Chapter 6 Little Colorado River Watershed

This chapter is broken up into three separate documents due to file size. The Upper Little Colorado River Sub-Watershed, The Middle Little Colorado River Sub-Watershed and the Lower Little Colorado River Sub-Watershed.

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Chapter 6 LITTLE COLORADO RIVER WATERSHED

Physical geographic description

The Little Colorado River is the major drainage within the basin and has perennial flows only in areas near the headwaters and below Silver Creek. There are approximately 1,300 springs within the basin (USGS 2006a).

Elevation increases from north to south with the highest point at San Francisco Peaks north of Flagstaff on Humphreys Peak. The White Mountains along the SE boundary of the basin rise to over 11,000 feet at Mt. Baldy. The lowest point is at 1300 feet, as the LCR exits the basin.

A number of named and unnamed tributaries contribute to the LCR, including larger perennial sources: Nurioso Creek, LCR West Fork, LCR East Fork, LCR South Fork, Silver Creek, Chevelon Creek and Clear Creek.

UPPER LITTLE COLORADO RIVER SUB-WATERSHED

LITTLE COLORADO RIVER ABOVE LYMAN COMPLEX

The Little Colorado River above Lyman Lake Complex is made up of 6 stocking sites. Additionally, it is a continuation of the discussion and analysis of the potential effects of the West Fork Little Colorado River Complex proposed stocking actions because those eight sites all drain into the Little Colorado River (LCR) above Lyman Lake (Figure 1). Effects of potential stocking actions to aquatic species located downstream of Lyman Lake would be discussed later in this chapter, as additional complexes and watersheds that contribute to the LCR below Lyman Lake are added to the discussion.

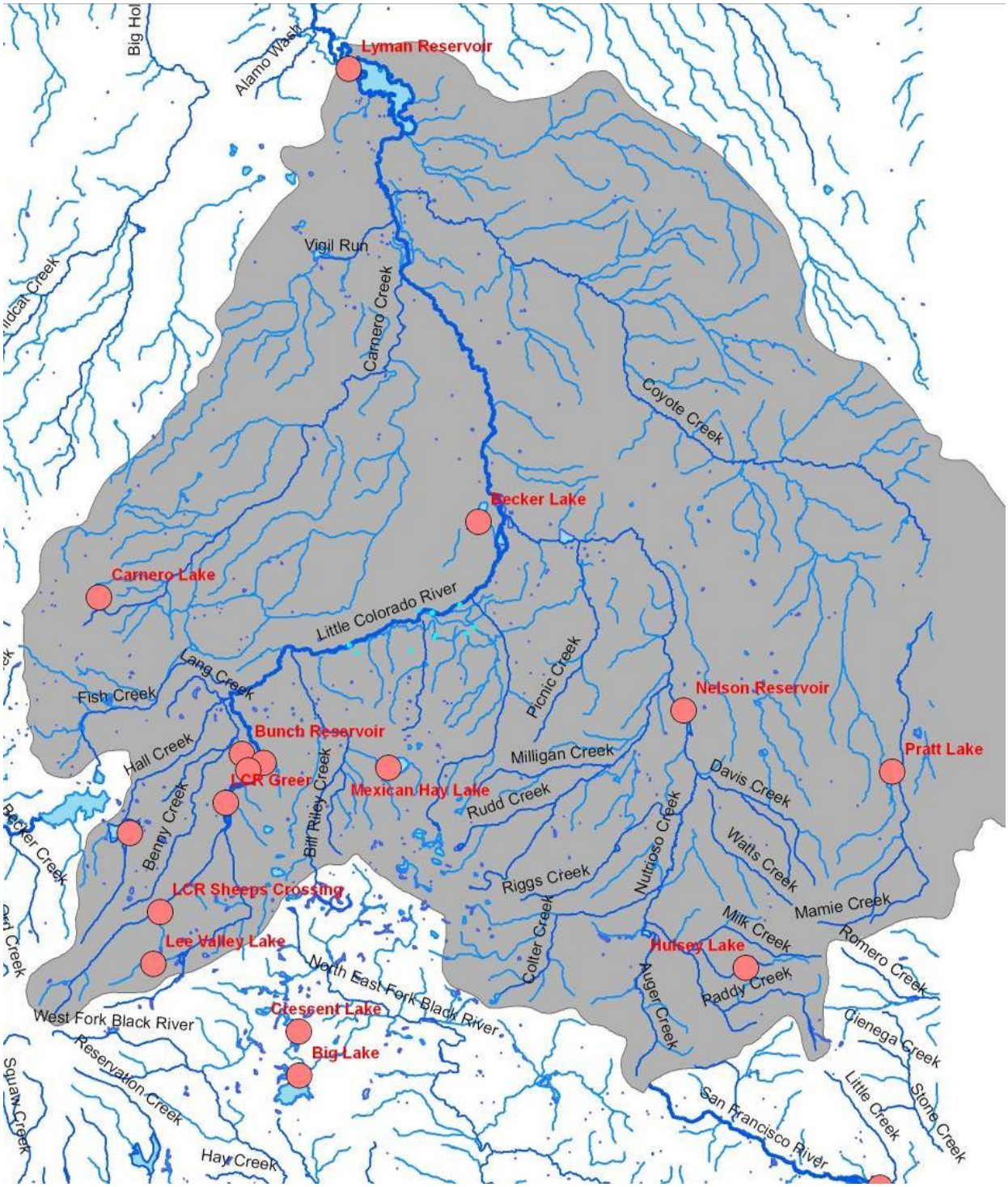

Figure 1. Overview map of the Little Colorado River headwaters watershed above Lyman Lake.

