

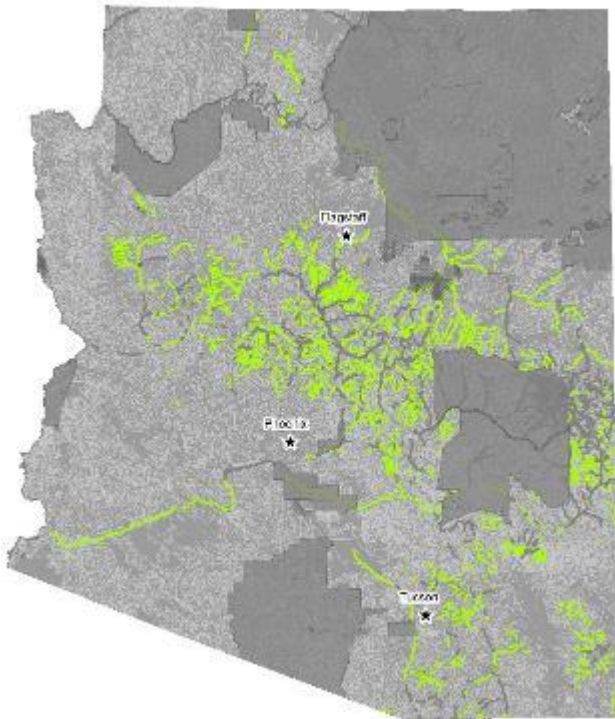
# How Elk Selfies, Midnight Flowing Streams, and 150,000 Time-lapse Images Enabled Arizona to Probabilistically Assess Intermittent Streams for the First Time



Jason D. Jones, Senior Scientist  
March 28, 2019

## Intermittent Stream Universe

6,051 stream miles  
1,450 reaches



5%

Assessed



## The Ecological and Hydrological Significance of Ephemeral and Intermittent Streams in the Arid and Semi-arid American Southwest



RESEARCH AND DEVELOPMENT

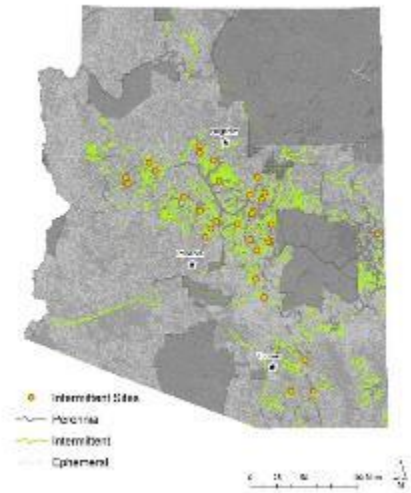
- Wildlife habitat and corridors
- Fish refuge and food source
- Move water, nutrients and sediment throughout watershed
- Hydrologic connections
- Dissipate stream energy during high flows
- Surface and subsurface water storage



