APRIL 1999

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April 7, 1999

Mr. Joseph Vozella
Assistant Area Manager
U.S. Department of Energy
Los Alamos Area Office
MS A316
Los Alamos, New Mexico 87545

RE: NMED-SWQB Comments On The LANL Draft Watershed Management Plan (WMP)

Dear Mr. Vozella:

The New Mexico Environment Department-Surface Water Quality Bureau (SWQB) staff have reviewed the February 9, 1999, Los Alamos National Laboratory (LANL) Draft Watershed Management Plan (WMP). SWQB considers LANL's commitment to consider the use of the watershed approach an important step towards achieving surface water protection.

We appreciate the opportunity to comment on such an ambitious endeavor, and trust that our comments will assist DOE/LANL in preparing an effective and sound watershed management plan. Comments generated by staff address both general and specific issues related to the WMP A copy of the comments are attached to this letter.

SWQB staff also reviewed and met with the NMED-Department of Energy/Oversight Bureau (DOE/OB) concerning their technical comments regarding the WMP. SWQB supports and

13249

believes that the DOE/OB technical comments complement similar concerns and/or recommendations of the SWQB staff, and urges LANL to also utilize both sets of comments in the preparation of the next revision of the plan.

If you have any questions regarding the SWQB comments, or would like to meet with staff to discuss our comments, please call Mr. Glenn Saums, or Ms. Barbara Hoditschek of my staff at (505) 827-2933.

Sincerely,

James H.Davis, Ph.D.
Bureau Chief

Enclosures

cc:

G. Lewis, Dir., NMED-WWMD
G. Saums, NMED-SWQB
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S. Rae, ESH-18, MS K497
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M. Alexander, ESH-18, MS K 497
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J. Canepa, LANL, MS M992
V. George, LANL, MS M992

B. Volke, DOE/LANL, MS J591
D. Mc Inroy, EM-ER, MS M992
T. Grieggs, ESH-19/EM-ER, MS K490
A. Puglisi, ESH-19, MS K498
T. Foxx, ESH-20, MS M887
R. Bodd, F-7, MS M713
D. Padilla, F-8, MS M718
B. Grace, ESA-FM-ESH, MS C928
B. Newman, EES-15, MS J495
D. Katzman, EES-13, MS M992
K. Campbell, EES-5, MS D452
S. Reneau, EES-1, MS D462
P. Longmire, CST-7, MS J534
T. Alexander, DX-DO, MS P915
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J. Lynn, ERM/PMC, Los Alamos, NM
File: LANL:Draft WMP:Comments: 3/99

ENCLOSURE-1

New Mexico Environment Department-Surface Water Quality Bureau (SWQB) Review Comments On The February 2, 1999, Department of Energy/ Los Alamos National Laboratory (DOE/LANL) Draft Watershed Management Plan (WMP)

OVERALL COMMENTS:

1. This document is somewhat misleading as a Watershed Management Plan (WMP) in that the EPA approved process ("watershed approach") for establishing a watershed plan, has not been maintained. The watershed approach as described in the Clean Water Action Plan (1998) states, in part:

   "Focusing on the whole watershed helps strike the best balance among efforts to control point source pollution and polluted runoff, and protect drinking water sources and sensitive natural resources such as wetlands. A watershed focus also helps identify the most cost-effective pollution control strategies to meet clean water goals. Working at the watershed level encourages the public to get involved in efforts to restore and protect their water resources and is the foundation for building strong clean water partnerships. The watershed approach is the best way to bring state, tribal, federal, and local programs together to more effectively and efficiently clean up and protect waters."

   Unfortunately, this draft plan falls short of this goal. Specifically, all stakeholders with possible investment in the watershed have not been included in the initial planning phase. As a result, this plan does not focus on the entire watershed, but instead focuses only on that part of the watershed which lies within DOE/LANL property. The draft plan therefore, also does not include management strategies for existing or potential activities that either flow onto or off of DOE/LANL property yet within the watershed boundaries. Involvement in the processes of the watershed consequently stops at the DOE/LANL boundaries. It is obvious that the diversity of landownership throughout the watersheds that include DOE/LANL property make the development of a comprehensive watershed management a challenge, however, NMED-SWQB recommends that DOE/LANL refocus their efforts in the next draft to include the necessary stakeholders. This task is an obtainable undertaking and should not be abandoned.

   SWQB believes that stakeholder involvement at all stages in the development of a comprehensive watershed management plan is essential. In this draft plan it does not appear that DOE/LANL involved any partners, such as the local community, local/state governments, environmental organizations, tribes, federal and State agencies, and the general public. Ideally, earlier involvement of stakeholders in the preparation of this draft would have been preferred, and would have reflected a greater commitment by DOE/LANL. In the future development of this plan such an approach will facilitate the

implementation of a comprehensive watershed management plan.

This is important when the WMP focuses on setting goals that will avoid enforcement action on non-point source pollution and achieving compliance under NPDES and RCRA, DOE/LANL. Although this may mean refocusing, organizing forums, conducting outreach, and reviewing existing goals and issues with stakeholders, such an approach would go far towards providing DOE/LANL with the necessary input and the opportunity to prioritize concerns and issues of all stakeholders into the development of a plan with a more integrated watershed management approach. This type of watershed management approach would address some of the shortcomings of this draft and lead to a plan which focuses on the entire watershed and to establishing a balance among efforts to control all types of pollution (non-point and point-source).

SWQB also reminds the DOE that pursuant to the Clean Water Action Plan, they and several other federal agencies committed to developing a Unified Federal Policy to enhance watershed management for the protection of water quality and the health of aquatic ecosystems on federal lands. This policy ensured a watershed approach to federal land, and resource management that emphasizes assessing the function and condition of watersheds, incorporating watershed goals in planning, enhancing pollution prevention, monitoring and restoring watersheds, recognizing water of exceptional value, and expanding collaborations with other agencies, states, tribes, and communities. The Unified Federal Policy includes:

1. Coordination and planning of federal programs and resource management activities on a watershed basis to achieve clean water objectives, emphasizing state, tribal, and federal priority watersheds, taking into account different federal, state, and tribal approaches, programs and guidelines.

2. Coordinated development and application of enhanced watershed assessment, hydrologic analysis, resources inventory, and classification; monitoring and evaluation methods; and compatible data standards.

3. Control of nonpoint sources of pollution through training in and implementation of best management practices, working with state and tribes to meet performance goals, and establishing appropriate memorandums of agreement.

4. Enhanced watershed restoration efforts including the integration of watershed restoration as a key part of land management planning and program strategies.

5. Development of a process and guidelines for identifying and designating waters or watershed on federal lands that may have significant human health, public use, or aquatic ecosystem values and a need for special protection.

6. A greater role for citizen stakeholders in completing watershed assessments, monitoring pollution sources, and planning and implementing restoration efforts through

collaborative stewardship approaches.

This draft watershed management plan, as presently written, will **not** fulfill DOE's commitment to water quality protection pursuant to the federal Clean Water Action Plan. However, SWQB believes this can be corrected.

Recommendation: NMED will commit to working together with DOE/LANL to facilitate the development of a unified plan that will involve all stakeholders.

2. There is no apparent attempt to evaluate watershed conditions in a comprehensive fashion (e.g., the plan uses outdated information for descriptions of the various canyon systems and watershed parameters).

Recommendation: Establish an adequate baseline of watershed condition for each of the watersheds by evaluating issues such as erosion and stream channel stability (geomorphic characteristics), sediment regimes as well as chemical nature, and biological parameters (aquatic life as well as riparian vegetation). Utilize current generated lab watershed information (e.g., Wilcox, etc., and DOE/OB) in the development of baseline watershed conditions.

3. The WMP is limited to water quality monitoring plan which only emphasizes point source monitoring and control.

Recommendation: Adequately address the critical nature of nonpoint sources of pollution. In addition, establish an adequate measure for seasonal variation in the water column (e.g., the plan proposes to sample at the established stations for only a total of 5 times in a 5 year period, with no discussion of seasonal timing or hydrological processes).

4. There is a lack of commitment in the WMP to address non-point source issues (e.g., by establishing/maintaining erosion stabilization measures). The plan only agrees to discuss the need for this type of action.

Recommendation: The lab should commit to implementation of the Surface Water Assessment Team (SWAT) recommendations, and is encouraged to utilize the regulatory and technical advice provided by the NMED members on the team. Also, the SWAT's mission and membership may need to be expanded to reflect stakeholder input.

5. The WMP states (page 2-1) in part, "the Laboratory has identified 23 drainages and sub-drainages where mobilization of contaminants from operational and historical sources may occur and potentially impact the water quality". The WMP is proclaimed as a voluntary document, however, in its introduction states, " the Laboratory is committed to conducting its operations in an environmentally safe manner in accordance with Director's Policy No.104, which states that "Operation at the Laboratory shall be performed in a manner that protects the environment and addresses compliance with applicable federal, state, and local environmental programs." The WMP however, is

riddled with unsubstantiated promises to "demonstrate compliance" and reflects a lack of commitment to carry out anything being proposed in the WMP. This raises the issue of compliance and how to ensure that the mission and objectives in the WMP will be implemented site-wide.

Recommendation: Because this draft reflects no assurance that DOE/LANL will actually carry out what is being proposed in the WMP, SWQB is considering seeking commitment from DOE/LANL by linking this document to a regulatory process. In addition, NMED-SWQB believes that DOE needs to include in the WMP elements which indicate that activities in the WMP will be backed in their annual budget and that DOE will continue to request budget resources to address the watershed management plan development and implementation. SWQB may also consider establishing a MOA with DOE that will include a DOE agreement to implement an improved watershed management plan which includes monitoring locations established at designated "surface water concern clusters" recommended by the SWAT.

SPECIFIC COMMENTS:

1.1 Introduction - Document Purpose and Scope

LANL is requested to cite in the reference section of the plan the EPA guidance(s) referred to in this section.

1.2 Introduction - Program Mission and Objectives

A unified approach is introduced in this section and advocated throughout the entire plan. However, it not clearly defined what internal or external mechanism is in place to assure that this will or can happen. Since it is a intrinsic part of the plan, please elaborate.

How will the data generated by the WMP be made comparable with the Environmental Restoration Program (ER) data in FIMAD, and will this data be accessible to the NMED?

This section refers to the current watershed protection efforts at the lab, please elaborate.

The plan is deficient in dealing with validation of contaminant transport. SWQB recommends that the lab include in this plan the development of a model to address this issue. Contaminant transport may also be addressed by acknowledging the quality of water being released, treated, or stored due to instream flows, and density of vegetation.

1.3 Relationship to Other DOE and LANL Programs

The WMP is designed to complement the SOP 2.01 and the Surface Water Assessment Team (SWAT) activities. What is the forum for this interaction, and what impact will the SOP 2.01 and SWAT have on the WMP? SWQB encourages DOE/LANL to utilize the regulatory and technical recommendations provided by NMED staff members on the team.

1.3.2 Relationship to Other DOE and LANL Programs - Natural Resources Trustee Council

How does the WMP further define and accomplish the Natural Resource Trustee Council's (NRT) objectives?

1.3.3 Relationship to Other DOE and LANL Programs -The Environmental Restoration Project

Define the scope of "long term" monitoring that is referred to in this section. If WMP data are to be used to determine if RCRA cleanup and No Further Action (NFA) decisions were sufficient how will insufficient results be addressed since the current

WMP has no regulatory driver? The WMP implies that when the ER program has completed its work that the various operational programs will assume responsibility for any additional or continued degradation indicated by WMP monitoring. What authority does the WMP possess to require compliance from these programs? What is the regulatory driver that will insure that additional cleanup will occur?

1.3.4 Relationship to Other DOE and LANL Programs - The Environmental Surveillance Program

It is not clear if the WMP will use the annual environmental surveillance report as an avenue to convey the result of its "enhanced surface water monitoring network", or if a separate report will be issued. How often will a report on the status of the watershed be issued?

How will the status of management actions resulting from the WMP reports and success of the lab-wide cooperation program be made available ?

1.3.5 Relationship to Other DOE and LANL Programs - The NPDES Storm Water Program

The WMP seems to indicate that additional monitoring of NPDES outfalls will be done. This is a pro active approach and SWQB encourages the lab to continue in this direction. The "mechanism" for doing this additional sampling however, is not clearly specified. SWQB recommends the use of data elements such as site assessments for physical integrity, erosion potential ratings, vegetative assessments, inspection, as well as and in addition to maintenance and monitoring of BMPs.

State of Arizona effluent dependent and ephemeral standards should not be used as surface water protection indices where the lab has already developed screening levels which require lower minimum quantification levels and better analytical methods.

1.3.6 Draft LANL-ER-SOP 2.01-Surface Water Site Assessment

SWQB recommends the SWAT develop a method for evaluating and documenting the effectiveness of upstream BMPs associated with specific PRSs and/or clusters of PRSs. Oversight of the effectiveness and quality of upstream BMPs would provide useful data regarding when interpreting the proposed WMP data to be collected at the lower confluences (e.g., appropriateness of upstream BMPs in preventing migration of contaminants to lower streams). SWAT should focus on establishing clusters which represent erosion and chemical contamination concerns.

2.0 Watershed Management Approach

The "process" referred to in this section is vague. Does it refer to operational process, naturally occurring process (e.g., fire) or some other process?

2.1 Watershed Management Approach - Strategy for Surface Water Protection

Describe how, and what the "high priority" issues affecting water (?surface) quality are at the lab.

The lab refers to 23 impacted canyons. Have the types and causes of contamination been delineated with regard to nature, rate and extent? This sections implies that the WMP is designed to monitor and evaluate this determination. Does the lab propose the WMP be used to meet the requirements of Module VIII. Q.C. 3. (Surface Water Contamination)?

Does the existing surface water data and watershed management information referred to in this section (as part of the 4 sources of monitoring and characterization data), include data from previous and ongoing DOE/LANL investigations on watershed erosion, etc, and data obtained from DOE/OB? If not, why does the lab think this information is not useful? It is also obvious that the WMP lacks strategies for obtaining and collecting data concerning the physical and biological nature of the watersheds, and that the focus of the WMP is only on evaluating the extent of chemical contamination in the watershed to determine compliance with NPDES, and/or RCRA. How and when will DOE/LANL address its broader role as stewards in the health of these watersheds by addressing these issues?

Does the SWAT have input as to the location of selected drainage and sub-drainage monitoring stations that will provide surface water quality monitoring to prioritize the need for management action? Exactly what form will these management actions take? Please give and example of this type of management action.

The SWQB is unaware of any requirement issued to LANL to develop TMDLs. However, SWQB does not discourage LANL from collecting data for this purpose. As an attachment to these comments SWQB has provided sampling and data collection recommendations that would assist LANL in their endeavor. If further information is required, LANL is encouraged to contact the SWQB.

What input will stakeholders have in the development of target analytes and/or surface water protection indices?

SWQB recommends the WMP address the geomorphology aspects of watersheds.

Will data be put into a spatial database for use with GIS? How does the lab plan to provide this information to SWQB and DOE/OB? Is there a mechanism in place?

2.2 Watershed Management Approach - Decisions and Criteria

Your description does not indicate that data for background levels and general water quality data (e.g., temperature, dissolved oxygen, pH, etc) will be taken. Will they?

2.2.2 Decisions and Criteria - Decisions

Exactly how often are monitoring samples collected? This is not clearly defined.

