

**Learning *from* Innovations in
Environmental Protection**

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**The WATERSHED
APPROACH:**

AN EMPIRICAL ASSESSMENT OF INNOVATION
IN ENVIRONMENTAL MANAGEMENT

**SIX CASE STUDIES:
APPENDICES A-F**

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Dungeness River Watershed, Washington

List of Acronyms

BMP	Best Management Practice
CCWF	Washington state Centennial Clean Water Fund
cfs	Cubic feet per second (flow measure)
DFW	Washington Department of Fish and Wildlife
DOE	Washington Department of Ecology
DRAWMC	Dungeness River Area Watershed Management Committee
DRMT	Dungeness River Management Team
DRRWG	Dungeness River Restoration Work Group
TMDL	Total Maximum Daily Load
USFS	US Forest Service
USFWS	US Fish and Wildlife Service
USGS	US Geological Survey

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Partnership Description

Since the late 1980s, the partnerships that have led management efforts for the Dungeness River watershed have changed names, geographic scope, and functions, while maintaining the same general core of participating interests. The latest and current incarnation of the partner-

ship efforts is the Dungeness River Management Team (DMRT), a diverse group of 13 citizen stakeholders and agency representatives (with 13 alternates). DRMT coordinates and shares information about a wide range of issues related to the Dungeness River and watershed, including salmon restoration, water quality, groundwater and surface water flows, and development and private property rights.

Clallam County and the Jamestown S’Klallam Tribe initiated the team through a joint county/tribal resolution in 1995 following their participation in the two-year Dungeness-Quilcene Water Resource Management Planning effort. The current DRMT is a successor of a previous DRMT, created through a county resolution in 1988. The original DRMT ceased to exist in the early 1990s, in part because of other water-resource planning efforts in the watershed and region. The current DRMT includes a subcommittee for education, and a salmon-restoration advisory group called the Dungeness River Restoration Work Group (DRRWG) which also grew out of the Dungeness-Quilcene Water Resource Management Plan.

Background, Genesis and Purpose of Partnership

Trigger

Watershed partnerships among a core group of Clallam County officials, tribal interests, and landowners began at the instigation of a county commissioner in the mid-1980s at about the same time that the Puget Sound Water Quality Authority was directing counties to identify priority watersheds for nonpoint source pollution control.

Initiator

A Clallam County commissioner convened a group with interests in management issues related to the Dungeness River (flows, flooding, habitat, use). From that point, a number of partnerships have evolved through various forms/names as detailed below (see Figure A-1).

Stated Partnership Goals and Objectives

Over time, the various partnerships have had similar goals and objectives regarding coordination and cooperation for watershed management efforts. The original 1988 DRMT was intended to “improve coordination and communication between agencies to establish goals and a plan for the Dungeness River.” Between 1991-1993, the Dungeness River watershed was part of a Dungeness-Quilcene Water Resources Pilot Planning Project, as a step in implementing an agreement (referred to as the Chelan Agreement¹) between the state and tribes. The project’s Regional Planning Group developed the Dungeness-Quilcene Area Water Resources Management Plan for watersheds in eastern Clallam and Jefferson Counties to fulfill their mission: “to work cooperatively to meet water quality and quantity needs of human and natural systems in a manner that will insure the sustainability of both.” The plan recommended creating a separate river management group for the Dungeness River watershed.

The following official purpose guides the reactivated DRMT: “exchange information on technical studies, issues, and projects occurring in the Dungeness watershed; pursue implementation of the Dungeness River Comprehensive Flood Control Management Plan (1989), Dungeness River Area Watershed Management Plan (1993), and the Dungeness-Quilcene Water

Resources Management Plan (1994); coordinate the use of staff, funding and other resources among agencies and representatives; and promote public education on watershed processes and activities.”²

Scope

■ *Substantive Scope:*

The scope of current Dungeness River watershed efforts has grown to include surface water and groundwater quality and quantity; salmon habitat; and flood control throughout the watershed and in several adjacent tributaries to the Strait of Juan de Fuca.

■ *Functional Scope:*

DRMT performs several functions to address resource issues. It: coordinates plans, implementation activities, funding opportunities, and resource information; promotes public water resource educational activities; provides public input on agency initiatives; proposes additional research; reviews and prioritizes restoration projects for state funding; and incorporates new issues into group actions as they arise.

Local Context for Watershed Partnerships

Watershed Description

The Dungeness River watershed encompasses about 300 square miles in Washington’s northern Olympic Peninsula. From its origins in Olympic National Park, the river drops 7300 feet over 32 miles through the Olympic National Park and Forest, heavily irrigated agricultural and rural residential lands and into Dungeness Bay, in the Strait of Juan de Fuca, eventually entering the Pacific Ocean. The river gradient decreases about 11 miles from the coast, where the river begins to braid across a wide gravelly channel. Much of the lower river is constrained by dikes, which frequently break, flooding agricultural and developed properties.

The river flows through the Olympic rain shadow, and the lower watershed receives as little as 15 inches of rainfall per year. The entire watershed includes over 500 miles of streams and tributaries, and about 100 miles of irrigation ditches. Historically, river flow averages 387 cubic feet per second (cfs) and ranges from 65-5200 cfs.³ Many low flow periods correspond to high demand periods for irrigated agriculture and withdrawals from the river.

The Dungeness River flows through forested parts of Jefferson and Clallam Counties before entering private lands in the foothills and alluvial fan. Most of the lower watershed lies within Clallam County. The upper thirty percent of the watershed’s land area lies within Olympic National Park.⁴ The only incorporated part of the watershed is the western portion of the City of Sequim, although there are a number of small unincorporated areas at Carlsborg, Agnew, Sequim Valley and Dungeness.

Most of the watershed is covered by steeply sloped forests. Agriculture is a major land use in the foothills and lower watershed, with over 10,000 acres used for crop, hay and pastureland. Much of the lower watershed is experiencing rapid growth—over 30 percent between 1980 and 1990—and the approximately 5 miles between Sequim and the Strait is dotted with new residential developments. Approximately 15,000 people live in the watershed.

Water Resource and Other Key Environmental Issues

The Dungeness River supports four species (five stocks) of salmon as well as steelhead trout, and protecting this fishery is one of the major issues in the watershed. In recent years, salmon runs in the river have declined sharply, and pink, chinook, and summer chum stocks are now considered at risk of extinction.⁵ Among the primary issues affecting the fishery are a shortage/absence of spawning habitat, lack of refugia for juveniles, and low streamflow.

Forestry and agricultural practices in the watershed add nonpoint sediment and nutrient loads to the mainstem and its tributaries. The major water-quality concerns are fecal coliform bacteria, sediments, and temperature. State water-quality permits for the watershed are largely limited to sand and gravel operations. Shellfish beds in the Dungeness Bay have shown excessive levels of bacteria and will be downgraded and closed by the state Department of Health in 2000. This action will force the county to create a shellfish protection district, and the condition led Washington Department of Ecology (DOE) to initiate an intensive investigation for sources of contamination in 1999 as a preliminary step to developing a total maximum daily load (TMDL) allocation. Other research efforts are attempting to understand the hydrologic continuity issues between the groundwater system and surface water flows, including the relationships between irrigation ditches and private wells.

As discussed below, a major river flow issue was addressed by an agreement between irrigators and DOE (with involvement from the Jamestown S’Klallam Tribe). The agreement institutionalizes a negotiated agreement between the tribe and irrigators.

Driving Issues

The major driving issues in the watershed are salmon restoration and shellfish protection. There is also strong local interest in continuing irrigated agriculture, protecting private property rights and controlling flooding.

Prior Relationships Among Partners

Three community leaders have been particularly important to partnership efforts in the watershed. The director of natural resources for Jamestown S’Klallam Tribe, a landowner and founding leader of the Water Users Group (who also owns and operates a local grocery store), and a Clallam County commissioner (now retired). The tribal natural-resources director initially approached irrigators (nine local ditch companies and irrigation districts that divert water from the Dungeness River) about water withdrawals and their effect on salmon. Initially, irrigators were defensive, but their leader, who was open to addressing the issues, enabled opportunities for additional discussions. The county commissioner⁶ facilitated the effort by creating the DRMT. The irrigators formed the Dungeness River Water Users Association in 1989. Their collective water rights range from 1895 to 1917.

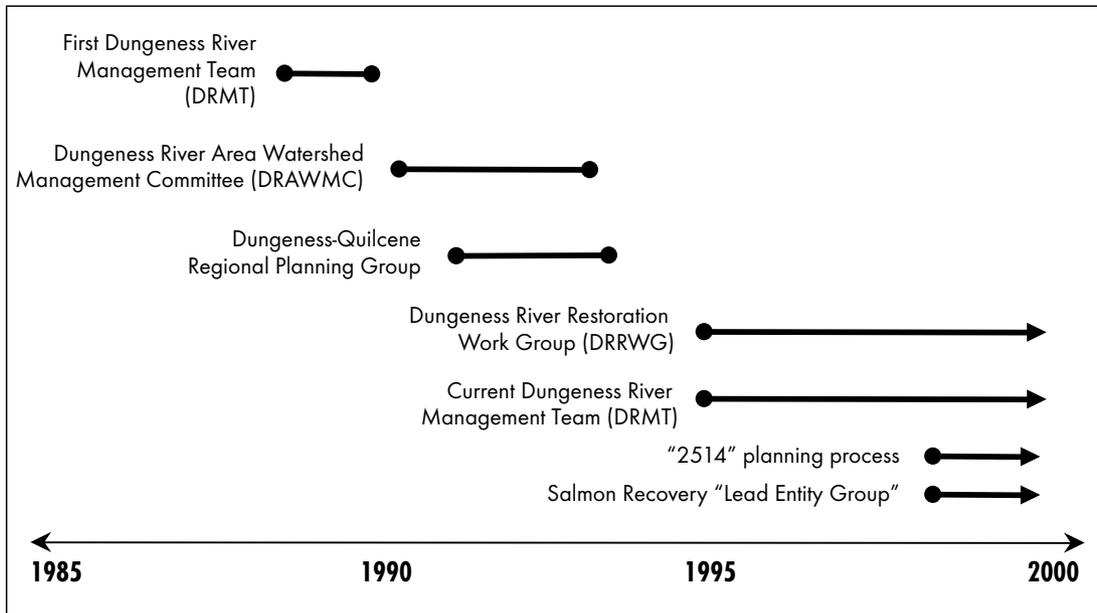
History/Key Dates

- | | |
|-----------|---|
| 1974 | Boldt Decision holds that tribes have a right to half of harvestable salmon. ⁷ |
| Mid-1980s | The director of natural resources for Jamestown S’Klallam Tribe meets with irrigators to discuss irrigation impacts on river resources; the meetings are contentious. |

- 1987 Clallam County nominates the Sequim Bay Watershed (immediately east of the Dungeness River watershed) for participation in the Puget Sound Water Quality Authority’s “early action watershed” program. Clallam County, Jamestown S’Klallam Tribe, some irrigators, and others participate. The collaborative planning process is led and facilitated by WSU-Extension agent, and produces Sequim Bay Watershed Management Plan.
- 1988 Clallam County initiates the first DRMT through a county resolution.
- 1988 Clallam County ranks its watersheds in priority order for pollution control as directed by the Puget Sound Water Quality Authority’s 1987 Puget Sound Water Quality Management Plan. The county ranks the Dungeness River watershed as its highest priority, and in 1989 receives planning funding from the state’s Centennial Clean Water Fund (CCWF) to support a state “400-12”⁸ planning process from 1990-1993. The Dungeness River Area Watershed Management Plan is completed in 1993.
- 1989 Clallam County and the US Army Corps of Engineers prepare a floodplain-management plan to address flood control for the river.
- 1989 Irrigators form the Dungeness River Water Users Association.
- 1990 The first DRMT becomes dormant as a new Dungeness River Watershed Management Committee (DRAWMC) is created to guide the “400-12” nonpoint source planning effort (described above). There is substantial carryover in membership.
- 1990 The Chelan Agreement between the state and tribes sets out guidelines for regional planning to address water resource management issues, including a specific “caucus” approach for interest representation.⁹
- 1991 Dungeness River watershed—along with Quilcene River Water Resource Inventory Area for the eastern Olympic Peninsula—is selected as one of two state pilots for implementing the Chelan Agreement. This Dungeness-Quilcene Water Resources Pilot Planning Project brings \$600,000 in state support for a two-year water resource planning process in the northeastern Olympic Peninsula. Jamestown S’Klallam Tribal efforts at the state level are critical to designation as a pilot, and the project is managed by Jamestown S’Klallam Tribe. As a requirement for funding, the Dungeness-Quilcene pilot project must form a Regional Planning Group with representatives from eight “caucus” groups. The Regional Planning Group begins developing a plan.
- 1992-99 Several major studies on surface and groundwater quantities, fish habitat and status are completed. Planning groups consider the studies critical to their efforts.
- 1993 Dungeness River Area Watershed Management Plan is completed. The plan outlines five broad goals and 100 specific actions for addressing watershed nonpoint source issues. Implementation continues into 1999.

- June 1994 The Dungeness-Quilcene Water Resource Management Plan is completed and accepted by seven of eight caucuses. The Agricultural Caucus, though instrumental throughout the planning period in addressing water-quantity issues, does not officially concur because of the belief that the plan was not fully supported by private property interests on the caucus.
- 1994 Water users agree to voluntarily limit their withdrawal to no more than 50 percent of Dungeness River flow; the agreement grew from extensive involvement in the Dungeness-Quilcene planning effort and participation with previous partnership efforts.
- 1995 State, local, and tribal agencies implement a recommendation of the Dungeness-Quilcene Plan by establishing the DRRWG to fully assess Dungeness River salmon restoration.
- 1995 Clallam County and Jamestown S’Klallam Tribe implement another Dungeness-Quilcene Plan recommendation by reactivating the DRMT through a joint resolution. The resolution directs DRMT to coordinate implementation of the Dungeness-Quilcene Plan and two previous plans. The tribe receives state funding to manage the team. DRRWG becomes an advisory body to DRMT.
- 1997 DRRWG and DRMT publish a long-term habitat conservation plan for the river and riparian corridor. DOE officially approves the plan and partners begin implementation.
- March 1998 The National Marine Fisheries Service proposes listing Puget Sound chinook salmon as “Threatened” under the Endangered Species Act.
- April 1998 Irrigators and DOE sign a water-rights memorandum of understanding, institutionalizing the 1994 voluntary withdrawal limitation agreement and creating trust water rights for the Dungeness River.
- 1998 The state initiates a new water-resources planning process (under HB 2514) administered through local planning units following state designated water-resource inventory-area boundaries.¹⁰ The local planning unit for the effort (a group involving two tribes, the cities, the county, and the largest water users) designates the DRMT as the planning committee for the Dungeness River and smaller nearby watersheds.
- 1998 Clallam Conservation District receives a grant from Washington Department of Fish and Wildlife (DFW) to form a Lead Entity Group (ten local and tribal governments) and begin a coordinated salmon recovery effort for the northwestern Olympic Peninsula, including the Dungeness River.
- March 1999 The National Marine Fisheries Service lists Puget Sound chinook salmon as “Threatened,” including Dungeness River stocks¹¹.

FIGURE A-1. MAJOR COLLABORATIVE PLANNING GROUPS FOR THE DUNGENESS RIVER WATERSHED



Organizational Arrangements

Composition/Representation

There have been several collaborative partnerships for the Dungeness River watershed over the past dozen years acting partly sequentially and partly simultaneously (see Figure A-1). In each case, partnership composition and representation was specified in advance by the funding agencies, either as part of an organizing resolution (as with both the original and reactivated DRMTs) or as a criterion for funding (as with the Dungeness-Quilcene pilot planning process). Both the original and reactivated DRMTs had representation from Clallam County, Jamestown S’Klallam Tribe, property owners and private property interests, irrigators, sports fishers, City of Sequim, Clallam Conservation District, DOE, Washington Department of Fish and Wildlife (DFW), US Fish and Wildlife Service (USFWS), and US Forest Service (USFS). The reactivated (current) DRMT includes representation from the North Olympic Land Trust and additional property owners associations.

The Dungeness-Quilcene Regional Planning Group, created for the Dungeness-Quilcene Water Resource Pilot Planning Process, used a state mandated “caucus” approach that enlisted two delegates and two alternates to represent eight constituency groups: agriculture, business, fisheries, environmental, recreation, tribal government, state government, and local government. While some participants reflected that they should have added another caucus for groundwater users, and suggested that a few of the caucuses did not really work, this structure brought 32 people into intensive participation in the planning process.

Structure/Process

The Dungeness-Quilcene planning process had a very structured arrangement of caucuses for representation on the Regional Planning Group. The group developed five committees: scoping (used only in the beginning to prepare a required scoping document); advisory (met as needed); budget (met as needed); education and public involvement (met frequently over more than two years); and technical (met bi-weekly—31 meetings involving approximately 900 volunteer hours in technical committee meetings alone). The issues in the Dungeness and Quilcene watersheds were so watershed-specific that the two groups divided their efforts by county after the first year, and each met separately until the plan was completed. Both watersheds have continuing implementation groups (DRMT for the Dungeness River).

One criticism of the Dungeness-Quilcene process related to lack of good formal group facilitation from professional facilitators. The Dungeness-Quilcene planning project had contracts with two separate professional facilitators (at an expense of \$42,500), but participants did not feel that either used an effective approach or had an appropriate style for the group. A Washington State University-Cooperative Extension agent facilitated one session that participants considered to be more effective. Generally, participants worked without facilitation, using facilitative meeting principles.

Dungeness-Quilcene followed a pure consensus decisionmaking process, not the modified consensus specified in the Chelan Agreement¹²: “Consensus is defined as no negative votes, with abstentions allowed. If no consensus is reached, such will be noted and all the information generated during the process will be collected and made available to all participants.” Upon reflection at the end of the process, group members would have preferred using the Chelan specification for consensus. As one participant commented, “One person from one caucus, for instance, objects to the word ‘prioritization,’—and that effectively takes care of any prioritization we may have been able to accomplish.”¹³ In these situations, participants suggested that individuals abused their “pure” consensus veto authority.

Clallam County and Jamestown S’Klallam Tribe formally (re)established DRMT through a joint county-tribal resolution to fulfill a recommendation from the Dungeness-Quilcene Plan. DRMT advisory and coordination responsibilities related to implementing watershed plans. The team continues to meet monthly. As another outgrowth of a Dungeness-Quilcene Plan recommendation, a technical group of biologists, planners, and engineers formed to assess comprehensively fishery restoration issues. The group (DRRWG) became advisory to DRMT, held separate meetings, and in 1997 developed a detailed assessment and overall framework for salmonid restoration.

Authority Relationships

The partnerships, and the Dungeness-Quilcene process in particular, strive to make representatives accountable to larger constituencies. Groundrules used by the Dungeness-Quilcene process reinforced accountability by requiring adequate time between meetings for representatives to interact with their constituencies and by stating obligations for “responsible representation.” Also, as the Dungeness-Quilcene Water Resource Pilot Planning Project lead, Jamestown S’Klallam Tribe was accountable to DOE for project-related expenses and products.

Staff Functions and Partner Roles

Table A-1 highlights several functions and roles for Dungeness watershed partners. Each of the numerous partnership efforts in the watershed had administrative support from either county,

TABLE A-1. MAJOR PARTNER ROLES AND FUNCTIONS FOR THE DUNGENESS RIVER WATERSHED

	Individual/ private citizens	Consultants	Local NGOs	County/local governments	Regional agency	State agencies	USEPA	NRCS	Other federal agencies	Tribal government
ADMINISTRATION/MANAGEMENT										
Initiation/convening				■						■
Administrative functions				■						■
Coordinative functions				■						■
Formal partnership facilitation		■		■ ¹						
Information provision/analysis	■	■	■	■	■	■		■	■	■
Implementation/management actions (BMP installation, habitat work)		■		■		■		■	■	■
FUNDING										
Funding for planning				■	■	■				
Funding for implementation staff				■		■	■	■	■	■
Funding for implementation/ management actions (BMPs, habitat improvements, land acquisition)	■			■		■	■	■	■	■

¹ The same local WSU-Cooperative Extension agent facilitated and coordinated the 1987 Sequim Bay planning effort and co-led a consensus-building workshop for caucus members in the Dungeness-Quilcene planning process.

state, or tribal staff. WSU-Extension led the initial Sequim Bay planning process in 1987; county staff led the 1990-1993 Dungeness area nonpoint source pollution control-planning process; tribal staff, hired with state funds, led the Dungeness-Quilcene process and the subsequently reactivated DRMT.

In each case, county, tribal, state, and federal agency staff have also coordinated efforts to provide technical and scientific support. Support has included commissioned studies, assistance in developing plans, expert information, and participation on committees. County, tribal, state, and federal agencies all monitor various aspects of this watershed (through joint and independent efforts) and make their results available.

Funding

There is a long history of funding for varied activities and projects from multiple sources. While the sources and amounts of funding for partner team operation are fairly straightforward, attempts at identifying all of the sources of funding for partner related activities in the watershed are somewhat futile—many of the funds were provided because of a partnership component, many apply to areas that extend beyond the watershed boundary, and a number of relevant grants awarded to individual partners were not dependent on other partners. Although no consolidated budget record exists, the key sources of funding are listed here.

- *Dungeness-Quilcene Planning Process*: \$600,000 appropriated by legislature. An additional \$1.3 million was leveraged as result of the project or indirectly to coordinate with the project (some of that was for efforts related solely to the Quilcene River watershed and Jefferson County).
- *Irrigation efficiency improvements*: More than \$1 million in various state and tribal grants for irrigation efficiency improvements (system assessments, pipe installation, operational changes) and flow monitoring in Dungeness alone. This includes \$130,000 from a tribal grant; \$100,000 from a fast-track “early action” DFW habitat conservation grant; \$200,000 in “referendum 38” funds for a comprehensive irrigation-system conservation plan; and \$150,000 from DOE for continuous flow monitoring.
- *Managing the reactivated DRMT*: Jamestown S’Klallam Tribe was granted \$101,000 from DOE to run the DRMT for two years (this required a \$33,000 match).¹⁴
- *Water-resource planning through HB 2514*: DOE provided Clallam County with \$242,600 to support organizational issues for the Elwha River, but also to be used for quality, habitat, and instream flows in both watersheds, and for support of each of the two “2514” watershed planning groups. The Elwha-Dungeness Water Resource Inventory Area is eligible for an additional \$250,000 in “2514” funds.
- *Funds for special studies*: Clallam County has received \$460,000 over several years from the state CCWF for projects directly related to Dungeness (including \$180,000 toward a hydrogeologic assessment of the basin and \$80,000 to study the Sequim/Dungeness aquifer).
- *Dungeness River restoration projects*: Jamestown S’Klallam Tribe receives additional assistance for the Dungeness from the state, the US Department of Commerce, the Bureau of Indian Affairs, the US Army Corps of Engineers, Puget Sound Water Quality Action Team, and others. The Clallam Conservation District received \$211,000 for a water-

quality improvement project, in part implementing the 1993 Dungeness River Watershed Management Plan and the 1994 Dungeness-Quilcene Plan. The state has also invested special “salmon money” for salmon habitat restoration efforts related to the “threatened” listing status (e.g., \$75,000 to remove a dike; local salmon recovery coordination).

- *Dungeness River Natural History Center and Railroad Bridge Park*: The center, under construction at the time of our research, features exhibits, trails, and a restored wooden trestle bridge that serves as a site for educational and local community events. The Jamestown S’Klallam Tribe owns the land, and state and federal agencies and private foundations fund the effort through more than \$500,000 in contributions, including land.
- *Tribal capacity building*: USEPA, as part of the Dungeness-Quilcene planning process, provided \$125,000 for “Water Conservation and Pollution education” and part of a larger grant (along with Washington Department of Natural Resources and Clallam County) for “Dungeness Bank Stabilization and Restoration.”¹⁵ In addition, the tribe receives numerous other water quality and natural resource staff and projects from EPA, the Department of Commerce, and the Bureau of Indian Affairs.
- *Volunteer activities*: Volunteer contributions are also substantial; in the Dungeness-Quilcene planning process alone, volunteers contributed more than 10,000 hours of their time.

Plans and Assessments

Watershed Assessments and Studies

Numerous past and ongoing scientific studies examine the Dungeness River fishery and habitat, forests, hydrology, history and land use changes, groundwater, wildlife, shellfish, citizen attitudes and water use. Many of the studies have taken place within the past ten years (both independently and jointly) as a result of coordinated planning projects for the river (see below). Highlights include a comprehensive aquatic-resource assessment for the entire river system conducted in the early 1990s; numerous investigations of salmonid migration and the effects of various environmental factors; and ongoing evaluation of the interactions between river flow, irrigation ditches, private well water withdrawals and groundwater levels. The current water-quality assessments related to shellfish pollution are conducted by the Jamestown S’Klallam Tribe, the county, and DOE.

