Date of Report: December 1, 1997

LCMR Final Work Program Update

1. Project Title and project Number: Upper Mississippi River Protection Project, C3 and M1-11

Project Managers: Gary Oberts and Theresa Eclov (replacing Molly MacGregor)
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A. Legal Citation: Sec. Minnesota Resources, Subd.5(m).
Total biennial LCMR appropriation: $200,000
Balance: $0

Appropriation Language: This appropriation from the future resources fund to the commissioner of natural resources for an agreement with the Mississippi headwaters board in cooperation with the metropolitan council to protect the Mississippi river from water quality impairment. This appropriation was matched by at least $100,000 of nonstate contributions, either cash or in-kind.

B. Status of Match Requirement:
Match Required: $100,000
Amount Committed to Date: $112,500
Match Spent to Date: $112,500

II. Project Summary:
A River Defense Network (RDN) has organized private and public parties interested in protecting the Mississippi River from water quality impairment and in developing a network of first responders to supplement regulatory requirements. Completion of technical studies, information management, convening activities in communities along the river from the Headwaters to the Twin Cities and establishment of river monitoring activities in grades K-12 were project activities.

The project was proposed jointly by the Metropolitan Council and the Mississippi Headwaters Board on behalf of the 17-member RDN steering committee and the Mississippi River Watch Project. LCMR funds were used to match U.S. Army Corps of Engineers' funds available for cooperative studies to produce a spill prevention and response manual, a study of spill response equipment needs, an assessment of spill hazards, and refinement of a Corps of Engineers' river model. River Watch Project participants produced a river quality education program, an educational curriculum, and a workbook describing activities that educators can use to protect the river. The products and activities produced will help communities implement spill prevention and response programs for the river, and build a body of information and educational material about water quality of the river and related tributaries.

The project built on two activities: 1) a cooperative venture to more effectively prevent spills and respond to them when they occur, involving private and public entities and a network of first responders from the Headwaters to the Twin Cities, and 2) the Mississippi Headwaters River Watch Project, an ambient water quality monitoring and protection program, established in 1990 on the first 400 miles of the river. Support for the RDN has come from several local, regional, state and federal agencies, industry, and river users, while support for the River Watch Program has come from the Mississippi Headwaters Board, Blandin Foundation and River Watch Network.

III. Final Work Program Update:
Corps personnel assigned to the REMM effort were pulled to perform emergency flood evaluation work in the Red River Valley, resulting in a two month delay in products related to REMM. Work tasks associated with equipment, personnel and training inventory products were completed. Some elements of Task A.1 depend upon input from other tasks (particularly REMM) and were submitted when those inputs became available.

Task A.2 refinement of the potential spill source database was completed. Data screening and local verification was completed for input to REMM. Work on REMM (Task C2) and the dye study of the upper river are complete. Economically and environmentally sensitive sites, and spill containment/diversion sites have been identified and incorporated into REMM. Work on assessment of spill hazard potential was incorporated into REMM.

River Watch curriculum and lesson plans have been prepared and printed. River Watch work book, study guide and evaluation materials have been published.

The preparation of an RDN manual was completed. Distribution of the final bound version will occur in conjunction with distribution of REMM material at RDN training sessions.

IV. Statement of Objectives:

Objective A. Technical Studies Related to Spills. This element evaluates the need for response equipment and the optimal placement of that equipment within the basin, and evaluates the potential hazard posed to various river users by various potential spill sources.
Objective B. River Defenders Convening. Participating teachers will develop river protection lesson plans, deliver these materials and evaluate usefulness within the classroom.
Objective C. Educational Support and River Model Refinement. Numerous curricula, videos and other resources will be acquired to assist teachers with implementing river education programs and the Corps of Engineers will improve select algorithms within REMM to better reflect state-of-the-art hydraulics and chemical modeling. A user's manual will be prepared and refined inventory information from Objective A will be incorporated into the REMM data base. Some in-field verification of the model assumptions will be done.
Objective D. Preparation of Manual and Workbook. The Corps of Engineers will prepare a manual that will contain many elements, including: potential spill sources, spill responders, river users, resource managers; uniform communications protocols to follow in the event of a spill; spill notification procedures; responsibilities of those causing and affected by spills; location and nature of ecologically sensitive areas along the river; location and nature of response deployment sites, and standard response, containment, recovery, and remediation procedures. A River Watch Workbook of lesson plans and activities for grades K-12 describing properties of water, river ecology, water quality, measurement of water quality and relation of land use to water quality, including chemical use by communities, will be prepared.

