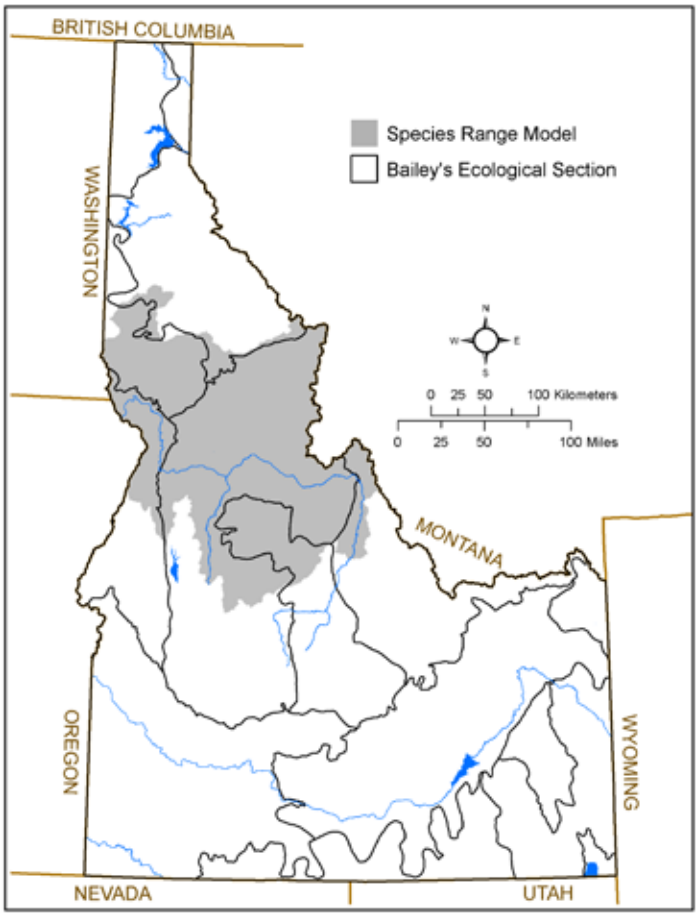
Pacific Lamprey

Entosphenus tridentatus



Class: Petromyzontida
Order: Petromyzontiformes
Family: Petromyzontidae

CONSERVATION STATUS & CLASSIFICATION
ESA: No status
USFS:
Region1: No status
Region 4: No status
BLM: Type 2
IDAPA: Endangered Species
G-rank: G4
S-rank: S1

SGCN TIER: 1
Rationale: Low population size, documented significant decline, IDAPA Endangered Species

DISTRIBUTION & ABUNDANCE
Range Extent in Idaho: 43,900 km² (~16,900 mi²)
Key Ecological Sections: Beaverhead Mountains, Bitterroot Mountains, Challis Volcanics, Idaho Batholith, Palouse Prairie
Population Size in Idaho: 50–250
Description: Pacific Lamprey were historically widespread along the West Coast of the US from Baja California to the Aleutian Islands, but populations have declined in abundance and distribution throughout Californa, Oregon, Washington, and Idaho. In Idaho, the species was originally distributed in all drainages of the Snake River below Shoshone Falls, except the Palouse River. It is now restricted to the Clearwater and Salmon River drainages and tributaries of the Snake River below Hells Canyon Dam. Once an abundant species used by native peoples for food, Pacific Lamprey now number less than a few hundred.

HABITAT & ECOLOGY
Environmental Specificity: Moderate: Generalist—some key requirements are scarce.
Description: In spring, adults spawn at the upstream end of riffle habitat in small, gravel-bottomed streams, and die within days. The larvae or ammocoetes hatch, drift downstream and burrow into silt or sand in areas having low-velocity current where they live for 5 or more years as filter feeders. Ammocoetes transform into macrothalmia (juvenile phase) over several months, developing eyes and teeth, before beginning their migration downstream to the ocean in winter and early spring. They spend 1-3 years in the ocean as a fish parasite before beginning upstream migration into freshwater in late spring. They overwinter in freshwater until they spawn the following spring.

POPULATION TREND
Short-term Trend: Decline 10–30%
Long-term Trend: Decline >90%
Description: Counts of adults returing to Idaho and eastern Oregon at Ice Harbor Dam in the lower Snake River decreased from >40,000 to <1000 fish after the dam was built. Since 1998, there have not been more than 300 adults counted at Lower Granite Dam, and most years less than 100 adults.

THREATS
Overall Threat Impact: High
Intrinsic Vulnerability: Highly vulnerable
Description: The primary factor affecting the persistence of Pacific Lamprey in Idaho is the design of adult fish passage facilities at hydroelectric projects in the Columbia and Snake Rivers.

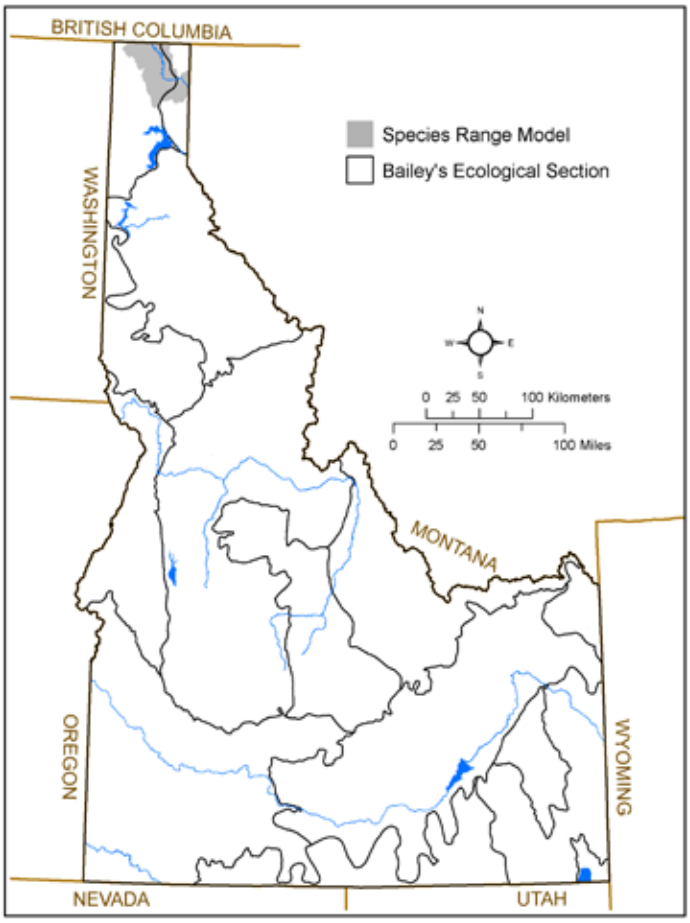
CONSERVATION ACTIONS
Conservation issues and management actions for the species are described in several documents including the IDFG Fisheries Management Plan 2013-2018, Northwest Power and Conservation Council's Columbia River Basin Fish and Wildlife Program 2014, and the Pacific Lamprey Assessment and Template for Conservation Measures.

ADDITIONAL COMMENTS
Pacific Lamprey were petitioned for listing under the ESA in 2003. In 2004, the USFWS found that the petition did not provide the required information to indicate that listing the species may be warranted. Idaho became a signatory to the Pacific Lamprey Conservation Initiative in 2012. The Initiative was developed to promote implementation of conservation measures for Pacific Lamprey in Alaska, Washington, Oregon, Idaho and California.

Information Sources: Cochnauer, T. and C. Claire. 2009. Evaluate status of Pacific lamprey in the Clearwater and Salmon River drainages, Idaho. Draft Conservation Plan. Project No. 2000-028-00. Technical Report prepared for US Department of Energy, Bonneville Power Administration, Portland, OR.; USFWS. 2012. Conservation Agreement for Pacific Lamprey (*Entosphenus tridentatus*) in the States of Alaska, Washington, Oregon, Idaho, and California. USFWS, Portland, OR.; Idaho Department of Fish and Game. 2013. Fisheries Management Plan 2013-2018. Idaho Department of Fish and Game, Boise, ID.; Idaho Department of Fish and Game. 2011. The status of Pacific lamprey (*Entosphenus tridentatus*) in Idaho. Boise, ID.
Map Sources: Idaho Department of Fish and Game. Idaho Fish and Wildlife Information System, Fish Distribution Database, accessed August 15, 2015.

