### POTENTIAL SOLUTIONS TO EVALUATE

<table>
<thead>
<tr>
<th>LEGISLATION</th>
<th>SUB-LEGISLATION</th>
<th>PLACE A STICKER IF YOU AGREE THIS SOLUTION SHOULD BE FURTHER EVALUATED</th>
<th>ADVANTAGES</th>
<th>DISADVANTAGES</th>
<th>WHAT ADDITIONAL INFO NEEDS TO BE GATHERED IF THIS IS A SOLUTION?</th>
<th>VOTE TOTAL</th>
</tr>
</thead>
</table>
| Evaluating/Methods for Conerving and Recharging Groundwater in the Area | Conveying treated surface water from St. Paul Regional Water Services to north and east communities. | - Serves multiple communities  
- Reduces groundwater use  
- Lessens community burden to meet permit requirements  
- Infrastructure already exists for some of the need | - Money and control  
- Legislative will power/cooperation  
- Initial public perception well to surface water taste/smell/etc.  
- Will cost the consumer 3x more  
- Shedding of turbidity and water quality issues -> flushing for years  
- Holes/cracks exposed needing repairs  
- Low river level/drought scenarios  
- Upstream risks (e.g., Monticello nuclear material leak)  
- What is max. draw/needs to be 0 to the city - SPRWS take over the infrastructure  
- Water chemistry/compatibility between systems - Flint, MI  
- Answer does this unfairly burden and impact underrepresented populations as a solution  
- Costs to change  
- Costs (include pop repair/flushing) to change the chemistry  
- Is there a blending option that mitigates some of the potential concerns? | | 12 |
| | Constructing a regional surface water treatment plant near the chain of lakes in the north metro and convey treated surface water to north and east communities. | - Reduces groundwater use  
- Lessens community burden to meet regulations | - Not enough water  
- Money and control  
- Legislative will power/cooperation  
- Water chemistry and pipe issues -> holes/cracks exposed needing repairs, shedding of turbidity and water quality issues -> flushing for years  
- Initial public perception well to surface water taste/smell/etc.  
- Quality risks | - What is max draw  
- Governance  
- Costs (include pop repair/flushing) to change chemistry  
- Water chemistry/compatibility between systems - Flint, MI  
- Is there a blending option that mitigates some of the potential concerns? | 8 |
| | Constructing a regional surface water treatment plant near the St. Croix River and convey treated surface water to north and east communities. | - Cleaner water  
- Reduces groundwater use  
- Lessens community burden to meet regulations | - Initial public perception well to surface water taste/smell/etc.  
- Too much energy to transport and geography  
- Money and control  
- Multi-state compact (border water)  
- Legislative will power/cooperation  
- Water chemistry and pipe issues -> holes/cracks exposed needing repairs, shedding of turbidity and water quality issues -> flushing for years  
- Site challenges | - What is max draw  
- Governance  
- Costs (include pop repair/flushing) to change chemistry  
- Water chemistry/compatibility between systems - Flint, MI  
- Scenic designation  
- Costs to change | 3 |

Are there other surface water sources not on this list that should be evaluated? What are the advantages and disadvantages?

- Redirect stormwater to augment White Bear Lake  
  - More water draining into lake  
  - Cost  
  - Contamination  
  | 13 |
- Close loop system, Las Vegas style  
  - Augment by surface or groundwater as needed  
  - Very expensive - government cooperation  
  | 2 |
- Mississippi river source separate from SPRWS  
  - Move local control/new governing body  
  - Cost, including chemistry/pipe issues  
<p>| 1 |</p>
<table>
<thead>
<tr>
<th>LEGISLATION</th>
<th>POTENTIAL SOLUTIONS TO EVALUATE</th>
<th>ADVANTAGES</th>
<th>DISADVANTAGES</th>
<th>WHAT ADDITIONAL INFO NEEDS TO BE GATHERED IF THIS IS A SOLUTION?</th>
<th>Votes</th>
</tr>
</thead>
</table>
| Reuse water | Reuse of treated wastewater from local Met Council interceptors for industrial and agricultural users. | ~ Source is there  
~ Large scale - what is feasibility and cost  
~ Single loop scale  
~ Reduces need for downstream convergence systems | ~ Needs to be closer to source  
~ Little Ag. Near WWTPs where groundwater concerns  
~ Plumbing code limitations  
~ Very complex, high costs for treatment and distribution  
~ Plumbing code challenges | ~ How do we do these at a smaller scale?  
~ How effective?  
~ All add to sustainability | 12 |
| Stormwater for irrigation. | | ~ Source is there  
~ Less costly and more feasible than other 3  
~ Easy to construct  
~ Less use of city water  
~ Stormwater available everywhere | ~ Rules make it complicated  
~ If drought, not feasible need ponds with a baseflow  
~ o+m costs  
~ Stormwater not available during droughts  
~ Future treatment requirements unknown | ~ How effective?  
~ Plumbing code changes?  
~ Change MDH/OU rules  
~ Panel sizing that meets irrigation needs  
~ All add to sustainability | 9 |
| Reuse water discharged from contaminated wells. | | ~ Water source is there  
~ Liability and perception  
~ Cost of PFAS treatment  
~ Unknown regulations | | ~ Already being implemented by Woodbury?  
~ How effective would this be?  
~ Where do contaminated wells exist?  
~ Groundwater modeling to determine impacts to WBL  
~ Potential TGPCD savings - all  
~ All add to sustainability | 7 |
| Reuse of treated wastewater from local Met Council interceptors for flushing toilets and irrigation water. | | ~ Source is there  
~ Reduces need for downstream convergence systems  
~ Multiple systems expensive  
~ Single loop system  
~ Large scale - what is feasibility and cost  
~ Reduces need for downstream convergence systems | ~ Needs to be closer to source perception  
~ New infrastructure need = $  
~ Plumbing code restrictions  
~ Health risks  
~ Very complex, requires separated water lines  
~ Plumbing code challenges | ~ How do we do these at a smaller scale?  
~ How effective?  
~ All add to sustainability | 1 |

