

<b>SPECIES: Scientific [common]</b>	<b><i>Stygobromus idahoensis</i> [Idaho amphipod]</b>
<b>Forest:</b>	<b>Salmon-Challis National Forest</b>
<b>Forest Reviewer:</b>	<b>Bart L. Gamett</b>
<b>Date of Review:</b>	<b>March 16, 2018</b>
<b>Forest concurrence (or recommendation if new) for inclusion of species on list of potential SCC: (Enter Yes or No)</b>	<b>Yes</b>

**FOREST REVIEW RESULTS:**

1. The Forest concurs or recommends the species for inclusion on the list of potential SCC:  
Yes  No
2. Rationale for not concurring is based on (check all that apply):  
Species is not native to the plan area \_\_\_\_\_  
Species is not known to occur in the plan area \_\_\_\_\_  
Species persistence in the plan area is not of substantial concern \_\_\_\_\_

**FOREST REVIEW INFORMATION:**

1. Is the Species Native to the Plan Area? Yes  No   
If no, provide explanation and stop assessment.
2. Is the Species Known to Occur within the Planning Area? Yes  No   
If no, stop assessment.

**Table 1.** All Known Occurrences, Years, and Frequency within the Planning Area

Year Observed	Number of Individuals	Location of Observations (USFS District, Town, River, Road Intersection, HUC etc.)	Source of Information
1986	4	The mouth of Wilson Creek (tributary to Middle Fork of the Salmon River), Lemhi County	Idaho Fish and Wildlife Information System (December 2017); Smithsonian National Museum of Natural History Department of Invertebrate Zoology. Internet website: <a href="http://invertebrates.si.edu/collections.htm">http://invertebrates.si.edu/collections.htm</a> . Accessed on January 12, 2018; Wang, D., and J. R. Holsinger. 2001. Systematics of the subterranean amphipod genus <i>Stygobromus</i> (Crangonyctidae) in western North America, with emphasis on the hubbsi group. Amphipacifica: Vol. 3: No. 2:

a. Are all Species Occurrences Only Accidental or Transient?

Yes\_\_\_ No\_X\_\_

If yes, document source for determination and stop assessment.

b. For species with known occurrences on the Forest since 1990, based on the number of observations and/or year of last observation, can the species be presumed to be established or becoming established in the plan area?

Yes\_\_\_ No\_\_\_

If no, provide explanation and stop assessment

N/A- no known occurrences on the Forest since 1990

c. For species with known occurrences on the Forest predating 1990, does the weight of evidence suggest the species still occurs in the plan area?

Yes\_X\_\_ No\_\_\_

Provide explanation for determination

*Stygobromus idahoensis* was documented on the Forest in 1986 but has not been reported on the Forest since that time (see Table 1). The failure to detect this species on the Forest since 1986 may be due to limited monitoring and monitoring methodologies. During this assessment, biologists from the Forest Service and Environmental Management and Planning Solutions, Inc. considered the area where this species was collected and there is no evidence to suggest that natural or anthropogenic events have extirpated this species from that area since it was observed there. Therefore, it is reasonable to conclude that *S. idahoensis* still occurs in that area and is still present on the Forest. It is recommended that the Forest Service take additional measures to confirm this species still occurs on the Forest.

If determination is no, stop assessment

d. **Map 1**, Idaho amphipod (*Stygobromus idahoensis*) range in Idaho (IDFG 2017a)



