This document is one chapter from the EPA "Handbook for Developing Watershed Plans to Restore and Protect Our Waters," published in March 2008. The reference number is EPA 841-B-08-002. You can find the entire document **http://www.epa.gov/owow/nps/watershed_handbook**.

Handbook for Developing Watershed Plans to Restore and Protect Our Waters

Appendix B: Worksheets

March 2008

Appendix B: Worksheets

Worksheet 3-1 Identifying Stakeholder Skills and Resources

Name: _____

Phone: _____

E-mail: _____

Skills/resources	If you possess these skills or have access to these resources	Comments
Skills in Stakeholder Group		
Accounting		
Graphic design		
Computer support		
Fund-raising		
Public relations		
Technical expertise (e.g., geographic information systems, water sampling)		
Facilitation		
Other		
Other		
Resources Available		
Contacts with media		
Access to volunteers		
Access to datasets		
Connections to local organizations		
Access to meeting facilities		
Access to equipment (please describe)		
Access to field trip locations		
Other		
Other		
Other		

Please identify any other skills or resources you bring to the group:

Worksheet 4-1 What Do We Already Know?

1. What are the known or perceived impairments and problems in the watershed?

2. Do we already know the causes and sources of any water quality impairments in the watershed? If so, what are they?

3. What information is already available, and what analyses have been performed to support development of a TMDL, watershed plan, or other document?

4. Have the relative contributions from major types of sources of the pollutant or stressor causing impairment been estimated?

5. Are there any historical or ongoing management efforts aimed at controlling the problem pollutants or stressors?

6. Are there any threats to future conditions, such as accelerated development patterns?

7. Have any additional concerns or goals been identified by the stakeholders?

Worksheet 4-2 What Ecosystem Issues Need to Be Considered?

1. What are the sensitive habitats and their buffers, both terrestrial and aquatic?

2. Where are these habitats located in the watershed?

3. What condition are these habitats in?

4. Are these habitats facing any of the following problems?

   a. Invasive species

   b. Changes associated with climate warming

   c. Stream fragmentation and/or in-stream flow alterations

   d. Changes in protection status

5. On what scale are these habitats considered? (e.g., regional, watershed, subwatershed, or site-specific)

Worksheet 4-3 Building a Conceptual Model

The conceptual model is essentially made up of three parts—the sources (at the top); the impairments (at the bottom); and the stressors (or the steps/relationships between the sources and impairments (in the middle).

1. Start at the end: Define the impairments

The impairments are the endpoints for the conceptual model. Add the impairments in boxes at the bottom of the next page. Put each impairment in its own box on the worksheet. Be as specific as possible. Keep the impairments on the same sheet (don't make a separate model for each impairment). You might find that the impairments share a common source and are linked in unexpected ways.

2. Go to the top

Start listing the most likely sources of impairment. In general, you will identify many more sources than impairments. List the sources in boxes at the top of the next page.

3. Identify the stressors and impacts that link sources to impairments

These boxes provide the links between the sources and the impairments. Draw in as few or as many stressors and impacts as are needed to show cause and effect between sources, stressors, and impairment.

4. Connect the sources, stressor, impacts, and impairments

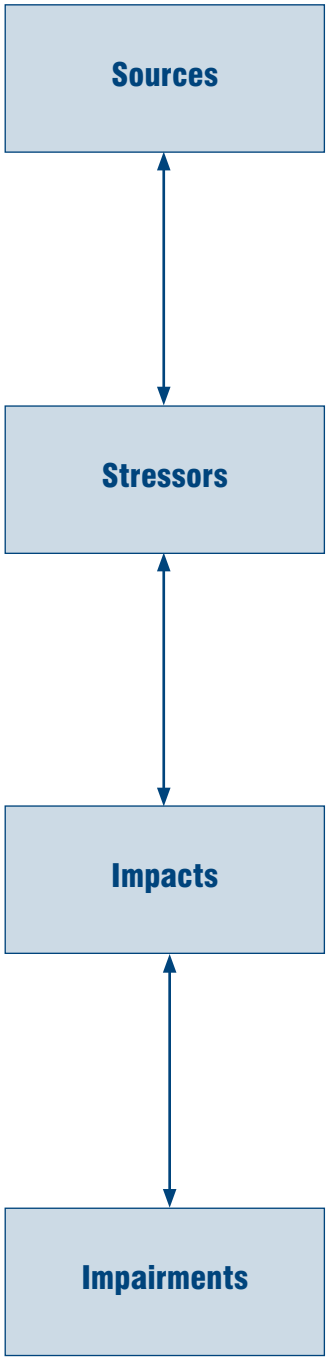
Start drawing arrows between the sources, linkages, and impairments. You might have arrows that go from sources to sources (e.g., between logging and unpaved roads), from sources to linkages, and finally from linkages to the impairments.

