PIMA: An Alternative Approach to Watershed Management
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Abstract

Water quality problems in the United States arise from a variety of urban and rural sources that require federal, state, and local collaboration to resolve. The reinvigorated total maximum daily load (TMDL) program has demonstrated the degree of difficulty and complexity associated with agricultural runoff problems, and the need for entities to cooperate in order to address problems on a watershed basis. Successful watershed programs must respond effectively to urban and agricultural contributors to water quality degradation. These programs will, of course, face challenges. Watershed management demands the ability to cope with vast areas of privately held lands, numerous landowners, multiple pollutants, and other inherently complex issues. Solutions to nonpoint source pollution problems will rest squarely on the manner in which private land is used and managed.

Agricultural pollution was not a significant issue when the Clean Water Act (CWA) was passed in 1972. If privately-held agricultural lands had been the primary focus of the legislation, the United States Department of Agriculture (USDA) and congressional agriculture committees would have been key players in resolving water quality problems. Now that times have changed and thirty years have passed, the critical question becomes: how can USDA and elected officials representing agricultural constituents capture significant leadership roles in addressing CWA issues?

Through the support of the Environmental Protection Agency (EPA) and USDA Natural Resource Conservation Service (NRCS), the Texas Institute for Applied Environmental Research (TIAER) has developed a watershed management program capable of meeting these challenges. This program, known as the Planned Intervention Microwatershed Approach (PIMA), divides watersheds into small microwatersheds, which allows government agencies and agricultural producers to better manage water quality complexities. PIMA also affords an opportunity to achieve CWA objectives through producer-friendly programs, while providing predictable backup to deal with bad actors.

PIMA rests upon an institutional framework in which people and process are the keys to modifying producer behavior. By generating a sense of community through a farm-friendly approach, PIMA stands apart from traditional government regulatory programs. Among other things, PIMA:

- Promotes local ownership of the problem
- Provides tools to deal with complexity
- Links USDA and EPA programs together at the community level
- Enables targeting within watersheds and addresses cumulative impacts
- Promotes positive peer pressure among producers
- Emphasizes sound science through reliable water quality assessments
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PIMA: An Alternative Approach to Watershed Management

Current U.S. Environmental Protection Agency (EPA) initiatives to deal with agricultural runoff, if enacted, will place government regulators in the production area of agriculture, an untenable position for American farmers. Agricultural producers cannot be forced to consult with government regulators before responding to changing market conditions that may call for a modification of crop rotations or other alterations in production practices. EPA’s newly proposed concentrated animal feeding operation (CAFO) regulations (EPA, 2001) would capture, under the Clean Water Act (CWA) (PL 92-500, 1972; PL 95-217, 1977) National Pollutant Discharge Elimination System (NPDES) (USC, 2000a), polluted runoff from crop fields receiving manure fertilizer. This action will set an unwanted precedent for the rest of production agriculture and, perhaps, quench the entrepreneurial spirit that drives the engine of production agriculture.

Polluted runoff from manure application fields is undoubtedly a significant problem in many parts of the country. A review of the history of the CWA, however, reveals that Congress never intended for rainfall induced runoff to be captured by the NPDES program. In addition, EPA’s own regulations and funding for nonpoint source programs show that the agency has consistently considered runoff from manure application fields to be a nonpoint source pollutant, not subject to the CWA.

The Texas Institute for Applied Environmental Research (TIAER) recently hosted Industry-Led Solutions II, a national workshop in which livestock industry leaders met with EPA and the U.S. Department of Agriculture (USDA) to discuss new initiatives the industry might promote (See Vergura et al., 2001). Participants agreed on the importance of promoting a new role for USDA Natural Resource Conservation Service (NRCS). Participants also emphasized their desire to see that all producers have the opportunity to achieve CWA objectives through voluntary programs. Finally, the group agreed that there should be predictable provisions to deal with bad actors.

Based on discussions during Industry-Led Solutions II, TIAER proposes that Congress support new programs that would allow NRCS to take a leadership role in assisting agricultural producers to achieve CWA objectives. Through funding from EPA Office of Policy and NRCS, over the past decade TIAER has developed and demonstrated key elements of its own Planned Intervention Microwatershed Approach (PIMA) (See McNitt et al., 1999). TIAER believes this program can serve as an alternative to

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1 For example, Senator Thomas Eagleton stated that, “While American farmers recognize the need for pollution control—they are, after all, our leading conservationists—I think we all recognize that the characteristics of agricultural pollution and the best means of controlling it are quite different from those associated with urban/industrial pollution” (Congressional Record, 1971).
Introduction to PIMA

Developed by TIAER in the 1990s, PIMA is an assessment-based, community-led, performance-driven hybrid water pollution abatement mechanism, combining a voluntary best management practice (BMP) program with provisions to address bad actors. Under PIMA, agricultural producers work closely with nonregulatory, agriculture-friendly state agencies, such as local soil and water conservation districts, to develop nutrient management plans and adopt BMPs designed to abate nonpoint source runoff. PIMA is assessment-based in that it commences with water quality monitoring in impacted watersheds and benchmark soil testing on individual farms. Such activities are essential in evaluating nutrient management issues faced by producers, BMP development, and as a means for measuring progress and success. It is community-led because it relies on the input and involvement of a watershed constituency committee and a council of local producers and landowners in managing and implementing environmental protection measures. And finally, PIMA is performance-driven because success is measured by achievement of established environmental goals in the water, rather than by the implementation of BMPs and other controls.

TIAER believes PIMA will predictably resolve water quality problems, deal with the complexities inherent in a watershed approach, minimize the cost to government and producers, and maintain the competitiveness of the agricultural industry. PIMA sets a precedent for minimal government involvement in land-use planning and management and respects issues related to agricultural heritage and entrepreneurship.

PIMA emphasizes the importance of people by:

- Promoting local ownership of water quality problems through well-designed community-based programs
- Emphasizing the importance of positive peer pressure among producers at the microwatershed level
- Providing the opportunity for all producers to achieve CWA objectives through voluntary programs, thereby keeping agricultural lands one step removed from direct government regulation
- Providing opportunity for corporate friends of agriculture to become involved in achieving CWA objectives
- Invigorating education programs with community focus at the microwatershed level

PIMA also strengthens the process of agricultural nonpoint source programs by:

- Tying USDA and EPA programs together at the community level
- Providing the capacity to deal with watershed complexities
- Promoting better land management without direct government regulation
- Effectively dealing with cumulative impacts
- Relying on sound science through good water quality assessments
- Integrating targeting as a key component of the watershed approach
- Measuring success through improved water quality rather than implementation of best management practices (BMPs)
- Providing producers with a private certification option as an alternative to government programs
- Enhancing the role of congressional agriculture committees and USDA

Figure 1 The Goose Branch Microwatershed

Working closely with the National Pork Producers Council and America’s Clean Water Foundation, TIAER recently added a certification option to the PIMA program. This program, known as the Agricultural Producer Certification Option (APCO), will provide agricultural producers with a comprehensive and objective assessment of water quality risk factors. Assessments will be conducted by one or more specialized technicians trained, tested, and certified to identify water quality risks. After the assessment the producer will be provided a written report that makes recommendations to reduce the operation’s actual or potential impact on surface or groundwater quality. If the producer acts on the recommendations by modifying the operation to comply with the written report, he or she will receive certification. When needed, Comprehensive Nutrient Management Plans (CNMPs) are developed. Producers who do not participate in the program, or who fail to receive certification, will not be shielded from government regulatory programs.
Problem Statement: A New Frame of Reference

PIMA recognizes the distinct difference between water quality problems associated with agricultural runoff, and water quality problems associated with municipal and industrial sources that were the focus of the Clean Water Act. The highly engineered, technology-based fixes that were so effective in addressing municipal and industrial point source pollution, will not provide acceptable solutions for the new generation of water quality issues. Instead, policy makers should find inspiration in traditional USDA conservation programs and approaches. Ideas incorporated into state programs that address highway beautification and litter might also aid in this process. TIAER believes that solutions should incorporate a mix of programs that include education, technical assistance, public funding, community and corporate involvement, and a reliable method for dealing with bad actors.

