# The Vorster Model

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**Maureen McGlinchy**
Hydrology Modeling Specialist
Mono Lake Committee

**Greg Reis**
Information & Restoration Specialist
Mono Lake Committee


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*Photo courtesy of Peter Essick*

# Vorster Model basics and background

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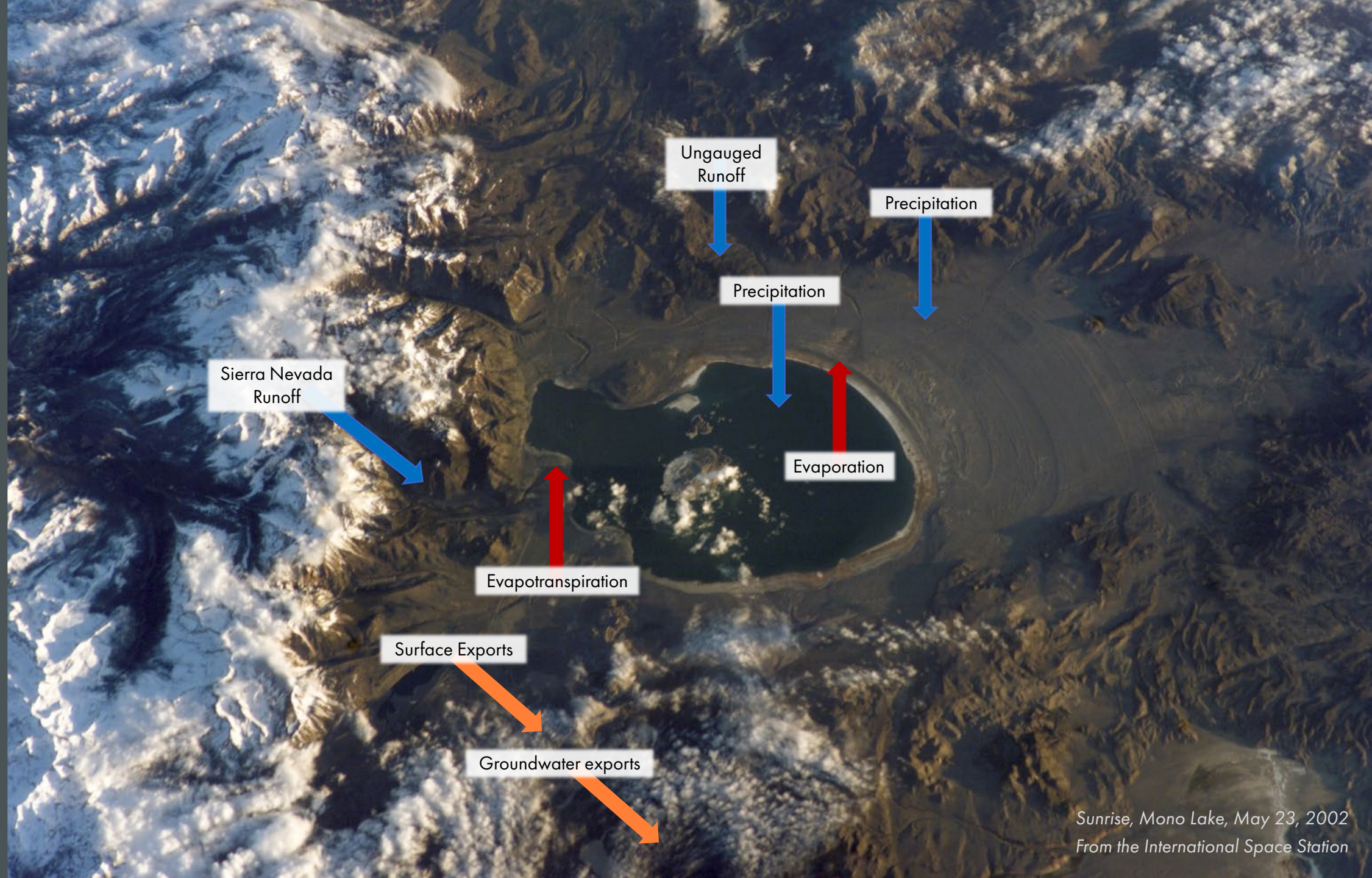


