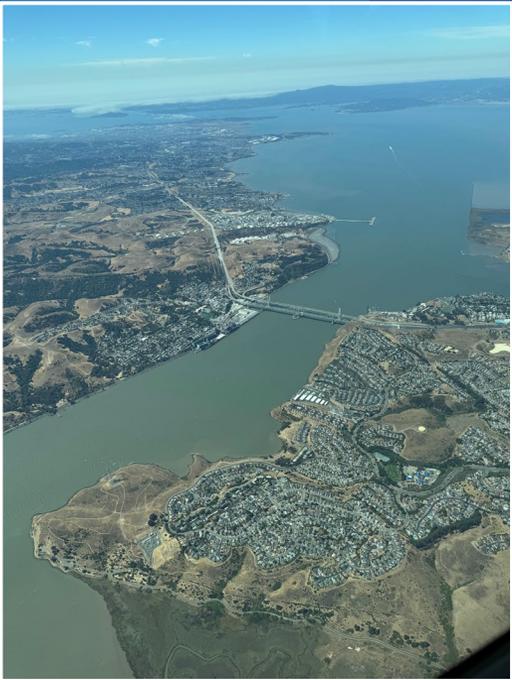


March 2026

2025 San Francisco Bay-Delta Estuary Elevation Mapping Update



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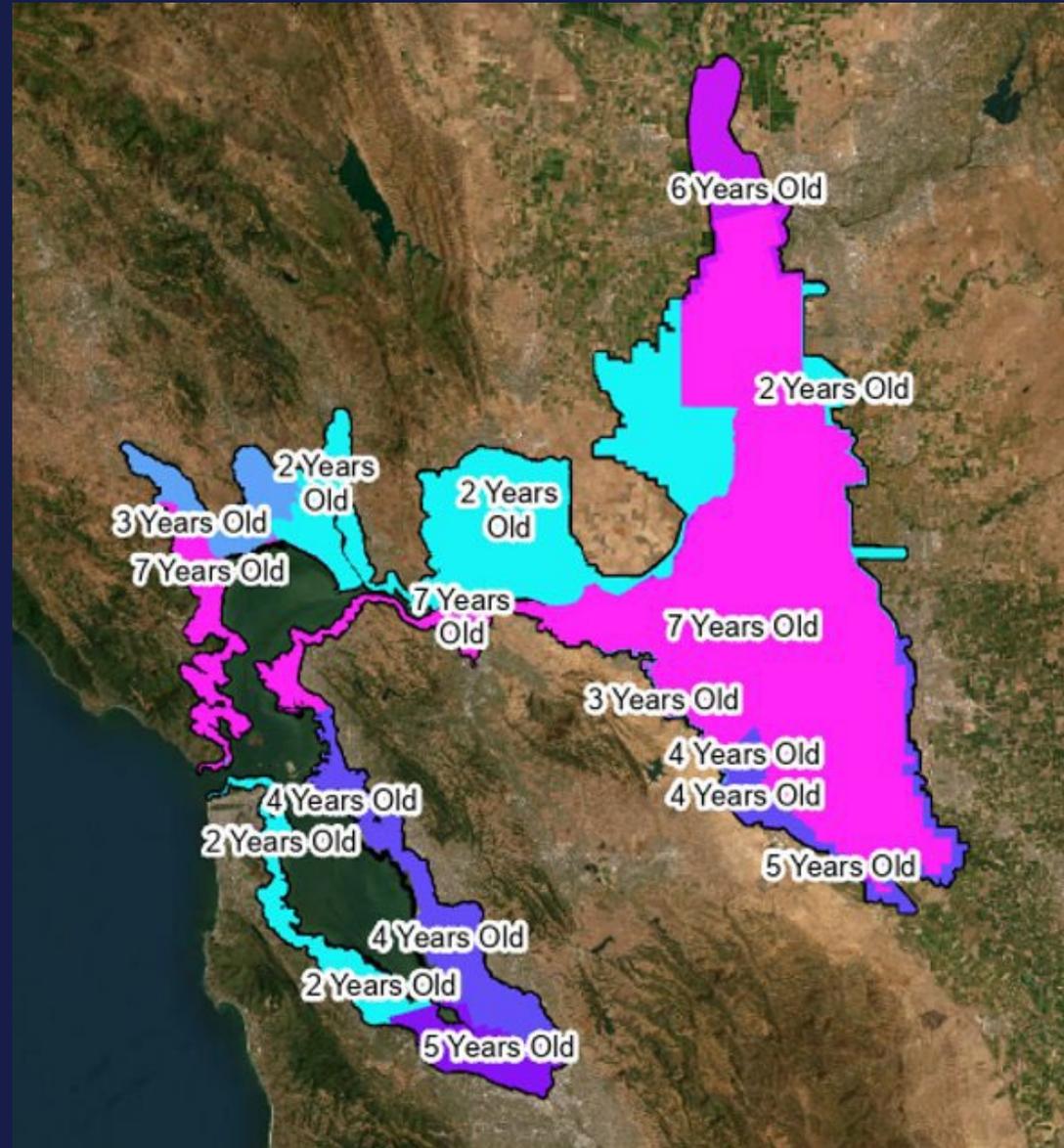
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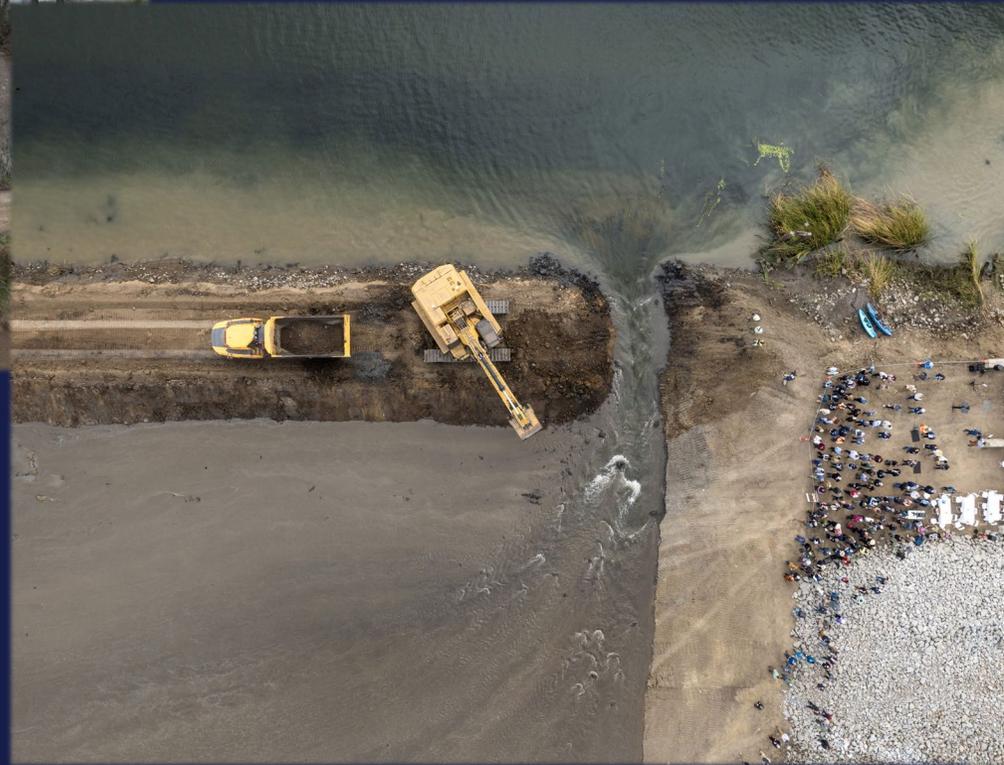
Until now our recent data showed...