Pratt Lake

Site Description

Pratt Lake is a natural lake, 12 acres in size, located northeast of the town of Nutrioso. Pratt Lake is considered a closed system with no outlet, and exists in a natural sinkhole about ¼ mile west of Coyote Creek. The portion of Coyote Creek closest to Pratt Lake goes dry regularly (M. Lopez pers. obs.). Pratt Lake is geographically close to Hulsey Lake and Nelson Reservoir, but has no hydrologic connection to these waters. The closest drainage, Coyote Creek, drains into the LCR just upstream of Lyman Lake, the lowest stocked water in this complex. Pratt Lake is located within the Apache Sitgreaves National Forest.

There is no outlet on this natural sinkhole and no mechanism to control water levels or to deliver water to anyone downstream; the lake also never spills. The lake catches just enough precipitation to offset evaporation. Pratt Lake is often not suitable to support trout and is stocked opportunistically when conditions and water levels are optimal.

Management of Water Body

Pratt Lake is managed as a primitive put-grow-and-take coldwater fishery. This fishery is not well promoted because of the difficult access via a rough primitive dirt road, and infrequent stocking. Anglers can access Pratt Lake typically May through October, with the winter months presenting extremely difficult road conditions. There are no direction signs, designated parking, boat ramps, or other facilities at Pratt Lake.

Pratt Lake's level is too low and too weedy during years of low winter precipitation to stock trout. However, the proposed action is worded to give us the ability to stock every year if the conditions allow. The lake was stocked nearly every year during the wet cycle in the 1980s and early 1990s when conditions were suitable (Table 1). The proposed action would allow the flexibility of a similar management approach if the precipitation and lake conditions allow within the period covered by this consultation.

Table 1. Stocking history in Pratt Lake

Species	First Year	Last Year	Num. of Stockings	Num. Stocked
Brown trout	1983	1995	11	47,101
Rainbow trout	1979	2009	11	48,819
Total			22	95,920

The Integrated Fisheries Management Plan for the LCR Watershed identifies a management emphasis at Pratt Lake as basic yield, put-grow-and-take sport fish with a desired species assemblage of rainbow trout and brown trout. However, we are proposing to stock only rainbow trout in the period covered by this consultation.

There have been no creel surveys conducted on site at Pratt Lake; however, a mail-out survey reported 254 AUDs in 2001 (Pringle 2004). This is likely a low estimate of the use that could

occur at Pratt Lake, as this survey occurred during a period when the lake conditions were often unsuitable and when it was only sporadically stocked.

Proposed Action
The Department proposes to stock rainbow trout for the period covered by this consultation.

Sub-catchable and/or catchable rainbow trout may be stocked multiple times from April through June annually, if conditions are suitable; numbers of trout may be from 0 to 10,000 sub-catchables and/or 0 to 2,000 catchables annually.

Water Distribution / Connectivity
There is no outlet on this natural sinkhole and no mechanism to control water levels or to deliver water to anyone downstream. The lake has never been known to spill. It is considered a closed system and the lake catches just enough precipitation to offset evaporation. There is no hydrologic connection to Coyote Creek or the LCR, thus nowhere for stocked trout to escape to. Pratt Lake is included in this complex because of its proximity to Hulsey Lake and Nelson Reservoir, but has no hydrologic connection to these or any other waters.

The closest drainage, Coyote Creek, drains into the LCR just upstream of Lyman Lake, the lowest stocked water in this complex. The portion of Coyote Creek closest to Pratt Lake goes dry regularly.

An artificial fish barrier on Coyote Creek is located approximately 2/3 mile upstream of the area closest to the tank, with a recovery population of Apache trout located upstream of the fish barrier in the only perennial water in Coyote Creek. Approximately 38.7 miles of Coyote Creek from the Pratt Lake area downstream to the LCR is normally dry and fishless, flowing only in response to a heavy snowmelt runoff (Novy and Lopez 1991a). But there is no hydrologic connection to Coyote Creek or the LCR, making the lake a closed system.

Fish Movement
There is no inlet or outlet from Pratt Lake. The lake exists in a natural sinkhole and catches just enough precipitation to offset evaporation in good precipitation years. There is no hydrologic connection to Coyote Creek or the LCR, thus nowhere for stocked trout to escape to.

Community Description
Pratt Lake contains rainbow trout when stocked, fathead minnow, and likely tiger salamander. There is no information supporting the presence of tiger salamander in Pratt Lake other than nearly all permanent stock tanks and small lakes at this elevation in pinion-juniper habitat contain tiger salamander larvae at one time or another. Stocked trout may persist in the lake if water levels are suitable, but there is no evidence that they reproduce within the lake. Table 2 provides a summary of surveys of Pratt Lake. Fathead minnows are established and reproduce naturally, although they are not reflected in any survey data (M. Lopez pers. comm.).

Table 2. Survey history for Pratt Lake

Date	Survey Type	Species	Num. Collected	Size Range
May 1987	Experimental gillnet	Brown trout	24	210-406
April 1985	Angling	Rainbow trout	6	297-439
April 2009	Experimental gillnet	No fish	0	-

Coyote Creek in the vicinity of the lake and downstream to the LCR is fishless, because it regularly goes dry. No surveys have been conducted in these reaches of Coyote Creek to document the dry conditions or absence of fish, because that part of the drainage is known to be dry and fisheries surveys are conducted in areas that support at least perennial pools.

A recovery population of Apache trout is located in the only permanent water in upper Coyote Creek, but are isolated by a constructed fish barrier located about 2/3 mile upstream of the Pratt Lake area. This area was surveyed in 1990, 1995, and 2001 through 2003 (Table *3*).

Table 3. Results of Coyote Creek fish surveys.

Year	Species	Num. Collected	Average size (mm TL)	Average weight (g)	Size Range
1990	Apache trout	110	109	17	71-241
1995	Apache trout	47	107	21	30-221
2001	Apache trout	5	178	63	160-195
2002	Apache trout	20	145	44	82-240
2003	Apache trout	1	145	37	145-145

Data from 1990 (Novy and Lopez 1991a; 38 sites), 1995, 2001,2002, and 2003 (T. Robinson pers.comm. using 3 pass depletion sampling on 50-meter stations with a backpack electroshocker).

