State of the Cienega Watershed

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OHMi Pima County

Abstract

The Cienega watershed has a great value to the local community because it contains one of the last perennial creeks in Southern Arizona and provides critical habitat for the survival of many species, including some threatened and endangered. This watershed is also very important for ranchers and visitors to beautiful recreation areas, and because it provides clean groundwater and flood control benefits to the City of Tucson. Lately, there have been concerns for the health of this watershed because of the opening of the Rosemont Mine that will be located in this watershed. The purpose of this project is to measure the state of the health of the watershed before, during, and after the mine starts operations. This project is an ongoing participatory effort that aims to assess the state of the watershed, leveraging from data collection activities and studies that already occur in the region. The presentation provides a baseline of the state of the Cienega Watershed that is composed of 20 indicators categorized into (1) climate, (2) water, (3) ecological, and (4) socio-cultural. Through a continuous stakeholder engagement process, the data have been revised and edited, and will be continuously updated to inform management actions.

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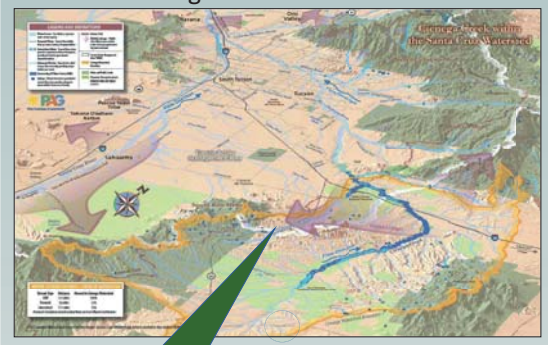
Introduction

The Cienega Watershed contains **one of the few remaining perennial streams in Arizona, with some of the rarest habitats types in the American Southwest**. This watershed includes many active cattle ranches, and is an attractive visitor destination. In addition, this watershed is ***one of the main water sources for Tucson Metropolitan Area***.

Threats

- population growth;
- human development;
- climate change;
- ***opening of the Rosemont copper mine.***

Such a development would likely alter local hydrological systems, and have significant impact on the landscape and ecosystems within the watershed. This plan has raised concerns among different stakeholders.



Objectives

To assess the state of the Cienega Watershed using a participatory approach to inform management actions.

- Identify and prioritize indicators
- Identify sources of data and collect data.
- Determine effective ways to communicate results to the wider public.

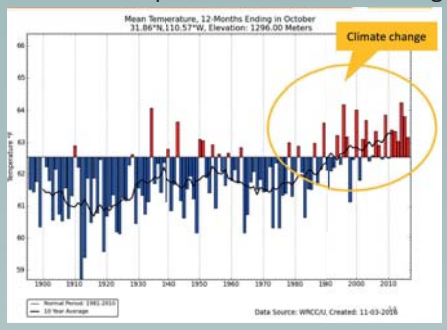
Methods

- Electronic survey to reduce the list of ***indicators.***
- Gather available data, determine ***how best to communicate the data***.
- Present data to stakeholder annually and ***incorporate feedback***.

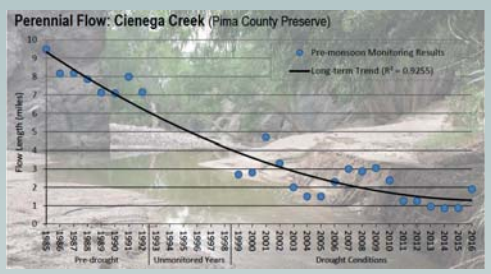
Indicator results

We have a list of **20 indicators** grouped in **4 categories**: ***climate, water, ecological, and socio-cultural***.

