San Miguel River
New Appropriation Hearing

September 13, 2011

San Miguel River – Montrose County

Staff and AG Testimony Overview

Staff

- *Linda Bassi* – Introduction

AG

- Susan Schneider – legal issues

Staff

- *Jeff Baessler* – Recommendation history and overview of factual claims in support the Board's statutory determinations
- *Owen Williams* – Water availability analyses

CPW & BLM

- *Mark Uppendahl, Roy Smith, Rick Anderson* – Natural Environment and Quantification analyses

Staff , CPW & AG

- Rebuttal and Staff Recommendation

CWCB Staff, AG Staff, CPW, BLM and other proponents will provide testimony and evidence that supports Board's statutory determinations that:

1. A natural environment exists

2. The natural environment will be preserved by the water available for the recommended appropriation

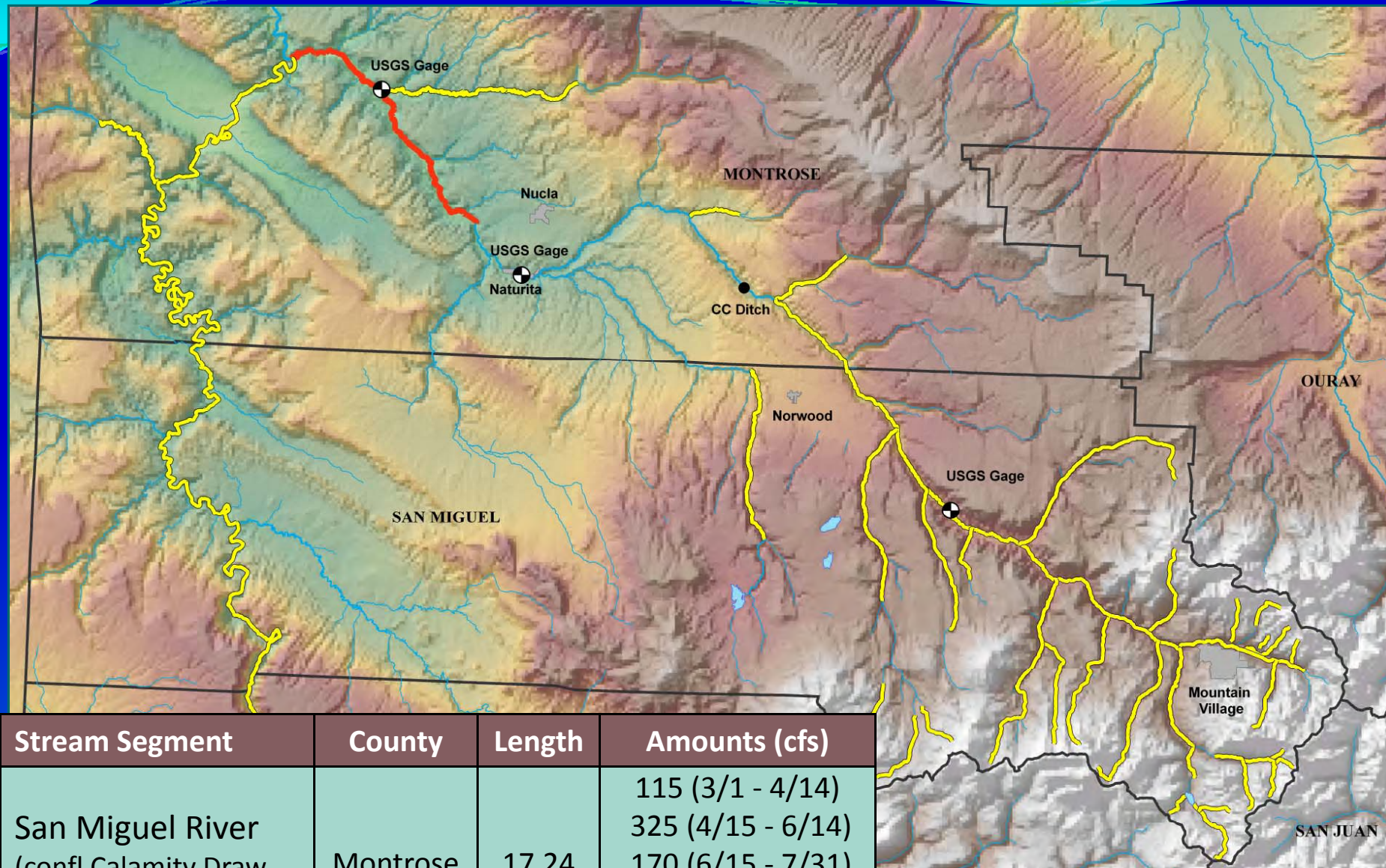3. No material injury to other water rights will occur

