

Big Sky Sustainable Water Solutions Forum Agenda

November Theme: Wastewater Treatment and Disposal

November 3, 2016

1:00-4:00pm

Big Sky Water & Sewer District, 561 Little Coyote Road

1:00-1:05pm: Welcome and Introductions

1:05-1:10pm: Public Comment

1:10-2:40: Presentation of Wastewater Treatment & Disposal and Future Needs

Wastewater Treatment and Disposal

BSWSD Overview, Ron Edwards, General Manager, Big Sky Water and Sewer District (BSWSD)

Yellowstone Club Overview – Mike DuCuennois, P.E., Vice President, Yellowstone Development, Yellowstone Club

Moonlight Overview, Kevin Germain, Vice President of Planning and Development, Lone Mountain Land Company

Canyon Area Overview, David O'Conner, Owner, Buck's T-4

Workforce Needs, Kevin Germain, Vice President of Planning and Development, Lone Mountain Land Company

Big Sky Area Septic Systems, Tom Moore, Environmental Health Specialist, Gallatin City-County Health Department

Wastewater Treatment and Disposal Regulations and Process, Todd Teagarden, DEQ, Water Quality Division, Engineering Bureau Chief

Connections to Ecological Impairments and Overview of Treatment and Disposal Options, Jeff Dunn, Watershed Hydrologist, RESPEC

2:40-3:15pm: Panel Presenter Q & A and Discussion

3:15-3:20pm: Break

3:20-3:45pm: Discussion

Examples: Community Models for Wastewater Treatment and Disposal

Discussion:

- If Big Sky strives to be a model community in this focus area, what elements does this include?
- Given what you heard, what are the most important things to address in this area?
- What else would we like to know before we start thinking about alternatives to address concerns in this area?

3:45-3:50pm: Public & Committee Stakeholder Comment

3:50-4:00: Closing Stakeholder Question

4:00pm: Adjourn

Big Sky Sustainable Water Solutions Forum

Notes

September Theme: Physical and Legal Water Availability

September 28, 2016

1:00-4:00pm

Big Sky Water & Sewer District

561 Little Coyote Road

Stakeholder Members Attending: Guy Alsentzer, Upper Missouri Waterkeeper; Brad Bauer, GGWC; Pat Byorth, Trout Unlimited; Rich Chandler; YC & GRTF Board; Mike DuCuennois, YC & BSWSD Board; Kristin Gardner, GRTF; Kevin Germain, LMLC & Big Sky Chamber & Resort Tax Board; Susan Duncan, AGAI; Ron Edwards, BSWSD & GRTF Board; Travis Horton, FWP; Matt Kelley, Gallatin City-County Health Department; Thomas Moore, Gallatin City-County Health Department; Ethan Kunard, Madison CD & Madison County Planning Board; Peter Manka, Alpine Water; Mike Richter, MBMG & GRTF Board; Ann Schwend, DNRC; Tim Skop, Gallatin County Planning Department; Kerri Strasheim, DNRC; Tammy Swinney, GLWQD; Eric Urban, DEQ; Wendi Urie, Custer-Gallatin National Forest; Brian Wheeler, Big Sky Resort & BSWSD Board; Ciara Wolfe, BSCO; Bob Zimmer, GYC

Public Attending: John LaFave, Montana Bureau of Mines and Geology; Sharon Brodie, SciGAIA; Gary Gannon, SciGAIA; Grant Hilton; Casey Drayton, BSOA; Britt Ide, Big Sky Chamber; Emily Casey, GRTF; JeNelle Johnson; Mia Lennon; James Rose, MBMG; Steve Johnson, Zoning

Notes: Karen Filipovich, Stephanie Lynn, Jeff Dunn

Detailed Notes

Welcome and Introductions

Attendees were asked to introduce themselves and to describe how they felt about being at the meeting. Responses were positive or neutral.

Public Comment

There were no public comments.

