

# ARID WEST WATER QUALITY RESEARCH PROJECT



## WORK PLAN – PHASE II

FOR

U.S. ENVIRONMENTAL PROTECTION AGENCY  
ASSISTANCE AGREEMENT  
ID NO. X-97952101-0

**July 15, 2003**

PIMA COUNTY WASTEWATER MANAGEMENT DEPARTMENT  
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**ARID WEST WATER QUALITY  
RESEARCH PROJECT  
PHASE II**

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**Arid West Water Quality Research Project**  
**Work Plan - Phase II**  
**July 15, 2003**

This Work Plan was prepared to support the application for \$500,000 available from the Environmental Protection Agency (EPA) for the Arid West Water Quality Research Project (AWWQRP or "Project") through Public Law 107-73. Elements of this Work Plan were prepared to support grant application requirements and provide easy comparison with the Phase I Work Plan prepared to support existing AWWQRP grant funding (EPA Grant #XP-99926701). This Project will continue work begun under EPA Grant #XP-99926701, using the same purpose, infrastructure and procedures established for that grant.

**Project Background**

*Establishment of the Arid West Water Quality Research Project*—The AWWQRP began as an idea in the early 1990's, an idea developed out of concerns regarding the applicability of national water quality criteria to western ephemeral and effluent-dependent waters. Two key issues were originally identified: (1) national water quality criteria were based on aquatic species and flow regimes not necessarily representative of ephemeral and effluent-dependent streams; and (2) the methods provided by the U.S. Environmental Protection Agency (EPA) to modify national water quality criteria for use in effluent-dependent and ephemeral streams were not readily applicable primarily because of the lack of basic data on organisms of importance in these arid West waters (note: throughout this document references to the arid West include both arid and semi-arid areas). With these concerns in mind, efforts were initiated to demonstrate the need for the establishment of a program for the development of standards and criteria applicable to the arid West, similar to regional programs established for the Great Lakes and coastal marine waters.

These efforts bore fruit with the establishment of the AWWQRP in 1995 as the result of a \$5,000,000 federal appropriation (Public Law 103-327) and the establishment of an Assistance Agreement between the EPA and Pima County, Arizona (EPA Grant #XP-99926701). The establishment of this original Agreement provided a significant opportunity for Pima County, EPA Region 9 and others throughout the arid West to work cooperatively to conduct the scientific research necessary to develop appropriate water quality criteria and standards for the region and improve the scientific basis for regulating wastewater and stormwater discharges in the arid and semi-arid West.

Since the establishment of the AWWQRP through the original EPA grant, three projects have been funded and additional projects are planned. As projects have been implemented and completed, the AWWQRP has shared Project results and their implications in a variety of forums. This outreach effort is leading to a broader understanding of water quality issues unique to the arid West and growing support for the establishment of a regional approach for the development and implementation of water quality standards. This growing support resulted in an additional federal appropriation of \$500,000 that is the subject of this Work Plan and will be administered as a separate AWWQRP grant.

## **Project Goals/Objectives**

The purpose of the AWWQRP was first identified in the Assistance Agreement Work Plan established for EPA Grant #XP-99926701 - to conduct scientific research and disseminate scientific information on ephemeral and effluent-dependent waters to help resolve issues of significance to both the regulated community and regulators at state, tribal and federal levels. This Work Plan states that AWWQRP funded research will focus on the following five areas:

- Water quality criteria and standards for arid West habitats;
- Water quality criteria for chemicals of concern;
- Biological and ecological criteria and standards for arid West ecosystems;
- Whole effluent toxicity testing guidance for arid West waters; and
- Arid West water quality policy and implementation issues.

Under this Work Plan, the purpose of the AWWQRP shall remain the same as described above.

## **Focus of Work Plan**

Since the establishment of the AWWQRP, the Project has completed the Discharger Survey and Habitat Characterization Study. A third project, the Extant Criteria Evaluation, is in final production. The AWWQRP has shared Project results and their implications in a variety of forums. This outreach effort has resulted in substantive stakeholder discussions of arid West issues. These stakeholders remain interested in continued research activities, but they also have identified the need for the creation of implementation documents specifically applicable to arid West waters.

