

Michele King

From: Brian Schmidt <bschmidt@greenbelt.org>
Sent: Monday, October 08, 2018 4:24 PM
To: Clerk of the Board
Subject: For Item 7.3 of the Board Agenda, supporting the staff recommendation
Attachments: Coyote Valley & Groundwater Protection.pdf

Dear Michele,

Please circulate the attached document, *Coyote Valley & Groundwater Protection*, for tomorrow's Item 7.3 in support of the staff recommendation to support Measures T and V.

Greenbelt Alliance acknowledges and thanks Water District staff for assistance as we developed this report. All conclusions are solely those of Greenbelt Alliance.

Best regards,
Brian

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COYOTE VALLEY & GROUNDWATER PROTECTION

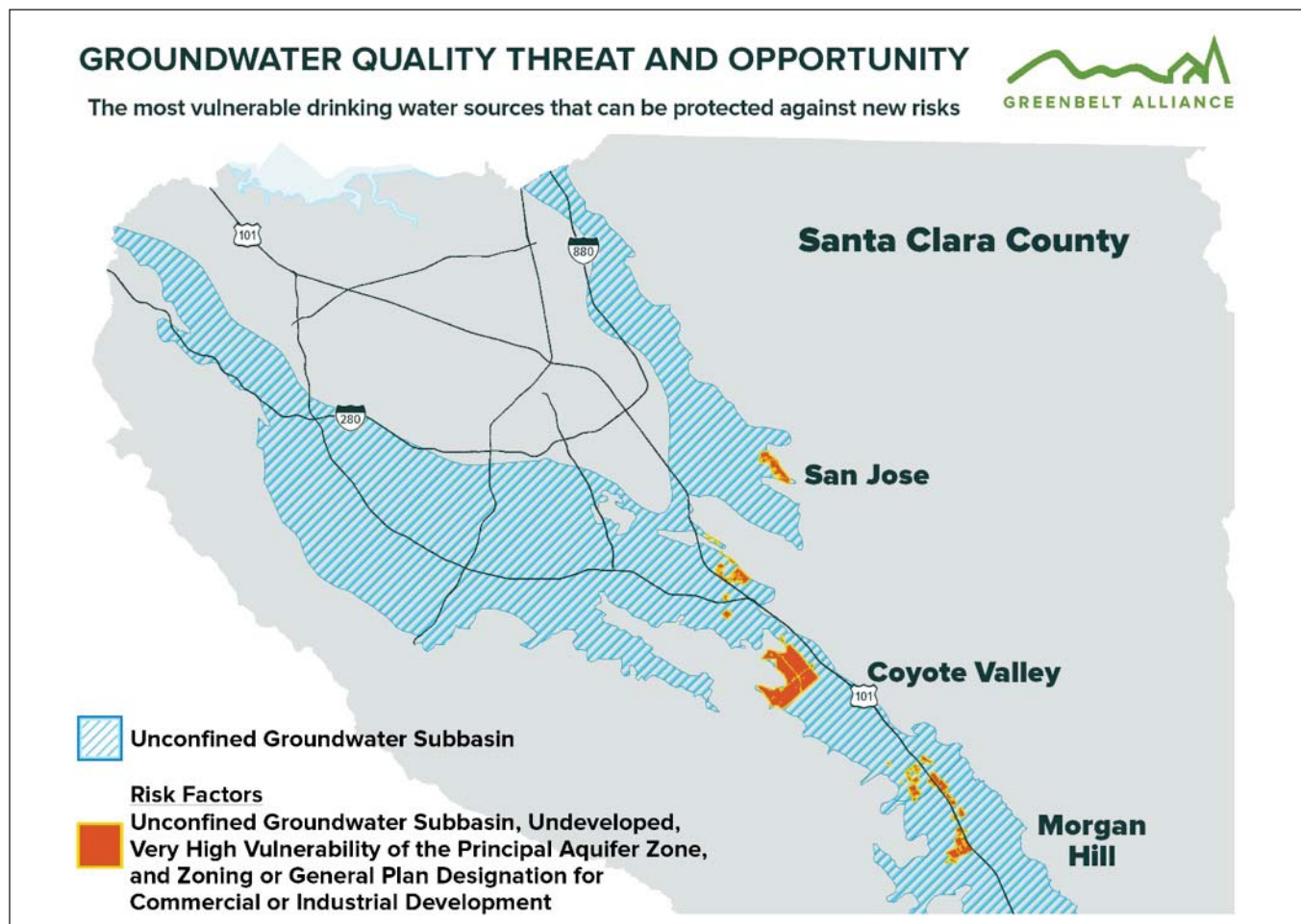
NORTH COYOTE VALLEY PRESENTS A UNIQUE OPPORTUNITY TO PROTECT GROUNDWATER QUALITY FROM A POTENTIAL THREAT TO THE DRINKING WATER FOR THOUSANDS OF SAN JOSE RESIDENTS. Physical characteristics of the land make it one of the most vulnerable areas in the county for contamination, but widespread industrial development has not yet occurred. The risk from that development can still be prevented entirely, while in already-developed areas it can only be managed. Local government agencies should undertake proactive policies and purchases in light of the combined opportunity and vulnerability for San Jose's groundwater supplies.



