

Grey Water: Finding Solutions in Nature

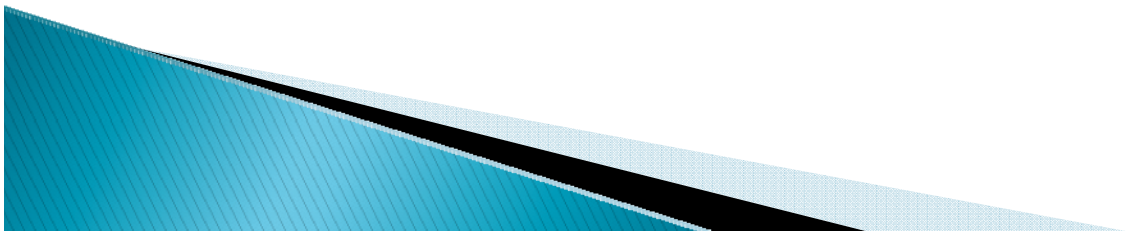
James Parker
Alex Day
JP Powers



<http://becominglast.com/tag/dirty-water/>

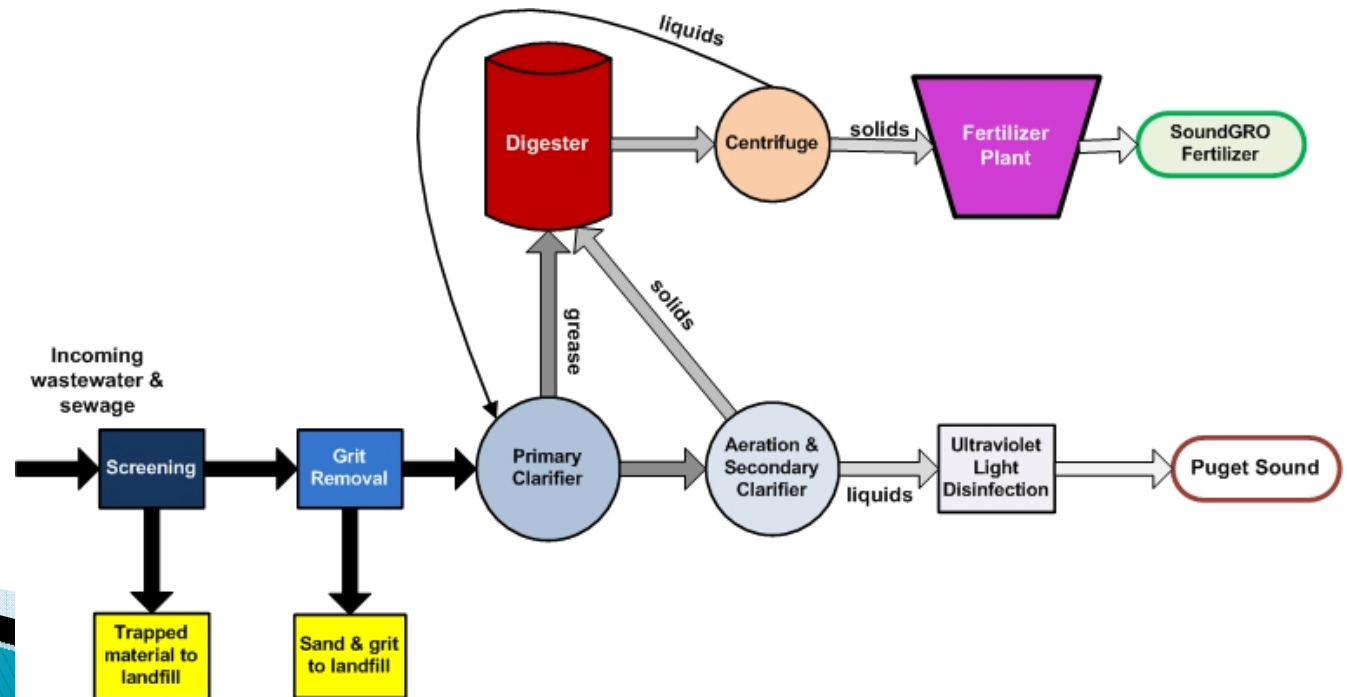
What goes down the drain?

- ▶ Grey water is everything that goes down your drains, aside from human waste.
- ▶ Some grey water contaminates:
 - Soap/Shampoo/Hygiene products
 - Food waste through in-sink disposals
 - Whatever is on you before you take a shower (yikes)
 - Anything else that you have ever dumped down the sink!



