



NOTICES OF PUBLIC INFORMATION

Notices of Public Information contain corrections that agencies wish to make to their notices of rulemaking; miscellaneous rulemaking information that does not fit into any other category of notice; and other types of information required by statute to be published in the Register.

Because of the variety of Notices of Public Information, the Office of the Secretary of State has not established a specific publishing format for these notices. We do however require agencies to use a numbered list of questions and answers and follow our filing requirements by presenting receipts with electronic and paper copies.

NOTICE OF PUBLIC INFORMATION

DEPARTMENT OF CHILD SAFETY

[M15-222]

- 1. Name of the Agency: Department of Child Safety (DCS)
2. The topic of the public information matter: Soliciting public input on proposed rules for the following topics. Definitions and General Requirements for Child Placing Agencies and Child Welfare Agencies, Child Placement Agency Licensing Requirements, and Licensing Process and Licensing Requirements for Child Welfare Agencies Operating Residential Group Care Facilities and Outdoor Experience Programs.
3. The Public Information relating to the topic: The Department of Child Safety was granted rulemaking authority under A.R.S. § 8-453(A)(5), and an 18-month exemption from the rulemaking requirements of Title 41, Chapter 6 under Arizona Laws 2014, Second Special Session, Chapter 1, Section 158 (Senate Bill 1001).
4. The name and address of agency personnel to whom questions and comments may be addressed: Complete information and an opportunity to provide written comments online regarding the proposed rules can be found at: https://dcs.az.gov/about/dcs-rules-rulemaking

NOTICE OF PUBLIC INFORMATION

DEPARTMENT OF ENVIRONMENTAL QUALITY

[M15-223]

- 1. A.R.S. Title and its heading: 49, The Environment
A.R.S. Chapter and its heading: 2, Water Quality Control
A.R.S. Article and its heading: 2.1, Total Maximum Daily Loads
Section: A.R.S. § 49-234, Total maximum daily loads; implementation plans
2. The public information relating to the listed statute: Pursuant to A.R.S. § 49-234, the Arizona Department of Environmental Quality (Department or ADEQ) is required to develop a total maximum daily load (TMDL) for navigable waters that are listed as impaired.



Public notice of the opportunity for public comment on the draft “Gila River – Centennial Wash to Gillespie Dam Reach 15070101-008 TMDLs for Total Boron & Total Selenium (Chronic)” was published in the *Buckeye Valley News*, a newspaper of general circulation in the vicinity of the impaired reach, in April 2015. The public comment period extended from April 23, 2015 to May 29, 2015.

3. Total Maximum Daily Loads (TMDLs)

A. TMDL Process

A TMDL represents the total load of a pollutant that can be assimilated by a waterbody on a daily basis and still meet the applicable water quality standard. The TMDL can be expressed as the total mass or quantity of a pollutant that can enter the waterbody within a unit of time. In most cases, the TMDL determines the allowable concentration or density of a pollutant in units per day and divides it among the various contributors in the watershed as waste load (i.e., point source discharge) and load (i.e., nonpoint source) allocations. The TMDL must also account for natural background sources and provide a margin of safety.

In Arizona, as in other states, changes in standards or the establishment of site-specific standards are the result of ongoing science-based investigations or changes in toxicity criteria from EPA. Changes in designated uses and standards are part of the surface water standards triennial review process and are subject to public review. Standards are not changed simply to bring the waterbody into compliance, but are based on sound science that includes evaluation of the risk of impact to humans or aquatic and wildlife communities. Existing uses of the waterbody and natural conditions are considered when standards for specific water segments are established.

These TMDLs meet or exceed the following EPA Region 9 criteria for approval:

Plan to meet State Surface Water Quality Standards: The TMDLs include a study and a plan for the specific pollutants that must be addressed to ensure that applicable water quality standards are attained.

Describe quantified water quality goals, targets, or endpoints: The TMDL must establish numeric endpoints for the water quality standards, including beneficial uses to be protected, as a result of implementing the TMDLs. This often requires an interpretation that clearly describes the linkage(s) between factors impacting water quality standards.

Analyze/account for all sources of pollutants: All significant pollutant sources are described, including the location and the magnitude of sources where data is available.

Identify pollution reduction goals: The TMDL plan includes pollutant reduction targets for all point and nonpoint sources of pollution.

Describe the linkage between water quality endpoints and pollutants of concern: The TMDLs must explain the relationship between the numeric targets and the pollutants of concern and determine whether the recommended pollutant load allocations exceed the loading capacity of the receiving water.

Develop margin of safety that considers uncertainties, seasonal variations, and critical conditions: The TMDLs must describe how any uncertainties regarding the ability of the plan to meet water quality standards have been addressed. The plan must consider these issues in its recommended pollution reduction targets.

Provide implementation recommendations for pollutant reduction actions: The TMDLs should provide a specific process and schedule for achieving pollutant reduction targets.

Include an appropriate level of public involvement in the TMDL process: This is usually met by publishing public notice of the TMDLs in a newspaper of general circulation in the area affected by the study, circulating the TMDLs for public comment, and holding public meetings in local communities. Public involvement must be documented in the state’s TMDL submittal to EPA Region 9.

In addition, these TMDLs specifically comply with the public notification requirements of A.R.S. Title 49, Chapter 2, Article 2.1 through this public notice: Publication of these TMDLs in the Arizona Administrative Review (A.A.R.) is required per Arizona Revised Statute, Title 49, Chapter 2, Article 2.1 prior to submission of the TMDL to EPA. The Department shall:

1. Prepare a draft estimate of the total amount of each pollutant that causes impairment from all sources that may be added to a navigable water while still allowing the navigable water to achieve and maintain applicable surface water quality standards;



2. Determine draft allocations among the contributing sources that are sufficient to achieve the total loadings;
3. Provide public notice and allow for comment on each draft estimate and draft allocation and shall prepare written responses to comments received on the draft estimates and draft allocations.
4. Publish the determinations of total pollutant loadings that will not result in impairment and the draft allocations among the contributing sources that are sufficient to achieve the total loadings that it intends to submit initially to the regional administrator, along with a summary of the responses to comments on the estimated loadings and allocations, in the A.A.R. at least forty-five days before the submission of the loadings and allocations to the regional administrator.

Federal law only requires the submittal of the pollutant loadings to EPA for approval. However, the Department considers the pollutant loadings and the draft allocations to be integrally related and that they should be presented together to afford the public a complete understanding of the issues, outcomes and recommendations of the TMDL analysis. For that reason, the Department has combined the loadings and allocations in this publication in the A.A.R.

B. TMDLs for the Gila River Reach 15070101-008

The Arizona Department of Environmental Quality (ADEQ) 1992 Clean Water Act (CWA) §303[d] Impaired Waters List listed the Gila River from Centennial Wash to the Gillespie Dam (HUC #15070101-008) as impaired for the Agricultural Irrigation (AgI) designated use due to total boron exceedances. Twenty-one of 23 samples collected in the 1989-90 period exceeded the AgI designated use criterion of 1,000 µg/L. These values were dissolved boron values, which were used as surrogates for total boron in the assessment. The reach has subsequently remained on the state's § 303(d) list for each assessment period since 1992 for the same impairment.

ADEQ's 2004 CWA §303[d] Impaired Waters List subsequently listed Reach 15070101-008 as impaired for the Aquatic and Wildlife effluent dependent water (A&Wedw) designated use due to chronic selenium exceedances. The reach was listed as impaired due to 18 of 23 samples from 1998 to 2002 exceeding the A&Wedw chronic standard of 2 µg/L. The reach has continued to be listed as impaired for selenium in each water quality assessment since 2004.

A two-year Total Maximum Daily Load (TMDL) investigation was undertaken in the summer of 2012 to identify the sources and causes of the impairments and to quantify the reductions necessary for the reach to attain water quality standards. Both impairment analytes were investigated simultaneously. Data were collected in storm flow and non-storm flow conditions on the Gila and Salt rivers at multiple locations and on tributaries and canals feeding the Gila or Hassayampa rivers. Both impairments were confirmed, and critical conditions and locations were identified. Critical conditions for both boron and selenium exceedances were found to be low-flow and non-storm conditions. Sampling for this TMDL project focused primarily upon "base flow" (i.e., continuous discharged flow) conditions, with storm flow data serving a subsidiary role. Boron and selenium both exhibited concentrations inversely proportional to flow magnitudes throughout the historical record, and both showed a similar pattern in project sampling.

Results of the TMDL study confirm that the reach is consistently impaired for both total boron and total selenium, with flow during dry conditions (60-90 percent flow exceedance range) identified as the most problematic flow regime. Only in flood or high-flow conditions do concentrations of the impairment analytes approach the attainment of standards. The reductions required to attain water quality standards are substantial, ranging from a low of 62.7 percent (boron, moist conditions) up to 93.6 percent (selenium, dry conditions). Low flows exacerbate loading problems. Concentration and load duration curves included in the document graphically depict the analytes' levels relative to water quality standards through the entire range of Gila River flows.

Nonpoint source contributors to the water quality problems include the following: discharges of agricultural irrigation tail and drain water, along with degraded excess irrigation supply water; certain industrial and wastewater discharges to the canal systems; and brackish or saline pumped groundwater discharges from the state-designated "waterlogged area." Interflow of infiltrated irrigation water finding its way to the Gila River channel also plays a role in the southwest project area. The principal problem consists of the recycling of irrigation water within and across irrigation districts after irrigation use, which leads to highly degraded water quality. The problems are persistent, as evidenced by repeated exceedances since the late 1980s, and significant, with exceedances routinely surpassing standards by a multiple factor for both boron and selenium.

Selected dischargers in the project area have been granted higher selenium permit limits than the Aquatic and Wildlife-effluent dependent water (A&Wedw) selenium standard based on the rationale that they discharge to the Buckeye Water Conser-



vation and Drainage District canal system with an Agricultural Irrigation (AgI) designated use (Se standard of 20 µg/L) instead of the Gila River or its tributaries. This rationale is not defensible in this TMDL analysis, since canal discharges are likely to negatively impact loading in the impaired reach due to their hydrologic persistence and a higher unlikelihood of infiltration as compared to tributary discharges. Waste load allocations and recommendations for revised permit limits are established in the TMDL that are consistent with the attainment of water quality standards in the impaired reach. The conservative assumptions inherent in the TMDL analysis permitted the accommodation of modified higher-concentration permit limits for selenium in a separate subsidiary analysis, assuming all other TMDL load and waste load targets are met. In addition to the explicit margin of safety, a modest buffer of assimilative capacity remains after WLA assignments.

TMDL CALCULATIONS

The TMDL calculations are based on flow and concentration data analyzed using load and concentration duration curves. The standard TMDL equation presented below is generally used for the determination of loading capacity and the resulting load reductions necessary to meet TMDL target values:

$$\text{TMDL} = \sum \text{WLA} + \sum \text{LA} + \text{MOS}$$

Where WLA is waste load allocation (point sources), LA is load allocation (nonpoint sources and natural background), and MOS is a margin of safety. In these TMDLs, due to factors restricting ADEQ's ability to comprehensively account for each of the elements of the TMDL equation, including consumptive use of water in the canal systems and areas ADEQ was unable to sample, the general TMDL equation has limited applicability. Aggregate load capacities and total loads, including natural background, WLAs, and load allocations, are determined for the entire project area as measured in the impaired reach. A 10% margin of safety for loads is determined at this level of analysis. Consideration of permittee and zone loading on a smaller scale relies upon a concentration based approach for evaluation of aggregate loads including both permittee discharges and non-point source loading. A 10% concentration margin of safety was applied in zone calculations. Permittee loading was considered in hybridized form by both permit concentration limits and design capacities of facilities. The TMDLs are premised on a concentration-neutral approach, which asserts that if all permitted dischargers are discharging at or below the water quality standards of the Gila River, and all zone discharges adhere to the water quality standard, loading in the impaired reach should be consistent with the Gila River achieving attainment of water quality standards. A corollary of this premise is that in those cases where concentrations are permitted at levels above the water quality standard, additional loading attributable to the higher concentrations must be offset by a buffer of additional assimilative capacity of the receiving waters elsewhere, either in the system itself or in the analysis.

