

2-21-92-F-503

SUMMARY
BIOLOGICAL OPINION ON THE EFFECTS TO LITTLE COLORADO SPINEDACE
FROM PROPOSED LIVESTOCK GRAZING ON THE
BUCK SPRINGS, HACKBERRY/PIVOT ROCK AND BAR-T-BAR ALLOTMENTS
COCONINO NATIONAL FOREST

Date of the opinion: May 6, 1997

Action agency: U.S. Forest Service, Coconino National Forest, Blue Ridge Ranger District

Proposal: To graze livestock in the upper portion of the East Clear Creek watershed on the Buck Springs Allotment and portions of the Hackberry/Pivot Rock and Bar-T-Bar Allotments for the 1997 livestock grazing season.

Listed species: Little Colorado spinedace (*Lepidomeda vittata*) and its designated critical habitat in East Clear Creek.

Biological opinion: Non-jeopardy and no destruction/adverse modification of critical habitat.

Incidental take statement:

Level of take anticipated: Because of the widely fluctuating population levels and ability of the species to move to different areas during high water situations, determining a specific amount of take that would occur is not possible. Continued degradation of habitats is proposed as a surrogate that can be measured.

Reasonable and prudent measures: Three RPMs are included in the document. The first deals with reducing risks to the spinedace at Dines Tank, the second addresses evaluation of existing grazing strategies and their effects on the watershed as a whole and the third addresses habitat effects from livestock grazing in 1997.

Terms and conditions: To implement RPM 1, livestock use around Dines Tank would be monitored to prevent overuse, adjustments to exclosure fencing to reduce livestock's view of the water be evaluated and livestock will be kept away from the exclosure during dry years. To implement RPM 2, monitoring data would be used to adjust use of allotments to maximize riparian and aquatic habitat recovery. To implement RPM 3, use of pastures will be limited to non-riparian areas where significant spinedace habitat is present in the riparian area, utilization levels will not exceed Coconino National Forest Plan standards and guidelines, all crossings of East Clear Creek will be surveyed prior to livestock access, and crossing areas should be selected to minimize mechanical damage to banks.

Conservation recommendations:

There are four conservation recommendations. The first deals with determining what would be necessary to achieve the Forest Plan goal of having three age classes of woody riparian vegetation before 2030. The second encourages the continuation of the East Clear Creek Ecosystem Plan development, the third suggests monitoring of elk

populations in cooperation with the Arizona Game and Fish Department and the fourth encourages the Forest Service to identify and correct factors limiting recovery of the spinedace on the Coconino National Forest.

Additional section 7 consultation needed:

Recreation in the meadows of upper East Clear Creek is contributing to the degradation of critical habitat. This activity has not been the subject of consultation.

This biological opinion covers only the 1997 livestock grazing season for the Buck Springs and Hackberry/Pivot Rock Allotments. Additional consultation will be needed before the 1998 livestock grazing season.

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AESO/SE
2-21-92-F-503

May 6, 1997

Mr. Fred Trevey
Forest Supervisor
Coconino National Forest
2323 E. Greenlaw Lane
Flagstaff, Arizona 86004

Dear Mr. Trevey:

The Fish and Wildlife Service has reviewed the biological assessment and evaluation (BAE) dated April 5, 1996, for operation of the Buck Springs Allotment and portions of the Bar-T-Bar and Hackberry/Pivot Rock Allotments on the Coconino National Forest in Coconino County, Arizona. Your April 5, 1996, request for formal consultation was received on April 8, 1996. This document represents the Service's biological opinion on the effects of continued livestock grazing on the three allotments on the threatened Little Colorado spinedace (*Lepidomeda vittata*) and its designated critical habitat in East Clear Creek in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.).

This biological opinion is based on information provided in the BAE of April 5, 1996, information on the 1997 proposed operations presented in letters from the Forest Service to the Service dated March 27 and April 23, 1997, meetings between Coconino National Forest and Service personnel, published and grey literature, data in our files, and other sources of information. A complete administrative record of this consultation is on file in our Arizona Ecological Services Field Office.

CONSULTATION HISTORY

The Coconino National Forest and the Service began discussions about ongoing operations and management of the Buck Springs Allotment in 1992. The existing Allotment Management Plan (AMP) was prepared in 1988 to expire in 1998, although efforts in the early 1990's to revise the AMP were initiated by the Coconino National Forest. Because the development of the new AMP was considered imminent, the Forest Service did not wish to enter into formal consultation on the existing AMP regarding effects to the Little Colorado spinedace (spinedace),

In the early 1990's, a temporary program to address the effects of the Buck Springs Allotment was developed between the Forest Service and the Service. Beginning with the 1992 livestock grazing season, livestock use of pastures containing Little Colorado spinedace habitat was deferred. The Coconino National Forest and the Service met each year to review the proposed annual operating plan. In 1993 the four affected pastures (Knolls, Dines, North Battleground, and McCarty) were again deferred. In 1994, with Dines Tank having been excluded from Dines Pasture, brief use of that pasture for holding livestock was proposed and allowed. In 1995 the Coconino National Forest and the Service agreed to continue to defer use of the Knolls, North

Battleground, and McCarty pastures for the 1995 grazing season. A field trip to the Buck Springs and Hackberry/Pivot Rock Allotments for additional discussions was held in July, 1995. Use of the deferred pastures of the Buck Springs Allotment in 1996 was discussed as well as use of the portions of the Hackberry/Pivot Rock Allotment within the East Clear Creek drainage. The Service stressed the need to complete consultation requirements. The development of the new AMP for Buck Springs had been further delayed and the use of only part of the allotment and reductions in stocking levels were of concern to both agencies and the permittee.

On March 19, 1996, the Coconino National Forest met with the Service to discuss the 1996 grazing season. Development of the new AMP for Buck Springs will not begin until 1997, and the need to initiate consultation for the existing management was discussed. The permittee proposes to use the entire allotment in 1996, including the deferred pastures and run the full allowed number of livestock. At this time, the Service suggested to the Coconino National Forest that formal section 7 consultation be initiated as soon as possible.

Two additional allotments whose operations fall within portions of the East Clear Creek watershed also are included in this consultation. These are the Hackberry/Pivot Rock Allotment and the Bar-T-Bar Allotment. The Hackberry/Pivot Rock allotment received a new 10-year term grazing permit in 1996. As part of the process, the Coconino National Forest was required to complete both National Environmental Policy Act (NEPA) and Endangered Species Act requirements prior to issuance of the new permit. Because of specific issues relating to the spinedace, those portions of the allotment in the East Clear Creek drainage are included in this consultation. In order to maintain an ecosystem approach, the Coconino National Forest also evaluated those portions of the Bar-T-Bar Allotment in the East Clear Creek drainage and included them in the April 5, 1996, request for consultation.