How do we deal with Wastewater?

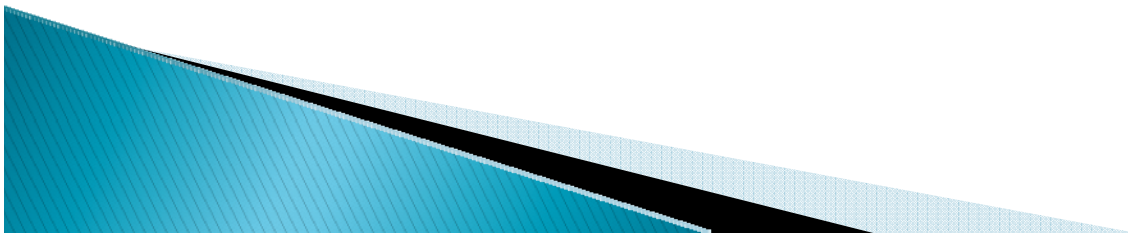
- ▶ **Water treatment facilities:** Treatment centers designed to completely purify water through a multi-step process.



Source: Pierce County Municipal

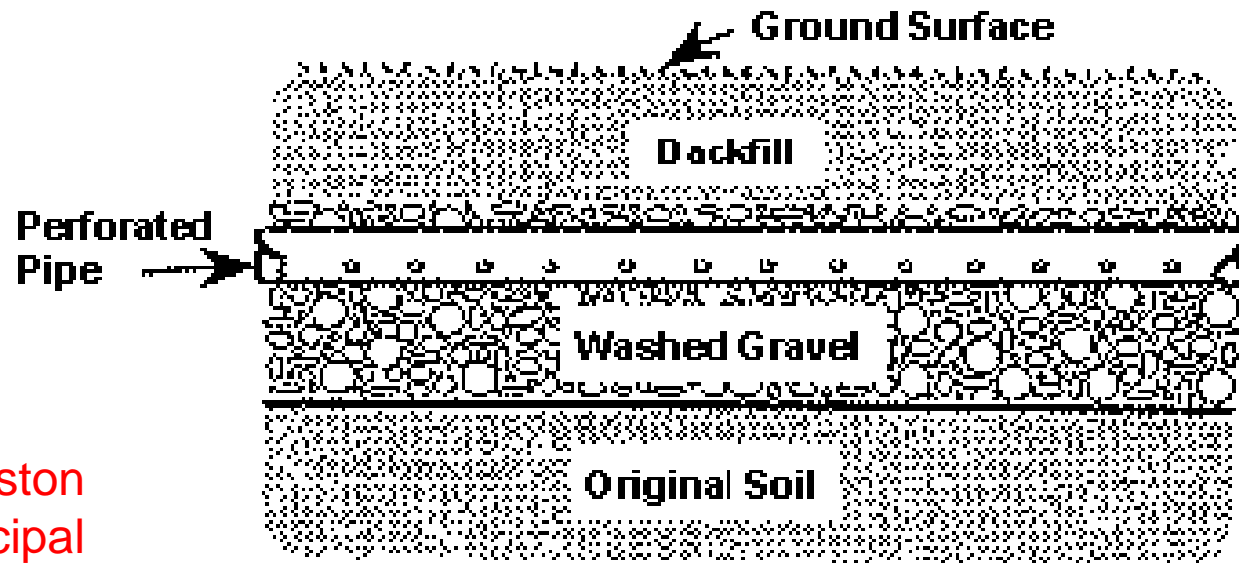
The problem with Water Treatment

- ▶ Energy intensive: Three Percent of total U.S. energy use for treating wastewater.
- ▶ Grey water is 50–80% of total wastewater, which means 1.5–2.4% of total U.S. energy needs come from grey water management.



How *else* do we deal with Wastewater?

