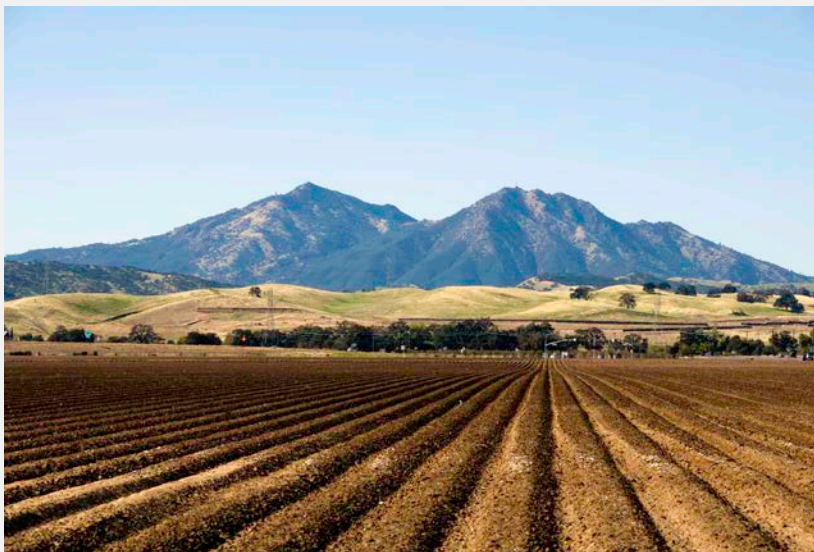


ADAPTING TO DROUGHT IN A CHANGING CLIMATE

CALIFORNIA WATER COMMISSION
JULY 20, 2022

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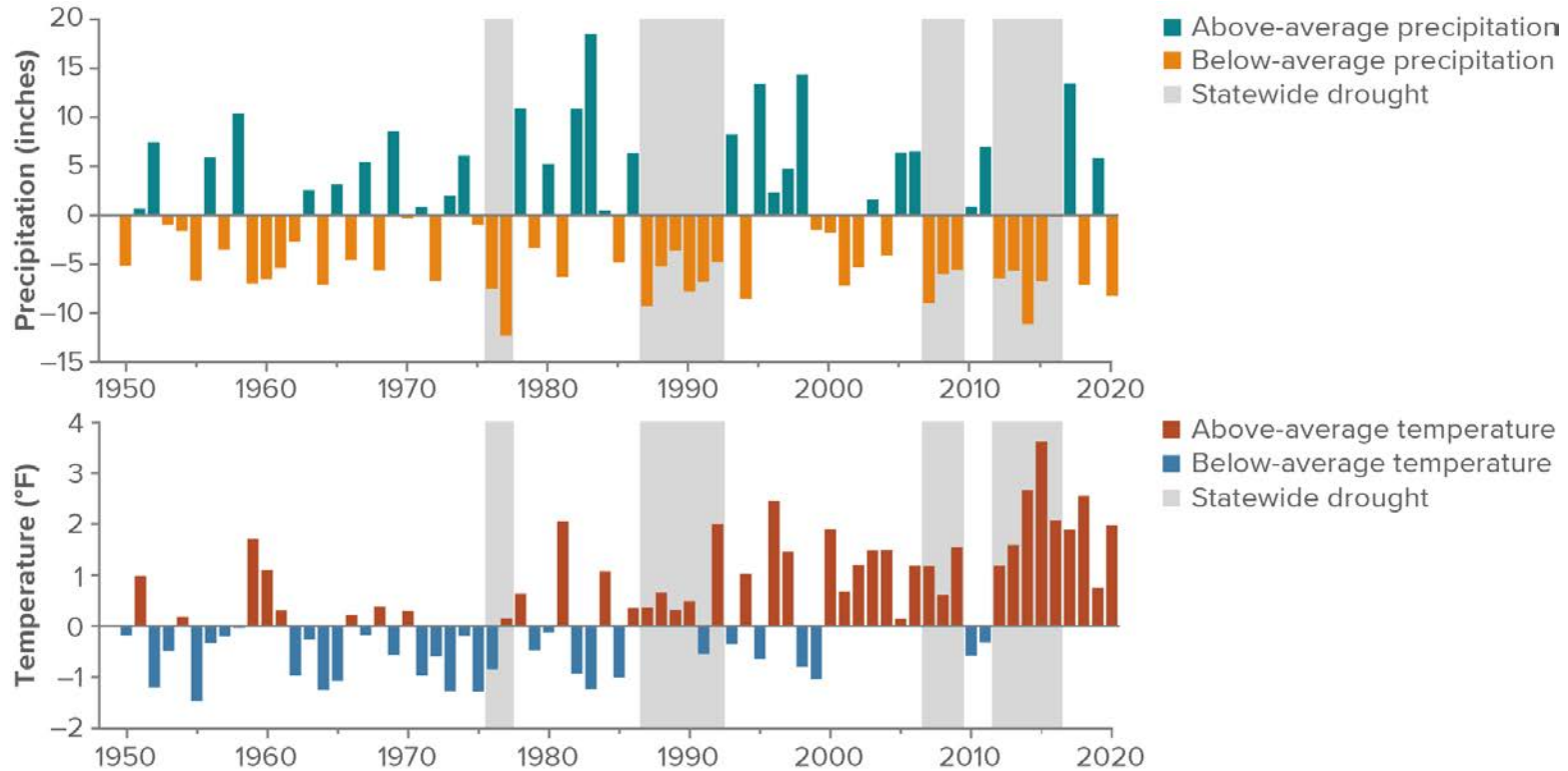
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Outline