San Miguel River
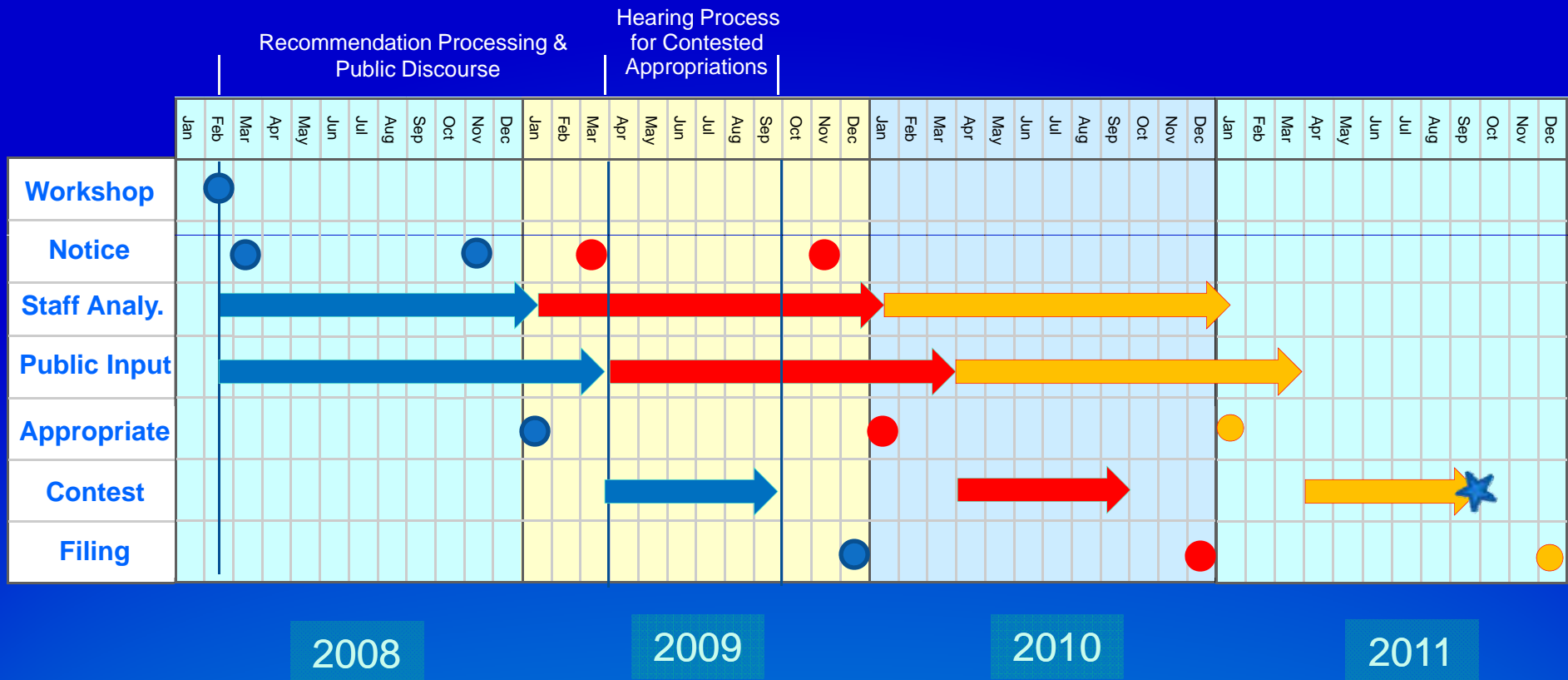# New Appropriation Hearing

