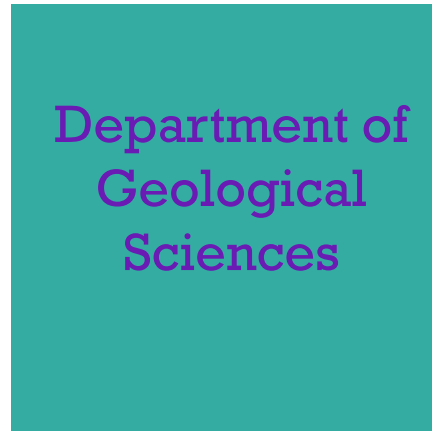




# Water Audit at California State University, Bakersfield (CSUB)



Department of  
Geological  
Sciences



Gurleen Kaur  
and  
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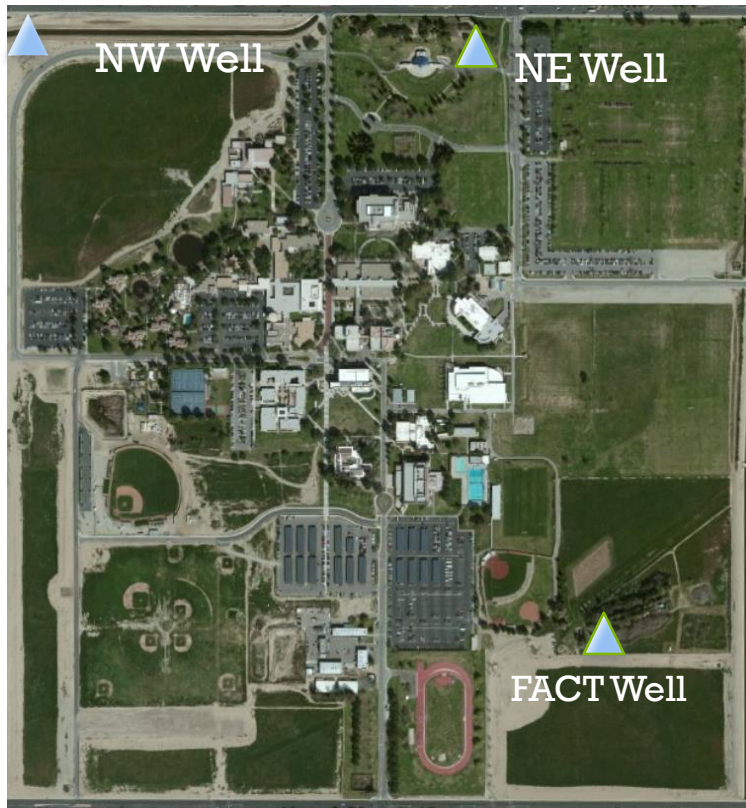
# + Outline

- Introduction
- Water Management Policies at CSUB
- Water Conservation at Other Campuses
- Issues
- Progress
- Conclusion



# + Introduction

- Examined the water table at three wells at CSUB during our Hydrogeology class.
- Consistent downward trend in the water table.
- This made us concerned about the water management at our campus.



