Unfiltereds Response to Regulatory Compliance

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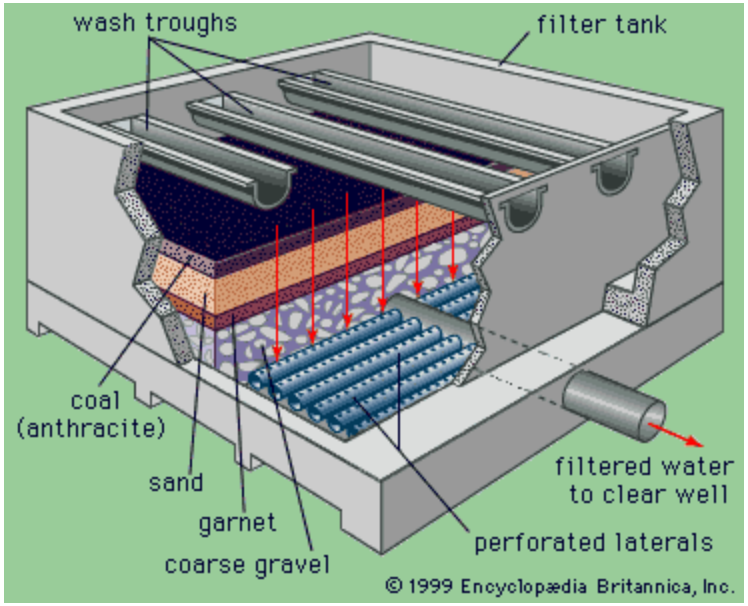
Long Term 2 Enhanced Surface Water Treatment Rule (LT2)

- Provides additional public health protection against *Cryptosporidium*
- requires *Cryptosporidium* removal or inactivation of unfiltered supplies
- Rule Finalized January 5, 2006

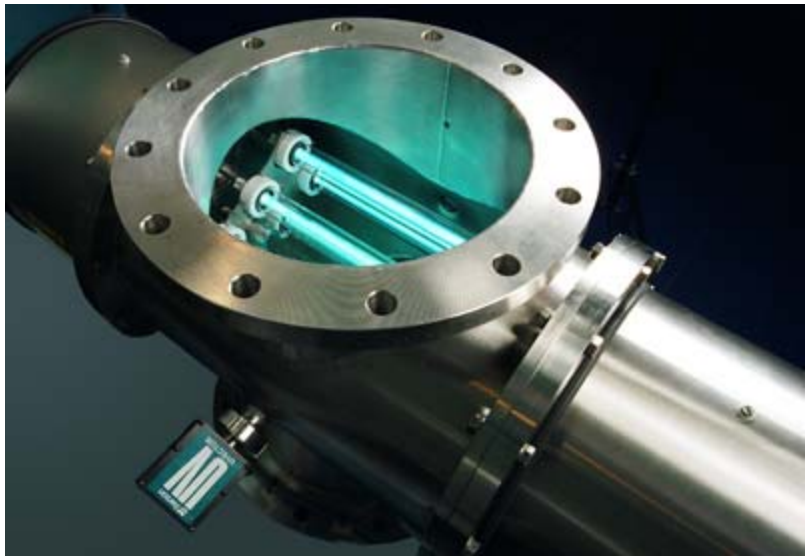
Schedule

2010		2011		2012	2013	2014	2015
Decision	Planning	Design & Permits		Construction		Start-up	
		Decision	Planning	Design & Permits	Construction		Start-up

