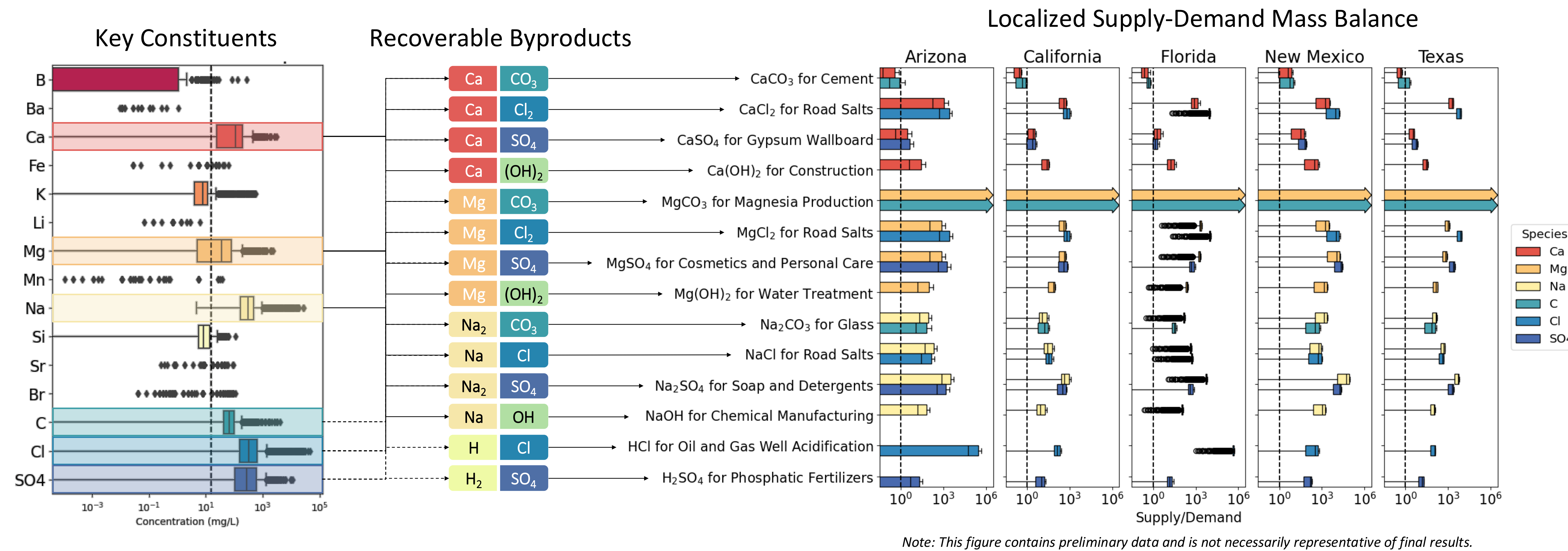
