

Enhancing Data Visualization for the Public and your Office

Agenda

- Introduction
- The Value of Data Visualizations
- What We've Done at WSSC Water
- What You Can Do at Your Organization



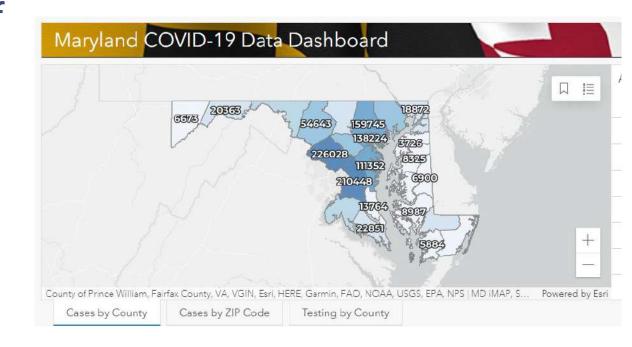
The Value of Data Visualizations



What is Data Visualization?

- Representation of data in the form of a graph, map, icon, picture, etc.
- Ex: MD COVID-19 Data Dashboard

 More engaging than showing numbers in a table





Why use Data Visualizations?

- Data Visualizations can make data that we know to be important, more accessible and understandable to a wider audience
- With Data Visualizations and Data Storytelling, you can:
 - Provide key decision makers an at-a-glance view of data
 - Explain key takeaways
 - Show why the audience should care about the data





GFOA Budget Presentation Award Program

#C5: Charts and graphs should be used, where appropriate, to highlight financial and statistical information. Narrative interpretation should be provided when the messages conveyed by the graphs are not self-evident.

Charts and Graphs

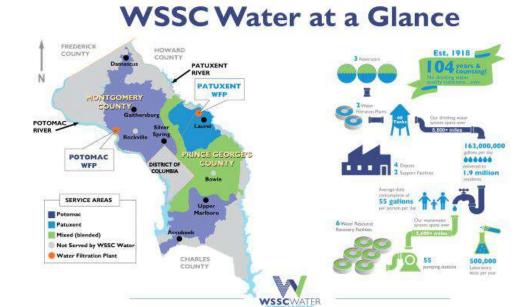
- Are charts and graphs used in the document to convey essential information (e.g., key policies, trends, choices and impacts)?
- 2. Are graphics explained?

Data Storytelling can be used to meet the requirements of the GFOA Presentation Award program!



Example: Introductory Graphic

- In the beginning of Yvonne's presentation, she used these visuals to show some fun facts about WSSC Water
- This slide is included in our PowerPoint template for public presentations and is a good way to highlight key facts quickly in an engaging manner!
- Let me show you why...

