

# **Voluntary Occurrence Monitoring for Contaminants of Emerging Concern**

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# Contaminants of Emerging Concern (CEC)

- Range of unregulated substances that have been historically present in the environment in very small amounts.
- Recent scientific interest shows presence in streams and rivers due to domestic wastewater discharges and the potential to impact aquatic life.
- Categories of these substances have expanded beyond pharmaceuticals and personal care products such as detergents, artificial sweeteners, industrial chemicals and flame retardants.



# Historical Monitoring in 2008-09

- Monitoring for pharmaceuticals and personal care products first occurred in 2008 with the addition of surface water treatment for drinking water.
- Parameters tested at 5 locations in the both the drinking water and wastewater treatment systems.
- Overall results showed that of 113 substances tested for 9% were detected and as expected higher concentrations found at wastewater locations.



# Monitoring Parameters in 2018-19

- Same 113 contaminants tested as previously based on 2 EPA laboratory methods (1694, 1698); primarily pharmaceuticals and personal care products.
- Addition of sucralose, the non-caloric artificial sweetener (brand name *Splenda*) because it is persistent through the human body and treatment processes.







# 2018 Monitoring Locations



# Monitoring Location Details

Monitoring Location	Sample Point ID	Description
Alameda Non-Potable Pump Station (Northside Reuse) (before chlorination)	North Reuse	River water after bank filtration, before chlorination. Used for municipal irrigation on North side of town.
San Juan-Chama Drinking Water Plant (SJCDWP) Raw Water Pump Station	Rio Grande	River water before any treatment at Drinking Water Treatment Plant.
SJCDWP Source Water	(raw) Drinking-Influent	River water pumped to Drinking Water Treatment Plant after grit removal.
SJCDWP Treated Water (west side pump station)	Treated Drinking Water	Treated drinking water sent to distribution. The field blank was taken at this location.
Manhole at Bosque School	Westside Interceptor	Raw wastewater in area where a future wastewater treatment plant will be constructed.
Tijeras Arroyo Interceptor Line (on Murray Rd west of the South Diversion Channel)	Tijeras Interceptor	Raw wastewater to Tijeras Collector Line downstream of Kirtland Air Force Base (KAFB) property line (KAFB and Sandia Lab contributors). Source for potential future wastewater treatment plant.
Influent to the Southside Water Reclamation Plant (SWRP)	(raw) SWRP Influent	Raw wastewater to SWRP.
Effluent from the SWRP	(treated) SWRP Effluent	Effluent being discharged into the Rio Grande.
SWRP Reuse Water	SWRP Reuse	Tertiary treated effluent used for municipal irrigation on south side of town.



# Seasonality and Frequency

- River flow variation was targeted based on an assessment of the monthly flow data at the USGS river gage at Alameda from 1989-2017.

- Determined target seasons:

