

Identification and Mapping

Groundwater Dependent Ecosystems Workgroup

Meeting Notes

Date/Time: Thursday, November 19, 2020 | 2:30 p.m.

Location: <https://csus.zoom.us/j/87923439778>

Contact: Sam Magill, Practitioner Work Group Facilitator

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MEETING SUMMARY

[Welcome and Introductions / Agenda and Meeting Schedule Review](#)

Sam Magill, Work Group Facilitator welcomed the group then ran through the day's agenda. He mentioned this meeting was the last one scheduled for the group, but staff would consider an additional meeting if needed.

Marcus Trotta welcomed the group and said there are some revisions and updates to the mapping that he wanted to share and receive input. He also was looking forward to hearing thoughts on prioritizing the GDEs' to help focus development of Sustainable Management Criteria and future monitoring of the GSA, future data collections, studies, and approaches of the implementation phase of the GDE.

[Update on Groundwater Dependent Ecosystem \(GDE\) Mapping Process](#)

Marcus Trotta presented updated maps for sensitive aquatic species and vegetation and then presented draft integrated preliminary GDE maps. Patrick Lei, Sonoma Water, explained that three data sources are used to create the maps: 1) Sonoma Vegetation Map; interconnected surface water data; and depth to water threshold <30 feet. The analyses (presented by Marcus Trotta) help make sure we encompass areas that could potentially have groundwater within 30 feet. The maps have been shared with the Nature Conservancy and compared with their maps; there are some slight differences.

[Questions/Comments](#)

Rogers (chat) – What do the green stream channels signify in the Petaluma Valley map? Are those where riparian corridors exist but no sensitive aquatic species? I don't see the same on the other maps.

Patrick Lei – I think we are seeing an artifact of the mapping; the orders and layers of the maps.

Wendy Trowbridge (chat) – The assumption here is that vegetation is an innocent victim of groundwater decline. How would the GSA deal with a situation where warmer summer conditions lead to an increase in evapotranspiration and the vegetation causes a decline in groundwater? It could create a difficult situation for the GSA.

Trotta – Good question. That is something that will have to be considered and factored in. We will be developing 50-year projected model scenarios that will incorporate a climate future. It is something we could look at with the models and is factored into the SMC if it looks like a significant issue.

Magill – Maybe it is something we could flag for the Interconnect Surface Water work group.

Maxfield (chat) – How will diversions of surface water be factored in?

Trotta (chat) - Surface water diversions will need to be considered when developing the SMC for surface water depletion. I don't think they necessarily come in to play for GDE mapping.

Robert Pennington (chat) – Is this monitoring for GDE mapping or monitoring for SMC criteria?

Trotta (chat) – Monitoring for GDE mapping, although there could very well be overlap with SMC criteria.

Steve Rogers – For groundwater dependent vegetation, it seems the 30-foot threshold is specific to the rooting depth of oaks, but oaks have some of the deepest rooting systems of groundwater dependent vegetation species. Probably there are other shallower root species. Do they address other species besides oaks? It seems 30 feet wouldn't take into consideration other species.

Trotta – The 30 feet threshold is intended for consideration in mapping the potential presence of GDEs in the basin to be somewhat conservative.

Lei – We are trying to filter out eco systems that currently are not within 30 feet and probably not dependent on groundwater. It is a conservative model.

Rogers – I see now it is used for mapping vegetation and won't be used for management criteria for vegetation.

Lei – My understanding is that that is the next step.

Rogers – Makes sense.

Steven Lee – Looking at Sonoma Valley, there is one tributary, Stewart Creek off Calabasas, that might be underrepresented. It is a tributary that has Steelhead. It looks like Stewart Creek isn't listed on the map.

Trotta – Stewart Creek was included in the Steelhead mapping that David Cook did.

Lee – I don't think so.

Rob Pennington – Are there Steelhead present in the alluvial basin part of the groundwater basin or are they present in the upper watershed?

Lee – They have probably been cut off alluvially during the dry season months. I want to raise the issue, maybe it is intentionally left off the map.