How will it be determined that stabilization (permanent/temporary) is working? How often will these samples be taken? What are the steps that will be taken when exceedence occurs? When will the stakeholders be notified of exceedences and have input to the resolution?

Who makes the final determination if BMPs are implemented, remediation and/or mitigation is initiated? What are the steps (e.g., criteria/decision making tree) established in the current management structure for making for these decisions? Where does stakeholder involvement fall within that "decision tree?"

How does the WMP coordinate remediation/stabilization actions at so called "active sites" where SWMUs will be addressed by program operations management? If ER and RCRA are no longer involved with restoration/stabilization activities, how does the WMP insure program operations will initiate and complete the actions necessary to further cleanup/monitoring site(s) within their jurisdiction?

Explain what is meant by the statement, "decisions will be made dependant on the exceedence of the "protection criteria" over a different time frame. Define the scope of the "time frame."

Decision 1 implies that BMPs will only be "prioritized" if monitoring results indicate an exceedence of "protection criteria" and BMPs will only be implemented when "trends" exist. Elaborate on what is ment by "trend(s)." Define the time period between prioritization and implementation, how much sampling or what constituent results set a "trend?"

2.2.3 Decisions and Criteria - Watershed Protection Criteria

It is not clear how often monitoring samples will be taken. This section implies that at a minimum it would be 1 time per year. This is insufficient, particularly to account for seasonal variation. SWQB recommends seasonal sampling and sampling associated with stormwater and snow melt events. A contingency plan should also be developed to address sampling substitution for "dry-years." Also background levels should be determined for each type of surface water analyzed in each canyon (e.g., perennial flow, snow-melt, etc.) to allow for determination of extent of contamination of these waters.

What are the target analytes the WMP will set for the current and continuing lab operations? How and when will they be determined? Will there be stakeholder input associated with this determination? Will these parameters be monitored throughout the WMP process? How often, when will the results be made available to stakeholders?

The "Decision rules" defined in the WMP only address sources of contamination and not what remedial actions will be taken to prevent or cleanup releases of contaminants (e.g. the plan only suggests BMPs may be considered). The WMP also implies that if in 5 samples no "trend" in exceedence of indices can be shown that the lab will make the assumption that there are no further concern with erosion problems in the canyon (at least not for ER purposes). It is clear that a "trend" can not be established as proposed by the current WMP approach. For example, there is no indication that samples be taken at the same point, time of year, etc. Also, the current approach demonstrates a lack of focus towards common issues of watershed management such as erosion and sediment transport. SWQB recommends DOE/LANL utilize the data collected from ongoing lab investigators (e. g., studies conducted by Wilcox, B.P., Breshers, D. D., Davenport, D. W. etc.) to supplement and/or model watershed trends.

What are the sediment indices? Table 2.2.1 only refers to water indices, when will sediment indices be developed? Will indices be based on the sediment background values developed by ER and approved by NMED-HRMB? If so, can these indices be used to compare sediment concentrations determined by WMP monitoring and influence ER investigation and/or remediation priorities? What is an example of the "action" prescribed by the ER project which is referred to in this section under Action 2.

Criteria 3 is vague. What "operational changes"? What are example(s) of the changes proposed/planned? In addition, each watershed should be investigated to determine the contribution levels of operations to the current condition of each watershed.

The lab's Commitment to attain mitigation measures is weak. It is not clear that project managers will ever be required to install BMPs or the mitigation measures. The plan implies that BMPs are only optional and states that mitigation measures will only be discussed with the project managers. What are the institutional controls that will make these program operations accountable for installation of BMPs and/or restoration? Have these institutional controls been successful in the past? How will this institutional approach address the future impact that NPDES outfalls will have on the canyons. Also, indicate location of all NPDES outfall and all outfalls used for storm water transport on any maps attached to the WMP.

Criteria 4. What is the timeline for the determination of wetland water quality and effect of wetlands on downstream water quality? Have wetlands been investigation to the extent that a determination can be made with regard to their "degradation"? All wetlands should be indicated on any maps accompanying this plan.

Criteria 6. Has the relationship between surface and groundwater at the lab been delineated? How will, or has, the impact of surface water to ground water lab been determined?

3.1.1 Participating Laboratory Organizations - Water Quality and Hydrology Group (ESH-18)

Has the centralized database intended to house the WMP generated data already been established by ESH-18 or does this still need to be developed? If it has not yet been developed, what is the timeline for its development? How will this database interact with the ER database (FIMAD)? Will this database be available to NMED?

Will the Env. Surv. Report be the vehicle for the reporting of annual progress/data collected from the WMP?

ER program will be using WMP data to establish compliance under RCRA/HSWA. This suggests the WMP is a regulatory-driven document and should be delivered to NMED to met the requirements of the HSWA module of the RCRA permit (e.g. refer to Q.C.3 of Module VIII). Does the lab plan to address this HSWA requirements through some other mechanism? If so, what mechanism?

3.1.2 Hazardous and Solid Waste Group (ESH-19)

SWQB recommends that prior to implementation, DOE/LANL discuss with SWQB any determination made that existing NM water quality standards are NOT applicable to LANL watercourses. Likewise any site-specific standards proposed by DOE/LANL should first be addressed through the Water Quality Control Commission.

3.1.5 Participating Laboratory Organizations - Earth and Environmental Sciences Division

What is the status of the sediment studies conducted by the lab?

3.2 Watershed Integration Team (WIT)

SWQB recommends that the NMED-DOE-OB have representation on the WIT. Ideally, this taskforce should also have representation from other stakeholders. Merely inviting stakeholders to attend meetings does not indicate a strong lab commitment to include stakeholders.

3.4 Management Processes

The WMP suggests that the WMP team leader be responsible for assuring that the management process described in the WMP is functional and/or working. If it is not working or functional, how is the WMP team leader empowered to make the necessary changes to elevate the problem?

3.4.1 Management Processes - Communication -External Stakeholder Communication

What is the nature of the "program status reports" (indicated in figure 3.1.1) on the WMP that the stakeholders will be receiving at quarterly and annual intervals from the lab?

What is the mechanism for feedback and assurance that feedback is considered and/or incorporated?

3.4.2 Management Processes - Program Improvement and Progress Reporting

SWQB recommends that the WMP program be made available through the LANL website, and that a URL be included.

4.3 Information Management

The WMP states, "Data collected for watershed management activities will also be included as it relates to protection of the environment". Please explain when data does NOT relate to the protection of the environment, and when data WILL NOT be included.

4.3.1 Information Management - Current Centralized Database

Can EPA, State agencies, or the general public access your database (read only)? If not, why not?

4.3.2 Information Management - Utilization of Centralized Database for Watershed Management Data

Will any geomorphology data be included in this database?

Does the lab have a Quality Assurance Plan that all lab programs follow for consistent data collection and entering into the database? The description of the database included in the WMP is not detailed enough, please expand the discussion.

"Protocols will be established...". When will these protocols be developed and put in place at the lab? Do these database management personnel exist now, or will they have to be budgeted into the system?

5.2.1 Hydrology-Surface Water

What evidence does the lab which verifies that springs located on the lab property do not contribute to flow that reaches the Rio Grande (even during high flow storm events)?

The WMP states, "None of these effluent are discharged in sufficient volume to individually reach the Rio Grande, unless augmented by precipitation runoff. " How often does this happen? Is it significant?

The WMP also states, "the chemical quality of the alluvial groundwater shows the effects of discharges from the Laboratory." Expand this statement to define what the

discharges are, and what the effects of these discharges are on the watersheds. Also indicate if the effects of these discharges to the watersheds are significant. Does groundwater drain to surface water? Where? The location of these drainage sites should be indicated on the watershed maps.

5.3 Climate and Meteorological Monitoring

Did, and/or will the lab consider atmospheric deposition (e.g., Hg, rad, etc.) as part of the climate and meteorological monitoring plan?

5.6.3 Ecology-Wetlands

Have all the wetlands been characterized/analyzed? If so, SWQB recommends that this data be made part of the WMP. The lab needs to include a commitment in the WMP that they will ensure that wetlands will be protected.

5.7 Anthropogenic Impacts

Are past lab activities/disposal considered anthropogenic impacts? If so, this section needs to be expanded.

5.7.3 Anthropogenic Impacts - LANL Impacts

The WMP only mentions land use and does not discuss impacts to the watersheds from these land uses. SWQB recommends that this part of the WMP be expanded to include a discussion of the impacts of land use on the watersheds.

PART II Drainage Work Plans

Figures

Various figures are missing from this section.

Potential Contaminant Sources Tables in all Canyons

Tables are vague and incomplete. Most lack dates, quantities, etc. The tables also need to be expanded and updated with current information (the information provided is greater than 30 years old). Results obtained from current sources of contamination should be included.

6.3.2 Existing Data and Monitoring Results - Surface Water Quality

It would be useful to included, for elevated levels, a table of concentrations and how they compare to State Water Quality Standards.

Table 6.4-1 Decision Criteria Applicable to the Los Alamos Canyon Drainage and Drainage-Specific Data Sources

The term "trigger" for action is not clear. How much of an increase or decrease in any of these criteria "trigger" an action? In addition, the lab needs to quantify the "triggers" for these actions.

6.5.2 Proposed Water Quality Monitoring Activities - Sampling Frequency

The sampling frequency is too low (e.g., the lab proposes to only take one sample at a time). What about chronic studies, specifically for metals and ammonia? SWQB recommends this section be expanded.

Table 7.4-1 Decision Criteria applicable to the Sandia Canyon Drainage and Drainage-Specific Data Sources

This decision criteria indicates that a decrease in size or habitat in wetlands "triggers" action. What about a change in the quality of the size and habitat of the wetland? Expand this discussion.

Appendix A: Watershed Protection and Management Strategy

As indicated in previous comments, SWQB would like to see the watershed approach utilized in this WMP. Therefore, any relevant information that DOE/LANL may have to characterize the watersheds in this plan should be utilized and would be encouraged (e.g., include on-going watershed studies at Bandelier National Monument and those conducted and published by LANL scientist).

The lab is encouraged to take a aggressive attitude in the development of "indicator criteria" by selecting more stringent standards than the regulatory standards. This would allow for early evidence of potential exceedence of water quality standards at sampling locations to be determined before they exceeded the regulatory standards. In the case of minimum reporting limits that are higher than the regulatory criteria (e.g., Hg, PCB) SWQB encourages DOE/LANL to apply alternative analytical methods.

Appendix B: Analytical Requirements For Surface Water Samples

Indicate method numbers.

Consult with SWQB regarding latest approved methods and/or flexibility in use of alternate methods.

Define terms used (e.g., estimated quantitation limit, etc.).

1998-2000 State of New Mexico §303(d) List for Assessed Stream and River Reaches

WATER BODY NAME (Basin, segment) EVALUATED OR MONITORED (E/M), SUPPORT STATUS WBS NUMBER	TOTAL SIZE AFFECTED (MILES WITHIN STATE OF NM JURISDICTION)	PROBABLE SOURCE(s) OF POLLUTANT/THREAT	TMDL SCHEDULE (DATE TMDL DUE)	# OF NPDES PERMITS ON THE REACH[a]	USES NOT FULLY SUPPORTED/ THREATENED[b]	SPECIFIC POLLUTANT(s) OR THREAT AND IMPACTED SAMPLING STATION(s)	TOXICS AT ACUTE LEVELS[b]	TOXICS AT CHRONIC LEVELS[b]	AQUATIC T or E SPECIES ON THE REACH	ACUTE PUBLIC HEALTH CONCERN (YES/NO)	PRIORITY
Rio Grande from Rio Pueblo de Taos to New Mexico-Colorado border (Rio Grande, 2119), M Partially Supported (URG1-20000)	51.1	Agriculture (1500), Hydromodification (7400), Recreation (8700)	December 31, 2017	0	CWF	*Stream bottom deposits			NO	NO	4
Rio Grande from Guaje Canyon to Rio Pueblo de Taos (Rio Grande, 2111), M Not Supported (URG1-10000)	47.1	Agriculture (1200, 1500), Spills (8400), Unknown (9000), Removal of Riparian Vegetation (7600)	December 31, 2017	0	MCWF, WWF	Turbidity (URG111.004407, URG111.003903, URG111.021035, URG111.021025, URG111.004410 and URG111.003115, NS) *Stream bottom deposits			NO	NO	7
Rio Grande from Northern Border of Isleta Pueblo to Jemez River[d] (Rio Grande, 2105, 2105.1), M Partially Supported (MRG3-30000)	38.3 (34.7)	Municipal point sources (0200), Urban runoff/storm sewers (4000), Spills (8400)	December 31, 2000	12 Rio Rancho #2 (NM0027987) Rio Rancho #3 (NM0029602) General Electric (NM0000159) Albuquerque WWTP (NM0022250) Siemens (NM0029394) PNM (Reeves Station) (NM0000124) Sandia Peak Ski Area (NM0027863) Delta Environmental/ Diamond Shamrock (NM0029688) Wylie Corporation (NM0029009) Holmes (NM0000116) Corrales Chevron (NM0029696) Duke City Dirtributing (DRT Consultants) (NM0029807) Rio Grande Resources, Inc. (NM0028100)	LWWF, SC, IRR	Total ammonia, chlorine, fecal coliform			YES Rio Grande Silvery Minnow Endangered	NO	1
Rio Grande from Leasburg Dam to Caballo Dam (Rio Grande, 2101, 2102), E Partially Supported (LRG1-20000)	21.4	Agriculture (1200, 1500), Hydromodification (7100, 7400)	December 31, 1998	2 Hatch (NM0020010) Los Ranchos Del Rio Subdivision (NM0029378)	LWWF, WWF	pH			NO	NO	6
Rio Grande from NM-TX border to Leasburg Dam (Rio Grande, 2101), E Partially Supported	1.7	Unknown (9000)	December 31, 1998	3 Sunland Park (NM0029483) Santa Teresa (NM0030201) El Paso Electric (NM0000108)	LWWF, IRR	Unknown Toxicity			NO	YES	1

WATER BODY NAME (Basin, segment) EVALUATED OR MONITORED (E/M), SUPPORT STATUS WBS NUMBER	TOTAL SIZE AFFECTED (MILES WITHIN STATE OF NM JURISDICTION)	PROBABLE SOURCE(s) OF POLLUTANT/THREAT	TMDL SCHEDULE (DATE TMDL DUE)	# OF NPDES PERMITS ON THE REACH[a]	USES NOT FULLY SUPPORTED/ THREATENED[b]	SPECIFIC POLLUTANT(s) OR THREAT AND IMPACTED SAMPLING STATION(s)	TOXICS AT ACUTE LEVELS[b]	TOXICS AT CHRONIC LEVELS[b]	AQUATIC T or E SPECIES ON THE REACH	ACUTE PUBLIC HEALTH CONCERN (YES/NO)	PRIORITY
Rio de los Pinos from the NM-CO border to the NM-CO border (Rio Grande, 2120), E Partially Supported	19.6	Agriculture (1200, 1500), Recreation (8700), Road Runoff (8300) Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2013	0	HQCWF	Unknown			NO	NO	4
San Antonio River from mouth on Los Pinos River to headwaters (Rio Grande, 2120), E Partially Supported (URG1-50100)	28	Agriculture (1200, 1500), Silviculture (2200), Recreation (8700), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	HQCWF	*Stream bottom deposits			NO	NO	4
Costilla Creek from New Mexico-Colorado border to irrigation diversion above Costilla (Rio Grande, 2120), M Partially Supported (URG1-40000)	3	Agriculture (1200, 1500), Hydromodification (7100, 7400), Road maintenance/runoff (8300)	December 31, 2017	0	HQCWF	*Stream bottom deposits, turbidity, metals	Al		NO	NO	3
Costilla Creek from Comanche Creek to Costilla Dam (Rio Grande, 2120), M Not Supported (URG1-30000)	5	Agriculture (1500), Hydromodification (7400), Road maintenance/runoff (8300), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	HQCWF[c]	Metals (Costilla065, Costilla0950)	Al		NO	NO	3
Comanche Creek from mouth on Costilla Creek to Little Costilla Creek (Rio Grande, 2120), M Partially Supported (URG1-30500)	4.3	Agriculture (1500), Silviculture (2300), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	HQCWF	Total phosphorus, *Stream bottom deposits, metals		Al	NO	NO	4
Cordova Creek from mouth on Costilla Creek to headwaters (Rio Grande, 2120), E Not Supported (URG1-30300)	3.8	Construction (3100), Hydromodification (7100), Recreation (8705), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 1999	0	HQCWF[c]	Total phosphorous (Costilla020, NS), *Stream bottom deposits			NO	NO	4