Base Flow: January - March

High flow: May - June

Irrigation: July - August

Low flow: September - November



# Quality Assurance and Control

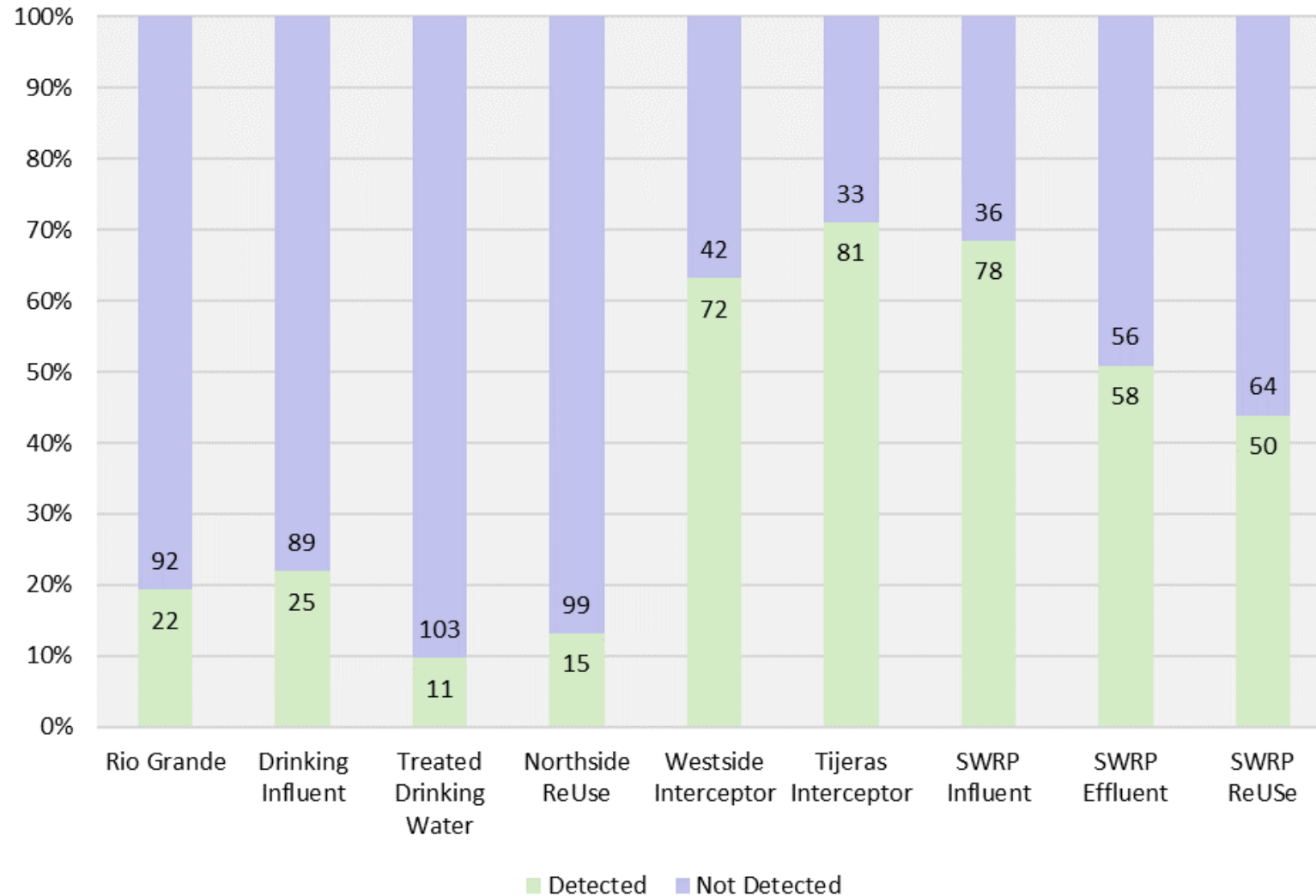
- The monitoring plan was completed to include grab sampling procedures that are used for very low level metals that requires at least two people.
- Field blanks were collected as an additional sample at the treated drinking water location for each event.
- Method blanks are required to be analyzed as part of the laboratory method and sample results corrected with blank detections.





