Minutes
December 4, 2020
Virtual

WAC Members: **Mary Adelstein**, **Wayne Chinouard** (vice chair), **Martin Pillsbury**, Dan Winograd, **Taber Keally, Karen Lachmayr (chair), Phillip Ashcroft**, **Adrianna Cillo, Stephen Greene, James Guiod, Craig Allen, George Atallah, Kannan Vembu** (bold=present)

Staff: Andreae Downs

MWRA: Wendy Leo, Sean Navin, Jeremy Hall, Brian Kubaska, Chris Goodwin, Maret Smolow, Dave Wu, Sally Carroll, David Kubiak, Solomon Wondimu, Carl Leone

Guests: Lou Taverna (Advisory Board), Emily Norton (CRWA), Belinda Stansbury (DEP), Charlie Jewell (BWSC), James Barsanti (DEP), John Reinhardt (MyRWA), Stephen Perkins (MyRWA), Wendy Miller, Cathy Vakalopoulos (DEP), Erica Casarano (AECOM), Kevin Brander (DEP), Julie Wood (CRWA), John Sullivan (BWSC), Joe Nerden (DEP wastewater engineer), Don Walker (AECOM), Lucica Hiller (Somerville)

VOTE: November Minutes

REPORTS:

Advisory Board—Annual rate survey will be going out Dec. 17, but no meeting. Begin budget season after that. Looking to establish a “new normal” committee to evaluate how to move forward post-COVID. But, similar to budget, we don’t really know when “new normal” begins, and too many moving pieces to understand where we are & how to move forward.

MWRA—recently published—annual operations & maintenance report & status. CSO semi-annual report, annual outfall monitoring overview.
Requested approval for ambient monitoring revisions. Open for comment, but already pretty hashed out.
New fishing pier at Deer Island is now open.
Construction projects continuing: Gravity thickeners, Chelsea Creek Headworks, Nut Island odor control and HVAC. Big new projects starting soon.

Director—WAC Membership changes—Belinda Stansbury is now working for MassDEP, wastewater division, and has stepped down. Zhanna Davidovitz has left MIT, but her colleague is now looking to join WAC. Sampling of wastewater at Deer Island for COVID RNA continues, the levels there tend to foreshadow increases and decreases in the Greater Boston population by a week. Unfortunately, the numbers seem to be rising precipitously.

PRESENTATION

Combined Sewer Overflow monitoring and modeling

David Kubiak

Long history here of DK reporting to WAC on CSO. Another bad thing about the pandemic is not being able to meet in person.

Semiannual Report #5/7–this and all reports so far on MWRA.com
Dec. 2021 final report, pursuant to the Court Order.

This report, for the first time, includes whether each outfall likely will meet the Long-term CSO Control Plan (LTCP) goals re: frequency and total discharge volume in the Typical Year. MWRA and communities are pursuing system improvements or evaluations to further reduce discharges where they don't meet goals. Development of water quality models for the Alewife, Mystic and Charles.

Data collection Jan-June 2020 includes rainfall and CSO data at 36 regulators in that period. When started (April 2018) had meters at 57 locations. Needed to calibrate model. Reduced the number of temporary meters to 36. June 30 removed most of the remaining temporary meters, with more confidence in hydraulic model. Meters upstream of MWRA permitted outfalls now permanent to be able to support MWRA's new public notification program.

Quick look at table:

We take the rainfall data as inputs to the hydraulic model in order to estimate the CSO discharge for each of the storms, but also analyze the data for each 6-month period against a half of a Typical Year.

Data Collection and Analyses: January –June, 2020

Rainfall: Continued to collect rainfall data at the 20 program gauges for analysis of storm-by-storm characteristics, comparison with the Typical Year, and input to the hydraulic model.

	Total Rainfall (in.)	Total No. of Storms	Number of Storms by Rainfall Depth (in.)					No. of Storms >0.4 in/hr peak intensity	Total CSO Discharge Volume (Treated and Untreated, MG)
			<0.25	0.25 to 0.5	0.5 to 1.0	1.0 to 2.0	>2.0		
Jan-Jun, 2020	20.3	46	21	8	12	4	1	3	87
Half Typical Year	23.4	47	25	7	8	4	3	5	213