1998-2000 State of New Mexico §303(d) List for Assessed Stream and River Reaches

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Red River from mouth on Rio Grande to Placer Creek (Rio Grande, 2119), M Not Supported (URG1-20400)	20.2	Agriculture (1500), Resource extraction (5600, 5700, 5900), Road maintenance/runoff (8300)	December 31, 2017	3 Molycorp Inc (NM0022306) Red River Fish Hatchery (NM0030147) Red River (NM0024899)	CWF[c], LW, IRR	Metals (Zn chronic, HRG24, HRG25, NS), Metals (Al, Cd, Cu, acute, NS), *Stream bottom deposits	Al, Cd, Cu	Al, Zn	NO	NO	1
Bitter Creek from mouth on Red River to headwaters (Rio Grande, 2120), M Not Supported (URG1-20450)	7.1	Agriculture (1500), Resource extraction (5100, 5800), Road maintenance/runoff (8300), Recreation (8700), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	HQCWF	Metals (URG120.028530, NS), *Stream bottom deposits		Al	NO	NO	3
Pioneer Creek from mouth on Red River to headwaters (Rio Grande, 2120), M Partially Supported (URG1-20430)	4.3	Resource extraction (5200, 5900), Recreation (8701, 8705), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	HQCWF	Turbidity, *Stream bottom deposits			NO	NO	4
Placer Creek from mouth on Red River to headwaters (Rio Grande, 2120), E Partially Supported (URG1-20510)	1.3	Resource extraction (5300, 5900), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	HQCWF	*Stream bottom deposits			NO	NO	4
Cabresto Creek from mouth on Red River to headwaters (Rio Grande, 2120), M Partially Supported (URG1-20410)	14.6	Hydromodification (7400), Agriculture (1200, 1500), Road maintenance/runoff (8300), Removal of Riparian Vegetation (7600)	December 31, 2017	0	HQCWF	*Stream bottom deposits			NO	NO	4
Rio Fernando de Taos from mouth on Rio Pueblo de Taos to headwaters (Rio Grande, 2120), M Partially Supported (URG1-20210)	15.6	Agriculture (1500), Recreation (8700, 8701), Onsite Wastewater Systems (6500), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	HQCWF	Metals (NS all stations), total phosphorus (PS all stations), *Stream bottom deposits	Al		NO	NO	3
Rio Pueblo de Taos from mouth on Rio Grande to Rio Grande del Rancho (Rio Grande, 2119), M Partially Supported (URG1-20100)	7.5	Agriculture (1500)	December 31, 2017	1 Taos (NM0024066)	CWF, IRR	Temperature (URG119.023505, PS), total ammonia (URG119.23515, NS), fecal coliform (URG119.023525, PS)			NO	NO	2

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Rio Grande del Rancho from mouth on Rio Pueblo de Taos to bridge on State Highway 518 (Rio Grande, 2119),E Partially Supported (URG1-20110)	13.6	Agriculture (1200, 1500), Road construction (3100), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	HQCWF	*Stream bottom deposits			NO	NO	4
Rio Santa Barbara from Picuris Pueblo boundary to USFS Boundary (Rio Grande, 2120), M Partially Supported (URG1-11100)	9.2 (4.1)	Agriculture (1500), Construction (3200), Hydromodification (7400) Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	HQCWF	*Stream bottom deposits			NO	NO	4
Rio Pueblo from the Picuris Pueblo to the headwaters (Rio Grande, 2120), M Partially Supported (URG1-11200)	22.2	Agriculture (1500), Construction (3200), Recreation (8700, 8701), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2013	0	HQCWF	*Stream bottom deposits			NO	NO	4
Embudo Creek from mouth on Rio Grande to border of Picuris Pueblo (Rio Grande, 2111), M Not Supported (URG1-11000)	11.0	Agriculture (1500), Land development (3200), Hydromodification (7100, 7200), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2013	0	MCWF, WWF	Metals (URG111.021505, URG111.021590, NS), *Stream bottom deposits, turbidity		Al	NO	NO	7
Santa Cruz River from mouth on Rio Grande to Santa Cruz Dam[d] (Rio Grande, 2111), E Not Supported (URG1-10500)	10 (0.0)	Agriculture (1200), Hydromodification (7300, 7400)	December 31, 2017	0	MCWF[c], WWF[c], IRR[c], SCR[c],LW[c]	*Stream bottom deposits, turbidity			NO	NO	8
Santa Cruz River from inflow to Santa Cruz Reservoir to confluence of Rio Frijoles and Rio Medio (Rio Grande, 2118), E Partially Supported (URG1-10600)	0.9	Agriculture (1200, 1500), Recreation (8701)	December 31, 2017	0	HQCWF	Total phosphorus			NO	NO	4

1998-2000 State of New Mexico §303(d) List for Assessed Stream and River Reaches

WATER BODY NAME (Basin, segment) EVALUATED OR MONITORED (E/M), SUPPORT STATUS WBS NUMBER	TOTAL SIZE AFFECTED (MILES WITHIN STATE OF NM JURISDICTION)	PROBABLE SOURCE(s) OF POLLUTANT/THREAT	TMDL SCHEDULE (DATE TMDL DUE)	# OF NPDES PERMITS ON THE REACH[a]	USES NOT FULLY SUPPORTED/ THREATENED[b]	SPECIFIC POLLUTANT(s) OR THREAT AND IMPACTED SAMPLING STATION(s)	TOXICS AT ACUTE LEVELS[b]	TOXICS AT CHRONIC LEVELS[b]	AQUATIC T or E SPECIES ON THE REACH	ACUTE PUBLIC HEALTH CONCERN (YES/NO)	PRIORITY
Pojoaque River from mouth on Rio Grande to Nambe Dam[d] (Rio Grande, 2111), E Partially Supported (URG1-10200)	14.4 (13.8)	Domestic point sources (0201), Agriculture (1500), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	2 Pojoaque Terraces Mobile Home Park (NM0028436) Pojoaque Valley Schools-Jacona Site (NM0029882)	MCWF, WWF	*Stream bottom deposits			NO	NO	6
Tesuque Creek from the confluence with Little Tesuque Creek to the confluence of North and South Forks of Tesuque Creek (Rio Grande, 2118), M Not Supported (URG1-10220)	6.7	Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2013	0	HQCWF	Turbidity (URG118.003405, NS)			NO	NO	4
Little Tesuque Creek from Big Tesuque Creek to headwaters (Rio Grande, 2118), M Not Supported (URG1-10230)	8.1	Recreation (8700, 8701)	December 31, 2017	0	HQCWF[c]	Turbidity, metals (URG118.003407, URG118.003414, and URG118.003417, NS)	Al				3
Rio Frijoles from confluence with Rio Medio to Pecos Wilderness boundary (Rio Grande, 2112), E Partially Supported (URG1-10700)	2.5	Agriculture (1500) Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	HQCWF	Unknown			NO	NO	4
Rio Chupadero from USFS boundary to headwaters Rio Grande, 2118), M Not Supported (URG1-10240)	4.1	Road maintenance/runoff (8300), Recreation (8700), Unknown (9000)	December 31, 2017	0	HQCWF[c]	Turbidity, metals (station Chupadero upper, NS), *Stream bottom deposits	Al		NO	NO	3
Rito Cañon de Frijoles from mouth on the Rio Grande to headwaters (Rio Grande, 2118), M Partially Supported (MRG1-20100)	2.8	Land Disposal (6300)	December 31, 2017	0	HQCWF	Pesticides (DDT)			NO	NO	3
Capulin Creek from mouth on Rio Grande to headwaters (Rio Grande, 2118), E Partially Supported (URG1-10600)	12.1	Silviculture (2100)	December 31, 2017	0	HQCWF	*Stream bottom deposits, turbidity			NO	NO	4

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Rio Chamita from mouth on Rio Chama to New Mexico-Colorado border (Rio Grande, 2116), E Not Supported (URG2-30500)	12.6	Municipal point sources (0200), Agriculture (1500), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 1999	1 Chama (NM0027731)	HQCWF[c], IRR	Temperature (URGI16.020005, NS), turbidity (URGI16.020055, NS), *Stream bottom deposits, total phosphorus (URGI16.020005, URGI16.020015, NS), total ammonia (URGI16.020005, URGI16.020015, URGI16.020035, NS)			NO	NO	2
Rito de Tierra Amarilla at US Highway 84 Bridge (Rio Grande, 2116), E Not Supported (URG2-30100)	22.1	Agriculture (1500), Removal of Riparian Vegetation (7600)	December 31, 2013	0	HQCWF[c]	Total phosphorus[c]			NO	NO	4
Rio Chama from mouth of Rio Brazos to Little Willow Creek (Rio Grande, 2116), E Partially Supported (URG2-30000)	12.6	Municipal point sources (0200), Agriculture (1200, 1500), Land Disposal (6500), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	1 Parkview Fish Hatchery (NM0030139)	HQCWF	*Stream bottom deposits			NO	NO	2
Rio Chama from mouth on Rio Grande to Abiquiu Dam[4] (Rio Grande, 2113), E Partially Supported (URG2-10000)	31.6 (28.2)	Agriculture (1201, 1500), Hydromodification (7300) Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	MCWF, WWF	Nutrients, unknown, pH			NO	NO	8
Rio Brazos from mouth on Rio Chama to Chavez Creek (Rio Grande, 2116), E Partially Supported (URG2-30200)	3.8	Hydromodification (7200), Unknown (9000), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	HQCWF	*Stream bottom deposits			NO	NO	4
Canjilon Creek from inflow to Abiquiu Reservoir to Canjilon Lakes outfall (Rio Grande, 2116), E Not Supported (URG2-10900)	24.3	Agriculture (1200, 1500), Hydromodification (7100), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	HQCWF[c]	Conductivity (URGI16.01505, NS), turbidity (URGI16.01505, NS), *Stream bottom deposits, total phosphorus (URGI16.01505, NS)			NO	NO	4

1998-2000 State of New Mexico §303(d) List for Assessed Stream and River Reaches

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Abiquiu Creek from mouth on Rio Chama to headwaters (Rio Grande, 2113), M Partially Supported (URG2-10700)	6.1	Agriculture (1500), Land disposal (6500), Hydromodification (7100), Road maintenance/runoff (8300)	December 31, 2017	0	MCWF, WWF	*Stream bottom deposits, plant nutrients			NO	NO	4
Rio del Oso from mouth on Rio Chama to headwaters (Rio Grande, 2112), E Partially Supported (URG2-10400)	15.1	Agriculture (1500), Recreation (8702), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	HQCWF	*Stream bottom deposits, turbidity			NO	NO	4
El Rito perennial reaches above El Rito (Rio Grande, 2112), E Partially Supported (URG2-10600)	20.8	Agriculture (1200, 1500), Road maintenance or runoff (8300), Recreation (8700), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	HQCWF	*Stream bottom deposits, plant nutrients			NO	NO	4
Rio Vallecitos from the confluence with the Rio Tusas to its headwaters (Rio Grande, 2112), E Partially Supported (URG2-10200)	33.4	Agriculture (1200, 1500), Resource extraction (5100), Hydromodification (7100), Road maintenance or runoff (8300), Recreation (8700), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	HQCWF	Metals *Stream bottom deposits	Cu, Zn	Al	NO	NO	3
Rio Tusas from the confluence with the Rio Vallecitos to the headwaters (Rio Grande, 2113), E Partially Supported (URG2-10300)	38	Agriculture (1500), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	MCWF, WWF	*Stream bottom deposits			NO	NO	8
Rio Ojo Caliente from the mouth on the Rio Chama to the confluence of the Rio Vallecitos and Rio Tusas (Rio Grande, 2113)E Partially Supported (URG2-10100)	22.4	Agriculture (1500) Hydromodification (7100), Recreation (8700), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	MCWF, WWF	*Stream bottom deposits			NO	NO	8

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Cañones Creek from the inflow to Abiquiu Reservoir to the headwaters (Rio Grande, 2116), M Not Supported (URG2-12000)	17.9	Agriculture (1500), Silviculture (2100), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	HQCWF[c]	Total phosphorus, turbidity, metals	Al		NO	NO	3
Chihuahuenos Creek from the mouth on Canones Creek to the headwaters (Rio Grande, 2116), M Partially Supported (URG2-12300)	8.9	Agriculture (1500), Road maintenance/runoff (8300), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	HQCWF	*Stream bottom deposits, turbidity			NO	NO	4
Polvadera Creek from the mouth on Canones Creek to the headwaters (Rio Grande, 2116),M Partially Supported (URG2-12100)	12.2	Agriculture (1200, 1500), Road maintenance/runoff (8300), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	HQCWF	*Stream bottom deposits, turbidity			NO	NO	4
Rio Gallina from confluence with Rio Capulin to headwaters (Rio Grande, 2116), M Not Supported (URG2-20200)	8.7	Agriculture (1500), Road maintenance/runoff (8300), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2013	0	HQCWF[c]	*Stream bottom deposits, total phosphorus (NS)			NO	NO	4
Clear Creek from mouth on Rio Gallina to headwaters (Rio Grande, 2116), M Partially Supported (URG2-20250)	2.5	Agriculture (1500), Silviculture (2300), Streambank Modification/Destabilization (7700)	December 31, 2013	0	HQCWF	*Stream bottom deposits, turbidity			NO	NO	4
Cecilia Canyon Creek from the mouth on Rio Capulin to San Pedro Parks Wilderness (Rio Grande, 2116), M Partially Supported (URG2-20211)	5.6	Agriculture (1500), Recreation (8701), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	HQCWF	*Stream bottom deposits, turbidity			NO	NO	4

