Intermittent Water and Water Pressure Recommendations

Contents

Chapter 4

Chapter 4 discusses issues related to data integration and watershed assessment. This chapter discusses two primary opportunities for coordination—preliminary data compilation and streamlined collection of additional data. The Comprehensive Preliminary Watershed Assessment is presented as a tool for preliminary data compilation. This tool focuses the efforts of the WCT on the most important watershed issues and helps identify the primary stakeholders and watershed cleanup goals. It is an effective tool that will help project managers understand watershed conditions and develop a preliminary watershed conceptual model.

Streamlining watershed assessment involves coordinated and collaborative data collection. To ensure that all opportunities for integration are used to save resources while reducing the waste of duplicative sampling efforts, coordinated assessment activities are performed independently by programs, agencies and stakeholders. The WCT reviews in advance the sampling and analysis plans (SAPs), which include the field sampling plan (FSP) and the quality assurance project plan (QAPP). Collaborative assessment is conducted when WCT partners combine efforts to perform additional assessment and sampling. Collaborative assessment requires developing common approaches and consistent methods that consider the multiple programs involved.

To integrate data compilation and collection, managers must consider the data requirements of the various programs. Chapter 4 presents issues that involve compiling existing data and collecting additional data, such as data quality, data evaluation, data management and the benchmarks against which the data are compared. It also presents the Triad approach to sampling used by several EPA programs. To provide personnel from different programs with an understanding of other program efforts, the chapter ends with a summary of typical program-specific assessment procedures and requirements.

Chapter 5 discusses integrated watershed cleanup topics such as the Watershed Feasibility Assessment (WFA), "Three-Rs" approach, Superfund-Restoration integration, total maximum daily load (TMDL)-Restoration integration using water quality trading, Supplemental Environmental Projects and WCT task assignments. It also discusses integrated monitoring. The chapter continues with a summary of program requirements for determining remediation and restoration actions and for long-term monitoring of watershed conditions. It concludes with additional topics that managers should consider in watershed cleanup such as wetlands and other applicable or relevant and appropriate requirements (ARARs).

This document proposes that federal and state programs and local watershed groups use the WFA to review and prioritize cross-programmatic cleanup opportunities. The WFA provides critical information regarding significant point and nonpoint sources (NPS) that have been identified and quantifies their associated loads to surface water. The analysis suggests potential remediation alternatives and assigns costs associated with specific load reductions. The WFA might not fulfill all the requirements of the various programs (such as a Superfund Feasibility Study (FS), Engineering Evaluation/Cost Analysis (EE/CA), or TMDL allocated loads), but it would provide the framework for these documents. To facilitate cleanup at each individual location, managers would perform fine-tuned assessment and design in subsequent steps according to specific program requirements.

The "Three-Rs" are remediation, restoration and reuse. The WCT should cooperatively set remedi

ACRT.....Allis Chalmers Reorganization Trust
AEA.....Atomic Energy Act
AMD.....Acid Mine Drainage
AML .....Abandoned Mine Land
ARARs.....Applicable or Relevant and Appropriate Requirements
ASTM .....American Society for Testing and Materials
ATSDR.....Agency for Toxic Substances and Disease Registry
AWPPG .....Assessment and Watershed Protection Program
AWRC .....Anacostia Watershed Restoration Commission
BASINS .....Better Assessment Science Integrating Point & Nonpoint Sources
BCHD .....Boulder County Health Department
BEAP .....Brownfield Environmental Assessment Program
BEDI.....Brownfields Economic Development Initiative
BFPP.....Bona Fide Prospective Purchaser
BEACH .....Beaches Environmental Assessment Closure and Health
BIA .....Bureau of Indian Affairs
BLM.....Bureau of Land Management
BMPs

USFS .....U.S. Forest Service
USFWS.....U.S. Fish and Wildlife Service
USGS.....U.S. Geological Survey
USNPS .....U.S. National Park Service
UST .....Underground Storage Tank
VCP .....Voluntary Cleanup Program
VOC.....Volatile Organic Compound
WATERS .....Watershed Assessment, Tracking, and Environmental Results
WCT .....Watershed Cleanup Team
WFA .....Watershed Feasibility Assessment
WLA .....Wasteload Allocation
WPDG .....Wetlands Program Development Grants
WQBELs .....Water Quality-Based Effluent Limits
WQLS .....Water Quality Limited Segments
WQS.....Water Quality Standards
WQSDB .....Water Quality Standards Database
WQX .....Water Quality Exchange
WRDA .....Water Resources Development Act

Purpose

EPA's princip anregulare y pgrams tothatucontrol ongog W[illegible]

Organization

This manual describes the interrelationships between programs and agencies involved in watershed assessment and cleanup, and it suggests potential opportunities for program integration. This introductory chapter presents a brief background on cleanup programs, elements of a successful

Assessment, Cleanup and Restoration

Various federal and state programs address the assessment, cleanup and restoration of contaminated waterbodies. These programs are discussed in detail in Chapter 2. Because Superfund and RCRA sites are often in watersheds where TMDLs are being developed, the chapter summarizes three of the most prominent programs: the CERCLA Program, the RCRA Corrective Action Program, and the TMDL Program.

The CERCLA Program identifies sites from which hazardous substances, pollutants or contaminants have been released or have the potential to be released, posing a threat to human health or the environment. If a site has been deemed sufficiently hazardous, it is placed on the National Priorities List (NPL) to receive funding and priority for cleanup. In general, EPA carries out the Superfund Program at most Superfund sites, either directly or by supervising work being performed by potentially responsible parties (PRPs). States can have the lead role at sites within their jurisdiction after developing a Superfund Memorandum of Agreement (SMOA), State-Superfund Contract (SSC), and/or a Cooperative Agreement (CA) with EPA. Other federal agencies carry out CERCLA cleanups (using separately appropriated funds) at facilities under their respective jurisdiction, custody or control.

Accidents or other activities at RCRA treatment, storage, and disposal facilities have sometimes released contamination into soil, ground water, surface water and air. The RCRA Corrective Action Program allows these facilities to address the investigation and cleanup of such releases themselves, under governmental supervision. The RCRA Corrective Action Program differs from Superfund in that it deals with sites that have viable operators and ongoing operations.

Under the CWA's TMDL Program, states are required to identify waterbodies that do not meet WQS. Such impaired waterbodies are placed on the state's CWA section 303(d) list if a TMDL has not yet been completed. For each waterbody on a state's 303(d) list, the state must calculate how

Figure 1-1. Watershed Cleanup Process

the extent and importance of the elements are likely to vary depending on the scope, location and complexity of the problem and the status of any existing program activities in the watershed. Community involvement is encouraged throughout the process and, indeed, is a required part of any CERCLA cleanup or TMDL development. Although, ideally, progress through these steps will be iterative, the key point is to ensure that they are accomplished, drawing on all possible resources available from all the stakeholders.

1. Identify driving forces and scale of watershed effort. The identification of an affected watershed often begins with a CWA 303(d) or NPL listing. These actions spur public interest and trigger funding support for public and agency involvement. The geographic scale of the project area will vary with the scope of the problem and the location of sources that contribute to the problem. If subwatersheds are designated, an additive approach can be taken to allow integration with downstream subwatersheds. The scale of the effort can also be defined by the impacts that will be addressed. The hydrologically defined geographic area should include all potential sources that can contribute to the impairment of the waterbody.

2. Compile existing data. To conduct an initial assessment, the Watershed Cleanup Team (WCT) collects and evaluates all existing water chemistry and flow, sediment, geological, soils, biological and source 5(,)5(u6 0 TdoS)5(a)5(noblem and t(o)5(w)ac6 -1.3 Tr)5(u)5(r)5(t)5(e)5(d)5( )5(l)5( )5(a)5(

cleanup of selected sites require supporting technical analysis demonstrating that the cleanup will attain and maintain the water quality defined by individual program standards.

9. Conduct the cleanup. Cleanup can be accomplished through CERCLA or RCRA actions, voluntary cleanups, brownfields cleanups, and implementation of NPDES permits, TMDLs, best management practices (BMPs) or any other available methods. Each of these cleanup methods typically requires the participation of the affected site owner and other PRP, voluntarily or pursuant to enforceable requirements. In addition, EPA might have resources to fund CERCLA cleanups, to facilitate brownfields cleanups and to otherwise aid the effort. To avoid potential conflicts that can arise when trying to coordinate schedules and appropriate levels of cleanup for taking action to address releases from different sources within a watershed under different regulatory authorities, a document can be developed in which stakeholders delineate a clear process and line of authority for managing cleanup actions. The document need not itself be legally binding but can reference regulations or other agreements.

10. Monitor performance. The watershed project manager develops a monitoring plan to determine the effectiveness of the implementation or cleanup actions and determine whether load reductions are being achieved and endpoints met. Effective long-term monitoring should include parameters of interest to all stakeholders and can include involvement of federal, state, tribal and local agencies; community groups; volunteer organizations; and educational institutions.

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Although the stakeholders should represent a cross section of the community or communities affected by the watershed cleanup, the WCT will likely need to communicate directly with those affected by its work. CERCLA and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) require extensive outreach to affected communities, and cleanups proposed at NPL sites must be presented to the public for their review and comment. EPA has issued several useful guidance documents supporting such activities, including the Superfund Community Involvement Handbook, . EPA is developing an additional resource for creating and operating a WCT, Draft Handbook for Developing Watershed Plans to Restore and Protect Our Waters, EPA 841-B-05-005, October 2005, . EPA maintains a searchable, online directory of watershed organizations at that lists more than 4,000 groups involved in watershed protection activities across the country. This can serve as a useful resource in reaching out to key community groups.