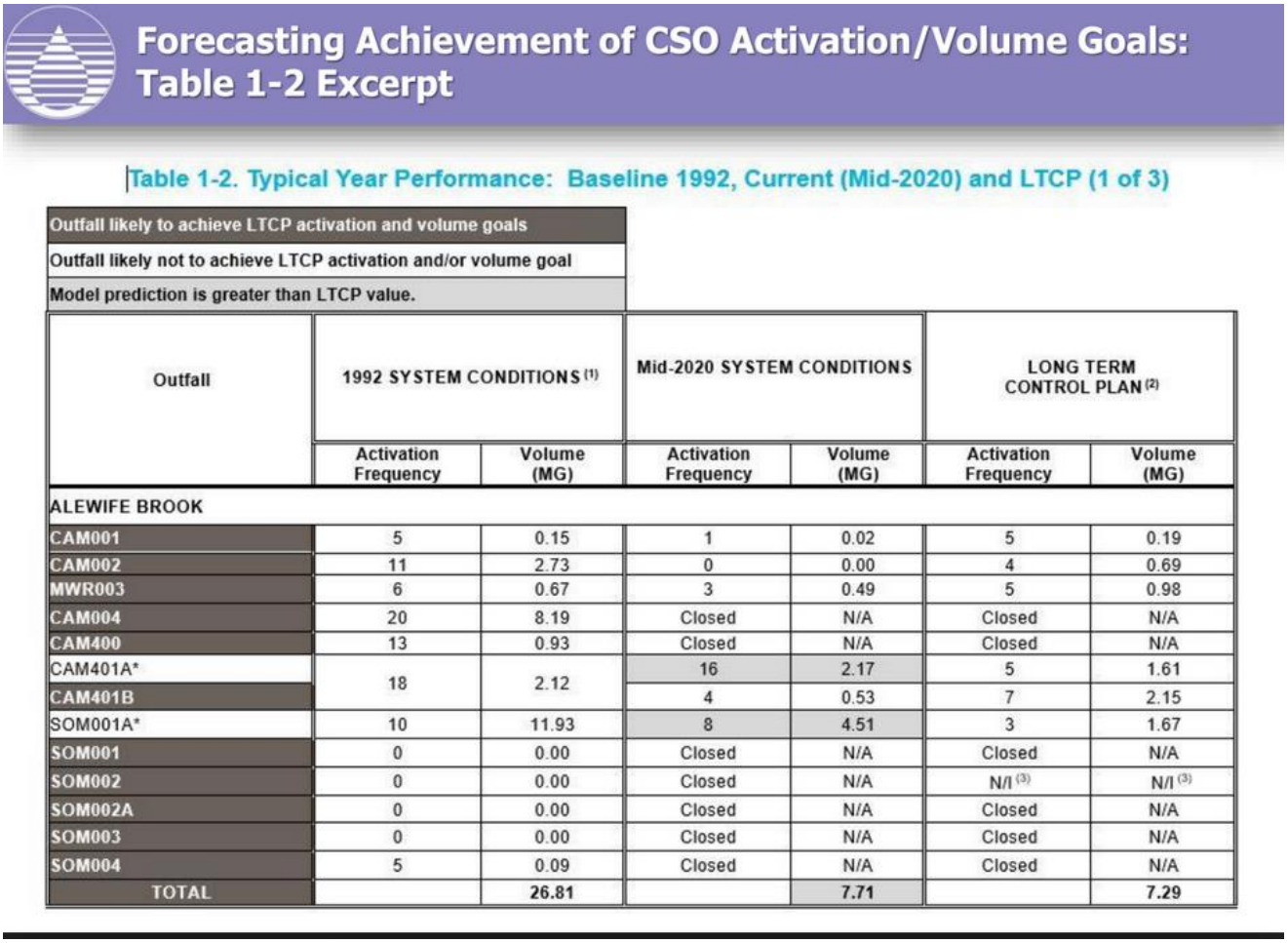
What we are trying to do is to evaluate the estimated discharge in the six-month period against the modeled discharge in half the Typical Year by comparing the rainfall in the six-month period against the rainfall in the Typical Year. Here you can see the estimated total CSO discharge and the rainfall comparison, and that we had much less discharge in the six-month period than half the Typical Year. Why is that? What really drives CSO discharge is the high intensity storms. There were fewer such storms in this six-month period compared to the Typical Year.

