

Water & Wastewater in Rural Alaska

Brian Lefferts, MPH, REHS, DAAS

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Yukon-Kuskokwim
HEALTH CORPORATION

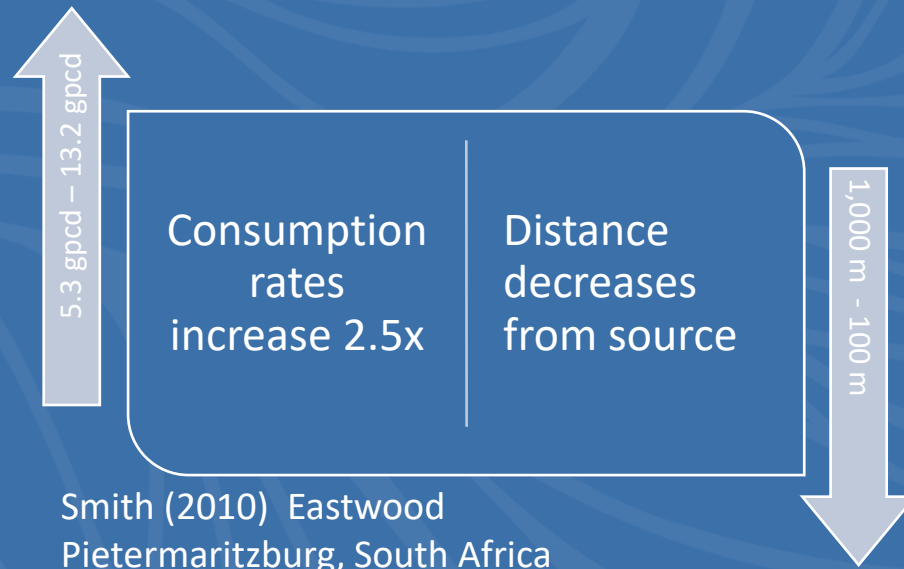


Service Delivery Types



Barriers to Water Use

Access



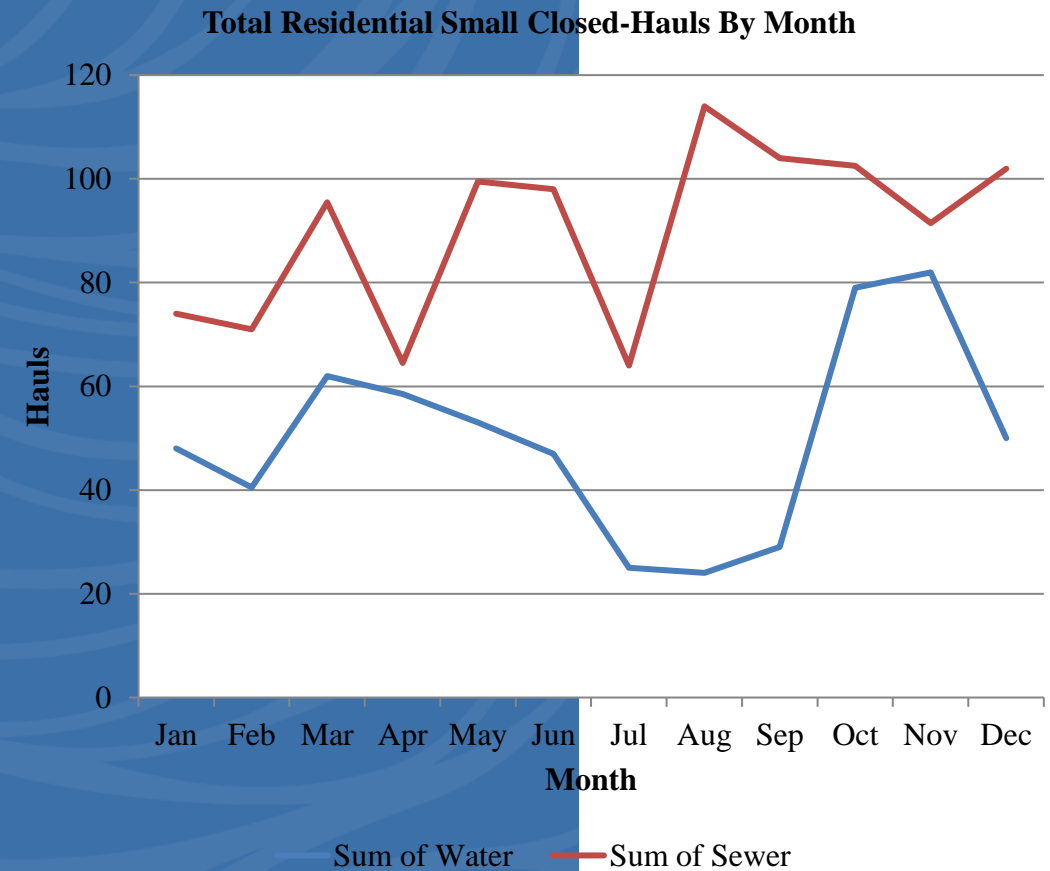
- Unserved 1.5 gpcd (range 0.9–1.8 gpcd) (Thomas et al., 2016).
- Small Closed Haul 3.7 gpcd (Altiok, 2011) 2.16 gpcd (YKHC)
- Piped averaged water usage was 17 times higher (25.7 gpcd) (Thomas et al. 2016)