Plans: Links Between Information and Action

DRMT is charged with coordinating implementation efforts related to several plans developed for the Dungeness River watershed over the past decade. DRMT concentrates primarily on the Dungeness-Quilcene Plan, which to some extent enfold the previous plans, and the subsequent plan for habitat restoration. Clallam County has initiated an effort to track in detail recommendations and management and implementation actions for these plans to enhance coordination and implementation and clarify DRMT responsibilities; the effort is not yet complete. Planning efforts involving watershed partnership teams include:

- *Sequim Bay Watershed Management Plan (1987)*: This first watershed planning effort was an “early action plan” funded by the state through the Puget Sound Water Quality Author-

ity (PSWQA) to address an immediate and known problem. Sequim Bay is immediately east (and outside) of the Dungeness watershed, although many of the current DRMT partners were involved in this effort. The plan addressed coordination and actions needs related to numerous nonpoint sources of pollution including a proposal to develop farm plans for bacteria control, land stabilization, and specific issues for education and awareness building. Clallam County, Clallam Conservation District, Jamestown S’Klallam Tribe and others have implemented some of the recommendations.

- *Clallam County Floodplain Management Plan (1989)*: Clallam County and the US Army Corps of Engineers prepared this plan to address river flood-control issues. Clallam County has used the plan to guide flood-control actions, and anticipates updating the plan to incorporate recommendations from the 1997 DRRWG plan.
- *Dungeness River Area Watershed Management Plan (1990-1993)*: Clallam County ranked its watersheds in priority order for pollution control as directed by the Puget Sound Water Quality Authority’s 1987 Puget Sound Water Quality Management Plan. It ranked the Dungeness River watershed as its highest priority, and received funding to plan from the state’s CCWF in 1989. Clallam County formed DRAWMC (which included carryover membership from the first DRMT and overlapping membership with the Dungeness-Quilcene process) and led the planning effort. The plan identified 100 actions for addressing watershed nonpoint source issues, but did not identify funding for implementation actions. Both Clallam County and DOE formally approved the plan. The Dungeness-Quilcene Plan (under development during much of the same period) cross-references the plan and its recommendations. The reactivated DRMT is charged with implementing this and other plans.
- *The Dungeness-Quilcene Water Resources Management Plan (1992-1994)*: The Dungeness-Quilcene Plan includes detailed recommendations for management and further research of habitat and instream flows, groundwater, water management, and education and conservation as well as a compilation of detailed information on the river systems addressed in the plan. DOE funded the two-year pilot planning effort as part of the 1991 Chelan Agreement between the state and tribes. Jamestown S’Klallam managed the planning effort with a mandated Regional Planning Group. Both the full Regional Planning Group and a technical committee analyzed and debated information for the plan. This plan was endorsed by seven of eight caucuses involved; the eighth did not feel all of his constituency supported the plan, even though the representative personally supported the plan. DOE, Clallam County, and Jamestown S’Klallam Tribe all formally approved the plan and work toward implementing plan recommendations through DRMT.
- *Recommended Restoration Projects for the Dungeness River (1995-1997)*: This “habitat plan” grew from the Dungeness-Quilcene process and was developed through a two-year effort of DRRWG, an independent advisory body to DRMT. It goes beyond site-specific fixes and assesses the river as a system— determining, for example, where dikes should be moved and bridge spans lengthened to restore a broader, more-natural flood plain and river bed. DRMT became knowledgeable about the “habitat plan” through a series of seminar style meetings, in which each team member presented a section of the plan. DRMT members unanimously endorsed this plan and partners are working towards implementation.

- “2514” *planning for the Elwha-Dungeness Water Resource Inventory Area (1998-2002)*: The local planning unit designated DRMT as the planning committee for the eastern portion of the water-resource inventory area. The process addresses water quantity, water quality, habitat, and minimum flow issues. DRMT connects to the local planning unit administratively and through several overlapping participants, including the DOE watershed team leader.
- *Other efforts*: DOE, Clallam County, and Jamestown S’Klallam Tribe are beginning assessment efforts that may lead to a TMDL allocation for bacteria for parts of the Dungeness River watershed and adjacent smaller tributaries to the Strait of Juan de Fuca.

Relationship to State Water-Quality Regulatory Program

Although allocation of water rights and streamflows are the major regulatory issues for the Dungeness River watershed, DRMT members are currently also addressing water quality issues. Very few facilities in the watershed require water-quality permits, and permits are largely limited to sand and gravel operations. DRMT has had limited involvement with water-quality permits for the Dungeness River, but individual partners have been involved in issues related to specific permits for facilities in neighboring watersheds (e.g., industrial and municipal discharges to the Strait of Juan de Fuca and Puget Sound, and the City of Sequim’s participation in a major state-funded demonstration project for wastewater-treatment-facility water reclamation). DRMT is currently working with tribal staff and staff from DOE Environmental Investigations and Laboratory Services Program to assess sources of bacterial contamination affecting shellfish beds in Dungeness Bay. Partners anticipate that assessments could lead to a regulatory TMDL allocation.

Accomplishments

Environmental Outcomes

The most significant environmental outcome from this evolving sequence of watershed partnerships is the rewatering of the Dungeness River. Agricultural water users—who hold individual senior adjudicated rights and claims to the water dating back as early as 1895—voluntarily reduced their withdrawals during critical low-flow periods so that additional water would remain in the river for salmon. Following a four-year voluntary agreement to limit withdrawals, irrigators signed a formal Memorandum of Understanding¹⁶ with DOE in April 1998 institutionalizing the voluntary agreement and creating trust water rights for the Dungeness River. Under the formal agreement, the Dungeness River Water Users Association agreed to divert no more than 50 percent of the Dungeness River flow at any time, with an upper limit of 156 cfs, the historic water rights of users determined by DOE. Historically, 16 percent of average daily flows have been below 156 cfs; the minimum recorded average daily flow is 65 cfs. The agreement reduced uncertainty regarding tribal claims to instream flows and, as a result of the agreement, irrigators receive assistance for efficiency improvements on their aging irrigation systems, partly in the form of federal salmon-habitat improvement-grants through the tribe.

The agreement came, in part, from ten years of efforts by the tribal director for natural resources in cooperation with a leader among the irrigators. Even with the partnership efforts, irrigators realized the tribe could take the issue to court, or the state could enter in a regulatory

capacity. One of the keys to reaching agreement was the realization by irrigators that they were taking a high percentage of river flows during low-flow periods; the realization came through new information provided by joint measurement by irrigators and tribal representatives. The agreement was tested by a drought soon afterward, and it proved viable, partly through active involvement of water users' leadership.

Environmental Outputs

Dungeness partnerships have also resulted in a number of intermediate environmental outputs, particularly related to salmon habitat restoration. DOE, the tribe and agricultural water users jointly funded irrigation efficiency studies, plan development, and project implementation; the major elements involve replacing earthen irrigation ditches with pipes to reduce infiltration losses as well as adding fish screens and replacing siphons. Through numerous funding sources, partners (particularly DFW, Clallam County, Clallam Conservation District/NRCS, and the Jamestown S'Klallam Tribe) have installed large-woody-debris structures, bioengineered streambank stabilization measures, and manipulated stream channels and riparian habitat in lower-watershed tributary streams. Team members also advise DFW regarding their captive brood-stock program to restore a wild salmon population. Clallam Conservation District and NRCS work with farmers in the watershed for improvements to nutrient and pasture management, soil conservation, and more. The tribe, conservation district and land trust coordinate to preserve existing riparian areas that have high habitat values.

Other Accomplishments

Other important accomplishments of the partnership relate to public education efforts, research, and the partnership's function as a forum and information clearinghouse for river activities. The centerpiece public educational effort for issues facing the Dungeness River is the Dungeness River Natural History Center and "Railroad Bridge Park." The center, under construction at the time of this research, features exhibits, trails, and a restored wooden trestle bridge that serves as a site for educational and local community events. State and federal agencies and private foundations fund the effort through more than \$500,000 in grants; the Jamestown S'Klallam Tribe owns the land and coordinates administration. Partners have produced and published several booklets related to the river (for example "Every River Has Its People," a 30-page booklet describing the watershed history and resource issues), hosted bay and watershed tours, and installed interpretive signs.

Dungeness partners are involved with current research on hydrologic continuity between groundwater, irrigation ditches, tributaries, the river, and wells. Partners are also involved in other research, including intensive monitoring and assessment work, led by DOE and the tribe, associated with identifying sources of bacteria polluting shellfish beds.

Meetings of the current watershed partnership (DRMT) are open and widely publicized, and as with its previous forms, the partnership teams provides a forum for stakeholders to discuss watershed issues and river related research. Public turnout for DRMT meetings has been high; attendance is diverse, including several private property rights proponents. Between the various planning and management efforts (see Figure A-1), local partners have provided watershed-oriented forums for more than a decade.

Case Commentary

The accomplishments of these Dungeness River partnerships, particularly the innovative trust water-rights agreement, are very promising indications that seemingly intractable issues can be successfully addressed in a watershed framework. Traditional programs had not resolved instream flow-depletion issues. The major accomplishments and pending restoration improvements here simply could not have developed without the high degree of coordination and information sharing enabled by the watershed approach—each planning effort involved intense cooperation among participants. Numerous state agencies, county departments, tribal interests and federal entities play key roles in Dungeness River management, and working through partnerships is now the accepted approach to water resource management in the watershed.

In addition to the accomplishments already identified, tribal and county capacity for addressing resource management has increased markedly since partnership efforts began. Both entities have increased their staff, enhanced their technical capacities, and gained a better understanding of resource conditions and resource management. Working in partnerships has also provided an historically under-represented group (the Jamestown S’Klallam Tribe) with new resources and influence over local public issues. Constant association with the tribe and their staff has increased understanding of tribal issues and appreciation of tribal abilities within the watershed community. The tribe has also contributed additional federal resources for environmental management unavailable to non-tribal groups.

Finally, and significantly, partners have sustained a concentrated local, state, and federal focus on Dungeness River resources for more than a decade. This focus and collaborative approach will continue.

Contributing Factors

The literature suggests a number of key variables thought to influence a watershed partnership’s accomplishments. We have identified key factors, which in our judgement, were important for this partnership. Factors are not ranked here, and the discussion reiterates information presented throughout this appendix:

- *Issue(s) salience*: Strong interests in salmon restoration (initially promoted by the tribe and others, and now given greater immediacy by the National Marine Fisheries Service) has driven partnership efforts for this watershed. Other local groups participate to coordinate and protect their interests in continued irrigation, other water uses, development, private property rights, and environmental protection/restoration.
- *Inclusive participation by a broad array of interests*: Each partnership has included a diverse range of interests, and their participation has both broadened the spectrum of perspectives and legitimized group plans and decisions. The joint Dungeness-Quilcene planning group illustrates potential problems from including too broad an area for planning; participants in those water-management areas were starting from different levels of issue and personal familiarity and were disconnected from each other geographically. Subsequent efforts targeted smaller watershed areas.
- *Initial leadership and sustained participation of respected local individuals along with active participation by capable state and local agency staff*: The partnerships were all largely initiated by local

leaders (particularly from within the irrigation and tribal communities, including tribal efforts to secure designation as a pilot for the Chelan Agreement) and led by local staff and citizens. Local agencies, political representatives, and residents sustain partnership efforts for Dungeness River management. Several state, local, and federal agencies interact on a regular basis through the DRMT. Those agencies, particularly DOE, DFW, Jamestown S’Klallam Tribe’s Department of Natural Resources, Clallam County, and the Clallam Conservation District, provide important group functions. Participation and shared leadership by both local citizens and agency staff together appears to influence success.

- *Formal governmental support:* Local governments and the state support and legitimize Dungeness River partnerships through endorsement/adoption and recognition of partnership efforts. Clallam County and Jamestown S’Klallam Tribe passed a joint resolution creating and supporting the DRMT. A city council member from Sequim, the only incorporated area in the watershed, participates on the team. The local government caucus approved the Dungeness-Quilcene Plan. DOE has approved each watershed management plan and, as part of the Chelan Agreement, funded the Dungeness-Quilcene Water Resources Pilot Planning project.
- *A sound scientific basis for assessment and action:* Partners conduct and share research on watershed resources and use computer models to understand sediment transport, stream flow and groundwater hydrologic continuity. They have also developed a detailed inventory and assessment, focused mostly on the river, riparian corridor, and lower watershed but also including upland watershed hydrogeology and identifying potential upland resource impacts.
- *Use of a watershed plan to guide actions:* Dungeness River watershed partners are carrying out several plans. The plans contain reference information and specify recommendations and implementation actions. The plans provide a scientifically sound framework and set of priorities for partner actions.
- *Funding to employ staff, collect information, develop plans, and implement actions:* Dungeness River partnerships have used numerous funding sources to support these activities. County and tribal staff are funded primarily through state and federal grants. Funding for information collection has come from federal agencies (EPA, USGS, USFS, USFWS) and as part of several state initiatives. Those partnership efforts have received substantial state support for planning. Partners draw from a variety of sources to implement their plans and continue to seek additional funding, including through agency and local government programs.
- *Staff for coordination, management, and technical work:* The county and Jamestown S’Klallam Tribe have both provided coordination and management staff for various Dungeness partnership efforts, supported largely through project grants. County, tribal, state, and federal agencies provide staff for technical assessment, design, and implementation work.

Nisqually River Watershed, Washington

List of Acronyms

BMP	Best Management Practice
CCWF	Washington state Centennial Clean Water Fund
cfs	Cubic feet per second (flow measure)
DFW	Washington Department of Fish and Wildlife
DOE	Washington Department of Ecology
FERC	Federal Energy Regulatory Commission
NRC	Nisqually River Council
NRCAC	Nisqually River Citizens Advisory Committee
TFW	Timber Fish and Wildlife
TMDL	Total Maximum Daily Load
USFS	US Forest Service
USFWS	US Fish and Wildlife Service
USGS	US Geological Survey

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Partnership Description

The Nisqually River Council (NRC) is a partnership among state agencies, federal land managers, Nisqually Tribe, local municipalities, other organizations and citizens. NRC, formed in 1987, is a non-regulatory cooperative group that has sponsored research and natural re-

source restoration and protection efforts and has been the major forum and information clearinghouse for water and natural resource issues related to the Nisqually River and watershed. NRC is one of five closely linked entities spawned by the legislatively mandated Nisqually River Management Plan. The plan was developed by Washington Department of Ecology (DOE) with assistance a Nisqually River Task Force, convened solely for the planning effort. Each of the program's four additional entities is distinct from NRC but has overlapping membership and goals: the Nisqually River Citizens Advisory Committee (NRCAC); the Nisqually River Interpretive Center Foundation; the Nisqually River Basin Land Trust; and the Nisqually River Education Project. Together, those entities form the Nisqually River Management Program.

Background, Genesis and Purpose of Partnership

Trigger

In 1985, the Washington State Legislature, recognizing the watershed as “a highly prized area of great natural beauty,” directed DOE to develop a plan leading to a “stewardship program” to balance economic and environmental interests in the watershed.¹⁷ The legislature appropriated \$42,516 to develop a plan. DOE convened the Nisqually River Task Force, which led development of the Nisqually River Management Plan.

Initiator

A Washington state legislator with a strong personal interest in protecting the basin introduced legislation that created a Nisqually River Management Plan.

Stated Partnership Goals and Objectives

The purpose of NRC is “to serve as a coordination and advocacy body for, and to analyze policy issues relating to, implementation of the Nisqually River Management Plan,” and “to act as a clearinghouse and coordinating unit for Nisqually River interests.”¹⁸

Scope

■ *Substantive scope:*

NRC considers a comprehensive range of issues throughout the Nisqually River watershed, including: instream, riparian, and wetland habitat; point and nonpoint sources of water pollution; fisheries restoration and management; water-quality impacts on shellfish; recreation and river access; land management; and environmental aesthetics. NRC has special interest in a “core management zone,” consisting of a 200-foot-wide corridor on each side of the Nisqually River and part of a major tributary, and a “stewardship management zone,” a viewshed corridor along the Nisqually River (between one-quarter mile and three-quarter miles on each side of the river) and 200-foot corridors on all other tributaries.

■ *Functional scope:*

NRC and its four affiliated organizations in the Nisqually River Management Program¹⁹ address issues through multiple means. Among their actions, they: coordinate implementation of the Nisqually River Management Plan and general information regarding watershed re-

source management actions; host adult and youth educational events and coordinate with the school-based Nisqually River Education Project; identify and generate funds for watershed partners; sponsor research; and engage local officials in discussions regarding local activities that may affect the resource (e.g., urbanization and development, riparian area modifications). NRC participates in a range of land- and water-management activities, including scientific research, stream and land rehabilitation, and land acquisition. Partners address new issues as they occur (e.g., responding to proposed land-use changes and discharge activities within the basin).

Local Context for Watershed Partnerships

Watershed Description

As recognized by the legislation initiating the river management plan, the Nisqually River basin is an area of exceptional beauty and resource value covering more than 700 square miles near the southern end of the Puget Sound. The watershed, located within a short drive of Seattle and Tacoma, begins on the slopes of Mt Rainier and flows 78 miles through a variety of habitats to the Nisqually Delta in the Nisqually National Wildlife Refuge. The river provides Southern Puget Sound's largest single source of fresh water. Flows in the upper half of the river are solely runoff and snowmelt; releases from four hydropower facilities and runoff from tributaries control flow in the lower half.

The Nisqually River basin includes three counties: Pierce County (58 percent of the watershed); Thurston County (35 percent); and Lewis County (17 percent). The basin includes a number of small urban areas including Yelm (population 2,500); Eatonville (population 1,900); and several smaller communities. The federal government manages 30 percent of the basin through Fort Lewis (US Army), Mount Rainier National Park (National Park Service), Nisqually National Wildlife Refuge (US Fish and Wildlife Service), and Gifford Pinchot National Forest (US National Forest Service). The Nisqually Tribe manages a 1,600-acre reservation adjacent to the river in the lower watershed. State lands account for 13 percent of the watershed, including the 4,100-acre University of Washington Pack Experimental Forest.

With the national park, national forest, Fort Lewis, state lands, and large commercial forestry land holdings, forests cover roughly 90 percent of the watershed. Urban areas constitute only about 1 percent, and agricultural and rural non-agricultural uses (including a growing number of rural residents in the lower watershed) account for the remaining nine percent.

Water Resource and Other Key Environmental Issues

Though the Nisqually basin is highly valued for its natural beauty and relatively pristine conditions, the river and tributaries face water-quality threats. Surface waters in the basin are affected by numerous nonpoint sources of pollution from forestry, agricultural, and urban lands, and from expanding urbanization and rural development. All those contribute sediments, nutrients, and bacteria. There are several permitted point source discharges to the river and tributaries, including wastewater treatment plants, gravel and construction materials operations, dairies, and a number of manufacturing operations. The area includes a large municipal sludge reclamation area and a new landfill. There are public health concerns over elevated levels of nitrates in groundwater, particularly in the face of increasing rural non-farm development on the glacial outwash. Shellfish beds at the Nisqually Delta have a conditional harvest

rating due to pollution from bacteria, which places restrictions on commercial harvests.

Restoring salmon and salmon habitat is a high-priority resource-management issue throughout the Pacific Northwest, and chinook salmon are listed as a threatened species throughout Puget Sound, including in the Nisqually basin. Despite having no remaining native Nisqually chinook salmon species, partners (particularly the Nisqually Tribe and Washington Department of Fish and Wildlife—DFW) are working to develop a wild salmon population from other fishery stock.

Ten water bodies/segments in the basin are listed on Washington’s 303(d) list of impaired waters. Four lake sites are listed for high levels of phosphorus, three stream reaches have high levels of fecal coliform, two have inadequate dissolved oxygen, and one stream is listed for high temperatures. DOE recommends total maximum daily load (TMDL) actions for nine of the sites, and the agency is beginning a process to further analyze the sources of impairment for these waters.

Driving Issues

Salmon protection and restoration and overall preservation of this highly valued natural area are the two main issues driving interest in this basin. The recent chinook salmon listing under the federal Endangered Species Act and ongoing tribal and DFW fishery management efforts are key elements in attempts for salmon recovery.

Prior Relationships Among Partners

The Nisqually Tribe has a history of resolved conflicts with public hydropower utility operators (through negotiations under authority of the Federal Energy Regulatory Commission—FERC) and with the state and major private timber interests (through the Timber Fish and Wildlife—TFW—discussions that partly overlapped efforts of the Nisqually River Task Force).

In 1974, the Nisqually Tribe initiated litigation against Tacoma Public Utilities over minimum instream flows and related habitat protection issues. In 1978, a FERC administrative law judge ordered Tacoma Public Utilities and Centralia City Light to provide minimum flows for fish habitat. The judge also established the Nisqually River Coordinating Committee with representation from the tribe, the two power companies, and the state fish and wildlife agencies in order to address and resolve future conflicts between hydropower and fish habitat over flows in the basin.²⁰

The TFW agreement among tribal, forestry, and state interests established an acceptable voluntary natural resource management process for forest practices on state and private lands. Several individuals from the forest products, tribal, and state agency groups participated in both the TFW discussions and on the Nisqually River Task Force or subcommittees.

History/Key Dates

- | | |
|---------|--|
| 1974 | Boldt decision holds that tribes have a right to half of harvestable salmon. ²¹ |
| 1974 | Nisqually Tribe sues Tacoma Public Utilities over minimum flows for the Nisqually River. |
| 1976-78 | Instream flow issues for the Nisqually River are settled by a FERC administrative judge. |

- 1985 Washington State legislature directs DOE to prepare a management plan for the Nisqually River, specifying that the plan not be implemented prior to adoption by the legislature.
- 1985 DOE initiates the Nisqually River Task Force, comprised of a broad representation of basin stakeholders. The task force established a steering committee and a technical advisory committee with six technical subcommittees, which, in turn developed the plan.
- 1987 State Legislature approves the Nisqually River Management Plan. DOE convenes the NRC and provides staff support for NRC activities. NRC selects 20 initial members for the NRCAC from over 50 applicants.
- 1987-1999 NRC meets monthly, NRCAC meets regularly, and both address resource management issues outlined in the Nisqually River Management Plan.
- 1989 The state legislature appropriates funds to support implementation of the Nisqually River Management Plan. The Nisqually River Basin Land Trust is created, following recommendations in the Nisqually River Management Plan.
- Early 1990s Tacoma Public Utilities and Centralia City Light begin to explore mitigation options related to an impending FERC relicensing process for their hydro-power facilities. NRC becomes a forum for discussion of mitigation options within the Nisqually basin, and NRC is influential in facilitating a Weyerhaeuser Company sale of land to Tacoma Public Utilities for FERC-related mitigation measures. The sale enables a “bluff to bluff” conservation area along a nine mile riparian corridor of the Nisqually River. Although development of this corridor would be more lucrative for Weyerhaeuser, by selling to Tacoma Public Utilities for conservation management, they secure a significant preservation accomplishment.
- 1992 NRC receives \$150,000 from the state legislature for initial planning of the Nisqually River Interpretive Center. The Nisqually River Interpretive Center Foundation is established to oversee planning and development.
- 1992 NRC formally requests a full environmental impact statement for the new City of Yelm wastewater treatment plant. It becomes a major issue for NRCAC, both because of a proposed discharge to the river and concerns over regional groundwater quality. The issue had grown since the late 1980s, when elevated nitrate levels in groundwater led Yelm to pursue a switch from septic systems to a blended septic/centralized wastewater treatment system.
- 1997 FERC issues license for both Tacoma Public Utilities and Centralia City Light hydropower operations.
- 1998 A local planning unit, involving several NRC partners, applies for and receives funding through the new “2514” watershed planning program. The Nisqually Tribe is the state’s only tribe to lead and manage a “2514” watershed planning process, indicating a high degree of trust and confidence from other watershed governments.

1999 The National Marine Fisheries Service lists Puget Sound chinook salmon as “threatened.”

Organizational Arrangements

Composition/Representation

The original Nisqually River Task Force had a 24-member steering team that included a broad range of high profile representatives from numerous public and private organizations, as well as a 50-member technical advisory team with six additional subcommittees. Its successor, NRC, has 20 members representing each basin county and municipality, state agencies (DOE, DFW, Washington Parks and Recreation Commission, Department of Natural Resources, Department of Agriculture, and University of Washington), federal land management agencies, and the Nisqually Tribal Council. A separate NRCAC (which requires at least two-thirds of its membership to be basin residents and landowners) involves additional stakeholders who self-nominate for membership. NRCAC is also formally represented on NRC.