White Sturgeon [Kootenai River DPS]

Acipenser transmontanus pop. 1



Class: Actinopterygii
Order: Acipenseriformes
Family: Acipenseridae

CONSERVATION STATUS & CLASSIFICATION
ESA: Endangered
USFS:
Region1: No status
Region 4: No status
BLM: Type 1
IDAPA: Endangered Species
G-rank: G4T1Q
S-rank: S1

SGCN TIER: 1
Rationale: Limited range, multiple threats, ESA listed

DISTRIBUTION & ABUNDANCE
Range Extent in Idaho: 2,200 km² (~800 mi²)
Key Ecological Sections: Flathead Valley, Okanogan Highlands
Population Size in Idaho: 250–1,000
Description: The White Sturgeon occurs in large rivers in the Pacific Northwest from central California to southwest Alaska. The Kootenai River population has been geologically isolated from other populations since the last ice age. The population ranges from Kootenay Lake in British Columbia up the Kootenai River through Idaho to Kootenai Falls in Montana.

HABITAT & ECOLOGY
Environmental Specificity: Very narrow: Specialist—key requirements are scarce.
Description: The White Sturgeon is the largest freshwater fish in North America with the largest verified record being a 630 kg (1387 lb) fish caught during 1897. Large adults generally occur in the larger, deeper pools of main river channels. Juveniles and subadults seasonally occupy sloughs off the main channel. In the Columbia River, young-of-the-year fish occur in 12-27 m (39-88 ft) of water. Individuals reach sexual maturity at ages 9-16 years, corresponding to lengths of about 1.2 m (4 ft) for males and 1.8 m (6 ft) for females. Females do not spawn annually but repeat spawning at intervals of 3-11 years, depending on food availability. Spawning occurs during the spring at water temperatures of 8-19°C (48-63°F), normally in areas with fast current, such as rapids or areas with hard substrates. The White Sturgeon is primarily a benthic feeder. Juveniles feed opportunistically on amphipods, clams, insects, and fish eggs while larger individuals also eat fish, crayfish, and other large items.

POPULATION TREND
Short-term Trend: Decline 10–30%
Long-term Trend: Decline 70–80%
Description: The Kootenai River White Sturgeon population has been in general decline since the mid-1960s. In 1997, the population size was estimated at 2,439 fish, with most individuals greater than 25 years of age, and the wild population was augmented with 2,283 hatchery-produced juveniles. By 2011, only an estimated 990 adults remained, with no significant recruitment of juveniles since at least 1974. The current population now consists of the remnant wild population along with hatchery produced juveniles that are estimated to number around 12,000–15,000. Juveniles have been produced from captured wild broodstock at the Kootenai Tribal Hatchery since 1992.

THREATS
Overall Threat Impact: High
Intrinsic Vulnerability: Highly vulnerable
Description: The primary threat to this population is habitat loss and degradation due to the construction of Libby Dam in 1972 and resulting altered river flow patterns and reduced river productivity. The development of agricultural lands has resulted in a loss of habitat for juvenile fish; dikes constructed along the river channel to prevent flooding eliminated slough backwaters which has caused a decline in juvenile recruitment. Excessive levels of pollutants in the 1950s and 1960s may have also reduced reproduction.

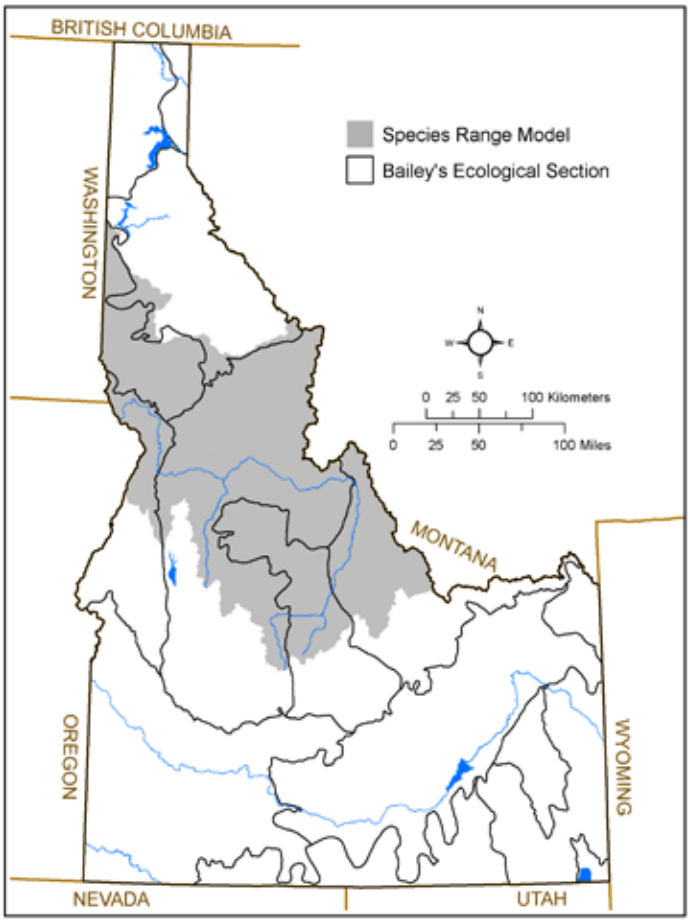
CONSERVATION ACTIONS
Conservation issues and management actions for the species are described in the appropriate section plans. In short, recommended strategies to restore habitat required for natural reproduction include adopting operational guidelines for Libby Dam that provide suitable flows and temperatures for successful recruitment, coordinating planning and implementation of annual flow proposals among involved agencies, monitoring the effects of flow augmentation, and continuing to refine a genetically-sound White Sturgeon conservation aquaculture program.

ADDITIONAL COMMENTS
This population of White Sturgeon was listed as Endangered under the ESA in 1994.

Information Sources: Wydoski and Whitney 2003; USFWS. 1999. Recovery Plan for the White Sturgeon (*Acipenser transmontanus*): Kootenai River Population. US Fish and Wildlife Service, Portland, OR.; Paragamian, V. L. 2012. Kootenai River white sturgeon: synthesis of two decades of research. Endangered Species Research 17:157-167; Beamesderfer, R, T Garrison, and P Anders. 2014. Abundance and survival of the remnant Kootenai River White Sturgeon population. SP Cramer and Associates Subcontract Report
Map Sources: Idaho Department of Fish and Game. Idaho Fish and Wildlife Information System, Fish Distribution Database, accessed August 15, 2015.

Steelhead [Snake River Basin DPS]

Oncorhynchus mykiss pop. 13



Class: Actinopterygii
Order: Salmoniformes
Family: Salmonidae

CONSERVATION STATUS & CLASSIFICATION
ESA: Threatened
USFS:
Region1: No status
Region 4: Threatened
BLM: Type 1
IDAPA: Game Fish, Threatened Species
G-rank: G5T2T3Q
S-rank: S2S3

SGCN TIER: 1
Rationale: Multiple threats, listed as Threatened under ESA

DISTRIBUTION & ABUNDANCE
Range Extent in Idaho: 57,600 km² (~22,200 mi²)
Key Ecological Sections: Beaverhead Mountains, Blue Mountains, Challis Volcanics, Idaho Batholith, Palouse Prairie
Population Size in Idaho: 10,000–100,000
Description: Steelhead are native Rainbow/Redband Trout that migrate to the ocean as juvenile fish and return to fresh water as adults to spawn. Historically, Steelhead had access to most of the Clearwater, Salmon, Weiser, Payette, Boise, Owyhee, Bruneau and Salmon Falls Creek drainages in Idaho. However, populations using the tributaries above Hells Canyon Dam were eliminated with the construction of the Hells Canyon complex in the 1950s. Access to the North Fork Clearwater River is blocked by Dworshak Dam. Currently, wild and hatchery Steelhead are found in the Snake River below Hells Canyon Dam, Clearwater, and Salmon River drainages.

HABITAT & ECOLOGY
Environmental Specificity: Moderate: Generalist—some key requirements are scarce.
Description: Steelhead spawn and rear in stream and small river habitat. Successful egg development and fry emergence depends on clean gravels. The majority of Steelhead returning to Idaho cross Lower Granite Dam during August-October and over winter in main-stem rivers before spawning the next spring. Spawning occurs in March–May, with fry emergence in mid-summer. Depending on elevation, temperature and stream productivity, Steelhead juveniles will rear in streams for 1–7 years (commonly 2–3) and attain a size of 15–23 cm (6–9 in) before migrating to the ocean. Steelhead remain in the ocean for 1–3 years (commonly 1-2) before returning to natal streams to spawn. Steelhead can return to the ocean and become repeat

spawners, however it is rare for this to occur in Idaho. Diets of juvenile steelhead consist primarily of aquatic and terrestrial insects and other invertebrates. They switch to primarily fish and squid shortly after entering the ocean.

