A potion of the water from stormwater infiltration goes to shallow groundwater and then surface waters. What portion goes to deep aquifers? Is it a significant volume?

Should the goal for surface water management in relation to groundwater preservation shift from capture/infiltration to reuse? Is this v.3.0?

So, after listening to Evan, can stormwater and green infrastructure even make a dent in our recharge needs?
Anonymous • 15 Sep 09:12AM

What additional data and modelling are needed to develop infiltration targets (spatial and quantity) to mimic natural groundwater recharge in the metro region?

Comments (2)

(Custom) John Bilotta • 0 upvotes • 0 downvotes
The panel at the end of the day may be addressing this.

(Custom) John Bilotta • 0 upvotes • 0 downvotes
Is it safe to say we know more about groundwater withdrawal then we do about recharge?

(Custom) Randy Neprash • 15 Sep 09:45AM

What is your general opinion of porous paving as a strategy? Are they effective in the long term?

Anonymous • 15 Sep 09:51AM

What is the political climate like for green infrastructure support (at the city level)?

Anonymous • 15 Sep 10:21AM

With 1200 BMPs installed in CRWD, what benefits have you actually measured in the water resources?
Cities were developed over 170 plus years, what is a realist goal for reinvesting in our cities to be more green and sustainable?

Cites like Minneapolis and St Paul are much more green than they look, density with a focus on walkable, green streets and water from the river is preferable to sprawl with groundwater pumping large lots and suburban BMPs. Dense organ areas provide a very low collective water footprint.

Is there a limit to the carrying capacity of the Twin Cities area?

How effective is underground treatment versus above ground when you are removing organic soils and vegetation from the equation?

Evan mentioned potential contamination in the lowest bedrock aquifer. What are those contaminants and their source?

Are there any current metro regions in the world that truly embrace the concepts of green infrastructure?

Milwaukee has a very extensive plan for green infrastructure to deal with CSOs and improve the city. Also, Amsterdam is going about introducing green infrastructure for climate resilience.
Anonymous • 15 Sep 09:31AM

Bruce. Please say more about the impacts of robotics and technology on stormwater management techniques and strategies.

Votes: 11

(Custom) Lisa Goddard • 15 Sep 10:25AM

Have there been studied of the long term maintenance needs of tree trenches? And especially in cold weather climates?

Votes: 11

Anonymous • 15 Sep 09:35AM

What role does changing our transportation habits have in storm water management? Can we substantially reduce impervious surface without altering our dependence on cars?

Votes: 9

Anonymous • 15 Sep 10:11AM

Mark - what is the long term vegetation management plan for rain gardens on boulevards? Wondering what will happen if homeowners don't replace desirable species?

Votes: 9

Anonymous • 15 Sep 09:09AM

Does the CWP 10% impervious threshold still have relevance for stormwater managers?

Votes: 8

Anonymous • 15 Sep 10:00AM

Do we need to better examine the definition of GI verses LID and what practices we list under each. Misinterpretation? for example, pervious pavement. It's not a GI practice, it's a LID practice.

Comments (1)

Anonymous • 1 upvote • 0 downvotes

Why does the distinction between these terms even matter?
Considering what we know now of maint issues and long range effectiveness of permeable pavements, is that why maybe folks are shying away? And considering maint issues, how effective are these paven

Comments (1)

Anonymous • 0 upvotes • 0 downvotes
If bioretention only getting infiltration March and April, would we get significantly more infiltration with porous pavements?

Anonymous • 15 Sep 10:26AM
How do we address nitrogen and chlorides?

Anonymous • 15 Sep 09:36AM
How feasible and necessary is a regional wastewater infiltration system in the Twin Cities?

Comments (1)

Anonymous • 0 upvotes • 0 downvotes
We have a long list of pharmaceuticals that we are not adequately addressing prior to discharge to surface waters. Until these legacy pollutants are addressed large scale infiltration of waste water into groundwater should be restricted.

Anonymous • 15 Sep 09:31AM
What IS the status of Mpls’ final remaining CSOs?

(Linkedin) Jonathan • 15 Sep 09:36AM
How did the creation of the Minneapolis Chain of Lakes influence local hydrology?
Anonymous • 15 Sep 10:32AM
What is the feasibility of getting the treated waste water back into groundwater rather than discharged to river?