- The changing Delta watershed
- Four areas for reform:
 - Accounting
 - Planning
 - Regulations
 - Wet-year storage
- Priorities for small communities, freshwater ecosystems

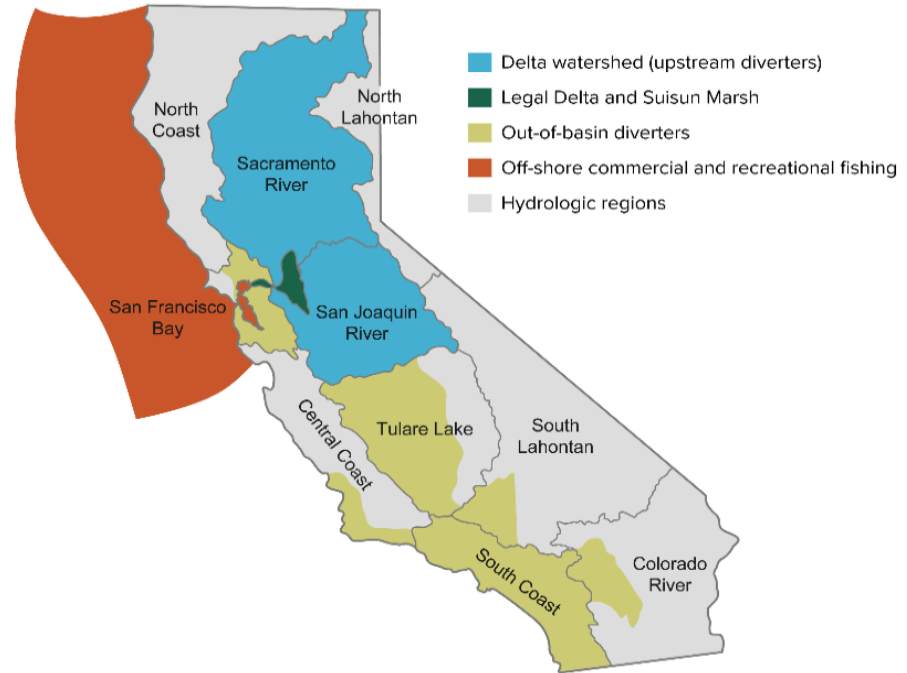


We are in the era of the hot drought

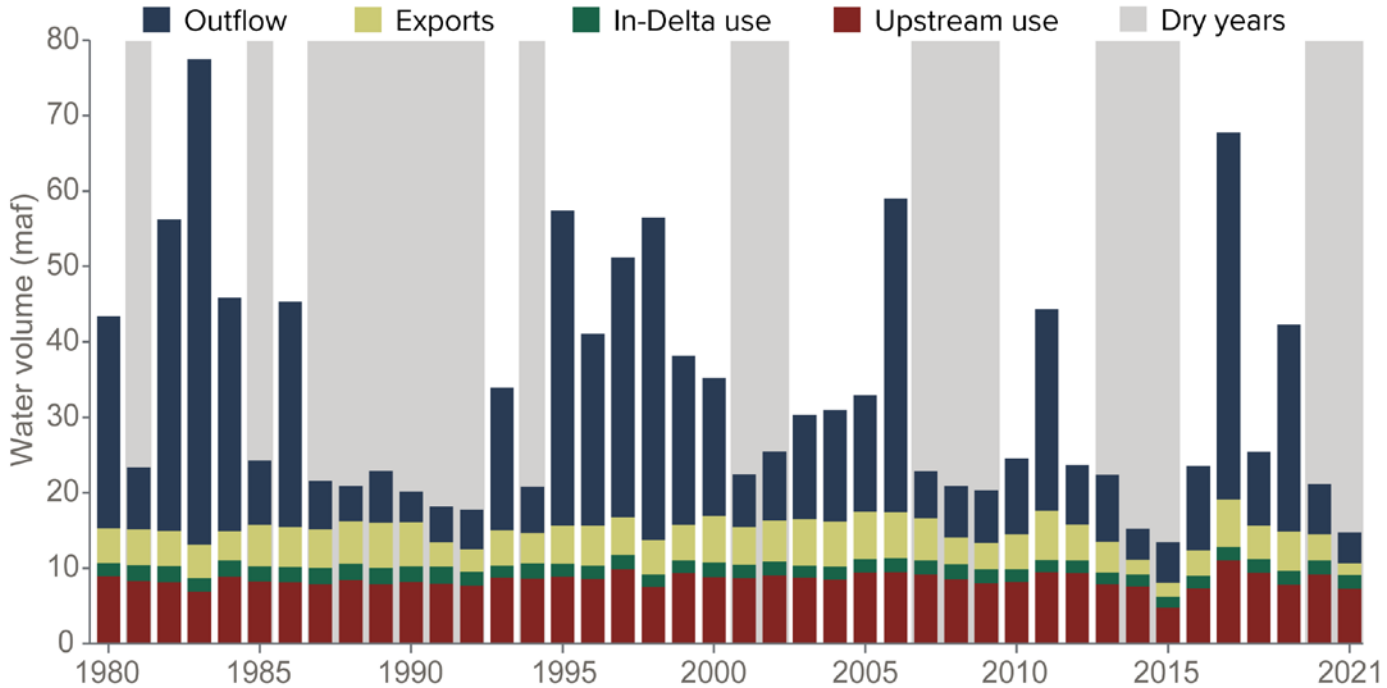


Most Californians rely on the Delta and its watershed

- Water supplies for:
 - 30 million residents
 - >6 million acres of farmland
- Home to unique, threatened freshwater ecosystem

