



# Non Potable Water Substitution and Reuse in the Field

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Surface Water and Wastewater  
USACHPPM

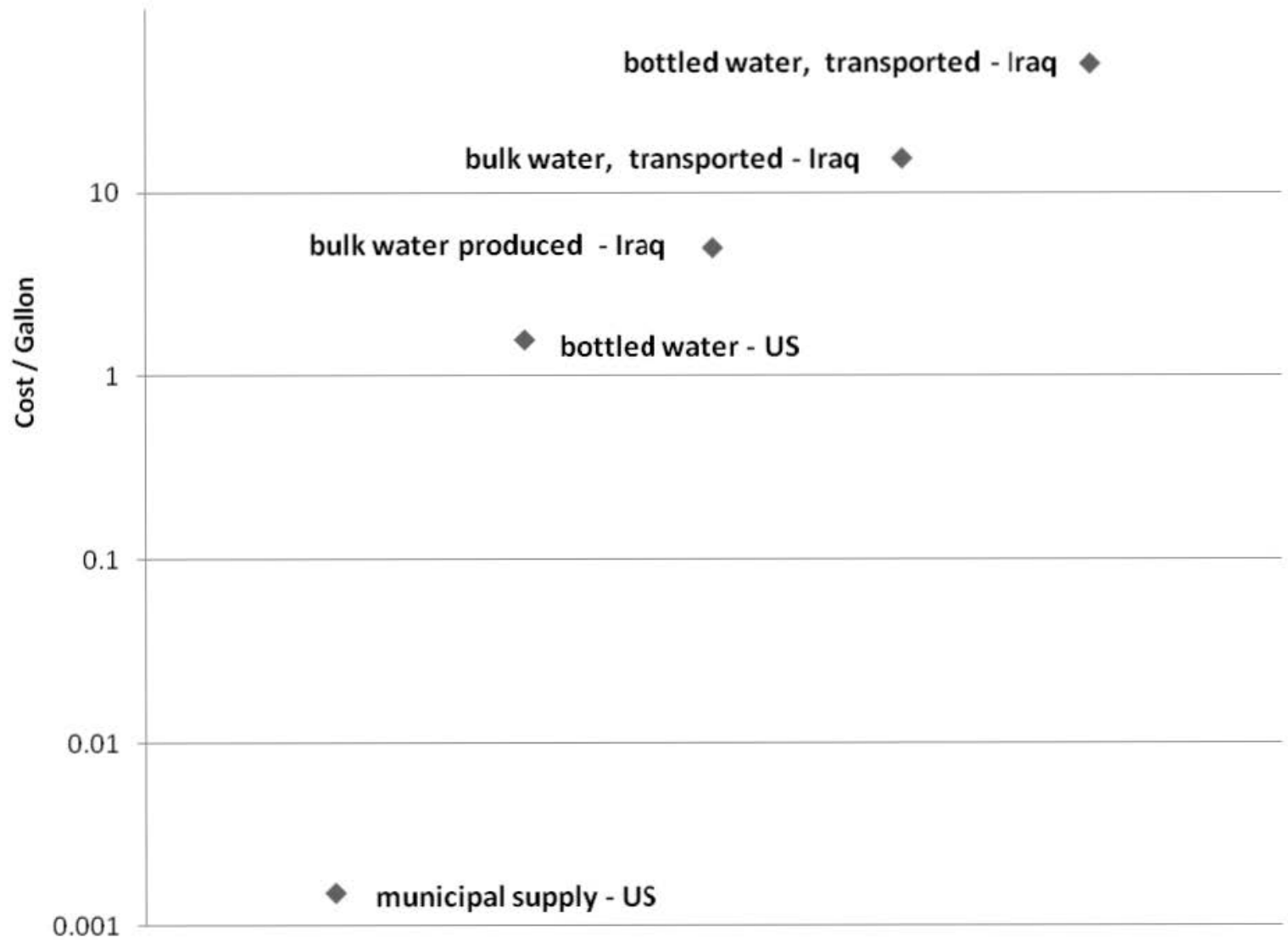
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# Water Cost



# Potable Water

Water that is safe to drink



# Insufficient Amount of Potable Water

- Replace potable water with non potable water in those applications that don't require potable water quality

