

Surface Hydrology

Vital Signs Monitoring- Southwest Alaska Network

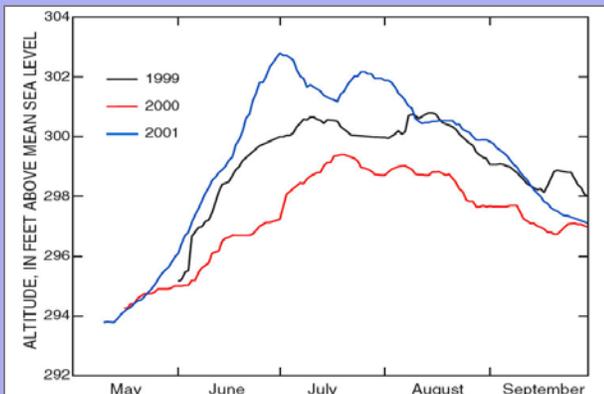


Importance / Issues

In establishing SWAN parks, Congress recognized the importance of clean water, with a specific reference to protecting and maintaining rivers and lakes in their natural state in the enabling legislation. Climate warming is decreasing glacial coverage in SWAN, shortening the length of ice cover on lakes, and increasing evaporation from water and land surfaces. This appears to be changing surface hydrology which, in turn, will also influence water chemistry, availability of aquatic habitats to fish and wildlife populations, and recreational access and opportunities.

Objectives and Monitoring Approach

How are the timing and magnitude of peak river discharge and lake level changing in key SWAN glacial and nonglacial systems? To address this question, stream flow will be estimated for targeted streams using acoustic Doppler current profile technology and lake level measurements. ADCP is well suited for large, fast flowing rivers, such as the outlet streams for Tier 1 lakes. USGS and SWAN are currently developing a methodology for estimating stream flow in other Tier 1 outlet streams. If proven feasible, SWAN or park staff would record lake levels, whereas USGS would provide stream profiles and ADCP discharge measurements on a 2-5 yr basis.



Annual variation in discharge of Lake Clark, 1999-2001 (from Brabets 2002)



SWAN cooperater Gabe Luna , USGS WRD, surveys in the channel cross section for the Chillikadrotna River at the outlet to Lower Twin Lake, Lake Clark National Park and Preserve. The crest and stage gage is visible below him. Photos courtesy of Chad Smith, USGS

Current and Future Monitoring

In 2006, staff and crest/stage gages were established under an interagency agreement with USGS at the outlets to Lake Brooks and Naknek Lake in KATM, and Twin and Telaquana Lakes in LACL. Absolute water level recorders and recording barometers were installed at all but Telaquana. USGS will maintain these stations through 2007 and develop stage-discharge rating curves for each site. NPS staff will establish gaging sites with water level recorders at Grosvenor River in KATM, and at 3 tributaries to Lake Clark. Discharge measurements will be taken at additional tributaries to Naknek Lake and Lake Clark that do not lend themselves to water level recorders. During 2007 staff will operate the Crescent River gaging station for the final year and data will be assessed for characterization of water quantity and water quality: Gages installed at Naknek, Brooks, Twin and Telaquana Lakes will be operated for second season to develop stage/discharge relationships.

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