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Sent via email to WSIPComments@cwc.ca.gov

Re: Supplemental Comments on Revised Proposed Regulations for the California Water Commission's Water Storage Investment Program Quantification Regulations

Dear Chairman Byrne and Members of the Commission:

American River Watershed Institute (ARWI) is submitting recommendations on the August 29 draft WSIP. We hope the Commission will consider these areas of concern, and will accept these recommendations.

The three areas of concern are as follows, expanded below:

1. **Public Process.** The process for final consideration of the proposed project does not include an adequate process for public and stakeholder comment. Inadequate feedback from the highly informed California public and stakeholder community limits the broader range of perspective, knowledge, and understanding that could assist the Commission's wise decision-making.
2. **Project Alternatives**. Project proposals are not required to formally consider reasonable alternatives to the proposed projects. ARWI recommends a more robust consideration of project alternatives.
3. **Climate Change.** The climate change considerations are limited in several ways. In addition, analysis tools already exist that can be easily utilized in project assessment. These tools include the EPA funded Sierra Climate Change Watershed Yield Calculator.

These issues are expanded below:

1. Public Process.
The adoption of the WSIP included several opportunities for stakeholder and public feedback, including workshops, a full day of public comment to the Commissioners, and this written comment period. The public process for the actual adoption of

the proposed projects and the allocation of significant public funds appears to have few opportunities for public and stakeholders to offer information, perspectives and insights into the decision-making.

ARWI recommends that when the project proposals are evaluated, those final proposals as well as the evaluations and recommendations be opened for public comment and stakeholder input. This process will assist in assuring the Commission that the projects are accurately represented in their proposals, as well as the anticipated outcomes, impacts, and consequences of the projects. Input from the public and stakeholders will broaden perspective, increase understanding, and inevitably lead to wise expenditures of public funds.

2. Project Alternatives

Will the project proposals sufficiently analyzed alternatives? An informed decision should consider reasonable alternatives. The public interest can be best served if alternatives have also been considered and evaluated. There is no specific requirement for analyzing project alternatives.

Perhaps the Commission is relying on the CEQA process to provide this information. This is problematic for a couple of reasons. First, timing for considering alternatives through CEQA does not match CWC timing. It appears that most CWC deliberation and analysis will occur in 2017. It is also stated that one of the first funding elements can be allocation of toward the EIR process. In that case, the decision to proceed on a project will occur before any alternatives are considered.

Second, the DEIR itself is not an assurance that reasonable alternatives have been addressed and evaluated. Comments on Draft EIR's often cite inadequate consideration of alternatives. Final EIR's are challenged in court on the basis of inadequate consideration of alternatives.

ARWI recommends that the Commission require project proposals include and analyze reasonable alternatives to the preferred project.

3. Climate Change.
ARWI makes several recommendations under this topic:

- revise approach to **precipitation parameters**,
- require projects address **climate scenarios** when available,
- use the **Sierra Climate Change Watershed Yield Calculator** for projects within the Sierra Nevada Study Area

Precipitation parameters.
The Climate Change section approach to predicting precipitation is flawed. Averaging the ensemble of scenarios selected by DWR resulted in a 2030 precipitation prediction of an increase of 2.4% and a 2070 increase of 4.6%. Using the average of the ensemble reduces the consideration of future precipitation to a non-issue, when the potential variation in precipitation is the salient issue for climate change. Rather than an average, assessments should be based on the range of precipitation change potential. In the DWR ensemble, the range is plus 15-20% precipitation to minus 15-20% precipitation. Requiring scenarios based on the range of variability rather than the average of the range better informs the risk inherent on speculating whether precipitation will increase or decrease. The key question is how well a project functions over the broad range of conditions. Understanding how projects function in an uncertain future is essential, particularly when many (or most) climate predictions call for exacerbated extremes of dry and wet, not a homogenous norm.