The landscape over the past 8 years has changed...



Cosumnes River, 2023.



Lookout Slough Restoration Project, 2024.



Highway 101, Marin County, 2026.

One map. Built together. For the whole Estuary.



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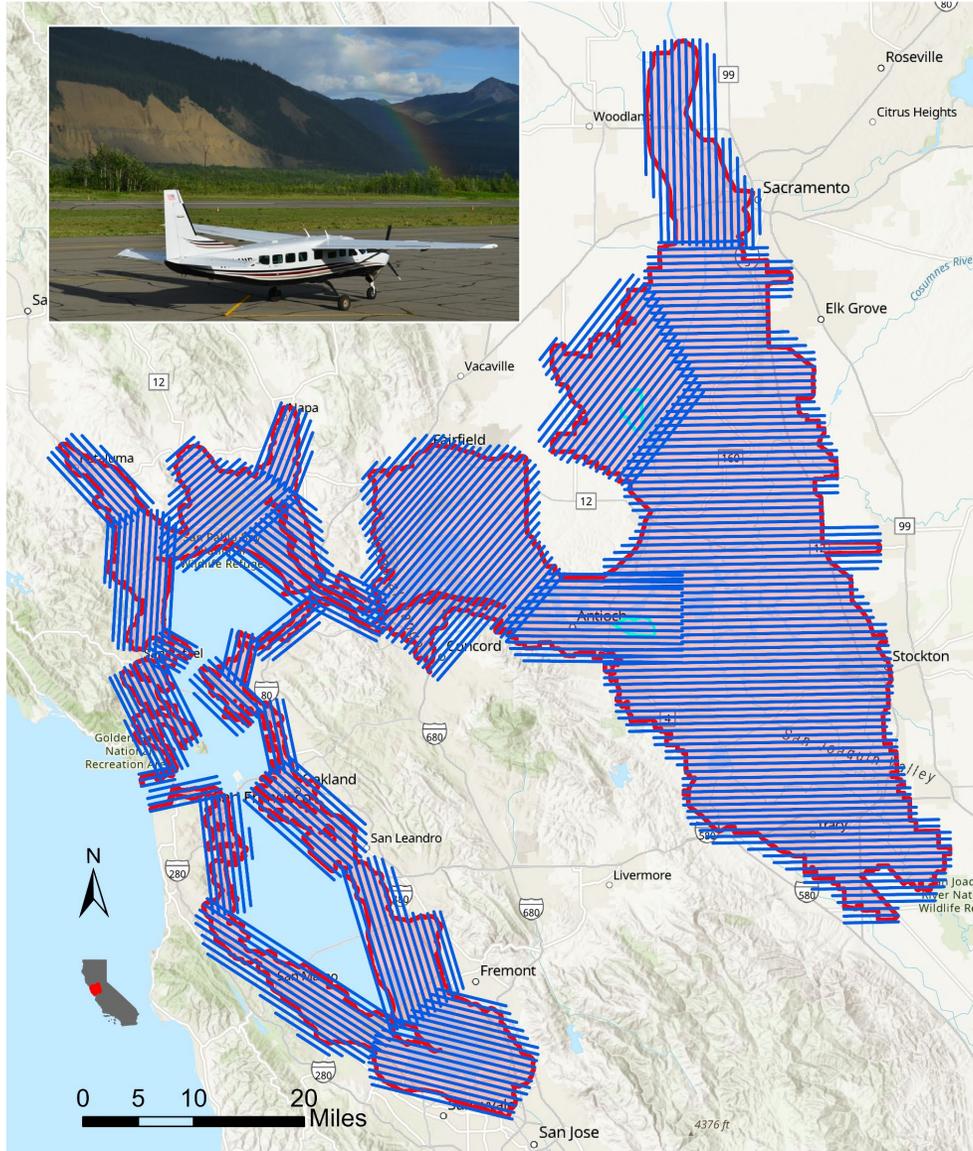
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Agenda Item: 7, Presentation
Meeting Date: March 26, 2026
Page 4 of 17