*Sunrise, Mono Lake, May 23, 2002*
*From the International Space Station*

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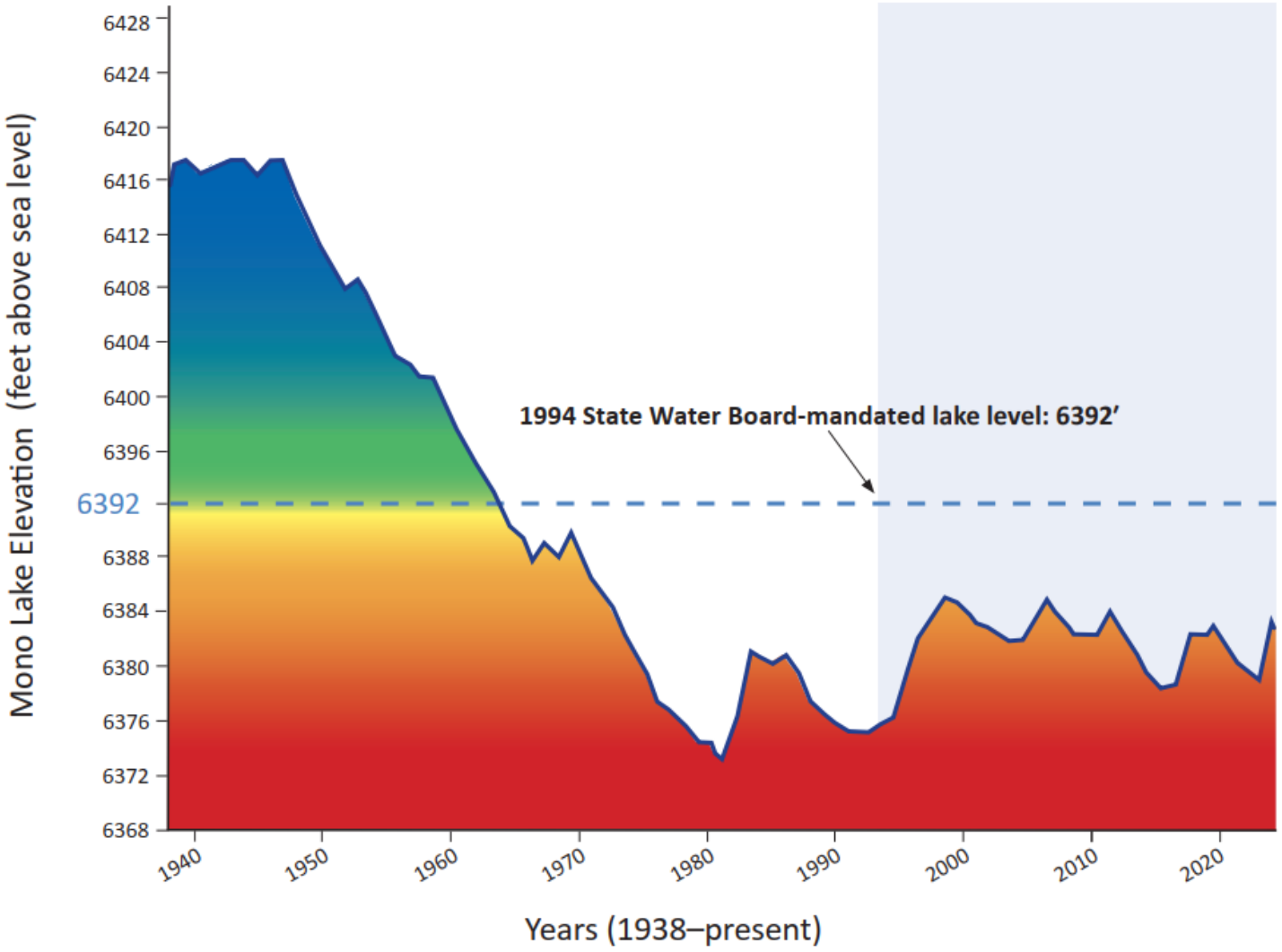
# Mono Lake surface elevation

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# Vorster Model applications and projections

