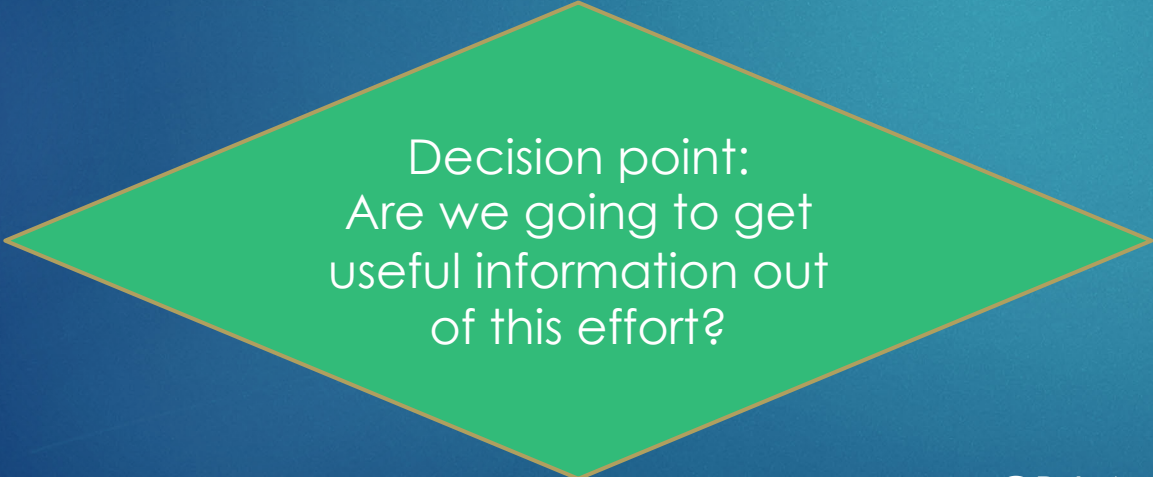




“Small” Community Sampling:
Tracking SARS-CoV-2 in Wastewater in Juneau, Alaska
Lori Sowa, PE

How did we get started?

- ▶ Phone call from ADEC asking about sampling equipment, interest
- ▶ Followed news reports, articles on WW testing
- ▶ Watched CDC webinar (July 2019), started doing some independent research (The Water Research Foundation, UAA contacts)
- ▶ Started discussions with City Manager, Emergency Ops folks
- ▶ Interest from the public



Decision point:
Are we going to get
useful information out
of this effort?



CBJ Assembly allocates \$75k in funding
through CARES Act for testing

Program Development

- ▶ Site specific sampling? Goal: Presence of virus in wastewater identify outbreaks in high risk settings
 - ▶ Identified sites of interest (Pioneer home, LCCC, schools)
 - ▶ Looked for sampling locations – access, staffing
 - ▶ Grab samples?
- ▶ Whole community surveillance? Goal: Collect trend information to help inform community risk level and public health recommendations
 - ▶ Influent composite samplers at 2/3 plants, need to install one more
 - ▶ Coordinate sample collection with staff availability
- ▶ Where can we get the samples analyzed? How soon can we get results?
 - ▶ Commercial lab identified, week turnaround for results, need to ship early in week
- ▶ How will we use this data and share it with the public?
 - ▶ Another metric in the Risk Mitigation Matrix

must be worn indoors in public areas where 6ft	be maintained keep social bubble limited to	a minimum distance of 6 feet can be	State mandates in reopen responsibly	State mandates in reopen responsibly
--	---	-------------------------------------	--------------------------------------	--------------------------------------

