

Goodyear Pilot Wetlands

Developing Hydraulic Loading Rates, Operations, Maintenance and Disposal Requirements for Wetland Treatment of Reverse Osmosis Concentrate

Research Bulletin
Science and Technology
Program
2922

Constructed Vertical Flow Treatment Wetlands were used to treat reverse osmosis concentrate to reduce regulated inorganic constituents to meet surface water discharge standards. Water, soil, and vegetation sampling, tracer testing, nutrient dosing, and wetland autopsies were used to assess treatment, operation and maintenance, and disposal requirements.

Mission Issue

Vertical Flow Treatment Wetlands treatment of reverse osmosis concentrate provides a low-tech, inexpensive, effective and innovative treatment for inland management of concentrate.

Principal Investigator

Deborah Tosline
Hydrogeologist
Program Development Division
Phoenix Area Office
dtosline@usbr.gov

Research Office Contact

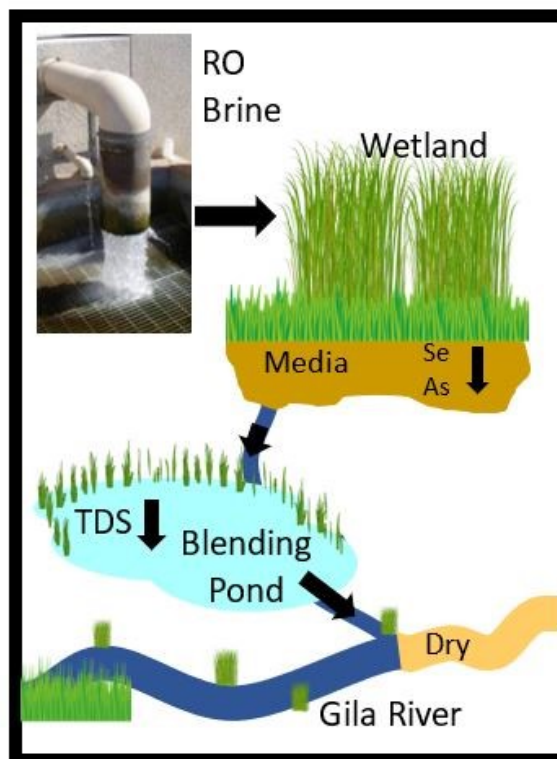
Yuliana Porras-Mendoza
Water Treatment Research Coordinator
yporasmendoza@usbr.gov

Problem

The City of Goodyear is located southwest of the Phoenix, Arizona, metropolitan area. Goodyear's Bullard Water Campus reverse osmosis (RO) system generates about 0.5 million gallons per day (MGD) of RO concentrate, with a total dissolved solids (TDS) concentration of about 8,500 milligrams per liter. The Bureau of Reclamation's 2007 Central Arizona Salinity Study predicted that RO facilities in the greater Phoenix area are likely to generate a waste stream of 28 MGD of RO concentrate by year 2035. Concentrate management in inland areas is challenging due to limited disposal options and high treatment costs. Alternative concentrate management options are necessary to allow for full utilization of water resources.

Solution

Vertical Flow Treatment Wetlands (VFTWs) may be used to remove inorganic compounds through microbial reduction and adsorption. A pilot test of VFTWs was conducted to determine whether selenium in RO concentrate could be removed at a level to allow it to be discharged to the Gila River to support ecosystems by creating and restoring habitat.



Pilot Wetland Reverse Osmosis Concentrate Treatment and Disposal Concept.

“Holistic water management options provide safe and reliable water resources, social amenities, and environmental benefits. It is time to pursue multi-beneficial, low-tech options to manage local water resources.”

Deborah Tosline
Hydrogeologist
Reclamation

Collaborators

Reclamation Phoenix Area Office

Reclamation Technical Service Center

City of Goodyear, Arizona

More Information

<https://www.usbr.gov/research/projects/detail.cfm?id=2922>

<https://www.usbr.gov/research/projects/researcher.cfm?id=1682>

Application and Results

VFTWs have the potential to remove selenium from RO concentrate to meet Arizona Department of Environmental Quality discharge requirements and benefit several stakeholders. This approach to brine management is both earth-friendly and economically sustainable.

Future Plans

Research ended in July 2018. Goodyear may collaborate with Maricopa County Parks and Recreation Department to construct a demonstration VFTW at Estrella Mountain Regional Park. If developed, the wetlands can be a new recreation destination, and could benefit the Gila River with riparian restoration and recreational improvements.