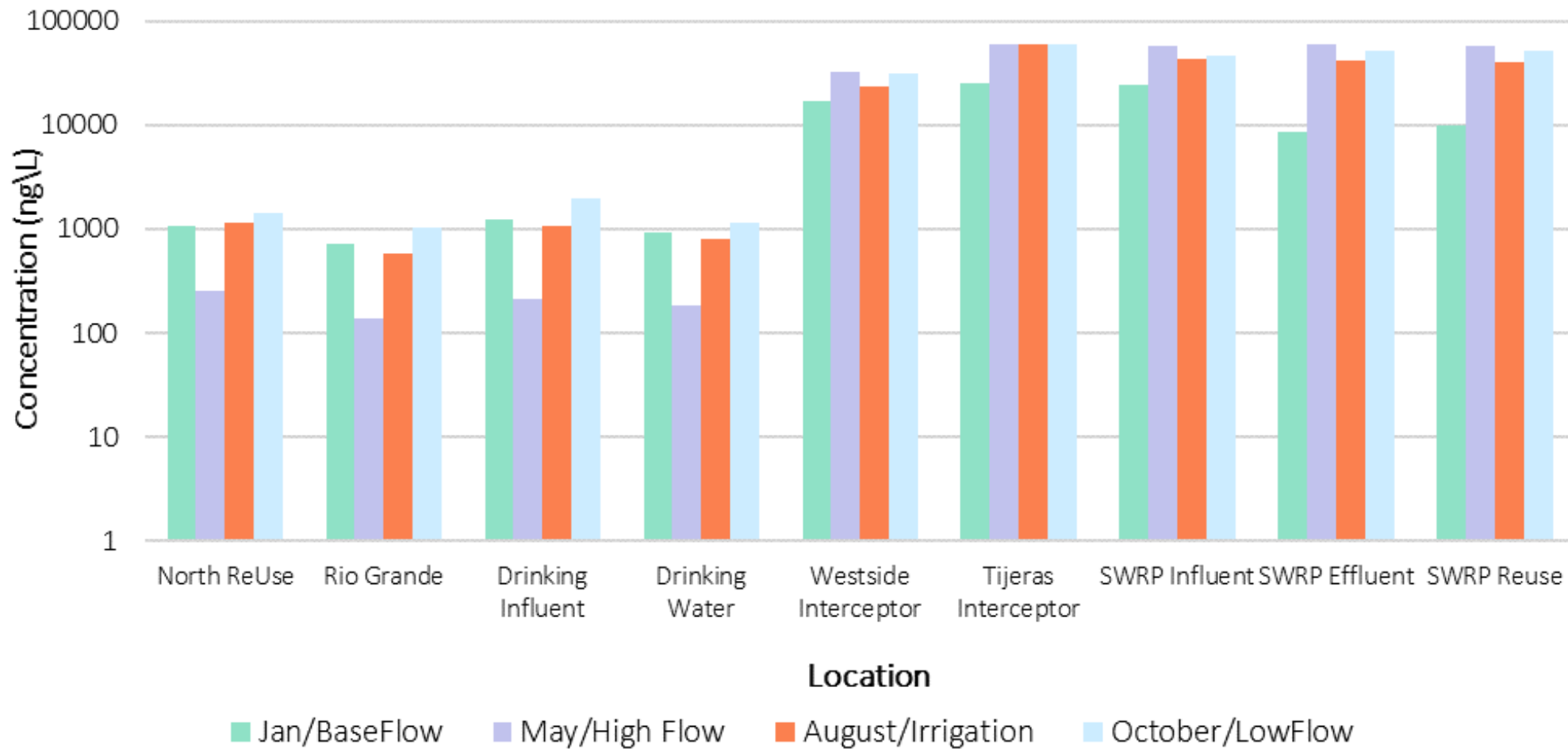
# Overall Findings: Detections at Each Location