The map below draws from the Santa Clara Valley Water District's *Revised Final Groundwater Vulnerability Study (Groundwater Study)*, and from land-use zoning and General Plan designation mapping to identify a combination of factors showing which land is most vulnerable to harm to groundwater quality and can most easily be protected.

Features of the Threat and Opportunity Map:

- The unconfined subbasin aquifer, shown on the map as the “Unconfined Groundwater Subbasin,” is an area where underground drinking water sources are more vulnerable than the rest of the county. The remaining gray areas on the map are either hilly areas without large aquifers, or “confined” aquifers where drinking water sources deep underground are partially protected by intervening layers of clay and separate, shallow aquifers above that clay.
- “Very High Vulnerability” is the Water District’s own most vulnerable rating category in its model. The study combined physical characteristics of the land in the county that increase or decrease the consequences if a contamination event occurred, together with the land uses that occur there that increase or decrease the likelihood of a contamination event. Combined, they measure vulnerability, and only a small part of the entire county is rated “Very High”.
- Undeveloped land zoned for commercial or industrial development presents a great opportunity for groundwater protection. Much of the threat to drinking water results from potential future development, but because the land is still vacant, the opportunity remains to find an alternative use that does not create this risk. Existing risk from undeveloped land uses (e.g. farming activities) could be limited through purchase of easements or fee title.



- The Water District does monitor groundwater for contamination, but the monitoring is not a guarantee against any contamination. Monitoring will only detect contamination after it has spread far enough to reach a monitoring location.

Why Coyote Valley Stands Out:

- Unlike most other locations, the drinking water aquifer is very near the surface. A contamination event that might not even reach the groundwater table in other locations will reach it in Coyote Valley and then become mobilized with the moving groundwater.
- Water moves quickly through Coyote Valley sediment, both vertically and horizontally. This means contamination may reach groundwater quickly and then move quickly to contaminate the aquifer further north.
- The speed at which groundwater moves in Coyote Valley could make it more difficult for groundwater monitoring to respond in time to limit additional contamination, even assuming the contaminant is being monitored.
- North Coyote Valley represents by far the largest geographic area with combined significant risk and significant opportunity to avoid inappropriate development.
- The three other areas also rated highly in this analysis are distinguishable from Coyote Valley in that they are generally small, scattered parcels that would be difficult to acquire or manage for agricultural benefit, they are surrounded on most or all sides with urbanization that makes their own development nearly inevitable or, in the case of the Evergreen Industrial Park, have no near-term prospects for industrial development. Regardless, even if the other three areas are considered equivalently important, over half (1,363 acres of 2,484 acres) of the priority land that is most vulnerable and feasibly protected is located in North Coyote Valley.

