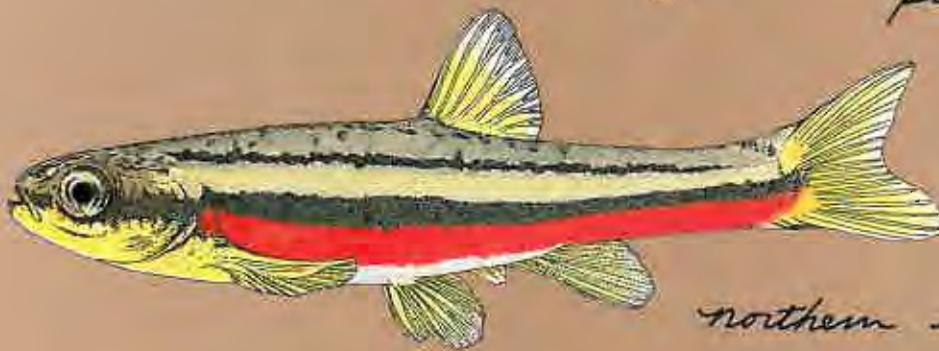


# NEBRASKA'S

## *Threatened and Endangered Species*



*pearl dace*



*northern redbelly dace*

*finescale dace*



### **Pearl, Northern Redbelly and Finescale Dace**

NEBRASKA GAME AND PARKS COMMISSION

# Pearl, Northern Redbelly and Finescale Dace — Threatened species

## Status

The pearl dace (*Margariscus margariscus*), northern redbelly dace (*Phoxinus eos*) and finescale dace (*Phoxinus neogaeus*) are protected as threatened species in Nebraska. These fish inhabit streams in the northern United States and Canada, reaching the southern extent of their range in Nebraska, where they are isolated from the principal populations by several hundred miles.

Nebraska populations represent northern species displaced to the south as glaciers advanced about 12,000 years ago. These fish remained in isolated pockets, relict populations, as the glaciers retreated 8,000 to 10,000 years ago. Of the three, the pearl dace has the most extensive range including most of Canada east of British Columbia and south of the Northwest Territories, extending southward to Virginia, the Great Lakes Region and Nebraska.

The northern redbelly dace has a more restricted range, occurring in Canada from Nova Scotia west to Alberta and extending southward to New York, the Great Lakes Region, Nebraska and Montana. The finescale dace has a distribution similar to the northern redbelly dace, but it is broken into disjunct populations in Alberta, northern Ontario, the central plains and Montana.

In Nebraska these dace often coexist in the headwaters of clear, cool streams similar to the streams they inhabited during the ice ages. Very little information is available concerning their historical distribution, but there are widely scattered records from the early 1900s in Wheeler, Custer, Logan, Dawes and Cherry counties and one record of the northern redbelly dace from 1893 in Knox County. Historically these species occurred over much of north-central Nebraska from Knox County west to the Wyoming border and south to Buffalo County.

Currently, these three dace can be found in widely dispersed small

streams in Keya Paha, Rock, Brown, Sheridan, Wheeler and Cherry counties and in the Niobrara River in Sioux County. The finescale and northern redbelly dace also occur in small, isolated populations in Custer, Logan, Lincoln and Keith counties.

## Description

The finescale dace, northern redbelly dace and pearl dace are members of the minnow family, Cyprinidae. In Nebraska, there are at least 31 species of minnows. These three species are very similar in appearance. Both the finescale and the northern redbelly dace have extremely small scales, giving them a smooth, shiny appearance and an abbreviated lateral line. The finescale dace has a stout body, a large mouth and can reach lengths up to five inches. It has a dark olive-green to brownish cape on the back, a silver-white belly, a single dark horizontal stripe along its side with a narrow iridescent gold stripe above.

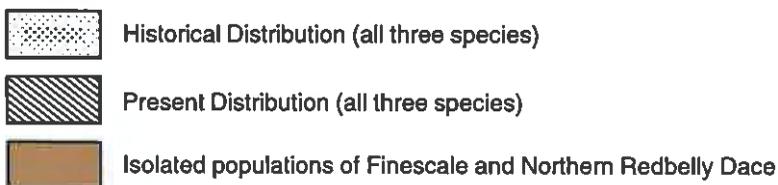
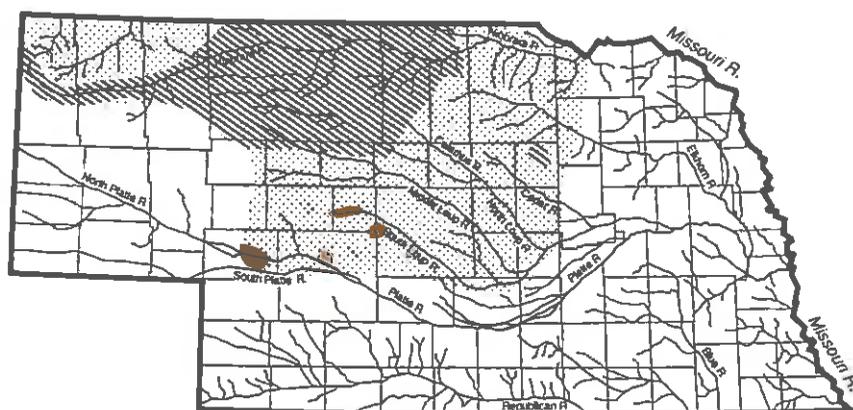
The northern redbelly dace is the smallest of the three, reaching three inches in length, and has a small