## Total Detected CECs

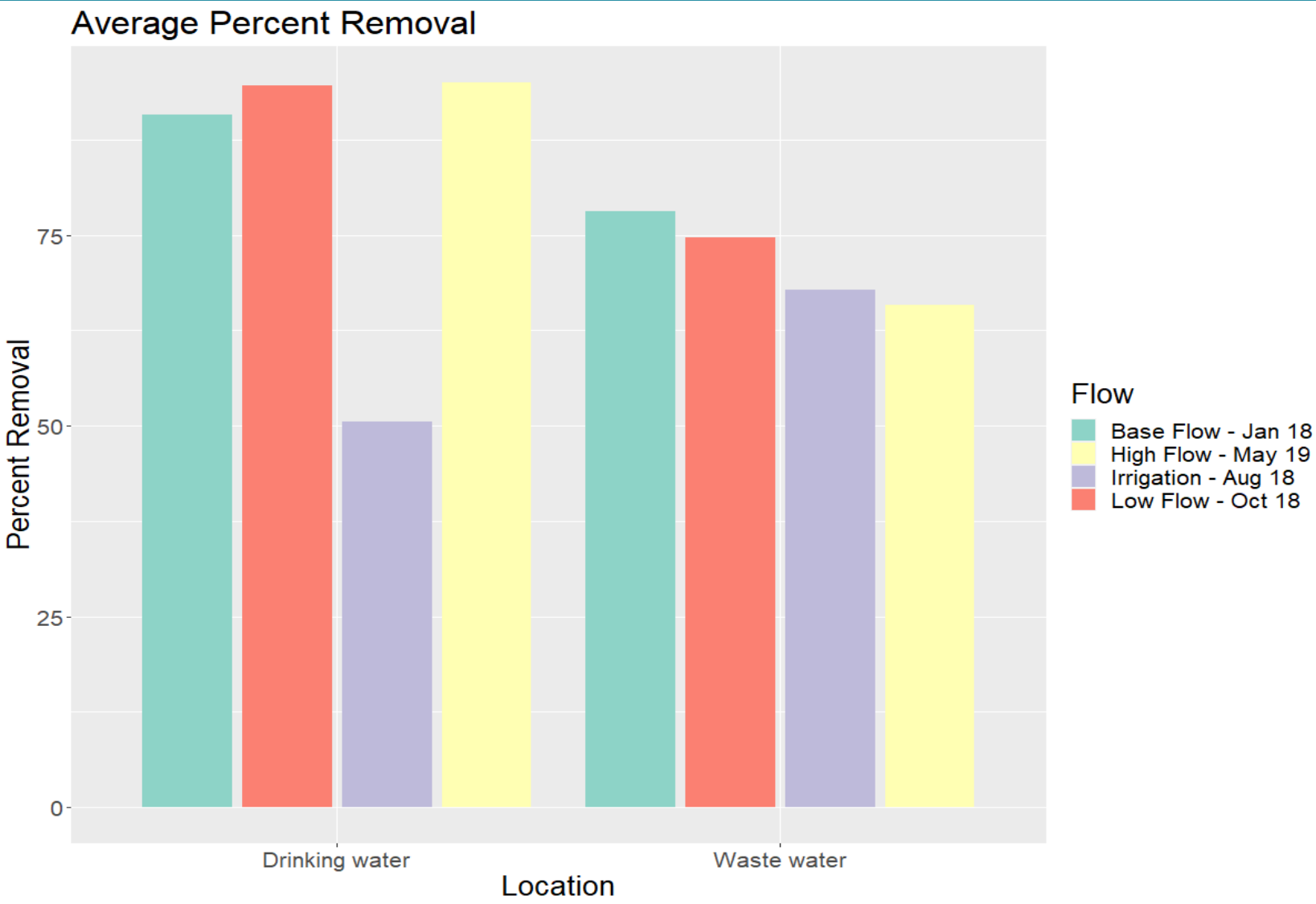


# Sucralose