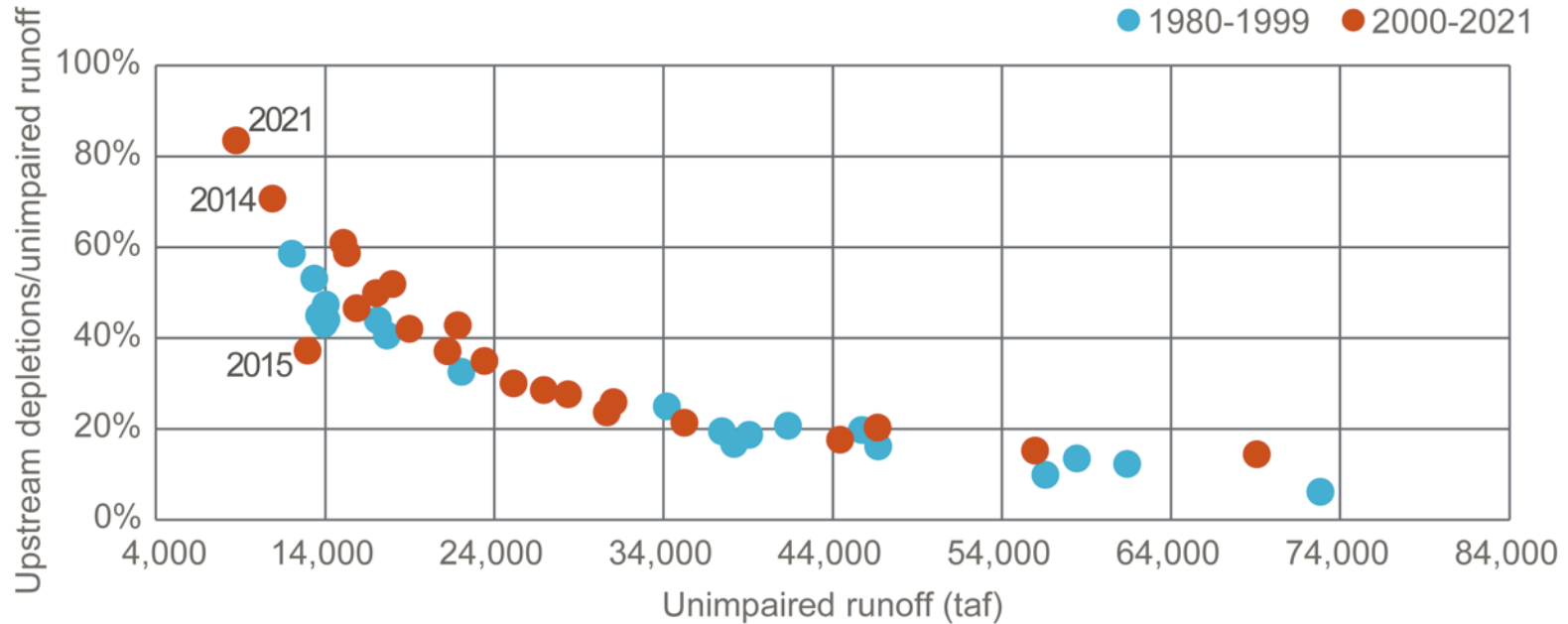


Water availability, uses in Delta watershed are changing



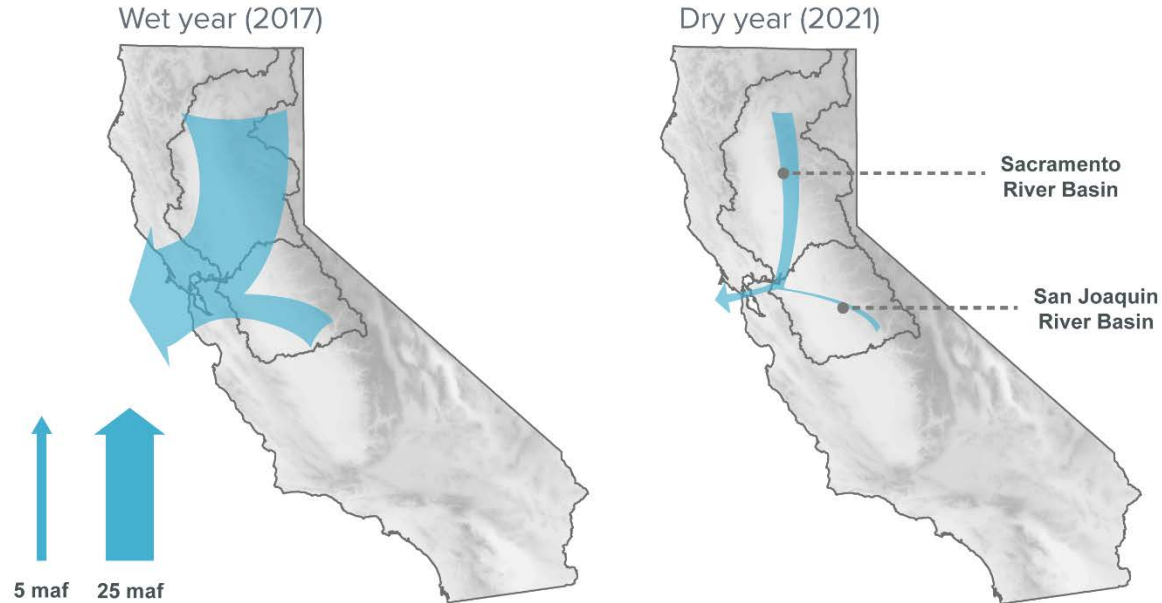
- **Changing Delta inflows:**
 - It’s been drier—with occasional wet years
 - More water depleted upstream, less reaching the Delta
- **Changing Delta outflows:**
 - In dry years, most outflow is to keep Delta fresh enough for human uses—and it’s taking more water to do this
 - Since mid-1990s, more outflow is required to protect ecosystems—but we haven’t stopped species declines
- **Dry-year “safety valves” are playing a bigger role:**
 - CVP and SWP reservoirs, exports, emergency orders

Upstream depletions are increasing in dry years, reducing inflow to the Delta—higher evaporative demand?