POPULATION TREND
Short-term Trend: Increase 10–25%
Long-term Trend: Decline 80–90%
Description: Average abundance has increased from extremely low levels through much of the 1990s, but there can be large fluctuations between yearly returning migrations. Current 30-year trend data show an average increase of 14% but the 95% confidence interval is 4%-23%.

THREATS
Overall Threat Impact: Medium
Intrinsic Vulnerability: Not intrinsically vulnerable
Description: The construction of dams on the main stem Snake and Columbia Rivers has reduced survival of juveniles and adults migrating to and from the ocean as they pass through dams and impoundments. Additional effects from dams have resulted in altered hydrographs and water temperatures that affect the run timing of juveniles and adults. Diversions in spawning and rearing streams have removed water, resulting in direct mortality, loss of habitat and migration barriers. Land management activities in adjacent uplands and intentional instream alterations have led to the loss of riparian cover, increased sedimentation, a reduction in woody debris, an increase in stream temperature, and artificial barriers to passage. The addition of hatchery programs to mitigate for lost habitat and survival of fish has introduced genetic concerns about effects to some wild stocks. Declining water quality from increasing development in and along some river and tributary streams can impact fish populations. Climate change may exacerbate habitat threats by altering hydrologic regimes (peak flows, low flows) and stream temperatures, though the effects will vary depending on watershed characteristics. Deleterious climate effects will most likely occur at lower elevations and in altered habitats. Fish growth may improve in high-elevation reaches.

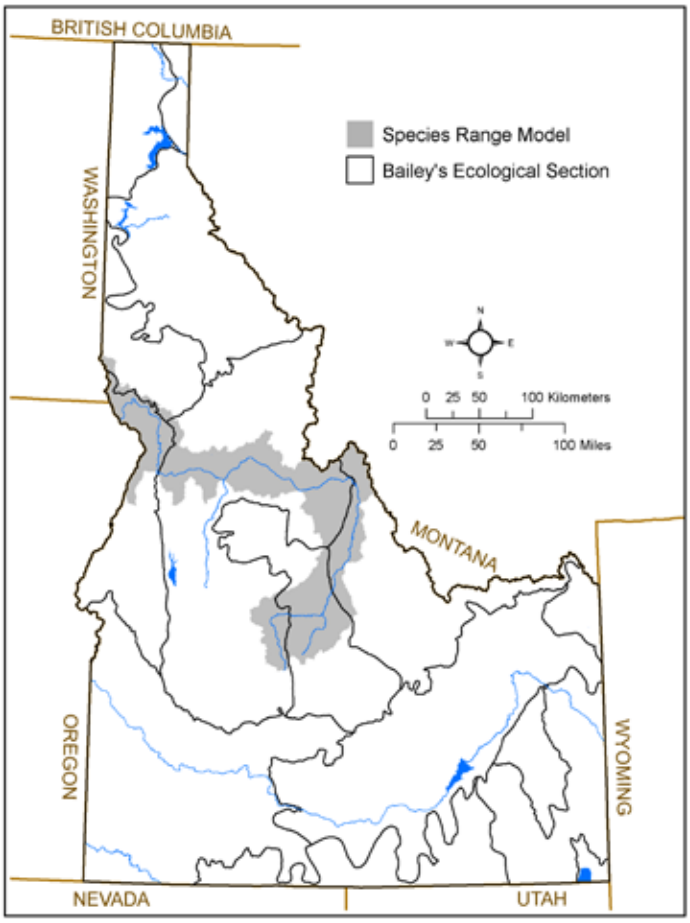
CONSERVATION ACTIONS
Conservation issues and management actions for Steelhead are described in the IDFG Fisheries Management Plan 2013-2018. In short, recommended strategies are to continue to work with federal, tribal, and state agencies and hyropower managers in developing recovery plans and actions to mitigate passage, habitat loss, hatchery and harvest issues, and altered hydrographs. In addition, continue to develop watershed agreements with private landowners and state and federal agences as needed to address upstream habitat and flow issues to improve life cycle survival.

ADDITIONAL COMMENTS
The Snake River Steelhead population was listed as Threatened under ESA in 1997.

Information Sources: Isaak, D. J., C. H. Luce, B. E. Rieman, D. E. Nagel, E. E. Peterson, D. L. Horan, S. Parkes, G. L. Chandler. 2010. Effects of climate change and wildfire on stream temperatures and salmonid thermal habitat in a mountain river network. Ecological Applications 20:1350–1371; Idaho Department of Fish and Game. 2013. Fisheries Management Plan 2013-2018. Idaho Department of Fish and Game, Boise, ID.; Tim Copeland, expert opinion; CWCS 2005
Map Sources: Idaho Department of Fish and Game. Idaho Fish and Wildlife Information System, Fish Distribution Database, accessed August 15, 2015.

Sockeye Salmon [Snake River ESU]

Oncorhynchus nerka pop. 1



Class: Actinopterygii
Order: Salmoniformes
Family: Salmonidae

CONSERVATION STATUS & CLASSIFICATION
ESA: Endangered
USFS:
Region1: No status
Region 4: Endangered
BLM: Type 1
IDAPA: Game Fish, Endangered Species
G-rank: G5T1Q
S-rank: S1

SGCN TIER: 1
Rationale: Multiple threats, limited range, ESA Listed

DISTRIBUTION & ABUNDANCE
Range Extent in Idaho: 19,800 km² (~7,600 mi²)
Key Ecological Sections: Beaverhead Mountains, Challis Volcanics, Idaho Batholith
Population Size in Idaho: 1,000–2,500
Description: The natural range of Sockeye Salmon was associated with lake systems accessible to the ocean around the northern Pacific rim from northern California to Japan. In Idaho, Sockeye Salmon historically spawned and reared in the large lakes in the Payette and Salmon River drainages. The Payette Lake population was eliminated in the early 1900s due to dam construction on the Payette River. Currently Sockeye Salmon are only found in lakes in the Stanley basin of the upper Salmon River, primarily Redfish and Alturas lakes. Additionally, they migrate to and from the ocean through the Salmon, Snake and Columbia rivers. Successful adult returns have occurred in the Sawtooth Valley (primarily Redfish Lake) since 2000 with a high of 1,579 Sockeye returning in 2014 (including 453 wild fish).

HABITAT & ECOLOGY
Environmental Specificity: Very narrow: Specialist—key requirements are scarce.
Description: Sockeye Salmon in the Snake River basin are an anadromous species that depend on freshwater lakes and access to the ocean. They spawn in gravel areas in lakes, where the juveniles rear for 1-3 years prior to migrating to the sea. There are 2 resident life forms; one spawns in lakes in late fall with most juveniles remaining in the lake, maturing and spawning without rearing in the ocean. The second, more common form known as Kokanee, spawns in tributary streams and moves to lakes during late summer/early fall. While in freshwater lakes, Sockeye Salmon prefer temperatures near 10°C (50°F). Juvenile Sockeye Salmon (smolts)

migrate to the ocean at ages 1-3 years and sizes of 7-18 cm (3-7 in). After 1-3 years in the ocean, they return as mature adults reaching the upper Salmon River lakes in mid-summer. Adults returning to Idaho weigh 1-2 kg (3-5 lbs). During their freshwater life, juveniles feed largely on zooplankton. In the ocean they feed upon marine zooplankton and small fish.

POPULATION TREND
Short-term Trend: Increase 10–25%
Long-term Trend: Decline >90%
Description: Counts of adult Sockeye Salmon at the Redfish weir in the 1950-60s averaged over 1,000/year, but decreased to years with no adult returns in the early 1990s. Between 1999 and 2007, more than 355 adults returned from the ocean, primarily because of a large return in 2000. Returns dropped from 2003-2007, but began building in 2008. Adult returns since 2009 have ranged rom a high of 1,579 fish in 2014 (including 453 wild fish) to a low of 257 adults in 2012 (52 wild fish). Sockeye Salmon returns to Alturas Lake ranged from 1 fish in 2002 to 14 in 2010. No fish have returned since 2012.

THREATS
Overall Threat Impact: High
Intrinsic Vulnerability: Not intrinsically vulnerable
Description: The construction of present and past dams on the Columbia, Snake, and Salmon rivers for hydropower and water diversions has adversely affected survival during migration to and from the ocean. Sockeye Salmon are vulnerable to increased temperatures in the migration corridor and, as climate changes, warming thermal regimes of the Snake River may be an issue. Additional concerncs include lowered levels of nutrients in lakes for juvenile life stages, genetic and disease issues with conservation hatchery programs, and the impacts of harvest of juvenile Sockeye Salmon in the Kokanee fisheries.