Timeline for Completion of Objectives:

	7/95	1/96	7/96	1/97	7/97
A. Studies					
1. Equipment needs	XXXXXX				
2. Hazard assessment		XXXXXXXXXXX			
B. Convening					
1. Education program	XXXXXXXXXXXXXXXXXXXXXXXXXXXXX				
2. Program evaluation			XXXXXXXXXXXXXXXXXXXX		
C. Educ./Model					
1. Educ. support	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX				
2. Model refinement		XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX			
D. Publications					
1. RDN manual	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX				
2. RW workbook					XXXXXXXXXX

V. Objectives/Outcome:

A. Title of Objective/Outcome: Technical Studies Related to Spills

A1. Activity: Equipment Needs

A.1.a. Context within the Project: This element evaluates the need for response equipment and the optimal placement of that equipment within the basin.

A.1.b. Methods: Currently available equipment and its location will be evaluated. This data will be compared with the geographic distribution and nature of potential spill sites to identify where equipment would likely be needed. The placement of equipment caches throughout the basin will be explored, as will the legality of equipment sharing.

A.1.c. Materials: This activity will be conducted by the Corps' of Engineers through a cooperative agreement.

A.1.d. Budget
Total Biennial LCMR Budget: $12,500
LCMR Balance: $0
Match: $12,500 from Corps of Engineers
Match Balance: $0

A.1.e. Timeline:

	7/95	1/96	6/96	1/97	6/97
Product 1	XXXXXX				
	(Inventory of current equipment)				
Product 2	XXXXXX				
	(Report assessing equipment needs)				

A.1.f. Final Workprogram Update: All of the inventory element has been completed and incorporated into REMM and/or the response manual. Information on the location of spill threats and potentially impacted users was incorporated in the REMM revision. The report on equipment needs incorporated input from REMM to assess proper equipment placement.

A2. Activity: Assessment of Spill Hazards

A.2.a. Context within the Project: This element examines the potential hazard posed to various river users and resources by various potential spill sources.

A.2.b. Methods: The location and nature of potential spill sources will be reviewed and evaluated relative to their proximity to river users (water utilities, power generation) and sensitive ecological resources. Spill scenarios will be run to determine the potential problems that would likely result if a spill occurred from categorical sources. From this analysis, a determination can be made as to those facilities and resources facing hazard from a spill, and plans can be developed to further protect them.

A.2.c. Materials: This activity will be conducted by the Corps' of Engineers through a cooperative agreement.

A.2.d. Budget
Total Biennial LCMR Budget: $12,500
LCMR Balance: $0
Match: $12,500 from Corps
Match Balance: $0

A.2.e. Timeline:

	7/95	1/96	7/96	1/97	7/97
Product 1	XXXXXXXXXXXXXXXXXXX				
	(Inventory of current potential spill sources and impacted uses)				
Product 2	XXXXXXXXXXXXXXXXXX				
	(Report assessing hazard potential for users/resources)				

A.2.f. Final Workprogram Update: All seven potential spill databases have been updated and were verified at the local level. Meetings were held with affected parties to identify economically and environmentally sensitive areas, and verified spill diversion and containment sites. All of this information was input to REMM, and is available as a separate directory within the model. Work was completed on scenario development for REMM.

B. Title of Objective/Outcome: River Defenders Convening

B1. Activity: Development of lesson plans, teacher training, evaluation.

B.1.a. Context within the Project: Teachers will be used to develop river protection lesson plans, deliver these materials and evaluate usefulness within the classroom.

B.1.b. Methods: MHB prepares lesson plans describing properties of water, ecology of streams and rivers, components of water quality, measurement of water quality and relation of land use to water quality for delivery in grades K-12. Teachers will review and approve materials. Training sessions will be held in use of materials before the school year. Evaluation session will be held in summer months.

B.1.c. Materials: MHB will prepare the materials.