Structure/Process

NRC has no formal bylaws. It coordinates through an executive committee consisting of the three counties, an advisory committee representative, the Nisqually Tribal Council, and three state agencies (DFW, Parks and Recreation Commission, and Department of Natural Resources). NRC is run by a chair that rotates among members. NRC meets monthly and, while seeking consensus, makes decisions by majority vote. NRC organizational arrangement were specified in the Nisqually River Management Plan, including the requirement for a citizens’ advisory body.

NRCAC selects a chair and vice-chair and has three formal positions on the NRC, although NRC encourages broad NRCAC member participation at NRC meetings. NRCAC has a process in place to determine its representation on NRC when controversial issues divide members. NRCAC holds its own monthly meetings and also uses a majority vote for decisions.

NRC and NRCAC share four joint committees: Executive/Budget; Education and Interpretation; Natural Resources, and Public Access. The Nisqually River Interpretative Center Foundation and the Nisqually River Basin Land Trust are each nonprofit organizations with their own boards of directors. NRC approves the Interpretive Center Foundation Center board members. The land trust is a membership organization with various membership categories based on donations. The Nisqually River Education Project focuses on watershed education for students from upper elementary school to high school, as well as teacher training, curriculum development and water quality monitoring.

Authority Relationships

NRC does not hold formal authority for resource-management decisions, but its stature as a legislatively created body legitimates NRC and its actions. NRC’s state, local, and federal governmental members exercise independent authority for watershed land and water resource management. The various Nisqually River auxiliary groups are accountable largely to themselves, their boards, and to the legislature.

Staff Functions and Partner Roles

Table B-1 identifies several staff and support roles for NRC efforts. DOE supports one full-time position for NRC and an additional position for the “2514” watershed planning efforts. For several years, both staff were assigned solely to NRC and related committee activities. Now, one coordinates council and committee meetings and events, manages council-related administration, develops newsletters, maintains and distributes minutes for each council meeting, and carries out additional NRC related activities. The second DOE employee oversees the watershed’s “2514” planning process, and participates actively in NRC activities, including serving a term as NRC chair. The Nisqually River Education Project is run by its director, and the Nisqually River Interpretative Center Foundation and the Nisqually River Basin Land Trust are staffed by board members.

Most agency partners contribute some form of technical assistance or technical information for NRC actions and deliberations. These include extensive research and monitoring from the Nisqually Tribe and DOE, conservation district inventory work and technical support for farmers and rural non-farm residents, DFW and tribal fishery management information, and land management information from numerous partners. NRC has been successful in coordinating applications and obtaining grant funding to support scientific research by partners.

Volunteers and partners at all levels of government have provided in-kind contributions for activities including restoration projects and educational and awareness events. It should be noted that professional facilitation was not an important aspect of this partnership.

Funding

Initially, NRC received funding from the legislature (about \$40,000 in flexible spending for issues connected to the watershed plan). Those resources have been redirected, but the council and partners generate additional funding for issues connected to the plan. Other sources of funding include the Coastal Zone Management program, state and federal salmon recovery funds, the state Centennial Clean Water Fund (CCWF), federal USEPA 319(h) funds and US Fish and Wildlife Service grants. Conservation districts have access to NRCS funding programs. The Nisqually Tribe receives additional funding for water quality programs, habitat restoration work, and community development actions from several federal agencies. Since 1987, NRC and its members have received over \$4 million in funding for watershed-related resource management work: in addition to nearly \$10 million in state and federal support for the City of Yelm’s innovative wastewater treatment plant.

The Nisqually River Basin Land Trust is funded through public and private donations and special events, and the land trust has oversight and administrative responsibility for the \$1.75 million Nisqually Delta Environmental Mitigation Trust, contributed by a company located near the river delta. The Interpretive Center Foundation raises additional private funding. The Nisqually River Education Project is currently funded through state funds and has received past support as part of a 319(h) grant.

Plans and Assessments

Watershed Assessment and Studies

In developing the Nisqually River Management Plan, the Nisqually River Task Force recognized a general lack of information about resource management in the basin. Since the mid-

TABLE B-1. MAJOR PARTNER ROLES AND FUNCTIONS FOR THE NISQUALLY RIVER WATERSHED

	Individual/ private citizens	Consultants	Local NGOs	County/local governments	Regional agency	State agencies	USEPA	NRCS	Other federal agencies	Tribal government
ADMINISTRATION/MANAGEMENT										
Initiation/convening						■				■
Administrative functions						■				
Coordinative functions	■		■			■				■
Formal partnership facilitation										
Information provision/analysis	■	■	■	■	■	■		■	■	■
Implementation/management actions (BMP installation, habitat work)	■	■	■	■		■		■	■	■
FUNDING										
Funding for planning				■		■				
Funding for implementation staff				■		■	■	■	■	■
Funding for implementation/ management actions (BMPs, habitat improvements, land acquisition)	■		■	■		■	■	■	■	■

1980s, the Nisqually Tribe has conducted extensive monitoring and water quality investigations at 11 baseline data sites throughout the watershed, particularly focused on upland tributaries. DOE also monitors groundwater and surface water quality and has developed digitized maps for the watershed. Other groups have research projects throughout the watershed, including Pierce and Thurston Counties, US Geological Survey (USGS), and Pierce and Thurston Conservation Districts.

Plans: Links Between Information and Action

The Nisqually River Management Plan provides an overarching framework for land and water resource management related to the river. The state legislature directed DOE to develop this plan in 1985, and the plan provides general guidance for actions in 15 different plan elements. The Nisqually River Task Force led plan development and wanted to produce a document that provided guidance and yet allowed for a wide variety of future actions. The plan distinguishes between a riparian “Core Management Zone” and a viewshed “Stewardship Zone,” and includes language stating that NRC should also consider and address anything outside of that area that might affect either zone. The state legislature formally approved the plan in 1987 and directed DOE to “...implement the Nisqually River Task Force recommendations.”²² DOE began implementing the plan by creating the NRC. NRC oversees and coordinates continued plan implementation, and formally requests municipalities and counties within the basin to review land use actions for consistency with the plan. Pierce County has formally adopted the Nisqually River Management Plan through a county resolution and reference in the county comprehensive plan. Thurston County adopted the Nisqually River Management Plan through reference in its county comprehensive plan.

Relationship to State Water-Quality Regulatory Program

NRC and NRCAC are informally connected to the water-quality regulatory program in several ways: they share data with DOE, which conducts independent water-quality assessments; they receive reports from DOE on water-quality monitoring related to the synchronized regulatory permitting program; and they participate in public comment and review of water-quality permits as facilities apply for and renew permits. NRC partners also participate actively in contaminant monitoring related to the health status of shellfish beds and in the processes for addressing sources of contamination.

Accomplishments

Environmental Outcomes

As intended, the most significant environmental outcomes have been in land conservation and protection. NRC helped facilitate the sale of a nine mile “bluff to bluff” riparian corridor from Weyerhaeuser to Tacoma Public Utilities (as part of a FERC licensing mitigation agreement) for protection and conservation management; development of this corridor would have been more lucrative. The Nisqually River Basin Land Trust, formed as part of the overall Nisqually River Management Program, holds over 200 acres of riparian lands and oversees a special \$1.75 million mitigation trust fund negotiated for the Nisqually Delta by NRC partners (especially tribal leadership) with a company impacting the Delta. A separate regional land-

trust targets watershed upland areas, in coordination with the Nisqually River Basin Land Trust.. The Nisqually Tribe and others hold additional conservation easements. NRC partners have also been working to improve river access and to develop the Nisqually-Mashel State Park, identified as the top recreation priority in the 1987 plan, through state investments of over \$3.25 million for nearly 600 acres of park lands to date.

Environmental Outputs

Partners can also claim environmental accomplishments of a more intermediate nature. NRCAC, in particular, influenced changes in the design for a local wastewater treatment plant to preclude discharges to the Nisqually River and reclaim 100 percent of effluent. The City of Yelm installed a waste water treatment system involving high-tech septic tanks that keep solids in the tank on-site and pipe liquids to a central treatment facility. Yelm had intended to discharge the treated liquid effluent into a bypass canal and then into the Nisqually River. NRC, and particularly the NRCAC, interjected themselves into this discussion by formally requesting a full environmental impact statement and by using the council as a forum for generating alternative ideas. NRCAC members threatened legal action to prevent the discharge, and eventually reached an agreement with the city to help lobby the state legislature for pilot funding to develop an innovative wastewater system that reused all effluent and produced no discharge to surface water. Nearly \$10 million in state funds were provided for this innovative wastewater treatment solution.

Partners have also funded and implemented several streambank stabilization and instream habitat restoration projects in tributaries throughout the basin, including reaches of Yelm, Ohop, and Muck Creeks. Through the lead of county conservation districts, partners help target and fund various agricultural and rural land management practices. These efforts include individual landowner plans for pasture and nutrient management, fencing, livestock/barnyard improvement programs. Following expanded inventory work, partners received a \$360,000 EPA 319(h) grant for addressing nonpoint source pollution (including funds for education). Many of the basin's smaller hobby farms did not qualify for USDA assistance-programs yet contributed significant sediment, nutrient and bacteria loads to tributary streams; NRC partners obtained additional funding from the US Fish and Wildlife Service and the state to assist those landowners.

Other Accomplishments

Nisqually watershed partnerships have led to several additional accomplishments and institutional outcomes. Given the conservation emphasis of this partnership, a major institutional accomplishment has been the formation of a land trust, started by NRC, with close connections to all NRC partners, including another regional land trust. The Nisqually Tribe has greatly enhanced its resource management capacity, and that of the whole initiative, through involvement with the partnership. The tribe has received over \$1.1 million in state funds alone supporting monitoring, analysis, and restoration activities, and has used the information to influence overall partnership management actions.

NRC has sustained important functions as an information clearinghouse and forum for communication among a large and diverse group of partners. Partners in the Nisqually River watershed consistently identified this information sharing function as the most valuable aspect of their participation. It has led to extensive indigenous knowledge for resource management

in the basin. The NRC and NRCAC forums also provide convenient points of access for citizens needing multi-agency assistance.

NRC and partners provide general education and awareness services by producing newsletters for NRC and the land trust, widely distributing detailed minutes from all NRC committee meetings, maintaining a presence in local schools through the Education project, and hosting special events. The Nisqually River Education Project, through separate grant funding, has numerous intangible effects on the resource through curricula development, teacher workshops, and water quality monitoring and stream restoration work with students. The Nisqually River Management Plan emphasized the importance of interpreting the watershed's significance for the general public. NRC partners formed the Nisqually River Interpretive Center Foundation and have developed a design and selected a site for a \$16-million center. The foundation is now negotiating land acquisition and raising funds for the project.

Case Commentary

The largest overall impact from Nisqually watershed partnerships is a cumulative benefit resulting from a 14-year sustained citizen, agency, and local government focus on protection and restoration issues related to the Nisqually River and its watershed. NRC enhanced local problem-solving capacity by providing coordination, information sharing, “forum” functions, and planned a framework for action. Collectively, those result in a heightened awareness of multiple land and water management issues and activities in this basin among a broad set of local actors. By working jointly toward goals outlined in the broadly scoped Nisqually River Management Plan, partners have found opportunistic ways to pool their resources for watershed protection, including a strategy of land conservation through acquisition—in particular with respect to the land trusts and Tacoma Public Utilities conservation corridor. The institutionalized format for citizen involvement and leadership has heightened agency awareness of citizen concerns, fostered coordination and cooperation among basin partners, and led to opportunities that would otherwise not have emerged, such as the \$1.75-million Nisqually Delta Environmental Mitigation Trust (managed by the Nisqually River Basin Land Trust) and the innovative Yelm wastewater treatment program.

NRC also benefits the Nisqually Tribe, through its function as a forum for common issues and through trust-building interactions with other local governments and interests. Among the most-promising achievements suggesting sustainable outcomes, Nisqually basin partners have developed a mutual familiarity and trust as demonstrated by Nisqually tribal leadership in the current “2514” watershed planning process—the only tribe in Washington to have a lead role.

Contributing Factors

Numerous factors appear to influence the accomplishments of NRC and related partnerships. Factors are not ranked here, and the discussion reiterates information presented throughout this appendix:

- *Issue(s) salience:* The widely recognized unique aesthetic and resource values of the watershed and potential threats to them drive federal, state, local and nongovernmental efforts for watershed protection and enhancement.
- *Inclusive participation by a broad array of interests:* While all NRC participants share an interest in natural resource protection, they represent a wide range of individual and

agency perspectives. Watershed partners often engage other interests over specific issues (e.g., landowners, public utilities, additional local government agencies). The breadth of participation adds value to the clearinghouse function and presents opportunities for both proactive actions (assisting with Tacoma Public Utility FERC mitigation issues) and reactive actions (addressing Yelm's wastewater treatment proposals, addressing a regional landfill siting decision).

- *Initial leadership and sustained participation of respected local individuals along with active participation by capable state and local agency staff:* The partnership was set in motion by the legislature, but a local political official (and later state senator) led the initial task force that developed the Nisqually River Management Plan. NRC's first chair was a highly respected local resident, and the NRC initially had more applicants than positions for its Citizens Advisory Committee, two-thirds of whose members must reside in the basin. Local citizens continue to manage and lead the advisory committee, although interest is now less intense. As critical as citizen leadership has been to NRC, the partnership actions have also depended on agency participation and leadership. State, local, and federal agencies interact through NRC on a regular basis. The agencies, particularly DOE, the Nisqually Tribe's Department of Natural Resources, and the conservation districts, provide numerous group functions (refer to Table B-1). Together, NRC members representing the various citizen and governmental interests in the watershed are vigilant about identifying potential natural resource related threats and opportunities for additional protection and restoration. NRC responds as participants identify issues, and that high degree of awareness has led to additional funding, resource protection, and land acquisition.
- *Formal governmental support:* The state legislature, DOE, DFW, and other state agencies formally support NRC. The high degree of state endorsement has helped maintain staff support and facilitated state funding for NRC activities. Local governments implicitly endorse the NRC and watershed partnership efforts through their participation in NRC meetings, cooperation for monitoring, and coordination for other resource management activities. Local county governments have adopted the Nisqually River Management Plan as part of their county comprehensive plans; NRC references such support during public discussions of county development proposals.
- *A sound scientific basis for assessment and action:* The Nisqually River Management Plan does not include a detailed watershed inventory and assessment, although DOE's Final Environmental Impact Statement for the plan, developed prior to legislative approval, involves a fairly exhaustive compilation of available data. The plan acknowledged a lack of comprehensive information and identified continued data development as a priority. Partners have conducted several river and watershed research projects. Modeling has not played a central role in NRC activities or in actions related to the Nisqually River Management Program. However, water-quality modeling does occur for the basin. In 1998, DOE initiated a South Puget Sound Model Nutrient Study²³ that incorporates DOE monitoring information in an attempt to understand point and nonpoint nutrient flows throughout the Southern Puget Sound. DOE has also conducted hydrologic flow modeling.

- *Use of a watershed plan to guide actions:* NRC and overall Nisqually River Management Program actions are generally guided by the inclusive Nisqually River Management Plan.
- *Funding to employ staff, collect information, develop plans, and implement actions:* Partners have successfully obtained agency and other funding support for critical functions. The NRC staff position is funded through DOE and is relatively stable. The state awarded numerous grants to the Nisqually Tribe for water-quality monitoring and assessment. The tribe also received assistance from EPA. The conservation districts conducted targeted inventories through district funding and with assistance from a EPA 319(h) grant. The state funded development of a watershed plan through a small legislative appropriation and agency funds. Partners receive funding from various sources for their implementation actions, both through regular agency expenditures and through special grants. Partners have worked together to secure state and federal project grants. For several years, the legislature appropriated a small amount of flexible funding for NRC's use in implementing the Nisqually River Management Plan.
- *Staff for coordination, management, and technical work:* DOE provides staff support to coordinate activities for the NRC, which facilitates communication among partners through newsletters and NRC/committee-meeting minutes. Agencies and volunteers conduct technical work related to information gathering and restoration and conservation projects (See Table B-1).

Tomorrow-Waupaca River Watershed, Wisconsin

List of Acronyms

BMP	Best Management Practice
DATCP	Wisconsin Department of Agriculture, Trade, and Consumer Protection
DNR	Wisconsin Department of Natural Resources
EQIP	Environmental Quality Incentives Program
NRCS	Natural Resources Conservation Service
NWQAP	National Water Quality Assessment Program
TU	Trout Unlimited
TWWA	Tomorrow-Waupaca Watershed Association
TWPWP	Tomorrow-Waupaca Priority Watershed Project
USGS	US Geological Survey

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Partnership Description

The partnership for the Tomorrow-Waupaca River watershed began as a citizen-driven nongovernmental organization for water resource management and through special designation and funding (as part of Wisconsin's priority watershed program) has transformed into a state and county-driven watershed project. The partnerships break into two phases: an initial Tomorrow-Waupaca Watershed Association (TWWA), spanning 1991-1995 (although still not officially disbanded) and the current Tomorrow-Waupaca Priority Watershed Project (TWPWP),

which began in 1993 (see Figure C-1). TWWA was a citizen-initiated association that played an instrumental role in this watershed's selection for the state priority watershed program for addressing nonpoint source pollution issues through substantial local funding and technical support for watershed assessment, planning, and BMP installation. TWWA members greatly influenced the project's planning efforts and became absorbed within the new TWPWP partnership. TWPWP is a state-local partnership for watershed management that uses state funding and county staff (augmented by close connections with federal and state technical staff and universities) and involves substantial guidance from interested citizens, local business, landowners, and universities.

Background, Genesis and Purpose of Partnership

Trigger

Partnerships for the Tomorrow-Waupaca River and watershed emerged from a meeting of roughly 75 resource managers, researchers, and other citizens with interests in the river and watershed, held at a private farm on the river in 1991. That meeting led to the formation of the citizen-led TWWA and a broad base of agency and research advisors.

Initiator

A private riparian landowner and angler worked with a local chapter of Trout Unlimited (TU) to improve habitat along streambanks on her property. Interested in working with others in different parts of the river, she reached the realization that no single group or agency coordinated management actions for the river. So, she took it upon herself to initiate inquiries, make contacts and generate coordination for the river and watershed by organizing and hosting a meeting at her farm.

Stated Partnership Goals and Objectives

TWWA had two main objectives: "to protect, preserve, restore, and advocate the wise use of the natural resources in the watershed for the aesthetic, recreational, economic benefit, and health of the citizens of the watershed"; and "to educate the general public regarding the inter-relationship of our waters, soils, plants, animals, and people."²⁴ TWPWP's primary objective is "to reduce nonpoint source pollution and to enhance and protect the water quality of surface and groundwater in the watershed."²⁵

Scope

■ *Substantive scope:*

The partnerships have focused primarily on controlling nonpoint sources of pollution to surface water and groundwater and improving instream and riparian habitat throughout the watershed.

■ *Functional scope:*

Partners currently employ a range of activities to address water quality. These include: coordination for multiagency programs for and interaction with agricultural producers and riparian

landowners; directing watershed/conservation educational efforts for farmers, urban residents, rural non-farm residents, riparian property owners, and developers; providing financial assistance for agricultural management practices and urban land use/stormwater plan development; commissioning and coordinating monitoring and research related to surface water, land use/groundwater quality interactions, and agricultural management practices; and providing technical assistance to agricultural producers and urban land developers for land management practices.

Local Context for Watershed Partnerships

Watershed Description

The Tomorrow-Waupaca River watershed drains 291 square miles of Wisconsin's central sands region, an area of mostly sandy and mixed-texture soils formed by a glacial moraine. The river, which changes names from the Tomorrow River to the Waupaca River in Waupaca County, is part of the Wolf River basin and eventually drains into Green Bay in Lake Michigan. The watershed includes many tributary streams and numerous natural lakes (roughly 80). More than half of the area drains internally to lakes, small ponds and glacial potholes.

The watershed covers parts of three central Wisconsin counties—two-thirds of the watershed is in Portage County, nearly one-third in Waupaca County, and three percent in Waushara County. It includes the cities of Waupaca and Weyauwega and the villages of Amherst, Amherst Junction, Nelsonville and Almond. In Wisconsin, town (township) governments have significant influence over land use in rural and ex-urban areas. The watershed includes most or all of eight towns and parts of nine others.

This is largely a rural watershed. Agriculture is the dominant land use, with 41 percent of the watershed used for dairy and crop farming and an additional nine percent used for large-scale irrigated vegetable production. Woodlots cover 37 percent of the land, wetlands cover three percent, rivers and lakes also cover three percent and urban/developed areas account for seven percent of the watershed. In all, approximately 13,000 people live in the watershed, largely concentrated in the urban areas, although most lakeshores are also fully developed with homes.

Water Resource and Other Key Environmental Issues

Surface waters are affected by a number of rural and urban nonpoint pollution sources and several permitted discharges; watershed streams are most affected by sediments, nutrients, and loss of aquatic habitat.²⁶ Agricultural impacts stem from barnyard runoff, agricultural management practices in upland areas, land application of manure, trampled or otherwise degraded stream banks, and agrichemicals. Urban impacts include pollutants, sediments and scouring effects from urban stormwater-runoff, discharges from municipal wastewater-treatment plants, and impacts from septic systems. Several farmers in the watershed apply municipal sludge on agricultural fields, and there are a number of solid-waste disposal sites, underground storage tanks, and known spills throughout the watershed. There is additional concern about a planned four-lane highway expansion and its impacts on both land and water resources.

Although those sources contribute pollutants throughout the watershed, the majority of the surface waters are in good condition. Several reaches are designated "Wisconsin outstanding or exceptional resource waters" and none of the streams or lakes is listed on the state's 303(d) list. The watershed supports a very productive fishery, although fisheries in several stream seg-

ments are affected by a loss of instream and streambank-cover habitat. Several coldwater streams are currently part of an intensive wild brook trout restoration-program.

The major water quality concern in the Tomorrow-Waupaca watershed (and regionally, throughout Wisconsin's central sands area) is groundwater contamination from nutrients and pesticides. The region's sandy soils allow rapid infiltration of water to groundwater and do not bind contaminants (such as agrichemicals) as readily as soils with higher clay contents. Lakes and streams in this watershed receive much of their water from groundwater. Improvements in irrigation and agricultural production technology fueled large investments in irrigated vegetable production throughout this region. In the 1980s, regional public health concerns over high levels of contaminants (particularly pesticides and nitrogen) in private and municipal drinking water supplies focused state attention on groundwater protection. State and federal agencies have initiated several projects to reduce groundwater contamination in the region, although prior to TWPWP, none had specifically targeted this watershed.

Well samples and baseflow stream monitoring in the watershed (conducted through a regional groundwater center and TWPWP) indicate nitrate levels above the state's 2.0 mg/L preventative action level. And nearly one-third of the well samples taken throughout the watershed indicate nitrate levels in excess of the state's 10.0 mg/L enforcement standard health advisory level. In 1995, nitrate levels for one of Waupaca's municipal wells were just below the health standard. In addition, there are three atrazine prohibition areas in the watershed, totaling 35 square miles.

Driving Issues

Public health concerns about groundwater quality—a region-wide issue—and interest in protecting and restoring the coldwater fishery habitat drive most of the partnership activities in this watershed.

Prior Relationships Among Partners

Several of the key TWWA founders knew one another and had worked together on conservation issues before initiating TWWA. At the county government level,²⁷ Waupaca County staff and several county board members, in particular, had a strong commitment to land and water conservation and stewardship. At about the same time TWWA began, the Waupaca County Board created a Water Quality Committee with an annual \$75,000 budget for water-quality related issues. This committee and county funding continue, and some of those resources have supported partnership efforts.