Options



Filtration

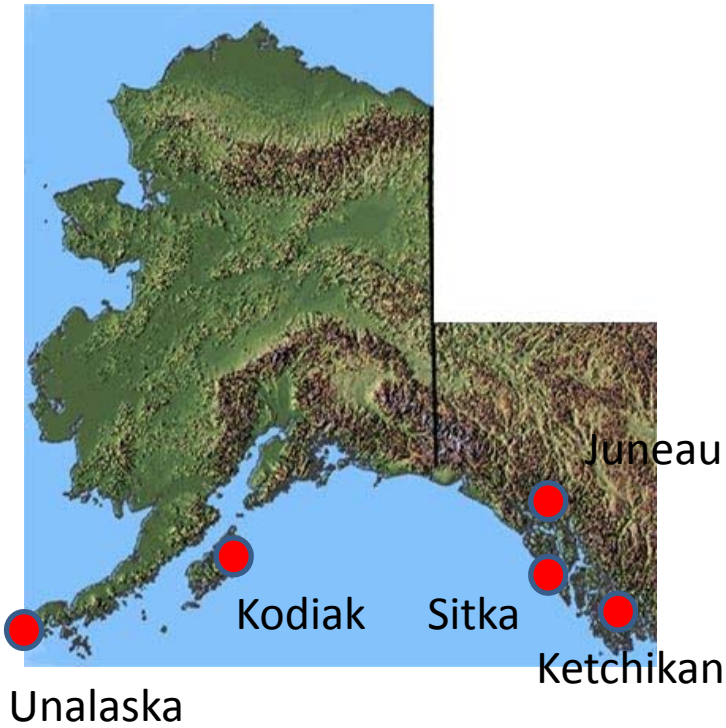


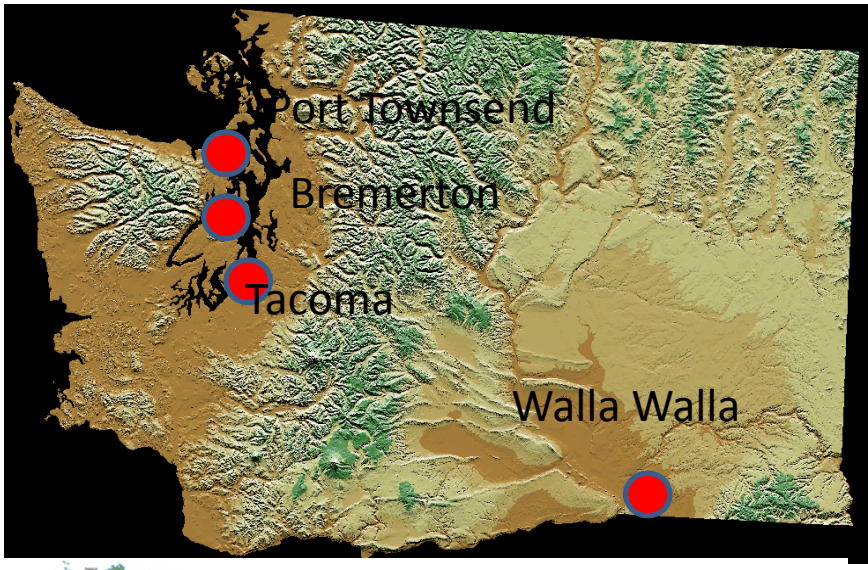
UV disinfection

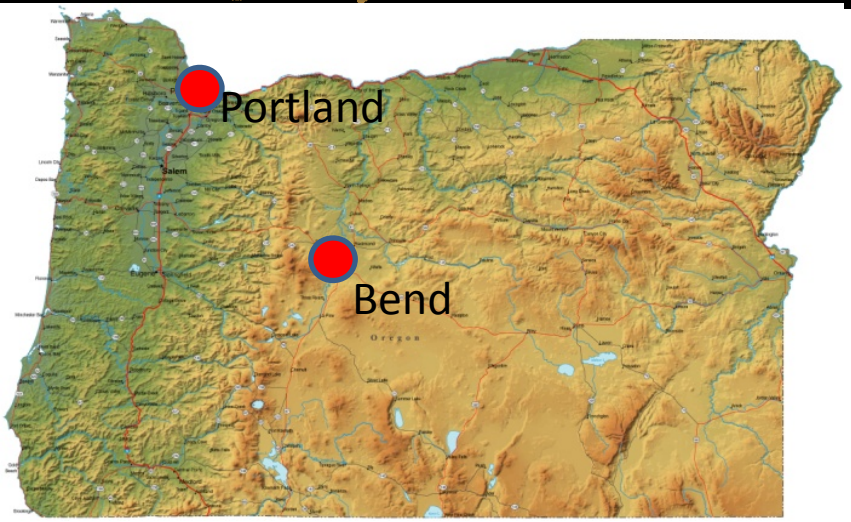
Philosophical Thought

- Regulation requires crypto inactivation
- UV is very effective at cypto inactivation
- UV is the most cost effective approach
- UV does not interfere or complicate anything else
- Why is filtration considered?

Who is Impacted?