Presentations: Physical and Legal Water Availability

Jeff Dunn provided an overview of several topics. First, he gave an overview of the hydrologic cycle. The Lone Mountain SNoTEL high elevation site has had highly variable precipitation in the period of 192-present (26.2"-42.9" with a mean of 33.7"), with increasing temperature. Gallatin streamflow has been recorded from 1930-present. In comparing the period 1930-1995 and 1995-2015, there is some evidence of higher runoff in May and a lower late season in the latter period. Ground water is upwelling above and below the West Fork into the West Fork. Water supply is in four major

“buckets” of the Big Sky Water and Sewer District (BSWSD), Yellowstone Club (YC), Lone Mountain Land Company (LMLC), and Canyon. Water use is highest in the summer with projected increasing demand. Development also can increase evapotranspiration and decreases infiltration because of increased impervious surfaces. Dunn also gave an overview of climate change projections from several sources. Over time, the models predict an increase in temperature, a range of possible trends in precipitation, and change from a snow driven climate to a transitional one by late in the century. Overall, the recommendation is to incorporate these factors into planning and management.

Kerri Strasheim, regional water manager for the Department of Natural Resources and Conservation, presented an overview on water rights and legal availability. Montana is a Western Doctrine state, so water use is “first in time, first in right.” Big Sky is in a closed basin. The Upper Missouri, like much of the state, is closed to further surface water appropriation. Part of the area is also in the Yellowstone Ground Water Control Area (south of the turn). Downstream demands with senior rights include hydropower and agricultural rights. In the Big Sky area, there are 444 exempt wells. Because it is a closed basin, mitigation to provide a greater water supply comes from historical rights. There are very few old rights in the Big Sky area. Ground water use has to be mitigated drop for drop since 2005. Exempt wells have reverted to 2014 rules for land subdivided in 2014 or earlier. As Big Sky plans, it has very limited options for “new” uses, due to the lack of mitigation water in the area around Big Sky. It is especially acute on the Gallatin side, but also present on the Madison side, though dam controlled water there makes it a little bit easier. Balancing demands on water supply effectively requires good planning. The Henry’s Fork in Idaho is a good example of how people have worked together to balance the issues.

Pat Byorth, director of Trout Unlimited’s Montana Water Project, described what’s important to think about with in-stream flows for fisheries and well information on mitigation and potential for conservation and green infrastructure. First, he addressed the question of how much water fish need. He said winter habitat is the most limiting factor. In winter, fish need enough water to avoid any of the three kinds of ice: frazil, pack ice, and anchor ice. Fish mortality can be significant. In spring, bank full flow at least biennially is important for fish passage and to recharge, redeposit and reseed the substrate and banks. In summer and fall, there needs to be enough water on the riffles to ensure oxygenation, adequate aquatic insect production, and keep water cool. Adequate depth and pools are also important for cover. There are several minimum flow methods that attempt to calculate minimum flows necessary, but all have some shortcomings. Second, Pat answered that there any water left over for people? Legally, the water has been allocated, so the answer is no. However, mitigation is a way to share the water. There are three kinds of mitigation. Legal mitigation is the sale, transfer or lease of existing water rights. In-lieu fee wetlands mitigation under the Clean Water Act, section 404 can be accomplished through a private mitigation bank and is driven by the permit process. There is also a third approach to mitigation that is less formal, but focuses on holding and slowing water across the landscape through ecological processes. These conservation and green infrastructure options includes improving pocket wetlands that had been drained by logging in the Big Sky area, beaver mimicry, and water quality and quantity solutions.

Ann Schwend, watershed planner for DNRC, discussed drought resiliency and community planning. Drought is present anytime there is water scarcity, so it isn't just lack of precipitation but also anytime there is not enough water to meet all demands. Planning is important because we all have a water budget we have to live within. Legally, we don't have enough water in the basins and climate change and drought both are shifting dynamics. A water budget is much like a household budget; resources can be allocated to one place or another, but it has to be done within the confines of the total available. In the headwaters area, slowing water down is like a savings account. The Montana Drought Resilience Partnership Demonstration Projects in the Upper Missouri River Basin (upstream of the Missouri headwaters) is designed to leverage and deliver resources, engage communities, and implement projects. This approach will develop local and regional capacity to plan for drought. Community drought planning will help develop an understanding of supply and demand, a vulnerability assessment, an emergency response plan, and mitigation strategies. Individual watersheds are developing plans that will roll up and be included in a headwaters basin level plan. The Gallatin River Task Force is developing the drought resiliency plan for the Upper Gallatin.

