

Northern Redbelly Dace

Chrosomus eos

Federal Listing

State Listing SC

Global Rank

State Rank S3

Regional Status



Photo by NHFG

Justification (Reason for Concern in NH)

Northern redbelly dace are vulnerable to habitat alterations that reduce summer base flows and riparian cover. Populations upstream of dams are also vulnerable to artificial water level fluctuations, especially during spawning. The extent of their distribution in New Hampshire is not well understood. Although aquatic habitats in northern New Hampshire are under less pressure from development than those of southern New Hampshire, there may be certain regions that are important for the persistence of the species, which has somewhat limited dispersal abilities. The biggest threat to northern redbelly dace populations may be the introduction of large predatory fish species, including bass, pike, and sunfish. The brightly colored breeding males, in particular, are not well adapted to avoiding larger fish predators. As a result of the widespread introductions of littoral predators, native minnow communities have become rare in lakes and ponds throughout the northeast outside of northern Maine (Whittier et al. 1997).

Distribution

The northern redbelly dace has a northern distribution in North America, inhabiting most of Canada, with isolated populations in the Missouri and upper Mississippi River watersheds, northern New York, Pennsylvania, Massachusetts, Vermont, New Hampshire, and Maine (Scott and Crossman 1973). In New Hampshire, northern redbelly dace populations occur north of the White Mountains, in the Androscoggin and upper Connecticut River watersheds, with isolated populations as far south as the Sugar and Cold River watersheds.

Habitat

The northern redbelly dace inhabits acidic lakes, ponds, and backwater streams in areas with minimal water velocity. Spawning occurs in algae masses within these habitats (Scarola 1987). Spawning times range from May to August and are dependent on latitude and local environment (Scott and Crossman 1973).

In New Hampshire, northern redbelly dace are usually found in lower gradient, cool headwater streams and small ponds with sluggish flow and ample cover from over hanging shrubs or aquatic vegetation. They tend to thrive in areas with a history of beaver activity. Individuals may be found in rivers or streams with higher gradients and flow, but they are assumed to have either washed out of or dispersed from areas of more suitable habitat upstream.

Adapted to thick ice cover and low oxygen levels, northern redbelly dace are well suited to living in northern climates, although they are slightly more tolerant of warm water conditions than finescale

Appendix A: Fish

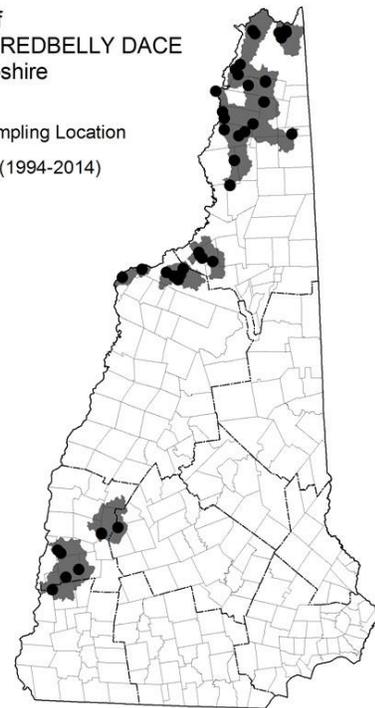
dace. Northern redbelly dace feed primarily on filamentous algae and other plant matter, but zooplankton and fish larvae are also consumed (Scott and Crossman 1973). Where finescale dace overlap with northern redbelly dace, hybridization may occur. The offspring tend to be all female and diploid, meaning that they contain a full set of chromosomes from each parent. The hybrids are able to reproduce clonally and they share characteristics from both species, including a more omnivorous diet. Northern redbelly dace usually spawn about two weeks later than finescale dace in warmer water temperatures (190C/670F for redbelly dace and 160C/600F for finescale dace). Hybridization occurs in areas where rapid temperature increases in spring may cause more overlap between the spawning seasons of the two species (Scott and Crossman 1973).

NH Wildlife Action Plan Habitats

- Coldwater Rivers and Streams
- Lakes and Ponds with Coldwater Habitat

Distribution of NORTHERN REDBELLY DACE in New Hampshire

- Fish Sampling Location
- Current (1994-2014)



Distribution Map

Current Species and Habitat Condition in New Hampshire

Survey records for northern redbelly dace are inadequate for assessing population health. Northern redbelly dace were recorded at 7 locations in 1939, although they were considered more abundant in northern New Hampshire than indicated by the survey record (Bailey and Oliver 1939). These sites were revisited in 2008 and redbelly dace were found at 5 of the seven sites with previous records. Since 1998, northern redbelly dace have been recorded at 54 sites, including the first documented presence of the species in the Cold River watershed. Although the survey record is limited, it does not suggest a decline in range.

Population Management Status

There are no population management projects targeting northern redbelly dace.

Appendix A: Fish

Regulatory Protection (for explanations, see Appendix I)

Quality of Habitat

Redbelly dace habitat is relatively intact in northern New Hampshire. The average impervious surface coverage in watersheds with redbelly dace records is 1.3%, which is below the threshold of 4% where aquatic habitats typically show signs of degradation (Wang et al. 2001; Stranko et al. 2008; Cuffney et al. 2010). Although some of the 54 watersheds upstream of sites with redbelly dace records have impervious surface coverages as high as 7.1%, more than half of the watersheds have less than 1% impervious cover. Habitat degradation due to development is less of an issue for northern redbelly dace than it is for species that are restricted to southern New Hampshire. Populations in the Cold River and Sugar River watersheds may be more at risk than populations in northern portions of New Hampshire, where there are large tracts of protected land.

