319(h) Work Plan

1. Project Title
Paso del Norte Watershed Based Plan

2. Project Applicant
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Paso del Norte Watershed Council
The Paso del Norte Watershed Council (Council) was established in 2000 to improve the Rio Grande ecosystem and water quality in the sub-basin between Percha Dam, New Mexico and the confluence of the Rio Conchos in Presidio County, Texas. Membership on the Council is open to anyone and extensive efforts have been made to maximize participation by stakeholders throughout the Paso del Norte watershed region. Current members of the Council represent a wide variety of stakeholders, including federal, state, and local governmental agencies, representatives from groups in Mexico, universities, a sovereign tribal entity, non-governmental organizations, environmental interests, and the general public.

Council Authority
The Council was initially formed to serve as an advisory group to the New Mexico-Texas Water Commission (Commission) which has since gone into a sunset phase. Following the sunset of the Commission, the Council became a separate and independent organization on August 25, 2006. Since its inception the Council has engaged in projects and activities to maintain a healthy watershed. The Council has the responsibility and authority to address issues concerning environmental enhancement and mitigation as identified in the Environmental Impact Statement (EIS) and subsequent Record of Decision for the El Paso/Las Cruces Regional Sustainable Water Project (http://www.ibwc.state.gov/Files/EP-ROD.pdf).

Council Statement of Purpose
The Council investigates, develops, and implements projects and activities for watershed planning and management and explores how water-related resources can best be balanced to benefit the Rio Grande ecosystem and the interests of all watershed stakeholders.

The Council builds collaborative relationships among stakeholders and through its members has developed a Coordinated Water Resources Database and Geographical Information System (GIS) for the region (http://www.pdnwc.org). Participants are actively working on a surface-groundwater modeling project that will improve the understanding of the watershed hydrology and water quality conditions. Through these projects the Council collaborates with additional local stakeholders who are not yet official members of the Council, such as the Elephant Butte Irrigation District (EBID).

3. Project Area
The project area is the El Paso-Las Cruces Watershed, hydrologic unit code (HUC) 13030102, which encompasses nearly 5,000 square miles of drainage and 107 river miles. The project includes four water quality impaired reaches known as assessment units (on the Rio Grande: Leasburg Dam to Percha Dam,

Picacho Bridge to Leasburg Dam, Anthony Bridge to Picacho Bridge, International Mexico boundary to Anthony Bridge). In an effort to refine the geographic areas of interest, the El Paso-Las Cruces watershed will be further broken down into 64 distinct 12 digit HUCs. See Appendix A for maps of the watershed.

4. Start and End Dates

The project is estimated to commence around March 1, 2010. It will be initiated once funding becomes available (anticipated date for funding is December 2009/January 2010) and contingent upon the approved hiring of required personnel and/or subcontractors, either through Intergovernmental Agreements, Professional Services Contracts, and/or internal award of funds. Experience has shown that the hiring tasks take approximately four to eight weeks. This complies with Task Implementation provisions outlined in RFP # FY10-SWQB/NPS-0001. The project will be completed in 24 months after project initiation unless a no-cost extension is requested and officially authorized.

5. Problem Statement

The Council understands nonpoint source (NPS) pollution is believed to be a leading cause of water quality degradation in the U.S. Under section 319(h) of the Clean Water Act (CWA), funds are made available to state and local agencies, non-profit groups, and citizen watershed groups to address NPS pollution. Under section 303(d)(1) of the CWA, states are required to develop a list of waters within its borders that are not in compliance with water quality standards and establish a Total Maximum Daily Load (TMDL) for each pollutant. In 2004, the New Mexico Environment Department (NMED) identified a water quality exceedance within the El Paso-Las Cruces Watershed and subsequently published a TMDL for *Escherichia coli (E. coli)* in the CWA 303(d)/305(b) Integrated Report and List of Assessed Surface Waters.

HUC 13030102 is the geographic area of concern and NMED has developed a TMDL document based on *E. coli* data collected by NMED's Surface Water Quality Bureau (SWQB) in 2004. A TMDL is defined as "a written plan and analysis established to ensure that a water body will attain and maintain a water quality standard including consideration of existing pollutant loads and reasonably foreseeable pollutant loads." This will be taken into consideration in the Council's proposed monitoring plan for sampling water quality. The existing water quality data does not adequately identify the locations or "hotspots" for pathogenic loads therefore effective implementation of best management practices (BMPs) and related load reductions cannot be estimated. The overall goals of a Watershed Based Plan (WBP) cannot be met without additional data collection and analysis to address the existing data gaps. In this phase of the WBP, data sets gathered by other agencies, including the U. S. Geological Survey (USGS), U.S. International Boundary and Water Commission (USIBWC), and EBID will be used to provide additional information and analyses where applicable, accessible, and available.

The bacteria *E. coli* was the only pollutant found in the project area that did not meet New Mexico's water quality standards, as referenced in NMED's 2008-2010 impaired waters list. *E. coli* bacteria live in the gut of warm blooded animals and its detection in water indicates contamination from fecal matter. While certain strains of *E. coli* are known to be pathogenic, its detection is generally used as a surrogate for evidence that other serious pathogens may also be present. Spatial and temporal analysis of the 2004 NMED TMDL assessment showed an increasing downgradient of *E. coli* exceedences in the river. These exceedences have been partially attributed to non-compliance of point source discharges (WWTPs) and there is evidence that precipitation events and subsequent storm water flows contributed to NPS pollution in some instances.

In July 2006 the Council undertook the initial 319(h) grant to develop a WBP (previously known as a Watershed Restoration Action Strategy) for the Paso del Norte watershed in response to the 2004 *E. coli* TMDL. The Phase I WBP accomplishments include a surface water quality data review, an extensive

analysis of existing biological data, regional stakeholder outreach, expanded Council membership, and local/regional partnerships. All components of the WBP including financial reporting requirements were submitted to NMED by December 31, 2007, through the fiscal agent, the New Mexico Department of Agriculture (NMDA).

One key function of the Phase II WBP will be to identify solutions and strategies to resolve the current data gaps:

1. In the 2004 data set, contamination from documented failures of WWTP's (largely confined to Sunland Park WWTP) caused the most extreme exceedance events. Most of these events occurred early in the year. While these are point sources, their extreme values skew the statistical analysis of the 2004 data set. Despite the limitations of this data set, the bacterial exceedances require continued development of the WBP.

