

# Arizona Water Watch

Leveraging Technology and Engaging  
Community Scientists



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# Arizona Waterbody Statistics



## Streams

- ~100.000 Miles



## Lakes

- ~257



## Wetlands

- ~870 Square Miles



## ADEQ Staff

- ~8 Monitoring Unit
- ~6 Watershed Protection Unit

**COMMUNITY SCIENCE  
TO THE RESCUE!**



- KAB Grant
- Targeting Oak Creek Canyon
- Health Habits



**Trash  
Clean Up**



**Water  
Sampling**

- Ambient
- Impaired Water
- Data Gaps
- BMP Effectiveness

- Intermittent Streams
- MS4 Stormwater Permit
- Waters of Arizona



**Time Lapse  
Camera**

**8 Delists!**

- Pollution Identification
- Intermittent Streams
- Ephemeral Streams



**Storm  
Sampling**



**Wet-Dry  
Mapping**

- Rio de Flag
- Agua Fria
- Scistarter & libraries



**Protecting  
Human Health**

- Butcher Jones
- Slide Rock State Park
- Fossil Creek



**Pollution  
Identification**



**AWW  
APP**

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

- k9 Sewage Sniffing Dogs
- Ship and Sniff



# Arizona Water Watch Apps



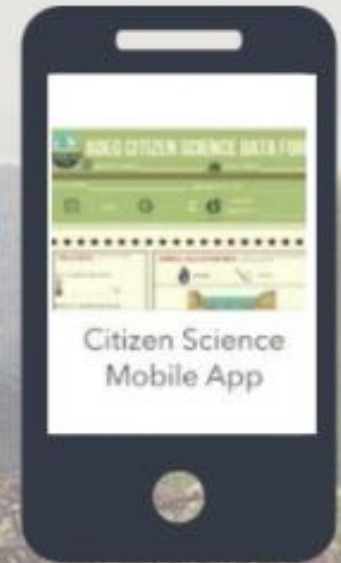
Less Time Intensive for Volunteers



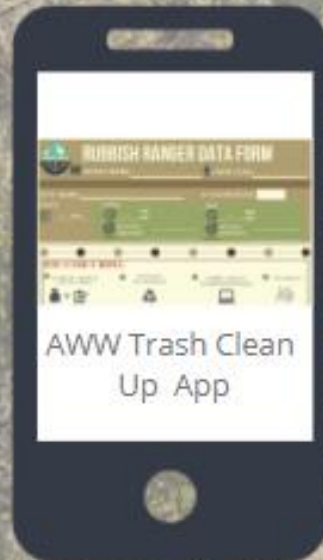
Arizona Water Watch

- Created for general public

- Created for trained AWW volunteers



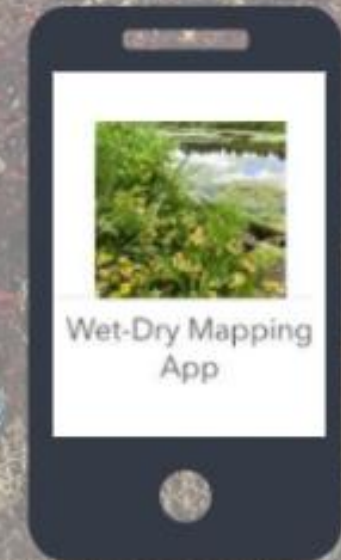
Citizen Science Mobile App



AWW Trash Clean Up App

- Created for general public

- Created for video trained volunteers



Wet-Dry Mapping App





# SHARE INFORMATION IN MULTIPLE WAYS

## VOLUNTEER RESOURCES

### STEP 1

#### IN PERSON TRAINING

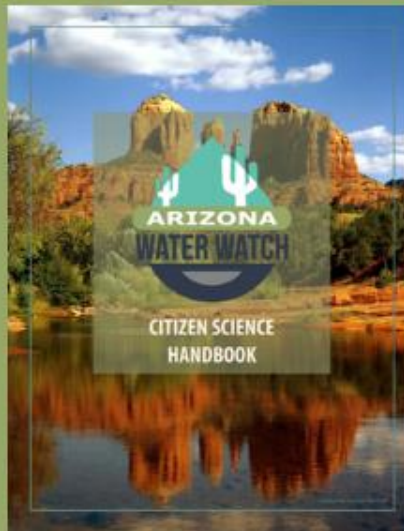
- Classroom setting (felt stream)
- At sampling site