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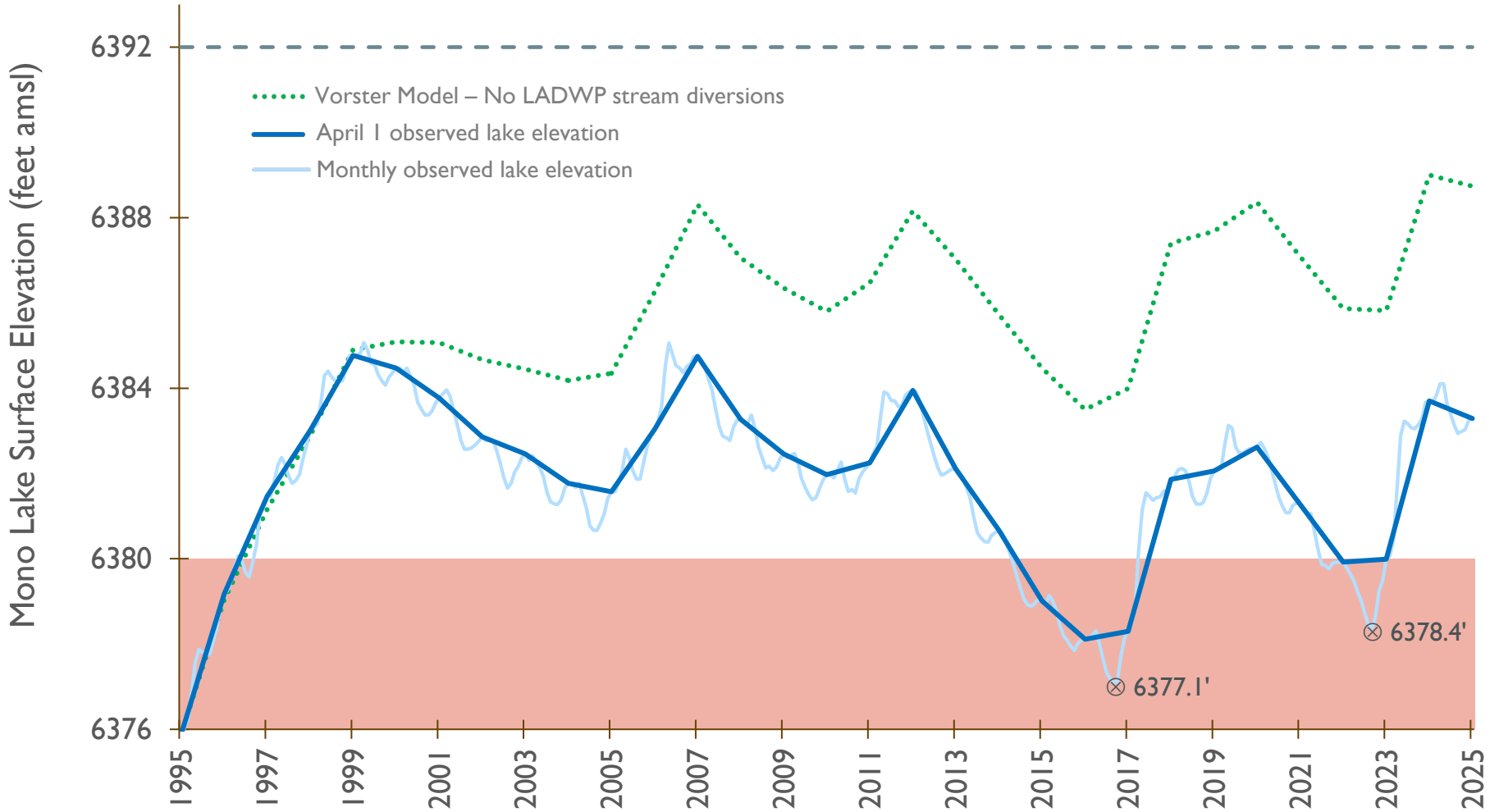
# Stream diversions impact Mono Lake elevation