2. Calendar year 2004 was an unusual year in hydrologic terms. In the period 1979-2002, the two irrigation districts in the Rio Grande Project [EBID, El Paso County Water Improvement District No. 1 (EPCWID#1), and the Republic of Mexico] had full diversion allocations, indicating a very wet period. In 2003 and 2004, allocations to EBID and EPCWID#1 were 22% and 25% of a full allocation, respectively. Snowpack records show that 2003 was a dry year followed by another dry year. In 2004, a fairly productive monsoon season in July through September produced several significant runoff events that appear to be correlated with elevated *E. coli* levels in the Rio Grande. One year of sampling data, with its particular climatic idiosyncrasies, limits the hypotheses that can be tested and conclusions that can be drawn regarding the sources of *E. coli* in the Rio Grande.

3. While the 2004 data set shows a correlation between elevated *E. coli* and precipitation and runoff events, the data is inadequate to say whether the source is urban, rural, or rangeland, wildlife, or some combination. This limits the specificity of BMP identification and implementation.

The first phase of the WBP clarified the implications of the *E. coli* data used in the preparation of NMED's TMDL document. Points 2 and 3 above suggest that informed and successful management of *E. coli* in the study area will require additional data. A systematic sampling and analysis program must be established to better define the sources and dynamics of *E. coli* in this stretch of the Rio Grande.

6. Key Persons

Day-to-day project management will be provided by the fiscal agent, NMDA, and the 319(h) Project Coordinator. Personnel from NMDA, including Julie Maitland (division director) and Hilary Brinegar (water specialist), will oversee fiscal and overall project management in collaboration with the Council and its Clean Water Subcommittee (CWS). In addition, Patricia Depner (NMDA audit budget technician) will provide record keeping and financial reporting assistance. Project management duties are described throughout the work plan narrative in greater detail depending on roles and responsibilities of personnel. In addition to those named below, the NMED Project Officer, Chris Canavan, will continue to play a key role in all aspects of the 319(h) project as he did in the Phase I WBP process.

The Council will continue to seek broader stakeholder participation in the continued development of the WBP. The Council's initial experience with 319(h) grant monies prompted the development of the CWS. Along with a Project Coordinator, this group will manage all aspects of the development of the Phase II WBP with NMDA personnel as described above. Key members of the CWS have undertaken coordination and writing of the proposal and work plan. These key members include Hilary Brinegar, Julie Maitland, Jennifer Montoya, Sue Watts, Vanessa Lougheed, Fernando Cadena, Patricia Depner, and others as needed to provide input to various phases of the WBP. The CWS includes the following individuals in alphabetical order:

Peter Bennett, City of Las Cruces
Kevin Bixby, Southwest Environmental Center
Daniel Borunda, U.S. Section, International Boundary and Water Commission
Hilary Brinegar, New Mexico Department of Agriculture, Council Vice-Chair
Christopher Brown, Ph.D., New Mexico State University
Fernando Cadena, consultant to Elephant Butte Irrigation District
Patricia Depner, New Mexico Department of Agriculture
Girisha Ganjegunte, Texas A&M University AgriLife Research Center at El Paso
Brian Hanson, retired, U.S. Fish and Wildlife Service
Conrad Keyes Jr., consultant to the U.S. Army Corps of Engineers, Council Chair
J. Phil King, Ph.D., New Mexico State University
Vanessa Lougheed, Ph.D., University of Texas at El Paso
Julie Maitland, New Mexico Department of Agriculture
Jennifer Atchley Montoya, Bureau of Land Management
Zhuping Sheng, Ph.D., Texas A&M University AgriLife Research Center at El Paso
Elizabeth Verdecchia, U.S. Section, International Boundary and Water Commission
Sue Watts, Ph.D., Texas Tech University Health Sciences Center, Council Secretary

Additional Support will be provided by Council Executive Committee members:

Juan Flores, Universidad Autónoma de Cuidad Juárez
Inga Groff, El Paso League of Women Voters
Joe Groff, Chihuahuan Desert Wildlife Rescue
Barbara Kauffman, Rio Grande Council of Governments
Ari Michelsen, Ph.D., Texas A&M University AgriLife Research Center at El Paso, Council Treasurer
Alfredo Granados Olivas, Ph.D, Universidad Autónoma de Cuidad Juárez
Erin Ward, New Mexico State University

7. Project Description

The Phase I WBP clearly identified data gaps that necessitate a water quality monitoring program and the further engagement of additional stakeholders to the WBP process. In the following paragraphs, the work plan outlines the methodology for the water quality monitoring project, stakeholder outreach and education, and other elements such as the future approach the Council will take for BMP identification and implementation.

This project will utilize the U.S. Environmental Protection Agency's (EPA) 'nine key elements' of the watershed-based planning process in the continued development of the Paso del Norte WBP:

I. Identification of causes and sources of impairment
II. Estimate of load reduction from management measures
III. Description of point source management measures
IV. Estimate of technical and financial need
V. Information and education component
VI. Schedule for implementing nonpoint source management
VII. Description of interim measurable milestones
VIII. Criteria for determining load reduction success and overall progress
IX. Monitoring component to evaluate effectiveness of management measures

Source: Environmental Protection Agency. October 2005. *Handbook for Developing Watershed Plans to Restore and Protect Our Waters.*

This project also implements New Mexico's Nonpoint Source Management Plan by addressing its watershed based planning objective (3.1 Objective 1 – Watershed-Based Planning):

> *Watershed-based plans that meet all nine elements identified in the Nonpoint Source Program and Grants Guidelines for States and Territories (Federal Register, October 23, 2003) are completed using stakeholder-driven processes for all priority watersheds at an average of ten new watersheds per year until all priority watersheds have plans in place by the year 2045.*
>
> *Stakeholder-driven planning processes will be used to reach this objective because stakeholders (resource management agencies, non-profit organizations, watershed residents, and other people interested in specific watersheds) will have a critical role in implementing these plans, and their early and substantive involvement will increase the quality of these plans. The intent of the Watershed Protection Section is to rely on previous planning efforts and watershed groups that have already developed as much as practicable, in order to utilize the investment the program developed between 2000 and 2009.*

Project Coordinator

The Council will hire or contract a 319(h) Project Coordinator (Coordinator) to be responsible for the day-to-day management of the 319(h) grant project including record keeping; coordination with the NMED program officer; submission of required reports to NMED in coordination with the fiscal agent, NMDA; communication among the Council members, project contractors, stakeholders, the general public, and other interested parties; meeting scheduling and facilitation; facilitation of outreach activities for existing and potential new stakeholders; identification of other existing water quality sampling programs in the project area including coordination with entities such as EBID, USIBWC, EPCWID#1, USGS and the City of Las Cruces (CLC); and coordination of the WBP and production of the final product for submission to NMED. If the Coordinator is hired as an employee, she/he will be housed at the NMDA offices.