1998-2000 State of New Mexico §303(d) List for Assessed Stream and River Reaches

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Rito Resumidero from the mouth on Rio Puerco de Chama to the headwaters (Rio Grande, 2116), E Partially Supported (URG2-11220)	4.3	Agriculture (1500), Silviculture (2100, 2200, 2300), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	HQCWF	*Stream bottom deposits			NO	NO	4
Rio Puerco de Chama from Poleo Creek to the headwaters (Rio Grande, 2116), M Partially Supported (URG2-11100)	10.3	Silviculture (2100, 2200), Recreation (8700), Removal of Riparian Vegetation (7600), Streambank, Modification/Destabilization (7700)	December 31, 2017	0	HQCWF	*Stream bottom deposits			NO	NO	4
Poleo Creek from the mouth on the Rio Puerco de Chama to the headwaters (Rio Grande, 2116), M Not Supported (URG-11210)	6.3	Silviculture (2300), Agriculture (1500), Removal of Riparian Vegetation (7600), Streambank, Modification/Destabilization (7700)	December 31, 2013	0	HQCWF[c]	Total phosphorus (URG116.010050, NS), turbidity (URG116.010050, NS)			NO	NO	4
Rito Encinco from the mouth on the Rio Puerco de Chama to headwaters (Rio Grande, 2116), M Not Supported (URG2-11110)	7.8	Agriculture (1500), Recreation (8700), Removal of Riparian Vegetation (7600), Streambank, Modification/Destabilization (7700)	December 31, 2013	0	HQCWF[c]	Total phosphorus (URG116.010020, NS), turbidity (URG116.010020, NS)			NO	NO	4
Coyote Creek from mouth on the Rio Puerco de Chama to the headwaters (Rio Grande, 2116), M Not Supported (URG2-11120)	13.4	Agriculture (1500), Road Maintenance (8300), Removal of Riparian Vegetation (7600), Streambank, Modification/Destabilization (7700)	December 31, 2013	0	HQCWF[c]	Total phosphorus (URG116.0100300, NS), tubidity (URG116.0100300, NS			NO	NO	4
Rito Redondo from the mouth on the Rito Resumidero to headwaters (Rio Grande, 2116), E Partially Supported (URG2-11221)	2	Agriculture (1500), Silviculture (2100, 2200), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	HQCWF	Total organic carbon (Reda), *Stream bottom deposits			NO	NO	4
Santa Fe River from the Cochiti Pueblo to the Santa Fe WWTP[d] (Rio Grande, 2110), M Not Supported (URG1-10300)	12.7 (6.1)	Municipal point sources (0200), Agriculture (1500), Resource extraction (5100, 5700)	December 31, 1999	1 Santa Fe WWTP (NM0022292)	MCWF[c], WWF[c], LW	Chlorine, *Stream bottom deposits, pH, total ammonia, gross alpha			NO	NO	6

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Cienega Creek from the mouth on the Santa Fe to Cienega Village (Rio Grande, 2110), E Partially Supported (URG1-10310)	4.1	Agriculture (1500), Land disposal (6500), Unknown (9000)	December 31, 2017	2 Valle Vista Sewer Company (NM0028614) Arroyo Hondo (Geohydrology Association) (NM0029823)	MCWF, WWF, IRR	Fecal coliform, chlorine, total ammonia			NO	NO	6
Alamo Creek from the mouth on the Santa Fe River to the headwaters (Rio Grande, 2110), E Partially Supported (URG1-10320)	3.1	Agriculture (1500)	December 31, 2017	0	MCWF, WWF	Metals		Uknown	NO	NO	8
Rio Puerco from Rito Olguin to the headwaters (Rio Grande, 2107), E Partially Supported (MRG4-20000)	39.6	Agriculture (1500), Road maintenance/runoff (8300), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2006	0	CWF	Temperature, *Stream bottom deposits			NO	NO	4
San Pablo Creek from the mouth on the Rio Puerco to the headwaters (Rio Grande, 2107), E Partially Supported (MRG4-20050)	10.8	Agriculture (1500), Resource extraction (5100), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2006	0	HQCWF	*Stream bottom deposits, plant nutrients			NO	NO	4
Rito Leche, perennial portions (Rio Grande, 2107), E Partially Supported (MRG4-20110)	2.9	Agriculture (1500), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	CWF	*Stream bottom deposits			NO	NO	4
Nacimiento Creek from USFS boundry to San Gregorio Reservoir (Rio Grande, 2107), E Partially Supported (MRG4-20100)	4.6	Agriculture (1500), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	CWF	*Stream bottom deposits, nutrients			NO	NO	4
Las Huertas Creek from Placitas to Capulin Canyon (Rio Grande, 2108.5), E Partially Supported (MRG1-10100)	8.8	Road maintenance/runoff (8300), Recreation (8700, 8701), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	CWF	*Stream bottom deposits			NO	NO	4

1998-2000 State of New Mexico §303(d) List for Assessed Stream and River Reaches

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Galisteo Creek, perennial portions (Rio Grande, unclassified), E Partially Supported	5.5	Agriculture (1500), Hydromodification (7000), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2013	0	WWF	*Stream bottom deposits			NO	NO	8
Sulphur Creek above Redondo Creek to the headwaters (Rio Grande, 2106), E Not Supported (MRG2-40100)	6.8	Unknown (9000) Natural (8600)	December 31, 2013	0	HQCWF[c]	pH			NO	NO	4
San Antonio Creek from the confluence with the East Fork of the Jemez River to headwaters (Rio Grande, 2106), E Partially Supported (MRG2-40000)	23.6	Agriculture (1500), Silviculture (2300), Land development (3200), Natural (8600), Recreation (8700, 8702), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	HQCWF	Temperature (MRG106.010010, PS), total phosphorus, (MRG106.010010, PS), *Stream bottom deposits			NO	NO	4
East Fork of the Jemez River from the confluence with San Antonio Creek to the headwaters (Rio Grande, 2106), E Partially Supported (MRG2-30000)	16.3	Agriculture (1500), Siviculture (2100), Recreation (8700), Streambank Modification/Destabilization (7700)	December 31, 2017	0	HQCWF	*Stream bottom deposits			NO	NO	4
Jemez River from Rio Guadalupe to the confluence of the East Fork of the Jemez River and San Antonio Creek (Rio Grande, 2106), E Partially Supported (MRG2-20000)	13.4	Municipal point sources (0200), Domestic point sources (0201), Agriculture (1201, 1500), Road Maintenance (8300), Natural (8600), Recreation (8700, 8701), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 1999	2 Jemez Springs WWTP (NM0028011) Jemez Springs Municipal Schools (NM0028479)	HQCWF, CWF, LW	Turbidity (MRG105.009035, PS), conductivity (MRG106.009505, PS), *Stream bottom deposits, plant nutrients			NO	NO	2
Rio Cebolla from confluence with the Rio de las Vacas to Fenton Lake (Rio Grande, 2106), E Not Supported (MRG2-20300)	9.1	Agriculture (1500), Road maintenance/runoff (8300)	December 31, 2017	0	HQCWF[c]	*Stream bottom deposits, pH (NS)			NO	NO	4

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Rio Cebolla from inflow to Fenton Lake to the headwaters (Rio Grande, 2106), M Partially Supported (MRG2-20400)	7	Agriculture (1500, 1700), Land disposal (6500), Road maintenance/runoff (8300)	NO	1 Seven Springs Fish Hatchery (NM0030112)	HQCWF	*Stream bottom deposits			NO	NO	2
Rio de las Vacas from the confluence with Rio Cebolla to Rito de las Palomas (Rio Grande, 2106), E Not Supported (MRG2-20200)	14	Agriculture (1500), Road maintenance/runoff (8300), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	HQCWF[c]	Temperature (MRG106.008535, NS), *Stream bottom deposits			NO	NO	4
Rito Peñas Negras from the mouth on the Rio de las Vacas to the headwaters (Rio Grande, 2106), E Partially Supported (MRG2-20230)	11.6	Agriculture (1500), Road maintenance/runoff (8300), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	Project ongoing outside of the ten year schedule on the Consent Decree	0	HQCWF	*Stream bottom deposits, temperature, turbidity			NO	NO	4
Rio Guadalupe from the mouth on the Jemez River to the confluence of the Rio de las Vacas and Rio Cebolla (Rio Grande, 2106), E Partially Supported (MRG2-20100)	12.4	Agriculture (1500), Road maintenance/runoff (8300), Recreation (8700), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 1999	0	HQCWF	Conductivity (MRG106.007501, PS), *Stream bottom deposits			NO	NO	4
American Creek from the mouth on the Rito de las Palomas to the headwaters (Rio Grande, 2106), E Partially Supported (MRG2-20241)	3.8	Agriculture (1500), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	HQCWF	*Stream bottom deposits, temperature, turbidity			NO	NO	4
Vallecito Creek from the eastern Jemez Pueblo boundary to the Village of Ponderosa (Rio Grande, 2105.5), E Not Supported (MRG2-10200)	5.7	Agriculture (1500), Hydromodification (7100, 7400), Unknown (9000), Removal of Riparian Vegetation (7600)	December 31, 2017	0	CWF[c], SCR	Temperature (PS), *Stream bottom deposits, pH (NS)			NO	NO	4
Rio Moquino from mouth on Rio Paguate to headwaters (Rio Grande, 2107), E Not Supported (MRG7-10110)	2	Resource extraction (5100, 5700), Removal of Riparian Vegetation (7600)	December 31, 2017	0	CWF[c]	Temperature, *Stream bottom deposits			NO	NO	4

1998-2000 State of New Mexico §303(d) List for Assessed Stream and River Reaches

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Rio Paguate from inflow to Paguate Reservoir to headwaters (Rio Grande, 2107), M Partially Supported (MRG7-10100)	11.5	Resource extraction (5100, 5700, 5900), Unknown (9000), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	CWF[c]	Metals, temperature (PS), *Stream bottom deposits		Se	NO	NO	3
Bluewater Creek portions on State Lands above Bluewater Reservoir and from private inholdings to the headwaters (Rio Grande, 2107), M Partially Supported (MRG7-20200)	10.2	Agriculture (1500), Silviculture (2100, 2300), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	CWF	Metals, temperature (MRG106.005045, NS), (MRG106.005035, MRG106.005020, PS) *Stream bottom deposits, turbidity, total phosphorus	Al		NO	NO	3
Bluewater Creek from the mouth on the Rio San Jose to Bluewater Dam (Rio Grande, 2107), E Partially Supported (MRG7-20100)	9.6	Agriculture (1500), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	CWF	Plant nutrients			NO	NO	4
Rio San Jose from USGS guage at Correo to Horrace Springs[d] (Rio Grande, 2107), E Not Supported (MRG7-10000)	26.4	Agriculture (1500), Unknown (9000), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	DWS, CWF[c]	Temperature (MRG107.002510, MRG107.002515, NS), total phosphorus (MRG107.002510, MRG107.002515, NS), pH (MRG107.002515, NS), *Stream bottom deposits			NO	NO	4
Alamosa Creek, perennial portions above Monticello diversion ditch (Rio Grande, 2103), E Partially Supported (MRG1-10100)	12.2	Agriculture (1500), Road maintenance/runoff (8300), Natural (8600), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	MCWF, WWF	Unknown			YES Alamosa Spring Snail Endangered	NO	1
Percha Creek from perennial portions above Caballo Reservoir to confluence of Middle and South Forks (Rio Grande, 2103), E Partially Supported (LRG1-10100)	10.5	Agriculture (1500), Resource extraction (5300) Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	MCWF, WWF	Unknown			NO	NO	8

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Pecos River from Alamitos Canyon to Willow Creek (Pecos River, 2214), M Partially Supported (UPR1-30000)	10.4	Construction (3100, 3200), Resource extraction (5600, 5700), Land disposal (6600), Road maintenance/runoff (8300), Recreation (8701, 8703), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	1 Lisbos Fish Hatchery (NM0030121)	HQCWF	Turbidity (PS)			NO	NO	2
Pecos River from Cañon del Oso to Alamitos Canyon (Pecos River, 2213), M Partially Supported (UPR1-20000)	71.6	Municipal point sources (0200), Agriculture (1500), Recreation (8700), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	2 Glorieta Baptist Conference Center (NM0028088) Native American Prep School (NM0029289)	MCWF	*Stream bottom deposits			NO	NO	6
Pecos River from the inflow to Sumner Reservoir to Cañon del Oso (Pecos River, 2211), M Partially Supported (UPR-10000)	102.1	Agriculture (1500), Hydromodification (7400), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	2 Rock Lake Fish Hatchery (NM0030155) Santa Rosa WWTP (NM0024988)	LWWF	Metals (08382650, PS), *Stream bottom deposits		Al	NO	NO	5
Pecos River from Black River to Lower Tansil Dam (Pecos River, 2202), M Partially Supported (PR11-20000)	22.8	Municipal point sources (0200), Agriculture (1201,1500), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700), Unknown (9000)	December 31, 2017	1 Carlsbad (NM0026395)	WWF	*Stream bottom deposits			NO	NO	6
Pecos River from the New Mexico-Texas border to Black River (Pecos River, 2201), M Not Supported (PR11-10000)	30.8	Agriculture (1200, 1500), Hydromodification (7400), Natural (8600), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	WWF[c], IRR, LW	*Stream bottom deposits, biological criteria (NS at Pecos River near Red Bluff Station)			NO	NO	8
Rio Mora from mouth on Pecos River to the headwaters (Pecos River, 2214), M Partially Supported (UPR1-30600)	0.25	Agriculture (1500), Recreation (8700), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	HQCWF	*Stream bottom deposits			NO	NO	4

1998-2000 State of New Mexico §303(d) List for Assessed Stream and River Reaches

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Willow Creek from the confluence at the Pecos River to the headwaters (Pecos River, 2214), M Partially Supported (UPR1-30500)	4.6	Road maintenance/runoff (8300), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700), Resource extraction (5700), Unknown (9000)	December 31, 2017	0	HQCWF[c], DWS[c], IRR[c], LW[c], WH[c], SCR[c], FC[c]	*Stream bottom deposits, conductivity, turbidity			NO	NO	4
Holy Ghost Creek from mouth on Pecos River to Doctor Creek (Pecos River, 2214), M Partially Supported (UPR1-30400)	4.5	Road maintenance/runoff (8300), Recreation (8700), Removal of Riparian Vegetation (7600)	December 31, 2017	0	HQCWF	Metals		Al	NO	NO	3
Cow Creek from mouth on Pecos River to headwaters (Pecos River, 2214), E Partially Supported (PR1-20200)	36.7	Agriculture (1500), Road maintenance/runoff (8300), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2013	0	HQCWF	*Stream bottom deposits			NO	NO	4
Tecolote Creek from the Village of Tecolote to headwaters (Pecos River, 2212), E Not Supported (UPR-20100)	26.4	Agriculture (1500), Construction (3200), Land disposal (6500), Road maintenance/runoff (8300), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	HQCWF[c]	Temperature (UPR212.004010, PS), conductivity (UPR212.004010, PS), turbidity (08379187, NS, UPR212.004010 and UPR212.004020, PS), *Stream bottom deposits			NO	NO	4
Wright Canyon from the mouth on Tecolote Creek to Forest Road 291 (Pecos River, 2212), E Partially Supported (UPR-20150)	0.5	Agriculture (1500), Road maintenance/runoff (8300), Recreation (8700)	December 31, 2017	0	HQCWF	Turbidity, *Stream bottom deposits			NO	NO	4
Gallinas River from the diversion for the Las Vegas reservoir to headwaters (Pecos River, 2212), M Not Supported (UPR-10300)	7	Agriculture (1400, 1800), Road maintenance/runoff (8300), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2013	0	HQCWF[c]	Turbidity (08380000, PS), metals (SWQB HP32, NS), temperature (08380500, PS), *Stream bottom deposits	Al		NO	NO	3

