

Concentrate Management Toolbox

The Concentrate Management Toolbox is a planning level tool designed to compare concentrate management technologies based on the needs of the end user

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This Toolbox helps water treatment planners identify and select processes for managing concentrate from new and existing desalination plants.

Mission Issue

Concentrate management is the bottleneck to inland desalination thus limiting development of inland water supplies from impaired sources.

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“Apples to apples comparison of concentrate management technologies.”

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More Information

<https://www.usbr.gov/research/projects/detail.cfm?id=5239>

Problem

As the need for fresh water increases, the Bureau of Reclamation’s (Reclamation) mission to deliver water in the Western United States will become more difficult to fulfill with conventional fresh water supplies. Desalination technologies have the potential to treat currently unusable water supplies to help meet future demands; however, governmental, municipal, and industrial water treatment all face increasing challenges in disposing of the constituents and water in the concentrate stream (what is left over from the water treatment process) in a cost effective and environmentally sustainable manner.

Thousands of documents have been published that present a myriad of concentrate management technologies: from technology development studies to regional assessments and review documents. Researchers and consultants have documented the “success” of these technologies; however, what researchers consider successful may still not be acceptable for an entity interested in implementing the technology at full scale.

Solution

This Reclamation Science and Technology research project developed a Concentrate Management Toolbox (Toolbox) that enables water planners and treatment professionals to:

1. Determine what concentrate management methods are available to treat, manage, and reduce the volume of concentrate generated from desalination plants.
2. Compare different concentrate management methods using a defined set of criteria to help identify candidate technologies for a given application.

Initially, the authors developed technology evaluation criteria that were used to score various concentrate management technologies. Next, the technologies and scores were used to develop the Toolbox, which was designed to inventory and categorize existing technologies and identify practical and economical strategies for concentrate management for a wide spectrum of water treatment situations.

We then developed a framework for collecting information from users to define project specific needs, analyze the technology inventory relative to these needs, and identify a candidate list of technologies for the user’s project. The Toolbox is an Excel spreadsheet [Toolbox], available upon request from the authors.

Application and Results

This document accomplishes the following:

- Explains the factors to consider for managing concentrate when planning a desalination project, whether it be for an add-on feature to an existing plant or for a new plant.
- Guides users through a series of screening questions to determine which concentrate management technologies are appropriate for their application.
- Guides users through a series of evaluation (weighting and prioritizing) questions to determine which technologies best suit their priorities.
- Presents suitable technologies, ranked in order of likely best fit, for the user’s project.

The authors demonstrated the Toolbox in two case studies: North Texas Municipal Water District (NTMWD) in Texas and Eastern Municipal Water District (EMWD) in California.

Future Plans

Future plans for the toolbox are to provide an open source document and tool for water treatment community, end-users and planners to compare treatment technologies, update toolbox with the latest technological development and provide a means of comparison to users.