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AGENCY RECEIPT

NOTICE OF FINAL RULEMAKING

1. Agency Name: Arizona Department of Environmental Quality

2. The applicable Title, Chapter, Subchapter(s), Article(s), Part(s), and Section(s) involved in the rulemaking, listed in alphabetical and numerical order:

Title:	18. Environmental Quality
Chapter:	11. Department of Environmental Quality – Water Quality Standards
Sections:	Action:
R18-11-106	Amend
R18-11-109	Amend
R18-11-110	Amend
R18-11-112	Amend
R18-11-115	Amend
R18-11-121	Amend
Appendix A	Amend
Appendix B	Amend
Appendix C	Amend

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AGENCY CERTIFICATE

NOTICE OF FINAL RULEMAKING

1. Agency Name: Arizona Department of Environmental Quality
2. Chapter heading: Department of Environmental Quality –Water Quality Standards
3. Code citation for the Chapter: 18 A.A.C. 11
4. The applicable Subchapter(s), Article(s), Part(s), and Section(s) involved in the rulemaking, listed in alphabetical and numerical order:

Sections Affected	Rulemaking Action
R18-11-106	Amend
R18-11-109	Amend
R18-11-110	Amend
R18-11-112	Amend
R18-11-115	Amend
R18-11-121	Amend
Appendix A	Amend
Appendix B	Amend
Appendix C	Amend

5. The rules contained in this package are true and correct as made.

6. Signature of Agency Chief Executive Officer:

Misael Cabrera
Director

August 2, 2016
Date

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GOVERNOR'S REGULATORY REVIEW COUNCIL
CERTIFICATE OF APPROVAL OF FINAL RULES

1. **Agency Name: ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY**
2. **Chapter Heading: Department of Environmental Quality – Water Quality Standards**
3. **Code Citation for the Chapter: 18 A.A.C 11, Article 1, Water Quality Standards for Surface Waters**

Subchapters, Articles, Parts and Sections	Action:
R18-11-106; R18-11-109; R18-11-110; R18-11-112; R18-11-115; R18-11-121; Appendix A; Appendix B; Appendix C	Amend

4. **The rules contained in this package and described above are approved as final rules.**

Check all that are applicable:

___ approved as submitted

___ approved in part, returned in part; copy of certificate provided to agency contact person listed in the cover letter or applicable notice

___ approved with changes accepted by the agency; copy of certificate provided to agency contact person listed in the cover letter or applicable notice

✓ immediate effective date, including any date earlier than a 60-day effective date -

___ date later than a 60-day effective date

Nicole A. Ong

Nicole A. Ong
Chairwoman

8/2/16

Date of Approval

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NOTICE OF FINAL RULEMAKING
TITLE 18. ENVIRONMENTAL QUALITY
CHAPTER 11. DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER QUALITY STANDARDS

PREAMBLE

1. Article, Part of Sections Affected (as applicable) **Rulemaking Action**

Section	
R18-11-106	Amend
R18-11-109	Amend
R18-11-110	Amend
R18-11-112	Amend
R18-11-115	Amend
R18-11-121	Amend
Appendix A	Amend
Appendix B	Amend
Appendix C	Amend

2. Citations to the agency's statutory rulemaking authority to include the authorizing statute (general) and the implementing statute (specific):

Authorizing statutes: A.R.S. §§ 49-202(A), 49-203(A)(1), 49-221, 49-222

Implementing statute: A.R.S. §§ 49-221, 49-222(C)

3. The effective date of the rule:

Immediate effective date pursuant to A.R.S. § 41-1032(A)(5). This rulemaking addresses past errors from the 2009 rulemaking and makes minor adjustments that lessen or ease a regulatory burden while achieving the same regulatory objective, such as creating a more flexible process for schedules of compliance. Additionally, the Arizona Department of Environmental Quality (ADEQ) is setting a site-specific standard to allow potential dischargers to discharge at a higher numeric value for copper, thereby decreasing the regulatory burden in future permits. As explained in the preamble, the change in standards has no effect on designated uses related to humans, such as a drinking water source or full-body contact and will not compromise the protection of sensitive aquatic species. Also, for twenty pollutants, ADEQ is reverting back to the numeric criteria last approved by the U.S.

Environmental Protection Agency (EPA) in 2003. ADEQ does not anticipate that these changes in numeric criteria will impact dischargers because ADEQ has not been able to use the 2009 revised, state-approved criteria for these pollutants in any permits.

4. Citations to all related notices published in the Register as specified in R1-1-409(A) that pertain to the record of the proposed rule:

Notice of Termination of Rulemaking: 22 A.A.R. 343, February 19, 2016

Notice of Rulemaking Docket Opening 22 A.A.R. 345, February 19, 2016

Notice of Proposed Rulemaking: 22 A.A.R. 255, February 19, 2016

5. The agency's contact person who can answer question about the rulemaking:

Name: Wendy LeStarge

Address: Arizona Department of Environmental Quality
Water Quality Division
1110 W. Washington Street
Phoenix, Arizona 85007

Telephone: (602) 771-4836 (Toll-free number in Arizona: (800) 234-5677)

Fax: (602) 771-4834

E-mail: lestarge.wendy@azdeq.gov

6. An agency's justification and reason why a rule should be made, amended, repealed or renumbered, to include an explanation about the rulemaking:

Water quality standards are used both as a mechanism to establish goals and as a regulatory requirement for permits when controls for discharges are inadequate. The Clean Water Act (CWA) establishes the basic structure for regulating discharges of pollutants into the waters of the United States and establishing water quality standards for surface waters. Section 303(c) of the CWA requires all states to review, and revise as necessary, surface water quality standards at least once every three years, subject to approval by EPA. ADEQ is the state agency responsible for administering the CWA. ADEQ previously amended these rules in 2009, and now proposes these changes to the surface water quality standards:

R18-11-106 Net Ecological Benefit

Under R18-11-106, ADEQ can modify a surface water quality standard when there is a net ecological benefit associated with the discharge of effluent that supports or creates a riparian

habitat. Usually the discharger or Arizona Pollutant Discharge Elimination System (AZPDES) permittee requests a modification to its permit because it cannot meet the existing surface water quality standard. ADEQ proposes to eliminate the requirement in subsection (A)(3) that a discharger have a plan to eliminate the discharge under active consideration as part of what must be demonstrated.

R18-11-109 Numeric Water Quality Standards

- In subsection (E), ADEQ is rewording how the dissolved oxygen water quality standard is described due to reported confusion from permittees. There is no substantive change in the standard.
- Subsection (F) identifies nutrient standards for certain streams and their perennial tributaries, with the intent to protect downstream lakes from nutrient accumulation. ADEQ proposes to limit the applicability of these standards to discharges that actually impact the surface water. Any tributary of a listed surface water would be included in the nutrient standard if the source discharging to the tributary has the reasonable potential to impact the listed surface water based on consideration of the factors listed.
- ADEQ is clarifying location segments of the Little Colorado River subject to the nutrient standards in subsection (F).
- ADEQ is correcting the pollutant limits for phosphorus and nitrogen for Oak Creek that were reversed in subsection (F).

R18-11-110 Salinity Standards for the Colorado River

ADEQ proposes to update the incorporation by reference in R18-11-110(B) to the most current salinity standards and plan of implementation for the Colorado River. The Colorado River Basin Salinity Control Forum approved its last triennial review of salinity standards and plan of implementation in 2014, but there are no changes affecting Arizona.

R18-11-112. Outstanding Arizona Waters

ADEQ proposes to eliminate the latitude/longitude coordinates since the Outstanding Arizona Water location is listed in Appendix B.

R18-11-115 Site-Specific Standards

R18-11-115 allows ADEQ to consider the effect of local water quality characteristics on the toxicity of specific pollutants and the varying sensitivities of local, affected aquatic populations

to pollutants to set a site-specific numeric water quality standard. ADEQ is adding more flexibility to the process that allows an outside party to submit a scientifically defensible study to support development of the site-specific standard.

- ADEQ is proposing to add "natural adaptive process" as one of the reasons to adopt a site-specific standard in subsection (B).
- In subsection (C), ADEQ proposes to delete the requirement that limits a study to only EPA methods that have been incorporated by reference. Instead, a person can propose a site-specific standard by first submitting a study outline to the Director for approval. The person can choose to submit an abbreviated study outline that uses the most recent EPA-recognized procedures, or submit a more rigorously documented study outline using any scientifically defensible procedure.

R18-11-121 Schedules of Compliance

When a new or revised surface water quality standard is promulgated, some dischargers need time to modify equipment or practices in order to achieve that standard. When developing an AZPDES permit, ADEQ establishes time to comply with the steps in a compliance schedule. ADEQ proposes to delete the set time of three years and create a more flexible process that allows ADEQ to look at certain factors in determining the time needed in the compliance schedule. The five factors listed are based on EPA's guidance in interpreting whether a compliance schedule is appropriate under 40 C.F.R. § 122.47(a). ADEQ is deleting subsections B through D as redundant; the flexible standard applies to all necessary situations.

Appendix A Numeric Water Quality Standards

Surface water quality standards consist of designating beneficial uses to a body of water, assigning criteria for allowable concentrations of pollutants, and establishing provisions or policies to protect the designated uses. In the 2009 rulemaking, ADEQ proposed new or revised numeric criteria for dozens of pollutants in Table 1. However, EPA did not approve revised criteria for twenty of the pollutants. As a result, the revised, state-approved criteria for these pollutants cannot be used in AZPDES permits and ADEQ must use the numeric criteria that EPA last approved in 2003.

- In order to state clearly what standards are being used in permits and for compliance, ADEQ proposes to repeal the current standards for these twenty pollutants and revert to the prior (2003) EPA-approved criteria (see table below).

Parameter	Affected Designated Use
Benzene	Fish consumption
Beryllium	Acute and chronic for Aquatic and wildlife (cold water) (A&Wc), Aquatic and wildlife (warm water) (A&Ww), Aquatic and wildlife (effluent-dependent water) (A&Wedw), and acute Aquatic and wildlife (ephemeral) (A&We)
Bromodichloromethane	Full body contact
Cadmium	Acute and chronic for A&Ww and A&Wedw, and A&We
Carbon tetrachloride	Partial Body contact
Chloroform	Fish consumption and full body contact
Dibromochloromethane	Full body contact
1,2-Dibromo-3-chloropropane	Full and partial body contact
Di (2-ethylhexyl) phthalate	Full body contact
Hexachlorocyclohexane gamma (lindane)	Chronic A&Wc, A&Ww, and A&Wedw
Hexachlorocyclopentadiene	Fish consumption, full body and partial body contact
Indeno (1,2,3-cd) pyrene	Fish consumption
Nickel	Domestic water source and fish consumption
Paraquat	Returning to no standard for Acute and chronic for A&Wc, A&Ww and A&Wedw
Pentachlorophenol	Fish consumption
Permethrin	Returning to no standard for Acute and chronic for A&Wc, A&Ww and A&Wedw
Sulfides	Acute A&We
1,1,2,2-Tetrachloroethane	Partial body contact
Thallium	Fish consumption
Toluene	Fish consumption, full body and partial body contact

- Also in Table 1, two radionuclides, strontium and tritium, were part of the surface water quality standards in the past, but were inadvertently deleted in the 2009 rulemaking. ADEQ proposes to list these pollutants in Appendix A, Table 1, and include a footnote explaining the measurement for all radionuclides.
- Tables 22 – 26 for ammonia and pentachlorophenol are correct but are overly precise in having values to the fourth place of significant figures. ADEQ proposes to round numeric values only to the first significant figure to the right of the decimal point. The tables will be renumbered as 10 – 12.
- Tables 2 – 21 for hardness-based metals (cadmium, chromium III, dissolved copper, dissolved lead, dissolved nickel, silver, and zinc) are correct but are overly precise. ADEQ is amending the tables, using the calculation formula for each designated use, but listing only three hardness values as examples: 20 mg/L (low), 100 mg/L (median), and 400 mg/L (high). The tables will be renumbered, 2 – 9.

<u>Appendix B Surface Waters and Designated Uses</u>

Appendix B lists surface waters in Arizona, their locations, and their designated uses. ADEQ proposes the following types of corrections throughout Appendix B:

- Change latitude/longitude coordinates from the North American Datum (NAD) of 27 to NAD 83, which conforms to the coordinate system ADEQ uses on its internet GIS mapping system;
- Remove decimals from seconds portion of latitude and longitude as it is overly precise and not used consistently;
- Name changes to conform to the U.S. Geological Survey naming conventions;
- Consistent segment description and locations as beginning at Point A and ending at Point B, so that:
    - A surface water begins at its headwaters and ends at some point.
    - If a surface water ends when it meets another surface water, it ends at the confluence with that water.
    - Remove latitude/longitude when stream reach ends at a named stream or lake as it is redundant to have both the name and latitude/longitude.
- Verify reference locations, such as road names or other surface waters;
- Eliminate unnamed washes designated as EDW if the discharging facility no longer exists. By default, the wash would be regulated under R18-11-105 (Tributaries; Designated Uses).
- Adjust EDW reach origin latitude/longitude to where effluent actually enters stream channel,

creating the EDW, rather than using the locational information of the facility or outfall;

- Eliminate "urban lake" in the segment description because it is redundant with "Urban" as listed in the "Lake Category" column;

ADEQ also made specific changes to the following surface waters:

Watershed	**Surface Water**	**Change**
BW	Boulder Creek	ADEQ proposes to delete the agricultural irrigation designated use for Boulder Creek because there is no crop irrigation in the watershed.
BW	Carter Tank	Correction from Verde River to Bill Williams watershed
BW	Coors Lake	ADEQ is proposing to remove Coors Lake from Appendix B, Surface Waters and Designated Uses. Coors Lake is a 35 acre impoundment of Butte Creek completed in 1982. Subsequent unmineralized overburden deposits have isolated the lake from Butte Creek. Coors Lake is maintained partially by precipitation runoff and by active groundwater pumping, which is required to keep Coors Lake as a viable lake. There is no outflow from the lake to any tributary. Coors Lake has been listed as an impaired water due to mercury.
BW	Red Lake	Correction from Verde River to Bill Williams watershed
CG	Redondo Lake	Correction from Colorado – Grand Canyon to Colorado –Lower Gila watershed
LC	Bow and Arrow Wash	Permitted outfall from Estate at Pine Canyon no longer exists so deleted as EDW; as a named wash, the designated use is changed to ephemeral
LC	Estate at Pine Canyon lake	A new listing that receives reclaimed water from the City of Flagstaff and then is discharged to three storage impoundments created in the drainage tributary to the Rio de Flag
LC	Huffer Tank	Correction from Little Colorado to Verde River watershed
LC	Pool Corral Lake	Correction from Little Colorado to Salt River watershed

LC	Salt House Lake	Correction from Little Colorado to Salt River watershed
LC	Unnamed wash	Permitted outfall from Estate at Pine Canyon no longer exists so deleted as EDW
LC	Unnamed wash	Permitted outfall from Estate at Pine Canyon no longer exists so deleted as EDW
MG	Andorra Wash	Permitted outfall from Town of Cave Creek no longer exists so deleted as EDW; as a named wash, the designated use is changed to ephemeral
MG	East Maricopa Floodway	A new listing recognizing that the East Maricopa Floodway (EMF) is a flood control channel with the primary function of regional stormwater flows. It receives water from numerous ephemeral drainages and redirects the flows south to the Gila River. Drainages that connect two or more surface water bodies are surface waters. The Army Corps of Engineers issued a Section 404 permit for maintenance activities in the EMF in February of 2003. In addition, two wastewater treatment plants discharge to the EMF and have AZPDES permits.
MG	Hank Raymond Lake	Name correction to more prevalent "Lower Lake Pleasant"
MG	The Lake Tank	Correction from Santa Cruz to Middle Gila watershed
MG	Mineral Creek	Segmenting Mineral Creek into three reaches to account for proposed changes in designated uses applied to the diversion channel and tunnel that convey flow around mining operations. The hydrologic modifications within the diversion channel and tunnel prevent the attainment of the current designated uses. The natural stream channel exists above and below mine operations.
MG	Unnamed wash	Permitted outfall from City of Phoenix Cave Creek WRF no longer exists so deleted as EDW
MG	Unnamed	A new listing for the new outfall from Town of Cave Creek WRF

	wash	discharges to an unnamed wash
MG	Unnamed wash	Permitted outfall from Queen Valley Sanitary District WWTP no longer exists so deleted as EDW
SC	Greene Wash	Adding a second segment in order to delineate tribal boundaries
SC	Paradise Lake	ADEQ is proposing to remove Paradise Lake from Appendix B, Surface Waters and Designated Uses. Paradise Lake was constructed around 1960. It is privately-owned and has no significant nexus with any surface waters. The homeowners association no longer has the water rights it had to keep the lake filled. To prevent the lake from drying up, the homeowners association wants to use treated effluent from the Arizona City Sanitary District.
SC	Santa Cruz River, West Branch	Clarifying the surface water's name, by deleting Santa Cruz Wash, West Branch and adding Santa Cruz River, West Branch
SC	Sycamore Canyon	Clarifying that part of the surface water is above 5,000 feet in elevation
SC	Unnamed wash	Deleting because an ephemeral wash is covered under R18-11-105 and the wash is unnamed.
SP	Mule Gulch	ADEQ proposes to change the aquatic and wildlife designated use of Mule Gulch from an effluent dependent water to an ephemeral. The Mule Gulch wastewater treatment plant was decommissioned in early 2006 and has not discharged into Mule Gulch since the first quarter of 2006, making the designated use of effluent dependent water no longer accurate nor necessary.
SP	Rucker Canyon Creek	Incorrectly listed in lake category
SP	Soldier Creek	Permitted outfall from Fort Huachuca WWTP no longer exists so deleted as EDW
SR	Unnamed wash	Permitted outfall from Cobre Valley Plaza WWTP no longer exists so deleted as EDW
UG	Bennett Wash	Permitted outfall from ADOC Safford WWTP no longer exists so

		deleted as EDW; as a named wash, the designated use is changed to ephemeral
UG	Cluff Ranch Pond #2	Name and location corrections by deleting Cluff Ranch Pond #2 and adding Evans Pond #2
UG	Unnamed Wash	Permitted outfall from ADOC Globe WWTP no longer exists so deleted as EDW
VR	Del Monte Wash	Adding two segments to reflect an ephemeral wash and an EDW wash that receives treated effluent from the City of Cottonwood wastewater treatment plant
VR	Green Valley Lake	A new listing created within American Gulch, a water of the U.S., which receives treated effluent from the Northern Gila County Sanitary District, American Gulch Water Reclamation Facility.

Appendix C Site-Specific Standards

ADEQ proposes to establish three site-specific standards for dissolved copper for the Aquatic and Wildlife designated use:

- For a segment of Pinto Creek in the Salt River Watershed near Globe-Miami, the proposed standard would be 34 µg/L;
- For a segment of Bright Angel Wash, which receives treated effluent from the Grand Canyon National Park South Rim Wastewater Treatment Plant, the proposed standard would be 42.5 µg/L;
- For a segment of Transept Canyon, which receives treated effluent from the Grand Canyon National Park North Rim Wastewater Treatment Plant, the proposed standard would be 42.5 µg/L.

Surface water quality standards are implemented through and affect various surface water programs, such as the AZPDES permitting program. Under CWA § 402, an entity seeking to discharge pollutants to a surface water as a point source must have an AZPDES permit, and its discharge must meet limits established in the permit to meet applicable surface water quality standards. Water quality standards also are implemented through a biennial assessment of a State's surface waters. When a water body does not meet one or more of the applicable surface water quality standards, it is considered impaired under § 303(d) of the CWA. The consequence of an impaired water is that it may require a State to establish stricter water quality-based limitations, thereby impacting any source

seeking to discharge to the impaired water. Section 303(d) requires that states list impaired waters in a biennial report evaluating and describing the status of water quality, which must be approved by EPA.

State and federal law authorize the adoption of site-specific standards that reflect local environmental conditions. The federal water quality standards at 40 CFR 131.11(b)(1)(ii) provides ADEQ with the authority to adopt water quality criteria that are "modified to reflect site-specific conditions." Similarly, A.R.S. § 49-221(C)(6) directs ADEQ to consider "[a]ny unique physical, biological, or chemical properties of the waters" when establishing surface water quality standards. Under A.R.S. § 49-222(C), ADEQ may consider the effect of local water quality characteristics on the toxicity of specific pollutants and the varying sensitivities of local, affected aquatic populations to pollutants when setting numeric water quality standards. ADEQ has specific authority for site-specific standards under R18-11-115, which identifies acceptable methods for developing a site-specific standard. Site-specific standards, like all surface water quality standards, must be based on a sound scientific rationale to protect the aquatic and wildlife designated use.

Background on Pinto Creek

Pinto Creek has not met the surface water quality standard for copper and has been listed as impaired since 1998. Pinto Creek flows in the historic Globe-Miami mining area, one of the major copper districts in the southwestern United States, with mining activities dating back to the late 1800's.

EPA developed a total maximum daily load analyses (TMDL) for Pinto Creek in 2001 based on existing available data. A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet surface water quality standards. The TMDL allocates, or budgets, that amount among the point and non-point sources in the watershed that discharge the pollutant of concern. The ultimate goal of a TMDL is restoring water quality so that an impaired water no longer exceeds but rather attains applicable surface water quality standards. A TMDL is implemented through a variety of actions, including effluent limits in permits and watershed restoration efforts aimed at reducing or eliminating the pollutant of concern.

ADEQ began monitoring activities in the Pinto Creek watershed in 2002. ADEQ issued its Phase II TMDL Modeling Report (Phase II Report) in February 2006. Based on the monitoring results, ADEQ concluded that even after aggressive remediation of surrounding mining sites, much of upper Pinto Creek would not meet the copper standard because copper occurs naturally in the area. Because the natural background concentration of copper is higher than the standard in this copper-rich mining

area, ADEQ determined that a site-specific standard needed to be developed for Pinto Creek.

ADEQ collected 670 water quality samples at 48 sites between 2000 and 2005. Of these water samples, approximately 126 were obtained from 21 sites in sub-watersheds judged to be representative of natural, pre-anthropogenic conditions. This information combined with numerous other environmental data was used to construct a dynamic watershed-water quality model of Pinto Creek using the Hydrologic Simulation Program Fortran (HSPF). This model provided a tool by which natural background water quality for all of Pinto Creek could be estimated with a reasonable degree of confidence.

A water quality model is a mathematical tool used to estimate or predict water quality conditions of water bodies under a specific set of environmental conditions. Part of the modeling process requires that a model be calibrated, which is the process by which a model's parameters or assumptions are changed to match available current field observations. A calibrated model should accurately predict existing conditions, and therefore should be reliable to estimate future conditions. An additional step in determining a representation of natural condition is to remove the model inputs that represent the human-caused sources of the pollutant from the model of the existing condition.

Using the Phase II Report, ADEQ calculated a site-specific standard for Pinto Creek of 42 µg/L ["Pinto Creek Site-Specific Water Quality Standard for Dissolved Copper," Arizona Department of Environmental Quality, Water Quality Division, (March 12, 2007)]. The design of ADEQ's 2007 study focused on monitoring results from multiple sites chosen to characterize different rock types but having no known anthropogenic sources of copper. Therefore, data from these sites should contain only naturally occurring levels of copper.

In the 2008 triennial review rulemaking, ADEQ proposed a site-specific standard of 42 µg/L for Pinto Creek, higher than the maximum amount of 29.28 µg/L set by EPA (based on a maximum allowable hardness of 400 mg/L). During the public comment period, commenters were generally opposed to the proposed standard for a variety of reasons including: consideration of past mining activities in the area, aerial deposition of copper from current and historic mines, impacts of wildfire, and the proximity of mining roads as well as other disturbances to areas thought to be the naturally occurring sites. Some of the commenters presented new information, including photos of disturbed areas upstream of one or more of ADEQ's sampling locations thought to have no influence by anthropogenic activities related to copper. Based on the new information, ADEQ withdrew the site-

specific standard for Pinto Creek from the final rule package, and revised the modeling calculations, which resulted in a modest change in the proposed standard.

One limitation of the modeling approach is that the effects of any unknown human-caused sources may be excluded from the model. This can result in human impacts being erroneously attributed to the natural condition. ADEQ reran the watershed model used to calculate the site-specific standard model after eliminating three sampling locations that had been used to estimate natural background because information presented by some commenters showed that these locations had been subject to anthropogenic activities related to copper. The current model predicted the natural background concentration of 26 µg/L as exceeding the default standard (23 µg/L based on the mean hardness). The average standard deviation (8.0) of copper from sites identified as representing natural background was added. ADEQ is proposing a site-specific standard of dissolved copper for Pinto Creek of 34 µg/L. This value is equal to the estimated maximum natural background concentration of dissolved copper in Pinto Creek thru the identified reach, and is a static value, not adjusted for variations in hardness for the A&Ww chronic criteria. The site specific standard for the A&Ww acute criteria will also be 34 µg/L where hardness values are less than 268 mg/L, but where hardness values are 268 mg/L or greater, the default hardness formula for acute copper values will need to be calculated.

Background on Grand Canyon surface waters

The Grand Canyon National Park's two wastewater treatment plants discharge to Bright Angel Wash and Transept Canyon under AZPDES permits. Both facilities receive the same source water and have reported copper levels above the standard. With no industrial dischargers to these facilities, the initial hypothesis was naturally elevated copper concentrations in the source water.

A water effects ratio (WER) study was performed with effluent from each facility. The WER procedure is an EPA-approved procedure for developing site-specific standards for metals. A number of physical and chemical characteristics of site water and a metal can affect the toxicity of that metal to aquatic organisms in a particular surface water. When deriving site-specific aquatic life criteria for a metal, the difference between the toxicity of the metal in laboratory water and site water may be adjusted with a site water effect ratio. Toxicity differences of site water and synthetic laboratory water are compared in the laboratory, and evaluated for differential lethal concentrations. The toxicity endpoints from these two tests are used to calculate the WER, which is then multiplied by the national or state aquatic life criterion to calculate the site-specific limit. Based on the WER results, the current

chronic water quality standard for copper can be increased to 42.5 µg/L without compromising the protection of sensitive aquatic species.

Background on this Rulemaking

The 2009 rulemaking had considerable stakeholder comments, amended most of the rule sections in Article 1, and reformatted the tables listing pollutant limits for specified designated uses. With such extensive amendments, some necessary elements were inadvertently omitted or listed erroneously. ADEQ began reviewing the rules for future amendments, but did not proceed with rulemaking until 2014 due to executive orders limiting agency rulemaking. ADEQ sought and received approval to proceed with rulemaking from both Governors Brewer and Ducey. ADEQ has taken the past actions related to these rules:

- December 26, 2014 Notice of Proposed Rulemaking, with an oral proceeding set for January 26, 2015.
- January 23, 2015, Notice of Public Information canceling the oral proceeding in response to Executive Order 2015-01 (Internal Review of Administrative Rules; Moratorium to Promote Jobs Creation and Customer-Service–Oriented Agencies).
- September 18, 2015 Notice of Termination to terminate the December 26, 2014 Notice of Proposed Rulemaking because the comment period had not been completed.
- September 18, 2015 Notice of Proposed Rulemaking, with an oral proceeding set and held on October 19, 2015.

After the comment period closed on October 19, 2015, EPA Region 9 expressed concern that the Notice of Proposed Rulemaking did not comply with the requirements in 40 CFR § 25.5(b) that notice of a hearing must be at least 45 days before the date of the hearing, and that reports, documents and data relevant to the discussion were not available to the public at least 30 days before the hearing. ADEQ had been concerned of the unknown impact of EPA's recently amended water quality standards rules, which became effective October 20, 2015. In subsequent discussions, ADEQ and EPA Region 9 agreed that ADEQ would renotice the proposed rule changes for 45 days and explain why it was not adopting new or revised EPA criteria, as required under 40 C.F.R. § 131.20(a).

ADEQ terminated the September 18, 2015 Notice of Proposed Rulemaking in order to ensure an unambiguous proposed rulemaking. ADEQ made some minor changes, and published the Notice of Proposed Rulemaking on February 19, 2016.

The CWA requires states to hold, at least once every three years, a public hearing for the purpose of reviewing applicable water quality standards. EPA's role is one of oversight to review and approve or disapprove state water quality standards. EPA also is responsible for publishing national recommended criteria to assist states in establishing water quality criteria. States may use EPA's CWA section 304(a) criteria recommendations, modify them to reflect site-specific conditions, or establish criteria using other scientifically defensible methods. Under EPA's recently amended rules, if states choose not to adopt new or revised criteria during their triennial review for any parameters for which EPA has published new or updated criteria recommendations under CWA section 304(a), they must explain their decision when reporting the results of their triennial review to EPA.

Since the extensive amendments to these rules in 2009, ADEQ has always intended that this proposed rulemaking would be to address past errors and make minor adjustments. With two Arizona administrations issuing executive orders limiting agency rulemaking, ADEQ also considered suggested changes that would comply with the executive orders, mainly to lessen or ease a regulatory burden while achieving the same regulatory objective. ADEQ stated in the Preamble of the December 26, 2014 Notice of Proposed Rulemaking that although some stakeholders requested additional amendments, those suggestions did not meet the scope of the Governor's authorization or would require more in depth analysis, and would be postponed for the next Triennial Review. ADEQ is aware that since 2009, EPA has published new CWA section 304(a) criteria recommendations. At this time, ADEQ does not have adequate information to make informed decisions on those recommendations. It has been over seven years since the last amendments to the Arizona surface water quality standards rules; ADEQ needs to correct errors from the 2009 rulemaking, including reverting criteria in Appendix A to what was previously approved in 2003. ADEQ is beginning to develop plans for the next Triennial Review. ADEQ will need to evaluate its rules according to EPA's recently amended rules and the CWA section 304(a) criteria recommendations.

7. A reference to any study relevant to the rule that the agency reviewed and proposes either to rely on or not to rely on in its evaluation of or justification for the rule, where the public may obtain or review each study, all data underlying each study, and any analysis of each study and other supporting material:

These studies are available on ADEQ's rulemaking website:
http://www.azdeq.gov/function/laws/draft.html#water
ADEQ "Pinto Creek Site-Specific Water Quality Standard for Dissolved Copper, Salt River Watershed – HUC# 15060103-018, Gila, Maricopa and Pinal Counties, Arizona" (February 2011)

AECOM "Grand Canyon National Park – Water Effect Ratio Studies – Round 1; Acute Toxicity of Copper to *Ceriodaphnis dubia* in Site and Reconstituted Laboratory Water Under Static Test Conditions" (May 2008).

AECOM "Grand Canyon National Park – Water Effect Ratio Studies – Round 2; Acute Toxicity of Copper to *Ceriodaphnis dubia* in Site and Reconstituted Laboratory Water Under Static Test Conditions" (October 2008).

ADEQ "Location and Application of LCR Nutrient Standards" (February 2014)

ADEQ "A Review of the Status of Paradise Lake as an Arizona Surface Water" (August 2010)

ADEQ "Proposal to Remove Coors Lake from Appendix B" (January 2016)

ADEQ " Review of Proposed Designated Use Changes to Mineral Creek" (January 2016)

8. A showing of good cause why the rulemaking is necessary to promote a statewide interest if the rulemaking will diminish a previous grant of authority of a political subdivision of this state:

Not applicable

9. A summary of the economic, small business, and consumer impact:

A. Brief summary of the information included in the economic, small business and consumer impact statement:

The overall impact of the proposed changes should be very minor. Persons most affected by this rulemaking are permittees under the AZPDES permitting program. The clarifications and correction of errors should benefit anyone, but particularly AZPDES permittees, who read and interpret the rules. ADEQ anticipates that a few of the rule changes may have a more specific impact. In addition to any costs, these rules overall benefit the general public. These rules ensure that clean water will be available as a source for drinking water, bathing, cooking, and is safe for swimming, fishing, boating, or other water-based recreation.

BACKGROUND

Surface water quality standards are provisions of state law required by the CWA and are implemented through and affect various surface water programs. The water quality standards consist of designating beneficial uses to a body of water and assigning numeric limits for allowable concentrations of pollutants, in order to protect the designated uses. Water quality standards are used both as a mechanism to establish goals and as a regulatory requirement when controls for discharges are inadequate.

The three main surface water programs affected by the surface water quality standards are:

- The AZPDES permitting program. Under § 402 of the CWA and A.R.S. § 49-255.01, an entity seeking a point source discharge of pollutants to a surface water must have an AZPDES permit, and its discharge must meet limits established in the permit to meet applicable surface water quality standards.
- The § 305(b) water quality assessment and § 303(d) impaired water listing. Section 305(b) of the CWA establishes a process to develop and report information on the quality of a State's surface waters. ADEQ monitors surface waters within its boundaries, prepares a biennial report describing the status of water quality in Arizona rivers, streams, lakes, and reservoirs and submits the report to the U.S. Environmental Protection Agency (EPA). Surface water quality standards provide the benchmarks used to assess water quality status. When a water body does not meet one or more of the applicable surface water quality standards, it is considered impaired under § 303(d) of the CWA. ADEQ identifies and lists impaired waters that do not meet one or more of the surface water quality standards.
- Total Maximum Daily Load (TMDL) Program. The consequence of an impaired water is that it may require a State to establish stricter water quality-based limitations, thereby impacting any source seeking to discharge to the impaired water. A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet surface water quality standards. The TMDL allocates, or budgets, that amount among the point and non-point sources in the watershed that discharge the pollutant of concern. The ultimate goal of a TMDL is restoring water quality so that an impaired water no longer exceeds but rather attains applicable surface water quality standards. A TMDL is implemented through a variety of actions, including effluent limits in permits and watershed restoration efforts aimed at reducing or eliminating the pollutant of concern.

B. Name and address of agency employees who may be contacted to submit or request additional data on the information included in the economic, small business and consumer impact statement:

Name: Wendy LeStarge

Address: Arizona Department of Environmental Quality
Water Quality Division
1110 W. Washington Street
Phoenix, Arizona 85007

Telephone: (602) 771-4836 (Toll-free number in Arizona: (800) 234-5677)

Fax: (602) 771-4834
E-mail: lestarge.wendy@azdeq.gov

C. Identification of persons who will be directly affected by, bear the costs of or directly benefit from the rulemaking:

Entities likely to be directly affected by this rulemaking would be entities that discharge to a surface water under an AZPDES permit, including publicly and privately owned wastewater treatment plants and some mining facilities. For purpose of this analysis, ADEQ defines annual costs or revenues on a cost-revenue scale as follows:

Minimal – less than $10,000
Moderate – $10,000 to $1 million
Substantial – more than $1 million

D. Cost-benefit analysis of probable costs and benefits to ADEQ and other agencies:

ADEQ could incur minimal costs in implementing this rulemaking. ADEQ does not anticipate any increase in FTEs or state funding to complete any additional TMDLs.

E. Cost-benefit analysis of probable costs and benefits to political subdivisions and to businesses:

ADEQ expects that some sections of this rulemaking will benefit a political subdivision or a business if it is a permitted discharger. The clarifications and correction of errors should benefit anyone, but particularly dischargers, who read and interpret the rules. ADEQ anticipates that the following rules will have only a minor impact, if any, to a discharger:

- R18-11-112. Outstanding Arizona Waters - ADEQ proposes to eliminate the latitude/longitude coordinates since the OAW location is listed in Appendix B.
- R18-11-110 Salinity Standards for the Colorado River - The updates to the 2014 current salinity standards and plan of implementation do not require changes in Arizona, so no cost or benefit is anticipated.
- Appendix A Numeric Water Quality Standards, Table 1, Water Quality Criteria by Designated Use - EPA did not approve revised criteria for twenty pollutants from ADEQ's 2009 rulemaking. ADEQ proposes to revert back to the numeric criteria last approved by EPA in 2003. ADEQ does not anticipate that these changes in numeric criteria will impact AZPDES dischargers because ADEQ has not been able to use the 2009 revised, state-approved criteria for these pollutants in

AZPDES permits. There should be a benefit in that the rules will state what ADEQ is actually able to enforce.

- Appendix B Surface Waters and Designated Uses
  - Clarification of locations and names should benefit anyone reading and interpreting the rules. The change to NAD 83 will allow ADEQ to begin planning over the next few years to integrate surface waters listed in Appendix B with its internet GIS mapping system.
  - Boulder Creek - deleting the agricultural irrigation designated use will mean that the agricultural irrigation metal standards, where they exist, will be the same for all of Boulder Creek in this watershed and reflects the reality that there is no agricultural irrigation.
  - East Maricopa Floodway - adding East Maricopa Floodway (EMF) more accurately reflects the existing reality of permitted discharges. The Army Corps of Engineers recognized the EMF as a waters of the U.S. when it issued a Section 404 permit for maintenance activities in the EMF in February of 2003. Also, two wastewater treatment plants discharge to the EMF and have AZPDES permits. Correctly identifying EMF as a waters of the U.S. benefits anyone reading and interpreting the rules.
  - Mineral Creek - ADEQ anticipates no impact because any permitted discharge must still meet required downstream standards for designated uses of aquatic and wildlife, full body contact, fish consumption, and agricultural livestock watering. The manmade features of the tunnel were constructed to convey flow in Mineral Creek around mining operations. Work on the lined channel and an extension to the preexisting tunnel segment was finalized in March 2002.

F. Cost-benefit analysis of probable costs and benefits by rule section:

R18-11-106 Net Ecological Benefit

ADEQ proposed to eliminate the requirement that a discharger have a plan to eliminate the discharge under active consideration as part of what must be demonstrated. Communities and developers should benefit by eliminating an extra burden in seeking to use high quality effluent to create aquatic and riparian ecosystems.

R18-11-109 Numeric Water Quality Standards

Currently the nutrient standards in subsection (F) apply to all tributaries of the listed waters, regardless of impact. The intent is to protect the downstream waters and lakes from nutrient accumulation and eutrophication. Eutrophication results in excessive growth of algae and nuisance aquatic plants, and can lead to conditions harmful to aquatic life. Wastewater treatment plants

discharging to a surface water under subsection (F) may have to implement costly advanced treatment for nutrient removal. There are about 12 wastewater treatment plants that discharge under an AZPDES permit to one of the waters described in subsection (F).

Under the proposed changes, ADEQ will evaluate whether a discharge will impact a listed water or its perennial tributary before applying the nutrient standards. ADEQ anticipates that it will not have to apply nutrient standards to six of the 12 wastewater treatment plants because the volume, frequency, magnitude and/or duration of their discharge does not affect the downstream water. Of the six, three are publicly-owned and three are privately-owned. The six wastewater treatment plants currently have a variance in their AZPDES permits because they cannot meet the nutrient standards. Generally under a variance, a discharger is expected to implement steps to achieve the required water quality standard. With the change to subsection (F), ADEQ anticipates that at least six wastewater treatment plants discharging under an AZPDES permit will not have to implement costly advanced treatment for nutrient removal.

R18-11-115 Site-Specific Standards

ADEQ is adding more flexibility to the process that allows an outside party to submit a scientifically defensible study to support development of the site-specific standard. A person or entity can choose to submit an abbreviated study outline that uses the most recent EPA-recognized procedures, or submit a more rigorously documented study outline using any scientifically defensible procedure. ADEQ anticipates that the additional flexibility on the study requirements should benefit entities proposing new site specific standards, such as AZPDES dischargers. ADEQ is unable to quantify the benefit, but since about 2007, ADEQ has received only three studies to support a site-specific standard. ADEQ would anticipate that under the proposed changes, it may receive more studies.

R18-11-121 Schedules of Compliance

Currently, a discharger has a set time of three years to come into compliance with a new or revised surface water quality standard under a compliance schedule. ADEQ proposes to create a more flexible standard that allows ADEQ to look at certain factors in determining the time needed in the compliance schedule. The change should benefit the regulated community by allowing a more individual consideration of an entity's circumstances to achieve compliance. Currently six dischargers have a compliance schedule in their AZPDES permits.

Appendix B Surface Waters and Designated Uses

There are eleven surface waters that were categorized as effluent dependent because they received an outfall from a permitted discharge. The permitted discharge no longer exists (a few wastewater treatment plants were decommissioned, a few changed disposal methods so that they no longer discharged to a surface water). ADEQ proposes to categorize these waters as ephemeral. This change would benefit anyone in control of stormwater discharges to the ephemeral water, because an ephemeral water needs to meet acute (less stringent) standards, where an effluent-dependent water is protected for both acute and chronic (more stringent) standards.

ADEQ is adding four effluent dependent waters to reflect permitted discharges to ephemeral washes. AZPDES permittees already meet the effluent dependent standards that are set in their permits. This change would affect anyone in control of stormwater discharges to one of these surface waters, because an effluent-dependent water is protected for both acute and chronic (more stringent) standards where an ephemeral water needs to meet acute (less stringent) standards only.

Removing Paradise and Coors Lakes as surface waters that are not regulated under the CWA is a legal interpretation. Removing these two waters may have some impact, since both lakes rely to a certain extent on groundwater pumping to maintain levels. Persons supporting and opposing removing Paradise Lake as a surface water submitted some cost information, but without supporting documentation. Persons supporting removing Paradise Lake stated that reclaimed water will allow for another source of water for the lake and will be beneficial for costs. A person opposed to removing Paradise Lake stated that any savings in using reclaimed water would be minimal of only about $8,000 per year.

Any other changes to Appendix B can potentially impact those discharging under an AZPDES general permit. ADEQ's general permits with the most permittees are to regulate stormwater discharges primarily by requiring the use of best management practices to lessen pollutants.

Appendix C Site-Specific Standards

A permitted discharger that cannot meet standards faces the regulatory burden of either ending the discharge or installing treatment to remove the specific pollutant to the standard level. ADEQ proposes to establish three site-specific standards for dissolved copper:

- For a segment of Pinto Creek, the proposed standard would be 34 µg/L;
- For a segment of Bright Angel Wash, the proposed standard would be 42.5 µg/L;
- For a segment of Transept Canyon, the proposed standard would be 42.5 µg/L

The proposed site-specific standards would allow potential dischargers to discharge at the higher numeric value for copper, thereby decreasing the regulatory burden in future AZPDES permits. The proposed site-specific standards have no effect on designated uses related to humans, such as a drinking water source or full-body contact.

ADEQ is responsible for reducing pollutants in impaired waters by limiting discharges to the impaired water and through remediation projects. The segment of Pinto Creek has not met the surface water quality standard for copper and has been listed as an impaired water since 1998. EPA developed a TMDL in 2001, but the current applicable standard is unattainable for TMDL implementation likely due to natural mineralization and historic mining in the basin. ADEQ has already approved two Water Quality Improvement (Section 319) grants totaling $710,277 to reduce pollutant loads from non-point sources. The site specific standard for Pinto Creek will allow ADEQ to complete a second phase TMDL and assign waste load allocations based upon the new standard. The site-specific standard for Pinto Creek allows a realistic, achievable surface water quality standard to guide both permitting decisions and clean-up actions.

The site-specific standard would help the Grand Canyon North Rim and South Rim WWTP's. These facilities currently have applications in for a variance for copper. This would eliminate them having to commit resources in showing reasonable progress towards achieving the original standard.

G. Probable impact on public and private employment:

ADEQ does not anticipate that private or public employment will be directly affected by these rules.

H. Probable impact on small businesses:

ADEQ would define a small business as any AZPDES permitted facility that discharges less than 1 million gallons per day.

1) The administrative and other costs required for compliance with the proposed rule making.

These rules do not have any administrative costs, nor establish any reporting schedules or deadlines for small businesses. ADEQ does not anticipate that any small dischargers will be affected by the proposed rulemaking

2) A description of the methods prescribed in section 41-1035 that the agency may use to reduce the impact on small businesses, with reasons for the agency's decision to use or not to use each method.

(i) Establish less costly schedules or less stringent deadlines for compliance, or consolidate or

simplify the rule's compliance or reporting requirements in the proposed rule making.

ADEQ does not anticipate that the proposed rule changes will affect minor dischargers, other than as described in this EIS.

(ii) Establish less costly compliance requirements, including establishing performance standards to replace design or operational standards in the proposed rule making.

The changes in the nutrient standards in R18-11-109 (F) should benefit the three privately owned wastewater treatment plants, which currently have a variance in their AZPDES permits because they cannot meet the nutrient standards. These three entities each discharge less than one million gallons per day so they would be considered a small business. ADEQ anticipates that the change to R18-11-109 (F) will benefit the three dischargers because they will not have to implement costly advanced treatment for nutrient removal. Additionally, for the changes to R18-11-121, one of the six dischargers with a compliance schedule in their AZPDES permits discharges less than one million gallons per day. The change to the compliance schedule rule should benefit the small business discharger by allowing a more individual consideration of its circumstances to achieve compliance.

(iii) Exempt small businesses from any or all requirements of the proposed rule making.

As a federally-delegated program, ADEQ's laws, rules, and program must comply with EPA requirements.

3) The probable cost and benefit to private persons and consumers who are directly affected by the proposed rule making.

Private persons and consumers are not directly affected by this rulemaking, but benefit indirectly. Improving the effectiveness of water quality regulation leads to restoring and maintaining the chemical, physical, and biological integrity of Arizona's waters. Improved water quality has many human health and ecological benefits, impacting:

- Drinking Water Treatment and Household Water Use. Reducing contaminants, nutrients, and sediment in surface water supplies lowers the cost of treating these waters, reduces the health risk from potential exposure to contaminated drinking water, and avoids the need for cities, towns and other public water systems to develop alternative water sources or supplies.
- Agricultural Water Use. Clean water ensures agricultural productivity. As noted in the Arizona Department of Agriculture's Annual Report, FY2014-2015, Arizona ranks third in the nation for overall production of fresh market vegetables. Arizona acreage produced over 89.6 million cartons of fresh produce last year. Arizona ranks second in the nation in

production of iceberg lettuce, leaf lettuce, romaine lettuce, cauliflower, broccoli, spinach, cantaloupes, and honeydews.

- Industrial Water Use. Sediment discharges may have negative effects on industrial water users. Suspended sediment increases the rate at which hydraulic equipment, pumps, and other equipment wear out, causing accelerated depreciation of capital equipment.
- Human Health Improvements. Some contaminants, such as mercury and DDT, may persist for long periods of time and bioaccumulate, meaning they can be found in levels several times higher than ambient water in large fish such as bass that consume contaminated bottom dwelling animals. Eating fish contaminated with mercury or PCBs may lead to developmental and neurological problems and is especially hazardous for children and pregnant women. Ensuring cleaner water may lead to a reduction in illness either through reduced consumption of contaminated seafood or through reduced exposure to infectious disease during recreation activities in contaminated waters.
- Recreational activities. Although considered a desert state, Arizona has many recreational activities enhanced by clean water.
    - Fishing. Degraded water can reduce fish populations by inhibiting reproduction and survival of an aquatic species. As an economic indicator of fishing's impact, the Arizona Game and Fish Department (AZGFD) issued 126,056 resident general fish licenses for 2013 (AZGFD 2013-2014 Annual Report).
    - Boating. Polluted water reduces the aesthetic appeal of recreational boating activities and can be damaging to motors and equipment (e.g., algae, excessive weed growth).
    - Swimming. Pollution of water by toxic chemicals or by fecal indicator bacteria may cause closure of water bodies for swimming. Eutrophication caused by nutrients and turbidity caused by sediment and other pollutants also may greatly reduce a swimmer's aesthetic enjoyment of a water body.

I. Probable effect on state revenues:

There are no fees associated with these rules. This rulemaking will have no impact on state revenues.

J. Description of less intrusive or less costly alternative methods of achieving the proposed rulemaking:

Water quality standards are provisions of state law required by the Clean Water Act, and are required to be revised at least once every three years.

K. Explanation of the limitations of the data available for this economic small business and consumer impact statement.

ADEQ does not require the costs of treatment as part of the regular AZPDES permitting program, so any specific information on costs was obtained through informal means from permittees or other knowledgeable individuals.

10. A description of any changes between the proposed rulemaking, to include supplemental notices, and the final rulemaking:

In Appendix A, Table 1, for the parameters Dibromochloromethane and Bromodichloromethane, under the designated use FBC, the proposed text reads "~~18,667~~ TTHM See (g)". In response to comments, ADEQ changed the text to "~~18,667~~ TTHM", deleting the reference to footnote (g). As detailed in the response to comment #5, ADEQ does not believe that deleting the text "See (g)" constitutes a substantial change, because:

- Footnote g was added in the 2009 rulemaking.
- ADEQ has stated throughout this rulemaking of its intent to revert back to numeric criteria that EPA last approved in 2003 for twenty pollutants EPA did not approve from 2009.
- TTHM was the text in the pre-2009 version of the rules (see Notice of Final Rulemaking, 14 A.A.R. 4708, at 4864-4865, December 26, 2008.)
- Before the 2009 amendments, there was no numeric criteria for FBC for Dibromochloromethane and Bromodichloromethane as the prior reference to "TTHM" meant no numeric standard (see Notice of Final Rulemaking, 14 A.A.R. 4708, at 4871)

In Appendix A, Table 1, for the parameter Total Chromium, the Notice of Proposed Rulemaking proposed reverting to the pre-2009 criteria of 100 µG/L for the designated uses of PBC and FBC. In response to comments, ADEQ is returning the criteria to the original text of no numeric standard. ADEQ does not believe that returning to the original text constitutes a substantial change. As detailed in the response to comment #6, the FBC/PBC standard was inconsistent before the 2009 amendments, in that the two constituents of Chromium III and Chromium VI would greatly exceed the Total Chromium standard of 100 µG/L for both FBC and PBC.

In Appendix A, Table 1, ADEQ added footnote k, which describes the values used in the mathematical equations of the subsequent tables.

k. Abbreviations for the mathematical equations are as follows:

e = the base of the natural logarithm and is a mathematical constant equal to 2.71828

LN = is the natural logarithm

CMC = Criterion Maximum Concentration (acute)

CCC= Criterion Continuous Concentration (chronic)

Also in response to comments for the new segment of Mineral Creek in Appendix B, ADEQ changed the latitude of the tunnel inlet to 33º12'24" and renamed the segment to "Mineral Creek (diversion tunnel and lined channel)". ADEQ also made various grammatical and technical changes at the suggestion of the Governor's Regulatory Review Council staff.

11. An agency's summary of the public or stakeholder comments made about the rulemaking and the agency response to the comments:

1. R18-11-121, Schedules of Compliance: Should the paragraph be lettered "A"?
   ADEQ RESPONSE: No. The Secretary of State's rule, A.A.C. R1-1-408(I), specifies the subsection labeling requirements.

2. R18-11-121: Compliance schedules should be flexible enough to accommodate a situation where it would be more cost effective to build a new facility than to modify an old or outdated facility.
   ADEQ RESPONSE: Deleting the set time of three years allows ADEQ to create a more flexible schedule and to consider an entity's individual circumstances to achieve compliance. The five factors listed are based on EPA's guidance in interpreting whether a compliance schedule is appropriate under 40 C.F.R. § 122.47(a). Cost effectiveness is not one of EPA's five factors; however cost effectiveness is a consideration for a variance, under R18-11-122. A variance is another mechanism to provide regulatory flexibility when it is not technically or economically feasible for a discharger to achieve compliance with a water quality standard.

3. Appendix A, Numeric Water Quality Standards: For the criteria for hardness-dependent metals, can ADEQ retain the existing tables, provide the full tables on its web site, or provide an online calculator.
   ADEQ RESPONSE: ADEQ is currently working on updating its website to include an online calculator to calculate the applicable criteria at each hardness level, which it expects to be online by July 2016.

4. Appendix A, Table 1. Water Quality Criteria by Designated Use: Cadmium, A&Ww Acute (µg/L), the "4" should be omitted as it refers to the Cadmium Table in the rule to be revised.

ADEQ RESPONSE: The "4" is being removed; the proposed rule complies with the Secretary of State's requirements in A.A.C. R1-1-502(B)(18) for showing deleted and new text.

5. Appendix A, Table 1: The FBC standards for Dibromochloromethane and Bromodichloromethane were changed from 18,667 µg/L to the Total Trihalomethane (TTHM) limit established in footnote (g), which says the TTHM standard is exceeded when the sum of the four compounds exceeds 80 µg/L. How can a permittee comply with the TTHM standard in footnote (g) for adding all four compounds (Dibromochloromethane, Bromodichloromethane, Chloroform, and Bromoform) when Chloroform is 230 µg/L and Bromoform is 180 µg/L? The FBC standards for Dibromochloromethane and Bromodichloromethane should be returned to 18,667 µg/L.
ADEQ RESPONSE: The commentor is correct that the FBC standards for the individual pollutants, added together, will exceed the TTHM standard of 80 µg/L, which is for drinking water designated use only. EPA did not approve the 2009 proposed FBC 18,667 µg/L standards for Dibromochloromethane and Bromodichloromethane, so ADEQ cannot retain them. In the case of Dibromochloromethane and Bromodichloromethane, ADEQ planned to revert to the numeric criteria of "TTHM", which was listed EPA last approved in 2003. ADEQ's error is that "TTHM" no longer means the same as what was approved in 2003; it was amended in 2009 to the current language in footnote g.

ADEQ believes the solution is to delete the footnote citation "see (g)", so that both Dibromochloromethane and Bromodichloromethane will list "TTHM" under FBC. Setting the FBC standard as "TTHM" means to reference Trihalomethanes (T) in Appendix A, Table 1, which has no numeric standard for FBC (the changes are described below):

Parameter		Pre-2009	2009 change	2016 proposed	Proposed change
TTHM (FBC)		NNS (no numeric number)			
	Dibromochloromethane	TTHM	18,667 µg/L	TTHM see (g)	TTHM
	Bromodichloromethane	TTHM	18,667 µg/L	TTHM see (g)	TTHM
Footnote (g) was added in the 2009 rulemaking: "The total trihalomethane (TTHM) standard is exceeded when the sum of these four compounds exceeds 80 µg/L, as a rolling annual average."					

ADEQ does not believe that deleting the text "See (g)" constitutes a substantial change, because:

- Footnote g was added in the 2009 rulemaking.

- ADEQ has stated throughout this rulemaking of its intent to revert back to numeric criteria that EPA last approved in 2003 for twenty pollutants EPA did not approve from 2009.
- TTHM was the text in the pre-2009 version of the rules (see Notice of Final Rulemaking, 14 A.A.R. 4708, at 4864-4865, December 26, 2008.)
- Before the 2009 amendments, there was no numeric criteria for FBC for Dibromochloromethane and Bromodichloromethane as the prior reference to "TTHM" meant no numeric standard (see Notice of Final Rulemaking, 14 A.A.R. 4708, at 4871)

ADEQ thanks the commentor City of Phoenix for discovering this error, and notes that the waters of likely concern (EDW reaches such as the Salt River from the City of Phoenix 23rd Ave WWTP outfall to the confluence with the Gila River) carry the PBC designated use, for which the 18,667 µg/L standard for Dibromochloromethane and Bromodichloromethane does still apply. Waters carrying the FBC designated use will still be required to meet the individual numeric standards for Chloroform and Bromoform.

6. Appendix A, Table 1: The FBC and PBC standard for Total Chromium is 100 µg/L, but its individual constituents are Chromium III at 1,400,000 µg/L and Chromium VI 2,800 µg/L. This will make compliance with the standards challenging.
ADEQ RESPONSE: The commentor is correct. ADEQ is returning the criteria to the original text of no numeric standard.

Chromium occurs in the environment primarily in two states, trivalent chromium (Chromium III) and hexavalent chromium (Chromium VI). The Total Chromium standard was inconsistent before the 2009 amendments, in that the two constituents of Chromium III and Chromium VI would greatly exceed the Total Chromium standard of 100 for both FBC and PBC. For the 2009 amendments, ADEQ proposed to delete the 100 standard for Total Chromium for FBC and PBC on the rationale that certain reference factors necessary to calculate a criteria for PBC or FBC did not exist (such as the relative source contribution) and ADEQ did not believe that a reliable criterion could be derived for PBC or FBC. The historical changes are described below:

Parameter		Pre-2009	2009 change	2016 proposed
Total Chromium (FBC and (PBC)		100 T		100 T
	Chromium III	2,100,000 µg/L	1,400,000 µg/L	
	Chromium VI	4,200 µg/L	2,800 µg/L	

EPA did not accept ADEQ's rationale and did not act on the proposed change to no criteria. ADEQ proposed to return the Total Chromium standard for both FBC and PBC to 100. In response to comments ADEQ reexamined the proposed language and decided to retain the original text of no numeric standard for the following reasons:

- ADEQ has standards protective of human health and the environment for Chromium III and Chromium VI for all designated uses (other than agricultural).
- Reliable reference factors necessary to calculate a criterion for PBC or FBC still do not exist for Total Chromium.
- EPA and other surrounding states have PBC/FBC standards for Chromium III and Chromium VI and set Total Chromium for a drinking water designated use.
- Total Chromium set at 100 µG/L for the designated uses of PBC and FBC is not supported by any data.

7. Appendix A, Table 1: For Nitrate, the CAS Number and PBC standard is split into two rows and is difficult to read.
   ADEQ RESPONSE: The Secretary of State's office is responsible for publishing the Arizona Register and Arizona Administrative Code.

8. Appendix A, Table 1: footnote (f) should include definitions of the following abbreviations: DWS, FC, FBC, PBC, A&Wc, A&Www, A&Wedw, AgI, and AgL.
   ADEQ RESPONSE: These acronyms are defined in R18-11-101.

9. Appendix A: An explanation of the calculations used in tables 2 – 12 should be included in the rule.
   ADEQ RESPONSE: ADEQ has added footnote k after Table 1 to explain the abbreviations used.

10. Appendix B. Surface Waters and Designated Uses: Two designations for the Phoenix Area Canals should be clarified for the issue if water treatment plants (WTP) are constructed in succession along a single canal, would the first WTP be considered a drinking water source (DWS) canal and the second WTP be a non-DWS canal?
    ADEQ RESPONSE: The designation language for the Phoenix area canals is consistent with the language for Yuma area canals; DWS designation above the WTP intakes, but not below them. As the language refers to all "WTP intakes", the DWS designation applies until below the last WTP intake.

11. Appendix B: A portion of the Salt River from the 23rd Avenue WWTP outfall to the 91st Avenue WWTP Outfall should be classified as ephemeral, and the Dobson Lake system and the Riverview Park Lake should be removed from Appendix B as these waters are maintained by purchased water purchased and precipitation runoff from storm events.
    ADEQ RESPONSE: Redesignating or removing additional waters from Appendix B at this stage of the rulemaking would be a substantial change, requiring that ADEQ renotice the changes and open the rulemaking up for an additional 45-day public comment period. ADEQ is not opposed to the suggested changes and will work with the city commentors to conduct any necessary studies supporting these changes for the next Triennial Review.

12. Appendix B: For the new segment of Mineral Creek, the correct latitude of the tunnel inlet should be 33º 12' 24". The commentor also suggests that the new segment be referred to "Mineral Creek (diversion tunnel and lined channel)".
    ADEQ RESPONSE: ADEQ agrees and has made both changes.

13. R18-11-101 Definitions: The existing regulatory definition of surface water tracks the federal definition of the term "waters of the United States" ("WOTUS") from 1986, which has been held to be overly broad in some respects by two Supreme Court decisions. Federal agencies adopted guidance to interpret the Supreme Court decisions (last revised in 2008). As the recently adopted regulatory definition has been stayed by multiple courts pending the resolution of numerous legal challenges to the rule, the 2008 guidance remains in effect in Arizona. ADEQ should clarify in the preamble to the final rule that notwithstanding the outdated definition contained in the rules, the phrase "surface water" will be interpreted for purposes of the SWQS as applying to WOTUS as defined by governing legal precedent.
    ADEQ RESPONSE: Comment noted, however it is outside the scope of this rulemaking.

14. The following is a summary of sections for which ADEQ received supportive comments:

- R18-11-106, Net Ecological Benefit: Removal of the requirement that there needs to be "…a plan to eliminate the discharge…"
- R18-11-109, Numeric Water Quality Standards: Change in nutrient standards.
- R18-11-115 , Site-Specific Standards: Enhanced flexibility that will be achieved by additional grounds for adopting site-specific criteria and allowing a broader range of studies to be submitted in support.

- R18-11-115: Adding natural adaptive process and the Biotic ligand model.
- R18-11-121, Schedules of Compliance: Eliminate the three year limitation on compliance schedules because allows dischargers the time needed to address particularly challenging situations that sometimes arise.
- Appendix A, Numeric Water Quality Standards: Revising the state rules to reflect the EPA-approved criteria for the particular 21 pollutants and uses, since it will eliminate permittee confusion.
- Appendix B: Supports discrete new segment of Mineral Creek (comprising the diversion tunnel and concrete-lined channel) that will have partial body contact as the only assigned designated use.

12. All agencies shall list other matters prescribed by statute applicable to the specific agency or to any specific rule or class of rules. Additionally, an agency subject to Council review under A.R.S. §§ 41-1052 and 41-1055 shall respond to the following questions:

a. Whether the rule requires a permit, whether a general permit is used and if not, the reasons why a general permit is not used:

The rules do not require permits, but establish standards. Standards are enforced as limitations in both individual and general permits. The rules governing permits are in Title 18, Chapter 9.

b. Whether a federal law is applicable to the subject of the rule, whether the rule is more stringent than federal law and if so, citation to the statutory authority to exceed the requirements of federal law:

The administrative rules are consistent with federal law and are no more stringent than federal law.

c. Whether a person submitted an analysis to the agency that compares the rule's impact of the competitiveness of business in this state to the impact on business in other states:

No person has submitted an analysis to the agency that compares the rule's impact on the competitiveness of business in this state to the impact on business in other states.