Addressing Water Quality Data Gaps

The Council will establish a monitoring program for water quality sampling in an effort to address **element I** of WBPs. The objective of the Phase II WBP process is to identify more specifically the sub-basins or areas within the watershed that may be contributing to the water quality exceedance.

This plan will also help identify the sources of impairment as discussed in the Phase I WBP 'Broad Monitoring Goals' and will:

- Determine sections of river where NPS pollution is likely to originate.
- Determine events and/or time periods where impairments occur or are likely to occur.
- Identify and better characterize nonpoint sources: rural, urban, rangeland.
- Identify and better characterize point sources (WWTP, animal feeding operations, septic systems).
- Characterize contribution of NPS from sub-watersheds, drain flows/return flows, storm water flows.
- Identify types of *E. coli* sources in the watershed on a preliminary basis.
- Develop a database management system compatible with STORET.
- Identify and develop an implementation plan for BMPs to meet water quality goals.
- Develop a long-term monitoring program.

Water Quality Monitoring Program

NMED's 2004 study indicated that exceedances were most likely to occur seasonally after June 1 and before October 1 in sites downstream from Derry, New Mexico. The exception was the site downstream of the Sunland Park WWTP, which was not functioning properly at that time. Since the exceedances appeared to be associated with runoff events and were distributed among various reaches, nonpoint sources are the most likely candidates. The project monitoring plan is designed with this in mind to account for these conditions.

Samples will be collected at specific locations distributed among the 12 digit HUCs for the Rio Grande between Elephant Butte Dam and International Dam. In particular, sampling will focus upstream and downstream from tributary flows such as wastewater treatment outflows and ephemeral arroyos, as well as nonpoint sources such as areas of intensive crop agriculture, rangeland, run-off from animal feeding facilities, and urban/suburban areas where pet, waterfowl, and/or other wildlife waste might accumulate. Whenever and wherever possible, sampling will coincide with existing sampling programs such as EBID, USIBWC, USGS, and EPCWID #1. The USIBWC Texas Clean Rivers Program (TxCRP) has offered the use of data collected from their regular monitoring sites in New Mexico, which includes locations upstream and downstream of major drains and wastewater inputs in the Rio Grande between Anthony and the southern-most area at the U.S./Mexico international boundary.

In the first year, the river and tributaries will be monitored on a monthly basis for the purpose of determining spatial and seasonal variability in water quality and pathogenic contamination due to stochastic events such as storms, drought, manure application, etc. During the monsoon months of July through October, when run-off is expected to be greatest, additional sampling of parameters will occur. Data collected in the first year will be used to adjust the sampling program in the second year to focus on hotspots. Monitoring will continue at sites to be determined and will be redistributed to provide the most information about NPS.

The Council will partner with EBID on water quality monitoring activities due to their on-going sampling program. For instance, from July through September of 2008, EBID sampled arroyo flows at the confluences with the Rio Grande that occurred as a result of monsoonal rainfall events. Since September 2008 EBID has been taking routine monthly samples at six sites along the Rio Grande (Below Caballo, Hayner Bridge, Leasburg Cable, Picacho Bridge, Mesilla Dam, and the River at Anthony). These six sites, plus the confluence of the Montoya Drain with the Rio Grande, could serve as primary routine monitoring sites for this project. At each site continuous flow data have been routinely recorded.

EBID has planned a future sampling program consisting of monthly sampling at seven river stations with bi-weekly routine samples in the monsoon season from July through September to include tributaries. Five major drains (Montoya, East, Del Rio, La Mesa, and Picacho) would be routinely sampled monthly at their confluence with the Rio Grande. (See Map 3 in Appendix A.)

Appendix A contains a map (Map 3) displaying proposed sampling sites for fixed, routine sampling activities. Episodic samples will also be collected during storm water events and locations will be entered into a global positioning system upon grab. Strategic diagnostic sampling will occur in response to positive *E. coli* tests found during routine and episodic sampling in order to isolate sections of drains and arroyos in the watershed where the NPS contribution may be accumulating. All episodic and diagnostic sampling will be adaptive.

Quality Assurance

Sample collection and analytical methods will follow NMED's SWQB "*Standard Operating Procedures (SOP)"* and will be analyzed in a laboratory with appropriate experience. Where possible, data review, verification and validation will be completed as described in the NMED-SWQB "*Quality Assurance Project Plan (QAPP) for water quality management programs*", and the QAPP will be adapted to reflect the data consistency, adaptability, and standardization of data. Verification of field data will begin prior to leaving a site, when all forms will be checked for completeness and will continue with the cataloguing of samples upon return from the field to the lab, and will be followed by careful accounting of analysis undertaken for each sample.

Analysis and Application of Monitoring Data

Results from the water quality monitoring program will be analyzed to identify areas of the river which are free from *E. coli* contamination versus areas where there are exceedances. For the areas where the cause of an exceedance can be attributed, BMP's will be identified to address the problem. Standard BMP's recommended in reliable references will be considered and final selection will be based on cost effectiveness and will rely on significant input by associated/affected stakeholders (**element III**). Once a BMP has been identified, then estimated load reductions will be calculated (**element II**) and a schedule for the implementation of the restoration measure can be devised (**element VI)**.

Database Management

Based upon review of the Phase I WBP, the EPA suggests the Council clarify how databases will be managed and maintained during all phases of the project. Included in the EPA's comments is a need to show how "the data management process will be used during the development of pre and post monitoring projects and the data verification process where a set of criteria is used to accept, reject or qualify information." EPA requests that data used to support 319(h) projects be provided for use by EPA in accordance with STORET protocols, or compatible with STORET.

EPA also states the Council should develop decision making criteria to compare data used for the identification of bacteria in the watershed.