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San Miguel River – Near Calamity Draw
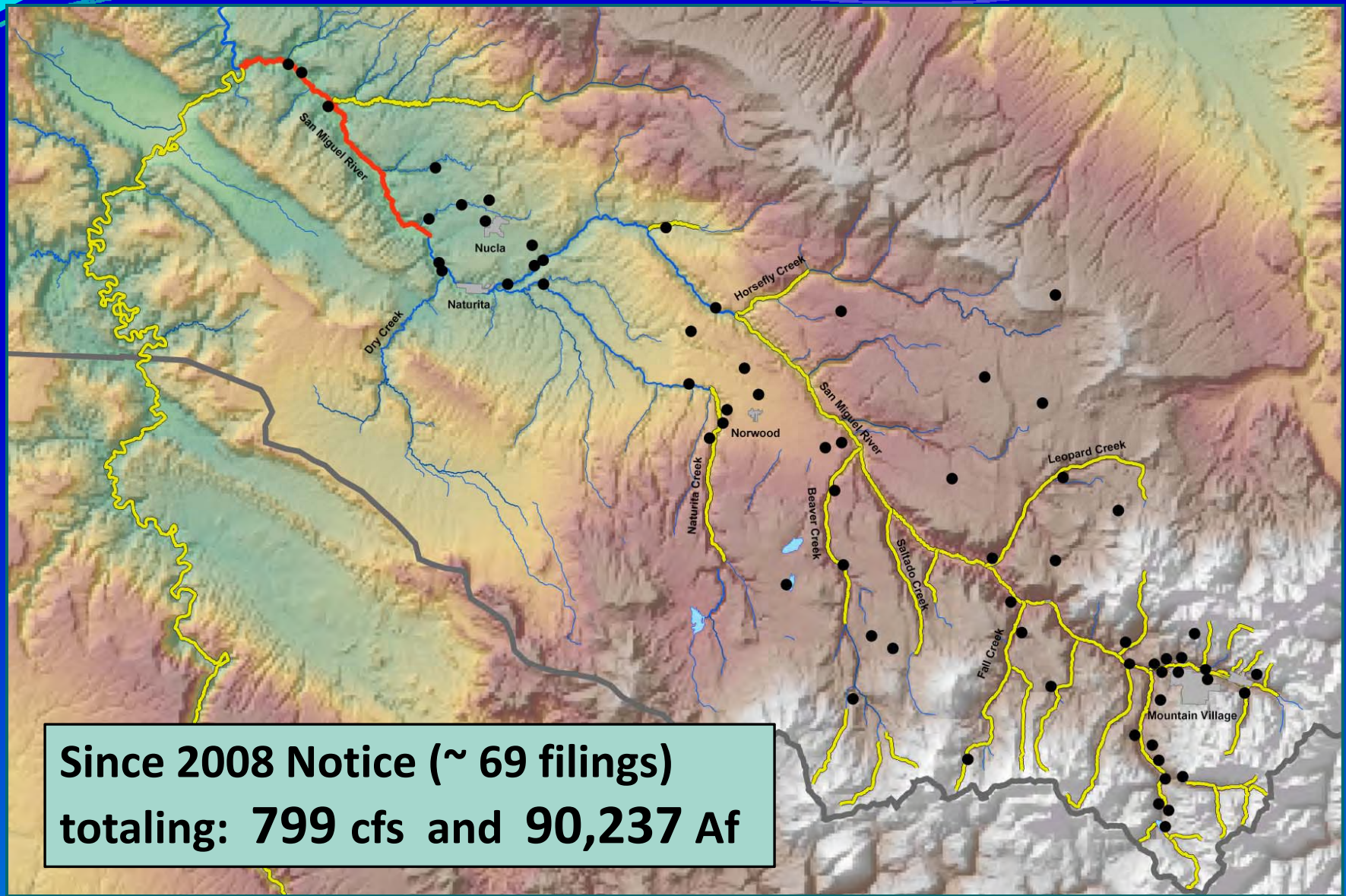
Proposed San Miguel River ISF

Stream Segment	County	Length	Amounts (cfs)
San Miguel River (confl Calamity Draw to confl Dolores River)	Montrose	17.24	115 (3/1 - 4/14) 325 (4/15 - 6/14) 170 (6/15 - 7/31) 115 (8/1 – 8/31) 80 (9/1 – 2/29)

San Miguel River
New Appropriation History

New Senior Filings Since 2008

Since 2008 Notice (~ 69 filings) totaling: 799 cfs and 90,237 Af

San Miguel River Natural Environment

bluehead sucker *
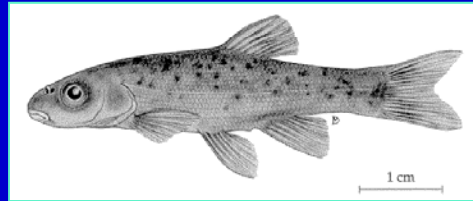(*Catostomus discobolus*)

flannelmouth sucker *
(*Catostomus latipinnis*)

roundtail chub* (*Gila robusta*)

Indicator Species

speckled dace

mottled sculpin

Northern
Leopard Frog

River Otter

Riparian Communities

State Species of Special Concern / BLM Sensitive Species

8

Minimum Amount Necessary

- ISF objective is preservation of the existing natural environment with the minimum amount of water

- Preservation of the fishery requires protection of optimum available habitat under average flow conditions

- Optimum habitat is defined as the most favorable condition for the growth and reproduction of an organism

- Diminution of habitat is likely to produce harmful changes in distribution, biomass, or health of the fishery, whereas maintaining the optimum habitat will ensure that the fishery is preserved.

- CPW's recommendation is the minimum flow that the PHABSIM model indicates will preserve existing optimum habitat.

