

# RESEARCH NEEDS SURVEY 2003

## Water Environment Research Foundation

WERF is in the process of establishing research priorities for 2004-2005. Your input will be used to set the agenda for an upcoming meeting of subscribers and the WERF Research Council to discuss and prioritize research topics. Your input is very much needed and appreciated.

**Please complete and return this survey by November 21, 2003.**

*If your agency has already completed this survey through its participation in WERF, you do not need to complete it again.*

**Please note:** Question 7 of the survey is designed so that you only need to complete the portions of the survey that are of most importance to your agency. Please skip any sections that you feel are not relevant. The total time required to complete the survey is approximately 15-20 minutes.

**ABOUT YOU**

Agency: \_\_\_\_\_  
 Agency Contact: \_\_\_\_\_  
 Contact Number: \_\_\_\_\_

**RESEARCH NEEDS AND WERF LONG-RANGE RESEARCH PLAN**

**1. What are the two most challenging research issues that your committee will face within the next 3-5 years?**

Issue #1: \_\_\_\_\_  
 Issue #2: \_\_\_\_\_

**2. How relevant are WERF's current research services to these issues?**

	Extremely Relevant	Relevant	Just OK	Not Especially Relevant	Completely Irrelevant	Don't Know
Issue #1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
Issue #2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>

**3. How important is it for WERF to provide research assistance on these issues?**

	Extremely Important	Above Average Importance	Average Importance	Below Average Importance	Not Important	Don't Know
Issue #1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
Issue #2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>

**4. What are the regulations (listed below in items i to vii) with which utilities need to comply that are technically the most challenging?**

**i. Water Quality Assessments §§305(b) and 303(d) CWA;**

- Guidance for 2004 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d) and 305(b) of the Clean Water Act, July, 2003

**ii. Water Quality Standards §301 CWA, EPA Water Quality Standard Regulation**

- 40 CFR Part 131 and Water Quality Guidance for the Great Lakes System, 40 CFR Part 132 issued as regulation
- EPA Guidance: Coordinating CSO Long-Term Control Planning with Water Quality Standards Reviews, July 2001

- WQS use attainability assessments
    - ❑ EPA Interim Economic Guidance for Water Quality Standards: Work Book
    - ❑ EPA, Region IX, Interim Final Guidance for Modifying Water Quality Standards and Protecting Effluent-Dependent Ecosystems, April 13, 1993
  - EPA criteria & documents
    - ❑ EPA Technical Support Document for Water Quality-based Toxics Control, March 1991
    - ❑ EPA Water Quality Criteria Documents – Copper
    - ❑ EPA Water Quality Criteria Documents – Ammonia
    - ❑ State or local specific water quality standard and requirements including for reclaimed water
    - ❑ EPA Antidegradation Policy, June 1991
  - WQS compliance/implementation schedules and other “administrative provisions”
    - ❑ EPA Administrator’s Decision in *Star Kist- Caribe*
- iii. ❑ **EPA Secondary Treatment Regulation for publicly owned treatment works CFR Part 133.**
- iv. **Biosolids §405(d) and (e) CWA**
- ❑ Standards For The Use or Disposal of Sewage Sludge, 40 CFR Part 503
- v. **EPA General Pretreatment Regulations, CFR Part 403**
- ❑ Pretreatment Compliance Monitoring and Enforcement Guidance (for Publicly Owned Treatment Works), July 1986
- vi **Water Quality Planning and Management §§303(d) & (e), 208, 40 CFR Part 130, 1992, partially revised 1995, including TMDLs and Final Water Quality Guidance for the Great Lakes System, 40 CFR Part 132 including TMDLs for the Great Lakes**
- ❑ EPA Guidance for 2004 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d) and 305(b) of the Clean Water Act, July, 2003
  - ❑ New Policies for Establishing and Implementing TMDLs, August 1997
- vii. **NPDES Permit Program §402 CWA and 40 CFR Parts 122 (and 123 state programs).**
- ❑ Interim Guidance for Performance-Based Reductions of NPDES Permit Monitoring Frequencies, April 1996
  - ❑ State water quality and permitting requirements for stormwater
  - ❑ Guidelines Establishing Test Procedures for the Analysis of Pollutants, 40 CFR Part 136
  - ❑ Toxicity and Whole Effluent Toxicity Testing
  - ❑ EPA Permit Regulations, 40 CFR Part 122.44 including (d)(1)(ii)
  - ❑ EPA CSO Control Policy, 1994
  - ❑ EPA Guidance: Coordinating Combined Sewer Overflow (CSO) Long-term Planning and Water Quality Standards Reviews
  - ❑ Combined Sewer Overflows Guidance for Nine Minimum Control Measures
  - ❑ Combined Sewer Overflow Guidance for Long-Term Control Plan
  - ❑ Combined Sewer Overflows Guidance for Monitoring and Modeling
  - ❑ Combined Sewer Overflows Guidance for Permit Writers
  - ❑ Combined Sewer Overflows Guidance for Financial Capability Assessment and Schedule Development (Final)
  - ❑ Combined Sewer Overflows Screening and Ranking Guidance
- ❑ EPA Sanitary Sewer Overflows, Notice of Proposed Rulemaking, January 1, 2001
  - ❑ Optimization of Collection System Maintenance Frequencies and System Performance, February 1999
  - ❑ Protocols for Identifying Sanitary Sewer Overflows, June 2000

