United States Department of Agriculture

Aquatic Species Not Recommended as Species of Conservation Concern Draft Evaluations

Tongass National Forest Plan Revision

Forest Service | Alaska Region | Tongass National Forest | March 2026

Cover Photo: Mountain Lady's-slipper (*Cypripedium montanum*), a species proposed as a Species of Conservation Concern for the Tongass National Forest. Photograph by Rosalee de la Forêt. CC-BY-SA-3.0.

Preface

The USDA Forest Service is pleased to share the individual draft species evaluations of the aquatic species not recommended as Species of Conservation Concern (SCC) for the Tongass National Forest. This document presents the collection of draft species evaluations prepared for the Tongass National Forest as part of the Species of Conservation Concern (SCC) identification process. Each draft evaluation summarizes the best available scientific information relevant to a species' distribution, habitat conditions, population trends, and ecological needs within the Tongass.

The purpose of these draft evaluations is to provide a clear, science-based foundation for determining whether there is substantial concern for a species' long-term persistence in the plan area, as required under the 2012 Planning Rule. Each assessment follows a consistent format—documenting conservation status, key threats and stressors, habitat and population trends, and life-history factors that may influence vulnerability.

Together, these draft evaluations reflect a comprehensive effort to understand the conservation needs of native species across the Tongass and to support a forest plan that sustains ecological integrity, resilience, and biodiversity for generations to come.

Why are we sharing these evaluations?

We are now inviting review and feedback from Tribes, Alaska Native Corporations, cooperating agencies, local knowledge holders, partners, and the public. Your insight is essential. Incorporating Indigenous knowledge through traditional ecological knowledge (TEK), place-based observations, and new scientific information strengthens our understanding of species' ecological needs and helps refine both the Proposed SCC List and the foundations of the revised Forest Plan.

What we are asking from you

We welcome any information that may help verify, refine, or supplement what is presented in the draft evaluations, including:

- Recent observations or monitoring data
- Traditional ecological knowledge, including long-term or place-based species observations
- Information about species distributions, declining or expanding populations, or changes noticed over time
- Knowledge of habitat conditions, disturbances, or local stressors
- Documentation of threats such as climate-related changes, invasive species, recreation impacts, or habitat loss
- Information indicating that a species may have been overlooked or mischaracterized

This stage of engagement is an opportunity to highlight species that may need additional attention or to identify where information gaps remain. All input received will be reviewed and incorporated into draft species evaluations or the Proposed SCC List where appropriate, before the list moves forward to the Regional Forester for consideration.

How to Participate

All SCC-related documents—including the full report, species evaluations and background materials—are posted on the Tongass Plan Revision SCC Identification Process webpage. Comments and supporting information may be submitted through the Tongass Plan Revision Comment Site.

Thank you for taking the time to review these evaluations and for contributing your knowledge to help shape a forest plan that reflects the ecological, cultural, and community values of Southeast Alaska. Your involvement is vital to ensuring that the Tongass continues to sustain resilient ecosystems, vibrant communities, and thriving populations of native species for generations to come.

Table of contents

This Table of contents is ordered by taxa group and then the species' scientific names in alphabetical order.

Aquatic Species Draft Evaluations

Esox lucius

Esox lucius Linnaeus 1758

Northern Pike (Pike Lakes population)

Global Rank: **G5T3Q**

Alaska State Rank: **S2S3**

Photo: U.S. National Park Service

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	A: Scarce or isolated. Habitat is naturally distributed as isolated patches (pictorially). Identified in fifteen lakes/ponds within the Pike Lakes (Antlen River) drainage system located 23 miles east of Yakutat (Harke 1994). These pike are the only natural-occurring pike in southeast Alaska and are believed to be remnant Pleistocene populations that survived only because the glacial advance missed the Pike Lakes area. Up until 2009, this pike population on the Tongass National Forest was listed on the Forest Service R10 Regional Forester Sensitive species list USFS 2009).
2 Distribution in surrounding geographic area	A	A: Only within the boundaries of the Tongass National Forest (local or regional endemics). The Pike Lakes population is the only native northern pike population in Southeast Alaska. Their presence in any other regional waters would be considered as an invasive species. Only desirable in current location. Global Rank: G5 United States Rank: N5 Canada Rank: N5 State Rank: S2S3 (Pike Lakes population), "Exotic" in many parts of the state. In 2008-2009, an introduced population of northern pike located in a series of ponds in Yakutat was eradicated. This

Criteria	*Rank*	*Rationale*
		population was illegally introduced and posed a risk to nearby salmon and steelhead fisheries. However, removing this accessible population has likely indirectly increased fishing pressure on the natural Pikes Lakes population. Widespread distribution in the United States and Canada, as well as parts of Eurasia.
3 Dispersal capability	B	B: Patchy or gaps. Pike can reach the reproductive stage in a year, females being 30 cm, males 19 cm. Pike normally live five to 15 years, but can be as old as 30. Life expectancy and growth are dependent on circumstances. A 25-to 30-pound female may contain up to half a million eggs which she deposits in the grassy margins of lake shores, slow-moving streams, or sloughs. Because of the colder temperatures of Alaskan waters, incubation may take 30 days (ADF&G 1994). The Pike Lakes ponds are not isolated ponds and all of them are connected by streams to the Antlin River. It is speculated by N. Catterson, FS Fish Biologist at Yakutat Ranger District, that some temperature or velocity gradient keeps them isolated in the ponds because no pike have been observed in the streams of the Antlin River. Adult sockeye salmon surveys have been conducted directly downstream of Big Pine lake along with seining events with no pike captures noted.
4 Abundance on Tongass NF	B	B: Uncommon. Current abundance is thought to be large enough that a change in population growth rates would not be likely to lead to rapid local extinction, but in combination with highly variable environmental factors, has the possibility of posing a threat to this population. A mark-recapture study performed by Vince Harke (USFS) in 1991 estimated 222-260 pike in Big Pine Lake, one of the largest of the Pikes Lakes ponds. Harke also identified fifteen ponds within the Pike Lakes area that contained pike. Many of these ponds were small but seven are greater than 10 acres. Harke estimated a 6.2 pike per acre density in Big Pine. This extrapolated to the total 181 acres of pond habitat identified yields an estimate of 1,122 adult northern pike in this system. This is only a crude estimate and assumption that all habitat is equal in value, which is not likely.

Criteria	*Rank*	*Rationale*
5 Population trend on Tongass NF	B/D	B/D: Stable population (B), however, insufficient information to draw inferences about criterion (D). There is little information on the population size and structure of this stock. Common to other small populations of pike, they are likely quite cannibalistic as little other food exists for the mature fish. The largest management concern for this stock is that they do not spread to other waters within the Yakutat forelands and have a negative effect on salmon production. There is little fishing pressure on this stock at this time, although sport fishing, including discussion on guided opportunities, is supposedly increasing. Pike retention in the Antlen River drainage (including Pike Lakes) is prohibited under current sport fish regulations. In the 1970's, float plane based guided angling reduced the number of large fish in the lakes and as a result, ADF&G implemented strict catch and release regulations for this stock. There is no trend data available for this population, though the stock has persisted since the last significant glacial advance (USDA 2008).
6 Habitat trend on Tongass NF	B	B: Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. Generally, pike spend the winter in deep water in lakes and rivers. During the spring, they move inshore or upstream to marsh areas where they spawn. Spawning areas are used annually. They are typically marshy areas with shallow water, emergent vegetation and mud bottoms covered with vegetative mats (Morrow 1980). The Pike Lakes are shallow with high concentrations of humic acid and peat-filled margins (USDA 2008). The Pike Lakes containing this population are located within a Special Interest Area Land Use Designation (LUD), which remain largely undisturbed by human uses or activities, except for localized interpretive purposes, and in some cases, recreation developments, and provide quality opportunities for public study, use, and enjoyment. Forest-wide standards and guidelines for wetlands and riparian management generally cover these areas.

Criteria	*Rank*	*Rationale*
7 Habitat vulnerability or modification; other threats	C	C: Habitat resilient, changes are similar in frequency and intensity to those expected from Natural Range of Variability (NRV), and modern stressors not significant. There has been no modification of habitat associated with this population and none is anticipated departing from expectations based on NRV. Forest Plan standards and guidelines are designed to protect wetland and riparian habitat. Natural habitat conditions associated with the lakes are expected to be maintained under the current plan.
8 Life history and demographics	C	C: High reproductive rate and not especially susceptible to disease, predation, or competition; and, species has life history characteristics that suggest populations will have a high ability to recover from disturbance events and no other demographic risk factors are known. Genetic analysis supports the theory that this endemic population is part of a small refugia isolated from other stocks since the last glaciation (USDA 2008; Senanan and Kapuscinski 2000). Highly piscivorous species. Generalist. High reproductive rate and highly competitive. Likely to have more ability to recover from population declines. Overall life history characteristics suggest this population has an ability to recover rapidly from disturbance events.