Although redbelly dace habitat in rivers and streams is largely intact, populations in ponded habitat, with water levels maintained by a dam, are vulnerable to rapid water level fluctuation, especially during dam repair. Lakes and ponds within the range of redbelly dace are also subject to shoreline development. With increased access comes a greater chance for introduced fish species, such as largemouth bass, which have contributed to the decline in minnow diversity throughout the northeast (Whittier et al. 1997).

Habitat Protection Status

Habitat Management Status

There are no habitat management projects targeting northern redbelly dace.

Threats to this Species or Habitat in NH

Threat rankings were calculated by groups of taxonomic or habitat experts using a multistep process (details in Chapter 4). Each threat was ranked for these factors: Spatial Extent, Severity, Immediacy, Certainty, and Reversibility (ability to address the threat). These combined scores produced one overall threat score. Only threats that received a "medium" or "high" score have accompanying text in this profile. Threats that have a low spatial extent, are unlikely to occur in the next ten years, or there is uncertainty in the data will be ranked lower due to these factors.

Mortality from subsidized or introduced predators (Black Bass; pickerel; sunfish) (Threat Rank: High)

Fish species including largemouth bass, smallmouth bass, black crappie, and northern pike are often illegally introduced into waterbodies by anglers to create new fishing opportunities. These introductions can significantly alter the species composition of a lake or pond.

Introductions of predator fish species have been implicated in an overall loss of minnow species diversity throughout the northeast (Whittier et al. 1997)

List of Lower Ranking Threats:

Habitat degradation from water level management

Habitat loss and degradation due to shoreline development

Actions to benefit this Species or Habitat in NH

Distribution surveys

Objective:

Map the distribution of fish species of conservation concern.

General Strategy:

Continue to conduct surveys to monitor the distributions of fish species of concern in New Hampshire.

Political Location:

Watershed Location:

Life history research

Objective:

Study the life histories of fish species of conservation concern in New Hampshire.

General Strategy:

There is a lack of basic information on the reproductive behavior, foraging habits, habitat requirements, seasonal movement patterns and other aspects of the life history of many lesser known fish species of concern in New Hampshire. A better understanding of these species would aid in the assessment of potential threats and the development of appropriate management actions.

Also of interest is their ecological role in aquatic communities and their potential use as indicators for water quality or intact habitat.

Political Location:

Watershed Location:

Water level management

Primary Threat Addressed: Habitat degradation from water level management

Specific Threat (IUCN Threat Levels): Natural system modifications

Objective:

Reduce the aquatic habitat impacts associated with artificial water level fluctuation at dams.

General Strategy:

Work with dam managers to achieve water level fluctuations that mimic natural flow regimes. Practices such as rapid changes in water level, excessive winter drawdown, and significantly reducing downstream flow to refill a waterbody should be avoided. Engaging stakeholders, including shorefront property owners, boaters, anglers, and hydropower project owners is critical to changing long established water level management traditions. The NHDES Dam Bureau is the lead on dam management issues in New Hampshire. The best strategy for improving water level management practices for fish and wildlife is to work with the Dam Bureau to identify opportunities to create more

Appendix A: Fish

natural water level fluctuations at a certain dams and then make slow incremental changes. This allows stakeholders to adjust to the changes and make comments when conflicts arise.

Political Location:

Watershed Location:

Prevent fish species introductions

Primary Threat Addressed: Mortality from subsidized or introduced predators (Black Bass; pickerel; sunfish)

Specific Threat (IUCN Threat Levels): Invasive & other problematic species, genes & diseases / Invasive non-native/alien species/diseases / Named species

Objective:

Prevent the introduction of predatory game fish, which alter the composition of native fish communities.

General Strategy:

Species introductions are notoriously hard to prevent. An angler determined to create a new fishing opportunity by stocking a few fish into a waterbody is hard to deter. Education on the ecological damage that can be caused by introducing nonnative species into a waterbody will help prevent some, but not all deliberate species introductions. In some cases, anglers invested in the existing fishery may make the best advocates against new species introductions. However, outreach efforts will not persuade everyone, so laws, penalties, and adequate funding for enforcement are the last line of defense against species introductions. It is important that penalties are severe enough and the presence of law enforcement is noticeable enough to act as a deterrent. New species introductions are inevitable, but the rate and overall extent of introductions may be contained.

Political Location:

Watershed Location:

References, Data Sources and Authors

Data Sources

Published literature was used to define the global distribution and habitat requirements of northern red-belly dace. New Hampshire Fish and Game (NHFG) unpublished data, New Hampshire Department of Environmental Services (NHDES) Biomonitoring data, and biological surveys by the NHFG from 1937 to 1939 were used to define the distribution of northern redbelly dace within the state. NHFG fish survey data.

Data Quality

There are relatively few records of redbelly dace in New Hampshire (54 records out of over 2,000 sites surveyed), despite extensive electrofishing surveys conducted throughout New Hampshire by NHFG biologists over the last 10 years as part of the Eastern Brook Trout Joint Venture project. The tendency to live in beaver impounded wetland streams and small ponds, which are difficult to survey, may explain why the species is under represented in the fish survey database. Northern redbelly dace are easily confused with finescale dace. The number sites known to contain northern redbelly dace has increased from 7 in 1939 to 54 as of 2013, but the health of individual populations is unknown.

Appendix A: Fish

2015 Authors:

Matthew Carpenter, NHFG, Benjamin Nugent, NHFG

2005 Authors:

Literature

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