

# Water Advocacy Task Force Presentation

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Source Water Utilization Tool  
March 27, 2008



# Presentation Outline

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- Review of WATF Recommendation
- Source Water Utilization Goals
- Approach
  - Interested Parties
  - Historical Data & Document Reviews
  - Development of SWU Tool
- Overview of SWU Tool
- Discussion



# Recommendation by WATF

*"...the City should adopt a water source use management plan to ensure optimal use of all surface and groundwater sources available to the City. Municipal, industrial, natural resource, and recreational uses should be considered in the development of the plan.*

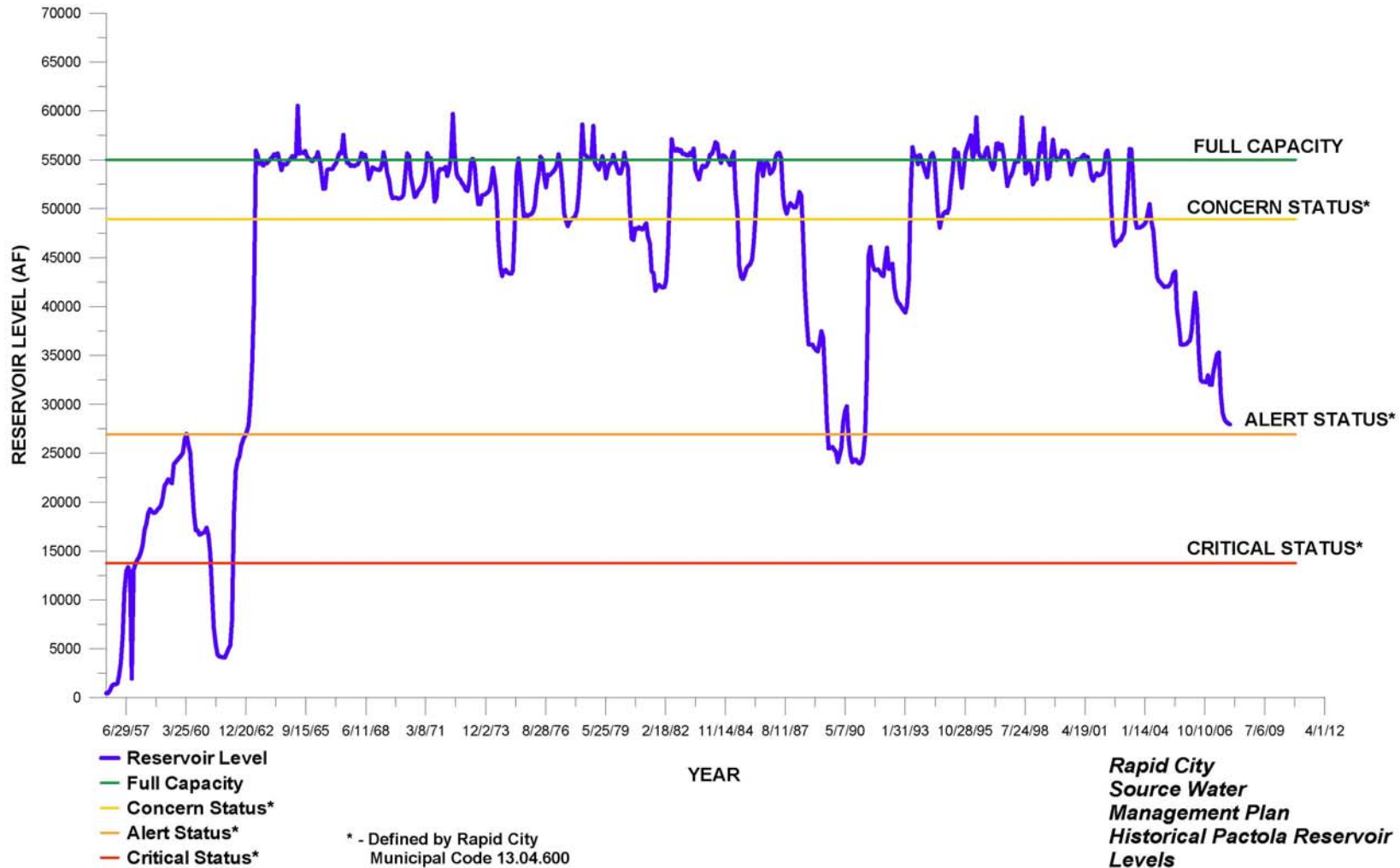
- This approach:
  - Maximizes resources in drought and wet periods
  - Provides the necessary flexibility for operation
  - Protects water supplies for the future