One map. Built together. For the whole Estuary.

Agenda Item: 7, Presentation
Meeting Date: March 26, 2026
Page 5 of 17



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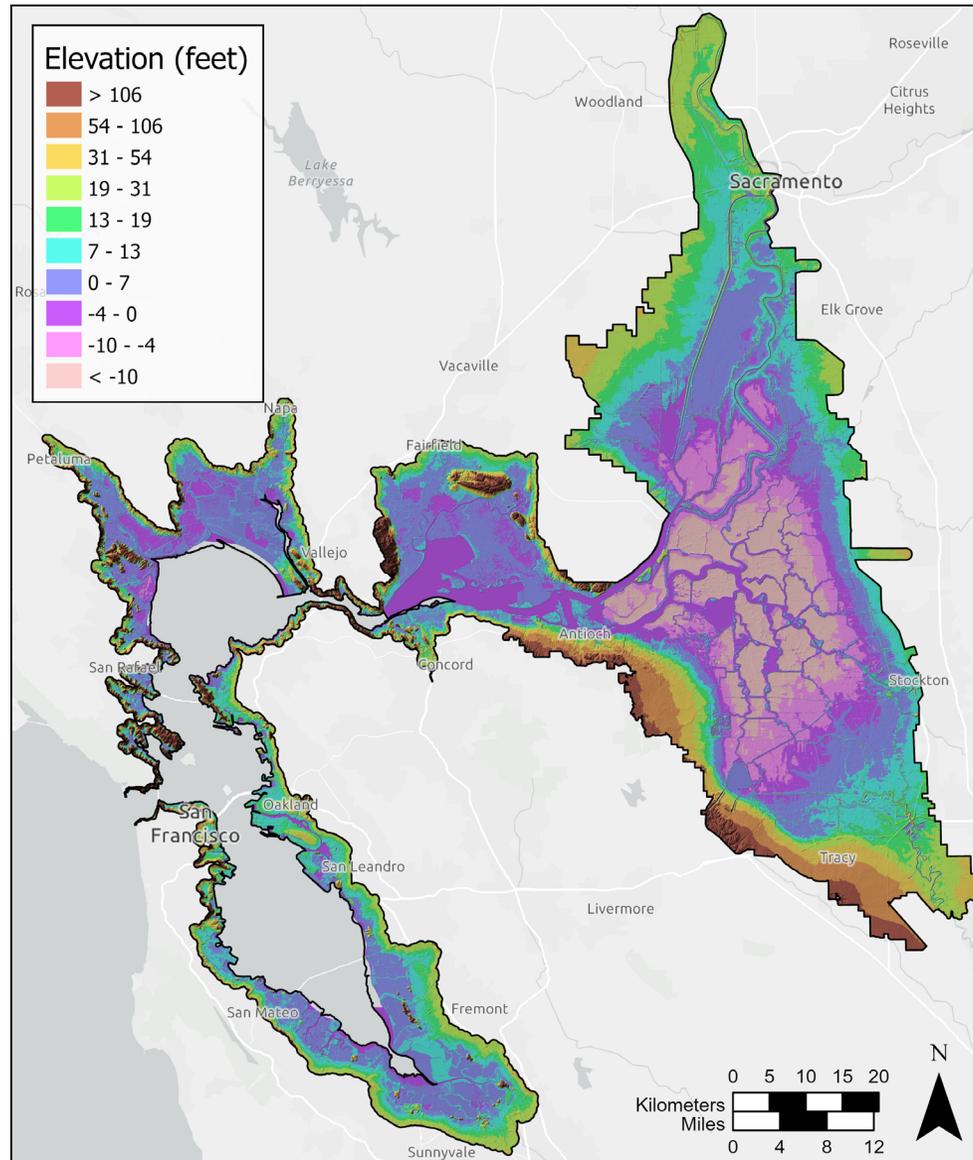