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Gallinas River from San Augustin to the diversion for the Las Vegas municipal reservoir (Pecos River, 2213), M Not Supported (UPR-10200)	10	Municipal point sources (0200), Agriculture (1500), Hydromodification (7100, 7400), Spills (8400), Unknown (9000), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	1 Medite, Inc (NM0029718)	MCWF[c]	Unknown toxicity, total ammonia (UPR211.0011525, NS), *Stream bottom deposits			NO	NO	6
Beaver Canyon Creek from the mouth on Porvenir Creek to the headwaters (Pecos River, 2214), E Partially Supported (PR1-10311)	6	Agriculture (1500), Recreation (8700), Hydromodification (7500), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2013	0	HQCWF	*Stream bottom deposits			NO	NO	4
Rio Hondo, perennial portions up to confluence of Rio Ruidoso and Rio Bonito (Pecos River, 2208), E Partially Supported (PR8-10000)	8	Agriculture (1500) Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2013	0	CWF, IRR	Unknown			NO	NO	4
Rio Ruidoso from Seeping Springs Lakes to the Mescalero Apache Reservation (Pecos River, 2209), M Partially Supported (PR8-50000)	12.2	Agriculture (1500), Construction (3200), Land disposal (6500), Recreation (8700), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	HQCWF	Temperature (RUD12, PS), *Stream bottom deposits, turbidity (LPR209.012035, PS, RUD12, RUD4, RUD2, NS)			NO	NO	2
Rio Ruidoso from the confluence with Rio Bonito to Seeping Springs Lakes (Pecos River, 2208), M Partially Supported (PR8-40000)	21.3	Municipal point sources (0200), Agriculture (1500), Hydromodification (7400), Road maintenance/runoff (8300), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	2 Ruidoso/ Ruidoso Downs (NM0029165) Rancho Ruidoso Valley Estates (NM0029238)	CWF	*Stream bottom deposits, plant nutrients			NO	NO	2

1998-2000 State of New Mexico §303(d) List for Assessed Stream and River Reaches

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Rio Bonito from the confluence with Rio Ruidoso to Angus Canyon (Pecos River, 2208), E Partially Supported (PR8-20000)	31.2	Agriculture (1500), Unknown (9000)	December 31, 2017	0	CWF, IRR	*Stream bottom deposits			NO	NO	8
Rio Peñasco, perennial portions (Pecos River, 2208), E Partially Supported (PR10-10000)	42.5	Agriculture (1500), Road maintenance/runoff (8300), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	1 Sacramento Methodist Assembly (NM0029815)	CWF	*Stream bottom deposits			NO	NO	2
Sitting Bull Creek from its mouth at Lost Chance Canyon to Sitting Bull Springs (Pecos River, unclassified), E Partially Supported	3	Agriculture (1500), Land disposal (6500), Recreation (8700, 8701, 8703), Removal of Riparian Vegetation (7600)	December 31, 2013	0	WWF, SCR	Plant nutrients, *Stream bottom deposits, fecal coliform, temperature, total phosphorus			NO	NO	8
Black River from the mouth on the Pecos River to the headwaters (Pecos River, 2202), E Partially Supported (PR11-20100)	16.9	Agriculture (1200, 1500), Resource extraction (5500), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	WWF	Unknown			NO	NO	8
Raton Creek from the mouth on Chicorica Creek to the headwaters (Canadian River, 2305), E Partially Supported (CR1-10410)	17.3	Municipal point sources (0200), Agriculture (1500), Unknown (9000)	December 31, 2017	2 Raton WWTP (NM0020273) Raton Public Service Company (NM0026522)	LWWF	Plant nutrients			NO	NO	6
Chicorica Creek from the mouth on the Canadian River to Raton Creek (Canadian River, 2305), E Partially Supported (CR1-10300)	9.2	Agriculture (1500), Recreation (8700, 8701, 8703), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	LWWF, IRR	Plant nutrients			NO	NO	8

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Vermejo River from Rail Canyon to York Canyon (Canadian River, 2306), E Partially Supported (CR1-10200)	21.8	Agriculture (1500), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	HQCWF	*Stream bottom deposits			NO	NO	4
Cieneguilla Creek from the inflow to Eagle Nest Lake to the headwaters (Canadian River, 2306), E Not Supported (CR2-50000)	13.6	Domestic point sources (0201), Agriculture (1500), Recreation (8705)	December 31, 1999	0	HQCWF[c], IRR	Plant nutrients, *Stream bottom deposits, turbidity (CRB306.012515, CRB306.012518, CRB306.012520 and CRB306.12525, NS)			NO	NO	4
Moreno Creek from the inflow to Eagle Nest Lake to the headwaters (Canadian River, 2306), E Partially Supported (CR2-30000)	14.4	Recreation (8700)	December 31, 1999	0	HQCWF, IRR	Fecal coliform, plant nutrients			NO	NO	4
Cimarron River from Turkey Creek to Eagle Nest Dam (Canadian River, 2306), E Not Supported (CR2-20000)	17.6	Agriculture (1500), Recreation (8700)	December 31, 2017	0	HQCWF[c]	Total phosphorus (CRB306.011550, NS)			NO	NO	4
Cimarron River from the mouth on the Canadian River to Turkey Creek (Canadian River, 2305), E Partially Supported (CR2-10000)	35.3	Agriculture (1500), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	LWWF	Plant nutrients			NO	NO	8
Ute Creek at its mouth on the Cimarron River (Canadian River, 2306), E Partially Supported (CR2-20100)	1	Agriculture (1500)	December 31, 2017	0	HQCWF	Turbidity, total phosphorus			NO	NO	4
Ponil Creek from the mouth on the Cimarron River to the confluence of North Ponil and South Ponil Creeks (Canadian River, 2306), E Not Supported (CR2-10300)	15.8	Agriculture (1500)	December 31, 2017	0	HQCWF[c]	Temperature (CRB306.011040, NS, 07207500, PS), conductivity (CRB306.011010, NS), turbidity, total phosphorus (CRB306.011010, NS), fecal coliform			NO	NO	4

1998-2000 State of New Mexico §303(d) List for Assessed Stream and River Reaches

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North Ponil Creek from the confluence with South Ponil Creek to the mouth of McCrystal Creek (Canadian River, 2306), E Not Supported (CR2-10400)	17.6	Agriculture (1500), Silviculture (2300), Removal of Riparian Vegetation (7600)	December 31, 1999	0	HQCWF, IRR	Temperature (CRB306.011045, NS), *Stream bottom deposits			NO	NO	4
Middle Ponil Creek from the confluence with South Ponil Creek to the headwaters (Canadian River, 2306), E Not Supported (CR2-10610)	20.9	Agriculture (1500), Silviculture (2300), Removal of Riparian Vegetation (7600)	December 31, 2017	0	HQCWF[c]	Total phosphorus (CRB306.011065, NS), *Stream bottom deposits			NO	NO	4
Rayado Creek from the mouth on the Cimarron River to Miami Lake diversion (Canadian River, 2305.3), E Partially Supported (CR2-10100)	16.5	Agriculture (1500), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	MCWF, WWF	*Stream bottom deposits			NO	NO	8
Mora River from Rio la Casa to the headwaters (Canadian River, 2306), E Not Supported (CR4-30000)	22.3	Agriculture (1500)	December 31, 2017	0	HQCWF[c]	Total phosphorus (CRB306.007530, NS), turbidity (CRB306.007530, NS), *Stream bottom deposits			NO	NO	4
Mora River from Wolf Creek to Rio la Casa (Canadian River, 2305.3), E Partially Supported (CR4-20000)	43.3	Municipal point sources (0200), Agriculture (1500)	December 31, 2017	1 Mora Mutual Domestic Water & Sanitation (NM0024996)	MCWF, WWF	Plant nutrients			NO	NO	6
Mora River from the mouth on the Canadian River to Wolf Creek (Canadian River, 2305), E Partially Supported (CR4-10000)	50.9	Agriculture (1500), Unknown (9000)	December 31, 2017	0	LWWF	Metals		Pb	NO	NO	7
Sapello River from the mouth on the Mora River to Manuelitas Creek (Canadian River, 2305.3), E Partially Supported (CR4-20100)	27.1	Agriculture (1500), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	MCWF, WWF	Unknown			NO	NO	8

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Ocate Creek from below the Village of Ocate to Wheaton Creek (Canadian River, 2305.3, 2306), E Partially Supported (CR3-20200)	7.1	Agriculture (1200, 1500), Road maintenance/runoff (8300), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	HQCWF, MCWF, WWF	Unknown			NO	NO	4
Manuelas Creek from Wheaton Creek to Manuelitas Canyon (Canadian River, 2306), E Partially Supported (CR3-20300)	1.5	Agriculture (1200, 1500), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	HQCWF	Unknown			NO	NO	4
Rio la Casa from the mouth on the Mora River to the confluence of North and South Forks (Canadian River, 2306), E Partially Supported (CR4-30100)	5.8	Construction (3100), Road maintenance/runoff (8300), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	HQCWF	*Stream bottom deposits			NO	NO	4
Coyote Creek from mouth on Mora River toBlack Lake (Canadian River, 2306), E Partially Supported (CR4-20300)	30.1	Agriculture (1201, 1500), Road maintenance/runoff (8300)	December 31, 2017	0	HQCWF	*Stream bottom deposits			NO	NO	4
Little Coyote Creek from inflow to Black Lake to headwaters (Canadian River, 2306),E Not Supported (CR4-20350)	1	Road Construction (3100)	December 31, 2017	0	HQCWF[c]	Turbidity, *Stream bottom deposits, total phosphorus, temperature (PS)			NO	NO	4
San Juan River from Cañon Largo to Navajo Dam (San Juan River, 2405), E Not Supported (SJR1-20000)	11.1	Agriculture (1500), Resource extraction (5500), Unknown (9000), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2004	0	HQCWF[c], WWF[c]	Turbidity (SJR104, NS), *Stream bottom deposits			NO	NO	4

1998-2000 State of New Mexico §303(d) List for Assessed Stream and River Reaches

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San Juan River from the Animas River to Cañon Largo (San Juan River, 2401), M Not Supported (SJR1-10000)	26	Agriculture (1200, 1500), Urban runoff (4000), Resource extraction (5500), Unknown (9000), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2004	3 Farmington Sand and Gravel (NM0028258) Bloomfield (NM0020770) Bloomfield Municipal Schools (NM0028142)	MCWF[c], WWF[c]	*Stream bottom deposits, fecal coliform (SJR 106 and SJR401.004020, NS)			NO	NO	6
San Juan River from the Chaco River to the Animas River (San Juan River, 2401), M Partially Supported (SJR5-20000)	31.2	Agriculture (1200, 1500), Resource extraction (5500, 5900), Unknown (9000), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2004	7 San Juan Concrete (NM0000027) Farmington (NM0020583) Farmington DWTP (NM0000051) Harper Valley Subdivision (NM0029025) Central Consolidated Schools (NM0029319) San Juan Coal Company San Juan Mine (NM0028746) Public Service Company San Juan Plant (NM0028606)	MCWF, WWF	*Stream bottom deposits			YES Colorado Squaw Fish Endangered		1
Animas River from the mouth on the San Juan River to Estes Arroyo (San Juan River, 2403), M Partially Supported (SJR4-10000)	16.5	Resource extraction (5500), Hydromodification (7100), Urban runoff (4000), Unknown (9000), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2004	4 Aztec WWTP (NM0020168) Farmington Animas Steam Plant (NM0000043) Farmington MOC (NM0029572) North Star Water Project (NM0029271)	MCWF, WWF	*Stream bottom deposits			NO	NO	6
Animas River from Estes Arroyo to the New Mexico-Colorado Border (San Juan River, 2404), M Partially Supported (SJR4-20000)	19.9	Agriculture (1200, 1500), Resource extraction (5500), Urban runoff (4000), Hydromodification (7100), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2004	0	CWF	*Stream bottom deposits			NO	NO	4

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La Plata River from the mouth on the San Juan River to the New Mexico-Colorado border (San Juan River, 2402), E Partially Supported (SJR5-20100)	24.7	Agriculture (1500) Resource extraction (5100, 5500, 5900), Unknown (9000), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2004	2 Black Diamond Coal Company-La Plata (NM0029611) San Juan Coal Company-La Plata Mine (NM0029505)	LWWF, MCWF	Plant nutrients			NO	NO	6
Rio Nutria from mouth on Zuni River to headwaters[d] (Lower Colorado River, unclassified), E Partially Supported (LCR4-20000)	22.8 (7)	Unknown (9000)	December 31, 2017	0	WWF	Metals		Hg	NO	NO	5
San Francisco River from Centerfire Creek to the New Mexico-Arizona border (San Francisco River, 2602), M Partially Supported	15	Agriculture (1500), Upstream impoundment (8800)	December 31, 2001	0	CWF[c]	Temperature, pH, total ammonia, plant nutrients			NO	NO	4
Centerfire Creek from the mouth on the San Francisco River to the headwaters (San Francisco River, 2603), M Partially Supported (SFR4-30300)	7.1	Agriculture (1500), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2001	0	HQCWF	Conductivity, plant nutrients			NO	NO	4
Tularosa River from the mouth on the San Francisco River to Apache Creek (San Francisco River, 2603), M Not Supported (SFR4-20600)	22.5	Agriculture (1500), Removal of Riparian Vegetation (7600)	December 31, 2001	0	HQCWF[c], IRR	Temperature, pH (SFR603.004025, NS), turbidity (SFR603.004035, PS)			YES Loach Minnow Threatened	NO	1
Apache Creek at its mouth on the Tularosa River (San Francisco River, 2603), E Not Supported (SFR4-20710)	2.5	Agriculture (1500), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2001	0	HQCWF[c]	Temperature, conductivity, total phosphorus			NO	NO	4

1998-2000 State of New Mexico §303(d) List for Assessed Stream and River Reaches

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Negrito Creek from the mouth on the Tularosa River to South Fork Negrito Creek (San Francisco River, 2603), E Partially Supported	12	Agriculture (1500), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2001	0	HQCWF	Unknown			NO	NO	4
South Fork of Negrito Creek from the confluence with the North Fork to the headwaters (San Francisco River, 2603), E Partially Supported	5.4	Agriculture (1500), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2001	0	HQCWF	Unknown			NO	NO	4
Silver Creek from the mouth on Mineral Creek to Little Fannie Mine (San Francisco River, 2603), M Not Supported	3.3	Resource extraction (5600, 5700)	December 31, 2001	0	HQCWF[c], LW	Metals, other inorganics	CN, Al		NO	NO	3
Whitewater Creek from the mouth on the San Francisco River to Whitewater Campground (San Francisco River, 2603), M Not Supported (SFR4-20100)	5.6	Hydromodification (7100, 7200, 7400), Road maintenance/runoff (8300), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2001	0	HQCWF[c]	Metals, turbidity, *Stream bottom deposits		Al	NO	NO	3
Gila River from Mangas Creek to Mogollon Creek (Gila River, 2502), M Not Supported (GRB2-20000)	15	Agriculture (1500, 1200), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2001	0	MCWF[c], WWF[c], PCR	*Stream bottom deposits, turbidity			YES Spikedace and Loach Minnow Threatened	NO	1
Gila River from Mogollon Creek to the East and West Forks of the Gila River (Gila River, 2502), M Not Supported (GRB1-10000)	39.8	Agriculture (1500), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2001	0	MCWF[c]	Turbidity (GRB502.008055, NS)			YES Spikedace and Loach Minnow Threatened	NO	1

