

# Moffett Creek Capstone Project

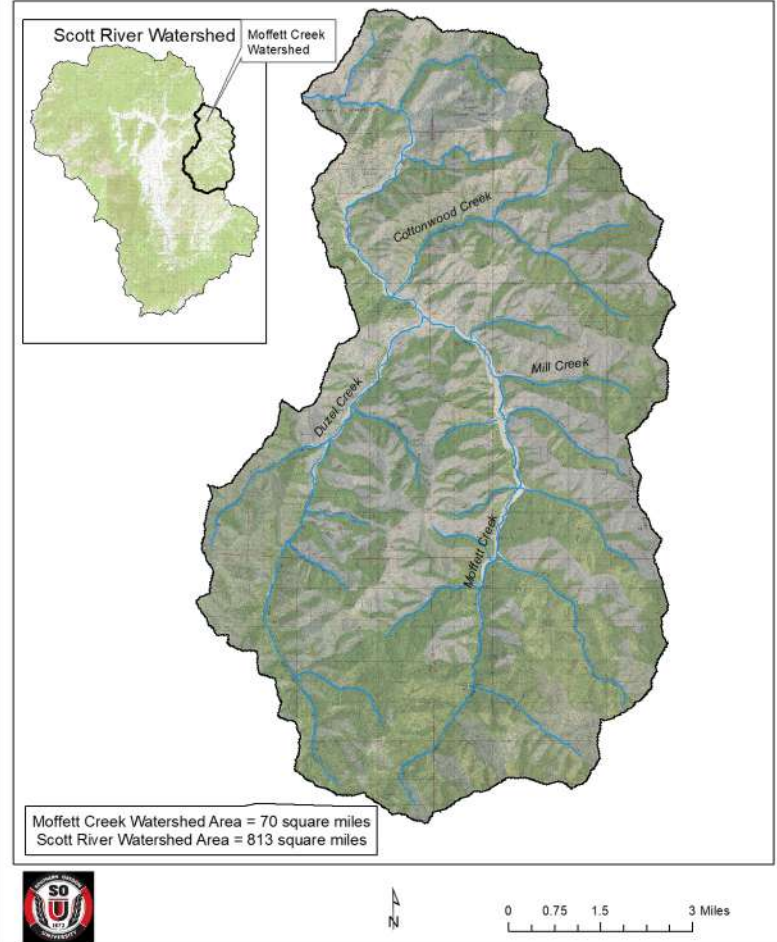
May 24, 2019

Southern Oregon University Environmental Science and Policy  
Scott Ford, Charnna Gilmore and Spencer Mangold

## Watershed Characteristics

- Located in Siskiyou County, Northern California
- Subwatershed of the larger Scott River, and the Klamath River basins
- Moffett Creek contains ~70 square miles
- Distinct seasons of a Mediterranean climate
- Annual precipitation ~ 21”
- Historic home to Shasta Indians
- Private ownership 89%
  - Mixed conifer forest, woodland and brush 63%
  - Rangeland 28%
  - Cropland 8%
  - Urban 1%
- Disadvantaged communities: \$38,524 average household income (Siskiyou County, 2018)

## Moffett Creek Capstone Project



Under section 303(d) of the Clean Water Act (CWA), the U.S. Environmental Protection Agency included the Scott River in the list of impaired waters for excessive levels of suspended sediment and elevated water temperature.

In 2005, the North Coast Regional Water Quality Control Board (NCRWQCB) adopted the Action Plan for the Scott River Sediment and Temperature Total Maximum Daily Loads (TMDL).

(California Regional Water Quality Control Board, 2001)

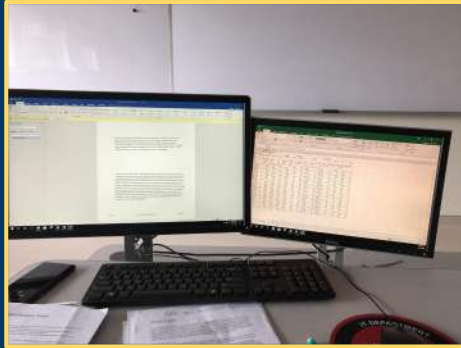


MCCP was designed to utilize field collection and analytical skills developed within the SOU Environmental Science and Policy curriculum to address the following research question:

Can the implementation of restoration techniques address anthropogenic impacts that would result in less degradation and improve water quality for both Moffett Creek and the larger Scott River riverine system?