Stakeholder interest in implementation issues is consistent with one of the major goals of the AWWQRP – to develop implementation documents that combine the findings of completed AWWQRP research with other related regional research. Accordingly, while work conducted under this Work Plan will continue to support research on arid West issues, this Work Plan will also focus on addressing this key stakeholder interest, i.e., the need for documents that begin to translate basic Project research and other regional information into guidance that will support the environmental protection of arid West waters.

## **Deliverables/Work Products**

In addition to the continued support of research, the preparation of implementation documents that integrate Project results with other related regional information will be an important product or deliverable under this Work Plan. These documents could serve as regional “how to” guides that provide not only integrated research findings from the AWWQRP, but also provide case study examples of how water quality standards, criteria and use designation issues have been addressed in arid West waters. The conceptual framework developed in these documents could

be used by all practitioners of water quality programs in ephemeral and effluent-dependent/dominated ecosystems – both regulators and dischargers.

At this time, we plan to focus the content of these documents on the following three areas: (1) Establishment of appropriate use designations; (2) Development of water quality standards and criteria; and (3) NPDES permit considerations for arid West waters. Topics within each of these areas would be developed as research data allows. Examples of potential topics for each of these areas include:

- Establishment of appropriate use designations – waterbody characterization, use attainability procedures, identification of existing uses, and the net ecological benefit concept.
- Development of water quality standards and criteria – consideration of frequency and duration elements of water quality criteria, regional consumption rates for fish and water, and protection of species and ecosystems.
- NPDES permit considerations for arid West waters – minimum treatment guidelines and use of appropriate flow statistics for arid West waters.

While the AWWQRP has often been the instigator of discussions in each of these areas, other organizations have also contributed important ideas. For example, in Colorado state regulators have convened a group of stakeholders to evaluate use designations on state waters, including those that are effluent dependent or dominated. The establishment of committees within the Western States Water Council to address issues related to use attainability and establishment of alternative criteria in arid West waters provides another key example. The Project documents would bring together information from these sources as well as other water quality practitioners. At a minimum, the documents envisioned under this concept would integrate ideas from the following key sources:

- Findings from AWWQRP-funded research projects – those funded under EPA Grant #XP-99926701 and this Work Plan;
- Input provided by the AWWQRP Regulatory Working Group (RWG) and Scientific Advisory Group (SAG);
- Other research conducted on arid West waters, e.g., site or regional specific studies conducted by the Water Environment Research Foundation, state and federal agencies and dischargers;
- Regional regulatory documents, e.g., methods used by states to establish water quality standards and criteria, and effluent limitations, and examples of use attainability analyses (UAA) to demonstrate acceptable UAA methods;
- Elements of existing state or federal guidance applicable to arid West waters; and
- Arid areas issues being considered by the Western Governors Association, Western States Water Council.

## **Steps to Accomplish Work Products**

### **Task 1 Administer/Manage AWWQRP Activities**

- Maintain and utilize the existing AWWQRP organizational structure that was established under EPA grant (#XP-99926701). This organizational structure consists of the following roles and responsibilities:

*AWWQRP Office*—The AWWQRP is directed and managed by the AWWQRP Office established within Pima County Wastewater Management (PCWWM), Tucson, AZ. Currently, the PCWWM Capital Development Manager serves as the Project Director. The Project Director supervises and coordinates the activities of the Project and is supported by a Program Manager, Program Services Specialist and office support staff. All support positions are recruited by advertisement per the requirements of Pima County. The primary responsibilities of the AWWQRP Office include:

- Manage and coordinate Project activities;
- Coordinate the selection of the AWWQRP Research Manager and Regulatory Working Group (RWG) and Scientific Advisory Group (SAG) members;
- Coordinate the procurement process for the advertisement, evaluation and award of research projects;
- Prepare and monitor budget to manage grant expenditures and fulfill EPA administrative procedures;
- Create timely and accurate reports on technical and financial achievements;
- Facilitate, as needed, audit procedures;
- Develop and manage contract-tracking procedures;
- Plan and coordinate AWWQRP related meetings and conferences;
- Coordinate activities with stakeholders, especially other Pima County departments;
- Develop and maintain files for all AWWQRP activities;
- Manage the Project's web site, <http://www.co.pima.az.us/wwm/wqrp>; and
- Respond to information requests.

