

**Rockville Town Council
Regular Meeting
Rockville Town Hall
July 10, 2024 – 6:00 pm**

1. **CALL TO ORDER AND ROLL CALL:** Mayor Leach called the meetings to order at 6:00 pm. Michael Evenson, Robin Smith, Megan Honer-Orton, Mayor Pam Leach and Jeff Ballard were in attendance. Also, in attendance were Planning Commission members Chair Tyler, Vice Chair Arnold, Ken Rybkiewicz, Jane Brennan, Linda Brinkley, and Delayney DeLange. Town Clerk, Shelley Cox, recorded the meeting.
2. **PLEDGE OF ALLEGIANCE:** Mayor Leach led the audience in the Pledge of Allegiance.
3. **APPROVAL OF THE AGENDA:** Jeff Ballard **MOVED** to approve the agenda. Michael Evenson **SECONDED** the motion.

Vote on Motion:

Michael Evenson - Aye
Robin Smith - Aye
Megan Honer-Orton - Aye
Mayor Leach - Aye
Jeff Ballard: - Aye

The motion **PASSED** unanimously.

DECLARATION OF CONFLICT OF INTEREST WITH AN AGENDA ITEM: No conflicts were declared.

PUBLIC COMMENTS: There were no public comments.

DISCUSSION/INFORMATION/NON-ACTION ITEMS

1. **REPORT ON HURRICANE VALLEY FIRE SPECIAL SERVICE DISTRICT:** Battalion Chief Tyler Ames gave the fire district report. He said for the month of June, we had two incidents in Rockville, 42 incidents in Springdale with 14 of those incidents in Zion National Park. There was one significant incident inside the tunnel of a motorcycle wreck and the 19-year-old driver died. We had fires on the 4th of July 9 total. All the fires were outside of areas where they were supposed to be lighting fireworks.

The biggest fire in the area was in the southern part of Hurricane and was approximately 6.6 acres and was started by fireworks, citations were given.

Currently we do have one of our crews deployed on the Silver King fire, which is the one up by Marysville and we are looking at sending a crew over to Deer Springs Fire, which is over near Central. There was also a fire on Kolob that was started by an RV just South of the Iron County line. The cause was the refrigerator, but luckily it was surrounded by green trees and green glass, and it didn't go anywhere. Unfortunately, our fire district call volume has increased about 28%. Usually there is an increase normally from year to year of about 12% to 15%, that's fire, EMS, and other calls. But currently we're at 28% and I just pulled the numbers for Rockville and Zion and we're up 24% from last year on our call log. He said he wasn't sure if it is tied to the visitation numbers increasing in the Park. He reported all stations are staffed and doing well.

Mayor Leach thanked Chief Ames and please pass that thanks on to all of your crews for working so well to keep us safe. It's a tough time of the year for you now during the hot season and fireworks.

2. **DRAFT REPORT ON GROUND WATER QUALITY AND SEPTIC SYSTEM DENSITY STUDY:** Mayor Leach introduced Trevor Schlossnagle, a geologist from the Utah Geological Survey, which was conducting this study of the septic density for the Town. She stated this is a draft and the final report will be completed soon. Trevor Schlossnagle said this project was funded by a water quality hardship landing grant through the state that is helping pay for this study on behalf of the town, as well as the town itself paying some.

Trevor Schlossnagle said that regularly functioning sewer systems don't contribute to the water quality issues, with the exception of nitrate contamination. That's why we're thinking about septic systems in Rockville and the effect on well water, as that is the town's supply. He stated the water supply comes from both the Virgin River area, as well as the South Mesa Well. Some residents North of the Virgin River in Town still have septic systems and others have connected to the sewer system. Those homes South of the Virgin River generally have septic systems.

He said the study makes a replica for the area with a make up of soils within the area to review how many septic tanks can be installed before it effects the nitrate contamination in the water. The land is a shinarump conglomerate, for the major area on the South Mesa, and that's currently where the drinking water supply for the town's water company comes from. There's always some concern there if you have septic systems. He said the Virgin River is just a layer of shallow stream settlements over the line. So, the reason for this study is to determine is there a density or quantity of subject systems that the area can support without lying into the risk of nature contamination. He then presented a number of slides showing the methodology.

He said that basically, they build a simple mass balance model that shows the natural nature groundwater and the direction it flows. He took samples of the water and the soil, then looked at the volume of eight and then projected it forward as we added septic systems. How much can the existing conditions buffer before the nitrate is too high? He said they also received data from the Southwest Health Department, along with census data. He then obtained numbers from the Division of Water Resources that aren't necessarily specific for Rockville, it's more like this is the amount of water estimated on how much a household of X amount of people use and data like. We have all of these essential constants that we put in and then we find additional information that may be needed and then calculate how much groundwater is moving through the system in an hour.

This may look like a lot of variables, but it's really just two. There is projected nitrate concentration and the total number of septic tanks and everything else in that building basically is a fixed value. And so, we just run a model that increases the number of septic tanks until we hit certain targeted projected concentrations and see what that gives us in terms of total septic systems through our density based on the acreage of the area.

Trevor Schlossnagle asked if anyone had any questions to just jump in at any point. He went on to say we have used this model all over Utah. It's robust, but it's very simple, so these are some of the limitations and assumptions we have limited and isolated data to make these calculations. So obviously when there's more data, we have a better estimation of groundwater flow. Typically on accounting for the special distribution of septic systems, but we're an aquifer, so if you have a cluster that will be a different result than if they're spread out equally, that sort of thing, so we have a fewer assumptions built into the model, but aside from going really deep into a complex model, this method is really the best to help get any answer.

Trevor Schlossnagle pointed out on the map there are two different outlines, one in yellow and one in green. These are outlines of two aquifer areas and each point has a label with a number indicating the nitrate concentration. If nitrate wasn't detected in the sample, it's below reporting limit number. Basically, something that's a 0.1 just means that the laboratory method did not detect any nitrate in it, but I can't confidently say there is none there it just means less than 0.1 milligram per liter. And for reference, the EPA maximum contaminant level for nitrate is 10 milligrams. This is what is referred to in public drinking water supply. It does not apply to private wells, although it's also a great guideline. So, on average, measuring concentrations definitely within the area naturally occurring there's only a few places that had any nitrate showing and where we have factors like agriculture or human impact.

