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Pasadena Water and Power

## Sunset Reservoir Wells Perchlorate Investigation Chilean Nitrate Fertilizer

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Presented to  
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at the Jet Propulsion Laboratories, Pasadena  
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## Chilean Nitrate Fertilizer

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1. It is impossible for Chilean Nitrate Fertilizers to have contaminated Bangham Well
  - a) The water is too young (20 – 30 years old) to have been influenced by any agricultural practices which ended 70 – 90 years ago.
  - b) Where would these fertilizers have been applied that it would only partially influence one well in the last 20 – 30 years?
  - c) The hypothesis rests upon one datum from one sample collected once from one well

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# Pasadena 1900

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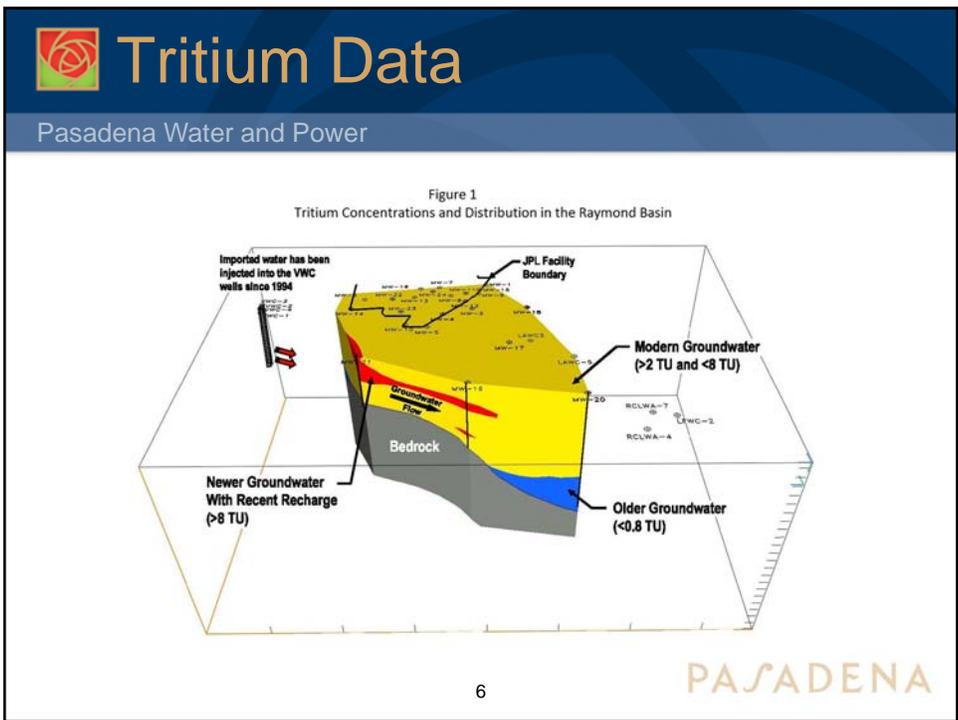
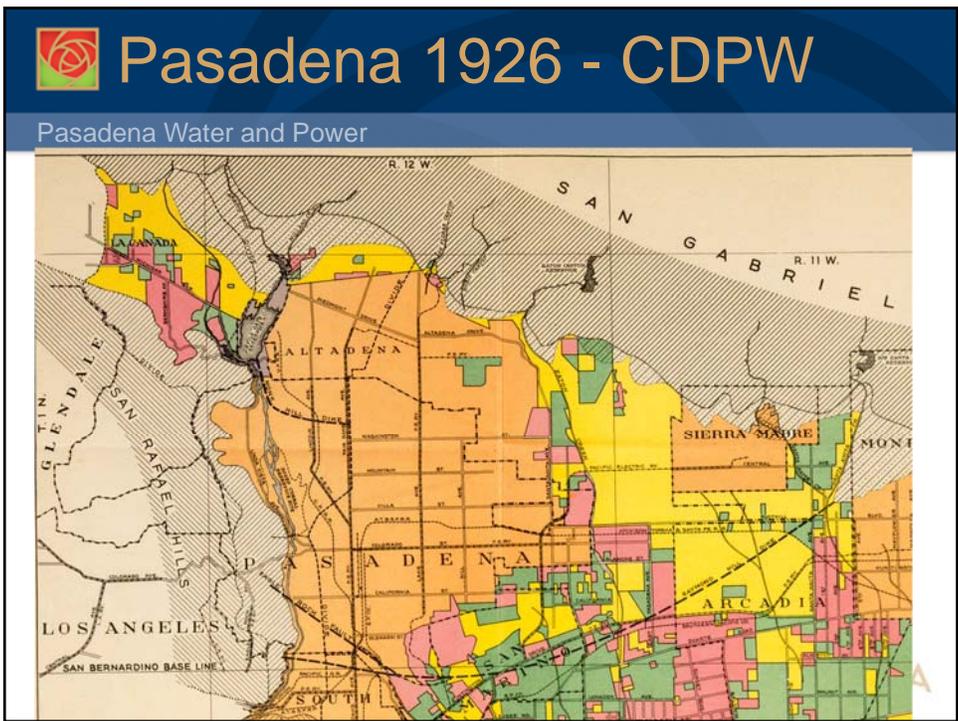
# Pasadena 1926