# Methods and Monitoring Design

1

Randomly  
Select 32 Sites



2

Photo Monitoring = 2  
pictures per day plus motion



3

Collect chemistry  
quarterly



4

Collect bug and  
habitat data once



5

Process Photos to  
identify flow & wildlife



# Continuous Improvement



M-880 Moultrie  
Trail Camera

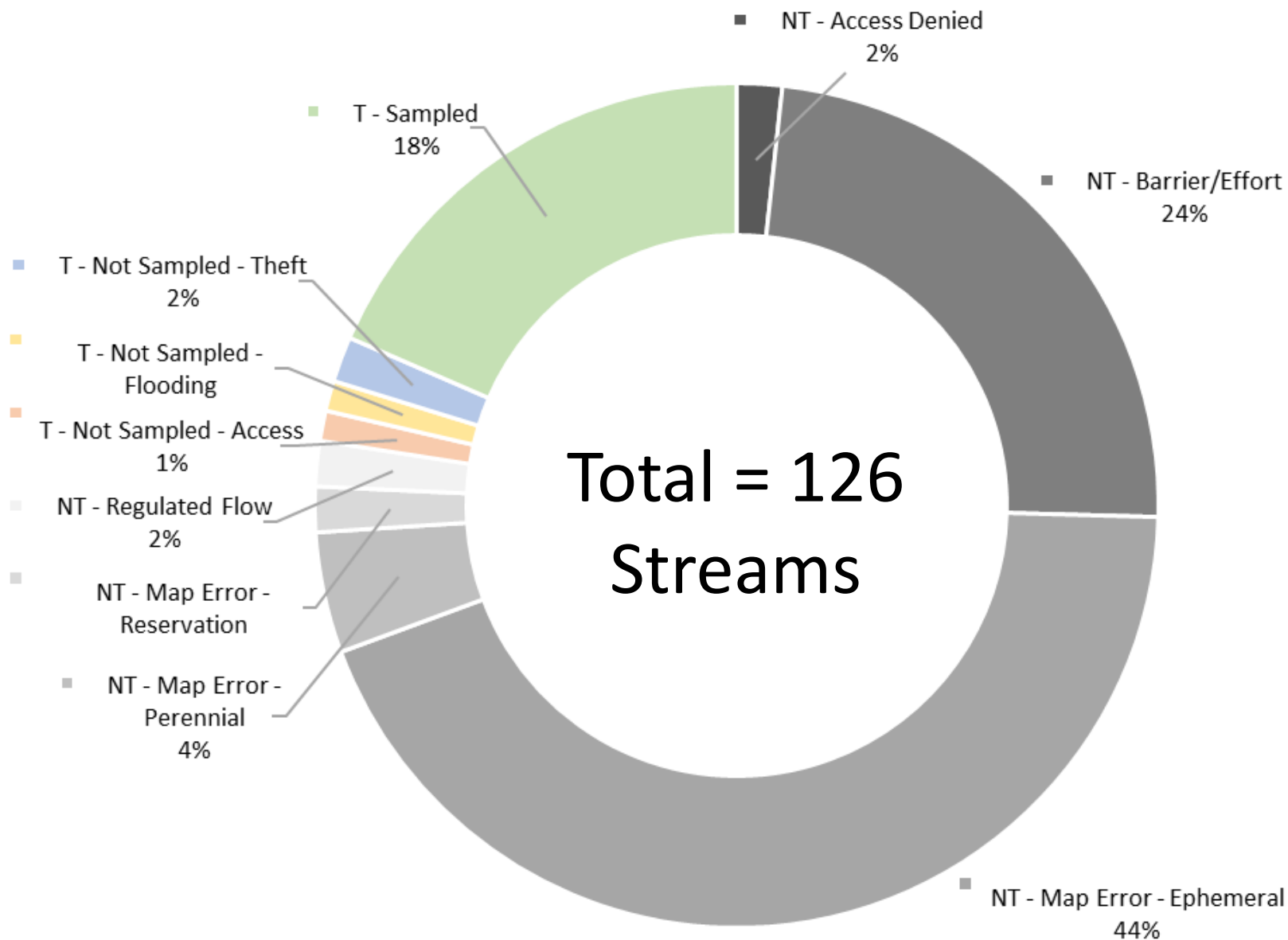


Solar panel and battery in one!

