

## **Informing Freshwater Decision Making for Tembladero and Elkhorn Sloughs**

Elkhorn Slough National Estuarine Research Reserve

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### Context

Due to ongoing water supply concerns which were exacerbated by the current drought, water purveyors have begun considering the possibility of diverting water that currently flows to the Tembladero Slough for use as recycled water. The current dialog has emphasized the benefits to water quality in this ecosystem by preventing some runoff and its associated pollutants from entering the natural system. This memo outlines concerns about potential impacts to the Tembladero Slough and Elkhorn Slough that could occur as a result of reduced freshwater input into these brackish water systems.

### Informing Freshwater Decision Making for Tembladero and Elkhorn Sloughs

The freshwater in the Tembladero and its tributaries is a significant biological resource worthy of conservation for the Tembladero Slough and associated wetlands as well as downstream, in the Elkhorn Slough. The Tembladero Slough includes significant biological features that are dependent on freshwater flow. We have robust and varied historical evidence indicating that the Tembladero Slough area included a rich wetland system that extend from north of the City of Salinas to the Lower Salinas River estuaries. Even today the Tembladero has value as a wetland, supporting wetland vegetation and associated wildlife. This habitat is severely degraded and not well documented. Due to this degraded state, any further reduction in water quality or flow will likely have immediate and negative consequences.

The Tembladero Slough is also an important freshwater (and sediment) source for the Elkhorn Slough. Estuaries are, by definition, a mixture of terrestrial, freshwater and marine habitats. One of the last remaining sources of freshwater for the Elkhorn Slough is the Old Salinas River channel, which conveys Tembladero Slough flows. We have documented freshwater pulses originating in the Old Salinas River channel, moving far up into the Elkhorn Slough with incoming tides. Historically, these connections were even more significant. Paleo-ecological evidence suggests that the Elkhorn Slough used to have much more freshwater vegetation mixed with the brackish and saltwater habitats. These diverse habitats were variously dominated by pickleweed, sedges, rushes, and cattails. Published reports indicate that loss of this more diverse marsh community is a result of decreased freshwater inputs. Federally listed tidewater gobies and state listed brackish water snails occur only in these Slough complexes where habitats have substantial freshwater inputs, highlighting the importance of such wetlands. Further loss of freshwater inputs into Elkhorn Slough is a concern, as it would likely lead to additional loss of fresh/brackish water habitats and negatively impact these listed species.

There is a potential to optimize benefits for drought relief and habitat restoration that includes a focus on the potential downstream effects to the Elkhorn Slough. Because water from the Tembladero Slough is highly polluted, we realize that there are trade offs for continuing freshwater flow to the Elkhorn Slough. Our recent water monitoring suggests that Tembladero Slough and the Old Salinas River channel are the dominant source of nitrate loading to Elkhorn Slough, with the Tembladero Slough accounting for two orders of magnitude more nitrate than the old Salinas River channel.

### Conclusions

1. If water quality is improved, the tradeoff of reduced flow to natural resources and biota might be offset by the positive benefits of clean water and could be more palatable from an environmental perspective.
2. A baseline inventory of the natural resources and ecological function of the Tembladero Slough is a critical first step to help determine what minimum flows would be in order to maintain the ecological services of Elkhorn Slough itself.