Trotta – It looks like it is one of the streams filtered out through looking at the interconnected surface water. That stream isn't mapped as being interconnected surface water. We can follow up with David Cook.

Lee – What is the criteria for the delineation?

Trotta – If it isn't interconnected surface water, groundwater is below the streambed throughout the year and isn't contributing to the flow of water in that creek.

Lee – I recently did some temperature monitoring. Based on the way temperature data look, it seems there is a connection with groundwater feeding it.

Lee – In the areas identified less than 30 feet to the groundwater, it looks like the channels themselves, it doesn't seem to get wide beyond the channel area. Some monitoring I have done recently shows the groundwater is shallow southeast of Calabasas Creek, 500 yards or so off the creek.

Trotta – It would be great to see any additional data you have.

Melissa Rohde – Could you elaborate more why saltmarshes aren't included?

Lei – We have been working under the assumption of tidally influenced rather than groundwater influenced. If we think it could be groundwater influenced, we should include saltwater marsh and aquatic. The map classes we have been working on from the beginning didn't include saltwater marsh.

Rohde – It is worth considering, these ecosystems are defined as being dependent on groundwater near the earth's surface. If it is about using groundwater and is groundwater dependent, the species don't use multiple sources of water simultaneously at different times of the year. If the saltwater marsh areas were impacted by pumping there could be an inadvertent impact on the ecosystem if connected to groundwater.

Lei – If anyone has further questions about why some habitats were included or excluded from the maps, let me know, and I can get them added to the maps. I look forward to hearing your input.

Preliminary Data Gaps/Recommendations on Future Data Collection

Marcus Trotta presented a slide with questions about recommendations for additional data collection and studies and asked the group for input.

- 1) *Are there additional monitoring needs for surface/groundwater interaction to better understand CDEs?*
- 2) *Are field verification surveys required to confirm maps?*
- 3) *Are there certain GDE parameters that should be considered?*
- 4) *How should any recommended studies/monitoring be prioritized for GSP implementation?*

Rogers – Are you planning on getting people together to discuss this?

Trotta – It would be good to get initial ideas here on types of monitoring and prioritization of locations for monitoring, etc. The Surface Water Depletion workgroup will also have a discussion on monitoring related to surface water depletion.

Rogers – My suggestion would be to put in monitoring that would best inform the modelling effort.

Andy Rich – All the models that we are developing are data rich, there could be some improvement, such as the data collected by the Ecology Center of surface water - groundwater interactions.

Lee – Basically we have most of the important creeks included in this. The question is what other areas aren't included? In terms of data gaps, when using vegetation mapping as a basis for the analysis, it seems underneath the canopy of other tree species that would indicate groundwater dependent eco-systems that wouldn't show up in those, I am thinking of seeps. Most areas I am thinking of are higher up in the watershed.

Trowbridge – I would be curious to hear how other GSAs have dealt with vernal pools. Clearly, there are perched aquifers, but water does flow out of vernal swells. And seepage runs. Also, another pitch for the importance of measuring evapotranspiration.

Rohde – With regards to vernal pools, they are not generally included in the mapping. If the groundwater that the eco-systems are accessing and not connected to a principal aquifer it is not groundwater dependent in the context of SGMA. We have a GDE pulse we put together that includes satellite data from the last 35 years for mapped polygons, it doesn't include data from

your mapping. It would be good for us to talk about how you could do that. How to update the GDE pulse with recent data. Maybe we could give you the code.

Trowbridge – It seems like some of the differences between Sonoma Water’s vegetation mapping and the TNC’s vegetation maps in Santa Rosa Plain are related to perched aquifers associated with vernal pools.

Rohde – My understanding is the hydrogeology of the area is mostly unconfined aquifers. Can you explain the hydrogeology of the basin?

Trotta – The shallow groundwater conditions in the central portions of the plain, the shallow aquifer system is primarily unconfined. It is interesting the oaks are coinciding with areas of vernal pools.

Rohde – Is the groundwater essentially at the surface because of vernal pools or are the vernal pools there because the groundwater is at the surface?