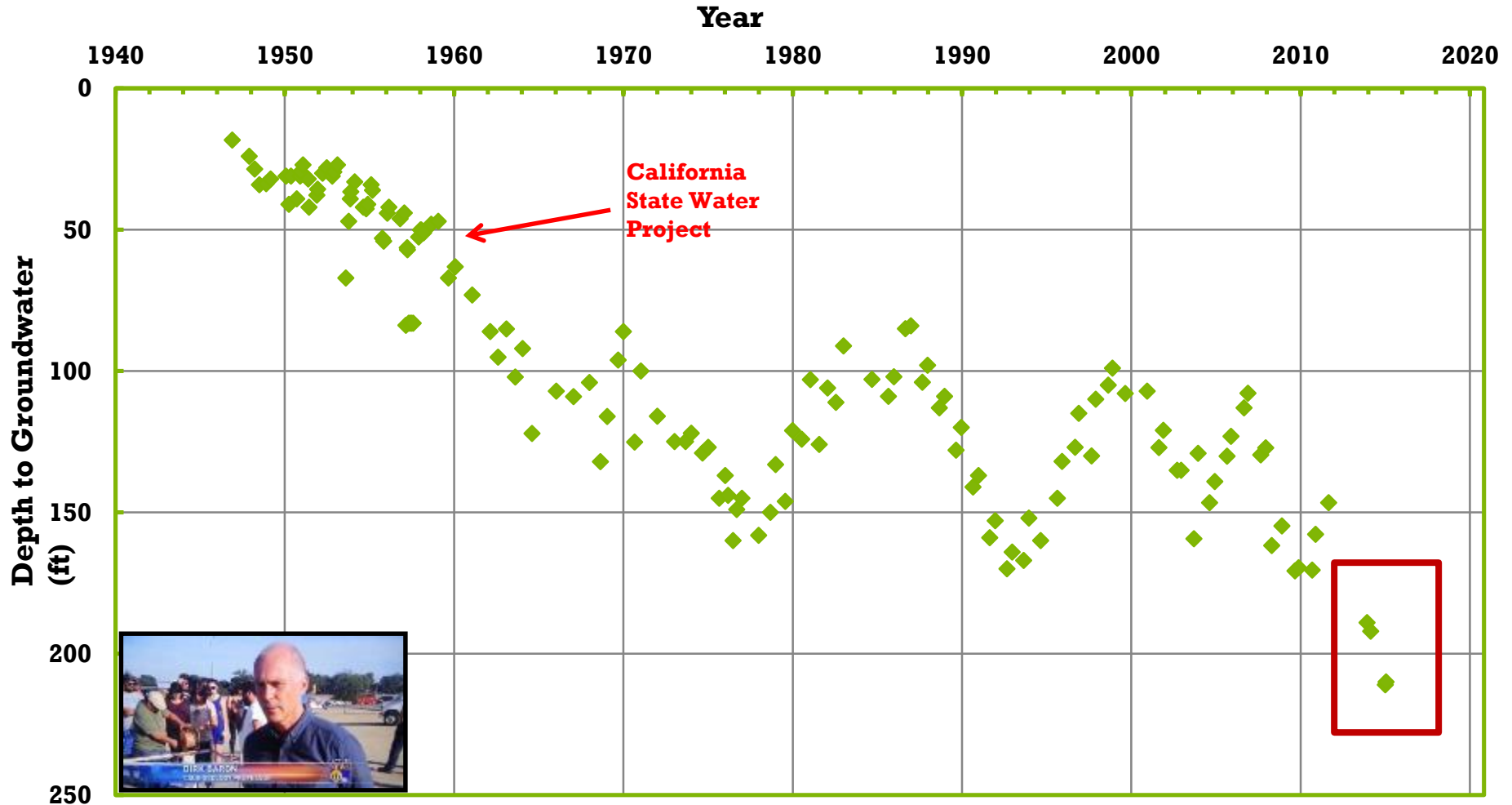
Spring 2011



Spring 2014

# Groundwater Level under CSUB Campus 1945-Present

## Well 30S27E05D001M



Data from CA DWR; 2014 and 2015 measurements from CSUB classes



- We often observed:
  - broken sprinklers,
  - Grass being watered at the wrong time of the day,
  - Overwatering
  - Or watering the walkways.



# + Water Management at CSUB

- Water usage varies season to season:
  - Summer: 3.2 acre feet\*;  
Costs \$40,000.
  - Winter: 0.5 acre feet\*;  
Costs \$6,000.
- The irrigation system is set on an electric timers that are run by a computer that runs 20 hours per day and seven days a week.

\* Landscaping + Building



# + Water Management at CSUB

- The system decides based on the water pressure and other readings to choose the best possible times to water.
- Some of the sprinklers are also not updated.
  - Before development of the campus, the sprinklers had a long range but, with newer developments of buildings and walkways, these sprinklers have to be updated to the correct range, which is an ongoing process.



# + Water Conservation At Other Campuses

## ■ Xeriscaping

- Native vegetation
- Gravel
- Zen Gardens
- Artificial Turf





# + Water Conservation

## ■ Elimination of Turf

- How much will it cost?
- How much water will be saved?
- How do we determine areas that will be zoned out?

Location	Area	
	Square Meters	Square Feet
Nursing School Turnaround	143	1,541
Baseball field parking lot	465	5,007
Facilities	224	2,408
Parking Lot H	1,061	11,423
Behind Runner Bookstore	17,072	183,766
Parking Lot K	25,194	271,191
Parking Lot J	1,295	13,943
Parking Lot I	63,676	685,400
Roadrunner Turnaround	1,530	16,474
SE Polygons(Around SRC, SCI 2, and behind bookstore)	63,352	681,910
<b>TOTAL</b>	<b>174,014 m<sup>2</sup></b>	<b>1,873,064 ft<sup>2</sup></b>

# + Issues

- Cost and Aesthetics
  - Water loving trees that were donated.
  - Changing surrounding landscape would shock trees or drought tolerant vegetation.
  - Costly to remove resulting dead vegetation.
- Drip systems for trees
  - Problems with animals (Kit foxes and squirrels)
    - Costly to replace/repair