# Source Water Utilization



- Portfolio #1 utilizes aquifer storage when necessary (drought)
- Portfolio #2 allows aquifer to recharge during wet periods

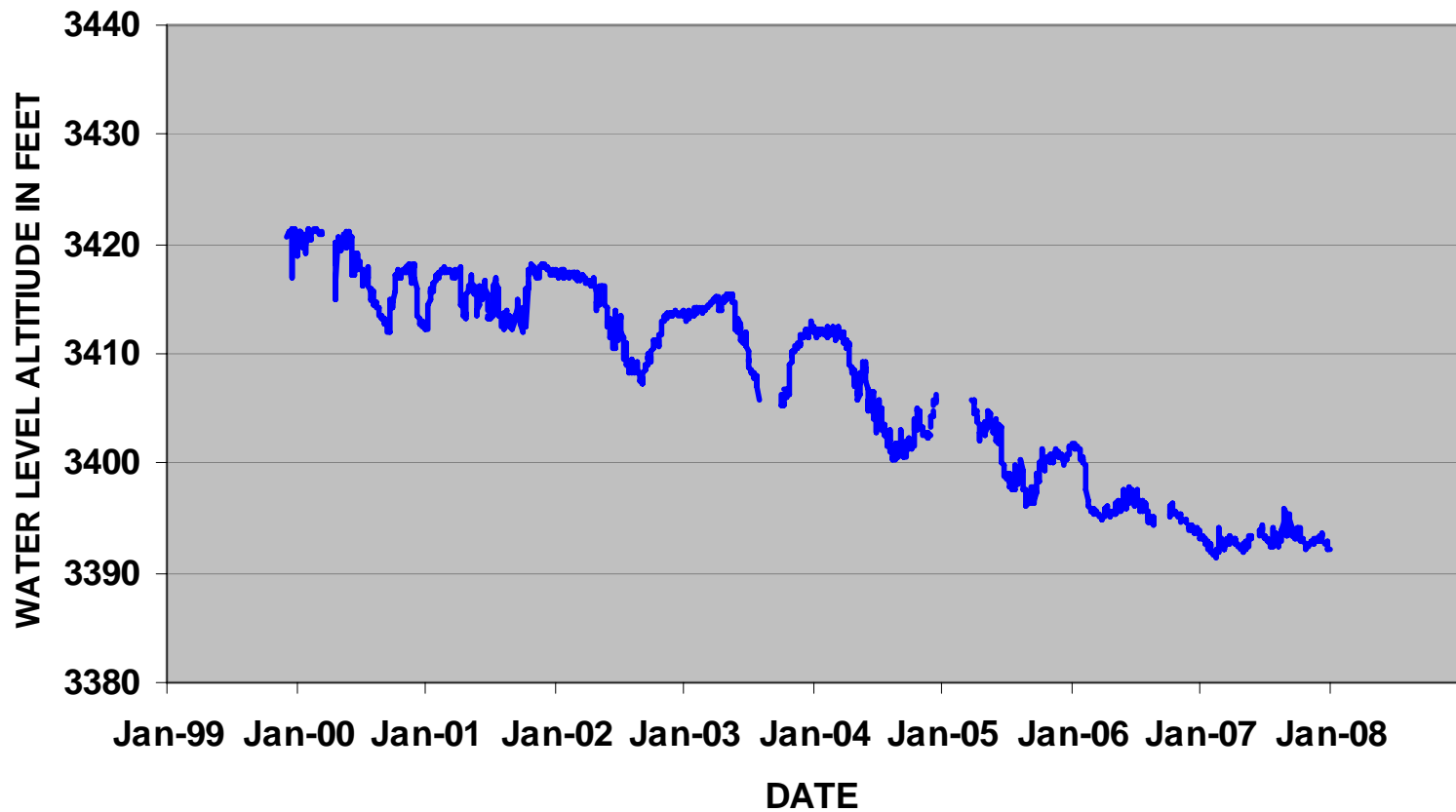
# Historical Pactola Levels



# Historical Aquifer Levels

USGS 440326103180702

MADISON AQUIFER OBSERVATION WELL NEAR JACKSON SPRINGS



# Source Water Utilization



- Portfolio #1 utilizes aquifer storage when necessary (drought)
- Portfolio #2 allows aquifer to recharge during wet periods



# Goal of SWU Tool

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- Provide a **simple** and **useful** tool that will allow the operational staff to optimize use of the City's raw water resources, while considering the needs of all interested parties.