The Service prepared a draft biological opinion on the effects of the use of these allotments, however, that opinion was never finalized. On March 28, 1997, the Coconino National Forest met with the Service and requested that the project under consultation be modified to cover only the 1997 livestock grazing season. Information on the proposed operation was provided to the Service at the meeting and in letters dated March 27 and April 23, 1997. The Service agreed to revise the draft biological opinion to reflect this change in the project. The Service also informed the Coconino National Forest that in changing the project description, the biological opinion would no longer cover the operations of the Buck Springs and Hackberry/Pivot Rock Allotments beyond this livestock grazing season. Additional consultation would be required for these allotments in the future.

There are no previous consultations with the Coconino National Forest on the operation of these three allotments that addresses effects to the spinedace. There has been some consultation concerning timber sales and other management activities in the area occupied by the allotments and these are discussed in the section below on the environmental baseline.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The proposed action for this consultation is livestock grazing in 1977 on the Buck Springs Allotment and on portions of the Hackberry/Pivot Rock Allotments. The proposed action also includes livestock grazing under the existing AMP for the Bar-T-Bar Allotment. Pastures in the latter two allotments are operated in conjunction with other pastures outside the East Clear Creek watershed.

The Buck Springs Allotment is located on the Blue Ridge Ranger District of the Coconino National Forest in Coconino County, Arizona. The allotment contains 70,986 acres of lands administered by the Coconino National Forest that range in elevation from 7,720 feet to 7,100 feet. The land slopes generally downward from south to north, draining to the Little Colorado River. The allotment contains portions of East Clear Creek, Barbershop Canyon, and Leonard Canyon as well as several smaller drainages. All pastures within the Buck Springs Allotment contain at least part of the watershed for East Clear Creek. McCarty Pasture contains part of the mainstem of East Clear Creek that is designated critical habitat for the spinedace, and the North, Dines and Knoll Pastures contain parts of Leonard Canyon to the east of East Clear Creek. Mixed conifer forests dominate on the southern portions of the allotment, meadow areas are largely associated with the drainages, although open, grassy areas also are found in areas that have been logged and seeded. The topography of the southern areas is characterized by broad, relatively level ridgetops separating the drainages. Drainages begin in meadows and enter canyons that become progressively deeper and less accessible toward the northern portion of the Allotment. Ponderosa pine forest dominates in the northern portion of the Allotment and ridgetops are narrower with drainages in deep, narrow, canyons. Here there are fewer meadow areas, except those created by logging or fire.

The Buck Springs Allotment is operated under an AMP signed in 1988. A 10-year permit was issued in 1994 and will expire in 2004. The present AMP calls for low-intensity grazing using 15 pastures. The permitted use is for 746 cow-calf pairs or up to 1,358 yearlings for five months in the summer. For the 1997 livestock grazing season, the proposed use is for about 1,300 yearlings to graze all 15 available pastures. Each pasture are proposed to be used 20 days or less. The BAE did not state whether time or utilization levels would be the basis for decisions to move the livestock from one pasture to the next. Livestock would be put out on the allotment in May and be removed in October. Livestock would rotate through the pastures from west to east. The McCarty Pasture would be used for approximately two weeks and extra riders will be used to keep livestock out of East Clear Creek. Livestock will be herded across the creek at an abandoned road crossing previously used for this purpose.

A second allotment considered in this consultation is the Hackberry/Pivot Rock Allotment. This allotment is located immediately west of the Buck Springs Allotment and the two share much of the same topography and vegetation types. The Hackberry/Pivot Rock Allotment is in two major drainages, East Clear Creek and West Clear Creek. The Allotment contains portions of East Clear Creek, Miller Canyon, Kehl Canyon and other smaller drainages. Baker, Potato, Kehl, Miller, and Clear Creek pastures in this allotment contain portions of East Clear Creek itself or significant tributaries. The Clear Creek Pasture borders with the McCarty Pasture of the Buck Springs Allotment to the north.

A new term grazing permit was issued for the Hackberry/Pivot Rock Allotment in January, 1996 that allows for the year-long grazing of 760 yearling cattle and 10 horses. Management of the grazing has changed since 1987. At that time, the East Clear Creek portion of the Hackberry/Pivot Rock Allotment was managed as a two pasture system used by 575 cattle for four months (two months per pasture) every year. Changes in management on other parts of the Allotment and subdivision of existing pastures have altered management on the East Clear Creek portion of the Allotment. Use of Potato, Kehl, and Clear Creeks Pastures containing known spinedace populations and designated critical habitat is allowed for 10 days every other year. No use is allowed in dry years when there is insufficient water in East Clear Creek to support livestock operation. For 1997, the Coconino National Forest proposes to rest the Clear Creek, Potato, Baker and Huffer Pastures and graze the Kehl and Miller Pastures for 26 and 32 days respectively with 90 percent of permitted numbers. The remainder of the grazing season the livestock would be in pastures outside of the watershed.

A third allotment considered in this consultation is the Bar-T-Bar Allotment. Portions of three management units of this allotment are within the watershed of East Clear Creek. The management plan issued in 1988 calls for high and low intensity grazing in half of the 17 total pastures each year. The current permitted numbers are 16,050 animal unit months and are divided among the management units in the Allotment. Specifics on proposed 1997 use of this allotment were not provided in the March 27 or April 23, 1997 letters to the Service. Livestock use of this allotment is considered in this opinion as it was described in the April 5, 1996 BA.

In the Red Hill Management Unit of the Bar-T-Bar Allotment, the Maverick and Red Hill pastures are within the East Clear Creek drainage and are located in the pinyon-juniper vegetation type. Elevations are between 6,200 to 6,500 feet. Much of the area was treated to control juniper during the 1950's and 1960's. The Red Hill and Maverick Pastures are grazed by 400 to 800 yearlings for two to three weeks in two out of three years. These pastures may be grazed twice in a season if regrowth of grasses is adequate. For the rest of the grazing season, the livestock are in pastures outside the East Clear Creek watershed. Range clusters established in 1984 and read in 1989 and 1994 indicate an increase in overall vegetative cover and cool-season grass composition.

The Moqui/Wilkins Management Unit of the Bar-T-Bar Allotment is located in the southern portion of the allotment and has two pastures used in combination by 500 cow/calf pairs. The Moqui Pasture is dominated by ponderosa pine type and borders East Clear Creek. Access to the Creek is limited by steep canyon walls. This pasture is used from June 1 to August 31 every other year. The Wilkins Pasture is dominated by juniper, and it is a transition area between the ponderosa pine and the woodland/grassland communities. It is used from August 31 to October 15 in the same year as the Moqui Pasture and is rested in the following year. In years these pastures are not used, the livestock use other areas of the Allotment outside the East Clear Creek watershed. Problems with low vegetative cover and high erosion rates have been identified and topography prevents livestock from directly accessing East Clear Creek.