The Problem at Coyote Valley Could Be Even Worse Than It Appears:

- Several reasons suggest that this map is a conservative estimate of the risk from North Coyote Valley. It is at the most upstream portion of the broader Santa Clara Valley aquifer, so underground water flows north from it through much of the remaining aquifer. By contrast, other potential contamination sites further north could harm a smaller portion of the aquifer. In addition, a surface-spill contamination event in Coyote Valley that reached Fisher Creek or Coyote Creek would rapidly move north past Coyote Valley in Coyote Creek's surface water. Contamination moving in this surface water percolates down into the drinking water aquifer for another mile before being stopped at the shallow aquifer (and then contaminating that shallow aquifer as well).¹
- Allowed land use includes industrial use with significant risk of contamination.
- The "Very High Vulnerability" rating for Coyote Valley could underestimate the future risk in that area. The study acknowledges the risk of future development in the text, but the risk weighting would become even worse if the area is developed. See *Groundwater Study* at page 61.

Coyote Valley, especially North Coyote Valley, stands at the confluence of threat and opportunity. With industrial development just a possibility rather than an on-the-ground reality, the risk that development entails can be entirely prevented rather than simply managed. New local government policies and land purchases present significant opportunities to protect San Jose's groundwater.

SUPPLEMENTAL INFORMATION

- SELECTED CASES OF CONTAMINATION IN SANTA CLARA
- CASE STUDY: AUSTIN TEXAS GROUNDWATER PROTECTION PROGRAM OF
LAND PURCHASES
- METHODOLOGY AND COMPONENT MAPS
 - DISCLAIMER REGARDING SHALLOW AQUIFERS

Selected Examples of Groundwater Contamination in Santa Clara County

Multiple groundwater contamination events have occurred in Santa Clara County, with more federal Superfund sites than any other county in the US. Fortunately, the most dangerous events have generally occurred in northern parts of the county where clay layers create shallow aquifers that trap contamination before it reaches the drinking water aquifer. This pattern highlights the risk of putting industrial development in Coyote Valley, where the drinking water aquifer is unshielded and near the surface.

Below are some contamination examples. More information can be found at the Santa Clara Valley Water District and its *Groundwater Study*.²

Perchlorate and Volatile Organic Compound (VOC) contamination:

- Middlefield-Ellis-Whisman & Moffett Field (349 acres)
- National Semiconductor (195 acres)
- Varian, 601 California Ave. (175 acres)
- Hewlett-Packard, 395 Page Mill Rd. (175 acres)
- Hewlett-Packard, 640 Page Mill Rd. (175 acres)
- FEI (TRW), 825 Stewart Dr. (124 acres)
- Mohawk Laboratories (110 acres)

Notes: the above contamination all happened in areas protected by the shallow aquifer. Most also did not reach deep levels, averaging a depth only 40 feet below ground. The drinking water aquifer in Coyote Valley, however, is closer to the surface than 40 feet.

- Fairchild: this Superfund site was located in South San Jose, an area not protected by clay layers and a shallow aquifer, resulting in drinking water aquifer contamination and significant cleanup costs. Even this location was not quite as vulnerable as Coyote Valley, with a greater depth to groundwater.

- Olin Facility Perchlorate: the most serious drinking water aquifer contamination was from perchlorate contamination in Morgan and San Martin, in the Llagas sub-aquifer that drains south instead of north. A nine-mile plume costing millions of dollars for cleanup resulted from this contamination. Again, this area was not protected by shallow aquifers, and was contaminated although groundwater levels were deeper and less exposed to contamination than in Coyote Valley.

San Antonio and the Edwards Aquifer Example

San Antonio, Texas, together with other areas of Texas, draws its primary water supply from the Edwards Aquifer. This parallels the situation with Santa Clara County, where the groundwater table stores twice as much water as all local reservoirs put together. Just as Coyote Valley is associated with important wildlife values, the Edwards Aquifer supports unique ecological values.

After a major, multi-year drought, Texas and its local governments embarked on a number of measures to protect their groundwater aquifer. Over the years, the protections involved a mix of regulatory actions, water conservation plans, and purchases. Beginning in 2000 and with regular renewals thereafter, San Antonio voters authorized a sales tax of one-eighth percent to purchase conservation easements on a voluntary basis from landowners. The easements prevent further subdivision of property and usually amount to significantly less than the land's total value. The program has protected over 130,000 acres and is intended to protect water quality as well as quantity.

