Brewing with East Bay Water

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Why do we care about water for brewing beer?

- Beer is >95% water
- Water is like a canvas for a painting; the better the canvas the better the painting *can* be
- Soft water contains few salts (dissolved solids), which is like a blank canvas, but can cause the final beer to taste bland
- Hard water contains lots of salts, which can cause the final beer to taste minerally or harsh
- Most East Bay water is fantastic water for brewing (quite soft)
- Knowing about your water and knowing how to adjust it can potentially lead to a better final beer product

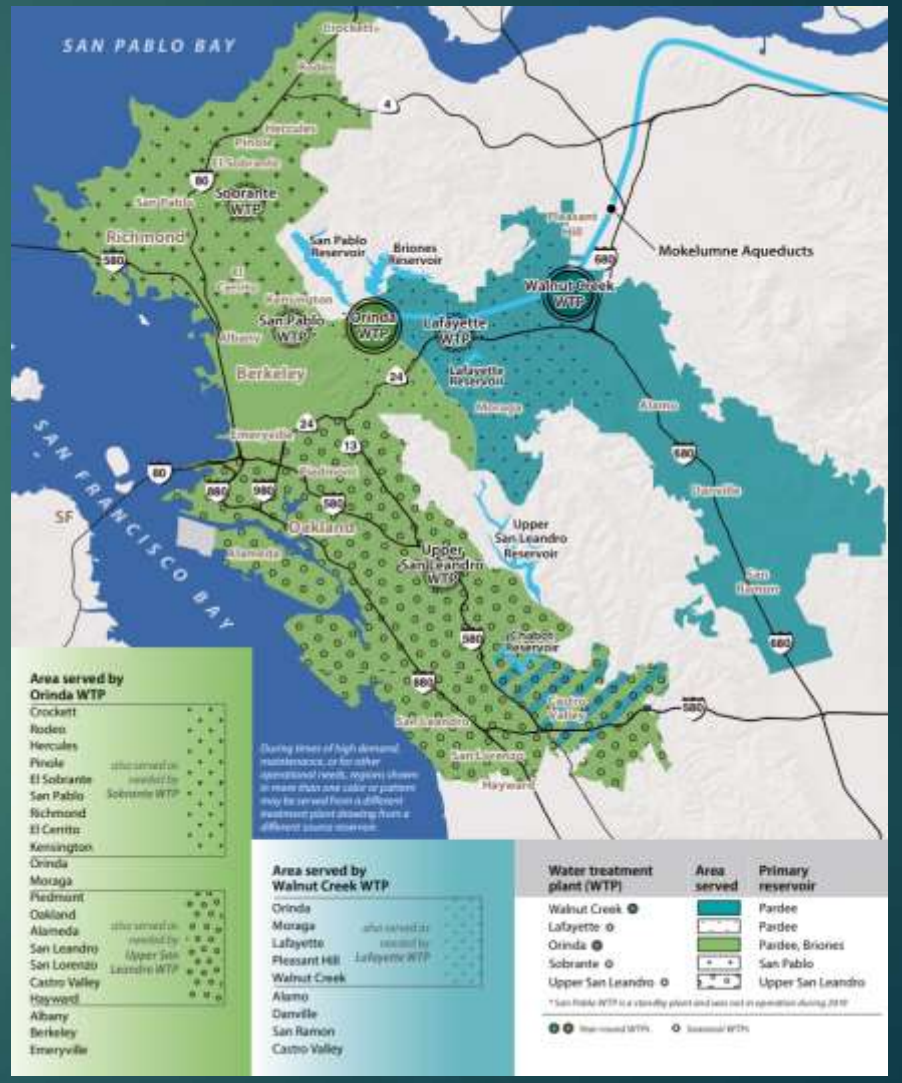
Knowing What's in Your Water

- Municipal water sources publish an annual water report
  - EBMUD just released their 2019 water report
- You can also test your own water
  - TDS Meter (Total Dissolved Solids)
  - LaMotte Water Test Kit
  - Commercial mail-in services

Reading an EBMUD Water Report

2 Regulated for drinking water aesthetics *Secondary MCL (Unit)*	State or federal goal *PHG or MCLG*	Highest amount allowed *MCL*	System average	Water treatment plants: Walnut Creek	Lafayette	Orinda	Sobrante	Upper San Leandro
Aluminum (ppb)	NA	200	<50	<50	<50	<50	<50 – 59	<50
Chloride (ppm)	NA	250	6	3 – 5	3 – 4	4 – 6	13 – 16	16 – 17
Color (color units)	NA	15	1	1	1	1	1	1
Specific conductance (µS/cm)	NA	900	106	54	54	54 – 102	284	388
Sulfate (ppm)	NA	250	7	1 – 2	1	1 – 9	27 – 37	45 – 48
Total dissolved solids (ppm)	NA	500	65	35 – 53	32 – 46	33 – 63	140 – 190	220 – 260
Turbidity (NTU)	NA	5	0.03	0.02 – 0.10	0.01 – 0.09	0.02 – 0.10	0.02 – 0.10	0.02 – 0.10