*EPA Project Officer*—An EPA Project Officer in EPA Region 9 provides support to the Project. The Project Officer serves as the primary point of contact with the EPA and participates to the extent possible in Project meetings, especially those involving the direction and management of the Project.

*Research Manager*—Scientific management of the AWWQRP is the responsibility of the Research Manager. A contractor recruited according to Pima County procurement procedures provides this service. Camp Dresser & McKee, Inc. (CDM) has provided scientific management services for the AWWQRP since 2001. Responsibilities of the Research Manager include:

- Assist the AWWQRP Project Director in scientific management of the AWWQRP and periodic review and modification of the Work Plan;

- Update the AWWQRP Research Agenda with assistance from the AWWQRP Office and the RWG;
- Provide technical direction to the Project Director and Program Manager;
- Recommend research proposals to be funded;
- Prepare technical content of Requests for Qualifications/Proposals (RFQs/RFPs), including requirements for performance to meet EPA quality control and publication in peer-reviewed journals;
- Monitor progress of funded projects including coordination with contractors, the RWG, SAG, EPA and other Project participants;
- Develop rationale and protocols for review and evaluation of proposals, including quality assurance and quality control of data;
- Participate in technical review of research products and prepare formal review comments to guide authors in producing final reports to meet EPA quality and Project requirements;
- Develop research project plans to be undertaken, when appropriate, by the AWWQRP and secure SAG and RWG review before initiation of effort;
- Prepare technical papers dealing with AWWQRP science issues and application of research results for publication in peer-reviewed journals;
- Participate in public outreach activities to disseminate Project results to stakeholders;
- Maintain communication with the scientific community interested in water quality research and regulation in the arid West;
- Arrange technical content of research conference(s), including contacting speakers, identifying presentation subjects and preparing conference technical program;
- Support AWWQRP Office efforts to coordinate SAG activities including facilitation of SAG review, evaluation and ranking of proposals and preparation of the SAG recommendations for funding.

*Quality Assurance Consultant (QAC)*—The grant award specifies that the Project will comply with Quality Assurance requirements that are consistent with the EPA. Consequently, the Project has developed a Quality Assurance Project Plan (QAPP) that specifies how this will be done and will retain an experienced investigator in quality assurance to review individual project work plans for compliance with the QAPP. Currently, the QAC is Aquatic Consulting & Testing, Inc.

*Regulatory Working Group*—The RWG was established to assist in identifying regulatory issues that should be addressed by research, developing the Project's Research Agenda and providing comments on the regulatory significance of proposed projects. A maximum of fifteen members representing state and federal regulatory agencies, Indian tribes, municipalities, industry, environmental organizations, consulting firms and universities serve on the RWG. Key responsibilities include:

- Define research ideas for inclusion in the Research Agenda;

- Identify regulatory issues that should be addressed by research;
- Provide comments on the regulatory significance of proposed RFQs; and
- Meet periodically to discuss the regulatory context of ongoing research and, as necessary, update the Research Agenda to address emerging regulatory issues of concern.

The RWG is currently composed of the following members:

- Kathleen M. Chavez, Chair, Pima County Wastewater Management, Tucson, AZ
- Edward C. Anton, Division of Water Rights, Sacramento, CA
- Rodney W. Cruze, Riverside Regional Water Quality Control, Riverside, CA
- Paul D. Frohardt, Colorado Water Quality Control Commission, Denver, CO
- Michael Gritzuk, City of Phoenix, Water Services, Phoenix, AZ
- Catherine Kuhlman, U.S. EPA, Region 9, San Francisco, CA
- Andrew Laurenzi, The Nature Conservancy, Tucson, AZ
- Susan MacMullin, U.S. Fish & Wildlife Service, Albuquerque, NM
- Patrick J. Maley, Strategic Environmental Management, Boise, ID
- Steve Davis, Malcom Pirnie, Inc., Western Region, Tucson, AZ
- James F. Pendergast, U.S. EPA, Office of Science and Technology, Washington, DC
- Sam Rector, Arizona Department of Environmental Quality, Phoenix, AZ
- Eric Rich, Navajo Environmental Protection Agency, Tuba City, AZ
- Daniel Santantonio, City of Las Cruces, Utilities Division, Las Cruces, NM
- Neil Stessman, Volunteer, National Audubon Society, National Wildlife Federation, Billings, MT