Similar programs exist in other parts of Texas to protect Edwards Aquifer. Austin has been involved in both regulating and purchasing development rights in the parts of the aquifer that provide water to the city. Controversies over protection of the land mirror those seen in Coyote Valley. A documentary movie, *The Unforeseen*, was made about that process that begins with the Wendell Berry poem, "Santa Clara Valley," highlighting our area as a cautionary example where development here in Silicon Valley has ignored the natural resource values of the land and water. Excerpts of "Santa Clara Valley" are quoted below:

I walked the deserted prospect of the modern mind where nothing lived or happened that had not been foreseen. What had been foreseen was the coming of the Stranger with Money. All that had been before had been destroyed: the salt marsh of unremembered time, the remembered homestead, orchard and pasture....

New buildings, built to seal and preserve the inside against the outside, stood in the blatant outline of their purpose in the renounced light and air. Inside them were sealed cool people, the foreseen ones, who did not look or go in any way that they did not intend....

Outside, what had been foreseen was roaring in the air. Roads and buildings roared in their places on the scraped and chartered earth; the sky roared with the passage of those who had been foreseen toward destinations they foresaw, unhindered by any place between. The highest good of that place was the control of temperature and light...I could not see past it but to its ruin.

I walked alone in that desert of unremitting purpose, feeling the despair of one who could no longer remember another valley where bodies and events took place and form not always foreseen by human, and the humans themselves followed ways not altogether in the light, where all the land had not yet been consumed by intention, or the people by their understanding, where still there was forgiveness in time, so that whatever had been destroyed might yet return. Around me as I walked were dogs barking in resentment against the coming of the unforeseen.

And yet even there I was not beyond reminding...The coots and gallinules skulked in the reeds, the mother mallards and their little ones afloat on the seaward-sliding water to no purpose I had foreseen. The stilts were feeding in the shallows, and the killdeer treading with light feet the mud that was all ashine with the coming day. Volleys of swallows leapt in joyous flight out of the dark into the brightening air in eternal gratitude for life before time not foreseen, and the song of the song sparrow rang in its bush.

Local California agencies here in Santa Clara County could consider following the environmental leadership demonstrated in Texas.

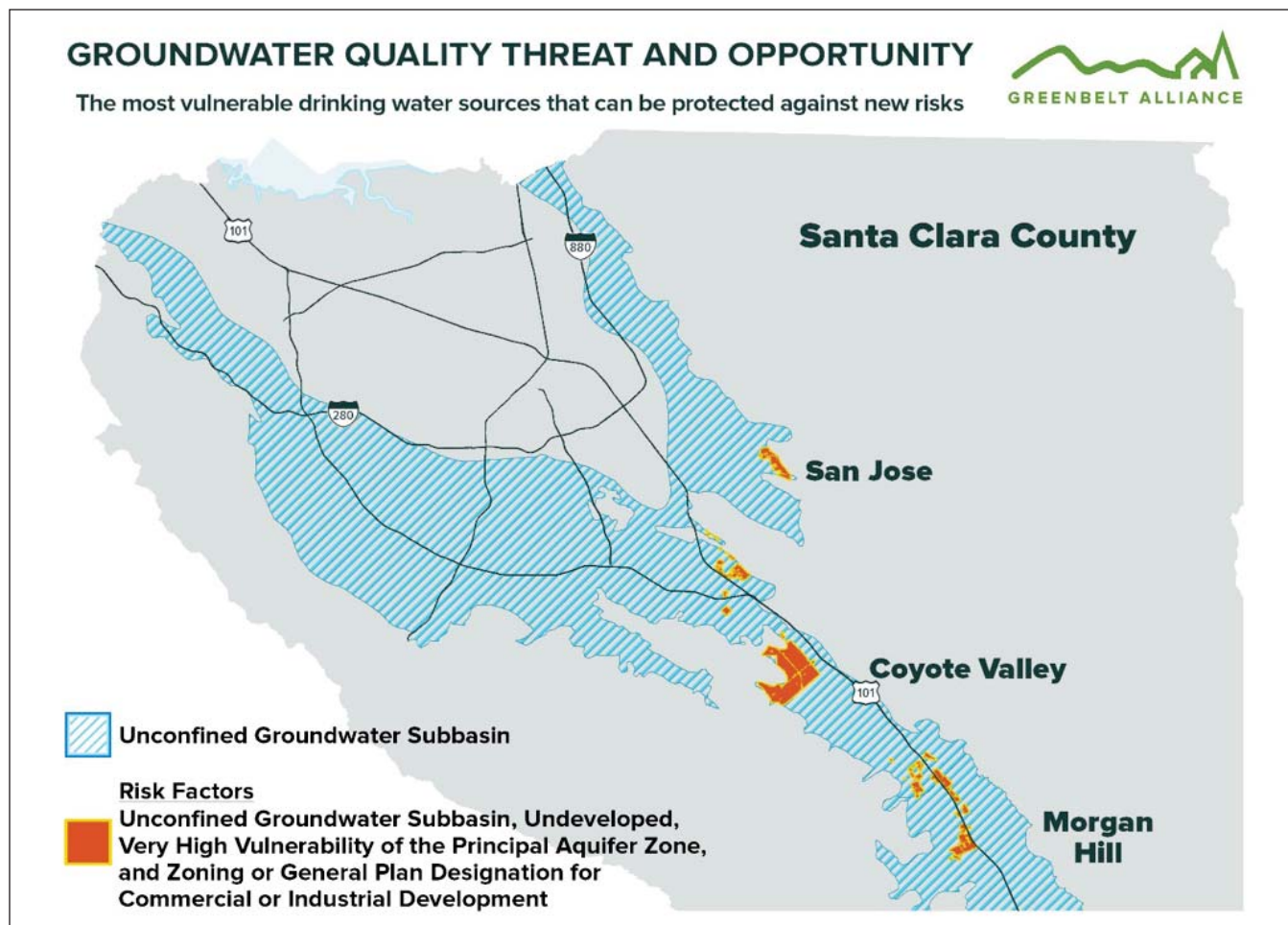
Greenbelt Alliance Methodology for This Analysis

