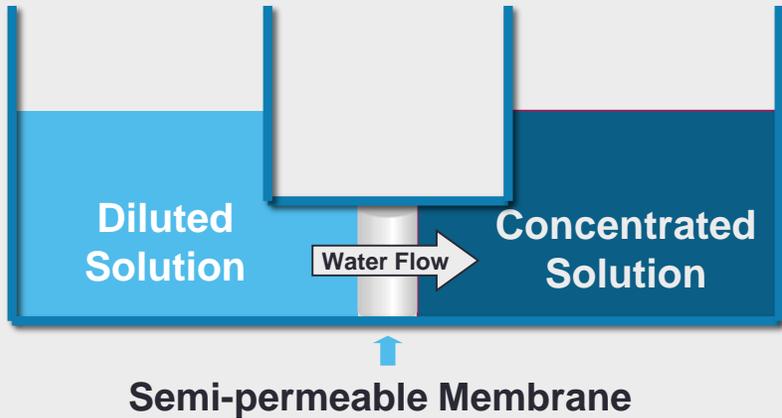




PUBLIC WORKS DEPARTMENT
WATER RESOURCES DIVISION

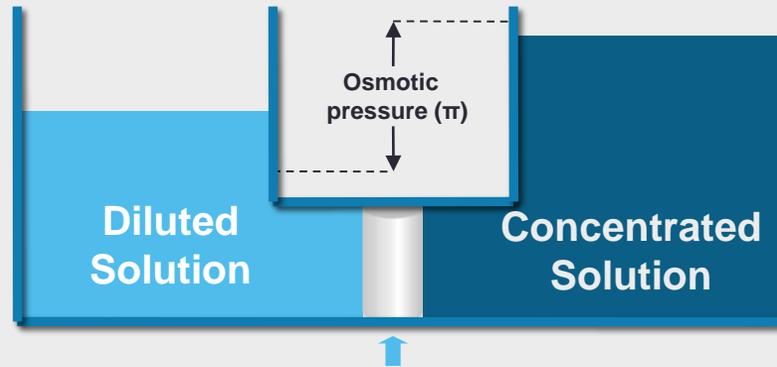
SEAWATER REVERSE OSMOSIS (SWRO)

