



**REPLENISH**  
— *Big Bear* —

**Presented by**  
Laine Carlson, WSC  
*January 25, 2023*

**STATUS UPDATE // BBARWA Board Presentation**





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- **Pilot Study**
- **Environmental Review Process**
- **Regulatory Timeline**
- **Grant Funding**
- **Benefit Resources**
- **Program Schedule**





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# Pilot Study





# Pilot Plan - Goals



Demonstrate process performance for site-specific wastewater conditions to regulatory agencies



Confirm the proposed treatment process as a viable design approach to meet the target treatment levels



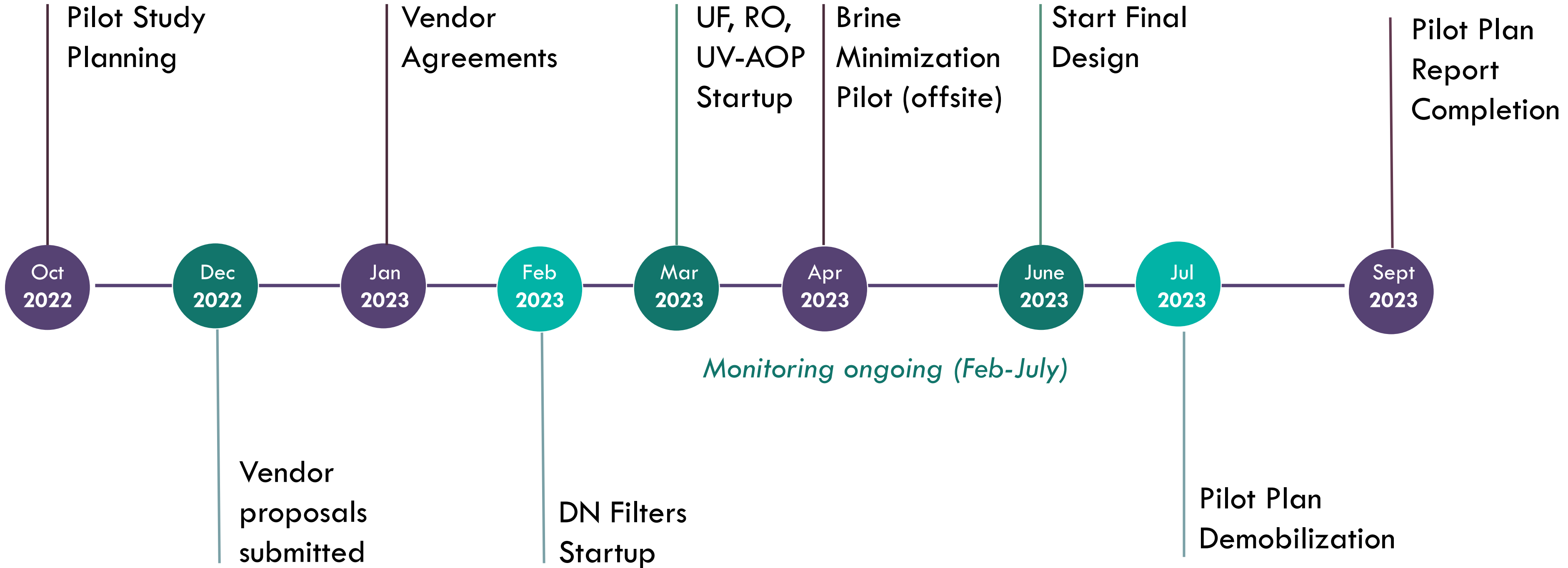
Quantify total system recovery for product water



# Pilot Plan Timeline



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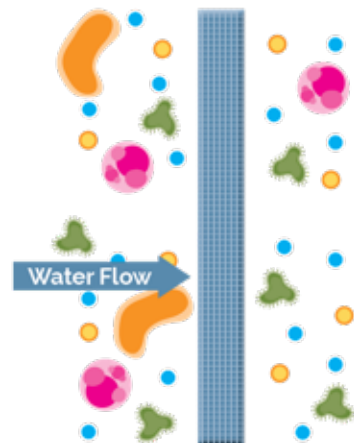
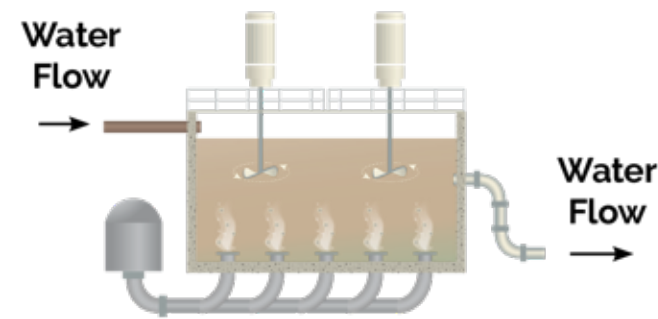




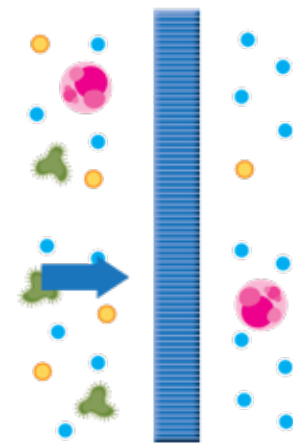
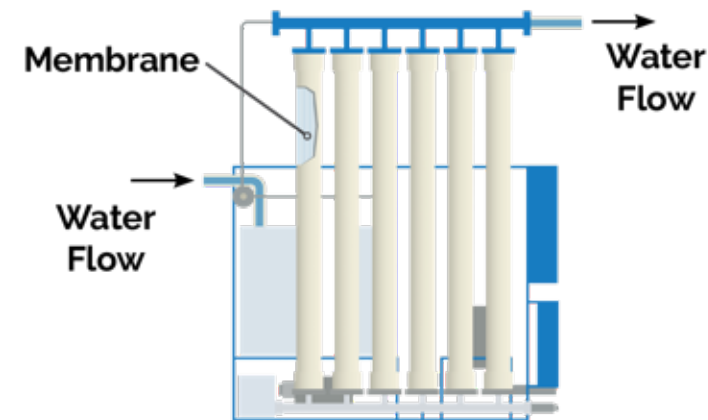
# Advanced Purification Facility

The existing BBARWA Wastewater Treatment Plant (WWTP) will be supplemented with a full advanced treatment facility with a capacity of 2.2 MGD, capable of producing up to 2,210 AFY. Multiple treatment processes will use the best available technology to produce purified water that meets or exceeds all State and Federal water quality standards to protect public health and the environment.

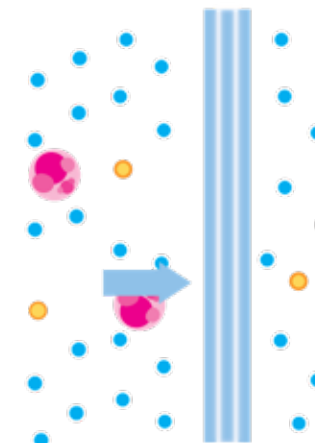
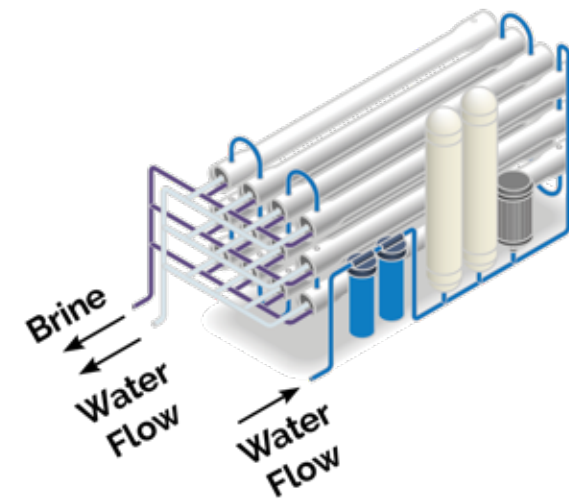
## Nutrient Removal



