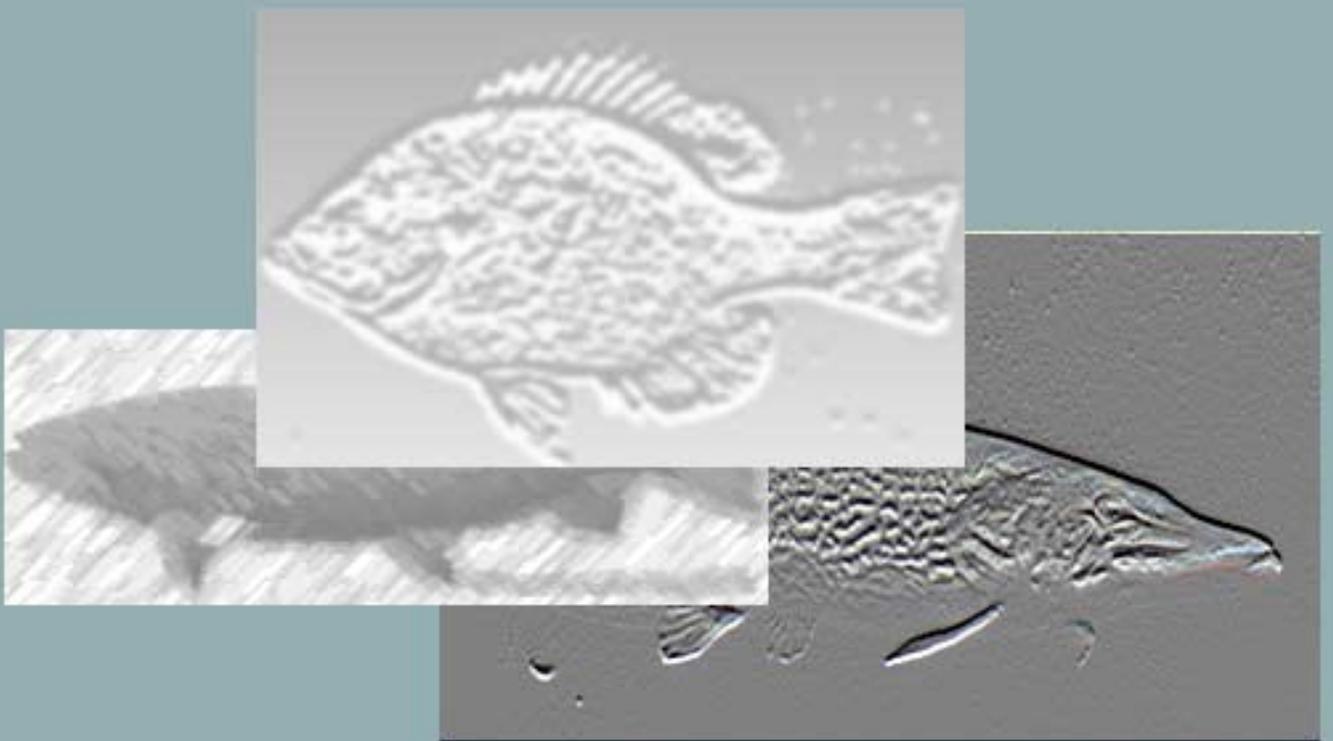


Selection Report:
Aquatic Management
Indicator Species
for the Black Hills
National Forest



Introduction

The Land and Resource Management Plan for the Black Hills National Forest was revised in 1997 and subsequently appealed. The deputy chief of the Forest Service signed his decision on the appeals on October 12, 1999. Among other instructions, the decision directed the forest to designate one or more aquatic management indicator species (MIS). This report documents the forest's designation of aquatic MIS in response to the appeal decision.

Implementing regulations and manual direction describe two categories of MIS. The first category includes species that meet one or more special criteria, such as state or federal listing, commercial importance, or dependence on special habitat. The second category includes species that react to

habitat changes in ways that are representative of the reactions of larger groups of species. These indicator species can reflect changes in biological communities. To address both these categories, the forest 1) identified species that meet the special criteria and 2) reviewed aquatic biological communities and determined which species represent them.

This report is divided into two sections and five appendices. The first section explains the results of the aquatic MIS designation process according to the categories listed above. The second section describes the selection process, from the text of regulation and manual direction to comparison of the species that meet each criterion.

Results

Special Criteria Species

1. Endangered and threatened plant and animal species identified on Federal lists for the planning area

This category addresses species whose viability is of concern and which are protected by special laws that may affect forest management. Included are endangered and threatened species identified on Federal lists for the planning area *if* the plan may affect the species (36 CFR 219.19 (a) (1)). Appropriate and representative federally listed sensitive species may also be included (FSM 2621.1). No aquatic species are listed on federal lists as endangered, threatened or sensitive in the Black Hills. Species listed by States under similar categories are addressed below under "Non-game species of special interest".

2. Species with special habitat needs that may be influenced significantly by planned management programs

This group includes species dependent on specialized habitat that could be significantly affected by the plan. Specialized habitat may include streams with unusual water temperature or substrate. The Black Hills' only self-sustaining population of rainbow trout occurs in Spearfish Canyon, indicating that special habitat may exist in this part of Spearfish Creek; however, the area would not be significantly affected by the plan. There are no other species of fish in the Black Hills with special habitat needs.

3. Species commonly hunted, fished, or trapped

This group includes fish managed as game fish by the State of South Dakota or Wyoming.

Brook trout

Reasons for selection Both brook and brown trout are important species in Black Hills

fisheries. Though they occur together in some areas, they represent two different types of habitat. Brook trout need cold, clean headwater streams and lakes. They will not thrive in warm or turbid water. Most brook trout populations in the Black Hills are self-sustaining, though some stocking occurs.

Brown trout

Reasons for selection As stated above, brown trout are an important fishery species in the Black Hills. Like brook trout, they prefer cold, clean headwater streams, but they can survive in water that is deeper, warmer, and slower than would be tolerated by other trout. They are widely stocked in the Hills.

4. Non-game species of special interest

These species are of special interest to the Forest Service, other agencies, or the public for reasons other than the above criteria. This group includes species listed by States as rare.

Finescale dace

Reasons for selection The finescale dace is listed as **endangered** in South Dakota and as **rare** in Wyoming. Populations in both states are considered disjunct and at the periphery of the species' range. The species is native to the Black Hills, where it is known to occur only in a few small creeks (mainly in beaver ponds), one small reservoir, and in the Redwater River a few miles outside the Forest boundary. Little is known about this species, but it appears to be negatively affected by habitat changes such as increases in stream temperature and sedimentation. Activities proposed by the plan could potentially cause such changes.

Lake chub

Reasons for selection The lake chub is listed as rare by the State of South Dakota. The species is native to the Black Hills and appears to occur only in Deerfield Lake, though it previously was common in Black Hills streams. This population is disjunct and relict and has declined in recent years, possibly due to a decrease in water quality.

Mountain sucker

Reasons for selection This species is native to the Black Hills. Surveys conducted over the last 40 years found mountain suckers in many creeks. However, the most recent surveys in the mid to late 1990s found the species to be missing from a substantial number of these locations. The mountain sucker is associated with clear, cold streams with aquatic vegetation and undercut banks; little else is known about its habitat requirements.

5. Ecological Indicator Species

Species selected because their population changes are believed to indicate the effects of management activities on other species of selected major biological communities or on water quality.

Large lakes

Brown trout

Reasons for selection As stated above, brown trout are an important fishery species in the Black Hills. Like brook trout, they prefer cold, clean headwater streams, but they can survive in water that is deeper, warmer, and slower than would be tolerated by other trout. They are widely stocked in the Hills.

Lake chub

Reasons for selection The lake chub is listed as rare by the State of South Dakota. The species is native to the Black Hills and appears to occur only in Deerfield Lake.

Small lakes

No Species Selected

No species found to be responsive to management actions.

Perennial flow streams

Brown trout

Reasons for selection Brown trout prefer cold, clean headwater streams, but they can survive in water that is deeper, warmer, and slower than would be tolerated by other trout. They are widely stocked in the Hills

Decadal variable flow streams

Brook trout

Reasons for selection Brook trout need cold, clean headwater streams and lakes. They will not thrive in warm or turbid water. Most brook trout populations in the Black Hills are self-sustaining, though some stocking occurs.

Finescale dace

Reasons for selection Little is known about this species, but it appears to be negatively affected by habitat changes such as increases in stream temperature, sedimentation and predation by trout.

Selection Process

Special Criteria Species

1. Endangered and threatened plant and animal species identified on Federal lists for the planning area

Direction

CFR 36 CFR 219.19 (a) (1) In order to estimate the effects of each alternative on fish and wildlife populations, certain vertebrate and/or invertebrate species present in the area shall be identified and selected as management indicator species and the reason for their selection will be stated. These species shall be selected because their population changes are believed to indicate the effects of management activities. In the selection of management indicator species, the following categories shall be represented where appropriate: Endangered and threatened plant and animal species identified on State and Federal lists for the planning area...

FSM FSM 2621.1 In selecting management indicators, meet the following requirements: 2. Select Federally listed endangered or threatened species as management indicators if the forest or project plan potentially impacts those species, or if opportunities exist to enhance recovery efforts. Consider for selection all sensitive species in the plan or project area.

Species meeting criterion

No aquatic species are federally listed as endangered, threatened, or sensitive.

2. Species with special habitat needs that may be influenced significantly by planned management programs

Direction

CFR 36 CFR 219.19 (a) (1) In the selection of management indicator species, the following categories shall be represented where appropriate: ...species with special habitat needs that may be influenced significantly by planned management programs...

FSM FSM 2621.1 Also, consider for selection...indicators representing special habitats, habitat components...

Species meeting criterion

No Forest species meet this criterion. Rainbow trout was, however, identified as having special habitat needs. One portion of Spearfish Creek in Spearfish Canyon supports the only known naturally reproducing population of rainbow trout in the Black Hills. The high-gradient stream habitat present in this location is thought to be the main factor in the existence of this population. The 1997 Black Hills Land and Resource Management Plan places special restrictions on management activities in Spearfish Canyon. Due to these restrictions, it is unlikely that planned management programs will significantly influence rainbow trout or the high-gradient stream habitat. Therefore rainbow trout does not meet this criterion.

3. Species commonly hunted, fished, or trapped

Direction

- CFR** 36 CFR 219.19 (a) (1) In the selection of management indicator species, the following categories shall be represented where appropriate: ...species commonly hunted, fished, or trapped...
- FSM** FSM 2621.1 Also, consider for selection those species in demand for recreational, commercial, or subsistence use...

Species meeting criterion

Black bullhead

Black bullheads are an introduced game species with localized distribution within the Black Hills National Forest. Black bullheads are very tolerant of drought, warm water, low oxygen content, organic pollution, and turbidity. Black bullheads do not adversely affect other game species. This species is a poor candidate for an indicator species.

Black crappie

Black crappie is an introduced warm water game species found in larger Black Hills lakes. This species is sensitive to extended periods of turbidity, but tolerant of cooler water, a variety of spawning substrates, and moderate changes in pH and oxygen content. Black crappie prefer clear water with extensive vegetation beds for population maintenance; no interspecific competition exists for this species. Except for a low tolerance for extended periods of turbidity, this species is a poor candidate for an indicator species.

Brook trout

Brook trout are an introduced cold water species present in Forest lakes and many streams of various sizes and conditions. Most brook trout populations are self-sustaining, though some stocking occurs; brook trout are important in local fisheries. The species is sensitive to increases in water temperature, low dissolved oxygen, and sedimentation, but also is affected by competition with brown trout. This species is likely to be affected by various management activities and is a good indicator species candidate.

Brown trout

Brown trout are an introduced cold water game species found in numerous streams and in larger, cooler lakes. Many populations are self-sustaining but stocking is also common. Brown trout are also important in local fisheries. This species is sensitive to increased water temperature and turbidity. Brown trout are more tolerant and resilient than other trout and less likely to show effects from habitat changes; however, spawning success can be negatively affected by turbidity. Brown trout is a good indicator species candidate.

Green sunfish

Green sunfish are an introduced warm water game species with limited distribution within Black Hills streams. Green sunfish are very tolerant of flooding, low flow, warm water, and turbidity. This species is of limited importance to local fisheries, and may, in some instances out compete other game and native species. Green sunfish are unlikely to show effects due to habitat changes caused by management activities.

Kokanee salmon

Kokanee salmon are very limited in occurrence within the forest boundary; one observation exists of a small, introduced population.

Largemouth bass

Largemouth bass are introduced species common in larger Black Hills lakes. This species is tolerant of warm, eutrophic waters, but is sensitive to turbidity. Largemouth bass are unlikely to show effects due to habitat changes caused by management activities.

Northern pike

Northern pike are an illegally introduced game species into all or almost all Black Hills lakes. The illegal introduction of Northern pike in Sheridan Lake and subsequent reproduction of this species had made trout management economically impossible. Trout stocking in Sheridan Lake was discontinued in 1997. Northern pike are tolerant of a wide variety of lake and river conditions such as low dissolved oxygen, occasional turbidity, a range of alkalinity and pH. Northern pike are not known to be sensitive to habitat changes brought on by management activities.

Rainbow trout

Rainbow trout are an introduced game species stocked in many Forest streams and lakes; self-sustaining populations exist only in Spearfish Canyon. This species is sensitive to sedimentation, increased water temperature and annual fluctuations in pH. The Forest contains few high-gradient streams or other suitable habitat for self-sustaining populations. Non self-sustaining populations are poor candidates for management indicators.

Rock bass

Rock bass are an introduced game species common in larger lakes; fewer exist in streams. Although this species appears to be sensitive to pollution and environmental degradation, it is also fairly tolerant of management activities.

Smallmouth bass

Smallmouth bass are an introduced game species and found only in Stockade Lake. They are sensitive to sedimentation and lack of forage, but evidently tolerant of eutrophic conditions. This species is probably not a good candidate for indicator species, since Stockade Lake is 1) in Custer State Park, 2) highly eutrophic, and 3) fed mainly by French Creek, which runs almost entirely through private pastureland, residential areas, and the city of Custer for several miles above the lake. Because of these factors, the smallmouth bass population is unlikely to be noticeably affected by National Forest management activities.

Splake

Splake is an introduced game species found only in Deerfield Lake; this species does not reproduce. Its sensitivity to management activities is similar to brook trout. Limited distribution, however, makes this species an unlikely candidate for a management indicator species.

Stonecat

Very few stonecat are known to exist in the Forest. The species is more suited to larger rivers and prairie habitats.

Yellow perch

Yellow perch are found in various Black Hills lakes. Yellow perch is very tolerant to most water quality conditions and is often considered an undesirable species due to its ability to overpopulate and out compete other more desirable species. Yellow perch are very tolerant of most forest management activities.

Comparison of species meeting criteria

Brook trout and brown trout populations are widespread in the Forest and, though stocked, are also self-sustaining in many locations. Both species are important to the Forest fisheries program and could potentially be affected by forest management, mainly through sedimentation of spawning habitat and increase in water temperature. There is only one self-sustaining rainbow trout population, and it seems to be dependent on habitat that is very limited in the Black Hills. Black crappie, rock bass, and largemouth bass are sensitive to certain habitat changes but are 1) tolerant of a wider range of conditions than are trout and 2) are not as prominent a factor in area fisheries. All other species examined were found to be 1) tolerant of management activities or 2) too limited in their distribution or population size.

4. Non-game species of special interest

Direction

CFR 36 CFR 219.19 (a) (1) In the selection of management indicator species, the following categories shall be represented where appropriate: ...non-game species of special interest...

Species meeting criteria

Finescale dace

The State of South Dakota lists the finescale dace as endangered while the State of Wyoming lists the species as rare. Populations in both states are considered disjunct and at the periphery of the species' range. Finescale dace is native to the Black Hills, where it is known to occur only in a few small creeks (mainly in spring holes and beaver ponds), small reservoirs, and in the Redwater River a few miles outside the Forest boundary. Little is known about this species, but it appears to be negatively affected by habitat changes such as increases in stream temperature and sedimentation.

Lake chub

The lake chub is listed as rare by the State of South Dakota. The species is native to the Black Hills and appears to be found only in Deerfield Lake, though it previously was common in Black Hills streams. This population is disjunct and relict and has declined in recent years, possibly due to drought cycles and/or a decrease in water quality.

Longnose sucker

The State of South Dakota lists this native species as threatened and disjunct. In the Black Hills, longnose sucker populations appear to have declined in recent decades and the species is known to exist in very few locations. No recent populations are found on National Forest System lands.

Mountain sucker

Mountain suckers are native to the Forest. Surveys conducted over the last 40 years found mountain suckers in many creeks. However, the most recent surveys in the mid to late 1990s found the species to be missing from a number of historic locations. The species is not currently listed by either state (SD or WY) or tracked by their Natural Heritage Database Programs. The mountain sucker is associated with clear, cold streams with aquatic vegetation and undercut banks; little else is known about its habitat requirements.

Plains topminnow

The plains topminnow is a Region 2 sensitive species and is considered rare by the State of South Dakota. It was previously on the state's threatened list but was delisted in 1996 after

surveys showed it to be more widespread than was once thought. It is found on the prairies of southern South Dakota and has been observed in Fall River, which lies on the Southern boundary of the National Forest. This area is mostly private property and includes very little National Forest land. This species may be an indicator of water quality

Comparison of species meeting criteria

Lake chub and mountain sucker are native to the Forest and have declined in recent years; reasons are not clear but both species appear to be associated with clear, cold water. Little is known about either species' response to management actions. Lake chub is listed by the State of South Dakota. The State of South Dakota lists the finescale dace as endangered while the State of Wyoming lists the species as rare

5. Ecological Indicator Species

Direction

CFR 36 CFR 219.19 (a) (1) In the selection of management indicator species, the following categories shall be represented where appropriate: ...additional plant or animal species selected because their population changes are believed to indicate the effects of management activities on other species of selected major biological communities or on water quality.

FSM FSM 2621.1 Also, consider for selection...indicators representing...plant and animal communities. Select ecological indicators (species or groups) only if scientific evidence exists confirming that measurable changes in these species or groups would indicate trends in the abundance of other species or conditions of biological communities they are selected to represent.

Aquatic Macro-invertebrates

Aquatic insects have been shown to be a good indicator of aquatic condition in some locations. At this point, however, it is not feasible to use insects as MIS on the Black Hills. Large-scale monitoring is required, and extensive data would need to be collected prior to determining monitoring and response protocol. Baseline data does not currently exist, and there would be a delay of two to three years before monitoring could begin. For these reasons, insects were not considered for MIS designation; however, collection of baseline data should begin now so it will be available for future needs.

Large lakes (Pactola, Sheridan, Deerfield; Stockade)

species	also	indicates effects on other spp	tolerant (no mgmt effect)	lo-
cal/wide				
black bullhead	game	no	very	localized
black crappie	game		fairly	widespread
brook trout	game		not very	moderate
brown trout	game		not very	moderate
fathead minnow		no	yes	moderate
golden shiner			fairly	widespread
lake chub	special interest		no	very localized
largemouth bass	game		yes	widespread
longnose sucker	t&e		no	very localized
rainbow trout	game		not very	widespread
rock bass	game		fairly	widespread
smallmouth bass	game	no	yes	localized
splake	game		not very	localized
spottail shiner		n/a	n/a	very localized if exists at all
white sucker		no	very	everywhere
yellow perch	game	no	very	widespread

Small lakes (all lakes other than large that are large than 35 acres)

species	also	indicates effects on other spp		tolerant (no mgmt effect)	lo-
cal/wide					
black bullhead	game	no	very	localized	
brook trout	game		not very	moderate	
brown trout	game		not very	moderate	
fathead minnow		no	yes	widespread	
finescale dace	t&e		no	very localized	
longnose sucker	t&e		no	very localized	
rainbow trout	game		not very	very widespread	
stonecat	game			very localized if exists at all	
white sucker		no	very	widespread	
yellow perch	game	no	very	widespread	

Perennial flow Streams (see map)

species	also	indicates effects on other spp		tolerant (no mgmt effect)	lo-
cal/wide					
black bullhead	game	no	very	localized	
black crappie	game		fairly	very localized	
brook trout	game			widespread	
brown trout	game		not very	widespread	
creek chub			?	localized	
fathead minnow		no	yes	moderate	
golden shiner			fairly	localized	
largemouth bass	game		yes	localized	
longnose dace			not very	widespread	
longnose sucker	t&e		no	localized	
mountain sucker	special concern?			? localized	
northern pike	game	no	yes	localized	
rainbow trout	game		not very	widespread	
rock bass	game		fairly	localized	
white sucker		no	very	widespread	
yellow perch	game	no	very	localized	

Decadal variable flow streams (see map)

species	also	indicates effects on other spp		tolerant (no mgmt effect)	lo-
cal/wide					
black bullhead	game	no	very	localized	
bluegill	game	no	very	localized	
brook trout			not very	widespread	
brown trout	game		not very	widespread	
creek chub			?	localized	
fathead minnow		no	yes	moderate	
finescale dace	t&e		no	very localized	

longnose dace			no	widespread
longnose sucker	t&e		no	localized
mountain sucker	special concern?			? localized
plains minnow		maybe	?	very localized
plains topminnow	t&e	maybe	no	very localized
rainbow trout	game		not very	widespread
rock bass	game		fairly	localized
sand shiner		no	very	very localized
white sucker		no	very	widespread
yellow perch	game	no	very	localized

Not considered

Non-native species reported at one time in the Black Hills but apparently no longer present

Bluegill
 Brook stickleback
 Cutthroat trout
 Emerald shiner
 Goldfish
 Lake trout
 Rainbow smelt
 Shorthead redhorse

Species found near but not within the Black Hills; appropriate habitat not found in the Black Hills

Channel catfish
 Plains killifish
 Shorthead redhorse

Undesirable exotic species

Common carp
 European rudd

Appendix A

Species List and Descriptions

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Rock bass	33	
Sand shiner	34	
Shorthead redhorse	35	
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Black bullhead

Ameiurus melas

Other names

Bullhead, mudcat, slick, common bullhead, horned pout, yellowbelly bullhead, polliwog, stinger, chucklehead, river snapper (T1);
Ictalurus melas (T1), *Silurus melas* (B5h)

Status

Federal threatened
Federal endangered
Federal sensitive
State threatened
State endangered
State rare

Black Hills data

Native
x Introduced

Location

Creeks: French, Galena, Hot Brook, Rapid, Spring

Lakes: Cook, Hemler, Sheridan, Stockade (B6, E1, E2, F4, M1, M2, M3, M4, M6, M8, M9, M10, M12, P3, S3, S4)

Summary of occurrence data

1. Sheridan Lake: Black bullheads not observed until recently, but have become common (M4p131).
2. Stockade Lake: Black bullheads were the most common species according to sampling (S3p97).
3. Cook Lake, Hemler Reservoir: Present in 1996; no other survey data available.
4. French, Rapid, Spring Creeks: Bullheads not present in most recent surveys (M8, M10).

Typical habitat

Inhabits clear to very turbid water in small ponds, pools in small slow-flowing streams, and lakes. Prefers mud or silt bottom with rooted aquatic vegetation. Optimal temperature 18-29C; will tolerate pH below 5.0, but can probably tolerate and survive to as low as 3.4. (B5h)

Black Hills habitat

Common in the more eutrophic lakes; rare in streams (M6, M8, M10).

Black Hills management

- x Game fish (S1p21, Wy2)
Currently being stocked
If stocked, also reproduces naturally
Nongame
Protected

If non-game, is species of special interest?
N/A

Special habitat needs

None. Black bullheads are hardy fish that are profuse in slow-moving waters and tolerant of warm water with low oxygen content (T1).

Habitat changes to which species is sensitive

None. Very drought-tolerant; can occupy shallow muddy streams with low food and oxygen content (B5h).

Management practices that affect species

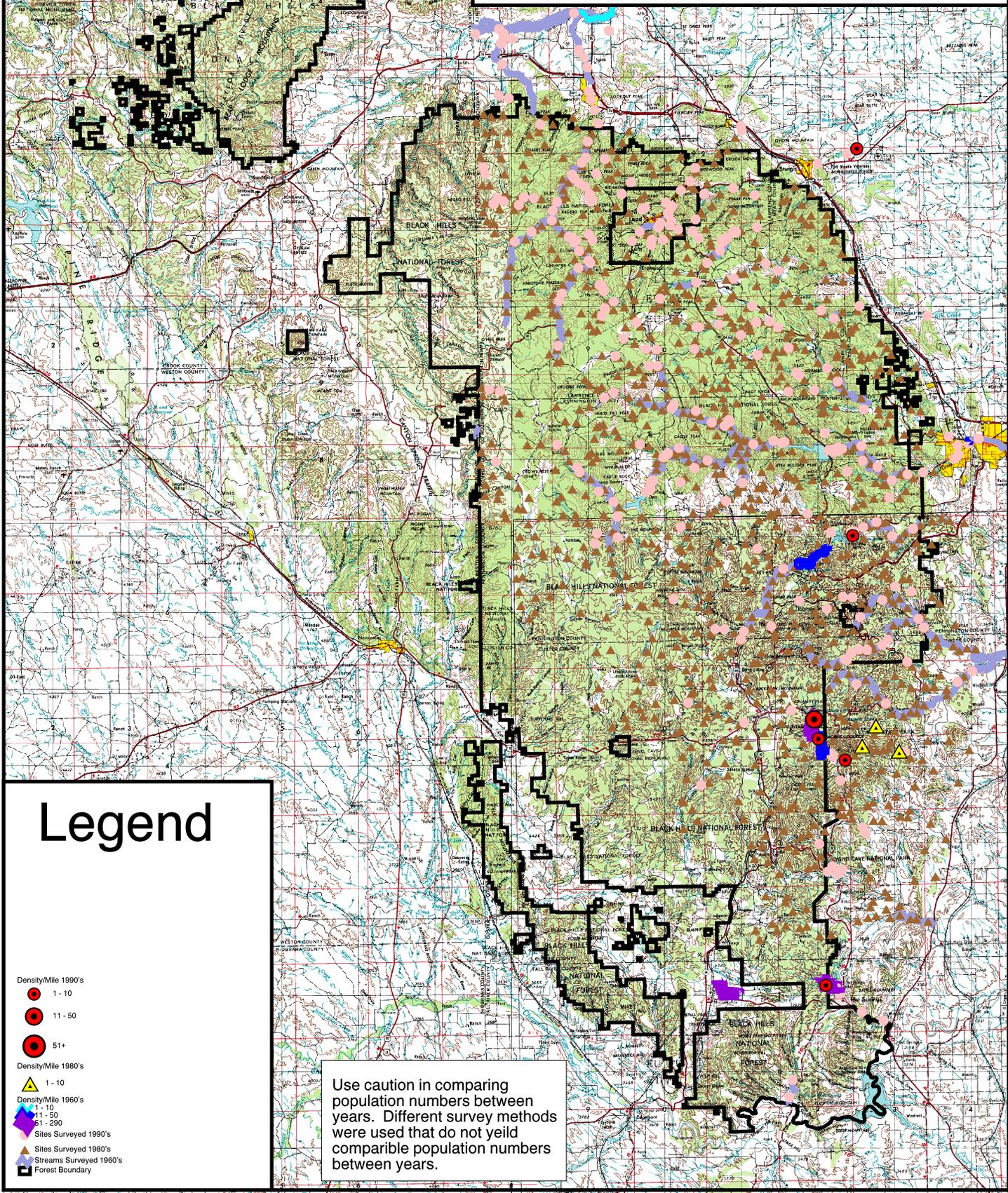
None known; species is very tolerant.

Ecological indicator (*population changes are believed to indicate the effects of management activities on species of selected major biological communities or on water*):

No; black bullheads are likely to be one of the last survivors of a drought (T1), are tolerant of organic pollution. Apparently can live in harmony without adverse effects on other game species. (B5h)

Black Bullhead Estimated Number/Mile 1960's, 80's and 90's

Wyoming Data
not currently
available in a
digital database



Legend

- Density/Mile 1990's
 - 1 - 10
 - 11 - 50
 - 51+
- Density/Mile 1980's
 - ▲ 1 - 10
- Density/Mile 1960's
 - ▲ 1 - 10
 - ▲ 11 - 50
 - ▲ 51 - 290
- Sites Surveyed 1990's
- Sites Surveyed 1980's
- Streams Surveyed 1960's
- Forest Boundary

Use caution in comparing population numbers between years. Different survey methods were used that do not yield comparable population numbers between years.