Reverse Osmosis



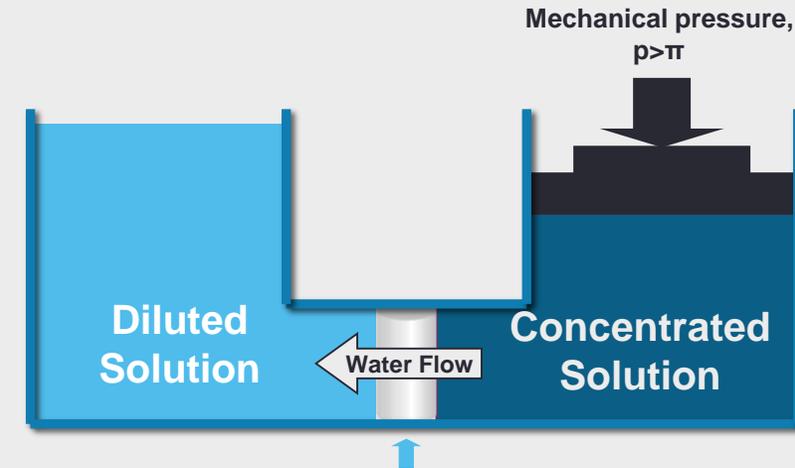
Osmosis

Fluid flows from low to high solute concentrations



Reverse Osmosis

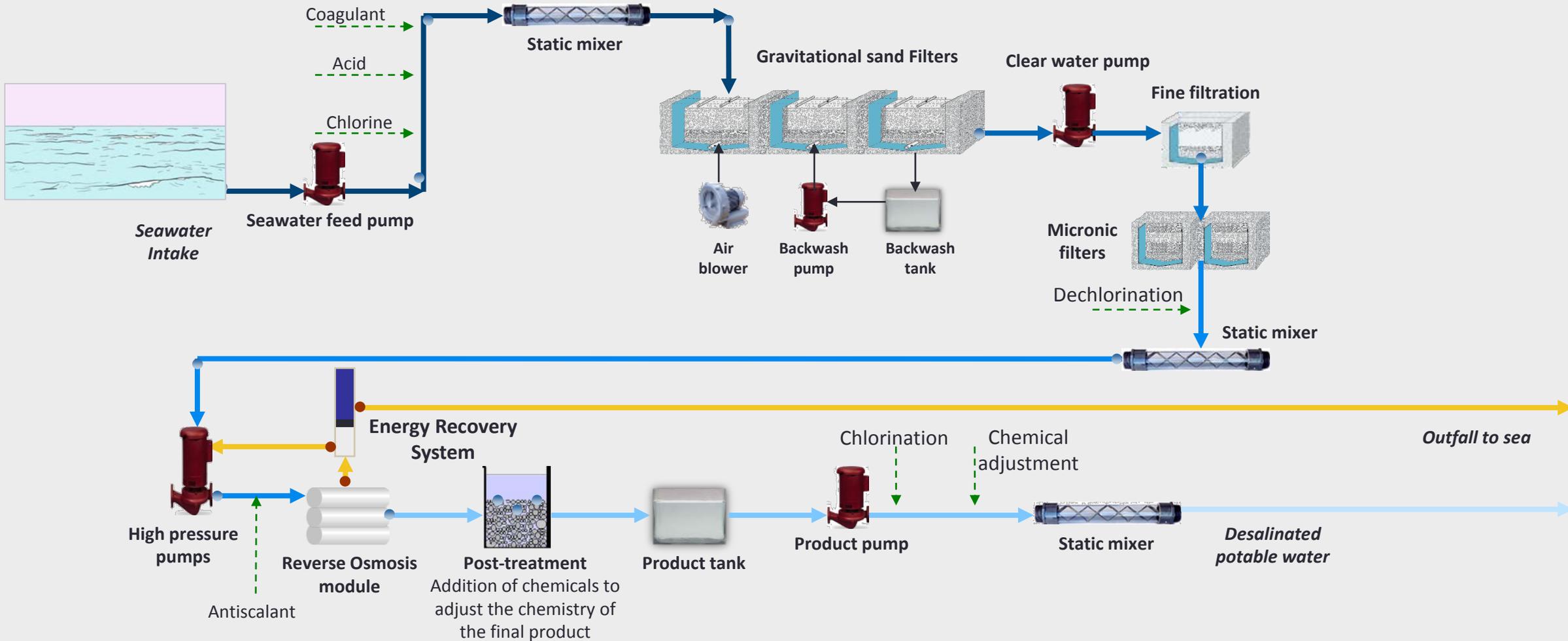
Fluid flows from high solute concentration through a semipermeable membrane to a region of low solute concentration



