

Net Zero Water Study For Fort Irwin California

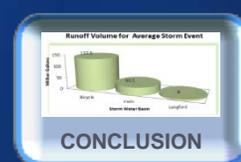
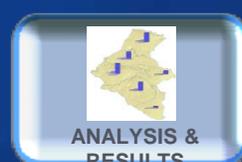
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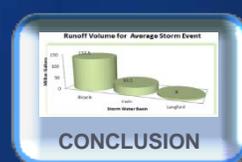
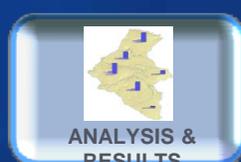
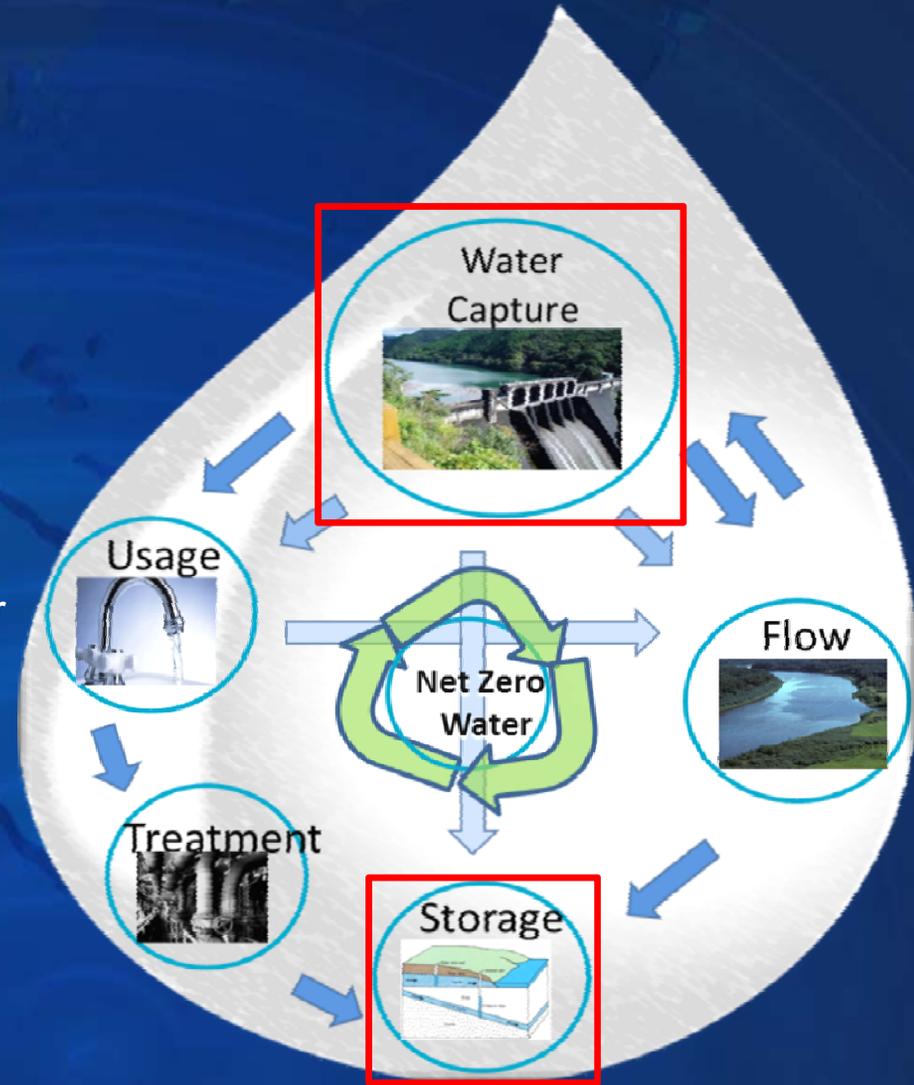
The Client



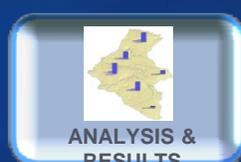
Background

Net Zero Water

A Net Zero Water facility limits the consumption of freshwater resources and returns as much water as it uses back to the source watershed in a year (US Army Energy program)

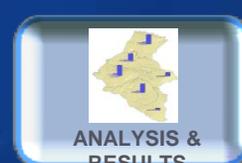


The Problem



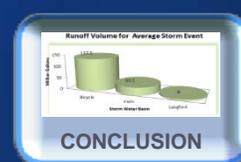
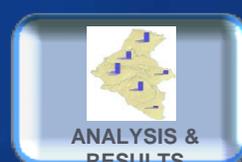
Scope

- Desktop application
- Limited to the Bicycle, Irwin, and Langford surface basins



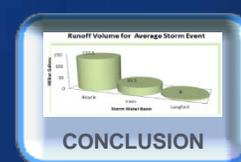
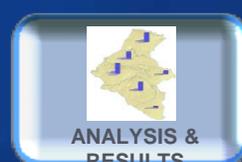
Platform