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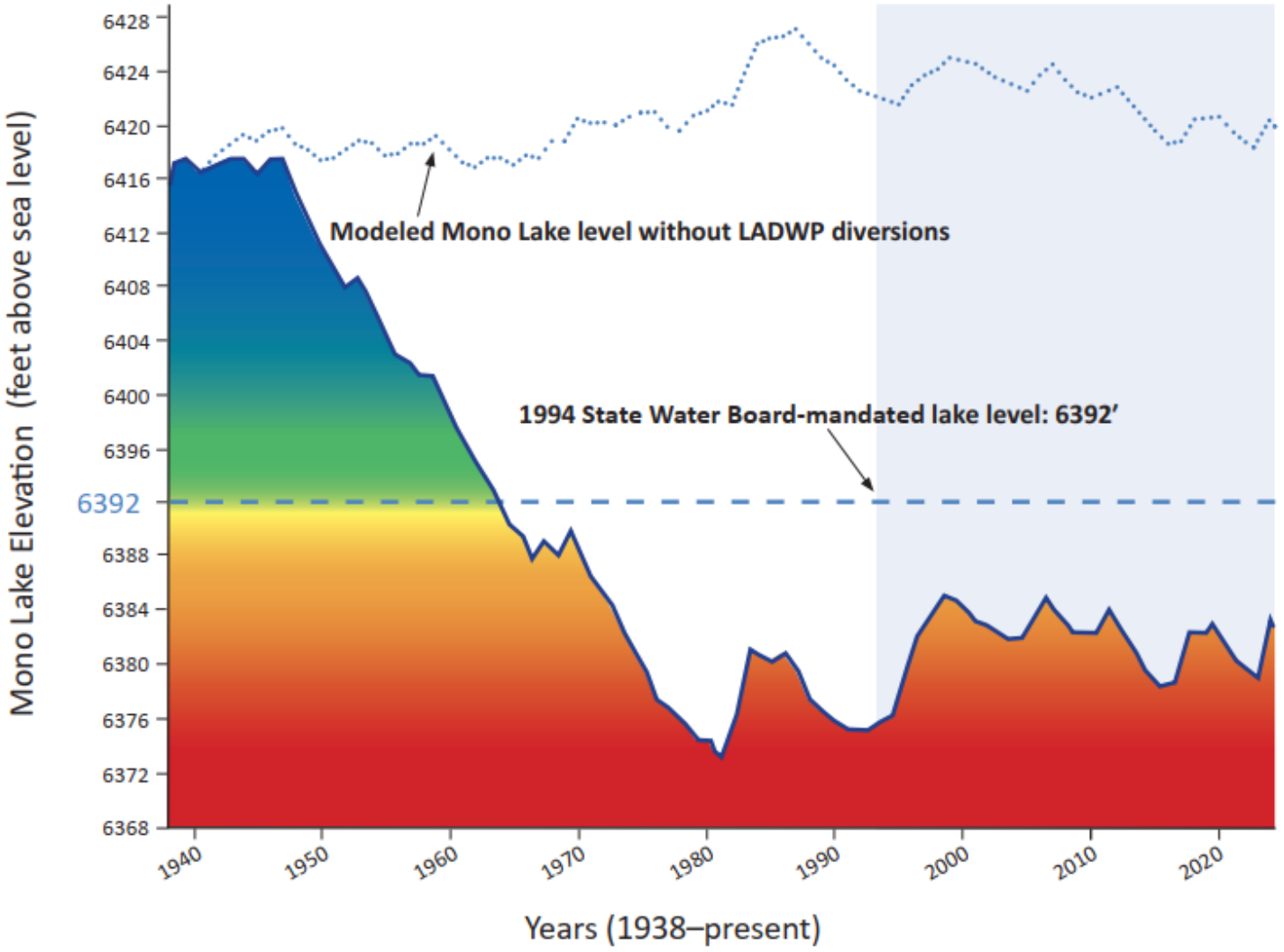
# Mono Lake surface elevation