13. List of any incorporated by reference material as specified in A.R.S. § 41-1028 and its location in the rules:

R18-11-110(B)	2014 Review, Water Quality Standards for Salinity, Colorado River System
R18-11-112(D)(4)(a)	Endangered and Threatened Wildlife, 50 CFR 17.11 (revised 2005) and Endangered and Threatened Plants, 50 CFR 17.12 (revised 2005)

14. Whether the rule was previously made, amended or repealed as an emergency rule, If so, cite the notice published in the *Register* as specified in R1-1-409(A). Also, the agency shall state where the text was changed between the emergency and the final rulemaking packages:

Not applicable

15. The full text of the rule follows:

TITLE 18. ENVIRONMENTAL QUALITY

CHAPTER 11. DEPARTMENT OF ENVIRONMENTAL QUALITY

WATER QUALITY STANDARDS

ARTICLE 1. WATER QUALITY STANDARDS FOR SURFACE WATERS

Section

R18-11-106. Net Ecological Benefit

R18-11-109. Numeric Water Quality Standards

R18-11-110. Salinity Standards for the Colorado River

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R18-11-115. Site-Specific Standards

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Appendix A. Numeric Water Quality Standards

Appendix B. Surface Waters and Designated Uses

Appendix C. Site-Specific Standards

ARTICLE 1. WATER QUALITY STANDARDS FOR SURFACE WATERS

R18-11-106. Net Ecological Benefit

A. The Director may, by rule, modify a water quality standard on the ground that there is a net ecological benefit associated with the discharge of effluent to support or create a riparian and aquatic habitat in an area where water resources are limited. The Director may modify a water quality standard for a pollutant if it is demonstrated that:

1. The discharge of effluent creates or supports an ecologically valuable aquatic, wetland, or riparian ecosystem in an area where these resources are limited;
2. The ecological benefits associated with the discharge of effluent under a modified water quality standard exceed the environmental costs associated with the elimination of the discharge of effluent;
3. The cost of treatment to achieve compliance with a water quality standard is so high that it is more cost effective to eliminate the discharge of effluent to the surface water. The discharger shall demonstrate that it is feasible to eliminate the discharge of effluent that creates or supports the ecologically valuable aquatic, wetland, or riparian ecosystem ~~and that a plan to eliminate the discharge is under active consideration~~;
4. The discharge of effluent to the surface water will not cause or contribute to a violation of a water quality standard that has been established for a downstream surface water;
5. All practicable point source discharge control programs, including local pretreatment, waste minimization, and source reduction programs are implemented; and
6. The discharge of effluent does not produce or contribute to the concentration of a pollutant in the tissues of aquatic organisms or wildlife that is likely to be harmful to humans or wildlife through food chain concentration.

B. The Director shall not modify a water quality criterion for a pollutant to be less stringent than a technology-based effluent limitation that applies to the discharge of that effluent. The discharge of effluent shall, at a minimum, comply with applicable technology-based effluent limitations.

R18-11-109. Numeric Water Quality Standards

A. *E. coli* bacteria. The following water quality standards for *Escherichia coli* (*E. coli*) are expressed in colony forming units per 100 milliliters of water (cfu / 100 ml) or as a Most Probable Number (MPN):

E. coli	**FBC**	**PBC**
Geometric mean (minimum of	126	126

four samples in 30 days)

Single sample maximum 235 575

B. pH. The following water quality standards for pH are expressed in standard units:

pH	**DWS**	**FBC, PBC, A&W[1]**	**AgI**	**AgL**
Maximum	9.0	9.0	9.0	9.0
Minimum	5.0	6.5	4.5	6.5

C. The maximum allowable increase in ambient water temperature, due to a thermal discharge is as follows:

A&Ww	**A&Wedw**	**A&Wc**
3.0° C	3.0° C	1.0° C

D. Suspended sediment concentration.

1. The following water quality standards for suspended sediment concentration, expressed in milligrams per liter (mg/L), are expressed as a median value determined from a minimum of four samples collected at least seven days apart:

A&Wc	**A&Ww**
25	80

2. The Director shall not use the results of a suspended sediment concentration sample collected during or within 48 hours after a local storm event to determine the median value.

E. Dissolved oxygen. ~~The following water quality standards for dissolved oxygen are expressed in milligrams per liter (mg/L)~~ A surface water meets the water quality standard for dissolved oxygen when either:

~~**1.**~~	~~**Dissolved oxygen**~~	~~**A&Ww**~~	~~**A&Wc**~~
	~~Single sample minimum[2]~~	~~6.0~~	~~7.0~~
~~2.~~	~~**Dissolved oxygen in effluent-dependent waters**~~		
	~~**(single sample minimum)**~~	~~**A&Wedw**~~	
	~~Three hours after sunrise to sunset~~	~~3.0~~	

	~~Sunset to three hours after sunrise~~	~~1.0~~
~~3.~~	~~A surface water meets with the water quality standard for dissolved oxygen if the percent saturation of dissolved oxygen is equal to or greater than 90 percent.~~	

1. The percent saturation of dissolved oxygen is equal to or greater than 90 percent, or
2. The single sample minimum concentration for the designated use, as expressed in milligrams per liter (mg/L) is as follows:

Designated Use	Single sample minimum concentration in mg/L
A&Ww	6.0
A&Wc	7.0
A&W edw for a sample taken from three hours after sunrise to sunset	3.0
A&W edw for a sample taken from sunset to three hours after sunrise	1.0
The single sample minimum concentration is the same for the designated use in a lake, but the sample must be taken from a depth no greater than one meter	

F. Nutrient criteria. The following are water quality standards for total phosphorus and total nitrogen ~~are~~ (expressed in milligrams per liter (mg/L)) that apply to the surface waters listed below. A minimum of 10 samples, each taken at least 10 days apart in a consecutive 12-month period, are required to determine a 90th percentile. Not more than 10 percent of the samples may exceed the 90th percentile value listed below. The Director will apply these water quality standards for total phosphorus and total nitrogen to a surface water listed below, and to any source discharging to a tributary (ephemeral, intermittent, effluent dependent water or perennial) based on volume, frequency, magnitude and duration of the discharge and distance to the downstream surface water listed below:

1. Verde River and its perennial tributaries from the Verde headwaters to Bartlett Lake:

Surface Water	**Annual Mean**	**90th Percentile**	**Single Sample Maximum**
Total phosphorus	0.10	0.30	1.00

Total nitrogen	1.00	1.50	3.00

2. Black River, Tonto Creek and their perennial tributaries for any segments that are not located on tribal lands:

Surface Water	**Annual Mean**	**90th Percentile**	**Single Sample Maximum**
Total phosphorus	0.10	0.20	0.80
Total nitrogen	0.50	1.00	2.00

3. Salt River and its perennial tributaries above Roosevelt ~~Reservoir, excluding Pinal Creek,~~ Lake for any segments that are not located on tribal lands:

Surface Water	**Annual Mean**	**90th Percentile**	**Single Sample Maximum**
Total phosphorus	0.12	0.30	1.00
Total nitrogen	0.60	1.20	2.00

4. Salt River below Stewart Mountain Dam to its confluence with the Verde River:

Surface Water	**Annual Mean**	**90th Percentile**	**Single Sample Maximum**
Total phosphorus	0.05	–	0.20
Total nitrogen	0.60	–	3.00

5. Little Colorado River and its perennial tributaries upstream ~~above River Reservoir in Greer, South Fork of Little Colorado River above South Fork Campground, and Water Canyon Creek above Apache-Sitgreaves National Forest boundary~~ from:
   a. The headwaters to River Reservoir,
   b. South Fork of Little Colorado River at 34°00’49”/109°24’18” to above South Fork Campground at 34°04’49”/109°24’18”, and
   c. The headwaters of Water Canyon Creek to the Apache-Sitgreaves National Forest boundary:

Surface Water	Annual Mean	90th Percentile	Single Sample Maximum
Total phosphorus	0.08	0.10	0.75
Total nitrogen	0.60	0.75	1.10

6. ~~Little Colorado River at the crossing of Apache County Road No. 124.~~

~~Surface Water~~	~~Annual Mean~~	~~90th Percentile~~	~~Single Sample Maximum~~
~~Total phosphorus~~	~~–~~	~~–~~	~~0.75~~
~~Total nitrogen~~	~~–~~	~~–~~	~~1.80~~

~~7.~~ From the Little Colorado River ~~above Lyman Lake to above the Amity Ditch diversion near crossing of Arizona Highway 273 (applies only when in-stream turbidity is less than 50 NTU):~~ and State Route 260 at 34°06’39”/109°18’55” to Lyman Lake:

Surface Water	Annual Mean	90th Percentile	Single Sample Maximum
Total phosphorus	0.20	0.30	0.75
Total nitrogen	0.70	1.20	1.50

~~8.~~ 7. Colorado River at the Northern International Boundary near Morelos Dam:

Surface Water	Annual Mean	90th Percentile	Single Sample Maximum
Total phosphorus	–	0.33	–
Total nitrogen	–	2.50	–

~~9.~~ 8. Oak Creek from its headwaters at 35°01'30"/111°44'12" to its confluence with the Verde River ~~at 34°40'41"/111°56'30"~~ and the West Fork of Oak Creek from its headwaters at 35°02'44"/111°54'48" to its confluence with Oak Creek ~~at 34°59'14"/111°44'46"~~.

Surface Water	Annual Mean	90th Percentile	Single Sample Maximum
Total phosphorus	~~1.00~~ 0.1	~~1.50~~ 0.25	~~2.50~~ 0.30
Total nitrogen	~~0.10~~ 1.00	~~0.25~~ 1.50	~~0.30~~ 2.50

~~10.~~ 9. No discharge of wastewater to Show Low Creek or its perennial tributaries upstream of and including Fools Hollow Lake shall exceed 0.16 mg/L total phosphates as P.

~~11.~~ 10. No discharge of wastewater to the San Francisco River or its perennial tributaries upstream of Luna Lake Dam shall exceed 1.0 mg/L total phosphates as P.

G. Footnotes:

1. "1" Includes A&Wc, A&Ww, A&Wedw, and A&We.

~~2. "2" The dissolved oxygen water quality standard for a lake applies below the water surface but not at a depth greater than one meter.~~

R18-11-110. Salinity Standards for the Colorado River

A. The flow-weighted average annual salinity in the lower main stem of the Colorado River shall not exceed the following criteria:

Location	Total Dissolved Solids
Below Hoover Dam	723 mg/L
Below Parker Dam	747 mg/L
At Imperial Dam	879 mg/L

B. The plan of implementation contained in the "~~2005~~ 2014 Review, Water Quality Standards for Salinity, Colorado River System," approved October ~~2005~~ 2014, is incorporated by reference to preserve the basin-wide approach to salinity control developed by the Colorado River Basin Salinity Control Forum and to ensure compliance with the numeric criteria for salinity in subsection (A). This material does not include any later amendments or editions of the incorporated material. Copies of the incorporated material are available for inspection at the Arizona Department of Environmental Quality, 1110 West Washington Street, Phoenix, Arizona 85007 or may be obtained from the Colorado River Basin Salinity

Control Forum, 106 West 500 South, Suite 101, Bountiful, Utah 84010-6232 or at http://www.coloradoriversalinity.org/.

R18-11-112. Outstanding Arizona Waters

A. The Director shall classify a surface water as an outstanding Arizona water (OAW) by rule.

B. The Director may adopt, under R18-11-115, a site-specific standard to maintain and protect existing water quality in an OAW.

C. Any person may nominate a surface water for classification as an OAW by filing a nomination with the Director. The nomination shall include:

1. A map and a description of the surface water;
2. A written statement in support of the nomination, including specific reference to the applicable criteria for an OAW classification prescribed in subsection (D);
3. Supporting evidence demonstrating that the criteria prescribed in subsection (D) are met; and
4. Available water quality data relevant to establishing the baseline water quality of the proposed OAW.

D. The Director may classify a surface water as an OAW based upon the following criteria:

1. The surface water is a perennial or intermittent water;
2. The surface water is in a free-flowing condition. For purposes of this subsection, "in a free-flowing condition" means that a surface water does not have an impoundment, diversion, channelization, rip-rapping or other bank armor, or another hydrological modification within the reach nominated for an OAW classification;
3. The surface water has good water quality. For purposes of this subsection, "good water quality" means that the surface water has water quality that meets or is better than applicable surface water quality standards. A surface water that is listed as impaired under R18-11-604(E) is ineligible for OAW classification; and
4. The surface water meets one or both of the following conditions:
    a. The surface water is of exceptional recreational or ecological significance because of its unique attributes, such as the geology, flora and fauna, water quality, aesthetic value, or the wilderness characteristic of the surface water;
    b. An endangered or threatened species is associated with the surface water and the existing water quality is essential to the species' maintenance and propagation or the surface water provides critical habitat for the threatened or endangered species. An endangered or threatened species is identified in "Endangered and Threatened Wildlife," 50 CFR 17.11 (revised 2005), and "Endangered and Threatened Plants," 50 CFR 17.12 (revised 2005). This material is

incorporated by reference and does not include any later amendments or editions of the incorporated material. Copies of the incorporated material are available for inspection at the Arizona Department of Environmental Quality, 1110 West Washington Street, Phoenix, Arizona 85007 or may be obtained from the National Archives and Records Administration at http://www.access.gpo.gov/nara/cfr/cfr-table-search.html#page1.

E. The Director shall hold at least one public meeting in the local area of a surface water that is nominated for classification as an OAW to solicit public comment on the nomination.

F. The Director shall consider the following factors when deciding whether to classify a surface water as an OAW:

1. Whether there is the ability to manage the surface water and its watershed to maintain and protect existing water quality;
2. The social and economic impact of Tier 3 antidegradation protection;
3. The public comments in support of, or in opposition to, an OAW classification;
4. The timing of the nomination relative to the triennial review of surface water quality standards;
5. The consistency of an OAW classification with applicable water quality management plans; and
6. Whether the nominated surface water is located within a national or state park, national monument, national recreation area, wilderness area, riparian conservation area, area of critical environmental concern, or it has another special use designation (for example, Wild and Scenic River).

G. The following surface waters are classified as OAWs:

1. The West Fork of the Little Colorado River, from its headwaters ~~at 33°55'02"/109°33'30"~~ to Government Springs ~~at 33°59'33"/109°27'54"~~ (approximately 9.1 river miles);
2. Oak Creek, from its headwaters ~~at 35°01'30"/111°44'12"~~ to its confluence with the Verde River ~~at 34°40'41"/111°56'30"~~ (approximately 50.3 river miles);
3. West Fork of Oak Creek, from its headwaters ~~at 35°02'44"/111°54'48"~~ to its confluence with Oak Creek ~~at 34°59'14"/111°44'46"~~ (approximately 15.8 river miles);
4. Peeples Canyon Creek, from its headwaters ~~at 34°23'57"/113°19'45"~~ to its confluence with the Santa Maria River ~~at 34°20'36"/113°15'12"~~ (approximately 8.1 river miles);
5. Burro Creek, from its headwaters at ~~34°52'46.5"/113°05'13.5"~~ to its confluence with Boulder Creek ~~at 34°374.5"/113°18'36"~~ (approximately 29.5 miles);
6. Francis Creek, from its headwaters at ~~34°54'38"/113°20'30"~~ to its confluence with Burro Creek ~~at 34°44'29"/113°14'37"~~ (approximately 22.9 river miles);
7. Bonita Creek, from its boundary of the San Carlos Indian Reservation ~~at 33°03'08"/109°33'41"~~ to its confluence with the Gila River ~~at 32°53'36"/109°28'43"~~ (approximately 14.7 river miles);

8. Cienega Creek, from its confluence with Gardner Canyon ~~and Spring Water Canyon at 31°47'38.5"/110°35'21.5"~~ to the USGS gaging station ~~at 32°02'09"/110°40'34"~~ (#09484600) (approximately 28.3 river miles);
9. Aravaipa Creek, from its confluence with Stowe Gulch ~~at 32°52'10"/110°22'03"~~ to the downstream boundary of the Aravaipa Canyon Wilderness Area ~~at 32°54'23"/110°33'42"~~ (approximately 15.5 river miles);
10. Cave Creek, from its headwaters ~~at 31°50'30"/109°17'04.5"~~ to the Coronado National Forest boundary ~~at 31°54'38"/109°08'40"~~ (approximately 10.4 river miles);
11. South Fork of Cave Creek, from its headwaters ~~at 31°50'20"/109°16'33"~~ to its confluence with Cave Creek ~~at 31°53'04"/109°10'30"~~ (approximately 8.6 river miles);
12. Buehman Canyon Creek, from its headwaters ~~at 32°52'0.5"/110°39'54.5"~~ to its confluence with unnamed tributary at ~~32°24'31.5"/110°32'08"~~ 32°24'31"/110°32'08" (approximately 9.8 river miles);
13. Lee Valley Creek, from its headwaters ~~at 33°55'49"/109°31'34~~" to ~~its confluence with~~ Lee Valley Reservoir ~~at 33°56'28"/109°30'15.5"~~ (approximately 1.6 river miles);
14. Bear Wallow Creek, from its headwaters ~~at 33°35'54"/109°26'54.5"~~ to the boundary of the San Carlos Indian Reservation ~~at 33°37'52"/109°29'44"~~ (approximately 4.25 river miles);
15. North Fork of Bear Wallow Creek, from its headwaters ~~at 33°34'47.5"/109°21'59.5"~~ to its confluence with Bear Wallow Creek ~~at 33°35'54"/109°26'54.5"~~ (approximately 3.8 river miles);
16. South Fork of Bear Wallow Creek, from its headwaters ~~at 33°34'38.5"/109°23'58"~~ to its confluence with Bear Wallow Creek ~~at 33°35'54"/109°26'54.5"~~ (approximately 3.8 river miles);
17. Snake Creek, from its headwaters ~~at 33°37'21.5"/109°26'11"~~ to its confluence with the Black River ~~at 33°40'31.5"/109°28'58.5"~~ (approximately 6.2 river miles);
18. Hay Creek, from its headwaters ~~at 33°51'00"/109°28'48"~~ to its confluence with the West Fork of the Black River ~~at 33°48'30"/109°25'19"~~ (approximately 5.5 river miles);
19. Stinky Creek, from the White Mountain Apache Indian Reservation boundary ~~at 33°52'36.5"/109°29'45"~~ to its confluence with the West Fork of the Black River ~~at 33°51'21.5"/109°27'09.5"~~ (approximately 3.0 river miles);
20. KP Creek, from its headwaters ~~at 33°34'03"/109°21'19"~~ to its confluence with the Blue River ~~at 33°31'44"/109°12'04.5"~~ (approximately 12.7 river miles);
21. Davidson Canyon, from the unnamed spring at ~~31°59'00"/110°38'46"~~ 31°59'00"/110°38'49" to its confluence with Cienega Creek; and

22. Fossil Creek, from its headwaters at the confluence of Sandrock and Calf Pen Canyons above Fossil Springs ~~at 34°26'48.7"/111°32'25"~~ to its confluence with the Verde River ~~at 34°18'21.8"/111°40'31.6"~~ (approximately 17.2 river miles).

R18-11-115. Site-Specific Standards

A. The Director shall adopt a site-specific standard by rule.

B. The Director may adopt a site-specific standard based upon a request or upon the Director's initiative for any of the following reasons:

1. Local physical, chemical, or hydrological conditions of a surface water such as pH, hardness, fate and transport, or temperature alters the biological availability or toxicity of a pollutant;
2. The sensitivity of resident aquatic organisms that occur in a surface water to a pollutant differs from the sensitivity of the species used to derive the numeric water quality standards to protect aquatic life in Appendix A;
3. Resident aquatic organisms that occur in a surface water represent a narrower mix of species than those in the dataset used by the Department to derive numeric water quality standards to protect aquatic life in Appendix A; ~~or~~
4. The natural background concentration of a pollutant is greater than the numeric water quality standard to protect aquatic life prescribed in Appendix A. "Natural background" means the concentration of a pollutant in a surface water due only to non-anthropogenic sources.
5. Natural adaptive processes have enabled a viable, balanced population of aquatic life to exist in a surface water where the level of a pollutant is greater than the numeric water quality standard to protect aquatic life prescribed in Appendix A; or
6. Other factors or combination of factors that upon review by the Director warrant changing a numeric water quality standard for a surface water.

C. ~~Site-specific study. A person shall conduct a study to support the development of a site-specific standard using one of the following procedures:~~

~~1. The Recalculation Procedure, Appendix L, pages 90 - 98, Water Quality Standards Handbook, Second Edition, EPA 823-B-94-005b, August 1994. This material is incorporated by reference and does not include any later amendments or editions of the incorporated material. A copy of the incorporated material is available for inspection at the Arizona Department of Environmental Quality, 1110 West Washington Street, Phoenix, Arizona 85007 or: may be obtained from the U.S. Environmental Protection Agency, Office of Water at http://www.epa.gov/waterscience/standards/handbook/ handbookappxL.pdf.~~

~~2. Water Effects Ratio for Metals, Appendix L, pages 1 - 89, Water Quality Standards Handbook,~~

~~Second Edition, EPA 823-B-94-005b, August 1994. This material is incorporated by reference and does not include any later amendments or editions of the incorporated material. A copy of the incorporated material is available for inspection at the Arizona Department of Environmental Quality, 1110 West Washington Street, Phoenix, Arizona 85007 or: may be obtained from the U.S. Environmental Protection Agency, Office of Water at http://www.epa.gov/waterscience/standards/handbook/ handbookappxL.pdf.~~

~~3. Streamlined Water Effects Ratio Procedure for Discharges of Copper, EPA-822-R-01-005, March 2001. This material is incorporated by reference and does not include any later amendments or editions of the incorporated material. A copy of the incorporated material is available for inspection at the Arizona Department of Environmental Quality, 1110 West Washington Street, Phoenix, Arizona 85007 or: may be obtained from the U.S. Environmental Protection Agency, Office of Water at http://www.epa.gov/ost/criteria/copper/copper.pdf.~~

~~4. Natural background.~~

~~a. A person seeking to develop a site-specific standard based on natural background shall provide a study outline to the Director and obtain the Director's approval before conducting the study.~~

~~i. The person may use statistical or modeling approaches to determine natural background concentration.~~

~~ii. Modeling approaches include Better Assessment Science Integrating Source and Nonpoint Sources (Basins), Hydrologic Simulation Program-Fortran (HSPF), and Hydrologic Engineering Center (HEC) programs developed by the U.S. Army Corps of Engineers.~~

~~b. The Director may establish a site-specific standard at a concentration equal to the natural background concentration.~~

~~c. For purposes of this subsection, "natural background" means the concentration of a pollutant in a surface water due only to non-anthropogenic sources.~~

Site-specific standard by request. To request that the Director adopt a site-specific standard, a person must conduct a study to support the development of a site-specific standard using a scientifically-defensible procedure.

1. Before conducting the study, a person shall submit a study outline to the Director for approval that contains the following elements:
   a. Identifies the pollutant;
   b. Describes the reach's boundaries;
   c. Uses one of the following procedures, as defined by the most recent EPA guidance documents:

i. The recalculation procedure,

ii. The water effects ratio for metals,

iii. The streamlined water effects ratio, or

iv. The Biotic ligand model.

d. Demonstrates that all designated uses are protected.

2. Alternatively, a study outline submitted for the Director's approval must contain the following elements:

a. Identifies the pollutant;

b. Describes the reach's boundaries;

c. Describes the hydrologic regime of the waterbody;

d. Describes the scientifically-defensible procedure, which can include relevant aquatic life studies, ecological studies, laboratory tests, biological translators, fate and transport models, and risk analyses;

e. Describes and compares the taxonomic composition, distribution and density of the aquatic biota within the reach to a reference reach and describes the basis of any major taxonomic differences;

f. Describes the pollutant's effect on the affected species or appropriate surrogate species and on the other designated uses listed for the reach;

g. Demonstrates that all designated uses are protected; and

h. A person seeking to develop a site-specific standard based on natural background may use statistical or modeling approaches to determine natural background concentration. Modeling approaches include Better Assessment Science Integrating Source and Nonpoint Sources (Basins), Hydrologic Simulation Program-Fortran (HSPF), and Hydrologic Engineering Center (HEC) programs developed by the U.S. Army Corps of Engineers.

R18-11-121. Schedules of Compliance

~~**A.** The Director may establish a schedule in an AZPDES permit to bring an existing point source into compliance with a new or revised water quality standard.~~ A compliance schedule in an AZPDES permit ~~for an existing point source, other than a stormwater discharge,~~ shall require the permittee to comply with a discharge limitation based upon a new or revised water quality standard ~~no later than three years after the effective date of the AZPDES permit~~ as soon as possible to achieve compliance. The permittee shall demonstrate that all requirements under § 301(b) and § 306 of the Clean Water Act [33 U.S.C. 1311(b) and 1316] are achieved and that the point source cannot comply with a discharge limitation based upon the new or revised water quality standard through the application of existing water pollution

control technology, operational changes, or source reduction. In establishing a compliance schedule, the Director shall consider:

1. How much time the permittee has already had to meet any effluent limitations under a prior permit;
2. The extent to which the permittee has made good faith efforts to comply with the effluent limitations and other requirements in a prior permit;
3. Whether treatment facilities, operations, or measures must be modified to meet the effluent limitations;
4. How long any necessary modifications would take to implement; and
5. Whether the permittee would be expected to use the same treatment facilities, operations or other measures to meet the effluent limitations as it would have used to meet the effluent limitations in a prior permit.

~~**B.** The Director may establish a schedule of compliance in an AZPDES permit for a new point source. The first AZPDES permit issued to a new point source may contain a schedule of compliance only when necessary to allow the permittee to attain compliance with a new or revised water quality standard that becomes effective after commencement of construction but less than three years before the discharge begins. For purposes of this subsection, "commencement of construction" means that the owner or operator of the point source has obtained the federal, state, and local approvals or permits necessary to begin physical construction of the point source and either:~~

~~1. Onsite physical construction has begun; or~~

~~2. The owner or operator has entered into a contract for physical construction of the point source and the contract cannot be cancelled or modified without substantial loss. For purposes of this subsection, "substantial loss" means in excess of 10 percent of the total cost incurred for physical construction.~~

~~**C.** The Director may establish a schedule of compliance in an AZPDES permit for a recommencing point source discharge. The first AZPDES permit issued to a recommencing point source discharger may contain a schedule of compliance only when necessary to attain compliance with a new or revised water quality standard that is effective less than three years before recommencement of the discharge.~~

~~**D.** The Director may establish a schedule to bring a point source discharge of stormwater into compliance with a water quality standard in an AZPDES permit. A compliance schedule for a stormwater discharge shall require implementation of all reasonable and cost-effective best management practices to control the discharge of pollutants in stormwater.~~

APPENDIX A. NUMERIC WATER QUALITY STANDARDS

Table 1. Water Quality Criteria By Designated Use (see f)

PARAMETER	CAS NUMBER	DWS (µG/L)	FC (µG/L)	FBC (µG/L)	PBC (µG/L)	A&Wc Acute (µg/L)	A&Wc Chronic (µg/L)	A&Ww Acute (µg/L)	A&Ww Chronic (µg/L)	A&Wedw Acute| (µg/L)	A&Wedw Chronic (µg/L)	A&We Acute (µg/L)	AgI (µg/L)	AgL (µg/L)
Acenaphthene	83329	420	198	56,000	56,000	850	550	850	550	850	550			
Acrolein	107028	3.5	1.9	467	467	34	30	34	30	34	30			
Acrylonitrile	107131	0.06	0.2	3	37,333	3,800	250	3,800	250	3,800	250			
Alachlor	15972608	2		9,333	9,333	2,500	170	2,500	170	2,500	170			
Aldrin	309002	0.002	0.00005	0.08	28	3		3		3		4.5	0.003	See (b)
Alpha Particles (Gross) Radioactivity		15 pCi/L See (h)												
Ammonia	7664417					See (e) & Table ~~25~~ 11	See (e) & Table ~~26~~ 12	See (e) & Table ~~25~~ 11	See (e) & Table ~~26~~ 12	See (e) & Table ~~25~~ 11	See (e) & Table ~~26~~ 12			
Anthracene	120127	2,100	74	280,000	280,000									
Antimony	7440360	6 T	640 T	747 T	747 T	88 D	30 D	88 D	30 D	1,000 D	600 D			
Arsenic	7440382	10 T	80 T	30 T	280 T	340 D	150 D	340 D	150 D	340 D	150 D	440 D	2,000 T	200 T
Asbestos	1332214	See (a)												
Atrazine	1912249	3		32,667	32,667									
Barium	7440393	2,000 T		98,000 T	98,000 T									
Benz(a)anthracene	56553	0.005	0.02	0.2	0.2									
Benzene	71432	5	~~114~~ 140	93	3,733	2,700	180	2,700	180	8,800	560			
3, 4 Benzfluoranthene	205992	0.005	0.02	1.9	1.9									
Benzidine	92875	0.0002	0.0002	0.01	2,800	1,300	89	1,300	89	1,300	89	10,000	0.01	0.01
Benzo(a)pyrene	50328	0.2	0.02	0.2	0.2									
Benzo(k)fluoranthene	207089	0.005	0.02	1.9	1.9									
Beryllium	7440417	4 T	84 T	1,867 T	1,867 T	65 D	5.3 D	65 D	5.3 D	65 D	5.3 D			
Beta particles and photon emitters		4 millirems /year See (i)												
Bis(2-chloroethyl) ether	111444	0.03	0.5	1	1	120,000	6,700	120,000	6,700	120,000	6,700			
Bis(2-chloroisopropyl) ether	108601	280	3,441	37,333	37,333									
Boron	7440428	1,400 T		186,667 T	186,667 T								1,000 T	
Bromodichloromethane	75274	TTHM See (g)	17	~~18,667~~ TTHM	18,667									
p-Bromodiphenyl ether	101553					180	14	180	14	180	14			
Bromoform	75252	TTHM See (g)	133	180	18,667	15,000	10,000	15,000	10,000	15,000	10,000			
Bromomethane	74839	9.8	299	1,307	1,307	5,500	360	5,500	360	5,500	360			

PARAMETER	CAS NUMBER	DWS (µG/L)	FC (µG/L)	FBC (µG/L)	PBC (µG/L)	A&Wc Acute (µg/L)	A&Wc Chronic (µg/L)	A&Ww Acute (µg/L)	A&Ww Chronic (µg/L)	A&Wedw Acute| (µg/L)	A&Wedw Chronic (µg/L)	A&We Acute (µg/L)	AgI (µg/L)	AgL (µg/L)
Butyl benzyl phthalate	85687	1,400	386	186,667	186,667	1,700	130	1,700	130	1,700	130			
Cadmium	7440439	5 T	84 T	700 T	700 T	See (d) & Table 2	See (d) & Table 3	See (d) & Table ~~4~~ 2	See (d) & Table ~~5~~ 3	See (d) & Table ~~4~~ 2	See (d) & Table ~~5~~ 3	See (d) & Table ~~6~~ 2	50	50
Carbofuran	1563662	40		4,667	4,667	650	50	650	50	650	50			
Carbon tetrachloride	56235	5	2	11	~~1,307~~ 980	18,000	1,100	18,000	1,100	18,000	1,100			
Chlordane	57749	2	0.0008	4	467	2.4	0.004	2.4	0.2	2.4	0.2	3.2		
Chlorine (total residual)	7782505	4,000		4,000	4,000	19	11	19	11	19	11			
Chlorobenzene	108907	100	1,553	18,667	18,667	3,800	260	3,800	260	3,800	260			
2-Chloroethyl vinyl ether	110758					180,000	9,800	180,000	9,800	180,000	9,800			
Chloroform	67663	TTHM See (g)	~~2,133~~ 470	~~9,333~~ 230	9,333	14,000	900	14,000	900	14,000	900			
p-Chloro-m-cresol	59507					15	4.7	15	4.7	15	4.7	48,000		
Chloromethane	74873					270,000	15,000	270,000	15,000	270,000	15,000			
2-Chloronapthalene	91587	560	317	74,667	74,667									
2-Chlorophenol	95578	35	30	4,667	4,667	2,200	150	2,200	150	2,200	150			
Chloropyrifos	2921882	21		2,800	2,800	0.08	0.04	0.08	0.04	0.08	0.04			
Chromium III	16065831		75,000 T	1,400,000 T	1,400,000 T	See (d) & Table ~~7~~ 4	See (d) & Table ~~8~~ 4	See (d) & Table ~~7~~ 4	See (d) & Table ~~8~~ 4	See (d) & Table ~~7~~ 4	See (d) & Table ~~8~~ 4	See (d) & Table ~~9~~ 4		
Chromium VI	18540299	21 T	150 T	2,800 T	2,800 T	16 D	11 D	16 D	11 D	16 D	11 D	34 D		
Chromium (Total)	7440473	100 T											1,000	1,000
Chrysene	218019	0.005	0.02	19	19									
Copper	7440508	1,300 T		1,300 T	1,300 T	See (d) & Table ~~10~~ 5	See (d) & Table ~~11~~ 5	See (d) & Table ~~10~~ 5	See (d) & Table ~~11~~ 5	See (d) & Table ~~10~~ 5	See (d) & Table ~~11~~ 5	See (d) & Table ~~12~~ 5	5,000 T	500 T
Cyanide (as free cyanide)	57125	200 T	16,000 T	18,667 T	18,667 T	22 T	5.2 T	41 T	9.7 T	41 T	9.7 T	84 T		200 T
Dalapon	75990	200	8,000	28,000	28,000									
Dibenz(ah) anthracene	53703	0.005	0.02	1.9	1.9									
Dibromochloromethane	124481	TTHM See (g)	13	~~18,667~~ TTHM	18,667									
1,2-Dibromo-3-chloropropane	96128	0.2		2,800	2,800									
1,2-Dibromoethane	106934	0.05		8,400	8,400									
Dibutyl phthalate	84742	700	899	93,333	93,333	470	35	470	35	470	35	1,100		
1,2-Dichlorobenzene	95501	600	205	84,000	84,000	790	300	1,200	470	1,200	470	5,900		

PARAMETER	CAS NUMBER	DWS (µG/L)	FC (µG/L)	FBC (µG/L)	PBC (µG/L)	A&Wc Acute (µg/L)	A&Wc Chronic (µg/L)	A&Ww Acute (µg/L)	A&Ww Chronic (µg/L)	A&Wedw Acute| (µg/L)	A&Wedw Chronic (µg/L)	A&We Acute (µg/L)	AgI (µg/L)	AgL (µg/L)
1,3-Dichlorobenzene	541731					2,500	970	2,500	970	2,500	970			
1,4-Dichlorobenzene	106467	75	5,755	373,333	373.333	560	210	2,000	780	2,000	780	6,500		
3,3'-Dichlorobenzidine	91941	0.08	0.03	3	3									
p,p'-Dichlorodiphenyltrichloroethane (DDT) and metabolites (DDD) and (DDE)	50293	0.1	0.0002	4	467	1.1	0.001	1.1	0.001	1.1	0.001	1.1	0.001	0.001
1,2-Dichloroethane	107062	5	37	15	186,667	59,000	41,000	59,000	41,000	59,000	41,000			
1,1-Dichloroethylene	75354	7	7,143	46,667	46,667	15,000	950	15,000	950	15,000	950			
1,2-cis-Dichloroethylene	156592	70		70	70									
1,2-trans-Dichloroethylene	156605	100	10,127	18,667	18,667	68,000	3,900	68,000	3,900	68,000	3,900			
Dichloromethane	75092	5	593	190	56,000	97,000	5,500	97,000	5,500	97,000	5,500			
2,4-Dichlorophenol	120832	21	59	2,800	2,800	1,000	88	1,000	88	1,000	88			
2,4-Dichlorophenoxyacetic acid (2,4-D)	94757	70		9,333	9,333									
1,2-Dichloropropane	78875	5	17,518	84,000	84,000	26,000	9,200	26,000	9,200	26,000	9,200			
1,3-Dichloropropene	542756	0.7	42	420	28,000	3,000	1,100	3,000	1,100	3,000	1,100			
Dieldrin	60571	0.002	0.00005	0.09	47	0.2	0.06	0.2	0.06	0.2	0.06	4	0.003	See (b)
Diethyl phthalate	84662	5,600	8,767	746,667	746,667	26,000	1,600	26,000	1,600	26,000	1,600			
Di (2-ethylhexyl) adipate	103231	400		560,000	560,000									
Di (2-ethylhexyl) phthalate	117817	6	3	~~1,300~~ 100	18,667	400	360	400	360	400	360	3,100		
2,4-Dimethylphenol	105679	140	171	18,667	18,667	1,000	310	1,000	310	1,000	310	150,000		
Dimethyl phthalate	131113					17,000	1,000	17,000	1,000	17,000	1,000			
4,6-Dinitro-o-cresol	534521	28	582	3,733	3.733	310	24	310	24	310	24			
2,4-Dinitrophenol	51285	14	1,067	1,867	1,867	110	9.2	110	9.2	110	9.2			
2,4-Dinitrotoluene	121142	14	421	1,867	1,867	14,000	860	14,000	860	14,000	860			
2,6-Dinitrotoluene	606202	0.05		2	3,733									
Di-n-octyl phthalate	117840	2,800		373,333	373,333									
Dinoseb	88857	7		933	933									
1,2-Diphenylhydrazine	122667	0.04	0.2	1.8	1.8	130	11	130	11	130	11			
Diquat	85007	20		2,053	2,053									
Endosulfan sulfate	1031078	42	18	5,600	5,600	0.2	0.06	0.2	0.06	0.2	0.06	3		
Endosulfan (Total)	115297	42	18	5,600	5,600	0.2	0.06	0.2	0.06	0.2	0.06	3		
Endothall	145733	100		18,667	18,667									
Endrin	72208	2	0.06	280	280	0.09	0.04	0.09	0.04	0.09	0.04	0.7	0.004	0.004
Endrin aldehyde	7421933					0.09	0.04	0.09	0.04	0.09	0.04	0.7		
Ethylbenzene	100414	700	2,133	93,333	93,333	23,000	1,400	23,000	1,400	23,000	1,400			

PARAMETER	CAS NUMBER	DWS (µG/L)	FC (µG/L)	FBC (µG/L)	PBC (µG/L)	A&Wc Acute (µg/L)	A&Wc Chronic (µg/L)	A&Ww Acute (µg/L)	A&Ww Chronic (µg/L)	A&Wedw Acute| (µg/L)	A&Wedw Chronic (µg/L)	A&We Acute (µg/L)	AgI (µg/L)	AgL (µg/L)
Fluoranthene	206440	280	28	37,333	37,333	2,000	1,600	2,000	1,600	2,000	1,600			
Fluorene	86737	280	1,067	37,333	37,333									
Fluoride	7782414	4,000		140,000	140,000									
Glyphosate	1071836	700	266,667	93,333	93,333									
Guthion	86500						0.01		0.01		0.01			
Heptachlor	76448	0.4	0.00008	0.4	467	0.5	0.004	0.5	0.004	0.6	0.01	0.9		
Heptachlor epoxide	1024573	0.2	0.00004	0.2	12	0.5	0.004	0.5	0.004	0.6	0.01	0.9		
Hexachlorobenzene	118741	1	0.0003	1	747	6	3.7	6	3.7	6	3.7			
Hexachlorobutadiene	87683	0.4	18	18	187	45	8.2	45	8.2	45	8.2			
Hexachlorocyclohexane alpha	319846	0.006	0.005	0.22	7,467	1,600	130	1,600	130	1,600	130	1,600		
Hexachlorocyclohexane beta	319857	0.02	0.02	0.78	560	1,600	130	1,600	130	1,600	130	1,600		
Hexachlorocyclohexane delta	319868					1,600	130	1,600	130	1,600	130	1,600		
Hexachlorocyclohexane gamma (lindane)	58899	0.2	1.8	280	280	1	0.08	1	0.28	1	0.61	11		
Hexachlorocyclopentadiene	77474	50	~~74~~ 580	~~11,200~~ 9,800	~~11,200~~ 9,800	3.5	0.3	3.5	0.3	3.5	0.3			
Hexachloroethane	67721	2.5	3.3	100	933	490	350	490	350	490	350	850		
Hydrogen sulfide	7783064						2 See (c)		2 See (c)		2 See (c)			
Indeno (1,2,3-cd) pyrene	193395	0.05	~~0.2~~ 0.49	1.9	1.9									
Iron	7439896						1,000 D		1,000 D		1,000 D			
Isophorone	78591	37	961	1,500	186,667	59,000	43,000	59,000	43,000	59,000	43,000			
Lead	7439971	15 T		15 T	15 T	See (d) & Table ~~13~~ 6	See (d) & Table ~~14~~ 6	See (d) & Table ~~13~~ 6	See (d) & Table ~~14~~ 6	See (d) & Table ~~13~~ 6	See (d) & Table ~~14~~ 6	See (d) & Table ~~15~~ 6	10,000 T	100 T
Malathion	121755	140		18,667	18,667		0.1		0.1		0.1			
Manganese	7439965	980		130,667	130,667								10,000	
Mercury	7439976	2 T		280 T	280 T	2.4 D	0.01 D	2.4 D	0.01 D	2.4 D	0.01 D	5 D		10 T
Methoxychlor	72435	40		4,667	4,667		0.03		0.03		0.03			
Methylmercury			0.3 mg/kg											
Mirex	2385855	1		187	187		0.001		0.001		0.001			
Naphthalene	91203	140	1,524	18,667	18,667	1,100	210	3,200	580	3,200	580			
Nickel	7440020	~~210 T~~ 140 T	~~511 T~~ 4,600 T	28,000 T	28,000 T	See (d) & Table ~~16~~ 7	See (d) & Table ~~17~~ 7	See (d) & Table ~~16~~ 7	See (d) & Table ~~17~~ 7	See (d) & Table ~~16~~ 7	See (d) & Table ~~17~~ 7	See (d) & Table ~~18~~ 7		
Nitrate	14797558	10,000		3,733,333	3,733,333									
Nitrite	14797650	1,000		233,333	233,333									

PARAMETER	CAS NUMBER	DWS (µG/L)	FC (µG/L)	FBC (µG/L)	PBC (µG/L)	A&Wc Acute (µg/L)	A&Wc Chronic (µg/L)	A&Ww Acute (µg/L)	A&Ww Chronic (µg/L)	A&Wedw Acute| (µg/L)	A&Wedw Chronic (µg/L)	A&We Acute (µg/L)	AgI (µg/L)	AgL (µg/L)
Nitrate + Nitrite		10,000												
Nitrobenzene	98953	3.5	138	467	467	1,300	850	1,300	850	1,300	850			
p-Nitrophenol	100027					4,100	3,000	4,100	3,000	4,100	3,000			
N-nitrosodimethylamine	62759	0.001	3	0.03	0.03									
N-nitrosodi-n-phenylamine	86306	7.1	6	290	290	2,900	200	2,900	200	2,900	200			
N-nitrosodi-n-propylamine	621647	0.005	0.5	0.2	88,667									
Oxamyl	23135220	200		23,333	23,333									
Parathion	56382					0.07	0.01	0.07	0.01	0.07	0.01			
Paraquat	1910425	32		4,200	4,200	~~100~~	~~54~~	~~100~~	~~54~~	~~100~~	~~54~~			
Pentachlorophenol	87865	1	~~270~~ 1,000	12	28,000	See (e), (j) & Table ~~22~~ 10	See (e), (j) & Table ~~23~~ 10	See (e), (j) & Table ~~22~~ 10	See (e), (j) & Table ~~23~~ 10	See (e), (j) & Table ~~22~~ 10	See (e), (j) & Table ~~23~~ 10	See (e), (j) & Table ~~24~~ 10		
Permethrin	52645531	350		46,667	46,667	~~0.3~~	~~0.2~~	~~0.3~~	~~0.2~~	~~0.3~~	~~0.2~~			
Phenanthrene	85018					30	6.3	30	6.3	30	6.3			
Phenol	108952	2,100	37	280,000	280,000	5,100	730	7,000	1,000	7,000	1,000	180,000		
Picloram	1918021	500	2,710	65,333	65,333									
Polychlorinatedbiphenyls (PCBs)	1336363	0.5	0.00006	19	19	2	0.01	2	0.02	2	0.02	11	0.001	0.001
Pyrene	129000	210	800	28,000	28,000									
Radium 226 + Radium 228		5 pCi/L												
Selenium	7782492	50 T	667 T	4,667 T	4,667 T		2 T		2 T		2 T	33 T	20 T	50 T
Silver	7440224	35 T	8,000 T	4,667 T	4,667 T	See (d) & Table ~~19~~ 8		See (d) & Table ~~19~~ 8		See (d) & Table ~~19~~ 8		See (d) & Table ~~19~~ 8		
Simazine	112349	4		4,667	4,667									
Strontium		8 pCi/L												
Styrene	100425	100		186,667	186,667	5,600	370	5,600	370	5,600	370			
Sulfides												100		
2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD)	1746016	0.00003	5x10-9	0.00003	0.0009	0.01	0.005	0.01	0.005	0.01	0.005	0.1		
1,1,2,2-Tetrachloroethane	79345	0.2	4	7	~~93,333~~ 56,000	4,700	3,200	4,700	3,200	4,700	3,200			
Tetrachloroethylene	127184	5	261	9,333	9,333	2,600	280	6,500	680	6,500	680	15,000		

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Thallium	7440280	2 T	~~1 T~~ 7.2 T	75 T	75 T	700 D	150 D	700 D	150 D	700 D	150 D			
Toluene	108883	1,000	~~29,907~~ 201,000	~~373,333~~ 280,000	~~373,333~~ 280,000	8,700	180	8,700	180	8,700	180			
Toxaphene	8001352	3	0.0003	1.3	933	0.7	0.0002	0.7	0.0002	0.7	0.0002	11	0.005	0.005
Tributylin						0.5	0.07	0.5	0.07	0.5	0.07			
1,2,4-Trichlorobenzene	120821	70	70	9,333	9,333	750	130	1,700	300	1,700	300			
1,1,1-Trichloroethane	71556	200	428,571	1,866,667	1,866,667	2,600	1,600	2,600	1,600	2,600	1,600		1,000	
1,1,2-Trichloroethane	79005	5	16	25	3,733	18,000	12,000	18,000	12,000	18,000	12,000			
Trichloroethylene	79016	5	29	280,000	280	20,000	1,300	20,000	1,300	20,000	1,300			
2,4,6-Trichlorophenol	88062	3.2	2	130	130	160	25	160	25	160	25	3,000		
2,4,5-Trichlorophenoxy proprionic acid (2,4,5-TP)	93721	50		7,467	7,467									
Trihalomethanes (T)		80												
Tritium		20,000 pCi/L												
Uranium	7440611	30 D		2,800	2,800									
Vinyl chloride	75014	2	5	2	2,800									
Xylenes (T)	1330207	10,000		186,667	186,667									
Zinc	7440666	2,100 T	5,106 T	280,000 T	280,000 T	See (d) & Table ~~20~~ 9	See (d) & Table ~~20~~ 9	See (d) & Table ~~20~~ 9	See (d) & Table ~~20~~ 9	See (d) & Table ~~20~~ 9	See (d) & Table ~~20~~ 9	See (d) & Table ~~21~~ 9	10,000 T	25,000 T

Footnotes

a. The asbestos standard is 7 million fibers (longer than 10 micrometers) per liter.

b. The aldrin/dieldrin standard is exceeded when the sum of the two compounds exceeds 0.003 µg/L.

c. In lakes, the acute criteria for hydrogen sulfide apply only to water samples taken from the epilimnion, or the upper layer of a lake or reservoir.

d. Hardness, expressed as mg/L $CaCO_3$, is determined according to the following criteria:

   i. If the receiving water body has an A&Wc or A&Ww designated use, then hardness is based on the hardness of the receiving water body from a sample taken at the same time that the sample for the metal is taken, except that the hardness may not exceed 400 mg/L $CaCO_3$.

   ii. If the receiving water has an A&Wedw or A&We designated use, then the hardness is based on the hardness of the effluent from a sample taken at the same time that the sample for the metal is taken, except that the hardness may not exceed 400 mg/L $CaCO_3$.

   iii. The mathematical equations for the hardness-dependent parameter represent the water quality standards. Examples of criteria for the hardness-dependent parameters have been calculated and are presented in separate tables at the end of Appendix A for the convenience of the user.

e. pH is determined according to the following criteria:

i. If the receiving water has an A&Wc or A&Ww designated use, then pH is based on the pH of the receiving water body from a sample taken at the same time that the sample for pentachlorophenol or ammonia is taken.

ii. If the receiving water body has an A&Wedw or A&We designated use, then the pH is based on the pH of the effluent from a sample taken at the same time that the sample for pentachlorophenol or ammonia is taken.

iii. The mathematical equations for ammonia represent the water quality standards. Examples of criteria for ammonia have been calculated and are presented in separate tables at the end of Appendix A for the convenience of the user.

f. Table 1 abbreviations.

i. µg/L = micrograms per liter,

ii. mg/kg = milligrams per kilogram,

iii. pCi/L = picocuries per liter,

iv. D = dissolved,

v. T = total recoverable,

vi. TTHM indicates that the chemical is a trihalomethane.

g. The total trihalomethane (TTHM) standard is exceeded when the sum of these four compounds exceeds 80 µg/L, as a rolling annual average.

h The concentration of gross alpha particle activity includes radium-226, but excludes radon and uranium.

i. The average annual concentration of beta particle activity and photon emitters from manmade radionuclides shall not produce an annual dose equivalent to the total body or any internal organ greater than four millirems per year.

j. The mathematical equations for the pH-dependent parameters represent the water quality standards. Examples of criteria for the pH-dependent parameters have been calculated and are presented in separate tables at the end of Appendix A for the convenience of the user.

k. Abbreviations for the mathematical equations are as follows:

e = the base of the natural logarithm and is a mathematical constant equal to 2.71828

LN = is the natural logarithm

CMC = Criterion Maximum Concentration (acute)

CCC= Criterion Continuous Concentration (chronic)

~~Table 2. Acute Water Quality Standards for Dissolved Cadmium Aquatic and Wildlife coldwater~~

~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~
~~1~~	~~0.02~~	~~41~~	~~0.85~~	~~81~~	~~1.64~~	~~121~~	~~2.42~~	~~161~~	~~3.20~~	~~201~~	~~3.97~~	~~241~~	~~4.73~~	~~281~~	~~5.49~~	~~321~~	~~6.25~~	~~361~~	~~7.00~~
~~2~~	~~0.04~~	~~42~~	~~0.87~~	~~82~~	~~1.66~~	~~122~~	~~2.44~~	~~162~~	~~3.22~~	~~202~~	~~3.99~~	~~242~~	~~4.75~~	~~282~~	~~5.51~~	~~322~~	~~6.27~~	~~362~~	~~7.02~~
~~3~~	~~0.07~~	~~43~~	~~0.89~~	~~83~~	~~1.68~~	~~123~~	~~2.46~~	~~163~~	~~3.24~~	~~203~~	~~4.01~~	~~243~~	~~4.77~~	~~283~~	~~5.53~~	~~323~~	~~6.29~~	~~363~~	~~7.04~~
~~4~~	~~0.09~~	~~44~~	~~0.91~~	~~84~~	~~1.70~~	~~124~~	~~2.48~~	~~164~~	~~3.26~~	~~204~~	~~4.03~~	~~244~~	~~4.79~~	~~284~~	~~5.55~~	~~324~~	~~6.31~~	~~364~~	~~7.06~~
~~5~~	~~0.11~~	~~45~~	~~0.93~~	~~85~~	~~1.72~~	~~125~~	~~2.50~~	~~165~~	~~3.28~~	~~205~~	~~4.04~~	~~245~~	~~4.81~~	~~285~~	~~5.57~~	~~325~~	~~6.33~~	~~365~~	~~7.08~~
~~6~~	~~0.13~~	~~46~~	~~0.95~~	~~86~~	~~1.74~~	~~126~~	~~2.52~~	~~166~~	~~3.30~~	~~206~~	~~4.06~~	~~246~~	~~4.83~~	~~286~~	~~5.59~~	~~326~~	~~6.34~~	~~366~~	~~7.10~~
~~7~~	~~0.15~~	~~47~~	~~0.97~~	~~87~~	~~1.76~~	~~127~~	~~2.54~~	~~167~~	~~3.31~~	~~207~~	~~4.08~~	~~247~~	~~4.85~~	~~287~~	~~5.61~~	~~327~~	~~6.36~~	~~367~~	~~7.12~~
~~8~~	~~0.17~~	~~48~~	~~0.99~~	~~88~~	~~1.78~~	~~128~~	~~2.56~~	~~168~~	~~3.33~~	~~208~~	~~4.10~~	~~248~~	~~4.87~~	~~288~~	~~5.63~~	~~328~~	~~6.38~~	~~368~~	~~7.14~~
~~9~~	~~0.19~~	~~49~~	~~1.01~~	~~89~~	~~1.80~~	~~129~~	~~2.58~~	~~169~~	~~3.35~~	~~209~~	~~4.12~~	~~249~~	~~4.88~~	~~289~~	~~5.64~~	~~329~~	~~6.40~~	~~369~~	~~7.15~~
~~10~~	~~0.21~~	~~50~~	~~1.03~~	~~90~~	~~1.82~~	~~130~~	~~2.60~~	~~170~~	~~3.37~~	~~210~~	~~4.14~~	~~250~~	~~4.90~~	~~290~~	~~5.66~~	~~330~~	~~6.42~~	~~370~~	~~7.17~~
~~11~~	~~0.23~~	~~51~~	~~1.05~~	~~91~~	~~1.84~~	~~131~~	~~2.62~~	~~171~~	~~3.39~~	~~211~~	~~4.16~~	~~251~~	~~4.92~~	~~291~~	~~5.68~~	~~331~~	~~6.44~~	~~371~~	~~7.19~~

~~12~~	~~0.26~~	~~52~~	~~1.07~~	~~92~~	~~1.86~~	~~132~~	~~2.64~~	~~172~~	~~3.41~~	~~212~~	~~4.18~~	~~252~~	~~4.94~~	~~292~~	~~5.70~~	~~332~~	~~6.46~~	~~372~~	~~7.21~~
~~13~~	~~0.28~~	~~53~~	~~1.09~~	~~93~~	~~1.88~~	~~133~~	~~2.66~~	~~173~~	~~3.43~~	~~213~~	~~4.20~~	~~253~~	~~4.96~~	~~293~~	~~5.72~~	~~333~~	~~6.48~~	~~373~~	~~7.23~~
~~14~~	~~0.30~~	~~54~~	~~1.11~~	~~94~~	~~1.90~~	~~134~~	~~2.68~~	~~174~~	~~3.45~~	~~214~~	~~4.22~~	~~254~~	~~4.98~~	~~294~~	~~5.74~~	~~334~~	~~6.50~~	~~374~~	~~7.25~~
~~15~~	~~0.32~~	~~55~~	~~1.13~~	~~95~~	~~1.92~~	~~135~~	~~2.70~~	~~175~~	~~3.47~~	~~215~~	~~4.24~~	~~255~~	~~5.00~~	~~295~~	~~5.76~~	~~335~~	~~6.51~~	~~375~~	~~7.27~~
~~16~~	~~0.34~~	~~56~~	~~1.15~~	~~96~~	~~1.94~~	~~136~~	~~2.72~~	~~176~~	~~3.49~~	~~216~~	~~4.26~~	~~256~~	~~5.02~~	~~296~~	~~5.78~~	~~336~~	~~6.53~~	~~376~~	~~7.29~~
~~17~~	~~0.36~~	~~57~~	~~1.17~~	~~97~~	~~1.95~~	~~137~~	~~2.73~~	~~177~~	~~3.51~~	~~217~~	~~4.27~~	~~257~~	~~5.04~~	~~297~~	~~5.80~~	~~337~~	~~6.55~~	~~377~~	~~7.30~~
~~18~~	~~0.38~~	~~58~~	~~1.19~~	~~98~~	~~1.97~~	~~138~~	~~2.75~~	~~178~~	~~3.53~~	~~218~~	~~4.29~~	~~258~~	~~5.06~~	~~298~~	~~5.81~~	~~338~~	~~6.57~~	~~378~~	~~7.32~~
~~19~~	~~0.40~~	~~59~~	~~1.21~~	~~99~~	~~1.99~~	~~139~~	~~2.77~~	~~179~~	~~3.55~~	~~219~~	~~4.31~~	~~259~~	~~5.08~~	~~299~~	~~5.83~~	~~339~~	~~6.59~~	~~379~~	~~7.34~~
~~20~~	~~0.42~~	~~60~~	~~1.23~~	~~100~~	~~2.01~~	~~140~~	~~2.79~~	~~180~~	~~3.56~~	~~220~~	~~4.33~~	~~260~~	~~5.09~~	~~300~~	~~5.85~~	~~340~~	~~6.61~~	~~380~~	~~7.36~~
~~21~~	~~0.44~~	~~61~~	~~1.25~~	~~101~~	~~2.03~~	~~141~~	~~2.81~~	~~181~~	~~3.58~~	~~221~~	~~4.35~~	~~261~~	~~5.11~~	~~301~~	~~5.87~~	~~341~~	~~6.63~~	~~381~~	~~7.38~~
~~22~~	~~0.46~~	~~62~~	~~1.26~~	~~102~~	~~2.05~~	~~142~~	~~2.83~~	~~182~~	~~3.60~~	~~222~~	~~4.37~~	~~262~~	~~5.13~~	~~302~~	~~5.89~~	~~342~~	~~6.65~~	~~382~~	~~7.40~~
~~23~~	~~0.48~~	~~63~~	~~1.28~~	~~103~~	~~2.07~~	~~143~~	~~2.85~~	~~183~~	~~3.62~~	~~223~~	~~4.39~~	~~263~~	~~5.15~~	~~303~~	~~5.91~~	~~343~~	~~6.66~~	~~383~~	~~7.42~~
~~24~~	~~0.50~~	~~64~~	~~1.30~~	~~104~~	~~2.09~~	~~144~~	~~2.87~~	~~184~~	~~3.64~~	~~224~~	~~4.41~~	~~264~~	~~5.17~~	~~304~~	~~5.93~~	~~344~~	~~6.68~~	~~384~~	~~7.44~~
~~25~~	~~0.52~~	~~65~~	~~1.32~~	~~105~~	~~2.11~~	~~145~~	~~2.89~~	~~185~~	~~3.66~~	~~225~~	~~4.43~~	~~265~~	~~5.19~~	~~305~~	~~5.95~~	~~345~~	~~6.70~~	~~385~~	~~7.45~~
~~26~~	~~0.54~~	~~66~~	~~1.34~~	~~106~~	~~2.13~~	~~146~~	~~2.91~~	~~186~~	~~3.68~~	~~226~~	~~4.45~~	~~266~~	~~5.21~~	~~306~~	~~5.97~~	~~346~~	~~6.72~~	~~386~~	~~7.47~~
~~27~~	~~0.56~~	~~67~~	~~1.36~~	~~107~~	~~2.15~~	~~147~~	~~2.93~~	~~187~~	~~3.70~~	~~227~~	~~4.47~~	~~267~~	~~5.23~~	~~307~~	~~5.99~~	~~347~~	~~6.74~~	~~387~~	~~7.49~~
~~28~~	~~0.58~~	~~68~~	~~1.38~~	~~108~~	~~2.17~~	~~148~~	~~2.95~~	~~188~~	~~3.72~~	~~228~~	~~4.48~~	~~268~~	~~5.25~~	~~308~~	~~6.00~~	~~348~~	~~6.76~~	~~388~~	~~7.51~~
~~29~~	~~0.60~~	~~69~~	~~1.40~~	~~109~~	~~2.19~~	~~149~~	~~2.97~~	~~189~~	~~3.74~~	~~229~~	~~4.50~~	~~269~~	~~5.27~~	~~309~~	~~6.02~~	~~349~~	~~6.78~~	~~389~~	~~7.53~~
~~30~~	~~0.62~~	~~70~~	~~1.42~~	~~110~~	~~2.21~~	~~150~~	~~2.99~~	~~190~~	~~3.76~~	~~230~~	~~4.52~~	~~270~~	~~5.28~~	~~310~~	~~6.04~~	~~350~~	~~6.80~~	~~390~~	~~7.55~~
~~31~~	~~0.64~~	~~71~~	~~1.44~~	~~111~~	~~2.23~~	~~151~~	~~3.01~~	~~191~~	~~3.78~~	~~231~~	~~4.54~~	~~271~~	~~5.30~~	~~311~~	~~6.06~~	~~351~~	~~6.82~~	~~391~~	~~7.57~~
~~32~~	~~0.66~~	~~72~~	~~1.46~~	~~112~~	~~2.25~~	~~152~~	~~3.03~~	~~192~~	~~3.80~~	~~232~~	~~4.56~~	~~272~~	~~5.32~~	~~312~~	~~6.08~~	~~352~~	~~6.83~~	~~392~~	~~7.59~~
~~33~~	~~0.68~~	~~73~~	~~1.48~~	~~113~~	~~2.27~~	~~153~~	~~3.04~~	~~193~~	~~3.81~~	~~233~~	~~4.58~~	~~273~~	~~5.34~~	~~313~~	~~6.10~~	~~353~~	~~6.85~~	~~393~~	~~7.60~~
~~34~~	~~0.70~~	~~74~~	~~1.50~~	~~114~~	~~2.29~~	~~154~~	~~3.06~~	~~194~~	~~3.83~~	~~234~~	~~4.60~~	~~274~~	~~5.36~~	~~314~~	~~6.12~~	~~354~~	~~6.87~~	~~394~~	~~7.62~~
~~35~~	~~0.72~~	~~75~~	~~1.52~~	~~115~~	~~2.31~~	~~155~~	~~3.08~~	~~195~~	~~3.85~~	~~235~~	~~4.62~~	~~275~~	~~5.38~~	~~315~~	~~6.14~~	~~355~~	~~6.89~~	~~395~~	~~7.64~~
~~36~~	~~0.75~~	~~76~~	~~1.54~~	~~116~~	~~2.33~~	~~156~~	~~3.10~~	~~196~~	~~3.87~~	~~236~~	~~4.64~~	~~276~~	~~5.40~~	~~316~~	~~6.16~~	~~356~~	~~6.91~~	~~396~~	~~7.66~~
~~37~~	~~0.77~~	~~77~~	~~1.56~~	~~117~~	~~2.35~~	~~157~~	~~3.12~~	~~197~~	~~3.89~~	~~237~~	~~4.66~~	~~277~~	~~5.42~~	~~317~~	~~6.17~~	~~357~~	~~6.93~~	~~397~~	~~7.68~~
~~38~~	~~0.79~~	~~78~~	~~1.58~~	~~118~~	~~2.37~~	~~158~~	~~3.14~~	~~198~~	~~3.91~~	~~238~~	~~4.68~~	~~278~~	~~5.44~~	~~318~~	~~6.19~~	~~358~~	~~6.95~~	~~398~~	~~7.70~~
~~39~~	~~0.81~~	~~79~~	~~1.60~~	~~119~~	~~2.38~~	~~159~~	~~3.16~~	~~199~~	~~3.93~~	~~239~~	~~4.69~~	~~279~~	~~5.45~~	~~319~~	~~6.21~~	~~359~~	~~6.97~~	~~399~~	~~7.72~~
~~40~~	~~0.83~~	~~80~~	~~1.62~~	~~120~~	~~2.40~~	~~160~~	~~3.18~~	~~200~~	~~3.95~~	~~240~~	~~4.71~~	~~280~~	~~5.47~~	~~320~~	~~6.23~~	~~360~~	~~6.98~~	~~400~~	~~7.74~~