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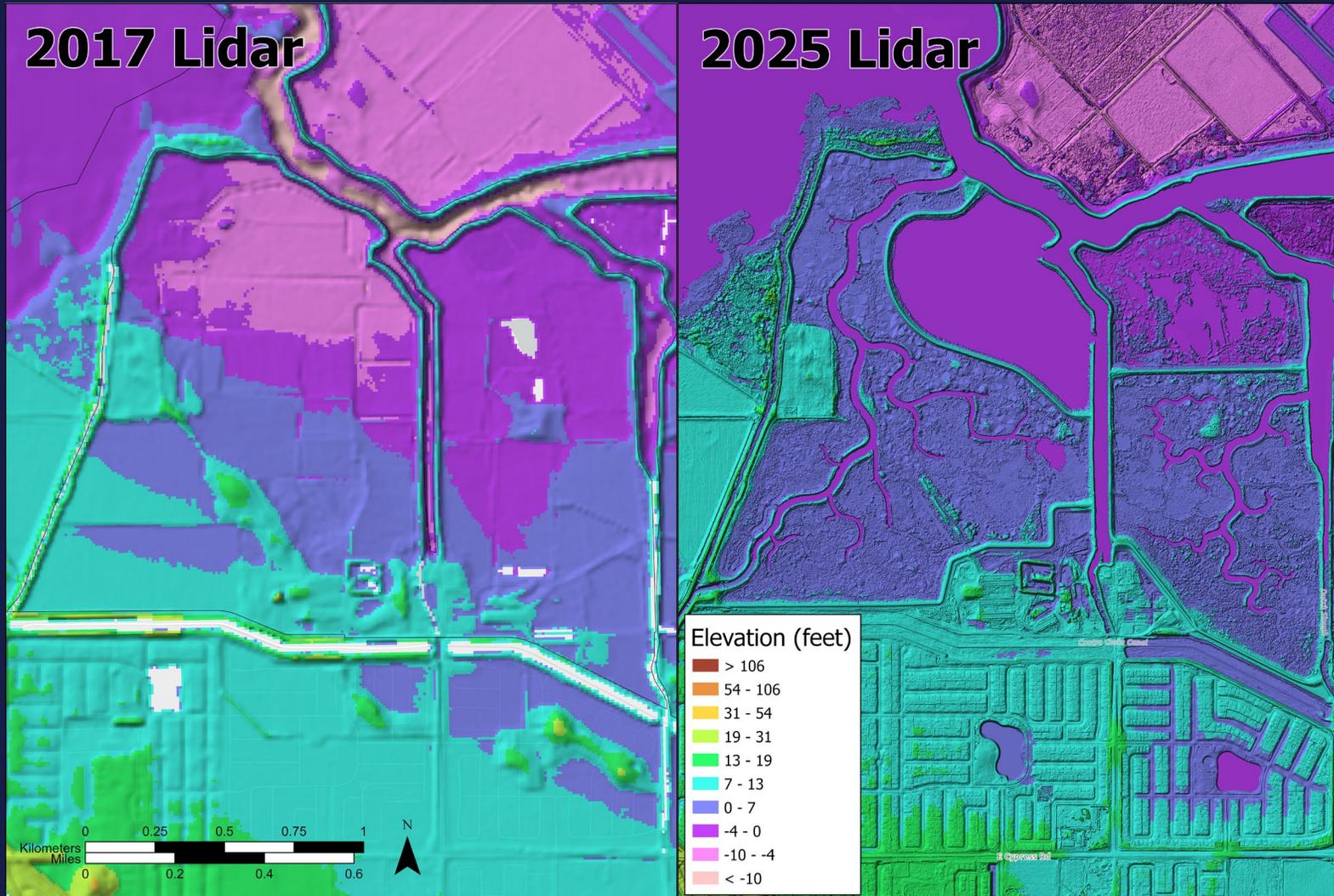


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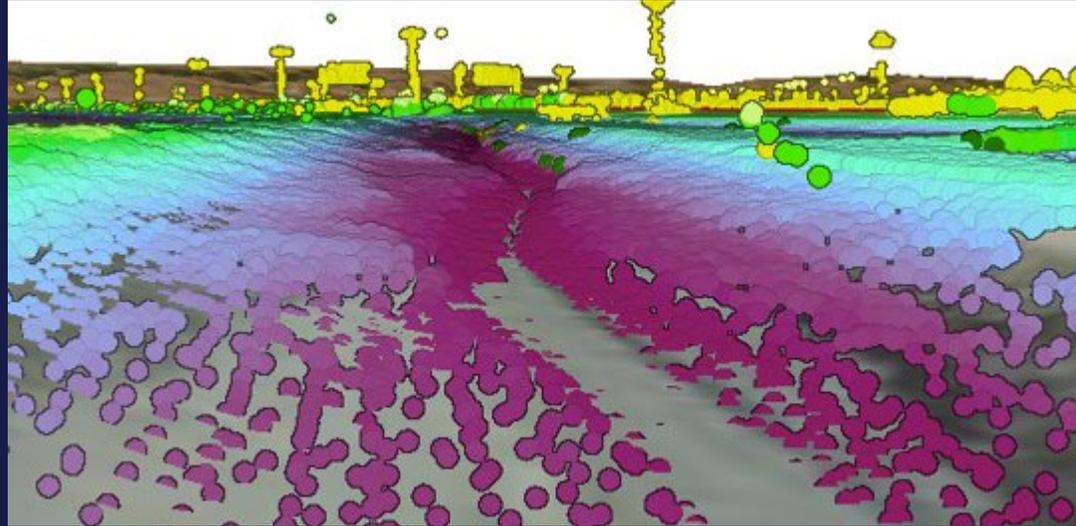
Bay-Delta DEM (preliminary data), by Michelle Stern

Now it looks like this...



