

KANAB AMBERSNAIL 2005 UPDATE: RESEARCH, MONITORING, AND MITIGATION

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Currently, two extant populations of the endangered Kanab ambersnail (KAS; Succineidae: *Oxyloma haydeni kanabensis*) occur in the American Southwest. One population is located north of Kanab, Utah, on a privately-owned wet meadow called Three Lakes. The other population occurs at a large, riverside spring in Grand Canyon National Park, known as Vaseys Paradise.

In 1998, Arizona Game and Fish Department partnered with the Central Utah Project Completion Act Office, the US Bureau of Reclamation Upper Colorado Region, US Fish and Wildlife Service, and the National Park Service to establish a second “wild” population of KAS in Arizona. Juvenile ambersnails were collected from Vaseys as founding stock for translocation efforts.

Translocated KAS were released at three sites (150 snails/site) along the river corridor in Grand Canyon (“KeyHole Spring” at 47.1mi R, Upper Elves Chasm at 116.6mi L, and Lower Deer Creek Spring at 136.1mi R) in September 1998 and again in July 1999.

Of the three sites, Upper Elves Chasm appears to have a successfully established population of KAS. Successive surveys at this site over the past seven years have consistently found live KAS and successful recruitment. In addition, this population has increased in occupied habitat (from 8.4m² to approximately 50m²). Both “KeyHole Spring” and Lower Deer Creek Spring appear to be failed sites for establishment—researchers have not found live KAS or shells at either site since 2001. Statistical analysis of various habitat characteristics and snail count data for each of the translocation sites and Vaseys did not provide any clear answers why Upper Elves Chasm was more successful than the other two sites.

No trematode parasites have been detected in any of the translocated snails or their progeny. Resident native snails (succineids--*Catinella* spp., zonitids, and physids) at the three sites were documented prior to the translocations and during following monitoring surveys. Densities and distribution of resident native snails at these sites do not appear to be affected by KAS translocation efforts. These other snail species co-exist with KAS at Vaseys Paradise.

Interagency partners continue to support monitoring of Upper Elves Chasm KAS, since this new population has full protection under the Endangered Species Act. In addition to helping achieving KAS recovery objectives, the ambersnails at Upper Elves Chasm and their occupied habitat can be included in mitigation decisions regarding the operation of Glen Canyon Dam and incidental take statements for Vaseys Paradise KAS. The successful establishment of this new ambersnail population allows for more flexibility with regards to future Beach/Habitat-Building Flows (BHBF) and adaptive management of other resources in Grand Canyon.

The habitat mitigation experiment at Vaseys Paradise for the November 2004 BHBF appears to be a successful option to helping recover KAS habitat from high flow impacts in a short timeframe. Monkeyflower rootmats were collected from vegetation patches that were expected to be inundated or scoured away from the 41,000 cfs flow, and were held on bread pallets above the flood zone during the flood. Following the flood, these rootmats were returned to their respective locations, and researchers documented the habitat recovery over the following year. Clay Nelson (AGFD) observed that the affected habitat in the flood-inundation zone at Vaseys Paradise had fully recovered to its initial condition and extent in approximately 3-6 months (as opposed to the approximately 2.5 years for habitat recovery following the 1996 BHBF of 45,000 cfs). Habitat recovery was likely aided by the extended wet weather during the winter of 2004-05 and following spring, as well as low river flows during that period.



<< KAS habitat moved in sod-like fashion to higher ground, then replaced after the flood receded.

Vaseys Paradise in July 2005. >> KAS habitat recovered to pre-flood condition. Line indicates level of 41,000 cfs river flow.



Prolonged drought conditions have potentially reduced the amount and quality of usable KAS habitat at Vaseys Paradise, and in turn may be reducing the resident population of ambersnails. The extended drought and low river flows over the past few years have also contributed to increased bighorn sheep foraging at Vaseys. Researchers have observed increases in habitat trampling, heavy grazing of water sedge and rushes, and changes in vegetation composition over time that were attributed to bighorn grazing at the site. The wet winter of 2004-05 and spring of 2005, has helped increase the amount of available ambersnail habitat at Vaseys, but numbers of KAS detected in plot sampling were still low in 2005.

The US Geological Survey is funding a current study of ambersnail taxonomy and genetics of KAS populations and related snails in Arizona and Utah. This study builds on past efforts to better understand within and among population variability of Southwestern ambersnails using more robust sample sizes, anatomical comparisons, and both nuclear and mitochondrial DNA sampling. A library of genetic markers is being developed for several local populations, which should help resolve some taxonomic uncertainties with succineid snails. Early results from this study (and from earlier genetic studies) indicate that the Vaseys Paradise KAS is genetically very distinct from other ambersnail populations in North America. Results from this study are expected to be available in autumn 2006.

Additional information on KAS: http://www.azgfd.gov/w_c/nongame_kanab_ambersnail.shtml



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