

Flow Regime Development in support of HDR Engineering Solutions Evaluation

May 2010



Science Subcommittee (SSC) Comments

- **SSC COMMENT:** *“Need to clearly discuss the purpose and intent of the study early in the report. It’s unclear how this study is different from Expert Science Subcommittee’s 2009 report.”*

SSC goal, objective and task:

- *“Our interpretation of a protective flow regime is one that will ensure the ‘survival **and recovery** of the species in the wild’. To accomplish this goal, the subcommittee determined that the recommended flow regime **must sustain an overall trend of maintaining or increasing** the populations of the threatened and endangered species. This task is **focused on developing withdrawal reductions and stages for critical period management** based on the flow requirements for eight threatened and endangered species found in the Comal and San Marcos springs ecosystems.”*

Science Subcommittee Comments

- **SSC COMMENT:** *“This [BIO-WEST] flow regime assessment and recommendations are not a refinement or improvement of the Expert Science Subcommittee’s’ document on the "j" charges, but BIOWESTS’s **interpretation of an appropriate flow regime for survival during a severe drought.**”*
- **RESPONSE:** *This is Correct. The purpose is to develop a flow regime for **survival** of the threatened and endangered species during a severe drought using mitigation and management options beyond the status quo. The regime is also designed so that coming out of the severe drought the habitat remaining and species populations would be such that there is the **potential for recovery.***

Science Subcommittee Comments

- **SSC COMMENT:** *“Concerned that readers will interpret this report as the next phase of the biologists’ interpretation of what constitutes an adequate minimum flow.”*
- **RESPONSE:** *At no time was this regime ever considered or proposed as a replacement for the SSC J charge recommendations. Both messages were conveyed repeatedly in the memorandum and during the March presentation made to the RIP.*

So, How are two flow regimes different?

SSC Comal Springs Flow Regime:

- Long-term average flow: 225 cubic feet per second
- Minimum 6-month average flow: 75 cubic feet per second
- Minimum 1-month average flow: 30 cubic feet per second with no flow below 5 cubic feet per second

SSC San Marcos Springs Flow Regime:

- Long-term average flow: 140 cubic feet per second
- Minimum 6-month average flow: 75 cubic feet per second
- Minimum 1-month average flow: 60 cubic feet per second with no flow below 52 cubic feet per second