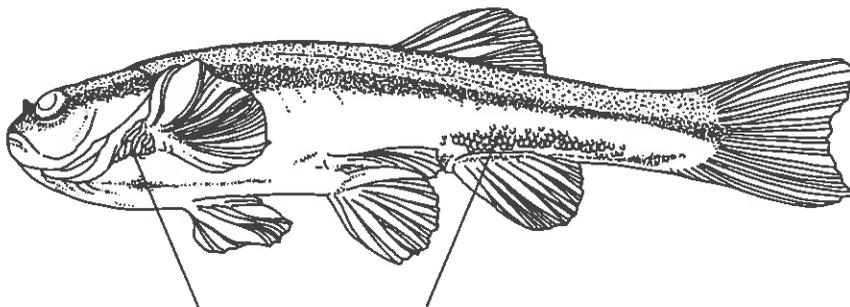
mouth. It has two dark side stripes with a lighter area between them. The upper stripe is thin and often indistinct, becoming a series of dots as it nears the tail. The lower stripe terminates in a dark spot on the tail fin.

The pearl dace has larger, more visible scales that form a herringbone pattern on its back and a complete lateral line that extends all the way to the tail. It can reach lengths of six inches and the mouth is medium in size between the other two dace. Its single side stripe is usually indistinct with a faint, narrow, light cream area above.

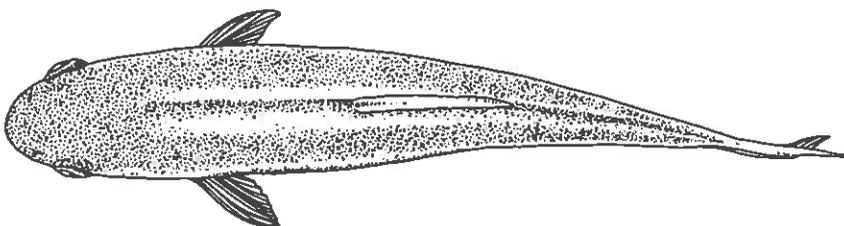
Hybridization complicates species identification even further. The northern redbelly dace commonly hybridizes with the finescale dace, producing predominately female offspring that closely resemble the northern redbelly dace. Where these species hybridize, the finescale dace is rare and the northern redbelly dace more common. The hybrids are always much more common than either of the parental species. Reproduction in hybrid populations is not well understood.

These dace are among Nebraska's

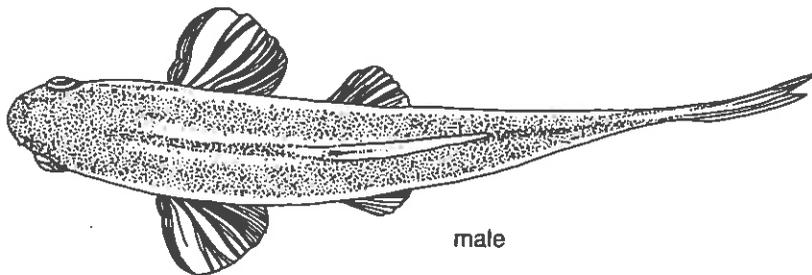




Breeding tubercles exhibited by males during spawning.



female



male

Comparison of enlarged pectoral fins of the male with those of the female.

most colorful minnows. In spring, breeding males of all three species are vividly colored with brilliant shades of red on their sides below the lateral stripe. The male breeding colors are illustrated on the cover. The red color is particularly striking on the northern redbelly dace and can extend onto the belly, fins and lower head. The northern redbelly and finescale dace can also have tinges of yellow on the sides and abdomen. The contrast of these colors with the dark lateral stripes and olive-colored back produces breeding fish whose splendor surpasses that of all of Nebraska's other native minnows.

## Reproduction

Spawning is usually dependent on water temperature, photoperiod or both. It is not known which of these factors controls spawning for these dace, but spawning occurs from April to June. The northern redbelly dace has a longer spawning period that extends into August. The northern redbelly dace releases its eggs into masses of filamentous algae, while the finescale and pearl dace release theirs over the stream bottom.

