



**WATER SUPPLY CITIZENS
ADVISORY COMMITTEE**
to the Mass. Water Resources Authority

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WSCAC Meeting

February 21, 2017 - 10:00 A.M.

Location: MWRA Facilities in Southborough

Members in Bold in Attendance:

Whitney Beals, WSCAC Chair, NE Forestry

Gerald Eves, Trout Unlimited

Martha Morgan, Nashua River Watershed

Bill Fadden, OARS

Kurt Tramposch, Wayland Wells

Janet Rothrock, LWV

Andrea Donlon, CRWC

Paul Lauenstein, NepRWA

Michael Baram, BU & CLF

Martin Pillsbury, MAPC

Terry Connolly, Town of Ware

Non –Members in Attendance:

Lexi Dewey, WSCAC staff

James Giuod, MWRA Advisory Board

Alison Field-Juma, OARS

Gabby Queenan, Mass Rivers Alliance

Matt Barry, Tata & Howard

Bill Dobson, Independent

Andreae Downs, WAC

Roger Skillings, Skillings & Sons

Jean McCluskey, M.F. Alliance

Karen Gracey, Tata & Howard

WSCAC Business

Whit Beals called the meeting to order and asked members/non-members to provide introductions for the recording. Whit then entertained a motion to approve the January Meeting Summary as distributed; the meeting summary was approved.

Lexi Dewey provided several updates. The conversation surrounding NPDES permitting is still ongoing. As the funding aspect is still to be determined, Lexi will keep members informed as she receives more information. Debt Service Inclusion for MWRA is still an ongoing conversation as well. The hope is to keep a placeholder at \$500,000 for this year, but it still unknown at this point.

Lexi spoke to the FY17 Second Quarter Orange Notebook and noted that the report discussed the impacts of the severe dry weather on both the water and sewer side of MWRA. Precipitation was the second lowest amount since July of 1998 with only 33.5 inches of rain. Lexi also mentioned that the MWRA Board of Directors voted to approve the northern and southern deep rock tunnels for redundancy to the water system. Staff will now move forward with MEPA review. This project will be an ongoing conversation for WSCAC.

Gabby Queenan, Policy Specialist from the Mass Rivers Alliance provided an update on the status of an Act Relative to Drought Management. The next step for the bill is review by its assigned committee which is likely to be the Joint Committee on Environment, Natural Resources, and Agriculture. Lexi thanked members for calling their respective representatives in support of the bill.

Lexi then informed the committee that MWRA is participating in a national lead service replacement program. The project is collaborative – MWRA will be working together with other water supply groups and environmental groups to accelerate the replacement of lead service lines.

Lexi thanked Kurt Tramosch and Lou Taverna for their help in putting the meeting together. Whit welcomed and introduced the first presenter, Gabby Queenan.

Private Irrigation Wells Nonessential Use Restrictions in Massachusetts

Presented by Gabby Queenan, Policy Specialist at Mass Rivers Alliance

Gabby introduced herself and informed the committee that she would be discussing a report completed by the Massachusetts Rivers Alliance regarding private well irrigation. The alliance began research for the report, *Private Irrigation Wells Nonessential Use Restrictions in Massachusetts*, in June of 2016. The Alliance was seeking to understand which Massachusetts laws and regulations impact private well usage and what towns are doing to regulate private well usage.

Gabby explained that she surveyed fifty-eight towns in the Commonwealth. Her intent was to focus on private irrigation wells, not just private wells used for domestic purposes. Gabby spoke with water suppliers, members of Boards of Health, and conservation commissions. Gabby asked the following three questions in the course of her research:

1. Do you have any by-laws that impact private well usage in terms of non-essential use restrictions?
2. Why or why not?
3. Have you ever considered putting such restrictions in place?

Gabby found that four towns had language in their use restriction by-laws that would hold private well users to the same standards as those in public water supply: Hamilton, Wenham, Topsfield, and Falmouth. Hamilton, Wenham, and Topsfield all actively enforce their by-laws. The motivation behind the enforcement of the by-law for all three towns was that they had appealed their Water Management Act permits and had been denied their appeal. Thereafter, MassDEP encouraged the towns to strengthen their use restrictions.

Falmouth's by-law may allow the Town to impose water restrictions on any of the Town's water users, including private well owners in the case of a declared "State of Water Supply Conservation." Falmouth has since updated their by-law. Gabby added that Wrentham has also passed a private well by-law since the report was completed.

Based upon her research, Gabby identified nine obstacles towns face in implementing by-laws that would restrict private well usage in terms of non-essential water use. The following chart (included in the report) details the obstacles and the number of towns that indicated the existence of such an obstacle.