- ArcGIS Desktop
plus
- Custom tools
and maps



Runoff Estimation

- Peak discharge
- Runoff volume



Candidate Water Capture Sites

- Suitability factors
- Ranking candidate sites



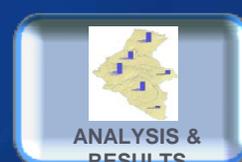
INTRODUCTION



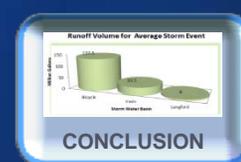
PLATFORM &
SOLUTION



DATA &
METHODS



ANALYSIS &
RESULTS

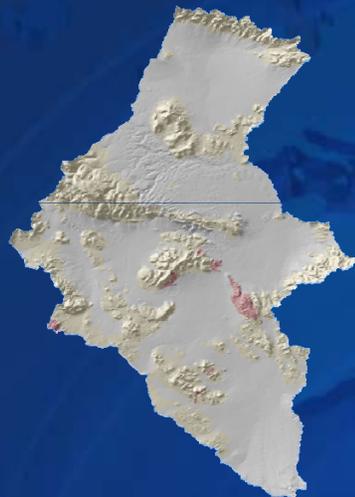


CONCLUSION

Data



Digital Elevation Model (DEM)



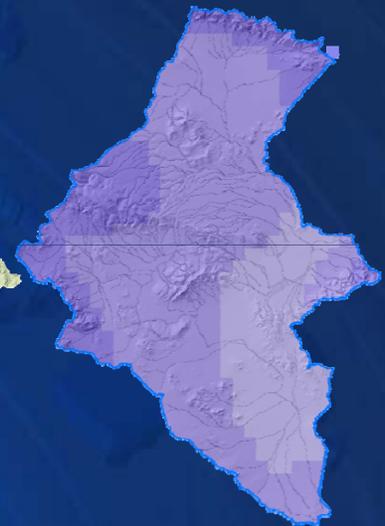
Geology



Soil



Land Cover



Rainfall



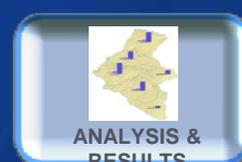
INTRODUCTION



PLATFORM & SOLUTION



DATA & METHODS



ANALYSIS & RESULTS

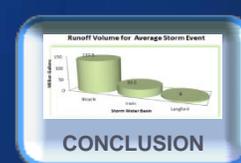
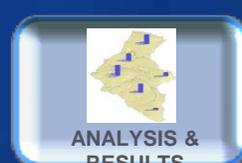
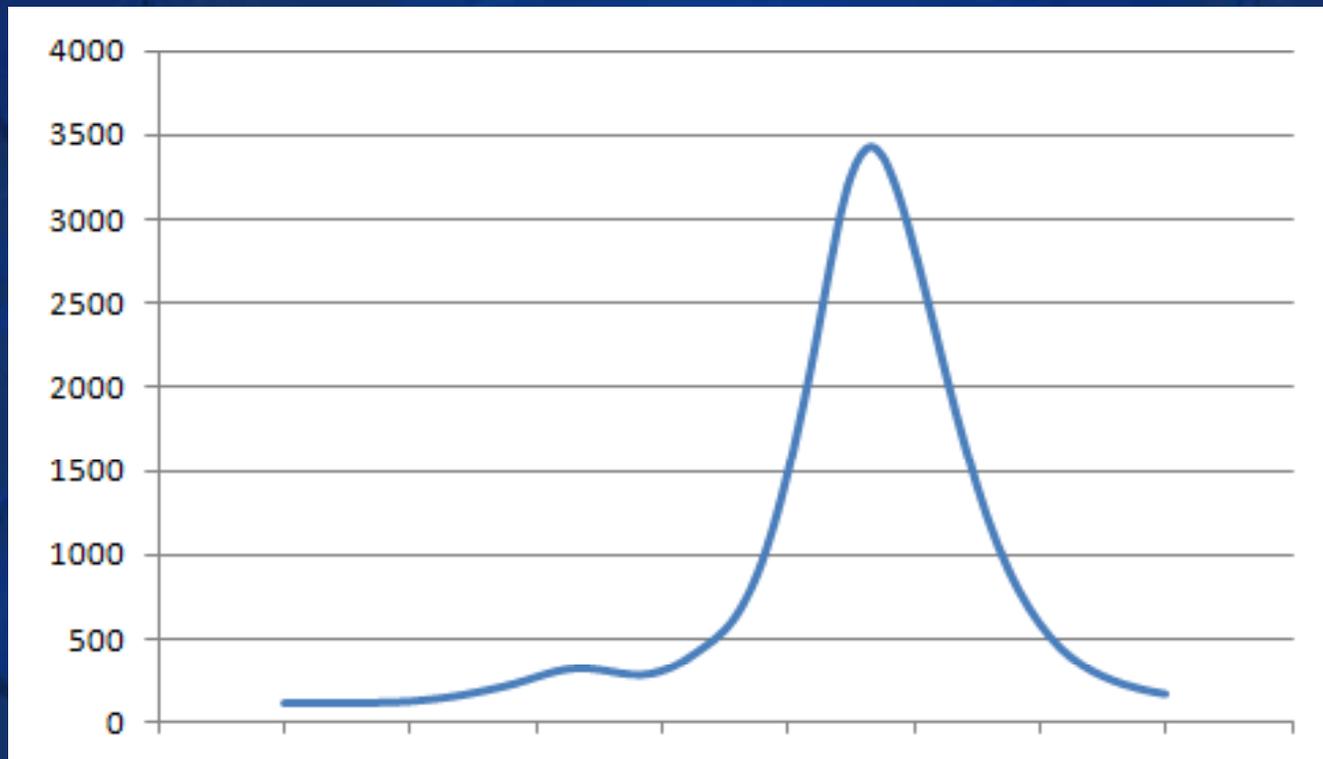


