Cathy Marcinkevage - NOAA Federal

From:	Cathy Marcinkevage - NOAA Federal
Sent:	Tuesday, May 14, 2019 8:27 PM
To:	Barry Thom - NOAA Federal
Cc:	Howard Brown; Maria Rea
Subject:	ROC LTO Climate Change Text

Barry --
I've summarized a comparison between what's in the BA modeling and what is recommended by more recent modeling for climate change impacts (the CA 4th Climate Change Assessment). The paragraph below that is excerpted from the Draft ROC LTO BiOp Section 2.1 Analytical Approach and provides a bit more detail. Finally, after that are excerpts from the CA Fourth Climate Change Assessment that are pertinent to the application of this assessment to water resources information in the Central Valley.

I'm in DC until about 5:30 Wednesday with no hard plans. While I don't expect to be at a computer, feel free to contact me if you need something on the fly.

Thanks-
Cathy

BA MODELING

Projection Source: CMIP3
Spatial resolution: 12 km
Anticipated air temperature change: +0.7 to +1.4 C
Anticipated precip change: -6% to +6%
SLR at 2030: 15 cm

CA FOURTH CLIMATE CHANGE ASSESSMENT

Projection Source: CMIP5
Spatial resolution: 6 km
Anticipated air temperature change: +1.9 C (between 2020-2059)
Anticipated precip change: -6% to +24%
SLR at 2030: 15 cm; SLR at 2050: 10-38 cm

FROM THE ANALYTICAL APPROACH

"Climate change is incorporated into this analysis implicitly to an extent by the modeling results provided in the BA and additionally by qualitative evaluations that reflect more recent climate prodictions applied in the biological opinion. The modeling of the PA as provided in the biological assessment characterizes a 2030 scenario of climate conditions, water demands, and build-out. In doing so, the PA uses a multi-model ensemble-informed approach to identify a best estimate of the consensus of climate projections from the third phase of the Coupled Model Intercomparison Project (CMIP3), which informed the Intergovernmental Panel on Climate Change's (IPCC) Fourth Assessment Report (AR4). These results are downscaled to a spatial resolution of approximately 12 km. This assessment report and approach results in an anticipated temperature change of +0.7 to +1.4 °C (representing the 25^{th} to 75^{th} quartile) and a precipitation change of -6% to +6%. Additionally, the approach used for the PA characterizes 2030 sea level rise an 15 cm. However, based on results from the application of RCP 4.5 and RCP 8.5 in California's Fourth Climate Change Assessment (He et al. 2018, Pierce

et al. 2018), NMFS expects that climate conditions will follow a more extreme trajectory of higher temperatures and shifted precipitation into 2030 and beyond. As provided by the assessment, NMFS assumes that temperatures would increase up to 1.9 °C between 2020-2059 and precipitation changes would range from -6% to +24% in the same period (He et al. 2018). Sea level rise is expected to range up to 15 cm in 2030 and 10-38 cm in 2050 (Pierce et al. 2018).

California's Fourth Climate Change Assessment Key Guidance (emphasis added)
He et al. 2018:
Page 1: In light of its importance, a large number of studies have focused on characterizing potential future
hydroclimatic events in California [19-29]. These studies mostly used climate model projections from the Coupled
Model Intercomparison Project Phase 3 (CMIP3) [30], which were produced more than a decade ago a***nd no***
longer represent the latest climate science.

Page 2: The objective of this study, from an operational perspective, is to provide an assessment of the changes
(from historical baseline) and trends of projected precipitation and temperature, along with the trends in
projected drought over California. This study extends beyond relevant previous studies in terms of (1) ***focusing on***
the spatial scale consistent with the water resources planning and management practices in the State, (2) using
climate projections that ***reflect the latest climate science***, and (3) applying the widely-used non-parametric
Mann-Kendall approach in trend analysis. Compared to the traditional linear regression method, this method
requires less assumption on data distribution and is less affected by the beginning and ending values of the study
data. This study offers insight into potential changes to California's hydroclimate ***on the scale meaningful for***
water resources management practices and informs decision-makers in developing strategies to cope with these
changes.

Page 5: Specifically, 20 individual projections from 10 general circulation models (GCMs) under two future
climate scenarios named Representative Concentration Pathway (RCP) 4.5 and ***RCP 8.5*** [32] are selected for the
analyses. These 10 GCMs were chosen by DWR Climate Change Technical Advisory Group and ***deemed as the***
most suitable for California climate and water resources assessment [33]. RCP 4.5 (RCP 8.5) assumes low (high)
future greenhouse-gas concentrations.