Climate scenarios.
Uncertainty seems to be the salient principle for climate change. An ensemble of scenarios makes sense. But there are many ensembles, some of which show very different futures than the DWR model. Examples of some of these scenario ensembles were presented by ARWI in our testimony before the Commission in September, including scenario ensembles from USGS, NOAA, NASA, and NCAR. These ensembles generally point toward a drier future condition.
In addition, actual tree ring history showing reconstruction of Sacramento River flows suggest precipitation variation of thirty percent over the past 1000 years, generally in a centennial pattern of dry and wet conditions.
Further, some scenario ensembles extend well beyond the 2070 date established by the Commission for climate scenarios. For example, the USGS ensemble provide scenarios out to the year 2100. Where data and/or scenarios exist that inform conditions beyond 2070, project proponents should be required to address those projections.
In sum, climate change is the defining issue of our time, and uncertainty is the central characteristic. Climate change should not be given short shrift, but should be addressed with the most robust analysis available to the project proponents and the Commission. Without thorough risk assessment, public investments may be made carelessly and unsuccessfully.

Sierra Climate Change Watershed Yield Calculator
The climate change watershed yield calculator was developed in 2003, funded by EPA, in a project overseen by the American River Watershed Institute (www.arwi.us). The purpose of the calculator was to provide the water management community with a tool that could present a generalized profile of the consequences of global warming on watershed yield in the Sierra Nevada. This information would be quite useful in analyzing proposed projects seeking funding under Proposition 1 which fall within the Study Area. The north and south ends of the Study Area are defined hydrographically by the watershed boundaries of the West Branch Feather River and the South Fork of the Kern River respectively.

Limitations of the calculator and recommendations for its legitimate uses were carefully addressed in Section 4.2 of Release 1 documentation. Because of the huge amount of data, the calculator had to use Generalized Hydrologic Response Units, which makes use of the tool inappropriate to for evaluations of watershed yield in site specific project planning. However, the calculator is specifically recommended to be "used to develop a preliminary risk assessment of existing or proposed site specific water resource projects, reservoirs, instream flow requirements, and water supply and power diversions." This is precisely the kind of risk assessment that would be useful for both project proponents and the Commission in making wise decisions regarding the expenditure of public funds.

The calculator is fully described in the online documentation: http://arwi.us/calc/docn.php.
Limitations of the calculator are found in section 4.2: http://arwi.us/calc/4-2_UsesForCalculator.pdf