Table 1. Obstacles to Addressing Private Well Regulations

| Obstacle | Number of Towns Indicating Obstacle* |
|------------------------------------------------------------------------------------------------------|---------------------------------------------|
| Bylaw including private wells has never been considered in the town | 25 |
| Concern that the town does not have authority to regulate private wells | 22 |
| Belief that water users should regulate themselves rather than having the town impose a bylaw | 9 |
| Lack of support from local citizens for a new bylaw | 9 |
| Representatives prefer to wait for DEP to impose mandatory regulations for private well restrictions | 8 |
| Skepticism that private wells have a hydrologic impact and feeling that bylaw would be unnecessary | 4 |
| Strong opposition at town meetings | 4 |
| Concern that the regulatory process would be too complex for a town to regulate private wells | 3 |
| Lack of confidence in the effectiveness of bylaw enforcement | 2 |

Gabby then discussed the major takeaways from the report. First and foremost, private irrigation wells generally draw on the same groundwater reserves that support public water supplies and sustain our streams and rivers. More research, however, must be done on the hydrologic impact of private irrigation wells. Gabby stated that secondly, looking at private irrigation wells is not just an environmental issue. Consideration must be given to matters of equity and enforcement as well. Finally, although local communities should look to revise their own by-laws, there is a role for the Commonwealth to play. The state for instance, could look into funding options for research regarding the hydrological impacts private irrigation wells. Gabby concluded her presentation and opened the floor for questions.

Paul Lauenstein thanked Gabby for her presentation saying it was informative and focused on an extremely important matter.

Michael Baram commented on property rights issues that arise in the context of regulating private wells at the local level. He identified “taking” issues as a potential challenge to the enactment or enforcement of such laws. Gabby agreed that this matter of property rights plays a role. She explained that towns that do have such by-laws cite to Massachusetts General Laws, Chapter 40: the police

powers of the towns to protect public health and public welfare. The towns have also relied on Chapter 41 which consists of a town's right to regulate water usage.

Whit asked if Gabby had discerned what the primary motivation was for a private landowner to put in a private irrigation well in an area where there was a public water supply. Gabby said the matter came up many times. In some instances, strong non-essential water use restrictions imposed by water suppliers have given impetus to an increase in private irrigation wells. Another motivation Gabby spoke to was the desire of private land owners to have direct control over their own water supply, especially in communities that impose block rate systems.

Roger Skillings, Skillings & Sons, Amherst, NH

Roger is the owner of Skillings & Sons Well Drilling and is a member of the New Hampshire Water Well Board. He introduced himself to the committee and said that well drillers are busier putting in irrigation wells than they ever have been before. One of the reasons for the high demand is the cost of water. Roger went on to state that overall, whether it be through private well usage or municipal water supply, people are wasting a ton of water. The way lawns are sized and watered is incredibly wasteful. This year, more than any year before, Roger advocated the benefits of conservation-minded landscaping to his customers. The way in which water is being wasted is not benefitting anyone – in fact, it is detrimental for all.

Roger then discussed bedrock wells. He explained that the industry struggles to see where the water comes from and where the recharge is. Roger said we also do not see a big influence to big aquifers. Towns, Roger explained, usually put their wells in “big” aquifers (500-1500 gallons per minute). We do not see the impact from drilled wells in bedrock to these aquifers. What we do see, however, is that when municipal wells are pumped and strained, neighbors are affected. The reason for this is that static levels in bedrock wells are very seldom the same as the water table around it.

Roger explained that wells are not the answer to the problem. Nonetheless, wells will spread the strain of the demand on. Whereas the municipal water for MWRA ratepaying towns in the eastern part of the Commonwealth is coming from the Quabbin, the groundwater in those towns is untapped. One of his selling points is that the well water is localized. In consequence, you are not depending on the municipal water supply when you have a private well.

With respect to the drought, Roger explained that eighty percent of the failed wells in 2016 were shallow, dug wells (10-12 feet deep). Point wells did not fail as frequently, as they go down twelve to thirty feet. As for the bedrock wells, anything that was over eighty to ninety feet, Roger did not experience any issue – other than the fact that users were trying to use more water than the wells were capable of.

Whit asked if Roger's test well drilling verified the fact that eventually it is the surface water table that replenishes the bedrock water – slowly, overtime. Whit asked if there is a direct correlation there. Roger said yes, there has to be. The question is how long does it take for any given well to affect the area around it. Whit commented that the question is also how long does it take for the bedrock to recharge from the surface water.

Michael commented that if a connection between bedrock wells and surface water impacts on streams and rivers cannot be shown, a court is likely to find that there is no rational basis for a town regulation. Paul commented on the concept of distributing demand. In the SWMI study, Paul explained, there was an efficient flow study conducted. They found that fish populations were not only affected by over-withdrawals, but there were places that were surcharged and also having an effect on fish populations. Paul theorized that if we could somehow distribute demand by putting smaller wells in other sub-basins, we could balance out the demand and make environments healthier.