The Buckhorn Management Unit is in the southeast portion of the Bar-T-Bar Allotment in an area dominated by "dog-hair" thickets of ponderosa pine and low forage availability. The Buckhorn Pasture is used from May 17 to October 14 every year for 260 yearlings. Here also topography prevents livestock direct access to East Clear Creek.

Livestock grazing under existing plans beyond 1997 for the Buck Springs and Hackberry/Pivot Rock is not covered by this biological opinion. Additional consultation will be required for operations in future years. For the Bar-T-Bar, additional consultation may not be necessary as long as there are not changes to the management described in the BA or other reinitiation triggers are not activated.

STATUS OF THE SPECIES

The Little Colorado spinedace was listed as a threatened species on September 16, 1987. Critical habitat was designated for portions of East Clear Creek, Chevelon Creek and Nutrioso Creek. At the time of listing, populations of the species were known from the East Clear Creek drainage, lower Chevelon Creek, Silver Creek, Nutrioso Creek and portions of the Little Colorado River. Since that time, an additional population was located in Rudd Creek, a tributary to Nutrioso Creek. The draft recovery plan for the species was sent out for public comment in August 1994. The recovery plan has not been finalized as of this date.

The spinedace is one of four species of the genus *Lepidomeda* in the tribe Plagopterini of the

family Cyprinidae. One of these species is now extinct. The Plagopterini also contains two monotypic genera, *Meda* and *Plagopterus*. The Plagopterini are restricted to portions of Arizona, Nevada, New Mexico and Utah (LaRivers 1962, Lee et al. 1980, Minckley 1973). Uyeno and Miller (1973) evaluated the karyotypes of the five remaining Plagopterini species and determined that *Meda* and *Plagopterus* are more closely related to each other than to the *Lepidomeda* species, and that the spinedace was more distinctly different from the other two *Lepidomeda* evaluated and probably arose earlier.

Mitochondrial DNA work on the spinedace was initiated in the 1990's and indicated the existence of three sub-groups identifiable by geographic area (Tibbits et al. undated). The East Clear Creek drainage formed one sub-group, Chevelon Creek the second, and the upper Little Colorado including Nutrioso and Rudd Creeks formed the third. The study concluded that the genetic patterns seen were likely the result of populations being isolated and differentiated by stochastic events. The East Clear Creek and Chevelon Creek sub-groups were more individually distinctive, likely the result of a higher degree of isolation and possess unique haplotypes. Individuals from the Little Colorado River sub-group are more similar and, possibly until very recently, there was one population with considerable gene flow when various dams and diversions increased local isolation. The cause or exact time of the isolation of the three sub-groups is not known (Tibbits et al. undated).

The spinedace was first described in collections made in 1871-1874 from the Little Colorado River drainage by the Wheeler Survey and was formally described in 1874 by E.D. Cope (Miller and Hubbs 1960). It is a small fish, adult males and females are generally less than 100 millimeters (mm) in total length and there is little size differentiation between the sexes, although females may on average be longer than males. The back and upper sides are olivaceous, bluish or lead grey with the venter being white and the sides silver with vertical black lines (Miller 1963).

The spawning period for spinedace is from May to June or July (Blinn 1993, Blinn and Runck 1990, Miller 1961, Minckley 1973, Minckley and Carufel 1967) although some females have been found to contain mature eggs as late as October (Minckley and Carufel 1967). Information from spinedace kept in a pond at the Flagstaff Arboretum indicate that adults there spawned three times in 1993 and 1994 (Blinn et al. 1994), but it is not certain if individual females spawn more than once.

Spawning at the Arboretum occurred during the day in the stream that feeds into the Arboretum pond. Small schools (4 to 40 individuals) would leave the pond and move into the stream. Gravel substrates were utilized and sediments were cleared from spawning sites. No spawning was observed in pools containing fine sediments, or within areas with larger gravel and cobbles or aquatic vegetation. Water temperatures in the spawning areas averaged 21° centigrade (Blinn et al. 1994). Fry hatched about five days later, after which they moved to the shallow areas of the pond, usually near floating algal mats or other aquatic vegetation (Blinn et al. 1994). Factors affecting spawning that were identified included changes to water levels, turbidity, photoperiod and water temperature.

Young of the year spinedace reach half their adult size within two months. The average life expectancy, based on recapture information from the Arboretum pond, is three years (Blinn et al. 1994).

As with most aquatic habitats in the southwest, the Little Colorado River basin contained a variety of aquatic habitat types and was prone to rather severe seasonal and yearly fluctuations in water quality and quantity. Both mountain streams and lower gradient streams and rivers have

provided habitat for the spinedace. Residual pools and spring areas are important refuges during periods of normal low water or drought. From these refuges, spinedace are able to recolonize other stream reaches during wetter periods. This ability to quickly colonize an area has been noted in the literature (Minckley and Carufel 1967) as well as in observations by others familiar with the species. Populations seem to appear and disappear over short time frames and this has made specific determinations on status and exact location of populations difficult. This tendency has been observed by both researchers and land managers (Miller 1963, Minckley 1965, Minckley 1973) and led to concerns in the 1960's and 1970's for the species survival.

As would be expected for a species adapted to fluctuating physical conditions, the spinedace is found in a variety of habitats (Blinn and Runck 1990, Miller 1963, Miller and Hubbs 1960, Nisselson and Blinn 1989). Whether occupancy of these habitats reflect the local preferences of the species or its ability to tolerate less than optimal conditions is not clear. Available information indicates that suitable habitat for the Little Colorado spinedace is characterized by clear, flowing pools with slow to moderate currents, moderate depths and gravel substrates (Miller 1963, Minckley and Carufel 1967). Cover from undercut banks or large rocks is often a feature. Spinedace have also been found in pools and flowing water conditions over a variety of substrates, with or without aquatic vegetation, in turbid and clear water (Denova and Abarca 1992, Nisselson and Blinn 1991). Spinedace are mid-water dwellers. During high water events, adult spinedace will utilize the lower end of riffles and the upper ends of pools and are positioned lateral to the current (Minckley 1984). It is during these high water events that recolonization of other areas of the stream can occur.

Aquatic and terrestrial insects form the basis of the spinedace diet (Runck and Blinn 1993), but they will also consume algae and detritus (Blinn and Runck 1990, Minckley and Carufel 1967). Spinedace are opportunistic feeders, using whatever is seasonally available (Runck and Blinn 1993). Foraging may take place both in the water column and on the bottom (Minckley and Carufel 1967).