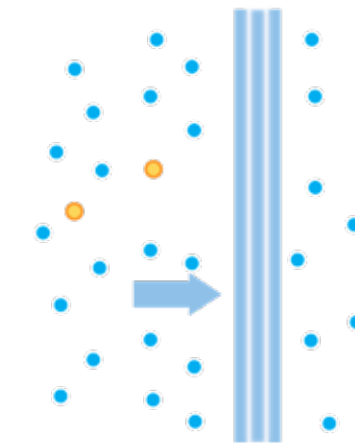
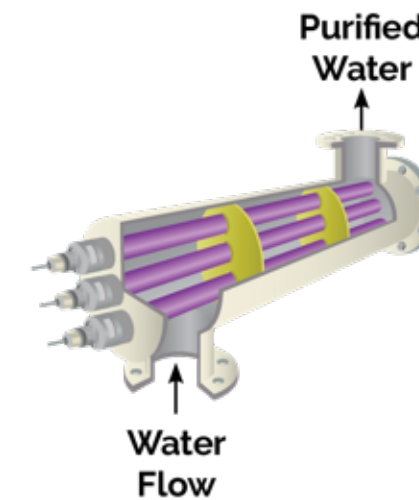
## Ultra Filtration



## Reverse Osmosis (RO)



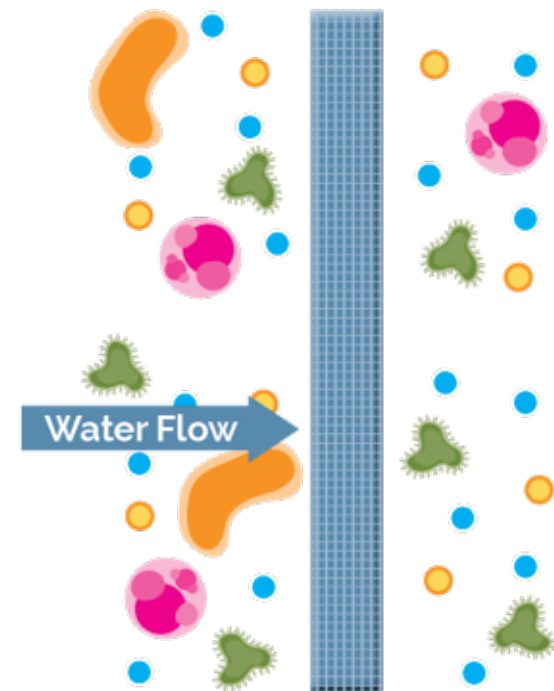
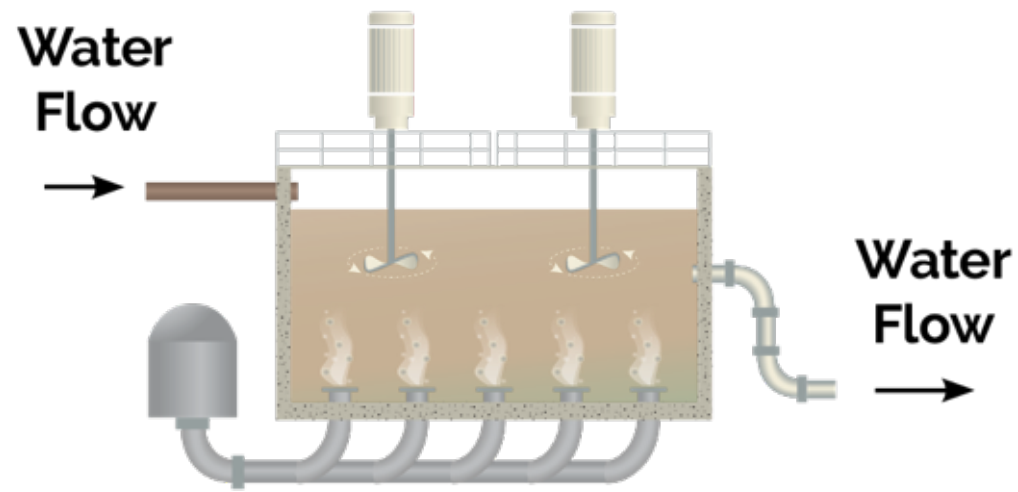
## UV Disinfection & Advanced Oxidation Process





# Nutrient Removal

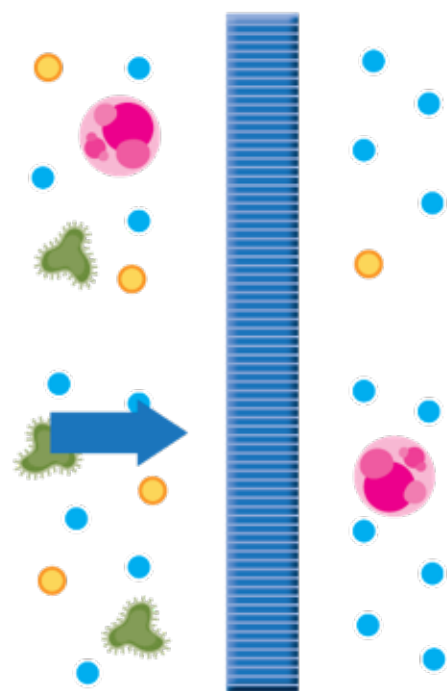
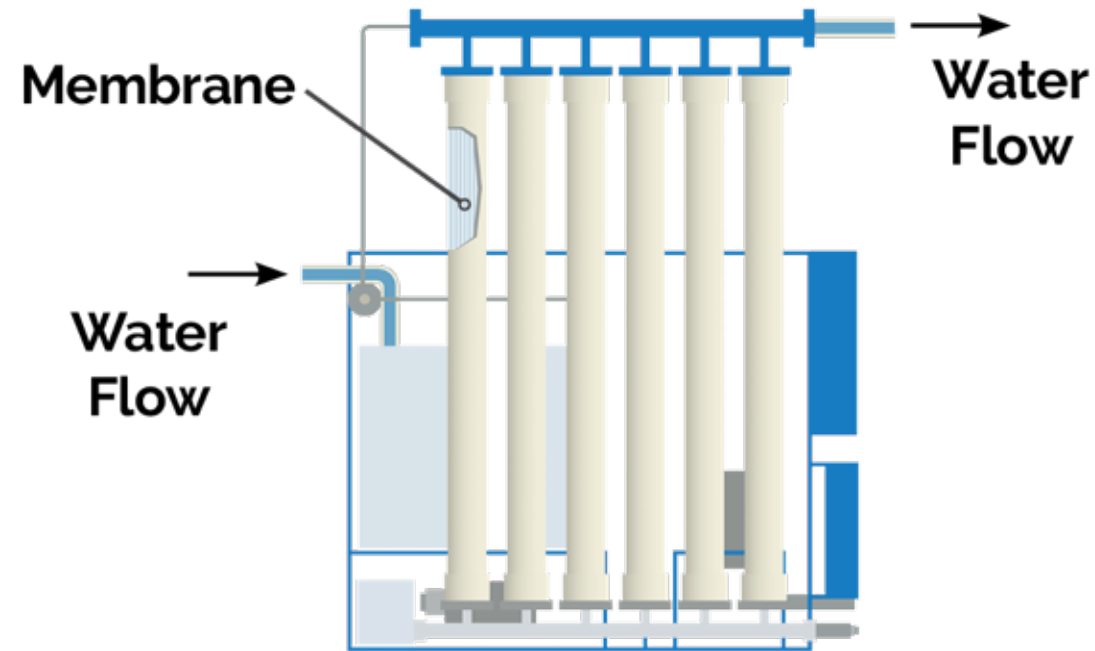
Specialized biological, chemical and physical treatment processes remove most of the organics, nitrogen, and phosphorous from the water.