Votes: 5
Shown

Anonymous • 15 Sep 10:35AM
Infiltration solves some quantity issues, but is it still an option in areas with chloride pollution? What should designers keep in mind when balancing quantity and quality? What tools are there?

Votes: 5
Shown

Anonymous • 15 Sep 09:39AM
Who owns the former ford plant property? How might ownership determine the extent of green infrastructure implementation?

Votes: 4
Shown

Anonymous • 15 Sep 09:53AM
How has the introduction of watershed law in the mid-50’s impacted the green infrastructure? This preceded the Met Council.

Votes: 4
Shown

Anonymous • 15 Sep 10:45AM
Are there any good reuse systems available for residential use to decrease reliance on treated groundwater to water lawns?

Votes: 4
Shown

Anonymous • 15 Sep 11:05AM
At our current usage rates of groundwater, when are we projected to run out of groundwater in the twin cities?
At inception in 1967 the Met Council had a quick positive impact on water infrastructure. Would refocusing the Met Council from it's recent focus on social re-engineering to Green Infrastructure help?

If surface water changes (ex ponds where wetlands were) resulted from increased impervious surfaces and runoff volumes, should we expect future changes as we disconnect and reduce impervious surfaces?

What is the impact of fracking on groundwater?

Bruce - you did a great job about summarizing past hydrologic changes. Can you say more about future hydrologic changes; expand on the mains points of Atlas 14 and what that means for future runoff.

Once an aquifer is depleted does it maintain the same capacity to hold groundwater if replenished (is there compaction/compression of the material)

What are the water quality issues with the Mt. Simon aquifer?
I recently read that in many urban areas, in spite of impervious surface, recharge to groundwater is actually increased over the natural condition due to leakage from water supply and wastewater systems.

Anonymous • 15 Sep 11:05AM
How much groundwater capacity are we losing through intense pumping? How do we know how healthy is this resource?

Anonymous • 15 Sep 11:12AM
Should we be taking municipalities off GW and draw more from our rivers that we are discharging our wastewater back into?

(Custom) Randy Neprash • 15 Sep 09:49AM
What is the potential for iron-enhanced filters and SAFL Baffles? How can we fulfill that potential more quickly?

Anonymous • 15 Sep 10:04AM
Why are we still building Surface parking lots? A underground or above ground ramp reduces the footprint, cleans the run off, add a green roof and that's the perfect fix, not tanks under parking lots.

Anonymous • 15 Sep 10:58AM
Evan...what does Prairie du Chien groundwater model show 1995 to 2011?

Anonymous • 15 Sep 10:59AM
Evan- Why did you use 1995 as a baseline year for recharge in the recharge model? Was it due to maximum growth in the 1990s?
Anonymous • 15 Sep 11:02AM

Evan, what is the time scale for infiltration to recharge, comparing the Anoka Sands and Carver County?

Anonymous • 15 Sep 11:14AM

How should implementers of green infrastructure prioritize green infrastructure projects that aim to help maintain surface water flows and water levels? How do we figure out what should go where?

Anonymous • 15 Sep 11:24AM

How much of our 316 million gallons/day of pumping is to treat groundwater contamination? Ways to put cleaned water back?

Anonymous • 15 Sep 10:28AM

Evan- will you make your ppt available to us?

Anonymous • 15 Sep 11:32AM

The panelists talked a lot about hopes for robotics and other technical innovations. Is that approach able to solve our issues without paired attention to social science research (behavior change)?
Comments (1)

Anonymous • 0 upvotes • 0 downvotes

Yes!! Sumps may be worse yet as they take out some of the organics that would hold the metals. Any of the suspended metals not captured in the sump can go right into the soil without having to filter through the sediment.

Anonymous • 15 Sep 01:13PM

Should we more concerned about groundwater pollution from septic systems or from stormwater bioinfiltration systems?

Votes: 18

(Custom) Randy Neprash • 15 Sep 08:53AM

In your book on groundwater & stormwater with Bob Pitt, you discussed the weakness of BMPs with only "minimal pretreatment". What does the term "minimal pretreatment" mean?

Votes: 16
Should we think of adsorption of pollutants to soil as long-term storage with eventual release, instead of treatment or removal?

If underground treatment practices infiltrate water below the vadose zone, is it being adequately treated? Is it still green infrastructure?

In your opinion, are the GI practices we are designing/installing able to treat (trap) these increasingly complex, compound pollutants? Is there a complex pollutant current GI is missing the boat on?