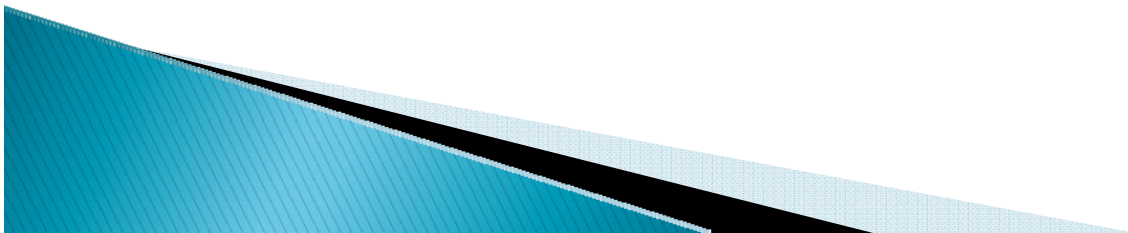
- ▶ “Drainfielding” – Filtering wastewater through soil and gravel in the earth.



Source: Thurston
County Municipal

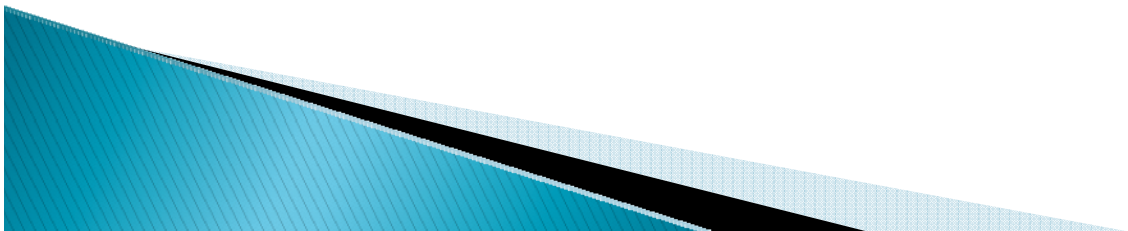
The problem with Drainfielding

- ▶ Requires near-perfect soil conditions for proper filtration
- ▶ Can pool up undesirable chemicals/pesticides
- ▶ Drainfields *need* natural microbial activity constantly.



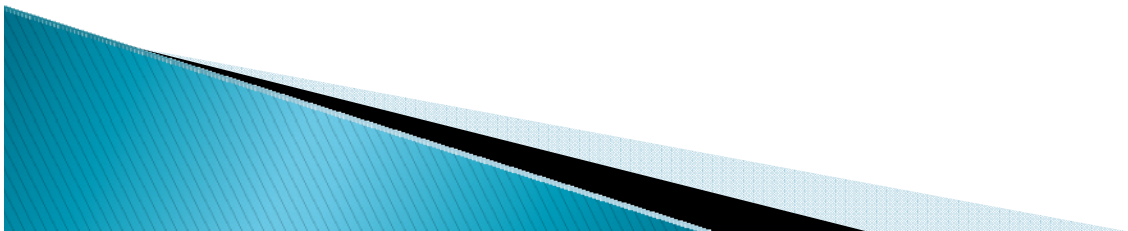
Statistics and Motivations

- ▶ Less than 1% of water on Earth is fit for human consumption.
- ▶ 3.9 trillion gallons of water are used in the United States every month.
- ▶ The average American uses 176 gallons/day.
- ▶ Subsidies keep our water resources less expensive than what they're worth.
- ▶ Recreational luxuries, like golf courses, use excessive amounts of water and pesticides.



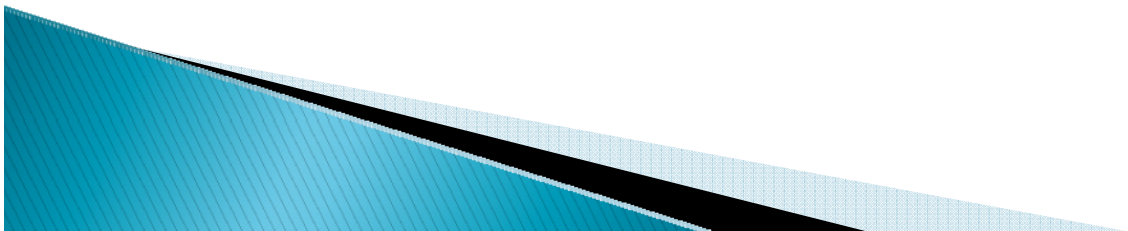
What can we do?

- ▶ Using organic methods to filter grey water may offer solutions to our over-consumption of water resources.
- ▶ On an immediate small scale, organically-filtered grey water may have applications within the community.



How well can organic materials filter Grey Water?

- ▶ **Hypothesis:** Organic methods can completely filter grey water to a potable state.