CONCLUSION

Basin Delineation



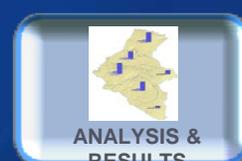
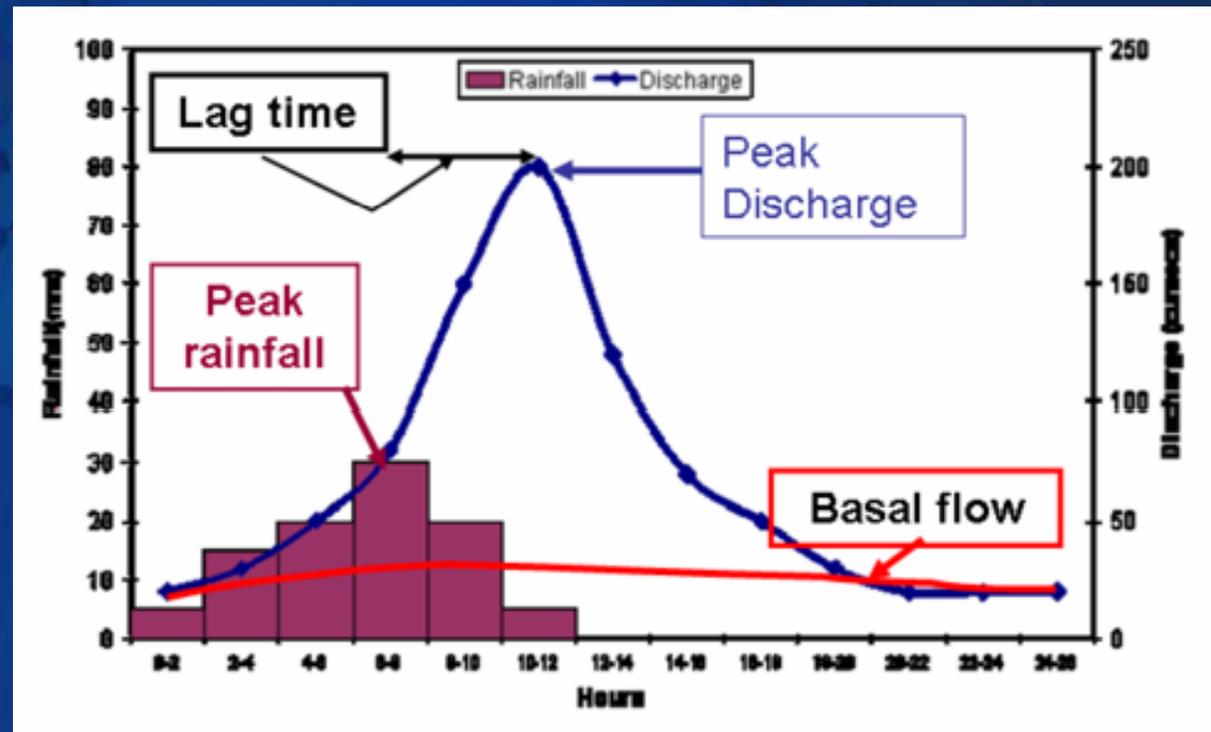
Quick Peak Discharge Estimate



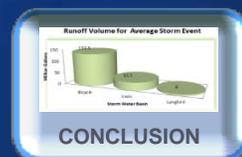
Comprehensive Runoff estimates

Curve Number :