Cross Bayou Watershed, Pinellas County, Florida

CASE STUDY

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State of Oregon

» *Industrial Water Supply:*

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Parameters of Concern: ,

Priority 4

» *Livestock Watering:*

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Parameters of Concern: a

» *Other Resident Fish and Aquatic Life:*

Parameters of Concern: , , ,

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» *Aesthetics:* (-)

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Parameters of Concern: , a, ,

Federal, state and local environmental agencies often have an interest in site assessment and cleanup and might be able to contribute to the watershed remediation process. This chapter describes the potential roles, authorities and interests of each of these agencies. The level of participation of a program will vary from project to project. The watershed project manager should ensure that respective parties' roles in a specific watershed project are discussed and identified at the initial meetings, while allowing for adjustment during subsequent meetings according to the projects. This chapter describes the agencies that operate under major environmental authorities, and then describes other stakeholders and the roles each can play in watershed investigation and cleanup. Additional entities that can provide resources for watershed cleanup are described in Chapter 3.

Watershed Cleanup Team

Table 2-1.

Table 2-1. EPA Programs Using a Watershed Approach (continued)

Context

Perhaps the most important programs for consideration by the WCT are found in the CWA, which establishes several means to restore and maintain the chemical, physical, and biological integrity of the nation's waters.[1] The 1972 Act set forth a goal of achieving zero discharge of pollutants by 1985 and, as an interim goal, wherever attainable, achieving water quality that provides for protection and propagation of fish, shellfish, and wildlife, and recreation in and on the water by mid-1983. These goals remain today. Under the CWA, a pollutant is broadly defined to include industrial, municipal or agricultural waste discharged into water, subject to certain exceptions. The term pollutant means dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal and agricultural waste discharged into water. (Note that, as discussed below, certain categories of activities involving pollutants may nevertheless be exempt from regulation under the CWA.)

The Water Quality Standards and Water Quality Monitoring and Assessment Programs provide the foundations for the CWA water quality programs. Once water quality conditions and goals have been established, the CWA includes various programs, including TMDL, NPS, and NPDES for achieving those water quality conditions and goals. EPA and state environment departments administer all CWA programs except for the CWA section 404 Dredge and Fill Program (see Chapter 5 of this manual), which the USACE jointly administers with EPA and authorized states.

The Clean Water Act requires point source discharges to receive NPDES permits (see further discussion below). Permits must consider both technology-based and water quality-based effluent limitations. All dischargers must meet industry-specific effluent limitations based on the technology available to control pollution. Where NPDES permit authorities (states and EPA) determine that these technology-based effluent limitations are inadequate to attain or maintain water quality

E to t t t o d Ass ss t o

www.epa.gov/owow/monitoring/elements/elements.html

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1. *Monitoring Program Strategy*

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2. *Monitoring Objectives*

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7 . *Data Analysis/Assessment*

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( ) 2000. *Guidance for 2006 Assessment, Listing, and Reporting Requirements Pursuant to Sections 303(d), 305(b), and 314 of the Clean Water Act* (200 ,

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www.epa.gov/owow/tmdl/2006IRG, www.epa.gov/owow/tmdl/2008_ir_memorandum.html

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10. *General Support and Infrastructure Planning*

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EPA encourages states to prepare a single report (the Integrated Report) that satisfies the reporting requirements of sections 303(d), 305(b), and 314, and describes the state's assessment methodology for making water quality attainment determinations (see EPA's Integrated Reporting Guidance at). As part of EPA's guidance to states for preparing Integrated Reports, EPA recommends that states use the following five reporting categories to report on the water quality status of all waters in their state:

Category 1:

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The regulated entities must obtain an NPDES stormwater permit and implement stormwater pol

» Quantify the total amount of pollutant that can be allowed into the water and what reductions are needed to achieve that amount. Surrogate endpoints may be established that are directly linked to the impairment to ensure the achievement of the water quality goals.

The following two elements are not required but may be included with a TMDL submission.

» Identify and implement the practices needed to reduce excess pollutants.

» Monitor the waterbodies to ensure the goals are being met, and modify the plan if needed.

TMDL documents are measured against the following review criteria:

1. **Water Quality Impairment Status**
   TMDL documents should include a description of the listed water quality impairments (pollutants). While the 303(d) list identifies probable causes and sources of water quality impairments, the information contained in the 303(d) list is generally not sufficiently detailed to provide an adequate understanding of the impairments. TMDL documents should include a thorough description or summary of all available water quality data such that the water quality impairments are clearly defined and linked to the impaired beneficial uses (e.g., aquatic life, drinking water) and/or appropriate WQS.
2. **Water Quality Standards**
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6. Allocation

TMDLs apportion responsibility for taking actions or allocating the available assimilative ca-. A perkinmance-

estuaries, other coastal waters and ground water. Atmospheric deposition and hydrologic modification are also NPS of pollution.

Section 319 of the CWA authorizes EPA to award grants to states and territories (hereinafter referred to as states) for the purpose of assisting them in implementing approved NPS management programs developed pursuant to section 319(b). The primary goal of the NPS Program is to

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Clean Water Act Enforcement

EPA or the state may issue an order to any person or company who violates the CWA. The order may impose a civil penalty plus recovery of any economic benefit of noncompliance and may require correction of the violation. Any person discharging a pollutant into the waters of the United States is subject to the enforcement provisions of the CWA. A person is defined as an individual, corporation, partnership, association, state, municipality, commission or political subdivision of a state, or any interstate body. Under section 309 of the CWA, penalties for discharging a pollutant

primary parts: Source Water Assessment and local Source Water Protection planning and implementation. The state conducts a Source Water Assessment and identifies the area of the water-

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RCRA governs the management of solid waste and its subset, hazardous waste, as well as USTs.[2] To achieve these goals, RCRA established three distinct yet interrelated programs whose different characteristics the WCT must consider when looking at both sources of contamination and resources for cleanup. RCRA Subtitle D, the solid waste program, encourages states to develop comprehensive plans to manage nonhazardous industrial solid waste and municipal solid waste, sets criteria for municipal solid waste landfills (MSWLFs) and other solid waste disposal facilities and prohibits the open dumping of solid waste. RCRA Subtitle C, the hazardous waste program,

of hazardous waste, both of which are described in 40 CFR section 261, Identification and Listing of Hazardous Waste. There are two types of RCRA hazardous wastes: those that have been specifically listed as a hazardous waste by EPA (e.g., F001 wastes, comprised of certain halogenated solvents that have been used in degreasing activities) and those that exhibit one or more of the following characteristics of hazardous wastes (corrosiveness, ignitability, reactivity, or toxicity).

» Corrosive Waste. A corrosive material can wear away (corrode) or destroy a substance. For example, most acids are corrosives that can eat through metal, burn skin on contact and give off vapors that burn the eyes.

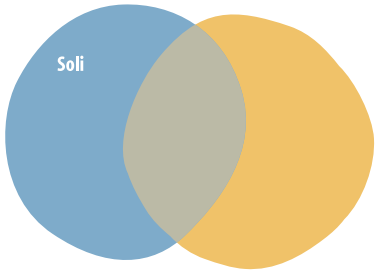
» Ignitable Waste. An ignitable material can burst into flames easily. It poses a fire hazard; can irritate the skin, eyes and lungs; and could give off harmful vapors. Gasoline, paint and furniture polish are ignitable.

» Reactive Waste. A reactive material can explode or create poisonous gas when combined with other chemicals. For example, chlorine bleach and ammonia are reactive and create a poisonous gas when they come into contact with each other.

» Toxic Waste. Toxic materials or substances can poison people and other life. Toxic substances can cause illness and even death if swallowed or absorbed through the skin. Pesticides, weed killers and many household cleaners are toxic.

Additionally, RCRA hazardous wastes generally include materials generated by the treatment of hazardous waste (the derived from rule), or that are contained in a hazardous waste (the mixture rule).

RCRA Subtitle C establishes an extensive management system that regulates hazardous waste from the moment it is generated until its ultimate disposal, in effect from "cradle to grave." EPA's Subtitle C Program establishes various administrative requirements applicable to the three categories of hazardous waste handlers: generators; transporters; and owners or operators of treatment, storage and disposal facilities (TSDFs). The regulations applicable to RCRA TSDFs are the most extensive; therefore, facilities that only generate hazardous wastes typically take steps to ship such wastes to TSDFs before they trigger the TSDF regulations. Additional information regarding the Subtitle C Program is at .



Of special interest to the WCT, TSDFs are required to assess all their solid waste management units, regardless of when the wastes were disposed of, and to perform corrective action for all releases of hazardous waste and hazardous constituents. Facilities must implement corrective action when necessary to protect human health and the environment, plus perform off-site corrective action when necessary. EPA estimates that at least 3,700 facilities are undergoing corrective action.

RCRA corrective action follows several steps, which are largely analogous to the CERCLA cleanup process.

1. RCRA Facility Assessment (RFA). An RFA is performed to determine evidence of a release and includes desktop review of available information, visual inspection and, occasionally, confirmatory sampling. After the RFA is completed, a schedule of compliance is developed for additional steps, if necessary.

2. RCRA Facility Investigation (RFI). An RFI is a detailed characterization of the nature,

pollutants or contaminants are generally not subject to EPA's enforcement authorities under sections 106 and 107.