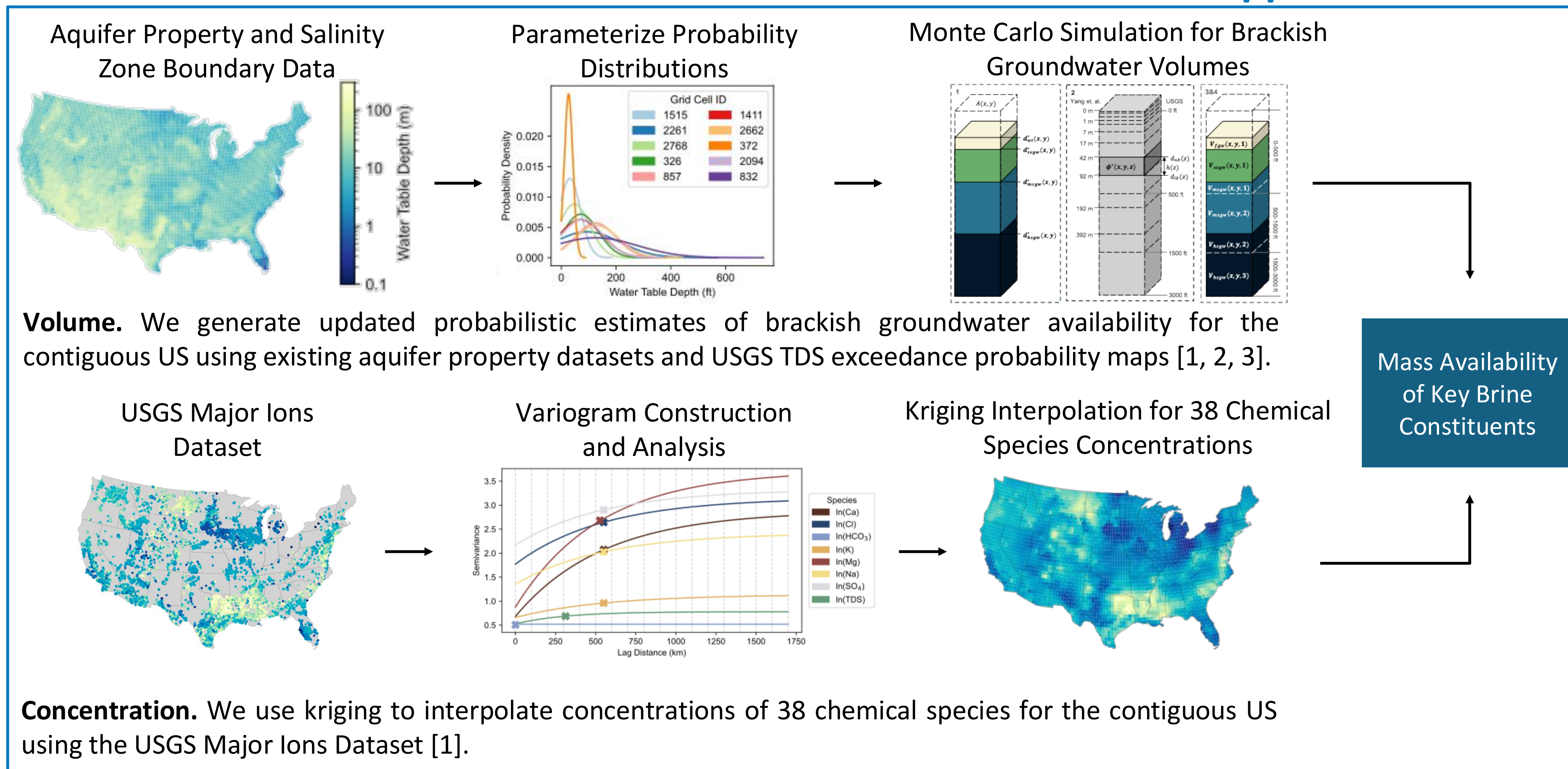