Delta flows vary greatly between wet and dry years

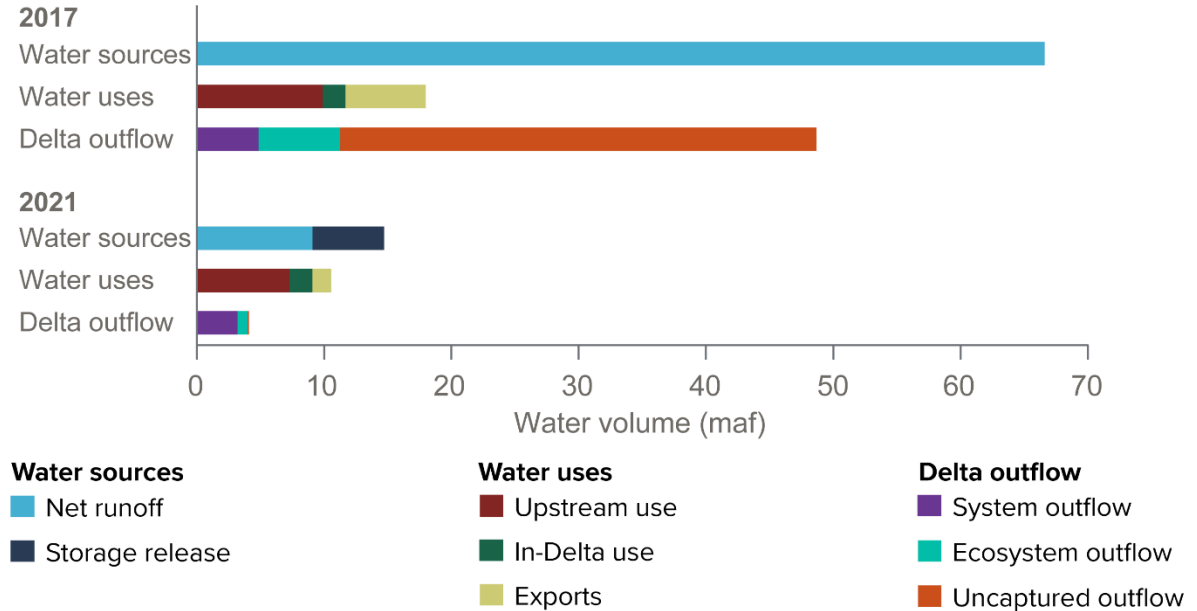
Water sources and outflow from the Delta



Delta flows vary greatly between wet and dry years

- **2021:** 100% of runoff used upstream & in-Delta
- **2017:** 55% of runoff was “uncaptured outflow”

Where water goes in the Delta watershed



How to better manage a warmer Delta watershed?

1. **Track where water goes:** Better tracking of diversions and return flows

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3. **Regulate for changing hydrology:** Simplify regulations, based on hydrology, not water year-types; more flexibility for water users and ecosystems
4. **Prepare:** Store more water in wet years (above, below-ground) for water users and ecosystems

What else is needed to help our freshwater ecosystems adapt to modern droughts?

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- **Set priorities:** Annual environmental watering plans for watersheds
- **Invest in biodiversity strongholds:** E.g., places with cold water, adequate habitat
- **Prepare for special actions:** E.g., nimble curtailments, water purchases, conservation hatcheries

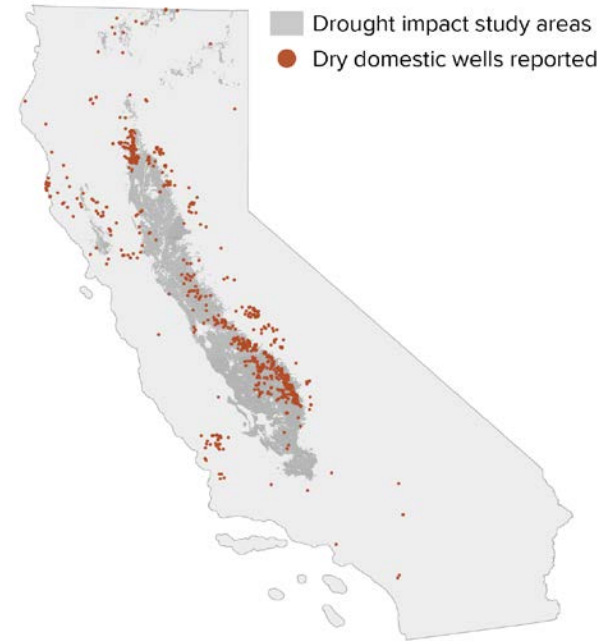
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- **Set priorities:** Annual environmental watering plans for watersheds
- **Invest in biodiversity strongholds:** E.g., places with cold water, adequate habitat
- **Prepare for special actions:** E.g., nimble curtailments, water purchases, conservation hatcheries
- **Store water for the environment:** To have more flexibility to meet drought water needs

What about adaptation in our communities?