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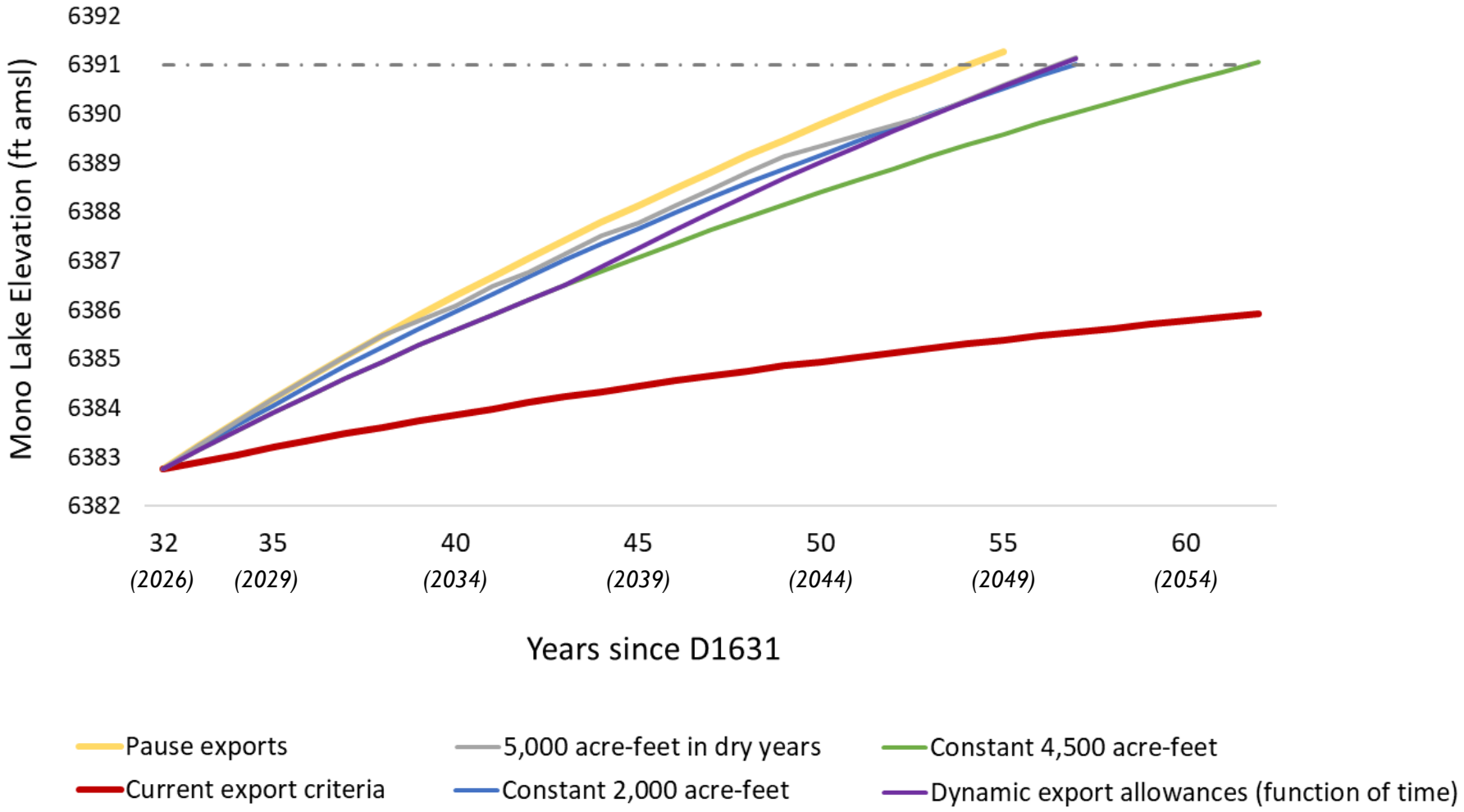
# Comparing Mono Lake rise between export scenarios




*Projected runs use averaged 1995–2024 hydroclimate*

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# How does the Vorster Model compare to UCLA-MLM?