### STEP 2

#### WRITTEN RESOURCES

- AWW binder
- Website
- Handbook



### STEP 3

#### VISUAL REMINDERS

- Cartoon micro-video lessons
- E. coli processing mat

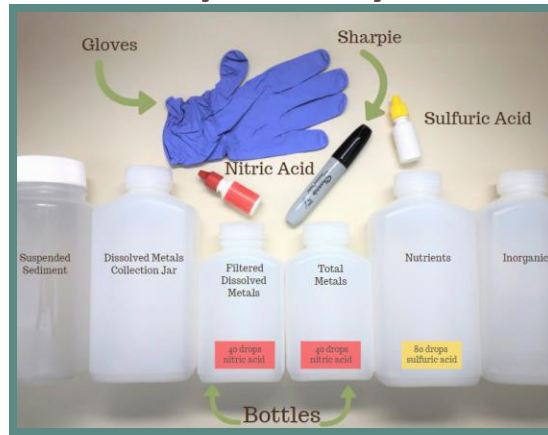


# Citizen Science- Arizona Water Watch

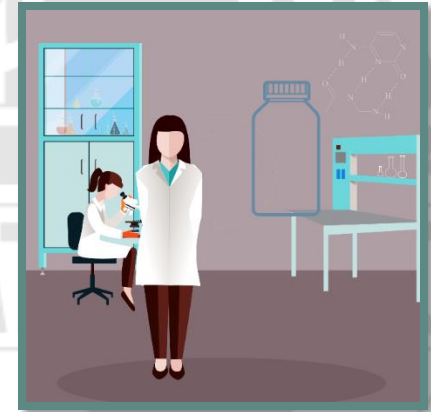
## CREDIBLE DATA



## Visually Friendly Guides



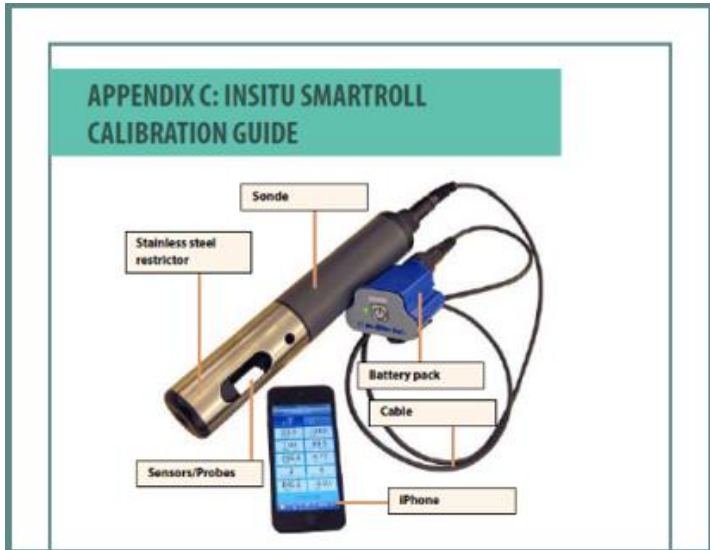
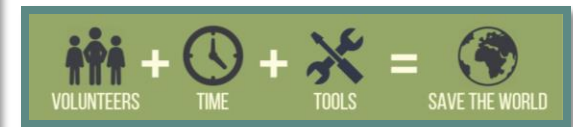
## Micro-video Lessons



## Processing Tools



## Scientific Equipment Loaner Program

## Survey123 Data



App



Portal

- App: you can't update
- Portal updates in real time
- Equipment Calibration Data
- Pre-populated for each volunteer group

## Convert Data



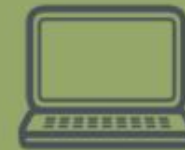
GIS Model



Python  
Script

- GIS Model pulls data from the cloud
- Python script turns data into proper excel format

## QAQC, Upload, and Approve



QAQC  
Dashboard,  
Upload  
WQDB



Update  
WQDB,  
Approve

- QAQC
- AWW Dashboard-view all data in real time
- Uploaded to WQX



# Data Collection and Submission



# ARIZONA WATER WATCH

- **Step 1:** Dedicated volunteers: annual training, SAP, annual audit required

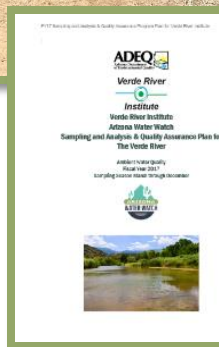
- **Step 2:** Field work: paper forms

- **Step 3:** Data Entry: App or portal



**CITIZEN SCIENCE FIELD AUDIT**

Checklist items include: 1. All water collection sites are properly labeled, 2. All water collection sites are properly marked, 3. All water collection sites are properly marked, 4. All water collection sites are properly marked, 5. All water collection sites are properly marked, 6. All water collection sites are properly marked, 7. All water collection sites are properly marked, 8. All water collection sites are properly marked, 9. All water collection sites are properly marked, 10. All water collection sites are properly marked.



