

2015 Multi-State Salinity Coalition Salinity Summit

***Desalination in the United States:
An International Perspective***

Tom Pankratz – Houston Texas – 19 February 2015

49 years of Reverse Osmosis

1st BWRO, California – 1966

source: Dave Laker



source: UCLA



1st SWRO, Bermuda – 1974

Global Installed RO Capacity



- 14,440 RO plants produce 16,075 MGD
 - 10,340 BWROs produce 8,400 MGD
 - 4,100 BWROs produce 7,675 MGD

source: DesalData.com, Feb 2015

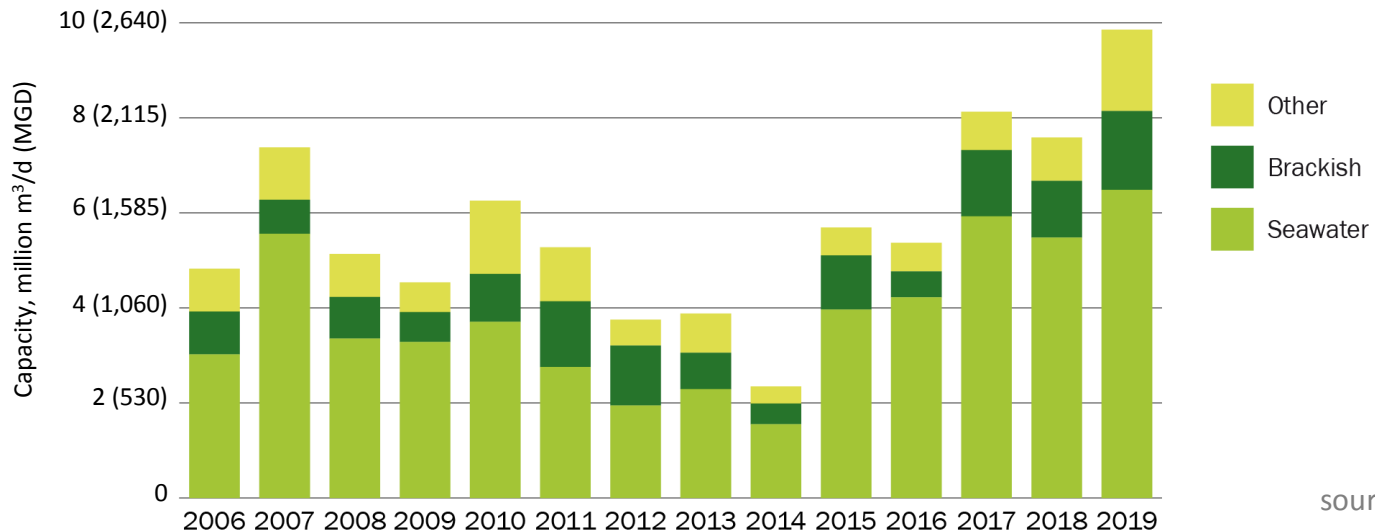
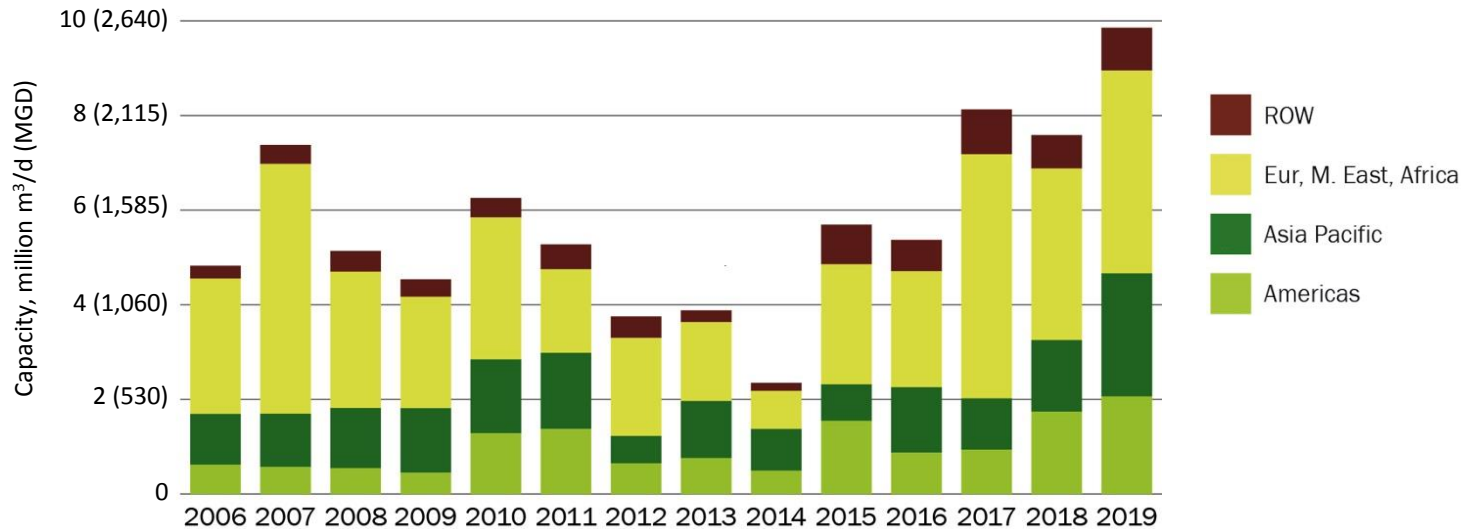
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- 14,440 RO plants produce 16,075 MGD
 - 10,340 BWROs produce 8,400 MGD
 - 4,100 BWROs produce 7,675 MGD
 - **US: 2,114 BWROs produce 2,445 MGD**
 - **ROW: 8,227 BWROs produce 5,955 MGD**
 - **US: 15 SWROs produce plants 105 MGD**
 - **ROW: 4,085 SWROs produce 7,570 MGD**

