

# IRWD Investigations of Water Quality Impacts of Proposed Huntington Beach Seawater Desalination Project

California Regional Water Quality Control Board  
Santa Ana Region  
*December 6, 2019*



## Presentation Agenda

1. Background on Irvine Ranch Water District
2. Need for Huntington Beach Seawater Desalination Project (HBDP)
3. IRWD Investigations of water quality impacts
  - IRWD potable water
  - IRWD recycled water
  - Orange County Groundwater Basin
3. Conclusions
4. Recommendations

## IRWD Services



### Drinking Water

5 water treatment plants  
27 Wells and 36 reservoirs  
1760 miles of water pipeline

### Sewage Collection

1070 miles of collection pipeline

### Recycled Water

2 recycled water plants  
525 miles of recycled water pipeline

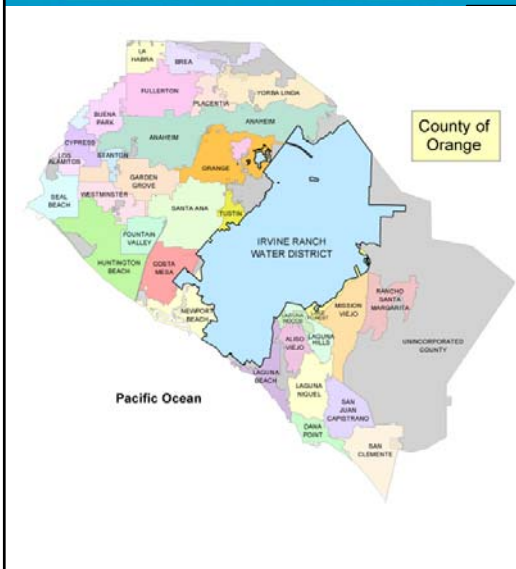
### Urban Runoff Treatment

IRWD San Joaquin Marsh  
27 wetland treatment sites

Irvine Ranch Water District

3

## Irvine Ranch Water District Service Area



### 6 Cities

Irvine  
Lake Forest  
Tustin  
Newport Beach  
Orange  
Costa Mesa  
Unincorporated Orange County

### 20% of Orange County

IRWD covers a large portion of central Orange County

### 181 square miles

Size of District

Irvine Ranch Water District

4

## Need for Huntington Beach Desalination Project

- IRWD has invested in its own projects to ensure water supply reliability
- There are no shortages of lower cost supplies to replenish the groundwater basin
- MWDOC demonstrated that cost effective alternatives are available
- No retail water agency has committed to purchase water from the project
- Orange County Water District will have to recharge the product water
  - Space is not available in the Orange County Groundwater Basin
  - Between \$200 and \$300 million in capital would be needed for new injection and production wells
  - IRWD and others would be forced to pay for water they do not need

**Participation in the Project should be voluntary.**

## IRWD Water Quality Technical Investigations

- IRWD retained 3 highly qualified firms:
  - Thomas Harder & Co. (Hydrogeologic Modeling)
  - HDR (Salt Balance Modeling)
  - Trussell Technologies (Boron Removal Modeling)
- Water quality impacts of HBDP were quantified:
  - IRWD potable and recycled water
  - Orange County Groundwater Basin
- Distribution methods
  - Direct deliveries
  - Groundwater recharge

## Water Quality from HBDP Product Water

Constituent	OCWD & Poseidon Term Sheet		Actual Poseidon Carlsbad Desalter <sup>1</sup>		Used in IRWD Investigations (mg/l)
	Avg (mg/l)	Max (mg/l)	Avg (mg/l)	Max (mg/l)	
TDS	350	500	217	333	150
Chloride	75	100	74	118	75
Boron	0.75	1.0	0.61	0.92	0 to 1.0

1/ Vallecitos Water District 2018 Water Quality Report

## Water Quality Impacts to IRWD Supplies

Constituent	Product Water Distribution Method	IRWD Recycled Water	IRWD Potable Water
TDS	Recharge	Improvement	Improvement
	Direct Delivery	Improvement	Improvement
Chloride	Recharge	Improvement	Improvement
	Direct Delivery	Significant Impacts	Less Than Significant
Boron	Recharge	Significant Impacts	Less Than Significant
	Direct Delivery	Significant Impacts	Significant Impacts