Low tide and low water levels reveals details hidden before...

Agenda Item: 7, Presentation
Meeting Date: March 26, 2026
Page 7 of 17



Hayward Shoreline. Photo by Alex Braud, SFEI

Digital mapping generated and photo taken by Alex Braud



Arina Ushakova, PLS

Department of Water Resources, Geomatics

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Alex Braud

San Francisco Estuary Institute

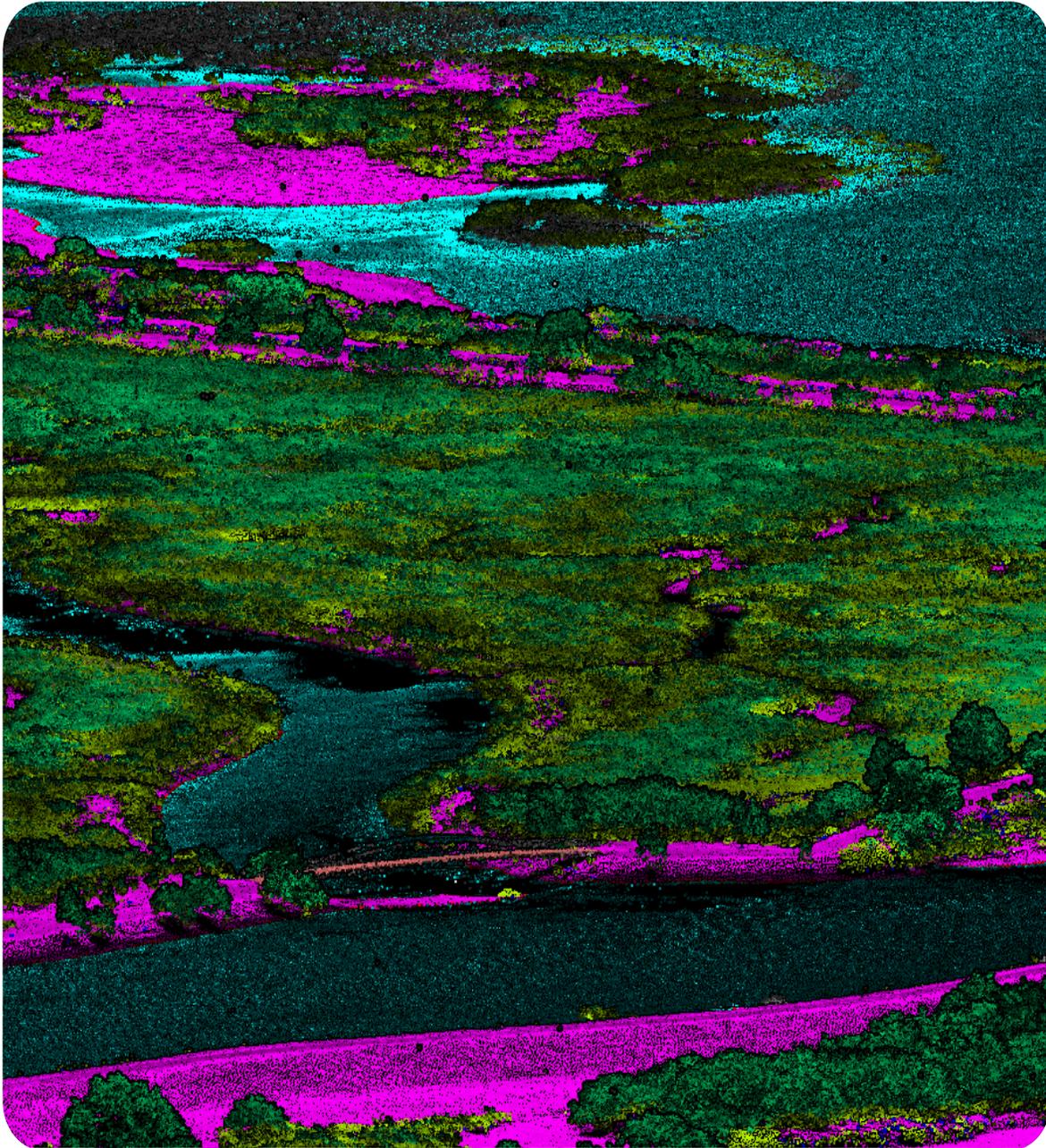
alexbr@sfei.org

LiDAR 101

- **LiDAR** (*Light Detection and Ranging*) uses pulsed laser sensors to measure distances.
- Sensors can be mounted on vehicles, drones, or fixed-wing aircrafts depending on acquisition needs.
- Data is calibrated and checked using boots-on-the-ground surveys