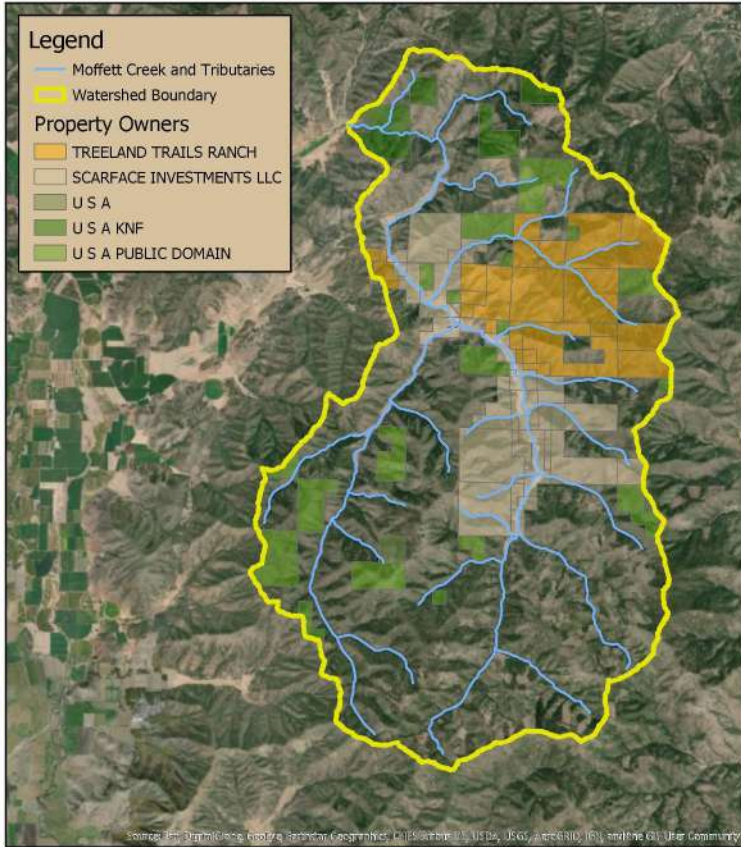
## Data Collection & Analysis



- Soil & Geology Analysis
- Discharge
  - ◆ 2 Flow Stations
- Turbidity
  - ◆ 5 Collection Stations
- Localize Precipitation
- Groundwater and Surface Water Elevations
  - ◆ 10 Groundwells & 4 Surface Ponds
- Survey Channel Configuration
- Historic data, points and documents



# Moffett Creek Property Ownership



Map Created by Scott Ford  
February 26, 2019  
Data retrieved from Siskiyou County Assessor, NRCS  
NAD 1983 State Plane California Fips 0401 Feet

0 1 2 4 Miles



## Partnerships

3 Landowners ~ 15,000 acres

- Scarface Investment LLC
- Treeland Trails Ranch
- Klamath National Forest



CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY  
NORTH COAST REGIONAL WATER QUALITY CONTROL BOARD

## MOFFETT CREEK SOIL MAP

— Moffett Creek and Tributaries

■ Moffett Watershed Boundary

### Map Unit Description & Slope %

- Bonnet loam; 0-2%
- Bonnet gravelly loam; 0-2%
- Bonnet gravelly loam; 2-5%
- Chaix-Chawanakee gravelly coarse sandy loams; 5-30%
- Dubakella-Ipish; 5-30%
- Dubakella-Ipish; 30-50%
- Duzel gravel - 5-9%
- Duzel-Jilson-Facy complex; 15-50%
- Jilson gravelly loam; 50-60%
- Jilson-Duzel gravelly loam; 5-50%
- Kindig-Neuns gravelly loam; 50-60%
- Lithic Haploxerolls-Rock outcrop complex; 0-65%
- Lithic Xerorthents-Rock outcrop complex; 0-65%
- Marpa-Kinkel-Boomer, cool complex; 15-50%
- Rock outcrop-Dubakella complex; 30-50%
- Rock outcrop-Dubakella complex; 30-50%
- Stoner gravelly sandy loam; 2-5%
- Weitchpec variant-Rock outcrop complex; 5-65%
- Xerofluvents; <1%
- <all other values>

0 0.75 1.5 3 Miles

Map created by Charma Gilmore  
February 26, 2019

Data retrieved from NRCS Soil Survey  
NAD 1983 UTM Zone 10

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), Swisstopo, © OpenStreetMap contributors, and the GIS User Community