The tank is within the historic range for both Chiricahua and Northern leopard frogs; however, the closest occurrences of these species, at or near Nelson Reservoir/Nutrioso Creek are old records and over 6.5 miles away over land.

The closest known current populations of Chiricahua leopard frogs are 15.5 miles away at Sierra Blanca Lake, 18.2 miles away at Three Forks, 20.2 miles away at lower Coleman Creek, and 21.5 miles away at Concho Bill Springs. The closest know population of Northern leopard frogs is 29.6 miles away at the LCR below Lyman Lake dam (Dan Groebner, per. comm.).

Consultation Species or Critical Habitat

No listed aquatic species have been documented in or near Pratt Lake. The closest listed aquatic species is the Apache trout within Coyote Creek, but there is no hydrologic connection and no way for stocked rainbow trout to escape into Coyote Creek naturally and no way for Apache

trout to disperse into Pratt Lake. Chiricahua and Northern leopard frogs are analyzed at a local site and broad scale level due to the movement potential into the stocked area and fish movement potential up or downstream into areas where frogs may occur (Figure 2).

Chiricahua leopard frog

Local Analysis: Although Pratt Lake and the LCR above Lyman buffered stocking complex are within the historical range of the Chiricahua leopard frog, the likelihood that Chiricahua leopard frogs could be exposed to fish stocked in Pratt Lake is low because there are no historical records for Chiricahua leopard frogs at Pratt Lake and it is a closed system. The likelihood of frogs being exposed to fish stocked in other sites within the LCR above Lyman buffered stocking complex is also low. There are historical records for Chiricahua leopard frogs from 3 sites in the buffered complex; Nelson Reservoir (SE Corner) (1971), Nutrioso Creek (Correjo Crossing) (1979), and Unnamed Creek (1 MI S of Alpine Divide Campground) (1974). There have been 68 surveys at 39 sites within the buffered stocking complex between 1935 and 2009, with most of them taking place between 1971 and 2009 (Figure 2, AGFD Riparian Herpetofauna Database, M. Sredl pers.comm.). In addition, Chiricahua leopard frogs were released at Trinity Reservoir in 1996 by the Department as part of ongoing recovery activities (AGFD Riparian Herpetofauna Database, M. Sredl pers.comm.). Chiricahua leopard frogs were not observed during subsequent surveys at Nelson Reservoir (SE Corner) (1987, 1992, 1993, and 1995), Nutrioso Creek (Correjo Crossing) (1995), or Unnamed Creek (1 MI S of Alpine Divide Campground) (1995) (AGFD Riparian Herpetofauna Database, M. Sredl pers.comm.). Although the LCR above Lyman buffered stocking complex has not been adequately surveyed, the Rudd Creek and Trinity Reservoir area was adequately surveyed for frogs after the 1996 release and no frogs were observed after the 1997 field season (D. Groebner and Sredl pers.comm.). In addition, the LCR above Lyman buffered stocking complex lies at the edge of the range for the Chiricahua leopard frog and the presence of crayfish and non native fish make the habitat less suitable for leopard frogs.Therefore, it is likely that Chiricahua leopard frogs no longer occupy this area.

Broad Scale Analysis: The likelihood that Chiricahua leopard frogs could be exposed to dispersing fish from stocking sites in the LCR above Lyman buffered stocking complex is low. The northernmost part of the LCR above Lyman buffered stocking complex is just outside of the range of the Chiricahua leopard frog, therefore further downstream in the LCR is outside of the range of the Chiricahua leopard frog. There are records for Chiricahua leopard frogs just south of the LCR above Lyman buffered stocking complex, but these sites are in different watersheds and it is not feasible for stocked fish in the LCR above Lyman buffered stocking complex to reach these areas and the likelihood of frogs traveling the overland distance to the headwater of the tributaries to the LCR is low. These Chiricahua leopard frog sites will be assessed in different complex documents.

Northern Leopard Frog

Local Analysis: Although Pratt Lake and the LCR above Lyman are within the historical range of the northern leopard frog, the likelihood that frogs could be exposed to fish stocked in Pratt Lake is low because there are no historical records for northern leopard frogs at Pratt Lake and it is a closed system. However, the likelihood of frogs being exposed to fish stocked in other sites within the LCR above Lyman buffered stocking complex is high. There are records from 2007-2009 just downstream of Lyman Lake, which is within the LCR above Lyman buffered stocking complex (Drost, pers. comm.). There are historical records for northern leopard frogs from 9 sites within the buffered stocking complex; Benny Creek (1979), Iris Spring (1979), LCR (Foot of Lyman Dam) (1935), LCR (Johnson Ranch) (1938), LCR (4.35 MI W of Eager) (1979), Nelson Reservoir (SE Corner) (1971), Nutrioso Creek (Correjo Crossing) (1979), Sheep Springs (1942), and Unnamed Creek (1 MI S of Alpine Divide Campground) (1974, 1979). There have been 68 surveys at 39 sites within the buffered stocking complex between 1935 and 2009, with most of them taking place between 1971 and 2009 (Figure 2,AGFD Riparian Herpetofauna Database, M. Sredl pers.comm.). Northern leopard frogs were not observed during subsequent surveys at Benny Creek (1992 and 1995), Iris Spring (1992, 1995, and 1997), LCR (Foot of Lyman Dam) (1997), LCR (Johnson Ranch) (1997), Nelson Reservoir (SE Corner) (1987, 1992, 1993, and 1995), Nutrioso Creek (Correjo Crossing) (1995), Sheep Springs (1995), or Unnamed Creek (1 mi. S of Alpine Divide Campground) (1995) (AGFD Riparian Herpetofauna Database, M. Sredl pers.comm.). Although the LCR above Lyman buffered stocking complex has not been adequately surveyed and it is likely that northern leopard frogs no longer occupy the sites mentioned above, the recent observations by Charles Drost show that northern leopard frogs currently occupy the area below Lyman Lake dam (Drost, pers. comm.). In addition, this is the last known extant population of northern leopard frogs in the upper LCR drainage and it is thought to be declining (Drost, pers. comm.).