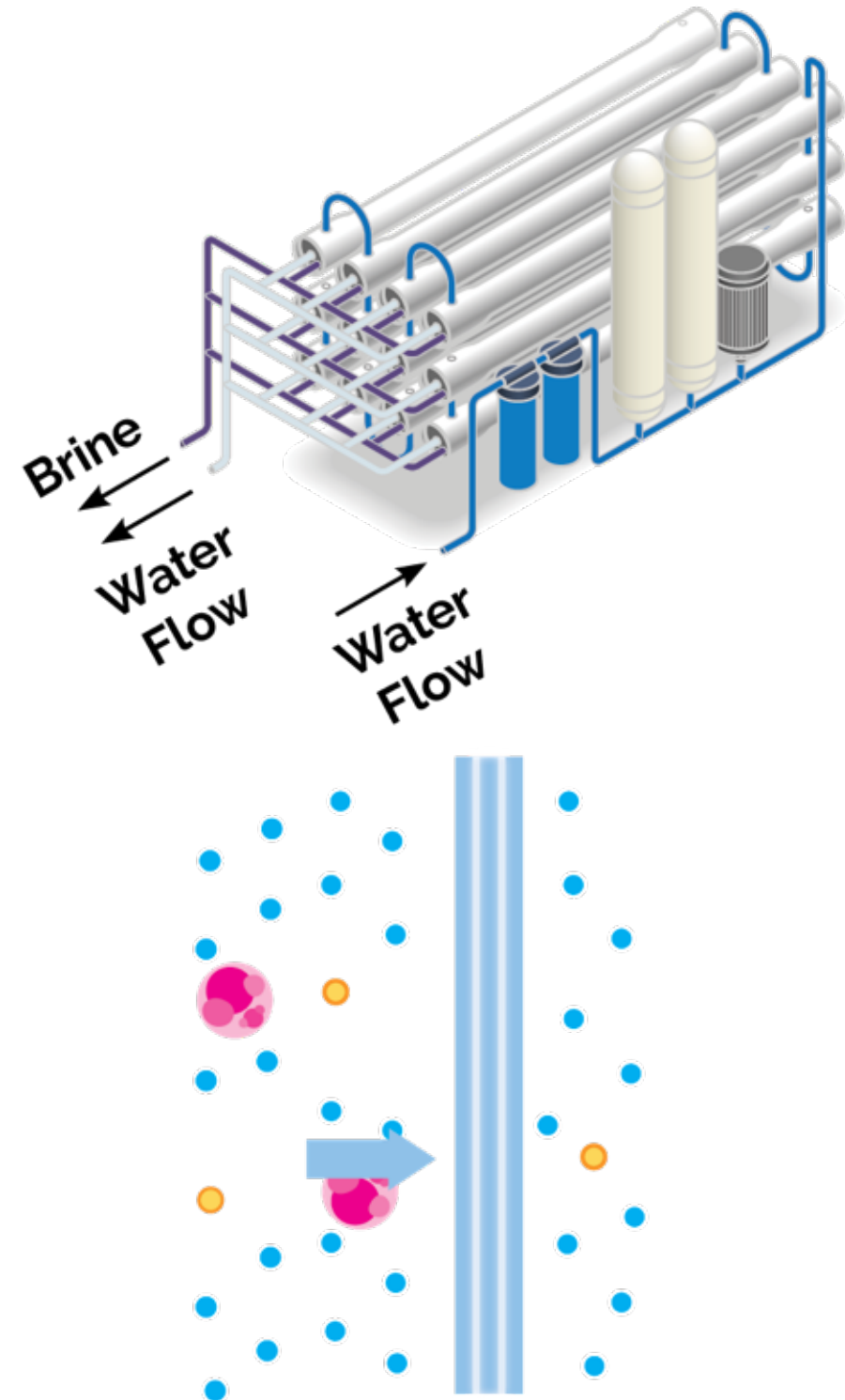
# Ultra Filtration

An ultra filtration process uses permeable membranes to remove suspended solids and bacteria from the treated water as it passes through the filter.





# Reverse Osmosis (RO)

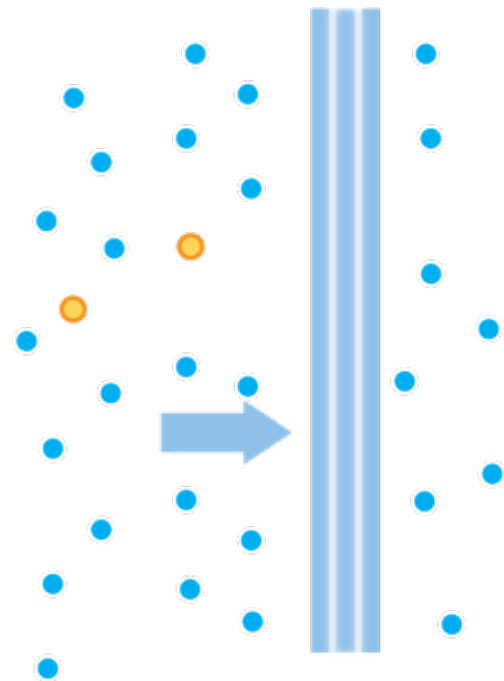
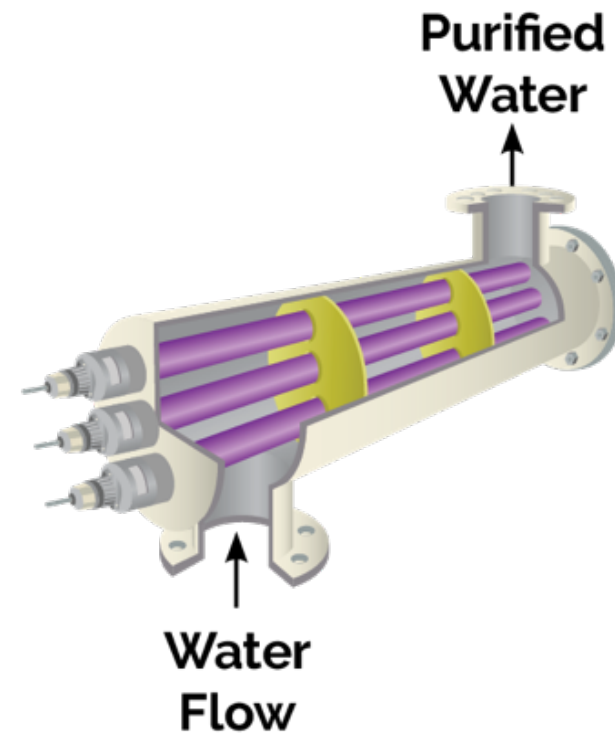


Water is forced under high pressure through reverse osmosis membranes to remove impurities, including salts, bacteria, viruses, pharmaceuticals, and personal care products.





# UV Disinfection & Advanced Oxidation

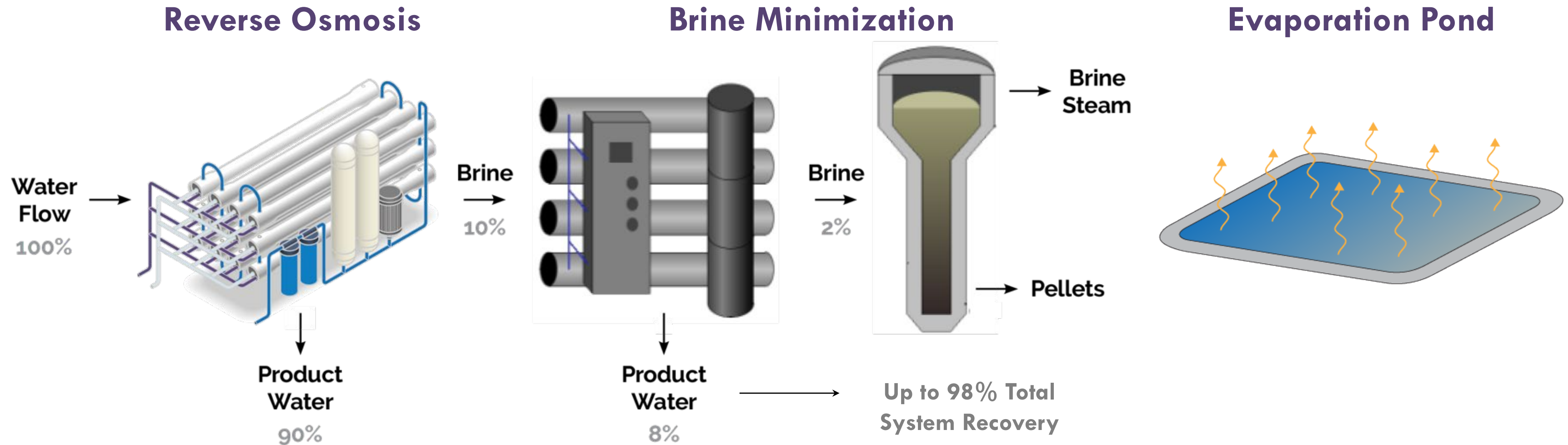


High-intensity UV light is combined with an oxidant to create oxidizing radicals that attack and decompose contaminants in the water so they are no longer harmful. At the same time, the UV light disinfects the water.