MARGIN OF SAFETY

A baseline margin of safety of 10 percent is subtracted from the TMDL allowance for each flow class to buffer against uncertainties in analysis, including variability and error associated with flow measurement, variability in laboratory analyses and other uncertainties associated with sampling. The margin is expressed as a load value for aggregated elements of the TMDL equation in the impaired reach, and as a concentration reduction in the zone analyses comprising the project area.

An additional implicit margin of safety is present for selenium based on the undertaking of a more conservative analysis for selenium, where lower-bound flows were used to establish load targets for each category instead of the mid-point flow was used for boron. The implicit margin of safety is quantified at 349 g/day of selenium, corresponding to an assimilative capacity buffer of 71.4 cfs at the Gila River selenium water quality standard of 2 µg/L. The implicit margin of safety was tapped to provide for accommodation of certain higher-limit permittees in the project area, who were required to meet more stringent WLAs than their current permit limits mandate. Assimilative capacity of 30.9 cfs remains as an implicit margin of safety after application.

WASTE LOAD ALLOCATIONS

AZPDES/NPDES Permits

Selenium WLAs

The selenium TMDL analysis was framed more conservatively than the boron TMDL analysis. Whereas the boron load duration analysis used mid-point flows of each flow category for the determination of category targets, the selenium analysis used lower-bound flows for the setting of category targets. When analyzed in the aggregate, the use of lower-bound flows for the analysis results in a weighted average buffer of 71.4 cfs of additional assimilative capacity available to accommodate the greater selenium loading of higher-limit permittees. See Table 1. Assimilative flow capacity buffer¹ for a flow summary.



This buffer allows for some discharge concentrations over the water quality standard of the impaired reach. However, existing permit limits higher than the Gila River’s chronic selenium standard will require modification to be consistent with the assimilative capacity available.

<i>Flow Category</i>	<i>Median Flows, cfs</i>	<i>Weight</i>	<i>Lower-Bound Flows, cfs</i>	<i>Weight</i>
1	764	0.1	320	0.1
2	166	0.3	113	0.3
3	86	0.2	63	0.2
4	34	0.3	14	0.3
5	9.3	0.1	4.07	0.1
	Weighted Flow	154.5	Weighted Flow	83.1
			Difference:	71.4

Table 1. Assimilative flow capacity buffer

Three dischargers in the TMDL project area are currently permitted to discharge selenium concentrations consistent with the AgI standard of 20 µg/L for Phoenix-area canals or with site-specific limits. These dischargers include the City of Goodyear 157th Ave. WRF (Outfall 2), JRC Goodyear, LLC (Outfalls 1, 2, and 3), and certain wells of the Salt River Project. These facilities or operations hold AZPDES permit #s 22357, 25747, and 24341 respectively. Canal water has been observed to persist after transit through the canal systems and is thereby adding excess loading for selenium to the impaired reach. Consequently, to ensure concentration-neutral conditions consistent with the identified buffer, it is necessary to evaluate discharge monitoring reported data for each permittee with the higher limits to determine current performance and set appropriate waste-load allocations for these facilities/operations.

Pre-TMDL permit limits for selenium are shown in Table 4. Determination of current performance for the three permittees with higher limits proceeded through the examination of the last three to five years of reported selenium data and additional data submitted by permittees during the public comment period. For the wells of the Salt River Project south of I-10 in SRP’s Area 26 (bounded on the east by 83rd Avenue), due to limited data availability for each well, individual well reporting was aggregated and treated as a single group. The mean, standard deviation and coefficient of variation were determined for each permittee’s data. Using the current performance mean as representative of the long-term average (LTA) for the facility or operation, methods consistent with EPA’s 1991 *Technical Support Document for Water Quality-Based Toxics Control* (TSD) were employed on each data set to establish recommended concentration-based permit limits for the waste load allocation (WLA), the average monthly limit (AML) and the maximum daily limit (MDL). These limits are reflected in Table 2. Recommendations for adjusted permit limits, selenium2. Limits are reported to one significant figure consistent with permit calculations, excepting limits of 10 or higher, which are reported to the nearest whole number.

Current-performance selenium waste load allocations based on standard TSD calculations were also applied for the two permittees in the project area currently without numeric selenium effluent limits. This group includes the City of Buckeye Sundance Water Reclamation Facility (AZPDES #24881) and the Central Buckeye WWTP (AZPDES #25313). Recommended selenium permit limits for these two permittees are also reflected in Table 2.

The recommended limits require an equivalent of 40.5 cfs of assimilative capacity for accommodation at the A&Wedw chronic standard of 2.0 µg/L. An additional 30.9 cfs of assimilative capacity remains in the buffer as an added margin of safety after accommodation of the recommended permit limits.



Recommendations for Adjusted Permit Limits, Selenium

All concentrations in ug/L

Permit #	Facility/Operation Name	Points of Discharge	WLA	AML	MDL
22357	City of Goodyear 157th Ave WRF	Outfall 2	6	5	11
25747		Outfall 1	22	18	29
	JRC Goodyear, LLC (Lockheed Martin)	Outfall 2	13	11	19
		Outfall 3	8	7	12
24881		Buckeye Sundance WRF	All outfalls	3	3
25313	Central Buckeye WWTP	Outfall 1	2	2	4
24341	Salt River Project	GW wells, Area 26 S of I-10*	6	–	10

* - Includes wells 1.0E-6.0N and 3.5E-6.0N north of boundary

Table 2. Recommendations for adjusted permit limits, selenium

Boron WLAs

Table 5 details existing permit limits for discharges containing boron. The table shows several permittees without boron limits on one or more outfalls or points of discharge. Since a TMDL analysis is essentially a pollutant budget aimed at isolating and quantifying water quality loading for the purpose of water quality improvement, unquantified loading additions from permitted sources cannot be allowed in the context of the analysis. Except for Central Buckeye WWTP, WLAs equivalent to the AgI boron water quality standard are therefore applied to each permittee’s outfall(s) or PODs within Zone 1 of the project area boundary where numeric limits do not currently exist. Outfalls where numeric limits are currently applied retain their existing permit limits.

The City of Buckeye submitted data for the Sundance and Central Buckeye facilities during the public comment period and requested a current-performance analysis for boron for each. Due to existing permit limits for the Sundance WRF (Table 5) and the anti-backsliding provisions of the Clean Water Act [Section 402(o), Section 303(d) (4) (A)], the current Sundance permit limits for boron remain unchanged by the TMDLs. Recommended permit limits for the Central Buckeye WWTP are established at an AML of 1231 µg/L and an MDL of 1682 µg/L. The WLA is likewise 1231 µg/L. The higher current performance limits for boron at this facility result in an additional 3.5 kg/day of boron loading over a concentration-neutral limit load at a concentration of 1000 µg/L. The additional loading reduces the explicit margin of safety by approximately 1%.

The methods used to determine the permit limits, as with the selenium WLAs, were derived from TSD methods. For human-health related criteria, such as the AgI use, the average monthly limit value defaults to the water quality standard of 1000 µg/L.

The newly applied WLAs and recommended permit limits consistent with them are summarized in Table 3 below. DMR data for each facility or operation in Table 3 where data are available indicates WLAs can be met.



WLAs and Permit Limit Recommendations, Boron

Permit #	Facility/Operation Name	Points of Discharge	WLA	AML	MDL
22357	City of Goodyear 157th Ave WRF	Outfall 2	1000	1000	1459
25747	JRC Goodyear, LLC (Lockheed Martin)	Outfall 1	1000	1000	1459
		Outfall 2	1000	1000	1459
23281	Wolf WRC	Outfall 1	1000	1000	1459
20524	CoP 91st Ave WWTP	Outfall 1	1000	1000	1459
		Outfall 2	1000	1000	1459
		Outfall 4	1000	1000	1459
		Outfall 5	1000	1000	1459
25500	Palo Verde WWTP	Outfall 1	1000	1000	1459
25313	Central Buckeye WWTP	Outfall 2	1231	1231	1682
24341	Salt River Project	GW wells, Area 26 S of I-10*	1000	—	1000

* - Includes wells 1.0E-6.0N and 3.5E-6.0N north of boundary

Table 1. Boron WLAs and permit limit recommendations for dischargers/outfalls without numeric limits or requiring modified limits

Other AZPDES/NPDES Permitting Considerations

The point of compliance for individual permittees unless otherwise specified is at each permitted outfall detailed in the permit and these TMDLs. For the SRP wells requiring a WLA, the point of compliance is at the outfall for each individual well for both boron and selenium.

For compliance purposes, WLAs are considered as annual means for both boron and selenium. SRP’s wells are considered in the aggregate as a single grouped WLA for both selenium and boron. The annual mean of all grouped SRP wells shall determine adherence to the WLA. For all permittees, MDLs (maximum daily limits) and AMLs (average monthly limits) where they are incorporated are applicable for the time frames indicated by their terminology. Consistent with their existing permit, SRP is not required to meet an AML value for either boron or selenium due to irregular and infrequent sampling of wells. SRP retains their existing permit MDL of 1000 µg/L for boron as applicable to other wells under permit coverage. The MDL will also apply to the wells itemized previously.

Mass-based limits for higher-limit permittees for both boron and selenium are set based upon the concentrations listed and the permitted design capacities of the facilities/outfalls as permitted at the time of the draft TMDL release in 2015. For SRP wells, the mass-based limits are based upon the concentrations presented and average annual flow value for the Buckeye Feeder Canal for calendar years 2012-2014 as measured at the Buckeye Feeder Canal gauge station. The addition of outfalls or the change of locations of outfalls with no changes in discharge capacity for these facilities does not require a reconsideration of loading under this TMDL, but requests for permit modifications for higher-limit permittees involving facility design capacity expansions will be contingent upon remaining capacity available to accommodate the expansion and will be considered on a case-by-case basis after TMDL finalization and approval.

Sampling frequency requirements in permits requiring revision shall be determined by the ADEQ Permits Unit. Permits are not required to be revised until they are due for renewal.

SRP wells not itemized in the table are not deemed to be a part of the TMDL analysis and therefore require no WLA for these TMDLs, nor do these other wells require any alteration of existing permit limits. Likewise, existing individual permittees not assigned an allocation in the extended project area (Zone 2, Zone 4, and Rainbow Valley above the Corgett Wash facility) do not require WLAs in these TMDLs and therefore require no revision of their existing permits.

Existing permit limits referenced in Table 4 and Table 5 are set as concentration-based waste load allocations in these TMDLs and cannot be altered without a re-consideration of TMDL loading for the entire project area.

All future applicants for AZPDES/NPDES permits in the project area of the TMDLs where WLAs are required must have boron and selenium permit limits set, even if reasonable potential for exceedances is not present. TMDL loading cannot be



evaluated without numeric permit limits.