Release: The term release is also defined broadly under CERCLA to include "any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping or disposing into the environment."

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to nearby targets (such as water intakes). The SI can be conducted in one stage or two. The

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1. Remedial Investigation/Feasibility Study. , ,

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2. Proposed Plan (PP). (
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3. Record of Decision. , ./ ,
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4. Remedial Design/Remedial Action.
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CERCLA Enforcement Authorities

A key element of CERCLA is its emphasis on enforcement. CERCLA provides EPA with enforcement authorities to get PRPs to implement removal or remedial actions at sites, either through consensual settlements or unilateral enforcement orders. CERCLA also provides EPA (as well as state and local governments and even private parties) the authority to seek reimbursement of its costs from PRPs. EPA's guiding philosophy in implementing the Superfund Program is to pursue enforcement first throughout the process. In this way, EPA seeks to compel those who are responsible for hazardous waste sites to undertake the cleanup and to conserve the resources of the trust fund for those sites where no PRPs can be found.

Under CERCLA, a person (which can include a corporation, a governmental entity and a variety of other organizations, as well as individuals) can be liable for response costs where:

- There is a release or a threatened release of a hazardous substance from a facility into the environment that causes incurrence of response costs, and
- The person is included in at least one class of PRPs

American Canyon, Utah

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Remediation/Restoration Goals

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Additional support for CERCLA assessment and cleanup is available from a variety of agencies,

requirements for implementation fall only on point source dischargers (NPDES permits are required to be consistent with wasteload allocations). These regulated point sources are frequently interested in the development, and implementation of TMDLs and can provide significant resources. Revitalized land can also interest various industry groups.

Educational Institutions

Universities can provide assistance for communities in assessment and cleanup of watersheds and often have previously undertaken relevant research. Cooperative efforts benefit both the university and the community. Universities can provide a high level of expertise at low cost. University stud-

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Collaborative Assessment and Feasibility Analysis

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Watershed-based cleanups can be accomplished through various funding and other resources available for investigation, cleanup, monitoring and community involvement. This section presents government funding opportunities available to various stakeholders, applicability of funds, accessing the funds and project requirements in use of the funds. Additional sources of funding could be available through state programs and government appropriations. A thorough review of grants and other funding available for specific projects should be conducted to determine potential assistance. A summary of assessment and cleanup financial resources is provided in Table 3-1 at the end of this chapter. One Web site that can help you find federal grants for a variety of tasks and grantees is .

This section also presents nonfinancial resources available through government and nongovern-

Brownfield projects that may be eligible for CWSRF funding includes, but is not limited to the list below:

- Excavation and disposal of USTs
- Constructed wetlands (filtering mechanism)
- Capping wells
- Excavation, removal and disposal of contaminated soil or sediments
- Tunnel demolition
- Well abandonment
- Phase I, Phase II, and Phase III assessments

Some potential repayment sources include the following:

- Fees paid by developers on other lands
- Recreational fees (fishing licenses, entrance fees)
- Dedicated portions of local, county, or state taxes or fees
- Property owner ability to pay (determined during loan application)
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purchase of vehicles or completion of work that was to have been completed under a prior grant. Region 8 criteria for their Consolidated Funding Process are summarized at the end of this section. Projects are funded from $10,000 to $200,000 with an average of $45,000.

EPA national or regional priorities, funding levels, current specifications and review criteria for proposals will be identified in the competitive funding announcements. To identify potential competitive funding opportunities for water program funding, see . The competitive announcements will identify proposal/application specifications and evaluation criteria.

To see examples of grants that have been awarded and the types of work they are funding, see the Left Hand Watershed Case Study in Chapter 2.

The Water Program funding sources listed below are managed differently in the various EPA Regions. Because of the regional differences in the management of these funds, a review of regional procedures and priorities should be performed to determine what resources are most useful for a watershed.

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and outcomes, must result in products/deliverables, should address national and regional priorities, and must demonstrate a 25 percent nonfederal match. While grants can be used to build and refine any element of a comprehensive wetland program, priority is currently given to projects that address the following two priority areas identified by EPA: enhancing wetlands protection/regulations and developing a comprehensive monitoring and assessment program.

Regional Geographic Initiative. (RGI) (CFDA 66.034, 66.424, 66.436, and 66.716) Most RGI grants are awarded under the authorities of section 103 (b)(3) of the CAA or section 104 (b)(3) of the CWA and, therefore, must qualify as a "survey, study, research, investigation, experiment, training, or demonstration." RGI is not a grant program but a pot of funds that the regions receive annually to address high priorities identified each year. The money can be used to fund grants, but there are other funding vehicles used for this money (includes funding contracts, and the like). Each Region has full authority to determine its own priorities for using this money; there are no set dollar amounts identified for water, watershed or waste projects. Grants, cooperative agreements and IAGs can be made available to state water pollution control agencies, interstate agen

Approved state NPS management programs provide the framework for determining what activities are eligible for funding under section 319(h). Examples of previously funded projects include the installation of BMPs to control animal waste from animal feeding operations (not subject to NPDES permit requirements), streambank stabilization and shoreline restoration projects, forest road decommissioning to reduce erosion and sedimentation, basinwide landowner education programs and wetlands restoration projects. Section 319 funds may also be used to fund abandoned mine land reclamations projects and urban storm water activities that are not specifically required by a draft AML or final NPDES permit. Additional details regarding these types of projects are given below:

» Updating and refocusing the state NPS Management Program and NPS Assessments to improve program effectiveness. States may use up to 20 percent of their base section 319 allocation for this purpose. States should refine their programs to reflect their most press-

Middle Fork Holston, Virginia

CASE STUDY

Region 8 2006 Criteria to Assist in Selecting Potential Funding Opportunities for Watershed Projects

Description of Funding Programs

1. Regional Geographic Initiative (RGI):

Projects that protect and restore water quality on a watershed basis:

www.epa.gov/water/waterplan/documents/FY06NPGNarrative.pdf).

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2. Total Maximum Daily Load (TMDL) Program: D -

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Table CS-1. Description of Funding Programs and Eligibility

Funding Program	CFDA[1]	Number Matching	Funds/ Type of Award	Mechanism/ Eligible Applicants
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[1] The Catalog of Federal Domestic Assistance (CFDA) can be viewed on the Web site atfarmers.1

CERCLA Funding Resources

Funds for assessment and cleanup of CERCLA sites may be provided by EPA CERCLA allocations from Congress or PRPs (the special taxes that Congress enacted to fund the dedicated Hazardous Substance Superfund expired on December 31, 1995, and have not been renewed). EPA's CERCLA Site Assessment Program funds work (its own and states' under co-operative agreements) to assess possible releases at sites. Once EPA has determined that there is a need for CERCLA response action(s), it first considers its enforcement options. Ideally, one or more PRPs agree to perform the work under EPA supervision. (As noted above, federal facilities generally undertake cleanup work under CERCLA at their own facilities, using separately authorized funds.) Where PRPs contribute only money, and EPA performs the work, funds from the PRPs are generally placed in a special account that is used only for work at that site. The NRDA aspect of CERCLA is funded by the Trustees and PRPs.

EPA, states and FLM agencies each manage certain CERCLA activities, but only EPA is empowered to disburse CERCLA funds. CERCLA grants to fund site-specific activities are not available to other agencies to conduct activities except for funding available for communities to meet the community involvement requirements of CERCLA. (Grants under the Small Business Liability Relief and Brownfields Revitalization Act are discussed separately.) This section describes assessment and cleanup resources available through CERCLA.

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Pre-remedial program funds are used to perform tasks required for site assessment and listing on the NPL. Funding for a specific project is on the basis of annual allocations and priorities of EPA Regions. Projects with high interest from the community or state or federal agencies are often

response management and assistant regional administrator approval and enforcement concurrence.

» Time-Critical Removal: TCRAs may be taken to protect public health. Generally as much as $2 million may be spent after consultation with EPA's Enforcement Program. Additional approval is required for spending above $2 million, or if the removal action will exceed 12 months, and EPA headquarters must approve certain expenditures over $6 million. An action memo must be prepared before project implementation.

» Non-Time Critical Removal: NTCRAs may be implemented at sites that pose a health or environmental threat for which more than 6 months are available for planning. An EE/CA must be performed to compare removal options. Funding is limited by Regional allocations for the Removal/Emergency Response Program.

Natural Resource Damage Assessment

Under CERCLA and OPA, Trustees assess injuries to public natural resources, determine damages and require PRPs to provide for restoration of resources injured due to the release of oil and hazardous substances. Natural Resource Damages are recovered from PRPs and may be used for assessment and restoration activities.

Funds deposited into the DOI's NRDA and Restoration Fund may be used as nonfederal matching funds for federal grants if the money is deposited pursuant to a joint and indivisible recovery by the DOI and a nonfederal Trustee and the money is transferred to the nonfederal Trustee. The money may not be used for nonfederal matching funds if it is transferred to the federal Trustee agency then distributed to a nonfederal agency.

Technical Assistance Grants and Technical Outreach Services for Communities

TAGs are awarded by EPA to community groups to contract with independent technical advisors to interpret and help the community understand technical information about the NPL site or proposed site in their community. Groups eligible to receive grants under the TAG Program are those whose members might be affected by a release or threatened release of toxic wastes at any facility listed or proposed for listing on the NPL and where preliminary site work has begun. In general, eligible groups are those groups of individuals who live near the site and whose health, economic well-being or enjoyment of the environment are directly threatened. A group applying for a TAG must be incorporated as a nonprofit (or working toward incorporation). PRPs, academic institutions, local governments or groups established or supported by the government are not eligible for TAG awards. If more than one group applies for a TAG, they are encouraged to form a coalition to apply for the grant (because only one TAG may be awarded). Up to $50,000 is available for the community to participate in decision making at their site. A 20 percent match, which may include donated or in-kind services, must be contributed by the community group.