History/Key Dates

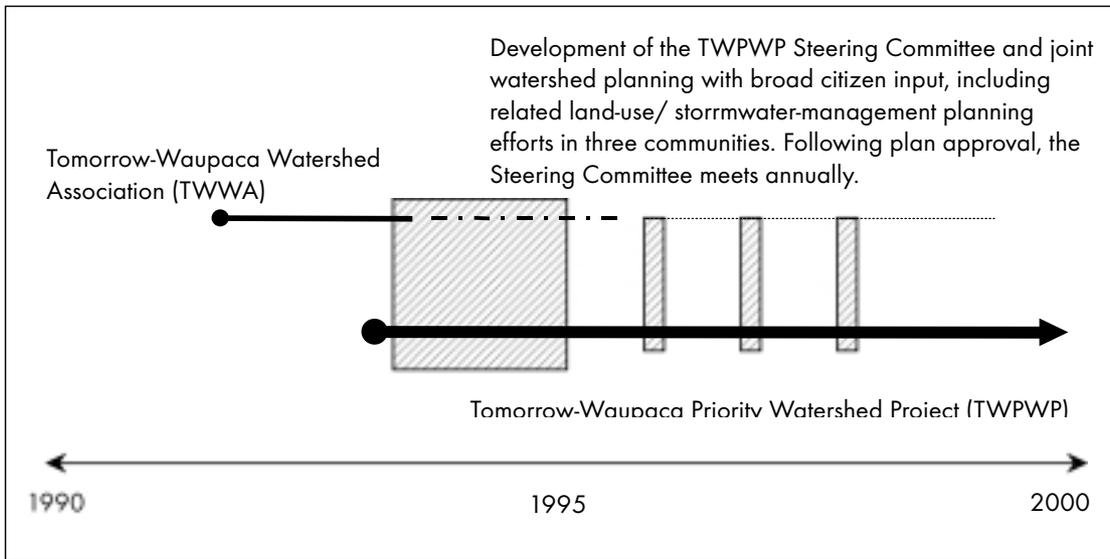
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| 1980s | Groundwater quality in Wisconsin's central sands region (including in the Tomorrow-Waupaca River watershed) related to irrigated agriculture becomes a major statewide water-quality issue. |
| 1991 | Local landowner initiates and hosts a meeting of resource managers, researchers and interested stakeholders to share information about management efforts in the watershed. The meeting, attended by 75 people, focuses on the need for |

a grassroots watershed group and the potential for group accomplishments through coordination and joint action.

- 1991 As a result of the meeting, TWWA forms and begins meeting; key roles are assumed by an informal steering team of agency and university professionals. As an initial effort to measure public awareness of the river and watershed and potential interest in watershed-wide membership, TWWA develops and administers a survey²⁸ (with assistance from University of Wisconsin-Stevens Point). The survey solicits opinions and knowledge related to water-resource management issues from riparian property owners on the Tomorrow-Waupaca River; nearly 600 of 1300 people respond.
- 1991-1993 TWWA holds regular meetings, hosts a number of public awareness discussions, and holds two “waterfests” in partnership with local schools, state and local agencies, and community businesses and landowners. TWWA also investigates the possibility of conducting watershed assessment and developing a plan for coordinated management. TWWA is primarily focused on the river, but addresses a broad range of additional water-quality issues, including groundwater.
- 1992 Waupaca County creates a Water Quality Committee; the committee is provided with \$75,000 annually for water-quality projects (created at the initiative of two county supervisors with an interest in water).
- 1992 TWWA supports a county application for state priority watershed designation for the watershed. The application identifies groundwater concerns and stresses the importance of TWWA for expanded citizen involvement.
- 1993 Tomorrow-Waupaca River watershed is designated as a state priority watershed. Designation provides more than \$4 million over twelve years to fund local staff and land management practices for controlling nonpoint source pollution to surface waters and groundwater. Status as TWPWP also effectively broadens the functional scope available for addressing issues throughout the watershed and provides incentives for participation in planning and implementation for the watershed’s agricultural producers. TWPWP also enables funding for local land use/stormwater management and municipal wellhead protection assistance for the Village of Almond and the City of Waupaca.
- 1993-1995 TWWA and other partners are heavily involved in intensive planning and initial implementation efforts for TWPWP. The project’s steering committee involves more than 80 people, including TWWA members. During this period, TWWA ceases operations as an organization, although it does not officially disband.
- 1995 Watershed planning efforts for TWPWP are completed and the partnership lead shifts to local agency project implementation, with annual meetings for the steering committee (including original TWWA members/participants).

- 1995-1999 TWPWP works throughout the watershed with agricultural producers, communities, and riparian landowners to implement management practices that reduce nutrients loads, control sediment loss, and protect riparian areas. The project is scheduled to end in 2005.
- 1998-1999 DNR, counties, landowners, and four local TU chapters work together on joint stream restoration and soil and water conservation activities.

FIGURE C-1. PARTNERSHIP EVOLUTION IN THE TOMORROW-WAUPACA RIVER WATERSHED



Organizational Arrangements

Composition/Representation

TWWA leadership, during its years of activity, consisted of approximately 24 members. They included: land owners, numerous recreational interests, DNR agency staff (fisheries, water quality, community assistance and state parks), USDA-soil conservation staff, Portage and Waupaca County conservationists, and representatives from UW-Extension and UW-Stevens Point. TWWA solicited involvement from anyone with an interest in the river and watershed, from landowners to university researchers.

TWPWP is currently led by project staff in Portage and Waupaca Counties, with formal oversight from county land conservation committees, DNR, and DATCP (the state agricultural agency) and additional guidance from a steering committee of over 80 people. The steering committee includes members of the latent TWWA, a broad range of agency and university interests, county agencies, municipal governments, lake associations, farm cooperatives, businesses, agricultural producers, and landowners. From the beginning, project staff and steering committee members actively sought broad representation for the advisory group, and would have preferred a larger agricultural landowner representation.

Structure/Process

TWWA elected officers, developed a mission statement and objectives, and drafted bylaws, but never formally incorporated or filed for 501(c)(3) status. The association established committees for various efforts and special events, and enrolled dues-paying members. TWWA met regularly over roughly a two-year period but ceased operation in 1993 and became absorbed into TWPWP. Meetings followed agendas, but were rather informal and operated through consensus.

TWPWP is currently a formal government project operated through the Waupaca County Land and Water Conservation Department and the Portage County Land Conservation Department. Project planning involved a steering committee and subcommittees (led by project staff) that focused on surface water and groundwater quality, education, and outreach. The partnership involved TWWA and local lake associations, but other than the steering committee, the watershed project was just that—an integrated watershed project with citizen and landowner advisory input. The steering committee and subcommittees met frequently over the intensive two-year assessment and planning phase. Project staff continue to hold joint monthly meetings for staff in both counties, and the full steering committee meets annually. Day-to-day management decisions are made by county staff; annual implementation decisions are made at meetings between staff, DNR and DATCP, with input from the steering committee. Accomplishments are reported to both state and federal agencies. Since its inception, TWPWP has sought—and largely achieved—consensus among partners. It was often facilitated in the planning phase by the DNR watershed planner and a regional UW-cooperative extension agent. Negotiations with DNR financial administrators concerning permitted practices and spending are a separate, non-consensus-based process.

Authority Relationships

TWWA was accountable only to its members, although it gained substantial recognition as an advocate for watershed concerns. TWPWP is a formal project between the State of Wisconsin and two counties. Wisconsin land (and water) conservation departments are each headed by a county conservationist and are accountable to land conservation committees, comprised of elected members of each county's board of supervisors. Landowners signing cost-share agreements are accountable to the county and state; the county is accountable to the state for TWPWP; and DNR is responsible for funding the project and cost-share agreements, along with overall evaluation and assessment of the project and overall state program.

Staff Functions and Partner Roles

TWWA operated through volunteers and had occasional assistance from UW-Extension and others for meeting-related functions (e.g., facilitating a priority-setting meeting). Volunteers from a number of other community groups assisted with TWWA events, and TWWA received technical, educational, and public awareness assistance from county staff, university faculty, and state agency staff for information related to organizational issues, habitat, water resources, land use, and agriculture.

Several TWWA and TWPWP partners have supported various functions as indicated in Table C-1. TWPWP provides local staff (funded by state and county allocations) and access to DNR support staff (a full-time watershed planner and additional staff for technical analysis, all funded through EPA 319(h) grants to the state) to handle the necessary administrative and technical functions associated with the project. During the planning phase, county staff, the

TABLE C-1. MAJOR PARTNER ROLES AND FUNCTIONS FOR THE TOMORROW-WAUPACA RIVER WATERSHED

	Individual/private citizens	Consultants	Local NGOs	County/local governments	Regional agency	State agencies	USEPA	NRCS	Other federal agencies	Tribal government
ADMINISTRATION/MANAGEMENT										
Initiation/convening	■									
Administrative functions	■		■			■				
Coordinative functions	■		■			■				
Formal partnership facilitation				■		■				
Information provision/analysis	■	■	■	■	■	■		■	■	
Implementation/management actions (BMP installation, habitat work)	■	■	■	■		■		■		
FUNDING										
Funding for planning				■		■	■			
Funding for implementation staff				■		■	■			
Funding for implementation/management actions (BMPs, habitat improvements, land acquisition)	■		■	■		■		■		

DNR watershed planner, and a UW-Extension specialist organized, coordinated and facilitated committee meetings. DNR and county support staff took care of financial administration. County project staff made contacts with landowners, conducted inventories and assessments, assisted with analysis and helped write the plan. Both county land conservation departments each currently employ two staff (for a total of four staff) for project implementation, management, education, and technical work.

Nearly all of the agencies on the steering committee provide professional and technical support. DNR and UW-Extension provided expertise and support for project planning functions, and the East Central Regional Planning Commission, with extensive assistance from Waupaca County Extension agents, led the land-use planning process for the City of Waupaca. Consultants led land-use planning processes for the other two communities. DNR and UW-Stevens Point conduct water-quality monitoring, and DNR, DATCP and the Natural Resources Conservation Service (NRCS) helped the counties apply models to their inventory information and set pollutant reduction goals. DATCP and NRCS contributed agricultural engineering expertise as well as skill development training sessions for county staff. UW-Extension also helped staff understand nutrient management issues and helped develop individualized demonstration plots.

TU has purchased riparian easements (generally for one dollar) for numerous habitat restoration projects. DNR contributes state habitat restoration funding, often through cost-share projects with TU. Local TU chapters also provide volunteers labor for restoration work.

Funding

A local riparian landowner and TWWA founding member stretched a \$5,000 personal grant award from the Chicago-based Munson Foundation to help cover costs associated with restoration work at her property, the TWWA survey, and basic TWWA administrative costs. That minimal funding provided a key resource for initial organizational activities. The organization generated financial and in-kind support from local businesses for higher visibility projects like Waterfests and streambank restoration efforts.

Funding for TWPWP has been provided by the Wisconsin Nonpoint Source Water Pollution Abatement Program and Local Assistance Grant Program (administered by DNR). Total state money expended thus far has been \$1.15 million to counties for staff, planning, and administration and nearly \$870,000 to landowners for BMPs. The \$1.15 million includes \$120,000 for three land-use plans developed for local communities as part of the planning process and additional funding for special technical and social science research. The counties pay 30 percent matches for any small capital purchases and administrative supplies, and counties provide office space and use of county equipment. Landowners pay varying percentages for BMPs. NRCS Environmental Quality Incentives Program (EQIP) funds have also been used by project staff for education and outreach projects not funded by the project. Additional related activities have been funded by Waupaca County's Water Quality Committee (the \$75,000 annual budget is renewed annually by the county board to support water resource related projects). Through TWPWP staff initiative, DNR, Waupaca County, and a local lake association jointly fund a two-year \$20,000 assessing agrichemical-contaminated groundwater flows into one of the watersheds lakes (75 percent DNR Lake Planning Grant funds—separate from priority watershed program funds—and 25% split between Waupaca County the lake association).

Most of the priority watershed program's eligible BMPs and cost-share rates are specified in Wisconsin Code (NR 120), but DNR has some flexibility in funding alternative practices and DNR and TWPWP have demonstrated innovative strategies (e.g., using project funds for land

use planning). Some ideas (strongly supported by local staff) go beyond the scope of activities that DNR is willing to consider. In some cases, when DNR will not fund an innovative practice that staff support, other partners can provide support. For example, TWPWP staff in Portage county would like to develop an alfalfa-marketing scheme to encourage legume rotations on irrigated vegetable land which will reduce nitrogen to groundwater. Because that is not an approach that DNR is willing to support, county staff are pursuing the idea with other partners—in this case, the Golden Sands Resource Conservation and Development Council, a nongovernmental organization (formerly associated with NRCS) that supports resource conservation issues in a multicounty region.

DNR has contributed additional money for special trout habitat research and restoration efforts through general agency funds and segregated trout stamp money (special assessment for recreational trout fishing licenses). DNR fishery management efforts are augmented substantially by volunteer labor from four local TU chapters of (Fox Valley, Frank Hornberg, Central, and Shawpaca Chapters, totaling approximately 500 members and 25 to 30 volunteer laborers).

Plans and Assessments

Watershed Assessments and Studies

State agencies, federal agencies, and universities study numerous water resource related issues in the watershed that relate to partnership efforts in varying degrees. Inventories and assessments conducted specifically for the watershed partnership effort are described below in association with the planning process. At least two additional efforts are worth noting: the Groundwater Center, located at the University of Wisconsin-Stevens Point, provides a testing service for private wells throughout the region and maintains data on numerous water quality parameters for each well; and DNR fishery-managers are conducting research on efforts to re-establish a wild trout fishery in the watershed. In a localized project, TWPWP staff, the University of Wisconsin-Stevens Point, and the local Stratton Lake Association are working together to evaluate lake water-quality impacts related to groundwater inflow contaminated with nitrate-N and triazines from an experimental agricultural operation that had been used by an area vegetable processing industry. In addition, the United States Geological Survey (USGS) maintains a monitoring site in this watershed as part of the National Water Quality Assessment Program (NWQAP). While NWQAP results are published and considered by the watershed partners, USGS staff have not participated closely with TWPWP, due largely to high costs for USGS monitoring data and differing research goals associated with the USGS national program.

TWWA (in collaboration with UW-Stevens Point College of Natural Resources and UW-Extension) conducted its own assessment in 1991/92 in the form of a survey of riparian landowners. TWWA wanted to determine resident perceptions about the resource as a way of setting priorities for their activities. From the responses of nearly 600 people, it was clear that the river's scenic quality was the most highly valued attribute, that people were generally unaware of river management activities or responsibilities, and that respondents were concerned about the potential for conflicts between landowners and recreational users. Results from the survey directed the group toward educational and awareness building activities.

Plans: Links Between Information and Action

Once designated as part of the state watershed program, Portage and Waupaca Counties and DNR were required to develop a detailed assessment and plan of action through a two-year project planning phase. The “Nonpoint Source Control Plan for the Tomorrow/ Waupaca River Priority Watershed” was developed with intensive involvement from the large project steering committee. It was officially reviewed by DNR and DATCP and approved by Wisconsin’s Land and Water Conservation Board in 1995. Portage and Waupaca Counties also passed resolutions formally approving the plan.

This action-oriented project plan focuses on nonpoint sources of pollution to surface water and groundwater. The plan contains detailed results of prescribed inventories for barnyard runoff, upland sediments, streambank erosion, spreading of manure, and urban nonpoint sources. The plan presents goals for sediment and nutrient reduction (developed through models described below); identifies priority “critical” sites; and specifies eligibility, cost-share rates, and deadlines for landowner participation in the project. The plan also describes an approach for evaluation and coordination with other related efforts (e.g., fishery and wildlife management) and presents general information about the watershed.

Information about landowners came through inventory efforts, individual contacts with farmers, and a series of public meetings related to land use planning efforts. There were two main inventory efforts:

- TWPWP staff conducted inventories of barnyards, sources of upland sediments, degraded streambank, wetlands, a sample of well-water quality, and manure applications. Results are documented in the watershed plan.
- In 1995, TWPWP, with assistance from UW-Extension, conducted a Farm Practices Inventory of agricultural management practices and nutrient application to identify appropriate localized components of an outreach strategy and baseline information for gauging changes in behavior. TWPWP also conducted specialized inventories of riparian property owners, urban residents, and rural non-farm residents to inform educational and outreach approaches. Partners plan to conduct the inventory again when the project ends in 2005.

Information about resource quality comes from: DNR water-quality and habitat monitoring; a long-term monitoring program for groundwater quality conducted by UW-Stevens Point Environmental Task Force; private well samples analyzed through UW-Stevens Point/Extension Groundwater Center; and monitoring of municipal wells.

The main tools for analyzing technical information in the watershed project have been computer models developed primarily by DNR and county staff. UW-Stevens Point is also assisting with GIS support for the project—GIS-based modeling is nearly complete. Models used in this project include BARNY, developed by DNR for estimating impacts from barnyard nutrients; WINHUSLE (modified to fit this watershed), used to estimate soil loss; and WISPER, a spreadsheet program used for on-farm nutrient-management planning.

This nonpoint source-oriented priority watershed plan is the main plan for addressing water resource management issues at this hydrologic scale. The nonpoint plan is a formal amendment to “The Wolf River Areawide Water Quality Plan,” used by DNR as a water resource management guide for the larger Wolf River system. Two additional levels of public-private watershed partnerships currently focus their efforts on the larger-scale basins: a DNR-initiated

basin partner team brings together a diverse set of interests for the Wolf River basin; and Fox-Wolf 2000, a 501(c)(3) nonprofit organization, seeks basinwide solutions to water-quality and habitat issues for the entire 6,000-plus square mile Fox-Wolf system. Both groups coordinate with the Tomorrow-Waupaca partners as appropriate.

In 2005, when TWPWP reaches the end of its implementation phase, partners plan to conduct a second farm practices inventory to assess changes in behaviors related to farm-management practices. They will also use enhanced GIS modeling and analysis to review accomplishments, and refocus new efforts on areas demonstrating continuing need.

Relationship to State Water-Quality Regulatory Program

The partnership has not been involved with water-quality permitting issues, although partners work to reduce groundwater nitrogen levels to acceptable public health standards for private wells and to maintain acceptable levels for municipal drinking-water supply.

Accomplishments

Environmental Outcomes

As of yet, the partnership has produced no measurable environmental outcomes in water quality; however, as explained below, partnership efforts have led to several intermediate environmental outputs which have reduced pollutant loads to surface and groundwater. The impact of the reductions is uncertain.

Environmental Outputs

Nutrient and sediment loads to surface waters have decreased as a result of changes in agricultural management practices. Following the plan, TWPWP staff and landowners have installed more than \$1 million (including nearly \$900,000 in state funds) in agricultural BMPs to protect water quality, including nearly twenty constructed barnyards, fifteen manure storage systems, and over a mile of fencing, riprap, and shoreline improvements, and additional changes in nutrient management approaches and cropping practices. The practices have reduced phosphorus reaching surface waters by more than 1,150 pounds per year (an overall 21 percent reduction, twice the TWPWP goal), decreased the amount of sediments reaching surface waters by more than 1,500 tons of sediments per year (a 12 percent reduction, surpassing the 1,060 ton/year goal), and reduced overall nitrogen applications by more than 77,000 pounds per year (a 3 percent reduction in nitrogen application; TWPWP goal is to reduce nitrogen applications as much as possible).

By taking account of the groundwater–surface water relationship, partners have potentially reduced nutrient loads to groundwater. While (with a few exceptions) it might take decades to demonstrate actual attributable improvements in groundwater quality, especially at a regional hydrologic scale, one of the City of Waupaca’s municipal wells has remained below the environmental enforcement standard since protective BMPs have been installed in the wellhead recharge area, helping to avoid a costly denitrification plant. Priority watershed funds have paid for some of the wellhead protection practices, including a program of intensive soil sampling and customized nutrient (fertilizer) application for farmers.

Sedimentation and scouring flows from urban stormwater have decreased in some areas through changes initiated by stormwater management and land use planning efforts within the watershed. Habitat improvements stemming from partner and related efforts include riparian protection, easements, and improvements to stream channels. With improvements in habitat DNR initiated a wild trout stocking program. TWPWP assists DNR and TU chapters by facilitating contacts with some landowners, discussing and touring potential locations for restoration, and providing funding for riparian fencing.

Other Accomplishments

Partners have also achieved a number of other accomplishments. In an innovative use of nonpoint source funding, the state allowed TWPWP to pay for three highly participatory land-use and stormwater-management planning processes. This was the first time in the state program's nearly 20-year history that funding had been permitted for community land-use plans, and partners made a concerted effort to convince DNR of the relevance and significance of the action for improving water quality. Testimonial evidence suggests that the collaborative and integrated nature of the TWPWP steering committee was influential in the decision. One of the steering-team members played a key organizing and facilitation role for the City of Waupaca's plan, which went beyond the city to include three town governments and the Chain-O-Lakes region; the effort included its own separate advisory committee—distinct from the TWPWP steering committee—of more than 120 local residents including key elected leaders. Each community plan addressed a comprehensive range of issues, each plan was developed through inclusive planning processes, and each plan resulted in recommended actions for stormwater management and new arrangements for continued coordination. The plans have led to physical modifications that remove significant stormwater problems, to changes in designs of new subdivision developments that reduce stormwater impacts, and to an overall heightened awareness of urban impacts on water quality—an important intermediate step in water-quality protection.

Since TWWA's inception, partners have emphasized education and awareness. TWWA hosted several public educational meetings and two “waterfests”—day-long educational fairs each attended by more than 100 people—involving community interests, schools, and agency professionals. The educational emphasis has continued through TWPWP efforts. In efforts to move beyond constructed BMPs and produce long-term changes in behavior, staff work closely with farmers in one-on-one educational efforts to demonstrate the overall benefits of reducing nutrients and consult with farmers on the range of available reduction options.

Significantly, TWWA, a citizen-led group, influenced creation of the multimillion dollar TWPWP via the state priority watershed program to address their water quality and habitat degradation concerns. Through the partnership, agencies have improved coordination for watershed resource management activity. That coordination is especially evident for agriculture and nutrient management, where project staff devote time to coordinating outreach, educational, and demonstration efforts across counties for several agencies. Additional coordinated research activities in the watershed examine the connections between land use management practices and nitrate levels in groundwater. UW-Stevens Point Environmental Task Force leads this effort to correlate winter baseflow stream sampling with private well samples and to connect these with various land use practices through GIS. The presence of a coordinating entity (project staff and a formal steering committee) leads to new opportunities for coordination, as has happened with recent habitat improvement projects.

Case Commentary

TWPWP demonstrates how a government program can build upon local citizen interest and organization to address mutual concerns. Without an open process and extensive citizen involvement, TWPWP would not have experienced the same degree of acceptance among landowners. Without special state funding, local partners could not have adequately addressed the same scope of issues or applied the same range of functional activities (coordinated staff deployment, monitoring, analysis, information management, planning, funding, education/outreach, and implementation actions). TWWA's initiation, growth, and transition into TWPWP illustrates the potential value of citizen leadership to help governmental resource managers coordinate their programs. TWWA was the initial focal point for multiagency and citizen interaction for watershed management, and its grassroots activities led to significant state investment through TWPWP. By all accounts TWPWP would not have happened absent TWWA.

Contributing Factors

TWWA and TWPWP accomplishments appear to be influenced by a number of factors identified in the literature and reinforced in this watershed. Factors are not ranked here, and the discussion reiterates information presented throughout this appendix:

- *Issue(s) salience:* Strong local and state interest in several specific issues drives partnership efforts: enhancing aquatic habitat for fisheries and other biota; reducing a public health threat; and managing development.
- *Inclusive participation by a broad array of interests:* Various aspects of the partnership efforts involved a huge diversity of participating interests, including rural landowners, lake homeowners, various types of agricultural producers, urban land developers, and school teachers. Steering committee participants also represent a broad range of agency and private citizen interests. Broad participation expanded partners' functional scope, enabled more resources for functions, and led to yet more participation in partner activities.
- *Initial leadership and sustained participation of respected local individuals along with active participation by capable state and local agency staff:* Leadership began with a core group of local citizens and agency advisors, including key local agency participants such as the County Conservationist for Waupaca County. Initially, citizens led the partnership efforts with input from agencies. Efforts are now led by local government staff with annual formal input from a large, mostly local, steering committee with both governmental and nongovernmental members, including influential nongovernmental interests such as leaders from the local farm cooperatives/agricultural supply and service stores.
- *Formal governmental support:* Wisconsin's Department of Natural Resources formally approved the priority watershed project and plan. The state Department of Agriculture Trade and Consumer Protection reviewed and accepted the plan. DNR endorsement has reinforced staff participation and coordination efforts for nonpoint source pollution control measures, fishery management, and other departmental management programs. Both watershed counties were actively involved in developing the partnership-based priority watershed plan, and both counties passed formal resolutions adopting the plan.

Local municipalities supported project-related land-use and stormwater-management planning efforts.