General Permit and MS4s

For selenium, a concentration-based WLA equivalent to the A&Wedw chronic water quality standard for total selenium (2.0 µg/L) is established for existing and future permittees covered under all sectors of the MSGP, CGP, and MS4s.

For boron, a concentration-based WLA equivalent to the AgI water quality standard for total boron (1,000 µg/L) is established for existing and future permittees covered under all sectors of the MSGP, CGP, and MS4s.

ADEQ will require general permittees to meet the terms of the WLA in one of the following ways:

- The pertinent water quality standard shall be met as a concentration-based waste load allocation for each of the individual storm water outfalls or other points of discharge as identified in the permittee's approved SWPPP or
- Permittees can demonstrate through monitoring and reporting that either discharges are not reaching receiving waters with the applicable designated use, or discharges reaching waters with the applicable designated use are not causing or contributing to exceedances of the appropriate water quality standard in the receiving water.

ADEQ may impose additional monitoring requirements to determine compliance in context with the general permit. Specific monitoring requirements and Best Management Practices (BMP) requirements will be addressed in SWPPPs to be reviewed by the ADEQ Stormwater and General Permits Unit, as required in Sections 2.2.2 and 3.1.1 of the 2010 ADEQ Mineral Industry and Industrial MSGPs and pertinent sections of the 2013 ADEQ CGP.

LOAD ALLOCATIONS

Load allocations for individual areas have been established for four different zones in the project area. In most flow conditions, including the most critical ones to address, flow that contributes directly to boron and selenium loading originates in the immediate Gila River vicinity west of State Route 85 (SR 85). When flow is continuous from upstream areas (i.e. east of SR 85 or from north of I-10 on the Hassayampa River), it is usually a result of storm flow conditions which generally ameliorate loading and dilute concentrations for both boron and selenium. While there are additional inputs to the Gila River between the eastern edge of the project area boundary and SR 85, they infiltrate before adding to loading in the impaired reach the vast majority of the time. Consequently, all hydrologic inputs to the Gila River upstream of the Hassayampa River confluence (west of SR 85) can be grouped into one contributing subwatershed or Loading Allocation Zone (LA1). All persisting contributions by the Hassayampa River, its tributaries, and its contributing areas (including persisting Buckeye Canal discharge) outside of recognized irrigation district boundaries are grouped into Loading Allocation Zone 2 (LA2). The contributing subwatershed area between the Hassayampa River confluence and the Arlington Canal discharge segment at the base of Gillespie Dam is considered Loading Allocation Zone 3 (LA3). Arlington Canal itself and any persisting flows joining the Arlington Canal from areas in the Centennial Wash subwatershed are considered Loading Allocation Zone 4 (LA4). In summary, two loading zones are subwatershed areas bounded by major canals, and two loading zones are tributary flows or contributing canals flows. Infrequent storm flow contributions from the desert lands to the south or east of the Gila River will be considered as loading attributable to a zone relative to its Hassayampa River confluence orientation. Source loading east of an extension of the Hassayampa River to the Buckeye Hills area will be assigned to Zone 1, while source loading to the west of an extension of the Hassayampa River in the same area will be assigned to Zone 3.

Load allocation zone targets are established on a concentration basis. Concentration targets are established equivalent to water quality standards less a 10 percent MOS based on a proportionality rationale. If each loading zone attains its target concentration and all WLAs are in compliance, the cumulative total maximum daily load at the reach's terminus will attain state water quality standards for both boron and selenium at the cumulative flow value.

LOAD REDUCTIONS

Load Reductions (LR) are needed when the existing load is larger than the LA calculated using the TMDL equation. The LR can be calculated by:

$$LR = \text{Existing load} - (\text{LA} + \text{Natural background} + \text{MOS})$$



The percent reduction needed is calculated by using:

$$\% \text{ Reduction} = (\text{LR/Existing Load}) * 100$$

In cases where the LR is negative, no reduction is necessary. In instances where the inclusion of the MOS causes existing loads to exceed the loading capacity, a reduction in the existing load will still be required. For these TMDLs, the pollutant budgets are considered in a concentration-based framework. Background loads and cumulative zone loadings were not quantified as independent, separable elements of the TMDL equation. Load allocations presented are therefore aggregate load allocations including background, point source, and nonpoint source loads. Margins of safety are quantified and presented as separable loads.

TMDLs identify the amount of pollutant that can be assimilated by the waterbody and still meet water quality standards. The pollutants of concern requiring TMDLs for the Gila River Reach 008 are selenium and boron. In order to calculate the load in kilograms per day (kg/day) from discharge in cubic feet per second (cfs) and concentrations in micrograms per liter (µg/L), a conversion factor is required:

$$1 \text{ ft}^3/\text{sec} * 1 \text{ } \mu\text{g}/\text{Liter} * 28.32\text{L}/\text{ft}^3 * 86,400\text{sec}/\text{day} * 1 \text{ kg}/1.0\text{E}9\mu\text{g} = 0.002445 \text{ kg}/\text{day}$$

The conversion factor of 0.002445 was used in the following equation:

$$\text{Existing Load} = Q * [\text{Constituent concentration in } \mu\text{g}/\text{L}] * 0.002445$$

Reductions by loading zone have been determined using project data. Concentration-based zone load allocations and reductions necessary are presented in Table 7. LA Zone 3 (Subwatershed 2, Hassayampa-Arlington Canal area) has been shaded for each constituent as the most critical zone to address to reduce loading based on the greatest percentage reductions necessary to meet the water quality load allocations. However, all zones require reductions of substantial magnitudes. Please refer to the TMDLs document for a map of zone extents and boundaries.

TABLES

The following tables detail the TMDL targets, waste load allocations, and reductions necessary for Reach 15070101-008. Table 4 summarizes selenium waste load allocations for all individual permittees. Table 5 summarizes boron waste load allocations for all individual permittees. Existing permit limits are also displayed in these tables in the left columns.

Table 6 gives a detailed breakdown by flow category of aggregate allocations and TMDL target values, existing loads, and percentage reductions calculations for both boron and selenium. The critical condition tier is shaded. Flows and associated loads and targets are broken out into five categories for each analysis, including high flows (0-10% flows), moist conditions (10-40% flows), mid-range flows (40-60%), dry conditions (60-90%) and low flows (>90% flows).

Table 7 presents concentration-based zone TMDL targets and load allocations. Reductions necessary to meet targets and allocations are also presented. A 10% margin of safety provides the difference between TMDL targets and load allocations as reflected in the second and third columns of both the boron and selenium groupings of Table 7.



See Permit Limits Monthly Avg. Concentration (ug/L)	Daily Max Concentration (ug/L)	AZPDES (MPDES) # Name	Serving	Status	Max Design Flow	Notes	CFS Equivalent	Assigned w/LAs
Gila: 2	3	22357 City of Goodyear 157th Ave WRF	Goodyear	Existing	4.0 MGD	(5)	6.19	Permit limits
BwCDD: 16.4	32.8	25747 JRC Goodyear, LLC (Lockheed Martin)	Lockheed Martin, Gdjr	Existing	Outfall 3 0.065 MGD Outfall 1 0.031 MGD Outfall 2 0.0825 MGD	(5)	0.1	6 ug/L 8 ug/L 22 ug/L 13 ug/L
None	None	24881 Buckeye Sundance WRF	Buckeye	Existing	3.5 MGD	(5)	5.42	3 ug/L
2	3	23281 Wolf WRC	Avondale	Existing	9.0 MGD	(1)	13.93	Permit limits
2	3.67	20524 CoP 91st Ave w/WTP	Phoenix	Existing	Outfall 1 89.0 MGD Outfall 2 89.0 MGD	(4)	137.7	Permit limits
2	3.67				Outfall 4 1.2 MGD		1.86	Permit limits
2	3.67				Outfall 5 80 MGD		123.78	Permit limits
2	3	20338 Tolleson W/WTP	Tolleson	Existing	17.5 MGD	(2)	27.08	Permit limits
2	3	25500 Palo Verde W/WTP	Buckeye	Proposed	0.5 MGD	(5)	0.77	Permit limits
2	3	23582 City of Goodyear Corgett Wash WRF	Goodyear	Existing	0.8 MGD		1.24	Permit limits
None: ECT	None: ECT	25313 Central Buckeye W/WTP	Buckeye	Existing	4.0 MGD	(3), (5)	6.19	2 ug/L
--	20	24341 Salt River Project	SW Phoenix metro area	Existing	N.A.	(6)	12.8	6 ug/L

Notes: (1) Avg. 4.87 MGD, 2008-2012
 (2) 16.89 MGD (avg daily)
 (3) expanding to 6.0 MGD
 (4) Exclusive alternate to Outfall 1
 (5) Discharge to Buckeye Canal system; see Figure 15.
 (6) Flow value used is average daily flow for Buckeye Feeder Canal for 2012-2014
 PVMGP - Palo Verde Nuclear Generating Plant
 ECT: Effluent Characterization Testing
 (9.28 CFS expanded equivalent)

Table 4. Selenium waste load allocations



B Permit Limits	Month Avg. Concentration (ug/L)	Daily Max Concentration (ug/L)	AZPDES (NPDES) #	Name	Serving	Status	Max Design Flow	Notes	CFS Equivalent	Assigned v/LAs
Gila River:	1000	1450	22357	City of Goodyear 157th Ave WRF	Goodyear	Existing	4.0 MGD	(5)	6.19	Permit limits to Gila River 1000 ug/L
Bv/CDD: None	None	None								
1 outfall:	1000	1144	25747	JRC Goodyear, LLC (Lockheed Martin)	Lockheed Martin, Gdjr	Existing	Outfall 3 Outfall 1 Outfall 2	(5) (5) (5)	0.1	Permit limits 1000 ug/L
	None	None								
	1000	1460	24881	Buckeye Sundance WRF	Buckeye	Existing	3.5 MGD	(5)	5.42	Permit limits 1000 ug/L
	None	None	23281	Wolf WRC	Avondale	Existing	9.0 MGD	(1)	13.93	Permit limits 1000 ug/L
	None	None	20524	CoP 91st Ave WwTP	Phoenix	Existing	Outfall 1 Outfall 2 Outfall 4 Outfall 5	(4) (4) (4) (4)	137.7 137.7 1.86 123.78	Permit limits 1000 ug/L
	None	None								
	1000	1459	20338	Tolleson WwTP	Tolleson	Existing	17.5 MGD	(2)	27.08	Permit limits 1000 ug/L
	None	None	25500	Palo Verde WwTP	Buckeye	Proposed	0.5 MGD	(5)	0.77	Permit limits 1000 ug/L
	1000	1500	23582	City of Goodyear Corgett Wash WRF	Goodyear	Existing	0.8 MGD		1.24	Permit limits 1231 ug/L
	None	None	25313	Central Buckeye WwTP	Buckeye	Existing	4.0 MGD	(3), (5)	6.19	Permit limits 1000 ug/L
	--	--	24341	Salt River Project	Sw/Phoenix Metro Area	Existing	N.A.	(6)	12.8	Permit limits 1000 ug/L

Notes:
 (1) Avg. 4.87 MGD, 2008-2012
 (2) 6.89 MGD (avg daily)
 (3) expanding to 6.0 MGD
 (4) Exclusive alternate to Outfall 1
 (5) Discharge to Buckeye Canal system; see Figure 15.
 (6) Flow value used is average daily flow for Buckeye Feeder Canal for 2012-2014

PVWGP- Palo Verde Nuclear Generating Plant
 * - SRP wells assigned an allocation have no permit limits in 2011 renewal.

