

# Citizen Science and Technology: There's An App For That, and That...and That Too!

How Arizona Partners With Volunteers To Collect  
Observations On Waterbodies Using Survey123



Rik Gay, Watershed Improvement Unit Manager  
May, 2019



## ADEQ MISSION

**TO PROTECT AND ENHANCE  
PUBLIC HEALTH AND THE  
ENVIRONMENT**

- Gila Watershed Partnership
- Prescott Creeks
- Prescott College



**Grants & Effectiveness**



**Water Sampling**

**3 Delists!**

- Ambient
- Impaired Water
- Data Gaps



**Time Lapse Camera**

- Intermittent Streams
- MS4 Stormwater Permit
- Effectiveness

Bloom Watch:Cattail Cove



**HABS**



**ARIZONA WATER WATCH**



**Wet-Dry Mapping**

- Rio de Flag
- Agua Fria
- Scistarter & libraries

Butcher Jones Slide Rock State Park



**Protecting Human Health**



**Pollution Identification**



**AWW APP**

- 1st App Made in House
- Survey123 Highlighted
- Coding Shared
- Flow Regime Updated
- Designated Uses

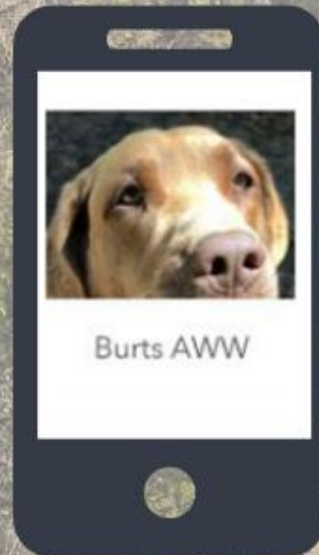
- k9 Sewage Sniffing Dogs
- Ship and Sniff



# Arizona Water Watch Apps



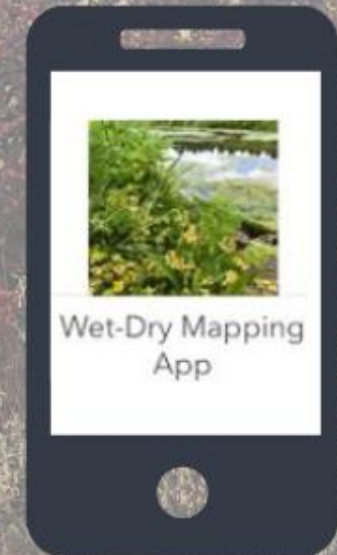
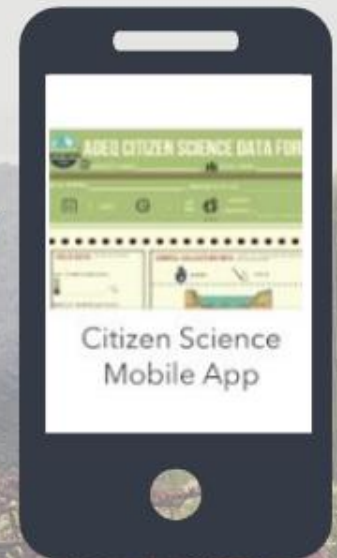
- Created for general public



- Created for SUPER volunteer



- Created for trained AWW volunteers



- Created for video trained volunteers

# Arizona Water Watch App

- Released in November 2017
- Uses Survey 123 platform
- Built in-house
- Takes ~ 3 minutes to complete
  - Yes/ No Questions
  - Photos
  - Comments



Download the **free** mobile app and instantly help **protect AZ waters**

- 1** Download **Survey123 for ArcGIS** (iPhone or Android) free from your app store 
- 2** Visit [bit.ly/azwaterwatchapp](http://bit.ly/azwaterwatchapp)
- 3** Select **Open in the Survey123 field app** and complete a test survey
- 4** Visit [azdeq.gov/programs/azww](http://azdeq.gov/programs/azww) for other volunteer opportunities