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Gila River from the New Mexico-Arizona border to Mangas Creek (Gila River, 2501, 2502), M Not Supported (GRB2-20000)	38.6	Agriculture (1201, 1500), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2001	0	LWWF[c], WWF[c], MCWF[c], PCR	Turbidity, *Stream bottom deposits			YES Spikedace and Loach Minnow Threatened	NO	1
East Fork of the Gila River from the confluence with the West Fork of the Gila River to the confluence of Beaver and Taylor Creeks (Gila River, 2503), M Partially Supported (GRB1-20000)	7.5	Agriculture (1500), Removal of Riparian Vegetation (7600)	December 31, 2001	0	HQCWF	Metals (Station GRB503.007540)		Al	YES Spikedace and Loach Minnow Threatened	NO	1
Snow Canyon Creek from the confluence with Gilita Creek to Snow Lake (Gila River, 2503), M Partially Supported (GRB1-30270)	1	Agriculture (1500), Upstream impoundment (8800), Unknown (9000)	December 31, 2001	0	HQCWF	*Stream bottom deposits			NO	NO	4
Canyon Creek from the mouth on the Middle Fork of the Gila to the headwaters (Gila River, 2503), E Partially Supported	4.5	Agriculture (1500) Removal of Riparian Vegetation (7600), Streambank Destabilization (7700)	December 31, 2013	0	HQCWF	Nutrients, unknown			NO	NO	4
Taylor Creek from the confluence with Beaver Creek to Wall Lake (Gila River, 2503), M Not Supported (GRB1-20300)	2.9	Agriculture (1500), Recreation (8700), Upstream impoundment (8800)	December 31, 2001	0	HQCWF[c]	Temperature, metals		Al	NO	NO	3
Black Canyon Creek from the mouth on the East Fork of the Gila River to the headwaters (Gila River. 2503), M Not Supported (GRB1-20100)	2	Agriculture (1500), Silviculture (2100)	December 31, 2001	0	HQCWF[c]	Temperature (GRB503.007523, GRB503.007525, NS)			NO	NO	4
Sapillo Creek from the mouth on the Gila River to Lake Roberts (Gila River, 2503), M Partially Supported (GRB1-10300)	5.0	Agriculture (1500), Hydromodification (7100), Upstream impoundment (8800), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2001	0	HQCWF	Biological impairment, unknown			NO	NO	4

1998-2000 State of New Mexico §303(d) List for Assessed Stream and River Reaches

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Mogollon Creek, perennial portions above the USGS gauge (Gila River, 2503), M Not Supported (GRB1-10100)	12.6	Agriculture (1500), Resource Extraction (5600, 5900), Unknown (9000), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2001	0	HQCWF[c]	Metals (NS), *Stream bottom deposits		Al, Pb	YES Gila Trout Endangered	NO	3
Carlisle Creek, perennial portions in New Mexico (Gila River, 2501), M Partially Supported (GRB2-10010)	10	Resource extraction (5800), Agriculture (1500), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	NO	0	LWWF, IRR, LW	Metals	Al, Cu, Zn, Cd		NO	NO	7
Mangas Creek from the mouth on the Gila River to Mangas Springs (Gila River, 2502), M Partially Supported (GRB2-20100)	4.7	Agriculture (1500), Hydromodification (7400), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2001	0	MCWF, WWF, PCR	Plant nutrients, *Stream bottom deposits			NO	NO	8
Bear Creek from the mouth on the Gila River to the headwaters (Gila River, 2502), M Partially Supported (GRB2-20200)	2.5	Resource extraction (5100, 5700), Agriculture (1500), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2001	1 Cyprus Pinos Altos Corp (NM0029157)	MCWF, WWF, LWWF	Metals	Al, Zn, Cu		NO	NO	5
Dry Cimarron River, perennial portions (Dry Cimarron River, 2701), E Not Supported (DC1-10000)	71.9	Agriculture (1500), Natural (8600), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	CWF[c]	Temperature (DCR701.000405, NS), pH (DCR701.002010, PS, DCR701,000105 and DCR701.000110, NS), TDS (DCR701.000105, NS), *Stream bottom deposits, total ammonia (DCR701.000105, NS)			NO	NO	4

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Long Canyon, perennial portions (Dry Cimarron River, 2701), E Not Supported (DC1-10100)	4.9	Agriculture (1500), Natural (8600), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	CWF[c]	Temperature			NO	NO	4
Oak Creek from the mouth on the Dry Cimarron River to the headwaters (Dry Cimarron River, 2701), E Partially Supported (DC1-30200)	9.1	Agriculture (1500), Natural (8600), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	CWF	Unknown			NO	NO	4
Carrizozo Creek from the mouth on the Dry Cimarron River to the headwaters (Dry Cimarron River, 2701), E Partially Supported	1.5	Unknown (9000) Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	CWF	Unknown			NO	NO	4
Three Rivers, perennial portions from U.S. Highway 54 to White Mountain Wilderness Boundary (Closed Basins, 2802), M Not Supported (CC3-20000)	7.5	Agriculture (1500)	December 31, 2017	0	HQCWF[c]	Temperature (CCB802.002025, CCB802.002015, NS), conductivity (CCB802.002025, CCB802.002015, NS)			NO	NO	4
Mimbres River from Sheppard Canyon to Cooney Campground (Mimbres River, 2804), M Not Supported (SWC2-20000)	11.6	Agriculture (1500), Resource extraction (5400), Hydromodification (7200), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	HQCWF[c]	Dissolved oxygen (SWC804.006048, PS), temperature (SWC804.003035, NS), *Stream bottom deposits			YES Chihuahua Chub Threatened	NO	1
Mimbres River, perennial portions below Sheppard Canyon (Mimbres River, 2803), M Not Supported (SWC2-10000)	12.5	Hydromodification (7200), Agriculture (1200, 1500), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	CWF[c], IRR	Temperature (SWC803.000105 and SWC803.002501, NS), *Stream bottom deposits			YES Chihuahua Chub Threatened	NO	1

1998-2000 State of New Mexico §303(d) List for Assessed Stream and River Reaches

WATER BODY NAME (Basin, segment) EVALUATED OR MONITORED (E/M), SUPPORT STATUS WBS NUMBER	TOTAL SIZE AFFECTED (MILES WITHIN STATE OF NM JURISDICTION)	PROBABLE SOURCE(s) OF POLLUTANT/THREAT	TMDL SCHEDULE (DATE TMDL DUE)	[illegible] PERMITS ON THE REACH	[illegible] SUPPORTED THREATENED	[illegible] THREAT AND IMPACTED SAMPLING STATION(s)	[illegible]	[illegible]	[illegible] SPECIES ON THE REACH	[illegible] HEALTH CONCERNS [illegible]	PRIORITY
Tularosa Creek from the town of Tularosa to the headwaters (Closed basins, 2801), M Partially Supported	10.2	Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700), Unknown (9000)	NO	0	CWF	Unknown			NO	NO	4
Gallinas Creek from the mouth on the Mimbres River to the headwaters (Mimbres River, 2803),E Partially Supported (SWC2-10300)	14.0	Agriculture (1200, 1500), Resource extraction (5900), Natural (8600), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	CWF	Temperature			NO	NO	4
Hot Springs Creek from the mouth on the Mimbres River to the headwaters (Mimbres River, 2803), E Not Supported	11.0	Agriculture (1500), Removal of Riparian Vegetation (7600), Streambank Modification/Destabilization (7700)	December 31, 2017	0	CWF	Unknown			NO	NO	4
Cold Springs Creek from the mouth on Hot Springs Creek to the headwaters (Mimbres River, 2803), M (SWC2-10210) Not Supported	8	Resource extraction (5200, 5700)	December 31, 2017	0	CWF[c]	Metals	Cu, Zn		NO	NO	3

WATER BODY NAME	TOTAL SIZE AFFECTED (ACRES WITHIN STATE OF NM JURISDICTION	PROBABLE SOURCE(s) OF POLLUTANT/THREAT	TMDL SCHEDULE (DATE TMDL DUE)	SPECIFIC POLLUTANT(s) OR THREAT	TOXICS AT CHRONIC LEVELS	ACUTE PUBLIC HEALTH CONCERN	PRIORITY
Abiquiu Reservoir	4,000 acres	Atmospheric Deposition (8100)	December 31, 2017	Fish guidelines	Hg	NO	8
Avalon Lake	930 acres	Atmospheric Deposition (8100)	December 31, 2017	Fish guidelines	Hg	NO	8
Bear Canyon Reservoir	22 acres	Atmospheric Deposition (8100)	December 31, 2017	Fish guidelines	Hg	NO	8
Carlsbad Municipal Lake	-	Atmospheric Deposition (8100)	December 31, 2017	Fish guidelines	Hg	NO	8
Charette Lakes	410	Atmospheric Deposition (8100)	December 31, 2017	Fish guidelines	Hg	NO	8
Eagle Nest Lake	2,000 acres	Atmospheric Deposition (8100)	December 31, 2017	Fish guidelines	Hg	NO	8
El Vado Reservoir	3,500 acres	Atmospheric Deposition (8100)	December 31, 2017	Fish guidelines	Hg	NO	8
Heron Reservoir	5,906 acres	Atmospheric Deposition (8100)	December 31, 2017	Fish guidelines	Hg	NO	8
Lake Maloya	150 acres	Atmospheric Deposition (8100)	December 31, 2017	Fish guidelines	Hg	NO	8
McAllister Lake	100 acres	Atmospheric Deposition (8100)	December 31, 2017	Fish guidelines	Hg	NO	8
Springer Lake	450 acres	Atmospheric Deposition (8100)	December 31, 2017	Fish guidelines	Hg	NO	8
Stubblefield Reservoir	683 acres	Atmospheric Deposition (8100)	December 31, 2017	Fish guidelines	Hg	NO	8
Clayton Lake	176 acres	Atmospheric Deposition (8100)	December 31, 2017	Fish guidelines	Hg	NO	8
Caballo Reservoir	11,000 acres	Atmospheric Deposition (8100)	December 31, 2017	Fish guidelines	Hg	NO	8
Cochiti Reservoir	1,240 acres	Atmospheric Deposition (8100)	December 31, 2017	Fish guidelines	Hg	NO	8
San Juan River from Hammond Diversion to Mancos River	-	Atmospheric Deposition (8100)	December 31, 2017	Fish guidelines	Hg	NO	8
Navajo Reservoir	15,000 acres	Atmospheric Deposition (8100)	December 31, 2017	Fish guidelines	Hg	NO	8
Sumner Reservoir	4,650 acres	Atmospheric Deposition (8100)	December 31, 2017	Fish guidelines	Hg	NO	8
Brantley Reservoir	2,000 acres	Atmospheric Deposition (8100)	December 31, 2017	Fish guidelines	Hg	NO	8
Conchas Reservoir	16,600 acres	Atmospheric Deposition (8100)	December 31, 2017	Fish guidelines	Hg	NO	8
Lake Farmington	198 acres	Atmospheric Deposition (8100)	December 31, 2017	Fish guidelines	Hg	NO	8
McGaffey Lake	13 acres	Atmospheric Deposition (8100)	December 31, 2017	Fish guidelines	Hg	NO	8
Elephant Butte Reservoir	40,000 acres	Atmospheric Deposition (8100)	December 31, 2017	Fish guidelines	Hg	NO	8
Ute Reservoir	8,200 acres	Atmospheric Deposition (8100)	December 31, 2017	Fish guidelines	Hg	NO	8
Santa Rosa Reservoir	1,500 acres	Atmospheric Deposition (8100)	December 31, 2017	Fish guidelines	Hg	NO	8

SUPERSCRIPT LEGEND

[a] = Conclusions concerning attainment of fishery uses are largely based on water quality analysis, where available, biological data was used to verify these results.

[b] = All toxics for which EPA has prepared a federal Clean Water Act § 304(a) guidance document were reviewed as required by EPA.

[c] = Pollutants present in concentrations or combinations such that designated or attainable uses are not supported.

= This reach includes areas wholly or in-part on Tribal Lands which are removed and separate from State of New Mexico jurisdictional authority.

***Stream bottom deposits** = **NMED/SWQB has no physical data to support these listings. These listings are based on best professional judgment only. The Bureau is in the process of developing stream bottom deposits protocols for the expressed purpose of measuring the impacts of stream bottom deposits.**

CODES FOR USES NOT FULLY SUPPORTED.

HQCWF	=	HIGH QUALITY COLDWATER FISHERY
CWF	=	COLDWATER FISHERY
MCWF	=	MARGINAL COLDWATER FISHERY
WWF	=	WARMWATER FISHERY
LWWF	=	LIMITED WARMWATER FISHERY
DWS	=	DOMESTIC WATER SUPPLY
PC	=	PRIMARY CONTACT
IRR	=	IRRIGATION
LW	=	LIVESTOCK WATERING
WH	=	WILDLIFE HABITAT

Fish culture, secondary contact and municipal and industrial water supply and storage are also designated in particular stream reaches where these uses are actually being realized. However, no numeric standards apply uniquely to these uses.

CODES FOR SOURCES OF NONSUPPORT.

0100	INDUSTRIAL POINT SOURCES
0200	MUNICIPAL POINT SOURCES
0201	DOMESTIC POINT SOURCES
0400	COMBINED SEWER OVERFLOWS
1000	AGRICULTURE
1100	NONIRRIGATED CROP PRODUCTION
1200	IRRIGATED CROP PRODUCTION
1201	IRRIGATED RETURN FLOWS
1300	SPECIALTY CROP PRODUCTION (e.g., truck farming and orchards)
1400	PASTURELAND
1500	RANGELAND
1600	FEEDLOTS - ALL TYPES
1700	AQUACULTURE
1800	ANIMAL HOLDING/MANAGEMENT AREAS
1900	MANURE LAGOONS
2000	SILVICULTURE
2100	HARVESTING, RESTORATION, RESIDUE MANAGEMENT
2200	FOREST MANAGEMENT
2300	ROAD CONSTRUCTION or MAINTENANCE
3000	CONSTRUCTION
3100	HIGHWAY/ROAD/BRIDGE
3200	LAND DEVELOPMENT
3201	RESORT DEVELOPMENT
3300	HYDROELECTRIC
4000	URBAN RUNOFF/STORM SEWERS
5000	RESOURCES EXTRACTION
5100	SURFACE MINING
5200	SUBSURFACE MINING
5300	PLACER MINING
5400	DREDGE MINING
5500	PETROLEUM ACTIVITIES
5501	PIPELINES
5600	MILL TAILINGS
5700	MINE TAILINGS
5800	ROAD CONSTRUCTION/MAINTENANCE
5900	SPILLS
6000	LAND DISPOSAL
6100	SLUDGE
6200	WASTEWATER
6300	LANDFILLS
6400	INDUSTRIAL LAND TREATMENT
6500	ONSITE WASTEWATER SYSTEMS (septic tanks, etc.)
6600	HAZARDOUS WASTE
6700	SEPTAGE DISPOSAL
6800	UST LEAKS
7000	HYDROMODIFICATION
7100	CHANNELIZATION
7200	DREDGING
7300	DAM CONSTRUCTION/REPAIR
7400	FLOW REGULATION/MODIFICATION
7500	BRIDGE CONSTRUCTION
7600	REMOVAL OF RIPARIAN VEGETATION
7700	STREAMBANK MODIFICATION/DESTABILIZATION
7800	DRAINING/FILLING OF WETLANDS
8000	OTHER
8010	VECTOR CONTROL ACTIVITIES
8100	ATMOSPHERIC DEPOSITION
8200	WASTE STORAGE/STORAGE TANK LEAKS
8300	ROAD MAINTENANCE or RUNOFF
8400	SPILLS
8500	IN-PLACE CONTAMINANTS
8600	NATURAL
8700	RECREATIONAL ACTIVITIES
8701	ROAD/PARKING LOT RUNOFF
8702	OFF-ROAD VEHICLES
8703	REFUSE DISPOSAL
8704	SPILLS
8705	SKI SLOPE RUNOFF
8800	UPSTREAM IMPOUNDMENT
8900	SALT STORAGE SITES
9000	SOURCE UNKNOWN

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SEDIMENT PROTOCOL FOR THE ASSESSMENT OF STREAM BOTTOM DEPOSITS

This protocol was designed to support an interpretation of the New Mexico State Water Quality Standards narrative for stream bottom deposits. The current guidance for the deposition of material on the bottom of a stream channel is listed in the "STATE OF NEW MEXICO STANDARDS FOR INTERSTATE AND INTRASTATE STREAMS, SECTION 1102. GENERAL STANDARDS A. Stream Bottom Deposits. The stream shall be free of water contaminants from other than natural causes that will settle and adversely inhibit the growth of normal flora and fauna or significantly alter the physical or chemical properties of the bottom. Siltation resulting from the reasonable operation and maintenance of irrigation and flood control facilities is not subject to these standards.

