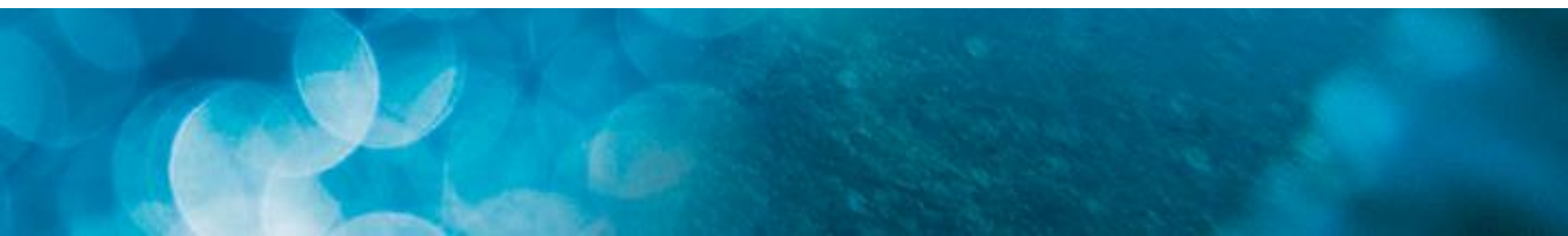




Claude "Bud" Lewis
Carlsbad Desalination Plant





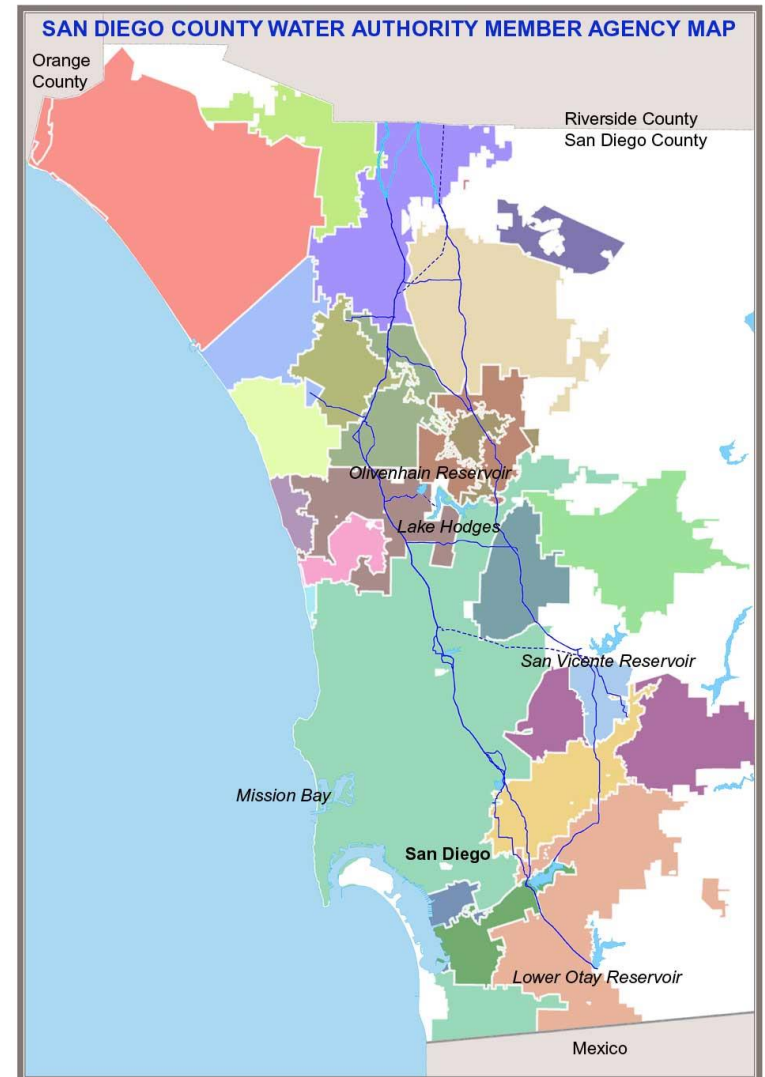
San Diego County Water Authority

Wholesale water agency created by State Legislature in 1944

- ▶ 24 member agencies
- ▶ 36-member board of directors
- ▶ Serves 3.2 million people and region's \$218 billion economy

