the effect of pretreatment on soil clogging and WSAS hydraulic and purification performance?</p>	<p>Field Performance Evaluation of Engineered Pretreatment Units and Their Effects on Biozone Formation in Soils and System Purification Efficiency</p> <p>Cooperating Institution: Colorado School of Mines</p> <p>Principal Investigator: Robert Siegrist</p> <p>Project Identifier: WU-HT-03-36</p>	<p>In the proposed project, proven methodologies involving existing research facilities and apparatus are being used to enable detailed characterization of the effluent quality produced by three different levels of pretreatment (septic tank, septic tank with textile filter unit, and a membrane bioreactor) and the effects of these effluent qualities on the genesis of an <i>in situ</i> biozone and the hydraulic and purification performance of a soil treatment system.</p>

Table 3-1
Correlation Between Research Needs Identified by the State Regulators and NDWRCDP-Funded Projects (Cont.)

Identified Research Need	NDWRCDP-Funded Project	Description
<p>Management. More management studies are needed to assist regulators and local authorities in the planning and implementation of good onsite sewage management programs.</p>	<p>State Authorities and Practices Regarding Management of Wastewater Systems <i>Cooperating Institution:</i> Environmental Research Institute of the States (ERIS) <i>Principal Investigator:</i> R. Steven Brown <i>Project Identifier:</i> WU-HT-00-29</p> <p>Developing a Risk-Based Management Program for Water Quality Protection in Tisbury, Massachusetts <i>Cooperating Institution:</i> Town of Tisbury, Massachusetts <i>Principal Investigator:</i> Dennis Luttrell <i>Project Identifier:</i> WU-HT-00-26</p> <p>Decentralized Wastewater System Reliability Analysis <i>Cooperating Institution:</i> Stone Environmental, Inc. <i>Principal Investigator:</i> Scott Johnstone <i>Project Identifier:</i> WU-HT-03-57</p>	<p>ERIS worked with state water officials and program managers, state and local public health officials, and their representative organizations to develop baseline data on existing state and local wastewater authorities and programs, regulations, and environmental and public health responsibilities.</p> <p>The Town of Tisbury has developed a Community Wastewater Management Plan (CWMP) to provide for comprehensive management of approximately 2,400 septic systems in the town of Tisbury. NDWRCDP support was provided to Tisbury to assist in performing an environmental risk assessment of Tisbury's waterbodies and groundwater, and for developing a risk-based management program for decentralized wastewater systems.</p> <p>This project involves developing a framework through which a practitioner may select appropriate asset management and reliability assessment tools and will provide an understanding of the tools available to practitioners.</p>

Table 3-1

Correlation Between Research Needs Identified by the State Regulators and NDWRCDP-Funded Projects (Cont.)

Identified Research Need	NDWRCDP-Funded Project	Description
<p>Technology Transfer. Many states wrestle with the question of how best to approve alternative systems and components. Technology transfer systems require an easily accessible database of research and copies of original research publications. To develop such a technology transfer system, regulators have targeted the following issues for further examination: The need for new technology testing and an assessment protocol that is accepted nationally or at least regionally (such as New Jersey's "A Protocol for Testing, Assessing and Approving Innovative or Alternative Onsite Wastewater Disposal Systems").</p>	<p>Variability and Reliability of Test Center and Field Data: Definition of Proven Technology from a Regulatory Viewpoint</p> <p>Cooperating Institution: New England Interstate Water Pollution Control Commission</p> <p>Principal Investigator: Tom Groves</p> <p>Project Identifier: WU-HT-03-35</p>	<p>This project involves developing statistical relationships. A decision support system that integrates test center and field data will result. This system will correctly predict field performance and provide the regulatory and manufacturing communities with common-sense guidance regarding how much data of what quality is needed to accept a technology as "proven." As the onsite program and industry moves toward a performance-based code and approach, this research will provide a baseline understanding on how to assemble, assess, and interpret new and existing data sets to maximize benefit to the onsite program.</p>
<p>Economics of Decentralized Wastewater Treatment Systems. As competition increases for government tax dollars through grants and loans, it has become increasingly important that local wastewater providers examine the use of onsite decentralized wastewater treatment and disposal systems. Direct and indirect benefits including cost of the use of decentralized wastewater systems must be provided to local officials to enable sound choices for wastewater management. The following questions define high-priority issues identified by regulators that require examination: How can we improve decision-making models used by communities to evaluate wastewater management alternatives? What effects do advanced onsite treatment technologies have on land-use patterns? How can decentralized treatment play a part in smart growth goals?</p>	<p>Wastewater Planning and Creative Zoning</p> <p>Cooperating Institution: University of Rhode Island (URI) Cooperative Extension</p> <p>Principal Investigator: Lorraine Joubert</p> <p>Project Identifier: WU-HT-00-30</p>	<p>In partnership with a planning and design firm, URI is developing a guidance manual for local officials to demonstrate the use of alternative onsite wastewater treatment technologies to support zoning for compact and sustainable land-use patterns. The manual compares standard development layouts using conventional septic systems with creative land-use development patterns using alternative onsite wastewater technologies, and addresses issues such as construction costs, maintenance needs, visual impact, extent of land disturbance, and environmental impacts. The project includes use of selected unsewered sites in southern Rhode Island to illustrate compact design options and application of alternative onsite wastewater options available to support the compact unsewered development.</p>

Table 3-1
Correlation Between Research Needs Identified by the State Regulators and NDWRCDP-Funded Projects (Cont.)