Examples

Use the template and examples on the next page as guides to identifying sources, stressors, impacts, and impairments in your watershed.

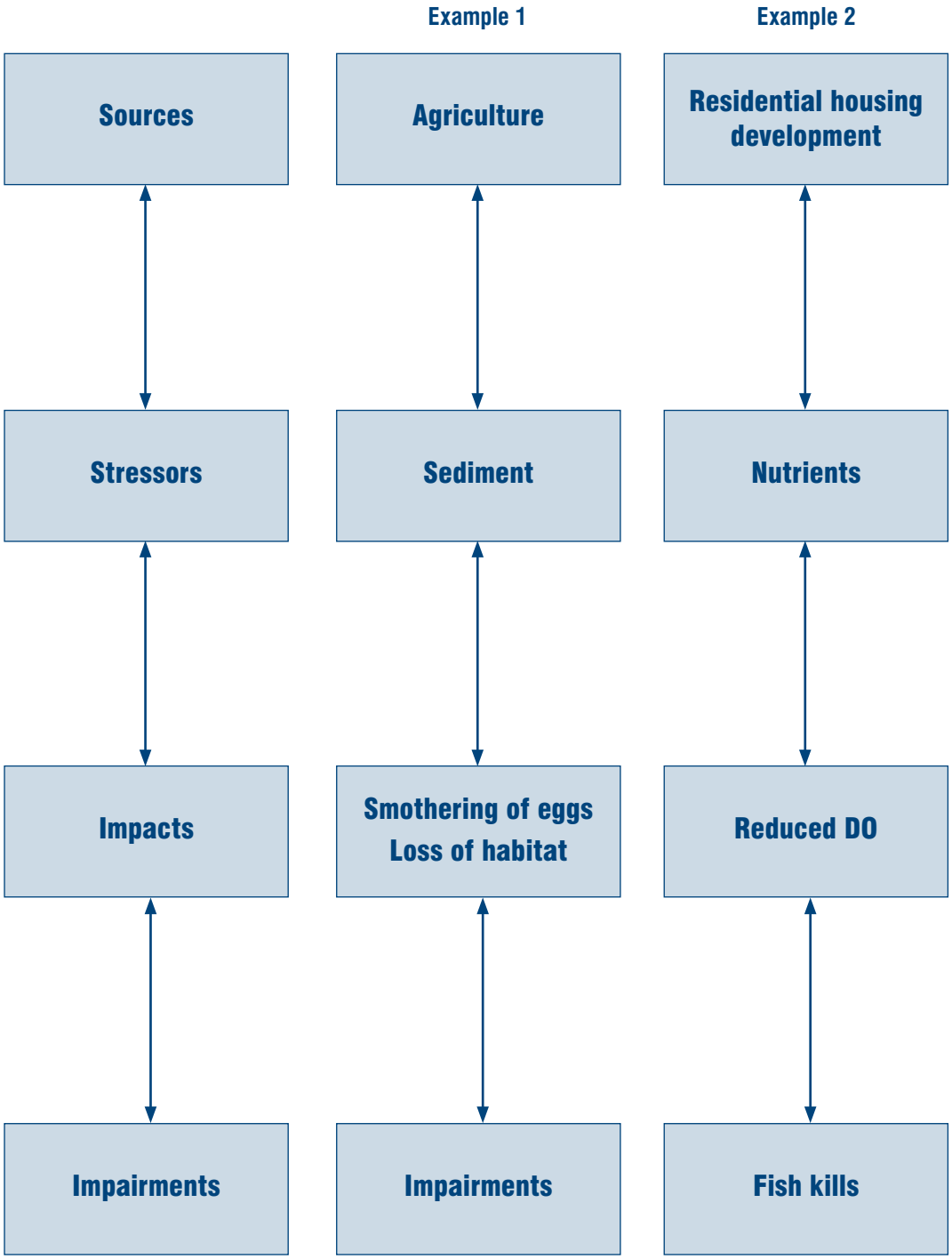
Worksheet 4-3 *Building a Conceptual Model* (continued)