The native fish fauna of the Colorado River Basin is largely composed of endemic species. The Little Colorado River fish fauna is typical of Basin fish faunas. Besides the spinedace, the speckled dace (*Rhinichthys osculus*), bluehead sucker (*Pantosteus discobolus*), Little Colorado River sucker (*Catostomus* sp.), roundtail chub (*Gila robusta*) and Apache trout (*Oncorhynchus apache*) were found in the mainstem and tributaries of the Colorado River Basin. In the last 100 years, at least 10 non-native fish species have been introduced into spinedace habitats. These include rainbow trout (*Oncorhynchus mykiss*), fathead minnow (*Pimephales promelas*) and golden shiner (*Notemigonus crysoleucus*). Recent surveys in East Clear Creek have documented the presence of those three non-native species and brown trout (*Salmo trutta*) in the watershed (Denova and Abarca 1992). Data from research experiments and field observations indicate that at least the rainbow trout is a predator and potential competitor with the spinedace (Blinn et al. 1993). Data on interactions between other native or non-native fish species and spinedace have not been obtained.

As previously mentioned, the populations of spinedace have a tendency to appear and disappear from locations within their range. These disappearances can be quite sudden, in as little as a few weeks, and last several years. In the 1960's and early 1970's, known populations were so few that the species appeared to be threatened with extinction (Miller 1964, Miller and Lowe 1964, Minckley 1965, Minckley 1973). Between the surveys of the early 1960's and those of the 1970's, the spinedace reappeared in most of the known range (Minckley and Carufel 1967) but populations declined in the late 1970's. In surveys from the early 1980's, five extant populations were identified (Minckley 1984) including two new locations in Nutrioso Creek. The Silver Creek population has not been collected in several years. Populations in East Clear Creek have

declined since 1983 (Denova and Abarca 1992) although there were increased reports of occurrence in the drainage after the flooding in 1993.

The spinedace was listed as a threatened species with habitat alteration and destruction, predation and competition with non-native aquatic organisms, and recreational fishery management actions largely responsible for the need to list the species. Land management activities in the range of the species have not changed significantly since the species was listed and there have been very few section 7 consultations with the Forest Service or other Federal agencies conducted for this species. State and private lands make up a considerable part of the habitat for this species outside the East Clear Creek drainage. No habitat conservation plan for the species has been proposed or is in development. The State of Arizona has acquired some private lands in the upper Little Colorado River drainage for wildlife purposes and there are management possibilities on those lands that could benefit the spinedace. Arizona also owns a portion of the lands supporting the Chevelon Creek population.

Since the spinedace was listed, the Rudd Creek population was discovered, and the Silver Creek population may have been lost. A refugium population for Rudd Creek fish has been established at the Flagstaff Arboretum. No refugia populations for the other two genetic units exist. The recovery plan for the spinedace has been drafted but not yet finalized by the Service.

The status of the spinedace has not significantly improved since listing. The protections that could be afforded the species by Arizona's purchase of lands and water rights in the Rudd Creek area may result in some improvements to habitat that would benefit the species. The issue of competition and predation on spinedace by introduced trout species has been partially addressed in a biological opinion dealing with stocking of rainbow trout for recreational purposes. While the result of that consultation may have effects that reduce the risk to spinedace from newly released trout, it does not address the resident trout populations. Research into the extent of the competition and predation between spinedace and trout is scheduled to start in 1996.

It is very difficult to document the actual status of spinedace populations. The apparently inherent wide fluctuations in population size make it difficult to assess the health of each population and difficult to determine the effects of specific land management activities. The possible loss of the Silver Creek population is a significant event because it represented an isolated population and the newly discovered Rudd Creek population is part of the upper Little Colorado River complex. The Little Colorado-Nutriso Creek-Rudd Creek population appeared to be holding its own in 1993, however increases in non-native trout in some areas was noted. The Chevelon population had declined significantly by 1993 (AGFD 1994) from much higher numbers in 1990-91 (AGFD 1992). The East Clear Creek population had declined by 1993 (AGFD 1994), but apparently increased with the flooding in 1993-94. Drought conditions in 1996 may reverse that gain and put additional stress on all known populations.

ENVIRONMENTAL BASELINE

Status of the Species in the Action Area

The East Clear Creek population of spinedace has been recorded primarily from the mainstem of the creek and in portions of Leonard Canyon. As stated previously, this population fluctuates widely and is usually found in small, isolated pockets and not over longer reaches of the streams. In recent years, the only reliable location to find spinedace in the East Clear Creek drainage was in Dines Tank in Leonard Canyon. Other reasonably reliable sites include the "95" Crossing and Jones Crossing on the mainstem. Critical habitat for the spinedace has been designated in East

Clear Creek above and below Blue Ridge Dam but not in Leonard Canyon.

As stated above, spinedace populations in the East Clear Creek drainage are not large or well distributed. Surveys in 1990-91 found spinedace only in Leonard Canyon both in and above Dines Tank (Denova and Abarca 1992). In 1993, spinedace were found in two sites on the mainstem both above Blue Ridge Reservoir (Jones Crossing and Cold Water Spring) and at Dines Tank (AGFD 1994). Since 1993, spinedace have been located below Blue Ridge Reservoir (pers. com Jim Burton, Arizona Game and Fish Department), near the "95" Crossing, Jones Crossing, near Poverty Draw, Dines Tank, and West Leonard Canyon (pers. com. Tom Cain, Coconino National Forest)

Spinedace habitats in the East Clear Creek drainage have been altered by the construction of dams on the mainstem and tributaries. Examples are the Blue Ridge Reservoir, Knoll Lake, and Bear Canyon Lake. Land management activities including timber harvest, livestock grazing, road construction and maintenance, recreational development and usage, fire management, and inter-basin water diversions also have altered the habitat. These activities have affected watershed function, runoff patterns, peak flows, seasonal flows, riparian vegetation, wet meadow functions, bank erosion, siltation, and water quality. Wildlife and fisheries management largely associated with providing hunting or fishing opportunities has altered the faunal component of the habitat. Introduction of non-native trouts and baitfish has increased competition for available resources. Crayfish (*Procamberus* sp.) also have reached the drainage through some human mechanism. Considerable discussion has occurred about the historic and present abundance of elk (*Cervus elaphus*) in the East Clear Creek drainage and their effect on the existing riparian and aquatic habitats.

The formal consultation that was conducted on the Coconino National Forest Plan included the spinedace as a proposed threatened species. There have been no formal section 7 consultations with the Coconino National Forest involving spinedace for activities in the East Clear Creek drainage. Informal consultations on the Bray Salvage Timber Sale, Moqui Draw Timber Sale, the Victorine 10-K block, and the Starlight Pines land exchange have disclosed no effects to spinedaces. Formal intraService consultation with Arizona Game and Fish Department (AGFD) as the applicant on the stocking of non-native trout into Knoll Lake and Blue Ridge Reservoir determined a no-jeopardy with reasonable and prudent measures guided by terms and conditions for incidental take.

The present condition of the upland, riparian and aquatic habitats is an important component of the environmental baseline. Site specific information on present conditions throughout the drainage is not available. There is, however, information on functional and dysfunctional stream conditions and watershed conditions in parts of the drainage that are of use in development of the baseline.