Greenbelt Alliance's research objective was to map where the greatest overlap exists between groundwater vulnerability on the one hand, and on the other hand, the opportunity to prevent that vulnerability threat because the development has not yet occurred. This analysis relies on the greater ability to prevent a threat if the development posing the threat has not yet occurred.

The analysis also makes use of the information that drinking water aquifers in much of Santa Clara County are partially protected from surface contamination by impermeable clay "aquitard" layers and shallow aquifers above the clay layers. Contamination from the surface affects those shallow aquifers long before it reaches the (in places, very deep) underlying drinking water aquifer. The methodology here prioritizes groundwater that is not

confined and protected by clay layers and shallow aquifers (called "unconfined aquifers").

The prioritization of unconfined aquifers does not in any way assume that protecting the confined aquifers or shallow aquifers is unimportant. Both confined aquifers and shallow aquifers have important functions for people and ecology. The ongoing cleanup of some contaminated shallow aquifers is necessary and an important lesson about preventing contamination threat where we can. This analysis simply focuses on the greater threat where aquifers are unconfined.



Mapping Analysis

To create the Groundwater Quality Threat and Opportunity Map for this report, Greenbelt Alliance researchers created a map that overlapped multiple GIS layers from governmental source data. The analysis overlays:

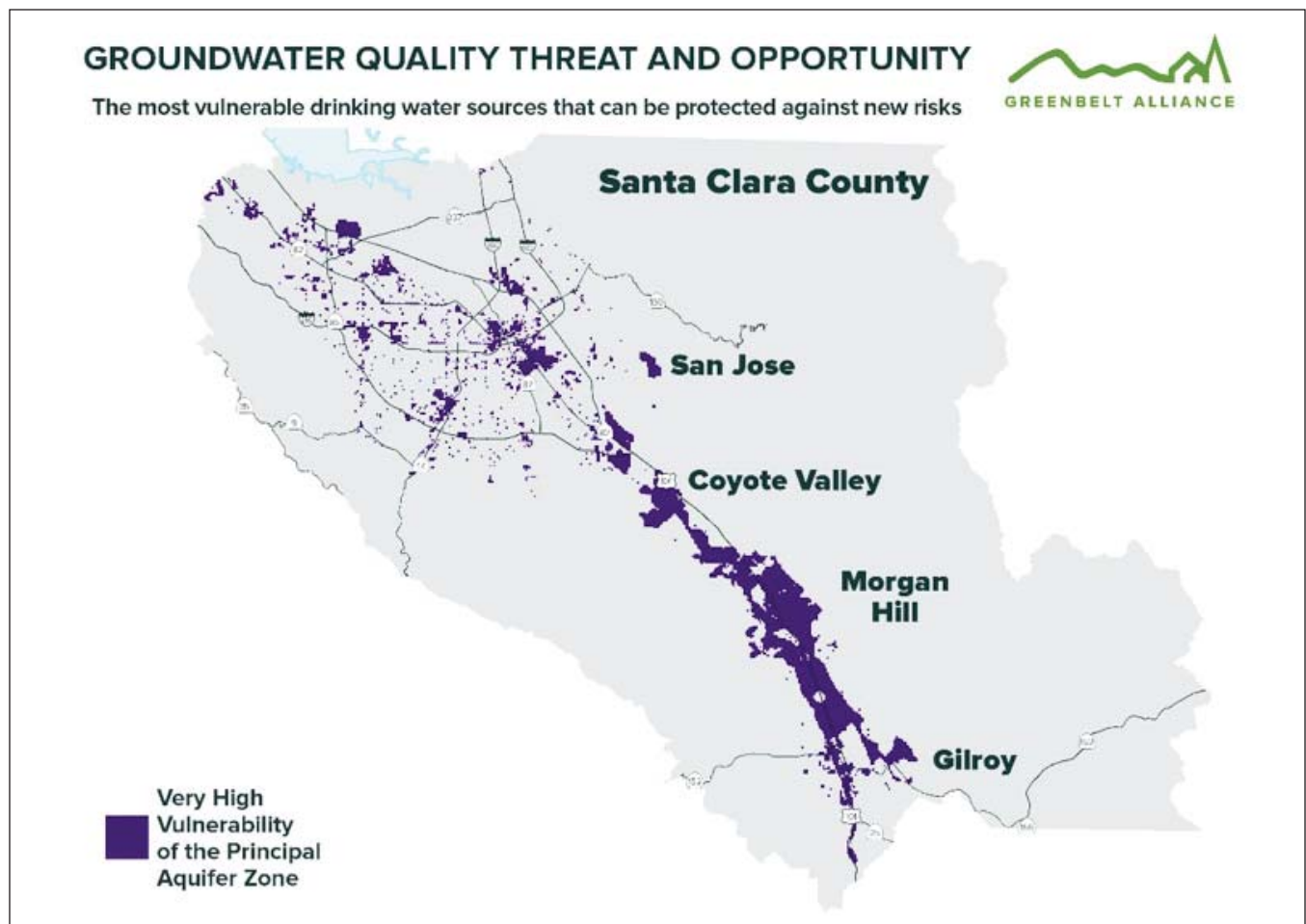
- GIS mapping data layers from the Water District's 2010 Groundwater Vulnerability analysis showing the highest rating ("Very High Vulnerability") for the principal aquifer;
- from the same Groundwater Vulnerability analysis, a map layer showing the Unconfined Aquifer portions of the principal aquifer;
- GIS mapping data layers from Santa Clara County and cities showing zoning and General Plan designation for commercial and industrial development; and

- mapping layers showing the land that is undeveloped.

The first three factors show where the threat to drinking water aquifers is potentially the greatest, while the fourth shows where there is at least a theoretical opportunity to prevent that threat because the development has not yet occurred.

As described above, Greenbelt Alliance used the following map layers to create the final version.