Your sources here



your impairments here

Worksheet 4-3 Building a Conceptual Model (continued)



Worksheet 4-4 Identifying Concerns, Causes, Goals, and Indicators

What are the problems/ concerns in the watershed?	What do you think caused the problems?	How can we assess current conditions? (Indicators)	What would you like to see for your watershed? (Goals)	How will we measure progress toward meeting those goals? (Indicators)

Worksheet 7-1 What Data Analysis Do We Need to Conduct for Water Quality?

Questions to help determine what kinds of data analyses are needed

Question	Answer
1. Are water quality standards being met? If so, are they maintaining existing levels?	
2. Is water quality threatened?	
3. Is water quality impaired?	
4. Are there known or expected sources causing impairment?	
5. Where do impairments occur?	
6. When do the impairments occur? Are they affected by seasonal variations?	
7. Under what conditions (e.g., flow, weather) are the impairments observed?	
8. Do multiple impairments (e.g., nutrients and bacteria) coexist?)	
9. Are there other impairments that are not measured by water quality standards?	

Questions to answer based on the results of the data analysis:

1. What beneficial uses for the waterbodies are being impaired? What pollutants are impairing them?
2. What are the potential sources, nonpoint and point, that contribute to the impairment?
3. When do sources contribute pollutant loads?
4. How do pollutants enter the waterbody (e.g., runoff, point sources, contaminated ground water, land uses, ineffective point source treatment, pipe failures)?
5. What characteristics of the waterbody, the watershed, or both could be affecting the impairment (e.g., current or future growth, increased industrial areas, future NPDES permits, seasonal use of septic systems)?
6. Revisit the conceptual model showing the watershed processes and sources, and revise it if necessary.

Worksheet 7-2 What Data Analysis Do We Need to Conduct for Habitat Assessment and Protection?

1. Where are critical habitats (e.g., headwaters, wetlands, forests, springs and seeps) and their buffers located?

2. What is their conservation status?

3. What is their condition?

4. Are they threatened?

5. Are there opportunities to protect or restore buffers or fill a habitat connectivity gap to reduce fragmentation and protect source water?

6. How does spatial hierarchy (e.g., site, subwatershed, watershed, basin, and region) factor into habitat protection and restoration goals?

7. What are the current and future development projections and who will they affect habitats and their buffers?

Worksheet 10-1 Identifying Existing Management Efforts

Wastewater Discharges

(Source of information: state water quality program administering NPDES permits)

1. Where are wastewater discharges located in the watershed?
   If possible, map the locations.

2. What volume of wastewater is being discharged?

3. What are the parameters of concern in the effluent?

4. For each permit, what are the existing requirements?

5. What is the recent (5-year) history of permit compliance? How severe are the violations, and what caused them?

6. Are significant treatment plant upgrades being planned?
   If so, will the future discharge show a net increase or decrease in pollutant loading?

7. Have potential threats to diminishing water supplies been identified in a source water assessment?

On-Site Wastewater Treatment Systems

(Source of information: local health department)

8. Where are on-site systems located? If possible, map the locations.

9. Are there known concentrations of failing on-site systems? If so, where?

10. Is there a homeowners' education program for proper maintenance of on-site systems?
    Is there an inspection program?