- *A sound scientific basis for assessment and action:* From the first TWWA meeting, partners sought to gather and coordinate scientific information to guide resource management decision making. Partners combined available information regarding effective nutrient reduction approaches with detailed inventory information and modeling efforts through TWPWP to assess the problem and develop a plan for action.
- *Use of a watershed plan to guide actions:* TWWA identified plan development as a priority action. TWPWP developed and is implementing a plan that identifies specific goals and actions, and has guided partners' efforts for nonpoint source pollution control and habitat restoration.
- *Funding to employ staff, collect information, develop plans, and implement actions:* While TWWA did not have funding for staff, the state and county provide twelve years of stable funding for local TWPWP staff that perform technical, administrative, and educational functions. The state also provided TWPWP with special funding for a detailed watershed inventory and assessment and development of a watershed plan as part of the priority watershed project. Prior to the watershed project, TWWA explored developing a plan but lacked sufficient capacity and resources, although local business contributions and in-kind county services enabled various TWWA activities. Partners utilized somewhat flexible state cost-share funding from the priority watershed program for BMP installation and local land-use /stormwater-management plans and state funds combined with local contributions for habitat-restoration improvements.
- *Staff for coordination, management, and technical work:* Initially, volunteers coordinated TWWA activities and agency staff provided technical information. As the partnership evolved into TWPWP, coordination and management functions shifted to Waupaca and Portage County conservation departments, with major initial facilitation and coordination support from county cooperative extension staff and DNR. County conservation department staff conduct most of the agricultural technical work, with assistance from regional NRCS engineers and county cooperative extension staff. University of Wisconsin-Stevens Point monitors and analyzes groundwater quality throughout the watershed. Regional DNR fishery-management staff conducts research and design work for habitat restoration activities. Municipalities engaged consultants, cooperative extension, and the regional planning commission for land use and stormwater management planning efforts. Collectively, partners have access to extensive staff resources.

Black Earth Creek Watershed, Wisconsin

List of Acronyms

BECCO	Black Earth Creek Conservation Organization
BECWA	Black Earth Creek Watershed Association
BMP	Best Management Practice
DATCP	Wisconsin Department of Trade and Consumer Protection
DNR	Wisconsin Department of Natural Resources
NRCS	Natural Resources Conservation Service
TU	Trout Unlimited
USGS	US Geological Survey

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Partnership Description

The partnership for natural resource management in Wisconsin's Black Earth Creek watershed consists of various citizen interests—largely involved through a nongovernmental Black Earth Creek Watershed Association (BECWA)—and state and county natural resource agencies. The relationship coalesced around two events in the mid-1980s: community concerns over landfill-related groundwater contamination threats; and the introduction of a state-funded Black Earth Creek Priority Watershed Project to address state and local concerns over nonpoint source pollution and related natural resource management issues. Numerous community members and landowners are involved with and have benefited from partnership activities and the priority watershed project. While individual participation has varied over the past fifteen years, several BECWA board members and natural-resource agency representatives have established and maintained a long-term working relationship.

BECWA serves as a major forum for citizen and agency interaction over natural resources issues in the watershed, and state agencies formally recognize the association as a citizen advisory body in the integrative multiagency watershed-priority watershed project. BECWA involvement has expanded citizen participation in the project, and enabled additional coordination between agencies and citizens over nonpoint source pollution, habitat restoration, and other watershed related issues. BECWA is not an environmental advocacy organization, although the board has included representatives from a more advocacy-oriented nongovernmental Black Earth Creek Conservation Organization (BECCO), as well as local farmers, recreation and conservation groups, and community leaders. As the state-funded priority watershed project approaches an extended closing date, BECWA is forging new relationships with local governments, and state and local agencies continue to use the association for citizen input and as a clearinghouse for information about watershed-resource management activities.

Background, Genesis and Purpose of Partnership

Trigger

A local chapter of Trout Unlimited (TU), a national coldwater conservation organization, convinced the Wisconsin Department of Natural Resources (DNR) to conduct a comprehensive evaluation of Black Earth Creek. A special DNR committee recommended creating a broad multidisciplinary team aimed at determining what resource measures could be taken to protect the creek's naturally reproducing brown trout fishery. Simultaneously, a graduate water-resources workshop at UW-Madison was considering the watershed as a site for a project. DNR collaborated with the graduate workshop to develop an evaluation strategy to address the concerns raised by TU and affirmed by the DNR task force. The evaluation, sustained support from DNR, and the strong interest of Dane County led to the designation of the entire Black Earth Creek as a priority watershed in 1985. The presence of a priority watershed project, local concern over landfill-related groundwater contamination, and general interest in local conservation and protection, helped lead to the formation of BECWA, a nongovernmental organization that served in a citizen advisory capacity for the priority watershed project.

Initiator

Stephen Born, a UW-Madison faculty member (and the principal investigator for this report), performed several key initiating roles for partnership activities in the Black Earth Creek watershed²⁹: he worked with the local TU chapter to request a special DNR assessment; in conjunction with DNR staff, he helped convince DNR to conduct the assessment through a UW-Madison graduate workshop; he co-led the graduate workshop; he promoted designation as a priority watershed project; and he helped found and lead BECWA, which was initiated in close cooperation with key county and state agency staff.

Stated Partnership Goals and Objectives

The partnership developed, in large part, because of two overlapping sets of goals and objectives: those of the state priority watershed project and those of BECWA. The priority watershed project, designated prior to BECWA's formation, had the specific goal of protecting the creek and habitat by reducing nonpoint sources of pollution. BECWA formed to pursue

four main objectives as a neutral organization of diverse citizen interests:

- facilitate the interchange of information between and among agencies and watershed interests;
- promote community awareness of Black Earth Creek and its value to the region;
- advocate generally for stewardship and wise use of land and water resources; and
- foster dialogue among watershed interests by providing a forum where citizens, resource managers, and public officials involved in watershed-related issues could interact.

Scope

- *Substantive scope:*

The BECWA/priority watershed project partnership focus expands beyond nonpoint source pollution control and fisheries to include wetlands, regional and local groundwater flow systems, aesthetic resources, and land development in the watershed.

- *Functional scope:*

The partnership addresses these issues through various means, including: interagency coordination for plans, staff resources, and implementation actions; awareness and outreach activities to various schools and rural and urban communities in the watershed; funding for land management practices and land acquisition; research and information analysis; public events and participation on management decisions; individual technical assistance landowners; and opportunistic intervention in activities that seem likely to affect the resource.

Local Context for Watershed Partnerships

Watershed Description

The Black Earth Creek watershed encompasses approximately 100 square miles of hilly glaciated and unglaciated terrain in northwestern Dane County, just west of a burgeoning Madison metropolitan area. Streamflow in the creek relies on groundwater, with an estimated 80 percent of flow coming from groundwater discharge. The creek meanders roughly 27 miles from its headwaters to its confluence with the Wisconsin River. Twelve miles in the upper half of the creek are identified by the state as either “outstanding” or “exceptional” resource waters, enabling a more stringent level of pollution control. Flows from the upper watershed average about 30 cubic feet per second (cfs) and range historically from 5-2000 cfs.

Dane County encompasses nearly the entire watershed, which includes three villages (with a combined population of approximately 6,000) and six towns (townships) with a rural population of roughly 4,000 people. Town governments make land-use decisions subject to approval by the Dane County Board of Supervisors, and each of the villages within the watershed has a separate plan. The Dane County Regional Planning Commission offers guidance to both towns and villages. Two school districts also make decisions affecting the area, and the county has general land use planning authority for the unincorporated area and a series of plans for parks, transportation, and farmland preservation.

The watershed is largely rural and agricultural with pockets of population concentrated in three villages. Combined, agriculture (row crops, pasture, and barnyards) and woodlots make up more than 80 percent of the watershed's land area. Incorporated villages account for less than five percent of the area, and a growing number of rural subdivisions and rural non-farm homes are scattered throughout the area. Much of the growth is fueled by close proximity to the Madison metropolitan area.

Water Resource and Other Key Environmental Issues

The Black Earth Creek and its tributaries are generally high-quality waters that support coldwater and warmwater fisheries. Watershed streams support a naturally reproducing brown trout population, and create one of the region's most highly valued and productive trout fisheries. State fishery management efforts in Black Earth Creek date back to the 1940s, when managers began acquiring riparian property and promoting various conservation practices. While healthy, the fishery is sensitive to fluctuations in flows and temperature, drops in dissolved oxygen levels, and impacts on instream habitat.

Nonpoint sources of pollution continue to affect streamwater quality. During storm events, runoff from dairy farms, agricultural fields, and urban areas dumps excessive nutrient and sediment loads into these waters, adversely affecting aquatic habitat. The watershed includes several permitted discharges, including three small municipal wastewater-treatment plants, a sand and gravel operation, and a number of smaller industrial facilities. Wisconsin DNR includes a total of 14 miles from two Black Earth Creek tributaries on the current Wisconsin 303(d) list of impaired waters—sediments and a variety of habitat limitations impair use in both streams. DNR is currently assessing how to address those impacts.

Streams in the watershed are heavily dependent on spring-fed base flows from a shallow aquifer system. Studies indicate that hillsides throughout the watershed are the primary source of groundwater recharge. Residential and commercial development—particularly in the three urban areas, an expanding urbanized area in the watershed's headwaters, and on hillsides throughout the watershed—decrease infiltration and groundwater recharge and threaten watershed base flows (as well as the aesthetic resource).

Driving Issues

The watershed's regional value as a trout fishery and its aesthetic character generate a strong desire for resource protection and enhancement among state and county resource managers, recreational interests, and local residents. Habitat protection and restoration have been long-time priorities for conservation groups. Threats from nonpoint source pollution and threats of development-related loss of hillside groundwater recharge areas currently drive water resource concerns.

Prior Relationships Among Partners

Prior to the watershed partnership, key conservation and fishery representatives involved with the Black Earth Creek watershed coordinated in a limited way for protecting riparian corridors and improving instream habitat. Also, for years, town and village governments throughout Wisconsin have experienced unresolved conflicts regarding parity of land-use decision authority and annexation powers,³⁰ and relationships between the watershed's six towns and

three villages reflect that statewide tension. Individual property-rights advocates have a strong presence in the watershed and are typically skeptical of planning efforts which might constrain private land uses.

History/Key Dates

- 1940s- 1980s: Extensive fishery management activity occurs in the watershed, including installation of some of Wisconsin's first conservation practices and instream habitat improvements. Fishery managers acquire long-term conservation leases along the creek's riparian corridor.
- 1984 The local TU chapter, with a long history of conservation work on the stream, convinces DNR to conduct a comprehensive evaluation of Black Earth Creek.
- 1985 UW-Madison Graduate Water Resources Management Program and DNR collaborate for an assessment of impacts in the upper half of the watershed. They investigate socioeconomic as well as physical dimensions of the watershed through recreational-user and interest-group surveys, a review and synthesis of studies previously performed in the area, and an analysis of impacts affecting the stream. The workshop recommends a new, more integrated approach for managing the resource.
- 1985 The Black Earth Creek watershed is designated as a priority watershed, under Wisconsin's Nonpoint Source Water Pollution Abatement Program. The designation provides state funding to the Dane County Land Conservation Department³¹ for staff, technical analysis, and financial support to landowners for agricultural management practices. Local staff and DNR begin a planning process, building upon the joint DNR-UW-Madison assessment effort.
- 1985 Local concerns increase over potential groundwater contamination from a landfill in the watershed headwaters.
- 1986 Concern over groundwater contamination combines with heightened interest in the creek, the surrounding area's glacial heritage, and strong citizen interest for action to form BECWA as a forum for addressing natural resource issues throughout the watershed.
- 1986 BECWA becomes a key forum for planning issues related to the priority watershed project. Participating agencies formally recognize the association as the citizen advisory body for the priority project, and BECWA leads coordination for community outreach efforts, including watershed signage, local informational events, and river-related community projects. The landfill remains a priority for several years. BECWA also begins seeking protection for critical lands and explores creating an educational interpretive center near the creek.
- 1988 The Refuse Hideaway landfill closes because of a documented threat to public health and becomes a Superfund site in 1992.

- 1989 The county and state formally approve the watershed plan.
- 1989-1999 DNR and Dane County Land Conservation Department, with assistance from BECWA and other partners, implement a detailed ten-year plan for controlling nonpoint source pollution and for related resource management in the watershed.
- 1990s Early: A series of contentious land use issues surface in the watershed, including: 1) passage and enforcement of a stringent hilltop development ordinance by the Village of Cross Plains (the village closest to the expanding Madison metropolitan area); a large mixed-use development is allowed in the Village of Mazomanie (farthest from Madison); and a printing plant, proposed for construction along the banks of Black Earth Creek—and supported financially by one of BECWA's board members—sharply divides BECWA and the community. The third issue leads to the creation of a new advocacy organization in the watershed, BECCO, with limited overlapping BECWA membership.
- 1996 BECWA, through local contributions, hires a nationally recognized environmental mediator to assess the potential for reaching a mediated agreement on land use management and related issues for the watershed. The mediator conducts 25 one-hour interviews involving more than 30 key stakeholders and determines that a structured consensus-building process for addressing land use issues in the watershed is not viable.³² The decision is based on the absence of a specific conflict, a vaguely defined scope of issues, and insufficient enthusiasm for financial and participatory support.
- 1998-1999 BECWA re-examines its directions as the ten-year priority watershed project partnership efforts draw to a close. BECWA gets new leadership, enlists organization members, and expands coordination with watershed municipalities.
- 1999 Priority watershed project funding is extended for an additional year.

Organizational Arrangements

Composition/Representation

BECWA is comprised of agricultural and urban landowners, recreational interests, local development interests (less involvement since 1995), environmentalists (including members of BECCO), local officials and other interested individuals. Partner agencies include the WDNR, represented through a single nonpoint source coordinator, with additional input from water quality, fishery, regulatory, and other related staff as needed. Other partners are the Wisconsin Department of Agriculture Trade and Consumer Protection (DATCP), Dane County (interactions between the Land Conservation Department, Planning Department, and Parks Department), University of Wisconsin-Extension, US Geological Survey (USGS), Natural Resource Conservation Service (NRCS), and various University of Wisconsin units involved in research.

Structure/Process

BECWA is an incorporated 501(c)(3) not-for-profit organization with formal bylaws and a board of directors. BECWA has a small but growing number of dues-paying members. Over the years, the frequency of board meetings has varied from monthly to quarterly, and BECWA sponsors at least one public event annually. Meetings operate under formal rules of order, but the group seeks consensus on all issues.

The Black Earth Creek Priority Watershed Project is a formal state-local government partnership-project operated through the Dane County Land Conservation Department. In its planning stage, project planning activities utilized a number of technical committees and were coordinated jointly by a project lead at DNR and the county conservationist for Dane County. Since 1989, when the plan was approved, day to day management decisions have been made by county staff. Annual implementation decisions are made at meetings between local project staff, DNR and DATCP, with input from BECWA and others. Since its inception, the project has sought and largely achieved consensus among partners.

For the past decade, BECWA has served as the main coordination forum for agencies involved in watershed-wide activities, including implementing the priority watershed project with citizens, municipalities and organizations in the watershed. An interagency watershed work-group met quarterly for less than two years in the early 1990s, but stopped meeting in part because BECWA meetings, which the representatives also attended, were serving the same purpose. The partnership has increased both regularized and informal interactions among agency staff.

Authority Relationships

BECWA's board of directors is accountable to itself and its membership. State and county agencies are not formally accountable to BECWA, although the watershed plan states that "state and local agencies should continue to support its [sic] activities by participating in its meetings and serving as advisors to BECWA's board of directors."³³ BECWA has had considerable influence over project implementation. The priority watershed project is a formal project between Wisconsin and Dane County. A county conservationist heads the county land conservation department, which is accountable to the Dane County Land Conservation Committee, which comprises elected members of the Dane County Board of Supervisors. Landowners who receive cost-share assistance for installing best management practices are legally bound to maintain the practices for various periods of time. Dane County is accountable to the state for project implementation responsibilities. DNR is responsible for funding the project and cost-share agreements, and overall evaluation and assessment of the project and larger state program.

Staff Functions and Partner Roles

Partner roles and support for a number of functions is illustrated in Table D-1. Several items are worth noting. From BECWA's inception through most of 1999, UW-Extension/ Department of Urban and Regional Planning and Dane County Land Conservation Department performed most administrative functions for BECWA. County staff recorded meeting minutes, and UW-Extension prepared agendas, set up meetings, and provided for copying and mailing costs associated with normal group operation. Local municipalities provided meeting

space. A DNR nonpoint source coordinator, DNR grant administration staff, and county staff conduct administrative functions related to the priority watershed project.

County staff also perform technical functions related to BMP design and implementation. The NRCS district conservationist and a University of Wisconsin-Madison research unit provided the initial inventory and assessment work. University of Wisconsin researchers and staff from DNR, USGS, and others share information related to ongoing independent research projects.

Local TU chapters provided volunteer labor, funding, and equipment for additional stream and habitat restoration projects. They have also negotiated easements with landowners to allow TU to install BMPs using priority watershed project cost-share funds.

Funding

BECWA has a small operating budget and has generated financial and in-kind support as needed for various projects and events. Until 1998, UW-Extension bore some of the basic administrative costs associated with meetings and communication. Over the past few years, BECWA has developed a dues structure and initiated a membership drive. BECWA has also recently generated financial contributions from each of the watershed's municipalities.

The Wisconsin Nonpoint Water Pollution Abatement Program and Local Assistance Grant Program (administered by DNR) funds the priority watershed project and shares some administrative costs with Dane County. The state, county, and landowners have spent more than \$2.5 million in conservation improvements through the project—more than \$1.5 million in state cost-share funding. DNR has also provided more than \$600,000 to Dane County staff, planning, and administration. Dane County pays a 30 percent match for any small capital purchases and administrative supplies. It also provides office space and use of county equipment. Landowners share the cost for management practices and conservation improvements.

DNR has contributed additional resources for special trout habitat research and restoration efforts through normal agency funds and trout stamp money (special assessment for recreational trout fishing licenses). At a number of sites, state fishery management and state nonpoint source funds have been used together.

Over the years, TU and other nongovernmental organizations have also contributed funds for landowner cost-share payments and in-kind services for riparian protection and restoration work.

Plans and Assessments

Watershed Assessments and Studies

The first major inventory and assessment synthesis was conducted in 1985 by the UW-Madison Water Resources Management Program graduate students workshop for the 45-square-mile upper watershed.³⁴ The effort compiled previous studies, gathered additional information on physical and socioeconomic parameters, evaluated problems and needs, and recommended management actions. The information became incorporated into the priority watershed project assessment.

In addition to the inventory and planning work conducted as part of this priority watershed project (described below), several state and federal agencies, the university, the county, and municipal governments have conducted numerous studies on resource issues in the Black Earth

TABLE D-1. MAJOR PARTNER ROLES AND FUNCTIONS FOR THE BLACK EARTH CREEK WATERSHED

	Individual/ private citizens	Consultants	Local NGOs	County/local governments	Regional agency	State agencies	USEPA	NRCS	Other federal agencies	Tribal government
ADMINISTRATION/MANAGEMENT										
Initiation/convening	■			■		■				
Administrative functions	■			■		■				
Coordinative functions				■		■				
Formal partnership facilitation		■ ¹				■ ¹				
Information provision/analysis	■	■	■	■	■	■		■	■	
Implementation/management actions (BMP installation, habitat work)	■		■	■		■				
FUNDING										
Funding for planning						■	■ ²			
Funding for implementation staff						■	■ ²			
Funding for implementation/ management actions (BMPs, habitat improvements, land acquisition)	■		■			■		■		

1 Partners have used very little formal facilitation. A trained state employee facilitated a BECWA retreat following the 1996 consensus-building initiative, and an environmental mediator conducted a process assessment in 1996 that concluded the consensus-building initiative would not succeed (see "Key Dates").

2 Wisconsin uses USEPA 319 funds for state-level nonpoint source program support and staff.

Creek watershed. Research summaries and updates are frequently discussed at BECWA meetings. For example, USGS, in cooperation with DNR is assessing BMP effectiveness at three sub-watersheds within the area.³⁵ DNR conducts biological monitoring as part of its regular water-quality management program. The University of Wisconsin and Wisconsin Geological and Natural History Survey continue extensive research on regional groundwater systems that has identified important groundwater recharge areas for Black Earth Creek and tributary base flows.

Plans: Links Between Information and Action

Wisconsin DNR and Dane County were required to develop an implementation plan for the priority watershed project. “A Plan for the Control of Nonpoint Sources and Related Resource Management in the Black Earth Creek Priority Watershed Project”, is a strategic plan specifying project goals, management actions, and eligibility criteria necessary for landowner participation. The plan also includes descriptive information about watershed resources.

Much of the information used in the plan was generated by county conservation department staff with assistance from the NRCS district conservationist for intensive inventories of barnyards and remote-sensing/GIS based assessment of sedimentation from agricultural areas. The main tools for analyzing technical information in the watershed project have been computer models developed primarily by the Agricultural Resources Service, DNR, University of Wisconsin and county staff, primarily: “feedlots” (used for plan development) and BARNY (used for plan accomplishment reporting) for estimating impacts from barnyard nutrients; and a GIS-based soil loss analysis that used a modified Universal Soil Loss Equation (for plan development) and WINHUSLE (for reporting) to estimate soil loss. Just prior to the Black Earth Creek planning process, a multiagency “CONSOIL” GIS-integration program³⁶ had developed a remote-sensing based erosion control assessment for all of Dane County. The program provided initial erosion-control estimates and GIS mapping and analytical support for the project, which expanded capacity for sub-watershed analyses.

The planning team made efforts to integrate this plan with other DNR plans for the watershed, including a DNR “Master Plan for the Black Earth Creek Fishery Area,” specifying target properties within the fishery area for special management and acquisition priorities.

Relationship to State Water-Quality Regulatory Program

This partnership has developed a relationship with DNR’s water-quality regulatory program that has involved citizen input on regulatory issues through BECWA. BECWA/partners have met with DNR water quality permit staff (at both BECWA’s and DNR’s requests) to review individual permits, to address permit-compliance for watershed permit holders, and to discuss new facility permits as they are considered. BECWA has also interacted with the Dane County Regional Planning Commission (the designated regional water quality agency), regarding review of state-mandated sewer service area expansion applications (necessary for communities wishing to extend sewer service) and other water quality matters; the commission representative regularly attended BECWA events and meetings. Although two reaches of tributary creeks appear on the state’s 303(d) list of impaired waters, they are considered medium-level state priorities, and the partnership has not yet focused on developing a restoration strategy.

Accomplishments

Environmental Outcomes

This partnership has helped to maintain a productive coldwater fishery and several areas of high water quality in the face of intense urbanization pressures. The state, county, and conservation groups have acquired several critical parcels of land throughout the watershed, including wetlands, headwater springs, and area along the riparian corridor. Research on the effectiveness of agricultural BMPs at various locations in the watershed demonstrates limited site-specific improvements in water quality attributed to BMPs installed through the priority watershed project. While the BMPs at those sites were installed through the efforts of the priority watershed project, they are part of the state nonpoint source program's efforts to measure BMP effectiveness at several sites throughout the state.

Environmental Outputs

Through the priority watershed project and watershed partnership, agricultural BMPs totaling more than \$2.5 million (\$1.8 million of which was paid by the state) were installed by 108 watershed landowners. Practices included improvements to barnyards, animal waste management systems, and soil conservation measures. These practices have effectively controlled nearly all of the upland sediment and barnyard phosphorus entering Black Earth Creek. The initial watershed inventory identified a total of 428,960 tons/year of cropland erosion and 1,280 pounds/year of phosphorus from animal lots throughout the watershed. Based on new information and improved modeling over the course of the priority watershed project, project managers report reductions of over 426,700 tons/year of cropland erosion and 3,550 pounds/year of phosphorus from animal lots³⁷—with improved information and better modeling techniques, load reductions exceed original load estimates. While baseline data elements are now suspect, absolute reductions far exceeded all original goals for nutrient and sediment.

The accomplishments also include riparian protection totaling more than 130,000 feet (nearly 25 miles) of streambank work—including fencing, stabilization, and nearly two miles of streambank habitat restoration work. Instream improvements included installing more than 500 special “lunker structures” for enhanced fish habitat and bank stabilization.

The partnership also influenced the design of a major new regional wastewater treatment system, arguing for a “forced main” to transfer waste, thereby discouraging development along the corridor between communities. Communities in the watershed, acting through a bi-county commission, have developed a regional wastewater treatment system and sludge management program to replace two aging treatment plants that both discharged effluent to the creek. The watershed's three municipalities use the same consultant for most of their municipal engineering services, and he was a principal in the design and selection of the regional system. He also has a long history of cooperative interactions with BECWA. Moreover, the commissioners include a former BECWA board member and local elected officials with positive relationships with BECWA.

Other Accomplishments

The Black Earth Creek partnership also has other accomplishments. Partners have promoted the notion of watershed protection through a long-term public information effort. Education and awareness activities have included an annual local stream clean-up event, resi-

dential well-testing programs, educational workshops and K-12 teacher training (coordinated by a county UW-Cooperative Extension agent and supported by BECWA), watershed signs, and newsletters. Partners also cultivated relationships with local and regional newspapers, which included numerous articles about the watershed.