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☒	☐
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☒	☐
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☒	☐

Conclusion Rationale

Significant Threats: There has been no modification of habitat associated with this population and none is anticipated departing from expectations based on NRV. Current Forest Plan standards and guidelines are designed to protect wetland and riparian habitat. Potential changes to, or reduction of these standards and guidelines in the creation of a new forest plan could put this species at greater risk.

Declining populations or habitat trends: The habitat for this stock is stable based on its land use designation and current forest plan standards and guidelines. Potential changes to, or reduction of these standards and guidelines in the creation of a new forest plan could put habitat at greater risk. There is no trend data available for this population, though the population has persisted since the last significant glacial advance.

Restricted Range: This species is widespread in the United States and Canada, as well as parts of Eurasia. The Pike Lakes population is the only native northern pike population in Southeast Alaska. Their presence in any other regional waters would be considered as an invasive species.

Low populations or restricted ecological conditions: The population is protected from over-harvest as retention is prohibited per current sport fish regulations. The population is restricted to the Pike Lakes Ponds and would be considered an invasive species elsewhere in the region, as it would interfere with salmon production.

Conclusion

☒	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.
☐	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

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Lampetra ayresii

photo: Alaska Fish and Game

Lampetra ayresii Günther 1870

River Lamprey

Global Rank: **G5**

Alaska State Rank: **S2**

Species Assessment

Criteria	Rank	Rationale
1 Distribution on Tongass NF	D	D: Insufficient information to draw inferences about criterion Previously recorded from Stephens Passage, Tee Harbor-Lynn Canal area, Taku River, Douglas Island, and Portland Canal. Not often found in Alaska (Mecklenburg et al 2002). Overall, very poor distribution information for the Tongass. The small parasitic River Lamprey is in the subgenus *Lampetra* and is the sister-species of the Western Brook Lamprey (Kostow 2002).
2 Distribution in surrounding geographic area	C	C: Wide distribution outside the Tongass National Forest. Global Rank G5, Alaska State Rank S2 Endemic to west coast of North America. Not often found in Alaska (Mecklenburg et al 2002). Otherwise, widely scattered, isolated populations (Moyle et al 1995, Moyle 2002) along the Pacific Slope from San Francisco Bay and the Sacramento-San Joaquin drainage, CA to Tee Harbor near Juneau, AK (Lee et al. 1980, Page and Burr 2011), including Oregon and Washington. In BC, feeding adults are common in Strait of Georgia and likely originated from Fraser River (Beamish and Withler 1986).

Criteria	Rank	Rationale
3 Dispersal capability	C	C: Readily disperses across landscapes with few habitat-related limitations. Transformed individuals migrate to sea and return to freshwater to spawn. Species dies after spawning. Species able to disperse readily across large areas of unsuitable habitat to reach suitable spawning grounds. Large river utilization makes this species less vulnerable to road-stream crossing impediments but could be limited by dams and water regulation, neither of which are threats on the Tongass at this time. Low level of concern.
4 Abundance on Tongass NF	D	D: Insufficient information to draw inferences about criterion. Unknown and not often found in Alaska, much less within the confines of the Tongass. Where found in Alaska, only incidental individuals have been documented, not populations. Generally, little specific abundance information is available, and even the limited abundance comments are contradictory. Total adult population size is unknown but very large. One reference considers the species to be uncommon in British Columbia, while another report British Columbia as the center of the range. Considered sparse in Washington rivers and uncommon in Alaska. Insufficient information exists to draw inferences about whether this species abundance is low or high enough to withstand stochastic and other factors that could lead to imperilment.
5 Population trend on Tongass NF	D	D: Insufficient information to draw inferences about criterion. Unknown. Paucity of information for Southeast Alaska makes it impossible to draw inferences about trends and persistence. More broadly, trend is uncertain but likely relatively stable or slowly declining, specifically mature individuals (IUCN 2023). Degradation of suitable spawning and rearing habitat in the lower reaches of larger rivers is the main cause for decline.
6 Habitat trend on Tongass	B	B: Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. The single threat on the Tongass would be already degraded habitat conditions in valley bottom large rivers and streams due to past management prior to the stringent stream protection measures currently in place on Forest Service

Criteria	Rank	Rationale
NF		lands. New threats to river lamprey spawning and rearing habitat due to management should be minimal to non-existent.
7 Habitat vulnerability or modification; other threats	C	C: Habitat resilient, changes are similar in frequency and intensity to those expected from NRV, and modern stressors not significant. Threats generally include habitat alteration and degradation due to stream regulation associated with dams, diversions, pollution, and channelization/dredging, urbanization, etc. (Moyle et al 1995; Renaud 1997). Generally, the habitat utilized by this species should be resilient and any changes would be similar in frequency and intensity to those expected from NRV. In some cases, habitat conditions would be assumed to be improving where in-stream restoration actions are occurring. Modern stressors should be minimal.
8 Life history and demographics	C	C: High reproductive rate and not especially susceptible to disease, predation, or competition; OR species has life history characteristics that suggest populations will have a high ability to recover from disturbance events and no other demographic risk factors are known. Anadromous, parasitic species. According to Moyle (2002), their life span is 6 to 7 years. River lampreys lay 11,400 to 37,300 eggs per adult female (Kostow 2002; Moyle 2002). Ammocoetes burrow in sandy and muddy pools of streams; metamorphose to adult form in summer and out-migrate following spring and early summer to feed in estuarine habitat and at sea for a few months (Mecklenburg et al 2002). Migrate upstream in fall to late winter and spawn the following spring in clear gravel rivers. Adults die after spawning. This species degree of fidelity to their natal streams is unknown (USFWS 2004). sturgeon, which would compete with it, are heavily fished. Otherwise, the life history characteristics of this species likely lead to low probability to local extinction based on what information is known. If salmon and herring continue to exist along with intact larger river habitat, it appears the risk to viability would be low. River lampreys kill a lot of salmon and herring annually, including estimates of 2-8 million salmon and 18-20 million herring in the Fraser River plume, British Columbia (Beamish and Youson 1987). There is no information on susceptibility to disease, but this species can obviously out-compete salmon. It is doing well in the Fraser River because sturgeon, which would compete with it, are heavily fished. Otherwise, the life history characteristics of this species likely lead to

Criteria	Rank	Rationale
		low probability to local extinction based on what information is known. If salmon and herring continue to exist along with intact larger river habitat, it appears the risk to viability would be low.

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☒	☐
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☒	☐
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☒	☐

Conclusion Rationale

Significant threats: Threats include habitat alteration and degradation due to stream regulation. Generally, the habitat utilized by this species should be resilient and any changes would be similar in frequency and intensity to those expected from NRV.

Declining populations or habitat trends: There is no population trend available for this species in the planning area. In the absence of hard data, some experts assume a stable or else slowly declining trend. Degradation of suitable spawning and rearing habitat in the lower reaches of larger rivers could be the main cause for an assumed decline.

Restricted range: This species is known from several locations on the Tongass and is widely scattered in isolated populations along the west coast of North America. Distribution information on the Tongass is lacking.

Low populations or restricted ecological conditions: Insufficient information exists to draw inferences about whether this species abundance is low or high enough to withstand stochastic and other factors that could lead to imperilment. However, based on what is known of the life history characteristics of this species, the likelihood of local extinction is probably low.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

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Lampetra richardsoni

Lampetra richardsoni *Vladykov and Follett 1965*

Western Brook Lamprey

Global Rank: **G4G5**

Alaska State Rank: S1

Photo: The City of Portland Oregon

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	D	D: Insufficient information to draw inferences about criterion. Population status and trends are unknown but suspected to be rare. Within Alaska, distribution of Western brook lamprey is restricted to southeastern Alaska; with eight known occurrences -- Southern Southeast Alaska north to approximately 20 miles north of Juneau; occurrence documented in the Taku River, McDonald Lake north of Yes Bay, Fowler Creek on Admiralty Island (Brewster 2013), Bear Creek on Mitkof Island (2 separate tributaries) (Mecklenburg et al. 2002), Farragut River on mainland (upstream of complete barrier), Towers Lake inlet stream on Kupreanof Island, Thoms Creek on Wrangell Island, and Hamilton River on Kupreanof Island. The small number of total SE Alaska observations suggests species is probably rare in the state, and at the northern extent of this species range. However, surveys have been limited or nonexistent.
2 Distribution in	C	C: Wide distribution outside the Tongass National Forest. Range includes streams of the North American Pacific coast from just to the north of Juneau in the Taku River, southern Alaska, to central California, including Vancouver Island, with major inland distributions in the Columbia and Sacramento-San Joaquin drainages (Vladykov and Follett 1965, Moyle 2002, Wydoski and Whitney 2003, Page and Burr