Are any of these practices effective at reducing non-SSTS related bacteria pollution?

What’s the long term fate of chloride. Will we see it in groundwater for decades? Longer?

Both your presentations re-remind us of the importance of organic matter and compost. Do we need to be incorporating more into our GI practices; what additional research is needed on compost?

Porous pavement may reduce need for salts, but what about infiltrating more heavy metals from roads without treatment?
Anonymous • 15 Sep 01:07PM

Shirley said developers don’t want drawdown times of 72 hours, but as regulators we have requested closer to 24 hours drawdown to allow plants to thrive. Are we missing out on pollutant removal?

Anonymous • 15 Sep 12:38PM

How are stormwater practices and research responding to the rise in nitrates in the aquifers? Are there current practices that are more prone to contributing to the problem?

Anonymous • 15 Sep 01:51PM

Where is an example of a long term permeable asphalt project that has seen multiple cycles of freeze/thaw within the metro area? What additional maintenance is needed & what is the extra install cost?

(Custom) Tina Carstens • 0 upvotes • 0 downvotes

RWMWD was installed in 2005. We do vacuum sweeping twice a year and it is still functioning well even with clogged areas in the drive lane.

(Custom) Anne Gelbmann • 0 upvotes • 0 downvotes

The city of Shoreview has multiple examples of permeable pavement. Contact mark malooley at the city for information on costs and maintenance.

(Custom) Dan Murphy • 15 Sep 12:58PM

With what particle size range are PAHs typically associated with? Is there any research being done to cost effectively treat PAH contaminated soils?
Organic material is not used around the underground devices as it will lessen the infiltration rate.

Can Underground infiltration devices with no pretreatment actually be worse for ground water than doing nothing at all.

Has the recent change to salting roads with brines instead of solid salt decreased the chloride loading?

How long does the high nutrient release last after new soil disturbance before back to preconstruction or start removing?

Permeable pavement is great but the idea that we should be able to drive anywhere at anytime is the underlying problem pushing chloride use. How do we move the discussion to changing behaviors.

$2.00 a gallon Gas Tax or an impact fee on gas based on the impacts driving has on the environment. Much like a carbon tax
Cleaning the underground devices could negatively impact groundwater.

Kinetics- in your opinion, are we designing/implementing GI practices that will retain Stormwater for sufficient amount of time to treat, bind, filter pollutants? (Pollutants beyond total phosphorus)

Can you discuss the benefits of a light imprint philosophy vs a LID when it comes to Groundwater protection?

A walkable connected community is your best way of reducing salt use, the problem is the need to drive not slippery roads.

Shirley, you focused a lot on the mitigation of inorganic contaminants. How does ammending the soil with organic matter affect the mitigation of organic contaminants?

What can be done about private parking lots w/ gutters where fear of lawyers overrides common sense. Our parking lot looks like it's concrete in the winter instead of asphalt like it is.
Considering public perception about winter road conditions and the need for salt, what's the realistic expectation of replacing roadways in the next few decades?

Is there a chloride input threshold to strive for to ensure a functioning rain garden? Particularly when we are promoting gardens to capture large parking lot runoff?

Is there a push at the legislature to limit liability for private applicators, perhaps by using certified applicators? They are often a big over user.

It was noted that MCLs are exceeded less than 10 percent of the time for many things. How do the volumes compare for those exceedence events?

What is the typical phosphate concentration added to drinking water for keeping pipes clear? It's this a significant source with runoff from (over) irrigation?

How do we capture copper? What are copper sources?

What is the maximum percent of compost you recommend in an engineered soil mix? Is 20% too high if the rest is sand?
Anonymous • 15 Sep 01:38PM

Why do you think salt staying in soil rather than runoff when it is applied to impervious surfaces? Where is the soil interaction if not in lakes n streams?

Votes: 2

(Custom) Randy Neprash • 15 Sep 09:06AM

Should we think of the adsorption of pollutants to soil as long-term storage with eventual release, instead of treatment or removal?

Votes: 0

Blocked

Anonymous • 15 Sep 02:29PM

Rather than cleaning a underground device when it gets a certain level of sediment we should let the seed it sit until infiltration is compromised? Wow no pretreatment and no cleaning is better?Yikes!