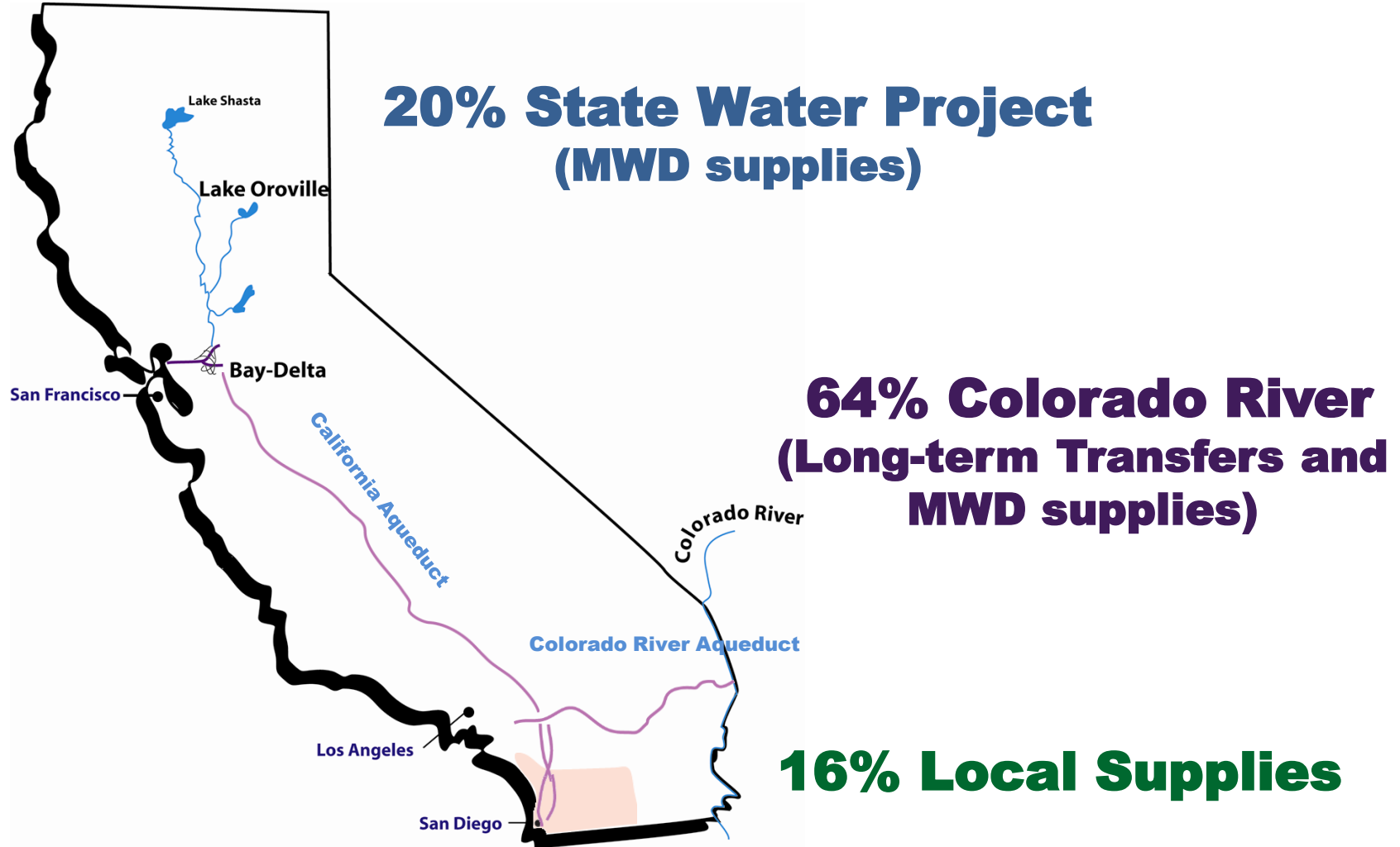
Imports 80%-90% of water used in San Diego County

- ▶ Added desalinated seawater to local supply in late 2015
- ▶ Builds, owns, operates and maintains large-scale regional water infrastructure
- ▶ Largest member agency of Metropolitan Water District of Southern California



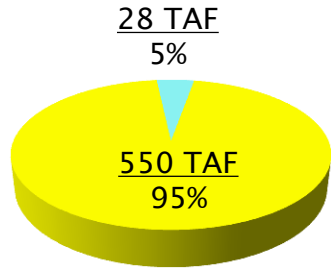
At the End of a Very Long “Pipeline”

Sources of San Diego County’s Water Supply (2011-2015 five-year average)