Risk Metrics - Daily Assessment

Primary	New case rate over 14 days	Containment situation	Nature of outbreaks	Positivity rate over 7 days	New case rate over 7 days	Syndromic data	Current BRH op status	Total CCU bed capacity
02/02/21	13.85	Level 2	Level 1		13.85	Stable	Normal Operations	4 beds available
02/01/21	13.4	Level 2	Level 1	1.33%	14.74	Stable	Normal Operations	4 beds available
01/31/21	13.85	Level 2	Level 1	1.13%	14.74	Stable	Normal Operations	4 beds available
01/30/21	13.18	Level 2	Level 1	1.05%	12.95	Stable	Normal Operations	5 beds available
01/29/21	12.73	Level 2	Level 1	1.10%	14.29	Stable	Normal Operations	4 beds available
01/28/21	9.83	Level 2	Level 1	1.27%	7.59	Stable	Normal Operations	4 beds available
01/27/21	10.72	Level 2	Level 1	1.95%	14.29	Stable	Normal Operations	3 beds available

Risk Metrics

Category	Key Question	Indicator	Level 1	Level 2	Level 3	Level 4
			Minimal	Moderate	High	Very High
Disease situation	What is the level of disease burden and how is it changing?	New case rate over 14 days including active/present nonresident cases, per 100k population	Case rate < 5.	Case rate 5-10	Case rate > 10.	Case rate > 10 and 14-day rate significantly lagging 7-day rate
		Containment situation	Minimal transmission, limited suspected undetected cases	Moderate transmission, likely undetected cases based on contact investigations	Significant transmission, many undetected cases based on contact investigations	Widespread transmission, many undetected cases based on contact investigations and/or inability to investigate
			Discrete, small, isolated cases and easily	One or more ongoing outbreak likely to result in limited secondary spread only with lower	Multiple ongoing outbreaks or one or more outbreaks involving high risk	Multiple outbreaks that are hard to contain or multiple outbreaks with

CBJ Sewage Surveillance Program

- ▶ Samples collected from each of the three WWTPs 2x per week, sent to lab for analysis.
- ▶ Why sewage surveillance?
 - ▶ Can be an indicator of relative prevalence of the virus in the community, and help with public health decision making.
 - ▶ Can detect virus present in the community independent of testing behavior, including asymptomatic cases.
- ▶ Challenge: many variables!