*Scientific Advisory Group*—Members of the SAG have been selected from academic and professional institutions and organizations. The SAG is currently composed of five members and two alternates who have research experience and training in environmental toxicology, biochemistry and ecology as well as a variety of other water quality disciplines. The primary role of the SAG is to review proposals received in response to RFQs and to rank and recommend proposals based on scientific merit. Specific responsibilities include:

- Provide advice on the Research Agenda;
- Provide technical comments on draft RFQs;
- Review proposals received in response to RFQs;
- Evaluate research progress and assist with review of research products; and
- Periodically contribute to AWWQRP research activities through meetings, correspondence and telephone conferences.

The SAG membership is renewed as necessary and current members include:

- Paul Adamus, Ph.D., Oregon State University, Corvallis, OR – Terrestrial ecology, wetland-riparian systems, ornithology and aquatic invertebrates;
  - Gary A. Chapman, Ph.D., Paladin Water Quality Consulting, Corvallis, OR – Water quality criteria development, aquatic and sediment toxicology;
  - Karmen E. King, Colorado Mountain College, Leadville, CO – Aquatic toxicology, fisheries biology and aquatic chemistry;
  - Robert W. McFarlane, Ph.D., McFarlane & Associates, Environmental Consultants, Houston, TX – Aquatic and terrestrial ecology, threatened and endangered species, environmental impact assessments, habitat evaluation and wetlands; and
  - Benjamin R. Parkhurst, Ph.D., HAF, Inc., Laramie, WY – Ecological risk assessment, aquatic toxicology, fisheries biology and aquatic ecology.
  - Robert H. Gray, Ph.D. (*alternate*), Richland, WA – Aquatic toxicology, environmental assessments, fisheries, herpetology and water quality; and
  - Carlton Sims White, Ph.D. (*alternate*), University of New Mexico, Department of Biology, Albuquerque, NM – Nutrient cycling, ecosystems.
- Maintain consistency with existing administrative requirements established under the Phase I Work Plan for EPA (grant #XP-99926701), e.g., prepare quarterly reports and maintain budget and procurement procedures and any addition administrative requirements specified for this grant.

Draws on this EPA grant award for research contracted by the AWWQRP will be made on a reimbursement basis against Project expenses. As the responsible financial party, Pima County accumulates these expenses, including direct salaries and benefits, contract obligations and operating costs and prepares requests for these reimbursements. The AWWQRP may also provide partial support to research projects conducted by other organizations, e.g., the Water Environment Research Foundation (WERF), if such research supports the purpose of the AWWQRP. Under these circumstances, representatives of the AWWQRP, RWG and/or SAG would be involved in the research oversight, and contractual arrangements would be made between the AWWQRP and the research organization and/or the competitively selected contractors and processed as above.

Draws on other research funds, i.e., funds other than the EPA grant award, will be made according to the requirements established in the Agreement that resulted in the transfer of funds to the AWWQRP.

## **Task 2 Conduct Research on Arid West Issues**

Selection of research activities to fund is based on the Research Agenda established by Project participants and is consistent with the Research Agenda established for EPA Grant #XP-99926701. Periodically updating this agenda is critical to the success of the Project since it provides a mechanism to ensure that research activities are conducted in a coordinated fashion. For example, experience with the completed and ongoing research projects has illustrated the

benefits of linking projects, that is, data generated and synthesized in one research project can provide the foundation for subsequent projects.

*Establishment of Original Research Agenda under EPA Grant #XP-99926701*—The arid West comprises many different interests, stakeholders and water quality concerns. Accordingly, it was recognized at the onset of the Project that it was essential to establish a research agenda that was representative of the issues and concerns prevalent in the arid West. To develop this agenda, the AWWQRP organized and hosted a conference in Tucson, Arizona in 1997. The conference summary is available at <http://www.co.pima.az.us/wwm/wgrp/index.html>. The purpose of this conference was to bring together people with interests in arid West water quality issues and identify water quality concerns within four general areas:

- Habitats of Concern;
- Biological and Ecological Criteria and Standards;
- Chemical Criteria and Standards; and
- Whole Effluent Toxicity (WET) Testing.