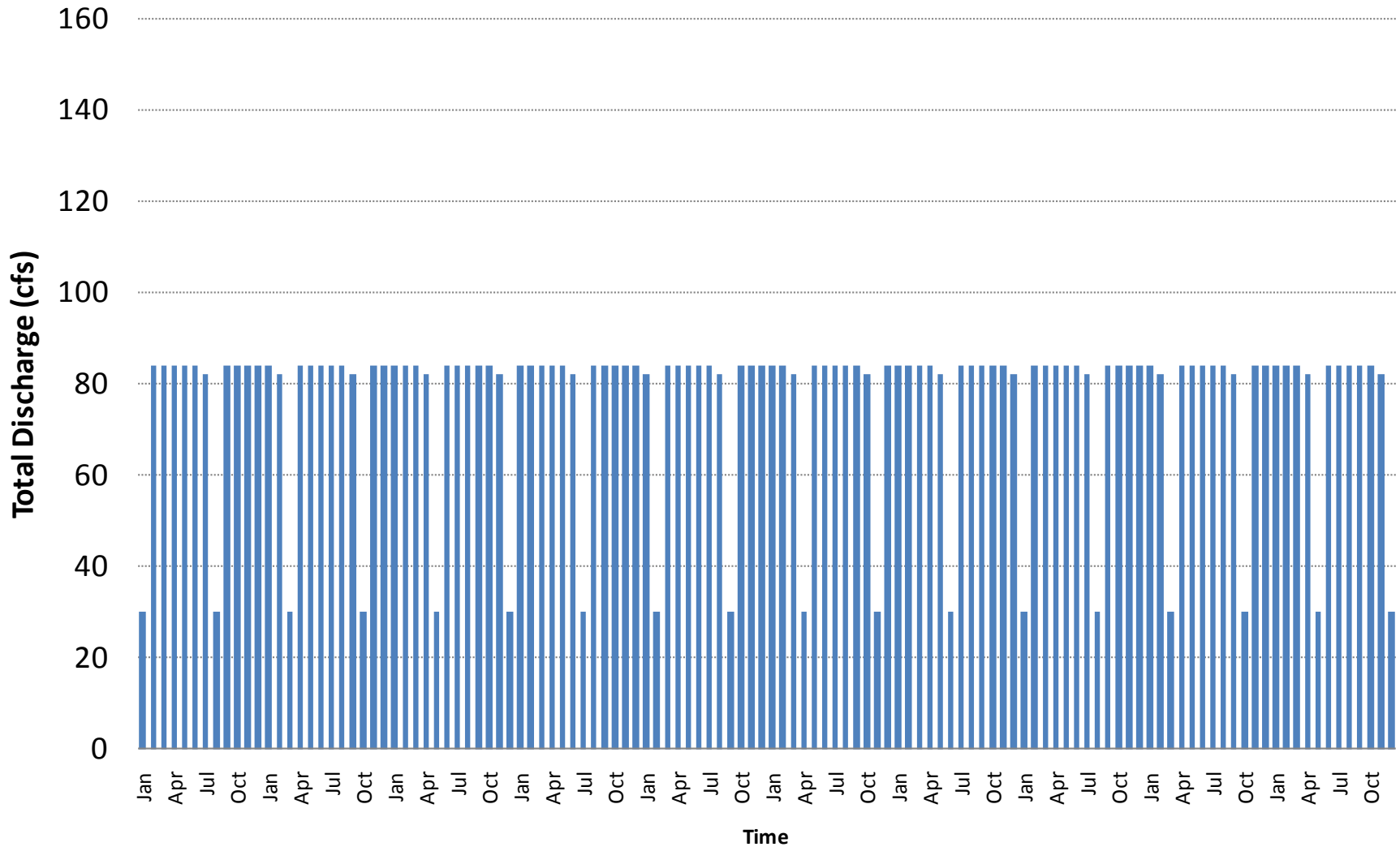
ASSUMPTIONS: Based on the Status Quo

How does one translate the SSC recommendation for a severe drought?

- A severe drought flow regime was not specifically developed or presented in the SSC report. This was not the charge.
 - The charge was to assist in the development of a Critical Period Management Plan.
 - The most prevalent comment received by the independent peer review of the SSC J charge report was that the SSC flow recommendations do not encompass all the components of a traditional instream flow study. Again, that was not the charge.
- Note: the SSC assumptions are based on the status quo.

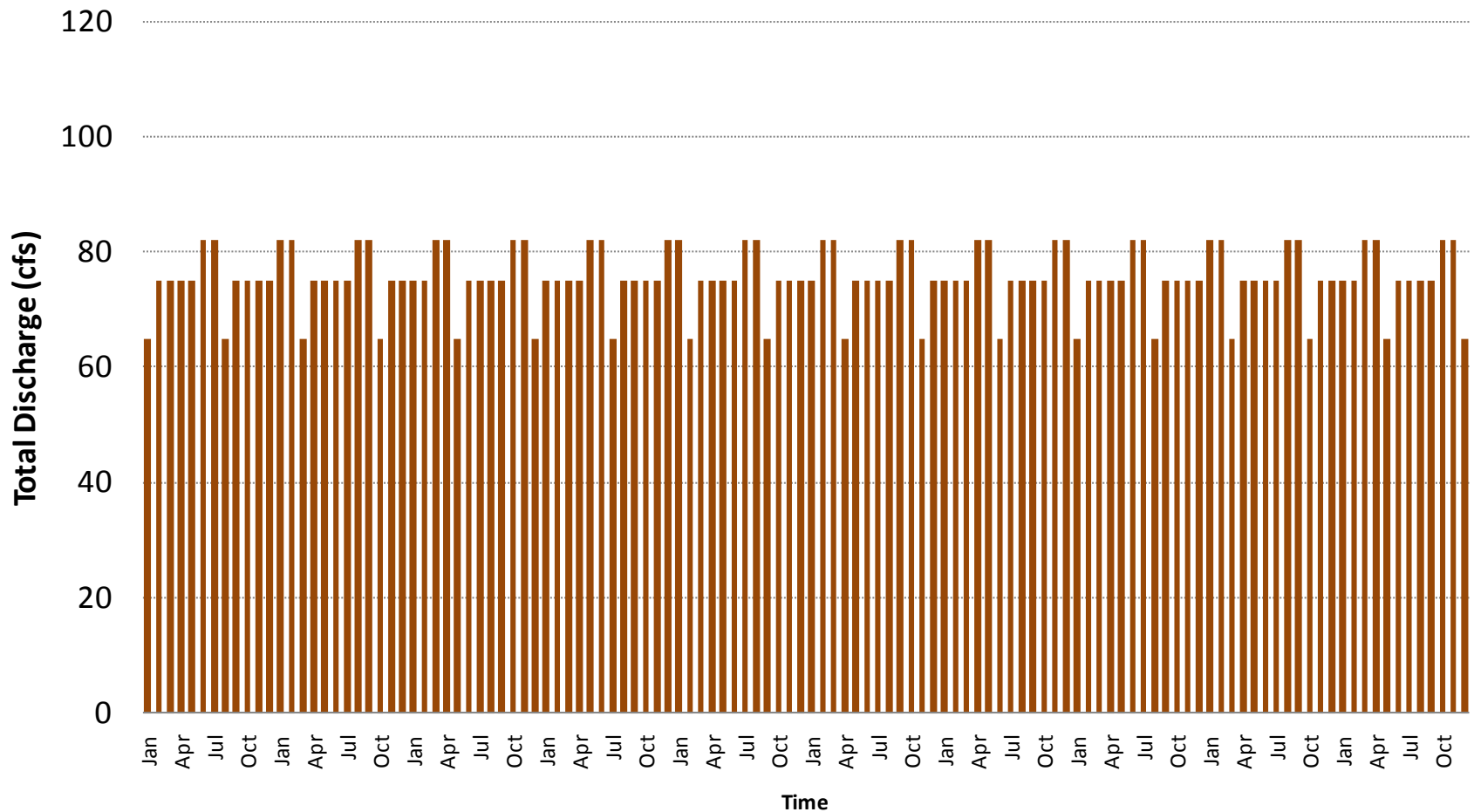
SSC Comal – strict interpretation

10 year (SSC) Flow Regime - Comal System
SSC recommendation (30 cfs - 1 month, 75 cfs - 6 month)