*Disclaimer: This list includes Clean Water Act statutory, regulatory, guidance and decision documents for the sole purpose of identifying research needs and may not be relied on for legal, regulatory or policy development purposes. WERF thanks Bob Weaver of Kelly & Weaver for his assistance in preparing this list.*

5. **Looking back at your #1 choice, what is the most useful thing that WERF could do to help you with this regulatory issue?** \_\_\_\_\_

6. The next set of questions (7A through 7K) refers to WERF's 2003-2004 Long-Range Research Plan. This plan comprises 11 categories. Please review the following categories and address those that are of the most importance to your Agency.

- |  |  |  |
|--|--|--|
| <input type="checkbox"/> Stormwater            | <input type="checkbox"/> Urban Management Practices        | <input type="checkbox"/> Collection Systems      |
| <input type="checkbox"/> Treatment Processes   | <input type="checkbox"/> Managing Utilities & Assets       | <input type="checkbox"/> Protecting Human Health |
| <input type="checkbox"/> Surface Water Quality | <input type="checkbox"/> Ecosystem Health                  | <input type="checkbox"/> Biosolids & Residuals   |
| <input type="checkbox"/> Water for Reuse       | <input type="checkbox"/> Communication & Public Partnering |  |

Is there another topic not on this list of 11 that you would like WERF to address? Please specify: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**2003-2004 LONG-RANGE RESEARCH PLAN: STORMWATER**

7A. Please consider the following issues and questions within the Stormwater category. Then indicate two things:

First, identify all issues that are of interest to you.  
 Then, rank the three issues that are most important to you as #1, #2 and #3.

<b>STORMWATER</b>		
<i>Issue is of interest to me</i>	<b>Rank 1-3</b>	<b>Issue: Conveyance &amp; Treatment</b>
<input type="checkbox"/>	_____	A. What critical factors influence the selection, sizing, and design of stormwater controls?
<input type="checkbox"/>	_____	B. What are the long-term operation and maintenance needs of stormwater control devices and structures?
<input type="checkbox"/>	_____	C. What design standards should apply for peak flow volume control? How does one express BMP performance objectives?
<input type="checkbox"/>	_____	D. Do underground controls (tunnels and tanks) have particular operating and selection issues?
<input type="checkbox"/>	_____	E. What trade-offs exist between surface and groundwater quality?
<input type="checkbox"/>	_____	F. How effective are the newer control measures?
<input type="checkbox"/>	_____	G. What are the life cycle effectiveness and costs of control systems?
<input type="checkbox"/>	_____	H. What are the long-term management options of captured pollutants?
<input type="checkbox"/>	_____	I. What is the effectiveness of BMP retrofit programs and associated costs?
<input type="checkbox"/>	_____	J. What are special cold-region and arid-region problems?
<input type="checkbox"/>	_____	K. Other question/comment (Please specify)
		_____
		_____