# Proposed Brine Management Facilities



## Brine Reduction and Evaporation

The Reverse Osmosis process produces a liquid brine concentrate that requires disposal. A Desalter system will use an additional RO process to reduce the liquid brine volume and a Pellet Reactor that will produce solid pellets for disposal or reuse. The remaining brine will be evaporated onsite using solar evaporation ponds.



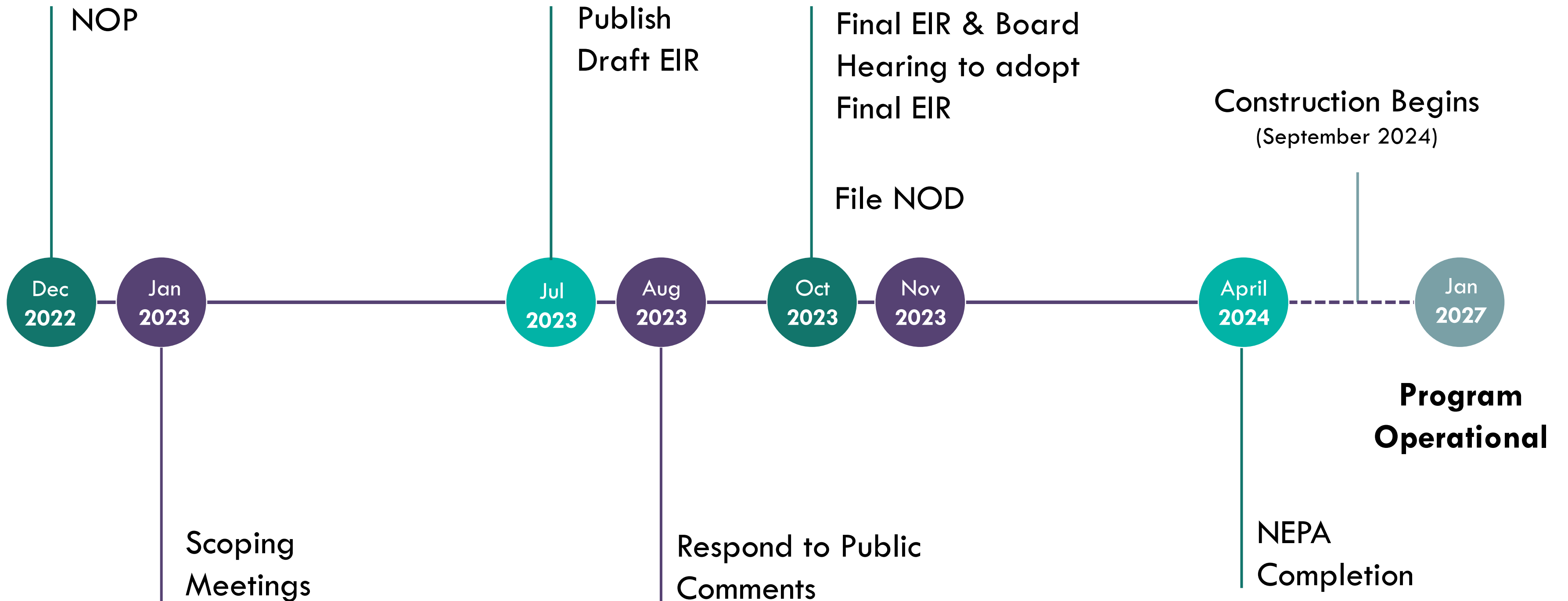


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# Environmental Documentation



# Environmental Documentation Milestones







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# Environmental Review Scoping Comments

**Water quality impacts in Big Bear Lake and downstream**

**Reduced flow to Lucerne Valley**

**Consistency with the 1977 Judgment for Big Bear Lake**

**Letters of support (three from local residents)**

**Brine impacts**

**Energy use and renewable energy sources**

**Consultation with Native American Tribes**





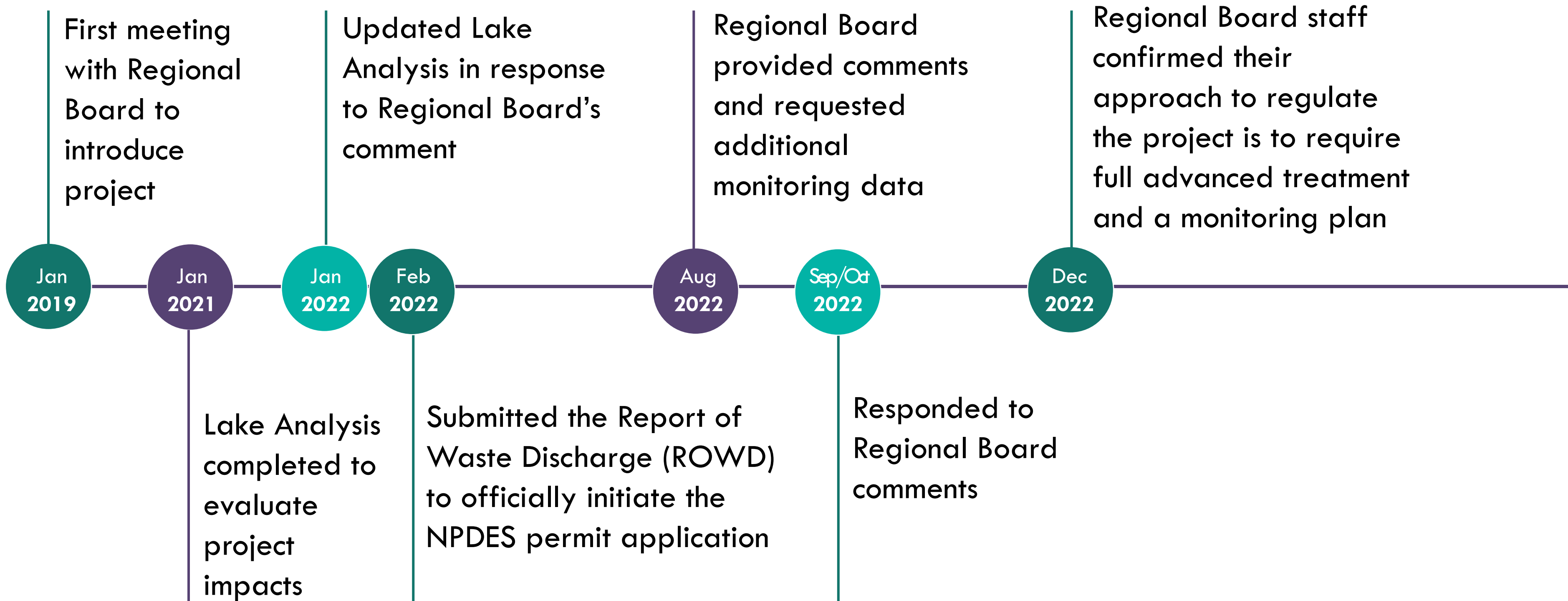
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# Regulatory