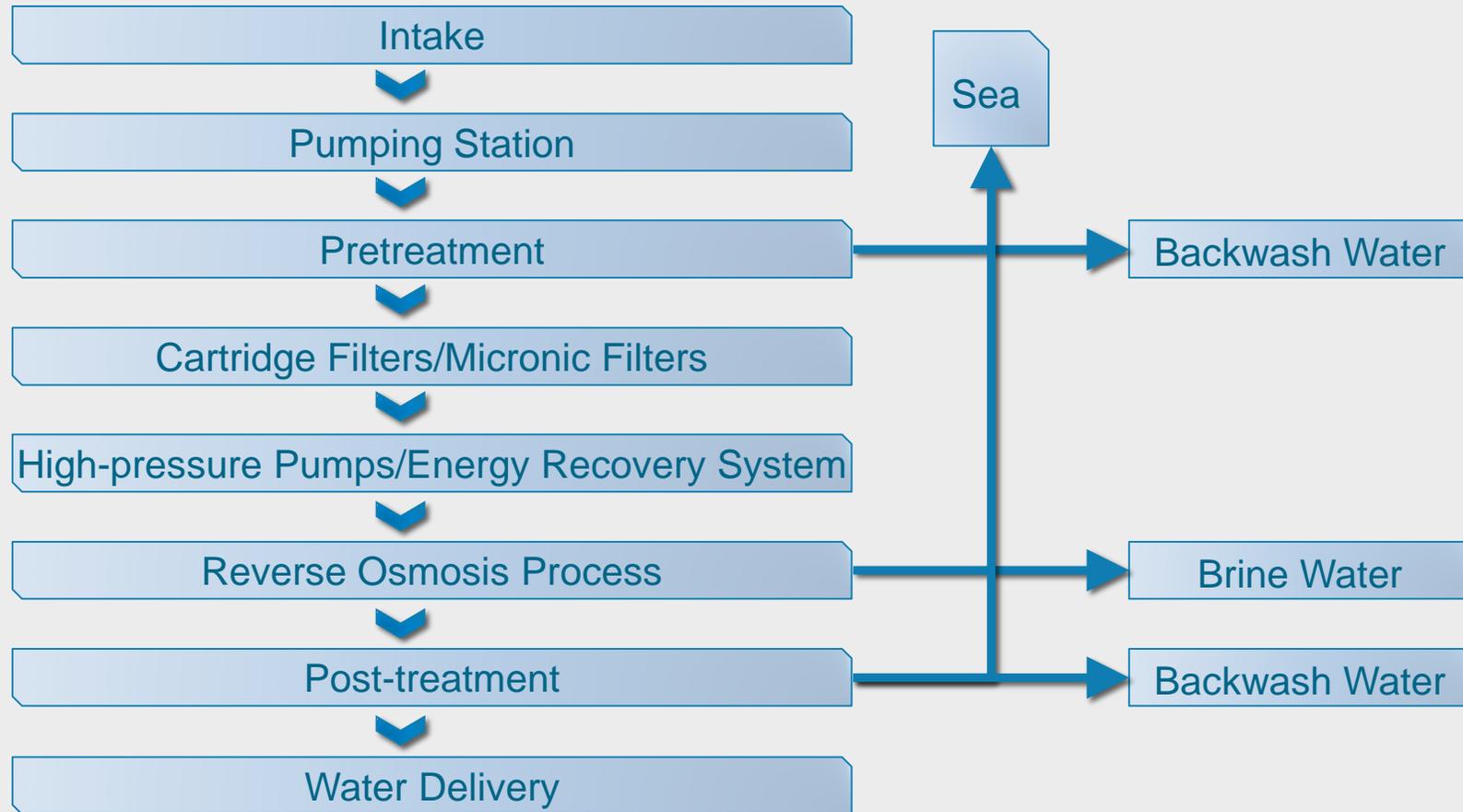
How?

