

# Assessing the Health of Arizona's Waters

Jason D. Jones, Senior Scientist

July 11, 2023



# Decisions as of 7/11/23

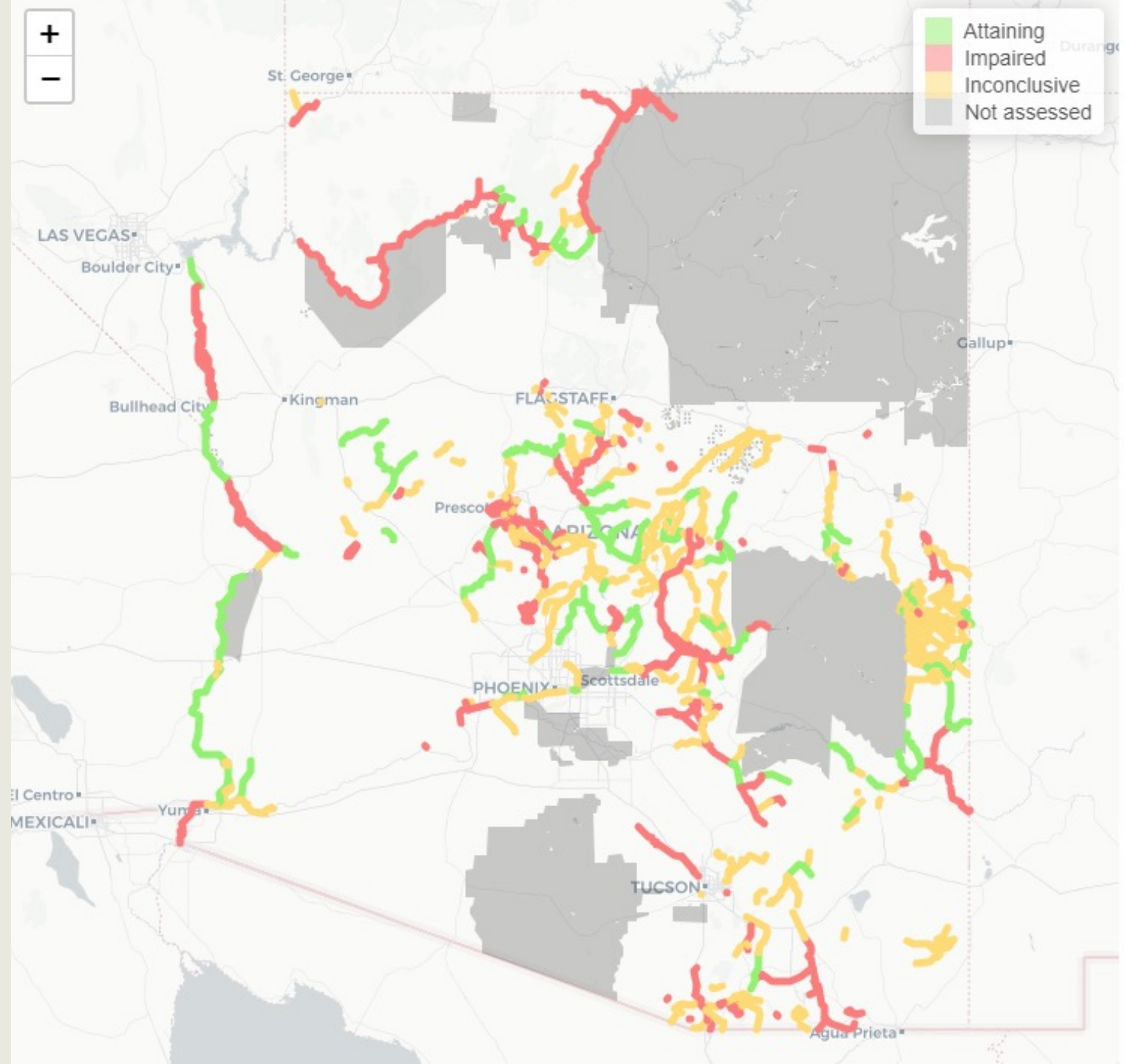
**Impaired = 183**

**Attaining = 89**

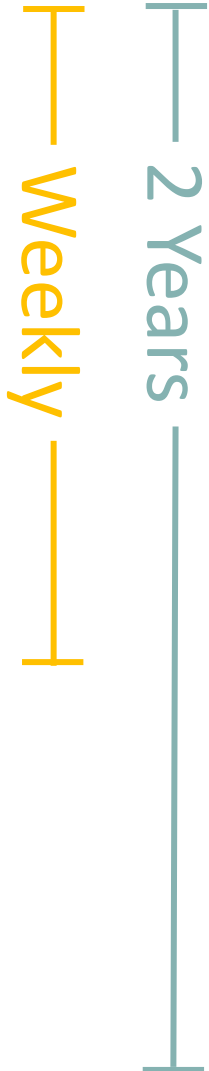
**Inconclusive = 271**



Arizona's Assessment Dashboard



# Process, Process, Process



- 1 – Gather**
- 2 – Format**
- 3 – Aggregate**
- 4 – Assess**
- 5 – Draft Report**
- 6 – Review**
- 7 – Public Comment**
- 8 – EPA Finalizes**



# Process, Process, Process

Weekly

2 Years

- 1 – Gather
- 2 – Format
- 3 – Aggregate
- 4 – Assess
- 5 – Draft Report
- 6 – Review
- 7 – Public Comment
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100%

- 1. Arizona Department of Environmental Quality
- 2. United States Geological Survey
- 3. Adventure Scientists
- 4. Aravaipa Group
- 5. AZ Water Dogs

21. Trout Unlimited

- 22. Verde River Institute
- 23. Water Guardians
- 24. Yuma Rivers Team

75%

- 6. Butte Creek Restoration Council
- 7. Colorado River Water Quality Improvement Program
- 8. Friends of Luna Lake
- 9. Friends of the Forest
- 10. Friends of the Tonto

- 25. Arizona Game and Fish
- 26. Arizona State Parks Park
- 27. Bureau of Land Management
- 28. Bureau of Reclamation

50%

- 11. Friends of the Verde
- 12. Gila Watershed Partnership
- 13. Greenbrush Grunts
- 14. Hassayampa Nature Preserve
- 15. Oak Creek Watershed Improvement Council