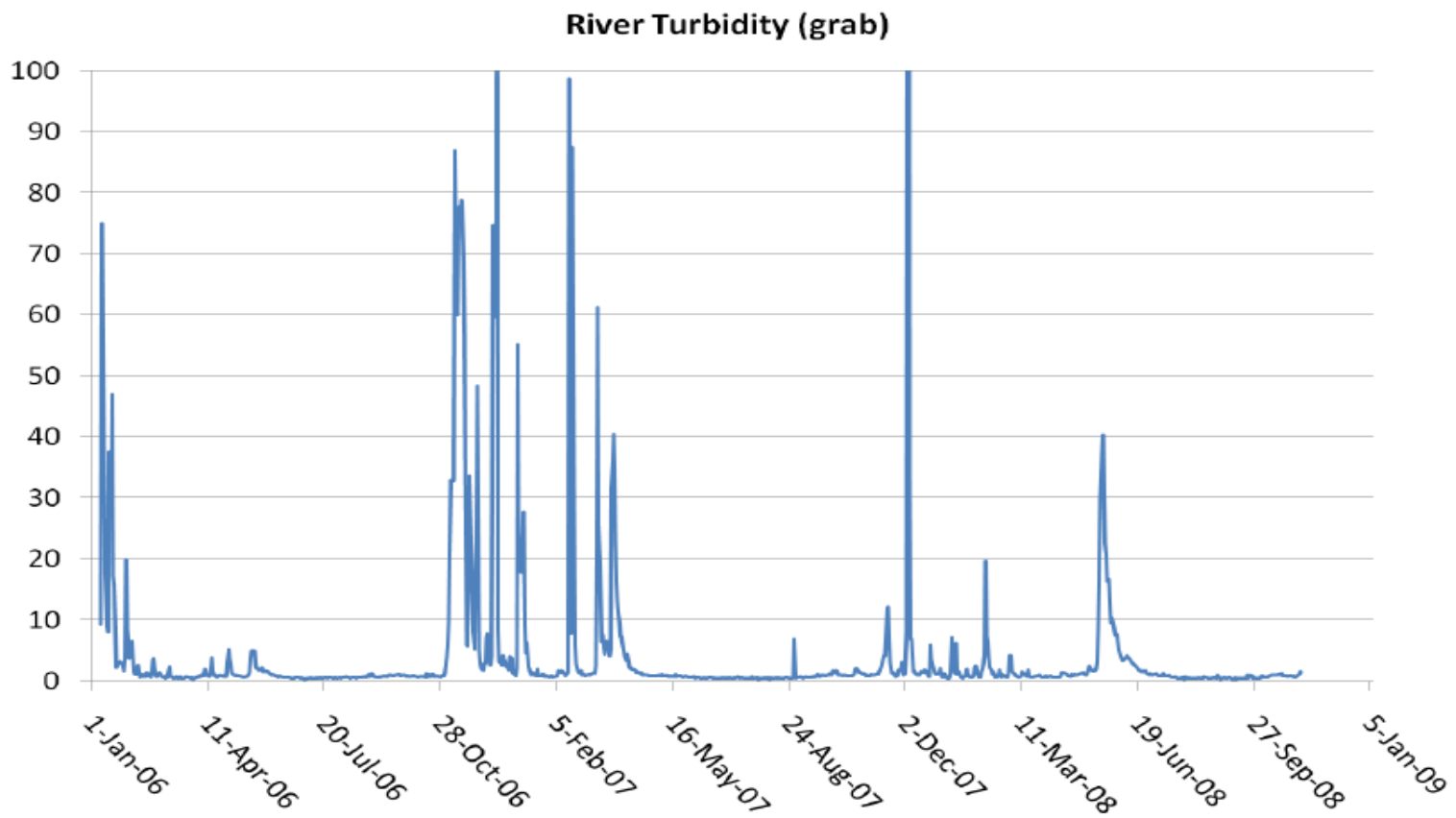


Tacoma

- Good model for how utilities decide
- Simple Cost Comparison Inadequate
- Value-based Decision Framework
- Used both monetary and non-monetary criteria
- First some background