source: DesalData.com, Feb 2015

RO Regions, Feedwater, Forecast



source: DesalData.com

RO Technology Issues: US vs ROW



Issue	BWRO		SWRO	
	US	ROW	US	ROW
Energy efficient	Moderate	Low	High	High
CHG	Increasing	n/a	Moderate to high	Low to moderate
Concentrate discharge	High	Moderate	Low to moderate	Low to moderate
Intake	Low to moderate	Low	Onerous	Increasing
Co-location	Only with industrial projects	Primarily on industrial projects	Increasingly uncommon	Common
Plant capacity	Low-medium	Low-medium	Modest to large	Small to very large
Water costs	Moderate	Moderate	Significantly higher	Higher

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RO Development Issues: US vs ROW



Issue	BWRO		SWRO	
	US	ROW	US	ROW
Need	Rapid growth	Moderate growth	Localized insurance strategy	Necessary in many areas
Projects under Development	Increasing	Increasing	Few	Moderate
Development Timeline	Accelerating	Moderate	Very long	Moderate
Permitting difficulty	Improving	Low	Poorly defined, inconsistent	Somewhat standardized
Project delivery	DBB, DB, BOT	DB, DBO	DBO, PPP	DBO, PPP
Political Opposition	Moderate	Low	Moderate to high	Low in most areas
Environmental opposition	Moderate	Low	High to very high	Moderate

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US Seawater Desal Plants



- 25 MGD Tampa Bay Water, Florida
- 2 MGD Stock Island, Florida
- 1 MGD Marathon, Florida
- 54 MGD Carlsbad, California*
- 6 MGD Corpus Christi, Texas**
- 9.6 MGD Monterey, California**
- 2.8 MGD Santa Barbara, California**

* under construction ** permitted/under development

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- When done right, it's usually competitive with other options
- BWRO (and SWRO) provide municipalities with a safe, local, weather-independent supply option
- In a growing number of locations: it's the only option