Table 2. Acute Water Quality Standards for Dissolved Cadmium

Aquatic and Wildlife coldwater		Aquatic and Wildlife warmwater, and edw		Aquatic and Wildlife ephemeral	
Hard. mg/L	**Std. µg/L**	**Hard. mg/L**	**Std. µg/L**	**Hard. mg/L**	**Std. µg/L.**
20	0.42	20	0.74	20	11.3
100	2.0	100	4.3	100	64.6
400	7.7	400	19.1	400	290
$e^{(1.0166*LN(Hardness)-3.924)}*(1.136672-LN(Hardness)*0.041838)$		$e^{(1.128*LN(Hardness)-3.6867)}*(1.136672-LN(Hardness)*0.041838)$		$e^{(1.128*LN(Hardness)-0.9691)}*(1.136672-LN(Hardness)*0.041838)$	

~~**Table 3. Chronic Water Quality Standards for Dissolved Cadmium Aquatic and Wildlife coldwater**~~

~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~Std. µg/L~~
~~1~~	~~0.01~~	~~41~~	~~0.13~~	~~81~~	~~0.21~~	~~121~~	~~0.28~~	~~161~~	~~0.34~~	~~201~~	~~0.40~~	~~241~~	~~0.45~~	~~281~~	~~0.50~~	~~321~~	~~0.55~~	~~361~~	~~0.60~~
~~2~~	~~0.02~~	~~42~~	~~0.13~~	~~82~~	~~0.21~~	~~122~~	~~0.28~~	~~162~~	~~0.34~~	~~202~~	~~0.40~~	~~242~~	~~0.45~~	~~282~~	~~0.50~~	~~322~~	~~0.55~~	~~362~~	~~0.60~~
~~3~~	~~0.02~~	~~43~~	~~0.14~~	~~83~~	~~0.22~~	~~123~~	~~0.28~~	~~163~~	~~0.35~~	~~203~~	~~0.40~~	~~243~~	~~0.46~~	~~283~~	~~0.51~~	~~323~~	~~0.55~~	~~363~~	~~0.60~~
~~4~~	~~0.03~~	~~44~~	~~0.14~~	~~84~~	~~0.22~~	~~124~~	~~0.29~~	~~164~~	~~0.35~~	~~204~~	~~0.40~~	~~244~~	~~0.46~~	~~284~~	~~0.51~~	~~324~~	~~0.56~~	~~364~~	~~0.60~~
~~5~~	~~0.03~~	~~45~~	~~0.14~~	~~85~~	~~0.22~~	~~125~~	~~0.29~~	~~165~~	~~0.35~~	~~205~~	~~0.40~~	~~245~~	~~0.46~~	~~285~~	~~0.51~~	~~325~~	~~0.56~~	~~365~~	~~0.60~~
~~6~~	~~0.03~~	~~46~~	~~0.14~~	~~86~~	~~0.22~~	~~126~~	~~0.29~~	~~166~~	~~0.35~~	~~206~~	~~0.41~~	~~246~~	~~0.46~~	~~286~~	~~0.51~~	~~326~~	~~0.56~~	~~366~~	~~0.60~~
~~7~~	~~0.04~~	~~47~~	~~0.15~~	~~87~~	~~0.22~~	~~127~~	~~0.29~~	~~167~~	~~0.35~~	~~207~~	~~0.41~~	~~247~~	~~0.46~~	~~287~~	~~0.51~~	~~327~~	~~0.56~~	~~367~~	~~0.61~~
~~8~~	~~0.04~~	~~48~~	~~0.15~~	~~88~~	~~0.23~~	~~128~~	~~0.29~~	~~168~~	~~0.35~~	~~208~~	~~0.41~~	~~248~~	~~0.46~~	~~288~~	~~0.51~~	~~328~~	~~0.56~~	~~368~~	~~0.61~~
~~9~~	~~0.05~~	~~49~~	~~0.15~~	~~89~~	~~0.23~~	~~129~~	~~0.29~~	~~169~~	~~0.35~~	~~209~~	~~0.41~~	~~249~~	~~0.46~~	~~289~~	~~0.51~~	~~329~~	~~0.56~~	~~369~~	~~0.61~~
~~10~~	~~0.05~~	~~50~~	~~0.15~~	~~90~~	~~0.23~~	~~130~~	~~0.30~~	~~170~~	~~0.36~~	~~210~~	~~0.41~~	~~250~~	~~0.46~~	~~290~~	~~0.51~~	~~330~~	~~0.56~~	~~370~~	~~0.61~~
~~11~~	~~0.05~~	~~51~~	~~0.15~~	~~91~~	~~0.23~~	~~131~~	~~0.30~~	~~171~~	~~0.36~~	~~211~~	~~0.41~~	~~251~~	~~0.47~~	~~291~~	~~0.52~~	~~331~~	~~0.56~~	~~371~~	~~0.61~~
~~12~~	~~0.06~~	~~52~~	~~0.16~~	~~92~~	~~0.23~~	~~132~~	~~0.30~~	~~172~~	~~0.36~~	~~212~~	~~0.41~~	~~252~~	~~0.47~~	~~292~~	~~0.52~~	~~332~~	~~0.57~~	~~372~~	~~0.61~~
~~13~~	~~0.06~~	~~53~~	~~0.16~~	~~93~~	~~0.23~~	~~133~~	~~0.30~~	~~173~~	~~0.36~~	~~213~~	~~0.42~~	~~253~~	~~0.47~~	~~293~~	~~0.52~~	~~333~~	~~0.57~~	~~373~~	~~0.61~~
~~14~~	~~0.06~~	~~54~~	~~0.16~~	~~94~~	~~0.24~~	~~134~~	~~0.30~~	~~174~~	~~0.36~~	~~214~~	~~0.42~~	~~254~~	~~0.47~~	~~294~~	~~0.52~~	~~334~~	~~0.57~~	~~374~~	~~0.61~~
~~15~~	~~0.07~~	~~55~~	~~0.16~~	~~95~~	~~0.24~~	~~135~~	~~0.30~~	~~175~~	~~0.36~~	~~215~~	~~0.42~~	~~255~~	~~0.47~~	~~295~~	~~0.52~~	~~335~~	~~0.57~~	~~375~~	~~0.62~~
~~16~~	~~0.07~~	~~56~~	~~0.16~~	~~96~~	~~0.24~~	~~136~~	~~0.30~~	~~176~~	~~0.36~~	~~216~~	~~0.42~~	~~256~~	~~0.47~~	~~296~~	~~0.52~~	~~336~~	~~0.57~~	~~376~~	~~0.62~~
~~17~~	~~0.07~~	~~57~~	~~0.17~~	~~97~~	~~0.24~~	~~137~~	~~0.31~~	~~177~~	~~0.37~~	~~217~~	~~0.42~~	~~257~~	~~0.47~~	~~297~~	~~0.52~~	~~337~~	~~0.57~~	~~377~~	~~0.62~~
~~18~~	~~0.07~~	~~58~~	~~0.17~~	~~98~~	~~0.24~~	~~138~~	~~0.31~~	~~178~~	~~0.37~~	~~218~~	~~0.42~~	~~258~~	~~0.47~~	~~298~~	~~0.52~~	~~338~~	~~0.57~~	~~378~~	~~0.62~~
~~19~~	~~0.08~~	~~59~~	~~0.17~~	~~99~~	~~0.24~~	~~139~~	~~0.31~~	~~179~~	~~0.37~~	~~219~~	~~0.42~~	~~259~~	~~0.48~~	~~299~~	~~0.53~~	~~339~~	~~0.57~~	~~379~~	~~0.62~~
~~20~~	~~0.08~~	~~60~~	~~0.17~~	~~100~~	~~0.25~~	~~140~~	~~0.31~~	~~180~~	~~0.37~~	~~220~~	~~0.43~~	~~260~~	~~0.48~~	~~300~~	~~0.53~~	~~340~~	~~0.57~~	~~380~~	~~0.62~~
~~21~~	~~0.08~~	~~61~~	~~0.17~~	~~101~~	~~0.25~~	~~141~~	~~0.31~~	~~181~~	~~0.37~~	~~221~~	~~0.43~~	~~261~~	~~0.48~~	~~301~~	~~0.53~~	~~341~~	~~0.58~~	~~381~~	~~0.62~~
~~22~~	~~0.09~~	~~62~~	~~0.18~~	~~102~~	~~0.25~~	~~142~~	~~0.31~~	~~182~~	~~0.37~~	~~222~~	~~0.43~~	~~262~~	~~0.48~~	~~302~~	~~0.53~~	~~342~~	~~0.58~~	~~382~~	~~0.62~~
~~23~~	~~0.09~~	~~63~~	~~0.18~~	~~103~~	~~0.25~~	~~143~~	~~0.32~~	~~183~~	~~0.37~~	~~223~~	~~0.43~~	~~263~~	~~0.48~~	~~303~~	~~0.53~~	~~343~~	~~0.58~~	~~383~~	~~0.62~~
~~24~~	~~0.09~~	~~64~~	~~0.18~~	~~104~~	~~0.25~~	~~144~~	~~0.32~~	~~184~~	~~0.38~~	~~224~~	~~0.43~~	~~264~~	~~0.48~~	~~304~~	~~0.53~~	~~344~~	~~0.58~~	~~384~~	~~0.63~~
~~25~~	~~0.09~~	~~65~~	~~0.18~~	~~105~~	~~0.25~~	~~145~~	~~0.32~~	~~185~~	~~0.38~~	~~225~~	~~0.43~~	~~265~~	~~0.48~~	~~305~~	~~0.53~~	~~345~~	~~0.58~~	~~385~~	~~0.63~~
~~26~~	~~0.10~~	~~66~~	~~0.18~~	~~106~~	~~0.26~~	~~146~~	~~0.32~~	~~186~~	~~0.38~~	~~226~~	~~0.43~~	~~266~~	~~0.48~~	~~306~~	~~0.53~~	~~346~~	~~0.58~~	~~386~~	~~0.63~~
~~27~~	~~0.10~~	~~67~~	~~0.19~~	~~107~~	~~0.26~~	~~147~~	~~0.32~~	~~187~~	~~0.38~~	~~227~~	~~0.43~~	~~267~~	~~0.49~~	~~307~~	~~0.54~~	~~347~~	~~0.58~~	~~387~~	~~0.63~~
~~28~~	~~0.10~~	~~68~~	~~0.19~~	~~108~~	~~0.26~~	~~148~~	~~0.32~~	~~188~~	~~0.38~~	~~228~~	~~0.44~~	~~268~~	~~0.49~~	~~308~~	~~0.54~~	~~348~~	~~0.58~~	~~388~~	~~0.63~~
~~29~~	~~0.10~~	~~69~~	~~0.19~~	~~109~~	~~0.26~~	~~149~~	~~0.32~~	~~189~~	~~0.38~~	~~229~~	~~0.44~~	~~269~~	~~0.49~~	~~309~~	~~0.54~~	~~349~~	~~0.59~~	~~389~~	~~0.63~~
~~30~~	~~0.11~~	~~70~~	~~0.19~~	~~110~~	~~0.26~~	~~150~~	~~0.33~~	~~190~~	~~0.38~~	~~230~~	~~0.44~~	~~270~~	~~0.49~~	~~310~~	~~0.54~~	~~350~~	~~0.59~~	~~390~~	~~0.63~~
~~31~~	~~0.11~~	~~71~~	~~0.19~~	~~111~~	~~0.26~~	~~151~~	~~0.33~~	~~191~~	~~0.39~~	~~231~~	~~0.44~~	~~271~~	~~0.49~~	~~311~~	~~0.54~~	~~351~~	~~0.59~~	~~391~~	~~0.63~~
~~32~~	~~0.11~~	~~72~~	~~0.20~~	~~112~~	~~0.27~~	~~152~~	~~0.33~~	~~192~~	~~0.39~~	~~232~~	~~0.44~~	~~272~~	~~0.49~~	~~312~~	~~0.54~~	~~352~~	~~0.59~~	~~392~~	~~0.63~~
~~33~~	~~0.11~~	~~73~~	~~0.20~~	~~113~~	~~0.27~~	~~153~~	~~0.33~~	~~193~~	~~0.39~~	~~233~~	~~0.44~~	~~273~~	~~0.49~~	~~313~~	~~0.54~~	~~353~~	~~0.59~~	~~393~~	~~0.64~~
~~34~~	~~0.12~~	~~74~~	~~0.20~~	~~114~~	~~0.27~~	~~154~~	~~0.33~~	~~194~~	~~0.39~~	~~234~~	~~0.44~~	~~274~~	~~0.50~~	~~314~~	~~0.54~~	~~354~~	~~0.59~~	~~394~~	~~0.64~~
~~35~~	~~0.12~~	~~75~~	~~0.20~~	~~115~~	~~0.27~~	~~155~~	~~0.33~~	~~195~~	~~0.39~~	~~235~~	~~0.45~~	~~275~~	~~0.50~~	~~315~~	~~0.55~~	~~355~~	~~0.59~~	~~395~~	~~0.64~~
~~36~~	~~0.12~~	~~76~~	~~0.20~~	~~116~~	~~0.27~~	~~156~~	~~0.33~~	~~196~~	~~0.39~~	~~236~~	~~0.45~~	~~276~~	~~0.50~~	~~316~~	~~0.55~~	~~356~~	~~0.59~~	~~396~~	~~0.64~~

~~37~~	~~0.12~~	~~77~~	~~0.21~~	~~117~~	~~0.27~~	~~157~~	~~0.34~~	~~197~~	~~0.39~~	~~237~~	~~0.45~~	~~277~~	~~0.50~~	~~317~~	~~0.55~~	~~357~~	~~0.59~~	~~397~~	~~0.64~~
~~38~~	~~0.13~~	~~78~~	~~0.21~~	~~118~~	~~0.28~~	~~158~~	~~0.34~~	~~198~~	~~0.40~~	~~238~~	~~0.45~~	~~278~~	~~0.50~~	~~318~~	~~0.55~~	~~358~~	~~0.60~~	~~398~~	~~0.64~~
~~39~~	~~0.13~~	~~79~~	~~0.21~~	~~119~~	~~0.28~~	~~159~~	~~0.34~~	~~199~~	~~0.40~~	~~239~~	~~0.45~~	~~279~~	~~0.50~~	~~319~~	~~0.55~~	~~359~~	~~0.60~~	~~399~~	~~0.64~~
~~40~~	~~0.13~~	~~80~~	~~0.21~~	~~120~~	~~0.28~~	~~160~~	~~0.34~~	~~200~~	~~0.40~~	~~240~~	~~0.45~~	~~280~~	~~0.50~~	~~320~~	~~0.55~~	~~360~~	~~0.60~~	~~400~~	~~0.64~~

Table 3. Chronic Water Quality Standards for Dissolved Cadmium

Aquatic and Wildlife coldwater			Aquatic and Wildlife warmwater, and edw	
Hard. mg/L	**Std. µg/L**		**Hard. mg/L**	**Std. µg/L**
20	0.08		20	0.68
100	0.25		100	2.2
400	0.64		400	6.2
$e^{(0.7409*LN(Hardness)-4.719)}*(1.101672-LN(Hardness)*0.041838)$			$e^{(0.7852*LN(Hardness)-2.715)}*(1.101672-LN(Hardness)*0.041838)$	

~~**Table 4. Acute Water Quality Standards for Dissolved Cadmium Aquatic and Wildlife warmwater, and edw**~~

~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~Std. µg/L~~
~~1~~	~~0.09~~	~~41~~	~~3.30~~	~~81~~	~~6.41~~	~~121~~	~~9.47~~	~~161~~	~~12.50~~	~~201~~	~~15.51~~	~~241~~	~~18.49~~	~~281~~	~~21.47~~	~~321~~	~~24.42~~	~~361~~	~~27.37~~
~~2~~	~~0.17~~	~~42~~	~~3.38~~	~~82~~	~~6.49~~	~~122~~	~~9.55~~	~~162~~	~~12.58~~	~~202~~	~~15.58~~	~~242~~	~~18.57~~	~~282~~	~~21.54~~	~~322~~	~~24.50~~	~~362~~	~~27.44~~
~~3~~	~~0.26~~	~~43~~	~~3.46~~	~~83~~	~~6.57~~	~~123~~	~~9.62~~	~~163~~	~~12.65~~	~~203~~	~~15.66~~	~~243~~	~~18.64~~	~~283~~	~~21.61~~	~~323~~	~~24.57~~	~~363~~	~~27.52~~
~~4~~	~~0.34~~	~~44~~	~~3.54~~	~~84~~	~~6.64~~	~~124~~	~~9.70~~	~~164~~	~~12.73~~	~~204~~	~~15.73~~	~~244~~	~~18.72~~	~~284~~	~~21.69~~	~~324~~	~~24.64~~	~~364~~	~~27.59~~
~~5~~	~~0.42~~	~~45~~	~~3.62~~	~~85~~	~~6.72~~	~~125~~	~~9.78~~	~~165~~	~~12.80~~	~~205~~	~~15.81~~	~~245~~	~~18.79~~	~~285~~	~~21.76~~	~~325~~	~~24.72~~	~~365~~	~~27.66~~
~~6~~	~~0.51~~	~~46~~	~~3.70~~	~~86~~	~~6.80~~	~~126~~	~~9.85~~	~~166~~	~~12.88~~	~~206~~	~~15.88~~	~~246~~	~~18.87~~	~~286~~	~~21.84~~	~~326~~	~~24.79~~	~~366~~	~~27.74~~
~~7~~	~~0.59~~	~~47~~	~~3.77~~	~~87~~	~~6.87~~	~~127~~	~~9.93~~	~~167~~	~~12.95~~	~~207~~	~~15.96~~	~~247~~	~~18.94~~	~~287~~	~~21.91~~	~~327~~	~~24.87~~	~~367~~	~~27.81~~
~~8~~	~~0.67~~	~~48~~	~~3.85~~	~~88~~	~~6.95~~	~~128~~	~~10.00~~	~~168~~	~~13.03~~	~~208~~	~~16.03~~	~~248~~	~~19.02~~	~~288~~	~~21.98~~	~~328~~	~~24.94~~	~~368~~	~~27.88~~
~~9~~	~~0.75~~	~~49~~	~~3.93~~	~~89~~	~~7.03~~	~~129~~	~~10.08~~	~~169~~	~~13.10~~	~~209~~	~~16.11~~	~~249~~	~~19.09~~	~~289~~	~~22.06~~	~~329~~	~~25.01~~	~~369~~	~~27.96~~
~~10~~	~~0.83~~	~~50~~	~~4.01~~	~~90~~	~~7.10~~	~~130~~	~~10.16~~	~~170~~	~~13.18~~	~~210~~	~~16.18~~	~~250~~	~~19.16~~	~~290~~	~~22.13~~	~~330~~	~~25.09~~	~~370~~	~~28.03~~
~~11~~	~~0.92~~	~~51~~	~~4.09~~	~~91~~	~~7.18~~	~~131~~	~~10.23~~	~~171~~	~~13.25~~	~~211~~	~~16.26~~	~~251~~	~~19.24~~	~~291~~	~~22.21~~	~~331~~	~~25.16~~	~~371~~	~~28.10~~
~~12~~	~~1.00~~	~~52~~	~~4.17~~	~~92~~	~~7.26~~	~~132~~	~~10.31~~	~~172~~	~~13.33~~	~~212~~	~~16.33~~	~~252~~	~~19.31~~	~~292~~	~~22.28~~	~~332~~	~~25.23~~	~~372~~	~~28.18~~
~~13~~	~~1.08~~	~~53~~	~~4.24~~	~~93~~	~~7.33~~	~~133~~	~~10.38~~	~~173~~	~~13.40~~	~~213~~	~~16.40~~	~~253~~	~~19.39~~	~~293~~	~~22.35~~	~~333~~	~~25.31~~	~~373~~	~~28.25~~
~~14~~	~~1.16~~	~~54~~	~~4.32~~	~~94~~	~~7.41~~	~~134~~	~~10.46~~	~~174~~	~~13.48~~	~~214~~	~~16.48~~	~~254~~	~~19.46~~	~~294~~	~~22.43~~	~~334~~	~~25.38~~	~~374~~	~~28.32~~
~~15~~	~~1.24~~	~~55~~	~~4.40~~	~~95~~	~~7.49~~	~~135~~	~~10.53~~	~~175~~	~~13.56~~	~~215~~	~~16.55~~	~~255~~	~~19.54~~	~~295~~	~~22.50~~	~~335~~	~~25.46~~	~~375~~	~~28.40~~
~~16~~	~~1.32~~	~~56~~	~~4.48~~	~~96~~	~~7.56~~	~~136~~	~~10.61~~	~~176~~	~~13.63~~	~~216~~	~~16.63~~	~~256~~	~~19.61~~	~~296~~	~~22.58~~	~~336~~	~~25.53~~	~~376~~	~~28.47~~
~~17~~	~~1.40~~	~~57~~	~~4.55~~	~~97~~	~~7.64~~	~~137~~	~~10.69~~	~~177~~	~~13.71~~	~~217~~	~~16.70~~	~~257~~	~~19.68~~	~~297~~	~~22.65~~	~~337~~	~~25.60~~	~~377~~	~~28.54~~
~~18~~	~~1.48~~	~~58~~	~~4.63~~	~~98~~	~~7.72~~	~~138~~	~~10.76~~	~~178~~	~~13.78~~	~~218~~	~~16.78~~	~~258~~	~~19.76~~	~~298~~	~~22.72~~	~~338~~	~~25.68~~	~~378~~	~~28.62~~
~~19~~	~~1.56~~	~~59~~	~~4.71~~	~~99~~	~~7.79~~	~~139~~	~~10.84~~	~~179~~	~~13.86~~	~~219~~	~~16.85~~	~~259~~	~~19.83~~	~~299~~	~~22.80~~	~~339~~	~~25.75~~	~~379~~	~~28.69~~
~~20~~	~~1.64~~	~~60~~	~~4.79~~	~~100~~	~~7.87~~	~~140~~	~~10.91~~	~~180~~	~~13.93~~	~~220~~	~~16.93~~	~~260~~	~~19.91~~	~~300~~	~~22.87~~	~~340~~	~~25.82~~	~~380~~	~~28.77~~
~~21~~	~~1.72~~	~~61~~	~~4.87~~	~~101~~	~~7.95~~	~~141~~	~~10.99~~	~~181~~	~~14.01~~	~~221~~	~~17.00~~	~~261~~	~~19.98~~	~~301~~	~~22.95~~	~~341~~	~~25.90~~	~~381~~	~~28.84~~
~~22~~	~~1.80~~	~~62~~	~~4.94~~	~~102~~	~~8.02~~	~~142~~	~~11.07~~	~~182~~	~~14.08~~	~~222~~	~~17.08~~	~~262~~	~~20.06~~	~~302~~	~~23.02~~	~~342~~	~~25.97~~	~~382~~	~~28.91~~
~~23~~	~~1.88~~	~~63~~	~~5.02~~	~~103~~	~~8.10~~	~~143~~	~~11.14~~	~~183~~	~~14.16~~	~~223~~	~~17.15~~	~~263~~	~~20.13~~	~~303~~	~~23.09~~	~~343~~	~~26.05~~	~~383~~	~~28.99~~
~~24~~	~~1.96~~	~~64~~	~~5.10~~	~~104~~	~~8.18~~	~~144~~	~~11.22~~	~~184~~	~~14.23~~	~~224~~	~~17.23~~	~~264~~	~~20.20~~	~~304~~	~~23.17~~	~~344~~	~~26.12~~	~~384~~	~~29.06~~

~~25~~	~~2.04~~	~~65~~	~~5.18~~	~~105~~	~~8.25~~	~~145~~	~~11.29~~	~~185~~	~~14.31~~	~~225~~	~~17.30~~	~~265~~	~~20.28~~	~~305~~	~~23.24~~	~~345~~	~~26.19~~	~~385~~	~~29.13~~
~~26~~	~~2.12~~	~~66~~	~~5.25~~	~~106~~	~~8.33~~	~~146~~	~~11.37~~	~~186~~	~~14.38~~	~~226~~	~~17.38~~	~~266~~	~~20.35~~	~~306~~	~~23.32~~	~~346~~	~~26.27~~	~~386~~	~~29.21~~
~~27~~	~~2.20~~	~~67~~	~~5.33~~	~~107~~	~~8.40~~	~~147~~	~~11.44~~	~~187~~	~~14.46~~	~~227~~	~~17.45~~	~~267~~	~~20.43~~	~~307~~	~~23.39~~	~~347~~	~~26.34~~	~~387~~	~~29.28~~
~~28~~	~~2.28~~	~~68~~	~~5.41~~	~~108~~	~~8.48~~	~~148~~	~~11.52~~	~~188~~	~~14.53~~	~~228~~	~~17.53~~	~~268~~	~~20.50~~	~~308~~	~~23.46~~	~~348~~	~~26.41~~	~~388~~	~~29.35~~
~~29~~	~~2.36~~	~~69~~	~~5.49~~	~~109~~	~~8.56~~	~~149~~	~~11.59~~	~~189~~	~~14.61~~	~~229~~	~~17.60~~	~~269~~	~~20.58~~	~~309~~	~~23.54~~	~~349~~	~~26.49~~	~~389~~	~~29.43~~
~~30~~	~~2.44~~	~~70~~	~~5.56~~	~~110~~	~~8.63~~	~~150~~	~~11.67~~	~~190~~	~~14.68~~	~~230~~	~~17.67~~	~~270~~	~~20.65~~	~~310~~	~~23.61~~	~~350~~	~~26.56~~	~~390~~	~~29.50~~
~~31~~	~~2.52~~	~~71~~	~~5.64~~	~~111~~	~~8.71~~	~~151~~	~~11.75~~	~~191~~	~~14.76~~	~~231~~	~~17.75~~	~~271~~	~~20.72~~	~~311~~	~~23.69~~	~~351~~	~~26.63~~	~~391~~	~~29.57~~
~~32~~	~~2.60~~	~~72~~	~~5.72~~	~~112~~	~~8.79~~	~~152~~	~~11.82~~	~~192~~	~~14.83~~	~~232~~	~~17.82~~	~~272~~	~~20.80~~	~~312~~	~~23.76~~	~~352~~	~~26.71~~	~~392~~	~~29.65~~
~~33~~	~~2.67~~	~~73~~	~~5.79~~	~~113~~	~~8.86~~	~~153~~	~~11.90~~	~~193~~	~~14.91~~	~~233~~	~~17.90~~	~~273~~	~~20.87~~	~~313~~	~~23.83~~	~~353~~	~~26.78~~	~~393~~	~~29.72~~
~~34~~	~~2.75~~	~~74~~	~~5.87~~	~~114~~	~~8.94~~	~~154~~	~~11.97~~	~~194~~	~~14.98~~	~~234~~	~~17.97~~	~~274~~	~~20.95~~	~~314~~	~~23.91~~	~~354~~	~~26.85~~	~~394~~	~~29.79~~
~~35~~	~~2.83~~	~~75~~	~~5.95~~	~~115~~	~~9.01~~	~~155~~	~~12.05~~	~~195~~	~~15.06~~	~~235~~	~~18.05~~	~~275~~	~~21.02~~	~~315~~	~~23.98~~	~~355~~	~~26.93~~	~~395~~	~~29.87~~
~~36~~	~~2.91~~	~~76~~	~~6.03~~	~~116~~	~~9.09~~	~~156~~	~~12.12~~	~~196~~	~~15.13~~	~~236~~	~~18.12~~	~~276~~	~~21.09~~	~~316~~	~~24.05~~	~~356~~	~~27.00~~	~~396~~	~~29.94~~
~~37~~	~~2.99~~	~~77~~	~~6.10~~	~~117~~	~~9.17~~	~~157~~	~~12.20~~	~~197~~	~~15.21~~	~~237~~	~~18.20~~	~~277~~	~~21.17~~	~~317~~	~~24.13~~	~~357~~	~~27.08~~	~~397~~	~~30.01~~
~~38~~	~~3.07~~	~~78~~	~~6.18~~	~~118~~	~~9.24~~	~~158~~	~~12.27~~	~~198~~	~~15.28~~	~~238~~	~~18.27~~	~~278~~	~~21.24~~	~~318~~	~~24.20~~	~~358~~	~~27.15~~	~~398~~	~~30.08~~
~~39~~	~~3.15~~	~~79~~	~~6.26~~	~~119~~	~~9.32~~	~~159~~	~~12.35~~	~~199~~	~~15.36~~	~~239~~	~~18.35~~	~~279~~	~~21.32~~	~~319~~	~~24.28~~	~~359~~	~~27.22~~	~~399~~	~~30.16~~
~~40~~	~~3.23~~	~~80~~	~~6.33~~	~~120~~	~~9.40~~	~~160~~	~~12.43~~	~~200~~	~~15.43~~	~~240~~	~~18.42~~	~~280~~	~~21.39~~	~~320~~	~~24.35~~	~~360~~	~~27.30~~	~~400~~	~~30.23~~

Table 4. Water Quality Standards for Dissolved Chromium III

Acute Aquatic and Wildlife coldwater, warmwater and edw		Chronic Aquatic and Wildlife coldwater, warmwater and edw		Acute Aquatic and Wildlife ephemeral	
Hard. mg/L	**Std. µg/L**	**Hard. mg/L**	**Std. µg/L**	**Hard. mg/L**	**Std. µg/L**
20	152	20	19.8	20	512
100	570	100	74.1	100	1912
400	1773	400	231	400	5950
$e^{(0.819*LN(Hardness)+3.7256)}*(0.316)$		$e^{(0.819*LN(Hardness)+0.6848)}*(0.86)$		$e^{(0.819*LN(Hardness)+4.9361)}*(0.316)$	

~~**Table 5. Chronic Water Quality Standards for Dissolved Cadmium Aquatic and Wildlife warmwater, and edw**~~

~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~STD. µG/L~~
~~1~~	~~0.02~~	~~41~~	~~0.30~~	~~81~~	~~0.48~~	~~121~~	~~0.64~~	~~161~~	~~0.78~~	~~201~~	~~0.91~~	~~241~~	~~1.03~~	~~281~~	~~1.15~~	~~321~~	~~1.26~~	~~361~~	~~1.37~~
~~2~~	~~0.04~~	~~42~~	~~0.31~~	~~82~~	~~0.49~~	~~122~~	~~0.64~~	~~162~~	~~0.78~~	~~202~~	~~0.91~~	~~242~~	~~1.04~~	~~282~~	~~1.15~~	~~322~~	~~1.26~~	~~362~~	~~1.37~~
~~3~~	~~0.05~~	~~43~~	~~0.31~~	~~83~~	~~0.49~~	~~123~~	~~0.65~~	~~163~~	~~0.79~~	~~203~~	~~0.92~~	~~243~~	~~1.04~~	~~283~~	~~1.16~~	~~323~~	~~1.27~~	~~363~~	~~1.37~~
~~4~~	~~0.06~~	~~44~~	~~0.32~~	~~84~~	~~0.50~~	~~124~~	~~0.65~~	~~164~~	~~0.79~~	~~204~~	~~0.92~~	~~244~~	~~1.04~~	~~284~~	~~1.16~~	~~324~~	~~1.27~~	~~364~~	~~1.38~~
~~5~~	~~0.07~~	~~45~~	~~0.32~~	~~85~~	~~0.50~~	~~125~~	~~0.66~~	~~165~~	~~0.79~~	~~205~~	~~0.92~~	~~245~~	~~1.05~~	~~285~~	~~1.16~~	~~325~~	~~1.27~~	~~365~~	~~1.38~~
~~6~~	~~0.08~~	~~46~~	~~0.33~~	~~86~~	~~0.51~~	~~126~~	~~0.66~~	~~166~~	~~0.80~~	~~206~~	~~0.93~~	~~246~~	~~1.05~~	~~286~~	~~1.16~~	~~326~~	~~1.27~~	~~366~~	~~1.38~~
~~7~~	~~0.09~~	~~47~~	~~0.33~~	~~87~~	~~0.51~~	~~127~~	~~0.66~~	~~167~~	~~0.80~~	~~207~~	~~0.93~~	~~247~~	~~1.05~~	~~287~~	~~1.17~~	~~327~~	~~1.28~~	~~367~~	~~1.38~~
~~8~~	~~0.10~~	~~48~~	~~0.34~~	~~88~~	~~0.51~~	~~128~~	~~0.67~~	~~168~~	~~0.80~~	~~208~~	~~0.93~~	~~248~~	~~1.05~~	~~288~~	~~1.17~~	~~328~~	~~1.28~~	~~368~~	~~1.39~~
~~9~~	~~0.10~~	~~49~~	~~0.34~~	~~89~~	~~0.52~~	~~129~~	~~0.67~~	~~169~~	~~0.81~~	~~209~~	~~0.94~~	~~249~~	~~1.06~~	~~289~~	~~1.17~~	~~329~~	~~1.28~~	~~369~~	~~1.39~~
~~10~~	~~0.11~~	~~50~~	~~0.35~~	~~90~~	~~0.52~~	~~130~~	~~0.67~~	~~170~~	~~0.81~~	~~210~~	~~0.94~~	~~250~~	~~1.06~~	~~290~~	~~1.17~~	~~330~~	~~1.28~~	~~370~~	~~1.39~~

~~11~~	~~0.12~~	~~51~~	~~0.35~~	~~91~~	~~0.53~~	~~131~~	~~0.68~~	~~171~~	~~0.81~~	~~211~~	~~0.94~~	~~251~~	~~1.06~~	~~291~~	~~1.18~~	~~331~~	~~1.29~~	~~371~~	~~1.39~~
~~12~~	~~0.13~~	~~52~~	~~0.36~~	~~92~~	~~0.53~~	~~132~~	~~0.68~~	~~172~~	~~0.82~~	~~212~~	~~0.95~~	~~252~~	~~1.07~~	~~292~~	~~1.18~~	~~332~~	~~1.29~~	~~372~~	~~1.40~~
~~13~~	~~0.14~~	~~53~~	~~0.36~~	~~93~~	~~0.53~~	~~133~~	~~0.68~~	~~173~~	~~0.82~~	~~213~~	~~0.95~~	~~253~~	~~1.07~~	~~293~~	~~1.18~~	~~333~~	~~1.29~~	~~373~~	~~1.40~~
~~14~~	~~0.14~~	~~54~~	~~0.37~~	~~94~~	~~0.54~~	~~134~~	~~0.69~~	~~174~~	~~0.82~~	~~214~~	~~0.95~~	~~254~~	~~1.07~~	~~294~~	~~1.19~~	~~334~~	~~1.30~~	~~374~~	~~1.40~~
~~15~~	~~0.15~~	~~55~~	~~0.37~~	~~95~~	~~0.54~~	~~135~~	~~0.69~~	~~175~~	~~0.83~~	~~215~~	~~0.95~~	~~255~~	~~1.07~~	~~295~~	~~1.19~~	~~335~~	~~1.30~~	~~375~~	~~1.40~~
~~16~~	~~0.16~~	~~56~~	~~0.38~~	~~96~~	~~0.55~~	~~136~~	~~0.69~~	~~176~~	~~0.83~~	~~216~~	~~0.96~~	~~256~~	~~1.08~~	~~296~~	~~1.19~~	~~336~~	~~1.30~~	~~376~~	~~1.41~~
~~17~~	~~0.16~~	~~57~~	~~0.38~~	~~97~~	~~0.55~~	~~137~~	~~0.70~~	~~177~~	~~0.83~~	~~217~~	~~0.96~~	~~257~~	~~1.08~~	~~297~~	~~1.19~~	~~337~~	~~1.30~~	~~377~~	~~1.41~~
~~18~~	~~0.17~~	~~58~~	~~0.38~~	~~98~~	~~0.55~~	~~138~~	~~0.70~~	~~178~~	~~0.84~~	~~218~~	~~0.96~~	~~258~~	~~1.08~~	~~298~~	~~1.20~~	~~338~~	~~1.31~~	~~378~~	~~1.41~~
~~19~~	~~0.18~~	~~59~~	~~0.39~~	~~99~~	~~0.56~~	~~139~~	~~0.71~~	~~179~~	~~0.84~~	~~219~~	~~0.97~~	~~259~~	~~1.09~~	~~299~~	~~1.20~~	~~339~~	~~1.31~~	~~379~~	~~1.41~~
~~20~~	~~0.18~~	~~60~~	~~0.39~~	~~100~~	~~0.56~~	~~140~~	~~0.71~~	~~180~~	~~0.84~~	~~220~~	~~0.97~~	~~260~~	~~1.09~~	~~300~~	~~1.20~~	~~340~~	~~1.31~~	~~380~~	~~1.42~~
~~21~~	~~0.19~~	~~61~~	~~0.40~~	~~101~~	~~0.57~~	~~141~~	~~0.71~~	~~181~~	~~0.85~~	~~221~~	~~0.97~~	~~261~~	~~1.09~~	~~301~~	~~1.21~~	~~341~~	~~1.31~~	~~381~~	~~1.42~~
~~22~~	~~0.20~~	~~62~~	~~0.40~~	~~102~~	~~0.57~~	~~142~~	~~0.72~~	~~182~~	~~0.85~~	~~222~~	~~0.98~~	~~262~~	~~1.10~~	~~302~~	~~1.21~~	~~342~~	~~1.32~~	~~382~~	~~1.42~~
~~23~~	~~0.20~~	~~63~~	~~0.41~~	~~103~~	~~0.57~~	~~143~~	~~0.72~~	~~183~~	~~0.85~~	~~223~~	~~0.98~~	~~263~~	~~1.10~~	~~303~~	~~1.21~~	~~343~~	~~1.32~~	~~383~~	~~1.42~~
~~24~~	~~0.21~~	~~64~~	~~0.41~~	~~104~~	~~0.58~~	~~144~~	~~0.72~~	~~184~~	~~0.86~~	~~224~~	~~0.98~~	~~264~~	~~1.10~~	~~304~~	~~1.21~~	~~344~~	~~1.32~~	~~384~~	~~1.43~~
~~25~~	~~0.21~~	~~65~~	~~0.42~~	~~105~~	~~0.58~~	~~145~~	~~0.73~~	~~185~~	~~0.86~~	~~225~~	~~0.99~~	~~265~~	~~1.10~~	~~305~~	~~1.22~~	~~345~~	~~1.32~~	~~385~~	~~1.43~~
~~26~~	~~0.22~~	~~66~~	~~0.42~~	~~106~~	~~0.58~~	~~146~~	~~0.73~~	~~186~~	~~0.86~~	~~226~~	~~0.99~~	~~266~~	~~1.11~~	~~306~~	~~1.22~~	~~346~~	~~1.33~~	~~386~~	~~1.43~~
~~27~~	~~0.23~~	~~67~~	~~0.42~~	~~107~~	~~0.59~~	~~147~~	~~0.73~~	~~187~~	~~0.87~~	~~227~~	~~0.99~~	~~267~~	~~1.11~~	~~307~~	~~1.22~~	~~347~~	~~1.33~~	~~387~~	~~1.43~~
~~28~~	~~0.23~~	~~68~~	~~0.43~~	~~108~~	~~0.59~~	~~148~~	~~0.74~~	~~188~~	~~0.87~~	~~228~~	~~0.99~~	~~268~~	~~1.11~~	~~308~~	~~1.22~~	~~348~~	~~1.33~~	~~388~~	~~1.44~~
~~29~~	~~0.24~~	~~69~~	~~0.43~~	~~109~~	~~0.60~~	~~149~~	~~0.74~~	~~189~~	~~0.87~~	~~229~~	~~1.00~~	~~269~~	~~1.12~~	~~309~~	~~1.23~~	~~349~~	~~1.34~~	~~389~~	~~1.44~~
~~30~~	~~0.24~~	~~70~~	~~0.44~~	~~110~~	~~0.60~~	~~150~~	~~0.74~~	~~190~~	~~0.88~~	~~230~~	~~1.00~~	~~270~~	~~1.12~~	~~310~~	~~1.23~~	~~350~~	~~1.34~~	~~390~~	~~1.44~~
~~31~~	~~0.25~~	~~71~~	~~0.44~~	~~111~~	~~0.60~~	~~151~~	~~0.75~~	~~191~~	~~0.88~~	~~231~~	~~1.00~~	~~271~~	~~1.12~~	~~311~~	~~1.23~~	~~351~~	~~1.34~~	~~391~~	~~1.44~~
~~32~~	~~0.25~~	~~72~~	~~0.45~~	~~112~~	~~0.61~~	~~152~~	~~0.75~~	~~192~~	~~0.88~~	~~232~~	~~1.01~~	~~272~~	~~1.12~~	~~312~~	~~1.24~~	~~352~~	~~1.34~~	~~392~~	~~1.45~~
~~33~~	~~0.26~~	~~73~~	~~0.45~~	~~113~~	~~0.61~~	~~153~~	~~0.75~~	~~193~~	~~0.89~~	~~233~~	~~1.01~~	~~273~~	~~1.13~~	~~313~~	~~1.24~~	~~353~~	~~1.35~~	~~393~~	~~1.45~~
~~34~~	~~0.26~~	~~74~~	~~0.46~~	~~114~~	~~0.61~~	~~154~~	~~0.76~~	~~194~~	~~0.89~~	~~234~~	~~1.01~~	~~274~~	~~1.13~~	~~314~~	~~1.24~~	~~354~~	~~1.35~~	~~394~~	~~1.45~~
~~35~~	~~0.27~~	~~75~~	~~0.46~~	~~115~~	~~0.62~~	~~155~~	~~0.76~~	~~195~~	~~0.89~~	~~235~~	~~1.02~~	~~275~~	~~1.13~~	~~315~~	~~1.24~~	~~355~~	~~1.35~~	~~395~~	~~1.46~~
~~36~~	~~0.28~~	~~76~~	~~0.46~~	~~116~~	~~0.62~~	~~156~~	~~0.76~~	~~196~~	~~0.90~~	~~236~~	~~1.02~~	~~276~~	~~1.14~~	~~316~~	~~1.25~~	~~356~~	~~1.35~~	~~396~~	~~1.46~~
~~37~~	~~0.28~~	~~77~~	~~0.47~~	~~117~~	~~0.63~~	~~157~~	~~0.77~~	~~197~~	~~0.90~~	~~237~~	~~1.02~~	~~277~~	~~1.14~~	~~317~~	~~1.25~~	~~357~~	~~1.36~~	~~397~~	~~1.46~~
~~38~~	~~0.29~~	~~78~~	~~0.47~~	~~118~~	~~0.63~~	~~158~~	~~0.77~~	~~198~~	~~0.90~~	~~238~~	~~1.02~~	~~278~~	~~1.14~~	~~318~~	~~1.25~~	~~358~~	~~1.36~~	~~398~~	~~1.46~~
~~39~~	~~0.29~~	~~79~~	~~0.48~~	~~119~~	~~0.63~~	~~159~~	~~0.77~~	~~199~~	~~0.91~~	~~239~~	~~1.03~~	~~279~~	~~1.14~~	~~319~~	~~1.26~~	~~359~~	~~1.36~~	~~399~~	~~1.47~~
~~40~~	~~0.30~~	~~80~~	~~0.48~~	~~120~~	~~0.64~~	~~160~~	~~0.78~~	~~200~~	~~0.91~~	~~240~~	~~1.03~~	~~280~~	~~1.15~~	~~320~~	~~1.26~~	~~360~~	~~1.36~~	~~400~~	~~1.47~~

Table 5. Water Quality Standards for Dissolved Copper

Acute Aquatic and Wildlife coldwater, warmwater and edw		Chronic Aquatic and Wildlife coldwater, warmwater and edw		Acute Aquatic and Wildlife ephemeral	
Hard. mg/L	**Std. µg/L**	**Hard. mg/L**	**Std. µg/L**	**Hard. mg/L**	**Std. µg/L**
20	2.9	20	2.3	20	5.1
100	13.4	100	9.0	100	23.3
400	49.6	400	29.3	400	85.9
$e^{(0.9422*LN(Hardness)-1.702)}*(0.96)$		$e^{(0.8545*LN(Hardness)-1.702)}*(0.96)$		$e^{(0.9422*LN(Hardness)-1.1514)}*(0.96)$	

~~**Table 6. Acute Water Quality Standards for Dissolved Cadmium Aquatic and Wildlife ephemeral**~~

~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~Std. µg/L~~
~~1~~	~~0.25~~	~~41~~	~~9.58~~	~~81~~	~~18.58~~	~~121~~	~~27.45~~	~~161~~	~~36.23~~	~~201~~	~~44.94~~	~~241~~	~~53.59~~	~~281~~	~~62.21~~	~~321~~	~~70.78~~	~~361~~	~~79.32~~
~~2~~	~~0.50~~	~~42~~	~~9.80~~	~~82~~	~~18.80~~	~~122~~	~~27.67~~	~~162~~	~~36.45~~	~~202~~	~~45.15~~	~~242~~	~~53.81~~	~~282~~	~~62.42~~	~~322~~	~~70.99~~	~~362~~	~~79.53~~
~~3~~	~~0.75~~	~~43~~	~~10.03~~	~~83~~	~~19.03~~	~~123~~	~~27.89~~	~~163~~	~~36.66~~	~~203~~	~~45.37~~	~~243~~	~~54.03~~	~~283~~	~~62.64~~	~~323~~	~~71.21~~	~~363~~	~~79.74~~
~~4~~	~~0.99~~	~~44~~	~~10.26~~	~~84~~	~~19.25~~	~~124~~	~~28.11~~	~~164~~	~~36.88~~	~~204~~	~~45.59~~	~~244~~	~~54.24~~	~~284~~	~~62.85~~	~~324~~	~~71.42~~	~~364~~	~~79.95~~
~~5~~	~~1.23~~	~~45~~	~~10.49~~	~~85~~	~~19.47~~	~~125~~	~~28.33~~	~~165~~	~~37.10~~	~~205~~	~~45.81~~	~~245~~	~~54.46~~	~~285~~	~~63.06~~	~~325~~	~~71.63~~	~~365~~	~~80.17~~
~~6~~	~~1.47~~	~~46~~	~~10.71~~	~~86~~	~~19.69~~	~~126~~	~~28.55~~	~~166~~	~~37.32~~	~~206~~	~~46.02~~	~~246~~	~~54.67~~	~~286~~	~~63.28~~	~~326~~	~~71.85~~	~~366~~	~~80.38~~
~~7~~	~~1.71~~	~~47~~	~~10.94~~	~~87~~	~~19.92~~	~~127~~	~~28.77~~	~~167~~	~~37.54~~	~~207~~	~~46.24~~	~~247~~	~~54.89~~	~~287~~	~~63.49~~	~~327~~	~~72.06~~	~~367~~	~~80.59~~
~~8~~	~~1.95~~	~~48~~	~~11.17~~	~~88~~	~~20.14~~	~~128~~	~~28.99~~	~~168~~	~~37.76~~	~~208~~	~~46.46~~	~~248~~	~~55.10~~	~~288~~	~~63.71~~	~~328~~	~~72.27~~	~~368~~	~~80.81~~
~~9~~	~~2.18~~	~~49~~	~~11.39~~	~~89~~	~~20.36~~	~~129~~	~~29.21~~	~~169~~	~~37.97~~	~~209~~	~~46.67~~	~~249~~	~~55.32~~	~~289~~	~~63.92~~	~~329~~	~~72.49~~	~~369~~	~~81.02~~
~~10~~	~~2.42~~	~~50~~	~~11.62~~	~~90~~	~~20.58~~	~~130~~	~~29.43~~	~~170~~	~~38.19~~	~~210~~	~~46.89~~	~~250~~	~~55.54~~	~~290~~	~~64.14~~	~~330~~	~~72.70~~	~~370~~	~~81.23~~
~~11~~	~~2.65~~	~~51~~	~~11.84~~	~~91~~	~~20.81~~	~~131~~	~~29.65~~	~~171~~	~~38.41~~	~~211~~	~~47.11~~	~~251~~	~~55.75~~	~~291~~	~~64.35~~	~~331~~	~~72.92~~	~~371~~	~~81.44~~
~~12~~	~~2.89~~	~~52~~	~~12.07~~	~~92~~	~~21.03~~	~~132~~	~~29.87~~	~~172~~	~~38.63~~	~~212~~	~~47.32~~	~~252~~	~~55.97~~	~~292~~	~~64.57~~	~~332~~	~~73.13~~	~~372~~	~~81.66~~
~~13~~	~~3.13~~	~~53~~	~~12.30~~	~~93~~	~~21.25~~	~~133~~	~~30.09~~	~~173~~	~~38.85~~	~~213~~	~~47.54~~	~~253~~	~~56.18~~	~~293~~	~~64.78~~	~~333~~	~~73.34~~	~~373~~	~~81.87~~
~~14~~	~~3.36~~	~~54~~	~~12.52~~	~~94~~	~~21.47~~	~~134~~	~~30.31~~	~~174~~	~~39.06~~	~~214~~	~~47.76~~	~~254~~	~~56.40~~	~~294~~	~~65.00~~	~~334~~	~~73.56~~	~~374~~	~~82.08~~
~~15~~	~~3.59~~	~~55~~	~~12.75~~	~~95~~	~~21.70~~	~~135~~	~~30.53~~	~~175~~	~~39.28~~	~~215~~	~~47.97~~	~~255~~	~~56.61~~	~~295~~	~~65.21~~	~~335~~	~~73.77~~	~~375~~	~~82.30~~
~~16~~	~~3.83~~	~~56~~	~~12.97~~	~~96~~	~~21.92~~	~~136~~	~~30.75~~	~~176~~	~~39.50~~	~~216~~	~~48.19~~	~~256~~	~~56.83~~	~~296~~	~~65.42~~	~~336~~	~~73.98~~	~~376~~	~~82.51~~
~~17~~	~~4.06~~	~~57~~	~~13.20~~	~~97~~	~~22.14~~	~~137~~	~~30.97~~	~~177~~	~~39.72~~	~~217~~	~~48.41~~	~~257~~	~~57.04~~	~~297~~	~~65.64~~	~~337~~	~~74.20~~	~~377~~	~~82.72~~
~~18~~	~~4.29~~	~~58~~	~~13.42~~	~~98~~	~~22.36~~	~~138~~	~~31.19~~	~~178~~	~~39.94~~	~~218~~	~~48.62~~	~~258~~	~~57.26~~	~~298~~	~~65.85~~	~~338~~	~~74.41~~	~~378~~	~~82.93~~
~~19~~	~~4.53~~	~~59~~	~~13.65~~	~~99~~	~~22.58~~	~~139~~	~~31.41~~	~~179~~	~~40.15~~	~~219~~	~~48.84~~	~~259~~	~~57.48~~	~~299~~	~~66.07~~	~~339~~	~~74.62~~	~~379~~	~~83.15~~
~~20~~	~~4.76~~	~~60~~	~~13.87~~	~~100~~	~~22.81~~	~~140~~	~~31.63~~	~~180~~	~~40.37~~	~~220~~	~~49.06~~	~~260~~	~~57.69~~	~~300~~	~~66.28~~	~~340~~	~~74.84~~	~~380~~	~~83.36~~
~~21~~	~~4.99~~	~~61~~	~~14.10~~	~~101~~	~~23.03~~	~~141~~	~~31.85~~	~~181~~	~~40.59~~	~~221~~	~~49.27~~	~~261~~	~~57.91~~	~~301~~	~~66.50~~	~~341~~	~~75.05~~	~~381~~	~~83.57~~
~~22~~	~~5.22~~	~~62~~	~~14.32~~	~~102~~	~~23.25~~	~~142~~	~~32.07~~	~~182~~	~~40.81~~	~~222~~	~~49.49~~	~~262~~	~~58.12~~	~~302~~	~~66.71~~	~~342~~	~~75.26~~	~~382~~	~~83.78~~
~~23~~	~~5.45~~	~~63~~	~~14.55~~	~~103~~	~~23.47~~	~~143~~	~~32.29~~	~~183~~	~~41.03~~	~~223~~	~~49.71~~	~~263~~	~~58.34~~	~~303~~	~~66.93~~	~~343~~	~~75.48~~	~~383~~	~~84.00~~
~~24~~	~~5.68~~	~~64~~	~~14.77~~	~~104~~	~~23.69~~	~~144~~	~~32.50~~	~~184~~	~~41.24~~	~~224~~	~~49.92~~	~~264~~	~~58.55~~	~~304~~	~~67.14~~	~~344~~	~~75.69~~	~~384~~	~~84.21~~
~~25~~	~~5.91~~	~~65~~	~~15.00~~	~~105~~	~~23.91~~	~~145~~	~~32.72~~	~~185~~	~~41.46~~	~~225~~	~~50.14~~	~~265~~	~~58.77~~	~~305~~	~~67.35~~	~~345~~	~~75.90~~	~~385~~	~~84.42~~
~~26~~	~~6.14~~	~~66~~	~~15.22~~	~~106~~	~~24.13~~	~~146~~	~~32.94~~	~~186~~	~~41.68~~	~~226~~	~~50.35~~	~~266~~	~~58.98~~	~~306~~	~~67.57~~	~~346~~	~~76.12~~	~~386~~	~~84.64~~
~~27~~	~~6.37~~	~~67~~	~~15.45~~	~~107~~	~~24.36~~	~~147~~	~~33.16~~	~~187~~	~~41.90~~	~~227~~	~~50.57~~	~~267~~	~~59.20~~	~~307~~	~~67.78~~	~~347~~	~~76.33~~	~~387~~	~~84.85~~
~~28~~	~~6.60~~	~~68~~	~~15.67~~	~~108~~	~~24.58~~	~~148~~	~~33.38~~	~~188~~	~~42.11~~	~~228~~	~~50.79~~	~~268~~	~~59.41~~	~~308~~	~~68.00~~	~~348~~	~~76.54~~	~~388~~	~~85.06~~
~~29~~	~~6.83~~	~~69~~	~~15.90~~	~~109~~	~~24.80~~	~~149~~	~~33.60~~	~~189~~	~~42.33~~	~~229~~	~~51.00~~	~~269~~	~~59.63~~	~~309~~	~~68.21~~	~~349~~	~~76.76~~	~~389~~	~~85.27~~
~~30~~	~~7.06~~	~~70~~	~~16.12~~	~~110~~	~~25.02~~	~~150~~	~~33.82~~	~~190~~	~~42.55~~	~~230~~	~~51.22~~	~~270~~	~~59.84~~	~~310~~	~~68.42~~	~~350~~	~~76.97~~	~~390~~	~~85.49~~
~~31~~	~~7.29~~	~~71~~	~~16.34~~	~~111~~	~~25.24~~	~~151~~	~~34.04~~	~~191~~	~~42.77~~	~~231~~	~~51.44~~	~~271~~	~~60.06~~	~~311~~	~~68.64~~	~~351~~	~~77.18~~	~~391~~	~~85.70~~
~~32~~	~~7.52~~	~~72~~	~~16.57~~	~~112~~	~~25.46~~	~~152~~	~~34.26~~	~~192~~	~~42.98~~	~~232~~	~~51.65~~	~~272~~	~~60.27~~	~~312~~	~~68.85~~	~~352~~	~~77.40~~	~~392~~	~~85.91~~
~~33~~	~~7.75~~	~~73~~	~~16.79~~	~~113~~	~~25.68~~	~~153~~	~~34.48~~	~~193~~	~~43.20~~	~~233~~	~~51.87~~	~~273~~	~~60.49~~	~~313~~	~~69.07~~	~~353~~	~~77.61~~	~~393~~	~~86.12~~
~~34~~	~~7.98~~	~~74~~	~~17.02~~	~~114~~	~~25.90~~	~~154~~	~~34.70~~	~~194~~	~~43.42~~	~~234~~	~~52.08~~	~~274~~	~~60.70~~	~~314~~	~~69.28~~	~~354~~	~~77.82~~	~~394~~	~~86.33~~
~~35~~	~~8.21~~	~~75~~	~~17.24~~	~~115~~	~~26.12~~	~~155~~	~~34.91~~	~~195~~	~~43.63~~	~~235~~	~~52.30~~	~~275~~	~~60.92~~	~~315~~	~~69.49~~	~~355~~	~~78.04~~	~~395~~	~~86.55~~
~~36~~	~~8.44~~	~~76~~	~~17.46~~	~~116~~	~~26.34~~	~~156~~	~~35.13~~	~~196~~	~~43.85~~	~~236~~	~~52.52~~	~~276~~	~~61.13~~	~~316~~	~~69.71~~	~~356~~	~~78.25~~	~~396~~	~~86.76~~

~~37~~	~~8.67~~	~~77~~	~~17.69~~	~~117~~	~~26.57~~	~~157~~	~~35.35~~	~~197~~	~~44.07~~	~~237~~	~~52.73~~	~~277~~	~~61.35~~	~~317~~	~~69.92~~	~~357~~	~~78.46~~	~~397~~	~~86.97~~
~~38~~	~~8.89~~	~~78~~	~~17.91~~	~~118~~	~~26.79~~	~~158~~	~~35.57~~	~~198~~	~~44.29~~	~~238~~	~~52.95~~	~~278~~	~~61.56~~	~~318~~	~~70.14~~	~~358~~	~~78.68~~	~~398~~	~~87.18~~
~~39~~	~~9.12~~	~~79~~	~~18.13~~	~~119~~	~~27.01~~	~~159~~	~~35.79~~	~~199~~	~~44.50~~	~~239~~	~~53.16~~	~~279~~	~~61.78~~	~~319~~	~~70.35~~	~~359~~	~~78.89~~	~~399~~	~~87.40~~
~~40~~	~~9.35~~	~~80~~	~~18.36~~	~~120~~	~~27.23~~	~~160~~	~~36.01~~	~~200~~	~~44.72~~	~~240~~	~~53.38~~	~~280~~	~~61.99~~	~~320~~	~~70.56~~	~~360~~	~~79.10~~	~~400~~	~~87.61~~

Table 6. Water Quality Standards for Dissolved Lead

Acute Aquatic and Wildlife coldwater, warmwater and edw		Chronic Aquatic and Wildlife coldwater, warmwater and edw		Acute Aquatic and Wildlife ephemeral	
Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L
20	10.8	20	0.4	20	22.8
100	64.6	100	2.5	100	136.3
400	281	400	10.9	400	592.7
$e^{(1.273*LN(Hardness)-1.46)}*(1.46203-(LN(Hardness))*(0.145712))$		$e^{(1.273*LN(Hardness)-4.705)}*(1.46203-(LN(Hardness))*(0.145712))$		$e^{(1.273*(LN(Hardness))-0.7131)}*(1.46203-(LN(Hardness))*(0.145712))$	

~~**Table 7. Acute Water Quality Standards for Dissolved Chromium III Aquatic and Wildlife coldwater, warmwater and edw**~~