**Total Cost= \$210.00**



# Site Evaluation Results



# Site Evaluation Results



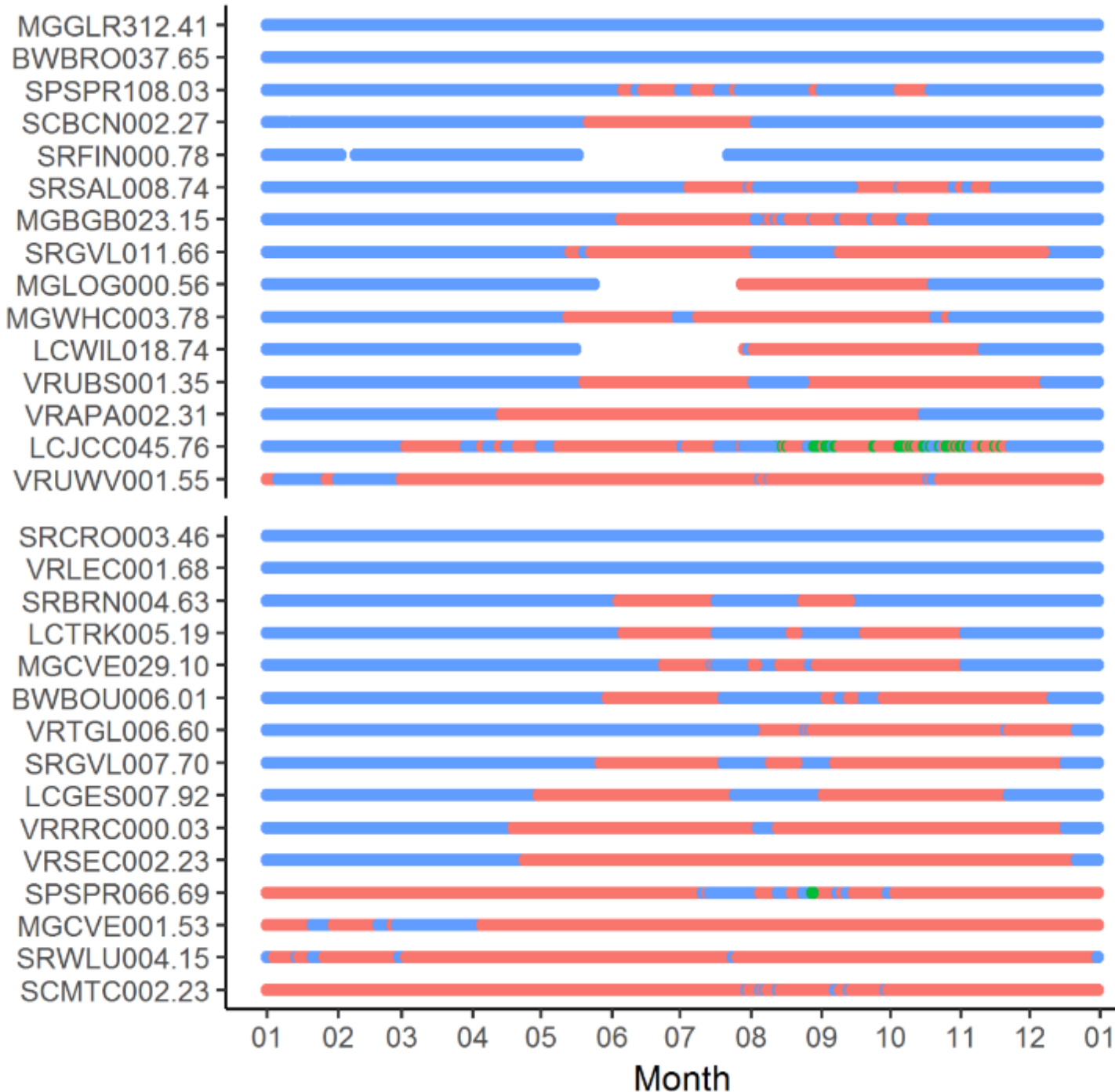