Broad Scale Analysis: The likelihood that northern leopard frogs could be exposed to dispersing fish from the LCR above Lyman buffered stocking complex is low. There are records from 2007-2009 for northern leopard frogs just below Lyman Lake within the LCR above Lyman buffered stocking complex and the likelihood that these frogs would be exposed to stocked fish in the buffered stocking complex is high (Drost, pers. comm.). However, there is only 1 other record downstream in the LCR at Salado Springs for northern leopard frogs (1939), but frogs were not observed at this site in 1997 and it is likely that northern leopard frogs no longer occupy this area or further downstream in the LCR or its tributaries (AGFD Riparian Herpetofauna Database, M. Sredl pers.comm.).

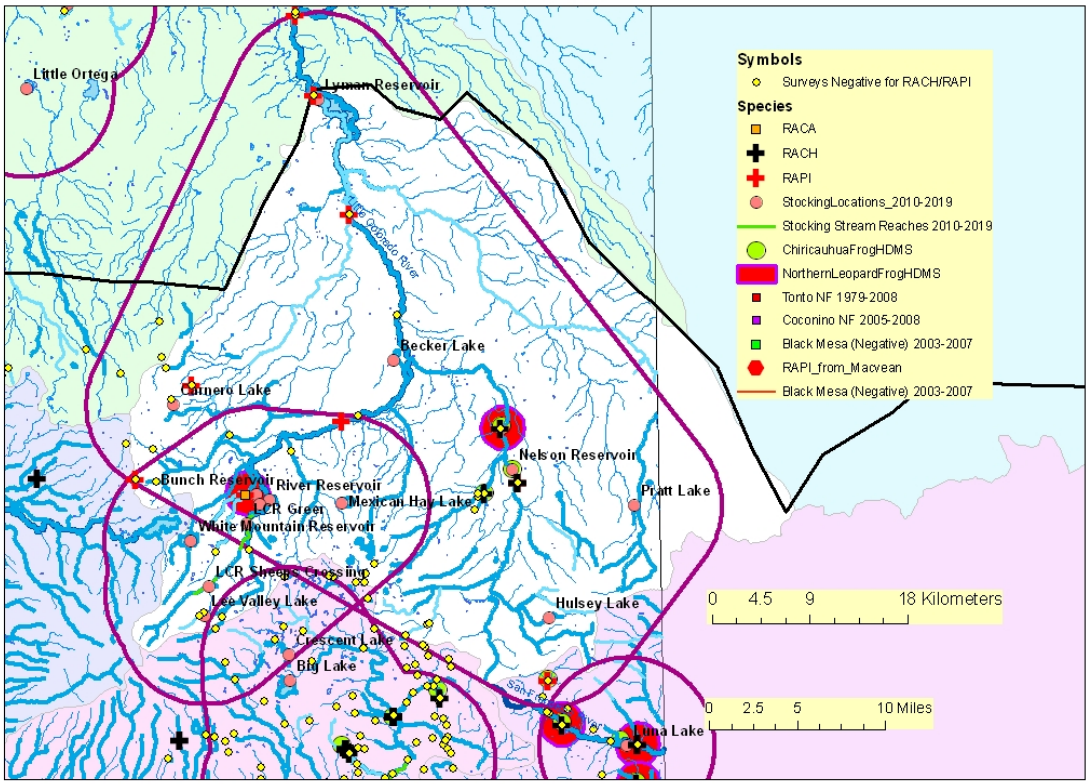

Figure 2. Map of LCR above Lyman buffered stocking complex for leopard frog analysis:

The purple line illustrates the 5 mile buffer surrounding a stocking site, stocking reach, or a group of stocking sites. Blue lines symbolize streams and rivers (both perennial and intermittent). A black line represents a Chiricahua leopard frog Recovery Unit boundary. The background color represents the 8 digit Hydrologic Unit Code. Other data are described in the legend. (Note: HDMS data appear as buffered points and may appear larger than site records for other surveys).

Hulsey Lake

Site Description

Hulsey Lake is a 5-acre lake impounding Hulsey Creek at 8580 feet elevation. It is located on the Apache Sitgreaves National Forest approximately 7 miles south of Alpine. The dam was originally constructed in 1887 and rebuilt in 1975. Hulsey Lake is a shallow reservoir with a maximum depth of about 12 feet. The lake is fed by a relatively small watershed, less than two square miles, but the lake fills and spills every year during snowmelt runoff in the spring. The lake only spills in the spring; however, it does not experience dramatic lake level fluctuations because no irrigation releases occur at this lake.

Hulsey Lake is accessed by an all weather road, Forest Road 56. The only facilities at the lake are a parking area at the top of the hill with a restroom. A short hike down the hill is required to get to the lakeshore. No boat ramps or fishing piers are present. The lake is normally accessible from March through November. The lake ices over in the winter, but does not receive much ice fishing use because of very low numbers of trout during the winter.

Hulsey Lake is very weedy, with strong summer blue-green algae blooms, and experiences occasional summer kills and frequent winter kills. Hulsey Lake likely winter kills much more often than is documented in the table below; however, the lake is not often surveyed to verify this assumption. Jim Novy, Fish Program Manager for this region from 1977 through 2001, stated that the lake winter killed often, therefore was not surveyed regularly. Plus, the early survey history at Hulsey Lake, discussed below, shows few or no fish present during spring surveys in 1978-1983, and again recently in 2009. The water quality at Hulsey Lake deteriorates usually by mid to late June with rapid growth of aquatic macrophytes and algae blooms, limiting the stocking season to mid-April through early June. Table 6 lists the history of known fish kills at Hulsey Lake.