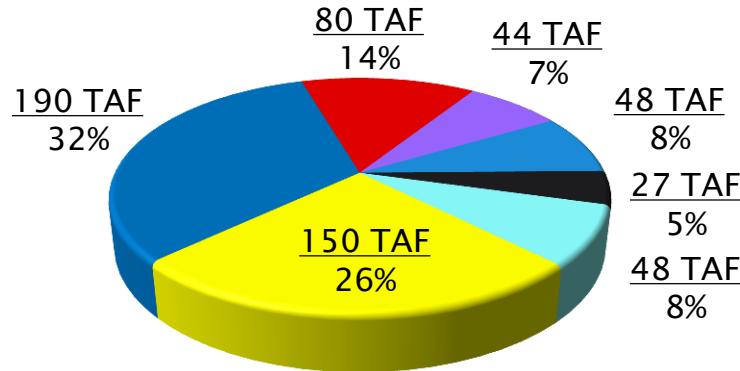
Increasing San Diego County's Water Supply Reliability through Supply Diversification

1991



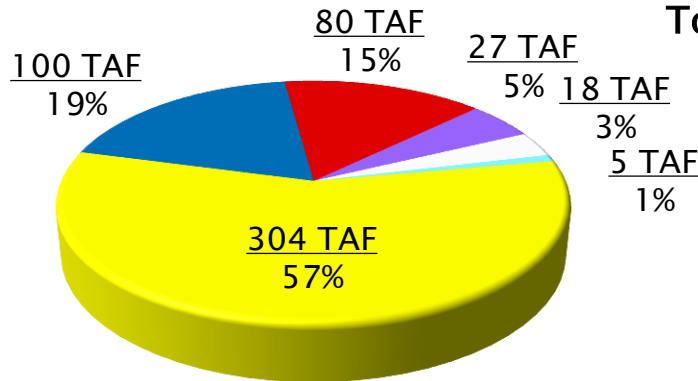
Total = 578 TAF

Estimated 2020



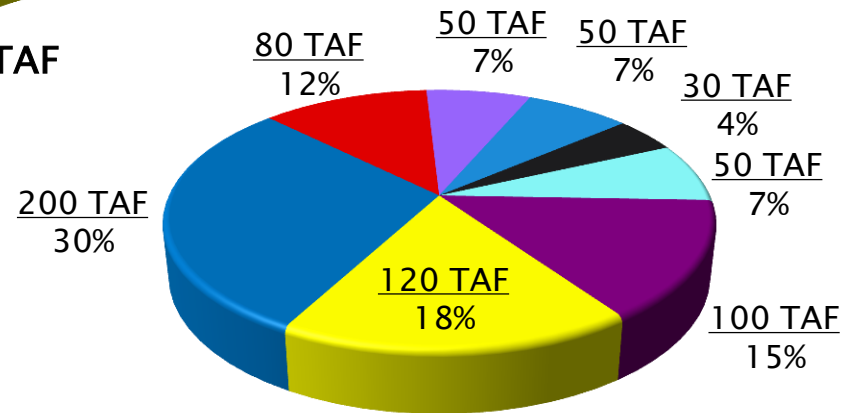
Total = 587 TAF

2015

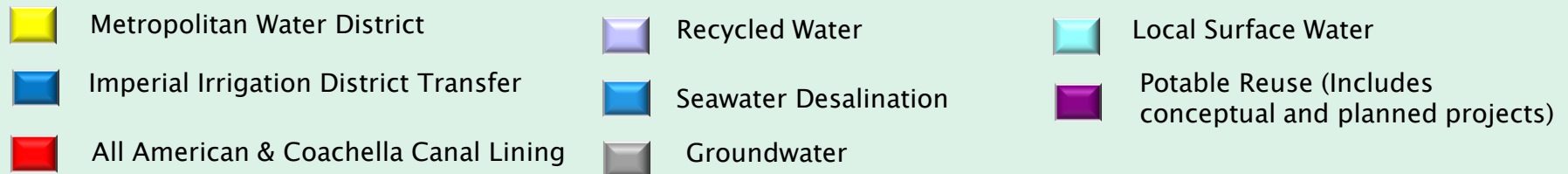


Total = 534 TAF

Projected 2035



Total = 680 TAF



TAF=Thousand Acre-Feet

Project Permitting

- ☑ City of Carlsbad - Environmental Impact Report
- ☑ City of Carlsbad - Local Land Use Permits
- ☑ Regional Water Quality Control Board - NPDES Permit
- ☑ Department of Drinking Water - Drinking Water Permit
- ☑ State Lands Commission – Jetty Lease
- ☑ CA Coastal Commission - Coastal Development Permit