Mike Richter, research specialist for the Montana Bureau of Mines and Geology (MBMG) described ground water conditions in the Big Sky area. Prior to 1995, there were about ten wells drilled per year. There was a rapid uptick in wells in the early to mid-1990s. Four factors seem to have contributed: the movie *A River Runs Through It*, Big Sky Resort installed the tram, Ron Edwards came on at the Big Sky Water and Sewer District (BSWSD) and the building moratorium was ended, and the exempt well loophole allowed an avenue for the development of smaller wells. MBMG has twelve long-term sites and three springs it monitors in the Big Sky area. The geology is quite diverse: the sand and gravel/alluvial aquifer is the best quality water, but least common in the area; the sandstone and shale has mixed quality water and elevated pH and minerals are common. The Madison Limestone is only available in the Canyon. Its fractured bedrock provides decent water supply. Snowmelt causes a yearly spike in ground water in the spring. The Meadow Village aquifer is a small, great aquifer that is relatively shallow. The North, Middle and Crail areas recharge, and it discharges into the West Fork. This aquifer responds to changes in climate and surface water and is susceptible to surface contamination. Ground water irrigation does cause a pulse in well data. The new public water supply goes online in response to greater demand on the Meadow Village aquifer.

James Rose, hydrogeologist for MBMG, presented information on the detailed study of the Resort and Meadow Village. He and the MGMB team are in the process of collecting and analyzing data and developing a model to help manage the ground water resources. The underlying rock includes cretaceous sediments, Madison limestone, and a Dacite intrusion. Nine aquifers are used by wells in the area. 65 wells are being monitored for water level and chemistry. There are 15 sites with stream flow. In the Meadow Village, there are alternating gaining and losing reaches. The delineated aquifer is thinner on the edges and is deepest along the northern edge. MBMG is tying the information together to develop a ground water model. This model is expected to be completed in 2017 and will be a useful for helping manage water supply for this portion of the Big Sky area.

Peter Manka, principal water resources engineer for Alpine Water, discussed water quality in the water supplies. In the BSWSD, there are approximately 2,000 service connections. This water is

high quality, though does have elevated calcium, which is commonly known as hard water. Salt water softeners can contribute high chloride levels as a result of the exchange which can then enter the wastewater system. Some cities and municipalities have restricted or banned the use of salt water softeners. Outside of the BSWSD and a handful of public water supplies, everyone relies on private, unregulated water systems. There are about 300 private water systems in the greater Big Sky area. Water quality problems in those private systems include iron, sulfides and even arsenic in some locations. There are treatment options for most taste, smell and health-related constituents, but some are very expensive and can be very energy intensive or wasteful of water. Manka said that the odorless, colorless constituents that can cause health problems and are highly variable in the Big Sky area and point to a need for individual well testing and a database that tracks water quality issues so that landowners and the community can ensure that appropriate measures can be taken.

Panel Presenter Question & Answer and Discussion

Q: We have a sediment recapture pond that we're restoring. Would we be better served by restoring it as a wetland? Why aren't we taking every opportunity to restore wetlands?

A: Pat Byorth: That's a tough one, because you want the amenity in the neighborhood. It's good to take it off from the stream, but I don't know enough about it to say whether or not the community would be better served with a wetland or a fishing pond. Ann Schwend: There are some additional factors like depth and evaporative loss that may affect water use and storage. It's best to take these projects on a case by case basis. Kerri Strasheim: Maintaining the wetlands we already have is just as important.

Q: Is anyone researching where you can take high runoff to recharge aquifers? Related to that, what are the issues relating to lower stream flow?

A: Ann Schwend: We [DNRC] just updated state water plan. We identified areas where we can do shallow water recharge. Riparian systems and floodplains are the natural systems for catching water. Allowing the area to flood might make the most sense. Looking at soils and aquifers could guide where that would be beneficial. Pat Byorth: Zones with dry, shallow aquifers would be the ideal place to do something like this. Travis Horton (FWP) There might not be room (in the groundwater system) to recharge at the key time. James Rose: Timing is key and it also depends on the geology of the system. It might not be the ideal place. Water moves through it regularly and it's pretty much full in the spring. Kerri Strasheim: There's a line when you cross into water right considerations. Natural restoration is OK, but diversions are not.