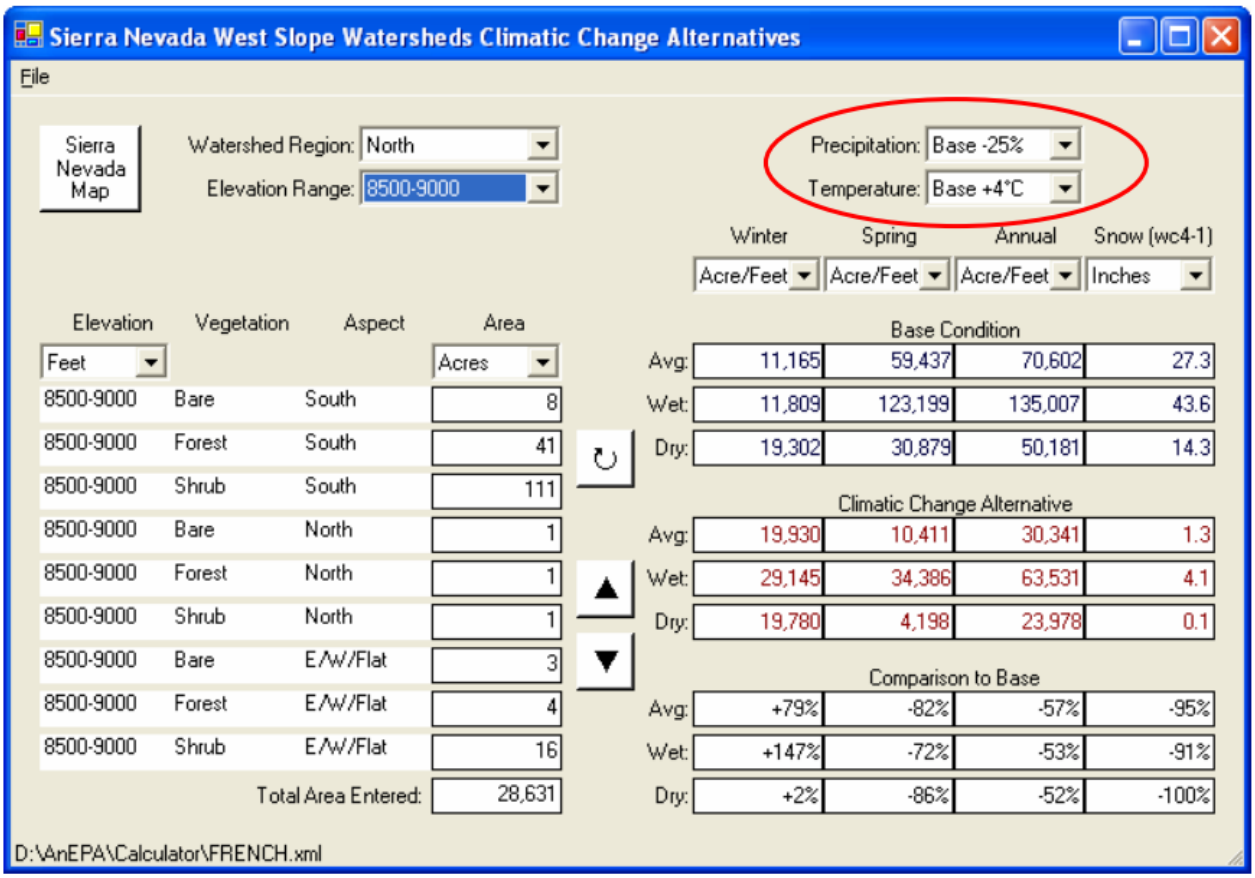
Key features of the calculator are:
- Watershed yield calculated for three water year types (wet, normal, and dry) which is a requirement of the Commission
- Watershed yield calculated for different temperature options from 1 to 4 degrees Centigrade, which falls within the chosen parameters of the Commission
- Watershed yield calculated for a range of precipitation, from 25% more precipitation to 25% less precipitation from the base condition, in 5% increments. This is a more sophisticated approach than that proposed by the Commission. Currently the CWC proposes averaging a

range of climate change precipitation scenarios, resulting in a 2 to 5% overall increase in precipitation. This level of information is not useful for understanding the viability of a project over a wide range of conditions. Climate change scenarios predict a wide range of precipitation possibilities. Addressing this variability should be required in the project proposal, particularly where a risk assessment can be made with a publicly available tool, developed with public funds, and in an application freely available to anyone.