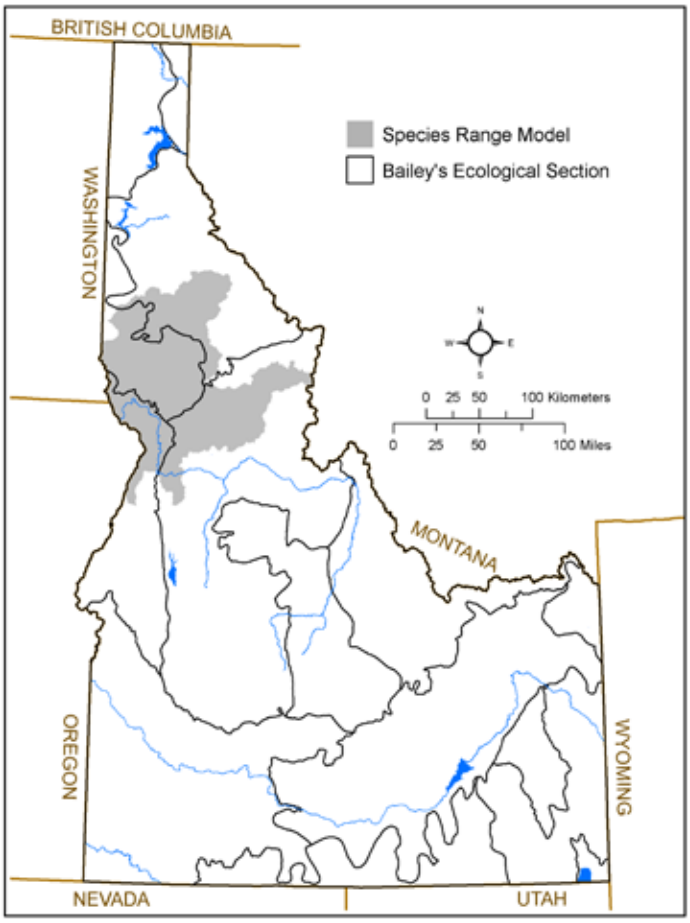
CONSERVATION ACTIONS
Conservation issues and management actions for Sockeye Salmon are described in the ESA Recovery Plan for Snake River Sockeye Salmon and the IDFG Fisheries Management Plan 2013-2018. In short, recommended strategies are to continue to work with federal agencies and the Bonneville Power Administration to improve passage conditions in the lower Snake and Columbia rivers, continue to maintain a conservation hatchery program, and continue to work with partners in evaluating population numbers, nutrient enrichment programs, Kokanee harvest fisheries, and genetic and disease prevention programs.

ADDITIONAL COMMENTS
The Snake River Sockeye Salmon was listed as Endangered under the ESA in 1991.

Information Sources: Idaho CWCS 2005; NMFS. 2015. ESA Recovery Plan for Snake River Sockeye Salmon (*Oncorhynchus nerka*). National Marine Fisheries Service, National Oceanic and Atmospheric Administration, Portland, OR.
Map Sources: Idaho Department of Fish and Game. Idaho Fish and Wildlife Information System, Fish Distribution Database, accessed August 15, 2015.

Chinook Salmon [Snake River fall-run ESU]

Oncorhynchus tshawytscha pop. 2



Class: Actinopterygii
Order: Salmoniformes
Family: Salmonidae

CONSERVATION STATUS & CLASSIFICATION
ESA: Threatened
USFS:
Region1: No status
Region 4: Threatened
BLM: Type 1
IDAPA: Game Fish, Threatened Species
G-rank: G5T1Q
S-rank: S1

SGCN TIER: 1
Rationale: Multiple threats, ESA Listed

DISTRIBUTION & ABUNDANCE
Range Extent in Idaho: 19,800 km² (~7,600 mi²)
Key Ecological Sections: Blue Mountains, Idaho Batholith, Palouse Prairie
Population Size in Idaho: 5,000–10,000 (mature wild individuals)
Description: Chinook Salmon are native to the Snake and Salmon Rivers. Historically, Snake River fall-run Chinook Salmon spawned in the Snake River upriver to the Hagerman Valley and in the lower portions of the Salmon and Clearwater Rivers. Populations using the tributaries above Hells Canyon Dam were eliminated with the construction of the Hells Canyon Complex in the 1950s and earlier upriver dams. The Idaho portion of the Snake River fall-run Chinook Salmon ESU consists of all the Clearwater River drainage up to Lolo Creek, except for the North Fork above Dworshak Dam, the Salmon River drainage upstream to the Little Salmon River, and the Snake River drainage upstream to Hells Canyon Dam. In recent years, the abundance of mature wild Fall Chinook has been between 5,000 and 10,000 individuals.

HABITAT & ECOLOGY
Environmental Specificity: Moderate: Generalist—some key requirements are scarce.
Description: Chinook Salmon are the largest of any salmon, with adults often exceeding 40-60 lbs after 3-5 years in the ocean. Fall Chinook Salmon use the mainstem of larger rivers to spawn compared to spring/summer runs which spawn in smaller, higher tributary systems. Adult fall-run Chinook Salmon enter the Snake River from late August through November and normally spawn using gravel/cobble bars in main river channels from late September-October. As with most salmon, adults die after spawning providing a large nutrient source for juvenile fish. Fry emerge in March. Juvenile fall-run Chinook Salmon typically differ from spring/summer Chinook Salmon in

that they begin a slow downstream migration as subyearlings soon after emerging from the gravel and feed on their way to the ocean. The downriver migration peaks in April and lasts through June; most complete the journey in the first year. Optimal water temperatures range from 14-19°C (59-64°F) and temperatures that exceed 21°C (73°F) are lethal. Juvenile fall-run Chinook Salmon feed on small aquatic invertebrates in both fresh and salt water, primarily insects in freshwater and crustaceans in marine environments. As they grow in saltwater, they quickly change to a fish diet.

POPULATION TREND
Short-term Trend: Increase >25%
Long-term Trend: Decline 50–80%
Description: Historically, approximately half a million fall-run Chinook Salmon traveled up the Columbia River and spawned in the mainstem of the Snake River. The fish run began to decline in the late 1800s, dropping to 72,000 fish in the late 1930s and 29,000 during the 1950s. After dams were constructed on the middle and lower Snake River (1958-1975), counts over Lower Granite Dam below Lewiston dropped to less than 1,000 fish/year, including some hatchery fish that began returning in the early 1980s. In the last 20 years, annual counts of adult fall-run Chinook Salmon over Lower Granite Dam have increased from just over 1,000 fish in 1995 to over 60,000 in 2014, including both hatchery and wild fish.

THREATS
Overall Threat Impact: Medium
Intrinsic Vulnerability: Not intrinsically vulnerable
Description: The construction and operation of dams on the mainstem Snake and Columbia rivers has reduced survival of migrating juveniles and adults and blocked access to nearly half of the historic range. Additional threats include changes in run timing of juveniles and adults, impacts form stream diversions, loss of riparian cover, sedimentation, and artificial barriers to stream passage. The addition of hatchery programs to mitigate for lost habitat and suvival of fish have introduced genetic concerns about effects to wild stocks.

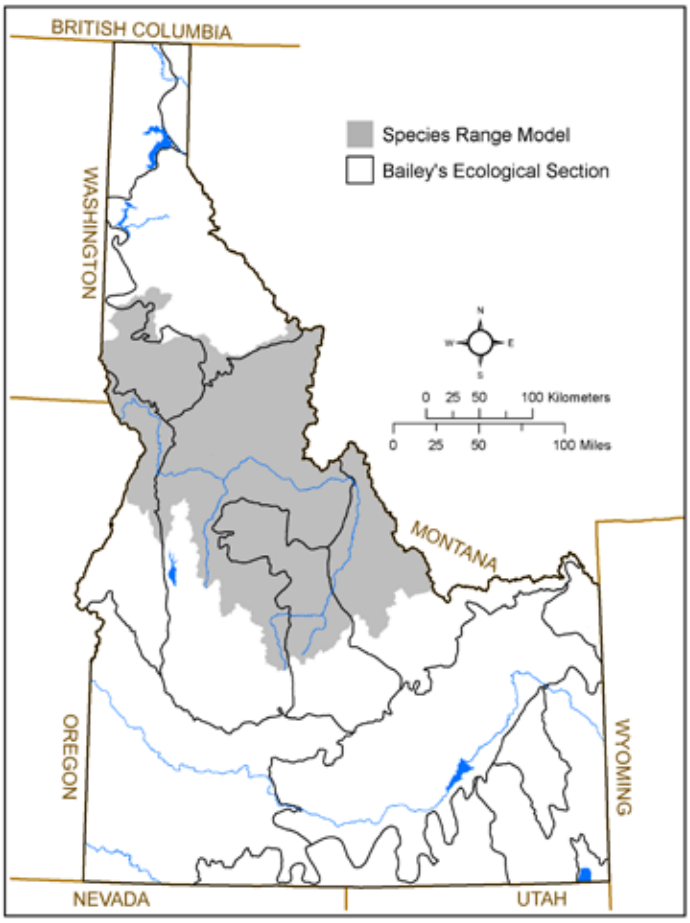
CONSERVATION ACTIONS
Conservation issues and management actions for the species are described in several documents including the Proposed ESA Recovery Plan for Snake River Fall Chinook Salmon and the IDFG Fisheries Management Plan 2013-2018. In short, recommended strategies include continuing to work with federal and state agencies, tribes, and hydropower managers to mitigate passage, habitat loss, harvest and hatchery issues, altered hydrographs, and to develop watershed agreements to address upstream habitat, flow issues, and management of nonnative species.