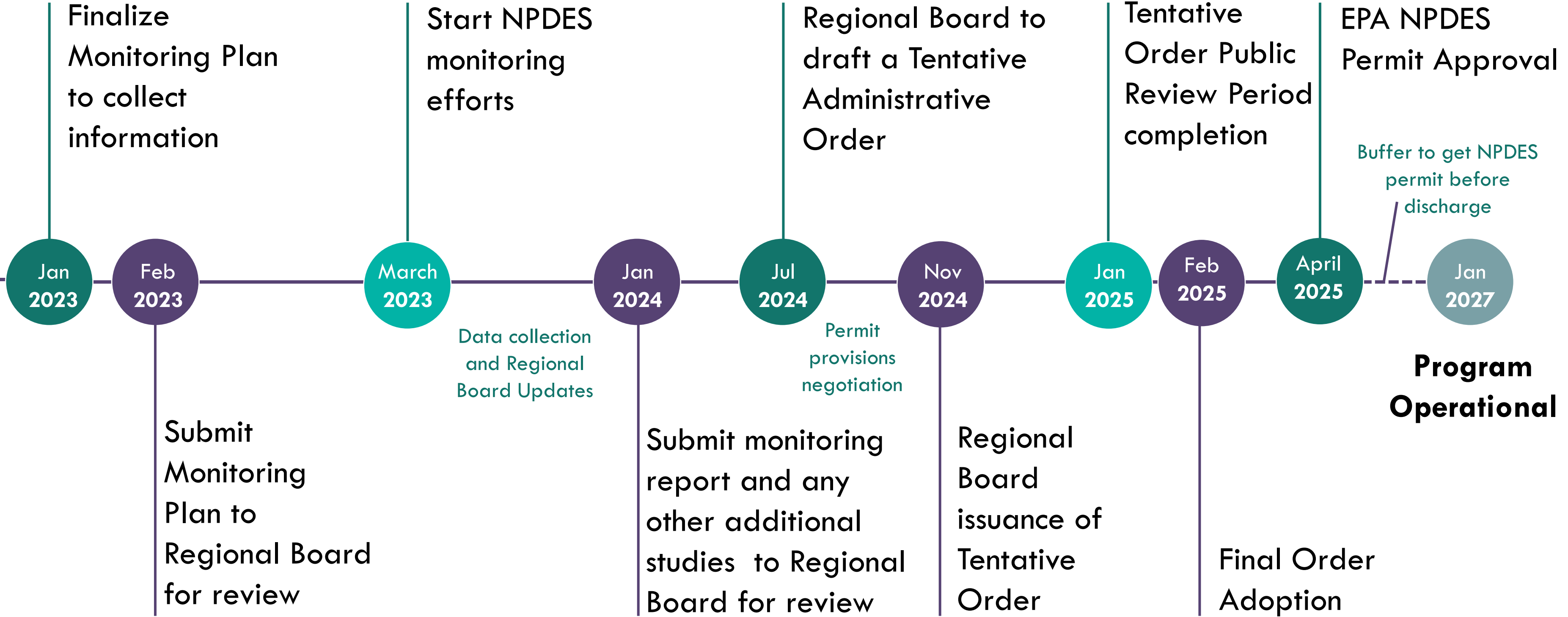
# NPDES Permitting Process Milestones



**Note:** The Environmental documents must be completed before an NPDES permit can be adopted



# NPDES Permitting Process Timeline



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# Grant Funding

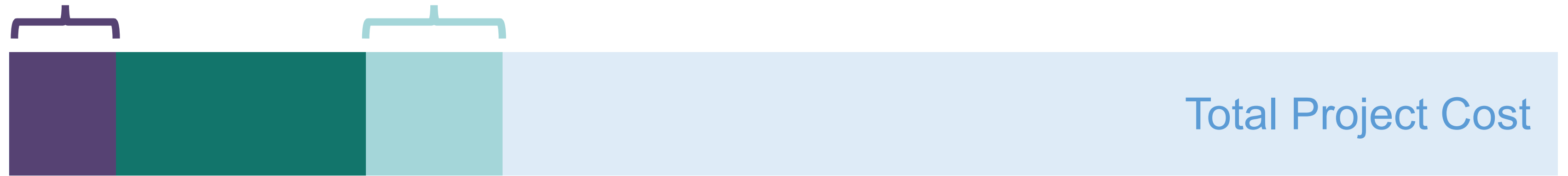




# Grants

**7% State Grants**

**9% Federal Grants Potential**



**16% Federal Grants**

**68% Other Financing Sources and State Grants**

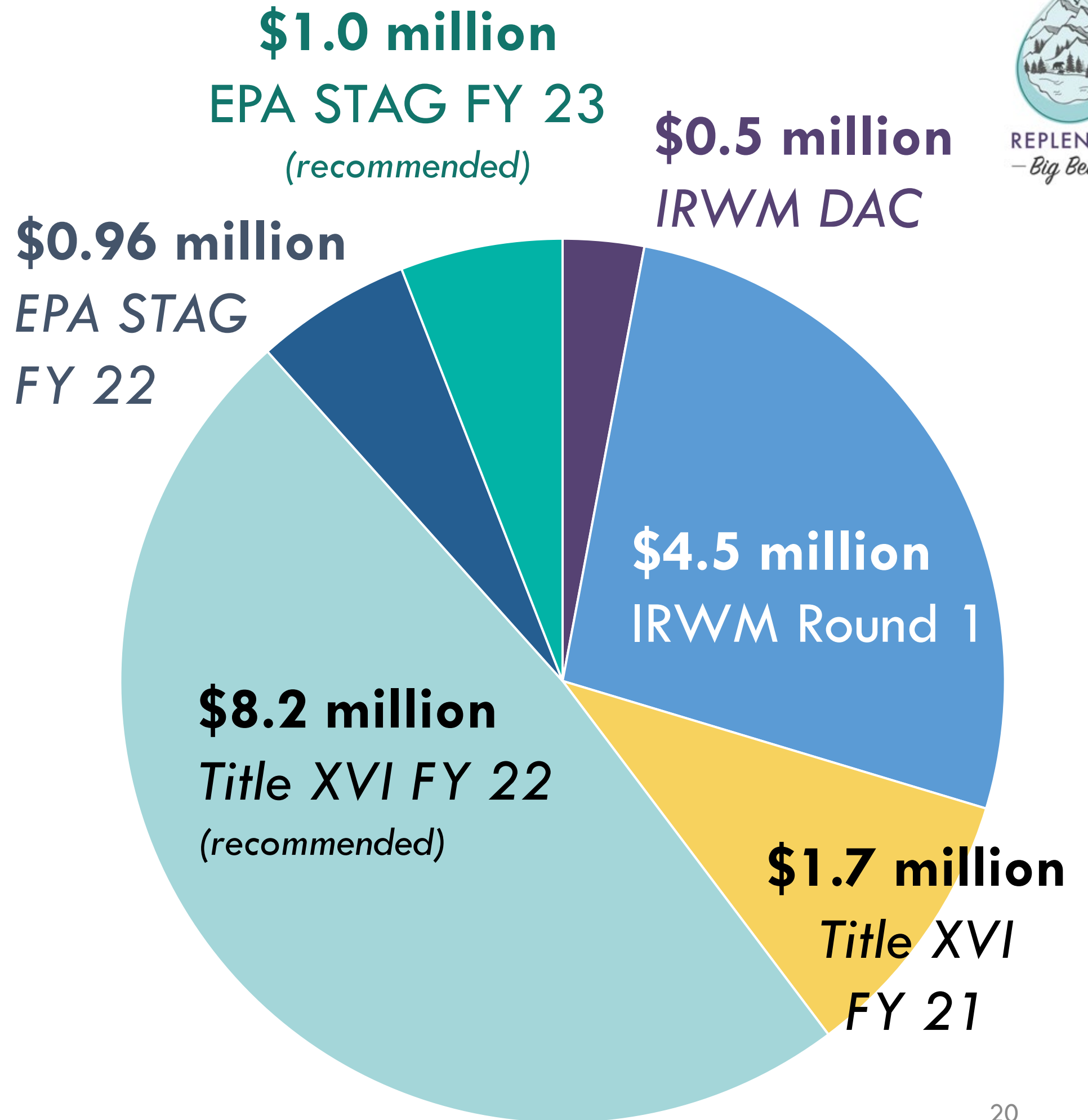
**Federal grants can cover up to 25% of the total project cost**



# Grants to Date



Replenish Big Bear has been successful on over \$16.9 million in grants!