Species Observations

■ Observations

Modeled Range

■ Summer Only

■ Winter Only

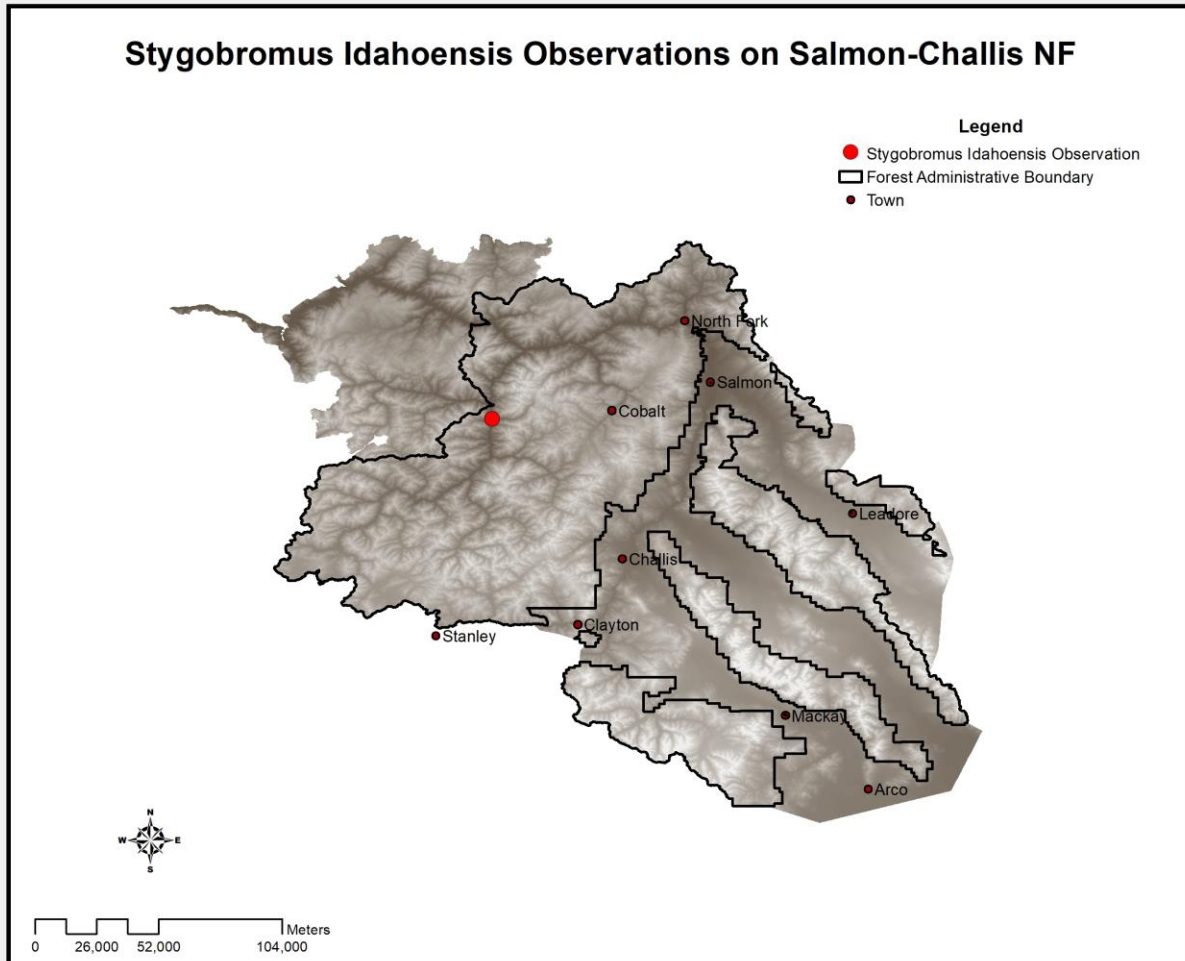
■ Spring/Fall Only

■ Year-round

■ Breeding and Nonbreeding

IDFG (Idaho Department of Fish and Game). 2017. Idaho amphipod (*Stygobromus idahoensis*). Internet website: <https://idfg.idaho.gov/species/taxa/68090>. Accessed on December 27, 2017.

- e. **Map 2**, Idaho amphipod (*Stygobromus idahoensis*) occurrences on the Salmon-Challis National Forest (Idaho Fish and Wildlife Information System [December 2017]; Smithsonian National Museum of Natural History Department of Invertebrate Zoology [January 2018])



December 27, 2017

3. Is There Substantial Concern for the Species' Capability to persist Over the Long-term in the Plan Area Based on Best Available Scientific Information?