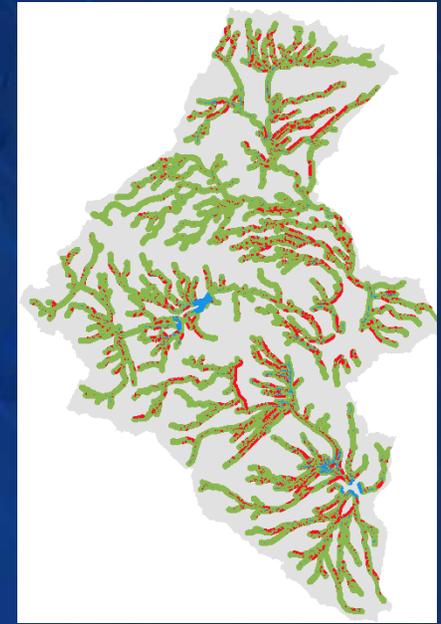
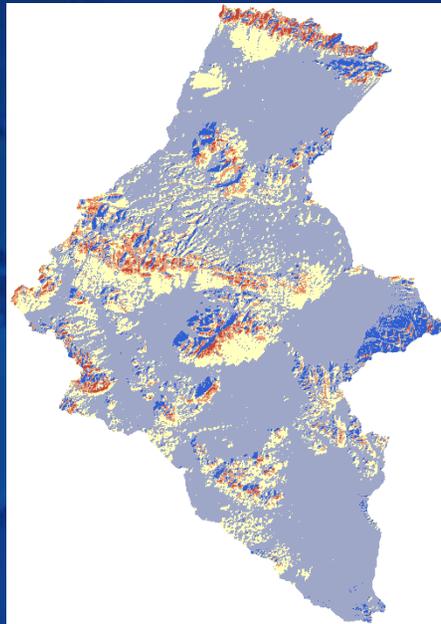
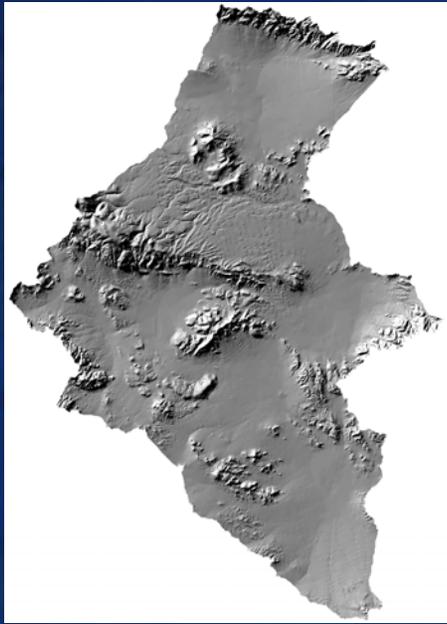
An empirical parameter used in hydrology for predicting direct runoff or infiltration from excess Rainfall
(Natural Resource Conservation Service)



Candidate Site Factors



Candidate Site Factors



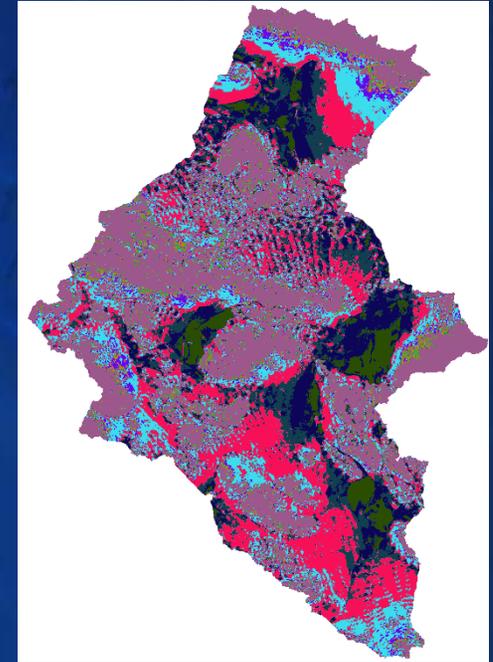
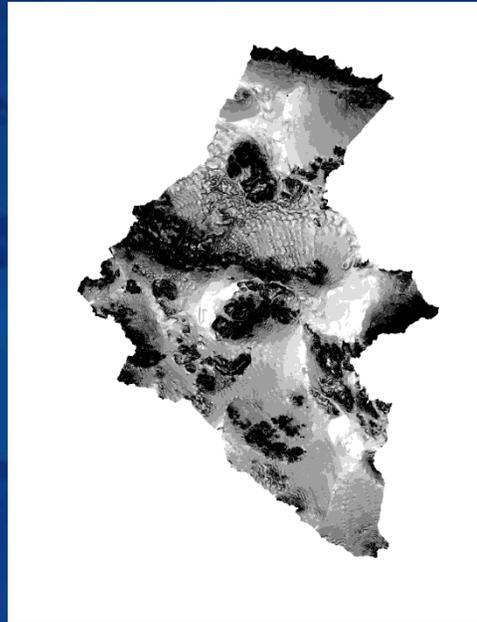
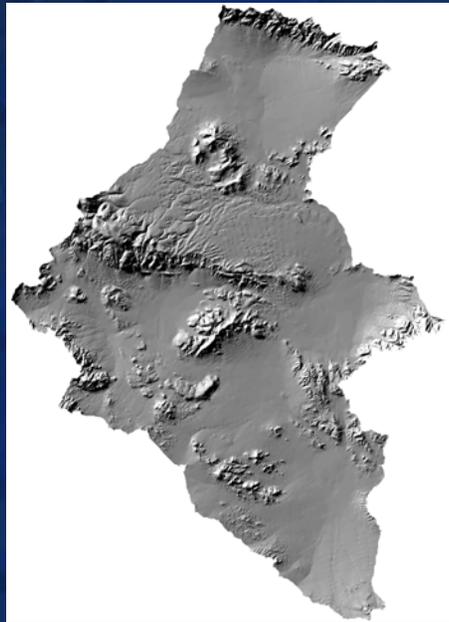
DEM

