

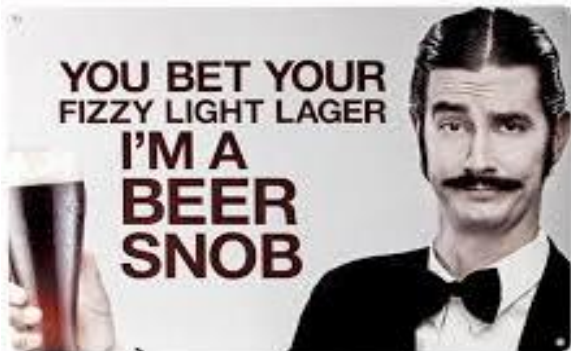
INTRODUCTION TO BREWING WATER ASSESSMENT & ADJUSTMENT

Steve Carper
Oregon Brew Crew
August, 8 2019



Agenda

- Why bother with water adjustment?
- Where does my water come from?
- What's in my water?
- Tools
- How do I use that information to make great beers?
- Resources



...and I love fizzy light lagers!

Disclaimer

- I am NOT a water chemist
- I am a water conservation tech



Why Bother with Water Adjustment?

- Primary component ~95%
- **Proper mash pH**
- Enzyme performance/extraction
- Healthy fermentation
- Clarity
- Chlorine/Chloramine removal
- Hardness/Alkalinity Adjustments
- Mineral Adjustments
 - Sulfate synergy with hop bitterness
 - Chloride sweetness and balance
 - Off Flavor mitigation

Where Does My Water Come From?

- Bull Run Reservoir



- Clackamas River



- Hagg Lake/Barney Reservoir



- Wells/Springs

Water Provider Lookup Tool



Regionalh2o.org



Who is my water provider?



Beaverton, City of, 503-526-2257


This lookup tool only works for customers whose water providers are members of the [Regional Water Providers Consortium](#).

Water Provider Information

- Consumer Confidence Report (CCR)
 - Source (s)
 - Treatment
 - Service area
 - Contaminants
- Call Water Quality




Water Provider Information



Clackamas River Water Home Brewer's Report

	Results (mg/L)	
	North Service Area	South Service Area
pH	7.84	8.55
Total Alkalinity (CaCO ₃)	20.6	24
Calcium	3.65	4.06
Sulfate	3.2	5.2
Chloride	2.7	6.1
Magnesium	1.12	1.22
Sodium	5.6	10.6
Hardness (Total)	17.9	18.4

Need data in parts per million? No problem! 1mg/L = 1ppm.



*Beer is 90% Water. So remember, Brewer's- **No Water, No Beer.***
Do your part to conserve water and take care of our watershed.
Visit www.crwater.com/conservation or www.conserveh2o.org to see how you can help.

Did we miss something? Let us know by e-mailing sdelorenzo@crwater.com

This data was last updated on March 25, 2019. Results will be updated as new data is available.

Lab Testing



Ag Testing - Consulting

Account No. : 49540

Water Analysis Report

CARPER, STEVE
GREEN DRAGON BREW CREW
11660 FILBERT DR
OREGON CITY OR 97045

Invoice No. : 1193525
Date Received : 10/16/2015
Date Reported : 10/19/2015

Lab Number : 19994

Results For : STEVE CARPER

Location :

Sample ID :

pH	8.1
Total Dissolved Solids (TDS) Est, ppm	72
Electrical Conductivity, mmho/cm	0.12
Cations / Anions, me/L	1.3 / 1.5

	ppm
Sodium, Na	9
Potassium, K	1
Calcium, Ca	10
Magnesium, Mg	5
Total Hardness, CaCO ₃	46
Nitrate, NO ₃ -N	0.1 (SAFE)
Sulfate, SO ₄ -S	1
Chloride, Cl	3
Carbonate, CO ₃	< 1.0
Bicarbonate, HCO ₃	80
Total Alkalinity, CaCO ₃	66
Total Phosphorus, P	0.05
Total Iron, Fe	0.04

*< - Not Detected / Below Detection Limit

\$42

<https://www.wardlab.com/BrewersKitOrder.php>

Important Ions

Ion Effects in Brewing	
Affect Hardness & Alkalinity	Affect Flavor
Calcium	Sodium
Magnesium	Chloride
Bicarbonate	Sulfate
	Magnesium

Source: Martin Brungard

Minerals and Beer Styles

Ionic Profiles for Major Brewing Centers							
Brewing Center	Ion Concentrations (ppm)						Residual Alkalinity
	Calcium	Magnesium	Sodium	Sulfate	Chloride	Bicarbonate	
Burton	275	40	25	610	35	270	5
Dortmund	230	15	40	330	130	235	20
Dublin	120	4	12	55	19	315	170
Edinburgh	100	20	55	140	50	285	150
London	70	6	15	40	38	166	85
Munich	77	17	4	18	8	295	180
Pilsen	7	2	2	8	6	16	5
Vienna	75	15	10	60	15	225	125

Source: Martin Brungard

Tools

- pH measuring
 - Strips
 - Meter
- Brewing Water Calculators
 - Standalone
 - *Bru'n Water*
 - Software
 - *BeerSmith*
 - Online
 - *Brewer's Friend*
 - App
 - *Palmer's Brewing Water Adjustment App*



Demonstration

Bru'n Water

Steve Carper

Batch Name:

Enter Batch Name Here

Enter Data into **Light Blue** cells, **Yellow** cells show **Calculated** results, **Pink** cells contain **Selection** boxes

Grain Bill Input

Hover cursor over cells w/ red corner marks to display helpful information

Grains	Grain Type	Quantity (lb)	Quantity (oz)	Color (L)	Percentage of Grain Bill
pils	Base Malt	10.00	0.00	1.7	100.0
med crystal	Crystal Malt	0.00	0.00	20.0	0.0
chocolate	Roast	0.00	0.00	300.0	0.0
flaked wheat	Wheat/Oat	0.00	0.00	1.5	0.0
acid malt	Acid Malt	0.00	0.00	0.0	0.0
	Base Malt	0.00	0.00	0.0	0.0
	Base Malt	0.00	0.00	0.0	0.0
	Base Malt	0.00	0.00	0.0	0.0
	Base Malt	0.00	0.00	0.0	0.0
	Base Malt	0.00	0.00	0.0	0.0
Enter grain names above to help verify that all the grist is entered	Base Malt	0.00	0.00	0.0	0.0
	Base Malt	0.00	0.00	0.0	0.0
Total Grist Weight (lbs)		10.00	Est. Beer Color (EBC)		6.4
Water to Grist Ratio (Qts/Lb)		1.50	Est. Beer Color (SRM)		3.2
Malt Color Setting	Lovibond	Remove Crystal Malts from Main Mash?		No	
Water used for Mash	Adjusted Water	Remove Roast Malts from Main Mash?		No	

Mash pH Result

Lactate added to water (ppm) =

Estimated Room-Temperature Mash pH

5.73

Acid Malt Strength Setting

1

Mash pH Guidance

Suggested mash pH range for lighter colored beers is 5.3 to 5.4
 Suggested mash pH range for darker colored beers is 5.4 to 5.6
 or crisp beer styles may benefit from a mash pH range of 5.2 to 5.3

Bru'n Water v. 5.5

Recommended Reading

WATER

A Comprehensive Guide for Brewers

John Palmer and Colin Kaminski

Simple Water Adjustment

Drew Beechum and Denny Conn

Zymurgy; May/June 2019

Water Knowledge

Martin Brungard

<https://sites.google.com/site/brunwater/water-knowledge>