Landmark Water Purchase Agreement between the Water Authority and Poseidon

- Water Authority Board approved WPA on Nov 29, 2012
- Outlines commercial and financial terms for production and delivery of water from the Carlsbad Desalination Project
- Transfers risk to private developer
 - Permitting
 - Design liability
 - Cost overruns
 - Operations
 - Must meet water quality requirements



Water Authority/Poseidon Responsibilities

- Poseidon:

- Permit, Design and Build the Desal Plant
- Permit, Design and Build the Conveyance Pipeline (design-build agreement)
- Own, operate and maintain the Desal Plant
- Supply Product Water that meets water quality requirements

- Water Authority:

- Timely Construction of Required Aqueduct Improvements
- Own, operate and maintain the conveyance facilities
- “Take or Pay” for Product Water if it meets specifications (minimum commitment of 48,000 AF/Year)

Total Project Costs

Total Capital Cost

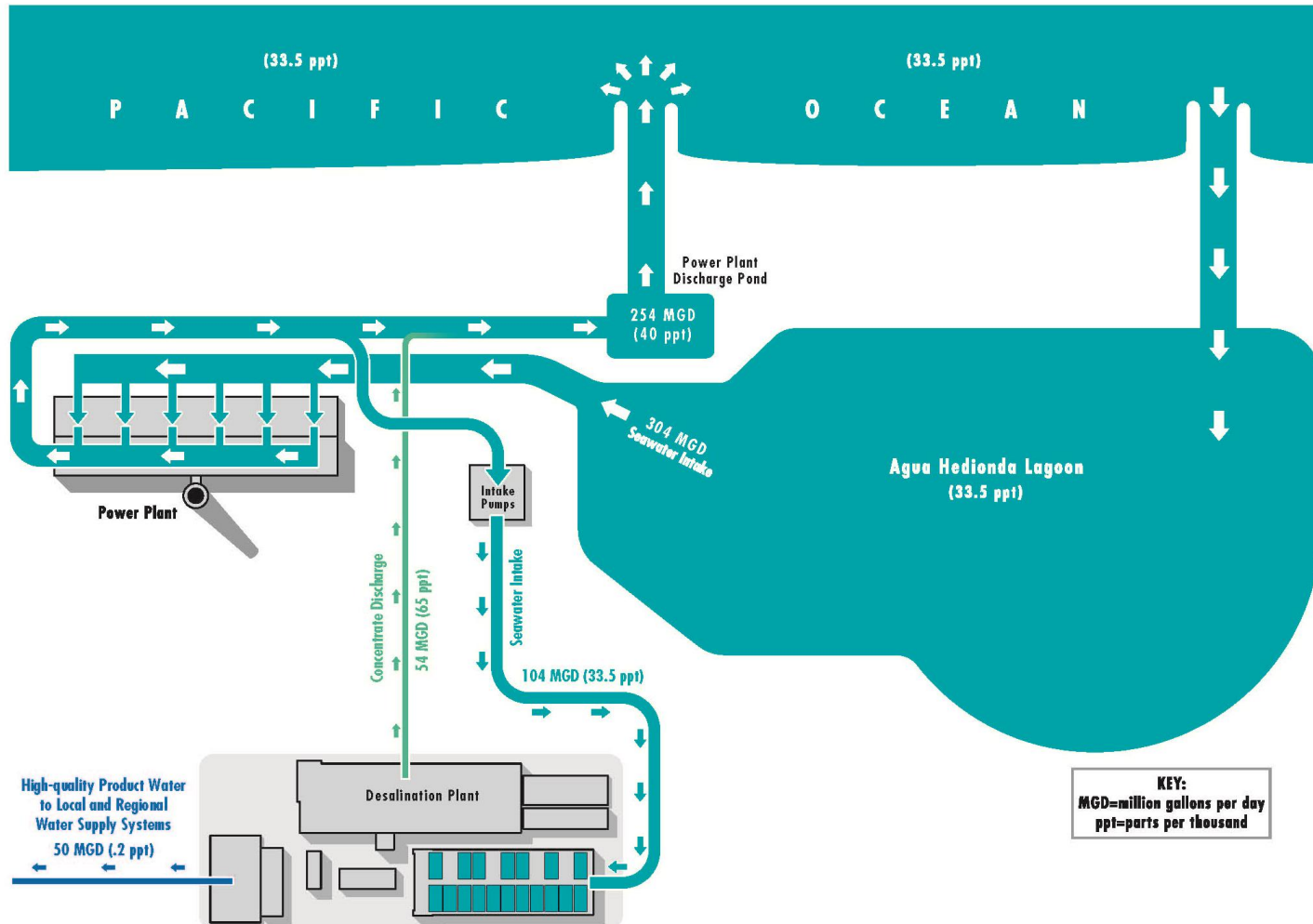
Total desalination plant	\$537 million
Total conveyance pipeline	\$159 million
Financing costs	\$227 million
Water Authority improvements and oversight	\$80 million
Total Capital Costs	\$1.003 billion