~80% of homes/businesses connected to municipal sewer system



**Mendenhall
Treatment Plant (MTP)**

Avg Flow 2 MGD

**Landfill Leachate
Brewery Waste
Fish processing**



**Juneau Douglas
Treatment Plant (JDTP)**

Avg Flow 1 MGD

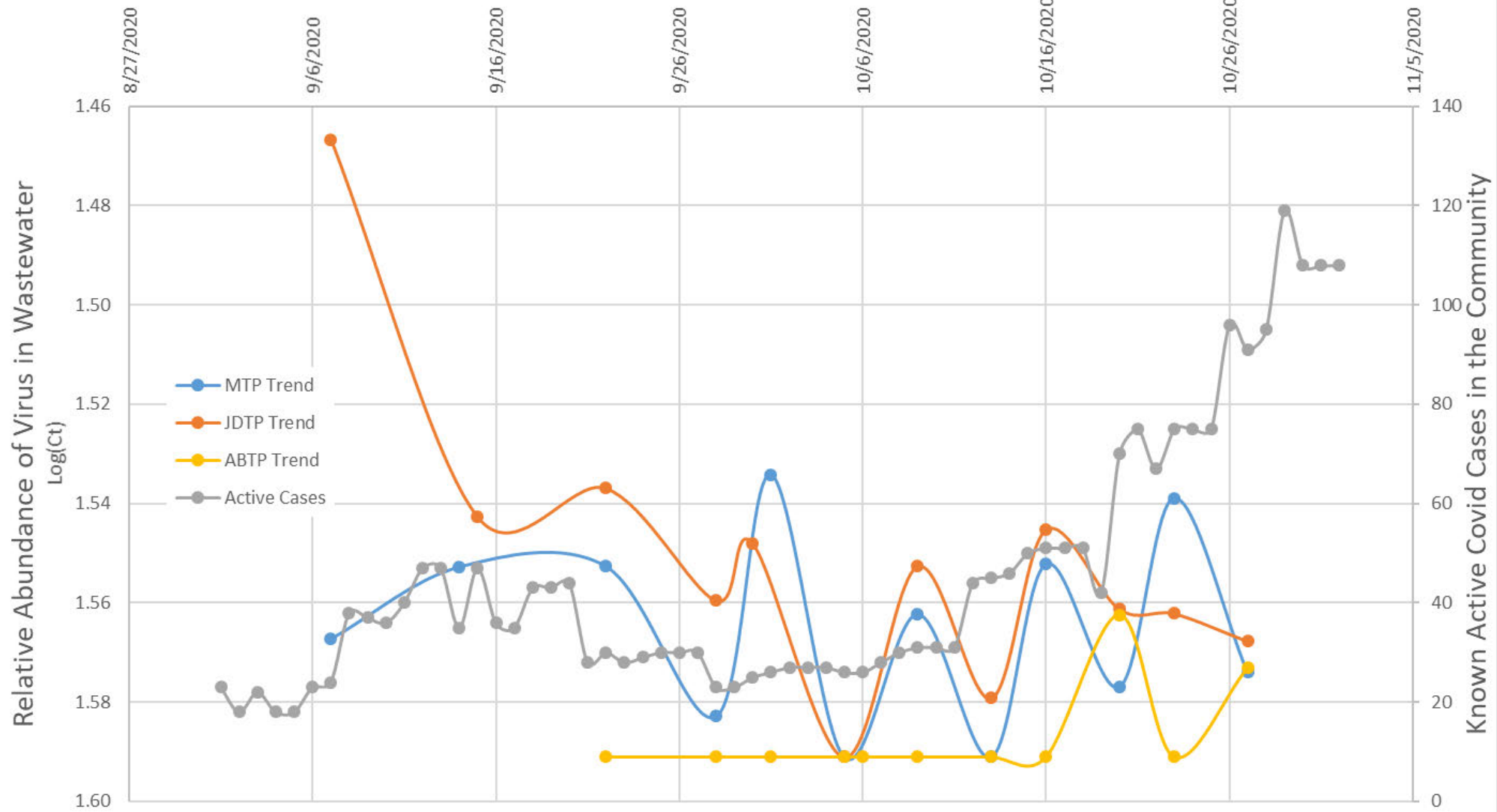
**Cruise ship WW
Downtown**



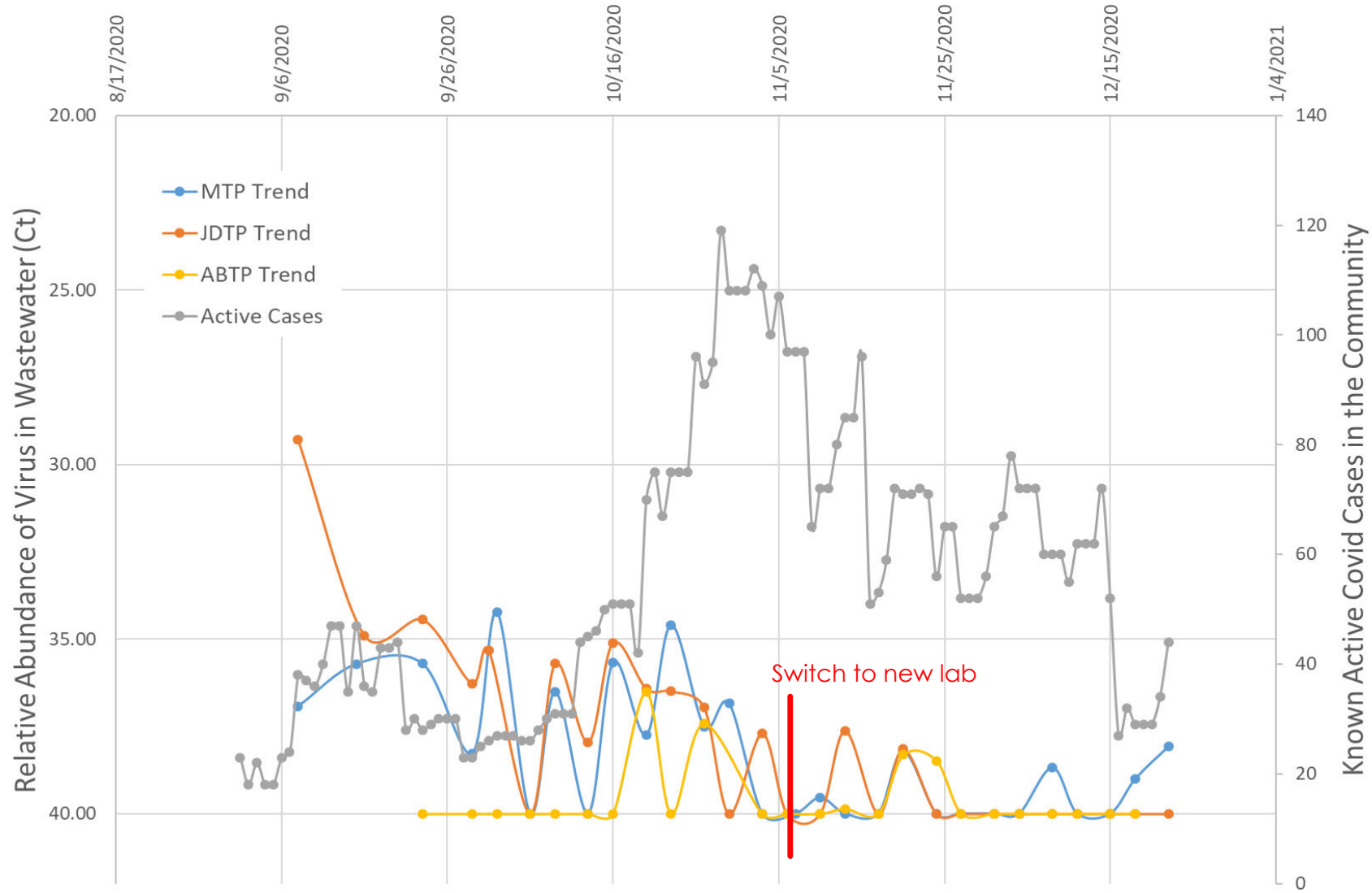
**Auke Bay Treatment
Plant (ABTP)**

Avg Flow 0.05 MGD

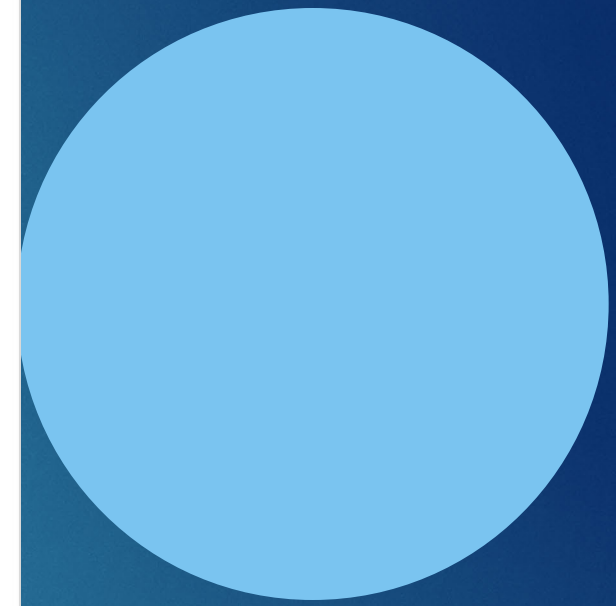
**University of AK
Southeast**

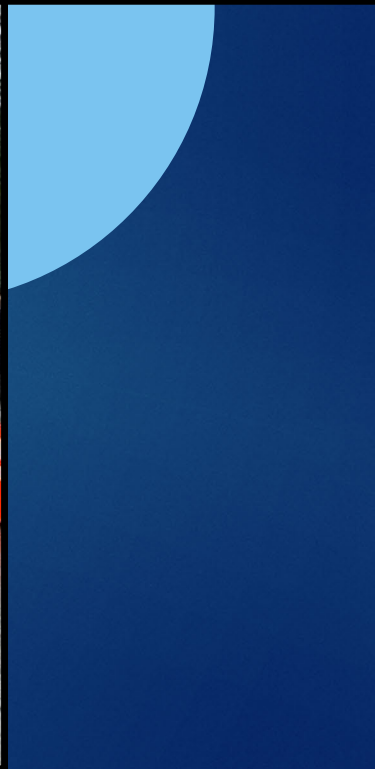