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# Additional Grant Opportunities

- Title XVI FY 23
- Actively evaluating additional State grant opportunities
- Investigating the Clean Water State Revolving Fund (CWSRF) loan for loan forgiveness opportunities



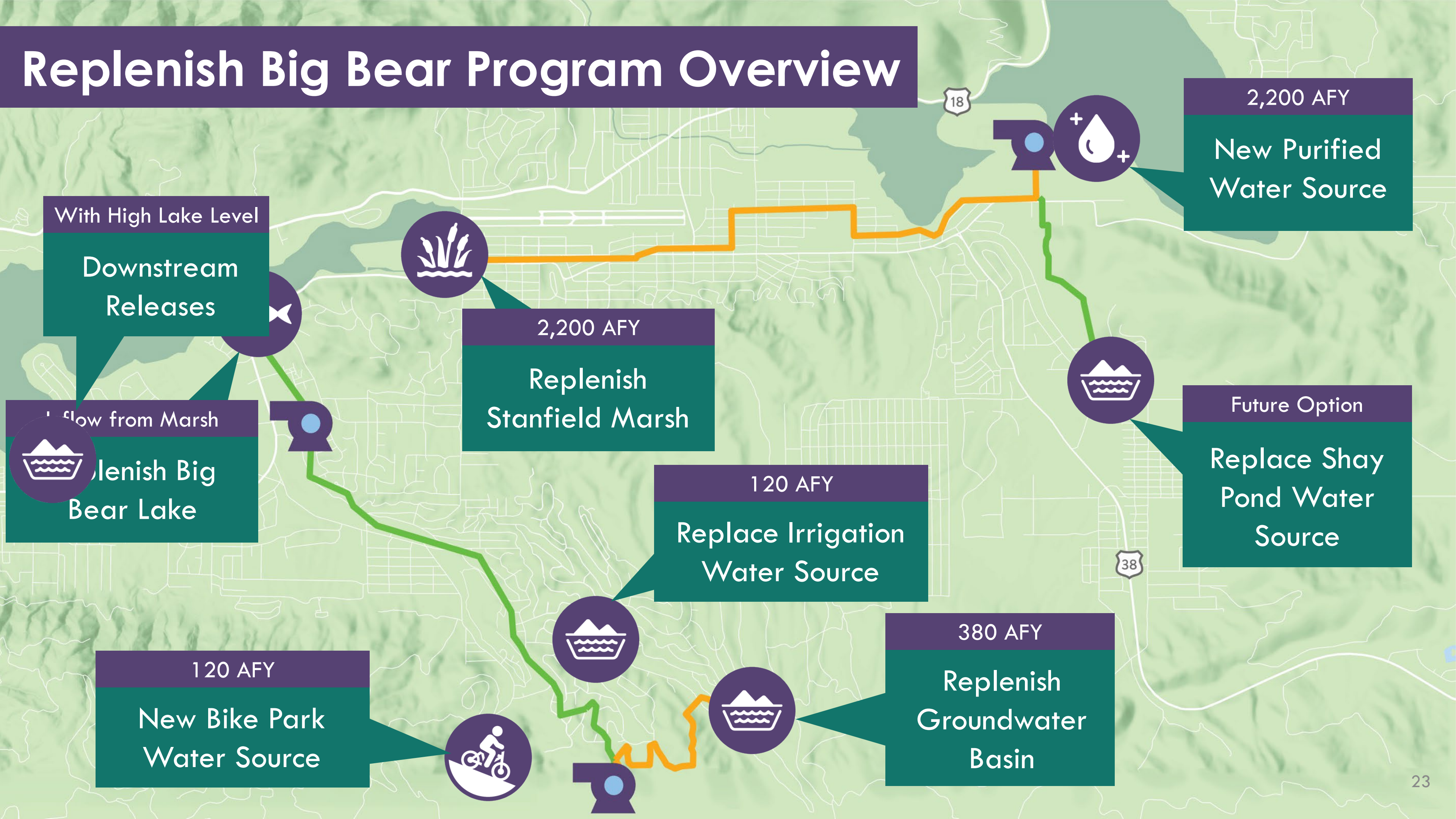


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# Project Benefit Resources



# Replenish Big Bear Program Overview



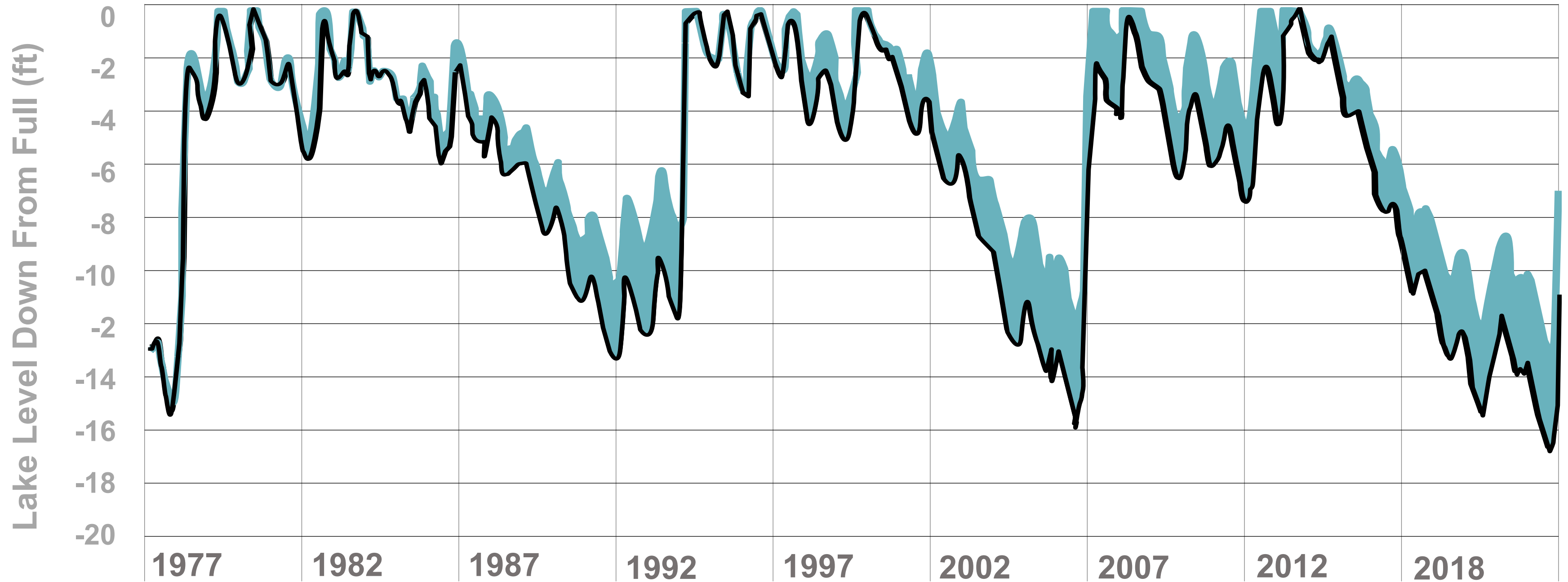


# New water source mitigates drought impacts to the Lake

— Historic Lake Level  
— Estimated Project Lake Level



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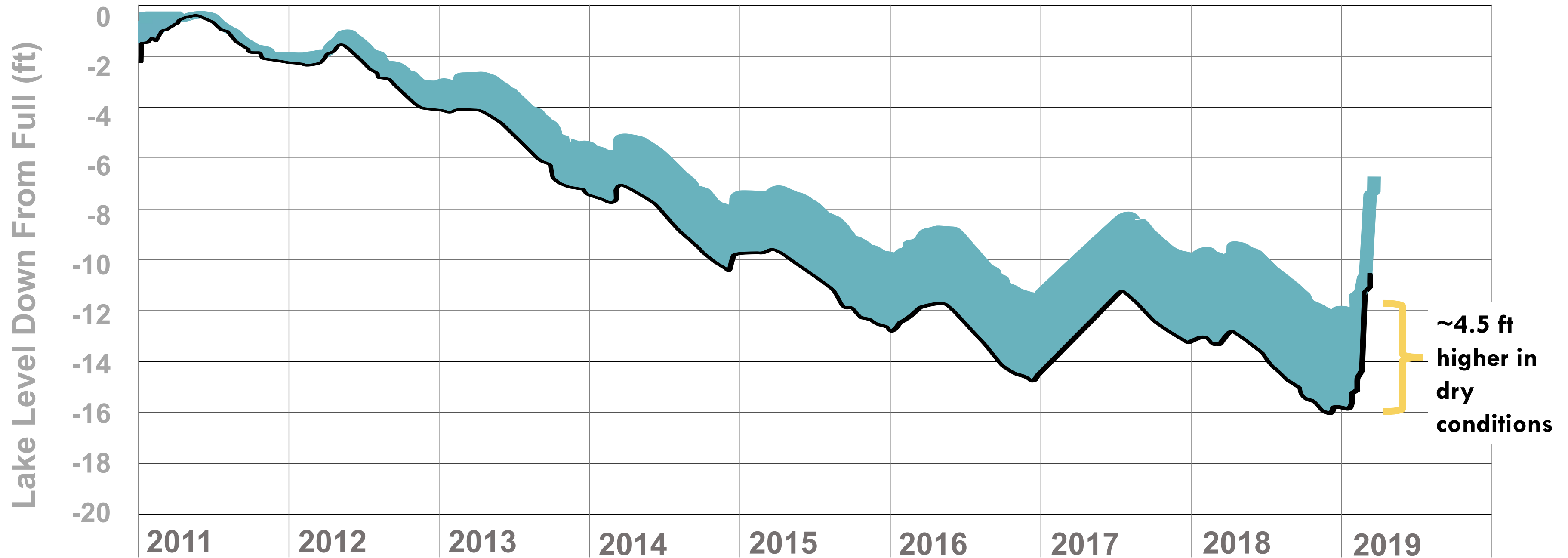