ADDITIONAL COMMENTS
The Snake River fall-run Chinook Salmon population was listed at threatened under ESA in 1992 and the listing was reaffirmed in 2005 and 2011.

Information Sources: Idaho CWCS 2005; NMFS. 2015. Proposed ESA Recovery Plan for Snake River Fall Chinook Salmon (*Oncorhynchus tshawytscha*). National Marine Fisheries Service, NOAA, Portland, OR.
Map Sources: Idaho Department of Fish and Game. Idaho Fish and Wildlife Information System, Fish Distribution Database, accessed August 15, 2015.

Chinook Salmon [Snake River spring/summer-run ESU]

Oncorhynchus tshawytscha pop. 8



Class: Actinopterygii
Order: Salmoniformes
Family: Salmonidae

CONSERVATION STATUS & CLASSIFICATION
ESA: Threatened
USFS:
Region1: No status
Region 4: Threatened
BLM: Type 1
IDAPA: Game Fish, Threatened Species
G-rank: G5T1Q
S-rank: S1

SGCN TIER: 1
Rationale: Multiple threats, ESA Listed

DISTRIBUTION & ABUNDANCE
Range Extent in Idaho: 55,600 km² (~21,500 mi²)
Key Ecological Sections: Beaverhead Mountains, Blue Mountains, Challis Volcanics, Idaho Batholith, Palouse Prairie
Population Size in Idaho: 20,000 (mature, wild individuals)
Description: Historically, Snake River spring/summer-run Chinook Salmon spawned in the Snake River tributaries of the Clearwater, Salmon, Weiser, Payette and Boise rivers. Populations using the rivers above Hells Canyon Dam were eliminated with the construction of Hells Canyon Compex from 1955-1967 and earlier upriver dams. Populations in the Clearwater drainage were eliminated or severely depressed by the Lewiston dam in the 1950s. The Idaho portion of the Snake River spring/summer-run Chinook Salmon ESU consists of all of the Salmon River drainage and the Snake River drainage upstream to Hells Canyon Dam. The Clearwater drainage was not included due to the loss of this population in the 1950s, however the reestablished Clearwater River populations are included in conservation efforts.

HABITAT & ECOLOGY
Environmental Specificity: Moderate: Generalist—some key requirements are scarce.
Description: Chinook Salmon are the largest of any salmon, with adults often exceeding 40-60 lbs after 3-5 years in the ocean. Spring/Summer-run Chinook Salmon use smaller, higher elevation tributary systems for spawning and juvenile rearing compared to fall-run fish which spawn in the mainstem of larger rivers. They normally spawn in late July-September using gravel bars in summer river and tributary streams. As with most salmon, adults die after spawning and provide a large nutrient source for juvenile fish. Juvenile spring/summer-run Chinook Salmon behave

differently than fall-run Chinook Salmon in that they remain in headwater streams for a year and out-migrate the following spring. Optimal water temperatures range from 14-19°C (59-64°F) and temperatures that exceed 21°C (73°F) are lethal. Juvenile spring/summer-run Chinook Salmon feed on small aquatic invertebrates, primarily insects in freshwater and crustaceans in marine environments. As they grow in saltwater, they quickly change to a fish diet.

POPULATION TREND
Short-term Trend: Decline >90%
Long-term Trend: Unknown
Description: Historic runs in the Snake River probably exceeded 1 million fish annually in the late 1800s. By the 1950s, the abundance of adult spring/summer-run Chinook Salmon had greatly declined to near 100,000 adults/year. Since the 1960s, counts of spring/summer-run Chinook Salmon adults have declined considerably at the lower Snake River dams. Counts in the 1960s peaked at approximately 79,000 fish, with hatchery returns comprising less than 10% of the total returns. In the 1970s, the runs declined to 67,000 fish with hatchery returns climbing to 22% of the total returns. During the 1980s, maximum salmon returns declined to 40,000 while hatchery returns climbed to an average of 44%. Although the maximum return in the 1990s was similar to the 1980s (44,000 with an average hatchery return of 53%) the minimum count ever recorded occurred during this decade with 2,327 salmon counted at Lower Granite Dam in 1995. Returns were variable in the 2000s with a maximum return of 192,000, a minimum return 31,000, and average hatchery returns comprising 76% of the total.

THREATS
Overall Threat Impact: Medium
Intrinsic Vulnerability: Not intrinsically vulnerable
Description: The primary threat for this species is the construction and operation of hydroelectric dams on the main stem Snake and Columbia rivers, which has blocked access to nearly half of the historic spawning habitat and reduced survival of juveniles and adults migrating to and from the ocean. Additional effects from hydroelectric dams and water storage projects have altered hydrographs and water temperature regimes affecting the timing of juvenile and adult runs. Additional threats include diversions in spawning and rearing streams, loss of riparian cover, sedimentation, genetic concerns, declining water quality, and introductions of nonnative fish.

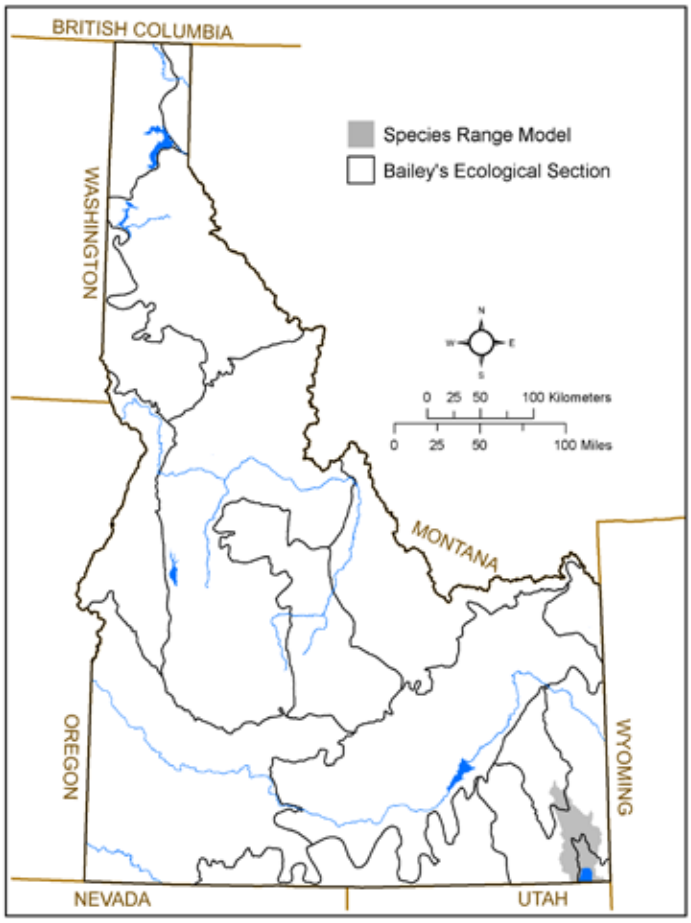
CONSERVATION ACTIONS
Conservation issues and management actions for the species are described in several documents including the Snake River Spring/Summer Chinook and Steelhead Recovery Plan (in Draft) and the IDFG Fisheries Management Plan 2013-2018. In short, recommended strategies include continuing to work with federal and state agencies, tribes, and hydropower managers to mitigate passage, habitat loss, harvest and hatchery issues, altered hydrographs, and to develop watershed agreements to address upstream habitat, flow issues, and management of nonnative species.

ADDITIONAL COMMENTS
The Snake River spring/summer-run Chinook Salmon population was listed as Threatened under the ESA in 1992. The listing was reaffirmed in 2005 and 2011.

