

IWC
4-20-99
B. Persons

Kanab ambersnail workshop and expert review panel

4/18/1999

Attachment 1

Proposed Objectives:

- 1) Review existing information on southwestern, Canadian, and northern USA gastropod conservation biology.
- 2) Identify sources of mortality of Kanab ambersnail (KAS) and incidental take from Glen Canyon Dam operations (including a review of the biological opinion 10% take limit).
- 3) Identify potential conservation strategies for KAS and other endemic landsnails in the region.
- 4) Establish roles of morphology/anatomy and genetics in determining the identity of the taxon of interest (KAS from Vaseys Paradise[VP], Three Lakes [3L], and Kanab Canyon [KC]; Niobrara ambersnail from Indian Gardens and -9 Mile Spring).
- 5) Identify roles of biological opinions and the KAS recovery plan in sustaining KAS in Grand Canyon.
- 6) Evaluate suggested criteria for establishment success of new KAS populations.

Review Panel Composition: (no KAWG members)

Malacologists (2) – systematists familiar with Succineidae or other T&E mollusks (should have a background in population dynamics, reproductive biology, geographic distribution and variation of landsnails).

Population Biologist/Geneticist (2) – scientists familiar with conservation and population genetics.

Conservationists (2) – scientists familiar with T&E species, PVA modeling, habitat loss, life history/reproduction, inter-/intra- population variation, environmental compliance, theoretical and practical conservation strategies.

Tony Morton's suggested questions for KAS review panel:

1) **STATEMENT:** KAS taxonomy has been based on internal and shell morphology, and is being revisited through molecular genetic techniques. In Arizona, KAS has apparently been restricted to VP in Grand Canyon National Park. No other wild KAS populations have been detected at more than 100 other springs/seeps in Grand Canyon region surveyed from 1992-1998. This suggests that the VP KAS population, like many southwestern spring species, is a Pleistocene relict which has become restricted in distribution as Holocene climate dried out. Genetic dissimilarity with other *Oxyloma haydeni* populations in the Grand Canyon region further supports this contention (Miller et al. in press).

1) **QUESTION:** Does it make any difference whether we base jeopardy and take on the species using morphology or genetics? For example, if the VP, 3L, and KC ambersnails all appear to be the same morphologically, should we treat them that way? What if the genetics analyses prove inconclusive (although we do know the 3L KAS are genetically different than the VP KAS)? Is it necessary, or appropriate, to be ultra-conservative and consider the populations distinct?

2) **STATEMENT:** The following is the proposed definition of establishment of a second wild population of KAS proposed by USFWS on July 2, 1998:

The establishment of a new wild population of KAS can be considered successful when:

- (1) the population densities, fecundity, and recruitment are similar to those of the parent population at VP;
- (2) habitat remains suitable while accommodating environmental uncertainties including changes in weather, food supply, predators, and other factors; and
- (3) the trend of population growth must be positive or at equilibrium with the available habitat for a certain period of time, perhaps three years.

2) **QUESTION:** Does this definition seem to fit with current knowledge about population viability for snails, or similar species? Would it be appropriate to discuss population establishment in terms of trends, ranges, or bottom-line conditions?

3) **STATEMENT:** Rematched historical photographs of VP (Turner and Karpiscak 1980) reveal that vegetative cover has increased greatly at lower stage elevations since completion of Glen Canyon Dam, and that flow regulation by the dam has increased primary KAS habitat area at VP, below the pre-dam 10-year flood stage of 125,000 cfs, by more than 40%. Furthermore, all vegetation below the approximate 90,000 cfs stage was scoured by annual pre-dam floods in normal years. The KAS population has survived numerous larger floods both before and after dam construction.

3) **QUESTION:** Given the pre-dam conditions that KAS have been able to survive, and the fact that available habitat has expanded by more than 40% since dam construction, would flows up to 90,000 cfs be considered a threat to the snails as a species [or as a local population?]. Would an incidental take of more than 10% of occupied habitat at VP be considered cause for alarm [when KAS habitat has recovered down to the 32,000 cfs stage, or within six months following a 45,000+ cfs flood]?

4) **STATEMENT:** The 1994 biological opinion states (in reference to VP):

The KAS population also has wide seasonal and annual fluctuations. This is the only known population of the KAS in a wilderness setting and the survival of this population is critical to the species (USFWS 1994b). Because the lower areas of KAS habitat can be quantified, incidental take will assume to be exceeded if more than 10% of the occupied habitat in Grand Canyon will be inundated by high flows or a controlled flood.