The standard has been used subjectively to list numerous stream segments as being impaired by sediment in the 305B Report. The standard is written as a narrative and it is difficult to determine when the threshold of deposition has occurred and sediments are adversely inhibiting the growth of normal flora and fauna. To determine a criteria for the threshold of adversely inhibiting the stream bottom, a quantitative assessment will be developed.

Sediment transport in a watershed and deposition in the stream channel has become a concern for Surface Water Quality Bureau (SWQB). The delivery of sediment to the stream and the effects on the aquatic habitat are constituents that need further investigation to support the narrative in the state standard. An increase in the sediment load entering a stream is often the most adverse effect from land management practices in a watershed. Large increases in the amount of sediment delivered to the stream channel can greatly impair, or eliminate, fish and aquatic invertebrate habitat, and alter the structure of the stream banks and adjacent riparian zone (McDonald, 1991), and change the the width to depth ratios of the stream itself. The intent of the protocol is to provide a quantitative assessment procedure for determining compliance with the narrative standard. A stable stream is one that is able to transport water and sediment while maintaining its pattern, profile and dimension without aggrading or degrading.

Anthropogenic sources of sediment include agriculture (row-crop cultivation, livestock grazing); forestry (timber harvest, logging roads, landslides); mining (spoil piles, tailing dumps, sand and gravel extraction); and urban development (residential, industrial). Road construction along with improper culvert design, produces some of the greatest quantities of sediment. Streambank erosion is a natural process in all streams but where it is exacerbated by human activities, destabilized streambanks may deliver great quantities of sediment directly into stream channels (Waters, 1995).

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A sediment budget is a complex measurement consisting of the amount and size of material entering the stream, storage in the channel and material being transported from the watershed. This assessment will be directed toward the storage of material in the channel because this component of the sediment budget is closely related to the state standard for sediment in a water body.

Reference segments in stream channels for sediment will be established for a channel type using the Rosgen stream classification. The reference segment will represent a stream channel that is relatively unimpacted or least impacted by sediment. The comparison between segments will be made within a hydro-physio geographic province and ecoregion type. Rosgen stream type classifications will be used to build a data base that may be used as a possible constant between reference and study sites. Land management practices, climate, geology, vegetation and watershed size will all be considered in the selection of a reference segment.

Numeric criteria will be developed to support both the narrative standard and the EPA Rapid Bioassessment Habitat Protocol similar to the protocol and philosophy proposed by the state of Colorado sediment task force. The following parameters will be utilized to measure the deposition of sediment on stream bottoms and provide data that can be incorporated into management decision that support the stream standards.

1. **Embeddedness:** Measurements will be conducted using the method developed by Burton and Harvey (1990). In streams with large amounts of fine sediment, the coarser particles tend to become surrounded or partially buried by the fine sediment (McDonald, 1991). The deposition of finer bedload material (sand-sized particles) also have been shown to adversely affect gravel permeability and the suitability of the gravel for spawning salmonids (Lisle, 1989). A lower permeability usually reduces the concentration of intergravel dissolved oxygen and this can be directly related to salmonid spawning success and the number and diversity of aquatic insects (Chapman, 1987). This metric will be used in scoring habitat paramenter number 3 under EPA's habitat assessment protocol (see attachment).

2. **Pebble Count:** The pebble count is a quick and simple technique for characterizing stream bed material and has long been used by geomorphologists, hydrologist, and river engineers (Potyondy, 1988). Measurements will be conducted using the Wolman method (1954). Large, stable particles provide important habitat niches for invertebrates and small fish (MacDonald, 1991). Pebble count data will be used in the Rosgen stream classification and to determine the quality of aquatic habitat. This metric will be used in scoring habitat parameters 1 and 2 under EPA's habitat assessment protocol.

3. **Interstitial Space Index:** The habitat available between substrate material is a critical area for the cohabitation of benthic macroinvertebrates and juvenile fishes. The deposition of fine sediment in the stream reduces the interstitial habitats. A direct

correlation between the benthic macroinvertebrate community and a change in the interstitial space will be determined. Calculation will be made using the method developed by Burton and Harvey (1990). This metric will be used in scoring habitat parameters 3 and 5 under EPA's habitat assessmnet protocol.

4. **Benthic Macroinvertebrates:** Collection will be conducted in accordance with EPA Rapid Bioassessment Protocols III for Use in Streams and Rivers 1991. Benthic macroinvertebrates offer advantages in biomonitoring, which explains their popularity. Some of these are intrinsic to the biology of the animals: 1) they are ubiquitous, therefore they can be affected by environmental perturbations in many different types of aquatic systems and in habitats within those waters; 2) the large number of species involved offers a spectrum of responses to environmental stresses; 3) their basically sedentary nature allows effective spatial analyses of pollutant or disturbance effects; 4) they have long life cycles compared to other groups which allows elucidation of temporal changes caused by perturbations (Rosenberg and Resh, 1993). This will be used as a final comparison between reference and study sites. Comparable benthic communities would indicate non-impairment by sedimentation or siltation. If however, the community at the study site is found to be impaired compared to the reference site the need for further investigation into the cause would be warranted.

5. **Electrofishing:** An evaluation of the fish communities will be used to illustrate the effects of sediment deposition in the stream channel. Fish populations can provide be strong correlation to stream health and the effects sediment transport within the watershed. The species of fish inhabiting a section of stream can be used descriptively to determine the stream conditions that have prevailed in the water body over an extended period of time. Anthropogenic activities may have significantly altered the stream channel conditions resulting in a different composition of both native and exotic species. Fish are also useful surrogates or integrators of a variety of physical and biological parameters (McDonald 1991).

To effectively monitor fisheries, an interagency team will be formed consisting of staff members from New Mexico Game and Fish Department, Forest Service , U. S. Fish and Wildlife Service and the Surface Water Quality Bureau. These efforts will be directed at the collection of field data and the review of historic records. At this time, it is believed that the benthic macroinvertebrate community is a better indicator of sediment impairment than the fishery. The greater taxonomic diversity in the macroinvertebrate community provides a more detailed description of population changes.

6. **Rosgen Stream Classification:** The natural stream channel stability is achieved by allowing the river to develop a stable dimension, pattern, and profile such that, over time, channel features are maintained and the stream system neither aggrades nor degrades. For a stream to be stable it must be able to consistently transport its sediment load, both in size and type, associated with local deposition and scour (Rosgen, 1996). The ability of the stream channel to remain stable can be directly

associate to the compliance with the state standard for sediment. A level 2 or 3 evaluation will be conducted consisting of; channel slope, width/depth ratio, sinuosity, entrenchment ratio, stream bank erosion potential, belt width, depositional pattern, and channel stability. Will be used as an aid in selecting reference sites for a particular study site under EPA's habitat assessment protocol along with similar ecoregions. Long term measurements may also aid in evaluating channel stability as a factor in sedimentation through aggradation and degradation along with equating biological condition with stream type.

7. **Surface Area in Watershed.** The size of the watershed upstream from the sample site will be measured, and a relationship to sediment and stream type calculated. The drainage area provides a limited unit of the earth's surface within which basic climatic quantities can be measured and characteristic landforms described, and a system within which a balance can be struck in terms of inflow and outflow of moisture and energy (Leopold, 1964).

8. **Hydrography:** Identify the hydrography from the nearest USGS gauge is an important measurement. This flow data will provide information on the patterns of discharge including the storage capacity in the watershed, size of peak flow, return intervals, volume of low flows, rate of run-off and potential influences of irrigation. The ability of the stream to transport the incoming sediment will help determine whether there is deposition or erosion within the active channel. The relationship between sediment load and sediment transport capacity will affect the distribution of habitat types, channel morphology, and bed material particle size (MacDonald, 1991). Included in the interpretation of this information is an overview of the geology in the watershed and the climatic pattern of the region.

9. **Stream Bank Stability.** The condition of the stream bank is a critical component in stream function and the availability of sediment. Erosion of the stream banks in a natural process within the watershed. The rate of this process can be increased by anthropogenic activities, resulting in the deposition of excessive quantities of sediment in the stream channel. Two processes that are chiefly responsible for this deposition are (1) entrainment of the bank material by high flows, and (2) bank failure that cause slumping of material directly into a stream to be entrained by normal flows (Waters, 1995).

The stream bank potential for erosion will be monitored using the Rosgen method of bank erodibility hazard rating guide. This method will provide an assessment of the bank condition and determine the potential for erosion and deposition into the stream channel. Criteria used in this method includes; bank height, root depth, root density, bank angle, bank material, and stratification of bank material. This metric will be used in evaluating habitat parameters 8 and 9 under EPA's habitat assessment protocol.

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10. **Proper Functioning Condition Assessment** ***(POTENTIAL HABITAT EVALUATION)*** The Bureau of Land Management developed this method (1995) and is currently being adopted by the Forest Service. This assessment depicts natural riparian-wetland areas as resources whose capability and potential is defined by the interaction of three components: 1) vegetation, 2) landform/soil, and 3) hydrology. An interdisciplinary team is select consisting of a specialist in each of the three components. A biologist also needs to be involved because of the high fish and wildlife values associated with riparian-wetlands areas. This metric may be incorporated into evaluating habitat parameter 10 under EPA's habitat assessment protocol.

11. **Identification of Ecoregions (Coley, Hatch, Jacobi et al).** The physical and climatic conditions must be taken into account when establishing reference and sampling sites for a sediment monitoring program. Water bodies in New Mexico exhibit a wide range of variability in their climate, hydrology. geology, land scape, and soil type. These differences have a direct effect on the stream channel morphology, water chemistry, runoff patterns, aquatic flora and fauna, and riparian ecosystem (McDonald). The sediment transport is influenced by all the features within the ecoregion. Aquatic ecoregions have been identified in the state and these delineations were based on similarities in water chemistry, physical habitat, and climate (Cowely, et. al. 1997). The identification of these ecoregions will serve as guidance for conducting the sediment protocol. The establishment of Rosgen stream classification, within an ecoregion will further strengthen the description of the stream reach. Reference reaches will be identified in each ecoregion for Rosgen stream types.

12. **Study Design.** The assessment of the stream conditions can not be started before a well thought out study design has been established. The objectives of the monitoring must clearly be identified. The selections of sampling sites must represent the intent of the project and document the conditions of the watershed. The study design will provide the investigators with the methodologies, purpose, primary objectives and depth of analyzations. Possible statistical procedures are; cluster analysis, nonlinear logistical regressional analysis, Friedman, Kendalls' Cochran's Procedures.

13. **Documentation.** Quality assurance of data is administrated by senior staff members for completeness, accuracy, trends and conclusions. Data collection will be standardized and analyses conducted to support the study design. These results are stored in a centralized data system. Data storage is arranged by stream segment, ecoregion, stream classification and common name. The data base is share with an interagency framework.

Application of Biological Assessment

Recommended field and laboratory protocols for benthic invertebrates may be found in " Colorado Department of Public Health and Environment, 1998". As previously

discussed biological measures may represent an integration of past perturbations of the aquatic system. Bioassessment measures will also be compared to a selected reference condition following the procedures referenced above. Biological groupings will be the same as defined in the Bureau's document "Procedures for Assessing Standards Attainment" Table 1. In this table sites achieving a biological assessment score equal to or greater than 80% of the reference condition will be determined to be supporting. Scores from 70 - 79% will be designated as full support impacts observed. Scores less than 70% but greater than or equal to 50% will be determined to be partially supporting and Scores less than 50% will be determined to be not supporting.

Attainment of Narrative Standard

It is possible that a not supporting determination may be made for either assessment method which is independent of the other. For example, the habitat assessment may be found to be fully supporting but the bioassessment may not be supporting. In this example it would be determined that while the biological community is impaired it is not due to stream bottom habitat conditions. A finding of full support for the stream bottom deposits narrative would be made. The following decision matrix will be utilized to make determinations of attainment with the stream bottom deposits narrative standard.

Habitat Evaluation

Stream bottom habitat will be evaluated as a percentage of the reference condition from the suite of measures collected at both sites. This assessment does not include all habitat measures found in habitat assessment procedures such as the RBP. This assessment is specifically limited to stream bottom measures. Other recommended measures may or may not directly impact the stream bottom. It would therefore be possible to have poor substrate condition but higher scores on other measures which would mask the substrate condition. Literature suggests that overall habitat may be equal to or greater than 74% of the reference condition and still be fully supporting. This guidance will adopt this percentage criterion for establishing environmentally significant differences between reference and sampling site indicators. This value will be reevaluated as more information is collected and will be adjusted if needed based on quantitative data.

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Stream Bottom Deposits Attainment Matrix.

Colorado Department of Public Health and Environment, 1998

Biological Quality as a % of reference.

Stream bottom habitat quality as % of reference	Not-supporting 0- 49%	Partially Supporting 50- 69%	Full Support Impacts Observed 70- 79%	Full Support 80- 100%
Non-supporting 0- 58%	NS	NS	FSIO	S
Partially supporting 59-73%	NS	PS	FSIO	S
Fully Supporting 74- 100%	S	S	S	S

NS- Narrative standard is not meet.
PS- Narrative is partially supporting.
FSIO- The narrative standard is meet but some impairment is seen.
S- The narrative standard is attained.

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FIELD PROCEDURES FOR THE ASSESSMENT OF SEDIMENT

Because the monitoring of sediment is a complex activity that incorporates the evaluation of numerous factors, it is critical that a sequence is followed in this operation so that consistent , reproducible results are collected. The following activities are listed in a chronological order that will support the effort of producing good results. The sequence should be followed by staff when preparing to depart, collection of field data, analyses and documentation.