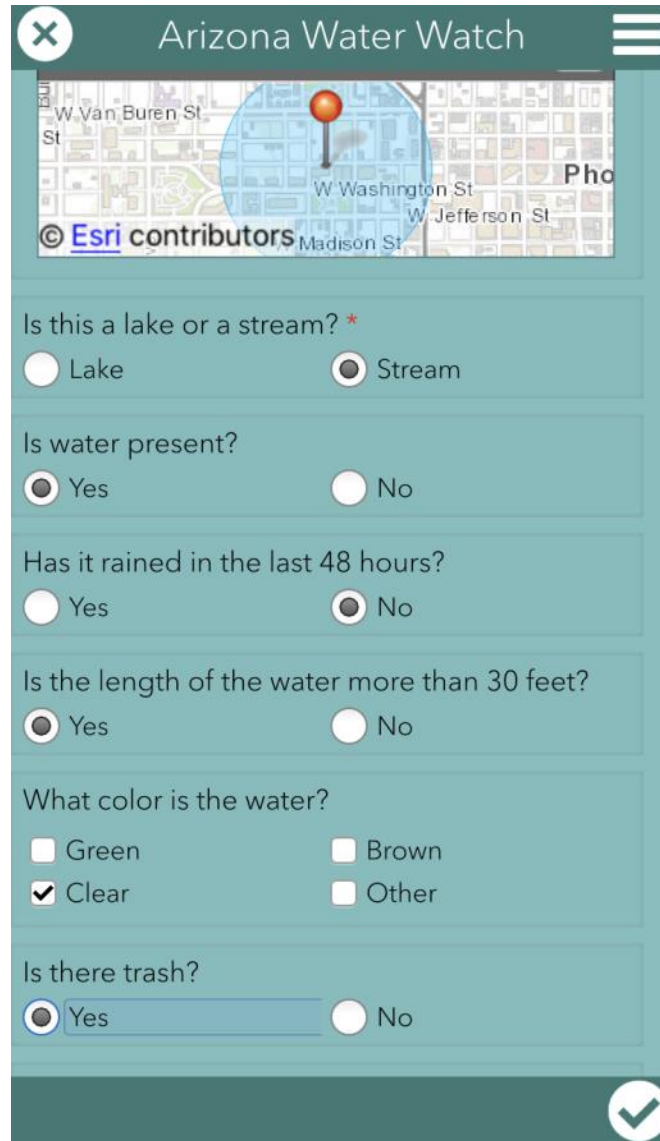


Go to a waterbody, take photos, make observations and submit. It only takes a few minutes!

Data will be interpreted, approved and posted to an online data map for analysis and research. Your contributions allow ADEQ scientists to better discover and analyze water quality issues at the source.

# AWW App

- Legal disclaimer before survey
- Geo-locates observation
- Deep dives into Questions if “Yes”
- Notifies HAB’s coordinator if algal bloom
- Complaint form button
- Picture submittal



Arizona Water Watch

Map showing location: W Van Buren St, W Washington St, W Jefferson St, Madison St, Pho

© Esri contributors

Is this a lake or a stream? \*

Lake  Stream

Is water present?

Yes  No

Has it rained in the last 48 hours?

Yes  No

Is the length of the water more than 30 feet?

Yes  No

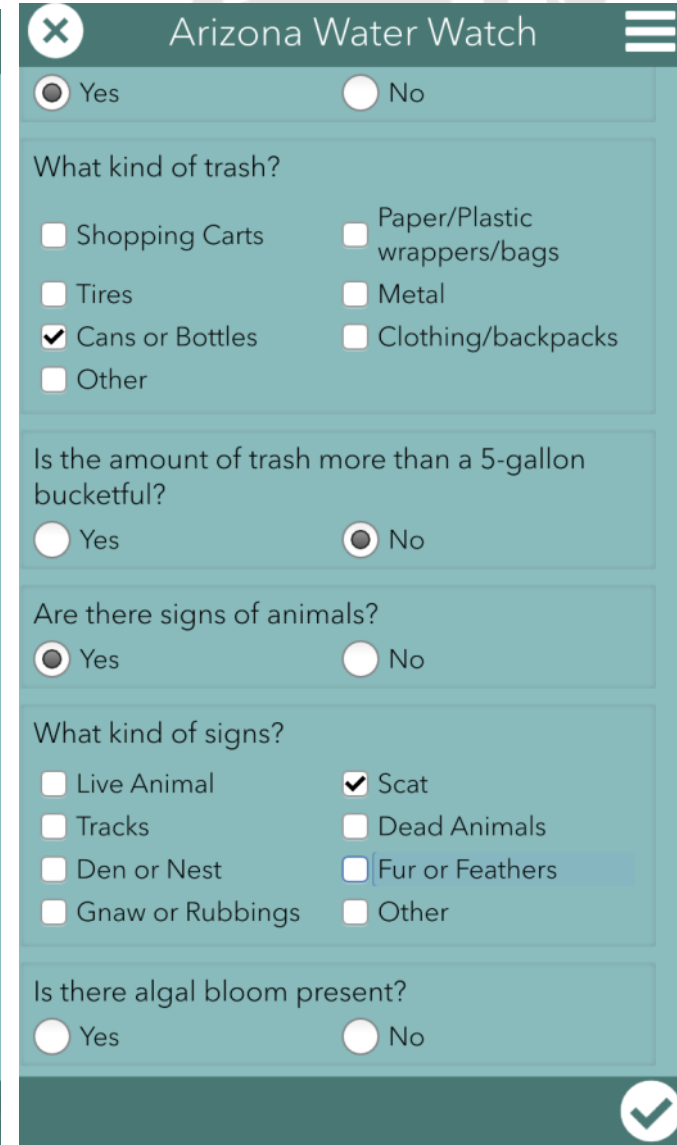
What color is the water?