Wet  
Dry  
Missing

Site

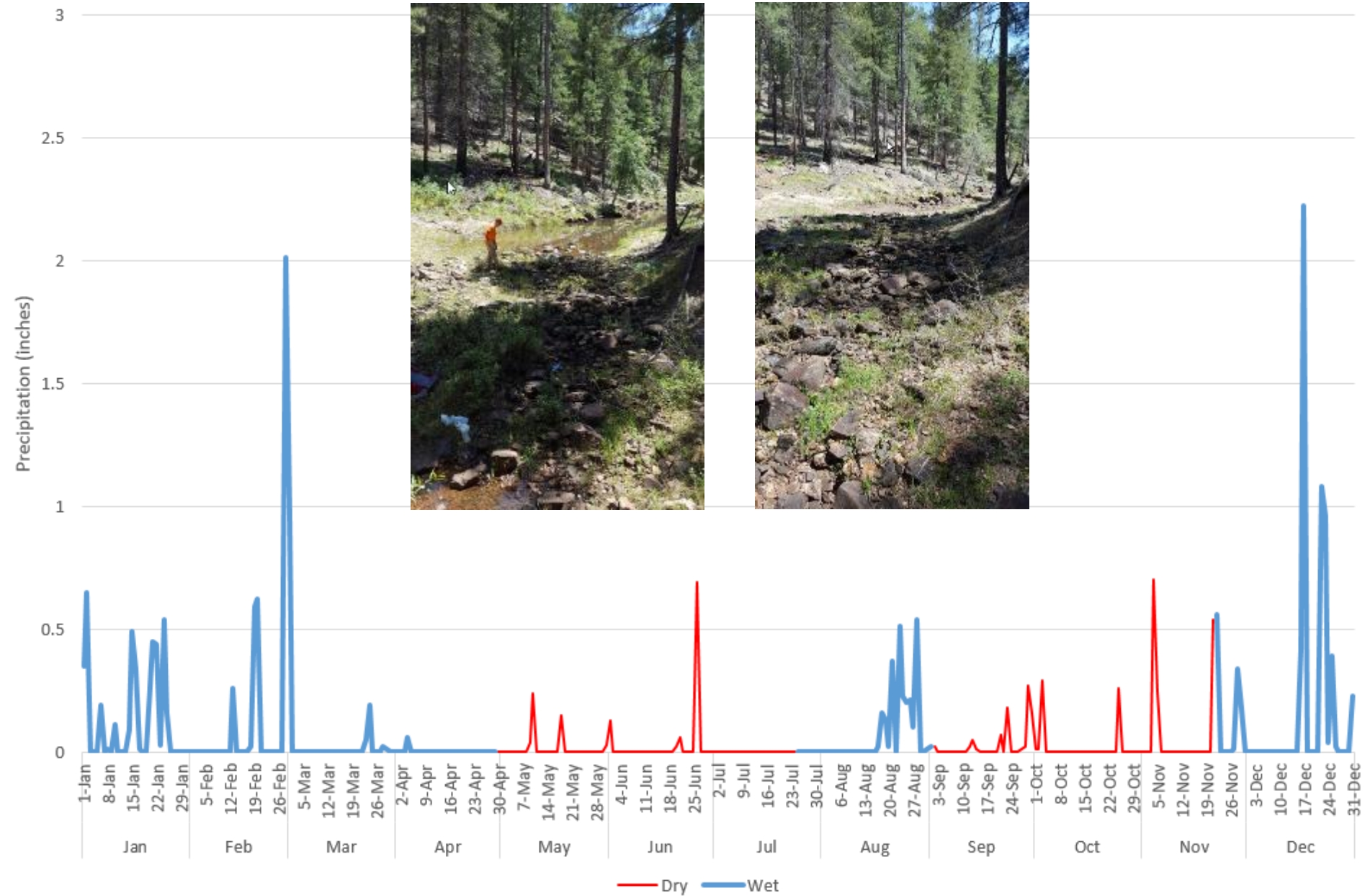


FY16

FY17