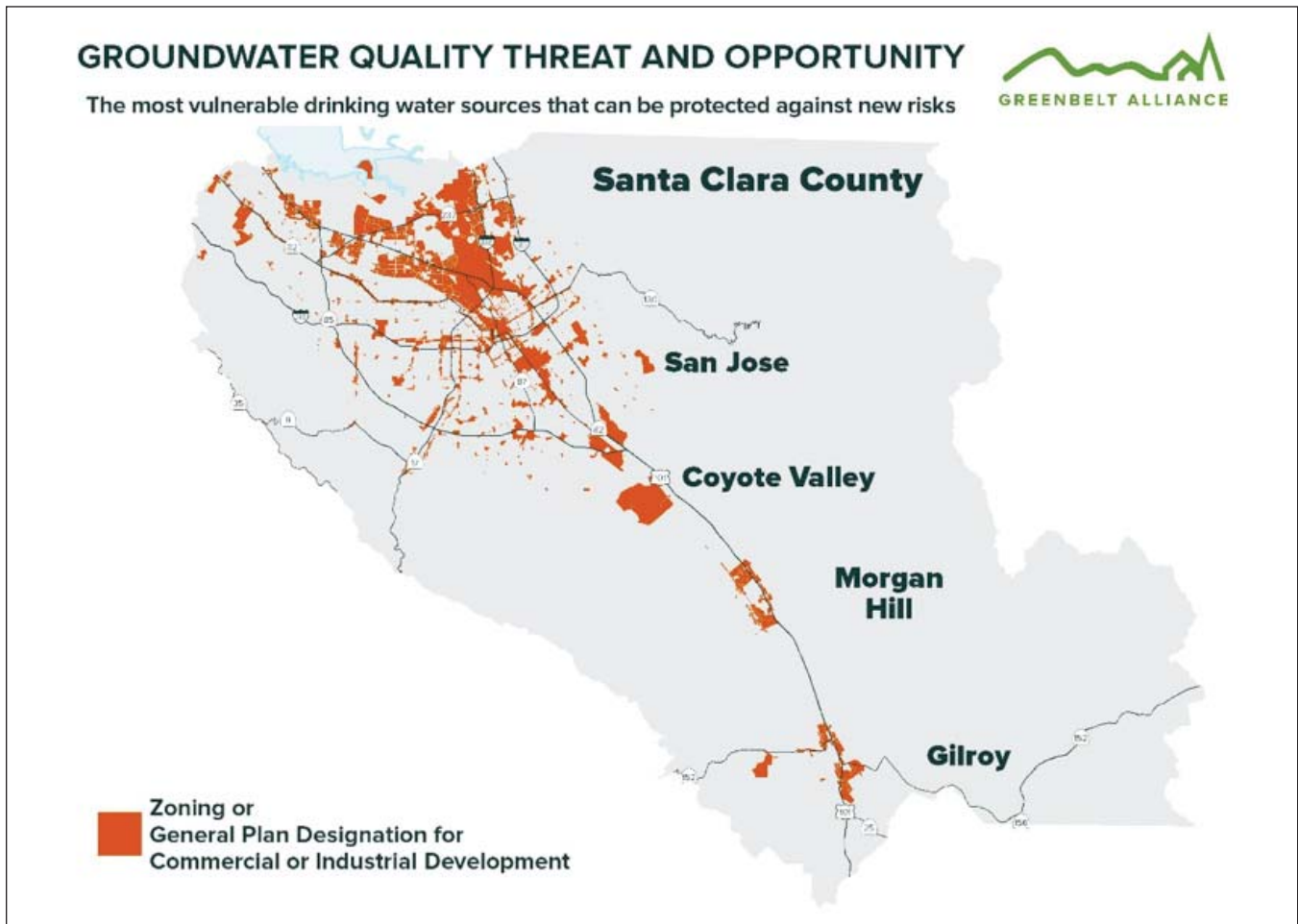
THREAT FACTOR: VERY HIGH VULNERABILITY



THREAT FACTOR: UNCONFINED ACQUIFER



THREAT FACTOR: ZONING OR GENERAL PLAN DESIGNATION FOR COMMERCIAL/INDUSTRIAL DEVELOPMENT

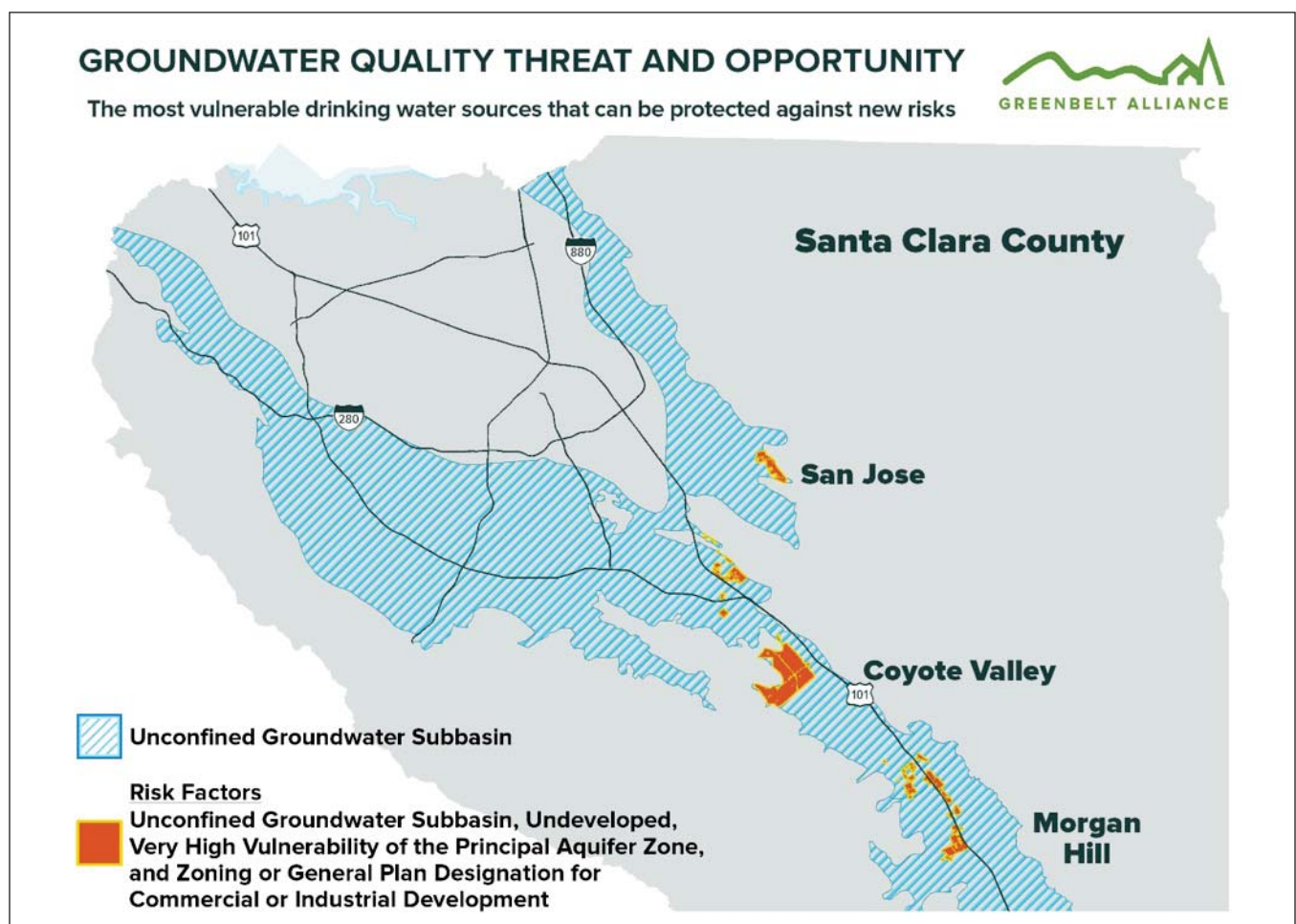


OPPORTUNITY FACTOR: UNDEVELOPED LAND



When putting the layers together into the final map, recopied below, the orange area shows where all four layers overlap. The unconfined aquifer is also shown to provide context that a relatively small part of that aquifer provides the best place to focus protection efforts for the combined threat and opportunity.

As described in the text, several additional reasons not analyzed in this mapping exercise demonstrate that the feasibility of protecting Coyote Valley exceeds that of the other areas mapped in orange.



ENDNOTES

- 1 Contamination of the creeks, a significant biological issue in addition to drinking water concerns, could come from a surface spill and could also come from a groundwater plume leaking into a creek in Coyote Valley and then flowing north for miles along Coyote Creek.
- 2 In addition to the above examples, Southern Santa Clara County also experiences some groundwater nitrate contamination from agricultural activities. This contamination, a separate issue from industrial contamination, has been addressed to manageable levels and could be further managed with land use protections in Coyote Valley that still allow appropriate agricultural use.