**Boron was identified as the controlling constituent requiring additional treatment.**

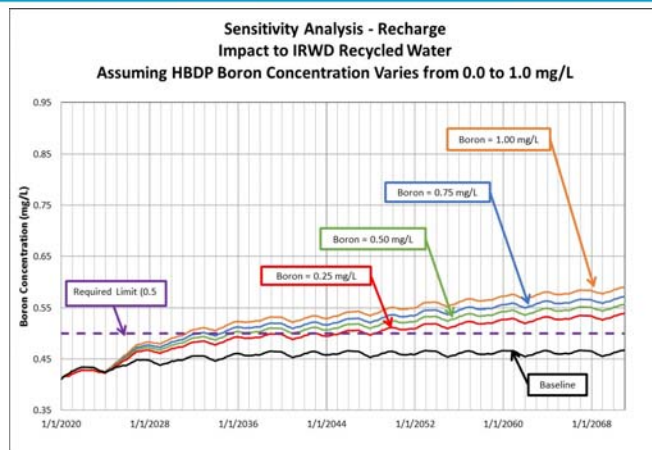
## Boron Impacts on Plants

- High levels of Boron (as low as 0.8 mg/l) causes stunted growth
- Citrus, fruit trees and most vegetables sensitive to Boron; lower productivity
- Sensitive ornamental plants:
  - Concentrations < 0.5 mg/l:
    - Photinia
    - Bird of Paradise
    - Juniper
    - Yellow sage
  - Concentrations between 0.5 and 1.0 mg/l:
    - Rosemary
    - Geranium
    - Zinnia



**IRWD has set a Boron limit = 0.5 mg/l**

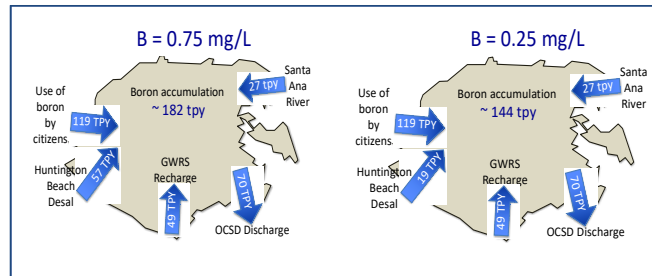
## Impacts to IRWD Recycled Water Supplies



**Notes:**  
80% full 2<sup>nd</sup> pass Reverse Osmosis treatment required to reduce boron in HBDP product water to less than 0.25 mg/l (Source: Trussell Technologies).

## Boron Accumulation in Groundwater Basin

HBDP Boron concentrations of 0.75 and 0.25 mg/l were evaluated



Source: Trussell Technologies (Appendix C)

### Notes:

1. Boron is accumulating in the Basin every year.
2. 100 % full 2<sup>nd</sup> pass Reverse Osmosis treatment required to avoid further degradation of the Groundwater Basin.

## Conclusions: HBDP Intake and Brine Discharge

- **Proposed HBDP**
  - Intake = 106.7 MGD
  - Brine discharge = 56.6 MGD
- **To avoid impacts to IRWD Recycled Water**
  - Intake = 127 MGD
  - Brine discharge = 77 MGD
- **To avoid increased Boron accumulation in the Basin**
  - Intake = 131 MGD
  - Brine discharge = 81 MGD

## Recommendations

- Defer consideration of Permit renewal until:
  1. Water agencies willing to take delivery and pay for HBDP product water are identified;
  2. OCWD has prepared a distribution plan;
  3. Integration studies have been completed;
  4. Compatible water quality specifications have been prepared to avoid impacts;
  5. Preliminary designs have been completed;
  6. Final intake and brine discharge requirements are known;
  7. Adequate CEQA review has been completed of the distribution plan and the required intake and brine discharge facilities.

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