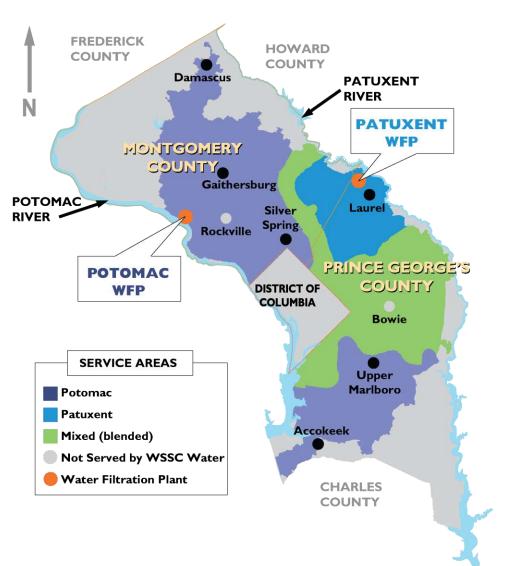


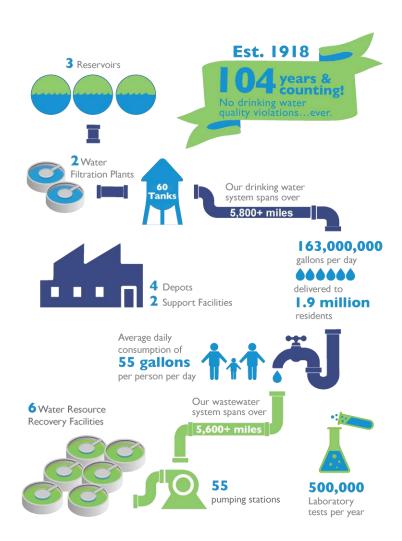


WSSC Water at a Glance

- WSSC Water serves Montgomery and Prince George's counties in Maryland. The utility was established in 1918, and has had 104 years with no water quality violations. WSSC Water has:
 - 3 reservoirs
 - 2 water filtration plants
 - 4 depots
 - 2 support facilities
 - o 60 tanks
 - A drinking water system spanning over 5800 miles
 - o a wastewater system spanning 5600 miles.
 - 6 water resource recovery facilities
 - 55 Pumping stations
- WSSC Water produces 163 million gallons per day, with each person consuming an average of 55 gallons of water per day and conducts half a million laboratory tests per year

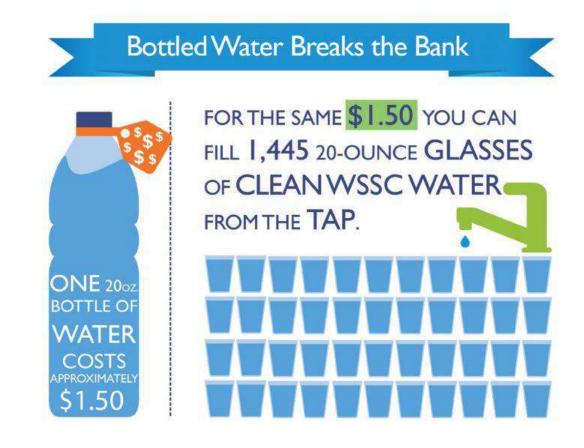
WSSC Water at a Glance





Value of Tap VS Bottled Water

Water Source	Cost	Amount
Bottled Water	\$1.50	20 Ounces
Tap Water	\$1.50	28,900 Ounces





VS

Key Considerations in Data Visuals

How long does it take me to understand this data?

Is it engaging?

 Can it be read clearly and easily by anyone, including those who are colorblind?

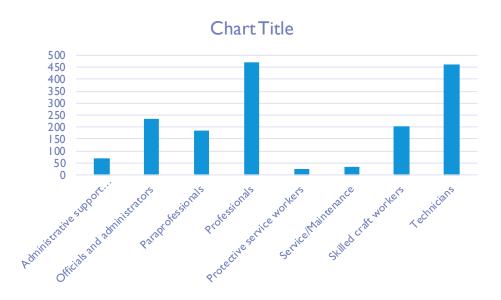


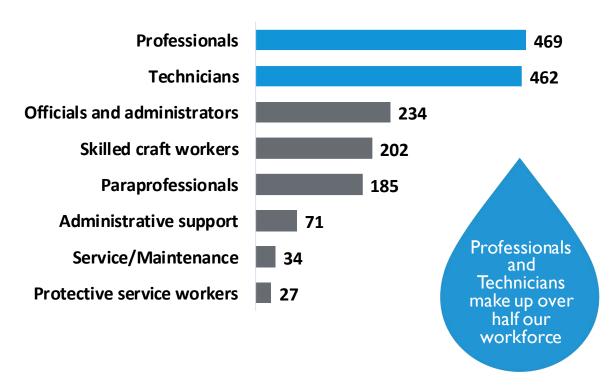
Visuals Best Practices Example

Default excel graph

Optimized graph following best practices

WSSC Water Employees by Job Classification







Tables: Two Examples

These tables contain identical data, however, the table on the right is clear and concise, while the table on the left is confusing and takes longer to read

