

Burbot - *Lota lota*

Abundance: Rare

Status: NSS3 (Bb)

NatureServe: G5 S3S4

Population Status: Population size and distribution restricted within native range.

Limiting Factor: Habitat: habitat fragmentation due to irrigation diversions and dams has impacted populations. Population numbers and length structure are thought to be vulnerable to angling pressure.

Comment: NSS Ranks are reviewed and revised with each SWAP revision. No changes were made for this species in this revision.

#### Introduction

The burbot is the only member of the Gadiforme order that spends its entire life in freshwater. Burbot spawning behavior is unique among freshwater fishes, spawning mid-winter under the ice. They have a strong association with the bottom of lakes and are described as benthic (McPhail and Paragamian 2000). Burbot have a strong preference for cold water and avoid water temperatures exceeding 55 degrees Fahrenheit (Hackney 1973). They are most active during the winter and in Wyoming they become nearly dormant during the summer months. Burbot are voracious predators. Miller (1970) observed that large burbot fed primarily on non-game fish in lakes and reservoirs in Wyoming. Wyoming represents the southwestern extreme of burbot distribution in North America. Burbot historically occurred in the Wind-Bighorn River drainage and the Tongue (Baxter and Stone 1995) and the Powder (Hubert 1993) rivers. Currently, burbot populations within their native range in Wyoming are found only in the Wind-Bighorn River and lakes and reservoirs within the watershed. Illegal introductions of burbot have occurred within the Green River drainage and the species has become well established in Big Sandy and Green rivers, as well as Fontenelle, Big Sandy, and Flaming Gorge reservoirs.

#### Habitat

The burbot lives in cold, deep lakes and large rivers. Burbot are cover oriented and prefer areas with rock substrate having numerous crevices or with aquatic vegetation (Robins and Deubler 1955; Edsall et al. 1993; Dillen et al. 2008). Lentic spawning occurs during January or February over gravel substrate in shallow, near-shore waters (Boag 1989; McCrimmon 1959) or over reefs or shoals in deeper water (McCrimmon 1959). Burbot may also ascend tributary streams to spawn (Bjorn 1939).

#### Problems

- h Habitat degradation (e.g., dewatering, loss of connectivity) and introduced species pose the most serious threats to this species' persistence.
- h This species appears to be expanding outside of its native range and could be adversely impacting native fish populations through competition and predation.
- h Burbot population densities and length structures are vulnerable to high angling harvest rates in some areas within their native range.
- h In the long term, trends in increased global temperatures could negatively impact the habitat and persistence of burbot in waters that may already have temperatures that are on the edge of the species preferred limits.

#### Conservation Actions

- h Entrainment in canals needs evaluation
- h A better understanding of juvenile habitat requirements is needed.
- h A better understanding of the habitat and flow requirements of this species is needed to assess the impacts of water and land use activities.
- h A better understanding of the "source and sinks dynamics" of natural recruitment maintaining various stocks is needed
- h Isolate sources of production in the Bighorn-Wind watershed by examining drift/migration patterns.
- h Continue to collaborate with Shoshone and Arapaho tribes and the USFWS to gain better understanding of factors influencing burbot populations within the Wind River drainage.
- h Continue efforts to maintain flows and connectivity.
- h Determine the effects that nonnative species are having on native burbot populations

#### Monitoring/Research

Continue established trend monitoring programs at Boysen Reservoir and Torrey Lake.

Investigate the utility of bioenergetics modeling to help explain predator-prey relationships and identify management options for enhancing the availability of prey for burbot (Abrahamse 2009).

Continue to identify and record observations while conducting fisheries management sampling.

#### Recent Developments

Outmigration and entrainment in irrigation diversions were not factors influencing burbot populations in the upper Wind River Drainage. The results are summarized in a masters thesis at the University of Wyoming Cooperative Fish and Wildlife Research Unit (Underwood 2015).

Burbot exploitation was determined to be variable and not a limiting factor in most lakes in the upper Wind River Drainage. The results are summarized in a masters thesis at Montana State University Fish and Wildlife Research Unit (Lewandoski 2015).

Abundance and structure of burbot populations in the Wind River drainage were summarized in a masters thesis at the University of Wyoming Cooperative Fish and Wildlife Research Unit (Abrahamse 2009).

Microchemistry profiles of otoliths collected throughout the Wind River drainage are currently being analyzed to determine drift/migration patterns of burbot in the watershed. The study is being conducted by Scott Carleton a post-doctoral researcher at the University of Wyoming.

In 2006, the statewide creel limit within the burbot's native range was decreased from 6 fish to 3 fish.

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SOURCE: Digital maps of ranges for Wyoming Species of Greatest Conservation Need: February 2016. Wyoming Game and Fish Department. Note that brown indicates the current known range of the species.