As part of the ongoing East Clear Creek Ecosystem evaluations, a map of all streams in the drainage was prepared showing the functional, at-risk, and dysfunctional stream reaches. Definitions used by the Coconino National Forest for these terms are from Medina et al. (1995). These definitions are briefly defined as follows:

- Functional stream reaches are those in which processes observed are those that move the system to a higher state of dynamic equilibrium.
- Dysfunctional stream reaches are those in which processes observed are those that move the system in a trend toward system degradation.

- At-risk stream reaches are those which are in danger of becoming dysfunctional.
- Processes are those involving vegetative, hydro/geomorphic, soil quality/erosion, air quality and animal effects components used to determine functionality.

The functional stream reaches were mostly those in steep canyons where ungulate access are very limited, other management actions are limited, and where the physical characteristics of the reach make it more resistant to effects of upstream activities. At-risk and dysfunctional areas were in the flatter, southern portions of the drainage, especially in meadow areas. Approximately 11 percent of the streams in the drainage are considered dysfunctional, 15 percent are at risk and 74 percent were considered functional. The areas where spinedace have been found recently above Blue Ridge Reservoir are in dysfunctional condition. Dines Tank and the area below Blue Ridge Dam are in functional condition, and West Leonard Canyon is at-risk.

Within the project area, dysfunctional reaches occur in the mainstem above Blue Ridge Reservoir, upper portions of General Springs Canyon, upper Dick Hart Draw, most of Buck Springs Canyon, and in portions of West and Mid Leonard Canyons. At-risk areas in Kehl Canyon, Miller Canyon, General Springs Canyon, Quien Sabe Draw, Bear Canyon, Merritt Draw, Barbershop Canyon, Dane Canyon, Yeager Canyon, and West Leonard Canyon are also within the allotments considered in this consultation. Functional reaches include Potato Draw, Quaking Aspen Canyon, lower Kehl Canyon, Miller Canyon, Bear Canyon, Houston Draw, Barbershop Canyon, East Clear Creek below Blue Ridge Dam, Yeager Canyon, and parts of Leonard Canyon and Buck Springs Canyons.

The Kehl and Leonard Canyons sub-watersheds were evaluated in 1993 (Hydro Science 1993) under a contract with the Forest Service. This contract report provides specific information on stream reaches most important to the spinedace in the East Clear Creek drainage. Relevant information from this source is summarized in the following discussion.

The Kehl Canyon watershed analysis area included the mainstem of East Clear Creek through the Potato, Kehl, and Clear Creek Pastures of the Hackberry-Pivot Rock Allotment and the McCarty Pasture of the Buck Springs Allotment.

Natural erosion risk for the watershed is low for most of the area, except around the Kinder Spring, Poverty Draw, and Potato Lake drainages where potentials are moderate to severe due to geological factors. Here, watershed conditions are generally satisfactory although conditions are not reaching potential. However, the low ground cover in meadows is of concern due to decreasing vigor of the plants that may further reduce cover levels. The stream reaches in these areas range from functional to dysfunctional condition. New, active gully formation is occurring near Cold Water Spring in the Clear Creek Pasture. Overall, stream stability is 13 percent poor, 70 percent fair, and 17 percent good in the 18.7 miles of stream cataloged (Hydro Science 1993). Streambeds contain little sediment with fine materials being washed out of the system.

East Clear Creek and its tributaries in the Kehl Canyon watershed are ephemeral. Most of the flows are the result of runoff from snowmelt in March and April, with localized contributions from summer monsoon rains. Peak flows can be quite high and the most recent high flows were in 1993. Scattered pools are found in the streams when there is no flowing surface water. Although these pools are often isolated, they provide the only fish habitat available during dry periods.

The Leonard Canyon watershed analysis area included the mainstem and tributaries of Leonard Canyon including Buck Springs Canyon. The portion of the watershed east of the canyon itself is

not included in the allotments under consideration here and is on a different National Forest. The western portion of the watershed is on the Buck Springs Allotment in the Knolls, Riparian, Horse, Dines, and North Pastures.

Natural erosion risk in the Leonard Canyon watershed is generally slight, with severe risk occurring at the upper ends of the drainages. Watershed conditions are generally satisfactory although many areas are below potential. Buck Springs Meadow is marginally stable. Stream reaches in these upper areas are largely in dysfunctional condition, or are at-risk. Stream stability is 94 percent fair and 6 percent good in the 17.2 miles of stream evaluated (Hydro Science 1993). Sediment load in these streams is low.

With no flow gages on Leonard Canyon, specific flow data is not available. However, it can be assumed that the rainfall and runoff patterns are the same as for the nearby Kehl Canyon watershed. Scattered pools, such as Dines Tank, persist through the seasonal dry periods.

Some historical background on riparian conditions is contained in the Hydro Science (1993) report. The present conditions of streams in the area is not the condition that would have existed without the overgrazing that began in the late 1800's and continued through the middle of the 1900's. Even if some stream reaches are considered "functional" today, it does not mean they are in good condition relative to the pre-overuse baseline. A wide, gravel-cobble wash is a very different system compared to a narrow, meandering stream channel bordered by riparian vegetation.

The streams in the allotment areas are now ephemeral. While this may be the baseline condition, the amount of time when there are no flows may have increased as bank storage declined due to erosive gullying and downcutting, and runoff increased as vegetation was reduced. This has had a significant effect on the availability and quality of fish habitat in the stream reaches under consideration in this consultation.

Timber harvest and post-sale activities have had a significant effect on the watersheds through changes in local runoff patterns, creation of roads, and actions to provide forage and water for ungulates in logged areas. Providing forage on the uplands and ridgetops was intended to draw livestock out of the overused riparian bottoms. In the process, non-native grasses such as orchard grass (*Dactylis glomerata*) became established and the population of elk increased as they made use of new resources. The presence of these new resources enabled development and implementation of new range management programs.

In addition to grazing and timber activities, recreational use of riparian and meadow areas has effected these areas. Soil compaction, bank damage, especially from off-road driving, and water quality issues are involved. These activities occur at varying levels throughout the area but are especially significant in the meadows of upper East Clear Creek. Recreation use of the upper meadows in the drainage is not part of this consultation.

In summary, aquatic and riparian conditions in the East Clear Creek areas for which studies have been done indicate that past overgrazing of the watersheds has resulted in considerable changes to the historic conditions of these habitats and thus the habitat available for the spinedace. The Leonard Canyon watershed has undergone perhaps less incision of stream channels than the Kehl Canyon watershed. However this is likely the result of different geologic and topographic conditions and not from different historic uses. In some areas, the channels are moving toward, or have achieved, stability although it is not the same as the pre-overuse stability. Recovery of the streams and associated floodplains and riparian areas to those historic conditions may be extremely difficult, if not impossible, to attain.