**Table 2.** Status summary based on existing conservation assessments

Entity	Status/Rank (include definition if Other)
NatureServe Global Rank	G1G2—Critically imperiled/Imperiled (At very high risk of extinction due to extreme rarity [often 5 or fewer populations], very steep declines, or other factors / At high risk of extinction due to a very restricted range, very few populations (often 20 or fewer), steep declines, or other factors)
NatureServe State Rank	S1—Critically imperiled (At very high risk of extinction due to extreme rarity [often 5 or fewer populations], very steep declines, or other factors)
State List Status	IDAPA—Unprotected Wildlife SGCN Tier 3 (Includes a suite of species that do not meet Tier 1 or Tier 2 criteria, yet still have conservation needs. In general, these species are relatively more common, but commonness is not the sole criterion and often these species have either declining trends rangewide or are lacking in information)
USDA Forest Service	No Region 1 status No Region 4 status
USDI FWS	No records found
Other	No BLM status No Xerces Society Red List status

**Table 3.** Status summary based on best available scientific information.

Species (Scientific and Common Name): <i>Stygobromus idahoensis</i> [Idaho amphipod]			
Criteria	Rank	Rationale	Literature Citations
1 Distribution on Salmon-Challis	A3	<i>Stygobromus idahoensis</i> (Idaho amphipod) is known only from its type locality at the mouth of Wilson Creek, a tributary of the middle fork of the Salmon River (Wang and Holsinger 2001). Based on its habitat (see Criterion 6) and presumed dispersal capability (see Criterion 3) it probably exists in isolated patches on the Forest with little or no dispersal between patches (Rank A3). Confidence is low due to the lack of	IDFG (Idaho Department of Fish and Game). 2017. Idaho State Wildlife Action Plan, 2015. Boise, ID.  Wang, D., and J. R. Holsinger. 2001.

Species (Scientific and Common Name): *Stygobromus idahoensis* [Idaho amphipod]

Criteria	Rank	Rationale	Literature Citations
		<p>recent occurrence records and the overall low number of occurrence records.</p> <p>Confidence in Rank: High, Medium, or <b>Low</b></p>	<p>Systematics of the subterranean amphipod genus <i>Stygobromus</i> (Crangonyctidae) in western North America, with emphasis on the hubbsi group. Amphipacifica: Vol. 3: No. 2: pp. 39-147.</p>
<p>2 Distribution in surrounding geographic area</p>	<p>A</p>	<p><i>S. idahoensis</i> is known only from its type locality on the Forest (see Criterion 1). There is a positive effect of body size of <i>Stygobromus</i> spp. and range (Holsinger 1978); <i>S. idahoensis</i> amphipods are small (&lt;3.5 mm) (Wang and Holsinger 2001) and therefore unlikely to have a large range. Known occurrences are therefore limited to the Salmon-Challis National Forest (Rank A). Confidence is low because the lack of additional records could be a result of low sampling effort, as well as the small size (see Criterion 3) and cryptic habitat (see Criterion 6) in which it is found (Holsinger 1978)</p> <p>Confidence in Rank: High, Medium, or <b>Low</b></p>	<p>Holsinger, J. R. 1978. Systematics of the Subterranean Genus <i>Stygobromus</i> (Crangonyctidae), Part II: Species of the Eastern United States. Smithsonian Contributions to Zoology: No. 266: 144 pp.</p> <p>Wang, D., and J. R. Holsinger. 2001. Systematics of the subterranean amphipod genus <i>Stygobromus</i> (Crangonyctidae) in western North America, with emphasis on the hubbsi group. Amphipacifica: Vol. 3: No. 2: pp. 39-147.</p>
<p>3 Dispersal Capability</p>	<p>B</p>	<p>Amphipods in the genus <i>Stygobromus</i> are adapted to subterranean waters, characterized by the loss of eyes, pigmentation, and often body attenuation (Wang and Holsinger 2001). Therefore, they are most likely restricted to suitable habitat and are unable to disperse long distances. They presumably disperse through wet interstitial media, such as stream gravels and soil (Holsinger 1978). <i>S. idahoensis</i> amphipods are small (see Criterion 2) and therefore unlikely to travel long distances.</p> <p><i>S. idahoensis</i> can probably only disperse through suitable habitat (Rank B), and individuals probably only disperse short distances even within</p>	<p>Holsinger, J. R. 1978. Systematics of the Subterranean Genus <i>Stygobromus</i> (Crangonyctidae), Part II: Species of the Eastern United States. Smithsonian Contributions to Zoology: No. 266: 144 pp.</p> <p>Wang, D., and J. R. Holsinger. 2001. Systematics of the subterranean amphipod genus <i>Stygobromus</i></p>

