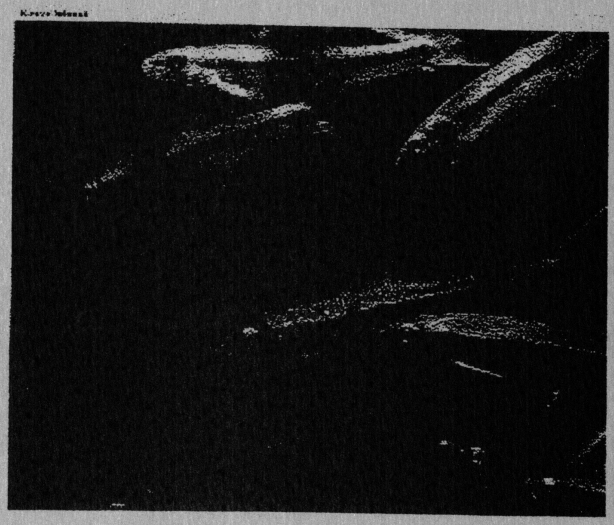
LAKE CHUB SURVEY



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BACKGROUND

This survey and report was funded by the SD GF&P small grants program. My survey was conducted to search and delineate the presence of the lake chub (*Couesius plumbeus*) in western South Dakota. When applying for this grant the lake chub was categorized as historically known by the South Dakota Heritage Database. The lake chub had been documented in Black Hills streams from 1929 to the 1950s (Bailey and Allum, 1962), but had not been collected in the Black Hills since, until the SD GF&P Rapid City Fisheries staff reported finding lake chubs in Deerfield Reservoir last summer (1996). The lake chub was documented in the Little Missouri River in the 1950's (Bailey and Allum, 1962) and in the 1970's (Bich & Scalet, 1977).

METHODS & MATERIALS

The streams and rivers were sampled using three different seines. An Erickson seine (a modified dipnet), a standard wall seine (4'x 8' with 1/4" mesh) and a bag seine (4' x 10' with 1/8" mesh). Standard two man seine hauls were made where terrain allowed. The Erickson seine was utilized in pools and undercut banks. Fish were identified using the following scientific keys: The Fishes of Missouri, How to Know the Freshwater Fish, Fishes of Kansas, and Fishes of Wyoming.

A list of species found at each station is provided in the following pages. Mature trout are identified by species. Fingerlings are listed as Trout sp.. The silvery minnow is listed as *Hybognathus sp.*. I did not attempt to split them by species as *Hybognathus placitus* or *Hybognathus argyritis*.

LITTLE MISSOURI RIVER WATERSHED STATIONS

1. Little Missouri River, Harding Co., T21N, R2E, S16; 28 May 1997
   - Stonecat, *Noturus flavus*
   - Flathead chub, *Hybopsis gracilis*
   - River carpsucker, *Carpiodes carpio*
   - Sand Shiner, *Notropis stramineus*
   - River carpsucker, *Carpiodes carpio*
   - Common carp, *Cyprinus carpio*
   - Fathead minnow, *Pimephales promelas*

2. Little Missouri River, Harding Co., T21N, R2E, S16; 28 May 1997
   - Fathead minnow, *Pimephales promelas*
   - Sand Shiner, *Notropis stramineus*
   - River carpsucker, *Carpiodes carpio*
   - Silvery Minnow, *Hybognathus sp.*
   - Longnose dace, *Rhinicthys cataractae*
   - White sucker, *Catostomus commersoni*
   - Flathead chub, *Hybopsis gracilis*

3. Little Missouri River, Harding Co., T21N, R2E, S16; 28 May 1997
   - Fathead minnow, *Pimephales promelas*
   - River carpsucker, *Carpiodes carpio*
   - Goldeye, *Hiodon alosoides*
   - Channel catfish, *Ictalurus punctatus*
   - Flathead chub, *Hybopsis gracilis*
   - Sand shiner, *Notropis stramineus*
   - Longnose dace, *Rhinicthys cataractae*
   - Silvery minnow, *Hybognathus sp.*
   - Stonecat, *Noturus flavus*

4. Little Missouri River, Harding Co., T21N, R2E, S15; 28 May 1997
   - Flathead chub, *Hybopsis gracilis*
   - River carpsucker, *Carpiodes carpio*
   - Silvery minnow, *Hybognathus sp.*
   - Sand shiner, *Notropis stramineus*
   - Longnose dace, *Rhinicthys cataractae*