SSC San Marcos – strict interpretation

10 year (SSC) Flow Regime - San Marcos System
SSC recommendation (60 cfs - 1 month, 75 cfs - 6 month)

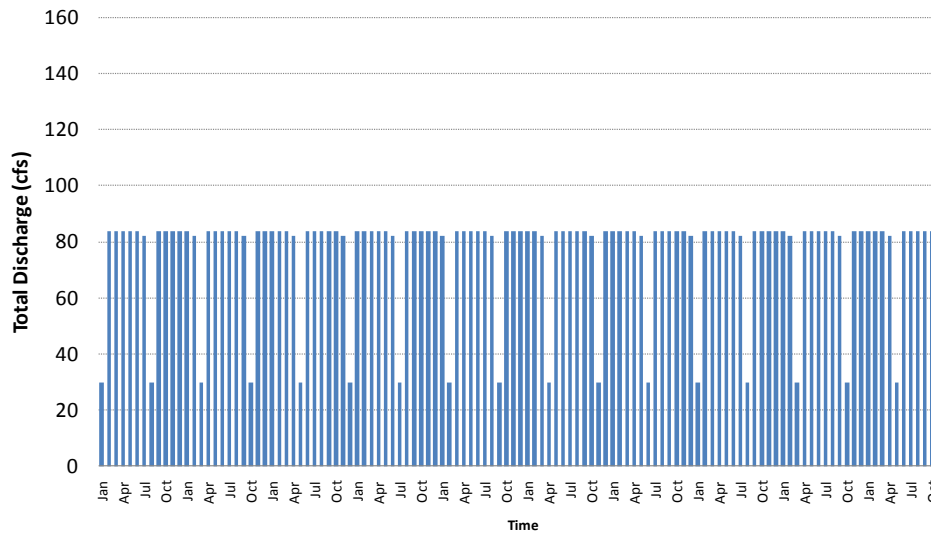


Severe Drought flow regime

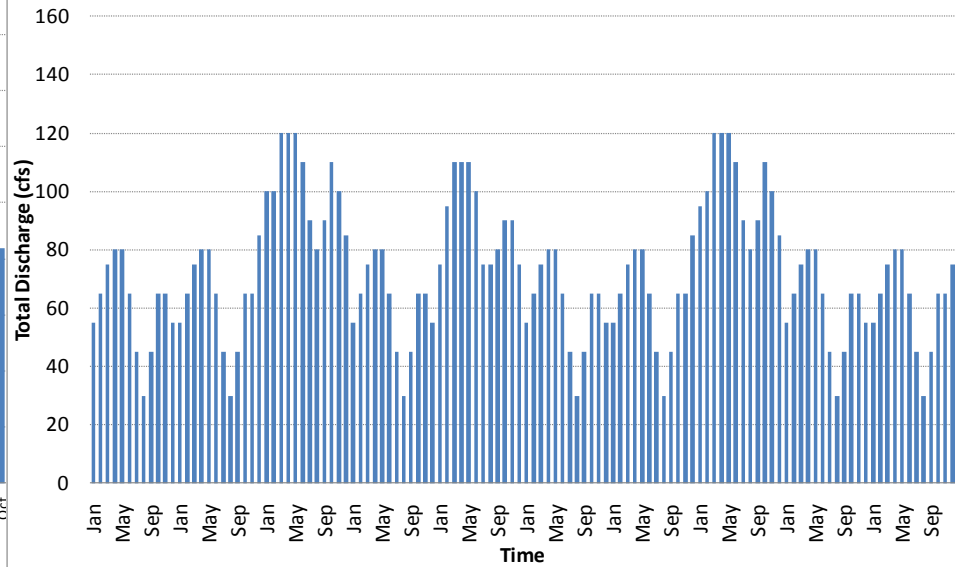
- **Major Differences:**
 - The purpose of this exercise was specifically to establish a flow regime during a severe drought that would keep the species alive in the wild with the potential for recovery afterwards. To be used in the HDR engineering solutions exercise.
 - The assumptions used in the Severe Drought regime go well beyond the status quo, thus allowing the regime to deviate from the SSC one-month and six-month values in certain instances.
 - The Severe Drought flow regime could be considered one possible translation of the SSC J charge recommendation, but with active adaptive management.

Comal Comparison

10 year (SSC) Flow Regime - Comal System
SSC recommendation (30 cfs - 1 month, 75 cfs - 6 month)
[Annual Average - 55,200 acre-feet]

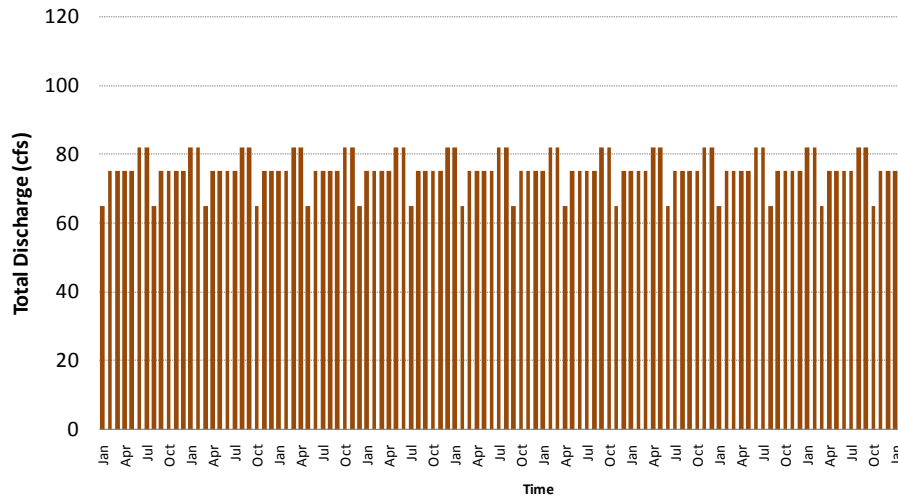


10 year - Severe Drought Flow Regime - Comal System
[Annual Average - 52,833 acre-feet]