Month

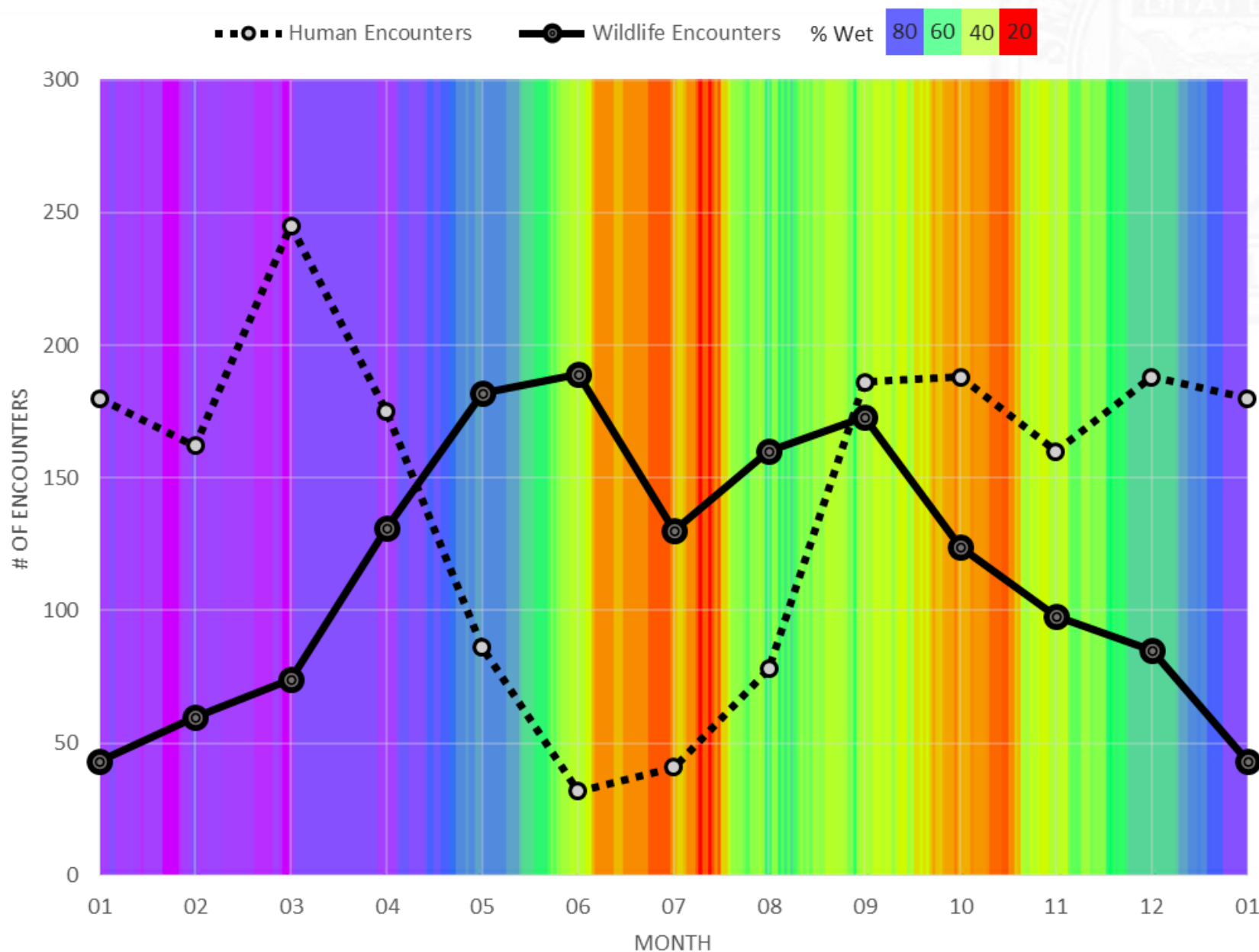
## Daily Flow and Precipitation for GENERAL SPRINGS