11. What is the depth of the water table?

Worksheet 10-1 Identifying Existing Management Efforts (continued)

Urban Stormwater Runoff

(Source of information: local government engineering and planning department)

12. Are cities and counties in the watershed covered by an NPDES stormwater permit?
    If so, what are the conditions of the permit?

13. Do local governments in the watershed have stormwater ordinances?
    If so, what are the requirements?

14. Do the regulations address stormwater volume and pollutant loading?

15. Do the stormwater requirements apply to redevelopment of existing developed areas?

16. Does the local government have a public education program for pollution prevention?

17. Does the local government have a stream restoration and BMP retrofit program?
    Are projects being located in your watershed?

18. Are any new ordinances or programs being developed or planned?

Agricultural and Forestry Practices

(Sources of information: local NRCS Conservation District office and Forest Service office, state soil and water district office, and state forestry service office)

19. Are there areas with active farming or logging in the watershed?
    If so, map them if possible.

20. Are management plans in place where these activities are occurring?

Worksheet 10-1 Identifying Existing Management Efforts (continued)

21. What percentage of the area uses management practices for controlling sediment and other pollutants? Are these practices effective? If not, why? Are monitoring data available?

22. For areas not using management practices to control runoff, what have been the obstacles to their use?

23. Are there existing stream side buffers? If so, how wide are they?

Note: Farm*A*Syst is a voluntary, confidential program in each state that helps farmers and ranchers evaluate pollution risks to their property and take preventive action to reduce those risks. Further state program information and Web links can be accessed through www.uwex.edu/farmasyst/index.html. Click on "Resources" and the state of interest. Other programs that have developed from Farm*A*Syst include Forest*A*Syst, Stream*A*Syst, and Cotton*A*Syst. Forest*A*Syst provides a series of questions for landowners on the types of practices conducted on their forestland. Stream*A*Syst is a set of materials that landowners review to determine whether there are stream-related factors to improve with better management practices. Cotton*A*Syst is an assessment tool to measure current levels of integrated pest management (IPM) implementation and help cotton farmers improve management practices.

Wetlands and Critical Habitat Protection

(Sources of information: Association of State Wetlands Managers, Association of State Floodplain Managers, local wetlands partners)

24. Have wetlands been identified and evaluated for the habitat value, water quality benefits, and flood control contributions?

25. To what extent do natural buffers and floodplains remain in the watershed?

26. What projects have created or restored wetlands and wetland formations?

27. To what extent are critical habitats such as headwater streams, seeps, and springs that provide many critical functions (e.g., habitat for aquatic organisms) being protected?

28. Has the natural hydrologic connectivity been mapped? If so, are there management practices in place to restore any fragmentation of stream networks?

Worksheet 10-2 Documenting Management Measure Opportunities and Constraints

Sources (e.g., streambanks, urban stormwater, malfunctioning septic systems, livestock in stream)
Causes (e.g., eroding streambanks, unlimited access of livestock, undersized culverts)
Name of management measure or program (NRCS code if applicable)
Data source (i.e., where you obtained your information on the management measure)
Description (what it is and what it does)
Approximate unit cost (including installation and operation and maintenance costs; may be expressed as a range)
Approximate or relative load reduction for each parameter of concern (could be high, moderate, low, or unit reduction per acre per year)
Planning considerations (e.g., project factors such as site size and contributing watershed area; physical factors such as slope, depth of water table, and soil type limitations or considerations; operation and maintenance requirements)
Skill needed to implement the management measures (e.g., engineering, landscape design, construction)
Permitting considerations
Other (e.g., stakeholders' willingness to use the measure)

Worksheet 12-1 Template for Implementation Plan Matrix

Note: prepare one worksheet for each management objective identified.

