Water and Environmental Research Center

Seward Peninsula Water Resources and Climate Change

Water Use and Vulnerability

Over the last century the Seward Peninsula has seen climatic and industrial changes, both of which potentially impact supply and demand of freshwater resources. Over the next century changes and temperature and precipitation may impact many water resources while changes in water infrastructure (storage, treatment, distribution) shape demand and determine which water resources can be used practically and safely.

Vulnerability, as it is used here, refers to change in volume due to a change in climate or to present biological quality (bacteria). Therefore a water source might be considered vulnerable if it is highly dependent on rainfall.

Current use (see table below) appears to be strongly influenced by distribution, as communities with piped water (gray) consume more water per person than those who haul water or have it delivered. Water shortages can occur because the source or storage capacity is insufficient.

Seward Peninsula Water Systems, Use, and Limitations.

Community	System	Use (gpcpd*)	Limitation (shortages)
Brevig Mission	piped	46	
Deering	haul	7.9	storage
Elim	piped	72	
Golovin	haul	25	storage
Nome	piped	105	
Shishmaref	haul	7.9	source + storage
Teller	haul	10	
Wales	haul	9.0	
White Mountain	piped	96	

*gallons per capita (person) per day

Questions?

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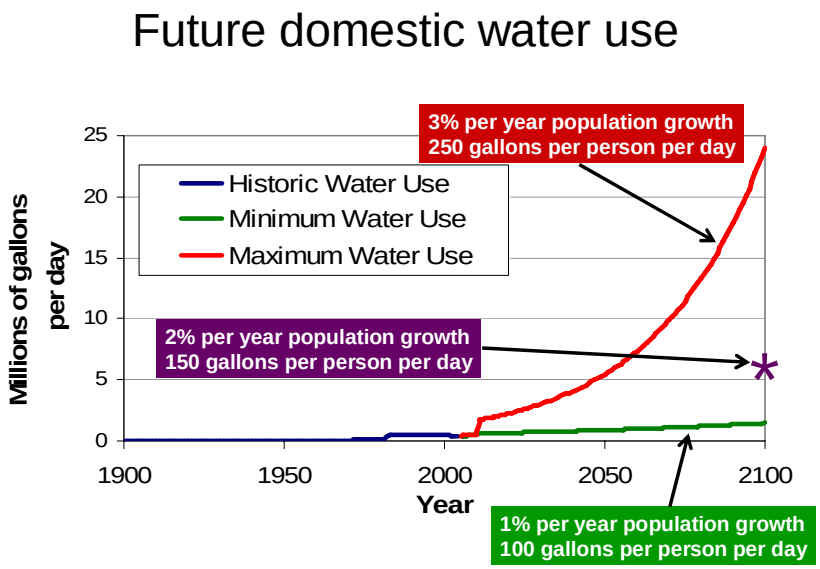

Water use is expected to increase on the Seward Peninsula as population increases and water infrastructure is improved. These estimates assume the installation of pipes in all communities by the end of the 21st century.

Data has been collected in Nome and other Seward Peninsula communities since the summer of 2004. In Nome, the water levels in the 3 Moonlight Springs wells have been logged. One area of continued research is to compare these recent data to previously collected data and analyze the data with respect to what is known about the aquifer.

In other communities on the Seward Peninsula sampling has included measurements of biological quality of streams used as water resources (tested for *E. coli*, *Giardia*, and *Cryptosporidium*), as well as measurements of electrical conductivity. Conductivity gives an indication of how much material is dissolved in the water. Rainwater or ice melt would have low conductivity while groundwater that has had considerable contact with rock would have higher conductivity. Conductivity measurements at the end of winter gave information on the groundwater that feeds the streams. When coupled with summer conductivity measurements, these values allowed the estimation of groundwater contribution during the summer. Water resources in these communities could then be described in terms of vulnerability. Shallow groundwater with little aquifer contact (low conductivity) or no winter groundwater contribution was considered a characteristic of high vulnerability. Small watersheds were also considered more vulnerable because flow could be very limited without regular precipitation. Fecal contamination (high *E. coli*) indicated that a water resource was less suitable for drinking without treatment. Water sources may be very good presently, but vulnerable to changes in volume.