1. Use equipment list when organizing field work and loading the vehicle.

A. Rosgen Level III
B. Collection of Benthic Macroinvertebrates
C. Sediment Protocol

2. After arriving at the sampling site a complete walk through of the stream reach should be conducted. During this walk, observations are directed at determining if the stream reach is representative of the general condition in this section of the watershed. Potential Rosgen stream classifications should be noted and locations of transition identified. Bankfull indicators should be noted at this time.

3. The collection of benthic macroinvertebrates will be done from sections of streams that have not been disturbed by foot traffic, because of this concern it should be the first activity completed. Protocol for benthic macroinvetebrates should follow EPA Rapid Bioassessment Methodology. Collections will be conducted in riffle sections.

4. Because the sediment protocol is a comprehensive effort, a team approach needs to be established. A team consist of four individuals is suggested and the team should be divided into two groups. The first group should perform the Rosgen Level II or III stream classification. The second group will direct their efforts toward the embeddedness protocol.

5. The group assigned to the Rosgen Level III should collect the following measurements.

A. Bankfull Width
B. Cross Sectional Area
C. Mean Depth
E. Maximum Depth
D. Flood Prone Area
F. Entrenchment Ratio
G. Reference Reach Slope
H. Length of Reach Surveyed
I. Slop of Surface Elevation
J. Slope of Thalweg
K. Pool Bed Slope
L. Riffle Bed Slope
M. Sinuosity
N. Belt Width
O. Stream Bank Stability
P. Pebble Count

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6. The second group will conduct the embeddedness field measurements. Samples need to be taken in the same reach of the stream as the cross section transect. Both pools and riffles should be monitored. The hoop is dispersed randomly and provides a replicate sample. An embeddedness transect consists of three hoop dispersions and measurements from within. Each hoop dispersions has two parts; (1) The percent fines that is measured using the framing square (applied in two directions) and has a total of 48 data points, (2) The measurement of rocks larger than four centimeters that are located within the hoop. Interstitial space in calculated back in the office.

7. The Rosgen group should take the responsibility of doing the pebble counts because the embeddedness effort is labor intensive. It is important that the pebble counts are conducted in reaches where the substrate has not been altered by the embeddedness monitoring. Pebble counts data from riffles and pools should be kept separate and form two different evaluations.

8. Habitat monitoring should be conducted cooperatively by all four individuals. A sufficient amount of time will be taken to observe and discuss the stream conditions. These observation will be incorporated in the habitat assessment.

9. After returning to the office all calculation should be performed and data forms completed. If possable however all calculations should be completed on site so further measurements can be made in case an error or mistake has been made. Data storage should following the requirements stated in documentation.

HABITAT ASSESSMENT FIELD DATA SHEET

RIFFLE/RUN PREVALENT STREAMS (HIGH GRADIENT)

Habitat Parameter	Category			
	Optimal	Suboptimal	Marginal	Poor
1. Instream Cover (Fish) Optimal Range Poor Range Optimal and Poor	Greater than 50% mix of snags, submerged logs, undercut banks, or other stable habitat.	30-50% mix of stable habitat; adequate habitat for maintenance of populations.	10-30% mix of stable habitat; habitat availability less than desirable.	Less than 10% stable habitat; lack of habitat is obvious.
SCORE ___	2019181716	1514131211	109876	543210
2 Epifaunal Substrate Optimal Range Poor Range Optimal and Poor	Well-developed riffle and run; riffle is as wide as stream and length extends two times the width of stream; abundance of cobble.	Riffle is as wide as stream but length is less than two times width; abundance of cobble; boulders and gravel common.	Run area may be lacking; riffle not as wide as stream and its length is less than 2 times the stream width; gravel or bedrock prevalent; some cobble present.	Riffles or runs virtually nonexistent; bedrock prevalent; cobble lacking.
SCORE ___	2019181716	1514131211	109876	543210
3. Embeddedness Optimal Range Poor Range Optimal and Poor	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE ___	2019181716	1514131211	109876	543210
4. Channel Alteration Optimal Range Poor Range Optimal and Poor	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	New embankments present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted.
SCORE ___	2019181716	1514131211	109876	543210
5. Sediment Deposition Optimal Range Poor Range Optimal and Poor	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from coarse gravel; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, coarse sand on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE ___	2019181716	1514131211	109876	543210

6. Frequency of Riffles	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream equals 5 to 7; variety of habitat is key. In the highest gradient streams (e.g., headwaters), riffles are continuous, and placement of boulders or other large, natural obstruction is evaluated as providing habitat diversity.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is equals 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
SCORE ___	2019181716	1514131211	109876	543210
7. Channel Flow Status [illegible]	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE ___	2019181716	1514131211	109876	543210
8. Bank Vegetative Protection (score each bank) Note: determine left or right side by facing downstream. Optimal Range Poor Range Optimal and Poor	More than 90% of the streambank surfaces covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 2 inches or less in average stubble height.
SCORE ___(LB)	Left Bank 109	876	543	210
SCORE ___(RB)	Right Bank 109	876	543	210
9. Bank Stability (score each bank) Optimal Range Poor Range Optimal and Poor	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems.<5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE ___(LB)	Left Bank 109	876	543	210
SCORE ___(RB)	Right Bank 109	876	543	210
10. Riparian Vegetative Zone Width (score each bank riparian zone) Optimal Range Poor Range Optimal and Poor	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear- cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE ___(LB)	Left Bank 109	876	543	210
SCORE ___(RB)	Right Bank 109	876	543	210
Total Score ___				

Go Back

TABLE 5-3. Reference reach field data form for stream classification.

REFERENCE REACH FIELD FORM
STREAM CHANNEL CLASSIFICATION **LEVEL II**

STREAM TYPE: _____

STREAM NAME: _____ DRAINAGE AREA: _____ BASIN NAME: _____

OBSERVERS: _____ DATE: _____

LOCATION: _____ Twp. _____ Rge. _____ Sec. _____ Qtr. _____

Bankfull WIDTH _____ Ft. (W_{bkf}) Bankfull MAX> DEPTH _____ Ft. (d_{max}) Channel SLOPE _____ Ft/Ft _____ %

Bankfull Mean DEPTH _____ Ft. (d_{bkf}) Flood Prone Area WIDTH _____ Ft. (W_{FP}) Valley SLOPE _____ Ft/Ft _____ %

WIDTH/DEPTH Ratio _____ ENTRENCHMENT Ratio _____ SINUOSITY (Stream Dist/Valley Dist.) _____

Channel MATERIALS: (Pebble Count) D15 _____ mm D34 _____ mm D50 _____ mm D84 _____ mm D95 _____ mm

photo

photo

PEBBLE COUNT

ite:			Reac															
arty:			Date:															
Inches	PARTICLE	Millimeters	PARTICLE COUNT 1	2	3	TOT #	ITEM %	% CUM	TOT #	ITEM %	% CUM	TOT #	ITEM %	% CUM
	Silt / Clay	< .062												
	Very Fine	.062 - .125												
	Fine	.125 - .25												
	Medium	.25 - .50												
	Coarse	.50 - 1.0												
.04 - .08	Very Coarse	1.0 - 2												
.08 - .16	Very Fine	2 - 4												
.16 - .22	Fine	4 - 5.7												
.22 - .31	Fine	5.7 - 8												
.31 - .44	Medium	8 - 11.3												
.44 - .63	Medium	11.3 - 16												
.63 - .89	Coarse	16 - 22.6												
.89 - 1.26	Coarse	22.6 - 32												
1.26 - 1.77	Very Coarse	32 - 45												
1.77 - 2.5	Very Coarse	45 - 64												
2.5 - 3.5	Small	64 - 90												
3.5 - 5.0	Small	90 - 128												
5.0 - 7.1	Large	128 - 180												
7.1 - 10.1	Large	180 - 256												
10.1 - 14.3	Small	256 - 362												
14.3 - 20	Small	362 - 512												
20 - 40	Medium	512 - 1024												
40 - 80	Large-Vry Large	1024 - 2048												
	Bedrock													
						TOTALS →								

SAND

GRAVEL

COBBLE

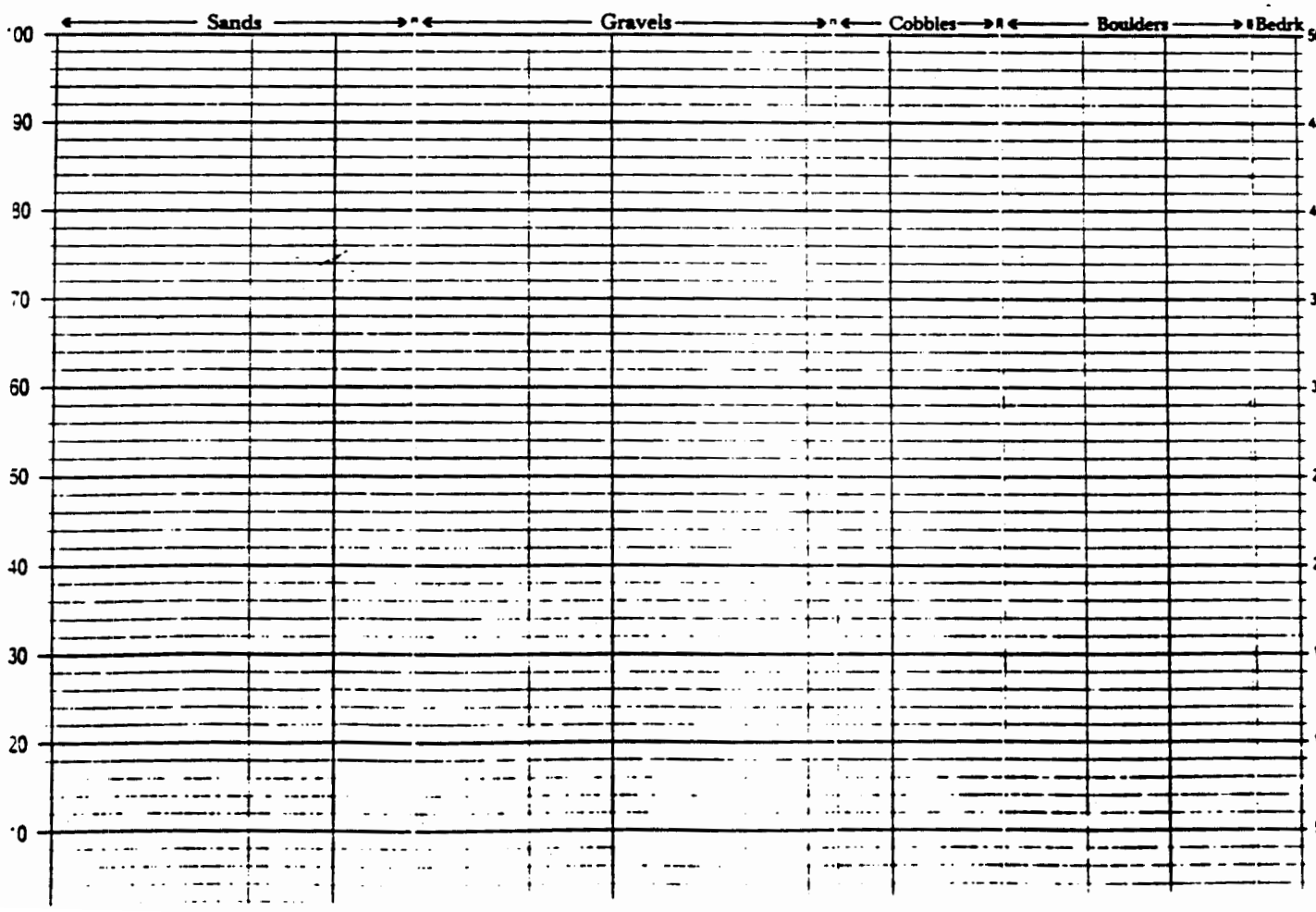
BOULDER

BEDROCK

PEBBLE COUNT | PEBBLE COUNT

Reach: | Reach:

Date: | Date:



PEBBLE COUNT DATA

GAGE:

Reach:

No:

Date

THE REFERENCE REACH FIELD BOOK

SURVEY DATA ⟹ CROSS - SECTION Part I

SITE: Date:

Location:

Party / Notes:

Distance; Point; or STATION Ft.	Back-Sight B S Ft.	Height of Instrument H I Ft.	Fore-Sight F S Ft.	Height; Depth; or Elevation Ft.	NOTES / COMMENT / REMARKS
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THE REFERENCE REACH FIELD BOOK

SURVEY DATA ⟹ CROSS - SECTION

SITE: Date:

Item	STATION Ft.	B S Ft.	H I Ft.	F S Ft.	Elevation Ft.	NOTES	COMMENT	REMA
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Stream Embeddedness Field Form

Stream _____ Crew _____

Date _____ Transect spacing _____

Transect #:			Transect #:			Transect #:		
Habitat type:			Habitat type:			Habitat type:		
Hoop 1	Hoop 2	Hoop 3	Hoop 1	Hoop 2	Hoop 3	Hoop 1	Hoop 2	Hoop3
% fines:	% fines:	% fines:	% fines:	%fines:	% fines:	% fines:	% fines:	% fines:
Depth:	Depth:	Depth:	Depth:	Depth:	Depth:	Depth:	Depth:	Depth:
Dist Rt bank:	Dist Rt bank:	Dist rt bank:	Dist Rt. Bank:	Dist Rt. Bank:	Dist Rt. Bank:	Dist Rt. Bank:	Dist Rt. Bank:	Dist Rt. Bank:
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Standard Checklist

Name of Riparian-Wetland Area: _____

Date: _____ Area/Segment ID: _____ Miles: _____

ID Team Observers: _____

Yes	No	N/A	HYDROLOGIC
			1) Floodplain inundated in "relatively frequent" events (1-3 years)
			2) Active/stable beaver dams
			3) Sinuosity, width/depth ratio, and gradient are in balance with the landscape setting (i.e., landform, geology, and bioclimatic region)
			4) Riparian zone is widening or has achieved potential extent
			5) Upland watershed not contributing to riparian degradation

Yes	No	N/A	VEGETATIVE
			6) Diverse age-class distribution (recruitment for maintenance/recovery)
			7) Diverse composition of vegetation (for maintenance/recovery)
			8) Species present indicate maintenance of riparian soil moisture characteristics
			9) Streambank vegetation is comprised of those plants or plant communities that have root masses capable of withstanding high streamflow events
			10) Riparian plants exhibit high vigor
			11) Adequate vegetative cover present to protect banks and dissipate energy during high flows
			12) Plant communities in the riparian area are an adequate source of coarse and/or large woody debris

Yes	No	N/A	SOILS-EROSION DEPOSITION
			13) Floodplain and channel characteristics (i.e., rocks, overflow channels, coarse and/or large woody debris) adequate to dissipate energy
			14) Point bars are revegetating
			15) Lateral stream movement is associated with natural sinuosity
			16) System is vertically stable
			17) Stream is in balance with the water and sediment being supplied by the watershed (i.e., no excessive erosion or deposition)

(Revised 1995)

Remarks

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Summary Determination

Functional Rating:

Proper Functioning Condition _____
Functional—At Risk _____
Nonfunctional _____
Unknown _____

Trend for Functional—At Risk:

Upward _____
Downward _____
Not Apparent _____

Are factors contributing to unacceptable conditions outside the control of the agency?

Yes _____
No _____

If yes, what are those factors? _____

____ Flow regulations ____ Mining activities ____ Upstream channel conditions
____ Channelization ____ Road encroachment ____ Oil field water discharge
____ Augmented flows ____ Other (specify) _____