~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~Std. µg/L~~	~~Hard mg/L~~	~~Std. µg/L~~
~~1~~	~~13~~	~~41~~	~~275~~	~~81~~	~~479~~	~~121~~	~~666~~	~~161~~	~~842~~	~~201~~	~~1009~~	~~241~~	~~1171~~	~~281~~	~~1328~~	~~321~~	~~1481~~	~~361~~	~~1630~~
~~2~~	~~23~~	~~42~~	~~280~~	~~82~~	~~484~~	~~122~~	~~671~~	~~162~~	~~846~~	~~202~~	~~1013~~	~~242~~	~~1175~~	~~282~~	~~1332~~	~~322~~	~~1485~~	~~362~~	~~1634~~
~~3~~	~~32~~	~~43~~	~~285~~	~~83~~	~~489~~	~~123~~	~~675~~	~~163~~	~~850~~	~~203~~	~~1017~~	~~243~~	~~1179~~	~~283~~	~~1336~~	~~323~~	~~1488~~	~~363~~	~~1638~~
~~4~~	~~41~~	~~44~~	~~291~~	~~84~~	~~494~~	~~124~~	~~680~~	~~164~~	~~854~~	~~204~~	~~1022~~	~~244~~	~~1183~~	~~284~~	~~1340~~	~~324~~	~~1492~~	~~364~~	~~1641~~
~~5~~	~~49~~	~~45~~	~~296~~	~~85~~	~~499~~	~~125~~	~~684~~	~~165~~	~~859~~	~~205~~	~~1026~~	~~245~~	~~1187~~	~~285~~	~~1343~~	~~325~~	~~1496~~	~~365~~	~~1645~~
~~6~~	~~57~~	~~46~~	~~302~~	~~86~~	~~504~~	~~126~~	~~688~~	~~166~~	~~863~~	~~206~~	~~1030~~	~~246~~	~~1191~~	~~286~~	~~1347~~	~~326~~	~~1500~~	~~366~~	~~1649~~
~~7~~	~~65~~	~~47~~	~~307~~	~~87~~	~~508~~	~~127~~	~~693~~	~~167~~	~~867~~	~~207~~	~~1034~~	~~247~~	~~1195~~	~~287~~	~~1351~~	~~327~~	~~1504~~	~~367~~	~~1653~~
~~8~~	~~72~~	~~48~~	~~312~~	~~88~~	~~513~~	~~128~~	~~697~~	~~168~~	~~871~~	~~208~~	~~1038~~	~~248~~	~~1199~~	~~288~~	~~1355~~	~~328~~	~~1507~~	~~368~~	~~1656~~
~~9~~	~~79~~	~~49~~	~~318~~	~~89~~	~~518~~	~~129~~	~~702~~	~~169~~	~~876~~	~~209~~	~~1042~~	~~249~~	~~1203~~	~~289~~	~~1359~~	~~329~~	~~1511~~	~~369~~	~~1660~~
~~10~~	~~86~~	~~50~~	~~323~~	~~90~~	~~523~~	~~130~~	~~706~~	~~170~~	~~880~~	~~210~~	~~1046~~	~~250~~	~~1207~~	~~290~~	~~1363~~	~~330~~	~~1515~~	~~370~~	~~1664~~
~~11~~	~~93~~	~~51~~	~~328~~	~~91~~	~~527~~	~~131~~	~~711~~	~~171~~	~~884~~	~~211~~	~~1050~~	~~251~~	~~1211~~	~~291~~	~~1367~~	~~331~~	~~1519~~	~~371~~	~~1667~~
~~12~~	~~100~~	~~52~~	~~334~~	~~92~~	~~532~~	~~132~~	~~715~~	~~172~~	~~888~~	~~212~~	~~1054~~	~~252~~	~~1215~~	~~292~~	~~1370~~	~~332~~	~~1522~~	~~372~~	~~1671~~
~~13~~	~~107~~	~~53~~	~~339~~	~~93~~	~~537~~	~~133~~	~~720~~	~~173~~	~~893~~	~~213~~	~~1058~~	~~253~~	~~1219~~	~~293~~	~~1374~~	~~333~~	~~1526~~	~~373~~	~~1675~~
~~14~~	~~114~~	~~54~~	~~344~~	~~94~~	~~542~~	~~134~~	~~724~~	~~174~~	~~897~~	~~214~~	~~1062~~	~~254~~	~~1223~~	~~294~~	~~1378~~	~~334~~	~~1530~~	~~374~~	~~1678~~
~~15~~	~~120~~	~~55~~	~~349~~	~~95~~	~~546~~	~~135~~	~~729~~	~~175~~	~~901~~	~~215~~	~~1067~~	~~255~~	~~1226~~	~~295~~	~~1382~~	~~335~~	~~1534~~	~~375~~	~~1682~~
~~16~~	~~127~~	~~56~~	~~354~~	~~96~~	~~551~~	~~136~~	~~733~~	~~176~~	~~905~~	~~216~~	~~1071~~	~~256~~	~~1230~~	~~296~~	~~1386~~	~~336~~	~~1537~~	~~376~~	~~1686~~
~~17~~	~~133~~	~~57~~	~~360~~	~~97~~	~~556~~	~~137~~	~~737~~	~~177~~	~~909~~	~~217~~	~~1075~~	~~257~~	~~1234~~	~~297~~	~~1390~~	~~337~~	~~1541~~	~~377~~	~~1689~~
~~18~~	~~140~~	~~58~~	~~365~~	~~98~~	~~560~~	~~138~~	~~742~~	~~178~~	~~914~~	~~218~~	~~1079~~	~~258~~	~~1238~~	~~298~~	~~1393~~	~~338~~	~~1545~~	~~378~~	~~1693~~
~~19~~	~~146~~	~~59~~	~~370~~	~~99~~	~~565~~	~~139~~	~~746~~	~~179~~	~~918~~	~~219~~	~~1083~~	~~259~~	~~1242~~	~~299~~	~~1397~~	~~339~~	~~1549~~	~~379~~	~~1697~~
~~20~~	~~152~~	~~60~~	~~375~~	~~100~~	~~570~~	~~140~~	~~751~~	~~180~~	~~922~~	~~220~~	~~1087~~	~~260~~	~~1246~~	~~300~~	~~1401~~	~~340~~	~~1552~~	~~380~~	~~1700~~
~~21~~	~~159~~	~~61~~	~~380~~	~~101~~	~~574~~	~~141~~	~~755~~	~~181~~	~~926~~	~~221~~	~~1091~~	~~261~~	~~1250~~	~~301~~	~~1405~~	~~341~~	~~1556~~	~~381~~	~~1704~~

~~22~~	~~165~~	~~62~~	~~385~~	~~102~~	~~579~~	~~142~~	~~759~~	~~182~~	~~930~~	~~222~~	~~1095~~	~~262~~	~~1254~~	~~302~~	~~1409~~	~~342~~	~~1560~~	~~382~~	~~1708~~
~~23~~	~~171~~	~~63~~	~~390~~	~~103~~	~~584~~	~~143~~	~~764~~	~~183~~	~~935~~	~~223~~	~~1099~~	~~263~~	~~1258~~	~~303~~	~~1413~~	~~343~~	~~1564~~	~~383~~	~~1711~~
~~24~~	~~177~~	~~64~~	~~395~~	~~104~~	~~588~~	~~144~~	~~768~~	~~184~~	~~939~~	~~224~~	~~1103~~	~~264~~	~~1262~~	~~304~~	~~1416~~	~~344~~	~~1567~~	~~384~~	~~1715~~
~~25~~	~~183~~	~~65~~	~~400~~	~~105~~	~~593~~	~~145~~	~~772~~	~~185~~	~~943~~	~~225~~	~~1107~~	~~265~~	~~1266~~	~~305~~	~~1420~~	~~345~~	~~1571~~	~~385~~	~~1719~~
~~26~~	~~189~~	~~66~~	~~405~~	~~106~~	~~598~~	~~146~~	~~777~~	~~186~~	~~947~~	~~226~~	~~1111~~	~~266~~	~~1270~~	~~306~~	~~1424~~	~~346~~	~~1575~~	~~386~~	~~1722~~
~~27~~	~~195~~	~~67~~	~~410~~	~~107~~	~~602~~	~~147~~	~~781~~	~~187~~	~~951~~	~~227~~	~~1115~~	~~267~~	~~1274~~	~~307~~	~~1428~~	~~347~~	~~1578~~	~~387~~	~~1726~~
~~28~~	~~201~~	~~68~~	~~415~~	~~108~~	~~607~~	~~148~~	~~785~~	~~188~~	~~955~~	~~228~~	~~1119~~	~~268~~	~~1277~~	~~308~~	~~1432~~	~~348~~	~~1582~~	~~388~~	~~1730~~
~~29~~	~~207~~	~~69~~	~~420~~	~~109~~	~~611~~	~~149~~	~~790~~	~~189~~	~~960~~	~~229~~	~~1123~~	~~269~~	~~1281~~	~~309~~	~~1435~~	~~349~~	~~1586~~	~~389~~	~~1733~~
~~30~~	~~213~~	~~70~~	~~425~~	~~110~~	~~616~~	~~150~~	~~794~~	~~190~~	~~964~~	~~230~~	~~1127~~	~~270~~	~~1285~~	~~310~~	~~1439~~	~~350~~	~~1590~~	~~390~~	~~1737~~
~~31~~	~~218~~	~~71~~	~~430~~	~~111~~	~~621~~	~~151~~	~~799~~	~~191~~	~~968~~	~~231~~	~~1131~~	~~271~~	~~1289~~	~~311~~	~~1443~~	~~351~~	~~1593~~	~~391~~	~~1741~~
~~32~~	~~224~~	~~72~~	~~435~~	~~112~~	~~625~~	~~152~~	~~803~~	~~192~~	~~972~~	~~232~~	~~1135~~	~~272~~	~~1293~~	~~312~~	~~1447~~	~~352~~	~~1597~~	~~392~~	~~1744~~
~~33~~	~~230~~	~~73~~	~~440~~	~~113~~	~~630~~	~~153~~	~~807~~	~~193~~	~~976~~	~~233~~	~~1139~~	~~273~~	~~1297~~	~~313~~	~~1451~~	~~353~~	~~1601~~	~~393~~	~~1748~~
~~34~~	~~235~~	~~74~~	~~445~~	~~114~~	~~634~~	~~154~~	~~811~~	~~194~~	~~980~~	~~234~~	~~1143~~	~~274~~	~~1301~~	~~314~~	~~1454~~	~~354~~	~~1604~~	~~394~~	~~1751~~
~~35~~	~~241~~	~~75~~	~~450~~	~~115~~	~~639~~	~~155~~	~~816~~	~~195~~	~~985~~	~~235~~	~~1147~~	~~275~~	~~1305~~	~~315~~	~~1458~~	~~355~~	~~1608~~	~~395~~	~~1755~~
~~36~~	~~247~~	~~76~~	~~455~~	~~116~~	~~643~~	~~156~~	~~820~~	~~196~~	~~989~~	~~236~~	~~1151~~	~~276~~	~~1309~~	~~316~~	~~1462~~	~~356~~	~~1612~~	~~396~~	~~1759~~
~~37~~	~~252~~	~~77~~	~~460~~	~~117~~	~~648~~	~~157~~	~~824~~	~~197~~	~~993~~	~~237~~	~~1155~~	~~277~~	~~1312~~	~~317~~	~~1466~~	~~357~~	~~1616~~	~~397~~	~~1762~~
~~38~~	~~258~~	~~78~~	~~465~~	~~118~~	~~652~~	~~158~~	~~829~~	~~198~~	~~997~~	~~238~~	~~1159~~	~~278~~	~~1316~~	~~318~~	~~1470~~	~~358~~	~~1619~~	~~398~~	~~1766~~
~~39~~	~~263~~	~~79~~	~~470~~	~~119~~	~~657~~	~~159~~	~~833~~	~~199~~	~~1001~~	~~239~~	~~1163~~	~~279~~	~~1320~~	~~319~~	~~1473~~	~~359~~	~~1623~~	~~399~~	~~1770~~
~~40~~	~~269~~	~~80~~	~~475~~	~~120~~	~~662~~	~~160~~	~~837~~	~~200~~	~~1005~~	~~240~~	~~1167~~	~~280~~	~~1324~~	~~320~~	~~1477~~	~~360~~	~~1627~~	~~400~~	~~1773~~

Table 7. Water Quality Standards for Dissolved Nickel

Acute Aquatic and Wildlife coldwater, warmwater and edw		Chronic Aquatic and Wildlife coldwater, warmwater and edw		Acute Aquatic and Wildlife ephemeral	
Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L
20	120.0	20	13.3	20	1066
100	468	100	52.0	100	4158
400	1513	400	168	400	13436
$e^{(0.846*LN(Hardness)+2.255)}*(0.998)$		$e^{(0.846*LN(Hardness)+0.0584)}*(0.997)$		$e^{(0.846*LN(Hardness)+4.4389)}*(0.998)$	

~~**Table 8. Chronic Water Quality Standards for Dissolved Chromium III Aquatic and Wildlife coldwater, warmwater and edw**~~

~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~
~~1~~	~~1.71~~	~~41~~	~~35.71~~	~~81~~	~~62.37~~	~~121~~	~~86.64~~	~~161~~	~~109.47~~	~~201~~	~~131.29~~	~~241~~	~~152.33~~	~~281~~	~~172.74~~	~~321~~	~~192.63~~	~~361~~	~~212.08~~
~~2~~	~~3.01~~	~~42~~	~~36.42~~	~~82~~	~~63.00~~	~~122~~	~~87.22~~	~~162~~	~~110.03~~	~~202~~	~~131.82~~	~~242~~	~~152.84~~	~~282~~	~~173.24~~	~~322~~	~~193.12~~	~~362~~	~~212.56~~
~~3~~	~~4.19~~	~~43~~	~~37.13~~	~~83~~	~~63.63~~	~~123~~	~~87.81~~	~~163~~	~~110.58~~	~~203~~	~~132.36~~	~~243~~	~~153.36~~	~~283~~	~~173.75~~	~~323~~	~~193.62~~	~~363~~	~~213.04~~
~~4~~	~~5.31~~	~~44~~	~~37.83~~	~~84~~	~~64.25~~	~~124~~	~~88.39~~	~~164~~	~~111.14~~	~~204~~	~~132.89~~	~~244~~	~~153.88~~	~~284~~	~~174.25~~	~~324~~	~~194.11~~	~~364~~	~~213.52~~
~~5~~	~~6.37~~	~~45~~	~~38.54~~	~~85~~	~~64.88~~	~~125~~	~~88.98~~	~~165~~	~~111.69~~	~~205~~	~~133.42~~	~~245~~	~~154.39~~	~~285~~	~~174.75~~	~~325~~	~~194.60~~	~~365~~	~~214.00~~
~~6~~	~~7.40~~	~~46~~	~~39.24~~	~~86~~	~~65.50~~	~~126~~	~~89.56~~	~~166~~	~~112.25~~	~~206~~	~~133.96~~	~~246~~	~~154.91~~	~~286~~	~~175.25~~	~~326~~	~~195.09~~	~~366~~	~~214.48~~
~~7~~	~~8.40~~	~~47~~	~~39.93~~	~~87~~	~~66.13~~	~~127~~	~~90.14~~	~~167~~	~~112.80~~	~~207~~	~~134.49~~	~~247~~	~~155.43~~	~~287~~	~~175.76~~	~~327~~	~~195.58~~	~~367~~	~~214.96~~
~~8~~	~~9.37~~	~~48~~	~~40.63~~	~~88~~	~~66.75~~	~~128~~	~~90.72~~	~~168~~	~~113.35~~	~~208~~	~~135.02~~	~~248~~	~~155.94~~	~~288~~	~~176.26~~	~~328~~	~~196.07~~	~~368~~	~~215.44~~
~~9~~	~~10.31~~	~~49~~	~~41.32~~	~~89~~	~~67.37~~	~~129~~	~~91.30~~	~~169~~	~~113.90~~	~~209~~	~~135.55~~	~~249~~	~~156.46~~	~~289~~	~~176.76~~	~~329~~	~~196.56~~	~~369~~	~~215.92~~

~~10~~	~~11.24~~	~~50~~	~~42.01~~	~~90~~	~~67.99~~	~~130~~	~~91.88~~	~~170~~	~~114.46~~	~~210~~	~~136.08~~	~~250~~	~~156.97~~	~~290~~	~~177.26~~	~~330~~	~~197.05~~	~~370~~	~~216.40~~
~~11~~	~~12.16~~	~~51~~	~~42.70~~	~~91~~	~~68.61~~	~~131~~	~~92.46~~	~~171~~	~~115.01~~	~~211~~	~~136.61~~	~~251~~	~~157.48~~	~~291~~	~~177.76~~	~~331~~	~~197.53~~	~~371~~	~~216.88~~
~~12~~	~~13.05~~	~~52~~	~~43.38~~	~~92~~	~~69.22~~	~~132~~	~~93.04~~	~~172~~	~~115.56~~	~~212~~	~~137.14~~	~~252~~	~~158.00~~	~~292~~	~~178.26~~	~~332~~	~~198.02~~	~~372~~	~~217.36~~
~~13~~	~~13.94~~	~~53~~	~~44.06~~	~~93~~	~~69.84~~	~~133~~	~~93.61~~	~~173~~	~~116.11~~	~~213~~	~~137.67~~	~~253~~	~~158.51~~	~~293~~	~~178.76~~	~~333~~	~~198.51~~	~~373~~	~~217.84~~
~~14~~	~~14.81~~	~~54~~	~~44.74~~	~~94~~	~~70.45~~	~~134~~	~~94.19~~	~~174~~	~~116.66~~	~~214~~	~~138.20~~	~~254~~	~~159.02~~	~~294~~	~~179.26~~	~~334~~	~~199.00~~	~~374~~	~~218.32~~
~~15~~	~~15.67~~	~~55~~	~~45.42~~	~~95~~	~~71.07~~	~~135~~	~~94.76~~	~~175~~	~~117.21~~	~~215~~	~~138.73~~	~~255~~	~~159.54~~	~~295~~	~~179.76~~	~~335~~	~~199.49~~	~~375~~	~~218.79~~
~~16~~	~~16.52~~	~~56~~	~~46.10~~	~~96~~	~~71.68~~	~~136~~	~~95.34~~	~~176~~	~~117.75~~	~~216~~	~~139.26~~	~~256~~	~~160.05~~	~~296~~	~~180.26~~	~~336~~	~~199.97~~	~~376~~	~~219.27~~
~~17~~	~~17.36~~	~~57~~	~~46.77~~	~~97~~	~~72.29~~	~~137~~	~~95.91~~	~~177~~	~~118.30~~	~~217~~	~~139.79~~	~~257~~	~~160.56~~	~~297~~	~~180.76~~	~~337~~	~~200.46~~	~~377~~	~~219.75~~
~~18~~	~~18.20~~	~~58~~	~~47.44~~	~~98~~	~~72.90~~	~~138~~	~~96.49~~	~~178~~	~~118.85~~	~~218~~	~~140.31~~	~~258~~	~~161.07~~	~~298~~	~~181.25~~	~~338~~	~~200.95~~	~~378~~	~~220.23~~
~~19~~	~~19.02~~	~~59~~	~~48.11~~	~~99~~	~~73.51~~	~~139~~	~~97.06~~	~~179~~	~~119.40~~	~~219~~	~~140.84~~	~~259~~	~~161.58~~	~~299~~	~~181.75~~	~~339~~	~~201.44~~	~~379~~	~~220.70~~
~~20~~	~~19.84~~	~~60~~	~~48.78~~	~~100~~	~~74.11~~	~~140~~	~~97.63~~	~~180~~	~~119.94~~	~~220~~	~~141.37~~	~~260~~	~~162.09~~	~~300~~	~~182.25~~	~~340~~	~~201.92~~	~~380~~	~~221.18~~
~~21~~	~~20.64~~	~~61~~	~~49.44~~	~~101~~	~~74.72~~	~~141~~	~~98.20~~	~~181~~	~~120.49~~	~~221~~	~~141.89~~	~~261~~	~~162.60~~	~~301~~	~~182.75~~	~~341~~	~~202.41~~	~~381~~	~~221.66~~
~~22~~	~~21.45~~	~~62~~	~~50.10~~	~~102~~	~~75.33~~	~~142~~	~~98.77~~	~~182~~	~~121.03~~	~~222~~	~~142.42~~	~~262~~	~~163.11~~	~~302~~	~~183.24~~	~~342~~	~~202.89~~	~~382~~	~~222.13~~
~~23~~	~~22.24~~	~~63~~	~~50.76~~	~~103~~	~~75.93~~	~~143~~	~~99.34~~	~~183~~	~~121.58~~	~~223~~	~~142.94~~	~~263~~	~~163.62~~	~~303~~	~~183.74~~	~~343~~	~~203.38~~	~~383~~	~~222.61~~
~~24~~	~~23.03~~	~~64~~	~~51.42~~	~~104~~	~~76.53~~	~~144~~	~~99.91~~	~~184~~	~~122.12~~	~~224~~	~~143.47~~	~~264~~	~~164.13~~	~~304~~	~~184.24~~	~~344~~	~~203.87~~	~~384~~	~~223.09~~
~~25~~	~~23.81~~	~~65~~	~~52.08~~	~~105~~	~~77.14~~	~~145~~	~~100.48~~	~~185~~	~~122.66~~	~~225~~	~~143.99~~	~~265~~	~~164.64~~	~~305~~	~~184.73~~	~~345~~	~~204.35~~	~~385~~	~~223.56~~
~~26~~	~~24.59~~	~~66~~	~~52.74~~	~~106~~	~~77.74~~	~~146~~	~~101.04~~	~~186~~	~~123.21~~	~~226~~	~~144.52~~	~~266~~	~~165.15~~	~~306~~	~~185.23~~	~~346~~	~~204.84~~	~~386~~	~~224.04~~
~~27~~	~~25.36~~	~~67~~	~~53.39~~	~~107~~	~~78.34~~	~~147~~	~~101.61~~	~~187~~	~~123.75~~	~~227~~	~~145.04~~	~~267~~	~~165.66~~	~~307~~	~~185.72~~	~~347~~	~~205.32~~	~~387~~	~~224.51~~
~~28~~	~~26.13~~	~~68~~	~~54.04~~	~~108~~	~~78.94~~	~~148~~	~~102.18~~	~~188~~	~~124.29~~	~~228~~	~~145.56~~	~~268~~	~~166.17~~	~~308~~	~~186.22~~	~~348~~	~~205.81~~	~~388~~	~~224.99~~
~~29~~	~~26.89~~	~~69~~	~~54.69~~	~~109~~	~~79.53~~	~~149~~	~~102.74~~	~~189~~	~~124.83~~	~~229~~	~~146.09~~	~~269~~	~~166.67~~	~~309~~	~~186.72~~	~~349~~	~~206.29~~	~~389~~	~~225.46~~
~~30~~	~~27.65~~	~~70~~	~~55.34~~	~~110~~	~~80.13~~	~~150~~	~~103.31~~	~~190~~	~~125.37~~	~~230~~	~~146.61~~	~~270~~	~~167.18~~	~~310~~	~~187.21~~	~~350~~	~~206.77~~	~~390~~	~~225.94~~
~~31~~	~~28.40~~	~~71~~	~~55.99~~	~~111~~	~~80.73~~	~~151~~	~~103.87~~	~~191~~	~~125.91~~	~~231~~	~~147.13~~	~~271~~	~~167.69~~	~~311~~	~~187.70~~	~~351~~	~~207.26~~	~~391~~	~~226.41~~
~~32~~	~~29.15~~	~~72~~	~~56.63~~	~~112~~	~~81.32~~	~~152~~	~~104.43~~	~~192~~	~~126.45~~	~~232~~	~~147.65~~	~~272~~	~~168.20~~	~~312~~	~~188.20~~	~~352~~	~~207.74~~	~~392~~	~~226.88~~
~~33~~	~~29.89~~	~~73~~	~~57.27~~	~~113~~	~~81.92~~	~~153~~	~~104.99~~	~~193~~	~~126.99~~	~~233~~	~~148.17~~	~~273~~	~~168.70~~	~~313~~	~~188.69~~	~~353~~	~~208.22~~	~~393~~	~~227.36~~
~~34~~	~~30.63~~	~~74~~	~~57.92~~	~~114~~	~~82.51~~	~~154~~	~~105.56~~	~~194~~	~~127.53~~	~~234~~	~~148.69~~	~~274~~	~~169.21~~	~~314~~	~~189.19~~	~~354~~	~~208.71~~	~~394~~	~~227.83~~
~~35~~	~~31.37~~	~~75~~	~~58.56~~	~~115~~	~~83.10~~	~~155~~	~~106.12~~	~~195~~	~~128.07~~	~~235~~	~~149.21~~	~~275~~	~~169.71~~	~~315~~	~~189.68~~	~~355~~	~~209.19~~	~~395~~	~~228.31~~
~~36~~	~~32.10~~	~~76~~	~~59.20~~	~~116~~	~~83.69~~	~~156~~	~~106.68~~	~~196~~	~~128.61~~	~~236~~	~~149.73~~	~~276~~	~~170.22~~	~~316~~	~~190.17~~	~~356~~	~~209.67~~	~~396~~	~~228.78~~
~~37~~	~~32.83~~	~~77~~	~~59.83~~	~~117~~	~~84.28~~	~~157~~	~~107.24~~	~~197~~	~~129.14~~	~~237~~	~~150.25~~	~~277~~	~~170.72~~	~~317~~	~~190.66~~	~~357~~	~~210.15~~	~~397~~	~~229.25~~
~~38~~	~~33.55~~	~~78~~	~~60.47~~	~~118~~	~~84.87~~	~~158~~	~~107.80~~	~~198~~	~~129.68~~	~~238~~	~~150.77~~	~~278~~	~~171.23~~	~~318~~	~~191.16~~	~~358~~	~~210.64~~	~~398~~	~~229.72~~
~~39~~	~~34.28~~	~~79~~	~~61.10~~	~~119~~	~~85.46~~	~~159~~	~~108.35~~	~~199~~	~~130.22~~	~~239~~	~~151.29~~	~~279~~	~~171.73~~	~~319~~	~~191.65~~	~~359~~	~~211.12~~	~~399~~	~~230.20~~
~~40~~	~~34.99~~	~~80~~	~~61.74~~	~~120~~	~~86.05~~	~~160~~	~~108.91~~	~~200~~	~~130.75~~	~~240~~	~~151.81~~	~~280~~	~~172.24~~	~~320~~	~~192.14~~	~~360~~	~~211.60~~	~~400~~	~~230.67~~

Table 8. Water Quality Standards for Dissolved Silver

Acute Aquatic and Wildlife coldwater, warmwater, edw, and ephemeral	
Hard. mg/L	Std. µg/L
20	0.20
100	3.2
400	34.9
$e^{(1.72*LN(Hardness)-6.59)}*(0.85)$	

~~Table 9. Acute Water Quality Standards for Dissolved Chromium III Aquatic and Wildlife ephemeral~~

~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~
~~1~~	~~44~~	~~41~~	~~921~~	~~81~~	~~1609~~	~~121~~	~~2235~~	~~161~~	~~2824~~	~~201~~	~~3386~~	~~241~~	~~3929~~	~~281~~	~~4456~~	~~321~~	~~4969~~	~~361~~	~~5470~~
~~2~~	~~78~~	~~42~~	~~939~~	~~82~~	~~1625~~	~~122~~	~~2250~~	~~162~~	~~2838~~	~~202~~	~~3400~~	~~242~~	~~3942~~	~~282~~	~~4469~~	~~322~~	~~4981~~	~~362~~	~~5483~~
~~3~~	~~108~~	~~43~~	~~958~~	~~83~~	~~1641~~	~~123~~	~~2265~~	~~163~~	~~2852~~	~~203~~	~~3414~~	~~243~~	~~3956~~	~~283~~	~~4481~~	~~323~~	~~4994~~	~~363~~	~~5495~~
~~4~~	~~137~~	~~44~~	~~976~~	~~84~~	~~1657~~	~~124~~	~~2280~~	~~164~~	~~2867~~	~~204~~	~~3428~~	~~244~~	~~3969~~	~~284~~	~~4494~~	~~324~~	~~5007~~	~~364~~	~~5507~~
~~5~~	~~164~~	~~45~~	~~994~~	~~85~~	~~1673~~	~~125~~	~~2295~~	~~165~~	~~2881~~	~~205~~	~~3441~~	~~245~~	~~3982~~	~~285~~	~~4507~~	~~325~~	~~5019~~	~~365~~	~~5520~~
~~6~~	~~191~~	~~46~~	~~1012~~	~~86~~	~~1690~~	~~126~~	~~2310~~	~~166~~	~~2895~~	~~206~~	~~3455~~	~~246~~	~~3996~~	~~286~~	~~4520~~	~~326~~	~~5032~~	~~366~~	~~5532~~
~~7~~	~~217~~	~~47~~	~~1030~~	~~87~~	~~1706~~	~~127~~	~~2325~~	~~167~~	~~2909~~	~~207~~	~~3469~~	~~247~~	~~4009~~	~~287~~	~~4533~~	~~327~~	~~5045~~	~~367~~	~~5545~~
~~8~~	~~242~~	~~48~~	~~1048~~	~~88~~	~~1722~~	~~128~~	~~2340~~	~~168~~	~~2924~~	~~208~~	~~3483~~	~~248~~	~~4022~~	~~288~~	~~4546~~	~~328~~	~~5057~~	~~368~~	~~5557~~
~~9~~	~~266~~	~~49~~	~~1066~~	~~89~~	~~1738~~	~~129~~	~~2355~~	~~169~~	~~2938~~	~~209~~	~~3496~~	~~249~~	~~4035~~	~~289~~	~~4559~~	~~329~~	~~5070~~	~~369~~	~~5569~~
~~10~~	~~290~~	~~50~~	~~1084~~	~~90~~	~~1754~~	~~130~~	~~2370~~	~~170~~	~~2952~~	~~210~~	~~3510~~	~~250~~	~~4049~~	~~290~~	~~4572~~	~~330~~	~~5082~~	~~370~~	~~5582~~
~~11~~	~~314~~	~~51~~	~~1101~~	~~91~~	~~1770~~	~~131~~	~~2385~~	~~171~~	~~2966~~	~~211~~	~~3524~~	~~251~~	~~4062~~	~~291~~	~~4585~~	~~331~~	~~5095~~	~~371~~	~~5594~~
~~12~~	~~337~~	~~52~~	~~1119~~	~~92~~	~~1785~~	~~132~~	~~2400~~	~~172~~	~~2981~~	~~212~~	~~3537~~	~~252~~	~~4075~~	~~292~~	~~4598~~	~~332~~	~~5108~~	~~372~~	~~5606~~
~~13~~	~~360~~	~~53~~	~~1137~~	~~93~~	~~1801~~	~~133~~	~~2415~~	~~173~~	~~2995~~	~~213~~	~~3551~~	~~253~~	~~4088~~	~~293~~	~~4611~~	~~333~~	~~5120~~	~~373~~	~~5619~~
~~14~~	~~382~~	~~54~~	~~1154~~	~~94~~	~~1817~~	~~134~~	~~2429~~	~~174~~	~~3009~~	~~214~~	~~3565~~	~~254~~	~~4102~~	~~294~~	~~4624~~	~~334~~	~~5133~~	~~374~~	~~5631~~
~~15~~	~~404~~	~~55~~	~~1172~~	~~95~~	~~1833~~	~~135~~	~~2444~~	~~175~~	~~3023~~	~~215~~	~~3578~~	~~255~~	~~4115~~	~~295~~	~~4637~~	~~335~~	~~5145~~	~~375~~	~~5643~~
~~16~~	~~426~~	~~56~~	~~1189~~	~~96~~	~~1849~~	~~136~~	~~2459~~	~~176~~	~~3037~~	~~216~~	~~3592~~	~~256~~	~~4128~~	~~296~~	~~4649~~	~~336~~	~~5158~~	~~376~~	~~5656~~
~~17~~	~~448~~	~~57~~	~~1206~~	~~97~~	~~1865~~	~~137~~	~~2474~~	~~177~~	~~3051~~	~~217~~	~~3606~~	~~257~~	~~4141~~	~~297~~	~~4662~~	~~337~~	~~5171~~	~~377~~	~~5668~~
~~18~~	~~469~~	~~58~~	~~1224~~	~~98~~	~~1880~~	~~138~~	~~2489~~	~~178~~	~~3066~~	~~218~~	~~3619~~	~~258~~	~~4155~~	~~298~~	~~4675~~	~~338~~	~~5183~~	~~378~~	~~5680~~
~~19~~	~~491~~	~~59~~	~~1241~~	~~99~~	~~1896~~	~~139~~	~~2503~~	~~179~~	~~3080~~	~~219~~	~~3633~~	~~259~~	~~4168~~	~~299~~	~~4688~~	~~339~~	~~5196~~	~~379~~	~~5693~~
~~20~~	~~512~~	~~60~~	~~1258~~	~~100~~	~~1912~~	~~140~~	~~2518~~	~~180~~	~~3094~~	~~220~~	~~3646~~	~~260~~	~~4181~~	~~300~~	~~4701~~	~~340~~	~~5208~~	~~380~~	~~5705~~
~~21~~	~~532~~	~~61~~	~~1275~~	~~101~~	~~1927~~	~~141~~	~~2533~~	~~181~~	~~3108~~	~~221~~	~~3660~~	~~261~~	~~4194~~	~~301~~	~~4714~~	~~341~~	~~5221~~	~~381~~	~~5717~~
~~22~~	~~553~~	~~62~~	~~1292~~	~~102~~	~~1943~~	~~142~~	~~2548~~	~~182~~	~~3122~~	~~222~~	~~3673~~	~~262~~	~~4207~~	~~302~~	~~4726~~	~~342~~	~~5233~~	~~382~~	~~5730~~
~~23~~	~~574~~	~~63~~	~~1309~~	~~103~~	~~1958~~	~~143~~	~~2562~~	~~183~~	~~3136~~	~~223~~	~~3687~~	~~263~~	~~4220~~	~~303~~	~~4739~~	~~343~~	~~5246~~	~~383~~	~~5742~~
~~24~~	~~594~~	~~64~~	~~1326~~	~~104~~	~~1974~~	~~144~~	~~2577~~	~~184~~	~~3150~~	~~224~~	~~3701~~	~~264~~	~~4234~~	~~304~~	~~4752~~	~~344~~	~~5258~~	~~384~~	~~5754~~
~~25~~	~~614~~	~~65~~	~~1343~~	~~105~~	~~1990~~	~~145~~	~~2592~~	~~185~~	~~3164~~	~~225~~	~~3714~~	~~265~~	~~4247~~	~~305~~	~~4765~~	~~345~~	~~5271~~	~~385~~	~~5766~~
~~26~~	~~634~~	~~66~~	~~1360~~	~~106~~	~~2005~~	~~146~~	~~2606~~	~~186~~	~~3178~~	~~226~~	~~3728~~	~~266~~	~~4260~~	~~306~~	~~4778~~	~~346~~	~~5283~~	~~386~~	~~5779~~
~~27~~	~~654~~	~~67~~	~~1377~~	~~107~~	~~2021~~	~~147~~	~~2621~~	~~187~~	~~3192~~	~~227~~	~~3741~~	~~267~~	~~4273~~	~~307~~	~~4790~~	~~347~~	~~5296~~	~~387~~	~~5791~~
~~28~~	~~674~~	~~68~~	~~1394~~	~~108~~	~~2036~~	~~148~~	~~2635~~	~~188~~	~~3206~~	~~228~~	~~3755~~	~~268~~	~~4286~~	~~308~~	~~4803~~	~~348~~	~~5308~~	~~388~~	~~5803~~
~~29~~	~~694~~	~~69~~	~~1411~~	~~109~~	~~2051~~	~~149~~	~~2650~~	~~189~~	~~3220~~	~~229~~	~~3768~~	~~269~~	~~4299~~	~~309~~	~~4816~~	~~349~~	~~5321~~	~~389~~	~~5815~~
~~30~~	~~713~~	~~70~~	~~1427~~	~~110~~	~~2067~~	~~150~~	~~2665~~	~~190~~	~~3234~~	~~230~~	~~3781~~	~~270~~	~~4312~~	~~310~~	~~4829~~	~~350~~	~~5333~~	~~390~~	~~5828~~
~~31~~	~~733~~	~~71~~	~~1444~~	~~111~~	~~2082~~	~~151~~	~~2679~~	~~191~~	~~3248~~	~~231~~	~~3795~~	~~271~~	~~4325~~	~~311~~	~~4841~~	~~351~~	~~5346~~	~~391~~	~~5840~~
~~32~~	~~752~~	~~72~~	~~1461~~	~~112~~	~~2098~~	~~152~~	~~2694~~	~~192~~	~~3262~~	~~232~~	~~3808~~	~~272~~	~~4338~~	~~312~~	~~4854~~	~~352~~	~~5358~~	~~392~~	~~5852~~
~~33~~	~~771~~	~~73~~	~~1477~~	~~113~~	~~2113~~	~~153~~	~~2708~~	~~193~~	~~3276~~	~~233~~	~~3822~~	~~273~~	~~4351~~	~~313~~	~~4867~~	~~353~~	~~5371~~	~~393~~	~~5864~~
~~34~~	~~790~~	~~74~~	~~1494~~	~~114~~	~~2128~~	~~154~~	~~2723~~	~~194~~	~~3289~~	~~234~~	~~3835~~	~~274~~	~~4364~~	~~314~~	~~4880~~	~~354~~	~~5383~~	~~394~~	~~5877~~
~~35~~	~~809~~	~~75~~	~~1510~~	~~115~~	~~2143~~	~~155~~	~~2737~~	~~195~~	~~3303~~	~~235~~	~~3849~~	~~275~~	~~4377~~	~~315~~	~~4892~~	~~355~~	~~5396~~	~~395~~	~~5889~~
~~36~~	~~828~~	~~76~~	~~1527~~	~~116~~	~~2159~~	~~156~~	~~2752~~	~~196~~	~~3317~~	~~236~~	~~3862~~	~~276~~	~~4390~~	~~316~~	~~4905~~	~~356~~	~~5408~~	~~396~~	~~5901~~
~~37~~	~~847~~	~~77~~	~~1543~~	~~117~~	~~2174~~	~~157~~	~~2766~~	~~197~~	~~3331~~	~~237~~	~~3875~~	~~277~~	~~4404~~	~~317~~	~~4918~~	~~357~~	~~5421~~	~~397~~	~~5913~~

~~38~~	~~865~~	~~78~~	~~1560~~	~~118~~	~~2189~~	~~158~~	~~2780~~	~~198~~	~~3345~~	~~238~~	~~3889~~	~~278~~	~~4417~~	~~318~~	~~4931~~	~~358~~	~~5433~~	~~398~~	~~5925~~
~~39~~	~~884~~	~~79~~	~~1576~~	~~119~~	~~2204~~	~~159~~	~~2795~~	~~199~~	~~3359~~	~~239~~	~~3902~~	~~279~~	~~4430~~	~~319~~	~~4943~~	~~359~~	~~5445~~	~~399~~	~~5938~~
~~40~~	~~903~~	~~80~~	~~1592~~	~~120~~	~~2220~~	~~160~~	~~2809~~	~~200~~	~~3372~~	~~240~~	~~3916~~	~~280~~	~~4443~~	~~320~~	~~4956~~	~~360~~	~~5458~~	~~400~~	~~5950~~

Table 9. Water Quality Standards for Dissolved Zinc

Acute and Chronic Aquatic and Wildlife coldwater, warmwater and edw		Acute Aquatic and Wildlife ephemeral	
Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L
20	30.0	20	284
100	117	100	1112
400	379	400	3599
$e^{(0.8473*LN(Hardness)+0.884)}*(0.978)$		$e^{(0.8473*LN(Hardness)+3.1342)}*(0.978)$	

~~**Table 10. Acute Water Quality Standards for Dissolved Copper Aquatic and Wildlife coldwater, warmwater and edw**~~

~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~
~~1~~	~~0.18~~	~~41~~	~~5.80~~	~~81~~	~~11.02~~	~~121~~	~~16.08~~	~~161~~	~~21.05~~	~~201~~	~~25.94~~	~~241~~	~~30.78~~	~~281~~	~~35.57~~	~~321~~	~~40.33~~	~~361~~	~~45.05~~
~~2~~	~~0.34~~	~~42~~	~~5.93~~	~~82~~	~~11.15~~	~~122~~	~~16.21~~	~~162~~	~~21.17~~	~~202~~	~~26.07~~	~~242~~	~~30.90~~	~~282~~	~~35.69~~	~~322~~	~~40.45~~	~~362~~	~~45.16~~
~~3~~	~~0.49~~	~~43~~	~~6.07~~	~~83~~	~~11.28~~	~~123~~	~~16.33~~	~~163~~	~~21.30~~	~~203~~	~~26.19~~	~~243~~	~~31.02~~	~~283~~	~~35.81~~	~~323~~	~~40.56~~	~~363~~	~~45.28~~
~~4~~	~~0.65~~	~~44~~	~~6.20~~	~~84~~	~~11.40~~	~~124~~	~~16.46~~	~~164~~	~~21.42~~	~~204~~	~~26.31~~	~~244~~	~~31.14~~	~~284~~	~~35.93~~	~~324~~	~~40.68~~	~~364~~	~~45.40~~
~~5~~	~~0.80~~	~~45~~	~~6.33~~	~~85~~	~~11.53~~	~~125~~	~~16.58~~	~~165~~	~~21.54~~	~~205~~	~~26.43~~	~~245~~	~~31.26~~	~~285~~	~~36.05~~	~~325~~	~~40.80~~	~~365~~	~~45.52~~
~~6~~	~~0.95~~	~~46~~	~~6.47~~	~~86~~	~~11.66~~	~~126~~	~~16.71~~	~~166~~	~~21.66~~	~~206~~	~~26.55~~	~~246~~	~~31.38~~	~~286~~	~~36.17~~	~~326~~	~~40.92~~	~~366~~	~~45.63~~
~~7~~	~~1.10~~	~~47~~	~~6.60~~	~~87~~	~~11.79~~	~~127~~	~~16.83~~	~~167~~	~~21.79~~	~~207~~	~~26.67~~	~~247~~	~~31.50~~	~~287~~	~~36.29~~	~~327~~	~~41.04~~	~~367~~	~~45.75~~
~~8~~	~~1.24~~	~~48~~	~~6.73~~	~~88~~	~~11.91~~	~~128~~	~~16.96~~	~~168~~	~~21.91~~	~~208~~	~~26.79~~	~~248~~	~~31.62~~	~~288~~	~~36.41~~	~~328~~	~~41.16~~	~~368~~	~~45.87~~
~~9~~	~~1.39~~	~~49~~	~~6.86~~	~~89~~	~~12.04~~	~~129~~	~~17.08~~	~~169~~	~~22.03~~	~~209~~	~~26.92~~	~~249~~	~~31.74~~	~~289~~	~~36.53~~	~~329~~	~~41.27~~	~~369~~	~~45.99~~
~~10~~	~~1.54~~	~~50~~	~~6.99~~	~~90~~	~~12.17~~	~~130~~	~~17.21~~	~~170~~	~~22.16~~	~~210~~	~~27.04~~	~~250~~	~~31.86~~	~~290~~	~~36.65~~	~~330~~	~~41.39~~	~~370~~	~~46.10~~
~~11~~	~~1.68~~	~~51~~	~~7.13~~	~~91~~	~~12.30~~	~~131~~	~~17.33~~	~~171~~	~~22.28~~	~~211~~	~~27.16~~	~~251~~	~~31.98~~	~~291~~	~~36.77~~	~~331~~	~~41.51~~	~~371~~	~~46.22~~
~~12~~	~~1.82~~	~~52~~	~~7.26~~	~~92~~	~~12.42~~	~~132~~	~~17.46~~	~~172~~	~~22.40~~	~~212~~	~~27.28~~	~~252~~	~~32.10~~	~~292~~	~~36.89~~	~~332~~	~~41.63~~	~~372~~	~~46.34~~
~~13~~	~~1.97~~	~~53~~	~~7.39~~	~~93~~	~~12.55~~	~~133~~	~~17.58~~	~~173~~	~~22.52~~	~~213~~	~~27.40~~	~~253~~	~~32.22~~	~~293~~	~~37.00~~	~~333~~	~~41.75~~	~~373~~	~~46.46~~
~~14~~	~~2.11~~	~~54~~	~~7.52~~	~~94~~	~~12.68~~	~~134~~	~~17.71~~	~~174~~	~~22.65~~	~~214~~	~~27.52~~	~~254~~	~~32.34~~	~~294~~	~~37.12~~	~~334~~	~~41.86~~	~~374~~	~~46.57~~
~~15~~	~~2.25~~	~~55~~	~~7.65~~	~~95~~	~~12.81~~	~~135~~	~~17.83~~	~~175~~	~~22.77~~	~~215~~	~~27.64~~	~~255~~	~~32.46~~	~~295~~	~~37.24~~	~~335~~	~~41.98~~	~~375~~	~~46.69~~
~~16~~	~~2.39~~	~~56~~	~~7.78~~	~~96~~	~~12.93~~	~~136~~	~~17.96~~	~~176~~	~~22.89~~	~~216~~	~~27.76~~	~~256~~	~~32.58~~	~~296~~	~~37.36~~	~~336~~	~~42.10~~	~~376~~	~~46.81~~
~~17~~	~~2.53~~	~~57~~	~~7.91~~	~~97~~	~~13.06~~	~~137~~	~~18.08~~	~~177~~	~~23.02~~	~~217~~	~~27.89~~	~~257~~	~~32.70~~	~~297~~	~~37.48~~	~~337~~	~~42.22~~	~~377~~	~~46.92~~
~~18~~	~~2.67~~	~~58~~	~~8.04~~	~~98~~	~~13.19~~	~~138~~	~~18.20~~	~~178~~	~~23.14~~	~~218~~	~~28.01~~	~~258~~	~~32.82~~	~~298~~	~~37.60~~	~~338~~	~~42.34~~	~~378~~	~~47.04~~
~~19~~	~~2.81~~	~~59~~	~~8.17~~	~~99~~	~~13.31~~	~~139~~	~~18.33~~	~~179~~	~~23.26~~	~~219~~	~~28.13~~	~~259~~	~~32.94~~	~~299~~	~~37.72~~	~~339~~	~~42.45~~	~~379~~	~~47.16~~
~~20~~	~~2.95~~	~~60~~	~~8.31~~	~~100~~	~~13.44~~	~~140~~	~~18.45~~	~~180~~	~~23.38~~	~~220~~	~~28.25~~	~~260~~	~~33.06~~	~~300~~	~~37.84~~	~~340~~	~~42.57~~	~~380~~	~~47.28~~
~~21~~	~~3.09~~	~~61~~	~~8.44~~	~~101~~	~~13.57~~	~~141~~	~~18.58~~	~~181~~	~~23.50~~	~~221~~	~~28.37~~	~~261~~	~~33.18~~	~~301~~	~~37.96~~	~~341~~	~~42.69~~	~~381~~	~~47.39~~
~~22~~	~~3.23~~	~~62~~	~~8.57~~	~~102~~	~~13.69~~	~~142~~	~~18.70~~	~~182~~	~~23.63~~	~~222~~	~~28.49~~	~~262~~	~~33.30~~	~~302~~	~~38.07~~	~~342~~	~~42.81~~	~~382~~	~~47.51~~

~~23~~	~~3.37~~	~~63~~	~~8.70~~	~~103~~	~~13.82~~	~~143~~	~~18.82~~	~~183~~	~~23.75~~	~~223~~	~~28.61~~	~~263~~	~~33.42~~	~~303~~	~~38.19~~	~~343~~	~~42.93~~	~~383~~	~~47.63~~
~~24~~	~~3.50~~	~~64~~	~~8.83~~	~~104~~	~~13.95~~	~~144~~	~~18.95~~	~~184~~	~~23.87~~	~~224~~	~~28.73~~	~~264~~	~~33.54~~	~~304~~	~~38.31~~	~~344~~	~~43.04~~	~~384~~	~~47.74~~
~~25~~	~~3.64~~	~~65~~	~~8.96~~	~~105~~	~~14.07~~	~~145~~	~~19.07~~	~~185~~	~~23.99~~	~~225~~	~~28.85~~	~~265~~	~~33.66~~	~~305~~	~~38.43~~	~~345~~	~~43.16~~	~~385~~	~~47.86~~
~~26~~	~~3.78~~	~~66~~	~~9.09~~	~~106~~	~~14.20~~	~~146~~	~~19.20~~	~~186~~	~~24.12~~	~~226~~	~~28.97~~	~~266~~	~~33.78~~	~~306~~	~~38.55~~	~~346~~	~~43.28~~	~~386~~	~~47.98~~
~~27~~	~~3.91~~	~~67~~	~~9.22~~	~~107~~	~~14.32~~	~~147~~	~~19.32~~	~~187~~	~~24.24~~	~~227~~	~~29.09~~	~~267~~	~~33.90~~	~~307~~	~~38.67~~	~~347~~	~~43.40~~	~~387~~	~~48.10~~
~~28~~	~~4.05~~	~~68~~	~~9.34~~	~~108~~	~~14.45~~	~~148~~	~~19.44~~	~~188~~	~~24.36~~	~~228~~	~~29.22~~	~~268~~	~~34.02~~	~~308~~	~~38.79~~	~~348~~	~~43.52~~	~~388~~	~~48.21~~
~~29~~	~~4.19~~	~~69~~	~~9.47~~	~~109~~	~~14.58~~	~~149~~	~~19.57~~	~~189~~	~~24.48~~	~~229~~	~~29.34~~	~~269~~	~~34.14~~	~~309~~	~~38.91~~	~~349~~	~~43.63~~	~~389~~	~~48.33~~
~~30~~	~~4.32~~	~~70~~	~~9.60~~	~~110~~	~~14.70~~	~~150~~	~~19.69~~	~~190~~	~~24.60~~	~~230~~	~~29.46~~	~~270~~	~~34.26~~	~~310~~	~~39.02~~	~~350~~	~~43.75~~	~~390~~	~~48.45~~
~~31~~	~~4.46~~	~~71~~	~~9.73~~	~~111~~	~~14.83~~	~~151~~	~~19.82~~	~~191~~	~~24.73~~	~~231~~	~~29.58~~	~~271~~	~~34.38~~	~~311~~	~~39.14~~	~~351~~	~~43.87~~	~~391~~	~~48.56~~
~~32~~	~~4.59~~	~~72~~	~~9.86~~	~~112~~	~~14.95~~	~~152~~	~~19.94~~	~~192~~	~~24.85~~	~~232~~	~~29.70~~	~~272~~	~~34.50~~	~~312~~	~~39.26~~	~~352~~	~~43.99~~	~~392~~	~~48.68~~
~~33~~	~~4.73~~	~~73~~	~~9.99~~	~~113~~	~~15.08~~	~~153~~	~~20.06~~	~~193~~	~~24.97~~	~~233~~	~~29.82~~	~~273~~	~~34.62~~	~~313~~	~~39.38~~	~~353~~	~~44.10~~	~~393~~	~~48.80~~
~~34~~	~~4.86~~	~~74~~	~~10.12~~	~~114~~	~~15.20~~	~~154~~	~~20.19~~	~~194~~	~~25.09~~	~~234~~	~~29.94~~	~~274~~	~~34.74~~	~~314~~	~~39.50~~	~~354~~	~~44.22~~	~~394~~	~~48.92~~
~~35~~	~~5.00~~	~~75~~	~~10.25~~	~~115~~	~~15.33~~	~~155~~	~~20.31~~	~~195~~	~~25.21~~	~~235~~	~~30.06~~	~~275~~	~~34.86~~	~~315~~	~~39.62~~	~~355~~	~~44.34~~	~~395~~	~~49.03~~
~~36~~	~~5.13~~	~~76~~	~~10.38~~	~~116~~	~~15.46~~	~~156~~	~~20.43~~	~~196~~	~~25.34~~	~~236~~	~~30.18~~	~~276~~	~~34.98~~	~~316~~	~~39.74~~	~~356~~	~~44.46~~	~~396~~	~~49.15~~
~~37~~	~~5.27~~	~~77~~	~~10.51~~	~~117~~	~~15.58~~	~~157~~	~~20.56~~	~~197~~	~~25.46~~	~~237~~	~~30.30~~	~~277~~	~~35.10~~	~~317~~	~~39.85~~	~~357~~	~~44.58~~	~~397~~	~~49.27~~
~~38~~	~~5.40~~	~~78~~	~~10.63~~	~~118~~	~~15.71~~	~~158~~	~~20.68~~	~~198~~	~~25.58~~	~~238~~	~~30.42~~	~~278~~	~~35.22~~	~~318~~	~~39.97~~	~~358~~	~~44.69~~	~~398~~	~~49.38~~
~~39~~	~~5.53~~	~~79~~	~~10.76~~	~~119~~	~~15.83~~	~~159~~	~~20.80~~	~~199~~	~~25.70~~	~~239~~	~~30.54~~	~~279~~	~~35.34~~	~~319~~	~~40.09~~	~~359~~	~~44.81~~	~~399~~	~~49.50~~
~~40~~	~~5.67~~	~~80~~	~~10.89~~	~~120~~	~~15.96~~	~~160~~	~~20.93~~	~~200~~	~~25.82~~	~~240~~	~~30.66~~	~~280~~	~~35.46~~	~~320~~	~~40.21~~	~~360~~	~~44.93~~	~~400~~	~~49.62~~

Table 10. Water Quality Standards for Pentachlorophenol

Acute Aquatic and Wildlife coldwater, warmwater and edw		Chronic Aquatic and Wildlife coldwater, warmwater and edw		Acute Aquatic and Wildlife ephemeral	
pH	µg/L	pH	µg/L	pH	µg/L
3	0.16	3	0.1	3	0.66
6	3.3	6	2.1	6	13.5
9	67.7	9	42.7	9	274
$e^{(1.005 * (pH)}$-4.83)		$e^{(1.005 * (pH)}$-5.29)		$e^{(1.005 * (pH)-3.4306)}$	

~~**Table 11. Chronic Water Quality Standards for Dissolved Copper Aquatic and Wildlife coldwater, warmwater and edw**~~

~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~	~~Hard. mg/L~~	~~Std. µg/L~~
~~1~~	~~0.18~~	~~41~~	~~4.18~~	~~81~~	~~7.48~~	~~121~~	~~10.54~~	~~161~~	~~13.45~~	~~201~~	~~16.26~~	~~241~~	~~18.99~~	~~281~~	~~21.65~~	~~321~~	~~24.26~~	~~361~~	~~26.82~~
~~2~~	~~0.32~~	~~42~~	~~4.27~~	~~82~~	~~7.56~~	~~122~~	~~10.61~~	~~162~~	~~13.52~~	~~202~~	~~16.33~~	~~242~~	~~19.06~~	~~282~~	~~21.72~~	~~322~~	~~24.33~~	~~362~~	~~26.89~~
~~3~~	~~0.45~~	~~43~~	~~4.35~~	~~83~~	~~7.64~~	~~123~~	~~10.69~~	~~163~~	~~13.60~~	~~203~~	~~16.40~~	~~243~~	~~19.13~~	~~283~~	~~21.78~~	~~323~~	~~24.39~~	~~363~~	~~26.95~~
~~4~~	~~0.57~~	~~44~~	~~4.44~~	~~84~~	~~7.72~~	~~124~~	~~10.76~~	~~164~~	~~13.67~~	~~204~~	~~16.47~~	~~244~~	~~19.19~~	~~284~~	~~21.85~~	~~324~~	~~24.45~~	~~364~~	~~27.01~~
~~5~~	~~0.69~~	~~45~~	~~4.53~~	~~85~~	~~7.79~~	~~125~~	~~10.84~~	~~165~~	~~13.74~~	~~205~~	~~16.54~~	~~245~~	~~19.26~~	~~285~~	~~21.92~~	~~325~~	~~24.52~~	~~365~~	~~27.08~~
~~6~~	~~0.81~~	~~46~~	~~4.61~~	~~86~~	~~7.87~~	~~126~~	~~10.91~~	~~166~~	~~13.81~~	~~206~~	~~16.61~~	~~246~~	~~19.33~~	~~286~~	~~21.98~~	~~326~~	~~24.58~~	~~366~~	~~27.14~~
~~7~~	~~0.92~~	~~47~~	~~4.70~~	~~87~~	~~7.95~~	~~127~~	~~10.99~~	~~167~~	~~13.88~~	~~207~~	~~16.68~~	~~247~~	~~19.39~~	~~287~~	~~22.05~~	~~327~~	~~24.65~~	~~367~~	~~27.20~~
~~8~~	~~1.03~~	~~48~~	~~4.78~~	~~88~~	~~8.03~~	~~128~~	~~11.06~~	~~168~~	~~13.95~~	~~208~~	~~16.75~~	~~248~~	~~19.46~~	~~288~~	~~22.11~~	~~328~~	~~24.71~~	~~368~~	~~27.27~~
~~9~~	~~1.14~~	~~49~~	~~4.87~~	~~89~~	~~8.11~~	~~129~~	~~11.13~~	~~169~~	~~14.02~~	~~209~~	~~16.81~~	~~249~~	~~19.53~~	~~289~~	~~22.18~~	~~329~~	~~24.78~~	~~369~~	~~27.33~~
~~10~~	~~1.25~~	~~50~~	~~4.95~~	~~90~~	~~8.18~~	~~130~~	~~11.21~~	~~170~~	~~14.09~~	~~210~~	~~16.88~~	~~250~~	~~19.59~~	~~290~~	~~22.24~~	~~330~~	~~24.84~~	~~370~~	~~27.39~~

11	1.36	51	5.04	91	8.26	131	11.28	171	14.16	211	16.95	251	19.66	291	22.31	331	24.91	371	27.46
12	1.46	52	5.12	92	8.34	132	11.35	172	14.24	212	17.02	252	19.73	292	22.38	332	24.97	372	27.52
13	1.57	53	5.21	93	8.42	133	11.43	173	14.31	213	17.09	253	19.80	293	22.44	333	25.03	373	27.58
14	1.67	54	5.29	94	8.49	134	11.50	174	14.38	214	17.16	254	19.86	294	22.51	334	25.10	374	27.65
15	1.77	55	5.37	95	8.57	135	11.57	175	14.45	215	17.23	255	19.93	295	22.57	335	25.16	375	27.71
16	1.87	56	5.46	96	8.65	136	11.65	176	14.52	216	17.29	256	20.00	296	22.64	336	25.23	376	27.77
17	1.97	57	5.54	97	8.73	137	11.72	177	14.59	217	17.36	257	20.06	297	22.70	337	25.29	377	27.83
18	2.07	58	5.62	98	8.80	138	11.79	178	14.66	218	17.43	258	20.13	298	22.77	338	25.35	378	27.90
19	2.17	59	5.71	99	8.88	139	11.87	179	14.73	219	17.50	259	20.20	299	22.83	339	25.42	379	27.96
20	2.26	60	5.79	100	8.96	140	11.94	180	14.80	220	17.57	260	20.26	300	22.90	340	25.48	380	28.02
21	2.36	61	5.87	101	9.03	141	12.01	181	14.87	221	17.64	261	20.33	301	22.96	341	25.55	381	28.09
22	2.46	62	5.95	102	9.11	142	12.08	182	14.94	222	17.70	262	20.40	302	23.03	342	25.61	382	28.15
23	2.55	63	6.03	103	9.18	143	12.16	183	15.01	223	17.77	263	20.46	303	23.09	343	25.68	383	28.21
24	2.65	64	6.12	104	9.26	144	12.23	184	15.08	224	17.84	264	20.53	304	23.16	344	25.74	384	28.28
25	2.74	65	6.20	105	9.34	145	12.30	185	15.15	225	17.91	265	20.60	305	23.22	345	25.80	385	28.34
26	2.83	66	6.28	106	9.41	146	12.37	186	15.22	226	17.98	266	20.66	306	23.29	346	25.87	386	28.40
27	2.93	67	6.36	107	9.49	147	12.45	187	15.29	227	18.04	267	20.73	307	23.35	347	25.93	387	28.46
28	3.02	68	6.44	108	9.56	148	12.52	188	15.36	228	18.11	268	20.79	308	23.42	348	25.99	388	28.53
29	3.11	69	6.52	109	9.64	149	12.59	189	15.43	229	18.18	269	20.86	309	23.48	349	26.06	389	28.59
30	3.20	70	6.60	110	9.72	150	12.66	190	15.50	230	18.25	270	20.93	310	23.55	350	26.12	390	28.65
31	3.29	71	6.68	111	9.79	151	12.74	191	15.57	231	18.32	271	20.99	311	23.61	351	26.19	391	28.72
32	3.38	72	6.76	112	9.87	152	12.81	192	15.64	232	18.38	272	21.06	312	23.68	352	26.25	392	28.78
33	3.47	73	6.84	113	9.94	153	12.88	193	15.71	233	18.45	273	21.13	313	23.74	353	26.31	393	28.84
34	3.56	74	6.92	114	10.02	154	12.95	194	15.78	234	18.52	274	21.19	314	23.81	354	26.38	394	28.90
35	3.65	75	7.00	115	10.09	155	13.02	195	15.85	235	18.59	275	21.26	315	23.87	355	26.44	395	28.97
36	3.74	76	7.08	116	10.17	156	13.10	196	15.92	236	18.65	276	21.32	316	23.94	356	26.50	396	29.03
37	3.83	77	7.16	117	10.24	157	13.17	197	15.99	237	18.72	277	21.39	317	24.00	357	26.57	397	29.09
38	3.92	78	7.24	118	10.32	158	13.24	198	16.05	238	18.79	278	21.46	318	24.07	358	26.63	398	29.15
39	4.01	79	7.32	119	10.39	159	13.31	199	16.12	239	18.86	279	21.52	319	24.13	359	26.70	399	29.22
40	4.09	80	7.40	120	10.47	160	13.38	200	16.19	240	18.92	280	21.59	320	24.20	360	26.76	400	29.28

Table 12.Acute Water Quality Standards for Dissolved Copper Aquatic and Wildlife ephemeral

Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L
1	0.30	41	10.04	81	19.07	121	27.84	161	36.43	201	44.91	241	53.28	281	61.57	321	69.80	361	77.97
2	0.58	42	10.27	82	19.29	122	28.05	162	36.65	202	45.12	242	53.49	282	61.78	322	70.00	362	78.17
3	0.85	43	10.50	83	19.52	123	28.27	163	36.86	203	45.33	243	53.70	283	61.99	323	70.21	363	78.37
4	1.12	44	10.73	84	19.74	124	28.49	164	37.07	204	45.54	244	53.90	284	62.19	324	70.41	364	78.58
5	1.38	45	10.96	85	19.96	125	28.70	165	37.29	205	45.75	245	54.11	285	62.40	325	70.62	365	78.78
6	1.64	46	11.19	86	20.18	126	28.92	166	37.50	206	45.96	246	54.32	286	62.61	326	70.82	366	78.98
7	1.90	47	11.42	87	20.40	127	29.14	167	37.71	207	46.17	247	54.53	287	62.81	327	71.03	367	79.19

8	2.15	48	11.65	88	20.62	128	29.35	168	37.92	208	46.38	248	54.74	288	63.02	328	71.23	368	79.39
9	2.41	49	11.88	89	20.84	129	29.57	169	38.14	209	46.59	249	54.94	289	63.22	329	71.44	369	79.59
10	2.66	50	12.11	90	21.06	130	29.78	170	38.35	210	46.80	250	55.15	290	63.43	330	71.64	370	79.80
11	2.91	51	12.33	91	21.28	131	30.00	171	38.56	211	47.01	251	55.36	291	63.64	331	71.85	371	80.00
12	3.16	52	12.56	92	21.50	132	30.22	172	38.77	212	47.22	252	55.57	292	63.84	332	72.05	372	80.20
13	3.40	53	12.79	93	21.72	133	30.43	173	38.99	213	47.43	253	55.78	293	64.05	333	72.26	373	80.41
14	3.65	54	13.02	94	21.94	134	30.65	174	39.20	214	47.64	254	55.98	294	64.25	334	72.46	374	80.61
15	3.89	55	13.24	95	22.16	135	30.86	175	39.41	215	47.85	255	56.19	295	64.46	335	72.66	375	80.81
16	4.14	56	13.47	96	22.38	136	31.08	176	39.62	216	48.06	256	56.40	296	64.67	336	72.87	376	81.02
17	4.38	57	13.70	97	22.60	137	31.29	177	39.84	217	48.27	257	56.61	297	64.87	337	73.07	377	81.22
18	4.62	58	13.92	98	22.82	138	31.51	178	40.05	218	48.48	258	56.81	298	65.08	338	73.28	378	81.42
19	4.86	59	14.15	99	23.04	139	31.72	179	40.26	219	48.68	259	57.02	299	65.28	339	73.48	379	81.62
20	5.11	60	14.37	100	23.26	140	31.94	180	40.47	220	48.89	260	57.23	300	65.49	340	73.69	380	81.83
21	5.35	61	14.60	101	23.48	141	32.15	181	40.68	221	49.10	261	57.44	301	65.69	341	73.89	381	82.03
22	5.59	62	14.83	102	23.70	142	32.37	182	40.89	222	49.31	262	57.64	302	65.90	342	74.09	382	82.23
23	5.82	63	15.05	103	23.92	143	32.58	183	41.11	223	49.52	263	57.85	303	66.11	343	74.30	383	82.44
24	6.06	64	15.28	104	24.14	144	32.80	184	41.32	224	49.73	264	58.06	304	66.31	344	74.50	384	82.64
25	6.30	65	15.50	105	24.36	145	33.01	185	41.53	225	49.94	265	58.26	305	66.52	345	74.71	385	82.84
26	6.54	66	15.73	106	24.57	146	33.23	186	41.74	226	50.15	266	58.47	306	66.72	346	74.91	386	83.04
27	6.77	67	15.95	107	24.79	147	33.44	187	41.95	227	50.36	267	58.68	307	66.93	347	75.11	387	83.25
28	7.01	68	16.17	108	25.01	148	33.65	188	42.16	228	50.57	268	58.89	308	67.13	348	75.32	388	83.45
29	7.25	69	16.40	109	25.23	149	33.87	189	42.37	229	50.78	269	59.09	309	67.34	349	75.52	389	83.65
30	7.48	70	16.62	110	25.45	150	34.08	190	42.59	230	50.99	270	59.30	310	67.54	350	75.73	390	83.85
31	7.72	71	16.85	111	25.66	151	34.30	191	42.80	231	51.19	271	59.51	311	67.75	351	75.93	391	84.06
32	7.95	72	17.07	112	25.88	152	34.51	192	43.01	232	51.40	272	59.71	312	67.95	352	76.13	392	84.26
33	8.18	73	17.29	113	26.10	153	34.72	193	43.22	233	51.61	273	59.92	313	68.16	353	76.34	393	84.46
34	8.42	74	17.52	114	26.32	154	34.94	194	43.43	234	51.82	274	60.13	314	68.36	354	76.54	394	84.66
35	8.65	75	17.74	115	26.53	155	35.15	195	43.64	235	52.03	275	60.33	315	68.57	355	76.74	395	84.87
36	8.88	76	17.96	116	26.75	156	35.37	196	43.85	236	52.24	276	60.54	316	68.77	356	76.95	396	85.07
37	9.12	77	18.18	117	26.97	157	35.58	197	44.06	237	52.45	277	60.75	317	68.98	357	77.15	397	85.27
38	9.35	78	18.41	118	27.19	158	35.79	198	44.27	238	52.65	278	60.95	318	69.18	358	77.36	398	85.47
39	9.58	79	18.63	119	27.40	159	36.01	199	44.48	239	52.86	279	61.16	319	69.39	359	77.56	399	85.68
40	9.81	80	18.85	120	27.62	160	36.22	200	44.69	240	53.07	280	61.37	320	69.59	360	77.76	400	85.88

Table 13.Acute Water Quality Standards for Dissolved Lead Aquatic and Wildlife coldwater, warmwater and edw

Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L
1	0.34	41	24.17	81	51.30	121	79.43	161	108.02	201	136.86	241	165.82	281	194.81	321	223.79	361	252.72
2	0.76	42	24.82	82	52.00	122	80.14	162	108.74	202	137.59	242	166.55	282	195.54	322	224.52	362	253.44
3	1.22	43	25.48	83	52.69	123	80.85	163	109.46	203	138.31	243	167.27	283	196.26	323	225.24	363	254.16
4	1.71	44	26.14	84	53.39	124	81.56	164	110.18	204	139.03	244	167.99	284	196.99	324	225.96	364	254.89
5	2.21	45	26.81	85	54.08	125	82.27	165	110.90	205	139.76	245	168.72	285	197.71	325	226.69	365	255.61
6	2.73	46	27.47	86	54.78	126	82.98	166	111.62	206	140.48	246	169.44	286	198.44	326	227.41	366	256.33
7	3.26	47	28.13	87	55.48	127	83.69	167	112.34	207	141.20	247	170.17	287	199.16	327	228.14	367	257.05

8	3.80	48	28.80	88	56.17	128	84.41	168	113.06	208	141.93	248	170.89	288	199.89	328	228.86	368	257.77
9	4.35	49	29.47	89	56.87	129	85.12	169	113.78	209	142.65	249	171.62	289	200.61	329	229.58	369	258.50
10	4.91	50	30.14	90	57.57	130	85.83	170	114.50	210	143.37	250	172.34	290	201.34	330	230.31	370	259.22
11	5.47	51	30.81	91	58.27	131	86.54	171	115.22	211	144.10	251	173.07	291	202.06	331	231.03	371	259.94
12	6.04	52	31.48	92	58.97	132	87.26	172	115.94	212	144.82	252	173.79	292	202.79	332	231.75	372	260.66
13	6.62	53	32.15	93	59.67	133	87.97	173	116.66	213	145.54	253	174.52	293	203.51	333	232.48	373	261.38
14	7.20	54	32.82	94	60.37	134	88.68	174	117.38	214	146.27	254	175.24	294	204.24	334	233.20	374	262.10
15	7.79	55	33.49	95	61.07	135	89.40	175	118.10	215	146.99	255	175.97	295	204.96	335	233.92	375	262.83
16	8.38	56	34.17	96	61.77	136	90.11	176	118.83	216	147.71	256	176.69	296	205.69	336	234.65	376	263.55
17	8.98	57	34.84	97	62.47	137	90.83	177	119.54	217	148.44	257	177.42	297	206.41	337	235.37	377	264.27
18	9.58	58	35.52	98	63.18	138	91.54	178	120.26	218	149.16	258	178.14	298	207.13	338	236.09	378	264.99
19	10.18	59	36.20	99	63.88	139	92.25	179	120.98	219	149.89	259	178.87	299	207.86	339	236.82	379	265.71
20	10.79	60	36.88	100	64.58	140	92.97	180	121.70	220	150.61	260	179.59	300	208.58	340	237.54	380	266.43
21	11.40	61	37.56	101	65.28	141	93.68	181	122.42	221	151.33	261	180.32	301	209.31	341	238.26	381	267.15
22	12.02	62	38.24	102	65.99	142	94.40	182	123.14	222	152.06	262	181.04	302	210.03	342	238.99	382	267.88
23	12.64	63	38.92	103	66.69	143	95.12	183	123.87	223	152.78	263	181.77	303	210.76	343	239.71	383	268.60
24	13.26	64	39.60	104	67.40	144	95.83	184	124.59	224	153.51	264	182.49	304	211.48	344	240.43	384	269.32
25	13.88	65	40.28	105	68.10	145	96.55	185	125.31	225	154.23	265	183.22	305	212.21	345	241.16	385	270.04
26	14.51	66	40.97	106	68.81	146	97.26	186	126.03	226	154.95	266	183.94	306	212.93	346	241.88	386	270.76
27	15.14	67	41.65	107	69.51	147	97.98	187	126.75	227	155.68	267	184.67	307	213.65	347	242.60	387	271.48
28	15.77	68	42.33	108	70.22	148	98.70	188	127.47	228	156.40	268	185.39	308	214.38	348	243.33	388	272.20
29	16.40	69	43.02	109	70.93	149	99.41	189	128.20	229	157.13	269	186.12	309	215.10	349	244.05	389	272.92
30	17.04	70	43.71	110	71.63	150	100.13	190	128.92	230	157.85	270	186.84	310	215.83	350	244.77	390	273.64
31	17.68	71	44.39	111	72.34	151	100.85	191	129.64	231	158.58	271	187.57	311	216.55	351	245.49	391	274.36
32	18.32	72	45.08	112	73.05	152	101.56	192	130.36	232	159.30	272	188.29	312	217.28	352	246.22	392	275.08
33	18.96	73	45.77	113	73.75	153	102.28	193	131.08	233	160.02	273	189.02	313	218.00	353	246.94	393	275.80
34	19.61	74	46.46	114	74.46	154	103.00	194	131.81	234	160.75	274	189.74	314	218.72	354	247.66	394	276.52
35	20.25	75	47.15	115	75.17	155	103.72	195	132.53	235	161.47	275	190.47	315	219.45	355	248.38	395	277.25
36	20.90	76	47.84	116	75.88	156	104.43	196	133.25	236	162.20	276	191.19	316	220.17	356	249.11	396	277.97
37	21.55	77	48.53	117	76.59	157	105.15	197	133.97	237	162.92	277	191.92	317	220.90	357	249.83	397	278.69
38	22.20	78	49.22	118	77.30	158	105.87	198	134.70	238	163.65	278	192.64	318	221.62	358	250.55	398	279.41
39	22.86	79	49.92	119	78.01	159	106.59	199	135.42	239	164.37	279	193.36	319	222.34	359	251.27	399	280.13
40	23.51	80	50.61	120	78.72	160	107.31	200	136.14	240	165.10	280	194.09	320	223.07	360	252.00	400	280.85

Table 14.Chronic Water Quality Standards for Dissolved Lead Aquatic and Wildlife coldwater, warmwater and edw

Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L
1	0.01	41	0.94	81	2.00	121	3.10	161	4.21	201	5.33	241	6.46	281	7.59	321	8.72	361	9.85
2	0.03	42	0.97	82	2.03	122	3.12	162	4.24	202	5.36	242	6.49	282	7.62	322	8.75	362	9.88
3	0.05	43	0.99	83	2.05	123	3.15	163	4.27	203	5.39	243	6.52	283	7.65	323	8.78	363	9.90
4	0.07	44	1.02	84	2.08	124	3.18	164	4.29	204	5.42	244	6.55	284	7.68	324	8.81	364	9.93
5	0.09	45	1.04	85	2.11	125	3.21	165	4.32	205	5.45	245	6.57	285	7.70	325	8.83	365	9.96
6	0.11	46	1.07	86	2.13	126	3.23	166	4.35	206	5.47	246	6.60	286	7.73	326	8.86	366	9.99
7	0.13	47	1.10	87	2.16	127	3.26	167	4.38	207	5.50	247	6.63	287	7.76	327	8.89	367	10.02

8	0.15	48	1.12	88	2.19	128	3.29	168	4.41	208	5.53	248	6.66	288	7.79	328	8.92	368	10.05
9	0.17	49	1.15	89	2.22	129	3.32	169	4.43	209	5.56	249	6.69	289	7.82	329	8.95	369	10.07
10	0.19	50	1.17	90	2.24	130	3.34	170	4.46	210	5.59	250	6.72	290	7.85	330	8.97	370	10.10
11	0.21	51	1.20	91	2.27	131	3.37	171	4.49	211	5.62	251	6.74	291	7.87	331	9.00	371	10.13
12	0.24	52	1.23	92	2.30	132	3.40	172	4.52	212	5.64	252	6.77	292	7.90	332	9.03	372	10.16
13	0.26	53	1.25	93	2.33	133	3.43	173	4.55	213	5.67	253	6.80	293	7.93	333	9.06	373	10.19
14	0.28	54	1.28	94	2.35	134	3.46	174	4.57	214	5.70	254	6.83	294	7.96	334	9.09	374	10.21
15	0.30	55	1.31	95	2.38	135	3.48	175	4.60	215	5.73	255	6.86	295	7.99	335	9.12	375	10.24
16	0.33	56	1.33	96	2.41	136	3.51	176	4.63	216	5.76	256	6.89	296	8.02	336	9.14	376	10.27
17	0.35	57	1.36	97	2.43	137	3.54	177	4.66	217	5.78	257	6.91	297	8.04	337	9.17	377	10.30
18	0.37	58	1.38	98	2.46	138	3.57	178	4.69	218	5.81	258	6.94	298	8.07	338	9.20	378	10.33
19	0.40	59	1.41	99	2.49	139	3.60	179	4.71	219	5.84	259	6.97	299	8.10	339	9.23	379	10.35
20	0.42	60	1.44	100	2.52	140	3.62	180	4.74	220	5.87	260	7.00	300	8.13	340	9.26	380	10.38
21	0.44	61	1.46	101	2.54	141	3.65	181	4.77	221	5.90	261	7.03	301	8.16	341	9.28	381	10.41
22	0.47	62	1.49	102	2.57	142	3.68	182	4.80	222	5.93	262	7.05	302	8.18	342	9.31	382	10.44
23	0.49	63	1.52	103	2.60	143	3.71	183	4.83	223	5.95	263	7.08	303	8.21	343	9.34	383	10.47
24	0.52	64	1.54	104	2.63	144	3.73	184	4.85	224	5.98	264	7.11	304	8.24	344	9.37	384	10.49
25	0.54	65	1.57	105	2.65	145	3.76	185	4.88	225	6.01	265	7.14	305	8.27	345	9.40	385	10.52
26	0.57	66	1.60	106	2.68	146	3.79	186	4.91	226	6.04	266	7.17	306	8.30	346	9.43	386	10.55
27	0.59	67	1.62	107	2.71	147	3.82	187	4.94	227	6.07	267	7.20	307	8.33	347	9.45	387	10.58
28	0.61	68	1.65	108	2.74	148	3.85	188	4.97	228	6.09	268	7.22	308	8.35	348	9.48	388	10.61
29	0.64	69	1.68	109	2.76	149	3.87	189	5.00	229	6.12	269	7.25	309	8.38	349	9.51	389	10.64
30	0.66	70	1.70	110	2.79	150	3.90	190	5.02	230	6.15	270	7.28	310	8.41	350	9.54	390	10.66
31	0.69	71	1.73	111	2.82	151	3.93	191	5.05	231	6.18	271	7.31	311	8.44	351	9.57	391	10.69
32	0.71	72	1.76	112	2.85	152	3.96	192	5.08	232	6.21	272	7.34	312	8.47	352	9.59	392	10.72
33	0.74	73	1.78	113	2.87	153	3.99	193	5.11	233	6.24	273	7.37	313	8.50	353	9.62	393	10.75
34	0.76	74	1.81	114	2.90	154	4.01	194	5.14	234	6.26	274	7.39	314	8.52	354	9.65	394	10.78
35	0.79	75	1.84	115	2.93	155	4.04	195	5.16	235	6.29	275	7.42	315	8.55	355	9.68	395	10.80
36	0.81	76	1.86	116	2.96	156	4.07	196	5.19	236	6.32	276	7.45	316	8.58	356	9.71	396	10.83
37	0.84	77	1.89	117	2.98	157	4.10	197	5.22	237	6.35	277	7.48	317	8.61	357	9.74	397	10.86
38	0.87	78	1.92	118	3.01	158	4.13	198	5.25	238	6.38	278	7.51	318	8.64	358	9.76	398	10.89
39	0.89	79	1.95	119	3.04	159	4.15	199	5.28	239	6.41	279	7.54	319	8.66	359	9.79	399	10.92
40	0.92	80	1.97	120	3.07	160	4.18	200	5.31	240	6.43	280	7.56	320	8.69	360	9.82	400	10.94

Table 15.Acute Water Quality Standards for Dissolved Lead Aquatic and Wildlife ephemeral

Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L
1	0.72	41	51.00	81	108.27	121	167.63	161	227.98	201	288.85	241	349.96	281	411.15	321	472.30	361	533.35
2	1.61	42	52.39	82	109.74	122	169.13	162	229.50	202	290.37	242	351.49	282	412.68	322	473.83	362	534.87
3	2.58	43	53.78	83	111.21	123	170.63	163	231.01	203	291.90	243	353.02	283	414.21	323	475.36	363	536.40
4	3.61	44	55.18	84	112.67	124	172.13	164	232.53	204	293.42	244	354.54	284	415.73	324	476.89	364	537.92
5	4.67	45	56.57	85	114.14	125	173.63	165	234.05	205	294.95	245	356.07	285	417.26	325	478.41	365	539.45

6	5.76	46	57.97	86	115.61	126	175.13	166	235.57	206	296.48	246	357.60	286	418.79	326	479.94	366	540.97
7	6.88	47	59.38	87	117.08	127	176.63	167	237.08	207	298.00	247	359.13	287	420.32	327	481.47	367	542.49
8	8.02	48	60.78	88	118.55	128	178.13	168	238.60	208	299.53	248	360.66	288	421.85	328	483.00	368	544.02
9	9.18	49	62.19	89	120.03	129	179.64	169	240.12	209	301.05	249	362.19	289	423.38	329	484.52	369	545.54
10	10.35	50	63.60	90	121.50	130	181.14	170	241.64	210	302.58	250	363.72	290	424.91	330	486.05	370	547.06
11	11.54	51	65.01	91	122.98	131	182.65	171	243.16	211	304.11	251	365.25	291	426.44	331	487.58	371	548.59
12	12.75	52	66.43	92	124.45	132	184.15	172	244.68	212	305.64	252	366.78	292	427.97	332	489.10	372	550.11
13	13.97	53	67.85	93	125.93	133	185.66	173	246.20	213	307.16	253	368.31	293	429.50	333	490.63	373	551.63
14	15.20	54	69.26	94	127.41	134	187.16	174	247.72	214	308.69	254	369.84	294	431.03	334	492.16	374	553.16
15	16.44	55	70.69	95	128.89	135	188.67	175	249.24	215	310.22	255	371.37	295	432.56	335	493.68	375	554.68
16	17.69	56	72.11	96	130.37	136	190.17	176	250.76	216	311.74	256	372.90	296	434.09	336	495.21	376	556.20
17	18.95	57	73.54	97	131.85	137	191.68	177	252.28	217	313.27	257	374.43	297	435.62	337	496.74	377	557.72
18	20.21	58	74.96	98	133.33	138	193.19	178	253.80	218	314.80	258	375.96	298	437.15	338	498.26	378	559.25
19	21.49	59	76.39	99	134.81	139	194.70	179	255.32	219	316.33	259	377.49	299	438.68	339	499.79	379	560.77
20	22.77	60	77.83	100	136.30	140	196.21	180	256.85	220	317.85	260	379.02	300	440.20	340	501.32	380	562.29
21	24.07	61	79.26	101	137.78	141	197.72	181	258.37	221	319.38	261	380.55	301	441.73	341	502.84	381	563.81
22	25.36	62	80.70	102	139.27	142	199.23	182	259.89	222	320.91	262	382.08	302	443.26	342	504.37	382	565.34
23	26.67	63	82.13	103	140.75	143	200.74	183	261.41	223	322.44	263	383.61	303	444.79	343	505.90	383	566.86
24	27.98	64	83.57	104	142.24	144	202.25	184	262.93	224	323.97	264	385.14	304	446.32	344	507.42	384	568.38
25	29.30	65	85.01	105	143.73	145	203.76	185	264.46	225	325.49	265	386.67	305	447.85	345	508.95	385	569.90
26	30.62	66	86.46	106	145.21	146	205.27	186	265.98	226	327.02	266	388.20	306	449.38	346	510.47	386	571.42
27	31.95	67	87.90	107	146.70	147	206.78	187	267.50	227	328.55	267	389.73	307	450.91	347	512.00	387	572.94
28	33.28	68	89.35	108	148.19	148	208.29	188	269.03	228	330.08	268	391.26	308	452.44	348	513.53	388	574.47
29	34.62	69	90.79	109	149.68	149	209.80	189	270.55	229	331.61	269	392.79	309	453.96	349	515.05	389	575.99
30	35.96	70	92.24	110	151.18	150	211.32	190	272.07	230	333.14	270	394.32	310	455.49	350	516.58	390	577.51
31	37.31	71	93.69	111	152.67	151	212.83	191	273.60	231	334.67	271	395.85	311	457.02	351	518.10	391	579.03
32	38.66	72	95.14	112	154.16	152	214.34	192	275.12	232	336.19	272	397.38	312	458.55	352	519.63	392	580.55
33	40.02	73	96.60	113	155.65	153	215.86	193	276.65	233	337.72	273	398.91	313	460.08	353	521.15	393	582.07
34	41.38	74	98.05	114	157.15	154	217.37	194	278.17	234	339.25	274	400.44	314	461.61	354	522.68	394	583.59
35	42.74	75	99.51	115	158.64	155	218.89	195	279.69	235	340.78	275	401.97	315	463.13	355	524.20	395	585.11
36	44.11	76	100.97	116	160.14	156	220.40	196	281.22	236	342.31	276	403.50	316	464.66	356	525.73	396	586.63
37	45.48	77	102.43	117	161.64	157	221.92	197	282.74	237	343.84	277	405.03	317	466.19	357	527.25	397	588.15
38	46.86	78	103.89	118	163.13	158	223.43	198	284.27	238	345.37	278	406.56	318	467.72	358	528.78	398	589.67
39	48.24	79	105.35	119	164.63	159	224.95	199	285.79	239	346.90	279	408.09	319	469.25	359	530.30	399	591.19
40	49.62	80	106.81	120	166.13	160	226.46	200	287.32	240	348.43	280	409.62	320	470.77	360	531.83	400	592.71

Table 16.Acute Water Quality Standards for Dissolved Nickel Aquatic and Wildlife coldwater, warmwater and edw

Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L
1	10	41	220	81	392	121	550	161	701	201	845	241	985	281	1122	321	1256	361	1387
2	17	42	225	82	396	122	554	162	704	202	849	242	989	282	1126	322	1259	362	1390
3	24	43	229	83	400	123	558	163	708	203	852	243	992	283	1129	323	1263	363	1394
4	31	44	234	84	404	124	562	164	712	204	856	244	996	284	1132	324	1266	364	1397
5	37	45	238	85	408	125	566	165	715	205	859	245	999	285	1136	325	1269	365	1400
6	43	46	243	86	412	126	569	166	719	206	863	246	1003	286	1139	326	1272	366	1403
7	49	47	247	87	416	127	573	167	723	207	867	247	1006	287	1142	327	1276	367	1407
8	55	48	252	88	420	128	577	168	726	208	870	248	1010	288	1146	328	1279	368	1410
9	61	49	256	89	424	129	581	169	730	209	874	249	1013	289	1149	329	1282	369	1413
10	67	50	260	90	428	130	585	170	734	210	877	250	1017	290	1153	330	1286	370	1416

11	72	51	265	91	432	131	588	171	737	211	881	251	1020	291	1156	331	1289	371	1420
12	78	52	269	92	436	132	592	172	741	212	884	252	1023	292	1159	332	1292	372	1423
13	83	53	274	93	440	133	596	173	744	213	888	253	1027	293	1163	333	1296	373	1426
14	89	54	278	94	444	134	600	174	748	214	891	254	1030	294	1166	334	1299	374	1429
15	94	55	282	95	448	135	604	175	752	215	895	255	1034	295	1169	335	1302	375	1433
16	99	56	287	96	452	136	607	176	755	216	898	256	1037	296	1173	336	1305	376	1436
17	105	57	291	97	456	137	611	177	759	217	902	257	1041	297	1176	337	1309	377	1439
18	110	58	295	98	460	138	615	178	763	218	905	258	1044	298	1179	338	1312	378	1442
19	115	59	300	99	464	139	619	179	766	219	909	259	1047	299	1183	339	1315	379	1445
20	120	60	304	100	468	140	622	180	770	220	912	260	1051	300	1186	340	1319	380	1449
21	125	61	308	101	472	141	626	181	774	221	916	261	1054	301	1189	341	1322	381	1452
22	130	62	312	102	476	142	630	182	777	222	919	262	1058	302	1193	342	1325	382	1455
23	135	63	317	103	480	143	634	183	781	223	923	263	1061	303	1196	343	1328	383	1458
24	140	64	321	104	484	144	637	184	784	224	926	264	1064	304	1199	344	1332	384	1462
25	145	65	325	105	488	145	641	185	788	225	930	265	1068	305	1203	345	1335	385	1465
26	150	66	329	106	492	146	645	186	792	226	933	266	1071	306	1206	346	1338	386	1468
27	155	67	334	107	496	147	649	187	795	227	937	267	1075	307	1209	347	1341	387	1471
28	159	68	338	108	500	148	652	188	799	228	940	268	1078	308	1213	348	1345	388	1474
29	164	69	342	109	504	149	656	189	802	229	944	269	1082	309	1216	349	1348	389	1478
30	169	70	346	110	508	150	660	190	806	230	947	270	1085	310	1219	350	1351	390	1481
31	174	71	350	111	511	151	664	191	810	231	951	271	1088	311	1223	351	1355	391	1484
32	179	72	355	112	515	152	667	192	813	232	954	272	1092	312	1226	352	1358	392	1487
33	183	73	359	113	519	153	671	193	817	233	958	273	1095	313	1229	353	1361	393	1490
34	188	74	363	114	523	154	675	194	820	234	961	274	1099	314	1233	354	1364	394	1494
35	193	75	367	115	527	155	678	195	824	235	965	275	1102	315	1236	355	1368	395	1497
36	197	76	371	116	531	156	682	196	827	236	968	276	1105	316	1239	356	1371	396	1500
37	202	77	375	117	535	157	686	197	831	237	972	277	1109	317	1243	357	1374	397	1503
38	207	78	379	118	539	158	689	198	835	238	975	278	1112	318	1246	358	1377	398	1506
39	211	79	384	119	542	159	693	199	838	239	979	279	1115	319	1249	359	1381	399	1510
40	216	80	288	120	546	160	697	200	842	240	982	280	1119	320	1253	360	1384	400	1513

Table 17.Chronic Water Quality Standards for Dissolved Nickel-Aquatic and Wildlife-coldwater, warmwater and edw

Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L
1	1.06	41	24.46	81	43.51	121	61.11	161	77.81	201	93.88	241	109.46	281	124.64	321	139.50	361	154.07
2	1.90	42	24.96	82	43.97	122	61.53	162	78.22	202	94.27	242	109.84	282	125.02	322	139.86	362	154.43
3	2.68	43	25.47	83	44.42	123	61.96	163	78.63	203	94.67	243	110.23	283	125.39	323	140.23	363	154.79
4	3.42	44	25.97	84	44.87	124	62.39	164	79.03	204	95.06	244	110.61	284	125.77	324	140.60	364	155.15
5	4.12	45	26.47	85	45.33	125	62.81	165	79.44	205	95.46	245	110.99	285	126.14	325	140.96	365	155.51
6	4.81	46	26.96	86	45.78	126	63.24	166	79.85	206	95.85	246	111.38	286	126.52	326	141.33	366	155.87
7	5.48	47	27.46	87	46.23	127	63.66	167	80.26	207	96.24	247	111.76	287	126.89	327	141.70	367	156.23
8	6.14	48	27.95	88	46.68	128	64.09	168	80.66	208	96.64	248	112.14	288	127.26	328	142.07	368	156.59
9	6.78	49	28.44	89	47.12	129	64.51	169	81.07	209	97.03	249	112.52	289	127.64	329	142.43	369	156.95
10	7.41	50	28.93	90	47.57	130	64.93	170	81.47	210	97.42	250	112.91	290	128.01	330	142.80	370	157.31
11	8.04	51	29.42	91	48.02	131	65.35	171	81.88	211	97.81	251	113.29	291	128.38	331	143.16	371	157.67
12	8.65	52	29.91	92	48.46	132	65.78	172	82.28	212	98.21	252	113.67	292	128.76	332	143.53	372	158.03
13	9.26	53	30.39	93	48.91	133	66.20	173	82.69	213	98.60	253	114.05	293	129.13	333	143.90	373	158.39

14	9.86	54	30.88	94	49.35	134	66.62	174	83.09	214	98.99	254	114.43	294	129.50	334	144.26	374	158.75
15	10.45	55	31.36	95	49.80	135	67.04	175	83.50	215	99.38	255	114.81	295	129.88	335	144.63	375	159.11
16	11.03	56	31.84	96	50.24	136	67.46	176	83.90	216	99.77	256	115.19	296	130.25	336	144.99	376	159.47
17	11.61	57	32.32	97	50.68	137	67.88	177	84.30	217	100.16	257	115.57	297	130.62	337	145.36	377	159.82
18	12.19	58	32.80	98	51.13	138	68.30	178	84.71	218	100.55	258	115.95	298	130.99	338	145.72	378	160.18
19	12.76	59	33.28	99	51.57	139	68.71	179	85.11	219	100.94	259	116.33	299	131.36	339	146.09	379	160.54
20	13.33	60	33.76	100	52.01	140	69.13	180	85.51	220	101.33	260	116.71	300	131.74	340	146.45	380	160.90
21	13.89	61	34.23	101	52.45	141	69.55	181	85.91	221	101.72	261	117.09	301	132.11	341	146.81	381	161.26
22	14.45	62	34.71	102	52.89	142	69.97	182	86.31	222	102.11	262	117.47	302	132.48	342	147.18	382	161.62
23	15.00	63	35.18	103	53.32	143	70.38	183	86.71	223	102.50	263	117.85	303	132.85	343	147.54	383	161.97
24	15.55	64	35.65	104	53.76	144	70.80	184	87.12	224	102.89	264	118.23	304	133.22	344	147.91	384	162.33
25	16.10	65	36.12	105	54.20	145	71.22	185	87.52	225	103.28	265	118.61	305	133.59	345	148.27	385	162.69
26	16.64	66	36.59	106	54.63	146	71.63	186	87.92	226	103.67	266	118.99	306	133.96	346	148.63	386	163.05
27	17.18	67	37.06	107	55.07	147	72.05	187	88.32	227	104.05	267	119.37	307	134.33	347	149.00	387	163.40
28	17.72	68	37.53	108	55.51	148	72.46	188	88.71	228	104.44	268	119.75	308	134.70	348	149.36	388	163.76
29	18.25	69	37.99	109	55.94	149	72.87	189	89.11	229	104.83	269	120.12	309	135.07	349	149.72	389	164.12
30	18.78	70	38.46	110	56.37	150	73.29	190	89.51	230	105.22	270	120.50	310	135.44	350	150.09	390	164.47
31	19.31	71	38.92	111	56.81	151	73.70	191	89.91	231	105.60	271	120.88	311	135.81	351	150.45	391	164.83
32	19.83	72	39.39	112	57.24	152	74.11	192	90.31	232	105.99	272	121.26	312	136.18	352	150.81	392	165.19
33	20.36	73	39.85	113	57.67	153	74.53	193	90.71	233	106.38	273	121.63	313	136.55	353	151.17	393	165.54
34	20.88	74	40.31	114	58.10	154	74.94	194	91.10	234	106.76	274	122.01	314	136.92	354	151.54	394	165.90
35	21.40	75	40.77	115	58.53	155	75.35	195	91.50	235	107.15	275	122.39	315	137.29	355	151.90	395	166.26
36	21.91	76	41.23	116	58.96	156	75.76	196	91.90	236	107.53	276	122.76	316	137.66	356	152.26	396	166.61
37	22.43	77	41.69	117	59.39	157	76.17	197	92.29	237	107.92	277	123.14	317	138.02	357	152.62	397	166.97
38	22.94	78	42.15	118	59.82	158	76.58	198	92.69	238	108.30	278	123.52	318	138.39	358	152.98	398	167.32
39	23.45	79	42.60	119	60.25	159	76.99	199	93.09	239	108.69	279	123.89	319	138.76	359	153.34	399	167.68
40	23.96	80	43.06	120	60.68	160	77.40	200	93.48	240	109.07	280	124.27	320	139.13	360	153.71	400	168.04

Table 18.Acute Water Quality Standards for Dissolved Nickel Aquatic and Wildlife ephemeral

Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L
1	85	41	1956	81	3479	121	4886	161	6221	201	7506	241	8752	281	9966	321	11154	361	12319
2	152	42	1996	82	3516	122	4920	162	6254	202	7538	242	8783	282	9996	322	11183	362	12348
3	214	43	2036	83	3552	123	4954	163	6287	203	7569	243	8813	283	10026	323	11213	363	12377
4	273	44	2076	84	3588	124	4988	164	6319	204	7601	244	8844	284	10056	324	11242	364	12405
5	330	45	2116	85	3624	125	5022	165	6352	205	7632	245	8875	285	10086	325	11271	365	12434
6	385	46	2156	86	3660	126	5056	166	6385	206	7664	246	8905	286	10116	326	11301	366	12463
7	438	47	2195	87	3696	127	5090	167	6417	207	7695	247	8936	287	10146	327	11330	367	12492
8	491	48	2235	88	3732	128	5124	168	6450	208	7727	248	8967	288	10176	328	11359	368	12521
9	542	49	2274	89	3768	129	5158	169	6482	209	7758	249	8997	289	10206	329	11389	369	12549
10	593	50	2313	90	3804	130	5192	170	6514	210	7790	250	9028	290	10235	330	11418	370	12578
11	643	51	2352	91	3839	131	5226	171	6547	211	7821	251	9058	291	10265	331	11447	371	12607
12	692	52	2391	92	3875	132	5259	172	6579	212	7852	252	9089	292	10295	332	11476	372	12636
13	740	53	2430	93	3911	133	5293	173	6612	213	7884	253	9119	293	10325	333	11506	373	12664
14	788	54	2469	94	3946	134	5327	174	6644	214	7915	254	9150	294	10355	334	11535	374	12693

15	835	55	2508	95	3982	135	5360	175	6676	215	7946	255	9180	295	10385	335	11564	375	12722
16	882	56	2546	96	4017	136	5394	176	6708	216	7978	256	9211	296	10414	336	11593	376	12751
17	929	57	2585	97	4053	137	5427	177	6741	217	8009	257	9241	297	10444	337	11622	377	12779
18	975	58	2623	98	4088	138	5461	178	6773	218	8040	258	9272	298	10474	338	11652	378	12808
19	1020	59	2661	99	4123	139	5494	179	6805	219	8071	259	9302	299	10504	339	11681	379	12837
20	1066	60	2699	100	4158	140	5528	180	6837	220	8102	260	9332	300	10533	340	11710	380	12865
21	1110	61	2737	101	4193	141	5561	181	6869	221	8133	261	9363	301	10563	341	11739	381	12894
22	1155	62	2775	102	4229	142	5594	182	6901	222	8165	262	9393	302	10593	342	11768	382	12922
23	1199	63	2813	103	4264	143	5628	183	6934	223	8196	263	9423	303	10622	343	11797	383	12951
24	1243	64	2851	104	4299	144	5661	184	6966	224	8227	264	9454	304	10652	344	11826	384	12980
25	1287	65	2888	105	4334	145	5694	185	6998	225	8258	265	9484	305	10682	345	11855	385	13008
26	1330	66	2926	106	4368	146	5727	186	7030	226	8289	266	9514	306	10711	346	11884	386	13037
27	1374	67	2963	107	4403	147	5761	187	7062	227	8320	267	9544	307	10741	347	11913	387	13065
28	1416	68	3001	108	4438	148	5794	188	7093	228	8351	268	9575	308	10770	348	11943	388	13094
29	1459	69	3038	109	4473	149	5827	189	7125	229	8382	269	9605	309	10800	349	11972	389	13123
30	1502	70	3075	110	4508	150	5860	190	7157	230	8413	270	9635	310	10830	350	12001	390	13151
31	1544	71	3112	111	4542	151	5893	191	7189	231	8444	271	9665	311	10859	351	12030	391	13180
32	1586	72	3149	112	4577	152	5926	192	7221	232	8475	272	9695	312	10889	352	12059	392	13208
33	1628	73	3186	113	4611	153	5959	193	7253	233	8506	273	9726	313	10918	353	12088	393	13237
34	1669	74	3223	114	4646	154	5992	194	7285	234	8536	274	9756	314	10948	354	12116	394	13265
35	1711	75	3260	115	4680	155	6025	195	7316	235	8567	275	9786	315	10977	355	12145	395	13294
36	1752	76	3297	116	4715	156	6058	196	7348	236	8598	276	9816	316	11007	356	12174	396	13322
37	1793	77	3333	117	4749	157	6090	197	7380	237	8629	277	9846	317	11036	357	12203	397	13350
38	1834	78	3370	118	4782	158	6123	198	7411	238	8660	278	9876	318	11066	358	12232	398	13379
39	1875	79	3407	119	4818	159	6156	199	7443	239	8691	279	9906	319	11095	359	12261	399	13407
40	1915	80	3443	120	4852	160	6189	200	7475	240	8721	280	9936	320	11124	360	12290	400	13436

Table 19.Water Quality Standards for Dissolved Silver Aquatic and Wildlife coldwater, warmwater, edw, and ephemeral

Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L
1	0.001	41	0.69	81	2.24	121	4.46	161	7.30	201	10.69	241	14.60	281	19.02	321	23.91	361	29.26
2	0.004	42	0.72	82	2.29	122	4.53	162	7.38	202	10.78	242	14.71	282	19.14	322	24.04	362	29.40
3	0.01	43	0.75	83	2.33	123	4.59	163	7.45	203	10.87	243	14.81	283	19.25	323	24.17	363	29.54
4	0.01	44	0.78	84	2.38	124	4.66	164	7.53	204	10.96	244	14.92	284	19.37	324	24.30	364	29.68
5	0.02	45	0.81	85	2.43	125	4.72	165	7.61	205	11.06	245	15.02	285	19.49	325	24.43	365	29.82
6	0.03	46	0.85	86	2.48	126	4.79	166	7.69	206	11.15	246	15.13	286	19.61	326	24.56	366	29.96
7	0.03	47	0.88	87	2.53	127	4.85	167	7.77	207	11.24	247	15.24	287	19.72	327	24.69	367	30.11
8	0.04	48	0.91	88	2.58	128	4.92	168	7.85	208	11.34	248	15.34	288	19.84	328	24.82	368	30.25
9	0.05	49	0.94	89	2.63	129	4.98	169	7.93	209	11.43	249	15.45	289	19.96	329	24.95	369	30.39
10	0.06	50	0.98	90	2.68	130	5.05	170	8.01	210	11.52	250	15.56	290	20.08	330	25.08	370	30.53
11	0.07	51	1.01	91	2.74	131	5.12	171	8.09	211	11.62	251	15.66	291	20.20	331	25.21	371	30.67
12	0.08	52	1.04	92	2.79	132	5.19	172	8.18	212	11.71	252	15.77	292	20.32	332	25.34	372	30.81
13	0.10	53	1.08	93	2.84	133	5.25	173	8.26	213	11.81	253	15.88	293	20.44	333	25.47	373	30.96
14	0.11	54	1.11	94	2.89	134	5.32	174	8.34	214	11.91	254	15.99	294	20.56	334	25.60	374	31.10
15	0.12	55	1.15	95	2.95	135	5.39	175	8.42	215	12.00	255	16.09	295	20.68	335	25.73	375	31.24

16	0.14	56	1.19	96	3.00	136	5.46	176	8.51	216	12.10	256	16.20	296	20.80	336	25.87	376	31.39
17	0.15	57	1.22	97	3.05	137	5.53	177	8.59	217	12.19	257	16.31	297	20.92	337	26.00	377	31.53
18	0.17	58	1.26	98	3.11	138	5.60	178	8.67	218	12.29	258	16.42	298	21.04	338	26.13	378	31.67
19	0.18	59	1.30	99	3.16	139	5.67	179	8.76	219	12.39	259	16.53	299	21.16	339	26.26	379	31.82
20	0.20	60	1.34	100	3.22	140	5.74	180	8.84	220	12.48	260	16.64	300	21.28	340	26.40	380	31.96
21	0.22	61	1.37	101	3.27	141	5.81	181	8.93	221	12.58	261	16.75	301	21.41	341	26.53	381	32.11
22	0.24	62	1.41	102	3.33	142	5.88	182	9.01	222	12.68	262	16.86	302	21.53	342	26.67	382	32.25
23	0.26	63	1.45	103	3.38	143	5.95	183	9.10	223	12.78	263	16.97	303	21.65	343	26.80	383	32.40
24	0.28	64	1.49	104	3.44	144	6.02	184	9.18	224	12.88	264	17.08	304	21.78	344	26.93	384	32.54
25	0.30	65	1.53	105	3.50	145	6.09	185	9.27	225	12.98	265	17.19	305	21.90	345	27.07	385	32.69
26	0.32	66	1.57	106	3.56	146	6.17	186	9.35	226	13.08	266	17.31	306	22.02	346	27.20	386	32.84
27	0.34	67	1.62	107	3.61	147	6.24	187	9.44	227	13.18	267	17.42	307	22.15	347	27.34	387	32.98
28	0.36	68	1.66	108	3.67	148	6.31	188	9.53	228	13.28	268	17.53	308	22.27	348	27.47	388	33.13
29	0.38	69	1.70	109	3.73	149	6.39	189	9.61	229	13.38	269	17.64	309	22.39	349	27.61	389	33.28
30	0.41	70	1.74	110	3.79	150	6.46	190	9.70	230	13.48	270	17.76	310	22.52	350	27.75	390	33.42
31	0.43	71	1.78	111	3.85	151	6.54	191	9.79	231	13.58	271	17.87	311	22.64	351	27.88	391	33.57
32	0.45	72	1.83	112	3.91	152	6.61	192	9.88	232	13.68	272	17.98	312	22.77	352	28.02	392	33.72
33	0.48	73	1.87	113	3.97	153	6.68	193	9.97	233	13.78	273	18.10	313	22.90	353	28.16	393	33.87
34	0.50	74	1.92	114	4.03	154	6.76	194	10.06	234	13.88	274	18.21	314	23.02	354	28.29	394	34.02
35	0.53	75	1.96	115	4.09	155	6.84	195	10.15	235	13.98	275	18.33	315	23.15	355	28.43	395	34.16
36	0.55	76	2.01	116	4.15	156	6.91	196	10.24	236	14.09	276	18.44	316	23.27	356	28.57	396	34.31
37	0.58	77	2.05	117	4.21	157	6.99	197	10.33	237	14.19	277	18.56	317	23.40	357	28.71	397	34.46
38	0.61	78	2.10	118	4.28	158	7.06	198	10.42	238	14.29	278	18.67	318	23.53	358	28.85	398	34.61
39	0.64	79	2.14	119	4.34	159	7.14	199	10.51	239	14.40	279	18.79	319	23.66	359	28.99	399	34.76
40	0.67	80	2.19	120	4.40	160	7.22	200	10.60	240	14.50	280	18.90	320	23.78	360	29.12	400	34.91

Table 20.Acute and Chronic Water Quality Standards for Dissolved Zinc Aquatic and Wildlife coldwater, warmwater and edw

Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L
1	2.4	41	55.1	81	98.0	121	137.7	161	175.4	201	211.7	241	246.9	281	281.2	321	314.8	361	347.7
2	4.3	42	56.2	82	99.0	122	138.7	162	176.4	202	212.6	242	247.8	282	282.1	322	315.6	362	348.5
3	6.0	43	57.3	83	100.1	123	139.6	163	177.3	203	213.5	243	248.6	283	282.9	323	316.4	363	349.4
4	7.7	44	58.4	84	101.1	124	140.6	164	178.2	204	214.4	244	249.5	284	283.8	324	317.3	364	350.2
5	9.3	45	59.6	85	102.1	125	141.6	165	179.1	205	215.3	245	250.4	285	284.6	325	318.1	365	351.0
6	10.8	46	60.7	86	103.1	126	142.5	166	180.0	206	216.2	246	251.2	286	285.5	326	318.9	366	351.8
7	12.3	47	61.8	87	104.1	127	143.5	167	181.0	207	217.1	247	252.1	287	286.3	327	319.8	367	352.6
8	13.8	48	62.9	88	105.2	128	144.4	168	181.9	208	217.9	248	253.0	288	287.1	328	320.6	368	353.4
9	15.2	49	64.0	89	106.2	129	145.4	169	182.8	209	218.8	249	253.8	289	288.0	329	321.4	369	354.2
10	16.7	50	65.1	90	107.2	130	146.4	170	183.7	210	219.7	250	254.7	290	288.8	330	322.2	370	355.1

11	18.1	51	66.2	91	108.2	131	147.3	171	184.6	211	220.6	251	255.6	291	289.7	331	323.1	371	355.9
12	19.4	52	67.3	92	109.2	132	148.3	172	185.5	212	221.5	252	256.4	292	290.5	332	323.9	372	356.7
13	20.8	53	68.4	93	110.2	133	149.2	173	186.4	213	222.4	253	257.3	293	291.4	333	324.7	373	357.5
14	22.1	54	69.5	94	111.2	134	150.2	174	187.4	214	223.3	254	258.1	294	292.2	334	325.6	374	358.3
15	23.5	55	70.6	95	112.2	135	151.1	175	188.3	215	224.1	255	259.0	295	293.0	335	326.4	375	359.1
16	24.8	56	71.7	96	113.2	136	152.1	176	189.2	216	225.0	256	259.9	296	293.9	336	327.2	376	359.9
17	26.1	57	72.8	97	114.2	137	153.0	177	190.1	217	225.9	257	260.7	297	294.7	337	328.0	377	360.7
18	27.4	58	73.9	98	115.2	138	153.9	178	191.0	218	226.8	258	261.6	298	295.6	338	328.9	378	361.5
19	28.7	59	74.9	99	116.2	139	154.9	179	191.9	219	227.7	259	262.4	299	296.4	339	329.7	379	362.4
20	30.0	60	76.0	100	117.2	140	155.8	180	192.8	220	228.6	260	263.3	300	297.2	340	330.5	380	363.2
21	31.2	61	77.1	101	118.2	141	156.8	181	193.7	221	229.4	261	264.2	301	298.1	341	331.3	381	364.0
22	32.5	62	78.2	102	119.2	142	157.7	182	194.6	222	230.3	262	265.0	302	298.9	342	332.2	382	364.8
23	33.7	63	79.2	103	120.2	143	158.7	183	195.5	223	231.2	263	265.9	303	299.8	343	333.0	383	365.6
24	35.0	64	80.3	104	121.1	144	159.6	184	196.4	224	232.1	264	266.7	304	300.6	344	333.8	384	366.4
25	36.2	65	81.3	105	122.1	145	160.5	185	197.3	225	232.9	265	267.6	305	301.4	345	334.6	385	367.2
26	37.4	66	82.4	106	123.1	146	161.5	186	198.3	226	233.8	266	268.4	306	302.3	346	335.4	386	368.0
27	38.6	67	83.5	107	124.1	147	162.4	187	199.2	227	234.7	267	269.3	307	303.1	347	336.3	387	368.8
28	39.9	68	84.5	108	125.1	148	163.3	188	200.1	228	235.6	268	270.2	308	304.0	348	337.1	388	369.6
29	41.1	69	85.6	109	126.1	149	164.3	189	201.0	229	236.5	269	271.0	309	304.8	349	337.9	389	370.4
30	42.2	70	86.6	110	127.0	150	165.2	190	201.9	230	237.3	270	271.9	310	305.6	350	338.7	390	371.2
31	43.4	71	87.7	111	128.0	151	166.2	191	202.8	231	238.2	271	272.7	311	306.5	351	339.5	391	372.1
32	44.6	72	88.7	112	129.0	152	167.1	192	203.7	232	239.1	272	273.6	312	307.3	352	340.4	392	372.9
33	45.8	73	89.8	113	130.0	153	168.0	193	204.6	233	239.9	273	274.4	313	308.1	353	341.2	393	373.7
34	47.0	74	90.8	114	130.9	154	168.9	194	205.5	234	240.8	274	275.3	314	309.0	354	342.0	394	374.5
35	48.1	75	91.8	115	131.9	155	169.9	195	206.3	235	241.7	275	276.1	315	309.8	355	342.8	395	375.3
36	49.3	76	92.9	116	132.9	156	170.8	196	207.2	236	242.6	276	277.0	316	310.6	356	343.6	396	376.1
37	50.5	77	93.9	117	133.9	157	171.7	197	208.1	237	243.4	277	277.8	317	311.5	357	344.5	397	376.9
38	51.6	78	94.9	118	134.8	158	172.7	198	209.0	238	244.3	278	278.7	318	312.3	358	345.3	398	377.7
39	52.8	79	96.0	119	135.8	159	173.6	199	209.9	239	245.2	279	279.5	319	313.1	359	346.1	399	378.5
40	53.9	80	97.0	120	136.8	160	174.5	200	210.8	240	246.0	280	280.4	320	314.0	360	346.9	400	379.3

Table 21.Acute Water Quality Standards for Dissolved Zinc Aquatic and Wildlife ephemeral

Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L	Hard. mg/L	Std. µg/L
1	22	41	522	81	930	121	1307	161	1665	201	2009	241	2343	281	2669	321	2987	361	3300
2	40	42	533	82	940	122	1316	162	1674	202	2018	242	2351	282	2677	322	2995	362	3307
3	57	43	544	83	950	123	1325	163	1682	203	2026	243	2360	283	2685	323	3003	363	3315
4	73	44	555	84	959	124	1334	164	1691	204	2034	244	2368	284	2693	324	3011	364	3323
5	88	45	565	85	969	125	1343	165	1700	205	2043	245	2376	285	2701	325	3019	365	3331
6	103	46	576	86	979	126	1353	166	1708	206	2051	246	2384	286	2709	326	3027	366	3338
7	117	47	587	87	988	127	1362	167	1717	207	2060	247	2392	287	2717	327	3034	367	3346

8	131	48	597	88	998	128	1371	168	1726	208	2068	248	2401	288	2725	328	3042	368	3354
9	145	49	608	89	1007	129	1380	169	1735	209	2077	249	2409	289	2733	329	3050	369	3362
10	158	50	618	90	1017	130	1389	170	1743	210	2085	250	2417	290	2741	330	3058	370	3369
11	171	51	629	91	1027	131	1398	171	1752	211	2093	251	2425	291	2749	331	3066	371	3377
12	184	52	639	92	1036	132	1407	172	1761	212	2102	252	2433	292	2757	332	3074	372	3385
13	197	53	649	93	1046	133	1416	173	1769	213	2110	253	2442	293	2765	333	3082	373	3392
14	210	54	660	94	1055	134	1425	174	1778	214	2119	254	2450	294	2773	334	3089	374	3400
15	223	55	670	95	1065	135	1434	175	1787	215	2127	255	2458	295	2781	335	3097	375	3408
16	235	56	680	96	1074	136	1443	176	1795	216	2135	256	2466	296	2789	336	3105	376	3416
17	248	57	691	97	1084	137	1452	177	1804	217	2144	257	2474	297	2797	337	3113	377	3423
18	260	58	701	98	1093	138	1461	178	1813	218	2152	258	2482	298	2805	338	3121	378	3431
19	272	59	711	99	1103	139	1470	179	1821	219	2161	259	2491	299	2813	339	3129	379	3439
20	284	60	721	100	1112	140	1479	180	1830	220	2169	260	2499	300	2821	340	3136	380	3446
21	296	61	732	101	1121	141	1488	181	1838	221	2177	261	2507	301	2829	341	3144	381	3454
22	308	62	742	102	1131	142	1497	182	1847	222	2186	262	2515	302	2837	342	3152	382	3462
23	320	63	752	103	1140	143	1506	183	1856	223	2194	263	2523	303	2845	343	3160	383	3469
24	332	64	762	104	1150	144	1515	184	1864	224	2202	264	2531	304	2853	344	3168	384	3477
25	344	65	772	105	1159	145	1523	185	1873	225	2211	265	2539	305	2861	345	3175	385	3485
26	355	66	782	106	1168	146	1532	186	1881	226	2219	266	2547	306	2869	346	3183	386	3492
27	367	67	792	107	1178	147	1541	187	1890	227	2227	267	2556	307	2876	347	3191	387	3500
28	378	68	802	108	1187	148	1550	188	1898	228	2236	268	2564	308	2884	348	3199	388	3508
29	390	69	812	109	1196	149	1559	189	1907	229	2244	269	2572	309	2892	349	3207	389	3515
30	401	70	822	110	1206	150	1568	190	1916	230	2252	270	2580	310	2900	350	3214	390	3523
31	412	71	832	111	1215	151	1577	191	1924	231	2260	271	2588	311	2908	351	3222	391	3531
32	423	72	842	112	1224	152	1586	192	1933	232	2269	272	2596	312	2916	352	3230	392	3538
33	435	73	852	113	1233	153	1594	193	1941	233	2277	273	2604	313	2924	353	3238	393	3546
34	446	74	862	114	1243	154	1603	194	1950	234	2285	274	2612	314	2932	354	3245	394	3554
35	457	75	871	115	1252	155	1612	195	1958	235	2294	275	2620	315	2940	355	3253	395	3561
36	468	76	881	116	1261	156	1621	196	1967	236	2302	276	2628	316	2948	356	3261	396	3569
37	479	77	891	117	1270	157	1630	197	1975	237	2310	277	2636	317	2956	357	3269	397	3577
38	490	78	901	118	1279	158	1638	198	1984	238	2318	278	2645	318	2964	358	3276	398	3584
39	501	79	911	119	1289	159	1647	199	1992	239	2327	279	2653	319	2971	359	3284	399	3592
40	512	80	920	120	1298	160	1656	200	2001	240	2335	280	2661	320	2979	360	3292	400	3599

Table 22. Acute Water Quality Standards for Pentachlorophenol Aquatic and Wildlife coldwater, warmwater, and edw

pH	µg/L	pH	µg/L
3	0.163	7	9.070
3.1	0.180	7.1	10.029

Table 23. Chronic Water Quality Standards for Pentachlorophenol Aquatic and Wildlife coldwater, warmwater, and edw

pH	µg/L	pH	µg/L
3	0.103	7	5.726
3.1	0.114	7.1	6.331

Table 24. Acute Water Quality Standards for Pentachlorophenol Aquatic and Wildlife ephemeral

pH	µg/L	pH	µg/L
3	0.660	7	36.760
3.1	0.730	7.1	40.646

~~3.2~~	~~0.199~~	~~7.2~~	~~11.090~~	~~3.2~~	~~0.126~~	~~7.2~~	~~7.001~~	~~3.2~~	~~0.807~~	~~7.2~~	~~44.943~~
~~3.3~~	~~0.220~~	~~7.3~~	~~12.262~~	~~3.3~~	~~0.139~~	~~7.3~~	~~7.741~~	~~3.3~~	~~0.892~~	~~7.3~~	~~49.695~~
~~3.4~~	~~0.243~~	~~7.4~~	~~13.558~~	~~3.4~~	~~0.154~~	~~7.4~~	~~8.559~~	~~3.4~~	~~0.986~~	~~7.4~~	~~54.949~~
~~3.5~~	~~0.269~~	~~7.5~~	~~14.992~~	~~3.5~~	~~0.170~~	~~7.5~~	~~9.464~~	~~3.5~~	~~1.091~~	~~7.5~~	~~60.758~~
~~3.6~~	~~0.298~~	~~7.6~~	~~16.577~~	~~3.6~~	~~0.188~~	~~7.6~~	~~10.465~~	~~3.6~~	~~1.206~~	~~7.6~~	~~67.182~~
~~3.7~~	~~0.329~~	~~7.7~~	~~18.329~~	~~3.7~~	~~0.208~~	~~7.7~~	~~11.571~~	~~3.7~~	~~1.334~~	~~7.7~~	~~74.284~~
~~3.8~~	~~0.364~~	~~7.8~~	~~20.267~~	~~3.8~~	~~0.230~~	~~7.8~~	~~12.794~~	~~3.8~~	~~1.475~~	~~7.8~~	~~82.138~~
~~3.9~~	~~0.402~~	~~7.9~~	~~22.410~~	~~3.9~~	~~0.254~~	~~7.9~~	~~14.147~~	~~3.9~~	~~1.631~~	~~7.9~~	~~90.822~~
~~4~~	~~0.445~~	~~8~~	~~24.779~~	~~4~~	~~0.281~~	~~8~~	~~15.643~~	~~4~~	~~1.803~~	~~8~~	~~100.424~~
~~4.1~~	~~0.492~~	~~8.1~~	~~27.399~~	~~4.1~~	~~0.311~~	~~8.1~~	~~17.296~~	~~4.1~~	~~1.994~~	~~8.1~~	~~111.041~~
~~4.2~~	~~0.544~~	~~8.2~~	~~30.296~~	~~4.2~~	~~0.343~~	~~8.2~~	~~19.125~~	~~4.2~~	~~2.204~~	~~8.2~~	~~122.781~~
~~4.3~~	~~0.601~~	~~8.3~~	~~33.498~~	~~4.3~~	~~0.380~~	~~8.3~~	~~21.147~~	~~4.3~~	~~2.437~~	~~8.3~~	~~135.762~~
~~4.4~~	~~0.665~~	~~8.4~~	~~37.040~~	~~4.4~~	~~0.420~~	~~8.4~~	~~23.383~~	~~4.4~~	~~2.695~~	~~8.4~~	~~150.115~~
~~4.5~~	~~0.735~~	~~8.5~~	~~40.956~~	~~4.5~~	~~0.464~~	~~8.5~~	~~25.855~~	~~4.5~~	~~2.980~~	~~8.5~~	~~165.985~~
~~4.6~~	~~0.813~~	~~8.6~~	~~45.286~~	~~4.6~~	~~0.513~~	~~8.6~~	~~28.588~~	~~4.6~~	~~3.295~~	~~8.6~~	~~183.534~~
~~4.7~~	~~0.899~~	~~8.7~~	~~50.074~~	~~4.7~~	~~0.568~~	~~8.7~~	~~31.611~~	~~4.7~~	~~3.643~~	~~8.7~~	~~202.938~~
~~4.8~~	~~0.994~~	~~8.8~~	~~55.368~~	~~4.8~~	~~0.628~~	~~8.8~~	~~34.953~~	~~4.8~~	~~4.029~~	~~8.8~~	~~224.393~~
~~4.9~~	~~1.099~~	~~8.9~~	~~61.222~~	~~4.9~~	~~0.694~~	~~8.9~~	~~38.648~~	~~4.9~~	~~4.454~~	~~8.9~~	~~248.117~~
~~5~~	~~1.215~~	~~9~~	~~67.694~~	~~5~~	~~0.767~~	~~9~~	~~42.734~~	~~5~~	~~4.925~~	~~9~~	~~274.349~~
~~5.1~~	~~1.344~~	~~9.1~~	~~74.851~~	~~5.1~~	~~0.848~~	~~9.1~~	~~47.252~~	~~5.1~~	~~5.446~~	~~9.1~~	~~303.354~~
~~5.2~~	~~1.486~~	~~9.2~~	~~82.765~~	~~5.2~~	~~0.938~~	~~9.2~~	~~52.248~~	~~5.2~~	~~6.022~~	~~9.2~~	~~335.426~~
~~5.3~~	~~1.643~~	~~9.3~~	~~91.515~~	~~5.3~~	~~1.037~~	~~9.3~~	~~57.772~~	~~5.3~~	~~6.659~~	~~9.3~~	~~370.888~~
~~5.4~~	~~1.817~~	~~9.4~~	~~101.190~~	~~5.4~~	~~1.147~~	~~9.4~~	~~63.880~~	~~5.4~~	~~7.363~~	~~9.4~~	~~410.100~~
~~5.5~~	~~2.009~~	~~9.5~~	~~111.888~~	~~5.5~~	~~1.268~~	~~9.5~~	~~70.633~~	~~5.5~~	~~8.141~~	~~9.5~~	~~453.457~~
~~5.6~~	~~2.221~~	~~9.6~~	~~123.717~~	~~5.6~~	~~1.4022~~	~~9.6~~	~~78.101~~	~~5.6~~	~~9.002~~	~~9.6~~	~~501.398~~
~~5.7~~	~~2.456~~	~~9.7~~	~~136.797~~	~~5.7~~	~~1.550~~	~~9.7~~	~~86.358~~	~~5.7~~	~~9.953~~	~~9.7~~	~~554.408~~
~~5.8~~	~~2.716~~	~~9.8~~	~~151.260~~	~~5.8~~	~~1.714~~	~~9.8~~	~~95.488~~	~~5.8~~	~~11.006~~	~~9.8~~	~~613.021~~
~~5.9~~	~~3.003~~	~~9.9~~	~~167.252~~	~~5.9~~	~~1.896~~	~~9.9~~	~~105.583~~	~~5.9~~	~~12.169~~	~~9.9~~	~~677.832~~
~~6~~	~~3.320~~	~~10~~	~~184.934~~	~~6~~	~~2.096~~	~~10~~	~~116.746~~	~~6~~	~~13.456~~	~~10~~	~~749.495~~
~~6.1~~	~~3.671~~	~~10.1~~	~~204.486~~	~~6.1~~	~~2.318~~	~~10.1~~	~~129.089~~	~~6.1~~	~~14.878~~	~~10.1~~	~~828.735~~
~~6.2~~	~~4.059~~	~~10.2~~	~~226.105~~	~~6.2~~	~~2.563~~	~~10.2~~	~~142.736~~	~~6.2~~	~~16.451~~	~~10.2~~	~~916.351~~
~~6.3~~	~~4.488~~	~~10.3~~	~~250.010~~	~~6.3~~	~~2.833~~	~~10.3~~	~~157.827~~	~~6.3~~	~~18.191~~	~~10.3~~	~~1013.231~~
~~6.4~~	~~4.963~~	~~10.4~~	~~276.442~~	~~6.4~~	~~3.133~~	~~10.4~~	~~174.513~~	~~6.4~~	~~20.114~~	~~10.4~~	~~1120.354~~
~~6.5~~	~~5.488~~	~~10.5~~	~~305.668~~	~~6.5~~	~~3.464~~	~~10.5~~	~~192.963~~	~~6.5~~	~~22.240~~	~~10.5~~	~~1238.802~~