Black crappie

Pomoxis nigromaculatus

Other names

Status

Federal threatened
Federal endangered
Federal sensitive
State threatened
State endangered
State rare

Black Hills data

Native
x Introduced

Location

Creeks: French Creek

Lakes: Stockade, Pactola, Sheridan

Summary of occurrence data

1. Lakes: Present and fairly common according to latest surveys (M4p111, S3).
2. French Creek: Not present in 1997 (M8).

Typical habitat

Prefers clear, quiet ponds, lakes and small rivers. Classified as warm water taxa. Spawns on mud, sand, or gravel substrates in moderately dense beds of aquatic vegetation in shallow water. (B5s)

Black Hills habitat

Found mainly in the larger lakes.

Black Hills management

x Game fish (S1p21, Wy2)
Currently being stocked
If stocked, also reproduces naturally
Nongame
Protected

If non-game, is species of special interest?

N/A

Special habitat needs

Clear water and extensive beds of aquatic vegetation are necessary for population maintenance; does not respond well to turbid water (B5s).

Habitat changes to which species is sensitive

Spawning success is negatively affected by reduction in water level in spring and by large changes in water temperature, pH and oxygen content. Larvae are intolerant of organic pollution. Extended periods of water turbidity are detrimental. (B5s)

Management practices that affect species

Adverse: Reduction in stream pools, aquatic vegetation, large woody debris; increase in sedimentation. (B5s)

Ecological indicator (*population changes are believed to indicate the effects of management activities on species of selected major biological communities or on water*):

Probably not – limiting factors on population appear to be water turbidity, availability of spawning areas, adequate food sources, and harvest pressure.

No
Map
Available

Bluegill

Lepomis macrochirus

Other names

Status

Federal threatened
Federal endangered
Federal sensitive
State threatened
State endangered
State rare

Black Hills data

Native
x Introduced

Location

Pactola Reservoir (S3)

Summary of occurrence data

Very few bluegill were recorded in Pactola in 1997 and none in 1998 (M4).

Typical habitat

Lakes, ponds, streams, and rivers in moderately swift to quiet water; classified as warm water taxa (B5t).

Black Hills habitat

Species probably is no longer present in the Black Hills.

Black Hills management

x Game fish (S1p21, Wy2)
Currently being stocked
If stocked, also reproduces naturally
Nongame
Protected

If non-game, is species of special interest?

N/A

Special habitat needs

None. Bluegills inhabit waters with a variety of trophic conditions, substrates, vegetation, and food sources (B5t).

Habitat changes to which species is sensitive

None known.

Management practices that affect species

Adverse: Channelization (prefers pools). Utilization

of wide range of bottom substrates indicates unre-sponsiveness to most management activities. (B5t)

Ecological indicator (*population changes are believed to indicate the effects of management activities on species of selected major biological communities or on water*):

Probably not – bluegills are an important forage source for several other species (C1), but are tolerant of a wide range of conditions.

No
Map
Available

Brook stickleback

Culaea inconstans

Other names

Eucalia inconstans (C1)

Status

Federal threatened
Federal endangered
Federal sensitive
State threatened
State endangered
State rare

Black Hills data

Native
x Introduced

Location

Sheridan Lake

Summary of occurrence data

Brook stickleback was recorded in Sheridan Lake in 1997, but was not present in 1998 (M4p131).

Typical habitat

Clear, cool, heavily-weeded spring-fed rivers and ponds; prefers mud or silt substrate. Almost always associated with dense algae and vascular aquatic plants. (B5i)

Black Hills habitat

Species is probably either no longer present in the Black Hills or present in very small numbers (M4p131).

Black Hills management

Game fish
Currently being stocked
If stocked, also reproduces naturally
x Nongame (S1p21, Wy2)
Protected

If non-game, is species of special interest?

No – probably not present.

Special habitat needs

Uses silt substrate to conceal itself when disturbed. All life stages are dependent on dense vegetative cover. (B5i)

Habitat changes to which species is sensitive

Increased turbidity and loss of rooted aquatic plants (B5i).

Management practices that affect species

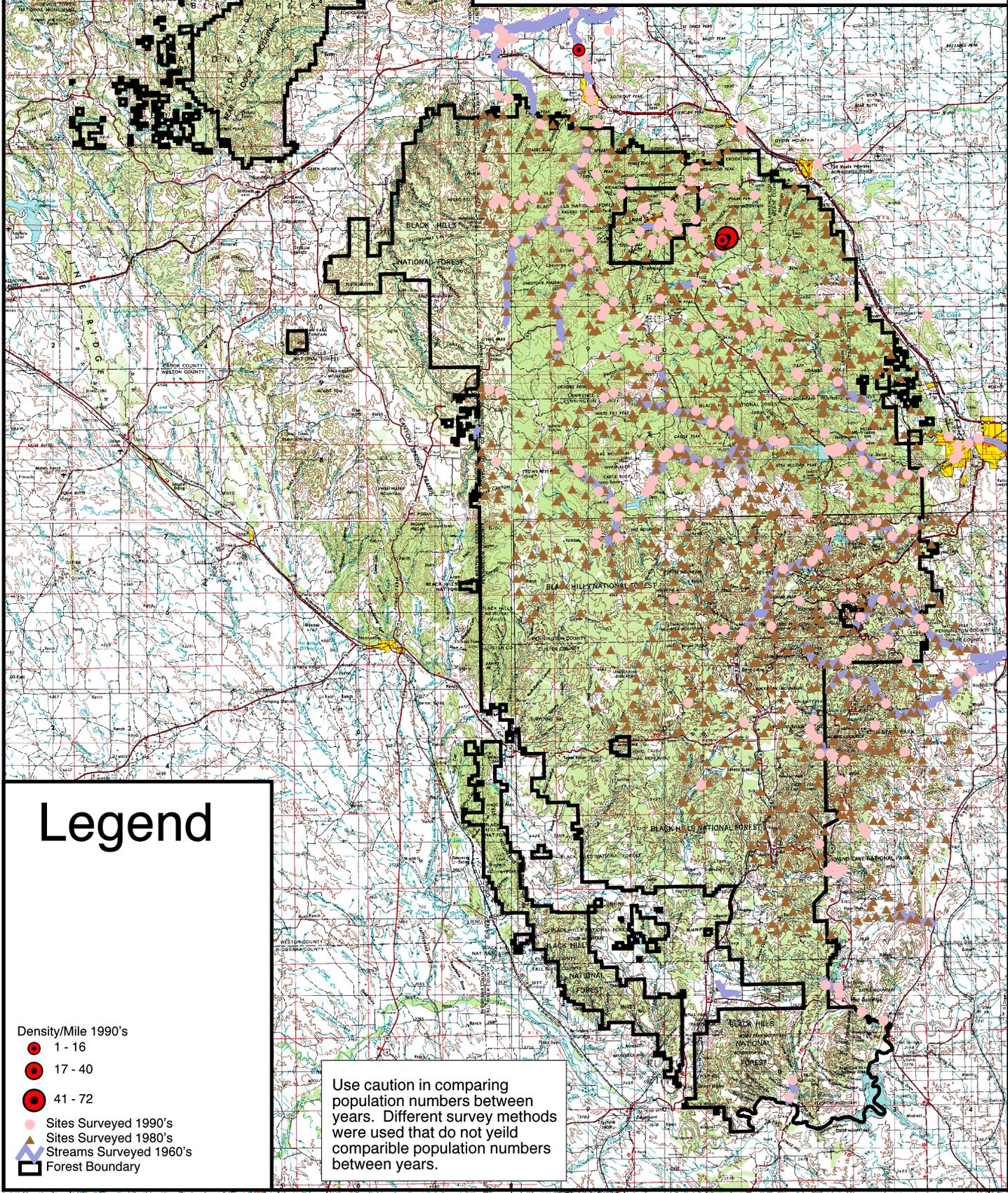
Adverse: excess sedimentation; livestock grazing in riparian zones (B5i).

Ecological indicator (*population changes are believed to indicate the effects of management activities on species of selected major biological communities or on water*):

No evidence to this effect.

Brook Stickleback Estimated Number/Mile 1960's - 1990's

Wyoming Data
not currently
available in a
digital database



Legend

- Density/Mile 1990's
 - 1 - 16
 - 17 - 40
 - 41 - 72
- Sites Surveyed 1990's
- ▲ Sites Surveyed 1980's
- Streams Surveyed 1960's
- ▭ Forest Boundary

Use caution in comparing population numbers between years. Different survey methods were used that do not yield comparable population numbers between years.

Brook trout

Salvelinus fontinalis

Other names

Eastern brook trout, speckled trout, char, square-tailed trout, mountain trout; *Salmo canadensis*, *S. immaculatus*, *S. hudsonicus*, *Baione fontinalis*, *Salvelinus timagamiensis* (B5u)

Status

Federal threatened
Federal endangered
Federal sensitive
State threatened
State endangered
State rare

Black Hills data

Native
x Introduced

Location

Creeks: Many

Lakes: Cook, Pactola, Sheridan

Summary of occurrence data

1. Sheridan Lake: No longer occur due to change in fishery management from cold-water to warm-water species (M4p131).
2. Pactola Reservoir: Brook trout were stocked in 1982 but not since, and few are present.
3. Cook Lake: Present in 1996 (M6).
4. Rapid Creek: Surveys from 1990-1997 found brook trout, but they were not present in 1998 (M10p213).
5. Iron (Lawrence County): First stocked in 1997; reproduction not confirmed.
6. Other creeks: Most have self-sustaining populations, but in many locations brook trout are overall less common than brown trout.

Typical habitat

Cold, clean headwater streams; cold lakes (B5u).

Black Hills habitat

Varies widely – present in many streams.

Black Hills management

x Game fish (S1p21, Wy2)
x Currently being stocked
x If stocked, also reproduces naturally
Nongame
Protected

If non-game, is species of special interest?

N/A

Special habitat needs

Cold water (preferably 13.9-15.6C; 25C is lethal); lack of extended periods of turbidity (B5u).

Habitat changes to which species is sensitive

Increase in water temperature to over 20C for extended periods; change in pH; low dissolved oxygen; sedimentation. Eggs susceptible to mortality from sediment. (B5u)

Management practices that affect species

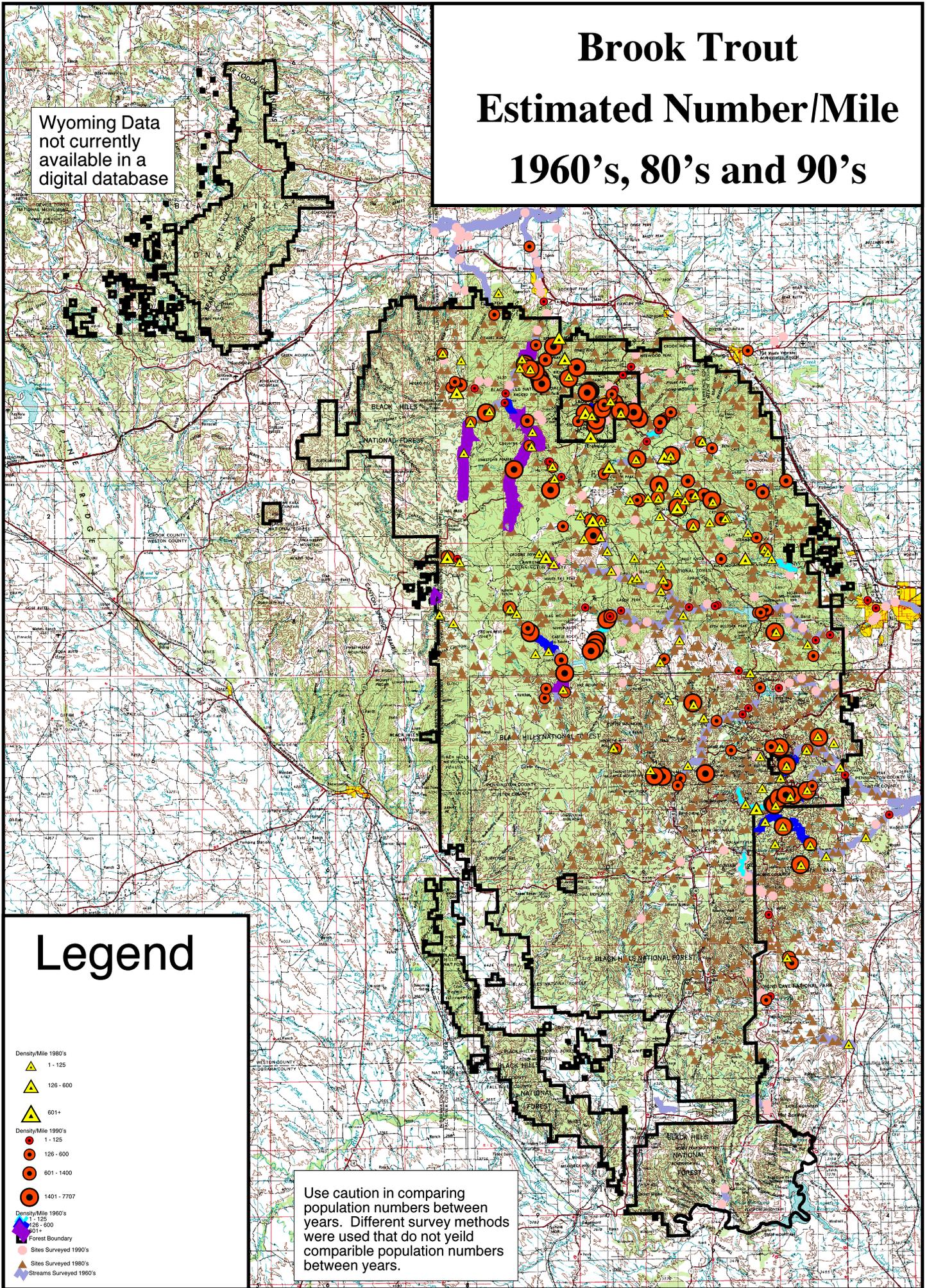
Adverse: Livestock grazing in riparian zones; channelization; sediment delivery from roads or other ground-disturbing activity (B5u).

Ecological indicator (*population changes are believed to indicate the effects of management activities on species of selected major biological communities or on water*):

Brook trout populations can be negatively affected by the habitat changes listed above but also by competition, lack of forage, and excessive harvest. In the Black Hills they are probably affected in some locations by competition with brown trout.

Brook Trout Estimated Number/Mile 1960's, 80's and 90's

Wyoming Data
not currently
available in a
digital database



Brown trout

Salmo trutta

Other names

Status

Federal threatened
Federal endangered
Federal sensitive
State threatened
State endangered
State rare

Black Hills data

Native
x Introduced

Location

Creeks: Many

Lakes: Cook, Pactola, Sheridan

Summary of occurrence data

Brown trout are widely stocked in Black Hills streams. They are no longer present in Sheridan Lake.

Typical habitat

Prefers clear, cold stream headwaters and lakes. Can survive deeper, warmer, slower waters than other trout. (B5j)

Black Hills habitat

Varies widely – present in many streams.

Black Hills management

x Game fish (S1p21, Wy2)
x Currently being stocked
x If stocked, also reproduces naturally
Nongame
Protected

If non-game, is species of special interest?

N/A

for egg survival. (B5j)

Habitat changes to which species is sensitive

Adverse: loss of riparian vegetation due to effects on water temperature. Increase in turbidity. (B5j)

Management practices that affect species

Adverse: Reduction of shade over water; channelization; sedimentation (B5j).

Ecological indicator (*population changes are believed to indicate the effects of management activities on species of selected major biological communities or on water*):

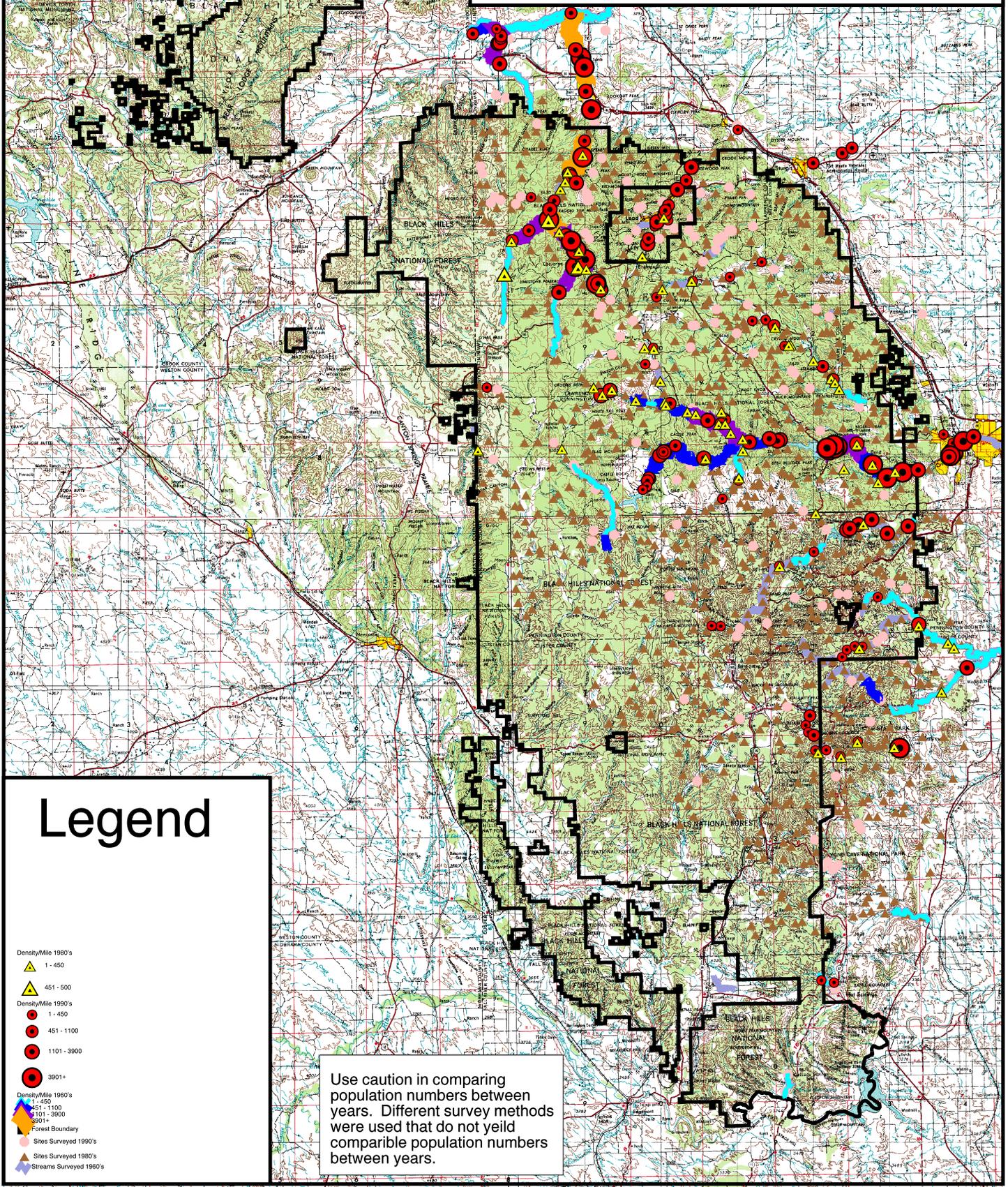
Brown trout are more resilient than other trout species and less likely to be an indicator of habitat changes. However, in larger, warmer streams, stocked populations are more likely to reproduce themselves than rainbow or brook trout. Non-native brown trout may have an adverse effect on native ecosystems and species. (B5j)

Special habitat needs

Cold water (preferred temperature 12-19C; lethal temperature 22-28C). Non-turbid waters required

Brown Trout Estimated Number/Mile 1960's, 80's and 90's

Wyoming Data
not currently
available in a
digital database



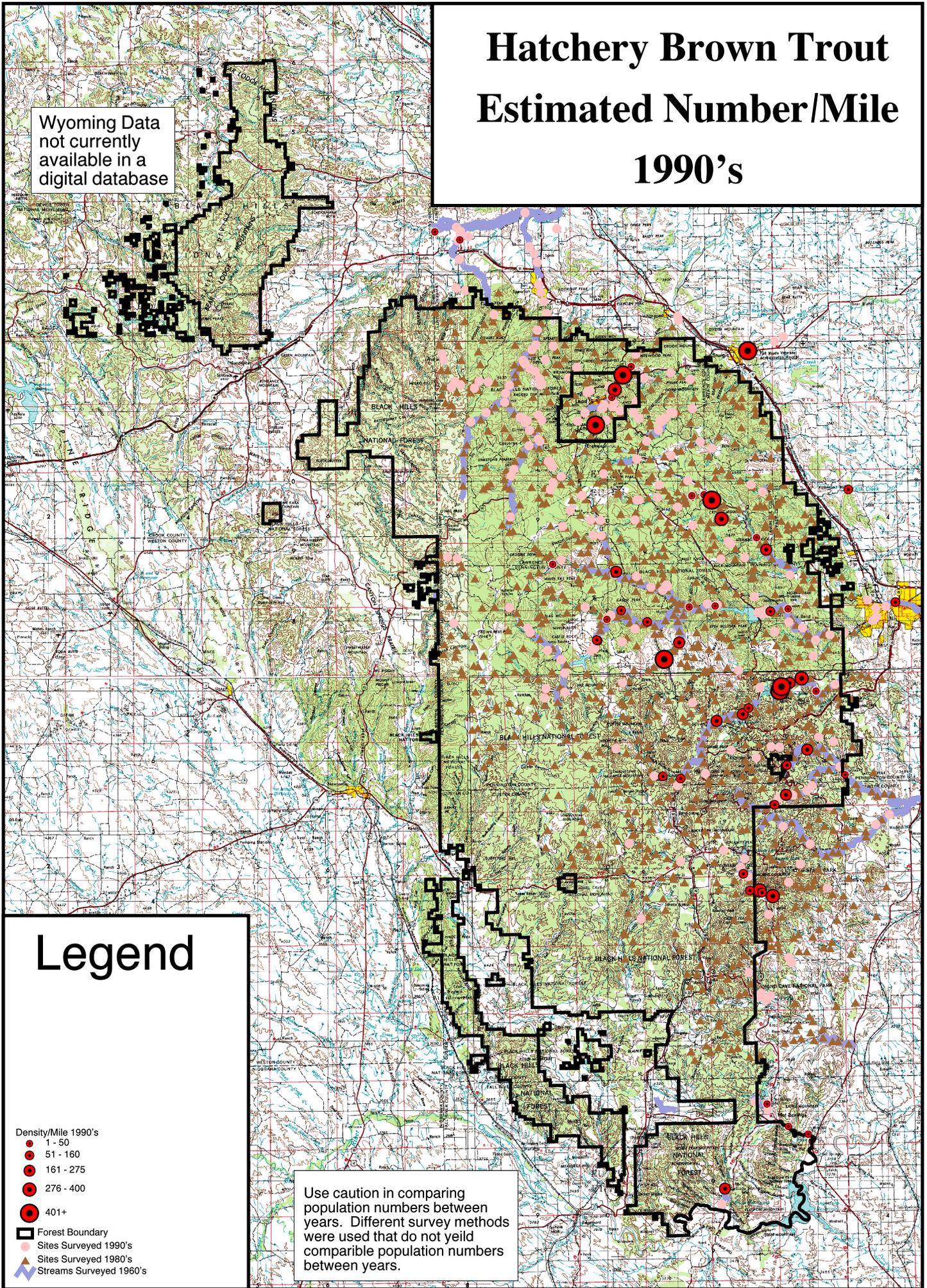
Legend

- Density/Mile 1980's
 - ▲ 1 - 450
 - ▲ 451 - 500
- Density/Mile 1990's
 - 1 - 450
 - 451 - 1100
 - 1101 - 3900
 - 3901+
- Density/Mile 1960's
 - ▲ 1 - 450
 - ▲ 451 - 1100
 - ▲ 1101 - 3900
 - ▲ 3901+
- Forest Boundary
- Sites Surveyed 1990's
- Sites Surveyed 1980's
- Streams Surveyed 1960's

Use caution in comparing population numbers between years. Different survey methods were used that do not yield comparable population numbers between years.

Hatchery Brown Trout Estimated Number/Mile 1990's

Wyoming Data
not currently
available in a
digital database



Legend

- Density/Mile 1990's
 - 1 - 50
 - 51 - 160
 - 161 - 275
 - 276 - 400
 - 401+
- Forest Boundary
- Sites Surveyed 1990's
- Sites Surveyed 1980's
- Streams Surveyed 1960's

Use caution in comparing
population numbers between
years. Different survey methods
were used that do not yield
comparable population numbers
between years.

of change. (B5v)

Channel catfish

Ictalurus punctatus

Other names

Status

Federal threatened
Federal endangered
Federal sensitive
State threatened
State endangered
State rare

Black Hills data

Native
x Introduced

Location

Literature review shows no occurrence records in the Black Hills. The closest records found are from Rapid Creek in Rapid City and from the Belle Fourche River near Fruitdale (E1, S4).

Summary of occurrence data

See Location, above.

Typical habitat

Prefers larger rivers and tolerates turbidity; generalist found in warm and cool waters, large rivers to ponds and reservoirs. (B1p119, B5).

Black Hills habitat

See Location, above.

Black Hills management

x Game fish (S1p21, Wy2)
Currently being stocked
If stocked, also reproduces naturally
Nongame
Protected

If non-game, is species of special interest?

N/A

Special habitat needs

None.

Habitat changes to which species is sensitive

Loss of aquatic cover. Tolerant of most other types

Management practices that affect species

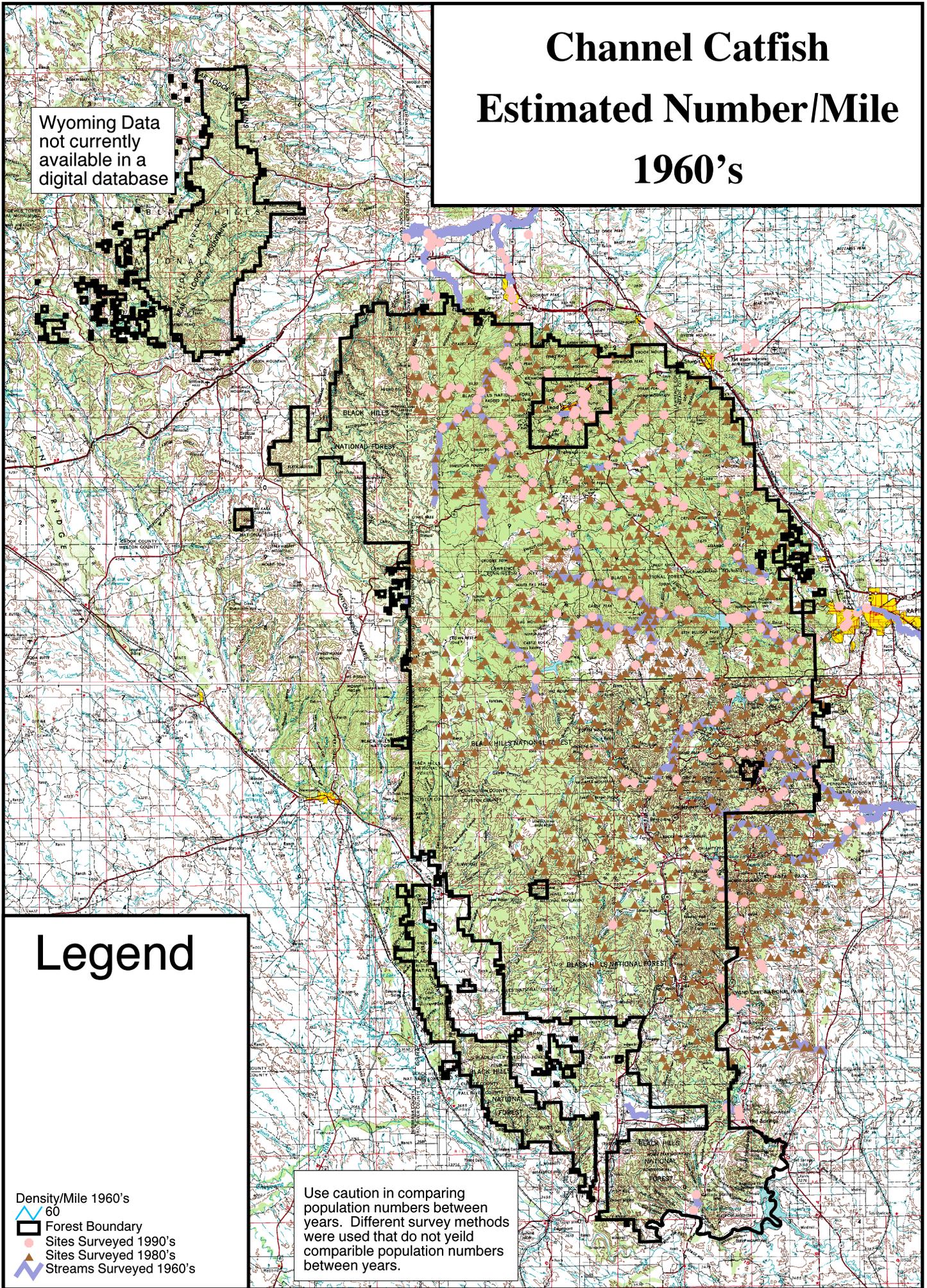
Channelization (B5).