Successful programs dealing with agricultural runoff must be developed with a new frame of reference. While USDA and EPA programs have been successful for their intended purpose, both agencies must adapt to a watershed approach. In making this adjustment, the agencies will find that a good watershed approach does not yet exist.

*TIAER believes that watershed approaches can best deal with polluted runoff by acknowledging a number of difficult issues, including the following:

The complexity associated with watershed approaches
Watersheds often contain large physical areas and a number of agricultural producers whose activities impact water quality. Human intrusions on one system often negatively impact other ecological processes. Thus, natural systems in large watersheds are often too complex to address in a manner that facilitates a proper understanding of cause and effect. By dividing large watersheds into small microwatersheds, policy makers can better understand the complex interactions that occur in natural systems.

Cumulative impacts
Agricultural endeavors have unique differences, and each has the potential to contribute to the nonpoint source pollution problem in a number of ways, typically resulting in cumulative impacts from multiple sources. Some microwatersheds need greater load reduction than others. Thus, policy makers need to do more than deal with polluted runoff on a farm-by-farm basis through application of uniform CNMPs (See USDA and EPA, 1999). Instead, CNMPs must be tailored to local, site-specific conditions.

Efficient use of educational and technical assistance resources
The U.S. government lacks the resources to sponsor cost-free, one-on-one education programs to all producers as the backbone of a delivery system. TIAER believes, however, that with predictable provisions to address bad actors, government can also provide education and technical assistance in a group setting, through microwatershed producer councils.
Coping with producer denial

In a large watershed where many people contribute to pollutant loads, a producer can refuse ownership of the problem by using the complexity inherent in watersheds to escape scrutiny by government. In a smaller watershed, an individual producer more readily understands his or her role in water quality protection.

Peer pressure

In a microwatershed, where agricultural producers know what their neighbors are doing, peer pressure helps guarantee performance. Peer pressure can serve as a positive mechanism for ensuring that producers carry out land management responsibilities. When a neighbor successfully institutes a change, it makes it all-but-impossible for another producer to argue that the change is not feasible.

Personnel required

If personnel from state and federal agricultural and conservation agencies are to play a significant role in new programs, they will have to take on new responsibilities. These individuals need to be people oriented, as they presently are, but they must also be unintimidated when asking producers to do more than what has been expected of them under traditional voluntary programs. Local conservation districts and state conservation agencies must step up and wear a “brown hat” by addressing bad actors.

Challenges Facing EPA

EPA must realize for the first time that it is faced with the need to address vast areas of the country’s landscape that are privately owned. This dilemma immediately brings the agency’s current delivery system into question. Neither EPA nor state environmental agencies possess a delivery system capable of meeting this fundamentally different challenge. Top-down, command-and-control regulatory programs will never receive enough funding to drive predictable inspection-based programs over such a vast land area. Because CWA programs must reach out over two billion acres of land, EPA must look beyond traditional in-house programs to effectively deal with these new water quality initiatives.

Challenges Facing NRCS

NRCS has a rich and successful history of working with agricultural producers. Nevertheless, the agency may face a greater challenge than EPA in assisting agricultural producers to achieve CWA objectives. To be successful, NRCS must find a way to deliver farm-friendly programs to an agricultural community that is fiercely independent, expects government to be its friend, and has little experience with water quality issues that are tied to CWA objectives. In the long term, the nation’s urban-suburban constituency will demand and receive clean water for drinking and recreational purposes.

Clean Water Act initiatives fall outside NRCS jurisdiction. State agencies will continue to carry primary responsibility for driving CWA implementation programs
in the agricultural arena. While EPA and states possess primary jurisdiction over the environment, NRCS has the expertise, an effective delivery system, and the confidence of farmers. For NRCS to obtain a significant new role in helping production agriculture meet its CWA responsibilities, it will need to take proactive steps based on thinking that is outside the traditional “conservation box.”

This challenge comes at a time when Congress is not supporting NRCS programs with significant increased funding. Nevertheless, if properly framed and illustrated, TIAER believes this issue can capture the imagination, and subsequently the support of Congress. Rural America will be a key to the success of urban society in the twenty-first century. Over the next 25 years, urban Americans will recognize the importance of maintaining a high quality supply of inexpensive food. Clean water will also be a high priority. The urban-suburban population will come to value rural America for its natural amenities and as a place to work, recreate, and retire. As the country’s urban-suburban constituency acquires this new value system, increased congressional appropriations can be expected to ensure these new goals are realized.

The traditional agricultural constituency of NRCS must be prepared to deal with changes that will occur in rural America over the next 25 years and with a Congress that will be dominated by urbanites and suburbanites. NRCS should take immediate steps to fill the institutional void that currently exists with programs that can address the concerns of an urban society, while garnering the support of production agriculture. NRCS has several advantages as it embarks on this difficult task. Successful demonstration projects throughout the United States have already illustrated the agency’s capacity to alter the status quo. In addition, NRCS has an excellent reputation for honesty and integrity with agricultural producers, a well designed and experienced delivery system that is considered by many to be the best in the world, a time-tested partnership with agencies at the state and federal level, and a pool of the best educated and experienced agricultural scientists anywhere.

Successful new initiatives will need to incorporate new ideas. NRCS should consider building greater capacity in the water sciences to compliment their unqualified expertise in the land sciences. There are huge issues facing agricultural producers related to water quality impacts from agricultural production in low flow regimes. The agency should consider increasing the capacity of its employees to build and facilitate watershed constituency groups and develop better skills for working with producers in group settings where issues are contentious. NRCS should also consider building a greater capacity to develop and produce education and information programs for targeted audiences.

A New Role: Cooperation and Environmental Capacity Development

States have captured CWA programs, and rightly so. Therefore, NRCS leadership must build upon its ability to resolve the next generation of water quality problems without having direct control over CWA programs. NRCS leadership will be based on know-how and funding support, rather than sole control of program delivery. Conservation districts, on the other hand, have the capacity to capture program
delivery at the state level. To be successful in this role, districts must go through significant change.

In short, conservation districts must be reinvigorated. Many districts need funding, additional personnel, and a new vision. Herein lies one of the more difficult issues facing districts. There are some 3,000 districts across the country (See NACD, 2002). It will be difficult in a time of tight budgets at both the state and federal level to build the capacity needed to address CWA issues in 3,000 districts. This is a very sensitive issue politically, but it must be addressed. Solutions cannot be allowed to diminish the political clout of local districts. NRCS has the opportunity to assist with this sensitive issue and to help districts gear up to assume the difficult responsibility of program delivery for CWA programs.

Herein lies a huge opportunity for NRCS. Producers who only want help in meeting their CWA responsibilities can become introduced to NRCS traditional capacity in conservation planning. CWA programs will enable NRCS to get on the land of producers, where they would otherwise not have access. Over the long term, voluntary conservation programs driven by whole-farm planning have a bright future.