2016 water purchase price* (includes pipeline)

56,000 acre-feet per year	48,000 acre-feet per year
\$2,131/AF	\$2,367/AF



Existing Flow Schematic

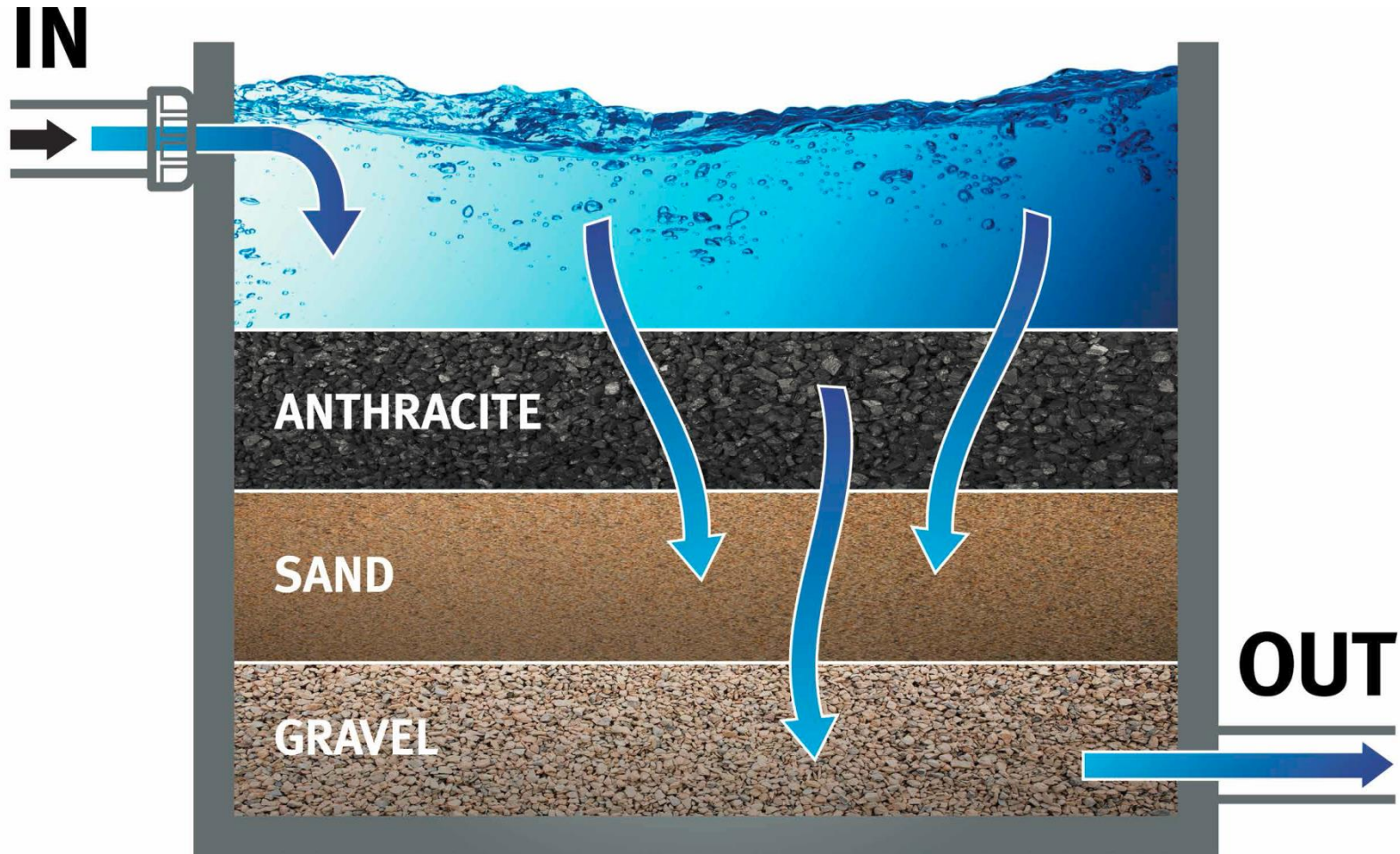




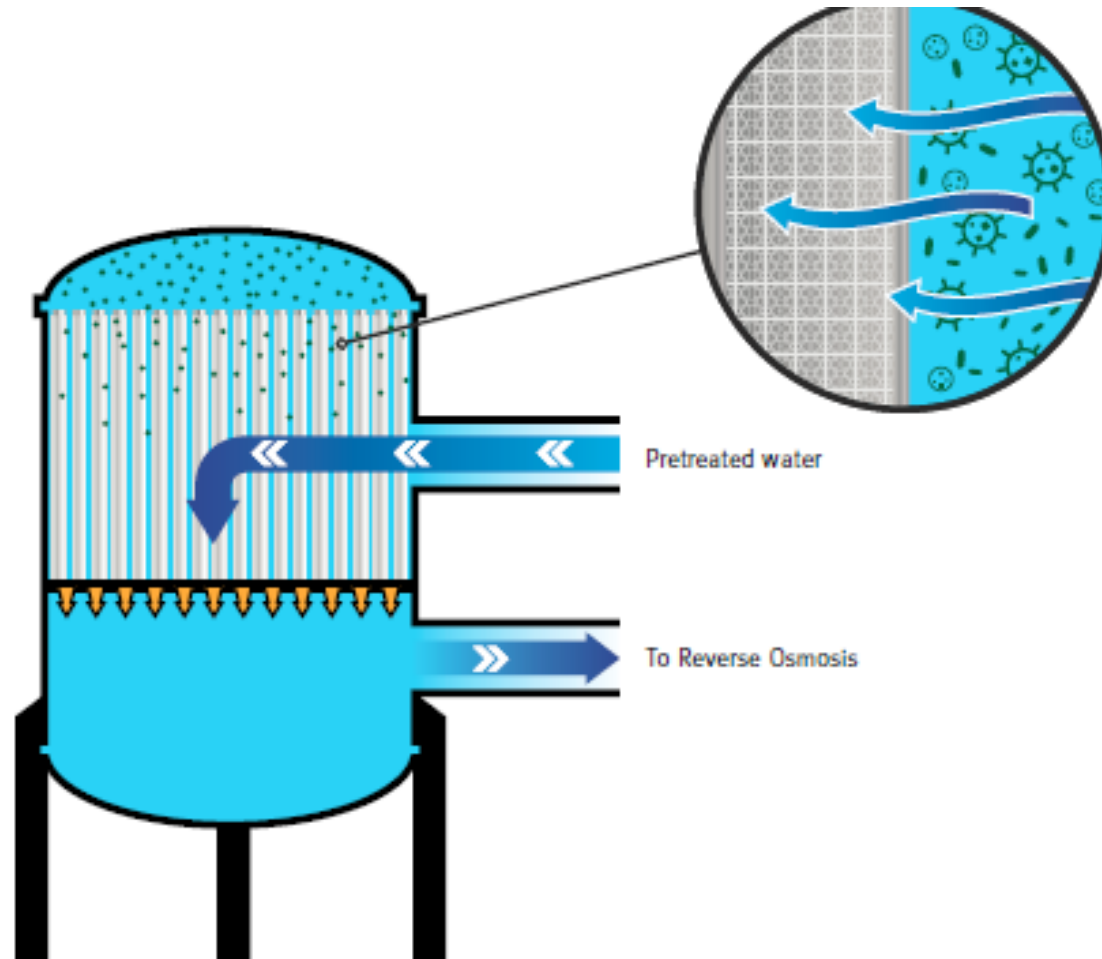
Seawater Feed Line



Media Filter



Cartridge Filter

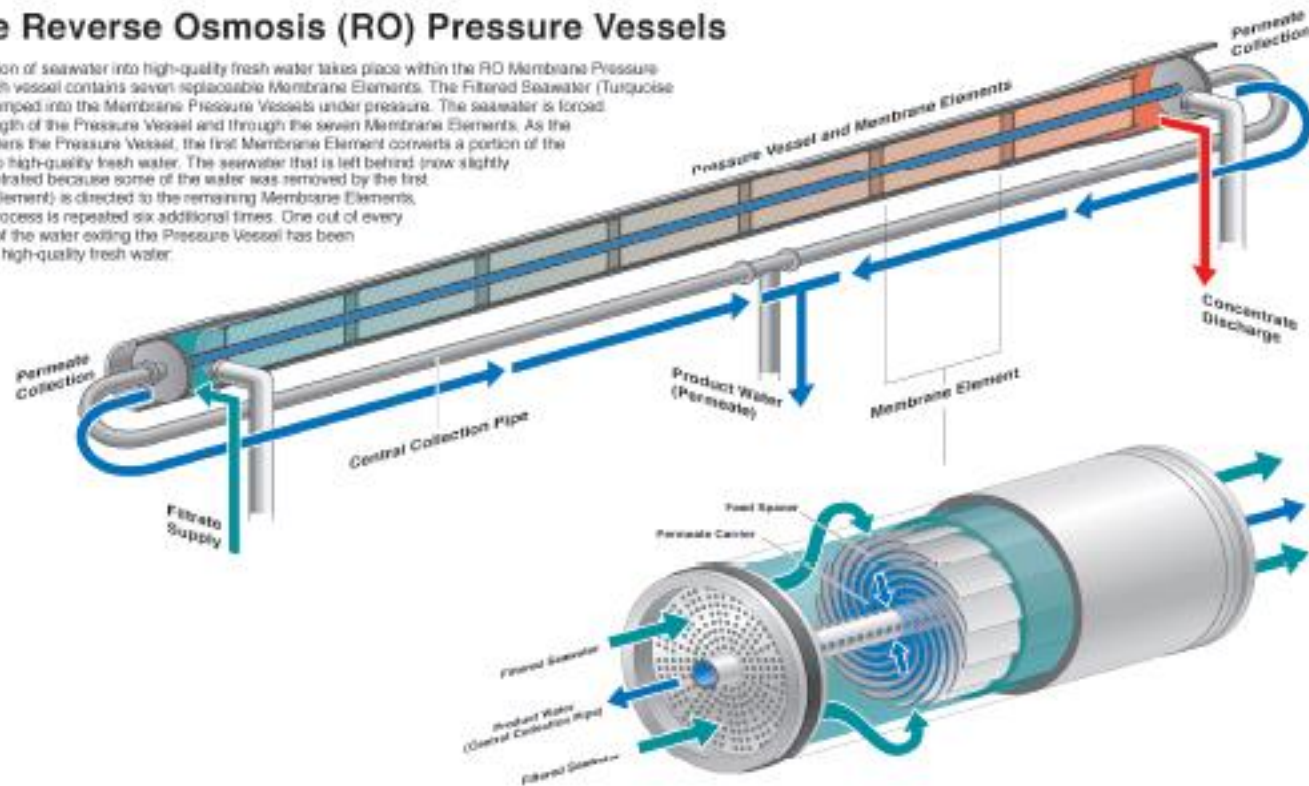




Reverse Osmosis Filter

4-The Reverse Osmosis (RO) Pressure Vessels

The conversion of seawater into high-quality fresh water takes place within the RO Membrane Pressure Vessels. Each vessel contains seven replaceable Membrane Elements. The Filtered Seawater (Turquoise arrow) is pumped into the Membrane Pressure Vessels under pressure. The seawater is forced along the length of the Pressure Vessel and through the seven Membrane Elements. As the seawater enters the Pressure Vessel, the first Membrane Element converts a portion of the seawater into high-quality fresh water. The seawater that is left behind (now slightly more concentrated because some of the water was removed by the first Membrane Element) is directed to the remaining Membrane Elements, where this process is repeated six additional times. One out of every two gallons of the water exiting the Pressure Vessel has been converted to high-quality fresh water.