Management of Water Body

Hulsey Lake is managed as an intensive use put-and-take coldwater fishery. It is stocked with catchable rainbow trout multiple times from April through early June of each year. The lake supports good catch rates in May and June when stocked, and decreasing in July, poor catch rates from August through early April. Creel surveys in 1998 showed catch rates of 1.43 and 1.04 fish per hour in May and June, respectively, 0.35 fish per hour in July, 0.0 to 0.15 fish per hour from August through April (Table 4). Despite the poor catch rates from late summer through winter, angler use remains fairly high for this small lake through October. The data suggest that a high percentage of the trout stocked are harvested in the spring and early summer, and the remaining trout succumb to winter kills and occasional summer kills. Creel surveys were conducted with limited opportunity for high-confidence intervals in the results. During creel surveys the trout which were creeled were measured, and there were no trout of larger sizes that would have indicated winter carryover (M. Lopez pers. comm.). To get better confidence and power in the

data and more accurate harvest estimates, creel surveys would have had to be implemented more than the 2 survey days per week.

Table 4. History of angler creel surveys at Hulsey Lake and return to creel of stocked trout.

Year	Sample period	Total anglers	Estimated harvest	Trout stocked	Percent harvested
1981	May-Nov	2434	2381	2000	119%
1998	Apr-Dec	11,192	9033	8100	112%

Table 5 shows the fishing success and harvest in 1998 by month, illustrating high catch rates in May and June, moderate in July, and poor for the rest of the year, even in the fall, showing that most of the trout are caught out by the end of July.

Table 5. Angler creel summary in 1998 for Hulsey Lake.

Month	Catch/hr	Harvest/hr	Total anglers	Total Harvest
APR	0	0	115	0
MAY	1.43	0.59	1321	1390
JUN	1.04	0.64	5098	5879
JUL	0.35	0.31	2354	1707
AUG	0.02	0	923	0
SEP	0.12	0.12	480	31
OCT	0.15	0.05	783	24
NOV	0	0	115	0
DEC	0	0	0	0
TOTAL	0.84	0.48	11,192	9033

Table 6. Documented fish kills in Hulsey Lake.

Date	Comments	Num. dead fish observed
6/8/1977	Summer kill related to weed growth and high pH	30
4/1983	Winter kill documented	
8/5/1983	Summer kill related to algae bloom die-off	50
9/4-8/1986	Summer kill related to algae bloom die-off, low oxygen	300-350
6/21-23/1992	Summer kill related to algae bloom and high pH	250
4/2/1993	Winter kill documented, oxygen measured at 1 ppm	6
8/4/1995	Summer kill	178
8/12/2003	Summer kill related to algae bloom die-off and low oxygen	270

Date	Comments	Num. dead fish observed
5/24-28/2008	Summer kill related to low oxygen levels	276

Early netting surveys conducted prior to stocking show little or no trout remained in the lake in early spring prior to stocking, likely from being caught out the prior fishing season, or because of fish kills (Table 7). Because of this survey history, it is assumed few trout carryover from the prior year.

Table 7. Fish Survey Netting History for Hulsey Lake.

Year	Sample period	Survey gear	Num. of fish caught	Size (mm TL)
1978	March	Trap net (1)	1 rainbow trout	320
1981	April	Trap net (4)	0	-
1983	April	Exp. Gillnet (1)	0	-
2009	April	Exp. Gillnet (2)	0	-

Based on the angler use (return to creel documented as at or near 100% in 91-98 surveys) and harvest, plus the winter kill loss and occasional summer kill loss, very few stocked trout are left in the lake when it spills in the spring during snowmelt runoff. Because there is no maintained road to the lakeshore, the lake is not accessible to stock until the hillside between the parking lot and the lake has dried out enough to support a full hatchery truck. By this time, the spill is reduced to a matter of a few inches, making it extremely difficult for a catchable size trout to escape over the spillway. There is a short stocking window in the early summer, after the hillside dries out and before the pH gets very high in the lake, and it is usually not possible to restock until the following spring/early summer because of lingering high pH levels through the fall.

The Integrated Fisheries Management Plan for the LCR (LCR) Watershed (Young et al. 2001) identifies the management emphasis for Hulsey Lake as intensive use sport fish, with a desired fish assemblage of rainbow trout. Hulsey Lake has been historically stocked mainly with rainbow trout from 1960-present, and with infrequent stockings of brown trout in 1978-1992, and brook trout in 1981-1985 (Table 8).

Table 8. Stocking History in Hulsey Lake.

Species	First Year	Last Year	Num. of Stockings	Num. Stocked
Brook trout	1981	1985	4	5,800
Brown trout	1978	1992	11	12,080
Rainbow trout	1960	2009	138	219,060
Total			153	236,940

Proposed Action
The Department proposes to stock rainbow trout for the period covered by this consultation.

Catchable rainbow trout would be stocked from April through July annually; numbers of trout stocked may be from 0 to 10,000 fish annually.

Water Distribution / Connectivity
Hulsey Creek drains the southwestern edge of Escudilla Mountain and flows into Hulsey Lake. Hulsey Creek has a poor survey history, with the only survey on record being upstream of the lake. This portion of Hulsey Creek was extremely low flow when surveyed, and no fish were found; it often dries entirely during low precipitation years.

Hulsey Lake fills and spills every year during snowmelt runoff in the spring, but does not spill most of the year. When it does spill, it flows down lower Hulsey Creek for 2.1 miles into Milk Creek, then down Milk Creek for 0.3 miles to the confluence with Nutrioso Creek just upstream of the Town of Nutrioso. Lower Hulsey Creek is intermittent and only flows during snowmelt runoff when the lake is spilling. Lower Hulsey Creek has a steep gradient with dense woody debris from numerous blow-downs in the thick mixed conifer forest. Milk Creek appears to have a low but permanent flow, and is fishless as determined by Department surveys in 1976, 1995, and 1996 (Table 9).