- Urban areas will continue to build resilience (supply + demand actions)
- Small communities are more vulnerable, with fewer options
 - Avoiding, mitigating effects of pumping is key
 - So is state help: consolidation, emergency supplies

Domestic dry wells in 2021



Thank you!

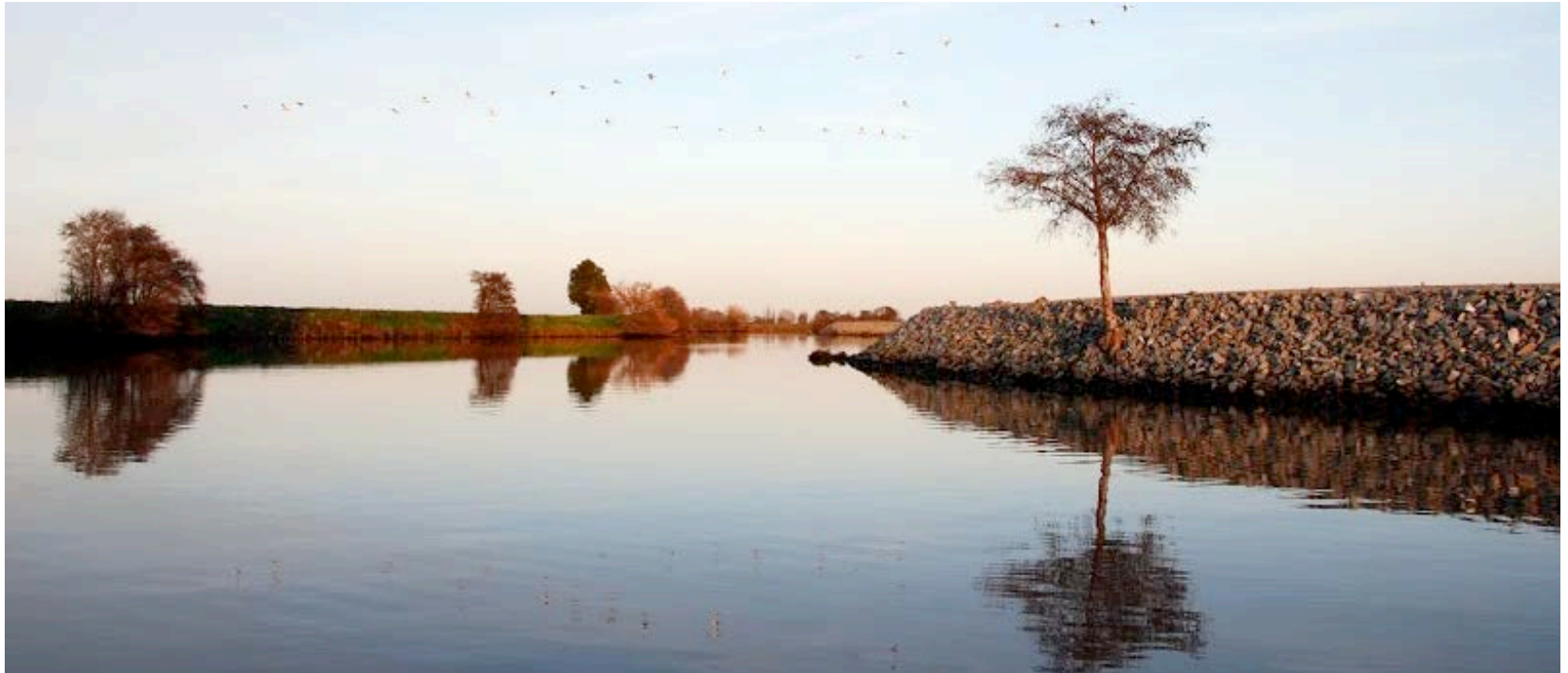



Photo C. Jeffres

Note on the use of these slides

These slides were created to accompany a presentation. They do not include full documentation of sources, data samples, methods, and interpretations. To avoid misinterpretations, please contact:

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Thank you for your interest in this work.