~~6.6~~	~~6.068~~	~~10.6~~	~~337.984~~		~~6.6~~	~~3.831~~	~~10.6~~	~~213.364~~		~~6.6~~	~~24.591~~	~~10.6~~	~~1369.773~~
~~6.7~~	~~6.709~~	~~10.7~~	~~373.717~~		~~6.7~~	~~4.235~~	~~10.7~~	~~235.922~~		~~6.7~~	~~27.191~~	~~10.7~~	~~1514.590~~
~~6.8~~	~~7.419~~	~~10.8~~	~~413.228~~		~~6.8~~	~~4.683~~	~~10.8~~	~~260.864~~		~~6.8~~	~~30.066~~	~~10.8~~	~~1674.718~~
~~6.9~~	~~8.203~~	~~10.9~~	~~456.916~~		~~6.9~~	~~5.178~~	~~10.9~~	~~288.444~~		~~6.9~~	~~33.245~~	~~10.9~~	~~1851.775~~
		~~11~~	~~505.223~~				~~11~~	~~318.939~~				~~11~~	~~2047.552~~

Table ~~25~~ 11. Acute Criteria for Total Ammonia (in mg/L as N) Aquatic and Wildlife coldwater, warmwater, and edw

pH	A&Wc	A&Ww and A&W edw
6.5	32.6	48.8
6.6	31.3	46.8
6.7	29.8	44.6
6.8	28.1	42.0
6.9	26.2	39.1
7.0	24.1	36.1
7.1	22.0	32.8
7.2	19.7	29.5
7.3	17.5	26.2
7.4	15.4	23.0
7.5	13.3	19.9
7.6	11.4	17.0
7.7	~~9.65~~ 9.7	14.4
7.8	~~8.11~~ 8.1	12.1
7.9	~~6.77~~ 6.8	10.1
8.0	~~5.62~~ 5.6	~~8.40~~ 8.4
8.1	~~4.64~~ 4.6	~~6.95~~ 7.0
8.2	~~3.83~~ 3.8	~~5.72~~ 5.7
8.3	~~3.15~~ 3.2	~~4.71~~ 4.7
8.4	~~2.59~~ 2.6	~~3.88~~ 3.9
8.5	~~2.14~~ 2.1	~~3.20~~ 3.2
8.6	~~1.77~~ 1.8	~~2.65~~ 2.7
8.7	~~1.47~~ 1.5	~~2.20~~ 2.2
8.8	~~1.23~~ 1.2	~~1.84~~ 1.8
8.9	~~1.04~~ 1.0	~~1.56~~ 1.6
9.0	~~0.885~~ 0.9	~~1.32~~ 1.3

Formula:	$CMC = \frac{0.275}{1+10^{7.204-pH}} + \frac{39.0}{1+10^{pH-7.204}}$	$CMC = \frac{0.411}{1+10^{7.204-pH}} + \frac{58.4}{1+10^{pH-7.204}}$

Table ~~26~~ 12. Chronic Criteria for Total Ammonia (mg/L as N) Aquatic and Wildlife coldwater, warmwater, and edw

	~~Temperature, °C~~									
~~pH~~	~~0~~	~~14~~	~~16~~	~~18~~	~~20~~	~~22~~	~~24~~	~~26~~	~~28~~	~~30~~
~~6.5~~	~~6.67~~	~~6.67~~	~~6.06~~	~~5.33~~	~~4.68~~	~~4.12~~	~~3.62~~	~~3.18~~	~~2.80~~	~~2.46~~
~~6.6~~	~~6.57~~	~~6.57~~	~~5.97~~	~~5.25~~	~~4.61~~	~~4.05~~	~~3.56~~	~~3.13~~	~~2.75~~	~~2.42~~
~~6.7~~	~~6.44~~	~~6.44~~	~~5.86~~	~~5.15~~	~~4.52~~	~~3.98~~	~~3.50~~	~~3.07~~	~~2.70~~	~~2.37~~
~~6.8~~	~~6.29~~	~~6.29~~	~~5.72~~	~~5.03~~	~~4.42~~	~~3.89~~	~~3.42~~	~~3.00~~	~~2.64~~	~~2.32~~
~~6.9~~	~~6.12~~	~~6.12~~	~~5.56~~	~~4.89~~	~~4.30~~	~~3.78~~	~~3.32~~	~~2.92~~	~~2.57~~	~~2.25~~
~~7.0~~	~~5.91~~	~~5.91~~	~~5.37~~	~~4.72~~	~~4.15~~	~~3.65~~	~~3.21~~	~~2.82~~	~~2.48~~	~~2.18~~
~~7.1~~	~~5.67~~	~~5.67~~	~~5.15~~	~~4.53~~	~~3.98~~	~~3.50~~	~~3.08~~	~~2.70~~	~~2.38~~	~~2.09~~
~~7.2~~	~~5.39~~	~~5.39~~	~~4.90~~	~~4.31~~	~~3.78~~	~~3.33~~	~~2.92~~	~~2.57~~	~~2.26~~	~~1.99~~
~~7.3~~	~~5.08~~	~~5.08~~	~~4.61~~	~~4.06~~	~~3.57~~	~~3.13~~	~~2.76~~	~~2.42~~	~~2.13~~	~~1.87~~
~~7.4~~	~~4.73~~	~~4.73~~	~~4.30~~	~~3.78~~	~~3.33~~	~~2.92~~	~~2.57~~	~~2.26~~	~~1.98~~	~~1.74~~
~~7.5~~	~~4.36~~	~~4.36~~	~~3.97~~	~~3.49~~	~~3.06~~	~~2.69~~	~~2.37~~	~~2.08~~	~~1.83~~	~~1.61~~
~~7.6~~	~~3.98~~	~~3.98~~	~~3.61~~	~~3.18~~	~~2.79~~	~~2.45~~	~~2.16~~	~~1.90~~	~~1.67~~	~~1.47~~
~~7.7~~	~~3.58~~	~~3.58~~	~~3.25~~	~~2.86~~	~~2.51~~	~~2.21~~	~~1.94~~	~~1.71~~	~~1.50~~	~~1.32~~
~~7.8~~	~~3.18~~	~~3.18~~	~~2.89~~	~~2.54~~	~~2.23~~	~~1.96~~	~~1.73~~	~~1.52~~	~~1.33~~	~~1.17~~
~~7.9~~	~~2.80~~	~~2.80~~	~~2.54~~	~~2.24~~	~~1.96~~	~~1.73~~	~~1.52~~	~~1.33~~	~~1.17~~	~~1.03~~
~~8.0~~	~~2.43~~	~~2.43~~	~~2.21~~	~~1.94~~	~~1.71~~	~~1.50~~	~~1.32~~	~~1.16~~	~~1.02~~	~~0.897~~
~~8.1~~	~~2.10~~	~~2.10~~	~~1.91~~	~~1.68~~	~~1.47~~	~~1.29~~	~~1.14~~	~~1.00~~	~~0.879~~	~~0.773~~
~~8.2~~	~~1.79~~	~~1.79~~	~~1.63~~	~~1.43~~	~~1.26~~	~~1.11~~	~~0.973~~	~~0.855~~	~~0.752~~	~~0.661~~
~~8.3~~	~~1.52~~	~~1.52~~	~~1.39~~	~~1.22~~	~~1.07~~	~~0.941~~	~~0.827~~	~~0.727~~	~~0.639~~	~~0.562~~
~~8.4~~	~~1.29~~	~~1.29~~	~~1.17~~	~~1.03~~	~~0.906~~	~~0.796~~	~~0.700~~	~~0.615~~	~~0.541~~	~~0.475~~
~~8.5~~	~~1.09~~	~~1.09~~	~~0.990~~	~~0.870~~	~~0.765~~	~~0.672~~	~~0.591~~	~~0.520~~	~~0.457~~	~~0.401~~
~~8.6~~	~~0.920~~	~~0.920~~	~~0.836~~	~~0.735~~	~~0.646~~	~~0.568~~	~~0.499~~	~~0.439~~	~~0.386~~	~~0.339~~
~~8.7~~	~~0.778~~	~~0.778~~	~~0.707~~	~~0.622~~	~~0.547~~	~~0.480~~	~~0.422~~	~~0.371~~	~~0.326~~	~~0.287~~
~~8.8~~	~~0.661~~	~~0.661~~	~~0.601~~	~~0.528~~	~~0.464~~	~~0.408~~	~~0.359~~	~~0.315~~	~~0.277~~	~~0.244~~
~~8.9~~	~~0.565~~	~~0.565~~	~~0.513~~	~~0.451~~	~~0.397~~	~~0.349~~	~~0.306~~	~~0.269~~	~~0.237~~	~~0.208~~
~~9.0~~	~~0.486~~	~~0.486~~	~~0.442~~	~~0.389~~	~~0.342~~	~~0.300~~	~~0.264~~	~~0.232~~	~~0.204~~	~~0.179~~

	Temperature, °C									
pH	0	14	16	18	20	22	24	26	28	30
6.5	6.7	6.7	6.1	5.3	4.7	4.1	3.6	3.2	2.8	2.5
6.6	6.6	6.6	6.0	5.3	4.6	4.1	3.6	3.1	2.8	2.4
6.7	6.4	6.4	5.9	5.2	4.5	4.0	3.5	3.1	2.7	2.4
6.8	6.3	6.3	5.7	5.0	4.4	3.9	3.4	3.0	2.6	2.3

6.9	6.1	6.1	5.6	4.9	4.3	3.8	3.3	2.9	2.6	2.3
7.0	5.9	5.9	5.4	4.7	4.2	3.6	3.2	2.8	2.5	2.2
7.1	5.7	5.7	5.2	4.5	4.0	3.5	3.1	2.7	2.4	2.1
7.2	5.4	5.4	4.9	4.3	3.8	3.3	2.9	2.6	2.3	2.0
7.3	5.1	5.1	4.6	4.1	3.6	3.1	2.8	2.4	2.1	1.9
7.4	4.7	4.7	4.3	3.8	3.3	2.9	2.6	2.3	2.0	1.7
7.5	4.4	4.4	4.0	3.5	3.1	2.7	2.4	2.1	1.8	1.6
7.6	4.0	4.0	3.6	3.2	2.8	2.5	2.2	1.9	1.7	1.5
7.7	3.6	3.6	3.3	2.9	2.5	2.2	1.9	1.7	1.5	1.3
7.8	3.1	3.2	2.9	2.5	2.2	2.0	1.7	1.5	1.3	1.2
7.9	2.8	2.8	2.5	2.2	2.0	1.7	1.5	1.3	1.2	1.0
8.0	2.4	2.4	2.2	1.9	1.7	1.5	1.3	1.2	1.0	0.90
8.1	2.1	2.1	1.9	1.7	1.5	1.3	1.1	1.0	0.88	0.77
8.2	1.8	1.8	1.6	1.4	1.3	1.1	0.97	0.86	0.75	0.66
8.3	1.5	1.5	1.4	1.2	1.1	0.94	0.83	0.73	0.64	0.56
8.4	1.3	1.3	1.2	1.0	0.91	0.80	0.70	0.62	0.54	0.48
8.5	1.1	1.1	1.0	0.90	0.77	0.67	0.59	0.52	0.46	0.40
8.6	0.92	0.92	0.84	0.74	0.65	0.57	0.50	0.44	0.37	0.34
8.7	0.78	0.78	0.71	0.62	0.55	0.48	0.42	0.37	0.33	0.29
8.8	0.66	0.66	0.60	0.53	0.46	0.41	0.36	0.32	0.28	0.24
8.9	0.57	0.57	0.51	0.45	0.40	0.35	0.31	0.27	0.24	0.21
9.0	0.49	0.49	0.44	0.39	0.34	0.30	0.26	0.23	0.20	0.18

$$CCC = \left(\frac{0.0577}{1+10^{7.688-pH}} \pm \frac{2.487}{1+10^{pH-7.688}} \right) - MIN\,(2.85, 1.45*10^{0.028(25-T)})$$

APPENDIX B. SURFACE WATERS AND DESIGNATED USES

(Coordinates are from the North American Datum of 1983 (NAD83). All latitudes in Arizona are north and all longitudes are west, but the negative signs are not included in the Appendix B table. Some web-based mapping systems require a negative sign before the longitude values to indicate it is a west longitude.)

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
BW	Alamo Lake	~~34°14'45"/113°35'00"~~ 34°14'06"/113°35'00"	Deep		A&Ww			FBC			FC		AgL
BW	Big Sandy River	Headwaters to ~~confluence at~~ Alamo Lake ~~at 34°18'36"/113°31'34"~~			A&Ww			FBC			FC		AgL
BW	Bill Williams River	Alamo Lake to confluence with Colorado River ~~at 34°18'04"/114°08'10"~~			A&Ww			FBC			FC		AgL
BW	Blue Tank	~~34°40'14"/112°58'16"~~ 34°40'14"/112°58'17"			A&Ww			FBC			FC		AgL
BW	Boulder Creek	Headwaters to confluence with unnamed tributary at ~~34°41'14"/113°03'34"~~ 34°41'13"/113°03'37"		A&Wc				FBC			FC	~~AgI~~	AgL

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
BW	Boulder Creek	Below confluence with unnamed tributary to confluence with Burro Creek ~~at 34°36'47"/113°18'00"~~			A&Ww			FBC			FC	~~AgI~~	AgL
BW	Burro Creek (OAW)	Headwaters to confluence with Boulder Creek ~~at 34°36'47"/113°18'00"~~			A&Ww			FBC			FC		AgL
BW	Burro Creek	Below confluence with Boulder Creek to confluence with Big Sandy River ~~at 34°32'24"/113°34'19.2"~~			A&Ww			FBC			FC		AgL
BW	Carter Tank	34°52'27"/112°57'31"			A&Ww			FBC			FC		AgL
BW	Conger Creek	Headwaters to confluence with unnamed tributary at ~~34°45'13"/113°05'45"~~ 34°45'15"/113°05'46"		A&Wc				FBC			FC		AgL
BW	Conger Creek	Below confluence with unnamed tributary to confluence with Burro Creek ~~at 34°46"05"/113°12'54"~~			A&Ww			FBC			FC		AgL
~~BW~~	~~Coors Lake~~	~~34°36'20"/113°11'25"~~	~~Igneous~~		~~A&Ww~~			~~FBC~~			~~FC~~		
BW	Copper Basin Wash	Headwaters to confluence with unnamed tributary at ~~34°28'11"/112°35'31"~~ 34°28'12"/112°35'33"		A&Wc				FBC			FC		AgL
BW	Copper Basin Wash	Below confluence with unnamed tributary to confluence with Skull Valley Wash ~~at 34°25'55"/112°41'42"~~				A&We			PBC				AgL
BW	Cottonwood Canyon	Headwaters to Bear Trap Spring ~~at 34°45'10"/112°52'32"~~		A&Wc				FBC			FC		AgL
BW	Cottonwood Canyon	Below Bear Trap Spring to confluence at Smith Canyon ~~at 34°37'34"/112°54'46.8"~~			A&Ww			FBC			FC		AgL
BW	Date Creek	Headwaters to confluence with Santa Maria River ~~at 34°18'11"/113°29'53"~~			A&Ww			FBC			FC		AgL
BW	Francis Creek (OAW)	Headwaters to confluence with Burro Creek ~~at 34°44'28"/113°14'35"~~			A&Ww			FBC		DWS	FC	AgI	AgL
BW	Kirkland Creek	Headwaters to confluence with Santa Maria River ~~at 34°32'02"/112°59'38"~~			A&Ww			FBC			FC	AgI	AgL
BW	Knight Creek	Headwaters to confluence with Big Sandy River ~~at 34°55'16"/113°37'30"~~			A&Ww			FBC			FC		AgL
BW	Peeples Canyon (OAW)	Headwaters to confluence with Santa Maria River ~~at 34°20'35"/113°15'11"~~			A&Ww			FBC			FC		AgL
BW	Red Lake	35°12'18"/113°03'57"	Sedimentary		A&Ww			FBC			FC		AgL
BW	Santa Maria River	Headwaters to ~~confluence with~~ Alamo Lake ~~at 34°18'36"/113°31'34"~~			A&Ww			FBC			FC	AgI	AgL
BW	Trout Creek	Headwaters to confluence with unnamed tributary at 35°06'47"/113°13'01"		A&Wc				FBC			FC		AgL
BW	Trout Creek	Below confluence with unnamed tributary to confluence with Knight Creek ~~at 34°55'16"/113°37'30"~~			A&Ww			FBC			FC		AgL

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
CG	Agate Canyon Creek	Headwaters to confluence with the Colorado River ~~at 36°08'38"/112°16'48"~~			A&Ww			FBC			FC		
CG	Beaver Dam Wash	Headwaters to confluence with the Virgin River ~~at 36°53'42"/113°55'09"~~			A&Ww			FBC			FC		AgL
CG	Big Springs Tank	~~36°36'10"/112°20'58"~~ 36°36'08"/112°21'01"		A&Wc				FBC			FC		AgL
CG	Boucher Creek	Headwaters to confluence with the Colorado River ~~at 36°06'54"/112°13'44"~~			A&Ww			FBC			FC		
CG	Bright Angel Creek	Headwaters to confluence with Roaring Springs ~~Canyon at 36°11'34"/112°01'54"~~ Creek		A&Wc				FBC			FC		
CG	Bright Angel Creek	Below Roaring Spring Springs ~~Canyon~~ Creek to confluence with Colorado River ~~at 36°05'56"/112°05'27.6"~~			A&Ww			FBC			FC		
CG	Bright Angel Wash	Headwaters to Grand Canyon National Park South Rim ~~of Grand Canyon~~ WWTP outfall at 36°02'59"/112°09'02"				A&We			PBC				
CG	Bright Angel Wash (EDW)	Grand Canyon National Park South Rim ~~Grand Canyon~~ WWTP outfall ~~at 36°00'11"/112°39'06"~~ to Coconino Wash					A&Wedw		PBC				AgL
CG	Bulrush Canyon Wash	Headwaters to confluence with Kanab Creek ~~at 36°46'55"/112°37'08"~~				A&We			PBC				
CG	Cataract Creek	Headwaters to Santa Fe Reservoir		A&Wc				FBC		DWS	FC	AgI	AgL
CG	Cataract Creek	Santa Fe Reservoir to City of Williams WWTP outfall at ~~35°15'40"/112°10'40"~~ 35°14'40"/112°11'18"		A&Wc				FBC			FC	AgI	AgL
CG	Cataract Creek (EDW)	City of Williams WWTP outfall to 1 km downstream					A&Wedw		PBC				
CG	Cataract Creek	Red Lake Wash to Havasupai Indian Reservation ~~at 33°56'52"/112°30'38.3"~~ boundary				A&We			PBC				AgL
CG	Cataract Lake	~~35°15'05"/112°12'58"~~ 35°15'04"/112°12'58"	Igneous	A&Wc				FBC		DWS	FC		AgL
CG	Chuar Creek	Headwaters to confluence with unnamed tributary at ~~36°11'36"/111°52'17"~~ 36°11'35"/111°52'20"		A&Wc				FBC			FC		
CG	Chuar Creek	Below unnamed tributary ~~at 36°11'36.4"/111°52'17"~~ to confluence with the Colorado River ~~at 36°08'20.4"/111°48'58.7"~~			A&Ww			FBC			FC		
CG	City Reservoir	~~35°13'57"/112°11'23"~~ 35°13'57"/112°11'25"	Igneous	A&Wc				FBC		DWS	FC		
CG	Clear Creek	Headwaters to confluence with unnamed tributary at ~~36°09'12"/111°58'25"~~ 36°07'33"/112°00'03"		A&Wc				FBC			FC		
CG	Clear Creek	Below confluence with unnamed tributary to confluence with Colorado River ~~at 36°04'55"/112°02'09.6"~~			A&Ww			FBC			FC		

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
CG	Coconino Wash (EDW)	South Grand Canyon Sanitary District Tusayan WRF outfall at 35°58'39"/112°08'25" to 1 km downstream ~~at 35°58'36"/112°08'54"~~					A&Wedw		PBC				
CG	Colorado River	Lake Powell to Lake Mead		A&Wc				FBC		DWS	FC	AgI	AgL
CG	Cottonwood Creek	Headwaters to confluence with unnamed tributary at ~~35°20'45.5"/113°35'31"~~ 35°20'46"/113°35'31"		A&Wc				FBC			FC		AgL
CG	Cottonwood Creek	Below confluence with unnamed tributary to confluence with Colorado River ~~at 35°22'05"/113°40'04.8"~~			A&Ww			FBC			FC		AgL
CG	Crystal Creek	Headwaters to confluence with unnamed tributary at ~~36°13'42"/112°11'48"~~ 36°13'41"/112°11'49"		A&Wc				FBC			FC		
CG	Crystal Creek	Below confluence with unnamed tributary to confluence with Colorado River ~~at 36°08'06"/112°14'34.8"~~			A&Ww			FBC			FC		
CG	Deer Creek	Headwaters to confluence with unnamed tributary at ~~36°26'16"/112°28'15.5"~~ 36°26'15"/112°28'20"		A&Wc				FBC			FC		
CG	Deer Creek	Below confluence with unnamed tributary to confluence with Colorado River ~~at 36°23'20"/112°30'28.8"~~			A&Ww			FBC			FC		
CG	Detrital Wash	Headwaters to Lake Mead ~~at 36°02'20"/114°27'47"~~				A&We			PBC				
CG	Dogtown Reservoir	~~35°12'40"/112°07'46"~~ 35°12'40"/112°07'54"	Igneous	A&Wc				FBC		DWS	FC	AgI	AgL
CG	Dragon Creek	Headwaters to confluence with Milk Creek ~~at 36°12'25"/112°09'33"~~		A&Wc				FBC			FC		
CG	Dragon Creek	Below confluence with Milk Creek to confluence with Crystal Creek ~~at 36°10'12"/112°12'10.8"~~			A&Ww			FBC			FC		
CG	Garden Creek	Headwaters to confluence with Pipe Creek ~~at 36°05'35"/112°06'40"~~			A&Ww			FBC			FC		
CG	Gonzalez Lake	~~35°15'26"/112°12'07"~~ 35°15'26"/112°12'09"	Shallow		A&Ww			FBC			FC	AgI	AgL
CG	Grand Wash	Headwaters to Lake Mead ~~at 36°15'29"/114°00'18"~~				A&We			PBC				
CG	Grapevine Creek	Headwaters to confluence with the Colorado River ~~at 36°03'29"/112°00'00"~~			A&Ww			FBC			FC		
CG	Grapevine Wash	Headwaters to Lake Mead ~~at 36°06'29"/114°00'07"~~				A&We			PBC				
CG	Hakatai Canyon Creek	Headwaters to confluence with the Colorado River ~~at 36°14'42"/112°22'59"~~			A&Ww			FBC			FC		
CG	Hance Creek	Headwaters to confluence with the Colorado River ~~at 36°02'46"/111°57'07"~~			A&Ww			FBC			FC		

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
CG	Havasu Canyon Creek	From the Havasupai Indian Reservation ~~;~~ boundary to confluence with the Colorado River ~~at 36°18'29"/112°45'43"~~			A&Ww			FBC			FC		
CG	Hermit Creek	Headwaters to Hermit Pack Trail crossing at ~~36°03'23"/112°13'25"~~ 36°03'38"/112°14'00"		A&Wc				FBC			FC		
CG	Hermit Creek	Below Hermit Pack Trail crossing to confluence with the Colorado River ~~at 36°06'00"/112°32'04"~~			A&Ww			FBC			FC		
CG	Horn Creek	Headwaters to confluence with the Colorado River ~~at 36°05'56"/112°07'59"~~			A&Ww			FBC			FC		
CG	Hualapai Wash	Headwaters to Lake Mead ~~at 36°00'40"/114°07'37"~~				A&We			PBC				
CG	Jacob Lake	~~36°42'26"/112°13'48"~~ 36°42'27"/112°13'50"	Sedimentary	A&Wc				FBC			FC		
CG	Kaibab Lake	~~35°17'04"/112°09'17"~~ 35°17'04"/112°09'32"	Igneous	A&Wc				FBC		DWS	FC	AgI	AgL
CG	Kanab Creek	Headwaters to confluence with the Colorado River ~~at 36°23'31"/112°37'44"~~			A&Ww			FBC		DWS	FC		AgL
CG	Kwagunt Creek	Headwaters to confluence with unnamed tributary at ~~36°13'29"/111°55'24"~~ 36°13'37"/111°54'50"		A&Wc				FBC			FC		
CG	Kwagunt Creek	Below confluence with unnamed tributary to confluence with the Colorado River ~~at 36°15'47"/111°49'40.8"~~			A&Ww			FBC			FC		
CG	Lake Mead	~~36°01'00"/114°44'15"~~ 36°06'18"/114°26'33"	Deep	A&Wc				FBC		DWS	FC	AgI	AgL
CG	Lake Powell	~~36°57'00"/111°29'15"~~ 36°59'53"/111°08'17"	Deep	A&Wc				FBC		DWS	FC	AgI	AgL
CG	Lonetree Canyon Creek	Headwaters to confluence with the Colorado River ~~at 36°04'48"/112°01'52"~~			A&Ww			FBC			FC		
CG	Matkatamiba Creek	Below Havasupai Indian Reservation ~~;~~ boundary to confluence with the Colorado River ~~at 36°20'38"/112°40'19"~~			A&Ww			FBC			FC		
CG	Monument Creek	Headwaters to confluence with the Colorado River ~~at 36°05'53"/112°10'55"~~			A&Ww			FBC			FC		
CG	Nankoweap Creek	Headwaters to confluence with unnamed tributary at ~~36°15'30"/111°57'23"~~ 36°15'29"/111°57'26"		A&Wc				FBC			FC		
CG	Nankoweap Creek	Below confluence with unnamed tributary to confluence with Colorado River ~~at 36°18'25"/111°51'28.8"~~			A&Ww			FBC			FC		
CG	National Canyon Creek	~~Portion of the creek that flows into the Colorado River at 36°15'25"/112°53'34.8" that is not located on the~~ Headwaters to Hualapai Indian Reservation boundary at 36°15'15"/112°52'34"			A&Ww			FBC			FC		
CG	North Canyon Creek	Headwaters to confluence with unnamed tributary at ~~36°33'57"/111°55'39"~~ 36°33'58"/111°55'41"		A&Wc				FBC			FC		

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
CG	North Canyon Creek	Below confluence with unnamed tributary to confluence with Colorado River ~~at 36°37'48"/111°45'46.8"~~			A&Ww			FBC			FC		
CG	Olo Creek	Headwaters to confluence with the Colorado River ~~at 36°22'16"/112°38'56"~~			A&Ww			FBC			FC		
CG	Parashant Canyon	Headwaters to confluence with unnamed tributary at ~~36°21'26"/113°28'10"~~ 36°21'02"/113°27'56"		A&Wc				FBC			FC		
CG	Parashant Canyon	Below confluence with unnamed tributary to confluence with the Colorado River			A&Ww			FBC			FC		
CG	Paria River	Utah border to confluence with the Colorado River ~~at 36°51'29"/111°36'04"~~			A&Ww			FBC			FC		
CG	Phantom Creek	Headwaters to confluence with unnamed tributary at ~~36°10'04"/112°07'50"~~ 36°09'29"/112°08'13"		A&Wc				FBC			FC		
CG	Phantom Creek	Below confluence with unnamed tributary to ~~Colorado River at 36°06'58"/112°05'09.6"~~ confluence with Bright Angel Creek			A&Ww			FBC			FC		
CG	Pipe Creek	Headwaters to confluence with the Colorado River ~~at 36°05'56"/112°06'36"~~			A&Ww			FBC			FC		
CG	Red Canyon Creek	Headwaters to confluence with the Colorado River ~~at 36°02'42"/111°55'08"~~			A&Ww			FBC			FC		
CG	Red Lake	~~35°40'00"/114°03'45"~~ 35°40'03"/114°04'07"			A&Ww			FBC			FC		AgL
~~CG~~	~~Redondo Lake~~	~~32°44'32"/114°28'02"~~	~~Shallow~~		~~A&Ww~~			~~FBC~~			~~FC~~		
CG	Roaring Springs	~~Headwaters of Roaring Springs Creek at 36°11'35"/112°01'55.2"~~ 36°11'45"/112°02'06"		A&Wc				FBC		DWS	FC		
CG	Roaring Springs ~~Canyon~~ Creek	Headwaters to confluence with Bright Angel Creek ~~at 36°11'35"/112°01'55"~~		A&Wc				FBC			FC		
CG	Rock Canyon	~~Tributary~~ Headwaters to confluence with Truxton Wash ~~at 35°26'56"/113°36'29"~~				A&We			PBC				
CG	Royal Arch Creek	~~Tributary~~ Headwaters to confluence with the Colorado River ~~at 36°11'53"/112°26'56"~~			A&Ww			FBC			FC		
CG	Ruby Canyon Creek	~~Tributary~~ Headwaters to confluence with the Colorado River ~~at 36°11'24"/112°18'54"~~			A&Ww			FBC			FC		
CG	Russell Tank	~~34°52'22"/111°52'44"~~ 35°52'21"/111°52'45"		A&Wc				FBC			FC		AgL
CG	Saddle Canyon Creek	Headwaters to confluence with unnamed tributary at ~~36°21'35.5"/112°22'46"~~ 36°21'36"/112°22'43"		A&Wc				FBC			FC		
CG	Saddle Canyon Creek	Below confluence with unnamed tributary to confluence with Colorado River ~~at 36°22'52"/112°23'16.8"~~			A&Ww			FBC			FC		
CG	Santa Fe Reservoir	~~35°14'26"/112°11'04"~~ 35°14'31"/112°11'10"	Igneous	A&Wc				FBC		DWS	FC		
CG	Sapphire Canyon Creek	Headwaters to confluence with the Colorado River ~~at 36°08'49"/112°17'28"~~			A&Ww			FBC			FC		

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
CG	Serpentine Canyon Creek	Headwaters to confluence with the Colorado River ~~at 36°12'22"/112°19'37"~~			A&Ww			FBC			FC		
CG	Shinumo Creek	Headwaters to confluence with unnamed tributary at ~~36°18'21"/112°18'03"~~ 36°18'18"/112°18'07"		A&Wc				FBC			FC		
CG	Shinumo Creek	Below confluence with unnamed tributary to confluence with the Colorado River ~~at 36°14'13"/112°20'52.8"~~			A&Ww			FBC			FC		
CG	Short Creek	~~Tributary~~ Headwaters to confluence with the Virgin River ~~at 36°58'23"/113°16'08"~~				A&We			PBC				
CG	Slate Creek	Headwaters to confluence with the Colorado River ~~at 36°08'06"/112°14'42"~~			A&Ww			FBC			FC		
CG	Spring Canyon Creek	Headwaters to confluence with the Colorado River ~~at 36°01'08"/113°21'00"~~			A&Ww			FBC			FC		
CG	Stone Creek	Headwaters to confluence with the Colorado River ~~at 36°20'49"/112°27'14"~~			A&Ww			FBC			FC		
CG	Tapeats Creek	Headwaters to confluence with the Colorado River ~~at 36°22'16"/112°28'05"~~		A&Wc				FBC			FC		
CG	Thunder River	~~Tributary~~ Headwaters to confluence with Tapeats Creek ~~at 36°23'31"/112°27'00"~~		A&Wc				FBC			FC		
CG	Trail Canyon Creek	Headwaters to confluence with the Colorado River ~~at 35°50'20"/113°19'37"~~			A&Ww			FBC			FC		
CG	Transept Canyon	Headwaters to Grand Canyon National Park North Rim WWTP outfall at ~~36°12'20"/112°03'35"~~ 36°12'20"/112°03'35"				A&We			PBC				
CG	Transept Canyon (EDW)	Grand Canyon National Park North Rim WWTP outfall to 1 km downstream					A&Wedw		PBC				
CG	Transept Canyon	From 1 km downstream of the Grand Canyon National Park North Rim WWTP outfall to confluence with Bright Angel Creek				A&We			PBC				
CG	Travertine Canyon Creek	~~Tributary~~ Headwaters to confluence with the Colorado River ~~at 36°06'11"/112°13'05"~~			A&Ww			FBC			FC		
CG	Truxton Wash	~~Tributary~~ Headwaters to Red Lake ~~at 35°37'23"/114°03'00"~~				A&We			PBC				
CG	Turquoise Canyon Creek	~~Tributary~~ Headwaters to confluence with the Colorado River ~~at 36°09'14"/112°18'07"~~			A&Ww			FBC			FC		
CG	Unkar Creek	Below confluence with unnamed tributary at 36°07'54"/111°54'06" to confluence with Colorado River ~~at 36°04'48"/111°52'22.8"~~			A&Ww			FBC			FC		
CG	Unnamed Wash (EDW)	Grand Canyon ~~NP~~ National Park Desert View WWTP outfall at 36°02'06"/111°49'13" to confluence with Cedar Canyon					A&Wedw		PBC				
CG	Unnamed Wash (EDW)	Valle Airpark WRF outfall at 35°38'34"/112°09'22" to confluence with Spring Valley Wash ~~at 35°38'29"/112°10'47"~~					A&Wedw		PBC				

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
CG	Vasey's Paradise	A spring at ~~36°26'49"/111°50'46"~~ 36°29'52"/111°51'26"		A&Wc				FBC			FC		
CG	Virgin River	~~Tributary~~ Headwaters to confluence with the Colorado River ~~at 36°47'28"/114°06'11"~~			A&Ww			FBC			FC	AgI	AgL
CG	Vishnu Creek	~~Tributary~~ Headwaters to confluence with the Colorado River ~~at 36°03'18"/111°59'42"~~			A&Ww			FBC			FC		
CG	Warm Springs Creek	~~Tributary~~ Headwaters to confluence with the Colorado River ~~at 36°11'49"/113°04'55"~~			A&Ww			FBC			FC		
CG	West Cataract Creek	~~Tributary~~ Headwaters to confluence with Cataract Creek ~~at 35°15'40"/112°11'38"~~		A&Wc				FBC			FC		AgL
CG	White Creek	Headwaters to confluence with unnamed tributary at ~~36°18'42"/112°21'03"~~ 36°18'45"/112°21'03"		A&Wc				FBC			FC		
CG	White Creek	Below confluence with unnamed tributary to confluence with the Colorado River ~~at 36°15'22"/112°19'30"~~			A&Ww			FBC			FC		
CG	Wright Canyon Creek	Headwaters to confluence with unnamed tributary at ~~35°20'54"/113°30'35"~~ 35°20'48"/113°30'40"		A&Wc				FBC			FC		AgL
CG	Wright Canyon Creek	Below confluence with unnamed tributary to confluence with Truxton Wash			A&Ww			FBC			FC		AgL
CL	A10 Backwater	~~33°31'38"/114°33'19"~~ 33°31'45"/114°33'19"	Shallow		A&Ww			FBC			FC		
CL	A7 Backwater	~~33°34'39"/114°39'42"~~ 33°34'27"/114°32'04"	Shallow		A&Ww			FBC			FC		
CL	Adobe Lake	~~33°02'39"/114°39'19"~~ 33°02'36"/114°39'26"	Shallow		A&Ww			FBC			FC		
CL	Cibola Lake	~~33°31'38"/114°33'19"~~ 33°14'01"/114°40'31"	Shallow		A&Ww			FBC			FC		
CL	Clear Lake	~~33°01'57"/114°31'26"~~ 33°01'59"/114°31'19"	Shallow		A&Ww			FBC			FC		
CL	Columbus Wash	~~Tributary~~ Headwaters to confluence with the Gila River ~~at 33°00'25"/113°16'08"~~				A&We			PBC				
CL	Colorado River	Lake Mead to Topock Marsh		A&Wc				FBC		DWS	FC	AgI	AgL
CL	Colorado River	Topock Marsh to Morelos Dam			A&Ww			FBC		DWS	FC	AgI	AgL
CL	Gila River	Painted Rock Dam to confluence with the Colorado River ~~at 32°43'12"/114°33'14"~~			A&Ww			FBC			FC	AgI	AgL
CL	Holy Moses Wash	Headwaters to City of Kingman Downtown WWTP outfall at ~~35°10'30"/114°03'43"~~ 35°10'33"/114°03'46"				A&We			PBC				
CL	Holy Moses Wash (EDW)	City of Kingman Downtown WWTP outfall to 3 km downstream					A&Wedw		PBC				
CL	Holy Moses Wash	From 3 km downstream of City of Kingman Downtown WWTP outfall to confluence with Sawmill Wash ~~at 35°09'43"/114°04'20"~~				A&We			PBC				
CL	Hunter's Hole Backwater	~~32°31'15"/114°48'03"~~ 32°31'13"/114°48'07"	Shallow		A&Ww			FBC			FC		AgL
CL	Imperial Reservoir	~~32°53'04"/114°27'40"~~ 32°53'02"/114°27'54"	Shallow		A&Ww			FBC		DWS	FC	AgI	AgL
CL	Island Lake	~~33°01'52"/114°35'07"~~ 33°01'44"/114°36'42"	Shallow		A&Ww			FBC			FC		

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
CL	Laguna Reservoir	~~32°51'15"/114°28'38"~~ 32°51'35"/114°28'29"	Shallow		A&Ww			FBC		DWS	FC	AgI	AgL
CL	Lake Havasu	~~34°18'15"/114°08'15"~~ 34°35'18"/114°25'47"	Deep		A&Ww			FBC		DWS	FC	AgI	AgL
CL	Lake Mohave	~~35°11'45"/114°34'00"~~ 35°26'58"/114°38'30"	Deep	A&Wc				FBC		DWS	FC	AgI	AgL
CL	Martinez Lake	~~32°58'52"/114°28'23"~~ 32°58'49"/114°28'09"	Shallow		A&Ww			FBC			FC	AgI	AgL
CL	Mittry Lake	~~32°49'11"/114°27'41"~~ 32°49'17"/114°27'54"	Shallow		A&Ww			FBC			FC		
CL	Mohave Wash	Headwaters to Lake Havasu ~~at 33°28'55"/114°35'56"~~				A&We			PBC				
CL	Nortons Lake	~~33°02'35"/114°37'58"~~ 33°02'30"/114°37'59"	Shallow		A&Ww			FBC			FC		
CL	Painted Rock (Borrow Pit) Lake	~~33°05'00"/113°01'20"~~ 33°04'55"/113°01'17"	Sedimentary		A&Ww			FBC			FC	AgI	AgL
CL	Pretty Water Lake	~~33°19'45"/114°42'15"~~ 33°19'51"/114°42'19"	Shallow		A&Ww			FBC			FC		
CL	Quigley Ponds	~~32°43'00"/113°58'00"~~ 32°43'40"/113°57'44"	Shallow		A&Ww			FBC			FC		
CL	Redondo Lake	32°44'32"/114°29'03"	Shallow		A&Ww			FBC			FC		
CL	Sacramento Wash	~~Tributary~~ Headwaters to Topock Marsh ~~at 34°43'48"/114°29'13"~~				A&We			PBC				
CL	Sawmill Canyon	Headwaters to abandoned gaging station at ~~35°09'46.5"/113°57'51"~~ 35°09'45"/113°57'56"			A&Ww			FBC			FC		AgL
CL	Sawmill Canyon	Below abandoned gaging station to confluence with ~~Sacramento~~ Holy Moses Wash ~~at 35°09'43"/113°58'01.2"~~				A&We			PBC				AgL
CL	Topock Marsh	~~34°47'30"/114°31'00"~~ 34°43'27"/114°28'59"	Shallow		A&Ww			FBC		DWS	FC	AgI	AgL
CL	Tyson Wash (EDW)	Town of Quartzsite WWTP outfall at ~~33°42'30"/114°13'14"~~ 33°42'39"/114°13'10" to 1 km downstream ~~at 33°42'30"/114°13'45"~~					A&Wedw		PBC				
CL	Wellton Canal	Wellton-Mohawk Irrigation District								DWS		AgI	AgL
CL	Wellton Ponds	~~32°42'15"/114°06'15"~~ 32°40'32"/114°00'26"			A&Ww			FBC			FC		
CL	YPG Pond	~~32°50'22"/114°26'25"~~ 32°50'58"/114°26'14"			A&Ww			FBC			FC		
CL	Yuma Area Canals	Above municipal water treatment plant intakes								DWS		AgI	AgL
CL	Yuma Area Canals	Below municipal water treatment plant intakes and all drains										AgI	AgL
LC	Als Lake	~~35°02'17"/111°25'13"~~ 35°02'10"/111°25'17"	Igneous		A&Ww			FBC			FC		AgL
LC	Ashurst Lake	~~35°01'10"/111°24'09"~~ 35°01'06"/111°24'18"	Igneous	A&Wc				FBC			FC	AgI	AgL
LC	Atcheson Reservoir	~~34°00'00"/109°20'41"~~ 33°59'59"/109°20'43"	Igneous		A&Ww			FBC			FC	AgI	AgL
LC	Auger Creek	~~Tributary~~ Headwaters to confluence with Nutrioso Creek ~~at 33°57'22"/109°12'58"~~		A&Wc				FBC			FC		AgL
LC	Barbershop Canyon Creek	~~Tributary~~ Headwaters to confluence with East Clear Creek ~~at 34°33'00"/111°09'43"~~		A&Wc				FBC			FC		AgL

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
LC	Bear Canyon Creek	~~Tributary~~ Headwaters to confluence with General Springs Canyon ~~at 34°32'18"/111°12'15"~~		A&Wc				FBC			FC		AgL
LC	Bear Canyon Creek	~~Tributary~~ Headwaters to confluence with Willow Creek ~~at 34°27'29"/111°00'00"~~		A&Wc				FBC			FC		AgL
LC	Bear Canyon Lake	~~34°24'10"/111°00'09"~~ 34°24'00"/111°00'06"	Sedimentary	A&Wc				FBC			FC	AgI	AgL
LC	Becker Lake	~~34°09'16"/109°18'18"~~ 34°09'11"/109°18'23"	Shallow	A&Wc				FBC			FC		AgL
LC	Billy Creek	~~Tributary~~ Headwaters to confluence with Show Low Creek ~~at 34°12'25"/110°00'00"~~		A&Wc				FBC			FC		AgL
LC	Black Canyon Creek	~~Tributary~~ Headwaters to confluence with Chevelon Creek ~~at 34°47'38"/110°36'22"~~		A&Wc				FBC			FC	AgI	AgL
LC	Black Canyon Lake	~~34°19'50"/110°41'59"~~ 34°20'32"/110°40'13"	Sedimentary	A&Wc				FBC		DWS	FC	AgI	AgL
LC	Blue Ridge Reservoir	~~34°33'15"/111°11'01"~~ 34°32'40"/111°11'33"	Deep	A&Wc				FBC			FC	AgI	AgL
LC	Boot Lake	~~34°58'53"/111°20'00"~~ 34°58'54"/111°20'11"	Igneous	A&Wc				FBC			FC		AgL
LC	Bow and Arrow Wash ~~(EDW)~~	~~Estates at Pine Canyon WWTP outfall #1 at 35°09'31"/111°38'24"~~ Headwaters to confluence with Rio de Flag ~~at 35°10'35"/111°36'42"~~				A&We	~~A&Wedw~~		PBC				
LC	Buck Springs Canyon Creek	~~Tributary~~ Headwaters to confluence with Leonard Canyon Creek ~~at 34°28'52"/111°05'24"~~		A&Wc				FBC			FC		AgL
LC	Bunch Reservoir	~~34°02'12"/109°26'45"~~ 34°02'20"/109°26'48"	Igneous	A&Wc				FBC			FC	AgI	AgL
LC	Camillo Tank	~~34°55'03"/111°22'41"~~ 34°55'03"/111°22'40"	Igneous		A&Ww			FBC			FC		AgL
LC	Carnero Lake	~~34°06'57"/109°31'39"~~ 34°06'57"/109°31'42"	Shallow	A&Wc				FBC			FC		AgL
LC	Chevelon Canyon Lake	~~34°30'39"/110°49'28"~~ 34°29'18"/110°49'30"	Sedimentary	A&Wc				FBC			FC	AgI	AgL
LC	Chevelon Creek	~~Tributary~~ Headwaters to confluence with the Little Colorado River ~~at 34°57'04"/110°31'30"~~		A&Wc				FBC			FC	AgI	AgL
LC	Chevelon Creek, West Fork	~~Tributary~~ Headwaters to confluence with Chevelon Creek ~~at 34°36'58"/110°46'05"~~		A&Wc				FBC			FC		AgL
LC	Chilson Tank	~~34°51'46"/111°22'52"~~ 34°51'43"/111°22'54"	Igneous		A&Ww			FBC			FC		AgL
LC	Clear Creek	~~Tributary~~ Headwaters to confluence with the Little Colorado River ~~at 34°59'13"/110°38'17"~~		A&Wc				FBC		DWS	FC		AgL
LC	Clear Creek Reservoir	~~34°58'10"/110°38'33"~~ 34°57'09"/110°39'14"	Shallow	A&Wc				FBC		DWS	FC	AgI	AgL
LC	Coconino Reservoir	~~35°00'16"/111°23'52"~~ 35°00'05"/111°24'10"	Igneous	A&Wc				FBC			FC	AgI	AgL
LC	Colter Creek	~~Tributary~~ Headwaters to confluence with Nutrioso Creek ~~at 33°58'19"/109°12'29"~~		A&Wc				FBC			FC		AgL
LC	Colter Reservoir	~~33°56'40"/109°28'50"~~ 33°56'39"/109°28'53"	Shallow	A&Wc				FBC			FC		AgL

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
LC	Concho Creek	~~Tributary~~ Headwaters to confluence with Carrizo Wash ~~at 34°36'25"/109°33'54"~~		A&Wc				FBC			FC		AgL
LC	Concho Lake	~~34°26'36"/109°37'40"~~ 34°26'37"/109°37'40"	Shallow	A&Wc				FBC			FC	AgI	AgL
LC	Cow Lake	~~34°53'19"/111°18'49"~~ 34°53'14"/111°18'51"	Igneous		A&Ww			FBC			FC		AgL
LC	Coyote Creek	~~Tributary~~ Headwaters to confluence with the Little Colorado River ~~at 34°18'22"/109°20'53"~~		A&Wc				FBC			FC	AgI	AgL
LC	Crisis Lake (Snake Tank #2)	~~34°47'51"/111°17'01"~~ 34°47'51"/111°17'32"			A&Ww			FBC			FC		AgL
LC	Dane Canyon Creek	~~Tributary~~ Headwaters to confluence with Barbershop Canyon Creek ~~at 34°30'29"/111°09'07"~~		A&Wc				FBC			FC		AgL
LC	Daves Tank	~~34°44'23"/111°17'08"~~ 34°44'22"/111°17'15"			A&Ww			FBC			FC		AgL
LC	Deep Lake	~~35°03'30"/111°24'55"~~ 35°03'34"/111°25'00"	Igneous		A&Ww			FBC			FC		AgL
LC	Dry Lake (EDW)	~~34°37'52"/110°23'40"~~ 34°38'02"/110°23'40"	~~Igneous~~ EDW				A&Wedw		PBC				
LC	Ducksnest Lake	~~34°59'15"/111°23'53"~~ 34°59'14"/111°23'57"			A&Ww			FBC			FC		AgL
LC	East Clear Creek	~~Tributary~~ Headwaters to confluence with Clear Creek ~~at 34°38'31"/110°59'49"~~		A&Wc				FBC			FC	AgI	AgL
LC	Ellis Wiltbank Reservoir	~~34°05'25"/109°28'24"~~ 34°05'25"/109°28'25"	Igneous		A&Ww			FBC			FC	AgI	AgL
LC	Estates at Pine Canyon lakes (EDW)	35°09'32"/111°38'26"	EDW				A&Wedw		PBC				
LC	Fish Creek	~~Tributary~~ Headwaters to confluence with the Little Colorado River ~~at 34°04'05"/109°26'49"~~		A&Wc				FBC			FC		AgL
LC	Fool's Hollow Lake	~~34°16'14"/110°04'15"~~ 34°16'30"/110°03'43"	Igneous	A&Wc				FBC			FC		AgL
LC	General Springs Canyon Creek	~~Tributary~~ Headwaters to confluence with East Clear Creek ~~at 34°32'17"/111°12'18"~~		A&Wc				FBC			FC		AgL
LC	Geneva Reservoir	~~34°01'44"/109°31'44"~~ 34°01'45"/109°31'46"	Igneous		A&Ww			FBC			FC		AgL
LC	Hall Creek	~~Tributary~~ Headwaters to confluence with the Little Colorado River ~~at 34°03'58"/109°27'07"~~		A&Wc				FBC			FC	AgI	AgL
LC	Hart Canyon Creek	~~Tributary~~ Headwaters to confluence with Willow Creek ~~at 34°30'40"/110°59'28"~~		A&Wc				FBC			FC		AgL
LC	Hay Lake	~~34°00'11"/109°25'55"~~ 34°00'11"/109°25'57"	Igneous	A&Wc				FBC			FC		AgL
LC	Hog Wallow Lake	~~33°58'57"/109°25'38"~~ 33°58'57"/109°25'39"	Igneous	A&Wc				FBC			FC	AgI	AgL
LC	Horse Lake	~~35°03'53"/111°27'51"~~ 35°03'55"/111°27'50"			A&Ww			FBC			FC		AgL
~~LC~~	~~Huffer Tank~~	~~34°27'45"/111°23'09"~~			~~A&Ww~~			~~FBC~~			~~FC~~		~~AgL~~
LC	Hulsey Creek	~~Tributary~~ Headwaters to confluence with Nutrioso Creek ~~at 33°56'28"/109°11'28"~~		A&Wc				FBC			FC		AgL

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
LC	Hulsey Lake	~~33°55'57"/109°09'33"~~ 33°55'58"/109°09'40"	Sedimentary	A&Wc				FBC			FC		AgL
LC	Indian Lake	~~35°00'38"/111°22'37"~~ 35°00'39"/111°22'41"			A&Ww			FBC			FC		AgL
LC	Jack's Canyon Creek	~~Tributary~~ Headwaters to confluence with the Little Colorado River ~~at 35°00'07"/110°39'07"~~		A&Wc				FBC			FC	AgI	AgL
LC	Jarvis Lake	~~33°58'59"/109°12'33"~~ 33°58'59"/109°12'36"	Sedimentary		A&Ww			FBC			FC		AgL
LC	Kinnikinick Lake	~~34°53'52"/111°18'20"~~ 34°53'53"/111°18'18"	Igneous	A&Wc				FBC			FC		AgL
LC	Knoll Lake	~~34°25'38"/111°05'10"~~ 34°25'38"/111°05'13"	Sedimentary	A&Wc				FBC			FC		AgL
LC	Lake Humphreys (EDW)	~~35°11'51"/111°35'16"~~ 35°11'51"/111°35'19"	EDW				A&Wedw		PBC				
LC	Lake Mary, Lower	~~35°06'22"/111°34'20"~~ 35°06'21"/111°34'38"	Igneous	A&Wc				FBC		DWS	FC		AgL
LC	Lake Mary, Upper	~~35°04'45"/111°31'56"~~ 35°03'23"/111°28'34"	Igneous	A&Wc				FBC		DWS	FC		AgL
LC	Lake of the Woods	~~34°09'39"/109°58'45"~~ 34°09'40"/109°58'47"	Igneous	A&Wc				FBC			FC	AgI	AgL
LC	Lee Valley Creek (OAW)	Headwaters to Lee Valley Reservoir		A&Wc				FBC			FC		
LC	Lee Valley Creek	From Lee Valley Reservoir to confluence with the East Fork of the Little Colorado River ~~at 33°56'35"/109°29'06"~~		A&Wc				FBC			FC		AgL
LC	Lee Valley Reservoir	~~33°56'30"/109°30'00"~~ 33°56'29"/109°30'04"	Igneous	A&Wc				FBC			FC	AgI	AgL
LC	Leonard Canyon Creek	~~Tributary~~ Headwaters to confluence with Clear Creek ~~at 34°37'26"/111°02'20"~~		A&Wc				FBC			FC		AgL
LC	Leonard Canyon Creek, East Fork	~~Tributary~~ Headwaters to confluence with Leonard Canyon Creek ~~at 34°25'52"/111°05'06"~~		A&Wc				FBC			FC		AgL
LC	Leonard Canyon Creek, Middle Fork	~~Tributary~~ Headwaters to confluence with Leonard Canyon, West Fork ~~at 34°26'17"/111°06'47"~~		A&Wc				FBC			FC		AgL
LC	Leonard Canyon Creek, West Fork	~~Tributary~~ Headwaters to confluence with Leonard Canyon, East Fork ~~at 34°28'01"/111°05'28"~~		A&Wc				FBC			FC		AgL
LC	Lily Creek	~~Tributary~~ Headwaters to confluence with Coyote Creek ~~at 33°59'46"/109°03'58"~~		A&Wc				FBC			FC		AgL
LC	Little Colorado River	Headwaters to Lyman Reservoir		A&Wc				FBC			FC	AgI	AgL
LC	Little Colorado River	Below Lyman Reservoir, to confluence with the Puerco River ~~at 34°53'20"/110°07'41"~~		A&Wc				FBC		DWS	FC	AgI	AgL

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
LC	Little Colorado River	Below confluence with the Puerco River to ~~the boundary of~~ the Navajo Nation Reservation boundary			A&Ww			FBC		DWS	FC	AgI	AgL
LC	Little Colorado River, East Fork	~~Tributary~~ Headwaters to confluence with the Little Colorado River ~~at 34°00'14"/109°27'22"~~		A&Wc				FBC			FC		AgL
LC	Little Colorado River, South Fork	~~Tributary~~ Headwaters to confluence with the Little Colorado River ~~at 34°05'20"/109°24'58"~~		A&Wc				FBC			FC		AgL
LC	Little Colorado River, West Fork (OAW)	Headwaters to Government Springs ~~at 33°59'33"/109°27'52"~~		A&Wc				FBC			FC		
LC	Little Colorado River, West Fork	Below Government Springs to confluence with the Little Colorado River ~~at 34°00'14"/109°27'21.6"~~		A&Wc				FBC			FC		AgL
LC	Little George Reservoir	34°00'37"/109°19'15"	Igneous		A&Ww			FBC			FC	AgI	
LC	Little Mormon Lake	~~34°17'00"/109°58'03"~~ 34°17'00"/109°58'06"	Igneous		A&Ww			FBC			FC	AgI	AgL
LC	Little Ortega Lake	~~34°22'45"/109°40'00"~~ 34°22'47"/109°40'06"	Igneous	A&Wc				FBC			FC		
LC	Long Lake, Lower	~~34°46'45"/111°12'00"~~ 34°47'16"/111°12'40"	Igneous	A&Wc				FBC			FC	AgI	AgL
LC	Long Lake, Upper	~~35°00'00"/111°21'00"~~ 35°00'08"/111°21'23"	Igneous	A&Wc				FBC			FC		AgL
LC	Long Tom Tank	~~34°20'37"/110°49'20"~~ 34°20'35"/110°49'22"		A&Wc				FBC			FC		AgL
LC	Lower Walnut Canyon Lake (EDW)	35°12'04"/111°34'07"	EDW				A&Wedw		PBC				
LC	Lyman Reservoir	~~34°21'30"/109°21'30"~~ 34°21'21"/109°21'35"	Deep	A&Wc				FBC			FC	AgI	AgL
LC	Mamie Creek	~~Tributary~~ Headwaters to confluence with Coyote Creek ~~at 33°59'24"/109°03'50"~~		A&Wc				FBC			FC		AgL
LC	Marshall Lake	~~35°07'10"/111°32'01"~~ 35°07'18"/111°32'07"	Igneous	A&Wc				FBC			FC		AgL
LC	McKay Reservoir	~~34°01'27"/110°29'07"~~ 34°01'27"/109°13'48"		A&Wc				FBC			FC	AgI	AgL
LC	Merritt Draw Creek	~~Tributary~~ Headwaters to confluence with Barbershop Canyon Creek ~~at 34°29'38"/111°09'54"~~		A&Wc				FBC			FC		AgL
LC	Mexican Hay Lake	~~34°01'57"/109°21'25"~~ 34°01'58"/109°21'25"	Igneous	A&Wc				FBC			FC	AgI	AgL
LC	Milk Creek	~~Tributary~~ Headwaters to confluence with Hulsey Creek ~~at 33°56'31"/109°11'17"~~		A&Wc				FBC			FC		AgL
LC	Miller Canyon Creek	~~Tributary~~ Headwaters to confluence with East Clear Creek ~~at 34°33'00"/111°14'17"~~		A&Wc				FBC			FC		AgL

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
LC	Miller Canyon Creek, East Fork	~~Tributary~~ Headwaters to confluence with Miller Canyon Creek ~~at 34°30'18"/111°14'53"~~		A&Wc				FBC			FC		AgL
LC	Mineral Creek	~~Tributary~~ Headwaters to Little Ortega Lake ~~at 34°22'52"/109°39'50"~~		A&Wc				FBC			FC	AgI	AgL
LC	Mormon Lake	~~34°56'40"/111°27'10"~~ 34°56'38"/111°27'25"	Shallow	A&Wc				FBC		DWS	FC	AgI	AgL
LC	Morton Lake	~~34°53'36"/111°17'39"~~ 34°53'37"/111°17'41"	Igneous	A&Wc				FBC			FC		AgL
LC	Mud Lake	~~34°55'24"/111°21'18"~~ 34°55'19"/111°21'29"	Shallow		A&Ww			FBC			FC		AgL
LC	Ned Lake (EDW)	~~32°17'18"/110°03'20"~~ 34°17'17"/110°03'22"	EDW				A&Wedw		PBC				
LC	Nelson Reservoir	~~34°03'12"/109°11'18"~~ 34°02'52"/109°11'19"	Sedimentary	A&Wc				FBC			FC	AgI	AgL
LC	Norton Reservoir	~~34°03'57"/109°31'21"~~ 34°03'57"/109°31'27"	Igneous		A&Ww			FBC			FC		AgL
LC	Nutrioso Creek	~~Tributary~~ Headwaters to confluence with the Little Colorado River ~~at 34°09'04"/109°17'35"~~		A&Wc				FBC			FC	AgI	AgL
LC	Paddy Creek	~~Tributary~~ Headwaters to confluence with Nutrioso Creek ~~at 33°54'47"/109°10'16"~~		A&Wc				FBC			FC		AgL
LC	Phoenix Park Wash	~~Tributary~~ Headwaters to Dry Lake ~~at 34°37'30"/110°22'12"~~				A&We			PBC				
LC	Pierce Seep	~~34°23'35"/110°31'22"~~ 34°23'39"/110°31'17"		A&Wc					PBC				
LC	Pine Tank	~~34°46'49"/111°17'17"~~ 34°46'49"/111°17'21"	Igneous		A&Ww			FBC			FC		AgL
LC	Pintail Lake (EDW)	~~34°18'06"/110°01'17"~~ 34°18'05"/110°01'21"	EDW				A&Wedw		PBC				
~~LC~~	~~Pool Corral Lake~~	~~33°58'16"/109°24'53"~~	~~Igneous~~		~~A&Ww~~			~~FBC~~			~~FC~~	~~AgI~~	~~AgL~~
LC	Porter Creek	~~Tributary~~ Headwaters to confluence with Show Low Creek ~~at 34°10'16"/109°58'48"~~		A&Wc				FBC			FC		AgL
LC	Potato Lake	~~34°27'44"/111°20'42"~~ 35°03'15"/111°24'13"	Igneous	A&Wc				FBC			FC		AgL
LC	Pratt Lake	~~34°01'31"/109°04'16"~~ 34°01'32"/109°04'18"	Sedimentary	A&Wc				FBC			FC		
LC	Puerco River	~~Tributary~~ Headwaters to confluence with the Little Colorado River ~~at 34°53'20"/110°07'41"~~			A&Ww			FBC		DWS	FC	AgI	AgL
LC	Puerco River (EDW)	Sanders Unified School District WWTP outfall at 35°12'52"/109°19'40" to 0.5 km downstream ~~at 35°12'39"/109°19'52"~~					A&Wedw		PBC				
LC	Rainbow Lake	~~34°09'03"/109°59'01"~~ 34°09'00"/109°59'09"	Shallow Igneous	A&Wc				FBC			FC	AgI	AgL
LC	Reagan Reservoir	~~34°02'09"/109°08'43"~~ 34°02'09"/109°08'41"	Igneous		A&Ww			FBC			FC		AgL
LC	Rio de Flag	Headwaters to City of Flagstaff WWTP outfall at 35°12'21"/111°39'17"				A&We			PBC				