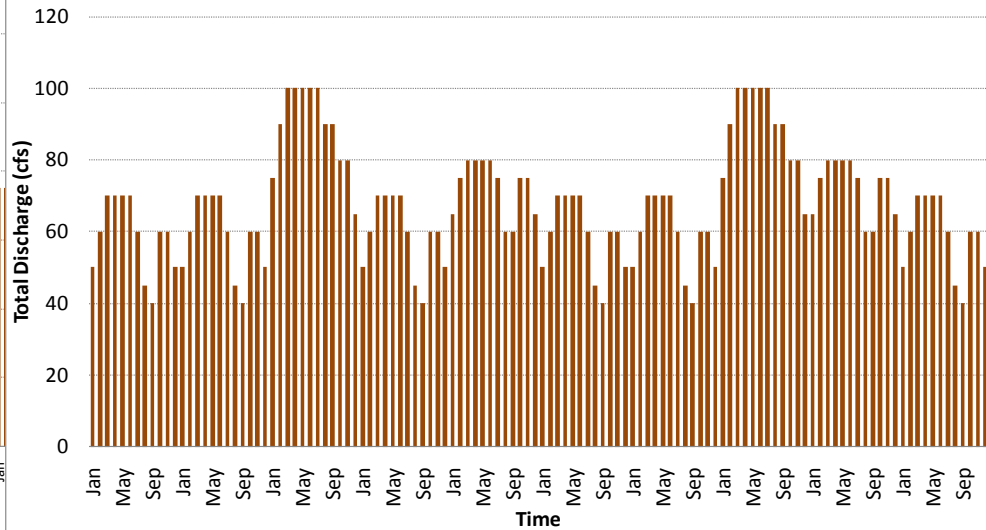


San Marcos Comparison

10 year (SSC) Flow Regime - San Marcos System
SSC recommendation (60 cfs - 1 month, 75 cfs - 6 month)
[Annual Average - 55,102 acre-feet]



10 year - Severe Drought Flow Regime - San Marcos System
[Annual Average - 49,335 acre-feet]



Science Subcommittee Comments

- **SSC COMMENT:** *“It is important for BIO-WEST to emphasize up front in the document that this is not a simulation of the drought of record, but BIO-WEST's recommended flow regimes to best permit the survival of the species during a severe drought.”*
- **RESPONSE:** *Great Comment. This regime was not intended to be a simulation of the drought of record. The terminology will be revised to clarify in the final report.*
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Science Subcommittee Comments

- **SSC COMMENT:** *“Qualify the conditions or clarify the extent of “recovery” intended by the phrase “potential for recovery.” For example, a characterization such as “recovery to pre-drought status” may be more appropriate.*
- **RESPONSE:** *Agreed. The terminology will be revised in the final report to say, “return to pre-drought status”.*