Criteria	*Rank*	*Rationale*
surrounding geographic area		2011). In Washington, this species occurs in coastal and Puget Sound streams and as far inland as the upper reaches of the Yakima River; recorded in streams on the west and south sides of the Olympic Peninsula but not on the north or east sides (Wydoski and Whitney 2003). This lamprey is relatively common in forested coastal basins, such as the Alsea River, and Smith River, Oregon (Gunckel et al 2009), but has largely disappeared from Columbia River basins above Bonneville Dam. In California, western brook lampreys have been recorded mainly from the Sacramento River drainage, including areas as remote as Kelsey Creek above Clear Lake (Lake County), but they are also present above Pillbury Reservoir in the Eel River and in Mark West Creek, a tributary of the Russian River; spawning adults were collected in the Navarro River (Mendocino County) in 1999 (Moyle 2002). Ammocoetes from an extirpated population in the Los Angeles River basin may represent this species (Moyle 2002). Western brook lamprey is easily overlooked and difficult to collect, it is likely that this species occurs in many streams in coastal California (Moyle 2002). Global Rank: G4G5 United States Rank: N4 Canada Rank: N4 State Rank: S1S2 IUCN Red List Category: LC - Least concern (Mecklenburg et al. 2002)
3 Dispersal capability	D	D: Insufficient information to draw inferences about criterion. Freshwater only species. Unknown as to full extent due to lack of data and no emphasis on intentional surveys for this species. Spawning success and survival apparently are high, as ammocoetes of this species are said to be one of the most abundant forms of life in the lower courses of streams in the northwestern United States (Scott and Crossman 1973). Problem culverts may limit dispersal if migration barriers.
4 Abundance on Tongass	D	D: Insufficient information to draw inferences about criterion. The Tongass is the northern edge of this species range with limited locations noted (see #1). Abundant in remainder of range. Ammocoetes are found in eddies of streams where rich deposits of silt, mixed with some sand, settle. Adults

Criteria	*Rank*	*Rationale*
NF		usually take over gravel riffles while spawning (Lee et al. 1980). Where this type of habitat exists and is intact, threats should be low.
5 Population trend on Tongass NF	D	D: Insufficient information to draw inferences about criterion. Population trend unknown within plan area. Too little information, only a few opportunistic sightings to date.
6 Habitat trend on Tongass NF	B	B: Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. Key or important habitats are largely undescribed and unknown in Alaska and on the Tongass. This freshwater, non-parasitic lamprey uses freshwater habitat for its entire life cycle. In general, habitat includes gravel riffles and runs of clear, cool streams (Page and Burr 2011). Ammocoetes are found in eddies of streams where rich deposits of silt and sand settle. Adults usually take over gravel riffles while spawning (Lee et al. 1980). In California, this lamprey occurs in low elevation portions of streams and rivers; likely restricted to the less disturbed portions of streams (Moyle 1976). Spawning occurs in riffles on rock, sand, or gravel stream bottoms. Lampreys spawn in a shallow depression 2 inches deep and 4-5 inches in diameter, at the head of a riffle (Wydoski and Whitney 1979). Potential threats include stream pollution and habitat modification which changes stream flow rates and siltation patterns (Moyle 2002); however, most known habitat in Alaska is likely pristine and the degree of threat is minimal.
7 Habitat vulnerability or modification;	C	C: Habitat resilient, changes are similar in frequency and intensity to those expected from Natural Range of Variability (NRV), and modern stressors not significant. The species is likely unable to withstand severe stream pollution or habitat changes/modifications which changes stream flow rates and siltation patterns (Moyle 2002). No major threats to this species are apparent at this time due to Forest Plan stream protection measures (stream buffers). Any potential reduction of these protection measures in the creation of the new Forest Plan could negatively impact this species' habitat. Some habitat modification has occurred from past

Criteria	*Rank*	*Rationale*
other threats		timber harvest practices, with conditions departed from NRV. However, new disturbance are assumed to be minimal. Passage barriers may pose a threat to migration.
8 Life history and demographics	C/D	C: High reproductive rate and not especially susceptible to disease, predation, or competition; and, species has life history characteristics that suggest populations will have a high ability to recover from disturbance events and no other demographic risk factors are known. D: Insufficient information to draw inferences about criterion in some areas (e.g., northern extent of range), related to unknown status of factors such as reproductive rate, disease, predation, and competition. As a species in general, these lampreys have a high reproductive rate (Scott and Crossman 1973). However, we don't know for certain whether this is the case this far north in their range. Nor do we know the extent of this species susceptibility to disease and predation, or competition for that matter. Ammocoetes are filter feeders; feed on microscopic plant and animal matter, including desmids, diatoms, algae and detritus (Scott and Crossman 1973). Adults do not feed. Spawns day or night, late April to July. Females 4.4 to 7.7 inches long produce 1,100 to 3,700 eggs (Wydoski and Whitney 1979). Eggs hatch in approximately 10 days when at temperatures of 50-60 F. The ammocoete stage lasts up to 6 years. Metamorphosis occurs between August-November. Adults become sexually mature in March and die shortly after spawning (Pletcher 1963). Spawning success and survival apparently are high, as ammocoetes of this species are supposedly of the most abundant forms of life in the lower courses of streams in the northwestern United States (Scott and Crossman 1973).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☒	☐
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☒	☐
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☒	☐

Conclusion Rationale

Significant threats: Threats include upstream pollution, changes to stream flow and siltation patterns, and passage barriers that could affect migration. The current Forest Plan uses stream buffers to protect riparian corridors. Reduction of these protection measures could threaten lamprey habitat. Habitat modification has occurred in the past due to timber harvest practices, but new disturbances are assumed to be minimal.

Declining populations or habitat trends: There is no population trend data for the TNF, but studies of other populations show high spawning rate and survival success. The brook lamprey is a fresh water species that inhabits cool clear streams. The current Forest Plan uses stream buffers to protect riparian corridors. Reduction of these protection measures could threaten lamprey habitat.

Restricted range: The brook lamprey is known from eight locations on the TNF, where it is at the northern extent of its range. Documentation of this species on the forest has been mostly circumstantial, so their true range on the Tongass is unknown. Globally it can be found from SE Alaska down the North American coast into California. This species is easily overlooked and difficult to collect.

Low populations or restricted ecological conditions: Little is known about the population numbers or ecological conditions specific to this species of lamprey on the TNF. Other studied populations show high levels of reproduction and survival success. Their preferred habitat is freshwater streams with riffles and pools and a variety of sediment types. The level of threat this species may face from a stochastic event is uncertain.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

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Oncorhynchus keta

Oncorgynchus keta Walbaum 1792

Chum Salmon (Fish Creek Population)

Global Rank: **G5T2T3Q**

Alaska State Rank: S1S2

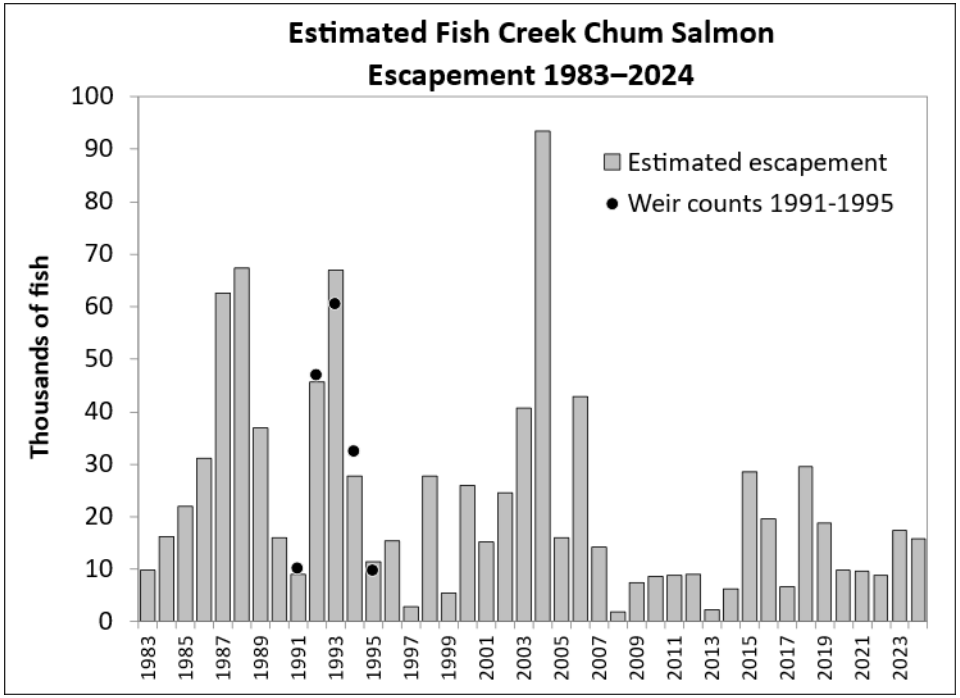
photo: Ken King, U.S. Fish and Wildlife Service