Reclassify

Elevation



Candidate Site Factors



DEM

Raster
Analysis

Slope



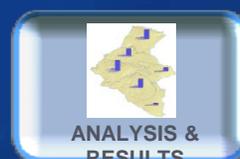
INTRODUCTION



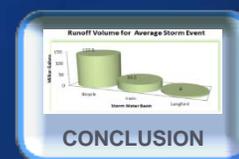
PLATFORM &
SOLUTION



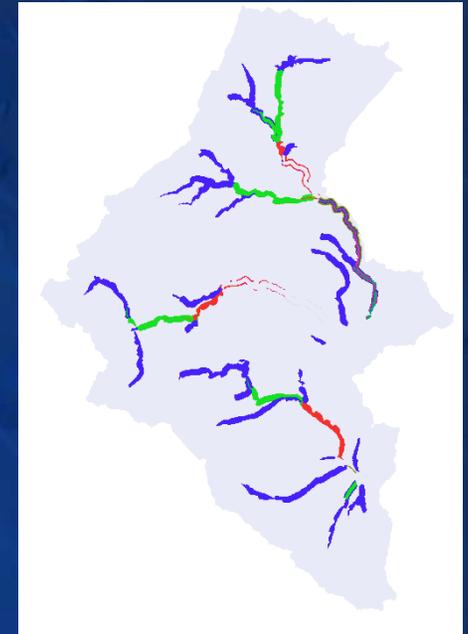
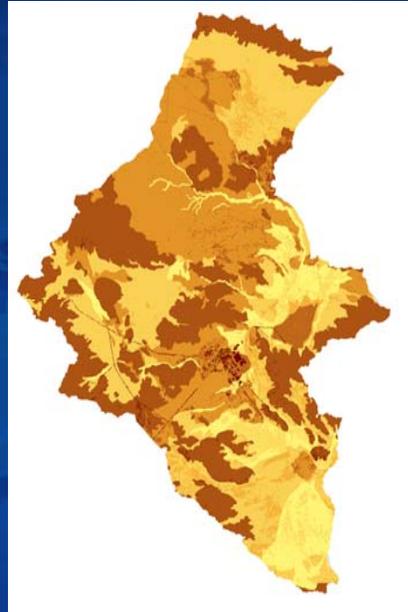
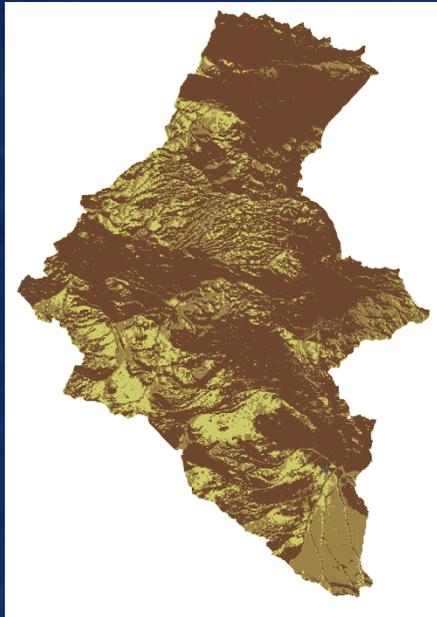
DATA &
METHODS