B.1.d. Budget
Total Biennial LCMR Budget: $21,450
LCMR Balance: $0
Match: $0

B.1.e. Timeline:

	7/95	1/96	7/96	1/97	7/97
Product 1	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX				
	(Review of River Defenders activities and lesson plans and teacher training at ELC)				
Product 2				XXXXXXXXXXX	
	(Evaluation of River Defenders activities and lesson plans)				

B.1.f. Workprogram Update:

River protection lesson plans, study guide and evaluation materials have been developed. Materials were presented at workshops in St. Paul in late July 1996, and redrafted for a teacher's workshop Jan. 24-26, 1996. Fifty copies of these materials will be distributed to teachers to evaluate usefulness in the classroom.

River protection lesson plans, curricula, study guides and evaluation materials were presented at two educators' workshops in June, 1997 at Audubon Center of the Northwoods for about 40 participants.

River protection lesson plans, study guides and evaluation materials have been prepared and distributed to 100 teachers in two separate workshop settings. Use of these materials will be evaluated so that final changes and corrections can be made. Evaluation occurred January through March, 1997.

Materials were distributed and used by 35 participants at teacher training workshops in June 1997 at Audubon Center of the Northwoods and Whitewater State Park. Additional changes led to delay in printing the final materials until December 1997.

C. Title of Objective/Outcome: Educational Support and River Model Refinement

C1. Activity: Educational Support

C.1.a. Context within the Project: Numerous curricula, videos and other resources will be acquired to assist teachers with implementing river education programs.

C.1.b. Methods: MHB has reviewed these materials and has produced a bibliography of these materials. MHB is producing a workbook of activities and lesson plans. These materials will supplement the workbook.

C.1.c. Materials: MHB has identified these materials.

C.1.d. Budget

Total Biennial LCMR Budget: $36,050

LCMR Balance: $0

Match: $0

C.1.e. Timeline:

	7/95	1/96	7/96	1/97	7/97
Product 1	XXXXXXXXXXXXXXXXXXXX				
	(Acquisition and distribution of curricula materials)				
Product 2			XXXXXXXXXXXXXXXXXXXX		
	(Evaluation of materials)				

C.1.f. Workprogram Update:

MHB has acquired curriculum for teacher use to educate students on concepts of river ecology, water quality monitoring and analysis, water quality protection and ecosystem management. MHB has also contracted with curriculum providers in Minnesota to provide short workshops to introduce these curriculums to teachers.

Additional materials on relations of geology to rivers and water quality, aquatic plants, manuals guiding chemical and biological analysis of river health are provided and distributed to teachers and educators.

Curriculum on dragon flies as indicators species and how chemical uses by communities influence the river have been prepared for final publication.

Materials were distributed and used by 35 participants at teacher training workshops in June 1997 at Audubon Center of the Northwoods and Whitewater State Park. Additional changes led to delay in printing the final materials until December 1997.

C2. Activity: Refinement of River Model

C.2.a. Context within the Project: This element involves improvements that will made to the Corps of Engineers' Riverine Emergency Management Model (REMM).

C.2.b. Methods: The Corps of Engineers will improve select algorithms within REMM to better reflect state-of-the-art hydraulics and chemical modeling. A users' manual will be prepared and refined inventory information from Objective A will be incorporated into the REMM database. Some in-field verification of the model assumptions will be done.

C.2.c. Materials: This activity will be conducted by the Corps' of Engineers through a cooperative agreement.

C.2.d. Budget

Total Biennial LCMR Budget: $37,500

LCMR Balance: $0
Match: $37,500 from Corps
Match Balance: $0
C.2.e. Timeline:

	7/95	1/96	7/96	1/97	7/97
Product 1	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX				
(Algorithm improvement)					
Product 2			XXXXXXXXXXXXXXXXXX		
(Preparation of users' manual)					
Product 3		XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX			
(In-field verification of model)					

C.2.f. Final Workprogram Update: Delivery of REMM was delayed two months because of staff emergency flood assignments at the Corps. Specific products related to Tasks A.1 and A.2 were completed after the final REMM output was available. The dye study of September 1996 formed the basis of REMM flow verification. A complete REMM product was delivered by September 1, 1997; printed copies were delivered shortly thereafter. The publication of the REMM effort is entitled Riverine Emergency Management Model -- User Manual, Version 3.0, dated August 1997. Limited copies of the model were made available for distribution to critical river defense entities. Distribution of the diskettes and manuals will occur before the end of the year at training sessions.