Proposed Bacterial Source Tracking Method and Sampling Plan

As noted in the Phase I WBP, the cause of an exceedance may be unidentifiable based on the data in hand and in these cases, it is likely that a bacterial source tracking (BST) study will be needed to help distinguish between animal and human *E. coli* sources. The Council has identified an opportunity to carry out a limited BST analysis in the Phase II WBP.

The Council is aware that two multi-year BST projects have been sponsored by NMED, one on the Middle Rio Grande (http://www.nmenv.state.nm.us/swqb/Rio_Grande/Middle/MST/index.html) and one in the Cimarron, New Mexico watershed (http://www.cimarronwatershed.org/info/AnnualReport2007_pp_1-24.pdf). These projects were carried out with Dr. Geof Smith from New Mexico State University and the Council proposes to contract with Dr. Smith as well.

BST Background

Due to the unique biochemical environment in the gastro-intestinal tract of different animal hosts, *E. coli* bacteria have become adapted to their animal "host" and many have become resident inhabitants and differ genetically from the *E. coli* in a different animal host. Thus, it is possible to track the source of *E. coli* back to its animal host source using genetic analyses. There are limitations to the method (see the EPA's Source Tracking Guide, 2005, http://www.epa.gov/nrmrl/pubs/600r05064/600r05064.pdf), such that BST studies must only be considered as reasonable estimates rather than exact attributions of sources to stream *E. coli*.

The two multi-year BST projects found that the number one contributor of stream *E. coli* was wildlife, specifically avian sources. The data from both projects demonstrated highest *E. coli* occurrences in seasons with the highest rainfall, specifically during the summer monsoon rains. Due to this connection between runoff events and high levels of *E. coli*, it is traditionally thought (and reasonably documented) that turbidity levels should track *E. coli* levels. In fact, the USGS has proposed the BacteriALERT program to estimate *E. coli* concentration using real-time monitoring of stream turbidity (http://ga2.er.usgs.gov/bacteria/SummaryAllText.cfm). The relationship between two different particles, one largely inorganic and non-living (stream turbidity) and the other a viable bacterium, is complicated. One finding in the Cimarron Watershed source tracking study is shown in Figure 1. Correlative data in one stream (the Cieneguilla) supports a statistically positive relationship between turbidity and *E. coli* levels, whereas the relationship is nil in the other stream (the Moreno). Data collected in this study may highlight the need to collect data to document the complex relationship between *E. coli*, rain events and stream turbidity.

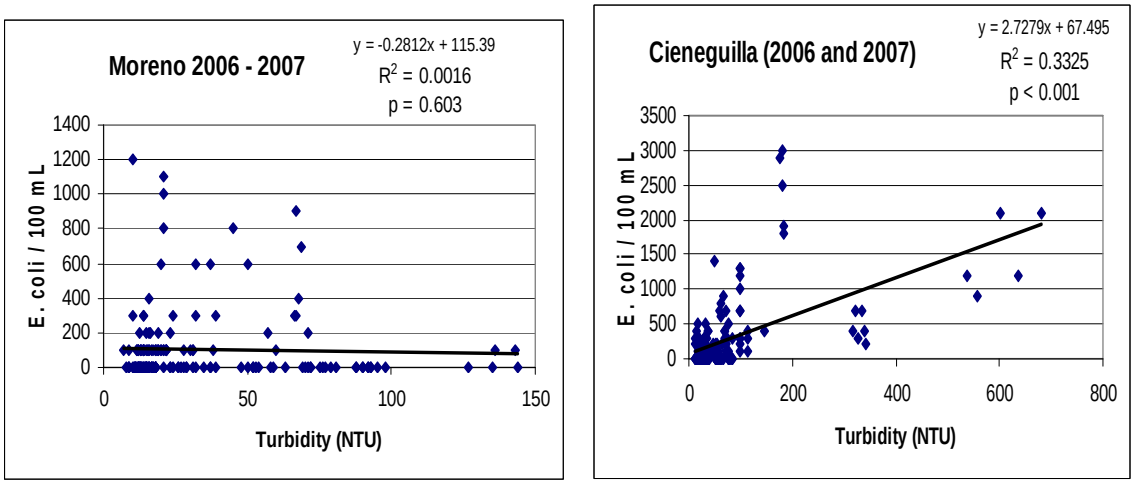


Figure 1. Regression analysis of the correlation between stream turbidity (in terms of Nephalometric Turbidity Units, NTU) vs. levels of *E. coli* in the Moreno and Cieneguilla creeks. For each stream, data is from 170 separate *E. coli* and turbidity measurements. Note: this is Figure 4 in the Cimarron Watershed Alliance 2007 report ((http://www.cimarronwatershed.org/info/AnnualReport2007_pp_1-24.pdf).

The lower Rio Grande has been listed in the 2008-2010 State of New Mexico CWA §303(d)/§305(b) Integrated Report as being in bacterial exceedance due to consistently high levels of *E. coli* being documented in the Rio Grande (http://www.nmenv.state.nm.us/swqb/LowerRioGrande/intro.pdf). There is an interesting gradient of *E. coli* contamination in the lower Rio Grande that increases from Caballo reservoir southward. At Caballo reservoir, though the sample size was small, no samples exceeded the *E. coli* standard, whereas at Percha Dam 17% of its samples were in exceedance, and further southward, 30% of the samples between Leasburg dam and the international border were in exceedance for *E. coli* (Figure 2).