Trevor Schlossnagle showed an example of some results. He said the average density of septic systems in the area on average is 21 acres. Obviously that that doesn't take into account the actual size of parcels. So, when we increase the number of septic systems in this lower valley area

concentration by 1, 2, or five milligrams per liter, the corresponding labels are the updated density. So, if you want to increase the number of septic systems down here to activate roughly 400 total septic systems. That would mean we have roughly 3 acres per system and nitrate concentration of 5.25 mil. Tydon Oler asked if this was still under the number allowed for contamination. Trevor Schlossnagle said that is half of the maximum containment level allowed. Typically, we will perform these projections to a number of benchmarks just to give communities an idea of what different levels of risk that they can be exposed to. Potentially like some places have initial amount of measurable nitrate concentrations of three or four and so they might only want to allow an increase of one or two per liter while another town, but this is this is hypothetical, may have a little more wiggle room to move forward. Jane Brennan asked if they took into consideration that on that map a big hunk of the Virgin River is on the north side. Trevor Schlossnagle yes that was considered. The estimate is overall not someone actually figuring out where the pieces are.

Trevor Schlossnagle said typically the study does not account for cluster areas, but the next slide attempts to consider clusters and accounting for location and numbers. So, this area here is a subdivision of small parcels that is approximately 40 acres on South Mesa. We know that there are no septic systems here. So, you're starting at basically 00 but if you were to increase by 500 grams per liter, that would give you a density of 1 1/2 acres per system. If you actually build out all 64 lots or whatever that total number, was you would actually exceed the 10-mil allowed. This does not happen instantaneously and don't even necessarily happen within a specific time window. He had taken some samples to basically the water, and the source does say the water flows slowly. So, this is the sort of thing where you might actually see the impact within a decade or longer and is something worth taking into consideration.

Trevor Schlossnagle said this report does not only go to the Planning Commission or Town Council but after a few more people review this report it will be published on their website for anyone to review for consideration. It is a good resource for people thinking about septic systems and thinking about advanced types of septic systems. Although it's outside of my area of expertise, but I know that there are newer technologies that will reduce your levels other than traditional septic leaching field, so this is really a resource for anyone to have that's thinking about building or development.

Megan Honer-Orton asked if there are 64 lots within that area, it would require 96 acres to development it. Trevor Schlossnagle said that would only reach the .5 mil. Tydon Oler questioned that would be .5 mil, but up to .10 mil is allowed correct. Trevor Schlossnagle said that is correct to maintain the concentration of only 5 milligrams. The problem with this approach and the limited data is you are dealing with these types of averages and you're not taking into consideration the possible outliers, with the possibility that you are underestimating something. You may find flow options for leach fields that flow paths cause faster flows than average and thus the velocity used for the study would not pertain. He said a study he has worked on in Iron County is causing the officials there to consider some different options for advanced systems that can help innovate this sort of thing. He said he did ask this question while doing a review of the study. Mayor Leach said she did reach out to Robert Beers, and he did send her some information about different types of advanced septic systems she had just received.

Tydon Oler asked if the advanced systems only helped if used correctly. Trevor Schlossnagle said yes, the advanced septic system helps to reduce concentration of the nitrate to increase the overall septic density. Megan Honer-Orton said the advanced systems may not be the self-contained pumpable type as before. Mayor Leach said the advanced systems are different and have denser filter fields and denser leach fields. Tydon Oler said some are still self-contained pumpable systems that get rid of the liquid and the solid left can just be hauled off. Mayor Leach said that option is one that she received information on. Jane Brennan asked if there is any information regarding the depth of seepage from the septic system leach line versus the depth of the aquifer. Trevor Schlossnagle said the way septic systems are meant to work and it's hard to say, but that's part of the design is that the release shown from the leach fields exists above the water table. Different soils in the ground such as leche can filter, however the designs are beneficial, and that's what we're talking about these

advances, since more knowledge beforehand helps as once it hits the groundwater there is not much that can be done.

Tim Arnold said in his experience the Southwest Health Department required him to maintain a 100' distance from the river but 50' is the maximum distance required. Is that enough distance to keep the leach field from the river water or is there a number listed that keeps us safe. Trevor Schlossnagle said that is a Southwest Health Department question. Tydon Oler said in his experience it was the geotechnical company who did the soil samples and then stated the distance they recommended. They actually dug down to where the water table was, but in our case, we had already dug a well, so we knew how deep it was and that is where they did the soil samples. Trevor Schlossnagle said all that helps with the design to help protect the water, but still, it may not address the actual way it occurs. Jane Brennan asked if this study shows that a septic system requires 1 ½ acre to accommodate it will the Southwest Health Department follow that on the South Mesa? But how much space should be required for down in the valley along the Virgin River Corridor to allow someone to install a septic system that is safe. Trevor Schlossnagle said that's a tricky question. Just because we only know that currently there is a 10-acre lot here or a 5-acre lot there that may help accommodate a 2-acre lot size requirement. He said this is up to Southwest Health Department. He said currently every well that has been requested and sampled has been a well for livestock or irrigation, except for one. These types of wells do not have the same type of impact as drinking water supply. He thinks the study indicates 3 acres per system on average will lead to an increase of over 5 milligrams per year. He said that doesn't give you enough information to enforce this size on residents. Jane Brennan said it's not up to the Town to enforce. It would be up to Southwest Health Department. She said she was curious about what would be recommended. Chair Tyler said in his review of some of the upgraded septic systems he was actually shocked by the reduction in size of leach fields required compared to what a standard field required, and the cost was actually quite minimal. To get these upgraded systems was \$1000-\$2000 dollars, thinking they could be \$30,000 possibly. Trevor Schlossnagle said the leach field is vitally important as it does a lot of work in the traditional system and by using that basic technology along with the new technology helps be more productive and less costly. Tydon Oler said that there are several systems that have been approved by the State of Utah that had been used for subsurface irrigation but in the last three years at least one system certified in Utah has been approved for above ground use. Trevor Schlossnagle said in reviewing documents for these studies he found companies requesting to use the newer technologies, for their current or upcoming models/studies so he thinks they may be addressing these issues and not be stuck with XYZ way of dealing with it.

Ken Rybkiewicz questioned where we go from here and will this data/review be shared with Southwest Health Department and the Town doesn't have a way to make Southwest Health Department follow this. He also asked how Rockville compares to other surrounding municipalities regarding density, as he had heard that many other studies which had been done did not include the Rockville area. Mayor Leach said it will be shared with Southwest Health Department and the Town may have other things to do or discussion before we adopt this. She said SWHD has been reviewing different types of systems and acknowledging their efficiency. Trevor Schlossnagle said this study information needs to be shared to be used. There will be a final study sent out once all the other needed people have reviewed it. Megan Honer-Orton said a development in Virgin near the river was required to have a self-contained system which was rather costly. Apple Valley has adopted a 7-acre rule for a septic tank through this type of study.

Mayor Leach asked if anyone had any more questions. She said if there are questions that arise later, they will contact Trevor Schlossnagle for a response. No questions were asked. Clerk Bell did ask for a digital copy of the slide presentation. Mayor Leach thanked Trevor Schlossnagle for his work and tonight's presentation. Mayor Leach asked if the Council and Planning Commission have any further questions to please let her know so she could ask.