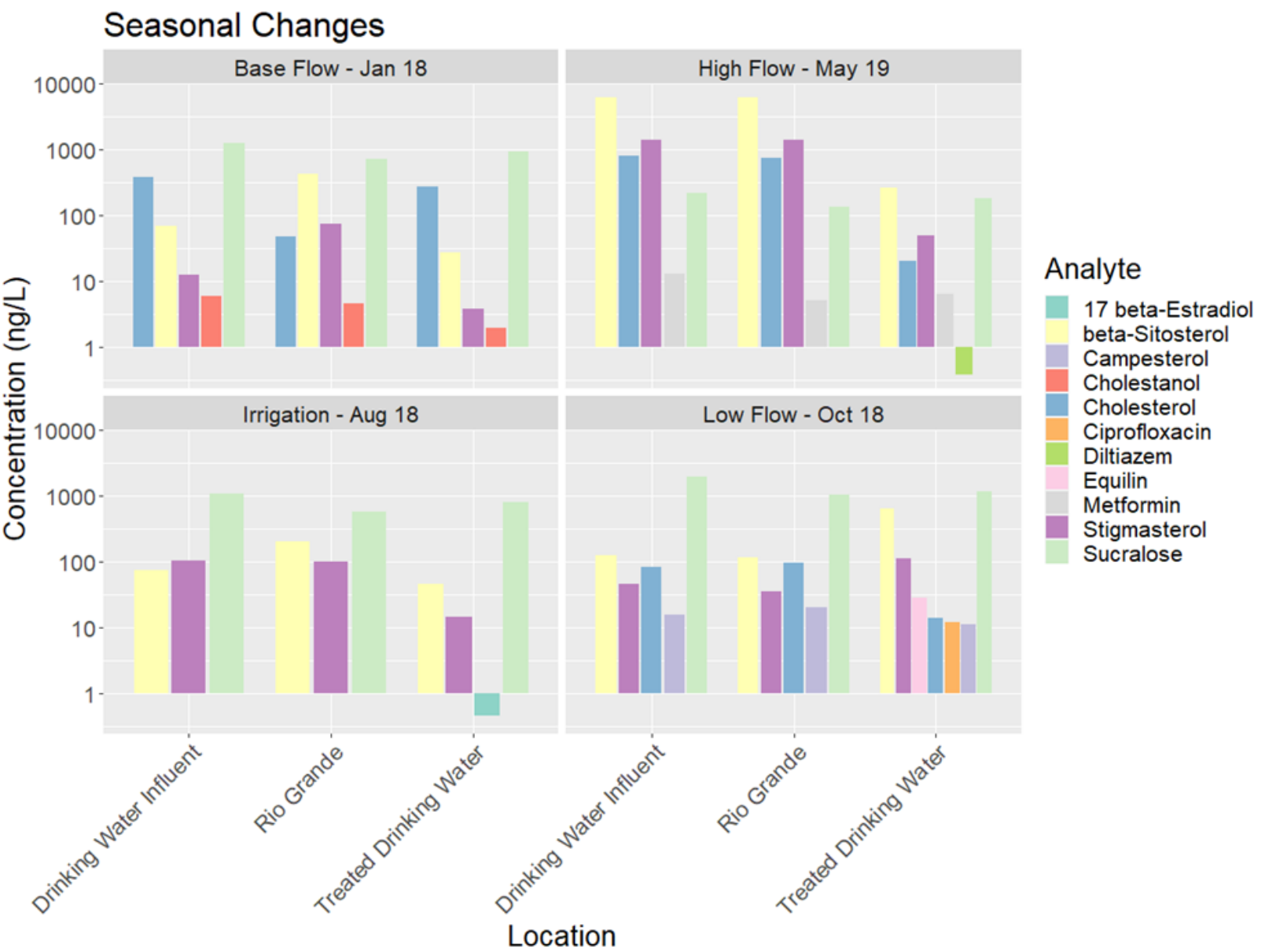
## Sucralose Concentrations