Green  Brown  
 Clear  Other

Is there trash?

Yes  No

✓



Arizona Water Watch

Yes  No

What kind of trash?

Shopping Carts  Paper/Plastic wrappers/bags  
 Tires  Metal  
 Cans or Bottles  Clothing/backpacks  
 Other

Is the amount of trash more than a 5-gallon bucketful?

Yes  No

Are there signs of animals?

Yes  No

What kind of signs?

Live Animal  Scat  
 Tracks  Dead Animals  
 Den or Nest  Fur or Feathers  
 Gnaw or Rubbings  Other

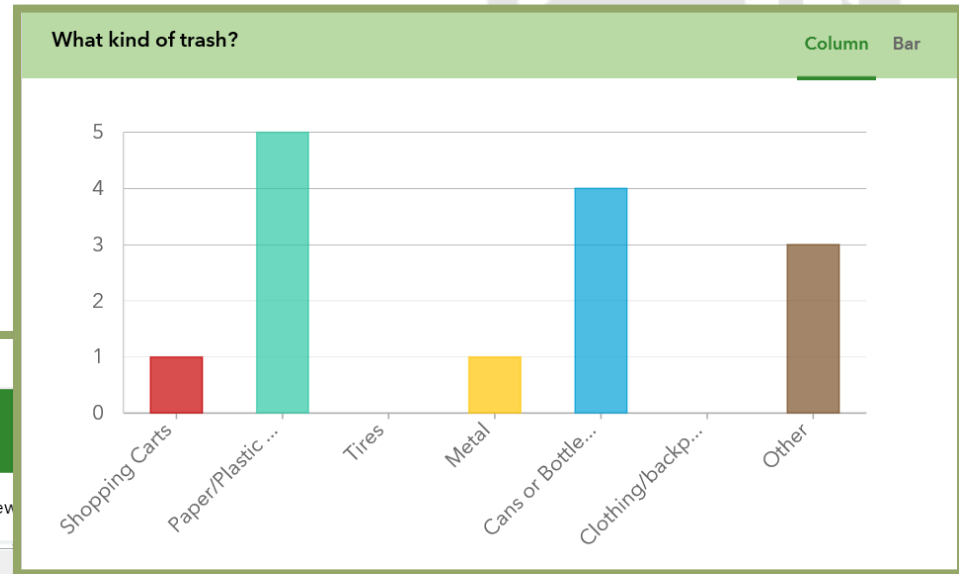
Is there algal bloom present?

Yes  No

✓



- View observations, check photos, approve and make public
- GIS flow regime maps updated annually based on results
- Automatic data analysis