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	A: Scarce or isolated. Habitat or population connectivity is limited. The Fish Creek (ADF&G Cat. No. 101-15-085) chum salmon run is known for its large fish size (Halupka et al 2000; Armstrong and Hermans 2004), although this is a generalization of sorts and unsubstantiated in any existing analysis. Halupka et al 2000 broadly stated that the largest chum salmon in SE Alaska are found in the southern area around Portland Canal, and the Fish Creek stock among the largest in each sex and age category analyzed. Helle (1984) compared Fish Creek chum salmon to only six other North American populations from which to draw his conclusion. Halupka et al. (2000), after analyzing body size data of 46 chum salmon populations in SE Alaska, found that no chum stock in the SE AK region was distinct in terms of body size. Analysis showed that Age 0.4 Fish Creek female chum salmon were over 20 mm longer, on average, than females from other SE Region stocks, but the distribution of body sizes was relatively even and this stock was found not to be an outlier. Halupka et al 2000 analysis was based on mideye-to-fork lengths and not weights. Stock-specific weight data were apparently not available region-wide. Fish Creek runs into the Salmon River near the head of Portland Canal near Hyder, Alaska. Salmon River is a glacial stream with a braided stream bed where Fish Creek enters. In the early 1960's through the mid-1970's annual glacial floods impacted the habitat in the lower reaches of Fish Creek. In the late 1970's dikes were built into the Salmon River to protect the lower Fish Creek and the adjacent road. In 1989, a spawning channel (Marx Creek) was constructed between Fish Creek and the Salmon River in an area protected by the dikes. The spawning channel has been

Criteria	*Rank*	*Rationale*
		lengthened in the years through 2014 improving conditions for chum salmon. These restoration and enhancement activities appear to have been successful in maintaining quality spawning habitat. Monitoring is ongoing. This stock spawns at gravel beds in Fish Creek, SE Alaska. The high quality of spawning gravel and extensive groundwater upwelling appear to contribute to high production. Chum salmon have a preference for spawning locations where upwelling occurs or just upstream of areas of turbulent flow (Salo 1991).
2 Distribution in surrounding geographic area	B	B: Limited distribution outside the Tongass National Forest (Fish Creek population). Species is widespread throughout Alaska and Canada. Fish Creek drainage, southeastern Alaska; Portland Canal and the Pacific Ocean (Morrow 1980). This is one stock. The species as a whole is widely distributed in other parts of Alaska. Global Rank: G5 United States Rank: N4N5 Canada Rank: N5B, N5N State Rank: S1S2 (Fish Creek population), S5 for state as a whole.
3 Dispersal capability	B	B: Disperses only through suitable habitat. Specific stock within Portland Canal, located along the Canadian border in southern Southeast Alaska, near Hyder. Fish Creek is the main occurrence of this population.
4 Abundance on Tongass	B/C	B: Uncommon / C: Common Fixed escapement goals have not been established for Fish Creek by ADF&G due to lack of sufficient information, however the population has generally been monitored through escapement surveys and, at times, weir counts (1991-1995). Estimated escapements of Fish Creek chum salmon have been highly variable and show a downward (but not biologically meaningful according to ADF&G) trend (Heinl 2005).

Criteria	*Rank*	*Rationale*
NF		
5 Population trend on Tongass NF	B	B: Stable population. A general decreasing escapement trend and not considered to be biologically meaningful. Relatively stable (<10% change). The summer chum salmon runs throughout the Portland Canal (both the Canadian and U.S. side) have been noted as being depressed, relative to historical abundance (Pacific Salmon Commission 1991) and were designated as stocks of special concern, with the stocks located on the Canadian side of Portland Canal of greatest concern, by the U.S./Canada Pacific Salmon Treaty. Tagging studies from the late 1980s and early 1990s indicated a fair amount of the harvest on this population occurs in the District 101 gillnet fishery and Canadian gillnet and seine fisheries on the border. The effort in all these fisheries has decreased since that time and Canada has had mandatory chum release periods in recent years during most of the season because of their concerns over northern BC chum stocks. Average effort levels have also dropped dramatically in the District 4 purse seine fishery. The number of boats purse seining in D4 averaged 188 from 1985 through 2004, which dropped to an average of 92 boats from 2005 through 2024. It is assumed harvest rate for Fish Creek chum salmon would also decrease over time but recent years have had above average chum salmon harvests in District 4 despite the drop in number of boats fishing From 1985 through 2004, average common property chum salmon purse seine harvest in D4 was approximately 418,000 fish; the average from 2005 through 2024 was 195,000, and 2021 to 2024 D4 purse seine chum salmon harvests have all been greater than 210,000 fish (about 458,000 in 2023) (Fish, email communication 2025).

Criteria	*Rank*	*Rationale*
		 **Figure (above). Estimated Fish Creek Chum Salmon Escapement counts since 1983 to 2024. Fish and Marx creek has been in a downward trend since 2004.** Escapement estimates from 1971 through 2024 range from 2,919 in 2008 to a high of 93,391 in 2004. There appears to be a general flat trend the past 20 years but decreased from historical abundance which ADF&G does not consider biologically meaningful because Fish Creek chum are harvested in a mixed stock fishery enroute to and far from their natal stream. Because ADF&G cannot accurately assign harvest in mixed stock fisheries to a single system, streams are grouped into larger aggregates where escapement indexes can be accurately assessed and tracked. At this subregion level ADF&G believes the harvest represents most of the fish in the area, and they track escapements to a number of index streams annually to have a year-to-year comparison of escapements and run-strength. 2024 counts are near the long-term and recent 10-year medians (Fish, email communication 2025; figure updated from Heinl et al 2000). To

Criteria	*Rank*	*Rationale*
		date, ADF&G has not recommended any chum salmon stocks in the Portland Canal area be considered as candidates for stock of concern status under the Sustainable Salmon Fisheries Policy. In a wider geographic area, the Southern Southeast stock group (includes Fish Creek area), the sustainable escapement goal over the last four decades for wild summer-run chum salmon has been met most years. More recently, between 2014-2024, escapement indices in the Southern Southeast Subregion were above the escapement goal (Piston and Fish 2024).
6 Habitat trend on Tongass NF	B/C	B: Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. Improving habitat quality or increasing amounts of suitable or potential habitat. The habitat does not appear to be in significant decline. Fish Creek is a low-gradient stream, dominated by high-quality spawning gravels and extensive areas of groundwater upwelling. The predominant upwelling and high-quality spawning gravels appear to be the reasons for the remarkable production levels. Marx Creek spawning channel improvements are intended to increase spawning habitat for this stock. Monitoring associated with that project continues through the Forest Service and in cooperation with ADF&G.
7 Habitat vulnerability or modification; other threats	C	C: Habitat resilient, changes are similar in frequency and intensity to those expected from Natural Range of Variability (NRV), and modern stressors not significant. Potential threats include over-harvest, both commercial and sport, and stream pollution and siltation of spawning areas (Norse 1990). From latest ADF&G information, it appears commercial fishing pressure on this stock has decreased. Based on a tagging study conducted by ADF&G from 1988 to 1995, exploitation rate averaged 56.7% from the years 1991-1995. Since that time, the Pacific Salmon Treaty was revised with language stating no directed net fisheries would be conducted in certain waters of Alaska and Canada in this Portland Canal general area, unless agreed otherwise by the parties. See #5 for additional exploitation information. Chum salmon use the stream environment only for spawning and incubation and young go to sea soon after emergence from the gravel. Habitat for the Fish Creek chum salmon is managed in accordance with the Forest-wide standards and guidelines for wetlands and riparian management. Risks of degradation from land management are expected to be minimal if standards and guidelines are carried over into the new Forest Plan. Additional standards and guidelines for