BECWA, in particular, as a non-advocacy nonprofit organization, has served as a public forum for addressing conservation and water quality related issues affecting the watershed; for example, the forum role led to design changes for Department of Transportation highway system repair plans, mitigation of impacts from reconstruction of a railroad line that traverses the watershed, coordination with public and private organizations for land acquisition, and discussions related to urbanization and growth management. The forum function, along with regular interagency interactions related to the priority watershed project, has improved and sustained overall coordination among agencies and other interests.

Case Commentary

The partnership has succeeded in maintaining an interagency and multi-organizational focus on resource management and protection in the Black Earth Creek watershed for almost 15 years. As one of the first priority watershed projects to address a broad scope of water-resource management issues, beyond solely nonpoint source pollution, the Black Earth Creek Priority Watershed Project served as a state model for subsequent projects. By sustaining an active presence in the watershed, BECWA and the project have generated widespread recognition of the significant value of the creek and related environmental resources to the region, an unlikely outcome from traditional agency-driven management efforts.

BECWA and partners have also approached issues of watershed land use planning, and despite a lack of success in generating a mediated watershed-wide dialogue on urbanization and land use management, BECWA has engaged local municipalities in community-specific discussions of conservation and watershed protection. Largely as a result of new local leadership in the organization, for the first time, local municipalities are contributing limited funds for BECWA's general operations. The renewed enthusiasm is coming at a time when staff and BMP implementation funding for the long-running Black Earth Creek Priority Watershed Project reaches its ending, and bodes well for BECWA's efforts to develop a sustained watershed-based presence.

Contributing Factors

Numerous factors influence partnership accomplishments in the Black Earth Creek watershed. Factors are not ranked here, and the discussion reiterates information presented throughout this appendix:

- *Issue(s) salience:* Angler interest in habitat protection and state agency and local interest in water quality protection and restoration motivated efforts in the Black Earth Creek watershed; concerns were especially high due to perceived threats from rapid county growth and urbanization in the Madison metropolitan region.
- *Inclusive participation by a broad array of interests:* Core participants share a conservation orientation and a general interest in wise use of natural resources. Other interests, including developers, municipal officials, and the primary municipal engineer for the watershed's communities interact through the BECWA forum for a variety of specific

issues (for example, discussions of local ordinances and reviews of development-site stormwater management plans and hilltop protection ordinances). The breadth of interests has broadened the scope of issues discussed by the group and has enabled individuals who may not otherwise interact to exchange information and perspectives.

- *Initial leadership and sustained participation of respected local individuals along with active participation by capable state and local agency staff:* While Born helped with initial partner group organization, several local leaders contributed importantly to BECWA's development. Their participation in meetings and outreach helped legitimize and energize partner efforts. BECWA provides a continuing citizen presence, and the state-funded/ county-operated priority watershed project has provided long-running locally based technical and financial assistance to watershed landowners. This sustained local presence has reinforced community awareness of the creek's resource significance and of conservation opportunities for rural landowners. Resource management agency participation and leadership has also been critical for accomplishments, particularly by Dane County and DNR. Other agencies, for example the state Department of Transportation, interact with the group on specific pertinent issues. State and local agencies have cooperated to provide critical technical, administrative, and financial support. Citizen and agency partners are vigilant in identifying new potential threats to the resource and new opportunities for resource protection (e.g., through land acquisition, or through opportunities for additional conservation funding).
- *Formal governmental support:* DNR formally approved the priority watershed project and plan and DATCP reviewed and accepted the plan. DNR endorsement has reinforced staff participation and coordination efforts for nonpoint source pollution control measures, fishery management, and other department management programs. Dane County formally approved the priority watershed project; municipalities participate on an ad hoc basis, for example, passing resolutions supporting BECWA's 1996 land use initiative assessment and contributing funds in 1999.
- *A sound scientific basis for assessment and action:* The UW-Madison graduate-workshop project provided an extensive compilation of prior research augmented by original research and monitoring data for the upper watershed. The watershed plan is based on inventory information collected through the priority watershed program. Total nonpoint source pollution contributions and critical needs were identified for each sub-watershed using inventory results and models. Interestingly, improvements in modeling over the course of the priority watershed project identified inaccuracies in initial pollution load assessments. Even with incorrect calculations for total pollutant-reduction needs, project partners had sufficient information to address key nonpoint pollution sources and reduce pollutant loads.
- *Use of a watershed plan to guide actions:* The partners' plan identifies specific goals and actions and has guided watershed efforts for nonpoint source pollution control and habitat restoration. The plan also identifies priority areas for land protection and acquisition.
- *Funding to employ staff, collect information, develop plans, and implement actions:* The state priority watershed program has provided 14 years of funding for Dane County Land Conservation Department technical staff. DNR also used EPA funding to support state-level

program staff. The state provided special funding for a detailed watershed inventory and assessment through the state nonpoint source water pollution abatement program (the priority watershed program). DNR and the University of Wisconsin-Madison also provided financial support for the graduate student assessment, and the state program funded USGS research on BMP effectiveness at sites within the watershed. The state program funded development of a watershed plan as part of the priority watershed project. Partners utilized state cost-share funding for BMP installation and state funds combined with local contributions for habitat restoration improvements. Funding for those functions has been critical for partnership accomplishments.

- *Staff for coordination, management, and technical work:* University of Wisconsin-Extension, DNR, and Dane County Land Conservation Department have all provided various degrees of staff assistance for coordinating and managing administrative details related to maintaining the partnership. Staff from Dane County Land Conservation Department have been available to watershed partners for technical support, and other state agency staff are accessible and responsive to partner needs.

Upper Little Tennessee River Watershed, North Carolina (and Georgia)

List of Acronyms

BMP	Best Management Practice
CWMTF	Clean Water Management Trust Fund
DENR	North Carolina Department of Environment and Natural Resources
DWQ	Division of Water Quality
LTWA	Little Tennessee Watershed Association
NPDES	National Pollution Discharge Elimination System
NRCS	Natural Resources Conservation Service
SAHC	Southern Appalachian Highlands Conservancy
SWCD	Soil and Water Conservation District
SWNC RC&D	Southwestern North Carolina Resource Conservation and Development Council
TMDL	Total Maximum Daily Load
TVA	Tennessee Valley Authority
WNCA	Western North Carolina Alliance

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Partnership Description

Partnership efforts for watershed conservation and restoration in the Upper Little Tennessee River watershed are centered around the Little Tennessee Watershed Association (LTWA)—a citizen-initiated and led non-advocacy conservation organization focused on restoring and protecting the Upper Little Tennessee River and watershed through coordination, awareness building, and science-based action. LTWA partnership arrangements include a board of directors, sizeable local membership, and an interagency advisory board.

Background, Genesis and Purpose of Partnership

Trigger

LTWA, formally established in 1994, grew out of a 1993 conference in Franklin, NC—the “Little Tennessee River Watershed Conference”—intended to generate interest and improve coordination for river protection and restoration. The conference was sponsored jointly by the Town of Franklin, the Western North Carolina Alliance (WNCA), and the Tennessee Valley Authority (TVA) with contributions from nearly 30 additional organizations (including churches, local businesses, recreation interests, resource management agencies, and environmental organizations). Many current board members played key roles at the conference.

Initiator

The conference (and ensuing partnerships) was sparked by a private citizen/fishery biologist who since 1989 has received grant support from TVA to perform biological monitoring on the Upper Little Tennessee River. Realizing the potential threats to the river and the need for improved coordination among interests, this individual solicited support for the conference, organized the conference, and with support from WNCA, developed a short informational video describing the issues and problems associated with the river.

Stated Partnership Goals and Objectives

LTWA is a grassroots volunteer organization dedicated to improving the water quality and habitat of the Little Tennessee River and its tributaries. The association encourages landowners to protect streamside vegetation, control erosion, and prevent pollution. The organization has a formal mission statement: “To work with public agencies, conservation interests, community groups, and public and private land owners to develop and implement a strategy for the conservation and improvement of the water quality and habitat of the Little Tennessee River and its tributaries upstream of Fontana Reservoir.”³⁸ LTWA identifies three main objectives:

- Identify, collect and make available information necessary for making sound management decisions within the watershed; this includes several specific tasks.
- Provide a public forum for involvement in watershed management by local citizens and organizations.
- Initiate, assist in and support activities aimed at protection and improvement of water quality, habitats and other natural resources throughout the watershed.

Scope

■ *Substantive Scope*

Partner efforts address nonpoint sources of sediment and riparian and aquatic habitat throughout the Upper Little Tennessee River watershed.

■ *Functional Scope*

Partner actions include: coordination for agency program-management and work-planning; education (including middle- and high-school students, teachers, and local citizen volunteers); funding streambank restoration/stabilization; sediment transport and biological monitoring; awareness-building among citizens and local officials, including landowner-recognition activities; land acquisition (through a land trust with considerable overlapping membership); and installation of conservation and restoration practices.

Local Context for Watershed Partnerships

Watershed Description

The Upper Little Tennessee River watershed covers 450 square miles of the 2,627 square-mile Little Tennessee River watershed located in the mountains of western North Carolina, Georgia, and Tennessee. The river stretches 53 miles from its source in Georgia to Fontana Lake in Swain County, flowing through Lake Emory, a run-of-the-river impoundment at Franklin, NC (in the middle of the watershed). Upper Little Tennessee has two major tributaries, the Cullasaja River and Cartoogechaye Creek, that both join the river just upstream of Franklin, as well as a number of smaller tributaries. Flows downstream of Franklin average 512 cfs, but can reach seven times that amount during flood events. The watershed is full of scenic hills and valleys with a number of spectacular waterfalls. The Upper Little Tennessee River downstream of Lake Emory includes a 12-mile stretch of river without a highway bridge or riparian house. This section of river, the Needmore Tract, is an important ecological area for the watershed's threatened and endangered species.

The Upper Little Tennessee begins in Georgia's Rabun County. The North Carolina portion of the watershed lies mostly within Macon County but includes approximately 30 square miles of Swain County. The watershed includes a number of small communities and three main municipalities: Franklin, NC (population approximately 3,500); Highlands, NC (population 2,000, which increases to as high as 20,000 in the summer); and Dillard, Georgia. Macon County's total 1998 population was estimated to be about 28,000 full-time residents, but the population swells significantly during the summer (possibly above 50,000). Almost all of the population lives within the watershed. The summer population includes a large proportion of retirees. Macon county population has grown 20 percent since 1990. Between 1980 and 1994, Franklin grew by 18 percent, and Highlands by 59 percent.

The area is predominantly forested—the Nantahala National Forest covers about one-third of the watershed, and much of the area in Georgia is part of the Chattahoochee National Forest—with 5 percent to 10 percent in agricultural use and a similar percentage in urban uses. Economic activities include agriculture, forestry, mining, hardwood flooring, textiles, and tourism. Asphalt production is also a small but very controversial industry in Macon and Rabun Counties. A major transportation corridor between Georgia and western North Carolina runs

through the watershed to northern destinations, including the Great Smoky Mountains National Park and a recently opened Cherokee Reservation Casino. The casino alone is estimated to increase traffic along the corridor by approximately 240,000 vehicles per year.

Water Resource and Other Key Environmental Issues

Sedimentation is the main water resource issue in the watershed. The watershed contains 53 permitted wastewater discharges in North Carolina, including Franklin and Highlands wastewater-treatment plants; an additional seven sites in the Georgia headwaters include textile processing plants that contribute over 95 percent of total permitted industrial discharges. The eight river-miles in Georgia are largely channelized and degraded. North Carolina's Department of Environment and Natural Resources (DENR) identified two stream segments in the water supply watershed for the City of Highlands as part of the state's 303(d) list of impaired waters because of high sediment loads. DENR is developing "management strategies" for both streams rather than formal total daily maximum load (TMDL) allocations.

The watershed supports four aquatic species identified by North Carolina as "endangered" and 15 additional species as "significantly rare," or of "special concern. These include two mussels with federal endangered status (the Littlewing Pearlymussel and Appalachian Elktoe) and the Spottfin Chub, federally listed as "threatened." The Needmore Tract, downstream of Lake Emory, is particularly important for these species. The area is also part of a river-otter restoration-effort

Despite a history of flood-related problems and a recent controversy over the siting of an asphalt plant on the bank of the Cullasaja River, Macon county does not have a flood-plain management ordinance or zoning. By state law, it does have a protective ordinance for water supply watersheds.

Driving Issues

The area's natural beauty and ecological value downstream of Franklin, and local interest in watershed protection and restoration, drive most of the partnership efforts here, although watershed residents have been in conflict over permitted discharges and facility siting on the Cullasaja, a very picturesque and popular mountain tributary river.

Prior Relationships Among Partners

A grassroots organization formed in 1991 to protest a municipal capital improvement project for Highlands that involved an expanded drinking water system and redirecting wastewater effluent directly into the Cullasaja River, bypassing a previously used tributary and two small impoundments. This group, Save Our Rivers, Inc., remains an active advocate for the Cullasaja and other rivers in the region and has promoted the anecdote that the number of full-immersion baptisms decreased in the river following the Highlands outfall change—a significant issue for some community members. Several other nonprofit organizations had also been active in the area and now interact with LTWA, including the WNCA (an environmental/ naturalist group) and the Southern Appalachian Highlands Conservancy (a regional land-trust), and the Highlands Land Trust.

Watershed residents indicate that the area has a history of independence and a strong lack of enthusiasm for government programs and regulations related to property use.

History/Key Dates

- 1989 A local resident/fishery biologist secures a grant from TVA and begins a biological monitoring project with WNCA administrative assistance. The effort involves numerous volunteers. Contracts are renewed continuously through 1999.
- 1992 The town of Franklin voluntarily resubmits to DENR an approved wastewater-treatment plant design permit and requests a more stringent level of protection than the state required. Changes include longer retention time for landfill leachate, more frequent toxicity testing, and backup dechlorination. That change results from comments by roughly two-dozen citizen monitors (volunteers supporting the TVA grant) at a public hearing for the treatment plant permit.
- 1993 With assistance from others, the resident/biologist organizes the “Little Tennessee River Watershed Conference”—intended to generate interest and improve coordination for river protection and restoration. Many future LTWA board members are active in the conference.
- 1993-1994 A core group of citizens continues meeting to explore forming a grassroots watershed organization.
- 1994 LTWA forms, creating an executive committee (now board of directors), an interagency advisory committee (now advisory board), and a mission statement and objectives.
- 1995 LTWA establishes committees for communications, education, funding, and natural resources.
- 1995 LTWA receives its first grant for streambank restoration work—a US Fish and Wildlife Service (USFWS) Partners for Wildlife grant. The TVA grant permits funding for basic organizational functions—producing a LTWA newsletter and limited administrative support through the part-time project assistant. Other grants follow, and work continues to the present.
- 1996 Nikwasi Land Trust (now The Land Trust for the Little Tennessee) is formed to focus on protecting significant lands in the watershed—primarily focusing on preserving pristine conditions of the Upper Little Tennessee River below Lake Emory.
- 1998 LTWA and partners receive a \$950,000 grant from the state Clean Water Management Trust Fund (CWMTF). Of that, \$750,000 is to be used for streambank restoration work in the watershed.
- 1998 Macon Soil and Water Conservation District (SWCD) hires a riparian restoration technician with grant funds. LTWA and the NRCS district conservationists oversee the position.
- 1998 LTWA hires its first executive director.

Organizational Arrangements

Composition/Representation

The partnership involves a broad mix of interested citizens, professionals and agency representatives. While seeking to be inclusive, the organization has specifically established a board of directors (consisting of local interests, including local agency staff) and a larger advisory board, consisting of numerous additional resource management agencies.

The LTWA board of directors includes: a former biologist for the state's Wildlife Resources Commission who is currently a regional director for the National Rifle Association; a director of the Land Trust for the Little Tennessee; an aquatic biologist; a vice president of Nantahala Power and Light Company; a researcher from the Coweeta Hydrologic Laboratory; the Natural Resource Conservation Service district conservationist; a US Forest Service ranger; a representative of the Nantahala Hiking Club, and several other private citizens.

Other partners and advisory board members include: a representative from the Tennessee Valley Authority; the director of the Southwestern North Carolina Resource Conservation and Development Council (SWNC RC&D), citizen volunteers and watershed landowners. Representatives from Macon County; the Town of Franklin; DENR-Division of Water Quality (DWQ) Asheville Regional Office; North Carolina Wildlife Resources Commission; USFWS; Macon County Cooperative Extension; and the US Corps of Engineers also participate. In addition, a representative from a Resource Conservation and Development Council in Georgia has attended meetings; LTWA directors have met with Georgia Department of Natural Resources; and local businesses and other organizations become involved with LTWA periodically.

LTWA has tried for better representation among landowners and builders and from three areas: Highlands, Swain County, and Georgia. LTWA approached a lake-property owners-association in the Highlands area (headwaters of Cullasaja), about coordination, and a member is now on the LTWA Board of Directors. LTWA has identified a potential board member in Swain County, but has not had success finding a board member from Georgia.

Structure/Process

LTWA is in the process of drafting bylaws and actively pursuing incorporation as a 501(c)(3) organization—to date, the SWNC RC&D has provided financial management for LTWA grants and contracts. The advisory board meets with LTWA's Board of Directors annually, and individual advisory board members occasionally participate in regular board meetings and on standing committees.

LTWA uses six standing committees: finance (limited to directors); volunteer projects (directors); membership (entire board of directors); riparian restoration (a mix of directors and SWCD staff); education (teachers, members of school board); and stewardship (directors and other interests). It also has currently an ad hoc committee for developing bylaws. Committees are appointed by the LTWA board chair. The executive director participates in every committee and ad hoc group. LTWA has approximately 100 members, and circulates newsletters to nearly 600 people.

The board meets monthly, with additional meetings for standing committees. Membership meetings are quarterly. Board meetings are led by the chair and follow standard rules of order and voting with a quorum. While conflict arises (characterized as healthy debate) over some

actions, LTWA has consistently maintained its position as a neutral non-advocacy organization. LTWA board members have agreed that in cases of disagreement, board members can act as individuals; but, they cannot use the LTWA name without board approval.

Authority Relationships

LTWA does not have formal authority, but LTWA greatly influences SWCD activities in the watershed, including restoration activity. DENR formally recognizes LTWA in the Little Tennessee River Basinwide Water Quality Management Plan.

Staff Functions and Partner Roles

For several years, administrative functions were shared among volunteer board members and others as illustrated in Table E-1. Until 1997, a board member (who was also a volunteer and a part-time administrative assistant for the TVA monitoring grant) recorded most of the meetings and developed a regular newsletter, partly supported by TVA grant funding. After 1997, the chair and vice-chair shared these responsibilities. The SWNC RC&D Council, a 501(c)(3) organization based in nearby Waynesville, NC, has administered nearly all of LTWA's grants. Other members write grant applications, record volunteer hours, and run committee meetings. Since November 1998, an executive director has taken over most of the administrative functions, with the exception of grant administration, although that will change once LTWA obtains 501(c)(3) status.

Technical functions are supported by a combination of agency staff and board members. Macon SWCD leads design and installation activities for restoration and conservation activities. The board member/fishery biologist and citizen volunteers conduct most monitoring activity in the watershed through the TVA grant, including biological work since 1990, and more recently sediment monitoring at 54 sites in the watershed. Several laboratories within the watershed and region analyze the data. DENR-DWQ monitors biological conditions every five years as part of their basin-planning cycle, oversees effluent toxicity monitoring of NPDES permits, and operates three ambient monitoring stations in the watershed (measuring a variety of parameters at least monthly). Georgia's Department of Natural Resources also conducts biological monitoring. Coweeta Hydrologic Laboratory (through collaboration with University of Georgia/USFS Long-Term Ecological Research Program) conducts long-term monitoring in the Coweeta Creek sub-watershed, monitoring associated with the Cartoogechaye Creek project, and research funded by EPA and USFS examining the impacts of restoration practices on sediments and nutrients. Each agency conducts individual technical analysis, which is available to LTWA.

The Land Trust for the Little Tennessee (formerly the Nikwasi Land Trust) is just beginning land acquisitions. Until late 1999, when it incorporated as a not-for-profit organization, the trust had been operating within the SAHC organization. The Land Trust for the Little Tennessee is amicably replacing SAHC as the land trust for the watershed.

Volunteers have contributed at least 3200 hours for biological monitoring, sediment monitoring, restoration work, and other actions. Agencies provide information as requested by LTWA. Nantahala Power and Light Company (now a division of Duke Power) supplies materials used by volunteers for sediment monitoring.

TABLE E-1. MAJOR PARTNER ROLES AND FUNCTIONS FOR THE UPPER LITTLE TENNESSEE RIVER WATERSHED

	Individual/private citizens	Consultants	Local NGOs	County/local governments	Regional agency	State agencies	USEPA	NRCS	Other federal agencies	Tribal government
ADMINISTRATION/MANAGEMENT										
Initiation/convening	■	■								
Administrative functions	■		■							
Coordinative functions	■	■	■	■ ¹						
Formal partnership facilitation						■ ²				
Information provision/analysis	■	■	■	■	■	■		■	■	
Implementation/management actions (BMP installation, habitat work)	■	■	■	■		■		■		
FUNDING										
Funding for planning						■ ³				
Funding for implementation staff			■		■	■		■		
Funding for implementation/management actions (BMPs, habitat improvements, land acquisition)	■					■	■	■	■	

1 DENR's Nonpoint Source Team for the Little Tennessee River basin contracted with a regional council of governments for planning related to the team's Crawford Branch project.

2 NCSU-Cooperative Extension Service facilitates public meetings in the watershed as part of DENR's basin planning for water quality.

3 DENR provides funding for basin plans for water quality and wetlands/riparian restoration; DENR also provided a one-time grant for the Nonpoint Source Team.

Funding

LTWA receives funding from a variety of private and public sources. Partners are optimistic about funding restoration projects, but uncertain about continued support from TVA, support for the executive director position, and organizational operating expenses. LTWA funding sources include:

- *Staff:* Z. Smith Reynolds Foundation provided \$27,500 toward supporting the executive director position. TVA also contributes funds for the executive director's salary (about \$30,000). The Janirve Foundation provided one year of support for a monitoring technician/trainee. Both the Clean Water Management Trust Fund grant (described below) and TVA's monitoring grants include funding for technical staff and some administration.
- *Planning:* DENR provided \$100,000 in a one-time Nonpoint Source Team grant; the team (which includes LTWA) spent \$23,000 to develop a plan for restoring Crawford Branch, an urban tributary to the Upper Little Tennessee River in Franklin.
- *Information and management actions:* The North Carolina Clean Water Management Trust Fund (CWMTF) awarded \$3.85 million in funding to the watershed—\$2.9 million goes to Macon County for a greenway project (in conjunction with Duke Power/Nantahala Power and Light); and \$950,000 to Southern Appalachian Highlands Conservancy (SAHC)—for restoration work to be determined by LTWA, including salary for SWCD restoration technician for inventory and other activities. Funds were granted because of broad involvement by partners; LTWA board members had a formative role in grant development. TVA funds biological and sediment monitoring (\$35,000 to \$40,000 per year throughout the project).³⁹ USFWS has provided multiple Partners in Wildlife grants for restoration work (totaling \$42,000). EPA has provided a \$100,000 319 (h) grant in 60:40 matching funds for agricultural management practices including stream bank fencing. The state Agricultural Cost-Share program contributes about \$100,000 per year to Macon SWC, the majority of which is invested in the watershed, which covers most of the county. As noted above, DENR's Nonpoint Source Team has provided \$70,000 in state money for the Crawford Branch project, and \$30,000 for information and education efforts throughout the entire 1,800-square mile North Carolina part of the Little Tennessee River basin. Z. Smith Reynolds Foundation also contributed \$20,000 to Western Carolina University to develop regional teacher-training workshops.
- *Other funds:* Membership dues and occasional general purpose donations/contributions are additional variable sources of funding. Nantahala Power and Light frequently pays for or supplies items for meetings, covers small expenses as needed, and donates sediment-monitoring project supplies.

Plans and Assessments

Watershed Assessments and Studies

A number of small-area assessments and studies occur within the watershed, including long-term studies conducted by the USFS and Coweeta Hydrologic Laboratory, located on a

tributary to the Upper Little Tennessee. The Wildlife Resources Commission, USFWS, regional universities, DENR, and others all conduct water-resource, aquatic-species, and related studies and assessments.

There is no formal inventory of sediment sources, particularly in the Georgia portion of the upper watershed. LTWA partners are familiar with the resource and tributaries and are beginning to develop a documented inventory through SWCD.