Identified Research Need	NDWRCDP-Funded Project	Description
<p>Economics of Decentralized Wastewater Treatment Systems (cont.)</p>	<p>Wastewater Planning Handbook: Mapping Onsite Treatment Needs, Pollution Risks, and Management Options Using GIS <i>Cooperating Institution:</i> University of Rhode Island Cooperative Extension <i>Principal Investigator:</i> Lorraine Joubert <i>Project Identifier:</i> WU-HT-01-17</p>	<p>This project involves developing a guidance manual for small communities on use of computer-generated maps and other databases for wastewater management planning.</p>
<p>Economics of Decentralized Wastewater Treatment Systems. What are the preferences and values of homeowners and how do these affect their choices of wastewater technologies? How can education campaigns be developed to increase acceptance of decentralized wastewater management and increased costs to manage them?</p>	<p>Case Studies of Economic Analysis and Community Decision-Making for Decentralized Wastewater Treatment <i>Cooperating Institution:</i> Rocky Mountain Institute <i>Principal Investigator:</i> Richard Pinkham <i>Project Identifier:</i> WU-HT-02-03</p>	<p>The goal of this project is to increase understanding of how communities consider and value the benefits and costs of scale wastewater facility options (onsite, cluster, and centralized options) in dollar or other terms and examine the driving issues, motivations, thought processes, and decision-making methods of stakeholders relative to choices of wastewater system scale.</p>

Table 3-1
Correlation Between Research Needs Identified by the State Regulators and NDWRCDP-Funded Projects (Cont.)

Identified Research Need	NDWRCDP-Funded Project	Description
<p>Professionalizing the Onsite/Decentralized Wastewater Treatment Industry. At least three sets of courses are needed to meet the education needs of the onsite wastewater treatment industry. A set of undergraduate courses for engineering, soil science, environmental science, and other related disciplines to train the next generation of onsite/decentralized wastewater professionals are needed. A set of graduate courses to train university graduates and current professionals in advanced concepts in onsite/decentralized wastewater practice, including technical issues, public policy, public awareness, regulation, and other issues are also needed. Perhaps even a “leadership institute” could be developed for the onsite/decentralized wastewater community. A set of adult education courses is needed to train regulators, contractors, practitioners, and others who need onsite wastewater treatment credentials/licensing and/or continuing education to maintain those credentials and to educate the public. These adult education courses can be used in conjunction with the National Environmental Training Center for Small Communities. The curricula for all three groups should be built around the skill needs for onsite/decentralized wastewater professionals.</p> <p>These needs include planning, performance requirements, site evaluation, design, construction, operation and maintenance, residuals management, certification and licensing, education and training, inspection and monitoring, corrective actions and enforcement, record keeping and reporting, and financial assistance.</p>	<p>University Curriculum Development for Decentralized Wastewater Management <i>Cooperating Institution:</i> University of Arkansas <i>Principal Investigator:</i> Mark Gross <i>Project Identifier:</i> WU-HT-01-06</p> <p>Model Decentralized Wastewater Practitioner Curriculum <i>Cooperating Institution:</i> North Carolina State University <i>Principal Investigator:</i> David Lindbo <i>Project Identifier:</i> WU-HT-01-05</p>	<p>This project is a coordinated effort of the Consortium of Institutes for Decentralized Wastewater Treatment to develop college curriculum materials for decentralized wastewater management. The goal of this project is to develop modules for a one-semester laboratory and field practicum in onsite and decentralized water and wastewater treatment and natural systems for water reclamation at the undergraduate level.</p> <p>The goal of this project, directed by the Consortium of Institutes for Decentralized Wastewater Treatment, is to develop a model decentralized wastewater field practitioners training curriculum to use throughout North America.</p>


Gold, A. J. and J. T. Sims. 2001. "Research Needs in Decentralized Wastewater Treatment and Management: A Risk-Based Approach to Nutrient Contamination." *National Research Needs Conference Proceedings: Risk-Based Decision Making for On-site Wastewater Treatment*. Project No. 1001446. Electric Power Research Institute, Palo Alto, CA, US Environmental Protection Agency, and National Decentralized Water Resources Capacity Development Project. March 15, 2001.

NDWRCDP. 2002. *2002–2003 National Decentralized Water Resources Capacity Development Project Training, Research and Development Plan*. Edited by ProWrite, Inc. Prepared by the National Decentralized Water Resources Capacity Development Project, Washington University, St. Louis, MO.

Sherman, K., R. Varnadore, and R. Forbes. 1998. "Examining Failures of Onsite Sewage Treatment Systems in Florida." *Proceedings of the Eighth National Symposium on Individual and Small Community Sewage Systems*. American Society of Agricultural Engineers, St. Joseph, MI.

Siegrist R., J. McCray, D. Huntzinger, S. Kirkland, and S. Van Cuyk. 2000. "Use of Modeling to Understand and Predict Wastewater Treatment for Onsite Wastewater Systems." *Proceedings of the NOWRA Annual Meeting*. National Onsite Wastewater Recycling Association, Laurel, MD.

Copyright ©2004 Chase Environmental Services, Inc.
Rochelle, IL. All rights reserved.

 Printed on recycled paper in the United States of America

WU-HT-01-16

NDWRCDP

Washington University, Campus Box 1150, One Brookings Drive, Cupples 2, Rm. 11, St. Louis, Missouri 63130-4899 • USA

*This report is available online at www.ndwrmdp.org. This report is also available through the
National Small Flows Clearinghouse • West Virginia University/NRCCE, P.O. Box 6064, Morgantown, WV 26506-6064 • USA
Tel: (800) 624-8301 • WWCDGN220*