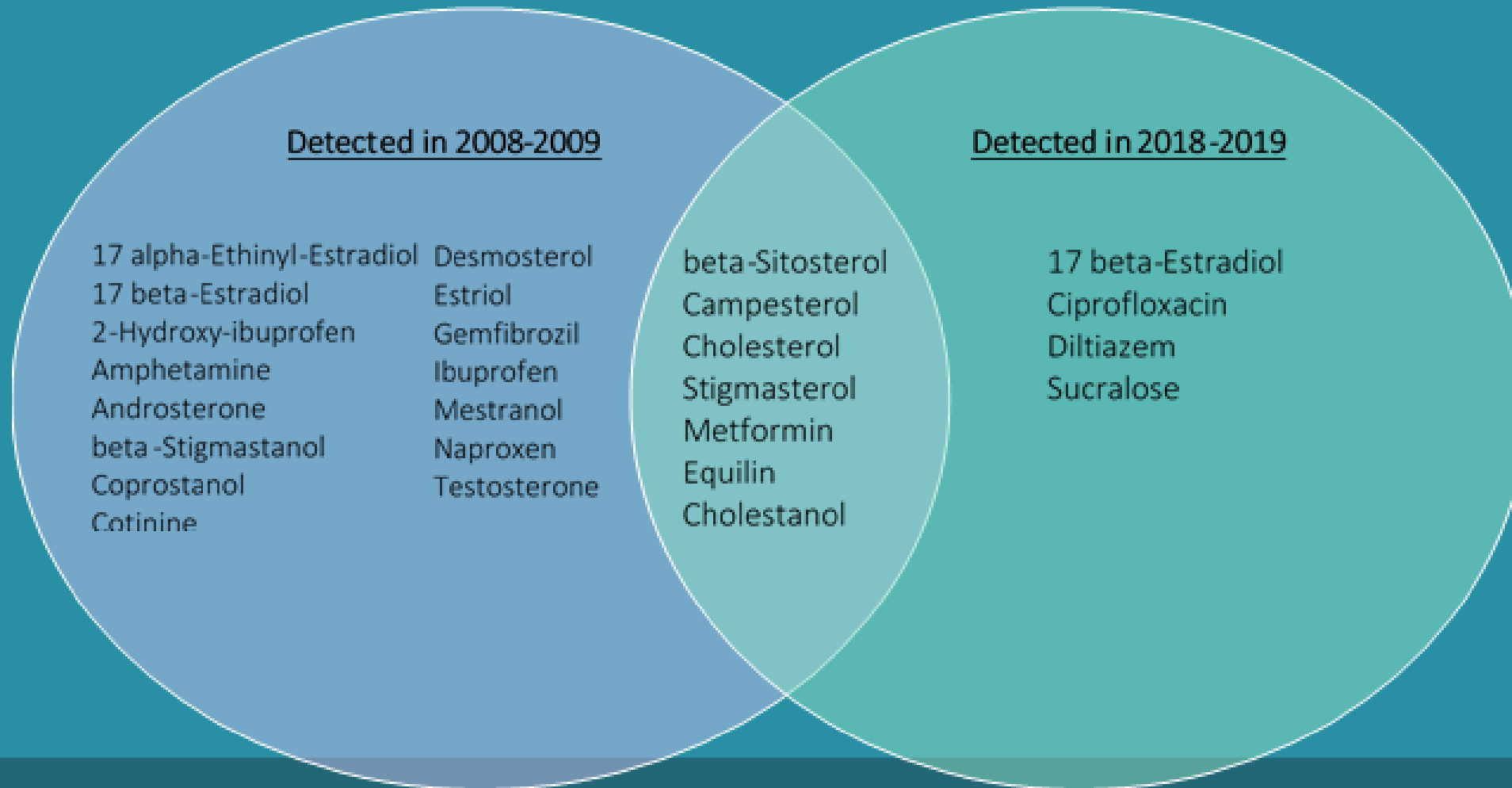
# Effectiveness of Treatment for CEC Removal