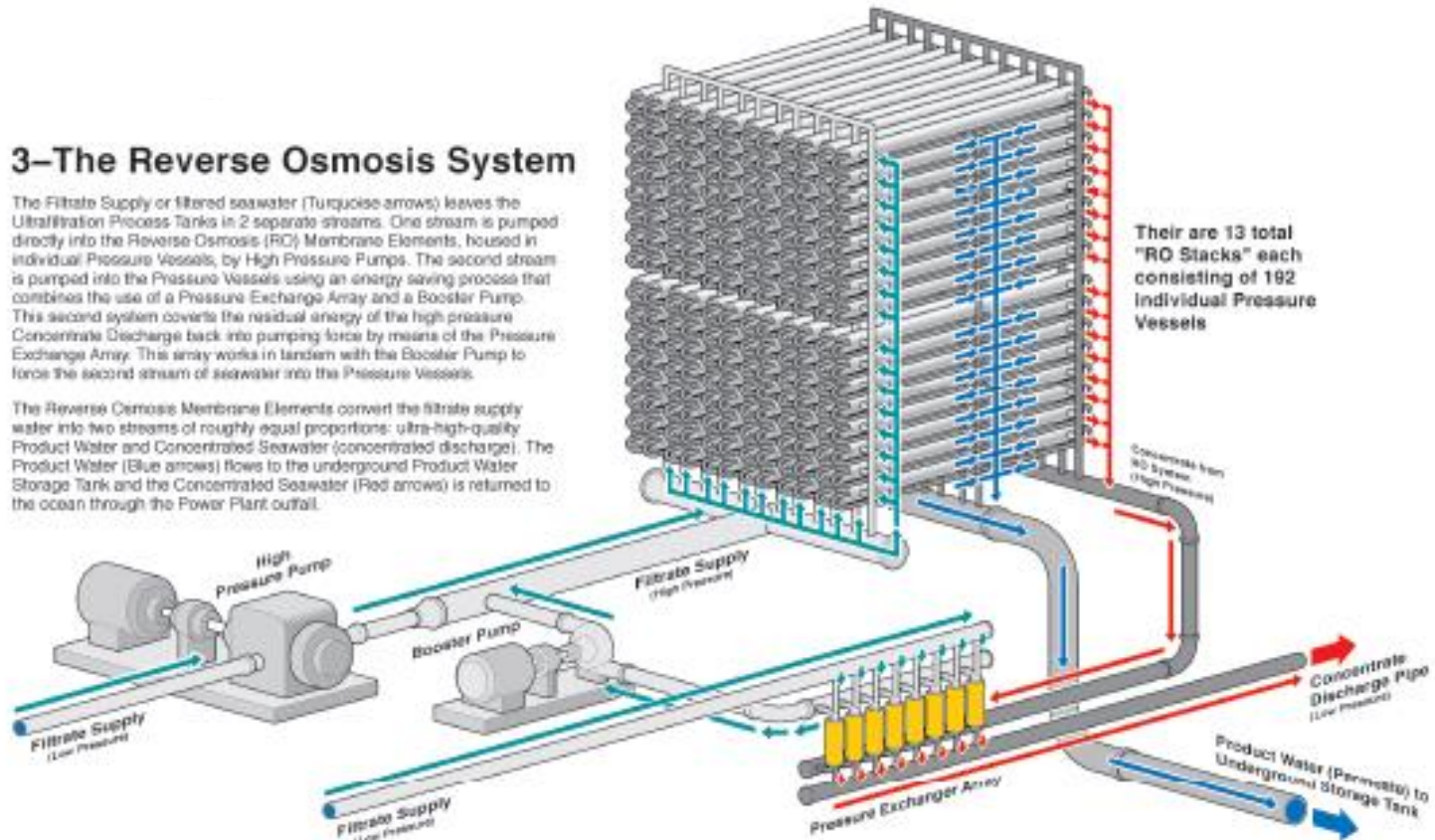


Reverse Osmosis System

3-The Reverse Osmosis System

The Filtrate Supply or filtered seawater (Turquoise arrows) leaves the Ultrafiltration Process Tanks in 2 separate streams. One stream is pumped directly into the Reverse Osmosis (RO) Membrane Elements, housed in individual Pressure Vessels, by High Pressure Pumps. The second stream is pumped into the Pressure Vessels using an energy saving process that combines the use of a Pressure Exchange Array and a Booster Pump. This second system recovers the residual energy of the high pressure Concentrate Discharge back into pumping force by means of the Pressure Exchange Array. This array works in tandem with the Booster Pump to force the second stream of seawater into the Pressure Vessels.

The Reverse Osmosis Membrane Elements convert the filtrate supply water into two streams of roughly equal proportions: ultra-high-quality Product Water and Concentrated Seawater (concentrated discharge). The Product Water (Blue arrows) flows to the underground Product Water Storage Tank and the Concentrated Seawater (Red arrows) is returned to the ocean through the Power Plant outfall.









Water Delivery System





poseidonwater.com