San Miguel River Geometric Mean of Daily Flows at the Lower Terminus
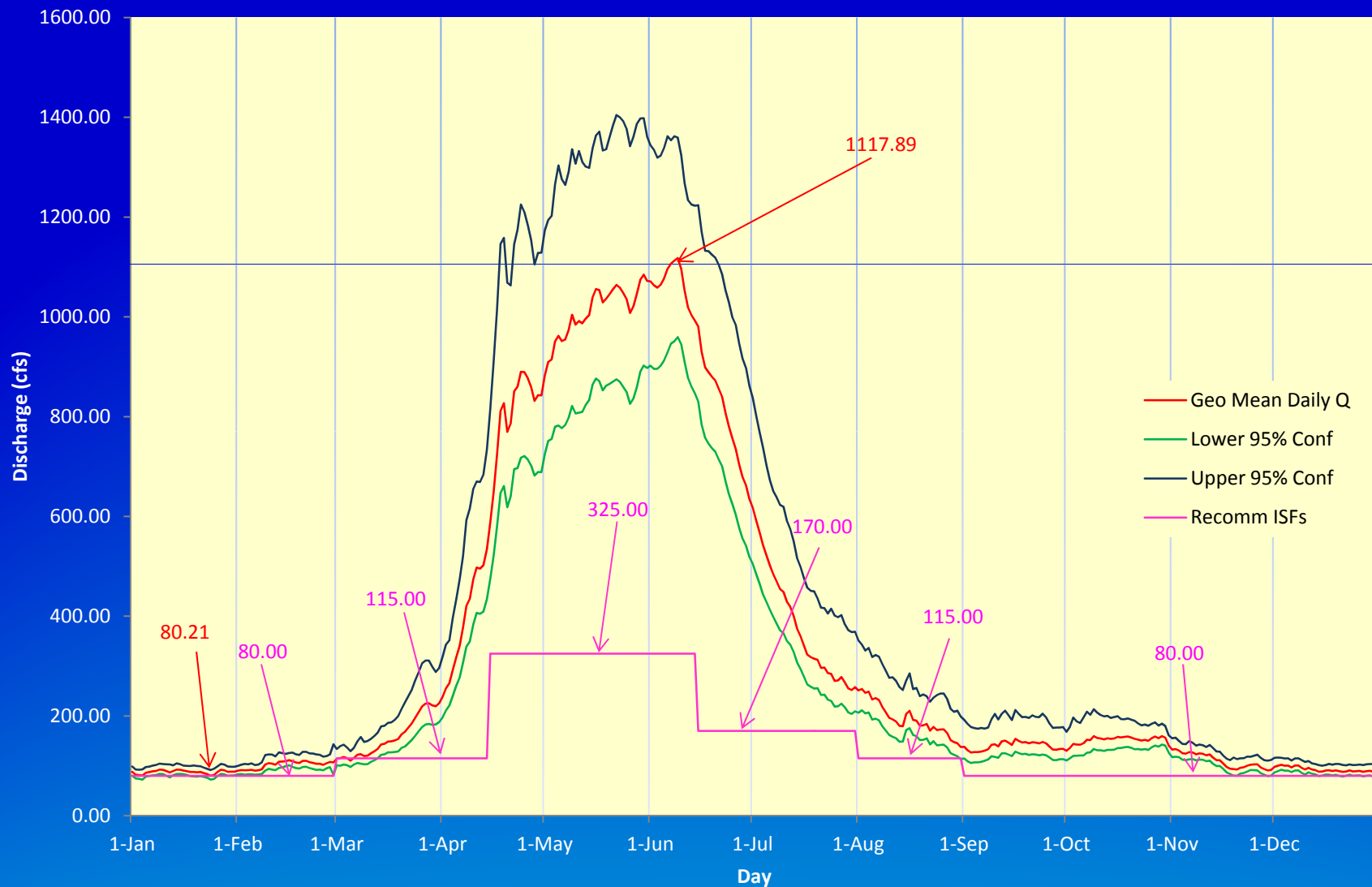
Correlating The Activities of Mankind with Reasonable Preservation

This ISF adequately balances the needs of people and the environment by:

1. Providing more than four years for water users to file for additional senior water rights to meet future needs.

2. Limiting the CPW and BLM quantified flows for reasonable preservation to water available under average conditions.

3. Considering the fact that additional water is left under the ISF - depleted hydrograph for future development.

4. Recognizing existing un-decreed practices

No Material Injury

The proposed ISF water right is entitled to conditions that existed at the time of appropriation and as a junior right, will not impact existing water rights.

Summary

It is a fact that:

- There is a natural environment and it can be preserved to a reasonable degree with this ISF appropriation.