Administrative Action Items

1. **DISCUSSION AND ACTION ON RESOLUTION NO. 24-0710-01 A RESOLUTION TO APPROVE AMENDMENTS TO THE ROCKVILLE APPLICATION REQUIREMENTS CHECKLISTS:** Mayor Leach explained this proposal is readdressing the building permit application for what information needs to be submitted prior to the application being considered by the Planning Commission. Currently the Fire Marshall's signature is further down on the application than the Planning Commission approval. These changes will help make sure the Fire Marshall's approval and signature are met prior to the meeting to ensure the issue has been addressed. It also has some other housekeeping items that were made in the number of copies required. Now that we have 7 Planning Commissions, we require more copies. Some of the important items are highlighted and it states water must be potable. This will hopefully expedite the approval process. Mayor Leach asked if there were any questions on these changes. The question was asked about the statement on the application stating not all lots are buildable. Clerk Bell said this has always been on there to make people aware that not all lots will meet the requirements to allow a building with the required setbacks. Megan Honer-Orton **MOVED** to approve Resolution No. 24-0710-01 approving the amendments to the Rockville application requirements checklist as outlined. Jeff Ballard **SECONDED** the motion.

Vote on Motion:

Michael Evenson - Aye
Robin Smith - Aye
Megan Honer-Orton - Aye
Mayor Leach - Aye
Jeff Ballard: - Aye

The motion PASSED unanimously.

2. **APPROVAL OF THE MINUTES FOR THE JUNE 12, 2024, PUBLIC HEARING AND REGULAR MEETING:** Mayor Leach asked if there were any corrections. No corrections were noted. Michael Evenson **MOVED** to approve the minutes of June 12, 2024, public hearing and regular meeting. Mayor Leach **SECONDED** the motion.

Vote on Motion:

Michael Evenson - Aye
Robin Smith - Aye
Megan Honer-Orton - Aye
Mayor Leach - Aye
Jeff Ballard: - Aye

The motion PASSED unanimously.

3. **APPROVAL OF THE MINUTES FOR JUNE 24, 2024, SPECIAL MEETING:** Mayor Leach asked if there were any corrections. None were noted. Jeff Ballard **MOVED** to approve the minutes of the June 24, 2024, special meeting. Megan Honer-Orton **SECONDED** the motion.

Vote on Motion:

Michael Evenson - Aye
Robin Smith - Aye
Megan Honer-Orton - Aye
Mayor Leach - Aye
Jeff Ballard: - Aye

The motion PASSED unanimously.

4. **APPROVAL OF EXPENDITURES FOR THE MONTH OF JUNE 2024:** Mayor Leach asked if there were any questions regarding the expenditures for the month of June 2024. Megan Honer-Orton asked about the payment to Utah Geological Survey. Clerk Bell said they bill monthly depending on

what has been done. Michael Evenson **MOVED** to approve the expenditures for the month of June 2024. Megan Honer-Orton **SECONDED** the motion.

Vote on Motion:

Michael Evenson - Aye
Robin Smith - Aye
Megan Honer-Orton - Aye
Mayor Leach - Aye
Jeff Ballard: - Aye

The motion PASSED unanimously.

5. **APPROVAL OF THE JUNE 2024 FINANCIAL STATEMENTS:** Mayor Leach asked if there were questions regarding the financial statements. Megan Honer-Orton asked for an explanation of the amounts. Clerk Bell stated this financial statement shows from the beginning of July 1, 2023, to June 30, 2024. These reflect the money going in and out throughout the year. Beginning balances on July 1, 2023, and then final balances on June 30, 2024. Michael Evenson said the size of the print is getting difficult to read. Mayor Leach said maybe try legal size paper next month. Megan Honer-Orton **MOVED** to approve the financial statement for June 2024. Jeff Ballard **SECONDED** the motion.

Vote on Motion:

Michael Evenson - Aye
Robin Smith - Aye
Megan Honer-Orton - Aye
Mayor Leach - Aye
Jeff Ballard: - Aye

The motion PASSED unanimously.

ADMINISTRATIVE NON-ACTION ITEMS

1. Mayor and Council Member Reports

Mayor Pam Leach reported the Rockville Bridge 100-year Celebration will be moved to October due to weather concerns. She had spoken with the adjacent property owner to use his property for the celebration. Some things will be done on the bridge and then moved to the adjacent property to allow bridge usage. She asked Council members to take a look at their calendars for October. She said Rockville days will be October 5th, the first weekend. Jane Brennan reminded the Council that Butch Cassidy Race is held the first Saturday of November. If the celebration was held on a Saturday, possibly more residents that work could attend. The Council discussed and decided October 19th would be the date.

Mayor Leach reported she is working with the State asking about possible mitigations for the fire area, as it could cause potential flooding. They will provide her with some resources and suggestions. She said at next month's Council meeting the two young men that reported the fire to 911 will be recognized for being so responsible.

Michael Evenson had nothing to report.

Robin Smith had nothing to report, as Tyler Ames had already presented it.

Megan Honer-Orton asked if a special fund would be needed to take donations for a speed sign on Bridge Road and she would like that mentioned in the newsletter due out in August 2024. Mayor Leach said first the Council needs to decide if they want a speed sign located on that road. Then find prices before any approval is given. Then we can work out the details. The Office has the ability to send out an email blast notifying citizens about this should the Council agree. Clerk Bell said a

special fund is not needed. It could just be a line item listed for that purpose. Megan also reported she had received 15 updated listings for the Rockville contact list.

Jeff Ballard had nothing to report.

2. STAFF REPORT AS NEEDED: There were no staff reports.

ADJOURNMENT: Jeff Ballard **MOVED** to adjourn the meeting at 6:55 pm. Michael Evenson **SECONDED** the motion.

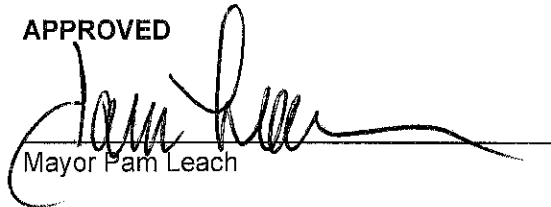
Vote on Motion:

Michael Evenson - Aye
Robin Smith - Aye
Megan Honer-Orton - Aye
Mayor Leach - Aye
Jeff Ballard: - Aye

The motion **PASSED** unanimously.