Breeding females can be recognized by their swollen abdomens, and breeding males by their brilliant colors. Males also exhibit larger pec-

toral fins and breeding tubercles, small projections that develop on the scales near the pectoral fins and elsewhere. The northern redbelly and finescale dace males chase the female during courtship, while the male pearl dace establishes and defends a territory, waiting for the female to come to him.

A single female dace can release anywhere from several hundred to several thousand eggs annually. The eggs hatch in four to 10 days, and young dace reach sexual maturity in one to two years. Most eggs and young do not survive to adulthood, becoming food for other carnivorous species.

## Food

Biologists often discuss the relationship between form and function, especially with respect to feeding. Scientists have demonstrated that carnivorous species have shorter intestines than herbivorous species. Of the three dace, the finescale has a short intestine, the pearl a bit longer intestine and the northern redbelly a long intestine. Additionally, the finescale dace is a large, stout-bodied minnow and has a large mouth.

Diet studies have shown that the finescale dace is carnivorous and consumes relatively large, hard organisms such as fingernail clams, snails and other invertebrates. The smaller-mouthed pearl dace feeds mainly on insects and small crustaceans. The herbivorous northern redbelly dace feeds primarily on algae, but also on insects and zooplankton.

## Habitat

In Nebraska the finescale, northern redbelly and pearl dace are usually found together in relatively pristine, small, cool, spring-fed streams with a moderate to slow current, a sand or gravel bottom and an absence of large predaceous fish. They prefer distinct habitats consisting of quiet

headwaters, marshes, beaver ponds and pools that are connected to the main stream. Aquatic vegetation such as pond-weed, muskgrass, cattails and bulrush is abundant. Overhanging bank vegetation is often present in the form of cottonwoods and small willows.

The faster-flowing main stream is an important corridor allowing interbreeding among populations and providing potential escape routes from predators or habitat destruction. As a rule, these colorful dace do not travel long distances, but tend to stay in one place, making them good indicators of high quality water.

Another important component of their environment is the other fish species present. These dace are typically associated with a distinctive fish community consisting of one or more of the following species: brook stickleback, fathead minnow, brassy minnow, Iowa darter, common shiner and blacknose shiner. Generally these dace exist in larger numbers in streams where fewer species of fish are found.

Predaceous species such as chubs, trout, bass and pike feed on dace. The presence of other minnow species or predaceous fish usually indicates that these dace will not occur in a stream or will be found in small numbers.

## Limiting Factors

Habitat loss and degradation are the major problems facing these dace. Many streams in Nebraska have undergone changes as the result of flood control, agriculture, cattle grazing and urban development. These changes include channelization, drainage of small marsh areas, impoundments, bank stabilization and stream flow depletion. Alteration or flow depletion of a stream can result in loss of the pool-like habitat essential for these dace.

It is easy to envision the detrimental effect of a large stream modifica-

tion project on these fish, but many, equally harmful small projects may go unnoticed. Many small changes have been made to Nebraska streams over the years, and the cumulative effect has been catastrophic for the dace.

Additionally, degradation of habitat through increased turbidity and pollution can render streams unsuitable for dace because they can survive only in relatively pure, clear water. Stream turbidity caused by soil erosion increases when cattle intensively use an area or when the surrounding land is cultivated to the stream bank. Pollution can also take the form of pesticide runoff and effluent from urban areas and livestock feeding operations.

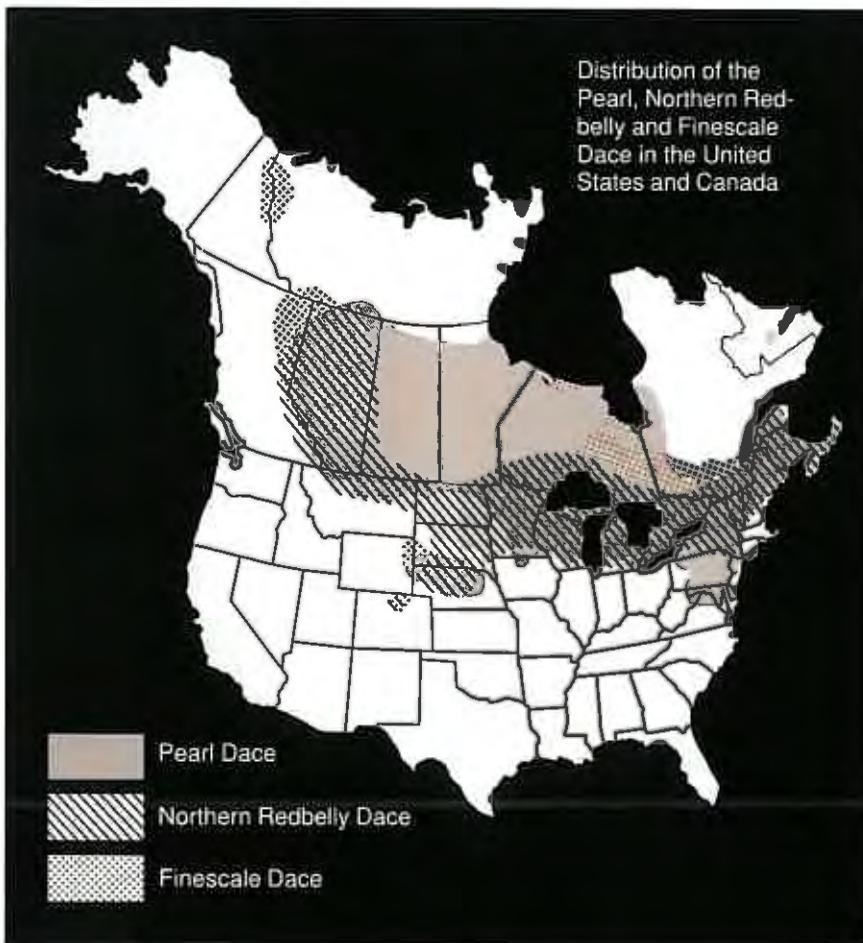
These dace have disappeared from much of their range in Nebraska. The largest remaining populations occur in certain Sandhills streams which are less degraded by