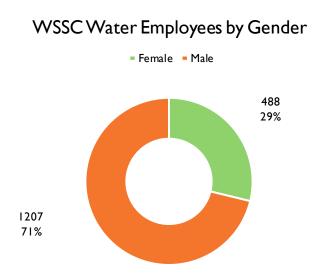
Contract	FY2I	FY22	
			FY23
AB35920	5,202,000	5,818,000	
			325,600
BD24814	1,000,000	3,030,000	
			2,360,000
Total	6,202,000	8,848,000	
			2,685,600

Contract	FY2I	FY22	FY23
AB35920	\$5,202,000	\$5,818,000	\$325,600
BD24814	\$1,000,000	\$3,030,000	\$2,360,000
Total	\$6,202,000	\$8,848,000	\$2,685,600



Colorblindness

• For those who have colorblindness, some graphs or charts may be difficult to read. The most common form of colorblindness is red green colorblindness: You can see an example below* of how a graph can look to those who experience red-blindness.





WSSC Water Employees by Gender

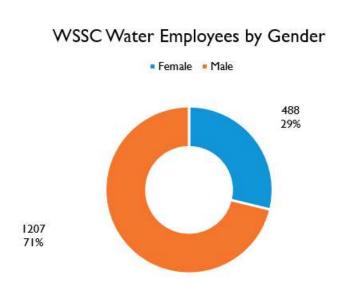
Female Male

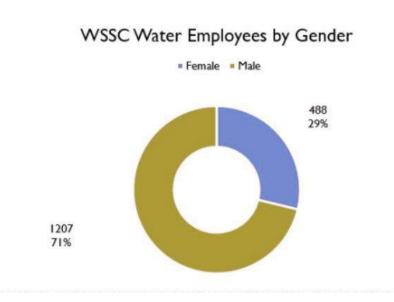
488
29%

^{*}You can test your own visuals with the simulator from Colblindor, linked <u>here</u>.

Colorblindness (Cont.)

 While we usually associate green with good or positive and orange or red with negative outcomes, using a shade of bright blue with the orange allows for an accessible contrast, and is thus recommended instead







What We've Done at WSSC Water

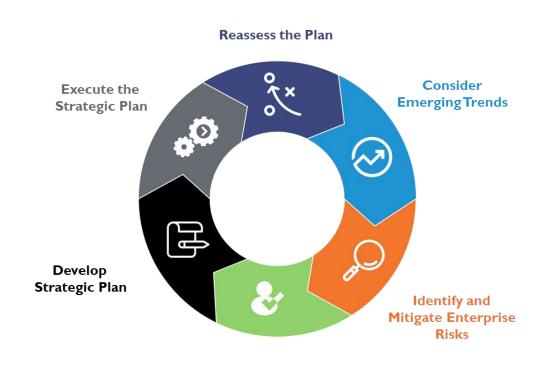


Strategic Plan Connection

 Established Strategic Initiative under Transform Employee Engagement Strategic Priority to:

Advance achievement of WSSC Water's Strategic Plan by facilitating organizational development activities to enable data and risk-informed decisions that optimize business processes

 Data is key to Executing the Strategic Plan

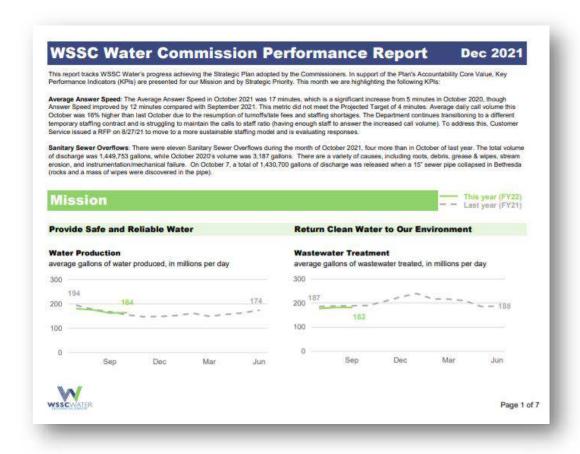


Endorse the Mission and Vision



Commission Performance Report

- Tracks our progress achieving the Strategic Plan via Key Performance Indicators (KPIs)
- Included in monthly General Manager Report, supports Plan's Accountability Core Value
- Serves as a tool for monitoring results, communicating progress, and identifying opportunities for improvement