Survey123 for ArcGIS    My Surveys    Help

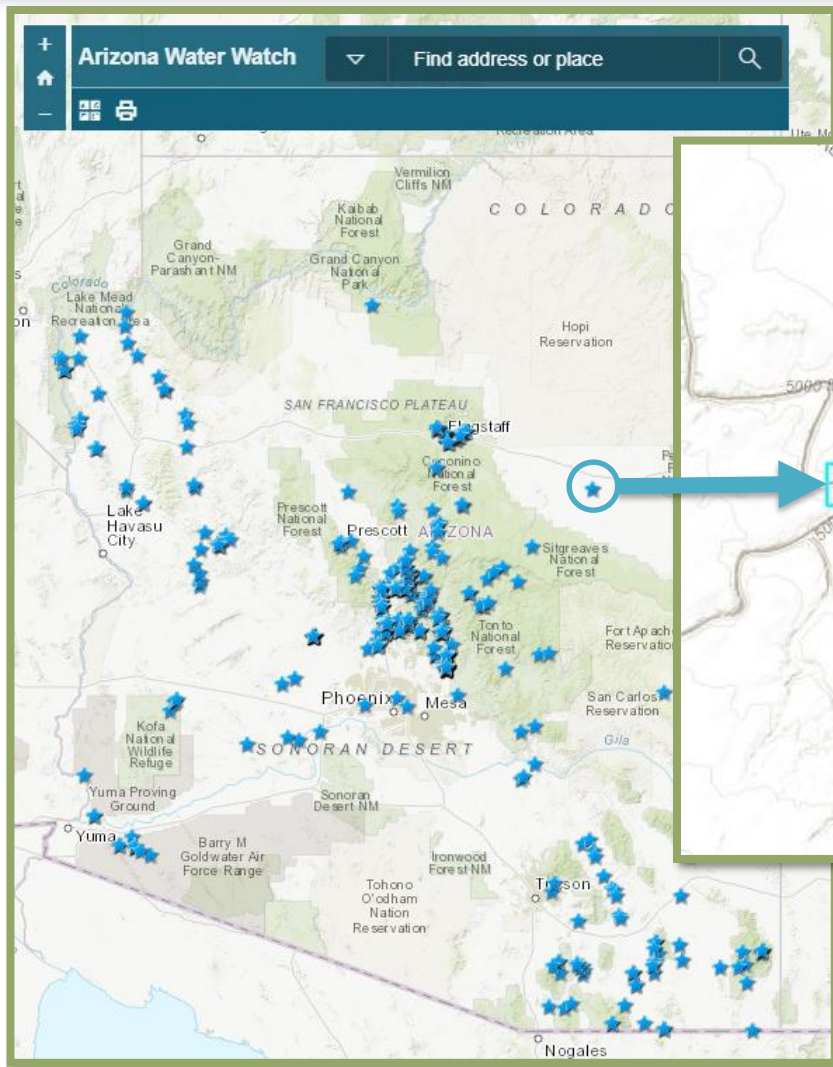
Arizona Water Watch

11/16/17 - 5/9/18    Report (Beta)    Export    Open in Map View

surveyPoint (Features: 63, Selected: 0)

End	Your name	Your email	Would you like to join our email list?	Date	Time	Latitude	Longitude	Ho
Apr 11, 2018	Burt Eastburn	Burt1@cox.net	Yes	Apr 11, 2018	12:38	33.9616833333333	-111.689933333333	5
Apr 17, 2018	John O'Halloran	Jp.ohalloran@yahoo.com	Yes	Apr 17, 2018	13:20	33.5723044473398	-109.959808312732	0
Apr 22, 2018	Meghan	Ms14@azdeq.gov	No	Apr 22, 2018	11:27	34.7754646998204	-112.046805102458	0
Apr 25, 2018	Jason Long	j.long@rwaa.info	Yes	Apr 25, 2018	21:00	32.862696164439	-111.679513265739	1,0
May 1, 2018	Jessica latzko	jl15@azdeq.gov	No	May 1, 2018	12:37	34.3280967878363	-112.37060404889	0

# Public View on ADEQ Website



Date	1/15/2018, 12:00 AM
Time	10:37
Is this a lake or a stream?	Stream
Is water present?	Yes
Has it rained in the last 48 hours?	No
Is the length of the water more than 30 feet?	Yes
What color is the water?	Brown

[Zoom to](#)