# Approach

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- Identify Interested Parties
- Collect documents and review agreements
- Determine variables of interest
- Analyze historical data
- Develop scoring methods



# Interested Parties

- For the purposes of this tool, *Interested Parties* were defined as entities that:
  - Have water use or source water agreements with the City
  - Can be directly impacted by the City's use of water rights
  - Can directly impact the City's ability to use their water rights



# Interested Parties

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- City of Rapid City
  - Water customers
- South Dakota Game Fish & Parks
- Pactola Marina & Recreation
- U.S. Bureau of Reclamation
- U.S. Geological Survey
- South Dakota Department of Environment and Natural Resources



# Interested Parties (cont.)

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- Rapid Valley Sanitary District
- Rapid Valley Irrigators
- C&J Sanders, Inc.
- Ellsworth AFB
- Chapel Valley Water District
- Other Madison Aquifer Users



# Documents Reviewed

- Pactola Agreement
- Deerfield Contract
- Bureau of Reclamation Reservoir Operating Criteria (portion)
- Rapid Valley Sanitary District
  - Agreements & Correspondence
- C&J Sanders
  - Agreement & Correspondence
- Pactola Level & Release Data
- USGS Stream Gauge Data
- Precipitation Data



# Variables of Interest

- Level in Pactola
  - Precipitation
  - Stream Flow
    - Gauging station near packing plant
  - Date
    - Pactola Agreement & Usage
    - Pactola Minimum Releases
  - Water Demand
- \* All other variables evaluated were determined to be dependent on one of these variables



# Overview of SWU Tool

- Operators input values for each variable and select the sources available for use
- Tool calculates a score for each variable based on:
  - Historical data
  - Time of year
  - Agreements with other entities
  - Other constraints (i.e. minimum creek flows)
- Scores are tallied and used to indicate quantity of surface vs. groundwater to use