Species (Scientific and Common Name): <i>Stygobromus idahoensis</i> [Idaho amphipod]			
Criteria	Rank	Rationale	Literature Citations
		<p>suitable habitat. Confidence is medium due to lack of species-specific estimates of dispersal.</p> <p>Confidence in Rank: High, <b>Medium</b>, or Low</p>	(Crangonyctidae) in western North America, with emphasis on the hubbsi group. Amphipacifica: Vol. 3: No. 2: pp. 39-147.
4 Abundance on the Salmon-Challis	D	<p>There are no abundance estimates for <i>S. idahoensis</i> (Rank D). Since the range of <i>S. idahoensis</i> is expected to be small (see Criterion 2), and since habitat for this species appears to be somewhat specific (see Criterion 6), <i>S. idahoensis</i> is unlikely to be common on the Forest.</p> <p>Confidence in Rank: High, Medium, or <b>Low</b></p>	
5 Population Trend on the Salmon-Challis	D	<p>There are no population trend estimates for <i>S. idahoensis</i> (D). Based on habitat trends and vulnerabilities to disturbance, it is possible that populations are declining.</p> <p>Confidence in Rank: High, Medium, or <b>Low</b></p>	
6 Habitat Trend on the Salmon-Challis	B	<p>All members of the genus <i>Stygobromus</i> are restricted to subterranean waters (see Criterion 3). <i>S. idahoensis</i> is a groundwater species that was found at about 1,000 m elevation in the area beneath the streambed that is saturated with water, which is referred to as the hyporheic zone (Wang and Holsinger 2001). The one occurrence record for <i>S. idahoensis</i> is located in the Frank-Church River of No Return Wilderness. Although many aquatic ecosystems on the Forest are degraded from historic conditions (USFS 2017a), areas in the Frank-Church River of No Return Wilderness are generally less affected by human activities that could affect streamflow and spring runout channel dynamics (see Criterion 7). Springs and groundwater-dependent wetlands in this area are deemed to be in good condition (IDFG 2017).</p> <p>Since <i>S. idahoensis</i> is a smaller <i>Stygobromus</i> species (see Criterion 3), they are predicted to be habitat specialists (Holsinger 1978). Based on</p>	<p>Holsinger, J. R. 1978. Systematics of the Subterranean Genus <i>Stygobromus</i> (Crangonictidae), Part II: Species of the Eastern United States. Smithsonian Contributions to Zoology: No. 266: 144 pp.</p> <p>IDFG (Idaho Department of Fish and Game). 2017. Idaho State Wildlife Action Plan, 2015. Boise, ID.</p> <p>USFS (United States Department of Agriculture, Forest Service). 2017a. Salmon Challis National Forest Data</p>

Species (Scientific and Common Name): <i>Stygobromus idahoensis</i> [Idaho amphipod]			
Criteria	Rank	Rationale	Literature Citations
		<p>the microhabitat where it is found, <i>S. idahoensis</i> could be sensitive to changes in water quality, water temperature, or streambed substrate (IDFG 2017). Watersheds on the Forest in the Frank-Church River of No Return Wilderness are thought to have water quality conditions similar to historic conditions and are used to as a control to measure water quality degradation in other areas of the Forest (USFS 2017a).</p> <p>In contrast to other aquatic ecosystems on the Forest, habitat for <i>S. idahoensis</i> appears to be similar to historic conditions on the Salmon-Challis National Forest (Rank A). Confidence is medium due to uncertainty of the distribution of habitat meeting all requirements for suitability on the Forest.</p> <p>Confidence in Rank: High, <b>Medium</b>, or Low</p>	<p>Assessment, Riparian Ecosystems Section (Draft a).</p> <p>Wang, D., and J. R. Holsinger. 2001. Systematics of the subterranean amphipod genus <i>Stygobromus</i> (Crangonyctidae) in western North America, with emphasis on the hubbsi group. <i>Amphipacifica</i>: Vol. 3: No. 2: pp. 39-147.</p>
7 Vulnerability of Habitats on the Salmon-Challis	A	<p><i>S. idahoensis</i> is thought to be vulnerable to disturbance of streamflow dynamics, water quality, water temperatures, and streambed substrate (IDFG 2017). The Frank-Church River of No Return Wilderness, in which the one occurrence record for <i>S. idahoensis</i> is located, has the largest roadless backcountry area in the continental United States (IDFG 2017). On the Forest, recreation and changes in climate are plausible threats to <i>S. idahoensis</i> habitat.</p> <p>Increased sedimentation, decreased riparian vegetation, pollution, and degradation of streambank integrity caused recreation can alter water quality of potential <i>S. idahoensis</i> habitat on the Forest (USFS 2017a). There is one campsite with a 30 person capacity along Wilson Creek in the Frank-Church River of No Return Wilderness (Lakes and Crags 2016). In 2008, bare mineral soil and heavy vegetation loss were recorded at the campsite (Lakes and Crags 2016). Near the water, there were multiple, worn pullouts and vegetation loss, as well as satellite sites and trails</p>	<p>Behrens, P.N., R.E. Keane, D.L. Peterson, and J.J. Ho. 2018. Chapter 6: effects of climatic variability and change on forest vegetation. In Halofsky, J.E., D.L. Peterson, J.J. Ho, N.L. Little, L.A. Joyce, editors. 2018. Climate change vulnerability and adaptation in the Intermountain Region. Gen. Tech. Rep. RMRS-GTR-374. Fort Collins, CO: US Department of Agriculture, Forest Service, Rocky Mountain Research Station.</p> <p>Halofsky, J.E., D.L. Peterson, J.J. Ho,</p>