Over 100 conference participants, representing federal, state, local and tribal government agencies, wastewater dischargers, and university researchers, attended breakout sessions devoted to identifying research needs under each of these areas and formulating specific questions to be researched. The RWG prioritized this list of critical/candidate issues, which was then consolidated and modified to create the Research Agenda (Table 1).

*Refinement of the Research Agenda*—The Project continues to utilize the original Research Agenda topics and uses the results of commissioned research projects and input received from Project participants and public outreach efforts to update and/or identify specific projects for consideration for RFQs. This process will continue under this Work Plan and guide the selection of research activities.

<b>Table 1. Research Agenda</b>	
<b>Research Topic Areas</b>	<b>Examples of Research Interest</b>
<b>Habitats of Concern</b>	<ul style="list-style-type: none"> <li>▪ Establish the basic descriptions of environmental conditions (physical, chemical, biological), which define beneficial use of effluent-dependent and ephemeral stream habitats, which have been attained and preserved under existing discharge conditions. Consideration should be given to the effect that historical discharges and conditions may have had on current uses. The influence of stormwater flows was recognized as a major consideration in defining effects on habitats in arid environments.</li> <li>▪ Identify the types of habitats that currently exist below effluent discharge and stormwater discharge points, e.g., community structure and habitat function.</li> <li>▪ Evaluate attainable environmental benefits of arid ephemeral stream habitats affected by discharges of treated effluents and stormwater. Determine the environmental benefits of habitats associated with effluent-dependent watercourses.</li> <li>▪ Determine the resiliency of arid West stream habitats to variation in water quality indicators (including chemical species), and effects on beneficial uses.</li> <li>▪ Identify and describe physical, chemical and biological ephemeral water characteristics.</li> <li>▪ Stream changes associated with changes in ratio of natural and effluent waters.</li> </ul>
<b>Biological and Ecological Criteria and Standards</b>	<ul style="list-style-type: none"> <li>▪ Determine the variability of biological communities of arid effluent-dependent waters and ephemeral streams.</li> <li>▪ Define the range of biologically acceptable reference conditions for arid effluent-dependent and ephemeral streams that offer net ecological benefit.</li> <li>▪ Define the differential response of biological communities to stormwater from natural landscape drainage, agricultural lands and municipal environments.</li> </ul>
<b>Whole Effluent Toxicity (WET)</b>	<ul style="list-style-type: none"> <li>▪ Identify conditions in arid ecosystem ephemeral and effluent-dependent streams appropriate for WET testing application in arid regions, including in relation to stormwater flows.</li> <li>▪ Assess the sensitivity of current test species to typical chemical and physical characteristics of effluent-dependent and ephemeral source waters in the arid West. Improve the test protocol, including solution matrix effects, rearing environment, and selection of native arid species in order to separate effects of effluents from effects of natural conditions, including stormwater flows. The relationship of test results to observed measures of downstream biological integrity needs to be established for representative stream segments.</li> <li>▪ Determine the correlation between test response of current test species and native species of typical arid effluent-dependent and ephemeral streams including “toxic” events.</li> </ul>
<b>Chemical Criteria and Standards</b>	<ul style="list-style-type: none"> <li>▪ Determine chemical quality indicators (nutrients, metals and organics) thresholds and exposure conditions (frequency, duration, and intensity of stress) needed to maintain existing arid West ephemeral and effluent-dependent stream environmental benefits.</li> <li>▪ Develop Biotic Ligand Model predictions for metal toxicity in arid West waters.</li> <li>▪ Conduct studies to understand effect of diel pH variation on metal and ammonia standards.</li> </ul>