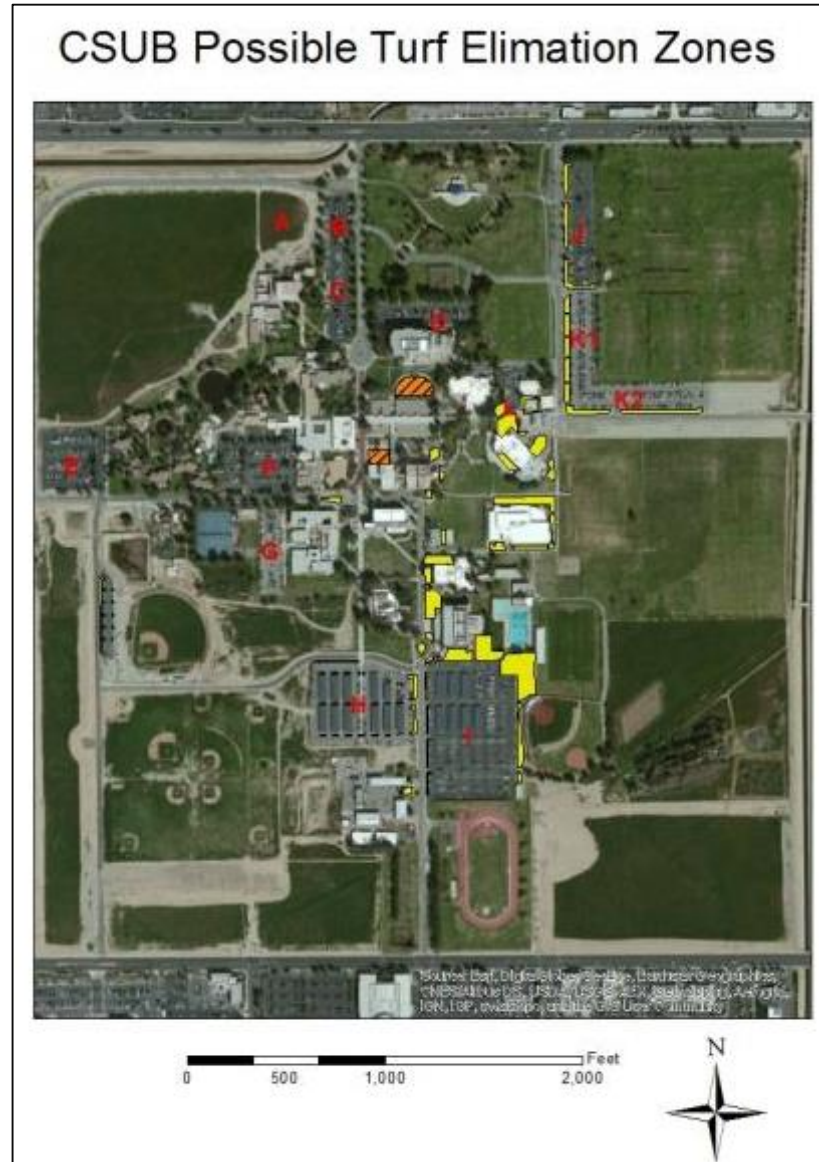
# + Issues

- Removing turf we face issues with destroying habitat and disturbing the endangered species on campus.
  - Costly to remove as biological consultations have to be done before it is removed.
  - Long-term benefits



# + Potential 'Water-Smart' Areas

- Possible Zoned Areas:
  - Parking areas
  - Small grassy areas
- Areas not converted:
  - Sport fields
  - Areas used for campus events
  - Areas at campus entrance
  - Sensitive biological areas
- Areas zoned with ArcGIS software.



# + Campus-Wide Survey

Facilities was concerned with how the faculty and student body would feel about the removal and replacement of turf throughout our campus.

As a result we compiled a survey to be sent out to the entire campus to determine the general attitude of the campus population towards xeriscaping and water conservation.

**2. How aware are you about California's water drought?**

I am aware and have discussed in a class or have researched the topic

I am aware but have some knowledge on the subject

I have an idea but I don't know much about the subject

I am not aware of the subject

I don't know and I don't care

**3. Considering the current water situation in our region answer the following question.**

	Important		Moderately Important		Not Important
How important is water conservation to you?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**4. Evaluate the following statements**

	Important		Moderately Important		Not Important
How important is traditional green landscaping (green grass, non-native large trees, etc.) for aesthetic purposes on campus?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How do you feel about drought tolerant landscaping for aesthetic purposes on campus?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How important is the green landscaping in and around the parking lot?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**5. Select any of the following alternatives for traditional landscaping (green grass, non-native large trees, etc.) that you are familiar with:**

Zen gardens

Gravel/Rock landscaping

Recharge Gardens

Usage of Native Plants and Trees

Other (please specify)

# + Progress

- Our Facilities office is doing their best to improve conditions and conserve water.
- As each new building is developed on campus, water usage and conservation are taken into account.
- Installation of native vegetation and by creating a reporting page for broken sprinklers or overwatering areas.



You can report over-watering, broken sprinklers, and flooded plant beds in face book at <https://www.facebook.com/CSUBFacilitiesmanagement>. Please include the day, time, and approximate location. It is helpful if you post pictures or videos or call 661-654-2211 to report what you see.



# + Progress

- Conservation Efforts:
  - Four zones are being surveyed for xeriscaping.
  - Artificial turf being installed.
  - Drip systems in some areas





# Conclusion

- The CSU system must reduce water usage by 20% by 2020.
  - Eliminating turf and installing water smart gardens will help reduce water usage and cost of maintenance.
  - Native vegetation will also help create a better habitat to many species on our campus.

## Acknowledgements

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