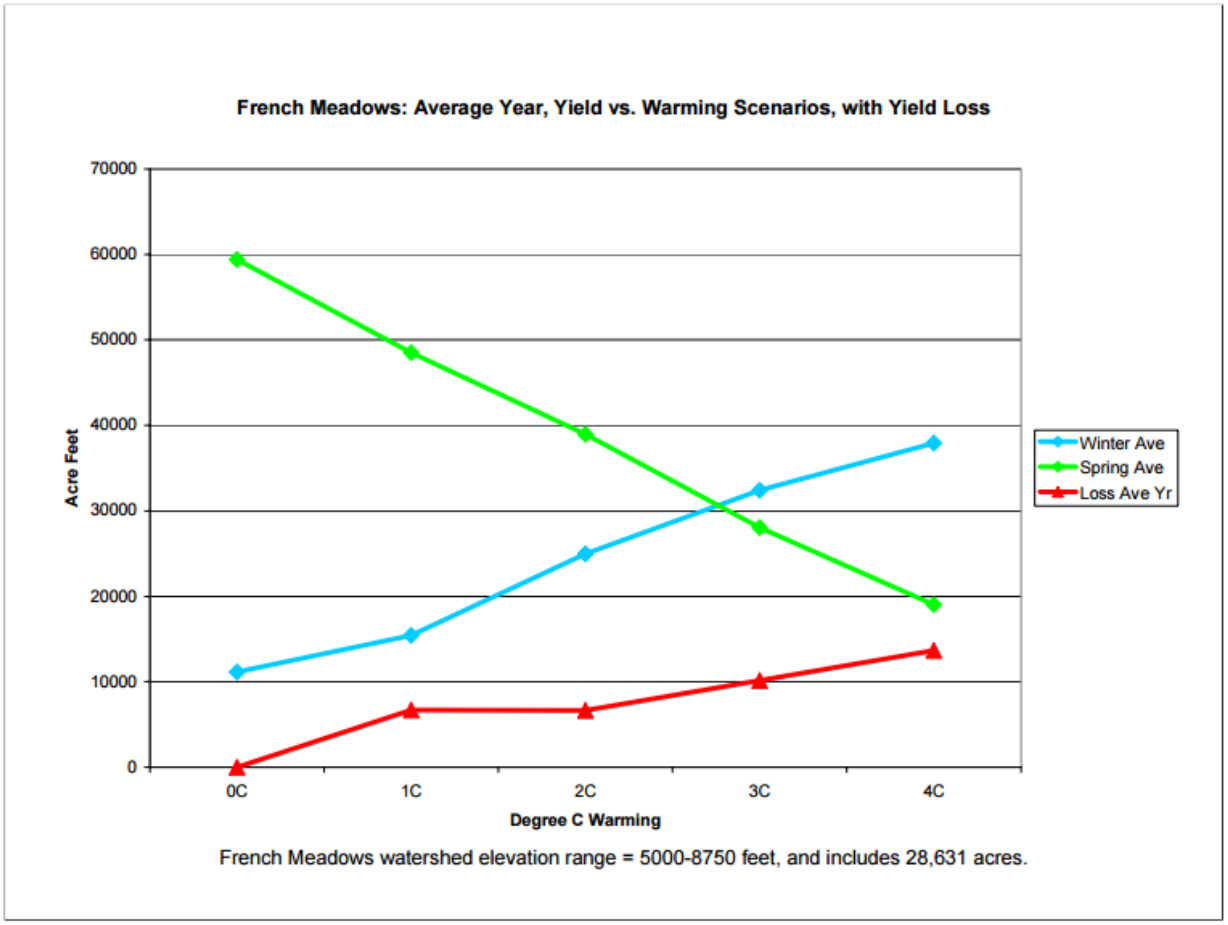
An example of the watershed calculator output is shown below. This example is the watershed yield calculation for French Meadows reservoir, which is 28,631 acres. The HRUs for the lower elevations have been entered, and only the final highest elevation band shows on the input screen. But the "total area entered" indicates that this is the accumulated total for the whole watershed. The parameters chosen were: 4 degrees C temperature rise, and 25% reduction in precipitation (which is not only within parameters of historic 1000 year tree ring history, but within parameters of some climate change scenarios).

The screen shows the baseline conditions for three water year types, the climate change scenarios for the three water year types based on the selected temperature and precipitation, and the percentage difference between the baseline condition and the chosen scenario. The data is presented in winter runoff, spring runoff, annual total runoff and April 1 snowpack.