Plans: Links Between Information and Action

LTWA partners have a sophisticated understanding of some of the major watershed issues. However, they have not laid out priority actions based on an assessment of greatest impact, i.e. a formal plan that would link goals, problem analysis an alternatives evaluation, and prioritized management activities. Their process for decision making is illustrated in their ongoing LTWA/TVA sediment-transport monitoring study. After a review in early 2000, partners will identify priority stream segments and tributary basins for restoration work and additional detailed assessment. In the absence of a plan, LTWA and SWCD developed criteria for assessing potential restoration sites. Sites selected thus far have demonstrated an obvious bank restoration need and shoreland property owners willing to participate.

DENR has produced two related plans for the watershed. DENR-DWQ's basin plan includes a section specifically for the Upper Little Tennessee River watershed that includes information and recommendations for nonpoint source and point source pollution control. The DENR basin plan is a necessary part of the process for issuing water-quality permits in the basin. As of 1999, the basin planning process is codified in legislation. The plan uses DENR records, original monitoring data, input from citizen workshops, and additional information from other agencies. It includes sediment-loading estimates derived from the Universal Soil Loss Equation. LTWA uses the basin plan as a reference document, and cited consistency with DENR plan recommendations as part of the joint CWMTF grant application (consistency is a requirement for CWMTF funding). LTWA members participated in public meetings during the planning process.

DENR-DWQ's Wetland Restoration Program developed a "Basinwide Wetlands and Riparian Restoration Plan for the Little Tennessee River Basin." The state legislature established the North Carolina Wetland Restoration Program (NCWRP) within DENR's Division of Water Quality and required the program to develop plans for each basin. The Little Tennessee Basin Wetland Restoration Plan uses GIS and input from numerous DENR and other agency plans to identify a set of necessary actions for protecting and restoring wetlands and riparian areas in priority sub-watersheds. The plan does not identify specific actors or funding sources, but the NCWRP hopes the information will influence other agencies and nongovernmental organizations working in this basin, and lead to partnership opportunities for NCWRP with others for addressing basin priorities. The plan includes an appendix with priority fishery management issues identified by the regional Wildlife Resources Commission staff.

While DENR uses these plans for its own decisionmaking, the plans do not guide decisions for the partnership in the Upper Little Tennessee River watershed. The DENR Little Tennessee River Nonpoint Source Team⁴⁰ is in the process of developing a plan of action for its Crawford Branch urban-stream rehabilitation effort.

Relationship to State Water-Quality Regulatory Program

Through their own initiatives, individual partners in this watershed actively involve themselves in the water-quality permitting process through letters to the regional DENR office, participation in public hearings, and in some cases, public-awareness campaigns. LTWA participated in citizen workshops related to the state's basin-planning process, and the basin plan includes a statement, "DWQ will continue to cooperate with and support the LTWA in their efforts."⁴¹ However, other than normal public hearings, no formal process link exists for partnership input with regard to permitting or other water-quality regulatory issues.

Accomplishments

Environmental Outcomes

After only five years, partners in the Upper Little Tennessee are still in the early phase of their partnership efforts, and while they have achieved numerous successes (described below), their efforts have not yet produced measurable changes in overall environmental quality of the river. LTWA is sensitive to this and notes that measurable impact on the health of the stream system will not be evident from restoration of a limited reach of streambank. The cumulative results of these efforts, if continued, are likely to be measured over generations.

Environmental Outputs

LTWA has made several site- and reach-specific conservation improvements. Specifically, partners have installed more than three miles of full-tree revetments on bare streambanks, more than three miles of riparian fencing, five miles of other riparian restoration, and have initiated a variety of additional agricultural-management practices. LTWA sets eligibility criteria for restoration projects, and considers the willingness of the landowner, the length and width of riparian area, whether one or both sides of a stream are involved, the size of the problem area, and any pertinent additional factors. This partnership is not pushing solutions on unwilling landowners. The initial restoration efforts with willing landowners, although not targeted, have generated credibility among additional landowners, and more landowners are now interested in restoration projects. Although the results are not quantified, scientists note positive impacts of activities in the riparian zone (terrestrial wildlife habitat, local reduction of soil loss, and improved streamside aesthetics).

Other Accomplishments

Partners in the Little Tennessee have also achieved numerous other accomplishments. LTWA is enhancing awareness of the Upper Little Tennessee River and its tributaries as a valuable regional resource in need of protection and restoration. Partners build awareness for river conservation and restoration through work days, displays at local fairs, an annual picnic/meeting, presentations to other groups, and press releases. LTWA has also initiated a stream-stewardship awards-program to landowners practicing sound riparian conservation stewardship. LTWA partners identify and nominate landowners; award winners receive a plaque, a small sign, and recognition through a formal announcement in the local newspaper. LTWA is building a strong local capacity for sustaining watershed management and has a base of nearly 100

members, many of whom participate in monitoring and/or workdays. LTWA also leads a large citizen-driven sediment- and biological-monitoring effort.

As a citizen organization, LTWA has improved coordination for watershed management through strong relationships and regular interaction with agencies and other related nongovernmental groups. It has created and is sustaining a forum for watershed issues, and the overall partnership presence in the watershed has helped gain acceptance for conservation programs among historically resistant landowners. LTWA provides a point of public contact for state and federal resource management agencies. For example, in 1998 DENR temporarily supported a number of basin-level interagency teams to address nonpoint source pollution issues; LTWA was the initial citizen contact for assistance for the larger Little Tennessee basin and continues to play a key role.

Case Commentary

LTWA has instigated coordination and interaction among agencies and citizens with interest in the watershed and captured state and federal investments for the watershed. LTWA added legitimacy to and increased the scope of Macon SWCD's conservation programs—Macon SWCD/NRCS have been key partners to LTWA, and the district conservationist is on the LTWA Board of Directors. Other agencies on the advisory board view interaction with LTWA as additional public participation—a two-way citizen advisory relationship. Testimonial evidence suggests that this array of accomplishments, in particular the coordination and concentration on conservation, would not have occurred absent the partnership.

The partnership began and continues at the initiative of local citizens interested in protecting and restoring their river and watershed. Through their organization, partners have dramatically increased their ability to address resource management problems. The group now has clear goals, technical support, information about the watershed, and financial and administrative support. Its baseline data-gathering effort, supported by extensive volunteer labor, will lead to a prioritized strategy for sediment control.

This group of citizens has assembled the pieces for a sustainable citizen and agency focus on watershed protection and restoration. As a result of a recent land-use siting conflict, LTWA has initiated discussions with the county relating to land-use regulations, specifically for floodplain zoning and for construction standards for rural gravel roads, which during storm events deliver sediments to the river. LTWA's focus on expanding participation of watershed citizens and enlarging the scope of interests/activities is a promising sign for future accomplishments.

Contributing Factors

Numerous factors appear to influence partner accomplishments in the Upper Little Tennessee River watershed. Factors are not ranked here, and the discussion reiterates information presented throughout this appendix:

- *Issue(s) salience:* Partners are motivated to protect a river system of great regional and ecological value through land acquisition and watershed-wide sediment load reduction. LTWA members, in particular, are driven by a larger goal of sustainable conservation stewardship for the entire watershed.
- *Inclusive participation by a broad array of interests:* LTWA unites numerous private-sector individuals and organizations with governmental resource managers. Conservation and

restoration interests, landowners, recreational interests and private-sector scientists, interact and coordinate with each other and with state and federal natural-resource managers for the watershed. Collectively, partners share information and resources, identify and leverage funds, address a broad range of issues relevant to partners. The diversity of participants and the partnership's explicit neutrality and openness to participation have legitimized the partnership with local landowners, agricultural producers, and businesses. While the partnership is still expanding, it has not yet been successful at including interests from the river's headwater area in Georgia.

- *Initial leadership and sustained participation of respected local individuals along with active participation by capable state and local agency staff:* LTWA's conservation and restoration initiatives for the watershed are generated and sustained by participation of respected community members. All of the major relevant local, state, and federal resource management agencies participate to some degree in the partnership efforts. Participation from NRCS/Macon SWCD and Nantahala Power and Light has been particularly important, providing technical support for conservation practices, and valuable services such as meeting space, small purchases, and monitoring supplies. Ten years of TVA support for locally initiated and managed monitoring has also been a key ingredient for both generating information and providing opportunities for education and volunteer participation. Local private and governmental partners continuously seek additional funding and protection opportunities.
- *Formal governmental support:* DENR supports LTWA efforts through statements in its basin plan, participation on the LTWA Advisory Board, and interaction through the special nonpoint source initiative for Crawford Branch. Other state agencies, including WRC, formally participate on the LTWA Advisory Board. Local governments have not officially endorsed LTWA, but they cooperate as partners on joint initiatives, including a joint application for the large CWMTF grant. LTWA is integrally connected with conservation-district activities and has met with county officials regarding initiating county land-use control- measures.
- *A sound scientific basis for assessment and action:* LTWA is developing an overall inventory of the watershed through its monitoring efforts. Based on analysis of monitoring program results, partners plan to target sub-watersheds for detailed action and further assessment. Several partners have extensive individual/undocumented knowledge of the watershed and its primary sources of sedimentation—and important informal source of scientific information.
- *Use of a watershed plan to guide actions:* DENR has produced two plans for this watershed, dealing with overall water quality issues and restoration and protection objectives for riparian areas and wetlands. LTWA partners use these plans as references, but the plans do not otherwise guide their actions. Rather than a plan, LTWA developed selection criteria for restoration sites; partners have carried out their restoration efforts in sites with obvious needs, but they have not yet ranked the relative importance of various sites in the watershed.
- *Funding to employ staff, collect information, develop plans, and implement actions:* TVA, the state CWMTF and a private grant fund LTWA/partner staff administrative and technical

support. CWMTF support is relatively stable, but other sources must be renewed annually. TVA funds most of the information-collection for the watershed through annual contracts with the LTWA board member/fishery biologist. Other than DENR's efforts, partners do not have additional resources to develop a watershed plan. LTWA and partners have obtained numerous grants to support their restoration objectives/activities.

- *Staff for coordination, management, and technical work:* For several years, LTWA operated with minimal staff support provided through the TVA monitoring contract; much of the coordination and management work was done by volunteers. In late 1998, LTWA hired an executive director to assume these responsibilities. SWNC RC&D has provided financial management, which LTWA will soon assume, following incorporation as a nonprofit organization. LTWA board members, volunteers, and agency partners (primarily Macon SWCD) perform technical work.

Long Creek Watershed, North Carolina

List of Acronyms

BMP	Best Management Practice
DEM	Division of Environmental Management
DENR	North Carolina Department of Environment and Natural Resources
DWQ	Division of Water Quality
MGD	Million gallons per day
NCSU	North Carolina State University
NRCS	Natural Resources Conservation Service
QNRC	Quality of Natural Resources Commission

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Partnership Description

The Long Creek partnership is an affiliation of mostly local agencies coordinated through a county initiative for water quality and through participation in the EPA Section 319 National Monitoring Program. The group focuses on reducing nonpoint source pollution and related water resource concerns in the upper 45-square-mile portion of the Long Creek watershed. The Long Creek watershed is not really the central organizing unit for the efforts in Long Creek, although the watershed approach is used at smaller scales within the watershed and at other locations in the county.

Background, Genesis and Purpose of Partnership

Trigger

The partnership stems from two key events:

- The formation in 1989 of the Gaston County Quality of Natural Resources Commission (QNRC) as a result of citizen concern over county natural resource issues (numerous fish kills, well contamination, air quality issues). QNRC created a flurry of activity among key county stakeholders. Following an inventory of county natural-resource issues that involved a public opinion poll conducted by North Carolina State University (NCSU), QNRC focused efforts on Long Creek watershed. Long Creek was entirely within the county and involved a full range of land-use issues.
- The interest of Bessemer City, a community of approximately 5,000 people whose water-supply source is in the upper Long Creek watershed, in improving water quality.

Initiator

The partnership effort became a focus for QNRC's Surface Water Committee through leadership from Gaston County Cooperative Extension and Gaston Natural Resources Conservation District.

Stated Partnership Goals and Objectives

QNRC anticipated that the Long Creek effort would provide lessons they could transfer to other parts of the county. Initial goals for the effort were to assess and address water-quality concerns in the Long Creek watershed. Partnership objectives became focused primarily on research efforts related to agricultural and to a limited degree, urban nonpoint source pollution-abatement with inclusion in the National Monitoring Program.

QNRC is a "parent" organization of the Long Creek partnership. Its purpose is to "study and review Gaston County's Natural Resources and recommend to the Board of County Commissioners...county policies, procedures, ordinances and/or changes to the general statutes to promote and protect the environment." Bylaws include four additional directives: to review sufficiency of state and federal regulations, evaluate and communicate county natural resource protection efforts, coordinate and communicate with appropriate county agencies and officials, and additional duties as assigned by the board.

Scope

- *Substantive scope*

The Long Creek watershed partnership has focused primarily on reducing agricultural nonpoint sources on the upper portions of the watershed. Partners have addressed urban runoff in a very limited way. The partnership largely emphasized agriculture because of partner expertise, subject familiarity, and an existing county/conservation district mechanism for land-owner interaction and program administration; they also had difficulty identifying sites that fit stringent National Monitoring Program research criteria for urban areas. Now that Long Creek

partners' participation in the National Monitoring Program is past the practices-installation phase, partners might refocus to address a broader array of issues for a larger watershed.

■ *Functional scope*

Watershed partners have addressed their issues through a variety of approaches, including: coordinating staff, funding, research and management actions around the watershed; education and outreach programs to reach students, community groups, and public officials; conducting research (monitoring and analysis) to understand the problem parameters and the effectiveness of BMPs; and installing agricultural BMPs (and some urban practices) to reduce nonpoint source pollution.

Local Context for Watershed Partnerships

Watershed Description

Long Creek watershed is a relatively small watershed of 61 square miles within the South Fork River watershed of the Catawba River basin in North Carolina's southwestern piedmont, just west of Charlotte. The creek runs approximately 18 miles from its source to its confluence with the South Fork River. The watershed lies at the edge of three major North Carolina geologic belts of mostly fractured igneous and metamorphic rock; soils are well-drained sandy loams with a clay subsoil. The Long Creek partnership has focused on the upper 45-square miles of the Long Creek watershed.

Long Creek watershed is almost entirely within Gaston County. The watershed includes portions of the City of Gastonia, the county's largest urban area with a population close to 60,000, as well as Bessemer City (population approximately 5,000), Dallas (population 3,000), and small suburban community of Ranlo.

Urban land-uses account for roughly 65 percent of the watershed area, agricultural uses 20%, with the remaining 15 percent of the watershed undeveloped and/or forested.⁴² Nearly all of the agricultural activity is concentrated in the upper one-third of the watershed; the lower two-thirds includes a mix of commercial, industrial, residential, and undeveloped/non-agricultural land uses. A lithium mine in the upper watershed is now closed. Population densities for the Long Creek and neighboring watershed average close to 600 people/square mile,⁴³ but urban activity is increasing throughout the watershed, and the entire county is experiencing growth pressure from the Charlotte metropolitan area.

Water Resource and Other Key Environmental Issues

Long Creek faces nonpoint source threats from rural and urban sedimentation, nutrients, fecal coliform, and metals associated with urban runoff. Among the residential developments is a 225-unit manufactured-home site with individual septic systems in a poorly drained part of the watershed. Numerous point sources discharge into Long Creek in the lower part of the watershed, including two "major" dischargers—an 8.0 million gallons per-day discharge from the City of Gastonia, and a smaller 0.3 MGD industrial discharge near the confluence of Long Creek and the Catawba River.⁴⁴

In 1998, two stream segments totaling 8.5 miles in the lower portion of the Long Creek watershed were added to the state's 303(d) list of impaired waters based on poor biological

sampling results. Monitors indicated impacts from point and nonpoint sources, but they did not identify specific parameters.⁴⁵ These segments are low priorities for the state Division of Water Quality and are to be monitored for additional information. The 303(d) listing is not driving actions for the partnership.

Urban nonpoint source impacts in the watershed are increasing. Gaston County has a restrictive ordinance for land uses in water supply watersheds (consistent with the state model ordinance), but neither the county, nor local communities have ordinances for urban stormwater management. The state requires sediment control measures for construction sites larger than five acres.

Agriculture in the watershed is concentrated almost entirely in the headwaters, and includes four dairy operations (each with 200 to 500 cows) and a number of cash-crop operations. The City of Gastonia operates a municipal waste-recovery farm and sludge distribution program on 690 acres within the predominantly agricultural area (the reclamation farm gets funding for BMPs through the Long Creek partnership and provides municipal sludge for land application to farmers around the county). Prior to purchase by the city (originally for an airport), much of this area had been a dairy farm.

Partners concentrate their activities in the upper portions of this area where agricultural uses are more prevalent and urban impacts are less severe. All of the analyses for agricultural pollutant loads (described later) were conducted for an area of 26,250 acres (the watershed upstream of State Highway 321).

Driving Issues

Initially, two issues drove the partnership: Bessemer City wanted to reduce sedimentation and dredging around its water-supply intake; and QNRC placed high priority on addressing surface water-quality issues in the watershed. Once the watershed became part of the EPA Section 319 National Monitoring Program, the main drivers became program related research requirements and the opportunities to leverage additional funding for county water quality goals.

Prior Relationships Among Partners

Several of the key leaders in municipal and county government are participants in this partnership, and have professional relationships spanning many years, partly through a ground-water-quality protection-project.

History/Key Dates

- | | |
|--------------|---|
| Mid-1980s | A number of high profile environmental concerns capture public attention (fish kills, groundwater contamination of household wells, and concerns over local air pollution). |
| 1988 | The Gaston County Board of Commissioners creates the QNRC; Gaston County Extension staff and others design a broad representative structure, specifying nearly fifty interests to be represented on the commission. |
| January 1989 | The first QNRC meeting takes place. |

- 1989 QNRC commissions NCSU faculty (including extension) to conduct a county-funded assessment process to help it understand county natural-resource issues. NCSU and the county agree on a two-phase approach. Phase 1 involves assembling existing data on county resources, identifying areas where additional monitoring and assessment is needed, and conducting a study of public opinion to assess environmental quality in Gaston County. Phase 2 involves developing and implementing a “comprehensive education plan for water and air quality,” identifying and developing policies to address major water- and air-quality issues, expanding the resource database, and using models to analyze the impacts of nonpoint source impacts under various scenarios.
- 1990 Report “Phase 1: Characterization of Air, Surface Water and Groundwater Quality” is submitted to QNRC by NCSU researchers.
- 1991 Gaston Conservation District (with support from county commissioners and the cities of Gastonia and Bessemer and QNRC through the county commissioners) requests the Department of Environment and Natural Resources (DENR) Division of Environmental Management (DEM) to upgrade Long Creek’s stream classification in the upper watershed to a more-stringent water-supply classification (from WS-III to WS-II⁴⁶). DEM conducts a field study and determines that the creek has the potential to be upgraded, but also finds high levels of pollution in the stream and suggests additional monitoring.
- 1991 QNRC’s Surface Water Quality Committee endorses a monitoring project for the watershed. Gaston Conservation District staff approach EPA Region 4 for assistance, and DEM and Region 4 staff develop a monitoring plan for the watershed with local staff.
- 1991 Gaston County Cooperative Extension hires the state’s first natural-resource extension agent, who immediately begins working with EPA, NCSU, and county agencies to finalize and implement the monitoring strategy for Long Creek watershed.
- 1992 NCSU submits the second natural-resource report, “Phase 2: Implementation of Natural Resource Education and Policy Development Programs,” to QNRC.
- 1992 An NCSU research team coordinates a proposal for including the upper portion of Long Creek in the EPA Section 319 National Monitoring Program.
- October 1992 Long Creek becomes part of the EPA Section 319 National Monitoring Program; EPA commits funding through September 30, 2001.
- 1992-1999 Long Creek Project partners hold monthly meetings to coordinate research project and other nonpoint source management issues for the watershed.
- 1993-1994 The City of Gastonia Public Works Department initiates the Gastonia Resource Recovery Farm on 690 acres within the watershed, amidst much local resistance. The land was originally purchased for a new Gastonia airport,

but public opposition (and a change in city government over the issue) halted the plan. Intense initial opposition among neighbors to a recovery farm leads to several high-conflict meetings. The Long Creek partnership assists with the participatory process, public education and acceptance. The land is managed for agricultural production, land conservation, and municipal sludge storage for a countywide municipal-sludge land-application program. The Long Creek project provides cost-share assistance for land management BMPs with the city and its tenant farmer. New partnerships for research and management develop around the Resource Recovery Farm (Long Creek partners, a local museum, NC Forest Service, and others). The farm is awarded EPA Region Four's "Beneficial Use of Biosolids Excellence Award," and receives honorable mention for the EPA's national award in that category.

1999 The Long Creek partnership effort has shifted focus from implementing management practices to conducting post-BMP monitoring. Most partners are active in other regional water-quality issues, e.g., water supply protection for Mountain Island Lake (City of Gastonia's water supply) and potential water-quality planning efforts related to Lower South Fork Catawba River, of which Long Creek is a tributary.

Organizational Arrangements

Composition/Representation

The partnership is led by a core group of two county-level agencies and NCSU-Cooperative Extension: Gaston Conservation District (including the Natural Resources Conservation Service district conservationist), Gaston County Cooperative Extension and NCSU-Cooperative Extension Water Quality Group in Raleigh. Kiser Dairy, the primary site for much of the BMP effectiveness-research, has been the most-involved landowner. Local municipalities, schools, UNC-Charlotte, Duke Power, and others have participated in specific events and activities. Long Creek partners are linked closely to the county QNRC through staff and overlapping membership. The QNRC Surface Water Committee receives regular reports on Long Creek issues, and QNRC has been an active force in watershed issues (particularly when the partnership first began).

Builders, developers, and realtors have been conspicuously absent from Long Creek activities; building interests were active with QNRC, but QNRC has also had a difficult time maintaining participation from builders and the "development community." Long Creek partners have had very limited involvement with urban landowners.

Structure/Process

The Long Creek partnership involves two organizational arrangements: Gaston County QNRC, and the partnership that has developed around the Long Creek watershed.

QNRC, the Long Creek partnership's "parent" organization, is a formal county commission created by county resolution, and operating as an advisory group to the Board of County Commissioners. QNRC bylaws specify a chair and officers, and both the bylaws and the original county resolution encourage participation from more than 50 specific entities and interests. Representatives

are appointed by their interest groups (e.g., the board of realtors), and some spots remain vacant. QNRC has operated with various committee structures but has consistently maintained a surface-water committee—the commission’s most direct link to Long Creek activities. QNRC and its committees meet regularly, and make decisions based on majority vote with a quorum.

The Long Creek partnership is a coordinating and administrative arrangement, formed to address issues related to water quality in Long Creek. The partnership uses a steering committee (the primary coordination committee), an advisory committee (currently inactive), and a mix of task-oriented “committees” within the steering committee (really an ad hoc committee structure with one or two members on a committee, mostly just reporting areas for meetings). Meetings, held monthly for several years and now bimonthly, are run by county staff with participation from various agencies. Key staff participants also have frequent contacts through the course of their regular countywide functions. The partnership works through consensus, guided by general goals set by specific requirements associated with the EPA Section 319 monitoring project and general recommendations set forth in the Phase 1 and Phase 2 reports.

Authority Relationships

Gaston County QNRC reports to the Gaston County Board of Commissioners. The Long Creek partners have specific responsibilities associated with their participation in the 319 project, and submit annual reports of their activities. The partnership is also accountable for additional funds outlined below.

Staff Functions and Partner Roles

Gaston County Cooperative Extension, Gaston Conservation District, and NCSU-Cooperative Extension provide nearly all of the administrative and technical support for this partnership effort. A monitoring-program project-coordinator leads the coordination effort and runs meetings; he also collects water-quality samples from project monitoring sites. Prior to that hire, the county natural-resources agent was the local lead. Gaston County Extension also provides an administrative assistant to record minutes. NCSU-Cooperative Extension compiles the annual reports. Gaston County Extension also provides staff support to QNRC, through a 30 hour/week administrative assistant, the natural-resources agent, and other staff as needed. Gaston Conservation District administers funds from the North Carolina Agricultural Cost-Share program and the federal NRCS programs.

The same offices provide most of the partnership’s technical functions. County extension staff conduct monitoring. Related laboratory work is performed under contract with neighboring Mecklenburg County. Prior to the National Monitoring Program funding, Gaston County Environmental Health Department and Gaston Conservation District employees also conducted monitoring. NCSU-Cooperative Extension assists with analysis and interpretation. Gaston Conservation District and the extension’s agricultural agent handle most of the design and oversight work for agricultural BMPs, although NCSU was closely involved with the BMP selection, design, and installation associated with the project’s research.

Numerous community groups have contributed time and labor for partnership projects. These include assistance from local scout troops for tree planting in the water-supply watershed, and construction of a boardwalk at the constructed wetland.