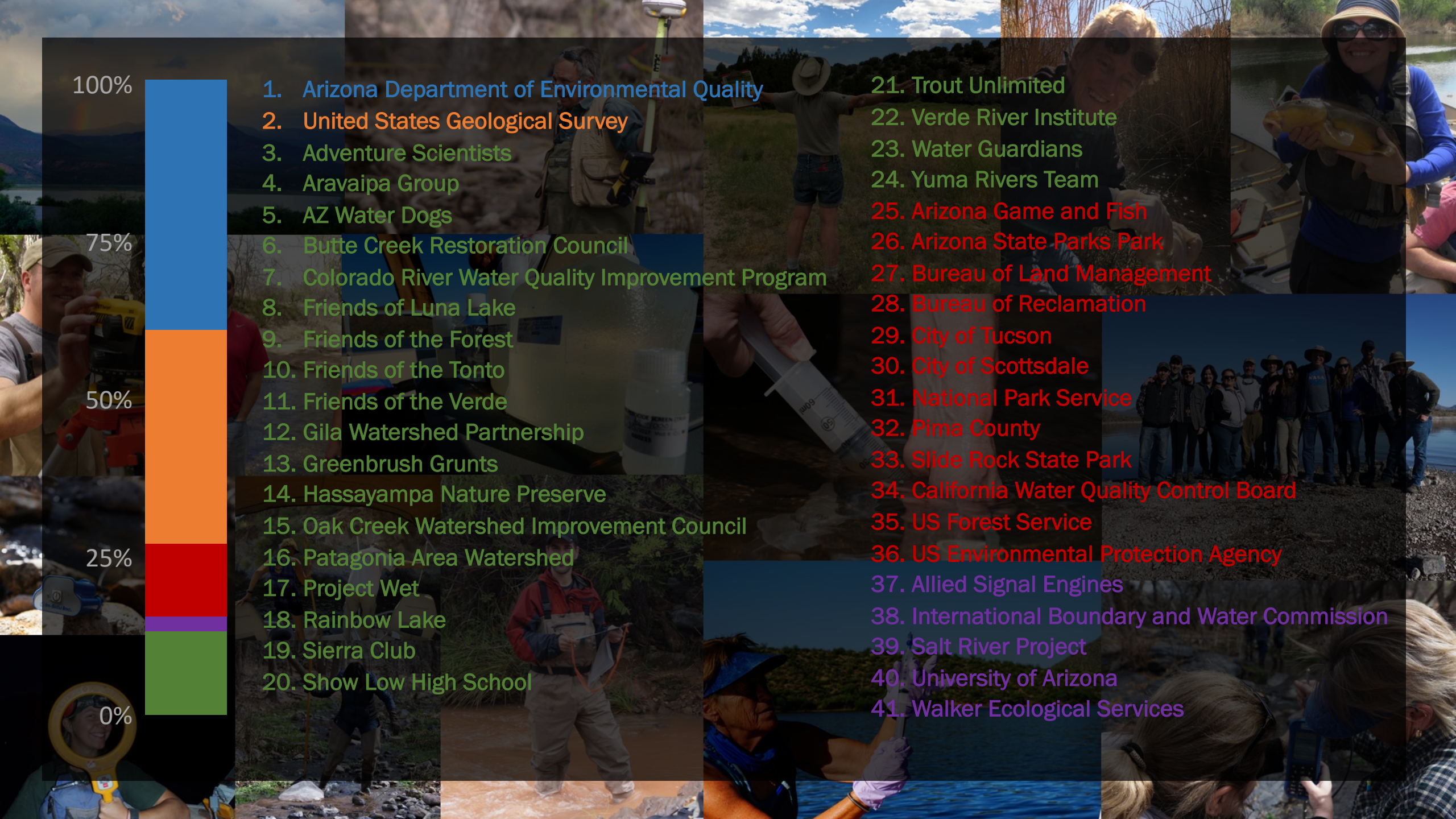
- 29. City of Tucson
- 30. City of Scottsdale
- 31. National Park Service
- 32. Pima County
- 33. Slide Rock State Park
- 34. California Water Quality Control Board

25%

- 16. Patagonia Area Watershed
- 17. Project Wet
- 18. Rainbow Lake
- 19. Sierra Club
- 20. Show Low High School

- 35. US Forest Service
- 36. US Environmental Protection Agency
- 37. Allied Signal Engines
- 38. International Boundary and Water Commission
- 39. Salt River Project
- 40. University of Arizona
- 41. Walker Ecological Services

0%





NATIONAL WATER  
QUALITY MONITORING  
COUNCIL

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## Welcome to the new Water Quality Portal

The Water Quality Portal (WQP) is the premiere source of discrete water-quality data in the United States and beyond. This cooperative service integrates publicly available water-quality data from the United States Geological Survey (USGS), the Environmental Protection Agency (EPA), and over 400 state, federal, tribal, and local agencies. [Learn More](#)

To download data complete the query below. Returning and experienced users may wish to use the [Advanced Download](#).

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### Select Location Parameters


Specify location parameters to describe the spatial extent of the desired dataset. All fields are optional.

**Country** 

All Countries 

**State** 

All States 


**County** 

**Point Location** 

Within

miles of  
Latitude

0

**Bounding Box** 

North:

90

South:

-90

East:

**Site Type** 

All Site Types 

**Organization ID** 

All Organization IDs 

**Site ID** 

# It is Just Math...

Date	Location	CharacteristicName	Unit	Result	Organization
8/11/2022	AZDEQ_SW-1967	Escherichia coli	cfu/100ml	325.5	Volunteer
8/11/2022	AZDEQ_SW-138	Escherichia coli	cfu/100ml	686.7	Volunteer
7/23/2022	AZDEQ_SW-1967	Escherichia coli	cfu/100ml	488.4	Volunteer
7/23/2022	AZDEQ_SW-138	Escherichia coli	cfu/100ml	344.8	Volunteer
5/16/2022	AZDEQ_SW-138	Escherichia coli	cfu/100ml	547.5	Volunteer
5/16/2022	AZDEQ_SW-1967	Escherichia coli	cfu/100ml	365.4	Volunteer
5/4/2022	AZDEQ_SW-138	Escherichia coli	cfu/100ml	344.1	Volunteer
5/4/2022	AZDEQ_SW-1967	Escherichia coli	cfu/100ml	135.4	Volunteer
4/17/2022	AZDEQ_SW-138	Escherichia coli	cfu/100ml	488.4	Volunteer
4/17/2022	AZDEQ_SW-1967	Escherichia coli	cfu/100ml	142.1	Volunteer
4/4/2022	AZDEQ_SW-138	Escherichia coli	cfu/100ml	248.9	Volunteer
4/4/2022	AZDEQ_SW-1967	Escherichia coli	cfu/100ml	98.7	Volunteer
3/23/2022	AZDEQ_SW-1967	Escherichia coli	cfu/100ml	112.6	Volunteer
3/23/2022	AZDEQ_SW-1971	Escherichia coli	cfu/100ml	139.6	Volunteer
3/23/2022	AZDEQ_SW-138	Escherichia coli	cfu/100ml	167	Volunteer
3/9/2022	USGS-09486490	Escherichia coli	cfu/100ml	88	USGS
3/9/2022	USGS-322232111064900	Escherichia coli	cfu/100ml	77	USGS
3/9/2022	USGS-09486500	Escherichia coli	cfu/100ml	120	USGS

Date	Location	CharacteristicName	Unit	Result	Organization
3/9/2022	USGS-09486509	Escherichia coli	cfu/100ml	48	USGS
3/7/2022	AZDEQ_SW-1971	Escherichia coli	cfu/100ml	44.3	Volunteer
3/7/2022	AZDEQ_SW-138	Escherichia coli	cfu/100ml	93.3	Volunteer
3/7/2022	AZDEQ_SW-1967	Escherichia coli	cfu/100ml	58.3	Volunteer
2/21/2022	AZDEQ_SW-138	Escherichia coli	cfu/100ml	49.6	Volunteer
2/21/2022	AZDEQ_SW-1971	Escherichia coli	cfu/100ml	52	Volunteer
2/21/2022	AZDEQ_SW-1967	Escherichia coli	cfu/100ml	44.1	Volunteer
12/22/2021	PIMA_AZ-20001-9025	Escherichia coli	cfu/100ml	155	Government
12/9/2021	PIMA_AZ-20001-9051	Escherichia coli	cfu/100ml	192	Government
12/4/2021	AZDEQ_SW-138	Escherichia coli	cfu/100ml	146.7	Volunteer
11/20/2021	AZDEQ_SW-1971	Escherichia coli	cfu/100ml	228.2	Volunteer
11/20/2021	AZDEQ_SW-138	Escherichia coli	cfu/100ml	478.6	Volunteer
10/31/2021	AZDEQ_SW-138	Escherichia coli	cfu/100ml	658.6	Volunteer
10/31/2021	AZDEQ_SW-1971	Escherichia coli	cfu/100ml	240	Volunteer
10/31/2021	AZDEQ_SW-1967	Escherichia coli	cfu/100ml	101.2	Volunteer
9/28/2021	PIMA_AZ-20001-9051	Escherichia coli	cfu/100ml	548	Government
9/22/2021	PIMA_AZ-20001-9025	Escherichia coli	cfu/100ml	178	Government
9/22/2021	PIMA_AZ-20001-9025	Escherichia coli	cfu/100ml	222	Government

Raw data

Decision	Use	Characteristic	Fraction	Met	Not	Tot
Not meeting criteria	PBC	ESCHERICHIA COLI	Total	15	2	17