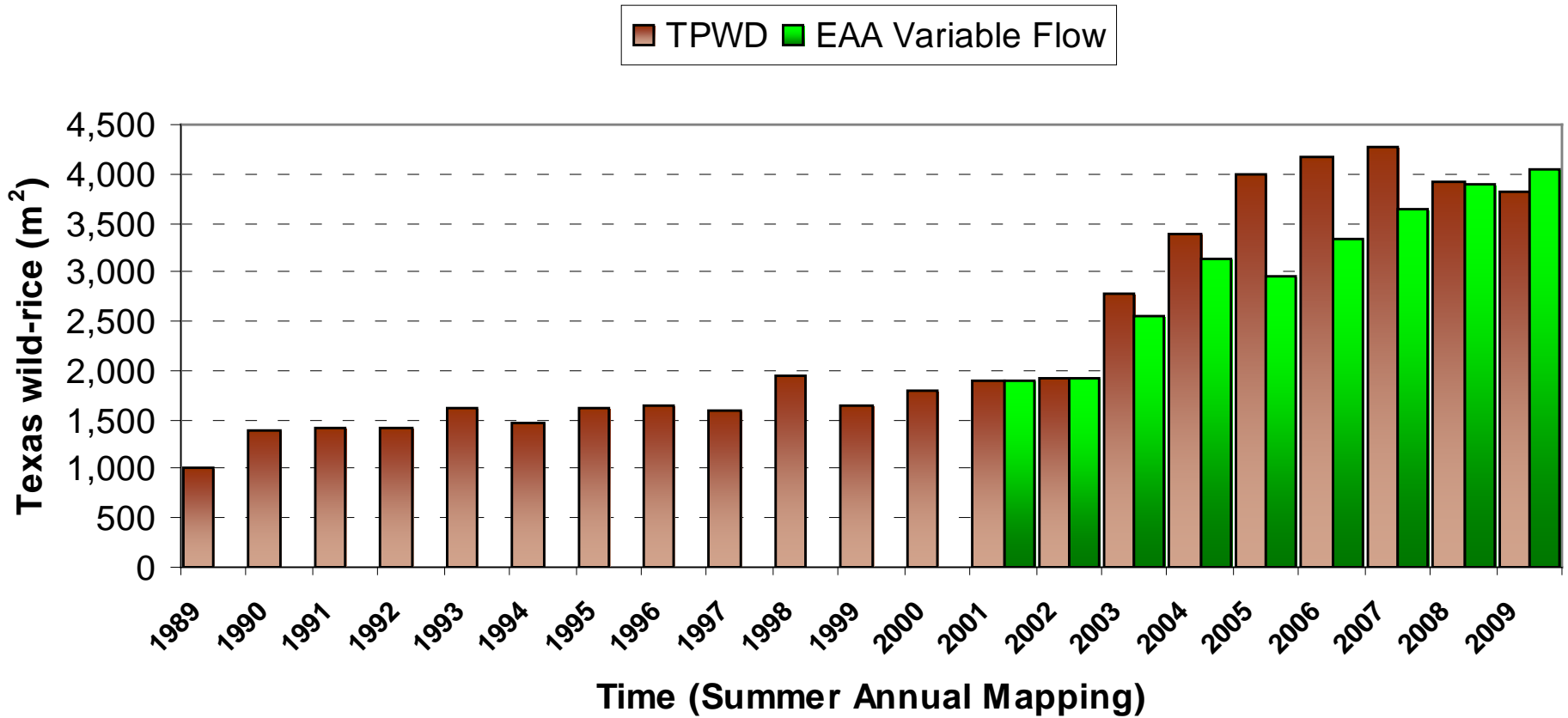
Science Subcommittee Comments

- *SSC Comment: “the model flow regime presented in this report is not similar to the drought of record and would reduce Texas wild-rice to extremely low aerial coverage, requiring **heroic** as well as **unpopular** measures to maintain enough individuals to recover the species.”*
- ***RESPONSE: That is Correct. A major concern highlighted in the memorandum was the potential effect on Texas wild-rice and therefore, one major assumption included is the development of Intensive Management Areas longitudinally down the San Marcos River.***

Science Subcommittee Comments

- **RESPONSE Continued:**
 - **What are longitudinal IMA's**
 - *Managed areas of depth, velocity and substrate that will maintain characteristics suitable for the maintenance of Texas wild-rice at the flow levels proposed in the Severe Drought regime. Also, it is envisioned that recreation would be kept away from these areas during lower flows.*
 - *Anticipate trying to maintain a total coverage of approximately 1,000 meters squared. For example, Five – 200 meter IMA's spread longitudinally down the river*
 - *These areas would be created during good river flows, not during stressed times. The goal is to get these in place during better conditions for transplanting so as to avoid the known issues surrounding transplanting during stressed conditions.*

Why 1,000 meters squared?



Science Subcommittee Comments

- ***SSC Comment: “The assumptions about control of exotics is unrealistic and impossible to accomplish.”***
- ***RESPONSE: I respectfully disagree.***

Severe Drought Flow Regime

MAJOR ASSUMPTIONS

- *Water quality of the spring flow will have the same chemistry and biological components as Edwards Aquifer water.*
- *Mitigation activities will control (not eliminate) exotic plant and animal species including the gill parasite.*
 - *Control of natives was also recommended by SSC*

Severe Drought Flow Regime

MAJOR ASSUMPTIONS

- *Recreational impacts to species will be addressed and managed to limit impact.*
- *Intensive Management Areas (IMAs) are in place on both the Comal and San Marcos systems.*
 - *To be established in advance in preparation for severe drought.*
- *Flow split between the new and old channels at Comal will be part of the management strategy.*

Science Subcommittee Comments

- **SSC COMMENT:** *“It may be difficult for MODFLOW and the simulation of engineered solutions to mimic the requested variable springflow. The model does not have this type of capability nor do engineered management strategies. We have a scale problem here: A flow regime at one scale and water management at another scale.”*
- **RESPONSE:** *The proposed Severe Drought regime is preliminary and the subsequent tasks of working with HDR to define triggers and application may enlighten management applicability.*

Science Subcommittee Comments

- **SSC COMMENT:** *“Memorandum appears to accomplish its stated objectives, is well-composed, and appropriately qualified with assumptions.”*
- **RESPONSE:** *Brilliant!*
- **SSC COMMENT:** *“...appears to be a comprehensive and well-written report....”*
- **RESPONSE:** *Cost me \$10, but was worth it.*