Votes: 0

Blocked
**Session Name:**
Q&A with Statewide Perspectives Panel

**Session Type:** Q&A

**Date:** 15 Sep 2015 08:30AM – 21 Sep 2015 05:00PM

**Description:** Agency perspectives on groundwater and surface water management

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**Anonymous • 15 Sep 02:46PM**
What is the role of watershed districts in groundwater management?

**Votes: 19**

**Anonymous • 15 Sep 03:06PM**
Why is MDH so concerned about the locations of stormwater infiltration BMPs, but apparently not or much less concerned about septic system locations? SSTS can apparently be in DWSMAs, floodplains, etc

**Votes: 17**

**Anonymous • 15 Sep 03:17PM**
Do you (or your agency) have an example of a site or location where you have said "GI or infiltration absolutely doesn't belong here!" - and if so, why did you take that hard line?

**Votes: 19**
From the speakers so far, it seems that we are spending considerable resources promoting GI practices that are unproven. Is this concerning? Or do you view it as a necessary stage of GI development?

**Comments (1)**

Anonymous • 0 upvotes • 0 downvotes
Concerning that these are unproven.

How can we make groundwater "sexy" and engaging when talking to the general public?

**Comments (3)**

Anonymous • 2 upvotes • 0 downvotes
Groundwater, like country music can never be sexy.

Anonymous • 2 upvotes • 0 downvotes
Maybe an annual calendar of hydrogeologists?

Anonymous • 0 upvotes • 0 downvotes
Mike Trojan for "Mr. January", no matter what he says about his qualifications.

Nitrate concentrations in gw exceed the MCL in widespread areas across the state. Do you think there will be a time when nitrogen applications to farm fields are subjected to regulatory scrutiny?
Is it problem that so many agencies have a role in groundwater management?

Anonymous • 0 upvotes • 0 downvotes
Yes

Anonymous • 3 upvotes • 0 downvotes
Water touches everything. Limiting agencies roles for groundwater within their area of responsibility (quantity, quality, public health, natural resources, etc.) is unrealistic. The key is good collaboration among agencies and that is happening.

Anonymous • 0 upvotes • 0 downvotes
As was mentioned, even when a state has one agency that houses all things water, they typically are organized by specific responsibilities - petroleum contamination clean up, well permitting, storm water permits, and so the challenge remains - building a culture that is actively aware and integrated with respect to all aspects of water management.

Anonymous • 15 Sep 02:59PM
Mike- do you agree with John Gulliver that the Stormwater manual's recommendation for %compost in bioretention facilities is random?

Comments (1)

(Custom) Mike Trojan • 0 upvotes • 0 downvotes
I would not use the term "random", but I agree we need more information on this topic. The 2005 MN Stormwater Manual included two recommended bioretention media mixes, both with 15% or greater organic matter (OM) content. We recently added two mixes, both with 5% or less OM. The addition of these mixes reflects research showing that high OM mixes can leach P and N and that lower OM mixes can support plant growth in certain situations. But we need additional work on this, as mentioned at the forum. For example, are all composts the same (I'm certain they are not)? Should we be layering our media? Can we build a system with high OM that does not result in export of P (we have a couple examples of these in the Manual)? I assume
Somebody earlier today mentioned GRAPS that the MDH is leading? Please talk more about them. How will counties, watershed districts, etc. be involved?

Anonymous • 15 Sep 03:21PM

Comments (1)

(Custom) Mike Trojan • 0 upvotes • 0 downvotes
I recommend talking to Sharon Kroening from the MPCA’s ambient groundwater program. I’m somewhat familiar with their findings thus far and data suggests chloride concentrations are increasing in shallow groundwater. There is insufficient data at this time to draw conclusions about deeper groundwater. A study by Walt Kelly in Chicago shows chloride concentrations in the deeper aquifer system have increased there. I also recommend taking a look at his work.

Anonymous • 15 Sep 03:17PM

What are the most important factors to consider for stormwater reuse project planning?

Anonymous • 15 Sep 03:16PM

(Custom) Elmo • 15 Sep 03:16PM

How dependant is ground water management and protection on clean water legacy funds?
The Construction Stormwater permit specifically prohibits infiltration at vehicle fueling locations. Biofiltration, where we have an underdrain or possibly even a liner under the treatment system, are likely to be reasonable options when we are working with petroleum hydrocarbons. In addition to providing a mechanism for sorbing the organic chemicals, a bioretention system will promote biological degradation of many organic chemicals.