ANALYSIS &
RESULTS



CONCLUSION



Flow Raster

Flow Analysis

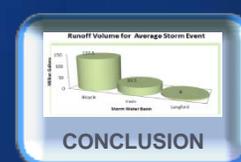
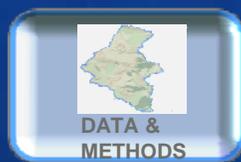
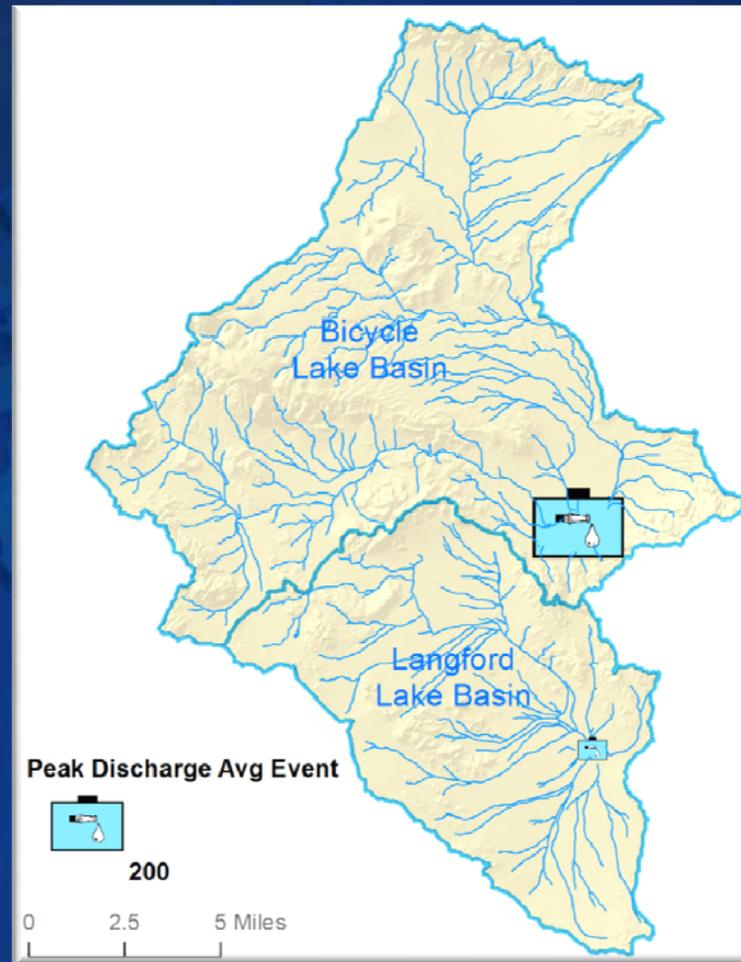
Runoff



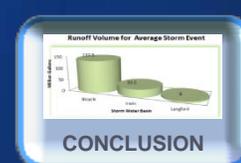
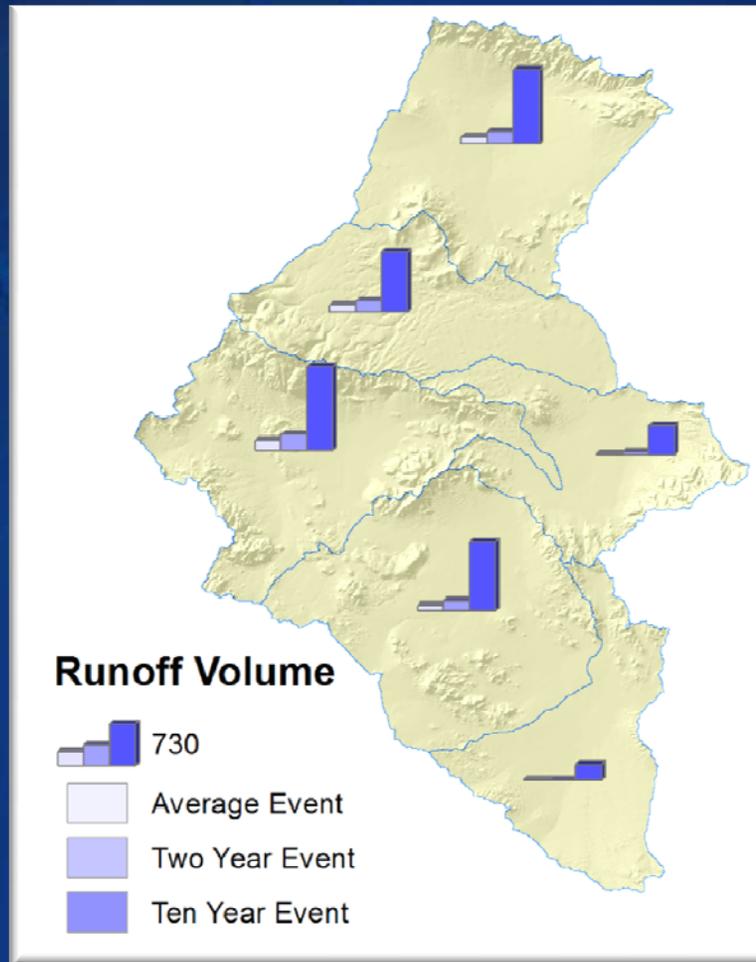
Identifying Candidate Sites