Are there other water reuse methods not on the list that should be evaluated? What are the advantages and disadvantages?

- **Gray water to use in toilets (sink to toilet)**  
  > Overall citizen education and buy-in
  > ~ Conserving clean water
  > ~ Create a GW model of more vast proportions and for multiples aquifers, so as to be able to make informed decisions on where and how to most effectively GW recharge/direct injection.

- **Direct injection of treated wastewater/dewatering**
  > ~ Sending allow GW after use downriver (Mississippi) and out of state is NOT sustainable
  > ~ Expensive to change how we’ve been doing it since forever, but keep the resource in state.
  > ~ Unknown interactions between water chemistries in the aquifer
  > ~ Study this
  > ~ Current/future contamination risks

- **Commercial manufacturing cooling**
  > ~ Not using “clean” water

- **Toilet tap start thinking about treating effluent for potable use**
  > ~ Large amount of water concentrated at a few locations
  > ~ Public perception
  > ~ Scale/Infrastructure

Votes: 3, 3, 2, 2
### Potential Solutions to Evaluate

<table>
<thead>
<tr>
<th>Legislation</th>
<th>Sub-Legislation</th>
<th>Potential Solutions to Evaluate</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>What Additional Info Needs to Be Gathered if This is a Solution?</th>
<th>Votes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluating Methods for Conserving and Recharging Groundwater in the Area</td>
<td>Projects designed to increase groundwater recharge</td>
<td>Lake augmentation by pumping treated surface water from the chain of lakes into White Bear Lake.</td>
<td>Study complete, costs relatively known, already peer reviewed</td>
<td>Lake water quality risks, PFAS and other contamination, invasive control</td>
<td>Lake modeling and eutrophication effects from mixing water, Potential rate impacts, $ or volume?</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Treat wastewater from local Met Council interceptors and inject the treated wastewater into the aquifer to raise groundwater elevations.</td>
<td>Keeps water in the area</td>
<td>Contamination concerns, May be slow lake level response, Expense, Treated drinking water standards may be needed, but may be expensive</td>
<td>Cost of four new wastewater treat facilities, Potential rate impacts, $ or volume?</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stormwater collection and infiltration to raise groundwater elevations.</td>
<td>Methods are known; already happening</td>
<td>Water quality questions and concerns, Limited opportunities to make meaningful difference</td>
<td>How much opportunity is there and how much is needed to make a meaningful difference, Potential stormsewer impacts, $ or volume?</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Combination of lake augmentation and groundwater injection by treated wastewater.</td>
<td>Keeps water in the area, May help lake levels but more slowly</td>
<td>Potentially costly infrastructure that is duplicative, Water chemistry questions</td>
<td>Potential rate impacts, $ or volume?</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lake augmentation by treating wastewater from local Met Council interceptors and pumping the treated wastewater into White Bear Lake.</td>
<td>Keeps water in the area, Helps lake levels directly, Cost effective</td>
<td>Very expensive, Potential concern with pathogens, Public perception of treated water, PFAS</td>
<td>PFAS risks, Potential rate impacts, $ or volume?</td>
<td>2</td>
</tr>
</tbody>
</table>

**Are there other groundwater recharge methods not on this list that should be evaluated? What are the advantages and disadvantages?**