Value of LiDAR Data

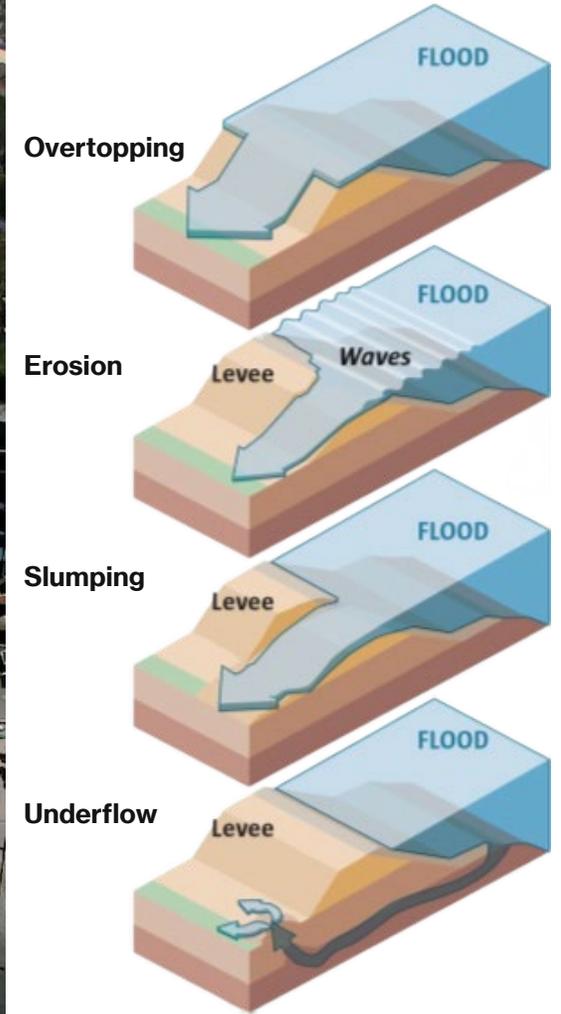


- Track elevation changes over time
- Account for ground motion and subsidence
- Capture features (levee crowns, vegetation, berms)
- Create system-wide analyses