D. Title of Objective/Outcome: Preparation of Manual and Workbook

D1. Activity: Preparation of River Defense Network Manual

D.1.a. Context within the Project: This element involves the preparation and distribution of a spill prevention and response manual for affected parties on the river.

D.1.b. Methods: The Corps of Engineers will prepare a manual that will contain many elements, including: the names of important parties (potential spill sources, spill responders, river users, resource managers); uniform communication protocols to follow in the event of a spill; spill notification procedures to follow in the event of a spill; the responsibilities of those causing and affected by spills; location and nature of ecologically sensitive areas along the river; the location and nature of response deployment sites where a spill can be contained or diverted; and standard response, containment, recovery, and remediation procedures.

D.1.c. Materials: Preparation of the material within the manual will be done by the Corps' of Engineers through a cooperative agreement. Printing and distribution of the manual will be done by the managers to the extent possible within the budget.

D.1.d. Budget

Total Biennial LCMR Budget: $55,000
LCMR Balance: $0
Match: $50,000 from Corps
Match Balance: $0
D.1.e. Timeline:

	7/95	1/96	7/96	1/97	7/97
Product 1		XXXXXXXXXXXXXXXXXXXXXXXXXX			
(Preparation of chapter on affected parties)					
Product 2		XXXXXXXXXXXXXXXXXXXXXXXXXX			
(Preparation of chapter on uniform communication protocols)					
Product 3			XXXXXXXXXXXXXXXXXXX		
(Preparation of chapter on spill notification procedures)					
Product 4			XXXXXXXXXXXXXXXXXXXXXXX		
(Preparation of chapter on spill responsibilities)					
Product 5		XXXXXXXXXXXXXXXXXXXXXXXXXXX			
(Preparation of chapter on ecologically and economically sensitive areas)					
Product 6		XXXXXXXXXXXXXXXXXXXXXXXXXXXXX			
(Preparation of chapter on spill response deployment sites)					
Product 7			XXXXXXXXXXXXXXXXXXX		
(Preparation of chapter on standard operating procedures)					
Product 8			XXXXXXXXXXXXXXXXXXX		
(Printing and distribution of manual)					

D.1.f. Final Workprogram Update: Work was completed on production of the manual. The printing budget was supplemented by the Blandin Foundation to allow for printing of 500 copies. The manual and REMM will be distributed at training sessions this year. The final RDN manual is entitled Mississippi River Defense Network Spill Response Manual, dated June 1997.

D2. Activity: Preparation of Mississippi River Watch Workbook

D.2.a. Context within the Project: This element involves the preparation and distribution of a workbook for Mississippi River Watch participants.

D.2.b. Methods: The River Watch Workbook is lesson plans and activities for grades K-12 describing properties of water, river ecology, water quality, measurement of water quality and relation of land use to water quality, including use of chemicals by river communities, with specific application for the Mississippi River in Minnesota. This workbook provides age-appropriate activities to build individual stewardship of the river and is built on activities developed in Objective B.

D.2.c. Materials: MHB is providing text for this workbook.

D.2.d. Budget
Total Biennial LCMR Budget: $25,000
LCMR Balance: $0
Match: $0
D.2.e. Timeline:

	7/95	1/96	7/96	1/97	7/97
Product				XXXXXXXXXX	

(Publication and distribution of River Watch Workbook)

D.2.f. Workprogram Update:
Preparation of the River Watch Workbook has been completed, but printing ($25,000) will await a single contract with the RDN manual to obtain a better printing cost. A draft photocopy of the workbook is available if needed by the LCMR.

Printing of 250 complete and 500 partial Workbooks was completed December 1997, following additional changes and corrections. Distribution to teachers and groups monitoring Minnesota streams began immediately.