For the spinedace in the East Clear Creek watershed, existing conditions provide habitat in isolated pools for most of the year. Movement within streams is difficult and can only take place during high water events. Access for the species to other streams where there is suitable habitat available also is considerably more difficult. Existing habitats are less stable than before due to changes in seasonal flows relating to bank storage or base flows. Spinedace behavior is tailored to making use of as much habitat as possible during wet periods and, during dry periods when the habitat is reduced, there are more opportunities for survival of a few individuals. With less habitat available for expansion, and less persistent pool habitats in dry periods, there is an increased risk of localized extinction. The Kehl Canyon watershed sub-population is especially at risk because Blue Ridge Reservoir prevents any spinedace from accessing this area from the lower reaches of the stream. Although the Leonard Canyon sub-population has the potential to reach East Clear Creek, that junction is below Blue Ridge Dam and does not ease the situation for the Kehl Canyon watershed population. The situation for the Leonard Creek fish may not be much more secure, especially if the spinedace found below Blue Ridge Dam originate from the Leonard Canyon sites and there is no self-sustaining population in East Clear Creek.

Effects of the Action

The effects of livestock grazing on watersheds and streams has been well documented in the published and in the grey literature (i.e. Meehan 1991, Platts 1990). The BAE provided by the Coconino National Forest contained a summary of the types of effects to aquatic and riparian systems that can be attributed to ungulate grazing. The Hydro Science (1993) report addressed the effect that past overuse of the available resources by livestock (and possibly elk) has had on the riparian and aquatic habitats in a portion of the area of the allotments under consideration. The Service recognizes that the Coconino National Forest has been working to improve range management and range conditions on these allotments. However, it must be understood that there is no livestock management scheme that entirely eliminates effects to riparian and aquatic habitats except for the removal of livestock from the watershed. In areas that have been so significantly affected and altered by past over-use, even allowing managed use to continue may impede any possible recovery in the system. Use of livestock as a tool to promote recovery of degraded rangelands may not be possible in programs to improve riparian and aquatic conditions in such degraded conditions.

Because of their placement in the head of the watershed, conditions in the streams within these three allotments cannot be attributed to upstream activities beyond the control of the Coconino National Forest. Also, there only is a limited amount of non-Federal land in the area of the allotments and, with the exception of the operation of Blue Ridge Dam, the Coconino National Forest has management authority over the majority of the lands involved. Thus outside entities have a limited effect on the resources utilized by the spinedace.

Buck Springs Allotment

For 1996, livestock use is proposed to begin on the western portion of the allotment and move east. The BAE identifies five populations of spinedace in this allotment. Three populations are in Leonard Canyon, including Dines Tank, in the Knolls and Dines Pastures; in Barbershop Canyon in the North Battleground Pasture; and in East Clear Creek, Jones Crossing, in the McCarty Pasture. In the Dines Pasture, Dines Tank is fenced to prevent livestock access, but there is access to the stream above and below the enclosure. Water may or may not be available outside the enclosure in the stream. The enclosure is small enough that heavy use of the grasses in the adjacent areas could affect local runoff into Dines Tank. However, there are no present indications of accelerated upland erosion in the vicinity (Hydro Science 1993). Runoff may also

transport fecal material to Dines Tank causing water quality problems that may adversely affect the spinedace. The site in Barbershop and the two other Leonard Canyon sites are not accessible to livestock because they are in steep canyons. There is always a potential for livestock to reach almost anywhere on an allotment, and the yearlings that would be run on the allotment may be more prone to stray. Having riders with the herd should reduce this potential but may not completely eliminate it. Indirect effects would be changes in runoff from removal of surface vegetation and potential increases in nutrients from fecal material transported to the stream. The proposed action is to move the livestock "quickly" through the pastures, although no rationale was provided in the BAE that would govern the moves. One would assume that utilization rates given in the Coconino National Forest Plan would be the governing rule, however this is not stated in the BAE.

Direct impacts to spinedace may occur in the McCarty Pasture since livestock will have to cross East Clear Creek to access pastures to the west. The proposed schedule is to use McCarty Pasture for two weeks beginning about May 17. The proposed crossing point is in an area "usually" dry and located away from known spinedace habitat. Due to heavy winter snows, use of this pasture may coincide with the last of the spring runoff period. If livestock are not kept away from East Clear Creek, damage from trampling of banks, overuse of available forage, damage to pools from livestock drinking and reduced water quality may occur. Even with riders to control up the yearling cattle there is a risk of some individual livestock reaching pools even if the designated crossing area is dry. The permittee's compliance with restrictions to protect East Clear Creek will be monitored and documented.

The reach that would be used for the crossing is in a part of the stream that exhibits a wide variation in stability (Hydro Science 1993) and in most places appears to be aggrading. There are some areas with more stable, vegetated banks that have higher value to wildlife and possibly to fish. These types of areas are very susceptible to overuse of vegetation and mechanical damage.

Information on the habitat conditions along other drainages in the remaining pastures within the Buck Springs Allotment are not available outside of the map showing functional and dysfunctional reaches. Most of these are either at-risk or functional. Records of spinedace from these streams are lacking. It can be assumed that the same type of effects from livestock use would occur in those areas as has been described above for those streams not in canyons. The entire drainage area covered by the Allotment drains into the mainstem of East Clear Creek either above or below Blue Ridge Reservoir. Effects to runoff patterns and seasonal flows that are continued by the use of the watershed have effects on conditions downstream. Critical habitat for the spinedace is located in East Clear Creek as are populations of spinedace.

Hackberry/Pivot Rock Allotment

Livestock use of the Clear Creek, Potato, and Kehl Pastures would have direct effects to East Clear Creek from trampling, effects to pools from livestock watering and trampling and nutrient loading. Heavy grazing use by elk and livestock has been observed (Hydro Science 1993) and this does not allow for meadow recovery. This reach of East Clear Creek is dysfunctional and there is active erosion, headcutting and gullyng occurring in the reach. There are some stable areas and also areas showing improvement in stream conditions. This may be the results of changes in livestock management already implemented.

In 1997, only the Miller and Kehl Pastures would be used. Livestock would cross East Clear Creek from west to east cutting through the extreme southwest corner of Clear Creek Pasture and crossing on the Kehl Pasture side of the fenceline. This is clearly a reduction in use over the recent past, but still allows for direct effects to an area identified as not being in functional

condition and where adverse effects from livestock use has been identified (Hydro Science 1993). The portion of East Clear Creek in the Kehl Pasture is largely in a canyon area and difficult to access. Access by livestock to this area is possible, but little is known about the habitat conditions for spinedace within that reach.