# Seasonal Changes in CEC Detections

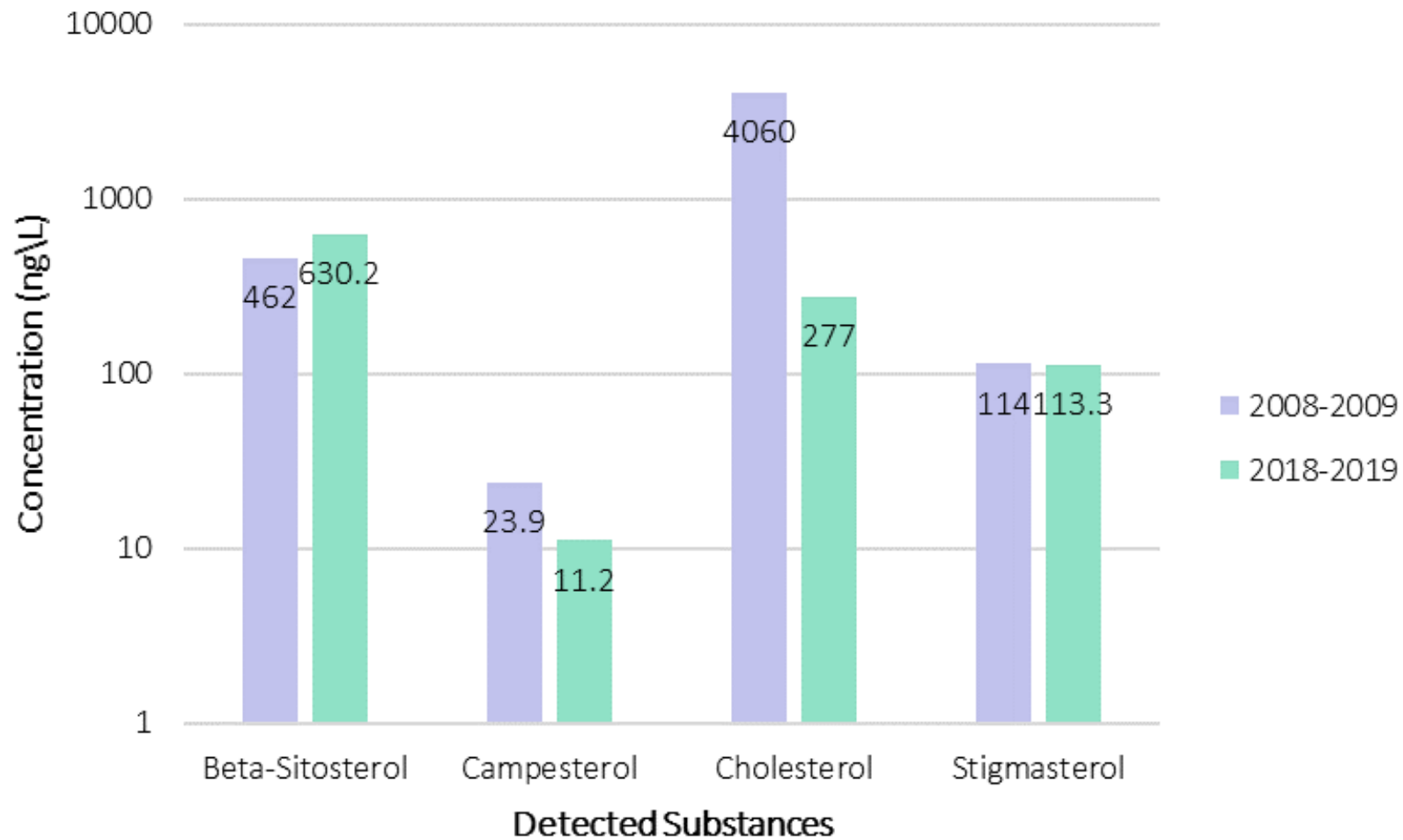


## Drinking Water Detected Substances 2008-2009 and 2018-2019





## Highest concentration in treated drinking water from 2008-9 and 2018-19



# Detections and Human Health

Substance	Classification	Highest Level Detected (ng/L)	Commonly Prescribed Dose or Dietary Intake Amount (mg/day)	Volume of Water Needed to Consume to Meet Prescribed Dose or Dietary Amount		Years of Consumption at Two Liters Daily to Meet One Prescribed Dose
				Liters	Gallons	
17 Beta-estradiol	Reproductive hormone	0.5*	0.5	1,087,000	287,000	1,500
Beta-Sitosterol	Plant sterol	630*	60	95,000	25,000	130
Campesterol	Plant sterol	11	28	2,500,000	660,000	3,400
Cholestanol	Stanol, fecal matter biomarker	2*	1.9	942,000	249,000	1,300
Cholesterol	Animal sterol	277*	200	722,000	191,000	1,000
Ciprofloxacin	Antibiotic	12	1,000	81,300,000	21,500,00	111,000
Diltiazem	Calcium channel blocker and antihypertensive drug	0.4	120	304,600,000	80,500,000	417,000
Equilin	Equine hormone, constituent of HRT drug (Primarin)	28	0.6	22,000	5,900	30
Metformin	Anti-diabetic medication	7	850	129,000,000	34,020,000	176,000
Stigmasterol	Plant sterol	113	28	247,000	65,000	340
Sucralose	Artificial sweetener, sugar substitute	1,170	350	299,000	79,000	410





# Questions?