WSSC Water Data Community

- WSSC Water's Data Community consists of 115 employees from across the organization
- Formed in April of 2021 and its purpose is:
 - To foster a community where H2O People can discuss data, share resources and learn from one another
 - Raising awareness about key performance indicators
 - Increasing data literacy across the organization through training and outreach





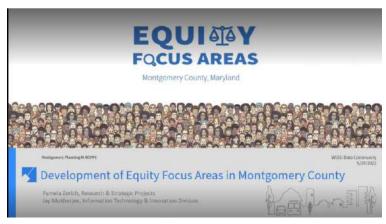
Data Community Meeting Topics

WSSC Water's Data Community holds monthly meetings. Some topics we've covered include:



Report Re-Designs such as WSSCWater Quality Report

Guest speakers from Montgomery County



Dashboard Best Practices

- WSSC Water Branding
- Used approved colors and Gill Sans MT font
- Use the <u>Power BI theme file</u> preset with WSSC Water branding to make setting up your dashboard easier!
- Formatting tips
 - Sizing of dashboard pages, avoiding overcrowding, and using color contrast to make data stand out

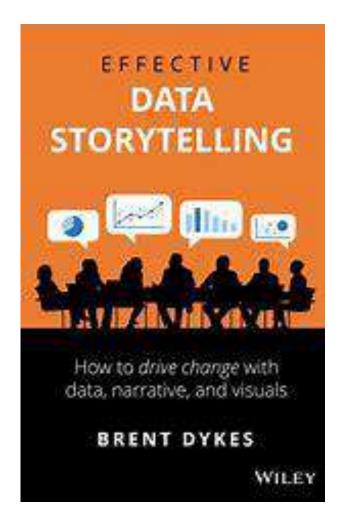


Dashboard Demos and Dashboarding best practices



Data Community Book Club

- The Data Community Book Club meets once a month separately from the usual Data Community meeting
- First book is Effective Data
 Storytelling by Brent Dykes,
 which had a book club discussion
 guide available through
 www.effectivedatastorytelling.com





Data Community Benefits

- Because the community meets virtually and is set up as a Microsoft Teams group, employees across the company can participate easily, whether they telework, report to our headquarters building, or are at one of our depots or plants.
 - We also keep meeting recordings and resource documents on Teams
- We've noticed an increase in cross-department collaboration and interest in data work which helps reduce organizational silos







Power BI

- We've had over 60 employees attend Power BI trainings, to empower employees with the skills they need to create their own dashboards
- Benefits of Microsoft Power BI:
 - Can be connected directly to data sources to keep data as current as possible
 - Encourages data democratization and enables analysts to more quickly answer business questions
 - Encourages the use of data in day-to-day decision making
 - Reduces reliance on IT, as employees can develop dashboards themselves





Power BI Dashboard Directory

- We've established our Power BI
 Dashboard Directory as a spot
 that all employees can go to find
 published dashboards
- This helps increase data accessibility and data use across the organization



Power BI Dashboard Directory

Welcome to WSSC Water's home page for data dashboards designed in Microsoft Power BI. As part of WSSC Water's initiative to encourage data-driven decisions, analysts are encouraged to utilize Power BI to analyze, visualize and publish dashboards for use by H20 People.