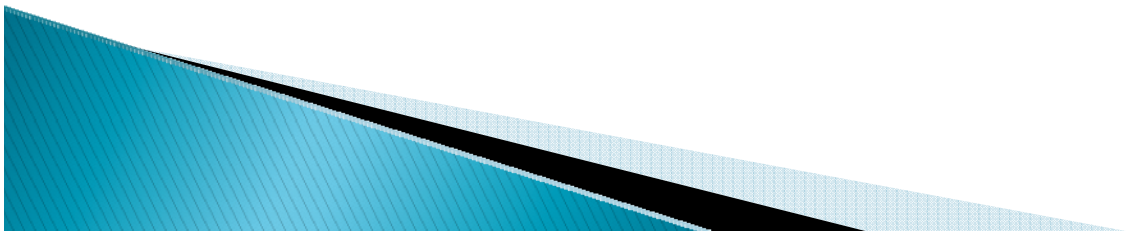
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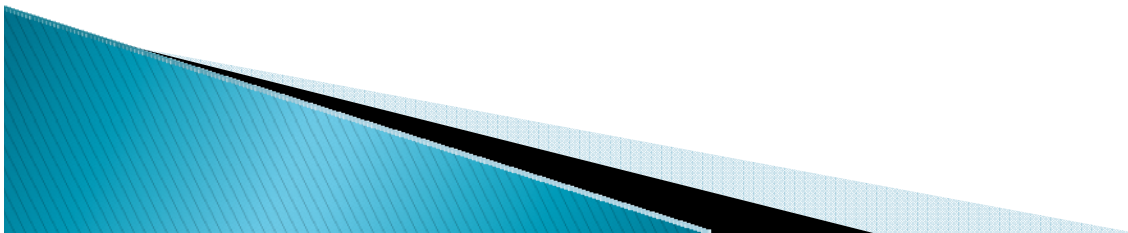
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- ▶ **Hypothesis:** Organic methods can completely filter grey water to a potable state.
- ▶ **Alternative:** Grey water can be filtered of most contaminants and could have applications in gardening and agriculture.
- ▶ **Null:** Organic methods of filtration are not very effective at filtering out grey water.



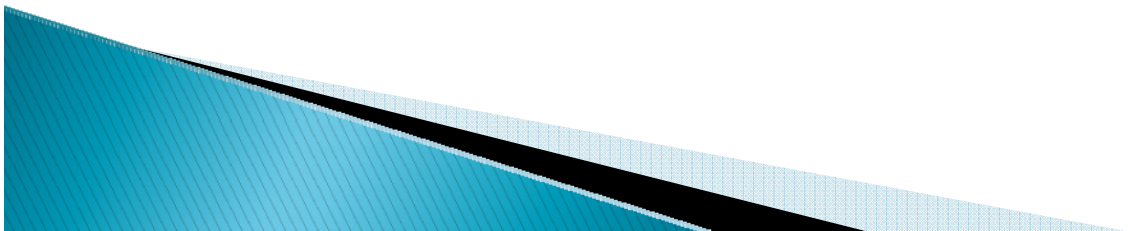
How will people feel about utilizing Grey Water?

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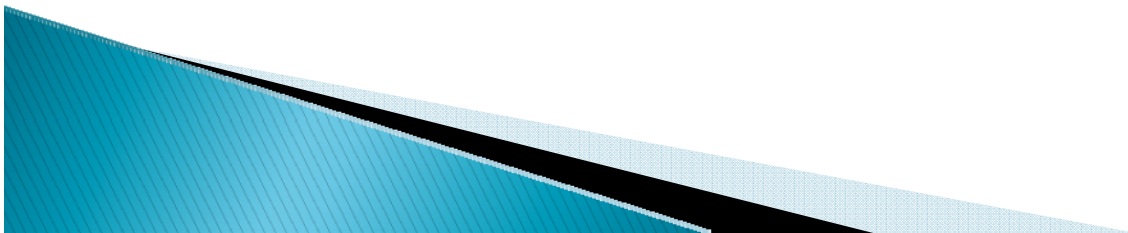
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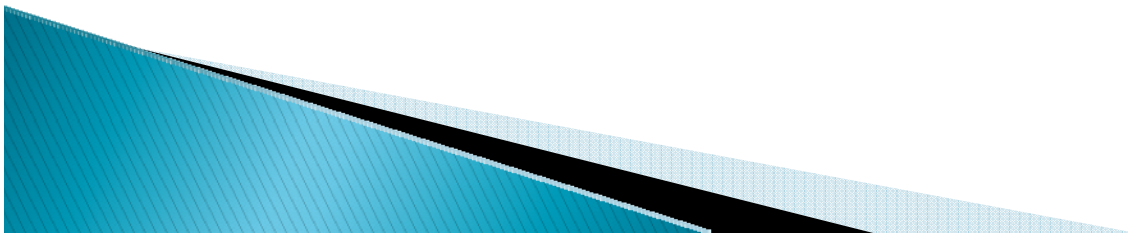
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- ▶ **Hypothesis:** People will be open to utilizing grey water through organic reclamation.
- ▶ **Alternative:** Some individuals might have stipulations about using grey water reclaimed through organic methods.
- ▶ **Null:** People will be too put-off by the idea of using reclaimed grey water.