Ecological indicator (*population changes are believed to indicate the effects of management activities on species of selected major biological communities or on water*):

No.

Channel Catfish Estimated Number/Mile 1960's

Wyoming Data
not currently
available in a
digital database



None.

Common carp

Cyprinus carpio

Other names

Status

Federal threatened
Federal endangered
Federal sensitive
State threatened
State endangered
State rare

Black Hills data

Native
x Introduced

Location

Literature review shows no occurrence records in the Black Hills. The closest records found are from Rapid Creek in Rapid City, Redwater River, Belle Fourche River, and Angostura Reservoir (E1, S4).

Summary of occurrence data

See Location, above.

Typical habitat

Warm, quiet waters (B5k).

Black Hills habitat

See Location, above.

Black Hills management

Game fish
Currently being stocked
If stocked, also reproduces naturally
x Nongame (S1p21, Wy2)
Protected

If non-game, is species of special interest?

Usually considered a nuisance species.

Special habitat needs

None.

Habitat changes to which species is sensitive

None.

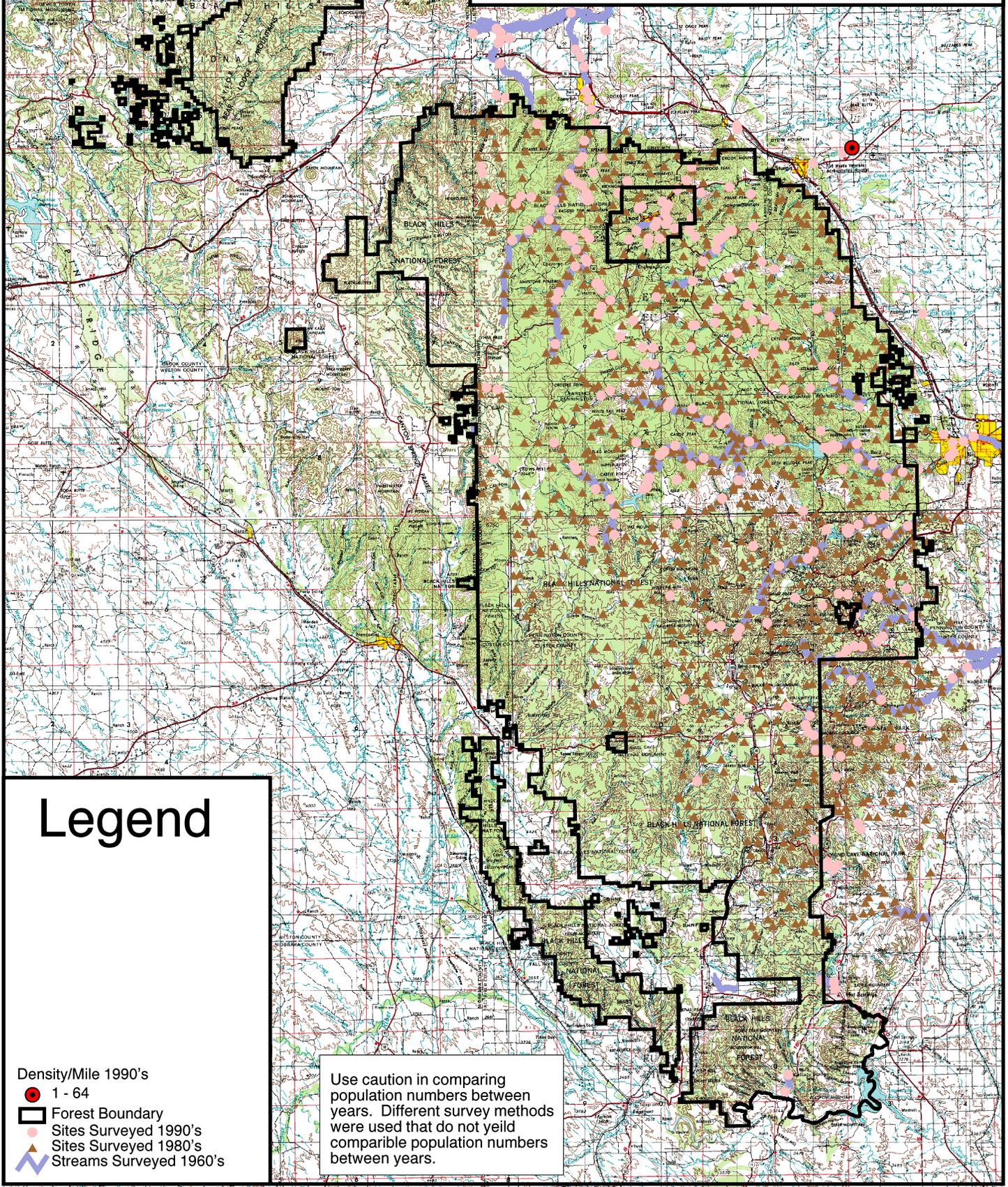
Management practices that affect species

Ecological indicator (*population changes are believed to indicate the effects of management activities on species of selected major biological communities or on water*):

Carp are generally associated with waters that are warm, muddy, or otherwise degraded. They are partly to blame for the decreased quality of these waters, but the original cause is the siltation of lakes and streams that allowed the carp to exploit these habitats. (T1p79)

Common Carp Estimated Number/Mile 1990's

Wyoming Data
not currently
available in a
digital database



Legend

- Density/Mile 1990's
- 1 - 64
- ▭ Forest Boundary
- Sites Surveyed 1990's
- ▲ Sites Surveyed 1980's
- Streams Surveyed 1960's

Use caution in comparing population numbers between years. Different survey methods were used that do not yield comparable population numbers between years.

- If stocked, also reproduces naturally
- x Nongame (S1p21, Wy2)
- Protected

Creek chub

Semotilus atromaculatus

Other names

Status

- Federal threatened
- Federal endangered
- Federal sensitive
- State threatened
- State endangered
- State rare

Black Hills data

- Native
- x Introduced

Note: Native to Black Hills according to forest plan (B2pIII-387, B8 and E3).

Location

Creeks: Battle, Beaver (Pennington County), Beaver (Crook County), Beaver South, Boxelder, French, Grace Coolidge, Lytle, Redwater River, Spring, Whitewood. (E2, F4, M1, M2, M3, M6, M8, M9, M10, S4)

Summary of occurrence data

1. Battle and Whitewood Creeks: Population surveys found creek chub in the 1980s, but not in the 90s.
2. Spring Creek: Creek chub numbers declined sharply during the 1990s, probably due to predation by adult brown trout (M10p235-243).
3. French Creek: Populations appeared to be stable through the 90s.
4. Other waters: The only available survey data is from the 80s.
(E2, F4, M1, M2, M3, M6, M8, M9, M10, S4)

Typical habitat

Small clear streams, occasionally clear lakes (T1p84). Generally inhabits pools with large woody debris over sand and gravel substrates (C5).

Black Hills habitat

Generally similar to typical habitat.

Black Hills management

- Game fish
- Currently being stocked

If non-game, is species of special interest?

Possibly, due to evident decrease in populations.

Special habitat needs

None known.

Habitat changes to which species is sensitive

Sensitive to sedimentation and channelization (B5f).
Increase in trout predation (M10p235-243).

Management practices that affect species

Beneficial practices include restriction of disturbance of habitat by wildlife and livestock, and construction of pools in streams (B5f).

Ecological indicator (*population changes are believed to indicate the effects of management activities on species of selected major biological communities or on water*):

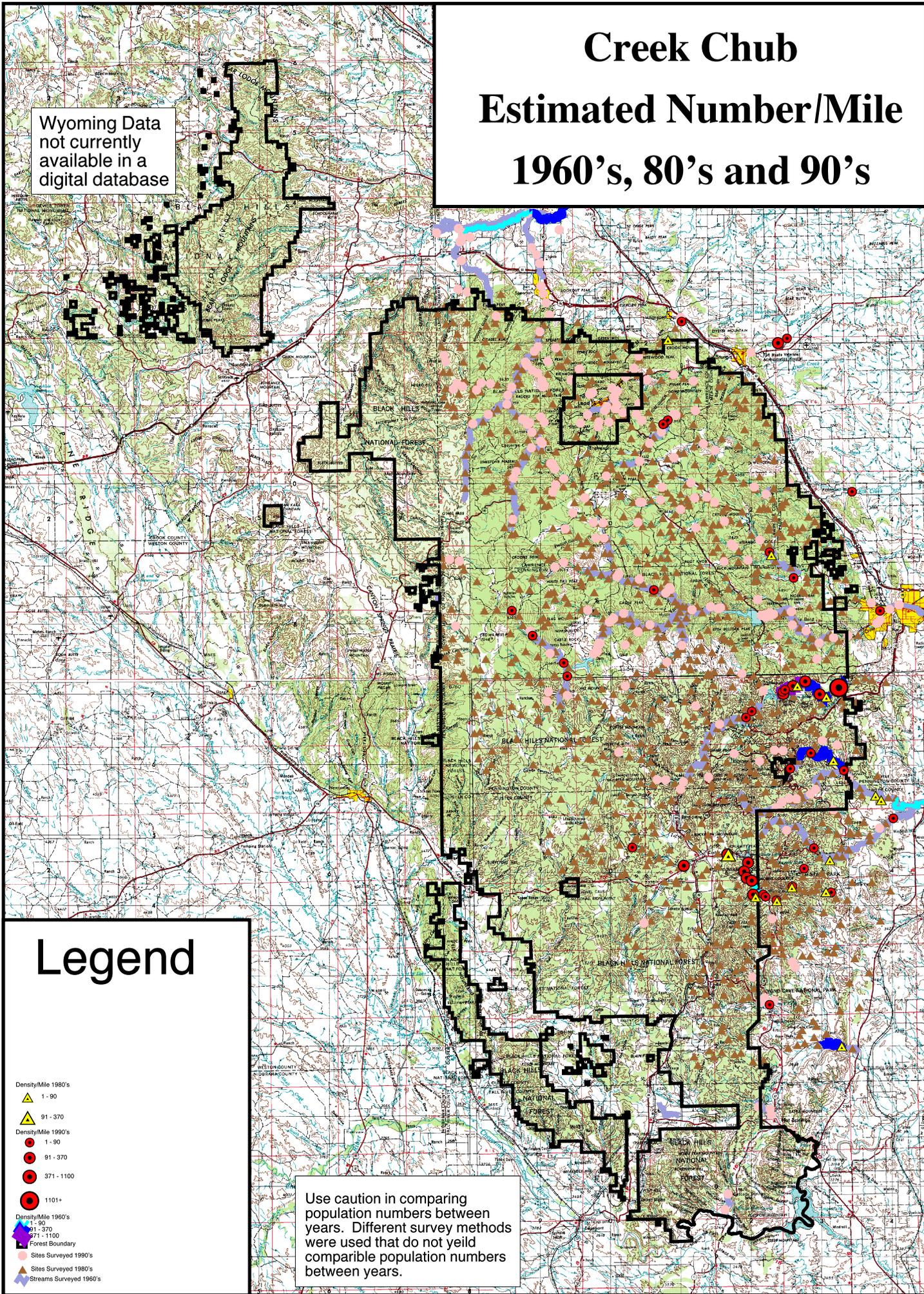
Sensitive to sedimentation (B5f).

Creek Chub

Estimated Number/Mile

1960's, 80's and 90's

Wyoming Data
not currently
available in a
digital database



Legend

- Density/Mile 1980's
 - ▲ 1 - 90
 - ▲ 91 - 370
- Density/Mile 1990's
 - 1 - 90
 - 91 - 370
 - 371 - 1100
 - 1101+
- Density/Mile 1960's
 - ▲ 1 - 90
 - ▲ 91 - 370
 - ▲ 371 - 1100
- ▬ Forest Boundary
- Sites Surveyed 1990's
- ▲ Sites Surveyed 1980's
- ▲ Streams Surveyed 1960's

Use caution in comparing population numbers between years. Different survey methods were used that do not yield comparable population numbers between years.

Cutthroat trout

Oncorhynchus clarki

Other names

Formerly *Salmo clarki* (B1p35). Subspecies historically stocked in the Black Hills include: Snake River (B1p34, T1p50) or west-slope (U1e) cutthroat (*O. clarki* subsp.) and Yellowstone cutthroat (*O. clarki lewisi*, *S. clarki lewisi*, or *S. lewisi* (B1p35)).

Status

Federal threatened
Federal endangered
Federal sensitive
State threatened
State endangered
State rare

Black Hills data

Native
x Introduced

Location

Creeks: French, Rapid

Lakes: Pactola, Stockade

Summary of occurrence data

1. French Creek: One cutthroat trout was found in 1992 (M3p49) but was probably washed down from Stockade Lake. None have been documented since.
 2. Rapid Creek: Small populations were documented in 1990 and 1992-1994, but this species has not been found since.
 3. Pactola Reservoir: Stocked in 1985, 1987-1992. Stocking ceased after 1992 and in 1998 no cutthroats were found in Pactola. (M10)
 4. Stockade Lake: Cutthroats were last stocked in 1991 and have not appeared in recent surveys. (S3p58)
- (E2, F4, M2, M3, M4, M8, M9, M10, S3, S4)

Typical habitat

Clear, cold streams and lakes (B5I)

Black Hills habitat

This species probably no longer occurs in the Black Hills.

Black Hills management

x Game fish (S1p21, Wy2)
Currently being stocked
If stocked, also reproduces naturally
Nongame
Protected

If non-game, is species of special interest?

N/A

Special habitat needs

N/A

Habitat changes to which species is sensitive

N/A

Management practices that affect species

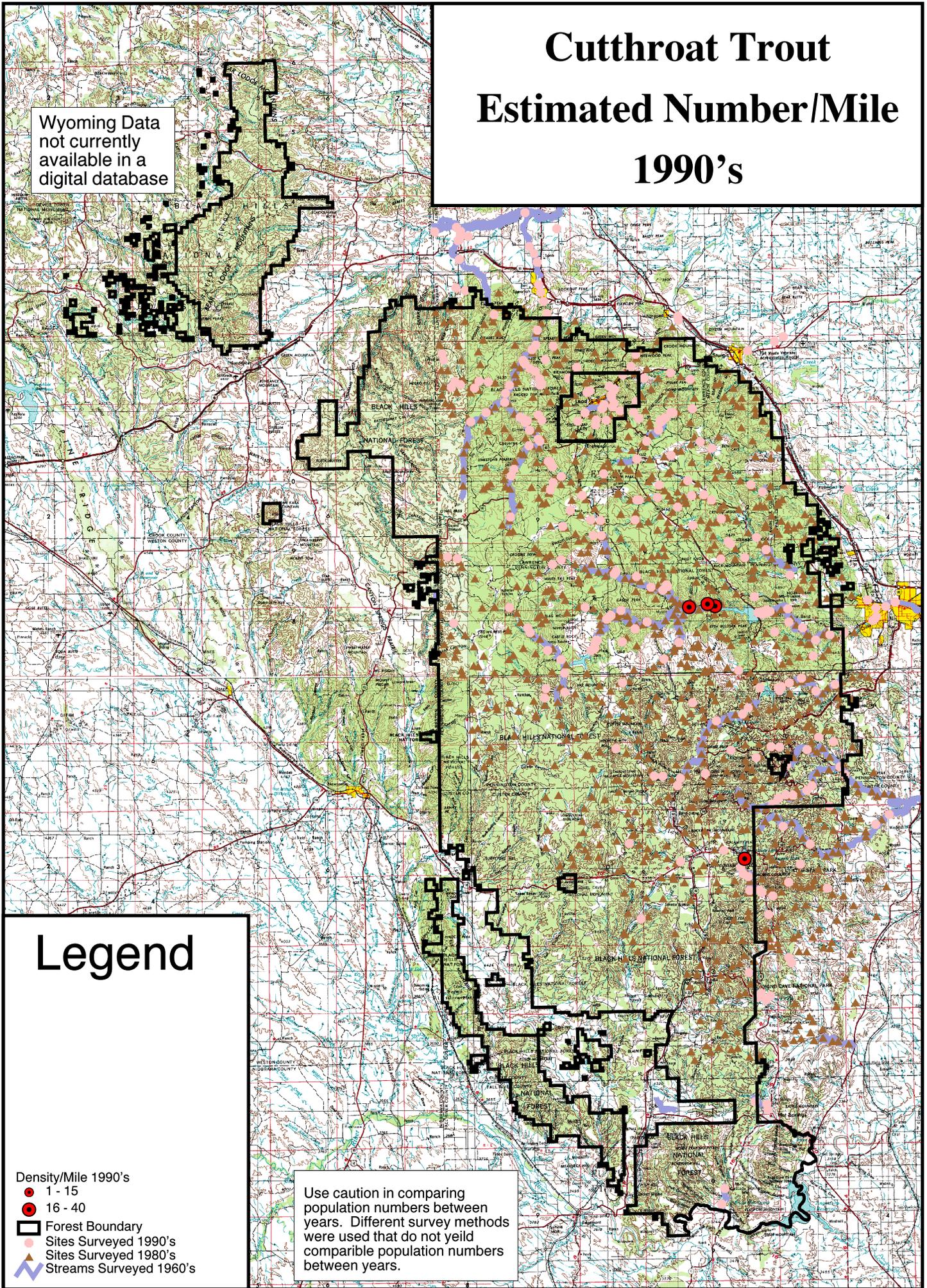
N/A

Ecological indicator (*population changes are believed to indicate the effects of management activities on species of selected major biological communities or on water*):

N/A

Cutthroat Trout Estimated Number/Mile 1990's

Wyoming Data
not currently
available in a
digital database



Legend

- Density/Mile 1990's
- 1 - 15
 - 16 - 40
 - ▭ Forest Boundary
 - Sites Surveyed 1990's
 - ▲ Sites Surveyed 1980's
 - Streams Surveyed 1960's

Use caution in comparing
population numbers between
years. Different survey methods
were used that do not yield
comparable population numbers
between years.

Emerald shiner

Notropis atherinoides

Other names

Status

Federal threatened
Federal endangered
Federal sensitive
State threatened
State endangered
State rare

Black Hills data

Native
x Introduced

Location

Pactola Reservoir

Summary of occurrence data

Emerald shiners were stocked in Pactola Reservoir in 1991 and 1992, but are no longer present (M4).

Typical habitat

N/A

Black Hills habitat

N/A

Black Hills management

Game fish
Currently being stocked
If stocked, also reproduces naturally
x Nongame (S1p21, Wy2)
Protected

If non-game, is species of special interest?

Species is probably no longer present in the Black Hills.

Special habitat needs

N/A

Habitat changes to which species is sensitive

N/A

Management practices that affect species

N/A

Ecological indicator (*population changes are believed to indicate the effects of management activities on species of selected major biological communities or on water*):

N/A

No
Map
Available

European rudd

Scardinius erythrophthalmus

Other names

Hybrid golden shiner, redfin shiner, red-tailed shiner (S1p26).

Status

Federal threatened
Federal endangered
Federal sensitive
State threatened
State endangered
State rare

Black Hills data

Native
x Introduced

Location

Lakes: Pactola, Sheridan

Summary of occurrence data

Small populations have been found in recent years in larger lakes.

Note

The European rudd is an aggressive exotic species considered undesirable and is illegal to use as baitfish (S1p26).

No
Map
Available

Fathead minnow

Pimephales promelas

Other names

Pime-phales promelas (M5)

Status

Federal threatened
Federal endangered
Federal sensitive
State threatened
State endangered
State rare

Black Hills data

- * Native
- Introduced

B4, B8 and E3 lists this species as native.

Location

Creeks: Battle, Bear Butte, Beaver (Lawrence County), Beaver (Crook County), Boxelder, Boxelder (middle fork), Flynn, Foster, French, Galena, Grace Coolidge, Horse, Iron (south), North Rapid, Pleasant (Custer County), Rapid, Slate, Spring, Tillson

Lakes: Cook, Deerfield, Spottedtail

Summary of occurrence data

1. Tillson, North Rapid, Iron South, Grace Coolidge: Present in 80s but not in 90s.
2. Boxelder (main and middle fork), French, Rapid, Spring: Present in 50s, 60s or 80s but very few or none found in 90s.
3. Beaver (both), Flynn, Foster, Galena, Cook Lake, Spottedtail Pond: Present in 80s or 90s but only surveyed once.
4. Battle, Bear Butte, Horse, Pleasant: Present in both 1960s and 90s.
5. Deerfield Lake: Present in varying populations 1996-98 (only available data).

Typical habitat

Slow-flowing, weedy streams and shallow lakes and ponds; tolerant of intermittency, clear and turbid water, and a wide range of pH. (C5p439, B1p93)

Black Hills habitat

Similar to typical habitat.

Black Hills management

- Game fish
- Currently being stocked
- If stocked, also reproduces naturally
- x Nongame (S1p21, Wy2)
- Protected

If non-game, is species of special interest?

Possibly, since populations have decreased in several streams over the last 20 to 40 years.

Special habitat needs

None – is tolerant of a wide range of habitats. Prefers stream pools over muddy bottom where current is reduced. Found in communities with few predators and many cyprinids (B5q)

Habitat changes to which species is sensitive

None known.

Management practices that affect species

None known.

Ecological indicator (*population changes are believed to indicate the effects of management activities on species of selected major biological communities or on water*):

No.

No
Map
Available

x Protected (S1p21)

Finescale dace

Phoxinus neogaeus

Other names

Status

Federal threatened
Federal endangered
Federal sensitive
State threatened

SD* State endangered

WY** State rare

*Nature Conservancy SD rank: Global 5, State 1 (disjunct) (S2)

**Nature Conservancy WY rank: Global 5, State 1 (south periphery of range, disjunct) (W11)

Black Hills data

x Native (B3, B4, B8, E3)
Introduced

Location (B3, M1)

Creeks: Ogden (and tributaries Richardson and Tent Canyon), Spotted Tail, Crow; Redwater River.

Lakes: Coxes Lake, Hemler Reservoir.

Summary of occurrence data (M1)

1976: First occurrence in Hemler.

1978: Small populations transplanted into Ogden Creek and tributaries.

1982: Transplanted into Hemler and recorded in sampling since.

1983: Transplanted into Spotted Tail Creek.

1990: Surveys found finescale dace in very marginal habitat on Ogden Creek.

Typical habitat

Cool spring-fed bogs, lakes and creeks; small, weedy, sluggish streams and small lakes. Sometimes associated with beaver ponds (A1, B1, T1, C3).

Black Hills habitat

Similar to typical habitat (see above).

Black Hills management

Game fish
Currently being stocked
If stocked, also reproduces naturally
Nongame

If non-game, is species of special interest?

Yes, due to protected status.

Special habitat needs

None.

Habitat changes to which species is sensitive

Sedimentation of ponds and pools, reduced oxygen, increased water temperature (M1p17). Beaver ponds becoming decadent (M1p13).

Management practices that affect species

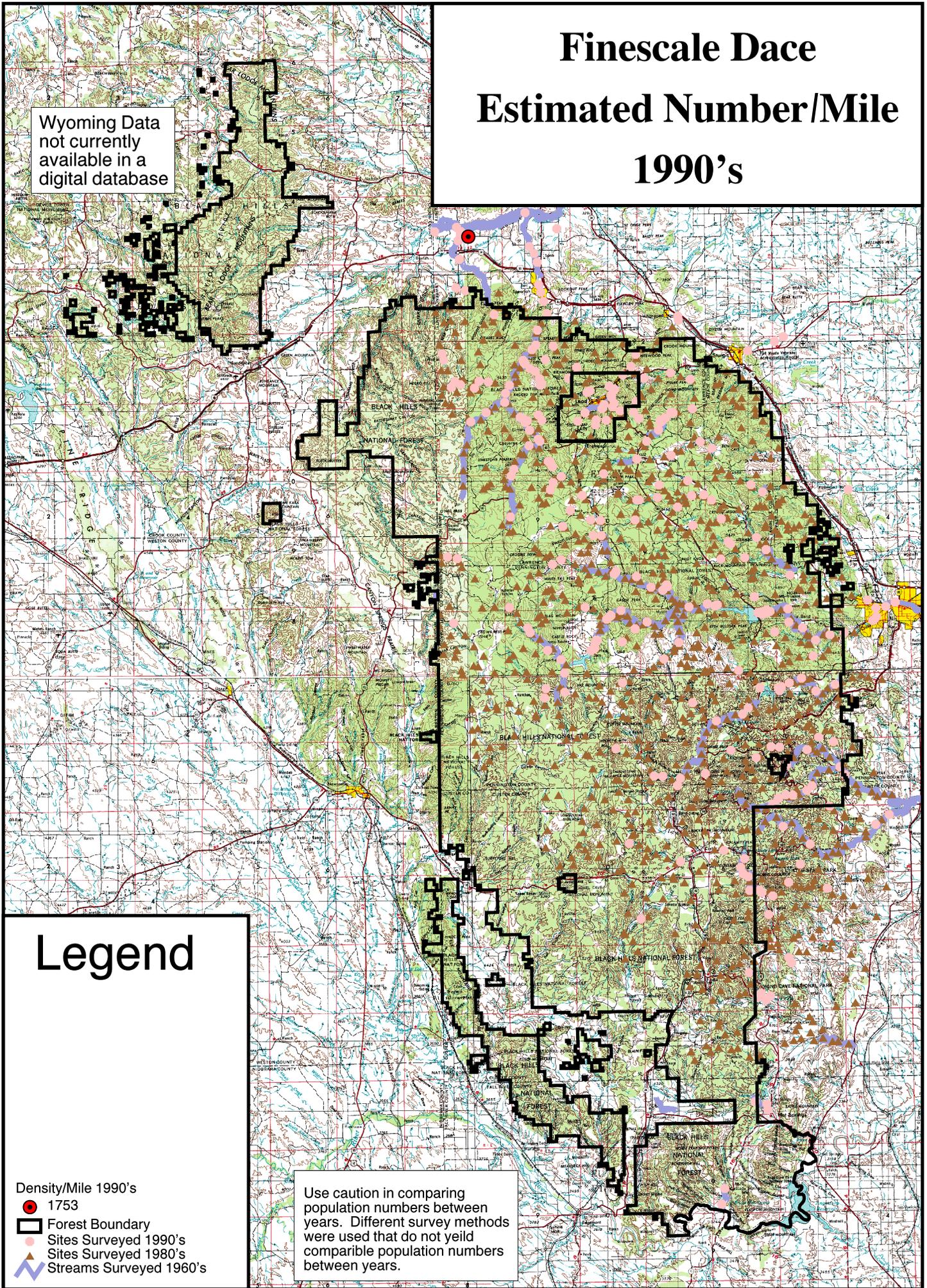
No data

Ecological indicator (*population changes are believed to indicate the effects of management activities on species of selected major biological communities or on water*)

No data

Finescale Dace Estimated Number/Mile 1990's

Wyoming Data
not currently
available in a
digital database



Legend

- Density/Mile 1990's
- 1753
- ▭ Forest Boundary
- Sites Surveyed 1990's
- ▲ Sites Surveyed 1980's
- ┃ Streams Surveyed 1960's

Use caution in comparing
population numbers between
years. Different survey methods
were used that do not yield
comparable population numbers
between years.

Golden shiner

Notemigonus crysoleucas

Other names

American bream, American roach (T1), *Cyprinus crysoleucas* (B5)

Status

Federal threatened
Federal endangered
Federal sensitive
State threatened
State endangered
State rare

Black Hills data

Native
x Introduced

Location

Creeks: Battle, Spring

Lakes: Deerfield, Pactola, Sheridan, Stockade

Summary of occurrence data

1. Pactola Reservoir: Very few present.
 2. Other lakes: Present.
 3. Creeks: Very few present.
- (M4, M10, S3)

Typical habitat

Warm lakes and ponds with moderate amounts of aquatic vegetation; also in areas of streams and rivers with reduced flow (B5).