If you would like your dashboard added to this dashboard page, please ensure it meets the requirements listed in the WSSC Water Dashboard Creation Guidelines document, and reach out to SPO@wsscwater.com. For more resources and support: join the Data Community on Teams.

C2M Performance Dashboard



The C2M Performance Dashboard provides visibility on how Customer to Meter (C2M) is performing from a business prospective & includes high level performance measures and detailed drill down datasets categorized by three of WSSC Water's Strategic Priorities:

- Enhance Customer Experience (Accounts Billed on Time, Consecutively Estimated Bills, To Do Volume, Customer Call Volume, Customer Calls Answered, Average Speed of Answer, Past Due Accounts & Past Due Amount)
- Optimize Infrastructure (Read Schedule Compliance, % Reads Uploaded Successfully, % Reads that Billed Automatically, Field Work Completion Rate, Field Work Volume, and Average Age of Open Field Work)
- Spend Customer Dollars Wisely (Payments Received, Revenue Billed, Days of Revenue Outstanding).

This dashboard is updated every business day, usually between the hours of 8-10AM.

Owners: Customer Service (John.Curry@wsscwater.com) Utility Services (Jorge.Rodriguez@wsscwater.com) & Finance (Letitia.Carolina-Powell@wsscwater.com)

Maintainer: IT Business Intelligence (dl_it-erdw@wsscwater.com)

User Guide





? Help

C2M Performance Dashboard

Report Date: 10/25/2022 Change Report Date

Outside Projections Meeting Projected Target Meeting World Class Target

Enhance Customer Experience

Performance Measures	FYTD ①	Previous Day	MTD ①	Projected Target	World Class Target	Status ①
Accounts Billed on Time	99.99%	NA	100.00%	99.85%	99.95%	
Consecutive Estimated Bills	13,134	130	3,046			
Value of Consecutive Estimated Bills (\$)	\$5,295,249	\$44,408	\$1,601,283			
To Do Volume	6,300	NA	NA			
Customer Call Volume	163,988	1,631	33,330	45,600	32,000	O
% Customer Calls Answered	81%	80%	77%	90%	96%	
Average Speed to Answer (sec)	898	434	1,284	210	30	
Past Due Accounts	84,652	NA	NA	60,364	24,500	
Past Due Amount (\$)	\$58,014,287	NA	NA	\$30,100,000	\$15,000,000	

🔪 Optimize Infrastructure

Performance Measures	FYTD	Previous Day	MTD	Projected Target	World Class Target	Status
Read Schedule Compliance	100%	100%	100%	98%	99%	
% Reads Uploaded Successfully	97%	96%	96%	95%	98%	
% Reads that Billed Automatically	85%	85%	85%	93%	98%	
Field Work Completion Rate	96%	133%	87%			
Field Work Volume	14,679	n/a	n/a			
Average Age of Open Field Work (days)	61	NA	n/a			

Spend Customer Dollars Wisely

Performance Measures	FYTD ①	Previous Day	MTD ①	Projected Target	World Class Target	Status ①	
% Payments Received of Previous Month Revenue Billed	102%	NA	103%	97%			
Payments Received (\$)	\$277,712,483	\$3,525,178	\$64,668,225				
Revenue Billed (\$)	\$279,146,208	\$2,537,595	\$56,714,597				
Days of Revenue Outstanding	48	NA	NA				

Payments Received (\$) Dashboard > Spend Customer Dollars Wisely > Payments Received (\$) Payments Received (\$) Historical View by Month Fiscal Year Prizo23 Selected Fiscal Year Previous Fiscal Year Selected Fiscal Year Previous Fiscal

 Example: C2M dashboard shows metrics used to monitor customer service performance, connection to the Strategic Plan, and allows users to drill down further to each metric

Best Practices Guidance

- We've created guidelines for external presentations and dashboard creations that line up with the branding guidelines created by our Communications Department
- We have also created a Power BI Theme file to ensure dashboards match our branding guidelines