5. Little Missouri River, Harding Co., T21N, R2E, S9; 28 May 1997
   - Flathead Chub, *Hybopsis gracilis*
   - River carpsucker, *Carpiodes carpio*
   - Silvery minnow, *Hybognathus sp.*
   - Sand shiner, *Notropis stramineus*
   - Longnose dace, *Rhinicthys cataractae*

6. Kimble Creek mouth, Harding Co., T21N, R2E, S9; 28 May 1997
   - Fathead Minnow, *Pimephales promelas*

7. Little Missouri River, Harding Co., T21N, R2E, S8; 28 May 1997
   - Sand shiner, *Notropis stramineus*
   - Flathead chub, *Hybopsis gracilis*
   - Longnose dace, *Rhinicthys cataractae*
   - Silvery minnow, *Hybognathus sp.*
   - Channel catfish, *Ictalurus punctatus*

8. Little Missouri River, Harding Co., T21N, R2E, S5; 28 May 1997
   Flathead chub, *Hybopsis gracilis*
   Longnose dace, *Rhinicthys cataractae*
   Silvery minnow, *Hybognathus sp.*
   Sand shiner, *Notropis stramineus*
   River carpsucker, *Carpiodes carpio*

9. Little Missouri River, Harding Co., T21N, R2E, S4; 28 May 1997
   Flathead chub, *Hybopsis gracilis*
   Longnose dace, *Rhinicthys cataractae*
   River carpsucker, *Carpiodes carpio*
   Sand shiner, *Notropis stramineus*
   Sauger, *Stizostedion canadense*
   Goldeye, *Hiodon alosoides*
   Fathead minnow, *Pimephales promelas*
   Sauger, *Stizostedion canadense*

10. Little Missouri River, Harding Co., T22N, R2E, S28; 28 May 1997
    Fathead minnow, *Pimephales promelas*
    Sand shiner, *Notropis stramineus*

11. Little Missouri River, Harding Co., T22N, R2E, S21; 29 May 1997
    River carpsucker, *Carpiodes carpio*
    Silvery minnow, *Hybognathus sp.*
    Sand shiner, *Notropis stramineus*
    Shorthead redhorse, *Moxostoma macrolepidotum*

12. Little Missouri River, Harding Co., T22N, R2E, S21; 29 May 1997
    Longnose dace, *Rhinicthys cataractae*
    Goldeye, *Hiodon alosoides*
    Flathead chub, *Hybopsis gracilis*
    Silvery minnow, *Hybognathus sp.*
    Sand shiner, *Notropis stramineus*

13. Little Missouri River, Harding Co., T22N, R2E, S16; 29 May 1997
    Longnose dace, *Rhinicthys cataractae*
    Goldeye, *Hiodon alosoides*
    Flathead chub, *Hybopsis gracilis*
    Silvery minnow, *Hybognathus sp.*
    Sand shiner, *Notropis stramineus*

14. Little Missouri River, Harding Co., T22N, R2E, S8; 29 May 1997
    Sauger, *Stizostedion canadense*
    Flathead chub, *Hybopsis gracilis*
    Silvery minnow, *Hybognathus sp.*
    Sand shiner, *Notropis stramineus*
    Longnose dace, *Rhinicthys cataractae*
    Fathead minnow, *Pimephales promelas*
    River carpsucker, *Carpiodes carpio*

15. Little Missouri River, Harding Co., T22N, R2E, S8; 29 May 1997
    Longnose dace, *Rhinicthys cataractae*
    Flathead chub, *Hybopsis gracilis*
    River carpsucker, *Carpiodes carpio*
    Sand shiner, *Notropis stramineus*
    Silvery minnow, *Hybognathus sp.*

16. Little Missouri River, Harding Co., T22N, R2E, S5; 29 May 1997
    Flathead chub, *Hybopsis gracilis*
    River carpsucker, *Carpiodes carpio*
    Silvery minnow, *Hybognathus sp.*
    Sand shiner, *Notropis stramineus*

17. Little Missouri River, Harding Co., T23N, R2E, S32; 29 May 1997
    Channel catfish, *Ictalurus punctatus*
    Goldeye, *Hiodon alosoides*
    Flathead chub, *Hybopsis gracilis*
    River carpsucker, *Carpiodes carpio*
    Sand shiner, *Notropis stramineus*
    Silvery minnow, *Hybognathus sp.*

18. Little Missouri River, Harding Co., T23N, R2E, S29; 29 May 1997
    Flathead chub, *Hybopsis gracilis*
    Silvery minnow, *Hybognathus sp.*