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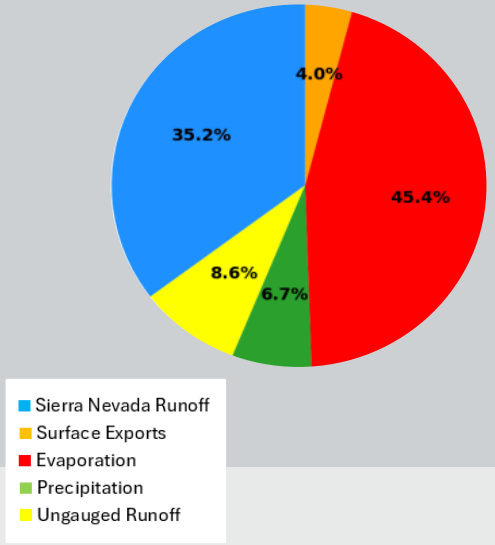
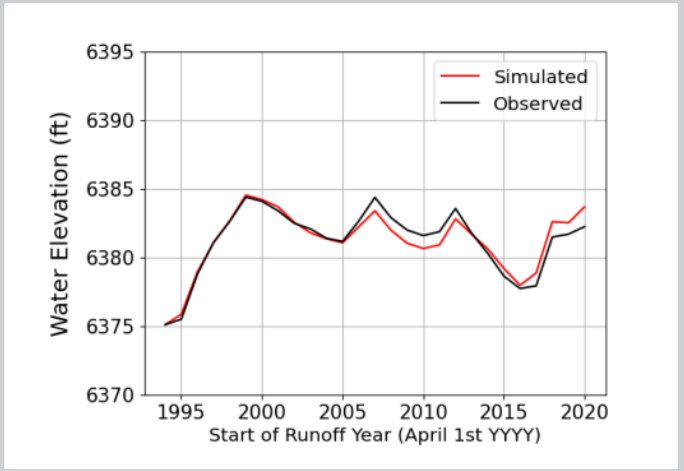
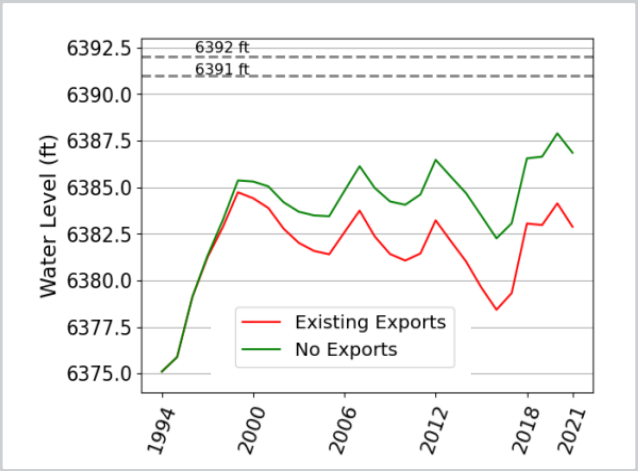
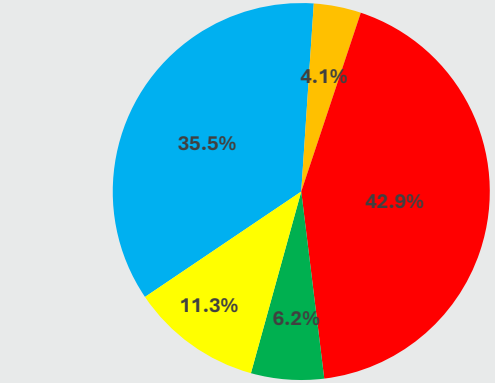
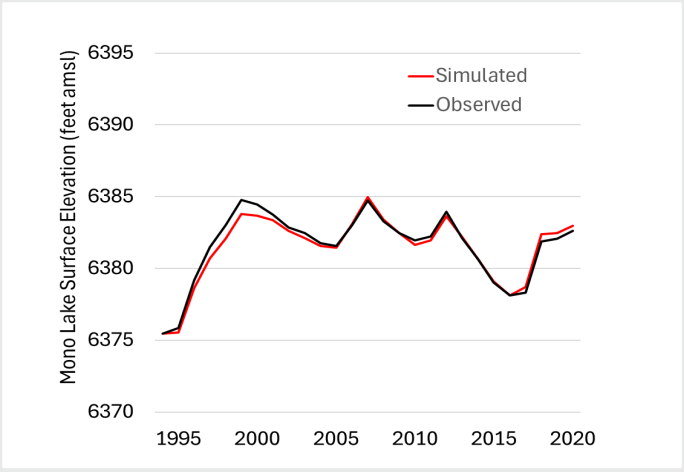
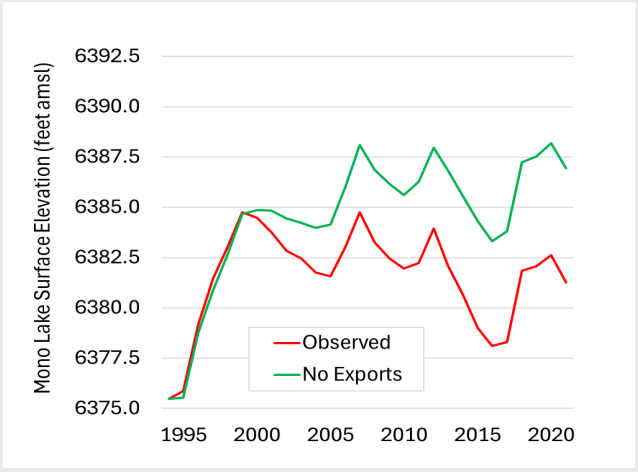
# The UCLA-MLM and Vorster Model results align