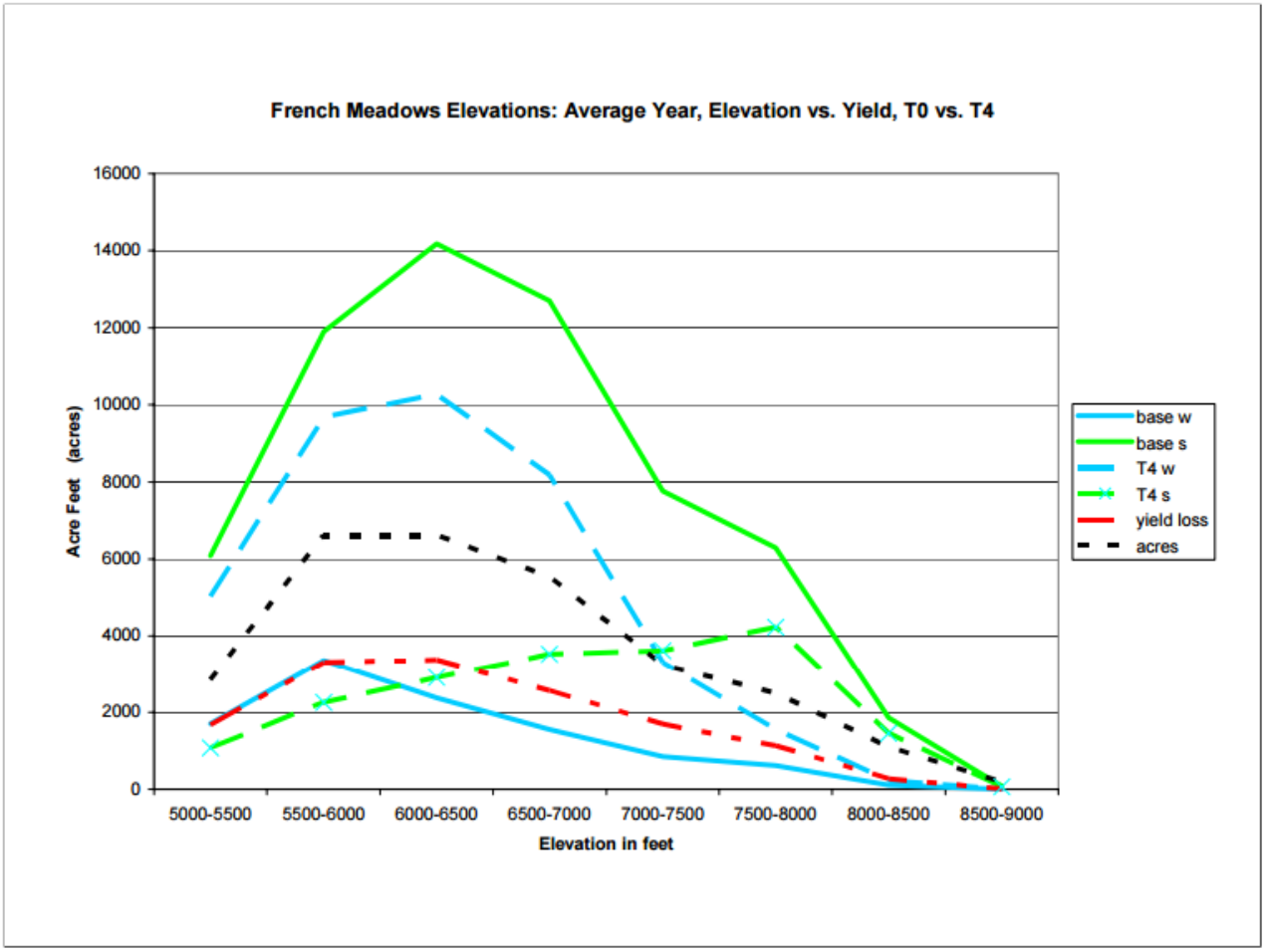
Example Scenario for French Meadows with +4 degree C and -25% precipitation



This type of data can be entered into graph form. The example below shows a French Meadows watershed example with the following parameters:
Precipitation baseline condition
Output from four temperature scenarios



The following graph shows the baseline precipitation condition, with the baseline temperature condition (solid lines) plotted against the +4 degree C scenario (dotted lines).



These examples demonstrate how this tool can provide important risk assessment information to both project proponent and the Commission. The tool can be easily used by anyone with a basic skill in ArcMap, to generate the HRU profiles for the catchment in question. The exercise is not difficult, not time consuming, and generally can be accomplished by water agency staff.

One of the comments made by CWC consulting staff at the Auburn Workshop was that the simple conditions of temperature and precipitation conditions set in the WSIP for climate change scenarios were established to make it "easy" for the applicant to do climate scenarios. While this approach is in fact "easy", it is also not useful in understanding the viability of a project over a wide range of conditions. The Sierra Climate Change Watershed Yield Calculator was developed for precisely the purpose of providing a tool that can be used to easily create a risk assessment tool for project.

ARWI recommends that the maximum level of scenario building be done for each project, within reason. It is reasonable that climate change scenarios for watershed yield be made by project proponents if their project falls within the study area.

ARWI appreciates this opportunity provided by the Commission for public and stakeholder input. We look forward to tracking the process of the CWC, and having increased opportunities for input in the future.

Sincerely,

Otis Wollan, President, ARWI
Former five-term Director, Placer County Water Agency