Trotta – The vernal pools are superficial features that fill from precipitation in areas where the shallowest soils are sufficiently low permeability that allows for the formation of the vernal pools rather than filled by seasonal high groundwater fluctuations.

Rohde – When we are mapping the eco systems, one of the challenges is that we have a poor understanding of the shallow aquifer systems and the perched clay lands. SGMA is about adaptive management. If the vernal pools are driven by precipitation and surface run-off, under SGMA they wouldn’t have to be categorized as groundwater dependent eco systems. We don’t have data to prove that, so I think we should keep vernal pools in and address it as we move forward.

Pennington – Are there ideas for the SMC of the non-stream GDEs? What would the monitoring network look like? Will we have the monitoring such that it improves the mapping will make much difference in the end in terms of evaluating impacts of GDEs?

Trotta – I think it will for some of the next upcoming topics. If we had some areas that were higher priorities, maybe it would help identify monitoring needs.

Pennington – So you are thinking of using water levels for the GDE’s sustainable management criteria.

Rich – It could be useful for identifying data gaps in the future.

Rohde – In general the non-riparian vegetation types should be considered when you are establishing SMC for chronic lowering of groundwater levels. You would have to define what an Undesirable Result looks like for that accounting for all the other beneficial users that rely on groundwater levels in the basin.

Trowbridge – I would encourage more monitoring. It seems like much of the Santa Rosa Plain where there are vernal pools are underlined by clay layers. I wonder if much of the riparian vegetation along the creeks isn’t groundwater dependent on the deep groundwater so much as dependent on the shallow groundwater in the same way the vernal pools are. I don’t think we have the information to say one way or another.

Trotta – When we look at the areas that have been mapped, we limited it to segments that have been mapped as interconnected surface water. Based on that data, those segments are connected to the shallow aquifer system. With all the clay in the Santa Rosa Plain, the continuity and degree of the connection is variable. We don’t have a fine scale subsurface portion of the aquifer system to differentiate that. That is why the streams are made as interconnected.

Trowbridge – I think Santa Rosa Creek is interconnected. I wonder about some of the other smaller creeks that run by vernal pools, the lower parts of Copeland for example.

Trotta – Sounds like an area for future investigation and monitoring.

Pennington – In terms of what would be helpful, more shallow monitoring wells near streams would be useful for answering that question. I agree with the seepage runs, very useful. My knowledge of the stream gauging network is that it is quite good, I am not sure if there is a gauge is the upper end of Mark West Creek near Wikiup/Larkfield. Maybe one there would be useful. For Sonoma Creek, Sonoma Ecology Center would be able to advise.

Lee – We have three gauges in Sonoma Creek and a whole series of additional ones we have been trying to answer similar questions with other funding. Having more gauges and tracking more tributary flows would be an additional useful support. Steven Lee showed examples of stream temperature monitoring that he had done in the summer around the watershed. Temperature can be used as additional data to help inform this topic.

Rohde – I attended an fascinating session on groundwater dependent eco systems. There is interesting research being done using thermal imagery to map springs. There is some utility of using temperature to fill in data gaps.

Trotta – We have been using temperature as a tracer for groundwater-surface water interaction for years. It is a robust tool that can be used. In most applications it is usually more a focused study versus basin wide. New technology is coming out, it is worth considering.

GDE Grouping and Prioritization

Marcus presented a slide with guiding questions for the group and asked for initial input on the topics.

- 1) *Do we need to prioritize different GDEs?*
- 2) *How do we assign value to different vegetation classes?*
- 3) *Are there certain streams or stream reaches that should be prioritized for focusing SMC development and monitoring?*
- 4) *How do we select areas for additional monitoring?*

Questions/Comments

Rohde – Have you thought of grouping them into units first based on hydrogeologic setting? Associating polygons that are near each other and sharing same groundwater conditions – similar processes, easier to rank and monitor them?

Trotta – I have thought about it but not about how to implement it. It would be good to identify areas that have document groundwater level declines. Otherwise grouping based on hydrogeology could be a little challenging. The Bulletin 118 basins' mapping is similar hydrogeology in terms of superficial units, it may be difficult to parse them out that way.