The TOSC Program provides free, independent, nonadvocate technical assistance about contaminated sites. Services and products may include explanation and review of technical documents, help to understand health risks and environmental issues, learning experiences to explain basic science and environmental policy, information about existing technical assistance materials, training

on innovative and emerging technologies and are recognized experts in several fields of science. In addition to its emergency response tasks, the ERT provides remedy recommendations/implementation, technology efficacy/cost-effectiveness, and emerging technology evaluation through

provide site-specific computer modeling and dose assessments. The laboratory also provides analytical services for testing and monitoring indoor environments for both radiological and chemical contaminants.

The Superfund Sediment Resource Center (SSRC)

EPIC—Remote Sensing and Mapping Support Contract

EPA's ORD has established a nationwide contract program to provide remote sensing and aerial imagery acquisition and interpretation support to the Program Offices and each of the 10 Regional Offices of EPA. The Environmental Photographic Interpretation Center (EPIC) provides support for site-specific to regional environmental characterization and change analyses, emergency response to hazardous developments, waste site inventories for large geographical areas and topographic mapping of sites.

Superfund Technical Assessment and Response Team (START)

The START contracts provide technical support for EPA's site assessment, response, prevention and preparedness activities. This support includes gathering and analyzing technical information, preparing technical reports on oil and hazardous substance investigations and technical support for A. Th/SI/EMC /Span <MCID 1232 >BDC T*to hHRSport forsanalHomelanalSecurity aredness activnal andi activities.

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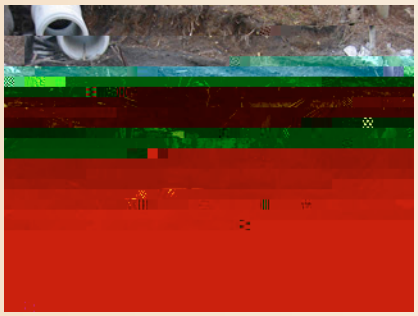
Allis Chalmers Utility Corridor, West Allis, Wisconsin

Demolition of existing infrastructure and buildings

Sediment stabilization mixing operation



Retrofitting new storm sewers with old storm sewers

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(CAA, section 103(b)(3) as amended; CWA, section 104(b)(3), as amended; Solid Waste Disposal Act, section 8001, as amended; TSCA, section 10, as amended; FIFRA, sections 18 and 20, as amended; SDWA, sections 1442(a), and (c)(A), as amended; and Marine Protection, Research, and Sanctuaries Act, section 203, as amended, CFDA 66.035)

The CARE Program, which began in 2005, helps to build broad-based local partnerships for reduc-

unaddressed, can have a significant impact on the effective cleanup of target watersheds. EJ staff can help identify community concerns early and begin to build trust among what may be disinterested or disaffected members of the community.

The EJ Program offers grants annually to communities for addressing environmental problems from an EJ perspective. In addition, the program works with EPA's operating programs to identify technical, human, and financial resources that might be made available to communities interested in addressing environmental injustices.

Department of Interior Assessment and Cleanup Resources

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The BOR stores and supplies water for irrigation and for use in homes and industry. The BOR generates hydroelectriceTowprogvden foloodconctroland ielp s met wfishand iwildlife neds.and i]TJEMC /Span <MC

efforts include long-term data collection, monitoring, analysis and predictive modeling. USGS scientists cover a range of disciplines, including hydrology, geology, geophysics, biology, geography and statistics. Projects within a specific watershed may be funded by grants, interagency agreements, congressional appropriation or occasionally from internal program funding. Water-quality studies may be initiated with the USGS by contacting a state representative to discuss the USGS cooperative funding program.

Through the National Water Information System (NWIS), USGS provides water data, including real-time water data, surface water flow measurements, ground water measurements and water quality measurements, from more than 1.5 million sites throughout the nation. Since 1991, USGS scientists with the NAWQA Program have been collecting and analyzing data and information in more than 50 major river basins and aquifers across the nation to develop long-term consistent and comparable information on streams, ground water and aquatic ecosystems to support sound management and policy decisions. USGS is available to support development of TMDLs.

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In support of the National Forest Plan revisions, which occur every 5 years, the USGS and U.S Forest Service (USFS) coordinate on an assessment of geological resources on USFS lands.

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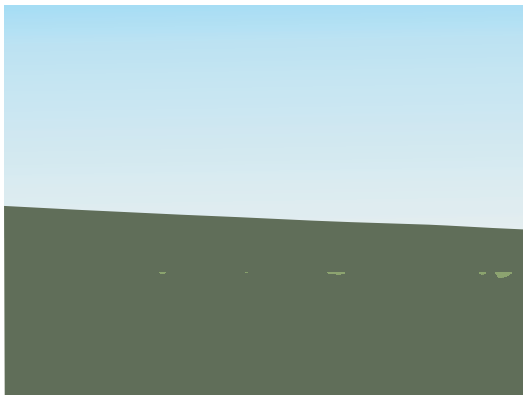
The USFWS is tasked to conserve, protect and enhance fish and wildlife and plants and their habitats for the continuing benefit of the American people. USFWS is the designated Natural Resource Trustee for certain anadromous fish, certain endangered species, certain marine mammals and migratory birds. Funding to support efforts related to protection of trust resources affected by contamination is available under the Contaminants Program. USFWS has a wide range of technical expertise and has many agreements in place to support ecological assessment and cleanup efforts. One example is preapproved permits for support of fish shocking or other wildlife collection and evaluation efforts.



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Under the 1996 Farm Bill, the NRCS provides assistance for landowners seeking to preserve soil and other natural resources. The Environmental Conservation Acreage Reserve Program (ECARP) authorizes the secretary of agriculture to designate watersheds, multistate areas, or regions of special environmental sensitivity as conservation priority areas that are eligible for enhanced federal assistance. Assistance in priority areas is to be used to help agricultural producers comply with NPS pollution requirements of environmental laws.

The Environmental Quality Incentives Program (EQIP) is a voluntary program that provides assistance to farmers and ranchers who face threats to soil, water, air and related natural resources on their land. Through EQIP, the NRCS provides assistance to agricultural producers to promote agricultural production and environmental quality as compatible goals, optimize environmental benefits and help farmers and ranchers meet federal, state, tribal and local environmental requirements. EQIP is reauthorized in the Farm Security and Rural Investment Act of 2002 (Farm Bill). Funding for EQIP comes from the Commodity Credit Corporation (CCC). Optimizing environmental benefits is achieved through a process that begins with the definition of national priorities.

The national priorities are as follows:

The Agricultural Research Service is USDA's main in-house scientific research agency. They find solutions to agricultural problems, including sustaining soils and other natural resources, and provide research support to other federal agencies.

Department of Commerce Assessment and Cleanup Funding Resources

NOAA conducts research and gathers data about the global oceans, atmosphere, space and sun and applies this knowledge to science and service. NOAA Fisheries is the federal agency responsible for the stewardship of the nation's living marine resources and their habitat.

The Community Based Restoration Program provides funding to regional governmental bodies and public or private organizations including business, community/watershed groups, nonprofit groups, educational institutions, conservation districts, local governments and state/territorial/tribal agencies to restore fishery habitat around the coastal United States. The required 1:1 cost match may be cash, salary, equipment, supplies, in-kind services or labor.

The NOAA Fisheries/National Fish and Wildlife Foundation (NFWF) Habitat Restoration Partnership funds restoration and educational efforts. The funding is distributed nationally and regionally through a series of NFWF funding initiatives including Chesapeake Bay Small Watershed Grants Program, Living

Work varies from employing one or several of the USACE's skills to using the whole range of the USACE's planning, engineering, real estate, contracting, construction management and legal skills. USACE's capabilities include, but are not limited to, the following areas: environmental planning and compliance, economic and financial analyses, floodplain management, cultural resources management and evaluation and general planning.