Black Hills habitat

Typical.

Black Hills management

Game fish
Currently being stocked
If stocked, also reproduces naturally
x Nongame (S1p21, Wy2)
Protected

If non-game, is species of special interest?

No data.

Special habitat needs

Requires aquatic vegetation for egg-laying. Prefers fairly warm water temperature of 16.7-23.8C. (B5s)

Habitat changes to which species is sensitive

No data.

Management practices that affect species

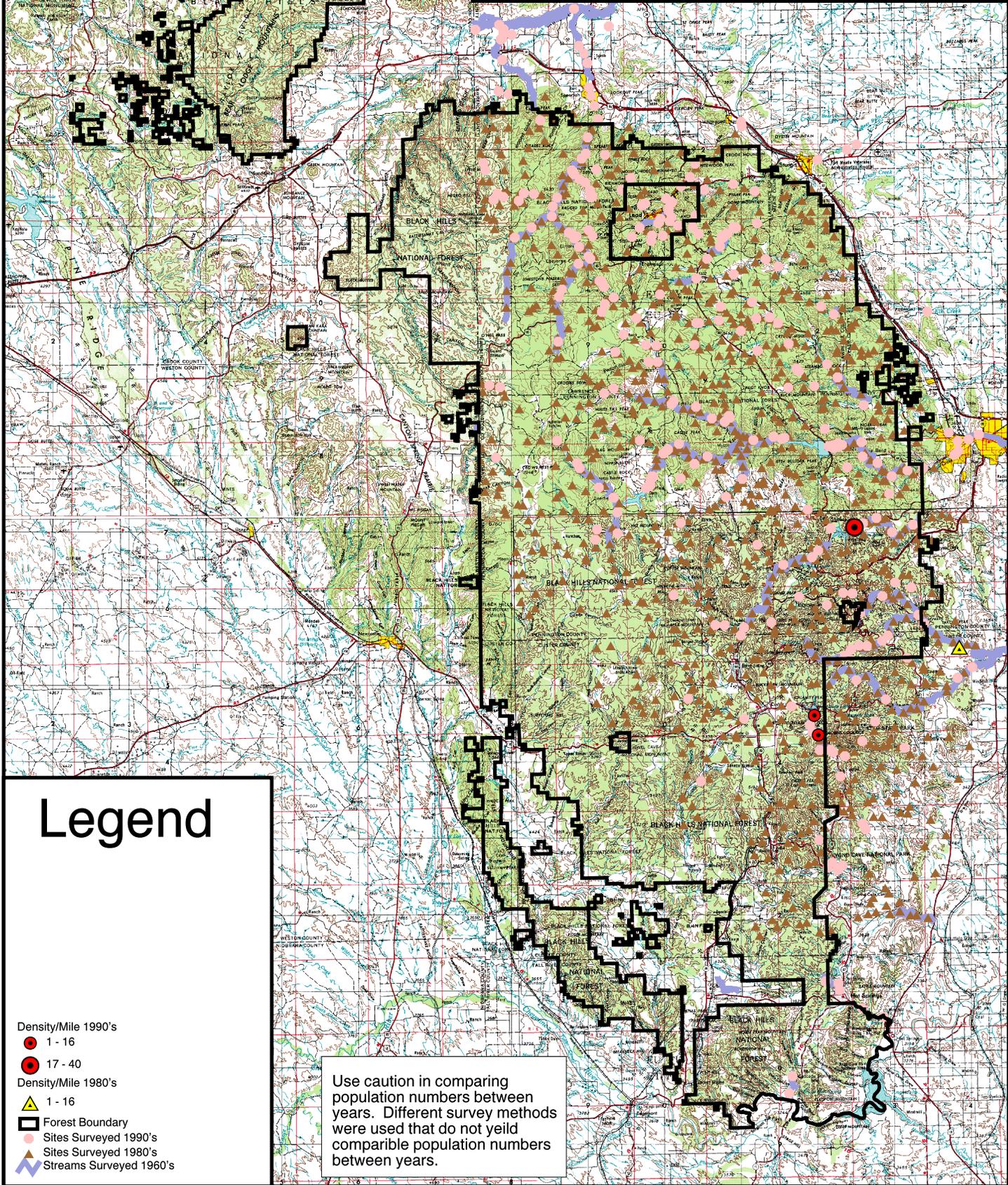
No data.

Ecological indicator (*population changes are believed to indicate the effects of management activities on species of selected major biological communities or on water*):

Little data is available, but seems unlikely due to tolerance of warm water.

Golden Shiner Estimated Number/Mile 1980's and 90's

Wyoming Data
not currently
available in a
digital database



Legend

- Density/Mile 1990's
 - 1 - 16
 - 17 - 40
- Density/Mile 1980's
 - ▲ 1 - 16
- ▭ Forest Boundary
- Sites Surveyed 1990's
- ▲ Sites Surveyed 1980's
- ▬ Streams Surveyed 1960's

Use caution in comparing
population numbers between
years. Different survey methods
were used that do not yield
comparable population numbers
between years.

Goldfish

Carassius auratus

Other names

Cyprinus auratus

Status

Federal threatened
Federal endangered
Federal sensitive
State threatened
State endangered
State rare

Black Hills data

Native
x Introduced

Summary of occurrence data

A limited number of goldfish were observed in creeks near Hot Springs in the 1960s and 1990s.

Black Hills management

Game fish
Currently being stocked
If stocked, also reproduces naturally
x Nongame (S1p21, Wy2)
Protected

If non-game, is species of special interest?

Usually considered a nuisance species.

Special habitat needs

None.

Habitat changes to which species is sensitive

None.

Management practices that affect species

None.

Ecological indicator (*population changes are believed to indicate the effects of management activities on species of selected major biological communities or on water*):

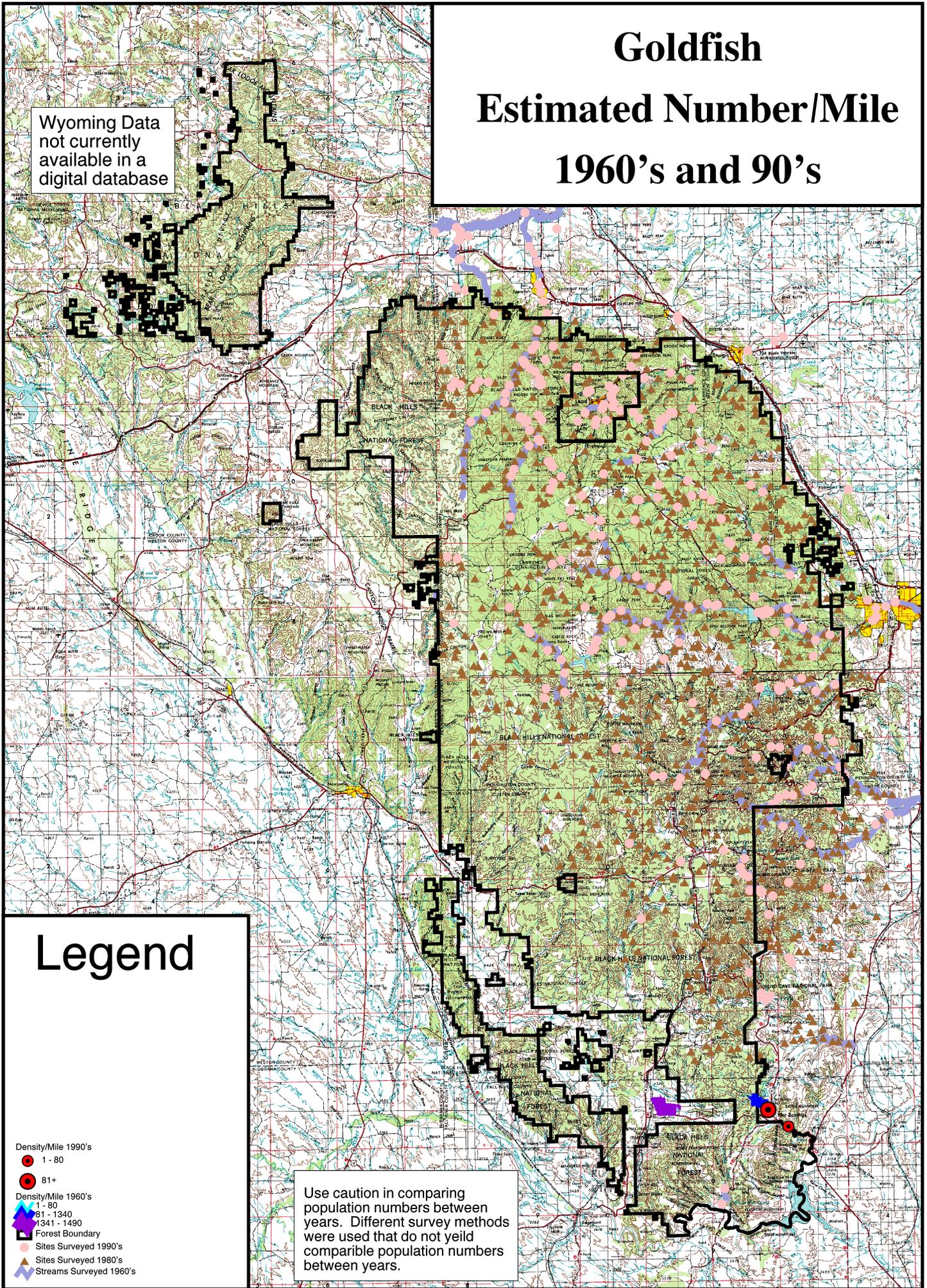
No.

Goldfish

Estimated Number/Mile

1960's and 90's

Wyoming Data
not currently
available in a
digital database



Legend

- Density/Mile 1990's
 - 1 - 80
 - 81+
- Density/Mile 1960's
 - ▲ 1 - 80
 - ▲ 81 - 1340
 - ▲ 1341 - 1490
- ▬ Forest Boundary
- Sites Surveyed 1990's
- ▲ Sites Surveyed 1980's
- ▲ Streams Surveyed 1960's

Use caution in comparing population numbers between years. Different survey methods were used that do not yield comparable population numbers between years.

Green sunfish

Lepomis cyanellus

Other names

Pomotis longulus, Bryttus longulus, Calliurus murinus, Calliurus longulus, Apomotis cyanellus (B5m)

Status

Federal threatened
Federal endangered
Federal sensitive
State threatened
State endangered
State rare

Black Hills data

Native
x Introduced

Summary of occurrence data

Limited populations of green sunfish have been observed in a few creeks on the Forest and in the Redwater River and Fall River near the Forest boundary.

Typical habitat

Ponds, lakes, and areas of rivers with little flow; warm water, turbid or clear (B5m).

Black Hills habitat

Typical.

Black Hills management

x Game fish (S1p21, Wy2)
Currently being stocked
If stocked, also reproduces naturally
Nongame
Protected

If non-game, is species of special interest?

N/A. **Note:** Green sunfish are considered a management problem in some areas due to negative impacts on game and native species (B5m).

Special habitat needs

Requires bank vegetation for production of forage in the form of terrestrial insects (B5).

Habitat changes to which species is sensitive

Few. Green sunfish are one of the last survivors in residual pools and one of the first to re-colonize after intermittent flow or flood. Low tolerance of pesticides and herbicides. (B5)

Management practices that affect species

Adverse: Channelization, uncontrolled riparian grazing, drainage of wetlands.
Beneficial: Protection of stream banks and vegetation. (B5m)

Ecological indicator (*population changes are believed to indicate the effects of management activities on species of selected major biological communities or on water*):

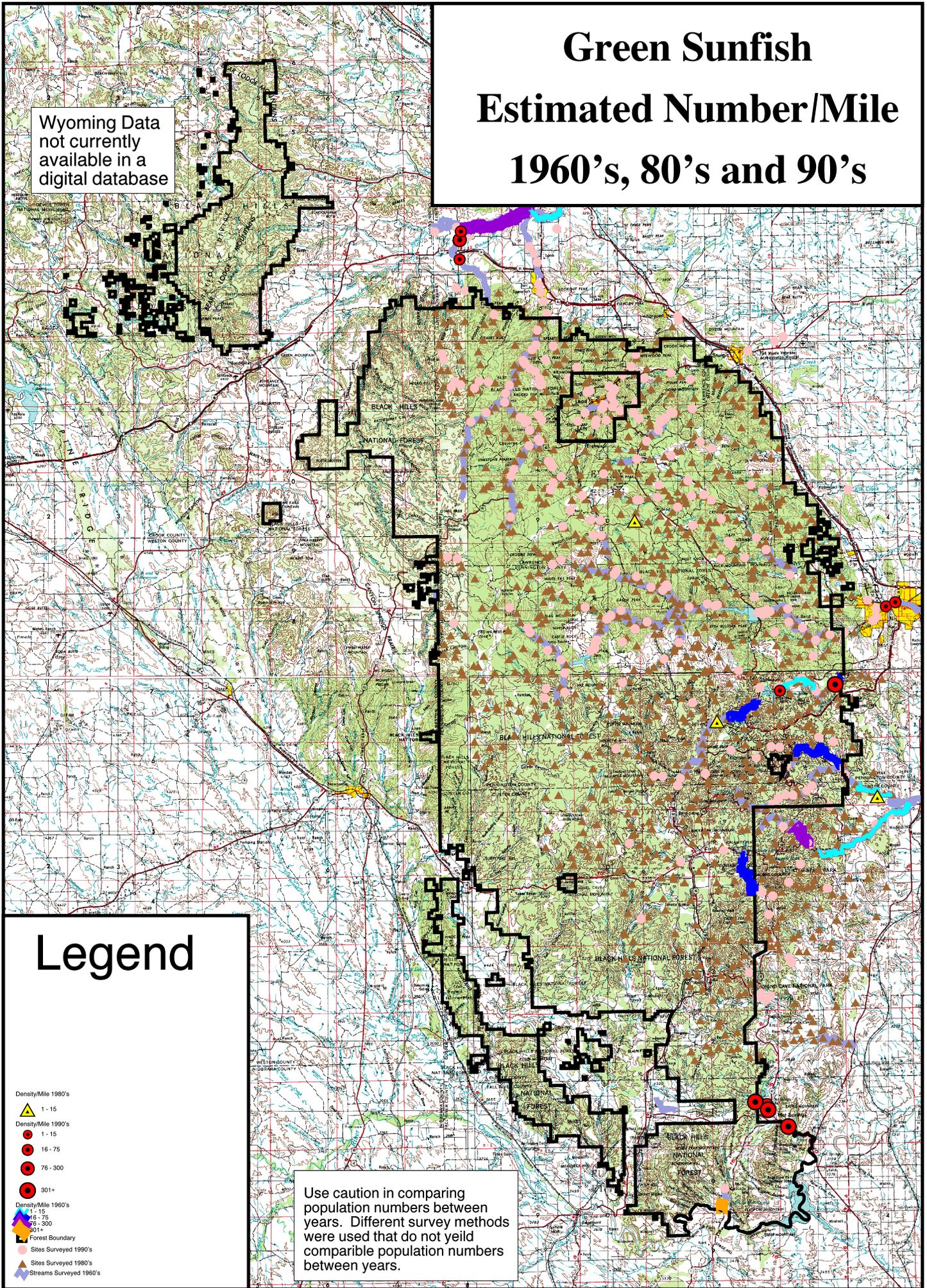
No. Very tolerant.

Green Sunfish

Estimated Number/Mile

1960's, 80's and 90's

Wyoming Data
not currently
available in a
digital database



Legend

- Density/Mile 1980's
 - ▲ 1 - 15
- Density/Mile 1990's
 - 1 - 15
 - 16 - 75
 - 76 - 300
 - 301+
- Density/Mile 1960's
 - ▲ 1 - 15
 - ▲ 16 - 75
 - ▲ 76 - 300
 - ▲ 301+
- ▬ Forest Boundary
- Sites Surveyed 1990's
- ▲ Sites Surveyed 1960's
- ▬ Streams Surveyed 1960's

Use caution in comparing population numbers between years. Different survey methods were used that do not yield comparable population numbers between years.

Kokanee salmon

Oncorhynchus nerka

Other names

Salmo nerka, sockeye salmon

Status

Federal threatened
Federal endangered
Federal sensitive
State threatened
State endangered
State rare

Black Hills data

Native
x Introduced

Summary of occurrence data

A small number of kokanee salmon were observed in Pactola Reservoir in the 1990s.

Typical habitat

Cold, clear lakes and reservoirs (B5n).

Black Hills habitat

Typical.

Black Hills management

x Game fish (S1p21, Wy2)
Currently being stocked
If stocked, also reproduces naturally
Nongame
Protected

If non-game, is species of special interest?

N/A

Special habitat needs

Requires moderate to high dissolved oxygen and cold water (temperatures above 15.5C may be lethal), unsilted substrate (B5n).

Habitat changes to which species is sensitive

Increase in temperature and sedimentation, decrease in dissolved oxygen.

Management practices that affect species

Adverse: Fires, lowered water levels, dredging,

organic chemicals.

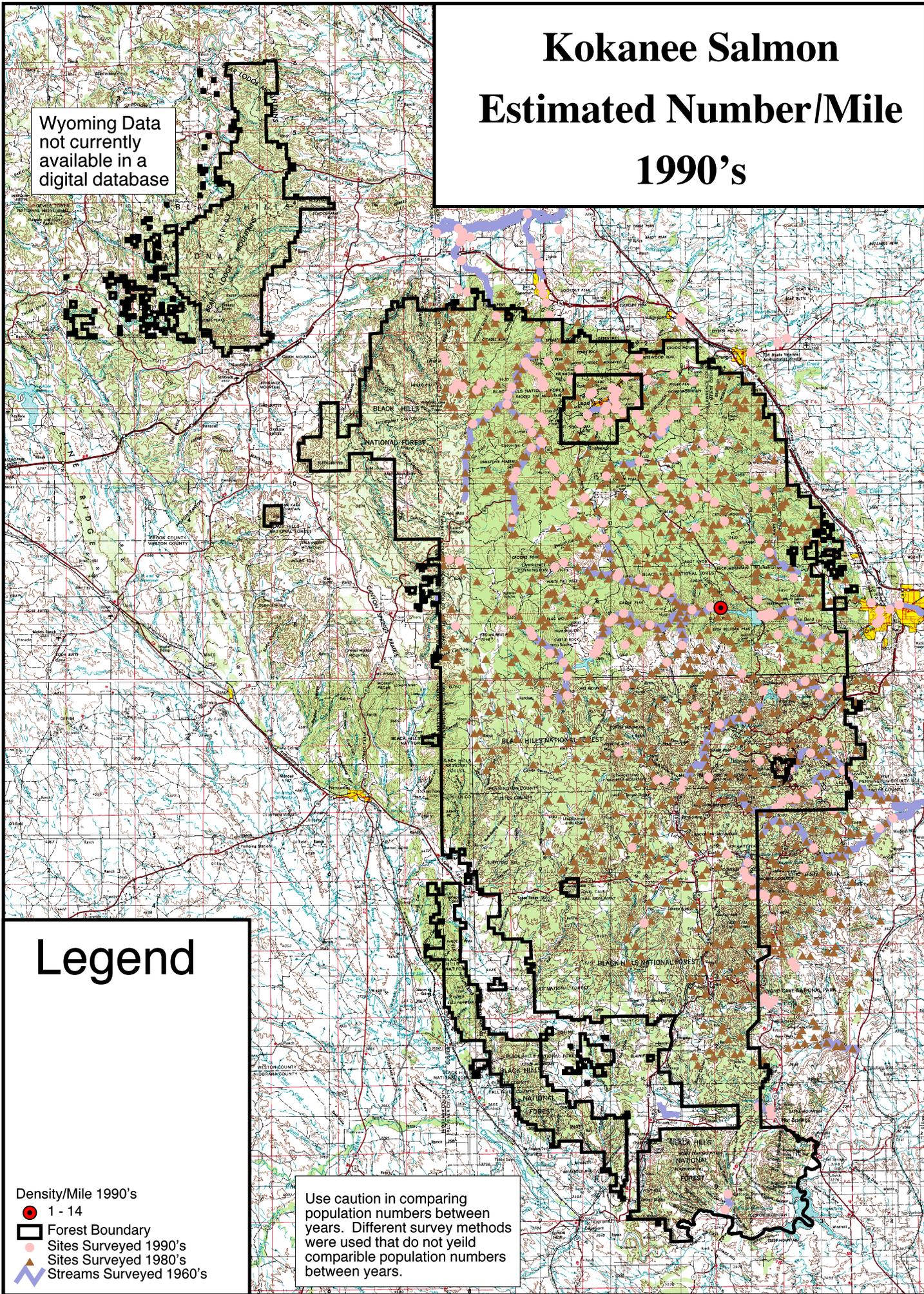
Beneficial: Restriction of disturbances.
(B5)

Ecological indicator (*population changes are believed to indicate the effects of management activities on species of selected major biological communities or on water*):

Possibly, due to the species' sensitivity to vegetation management, fire, and sedimentation.

Kokanee Salmon Estimated Number/Mile 1990's

Wyoming Data
not currently
available in a
digital database



Legend

- Density/Mile 1990's
- 1 - 14
- ▣ Forest Boundary
- ▣ Sites Surveyed 1990's
- ▲ Sites Surveyed 1980's
- Streams Surveyed 1960's

Use caution in comparing population numbers between years. Different survey methods were used that do not yield comparable population numbers between years.

Lake chub

Couesius plumbeus

Other names

Status

Federal threatened
Federal endangered
Federal sensitive
State threatened
State endangered

SD* State rare

*Nature Conservancy: Global 5, State 1 (S2)

Black Hills data

x Native (B3, B7, B8, E3)
Introduced

Location

Deerfield Lake (S3).

Summary of occurrence data

S3 states that surveys prior to 1994 misidentified lake chub as creek chub (S3p107). Lake chub numbers decreased sharply in 1997 from higher 1994-1996 figures and recovered slightly in 1998 (S3, M4p94). Cited references do not speculate on the reason for the decline. B3 states that lake chub were previously common in streams.

Typical habitat

Prefers cool streams and lakes (B7), but will inhabit virtually any body of water, standing or flowing, large or small. Most common in gravel-bottomed pools and runs of streams and along rocky lake margins. (F5)

Black Hills habitat

Deerfield Lake has a surface area of 435 acres with silt deposits and weed growth in the upper bays, but generally light vegetation conditions. Between 1979 and 1997 water quality changed generally from oligotrophic to mesotrophic or even eutrophic conditions. (S3)

Black Hills management

Game fish
Currently being stocked
If stocked, also reproduces naturally
x Nongame (S1p21)
Protected

If nongame, is species of special interest?

Yes, due to its status as rare and disjunct or relict.

Special habitat needs

Not known.

Habitat changes to which species is sensitive

Possibly sensitive to introduction of trout and exotics; more likely sensitive to decline of streams and streamside vegetation (decline in water yield due to increased forest coverage; overuse of riparian areas by livestock causing loss of riparian vegetation and widening of streams). (B7)

Management practices that affect species

Adverse: Possibly fire suppression (decline in water yield) and overgrazing (S3).

Ecological indicator (*population changes are believed to indicate the effects of management activities on species of selected major biological communities or on water*):

Possibly – decline of lake chub in Deerfield Lake may be related to change in water quality, but this relationship has not been proven (S3).

No
Map
Available

Lake trout

Salvelinus namaycush

Other names

Status

Federal threatened
Federal endangered
Federal sensitive
State threatened
State endangered
State rare

Black Hills data

Native
x Introduced

Location

Summary of occurrence data

The forest plan EIS (B2p389) indicates that lake trout have been introduced into Pactola Reservoir. Personal communication with Jack Erickson (GFP) and Judy Smith (GFP) in April 2000 indicated that Lake trout were stocked in Pactola in 1978 (one time only) and are still present in Pactola.

Typical habitat

Black Hills habitat

Black Hills management

x Game fish (S1p21)
Currently being stocked
If stocked, also reproduces naturally
Nongame
Protected

If non-game, is species of special interest?

Special habitat needs

Habitat changes to which species is sensitive

Management practices that affect species

Ecological indicator (*population changes are believed to indicate the effects of management activities on species of selected major biological communities or on water*):

No
Map
Available

Nongame
Protected

Largemouth bass

Micropterus salmoides

Other names

Status

Federal threatened
Federal endangered
Federal sensitive
State threatened
State endangered
State rare

Black Hills data

Native
x Introduced

Location

Creeks: Rapid, Spring

Lakes: Pactola, Sheridan, Stockade

Summary of occurrence data

1. Rapid Creek: A few in 1990 and 1996.
2. Spring Creek: A few in 1984, 1996 and 1998.
Probably washed down from Sheridan Lake (M10p241).
3. Pactola, Sheridan, Stockade Lakes: Many.
Slow growth in Sheridan Lake probably due to late spawning vs. prairie populations, and lack of forage and preferred habitat (M10p134).
(E2, M2, M3, M4, M8, M9, M10, S4)

Typical habitat

Warmwater ponds and reservoirs with abundant vegetation and clear water; backwaters of slow streams (C2p200, B1p132). Largest numbers occur in mesotrophic to eutrophic lakes and reservoirs (B5r)

Black Hills habitat

Larger lakes.

Black Hills management

- x Game fish (S1p21, Wy2)
Currently being stocked
If stocked, also reproduces naturally

If non-game, is species of special interest?
N/A

Special habitat needs

Relatively warm water. Spawning may begin when the water temperature reaches 15C, but spawning activity is slight below 18C. Intolerant of turbidity and probably of organic pollution. (B5r)

Habitat changes to which species is sensitive

Decrease in water temperature and aquatic vegetation (B5r, M10p134).

Management practices that affect species

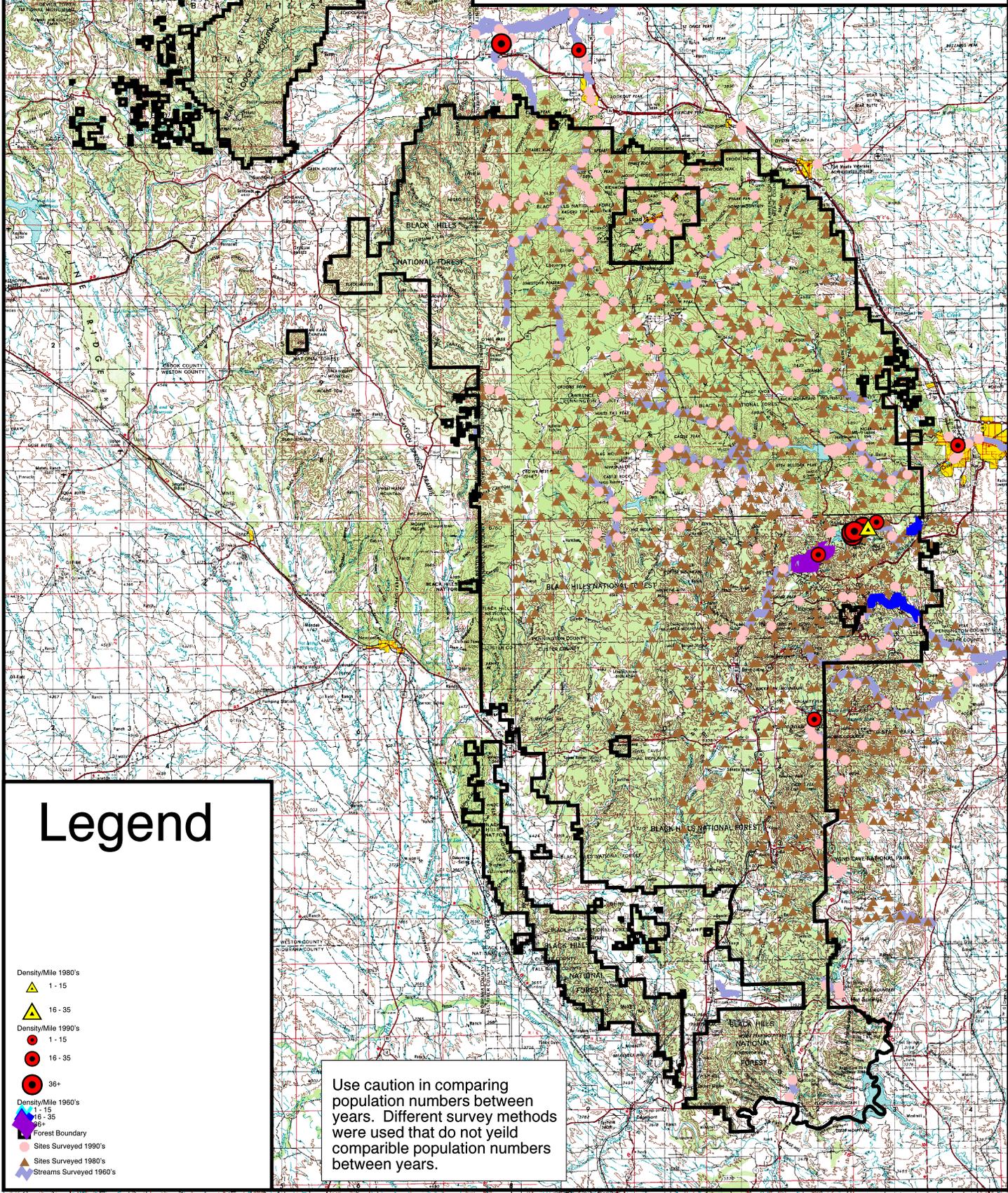
Beneficial: Dredging.