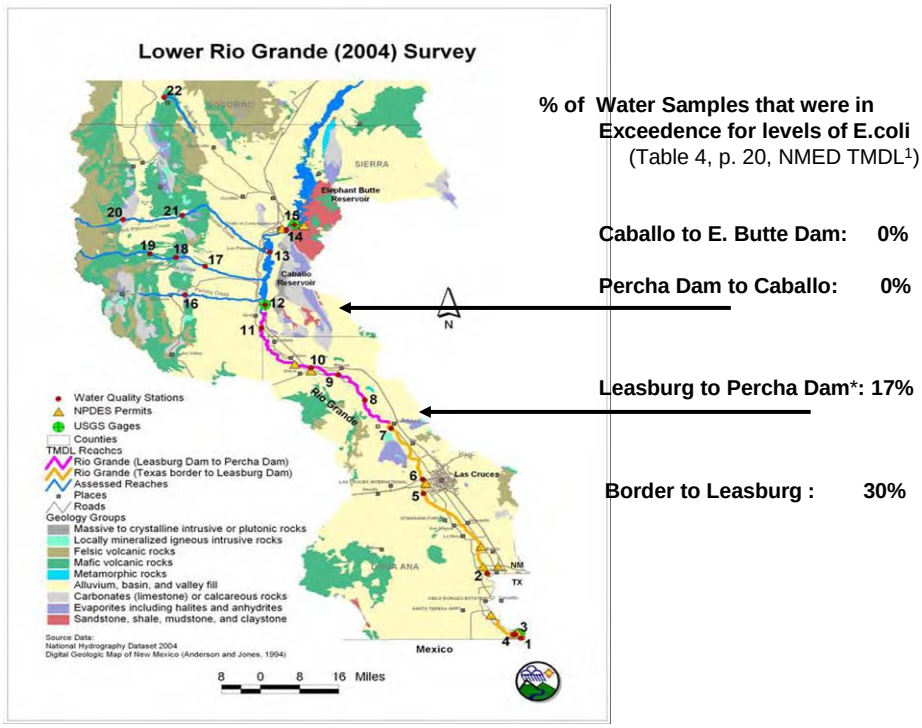


Figure 2. Percent of samples from the Lower Rio Grande that are in exceedance of the *E. coli* standard of 235 / 100 mL. Note the trend of increasing southward contamination. Figure was drawn from information in the 2007 TMDL NMED report. (http://www.nmenv.state.nm.us/swqb/LowerRioGrande/intro.pdf).

BST Method and Sampling Plan

The Council would like to perform analyses similar to the approach used in the Cimarron Watershed (CWA 2007 reference above) where it will be cost-effective to perform BST analyses. The approach will routinely test for *E. coli* using the EPA approved 1603 method http://www.epa.gov/nerlcwww/1603sp02.pdf). After the first year of sampling, it is expected that identified hotspots will show significantly elevated *E. coli* levels. In consultation with the BST contractor, the CWS and the Council will select approximately four sites to perform BST analyses using methods similar to those previously used in NMED-funded projects.

Personnel at the Institute of Environmental Health (IEH) in Seattle, Washington were among the first scientists to develop the methods for microbial source tracking, and IEH continues to be employed to source-track recent outbreaks in the U.S. It has accumulated one of the world's biggest libraries of known-source *E. coli* isolates; their library contains over 18,000 unique strains of *E. coli* that have been typed and associated with animal hosts. See IEH's Microbial Source Tracking website for additional details: http://www.iehinc.com/mst.html. The ribotyping method used by IEH has been the method (and the lab) used for source tracking in the two previous NMED BST projects.

Long Term Monitoring

The Phase II WBP will include a plan for long-term water quality monitoring. Once sources of *E. coli* have been identified, it will be possible to determine suitable BMPs and the costs for implementation in the watershed. The Council will develop a long-term monitoring strategy to determine the effectiveness of BMP's in meeting water quality standard goals in accordance with state regulations. The long-term monitoring plan will include an adaptive management approach such that BMPs can be adjusted to

achieve water quality goals with respect to pollutant load reductions. Creation of a long term monitoring plan with the flexibility characteristic of an adaptive management approach will address **elements VII, VIII** and **IX** of WBPs. This phase of the WBP, however, will not include on-the-ground BMP implementation.

Achievement of Target Load Reductions

In EPA's letter to NMED dated June 25, 2009, the EPA discusses the Council's previous Phase I WBP effort. EPA requests, "work plans include a technical basis for focus of implementation efforts, an estimate of load reductions, and a description of monitoring to assess effects on water quality." This work plan includes descriptions of the technical basis for the approach to collect additional water quality samples to ascertain with greater confidence the possible sources and therefore probable location of *E. coli* in the watershed. Through this effort the Council will be able to identify BMPs that have the potential, once implemented in a consistent pattern, to meet load reductions and achieve the stated water quality goals. It should be understood by EPA that this phase of the WBP process will lead to a better understanding of the overall conditions at the sub-basin level of the watershed.

According to NMED's TMDL, "the target values for bacteria are based on the reduction in bacteria necessary to achieve numeric criteria. The TMDL is also consistent with New Mexico's antidegradation policy. The segment-specific criteria leading to an assessment of use impairment for the Rio Grande (International Mexico Boundary to Leasburg Dam) and the Rio Grande (Leasburg Dam to Percha Dam) is the numeric criteria stating that "the monthly geometric mean of *E. coli* bacteria126cfu /100 mL or less; single sample 410cfu /100 mL or less" for the designated contact use (20.6.4.101 NMAC)."

To more fully address **element II**, the EPA indicates the Council needs to provide estimates of load reductions from management measures in the next phase. The Council posits this will occur through the water quality sampling program in this phase of the WBP.

EPA's comments regarding the Phase I WBP states, "missing is the landscape/landowner level of specificity that will eventually become necessary to execute the plan." As can be seen from this work plan, the Council will use the 12 digit HUC ID to bring the understanding of the watershed to the sub-basin level. Items identified by EPA for inclusion in the next WBP to address **element I** in a map include:

- Critical areas (e.g., acreage of affected land identified as a source of bacteria within the watershed).
- Physical features such as lakes, dams, acequias, and streams. Run-off analysis with respect to the critical areas identified above.
- Land use distribution and diversity (e.g., allotments on BLM lands).
- Surface water sampling locations defined as NMED sampling locations, USGS sampling location, etc. Identification of surface water features in the upland acres needed to be sampled.

Water Quality Sampling Partnerships

The Council intends to utilize its existing partnerships through its members and form new cooperative relationships to establish a collaborative program in water quality data sampling, monitoring, and analysis to accomplish the goal of identifying causes and sources of NPS. Strengthening these cooperative relationships with our regional water quality stakeholders will ensure the best use of financial resources and contribute to match assistance.

The Council envisions the creation of a Volunteer Water Quality Monitoring Team (Team) and Sampling Network (Network) through continued stakeholder outreach and expansion of the Council. The use of

volunteers in the implementation of an educational sampling and monitoring program on the river (at public access areas) will meet multiple goals of the stakeholder outreach portion of the project. This could include the use of the Southwest Environmental Center's (SWEC) volunteer base, other members of the Council, and students ranging from middle school to university level as well as other citizen volunteers. The Council envisions the volunteer sampling program will, at the minimum, educate volunteers about water quality sampling methods. If volunteers are properly trained and safety and liability issues are adequately addressed, a certain cadre of volunteers may be used to collect samples.