Criteria	*Rank*	*Rationale*
		chum salmon that apply include coordination with appropriate agencies to protect, maintain, and preserve this run of chum salmon, and to provide for habitat improvement as necessary to maintain the viability of the run. The enhancement of Marx Creek spawning channel, connected to Fish Creek, is designed to increase spawning habitat for this run. Hypotheses on decreased size include changes in oceanographic conditions, increased population density, or other factors (Helle and Hoffman 1998). Smaller size may contribute to lower survival rate.
8 Life history and demographics	C	C: High reproductive rate and not especially susceptible to disease, predation, or competition; and, species has life history characteristics that suggest populations will have a high ability to recover from disturbance events and no other demographic risk factors are known. Chum salmon young go to sea soon after emergence from stream gravels and spend anywhere from 3 to 5 years and although seldom up to 6 years in the ocean, making this species somewhat adjustable to recovery from disturbance events affecting a particular year class. The Fish Creek stock maintains a very restricted distribution. However, this stock was not identified as being genetically distinct and fell into the southern southeast Alaska and northcentral British Columbia clustering according to genetics analysis conducted by Kondzela et al (1994). This cluster was somewhat separated from the North to Central British Columbia cluster but less distinct than that observed between other clusters because several collections overlapped. Chum salmon escapement into Fish Creek have numbered > 60,000 some years (Armstrong and Hermans 2004). The stock is a summer population with protracted run duration and some spawning occurs in warm upwelling areas, likely contributing to the protracted run duration that extends from June to October (Halupka et al 2000). According to Helle and Hoffman (1995), the Fish Creek chum population showed a significant decline in mean length at maturity of all age groups starting in 1980. Additionally, mean age at maturity increased as growth decreased. Age composition has been highly variable with Age -4 and -5 fish typically more abundant than Age -3 fish. After 1985, there was an observed increase in Age -5 fish and Age -6 fish began to play a role in the overall composition (Helle and Hoffman 1995). Environmental change (i.e. oceanographic conditions) or density dependent factors, or a combination of both, are speculated as responsible for the decline in size at maturity and increase in age at maturity (Helle and

Criteria	*Rank*	*Rationale*
		Hoffman 1995; 1998). This general decreasing trend noted into the 1990's appeared to follow a major ocean climate regime shift in the North Pacific Ocean that transpired 1976-1977. However, since the 1990's, there have been increases in some years, perhaps indicating additional changes in ocean conditions (Halle and Hoffman 1998).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☒	☐
Declining populations or habitat trends	☐	☒	☐
Restricted range	☐	☒	☐
Low populations or restricted ecological conditions	☐	☒	☐
Other factors (see conclusion rationale)	☐	☒	☐

Conclusion Rationale

Significant threats: Potential threats include over-harvest, both commercial and sport, and stream pollution and siltation of spawning areas. Harvest of this species is regulated by ADF&G.

Declining populations or habitat trends: Estimated escapements of Fish Creek chum salmon have been highly variable since 1982, with persistent low escapements documented from 2008 to 2014 and a slight increase since 2014. However, ADF&G has not recommended any chum salmon stocks in the Portland Canal area be considered as candidates for stock of concern status under the Sustainable Salmon Fisheries Policy (as of April 2022). In a wider geographic area, the Southern Southeast stock group, wild summer-run chum salmon escapement goals have been met most years over the past four decades, including from 2019 through 2024. Habitat for the Fish Creek chum salmon is managed in accordance with the Forest-wide standards and guidelines for wetlands and riparian management. Risks of degradation from land management are expected to be minimal if standards and guidelines are carried over into the new Forest Plan. Efforts to improve habitat and spawning channel have been undertaken and monitoring is ongoing. The Fish Creek chum salmon was removed from the Regional Forester Sensitive Species list in 2009 because the habitat and population were found not to be in significant decline.

Restricted range: This stock is known from the Fish Creek Drainage on the TNF, to Portland Canal, to the Pacific Ocean. The species as a whole is

widely distributed in other parts of Alaska.

Low populations or restricted ecological conditions: the ADF&G has not recommended that any chum salmon stocks in the Portland Canal area be considered as candidates for stock of concern status under The Sustainable Salmon Fisheries Policy (as of April 2022). Escapement has been low in recent years. This stock relies specifically on the Fish Creek Drainage to complete its life cycle, and the habitat does not appear to be in significant decline. Fish Creek is a low-gradient stream, dominated by high-quality spawning gravels and extensive areas of groundwater upwelling. Spawning channel improvements have been undertaken and are intended to increase spawning habitat for this stock.

Conclusion

☒	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.
☐	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

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Oncorhynchus tshawytscha (pop. 4)

Oncorhynchus tshawytscha Walbaum, 1792

Chinook Salmon (Wheeler Creek run)

Global Rank: **G5T2T3Q**
Alaska State Rank: **S2S3B**

photo: Michael Humling, U.S. Fish and Wildlife Service

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	A1: Habitat is scarce throughout the Forest, indicating strong potential for extirpations, and little likelihood of recolonization. The Wheeler Creek Chinook are a small run of Chinook salmon restricted to Wheeler Creek located on Admiralty Island, southeast of Juneau, in southeast Alaska within the Tongass NF plan area (Morrow 1980; Armstrong and Hermans 1995; Halupka et al 2000). This is one of two known island spawning stocks in southeast Alaska recognized by the Alaska Department of Fish and Game as a viable population. This stock is supposedly restricted to Wheeler Creek. Apparently, juvenile Chinook salmon have only been documented in the east fork of Wheeler Creek, which makes up less than a quarter of the overall system. The Wheeler Creek Chinook migrate to the Pacific Ocean. Wheeler Creek enters the Hawk Inlet approximately three miles southwest of Greens Creek. The last known documentation of chinook salmon in Wheeler Creek was in 2010 by US Forest Service personnel (Kriener 2010) and before that by Brenda Wright from PNW – Juneau in 1993 (Wright 1993). This stream lies primarily in an undeveloped portion of the Admiralty National Monument and would, therefore, likely still possess low numbers of Chinook salmon. The present lack of knowledge and unknown status of these fish prompted the US Forest Service to survey for Chinook salmon in Wheeler Creek in 2009-2010. Although some speculate that the Chinook in Wheeler Creek may be strays, the juveniles and adults documented in the system in 2010 lead us to consider this as a distinct stock (Kriener 2010).

Criteria	*Rank*	*Rationale*
2 Distribution in surrounding geographic area	A	A: Only within the boundaries of the Tongass National Forest (local or regional endemics). Global Rank G5/G5T2T3Q, Alaska State Rank S2S3B (Wheeler Creek run), S4 for state as a whole. Canada Rank: N45B, N5N There are more than 85 identified stocks of Chinook in SE AK according to Halupka et al 2000. Many of these populations are small, with only three rivers receiving runs greater than 10,000 fish, and nine others receiving runs greater than 1,500 fish (Pahlke 2010). However, the Admiralty Island King Salmon River, Wheeler Creek and Greens Creek are the only wild stocks found in island drainages (Armstrong and Hermans 1995, Guthrie III and Wilmot 2004). Up until 2009, these populations of island spawning Chinook salmon on the Tongass National Forest were listed on the Forest Service R10 Regional Forester Sensitive species list (Armstrong and Hermans 1995; USDA 2008). These are all endemic island stocks. Other SE AK Chinook stocks are mainland only.
3 Dispersal capability	B	B: Disperses only through suitable habitat (dispersal areas may or may not be corridors). Spawning primarily occurs in lower 2.4 km of the river in moderate gradient contained channel (MC) and floodplain (FP) channel types accessible to anadromous fish (Wright 1993). A complete anadromous barrier falls is documented in the upper east fork of the drainage. It is speculated that carrying capacity in this system may be such that there really is no population and these fish may be strays from the King Salmon River that irregularly spawn in this system. However, a small number of juvenile Chinook and a few adult Chinook were documented in this system in 2010 (Kriener 2010). Like the King Salmon River Chinook, this run was presumed to return to the river in ripe condition and spawn soon after entering the freshwater environment, potentially spawning in tidally influenced areas (Halupka et al 2000). However, the adults observed in the upper river in 2010 were chrome bright and nowhere near exhibiting spawning sign (Kriener 2010).
4 Abundance on Tongass	D	D: Insufficient information to draw inferences about criterion. Very little information is available for the Wheeler Creek Chinook stock. The population size of the Wheeler Creek stock was considered to be very small (personal communications with Mark Laker, FS Fish Biologist and Alex Werthheimer, NMFS Fish Biologist in 1996 – from Halupka et al 2000). Adult Chinook salmon have been documented in the stream by

Criteria	*Rank*	*Rationale*
NF		local property owners (private cabins) as well as local sport fishers (USFS 2009). Young of year Chinook salmon were observed in Wheeler Creek in July 1993 and again in 2010, but only in the east fork, which makes up less than a quarter of the overall system. Adult Chinook were documented in the upper river near a complete barrier falls in August 2010 (Kriener 2010).
5 Population trend on Tongass NF	D	D: Insufficient information to draw inferences about criterion. Unknown. Due to the restricted distribution of the population, there is some potential for overexploitation. However, there are no targeted fisheries for these Chinook.
6 Habitat trend on Tongass NF	B	B: Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. Wheeler Creek Chinook are anadromous fish that spawn in gravel beds of the Wheeler Creek drainage. The Wheeler Creek watershed is located on National Monument (non-wilderness) Land Use Designation. Natural habitat conditions are to be maintained, and specific Forest-wide standards and guidelines apply. Application of the requirements for the land use designation prescriptions, and Forest-wide standards and guidelines to sustain habitat conditions, would not result in any effects on this stock.
7 Habitat vulnerability or modification; other threats	B	B: Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors. Thermal regimes, increased siltation in freshwater environment, and flood intensity affecting spawning gravels may be of the most significant habitat features affecting Chinook salmon production. In smaller watersheds such as the Wheeler Creek watershed, the consequences of a blockage from a landslide, either natural or human-caused, may be more severe and threaten the existence of this stock (Halupka et al 2000). According to Halupka et al 2000, Chinook stocks in SE Alaska, including this one, do not face serious risks so long as pristine habitats are maintained and conservative harvest strategies are followed (Halupka et al 2000). Overexploitation is a potential risk.