NRCS should continue to support industry-led solutions. The twenty-first century producer, the clientele of NRCS, is different from producers of the 1940s and 1950s. Today’s producers, and particularly producers of the future, will have more capacity and know-how and can become full partners with NRCS and districts to develop and implement water quality programs. NRCS should continue to support third-party programs. Such programs offer significant opportunity for helping to resolve thorny environmental issues, where bad actors must be dealt with in a predictable manner. NRCS should help get such programs institutionalized across the country (See Vergura et al., 2001).

NRCS should develop the capacity to successfully address all environmental issues on privately-held lands. If NRCS develops the expertise and capacity to address these issues, the agency will have the ability to mentor other agencies and groups, as they work to resolve environmental problems across the country. NRCS should take immediate steps to become the mentor for other entities, both public and private. In particular, NRCS should take steps to improve its capacity in water quality monitoring and limnology. The agency has the historical base to support this objective.

To be successful, however, NRCS needs grants to sustain its mentoring activities. In this regard, Congress should consider providing grant programs that NRCS can administer to support other agencies and groups as they deal with environmental issues on private lands. At the same time, NRCS must also understand that elected officials at the state and federal level will not provide funding for voluntary programs that do not produce tangible, identifiable results in receiving waters.

In our market-based economy, at a time when Congress is looking for alternatives to the current command-and-control approach, NRCS and production agriculture should move forward with programs that embrace these new realities.
NRCS: Fulfilling Its Potential

TIAER believes NRCS can fulfill its full potential by providing:

- Accessible, voluntary programs that predictably resolve water quality problems
- Cost-share and technical assistance to the extent funding will support
- Mentoring activities
- Programs that feature targeting

NRCS should rely on science-based programs that maintain the long-term competitiveness of the industry. Ideally, NRCS should design programs with the objective of getting 90 to 95 percent of producers in compliance with the CWA through voluntary programs. To accomplish this objective, one must also recognize the need for programs that deal with bad actors. Under TIAER’s approach, state conservation agencies address bad actors. Therefore, NRCS need not face exposure to unhappy producers.

It should be noted that the number of agricultural operations requiring CNMPs and/or appropriate inspections is enormous (See e.g., USDA and EPA, 1999). Rather than establishing a huge government staff, Congress might provide direct grants to producers to support CNMP development and certification by private, independent consultants. Another option TIAER recommends is a private certification program in which producers receiving certification would not be subject to regulatory programs. NRCS should continue to support such programs, thereby putting itself in a position to recommend new strategies for third-party programs and entirely new initiatives that can be accomplished through third parties.

The Watershed

In the future, watersheds will act as the focal point of CWA programs. A watershed approach demands an entirely new way of addressing pollution, since watersheds are not like traditional regulatory units, such as wastewater treatment plants or industrial facilities. Regulatory agencies have 25 years of experience in addressing pollution problems on a source-by-source basis, however, the NPDES program will falter under the complexities associated with landscape-based pollution. A coordinated, holistic, watershed approach to pollution management, on the other hand, will generate strategies customized to the array of sources and ecological conditions in each watershed. A watershed approach cannot be successful without the following components:

- The capacity to deal with complexities inherent in a watershed
- The ability to target hot spots within a watershed
- The capacity to focus only on the issue of primary concern
- The ability to create a sense of community among producers that will generate positive peer pressure
- A watershed constituency committee and microwatershed producer council, along with funding to support these activities
A willingness to ask producers to take steps beyond those taken through traditional conservation programs

Ultimately, proper land planning and land management forms the basis of any successful water quality program directed at agricultural lands. Through its work in the Bosque River watershed, TIAER discovered that water quality issues related to livestock operations can only be addressed in conjunction with other significant nutrient dischargers.

At this time, a watershed program fully capable of addressing land-based polluted runoff has not been developed. With funding from EPA’s Office of Policy and NRCS, TIAER has, however, developed a policy foundation to address polluted runoff on a watershed basis. Over the past decade, TIAER used the one million-acre Bosque River watershed as an outdoor laboratory to develop the science and ideas behind the Planned Intervention Microwatershed Approach (PIMA).²

The reinvigorated total maximum daily load (TMDL) program (USC, 2000b) provides insight into the kinds of water quality issues that rural America will face over the next 25 years. The TMDL approach will not go away. Our urban-suburban constituency will ensure that TMDLs are used to address problem watersheds. One should note, however, that the TMDL program is very unforgiving by failing to acknowledge the uncertainty in landscape-based water quality science. TMDLs are also being developed in abbreviated time frames, which is likely to ensure difficulties. The TMDL process also does a poor job of handling future growth.

² For information regarding the application of PIMA in the Goose Branch microwatershed of north central Texas, see The Goose Branch Story: Planned Intervention at the Microwatershed Level (Vergura et al., 2002), and Evaluating Phosphorus Control Practices in the Goose Branch Microwatershed (McFarland et al., 2001).
Because of problems with the TMDL program, TIAER suggests production agriculture focus on problem watersheds before they are assigned TMDL status. Agriculture should insist that good science underpin the CWA listing process and that better use is made of the “threatened” list. TIAER proposes establishment of a triggering mechanism to provide USDA funding for assessments on all agricultural watersheds that are formally listed as threatened. Funding could be used to determine: (1) the nature of the problem or whether one even exists; (2) the geographic extent of the problem; and (3) the primary contributing source(s) of the problem. If the assessment reveals a water body facing verifiable threats, through this program, states will possess the data necessary to develop good programs. The assessment will also provide more flexibility to deal with TMDL issues like future growth and margin of safety. Once assessments are completed, funding should also be provided to appropriate remedial programs. Federal and state cost-share should be considered.

Addressing problem watersheds before they are designated as impaired is a good idea for a number of reasons. It is advantageous for agriculture because the issue will be addressed while there are still reasonable options available. Environmental groups will be pleased with any proactive agricultural initiative, and our urban-suburban

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3 For information regarding the listing of “threatened” waters, see National Clarifying Guidance for 1998 State and Territory Clean Water Act Section 303(d) Listing Decisions (EPA, 1997).
population will see their drinking and recreational waters improve. A proactive approach will also avoid the polarization of constituencies that can occur with TMDL designation. By the time a stream segment receives attention through the TMDL process, upstream and downstream interests may have already diverged into distinct and often antagonistic camps. In these cases, agriculture will be the loser and the urban-suburban constituency will prevail.

The Planned Intervention Microwatershed Approach

Planned Intervention

The planned intervention approach encompasses a combination of voluntary and regulatory measures to provide agricultural producers the freedom to implement best management practices (BMPs) within a reasonable time frame, while ensuring that bad actors are not permitted to continue to pollute. Producers choose among various pollution abatement BMPs and, within reason, the time frame for implementation. Voluntary BMP implementation does not mean a CAFO producer has the freedom to reject CWA objectives. Instead, planned intervention inserts a voluntary, time-and-resource loop into an otherwise inflexible regulatory process. The loop provides producers with a period of time and cost-share assistance to comply with established environmental goals.

Figure 3 Planned intervention through a voluntary loop

The primary goal of PIMA is to provide agricultural producers with a scientifically sound, farm-friendly approach for achieving CWA objectives. TIAER’s experience in
the Bosque River watershed indicates that agricultural producers and clean water advocates will not support government programs where some producers take steps necessary to achieve CWA goals, while other producers do nothing. Producers prefer voluntary programs, but fairness dictates that all producers do their part to address the problem.