- Water is available for this appropriation

- No material injury to water rights (decreed or not) will occur.

- The activities of mankind have been correlated with reasonable preservation of the natural environment

Staff recommends that the Board:

1) Determine, pursuant to section 37-92-102(3), CRS, and based upon the recommendations of the BLM and CPW, a review of the data and other information presented by Staff, and Staff's recommendation for instream flow appropriations on the subject reach of the San Miguel River, That:
    a) A natural environment does exist on this stream
    b) Water is available in the subject reach of the San Miguel River for the recommended appropriation
    c) The natural environment will be preserved to a reasonable degree by the water available for the recommended appropriation;
    d) Such appropriation can be made without material injury to water rights.

2) Pursuant to Rule 5f., establish January 25, 2011 as the appropriation date for the San Miguel River ISF right.

3) Request the Attorney General's Office to file the necessary water rights application.

BACKGROUND

- SLP assessed water availability for instream flow (ISF) in the San Miguel R. immediately upstream of the Dolores R. confluence.

- Staff determined that: 1) water is available for this appropriation; 2) this junior appropriation could be made without material injury to existing water rights (decreed and undecreed); and 3) there is unappropriated water available for future use.

- CWCB Staff reached this conclusion using its standard analysis. Though the Board has approved its use, the following step-wise explanation may be useful for new members:

  - **1. Create a baseline hydrograph at a stream gage.** Using gage data and water rights and use records, human impacts to daily discharge values are removed by adjusting gage discharge values by average daily depletions and/or additions.

  - **2. Transform values.** Following USGS guidelines, the adjusted daily discharge values are transformed into geometric mean values (≈ median, to reduce hydrograph distortions caused by uncommon, excessively high flows. Hydrograph is generally lower than average.)

BACKGROUND - Continued

- **3. Create baseline geometric daily mean hydrograph (bgdmh) for the gage station basin.** Using the transformed versions of adjusted discharge values at gage, compute daily average discharge. Transform these back into "normal" values.

- **4. Compute confidence limits.** Using USGS recommended statistics, compute upper and lower 95% confidence values.

- **5. Create bgdmh for ISF basin.** Using basin areas, the bgdmh of gage basin is prorated to produce the bgdmh for the ISF basin.

  - The proration factor (aka area ratio) is the ISF basin area/gaged basin area (e.g., 2000 mi^2 ISF basin area divided by 1000 mi^2 gage basin area = 2.0). In this example the discharge values of the bgdmh for the ISF basin = 2 times those of the bgdmh for the gage station basin {i.e. the hydrograph would be doubled}.

- **6. Create the existing condition geometric daily mean hydrograph for the ISF basin.** Adjust the bgdmh for the ISF basin by the depletions and additions of the ISF basin. (In the example above , these would include all depletions and additions from the gage basin plus all from the additional 1000 mi^2 of the ISF basin.)

- The following hydrograph displays the result of the foregoing analysis.