Types of Levee Failure



New Orleans, Hurricane Katrina 2005
AP Photo/David J. Phillip

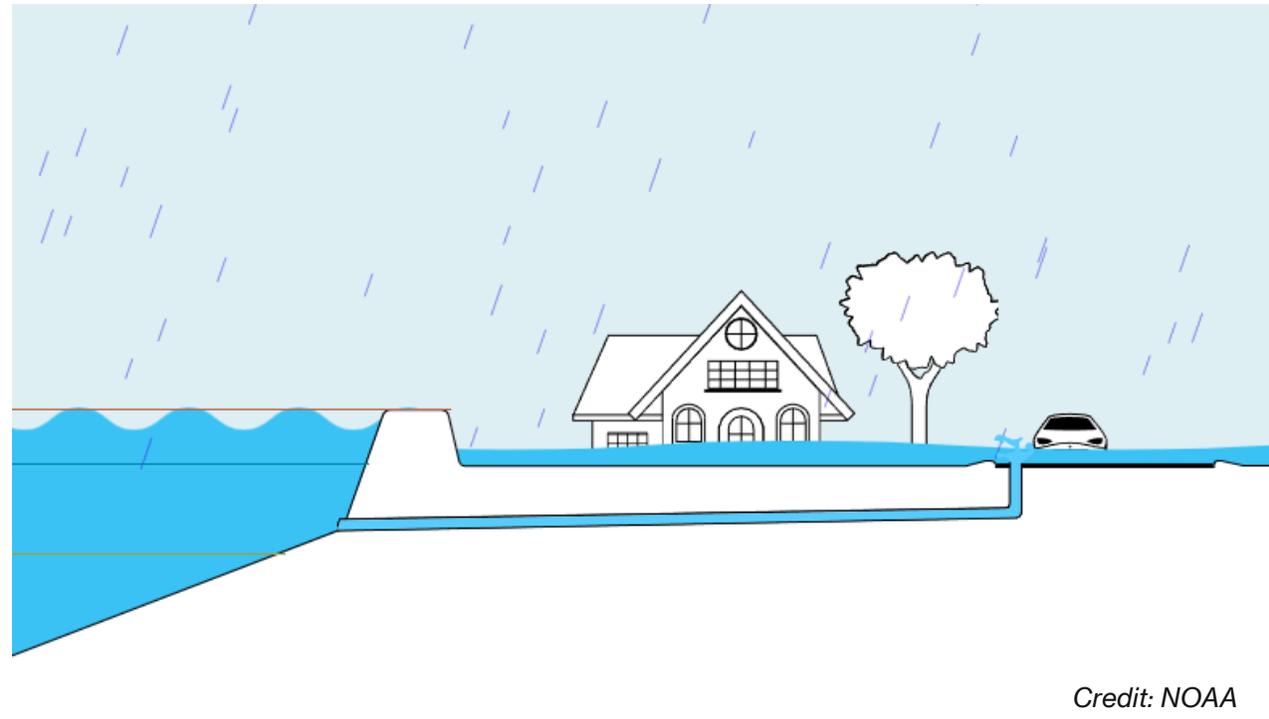


Credit: Seattle Times

The Flood Risk Equation

Agenda Item: 7, Presentation
Meeting Date: March 26, 2026
Page 12 of 17

Water Level — Elevation



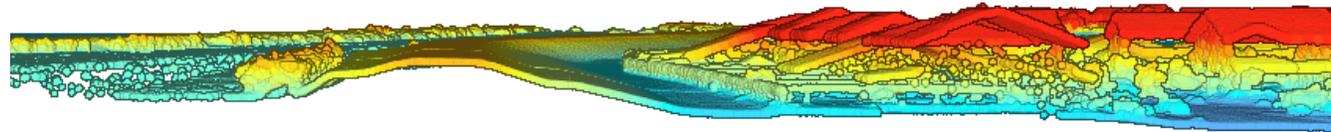
The Flood Risk Equation

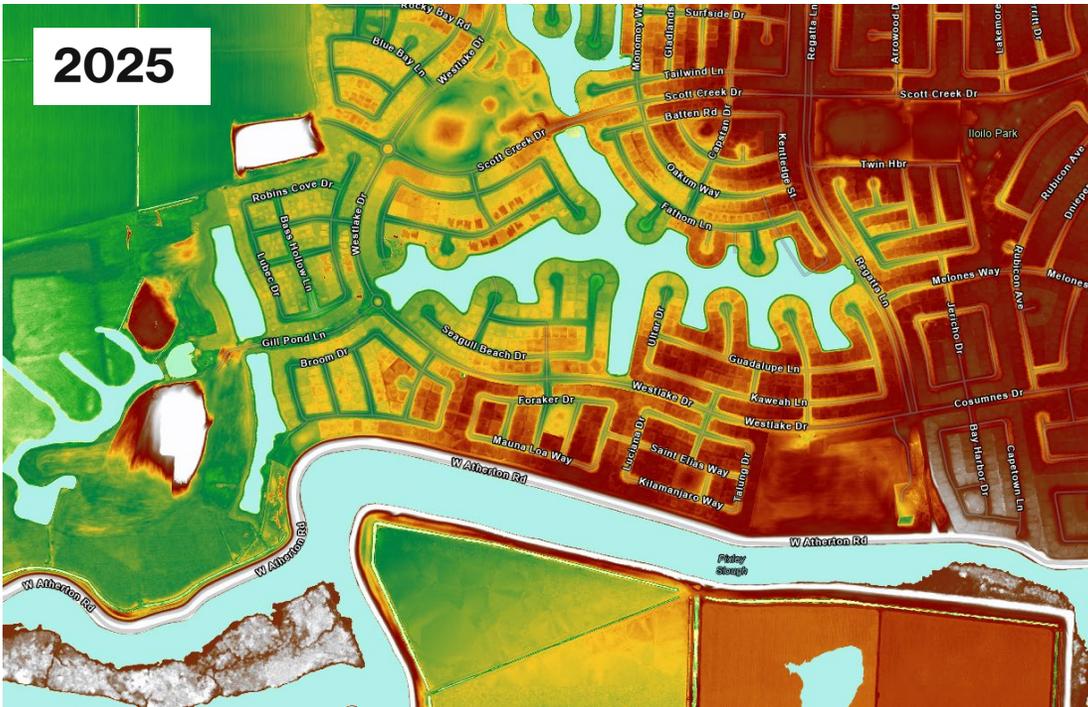
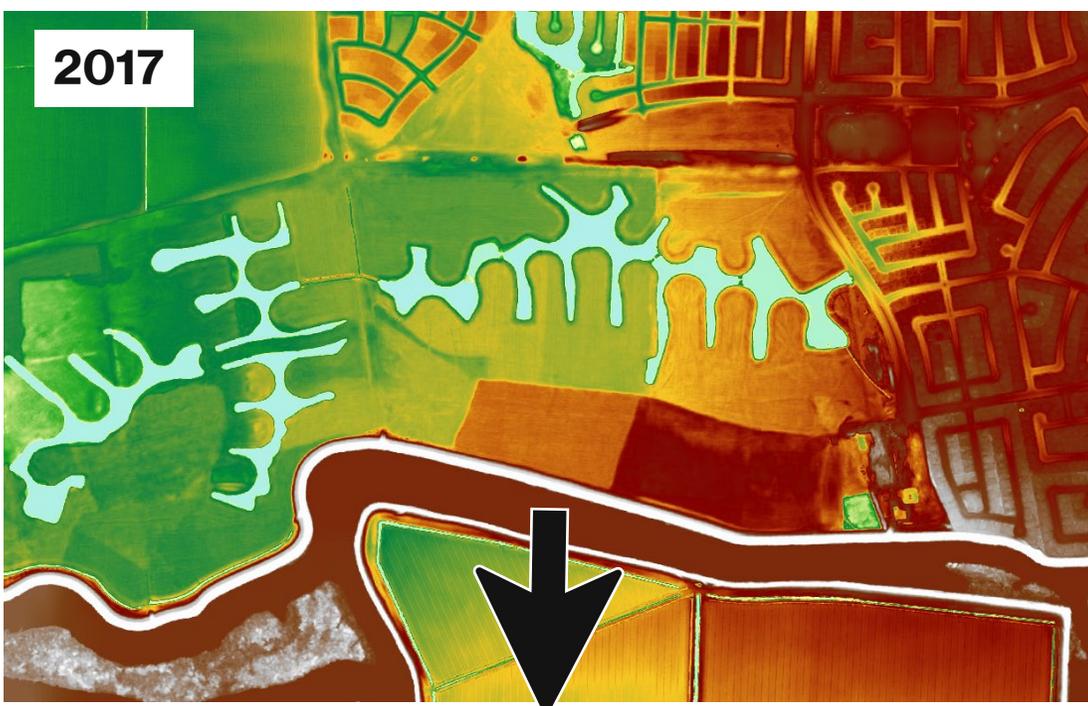
Agenda Item: 7, Presentation
Meeting Date: March 26, 2026
Page 13 of 17