19. Box Elder Creek, Harding Co., T23N, R1E, S22; 29 May 1997
    Flathead chub, *Hybopsis gracilis*
    Goldeye, *Hiodon alosoides*
    Stonecat, *Noturus flavus*
    Fathead minnow, *Pimephales promelas*
    Silvery minnow, *Hybognathus sp.*
    Longnose dace, *Rhinicthys cataractae*
    Sand shiner, *Notropis stramineus*

20. Little Missouri River (Painter School Crossing), Harding Co., T21N, R2E, S21; 26 August 1997
    Silvery Minnow, *Hybognathus sp.*
    Flathead chub, *Hybopsis gracilis*
    River carpsucker, *Carpiodes carpio*
    Longnose dace, *Rhinicthys cataractae*
    Sand shiner, *Notropis stramineus*
    Shorthead redhorse, *Moxostoma macrolepidotum*
    Green sunfish, *Lepomis cyanellus*

21. Slick Creek (North Fork), Harding Co., T20N, R1E, S27; 26 August 1997
    Golden shiner, *Notemigonus crysoleucas*

22. Slick Creek (South Fork), Harding Co., T20N, R1E, S27; 26 August 1997
    Creek chub, *Semotilus atromaculatus*
    Green sunfish, *Lepomis cyanellus*
    Iowa darter, *Etheostoma exile*
    Carp, *Cyprinus carpio*
    Golden shiner, *Notemigonus crysoleucas*
    Fathead minnow, *Pimephales promelas*
    Sand shiner, *Notropis stramineus*

23. Little Missouri River (Camp Crook), Harding Co., T18N, R1E, S2; 26 August 1997
River carpsucker, *Carpiodes carpio*
Stonecat, *Noturus flavus*
Longnose dace, *Rhinicthys cataractae*
Shorthead redhorse, *Moxostoma macrolepidotum*
Flathead chub, *Hybopsis gracilis*
Channel catfish, *Ictalurus punctatus*

24. Little Missouri River, Harding Co., T18N, R1E, S28; 26 August 1997
Silvery minnow, *Hybognathus sp.*
Longnose dace, *Rhinicthys cataractae*
Channel catfish, *Ictalurus punctatus*
Flathead chub, *Hybopsis gracilis*
Sand shiner, *Notropis stramineus*

RAPID CREEK

1. Rapid Creek, Pennington Co., T1N, R5E, S1 & S12; 27 August 1997
Both sites were attempted , but CFS was 170, making it difficult to sample . No species were collected.

DEERFIELD LAKE WATERSHED STATIONS

1. Castle Creek, Pennington Co., T1S, R4E, S14; 27 August 1997
Longnose dace, *Rhinicthys cataractae*
Brook trout, Salvelinus *fontinalis*

2. Castle Creek, Pennington Co., T1N, R2E, S25; 27 August 1997
Rainbow trout, *Salmo gairdneri*
Trout sp.

3. Castle Creek, Pennington Co., T1N, R2E, S22; 27 August 1997
Trout sp.

4. Castle Creek, Pennington Co., T1N, R2E, S5; 27 August 1997
Trout sp.

5, Castle Creek, Pennington Co., T2N, R1E, S36; 27 August 1997
This was the creeks head, not enough water to sample.

6. Castle Creek , Pennington Co., T1S, R2E, S11; 27 August 1997
Trout sp.

7. Ditch Creek, Pennington Co., T1S, R2E, S23; 27 August 1997
Trout sp.

8. Castle Creek, Pennington Co., T1N, R3E, S16; 27 August 1997
The stream was over a meter deep, and had high CFS, no species were caught.

9. Deerfield Lake, Pennington Co., T1N, R3E, S19; 27 August 1997
Lake chub, *Couesius plumbeus*
Fathead minnow, *Pimephales promelas*
Rock bass, *Ambloplites rupestris*

FRENCH CREEK STATIONS

1. French Creek, Custer Co., T3S, R4E, S28; 28 August 1997
   Creek chub, *Semotilus atromaculatus*

2. French Creek, Custer Co., T3S, R4E, S29; 28 August 1997
   Creek chub, *Semotilus atromaculatus*

3. French Creek, Custer Co., T3S, R3E, S11; 28 August 1997
   Creek chub, *Semotilus atromaculatus*
   Fathead minnow, *Pimephales promelas*
   White sucker, *Catostomus commersoni*