VI. Evaluation: The River Defense Network components of the project will be successful if the level of spill prevention increases and if the response to spills when they occur happens more effectively. The reasons that the RDN began were to increase knowledge of the potential for spills, to work on preventing them before they occur, to respond more quickly and effectively to spills, and to establish better lines of communications among river users, potential spillers and resource managers. The RDN oversight committee (formerly called the "steering committee") has been asked by the RDN affiliates to manage the various tasks that need to be done before the RDN can become an effective operation. As such, the committee will actively manage the study and work with the Corps on behalf of the RDN to assure that its project goals are met. The project managers are both members of the RDN oversight committee.

The Mississippi Headwaters River Watch Project has the goals of monitoring and protecting the river's health, and using citizens to assist in providing that information. The proposed River Defenders activities will be successful if the materials prepared under this project help teachers and the community prepare students for participation in River Watch; other measures of success will be the extent to which the materials can be incorporated in formal education, especially in grades K-9, and whether these materials are used to develop informal education programs.

VII. Context within Field: The state and federal regulations related to spill prevention and response require that prevention and response planning be done; however, the planning is done on a site-by-site basis with little communication among affected parties, and response is typically slow to occur because of the personnel and equipment mobilization required. This effort is an attempt to improve both the prevention of spills and the early response to them when they occur before the large response contractors arrive. The RDN will also use the materials developed to promote training of potential spillers and responders.

The Mississippi Headwaters River Watch Project was established by the MHB in 1990 to evaluate the effectiveness of the MHB's program of river protection through land use controls. The program provides a baseline of information about water quality. It also raises awareness about the Mississippi River by providing hands-on environmental education in the classroom, uses the Mississippi River as an outdoor classroom and connects human uses of the river with water quality.

VIII. Budget Context:
a) The RDN effort began with a State of Minnesota/Corps of Engineers water planning study (Section 22) conducted from 1991 to 1993 at a cost of approximately $330,000. The City of Minneapolis provided most (approximately $100,000) of the required local match, supplemented by funds from the St. Paul Water Utility, NSP and Lakehead Pipeline Company. The Metropolitan Council provided in-kind project management (approximately equal to $25,000) for the Section 22 study. Subsequent organization and initial planning activities of the RDN have been funded (approximately $30,000) by the Blandin Foundation, the Mississippi Headwaters Board, the St. Paul Water Utility, the State of Minnesota, the Metropolitan Council, the City of St. Cloud and NSP. Funds for managing both of these efforts (approximately $50,000) have been provided by the Metropolitan Council, the City of Minneapolis and the State of Minnesota (EQB, MPCA).

The Mississippi River Watch Project has been conducted since 1990 with $380,000 provided by the Blandin Foundation. Neither effort has been the recipient of LCMR funds.

b) The LCMR grant will provide funds for technical studies related to the RDN. At this time, it is anticipated that the project managers, along with the City of Minneapolis will bear primary management responsibility for the RDN oversight committee. Some funds are being sought from foundations for RDN outreach and organizational activities.

The Mississippi Headwaters River Watch Project is funded by the Blandin Foundation. 1995 expenditures from that source are estimated at $80,000. Special projects related to River Watch have been conducted with funds from The McKnight Foundation ($70,000 from 1994-5). MHB has received a $5,000 Learn and Serve America grant from the Minnesota Department of Education for sampling and organizing in

River Watch communities.

c) Request for Disbursement to Match Federal Funding Phases. Since the state and federal fiscal years do not match, and the Corps of Engineers is under an annual (fiscal year) disbursement format for its funding, the project managers request that the portion of the state disbursement of funds being used to match the federal funds occur in three increments to match federal disbursements. The Phase I disbursement of $12,500 would occur on July 1, 1995; Phase II would be $67,500 on October 1, 1995; and Phase III would be $32,500 on July 1, 1996. The Corps has stated its intent to dedicate Section 22 funds for the state of Minnesota to this project for the duration of the study. Only dramatic cuts in federal funding would negate Corps' participation. Funding of the remaining non-match portions of the grant on a reimbursement basis will not present a problem. A three month advance on the final disbursement was requested by the Corps of Engineers so that the St. Paul District can better compete for much-reduced Section 22 funds. Federal Fiscal Year 1997 Section 22 funds are severely limited, and the advanced disbursement will allow the St. Paul District to assure local financial match beyond any doubt.