(9.28 CFS expanded equivalent)

Table 5. Boron waste load allocations



Percent Reductions Required by Flow Category

<u>Boron, Total</u>	<u>Number of samples</u>	<u>Existing Loads, Kg/day</u>	<u>TMDL target, Kg/day</u>	<u>Aggregate Load Allocations, Kg/day</u>	<u>Percent Reductions, TMDL Target</u>	<u>Percent Reductions, Aggregate Load Allocations</u>
Cumulative	244	1,396.8	417.0	375.3	70.1%	73.1%
Category 1 (0.1-10 FPE)	50	5,721.2	1,868.7	1,681.9	67.3%	70.6%
Category 2 (10.1-40 FPE)	110	979.9	406.0	365.4	58.6%	62.7%
Category 3 (40.1-60 FPE)	50	570.4	210.4	189.3	63.1%	66.8%
Category 4 (60.1-90 FPE)	34	417.1	83.2	74.8	80.1%	82.1%
Category 5 (90.1-99.9 FPE)	0	--	22.7	20.5	N.A.	N.A.

<u>Selenium, Total</u>	<u>Number of samples</u>	<u>Existing Loads, Kg/day</u>	<u>TMDL target, Kg/day</u>	<u>Aggregate Load Allocations, Kg/day</u>	<u>Percent Reductions, TMDL Target</u>	<u>Percent Reductions, Aggregate Load Allocations</u>
Cumulative	260	3.32	0.449	0.404	86.5%	87.8%
Category 1 (0.1-10 FPE)	57	8.53	1.565	1.409	81.6%	83.5%
Category 2 (10.1-40 FPE)	127	2.22	0.553	0.498	75.1%	77.6%
Category 3 (40.1-60 FPE)	50	1.51	0.308	0.277	79.6%	81.7%
Category 4 (60.1-90 FPE)	26	0.97	0.068	0.062	92.9%	93.6%
Category 5 (90.1-99.9 FPE)	0	--	0.020	0.018	N.A.	N.A.

FPE - Flow Percent Exceedance
 Cumulative weighted TMDL targets adjusted to reflect populated categories only.

Table 6. Cumulative load reductions and allocations



Load Allocations						
Boron 90th Percentile Concentration Target						
LA Zone	Total TMDL Concentration (µg/L)	Load Allocation Target Concentration	Existing 90th P-tile Concentration (µg/L)	Number of Data Events	Percent Reduction LA	Percent Reduction LA
LA1	1000	900	4290	7	79.0%	79.0%
LA2	1000	900	2440	15	63.1%	63.1%
LA3	1000	900	4869	9	81.5%	81.5%
LA4	1000	900	1868	4	51.8%	51.8%
				Median Percent Reduction:	71.1%	71.1%

Selenium Average Concentration Target						
LA Zone	Total TMDL Concentration (µg/L)	Load Allocation Target Concentration	Existing Average Concentration (µg/L)	Number of Data Events	Percent Reduction LA	Percent Reduction LA
LA1	2.0	1.8	6.63	7	72.8%	72.8%
LA2	2.0	1.8	6.57	15	72.6%	72.6%
LA3	2.0	1.8	10.66	9	83.1%	83.1%
LA4	2.0	1.8	4.63	4	61.1%	61.1%
				Median Percent Reduction:	72.7%	72.7%

Table 7. Zone load allocations and reductions

SUMMARY OF COMMENTS

Comments were received from the stakeholders listed below. Following that is a summary of the comments and ADEQ's responses. Comment headings have been paraphrased to be addressed more generally in some cases, as have comment



responses. Similar comments from different sources have been grouped together for the purposes of this public notice.

Roosevelt Irrigation District
Buckeye Water Conservation and Drainage District
Brian Imbornoni / Jennings, Strouss, & Salmon P.L.C. on behalf of Arlington Canal Company
Grand Canyon Chapter, Sierra Club
Daniel B. Jones / Salmon, Lewis, and Weldon, P.L.C. on behalf of Jason Hardison
Maricopa County Farm Bureau
John Utz, Paloma Irrigation District
Salt River Project
Brandon Leister, Rocker 7 Farms
Arizona Department of Transportation
Peoria-Glendale Farm Bureau
Jake Sanders/Sanders Farms
Walt Bouchard / W.L. Bouchard and Associates on behalf of JRC Goodyear, LLC.
City of Buckeye

I. Aggregated/composited comments

The following comments or topics of concern were repeated in more than one stakeholder letter. ADEQ responses to similar comments across letters have been compiled and are presented here in aggregated form.

Comment: BMPs presented in the TMDL document are impractical, economically infeasible, have already been employed and found unsuitable, or are otherwise not appropriate for the area.

ADEQ response(s):

With regard to specific best management practices (BMPs) discussion, it should be noted that Appendix D of the document specifying possible best management practices is excerpted from an EPA manual that was written to address agriculture as practiced on a nation-wide basis. We do not expect that all measures in the appendix are feasible or necessarily appropriate to apply in Arizona; they are presented intending to stimulate thought and consideration by stakeholders as to what methods would be best applied in the deserts of the Southwest. ADEQ is relying upon input and initiative of stakeholders to identify, define, and apply best management practices that are the most cost-effective, feasible, and beneficial for water quality here on a local basis, as outlined in the TMDL Implementation section of the document:

The implementation plan is meant to suggest possible improvements and BMPs that can be employed to improve water quality. ...This implementation plan is intended to provide a general framework for addressing the Gila River boron and selenium problems with broad-brush guidance; it will subsequently provide more focused recommendations and guidance for the implementation of more specific improvement measures on a local scale as stakeholders and interested parties come forward with proposals. Actual on-the-ground improvements in water quality will rely upon the initiative and actions of stakeholder groups and interested individuals employing standard BMPs at a local scale throughout the entire project area. (Section 8.0, p. 65)

It is emphasized that stakeholders are under no obligation to adopt or implement best management practices that they perceive as inappropriate, impractical, economically infeasible, or ultimately detrimental. ADEQ must abide by Arizona state law in writing TMDLs and TMDL implementation plans. According to A.R.S. 49-234 (G.),

“...any reductions in loadings from nonpoint sources shall be achieved voluntarily.”

ADEQ has presented four potential solutions to the boron and selenium problems of the Gila River in Section 8 that have been assessed as having the best balance between cost feasibility for the stakeholders of the area and effectiveness in improving water quality. These four solutions have been demonstrated to work, either here locally or in the southwestern and western U.S. regions. Stakeholders are free to consider these measures and decline to pursue them if they are deemed inappropriate. In that case, ADEQ encourages the suggestion, discussion, and implementation of alternative approaches that may be better suited to improving water quality instead. Change in current practices, in whatever form that may take, will be necessary if Gila River water quality is to improve. Both the historical data and the data collected in this project are unequivocal; a significant pollution problem with boron and selenium exists and is in need of remediation. This problem is degrad-



ing aquatic habitat and limiting agricultural uses of Gila River water further downstream.

... while irrigation districts and their systems were originally designed for irrigation, de-watering, and storm run-off, consideration was not given in the design to water quality concerns. ADEQ acknowledges that water quality has become a concern nationally only in the past few decades, after the irrigation districts were formed, but it is a concern that will now require adaptation and incorporation into district planning and operations if improvement is to be realized. The wastewater of one district becomes the irrigation water of the district further downstream or down-gradient, and a community obligation exists to ensure that one district's run-off is not limiting options for other districts in the area. Water high in boron and selenium, as outlined in the TMDLs, can limit crop selection, reduce crop yields, and negatively affect aquatic and wildlife relying upon river habitat. High selenium in irrigation water may also reduce the quality of livestock feed and adversely affect livestock.

Comment: A panel or working group comprised of local landowners, irrigation districts, irrigation experts, permittees, and/or stakeholders should be the ones determining which BMPs should be selected and applied.

ADEQ response(s):

ADEQ agrees that irrigation districts and land-owners in the districts are in the best position to know which (nonpoint source) measures have been attempted, are currently employed, and/or have been found to be unsuitable or lacking. For these reasons, while certain BMPs are suggested, the suggestions should not be construed as decrees or directives. Alternative proposals for BMPs shown to be effective are welcomed in implementing the TMDLs. We anticipate that any such solutions will require a high degree of participation, cooperation, and collaboration among all irrigation districts and stakeholders in order to be regionally effective and meet all parties' needs for both water quantity and suitable water quality.

ADEQ agrees with the suggestion that BMPs be developed and proposed by a committee composed of irrigation company experts from the area, farmers who actively farm the land in the area, and other associated experts. The formation of a watershed group comprised of these parties and focused on water quality concerns is an essential first step in this process; with a watershed group comprised of interested and engaged stakeholders, ADEQ has a defined organizational partner with which to explore these issues further. ADEQ is particularly asking irrigation districts to step forward and assume the organizational mantle of leadership, stakeholder organization, and mutual cooperation and collaboration among districts in beginning to address these issues.

ADEQ agrees that the convening of a technical group to provide recommendations for ... individual permittees is a good idea. However, at this time ADEQ can devote neither the resources nor manpower to sustain such an ADEQ-led effort on an ongoing basis. ADEQ has responded to several stakeholders in these comment response letters indicating its willingness to coordinate an effort as the stakeholder community begins to coalesce. We will follow up on these responses by reaching out to those who have commented on the TMDLs to gauge interest in forming such a group and helping those interested in identifying what the next steps would be.

Comment(s): Inadequate time was allotted in the comment review period for a comprehensive TMDL review. Public notice of the TMDLs was inadequate, and outreach was lacking. The comment period should be extended, or the TMDL process should be halted until stakeholders have a chance to fully consider the issues. Stakeholders reserve the right to add additional comments at a later date.

ADEQ response(s):

... the impaired segment of the Gila River has been listed as such on Arizona's Impaired Waters List, as mandated by the federal Clean Water Act, since 1992 (for boron) and 2004 (for selenium). This water quality problem is one that has been in the public domain for more than two decades. ADEQ began work on this project in late 2011. ADEQ has held two public meetings for the TMDLs, one in December of 2013 and the other recently in April of this year. After disappointing attendance at the first public meeting, ADEQ redoubled its notice and outreach efforts for the second public meeting. Notice of the TMDLs was published in two local newspapers¹ in the Buckeye area in advance of the last meeting. The TMDLs were posted on our agency website, and public announcement was posted on the agency calendar. Advance notice was also

1. Additional note: It was subsequently discovered prior to the drafting of the AAR public notice and after comment responses were sent that only one notice was published in advance of the public meeting, though bids were solicited for two and a request to publish two was submitted.



extended to NRCS in Avondale, with the request that NRCS assist in disseminating the word about the TMDLs release, which they assisted us with.

The public meeting held on April 23rd of this year in Buckeye was convened for the purpose of releasing the draft TMDLs at the beginning of a thirty day comment period. ADEQ chose to extend the comment period an additional week to allow stakeholders who had not been aware of the TMDLs and found out about them late in the comment period an opportunity to submit comments. However, with the official close of the comment period on May 29th, no further written comments will officially be accepted or formally responded to.