4) **QUESTION:** Because no other information or justification is given [for current restrictions, not past] for establishing a 10% limit on take of occupied habitat, does 10% seem to be an appropriate limitation on take of occupied habitat, given the very high pre-dam flows and normally high over-winter mortality of snails. Three years of population data indicate that the KAS population undergoes a substantial reduction through over-wintering mortality. Natural winter mortality may reduce the KAS population by nearly 25%-90% (IKAMT 1998). For example, how much of the VP habitat or how many KAS could be lost due to all sources [of mortality (seasonal and over-winter mortality, flooding, predation, etc....)] and the VP population still be able to survive?

5) **STATEMENT:** The 1994 opinion also states (in reference to VP):

Monitoring following flood events will assist in defining the species' response to those events and in refining a take level.

We know that it is taking over two years for VP habitat lost/degraded in the 1996 experimental 45,000 cfs flood to rebound.

5) **QUESTION:** How does the habitat recovery time reflect on the appropriateness of established take limits for KAS?

6) **STATEMENT:** During the 1996 flood, and as currently drafted in the KAS Contingency Plan, impacts to KAS are mitigated by physically moving them out of harms way. During 1996, that meant moving them up above the peak flow stage, but still within VP. For future actions, that could involve moving KAS both to higher ground at VP and to other locations within Grand Canyon, or completely out of the canyon, to zoological or academic refugiums.

6) **QUESTION:** Is moving an endangered species an appropriate, ongoing method to protect the creatures, or is it an inappropriate precedent, too unnatural?

7) **STATEMENT:** In the draft 1999 Beach/Habitat-Building Flow (BHBF) biological assessment, it is noted that approximately 68.8 m² (10.5%) of the estimated total habitat will be inundated during a 45,000 cfs BHBF. This value is 0.5% more than the BO-specified level of habitat take of 10%. A total of 22.7 m² of the habitat lying below the 45,000 cfs stage in the September 1998 survey consists of mixed vegetation patches dominated by horsetail (*Equisetum* spp.), reed (*Phragmites australis*) and other species. These patches are little used by KAS, and are extremely resistant to scour, having persisted through the 1996 BHBF and the high flows of 1997 and 1998. If this area is subtracted, a 45,000 cfs flow would inundate 7.3% of the total habitat.

7) **QUESTION:** Is it appropriate to distinguish primary and secondary habitats and extent of use, or is it enough to know that KAS use it, therefore it is of critical value?

Gary Burton's suggested questions for KAS review panel:

1. Are the genetic variances in the new KAS congregations [or "meta-populations" in Kanab Canyon?] significant enough to change our assessment of the number of known KAS "populations"?
2. If the various KAS congregations [in KC?] do not accomplish genetic exchange, are they separate populations?
3. Can populations outside of Arizona contribute to the 10 populations specified for downlisting?
4. What is the natural mode of spread of the species to expand its range - high flows, birds?
 - a). In pre-dam days, how did KAS recover/recolonize VP after extreme high flow events?
 - b). Being a pulmonate species, could high peak flows through the Canyon serve as a significant dispersal mode for the species?
 - c). Could the VP population have been seeded from other locations upstream?
 - d). With high peak flows, could the VP population seed downstream habitats?
5. In attempting to establish new populations, what period of time (persistence) or number of successful generations is reasonable to consider the population a success? Is there a population size requirement.
6. KAS appears to replace its entire population every year. Would there be long-term impacts to the VP population from a 25% population loss in one year?
7. What are the critical biotic and abiotic characteristics of the VP site that create unique habitat for KAS only at this location in the Canyon?

Bob Winfree's suggested questions for the KAS review panel:

1. Is the use of different genetic markers to discern population differences likely to indicate the same genetic relationships or different relationships? Is it likely that genetic trees developed by different methods would give the same results, or different results?
2. KAS typically experiences large annual reductions in population size. There appears to be no evidence of genetic exchange between populations now, although there may have been exchange in past millennia in order for geographically separate populations to have established. Population biologists have noted declines in

reproduction, recruitment, and other vital traits in other small and confined populations. Inbred strains of domestic animals frequently die off after a period of years unless genetic material from outside the genetic pool is reintroduced. Total population size may number hundreds of thousands of individuals on tropical fish farms in which losses of inbred strains occurs frequently. Is inbreeding a significant risk factor for the VP KAS? Should establishment of hybrid populations be considered for some of the new populations (introducing snails added from several isolated populations, not just one?)

3. Are rare endemic species automatically regarded as being endangered if they are limited to one or few natural relict areas (springs, caves, mesa tops, etc.), and if there is no evidence that habitat has become smaller or less suitable in recent history?