<i>Issue is of interest to me</i>	<b>Rank 1-3</b>	<b>Issue: Program Management</b>
<input type="checkbox"/>	_____	L. What measures can be used to benchmark stormwater utilities?
<input type="checkbox"/>	_____	M. What institutional and technological framework can be used for integrating water resources management?
<input type="checkbox"/>	_____	N. What are the institutional needs to ensure control system survival and performance?
<input type="checkbox"/>	_____	O. What is the most cost effective means to protect/restore ecological integrity?
<input type="checkbox"/>	_____	P. What is the role and effectiveness of pollution prevention measures?
<input type="checkbox"/>	_____	Q. Can urbanization result in zero-impact and de minimis-impact on streams?
<input type="checkbox"/>	_____	R. Other question/comment (Please specify)
		_____
		_____

**STORMWATER, continued**

*Issue is of interest to me*

**Rank 1-3**

**Issue: Decentralized Approaches**

- \_\_\_\_\_ S. How effective are on-site treatment and decentralized systems?
- \_\_\_\_\_ T. What are long- and short-term management issues and approaches?
- \_\_\_\_\_ U. What are the limits to growth?
- \_\_\_\_\_ V. Do low-impact techniques work?
- \_\_\_\_\_ W. How well do natural resource conservation methods, such as forest buffers, protect water quality?
- \_\_\_\_\_ X. What is the role and effectiveness of minimization measures?
- \_\_\_\_\_ Y. What is the role and effectiveness of strategic timing to maintain time of concentration?
- \_\_\_\_\_ Z. What is the role and effectiveness of integrated management practices for a hydrologically functional landscape?
- \_\_\_\_\_ AA. What are the institutional roadblocks and educational needs?
- \_\_\_\_\_ BB. What are the monitoring and modeling needs?
- \_\_\_\_\_ CC. How does cluster vs. sprawl development impact stormwater?
- \_\_\_\_\_ DD. Other question/comment (Please specify)

*Issue is of interest to me*

**Rank 1-3**

**Issue: Impacts on Receiving Waters**

- \_\_\_\_\_ EE. How do different BMPs affect receiving water biota and geomorphology?
- \_\_\_\_\_ FF. How effective are in-stream controls to limit stream and river degradation caused by urbanization?
- \_\_\_\_\_ GG. How do variances in site geology, soil chemistry, pollutant chemistry, and depth to groundwater affect the impact of infiltration of stormwater pollutants on groundwater?
- \_\_\_\_\_ HH. Other question/comment (Please specify)

**2003-2004 LONG-RANGE RESEARCH PLAN: URBAN MANAGEMENT PRACTICES**

**7B. Please consider the following issues and questions within the Urban Management Practices category. Then indicate two things:**

**First, identify all issues that are of interest to you.**

**Then, rank the three issues that are most important to you as #1, #2 and #3.**

*Issue is of interest to me*

**Rank 1-3**

**URBAN MANAGEMENT PRACTICES**

**Issue: Source Identification & Control**

- \_\_\_\_\_ A. Has the increased use of landscaping services and chemicals contributed to receiving water pollution?
- \_\_\_\_\_ B. How can pollution prevention and product substitution help control sources?
- \_\_\_\_\_ C. How can automobile pollution sources be controlled?
- \_\_\_\_\_ D. What are the sources and health risks of pathogens in stormwater?
- \_\_\_\_\_ E. What factors influence accumulation and transport of trash and how can they be controlled?
- \_\_\_\_\_ F. How do we better differentiate between pathogens of human vs. animal origin?
- \_\_\_\_\_ II. Other question/comment (Please specify)

*Issue is of interest to me*

**Rank 1-2**

**Issue: Tools & Technologies**

- \_\_\_\_\_ G. What new technologies can reduce pollution from construction and development?
- \_\_\_\_\_ H. What tools can reduce pollution from construction and development?
- \_\_\_\_\_ JJ. Other question/comment (Please specify)