Discussions and dialogue are a part of the TMDL implementation process, which is now opening and will be ongoing. These discussions need not delay the finalization of the TMDL analysis and report. ADEQ remains open and committed to continuing ongoing dialogue and discussion oriented towards improving the water quality of the Gila River with all interested stakeholders.

Comment: It does not appear ADEQ consulted with ADWR, the Arizona Department of Agriculture, or other interested government agencies during the TMDL study regarding BMPs.

ADEQ response(s):

ADEQ did contact ADWR in the course of the investigation to apprise them of the pending TMDL and solicit their involvement in the process, but did not receive a response indicating they wished to collaborate. We hope to more fully engage ADWR in the TMDL implementation phase of the project, as well as the state Department of Agriculture, recognizing that valuable additional suggestions for BMPs for the stakeholder community could be added to the dialogue.

Future discussions may well involve input from the Arizona Department of Agriculture, the University of Arizona Cooperative Extension, the Department of Water Resources, or other interested government agencies.

Comment: Cost information on BMPs in Appendix D is outdated.

ADEQ response(s):

ADEQ has removed the discussion on BMP costs from the TMDL document

Comment: Integrated on-Farm Drainage Management systems (IFDMs) may actually make Gila River water quality worse, or are not practical or cost-effective for single-farms. ...By requiring that everything be maintained on-site, you will see more concentrated percolations into the aquifer, which will reduce the amount of productive farm ground and possibly spread the problem...to the bottom of farm fields. Restricting or eliminating run-off from fields is unfathomable to us.

ADEQ response(s):

While technical challenges may arise in implementing Integrated on-Farm Drainage Management systems (IFDMs), ADEQ finds the claim that IFDMs would actually harm water quality to be without merit. These methods are actively used in the San Joaquin Valley of California and are in fact recommended by reputable entities for salinity management challenges impacting water quality, including the U.S. EPA, the California Regional Water Quality Control Board, and the USDA Salinity Management Laboratory in Riverside, California. Dr. Karl Longley of the California Water Institute reports that employment of IFDMs in the Panoche Irrigation District and the Tulare Lake Irrigation District of central California has reduced TDS levels by 85%.

The purpose of IFDMs is to maximally use water within the system and evaporate the remainder at the end of the process. When properly established, the volume of water to be evaporated at the conclusion of irrigation activities is minimal; likewise, the areal footprint of a solar evaporator is only a fraction of the footprint of the entire farm. Evaporation is typically achieved not by letting water sit in ponds, where infiltration can take place, but by spraying/misting excess water into the atmosphere, thus encouraging evaporation and allowing salts to gather on the surface within the designated solar evaporator area. Thus, it is highly unlikely that there would be any negative impact on groundwater quality, let alone the surface water quality of the Gila River.

IFDMs may or may not prove to be cost-effective on an individual farm scale in Arizona, but nothing precludes the application of this BMP on a district or regional scale, where the economic considerations could be more advantageous. In fact, one



local stakeholder suggested this possibility at the conclusion of the public meeting. Such scaling considerations would necessarily require regional collaboration, administration, and cooperation among land-owners. References on IFDMs are included in the TMDL document for further research, and a wide variety of additional information on California's use of IFDMs is available online.

With regard to comments about on-site re-use strategies, ADEQ discusses in Section 8 how attempting to mix water use strategies leads to worse water quality. If re-use is deemed to be the prime objective to maximize utility of water resources, then the possibility of acceptable-quality discharge to a water of the U.S. like the Gila River without remediation efforts becomes slim to non-existent. Strictly from a water quality perspective, allowing no discharge is the only practical way to prevent river water degradation in such a case. As discussed in the TMDL, this may not be a legally viable or defensible strategy to pursue where other legal claims on the water exist downstream or down-gradient, or in other areas where stakeholders may have a legal right to tail water. On the other hand, if maintaining acceptable water quality and quantity for water users downstream is the prime objective, then re-use as a strategy is counterproductive and a single-use philosophy should be considered. Each of these approaches can lead to better water quality, but they are mutually exclusive approaches and cannot be mixed without making water quality worse. Currently, the irrigation districts of the area are both re-using water multiple times as mentioned in the discussion about recycling and discharging the waste water to a water of the United States. Water quality will not likely improve in the Gila River until these mixed approaches change.

Comment: Boron and selenium are not being added to the water in the project area, therefore the problem is of natural origin. Farmers are not applying either boron or selenium to the soil. Therefore, no overt action is being taken by agricultural producers to contribute to the level of these elements in the Middle Gila River. Irrigation districts are not sources of the problem. There is no apparent anthropogenic activity responsible for water quality conditions.

ADEQ response(s):

ADEQ respectfully disagrees that existing water quality is naturally impaired. A natural impairment designation is warranted only in cases where there are no anthropogenic activities affecting water quality, and water quality standards are still being exceeded. Background sampling was performed in the course of this investigation (Appendix B of the document), and effluent from the Phoenix 91st Avenue waste water treatment plant, and source water from the Roosevelt Canal all show acceptable TDS levels and boron and selenium concentrations below state water quality standards.

While boron and selenium are naturally-occurring substances with boron being more prevalent in arid environments, it is anthropogenic activities that are either liberating these elements from the soils or concentrating their presence in source water and ultimately transporting them to the Gila River. In the case of selenium, a 1999 USGS study found that selenium was most likely to occur in former marine sediments and rock units of Cretaceous origin. With none of those types of geologic units present locally, the selenium is likely carried into the area through source water concentrations, though not at the problematic levels we see in the impaired reach.

A large part of the existing water quality problem consists of the combination of flood irrigation designed to leach salts out of the root zones with the subsequent pumping of groundwater more highly concentrated in salts as a result of this practice to augment water supplies. Discussion was presented at the public meeting about the process of irrigation water recycling and its role in degrading water quality. Recycling can occur in a number of forms, including the locally little-used process of tile drainage, the collection and re-use of agricultural tail water, and the pumping of groundwater previously used to leach the soil of crop lands and having higher salt concentrations as a consequence.

[The source of the problem] is due to the recycling of irrigation water itself by the re-use of tail-water for supply augmentation across district boundaries, by the practices of flood irrigation designed to push salts out of crops' root zones and by groundwater pumping. The excess irrigation water dissolves and absorbs salts in the root zone that then migrate down to the water table and become a part of the groundwater of the area. This groundwater becomes more concentrated in salts over time; it is then pumped up and used to augment water supplies for irrigation in the area. Furthermore, the re-use of irrigation water across district boundaries exacerbates the problem; each pass through a soil profile or across surface soils increases the salt levels of the water. Boron and selenium levels correspond closely with the salt concentrations of the irrigation water, as shown in the TMDLs. ADEQ sampling has determined that water is of only moderate salinity and non-problematic boron and selenium concentrations at the head of the Buckeye Canal, in the Gila River upstream of the Buckeye Canal, and in the Roosevelt Canal system. Water draining to the river in the irrigation districts and from the Hassayampa River, by contrast, is saline and considerably degraded.



All source water sampled in the project area, including at the head of the Buckeye Canal, in historical groundwater samples within the project area, and in Roosevelt Irrigation District supply water had background or higher levels of boron and selenium associated with it. Furthermore, soil conductivity data and historical well boron and selenium concentrations both indicate water extracted by pumping ... is high in TDS, boron, and selenium (Table 5, Figures 7-9, 12, draft TMDLs). Since water quality is considerably degraded in the impaired reach, the discharge activities and practices of all irrigation districts returning water to the Gila or Hassayampa rivers are thereby implicated to some degree. Furthermore, while [the districts may] have appropriative rights to pump groundwater, if pumped groundwater exceeds state surface water quality standards and is ultimately discharged to a water of the U.S., the anthropogenic activity of pumping is responsible in part for the degradation of surface water quality. ... the TMDL study was able to document loading additions due to either ... return water or run-off / interflow from fields ... by establishing that loads are greater for both boron and selenium in the Gila River at Gillespie Dam than they are near the origin of the impaired reach.

Comment: Individual farmers and members of the irrigation districts feel they are being held responsible with no reasonable or economically feasible solutions.

ADEQ response(s):

It is not ADEQ's intention in this process, nor is it within our authority, to hold community nonpoint source stakeholders accountable in a legally-binding way. The purpose of the TMDL is not to affix blame or point fingers. It is to establish a cooperative framework in which a problem is identified, quantified, and recognized by the concerned public as a community problem requiring a community solution. While ADEQ is required to do a TMDL for streams identified as impaired, implementation on the stakeholders' part is voluntary. However, identifying a problem and proposing solutions necessarily require an accurate diagnosis of the source of the problem. ADEQ has conducted a thorough investigation of the water quality of the area. Background levels have been studied, analyzed, and characterized. Contributions from other sources have been identified and quantified, and some permittees in the watershed will have to accept reduced permit limits as they do their part to improve Gila River water quality. We ask the agricultural community in the area to come to the table in good faith and be willing to do their part in addressing and correcting this community problem.

Comment: The problem is created by upstream point sources, Mother Nature, and evaporative concentrates.... The real problem is that the river is dead with no running water and there is nothing to wash nor dilute the selenium and boron to a suitable level. Arizona Department of Environmental Quality is one of the most powerful government agencies there is and until some of that power is exerted in the right direction, the river will remain dry and so will the selenium and boron remain high.... Dilution is the solution, and there is no higher-quality water to blend with.

ADEQ respectfully disagrees with the position that the boron and selenium problem is created from upstream point sources and natural processes. The Buckeye Main Canal shows generally acceptable water quality near its origin. ... Background sampling was performed in the course of this investigation (Appendix B of the document), and Gila River water above the Buckeye Canal head works, effluent from the Phoenix 91st Avenue waste water treatment plant, and source water from the Roosevelt Canal all show acceptable TDS levels and boron and selenium concentrations below state water quality standards. ... The Gila's water quality problems are clearly being exacerbated by land-use activities occurring within the project area.

Questions and concerns relating to the quantity of water available in the Gila River are outside the scope and purview of ADEQ's authority. The Arizona Department of Water Resources addresses quantity concerns in administering water rights in the state of Arizona, and diversions/impoundments of long-standing duration in the Middle Gila watershed are the "givens" that ADEQ must work from in attempting to improve water quality. ADEQ does not have the authority to make the Gila and Salt rivers free-flowing as they were prior to the early 20th century.

ADEQ does contend that water quality can be improved if stakeholders in the area work cooperatively to explore options and find mutually beneficial solutions. One of our primary motivations in drafting these TMDLs is to improve water quality for all users of the river's water, including those who... are at the end of the supply line.

ADEQ acknowledges discussion concerning dilution or blending as one possible solution to the problem. The Roosevelt Irrigation District has been able to use this approach with some success to improve the quality of their irrigation water. ADEQ also acknowledges the constraints [the districts are] facing with the current unavailability of higher quality water to blend with. ADEQ has become aware of a Bureau of Reclamation project to investigate the capture and use of storm water in the



Hassayampa River channel. The possibility of using retained storm water for blending where discharges to the river occur might address both quality and quantity concerns for the District. ADEQ encourages the District to investigate and learn more about this possibility.

II Specific and comprehensive comments

Specific comments from individual stakeholders and ADEQ responses are presented in this section.

Roosevelt Irrigation District

Roosevelt Irrigation District (“RID”) has reviewed the Draft Middle Gila River TMDL study report (the “Report”) and provides the following comments:

Section 4.2.3.1 of the Report contains numerous incorrect statements regarding RID, many of which appear to be based on a December 4, 2009, letter from Salt River Project (the “2009 SRP Letter”). The 2009 SRP letter also contains multiple misstatements regarding RID, RID’s contracts and the law. There are also a number of statements in this section regarding wells that do not apply in the context of RID and its facilities. Attached hereto is the paragraph addressing RID, marked to correct the facts. Please make these changes to the Report.