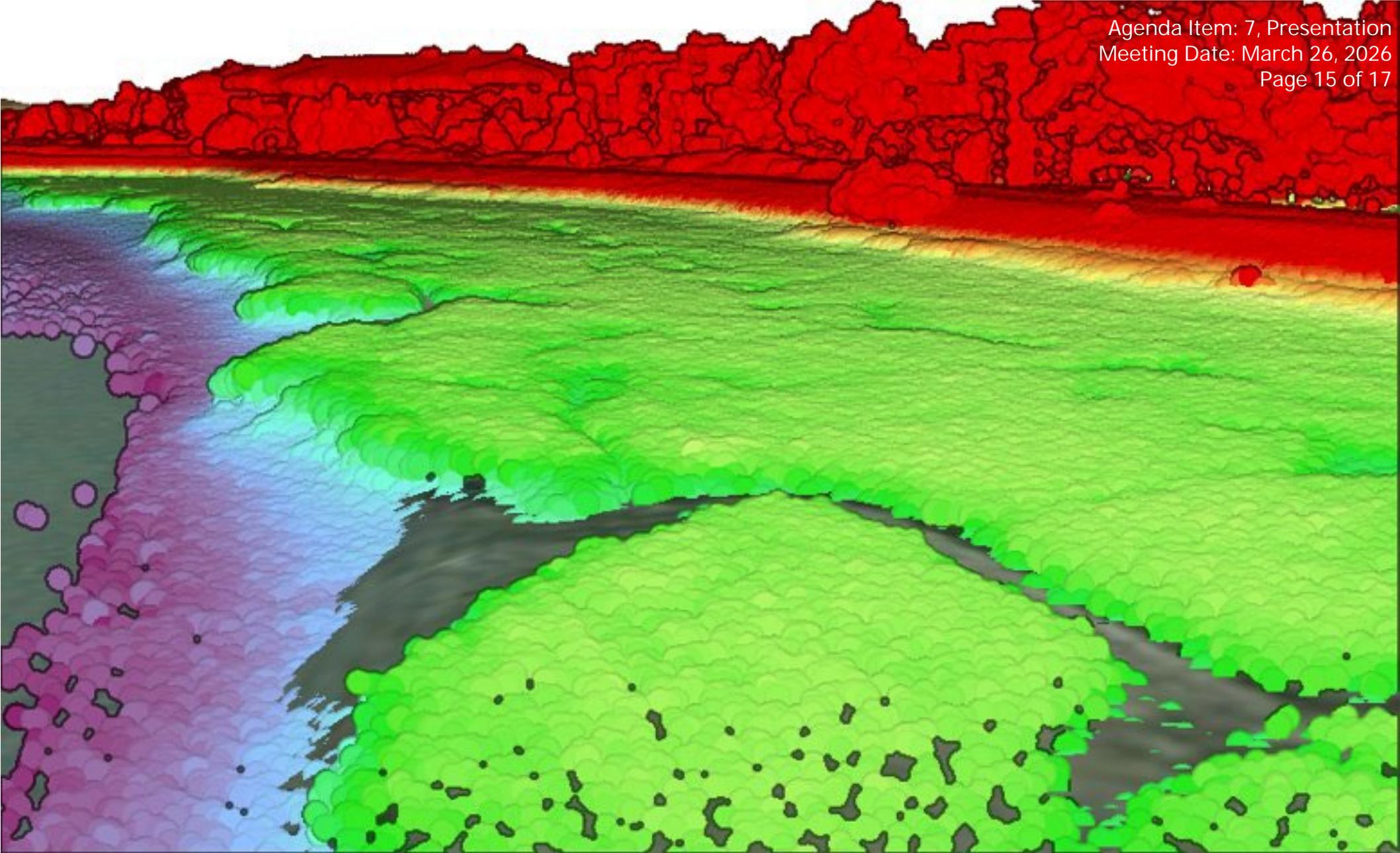
Water Level



Elevation







Next Steps



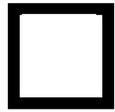
Elevation data collection



Data review and approval



Data publishing to multiple sites by WRMP, DWR, CNRA, and NOAA



USGS to add elevation data to its National Map. The National Map is used by government, industry, and academia, as well as the general public to make life-saving decisions, support scientific missions, enhance recreational experiences, and more.



Scan the QR code and follow the SF Bay-Delta lidar project on the Science Tracker to receive the most recent updates!

Acknowledgments



Thank you

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