To function effectively, planned intervention programs require timely, proactive cooperation by conservation agencies and regulators to recognize potential CAFO pollution problems in their early stages, and to formally target the most acute problems. Once a pollution problem has been identified, EPA (or its state designee), NRCS, and/or state conservation agencies must cooperate to determine:

- The amount of time producers need to implement BMPs in the targeted area
- The amount of time permitted for BMP implementation to positively impact water quality
- The criteria by which the regulatory authority will measure improvement in water quality

NRCS has the opportunity to become a key player by providing technical, educational, and at times financial support to achieve environmental objectives. In addition, NRCS could also provide a newly created mentoring program. Environmental regulators will provide a watershed pollution abatement target and a realistic time frame for achieving the goal.

In contrast to planned intervention, unplanned intervention occurs when a CAFO pollution problem draws public attention and environmental policy makers fail to address the problem in a timely manner. The pollution problem eventually takes on a life of its own and public pressure forces regulators to intervene on an ad hoc basis, often by imposing harsh penalties on a few producers in order to make a public statement and awaken the regulated community. Witness the events in the Bosque River watershed of Texas.

The polar opposite to unplanned intervention can be described as planned nonintervention. This term reflects a situation where policy makers rely on a wholly voluntary approach to pollution abatement. Financial, educational, and technical assistance provide the only solution to a recognized CAFO pollution problem. The greatest shortcoming of planned nonintervention is incomplete pollution abatement due to the conduct of bad actors who refuse to adopt BMPs.

In regard to an alternative watershed approach, proactive steps by NRCS to address problem watersheds prior to an impaired designation fits well within the concept of a voluntary loop. NRCS can work directly in threatened watersheds to resolve problems or mentor state agencies or other groups undertaking water quality abatement programs. Federal funding should be made available for CNMP development, BMP implementation, and other expenses necessary to carry out watershed programs.
The Microwatershed Approach

The microwatershed establishes the geographic limits of manageable units for implementation of planned intervention. A microwatershed consists of an area within a watershed with identifiable hydrologic boundaries and the capacity to allow the targeting of limited resources on a manageable scale (Rottler et al., 1999). It incorporates anywhere from 3,000 to 20,000 acres. By dealing with this smaller area, one may reduce land-use variables to a manageable level and more readily identify pollutant load contributors. The microwatershed approach:

- Is a pollution abatement program that can cope with complexities inherent in watersheds
- Provides a context where producers can take ownership of the problem
- Provides a sense of community and the establishment of positive peer pressure
- Establishes a location to measure program success

The 230,000 acre Upper North Bosque River watershed encompasses a diversity of land uses (TNRCC, 2000). Dairy operations are the major agricultural enterprise. Approximately 100 dairies with a combined milking herd size of 40,000 cows reside within the watershed (TNRCC, 2000). Land uses also include peanut farming, rangeland for beef cattle, pecan farming, and cultivation of hay (McFarland and Hauck, 1999a). Using satellite images, land use characteristics in the Upper North Bosque River watershed have been estimated to be 68 percent woodland and rangeland; 29 percent improved pasture including wheat, peanuts, and orchards; and approximately 2 percent urban (McFarland and Hauck, 1999b). The Upper North Bosque River watershed contains the City of Stephenville with a population of 16,000 people, and smaller cities including Hico and portions of Dublin (McFarland and Hauck, 1999b). Thus, even within this relatively small watershed one finds a variety of land uses and physical characteristics. Only at the microwatershed level may one narrow land-use variables to a manageable level.

The microwatershed approach calls for dividing watersheds into smaller, more discrete areas in order to best identify and control landscape pollutants. When a problem watershed is identified, targeting resources to hot spots or microwatersheds possessing disproportionate pollutant loadings, will provide the most efficient use of resources.

TIAER’s extensive examination of water quality data in the Upper North Bosque River watershed reveals the practicality of targeting small microwatersheds. Pollutant loadings congregate in microwatersheds that receive a disproportionate share of intensive agricultural use, particularly where there are livestock operations with waste application fields. In analyzing water quality data for the Upper North Bosque River watershed, TIAER found that as the percent of land used for waste application (or dairy cow density) in a drainage basin increases, the concentration of water quality constituents in storm water runoff and downstream reservoirs increases (McFarland and Hauck, 1999a).

By singling out hot microwatersheds for attention, one can define the problem areas of a watershed in a manageable fashion. The microwatershed approach also provides
greater recognition of the challenges facing producers and residents. Individual communities, towns, or cities may sponsor watershed initiatives. Where the microwatershed encompasses large cities, those municipalities may be able to afford activities that address pollutant loadings. In addition, microwatersheds are in a better position to attract support and funding from corporations that operate within the watershed. More efficient use of government funding is also likely as resources are used in areas where the greatest environmental benefits can be obtained.

Sound scientific and economic assessments facilitate identification of target microwatersheds. Block grants from NRCS make reliable watershed assessments possible. These assessments establish the foundation for program performance and, ultimately, the success of water quality programs directed at agriculture.

PIMA: A Step-by-Step Guide

Elevated nutrients represented the water quality problem of concern to the Texas Natural Resource Conservation Commission (TNRCC) and EPA in the Bosque River watershed (See TNRCC, 2000). During the time that TIAER worked in the Bosque, this concern grew into a formal listing under section 303(d) of the CWA (TNRCC, 2000). TNRCC began preparation of a TMDL and selected TIAER as the lead agency for its development. Implementation of the Bosque River TMDL will provide the opportunity to test PIMA in a real-life setting.

In addressing runoff issues associated with agricultural operations, the watershed is the appropriate scale to address the problem. Ideally, the vast majority of problem watersheds will be addressed before they are listed as impaired. Logic dictates that the steps that should be taken to address a problem watershed will, in most cases, be the same regardless of its level of impairment. The steps outlined in this chapter provide the basis for implementing PIMA. The following characteristics of PIMA make it suitable for use in a TMDL setting as well: (1) it provides a framework for local, voluntary programs; (2) it provides a vehicle to deal with bad actors; (3) the microwatershed approach is able to cope with complexity; and (4) it provides an assessment-based, community-led, performance-driven approach to water quality improvement.

The approach described below reflects not only the principles behind PIMA, but also ideas incorporated into the TMDL program and other common sense steps to address water quality problems on a watershed basis. The TMDL program provides an example of the new generation of agricultural environmental programs that will impact agricultural producers.

Part I: The Watershed Report

The creation of the Watershed Report and Implementation Plan lead to the establishment of a Watershed Action Plan.

NRCS should have the capacity to carry out development of the Watershed Report, including the data needed to support it. While NRCS may not do many reports, the
agency must have the experience and capability to do the Watershed Report if they desire to mentor other agencies and groups. Given the cost of such work, Congress must be willing to appropriate the funds needed to support this initiative. As groups perceive their interests being adversely affected due to a lack of good data, Congress can be expected to appropriate significant funding to support watershed initiatives. TIAER believes that NRCS, given its history, capacity, partners, delivery system, and relationship with agricultural producers, is in a good position to capture a significant role as a mentor if it has a good watershed model and can support it across the country.

Development of the Watershed Report requires the following steps:

1. Creation of a watershed constituency committee
2. Performance of a watershed assessment
3. Determination of the current loading in the stream segment
4. Determination of the assimilative capacity of the stream segment for the pollutant of concern
5. Calculation of nonpoint source and point source load reductions necessary to achieve the watershed objective
6. Allocation of load reductions among contributing sources

1. Form the Watershed Constituency Committee

A critical task at the beginning of a watershed project consists of creating a watershed stakeholder group. The stakeholder group, or constituency committee, is established first to ensure the participation of stakeholders and other interest groups. This ensures that input is received in the design of the Watershed Report and the concerns of all interests are considered. It also gives legitimacy to the Watershed Report’s findings.