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
LC	Rio de Flag (EDW)	From City of Flagstaff WWTP outfall ~~at 35°12'21"/111°39'17"~~ to the confluence with San Francisco Wash					A&Wedw		PBC				
LC	River Reservoir	34°02'01"/109°26'07"	Igneous	A&Wc				FBC			FC	AgI	AgL
LC	Rogers Reservoir	~~33°58'30"/109°16'18"~~ 33°56'30"/109°16'20"	Igneous		A&Ww			FBC			FC		AgL
LC	Rudd Creek	~~Tributary~~ Headwaters to confluence with Nutrioso Creek ~~at 34°04'12"/109°11'56"~~		A&Wc				FBC			FC		AgL
LC	Russel Reservoir	~~33°59'29"/109°20'00"~~ 33°59'29"/109°20'01"	Igneous		A&Ww			FBC			FC	AgI	AgL
~~LC~~	~~Salt House Lake~~	~~33°57'06"/109°20'12"~~	~~Igneous~~		~~A&Ww~~			~~FBC~~			~~FC~~		~~AgL~~
LC	San Salvador Reservoir	~~33°58'51"/109°19'51"~~ 33°58'51"/109°19'55"	Igneous	A&Wc				FBC			FC	AgI	AgL
LC	Scott Reservoir	~~34°10'27"/109°57'27"~~ 34°10'31"/109°57'31"	Igneous	A&Wc				FBC			FC	AgI	AgL
LC	Show Low Creek	~~Tributary~~ Headwaters to confluence with Silver Creek ~~at 34°25'26"/110°04'05"~~		A&Wc				FBC			FC	AgI	AgL
LC	Show Low Lake	~~34°11'25"/109°59'55"~~ 34°11'36"/110°00'12"	Igneous	A&Wc				FBC			FC	AgI	AgL
LC	Silver Creek	~~Tributary~~ Headwaters to confluence with the Little Colorado River ~~at 34°44'24"/110°02'17"~~		A&Wc				FBC			FC	AgI	AgL
LC	Slade Reservoir	~~33°59'50"/109°20'00"~~ 33°59'41"/109°20'26"	Igneous		A&Ww			FBC			FC	AgI	AgL
LC	Soldiers Annex Lake	~~34°47'13"/111°13'48"~~ 34°47'15"/111°13'51"	Igneous	A&Wc				FBC			FC	AgI	AgL
LC	Soldiers Lake	~~34°47'49"/110°13'59"~~ 34°47'47"/111°14'04"	Igneous	A&Wc				FBC			FC	AgI	AgL
LC	Spaulding Tank	~~34°30'17"/111°02'03"~~ 34°30'17"/111°02'06"			A&Ww			FBC			FC		AgL
LC	Sponseller Lake	~~34°14'10"/109°50'42"~~ 34°14'09"/109°50'45"	Igneous	A&Wc				FBC			FC		AgL
LC	St Johns Reservoir (Little Reservoir)	~~34°29'14"/109°21'57"~~ 34°29'10"/109°22'06"	Igneous		A&Ww			FBC			FC	AgI	AgL
LC	Telephone Lake (EDW)	~~34°17'35"/110°02'39"~~ 34°17'35"/110°02'42"	EDW				A&Wedw		PBC				
LC	Tremaine Lake	~~34°46'00"/111°14'10"~~ 34°46'02"/111°13'51"	Igneous	A&Wc				FBC			FC		AgL
LC	Tunnel Reservoir	~~34°01'51"/109°26'32"~~ 34°01'53"/109°26'34"	Igneous	A&Wc				FBC			FC	AgI	AgL
LC	Turkey Draw (EDW)	High Country Pines II WWTP outfall at ~~34°25'35"/110°38'13"~~ 33°25'35"/110°38'13" to confluence ~~of Turkey Draw~~ with Black Canyon Creek ~~at 34°25'20"/110°36'36"~~					A&Wedw		PBC				
LC	Unnamed Wash (EDW)	Bison Ranch WWTP outfall at ~~34°23'31"/110°31'41"~~ 34°23'31"/110°31'29" to Pierce Seep ~~at 34°23'35"/110°31'22"~~					A&Wedw		PBC				
LC	Unnamed Wash (EDW)	Black Mesa Ranger Station WWTP outfall at ~~34°23'32"/110°53'32"~~ 34°23'35"/110°33'36" to confluence of Oklahoma Flat Draw ~~with Pierce Wash at 34°26'47"/110°29'25"~~					A&Wedw		PBC				

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
~~LC~~	~~Unnamed Wash (EDW)~~	~~Estates at Pine Canyon WWTP outfall at 35°09'17"/111°38'22" to confluence of unnamed wash with Bow Wash and Arrow Wash at 35°09'51"/111°37'29"~~					~~A&Wedw~~		~~PBC~~				
~~LC~~	~~Unnamed Wash (EDW)~~	~~Estates at Pine Canyon WWTP outfall #3 at 35°09'45"/111°38'48" to confluence with Rio de Flag at 35°10'05"/111°38'37~~					~~A&Wedw~~		~~PBC~~				
LC	Vail Lake	~~35°05'24"/111°30'42"~~ 35°05'23"/111°30'46"	Igneous	A&Wc				FBC			FC		AgL
LC	Walnut Creek	~~Tributary~~ Headwaters to confluence with Billy Creek ~~at 34°09'50"/109°58'48"~~		A&Wc				FBC			FC		AgL
LC	Water Canyon Creek	~~Tributary~~ Headwaters to confluence with the Little Colorado River ~~at 34°06'47"/109°18'43"~~		A&Wc				FBC			FC		AgL
LC	Water Canyon Reservoir	~~34°00'15"/109°20'05"~~ 34°00'16"/109°20'05"	Igneous		A&Ww			FBC			FC	AgI	AgL
LC	Whale Lake (EDW)	~~35°12'32"/111°34'42"~~ 35°11'13"/111°35'21"	EDW				A&Wedw		PBC				
LC	Whipple Lake	~~34°16'47"/109°58'28"~~ 34°16'49"/109°58'29"	Igneous		A&Ww			FBC			FC		AgL
LC	White Mountain Lake	~~34°21'54"/109°59'38"~~ 34°21'57"/109°59'21"	Igneous	A&Wc				FBC			FC	AgI	AgL
LC	White Mountain Reservoir	~~34°00'15"/109°30'48"~~ 34°00'12"/109°30'39"	Igneous	A&Wc				FBC			FC	AgI	AgL
LC	Willow Creek	~~Tributary~~ Headwaters to confluence with Clear Creek ~~at 34°38'31"/110°59'49"~~		A&Wc				FBC			FC		AgL
LC	Willow Springs Canyon Creek	~~Tributary~~ Headwaters to confluence with Chevelon Creek ~~at 34°21'32"/110°53'20"~~		A&Wc				FBC			FC		AgL
LC	Willow Springs Lake	~~34°18'45"/110°52'34"~~ 34°18'13"/110°52'16"	Sedimentary	A&Wc				FBC			FC	AgI	AgL
LC	Woodland Reservoir	~~34°07'36"/109°57'06"~~ 34°07'35"/109°57'01"	Igneous	A&Wc				FBC			FC	AgI	AgL
LC	Woods Canyon Creek	~~Tributary~~ Headwaters to confluence with Chevelon Creek ~~at 34°21'32"/110°53'20"~~		A&Wc				FBC			FC		AgL
LC	Woods Canyon Lake	~~34°20'05"/110°56'35"~~ 34°20'09"/110°56'45"	Sedimentary	A&Wc				FBC			FC	AgI	AgL
LC	Zuni River	~~Tributary~~ Headwaters to confluence with the Little Colorado River ~~at 34°38'42"/109°40'26"~~		A&Wc				FBC			FC	AgI	AgL
MG	Agua Fria River	Headwaters to confluence with unnamed ~~EDW wash~~ tributary at ~~34°35'43"/112°16'29", receiving treated wastewater from the Prescott Valley WWTP~~ 34°35'14"/112°16'18"				A&We			PBC				AgL
MG	Agua Fria River (EDW)	Below confluence with unnamed ~~wash receiving treated wastewater from the Prescott Valley WWTP~~ tributary to State Route 169 ~~at 34°31'43"/112°14'7.5"~~					A&Wedw		PBC				AgL

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
MG	Agua Fria River	From State Route 169 to Lake Pleasant ~~at 34°54'54.7"/112°14'7.5"~~			A&Ww			FBC		DWS	FC	AgI	AgL
MG	Agua Fria River	Below Lake Pleasant to the City of El Mirage WWTP at ~~33°34'36"/112°48'45"~~ 33°34'20"/112°18'32"				A&We			PBC				AgL
MG	Agua Fria River (EDW)	From City of El Mirage WWTP outfall to 2 km downstream					A&Wedw		PBC				
MG	Agua Fria River	Below 2 km downstream of the City of El Mirage WWTP to City of Avondale WWTP outfall at 33°23'55"/112°21'16"				A&We			PBC				
MG	Agua Fria River	From City of Avondale WWTP outfall ~~at 33°23'24"/112°21'50.4"~~ to confluence with Gila River ~~at 33°23'22"/112°21'48"~~					A&Wedw		PBC				
MG	Alvord Park Lake	~~Urban Lake:~~ 35th Avenue & Baseline Road, Phoenix at ~~33°22'34"/112°08'11"~~ 33°22'23"/112°08'20"	Urban		A&Ww				PBC		FC		
MG	Andorra Wash ~~(EDW)~~	~~Town of Cave Creek WWTP outfall #1 at 33°50'00"/111°56'32"~~ Headwaters to confluence with Cave Creek Wash ~~at 33°49'54"/111°57'57.4"~~				A&We	~~A&Wedw~~		PBC				
MG	Antelope Creek	~~Tributary~~ Headwaters to confluence with Martinez Creek ~~at 34°16'37"/112°08'46"~~			A&Ww			FBC			FC		AgL
MG	Arlington Canal	From Gila River at 33°20'54"/112°35'39" to Gila River at 33°13'44"/112°46'15"											AgL
MG	Ash Creek	Headwaters to confluence with Tex Canyon ~~at 34°34'44"/112°07'18"~~		A&Wc				FBC			FC	AgI	AgL
MG	Ash Creek	Below confluence with Tex Canyon to confluence with Agua Fria ~~at 34°19'34"/112°04'30"~~ River			A&Ww			FBC			FC	AgI	AgL
MG	Beehive Tank	~~32°52'36"/111°02'19"~~ 32°52'37"/111°02'20"			A&Ww			FBC			FC		AgL
MG	Big Bug Creek	Headwaters to confluence with Eugene Gulch ~~at 34°27'11"/112°18'28.5"~~		A&Wc				FBC			FC	AgI	AgL
MG	Big Bug Creek	Below confluence with Eugene Gulch to confluence with Agua Fria River ~~at 34°18'54"/112°03'58"~~			A&Ww			FBC			FC	AgI	AgL
MG	Black Canyon Creek	~~Tributary~~ Headwaters to confluence with the Agua Fria River ~~at 34°04'12"/112°09'29"~~			A&Ww			FBC			FC		AgL
MG	Blind Indian Creek	~~Tributary~~ Headwaters to confluence with the Hassayampa River ~~at 34°12'40"/112°32'17"~~			A&Ww			FBC			FC		AgL
MG	Bonsall Park Lake	~~Urban Lake:~~ 59th Avenue & Bethany Home Road, Phoenix at ~~33°31'23"/112°11'05"~~ 33°31'24"/112°11'08"	Urban		A&Ww				PBC		FC		
MG	Canal Park Lake	~~Urban Lake:~~ College Avenue & Curry Road, Tempe at ~~33°26'57"/111°56'14"~~ 33°26'54"/111°56'19"	Urban		A&Ww				PBC		FC		
MG	Cave Creek	Headwaters to the Cave Creek Dam			A&Ww			FBC			FC		AgL

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
MG	Cave Creek	Cave Creek Dam to the Arizona Canal ~~at 33°34'24"/112°06'25"~~				A&We			PBC				
MG	Centennial Wash	~~Tributary~~ Headwaters to confluence with the Gila River at ~~33°13'44"/112°46'16"~~ 33°16'32"/112°48'08"				A&We			PBC				AgL
MG	Centennial Wash Ponds	~~33°55'10"/113°23'05"~~ 33°54'52"/113°23'47"			A&Ww			FBC			FC		AgL
MG	Chaparral Park Lake	~~Urban Lake;~~ Hayden Road & Chaparral Road, Scottsdale at ~~33°30'41"/111°54'25"~~ 33°30'40"/111°54'27"	Urban		A&Ww				PBC		FC	AgI	
MG	Cortez Park Lake	~~Urban Lake;~~ 35th Avenue & Dunlap, Glendale at ~~33°34'13"/112°07'51"~~ 33°34'13"/112°07'52"	Urban		A&Ww				PBC		FC	AgI	
MG	Desert Breeze Lake	~~Urban Lake;~~ Galaxy Drive, West Chandler at ~~33°18'47.5"/111°55'08"~~ 33°18'47"/111°55'10"	Urban		A&Ww				PBC		FC		
MG	Devils Canyon	~~Tributary~~ Headwaters to confluence with Mineral Creek ~~at 33°12'58"/110°59'42"~~			A&Ww				FBC		FC		AgL
MG	Dobson Lake	~~Urban Lake;~~ Dobson Road & Los Lagos Vista Avenue, Mesa at ~~33°22'17"/111°53'12"~~ 33°22'48"/111°52'35"	Urban		A&Ww				PBC		FC		
MG	East Maricopa Floodway	From Brown and Greenfield Rds to the Gila River Indian Reservation Boundary			A&We				PBS				AgL
MG	Eldorado Park Lake	~~Urban Lake;~~ Miller Road & Oak Street, Tempe at ~~33°28'25"/111°54'51"~~ 33°28'25"/111°54'53"	Urban		A&Ww				PBC		FC		
MG	Encanto Park Lake	~~Urban Lake;~~ 15th Avenue & Encanto Blvd., Phoenix at ~~33°28'36"/112°05'17"~~ 33°28'28"/112°05'18"	Urban		A&Ww				PBC		FC	AgI	
MG	Fain Lake	~~City~~ Town of Prescott Valley Park Lake ~~34°34'29"/112°21'03"~~ 34°34'29"/112°21'06"	Urban		A&Ww				PBC		FC		
MG	French Gulch	Headwaters to confluence with Hassayampa River			A&Ww				PBC				AgL
MG	Galena Gulch	~~Tributary~~ Headwaters to confluence with the Agua Fria River ~~at 34°28'37"/112°15'14"~~				A&We			PBC				AgL
MG	~~Gallaway~~ Galloway Wash (EDW)	Town of Cave Creek WWTP outfall ~~#2~~ at ~~33°49'58"/111°57'30"~~ 33°50'15"/111°57'35" to confluence with ~~Andorra Wash at 33°49'59"/111°57'41"~~ Cave Creek					A&Wedw		PBC				
MG	Gila River	San Carlos Indian Reservation boundary to the Ashurst-Hayden Dam ~~at 33°06'01"/111°14'46"~~			A&Ww			FBC			FC	AgI	AgL
MG	Gila River	~~AshurstHayden~~ Ashurst-Hayden Dam to the Town of Florence WWTP outfall at ~~33°02'30"/111°24'16"~~ 33°02'20"/111°24'19"				A&We			PBC				AgL

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
MG	Gila River (EDW)	Town of Florence WWTP outfall to Felix Road ~~at 33°01'49"/111°17'16"~~					A&Wedw		PBC				
MG	Gila River	Felix Road to the Gila River Indian Reservation boundary				A&We			PBC				AgL
MG	Gila River (EDW)	From the confluence with the Salt River to ~~the~~ Gillespie Dam ~~at 33°13'45"/112°46'07"~~					A&Wedw		PBC		FC	AgI	AgL
MG	Gila River	Gillespie Dam to confluence with Painted Rock Dam ~~at 33°04'23"/113°00'40"~~			A&Ww			FBC			FC	AgI	AgL
MG	Granada Park Lake	~~Urban Lake;~~ 6505 North 20th Street, Phoenix at ~~33°31'58.6"/112°02'06"~~ 33°31'56"/112°02'16"	Urban		A&Ww				PBC		FC		
MG	Groom Creek	~~Tributary~~ Headwaters to confluence with the Hassayampa River ~~at 34°27'14"/112°29'24"~~		A&Wc				FBC		DWS	FC		AgL
MG	~~Hank Raymond Lake~~ Lower Lake Pleasant	~~33°50'18"/112°16'07"~~ 33°50'32"/112°16'03"			A&Ww			FBC			FC	AgI	AgL
MG	Hassayampa Lake	~~34°25'45"/112°25'29"~~ 34°25'45"/112°25'33"	Igneous	A&Wc				FBC		DWS	FC		
MG	Hassayampa River	Headwaters to confluence with unnamed tributary at 34°26'09"/112°30'32"		A&Wc				FBC			FC	AgI	AgL
MG	Hassayampa River	Below confluence with unnamed tributary to ~~8 miles south of Wickenberg~~ confluence with unnamed tributary at 33°51'52"/112°39'56"			A&Ww			FBC			FC	AgI	AgL
MG	Hassayampa River	~~8 miles south of Wickenburg~~ Below unnamed tributary to the Buckeye Irrigation Company Canal ~~at 33°23'38"/112°22'22.8"~~				A&We			PBC				AgL
MG	Hassayampa River	Below Buckeye Irrigation Company canal to the Gila River ~~at 33°19'34"/112°42'39.6"~~			A&Ww			FBC			FC		AgL
MG	Horsethief Lake	~~34°09'42"/112°17'56"~~ 34°09'42"/112°17'57"	Igneous	A&Wc				FBC		DWS	FC		AgL
MG	Indian Bend Wash	~~Tributary~~ Headwaters to confluence with the Salt River ~~at 33°26'13"/111°54'58"~~				A&We			PBC				
MG	Indian Bend Wash Lakes	~~Urban Lakes;~~ Scottsdale at ~~33°30'31"/111°54'24"~~ 33°30'32"/111°54'24"	Urban		A&Ww				PBC		FC		
MG	Indian School Park Lake	~~Urban Lake;~~ Indian School Road & Hayden Road, Scottsdale at ~~33°29'45"/111°54'33"~~ 33°29'39"/111°54'37"	Urban		A&Ww				PBC		FC		
MG	Kiwanis Park Lake	~~Urban Lake;~~ 6000 South Mill Avenue, Tempe at ~~33°22'27"/111°56'21"~~ 33°22'27"/111°56'22"	Urban		A&Ww				PBC		FC	AgI	
MG	Lake Pleasant	~~33°51'15"/112°16'15"~~ 33°53'46"/112°16'29"	Deep		A&Ww			FBC		DWS	FC	AgI	AgL
MG	The Lake Tank	32°54'14"/111°04'15"			A&Ww			FBC			FC		AgL
MG	Lion Canyon	~~Tributary~~ Headwaters to confluence with Weaver Creek ~~at 34°10'12"/112°41'49"~~			A&Ww			FBC			FC		AgL
MG	Little Ash Creek	~~Tributary~~ Headwaters to confluence with Ash Creek at ~~34°20'46"/112°04'16"~~			A&Ww			FBC			FC		AgL

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
MG	Lynx Creek	Headwaters to confluence with unnamed tributary at ~~34°34'29"/112°21'05"~~ 34°34'29"/112°21'07"		A&Wc				FBC			FC		AgL
MG	Lynx Creek	Below confluence with unnamed tributary to confluence with Agua Fria River ~~at 34°37'49"/112°14'42"~~			A&Ww			FBC			FC		AgL
MG	Lynx Lake	~~34°31'08"/112°23'05"~~ 34°31'07"/112°23'07"	Deep	A&Wc				FBC		DWS	FC	AgI	AgL
MG	Maricopa Park Lake	~~33°35'30"/112°18'16"~~ 33°35'28"/112°18'15"	Urban		A&Ww				PBC		FC		
MG	Martinez Canyon	~~Tributary~~ Headwaters to confluence with Box Canyon ~~at 33°06'33"/111°12'48"~~			A&Ww			FBC			FC		AgL
MG	Martinez Creek	~~Tributary~~ Headwaters to confluence with the Hassayampa River ~~at 33°59'56"/112°44'38"~~			A&Ww			FBC			FC	AgI	AgL
MG	McKellips Park Lake	~~Urban Lake;~~ Miller Road & McKellips Road, Scottsdale at ~~33°27'14"/111°54'45"~~ 33°27'14"/111°54'49"	Urban		A&Ww				PBC		FC	AgI	
MG	McMicken Wash (EDW)	City of Peoria Jomax WWTP outfall at ~~33°43'30"/112°20'11"~~ 33°43'31"/112°20'15" to confluence ~~of McMicken Wash~~ with Agua Fria River ~~at 33°39'39"/112°18'56"~~					A&Wedw		PBC				
MG	Mineral Creek	~~Tributary~~ Headwaters to ~~the Gila River at 34°17'42"/112°13'34"~~ 33°12'34"/110°59'58"			A&Ww			FBC			FC		AgL
MG	Mineral Creek (diversion tunnel and lined channel)	33°12'24"/110°59'58" to 33°07'56"/110°58'34"						PBC					
MG	Mineral Creek	End of diversion channel to confluence with Gila River			A&Ww			FBC			FC		AgL
MG	Minnehaha Creek	~~Tributary~~ Headwaters to confluence with the Hassayampa River ~~at 34°11'49"/112°32'24"~~			A&Ww			FBC			FC		AgL
MG	Mountain Valley Park Ponds (EDW)	Town of Prescott Valley WWTP outfall 002 at ~~34°26'07"/112°18'48"~~ 34°36'07"/112°18'48" to Navajo Wash	EDW				A&Wedw		PBC				
MG	New River	Headwaters to ~~I17 at 33°54'19.5"/112°08'46"~~ Interstate 17			A&Ww			FBC			FC	AgI	AgL
MG	New River	Below ~~I17~~ Interstate 17 to confluence with Agua Fria River ~~at 33°30'47"/112°18'14"~~				A&We			PBC				AgL
MG	Painted Rock Reservoir	~~33°04'15"/113°00'30"~~ 33°04'23"/113°00'38"	Sedimentary		A&Ww			FBC			FC	AgI	AgL
MG	Papago Park Ponds	~~Urban Lake;~~ Galvin Parkway, Phoenix at ~~33°26'56"/111°56'50"~~ 33°27'15"/111°56'45"	Urban		A&Ww				PBC		FC		
MG	Papago Park South Pond	~~Urban Lake;~~ Curry Road, Tempe 33°26'22"/111°55'55"	Urban		A&Ww				PBC		FC		
MG	Perry Mesa Tank	~~34°11'03"/112°01'59"~~ 34°11'03"/112°02'01"			A&Ww			FBC			FC		AgL

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
MG	Phoenix Area Canals	Granite Reef Dam to all municipal WTP intakes								DWS		AgI	AgL
MG	Phoenix Area Canals	Below municipal WTP intakes and all other locations										AgI	AgL
MG	Picacho Reservoir	~~32°51'17"/111°28'49"~~ 32°51'10"/111°28'25"	Shallow		A&Ww			FBC			FC	AgI	AgL
MG	Poland Creek	Headwaters to confluence with Lorena Gulch ~~at 34°12'32"/112°19'07"~~		A&Wc				FBC			FC		AgL
MG	Poland Creek	Below confluence with Lorena Gulch to confluence with Black Canyon Creek ~~at 34°14'20"/112°12'54"~~			A&Ww			FBC			FC		AgL
MG	Queen Creek	Headwaters to the Town of Superior WWTP outfall at ~~33°16'45"/111°17'25"~~ 33°16'33"/111°07'44"			A&Ww				PBC				AgL
MG	Queen Creek (EDW)	Below Town of Superior WWTP outfall to confluence with Potts Canyon ~~at 33°17'17"/111°11'36"~~					A&Wedw		PBC				
MG	Queen Creek	Below Potts Canyon to ~~Queen Valley golf course at 33°17'55"/111°17'17"~~ Whitlow Dam			A&Ww			FBC			FC		AgL
MG	Queen Creek	Below ~~Queen Valley golf course~~ Whitlow Dam to confluence with Gila River ~~at 33°09'50"/111°53'16.8"~~				A&We			PBC				
MG	Riverview Park Lake	~~Urban Lake;~~ Dobson Road & 8th Street, Mesa at ~~33°25'50"/111°52'29"~~ 33°25'50"/111°52'29"	Urban		A&Ww				PBC		FC		
MG	Roadrunner Park Lake	~~Urban Lake;~~ 36th Street & Cactus, Phoenix at ~~33°35'57"/112°00'18"~~ 33°35'56"/112°00'21"	Urban		A&Ww				PBC		FC		
MG	Salt River	Verde River to 2 km below Granite Reef Dam ~~(Granite Reef Dam is at 31°26'23"/111°12'40")~~			A&Ww			FBC		DWS	FC	AgI	AgL
MG	Salt River	2 km below Granite Reef Dam to City of Mesa NW WRF outfall at ~~33°26'45"/111°56'35"~~ 33°26'22"/111°53'14"				A&We			PBC				
MG	Salt River (EDW)	City of Mesa NW WRF outfall ~~at 33°26'45"/111°56'35"~~ to Tempe Town Lake ~~at~~ 33°26'01"/111°54'55"					A&Wedw		PBC				
MG	Salt River	Below Tempe Town Lake to ~~I-10~~ Interstate 10 bridge				A&We			PBC				
MG	Salt River	~~I-10~~ Below Interstate 10 bridge to the City of Phoenix 23rd Avenue WWTP outfall at ~~33°25'03"/112°06'41.6"~~ 33°24'44"/112°07'59"			A&Ww				PBC		FC		

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
MG	Salt River (EDW)	From City of Phoenix 23rd Avenue WWTP outfall to confluence with Gila River ~~at 33°22'55"/112°18'21.6"~~					A&Wedw		PBC		FC	AgI	AgL
MG	Siphon Draw (EDW)	Superstition Mountains CFD WWTP outfall at 33°21'40"/111°33'30" to 6 km downstream ~~at 33°21'01"/111°36'59"~~					A&Wedw		PBC				
MG	Sycamore Creek	Headwaters to confluence with Tank Canyon ~~at 34°19'32"/111°50'12"~~		A&Wc				FBC			FC		AgL
MG	Sycamore Creek	Below confluence with Tank Canyon to ~~the~~ confluence with Agua Fria River ~~at 34°19'30"/112°04'12"~~			A&Ww			FBC			FC		AgL
MG	Tempe Town Lake	At Mill Avenue Bridge at ~~33°26'30"/111°53'30"~~ 33°26'00"/111°56'26"	Urban		A&Ww			FBC			FC		
MG	Tule Creek	~~Tributary~~ Headwaters to confluence with the Agua Fria River ~~at 33°57'25"/112°14'13"~~			A&Ww			FBC			FC		AgL
MG	Turkey Creek	Headwaters to confluence with unnamed tributary at ~~34°19'28"/112°21'28"~~ 34°19'28"/112°21'33"		A&Wc				FBC			FC	AgI	AgL
MG	Turkey Creek	Below confluence with unnamed tributary to confluence with Poland Creek ~~at 34°14'20"/112°12'54"~~			A&Ww			FBC			FC	AgI	AgL
~~MG~~	~~Unnamed Wash (EDW)~~	~~City of Phoenix Cave Creek WRF outfall at 33°45'20"/112°00'59" to unnamed wash to 0.5 km downstream at 33°35'07"/112°01'12"~~					~~A&Wedw~~		~~PBC~~				
MG	Unnamed Wash (EDW)	Gila Bend WWTP outfall to confluence with the Gila River ~~at 32°58'13"/112°43'46"~~					A&Wedw		PBC				
MG	Unnamed Wash (EDW)	Luke Air Force Base WWTP outfall at 33°32'00"/112°19'03" to confluence with the Agua Fria River ~~at 33°32'21"/112°19'15"~~					A&Wedw		PBC				
MG	Unnamed Wash (EDW)	North Florence ~~Gardens~~ WWTP outfall at ~~33°03'49.54"/111°23'13.28"~~ 33°03'50"/111°23'13" to confluence with Gila River ~~at 33°02'59"/111°23'15"~~					A&Wedw		PBC				
MG	Unnamed Wash (EDW)	Town of Prescott Valley WWTP outfall at 34°35'16"/112°16'18" to confluence with the Agua Fria River ~~at 34°35'16"/112°16'18"~~					A&Wedw		PBC				
MG	Unnamed Wash (EDW)	Town of Cave Creek WRF outfall at 33°48'02"/111°59'22" to confluence with Cave Creek					A&Wedw		PBC				
~~MG~~	~~Unnamed Wash (EDW)~~	~~Queen Valley Sanitary District WWTP outfall at 33°17'38"/111°18'31" to the confluence with Queen Creek~~					~~A&Wedw~~		~~PBC~~				
MG	Wagner Wash (EDW)	City of Buckeye Festival Ranch WRF outfall at 33°39'14"/112°40'18" to 2 km downstream					A&Wedw		PBC				

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
MG	Vista Del Camino Park North	~~Urban Lake;~~ 7700 East Roosevelt Street, Scottsdale at ~~33°27'33"/111°54'49.3"~~ 33°27'33"/111°54'52"	Urban		A&Ww				PBC		FC		
MG	Walnut Canyon Creek	~~Tributary~~ Headwaters to confluence with the Gila River ~~at 33°06'47"/111°05'20"~~			A&Ww			FBC			FC		AgL
MG	Weaver Creek	~~Tributary to Martinez Creek at 34°03'18"/112°46'48"~~ Headwaters to confluence with Antelope Creek			A&Ww			FBC			FC		AgL
MG	White Canyon Creek	~~Tributary~~ Headwaters to confluence with Walnut Canyon Creek ~~at 33°09'25"/111°04'48"~~			A&Ww			FBC			FC		AgL
SC	Agua Caliente Lake	~~Urban Lake;~~ 12325 East Roger Road, Tucson 32°16'51"/110°43'52"	Urban		A&Ww				PBC		FC		
SC	Agua Caliente Wash	Headwaters to confluence with Soldier Trail ~~at 32°17'48"/110°42'58.5"~~			A&Ww			FBC			FC		AgL
SC	Agua Caliente Wash	Below Soldier Trail to confluence with Tanque Verde Creek ~~at 32°14'35"/110°47'17"~~				A&We			PBC				AgL
SC	Aguirre Wash	~~Those reaches not located on~~ From the Tohono O'odham Indian Reservation boundary to 32°28'38"/111°46'51"				A&We			PBC				
SC	Alambre Wash	~~Tributary~~ Headwaters to confluence with Brawley Wash ~~at 31°57'47"/111°23'28"~~				A&We			PBC				
SC	Alamo Wash	~~Tributary~~ Headwaters to confluence with Rillito Creek ~~at 32°16'23"/110°54'18"~~				A&We			PBC				
SC	Altar Wash	~~Tributary~~ Headwaters to confluence with Brawley Wash ~~at 31°57'47"/111°23'28"~~				A&We			PBC				
SC	Alum Gulch	Headwaters to 31°28'20"/110°43'51"				A&We			PBC				AgL
SC	Alum Gulch	From 31°28'20"/110°43'51" to 31°29'17"/110°44'25"			A&Ww			FBC			FC		AgL
SC	Alum Gulch	Below 31°29'17"/110°44'25" to confluence with Sonoita Creek ~~at 31°30'58"/110°47'06"~~				A&We			PBC				AgL
SC	Arivaca Creek	~~Tributary~~ Headwaters to confluence with Altar Wash ~~at 31°43'01"/111°25'41"~~			A&Ww			FBC			FC		AgL
SC	Arivaca Lake	~~31°31'50"/111°15'05"~~ 31°31'52"/111°15'06"	Igneous		A&Ww			FBC			FC	AgI	AgL
SC	Atterbury Wash	~~Tributary~~ Headwaters to confluence with Pantano Wash ~~at 32°10'52"/110°48'50"~~				A&We			PBC				AgL
SC	Bear Grass Tank	~~31°33'01"/111°11'32"~~ 31°33'01"/111°11'03"			A&Ww			FBC			FC		AgL
SC	Big Wash	~~Tributary~~ Headwaters to confluence with Cañada del Oro ~~at 32°24'47"/110°56'28"~~				A&We			PBC				
SC	Black Wash (EDW)	Pima County WWMD Avra Valley WWTP outfall at ~~32°09'50"/111°10'49"~~ 32°09'58"/111°11'17" to confluence with Brawley Wash ~~at 32°15'00"/111°14'34"~~					A&Wedw		PBC				
SC	Bog Hole Tank	~~31°28'34"/110°37'07"~~ 31°28'36"/110°37'09"			A&Ww			FBC			FC		AgL

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
SC	Brawley Wash	~~Tributary~~ Headwaters to confluence with Los Robles Wash ~~at 32°21'54"/111°17'31"~~				A&We			PBC				
SC	California Gulch	~~South of Ruby~~ Headwaters To U.S./Mexico border			A&Ww			FBC			FC		AgL
SC	Cañada del Oro	Headwaters to ~~Highway 89 at 32°24'48"/110°56'14"~~ State Route 77			A&Ww			FBC			FC	AgI	AgL
SC	Cañada del Oro	Below ~~Highway 89~~ State Route 77 to confluence with the Santa Cruz River ~~at 32°19'30"/111°03'47"~~				A&We			PBC				AgL
SC	Cienega Creek	Headwaters to confluence with Gardner Canyon ~~and Spring Water Canyon at 31°47'38"/110°35'17"~~			A&Ww			FBC			FC		AgL
SC	Cienega Creek (OAW)	From confluence with Gardner Canyon ~~and Spring Water Canyon~~ to USGS gaging station ~~at 32°02'09"/110°40'34" (becomes Pantano Wash below this point)~~ (#09484600)			A&Ww			FBC			FC		AgL
SC	Davidson Canyon	Headwaters to unnamed spring at ~~31°59'00"/110°38'46"~~ 31°59'00"/110°38'49"				A&We			PBC				AgL
SC	Davidson Canyon (OAW)	~~Unnamed~~ From unnamed Spring to confluence with unnamed tributary at ~~31°59'32.5"/110°38'43.5"~~ 31°59'09"/110°38'44"			A&Ww			FBC			FC		AgL
SC	Davidson Canyon (OAW)	~~From~~ Below confluence with unnamed tributary to unnamed spring at ~~32°00'54"/110°38'54"~~ 32°00'40"/110°38'36"				A&We			PBC				AgL
SC	Davidson Canyon (OAW)	From unnamed spring ~~at 32°00'54"/110°38'54"~~ to confluence with Cienega Creek ~~at 32°01'05"/110°38'32"~~			A&Ww			FBC			FC		AgL
SC	Empire Gulch	Headwaters to unnamed spring at ~~31°47'14"/110°38'13"~~ 31°47'18"/110°38'17"				A&We			PBC				
SC	Empire Gulch	From ~~31°47'14"/110°38'13"~~ 31°47'18"/110°38'17" to ~~31°47'11" / 110°00'39"~~ 31°47'03"/110°37'35"			A&Ww			FBC			FC		
SC	Empire Gulch	~~Below 31°47'11" / 110°00'39"~~ From 31°47'03"/110°37'35" to ~~31°47'18" / 110°36'57"~~ 31°47'05"/110°36'58"				A&We			PBC				AgL
SC	Empire Gulch	From ~~31°47'18" / 110°36'57"~~ 31°47'05"/110°36'58" to confluence with Cienega Creek ~~at 31°48'32"/110°35'20"~~			A&Ww			FBC			FC		
SC	Flux Canyon	~~Tributary~~ Headwaters to confluence with Alum Canyon ~~at 31°30'22"/110°46'41"~~				A&We			PBC				AgL
SC	Gardner Canyon Creek	Headwaters to confluence with Sawmill Canyon ~~at 31°42'51"/110°44'43"~~		A&Wc				FBC			FC		
SC	Gardner Canyon Creek	Below Sawmill Canyon to confluence with Cienega Creek ~~at 31°47'38"/110°35'17"~~			A&Ww			FBC			FC		

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
SC	Greene Wash	~~Tributary~~ Greene Reservoir at 32°37'09"/111°41'12" to the ~~Santa Cruz River at 33°00'54"/111°59'46"~~ Tohono O'odham Indian Reservation boundary				A&We			PBC				
SC	Greene Wash	Tohono O'odham Indian Reservation boundary to confluence with Santa Rosa Wash at 32°53'52"/111°56'48"				A&We			PBC				
SC	Harshaw Creek	~~Tributary~~ Headwaters to confluence with Sonoita Creek at ~~31°32'35"/110°44'42"~~				A&We			PBC				AgL
SC	Hit Tank	32°43'57"/111°03'18"			A&Ww			FBC			FC		AgL
SC	Holden Canyon Creek	Headwaters to U.S./Mexico border ~~at 31°23'38"/111°15'54" in the Coronado National Forest~~			A&Ww			FBC			FC		
SC	Huachuca Tank	~~31°21'11"/110°30'12"~~ 31°21'11"/110°30'18"			A&Ww			FBC			FC		AgL
SC	Julian Wash	~~Tributary~~ Headwaters to confluence with the Santa Cruz River ~~at 32°11'20"/110°59'13"~~				A&We			PBC				
SC	Kennedy Lake	~~Urban Lake;~~ Mission Road & Ajo Road, Tucson at ~~32°10'48.5"/111°00'27"~~ 32°10'49"/111°00'27"	Urban		A&Ww				PBC		FC		
SC	Lakeside Lake	~~Urban Lake;~~ 8300 East Stella Road, Tucson at ~~32°11'10.5"/110°49'00"~~ 32°11'11"/110°49'00"	Urban		A&Ww				PBC		FC		
SC	Lemmon Canyon Creek	Headwaters to confluence with unnamed tributary at ~~32°23'47"/110°47'46"~~ 32°23'48"/110°47'49"		A&Wc				FBC			FC		
SC	Lemmon Canyon Creek	Below unnamed tributary to confluence with Sabino Canyon Creek ~~at 32°23'02"/110°47'28"~~			A&Ww			FBC			FC		
SC	Los Robles Wash	~~Tributary~~ Headwaters to confluence with the Santa Cruz River ~~at 32°32'13"/111°23'53"~~				A&We			PBC				
SC	Madera Canyon Creek	Headwaters to confluence with unnamed tributary at ~~31°43'42"/110°52'50"~~ 31°43'42"/110°52'51"		A&Wc				FBC			FC		AgL
SC	Madera Canyon Creek	Below unnamed tributary to confluence with the Santa Cruz River ~~at 31°46'55"/111°00'58"~~			A&Ww			FBC			FC		AgL
SC	Mattie Canyon	~~Tributary~~ Headwaters to confluence with Cienega Creek ~~at 31°51'31"/110°34'25"~~			A&Ww			FBC			FC		AgL
SC	Nogales Wash	~~Tributary~~ Headwaters to confluence with Potrero Creek ~~at 31°24'07"/110°57'11"~~			A&Ww				PBC		FC		
SC	Oak Tree Canyon	~~Tributary~~ Headwaters to confluence with Cienega Creek ~~at 31°48'43"/110°35'24"~~				A&We			PBC				
SC	Palisade Canyon Creek	Headwaters to confluence with unnamed tributary at ~~32°22'34"/110°45'35"~~ 32°21'59"/110°46'16"		A&Wc				FBC			FC		

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
SC	Palisade Canyon Creek	Below unnamed tributary to confluence with Sabino Canyon Creek ~~at 32°21'54"/110°46'23"~~			A&Ww			FBC			FC		
SC	Pantano Wash	~~Tributary~~ Headwaters to confluence with Tanque Verde Creek ~~at 32°16'23"/110°54'18"~~				A&We			PBC				
~~SC~~	~~Paradise Lake~~	~~32°44'18"/111°40'42"~~	~~Urban~~		~~A&Ww~~				~~PBC~~			~~AgI~~	
SC	Parker Canyon Creek	Headwaters to confluence with unnamed tributary at ~~31°24'17"/110°28'44.5"~~ 31°24'17"/110°28'47"		A&Wc				FBC			FC		
SC	Parker Canyon Creek	Below unnamed tributary to U.S./Mexico border ~~at 31°19'59"/110°33'58"~~			A&Ww			FBC			FC		
SC	Parker Canyon Lake	31°25'35"/110°27'15"	Deep	A&Wc				FBC			FC	AgI	AgL
SC	Patagonia Lake	~~31°29'30"/110°52'00"~~ 31°29'56"/110°50'49"	Deep		A&Ww			FBC			FC	AgI	AgL
SC	Peña Blanca Lake	~~31°24'12"/111°05'04"~~ 31°24'15"/111°05'12"	Igneous		A&Ww			FBC			FC	AgI	AgL
SC	Potrero Creek	Headwaters to Interstate 19 ~~at 31°23'24"/110°57'30"~~				A&We			PBC				AgL
SC	Potrero Creek	Below Interstate 19 to confluence with Santa Cruz River ~~at 31°27'07"/110°57'40"~~			A&Ww			FBC			FC		AgL
SC	Puertocito Wash	~~Tributary~~ Headwaters to confluence with Altar Wash ~~at 31°43'01"/111°25'41"~~				A&We			PBC				
SC	Quitobaquito Spring	(Pond and Springs) 31°56'39"/113°01'06"			A&Ww			FBC			FC		AgL
SC	Redrock Canyon Creek	~~Tributary~~ Headwaters to confluence with Harshaw Creek ~~at 31°32'35"/110°44'13"~~			A&Ww			FBC			FC		
SC	Rillito Creek	~~Tributary~~ Headwaters to confluence with the Santa Cruz River ~~at 32°18'50"/111°03'18"~~				A&We			PBC				AgL
SC	Romero Canyon Creek	Headwaters to confluence with unnamed tributary at ~~32°24'30"/110°50'35"~~ 32°24'29"/110°50'39"		A&Wc				FBC			FC		
SC	Romero Canyon Creek	Below unnamed tributary to confluence with Sutherland Wash ~~at 32°25'52"/110°53'56"~~			A&Ww			FBC			FC		
SC	Rose Canyon Creek	~~Tributary~~ Headwaters to Rose Canyon Lake ~~at 32°23'10"/110°43'01"~~		A&Wc				FBC			FC		
SC	Rose Canyon Lake	32°23'13"/110°42'38"	Igneous	A&Wc				FBC			FC		AgL
SC	Ruby Lakes	~~Near the town of Ruby at 31°26'28.5"/111°14'19"~~ 31°26'29"/111°14'22"	Igneous		A&Ww			FBC			FC		AgL
SC	Sabino Canyon Creek	Headwaters to confluence with unnamed tributary at ~~32°23'28"/110°47'00"~~ 32°23'28"/110°47'03"		A&Wc				FBC		DWS	FC	AgI	
SC	Sabino Canyon Creek	Below unnamed tributary to confluence with Tanque Verde River ~~at 32°15'40"/110°49'30"~~			A&Ww			FBC		DWS	FC	AgI	

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
SC	Salero Ranch Tank	~~31°35'42"/110°53'22"~~ 31°35'43"/110°53'25"			A&Ww			FBC			FC		AgL
SC	Santa Cruz River	Headwaters to the ~~International Boundary~~ at ~~31°19'58"/110°35'48"~~ U.S./Mexico border			A&Ww			FBC			FC	AgI	AgL
SC	Santa Cruz River	~~International Boundary~~ U.S./Mexico border to the Nogales International WWTP outfall at ~~31°27'24"/110°58'05"~~ 31°27'25"/110°58'04"			A&Ww			FBC		DWS	FC	AgI	AgL
SC	Santa Cruz River (EDW)	Nogales International WWTP outfall to the Tubac Bridge ~~at 31°36'25"/110°02'00"~~					A&Wedw		PBC				AgL
SC	Santa Cruz River	~~The~~ Tubac Bridge to ~~Roger Road WWTP~~ Agua Nueva WRF outfall at 32°17'04"/111°01'45"				A&We			PBC				AgL
SC	Santa Cruz River (EDW)	~~Roger Road WWTP~~ Agua Nueva WRF outfall to Baumgartner Road ~~at 32°35'37"/111°28'08"~~					A&Wedw		PBC				
SC	Santa Cruz River, West Branch	Headwaters to the confluence with Santa Cruz River				A&We			PBC				AgL
SC	Santa Cruz Wash	Baumgartner Road to the Ak Chin Indian Reservation boundary				A&We			PBC				AgL
~~SC~~	~~Santa Cruz Wash, West Branch~~	~~Tributary to the Santa Cruz Wash at 32°12'07"/110°59'20"~~				~~A&We~~			~~PBC~~				~~AgL~~
SC	Santa Cruz Wash, North Branch	~~Tributary to the Santa Cruz Wash at 32°55'55"/111°53'10"~~ Headwaters to City of Casa Grande WRF outfall at 32°54'57"/111°47'13"				A&We			PBC				
SC	Santa Cruz Wash, North Branch (EDW)	City of Casa Grande WRF outfall ~~at 32°54'57"/111°47'13"~~ to 1 km downstream ~~at 32°54'49"/111°47'48"~~					A&Wedw		PBC				
SC	Santa Rosa Wash	Below Tohono O'odham Indian Reservation to the Ak Chin Indian Reservation				A&We			PBC				
SC	Santa Rosa Wash (EDW)	Palo Verde Utilities WWTP outfall at 33°04'20"/112°01'47" to the Gila River Indian Reservation					A&Wedw		PBC				
SC	Soldier Lake	~~32°25'34"/110°44'41"~~ 32°25'34"/110°44'43"		A&Wc				FBC			FC		AgL
SC	Sonoita Creek	Headwaters to the Town of Patagonia WWTP outfall at ~~31°32'15"/110°45'30"~~ 31°32'25"/110°45'31"				A&We			PBC				AgL
SC	Sonoita Creek (EDW)	Town of Patagonia WWTP outfall to permanent groundwater upwelling point approximately 1600 feet downstream of outfall					A&Wedw		PBC				AgL
SC	Sonoita Creek	Below ~~1600 feet downstream of Town of Patagonia WWTP outfall~~ groundwater			A&Ww			FBC			FC	AgI	AgL

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
		upwelling point to confluence with the Santa Cruz River ~~at 31°29'43"/110°58'37"~~											
SC	Split Tank	~~31°28'15"/111°05'15"~~ 31°28'11"/111°05'12"			A&Ww			FBC			FC		AgL
SC	Sutherland Wash	~~Tributary~~ Headwaters to confluence with Cañada del Oro ~~at 32°25'05"/110°55'26"~~			A&Ww			FBC			FC		
SC	Sycamore Canyon	Headwaters to 32°21'60" / 110°44'48"		A&Wc				FBC			FC		
SC	Sycamore Canyon	From ~~32°21'36" / 110°45'21"~~ 32°21'60" / 110°44'48" to Sycamore Reservoir			A&Ww			FBC			FC		
SC	Sycamore Canyon Creek	Headwaters to the U.S./Mexico border ~~at 31°22'48"/111°13'19"~~			A&Ww			FBC			FC		AgL
SC	Sycamore Reservoir	~~32°20'57"/110°44'52"~~ 32°20'57"/110°47'38"		A&Wc				FBC			FC		AgL
SC	Tanque Verde Creek	Headwaters to Houghton Road ~~at 32°14'13"/110°46'04"~~			A&Ww			FBC			FC		AgL
SC	Tanque Verde Creek	Below Houghton Road to confluence with Rillito Creek ~~at 32°16'08"/110°52'30"~~				A&We			PBC				AgL
~~SC~~	~~The Lake Tank~~	~~32°54'14"/111°04'14"~~			~~A&Ww~~			~~FBC~~			~~FC~~		~~AgL~~
SC	Three R Canyon	Headwaters to ~~31°28'35"/110°46'19"~~ 31°28'26"/110°46'04"				A&We			PBC				AgL
SC	Three R Canyon	From ~~31°28'35"/110°46'19"~~ 31°28'26"/110°46'04" to ~~31°28'27"/110°47'12"~~ 31°28'28"/110°47'15"			A&Ww			FBC			FC		AgL
SC	Three R Canyon	From ~~31°28'27"/110°47'12"~~ 31°28'28"/110°47'15" to confluence with Sonoita Creek ~~at 31°29'56"/110°48'54"~~				A&We			PBC				AgL
SC	Tinaja Wash	Headwaters to confluence with the Santa Cruz River ~~at 31°32'58.4"/111°02'45.7"~~				A&We			PBC				AgL
SC	Unnamed Wash (EDW)	Oracle Sanitary District WWTP outfall at 32°36'54"/110°48'02" to 5 km downstream					A&Wedw		PBC				
~~SC~~	~~Unnamed Wash~~	~~5 km downstream of the Oracle Sanitary District WWTP outfall~~				~~A&We~~			~~PBC~~				
SC	Unnamed Wash (EDW)	Arizona City Sanitary District WWTP outfall at ~~32°45'47"/111°44'20"~~ 32°45'43"/111°44'24" to confluence with Santa Cruz Wash ~~at 35°45'45"/111°46'43"~~					A&Wedw		PBC				
SC	Unnamed Wash (EDW)	Saddlebrook WWTP outfall at ~~32°32'00"/110°52'59"~~ 32°32'00"/110°53'01" to confluence with Cañada del Oro ~~at 32°30'20"/110°52'27"~~					A&Wedw		PBC				
SC	Vekol Wash	Those reaches not located on the Ak-Chin, Tohono O'odham and Gila River Indian Reservations				A&We			PBC				
SC	Wakefield Canyon	Headwaters to confluence with unnamed tributary ~~31°52'47"/110°26'25"~~ at 31°52'48"/110°26'27"		A&Wc				FBC			FC		AgL

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
SC	Wakefield Canyon	Below confluence with unnamed tributary to confluence with Cienega Creek ~~at 31°52'47.5"/110°26'25"~~			A&Ww			FBC			FC		AgL
SC	Wild Burro Canyon	Headwaters to confluence with unnamed tributary at ~~32°28'36"/111°05'18"~~ 32°27'43"/111°05'47"			A&Ww			FBC			FC		AgL
SC	Wild Burro Canyon	Below confluence with unnamed tributary to confluence with Santa Cruz River ~~at 32°28'34"/111°05'15.5"~~				A&We			PBC				AgL
SC	Williams Ranch Tanks	~~31°55'15"/110°25'30"~~ 31°55'14"/110°25'31"			A&Ww			FBC			FC		AgL
SP	Abbot Canyon	Headwaters to confluence with Whitewater Draw ~~at 31°33'32"/109°48'39.6"~~			A&Ww			FBC			FC		AgL
SP	Aravaipa Creek	Headwaters to confluence with Stowe Gulch ~~at 32°52'10"/110°22'00"~~			A&Ww			FBC			FC		AgL
SP	Aravaipa Creek (OAW)	Stowe Gulch ~~confluence~~ to downstream boundary of Aravaipa Canyon Wilderness Area ~~at 32°54'23"/110°33'40"~~			A&Ww			FBC			FC		AgL
SP	Aravaipa Creek	Below downstream boundary of Aravaipa Canyon Wilderness Area to confluence with the San Pedro River ~~at 32°50'20"/110°42'50"~~			A&Ww			FBC			FC		AgL
SP	Ash Creek	~~Chiricahua Mountains, near Whitewater Draw at 31°50'28"/109°40'01.2"~~ Headwaters to 31°50'28"/109°40'04"			A&Ww			FBC			FC	AgI	AgL
SP	Babocomari River	~~Tributary~~ Headwaters to confluence with the San Pedro River ~~at 31°43'19"/110°11'35"~~			A&Ww			FBC			FC		AgL
SP	Bass Canyon Creek	Headwaters to confluence with unnamed tributary at ~~32°26'06"/110°13'18"~~ 32°26'06"/110°13'22"		A&Wc				FBC			FC		AgL
SP	Bass Canyon Creek	Below confluence with unnamed tributary to confluence with Hot Springs Canyon Creek ~~at 32°20'53"/110°15'14"~~			A&Ww			FBC			FC		AgL
SP	Bass Canyon Tank	32°24'00"/110°13'00"			A&Ww			FBC			FC		AgL
SP	Bear Creek	Headwaters to U.S./Mexico border ~~at 31°19'59"/110°22'58.5"~~			A&Ww			FBC			FC		AgL
SP	Big Creek	~~Tributary~~ Headwaters to confluence with Pitchfork Canyon ~~at 32°35'24"/109°57'07"~~		A&Wc				FBC			FC		AgL
SP	Blacktail Pond	Fort Huachuca Military Reservation at ~~31°24'13"/110°17'21"~~ 31°24'13"/110°17'23"			A&Ww			FBC			FC		
SP	Blackwater Draw	Headwaters to the U.S./Mexico border ~~at 31°20'02"/109°15'36" in the San Bernardino Valley~~			A&Ww			FBC			FC		AgL
SP	Booger Canyon Creek	~~Tributary~~ Headwaters to confluence with Aravaipa Creek ~~at 32°54'54"/110°29'35"~~			A&Ww			FBC			FC		AgL

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
SP	Buck Canyon	Headwaters to confluence with Buck Creek Tank ~~at 31°33'06"/109°52'43"~~			A&Ww			FBC			FC		AgL
SP	Buck Canyon	Below Buck Creek Tank to confluence with Dry Creek ~~at 31°31'08"/109°18'25"~~				A&We			PBC				AgL
SP	Buehman Canyon Creek (OAW)	Headwaters to confluence with unnamed tributary at ~~32°24'31.5"/110°32'08"~~ 32°24'54"/110°32'10"			A&Ww			FBC			FC		AgL
SP	Buehman Canyon Creek	Below confluence with unnamed tributary ~~at 32°25'41"/110°29'53"~~ to confluence with San Pedro River			A&Ww			FBC			FC		AgL
SP	Bull Tank	~~32°31'15"/110°12'45"~~ 32°31'13"/110°12'52"			A&Ww			FBC			FC		AgL
SP	Bullock Canyon	~~Tributary~~ Headwaters to confluence with Buehman Canyon ~~at 32°23'00"/110°33'04"~~			A&Ww			FBC			FC		AgL
SP	Carr Canyon Creek	Headwaters to confluence with unnamed tributary at ~~31°27'00"/110°15'45"~~ 31°27'01"/110°15'48"		A&Wc				FBC			FC		AgL
SP	Carr Canyon Creek	Below confluence with unnamed tributary to confluence with the San Pedro River ~~at 31°30'32"/110°07'37"~~			A&Ww			FBC			FC		AgL
SP	Copper Creek	Headwaters to confluence with Prospect Canyon ~~at 32°44'48"/110°30'18"~~			A&Ww			FBC			FC		AgL
SP	Copper Creek	Below confluence with Prospect Canyon to confluence with the San Pedro River ~~at 32°41'17"/110°36'43"~~				A&We			PBC				AgL
SP	Deer Creek	Headwaters to confluence with unnamed tributary at ~~32°59'56"/110°20'09"~~ 32°59'57"/110°20'11"		A&Wc				FBC			FC		AgL
SP	Deer Creek	Below confluence with unnamed tributary to confluence with Aravaipa Creek ~~at 32°54'25"/110°28'01"~~			A&Ww			FBC			FC		AgL
SP	Dixie Canyon	Headwaters to confluence with Mexican Canyon ~~at 31°29'02"/109°45'04" in the Mule Mountains~~			A&Ww			FBC			FC		AgL
SP	Double R Canyon Creek	~~Tributary~~ Headwaters to confluence with Bass Canyon ~~at 32°21'06"/110°14'23"~~			A&Ww			FBC			FC		
SP	Dry Canyon	Headwaters to confluence with Abbot Canyon ~~at 31°33'25"/109°43'23" in the Mule Mountains~~			A&Ww			FBC			FC		AgL
SP	East Gravel Pit Pond	Fort Huachuca Military Reservation at ~~31°30'54"/110°19'42"~~ 31°30'54"/110°19'44"	Sedimentary		A&Ww			FBC			FC		
SP	Espiritu Canyon Creek	~~Tributary~~ Headwaters to confluence with Soza Wash ~~at 32°18'52"/110°28'35"~~			A&Ww			FBC			FC		AgL
SP	Fly Pond	Fort Huachuca Military Reservation at ~~31°32'53"/110°21'14"~~ 31°32'53"/110°21'16"			A&Ww			FBC			FC		
SP	Fourmile Canyon Creek	~~Tributary~~ Headwaters to confluence with Aravaipa Creek ~~at 32°50'14"/110°20'08"~~			A&Ww			FBC			FC		AgL

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
SP	Fourmile Canyon, Left Prong	Headwaters to confluence with unnamed tributary at ~~32°43'14"/110°23'43"~~ 32°43'15"/110°23'46"		A&Wc				FBC			FC		AgL
SP	Fourmile Canyon, Left Prong	Below confluence with unnamed tributary to confluence with Fourmile Canyon Creek ~~at 32°47'33"/110°22'36"~~			A&Ww			FBC			FC		AgL
SP	Fourmile Canyon, Right Prong	~~Tributary~~ Headwaters to confluence with Fourmile Canyon ~~at 32°47'33"/110°22'36"~~			A&Ww			FBC			FC		AgL
SP	Gadwell Canyon	Headwaters to confluence with Whitewater Draw ~~at 31°36'50"/109°43'41" in the Mule Mountains~~			A&Ww			FBC			FC		AgL
SP	Garden Canyon Creek	Headwaters to confluence with unnamed tributary at ~~31°29'00"/110°19'42"~~ 31°29'01"/110°19'44"		A&Wc				FBC		DWS	FC	AgI	
SP	Garden Canyon Creek	Below confluence with unnamed tributary to confluence with the San Pedro River ~~at 31°41'46"/110°12'40"~~			A&Ww			FBC		DWS	FC	AgI	
SP	Glance Creek	Headwaters to confluence with Whitewater Draw ~~at 31°27'04"/109°42'29" in the Mule Mountains~~			A&Ww			FBC			FC		AgL
SP	Gold Gulch	Headwaters to U.S./Mexico border ~~at 31°20'10"/109°50'06" in the Mule Mountains~~			A&Ww			FBC			FC		AgL
SP	GolfCourse Pond	Fort Huachuca Military Reservation at ~~31°32'14"/110°18'49"~~ 31°32'14"/110°18'52"	Sedimentary		A&Ww				PBC		FC		
SP	Goudy Canyon Creek	~~Headwaers~~ Headwaters to confluence with Grant Creek ~~at 32°35'13"/109°58'37" in the Pinaleno Mountains~~		A&Wc				FBC			FC		AgL
SP	Grant Creek	Headwaters to confluence with unnamed tributary at ~~32°38'09.5"/109°56'35"~~ 32°38'10"/109°56'37"		A&Wc				FBC		DWS	FC		AgL
SP	Grant Creek	Below confluence with unnamed tributary to terminus near Willcox Playa ~~at 32°33'43"/109°58'55"~~			A&Ww			FBC			FC		AgL
SP	Gravel Pit Pond	Fort Huachuca Military Reservation at ~~31°30'51"/110°19'47.6"~~ 31°30'52"/110°19'49"	Sedimentary		A&Ww			FBC			FC		
SP	Greenbrush Draw	From ~~Mexican~~ U.S./Mexico border to confluence with San Pedro River				A&We			PBC				
SP	Hidden Pond	Fort Huachuca Military Reservation at 32°30'30"/109°22'17"			A&Ww			FBC			FC		
SP	High Creek	Headwaters to confluence with unnamed tributary at ~~32°33'07"/110°14'40"~~ 32°33'08"/110°14'42"		A&Wc				FBC			FC		AgL