# Use of Intermittent Streams

DITAT DEUS





APPLE 7°F 12 SEP 2016 12:13 am



TU 105°F 23 AUG 2016 06:07 pm



BLANKET 44°F 28 APR 2016 06:49 am



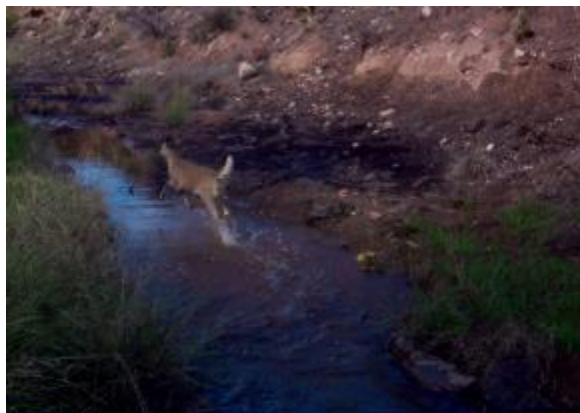
OCEAN 89°F 10 AUG 2016 11:21 am



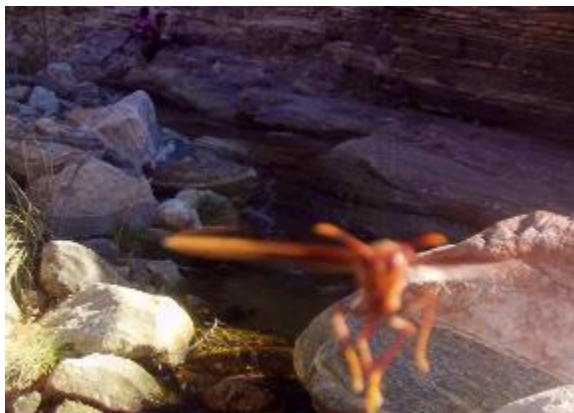
RAINBOW AUR 89°F 16 AUG 2016 03:22 pm



TU 7°F 10 DEC 2016 02:58 pm