Figure 4 Constituency members listen attentively

Establishing a watershed stakeholder group at the beginning of a project, and maintaining participation throughout, increases support for restoring water quality. Since each watershed presents a unique and complex set of problems, solving them

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For additional information on establishing stakeholder groups, constituency committees, or public participation in general, see chapter 5 of Developing Total Maximum Daily Load Projects in Texas: A Guide for Lead Organizations (TNRCC, 1999).
requires a different mix of actions. In general, for this mix of actions to result in the restoration and maintenance of water quality standards, individuals and organizations who actually use, or contribute pollution to the water body, should help to design and carry out the watershed action plan.

One question that must be addressed early on is who qualifies as a stakeholder. TIAER has found that stakeholders consist of two primary groups: (1) significant contributors to pollutant loadings and (2) individuals or organizations significantly affected by water quality problems. Individuals possessing an interest in the watershed initiative should also have the opportunity to provide input. Additional participants might include government agencies with oversight responsibilities, lobbyists who represent important stakeholders, and elected officials.

TIAER has found it helpful to keep the following considerations in mind:

- Individuals possessing the capacity to affect outcomes should chair the stakeholder group. TIAER suggests that elected officials serve as chairs, or co-chairs, of the constituency committee. Where powerful individuals chair committee meetings, attendance is ensured. Participation by policy makers elevates the visibility of the process and attracts more committed participation.
- Government agencies need to participate in the discussion from their own table, as a resource to stakeholders.
- Every attempt should be made to obtain the participation of producers at the stakeholder table. Lobbyist participation may also be important in some cases. Therefore, they should be allowed to participate, but perhaps in a more indirect manner. Reserve a special table for lobbyists.

Policy developed without full input by all affected parties is subject to frequent overhaul. In contrast, policy initiatives developed through the constituency committee survive extensive debate and analysis from all perspectives and are thus more likely to endure. In regard to more mundane matters, special seating arrangements ensure that committee members communicate effectively with other participants including government agencies and lobbyists. The seating arrangement can also distinguish important stakeholders from others with a more general interest in the process.

Once 20 to 35 individuals are pulled together, the stakeholder group possesses various oversight responsibilities, including: (1) planning the project, (2) collecting data, (3) setting the water quality target or other specific objectives, (4) allocating pollutant loads, (5) developing the implementation plan, and (6) putting the watershed plan into action. A group will often need to work together for six to eight months, over a number of meetings, before they start listening to one another and achieve results.

Stakeholder meetings should be conducted with the aid of a facilitator. In addition to facilitation skills, this individual should be knowledgeable in the watershed approach. NRCS should pursue a special program to train facilitators and make this training available to other groups. The facilitator can encourage team development, enforce procedural ground rules, ensure member participation, encourage the free flow of ideas, coordinate with outside organizations, keep meetings on track,
coordinate outreach to ensure all appropriate stakeholders are involved early in the
process, publicize meetings, and distribute meeting proceedings, group reports, and
related materials. With the aid of a facilitator, the constituency committee serves to
educate stakeholders regarding pollution sources, pollution prevention, and
alternative solutions. Through an open dialogue, stakeholders gain insight into the
views of other interest groups. Finally, the process ensures that government considers
local perspectives in making its decisions.

The committee can also act as a vehicle to seek funding. Elected officials pay
particular attention to requests from stakeholders. Agency and university requests
are often seen as self-serving and, perhaps, of limited value in solving real problems.
Constituency committees often fail because they are used to rubber-stamp the ideas
of government employees. Members must be afforded the opportunity to participate
in the process of developing the problem statement. This dynamic promotes reasoned
decision making. The provision of adequate time for conflict resolution is another
important attribute of the process, as committee members must thoroughly evaluate
all points of view.

2. Conduct Watershed Assessment

The Watershed Assessment is the second step in developing the Watershed Report.
The assessment is critical for two reasons: (1) the assessment stage is when data is
collected to determine if there is a problem; and (2) if there is a documented problem,
the assessment helps answer the following questions:

- What is the pollutant of concern?
- What is the geographic extent of the pollution?
- Is there impairment to the water body?
- Who are the major contributors to the water quality impairment?

Evaluation of existing data and collection of additional watershed information forms
the basis of the water quality assessment. When collection of new data occurs, a
Quality Assurance Project Plan (QAPP) must be on file with the state EPA.
Good scientific and economic assessments serve as the foundation for successful watershed projects. Assessments, however, are expensive since they deal with complexities inherent in a watershed system. Until adequate funding exists to support viable assessments, the country will continue to struggle with the demands of developing a good watershed plan. Where TMDLs must be developed, regulations require environmental protection even where data is lacking. Accordingly, the onus is on the agricultural industry to secure funding to support good assessments, thereby ensuring informed actions.

3. Determine Current Loadings

The third step consists of determining current loadings in the stream segment being evaluated. This step ascertains the total loadings of the pollutant of concern and the contribution of all significant sources. While ongoing state monitoring programs can provide information regarding point sources, data related to nonpoint source loadings will probably not exist. TIAER’s monitoring experience in the Bosque indicates that pollutant loads vary tremendously both within and between rainfall events. For these reasons, development of current loadings must be done carefully.

Water quality data supports several tasks, including assessment of current watershed conditions, determination of loading capacity, and allocation of pollutant loadings among contributing sources. Based on the water quality assessment, the watershed project requires the stakeholder group to identify the location and types of pollution sources, and the current and projected pollutant load for each source. A pollutant load is a mass per unit of time. The data necessary for this task includes, but is not limited to, the following: watershed and microwatershed boundaries; hydrologic conditions; location of stream segments; location of pollutant sources; types of pollutant sources; anticipated growth of discharges during the implementation period; rainfall data, including runoff coefficients; land uses and land cover; and soil types (TNRCC, 1999). Pollutant sources may encompass wastewater treatment plants,
as well as urban, forest, or agricultural runoff. The constituency committee will characterize the pollutant sources, as point, nonpoint, or natural background.

The collection of data should permit analysis of pollutant loads on a microwatershed level. Collection and maintenance of information by subwatershed enhances the identification of cause-and-effect relationships. Pollutant load data should also incorporate geographic references in usable formats. It is worth noting that data may also be generated through the use of mathematical models or other forms of scientific estimation.

4. Determine Assimilative Capacity of Stream Segments

The fourth step is to determine the assimilative capacity of the stream segment for the pollutant of concern. This calculation permits establishment of a watershed target. More specifically, the loading capacity of a stream segment refers to the maximum pollutant load a water body can receive without violating water quality standards (TNRCC, 1999). In determining the loading capacity of stream segments, a question arises: are all waters of equal concern, so that all stream segments receive the same level of protection? In answering this question, the constituency committee may wish to examine whether the water body at issue implicates local, regional, state, or national concerns, and whether it has some special value or utility. This process is also guided by regulatory standards for the pollutants of concern, or designated uses for the water body.

Modeling can also play an important role in this phase. Computer models accomplish a number of tasks, including: (1) assessing current watershed conditions, (2) determining the water body’s loading capacity, (3) estimating current pollutant loads, (4) evaluating load allocation alternatives, (5) estimating the water quality impacts of changes in pollutant loads, and (6) estimating the water quality impacts of changing conditions in the water body and the watershed.

5. Calculate Point and Nonpoint Source Load Reductions

Step five deals with calculating point and nonpoint source load reductions necessary to achieve the watershed objective. Point sources discharge pollutants into waterways through a discrete conveyance such as a pipe, ditch, or tunnel. Nonpoint sources reflect diffuse land-based operations and rainfall-induced runoff.