*Issue is of interest to me*

**Rank 1-3**

**Issue: Measures of Success**

- \_\_\_\_\_ I. What critical indicators can be monitored?
  - \_\_\_\_\_ J. Should there be standardized protocols, terminology, and measurement methods?
  - \_\_\_\_\_ K. How should we monitor for long-term effectiveness of stormwater management programs?
  - \_\_\_\_\_ L. How can BMP effectiveness be measured?
  - \_\_\_\_\_ M. How can procedures be refined regarding efforts to monitor suspended solids?
  - \_\_\_\_\_ KK. Other question/comment (Please specify)
- 
- 

Issue is of interest to me

Rank 1-3

**Issue: Mitigation Measures**

- \_\_\_\_\_ N. How can development design be improved to minimize impact?
  - \_\_\_\_\_ O. What is the role of urban soils in BMP design?
  - \_\_\_\_\_ P. What designs can best reduce pollution from urban development?
  - \_\_\_\_\_ LL. Other question/comment (Please specify)
- 
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**2003-2004 LONG-RANGE RESEARCH PLAN: COLLECTION SYSTEMS**

**7C. Please consider the following issues and questions within the Collection Systems category. Then indicate two things:**

**First, identify all issues that are of interest to you.**

**Then, rank the three issues that are most important to you as #1, #2 and #3.**

**COLLECTION SYSTEMS**

Issue is of interest to me

Rank 1-2

**Issue: Rehabilitation & Construction**

- \_\_\_\_\_ A. How can we predict when and where rehabilitation will be needed?
  - \_\_\_\_\_ B. What new materials and techniques are available for repair and replacement?
  - \_\_\_\_\_ MM. Other question/comment (Please specify)
- 
- 

Issue is of interest to me

Rank 1-3

**Issue: Operations & Maintenance**

- \_\_\_\_\_ C. How can collection systems be cost effectively managed?
  - \_\_\_\_\_ D. What are the performance issues and implications of collection systems?
  - \_\_\_\_\_ E. What issues are related to effective operation and maintenance of combined sewers?
  - \_\_\_\_\_ F. How can we better pre-treat, monitor, control, and utilize system capacity for combined and separate systems?
  - \_\_\_\_\_ G. What innovative methods can reduce or convey wastes, or both?
  - \_\_\_\_\_ NN. Other question/comment (Please specify)
- 
- 

**2003-2004 LONG-RANGE RESEARCH PLAN**

**7D. Please consider the following issues and questions within the Treatment Processes category. Then indicate two things:**

**First, identify all issues that are of interest to you.**

**Then, rank the three issues that are most important to you as #1, #2 and #3.**

**TREATMENT PROCESSES**

Issue is of interest to me

Rank 1-2

**Issue: Disinfection**

- \_\_\_\_\_ A. What are effective alternatives to chlorination for disinfection and how can processes be optimized for pathogen removal and inactivation?
- \_\_\_\_\_ B. How can CSOs, SSOs, and wet weather flow bypasses be effectively monitored and treated?

\_\_\_\_\_ OO. Other question/comment (Please specify)

Issue is of interest to me

**Rank 1-3 Issue: Nutrients and Organics**

- \_\_\_\_\_ C. What are the most effective and robust processes for nutrient removal?  
 \_\_\_\_\_ D. How can biological treatment processes be optimized?  
 \_\_\_\_\_ E. What tools can be developed to assess process operations and stats of microbial populations?  
 \_\_\_\_\_ PP. Other question/comment (Please specify)

Issue is of interest to me

**Rank 1-2 Issue: Odors, Aerosols, & Air Pollutants**

- \_\_\_\_\_ F. How can odors, aerosols, and air emissions be measured and controlled?  
 \_\_\_\_\_ G. What is the fate of emissions during dispersion?  
 \_\_\_\_\_ QQ. Other question/comment (Please specify)