The Report also appears to contain multiple other statements that appear to be incorrect, inconsistent and/or misleading. RID has not attempted to address such statements in this letter. However, by not doing so, RID is not accepting nor agreeing with the remainder of the Report.

RID would like to point out that the accumulation of selenium and boron in this region is not strictly from local agricultural practices but rather, as the Report states in several places, is the natural result of importation and use of high- TDS waters in the entire basin. As reported in the Central Arizona Salinity Study, an estimated 1.45 million tons of salt enters the Phoenix-area system annually with approximately three quarters of that remaining in the Phoenix area. Included in these imported salts are both selenium and boron.

Lastly, the Report suggests “*voluntary responsibility for on-the-ground (TMDL) implementation will rest in large part with the three major irrigation districts...*” through implementation of best management practices (“BMPs”). RID currently employs BMPs in its operations including lining of the major canal and blending groundwater with reclaimed wastewater from the City of Phoenix 23rd Avenue wastewater treatment plant. RID will continue efforts to provide the most efficient use of irrigation water through use of these BMPs.

ADEQ response:

ADEQ has corrected statements in Section 4.2.3.1 regarding the Roosevelt Irrigation District based on RID input. Edits/corrections were made in accordance with RID suggestions, and several of the statements RID asked to be deleted have been deleted. ADEQ has retained the first clause of the sentence discussing the number of RID wells based on information ADEQ has in-house, as this is directly pertinent to the study. In the absence of more accurate figures, the best possible information will be presented. If ADEQ’s numbers on the number of RID wells within the project area are incorrect, please contact us and provide us with updated figures on RID’s infrastructure, as we requested prior to the public release of the TMDLs.

ADEQ has cited the Central Arizona Salinity Study several times in the draft TMDLs document and generally agrees with RID’s assertion that the accumulation of boron and selenium is not strictly from local irrigation practices. Background levels of boron and selenium do exist in the water imported into the area and have been addressed specifically in the report. Other sources of loading, both permitted and nonpoint source loading, are discussed extensively in Section 4. Nonpoint source activities are not the only activities being addressed in the TMDLs; it is worth noting, as well, that permittees with higher boron and selenium permit limits are also having permit limits adjusted to lower levels where needed and appropriate. However, background levels are not problematic prior to irrigation and pumping activities in the project area, which easily comprise the majority of water volume used in the area. RID’s own water quality in the main canal and the water quality of the Gila and Salt rivers above the Buckeye Canal both indicate that source water is not exceeding water quality standards for boron and selenium prior to entry and use within the project area (Appendix B).

ADEQ acknowledges RID’s excellent previously-implemented BMP work in blending groundwater with reclaimed effluent



from the City of Phoenix to improve the quality of its supply water, and in lining its main canal with concrete. Blending was one of the options discussed in the implementation plan (Section 8) for the improvement of water quality. Both of these measures make a marked difference for the better in the water quality of supply water for the district. We hope that RID, in concert with other irrigation districts and stakeholders, will give consideration to the adoption, implementation, and employment of additional BMPs which will address the problem of recycled and re-used irrigation water ultimately discharged to the Gila or Hassayampa rivers with excessive boron and selenium concentrations.

RID assertions that multiple other statements in the report appear to be incorrect, inconsistent, or misleading cannot be addressed without RID's raising specific points for consideration and correction. ADEQ has endeavored through a long process of sampling, investigation, and analysis to produce the most accurate and comprehensive report possible. Public comment periods are an integral part of the editing and revision process to correct any errors that may have been made through the knowledgeable and beneficial input of stakeholders participating fully in the public process in good faith. ADEQ hopes that RID will reconsider its position and choose to work cooperatively with us and other stakeholders to ensure the TMDL study is as accurate and useful for its intended purpose as it can be, and to improve this long-standing water quality problem.

ADEQ is hopeful that RID will be a prime leader in the area's effort to organize and collectively address water quality issues. We encourage the formation of a watershed group with stakeholders, including other irrigation districts, to collectively explore and determine what BMPs may be applied area-wide in the most cost-effective, feasible, and resource-effective manner to improve water quality.

Salt River Project

Salt River Project (SRP) has completed its review of the draft Total Maximum Daily Load (TMDL) analyses for the Gila River (Reach 15070101-008: Gillespie Dam – Centennial Wash). SRP submits the following comments regarding the description of the Roosevelt Irrigation District (Section 4.2.3.1, page 29) for your consideration.

1. The sentence that reads, “[t]he district also has a claim on up to...,” should be revised to state, “[t]he district has an agreement with the City of Phoenix under an exchange with SRP for up to...”
2. The sentence that reads, “...and some water supplied to the district's canal system by the Central Arizona Project (USBR, 2000),” may not be factually correct. SRP is not aware of any CAP water being directly delivered to RID.
3. The sentence that contains the statement, “...shared drainage with SRP...” when describing the Buckeye Feeder is not correct. RID's pumped water discharges in Zanjero Area 26 are not commingled with SRP's surface water deliveries. RID's wells discharge directly to RID's canal. We suggest revising this sentence to state, “These additional wells, though outside the project area, are identified because they contribute pollutants to the impaired reach.”

ADEQ response:

As all of SRP's comments pertained to the discussion of the Roosevelt Irrigation District (RID), ADEQ has first addressed RID's comments and corrections in the same section before addressing SRP's comments. In some cases, ADEQ has taken SRP's reporting on these specific points as confirmation of RID's stated position and corrections. Some of the corrections/deletions proposed by RID supersede topics that SRP also chose to comment on. These will be noted in the specific responses below.

1. *The sentence that reads, “[t]he district also has a claim on up to...,” should be revised to state, “[t]he district has an agreement with the City of Phoenix under an exchange with SRP for up to...”*

ADEQ has incorporated this revision in the TMDL document.

2. *The sentence that reads, “...and some water supplied to the district's canal system by the Central Arizona Project (USBR, 2000),” may not be factually correct. SRP is not aware of any CAP water being directly delivered to RID.*

RID has requested that the sentence be deleted, and the request has been accommodated based upon their request and



SRP's confirmation of the corrected fact.

3. The sentence that contains the statement, "...shared drainage with SRP..." when describing the Buckeye Feeder is not correct. RID's pumped water discharges in Zanjero Area 26 are not commingled with SRP's surface water deliveries. RID's wells discharge directly to RID's canal. We suggest revising this sentence to state, "These additional wells, though outside the project area, are identified because they contribute pollutants to the impaired reach."

ADEQ has deleted the entire discussion of RID wells outside the defined project area from the document, at RID's request, since SRP has confirmed that the reason for the prior inclusion (shared drainage) in actuality does not exist.

Additionally, after reconsideration of higher-limit permittees' operation-specific waste load allocations (WLAs) and consultation with EPA, ADEQ has altered SRP's WLAs in the final TMDL document. SRP's new recommended selenium limits for the wells addressed in the draft TMDL include a concentration of 6 µg/L for the WLA, and an MDL of 10 µg/L. The boron limits remain unchanged as they are presented in the draft TMDLs. Since submitted SRP well data indicates that all values are well below the recommended MDL of 10 µg/L, the option of sampling and averaging multiple wells in one day, included to assist SRP in meeting recommended limits, is no longer necessary and has been removed from the final version of the document. The recommended permit limits will be implemented and take effect for Permit #AZ0024341 at SRP's next permit renewal.

JRC Goodyear, LLC.

Summary

On behalf of JRC Goodyear, LLC we offer the following summary comments in addition to the other remarks provided herein.

- The 30-day comment period allowed for response to the TMDL Study, has been very brief. JRC Goodyear, LLC requests a 60-day extension of the comment period, to more thoroughly review and comment to ADEQ on these important matters. Given the period devoted to the preparation of the TMDL, it is unreasonable to expect the regulated community to provide the necessary analysis and input within a limited 30-day comment period.
- Based on the currently calculated Selenium loading presented above in Table 2.0, Selenium discharges from the JRC Site would be in the general range of the proposed TMDL Study's WLAs, only if compliance were calculated on a site-wide basis. However, that would preclude any additional site wastewater discharge.
- For the reasons expressed herein; JRC Goodyear, LLC requests that the existing WLA of 20.0 µg/L be upheld in the TMDL Study regarding the JRC Site. If the proposed WLAs were applied to the JRC Site; it would represent a virtual cap on growth at the JRC Site; and a "material taking" of the potential development and use of existing and future use of the JRC Site.
- To the knowledge of JRC Goodyear, LLC there are no known commercially viable methods available to reduce the naturally occurring Selenium; which exists in groundwater sources at the JRC Site. Further, ADEQ has not suggested a course of action by which compliance with the proposed WLAs can be achieved at the JRC Site; short of curtailing any future growth.
- JRC Goodyear, LLC requests that ADEQ lead a technology investigation; aimed at determining solutions for reduction of Selenium from Non-Point Source and Point Source dischargers faced with the difficult challenges presented in the TMDL Study.
- Selenium WLA reductions should only be required by ADEQ for regulated sources; where viable control technology is available on a cost effective basis.
- JRC Goodyear, LLC believes that the TMDL Study currently under consideration; should not predetermine reduced Selenium discharge limits for a future JRC Site AZPDES Permit. A permit renewal application will be due in the second quarter of 2018. At the time of permit renewal, the relevant status of Selenium impairment in the middle Gila River can be re-assessed, technology can be reviewed in terms of its viability for Selenium control at the JRC Site, and the economic impact of any suggested reductions in Selenium loading can be taken into account.

ADEQ response:

ADEQ acknowledges the concerns JRC has expressed and has reconsidered the calculations resulting in the site-specific numbers presented in the draft TMDLs. ADEQ has endeavored in the course of this investigation to keep the focus and orientation of the TMDLs where the agency believes it should rightfully be – on the non-point source contributions impairing water quality of the Gila River. In keeping with this orientation, ADEQ has attempted to the utmost of its ability to minimize impacts on existing permittees to the extent possible. The “current performance” customized analysis incorporated for higher-limit permittees is expressly designed so that if future discharges are similar to past discharges, the facility should have little or no difficulty meeting the revised permit terms. We believe the modified limits communicated in this letter and adopted for use in the TMDLs should alleviate most, if not all of your concerns.

However, the subordinate objective of minimizing impacts on permittees does not necessarily guarantee that there will be no impacts on permittees, particularly if growth is foreseen in the future. All permittees discharging to the hydrologic network where flows persist for eventual discharge to the Gila or Hassayampa rivers must be regulated in such a fashion that it can be expected that water quality standards will be attained in the impaired reach. Arizona Revised Statutes require this of TMDLs. Existing permittees with selenium and boron limits equal to the Gila’s water quality standard will be required to maintain those limits. Higher-limit permittees, while surrendering some of the “excess” of their permit limits in the current-performance analysis, are from another perspective being permitted extra latitude over and above the Gila’s water quality standards, especially as compared to permittees discharging directly to the Gila or its tributaries. This extra latitude granted has come at a cost, namely, reducing the ability of the impaired reach to receive excess pollutant loading without exceeding state water quality standards, and encroaching upon the implicit margin of safety built into the selenium analysis. The implicit margin of safety was originally designed and incorporated to ensure minimum impact from this toxic pollutant for the benefit of aquatic life and wildlife. It was not a given that ADEQ would be able to achieve both of these competing objectives at once; the explicit margin of safety allotted early in the study design was exceeded when all higher-limit permittee contributions were identified and quantified. ADEQ found it necessary to dig deeper into the analysis to identify and quantify this additional implicit margin of safety to accommodate current-performance requirements. Furthermore, it is the agency’s position that no permittee in the defined project area can be exempt from accepting revised limits where necessary or making other necessary concessions to water quality improvement when all other permittees in the project area are being required to do so.