Altiok, 2011; Thomas et al., 2016



Closed-Haul

- Small Closed Haul (120 gal haul tank)
 - 2016/2017 household average
 - 6.7 water hauls (804 gallons per year)
 - 12.1 sewer hauls (1,452 gallons per year)
 - Washeteria usage (3,318 gallons per year)
 - 82,100 gallons for laundry
 - 8,000 gallons for showers
 - 1.45 gpcd correction for self disposal and travel
 - 2.16 gpcd (YKHC) - 3.72 gpcd (Altiok, 2011)
- Large Closed Haul (3,000 gal haul tank)
 - The median rate for haul customers in Bethel is 1,000 gallons per week.
 - 35.6 gpcd
 - 10 times the amount used in small closed-haul systems



Water Sanitation and Health

- Handwashing, hygiene, bathing have been shown to reduce spread of communicable illnesses
- These are considered “water-washed” diseases: even though they are not directly transmitted through water, their transmission is linked to water availability and its relationship with hygiene.
- Other potential impacts: dishwashing, laundry, general cleaning, poverty reduction
- Estimate ranges:
 - 5 (20 L) gpcd essential for short-term survival
 - 16 (60 L) gpcd minimum in CRUM
 - 26 (100 L) gpcd long-term consumption and hygiene needs



Hennessy et al., 2008; Kayse et al., 2013; Raczniak et al., 2016; Reed & Reed, 2010; Ritter, 2012; Smith, 2010; Smith, 1996

Water Sanitation and Health

- The previous analysis identified that pneumonia/influenza visit rates, skin infection visit rates, and MRSA infection visit rates were lower in areas with water service
- In 2020 we identified the same associations between visit rates and increasing levels of piped water service, with the addition of lower rates for other respiratory infection visits as well.
- Diarrheal disease visit rates were not associated with water service in either study
- Compared to a community with no piped water service:
 - a community with 100% coverage of piped water would have 40% fewer visits for pneumonia/influenza, 20% fewer visits for other respiratory infections, 80% fewer visits for MRSA, and 40% fewer visits for other skin infections
 - a community with 100% coverage of hauled water would have 20% fewer visits for respiratory infections and 30% fewer visits for MRSA

| Decrease in Illness with Each 10% Increase in Coverage | | |
|--|------|-----------------------------|
| Piped | Haul | Illness |
| 4% | | Pneumonia/ Influenza |
| 2% | 2% | Other Respiratory Infection |
| 8% | | MRSA |
| 4% | 3% | Other Skin Infection |

Barriers to Construction

- Funding, \$587 Million YK Delta to address dire sanitation conditions
- State Match
 - Requires Approved Business Plan
 - Best Practices Scores
- Federal Requirements
 - IHS Cost Caps
 - EPA Certified Operator Requirements

| Project Administration | Allocation System | Funding Source | Amount | |
|------------------------|------------------------------------|--|--------------|----------|
| ANTHC or VSW | VSW Capital Improvement Program | State of Alaska VSW | \$58.7M | \$14.7M |
| | | USDA Rural Development (RD) Rural Alaska Villages Grant | 46 percent | \$20.8M |
| | | EPA Clean Water Act and Drinking Water Act State Revolving Fund (Alaska Native Villages Grant) | | \$23.2M |
| | Sanitation Deficiency System (SDS) | Indian Health Service Regular Funding | \$41.6M | \$28.7M |
| | | EPA Safe Drinking Water Act Tribal Set-Aside | 32.7 percent | \$4.3M |
| | | EPA Clean Water Act Tribal Set-Aside | | \$8.0M |
| | | EPA Water Infrastructure Improvements for the Nation | | \$0.1M |
| | | Denali commission | | \$0.5M |
| | Housing Priority System | Indian Health Service Housing | 6 percent | \$8.3M |
| ANTHC | Other | Other funding sources | 9 percent | \$16.8M |
| | Energy | Miscellaneous energy funding | 1.6 percent | \$2.1M |
| Total funding per year | | | | \$127.4M |

Residential Collection Rates

- Business Plans
 - Must meet State Affordability Matrix
 - No piped system would have been constructed under new matrix developed in 2020
 - Average monthly rate \$110; Average Highest Possible Rate \$49
- FY19 Analysis of 26 ARUC communities
 - Affordability Score had no impact on collection rates
- Published peer-reviewed literature shows customers with the least reliable and poorest quality service were willing to pay the most for improvements to systems

| Factor | Collection Rate |
|---------------------------|-----------------|
| Rates > \$150 per month | 73% |
| Inability to shut off | 74% |
| High Burden Affordability | 96% |

Best Practice Scores

- Small, isolated communities, small labor pools, limited economies, and high rates of employee turnover all make it difficult to achieve strong financial and managerial capabilities.
- In 2017, 46% of rural utilities collected revenues sufficient to cover the costs of their operations
 - Served 83/152 55%
 - Underserved 3/10 30%
 - Unserved 3/33 9%
- A link has also been demonstrated between water system type and managerial support and Best Practices score. In Spring 2021 in the YK Delta:
 - < 30 % piped avg. best practice score: 36
 - 30-80% piped avg. best practice score: 55
 - > 80% piped avg. best practice score: 60