Rohde – Well maybe not by hydrogeology but by location and habitat type? That would be my approach.

Rich – I think we could use some of the sub areas that were developed for the models. Some are based on hydrogeology and other groupings that might be helpful.

Trowbridge – One concern I have is that trees are a lagging indicator of groundwater depletion. What would be constrained are smaller trees and regeneration, and smaller vegetation. By using mature trees, you will miss the signal until it is too late.

Rohde – Yes, I echo Trowbridge's point. We need to maintain groundwater levels to ensure saplings survive. It is critical to ensuring the forests remain intact in the long term. It is key that groundwater needs to support spawning in future.

Lee – I appreciate the prioritization examples. Maybe there is a bit of a logic gap here. By choosing Steelhead streams we selected for high priority streams off the bat. But there are other streams that aren't Steelhead streams but that are fed by springs and have bugs and ecological value and

are dependent on groundwater. Maybe they aren't the high value ones, but they are groundwater dependent eco systems that have been selected in the process.

Pennington – In terms of David Manning's assessment, the most sensitive GDE are the streams, riparian vegetation, and then the oak woodland. My feeling for the oak woodland is that their rooting depths can change significantly, probably a little more resilient and cover a large area. Also, in terms of Steelhead streams, once the streams have been mapped, it would probably be good to stop labeling them as Steelhead streams. There is a framework, CA Environmental Flows Framework that relates different flow criteria and beneficial uses and functions.

Rohde – My colleague, Julie Zimmerman is co-leading that effort, if you are interested, I can put you in touch with her. I second the eco-system approach.

Trotta – We have been moving away from calling them Steelhead streams or Steelhead maps and changing it to Aquatic streams and maps. It is a change you will see going forward.

Pennington – In terms of grouping by stream, it would be useful to group them by what periods/seasons the different species exist in the streams.

Marcus Trotta said staff would send out the questions and PDFs of the maps for the group to review and consider and provide input, especially on prioritization of grouping. When staff receives your input, we will make additional adjustments and develop a draft narrative for the Advisory Committee and Surface Water Depletion workgroup. If needed, we can schedule another meeting to discuss remaining issues.

Marcus Trotta closed with a slide indicating next steps including: initial draft narrative describing process and how mapping will be used in GSP; develop draft assignment of ecological value; share maps and approach with Surface Water Depletion SMC workgroup; and compile list of prioritized recommended data collection activities.

Review Meeting Action Items

Marcus Trotta, Andy Rich and Rob Pennington thanked the attendees for their time, thoughts and interest.

Melissa Rohde asked if there would be a meeting on SMC for groundwater levels regarding groundwater dependent eco systems. Marcus Trotta said there is a separate workgroup meeting to discuss Interconnected Surface Water SMC. He said it would be great to get any thoughts from this group for developing the SMC for lowering groundwater levels and added that maybe we can loop this group into the discussions with the Advisory Committee.

Rob Pennington asked if draft SMC on chronic lowering of groundwater levels already been developed in all the basins.

Trotta – There have been some initial drafts of our proposed methodology, we are currently working on it and plan to bring it to the Advisory Committee in January.

Pennington – In discussions so far, have there been any conversations about the ecosystem?

Trotta – Most of the discussions have been about maintaining groundwater levels within or above historical ranges and making sure they stay above nearby wells. We did say we would revisit the SMC with information from groundwater eco system mapping but there hasn't been discussion yet on how it would be incorporated.

Attendees:

Jessie Maxfield, CA Department of Fish & Wildlife
Melissa Rohde, The Nature Conservancy (joined 3:10)
Rick Rogers, National Marine Fisheries Service
Robert Pennington, Permit Sonoma
Steve Lee, Sonoma Ecology Center
Wendy Trowbridge, Santa Rosa de Laguna Foundation

Staff/Presenters

Marcus Trotta, Sonoma Water
Andy Rich, Sonoma Water
Patrick Lei, Sonoma Water
Simone Peters, Sonoma Water (recording meeting notes)

Facilitator

Sam Magill, Sacramento State University – Consensus and Collaboration Program