Information Sources: Idaho CWCS 2005; NMFS 2015. Draft ESA Recovery Plan for Idaho Snake River Spring/Summer Chinook Salmon (*Oncorhynchus tshowytscha*) and Snake River Steelhead (*Oncorhynchus mykiss*) Populations. National Marine Fisheries Service, Portland, OR.
Map Sources: Idaho Department of Fish and Game. Idaho Fish and Wildlife Information System, Fish Distribution Database, accessed August 15, 2015.

Bear Lake Whitefish

Prosopium abyssicola



Class: Actinopterygii
Order: Salmoniformes
Family: Salmonidae

CONSERVATION STATUS & CLASSIFICATION
ESA: No status
USFS:
Region1: No status
Region 4: No status
BLM: No status
IDAPA: Game Fish
G-rank: G1
S-rank: S1

SGCN TIER: 2
Rationale: Endemic, range restricted

DISTRIBUTION & ABUNDANCE
Range Extent in Idaho: 2,600 km² (~1,000 mi²)
Key Ecological Sections: Bear Lake
Population Size in Idaho: >1,000,000
Description: Bear Lake Whitefish are endemic to Bear Lake in extreme southeast Idaho.

HABITAT & ECOLOGY
Environmental Specificity: Moderate: Generalist—some key requirements are scarce.
Description: This species typically occurs in the benthic zone at water depths greater than 40 m (130 ft). Spawning occurs in mid-February to mid-March in shallow, rocky areas. Ostracods comprise the majority of the diet, but other invertebrates found on the lake bottom may be consumed.

POPULATION TREND
Short-term Trend: Relatively Stable (<=10% change)
Long-term Trend: Relatively Stable (<=10% change)
Description: The Bear Lake Whitefish is monitored annually through standard gillnet surveys. The population appears stable.

THREATS
Overall Threat Impact: Medium
Intrinsic Vulnerability: Moderately vulnerable

Description: A lowering of lake levels due to drought and water management could limit spawning and rearing habitat. Increasing human development around the lake could lead to lowering of water quality due to waste water discharges. Legal and illegal introductions of piscivorous fish could affect populations by increasing predation rate.

CONSERVATION ACTIONS
Conservation issues and management actions are described in the Bear Lake Ecological Section plan. In short, the conservation strategies for this species include monitoring the population status and trends and introducing rock substrates at elevations of 5914 and lower to increase spawning habitat and improve spawning success during prolonged drought cycles.

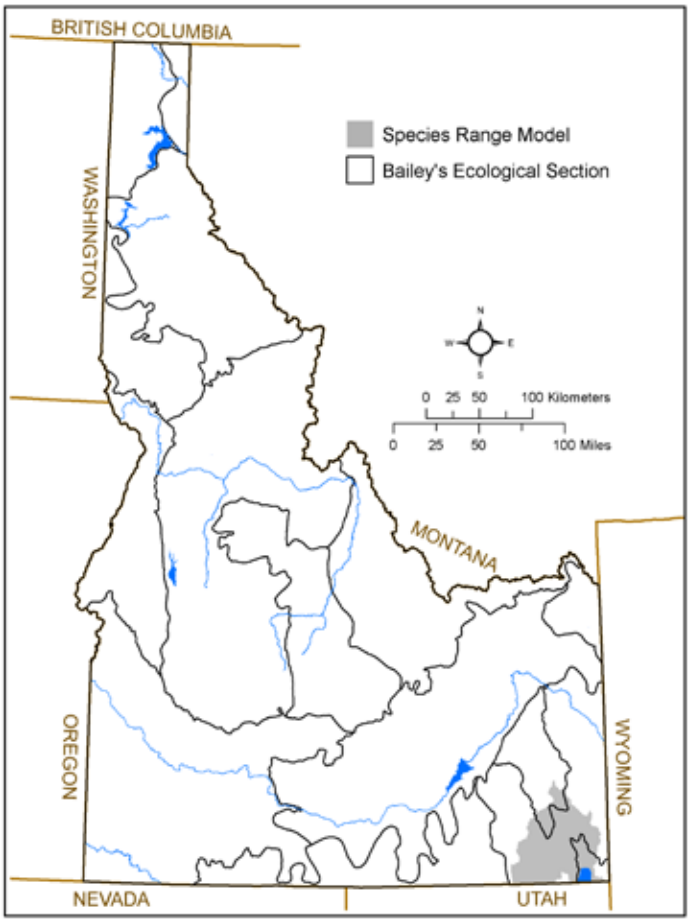
ADDITIONAL COMMENTS
None.

Information Sources: Idaho CWCS 2005; Sigler, WF and JW Sigler. 1987. Fishes of the Great Basin, A Natural History. Reno(NV): University of Nevada Press. 425 pp; Tolentino, S. and D. Teuscher. 2010. Bear Lake Fisheries Management Plan. Utah Division of Wildlife Resources, Salt lake City, Utah and Idaho Department of Fish and Game, Boise, ID.; David Teuscher, expert opinion
Map Sources: Idaho Department of Fish and Game. Idaho Fish and Wildlife Information System, Fish Distribution Database, accessed August 15, 2015.

Bonneville Cisco

Prosopium gemmifer

Class: Actinopterygii
Order: Salmoniformes
Family: Salmonidae



CONSERVATION STATUS & CLASSIFICATION
ESA: No status
USFS:
Region1: No status
Region 4: No status
BLM: Type 2
IDAPA: Game Fish
G-rank: G3
S-rank: S3

SGCN TIER: 2
Rationale: Endemic, range restricted

DISTRIBUTION & ABUNDANCE
Range Extent in Idaho: 5,100 km² (~2,000 mi²)
Key Ecological Sections: Bear Lake
Population Size in Idaho: >1,000,000
Description: Bonneville Cisco are endemic to Bear Lake in extreme southeast Idaho. Attempts to introduce the species into other waters in the West have been unsuccessful. The hydroacoustic estimate of abundance in 2008 was approximately 9 million individuals.

HABITAT & ECOLOGY
Environmental Specificity: Moderate: Generalist—some key requirements are scarce.
Description: This species is typically found in schools in the pelagic zone. Schools are near or below the thermocline when the lake is thermally stratified during the spring to fall months. At night, individuals break from their schools and are widely scattered throughout the lake. Spawning occurs from mid-January to early Febrary over rocky areas along the shoreline, weedbeds, and deeper, rocky shoals. The species feeds almost exclusively on zooplankton.

POPULATION TREND
Short-term Trend: Relatively Stable (<=10% change)
Long-term Trend: Relatively Stable (<=10% change)
Description: The Bonneville Cisco is monitored annually through hydroacoustic surveys and comprehensive angler creel surveys at 3-5 year intervals. Hydroacoustic estimates of abundance indicate the population numbered between 2 and 3 million individuals from 1988 to the mid-1990s and between 5 and 10 million individuals from 2000-2008.

THREATS
Overall Threat Impact: Medium
Intrinsic Vulnerability: Moderately vulnerable
Description: A lowering of lake levels due to drought and water management could limit spawning and rearing habitat. Increasing human development around the lake could lead to lowering of water quality due to waste water discharges. Legal and illegal introductions of piscivorous fish could affect populations by increasing predation rate.

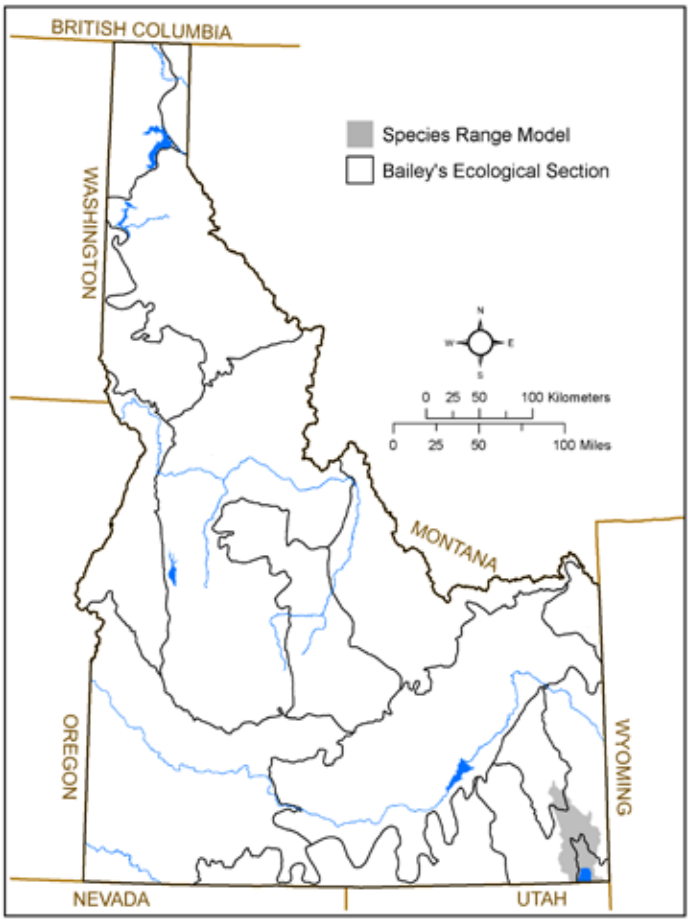
CONSERVATION ACTIONS
Conservation issues and management actions are described in the Bear Lake Ecological Section plan. In short, the conservation strategies for this species include monitoring the population status and trends, reducing trout stocking programs and harvest as necessary, introducing rock substrates at elevations of 5914 and lower to increase spawning habitat and improve spawning success during prolonged drought cycles, and working with water management entities to maintain water levels.