From the confluence of Milk Creek, Nutrioso Creek flows downstream through the Town of Nutrioso for 11.1 miles to Nelson Reservoir. This flow is perennial going into the Town of Nutrioso; however, numerous water diversions exist through the town and the creek does not always flow continuously into Nelson Reservoir during the summer irrigation season, with occasional drying into isolated pools.

There are two other major tributaries entering Nutrioso Creek between the confluence with Milk Creek and Nelson Reservoir. Auger Creek and Colter Creek enter at 1.9 miles and 3.5 miles, respectively, downstream of the Milk Creek confluence. Both of these tributaries have permanent flow; however, a number of water diversions often keep this permanent flow from reaching Nutrioso Creek during the summer irrigation season.

The reach of upper Nutrioso Creek upstream of the confluence of Milk Creek also flows perennially. A perennial tributary, Paddy Creek, also enters this reach of Nutrioso Creek.

Hulsey Lake, Hulsey Creek, Milk Creek, upper Nutrioso Creek, Auger Creek, Colter Creek, and Nelson Reservoir are all connected during snowmelt runoff during the spring. However, at base flows, Hulsey Lake does not spill, Hulsey Creek is dry and permanent flow in Nutrioso Creek, Auger Creek, and Colter Creek often are not connected with each other or to Nelson Reservoir because of numerous water diversions around the Town of Nutrioso. The diverted water is used

to irrigate fields throughout the old floodplain from the Town of Nutrioso down to the Forest boundary just above Nelson Reservoir. Nutrioso Creek is incised/downcut from the lower end of Nutrioso almost down to Nelson Reservoir, up to 10 feet below the old floodplain in some places.

Fish Movement

During base flow times at Hulsey Lake, fish would not have the opportunity to move in or out of the lake and Hulsey Creek is dry with no connection. When it spills, because there is no maintained road to the lakeshore, the lake is not accessible to stock until the hillside between the parking lot and the lake has dried out enough to support a full hatchery truck. By this time, the spill is reduced to a matter of a few inches, making it extremely difficult if not impossible for a catchable size trout to escape over the spillway. In addition, the spill occurs only in spring for a short duration and often at a minimal depth of ½ inch or less entering into the Milk Creek (for 2.4 miles, then into Nutrioso Creek). The stream above the lake flows more frequently than that below, but dries in the mid summer months and does not support fish. Further, Lower Hulsey Creek has a steep gradient with dense woody debris from numerous blow-downs in the thick mixed conifer forest. Milk Creek appears to have a low but permanent flow, and remains fishless.

A stocked trout could escape downstream of the reservoir, but would have to survive frequent winter kills, a steep gradient, dense woody debris and encounter a spring spill that was large enough to allow a full size trout to pass over the spillway. During the spring spill, Hulsey Creek is running continuously into Milk Creek, and then into Nutrioso Creek. Once in Nutrioso Creek, an escaped trout could move upstream into perennial trout habitat, or downstream towards the Town of Nutrioso, and potentially downstream towards Nelson Reservoir. The potential to move out of the reservoir exists, but is likely rare.

Community Description

Hulsey Lake contains rainbow trout when stocked, fathead minnow, and crayfish, and experiences occasional summer fish kills and frequent winter kills (see Table 6 and Table 7). Upper Hulsey Creek above the lake is fishless, based on a survey conducted by the Department throughout 1.86 miles of stream in June 1998. The 2.1 miles of Hulsey Creek below the lake is considered fishless because of its intermittent nature and inability to support a fish population long-term. No formal fisheries surveys have been conducted because Hulsey Creek goes dry.

Table 9. Summary of Milk Creek Fish Surveys.

Date Surveyed	Effort	Num. of fish collected
September 1976	Electrofishing - Four 100-meter stations	0
July 1995	Electrofishing - Ten 50-meter stations, 3 pass depletion	0

Date Surveyed	Effort	Num. of fish collected
November 1996	Visual - Entire stream	0

Nutrioso Creek at the confluence of Milk Creek contains wild rainbow trout hybrids and some speckled dace (Marsh and Young 1988). Spinedace were found a short distance downstream around the town of Nutrioso in 1988 (Marsh and Young 1988), but mixed in with wild rainbow trout in that same area around the Town of Nutrioso. Marsh and Young (1988) identified these trout as hybrid rainbow X Arizona (Apache) trout, indicating wild trout populations in upper Nutrioso Creek. Extensive surveys in 1994 also found numbers of wild hybrid trout in the upper reaches of Nutrioso Creek (Lopez et al. 2001). These wild trout are not found downstream of Auger Creek, as the habitat downstream of Nutrioso is predominately low gradient, exposed, and of fine sediment, suitable for spinedace, speckled dace, and suckers. The habitat upstream of Nutrioso is primarily high gradient, shaded, and of gravel/cobble substrates, suitable primarily for trout. Recent surveys in May 2009 again confirmed the presence of wild rainbow X Apache trout hybrids in Nutrioso Creek between the confluences of Milk Creek and Paddy Creek. A total of 68 trout were collected in 200 meters of stream, ranging in size from 69 mm to 220 mm total length (TL). These results were similar to the 1994 surveys when 90 rainbow hybrids were collected in six 50-meter stations, ranging in size from 37 mm to 215 mm TL (Lopez et al. 2001). One brook trout was also found in this headwater reach of Nutrioso Creek in the 1994 surveys, but is considered to be an escapee from either Hulsey Lake or Nelson Reservoir, because of the size of the fish (230 mm) and the fact that no other brook trout has been documented in the headwaters of Nutrioso Creek, upstream of the Town of Nutrioso, so it is unlikely there is a wild population. This brook trout was most likely an escapee from Nelson Reservoir and not Hulsey Lake, since brook trout were being stocked regularly in Nelson through 1994. The last brook trout stocked into Hulsey Lake was in 1985 and would have died of old age prior to this record, assuming it could have persisted through the high angler use and harvest, winter kill, and occasional summer kill in Hulsey Lake.