*Selection of Research Topics: The Research Plan Process*—Projects implemented under the Phase I Work Plan for EPA Grant #XP-99926701 were selected on the basis of input from the 1997 Conference and recommendations of the RWG, SAG and Research Manager. The

completion of each project has resulted in the development of recommendations for follow-up projects. These recommendations have come from a variety of sources including outreach efforts, the researchers, and SAG and RWG meetings. These activities coupled with the findings from funded projects have generated numerous ideas for potential research activities. Input from these various sources has resulted in the creation of three ways to categorize research activities (Table 2). The selection of any project for research should satisfy all three categories:

<b>Table 2. Research Topic Selection Process</b>		
<b>Research Area Technical Framework<sup>1</sup></b>	<b>Regulatory Interest Framework<sup>2</sup></b>	<b>Selective Criteria<sup>3</sup></b>
<ul style="list-style-type: none"> <li>▪ Habitats of Concern</li> <li>▪ Biological and Ecological Criteria and Standards</li> <li>▪ Chemical Criteria and Standards</li> <li>▪ Whole Effluent Toxicity</li> </ul>	<ul style="list-style-type: none"> <li>▪ Designated use characterization, e.g., ephemeral, effluent-dependent, effluent-dominated, etc.</li> <li>▪ Minimum criteria to protect the use</li> <li>▪ Policies and procedures to support implementation of Project findings</li> </ul>	<ul style="list-style-type: none"> <li>▪ Build upon completed studies</li> <li>▪ Have regulatory relevance to the arid West</li> <li>▪ Emphasize watershed or ecosystem level issues</li> <li>▪ Have regional rather than site-specific application</li> <li>▪ Provide regional context to national initiatives, e.g., nutrient criteria.</li> </ul>

- (1) **Research Area Technical Framework**—Research projects will be categorized technically into the same categories established as a result of the 1997 Conference (Habitats of Concern, Biological and Ecological Criteria and Standards, Chemical Criteria and Standards, and Whole Effluent Toxicity). These categories define key physical, chemical and biological elements of the water quality standards program.
- (2) **Regulatory Interest Framework**—Research projects should support the emerging regulatory framework that has developed from Project meetings, especially RWG meetings. Ultimately, it is within this framework that Project results would be implemented.
- (3) **Selective Criteria Framework**—While a project may not meet all the criteria within the selective criteria framework, projects that satisfy the majority of criteria will be viewed as better candidates for research.

The iterative process described above will continue under this Work Plan. Recommended research topics are evaluated in the context of the Research Agenda established for the Project. The Research Manager in consultation with Pima County staff selects one or more research topics that support the Research Agenda for development as research projects. These specific projects will be based upon the recommendations of major Project participants, including the RWG, SAG and EPA. The specifics of each research topic are identified in a separate document, the Research Plan, which has a limited distribution to safeguard the solicitation and procurement process for RFQs.

*Preparation of RFQs and Selection of Contractors*—The Research Manager and AWWQRP Office will draft research proposals according to requirements for RFQs established by the Pima County procurement procedures. Draft RFQs will be submitted to the RWG and SAG for comment. As applicable, RFQs will include specifications for professional services, quality control, deliverables including presentation and publication requirements, financial limitations, submittal dates, proposal evaluation criteria, proposed award dates, and describe the relevance and importance of the proposed research in the context of AWWQRP goals and objectives.

After an initial screening by Pima County Procurement Department, the Research Manager and AWWQRP Office will screen responses to RFQs for adherence to specifications. The SAG will review qualifying responses to evaluate qualifications of the respondents' project teams and facilities for conducting the research, including their prior project experience and recognition in the scientific community. The SAG will also evaluate each respondent's understanding of the request for professional services, their approach to conducting research to fulfill the request, including the reasonableness of their timetable and budget. Following this review the SAG will submit a recommendation to the Research Manager for selection of a contractor. The recommendation will consist of a ranked list. The RWG may provide comments on the SAG ranked list. The Research Manager and AWWQRP Project Director will review the ranked list and SAG comments and select a contractor.

Following the selection of a contractor, the contractor will be invited to meet with the AWWQRP Project Director, Program Manager and Research Manager to finalize the scope of professional services, schedule and address contract issues. It will be the responsibility of Pima County to manage the administrative and financial obligations of the contract. Contract management will include the tracking of deliverables, monitoring of contract requirements, processing of invoices and payment of contractors. The Research Manager will monitor the progress of those contracts and compliance with research objectives. The Research Manager and AWWQRP Office may also arrange and schedule meetings and presentations between the contractor and the SAG or RWG.