4. French Creek, Custer Co., T3S, R5E, S21; 28 August 1997
   Creek chub, *Semotilus atromaculatus*

5. French Creek , Custer Co., T4S, R7E, S26; 28 August 1997
   Creek chub, *Semotilus atromaculatus*

6. French Creek , Custer Co., T4S, R8E, S19; 28 August 1997
   Creek chub, *Semotilus atromaculatus*
   Fathead minnow, *Pimephales promelas*
   Longnose dace, *Rhinicthys cataractae*
   White sucker, *Catostomus commersoni*

GRACE COOLIDGE STATIONS

1. Grace Coolidge Creek, Custer Co., T3S, R6E, S8; 28 August 1997
   Rainbow trout, *Salmo gairdneri*
   Trout sp.

2. Grace Coolidge Creek, Custer Co., T3S, R7E, S1; 28 August 1997
   Creek chub, *Semotilus atromaculatus*
   Longnose dace, *Rhinicthys cataractae*
   Mountain sucker, *Catostomus platyrhynchus*
   White sucker, *Catostomus commersoni*
   Trout sp.

SPRING CREEK STATIONS

1. Spring Creek, Pennington Co., T2S, R4E, S22 27 August 1997
   Trout sp.

2 Spring Creek, Pennington Co., T1S, R8E, S27 28 August 1997
   Creek chub, *Semotilus atromaculatus*
   Carp, *Cyprinus carpio*
   White sucker, *Catostomus commersoni*
   Fathead minnow, *Pimephales promelas*
   Green sunfish, *Lepomis cyanellus*

BOX ELDER CREEK STATION

1. Box Elder Creek, Pennington Co., T2N, R5E, S2 July & August 1997
   Longnose dace, *Rhinicthys cataractae*
   Mountain sucker, *Catostomus platyrhynchus*
   White sucker, *Catostomus commersoni*

SUMMARY

The goal of my survey was to document the presence or absence of the lake chub in historic sites. My survey documented the lake chub in only one location, Deerfield Reservoir. I surveyed Castle Creek upstream and downstream from Deerfield Reservoir, but could not locate even one lake chub. After intensely surveying historic sites, it is my opinion the lake chub is extirpated from the following areas in South Dakota: French Creek, Grace Coolidge Creek, Spring Creek, Rapid Creek, Little Missouri River and Castle Creek away from Deerfield Reservoir.

I contacted Wyoming Game and Fish and the USFWS Bismarck ND office (pers. com., Wade King) in regards to the lake chub in the Little Missouri River and the Black Hills region of Wyoming. The USFWS and the state of North Dakota had surveyed the Little Missouri River this summer and had not found any lake chubs. In Wyoming a recent survey had been conducted of the Missouri River drainage's (Patton, 1997). The results showed lake chub in only two areas near South Dakota, one station in the Belle Fourche River and one station at the headwaters of the Little Missouri River. This survey showed a decline of the lake chub in Wyoming over the last thirty years.

After writing this grant I found a documented historic record of lake chubs in Box Elder Creek in Pennington County that wasn't in the SD Heritage database.. I attempted to survey this area twice, but with unusually high CFS this year I was not able to intensely survey this location. I did collect fish but the lake chub was not present. South Dakota GF&P surveys of this stream have not found any lake chubs.

Rapid Creek had a CFS of 170 when I twice attempted to sample it. I did not capture any fish at the historic sites. The SD GF&P has surveyed this stream and had not located any lake chubs.

The decline of the lake chub can probably be attributed to several factors. Predation by introduced species, such as trout, and competition for food are probably the major factors. Trout and lake chubs have similar diets. Pollution of the streams could very well be a contributing factor. Mining chemicals can diminish or eliminate food sources. Lake chubs may be sensitive to chemicals and pollutants. The cyprinads that still inhabit the Black Hills streams have a high tolerance for environmental changes and are generalists in their dietary needs. The lake chubs are specialists in their dietary needs. When ecosystems are influenced by environmental factors, the specialists are the first species that decline or become extinct. The reason they still inhabit Deerfield Reservoir, is that a lake has refuges (such as vegetation beds) which allow their young to escape predation and provides a larger food base, decreasing competition. Streams have limited refuges and food supplies.

My survey data shows that the lake chub should be a candidate for listing as a state endangered or threatened species. The lake chub had been listed as historically known in South Dakota. The lake chub had been in Deerfield Reservoir all along, but had been misidentified as creek chubs. Because of a more intense focus on native nongame species this misidentification error will probably not happen in the future. Before listing, a survey in the Belle Fourche watershed should be conducted to determine if any lake chubs are present. I did not survey this area as South Dakota has no records of it being there. I only became aware of their presence in this drainage in Wyoming while writing this report.

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