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
SP	High Creek	Below confluence with unnamed tributary to terminus near Willcox Playa ~~at 32°31'41"/109°02'38"~~			A&Ww			FBC			FC		AgL
SP	Horse Camp Canyon Creek	~~Tributary~~ Headwaters to confluence with Aravaipa Creek ~~at 32°55'07"/110°30'56"~~			A&Ww			FBC			FC		AgL
SP	Hot Springs Canyon Creek	~~Tributary~~ Headwaters to confluence with the San Pedro River ~~at 32°17'24"/110°22'55"~~			A&Ww			FBC			FC		AgL
SP	Johnson Canyon	Headwaters to Whitewater Draw at ~~31°32'56"/109°46'19" in the Chiricahua Mountains~~ 31°32'46"/109°43'32"			A&Ww			FBC			FC		AgL
SP	Lake Cochise (EDW)	South of Twin Lakes Municipal Golf Course at ~~32°13'58"/109°49'25"~~ 32°13'50"/109°49'27"	EDW				A&Wedw		PBC				
SP	Leslie Canyon Creek	Headwaters to confluence with Whitewater Draw ~~at 31°32'10"/109°40'12" in the Chiricahua Mountains~~			A&Ww			FBC			FC		AgL
SP	Lower Garden Canyon Pond	Fort Huachuca Military Reservation at 31°29'39"/110°18'34"			A&Ww			FBC			FC		
SP	Mexican Canyon	Headwaters to ~~Whitewater Draw at 31°29'13"/109°46'30" in the Mule Mountains~~ confluence with Dixie Canyon			A&Ww			FBC			FC		AgL
SP	Miller Canyon Creek	Headwaters to Broken Arrow Ranch Road at ~~31°25'33"/110°15'08"~~ 31°25'35"/110°15'04"		A&Wc				FBC		DWS	FC		AgL
SP	Miller Canyon Creek	Below Broken Arrow Ranch Road to confluence with the San Pedro River ~~at 31°29'56"/110°07'37"~~			A&Ww			FBC		DWS	FC		AgL
SP	Moonshine Creek	~~Tributary~~ Headwaters to confluence with Post Creek ~~at 32°40'52"/109°54'25"~~		A&Wc				FBC			FC		AgL
SP	Mule Gulch	Headwaters to ~~just above~~ the Lavender Pit at ~~31°26'23.7"/109°45'36.7"~~ 31°26'11"/109°54'02"			A&Ww				PBC		FC		
SP	Mule Gulch	~~Just above the~~ The Lavender Pit to the ~~Bisbee WWTP outfall at 31°25'30"/109°52'40"~~ Highway 80 bridge at 31°26'30"/109°49'28"				A&We			PBC				
~~SP~~	~~Mule Gulch (EDW)~~	~~Below the Bisbee WWTP outfall to the Highway 80 bridge at 31°26'30"/109°49'28"~~					~~A&Wedw~~		~~PBC~~				
SP	Mule Gulch	Below the Highway 80 bridge to confluence with Whitewater Draw ~~at 31°28'03"/109°42'21"~~				A&We			PBC				AgL
SP	Oak Grove ~~Creek~~ Canyon	~~Tributary~~ Headwaters to confluence with Turkey Creek ~~at 32°45'32"/110°14'06"~~			A&Ww			FBC			FC		AgL
SP	Officers Club Pond	Fort Huachuca Military Reservation at ~~31°32'51"/110°21'35"~~ 31°32'51"/110°21'37"	Sedimentary		A&Ww				PBC		FC		
SP	Paige Canyon Creek	~~Tributary~~ Headwaters to confluence with the San Pedro River ~~at 32°17'10"/110°22'48"~~			A&Ww			FBC			FC		AgL

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
SP	Parsons Canyon Creek	~~Tributary~~ Headwaters to confluence with Aravaipa Creek ~~at 32°54'11"/110°27'40"~~			A&Ww			FBC			FC		AgL
SP	Pinery Creek	Headwaters to State Highway 181 ~~at 32°00'24"/109°25'16"~~		A&Wc				FBC		DWS	FC		AgL
SP	Pinery Creek	Below State Highway 181 to terminus near Willcox Playa ~~at 32°01'05"/109°34'23"~~			A&Ww			FBC		DWS	FC		AgL
SP	Post Creek	~~Tributary~~ Headwaters to confluence with Grant Creek ~~at 32°40'05"/109°54'58"~~		A&Wc				FBC			FC	AgI	AgL
SP	Ramsey Canyon Creek	Headwaters to Forest Service Road #110 at ~~31°27'44"/110°17'27"~~ 31°27'44"/110°17'30"		A&Wc				FBC			FC	AgI	AgL
SP	Ramsey Canyon Creek	Below Forest Service Road #110 to confluence with Carr Wash ~~at 31°30'04"/110°09'11"~~			A&Ww			FBC			FC	AgI	AgL
SP	Rattlesnake Canyon	Headwaters to confluence with Brush Canyon ~~at 32°38'27"/110°21'24"~~		A&Wc				FBC			FC		AgL
SP	Rattlesnake Canyon	Below confluence with Brush Canyon to confluence with Aravaipa Creek ~~at 32°48'00"/110°17'32"~~			A&Ww			FBC			FC		AgL
SP	Redfield Canyon Creek	Headwaters to confluence with unnamed tributary at ~~32°33'39"/110°18'41"~~ 32°33'40"/110°18'42"		A&Wc				FBC			FC		AgL
SP	Redfield Canyon Creek	Below confluence with unnamed tributary to confluence with the San Pedro River ~~at 32°09'32"/110°17'56"~~			A&Ww			FBC			FC		AgL
SP	Riggs ~~Flat~~ Lake	~~32°42'27"/109°57'51"~~ 32°42'28"/109°57'53"	Igneous	A&Wc				FBC			FC	AgI	AgL
SP	Rock Creek	~~Tributary~~ Headwaters to confluence with Turkey Creek ~~at 31°53'20"/109°30'00"~~ Alc						FBC			FC		AgL
SP	Rucker Canyon Creek	Headwaters to confluence with Whitewater Draw ~~at 31°44'46"/109°26'06"~~	~~Igneous~~	A&Wc				FBC			FC		AgL
SP	Rucker Canyon Lake	31°46'46"/109°18'30"	Shallow	A&Wc				FBC			FC		AgL
SP	San Pedro River	U.S./ Mexico Border to Redington ~~at 32°25'39"/110°29'33"~~			A&Ww			FBC			FC	AgI	AgL
SP	San Pedro River	From Redington to confluence with the Gila River ~~at 32°59'02"/110°46'55"~~			A&Ww			FBC			FC		AgL
SP	Snow Flat Lake	~~32°39'09"/109°51'52"~~ 32°39'10"/109°51'54"	Igneous	A&Wc				FBC			FC	AgI	AgL
SP	Soldier Creek	~~Tributary~~ Headwaters to confluence with Post Creek at ~~32°40'52"/109°54'40"~~ 32°40'50"/109°54'41"		A&Wc				FBC			FC		AgL
~~SP~~	~~Soldier Creek (EDW)~~	~~Fort Huachuca WWTP outfall to unnamed wash at 31°34'48"/110°18'35" to confluence with Soldier Creek to confluence with Babocomari River at 31°39'46"/110°17'24"~~					~~A&Wedw~~		~~PBC~~				
SP	Soto Canyon	Headwaters to confluence with Dixie Canyon ~~at 31°29'46"/109°55'37" in the Mule Mountains~~			A&Ww			FBC			FC		AgL

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
SP	Swamp Springs Canyon Creek	~~Tributary~~ Headwaters to confluence with Redfield Canyon ~~at 32°26'10"/110°19'30"~~			A&Ww			FBC			FC		AgL
SP	Sycamore Pond I	Fort Huachuca Military Reservation at ~~31°35'12"/110°26'09"~~ 31°35'12"/110°26'11"	Sedimentary		A&Ww			FBC			FC		
SP	Sycamore Pond II	Fort Huachuca Military Reservation at ~~31°34'38.6"/110°26'07"~~ 31°34'39"/110°26'10"	Sedimentary		A&Ww			FBC			FC		
SP	Turkey Creek	~~Tributary~~ Headwaters to confluence with Aravaipa Creek ~~at 32°53'49"/110°26'35"~~			A&Ww			FBC			FC		AgL
SP	Turkey Creek	Headwaters to confluence with Rock Creek ~~at 31°53'20"/109°30'00"~~		A&Wc				FBC			FC	AgI	AgL
SP	Turkey Creek	Below confluence with Rock Creek to terminus near Willcox Playa ~~at 31°59'56"/109°49'01"~~			A&Ww			FBC			FC	AgI	AgL
SP	Unnamed Wash (EDW)	Mt. Lemmon WWTP outfall at 32°26'51"/110°45'08" to 0.25 km downstream					A&Wedw		PBC				
SP	Virgus Canyon Creek	~~Tributary~~ Headwaters to confluence with Aravaipa Creek ~~at 32°54'58"/110°31'16"~~			A&Ww			FBC			FC		AgL
SP	Walnut Gulch	Headwaters to Tombstone WWTP outfall at 31°43'47"/110°04'06"				A&We			PBC				
SP	Walnut Gulch (EDW)	Tombstone WWTP outfall to the confluence ~~of~~ with Tombstone Wash ~~at 31°44'02"/110°05'58"~~					A&Wedw		PBC				
SP	Walnut Gulch	Tombstone Wash to confluence with San Pedro River ~~at 31°43'19"/110°11'35"~~				A&We			PBC				
SP	Ward Canyon Creek	~~Tributary~~ Headwaters to confluence with Turkey Creek ~~at 31°51'47"/109°20'13"~~		A&Wc				FBC			FC		AgL
SP	Whitewater Draw	Headwaters to confluence with unnamed tributary at ~~31°20'36"/109°34'46"~~ 31°20'36"/109°43'48"				A&We			PBC				AgL
SP	Whitewater Draw	Below confluence with unnamed tributary to U.S./Mexico border ~~at 31°20'02"/109°34'44"~~			A&Ww			FBC			FC		AgL
SP	Willcox Playa	From 32°08'19"/109°50'59" in the Sulphur Springs Valley	Sedimentary		A&Ww			FBC			FC		AgL
SP	Woodcutters Pond	Fort Huachuca Military Reservation at ~~31°31'11.5"/110°20'15"~~ 31°30'09"/110°20'12"	Igneous		A&Ww			FBC			FC		
SR	Ackre ~~(Judge)~~ Lake	~~33°37'00"/109°20'37"~~ 33°37'01"/109°20'40"		A&Wc				FBC			FC	AgI	AgL
SR	Apache Lake	~~33°35'30"/111°20'30"~~ 33°37'23"/111°12'26"	Deep		A&Ww			FBC		DWS	FC	AgI	AgL
SR	Barnhardt Creek	Headwaters to confluence with unnamed tributary at ~~34°05'36"/111°26'38"~~ 34°05'37/111°26'40"		A&Wc				FBC			FC		AgL

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
SR	Barnhardt Creek	Below confluence with unnamed tributary to confluence with Rye Creek ~~at 34°06'58"/111°21'32"~~			A&Ww			FBC			FC		AgL
SR	Basin Lake	~~33°55'00"/109°26'05"~~ 33°55'00"/109°26'09"	Igneous		A&Ww			FBC			FC		AgL
SR	Bear Creek	~~Tributary~~ Headwaters to confluence with the Black River ~~at 33°43'26"/109°22'30"~~		A&Wc				FBC			FC	AgI	AgL
SR	Bear Wallow Creek (OAW)	~~Tributary~~ Headwaters to confluence with the Black River ~~at 33°37'44"/109°31'23"~~		A&Wc				FBC			FC		AgL
SR	Bear Wallow Creek, North Fork (OAW)	~~Tributary~~ Headwaters to confluence with Bear Wallow Creek ~~at 33°35'53"/109°26'49"~~		A&Wc				FBC			FC		AgL
SR	Bear Wallow Creek, South Fork (OAW)	~~Tributary~~ Headwaters to confluence with Bear Wallow Creek ~~at 33°35'53"/109°26'49"~~		A&Wc				FBC			FC		AgL
SR	Beaver Creek	~~Tributary~~ Headwaters to ~~the~~ confluence with Black River ~~at 33°43'44"/109°21'07"~~		A&Wc				FBC			FC	AgI	AgL
SR	Big Lake	~~33°52'45"/109°25'00"~~ 33°52'36"/109°25'33"	Igneous	A&Wc				FBC		DWS	FC	AgI	AgL
SR	Black River	~~Tributary~~ Headwaters to ~~the~~ confluence with Salt River ~~at 33°44'20"/110°13'30"~~		A&Wc				FBC		DWS	FC	AgI	AgL
SR	Black River, East Fork	~~Tributary~~ From 33°51'19"/109°18'54" to confluence with the Black River ~~at 33°45'07"/109°21'43"~~		A&Wc				FBC		DWS	FC	AgI	AgL
SR	Black River, North Fork of East Fork	~~Tributary~~ Headwaters to confluence with Black River, East Fork ~~at 33°56'17"/109°24'11"~~		A&Wc				FBC		DWS	FC	AgI	AgL
SR	Black River, West Fork	~~Tributary~~ Headwaters to confluence with the Black River ~~at 33°45'07"/109°21'43"~~		A&Wc				FBC		DWS	FC	AgI	AgL
SR	Bloody Tanks Wash	Headwaters to Schultze Ranch ~~at 33°22'29"/110°54'39"~~ Road				A&We			PBC				AgL
SR	Bloody Tanks Wash	Schultze Ranch Road to confluence with Miami Wash ~~at 33°25'05"/110°50'02"~~				A&We			PBC				
SR	Boggy Creek	~~Tributary to the Black River~~ Headwaters to confluence with Centerfire Creek ~~at 33°44'31"/109°26'20"~~		A&Wc				FBC			FC	AgI	AgL
SR	Boneyard Creek	~~Tributary~~ Headwaters to confluence with Black River, East Fork ~~at 33°51'22"/109°18'50"~~		A&Wc				FBC			FC	AgI	AgL
SR	Boulder Creek	~~Tributary~~ Headwaters to confluence with LaBarge Creek ~~at 33°30'54"/111°24'40"~~			A&Ww			FBC			FC		
SR	Campaign Creek	~~Tributary~~ Headwaters to Roosevelt Lake ~~at 33°37'30"/111°00'04"~~			A&Ww			FBC			FC		AgL
SR	Canyon Creek	Headwaters to the White Mountain Apache Reservation ~~at 33°57'53"/110°47'00"~~ boundary		A&Wc				FBC		DWS	FC	AgI	AgL
SR	Canyon Lake	~~33°33'15"/111°26'30"~~ 33°32'44"/111°26'19"	Deep		A&Ww			FBC		DWS	FC	AgI	AgL

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
SR	Centerfire Creek	~~Tributary~~ Headwaters to confluence with the Black River ~~at 33°42'47"/109°26'17"~~		A&Wc				FBC			FC	AgI	AgL
SR	Chambers Draw Creek	~~Tributary~~ Headwaters to confluence with the North Fork of the East Fork of Black River ~~at 33°53'03"/109°20'13"~~		A&Wc				FBC			FC		AgL
SR	Cherry Creek	Headwaters to confluence with unnamed tributary at ~~34°05'09"/110°56'04"~~ 34°05'09"/110°56'07"		A&Wc				FBC			FC	AgI	AgL
SR	Cherry Creek	Below unnamed tributary to confluence with the Salt River ~~at 33°40'16"/110°48'03.6"~~			A&Ww			FBC			FC	AgI	AgL
SR	Christopher Creek	~~Tributary~~ Headwaters to confluence with Tonto Creek ~~at 34°18'36"/111°04'23"~~		A&Wc				FBC			FC	AgI	AgL
SR	Cold Spring Canyon Creek	Headwaters to confluence with unnamed tributary at ~~33°49'50"/110°52'55"~~ 33°49'50"/110°52'58"		A&Wc				FBC			FC		AgL
SR	Cold Spring Canyon Creek	Below confluence with unnamed tributary to confluence with Cherry Creek ~~at 33°50'06"/110°51'28.8"~~			A&Ww			FBC			FC		AgL
SR	Conklin Creek	~~Tributary~~ Headwaters to confluence with the Black River ~~at 33°41'49"/109°27'36"~~		A&Wc				FBC			FC	AgI	AgL
SR	Coon Creek	Headwaters to confluence with unnamed tributary at ~~33°46'42"/110°54'25"~~ 33°46'41"/110°54'26"		A&Wc				FBC			FC		AgL
SR	Coon Creek	Below confluence with unnamed tributary to confluence with Salt River ~~at 33°39'47"/110°50'24"~~			A&Ww			FBC			FC		AgL
SR	Corduroy Creek	~~Tributary~~ Headwaters to confluence with Fish Creek ~~at 33°59'46"/110°17'31"~~		A&Wc				FBC			FC	AgI	AgL
SR	Coyote Creek	~~Tributary~~ Headwaters to confluence with the Black River, East Fork ~~at 33°50'53"/109°18'18"~~		A&Wc				FBC			FC	AgI	AgL
SR	Crescent Lake	~~33°54'36"/109°25'08"~~ 33°54'38"/109°25'18"	Shallow	A&Wc				FBC			FC	AgI	AgL
SR	Deer Creek	~~Tributary~~ Headwaters to confluence with the Black River, East Fork ~~at 33°48'07"/109°19'26"~~		A&Wc				FBC			FC		AgL
SR	Del Shay Creek	~~Tributary~~ Headwaters to confluence with Gun Creek ~~at 34°00'22"/111°15'43"~~			A&Ww			FBC			FC		AgL
SR	Devils Chasm Creek	Headwaters to confluence with unnamed tributary at ~~33°48'46"/110°52'33"~~ 33°48'46" /110°52'35"		A&Wc				FBC			FC		AgL
SR	Devils Chasm Creek	Below confluence with unnamed tributary to confluence with Cherry Creek ~~at 33°49'34"/110°54'18"~~			A&Ww			FBC			FC		AgL
SR	Dipping Vat Reservoir	~~33°55'54"/109°25'15"~~ 33°55'47"/109°25'31"	Igneous		A&Ww			FBC			FC		AgL

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
SR	Double Cienega Creek	~~Tributary~~ Headwaters to confluence with Fish Creek ~~at 33°38'35"/109°22'08"~~		A&Wc				FBC			FC		AgL
SR	Fish Creek	~~Tributary~~ Headwaters to confluence with the Black River ~~at 33°42'40"/109°26'31"~~		A&Wc				FBC			FC	AgI	AgL
SR	Fish Creek	~~Tributary~~ Headwaters to confluence with the Salt River ~~at 33°34'37"/111°21'11"~~			A&Ww			FBC			FC		
SR	Gold Creek	Headwaters to confluence with unnamed tributary at ~~33°59'47"/111°25'07"~~ 33°59'47"/111°25'10"		A&Wc				FBC			FC		AgL
SR	Gold Creek	Below confluence with unnamed tributary to confluence with Tonto Creek ~~at 33°58'55"/111°18'03.6"~~			A&Ww			FBC			FC		AgL
SR	Gordon Canyon Creek	Headwaters to confluence with Hog Canyon ~~at 34°13'49"/111°00'27"~~		A&Wc				FBC			FC		AgL
SR	Gordon Canyon Creek	Below confluence with Hog Canyon to confluence with Haigler Creek ~~at 34°11'56"/111°03'21"~~			A&Ww			FBC			FC		AgL
SR	Greenback Creek	~~Tributary~~ Headwaters to confluence with Tonto Creek ~~at 33°47'38"/111°15'22"~~			A&Ww			FBC			FC		AgL
SR	Haigler Creek	Headwaters to confluence with unnamed tributary at ~~34°12'23.5"/111°00'11"~~ 34°12'23"/111°00'15"		A&Wc				FBC			FC	AgI	AgL
SR	Haigler Creek	Below confluence with unnamed tributary to confluence with Tonto Creek ~~at 34°12'54"/111°05'45.6"~~			A&Ww			FBC			FC	AgI	AgL
SR	Hannagan Creek	~~Tributary~~ Headwaters to confluence with Beaver Creek ~~at 33°42'07"/109°14'46"~~		A&Wc				FBC			FC		AgL
SR	Hay Creek (OAW)	~~Tributary~~ Headwaters to confluence with the Black River, West Fork ~~at 33°48'32"/109°25'16"~~		A&Wc				FBC			FC		AgL
SR	Home Creek	~~Tributary~~ Headwaters to confluence with the Black River, West Fork ~~at 33°45'43"/109°22'48"~~		A&Wc				FBC			FC		AgL
SR	Horse Creek	~~Tributary~~ Headwaters to confluence with the Black River, West Fork ~~at 33°45'11"/109°21'50"~~		A&Wc				FBC			FC		AgL
SR	Horse Camp Creek	Headwaters to confluence with unnamed tributary at ~~33°53'53"/110°50'10"~~ 33°54'00"/110°50'07"		A&Wc				FBC			FC		AgL
SR	Horse Camp Creek	Below confluence with unnamed tributary to confluence with Cherry Creek ~~at 33°52'08"/110°52'33.6"~~			A&Ww			FBC			FC		AgL
SR	Horton Creek	~~Tributary~~ Headwaters to confluence with Tonto Creek ~~at 34°20'24"/111°05'42"~~		A&Wc				FBC			FC	AgI	AgL
SR	Houston Creek	~~Tributary~~ Headwaters to confluence with Tonto Creek ~~at 34°07'30"/111°15'25"~~			A&Ww			FBC			FC		AgL

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
SR	Hunter Creek	~~Tributary~~ Headwaters to confluence with Christopher Creek ~~at 34°18'29"/111°01'55"~~		A&Wc				FBC			FC		AgL
SR	LaBarge Creek	Headwaters to Canyon Lake ~~at 33°31'34"/111°25'15.6"~~			A&Ww			FBC			FC		
SR	Lake Sierra Blanca	33°52'25"/109°16'05"		A&Wc				FBC			FC	AgI	AgL
SR	Miami Wash	~~Tributary~~ Headwaters to confluence with Pinal Creek ~~at 33°27'04"/110°50'17"~~				A&We			PBC				
SR	Mule Creek	~~Tributary~~ Headwaters to confluence with Canyon Creek ~~at 34°16'34"/110°48'00"~~		A&Wc				FBC		DWS	FC	AgI	AgL
SR	Open Draw Creek	~~Tributary~~ Headwaters to confluence with the East Fork of Black River ~~at 33°49'52"/109°18'18"~~		A&Wc				FBC			FC		AgL
SR	P B Creek	Headwaters to Forest Service Road #203 at ~~33°57'08"/110°56'09"~~ 33°57'08"/110°56'12"		A&Wc				FBC			FC		AgL
SR	P B Creek	Below Forest Service Road #203 to Cherry Creek ~~at 33°55'34"/110°54'18"~~			A&Ww			FBC			FC		AgL
SR	Pinal Creek	Headwaters to confluence with unnamed EDW wash (Globe WWTP) at ~~33°25'29"/110°48'18"~~ 33°25'29"/110°48'20"				A&We			PBC				AgL
SR	Pinal Creek (EDW)	~~Globe WWTP outfall on unnamed wash at 33°25'46"/110°47'28" to confluence with Pinal Creek to Radium at 33°26'54"/110°49'02"~~ Confluence with unnamed EDW wash (Globe WWTP) to 33°26'55"/110°49' 25"					A&Wedw		PBC				
SR	Pinal Creek	~~Radium~~ From 33°26'55"/110°49'25" to ~~lower~~ Lower Pinal Creek water treatment plant ~~discharge at 33°32'05"/110°52'17"~~ outfall #001 at 33°31'04"/110°51'55"				A&We			PBC				AgL
SR	Pinal Creek	From Lower Pinal Creek WTP outfall #~~1 at 33°31'56"/110°52'14"~~ to See Ranch Crossing at 33°32'25"/110°52'28"					A&Wedw		PBC				
SR	Pinal Creek	From See Ranch Crossing to ~~33°35'33"/110°54'33"~~ confluence with unnamed tributary at 33°35'28"/110°54'31"			A&Ww			FBC					
SR	Pinal Creek	From ~~33°35'33"/110°54'33"~~ unnamed tributary to confluence with Salt River			A&Ww			FBC			FC		
SR	Pine Creek	~~Tributary~~ Headwaters to confluence with the Salt River ~~at 33°36'04"/111°12'36"~~			A&Ww			FBC			FC		
SR	Pinto Creek	Headwaters to confluence with unnamed tributary at ~~33°19'27"/110°54'56"~~ 33°19'27"/110°54'58"		A&Wc				FBC			FC	AgI	AgL
SR	Pinto Creek	Below confluence with unnamed tributary to Roosevelt Lake ~~at 33°39'11"/111°00'43"~~			A&Ww			FBC			FC	AgI	AgL

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
SR	Pool Corral Lake	33°30'38"/110°00'15"	Igneous		A&Ww			FBC			FC	AgI	AgL
SR	Pueblo Canyon Creek	Headwaters to confluence with unnamed tributary at ~~33°50'30"/110°53'13"~~ 33°50'23"/110°51'37"		A&Wc				FBC			FC		AgL
SR	Pueblo Canyon Creek	Below confluence with unnamed tributary to confluence with Cherry Creek ~~at 33°52'30"/110°52'55"~~			A&Ww			FBC			FC		AgL
SR	Reevis Creek	~~Tributary~~ Headwaters to confluence with Pine Creek ~~at 33°33'07"/111°09'40"~~			A&Ww			FBC			FC		
SR	Reservation Creek	~~Tributary~~ Headwaters to confluence with the Black River ~~at 33°41'42"/109°28'26"~~		A&Wc				FBC			FC		AgL
SR	Reynolds Creek	~~Tributary~~ Headwaters to confluence with Workman Creek ~~at 33°52'16"/111°00'14"~~		A&Wc				FBC			FC		AgL
SR	Roosevelt Lake	~~33°40'45"/111°09'15"~~ 33°52'17"/111°00'17"	Deep		A&Ww			FBC		DWS	FC	AgI	AgL
SR	Russell Gulch	From headwaters to confluence with Miami Wash				A&We			PBC				
SR	Rye Creek	~~Tributary~~ Headwaters to confluence with Tonto Creek ~~at 34°01'41"/111°17'06"~~			A&Ww			FBC			FC		AgL
SR	Saguaro Lake	~~33°34'00"/111°32'06"~~ 33°33'44"/111°30'55"	Deep		A&Ww			FBC		DWS	FC	AgI	AgL
SR	Salome Creek	~~Tributary~~ Headwaters to confluence with the Salt River ~~at 33°41'56"/111°05'46"~~			A&Ww			FBC			FC	AgI	AgL
SR	Salt House Lake	33°57'04"/109°20'11"	Igneous		A&Ww			FBC			FC		AgL
SR	Salt River	Theodore Roosevelt Dam to 2 km below Granite Reef Dam			A&Ww			FBC		DWS	FC	AgI	AgL
SR	Slate Creek	~~Tributary~~ Headwaters to confluence with Tonto Creek ~~at 33°56'24"/111°18'25"~~			A&Ww			FBC			FC		AgL
SR	Snake Creek (OAW)	~~Tributary~~ Headwaters to confluence with the Black River ~~at 33°40'30"/109°28'55"~~		A&Wc				FBC			FC		AgL
SR	Spring Creek	~~Tributary~~ Headwaters to confluence with Tonto Creek ~~at 34°09'54"/111°10'08"~~			A&Ww			FBC			FC		AgL
SR	Stinky Creek (OAW)	~~Tributary~~ Headwaters to confluence with the Black River, West Fork ~~at 33°51'22"/109°27'07"~~		A&Wc				FBC			FC		AgL
SR	Thomas Creek	~~Tributary~~ Headwaters to confluence with Beaver Creek ~~at 33°42'29"/109°15'11"~~		A&Wc				FBC			FC		AgL
SR	Thompson Creek	~~Tributary~~ Headwaters to confluence with the West Fork of the Black River ~~at 33°53'24"/109°28'48"~~		A&Wc				FBC			FC		AgL
SR	Tonto Creek	Headwaters to confluence with unnamed tributary at ~~34°18'10"/111°04'14"~~ 34°18'11"/111°04'18"		A&Wc				FBC			FC	AgI	AgL
SR	Tonto Creek	Below confluence with unnamed tributary to Roosevelt Lake ~~at 33°45'14"/111°14'17"~~			A&Ww			FBC			FC	AgI	AgL

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
SR	Turkey Creek	~~Tributary~~ Headwaters to confluence with Rock Creek ~~at 33°58'30"/111°06'47"~~		A&Wc				FBC			FC		
~~SR~~	~~Unnamed Wash (EDW)~~	~~Cobre Valley Plaza WWTP at 33°24'56"/110°49'43" to confluence with Russell Gulch~~					~~A&Wedw~~		~~PBC~~				
SR	Wildcat Creek	~~Tributary~~ Headwaters to confluence with Centerfire Creek ~~at 33°43'41"/109°26'28"~~		A&Wc				FBC			FC		AgL
SR	Willow Creek	~~Tributary~~ Headwaters to confluence with Beaver Creek ~~at 33°43'52"/109°18'04"~~		A&Wc				FBC			FC		AgL
SR	Workman Creek	Headwaters to confluence with Reynolds Creek ~~at 33°52'17"/111°00'14.5"~~		A&Wc				FBC			FC	AgI	AgL
SR	Workman Creek	Below confluence with Reynolds Creek to confluence with Salome Creek ~~at 33°52'37"/111°02'20"~~			A&Ww			FBC			FC	AgI	AgL
UG	Apache Creek	~~Tributary~~ Headwaters to confluence with the Gila River ~~at 32°52'08"/109°11'53"~~			A&Ww			FBC			FC		AgL
UG	Ash Creek	Headwaters to confluence with unnamed tributary at ~~32°45'37"/109°52'22"~~ 32°46'15"/109°51'45"		A&Wc				FBC			FC		AgL
UG	Ash Creek	Below confluence with unnamed tributary to confluence with the Gila River ~~at 32°53'35"/109°47'34.8"~~			A&Ww			FBC			FC		AgL
UG	Bennett Wash ~~(EDW)~~	~~ADOC Safford WWTP outfall at 32°50'20"/109°34'44"~~ Headwaters to the Gila River				A&We	~~A&Wedw~~		PBC				
UG	Bitter Creek	~~Tributary~~ Headwaters to confluence with the Gila River ~~at 32°50'17"/109°10'59"~~			A&Ww			FBC			FC		
UG	Blue River	Headwaters to confluence with Strayhorse Creek at ~~33°29'02"/110°12'12"~~ 33°29'02"/109°12'14"		A&Wc				FBC			FC	AgI	AgL
UG	Blue River	Below confluence with Strayhorse Creek to confluence with San Francisco River ~~at 33°12'36"/109°11'27.6"~~			A&Ww			FBC			FC	AgI	AgL
UG	Bonita Creek (OAW)	San Carlos Indian Reservation boundary to confluence with the Gila River ~~at 32°53'35"/109°28'41"~~			A&Ww			FBC		DWS	FC		AgL
UG	Buckalou Creek	~~Tributary~~ Headwaters to confluence with Castle Creek ~~at 33°43'34"/109°09'07"~~		A&Wc				FBC			FC		AgL
UG	Campbell Blue Creek	~~Tributary~~ Headwaters to confluence with the Blue River ~~at 33°43'30"/109°02'46"~~		A&Wc				FBC			FC		AgL
UG	Castle Creek	~~Tributary~~ Headwaters to confluence with Campbell Blue Creek ~~at 33°44'06"/109°08'10"~~		A&Wc				FBC			FC		AgL
UG	Cave Creek (OAW)	Headwaters to confluence with South Fork Cave Creek ~~at 31°53'04"/109°10'27"~~		A&Wc				FBC			FC	AgI	AgL

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
UG	Cave Creek (OAW)	Below confluence with South Fork Cave Creek to Coronado National Forest boundary			A&Ww			FBC			FC	AgI	AgL
UG	Cave Creek	Below Coronado National Forest boundary to New Mexico border ~~at 31°58'19"/109°03'00"~~			A&Ww			FBC			FC	AgI	AgL
UG	Cave Creek, South Fork	~~Tributary~~ Headwaters to confluence with Cave Creek ~~at 31°53'04"/109°10'27"~~		A&Wc				FBC			FC	AgI	AgL
UG	Chase Creek	Headwaters to the Phelps-Dodge Morenci Mine			A&Ww			FBC			FC		AgL
UG	Chase Creek	Below the Phelps-Dodge Morenci Mine to confluence with San Francisco River				A&We			PBC				
UG	Chitty Canyon Creek	~~Tributary~~ Headwaters to confluence with Salt House Creek ~~at 33°30'32"/109°24'04"~~		A&Wc				FBC			FC		AgL
UG	Cima Creek	~~Tributary~~ Headwaters to confluence with Cave Creek ~~at 31°52'19"/109°14'02"~~		A&Wc				FBC			FC		AgL
UG	Cluff Ranch Pond #1	~~32°48'55"/109°49'15"~~ 32°48'55"/109°50'46"	Sedimentary		A&Ww			FBC			FC	AgI	AgL
~~UG~~	~~Cluff Ranch Pond #2~~	~~32°49'15"/109°50'33"~~	~~Sedimentary~~		~~A&Ww~~			~~FBC~~			~~FC~~	~~AgI~~	~~AgL~~
UG	Cluff Ranch Pond #3	~~32°48'20"/109°51'43"~~ 32°48'21"/109°51'46"	Sedimentary		A&Ww			FBC			FC	AgI	AgL
UG	Coleman Creek	~~Tributary~~ Headwaters to confluence with Campbell Blue Creek ~~at 33°44'20"/109°09'32"~~		A&Wc				FBC			FC		AgL
UG	Dankworth ~~Ponds~~ Lake	~~32°43'15"/109°42'15"~~ 32°43'13"/109°42'17"	Sedimentary	A&Wc				FBC			FC		
UG	Deadman Canyon Creek	Headwaters to confluence with unnamed tributary at ~~32°43'50"/109°49'01"~~ 32°43'50"/109°49'03"		A&Wc				FBC		DWS	FC		AgL
UG	Deadman Canyon Creek	Below confluence with unnamed tributary to confluence with Graveyard Wash ~~at 32°46'48"/109°44'13"~~			A&Ww			FBC		DWS	FC		AgL
UG	Eagle Creek	Headwaters to confluence with unnamed tributary at ~~33°23'24"/109°29'35"~~ 33°22'32"/109°29'43"		A&Wc				FBC		DWS	FC	AgI	AgL
UG	Eagle Creek	Below confluence with unnamed tributary to ~~Eagle Creek at 32°57'36"/109°24'21.6"~~ confluence with the Gila River			A&Ww			FBC		DWS	FC	AgI	AgL
UG	East Eagle Creek	~~Tributary~~ Headwaters to confluence with Eagle Creek ~~at 33°29'38"/109°28'05"~~		A&Wc				FBC			FC		AgL
UG	East Turkey Creek	Headwaters to confluence with unnamed tributary at ~~31°58'22"/109°12'17"~~ 31°58'22"/109°12'20"		A&Wc				FBC			FC		AgL
UG	East Turkey Creek	Below confluence with unnamed tributary to terminus near San Simon River ~~at 31°59'53"/109°07'37"~~			A&Ww			FBC			FC		AgL

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
UG	East Whitetail	Headwaters to terminus near San Simon River ~~at 32°08'52"/109°09'25" in the Chiricahua Mountains~~			A&Ww			FBC			FC		AgL
UG	Emigrant Canyon	Headwaters to terminus near San Simon River ~~at 32°17'02"/109°20'27.6" in the Chiricahua Mountains~~			A&Ww			FBC			FC		AgL
UG	Evans Pond #1	~~32°49'15"/109°51'15"~~ 32°49'19"/109°51'12"	Sedimentary		A&Ww			FBC			FC	AgI	AgL
UG	Evans Pond #2	32°49'14"/109°51'09"	Sedimentary		A&Ww			FBC			FC	AgI	AgL
UG	Fishhook Creek	~~Tributary~~ Headwaters to confluence with the Blue River ~~at 33°35'13"/109°10'01"~~		A&Wc				FBC			FC		AgL
UG	Foote Creek	~~Tributary~~ Headwaters to confluence with the Blue River ~~at 33°35'24"/109°08'49"~~		A&Wc				FBC			FC		AgL
UG	Frye Canyon Creek	Headwaters to Frye Mesa Reservoir ~~at 32°45'09.5"/109°50'02"~~		A&Wc				FBC		DWS	FC		AgL
UG	Frye Canyon Creek	~~Below Frye Mesa Reservoir to~~ Highline Canal ~~Headwaters~~ headwaters to terminus near San Simon River ~~at 32°50'10"/109°45'43"~~			A&Ww			FBC			FC		AgL
UG	Frye Mesa Reservoir	~~32°45'13"/109°50'00"~~ 32°45'14"/109°50'02"	Igneous	A&Wc				FBC		DWS	FC		
UG	Gibson Creek	~~Tributary~~ Headwaters to confluence with Marijilda Creek ~~at 32°41'24"/109°48'11"~~		A&Wc				FBC			FC		AgL
UG	Gila River	New Mexico border to the San Carlos Indian Reservation ~~at 33°05'37"/110°03'21"~~ boundary			A&Ww			FBC			FC	AgI	AgL
UG	Grant Creek	~~Tributary~~ Headwaters to confluence with the Blue River ~~at 33°34'16"/109°10'37"~~		A&Wc				FBC			FC		AgL
UG	Judd Lake	~~33°51'15"/109°09'15"~~ 33°51'15"/109°09'35"	Sedimentary	A&Wc				FBC			FC		
UG	K P Creek (OAW)	~~Tributary~~ Headwaters to confluence with the Blue River ~~at 33°31'44"/109°12'04"~~		A&Wc				FBC			FC		AgL
UG	Lanphier Canyon Creek	~~Tributary~~ Headwaters to confluence with the Blue River ~~at 33°35'42"/109°07'52"~~		A&Wc				FBC			FC		AgL
UG	Little Blue Creek	Headwaters to confluence with Dutch Blue Creek ~~at 33°24'26.5"/109°09'18"~~		A&Wc				FBC			FC		AgL
UG	Little Blue Creek	Below confluence with Dutch Blue Creek to confluence with Blue Creek ~~at 32°22'30"/109°10'30"~~			A&Ww			FBC			FC		AgL
UG	Little Creek	~~Tributary~~ Headwaters to confluence with the San Francisco River ~~at 33°49'41"/109°04'26"~~		A&Wc				FBC			FC		
UG	Lower George's Reservoir	~~33°51'23.5"/109°08'28"~~ 33°51'24"/109°08'30"	Sedimentary	A&Wc				FBC			FC		AgL
UG	Luna Lake	~~33°49'45"/109°05'15"~~ 33°49'50"/109°05'06"	Sedimentary	A&Wc				FBC			FC		AgL

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
UG	Marijilda Creek	Headwaters to confluence with Gibson Creek ~~at 32°41'23"/109°48'13"~~		A&Wc				FBC			FC		AgL
UG	Marijilda Creek	Below confluence with Gibson Creek to confluence with Stockton Wash ~~at 32°46'30"/109°40'51.6"~~			A&Ww			FBC			FC	AgI	AgL
UG	Markham Creek	~~Tributary~~ Headwaters to confluence with the Gila River ~~at 32°56'17"/109°53'13"~~			A&Ww			FBC			FC		AgL
UG	Pigeon Creek	~~Tributary~~ Headwaters to confluence with the Blue River ~~at 33°16'08"/109°11'42"~~			A&Ww			FBC			FC		AgL
UG	Raspberry Creek	~~Tributary~~ Headwaters to confluence with the Blue River ~~at 33°30'07"/109°12'32"~~		A&Wc				FBC			FC		
UG	Roper Lake	~~32°45'20"/109°42'11"~~ 32°45'23"/109°42'14"	Sedimentary		A&Ww			FBC			FC		
UG	San Francisco River	Headwaters to the New Mexico border ~~at 33°49'24.5"/109°02'46"~~		A&Wc				FBC			FC	AgI	AgL
UG	San Francisco River	New Mexico border to confluence with the Gila River ~~at 33°14'25"/109°02'49"~~			A&Ww			FBC			FC	AgI	AgL
UG	San Simon River	~~Tributary~~ Headwaters to confluence with the Gila River ~~at 32°49'52"/109°38'53"~~				A&We			PBC				AgL
UG	Sheep Tank	~~32°46'15"/109°48'08"~~ 32°46'14"/109°48'09"	Sedimentary		A&Ww			FBC			FC		AgL
UG	Smith Pond	~~32°49'09"/109°50'26"~~ 32°49'15"/109°50'36"	Sedimentary		A&Ww			FBC			FC		
UG	Squaw Creek	~~Tributary~~ Headwaters to confluence with Thomas Creek ~~at 33°23'38"/109°12'22"~~		A&Wc				FBC			FC		AgL
UG	Stone Creek	~~Tributary~~ Headwaters to confluence with the San Francisco River ~~at 33°50'38"/109°02'46"~~		A&Wc				FBC			FC	AgI	AgL
UG	Strayhorse Creek	~~Tributary~~ Headwaters to confluence with the Blue River ~~at 33°29'02"/109°12'11"~~		A&Wc				FBC			FC		
UG	Thomas Creek	Headwaters to confluence with Rousensock Creek ~~at 33°23'45"/109°13'13"~~		A&Wc				FBC			FC		AgL
UG	Thomas Creek	Below confluence with Rousensock Creek to confluence with Blue River ~~at 33°23'20"/109°11'20"~~			A&Ww			FBC			FC		AgL
UG	Tinny Pond	~~33°47'49"/109°04'23"~~ 33°47'49"/109°04'27"	Sedimentary		A&Ww			FBC			FC		AgL
UG	Turkey Creek	~~Tributary~~ Headwaters to confluence with Campbell Blue Creek ~~at 33°44'10"/109°04'05"~~		A&Wc				FBC			FC		AgL
~~UG~~	~~Unnamed Wash (EDW)~~	~~ADOC Globe WWTP outfall at 33°24'55"/110°42'35" to the San Carlos Indian Reservation~~					~~A&Wedw~~		~~PBC~~				
VR	American Gulch	Headwaters to the Northern Gila County Sanitary District WWTP outfall ~~(Payson)~~ at ~~34°14'05"/111°22'18"~~ 34°14'02"/111°22'14"			A&Ww			FBC			FC	AgI	AgL

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
VR	American Gulch (EDW)	Below Northern Gila County Sanitary District WWTP outfall ~~(Payson)~~ to confluence with the East Verde River ~~at 34°14'42"/111°25'08"~~					A&Wedw		PBC				
VR	Apache Creek	~~Tributary~~ Headwaters to confluence with Walnut Creek ~~at 34°55'12"/112°50'42"~~			A&Ww			FBC			FC		AgL
VR	Ashbrook Wash	Headwaters to the Fort McDowell Indian Reservation boundary ~~at 33°36'54"/111°42'06"~~				A&We			PBC				
VR	Aspen Creek	~~Tributary~~ Headwaters to confluence with Granite Creek ~~at 34°31'55"/112°28'19"~~			A&Ww			FBC			FC		
VR	Bar Cross Tank	~~35°00'40"/112°05'34"~~ 35°00'41"/112°05'39"			A&Ww			FBC			FC		AgL
VR	Barrata Tank	~~35°02'43"/112°24'17"~~ 35°02'43"/112°24'21"			A&Ww			FBC			FC		AgL
VR	Bartlett Lake	~~33°49'00"/111°37'45"~~ 33°49'52"/111°37'44"	Deep		A&Ww			FBC		DWS	FC	AgI	AgL
VR	Beaver Creek	~~Tributary~~ Headwaters to confluence with the Verde River ~~at 34°34'26"/111°51'14"~~			A&Ww			FBC			FC		AgL
VR	Big Chino Wash	~~Tributary~~ Headwaters to confluence with Sullivan Lake ~~at 34°52'37"/112°28'37"~~				A&We			PBC				AgL
VR	Bitter Creek	Headwaters to the Jerome WWTP outfall at ~~34°45'08"/112°06'25"~~ 34°45'12"/112°06'24"				A&We			PBC				AgL
VR	Bitter Creek (EDW)	Jerome WWTP outfall to the Yavapai Apache Indian Reservation ~~at 34°45'45.5"/112°04'44"~~ boundary					A&Wedw		PBC				AgL
VR	Bitter Creek	Below the Yavapai Apache Indian Reservation boundary to confluence with the Verde River ~~at 34°46'37"/112°02'53"~~			A&Ww			FBC			FC	AgI	AgL
VR	Black Canyon Creek	Headwaters to confluence with unnamed tributary at ~~34°39'20"/112°05'05"~~ 34°39'20"/112°05'06"		A&Wc				FBC			FC		AgL
VR	Black Canyon Creek	Below confluence with unnamed tributary to confluence with the Verde River ~~at 34°40'59"/111°57'28.8"~~			A&Ww			FBC			FC		AgL
VR	Bonita Creek	~~Tributary~~ Headwaters to confluence with Ellison Creek ~~at 34°20'56"/111°14'20"~~		A&Wc				FBC			FC		
VR	Bray Creek	~~Tributary~~ Headwaters to confluence with Webber Creek ~~at 34°22'37"/111°20'53"~~		A&Wc				FBC			FC		AgL
VR	Camp Creek	~~Tributary~~ Headwaters to confluence with the Verde River ~~at 33°45'32"/111°30'14"~~			A&Ww			FBC			FC		AgL
~~VR~~	~~Carter Tank~~	~~34°52'27"/112°57'28"~~			~~A&Ww~~			~~FBC~~			~~FC~~		~~AgL~~
VR	Cereus Wash	Headwaters to the Fort McDowell Indian Reservation ~~at 33°34'13"/111°42'28"~~ boundary				A&We			PBC				
VR	Chase Creek	~~Tributary~~ Headwaters to confluence with the East Verde River ~~at 34°22'48"/111°16'59"~~		A&Wc				FBC		DWS	FC		

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
VR	Clover Creek	~~Tributary~~ Headwaters to confluence with headwaters of West Clear Creek ~~at 34°33'04"/111°24'11"~~		A&Wc				FBC			FC		AgL
VR	Coffee Creek	~~Tributary~~ Headwaters to confluence with Spring Creek ~~at 34°48'18"/111°55'41"~~			A&Ww			FBC			FC		AgL
VR	Colony Wash	Headwaters to the Fort McDowell Indian Reservation ~~at 33°35'42"/111°42'15"~~ boundary				A&We			PBC				
VR	Dead Horse Lake	~~34°45'00"/112°00'30"~~ 34°45'08"/112°00'42"	Shallow		A&Ww			FBC			FC		
VR	Deadman Creek	~~Tributary~~ Headwaters to Horseshoe Reservoir ~~at 34°00'00"/111°42'36"~~			A&Ww			FBC			FC		AgL
VR	Del Monte Wash	Headwaters to confluence with City of Cottonwood WWTP outfall 002 at 34°43'57"/112°02'46"				A&We			PBC				
VR	Del Monte Wash (EDW)	City of Cottonwood WWTP outfall 002 at 34°43'57"/112°02'46" to confluence with Verde River					A&Wedw		PBC				
VR	Del Rio Dam Lake	~~34°48'55"/112°28'00"~~ 34°48'55"/112°28'03"	Sedimentary		A&Ww			FBC			FC		AgL
VR	Dry Beaver Creek	~~Tributary~~ Headwaters to confluence with Beaver Creek ~~at 34°37'59"/111°49'34"~~			A&Ww			FBC			FC	AgI	AgL
VR	Dry Creek (EDW)	Sedona Ventures WWTP outfall at ~~34°50'45"/111°52'15"~~ 34°50'02"/111°52'17" to ~~confluence with Dry Creek at 34°50'31"/111°52'39"~~ 34°48'12"/111°52'48"					A&Wedw		PBC				
VR	Dude Creek	~~Tributary~~ Headwaters to confluence with the East Verde River ~~at 34°23'06"/111°16'26"~~		A&Wc				FBC			FC	AgI	AgL
VR	East Verde River	Headwaters to confluence with Ellison Creek ~~at 34°21'10"/111°16'47.5"~~		A&Wc				FBC		DWS	FC	AgI	AgL
VR	East Verde River	Below confluence with Ellison Creek to confluence with the Verde River ~~at 34°17'02"/111°40'19"~~			A&Ww			FBC		DWS	FC	AgI	AgL
VR	Ellison Creek	~~Tributary~~ Headwaters to confluence with the East Verde River ~~at 34°21'11"/111°16'48"~~		A&Wc				FBC			FC		AgL
VR	Fossil Creek (OAW)	~~Tributary~~ Headwaters to confluence with the Verde River ~~at 34°18'22"/111°40'30"~~			A&Ww			FBC			FC		AgL
VR	Fossil Springs (OAW)	~~34°25'24"/111°34'25"~~ 34°25'24"/111°34'27"			A&Ww			FBC		DWS	FC		
VR	Foxboro Lake	~~34°53'48"/111°40'00"~~ 34°53'42"/111°39'55"			A&Ww			FBC			FC		AgL
VR	Fry Lake	~~35°03'45"/111°48'02"~~ 35°03'45"/111°48'04"			A&Ww			FBC			FC		AgL
VR	Gap Creek	Headwaters to confluence with Government Spring ~~at 34°23'23"/111°50'53.5"~~		A&Wc				FBC			FC		AgL
VR	Gap Creek	Below Government Spring to confluence with the Verde River ~~at 34°24'50"/111°46'51.6"~~			A&Ww			FBC			FC		AgL

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
VR	Garrett Tank	~~35°18'57"/112°42'16"~~ 35°18'57"/112°42'20"			A&Ww			FBC			FC		AgL
VR	Goldwater Lake, Lower	~~34°29'55"/112°27'18"~~ 34°29'56"/112°27'17"	Sedimentary	A&Wc				FBC		DWS	FC		
VR	Goldwater Lake, Upper	~~34°29'51"/112°26'55"~~ 34°29'52"/112°26'59"	Igneous	A&Wc				FBC		DWS	FC		
VR	Granite Basin Lake	~~34°37'01"/112°42'16"~~ 34°37'01"/112°32'58"	Igneous	A&Wc				FBC			FC	AgI	AgL
VR	Granite Creek	Headwaters to Watson Lake ~~at 34°35'15"/112°25'05"~~		A&Wc				FBC			FC	AgI	AgL
VR	Granite Creek	Below Watson Lake to confluence with the Verde River ~~at 34°52'54"/112°25'05"~~			A&Ww			FBC			FC	AgI	AgL
VR	Green Valley Lake (EDW)	34°13'54"/111°20'45"	Urban				A&Wedw		PBC		FC		
VR	Heifer Tank	~~35°20'28"/112°32'56"~~ 35°20'27"/112°32'59"			A&Ww			FBC			FC		AgL
VR	Hell Canyon Tank	~~35°05'00"/112°24'06"~~ 35°04'59"/112°24'07"	Igneous		A&Ww			FBC			FC		AgL
VR	Homestead Tank	~~35°21'23"/112°41'32"~~ 35°21'24"/112°41'36"	Igneous		A&Ww			FBC			FC		AgL
VR	Horse Park Tank	~~34°58'15"/111°36'29"~~ 34°58'15"/111°36'32"			A&Ww			FBC			FC		AgL
VR	Horseshoe Reservoir	~~33°59'00"/111°42'30"~~ 34°00'25"/111°43'36"	Sedimentary		A&Ww			FBC			FC	AgI	AgL
VR	Houston Creek	~~Tributary~~ Headwaters to confluence with the Verde River ~~at 34°16'55"/111°41'06"~~			A&Ww			FBC			FC		AgL
VR	Huffer Tank	34°27'46"/111°23'11"			A&Ww			FBC			FC		AgL
VR	J.D. Dam Lake	~~35°04'01"/112°01'40"~~ 35°04'02"/112°01'48"	Shallow	A&Wc				FBC			FC	AgI	AgL
VR	Jacks Canyon Wash	Headwaters to Big Park WWTP outfall at ~~34°45'32"/111°45'10"~~ 34°45'46"/111°45'51"				A&We			PBC				
VR	Jacks Canyon Wash (EDW)	Below Big Park WWTP outfall to confluence with Dry Beaver Creek ~~at 34°44'28"/111°46'01"~~					A&Wedw		PBC				
VR	Lime Creek	~~Tributary~~ Headwaters to Horseshoe Reservoir ~~at 33°59'20"/111°44'13"~~			A&Ww			FBC			FC		AgL
VR	McLellan Reservoir	~~35°13'15"/112°17'05"~~ 35°13'09"/112°17'06"	Igneous		A&Ww			FBC			FC	AgI	AgL
VR	Meath Dam Tank	~~35°07'46"/112°27'35"~~ 35°07'52"/112°27'35"			A&Ww			FBC			FC		AgL
VR	Mullican Place Tank	~~34°44'16"/111°36'08"~~ 34°44'16"/111°36'10"	Igneous		A&Ww			FBC			FC		AgL
VR	Oak Creek (OAW)	Headwaters to confluence with unnamed tributary at ~~34°57'08.5"/111°45'13"~~ 34°59'15"/111°44'47"		A&Wc				FBC		DWS	FC	AgI	AgL
VR	Oak Creek (OAW)	Below confluence with unnamed tributary ~~at 34°57'08.5"/111°45'13"~~ to confluence with Verde River			A&Ww			FBC		DWS	FC	AgI	AgL

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
VR	Oak Creek, West Fork (OAW)	~~Tributary~~ Headwaters to confluence with Oak Creek ~~at 34°59'13"/111°44'46"~~		A&Wc				FBC			FC		AgL
VR	Odell Lake	~~34°56'02"/111°37'52"~~ 34°56'5"/111°37'53"	Igneous	A&Wc				FBC			FC		
VR	Peck's Lake	~~34°47'07"/112°02'30"~~ 34°46'51"/112°02'01"	Shallow		A&Ww			FBC			FC	AgI	AgL
VR	Perkins Tank	~~35°06'42"/112°04'08"~~ 35°06'42"/112°04'12"	Shallow	A&Wc				FBC			FC		AgL
VR	Pine Creek	Headwaters to confluence with unnamed tributary at ~~34°21'51"/111°26'46"~~ 34°21'51"/111°26'49"		A&Wc				FBC		DWS	FC	AgI	AgL
VR	Pine Creek	Below confluence with unnamed tributary to confluence with East Verde River ~~at 34°13'19"/111°29'27.6"~~			A&Ww			FBC		DWS	FC	AgI	AgL
VR	Red Creek	~~Tributary~~ Headwaters to confluence with the Verde River ~~at 34°09'47"/111°43'12"~~			A&Ww			FBC			FC		AgL
~~VR~~	~~Red Lake~~	~~35°12'19"/113°03'55"~~	~~Sedimentary~~		~~A&Ww~~			~~FBC~~			~~FC~~		~~AgL~~
VR	Reservoir #1	~~35°13'05"/111°50'07"~~ 35°13'5"/111°50'09"	Igneous		A&Ww			FBC			FC		
VR	Reservoir #2	~~35°13'16"/111°50'36"~~ 35°13'17"/111°50'39"	Igneous		A&Ww			FBC			FC		
VR	Roundtree Canyon Creek	~~Tributary~~ Headwaters to confluence with Tangle Creek ~~at 34°09'04"/111°48'18"~~			A&Ww			FBC			FC		AgL
VR	Scholze Lake	~~35°11'53"/112°00'31"~~ 35°11'53"/112°00'37"	Igneous	A&Wc				FBC			FC		AgL
VR	Spring Creek	Headwaters to confluence with unnamed tributary at ~~34°57'23.5"/111°57'19"~~ 34°57'23"/111°57'21"		A&Wc				FBC			FC	AgI	AgL
VR	Spring Creek	Below confluence with unnamed tributary ~~at 34°44'38"/111°54'19"~~ to confluence with Oak Creek			A&Ww			FBC			FC	AgI	AgL
VR	Steel Dam Lake	~~35°13'36"/112°24'51"~~ 35°13'36"/112°24'54"	Igneous	A&Wc				FBC			FC		AgL
VR	Stehr Lake	~~34°21'59"/111°40'00"~~ 34°22'01"/111°40'02"	Sedimentary		A&Ww			FBC			FC		AgL
VR	Stone Dam Lake	~~35°13'36"/112°24'16"~~ 35°13'32"/112°24'10"		A&Wc				FBC			FC	AgI	AgL
VR	Stoneman Lake	~~34°46'44"/111°31'05"~~ 34°46'47"/111°31'14"	Shallow	A&Wc				FBC			FC	AgI	AgL
VR	Sullivan Lake	~~34°51'46"/112°27'41"~~ 34°51'42"/112°27'51"			A&Ww			FBC			FC	AgI	AgL
VR	Sycamore Creek	Headwaters to confluence with unnamed tributary at ~~35°03'40"/111°57'28"~~ 35°03'41"/111°57'31"		A&Wc				FBC			FC	AgI	AgL
VR	Sycamore Creek	Below confluence with unnamed tributary to confluence with Verde River ~~at 34°51'47"/112°04'41"~~			A&Ww			FBC			FC	AgI	AgL
VR	Sycamore Creek	~~Tributary~~ Headwaters to confluence with Verde River at 33°37'55"/111°39'58"			A&Ww			FBC			FC	AgI	AgL
VR	Sycamore Creek	~~Tributary~~ Headwaters to confluence with Verde River ~~at 34°04'42"/111°42'14"~~			A&Ww			FBC			FC		AgL
VR	Tangle Creek	~~Tributary~~ Headwaters to confluence with Verde River ~~at 34°05'06"/111°42'36"~~			A&Ww			FBC			FC	AgI	AgL

Watershed	Surface Waters	Segment Description and Location (Latitude and Longitudes are in NAD ~~27~~ 83)	Lake Category	Aquatic and Wildlife				Human Health				Agricultural	
				A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
VR	Trinity Tank	~~35°27'44"/112°47'56"~~ 35°27'44"/112°48'01"			A&Ww			FBC			FC		AgL
VR	Unnamed Wash	Flagstaff Meadows WWTP outfall at ~~36°14'17"/111°49'28"~~ 35°13'59"/111°48'35" to Volunteer Wash ~~at 35°11'55"/111°49'42"~~					A&Wedw		PBC				
VR	Verde River	~~Above Bartlett Damfrom~~ From confluence of Chino Wash and Granite Creek to Bartlett Lake Dam			A&Ww			FBC			FC	AgI	AgL
VR	Verde River	Below Bartlett Lake Dam to Salt River			A&Ww			FBC		DWS	FC	AgI	AgL
VR	Walnut Creek	~~Tributary~~ Headwaters to confluence with Big Chino Wash ~~at 34°58'12"/112°34'55"~~			A&Ww			FBC			FC		AgL
VR	Watson Lake	~~34°35'15"/112°25'05"~~ 34°34'58"/112°25'26"	Igneous		A&Ww			FBC			FC	AgI	AgL
VR	Webber Creek	~~Tributary~~ Headwaters to confluence with the East Verde River ~~at 34°18'50"/111°19'55"~~		A&Wc				FBC			FC		AgL
VR	West Clear Creek	Headwaters to confluence with Meadow Canyon ~~at 34°33'40"/111°31'30"~~		A&Wc				FBC			FC		AgL
VR	West Clear Creek	Below confluence with Meadow Canyon to confluence with the Verde River ~~at 34°30'14"/111°49'41"~~			A&Ww			FBC			FC	AgI	AgL
VR	Wet Beaver Creek	Headwaters to unnamed springs at 34°41'17"/111°34'34"		A&Wc				FBC			FC	AgI	AgL
VR	Wet Beaver Creek	Below unnamed springs to confluence with Dry Beaver Creek ~~at 34°37'59"/111°49'33.6"~~			A&Ww			FBC			FC	AgI	AgL
VR	Whitehorse Lake	~~35°07'00"/112°00'47"~~ 35°06'59"/112°00'48"	Igneous	A&Wc				FBC		DWS	FC	AgI	AgL
VR	Williamson Valley Wash	Headwaters to confluence with Mint Wash ~~at 34°49'05"/112°37'55"~~				A&We			PBC				AgL
VR	Williamson Valley Wash	~~Confluence~~ From confluence of Mint Wash to 10.5 km downstream ~~at 34°49'05"/111°37'55"~~			A&Ww			FBC			FC		AgL
VR	Williamson Valley Wash	~~Below~~ From 10.5 km downstream of Mint Wash confluence to confluence with Big Chino Wash ~~at 32°52'52"/112°28'48"~~				A&We			PBC				AgL
VR	Williscraft Tank	~~35°11'23"/112°35'38"~~ 35°11'22"/112°35'40"			A&Ww			FBC			FC		AgL
VR	Willow Creek	Above Willow Creek Reservoir	~~Shallow~~	A&Wc				FBC			FC		AgL
VR	Willow Creek	Below Willow Creek Reservoir to confluence with Granite Creek			A&Ww			FBC			FC		AgL
VR	Willow Creek Reservoir	34°36'17"/112°26'19"	Shallow		A&Ww			FBC			FC	AgI	AgL
VR	Willow Valley Lake	~~34°41'08"/111°19'57"~~ 34°41'08"/111°20'02"	Sedimentary		A&Ww			FBC			FC		AgL

Watersheds

BW = Bill Williams

CG = Colorado – Grand Canyon

CL = Colorado – Lower Gila

LC = Little Colorado

MG = Middle Gila

SC = Santa Cruz – Rio Magdelena – Rio Sonoyta

SP = San Pedro – Willcox Playa – Rio Yaqui

SR = Salt River

UG = Upper Gila

VR = Verde River

Other Abbreviations

WWTP = Wastewater Treatment Plant

Km = kilometers

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APPENDIX C. SITE-SPECIFIC STANDARDS

Watershed	Surface Water	Surface Water Description & Location	Parameter	Site-Specific Criterion
LC	Rio de Flag (EDW)	Flagstaff WWTP outfall to the confluence with San Francisco Wash at 35°14'04"/111°28'02.5"	Copper (D)	36 µg/L (A&Wedw)
CL	Yuma East Wetlands	From inlet culvert from Colorado River into restored channel to Ocean ~~bridge~~ Bridge	Selenium (T) Total residual chlorine	2.2 mg/L (A&Ww chronic) 33 µg/L (A&Ww acute) 20 µg/L (A&Ww chronic)
SR	Pinto Creek	From confluence of Ellis Ranch tributary at 33°19'26.7"/110°54'57.5" to the confluence of West Fork of Pinto Creek at 33°27'32.3"/111°00'19.7"	Copper (D)	34 µg/L (A&Ww acute for hardness values below 268 mg/L)
				34 µg/L (A&Ww chronic)
CG	Bright Angel Wash	South Rim Grand Canyon National Park WWTP at 36°02'59"/112°09'02" to Coconino Wash	Copper (D)	42.5 µg/L (A&W edw)
CG	Transept Canyon	North Rim Grand Canyon WWTP at 36°12'20"/112°03'35" to1km downstream	Copper (D)	42.5 µg/L (A&W edw)