While ADEQ believes JRC’s modified limits will largely meet its current operational needs, the agency remains concerned about records in JRC’s DMR reporting where selenium values exceed 20 µg/L. These episodic high values have the potential to exceed assessment-level daily maximums for the facility and contribute to skewing permit averages. We strongly encourage JRC to investigate these anomalies thoroughly and devise a means of predicting them, controlling them and/or limiting their impacts on JRC discharges. JRC will have a number of years to sample and investigate these anomalous readings more fully before the revised permit terms take effect. Several remediation possibilities suggest themselves for consideration; blending of water between JRC’s two on-site groundwater wells might alleviate the problem. JRC may also want to confer with the City of Goodyear regarding their pilot wetlands demonstration project. Goodyear has had remarkable success on a small scale in dramatically reducing selenium concentrations in their discharge water/brine from their water campus/RO plant on Bullard Avenue. Goodyear has achieved this by using plots of wetland and salt-tolerant plants to take up excess selenium in wastewater. Given that JRC’s discharge volumes are relatively small, adopting this solution on-site might well serve your needs. Contact information can be provided if JRC wishes to investigate further. JRC may also wish to explore a cooperative agreement with the City of Goodyear for disposal of its wastewater, or investigate on-site water re-use or recharge by spreading and the employment of groundwater recharge basins in accordance with ADEQ APP requirements. These are a few of the potential solutions available for consideration.

ADEQ respectfully disagrees with JRC’s contention that revising permit limits constitutes a limit on JRC’s future growth potential. However, the situation does suggest that solutions for limiting selenium loading will need to be found and implemented if JRC intends to discharge water at higher volumes in the future. The possibility of higher discharge volumes in the future for JRC will rest in large part on JRC’s initiative and its ability to reduce selenium loading of its discharges over time. As suggested previously, these are not necessarily technology-based solutions, but they will likely require some changes in JRC’s operating procedures. While permittees discharging at the concentrations of the water quality standard can be allowed additional loading at the same concentrations, higher-limit permittees must necessarily accept a cap on their mass loading in order for the assimilative capacity buffer to avoid being overtaxed and exhausted. This is in keeping with the concentration-neutral approach of the TMDLs. Initial calculations in the draft TMDL using maximum design capacities of JRC’s current



outfalls indicate that JRC has been granted excess capacity as compared to the average reported flow volumes in Table 2.0 of your letter. Additionally, the revised WLA and limits communicated in this letter give JRC added leeway in its loading. These TMDL measures should serve immediate and short-term growth needs. If JRC can reduce its selenium concentrations proportionally over time, increased permitted discharge volumes can then be progressively realized.

In reviewing the additional data submitted from JRC for both selenium and boron, ADEQ has calculated outfall-specific waste-load allocations and recommended permit limits based upon the data supplied and previous DMR data available for ADEQ consideration. Selenium limits, given to the nearest whole unit, are outlined in Table 1. Boron limits are outlined in Table 2. These revised permit limits will take effect at the next permit renewal. Please note the maximum daily limit for selenium discharged from Outfall 001 has been capped at 29 µg/L, consistent with the current permit’s assessment-level daily maximum. Additionally, existing boron permit limits for Outfall 003 remain in place, due to anti-back-sliding provisions of the Clean Water Act and federal regulations.

Facility Name	Permit Number	Outfall	WLA*, µg/L	AML, µg/L	MDL, µg/L
JRC Goodyear, LLC.	AZ0025747	Outfall 001	22	18	29 ⁺
		Outfall 002	13	11	19
		Outfall 003	8	7	12

Table 2. Selenium Limits, JRC Goodyear, LLC.

* Chronic - based WLA

+ Capped at current permit’s assessment level daily maximum

Facility Name	Permit Number	Outfall	WLA*, µg/L	AML, µg/L	MDL, µg/L
JRC Goodyear, LLC.	AZ0025747	Outfall 001	1000	1000	1459
		Outfall 002	1000	1000	1459
		Outfall 003 ⁺	1000	1000	1144 ⁺

Table 3. Boron Limits, JRC Goodyear, LLC.

* Based on AML as WLA

+ Anti-back-sliding cap; Current permit limits remain as recommended TMDL limits

ADEQ mentioned the use of trace metals chemical analyses (EPA Method 1638) for selenium analyses as a means of getting more accurate and probable lower reporting during the final public meeting. ADEQ is working with the Arizona State Laboratory to have this method authorized for compliance testing in the future; however, please be advised that there are currently no labs licensed by ADHS that ADEQ is aware of capable of conducting these analyses, either in state or out of state. The lab ADEQ has routinely used for non-compliance sampling analysis with this method has declined to apply for Arizona licensure. We sincerely hope that this state of affairs is rectified in the future and will continue to work to encourage labs capable of employing this method to apply for Arizona lab licensure, giving permittees a more advantageous path to permit compliance.

City of Buckeye

The City of Buckeye would like to share laboratory results from two of its wastewater treatment plants, the Central Buckeye WWTP and the Sundance WRF. These two wastewater treatment plants discharge residential and commercial wastewater under AZPDES permits into irrigation district canals in the Middle Gila River watershed.

The attached two tables (not included) list the following laboratory results:

- Central Buckeye WWTP effluent results for boron samples collected in 2015 and selenium samples collected from 2013 to 2015.
- Sundance WRF effluent results for boron samples collected in 2015 and selenium samples collected from 2013-2015.

In addition to the results listed in the attached two tables, the following results for boron and selenium were also detected by laboratory testing:

- An effluent sample collected on June 4, 2014 at the Sundance WRF was reported to have a boron concentration of 1390 micrograms per liter.
- An effluent sample collected on February 11, 2008 from the Sundance WRF was reported to have a selenium concentration of 4.0 micrograms per liter.
- An effluent sample collected on December 16, 2005 from the Central buckeye WWTP was reported to have a selenium concentration of 4.0 micrograms per liter.

The City of Buckeye requests that ADEQ take the above-mentioned analytical results and the results listed in the attached tables into consideration when setting permit limits for total boron and total selenium. The wastewater treated by the City of Buckeye’s WWTPs consists of municipal (residential and commercial) wastewater, with a lack of significant industrial wastewater.

Currently, the City of Buckeye’s only municipal water source consists of groundwater pumped from local wells. Because the wastewater treated by the City of Buckeye consists of residential and commercial wastewater, with a lack of significant industrial wastewater, the City believes the total boron concentrations detected in wastewater discharged from its wastewater treatment facilities is largely influenced by the total boron concentrations present in the local groundwater. In addition, due to a lack of significant industrial wastewater, the City believes that the wastewater discharged by the City is not a significant contributor to the selenium impairment of the Gila River.

ADEQ response:

In reviewing Buckeye’s data submitted from the Sundance and Central Buckeye WWTPs for both selenium and boron, ADEQ has calculated facility/outfall-specific waste-load allocations and recommended permit limits based upon the data supplied. Selenium limits, given to one significant figure, are outlined in Table 1. Boron limits are outlined in Table 2. Please note that Sundance WRF allocations include the newly-proposed Outfall 002 (application for permit modification received June 4, 2015 by the ADEQ AZPDES Permits Unit); the same concentration limits will apply to each outfall as long as plant capacity does not change. These limits will take effect upon the next permit renewal.

Facility Name	Permit Number	Outfall	Wasteload Allocation* (WLA), µg/L	Average Monthly Limit (AML), µg/L	Maximum Daily Limit (MDL), µg/L
Buckeye Sundance WRF	AZ0024881	All outfalls	3	3	5
Central Buckeye WWTP	AZ0025313	Outfall 002	2	2	4

Table 4. Selenium Limits, City of Buckeye

* Chronic - based WLA

Facility Name	Permit Number	Outfall	Wasteload Allocation* (WLA), µg/L	Average Monthly Limit (AML), µg/L	Maximum Daily Limit (MDL), µg/L
Central Buckeye WWTP	AZ0025313	Outfall 002	1231	1231	1682

Table 5. Boron Limits, City of Buckeye

* Based on AML as WLA

Due to Buckeye Sundance’s existing permit limits for boron and the anti-backsliding provisions of the Clean Water Act [Section 402(o), Section 303(d)(4)(A)], the current permit limits for boron will remain unchanged by the TMDLs.

ADEQ and Buckeye have had informal conversations regarding the use of trace metals chemical analyses (EPA Method 1638) for selenium. ADEQ is working with the Arizona State Laboratory to have this method authorized for compliance testing in the future; however, please be advised that there are currently no labs licensed by ADHS that ADEQ is aware of capable of conducting these analyses, either in state or out of state. The lab ADEQ has routinely used for non-compliance sampling analysis with this method has declined to apply for Arizona licensure. We sincerely hope that this state of affairs is



rectified in the future and will continue to work to encourage labs capable of employing this method to apply for Arizona lab licensure.

Arizona Department of Transportation

ADOT provides these comments for consideration in finalizing the TMDLs.

* ADOT operates two major routes within the subject watershed and specific TMDL Project Area (Figure 5, page 17). Interstate 10 flanks and State Route 85 intersects Zone 1 (Figure 15, page 58).

* ADOT holds an individual permit for discharges of stormwater (AZS0000018-2008), which incorporates aspects of a municipal separate storm sewer system (MS4) and industrial and construction activities subject to general permits (Section 4.0 pages 23-27)

* ADOT has a single outfall currently identified that discharges to the Agua Fria, south of Interstate 10 at milepost 130.2 (Section 7.3.1.3 page 56, first sentence regarding point of compliance).

While ADOT supports this TMDL, it would not seem to be applicable for ADOT as an MS4 or construction permittee to partake of any waste load allocation because the transportation MS4 is not a contributor of the pollutants identified. That is, ADOT does not have activities that will add selenium or boron to the existing environment. ADOT would potentially disturb currently occurring elements, not exacerbate through additional input.

ADEQ response

ADEQ appreciates ADOT's support in the promulgation of these TMDLs and acknowledges the transportation corridors identified adjoining or transiting the project area. Thank you for bringing to our attention your outfall on the Agua Fria River. While ADEQ agrees that ADOT activities are not likely contributing to the boron and selenium problems of the Gila River, by virtue of the fact that permit coverage of various types has been extended to ADOT, a waste load allocation for ADOT is necessary. Without the granting of a waste load allocation consistent with the terms of its permits, ADOT would not be authorized to have any selenium or boron in its stormwater, construction, or MS4 discharges. The WLA serves as a type of authorization, in concert with ADOT's permits, allowing for the presence of the constituents of concern in concentrations consistent with permit limits and water quality standards in its discharges.

III. Additional comments not previously addressed

Comment: Suggested measures may adversely affect users' appropriative water rights.