The constituency committee helps allocate a portion of the receiving water’s loading capacity for existing and future nonpoint sources and natural background sources. The committee also assists in the development of a point source allocation, which consists of the receiving water’s loading capacity that is earmarked for existing and future point sources.

In evaluating these issues, the constituency committee may benefit from the assistance of a technical advisory group or other scientific body. These resources may be formed to address difficult scientific and technical issues or to develop the information necessary to calculate point and nonpoint source load reductions.
6. Allocate Load Reductions

The final step in developing the Watershed Report consists of allocating load reductions among the various contributing sources. The loading capacity, or assimilative capacity of a stream, is determined by adding the present and future allocations for point and nonpoint sources. Trade-offs may be made between sources to maintain the level of water quality desired, however, neither the CWA nor EPA regulations specify methods for allocating pollutant loads among contributing sources. Instead, this decision has been left to the states. In Texas, the TNRCC recommends that stakeholder groups be responsible for evaluating and recommending loading allocations to meet water quality standards (TNRCC, 1999).

In making allocations, a number of issues emerge: variations in flow and pollutant load, temporal aspects of pollution, anti-backsliding requirements, future growth allocations, and antidegradation requirements (TNRCC, 1999). As an illustration, pollution load allocations must address variability in hydrology and effluent discharge, potentially providing different loading levels for different flow conditions. In systems with significant nonpoint source load contributions, it may be appropriate to use an annual time frame for evaluating pollutant loads.

Part II: Initial Considerations in Developing the Implementation Plan

Findings and conclusions drawn from the Watershed Report will generate objectives for the Implementation Plan. The challenge in developing an Implementation Plan arises out of the uncertainty associated with producers actually modifying the manner in which they use and manage their land.

In seeking to modify producer practices, EPA must recognize that it is asking individuals to change how they use and manage their land (See Vergura and Jones, 2001). In this country, EPA and government in general have little experience with this endeavor. Most of our achievements in water and air quality have come through technology-based strategies. Future improvement in air and water quality, however, will come through programs that, for the first time, seek to change the daily behavior of hundreds of millions of individuals. Agricultural producers may well be the first group in society to feel the impact as government takes steps to address land-management issues that, for good reason, were left unresolved by Congress thirty years ago.

There are two broad categories of government-sponsored programs. The first consists of voluntary programs in which individuals commit to appropriate actions as a result of education, cost-share, or other incentive programs. USDA conservation programs provide one example of this type of program. The second type of program is regulatory—government imposes command-and-control style regulation, backed by penalties for violators.

There are also two primary means of achieving water quality objectives. The first, technology-based programs, reflect engineered solutions and produce highly
predictable outcomes, with little need for government oversight to ensure performance. With these programs, human behavior has little to do with achieving success. The second means of achieving water quality objectives focuses upon land management-based programs. In this case, success depends upon inducing appropriate human behavior. Outcomes can vary widely by virtue of the level of commitment and the skill brought to bear. For animal feeding operations, success on the fields also rests upon unpredictable weather events.

In developing watershed-based land-use management programs, government must also take note of concerns related to agricultural heritage and entrepreneurship. While agricultural producers must accept responsibility to deal with the negative externalities associated with how they manage their operations, government agencies must respect the private property rights of producers, as well as their fierce independence. In addition, government must ensure that agricultural producers retain the ability to respond to changing market conditions without having to constantly consult EPA (See Vergura and Jones, 2001).

In the past, EPA has used best management practices (BMPs) as a critical feature of regulatory programs. Enforceable EPA provisions might include restrictions on type of crop grown, width of filter or buffer strips, soil test phosphorus, slope of land, distance to nearest streams, etc. Nonetheless, inspection programs on agricultural fields will never produce the kind of predictability EPA has experienced with point source programs. The uncertainty of weather conditions and the variability in management skills among farm laborers will challenge the utility of EPA inspections and may make producers vulnerable to unrealistic expectations.

Establishment of minimum national standards has been an important component of successful environmental programs. National standards have been an essential component of programs for municipal and industrial point sources. To the extent practicable, policy makers also need to standardize polluted runoff programs across the country. Climatic, geographic, and other biophysical differences, however, make standardization a challenge. As a result, it will become more economical to operate in some areas of the country than others.

Several livestock sectors are in the midst of change. In general, policy makers try to avoid environmental programs that hasten a move from small to large operations. Government has a history of providing financial support to agriculture as the industry goes through difficult transitions. It is not easy to predict the position Congress will take in regard to helping producers pay for environmental programs. In general, it is easier for large producers to finance environmental programs than it is for smaller producers.

One option to ease the transition is environmental certification and incentive payments. Some producers in the dairy industry have considered programs that establish incentive payments tied to environmental certification programs. Producers certified to be in compliance with federal water quality programs would receive an incentive payment that could be passed forward to consumers in the price of milk and milk products.
Policy makers would do well to note that the livestock industry in this country must remain competitive with international producers. Programs that reduce the competitiveness of U.S. producers may drive agriculture out of this country.

The next section will discuss the steps necessary to organize the watershed program and implement the recommendations of the Watershed Report. A guiding principle of this process reflects the notion that viable solutions are about people, process, and coping with complexity. NRCS should have the capacity to perform all aspects of the implementation program, as well as the ability to mentor relevant state agencies and involved groups.

1. Divide Watersheds into Microwatersheds

The information gained during the water quality assessment permits stakeholders to identify the geographic boundaries of microwatersheds and the specific pollutant loadings assigned to each. Specific microwatersheds may take priority for action purposes. Because the microwatershed reflects the fact that this is the area where changes in individual management take place, the success or failure of the watershed approach is measured by the cumulative impact of changes taking place at the microwatershed.

One must recognize the importance of enlisting the aid of producers in the targeted microwatershed. A good facilitator represents the key to the microwatershed process and ensures that microwatershed activities are completed in a timely fashion.

Important microwatershed activities include introducing the PIMA program, establishing objectives for the area, and performing individual farm assessments (IFAs). IFAs examine production areas and include benchmark soil tests that assist in CNMP development and provide a means of measuring the success of nutrient management activities.

For producers who choose the certification option described earlier, their operation is assessed by specialized technicians trained, tested, and certified to identify water quality risks. After the assessment, the producer is provided a written report that makes recommendations. If at that point the producer acts on the recommendations, he or she receives certification.

Additional microwatershed activities focus on the reporting of IFA results, education programs, development of CNMPs, implementation of BMPs, and use of third-party audits and other measures to help producers achieve certification. Producers who receive annual certification avoid regulatory exposure. TIAER anticipates that on-farm assessments occur every eighteen months to two years. For all of these activities, NRCS can serve as a mentor to states.
A selected microwatershed should be small enough to bring all agricultural producers to one table, with a maximum of 25 producers. The microwatershed should also be limited in geographic scope, in order to permit a ready understanding of the biophysical and management characteristics of the area. Microwatershed size depends on the physical characteristics and biophysical diversity of the larger watershed and the number of producers in the microwatershed.
2. Establish Producer Councils

Singling out specific microwatersheds for targeted attention permits the convening of local producer councils and provides a forum for effective producer involvement. The producer councils encourage local ownership of water quality problems and local investment in their resolution. The microwatershed is small enough to get all producers around one table. The discrete scale also facilitates a ready understanding of the biophysical components of an impacted area and the interaction between them.

Producer councils should create a sense of community as well as peer pressure to adopt appropriate management measures. The council is a key for motivating producers to improve land management. Education and information flow can take place on this small scale, avoiding the expense of using only one-on-one education and technical assistance programs throughout the watershed.