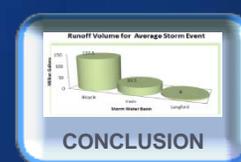
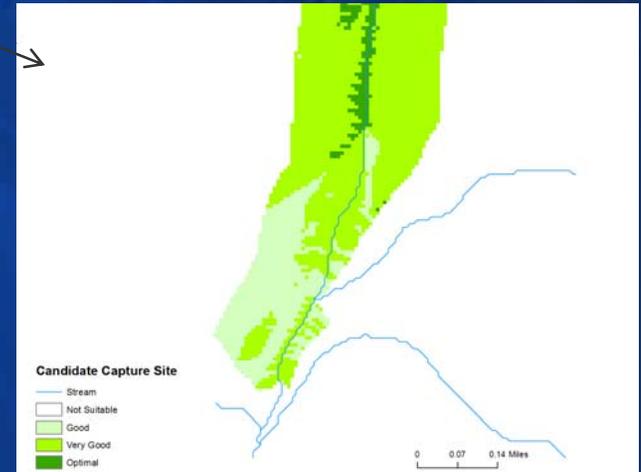
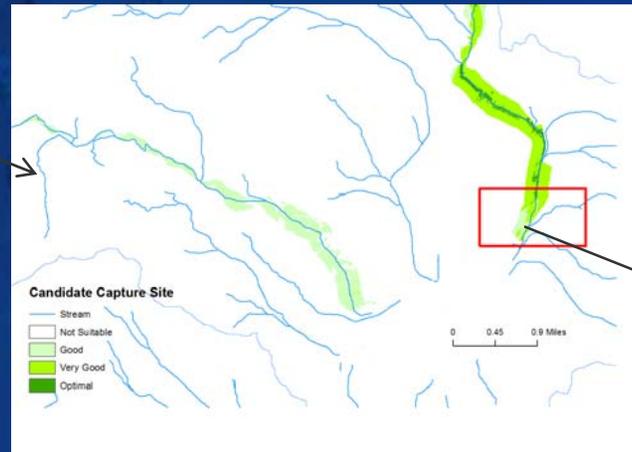
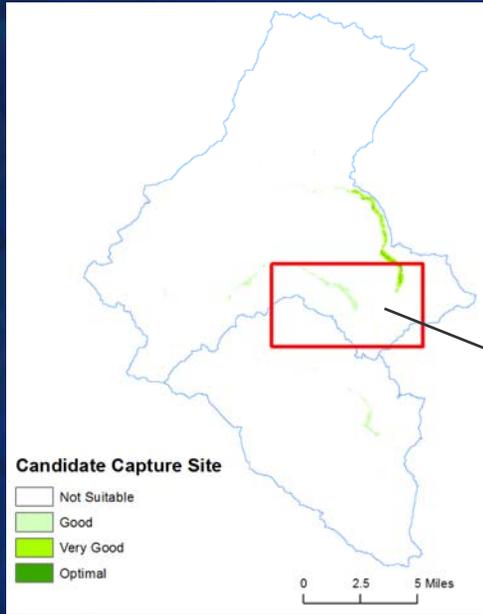
Peak Discharge



Runoff Volume



Candidate Site Analysis



Peak discharge USGS

Name	2 Year Peak Discharge (USGS)	10 Year Peak Discharge (USGS)	100 Year Peak Discharge (USGS)
Bicycle Lake Basin	207.40	4207.28	25220.74
Langford Lake Basin	142.02	2806.81	16073.95

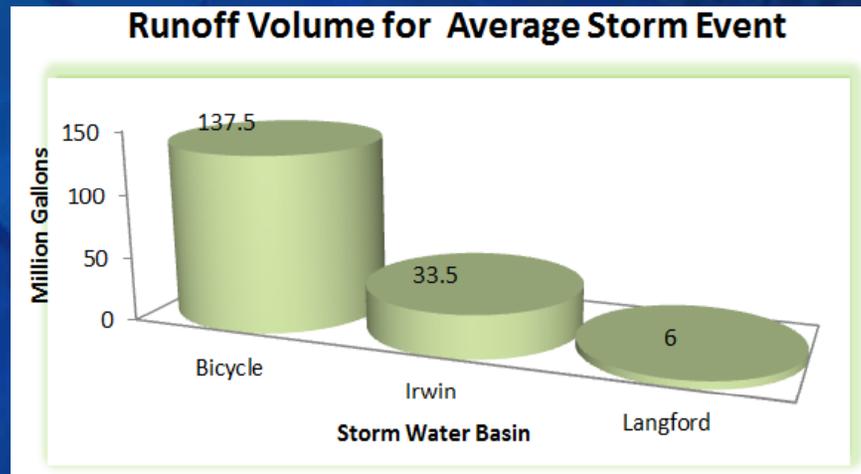
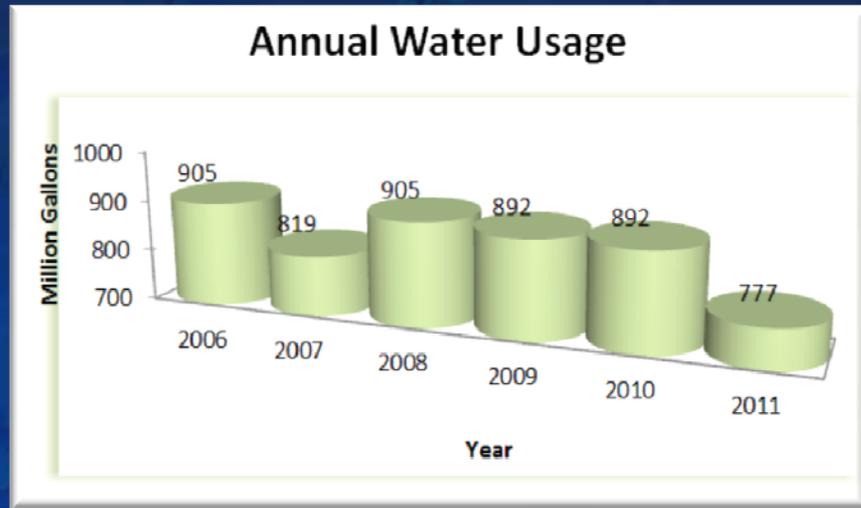
Peak discharge Curve Number method