| | Water budget | Model calibration | No-export run |
|---|---|---|---|
| UCLA-MLM |  |  |  |
| Vorster Model |  |  |  |



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# About the Mono Lake Technical Working Group

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# Collaborative Technical Modeling

## Mono Lake Technical Working Group

Model: eSTREAM

September 2023–April 2024

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Los Angeles Department of Water & Power
with Watercourse

Mono Lake Committee

California Department of Fish & Wildlife

State Water Resources Control Board
with UCLA Center for Climate Science

An important step in exploring a greater understanding of how exports impact Mono Lake.

Modeling only the Transition Period with historical hydrology limited our ability to see patterns and draw conclusions (e.g. 1982–1983 wet years had a large influence on results). Metrics like "average time to transition" are easy to misinterpret.

*Photo by Greg Reis*

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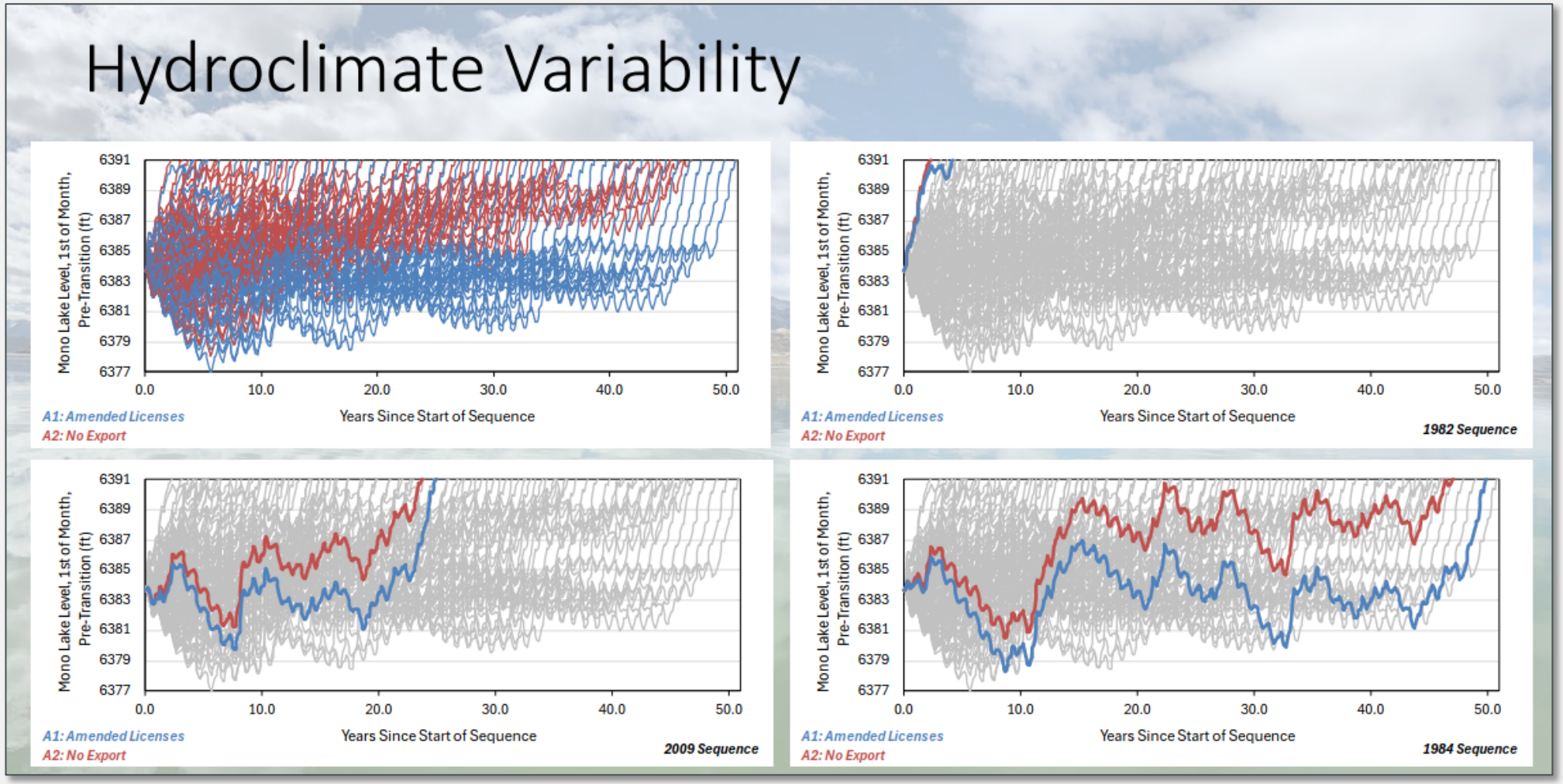
# Incremental benefits are meaningful