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## Tritium Data

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1. The half-life of  $^3\text{H}$  is 12.3 yr.
2. Most of the samples collected in 2005 had tritium concentrations between 0.8 and 8.0 TU, which corresponds to water that had between 2 and 20 TU when it first entered the aquifer and lost contact with the atmosphere.
3. This corresponds to water that was last exposed to air in 1987, or about 20 years old.

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## Tritium Data in NASA's 2007 TM

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- ***“Tritium concentration (activity) is a useful parameter for assessing the age of water for periods of up to 60 years, due to its relatively short half-life of 12.4 years.”***

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# Helium-3 Data

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1.  $^3\text{H}$  decays to  $^3\text{He}$  by beta particle emission.
2. The ratio of  $^3\text{H}$  to  $^3\text{He}$  can be used to determine the age of the groundwater
3. Groundwater Age (in years) =  $-17.8 \ln(1 + ^3\text{He}/^3\text{H})$ .

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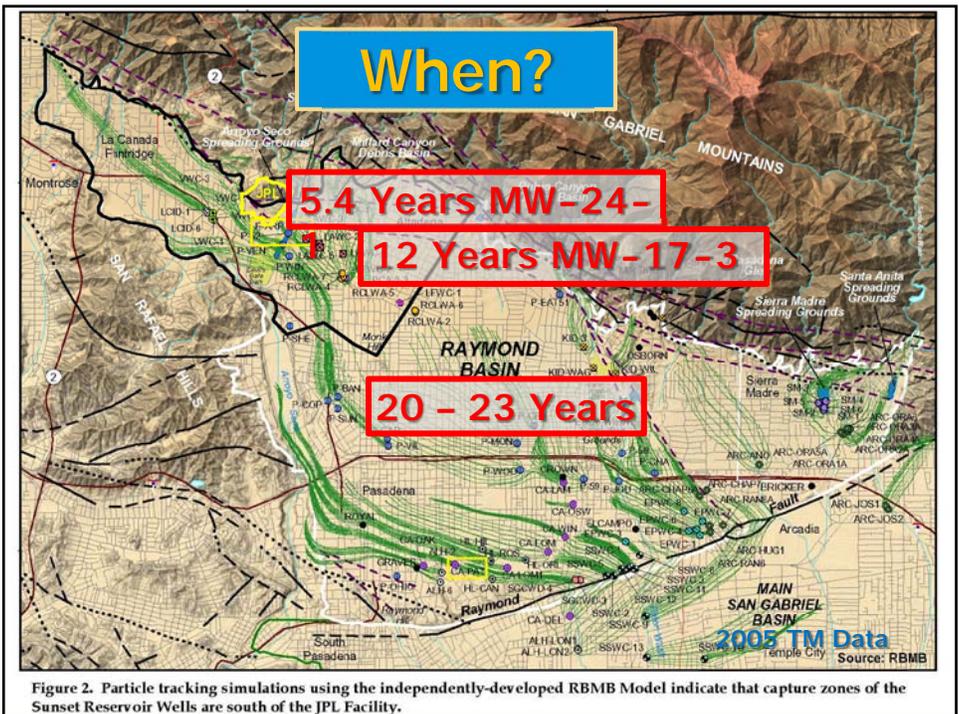


Figure 2. Particle tracking simulations using the independently-developed RBMB Model indicate that capture zones of the Sunset Reservoir Wells are south of the JPL Facility.