Tacoma Primary Source – Eagle Gorge Reservoir

Reservoir Becomes Turbid in Winter



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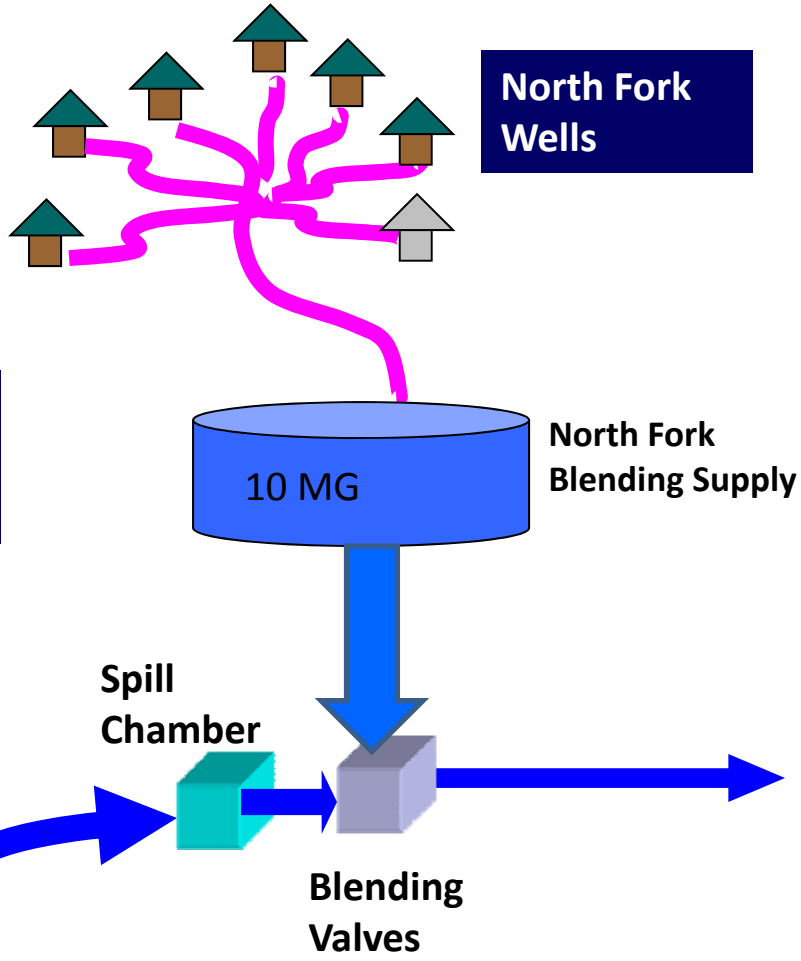
Tacoma Blends to Mitigate Turbidity



Framing the Decision

Developed comprehensive list of values

- All Tacoma and Partners staff and management participated

Developed criteria to capture breadth of values

- Criteria are exhaustive, measureable and differentiate between options

Categorized values

- Balanced group representation organized many values into six categories

Created evaluation model

- Criteria weighted by participants
- Options rated against criteria

Water Quality & Public Health Protection

Cost

Regulatory Requirements

Reliability & Yield

Operations

Sustainability

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Avoided Costs

Element	Basis	Filtration	UV
Reduced Chlorine Dose	25% & 10% reduction	$49,500	$19,800
Fewer T&Os	60% reduction	$46,800	$0
Less Flushing Water Mains	50% reduction	$603,100	$0
Less Cleaning of Reservoirs	50% reduction	$77,100	$0
Partners Avoided Cost for Augmenting Supply	50% reduction	$426,800	$0

Evaluation Criteria (1 of 3)

	Criteria	Question
Water Quality & Public Health Protection	Contamination Barriers	No. Barriers Option Presents?
	DBPs	Does Option Decrease DBPs?
	Corrosivity	Manage Corrosivity in System?
	Iron and Manganese	How Well Removed?
	Chlorine	How Much Required?
	Turbidity	Minimize Turbidity ?

Evaluation Criteria (2 of 3)

	Criteria	Question
Regulatory Requirements	Current Regs	Meet Current Regs?
	Future Regs	Flexibility For Future?
	Certainty	Manage Risk Maintaining Unfiltered Status?

	Criteria	Question
Reliability & Yield	Maximize Available Water	How Often Avoid Blending?
	Long Term Supply	Long Term Water Supply Certainty With Climate Change?

Evaluation Criteria (3 of 3)

	Criteria	Question
Operations	Range of Water Quality	Flexibility for Range?
	Minimize Poor Water to Customers	Risk of Treatment Failure?
	Training	Level of Expertise Required?

	Criteria	Question
Sustainability	Carbon Footprint	Carbon Production Minimized?
	Waste	Quantity Minimized?
	Aquifer Storage	ASR Enabled?