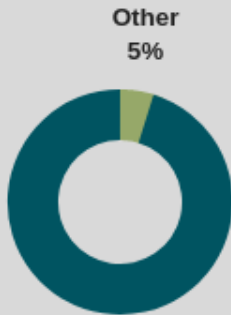




# Arizona Water Watch App Stats



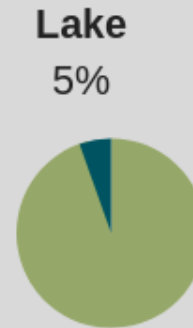
- ~810 Records
- ~30 Participants
- 



**Burt & Cocoa**  
95%



- 766 Streams
- 46 Lakes

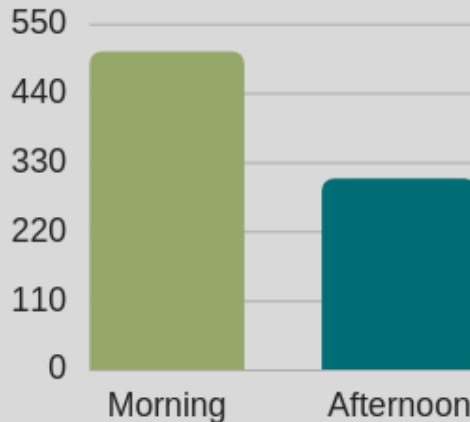


**Lake**  
5%

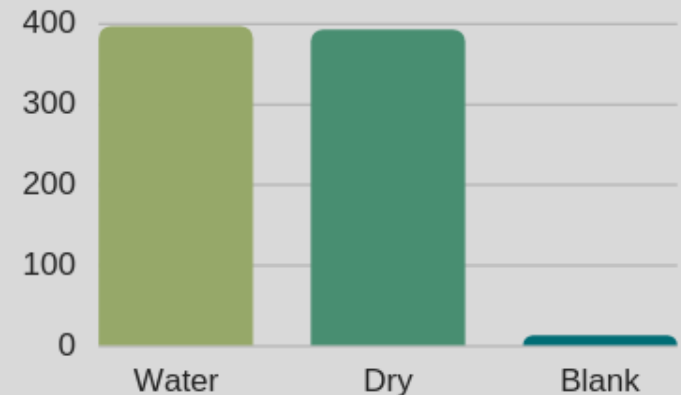
**Stream**  
95%



- Morning Preferred
- 10-11 am: 131 observations



- Dry and Wet Stream Observations



# AWW Data Form App

- **Burt has submitted over 771 AWW Observations!**
  - Burt and Cocoa visit streams every Monday, Wednesday, and Friday.

**“This has given my retirement meaning!”**

**-Burt Eastburn**

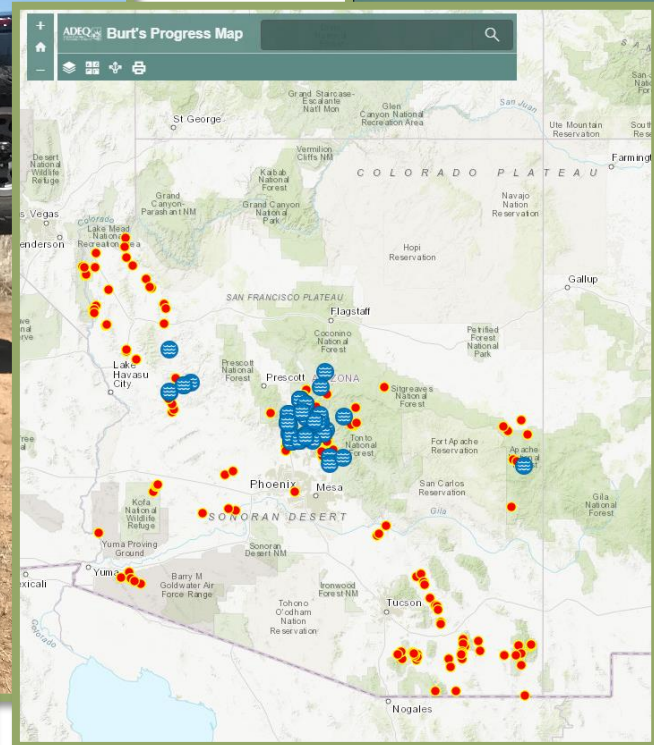
**Burt's Arizona Water Watch**

Your name \*  
Burt Eastburn

Your email \*  
burt1@cox.net

Would you like to join our email list?  
 Yes  No

Date \*  
April 25, 2019



# AWW Data Form App

- Site ID Automatically autopopulates
- Calculates Float
- Photos metadata labeled “upstream, downstream”
- Pre-calibration and Post check of Equipment submitted with data
- Microvideo Lessons are embedded into the app
- Data formats to proper template for WQDB upload!



**DOWNLOAD**

From your phone go to the App Store or Google Store. Download two apps:

1. Explorer for ArcGIS
2. Survey123

**EXPLORER**

- Open Explorer for GIS
- Select "Continue Without Signing In"
- Search for "ADEQ Citizen Science Explorer Map"
- Press and open

**NAVIGATE**

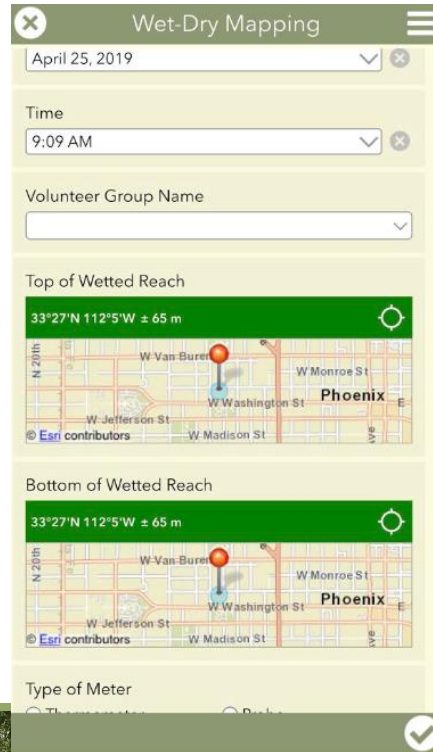
In the field press the arrow (located in the upper right corner of the map) to navigate to current location