Ecological indicator (*population changes are believed to indicate the effects of management activities on species of selected major biological communities or on water*):

No.

Largemouth Bass Estimated Number/Mile 1960's, 80's and 90's

Wyoming Data
not currently
available in a
digital database



Legend

- Density/Mile 1980's
 - ▲ 1 - 15
 - ▲ 16 - 35
- Density/Mile 1990's
 - 1 - 15
 - 16 - 35
 - 36+
- Density/Mile 1960's
 - ▲ 1 - 15
 - ▲ 16 - 35
 - ▲ 36+
- Forest Boundary
- Sites Surveyed 1990's
- Sites Surveyed 1980's
- Streams Surveyed 1960's

Use caution in comparing population numbers between years. Different survey methods were used that do not yield comparable population numbers between years.

Currently being stocked
If stocked, also reproduces naturally
x Nongame
Protected
(Ref: S1p21)

Longnose dace

Rhinichthys cataractae

Other names

None

Status

Federal threatened
Federal endangered
Federal sensitive
State threatened
State endangered
State rare

Black Hills data

x Native (B3, B4p13, B8, E3)
Introduced

Location

Creeks: Battle, Bear Butte, Beaver, Beaver North, Beaver South, Beaver West (Bearlodge), Blacktail, Bogus Jim, Boxelder, Middle Boxelder, North Boxelder, South Boxelder, Buskala, Cascade, Castle, Chicken, Corral, Crow, Deadwood, Elk, False Bottom, Flynn, French, Galena, Grace, Grizzly Bear, Horse, Hot Brook, Iron, Iron South, Kirk, Lake, Lytle, Meadow, Newton Fork, Potato, North Rapid, Rapid, Redwater River, Redwater South, Slate, Sand, Spearfish, Spring, Stockade Beaver, Sunday Gulch, Thompson Ditch, Tillson, Whitetail, Whitewood. (B6, E1, E2, F4, M2, M3, M5, M8, M9, M10, S4).

Summary of occurrence data

Widespread and common in the Black Hills (see location references).

Typical habitat

Riffles of small and large cool/cold-water streams; may be found in lakes, usually along rocky shoreline (B1p77, B5).

Black Hills habitat

Similar to typical habitat, but not known to occur in lakes (see location references).

Black Hills management

Game fish

If non-game, is species of special interest?
Probably not.

Special habitat needs

Riffles (B5e).

Habitat changes to which species is sensitive

Sedimentation and loss of riffle habitat (B5e).

Management practices that affect species

Adverse: sedimentation; dredging; channelization; livestock grazing in riparian zones (B5e).

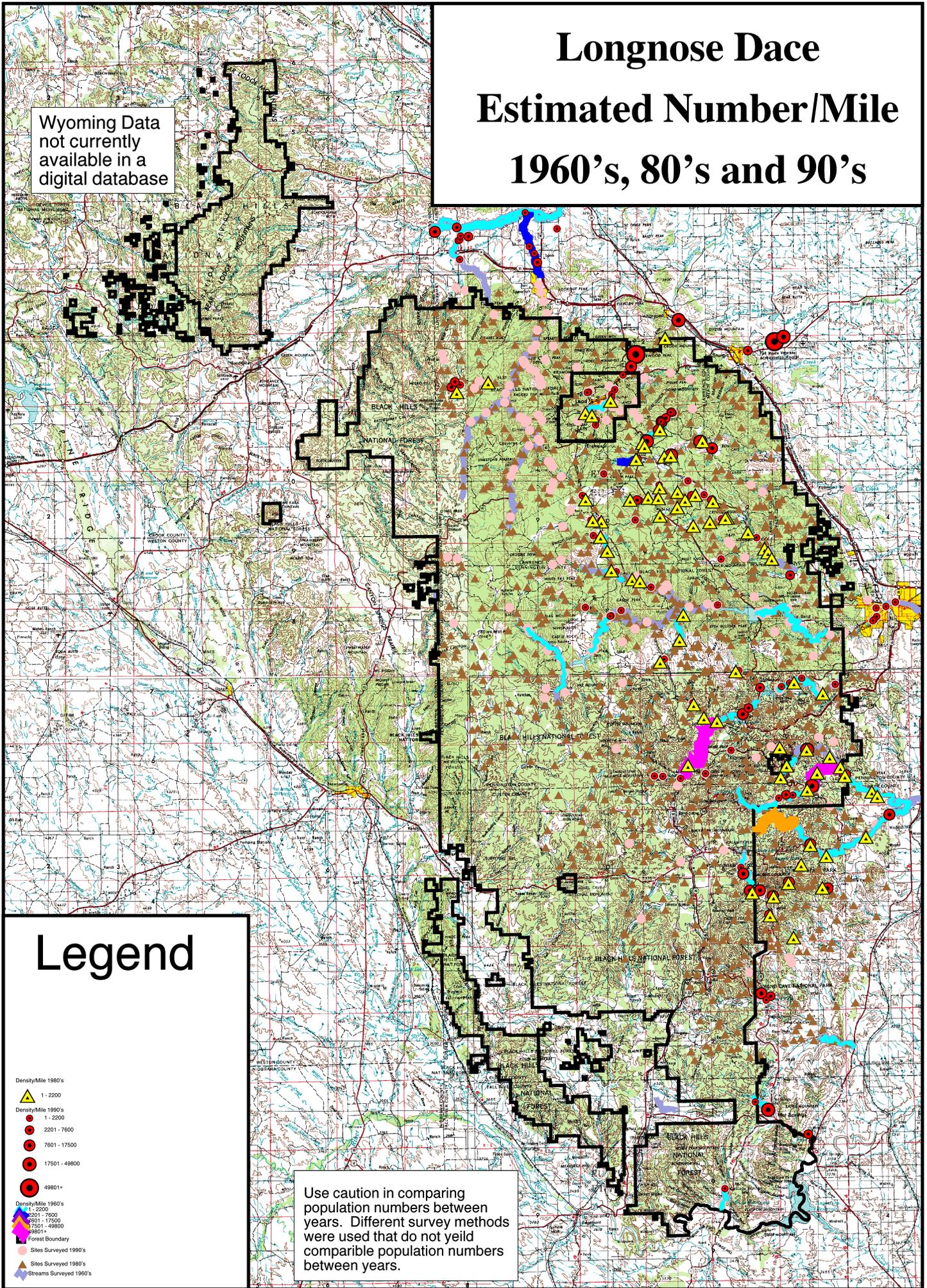
Beneficial: restriction of habitat disturbance; retention of large patch size; retention of riffles in streams; controlled livestock grazing (B5e).

Ecological indicator? (*population changes are believed to indicate the effects of management activities on species of selected major biological communities or on water*)

No data.

Longnose Dace Estimated Number/Mile 1960's, 80's and 90's

Wyoming Data
not currently
available in a
digital database



Legend

Use caution in comparing population numbers between years. Different survey methods were used that do not yield comparable population numbers between years.

If stocked, also reproduces naturally

Nongame

x Protected (S1p21)

Longnose sucker

Catostomus catostomus

Other names

Status

Federal threatened

Federal endangered

Federal sensitive

SD* State threatened (S2, B3)

State endangered

State rare

*Nature Conservancy: Global 5, State 1 (disjunct).

In Wyoming, considered common & stable with stable habitat (—daves ref).

Black Hills data

x Native (B3, B4, Wy2)

Introduced

Location

Creeks: Crow, French, Sand, Spearfish

Lakes: Cook, Pactola

Summary of occurrence data

1. French Creek: Present in the 1960s but not found in the 80s or 90s.
2. Crow Creek: Present in 60s, 80s and 90s.
3. Cook Lake and Sand Creek: Present in 90s. Sand Creek is unique in supporting a large population of longnose sucker, since populations at other sites in the Black Hills appear to be declining (M1p13).
4. Spearfish Creek: Present in 1959 and 1998, but only off-forest (four miles downstream from Spearfish).
5. Pactola: No records from 1997 or 1998.

Typical habitat

Clear, cold lakes and streams (C1p467, F1a); widespread.

Black Hills habitat

Mainly found in fairly small, clear, cold streams.

Black Hills management

Game fish

Currently being stocked

If non-game, is species of special interest?

Possibly, due to protected status. The Black Hills population is the only one known in South Dakota and the Sand Creek population is unique in its stability (see occurrence summary), though the species is widespread elsewhere.

Special habitat needs

None known.

Habitat changes to which species is sensitive

Increase in water temperature and decrease in water quality (A1).

Management practices that affect species

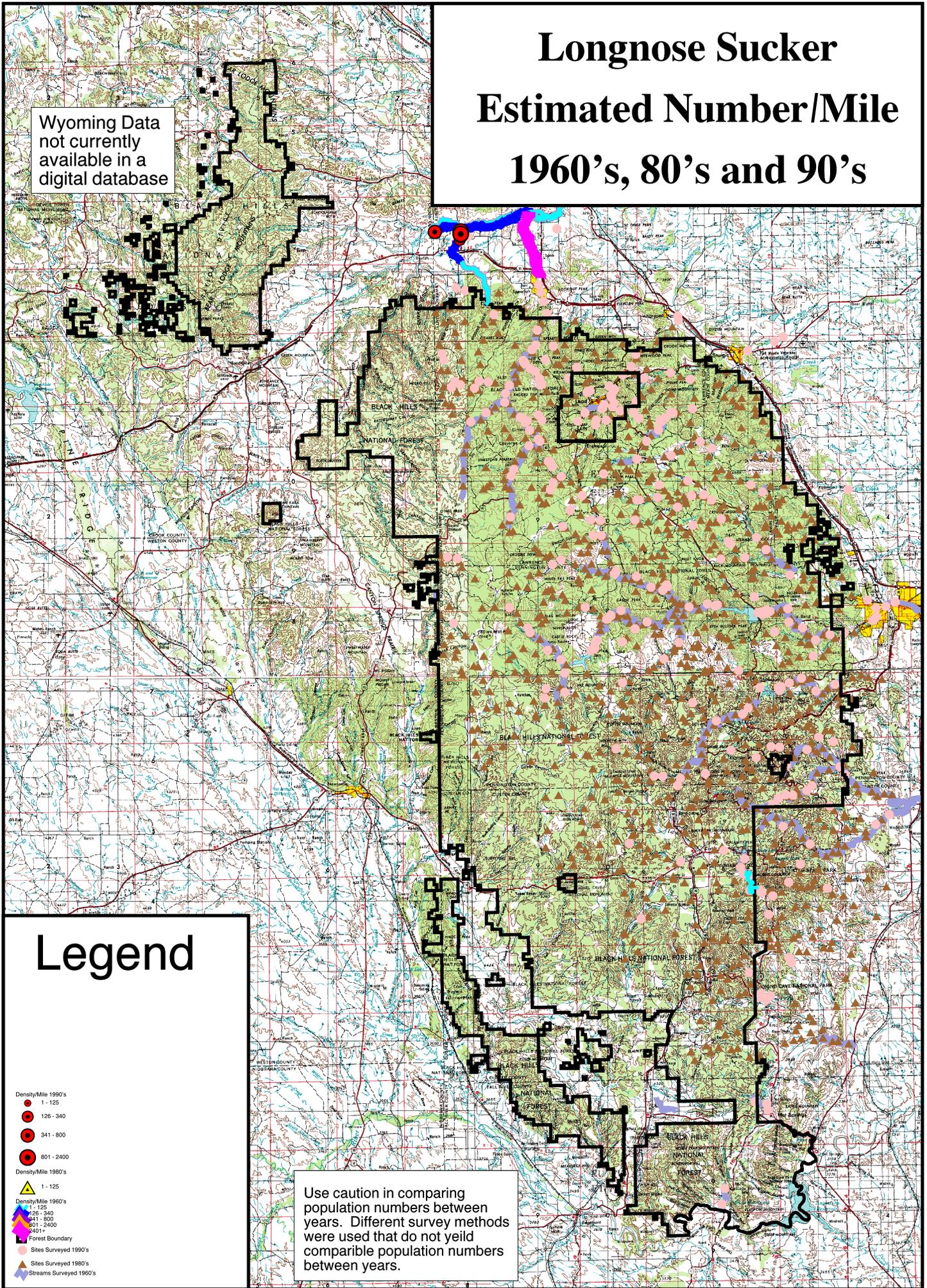
Logging, mining or other activities that could result in increased water temperature and decreased water quality (A1).

Ecological indicator (*population changes are believed to indicate the effects of management activities on species of selected major biological communities or on water*):

Possibly – some references seem to associate the species with cool to cold high-quality water (A1, C1p467, F1a, M1), though others indicate a wider habitat tolerance (C5b).

Longnose Sucker Estimated Number/Mile 1960's, 80's and 90's

Wyoming Data
not currently
available in a
digital database



Legend

- Density/Mile 1990's
 - 1 - 125
 - 126 - 340
 - 341 - 800
 - 801 - 2400
- Density/Mile 1980's
 - ▲ 1 - 125
- Density/Mile 1960's
 - ▲ 1 - 125
 - ▲ 126 - 340
 - ▲ 341 - 800
 - ▲ 801 - 2400
 - ▲ 2401 -
- ▲ Forest Boundary
- Sites Surveyed 1990's
- ▲ Sites Surveyed 1980's
- ▲ Streams Surveyed 1960's

Use caution in comparing population numbers between years. Different survey methods were used that do not yield comparable population numbers between years.

- If stocked, also reproduces naturally
x Nongame (S1p21, Wy2)
Protected

Mountain sucker

Catostomus platyrhynchus

Other names

Pantosteus platyrhynchus

Status

Federal threatened
Federal endangered
Federal sensitive
State threatened
State endangered
State rare

Black Hills data

- x Native (B3, B4p13, B8, E3)
Introduced

Location

Creeks: Battle, Bear Butte, Beaver, Beaver South, Beaver (Crook County), Bogus Jim, Boxelder, Middle Boxelder, North Boxelder, Buskala, Cascade, Castle, Elk, False Bottom, Flynn, Foster, French, Grace Coolidge, Grizzly, Horse, Hot Brook, Iron South, Kirk, Lytle, Meadow, Newton Fork, North Rapid, Rapid, Sand, Slate, South Boxelder, South Rapid, Spearfish, Spring, Tillson, Whitewood

Summary of occurrence data

Appears to be in decline (B3).

1. Beaver South, Cascade, Castle, Grizzly, Rapid, South Boxelder, Spearfish, Spring, Tillson: Not present at last survey
2. Bear Butte, Beaver (Crook County), Elk, French, Grace Coolidge, Horse, Meadow, North Boxelder, Sand, Slate, Whitewood: Present at last survey (90s)

Typical habitat

Cold, clear streams and lakes. Mostly small streams with aquatic vegetation or undercut banks (T1).

Black Hills habitat

Mainly smaller streams.

Black Hills management

Game fish
Currently being stocked

If non-game, is species of special interest?

Yes, due to its status as one of the few fish species native to the Black Hills, and because its range in the Black Hills has declined in recent decades.

Special habitat needs

No data.

Habitat changes to which species is sensitive

No data.

Management practices that affect species

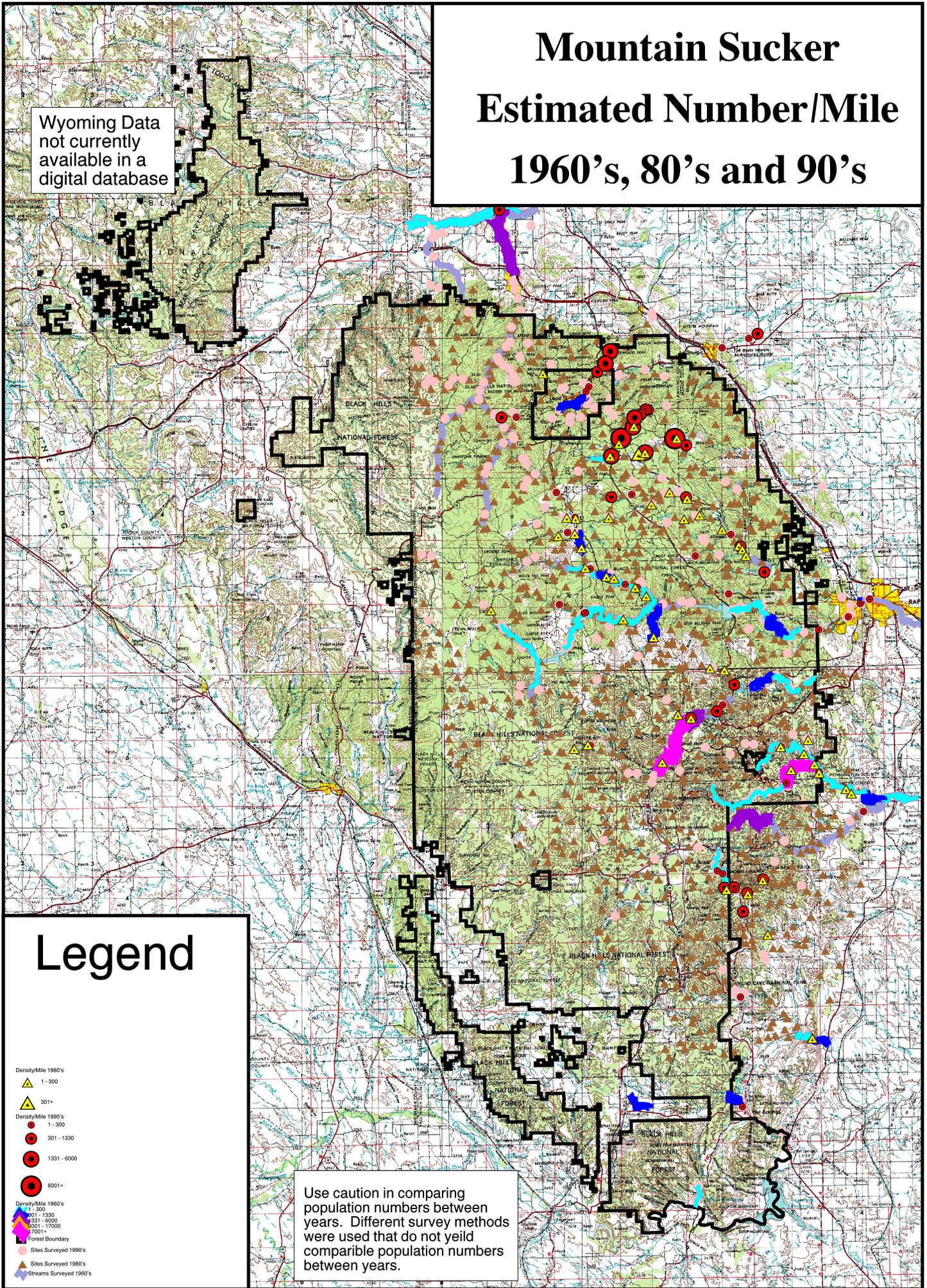
No data.

Ecological indicator (*population changes are believed to indicate the effects of management activities on species of selected major biological communities or on water*):

No data.

Mountain Sucker Estimated Number/Mile 1960's, 80's and 90's

Wyoming Data
not currently
available in a
digital database



Legend

- Density/Mile 1960's
 - ▲ 1 - 300
 - ▲ 301+
- Density/Mile 1980's
 - ▲ 1 - 300
 - ▲ 301 - 1330
 - ▲ 1331 - 6000
 - ▲ 6001+
- Density/Mile 1990's
 - ▲ 1 - 300
 - ▲ 301 - 1330
 - ▲ 1331 - 6000
 - ▲ 6001+
- ▲ Forest Boundary
- Sites Surveyed 1990's
- ▲ Sites Surveyed 1980's
- ▲ Streams Surveyed 1960's

Use caution in comparing population numbers between years. Different survey methods were used that do not yield comparable population numbers between years.

Northern pike

Esox lucius

Other names

Pickereel

Status

Federal threatened
Federal endangered
Federal sensitive
State threatened
State endangered
State rare

Black Hills data

Native
x Introduced (B5, M12, M13)

Summary of occurrence data

Northern pike were observed in the 1990s in Sheridan Lake and Spring Creek. Reported in almost all lakes in the Black Hills.

Typical habitat

Lakes, ponds, and rivers with slow currents and abundant aquatic vegetation or other cover; prefers clear water (B5).

Black Hills habitat

Typical.

Black Hills management

x Game fish (S1p21)
Currently being stocked
If stocked, also reproduces naturally
Nongame
Protected

If non-game, is species of special interest?

N/A

Special habitat needs

Aquatic vegetation (B5).

range of alkalinity and pH (B5).

Management practices that affect species

Adverse: Wetland drainage (B5).

Ecological indicator (*population changes are believed to indicate the effects of management activities on species of selected major biological communities or on water*):

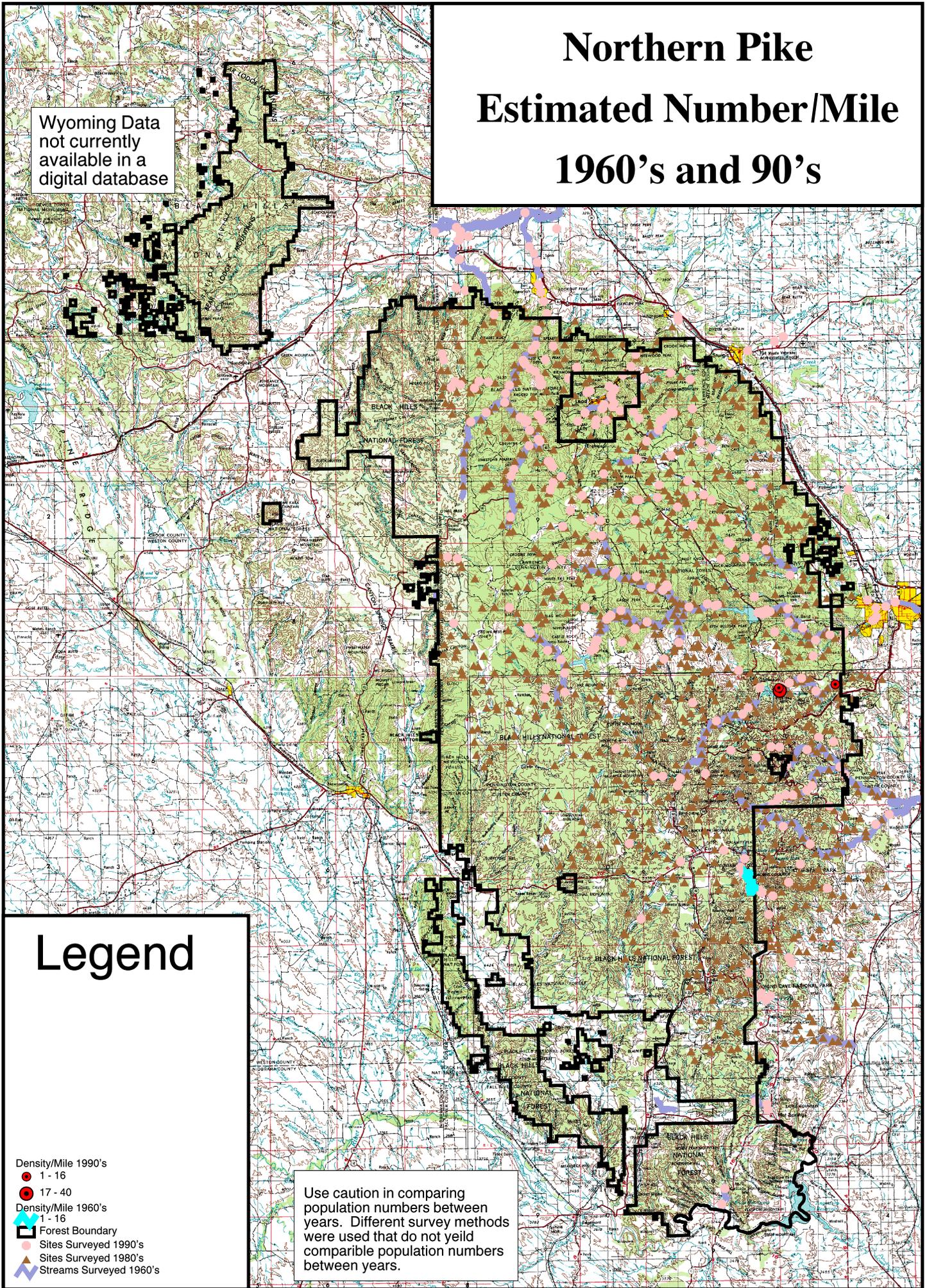
No; species is tolerant of a variety of conditions.

Habitat changes to which species is sensitive

Continuous turbidity, fluctuating water levels. Few other limitations; species is tolerant of low dissolved oxygen, occasional turbidity, variety of substrates,

Northern Pike Estimated Number/Mile 1960's and 90's

Wyoming Data
not currently
available in a
digital database



Legend

- Density/Mile 1990's
 - 1 - 16
 - 17 - 40
- Density/Mile 1960's
 - ▲ 1 - 16
- ▭ Forest Boundary
- Sites Surveyed 1990's
- ▲ Sites Surveyed 1980's
- ▲ Streams Surveyed 1960's

Use caution in comparing population numbers between years. Different survey methods were used that do not yield comparable population numbers between years.

Plains killifish

Fundulus zebrinus

Other names

Rio Grande killifish

Status

Federal threatened
Federal endangered
Federal sensitive
State threatened
State endangered
State rare

Black Hills data

Native

* Introduced

*Native to Wyoming, but not to the Black Hills (Wy2, B3).

Location

Creeks:

Lakes:

Summary of occurrence data

Typical habitat

Sandy, saline creeks of the high plains (T1).

Black Hills habitat

Black Hills management

Game fish

Currently being stocked

If stocked, also reproduces naturally

x Nongame (S1p21, Wy2)

Protected

If non-game, is species of special interest?

Probably not – populations are considered secure in SD and WY, and occurrences in the Black Hills are probably accidental.

Special habitat needs

Sand or gravel in shallow water (less than 10 cm deep) with low current for spawning habitat.

Habitat changes to which species is sensitive

Sedimentation. Few others – species is tolerant of low oxygen levels, highly saline and alkaline environments (B5).

Management practices that affect species

Adverse: Dredging, sedimentation, channelization.

Ecological indicator (*population changes are believed to indicate the effects of management activities on species of selected major biological communities or on water*):

Activities that allow sediment to enter sandy or gravel-bottomed streams could be detrimental to reproduction of this species (B5).

No
Map
Available

Plains minnow

Hybognathus placitus

Other names

Status

Federal threatened
Federal endangered
Federal sensitive
State threatened
State endangered
State rare

Note: Species is considered “uncommon” in Wyoming – declining but not in danger of extirpation, habitat vulnerable but no recent loss (daves letter).

Black Hills data

* Native
Introduced

*Native to Wyoming. Not clear whether the species is native to documented locations in the Black Hills.

Location

Stockade Beaver Creek (B6).

Summary of occurrence data

It is not evident from B6 whether the plains minnow was found on or near National Forest.

Typical habitat

Larger, sandy, shallow streams with emergent vegetation; clear to highly turbid water (C1, T1, B5).

Black Hills habitat

Stockade Beaver Creek includes a variety of habitat types, from trout spawning conditions at the headwaters to high dissolved solids content further down on the prairie. Reference B6 does not make clear where on the stream the plains minnow has been located.