By applying a pressure in excess of the osmotic pressure

Typical RO Desalination Process



Simplified RO Process Diagram



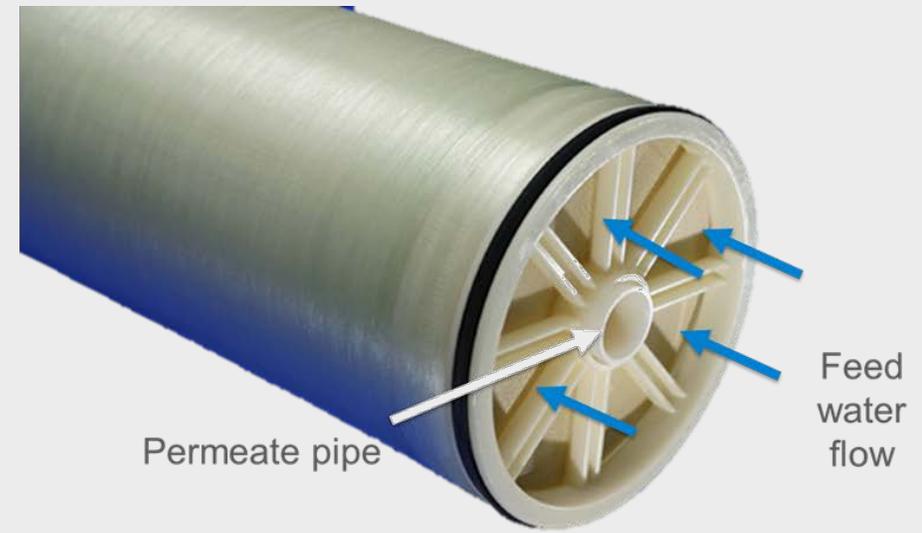
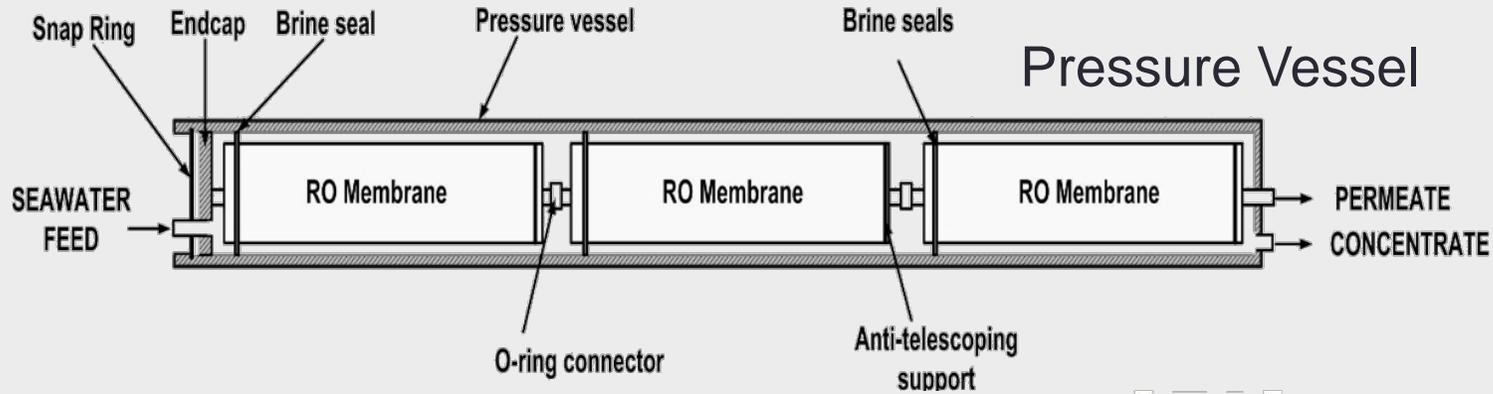
Reverse Osmosis

- Reverse osmosis is the finest level of filtration available
- The RO membranes act as a barrier to all dissolved salts and inorganic molecules, as well as organic molecules with molecular weight greater than approximately 100
- Water molecules pass freely through the membranes creating a purified product stream
- Rejection of dissolved salts is typically 95% to greater than 99%

Terminology

- **Recovery** – the percentage of membrane system feed water that emerges from the system as product water or “permeate”
- **Rejection** – the percentage of solute concentration removed from the system feed water by the membrane.
- **Passage** – the opposite of “rejection”, passage is the percentage of dissolved constituents (contaminants) in the feed water allowed to pass through the membrane
- **Permeate** – the purified product water produced by a membrane system.
- **Flux** – the rate of permeate transported per unit of membrane area, usually measured in gallons per square foot per day (gfd) or liters per square meter per hour ($1\text{mh}=1/\text{m}^2/\text{h}$).

RO Membrane



Anti-telescoping instrument