# Lake level benefits are greatest during dry periods

- Historic Lake Level
- Estimated Project Lake Level

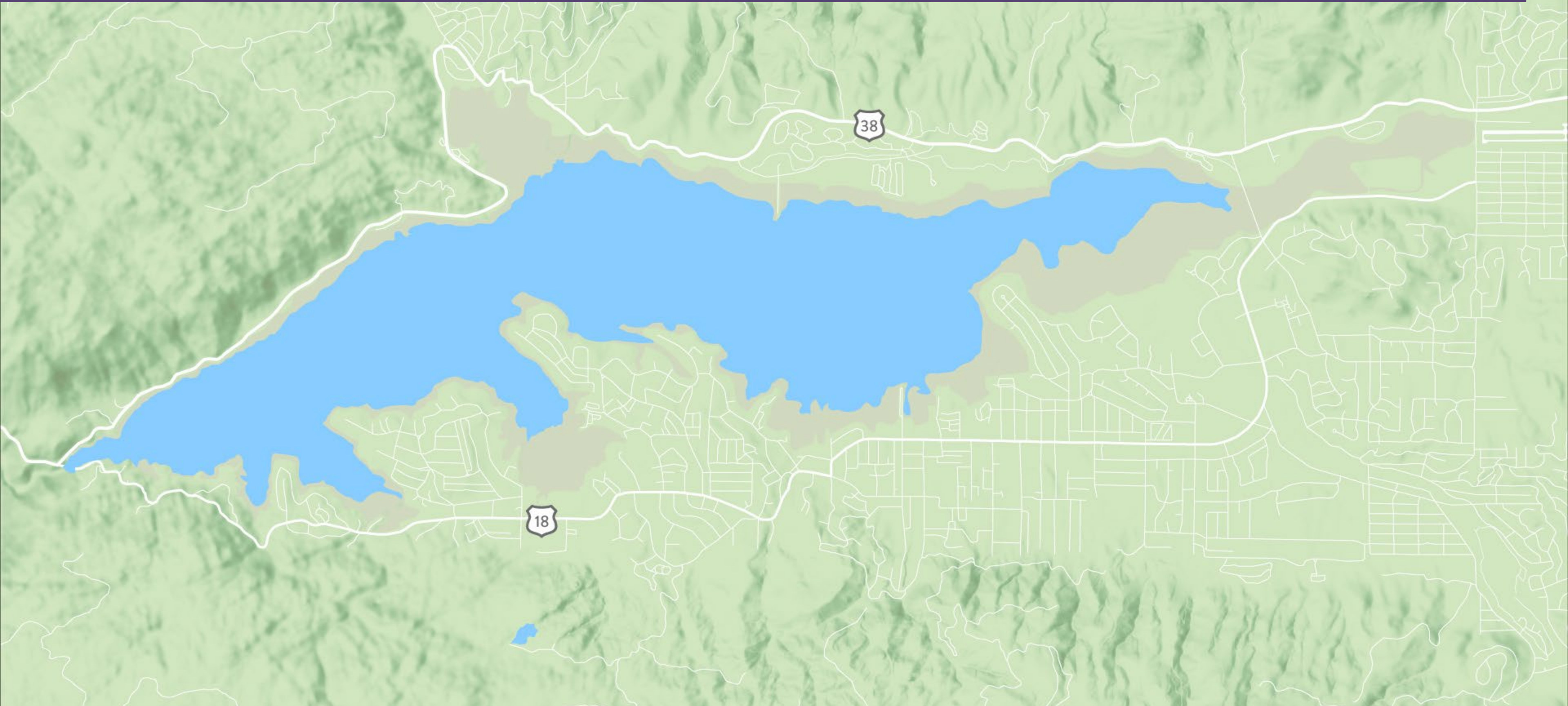


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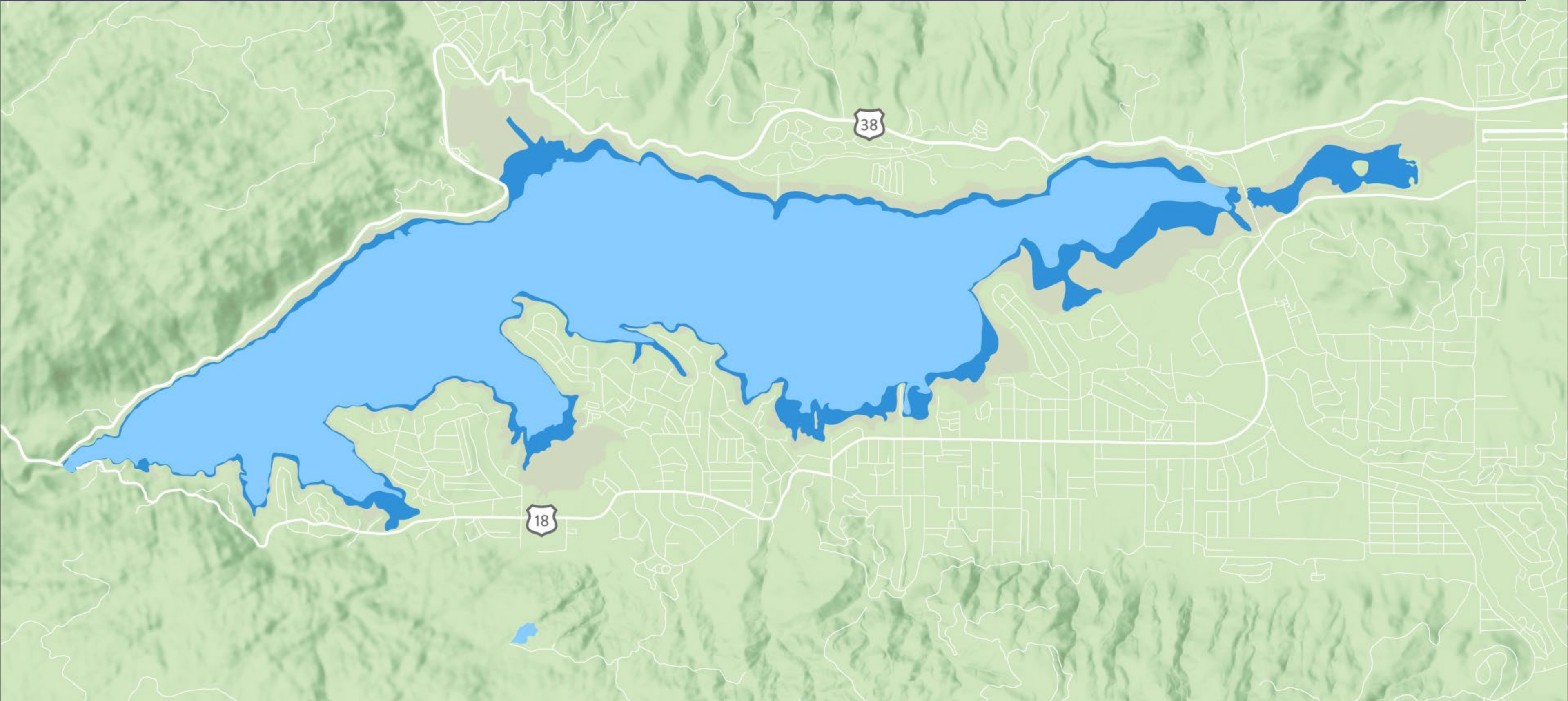
# Lake area was at a record low in 2018 and Marsh was dry