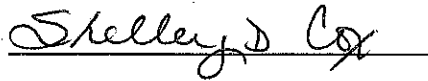
Minutes prepared by
Shelley Cox, Town Clerk
Town of Rockville

APPROVED



Mayor Pam Leach

The foregoing was posted in the foyer cabinet of the Rockville Town Office by Shelley D Cox
at approximately 9:30 AM/PM on 8-15-24, on Rockville's Website and the Utah
Public Notice Website.

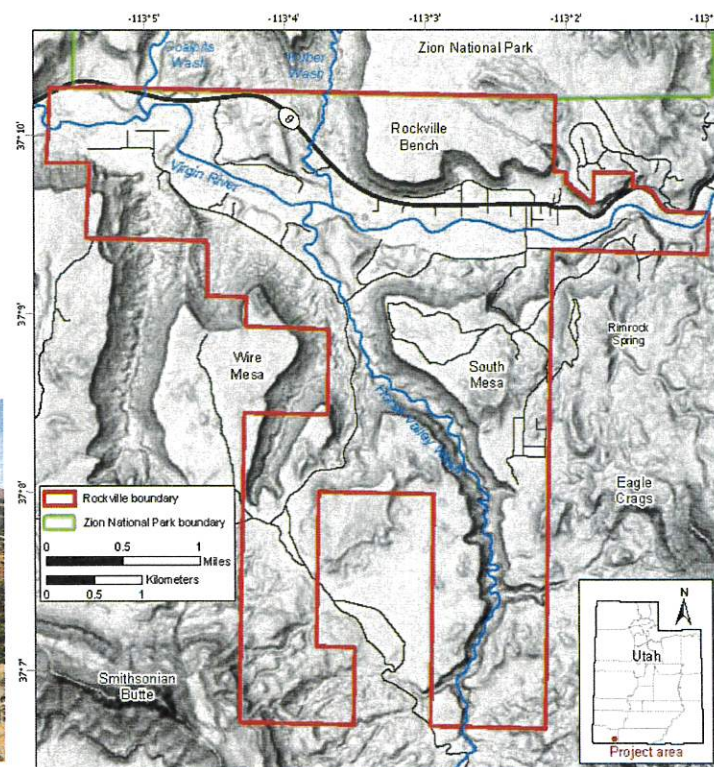
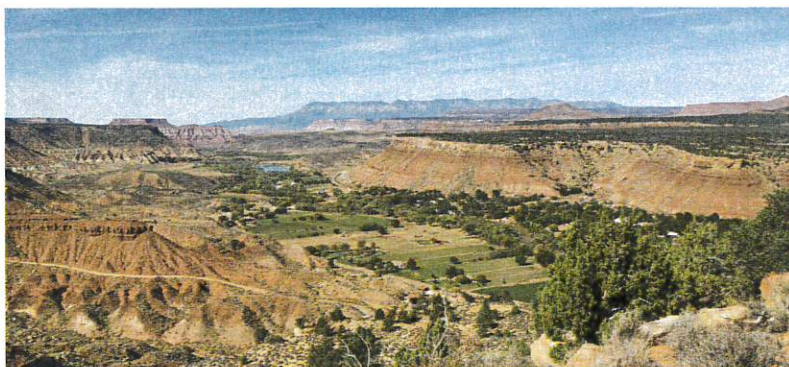


Rockville Septic Density Analysis

Rockville Town Council Meeting, July 10, 2024

Trevor Schlossnagle and Torri Duncan

Funded by DEQ Division of Water Quality Hardship Planning Grant, Town of Rockville, and Utah Geological Survey

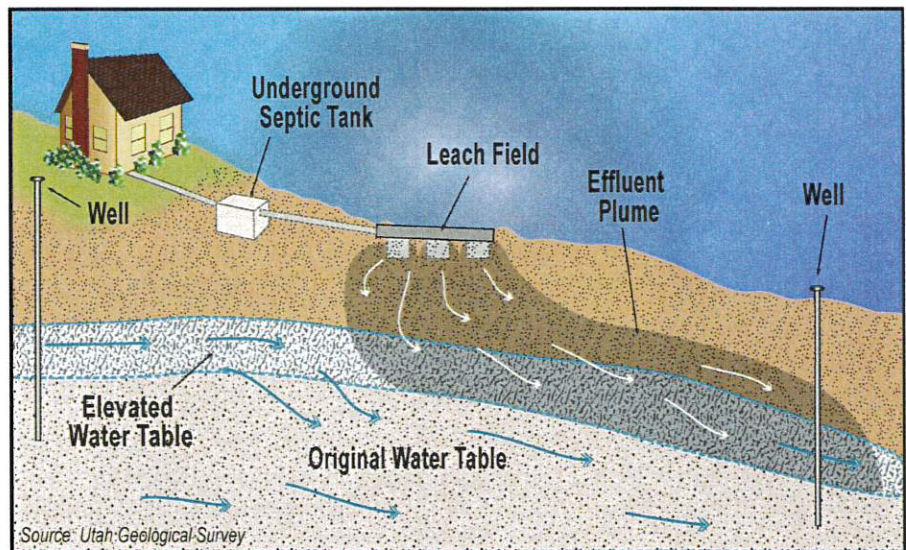


Utah Geological Survey

geology.utah.gov

Background

- Excessive septic-system density can cause nitrate contamination of groundwater
- Properties south of the Virgin River, including the South Mesa, generally must use/establish septic-tank systems.
- Existing/future septic systems overlie (South Mesa) Shinarump Conglomerate, the principal aquifer for Rockville public drinking water or (Virgin River Corridor) shallow alluvium over Moenkopi Formation
- What is the density/quantity of septic systems that a groundwater system support without contamination?



The Methods: Mass balance analysis

Baseline N mass + N mass from new septic tanks
Volume of discharge through aquifer + septic-effluent volume

- Baseline nitrate concentration (samples collected October 2023)
- Current number of septic-tanks and population using them (Southwest Utah Public Health Department/Town of Rockville/2020 Census data)
- Nitrogen loading from septic-tanks (DEQ/Division of Water Resources)
- Ground water available for mixing (existing hydrologic data)



The Methods: Groundwater available for mixing

$$Q = KbLI$$

discharge (ft³/sec) = hydraulic conductivity (ft/sec) *
vertical mixing depth (ft) * width of flow (ft) *
hydraulic gradient (ft/ft)

- Hydraulic conductivity derived from transmissivity (T) reported in aquifer tests ($K = T/b$) or well logs
- Mixing depth based on assumptions around aquifer thickness, vertical conductivity, dispersion, etc
- Width of flow based on study area boundary



The Methods: Nitrogen projection

Baseline N mass + N mass from new septic tanks
Volume of discharge through aquifer + septic-effluent volume

$$N_p = \frac{[(ST_t - ST_c)Q_{st}]N_{st} + N_a(Q_{gw} + [ST_t * Q_{st}])}{(ST_t * Q_{st}) + Q_{gw}}$$