IX. Dissemination: All of the technical studies of the RDN-related components will be shared with any affected party expressing interest. Reports done on the studies will be made available through the Metropolitan Council or Mississippi Headwaters Board, as has been the practice in the past. The RDN manual will have an initial printing and distribution within the $5,000 LCMR budget. Printing and distribution beyond this will be on a cost recovery basis.

Materials prepared for the River Defenders part of this proposal will be distributed to any interested party. All materials will be provided to the public school districts of the Mississippi Headwaters region, community education specialists, and public libraries. Member counties of the MHB will also receive materials. The River Defenders Workbook and related material will be distributed to others outside the region for a modest cost, which will be used to fund additional printing of materials.

X. Time: An extension beyond the two-year period was requested due to COE emergency flood duty. Final products related to REMM were delivered by the September 1, 1997 deadline.

XI. Cooperation: This project is managed jointly by the Mississippi Headwaters Board and the Metropolitan Council, based on recommendations of the RDN, through its committees.

XII. Reporting Requirements: Semiannual six-month workprogram update reports will be submitted not later than January 1, 1996, July 1, 1996, January 1, 1997, and a final six-month workprogram update and final report by June 30, 1997.

XIII. Required Attachment:

1. Qualifications: see previous submittals

2. Project Staffing Summary: Project Managers will supervise completion of activities described within Objectives A-D. Each project manager is assigned responsibility for River Defense Network as part of routine job description, which is estimated no more than 25 percent of project managers' normal work load from July 1, 1995 to June 30, 1997. LCMR funds are not required to supplant staff time. All specific work elements will be performed by U.S. Army Corps of Engineers, contractors to be hired or teachers participating in the Mississippi Headwaters River Watch Project. Completion of these work activities are complementary to 1995-97 work schedules for staff for the Metropolitan Council and the Mississippi Headwaters Board.

ABSTRACT

1995 Project Abstract
For the Period Ending September 1, 1997 (as amended from the original June 30, 1997 due date)
This project was supported by the MN Future Resources Fund

TITLE: Upper Mississippi River Protection Project
PROJECT MANAGERS: Gary Oberts and Theresa Eclov
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LEGAL CITATION: ML95, Chp.220, Sec.19, Subd: 5(m).
APPROPRIATION AMOUNT: $200,000.

Statement of Objectives : Conduct technical studies related to spills on the Mississippi River, including an evaluation of the need for response equipment, the optimal placement of that equipment within the basin, and the potential hazard posed to various river users by various potential spill sources. Convene participating River Defenders teachers to develop river protection lesson plans, and deliver these materials and evaluate their usefulness within the classroom. Develop educational support and a refined river spill model (REMM), including numerous curricula, videos and other resources to assist teachers with implementing river education programs, and Corps of Engineers' improvements in select algorithms within REMM to better reflect state-of-the-art hydraulics and chemical modeling. The Corps of Engineers will prepare a manual containing many elements, including: potential spill sources, spill responders, river users, resource managers; uniform communications protocols to follow in the event of a spill; spill notification procedures; responsibilities of those causing and affected by spills; location and nature of ecologically sensitive areas along the river; location and nature of response deployment sites, and standard response, containment, recovery, and remediation procedures. Prepare a River Watch Workbook of lesson plans and activities for grades K-12 describing properties of water, river ecology, water quality, measurement of water quality and relation of land use to water quality, including chemical use by communities.

Overall Project Results All of the above products were prepared and delivered. The River Watch and RDN Manuals, and the REMM Manual and diskettes are available for distribution.

Project Results Use and Dissemination: The products of this LCMR project will be used as basic response tools for emergency responders in the upper Mississippi River basin. The REMM computer model and RDN Manual, respectively, provide user-friendly methods to identify pollutant movement and behavior, and protocol descriptions for emergency response once a spill is detected. The tools can also be used for planning and training purposes. The RDN Manuals and REMM Manuals/diskettes will be distributed as part of training programs to be offered over the next year. The River Watch Manual and educational materials prepared through the Mississippi Headwaters Board provide practical educational tools for educators involved in training students and local volunteers in the techniques for water quality data collection and the importance of such data. The Headwaters Board makes the River Watch Manuals and training available as part of its cooperative program with schools, and to community groups organized to protect streams or watersheds.