4 Other parameters of interest to customers *(Unit)*		Water treatment plants: Walnut Creek	Lafayette	Orinda	Sobrante	Upper San Leandro
Alkalinity, Total as $CaCO_3$ (ppm)		21 – 33	21 – 32	22 – 44	74 – 89	140 – 150
Calcium (ppm)		4 – 6	4	4 – 8	17 – 23	30 – 35
Hardness as $CaCO_3$	(gpg[f])	1	1	1 – 2	4 – 5	8 – 9
	(ppm)	13 – 24	12 – 23	14 – 34	70 – 94	140 – 150
Magnesium (ppm)		1	1	1 – 2	6 – 8	12 – 14
pH (pH)		9.3 – 9.4	9.2 – 9.4	9.2 – 9.4	8.1 – 8.9	8.2 – 8.6
Potassium (ppm)		<1 – 1	<1 – 1	<1 – 1	1	2
Silica (ppm)		8 – 12	8 – 12	8 – 12	9 – 11	9 – 10
Sodium (ppm)		5 – 6	5 – 6	5 – 9	20 – 26	27 – 32



https://www.ebmud.com/water/about-your-water/water-quality/water-quality-report-english/

Important Take-aways from the 2019 EBMUD Water Report

Main Salts in EBMUD Water

- Calcium: 4-35ppm
  - For yeast health; target 50+ppm
- Chloride: 3-17ppm
  - Accentuates maltiness; target 50-150ppm
- Sulfate: 1-48ppm
  - Accentuates hop bitterness; target 50-350ppm

Additional Considerations

- Magnesium: 1-14ppm
  - For yeast health; target 10-20ppm at most
- Sodium: 5-32ppm
  - Might accentuate misc flavors; target TBD
- Alkalinity: 21-150ppm
  - Relates to the pH of the beer

What do I do with the water report information?

- Increasing chloride levels
  - Accentuates “maltiness” in beers
  - Add 1 tsp calcium chloride to 5 gallons to increase to ~100ppm chloride
- Increasing sulfate levels
  - Accentuates “hop bitterness” in beers
  - Add 1 tsp calcium sulfate (gypsum) to 5 gallons to increase to ~100ppm sulfate
- Either one of these additions will increase calcium levels to >50ppm calcium
- Adding too much of any brewing water salts can make the final beer taste harsh and/or minerally

Adding other salts to brewing water

- Magnesium sulfate (Epsom salts)
  - For yeast health
  - Not necessary to worry about with East Bay water
- Sodium chloride (table salt)
  - Might act as "seasoning" for finished beer
  - Already a component of some beers (e.g. Gose)
  - Experiment with adding small amounts of table salt to some beers to adjust final flavor
- Sodium bicarbonate (baking soda)
  - Adjusts the "buffering" or how pH acts in the finished beer
  - Can be important for dark beers
  - Experiment with adding different amounts to beers that contain dark grains in the mash (try 0.5-2 tsp for 5 gallons)

Testing your own brewing water

- TDS Meter (Total Dissolves Solids)
  - Measures total amount of salts in water by conductivity
  - Provides a quick measure to determine if your water has changed recently (or changed water sources)
- LaMotte Test Kit
  - Provides a series of colorimetric tests to measure various brewing salts in water
  - Available at MoreBeer etc
- Commercial mail-in services
  - Ward labs - $42

Other water considerations

- Chlorine/chloramine
  - Added to municipal water sources as a disinfectant
  - Can negatively affect beer flavor/chemistry
    - Leading cause of chlorophenolic off-flavor
  - Can be removed from your water source by using a carbon filter, R.O. (reverse osmosis) filter system, or pre-boiling your brewing water ahead of time with a Camden tablet (potassium metabisulfite; 1 tablet per 20 gallons of water)
  - Alternatively, you can buy filtered water

What about pH?

- The pH of a beer is primarily set at the beginning of the mash and is retained at that level until the onset of fermentation (either by yeast or by bacteria)
- pH can be a relatively difficult topic to cover for a general audience, so the focus here will be on "What should I do about the pH of my beer?"
- Answer: if you're brewing with East Bay water, you don't really need to worry about mash pH for most beers/recipes
- The crushed grain has a strong ability to set the mash pH at the desired 5.2-5.6 range (as measured at room temperature)
- For dark beers that use a high amount of dark malts in the recipe, adding a salt to raise the mash pH to the higher end of the spectrum might yield a better final beer
  - Salts that raise pH: slaked lime (calcium hydroxide), sodium/potassium carbonate/bicarbonate, lye (sodium hydroxide)
  - Chemicals that lower pH: phosphoric/hydrochloric/sulfuric acid

Post-brewing water adjustments

- You don't necessarily have to adjust your brewing water when brewing
- You can adjust the water at packaging
- Create concentrated solutions of your water salts (gypsum etc) and dose drops into a sample of your beer to taste
- Scale your findings and add water salt solutions to your finished beer, mix well, and package

Final Take-aways

- If your beer tastes good, then no need to do anything!
- If you want to adjust your brewing water, taking good notes can help you develop your process
- If your water source tastes good, then go ahead and use it
- Small adjustments to brewing water with brewing water salts *can* make your final beer taste better
- If your water source tastes bad (salty, chlorine, minerally, or just plain weird), then carbon filter your water, purchase an R.O. water filtration system, or consider buying water from a commercial source

Thank You
&
Questions?