- N_p = projected nitrate concentration
- N_a = baseline nitrate concentration
- N_{st} = average nitrate concentration from septic-tank systems
- ST_t = total number of septic-tank systems
- ST_c = current number of septic-tank systems
- Q_{st} = flow from each septic-tank system
- Q_{gw} = groundwater flow



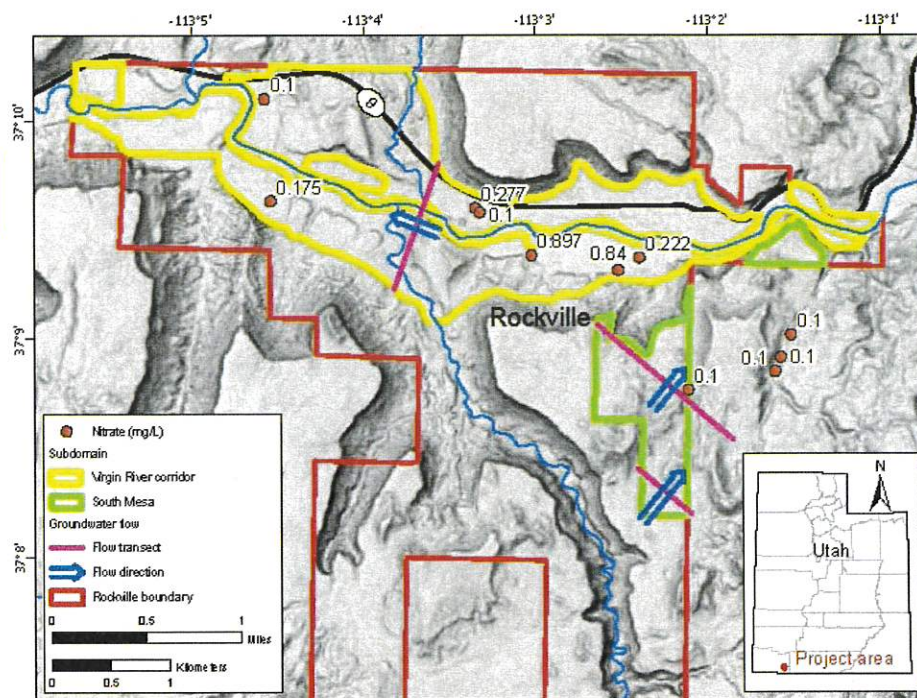
The Methods: Limitations & assumptions

- **GW flow calculations based on limited/isolated data**
- **Assumption of uniform geologic/hydrologic conditions**
- **Calculations don't account for plumes or clusters of septic tanks**
- **Baseline nitrate data based on natural sources, agriculture, septic-tank use, but projected nitrate based only on new septic input**
- **Assumption of instantaneous mixing and septic-tank outflow in steady-state condition with aquifer**