WSSC Water Power BI Dashboard Directory Guidelines

Dashboard Best Practices

Basic Branding Guidelines

Please be sure to follow these basic branding guidelines for colors:

 Dark Blue
 (Hex Code: #3C4981, RGB Code: 60 73 129)

 Gray
 (Hex Code: #676C73, RGB Code: 103 108 115)

 Green
 (Hex Code: #8FD16A, RGB Code: 143 209 106)

 Orange
 (Hex Code: #F4762D, RGB Code: 244 118 45)

 Light Blue
 (Hex Code: #1295D8, RGB Code: 18 149 216)

Typography: Gill Sans MT

 Text should always be Gill Sans MT. For readability, font size should not be smaller than 10 point.

Finding Resources

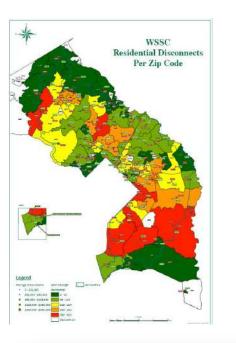
- A Power BI theme file with these colors and fonts preloaded is available on the Data Community Teams page, linked here. We highly recommend using this theme file for all official WSSC Water branded projects.
 - For instructions on how to use a theme file in Power BI, please see the guidance from Microsoft linked here.
- Be sure to check out WSSC Water's official branding guidelines <u>here</u> for additional information.
- WSSC Water's approved Icons can be downloaded here.



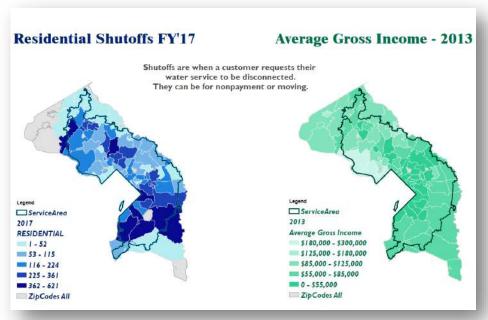
Visualization Trainings

- We've had over 200 employees attend trainings conducted by an external trainer, Ann Emery of Depict Data Studio on Data Visualization
- Internal trainings have also been conducted for those who frequently prepare and review presentations for public facing meetings on our branding guidelines and established visualization best practices to ensure consistency across the organization







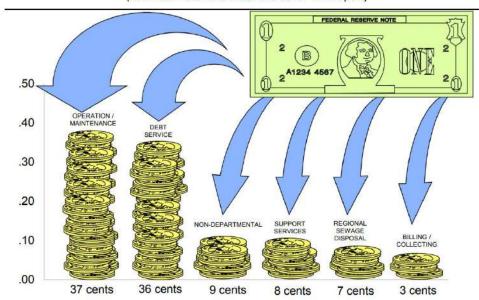


Data Visualization trainings help take Budget books from this...

6

FY'18 PROPOSED BUDGET

(How Each Dollar of a Water and Sewer Bill is Spent)



...To this! (FY23 Proposed Budget)



WSSCWATER DELIVERING THE ESSENTIAL

HOW EACH OPERATING DOLLAR IS SPENT



Simplify the Data

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Haloacetic Asids (HAA5)	ugt.	41		85-12-1		60 "	rile	NO:	Syproduct of drinking water chlorinollari Syproduct of chinking water chlorinollari
Total Tribakonethanes (TTHWs) DETECTED UNI	REGUL				108	80	5/8	NO	Registrated of differing water officination
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water before which there is no known or expected risk to health, MCLOs allow for a margin of wilely and one nemerotropicity public health gools. TT - Treatment Technique. A required process intended to reduce the level of a

ordenment in divining radio.