Parameter Decision



**9 Months**  
▼  
**12 Minutes**



# Top 5 Reasons R is Great for Assessments

1. Free and open source
2. The Assessment is a 150 page math problem! R handles:
  - Formatting
  - Aggregation
  - Basic Standards
  - Complicated Standards
  - Making Assessment Decisions at Multiple Levels
3. Large community to help solve development problems
4. Packages like dplyr and ggplot
5. Connections to the portal and databases

```
1044 # 1 - Regular Standards
1045 f1.stdregular <- f.stdtypejoin %>%
1046   filter(STDTYPE == "regular") %>%
1047   left_join(ZUSECROSSWALK2, by = "NewUse") %>% # Join for use map.
1048   inner_join(f.gatheredstds, by = c("CharacteristicName", "ResultSampleFractionText")) %>%
1049   mutate(Exceed = ifelse(aggtimespace > STDNEW, "Yes", "No")) %>% # If
1050   select(-SUBSTANCE_CAS_NO) %>%
1051   mutate(SUBSTANCE_CAS_NO = "None") %>%
1052   select(all_of(f.fields)) %>% # select same fields so can combine rows
1053   filter(!is.na(Exceed)) # Remove rows with NA in Exceed Column (missing)
1054
1055 # 2 - Oxygen Standards
1056 f2.stdoxygen <- f.stdtypejoin %>%
1057   filter(CharacteristicName == "DISSOLVED OXYGEN SATURATION" | CharacteristicName == "DISSOLVED OXYGEN (DO)") %>%
1058   filter(ResultSampleFractionText == "Dissolved") %>%
1059   filter(grepl("AW", NewUse, fixed = TRUE)) %>% # Filter for AW use
1060   filter(grepl("Chronic", NewUse, fixed = TRUE)) %>% # Chronic is arbitrary
1061   filter(NewUse != "AWEAcute") %>% # Exclude AWE...no standards for groundwater
1062   pivot_wider(names_from = CharacteristicName, values_from = aggtimespace) %>%
1063   inner_join(ZUSECROSSWALK2, by = "NewUse") %>% # Join for use map
1064   mutate(STDUSE = ifelse(STDUSE == "AWC_CHRONIC_MAX", "AWC_ACUTE_MIN", STDUSE)) %>%
1065   mutate(STDUSE = ifelse(STDUSE == "AWEDW_CHRONIC_MAX", "AWEDW_ACUTE_MIN", STDUSE)) %>%
1066   mutate(STDUSE = ifelse(STDUSE == "AWW_CHRONIC_MAX", "AWW_ACUTE_MIN", STDUSE)) %>%
1067   rename(aggtimespace = `DISSOLVED OXYGEN (DO)`) %>% # Format, Add STDUSE
1068   mutate(CharacteristicName = "DISSOLVED OXYGEN (DO)") %>%
1069   left_join(f.gatheredstds, by = c("CharacteristicName", "STDUSE")) %>%
1070   select(-ResultSampleFractionText.y) %>%
1071   rename(ResultSampleFractionText = ResultSampleFractionText.x) %>%
1072   rename(STDNEW2 = STD) %>% # do is already in mg/L so no need to create
1073   mutate(Exceed = ifelse(aggtimespace < STDNEW2, "Yes", "No")) %>%
1074   drop_na(aggtimespace) %>%
1075   filter(Exceed != "Yes" | !is.na(`DISSOLVED OXYGEN SATURATION`)) %>%
```

Welcome

**DISCLAIMER - THIS DASHBOARD DISPLAYS ASSESSMENT INFORMATION. THIS DATA IS PROVISIONAL UNTIL EPA APPROVES THE OFFICIAL ASSESSMENT. OFFICIAL ASSESSMENTS ARE GENERALLY APPROVED EVERY EVEN YEAR AND ARE DUE TO EPA BY APRIL 1ST.**

The 2026 assessment cycle includes data from 7/1/2019 to 6/30/2024. New data is added weekly.

Assumptions and detailed instructions for using the dashboard can be found by clicking the 'Help' page or by clicking [HERE](#).