Roger replied that the problem with putting wells in other places arises from the realities of development. Development of the land has eliminated options for well sites. The other issue is that we have polluted the land in so many places that water sources have been polluted and lost.

Paul suggested that if some of the other wells were used for irrigation, as opposed to drinking water supply, it may relieve some pressure on the municipal wells. Roger agreed. Nonetheless, the municipalities have made it difficult to put such wells in place.

Alison Field-Juma commented that she accessed Roger's website and noted that he talks about outdoor water use including xeriscaping and lawns. She asked: how can well-drillers and advocates for streams and rivers work together? Is there a better way to get the message out to members of the community? Roger said initially, the first order of business must be limiting the amount of grass in our towns. Secondly, irrigation should not be taking place while it is raining or when rain is anticipated. Regulation is required in this instance. Roger noted however, that issues of equity will inevitably arise.

The committee thanked Roger for his presentation.

New Source Development for Municipal Wells

Presented by Karen Gracey and Matthew Barry, Tata & Howard

Karen and Matthew introduced themselves and began their presentation by stating that Tata & Howard is a specialized water, wastewater, stormwater, and environmental services engineering consulting firm. Generally, Karen explained, they do not work in the realm of private irrigation wells; their primary focus consists of larger municipalities throughout New England. A majority of their clients are in Massachusetts. Their presentation would describe the process of siting and permitting a new municipal well

Matt provided an overview of Tata & Howard's Groundwater Exploration Program. When working with a municipality, the first step is to review available hydrogeological data. The next step is to obtain permission from the land owner and conduct site visits to determine if there is a need for permitting. Following site visits and permitting, Matt explained that they contract with a drilling company to install test wells. Preliminary water quality samples are then collected. Based upon the information gathered, the engineer will generate a report that details their findings, including an estimate of yield.

The next phase of the project consists of a Water Management Site Screening. In addition to the creation of a water conservation plan, an alternative analysis is developed. For instance, what will happen if this project is not completed, or what can happen if the project is implemented elsewhere?

Matt explained that the next step is a request for a site exam. The aforementioned work is summarized and a preliminary conceptual model of the aquifer is prepared. A preliminary Zone II delineation is also conducted. Zone II is the secondary area that contributes to the well. Zone I surrounds the immediate well site and must be well protected. Zone II, in contrast, extends much further out. All of this information is compiled into a report that is then submitted to MassDEP.

Once the request is approved by MassDEP, the engineer will meet with MassDEP on site to perform a site exam. While on the site, they consider issues such as land use, surface water features, and potential hydraulic connections to the aquifer. If a site is located next to a river or pond, they must determine if they are in fact pulling from those sources. The location of observation wells is also contemplated. Finally, the Zone I area is identified.

Alison asked if Matt if he has to look at water that the well would intercept – in that the well is intercepting water that would otherwise go to a stream. Her primary concern is with the impact on streamflow.

Matt replied that they do perform streamflow calculations in the pump test report. Actual pump tests regulated by MassDEP are conducted for a minimum of five days. You must monitor water levels for five days before the test, and then you monitor water levels during the five days of pumping. Potentially, depending on conditions, the pumping could extend beyond five days. Matt explained that if you are pumping near a pond, and you see the pond dropping, that serves as one indication that you are pulling from the pond. Water temperature is another indication. The groundwater in the middle of the winter might be fifty-degrees, but surface water is thirty-three to thirty-four degrees. So if the temperature of the water from the well you are pumping starts to drop, you know you are pulling from the pond. There are a number of factors to be considered, but a substantial amount of monitoring is done with respect to surface water impacts.

Whit asked if the first step is to look for any potential source of contamination in Zone I – the four-hundred-foot radius. Matt replied that yes, you need to own or control the area that constitutes Zone I. If you do not own the entirety of the Zone I area, you would need to obtain a conservation restriction on the portion that exists on an abutter's property – nothing can be in that Zone I.

Kurt asserted that the four-hundred-foot radius is an artificial construct. Rather, he explained, consideration must be given to the capture zone. Kurt asked if Matt looks strictly at the Zone I area or if he also considers the capture zone. Matt replied that if you cannot control Zone I, it is not even worth looking at the site. Zone I considerations are determinative with respect to moving forward in the process. Matt explained that if there were a septic system several hundred feet outside of the Zone I, they would take that into consideration to determine if they are pulling water from that direction. The ultimate objective is to determine if the site is in fact a safe water supply.

Following the conclusion of the site exam, Tata & Howard prepares a pump test proposal for MassDEP. The report discusses pumping rates, the need for a step-test: stress the well in increments to look at flows, drawdowns, and get an idea of what rate the well may be pumped at for a long duration. Matt explained that the pump test proposal also looks at the location of observation wells. Rather than a perfect ring of wells placed around your production well, you want to stagger the observation wells at varying distances to get a better idea about drawdown around the well.