**SITE NAME**

- Select the site closest to your location by tapping the red bucket
- Select "Surface Water- Sampling Site"
- Select "Collect Water Quality Data"

# Wet Dry Mapping App

- Aww App not the right tool
- Mark top of reach and bottom of reach
- Micro-Video Cartoon Lesson Embedded
- Photos labeled
- Coming soon are segments!




Wet-Dry Mapping

April 25, 2019


Time: 9:09 AM

Volunteer Group Name

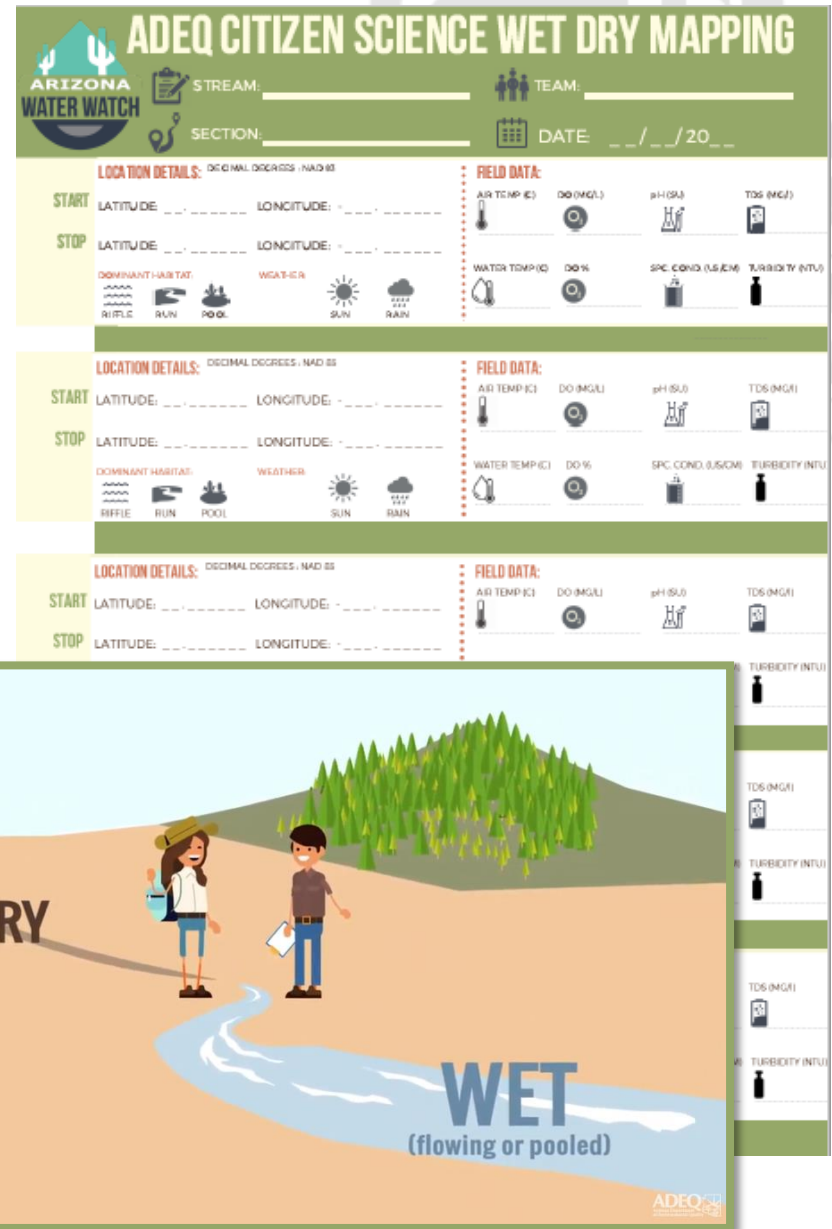
Top of Wetted Reach  
33°27'N 112°5'W ± 65 m