Results: Nitrate concentrations & GW flow parameters

Virgin River Corridor
baseline: 0.26 mg/L



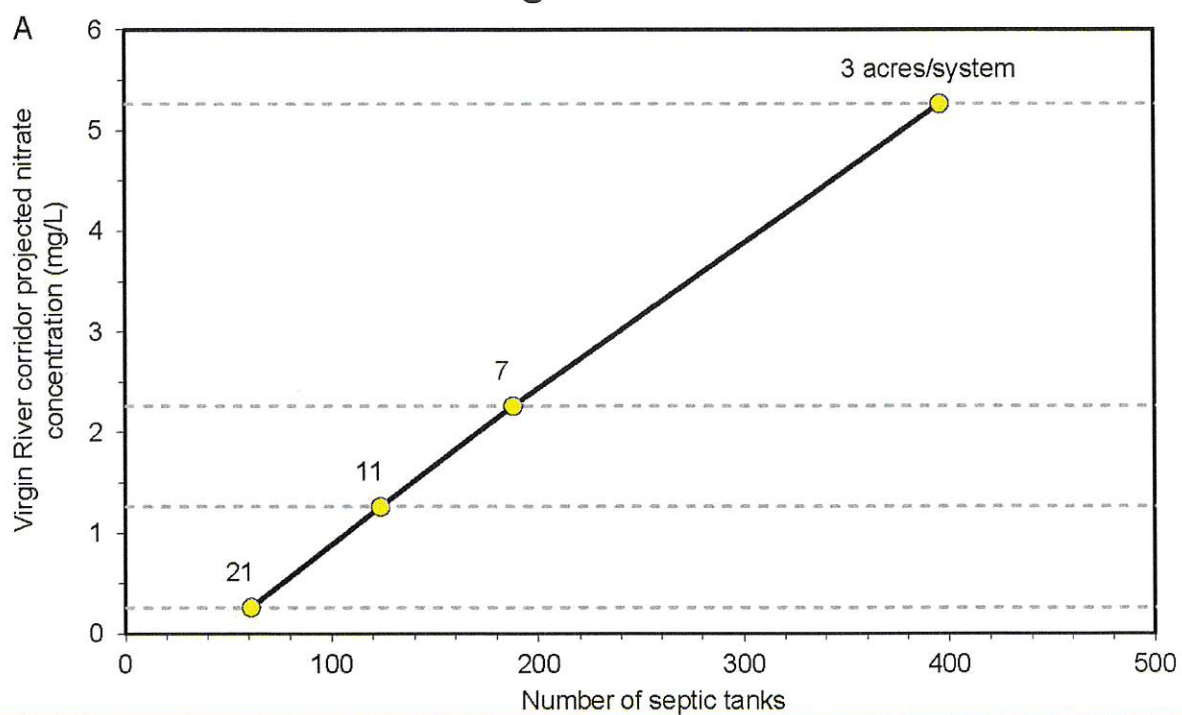
South Mesa
baseline: 0.1 mg/L



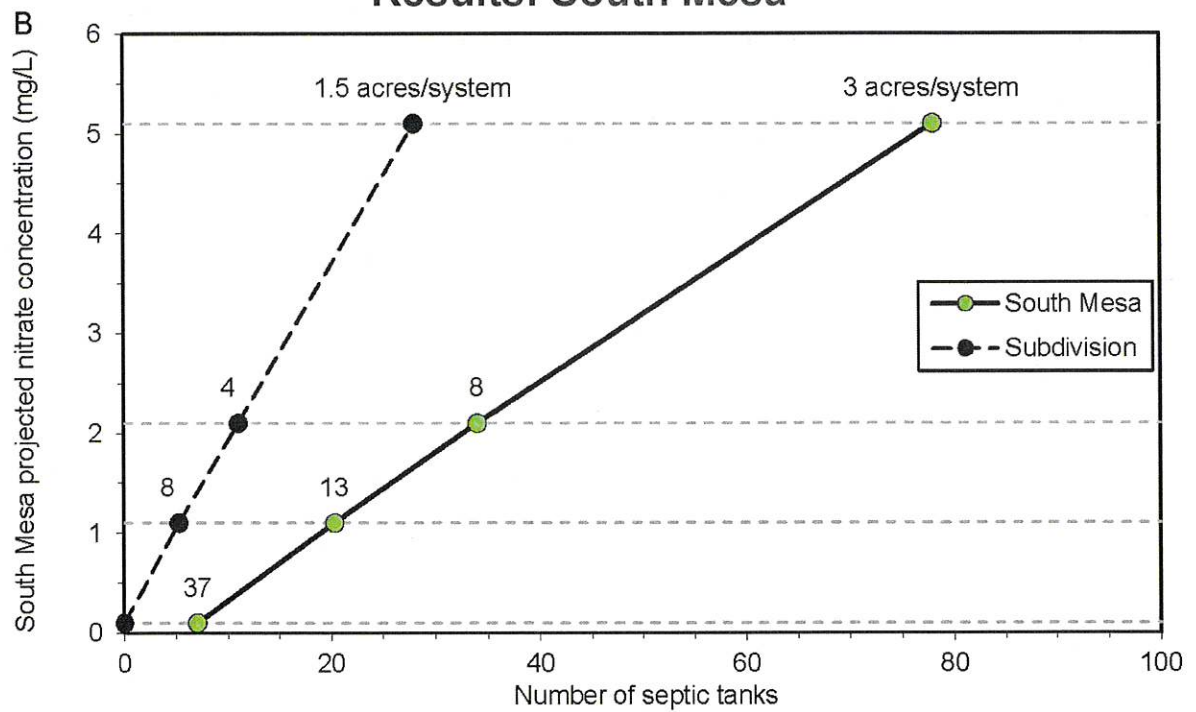
Utah Geological Survey

geology.utah.gov

Results: Virgin River Corridor



Results: South Mesa



Results Summary

Study Domain	Area (acres)	Discharge (cfs)	Current density (acres/system)	Current septic tanks	Projected nitrate concentration (mg/L)	Projected total septic tanks	Calculated density (acres/system)
Virgin River corridor	1300	0.71	21	61	1.26	124	11
					2.26	188	7
					5.26	396	3
South Mesa	260	0.15	37	7	1.1	20	13
					2.1	34	8
					5.1	78	3
South Mesa subdivision	40	0.06	0	0	1.1	5	8
					2.1	11	4
					5.1	28	1.5



UTAH GEOLOGICAL SURVEY

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NEW ISSUE!

SURVEY NOTES

Check out the 75th year anniversary issue of Survey Notes featuring a timeline of important events in the history of the UGS, an article on the evolution within each of the Survey's programs, employee reflections, a recap of 24 years of GeoSights articles, and much more.

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Clw Feedback

Salt Flats Collection Press Release: Putting Down Roots in Earthquake Country, Now in Spanish!

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- MAP & BOOKSTORE UGS LIBRARY GLAD YOU ASKED GREAT SALT LAKE GROUNDWATER



Utah Geological Survey

geology.utah.gov



UTAH DEPARTMENT OF
ENVIRONMENTAL QUALITY
WATER
QUALITY

Water Quality
Water Quality Board
Water Quality & Health
Laws & Rules
Public Notices
Info & Data Requests
Integrated Report Program
Nutrient Pollution
Monitoring
Engineering
Ground Water Protection/

Onsite Wastewater Program

The Onsite Program includes [certification](#) of Onsite System Professionals, review of [designs and plans](#) for onsite septic systems (including large underground systems), [operating permits](#) and information about [financial assistance](#) available through the State Revolving Fund (SRF) program for repair or replacement of septic systems when applicants meet the [requirements](#).

Onsite (Septic) Wastewater Systems

- [Rule—Utah Administrative Code R317-4, Revised Rule Effective January 1, 2016.](#)

Jump to:

- [Onsite \(Septic\) Wastewater Systems](#)
- [Onsite Professional Certification](#)
- [Onsite Related Rules](#)



Utah Geological Survey

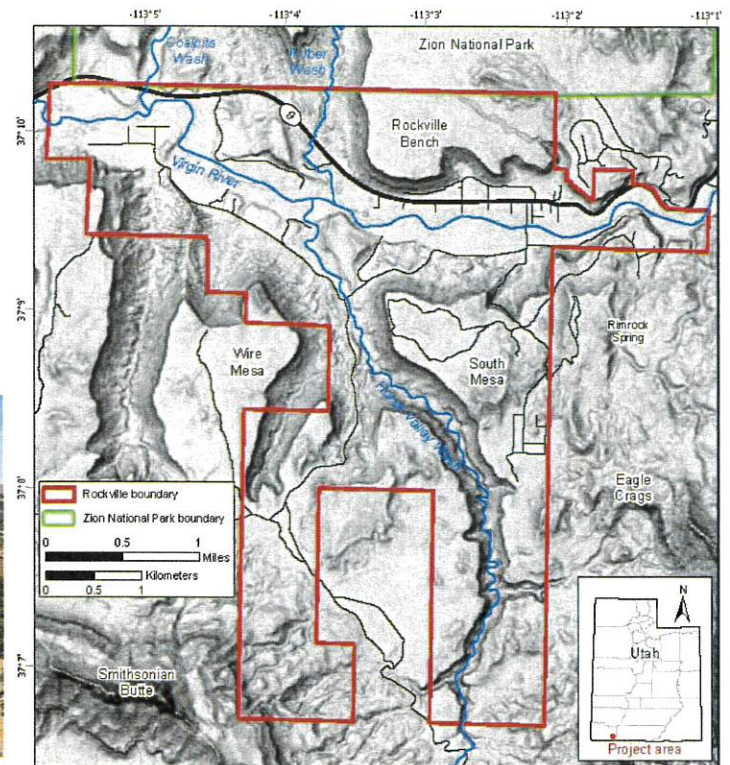
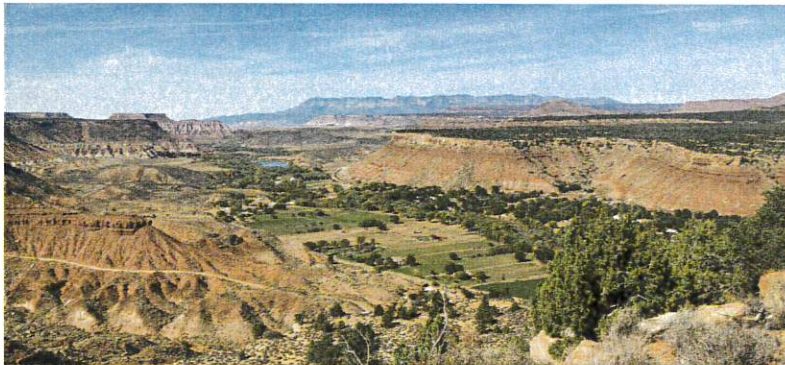
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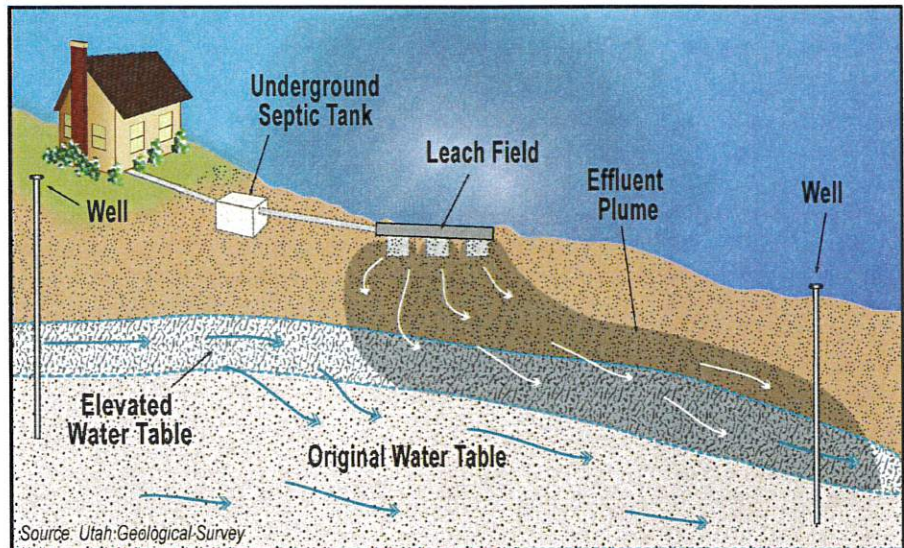