Species (Scientific and Common Name): *Stygobromus idahoensis* [Idaho amphipod]

Criteria	Rank	Rationale	Literature Citations
		<p>(Lakes and Crags 2016). By 2015, the campsite condition at Wilson Creek had improved somewhat and was downgraded from Frissell Condition Class IV to Class III (Lakes and Crags 2016).</p> <p>Changes in climate could also impact this species. Changes in climate are expected to increase air temperatures and decrease snow to rain ratios which will likely result in a smaller snowpacks, changes in stream flow patterns, and higher stream temperatures (IAP 2016). These changes could negatively impact this species.</p> <p>To project the future climate and impacts to resources in the Intermountain Region including the Salmon-Challis, the Intermountain Adaptation Partnership (IAP) used Representative Concentration Pathway [RCP] 4.5 and 8.5, which capture a moderate and high future warming, respectively (Halofsky et al. 2018). Although pathways predicting lower warming exist, the 4.5 and 8.5 pathways were chosen by the IAP because they are, in comparison, well studied providing a large set of projections that enhance our understanding of the possible range in future climate. Thus, this represents best available science for our Forest with regard to a warming climate.</p> <p>Although uncertainty exists about the magnitude and rate of change in climate (For a discussion of this see Behrens et al. 2018), warming temperatures are the most certain consequence of increased CO<sub>2</sub> in the atmosphere. By 2100, median minimum and maximum temperature in the Middle Rockies subregion, which includes the Salmon-Challis, is projected to rise about 5-6°F under the moderate warming scenario and about 10°F under the high warming scenario. Regardless of scenario, the greatest departure from historical seasonal minimum temperatures occurs in the summer. Annual precipitation projections are highly</p>	<p>N.L. Little, L.A. Joyce, editors. 2018. Climate change vulnerability and adaptation in the Intermountain Region. Gen. Tech. Rep. RMRS-GTR-374. Fort Collins, CO: US Department of Agriculture, Forest Service, Rocky Mountain Research Station.</p> <p>IAP (Intermountain Adaption Partnership). 2016. Intermountain Adaption Partnership: Climate Vulnerability Assessment Summaries (Draft).</p> <p>IDFG (Idaho Department of Fish and Game). 2017. Idaho State Wildlife Action Plan, 2015. Boise, ID.</p> <p>Joyce, L.A. and M. Talbert. 2018. Chapter 3: Historical and projected climate. In Halofsky, J.E., D.L. Peterson, J.J. Ho, N.L. Little, L.A. Joyce, editors. 2018. Climate change vulnerability and adaptation in the Intermountain Region. Gen. Tech. Rep. RMRS-GTR-374. Fort Collins, CO: US Department of Agriculture, Forest Service, Rocky Mountain Research</p>

Species (Scientific and Common Name): *Stygobromus idahoensis* [Idaho amphipod]