## Geology

### Watershed Investigation Report **MOFFETT CREEK**

SISKIYOU COUNTY, CALIFORNIA

SEPTEMBER 1971

Type 50 Library Copy

Siskiyou National Conservation District  
P.O. Box 641  
Fort Jones, CA 96022

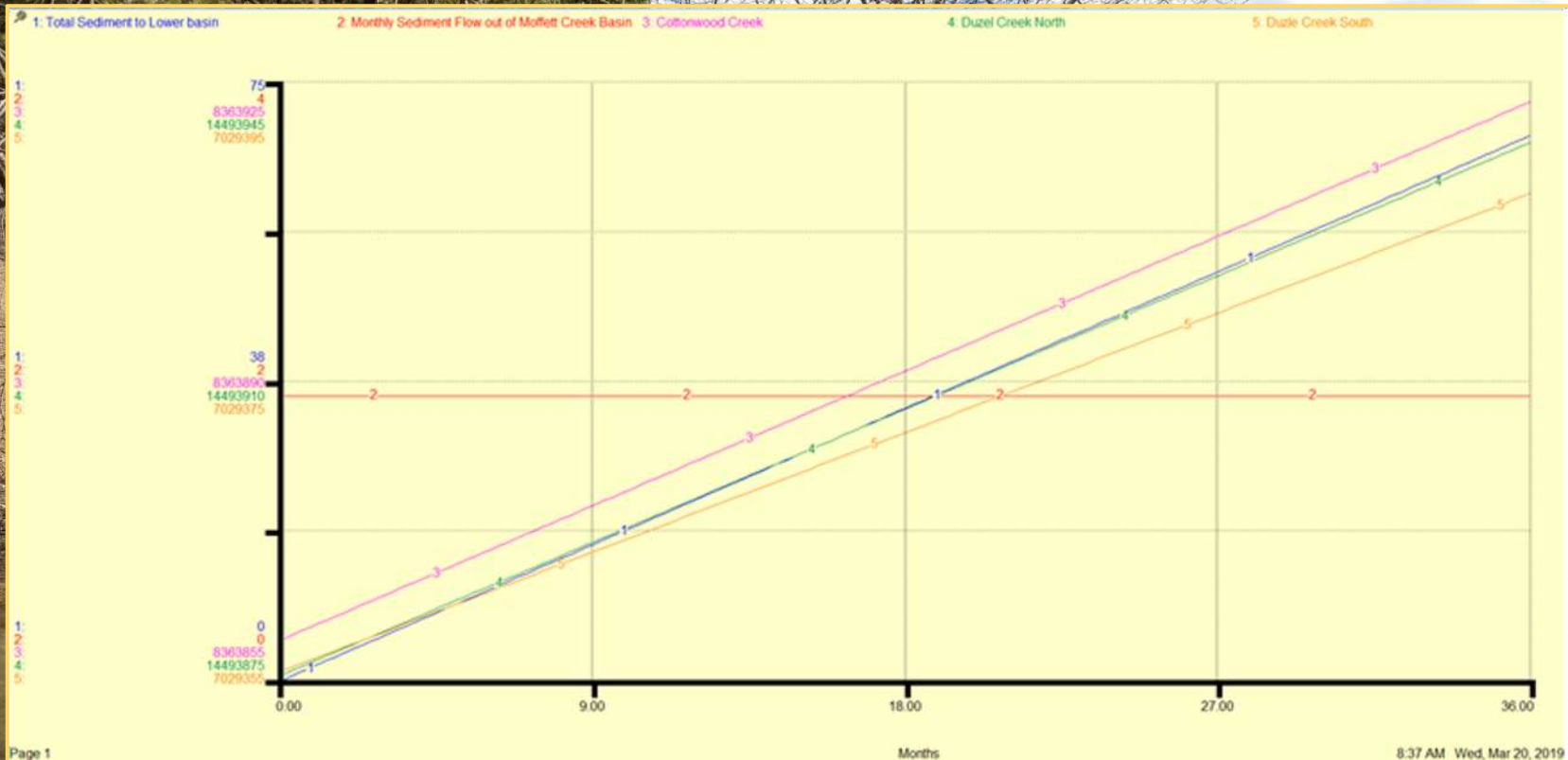


UNITED STATES DEPARTMENT OF AGRICULTURE  
RIVER BASIN PLANNING STAFF  
BERKELEY, CALIFORNIA 94704





# Soil Model Result



## Turbidity

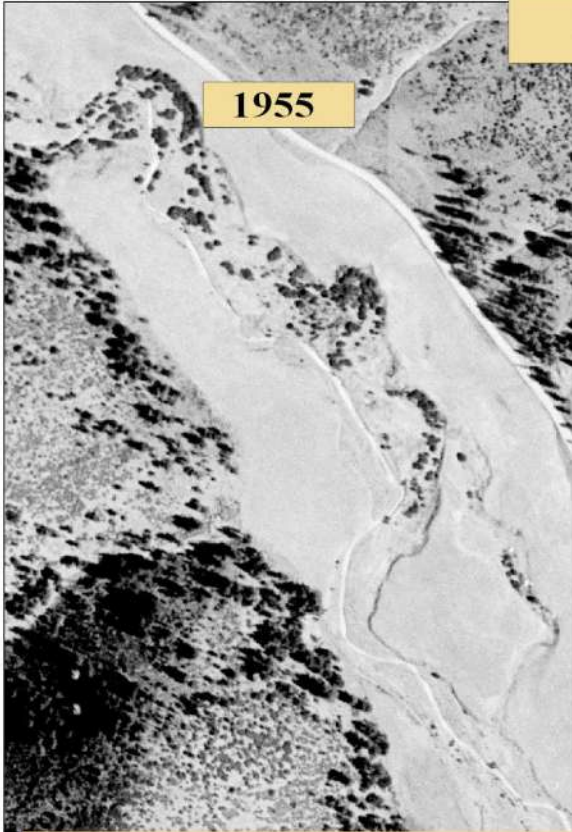
	Station 1 Lower Transect	Station 2 First Bridge	Station 3 Second Bridge	Station 4 Scarface Bridge	Station 5a Upper Transect	Station 5b Upstream Branch	Station 5c East Branch
Min	0.31	0.44	0.39	0.89	0.42	0.38	0.57
Max	9.57	11.33	10.07	15.9	31.33	41.24	5.74
Mean	2.33	2.91	3.12	5.28	5.23	6.03	2.23

- Measured in Nephelometric Turbidity Units (NTU).
- NTU measures the intensity of light scattered through the water sample.
- More light scatter means higher suspended sediment.