NADDOX 60°F 30 OCT 2016 11:24 am



FIRI 84°F 06 DEC 2016 02:10 pm

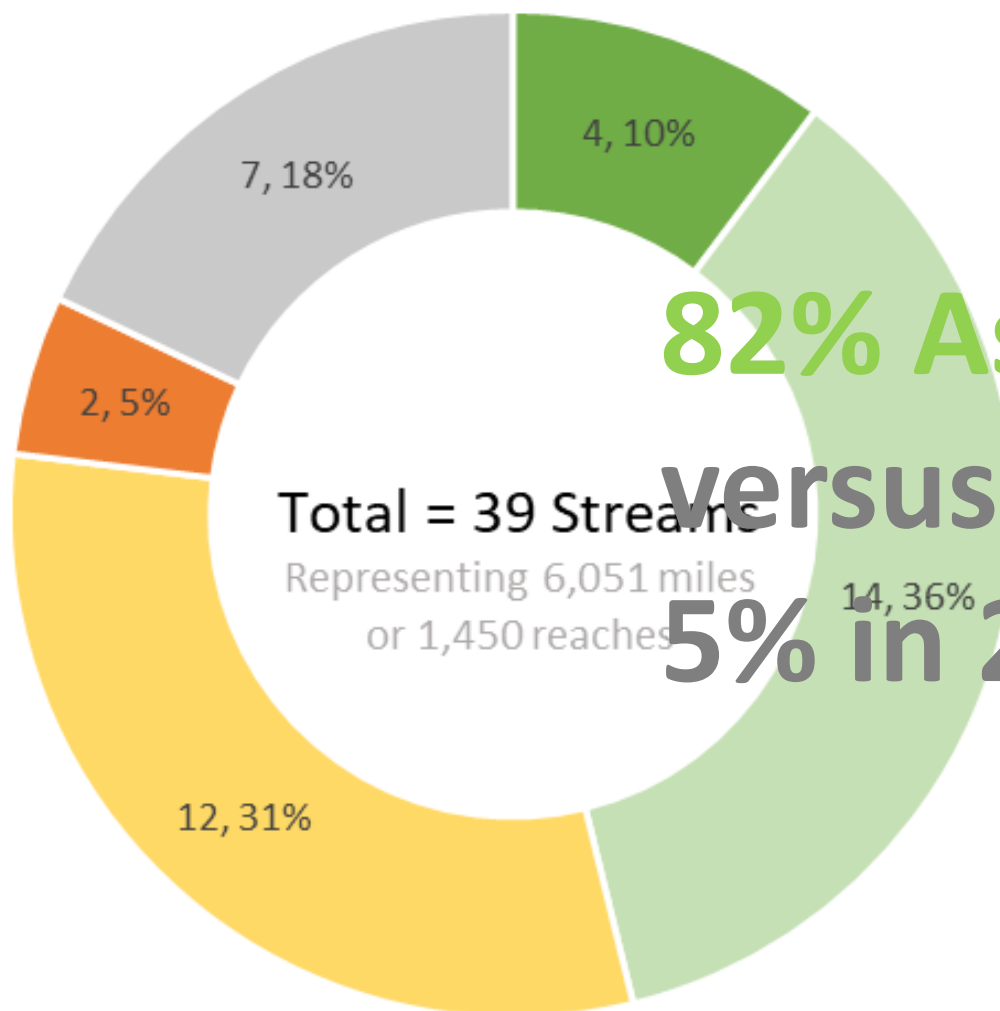


OWEEZ 60°F 13 NOV 2016 11:50 am





# Assessment of Arizona Intermittent Streams

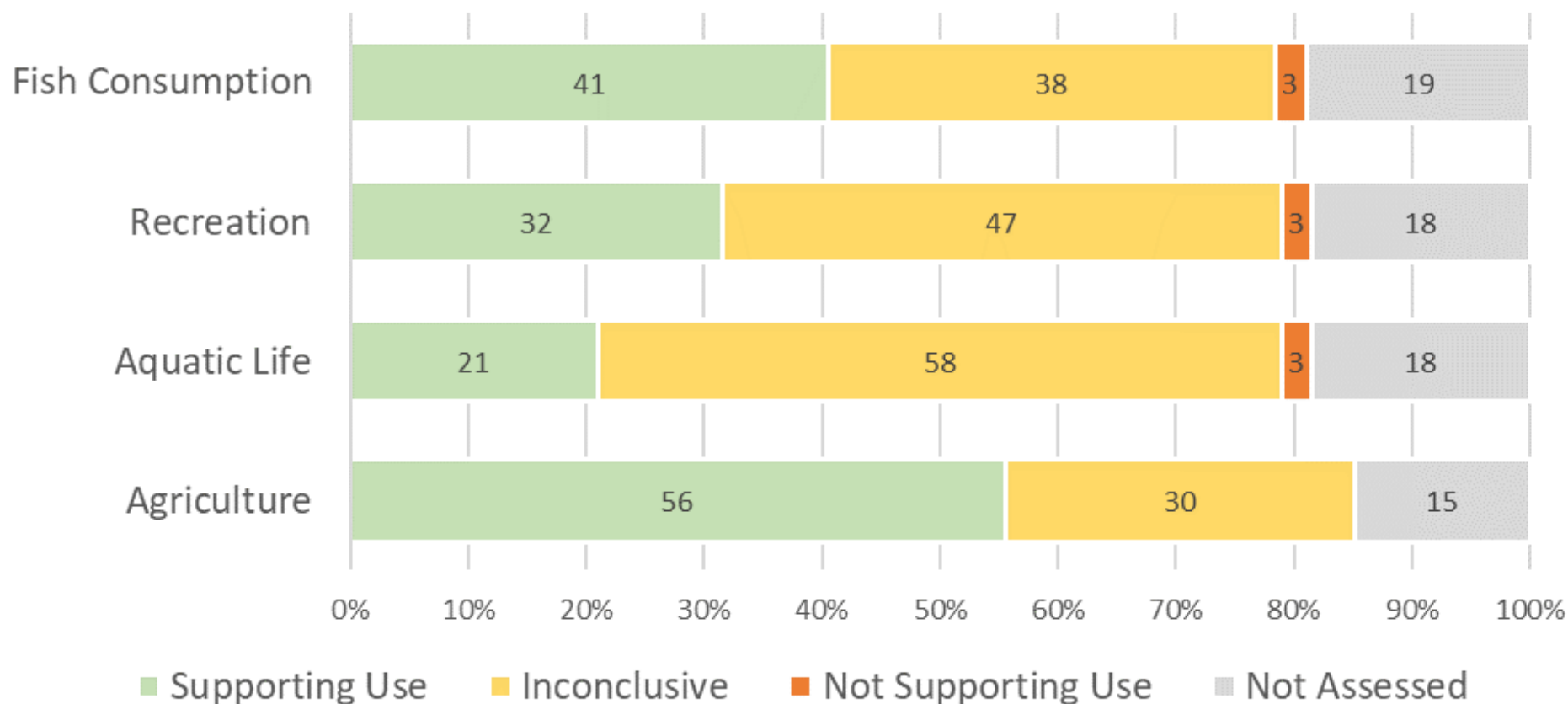


**82% Assessed**  
**versus**  
**5% in 2016**

■ Fully Supporting ■ Partially Supporting ■ Inconclusive ■ Not Supporting ■ Not Assessed