**ADEQ CITIZEN SCIENCE DATA FORM**

PROJECT NAME: \_\_\_\_\_ FIELD CREW: \_\_\_\_\_

SITE NAME: \_\_\_\_\_ ADEQ SITE ID: \_\_\_\_\_

DATE: \_\_\_/\_\_\_/2017 TIME: \_\_\_:\_\_\_ AM/PM LATITUDE: \_\_\_\_\_ LONGITUDE: \_\_\_\_\_

**FIELD DATA: FILL IN THE BLANKS**

AIR TEMPERATURE: \_\_\_\_\_ °C

WATER TEMPERATURE: \_\_\_\_\_ °C

DISSOLVED OXYGEN: \_\_\_\_\_ mg/L

pH: \_\_\_\_\_

SPECIFIC CONDUCTIVITY: \_\_\_\_\_ uS/cm

TOTAL DISSOLVED SOLIDS: \_\_\_\_\_ mg/L

TURBIDITY: \_\_\_\_\_ NTU

**SAMPLE COLLECTION INFO: CIRCLE ALL APPLICABLE INFORMATION IN EACH SECTION**

GRAB POLE

LOOKING DOWNSTREAM

RIFFLE RUN POOL

Sample Collected: \_\_\_\_\_ QC SAMPLE NAME: \_\_\_\_\_

E. COLI METALS NUTRIENTS SSC INORGANICS

**E. COLI: CIRCLE AND FILL IN APPLICABLE INFORMATION**

COLLECTED: \_\_\_\_\_ INCUBATED: \_\_\_\_\_ COATED: \_\_\_\_\_ LG. WELL: \_\_\_\_\_ SM. WELL: \_\_\_\_\_ MPN

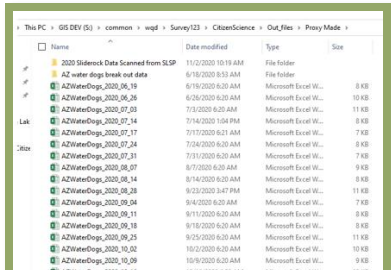
REGULAR: \_\_\_\_\_ AM \_\_\_\_\_ AM \_\_\_\_\_ AM