Issue is of interest to me

**Rank 1-3 Issue: Decentralized Systems**

- \_\_\_\_\_ H. How can decentralized systems be effectively monitored and managed?  
 \_\_\_\_\_ I. What are appropriate alternative collection/conveyance systems?  
 \_\_\_\_\_ J. What are the best designs for reducing/controlling pollution from on-site, decentralized treatment systems?  
 \_\_\_\_\_ RR. Other question/comment (Please specify)

Issue is of interest to me

**Rank 1-3 Issue: Salinity & Total Dissolved Solids**

- \_\_\_\_\_ K. How can salinity loads be minimized?  
 \_\_\_\_\_ L. How do salinity and TDS affect wastewater treatment processes?  
 \_\_\_\_\_ M. What are appropriate disposal or reuse strategies for membrane concentrate?  
 \_\_\_\_\_ N. Other question/comment (Please specify)

Issue is of interest to me

**Rank 1-2 Issue: Toxic Compounds**

- \_\_\_\_\_ O. How can toxic compounds be degraded and removed? What is the role of pretreatment, product substitution, and new formulations?  
 \_\_\_\_\_ P. What are the fate and transport mechanism(s) of toxic compounds?  
 \_\_\_\_\_ Q. Other question/comment (Please specify)

Issue is of interest to me

**Rank 1-3 Issue: Efficiency**

- \_\_\_\_\_ R. What new process could improve automation, efficiency, and effectiveness and reduce costs?  
 \_\_\_\_\_ S. How can we optimize existing facilities?  
 \_\_\_\_\_ T. What is the appropriate design and operation for variable and seasonal flow treatment?  
 \_\_\_\_\_ U. Other question/comment (Please specify)

**2003-2004 LONG-RANGE RESEARCH PLAN: MANAGING UTILITIES & ASSETS**

**7E. Please consider the following issues and questions within the Managing Utilities & Assets category. Then indicate two things:**

**First, identify all issues that are of interest to you.**

**Then, rank the three issues that are most important to you as #1, #2 and #3.**

<b>MANAGING UTILITIES &amp; ASSETS</b>		
<i>Issue is of interest to me</i>	<b>Rank 1-3</b>	<b>Issue: <i>Facility Management</i></b>
<input type="checkbox"/>	_____	A. What can managers do to improve and optimize facility management?
<input type="checkbox"/>	_____	B. How can we assess condition, improve efficiency, and manage performance of assets?
<input type="checkbox"/>	_____	C. What tools can be developed to help managers make sound decisions regarding management of assets?
<input type="checkbox"/>	_____	D. What methodologies can be developed to determine the service life of assets?
<input type="checkbox"/>	_____	E. Other question/comment (Please specify)
		_____
		_____

<i>Issue is of interest to me</i>	<b>Rank</b>	<b>Issue: <i>Security</i></b>
<input type="checkbox"/>	_____	F. How can we reduce the vulnerability and improve the recovery of wastewater plants and infrastructure to incidence of terrorism and unplanned disasters?
<input type="checkbox"/>	_____	G. Other question/comment (Please specify)
		_____
		_____

**2003-2004 LONG-RANGE RESEARCH PLAN: PROTECTING HUMAN HEALTH**

**7F. Please consider the following issues and questions within the Protecting Human Health category. Then indicate two things:**

**First, identify all issues that are of interest to you.**

**Then, rank the three issues that are most important to you as #1, #2 and #3.**

<b>PROTECTING HUMAN HEALTH</b>		
<i>Issue is of interest to me</i>	<b>Rank 1-3</b>	<b>Issue: <i>Chemical Contaminants</i></b>
<input type="checkbox"/>	_____	A. How can we protect worker health in wastewater management?
<input type="checkbox"/>	_____	B. Can a generalized screening procedure be developed to assess impacts of new compounds on human health and the environment?
<input type="checkbox"/>	_____	C. What target chemical constituents can be used to focus on constituents in wastewater/reclaimed water that are of potential health concern?
<input type="checkbox"/>	_____	D. What is the interplay of wastewater treatment practices and the production of chemical constituents of human health and ecological concern?
<input type="checkbox"/>	_____	E. Other question/comment (Please specify)
		_____
		_____