Q: Our water right doesn't account for and enable low impact development because it is classified as DNRC as a diversion or new use. Could you comment on how you this might work?

A: Kerri Strasheim: Potentially. It's case by case. One thing that is nice about Big Sky is the permitting was done before the TU decision. A lot of permits were issued with the idea that they could be fully consumptive. Theoretically, you could change the dynamic and figure out something else to do beside irrigate (fully consumptive). Pat Byorth: The law is constantly evolving. There are great opportunities to craft and adjust or reform the law. We have to figure out ways to more flexible and fleet on our feet and acknowledge that downstream water rights have primacy.

Q: Can you change an existing commercial right to a municipal right?

A: Kerri Strasheim: Yes, it would require a change application. We could look into change in purpose. I would have to get more details, but yes, it is possible.

A: There is a well on the mountain that needs to be rehabbed. Because it's commercial, we can't rehabilitate it. If that well were designated as municipal, we could rehab. Do we have a law on the books for water rights banking? Can we acquire water rights and transfer down to Big Sky?

A: Pat Byorth: We're working with a group to address that question, and Big Sky would be a natural partner. Right now people are advertising water rights in the classified section. With a Gallatin water exchange, we could make this process more efficient. There's a lot of people working to get that up and running. Kerri Strasheim: Recently, we opened the law up to water exchange. We're expedited the process without showing the use up front. You just need to demonstrate where mitigation would be effective. We're not trying to be a banker, but the Gallatin project is trying to be a banker or clearing house for mitigation and water rights exchange.

Q: AGAI has developed a mitigation group that is working on this. This is new to irrigators. You have to decide you don't need it and it's like going out of business. In terms of buying and selling, it's based on what you use, not what is on paper. A neighbor can only transfer 25% of what you have. The change process is not what you would expect. How do you determine what the price is? And whether the person selling is going to get what they think? And whether the buyer is going to get the volume you would expect?

A: Pat Byorth: With a water right, you take out a certain amount and apply it to a specific acreage. You can only sell the consumptive portion or the portion taken up by the plants. Any time you go through the change process you have to do your due diligence just like real estate. When you go through a change, you take it from grey to black and white.

Comment: Susan Duncan: At AGAI, we have a challenge explaining it to our members. This will change us from private to semi-private.

A: Pat Byorth: There is no mature market for buying water. Where free market drives the exchange of water, 10 acres of alfalfa don't equal as much \$\$ as a development. We want to make this a more reasonable and thoughtful process. In the Gallatin Valley, there are ranches that have been subdivided and part of their water right could either be considered "abandoned" or could be sold as "mitigation".

Comment: Ron Edwards: A rancher called BSWSD to sell his water right to Big Sky. He claimed to have 3200 acre feet with an 1885 date. He has less than 300 in historical use. There a lot of ranchers who think they have a big pay day coming and they don't. And we don't even know if we can legally move the water up to Big Sky.

A: Kerri Strasheim: Being able to move it upstream, you would have to show no adverse effect, which would be challenging.

Comment: Travis Horton: Part of the problem is the paper claims haven't been adjudicated. Just because you can buy 3,000 acre feet in Bozeman, unless you can physically move it, you can't use it; there would be too many effects downstream. The spatial context of mitigation is critical.

Kerri Strasheim: We have been through adjudication and the use is near the maximum.

Comment: Susan Duncan: The worry is that Big Sky will buy up a ton of water rights and run the river dry.

A: Ann Schwend: You make a good case for planning and it's going to be very complicated. You have to think about supply and demand, the legal framework, and bring all the people together to better understand where we go in the future. Our budget isn't increasing, but the demands are.

Comment: Susan Duncan: There can't be winners and losers.

A: Pat Byorth: We need to do some research on the demands of full and half build-out and what that means downstream. If you can save water in Big Sky, there might not be an effect on downstream water users.

Q: James, we had previous thought about doing a similar ground water study in the Canyon. We didn't get it but can we reapply?