watershed modification or pollution.

The introduction of predaceous, competitive or non-native species may also be an important factor in limiting the range and size of dace populations. These minnows exist in very small numbers or have been completely eliminated from streams with high diversity of fish species or large predaceous fish.

## Management and Outlook

The northern redbelly, finescale and pearl dace have been listed as threatened by the State of Nebraska since 1976. The Nebraska Nongame and Endangered Species Conservation Act of 1975 requires state agencies, in consultation with the Game and Parks Commission, to ensure that their actions do not jeopardize



endangered or threatened species. Over the years this law has slowed the modification of some habitat occupied by the dace. Commission regulations also prohibit the seining or trapping of any bait fish or minnows in streams known to be inhabited by the dace.

Management of these threatened species will require additional surveys to determine specific habitat requirements and population trends and track habitat conditions. Once prime habitats are identified, site-specific management plans will be implemented to maintain or enhance habitat necessary for the continued existence of these species. Management may include obtaining in-stream flow rights, encouraging alternative agricultural practices that reduce soil erosion, planting bands of native vegetation along stream banks, fencing out livestock from critical areas and eliminating sources of pollution.

Long-term habitat protection is dependent on the cooperation and participation of state and local government as well as private landowners. To foster cooperation and protection, information on streams inhabited by these dace, their essential habitat requirements and the types of actions that would jeopardize their survival must be provided to these entities. Land acquisitions, conservation easements or cooperative landowner agreements may be necessary to protect prime habitats. If future research determines that these dace do not exist in a sufficient number of streams or in large enough populations to ensure species survival, reintroduction efforts may become necessary.

The release of additional species of fish or non-native aquatic species into streams occupied by the dace will be carefully evaluated. The Commission will continue to review the need for legislation or regulations to prevent the introduction of non-native species by private citizens or organizations.



The pearl dace can reach six inches. It has larger, more visible scales forming a herringbone pattern, a single, less distinct side stripe and a complete lateral line.



The northern redbelly dace reaches three inches. It has two dark side stripes with a lighter area between them and an abbreviated lateral line.



The finescale dace reaches five inches. It has a dark green-to-brown cape, a dark side stripe under a narrow iridescent gold stripe and an abbreviated lateral line.

The outlook for survival of the northern redbelly, finescale and pearl dace in Nebraska will depend heavily on public attitude and the future use and quality of the state's water. If the land-use practices that are degrading or destroying their habitat continue unabated, these dace and other species may not survive. Successful management and recovery programs will require the cooperation of government and private citizens. By working together and managing land properly, we can ensure a future for the northern redbelly dace, finescale dace and pearl dace in Nebraska streams.



Quiet, clear stream habitat of the pearl, northern redbelly and finescale dace in Keya Paha County, Nebraska.

### Suggested Reading

Hubbs, C.L. and G.P. Cooper. 1936. *Minnows of Michigan*. Cranbrook Institute of Science. Bull. 8. 84pp.

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Note: New data on the occurrence and distribution of these species are being collected constantly, and some of the information in this publication may be outdated. It should be used for a general understanding of the status of these species in Nebraska and not as the sole source of locational information for any report, project, regional/local planning or environmental impact assessment. For current information on these or other threatened and endangered species or for additional copies of this publication, contact the Wildlife Division, Nebraska Game and Parks Commission, P.O. Box 80370, Lincoln, NE 68503.



Forest Stewardship Program



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