<i>Issue is of interest to me</i>	<b>Rank 1-3</b>	<b>Issue: <i>Monitoring &amp; Detection Tools</i></b>
<input type="checkbox"/>	_____	F. What tools do we need to better differentiate between pathogens of human versus animal origin?
<input type="checkbox"/>	_____	G. How do we monitor for organisms that are on the EPA Candidate Contaminant List?
<input type="checkbox"/>	_____	H. Are there better tools for measuring or anticipating chemical toxicity in wastewater effluent and products?
<input type="checkbox"/>	_____	I. How do we measure pathogens and indicator organisms in biosolids?
<input type="checkbox"/>	_____	J. Other question/comment (Please specify)
		_____
		_____

<i>Issue is of interest to me</i>	<b>Rank 1-3</b>	<b>Issue: <i>Pathogens &amp; Indicators</i></b>
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- \_\_\_\_\_ K. How can we protect worker health in wastewater management?
  - \_\_\_\_\_ L. Do pathogens that survive disinfection acquire resistance to disinfection methods, and are they capable of regrowth to infectious levels?
  - \_\_\_\_\_ M. Do current indicator organisms truly predict health risk, or can more appropriate organisms be found?
  - \_\_\_\_\_ N. How can the seasonality of pathogenic microorganisms in wastewater treatment systems be determined?
  - \_\_\_\_\_ O. Other question/comment (Please specify)
- 
- 

**2003-2004 LONG-RANGE RESEARCH PLAN: SURFACE WATER QUALITY**

**7G. Please consider the following issues and questions within the Surface Water Quality category. Then indicate two things:**

**First, identify all issues that are of interest to you.**

**Then, rank the three issues that are most important to you as #1, #2 and #3.**

		<b>SURFACE WATER QUALITY</b>	
<i>Issue is of interest to me</i>	<b>Rank</b>	<b>Issue: <i>TMDLs</i></b>	
<input type="checkbox"/>	_____	A. How can the TMDL process be improved?	
<input type="checkbox"/>	_____	B. Other question/comment (Please specify)	
<hr/>			
<hr/>			
<i>Issue is of interest to me</i>	<b>Rank 1-3</b>	<b>Issue: <i>Watershed Management</i></b>	
<input type="checkbox"/>	_____	C. How can water quality and quantity issues best be integrated and managed?	
<input type="checkbox"/>	_____	D. How should nutrients be managed on a watershed basis?	
<input type="checkbox"/>	_____	E. How can we identify and quantify upwind sources of nitrogen to reduce downwind loadings to water?	
<input type="checkbox"/>	_____	F. Other question/comment (Please specify)	
<hr/>			
<hr/>			
<i>Issue is of interest to me</i>	<b>Rank 1-3</b>	<b>Issue: <i>Modeling &amp; Monitoring</i></b>	
<input type="checkbox"/>	_____	G. What parameters should be built into water quality models (problem specific)?	
<input type="checkbox"/>	_____	H. What are the appropriate temporal and spatial scales for desirable resolution or confidence in prediction?	
<input type="checkbox"/>	_____	I. How can models be developed that can be applied to a range of regions and problems?	
<input type="checkbox"/>	_____	J. Can existing information on large-scale systems be integrated to better understand water quality effects?	
<input type="checkbox"/>	_____	K. How can monitoring efforts be integrated into model development?	
<input type="checkbox"/>	_____	L. Other question/comment (Please specify)	
<hr/>			
<hr/>			
<i>Issue is of interest to me</i>	<b>Rank 1-2</b>	<b>Issue: <i>Supporting Regulatory Compliance</i></b>	
<input type="checkbox"/>	_____	M. What are protective and attainable measures of water quality?	
<input type="checkbox"/>	_____	N. How can watershed authorities harness the marketplace to achieve water quality improvements?	
<input type="checkbox"/>	_____	O. Other question/comment (Please specify)	
<hr/>			
<hr/>			

**2003-2004 LONG-RANGE RESEARCH PLAN: ECOSYSTEM HEALTH**

**7H. Please consider the following issues and questions within the Ecosystem Health category. Then indicate two things:**