Criteria	Rank	Rationale	Literature Citations
		<p>variable with no discernible trend under moderate warming and a slight increasing trend with high warming (Joyce and Talbert 2018).</p> <p><i>S. idahoensis</i> habitat on the Forest could be vulnerable to human activities, and in the future changes in climate should significantly threaten <i>S. idahoensis</i> habitat (Rank A). Confidence is medium due to lack of knowledge of the range of conditions tolerated by <i>S. idahoensis</i>.</p> <p>Confidence in Rank: High, <b>Medium</b>, or Low</p>	<p>Station.</p> <p>Lakes, T., &amp; Crags, B. H. 2016. Historic Preservation Plan For the Frank Church–River of No Return Wilderness. 71 pp.</p> <p>Mazzacano, C. 2008. Caddisflies: a northern Rocky Mountain refugium caddisfly (<i>Sericostriata surdickae</i>) (Trichoptera: Uenoidae). The Xerces Society for Invertebrate Conservation. Internet website: <a href="https://xerces.org/caddisfly-sericostriata_surdickaea">https://xerces.org/caddisfly-sericostriata_surdickaea</a>. Accessed on November 30, 2017.</p> <p>USFS (United States Forest Service) Salmon-Challis National Forest. 2016. Forest plan monitoring and evaluation report: Salmon-Challis National Forest: Salmon and Challis Forest plans FY 2012, 2013, 2014, and 2015.</p> <p>USFS (United States Department of Agriculture, Forest Service). 2017a. Salmon Challis National Forest Data Assessment, Riparian Ecosystems Section (Draft a).</p>

Species (Scientific and Common Name): ***Stygobromus idahoensis* [Idaho amphipod]**

Criteria	Rank	Rationale	Literature Citations
<p>8 Life History and Demographics</p>	<p>B</p>	<p><i>S. idahoensis</i>, and all members of the genus <i>Stygobromus</i>, are stygobionts, meaning that they are adapted to subterranean waters (Holsinger 1978). In general, stygobionts have reduced reproduction compared to related surface-dwelling clades, and species in the genus <i>Stygobromus</i> have slower metabolic rates than surface-dwelling relatives (Hutchins and Culver 2018). Examinations of the clutch sizes of three slightly larger species (<i>Stygobromus mackini</i>, <i>S. allegheniensis</i>, and <i>S. spinatus</i>) found a range of 1-12 eggs per female, with a mean clutch size of 5-7 eggs.</p> <p>Based on information from other <i>Stygobromus</i> spp., <i>S. idahoensis</i> probably has low reproduction (Rank B). Confidence is medium, since other demographic risk factors are unknown.</p> <p>Confidence in Rank: High, Medium, or Low</p>	<p>Hutchins, B. C., and D. C. Culver. Investigating rare and endemic pollution-sensitive subterranean fauna of vulnerable habitats in the NCR. Report prepared for U.S. National Park Service, National Capital Region. Accessed online January 18, 2018.</p>
<p><b>Summary and recommendations:</b> <i>Stygobromus idahoensis</i> (Idaho amphipod) is a freshwater stygobiotic invertebrate known from four individuals collected in 1986 on the Forest. Distribution, population trends, and abundance of <i>S. idahoensis</i> are unknown due to the lack of multiple occurrence records or recent surveys; however, it is unlikely that <i>S. idahoensis</i> is widely distributed or common. Low dispersal, combined with habitat specificity and sensitivity, suggest that <i>S. idahoensis</i> is unlikely to recolonize or colonize new habitat in response to disturbance. The groundwater habitat in which <i>S. idahoensis</i> occurs is located in the Frank-Church River of No Return Wilderness and therefore should be in relatively good condition. Habitat is vulnerable to backcountry recreational activities on the Forest and is expected to be impacted by changes in climate. In general, <i>Stygobromus</i> spp. appear to have low reproductive rates.</p> <p><i>S. idahoensis</i> is recommended as an SCC due to the fact that it is only known to occur on the Forest, as well as its habitat specificity, vulnerability to disturbance, and low ability to recover from disturbance events as evidenced by low rates of reproduction and dispersal.</p>			<p>Date: 1/30/2018</p>

Species (Scientific and Common Name): <b><i>Stygobromus idahoensis</i> [Idaho amphipod]</b>			
Criteria	Rank	Rationale	Literature Citations
Evaluator(s): Rei Scampavia and Bart Gamett			
<p>Forest Recommendation: This analysis indicates there is substantial concern for the capability of <i>Stygobromus idahoensis</i> to persist over the long-term on the Salmon-Challis National Forest. Therefore, it is recommended that <i>Stygobromus idahoensis</i> be designated as a Species of Conservation Concern.</p>			