ADDITIONAL COMMENTS
None.

Information Sources: Idaho CWCS 2005; Sigler, WF and JW Sigler. 1987. Fishes of the Great Basin, A Natural History. Reno(NV): University of Nevada Press. 425 pp; Tolentino, S. and D. Teuscher. 2010. Bear Lake Fisheries Management Plan. Utah Division of Wildlife Resources, Salt lake City, Utah and Idaho Department of Fish and Game, Boise, ID.; David Teuscher, expert opinion
Map Sources: Idaho Department of Fish and Game. Idaho Fish and Wildlife Information System, Fish Distribution Database, accessed August 15, 2015.

Bonneville Whitefish

Prosopium spilonotus



Class: Actinopterygii
Order: Salmoniformes
Family: Salmonidae

CONSERVATION STATUS & CLASSIFICATION
ESA: No status
USFS:
Region1: No status
Region 4: No status
BLM: Type 2
IDAPA: Game Fish
G-rank: G3
S-rank: S3

SGCN TIER: 2
Rationale: Endemic, range restricted

DISTRIBUTION & ABUNDANCE
Range Extent in Idaho: 2,600 km² (~1,000 mi²)
Key Ecological Sections: Bear Lake
Population Size in Idaho: >1,000,000
Description: Bonneville Whitefish are endemic to Bear Lake in extreme southeast Idaho.

HABITAT & ECOLOGY
Environmental Specificity: Moderate: Generalist—some key requirements are scarce.
Description: This species is typically found at depths of 12–30 m (40–100 ft). Spawning occurs from mid–February to early March over rocky areas along the shoreline. The species is omnivorous and consumes plankton and invertebrates found on the lake bottom. Individuals >30 cm (>12 in) are piscivorous and consume other whitefish, Bear Lake sculpin, and other small fish.

POPULATION TREND
Short-term Trend: Relatively Stable (<=10% change)
Long-term Trend: Relatively Stable (<=10% change)
Description: The Bonneville Whitefish is monitored annually through standard gillnet surveys and in comprehensive angler creel surveys at 3 to 5 year intervals. The population appears stable.

THREATS
Overall Threat Impact: Medium
Intrinsic Vulnerability: Moderately vulnerable

Description: A lowering of lake levels due to drought and water management could limit spawning and rearing habitat. Increasing human development around the lake could lead to lowering of water quality due to waste water discharges. Legal and illegal introductions of piscivorous fish could affect populations by increasing predation rate.

CONSERVATION ACTIONS
Conservation issues and management actions are described in the Bear Lake Ecological Section plan. In short, the conservation strategies for this species include monitoring the population status and trends and introducing rock substrates at elevations of 5914 and lower to increase spawning habitat and improve spawning success during prolonged drought cycles.

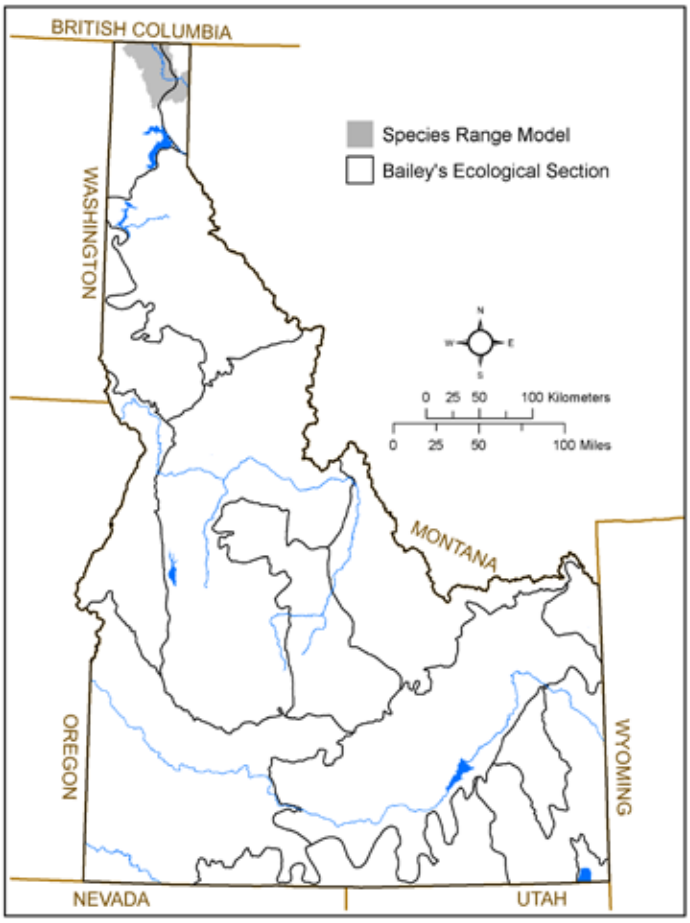
ADDITIONAL COMMENTS
None.

Information Sources: Idaho CWCS 2005; Sigler, WF and JW Sigler. 1987. Fishes of the Great Basin, A Natural History. Reno(NV): University of Nevada Press. 425 pp; Tolentino, S. and D. Teuscher. 2010. Bear Lake Fisheries Management Plan. Utah Division of Wildlife Resources, Salt lake City, Utah and Idaho Department of Fish and Game, Boise, ID.; David Teuscher, expert opinion
Map Sources: Idaho Department of Fish and Game. Idaho Fish and Wildlife Information System, Fish Distribution Database, accessed August 15, 2015.

Burbot

Lota lota

Class: Actinopterygii
Order: Gadiformes
Family: Gadidae



CONSERVATION STATUS & CLASSIFICATION
ESA: No status
USFS:
Region1: No status
Region 4: No status
BLM: Type 2
IDAPA: Game Fish, Endangered Species
G-rank: G5
S-rank: S1

SGCN TIER: 1
Rationale: Low population size, large long term declines, multiple threats, IDAPA Endangered

DISTRIBUTION & ABUNDANCE
Range Extent in Idaho: 2,200 km² (~800 mi²)
Key Ecological Sections: Flathead Valley, Okanogan Highlands
Population Size in Idaho: 1–50
Description: Burbot are circumpolar in distribution, extending south just to the northern portions of the conterminous US. In Idaho, they are only found in the Kootenai River drainage. Population estimates (prior to hatchery releases) ranged from 225 in 1997 to 50 Burbot in 2003. Current total population size of Burbot, including hatchery juveniles, is estimated between 2,500-10,000.

HABITAT & ECOLOGY
Environmental Specificity: Very narrow: Specialist—key requirements are scarce.
Description: Adult Burbot primarily inhabit deep, cool lakes, reservoirs, or rivers. In lakes, Burbot are strongly associated with the bottom and prefer temperatures of 10-12°C (50-54°F), remaining below the thermocline. They can attain lengths of 99 cm (39 in) and weigh 8 kg (17 lbs), but most are much smaller (in the 1-3 kg [2-7 lbs] range). Southern populations mature in 3-4 years and females may not spawn each year. Although Burbot can spawn in lakes and rivers, the wild and hatchery produced adults are currently recorded spawning only in the mainstem of the Kootenai River and its tributaries. In rivers, Burbot spawn in low velocity areas in main channels or in side channels behind deposition bars over fine gravel, sand, or silt. The semi-buoyant egs are broadcast above the substrate and may drift but eventually settle into the substrate. Spawning is generally highly synchronized over a short 2-3 week time period in late February to early March when water temperatures are low (1-3°C [34-39°F]). Burbot primarily feed at night, with fry feeding on zooplankton and small aquatic invertebrates and adults mainly feeding on fish.