San Miguel River Geometric Mean of Daily Flows at the Lower Terminus
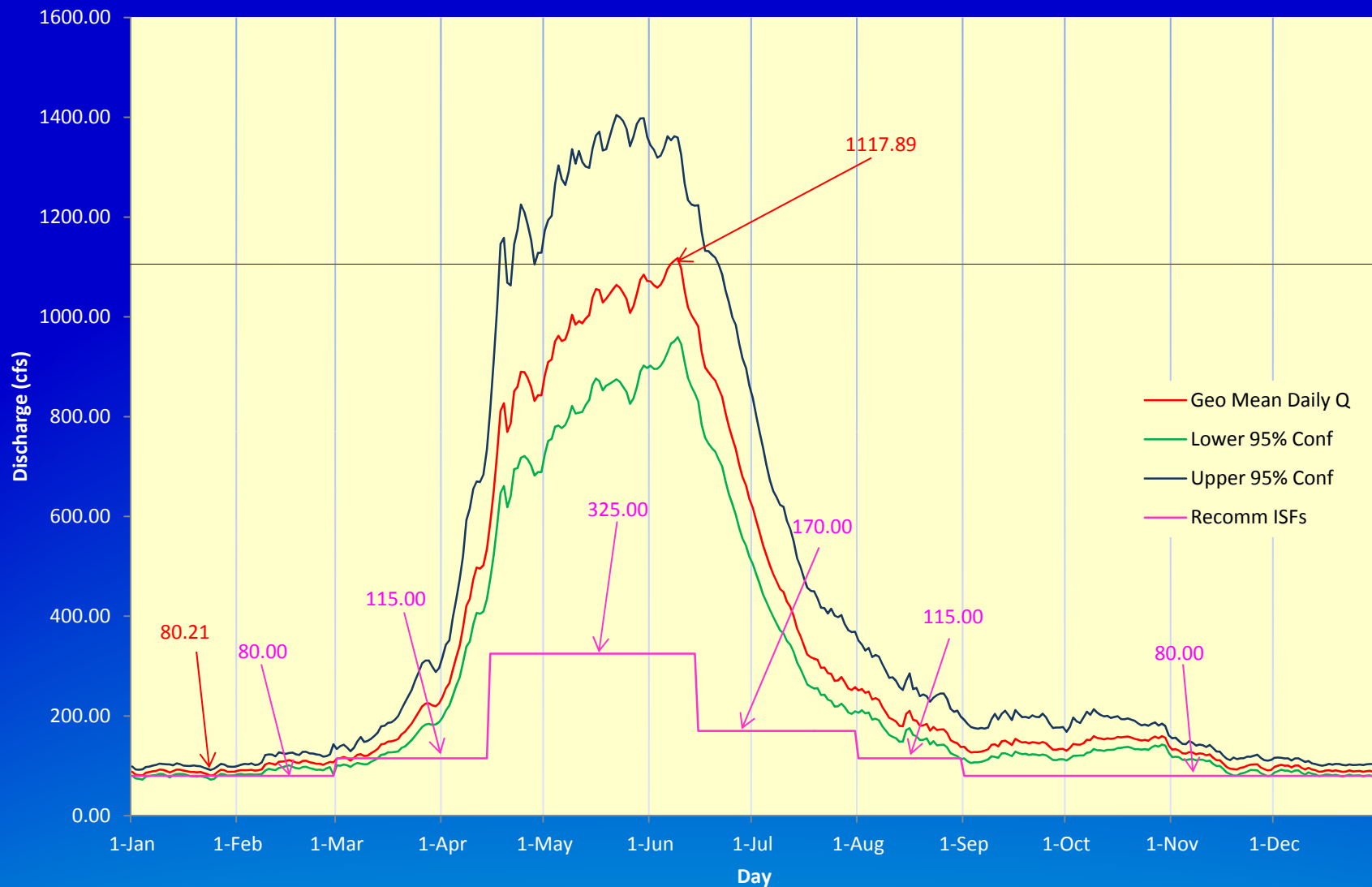
THE SAN MIGUEL ANALYSIS:

- The analytical approach is based upon tools and cautions contained in USGS Techniques of Water-Resources Investigations publications
- Data used in this analysis was retrieved from the State's Decision Support System and the USGS National Water Information System
- The Board has been fully briefed on the analytical approach used
- Staff routinely uses this analytical approach in Water Availability analyses
- The use of mean/median flows as determined at the lower terminus (LT) of an ISF reach has been in place since the beginning of the Program
- Mean/Median flows characterize the long-term hydrology that has sustained the Natural Environment including Indicator Species
- The determination of Water Availability for the purpose of preserving the Natural Environment differs from the determination of Water Availability (Firm Yield Analyses) for Water Development Projects.
- Opposers' critiques are largely incorrect, insufficient, or irrelevant.