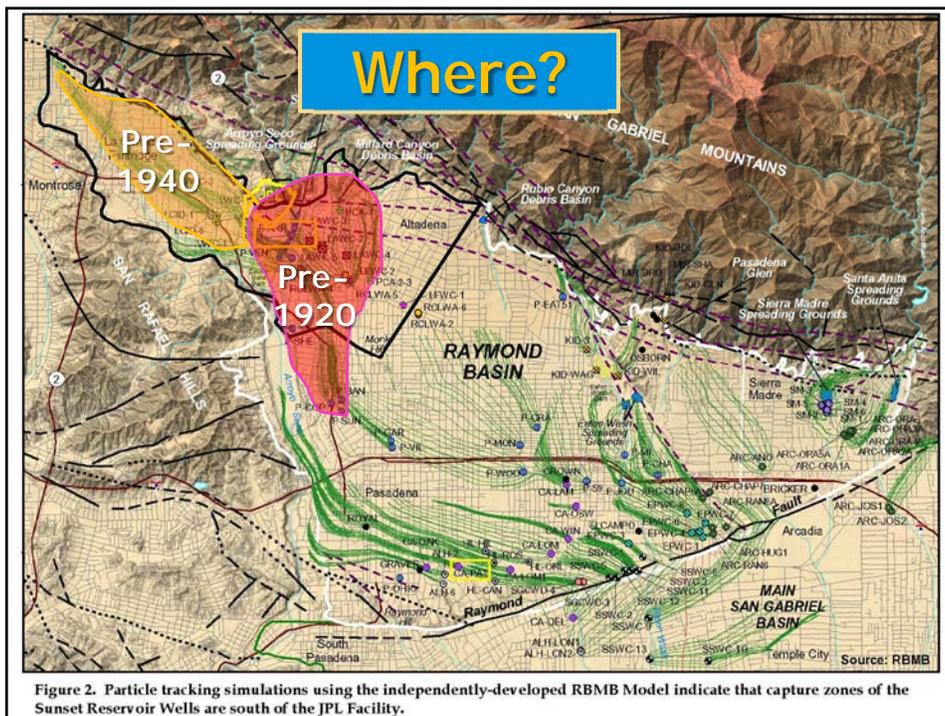
# Location

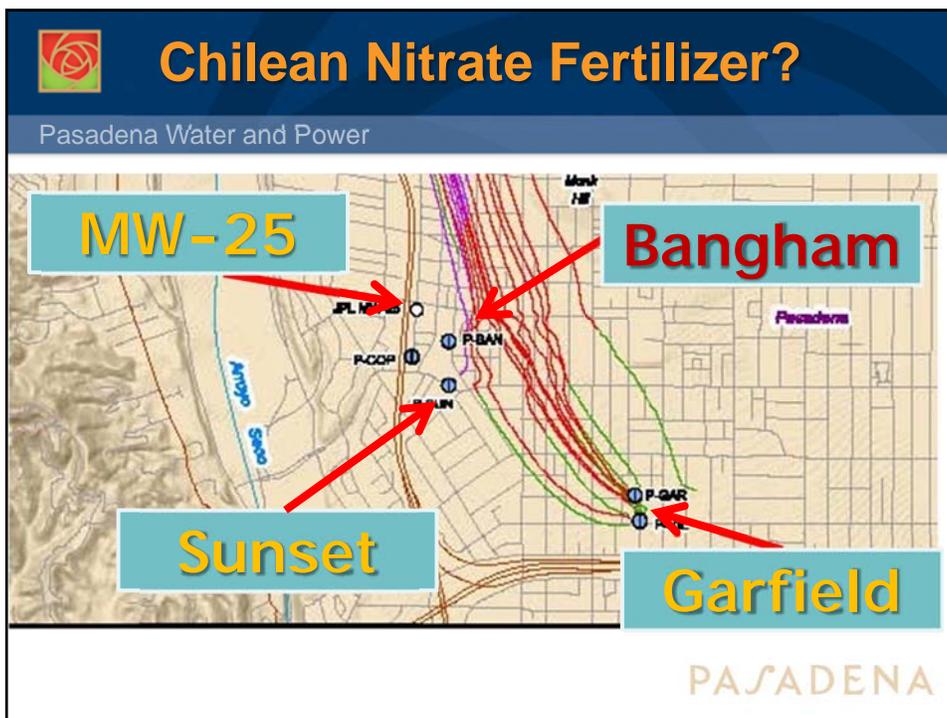
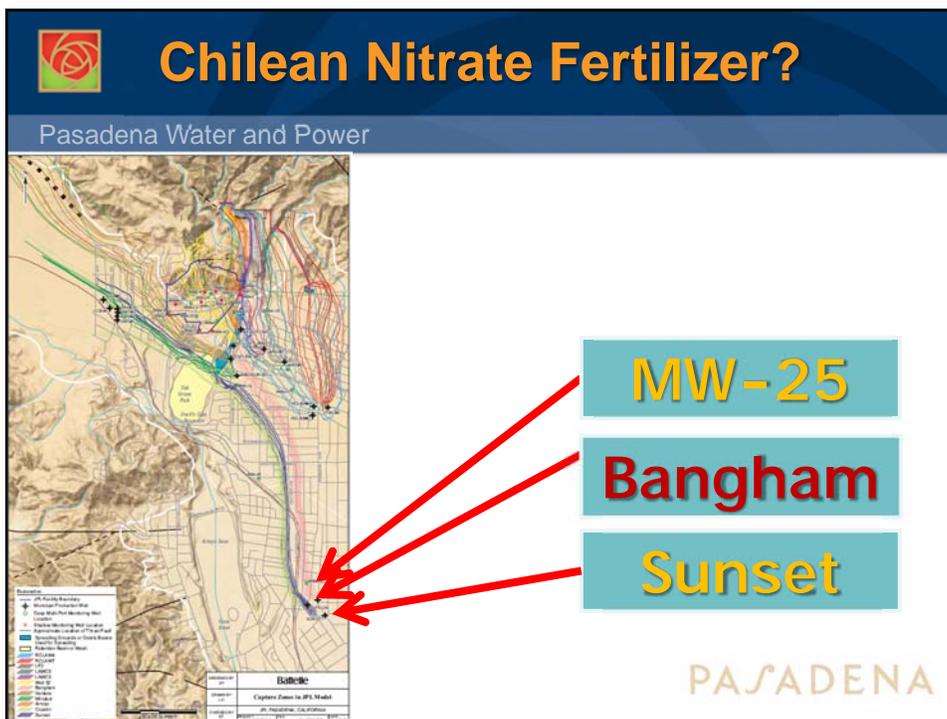
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1. The Recharge area for Bangham Well is the same as for the Other Sunset Reservoir Wells
2. Where would it be possible to apply Chilean Nitrate Fertilizer that it would only influence Bangham and no other well?
3. Where would it have been applied that it would be influencing only one well 90 years later?