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hydraulic gradient (ft/ft)

- Hydraulic conductivity derived from transmissivity (T) reported in aquifer tests ($K = T/b$) or well logs
- Mixing depth based on assumptions around aquifer thickness, vertical conductivity, dispersion, etc
- Width of flow based on study area boundary



The Methods: Nitrogen projection

Baseline N mass + N mass from new septic tanks
Volume of discharge through aquifer + septic-effluent volume

$$N_p = \frac{[(ST_t - ST_c)Q_{st}]N_{st} + N_a(Q_{gw} + [ST_t * Q_{st}])}{(ST_t * Q_{st}) + Q_{gw}}$$

- N_p = projected nitrate concentration
- N_a = baseline nitrate concentration
- N_{st} = average nitrate concentration from septic-tank systems
- ST_t = total number of septic-tank systems
- ST_c = current number of septic-tank systems
- Q_{st} = flow from each septic-tank system
- Q_{gw} = groundwater flow



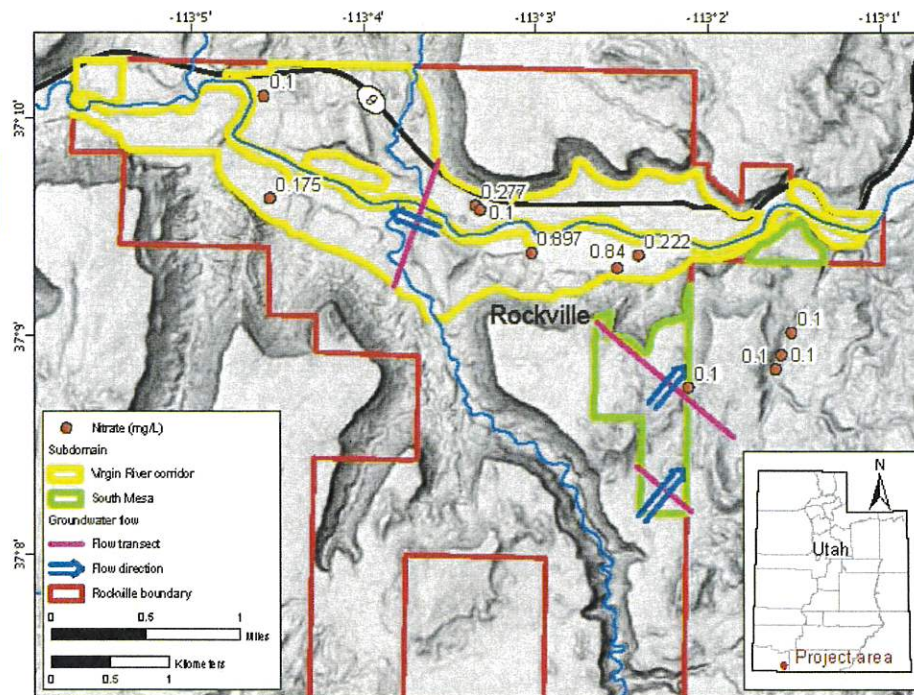
The Methods: Limitations & assumptions

- **GW flow calculations based on limited/isolated data**
- **Assumption of uniform geologic/hydrologic conditions**
- **Calculations don't account for plumes or clusters of septic tanks**
- **Baseline nitrate data based on natural sources, agriculture, septic-tank use, but projected nitrate based only on new septic input**
- **Assumption of instantaneous mixing and septic-tank outflow in steady-state condition with aquifer**