Before the USACE can support state and local governments, the requesting government must certify that it cannot obtain the services reasonably and expeditiously from private firms. The technical services that may be provided include studies and planning activities, engineering and design (including plans and specifications), construction management assistance and training. Construction management assistance is limited to technical advice to improve state or local management capability in contract preparation, negotiation and evaluation; contract administration; quality assurance; and supervision and inspection. The USACE may not acquire real estate nor can it serve as the contracting officer for project construction for a state or local government. All USACE costs must be provided by the customer agency. Under the program, the customer retains responsibility for program planning, development, and budgeting. ,

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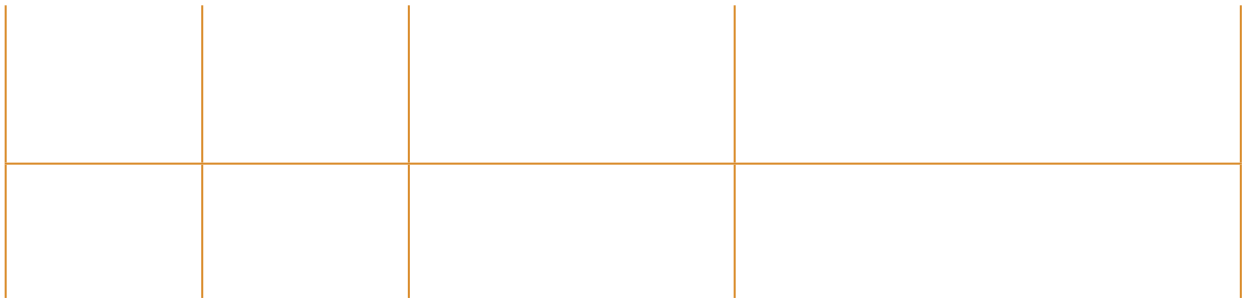
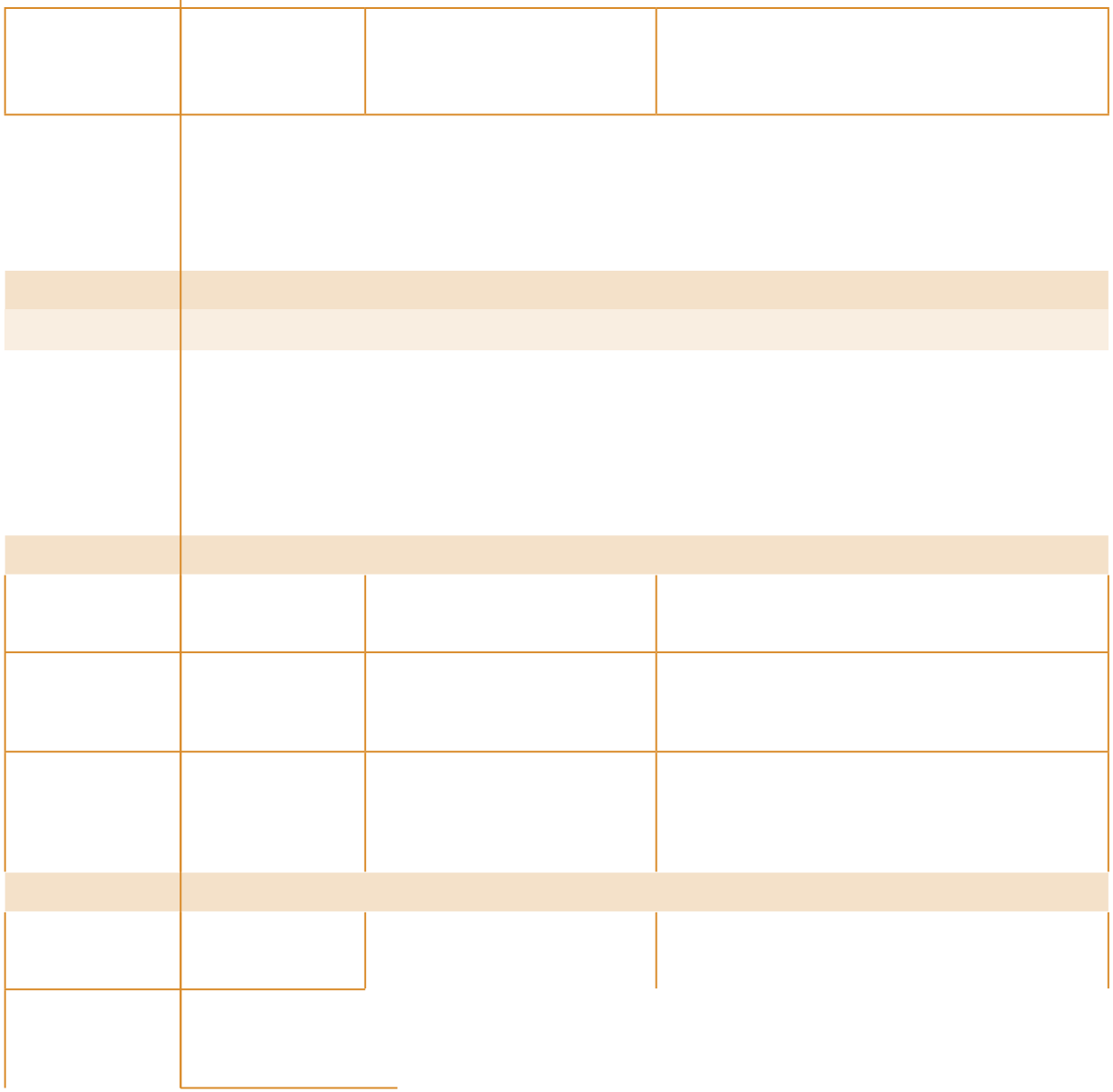
HUD offers a variety of funding opportunities for projects that involve urban area renewal and economic development. The Brownfields Economic Development Initiative (BEDI) is a key competitive grant program that HUD administers to stimulate and promote economic and community development. BEDI funds are used for local governments and private sector parties to commence redevelopment or continue phased redevelopment efforts on brownfields sites where either potential or actual environmental contamination are known and redevelopment plans exist.



Resource	Assessment—(A)/ Cleanup—(C)/		



Grant Program	Brownfields Assessment Grants	Brownfields Revolving Loan Fund Grants	Brownfields Cleanup Grants	Job Training & Workforce Development Grants	State/Tribal Response Programs Grants
Priorities	» , . » .¬ , . » .¬ / , , , . » . » .¬ . » , , - .		» , z , , , , . » .		» . » /

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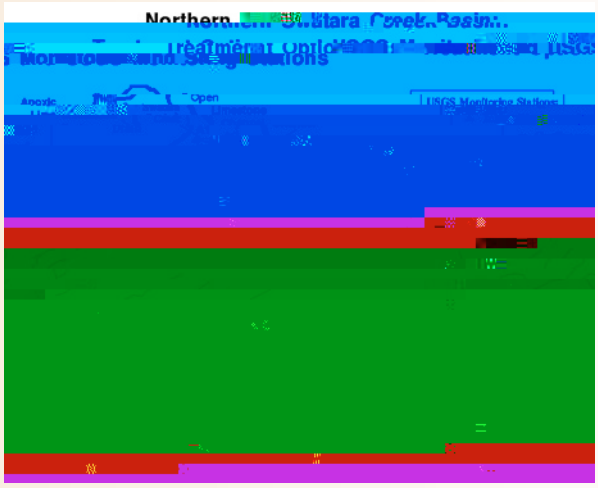
Swatara Creek, Pennsylvania



Water Quality Concern:

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Project Description:

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Community Outreach:

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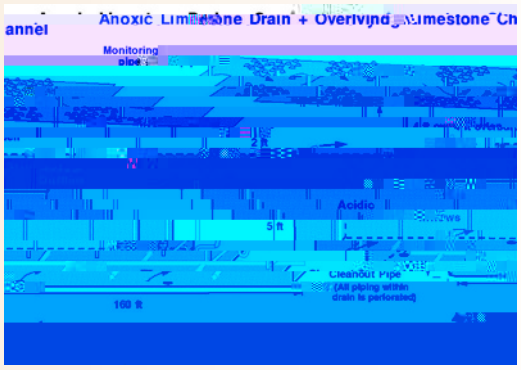
Key Successes and Lessons Learned:



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1997: Limestone channel on Swatara Creek

1997: Anoxic limestone drain on tributary to Swatara Creek

1997: Pollys Run project

Table 4-1.

Comprehensive Preliminary Watershed Assessment

The Comprehensive Preliminary Watershed Assessment (see box below) is an effective tool that assists in understanding watershed conditions and the development of a preliminary watershed conceptual model. The conceptual model will be used to help identify interested parties and focus the WCT on important issues. The Comprehensive Preliminary Watershed Assessment should include, at a minimum maps and aerial photographs depicting the entire watershed and displaying any property ownership/zoning; identification of WQS for each waterbody within the watershed and current waterbody status in meeting the standards; readily available data (including summaries/ references to monitoring data reports collected through various regulatory programs, identification of potential human and environmental receptors [e.g., humans, fish, birds, soil community]); location of historical and current sources of contamination; key findings of previous geological, hydrological, and hydrology studies; NPDES permits (with identification numbers); RCRA facilities and CERCLA/CERCLIS sites within the watershed; Clean Watersheds Needs; and documentation of past, current or planned cleanup activities. The assessment may also include preliminary scoping studies such as a qualitative macroinvertebrate study or watershed-wide contaminant loading study. A reconnaissance field trip may be the culmination of the assessment and provide information to assist in scoping the need for future study.

Potential sources of information for the Comprehensive Preliminary Watershed Assessment include EPA PA/SIs, Removal Assessments, Removal Actions, RI/FSs, TBAs, Emergency Response Actions, water quality agencies and databases, state permitting authorities, county/local health/environmental departments, educational institutions, USGS, federal and tribal land management agencies, existing databases such as STORET, WATERS, NWIS and other potential sources discussed in Chapter 3.

The Comprehensive Preliminary Watershed Assessment should average between 15 and 30 pages, including maps, photos, aerial photography and land ownership. The Comprehensive Preliminary Watershed Assessment may assist in development of a site conceptual model. Figure 4-2 provides an example of a site conceptual model that was developed for a cross-programmatic watershed cleanup effort in the Anacostia River Watershed in Maryland and the District of Columbia.