DUPPLICATE: \_\_\_\_\_ AM \_\_\_\_\_ AM \_\_\_\_\_ AM

BLANK: \_\_\_\_\_ NA \_\_\_\_\_ AM \_\_\_\_\_ AM \_\_\_\_\_ PM



# Data Conversion

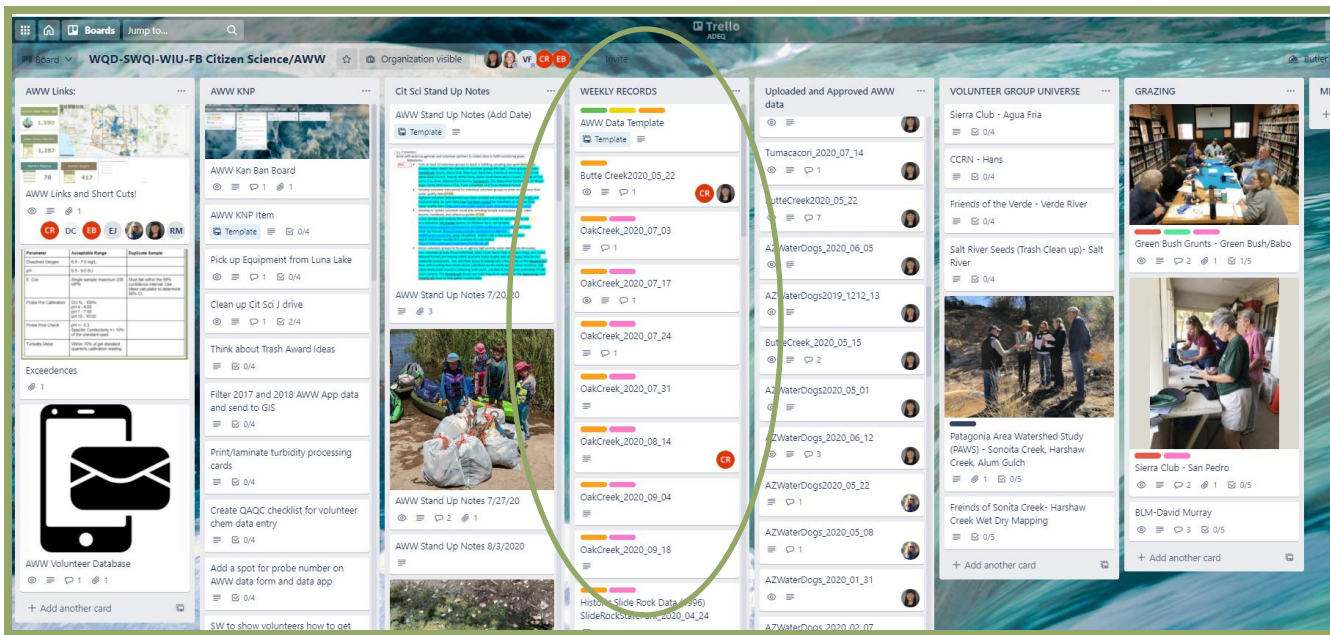


**Step 1:** Data is pulled from the cloud using a GIS model

WQ Number	Agency	Agency Type	Sample ID	Sample Type	Date/Time	Depth	Method	Stream	Reporting Point	Results	Unit	Dilution	In Quality	Fish Quality	In Quality	Site ID	Comment	Comments	Substance	Emp	MCL
11515	ADEQ	VOL	Black Camp F	R	03/08/202 0946	0	Field			5.85	MG/L					MS14	MBGLA02-AZWaterDogs B01: DISSOLVE	Dissolved Water			
11515	ADEQ	VOL	Black Camp F	R	03/08/202 0946	0	Field			99.1	PERCENT					MS14	MBGLA02-AZWaterDogs B01: DISSOLVE	Dissolved Water			
11515	ADEQ	VOL	Black Camp F	R	03/08/202 0946	0	Field			796.1	UMH/CM					MS14	MBGLA02-AZWaterDogs B01: DISSOLVE	Specific c Water			
11515	ADEQ	VOL	Black Camp F	R	03/08/202 0946	0	Field			22.7	DEG C					MS14	MBGLA02-AZWaterDogs B01: DISSOLVE	Temperature Water			
11515	ADEQ	VOL	Black Camp F	R	03/08/202 0946	0	Field			16.82	DEG C					MS14	MBGLA02-AZWaterDogs B01: DISSOLVE	Temperature Water			
11515	ADEQ	VOL	Black Camp F	R	03/08/202 0946	0	Field			507.03	MG/L					MS14	MBGLA02-AZWaterDogs B01: DISSOLVE	Total Diss Water			
11515	ADEQ	VOL	Black Camp F	R	03/08/202 0946	0	Field			1.36	NTU					MS14	MBGLA02-AZWaterDogs B01: DISSOLVE	Turbidity Water			
11515	ADEQ	VOL	Black Camp F	R	03/08/202 0946	0	Field			7.76	SU					MS14	MBGLA02-AZWaterDogs B01: DISSOLVE	pH			
11515	ADEQ	VOL	Bumble B.F	R	03/08/202 1138	0	Field			5.71	MG/L					MS14	MBGM02-AZWaterDogs B02: DISSOLVE	Dissolved Water			
11515	ADEQ	VOL	Bumble B.F	R	03/08/202 1138	0	Field			105.4	PERCENT					MS14	MBGM02-AZWaterDogs B02: DISSOLVE	Dissolved Water			
11515	ADEQ	VOL	Bumble B.F	R	03/08/202 1138	0	Field			879.8	UMH/CM					MS14	MBGM02-AZWaterDogs B02: DISSOLVE	Specific c Water			
11515	ADEQ	VOL	Bumble B.F	R	03/08/202 1138	0	Field			21.8	DEG C					MS14	MBGM02-AZWaterDogs B02: DISSOLVE	Temperature Water			
11515	ADEQ	VOL	Bumble B.F	R	03/08/202 1138	0	Field			13.51	DEG C					MS14	MBGM02-AZWaterDogs B02: DISSOLVE	Temperature Water			
11515	ADEQ	VOL	Bumble B.F	R	03/08/202 1138	0	Field			567.84	MG/L					MS14	MBGM02-AZWaterDogs B02: DISSOLVE	Total Diss Water			
11515	ADEQ	VOL	Bumble B.F	R	03/08/202 1138	0	Field			5.25	NTU					MS14	MBGM02-AZWaterDogs B02: DISSOLVE	Turbidity Water			