4. Do humans have an obligation to manipulate the environment in order to expand or preserve habitat available for species occupying small relict areas, if those areas have declined through natural climate shifts or geologic events? [A philosophical question? Wildlife management and conservation biology would argue "yes" if the objective is to preserve species of concern for future generations, including their habitat...example: the land acquisition and management of riparian/wetland areas for wildlife and native flora, not consumptive uses like ranching, timber harvest, agriculture, development, mining].

5. Would re-establishment of periodic flooding automatically jeopardize the long-term survival of this species, if still within the range of conditions that the species evolved under? KAS habitat at VP has expanded post-dam as a result of human intervention (river management). Current ecosystem management efforts call for re-establishment of a more natural flooding regime (magnitude and frequency). VP habitat area is likely to be reduced by floods over 32,000 cfs and floods of up to 60,000-90,000 cfs are being considered, but total remaining area will still equal or exceed total area present as recently as 1984 [check this date!]. VP KAS evolved under conditions of frequent flooding. Floods of 200,000-300,000 cfs have occurred within the last 150 years [source?], and floods of 90,000-100,000 cfs occurred almost annually before 1963 [check this date!] and also in 1983.

6. When dealing with endemic populations, where genetic differences are likely to be encountered in populations separated by only a few miles, is establishment of multiple (10) populations an appropriate conservation strategy? If this approach were used to multiply each of the currently known populations of *Oxyloma haydeni* (VP, 3L, KC, Indian Gardens, -9 Mile Spring) we would likely be stocking KAS into every potentially suitable site so far discovered, possibly having unanticipated effects on species [landsnails? or other?] already inhabiting those sites.

7. What measures should be undertaken when introducing a species known to carry parasites to a new location? Should the parasite be intentionally moved also, or should efforts be taken to use only disease-free [is this parasite a "disease"?) specimens? [If this parasite has evolved naturally with the ambersnail, and it is self-regulating in its infection rate and impact on KAS populations, should relocation efforts even be focused on attempting to "eradicate" or restrict its spread?...especially since we have evidence that it occurs at both VP and 3L, and the determinate hosts are migratory birds that range across the region].

*** Please provide specific information (case histories) about the approaches used and results of efforts to conserve other rare mollusks, especially landsnails and springsnails (Pacific Northwest forest species, Snake River spring species, Everglades tree snails, etc.) [If you have this information, please make it available to us].

*** Please review the recommendations made in the Recovery Plan and Biological Opinions related to KAS. Comment as appropriate and make recommendations regarding other promising alternatives from your experience or knowledge.

Timetable & Schedule of events:

Nov 1998: first identified need for KAS workshop (as opposed to just a review panel).

Dec-Feb 1998-1999: request for questions/objectives/potential panelists (including contact numbers/addresses) from KAWG and TWG, secure funding from WAPA and USBR (\$30,000 limit).

Mar-Apr 1999: list of potential panelists (need contact numbers/addresses!), begin compiling background info, set tentative workshop dates, create peer review format and conflict of interest statements (using GCMRC format). Begin the review of questions for panelists at KAWG meeting.

May 1999: begin initial contacts of potential panelists, continue to compile background info and revise questions.

June 1999: AGFD and GCMRC selection of panelists, review of questions with KAWG and finalize workshop dates. Notify panelists of selection and final dates, reserve conference room and hotel availability (reserve AGFD A/V videocamera and tripod).

1 month prior to the workshop, KAWG agencies and investigators will provide background information to be distributed to the review panelists. All information will be compiled and distributed by AGFD.

3 weeks prior to the workshop, review panelists will be provided background information on KAS studies/issues.

The 3-day workshop is planned for August-October 1999 (tentatively Aug 2-4).

Day 1: presentations by KAWG agencies and investigators (question/answer)

Day 2: discussions concerning management recommendations

Day 3: closed session for review panel to formulate recommendations document

Review panelists will be given a list of specific questions concerning conservation issues and management options to answer. They will have the opportunity to ask other questions of the KAWG or fellow panelists as needed to clarify issues or ecological relationships/conditions.

The panelist chairman will write a short recommendations document and distribute it (via email or prepaid envelopes). The chairman will be compensated (additional \$400) for their time & effort.

A non-partial facilitator (either AGFD or USBR) will be used to run the meeting agenda, timeframe, and moderate discussions. In lieu of a dedicated recorder, a videocamera will be used to document the workshop presentations and discussions (AGFD A/V gear).