1992–comparison. Looking at the specific changes from mid-2019 to 2020 system conditions at Alewife Brook, Somerville Marginal and Fort Point Channel. At Somerville Marginal, changed the operation of the station. If open the gates later in a storm, you take advantage of upstream storage of the system, if any is available. If you close the gates earlier, near the end of a storm

you also can store water upstream - water that then drains into the Deer Island system. We found at Somerville Marginal CSO facility we could close the gates earlier and reduce the volume of CSO a bit.

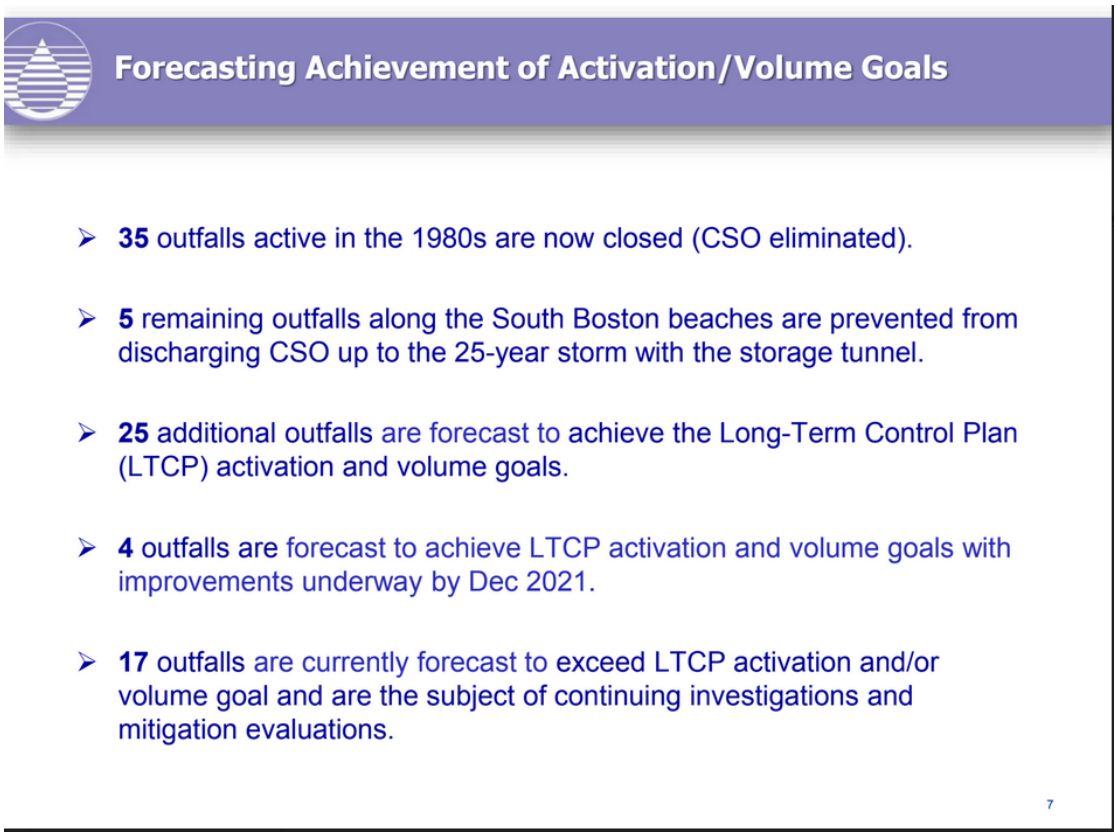
Tables 1-2 and 1-3 in Semiannual Report No. 5 show that measures we are pursuing or communities are pursuing can achieve the long-term control goals or reduce discharge toward those goals at some locations.

In this excerpt of Table 1-2 for Alewife Brook, most of these outfalls either already meet or we've forecasted will meet the long-term controls. Two that don't meet or may not meet the goals by Dec. 2021. At CAM401A, Cambridge just removed sediment that had been causing standing water within the CAM 401A system, that may result in meeting the LTCP goal. MWRA is now working with Somerville on SOM001A, which at this time is forecast not to meet the goals.