Watershed Goal:

Management Objective (MO 1):

Implementation Activities						
Management Measures	**Who Needs to Be Involved? (Authorities/ Resp. Party/Other**	**Costs (Annual/ Total Funding Sources)**	**Schedule/Milestones**			
			Short	**Med**	**Long**	**Remaining**
MM 1 Benefits/ estimated load reduction						
MM 2 Benefits/ estimated load reduction						
MM 3 Benefits/ estimated load reduction						
I/E Activities						
I/E 1						
I/E 2						
I/E 3						
Monitoring Component						

Worksheet 12-2 Developing Criteria to Measure Progress in Meeting Water Quality Goals

[Note: Complete one worksheet for each management objective identified.]

Management Objective: Reduce nutrient inputs into Cane Creek by 20 percent				
Indicators to Measure Progress	**Target Value or Goal**	**Interim Targets**		
		Short-term	**Medium-term**	**Long-term**

Worksheet 12-3 Basic Components of a Watershed Plan

Key watershed planning components	Done?	Comments
Include the geographic extent of the watershed covered by the plan.		
Identify the measurable water quality goals, including the appropriate water quality standards and designated uses.		
Identify the causes and sources or groups of similar sources that need to be controlled to achieve the water quality standards.		
Break down the sources to the subcategory level.		
Estimate the pollutant loads entering the waterbody.		
Determine the pollutant load reductions needed to meet the water quality goals.		
Identify critical areas in which management measures are needed.		
Identify the management measures that need to be implemented to achieve the load reductions.		
Prepare an I/E component that identifies the education and outreach activities needed for implementing the watershed management plan.		
Develop a schedule for implementing the plan.		
Develop interim, measurable milestones for determining whether management measures are being implemented.		
Develop a set of criteria to determine whether loading reductions are being achieved and progress is being made toward attaining (or maintaining) water quality standards, and specify what measures will be taken if progress has not been demonstrated.		
Develop a monitoring component to determine whether the plan is being implemented appropriately and whether progress toward attainment or maintenance of applicable water quality standards is being achieved.		
Estimate the costs to implement the plan, including management measures, I/E activities, and monitoring.		
Identify the sources and amounts of financial and technical assistance and associated authorities available to implement the management measures.		
Develop an evaluation framework.		

Worksheet 12-4 Example Checklist for Reviewing Section 319 Work Plans

319 WATERSHED PLANT REVIEW LIST

Watershed:

Plan(s): Document(s) reviewed and dates.

a. An identification of the causes and sources or groups of similar sources that will need to be controlled to achieve the load reductions estimated in this watershed-based plan (and to achieve any other watershed goals identified in the watershed-based plan), as discussed in item b immediately below. Sources that need to be controlled should be identified at the significant subcategory level with estimates of the extent to which they are present in the watershed (e.g., including a rough estimate of the number of cattle per facility, Y acres of row crops needing improved nutrient management or sediment control, or Z linear miles of eroded streambank needing remediation).

- ❑ Plan(s) meets element as demonstrated.
- ❑ Plan(s) **does not** meet element. The following additional information is required:

b. An estimate of the load reductions expected for the management measures described under paragraph c below (recognizing the natural variability and the difficulty in precisely predicting the performance of management measures over time). Estimates should be provided at the same level as in item a above (e.g., the total load reduction expected for row crops, or eroded streambanks).

- ❑ Plan(s) meets element as demonstrated.
- ❑ Plan(s) **does not** meet element. The following additional information is required:

c. A description of the BMPs and techniques (nonpoint source management measures) that are expected to be implemented to achieve the load reductions estimated under item b above (as well as to achieve other watershed goals identified in this watershed-based plan), and an identification (using a map or a description) of the critical areas (by pollutant or sector) in which those measures will be needed to implement this plan.

- ❑ Plan(s) meets element as demonstrated.
- ❑ Plan(s) **does not** meet element. The following additional information is required:

Worksheet 12-4 Example Checklist for Reviewing Section 319 Work Plans (continued)

d. An estimate of the amounts of technical and financial assistance needed, monitoring and I&E cost, associated administrative costs, and/or the sources and authorities that will be relied on to implement the entire plan (include administrative, I&E, and monitoring costs). Expected sources of funding, states to be used section 319 programs, State Revolving Funds, USDA's Environmental Quality Incentives Program and Conservation Reserve Program, and other relevant federal, state, local, and private funds to assist in implementing this plan.