## Moffett Creek Watershed Change Over Time

1955



1965



2019



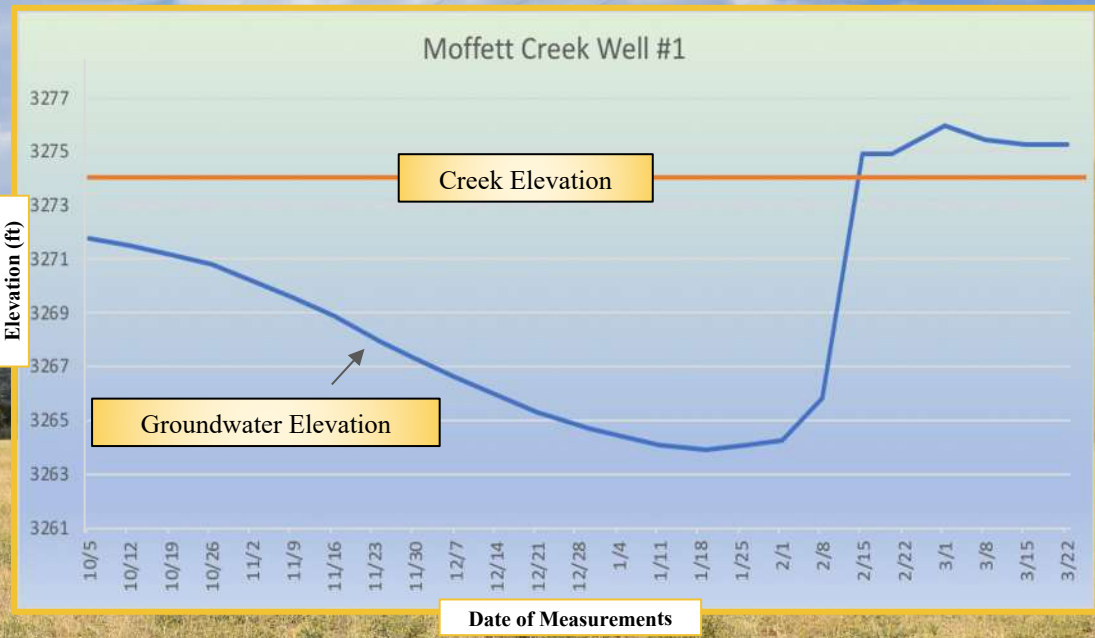
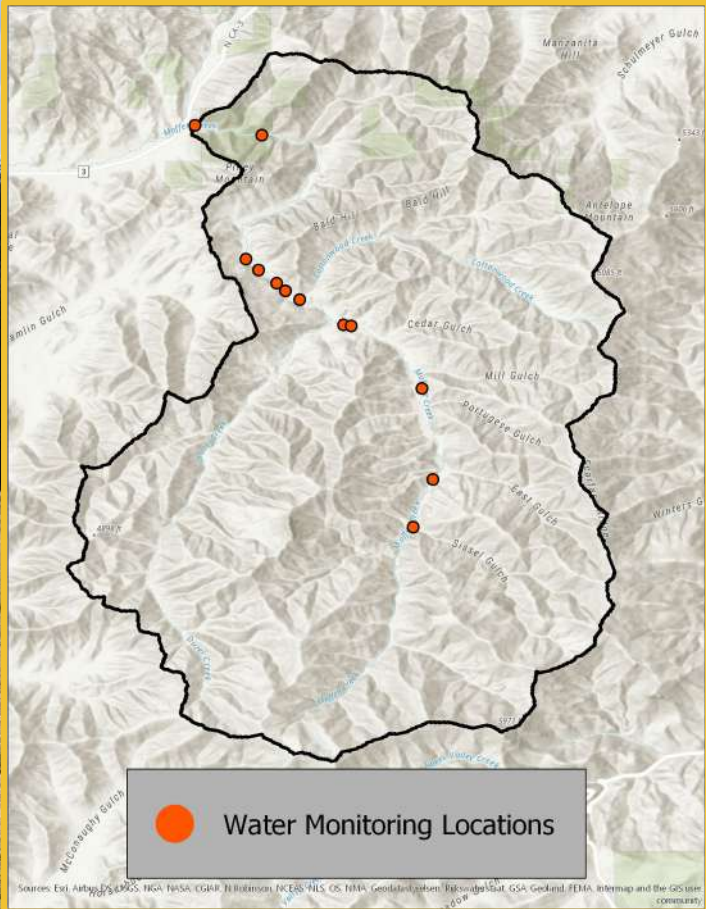
Map created by Charnna Gilmore for Southern Oregon University ES 453 and the Moffett Creek Capstone Project. Historic photo (left) was taken August 12, 1955 and July 19, 1965, and the current photo (right) was taken on April 2, 2011 and updated on May 15, 2019. WGS 1984 UTM Zone 10N