Outfall	1992 SYSTEM CONDITIONS (1)		Mid-2020 SYSTEM CONDITIONS		LONG TERM CONTROL PLAN (2)	
	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)
ALEWIFE BROOK						
CAM001	5	0.15	1	0.02	5	0.19
CAM002	11	2.73	0	0.00	4	0.69
MWR003	6	0.67	3	0.49	5	0.98
CAM004	20	8.19	Closed	N/A	Closed	N/A
CAM400	13	0.93	Closed	N/A	Closed	N/A
CAM401A*	18	2.12	16	2.17	5	1.61
CAM401B			4	0.53	7	2.15
SOM001A*	10	11.93	8	4.51	3	1.67
SOM001	0	0.00	Closed	N/A	Closed	N/A
SOM002	0	0.00	Closed	N/A	N/I (3)	N/I (3)
SOM002A	0	0.00	Closed	N/A	Closed	N/A
SOM003	0	0.00	Closed	N/A	Closed	N/A
SOM004	5	0.09	Closed	N/A	Closed	N/A
TOTAL		26.81		7.71		7.29

Although some still discharging at higher than LTCP goals, they are less than in 1992 by a lot.



Ongoing work will allow MWRA to meet or move closer to the goals, where they presently do not meet them. There were 4 Chelsea outfalls, city closed CHE002. Chelsea 003 is still active, but meets level of control (which is no activation in the Typical Year. CHE004 and CHE008 are not meeting goals. At CHE004, city is raising the weir which should bring the discharges to the goals. MWRA is pursuing adding a larger connection to the MWRA interceptor system at Chelsea 008, with the goal of attaining LTCP goals.

11 CSO outfalls were active in the 1980s in East Boston, 3 have been closed. BOS 004&5 still open, but meeting LTCP goals. Remaining outfalls-13, 10 and 12 all discharge to Chelsea Creek, and can attain the goals with the completion of the BWSC sewer separation contracts 1 and 2 now in construction. At Boston 14, 9 and 3, discharges will be reduced a bit, but not fully. MWRA & BWSC are looking at further measures that will help meet the goals there. BWSC sewer separation Contract 3 will get outfall 9 into compliance by Nov 2022.

Overlapping the CSO assessment is the 5-year variances for Charles, Upper Mystic and Alewife Brook. Required project evaluations in the variances include the following:

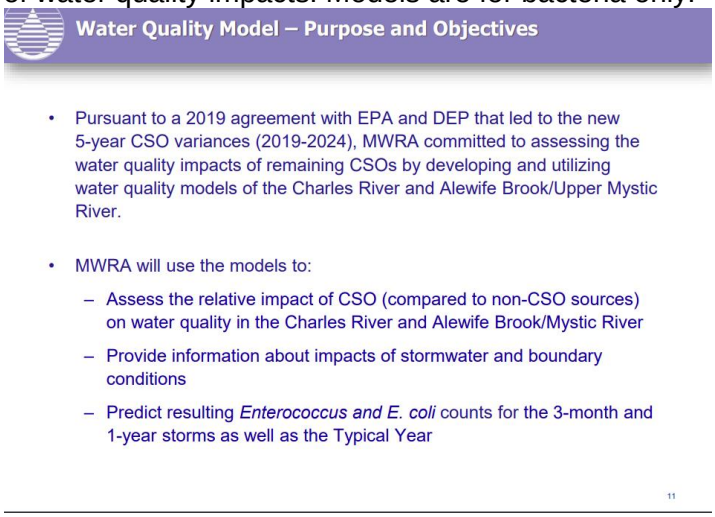
Optimization of the Alewife Brook Pump Station, to keep the wet well elevation lower during storms, may help toward meeting or bettering the goals.

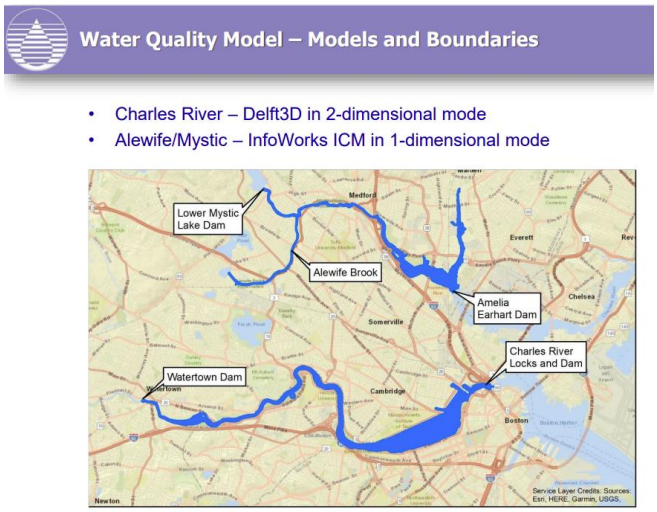
Worst outfall is Somerville Marginal (discharges into the Mystic (lower tide) and the Upper Mystic (higher tides)). Evaluating upgrading the connection into the MWRA interceptor system. Looking also at separate stormwater that enters the Somerville combined system. If able to remove it and send it directly to the river, it may reduce activations and volumes at the facility.