Last Day Assessment Tool Ran: **2023-06-26**

Number of Records (formatted and aggregated): **105615**

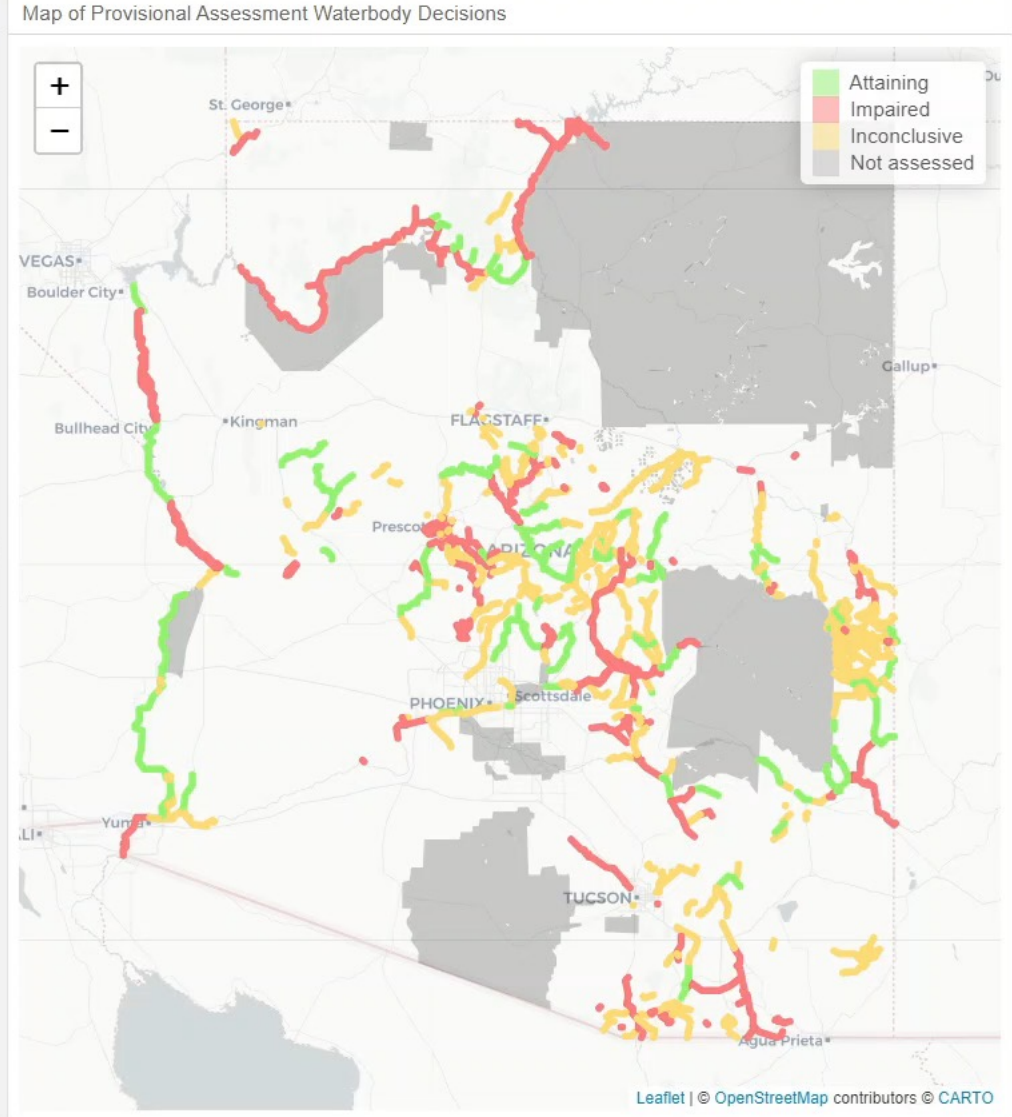
Number of Provisional Impaired Waters (All): **183** (Click the [Impairments](#) page for more information)

Number of Exceedances: **1365**. (Click the [Decisions](#) page for more information)

Number of Inconclusives (Use): **802**. (See below and/or click the [Datagap](#) page for more information)

Provisional Decisions at Each Assessment Level

Level	Attaining-Supporting-Meeting	Impaired-Not Supporting-Not Meeting	Inconclusive
Parameter	17569	338	6877
Use	1049	256	802
Waterbody	89	183	271



## Arizona's Assessment Dashboard



[https://azdeq.shinyapps.io/assessment\\_dashboard\\_2026\\_Prod](https://azdeq.shinyapps.io/assessment_dashboard_2026_Prod)