

# Sevan Trout (*Salmo ischchan*)

## Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, May 2012  
Revised, May 2019  
Web Version, 2/18/2021

Organism Type: Fish

Overall Risk Assessment Category: Uncertain



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[https://commons.wikimedia.org/wiki/File:Sevan\\_trout\\_Севанская\\_форель.jpg](https://commons.wikimedia.org/wiki/File:Sevan_trout_Севанская_форель.jpg)

## 1 Native Range and Status in the United States

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### Native Range

From Froese and Pauly (2019):

“Former USSR: Armenia, Lake Sevan.”

### Status in the United States

No records of *Salmo ischchan* in the wild or in trade in the United States were found.

All species in the family Salmonidae are listed as injurious species under 18 U.S.C. 42 (a) due to the risk of carrying certain pathogens, thus prohibiting their importation unless imported live with a health certification or are dead and eviscerated (USFWS 1967).

From Arizona Office of the Secretary of State (2013):

“I. Fish listed below are considered restricted wildlife:

[...]

34. All species of the family *Salmonidae*. Common names include: trout and salmon.”

## Means of Introductions in the United States

No records of *Salmo ischchan* in the wild in the United States were found.

## Remarks

From Freyhof (2019):

“It is important to note that there is some taxonomic uncertainty associated with *Salmo* taxa. Collectively, all nine proposed taxa identified by the IUCN SSC Salmon Specialist Group (SSG) as uncertain—*Salmo tigradis*, *S. platycephalus*, *S. ischchan*, *S. abanticus*, *S. labecula*, *S. chilo*, *S. opimus*, *S. rizeensis*, and *S. coruhensis*—could be considered to fall within what some authors have referred to as the *Salmo trutta* species complex. This statement means nothing more than the fact that the mtDNA of these taxa would fall within the multiple clades of what sometimes has been simply referred to as *Salmo trutta*, comprising five or six major mtDNA lineages. The only *Salmo* taxa outside of this group of clades (genetically speaking) would be Atlantic Salmon (*S. salar*), *S. belvitca*, *S. ohridanus*, and Soft-mouthed Trout (*S. obtusirostris*). Whereas future higher resolution genetic data (i.e. genomic) will undoubtedly shed more light on the pairwise divergence and phylogenetic position of these taxa, the SSG sees no evidence, nor has any expectation, that genomic level data will place any of these taxa outside of these major mtDNA lineages.”

“It is unclear, if the species [*Salmo ischchan*] would survive if artificial reproduction would stop and the species may be already fully conservation dependent (Extinct in the Wild). The species is assessed as Critically Endangered despite the large extent of occurrence, which is the area of the lake itself (1,250 km<sup>2</sup>). The area of occupancy (AOO) is, however, calculated on the remaining spawning areas, which is estimated to be now less than 10 km<sup>2</sup>, in fact there may be no natural spawning areas remaining.”

“Lake Sevan Trout (or trouts) have strongly declined in the past. It is believed, that of the four populations (which may be separate species), only two are still present (Winter Bakhtak and Bojak) which are mainly maintained by artificial reproduction. It is unclear if there is still enough natural reproduction to sustain the population(s). The decline of Lake Sevan Trout seems to still be ongoing as water levels of the lake drop.”

From Bogdanowicz et al. (2017):

“The Sevan trout was divided into four distinct subspecies (morphs) differing in terms of breeding times and places, as well as growth rate: the winter bakhtak (*S. i. ischchan*); the summer bakhtak (*S. i. aestivalis*); the gegarkuni (*S. i. gegarkuni*); and the bodjak (*S. i. danilewskii*). Two of these subspecies bred exclusively in the lake: the winter bakhtak (the largest form, growing up to 90 cm in total length and reaching 15 kg) and the bodjak (dwarf, slowly-growing lacustrine fish, not exceeding 33 cm in total length and 0.25 kg).”

## 2 Biology and Ecology

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### Taxonomic Hierarchy and Taxonomic Standing

From Fricke et al. (2019):

“**Current status:** Valid as *Salmo ischchan* Kessler 1877.”