Volunteers involved will receive training by a qualified entity to be determined (NMED personnel will likely provide the training in accordance with the QAPP). In addition, water quality sampling and monitoring equipment and supplies will be purchased for use by volunteers and personnel. Sampling partners identified by the Council include EBID, New Mexico State Parks, USIBWC's TxCRP for the Rio Grande Basin in Texas, where applicable, CLC through its storm water management program, the USGS which conducts sampling, monitoring, and analyses of water quality parameters along the Rio Grande and others as identified. Other partners may include counties and additional municipalities in the area that also must address storm water management planning and program objectives.

8. Implementation Task Schedule

The Phase I WBP contains future recommendations for BMP implementation and stakeholder input during the Phase II process. Once a sound characterization of water quality impairments caused by *E. coli* exceedances is accomplished in Phase II, the Council and the CWS will be able to coordinate with other regional water quality stakeholders in redefining effective BMPs for the Paso del Norte watershed, the implementation of BMP recommendations, and effectiveness monitoring. These future activities would fully address **elements VII, VIII and IX** of the WBP. Following the water quality sampling data collection phase of this work plan, the Council will develop a specific list of BMPs for implementation in the watershed. This action will address **element III** of the WBP process. The Council's CWS will lead the effort to complete Phase II of the Paso del Norte WBP. The Council expects the size and the diversity of the CWS to increase with participation by new stakeholders. We will ensure stakeholder input to the WBP document, regardless of whether the stakeholder is a member of the Council.

The Phase II WBP will integrate an adaptive management approach and will be based on the data collected. At the close of the Phase II WBP, the Council will have a clearer understanding of sources of *E. coli* in the watershed and will be in a stronger position to select and promote the use of BMPs.

The following elements will be included in the WBP:

- Identification of potential sources and possible types of *E. coli* contamination.
- Identification of the water quality goal(s) as established by NMED and EPA's water quality standard numeric value.
- Development of criteria to determine load reductions to reach target water quality goals.
- Recommended BMPs tailored to conditions in the Paso del Norte watershed.
- Identification of sites suitable for BMPs.
- Estimates of costs for future implementation of BMPs and other management activities such as education, monitoring, planning, and evaluation.
- Sources of funding that will assist in implementation of BMPs.
- Identification of stakeholders and/or partners to implement BMPs.
- Monitoring strategies to measure success and track interim, measurable milestones for future BMPs and other activities.
- Creation of a method to determine success including identification of other environmental indicators to measure progress.

9. Stakeholder Outreach and Education

The Council launched its information/education component in the Phase I WBP where it found there is broad concern in the watershed for water quality and a willingness to work toward improving the condition of the Rio Grande. The Council will continue to enhance public understanding of the project and the issues by building upon the early participation of the various stakeholder groups in Phase I. This aspect of the Phase II project will address **element V** of WBPs.

The following is the methodology that will be used to develop broad stakeholder participation and lead to the selection, design, and implementation of the NPS management measures:

Identify Key Stakeholders

In the Phase I WBP, the Council identified key stakeholders and built a database with contact information. Several important stakeholder entities, such as local governments, have not been engaged due to lack of capacity. Doña County, New Mexico State Parks, Doña Ana Flood Commission, New Mexico Interstate Stream Commission, Lower Rio Grande Water Users Organization, Doña Ana and Caballo Soil & Water Conservation Districts are examples of entities the Council will reach out to and encourage participation and membership. The Coordinator will continually update the stakeholder database. The Coordinator will also learn about other watershed organizations that have identified key stakeholders and would adopt any appropriate methods.

Facilitate and Engage Stakeholders

The Coordinator will serve as the main point of contact for regional stakeholders and will perform outreach activities with guidance from the CWS. The Coordinator will utilize, and update as necessary, outreach materials produced in Phase I. The Coordinator will develop new information and education materials, such as factsheets, brochures, presentations and other media. These will describe the 319(h) grant, the watershed of concern, the consequences of exceeding *E. coli* standards and the benefits of implementing BMPs. The Coordinator will also explore what outreach materials have been developed by other watershed organizations and adapt them if appropriate. The work plan budget includes funds for postage and mailing to send materials and invitations and for advertisement of meetings through legal notices and other announcements. The Council is aware that all stakeholders do not have access to email or the internet and may face constraints such as economics and provider services.

The Coordinator will contact each stakeholder group personally and present the Phase I WBP and Phase II goals, including the need for expanded monitoring. The Coordinator will also make presentations describing the problems and issues associated with elevated levels of pathogenic water quality parameters. Stakeholders will be asked to join the Council and to sign up for the Team.

The Coordinator will identify entities that are sampling water quality, such as schools, universities, researchers and agencies. The Council will propose that these entities comprise the Team and Network of regional volunteers who are water quality stakeholders to participate in monitoring and sampling; this will serve multiple purposes of data sharing, identifying causes and sources of impairments and stakeholder outreach. The Team and Network will be facilitated by the Coordinator.

The Council will host a series of lectures and field trips that will explain the possible sources of fecal coliform contamination as well as the negative consequences of elevated levels of *E. coli* in the watershed. The interactive lectures and field trips will be held over the course of the grant project in various communities within the watershed. At these events participants will be asked to join the Team and to join the Council. The Council will also participate in regional events and host events at a variety of venues, such as senior centers, schools, fire stations, and community centers. Events will be announced through a variety of print and web based medium. The Coordinator will arrange and manage these events.

All outreach materials will be made available on the Council's website, http://www.pdnwc.org. (Phase I WBP and outreach materials are currently available on this website.)