Members report on and discuss overall progress in the producer council meetings. Councils focus on performance by taking a flexible approach to problem resolution. Producer councils may target cost-share assistance to specific operations in order to achieve water quality improvement. Councils also possess the capacity to address failures, difficult management problems, and innovative ways of achieving success. Specifically, councils can investigate technical assistance issues, or areas in which producers require particular assistance. Thus, producer councils provide a forum for NRCS, state conservation agencies, and local soil and water conservation districts to provide plans, cost-share, technical assistance, complaint resolution, education, and peer pressure.

A facilitator initially acts to mediate the meetings of the producer council. To do this, the facilitator must possess substantial knowledge of agricultural production, as well as the personal skills to motivate others. Over time, the facilitator should attempt to transfer leadership to the council. In Texas, the Texas State Soil and Water Conservation Board (TSSWCB) uses activities of the council to encourage producers to achieve water quality objectives through farm-friendly approaches similar to PIMA. Producers failing to make a good faith effort are referred to the state EPA to achieve objectives through bad actor programs.

The microwatershed producer council must also have adequate funding to pay for secretarial and clerical support. Funding should exist to promote and advertise progress and reward individual and microwatershed performance. Local and national organizations might participate in this effort. For example, a local John Deere dealer could provide funding for local recognition awards, while at the national level the John Deere company could provide funding for a national campaign to educate the public on agriculture’s land-stewardship initiatives. Well trained facilitators, technical guidance from scientists, and clerical support help to ensure the success of councils.

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5 For additional information regarding producer councils, see Vergura et al., 2002.
3. Define Success for Each Microwatershed

To motivate action, one must recognize success at the microwatershed level. Project leaders should develop a means for recognizing good performance. One possibility is to put a sign at the producer’s entrance indicating the operation has been certified and is currently meeting CWA objectives. One must also remember that the ultimate goal is to achieve water quality objectives for the entire watershed. Thus, the cumulative impact of the various microwatershed goals must generate the desired level of water quality improvement on a larger watershed scale. Important steps in this process include:

a. Perform benchmark soil tests on individual farms.

The individual farm assessments will permit an evaluation of the nutrient management issues faced by individual facilities. The use of benchmark soil tests will also assist in CNMP development and provide a means of measuring progress of nutrient management activities. Development of specific provisions for individual CNMPs should begin based on the number of animals for each operation. Individual soil test information will remain confidential, while aggregate data for the entire microwatershed will become public.

b. The microwatershed council should establish interim measures of progress

The producer council should assist in developing measures of progress, thereby ensuring “buy in” from agricultural producers. Producers must also understand the serious nature of these commitments, as success associated with PIMA may act to insulate watersheds from the reach of a TMDL. Substeps may include:

1. Obtain NRCS or third-party guidance in development of CNMPs
2. Define expected end points—farm-level assessments will facilitate this process
3. Decide where success should be measured and where monitoring should occur
4. Define what constitutes acceptable progress and success
5. Define good faith effort
6. State agricultural and conservation agencies will need to develop guidance as to what constitutes a bad actor
7. Spell out how producer certification will take place, including the identification of who will inspect, what will be inspected, and how long producers have to fix problems

Certification will provide the producer with the assurance that the state EPA will not inspect his or her field operations except through well designed sampling programs that ensure the program is working. The certification program should be integrated into a state’s official CWA agricultural nonpoint source program. In Texas, the program is the official responsibility of the Texas State Soil and Water Conservation Board. In this manner, bad actors are dealt with predictably and certification programs, whether state run or conducted through third-party programs, are institutionalized into official state programs, thus avoiding the creation of another hoop for producers to jump through.

3. Establish a Range of Management and Technology Options

In developing plans, the idea is to create a range of management and technology options that can be used to achieve success at the microwatershed level. Models employed by TIAER in the Bosque River watershed can provide guidance in evaluating the effectiveness of a variety of management practices. TIAER has employed modeling to determine the viability of BMPs, including distinct cropping practices, manure application rates, and composting, among others. Modeling revealed both the environmental and economic consequences of BMP adoption. For example, in the Upper North Bosque River, applying manure at a low phosphorus agronomic rate provided the lowest unit cost for reduction of nutrients in the watershed (Pratt et al., 1997).
Modeling was also used in the Lake Fork, Texas watershed to determine the viability of nutrient-based pasture management, alternative production systems, dietary management, and filter strips (See McNitt et al., 1999). These modeling runs indicated that small pasture-based livestock operations could meet environmental goals by employing intensive rotational grazing practices. They also showed that limiting the phosphorus intake of dairy cows resulted in strong environmental improvement and a cost savings for producers. The use of filter strips also provided environmental benefits at little cost.

Most recently, modeling was applied to the Upper Maquoketa River watershed in Iowa (See Keith et al., 2000). This region is dominated by agriculture and fishing interests. The modeling runs revealed a number of policies to reduce total phosphorus in the watershed, including contour buffer strips, no-till, and terraces. The modeling also emphasized that watershed stakeholders and government officials need to choose carefully among options given the high costs involved.

Information gained through modeling runs, research, or NRCS technical guidance, will permit the development of comprehensive nutrient management plans. In developing CNMPs, it is important to ensure that the plan developed will produce desired changes. If it does not, the producer will become disenchanted and lose interest.

**Part III: Implementing the Plan, NRCS as the Key**

CWA programs provide a new opportunity for NRCS to serve production agriculture. The agency, however, must find a way to be successful without alienating its traditional constituency. NRCS must be able to continue to wear its “white hat” while working with agricultural producers. The challenge lies in developing a new model and getting agency personnel to accept it—to do otherwise, would be akin to “putting new wine in old wine skins.” A new model will recognize:

- The need to assist agricultural producers in achieving CWA objectives
- That CWA objectives are often different than conservation program goals
- That voluntary programs alone may not achieve CWA compliance objectives
- The importance of developing mentoring skills to address a wide variety of CWA programs in which states have the lead role

Under PIMA, TIAER anticipates that state conservation agencies will implement programs at the community level through local conservation districts. NRCS can link its traditional activities of providing technical expertise and planning to EPA policy initiatives implemented at the community level through state agencies. Local conservation districts, which were developed in response to soil and water conservation problems in the 1930s, are uniquely situated to handle agricultural land management issues. PIMA envisions local districts as the vehicle for linking voluntary programs with initiatives to deal with bad actors at the local level, the place where changes are needed in land management (McNitt et al., 1999).

As discussed above, states have the lead role in developing and implementing Clean Water Act programs. TIAER recommends that state and local conservation districts
move to the forefront in dealing with polluted runoff issues. Conservation agencies could be given overall responsibility for implementing watershed programs at the state level. In this system, NRCS could take on a number of important roles, including the following:

a. Develop a watershed program that NRCS would fund and help implement. Program guidance developed to achieve CWA objectives will be a first in this country. Initial activities in this area are very important to production agriculture. Taking a proactive position is key to long term success.

b. Assume responsibility for administering the following two USDA grant programs: (1) a capacity building program for state and local conservation districts, and (2) cost share to support assessment and certification programs and BMP implementation.

c. Perform watershed management projects in their entirety.

d. Mentor state conservation agencies, local conservation districts, and other groups as appropriate in conducting watershed management projects. In this setting, NRCS could establish criteria for mentoring privileges. NRCS assistance might include:

- The provision of specialists, such as program administrators, watershed constituency committee facilitators, microwatershed facilitators, or other key support staff.
- Technical guidance to support the overall effort or in support of projects led by other groups. NRCS will play a critical role in supplying technical assistance for the development and implementation of CNMPs in targeted microwatersheds. Where funding is limited, microwatersheds will need to be prioritized. Even within watersheds, it will be difficult to achieve levels of funding needed to address all conservation issues that may arise. Focusing on specific water quality issues of concern will be important to get the most out of limited funding. In this regard, NRCS must move beyond its traditional role of providing conservation planning on a whole-farm basis. The goal here is to achieve water quality objectives.