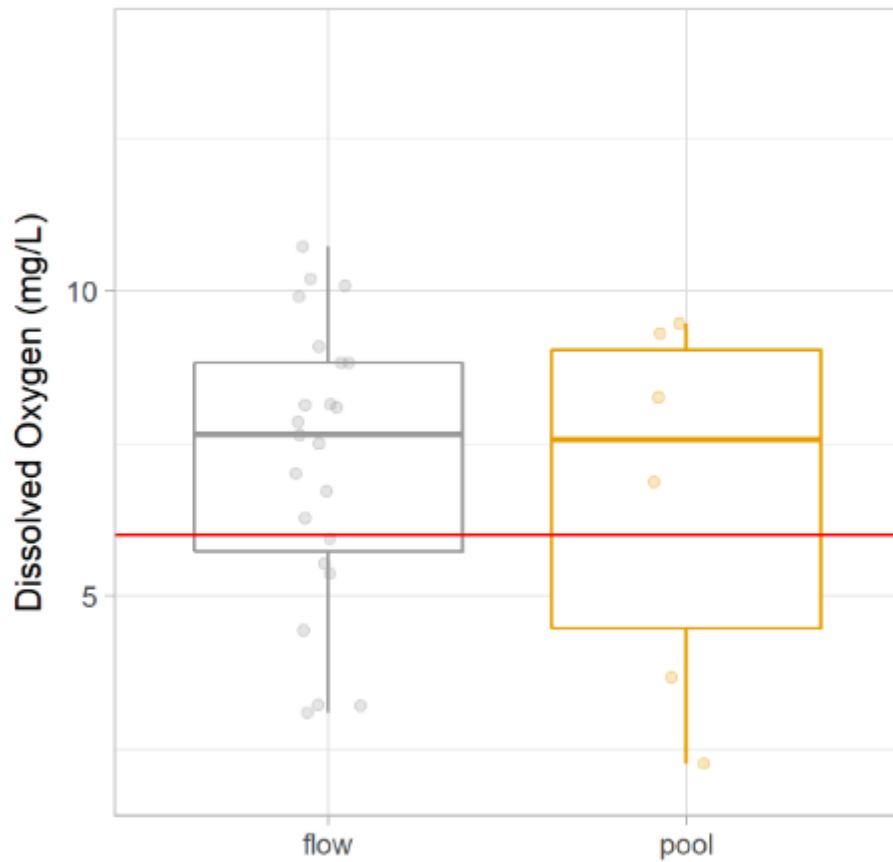


# Assessment by Use

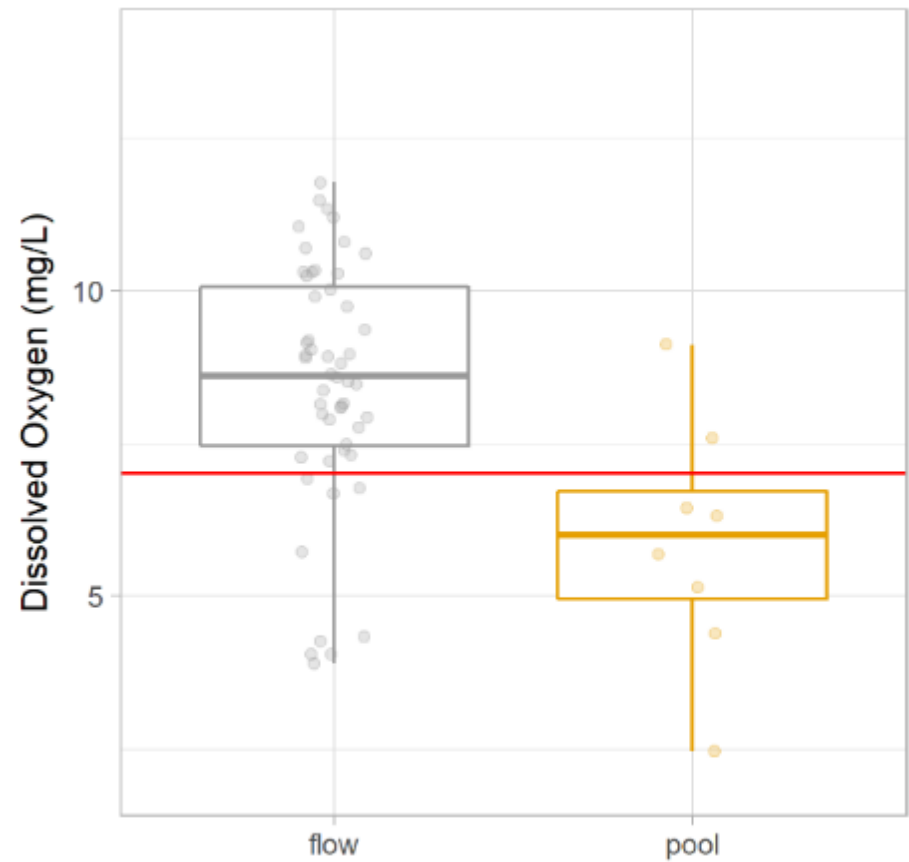


# Dissolved Oxygen Standard

Cold



Warm





- Continue to sample **inconclusives** until an **impairment** or **attainment** decision reached
- Sample **macroinvertebrates** in the winter when flow is more likely to be present
- Incorporate longitudinal analysis of stream flow (**wet/dry mapping**)
- Staff gage each site to quantify flow







Read the Report:

[http://static.azdeq.gov/wqd/reports/int\\_streams\\_2018.pdf](http://static.azdeq.gov/wqd/reports/int_streams_2018.pdf)