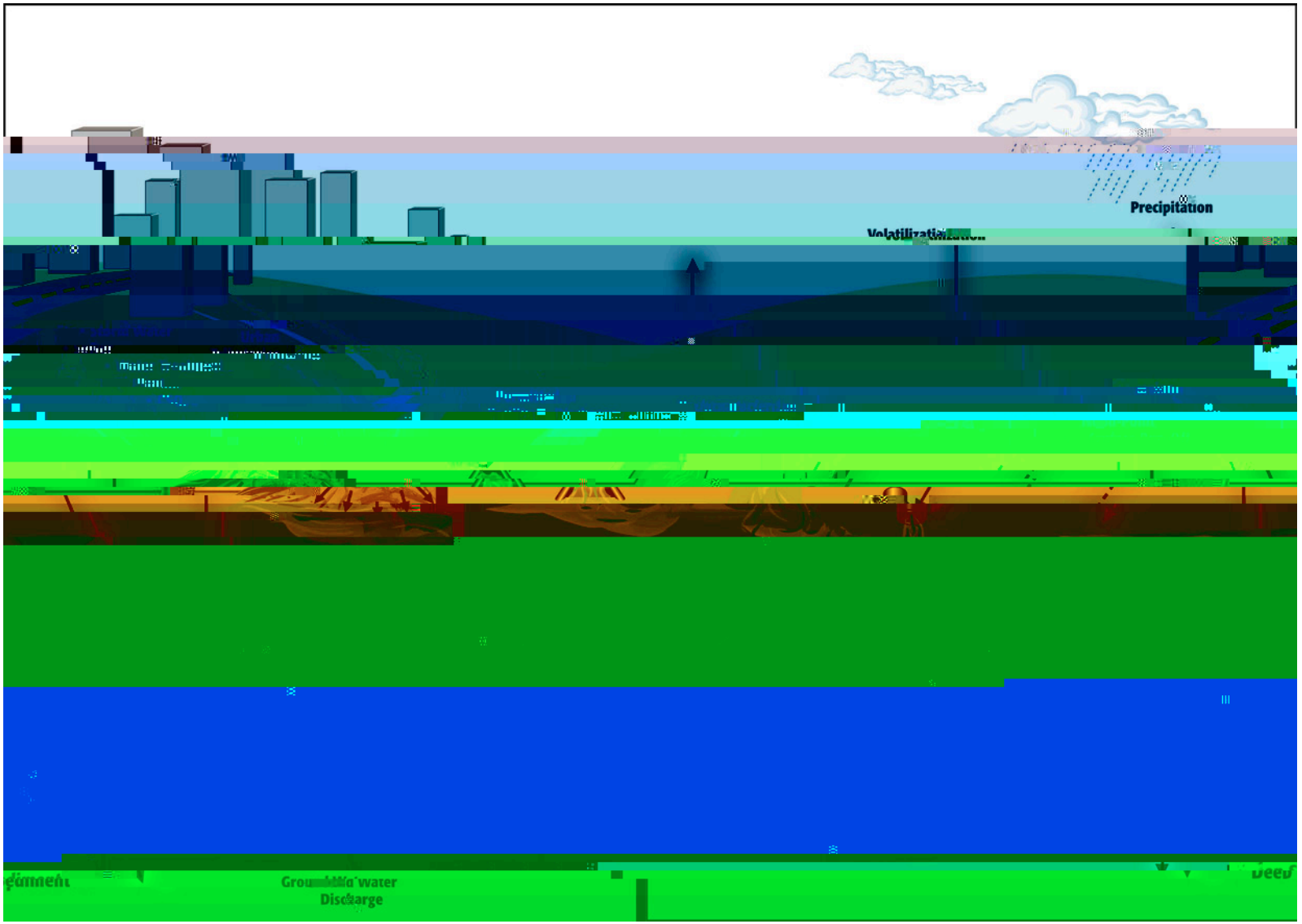

Figure 4-2. Site Conceptual Model, Anacostia River Watershed, Maryland, and Washington, D.C.

From: Charting a Course Toward Restoration: A Toxic Chemical Management Strategy for the Anacostia River, prepared by member organizations of the Anacostia Watershed Toxics Alliance and the Anacostia Watershed Restoration Commission (AWRC).

Additional Watershed Data Collection

To save time and money, the WCT might want to consolidate future data collection efforts. Depending on the participants, overlap of data needs, funding, and other considerations, additional data can be collected by individual programs/agencies (cooperative sampling) or a multiagency/stakeholder sampling effort (collaborative sampling). It is likely that a combination of approaches will be used. No matter how data collection is structured, cooperation between WCT programs/agencies will save time and precious resources despite the additional initial planning efforts.

[illegible]

In some cases, the WCT may decide that individual agencies/programs will conduct future data collection efforts separately. In that case, the SAP should be available for review by the WCT in advance to maximize integration. An example of the benefit of sharing plans in advance might be at an NPL site where the RI contractor will be collecting quarterly surface water samples at three locations to assess seasonal stream gains from a contaminated aquifer. Because surface water quality and stream flow data are important to most programs involved in watershed cleanup, the plan should be reviewed to determine the applicability of the data to the state water quality data set, the NRDA and the TMDL programs. It might mean that the data collection techniques or analytical parameters are adjusted slightly (i.e., adding flow rate to the field measurements, or collecting samples for both total and dissolved metals concentrations) to accommodate other program needs but might also prevent unnecessary and wasteful duplicative sampling efforts by another program.

[illegible]

The WCT may decide to collaborate on some data collection efforts. A common approach and consistent methods should be used to accommodate the needs of the multiple programs involved. A multiagency SAP will be necessary to guide the sampling. Data Quality Objectives (DQOs) will provide the focus for preparing these documents. The SAP should include consensus among stakeholders on site naming conventions, sampling locations, media collected, protocols for sampling and analysis, and detection levels. Preparation of a consolidated SAP may be performed by the

sample containers and preservatives, vehicles, and other site-specific tools. EPA Regional Labora-

After the data are validated, data that meets the requirements may be used to evaluate site conditions. Various numerical and graphical analytical methods may be used to evaluate the data on the basis of the study objectives. For example, the user might need to know if data support statistical assumptions regarding the presence or absence of contamination or biological response to the contamination. At other times, the user might want to determine if there is a trend to the data or correlation between two variables. For some studies, mean or median values and standard deviation or another determination of variance are adequate for the purposes of the study. Environmental data may require transformation before statistical analysis.

The flow and water chemistry loading data should also be reviewed to ensure that they provide enough spatial and temporal variability with regard to high and low flow to determine critical conditions within the watershed.

Benchmarks

Data should be compared against appropriate standards such as those provided in the following table. Values used for comparison will depend on the sample matrix, the contaminant of interest, the contaminant pathway being evaluated, and program requirements. One screening concentration's benchmark of note in the table below is the SCDM—a compilation of values for use in the HRS. Many of the values listed on the SCDM are derived from or applicable to other program benchmarks, so this document is valuable for determining benchmarks that will be used by a variety of programs involved in the watershed cleanup. Criteria and standards for dissolved metals are

Data Collection Strategies

EPA often uses the Triad approach for planning site assessment activities. The Triad approach allows the field work to be conducted cost-effectively and logically. The Triad approach is a three-step process that includes systematic planning, dynamic work strategies and real-time measurement technologies.

» Systematic planning includes developing a conceptual site model that shows sources, pathways, and receptors. The planning team uses the seven-step DQO process to ensure

of water quality information is the USGS NWIS. Other databases are available with regional or local data. These might be useful but should be compatible with STORET. Table 4-3 presents typical data requirements for using sampling data in a site database.

The STORET database is EPA's repository for water quality, biological, physical, soil, sediment, air habitat assessment and field measurement metadata collected by a variety of sources—from state and federal agencies to volunteer monitors. STORET is primarily used by states to report required water data to EPA; however, it may be used to manage all types of data from a variety of sources. Potential data sources include EPA programs such as Superfund, RCRA, and Brownfields; other federal agencies; tribes; state water and environmental agencies; and local/regional groups such as communities, municipalities, watershed councils and volunteer monitoring organizations.

STORET is an ideal way to manage data in a multiprogrammatic watershed cleanup effort for several reasons. STORET's data retrieval functions are Web-enabled so the public can use the Internet to query and download data. Data providers can submit data to STORET via data entry modules that operate on personal computers and are available free of charge to monitoring organizations. Web tools are also available to data providers who would like to submit data to STORET but do not want to use the standard STORET software. See the Region 8 case study on managing data and Web tools below. Data in STORET are available to all in a consistent format that allows mapping, sample location identification and data viewing.

Table 4-3. Sample Data Requirements

Sample Data Requirements	
Project Information	» » » 1 (F (/ / D 121 D 0.4 10. 0 0 3 / 0

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WATERS is an integrated information system for the nation's surface waters. Water quality information must be gathered to fulfill the requirements of the CWA and the SDWA, the two main federal laws that protect our nation's waters. The EPA Office of Water has various programs that store data in associated databases. These databases are separately managed, but under WATERS, the program databases are connected to a larger framework. This framework is a digital network of surface water features known as the National Hydrography Dataset (NHD). By linking to the NHD, one program database can reach another, and information can be shared across programs. Databases linked to WATERS include Water Quality Standards Database (WQSDB), National Assessment Database (NAD), National Total Maximum Daily Load Tracking System (NTTS), STORET, NPDES PCS, Clean Watersheds Needs Survey Database, SDWIS, National Listing of Fish and Wildlife Advisories (NLFWA) database, Nutrient Criteria Database, CWA section 319 Grants Reporting and Tracking System (GRTS), and the Beaches Environmental Assessment, Closure & Health (BEACH) Watch database. WATERS provides a Web-based mapping tool, known as EnviroMapper for Water, for viewing where these data are located and generating associated reports. WATERS also provides a Web-based query tool, known as AskWATERS, that produces summary and detailed data reports for watersheds and other areas of interest.