Actual Lake Area in December 2018



# Replenish Big Bear would increase area and wet the Marsh



Projected Lake Area under December 2018 conditions with Replenish Big Bear

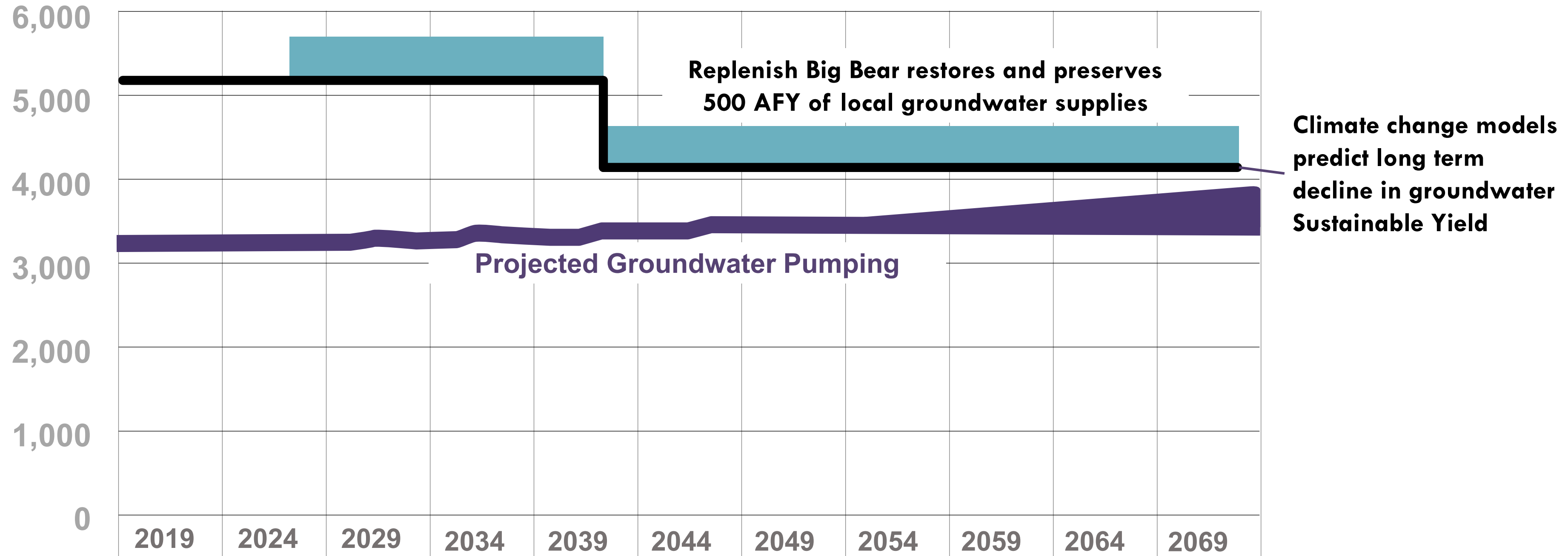


# New Water Source Enhances Groundwater Sustainability



— Projected Sustainable Yield

— Sustainable Yield with Project







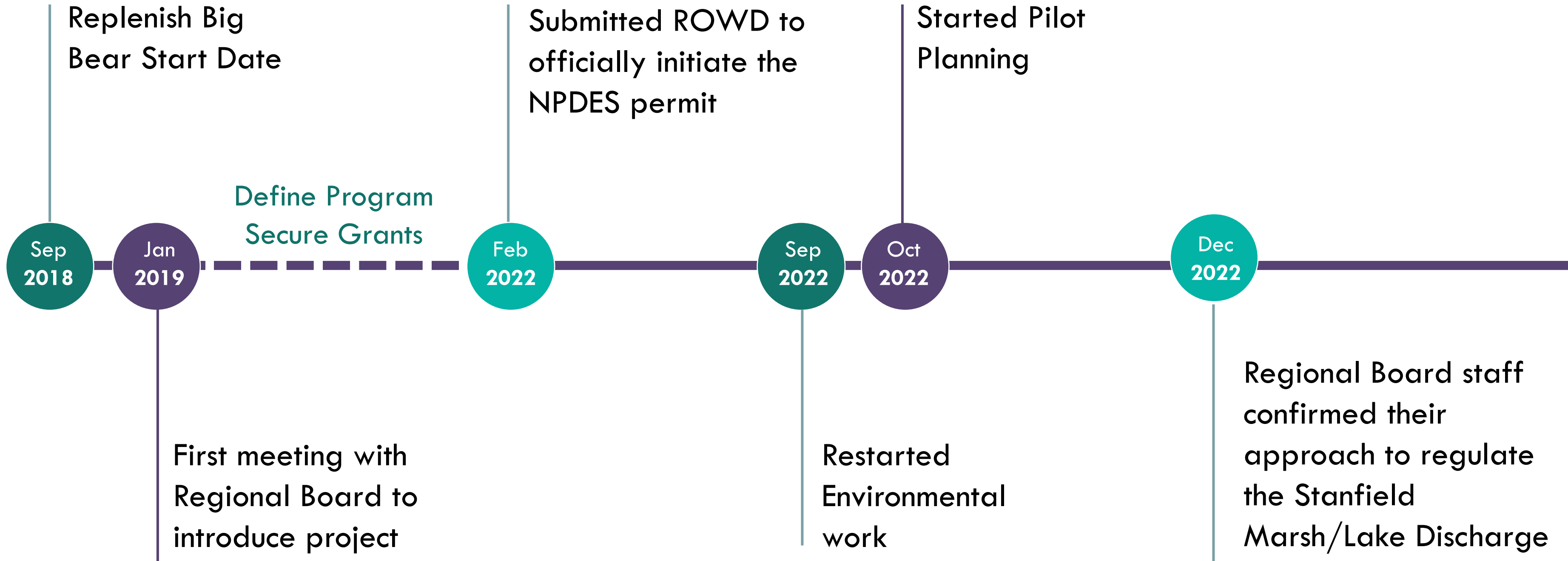
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# Schedule



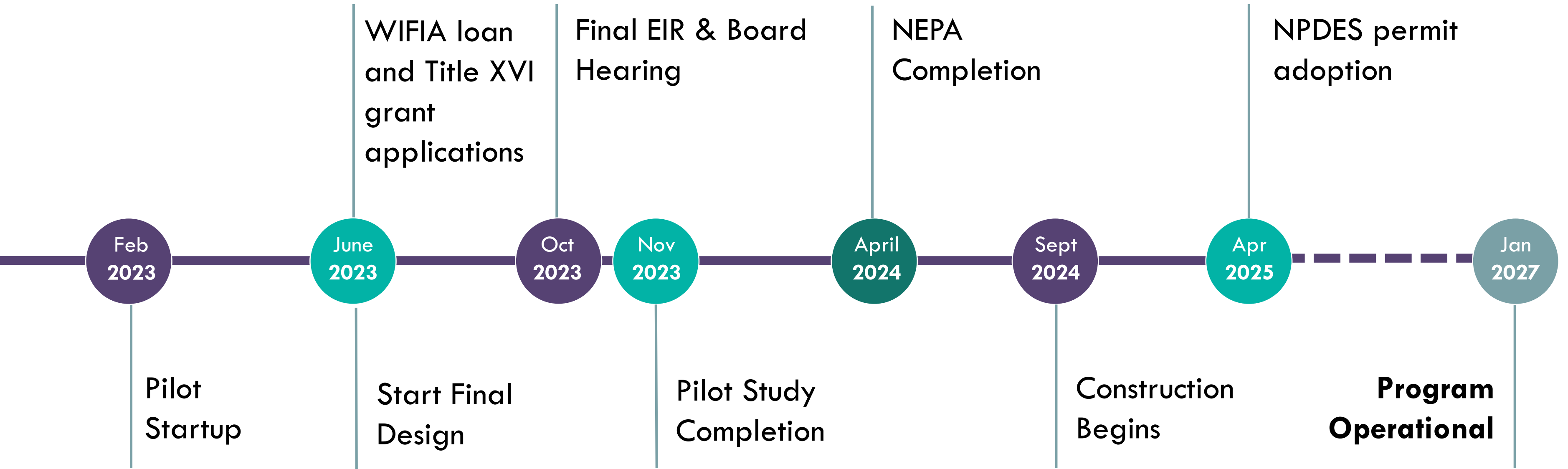


# Program Milestones





# Program Milestones







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Questions?