Also, project staff have benefited from meetings and national contacts established through association with the National Monitoring Program’s other watershed monitoring projects.

TABLE F-1. MAJOR PARTNER ROLES AND FUNCTIONS FOR THE LONG CREEK WATERSHED

	Individual/ private citizens	Consultants	Local NGOs	County/local governments	Regional agency	State agencies	USEPA	NRCS	Other federal agencies	Tribal government
ADMINISTRATION/MANAGEMENT										
Initiation/convening				■				■		
Administrative functions				■						
Coordinative functions				■						
Formal partnership facilitation										
Information provision/analysis				■		■	■	■		
Implementation/management actions (BMP installation, habitat work)			■	■		■		■		
FUNDING										
Funding for planning				■						
Funding for implementation staff				■			■	■		
Funding for implementation/ management actions (BMPs, habitat improvements, land acquisition)	■		■	■		■	■	■		

Funding

Initial funding for efforts in Long Creek came from Gaston County's QNRC and through staff resources of Gaston Conservation District and Extension. QNRC funded a natural-resource assessment (under contract with NCSU) and the state's first extension natural-resources agent. Duke Power provided equipment, supplies, and training for the initial monitoring efforts. Selection as part of the EPA Section 319 National Monitoring Program provided \$900,000 in funding for equipment, staff and analysis. State and federal programs provided additional funds for BMP cost-sharing. The primary sources of funding are listed below:

- *Federal funds:* EPA Section 319 National Monitoring Program provided \$900,000 for monitoring and evaluation. The money is used for equipment, analysis, a monitor/project coordinator and funds to support NC Water Quality Group's involvement; it does not include money for BMPs. The 319 program is funded through DENR to NCSU and Gaston County Extension. EPA also provides support through its national monitoring program conferences and the network of program researchers. EPA helped Gaston County develop a monitoring strategy prior to involvement in the 319 program and provided a 319 (h) grant of \$200,000 for the Long Creek Watershed Restoration Project; and administration paid for a number of agricultural BMPs, streambank restoration, and an experimental constructed wetland in Gastonia. NRCS "Farm Bill" Conservation Program funds are used in the watershed, including the Conservation Reserve Program, the Water Quality Incentives Program, and the Environmental Quality Incentives Programs.
- *State funding:* North Carolina Agricultural Cost-Share Program for Nonpoint Source Pollution Control (NC Agricultural Cost-Share Program) has provided more than \$520,000 in state funds for agricultural BMPs between 1989 and 1999. DENR Division of Water Resources contributed funds for the constructed wetland and boardwalk.
- *Local funding:* Gaston County provided funding for extension staff and for the initial county natural-resource assessment. Gaston Conservation District provides key staff resources.

Plans and Assessments

Watershed Assessments and Studies

Much of the original information used by Long Creek partners came from the two-phase natural resource inventory and assessment conducted by NC Cooperative Extension. The Phase 1 document compiled existing countywide information related to water quality, reported the results of a public opinion survey (conducted as part of the inventory), identified additional information needs, and outlined a county education and awareness strategy. The Phase 1 public-opinion survey was a random telephone survey of county residents aimed at eliciting opinions and priorities regarding the environmental and natural-resource management priorities for the county.

Phase 2 included recommendations for numerous county water resource issues. Phase 2 also included an expanded analysis of nonpoint source water-quality impacts in a portion of Long Creek watershed as part of a learning effort for dealing with nonpoint source issues in the

county. (Long Creek was selected because of its mix of land uses, and because it is almost entirely contained within the county). Primarily, the Phase 2 analysis of Long Creek identified priority pollution sources (based on aerial photographs and models including AGNPS, P8, and SWRRBWQ; the report describes each model and its limitations) and projected nonpoint source impacts under various BMP and build-out scenarios. However, because of a major concern with agricultural nonpoint pollution, especially above the Bessemer City water-supply intake, the area of analysis excluded much of the lower and more urbanized portions of the watershed. The Phase 2 report does acknowledge the potential impacts of urbanization but does not recommend actions to address those impacts: “Business and industrial expansion within the watershed could significantly degrade the water quality of Long Creek, especially for sections such as upper Long Creek where currently degradation is minimal.”⁴⁷

Selected additional sources of information on Long Creek include: Gaston Conservation District for GIS; City of Gastonia (monitoring associated with wastewater discharge and the resource-recovery farm); NC DENR- DWQ (monitoring, basin plans, and permits); EPA (initial monitoring strategy and previous history of assistance to county with groundwater issues); USGS (very limited, installed gauging station through project funding); Mecklenberg County (contract for lab work on water samples); and UNC-Charlotte (research and committee participation—contracted to study phosphorus reduction impacts associated with decreased sedimentation).

Plans: Links Between Information and Action

There is no formal plan for the Long Creek watershed. Rather, there are numerous sources of information and workplans related to projects and agency activities that are somewhat coordinated through the Long Creek partnership group. Although not part of a plan, Phase 2 of the county’s natural resources inventory identified a number of critical sites for addressing agricultural nonpoint sources in the watershed. DENR Division of Soil and Water Conservation drew from this inventory to outline a soil reduction strategy. Gaston Conservation District and NRCS used inventory information in their work with watershed landowners, for example, targeting areas that had greater than 20 tons/acre/year of erosion.

Long Creek is part of the Catawba River basin, and DENR-Division of Water Quality (DWQ—formerly DENR-DEM) prepares a plan for the Catawba basin every five years. The most recent Catawba basin plan was published in February 1995. The Catawba plan provides information on basin demographics and economic activities, water quality, use attainment, and programs, agencies and policies to address water quality issues. The plan is linked formally to the water-quality permitting process but also recommends actions related to water quality impairment, including both point and nonpoint sources of pollution. For example: “...because of the widespread occurrence of stormwater runoff impacts throughout this rapidly urbanizing basin, it is recommended that smaller municipalities begin efforts to identify sources of stormwater runoff and take corrective actions such as eliminating illicit discharges to stormwater systems.” The plan also provides strategies for addressing urban stormwater.⁴⁸

The Catawba basin plan and planning process drives DWQ monitoring efforts in Long Creek, and management actions conducted by Long Creek partners are consistent with the overall recommendations outlined in the plan. The Catawba basin plan includes a brief description of the Long Creek partnership and notes: “North Carolina Agricultural Cost-Share Program funds will be targeted for BMP implementation for animal waste management systems to address non-point [sic] sources of oxygen-consuming wastes.”⁴⁹ While potentially

benefiting from consistency with the plan, Long Creek partners do not use the plan as an implementation guide, primarily because of scalar differences and scoping—partners have focused on nonpoint source issues in a 45-square-mile subwatershed within the 3,300-square-mile Catawba River basin, and the basin plan (more broadly scoped) does not provide sufficiently detailed information to guide land management actions at the partners' scale.

Relationship to State Water-Quality Regulatory Program

The Long Creek partnership has limited involvement with DENR's water-quality regulatory actions. DWQ helped develop the Long Creek partners' monitoring design, and local project monitors and DENR exchange information, although DENR's basin plan recommendations are based on an independent DWQ assessment. The basin plan—DENR's guide for permit and funding decisions—acknowledges and supports the Long Creek partnership. Long Creek partners are not involved in permitting decisions, although local municipalities hold water-quality permits for wastewater discharge.

Accomplishments

Environmental Outcomes

Intensive monitoring of BMPs has documented *site-specific* improvements in nutrient, bacteria, and sediment reduction at several research sites in the upper watershed. For example, monitoring at the dairy research site indicates statistically significant decreases attributed to livestock fencing of 69 percent total phosphorus, 46 percent for nitrite+nitrate, 80 percent in total suspended solids, and 90 percent for fecal coliform.⁵⁰ These improvements were measured through pre- and (ongoing) post-installation monitoring and through monitoring above and below the BMP locations. EPA funding enabled the monitoring and evaluation.

Environmental Outputs

The Partnership focus in Long Creek, particularly because of support from QNRC, has intensified the efforts for promoting agricultural BMPs in the watershed's focus area. Since QNRC selected Long Creek as its water-quality priority, conservation-district staff have directed more than \$500,000 in state agricultural cost-share funds into this watershed—roughly one-half to one-third of the district's total allocation for that period. This investment has reduced agricultural erosion by 60 percent (from 2,390 acres of agricultural land eroding greater than 12 tons/acre/year to only 397 acres eroding greater than 12 tons/acre/year).⁵¹ Partners have promoted and installed a wide range of agricultural BMPs with farmers throughout the watershed.⁵² More than 40 different types of BMPs have been implemented with state, federal, local and landowner assistance totaling 1,270 practices on 7,789 acres (97 percent of agricultural land), and 513,079 feet of field borders, diversion, and grassed waterways. Other practices include tree planting/wildlife habitat around Bessemer City's water supply intake (13 acres), fencing and planting practices, nutrient management planning and certification, and streambank stabilization and riparian restoration. The 319 (h) funds paid for 15 miles of streambank stabilization and riparian restoration, alternative watering systems for livestock, and other practices. Animal-waste systems installed at four dairies in the upper watershed prevent 50,000 pounds of nitrogen and 60,400 pounds of phosphate annually from entering

the creek, representing an estimated 10 percent reduction for nitrogen and 70 percent reduction for phosphorus.⁵³ Partners have also installed an experimental constructed wetland at an urban park and rehabilitated the riparian corridor for about a quarter-mile of an urban stream, primarily for water quality.

Other Accomplishments

Provisions for public participation were aimed at education and outreach, and there were numerous water-quality outreach efforts (not necessarily limited to Long Creek issues) to schools, public officials, landowners, and interested citizens through a semi-annual newsletter. In addition, there have been annual workshops; talks; dozens of tours to groups ranging from senior citizens to out-of-state conventioners; assistance with school projects; participation in clean-ups; storm-drain stenciling; and formation of a short-lived waterwatch group. Long Creek meetings and QNRC meetings are open.

The partnership has emphasized conducting research on the effectiveness of agricultural BMPs. That has involved coordinated research design, practice installation, and monitoring (including above- and below-site monitoring, paired-watershed monitoring, and single-site monitoring). Results will help efforts in other area watersheds and other watersheds around the country. EPA will include results from Long Creek watershed in a larger database for the National Monitoring Program. NCSU has applied several existing nonpoint source pollution models for portions of the watershed, and is testing their accuracy through extensive calibration.

Case Commentary

Most of the accomplishments in the watershed appear to result from the coordinated actions of the Gaston Natural Resources Conservation District and the Gaston County Cooperative Extension with support from NCSU-Cooperative Extension. Most of the agricultural improvements in the watershed were developed through state and NRCS funding sources, which were not dependent on watershed partnerships. The Long Creek partnership has made progress towards its goals for: understanding how to address nonpoint source pollution; improving models for nonpoint source pollution control; and measuring effectiveness of agricultural BMPs. They have reduced nutrient, bacteria, and sediment contributions for numerous agricultural pollution sources and demonstrated water-quality improvements for limited stream reaches. They have reduced sediments accruing at the water supply intake for Bessemer City. However, monitoring has not demonstrated a significant reduction in any water-quality parameters over the entire study area.

Even with some successes in the agricultural (upper) portion of the watershed, partnership efforts have been scoped so that they do not adequately address several very significant water-quality threats: existing urban runoff quality and quantity, the potential for increasing urban runoff in both upper and lower portions of the watershed, and point source discharges in the lower watershed. Even with the upstream improvements, sections of lower Long Creek were added to the state's 303(d) list in 1998. The absence of protective local ordinances (with the exception of the water-supply portion of the upper watershed) casts doubts on the prospects for sustained longer-term benefits. However, local staff is expecting Phase II EPA stormwater regulations to force action for better stormwater management in the watershed.

This is largely a research effort that grew from a county initiative to do (and learn) something about local water quality. As part of the National Monitoring Program—a program designed

to study the effectiveness of specific BMPs, not to restore and better manage entire watersheds—EPA paid for equipment, staff, materials, and analysis with the intent of contributing to general knowledge for nonpoint source pollution control. While a diverse county-level commission identified the watershed as a county priority for water-quality improvement efforts, the collaboration evolved away from the county commission to a reduced-scale collaborative effort primarily involving the resource conservation district and the county Extension program. This is a possible “springboard” for efforts in South Fork River and other parts of the county. There is a very good chance that Long Creek partners will become part of a larger effort addressing issues in a watershed one-scale larger. The larger watershed involves two counties and additional complexities. Long Creek partners are already considering approaches to assess issues in the new watershed, including a GIS-based characterization run by a regional land-trust coalition.

Contributing Factors

A number of factors influenced the results of this initiative. The factors presented here are not ranked, and the discussion reiterates information presented throughout this appendix:

- *Issue(s) salience:* This partnership began because QNRC was motivated to address a county surface water-quality issue at the same time that Bessemer City wanted to reduce sedimentation around its Long Creek water-supply intake; sediment load reduction was the driving issue. County staff and QNRC have continuing interest in reducing pollutants and restoring riparian areas through agency responsibilities and various project commitments, and agricultural landowners have an interest in enhancing agricultural production and personal interests in improving stewardship. County surveys indicated broad public support for protecting local resources and water quality generally, but improving Long Creek does not appear to hold great salience with most nongovernmental interests.
- *Inclusive participation by a broad array of interests:* QNRC includes broad representation of diverse interests, and initial Long Creek activities attracted broad-ranging participation. However, as the Long Creek partnership efforts became increasingly focused on monitoring and agricultural BMPs in the upper watershed, some early participants lost interest, and participation narrowed.
- *Initial leadership and sustained participation of respected local individuals along with active participation by capable state and local agency staff:* Leaders from the cooperative extension and conservation district have played crucial roles throughout the history of this partnership: introducing Long Creek to QNRC as a candidate for water-quality improvement efforts; organizing an coordinating information and QNRC orientation events for the watershed; and networking to include additional partners. QNRC actively supported initial monitoring, assessment, and management efforts. QNRC also secured county funding for an additional county cooperative extension agent focused on natural resources, including Long Creek. Project staff keep QNRC apprised of Long Creek actions, but QNRC does not actively participate in the project. It is important to note that many of the staff leaders in various county and municipal agencies have relationships spanning many years.

- *Formal governmental support:* Gaston County formally supports partnership and management efforts in Long Creek. State agencies and EPA support the Long Creek partnership's involvement in the national monitoring program.
- *A sound scientific basis for assessment and action:* Gaston County and NCSU developed a detailed assessment of the upper/ agricultural portion of the Long Creek watershed. This assessment incorporated field visits, remote sensing, and computer modeling to identify target areas for sediment and nutrient reduction. The assessment also produced estimates for water-quality impacts related to various development scenarios. However, the assessment did not generate information related to pollution sources or control strategies for the large urban portion of the entire watershed. As part of EPA's National Monitoring Program, partners have extensive information about the effects of specific BMPs on Long Creek's smaller sub-watersheds.
- *Use of a watershed plan to guide actions:* Partners have not developed a watershed plan for Long Creek. Small-scale watershed and site-specific plans were developed for testing specific BMPs, and for reducing pollutant loads from specific farms.
- *Funding to employ staff, collect information, develop plans, and implement actions:* Long Creek partners have had funding for all of these functions but have not necessarily deployed them on a watershed scale/basis. Technical staff are supported through county funds, conservation district funds, and EPA. The federal monitoring program grant provided substantial funding for information collection. QNRC also funded initial information collection and assessment which could have led to a watershed plan. EPA, the state agricultural cost-share program, and NRCS funding supported implementation actions.
- *Staff for coordination, management, and technical work:* Long Creek partners are primarily county, conservation district, and NCSU Cooperative Extension staff. Staff provide partnership coordination, project management, monitoring, technical design, education, and program administration. The watershed partnership has stable staff support for coordination, management, and technical work.

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Appendix A: Dungeness River Watershed

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Appendix B: Nisqually River Watershed

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Appendix D: Black Earth Creek Watershed

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Appendix E: Upper Little Tennessee River Watershed

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Appendix F: Long Creek Watershed

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Appendices Endnotes

Appendix A: Dungeness River Watershed, Washington

- 1 Refer to the description of the Chelan agreement and process in the “Washington State: Two Cases” section of the main report.
- 2 Clallam County, Washington resolution No. 104, 1995.
- 3 Based on average streamflow recorded daily since 1937 from USGS Station number 12048000 near Sequim, Washington.
- 4 Clallam County Department of Community Development. October 1993. “Dungeness River Area Watershed Management Plan.” page 1-6.
- 5 Dungeness River Restoration Work Group. 1997. “Recommended Restoration Projects For the Dungeness River.” page v.
- 6 Counties in Washington each have three county commissioners.
- 7 US v Washington, Phase I, 384 F. Supp. 312 (1974), 356, affirmed in Washington v Passenger Fishing Vessel Association, 443 US 658 (1979); US v. Washington, Phase II, 506 F. Supp. 187 (1980).
- 8 These nonpoint source plans are referred to as “400-12” plan because their funding is authorized in the state Nonpoint Source Rule, WAC 400-12.
- 9 Refer to “Washington State: Two Cases” in the main document Case Summaries.
- 10 See *supra* note 9.
- 11 Additional information is available at <http://www.nwr.noaa.gov/1salmon/salmesa/shinpug.htm>.
- 12 The Chelan Agreement specified the following definition for consensus: “In cases where consensus is not possible, decisions will be made by a consensus of the government caucuses and a majority of the interest group caucuses. Minority reports, if prepared, shall be included in the plan document.”
- 13 Comment by Carol Volk included on page 14.32 of Jamestown S’Klallam Tribe and Dungeness-Quilcene Water Resources Pilot Planning Project Regional Planning Group. 1994. “Dungeness-Quilcene Water Resource Management Plan.”
- 14 Information on Water Quality Grants for the Elwha-Dungeness Water Resource Inventory Area is available at <http://www.wa.gov/ecology/watershed/wqgrants/wq18grants.htm>.
- 15 Jamestown S’Klallam Tribe and Dungeness-Quilcene Water Resources Pilot Planning Project Regional Planning Group. 1994. “The Dungeness-Quilcene Water Resources Management Plan.” Appendix B, page B.1
- 16 Washington Department of Ecology document: “The Memorandum of Understanding to Transfer Water Under Trust Water Rights Program Chapter 90.42 RCW” signed April 1998.

Appendix B: Nisqually River Watershed, Washington

- 17 Washington SHB 323, 1985.
- 18 Washington Department of Ecology and Nisqually River Task Force. 1987. "Nisqually River Management Plan." Elements 14.3.1 and 14.3.2.
- 19 The Nisqually River Citizens Advisory Committee; the Nisqually River Interpretive Center Foundation; the Nisqually River Basin Land Trust; and the Nisqually River Education Project.
- 20 Washington Department of Ecology. 1986. "Nisqually River Management Plan: Final Environmental Impact Statement."
- 21 See *supra* note 7.
- 22 Nisqually River Council and Washington Department of Ecology. 1988. "Nisqually River Management Plan Implementation Annual Report to the Legislature." page 6.
- 23 Washington Department of Ecology (DOE), Environmental Inventory and Laboratory Services Program is developing this model at the request of DOE's Southwest Regional Office. Additional information at: http://www.wa.gov/ecology/eils/spasm/spasm_descrip.html

Appendix C: Tomorrow-Waupaca River Watershed, Wisconsin

- 25 draft bylaws for the Tomorrow/Waupaca Watershed Association
- 25 Wisconsin Department of Natural Resources (DNR). 1995. "Nonpoint Source Control Plan for the Tomorrow/Waupaca River Priority Watershed Project." Publication WR-434-95. page 1.
- 26 *ibid.* pages 28-29.
- 27 In 1981, Wisconsin dissolved its soil conservation districts and incorporated their functions into county government. Wisconsin counties now have land conservation departments, which are accountable to county executives and land conservation committees comprised of elected members to the county board of supervisors. Wisconsin is the only state that does not have soil conservation districts.
- 28 Thonton, JA and S Lies. 1992. "Public Opinion of Water Use and Water Quality in the Tomorrow/Waupaca River (Portage/Waupaca Counties, Wisconsin)." University of Wisconsin-Stevens Point. 11 pages.

Appendix D: Black Earth Creek Watershed, Wisconsin

- 29 Born is a professor of Urban and Regional Planning and Environmental Studies as well as a UW-Extension specialist in public policy and natural resources planning. We have tried not to let his extensive personal involvement in the watershed bias our reporting and analysis .
- 30 In Wisconsin, town governments (formed largely around originally surveyed township boundaries) influence land use decisions in rural and unincorporated areas. Incorporated cities and villages have the authority to annex land from the towns. Land use management decisions and use of village and city annexation powers create conflicts between these urban and rural governments. Recently enacted (1999) "Smart Growth" planning legislation may ameliorate some of this historic conflict in Wisconsin.
- 31 see *supra* note 27.

- 32 Howard Bellman conducted the assessment with coordination and interview assistance from Kenneth Genskow, one of the authors of this report.
- 33 Wisconsin Department of Natural Resources. 1989. "A Plan for the Control of Nonpoint Sources and Related Resource Management in the Black Earth Creek Priority Watershed." page 5-22.
- 34 Institute for Environmental Studies (IES), University of Wisconsin-Madison. 1986. "Black Earth Creek: A Watershed Study with Management Options." IES Report 129. Water Resources Management Workshop. 289 pages.
- 35 USGS and DNR are jointly evaluating pre- and post- BMP biological and stream-habitat conditions above and below numerous sites throughout Wisconsin. USGS is monitoring sites in three sub-watersheds in the Black Earth Creek Watershed: Garfoot Creek, Brewery Creek, and Halfway Prairie Creek. USGS prepares annual reports for this ongoing evaluation project.
- 36 CONSOIL (Conservation of Natural Resources through Sharing of Information Layers) involved participation from USDA-Soil (Natural Resources) Conservation Service, US Geological Survey, US Department of Commerce, WI Department of Natural Resources, WI Department of Agriculture Trade and Consumer Protection, Wisconsin Geological and Natural History Survey, Dane County, and UW-Madison.
- 37 Dane County Land Conservation Department records and WDNR 1998. Nonpoint Source Water Pollution Abatement Program, 1997 Accomplishment Report. 141 pages.

Appendix E: Upper Little Tennessee River Watershed, North Carolina

- 38 Quoted from an LTWA informational pamphlet.
- 39 This was originally funded through WNCA, now funded through LTWA/SWNC RC&D.
- 40 Created by DENR in 1998 and provided with \$100,000 to address nonpoint source pollution issues in the larger Little Tennessee River Basin.
- 41 NC Department of Environment, Health, and Natural Resources [now DENR]. 1997. "Little Tennessee River Basinwide Water Quality Management Plan." p 6-11.

Appendix F: Long Creek Watershed, North Carolina

- 42 Land-use estimates are based on information provided by Gaston Natural Resources Conservation District and the following report: North Carolina Cooperative Extension Service. 1992. "Natural Resources in Gaston County—Phase 2: Implementation of Natural Resource Education and Policy Development Programs." variously paginated.
- 43 1990 estimate from NC Department of Environment, Health, and Natural Resources [now DENR]. 1995. "Catawba River Basinwide Water Quality Management Plan." variously paginated.
- 44 Dischargers are identified on page 3.17 of the Catawba River Basinwide Water Quality Management Plan (*supra* note 43), and on page 4.50 of North Carolina Agricultural Extension Service. 1990. "Natural Resources in Gaston County—Phase 1: Characterization of Air, Surface Water and Groundwater Quality." variously paginated.
- 45 North Carolina 1998 303(d) List, page T-7.

- 46 North Carolina requires counties to adopt ordinances providing special protection watersheds that provide municipal water supplies. As a condition of state approval for installing a new water supply intake system in the watershed, a watershed community needed to improve water quality in the water supply portion of this watershed.
- 47 North Carolina Cooperative Extension Service. 1992. "Natural Resources in Gaston County—Phase 2: Implementation of Natural Resource Education and Policy Development Programs." page 2.34.
- 48 NC Department of Environment, Health, and Natural Resources [now DENR]. 1995. "Catawba River Basinwide Water Quality Management Plan." page *x*.
- 49 *Ibid.* pp. 6-9.
- 50 North Carolina Cooperative Extension Service. 1998. "Long Creek Watershed Project: Sixth Annual Report on the 319 National Monitoring Project." page 6.
- 51 Gaston Natural Resources Conservation District records.
- 52 These practices are detailed in a Gaston Conservation District Geographic Information System records and in the 1998 annual 319 project report (*supra* note 51).
- 53 Based on Gaston Natural Resource Conservation District records and load estimates from North Carolina Cooperative Extension Service. 1992. "Natural Resource Quality in Gaston County—Phase 2: Implementation of Natural Resource Education and Policy Development Programs." pp.2.32-2.33.