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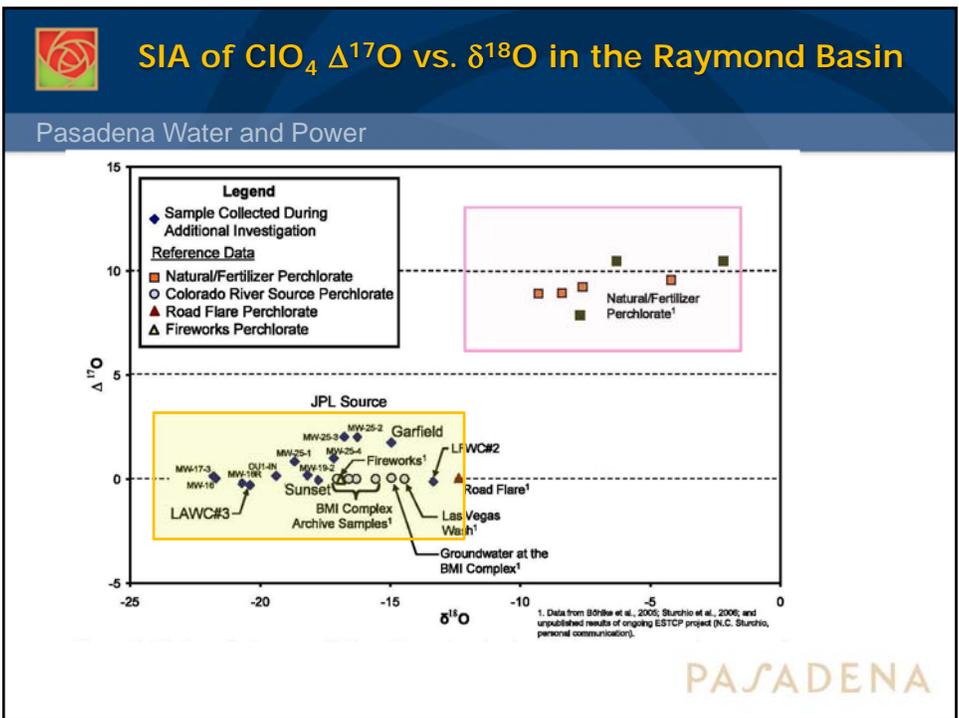
## Chilean Nitrate Fertilizer

