

MEMORANDUM

Department of Natural Resources
Division of Mining, Land and Water
Alaska Hydrologic Survey

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To: Wendy Tatlow
Natural Resource Specialist

From: Roy Ireland R.I.
Hydrologist

Subject: Seemann Estate Trust LAS 13742

While data on flow in the creek is sparse, it does appear that the creek is in a gaining reach, that is, the creek is generally getting larger as it flows downgradient (observations made at culverts downgradient). There are sections in which the creek largely disappears into the gravels, only to resurface a short distance away. A single flow estimate near the applicant's site, based on the creek profile and a measured surface velocity, indicated a discharge of approximately $\frac{1}{8}$ cubic feet per second (cfs), or about 78,000 gallons per day. Photos taken further downstream suggest $\frac{1}{2}$ cfs or more.

The water source is probably seasonal snowmelt augmented by precipitation during the summer months. The surficial slope and its exposure to the sun and the wind tends to dewater the area but the wetlands, acting as a large sponge, keep the streams flowing through the year. Deep infiltration is apparently minimized by a silty hardpan at depths of about 20 ft to 40 ft. This hardpan contributes to the existence of the wetlands. Dry silty gravels are found at depths below the hardpan layer, with the next water (saturated material) as deep as 90 ft or more. The deeper aquifer apparently has minimal local input of water due to the low transmissivity of these deeper layers (Dearborn, 1982).

Summer heat and the occasional drought have had an impact from time to time, with several fires having occurred. Not having any hydrologic record, it is unknown how the wet lands actually responded, but it can be assumed that, during extreme conditions, their contribution to stream flow can vary greatly: there may be times that the streams are not capable of providing adequate water.

The existence of artificial ponds, downstream, would lead to local mounding of the unconfined, and apparently perched, local aquifer in the area of the ponds. This mounding could make nearby shallow wells viable where they may not have been without the ponds. The water contribution to the deeper aquifer is locally minimized by the hardpan layer, so the ponds would not be expected to influence the deeper aquifer in any meaningful way.

The applicant requests approximately $\frac{1}{3}$ of the measured flow. Due to the lack of any hydrologic record, it is unknown if this is viable during the entire season; however, the slow release of water from the wetland "sponge" should maintain fairly steady water levels except during extreme conditions. Based on a fairly expansive, perched wetland, it appears that adequate water is normally available.

Staff gages should be installed in the stream 20 yds or more above and below the take point. At least monthly stage measurements should be made. The channel appears armored against the measured flow and the gradient is fixed, so stage measurements would be adequate to typify the flow regime. Actual use should be limited, so that not all the water is taken – a portion has to stay in the channel.