A: James Rose: Every year we go through a selection process. I think we can try again next year or in two years. We need to clean up some points and get more to the urgency of the situation. Big Sky has an impact on the economy of the state.

Closing Question: Any last take homes?

A: James Rose: The systems are pretty broken up. Trying to consolidate into the better aquifers might be a good way to manage the systems. We hope to be able to better illustrate the variability within the aquifer for the future.

A: Ann Schwend: I think there are great leaders and minds; this is going to take some rolling up our sleeves to figure it out.

A: Pat Byorth: Water is everything and it touches all the major issues. Getting the data and spending some time brainstorming creative approaches will be cool.

A: Kerri Strasheim: The same thing. The location is a challenge. There isn't a lot of historical water, so you'll have to think of pooling water and stretching it.

A: Pete Manka: We're at a great juncture and we haven't run out of water yet. We have to pool our knowledge and move forward. We need to get people informed and help them understand systems.

A: Mike Richter: Water conservation is going to be a critical player in Big Sky. We're ahead of it and don't have our backs against the wall.

A: Jeff Dunn: There are lots of available resources and opportunities to restore resources and mitigate.

Community Models and Discussion

Examples: Community Models for Water Supply

Karen Filipovich briefly presented several community models that address water supply and availability. Denver Water coined the term "xeriscaping" in 1981, as a way to describe a way to

describe drought-proof landscaping. In addition to remaining a leader in xeriscaping, Denver Water combines this voluntary approach with water pricing, watering rules, rebates and education and outreach. The City of Bozeman offers another good example of an integrated approach with the development of an Integrated Water Resources Plan (with a 50 year outlook), a water conservation program, modest water pricing, drought planning and seeking additional supply. Los Angeles has begun implementing a Storm Water Capture Master Plan that actively channels stormwater into the ground water aquifer where it is then pumped and reused in a “toilet to tap” cycle that represents part of the city’s portfolio of water sources. Additionally, Los Angeles recycles filtered wastewater and uses it to water cemeteries, parks, and lakes such as Lake Balboa, and employs purple pipes to integrate recycled water into its irrigation system. Legal mitigation is possible in Montana and the Grass Valley French Ditch Company, on the west fringes of Missoula, has completed the change process and set up a private mitigation bank in Montana, the culmination of a seven year process.

Discussion:

The group discussed three questions. These questions are the same as discussed in the previous meeting. Each time, the group is asked to focus on the topic, in this case water supply and availability.

The group considers the first two together: If Big Sky strives to be a model community in this focus area, what elements does this include? Given what you heard, what are the most important things to address in this area?

Answers:

- Establishing the desired state
- Development regulations on the amount of green space, water features, ponds (changing and convincing those that have to change direction)
- Is development of confined aquifers sustainable?
- Scientific credibility: do not want to set up effort to fail. Tie growth to watershed health.
- Maintain legal rights and framework
- Understanding existing regulatory framework
- Integrate good long term climate models
- Reminiscent of Integrated Water Resource Plan: Find out what we have, what maximum build-out is, and how to balance that (looking out 25 or 50 years)
- Lots of opportunities with innovative storm water impacts: high water in spring – can be captured; storm water rain garden/wetland
- Efficiency in treating and using water – how treatments affects processes
- Water meters on all public system and effective tiered rates
- Establishing nature of GW/SW connection
- DNRC has guidelines on shallow aquifer recharge: if in capturing water, not just storm water, if downstream senior water right objects, you need a water right
- Building a much higher awareness in the community of needing to conserve water

What else would you like to know before we start thinking about alternatives to address concerns in this area?

- Uncertainty on GW development of exempt wells and what the legislature will do in January: How much could you take legally now?
 - DNRC: What do you want aquifer to be maintained at? You can have a controlled groundwater area in the Meadow. The bureau could help with that. MBMG can add in factors like climate change.
- Pre and post water balance or budget: technically, post development there is more water due to increased impervious services
- CSKT claims – pre 1855, good for instream flow, potentially bad for development
- What if community dynamics shift towards more families and year-round residents?
- Modeling and monitoring should be complementary activities. Do we have adequate monitoring in the system for the groundwater and surface water systems?

Public & Committee Stakeholder Comment

There were no comments.

The meeting adjourned at 4:00pm.