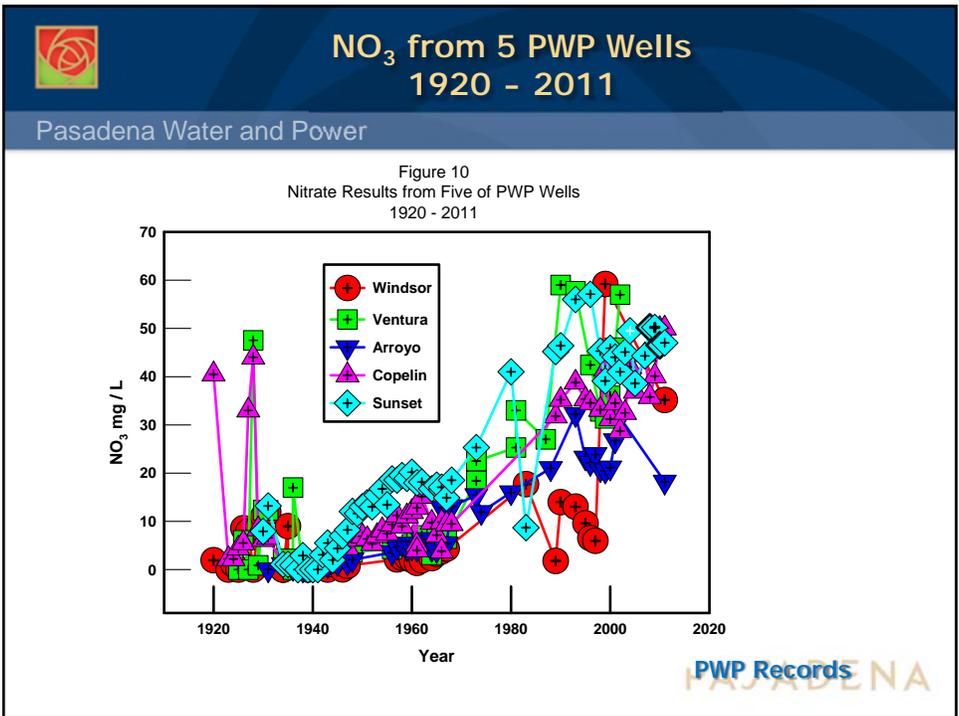
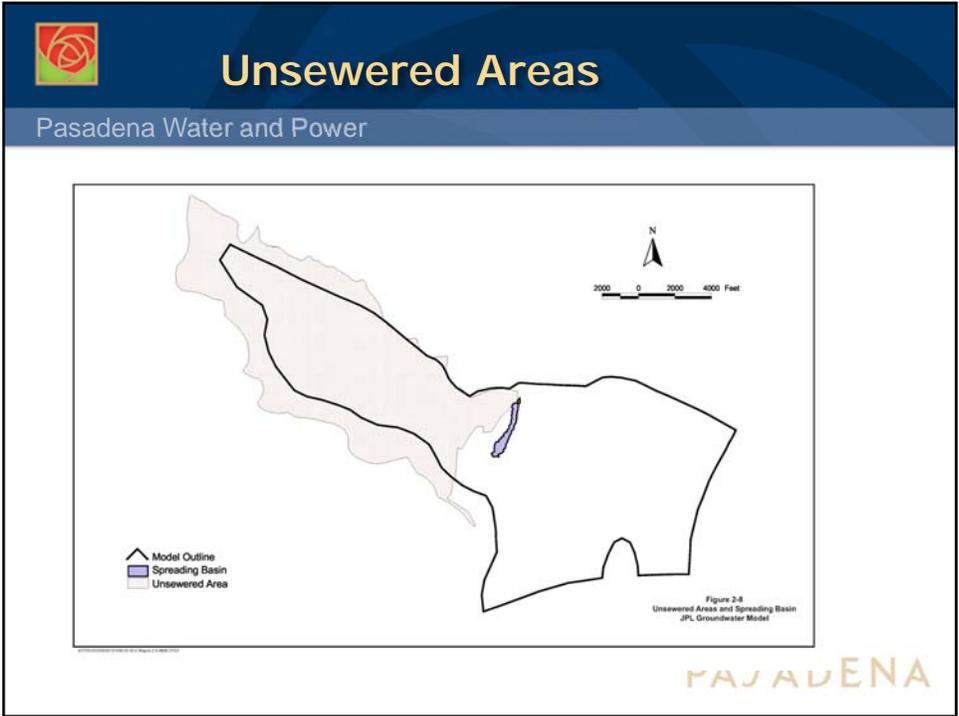
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**The Entire Argument for the Existence of Chilean Nitrate Fertilizer consists of**

- 1) One Datum**
- 2) From One Sample**
- 3) Analyzed Once**
- 4) From One Well**
- 5) Sampled Once**

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## Conclusions

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- **The Preponderance of the Evidence Argues Overwhelmingly Against the Presence of Chilean Nitrate Fertilizer**