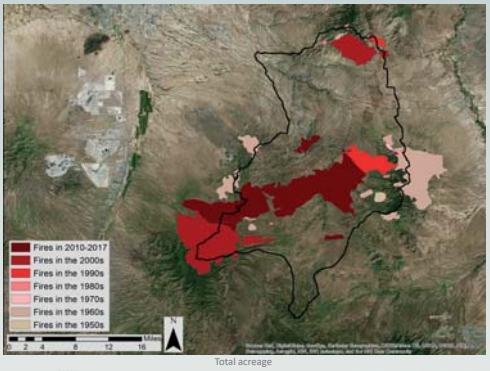
Climate: temperatures have been rising



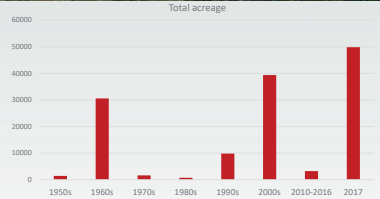
Water: wet lengths of the Cienega Creek have been decreasing significantly over time.



Ecological: wildfires have drastically increased in the last decade.

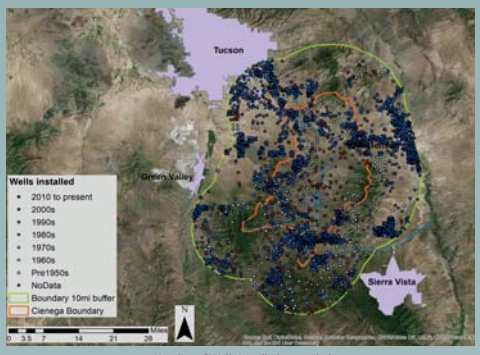


Total acreage



Indicator results

Socio-cultural: number of wells installed has increased over time.



Number of Wells installed - cumulative

Conclusions

Climate and water indicators show negative results, while ecological and social indicators show different trends.

No.	Indicator	Description	Ranking
1	Precipitation	Decrease in winter precipitation in the last 20 years	👎
2	Temperature	Dramatic increase in temperature since 1980	👎
3	Drought	Since the mid 1990s, we have been in a drought with wet swings	👎
4	Groundwater levels	Although there is a slight recent upward trend, current groundwater levels are still lower than they were prior to the 1980s.	👎
5	Wetlands	Baseline produced for spatial location and extent of wetlands for 2017.	👌
6	Wet-dry	Slight increase in 2016, but wet lengths are lower than they were prior to 1999, and significantly lower than the early 1980s.	👎
7	Gauges	Significant decrease in annual average stream flow in Pantano gauge, slight increase in Cienega Creek gauge.	👎
8	Winter stream flows	Decrease in winter stream flows in CC2 (Preserve) and Upper Cienega Creek (BLM), but slight increase in the Empire Gulch (spring source at BLM).	👎
9	Water quality	Preserve - Decrease in TDS, decrease in PH (except in Davidson 2) BLM – no clear trend.	👌
10	Vegetation composition/ cover	Shrub cover has been decreasing due to mesquite removal and prescribed-fire projects. Perennial grass basal cover has declined, but 2015 and 2016 have shown some recovery. Invasive perennial grasses (e.g., Lehman lovegrass) have shown increase. Bare ground has decreased, while litter has increased.	👌
11	Pronghorn	Slight recovering after a decline in population numbers in 2002.	👍
12	Fish	Endangered species recovering since 2014.	👍
13	Frogs	Recovery of endangered species and reduction of invasive species since 2013.	👍
14	Wildfire	Significant acreage burned in the 1960s. Dramatic increase in acreage burned in the 2000s resulting in significant damage to vegetation and infrastructure.	👎
15	Economic vitality	Baseline created for 2016. Median household income is $47K, median house/condo value is $227K, unemployment is 4.88%, residents below poverty level is 6.22%.	👌
16	Land use land cover change	Downward trend in shrub cover since 1379. Increase in development with a peak in 1999 and sight decrease in 2009. No clear trend in other land cover classifications.	👌
17	Number of wells	Peak in number of wells installed in the 1990s and decline in more recent decades. Dramatic upward trend since pre 1990s (cumulative).	👎
18	Archaeological site conditions	Intra-agency collaboration to monitor site conditions consistently.	👌
19	Number of recreational permits	Increase in recreational permits and vistors since 2013, less so in number of schools and organizations.	👍
20	Stewardship engagement programs	13 stewardship engagement programs were identified. The earliest program started operations in the mid 1980s.	👌

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