From ITIS (2019):

Kingdom Animalia  
Subkingdom Bilateria  
Infrakingdom Deuterostomia  
Phylum Chordata  
Subphylum Vertebrata  
Infraphylum Gnathostomata  
Superclass Actinopterygii  
Class Teleostei  
Superorder Protacanthopterygii  
Order Salmoniformes  
Family Salmonidae  
Subfamily Salmoninae  
Genus *Salmo*  
Species *Salmo ischchan* Kessler, 1877

### Size, Weight, and Age Range

From Froese and Pauly (2019):

“Max length : 104 cm TL male/unsexed; [Berg 1962]; common length : 33.0 cm TL male/unsexed; [Berg 1962]; max. published weight: 17.0 kg [Berg 1962]”

### Environment

From Froese and Pauly (2019):

“Freshwater; demersal.”

### Climate

From Froese and Pauly (2019):

“Temperate; 41°N - 40°N, 44°E - 46°E”

## Distribution Outside the United States

### Native

From Froese and Pauly (2019):

“Former USSR: Armenia, Lake Sevan.”

### Introduced

Froese and Pauly (2019) lists *Salmo ischchan* as introduced from Issyk-Kul to Kazakhstan with the current population unknown. Froese and Pauly (2019) also lists *Salmo ischchan* as introduced and established in Kyrgyzstan and Uzbekistan, as introduced and not established in the Russian Federation and USSR, and introduced with the current population unknown in Kazakhstan.

## Means of Introduction Outside the United States

From Froese and Pauly (2019):

“Larvae (1.3 million) was introduced into Lake Balkhash [Mitrofanov and Petr 1999].”

“In 1930, 755,000 fertilized eggs were released [in Kyrgyzstan] following the recommendation of Berg (1929). In 1936, 800,000 were again brought in. Became an active predator on other fish in the lake following its introduction. The limiting factors for this species in Lake Issyk-kul are food resources and habitat for reproduction [Savvaitova and Petr 1999].”

From Bogdanowicz et al. (2017):

“In the former Soviet Union the Sevan trout was a promising subject for acclimatization in other bodies of water. The stocking of Lake Issyk Kul in Kirghizstan with *S. i. gegarkuni* serves as a good example of this process. Over 1.5 million fertilized eggs were transferred, and over one million fry of 19 to 24 mm in length (i.e. ages of 22 to 45 days) were introduced into that lake in 1930 and 1936 [Luzhim 1956] in order to start a commercial trout fishery. After introduction to its new environment, the biology and morphology of the Sevan trout changed so markedly that it began to be treated as a new subspecies, *S. i. issykogegarkuni* Lushin, 1951 [Luzhin 1956; Dorofeyeva 2008]. This species was also introduced to Lake Balkhash in Kazakhstan in 1971 and 1974 (1.3 million larvae) and to Reservoir Charvak in Uzbekistan in 1973–1983 (over 3 million fry). Both samples originated from Issyk Kul, Kirghizstan ([Mitrofanov et al. 1999]; E.E. Khurshut, in litt.; see also [Khurshut 2006]) as the sample (3.6 million larvae) used in the late 1970s for stocking Reservoir Toktogul in Kirghizstan [Konurbayev and Sydykov 1981], where the Sevan trout now naturally breeds (A. Ryspaev, pers. comm.; [...]). The Uzbek population in the wild appears to be well established according to the Introduced Species Fact Sheets of FAO Fisheries and Aquaculture Department [FAO Fisheries and Aquaculture Department 2016]. In contrast, the introduction to Kazakhstan was unsuccessful and the species is no longer listed among fishes occurring in the country [Mitrofanov et al. 1992].”

## Short Description

No information on a short description of *Salmo ischchan* was found.

## Biology

From Froese and Pauly (2019):

“The adults spawn in the lake proper at a depth range of 0.5 to 3 m, over fine gravel. Two spawning stocks are known: one spawns in the northwestern corner of the lake from the beginning of November till the end of December; the other spawns at the southeastern corner, from the middle or the end of January till the end of March. This fish approaches the coast twice a year: from April till July and from October till December. In mid winter and at the end of summer, it leaves the coasts to stay at greater depth. Adults feed exclusively on sand hoppers (Amphipoda) [Berg 1962].”

## Human Uses

From Froese and Pauly (2019):

“Fisheries: commercial; gamefish: yes”

From Freyhof (2019):

“The species was and still is the object of local fisheries.”

## Diseases

**No records of OIE-reportable diseases (OIE 2021) were found for *Salmo ischchan*.**

Amin et al. (2016) lists *Salmo ischchan* as a host of parasite *Echinorhynchus baeri*.

## Threat to Humans

From Froese and Pauly (2019):

“Harmless”

## 3 Impacts of Introductions

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No records of impacts of introductions were found for *Salmo ischchan*.