Criteria	*Rank*	*Rationale*
		Multiple climate change factors have the potential to impact Chinook salmon. For example, due to long residence time in freshwater, increased freshwater water temperatures may negatively impact Chinook salmon, especially the rearing life stage (EcoAdapt 2014).
8 Life history and demographics	B	B: Low reproductive rate or high mortality (e.g., susceptible to disease, predation, or competition), but not both; OR life history characteristics that suggest populations have an intermediate ability to recover from disturbance events and no other demographic risk factors are known. This stock is considered to have distinctive characteristics in that it inhabits an island drainage. Apparently, like the King Salmon River stock, this stock is presumed to enter freshwater in ripe condition and that some spawning occurs in tidally influenced areas. This makes this stock available to local sport and commercial fisheries throughout an even longer period than other SE stocks. While there are currently no targeted commercial or sport fisheries for this stock, it is likely that fish are taken incidentally in recreational sport fish, drift gillnet, and troll fisheries in marine waters in the region (Der Hovanisian et al 2011). The 'stream-type' Chinook salmon stocks in SE AK typically spend one year in freshwater prior to smolting to the ocean environment. Reproductive success for Chinook is of the lowest of all salmonids. Coupled with low escapement numbers in any one year, there is some risk of this stocks ability to rebound from stochastic or human-caused population reductions. Genetic analysis is needed on this stock to determine whether it is just strays from other systems or a unique stock of Chinook salmon. An insufficient number of samples were acquired in 2010 collection.

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☒	☐

Conclusion Rationale

Oncorhynchus tshawytscha (pop. 4**)** is not recommended as a Species of Conservation Concern based upon the following:

- Gulf of Alaska Chinook Salmon is a candidate species for listing under the Endangered Species and therefore does not meet the criteria for species of conservation concern.
- Significant threats – Thermal regimes, increased siltation in freshwater environment, and flood intensity affecting spawning gravels may be of the most significant habitat features affecting Chinook salmon. Chinook stocks in SE Alaska, including this one, do not face serious risks so long as pristine habitats are maintained, and conservative harvest strategies are followed. Overexploitation may be a potential threat.
- Declining populations or habitat trends – Population trend is unknown. Habitat falls within a Wilderness Land Use Designation and therefore receives additional protections from management actions. Application of the Land Use Designation type prescription and Forest-wide standards and guidelines to sustain habitat conditions would not result in any effects on this stock.
- Restricted range – Endemic to Admiralty Island.
- Low populations or restricted ecological conditions – Very little information is available for the Wheeler Creek Chinook stock. However, the population size of the Wheeler Creek stock is considered to be very small. Spawning primarily occurs in the lower 2.4 km of the river. Juvenile Chinook salmon have only been documented in the east fork of Wheeler Creek, which makes up less than a quarter of the overall system. This stock is considered to have distinctive characteristics in that it inhabits an island drainage.
- Other factors - It is speculated that carrying capacity in this system may be such that there really is no population and these fish may be strays from the King Salmon River that irregularly spawn in this system. Genetic analysis is needed on this stock to determine whether it is just strays from other systems or a unique stock of Chinook salmon.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

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Oncorhynchus tshawytscha (pop. 5)

photo: Ryan Haggerty, U.S. Fish and Wildlife Service

Oncorhynchus tshawytscha Walbaum, 1792

Chinook Salmon (King Salmon River run)

Global Rank: **G5T2T3Q**
Alaska State Rank: S2S3B

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	A2: Habitat or population connectivity is limited due to factors such as environmental gradients, introduced species, disease, habitat loss, or habitat degradation. Dispersal among patches is limited or not possible. Population 5 consists of a small run of chinook salmon restricted to King Salmon River located on Admiralty Island, southeast of Juneau, in southeast Alaska within the Tongass NF plan area (Morrow 1980).
2 Distribution in surrounding geographic area	A	A: Only within the boundaries of the Tongass National Forest (local or regional endemics). Global Rank G5/G5T2T3Q, Alaska State Rank S2S3B (King Salmon River run), S4 for state as a whole. King Salmon River run of Chinook salmon considered as a "Stock of Concern" by the Alaska Department of Fish and Game as of 2017 (reviewed 2020) for the following categories: 1) Yield, 2) Management, and 3) Conservation. Canada Rank: N45B, N5N Endemic to Admiralty Island. Chinook eggs were taken from the King Salmon River chinook drainage as part of enhancement for chinook salmon in response to the depressed status of southeast Alaska chinook stocks. This stock has been used at Port Armstrong Jetty Lake (Baranof Is.), Little Port Walter Sashin Creek (Baranof Is.), Crystal Lake, Snettisham Speel Arm, and DIPAC Salmon and Sheep Creek hatcheries with various release sites throughout the Tongass (Halupka et al 2000).

Criteria	*Rank*	*Rationale*
		There are more than 85 identified stocks of chinook in SE AK according to Halupka et al 2000. Many of these populations are small, with only three rivers receiving runs greater than 10,000 fish, and nine others receiving runs greater than 1,500 fish (Pahlke 2010). However, the Admiralty Island King Salmon River, Wheeler Creek, and Greens Creek are the only wild stocks found in island drainages (Armstrong and Hermans 1995, Guthrie III and Wilmot 2004). Up until 2009, these populations of island spawning chinook salmon on the Tongass National Forest were listed on the Forest Service R10 Regional Forester Sensitive species list (Armstrong and Hermans 1995; USDA 2008).
3 Dispersal capability	B	B: Disperses only through suitable habitat (dispersal areas may or may not be corridors). The King Salmon River chinook are anadromous, breeding and spawning in King Salmon River, Southeastern Alaska, and migrating to the Pacific Ocean. Spawning primarily occurs in lower 4.8 km of the river but in years with large escapements, the fish push farther upstream up to the total available 7.4 km anadromous habitat. King Salmon River chinook return to the river in ripe condition and spawn soon after entering the freshwater environment, potentially spawning in tidally influenced areas (Halupka et al 2000).
4 Abundance on Tongass NF	B	B: Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat. King Salmon River is surveyed annually by ADF&G using a combination of helicopter and foot surveys to count adult chinook salmon. It is also one of the model stocks for Southeast Alaska which is part of the coast wide Chinook Salmon abundance index estimated by the Chinook Technical Committee (CTC which is associated with the Pacific Salmon Committee). Peak counts of large adult chinook salmon have been collected annually using a standardized method (Richards and Johnson 2013). Ten years of concurrent weir and index count data were used to estimate the expansion factor of 1.52. Peak counts and resulting estimates of total escapement are used by ADF&G and CTC to evaluate stock status and implement abundance-based management of this stock. Spawning escapement averaged 178 fish between 1974 - 2013 and 145 between 2006 - 2013 with a high of 394 estimated in 1982. In 1981, ADF&G established a peak index escapement goal of 200 large fish, based on maximum counts of 200 spawners in 1957 and 211 spawners in 1973. In the mid-1980s, the goal was revised to 250 large spawners counted through the weir that was operated at the time. The current biological escapement goal (BEG) range of 120 – 240 large spawners (> 660 mm MEF size (3+ ocean age)) was established in 1997, based on a stock-recruit analysis of 1971–1991 brood year data (McPherson and Clark 2001).