NRCS expertise and responsibilities would expand significantly to accomplish the above objectives. Some staffing requirements would obviously change. NRCS employees have historically been highly trained in soil sciences and other land management skills. NRCS will, however, need to beef up its capacity to address the land/water interface and other water quality issues. NRCS will need more experts in water quality biology with the capacity to recommend appropriate water quality standards, particularly in low flow regimes where many agricultural operations are located. The agency will also need to hone its skills in facilitation, mentoring, and in conflict resolution. In short, NRCS must become the recognized and undisputed expert for addressing environmental issues on private lands.

This report would not be complete without addressing a very controversial issue. TIAER sees local conservation district performance as a key to the overall success of PIMA. Districts must be well funded. Because there are approximately 3,000 districts nationwide, it is hard to envision how funding can be obtained to support a quality staff in each location. A method must be found to provide the increased financial
support needed by districts, without diminishing their political clout. TIAER is convinced that successful new ideas can be developed if NRCS, districts, and agricultural producers come together to assess a wide range of alternatives.

Finally, TIAER sees a need for enlisting the support of corporate friends of agriculture. Multinational corporations can play important roles in assisting agriculture to achieve CWA objectives. For example, “adopt a watershed” programs may be one way to assist producers in achieving water quality objectives. Tax incentives might be used to induce corporations to participate in these programs. Corporate friends of agriculture-funded public service announcements on television and other media outlets could educate the general public on new and successful programs being carried out by agricultural producers.

Concluding Thoughts: NRCS and the Clean Water Act

NRCS has a successful and notable history with production agriculture. To help agriculture successfully address the next generation of water quality issues, NRCS may need to utilize a different mix of programs and delivery systems than what made the agency successful over its first 50 years. NRCS is currently analyzing alternative programs as they attempt to continue their successful partnership with production agriculture.

In the past, NRCS dealings with water quality were in the context of implementing good conservation practices. NRCS built its reputation on developing whole-farm plans that, if properly implemented, would resolve most environmental issues facing the industry. There is no question that good conservation programs, if implemented and properly maintained, will go a long way toward resolving clean water issues in agriculture. However, there are new considerations.

The CWA adds a new and difficult dimension to water quality issues facing agriculture. Some water quality issues will be targeted above others, and some geographic areas will receive a higher priority than others. Witness the TMDL program. Will old programs and ideas developed to address conservation issues serve NRCS well as the agency addresses CWA issues? NRCS is currently examining its options for addressing these pressing problems. The following complicate decisions facing NRCS:

- Many producers do not want whole-farm plans. In fact, many producers have decided against accepting traditional NRCS planning activities. Some producers only want to address the specific water quality problem they face. How can NRCS best reach out to these producers? The agency may want to keep this point in mind: producers who initially want NRCS services to resolve a specific water quality problem may, over the long-term, become one of the agency’s biggest supporters and eventually request the full range of services the agency offers.

- In all likelihood, there will not be enough funding to address all conservation issues on a farm, ranch, or watershed when CWA issues are raised. Targeting of
specific issues and geographic areas may be the only economical way to address the CWA water quality problems facing producers.

- Promoting government sponsored land-planning to address CWA issues may be a dangerous proposition. It is one thing to do whole-farm planning that is strictly voluntary. It is quite another to propose whole-farm planning to address specific water quality problems under the CWA. What is initiated as voluntary whole-farm planning could become EPA sponsored land-planning.

- One way for NRCS to proceed is to modify existing programs to address specific CWA issues. Newly developed programs could focus narrowly on defined CWA concerns, and thus, not plan the entire farm or watershed in order to achieve CWA objectives.

There is great concern among some conservation advocates about taking funding reserved for conservation programs and using it to address CWA issues. Some supporters of NRCS prefer to let EPA deal with the difficult and controversial CWA problems in agriculture, rather than get NRCS involved with a new venture that could take money from current programs.

Alternatively, if NRCS stands aside at this important juncture, the result could put privately-held agriculture lands in the hands of EPA regulatory programs. TIAER believes NRCS can address traditional, as well as CWA issues, to its advantage and the advantage of production agriculture. NRCS can seek new funding to address this new generation of problems. Leaders in the agricultural industry should step forward to educate Congress on the dilemma they face and to seek new funds for NRCS that can be used to address CWA initiatives. Given the alternatives, there is a high probability that funding for new programs can be obtained. Entirely new constituencies can be created for NRCS. Such an initiative would also provide agriculture committees in Congress significant new roles in achieving CWA objectives.

The NRCS delivery system is unique and will be difficult for any other agency to replicate. New programs that trigger funding in NRCS to address problem watersheds before they reach TMDL status would be of great benefit to both agriculture and urban and suburban communities. If the agricultural community does not move quickly to get NRCS involved in resolving CWA problems, the opportunity may be lost for the agency and the agricultural industry.

NRCS should be seen as experts in addressing environmental problems on private lands. An icon should be developed, similar to “Smokey the Bear,” that the entire country can identify, and that communicates the notion that NRCS is the undeniable expert concerning private lands and the environment.

NRCS must recognize, however, that they cannot be the lead agency in CWA activities. Although states will take the lead, it should not deter NRCS or impede its enthusiasm. There is a huge void that must be filled if water quality problems on private lands are addressed without depending upon EPA top-down, inspection-based regulatory programs. NRCS has an excellent opportunity to fill that void. Change must occur within the agency, however, if it is to be successful. The agency should consider the following:
• Take steps to become water science experts, as well as land science experts.

• Take a leadership role in developing the science related to the land/water interface or the relationship between land-use and land-management and receiving water quality.

• Take on the issue of developing legitimate expectations for water quality in low flow regimes. Can existing water quality standards be achieved while maintaining the economic viability of production agriculture and rural communities?

• Consider adopting the Bosque River as its first outdoor laboratory and establish nine additional watersheds across the country to develop appropriate scientific underpinnings for new programs.

• Develop an effective partnership with producer groups to establish a research agenda and a new model for carrying out that agenda. Producers must be more involved in establishing the agenda and monitoring research programs. The producer of the twenty-first century is different than the producer of the twentieth century. Producers are educated and reaching them with new ideas is no longer a major hurdle. Although the old research model has advantages and serves a valuable purpose, left to itself, the old model will take too long to position researchers to address new issues of practical importance to producers. By the time the old system provides needed information, politics will have taken over and decisions on water quality will have been made absent good data.

• NRCS does not need to wear a “black hat” with producers. State conservation agencies and local conservation districts must accept the challenge of wearing a “brown hat” to deal with bad actors. If third-party programs are successful, producers that do not make good faith efforts self-identify themselves when they refuse to participate or do not receive certification. State conservation agencies should step up and accept responsibility for agricultural nonpoint source programs that will provide oversight for third-party activities, and institutionalize such programs across the country. This will make it possible to tie together EPA and USDA programs at the community level.

• NRCS can take these steps without alienating the agricultural community. To be successful, however, production agriculture must be encouraged to become a full partner with NRCS as steps are taken to move new ideas into the policy arena.

TIAER looks forward to working with NRCS and production agriculture under the heading of “Industry-Led Solutions.” TIAER will be working with agricultural groups, NRCS, EPA, and the Council on Environmental Quality to move the environment and private lands agenda forward in a way that will allow agricultural producers to impact policy outcomes.