Black Hills management

Game fish
Currently being stocked
If stocked, also reproduces naturally
x Nongame
Protected

If non-game, is species of special interest?

Probably not - this species has been documented in only one location on or near the forest.

Special habitat needs

Apparently requires a strong current at various points in its life cycle (T1).

Habitat changes to which species is sensitive

Formerly one of the most abundant fishes of the Great Plains, the dewatering of streams is suspected of extirpating this species from much of its former range (T1).

Management practices that affect species

Adverse: Lowered water levels.

Beneficial: Maintenance of high flow during spawning season. (B5)

Ecological indicator (*population changes are believed to indicate the effects of management activities on species of selected major biological communities or on water*):

Indicates water levels but not water quality.

No
Map
Available

Plains topminnow

Fundulus sciadicus

Other names

Status

Federal threatened
Federal endangered
R2 Federal sensitive
State threatened
State endangered
SD* State rare (B3, S2)
*Nature Conservancy: Global 4, State 3

Black Hills data

Native
x Introduced

Location

Fall River, Cold Brook Creek

Summary of occurrence data

Observed locations are outside or on the National Forest boundary. The locations are in other ownership and are not near land administered by the Forest Service.

Typical habitat

Clear, slow-moving streams with aquatic vegetation; quiet pools of small creeks and backwaters and overflow pools of larger streams (A1).

Black Hills habitat

See above.

Black Hills management

Game fish
Currently being stocked
If stocked, also reproduces naturally
WY Nongame (Wy2)
SD Protected (S1p21)

If non-game, is species of special interest?

Possibly, due to protected status in SD and sensitive status in Region 2.

Special habitat needs

Needs aquatic vegetation and algae for egg deposition (A1).

Habitat changes to which species is sensitive

No data.

Management practices that affect species

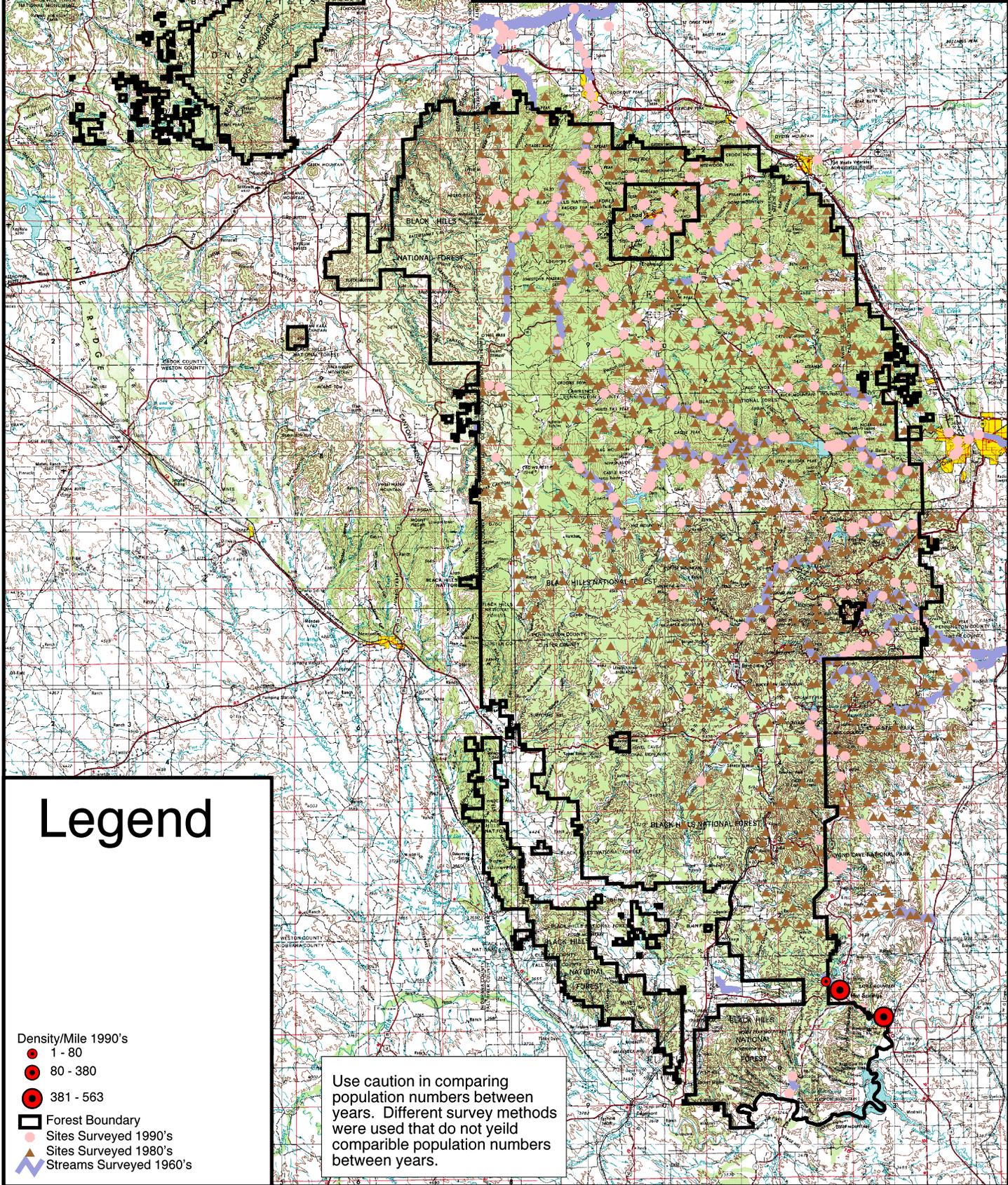
No data.

Ecological indicator (*population changes are believed to indicate the effects of management activities on species of selected major biological communities or on water*):

The plains topminnow may be an indicator of stream water quality (A1).

Plains Topminnow Estimated Number/Mile 1990's

Wyoming Data
not currently
available in a
digital database



Habitat changes to which species is sensitive

N/A

Management practices that affect species

N/A

Rainbow smelt

Osmerus mordax

Other names

American smelt

Status

Federal threatened
Federal endangered
Federal sensitive
State threatened
State endangered
State rare

Black Hills data

Native
x Introduced

Location

Pactola Reservoir

Summary of occurrence data

Rainbow smelt were stocked in Pactola in 1984 and 1992. Smelt are still present in Pactola (M13).

Typical habitat

Usually cold water, though may also be found in warm water ponds (C1).

Black Hills habitat

Appears not to be present.

Black Hills management

Game fish
Currently being stocked
If stocked, also reproduces naturally
* Nongame (S1p21)
Protected

*Not listed as occurring in Wyoming (Wy2).

If non-game, is species of special interest?

Probably not – may have a negative effect on native and game fisheries due to its tendency to eat smaller game and bait fish (T1).

Special habitat needs

Prefers cooler water (C1).

Ecological indicator (*population changes are believed to indicate the effects of management activities on species of selected major biological communities or on water*):

N/A

No
Map
Available

Rainbow trout

Oncorhynchus mykiss

Other names

Salmo gairdneri

Status

Federal threatened
Federal endangered
Federal sensitive
State threatened
State endangered
State rare

Black Hills data

Native
x Introduced

Location

Creeks: Arnold, Battle, Bear Butte, Bear Gulch, Beaver, Beaver South, Beaver West (Bearlodge), Boxelder, Cascade, Castle, Chicken, Cold Springs, Crow, Ditch, French, Grace Coolidge, Hanna, Horse, Hot Brook, Iron, Iron South, Little Spearfish, Rapid, Rhoades Fork, South Rapid, Sand, Spearfish, Spotted Tail, Spring, Stockade Beaver, Squaw.

Lakes: Bismarck, Cook, Custer Municipal Pond, Dalton, Deerfield, Iron Creek, Pactola, Reausaw, Roubaix, Sheridan, Stockade, Victoria, Ward Pond. (B6, F2, F3, F4, G1, H1, M1, M9, P3, S4)

Summary of occurrence data

Stocked in reservoirs and creeks. Self-sustaining populations in a few creeks (Sand, M1p13; Spearfish, M9p203; Rapid, M8p181; Stockade Beaver, M6p4) but evidently not in lakes (M4p126).

Typical habitat

Cool clear lakes and cool swift perennial streams with silt-free rocky substrates and pool-to-riffle ratios of about 1:1; vegetated banks, deep pools, shade, submerged vegetation, log jams, boulders. Spawns in gravel riffles (B5c).

Black Hills habitat

Stocked in a wide variety of creeks and lakes. Self-sustaining populations are in typical habitat (see above).

Black Hills management

- x Game fish (S1p21)
 - x Currently being stocked (M9)
 - x If stocked, also reproduces naturally
- Nongame
Protected

If non-game, is species of special interest?

N/A

Special habitat needs

Silt-free rocky substrate is important for spawning, cover and food production. Gravel required for spawning. Overhanging vegetation on banks, deep pools, submerged vegetation, log jams, boulders, etc. are essential habitat components for escape and resting cover. Avoids permanent residence in water with temperature above 18C. Upper lethal temperature 26-28C. PH less than 5.0 is harmful to eggs. High pH in summer due to aquatic plant growth is severely limiting (B5c). Tolerant of a wide variety of limnological conditions (B5c) and warmer water than other trout (T1p49).

Habitat changes to which species is sensitive

1. Decreased shade over water
 2. Increased water temperature
 3. Sedimentation
 4. Channelization
- (B5c)

Management practices that affect species

Adverse:

1. Clearcuts and other logging practices that reduce shade over water
 2. Management actions that increase sedimentation
 3. Draining of wetlands, bogs and lakes
 4. Stream channelization
- (B5c)

Beneficial:

1. Regulated take
 2. Supplemental feeding
 3. Artificial nest structures
 4. Creation of mixed pools and riffles
 5. Revegetation of stream banks
 6. Development of fishways at dams
 7. Controlled livestock grazing
- (B5c)

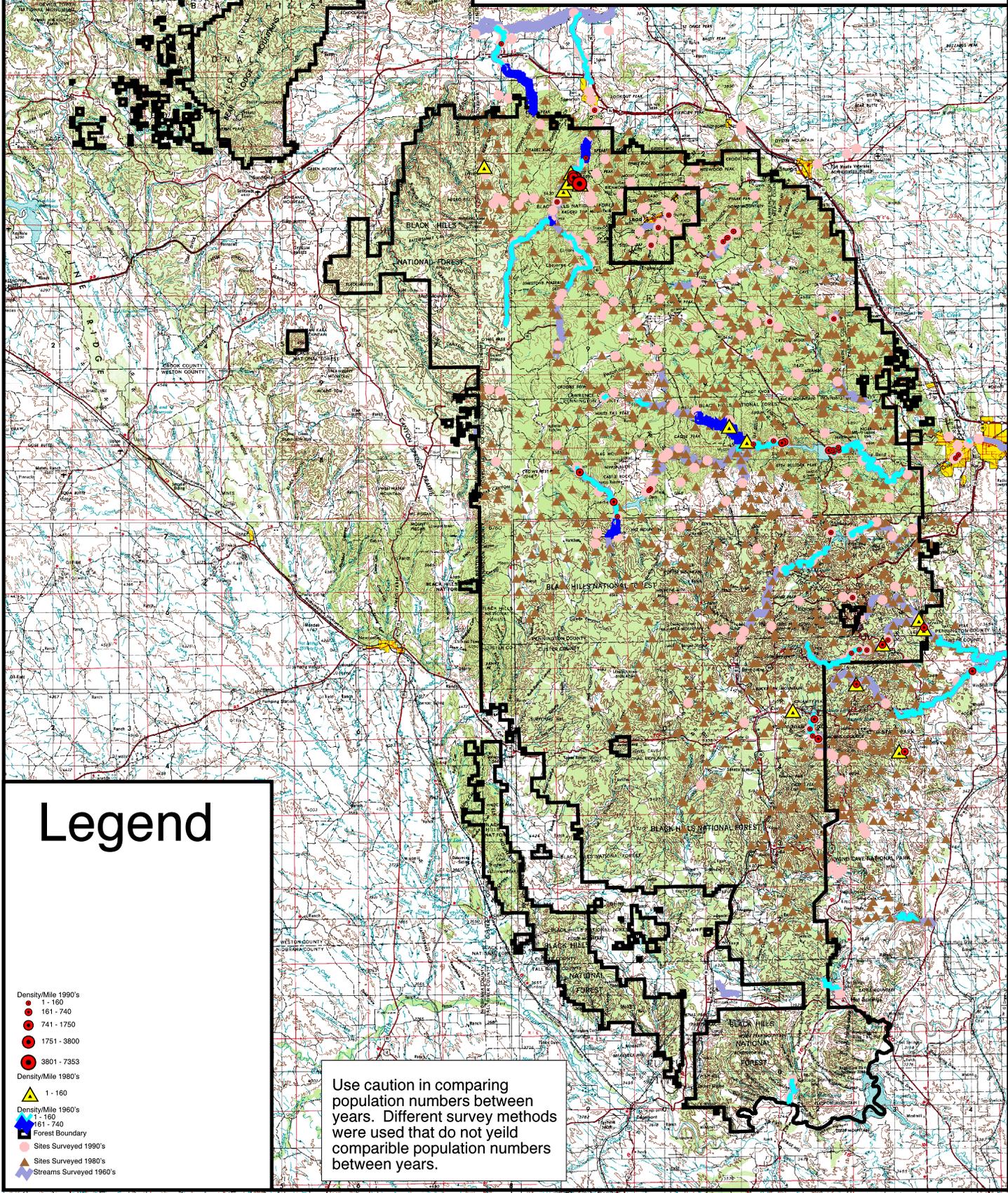
Ecological indicator (*population changes are believed to indicate the effects of management activities on species of selected major biological*

communities or on water):

Sensitive to sedimentation, but more tolerant of change in water temperature and pH than other trout.

Rainbow Trout Estimated Number/Mile 1960's, 80's and 90's

Wyoming Data
not currently
available in a
digital database



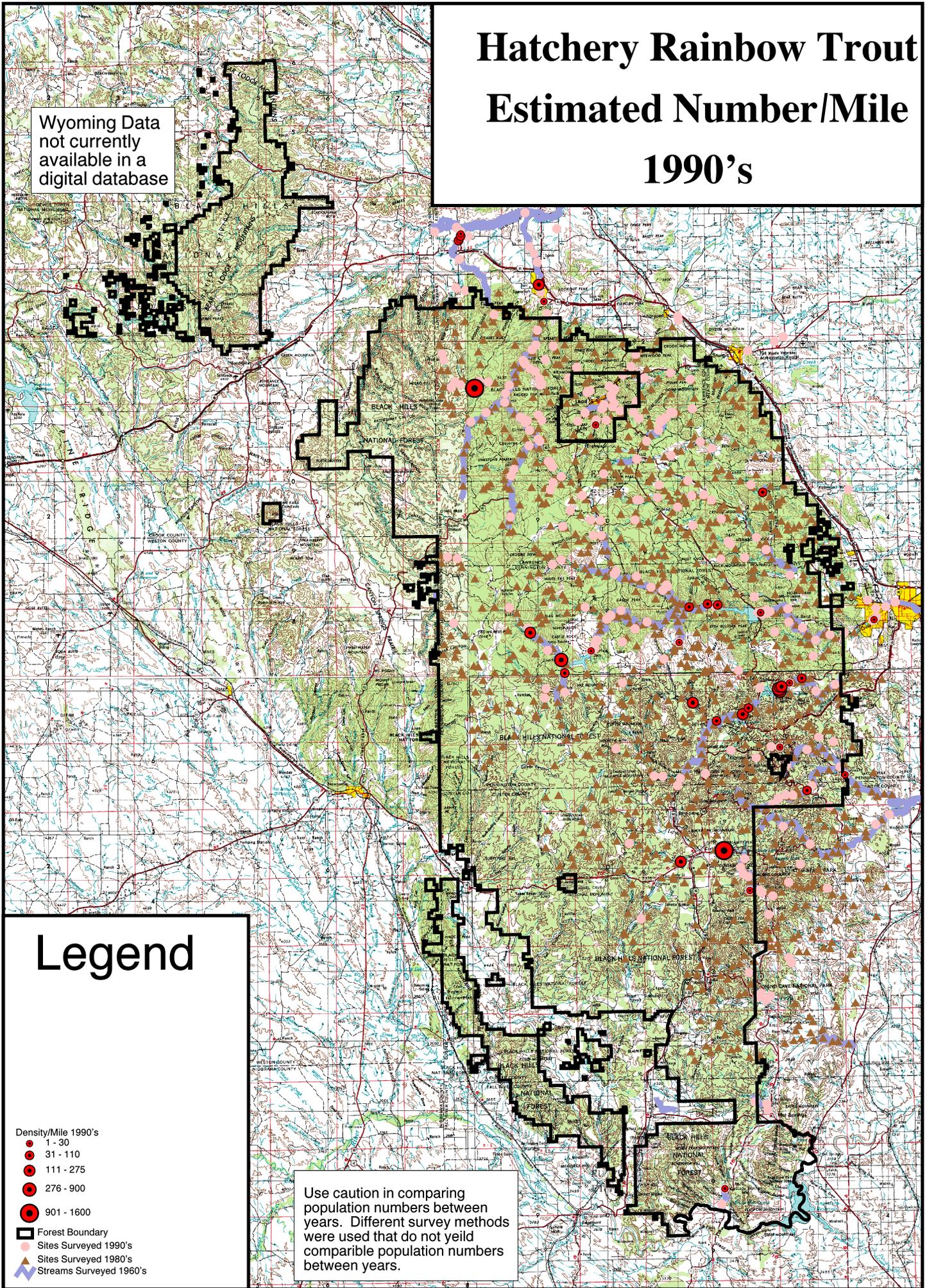
Legend

- Density/Mile 1990's
 - 1 - 160
 - 161 - 740
 - 741 - 1750
 - 1751 - 3800
 - 3801 - 7353
- Density/Mile 1980's
 - ▲ 1 - 160
- Density/Mile 1960's
 - ▲ 1 - 160
 - ▲ 161 - 740
- ▬ Forest Boundary
- Sites Surveyed 1990's
- ▲ Sites Surveyed 1980's
- ▲ Streams Surveyed 1960's

Use caution in comparing population numbers between years. Different survey methods were used that do not yield comparable population numbers between years.

Hatchery Rainbow Trout Estimated Number/Mile 1990's

Wyoming Data
not currently
available in a
digital database



If non-game, is species of special interest?
N/A

Rock bass

Ambloplites rupestris

Other names

Status

Federal threatened
Federal endangered
Federal sensitive
State threatened
State endangered
State rare

Black Hills data

Native
x Introduced

Location

Creeks: Battle, Rapid, Spring, Whitewood (E2, F4, M2, M3, M8, M9, M10, S4)

Lakes: Deerfield, Pactola, Sheridan (M4, S3)

Summary of occurrence data

1. Spring, Whitewood, Battle Creeks: Very low populations in the 80s or 90s.
2. Rapid Creek: Surveys found rock bass in the 1950s, 80s, and early 90s, but none have been found since 1996.
3. Pactola, Sheridan Lakes: Late 1990s surveys found rock bass to be very common.
4. Deerfield Lake: Rock bass were first found in 1997 and were again present in 1998.
(E2, F4, M2, M3, M4, M8, M9, M10, S3, S4)

Typical habitat

Cool, weedy lakes; pools in rocky streams (C2p20, B1p136).

Black Hills habitat

Found almost exclusively in larger lakes.

Black Hills management

x Game fish (S1p21)
Currently being stocked
If stocked, also reproduces naturally
Nongame
Protected

Special habitat needs

Generally found under cover of rocks, ledges, logs, or overhanging branches (R1).

Habitat changes to which species is sensitive

Pollution, environmental degradation (M11).

Management practices that affect species

No data.

Ecological indicator (*population changes are believed to indicate the effects of management activities on species of selected major biological communities or on water*):

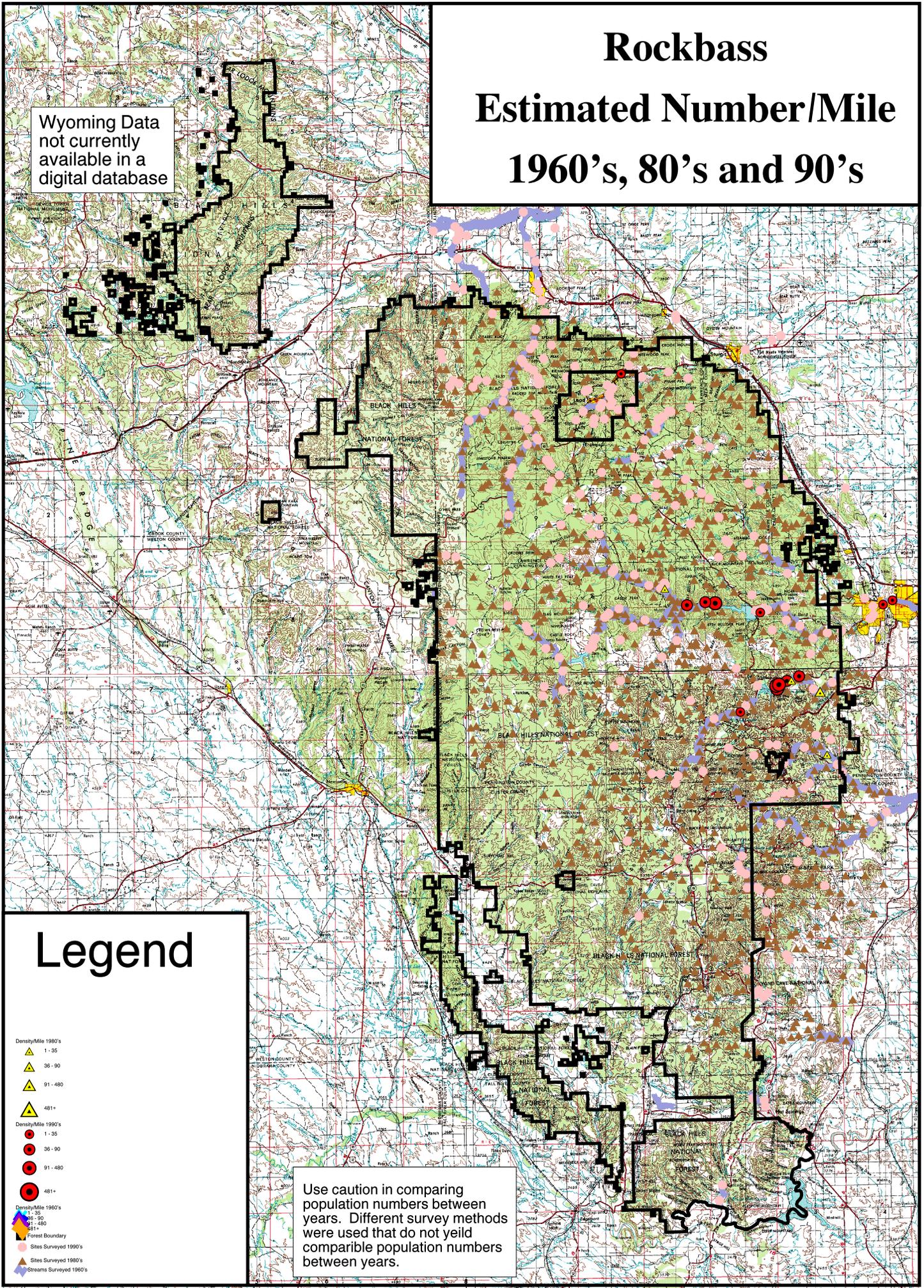
Probably not.

Rockbass

Estimated Number/Mile

1960's, 80's and 90's

Wyoming Data
not currently
available in a
digital database



Legend

- Density/Mile 1980's
 - ▲ 1 - 35
 - ▲ 36 - 90
 - ▲ 91 - 480
 - ▲ 481+
- Density/Mile 1990's
 - 1 - 35
 - 36 - 90
 - 91 - 480
 - 481+
- Density/Mile 1960's
 - ▲ 1 - 35
 - ▲ 36 - 90
 - ▲ 91 - 480
 - ▲ 481+
- Forest Boundary
- Sites Surveyed 1990's
- Sites Surveyed 1980's
- Streams Surveyed 1960's

Use caution in comparing population numbers between years. Different survey methods were used that do not yield comparable population numbers between years.

Protected

Sand shiner

Notropis stramineus

Other names

Notropis ludibundus (U1)

Status

Federal threatened
Federal endangered
Federal sensitive
State threatened
State endangered
State rare

Black Hills data

Native
* Introduced

*See summary below.

Location

Stockade Beaver Creek

Summary of occurrence data

Stockade Beaver Creek below Salt Creek only supports species tolerant of high temperatures and total dissolved solids, such as sand shiners (B6p9). Salt Creek enters Stockade Beaver Creek well outside the forest boundary. (No other records were found stating that this species is especially tolerant.) Sand shiners are also present in Fall River downstream from Hot Springs, also outside the forest boundary (M10). No records of this species occurring specifically on the forest were found.

Typical habitat

Permanent, clear streams with sandy bottom (B1p86, C2p432). Middle portions of small streams and rivers (R1).

Black Hills habitat

Typical habitat.

Black Hills management

Game fish
Currently being stocked
If stocked, also reproduces naturally
x Nongame (S1p21, Wy2)

If non-game, is species of special interest?

Probably not – occurrence in Black Hills very limited.

Special habitat needs

No data.

Habitat changes to which species is sensitive

No data.

Management practices that affect species

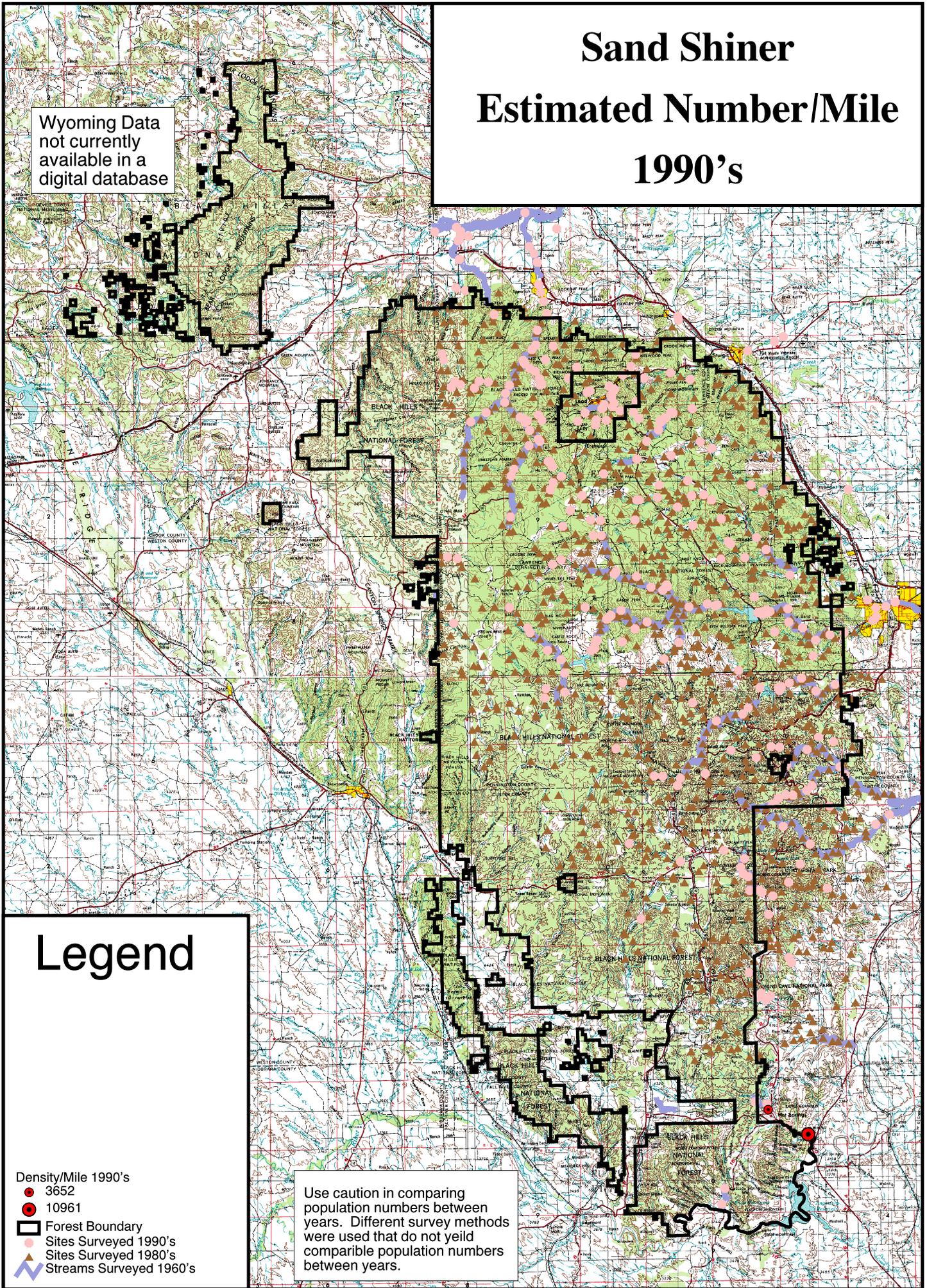
No data.