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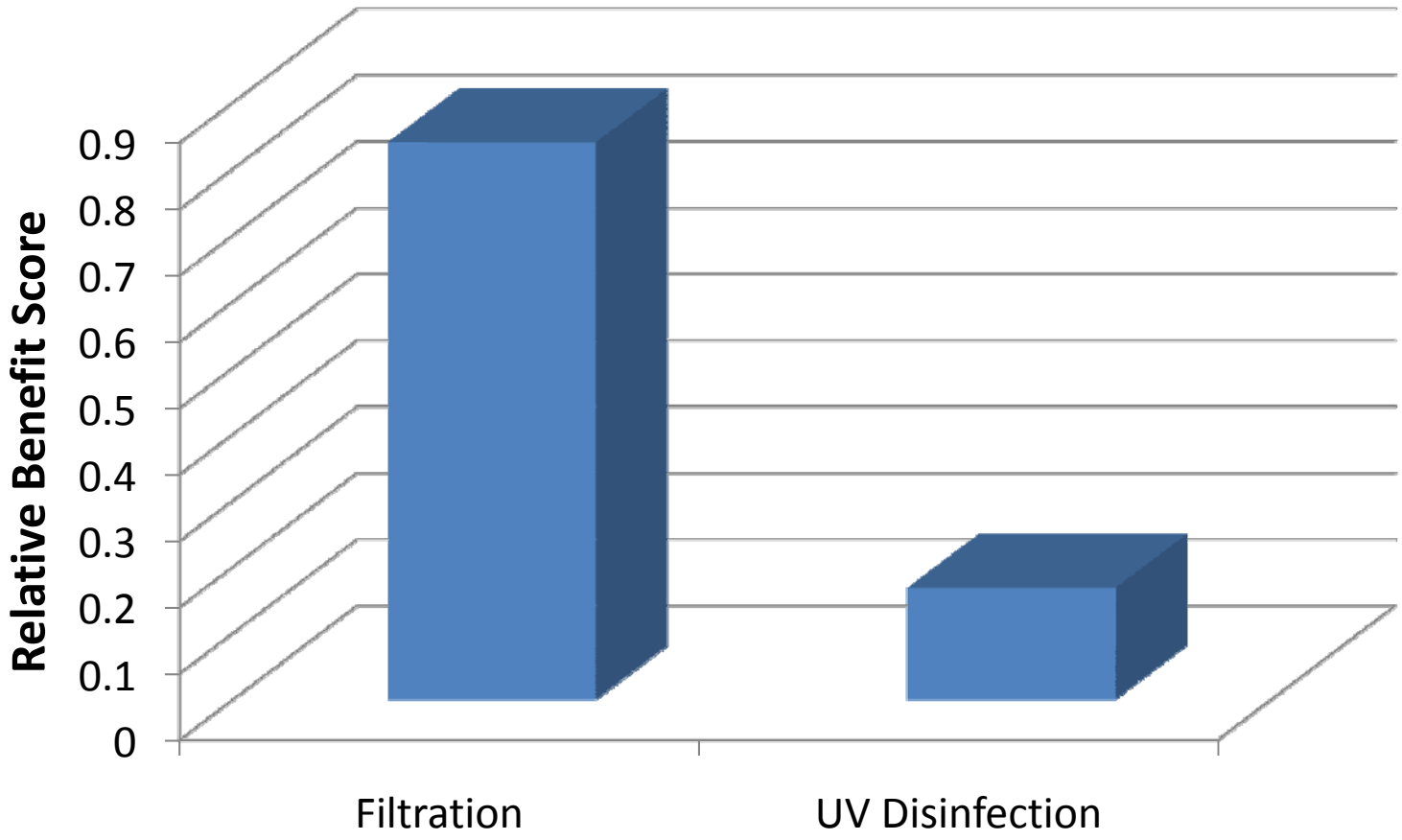
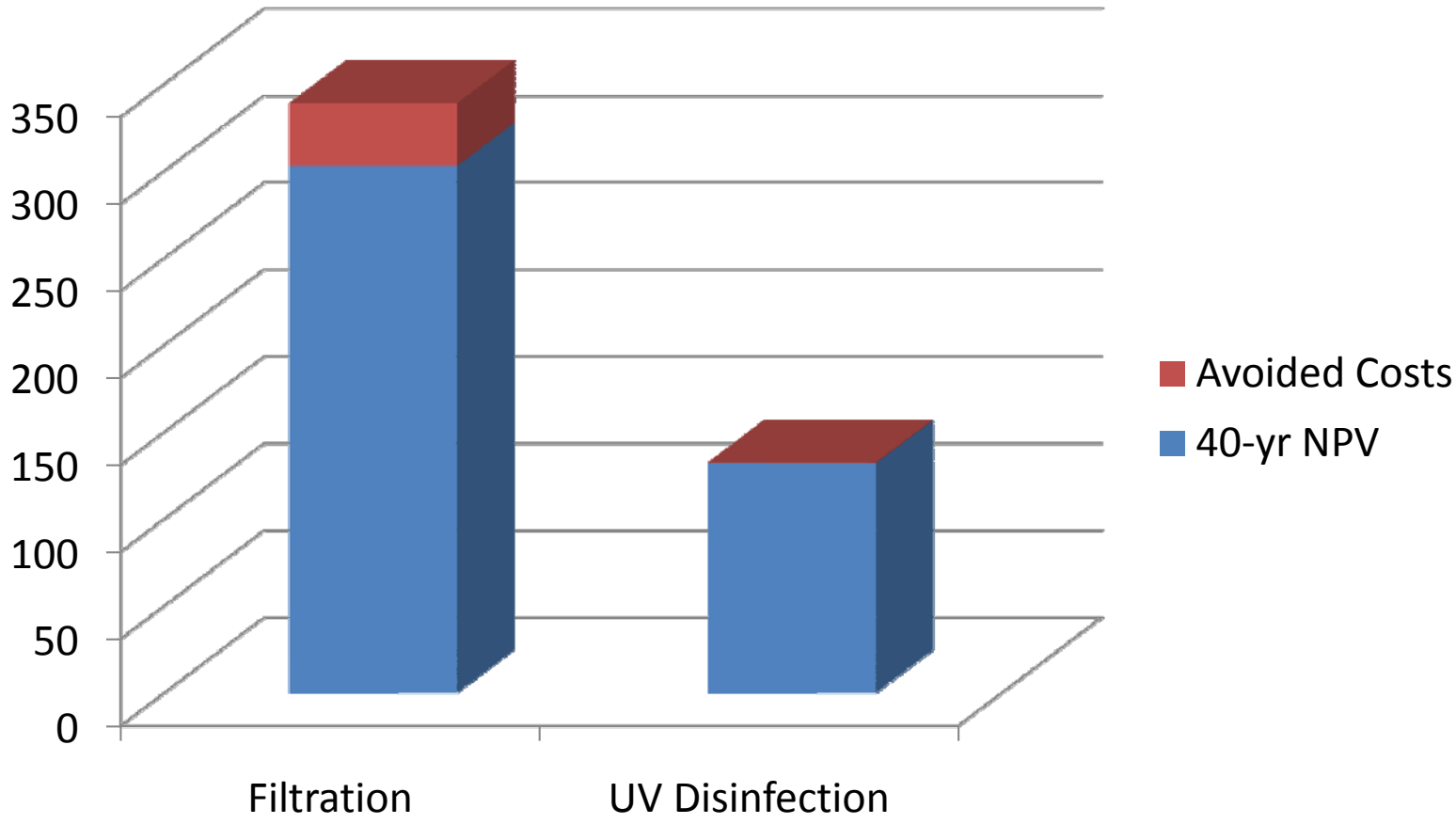