SARS-CoV-2 Levels in Wastewater and Known Active Cases in the Community

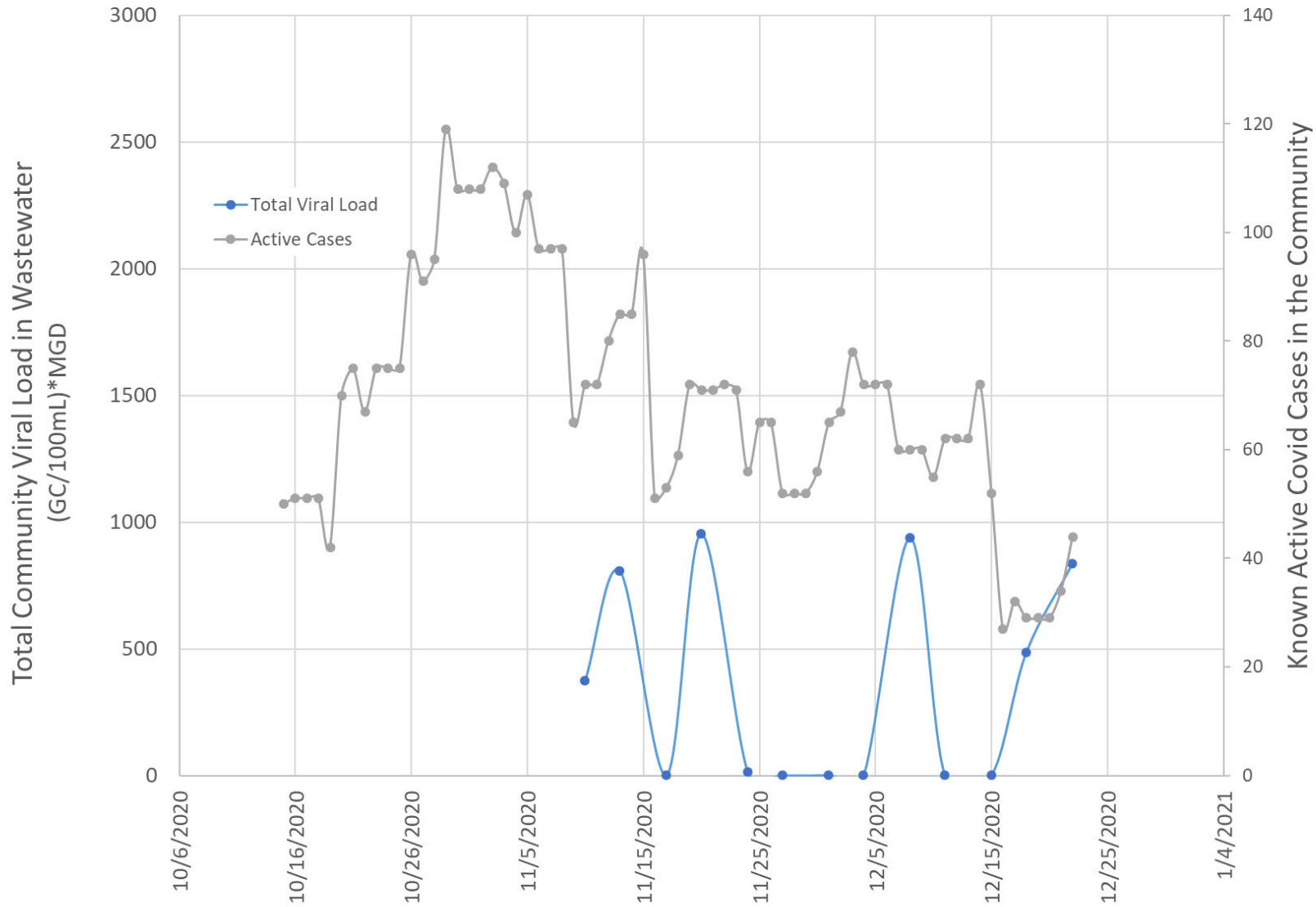


SARS-CoV-2 Levels in Wastewater and Known Active Cases in Juneau





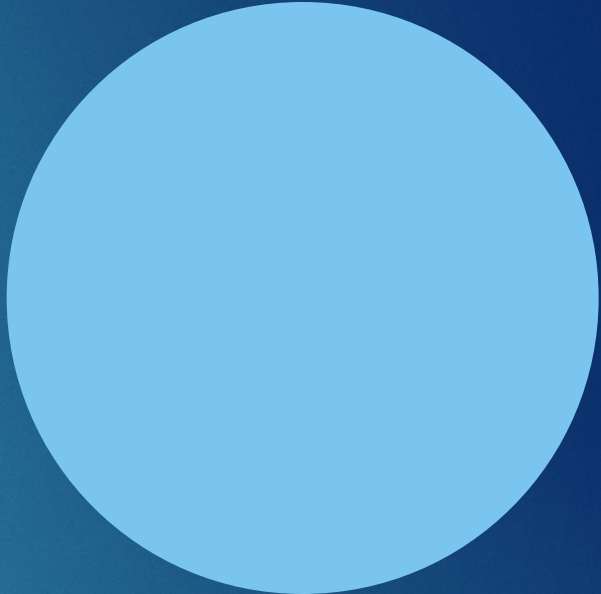
SARS-CoV-2 Total Viral Load in Wastewater and Known Active Cases



$$\text{Total Community Viral Load} = C_M * Q_M + C_{JD} * Q_{JD} + C_{AB} * Q_{AB}$$

Comparison of results from split samples analyzed by both labs

		Lab 1	Lab 2
Date	Location	Ct	Ct
12/18/2020	MTP	33.89	39.01
12/22/2020	MTP	35.36	38.08
12/18/2020	JDTP	ND	ND
12/22/2020	JDTP	ND	ND
12/18/2020	ABTP	ND	ND
12/22/2020	ABTP	ND	ND



Challenges

- ▶ Significant wet weather events led to highly variable flows
- ▶ Using BOD as an indicator of strength doesn't work due to industrial inputs
- ▶ Relatively low incidence of disease in the community (this is a GOOD thing!)
- ▶ Presenting data to the public in a meaningful way
- ▶ Navigating the different analytical methods, no standard method
- ▶ Lag between sample collection and results

Current status

- ▶ Decision made to “pause” testing due to funding needs and lack of actionable data
- ▶ Clinical testing availability is good, turnaround time improving
- ▶ May consider starting testing again prior to tourism, monitor for re-emergence in the community

- ▶ We are all glad that we did this work, but the results weren't as actionable as hoped

Thank you!

Aaron Dotson, UAA
Eric Bortz, UAA
John Albert, WRF
Nathan LaCross, UtahDH
Jeff Ostermiller, UtahNR
Erica Gaddis, UtahWQ