Ecological indicator (*population changes are believed to indicate the effects of management activities on species of selected major biological communities or on water*):

No data.

Sand Shiner Estimated Number/Mile 1990's

Wyoming Data
not currently
available in a
digital database



Legend

- Density/Mile 1990's
 - 3652
 - 10961
- ▭ Forest Boundary
- Sites Surveyed 1990's
- ▲ Sites Surveyed 1980's
- └┴┘ Streams Surveyed 1960's

Use caution in comparing population numbers between years. Different survey methods were used that do not yield comparable population numbers between years.

Shorthead redhorse

Moxostoma macrolepidotum

Other names

Northern redhorse

Status

Federal threatened
Federal endangered
Federal sensitive
State threatened
State endangered
State rare

Black Hills data

Native

* Introduced

*Native to Wyoming as a whole, but not to the Black Hills.

Location

Creeks: Boxelder, French; Redwater River.

Summary of occurrence data

Small populations of shorthead redhorse were observed in Boxelder Creek in the 1960s and mid-80s; in French Creek in the 1970s; and in the Redwater River (outside the forest) in the 50s and 70s. Surveys in the 1990s did not locate this species in these creeks or elsewhere on the forest.

Typical habitat

Medium-sized streams and some lakes where the water is clear and cool. Does not thrive in small creeks (B1p102). This reference lists the Belle Fourche and North Platte Rivers as being typical locations for shorthead redhorse in Wyoming.

Black Hills habitat

Historical observations are from streams that are large for the Black Hills but fairly small in a regional sense.

Black Hills management

Game fish
Currently being stocked
If stocked, also reproduces naturally
x Nongame (S1p21, Wy2)
Protected

If non-game, is species of special interest?

Probably not; Black Hills habitat is marginal at best.

Special habitat needs

Larger streams than those found on the forest.

Habitat changes to which species is sensitive

No data.

Management practices that affect species

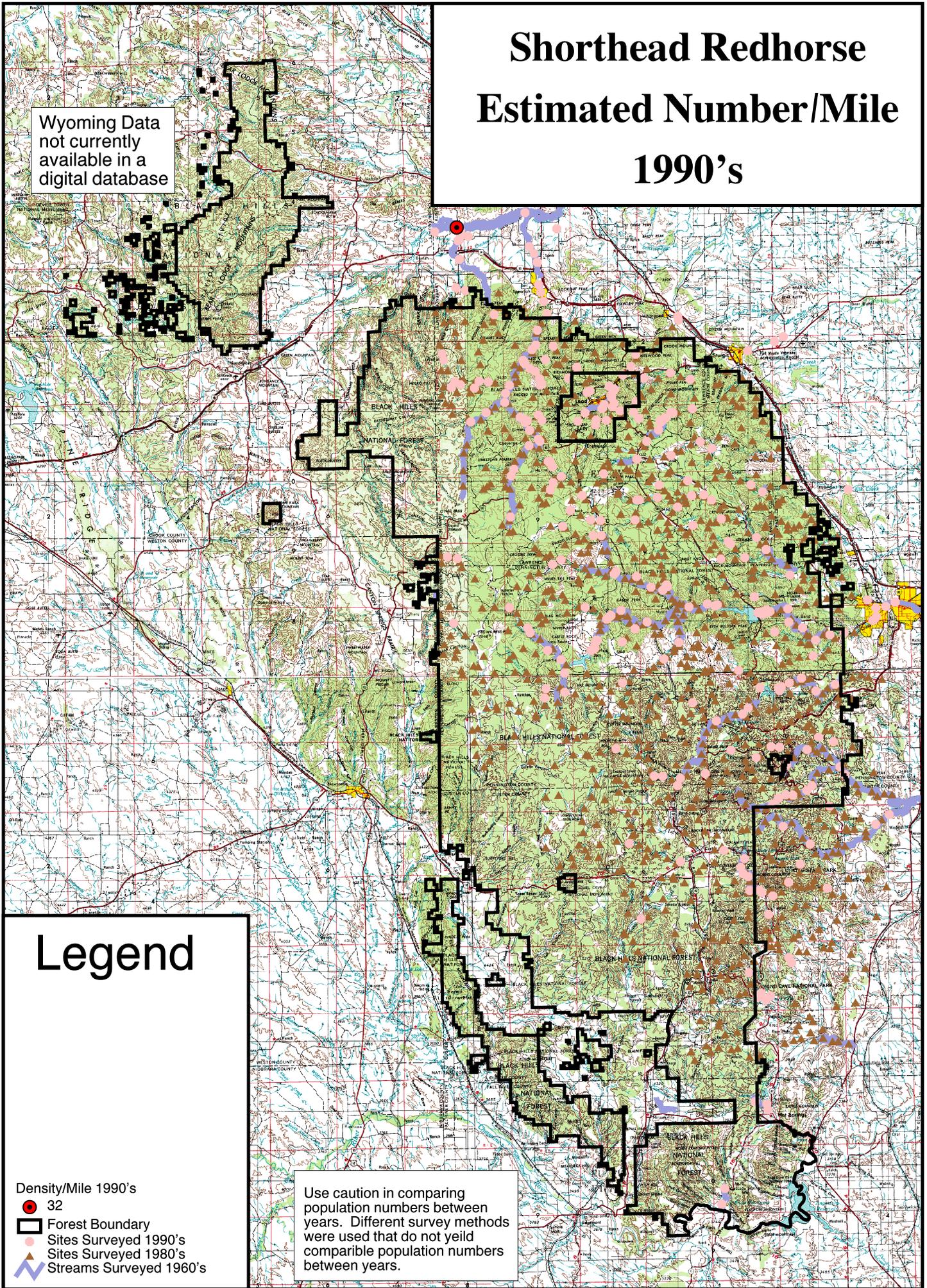
No data.

Ecological indicator (*population changes are believed to indicate the effects of management activities on species of selected major biological communities or on water*):

Probably not.

Shorthead Redhorse Estimated Number/Mile 1990's

Wyoming Data
not currently
available in a
digital database



Smallmouth bass

Micropterus dolomieu

Other names

Black bass, *Micropterus dolomieu*, *Lepomis dolomieu*

Status

Federal threatened
Federal endangered
Federal sensitive
State threatened
State endangered
State rare

Black Hills data

Native
x Introduced

Location

Creeks: Spring, French

Lakes: Stockade

(E2, F4, M2, M3, M4, M8, M9, M10, S3)

Summary of occurrence data

1. Spring Creek: Found in the 1960s but not since.
2. French Creek: One found in 1994, no surveys done since.
3. Stockade Lake: Found in 1997 and 1998; in this lake "smallmouth bass have excellent recruitment and survival" (S3p50).

(E2, F4, M2, M3, M4, M8, M9, M10, S3)

Typical habitat

Cool flowing streams and large clear lakes; more likely to be in lakes in this part of their range. Adults are rarely found in streams less than 10.5 meters wide (C2p152).

Black Hills habitat

Apparently limited to Stockade Lake. Streams are probably not of sufficient size to sustain a population.

Black Hills management

x Game fish (S1p21, Wy2)
Currently being stocked
If stocked, also reproduces naturally
Nongame
Protected

If non-game, is species of special interest?

N/A

Special habitat needs

None.

Habitat changes to which species is sensitive

Sedimentation; lack of forage (B5p).

Management practices that affect species

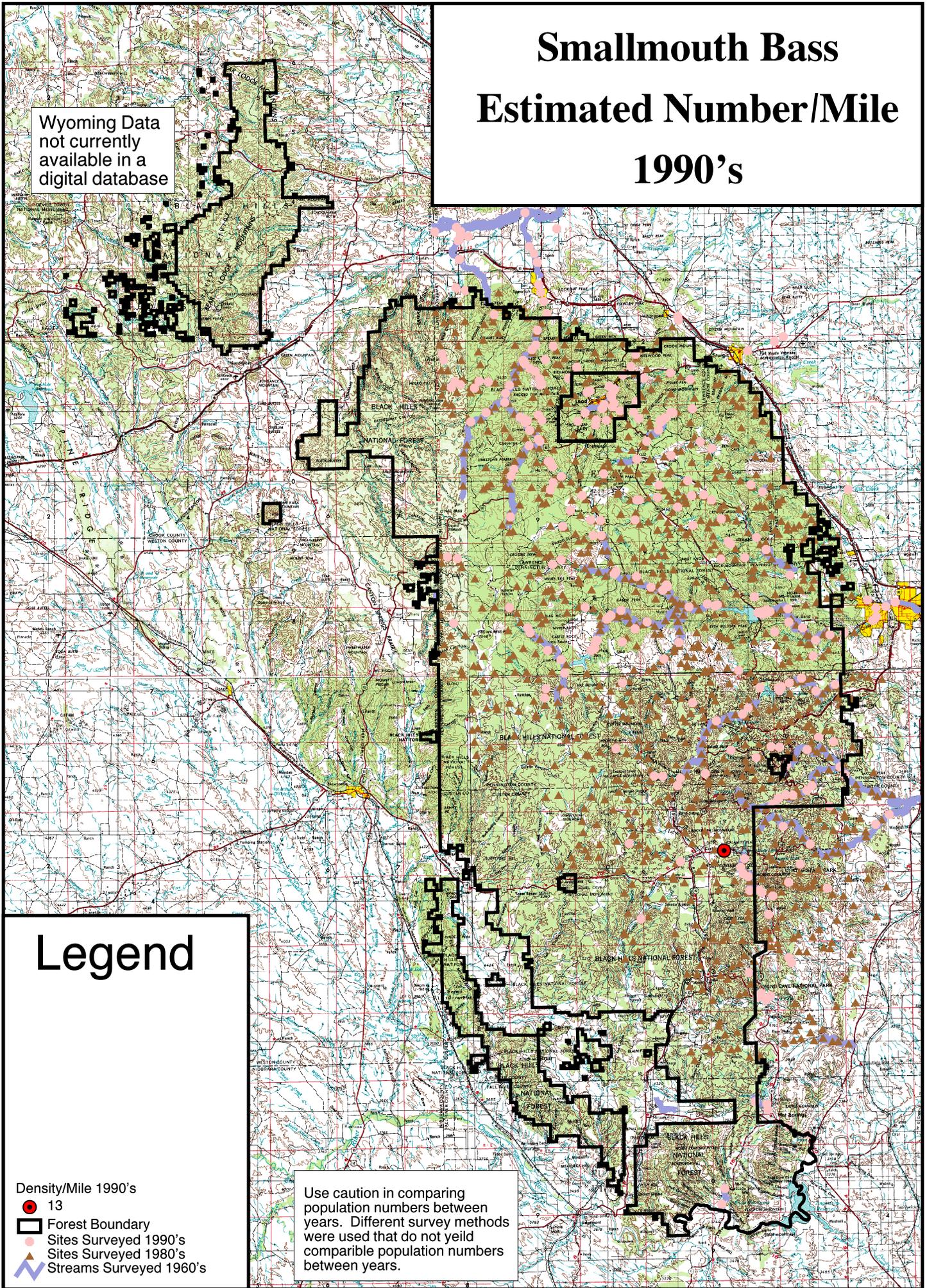
Uncontrolled cattle grazing; water draw-downs (as for irrigation). (B5p)

Ecological indicator (*population changes are believed to indicate the effects of management activities on species of selected major biological communities or on water*):

Probably not.

Smallmouth Bass Estimated Number/Mile 1990's

Wyoming Data
not currently
available in a
digital database



Legend

- Density/Mile 1990's
- 13
- Forest Boundary
- Sites Surveyed 1990's
- ▲ Sites Surveyed 1980's
- Streams Surveyed 1960's

Use caution in comparing
population numbers between
years. Different survey methods
were used that do not yield
comparable population numbers
between years.

Splake

Salvelinus fontinalis x *namaycush*

Other names

Status

Federal threatened
Federal endangered
Federal sensitive
State threatened
State endangered
State rare

Black Hills data

Native
x Introduced

Location

Rapid Creek

Lakes: Deerfield, Pactola, Pactola Basin, Sheridan

Summary of occurrence data

1. Rapid Creek: One splake was recorded in 1992. None have been recorded since.
2. Deerfield Lake: Stocked with splake trout in 1984, 1987, 1990, 1993, 1996; scheduled to be stocked again in 1999 (M4p94). However, the survey report recommends re-evaluating splake stocking, since surveys in the mid-90s found a much greater proportion of splake to rainbow than what was stocked (M4p96). The most recent survey data available (1998) reported a large splake population, but both splake and brook trout were reported as splake (M4p93).
3. Pactola Reservoir, Pactola Basin: Splake were stocked in the reservoir in 1985, 1988, and 1991. Stocking then ceased. Numbers steadily decreased through the 90s until none were found by the 1998 survey. Splake "have apparently nearly run their course...only an occasional fish can be expected in the future" (M4p111). However, in Pactola Basin (immediately below the dam), a few splake were collected in 1998 (M4p106).
4. Sheridan Lake: No splake were found by the 1998 survey. The lake is no longer managed for trout. (M4p129).

Typical habitat

See brook trout and lake trout.

Black Hills habitat

Probably limited to Deerfield Lake.

Black Hills management

x Game fish (S1p21)
Currently being stocked
If stocked, also reproduces naturally
Nongame
Protected

If non-game, is species of special interest?

N/A

Special habitat needs

See brook trout and lake trout.

Habitat changes to which species is sensitive

See brook trout and lake trout.

Management practices that affect species

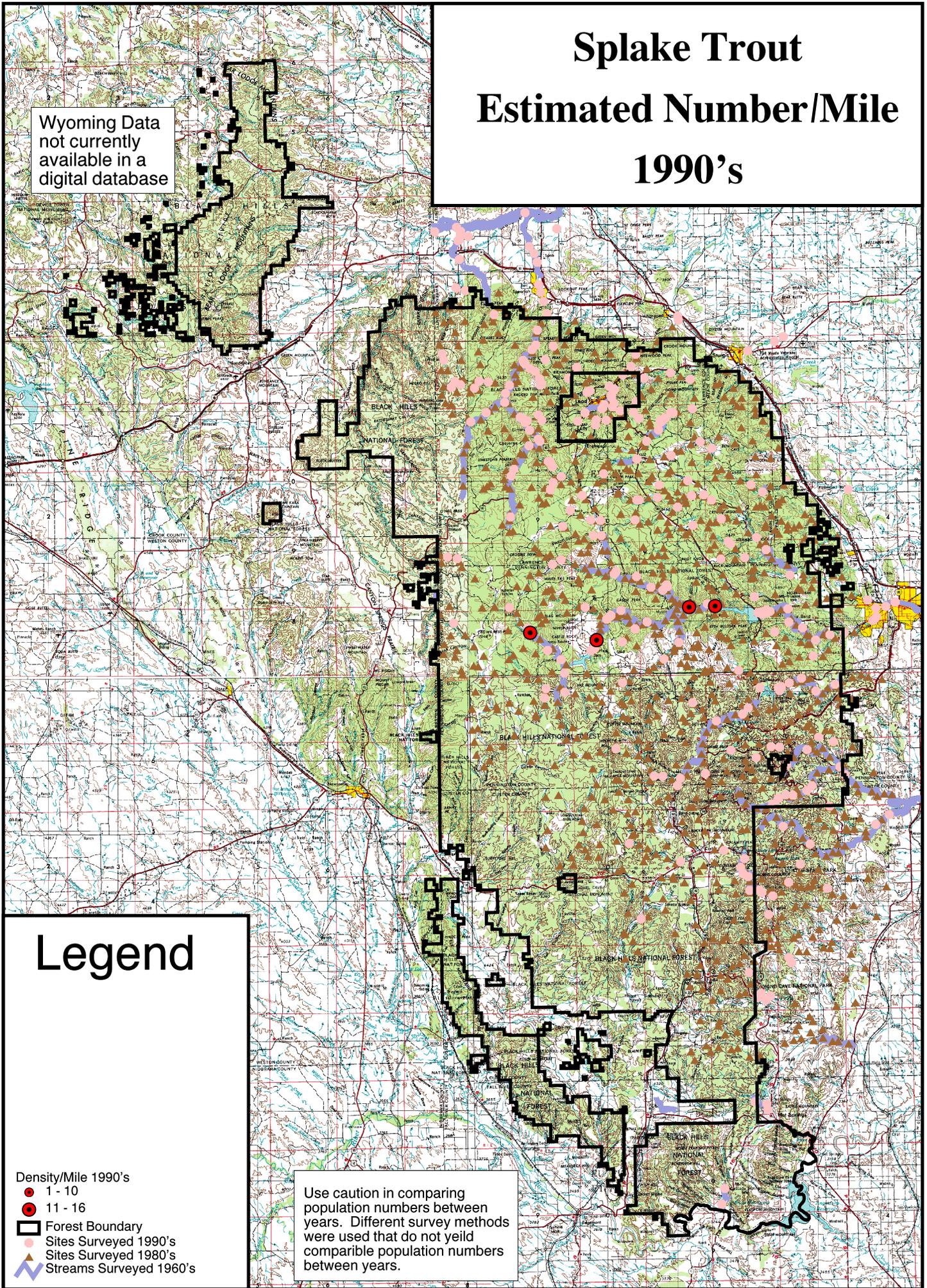
See brook trout and lake trout.

Ecological indicator (*population changes are believed to indicate the effects of management activities on species of selected major biological communities or on water*):

See brook trout and lake trout.

Splake Trout Estimated Number/Mile 1990's

Wyoming Data
not currently
available in a
digital database



Legend

- Density/Mile 1990's
- 1 - 10
 - 11 - 16
 - ▭ Forest Boundary
 - Sites Surveyed 1990's
 - ▲ Sites Surveyed 1980's
 - ↘ Streams Surveyed 1960's

Use caution in comparing
population numbers between
years. Different survey methods
were used that do not yield
comparable population numbers
between years.

No data.

Management practices that affect species

No data.

Ecological indicator (*population changes are believed to indicate the effects of management activities on species of selected major biological communities or on water*):

No data.

Spottail shiner

Notropis hudsonius

Other names

Status

Federal threatened
Federal endangered
Federal sensitive
State threatened
State endangered
State rare

Black Hills data

Native
x Introduced

Location

Pactola Reservoir

Summary of occurrence data

Spottail shiners were stocked in Pactola Reservoir in 1991, 1992, and 1993. Surveys found them to be present in 1997 but not in 1998. (M4p112, 114)

Typical habitat

Large lakes and rivers to small streams; clear water (C3c).

Black Hills habitat

Note: Species may not exist in the Black Hills.

Black Hills management

Game fish
Currently being stocked
If stocked, also reproduces naturally
x Nongame (S1p21, Wy2)
Protected

If non-game, is species of special interest?

No data.

Special habitat needs

No data.

Habitat changes to which species is sensitive

No
Map
Available

Stonecat

Noturus flavus

Other names

Madtom (i1). See also Notes (end of document).

Status

Federal threatened
Federal endangered
Federal sensitive
State threatened
State endangered
State rare

Black Hills data

Native
x Introduced

Location

Creeks: Battle, Beaver (Crook County), Beaver (Custer County), Boxelder, Rapid, Redwater River (outside forest boundary)

Summary of occurrence data

1. Battle: Present in 1994, none found since.
2. Beaver (Crook County): Present in 1996; no other data available.
3. Beaver (Custer County): Present in 1959, none found since.
4. Boxelder: Present in 1984, 1985. In 1994 this creek had the only site surveyed in the Black Hills with stonecat. This location has not been surveyed since 1994, but no stonecat have not been found in yearly surveys of the north, middle, or south forks of Boxelder Creek.
5. Rapid: Present in 1959 and 1985; none found since.
(E1, M1, M2, M3, M6, M8, M9, P3, S4).

Typical habitat

Large rivers and medium-sized tributary streams (B1p121). Prefer stream riffle habitats (C1p

Larger creeks. **Note:** Species may not currently be present.

Black Hills management

- * Game fish (S1p21, Wy2)
Currently being stocked
If stocked, also reproduces naturally
Nongame
Protected

*Member of catfish family (game fish) but probably de facto nongame since usual size is 4-6" (T1p124).

If non-game, is species of special interest?

No.

Special habitat needs

Cover for spawning and daytime hiding (T1p124).

Habitat changes to which species is sensitive

No data.

Management practices that affect species

No data.

Ecological indicator (*population changes are believed to indicate the effects of management activities on species of selected major biological communities or on water*):

No data.

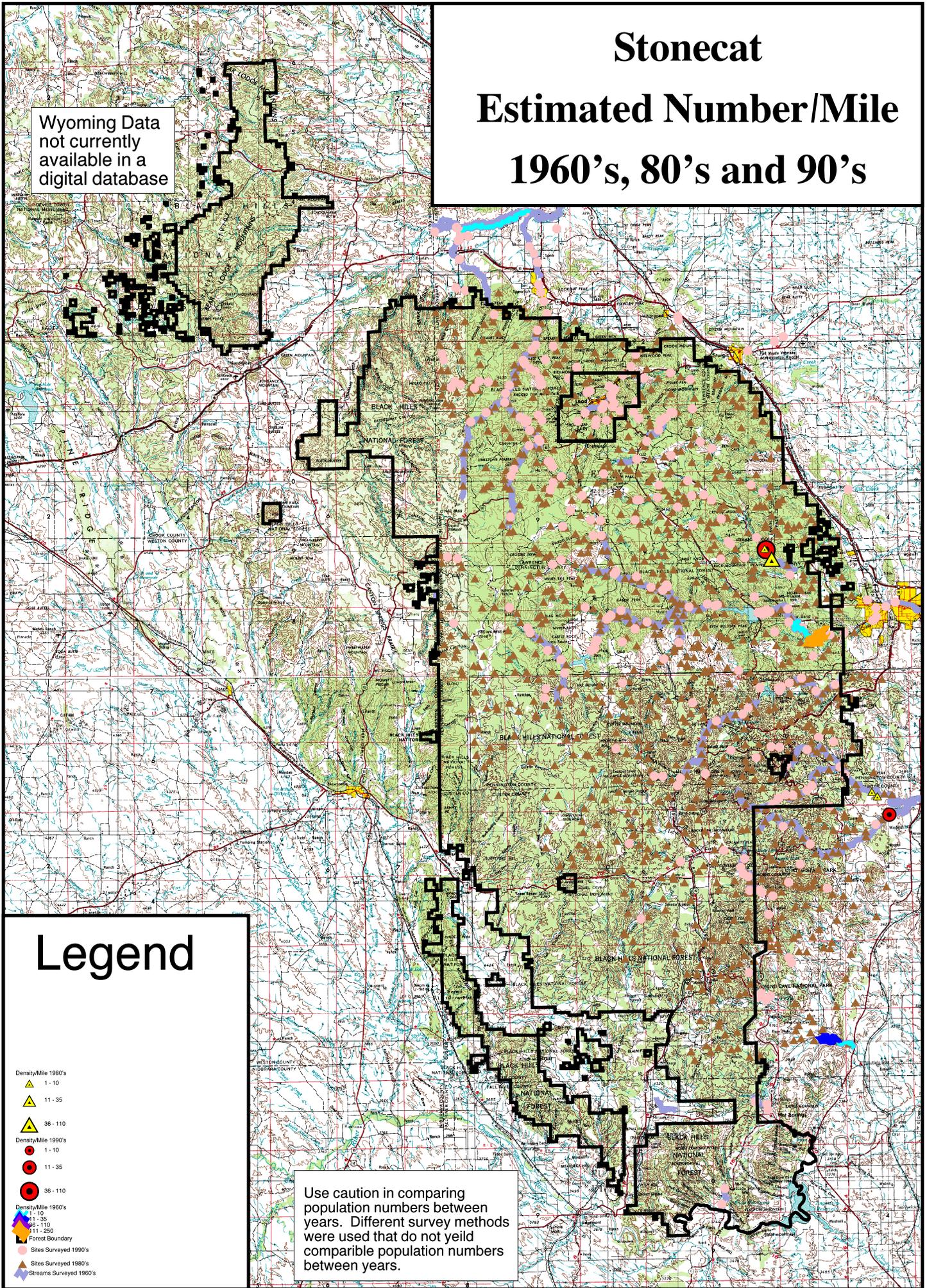
Black Hills habitat

Stonecat

Estimated Number/Mile

1960's, 80's and 90's

Wyoming Data not currently available in a digital database



Ecological indicator (*population changes are believed to indicate the effects of management activities on species of selected major biological communities or on water*):

N/A

Tiger trout

Salmo x Salvelinus trutta x fontinalis

Other names

Status

Federal threatened
Federal endangered
Federal sensitive
State threatened
State endangered
State rare

Black Hills data

Native
x Introduced

Summary of occurrence data

A small population of tiger trout (sterile cross of brown and brook trout) was observed in Spearfish Creek in the 1990s.

Typical habitat

Black Hills habitat

Note: This species is a sterile hybrid and may no longer be present.

Black Hills management

x Game fish (S1p21)
Currently being stocked
If stocked, also reproduces naturally
Nongame
Protected

If non-game, is species of special interest?

N/A

Special habitat needs

N/A

Habitat changes to which species is sensitive

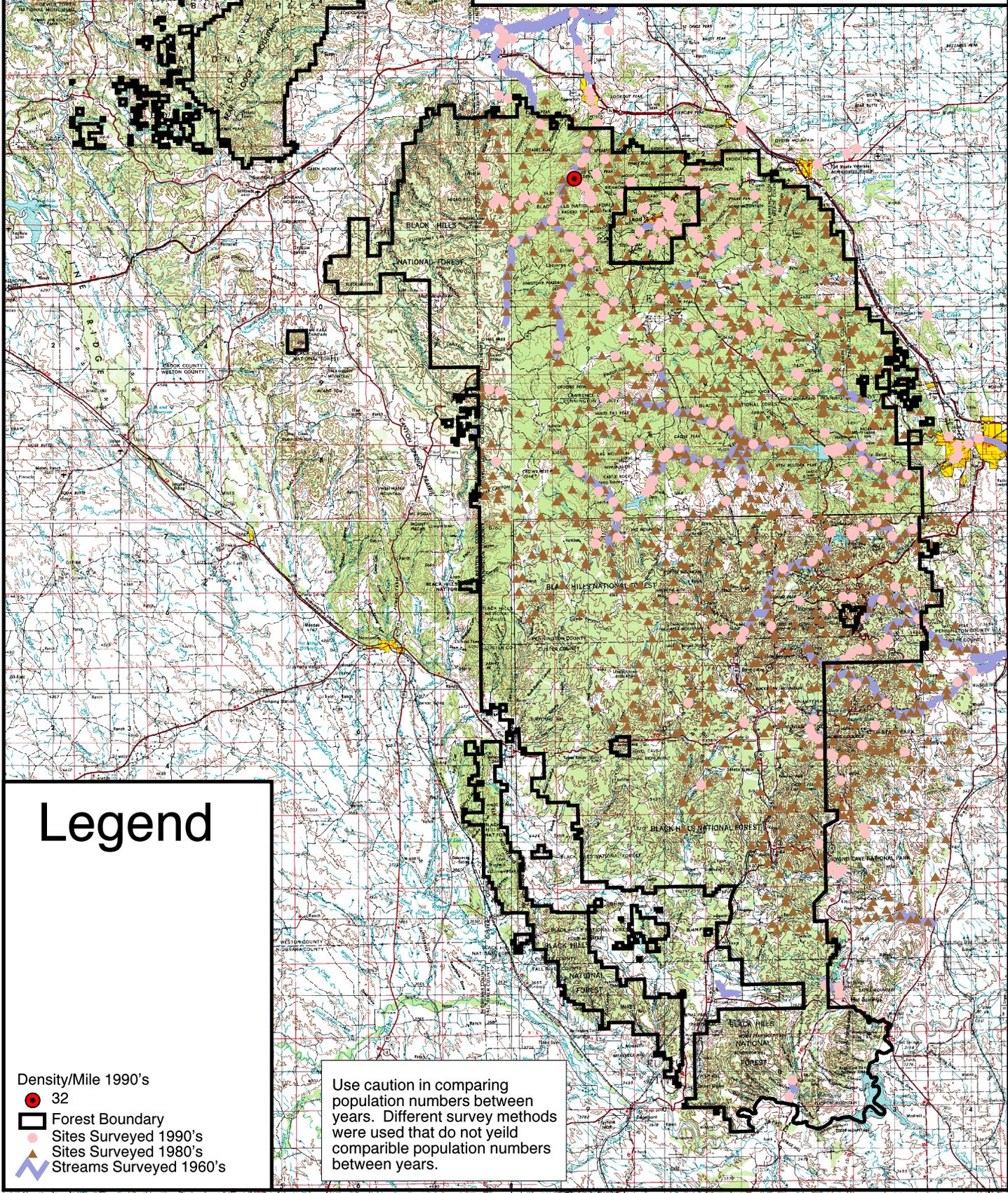
N/A

Management practices that affect species

N/A

Tiger Trout Estimated Number/Mile 1990's

Wyoming Data
not currently
available in a
digital database



Legend

- Density/Mile 1990's
- 32
- ▭ Forest Boundary
- Sites Surveyed 1990's
- ▲ Sites Surveyed 1980's
- ▬ Streams Surveyed 1960's

Use caution in comparing
population numbers between
years. Different survey methods
were used that do not yield
comparable population numbers
between years.