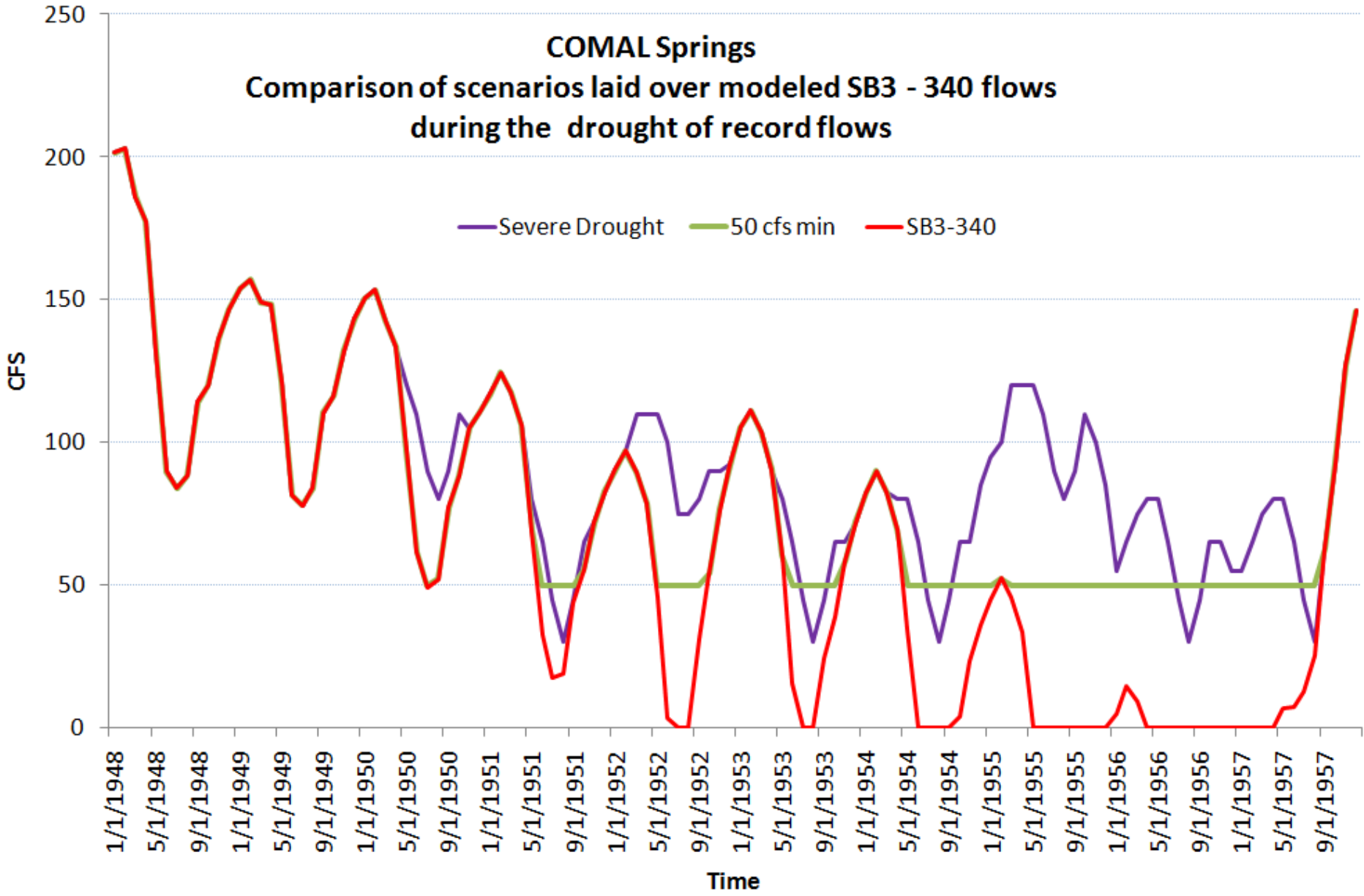
Where does the RIP go from here?

- *What should HDR use in their engineered solutions exercise?*
 - *SSC recommendations?*
 - *Not applicable for this application without translation*
 - *Severe drought flow regime preliminary values?*
 - *Needs to carry along Major Assumptions*
 - *Some constant volume?*
 - *50 cfs? – Comal / 65 cfs? – San Marcos*
 - *Would need to be accompanied by Major Assumptions*