POPULATION TREND
Short-term Trend: Decline 10–30%
Long-term Trend: Decline >90%
Description: Although common in large portions of their range, the Kootenai population has declined significantly in past years. In the 1960s, the winter fishery on the Kootenai River was thought to have exceeded thousands of pounds of fish in both the commercial and sport harvest. By the late 1970s, the population had collapsed, and was estimated at 150 fish in the mid-1990s and only 50 fish by the early 2000s. With annual mortality estimated at 63%, the wild stock was estimated to be extirpated by 2015. Since 2009, juveniles have been produced from captured wild broodstock on Moyie Lake, British Columbia, and reared at the University of Idaho. Population trends for wild adults continues to decline, but the hatchery juvenile population has increased by >25%.

THREATS
Overall Threat Impact: Medium
Intrinsic Vulnerability: Highly vulnerable
Description: The primary threat to this species is habitat loss and degredation due to the construction of Libby Dam in 1972. The altered flows associated with hydropower and flood control below Libby Dam has resulted in higher winter velocities, which may restrict or disrupt upstream migration of adults, as well as warmer temperatures which limit egg hatching success. Daily flow fluctuations for peak power generation may also flush eggs from spawning areas. In addition, nutrient settling above Libby Dam has reduced Burbot productivity of the river and the development of agricultural lands has resulted in a loss of habitat for juvenile fish with the elimination of slough backwaters by the diking of the river channel to prevent flooding.

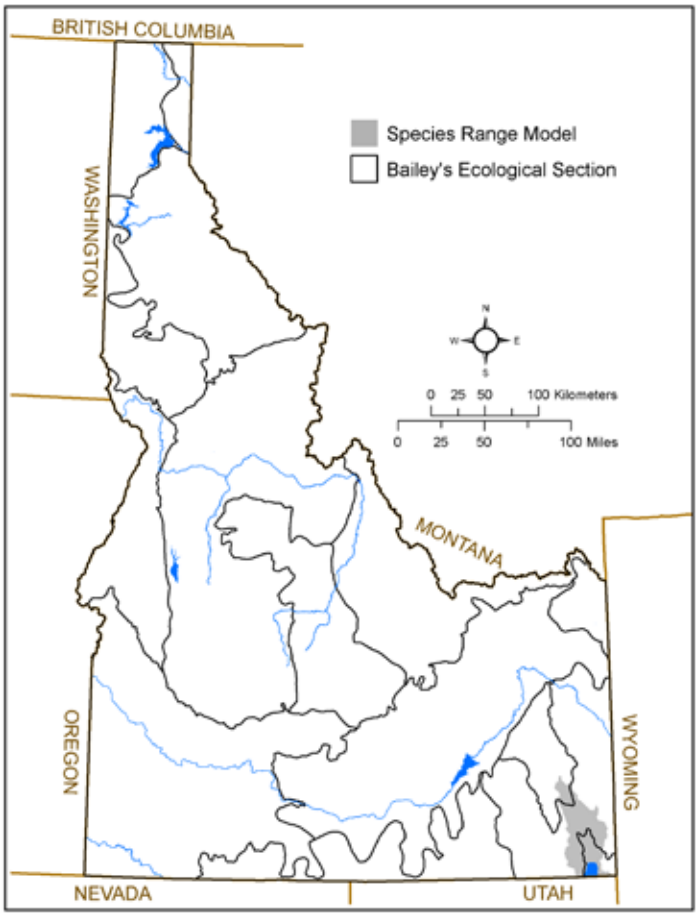
CONSERVATION ACTIONS
Conservation issues and management actions for the species are described in the Kootenai River/Kootenay Lake Burbot Conservation Strategy (Strategy) and appropriate section plans. The recommended action is to address the operation of Libby Dam considering river flow and temperature requirements for Burbot during the critical prespawn, spawning, and egg incubation periods from December through April. The Strategy also identifies conservation aquaculture as a remedial measure to help strengthen the depressed Burbot stock. In addition, habitat improvements to spawning and rearing locations as well as nutrient additions to increase food during larval rearing are also identified to help sustain and improve the population.

ADDITIONAL COMMENTS
The Kootenai River Burbot were petitioned for listing under the ESA in 2000, but was found as not warranted by the USFWS because it did not represent a distinct population segment.

Information Sources: Paragamian, VL, BJ Pyper, MJ Daigneault, RCP Beamesderfer, SC Ireland. 2008. Population dynamics and extinction risk of burbot in the Kootenai River, Idaho, USA and British Columbia, Canada. A. Fish. Soc. Symp. 59:213-234; Paragamian, VL and MJ Hansen. 2011. Stocking for rehabilitation of burbot in the Kootenai River, Idaho , USA and British Columbia, Canada. J. of Appl. Ichth. 27:22-26; KVRI Burbot Committee. 2005. Kootenai River/Kootenay Lake Burbot Conservation Strategy. Kootenai Tribe of Idaho and S. P. Cramer and Associates. 77 pp.; Hardy, R and VL Paragamian. 2013. A synthesis of Kootenai River Burbot stock history and future managmement goals. Trans. A. Fisheries Soc. 142:162-1670; Hardy, RS, SM Stephenson, MD Neufeld, and SP Young. 2015. Adaptation of lake-origin burbot stocked into a large river environment. Hydrobiologia. DOI: 10.1007/s10750-015-2226-0.
Map Sources: Idaho Department of Fish and Game. Idaho Fish and Wildlife Information System, Fish Distribution Database, accessed August 15, 2015.

Bear Lake Sculpin

Cottus extensus



Class: Actinopterygii
Order: Scorpaeniformes
Family: Cottidae

CONSERVATION STATUS & CLASSIFICATION
ESA: No status
USFS:
Region1: No status
Region 4: No status
BLM: Type 2
IDAPA: Protected Nongame Species
G-rank: G3
S-rank: S3

SGCN TIER: 2
Rationale: Endemic, range restricted

DISTRIBUTION & ABUNDANCE
Range Extent in Idaho: 2,600 km² (~1,000 mi²)
Key Ecological Sections: Bear Lake
Population Size in Idaho: >1,000,000
Description: Bear Lake Sculpin are endemic to Bear Lake in extreme southeast Idaho. The population is estimated to be in the millions.

HABITAT & ECOLOGY
Environmental Specificity: Moderate: Generalist—some key requirements are scarce.
Description: This species occurs throughout the lake in benthic areas. Individuals spawn near shore in mid-April to mid-May and attach eggs to the undersides of rocks where males guard egg masses. Adults return to deeper waters after spawning. After hatching, fry use currents to disperse from the rocky spawning areas. Sculpins are opportunistic bottom feeders on benthic invertebrates and ostracods.

POPULATION TREND
Short-term Trend: Relatively Stable (<=10% change)
Long-term Trend: Relatively Stable (<=10% change)
Description: The Bear Lake Sculpin is monitored by bottom trawl surveys every other year. From 1988 to 1995, mean catch per trawl densities ranged from 25-50 sculpin per trawl which extrapolates to a minimum whole lake population estimate between 1 and 2 million fish. Since 1995, the density estimates have been greater than 50 sculpin per trawl with a high of 175 sculpin per trawl in the late 1990s.

THREATS
Overall Threat Impact: Medium
Intrinsic Vulnerability: Moderately vulnerable
Description: A lowering of lake levels due to drought and water management could limit spawning and rearing habitat. Increasing human development around the lake could lead to lowering of water quality due to waste water discharges. Legal and illegal introductions of piscivorous fish could affect populations by increasing predation rate.

CONSERVATION ACTIONS
Conservation issues and management actions are described in the Bear Lake Ecological Section plan. In short, the conservation strategies for this species include monitoring the population status and trends, reducing trout stocking programs as necessary, introducing rock substrates at elevations of 5914 and lower to increase spawning habitat and improve spawning success during prolonged drought cycles, and working with water management entities to maintain water levels.

ADDITIONAL COMMENTS
None.

Information Sources: Idaho CWCS 2005; Sigler, WF and JW Sigler. 1987. Fishes of the Great Basin, A Natural History. Reno(NV): University of Nevada Press. 425 pp; Tolentino, S. and D. Teuscher. 2010. Bear Lake Fisheries Management Plan. Utah Division of Wildlife Resources, Salt lake City, Utah and Idaho Department of Fish and Game, Boise, ID.; David Teuscher, expert opinion
Map Sources: Idaho Department of Fish and Game. Idaho Fish and Wildlife Information System, Fish Distribution Database, accessed August 15, 2015.