Checking out the Ten Hills area, City of Somerville looking at storm drains from I -93 that currently send stormwater into the combined system.

Water Quality models: David Wu

AECOM, under the CSO Assessment contract with MWRA developed water quality models and will do assessments of water quality impacts. Models are for bacteria only.





Enterococcus and E. coli are fecal indicator bacteria that are used by the state water quality standards.

The Charles and the Alewife/Mystic have separate models.

Three major factors affect water quality in these rivers: CSOs, stormwater, and the boundary conditions. Each of those three are accounted for separately in each model.

For CSOs –there are two different kinds of CSOs, treated and untreated.

The model over time can tell us the percentages of sanitary and stormwater volumes at each CSO outfall. Each of those fractions has differing amounts of bacteria, so each CSO outfall per storm, in terms of bacteria, can be modeled individually. MWRA staff also collected bacteria samples at two untreated CSOs on the Alewife Brook. Treated CSO facilities such as Cottage Farm (Charles) and Somerville Marginal (Mystic) are required by MWRA's NPDES permit to collect effluent samples for bacteria four times a year.

MWRA and community staff (Cities of Cambridge and Somerville) collected stormwater samples in the Alewife/Mystic and Charles.

In the Charles, the boundary condition was developed using data from an MWRA sampling location at the Watertown dam and a submodel of the areas upstream of the dam. In the Mystic, MWRA had sampling data at the each of the boundaries.

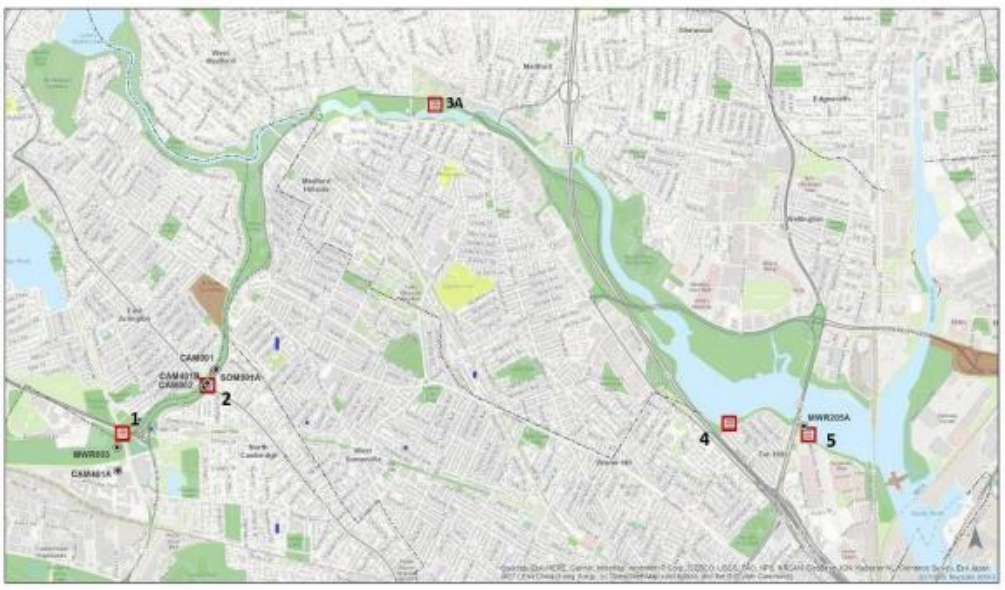
AECOM calibrated the models based on MWRA's 2018 in-stream sampling data – the model predictions were compared to actual sampling data. The predictions and the sampling data were similar, with a fairly minimal amount of model tuning.

A water quality assessment report is due Sept. 2021, which will estimate the total number of days the rivers will exceed standards for fecal bacteria in a Typical Year. The models also allow you to adjust the assumptions and see how the outputs might be changed — this data will be in the Alternative Simulations report, due in December 2021.

Two additional things are required by the 5-year CSO variances.

- CSO informational signs on Alewife Brook (2), One on Mystic River, 2 along the Mystic basin:
- CSO notifications

MWRA putting up signs in 5 locations. (Map) Hope to install spring 2021



Final requirement is public notifications of CSO activations by a subscription system. Near-real-time notifications of both treated and untreated CSOs on the Charles and Mystic will be provided by email and/or text message.