Name	2 Year Peak Discharge (CN)	10 Year Peak Discharge (CN)	100 Year Peak Discharge (CN)
Bicycle Lake Basin	521.36	3222.30	8805.81
Langford Lake Basin	102.66	1056.28	3293.50



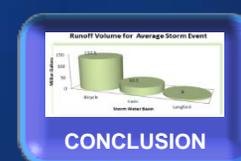
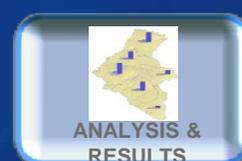
Outcome

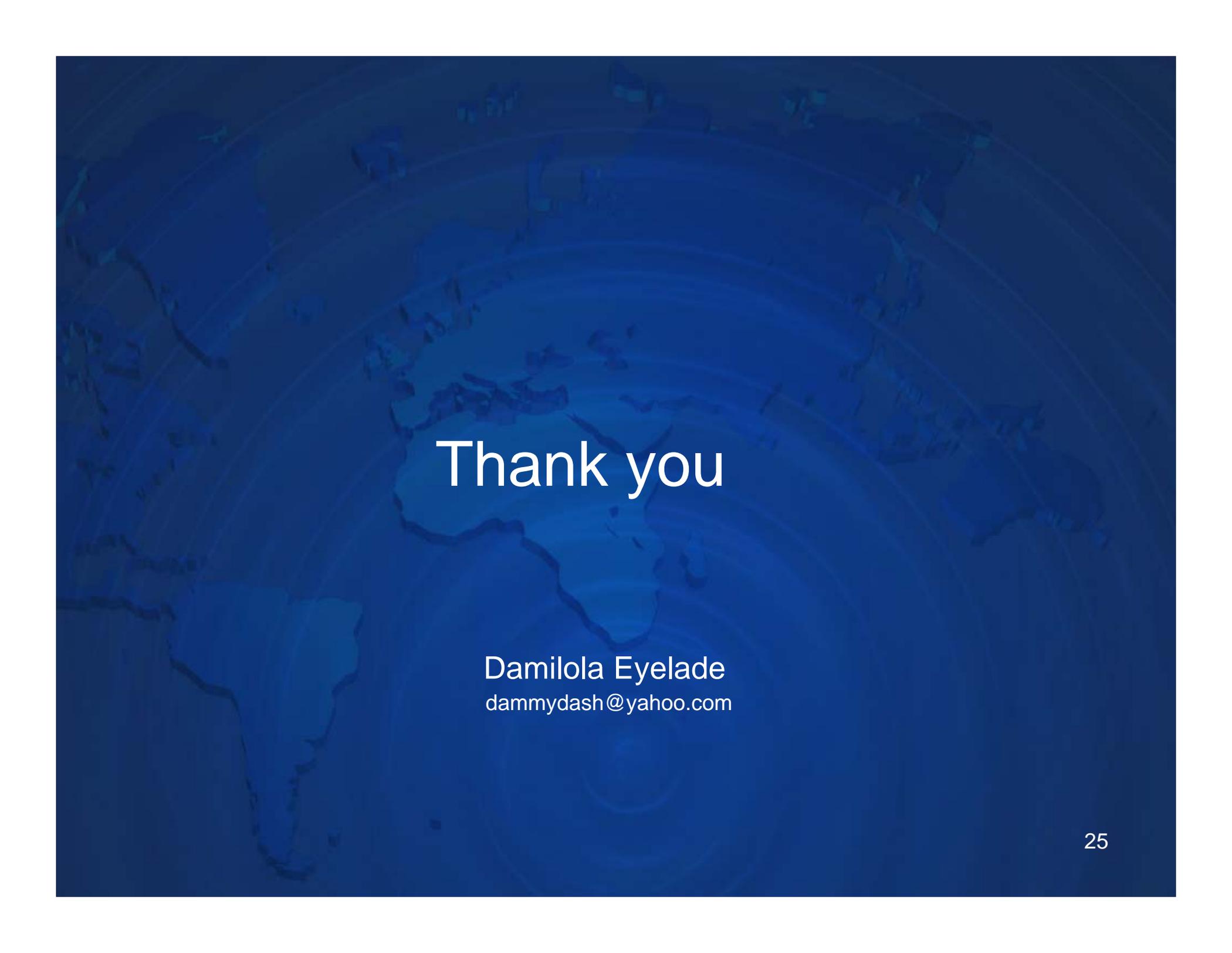
- Water usage
- Runoff volume



Conclusion

- Volume of Runoff is enough to make water capture feasible at Fort Irwin
- Cannot be sole source of water for aquifer recharge





Thank you

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