### **Task 3 Prepare “How To”/Implementation Documents for Arid West Waters**

- Prepare draft documents. Documents are subject to the review of the Project advisory groups as described above.
- Identify new data gaps and refined the Research Agenda, as appropriate. Data needs have been identified by completed projects; however, it is expected that the creation of these documents will identify new data gaps. Elements identified as data gaps could become funded as AWWQRP research projects, as funding allows and as directed by Project advisory groups.
- Conduct peer review of draft documents by the RWG and SAG and prepare final documents.

**Task 4 Coordinate Work Plan activities under this grant with ongoing AWWQRP activities authorized under the Phase I Work Plan approved for EPA Grant #XP-99926701.**

- Public outreach has proven to be an important vehicle for sharing information regarding the AWWQRP and generating discussion on the goals and objectives of the Project. At the recommendation of the RWG, the AWWQRP has accelerated public outreach efforts, especially in 2001 and 2002. These outreach efforts have been focused on the following groups:
  - Federal Agencies, e.g., Army Corps of Engineers
  - State Water Quality Agencies, e.g., Colorado Water Quality Control Commission
  - Scientific Organizations, e.g., American Water Resources Association
  - Water Industry Organizations, e.g., Water Environment Federation
  - Water Policy Organizations, e.g., Western States Water Council

Most outreach efforts have ranged from formal oral presentations based on accepted abstracts to informal discussions with agency representatives. Several of these presentations have included the submission of a manuscript for publication as part of the conference proceedings.

The publication of research manuscripts in peer-reviewed journals has been a goal of the AWWQRP since its inception. In May 2002, *Comparative Biochemistry and Physiology* formally accepted a manuscript stemming from the Extant Criteria Evaluation, “Evaluating the role of ion composition on the toxicity of copper to *Ceriodaphnia dubia* in very hard waters,” was accepted for publication. This manuscript was published as part of a series of papers addressing various elements of the Biotic Ligand Model.

In addition to this publication, a manuscript has been submitted to the *Journal of the American Water Resources Association*: “Characterizing the habitat of effluent-dependent streams: Results from the Arid West Water Quality Research Project,” and discussions are underway with the Society for Environmental Toxicology and Chemistry (SETAC) to publish the results of the Extant Criteria Evaluation in book form.

Other opportunities to share information through society or regional newsletters and publications are taken advantage of when available. For example, the AWWQRP presented findings from the Habitat Characterization Study at the annual Water Environment Federation Technology Conference meeting in Atlanta, GA, 2001. One of the papers presented at this meeting, “An Alternative Approach to Permitting Effluent-dependent Waterbodies Is Needed,” was published as a feature article in the Water Environment Federation publication *Watershed and Wet Weather* in July 2002. Under this Work Plan, the AWWQRP will continue its public outreach efforts to share project results to project stakeholders.

- Ensure consistency with AWWQRP policy/guidance documents — Documents produced under this Work Plan will be consistent with the AWWQRP policy/guidance documents prepared under the Work Plan established for EPA Grant #XP-99926701, specifically the *AWWQRP Glossary* and *AWWQRP Publication, Presentation and Style Guide*.

### **Cost Breakdown**

- Administration:           \$218,678
- Research:                 \$281,322

### **Measures of Success**

Measures of success have been identified for each task. The attached timeline illustrates when various activities are expected to occur (Figure 1).

#### **Task 1**

- Submit quarterly progress reports to EPA Project Officer. Each quarterly report will include a summary of administrative activities and will provide an update on the status of Work Plan tasks.
- Conduct at least two RWG meetings during the term of the grant.

#### **Task 2**

- The AWWQRP will continue to commission research projects that are consistent with the Project's purpose and Research Agenda with advice and guidance from the RWG and SAG.

#### **Task 3**

- Preparation and submittal of draft documents for peer review by the SAG and RWG.
- Identification of data gaps that, if filled, would support these documents.
- Preparation of documents.