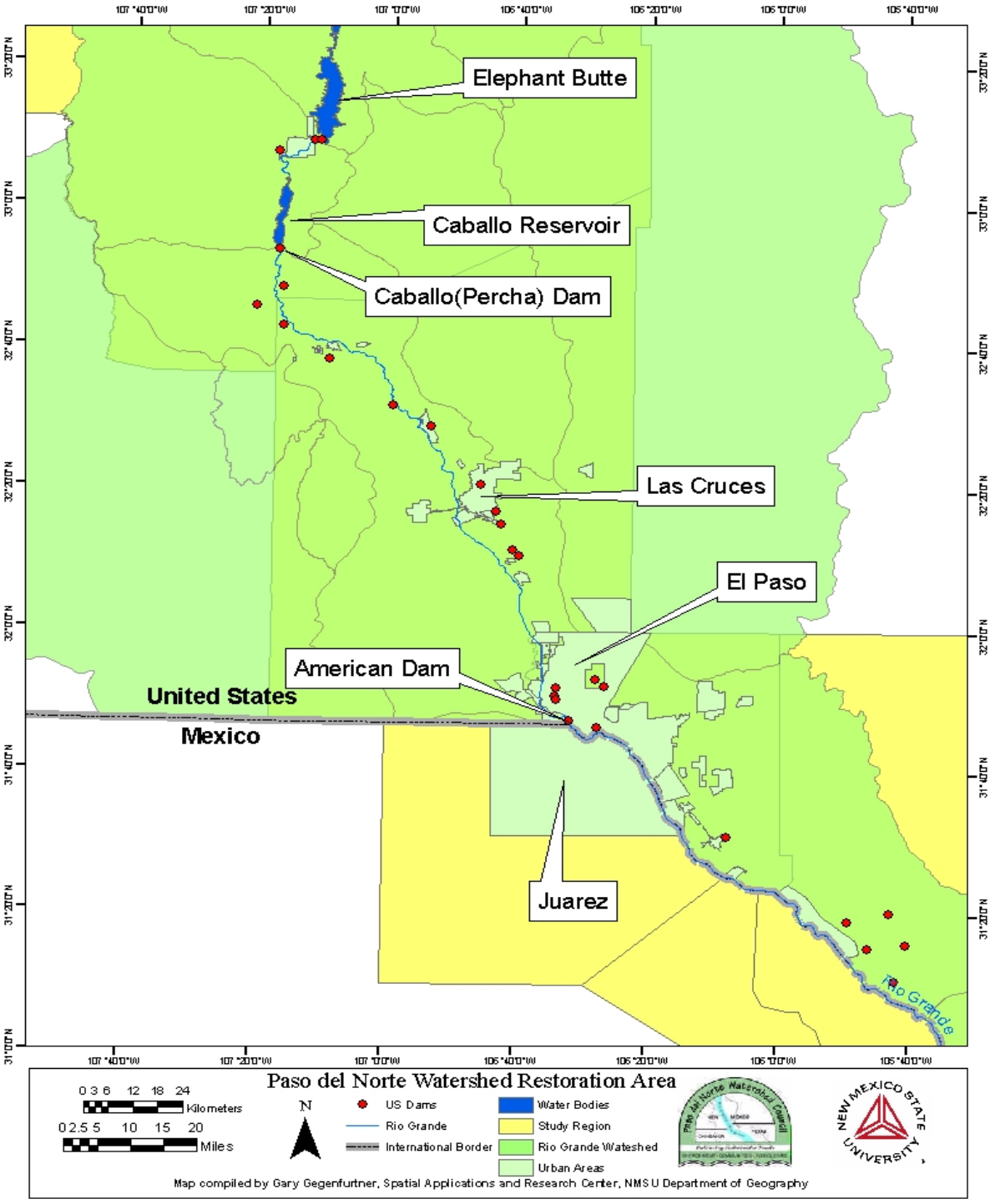
10. Performance Measures

The project goals outlined in the implementation schedule serve as a roadmap for this phase of the watershed based planning process. Meeting performance targets related to these activities will be accomplished by the Council's CWS with assistance by hired contractors. Successful progress will be determined as the multi-disciplinary team works with expert contractors to the capacity allowed by the established budget.

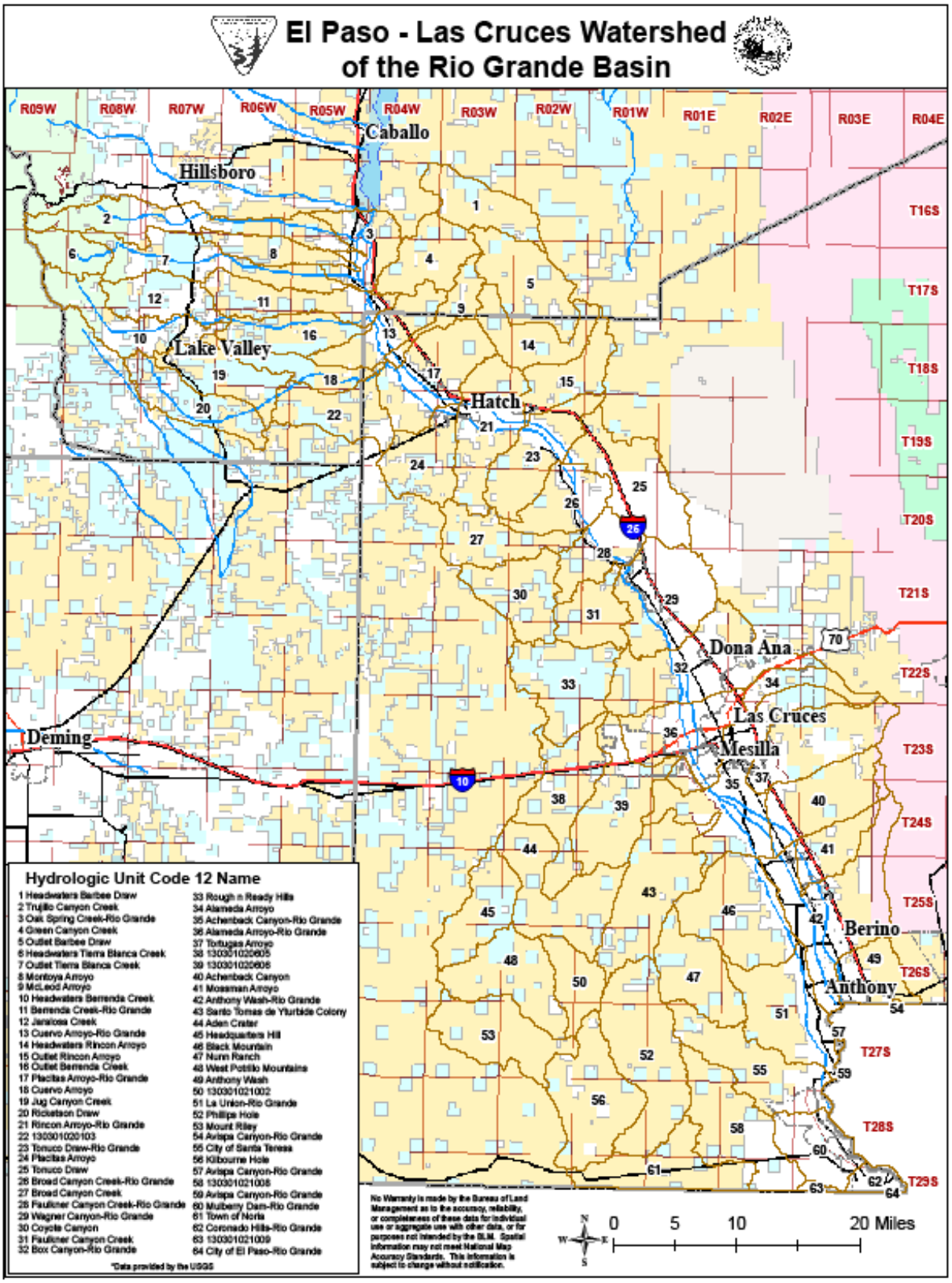
It is not anticipated that the Council will have the ability to measure milestones as related to attainment of future water quality goals until this phase of the WBP is complete and additional funding is solicited to implement BMPs. It is the Council's hope that this phase of the process will result in concrete outcomes that can be funded in the near term to begin to achieve the water quality goals of the 319(h) project in order to delist the stream segment in the El Paso-Las Cruces Watershed, HUC 13030102.