- ❑ Plan(s) meets element as demonstrated.
- ❑ Plan(s) does **not meet** element. The following additional information is required:

e. An information/education component that will be implemented to enhance public understanding of the project and enable the public's early and continued participation in selecting, designing, and implementing the NPS management measures that will be implemented (cost needs to be included in item d above).

- ❑ Plan(s) meets element as demonstrated.
- ❑ Plan(s) **does not** meet element. The following additional information is required:

f. A schedule for implementing the activities and NPS management measures identified in this plan.

- ❑ Plan(s) meets element as demonstrated.
- ❑ Plan(s) **does not** meet element. The following additional information is required:

g. A description of interim, measurable milestones for determining whether NPS management measures or other control actions are being implemented and what will be done if the project is not meeting its milestones.

- ❑ Plan(s) meets element as demonstrated.
- ❑ Plan(s) **does not** meet element. The following additional information is required:

Worksheet 12-4 Example Checklist for Reviewing Section 319 Work Plans (continued)

h. A set of environmental criteria that will be used to determine whether loading reductions are being achieved over time, and substantial progress is being made toward attaining water quality standards. These criteria provide the basis for determining whether the watershed-based plan needs to be revised or whether the nonpoint source TMDL needs to be revised.

- ❑ Plan(s) meets element as demonstrated.
- ❑ Plan(s) **does not** meet element. The following additional information is required:

i. A monitoring and evaluation component to track progress and evaluate the effectiveness of the implementation efforts over time, measured against the criteria established under items g and h above.

- ❑ Plan(s) meets element as demonstrated.
- ❑ Plan(s) **does not** meet element. The following additional information is required:

Worksheet 12-5 Missouri's Nine-Element Watershed Management Planning Worksheet

The attached worksheet provides guidance for the development of watershed management plans that meet the requirements of the Environmental Protection Agency to be eligible for certain grant funding. It is designed to help the user find basic information to begin the development of these watershed management plans, as well as providing information about the nine elements that are required in the plan. The completion of this worksheet does not constitute an approved plan, but it should provide the user with the basic necessary information from which an approved watershed management plan can be developed and ultimately implemented.

Completing the Worksheet:

This worksheet must include the Waterbody Identification Number (WBID) of the impaired waterbody that the planning effort will impact.

If a Total Maximum Daily Load (TMDL) has been written for the watershed, the Watershed Management Plan must be designed to achieve the reduction in pollutant load called for in the NPS Total Daily Maximum Load (TMDL). If a TMDL has not been developed for the waterbody, the plan must include implementation practices to remove the waterbody from the 303(d) list.

Project Name:	**Waterbody Name(s)**	**Waterbody ID Number**
Project Sponsor:		
Address:		
Project Manager:		
Phone:		
E-mail:		

Watershed Identification					
Name of Watershed:					
HUC Codes for all 14-Digit Watersheds in Planning Effort:					
Total Area Encompassed in Planning Effort (Acres):					
Approved TMDLs with nonpoint source impairments (if any) **See Attachment B**	Waterbody	WBID	Size	Pollutant(s)	Source
Does the area encompass a Public Water Supply?	Yes ❑	Name(s):			
	No				

Worksheet 12-5 Missouri's Nine-Element Watershed Management Planning Worksheet (continued)

Elements of the Watershed Management Plan (see Attachment C)									
Element A Pollutant(s) Addressed in the Plan:	**Pollutant Category** (see Attachment D) (Mark all that apply)								**Element A** Quantify Sources of Pollutant (e.g., # of cattle, # of acres, miles of stream, etc.)
	Ag CP	**Ag AP**	**Silv.**	**C**	**U/ SW**	**HM**	**LD**	**RE**	
Sediment									
Nutrients									
Pesticides									
Fecal Coliforms									
Dissolved Oxygen									
Metals									
pH									
Other/Unknown									
AgCP-Agriculture Crop Production, **AgAP**-Agriculture Animal Production, **Silv.**-Silviculture, **C**-Construction, **U/SW**-Urban/Stormwater, **HM**-Hydrologic/Habitat Modification, **LD**-Land Disposal, **RE**-Resource Extraction									