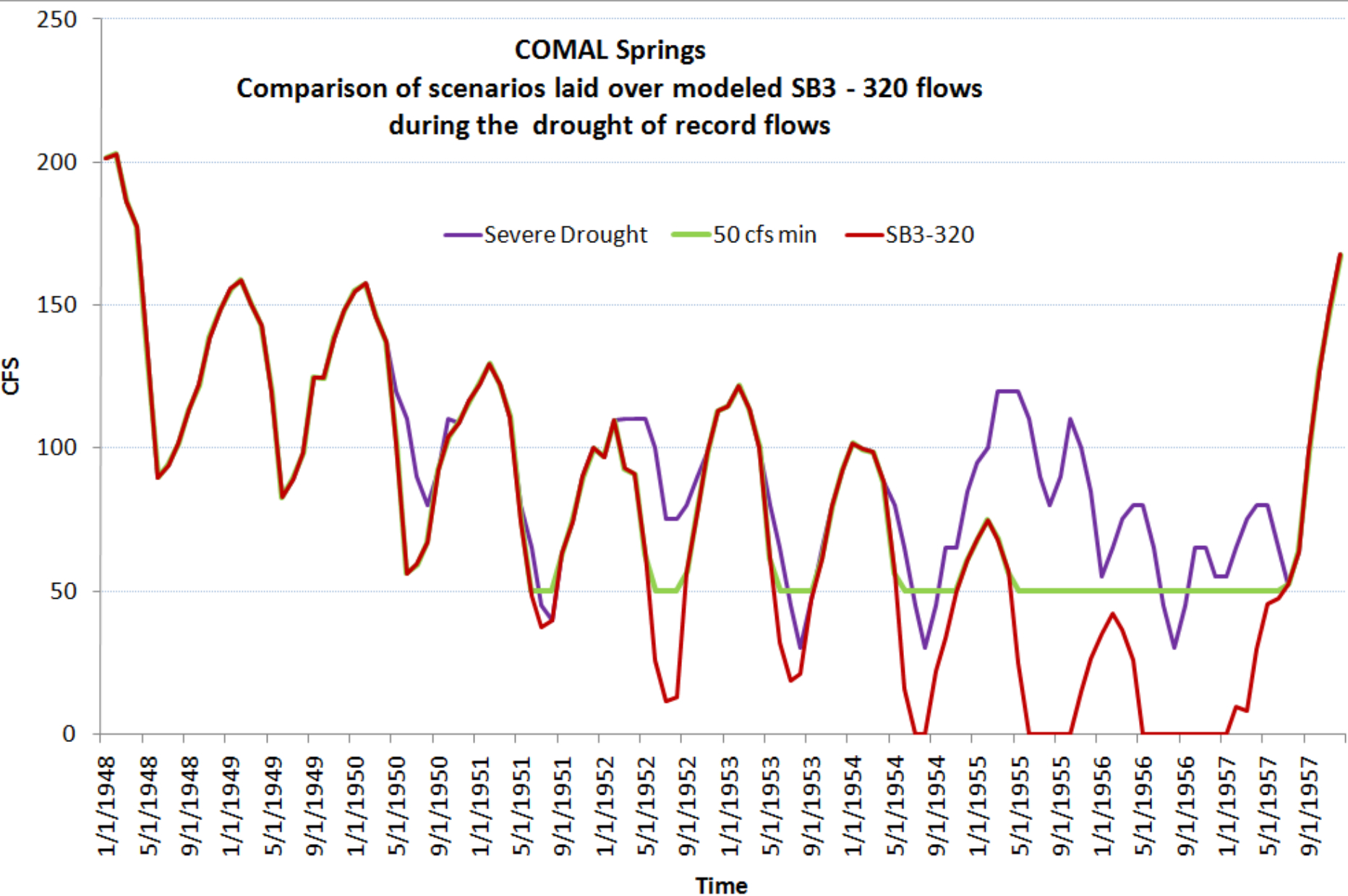
COMAL Springs

Comparison of scenarios laid over modeled SB3 - 340 flows during the drought of record flows