Use of pastures in the Hackberry/Pivot Rock Allotment may have effects to riparian and aquatic habitats in East Clear Creek below the northern boundary of the Allotment through changes in seasonal flows and runoff. These effects become additive with the effects originating in the McCarty Pasture of the Buck Springs Allotment and can affect the entire reach of critical habitat above Blue Ridge Reservoir. The spinedace population in this portion of the drainage is more vulnerable to local extirpation since there are no immigration routes available for other populations to recolonize the stream. Activities that do not provide for recovery of the available habitat increase the risk of extirpation to the spinedace.

Bar-T-Bar Allotment

All the management areas and pastures in the Bar-T-Bar Allotment that are in the East Clear Creek drainage do not have direct effects to streams in the drainage due to lack of access for livestock. Effects are indirect and involve watershed and runoff considerations. Specific information on the watershed conditions in the Allotment were not provided, although limited information in the BAE indicated range conditions have improved under the recent management changes. The reach of East Clear Creek contained in this allotment is considered in functional condition.

Interrelated and Interdependent Effects

Livestock grazing management requires that roads, fences, and water sources be maintained. Roads also are a part of the un-related recreation and timber access, but fences and water sources are directly related to grazing. Livestock management has contributed to the increase in elk populations through programs to increase water and forage availability implemented through the timber program. Elk intense use of riparian areas and meadows may retard progress toward restoration of functioning conditions. Elk populations have been reduced significantly in the last few years, but effects at some level continue.

Cumulative Effects

Cumulative effects include the effects of future State, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

State activities affecting the recreational fishery in the East Clear Creek drainage have a Federal nexus via Federal Aid in Sport Fish Restoration programs and thus do not fall under this category. The construction of Knoll Lake and Blue Ridge Reservoir within the drainage occurred prior to the listing of the spinedace. There may or may not be any Federal nexus that would require consultation on these structures in the future. It is clear however that the operation of the dams is not under the jurisdiction of the Coconino National Forest, however there may be authority vested in some other Federal agency. At this time, no changes to dam operations have been identified that would be reasonably certain to occur.

CONCLUSION

After reviewing the current status of the Little Colorado spinedace, the environmental baseline for the action area, the effects of the proposed implementation of the livestock grazing programs described in the biological opinion and supporting documents on the three allotments and the cumulative effects, it is the Service's biological opinion that the actions, as described in the BAE and this opinion, are not likely to jeopardize the continued existence of the Little Colorado spinedace and are not likely to destroy or adversely modify designated critical habitat in East Clear Creek.

The Service has determined that livestock grazing in the East Clear Creek watershed, as proposed in the existing AMPs has significant adverse effects to the spinedace and its critical habitat. These adverse effects have been reduced by actions specific to the 1997 livestock grazing season. There is no certainty that these effects can be reduced in future years. Because of this concern, the Service would like to address, in general, the rationale for this determination. The analysis is based on effects to both survival and recovery of the spinedace.

At the time of listing, there were four populations of spinedace known to occur. Now, with the likely loss of the Silver Creek population, there are three. Of the remaining populations or subgroups, Chevelon Creek and Little Colorado River-Nutriosio-Rudd Creeks are primarily located on non-Federal lands. These subgroups are also located lower in their respective drainages and there are significant upstream and downstream effects from water diversions, dams, and other activities. Only the East Clear Creek subgroup has a significant presence on Federal land and has far fewer non-Federal activities affecting the habitat. Even considering the potential benefits to spinedace habitat from the Arizona Game and Fish Department lands, the longterm status of the Chevelon Creek and Little Colorado River-Nutriosio-Rudd Creek subgroups is more uncertain than that of East Clear Creek. It cannot be said that the East Clear Creek subgroup is stable or that visible improvements are being made. The majority of the individuals are in Leonard Canyon and Dines Tank. While not as at risk from livestock as the upper East Clear Creek portion, it remains vulnerable to stochastic events that could eliminate either individuals or habitat. Without a sustainable, stable population in at least two parts of the drainage, the potential for loss of the Leonard Canyon individuals is significant for both the subgroup and the species as a whole. The draft Recovery Plan specifically stated that loss of any one of the four populations significantly increases the risk of extinction. Silver Creek may already have been lost. East Clear Creek is one of the genetic subgroups known and there is no refugia population to sustain this genetic unit if something was to happen in the drainage. The status of the Chevelon Creek subgroup is precarious due to land ownership and location factors, and even though the Little Colorado River-Nutriosio-Rudd Creeks subgroup is more robust, it is very fragmented and subject to continued habitat alteration and degradation.

The preceding paragraph primarily looked at effects to survival. Recovery of any species is compromised if the survival of the species is more in doubt. Some degree of resiliency is required for recovery to occur and resiliency is lost as probability of extinction rises. Recovery of the spinedace requires preservation of existing genetic variability, restoration of habitats, and establishment of refugia to replicate subgroups. Unless adequate habitat in suitable condition is available to sustain spinedace in at least three locations within the East Clear Creek drainage, the subgroup cannot be considered recovered and thus the species cannot be recovered. The livestock use of upper East Clear Creek, an area identified in the draft Recovery Plan as a refugia area, is preventing restoration of the habitat and directly affecting individuals in a way that compromises use of the area as a refuge.

Critical habitat is designated to identify those areas essential to the survival and recovery of a species. For the spinedace, 44 miles of critical habitat was designated. Of that amount, 82 percent is on Federal lands, 70 percent on the Coconino National Forest and 30 percent on the

Apache-Sitgreaves National Forests. Upper East Clear Creek represents 36 percent of the critical habitat on National Forest lands and 29 percent of the total. It is the critical habitat segment highest in the watershed and subject to the fewest adverse effects from human activities. It is also an identified location for a refugia for the East Clear Creek subgroup. Unless the habitat degradation in this area of critical habitat is halted and reversed, it cannot function in that role.

Critical habitat identifies constituent elements essential to the conservation of a species. Areas not currently containing all of these elements, but with the capability to do so in the future, may also be essential for the long-term recovery of the species. Actions to restore constituent elements to areas of critical habitat that have been degraded are part of the recovery effort. For many native fish species in the American Southwest, there are no pristine, undegraded habitats remaining. Critical habitats are then, almost by definition, deficient in one or more constituent elements. The Service understands that the majority of the damage to the aquatic and riparian habitats of East Clear Creek predate the listing of the spinedace as a threatened species and the designation of critical habitat. It is also clear that most of the occupied critical habitat in East Clear Creek is less than fully functional and therefore lacks some constituent elements. Data from studies conducted for the National Forest Service (Hydro Science 1993) indicate that restoration of historic habitat conditions in the upper East Clear Creek drainage is very likely not achievable, however the system is moving toward a degree of healing and stability at some new level. It is hoped that this stability would improve the status of the spinedace in this stream, therefore reducing risks of extirpation. This healing is being set back by the continued use of the stream area for livestock grazing. This is evident in observations made of livestock use removing vegetation and disturbing banks in the vicinity of headcuts on the Hackberry/Pivot Rock Allotment. These observations were made in 1993 and reported by Hydro Science in their report to the Coconino National Forest, after the major changes in the management of the allotment had been implemented.