- Water Substitution

- Water Reuse



# Considerations for Non Potable Water Substitution / Reuse

- Type of Source Water
- Quality of Source Water
- Application & Requirements



# Source Waters

- Local Waters
  - Local water supplies
  - Ground water
  - Surface water
- Army Generated
  - Filtered water
  - ROWPU brine
  - Gray water
  - Treated wastewater



# Source Water Quality

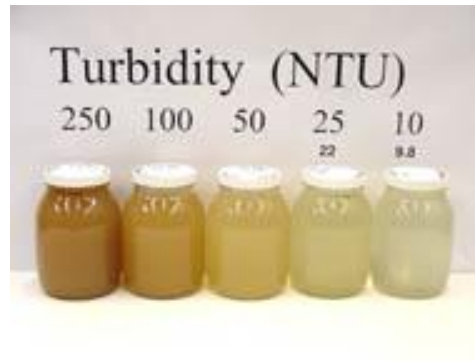
- What needs to be measured?
- What can be measured?
- Microbial quality
  - total coliforms, E. coli
    - IDEXX's Colilert, Quanti-Tray





# Source Water Quality (II)

- Turbidity
  - Measurement for physical quality
  - Correlates well with disinfection requirements



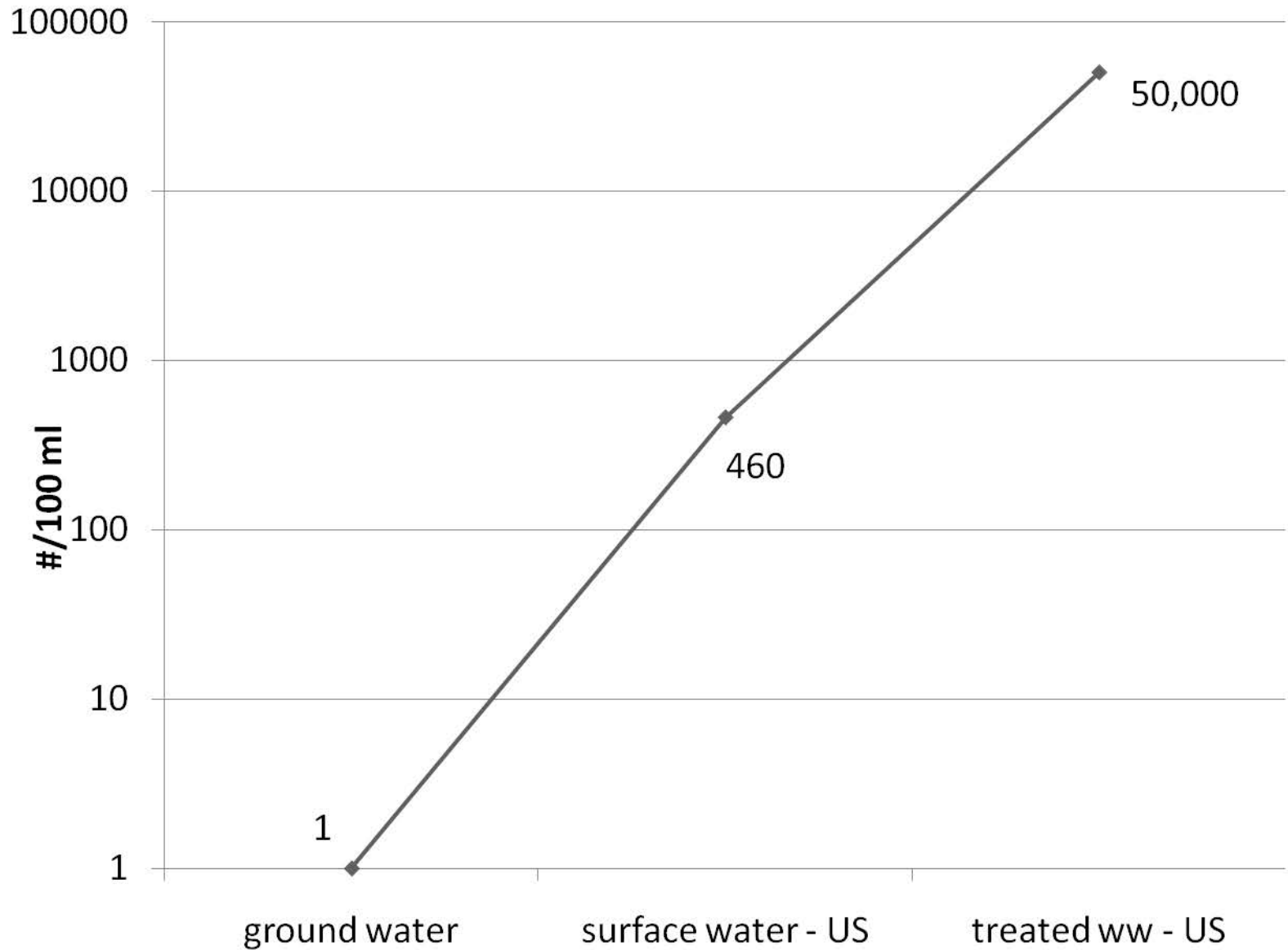
# Applications for Substitution and Reuse