NPS Management Measures—Element C		
BMP to Be Implemented (For a list of some BMPs, refer to the Natural Resources Conservation Service's (NRCS) Electronic Field Office Technical Guide)	**Total # or Area Unit of Measure**	**Estimate of Pollutant Load Reduction—Element B**

Describe Methods Used to Estimate Pollutant Load Reduction:

Worksheet 12-5 Missouri's Nine-Element Watershed Management Planning Worksheet (continued)

Estimate of Assistance Needed—Element D	
Agency Providing Technical Assistance (For a list of some agencies, refer to appendix J of the Nonpoint Source Management Plan)	**Technical Assistance to be Provided**

Agency Providing Technical Assistance (For a list of some agencies, refer to appendix J of the Nonpoint Source Management Plan)	**Amount of Financial Assistance Provided**

Schedule for BMP Implementation—Element F				
	Anticipated Date of Completion			
BMP to Be Implemented	25% complete	50% complete	75% complete	100% complete

Description of Interim Milestones—Element G
Describe interim, measurable milestones:

Method Used to Determine Load Reduction—Element H	**Pollutant Type(s)**
Fixed Station Network	
Intensive Surveys	
Toxics Monitoring Program	
Biological Monitoring Program	
Fish Tissue Analysis	
Volunteer Monitoring Program	
Other(s)	

Worksheet 12-5 Missouri's Nine-Element Watershed Management Planning Worksheet (continued)

Monitoring Program—Element 1
Describe monitoring component(s):

Information/Education Component—Element E
Describe information/education component(s):

Worksheet 13-1 Sample Watershed Stakeholder Committee Evaluation

Possible Evaluation Questions for Participants

Purpose: To determine how the level of participation in the Watershed Stakeholder Committee has changed over the past 2 years and why, and to assess the usefulness of the Committee.

Name/Affiliation:

Participation

1. How many Watershed Stakeholder Committee meetings have you participated in over the past 2 years?

2. If you have not participated in all the meetings, what factors would have increased your participation?

- ❑ Hosting the meeting closer to where I live.
- ❑ Hosting the meeting at a time that was more convenient for me, such as .
- ❑ Providing more advance notice of where and when the meeting was to be held.
- ❑ Including topics for discussion that were more relevant to my interests.
- ❑ Other:

Group Structure

1. Do you feel the size of the group was adequate? Please explain.

2. Do you feel the composition of the group was representative of the watershed community? Please explain.

Group Input

1. Do you feel the meetings were held to optimize participation from the attendees? Please explain.

2. Do you feel that your input was incorporated into the watershed management planning process? Please explain.

Overall Recommendations

1. What do you think are the most useful aspects of the Watershed Stakeholder Committee?

2. What do you think can make the Watershed Stakeholder Committee more useful?

3. Would you like to be involved in future watershed protection efforts?

Worksheet 13-2 Sample Topics to Discuss at Quarterly Review of Watershed Management Plan

Review Administrative and Management Activities

1. Are we on track with resources and expenditures?

2. Do we have any gaps in skills or do we need additional technical assistance?

3. What implementation activities have occurred since the last quarterly meeting?

4. Are we meeting our implementation milestones?

5. What are the next management measures to be implemented?

6. Do we have the resources/skills/authorities to proceed?

Review I/E Activities

7. Are we getting participation at the events?

8. What materials have been produced?

9. How were they distributed?

10. What are the upcoming I/E activities?

Review Monitoring Activities

11. Are we meeting our interim load reduction targets?

12. When is the next round of monitoring?

13. How will we publicize the monitoring results?

Additional Issues

14. Are there any upcoming initiatives or new regulatory requirements of which we need to be aware?

15. Are there any additional issues that we need to discuss?