**First, identify all issues that are of interest to you.**

**Then, rank the three issues that are most important to you as #1, #2 and #3.**

**ECOSYSTEM HEALTH**

*Issue is of interest to me*

**Rank 1-3**

**Issue: *Ecosystems Under Stress***

- |                          |       |  |
|--------------------------|-------|--|
| <input type="checkbox"/> | _____ | A. What tools can determine which stressors create the greatest concern?                               |
| <input type="checkbox"/> | _____ | B. What tools can predict effluent impacts on ecosystems?  |
| <input type="checkbox"/> | _____ | C. How can source delineation and characterization be improved and forecasting of effects be improved? |
| <input type="checkbox"/> | _____ | D. How can ecosystem health be monitored and measured?   |
| <input type="checkbox"/> | _____ | E. How can risk assessment processes be improved?  |
| <input type="checkbox"/> | _____ | F. How can negative effects of elevated hydraulic loadings be measured and reduced?                    |
| <input type="checkbox"/> | _____ | G. What modeling approaches can assess multiple stressor impacts?                                      |
| <input type="checkbox"/> | _____ | H. What are the best long-term sentinels of ecosystem health?  |
| <input type="checkbox"/> | _____ | I. Other question/comment (Please specify)   |

\_\_\_\_\_  
\_\_\_\_\_

*Issue is of interest to me*

**Rank 1-3**

**Issue: *Contaminants of Concern***

- |                          |       |   |
|--------------------------|-------|---|
| <input type="checkbox"/> | _____ | A. Are endocrine-disrupting chemicals (EDCs) having a measurable effect in the environment? |
| <input type="checkbox"/> | _____ | B. What models can predict ecosystem effects of EDCs?                                       |
| <input type="checkbox"/> | _____ | C. How can pathogen exposures to humans be better assessed and managed in watersheds?       |
| <input type="checkbox"/> | _____ | D. What strategies are available to manage persistent, bioaccumulative toxic chemicals?     |
| <input type="checkbox"/> | _____ | E. Other question/comment (Please specify)  |

\_\_\_\_\_  
\_\_\_\_\_

**2003-2004 LONG-RANGE RESEARCH PLAN: BIOSOLIDS & RESIDUALS**

**7I. Please consider the following issues and questions within the Biosolids & Residuals category. Then indicate two things:**

**First, identify all issues that are of interest to you.**

**Then, rank the three issues that are most important to you as #1, #2 and #3.**

**BIOSOLIDS & RESIDUALS**

*Issue is of interest to me*

**Rank 1-3**

**Issue: *Product Use***

- |                          |       |   |
|--------------------------|-------|---|
| <input type="checkbox"/> | _____ | A. What is the overall effect of biosolids on soil quality and sustainability?                                |
| <input type="checkbox"/> | _____ | B. How do metals and nutrients affect soil properties during the long-term application of biosolids to soils? |
| <input type="checkbox"/> | _____ | C. Does the use of biosolids present a health risk?   |
| <input type="checkbox"/> | _____ | D. How can pathogens and indicator organisms in biosolids be measured?  |
| <input type="checkbox"/> | _____ | E. What are the most effective ways to attenuate or ameliorate biosolids odors after land application?        |
| <input type="checkbox"/> | _____ | F. How can biosolids be used for carbon sequestration and other environmental benefits?                       |
| <input type="checkbox"/> | _____ | G. What constitutes a stable biosolids product?   |
| <input type="checkbox"/> | _____ | H. Are there better tools for measuring chemicals in biosolids?   |
| <input type="checkbox"/> | _____ | I. Other question/comment (Please specify)  |