Bottom of Wetted Reach  
33°27'N 112°5'W ± 65 m



Type of Meter



### ADEQ CITIZEN SCIENCE WET DRY MAPPING


ARIZONA WATER WATCH

STREAM: \_\_\_\_\_ TEAM: \_\_\_\_\_

SECTION: \_\_\_\_\_ DATE: \_\_/\_\_/20\_\_

LOCATION DETAILS: DECIMAL DEGREES - NAD 83		FIELD DATA:			
START	LATITUDE: _____ LONGITUDE: _____	AIR TEMP (C)	DO (MG/L)	pH (SU)	TDS (MG/L)
STOP	LATITUDE: _____ LONGITUDE: _____	WATER TEMP (C)	DO %	SPC COND (US/CM)	TURBIDITY (NTU)
DOMINANT HABITAT: RIFFLE RUN POOL		WEATHER: SUN RAIN			

Micro-video cartoon lesson showing a transition from a dry streambed to a wet stream:



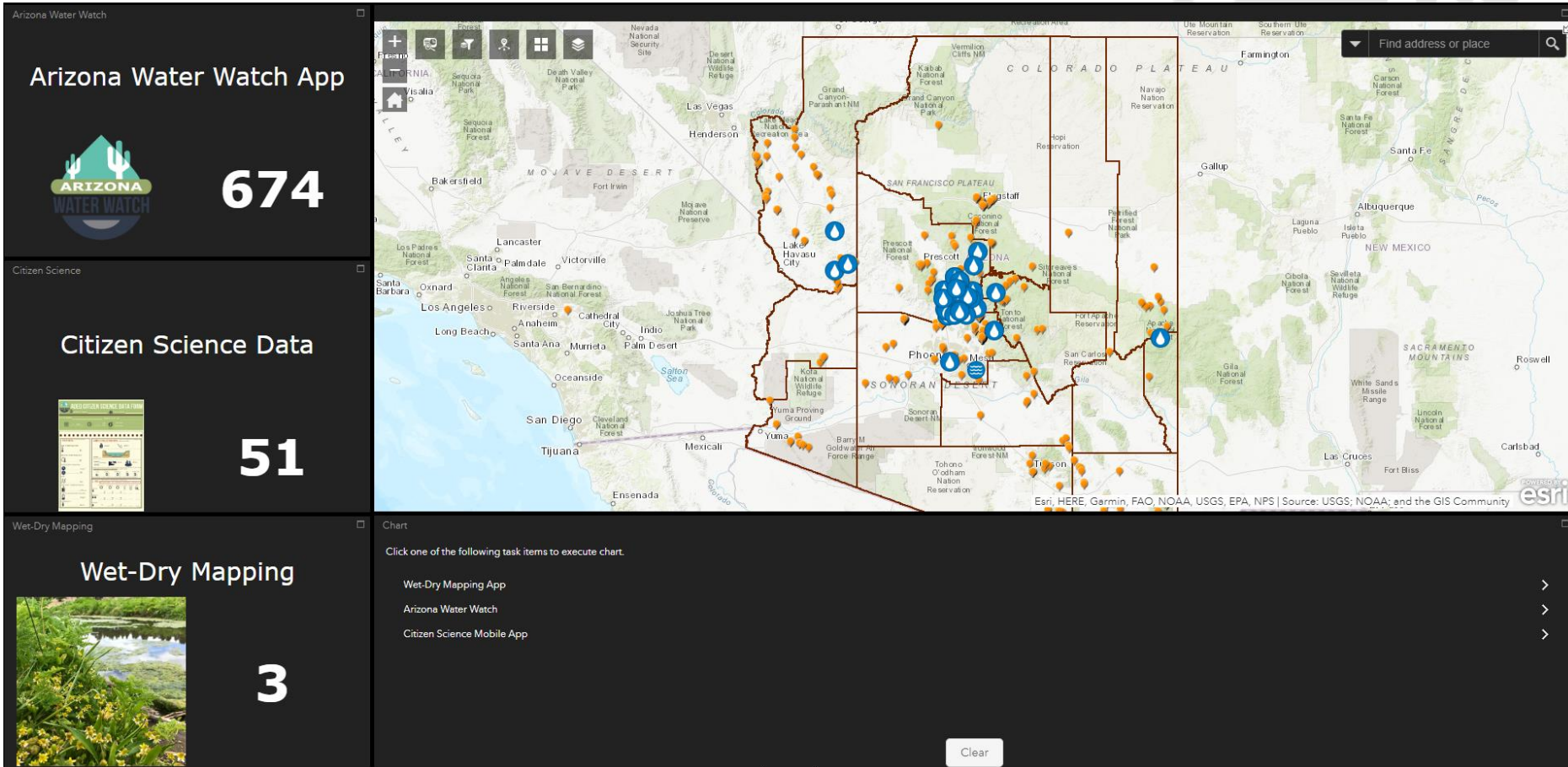
**DRY**

**WET**  
(flowing or pooled)