Sign up at http://www.mwra.com/updates/eve rbridge/join.html
More info at https://www.mwra.com/harbor/html/cso_reporting.htm

Also required to report volumes within 5 days – this information will be on mwra.com at the second link above.

Q&A

Q: when you mention getting more flow to Deer Island, is there capacity downstream and at DI itself once you get all that additional volume, especially in bigger storms?
Dave Kubiak: That's why I say "preliminary modeling" each time. This is the investigation- so far. Additional modeling will be conducted to ensure that if more flow is added to the interceptor system, it doesn't cause harm, such as higher CSO somewhere else or an SSO. We model the Typical Year, as well as larger storms (5 and 10-year), also looking at upstream impacts to ensure no harm to low-lying neighborhoods.

Q: Another option you mentioned was diverting stormwater directly into rivers—can that be done without increasing the nutrient loads to the river? What's the quality of that stormwater, and how might that have to be managed?

DK: absolutely have to look at that. All 4 communities are taking stormwater out of the CS (sewer separation), which will reduce overflows, and are planning to send that stormwater to receiving waters. May affect or be regulated by the community's MS4 permit. An example of a limitation on how much stormwater can be sent away from the CS, is the Cambridgeport area. Our LTCP goals at Cottage Farm had relied on full separation. But because of TMDL for phosphorus and related requirement in Cambridge MS4 permit, Cambridge can't send all of the stormwater into the Charles. Looking at partial sewer separation. MWRA has approved this partial sewer separation plan on a trial basis. Prior to implementing partial sewer separation system modifications, all of the Cambrideport separated stormwater went to MWRA and contributed to Cottage Farm discharges. Now that improvements are in place, some of the stormwater is going to sewer system, some to the Charles. Evaluating the benefits. Preliminary modeling showed Cottage Farm still not meeting LTCP for volume. New modeling with updated meter data post-adjustments might show attainment.

Q: Report mentions a final water quality model and calibration report in November. Is that available to the public?

Wu—we just received the final a few days ago. At a minimum will post this to our website

Q is MassDOT resisting the sending of stormwater from I-93 into the Mystic?

DK: MWRA and Somerville just starting to investigate the feasibility of diverting the highway flow to the Mystic or into the CSO facility further downstream. MWRA is metering the 10-hills area to figure out how much flow there is and whether it is feasible to send it downstream of Somerville Marginal. Also looking at the quality of the water. They are not without bacteria but more typical of stormwater than sewage.

If we or Somerville pursues removing these flows, then we will discuss it with MassDOT.

Q On Accuracy of meters & hydraulic model:

DK: Absolutely right that these are estimates of flow. We are collecting a lot of data at outfalls, not actual volumes, but rise of water within the regulator, flow into the regulator, gate inclination at the tide gates to see whether the tide gates are opening. All this data is then used to determine whether there was an activation and estimate volume. But they are estimates. Metering has improved greatly, but not exact science. Hydraulic modeling is the same way. It has improved greatly, but also still based on estimates. Even today, there are certain complex hydraulic performance not completely captured by the models.

Would call these very good approximations. Calibrated with an enormous amount of data. Which you can see from our reports. We have a lot of confidence in this hydraulic model. Also compare it with data from within our interceptor system, which is much more accurate.

Also, take a look at **S 2.4** of **Semiannual report #4**. That section deals with margins of error.

Karen Lachmayr – thanks for the presentation. You mentioned you are a "repeat act," and there's good reason for that—the enormous investment in CSO prevention, and WACs interest in maintaining and protecting the investments made by ratepayers etc. into the MWRA

Can you give us a ballpark of the monetary investment in CSO prevention since the inception of the MWRA?

Includes all design and construction of all projects, planning work from late 1980s onward when MWRA was formed. $912m. Also includes $5.2 for current performance assessment. $3m of that just for rainfall & CSO data. Metering is very expensive, which is one reason we phased out the temporary meters.

Q: rainfall and lack of it this summer—a problem for modeling?

DK: had enough rain that it's not a worry.

Q: Is it correct that the water downstream of CSOs has less bacteria than upstream?

A: Yes, typically and over many years worst water quality is upstream of the Watertown Dam. Water quality in the basin, particularly in dry weather is quite good.

Next meeting:
February 5, 10:30 am, Virtual
Post-Covid Facilities Planning