

**UAS Environmental Science and Anthropology Undergraduates Produce
Comparative Bathymetric Maps of Auke Lake to support Auke Bay
Archeology Research near Juneau Alaska.**

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The University of Alaska Southeast (UAS), in collaboration with the City and Borough of Juneau (CBJ) is planning an upgrade to the old Auke Lake trail adjacent to campus. In preparation for this work, baseline archeological and physical limnological data were collected as part of a 2006 UAS summer field course in archeology. Evidence of human occupation of the Auke Lake region from earliest Alaska Native Tlingit people to much more recent fox farmers, fishermen, and 1920s highway construction crews were documented by the archeology students.

UAS Environmental Science students carried out the bathymetric studies by collecting depth and location data from a small boat using an acoustic depth sounder (600 W, 200 kHz, either 15 or 5 degree beamwidths) coupled with a differential GPS (DGPS) receiver. The accuracy of the soundings is thought to be about 2 percent and DGPS locations accurate to about 1 m. Raw water depth data was registered to 17 m above MHHW, an elevation recorded on the 1986, 1:25,000 scale, USGS Juneau B2 NW topographic map. Auke Lake level remains relatively constant due to a NOAA fish weir and dam downstream which blocks the outlet stream (Auke Creek). Four thousand, nine hundred and four soundings were collected and co-registered with DGPS positions to produce a bathymetric map of the lake in order to better understand the origin of its bedrock basin and its glacial history. The data was compared with a newly digitized 1968 NOAA Auke Bay Lab 1968 bathymetric survey to determine change in sedimentation and erosion over the intervening 38 years. The maps were produced using bathymetry processed with 3D Analyst in ArcGIS 9.1, using existing IKONOS 1 m/pixel imagery for the basemap.

This work will also aid in studies of impacts to shoreline habitats by lake recreational users. This includes lakeside resident homes and the University, shoreline fishing, canoeing, kayaking, swimming, jet skiing, other motorized boating, and float plane take offs and landings. In addition, the new map will support ongoing ecology and fisheries studies directed at questions about physical limnology, sockeye and pink salmon habitat distributed by depth, water quality, and nutrient cycling.