# SWU Tool Variable Inputs



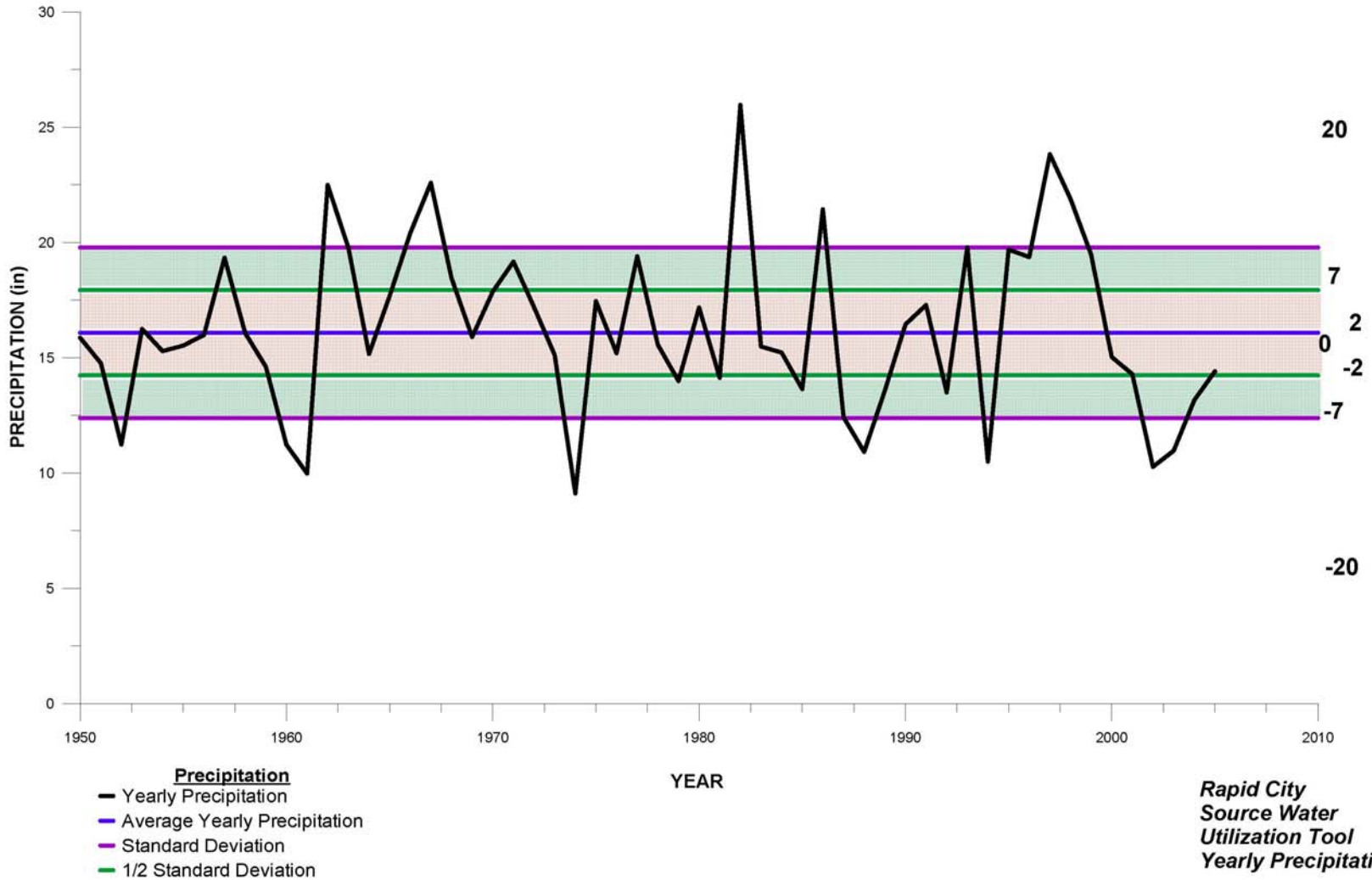
## Rapid City Source Water Utilization Tool