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BASINS is a multipurpose environmental analysis system designed for use by regional, state and local agencies in performing watershed- and water quality-based studies. It integrates a geographical information system (GIS), national watershed data and state-of-the-art environmental assessment and modeling tools into one convenient package. This system makes it possible to quickly assess large amounts of point source and NPS data in a format that is easy to use and understand. Installed on a personal computer, BASINS allows the user to assess water quality at selected stream sites or throughout an entire watershed.

This invaluable tool integrates environmental data, analytical tools and modeling programs to support development of cost-effective approaches to watershed management and environmental protection, including TMDLs.

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Water quality monitoring approaches vary from state to state. Degrees of sampling effort and density, and the chemical/physical/biological analyses performed on the samples can vary widely. Efforts are being made to make state monitoring programs more consistent, and states are now required to begin implementation of the strategy described in the recommended Elements of a State Monitoring Program. This section describes state water quality monitoring on the basis of this document.

The ten elements of a state monitoring program include:

- Monitoring program strategy
- Monitoring objectives
- Monitoring design
- Core indicators of water quality
- Quality assurance
- Data management
- Data analysis and assessment
-

Data Quality. Data may be screening or definitive depending on compliance with QA/QC protocols and the sampling objective. States report data in STORET and also maintain the data in their own database. States also provide appropriate geospatial data to enable the use of current GIS tools. The Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b) and 314 of the Clean Water Act ( ) asks states to define the geographic location of assessment units using the NHD.

Data Uses. Data are used to meet the needs of the State Water Monitoring and Assessment Program as required by the CWA. Data are used to compile the section 305(b) water quality inventory report and the section 303(d) list and provide information on monitoring and notification programs for coastal recreation waters. Data may also be used for preparing triennial reviews, UAAs, standards revisions, water quality-based effluent limits (WQBELs) in permits, TMDLs, NPS programs and watershed plans.

For more information, see Elements of a State Monitoring Program. EPA 841-B-03-003. March 2003.

For more information, see

- Water Quality Standards page on EPA's Web site,
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manufacture since the late 1970s, PCBs are still in use because of the extended life span of equipment in which they were used. Additionally, PCBs are hydrophobic and thus tend to bind to organic particles in sediment and soils. Because of their chemical stability, PCBs tend to persist in the environment. PCBs enter fish and other wildlife through absorption or ingestion and accumulate in their tissues at levels many times higher than in the surrounding water and at levels unsuitable for human consumption. EPA has deter-

Short Time Frame for TMDL Development

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Laboratory Analysis: Samples are analyzed for the TMDL pollutant and associated indicators

Data Quality. Data must be shown to be reliable and in accordance with applicable data collection or QA/QC program requirements. Data quality requirements are variable; for example, samples collected for water quality analysis generally have a high-level of QA/QC, while samples collected for source identification and assessment may have lesser data quality requirements.

Data Uses. Data are used to determine acceptable pollutant loads on the basis of the designated water use, the maximum amount of a pollutant that a waterbody can receive and still meet WQS on a seasonal basis, where and how pollutant loading must be reduced and if the TMDL is achieving the desired goals.

For more information, see

- Guidance for Water Quality-based Decisions: The TMDL Process. EPA 440-4-91-001. April 1991.
- Contaminated Sediment Remediation Guidance for Hazardous Waste Sites. Office of Solid Waste and Emergency Response (OSWER). EPA-540-R-05-012. OSWER 9355.0-85. December 2005.
- Technical Support Document for Water Quality-based Toxics Control. EPA/505/2-90-001. PB91-127415. March 1991.

Unified Phase Assessment (UPA)

EPA Region 3 has developed and tested an initial environmental assessment tool, the UPA, to organize information about a site in a way that can be used for purposes of CERCLA, RCRA and USTs, (Unified Phase Assessment Guidance Manual, EPA Region 3. Hazardous Sites Cleanup Division, September 15, 2004). Under the UPA process, a site may be referred to the most appropriate program without repeating the PA process, thereby increasing the speed and effectiveness of SI and cleanup. Typically, the UPA contains three parts:

1. A single page quick reference
2. The primary assessment containing elements common to all initial assessments
3. Program-specific data including QC information, large maps and other data and background information

Laboratory Analysis. Analytical parameters vary significantly depending on source materials and the potential threats of those materials to the identified receptors. Detection levels for each sample/analyte are dependent on the specific HRS factor being evaluated and the benchmark that will be used for comparison. The detection levels might not match the Contract Required Quantitation Limits (CRQL) or the Contract Required Detection Limits (CRDL).

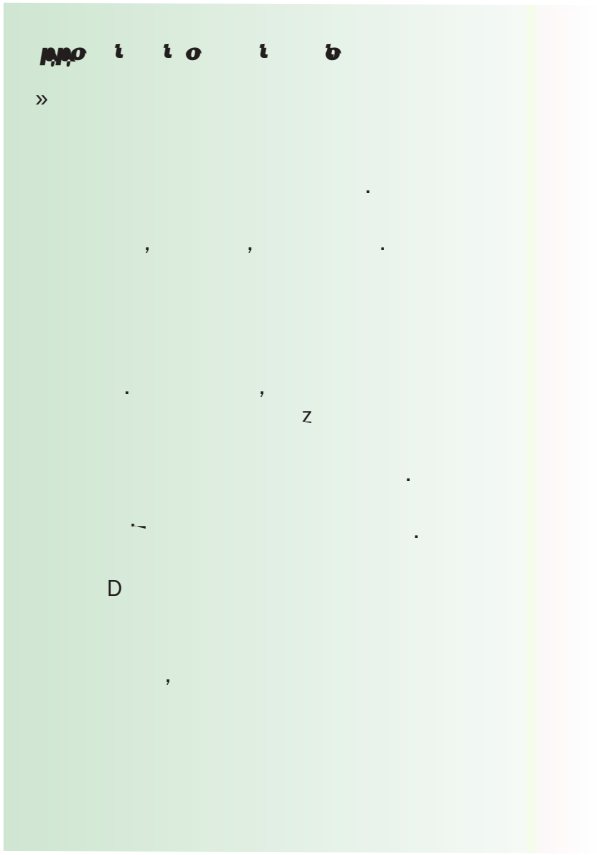
Data Quality. The minimum data quality requirements for each analysis depend on the chemical and the specific HRS factor being evaluated. Data used to document the site HRS score should be included in the administrative record and be legally defensible. Data used for determining source dimensions, for example, may be screening level data. The following describes the typical process used. Proper sample collection and handling procedures are used and quality control samples are collected, including field duplicate, field blank, trip blank and field rinsate samples. Samples are sent

evaluate one or more treatment alternatives. In that case, samples may be collected to test the

Data Quality. DQOs are site-specific—the DQO process is a key component of the

to the community by accelerating the cleanup. The WFA can also be the basis for TMDL load allocations. The study can be used to prepare grant applications (Brownfields and 319 NPS) and as the framework for programmatic documentation requirements (TMDL allocations and implementation plan, CERCLA EE/CA or FS, RCRA CMS), thus streamlining the efforts of all programs. Projects that are supported by a variety of stakeholders and agencies and implement TMDLs frequently receive priority for grant and program funding. The WFA and subsequent prioritization of projects by the WCT requires the participation and concurrence

EPA guidance provides that reasonably anticipated future land use should be considered at various stages of the remedy selection process, including the risk assessment phase of the RI/FS, which analyzes site-specific human health and ecological risks. Thus, it might be appropriate to consider prospective reuse plans as part of the RI/FS. The remedial action must meet or waive ARARs, and if WQS are considered ARARs for the selected remedy, the remedial action generally should be designed to support the designated use (i.e., recreational use, aquatic life, industrial). Toward this end, remedial actions should normally be selected and described in the ROD that are consistent with the designated use and can also provide, for example, land use restrictions that are consistent with the designated controls. For example, wildlife easements, measures designed to ensure BMPs, and monitoring to assure compliance with particular zoning classification may be appropriate components of a remedial action that is consistent with ecological recovery or community revitalization within the bounds of Superfund.



Prior to NTCRAs or remedial actions, the EE/CA or FS must evaluate ARARs, and the ROD or Action Memo should state how they will be met or waived. To assure protectiveness and comply compliance with ARARs, Superfund dollars may be used to remediate ecological resources. For example, compliance with ARARs like CWA section 404 can lead to mitigation of wetlands and riparian buffers.

Tasks that the WCT determines are appropriate but that are not required under CERCLA (i.e., not required to achieve protectiveness or meet ARARs) that are nevertheless restoration could be conducted with Brownfields (at qualifying sites), 319 NPS, and NRDA funding. Tasks that are necessary to promote redevelopment may be left for actions funded by local redevelopment agencies, private developers and Brownfields loans and state grants. Note that identifying proposed restoration and redevelopment tasks during the RI/FS stage can allow for synchronization of NRDA restoration activities and remedial tasks.

Finally, consistent with the NCP's nine criteria for evaluating alternatives, it might be appropriate to consider use of ecologically friendly remedial alternatives when determining the technology

If a discharger installs a control technology that results in pollutant reductions greater than those required by the WQBEL, the discharger can generate credits. The number of credits generated is the difference between the wasteload allocated to that discharger (as expressed by the WQBEL in its permit) and the pollutant load actually discharged after installation of treatment processes or other pollutant reduction measures.