Results: Nitrate concentrations & GW flow parameters

Virgin River Corridor
baseline: 0.26 mg/L



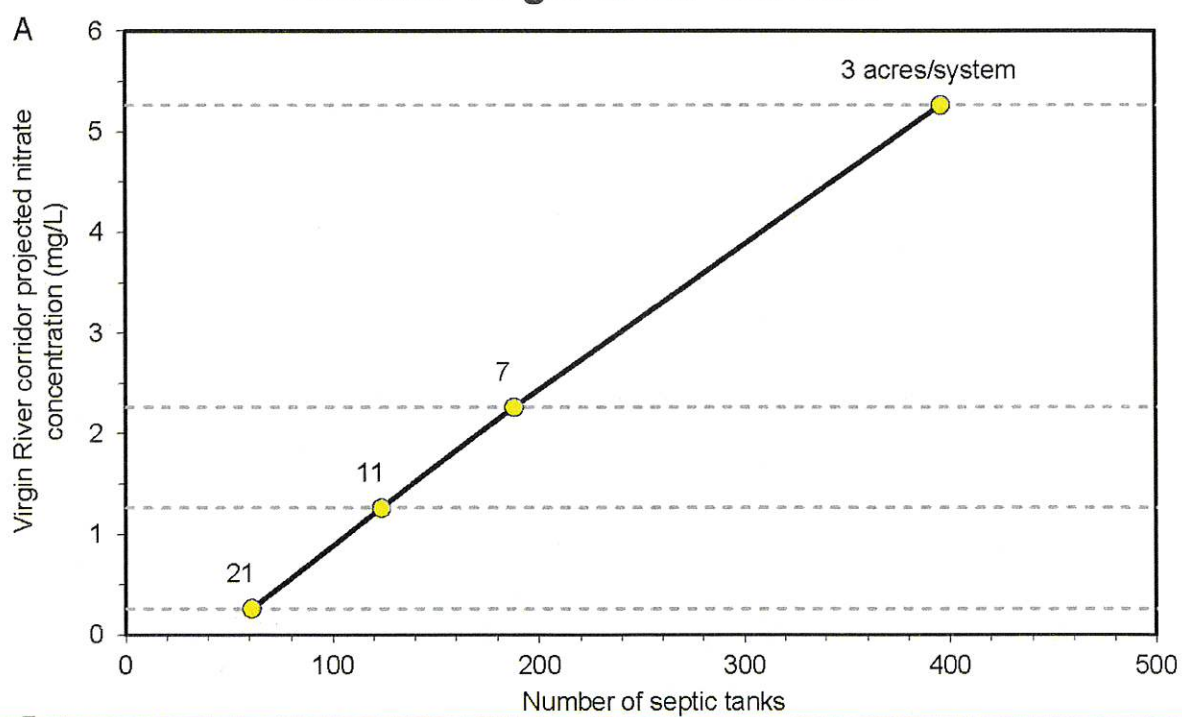
South Mesa
baseline: 0.1 mg/L



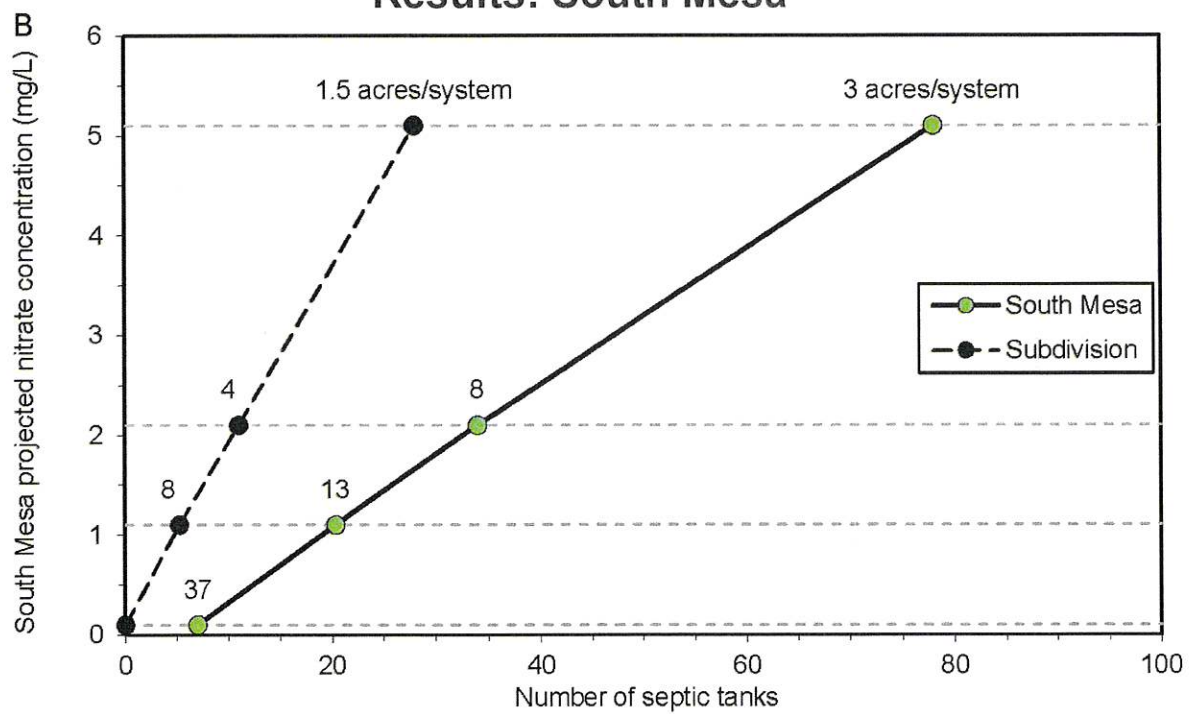
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Results: Virgin River Corridor



Results: South Mesa



Results Summary

Study Domain	Area (acres)	Discharge (cfs)	Current density (acres/system)	Current septic tanks	Projected nitrate concentration (mg/L)	Projected total septic tanks	Calculated density (acres/system)
Virgin River corridor	1300	0.71	21	61	1.26	124	11
					2.26	188	7
					5.26	396	3
South Mesa	260	0.15	37	7	1.1	20	13
					2.1	34	8
					5.1	78	3
South Mesa subdivision	40	0.06	0	0	1.1	5	8
					2.1	11	4
					5.1	28	1.5



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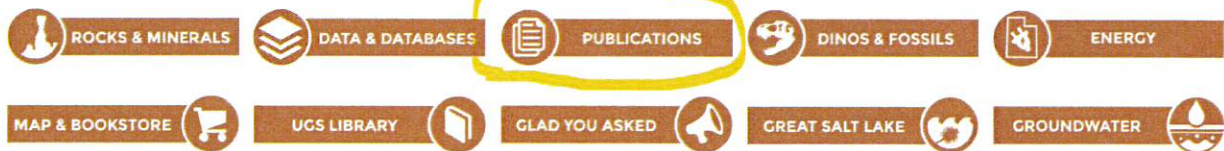
SURVEY NOTES

Check out the 75th year anniversary issue of Survey Notes featuring a timeline of important events in the history of the UGS, an article on the evolution within each of the Survey's programs, employee reflections, a recap of 24 years of GeoSights articles, and much more.

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Onsite Wastewater Program

The Onsite Program includes [certification](#) of Onsite System Professionals, review of [designs and plans](#) for onsite septic systems (including large underground systems), [operating permits](#) and information about [financial assistance](#) available through the State Revolving Fund (SRF) program for repair or replacement of septic systems when applicants meet the [requirements](#).

Onsite (Septic) Wastewater Systems

- [Rule—Utah Administrative Code R317-4, Revised Rule Effective January 1, 2016.](#)

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- [Onsite Professional Certification](#)
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**Rockville Town Council
Regular Meeting
Planning Commission Invited also
July 10, 2024 6:00 p.m.
Rockville Town Hall**

PLEASE SIGN YOUR NAME AND PLACE OF RESIDENCE FOR THE RECORD

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