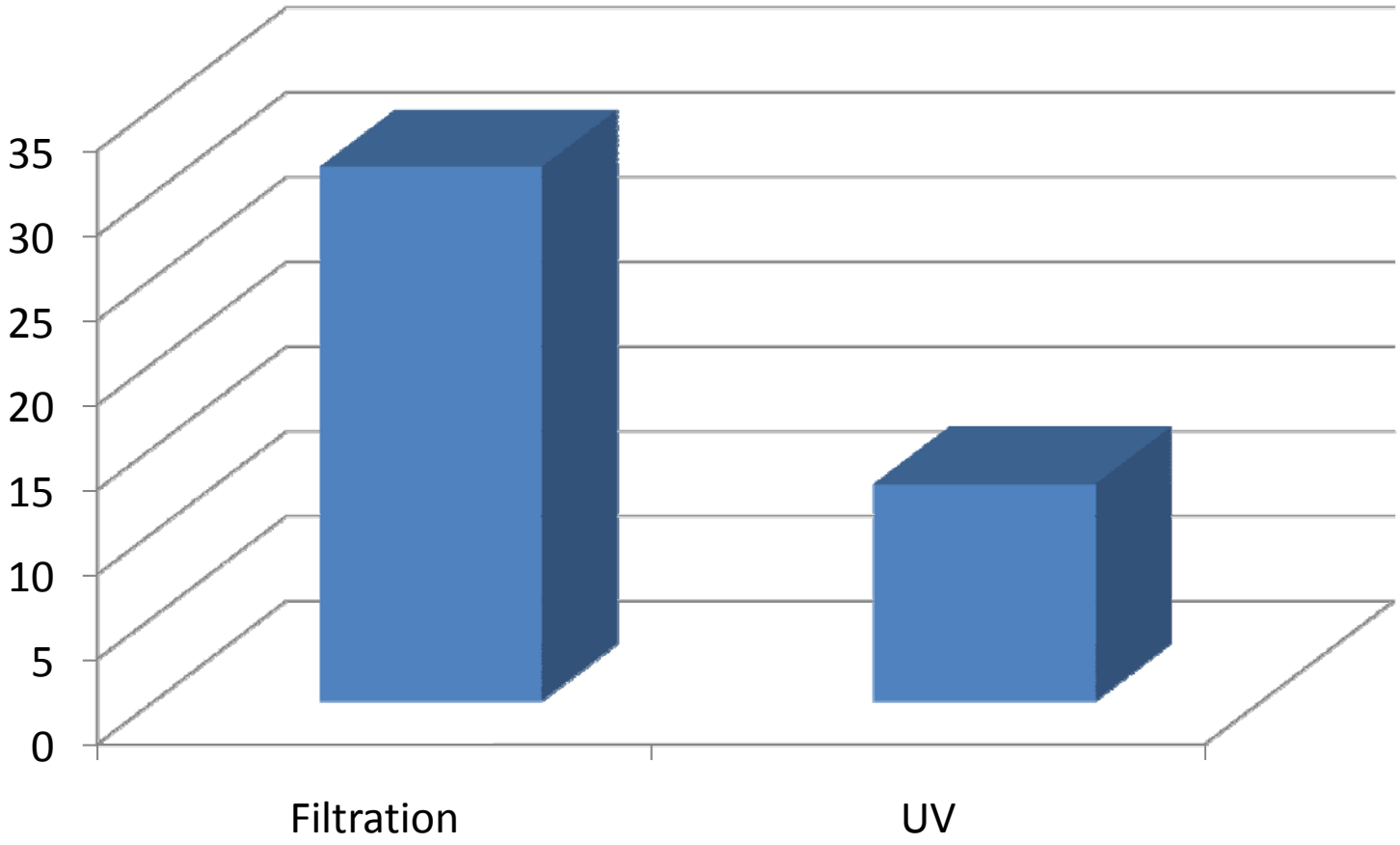
Results