San Miguel River Geometric Mean of Daily Flows at the Lower Terminus
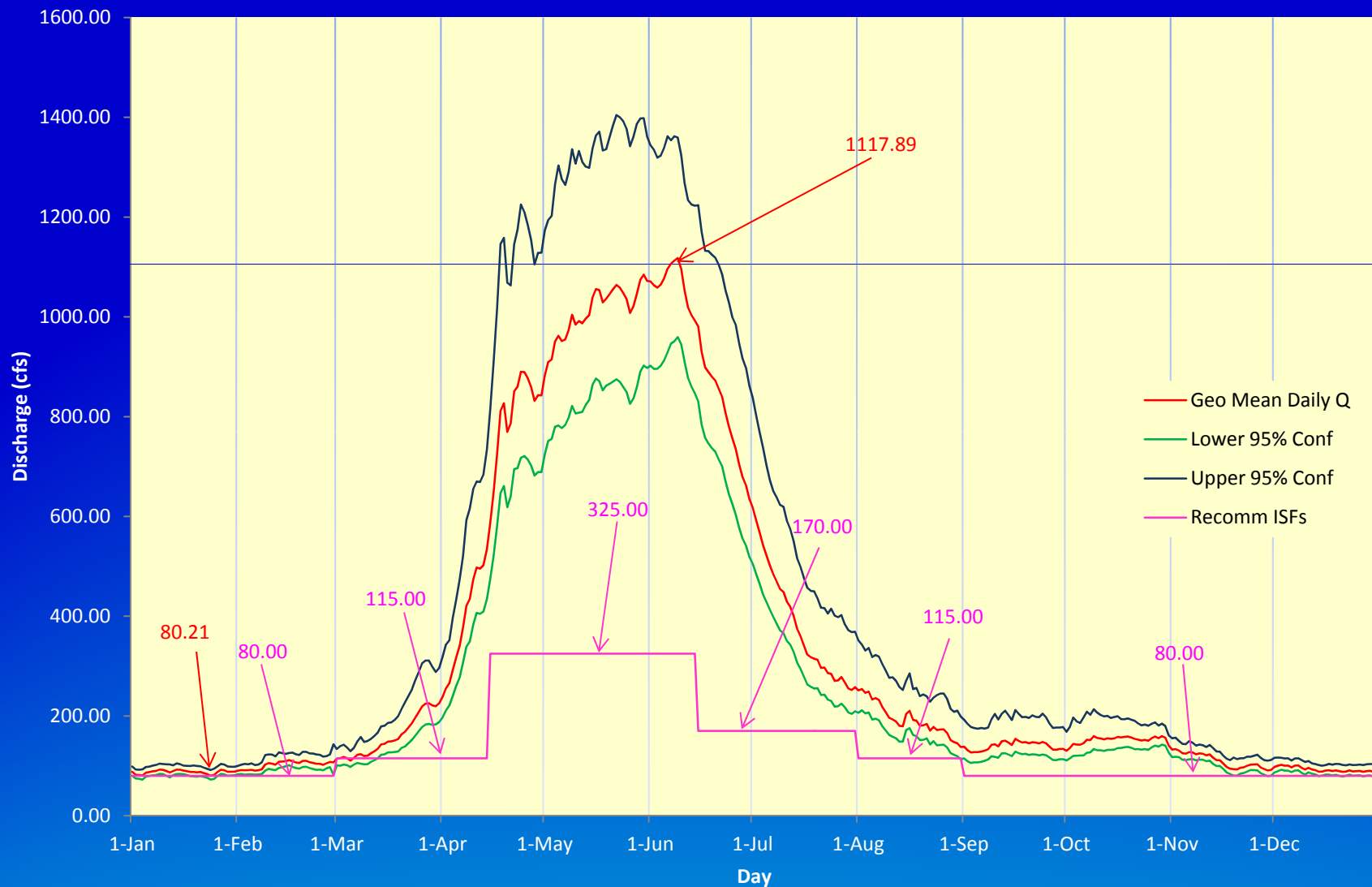
CRITIQUES & REBUTTAL

- Claimed flows are unavailable about ½ the time
- ✓ **CWCB has a policy that water is regarded as available for ISF appropriation if the recommended ISF flow amounts are less than or equal to the hydrograph of median daily values (i.e., the ~50% exceedance value)**

- Extrapolation – Should determine water availability at the gage using gage discharge values and not extrapolate to the LT
- ✓ **Calculation of water availability at the gage would ignore 58 mi^2 of contributing area and any human influences that area might contain; gage data is used, just prorated for the large watershed by area**

- Recommended Reach is Effluent (gaining), therefore amounts calculated at the downstream end may be unavailable at the upstream end
- ✓ **As a matter of policy, water availability is computed at a point and that point is at the lower terminus. If sufficient water is found there, the indicator fish and the environment can be protected. A reach may contain areas of both gain (effluent) and loss (influent) that may have little or no effect upon the fish and environment throughout the reach. An assertion of the effluent/influent status of a reach or portion of a reach requires substantiation as to specific location and timing. The characterization of water availability at multiple points from the lower terminus to the upper terminus would be infeasible and impractical. Also, gage data upstream of the upper terminus shows water to be available .**

CRITIQUES & REBUTTAL - Continued

- Precipitation Volume Ratio (PVR) should be used rather than Area Ratio (AR)
- ✓ **A Ratio is Limited by the Quality of the Data Used to Create it. The AR is created from data with less likelihood of measurement and other errors than the PVR. The six or seven points of precipitation data found in this basin limit what can be said about basin-wide precipitation. On a basin-wide basis, precipitation is typically described by isohyets (connected points of equal precipitation) that are derived from area-elevation relationships and precipitation values derived from one or more algorithms that are based on data collected on and/or off site. There are numerous opportunities for errors to occur in computing precipitation in this basin.**

