



## More Water - Less Concentrate: Grand Challenge Stage 1

**When: Planned Launch Fall 2016**

**Problem Statement:** As the demand for fresh water increases, the need to develop new water supplies from non-traditional water sources, such as saline (brackish) groundwater and surface water using desalination technologies continues to grow. Nation-wide, desalination can help meet the increasing demand for fresh water, diversify water supply portfolios, and improve water supply reliability, particularly in areas affected by climate change, population growth and drought.

The by-product from commonly employed desalination technologies, such as reverse osmosis, is a highly saline waste stream, termed “concentrate.” In coastal areas, brine concentrate can be returned to the ocean. However, in inland areas, the high cost and complexity associated with the management of concentrate, through disposal or volume minimization, is one of the major factors limiting more widespread use of desalination.

The most commonly employed concentrate management methods are disposal to the local sewer system, discharge to surface water sources, and disposal in evaporation ponds or deep well injection. Surface and sewer discharge alternatives are unsustainable because they result in high salt loading to fresh, surface water sources. Most utilities using surface discharge are operating under temporary permits and need to find an alternative solution for long term use. Evaporation ponds and deep well injection are costly and have potentially adverse environmental impacts. Technologies that reduce or eliminate concentrate liquid volumes are energy intensive, costly, and operationally complex. Numerous technologies have been pilot-tested in various locations, but none have been shown to be cost-competitive with alternatives such as surface discharge and deep-well injection.

**Brief description of the potential impact from a successful solution to this problem:** The number of municipalities using reverse osmosis continues to increase to meet more stringent water quality requirements and to provide additional water capacity. Solutions developed through prize competitions in concentrate management will help to enable these municipalities in providing cost effective, high quality drinking water to their customers while meeting permitting and regulatory requirements in an environmental sound and sustainable manner.

**Prize Competition Scope:** This is a Grand Challenge envisioned to consist of 3 main stages. The decision to proceed to Stage 2 will depend on the results of Stage 1 and other considerations.

- **Stage 1** is a concept challenge requiring a white paper submittal with a total prize purse of \$150,000.
- **Stage 2** is envisioned as a subsequent reduction-to-practice (RTP) Challenge to demonstrate proof-of-concept data at the bench scale with a total prize purse of at least \$450,000.
- **Stage 3** is envisioned as a Reduction-to-Practice demonstration at full-scale in a field-test setting with a total prize purse of at least \$500,000

Reclamation also plans to invite industry, non-profit organizations, and venture capital representatives to participate as partners and/or, official judges of this competition and seek potential business deals with competition participants.

**Collaborators:**

**RECLAMATION**  
*Managing Water in the West*



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