\_\_\_\_\_  
\_\_\_\_\_

<i>Issue is of interest to me</i>	<b>Rank 1-2</b>	<b>Issue: <i>Watershed Effects</i></b>
<input type="checkbox"/>	_____	J. What are the watershed and ecosystem effects of land-applied biosolids?
<input type="checkbox"/>	_____	K. Are there chemicals in biosolids that may affect public health?
<input type="checkbox"/>	_____	L. Other question/comment (Please specify)
<hr/>		
<hr/>		
<i>Issue is of interest to me</i>	<b>Rank 1-3</b>	<b>Issue: <i>Residuals</i></b>
<input type="checkbox"/>	_____	M. How can residuals and/or biosolids be modified to produce different products?
<input type="checkbox"/>	_____	N. How can liquid-solid separations be achieved more efficiently and economically?
<input type="checkbox"/>	_____	O. How can treatment processes be modified to yield better products or less material?
<input type="checkbox"/>	_____	P. Other question/comment (Please specify)
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<b>2003-2004 LONG-RANGE RESEARCH PLAN: WATER FOR REUSE</b>
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**7J. Please consider the following issues and questions within the Water for Reuse category. Then indicate two things:**

**First, identify all issues that are of interest to you.  
Then, rank the three issues that are most important to you as #1, #2 and #3.**

<b>WATER FOR REUSE</b>		
<i>Issue is of interest to me</i>	<b>Rank 1-2</b>	<b>Issue: <i>Processes &amp; Treatment</i></b>
<input type="checkbox"/>	_____	A. How can processes be modified or developed to yield water for subsequent use?
<input type="checkbox"/>	_____	B. How can processed effluents be used to prevent saltwater intrusion?
<input type="checkbox"/>	_____	C. Other question/comment (Please specify)
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<i>Issue is of interest to me</i>	<b>Rank 1-3</b>	<b>Issue: <i>Standards</i></b>
<input type="checkbox"/>	_____	A. What are appropriate design standards and guidance on distribution systems for reclaimed water?
<input type="checkbox"/>	_____	B. What levels of removal are needed in treated wastewater, both for incidental and planned reuse?
<input type="checkbox"/>	_____	C. Does the beneficial reuse of reclaimed water present a health risk?
<input type="checkbox"/>	_____	D. Are there better tools for measuring chemical toxicity in reclaimed water?
<input type="checkbox"/>	_____	E. Other question/comment (Please specify)
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<b>2003-2004 LONG-RANGE RESEARCH PLAN: COMMUNICATIONS &amp; PUBLIC PARTNERING</b>
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**7K. Please consider the following issues and questions within the Communications & Public Partnering category. Then indicate two things:**

**First, identify all issues that are of interest to you.  
Then, rank the three issues that are most important to you as #1, #2 and #3.**

<b>COMMUNICATION &amp; PUBLIC PARTNERING</b>		
<i>Issue is of interest to me</i>	<b>Rank 1-2</b>	<b>Issue: <i>Building Public Partnerships</i></b>
<input type="checkbox"/>	_____	A. What processes can be implemented to incorporate public concerns and practical knowledge in determining research needs?
<input type="checkbox"/>	_____	B. What processes can be implemented to incorporate public concerns and practical knowledge in providing oversight of research projects?
<input type="checkbox"/>	_____	C. Other question/comment (Please specify)
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Issue is of interest to me

Rank 1-3

**Issue: *Enriching & Sharing Knowledge***

\_\_\_\_\_

D. How can we synthesize data on chemical and microbial constituents into an accessible source that can be used to assess wastewater management alternatives?

\_\_\_\_\_

E. What new awareness and insights concerning cultural and contextual values are needed to work with the public?

\_\_\_\_\_

F. What new tools and processes are needed to work effectively with the public?

\_\_\_\_\_

G. How can we incorporate all available resources into building and maintaining a public outreach/involvement program?

\_\_\_\_\_

H. How can we capture the successes and lessons-learned to establish an evolving continuum for improving public outreach/involvement programs?

\_\_\_\_\_

I. Other question/comment (Please specify)

\_\_\_\_\_

**8. To what degree do you agree or disagree with the following statement?**

**The WERF 2003-2004 Long-Range Research Plan has correctly identified the most important long-term issues facing the water quality community.**

Strongly Agree

Agree

Disagree

Strongly Disagree

**THANK YOU FOR YOUR TIME!**

**Please fax the completed survey to:  
Stephanie Freno, WERF at (703) 299-0742 and  
Chris Hornback, AMSA at (202) 833-4657**