A wild population of trout is also present in Paddy Creek, a tributary to Nutrioso Creek just upstream of Hulsey Creek, and was thought to be native trout hybrids. Loudenslauger et al. (1986) reported the trout in Paddy Creek to be Apache and rainbow hybrids, but no pure Apache trout. However, Dowling and Childs (1992) reported Paddy Creek to be primarily of cutthroat trout origin. Regardless, pure Apache trout have not been documented to remain in the Nutrioso Creek drainage, but presence of hybrids indicates that they used to inhabit the creek. Intensive electrofishing surveys (3 pass depletion) of twelve 50-meter stations in Paddy Creek in August 1994 found 353 hybrid Apache-rainbow trout, ranging in size from 35 mm to 278 mm TL.

Auger Creek is perennial but fishless, determined by electrofishing surveys (3 pass depletion of 5 survey sites) of the stream in August 1994.

Colter Creek is perennial and supports a wild population of rainbow hybrid trout; likely Apache-rainbow hybrids, but genetic analyses on these fish have not been done. Intensive electrofishing surveys (3 pass depletion) in 1994 found 273 trout throughout thirty-nine 50-meter stations, ranging in size from 36 mm to 235 mm TL. Twenty-six speckled dace were also found in the lower reach of Colter Creek.

Spinedace have been documented from the town of Nutrioso downstream to just above Nelson Reservoir (Lopez et al. 2001; Sweetser et al. 2002), along with native speckled dace and bluehead sucker (Table 10). Little Colorado sucker are not present in Nutrioso Creek. Several Little Colorado suckers reported by Marsh and Young in 1988 may have been misidentifications. Over 6000 suckers have been surveyed in the Nutrioso Creek drainage since 1988 and all of them have been identified as bluehead suckers. Fathead minnow and crayfish are abundant in this reach of Nutrioso Creek, and green sunfish are occasionally collected. The 1997-2000 surveys were conducted in the spring and fall with a backpack electroshock with results detailed in the 2001 Nutrioso Creek Fish Management Report, AGFD Technical Report 01-01 (Lopez et al, 2001). The 2005 survey was conducted in May with a backpack electroshocker, with results detailed in a trip report (McKell 2005e). The 2006 surveys were conducted in April-June with a backpack electroshocker and 1/8” mesh seines, with results described in two trip reports (Carter et al 2006a, 2006b). The 2007and 2008 surveys were conducted in July of each year with 1/8” mesh seines, with results described in the 2007 Nutrioso Survey Report (Weiss 2007c) and 2008 Nutrioso and Rudd Creeks Survey Report (Weiss and Lopez 2008). The 2009 survey was conducted in May-June with a backpack electroshocker and 1/8” mesh seines (Mike Lopez, per. comm.).

Table 10. Fish survey summary from 1996-present for Nutrioso Creek from Nelson Reservoir upstream to the town of Nutrioso.

Species	**Native fish**			**Non native fish**			**Total**
	Spinedace	Bluehead sucker	Speckled dace	Rainbow trout	Fathead minnows	Green sunfish	
Spring 1997	146	411	69	0	86	0	712
Fall 1997	59	229	14	0	139	0	441
Spring 1998	3	20	10	0	22	0	55
Spring 1999	4	38	11	0	144	0	197
Fall 1999	50	36	40	0	273	0	399
Spring 2000	147	358	74	5	2390	3	2,977
2005	7	7	48	0	145	0	207

Species	**Native fish**			**Non native fish**			**Total**
	Spinedace	Bluehead sucker	Speckled dace	Rainbow trout	Fathead minnows	Green sunfish	
2006	895	109	234	0	1,374+	0	2,612+
2007	60	4	39	0	1090	0	1,193
2008	57	38	46	0	432	2	575
2009	19	0	15	0	766	2	802

Trout likely do not persist within Nutrioso Creek between the Auger Creek confluence and Nelson Reservoir, as only six have been captured in the numerous surveys; five in 2000 and one in 1993. The six trout were of hatchery origin. Five rainbow trout were collected in one pool approximately 0.25 mile upstream of Nelson Reservoir in 2000 and all had tetracycline marks (Sweetser et al. 2002) as required in the consultation recommendations for Nelson Reservoir. The grouping in one pool in close proximity to Nelson Reservoir also suggests they were from stocked fish in Nelson and not from Hulsey Lake. One brook trout was captured in Nutrioso Creek at the gauging station in 1993, not far upstream of Nelson Reservoir. This brook trout was likely an escapee from Nelson Reservoir, as was the 1 brook trout documented in the headwaters mentioned earlier, since there are no wild populations of brook trout documented upstream of Nelson Reservoir and brook trout were stocked into Nelson Reservoir almost every year from 1980 through 1994. Hulsey Lake was last stocked in 1985.

Little Colorado spinedace and bluehead sucker may be as close as 1 mile downstream in Nutrioso Creek from the confluence with Milk Creek, as reported by Marsh and Young in 1988. This area has not been surveyed since 1988. Little Colorado spinedace still occur within the first several miles upstream of Nelson Reservoir (Lopez et al. 2001; Sweetser et al. 2002) and were recently confirmed in surveys conducted in 2009.

There is no evidence that stocked rainbow trout reproduce in Hulsey Lake, nor in Hulsey Creek. The headwaters of Nutrioso Creek upstream of the Town of Nutrioso are suitable trout habitat, and survey data indicate that trout are reproducing there. Survey data also indicate that wild trout populations are also reproducing in Paddy Creek and Colter Creek. Apache trout were historically native to these streams; however they likely hybridized with non native rainbow and cutthroat trout stocked into Paddy Creek during 1933-1947 and into Colter Creek during 1933-1948. Hybridization may have also occurred with any stocked trout that escaped Hulsey Lake and/or Nelson Reservoir.