We present a **spatially resolved framework** for evaluating the **valorization potential** of major constituents from **US brackish groundwater resources**, and demonstrate its utility through a case study in **5 high priority states**.

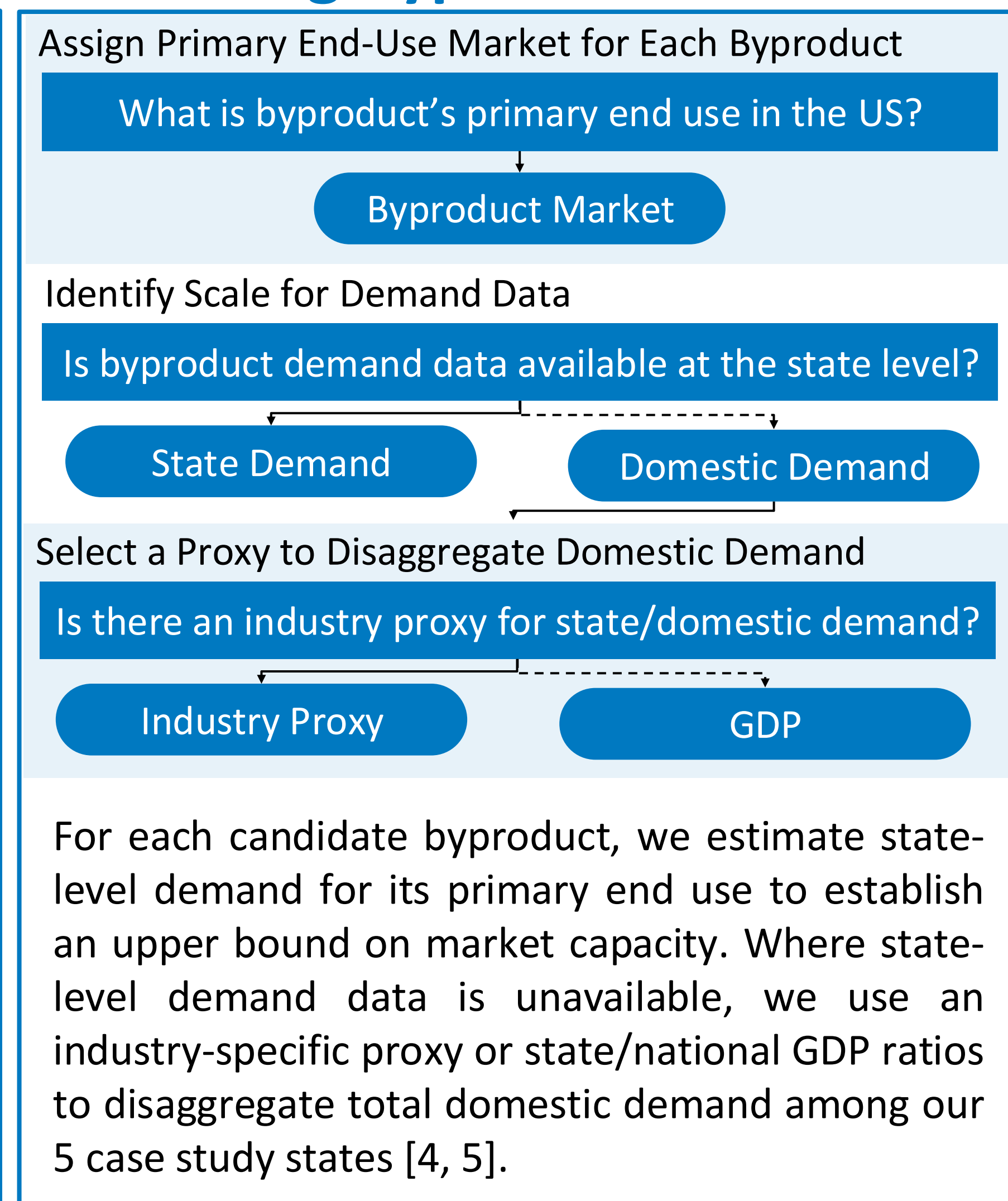


Widespread use of brackish groundwater desalination has been historically inhibited by concerns over waste management, as most traditional brine disposal methods are too economically or environmentally costly to be sustainable in the long-term. Brine valorization, a process through which a set of marketable byproducts are selectively recovered from brine streams, presents an opportunity for desalination facilities to offset waste management costs while mitigating environmental concerns. The viability of this solution, however, is dependent on the suite of byproducts potentially recoverable from brines and the capacity of local markets to absorb them.

Monte Carlo Simulation of Brackish Groundwater Constituent Supplies



Estimating Byproduct Demand



NAWI CONNECTIONS

Period of Performance: September 2023 – Present

Topic Area: Data Modeling and Analysis

This work contributes to NAWI's ongoing efforts to develop standardized methods for assessing technology performance potential to align work across research areas.

NAWI Leverage:

In conducting this study, we leveraged NAWI's extensive network of academics and industry professionals to assemble a board of stakeholders with extensive knowledge of brackish water resources, brine generation, and target end-use markets. The collective expertise of this stakeholder board has helped us to streamline our byproduct screening process, narrowing our focus to only the most promising valorization pathways.

KEY FINDINGS AND CONCLUSIONS

We find that, in most cases, the byproduct supply theoretically recoverable from brackish groundwater falls on a similar order of magnitude to state-level demand, a promising indicator for feasibility of market penetration. However, in some states, particularly New Mexico, the demand for brine byproducts is not sufficiently high to absorb the recoverable supply, which could be problematic for brine valorization efforts in these regions.

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