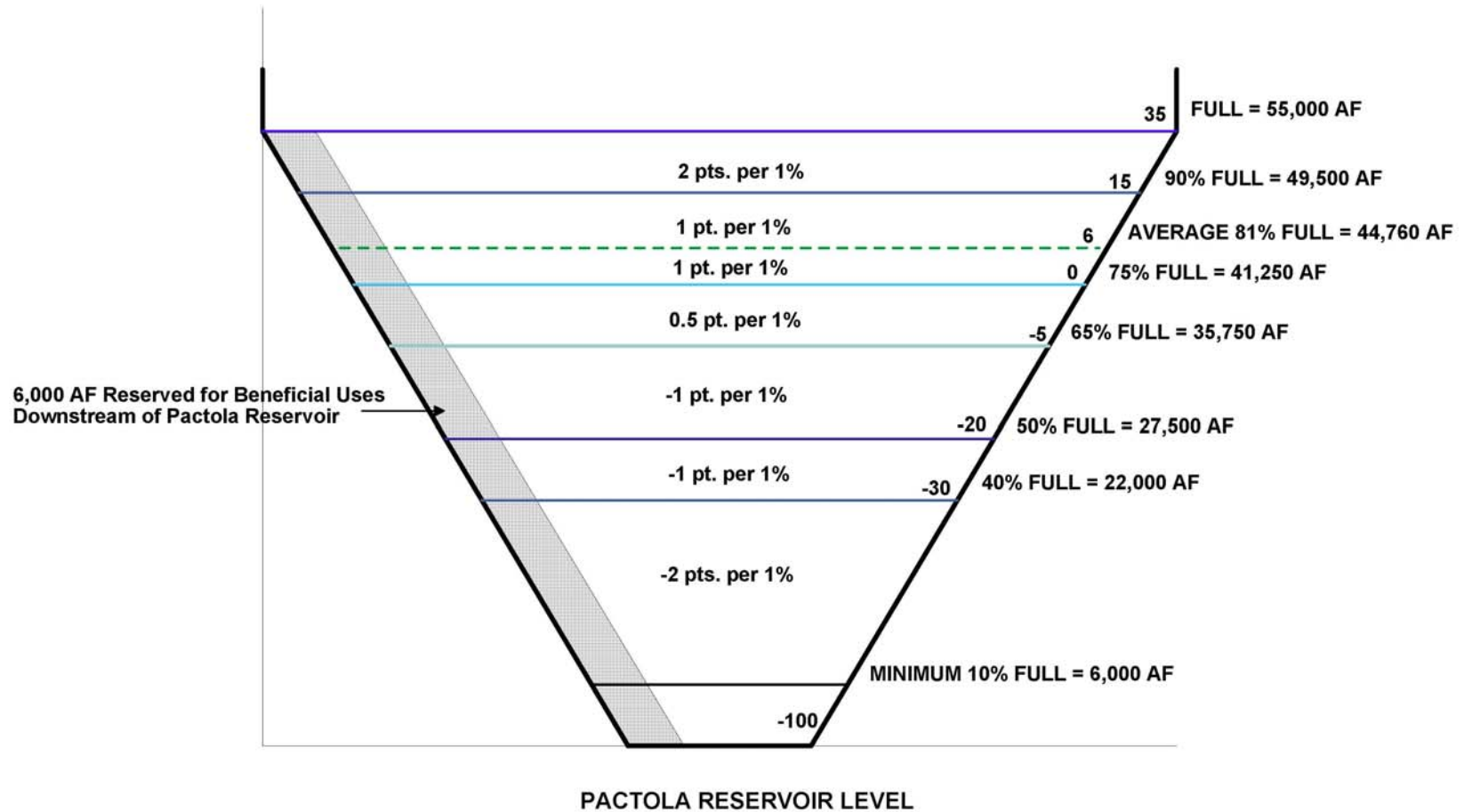
Inputs		Website Link
Date	1-Dec-08	
Current Month Precipitation Total Amount	2 in	<a href="#">NWS</a>
Prior 11 Month Precipitation Total	12.5 in	RC Airport Precipitation Worksheet
Pactola Reservoir Level	31500 AF	<a href="#">Pactola Reservoir Data (Station Code: PTR, Parameter: AF)</a>
USGS Stream Gauge 06414000	24 cfs	<a href="#">USGS</a> Minimum Stream Flow Met
Water Treatment Plant Flow	0 MGD	0.00 cfs
Average Day Demand	8 MGD	
<b>Total Points Received</b>	-15	
Zero Point Total indicates 50/50 split SW/GW		