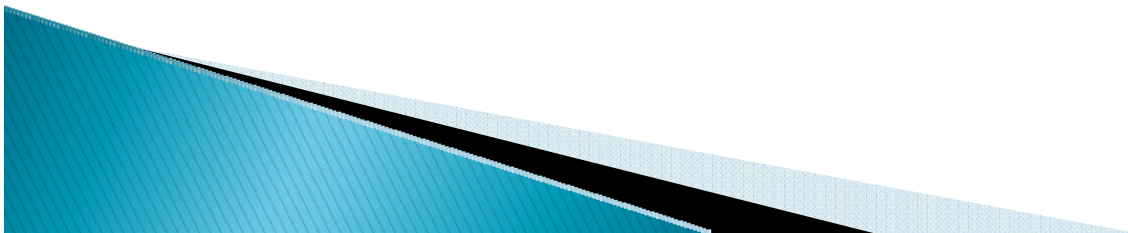
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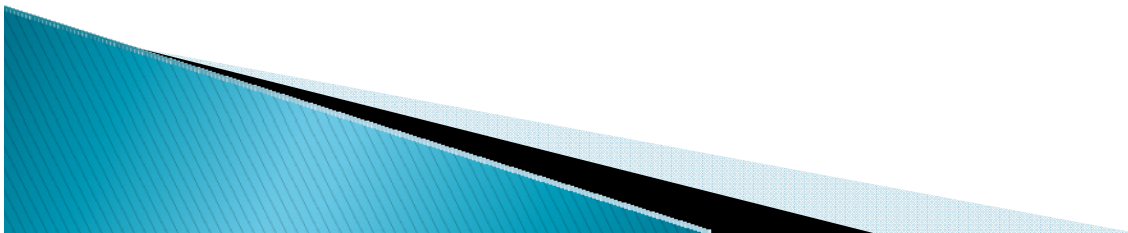


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 - ▶ **Alternative:** Alternative methods of grey water filtration can save energy usage at water reclamation facilities.
 - ▶ **Null:** Grey water reclamation has no economic benefits and may only prove to be more expensive.
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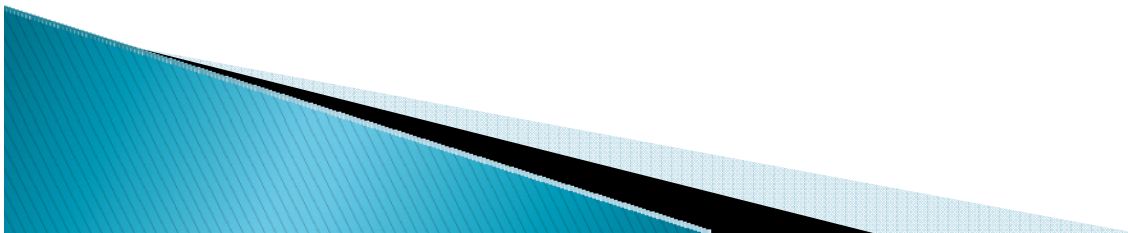
Methods for construction

- ▶ A three-tank system design:
 - Level one: Large material filtration with a mesh screen.
 - Level two: Finer materials filtration using alternating layers of gravel and sand. Use of activated charcoal integrated between layers.
 - Final level: Holding tank for filtered water.



Challenges of at-home grey water filtration

- ▶ Grey water must be used shortly after filtration.
- ▶ Overall cost can exceed benefits if done incorrectly.



Grey water is the way to go!