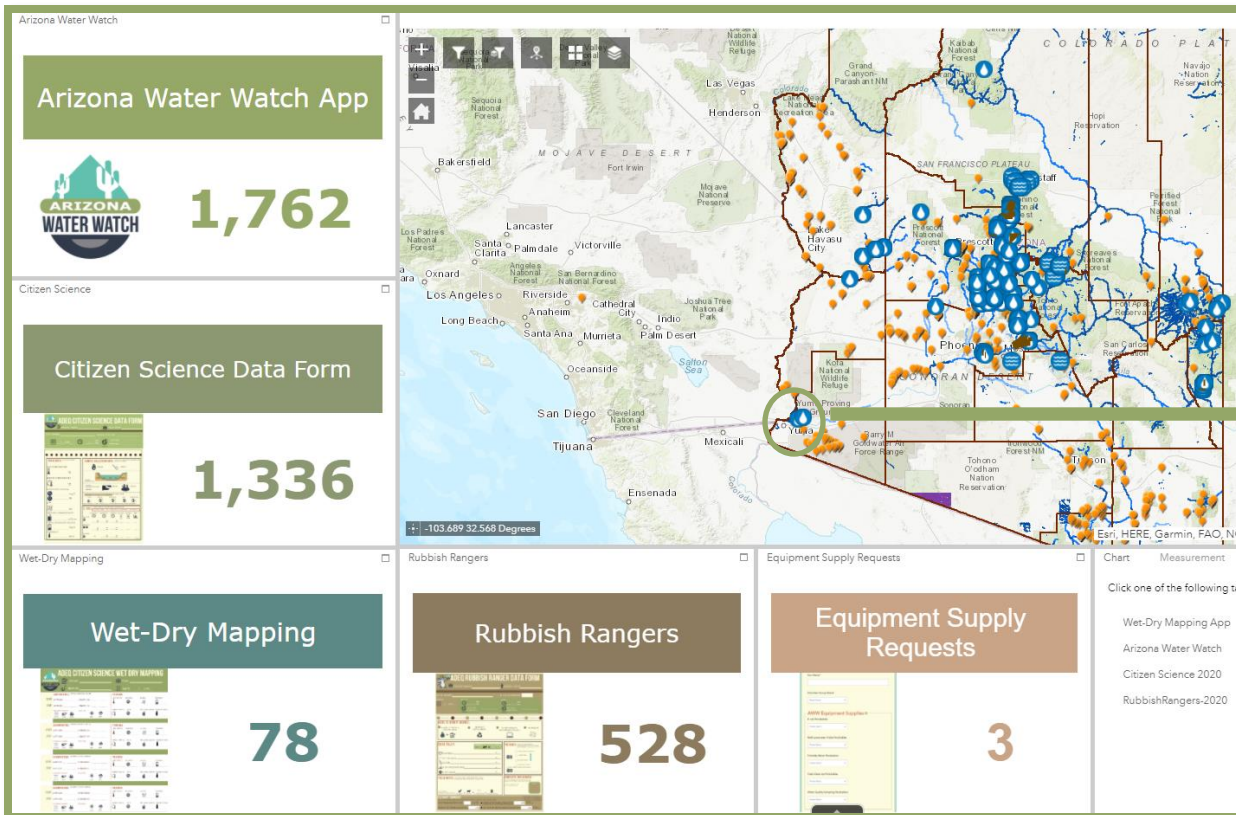


**Step 2:** Data runs through a python script to make sure ADEQ's Water Quality Database will accept the upload



**Step 3:** A proxy is made for each excel sheet submitted, ADEQ staff champion a proxy

# QAQC Process – upload to WQX



Field Data	Collection Date
12/19/2020, 12:00 PM	10:02
Air Temperature (°C)	12.60
Water Temperature (°C)	8.56
Dissolved Oxygen (mg/L)	8.84
Dissolved Oxygen (%)	76.10
pH (SU)	7.95
Specific Conductivity (uS/cm)	4,013.30

[Zoom to](#)

- Step 1:** Data is viewed in AWW dashboard
- Step 2:** Pre/post equipment calibration checked (automated)
- Step 3:** Notes and photos confirmed



# Upload and Approve

**Step 1:** Data is uploaded to ADEQ's Water Quality Database (WQDB)

**Step 2:** Trip info is added, notes added by reviewer (ex. storm event)

**Step 3:** Internal QA/QC processes applied, exceedances flagged

**Step 4:** Approved and automatically uploaded to WQX

Open data page for volunteers to access their data (excel, shapefile, KML, etc...).



- Wet Dry Mapping
- <http://www.azdeq.gov/azww/wet-dry>



- Arizona Water Watch App
- <http://www.azdeq.gov/node/3784>



- Time Lapse Photography
- <http://www.azdeq.gov/azww>



- Trash Clean Up
- <http://www.azdeq.gov/azww/trash>



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## Arizona Water Watch Website:

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