0 0.07 0.15 0.3 Miles



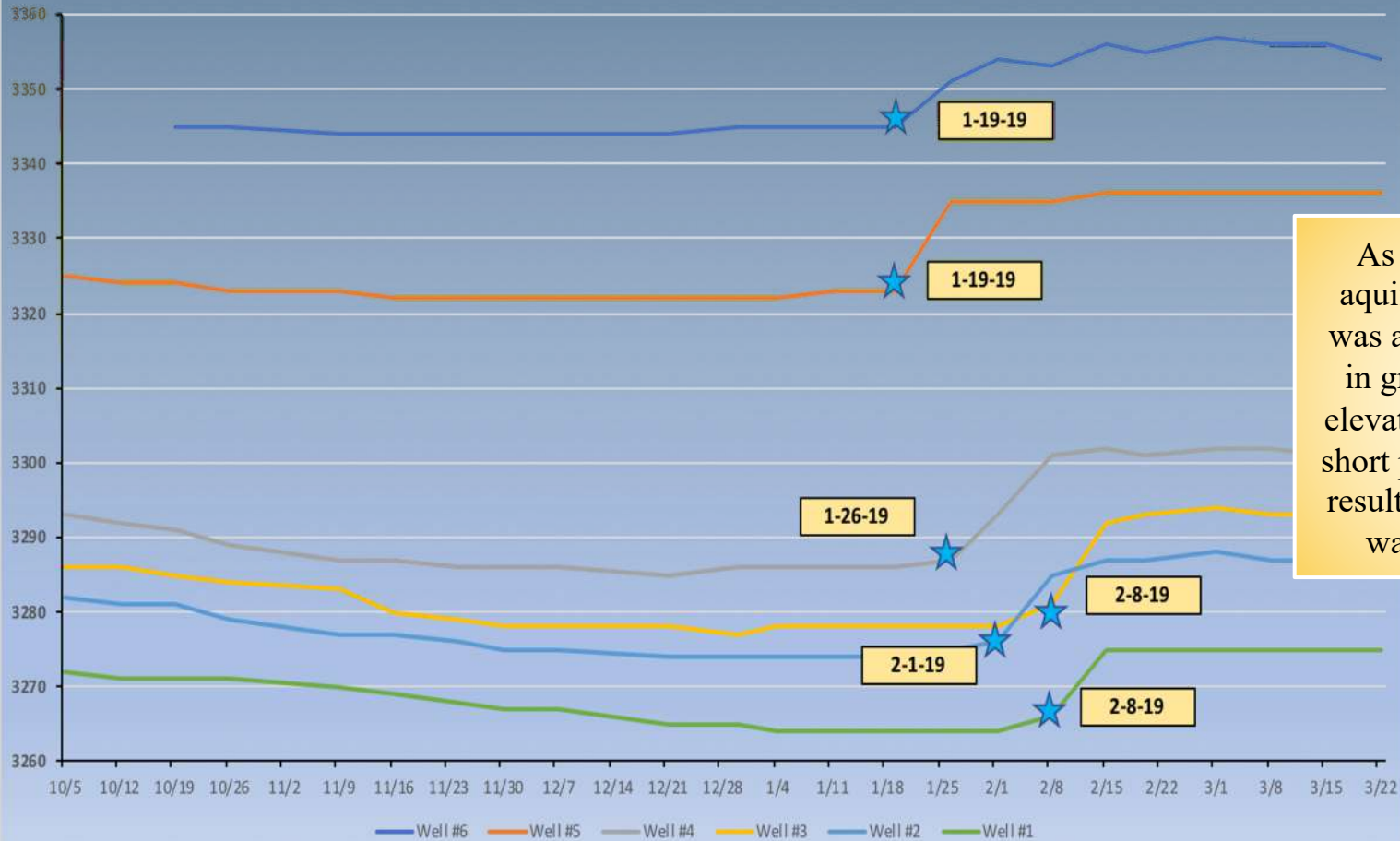


**September 29, 2018 - March 22, 2019**



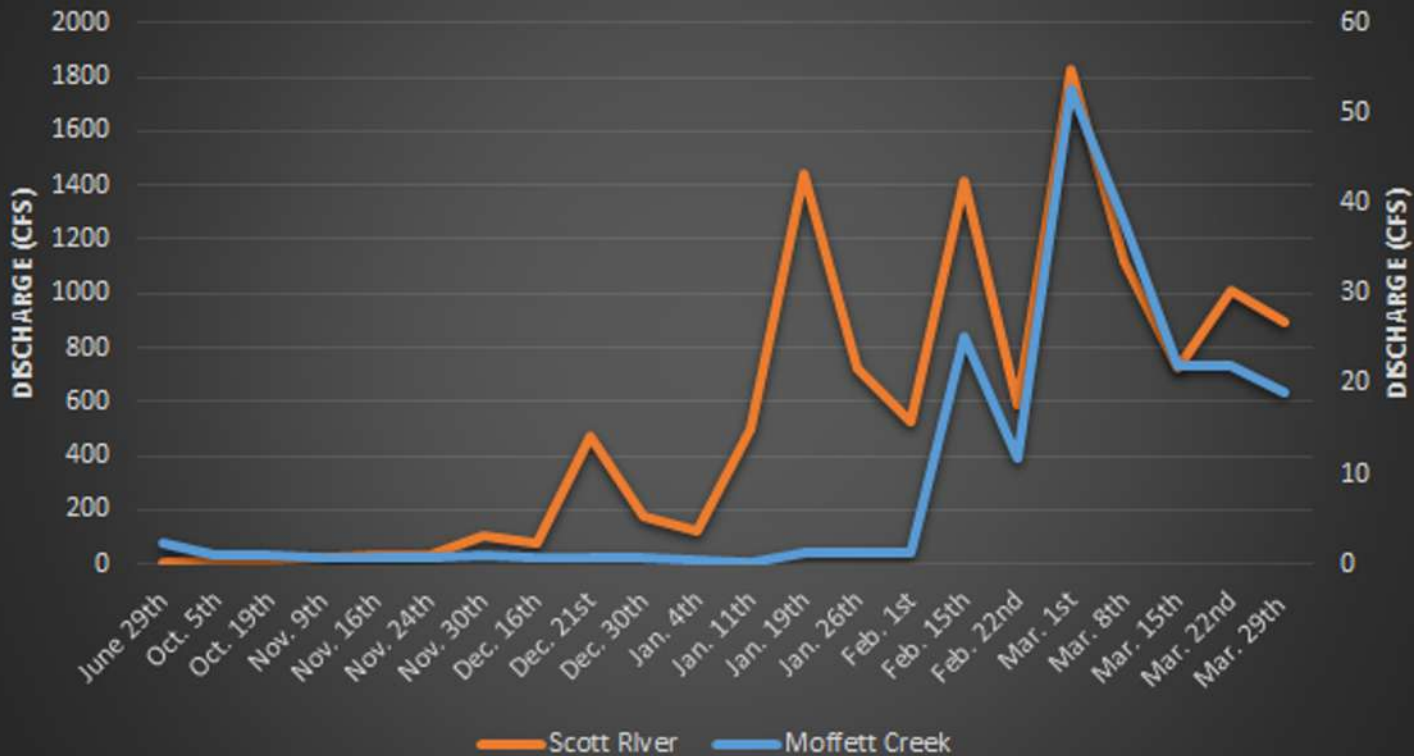
Sources: Esri, Airphoto, ©2005, TRCA, NASA, CGAR, J. Robinson, NCEAS, NLS, OS, NMA, Geostation, zebco, Rakswat, Esri, GSA, GeoInt, FEMA, Intermap and the GIS User community.