All species in the family Salmonidae are listed as injurious species in the United States due to the risk of carrying certain pathogens, thus prohibiting their importation unless imported live with a health certification or are dead and eviscerated.

## 4 History of Invasiveness

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*Salmo ischchan* have been introduced to a limited extent in the former Soviet Union, but little is known of these introductions or impacts. The history of invasiveness is data deficient.

## 5 Global Distribution



**Figure 1.** Known global distribution of *Salmo ischchan*. Location is in Armenia. Map from GBIF Secretariat (2019).



**Figure 2.** Map of the Caucasus region and Central Asia where *Salmo ischchan* is present and has been introduced. Location in Lake Balkhash, Kazakhstan was not used in the climate match because this was a failed introduction. Map from Bogdanowicz et al. (2017); licensed under Creative Commons Attribution License.

## 6 Distribution Within the United States

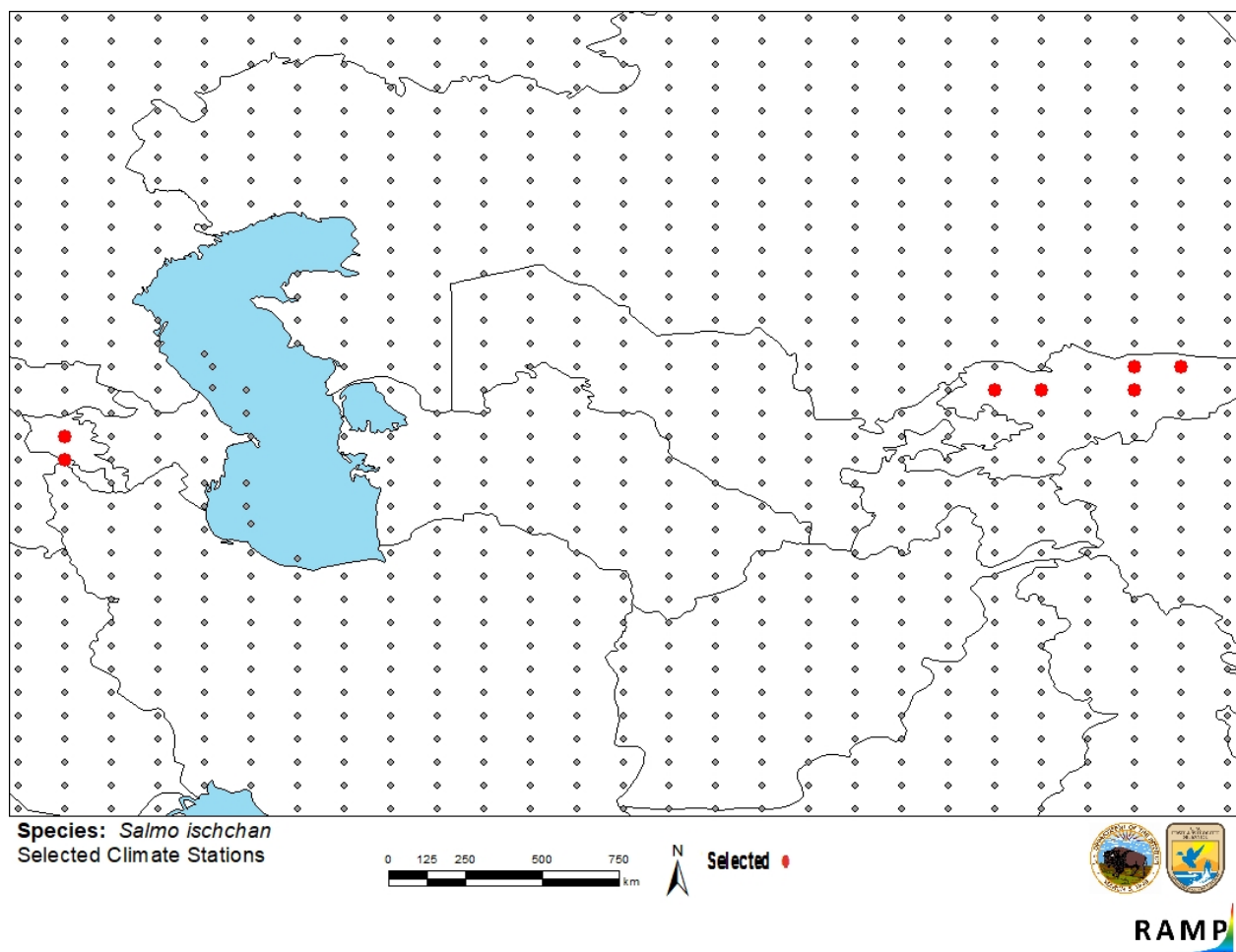
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No records of *Salmo ischchan* in the wild in the United States were found.