- Extrapolation leads to inflated estimate of discharge because the added area receives less precipitation than the rest of the basin. Treating the added (assumed drier) area like the remainder of the basin increases estimates of discharge.
- ✓ **Staff analysis applies to entire basin. The precipitation in the additional 58 mi^2 has about the same isohyet pattern as about ½ of Basin (see next figure), therefore the additional area is not as dry as opposer assumes. Water availability is computed on a unit discharge per acre basis. Because this value is computed from stream discharge data divided by area of contributing basin, the addition of this area merely assumes an average rate of discharge per acre. Precipitation and discharge are not necessarily linearly related. A unit increase in precipitation may not result in a unit increase in discharge. Gaining and losing reaches can affect discharge so that changes in precipitation are not necessarily reflected in similar changes in discharge.**
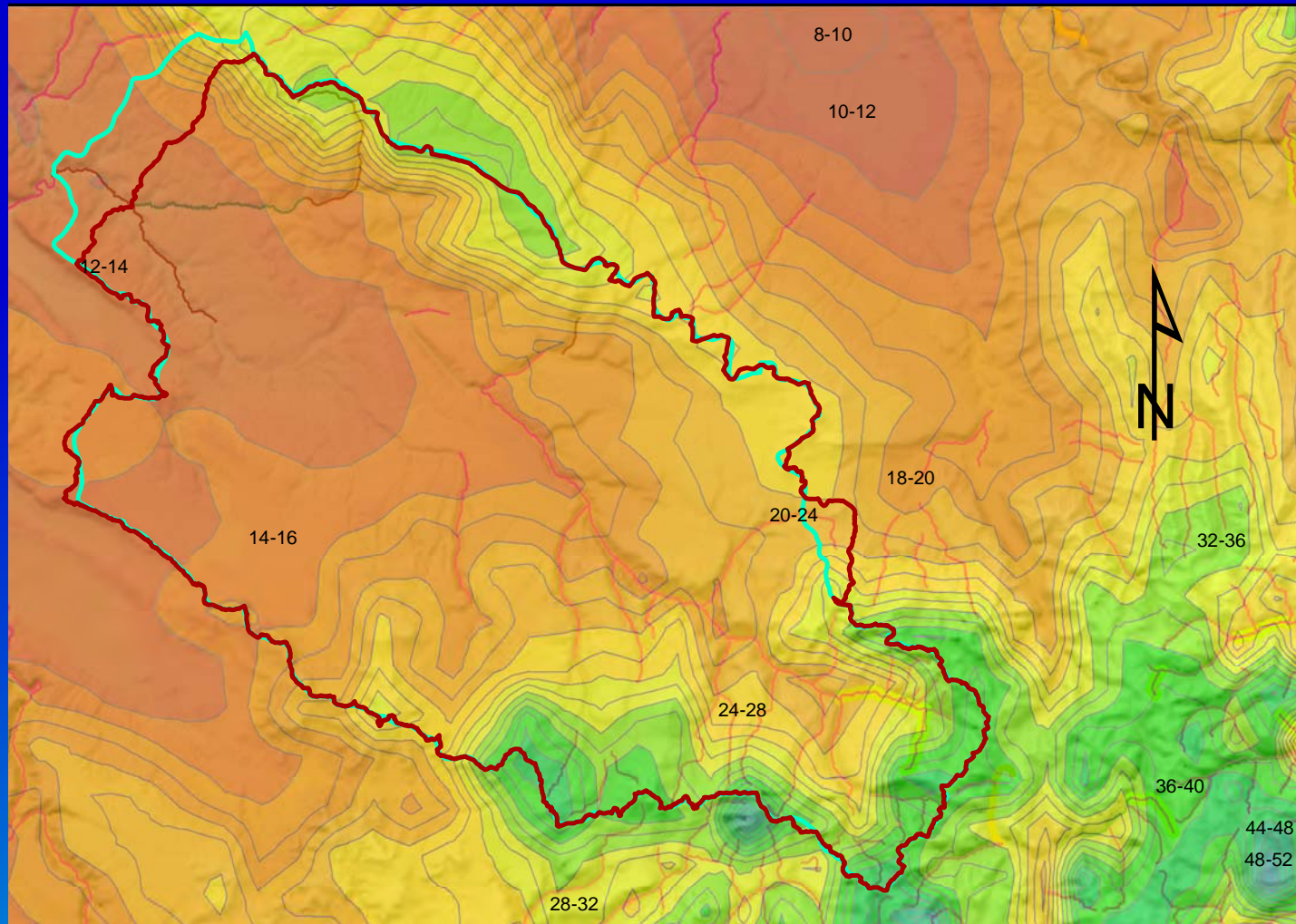
CONCLUSIONS

- CWCB Staff used its standard analysis, USGS gage data, DWR water rights and uses records, and USGS statistical tools

- Differences between Staff's and Opposers' analysis outcomes were small and reasonably likely to be overwhelmed by probable measurement and other forms of error

- Whether using the CWCB approach or another, whether at the Uravan gage as suggested or at the lower terminus, water remained available for appropriation after subtraction of discharges dedicated to ISF

- Staff found no instance of injury to existing water rights (decreed or not)