Appendix A

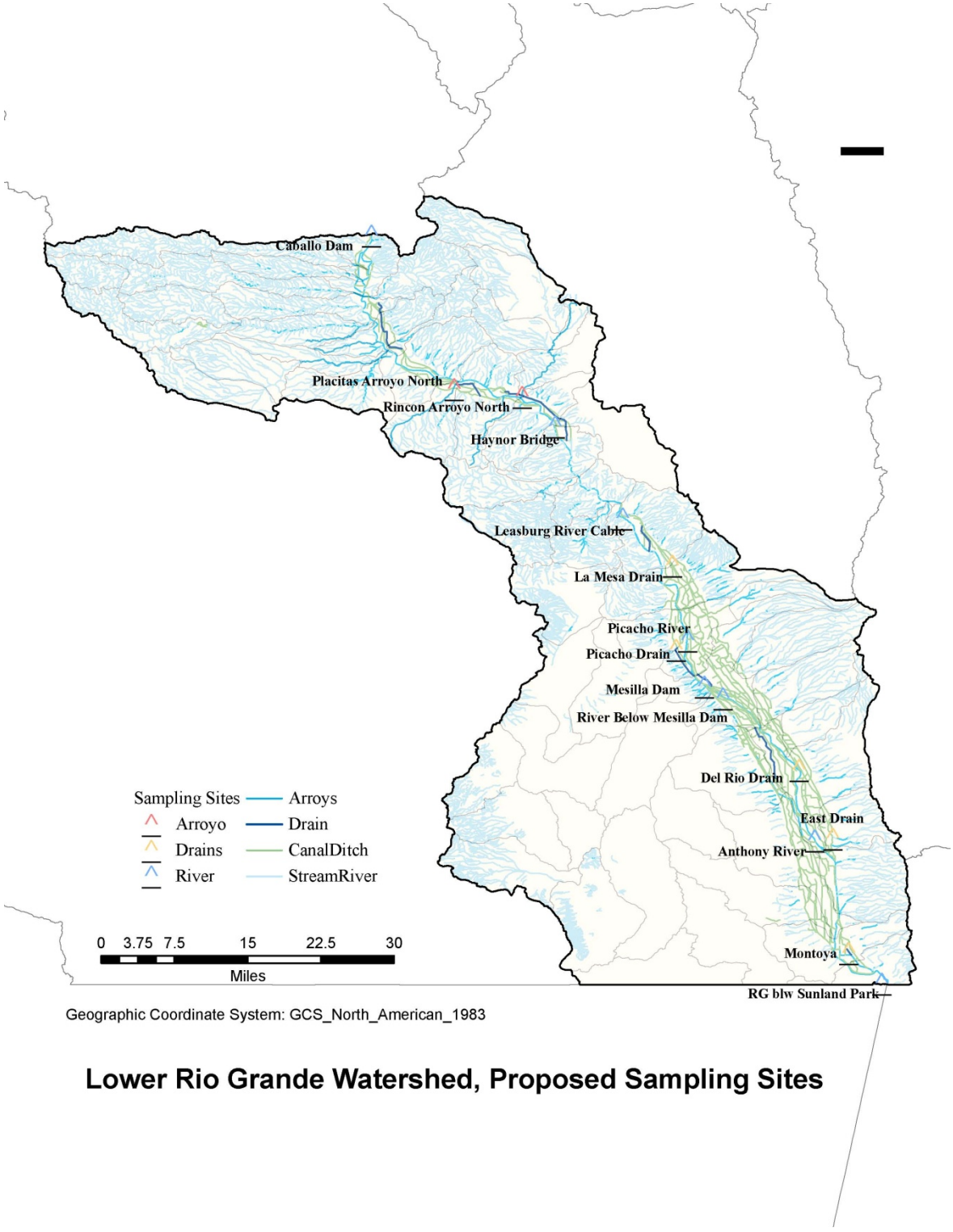
Maps of the Watershed



Map 1: Paso del Norte Watershed Restoration Area



Map 2: El Paso-Las Cruces Watershed 12 Unit HUC



Map 3: El Paso-Las Cruces Watershed Proposed Sampling Sites

Appendix B

Acronyms

AOAC	Association of Official Agricultural Chemists
BMP	Best Management Practice
BST	Bacterial Source Tracking
CLC	City of Las Cruces
CWA	Clean Water Act
CWS	Clean Water Subcommittee
EBID	Elephant Butte Irrigation District
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
EPCWID#1	El Paso County Water Improvement District #1
GIS	Geographical Information System
HUC	Hydrologic Unit Code
IEH	Institute of Environmental Health
NMDA	New Mexico Department of Agriculture
NMED	New Mexico Environment Department
NPS	Nonpoint Source
QAPP	Quality Assurance Project Plan
SWQB	Surface Water Quality Bureau
TMDL	Total Maximum Daily Load
TxCRP	Texas Clean Rivers Program
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
USIBWC	U.S. International Boundary and Water Commission
WBP	Watershed Based Plan
WWTP	Wastewater Treatment Plan