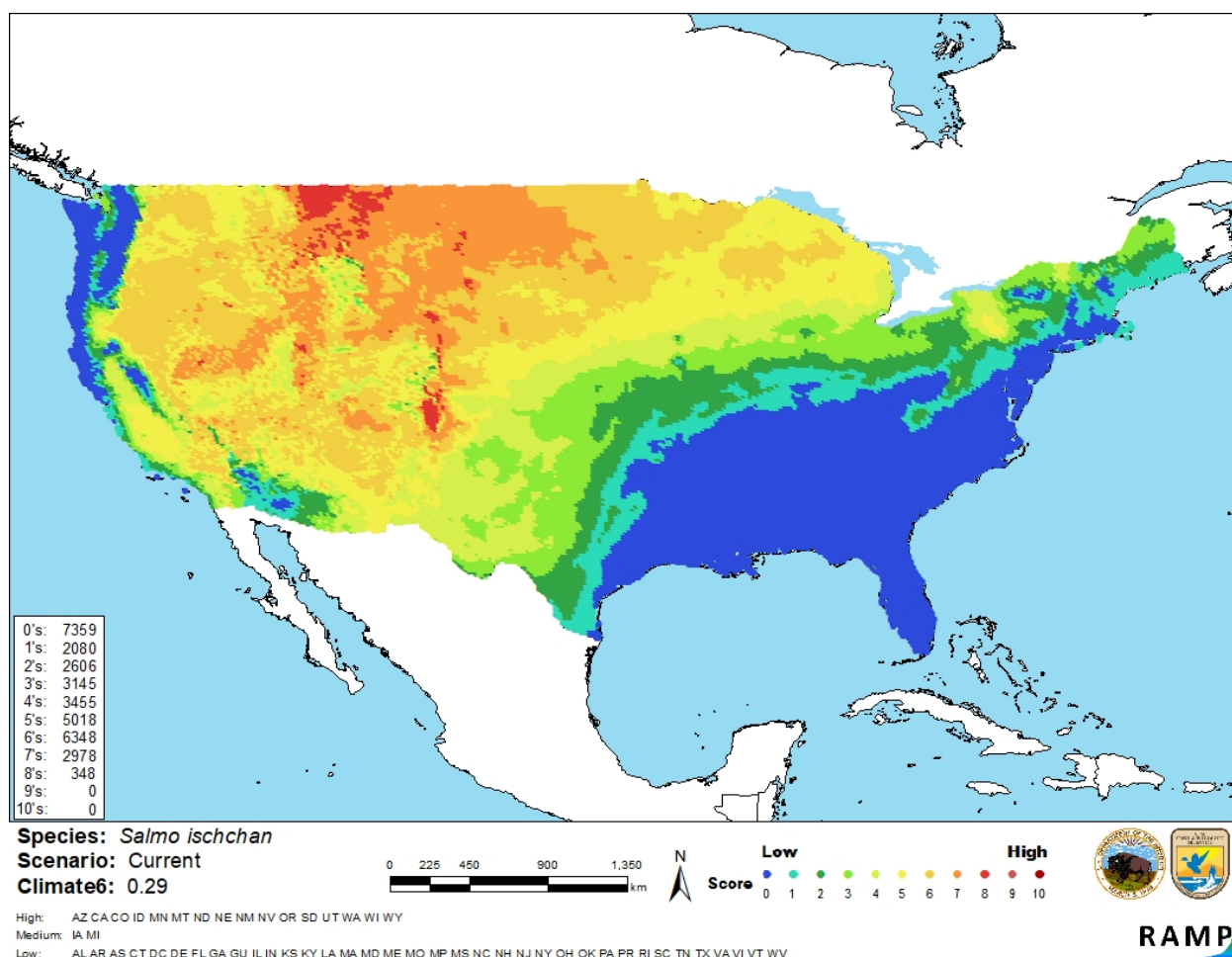
## 7 Climate Matching

### Summary of Climate Matching Analysis

The climate match for *Salmo ischchan* was high for the majority of the western and Midwest United States. The Southeast and East Coast had low to medium match. There was additional low match along the West Coast of Washington, Oregon, and California. The Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for the contiguous United States was 0.290, high (scores 0.103 and greater are classified as high). A majority of the States had low individual climate scores with Iowa and Michigan having medium individual scores, and Arizona, California, Colorado, Idaho, Minnesota, Montana, North Dakota, Nebraska, New Mexico, Nevada, Oregon, South Dakota, Utah, Washington, Wisconsin, and Wyoming having high individual scores.