<table>
<thead>
<tr>
<th>Methods eval</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Additional Info</th>
</tr>
</thead>
<tbody>
<tr>
<td>Augmentation of WBL or injection to groundwater from SPRWS treated water</td>
<td>Available capacity?</td>
<td>$$$$$</td>
<td>Available capacity, Needed infrastructure</td>
</tr>
<tr>
<td>Closed loop potable reuse - direct potable reuse</td>
<td>Long term growth</td>
<td>$</td>
<td>Reliable</td>
</tr>
</tbody>
</table>

**Votes:**
- Evaluating Methods for Conserving and Recharging Groundwater in the Area: 12
- Treat wastewater from local Met Council interceptors and inject the treated wastewater into the aquifer to raise groundwater elevations: 10
- Stormwater collection and infiltration to raise groundwater elevations: 8
- Combination of lake augmentation and groundwater injection by treated wastewater: 3
- Lake augmentation by treating wastewater from local Met Council interceptors and pumping the treated wastewater into White Bear Lake: 2
### Potential Solutions to Evaluate

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<th>WHAT ADDITIONAL INFO NEEDS TO BE GATHERED IF THIS IS A SOLUTION?</th>
<th>Total Votes</th>
</tr>
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<tbody>
<tr>
<td>Evaluating Methods for Conserving and Recharging Groundwater in the Area</td>
<td>Other methods for reducing groundwater use</td>
<td>Lawn watering restrictions (day of week and time)</td>
<td>Easy to follow/understand</td>
<td>Easy not to follow</td>
<td>Is this effective for all? Rank effectiveness Potential GPCD water savings</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alternative turf grasses and landscaping</td>
<td>State mandated native landscape</td>
<td>Not currently accepted by many in the public</td>
<td>Is this effective for all? Rank effectiveness Potential GPCD water savings</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tiered increasing block water utility rates</td>
<td>Already in place</td>
<td>Not incentive conservation</td>
<td>Is this effective for all? Rank effectiveness Potential GPCD water savings</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Leak detection and unaccounted for water audits</td>
<td>Wise to do</td>
<td>Each municipality plus responsible</td>
<td>Is this effective for all? Rank effectiveness Potential GPCD water savings</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Smart irrigation control and rain sensor program</td>
<td>Water saving (20%)</td>
<td></td>
<td>Is this effective for all? Rank effectiveness Potential GPCD water savings</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Education and outreach</td>
<td>Increased knowledge leads to behavior</td>
<td>Hard to measure; may not be reliable</td>
<td>Is this effective for all? Rank effectiveness Potential GPCD water savings</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Enforcement of adopted water conservation policies</td>
<td>Additional water savings</td>
<td>Requires staff, cost increases</td>
<td>Is this effective for all? Rank effectiveness Potential GPCD water savings</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Commercial and homeowner association irrigation cost share program</td>
<td>Savings for customers</td>
<td></td>
<td>Is this effective for all? Rank effectiveness Potential GPCD water savings</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pressure regulation on plumbing systems</td>
<td>Water reduction potential</td>
<td>Less water pressure for bathing Licensed plumbers required to install</td>
<td>Is this effective for all? Rank effectiveness Potential GPCD water savings</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Appliances and plumbing fixture efficiency program</td>
<td>Happens overtime</td>
<td>$ spent on replacements that will already happen Low flow toilets don't flush everything well Citizen acceptance</td>
<td>Is this effective for all? Rank effectiveness Potential GPCD water savings</td>
<td>0</td>
</tr>
</tbody>
</table>

### Are there other methods for conserving or reducing groundwater not on the list that should be evaluated? What are the advantages and disadvantages?

- **Implement/require/encourage non- or less-potable water reuse for irrigation and process water**
  - Could have BIL reduction in groundwater use for irrigation/processing/industrial use
  - Need MDH (7) and DL plumbing codes changed to allow
  - Any barriers?

  *Total Votes: 9*

- **Centralized water softening**
  - Cut down on chloride pollution
  - Use less water
  - Change is hard
  - New infrastructure costs
  - Softener lobby will oppose
  - No point softening water that is used for irrigation
  - Cost/benefit analysis
  - Water savings that would be realized

  *Total Votes: 4*

- **Less manicured lawns “Turf”**
  - Water conservation
  - More pollinators

  *Total Votes: 2*

- **Require commercial accounts that utilize water for cooling equipment to change to other methods for cooling**
  - Long term benefit and savings
  - Potentially $ saved
  - Unknown number of opportunities

  *Total Votes: 0*

- **Increase recharging**
  - Local control
  - Takes time to implement

  *Total Votes: 0*