#### **Task 4**

- The AWWQRP will participate in at least two public outreach activities during the term of the grant. If appropriate, these activities will be coordinated with our public outreach conducted under the existing Phase I Work Plan.

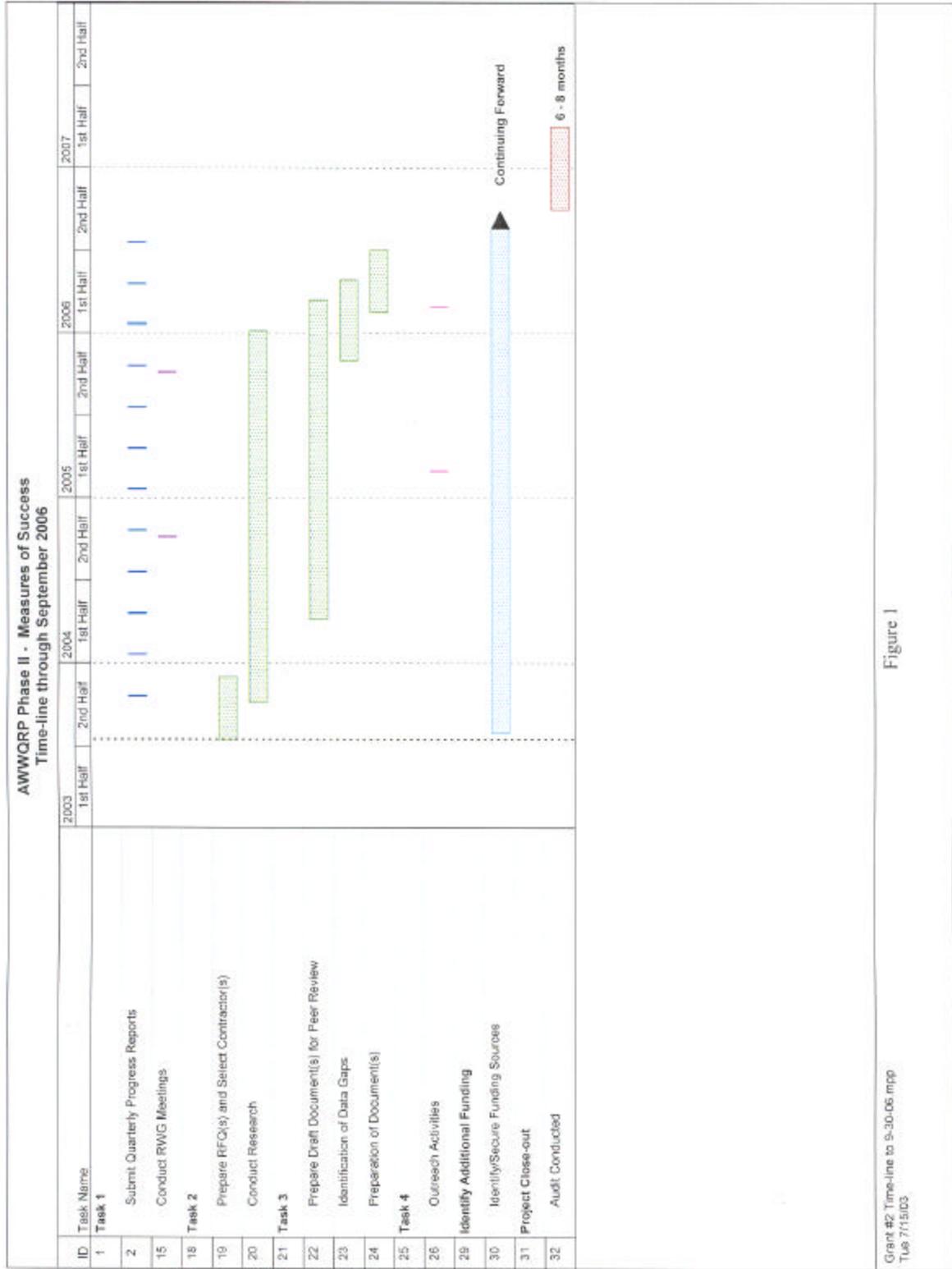


Figure 1