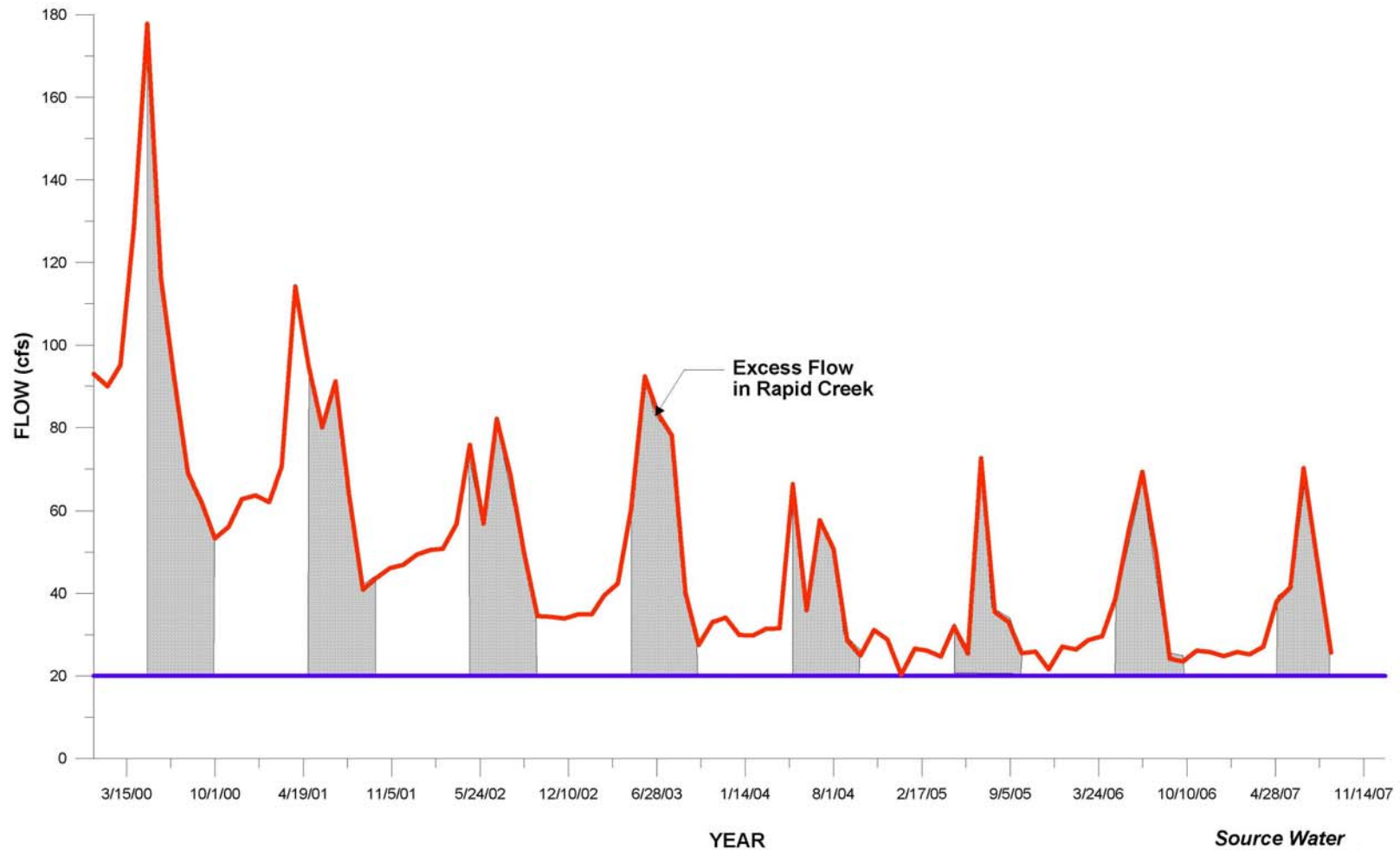
# Precipitation Scoring



# Pactola Level Scoring



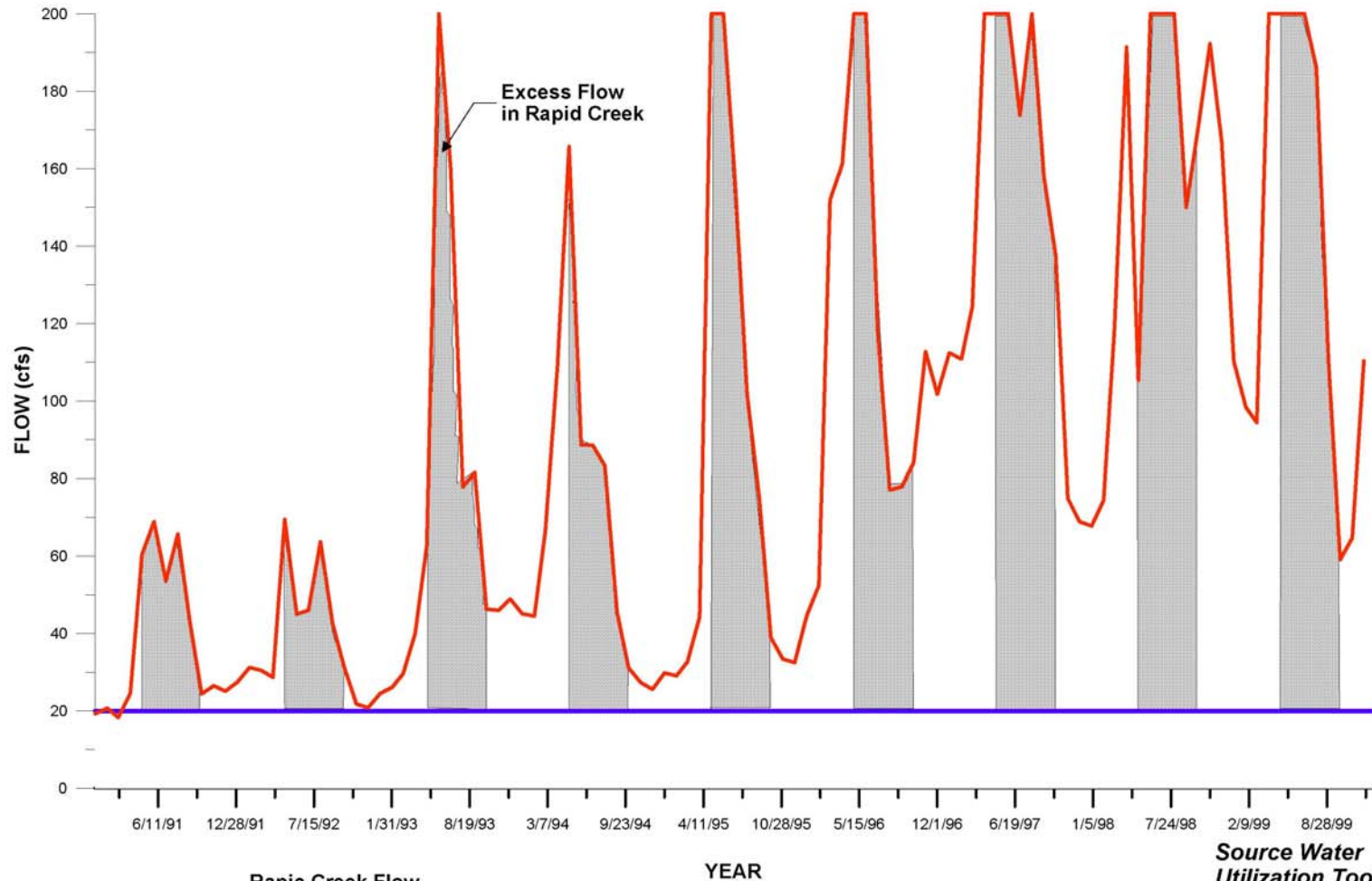
# Creek Flow Scoring



**Rapid Creek Flow**  
— Minimum Stream Flow 20 cfs per Game, Fish & Parks  
— Monthly Average Flow

Source Water  
Utilization Tool  
Stream Gauge 06414000  
1/00-10/07

# Creek Flow Scoring



**Rapic Creek Flow**  
— Minimum Stream Flow 20 cfs per Game, Fish & Parks  
— Monthly Average Flow

**Source Water  
Utilization Tool  
Stream Gauge 06414000  
01/90-12/99**

# SWU Output

## Surface Water Sources Available

Mt. View WTP	Y	Enter Y or N
Jackson Springs	Y	
Cleghorn Springs	Y	
Meadowbrook	Y	
Girl Scout	Y	

## Surface Water Sources Running

Mt. View WTP	Y	Consider Costs of Turning on Additional Sources
Jackson Springs	Y	
Cleghorn Springs	Y	
Meadowbrook	Y	
Girl Scout	Y	

Adequate supply already running

## Ground Water Sources Available

Well #1	Y	Enter Y or N
Well #4	Y	
Well #5	Y	
Well #6	Y	
Well #8	Y	
Well #9	Y	
Well #10	Y	
Well #11	Y	
Well #12	Y	

## Ground Water Sources Running

Well #1	Y	Consider Costs of Turning on Additional Sources
Well #4	Y	
Well #5	Y	
Well #6	Y	
Well #8	Y	
Well #9	Y	
Well #10	Y	
Well #11	Y	
Well #12	Y	

Adequate supply already running

	Optimal Supply		Actual supply		
	%	MGD	%	MGD	
Demand met w/ Ground Water	80%	6.4	80%	6.4	Adequate supply available
Demand met w/ Surface Water	20%	1.6	20%	1.6	Adequate supply available
				8.000	Demand Met



# SWU Tool Summary

- Tested Model Using 108 Different Scenarios
  - Includes extremes, wet & dry years
- Operator/User Friendly
- Minimal Supervisor Maintenance
  - Historical data updated monthly

All Interested Parties and the City will benefit from this tool through better utilization of the water resources!



# Questions & Discussion

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