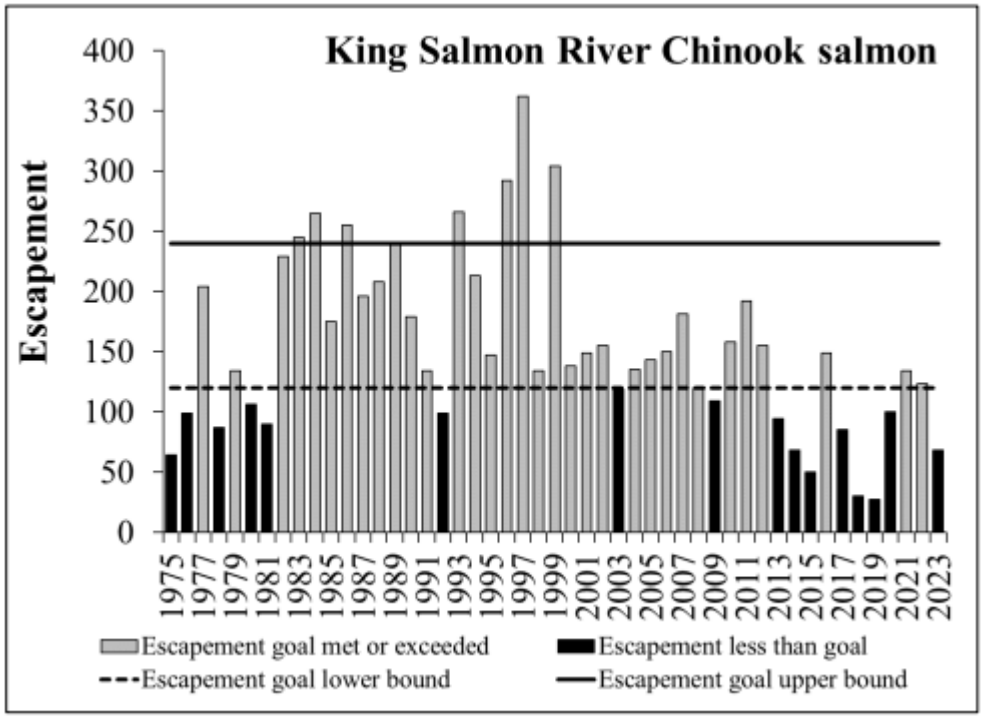
Criteria	*Rank*	*Rationale*
		Summary from Hagerman et al. (2022): Since 1975, Chinook salmon escapements in the King Salmon River have averaged 157 fish. Escapements during the recent 10-year period (2011–2020) averaged 95 Chinook salmon (range 27-192) and the recent 5-year period (2016–2020) averaged 78 Chinook salmon (range 27-149). King salmon escapements to the King Salmon River over the last 5 years, including the 2020 estimate, have been below the lower bound of the BEG in every year except 2016 (149). See tabled below.

Table 4.–Escapement index counts, escapement estimates of large (≥660 mm MEF) spawners, and expansion factors for King Salmon River Chinook salmon population from 1975 to 2014, in Southeast Alaska.

Year	Survey counts	Spawning escapement	Expansion factor
1975	42	64 [a]	–
1976	65	99 [a]	–
1977	134	204 [a]	–
1978	57	87 [a]	–
1979	88	134 [a]	–
1980	70	106 [a]	–
1981	101	154 [a]	–
1982	259	394 [a]	–
1983	183	245 [b]	1.17
1984	184	265 [b]	1.37
1985	105	175 [b]	1.57
1986	190	255 [b]	1.25
1987	128	196 [b]	1.38
1988	94	208 [b]	2.02
1989	133	240 [b]	1.59
1990	98	179 [b]	1.74
1991	91	134 [b]	1.38
1992	58	99 [b]	1.71
1993	175	266 [a]	–
1994	140	213 [a]	–
1995	97	147 [a]	–
1996	192	292 [a]	–
1997	238	362 [a]	–
1998	88	134 [a]	–
1999	200	304 [a]	–
2000	91	138 [a]	–
2001	98	149 [a]	–
2002	102	155 [a]	–
2003	78	119 [a]	–
2004	89	135 [a]	–
2005	94	143 [a]	–
2006	99	150 [a]	–
2007	119	181 [a]	–
2008	79	120 [a]	–
2009	72	109 [a]	–
2010	104	158 [a]	–
2011	126	192 [a]	–
2012	102	155 [a]	–
2013	62	94 [a]	–
2014	45	68 [a]	
Averages:			
1975–2014	116	178	–
2006–2014	90	136	–

Above table from Johnson and Sanguinetti 2015.

Criteria	*Rank*	*Rationale*



Above figure from Priest et al 2024

Table (below). Escapement* of large (> age 5) Chinook salmon from the King Salmon River, 2011-2020.

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	5-year avg.	10-year avg.
Escapement	192	155	94	68	50	149	85	30	27	100	78	95

*The biological escapement goal (BEG) range for King Salmon River Chinook salmon is 120 to 240 large Chinook salmon.

Above table from Hagerman et al. 2022.

Criteria	*Rank*	*Rationale*
5 Population trend on Tongass NF	A	A: Significant downward or suspected downward population trend. This stock was assessed for trends in escapement in an ADF&G study spanning data from 1960-1993 and showed a significant decline based on weir counts (9 years) but found to be stable based on intensive surveys (24 years) (Halupka 2000). Because data from weir counts are generally more reliable than data from helicopter surveys, and because of the distinctive nature of the King Salmon River stock, this stock was considered by Halupka et al 2000 to have a significant decline. Decline was speculated to be associated with weir operations, including egg takes, as well as increased sport harvest (Halupka et al 2000). As shown in section 4 (above) escapement trends were not being met during the majority of years between 2011-2020. Between 2019 and 2023, 2 of 5 years were within the lower bound of the escapement goal range.
6 Habitat trend on Tongass NF	B	B: Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. The King Salmon River watershed is located on National Monument (non-wilderness) Land Use Designation. Natural habitat conditions are to be maintained, and specific Forest-wide standards and guidelines apply. Application of the Land Use Designation type prescription and Forest-wide standards and guidelines to sustain habitat conditions would not result in any effects on this stock.
7 Habitat vulnerability or modification; other threats	B	B: Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors. Thermal regimes, increased siltation in freshwater environment, and flood intensity affecting spawning gravels may be of the most significant habitat features affecting Chinook salmon production. In smaller watersheds such as the King Salmon River watershed, the consequences of a blockage from a landslide, either natural or human-caused, may be more severe and threaten the existence of this stock (Halupka et al 2000). According to Halupka et al 2000, Chinook stocks in SE Alaska, including this one, do not face serious risks so long as pristine habitats are maintained and conservative harvest strategies are followed (Halupka et al 2000). Overexploitation is a potential risk. Multiple climate change factors have the potential to impact Chinook salmon. For example, due to long residence time in freshwater, increased freshwater water temperatures may negatively impact Chinook salmon, especially the rearing life stage (EcoAdapt 2014).

Criteria	*Rank*	*Rationale*
8 Life history and demographics	B	B: Low reproductive rate or high mortality (e.g., susceptible to disease, predation, or competition), but not both; OR life history characteristics that suggest populations have an intermediate ability to recover from disturbance events and no other demographic risk factors are known. This stock is considered to have distinctive characteristics in that it inhabits an island drainage and has distinctively early run timing. Apparently, this stock enters freshwater in ripe condition and that some spawning occurs in tidally influenced areas. This makes this stock available to local sport and commercial fisheries throughout an even longer period than other SE stocks. While there are currently no targeted commercial or sport fisheries for this stock, fish are taken incidentally in recreational sport fish, drift gillnet, and troll fisheries in marine waters in the region (Der Hovanisian et al 2011). The 'stream-type' chinook salmon stocks in SE AK typically spend one year in freshwater prior to smolting to the ocean environment. Reproductive success for chinook is of the lowest of all salmonids. Coupled with low escapement numbers in any one year, there is some risk of this stocks ability to rebound from stochastic or human-caused population reductions. Of the fish used for enhancement operations from 1979-1992, the fish tested for disease had a low incidence of bacterial kidney disease and no incidence of IHNV or Viral Hemorrhagic Septicemia Virus (VHSV) (Josephson et al 1993). Age-sex-length data collection has been collected for a period of years and was planned for this stock during 2015 by ADF&G (Johnson and Sanguinetti, 2015). Review of this data will be crucial, especially in regard to decreasing size and changes in age composition of this stock which might be cause for additional management action.

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☒	☐	☐
Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☒	☐

Conclusion Rationale

Oncorhynchus tshawytscha (pop. 5**)** is not recommended as a Species of Conservation Concern based upon the following:

- Gulf of Alaska Chinook Salmon is a candidate species for listing under the Endangered Species and therefore does not meet the criteria for species of conservation concern. If the National Marine Fisheries Service determines ESA listing is not warranted, the King Salmon River run should be considered as a species of conservation concern.
- Significant threats – Thermal regimes, increased siltation in freshwater environment, and flood intensity affecting spawning gravels may be of the most significant habitat features affecting Chinook salmon. At this time, this stock may not be at immediate short-term risk based on knowledge of its abundance, lack of threats to persistence, trends in habitat, and responses to management.
- Declining populations or habitat trends – The escapement estimates are somewhat variable for this population and the general trend appears to be downward. The Alaska Department of Fish and Game (ADF&F) added the King Salmon River Chinook salmon population to the "Stocks of Concern" list in 2017 (reviewed 2024), including the categories of Yield, Management, and Conservation. Habitat falls within a Wilderness Land Use Designation and therefore receives additional protections from management actions. Application of the Land Use Designation type prescription and Forest-wide standards and guidelines to sustain habitat conditions would not result in any effects on this stock.
- Restricted range – Endemic to Admiralty Island.
- Low populations or restricted ecological conditions – King salmon escapements to the King Salmon River over the last 5 years have been below the lower bound of the BEG in every year except 2021 and 2022. This stock is considered to have distinctive characteristics in that it inhabits an island drainage and has distinctively early run timing.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.
☐	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.

☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.
☒	Other: The National Marine Fisheries Service was petitioned to list Gulf of Alaska Chinook salmon and the species' status is currently under review; therefore, Chinook salmon is an ESA-candidate species. As a result, it cannot be recommended as an SCC at this time.

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Stygobromus quatsinensis

Stygobromus quatsinensis Holsinger and Shaw 1987

Quatsino Cave Amphipod

Global Rank: **G1**

Alaska State Rank: S2S3

photo: Eli Wolpin

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	A2: Habitat or population connectivity is limited due to factors such as environmental gradients, introduced species, disease, habitat loss, or habitat degradation. Dispersal among patches is limited or not possible. *Stygobromus quatsinensis* is only known from karst groundwater habitats on coastal islands adjacent to Prince of Wales Island but full distribution information is likely incomplete. *Stygobromus quatsinensis* has been found on the outer islands of Southeast Alaska including Dall, Coronation, Heceta (Nautilus Cave), Baker, and Suemez (Carlson 1994, 1996, 1997; Holsinger et al. 1997). The occurrence on Coronation Island represents the high latitude record for any troglobitic species in this hemisphere (Holsinger et al 1997). There are only a small number of caves and resurgent springs that have been inventoried (20-30), and there have been no resurveys of sites where occurrences were originally documented.
2 Distribution in surrounding geographic area	D	D: Insufficient information to draw inferences about criterion. Global Rank G1, Alaska State Rank S2S3 Cave-adapted invertebrate habitats within karst landscapes are scattered throughout Alaska but have been best studied in Southeast Alaska. On a global scale, karst landscapes are generally rare. This species was initially identified in caves on coastal Vancouver Island, BC (Wang 2001). Vancouver Island, BC has been isolated from mainland North America for around 40 million years. The known distribution may be the result of subterranean communities remaining stable

Criteria	*Rank*	*Rationale*
		through periods of glacial coverage (cave-adapted fauna are perhaps the only invertebrates that could survive glaciation in situ) or radiation from existing southern mainland populations after glaciers receded (Holsinger and Shaw 1987; Carlson 1997). Recent description of this species and its distribution suggests new occurrences may be found in the future; further exploration of freshwater cave and karst aquatic habitats should be undertaken to establish full geographic range.
3 Dispersal capability	A	A: Very limited dispersal ability (restricted dispersal capability coupled with ephemeral habitats). This organism is geographically constrained to certain karst areas and thus has limited to no dispersal capability between locations. Balogh et al. (2020), using population genomics, found cave-obligate invertebrates' dispersal extremely limited between caves.
4 Abundance on Tongass NF	B	B: Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat. A study of aquatic and terrestrial cave-associated invertebrates in Southeast Alaska found overall species abundance and richness decreased as collection sites progressed east to west and from north to south, with most abundance closer to Prince of Wales Island and mainland Alaska. Overall abundance per collection site was low (<10 organisms) (Carlson 1997a). Recent description of this species and its distribution suggests new occurrences of *Stygobromus quatsinensis* may be found in the future; further exploration of freshwater cave and karst aquatic habitats should be undertaken to establish full geographic range.
5 Population trend on Tongass NF	D	D: Insufficient information to draw inferences about criterion. Population trend is unknown. However, cave-adapted species are probably the most sensitive of all invertebrates to disturbance or impact due to their extremely specific habitat requirements and physiological traits which make them unable to compete with terrestrial/surface dwelling invertebrates (Carlson 1997b). Where surveys have been conducted, small numbers (< 10) were noted. There have been only a very small number of caves and resurgent springs that have been inventoried (20-30) and there have been no resurveys of sites where occurrences were originally documented.

Criteria	*Rank*	*Rationale*
6 Habitat trend on Tongass NF	B	B: Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. *Stygobromus quatsinensis* occurs in resurgence areas of limestone caves or karst formations, in cave streams, springs or drip pools with substrates of mud, pebble, cobble or bare rock. Water bodies are characterized by small amounts of organic matter, low temperatures (3.0-8.5°C) and pH of approximately 7.5-8.0 (Holsinger and Shaw 1987, Carlson 1997a, Carlson 1997c). Organic matter enters karst system in runoff, seeps, and streams, which is broken down by microscopic organisms, and provides nutrients and energy to cave inhabitants (Carlson 1997b). Generally, the condition of the cave habitat is pristine, although several caves have been degraded due to human visitation, past timber harvest, and associated road construction. Further, karst sinkhole features in young-growth areas may be more vulnerable. The same levels of protection that occur on federal lands may not be the case on other land ownerships within the bounds of Southeast Alaska.
7 Habitat vulnerability or modification; other threats	B	B: Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors. Subaquatic habitat vulnerabilities include silting, sediment production and debris accumulation, and flooding that could alter water infiltration rates; geochemical changes to groundwater pH due to increased outwash from runoff due to the surface activities; and poorly planned road drainage causing groundwater contamination from roading outwash and sediment transport into karst systems. Because this species has a very limited habitat type (requires aquatic subterranean habitats with specific temperature range and pH range); has a low reproductive rate; presumably low tolerance to contaminants; and recruitment from outside the system is non-existent, it has less ability to recover from population declines as it may not recover rapidly from disturbance events. Federal Cave Resources Protection Act of 1988 safeguards caves on federal lands by regulating use, requiring permits for removal of cave resources, prohibiting destruction, and allowing for cave locations to remain confidential and requiring that caves be included in land management plans.
8 Life history	A	A: Low reproductive rate and high mortality (such as: susceptible to disease, predation, or competition); OR life history characteristics that suggest populations may not recover rapidly from disturbance events or other demographic risk factors are of concern.

Criteria	*Rank*	*Rationale*
and demographics		*Stygobromus quatsinensis* is a blind, unpigmented subterranean amphipod. It is a medium sized groundwater species distinguished by the presence of 2 or 3 submarginal setae on the distal part of the posterior margin of propod of gnathopod 1, inserted below defining angle; and absence of distal peduncular process on uropod 1 of males (Wang 2001). Females are up to 7 mm long, while males are 6.3 mm long. Males and females are generally similar except for slight differences in gnathopod and uropod appendages (Holsinger and Shaw 1987). *Stygobromus quatsinensis* is understood to be a predator-scavenger of organic matter that falls below the surface of cave drip pools and streams (Carlson, 1997b). This species is generally thought to have a low reproductive rate and is one of the most sensitive to disturbance or impact. It's extremely specific habitat requirements and physiological traits make it unable to compete with terrestrial/surface-dwelling invertebrates (Carslon 1997b). It is sensitive to changes in water chemistry (temperature and pH in particular) and water quality. However, additional research is needed to determine life history and specific habitat requirements. Overall, there is little information to assess the degree of adaptability of this species to rebound from stochastic population reductions. Genetic studies are needed to establish dispersal timing and provide information on colonization of offshore islands (Shaw and Davis 2000).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☒	☐	☐

Conclusion Rationale

Stygobromus quatsinensis is not recommended as a Species of Conservation Concern based upon the following:

- Significant threats – Subaquatic habitat vulnerabilities include silting, sediment production and debris accumulation, and flooding that could alter water infiltration rates; geochemical changes to groundwater pH due to increased outwash from runoff due to the surface

activities; and poorly planned road drainage causing groundwater contamination from roading outwash and sediment transport into karst systems. However, there is no information indicating these threats are currently impacting *Stygobromus quatsinensis* populations.

- Declining populations or habitat trends – Population trend is unknown. Cave habitat is generally pristine, although several caves have been degraded due to human visitation, past timber harvest, and associated road construction.
- Restricted range – Within the Tongass NF, *Stygobromus quatsinensis* is known from karst groundwater habitats on coastal islands adjacent to Prince of Wales Island. Cave-adapted invertebrate habitats within karst landscapes are scattered throughout Alaska but have been best studied in Southeast Alaska. On a global scale, karst landscapes are generally rare. This species was initially identified in caves on coastal Vancouver Island, BC.
- Low populations or restricted ecological conditions – *Stygobromus quatsinensis* is only known from karst groundwater habitats. There are only a small number of caves and resurgent springs that have been inventoried (20-30), however inventories reported small numbers (< 10) of *Stygobromus quatsinensis*. Recent description of this species and its distribution suggests new occurrences may be found in the future; further exploration of freshwater cave and karst aquatic habitats should be undertaken to establish full geographic range.
- Other factors - Because this species has a very limited habitat type (requires aquatic subterranean habitats with specific temperature range and pH range); has a low reproductive rate; presumably low tolerance to contaminants; and recruitment from outside the system is non-existent, it has less ability to recover from population declines as it may not recover rapidly from disturbance events.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

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