ADEQ response(s):

As noted in several places in the draft TMDLs, the TMDLs recognize that water rights will play a substantial role in the determination of regional solutions to the boron and selenium pollution problems of the Gila River. ADEQ takes no official position on the resolution of any conflicting claims of water rights; the questions of water rights adjudication and resolution are beyond the scope of the TMDLs and stated as such in the document. ADEQ has made several suggestions for consideration by the stakeholder community for the improvement of water quality; these suggestions are qualified with the disclaimers mentioned above. The stakeholder community, including all irrigation districts, are urged to work in collaboration to consider the suggested measures or alternatively to propose measures of their own.

Comment: Single-use strategy may limit water availability and is not a holistic solution.

ADEQ response(s):

With specific regard to the single-use strategy, the objective of such a strategy is to reduce the number of times water is allowed to pass through the soil profile, thereby reducing its exposure to salts in the soil. The reason groundwater in the area is of such poor quality to begin with is because decades of soil leaching and flushing of salts down to the water table have progressively degraded groundwater quality. Each opportunity that irrigation water has to be applied to fields increases its concentrations of total dissolved solids, including boron and selenium. Discharge of this water at the end of the recycling process exacerbates the problem.

ADEQ disagrees with the contention that single-use strategies necessarily adversely affect water quantity. Though this was



not directly asserted as such in the document, ADEQ considers a single-use strategy as the most holistic possibility at this point in addressing both quality and quantity concerns. Water discharged to either the Hassayampa or Gila rivers after a single use, instead of recycling and re-use across district boundaries, will likely meet TDS targets and show substantial reductions in selenium and boron concentrations over current conditions. This water would then be available for further use by other users at the terminus of the hydrologic network without the possibility of further discharges to a water of the U.S.

Comment: It appears that source of boron and selenium is speculative. Does it occur naturally in the soils of the region? Is the source somewhere upstream, only reaching concentrations of concern in this short reach of the river? To effectively regulate these elements, questions of origin need to be documented.

The origin is not speculative. Background sampling has determined that source water flowing into the area exhibits boron and selenium concentrations below state water quality standards (Appendix B). [The exacerbation of the problem] is due to the recycling of irrigation water itself by the re-use of tail-water for supply augmentation across district boundaries and by the practices of flood irrigation designed to push salts out of crops' root zones and groundwater pumping. The excess irrigation water dissolves and absorbs salts in the root zone that then migrate down to the water table and become a part of the groundwater of the area. This groundwater becomes more concentrated in salts over time; it is then pumped up and used to augment water supplies for irrigation in the area. These processes are the source of the brackishness mentioned. ADEQ sampling has determined that water is of only moderate salinity and non-problematic boron and selenium concentrations at the head of the Buckeye Canal, in the Gila River upstream of the Buckeye Canal, and in the Roosevelt Canal system. Water draining to the river in the irrigation districts and from the Hassayampa River, by contrast, is saline and considerably degraded.

Comment: From a practical and economic point of view, water needs to be used and reused because supplies are limited. Often farmers downstream depend on tailwater from farmers irrigating upstream.

While ADEQ is sympathetic to the constraints of the local agricultural community in regards to water supply limitations, ... re-use of this water with eventual discharge to a waters of the United States is impairing Gila River water quality, and the cause is due to anthropogenic activities. The solutions, then, can only be one of three general options: augment and dilute the water with higher-quality water, alter the practices that are responsible for degrading water quality, or cease discharging water to waters of the United States. While farmers downstream do depend on water supply from users upstream, they also have a need to receive water that meets state water quality standards for agricultural irrigation and does not limit their crop yields due to degradation. Currently, that is not the case. ADEQ has an obligation to present the nature and extent of the water quality problem, so that any eventual solutions adopt a holistic perspective, addressing both quantity and quality concerns. We invite the stakeholder community to propose alternative solutions addressing water quality improvement that will work for all parties if the proposed solutions in the TMDLs are considered by the stakeholder community to be infeasible or impractical.

Comment: Stakeholder requests a community-wide informational process be conducted to help the farmers, landowners, irrigation districts and agricultural organizations understand the analyses for boron and selenium and the suggested measures to address the water quality issue. Clarity and current data is important to understanding the content and future application of this TMDL analysis.

The request for a community-wide informational process to help the farmers, landowners, irrigation districts and agricultural organizations understand the analyses for boron and selenium and the suggested measures to address the water quality issue is what the public meetings were designed to present and convey¹.

ADEQ has presented its case in the clearest way possible in the document, which has been through numerous rounds of review to this point. Necessarily, the supporting technical basis for the analysis had to be presented to support the study. The public meetings presented the outline in a simpler, non-technical manner for the public. Current data was collected and incorporated into the analysis over the two year period of sampling of 2012 and 2013. The current data confirms what historical data showed: a pervasive and significant impairment of Gila River water quality for both boron and selenium.

1. Additional note: ADEQ will pursue additional stakeholder engagement activities in the project area to support TMDL implementation provided there is local interest to participate.



Comment: ADEQ's analysis does not fully conform to the regulatory requirements in A.A.C. R18-11-602 (credible data), -603 (data interpretation requirements), and -605 (evaluating a surface water segment).

Data used and assessed in the TMDL study was either collected according to ADEQ protocols for data credibility during the project time frame, or had previously passed QC checks for data credibility for use in ADEQ's biennial water quality assessments. Historical data already in ADEQ's data repository originated from two different sources – ADEQ's own sampling records, or submitted data from the U.S. Geological Survey. Both of these sources complied with all regulatory requirements for the use of the data. The data used was either assessed in numerous previous water quality assessments according to the Impaired Waters Identification Rule (IWIR) requirements, including the 2002, 2004, 2006/08, 2010, and the current pending 2012/14 assessments, or met requirements in the IWIR for use when its pedigree existed prior to the adoption of the IWIR in 2002. Each of these assessments reaffirmed the impaired nature of the reach for boron and selenium, excepting selenium in 2002 (selenium first being listed in 2004). In addition to the data credibility requirement, each assessment also complied with requirements for data interpretation and evaluation of a surface water segment as a part of each assessment process. Assessments were subject to public review and comment, and excepting the 2012/14 assessment currently awaiting EPA approval, ultimately achieved final approval to the satisfaction of the parties involved. Consequently, neither the data nor ADEQ's methodology is in question.

Comment: ADEQ has failed to consider the experience with comparable BMPs tried in other western states and whether they would be successful under the particular circumstances existing in the Middle Gila River watershed.

ADEQ has presented four potential solutions to the boron and selenium problems of the Gila River in Section 8 that have been assessed as having the best balance between cost feasibility for the stakeholders of the area and effectiveness in improving water quality. These four solutions have been demonstrated to work, either here locally or in the southwestern and western U.S. regions.

Comment: Stakeholder requests that ADEQ contact all the landowners and farmers in the area that [ADEQ is] considering regulating.

TMDLs have no regulatory power for any stakeholder who is not a currently regulated permittee in the watershed. They are simply water quality improvement analyses and plans that solicit voluntary involvement on the part of landowners and other stakeholders in addressing nonpoint source pollution and point the way to improvements that can be collectively realized through voluntary cooperation.

Comment: We noted that Salt River Project (SRP) wells that have been determined to require WLAs will be allowed to be averaged to comply with the MDL value. While this approach may help SRP meet newly applied standards, it may also allow problematic wells to continue to operate and discharge without improvement. Analyzing and applying standards to each well individually would be more likely to reduce discharge that is contributing to exceedances. Additionally, we noted that "SRP is not required to meet an average monthly limit (AML) value for either boron or selenium due to irregular and infrequent sampling of wells." Compelling more frequent and regular sampling of wells would be more likely to positively affect water quality in the Gila River.

With regard to specific recommendations for adjusted permit limits in the draft TMDLs, where limits were called to be established by a customized analysis, as in the case of SRP and other permittees, these limits have been revised in the final version of the TMDLs after review of data and calculations and further consultation with EPA. The allowance for well concentrations to be averaged to meet the proposed MDL has been removed, as the new calculations have determined this provision is no longer necessary. New limits have been calculated according to standard permitting methods as outlined in EPA's 1991 *Technical Standards Document for Water Quality-based Toxics Control* and subsequently reviewed and confirmed by EPA. While the recommended new limits are higher than the draft TMDLs' version, all such limits are consistent with the objectives of the mass-limits balance and the larger objectives of the TMDLs.

Averaging of multiple wells' data was used in the customized analysis and permitted in the TMDLs because individual SRP wells are sampled infrequently, and the data used to determine limits consisted of only one or two data points from each well over the previous three year period. No additional data was available for consideration. Insufficient statistical robustness, with greater uncertainty, would have resulted by attempting to analyze each well individually. Furthermore, ADEQ has endeavored to allow existing permit precedents to stay in place where possible in these cases in order to minimize disruption



to existing operations. As SRP did not have a required AML in its current permit and the reasoning for this condition as outlined in the permit support documents is sound, ADEQ sees no reason to alter that in the customized WLA analysis.

Comment: The plan suggests that Roosevelt Irrigation District, Buckeye Water and Conservation Drainage District and Arlington Canal Company will need to work with agricultural interests within their jurisdictions to voluntarily improve practices, and describes approaches that may improve water quality in the Gila. ... If local agricultural interests are not compelled to adopt BMPs to improve water quality, we are concerned that they will continue to operate as they always have.

ADEQ must abide by Arizona state law in writing TMDLs and TMDL implementation plans. According to A.R.S. § 49-234 (G.),

“...any reductions in loadings from nonpoint sources shall be achieved voluntarily.”

Consequently, the assertion that local agricultural operators should be compelled to adopt BMPs to improve water quality cannot be assented to or supported by ADEQ. Beyond the legal requirements, ADEQ’s position is that soliciting long-term voluntary cooperation among stakeholders provides a more sustainable and effective model over the long run in realizing lasting water quality improvements.

Comment: We noted ... that many of the BMPs referenced were developed in the 1970s and 1980s. ...Implementation strategies involving green infrastructure such as use of native vegetation to ameliorate water quality should be explored and viability weighed along with the strategies outlined in the implementation plan.

Information included in Appendix D is drawn from an EPA manual addressing agricultural BMPs that was published in 1993. These are BMPs addressing the improvement of water quality for the general consideration of stakeholders that can be as effective today as when they were published, if appropriate for employment in the specific circumstances prevalent here in Arizona. Measures mentioned in the body of the document, including single-use strategies, blending, integrated on-farm drainage systems, and recharge basins or evaporation ponds are some of the more promising applicable measures that ADEQ would like for the stakeholder community to seriously consider. ... some of the measures are already employed locally (with RID blending groundwater with City of Phoenix effluent), in the state of Arizona (as in Yuma-area districts adoption and use of single-use strategies), or in California (IFDMs) within a more recent time frame. The use of green infrastructure and technologies, while not addressed in the document, was raised in the public meeting by highlighting the City of Goodyear’s wetland demonstration project for the removal of trace metals from reverse osmosis brine. We are hopeful that Goodyear’s efforts will bear fruit for application on a wider scale, which might then be suitable for general adoption and pursuit by the area’s stakeholder community. ADEQ’s research into green technology beyond this example has not turned up any BMPs specifically oriented to the remediation of boron and selenium problems. We invite you to provide us with direct references if you know of any.

4. Name and address of agency personnel with whom persons may communicate:

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Copies of the final TMDL may be obtained from the Department by contacting the numbers above. The final TMDL may also be downloaded from the Department’s web site at: http://www.azdeq.gov/environ/water/assessment/tmdl_status-mg.html