Compounding the effects of livestock use are two other uses. Elk also graze on these allotments and have effects to riparian and aquatic habitats that are additive to those caused by livestock. Elk numbers are being reduced by management of hunting and may play less of a part in the future. Recreational use of the allotment, especially the headwaters areas of East Clear Creek has caused considerable damage to streams and riparian areas. This use is largely unmanaged and will continue to be a problem that impedes recovery of these streams.

INCIDENTAL TAKE

Sections 4(d) and 9 of the Act, as amended, prohibit taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct) of listed species of fish or wildlife without a special exemption. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such a breeding, feeding and sheltering. Harass is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns, which include, but are not limited to, breeding, feeding or sheltering. Incidental take is any take of listed animal species that results from, but is not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or the applicant. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered a prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The Service wishes to advise the Forest Service that this incidental take statement does not include take that is associated with recreational uses of the meadows of upper East Clear Creek. That take is not covered by any biological opinion. The earlier consultation on the forest plan did

not include an incidental take statement, so although the findings for the spinedace in that consultation were non-jeopardy and no destruction or adverse modification of critical habitat, that consultation is not adequate to address the recreational activities that are degrading the meadows. The Service advises the Forest Service to address this situation as soon as possible.

Operations of the Buck Springs and Hackberry-Pivot Rock Allotments in 1997 may still result in the direct taking of one or more individual spinedace. It is not possible at this time to determine a specific level for this take because of the variability in both size and location of spinedace populations in the drainage. It is not anticipated that this take would be significant.

In addition to the direct take of individuals, operations in the two allotments will have direct effects on all aquatic habitats in the East Clear Creek drainage. As with the take of individuals, it is not possible to provide a specific level for this take. The amount of take that occurs each year will depend upon the time any area is grazed, length of time any pasture is used, distribution of livestock across the pasture, effectiveness of monitoring utilization, and effects of the previous year's grazing use.

There will also be indirect take from the use of the watershed in the three allotments for livestock in the form of changes to runoff and seasonal water flows to the streams. Because of the past actions and the damage to the riparian and aquatic habitats resulting from them, it is very difficult to separate out any new effects resulting from the continuation of livestock grazing on the watershed.

There is some incidental take associated with the Leonard Canyon portion of the drainage. Direct access to the streams here is partially blocked by topography, thus some areas may be accessible. Dines Tank is the only place in the East Clear Creek drainage where surveys have reliably found spinedace over a period of several years. The Tank is not particularly large and is in the aggrading channel of Leonard Canyon. Although it is fenced to exclude livestock, the fence is very near the tank and any livestock in the immediate area can see the water. Livestock have access to the creek above and below the Tank. Allowing livestock use of Dines Pasture increases the risk of nutrient loading to Dines Tank, may result in overuse of forage in the vicinity of the water and, in dry years, increase the risk of fence failure as livestock try to reach the water.

The amount of take is not quantifiable, nor can it be measured directly. The Service has identified a surrogate measurement to use in determining when incidental take has been exceeded. Measurement of watershed and riparian conditions in areas near or upstream of spinedace habitat will serve as a surrogate measurement of take. Any new degradation to the watershed or riparian habitats that has an effect on spinedace habitat would exceed the level of incidental take. The Service understands that natural events may also have a significant effect on riparian resources. Each time such an event occurs, the Forest Service should evaluate the post-event conditions and discuss the findings with the Service.

REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measures (RPMs) are necessary and appropriate to minimize take of the Little Colorado spinedace:

1. Measures will be taken to reduce the risk to the spinedace population at Dines Tank.
2. Measures will be taken to evaluate ongoing grazing strategies and identify alternatives.

3. Measures will be taken to minimize potential for habitat damage during the 1997 livestock grazing season.

Terms and Conditions:

1. To implement reasonable and prudent measure 1:
 - a. Livestock use of the upland area around Dines Tank will be monitored to ensure that overuse does not occur.
 - b. Adjustments to the enclosure fence to prevent or minimize livestock view of the water should be evaluated and if appropriate, implemented within three years.
 - c. During dry years, livestock should be herded or otherwise maintained away from the enclosure. No grazing of grasses around the enclosure by livestock will occur in years of less than normal precipitation.
2. To implement reasonable and prudent measure 2:
 - a. Information obtained through appropriate monitoring will be used to adjust use of the allotments to maximize the rate of riparian and aquatic recovery.
3. To implement reasonable and prudent measure 3:
 - a. If pastures containing spinedace habitat are to be used for more than transit of livestock, use of the pasture will be limited to non-riparian areas when significant spinedace habitat is present within that reach of creek. Utilization levels should not be higher than those specified in the Coconino National Forest Plan or in other planning documents and should foster an increase in watershed condition.
 - b. When livestock crossings of East Clear Creek are made, the crossing area will first be surveyed by Forest Service personnel to ensure there are no pools containing spinedace in the area of the crossing. If spinedace are found, no crossing in that area is permitted.
 - c. When crossing areas are selected, locations least likely to suffer mechanical damage or increased bank instability should be selected. The area should also be dry, or if water is present, the area should be surveyed for spinedace. If spinedace are present, the crossing site will not be used.
 - d. The Coconino National Forest will provide the Service with a report on use of the Buck Springs and Hackberry/Pivot Rock Allotments before the beginning of the next grazing season. This report should include information on how long and when pastures were used.

CONSERVATION RECOMMENDATIONS

Section 7 (a)(1) of the Act directs Federal agencies to utilize their authorities to further the purpose of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. We recommend that:

1. The Forest Service consider what program would be necessary to achieve the goal of three age classes of riparian woody species before 2030.
2. The Forest Service continue with the East Clear Creek Ecosystem Plan development to determine the desired future functionality of the watershed and streamcourses.
3. The Forest Service work with AGFD to monitor the effects of elk on riparian areas.
4. The Forest Service identify factors that limit recovery potential of spinedace on lands under their jurisdiction and work to correct them.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION STATEMENT

This concludes formal consultation on the action described in your request. As provided by 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

If there are any questions regarding this biological opinion or we may assist in any way, please contact Lesley Fitzpatrick or Ted Cordery in our Arizona Ecological Services Office.

Sincerely,

Regional Director

cc: Regional Director, Fish and Wildlife Service, Albuquerque, NM
Field Supervisor, Arizona Ecological Services Office, Phoenix, AZ
Project Leader, Arizona Fisheries Resources Office, Pinetop, AZ
Project Coordinator, Arizona Fisheries Resources Office, Parker, AZ
Director, Arizona Game and Fish Department, Phoenix, AZ

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