AL - Action level. The concernation of a contaminant which, if exceeded, triggers treatment or other regimentarity which a vetter system must follow. MRDL - Haviman Rasolusi Districtant Lorel. The highest level of a discretization of the state of

distribution; below which there is no known or expedied not to health. MRDLGs do not reflect the blenkfor of the use of disnitrotients to control morphial contamination. Turk kilds - A measure of the claudiness of the setter. He montar it because it is a

MTU - Nephelimetric Turpktily Unit

agit. Micrograms per Rec, equal to parts per folion (upit.) The equivalent of a so minute in 2,900 years or one porary in \$10 million. agit. - Nonsports per like, equal to parts per folion (spots The equivalent of use

ela - Not applicable

Loss than

1. Filtered water, manifrom of measurements belon every 15 minutes 2. EPA consisters 50 pCirt, to be the level of concern for bota particles.

3. The MCL and MCL Gapply to combined Redium 220 and 228. 4. Most recent asens log, behavior June and Explander 2017.

& If many their 10 persons of sites exceed the action level, system is required to take additional steps to central connectorates of first water. C. Hohed ramping served principle (RAU)

T.All primaries descript to true detectable storefectors residual.

B. Maximum residual distributant level (MRDL), the highest level of a distributant allowed in drinking water, based on a running armust average (PWA)

W. Maximum materialistic level transition (955) 11. Unrequired custominants were mentionel according to State of

Maryland topication requiring WISC Water to continue listed opcle of LCMR. Enclosibly required UCMRS membring ended in 2014. For full results and explanations, see <u>extension constant 1</u>.

12. Routine and report surroles are total collions position and either

2020 Water Quality Results

				Patuxen	t Tap	
Detected Subtance	Units	MCL	MCLG	Level Found	Range	
Barium	mg/L	2	2	0.03	0.02-0.03	
Fluoride	mg/L	4	4	0.7	0.4-0.7	
Nitrate	mg/L	10	10	2.0	0.6-2.0	
Turbidity	NTU	TT=I NTU	n/a	0.02	0.02-0.12	
	% <0.3 NTU	100%	n/a	100%	n/a	
Residual Chlorine	mg/L	TT>=0.2	n/a	met TT require	ements	
Viruses	n/a	TT=99.99% removal	0	met TT requirements		
Giardia lamblia	n/a	TT=99.9% removal	0	met TT requirements		
Cryptosporidium	n/a	TT=99% removal	0	metTT require	ments	
Total Organic Carbon	n/a	TT	n/a	met TT require	ements	
Gross Beta	pCi/L	50 ₂	0	<4	n/d-5.2	
Unregulated Subtance	Units	MCL	MCLG	Level Found	Range	
Manganese 10	µg/L	n/a	n/a	<0.4	n/d-0.78	
Sodium	mg/L	n/a	n/a	13	12-14	
I-butanol	µg/L	n/a	n/a	<2	n/d-2.2	

TERMS

MCLG - Maximum Contaminant Level Goal. The level of a contaminant in drinking water below which there is no known or expected risk to health MCLGs allow for a margin of safety and are non-enforceable public health goals

MCL - Maximum Contaminant Level. The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology

TT - Treatment Technique. A required process intended to reduce the level of a contaminant in drinking water

AL - Action level. The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow MRDL - Maximum Residual Disinfectant Level, The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants

MRDLG - Maximum Residual Disinfectant Level Goal. The level of a drinking water disinfectant below which there is no known or expected risk to health, MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminate

Turbidity - a measure of the cloudiness of the water. We monitor it because it is a good indicator of the effectiveness of our treatment process



What Can You Do?

- Identify and encourage best practices across your organizations to standardize presentations and publications
- Set up your own Data Community, large or small!
 - Encourage staff to share data work and break down silos
 - Attend meetings such as MASN (Mid-Atlantic Stat Network) to learn from others and meet people who may be willing to speak to your organization
- Look into trainings, and if it's not in the budget, you can use free resources online to learn and improve your skills
 - You can use some of the tips shared today!
 - Resources are also available at the <u>Data Visualization Society</u>



Questions?