- Divided into two broad categories
  - Unrestricted use (high quality)
    - Minimal bacterial contamination
    - Body contact allowed
      - e.g., showering
  - Restricted/industrial use (lower quality)
    - Some bacterial contamination
    - Limited body contact/public exposure
      - e.g., construction activities

# Guidelines for Water Substitution and Reuse



# Total Coliform Concentrations



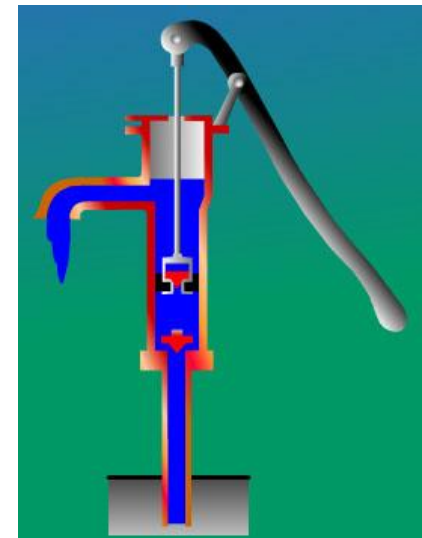
# Guideline Classification

1. Ground water
2. Surface Water
  - To include filtered water and ROWPU brine
3. Treated Wastewater
  - To include gray water



# Water Substitution Guidance – Ground Water

- Ground Water
  - Extremely low turbidity and bacterial contamination
  - Can be used directly for all non potable water applications
  - Exception: ground water under the direct influence of surface water



# Surface Waters

## EPA Criteria\* for Bacteria in Recreational Fresh Water#

Indicator	Geometric Mean Density <sup>^</sup>	Single Sample Maximum
Enterococci	33	62
E. coli	126	235

\*Measured as bacterial densities (colony forming units) per 100 ml

#Based on an acceptable gastrointestinal illness rate of 8 per 1000 swimmers.

<sup>^</sup>Calculated with a minimum of five samples collected over a 30-day period.

# Water Substitution Guidance – Surface Water

- Deployment situations
  - Surface waters
    - More heavily polluted
    - Sometimes open sewers
- Guidance



<b>Application</b>	<b>Action</b>
<b>Unrestricted Use with Body Contact</b>	<b>Disinfect and use</b>
<b>Industrial / Restricted Use</b>	<b>Use directly</b>



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<b>Water Quality</b>	<b>Acceptable Activities</b>
<b>Disinfected Fresh Water</b>	<b>Centralized hygiene such as field showers Decontamination of personnel Retrograde cargo washing Heat casualty body cooling Graves registration personnel sanitation Well development</b>
<b>Fresh Water</b>	<b>Vehicle coolant Aircraft washing Pest control Field laundry Concrete construction Well drilling</b>
<b>Brackish and Seawater</b>	<b>Vehicle washing Electrical grounding Fire fighting CBRNE decontamination of materials</b>

# Treated Wastewater

- Significant bacterial contamination
- Federal and State reuse classifications
  - Level of treatment
  - Water quality standards
  - Monitoring schedule
  - Setback distance



# Water Reuse Guidance – Treated Wastewater



- Guidance

Category	Wastewater Treatment	Turbidity (NTU)		E. coli (#/100 ml)	
		median value	single sample max	median value	single sample max
Unrestricted/ Body Contact	Tertiary	≤2	≤5	none	≤10
Restricted/ Industrial	Secondary	≤5	≤10	≤150	≤600

# Final Thought

- Goal.....

Produce comprehensive Army  
Policy for Water Substitution  
and Reuse in the Field