ADEQ logo

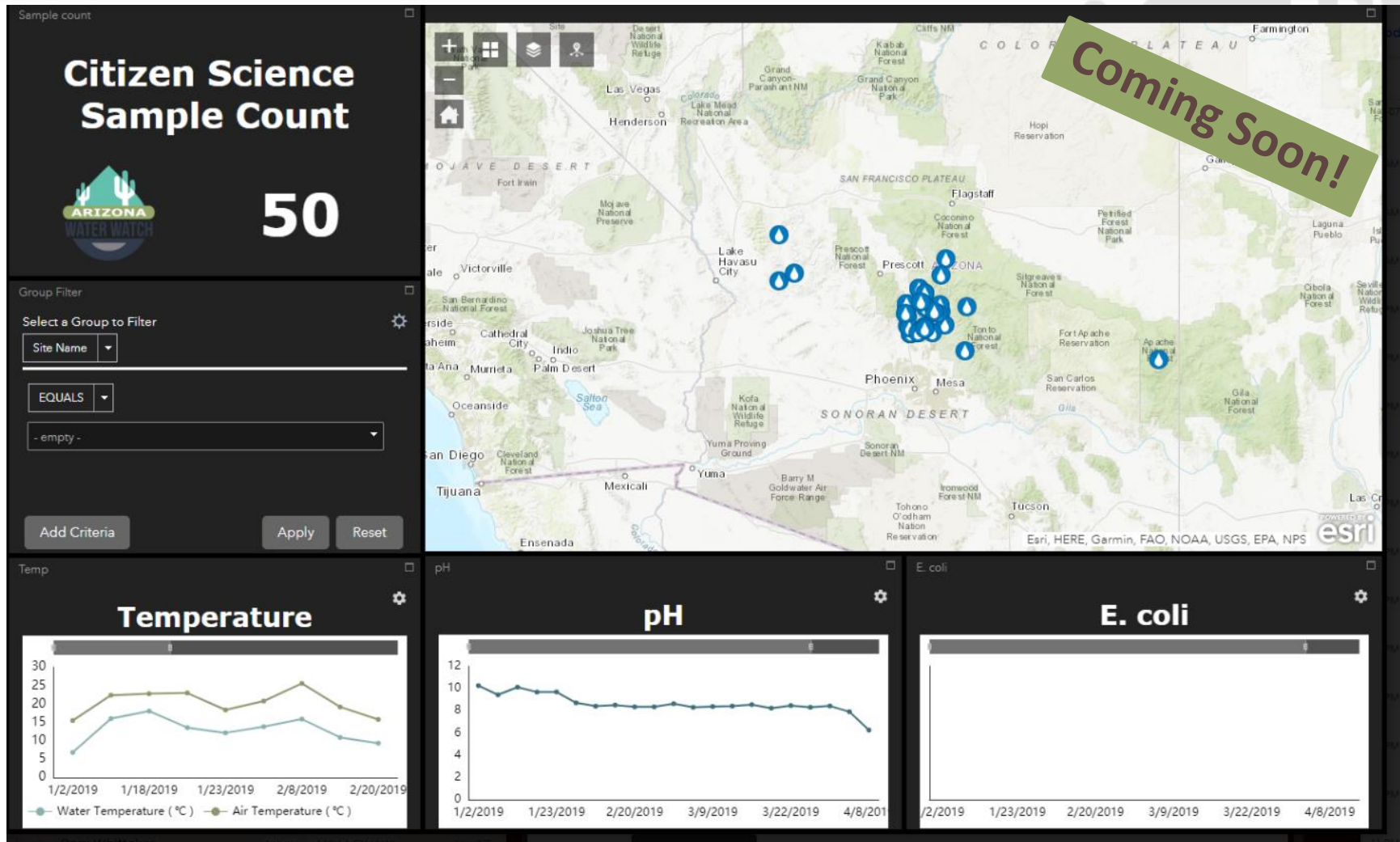


# Dashboard



- Data in real time
- Email sent when citizen science data form entered
- Easily filtered and metrics updated

# Individual Volunteer Group Dashboard



- Can access their own data and see trends over time
- See their contributions in real time
- Volunteers can download their data



- Think outside the box!
- Leverage technology
- Ask questions and look for help on GIS forums
- Build off others!
  - We will share our app coding, data forms, ideas, etc.!



## Arizona Water Watch Website:

<http://www.azdeq.gov/programs/azww>



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