**Figure 3.** RAMP (Sanders et al. 2018) source map showing weather stations in Caucasus region in Central Asia selected as source locations (red; Armenia, Kyrgyzstan) and non-source locations (gray) for *Salmo ischchan* climate matching. Source locations from GBIF Secretariat (2019) and Bogdanowicz et al. (2017). Selected source locations are within 100 km of one or more species occurrences and do not necessarily represent the locations of occurrences themselves.



**Figure 4.** Map of RAMP (Sanders et al. 2018) climate matches for *Salmo ischchan* in the contiguous United States based on source locations reported by GBIF Secretariat (2019) and Bogdanowicz et al. (2017). Counts of climate match scores are tabulated on the left. 0/Blue = Lowest match, 10/Red = Highest match.

The High, Medium, and Low Climate match Categories are based on the following table:

|                                                                                                  |                                      |
|--------------------------------------------------------------------------------------------------|--------------------------------------|
| Climate 6:<br>(Count of target points with climate scores 6-10)/<br>(Count of all target points) | Overall<br>Climate Match<br>Category |
| $0.000 \leq X \leq 0.005$                                                                        | Low                                  |
| $0.005 < X < 0.103$                                                                              | Medium                               |
| $\geq 0.103$                                                                                     | High                                 |

## 8 Certainty of Assessment

The certainty of assessment for *Salmo ischchan* is low. There is some biological information available for *S. ischchan*. There is some taxonomic uncertainty concerning this species. Information on introductions was found for *Salmo ischchan*; however, no information was found on the impacts of introductions.

## 9 Risk Assessment

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### Summary of Risk to the Contiguous United States

The Sevan trout (*Salmo ischchan*) is an endemic fish found in Lake Sevan, Armenia. The Sevan trout has been intentionally introduced outside of its native range and has become established in Kyrgyzstan. Although it has been introduced, no information has been found on impacts from the introductions. Therefore, the history of invasiveness is data deficient. All species in the family Salmonidae are listed as injurious species in the United States due to the risk of carrying certain pathogens, thus prohibiting their importation unless imported live with a health certification or are dead and eviscerated. The climate match for the contiguous United States was high, with Arizona, California, Colorado, Idaho, Minnesota, Montana, North Dakota, Nebraska, New Mexico, Nevada, Oregon, South Dakota, Utah, Washington, Wisconsin, and Wyoming having individually high climate matches. The certainty of assessment is low. The overall risk assessment category for *Salmo ischchan* is uncertain.

### Assessment Elements

- **History of Invasiveness (Sec. 4): Data Deficient**
- **Overall Climate Match Category (Sec. 7): High**
- **Certainty of Assessment (Sec. 8): Low**
- **Remarks/Important additional information:** No additional remarks.
- **Overall Risk Assessment Category: Uncertain**

## 10 Literature Cited

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**Note:** The following references were accessed for this ERSS. References cited within quoted text but not accessed are included below in Section 11.

Amin OM, Heckmann RA, Evans RP, Tepe Y. 2016. A description of *Echinorhynchus baeri* Kostylew, 1928 (Acanthocephala: Echinorhynchidae) from *Salmo trutta* in Turkey, with notes on synonymy, geographical origins, geological history, molecular profile, and X-ray microanalysis. *Parasite* 23:1–14.

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- USFWS. 1967. Importation of wildlife or eggs thereof. U.S. Fish and Wildlife Service. 32 Federal Register 20655, July 27.

## 11 Literature Cited in Quoted Material

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**Note: The following references are cited within quoted text within this ERSS, but were not accessed for its preparation. They are included here to provide the reader with more information.**

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- Dorofeyeva EA. 2008. Morphological characters of lake forms of salmonid fishes of the genera *Salmo* and *Oncorhynchus* (Pisces: Salmonidae). Proceedings of the Zoological Institute RAS 312:114–126.
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