Relative Benefit Score
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Filtration
UV Disinfection

Costs

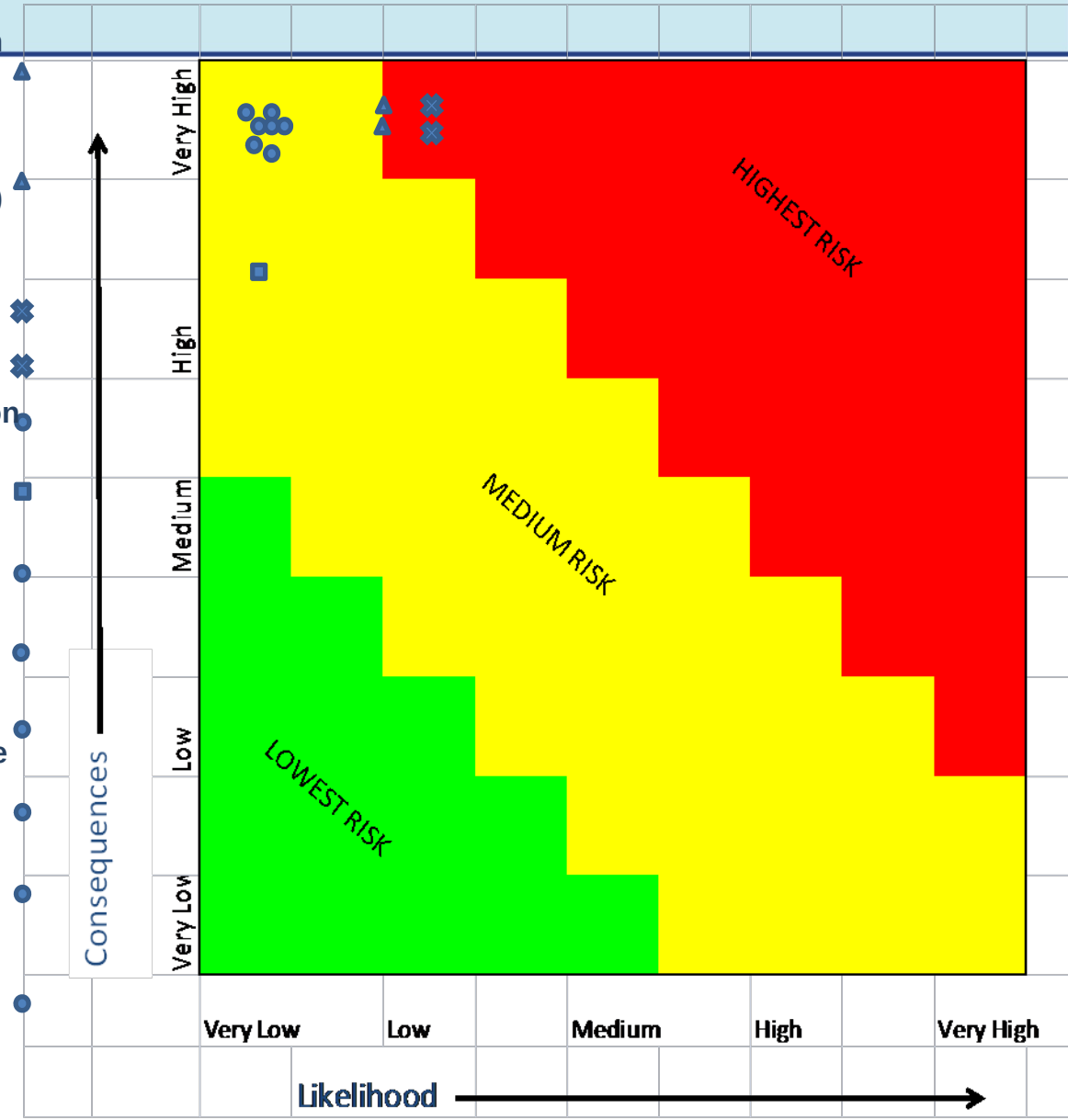

350
300
250
200
150
100
50
0
Filtration
UV Disinfection
Avoided Costs
40-yr NPV

Benefit/Cost Ratio



Risk Assessment

1. Source water Fecal Coliform limits (6 month running average)
2. Disinfection Byproducts (chlorine + natural organics) below specific levels
3. Turbidity Limits
4. Watershed Control
5. Giardia and virus disinfection
6. Daily certified laboratory access
7. No waterborne disease outbreaks
8. Redundant disinfection equipment
9. Continuous chlorine into the system
10. Maintenance of chlorine throughout the system
11. Compliance with Coliform bacteria requirements
12. Annual inspection of watershed & treatment facilities



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Filtration Option Chosen

- Better Water Quality/Public Health Protection
- Avoided Risks
- Improved System Maintenance
- Flexibility to Deal with Future Changes
  - Water Quality
  - Regulations

Portland Water Bureau

- Water Shed is Well Protected – 100% USFS owned with Federal Restrictions
- Turbidity Dependably Low – Elevated Turbidity is Rare
- Secondary Source Dependable
- Community Sentiment Towards "Unadulterated" Water
- Filtration Not Warranted
- UV Chosen

Other Utilities

Public Water System	Regulatory Response
Unalaska	UV Disinfection
Kodiak	UV Disinfection
Juneau	UV Disinfection - Note: Considered Filtration – On River with Turbidity.
Sitka	UV Disinfection
Ketchikan	UV Disinfection
Port Townsend	Considering: Slow Sand, Direct, and UV
Bremerton	UV Disinfection
Walla Walla	UV or Membranes
Bend	Membrane Filtration

Why is Filtration Considered?

- Source Water Quality
  - Historically Pristine Source, Strong Watershed Control - Less Likely to Filter
- Improve Quality and Reliability of Delivered Water
  - If utility has reliable back-up supply less likely to filter
- Community Values

Summary

- Focus Has Been How Decision Made and Factors Considered
- Cost is Key Criteria, Not Sole Criteria
- Consider Benefits
- Every Situation has Unique Aspects
- Focus on Criteria Important to You and Your Customers

End

Questions or Comments?