Kurt asked if the observation wells vary in depth. Matt has seen varying depths, but typically if you have a gravel pack well at thirty feet, you want your observation well to be at thirty feet as well.

Matt continued to explain that the pump test proposal includes projections regarding the frequency of level readings and the use of flow measuring devices. Moreover, MassDEP wants to know where the water will be discharged to, how much water will be discharged, and what are you going to do to protect the environment. The proposal also discusses water quality testing parameters and frequency. If the pump test is scheduled to last for five days, the typical process is to test at the beginning, middle, and end of the test. If the test will exceed the five-day period, however, the water quality testing will be more frequent. The pump test proposal is sent to MassDEP for approval.

Paul asked where the effluent from the pump tests goes – his concern was respect to the recirculation of the same water. Matt explained that the discharge has to be down-gradient from the well, a minimum for four-hundred feet away.

Once the proposal is approved and returned, the pump test is performed. Prior to pumping, you must record your static water levels for a minimum of five days. Surface water levels and test wells are monitored; an ambient well, located far enough away from the proposed production well site so that it will not be affected, is monitored as well. Once the test is actually started, water levels are recorded. If it rains, precipitation is also measured to determine if the rain affects the water in the wells. Snow is also recorded.

During the pump test, the point of stabilization is also determined. At that point, you want to make sure that the well does not fluctuate more than one half inch over twenty-four hours. Once the point of stabilization is reached, MassDEP is notified and typically, the pump test can be shutdown. As soon as the pumps are turned off, recovery levels are monitored and recorded. The objective is to determine how fast is the water is coming back into the wells – both the production well (the test well) and the observation wells. After the pump test, records are maintained until ninety-five percent recovery is achieved – when the recovered level reaches within ninety-five percent of the original well level.

Janet asked if Tata & Howard tests for pharmaceuticals at this point in the process. Karen replied that although they test for a great deal of things, they do not test for pharmaceuticals.

Roger explained that pharmaceuticals often come from septic systems. If nitrate levels are high, it gives an indication that more research is required. He cautioned that you can only test for so much.

Matt continued to discuss the substance of the pump test report. The water quality results are analyzed and determinations are made regarding any need for treatment. The pump test data is also analyzed and safe yield calculations are performed with a seventy-five percent safety factor. The calculations take what you potentially could use and take twenty-five percent off the top. Matt explained that MassDEP will never issue a permit for a water supply that is the safe yield. The report also discusses a groundwater monitoring program. Tata & Howard prepares an Environmental Notification Form (ENF) – the ENF is triggered by the 100,000 gallons per day threshold. The Water Management Act must also be considered in the event that an application must be filed. In some instances, a town is looking to create redundancy in their system so they are not changing the current amount of water they are withdrawing from their basin.

Janet asked if any federal laws apply to this process. Karen explained that they must follow EPA regulations. MassDEP is the primary agency delegated to enforce drinking water regulations. Thus, Tata & Howard generally works with MassDEP. Nonetheless, they also work with EOEEA and the Army Corps of Engineers.

Matt explained that once MassDEP approves the pump test report, they will send a letter back to Tata & Howard summarizing the information, detailing any conditions that apply to what would then be a permitted site. The site would then go into MassDEP's database as a permitted public water supply. At minimum, a project such as this takes five to seven years.

Matt then discussed the impact of the Massachusetts drought conditions. The drought was the worst drought on record through August 2016. Three Tata & Howard clients with surface water sources in central and western Massachusetts were severely impacted. Groundwater resources, however, were impacted to a lesser extent. Matt cited a recent study that found that a six-inch rain event in Massachusetts is barely sufficient to get water into the reservoirs themselves. Rain events are therefore needed to maintain supplies – even more rain is needed to recover from the drought.

Kurt asked how Tata & Howard is dealing with emerging contaminants as they are becoming more prevalent in water sources. Karen agreed with Kurt that it is a challenging issue and discussed a number of towns that are now testing for emerging contaminants.

Whit asked what the average cost of a new municipal well project would be for a municipality. Karen explained that the project is done in phases. The exploratory phase may be a couple hundred thousand. Towards the end of the project, when you are looking at treatment that may be required, you really need buy-in. Matt estimated about three and a half million dollars overall.

Paul asked if Matt or Karen had a feel for the trend/number of new municipal wells in Massachusetts every year. Is it trending downwards or upwards? Karen answered that it is definitely trending downwards. SWMI created a challenge in trying to develop new sources in Massachusetts. Moreover, it is difficult to get a site permitted and the cost is significant. What Karen is seeing is a lot more conservation – fixing leaking pipes, for instance.

The committee thanked Matt and Karen for their informative presentation. Click [here](#) to see the Tata & Howard Presentation on the WSCAC website.

The meeting was adjourned.