### Moffett Creek Water Elevation - Wells #1 through #6



As the Moffett Creek aquifer recharged, there was an observed increase in groundwater surface elevation over a relatively short period of time which resulted in visible surface water flow in creek.

## Scott River versus Moffett Creek







## Moffett Creek Ag Land versus Riparian Area



Created by Charmna Gilmore  
March 11, 2019  
NAD 1983 UTM Zone 10N Map

0 0.3 0.6 1.2 Miles



## Property Ownership: Scarface Investments

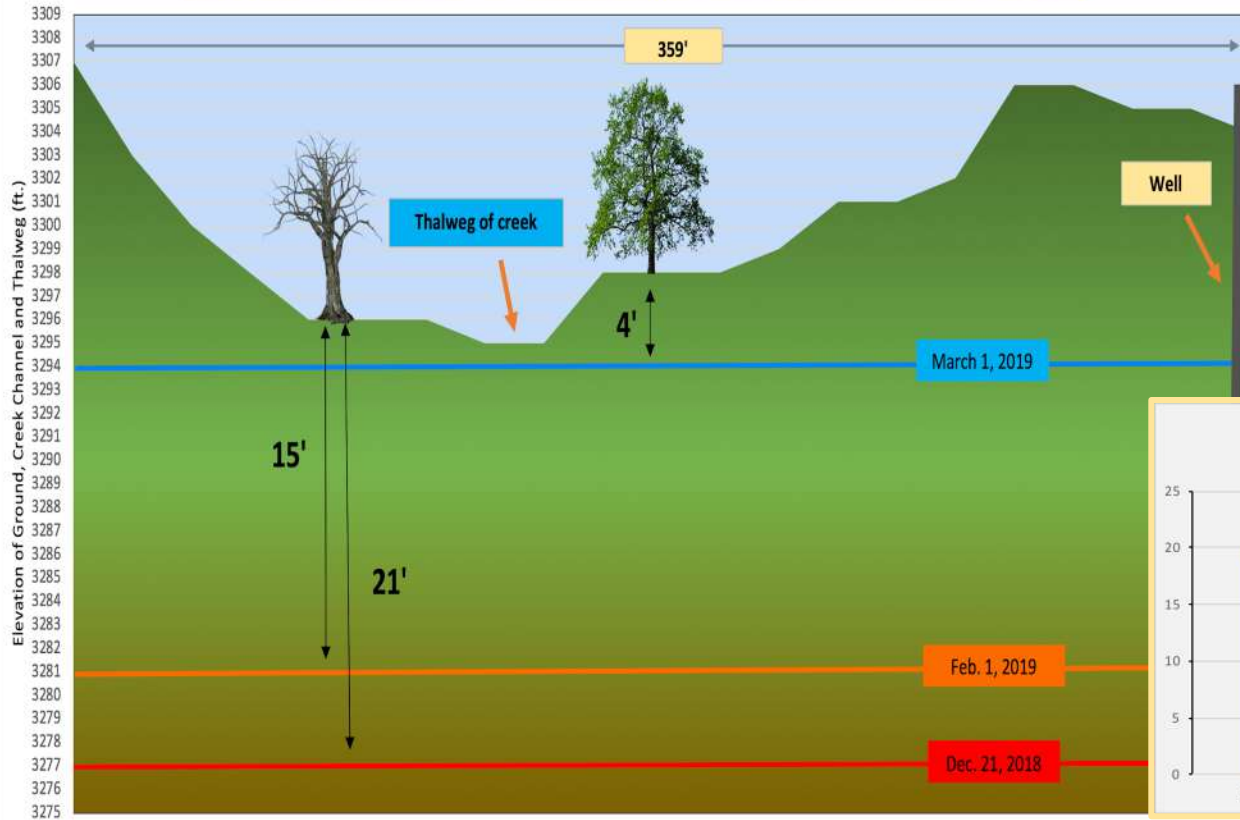
Approximately 6.70 miles

Approximately 492 acres of valley bottom land

Riparian acres (50 ft.) is approximately 116 acres

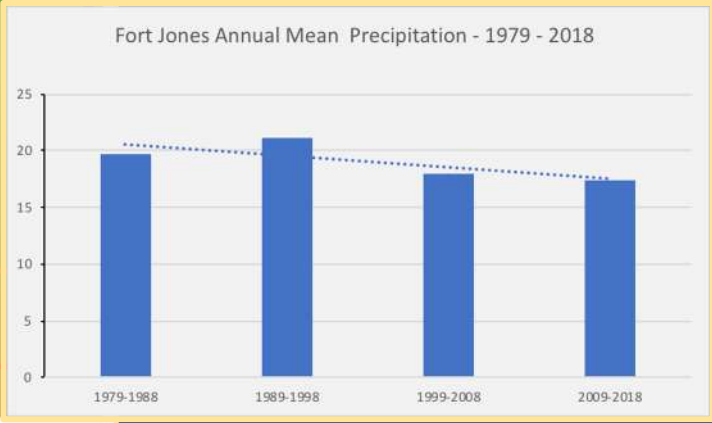


# MOFFETT CREEK GROUNDWATER RELATIONSHIP WITH SURFACE FLOW AND RIPARIAN ROOT ZONE



Moffett Creek Channel Cross Sectional Profile

9-29-18 through 4-12-19  
Average depth to water  
**7.95'**



## Restoration

***“Voluntary conservation should be easier to achieve than it currently is. Complex applications, fees and inconsistencies prevent conservation from getting done.”***

(Ochwat and Schohr, 2008)

***“Reduce permitting time for multi-benefit restoration projects through coordinated and collaborative multi-agency permitting while complying with all applicable laws.”***

(Delta Plan Interagency Implementation Committee, 2018)

**Programmatic Environmental Impact Statement  
for Habitat Restoration Implementation  
in the Moffett Creek Watershed, a Subbasin  
of the Scott River Watershed, Siskiyou County  
November 29, 2018**



## Conclusion and Next Steps

- The low groundwater elevations will present challenges for the establishment of riparian planting.