Point sources may find it more cost-effective to trade with nonpoint sources. Also, point-nonpoint source trading may have additional benefits to the environment other than specific pollutant reduction. The installation of nonpoint source best management practices could result in additional environmental benefits such as habitat restoration, flood control through wetlands creation, or control of additional pollutants. For more information on water quality trading please go to

- Benchmarks/detection limits
- Standard operating procedures for sample/data collection and evaluations
- Data quality requirements
- Monitoring frequency
- Monitoring responsibilities (who, where, for what period of time)
- Data management and distribution
- Funding for all aspects of monitoring

and local programs that include regulatory, nonregulatory, and voluntary efforts. The TMDL should include a description of the pollution control BMPs that must be implemented to achieve the specified load reductions. They may be expressed as numeric maximum allowable load, numeric reductions in pollutant load, or narrative statements of desired conditions regarding habitat or biology.

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RCRA Corrective Measures Study (CMS)

A CMS is performed when the potential need for corrective measures is verified by an RFI. EPA sets action levels that may be based on existing standards such as those found in the SCDM, Region 3 Risk Based Concentrations or Region 9 PRGs, state Water Quality Criteria or other appropriate levels. The facility may request that no further action be required on the basis of a determination that no release poses a threat to human health and the environment. If EPA requires further action, the CMS is prepared to analyze potential remedies. The number of remedies evaluated can vary from site to site. Potential remedies are evaluated for performance, reliability, ease of implementa-

The processes related to selection and implementation of remedial alternatives are described generally below.

Feasibility Study

The FS generally is conducted to develop and evaluate remedial alternatives. FS activities typically are fully integrated with the RI. FSs can include an alternatives screening step to select a reasonable number of alternatives for detailed analysis. To develop and screen alternatives, RPMs normally identify remedial action objectives that specify contaminants of concern, potential exposure pathways and remediation goals. Remediation goals generally establish the extent to which the site should be cleaned up to protect human health and the environment. The NCP and Superfund guidance documents for remedial actions address several factors that are considered in developing remedial action objectives, including the following:

- For known or suspected carcinogens, the remedial action normally achieves an upper-bound lifetime cancer risk level of between 10^{-4} and 10^{-6} for high-end receptors.
- For noncarcinogenic hazardous substances, a safe exposure level generally is established. This level normally represents a dose below which no adverse health effects are expected.
- For ground water, MCLs and nonzero MCLGs established under the SDWA (applicable to certain public water supplies) are potential ARARs.
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6. Implementability
7. Cost
8. State acceptance
9. Community acceptance

Generally, the purpose of the comparative analysis is to identify the advantages and disadvantages of each alternative relative to the others. These nine criteria can be categorized into three groups: threshold criteria, primary balancing criteria and modifying criteria.

Threshold criteria (which are the first two and based on statutory requirements) must be satisfied for a remedial alternative to be eligible for selection. Primary balancing criteria generally are used to weigh trade-offs between alternatives. State acceptance and community acceptance are modifying criteria that are taken into account after public comments are received on the proposed plan.

CE C AC i o i A b

Threshold Criteria

Overall Protection of Human Health and the Environment

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Compliance with ARARs -

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Primary Balancing Criteria

Long-term Effectiveness and Permanence

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A variety of alternatives may be considered for a site. For example, remedial alternatives for a site containing soil contaminated with solvents might include excavation and on-site or off-site treatment, capping combined with ground water pumping and treatment and in-situ treatment. Special rules can apply to sites where off-site transport and disposal are the selected alternative, to ensure hat the ultimate waste repository is in compliance with applicable laws. Generally, an alternative that does not allow unlimited use of a site after the remedial action is implemented, includes institutional controls to restrict land usage.

[illegible]

For NTCRAs, the lead agency normally conducts an EE/CA, which is an analysis of removal alternatives for a site. The EE/CA should present definitive information on the source, nature and extent of contamination and risks presented by the site. The EE/CA also presents an analysis of removal alternatives. If an RI has been completed (because the removal is related to an NPL site), risk assessment data from the RI may be used to support the removal action objectives and only limited data collection will be required. The goal of the EE/CA is to identify the objectives of the removal action and to analyze the effectiveness, ability to implement and cost of various alternatives that may satisfy the objectives. For TCRAs, a similar but less formal process is conducted.

The EE/CA contains the following:

- Site characterization includes the site description and background (location, type of facility and operational status, structures/topography, geology/soil/aquifer information, surrounding land use and populations, sensitive ecosystems and meteorology); previous removal actions; source, nature and extent of contamination (locations of contaminants, magnitude of contamination, physical and chemical properties of the contaminant and targets potentially affected by the site); analytical data (existing data and data collected during the EE/CA); and streamlined risk evaluation (focused on the source of contamination the removal action will address).
- Identification of Removal Action Objectives requires a review of statutory limits on removal actions, determination of removal scope, determination of removal schedule and planned remedial activities.
- Identification and Analysis of Removal Action Alternatives involves the determination of the effectiveness (protection of human health and the environment; compliance with ARARs and other criteria; long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; short-term effectiveness), implementability (technical feasibility, administrative feasibility, availability, state acceptance, and community acceptance); and cost (direct capital costs, indirect capital costs and post-removal site control costs) of an alternative. Presumptive remedies may be used to speed selection of an alternative.
- Comparative Analysis of Removal Action Alternatives is a comparison of the alternatives.
- Recommended Removal Action Alternative is the treatment that is preferred over containment or land disposal, and permanent solutions are preferred over temporary.

Cooperatively Working in the Left Hand Watershed

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The state and the public are given the opportunity to comment on the EE/CA and recommended removal action. An action memo is prepared that documents the need for a removal response, the proposed action, the rationale for the proposed action and how state and public comments were considered. The action memo must be approved before work begins.

Proposed Plan, Public Comment, and Record of Decision

The selection of the remedial action generally is a two-step process; first the Region develops a PP that is put out for public comment, and second, the Region issues a ROD. The state, community and other stakeholders are given several opportunities to participate in the remedy selection activities. The remedy selection process may be initiated at one OU at a site while other OUs are still undergoing investigation or are in other stages of the cleanup process.

The lead agency (typically EPA at private sites; the owning federal agency at federal facilities) often works closely with the support agency to prepare a PP that summarizes the remedial alternatives that were analyzed, proposes a preferred remedial alternative and summarizes the information used to determine the preferred alternative. The PP is presented to the public and may be revised in response to state and public comments as appropriate.

After evaluating all comments received on the PP, the lead agency makes the final remedy selection decision. This decision is documented in the ROD, which may be signed by the Regional Administrator for sites where EPA is the lead agency. The ROD typically contains significant facts, analysis of facts and site-specific policy determinations considered in the remedy selection process and explains how the nine evaluation criteria were used to select the remedy. Generally, the ROD is based on an administrative record and is made available for public inspection. RODs for Superfund-financed actions normally include a formal written concurrence from the state.

Remedial Design/Remedial Action

The RD generally is the engineering plan used to guide implementation of the selected remedy. Remedial action (RA) generally is the physical implementation of the ROD and RD. RD/RA activities generally conform to the remedy set forth in the ROD and other decision documents. The NCP addresses mechanisms through which changes can be made to remedies specified in ROD. If the lead agency determines that some changes should be made to the selected remedy, but the changes do not fundamentally alter the remedial selection analysis set forth in the ROD, it may be appropriate to publish an explanation of significant differences (ESD). Fundamental changes to a ROD normally are documented in an amended ROD.

Operation and Maintenance

Many RAs will require O&M measures to continue at the site to ensure effective remedy implementation. O&M measures generally are initiated after the remedy is constructed and is determined to be operational and functional. At Fund-lead sites, in general EPA pays 90 percent of CERCLA remedial activities, and the state pays a 10 percent cost share. Typically one year after the commencement of O&M measures, the state assumes 100 percent of O&M. Federal funding (90 percent) of certain actions involving measures to restore ground water to beneficial use may continue for up to 10 years after the remedy becomes operational and functional.

Five-year reviews are performed at many CERCLA sites to ensure the remedy continues to be protective of human health and the environment.

Brownfields cleanups must protect human health and the environment and be conducted in accordance with federal and state laws. Cleanup levels that protect human health and the environment are determined by EPA and state agencies and may be based on existing standards such as those found in the SCDM, Region 3 Risk Based Concentrations or Region 9 PRGs, state Water Quality Criteria or other appropriate levels. Cleanup levels depend on the intended use of the property. The approach to selecting a cleanup alternative that will meet the cleanup levels is flexible. Innovative cleanup technologies are encouraged but must meet the site-specific cleanup standards. Public participation is required beofre implementing the remedy.

approved by the EPA. Effluent limits for point sources in NPDES permits should be consistent with the assumptions and requirements in a WLA in an approved TMDL.

TMDLs established by states, territories or authorized Indian tribes, may or may not be promulgated as rules. EPA-established TMDLs are not promulgated as rules, are not enforceable and, therefore, are not ARARs. TMDLs established by states, territories or authorized tribes should be evaluated on a regulation-specific and site-specific basis. Even if a TMDL is not an ARAR, it may aid in setting protective cleanup levels and may be appropriately a to-be-considered (TBC) guidance. Project managers should work closely with regional EPA Water Program and state personnel to coordinate matters relating to TMDLs. The project manager should remember that even when a TMDL or WLA is not enforceable, the WQS on which they are based may be ARARs. TMDLs can

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Jordan River, Salt Lake County, Utah

Milltown Reservoir/Clark Fork River Superfund Site, Western Montana

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Remedial and Restoration Funding

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There are four appendices in this document:

Because of their size, they are available only online at