Severe Drought 50 cfs min SB3-340

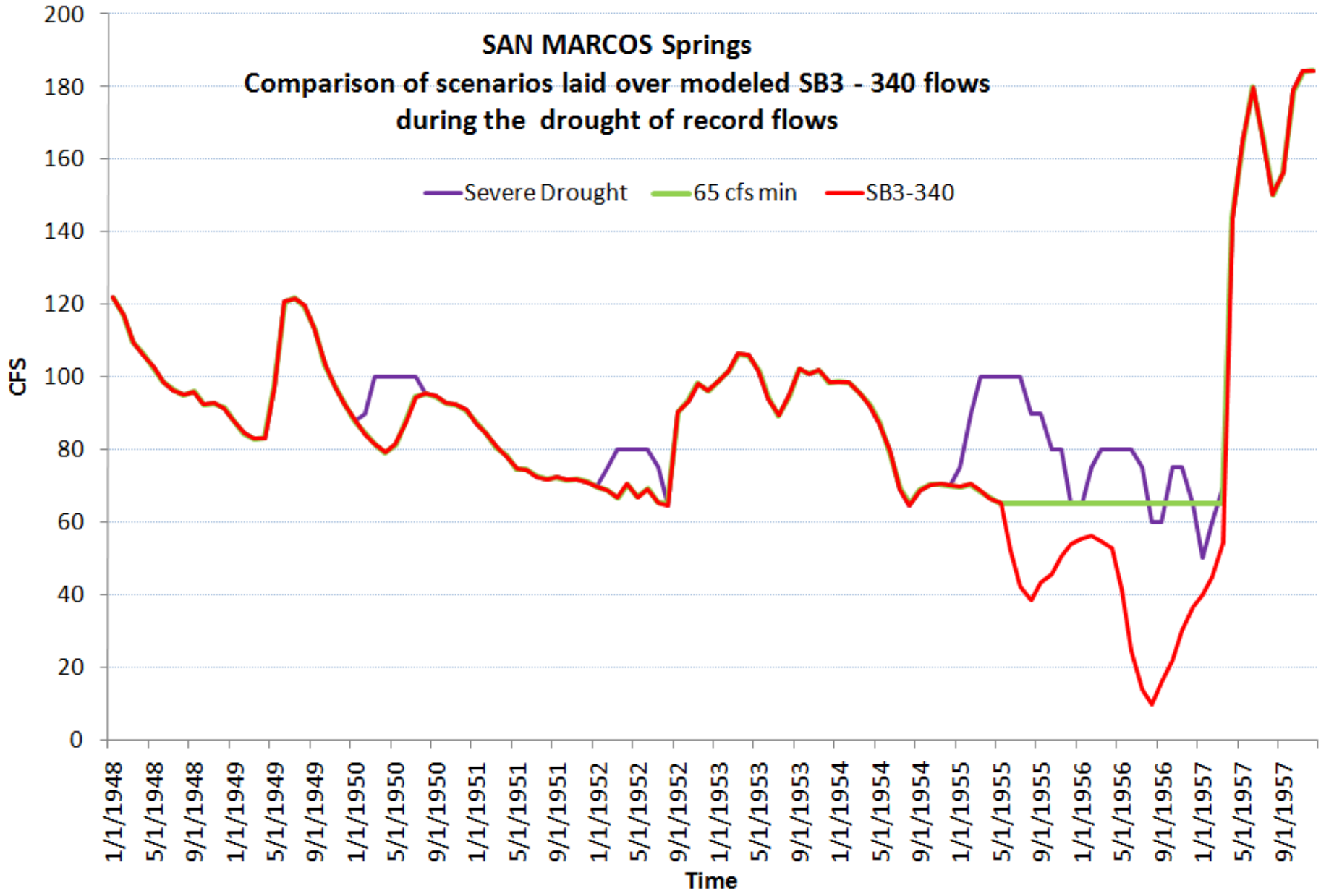


COMAL Springs Comparison of scenarios laid over modeled SB3 - 320 flows during the drought of record flows



SAN MARCOS Springs Comparison of scenarios laid over modeled SB3 - 340 flows during the drought of record flows

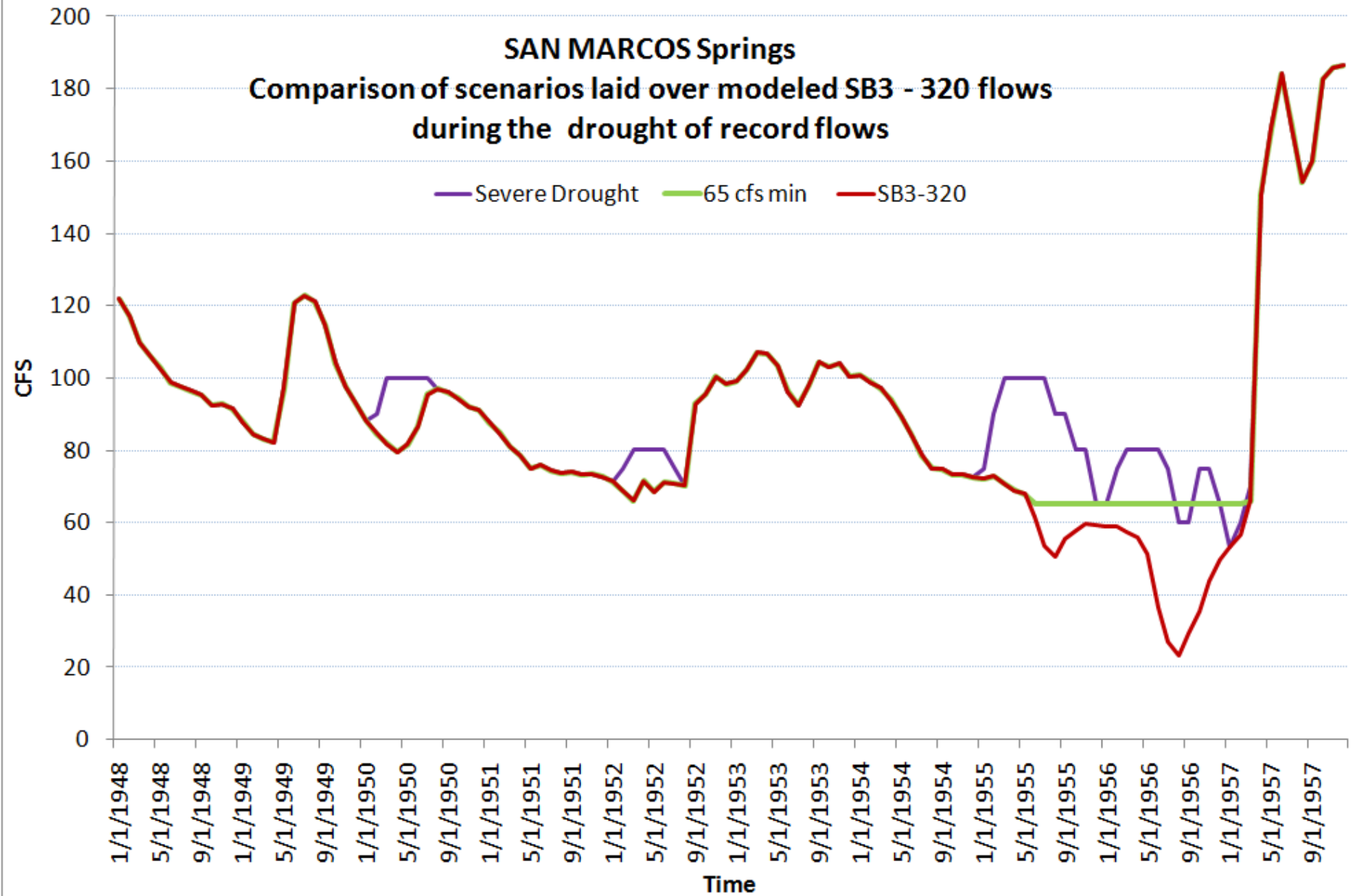
Severe Drought 65 cfs min SB3-340



SAN MARCOS Springs

Comparison of scenarios laid over modeled SB3 - 320 flows during the drought of record flows

Severe Drought 65 cfs min SB3-320



HDR Engineering Solutions Discussion

THOUGHTS / QUESTIONS