Interpretation of model results and metrics must be done with caution




*Slide from the Technical Working Group presentation to the State Water Board, May 2, 2024.*

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# Conclusions from the Technical Working Group

From the Technical Working Group presentation to the State Water Board, May 2, 2024

- Just as in the analysis done for D1631, modeled results for the time to reach transition for Mono Lake vary widely (from 3 to 50 years) and are **heavily dependent on hydrology**.
- **Results and metrics should be interpreted with caution**, especially averages and those affected by extreme wet and prolonged dry periods. Results should be used in a comparative manner.
- Scenarios behave similarly during exceptionally wet periods and **differences in scenarios become apparent during extended normal and dry periods.**
- **Differences in surface exports over time have an effect on lake level.**

*Emphasis added.*

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# Conclusions

The established Mono Lake models concur with the UCLA model.

A pause in surface water exports will allow Mono Lake to rise to the 6,392′ public trust management level.

The UCLA-MLM's incorporation of climate change is a valuable addition to the capabilities of the ensemble of Mono Lake models. The climate change projections highlight that it is easier to raise the lake now than it will be later in the century. The model enhances confidence that Mono Lake can rise to the State Water Board's required level under the right management scenario.

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# Appendix

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Collaborative Modeling Pros and Cons
September 2023- April 2024
Technical group meeting attendees: DWP & Watercourse, MLC, CDFW, SWRCB & UCLA

| Pros | Cons |
|---|---|
| Modeled the bookends<br>• Pause exports (0 ac-ft)<br>• Status quo (up to 16,000 ac-ft) | Modeling only the Transition Period with historical hydrology limited the ability to see patterns and draw conclusions (e.g. 1982-83 wet years had a large influence on results) |
| Explored new ideas between the bookends<br>• Varying exports by year-type<br>• Dynamic rules (i.e. rules that change over time) | • ESTREAM had limited capability to model dynamic rules<br>• Team had limited capacity |
| Gained insights and reached collaborative conclusions about the role of exports and hydroclimate (exports directly affect lake level, export pattern matters, hydroclimate matters) and the risk of worst-case scenarios (e.g. Status quo taking 34 years longer than a pause in exports) | • Consensus approach limited scope<br>• Metrics like "average time to transition" easy to misinterpret |
| Model results showed<br>• 6392 management level is achievable (esp. near the zero export bookend)<br>• Status quo bookend allows too much export, tends to maintain current lake levels, and post-transition doesn't maintain 6392 management level | We were unable to examine post-transition results as a group due to limited scope |