- Continue to work with landowners to better understand and promote good land stewardship, including fencing riparian zones.
- Develop a restoration plan for the subwatershed that includes the objectives of raising the water table in order to support a riparian zone that will help trap sediment, increase roughness, and promote channel complexity.
- Continue to collect and analyze data to better understand the relationship Moffett Creek has on the larger Scott River system, particularly as it relates to sediment.



# Moffett Creek Capstone Project Cohort 2019/2020



SCOTT RIVER  
WATERSHED COUNCIL



**Special thanks to Southern Oregon University's  
Environmental Science and Policy Department Professors -  
Dr. Alissa Arp, Ms. Eldridge, Dr. John Gutrich, Dr. Charles Lane,  
Dr. Vincent Smith, Dr. Jamie Trammell, and Dr. Rob Strahan**

A copy of our full report will be available by June 15, 2019 at  
<https://www.scottriverwatershedcouncil.com/southern-oregon-university>



# Questions?



## References

- California Regional Water Quality Control Board. 2001. North Coast Regional Water Quality Control Board 303(d) List
- Delta Plan Interagency Implementation Committee. 2018. Statewide Restoration Permitting Initiative Update.
- Ochwat, K. and Schohr, T. 2008. California Restoration and Enhancement Permitting, Challenges to California's Permitting Process for Restoration and Enhancement Project.
- SHN Consulting Engineers and Geologists, Inc. 2003. Moffett Creek Gross Sediment Assessment.
- Western Regional Climate Center. 2019. Fort Jones Ranger Station, California. [www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca3182](http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca3182)