White sucker

Catostomus commersoni

Other names

Status

Federal threatened
Federal endangered
Federal sensitive
State threatened
State endangered
State rare

Black Hills data

- * Native
- Introduced

This species is native to the Black Hills (B4, B8, E3). M1p13 states that white sucker is native to Sand Creek in Wyoming.

Location

Creeks: Battle, Bear Butte, Beaver, Beaver South, Beaver West (Crook County), Boxelder, Middle Boxelder, North Boxelder, South Boxelder, Cascade, Castle, Crow, Elk, Foster, French, Galena, Grace, Grizzly Bear, Hot Brook, Iron, Iron South, Lake Creek, Lytle, North Rapid, Rapid, Redwater River, Sand, Slate, South Rapid, Spearfish, Spring, Stockade Beaver, Sunday Gulch, Tillson, Thompson Ditch, Whitewood.

Lakes: Cook, Deerfield, Pactola, Sheridan, Stockade and numerous small lakes.

Summary of occurrence data

White suckers are common and widespread in the Black Hills. Surveys conducted in the 1990s found the species in all of the streams (where data exists) in which they were present in the late 1950s and early 60s (E1, M1, M2, M3, M4, M6, M8, M9, M10, P3, S4). During the 90s, white suckers increased in population and size in Deerfield Lake. After an early 80s chemical renovation of the fish population in Deerfield; GFP netted one sucker in 1993 (M12, p109) and by 1999 GFP was doing a sucker removal project. GFP removed 3,136 white suckers (4,500 pounds) in 4 days of netting (M13, p159). The white sucker are directly competing with trout for food and space.

Typical habitat

Relatively cool lakes and streams. Limited by extreme turbidity; avoids rapid current. (B1p104)

Black Hills habitat

Found in a variety of lake and stream habitats.

Black Hills management

- Game fish
- Currently being stocked
- If stocked, also reproduces naturally
- x Nongame (S1p21, Wy4p4)
- Protected

If non-game, is species of special interest?

Possibly, since it's one of the few native species.

Special habitat needs

Few; species is "resilient and widespread" (B5o).

Habitat changes to which species is sensitive

Prefers shaded conditions and pools with logs, brush or rocks. Can tolerate but not reproduce in low-pH water (B5o).

Management practices that affect species

Adverse: Sedimentation, reduction in shade, dredging, livestock grazing in riparian areas. (B5o)

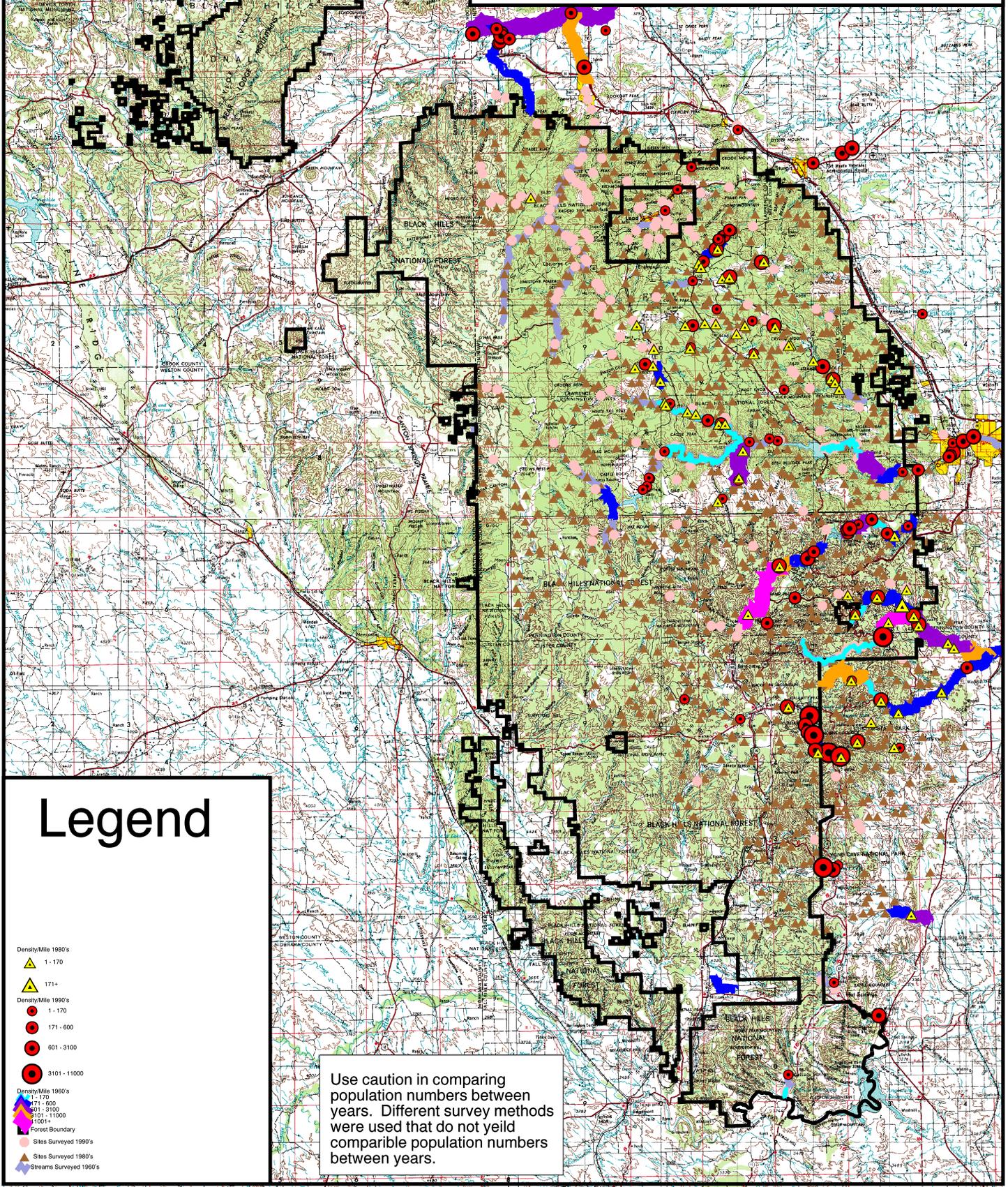
Beneficial: Revegetate stream banks, restrict disturbance of habitat. (B5o)

Ecological indicator (*population changes are believed to indicate the effects of management activities on species of selected major biological communities or on water*):

No.

White Sucker Estimated Number/Mile 1960's, 80's and 90's

Wyoming Data
not currently
available in a
digital database



Legend

- Density/Mile 1960's
 - ▲ 1 - 170
 - ▲ 171+
- Density/Mile 1990's
 - 1 - 170
 - 171 - 600
 - 601 - 3100
 - 3101 - 11000
- Density/Mile 1980's
 - ▲ 1 - 170
 - ▲ 601 - 3100
 - ▲ 1001+
- Forest Boundary
- Sites Surveyed 1990's
- ▲ Sites Surveyed 1980's
- ▲ Streams Surveyed 1960's

Use caution in comparing population numbers between years. Different survey methods were used that do not yield comparable population numbers between years.

Yellow perch

Perca flavescens

Nongame
Protected

Other names

If non-game, is species of special interest?
N/A

Status

Federal threatened
Federal endangered
Federal sensitive
State threatened
State endangered
State rare

Special habitat needs

None.

Black Hills data

Native
x Introduced

Habitat changes to which species is sensitive

Overcrowding (B1p142).

Management practices that affect species

Beneficial: Bank stabilization; increase in vegetation; develop stream pools (B5d).

Location

Creeks: Battle, French, Galena, Pine, Rapid, Spring (E2, F4, M2, M3, M8, M9, M10)

Ecological indicator (*population changes are believed to indicate the effects of management activities on species of selected major biological communities or on water*):

No.

Lakes: Deerfield, Pactola, Sheridan, Stockade (M4, S3)

Summary of occurrence data

1. Spring Creek: Surveys recorded small populations of yellow perch through the 1990s.
2. Other creeks: Yellow perch were recorded in the mid-1980s (F4), but were not present in the 90s.
3. Pactola, Sheridan, Stockade Lakes: Surveys in the mid to late 90s found populations of yellow perch.
4. Deerfield Lake: In 1997 no yellow perch were found. In 1998, surveys recorded one. (E2, F4, M2, M3, M4, M8, M9, M10, S3)

Typical habitat

Shoreline areas of clear lakes and ponds with moderate amounts of aquatic vegetation; occasionally found in pools and backwaters of rivers, including saline areas. (B5d, T1p200). **Note:** Because of its tendency to overpopulate habitat and compete with more desirable game fish, yellow perch is generally considered an undesirable species (B1p143).

Black Hills habitat

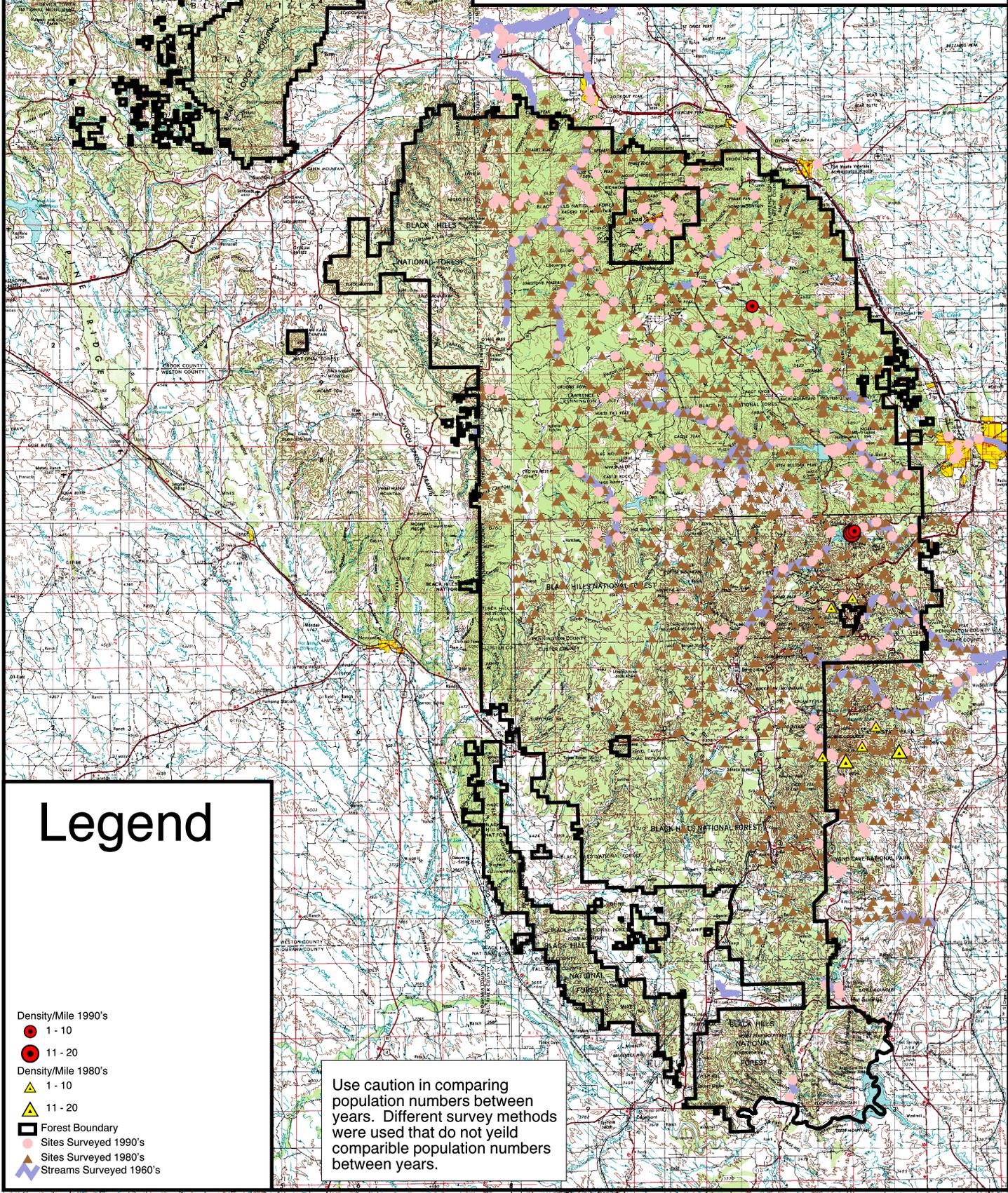
Found mainly in lakes, especially Sheridan and Stockade.

Black Hills management

- x Game fish (S1p21, Wy4p4)
Currently being stocked
If stocked, also reproduces naturally

Yellow Perch Estimated Number/Mile 1980's and 90's

Wyoming Data
not currently
available in a
digital database



Legend

- Density/Mile 1990's
 - 1 - 10
 - 11 - 20
- Density/Mile 1980's
 - ▲ 1 - 10
 - ▲ 11 - 20
- ▭ Forest Boundary
- Sites Surveyed 1990's
- ▲ Sites Surveyed 1980's
- Streams Surveyed 1960's

Use caution in comparing population numbers between years. Different survey methods were used that do not yield comparable population numbers between years.

Elizabeth Krueger

Dave Fisher

July 2000

Notes

Fathead chub – Listed in S4 as observed in 1959 on Middle Fork Castle Creek. I have not found this name elsewhere. The 1959 record could be referring either to flathead chub (*Platygobio gracilis*) or fathead minnow.

Goldeye – This species was evidently erroneously on a list prepared earlier in this process. We have not been able to locate any records of goldeye in the Black Hills.

Madtom (*Noturus sp.*; *Noturus gyrinus*=tadpole madtom): The only reference to madtom in the literature we reviewed was in Steward & Thilenius 1964 (S4). This reference does not give a complete name or latin name. S4 also lists stonecat in different creeks. Reference i1 states that madtom can be another name for stonecat. Given that 1) there are no other references to madtom in other literature, 2) madtom can be a name for stonecat, 3) the S4 madtom reference is in Boxelder Creek, and 4) there are references to stonecat in Boxelder Creek in 1984, 1985, and 1994, I conclude that the S4 madtom listing probably refers to stonecat, and if it doesn't, it's a very isolated occurrence.

River carpsucker was on a list prepared earlier in this process. It appears that this species was on the list by mistake – there don't seem to be any records of it in the Black Hills, but there are records from the Cheyenne River (B6), which is the expected habitat (large prairie rivers, B1p101).

Sauger was also on an earlier list, evidently by mistake. The source was probably E1, which is a selection of pages from an EPA report. If you don't look closely it can appear that the sauger record is from Deadwood Creek, but further investigation shows that the record is from the Missouri River. There are no known records of sauger in the Hills.

Appendix B

Biological Communities Determination

Major Biologic Communities

Intro

At a minimum, the forest service manual defines the aquatic community as a “major biologic community” at the forest scale for the purpose of selecting management indicator species (MIS).

Within the forest have one major subdivision – stream vs. lake systems and one major sub set for each of the subdivisions

Lakes

- Large lake (>100 acres)

- Small lakes (<35 acres)

Streams

- Perennial flows

- Decadal Variable flows

Lakes

No natural lakes exist within the Black Hills National Forest. All lakes are a result of dam construction.

Large lakes

Four large lakes exist in the hills – Pactola, Deerfield, Sheridan, and Stockade. These four lakes comprise approximately 1,715 surface acres of water. Larger lakes are typically deeper, maintain cooler temperatures during critical summer periods, and are less prone to pollution, sedimentation, and decreased oxygen levels. Sheridan and Stockade Lakes are managed as cool-water fisheries and Pactola and Deerfield are managed with trout.

Small lakes

Approximately 19 small lakes in the Forest comprise roughly 260 surface acres. Smaller lakes are typically shallower than large lakes causing susceptibility to increases in temperature during critical summer periods, excessive plant development, sedimentation, pollution, and decreased oxygen levels. The small lakes are managed with trout.

Streams

Three major things characterize stream communities within the Forest; geology, climate, and manmade reservoirs.

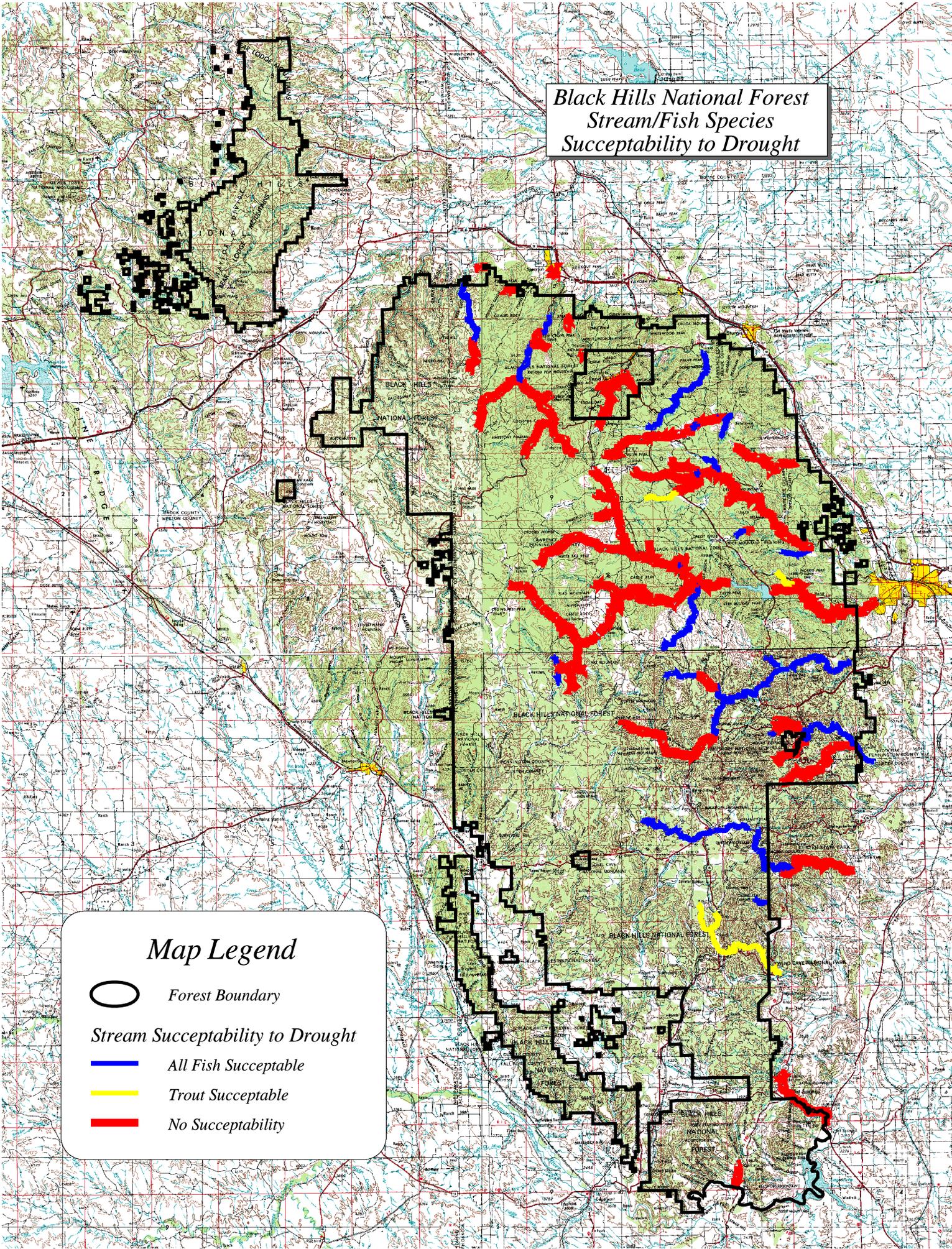
Geology – The productivity of streams is related largely to the type of material in which they originate, and flow. Western limestone plateaus contain few if any streams, all rain and snowfall typically infiltrates. These areas, although limited in the Forest, contain the highest potential for plant and animal productivity. The central metamorphic zone is the origin of most streams in the Black Hills, and most streams are found here. Production in these areas is lower than limestone plateaus due to lesser amounts of essential nutrients. Outside edge streams flow through exposed tilted layers and see large water volume losses. Only two streams flow out of central hills year round with many others losing most or all of water to loss zones.

Climate – The Forest experiences drought cycles every ten years or so (Stewart and Thilenius 1964). Perennial stream flows during drought years are adequate in Spearfish, Rapid and Castle Creeks for aquatic life to survive. Bearlodge streams; Beaver, Whitewood, Elk, Boxelder, Spring, Battle and French Creeks in the Black Hills, have many miles of stream disappear in part during these drought cycles. Numerous tributary streams of the above mentioned streams disappear in part or whole during drought cycles. Trout are able to persist in those streams with consistent stream flow, but reduce or disappear completely in the other streams. Many native species populations decline during high flow years due to trout encroachment, and rebound in drought years as trout disappear. Drought cycles play an important role in determining stream water yield. In high precipitation years, the water table is recharged, allowing increased runoff and higher water yields. In drought years, little runoff occurs due to increased infiltration into the water table. This results in decreased water yield.

Manmade reservoirs provide consistent flow areas below dams. These areas may fluctuate in water yield due to reservoir maintenance and municipal needs, but provide consistent flows regardless of precipitation and geology. Pactola Reservoir provides municipal water for Rapid City and irrigation water for Rapid Valley. During a drought period in 1990, Pactola Reservoir had dropped 49 feet and had 24,000 acre feet in storage. Full storage is 54,995 acre feet. Pactola water releases to Rapid Creek were lower during this drought period but still adequate for aquatic life.

In conclusion, there are four major aquatic systems in the Forest, large lakes, small lakes, perennial flow streams and decadal variable flow streams. Lake systems are divided based on differences in water temperature, oxygen levels, and susceptibility to over-vegetation, sedimentation and pollution. Stream systems are divided based on geology, climate and manmade reservoirs to determine the ability of each stream to maintain water flow.

*Black Hills National Forest
Stream/Fish Species
Succetptability to Drought*



Map Legend

-  Forest Boundary
- Stream Succetptability to Drought*
-  All Fish Succetptable
-  Trout Succetptable
-  No Succetptability

Appendix C

Forest Plan Proposed Activities List

Non-Motorized Dispersed Recreation

Includes hiking, mountain biking, horseback riding, camping, religious values and activities, visual resources and values, hunting, fishing, trapping, handicapped accessible activities.

Many of these activities require trail and/or road construction and surface maintenance, including anti-erosion devices. Impacts to watersheds and fisheries may occur in the form of overharvest of game species; wanton destruction of non-game species; introduction of exotic species; trapping or shooting of beavers increases rate of dam failure, increases rate of mobilization of stored sediments within dams, increases flow energy, decrease in the number of pools in a stream reach, etc.; erosion of trails from recreationists increases sediment delivery into streams; and point and non-point pollution sources.

On Road Motorized Vehicles

Includes usage by cars, trucks, motorcycles, ATVs, snowmobiles.

Necessitates road construction and surface maintenance. Structures such as road surfaces, bridges, culverts, ditches, rolling dips, waterbars, and hardened fords must be constructed and maintained. Maintenance of surfaces include plowing, grading, salting, sanding, grooming, and signing. Impacts to fisheries and watersheds include point and non-point pollution sources, sediment delivery into watercourses, loss of wetland and riparian habitats, diversion and channelization of watercourses, and mass wasting of soils from roadcuts.

Off Road Motorized Vehicles

Includes usage by cars, trucks, ATVs, motorcycles, dirt bikes, and snowmobiles.

Impacts to fisheries and watersheds include rut formation which increases sediment delivery into streams, driving vehicles through wetlands and stream bottoms, loss or deterioration of riparian and wetland areas, spreading of noxious weed species (which can replace desirable riparian and wetland species), soil compaction which decreases the soils sponge and filtering potential, increases access to isolated areas which may allow unscrupulous individuals to overharvest game species.

Timber Harvest

Includes road building and maintenance; skid trail and cat trail formation; mechanical harvest or manual harvest as: precommercial thin, commercial harvest (seed cut, overstory removal, patch cut, clearcut, POL, selective harvest, meadow restoration, aspen regeneration, salvage), and fuelwood harvest. Prescribed fire and wildfire would be included within this category.

Impacts to watersheds and fisheries are from short term or long term increases in water yield due to reduced evapotranspiration of overstory vegetation, increased runoff from roads with associated sediment delivery into watercourses, increases in erosion rates from soils on steep areas, possible increases in the amounts of slash in streams, possible decreases in the amount of shade and large woody debris available to watercourses, soil compaction, and scarification of soils increasing spread of noxious weed species.

Livestock Grazing

Includes noxious weed treatments, riparian grazing, riparian exclosures, season-long vs. deferred vs. rest/rotation grazing schedules, fence construction and maintenance, cattle guards and gates, spring exclosure construction and maintenance, botanical area exclosures, trailing, salting locations, roundup, and holding pens.

May impact fisheries and watersheds by over-utilization of riparian/wetland species and habitats leading to loss of species diversity, bank destabilization, bank trampling and/or shearing, increased sedimentation rates, impairment of water quality from point and non-point sources, nutrient loading, trail formation through erosive soils, reduction of shade over water leading to increases in water temperature, and reduction of the filtering/buffering effects of bankside vegetation.

Mineral Development

Includes panning, dredging, placer, quarrying, surface mining, underground mining.

Impacts to fisheries and watersheds encompass increased sedimentation, perturbations to bottom substrates, acidic drainage, heavy metal mobilization, point and non-point sources of pollution, habitat loss, increased runoff rates from loss of vegetation and soils.

Appendix D

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G	I	G
<i>carpio</i>		I
Rock bass	<i>Ambloplites rupestris</i>	x
	Sand shiner	<i>Notropis stramineus</i>
O		Shorthead (northern) redhorse
	O	N
bass)	<i>Micropterus dolomieu</i> (<i>Lepomis dolomieu</i>)	
G		

	River carpsucker	<i>Carpoides</i>
O	N	O
I		G
	I	O
		N
	<i>Moxostoma macrolepidotum</i>	x
O		Smallmouth bass (black
x	I	G
		I

Common name		Latin name	
Listing	Game/ Other	Native/	Intr.
		Snake River cutthroat trout	
	G	I*	
<i>x namaycush</i>	x	I	
Spottail shiner	<i>Notropis hudsonius</i>	x	I
Stonecat	<i>Noturus flavus</i>	x	I
Tadpole madtom		<i>Norturus gyrinus</i>	
	n/a	Tiger trout	
I		G	None (Wy2)
<i>Catostomus commersoni</i>		x	I (B3), N (B4)
Yellow perch	<i>Perca flavescens</i>	x	I

* Native to western Wyoming but not the Black Hills.

FP	SD	WY
Listing	Game/ Other	Native/ Intr.
		<i>Oncorhynchus clarki subsp.</i>
G		Splake <i>Salvelinus fontinalis</i>
G	I	G
	O	I
	G	N
	I	G
		None (Wy2)
	<i>Salmo x Salvelinus trutta x fontinalis</i>	
	n/a	White sucker
	O	N
	G	I
		O
		G