No trout likely reproduce in Nutrioso Creek between the Town of Nutrioso and Nelson Reservoir. This reach of stream is low gradient, dominated by fine substrates of sand/silt, and

gets fairly warm early in the spawning season. Trout also do not reproduce in Nelson Reservoir (M. Lopez pers. comm.).

Consultation Species or Critical Habitat
Potential impacts from the proposed action to candidate and listed species are described below. Please refer to Chapter 4 for a detailed description of the nature of the impacts (which may include predation, competition for space and food, and hybridization etc.).Subsequent responses (resulting from the frequency, magnitude and duration of the impacts) between proposed stocked and candidate and listed species, and any site or complex factors that provide context for determining the meaningfulness of the impacts, are discussed below. Impacts from the proposed action resulting from angler related recreation and/or potential introduction of disease, pathogen or invasive species are evaluated at a broad scale for the entire action area and are described in Chapter 4. If potential impacts specific to a stocking site or complex have been identified they are discussed below.

Chiricahua and Northern leopard frogs are analyzed at the local site and broad scale level due to the movement potential into the stocked area and fish movement potential up or downstream into areas where frogs may occur.

Little Colorado Spinedace occupy Nutrioso Creek and Mexican spotted owl critical habitat is discussed below.

Chiricahua Leopard Frog
Local Analysis: Although Hulsey Lake and the LCR above Lyman buffered stocking complex are within the historical range of the Chiricahua leopard frog, the likelihood that Chiricahua leopard frogs could be exposed to fish stocked in Pratt Lake is low because there are no historical records for Chiricahua leopard frogs at Hulsey Lake and if fish were able to disperse from the lake, it is not likely that they would persist. The likelihood of frogs being exposed to fish stocked in other sites within the LCR above Lyman buffered stocking complex is also low. There are historical records for Chiricahua leopard frogs from 3 sites in the buffered complex; Nelson Reservoir (SE Corner) (1971), Nutrioso Creek (Correjo Crossing) (1979), and Unnamed Creek (1 MI S of Alpine Divide Campground) (1974). In addition, Chiricahua leopard frogs were released at Trinity Reservoir in 1996 by the Department as part of ongoing recovery activities (AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). There have been 68 surveys at 39 sites within the buffered stocking complex between 1935 and 2009, with most of them taking place between 1971 and 2009 (Figure 2, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). Chiricahua leopard frogs were not observed during subsequent surveys at Nelson Reservoir (SE Corner) (1987, 1992, 1993, and 1995), Nutrioso Creek (Correjo Crossing) (1995), or Unnamed Creek (1 MI S of Alpine Divide Campground) (1995) (AGFD Riparian Herpetofauna Database, M. Sredl pers.comm.). Although the LCR above Lyman buffered

stocking complex has not been adequately surveyed, the Rudd Creek and Trinity Reservoir area was adequately surveyed for frogs after the 1996 release and no frogs were observed after the 1997 field season (D. Groebner and M.Sredl pers.comm.). In addition the LCR above Lyman buffered stocking complex lies at the edge of the range for the Chiricahua leopard frog and the presence of crayfish and non native fish make the habitat less suitable for leopard frogs. Therefore, it is likely that Chiricahua leopard frogs no longer occupy this area.

Broad Scale Analysis: The likelihood that Chiricahua leopard frogs could be exposed to dispersing fish from stocking sites in the LCR above Lyman buffered stocking complex is low. The northernmost part of the LCR above Lyman buffered stocking complex is just outside of the range of the Chiricahua leopard frog, therefore further downstream in the LCR is outside of the range of the Chiricahua leopard frog. There are records for Chiricahua leopard frogs just south of the LCR above Lyman buffered stocking complex, but these sites are in different watersheds and it is not feasible for stocked fish in the LCR above Lyman buffered stocking complex to reach these areas and the likelihood of frogs traveling the overland distance to the headwater of the tributaries to the LCR is low. These Chiricahua leopard frog sites will be assessed in different complex documents.

Northern Leopard Frog

Local Analysis: Although Hulsey Lake and the LCR above Lyman buffered stocking complex are within the historical range of the northern leopard frog, the likelihood that frogs could be exposed to fish stocked in Hulsey Lake is low because there are no historical records for northern leopard frogs at Hulsey Lake and if fish were able to disperse from the lake, it is not likely that they would persist. However, the likelihood of frogs being exposed to fish stocked in other sites within the LCR above Lyman buffered stocking complex is high. There are records for northern leopard frogs from 2007-2009 just downstream of Lyman Lake, which is within the LCR above Lyman buffered stocking complex (Drost, pers. comm.). There are historical records for northern leopard frogs from 9 sites in the buffered complex; Benny Creek (1979), Iris Spring (1979), LCR (Foot of Lyman Dam) (1935), LCR (Johnson Ranch) (1938), LCR (4.35 MIW of Eager) (1979), Nelson Reservoir (SE Corner) (1971), Nutrioso Creek (Correjo Crossing) (1979), Sheep Springs (1942), and Unnamed Creek (1 mile S of Alpine Divide Campground) (1974, 1979). There have been 68 surveys at 39 sites within the buffered stocking complex between 1935 and 2009, with most of them taking place between 1971 and 2009 (Figure 2, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). Northern leopard frogs were not observed during subsequent surveys at Benny Creek (1992 and 1995), Iris Spring (1992, 1995, and 1997), LCR (Foot of Lyman Dam) (1997), LCR (Johnson Ranch) (1997), Nelson Reservoir (SE Corner) (1987, 1992, 1993, and 1995), Nutrioso Creek (Correjo Crossing) (1995), Sheep Springs (1995), or Unnamed Creek (1 MI S of Alpine Divide Campground) (1995) (AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). Although the LCR above Lyman buffered stocking complex has not been adequately surveyed and it is likely northern leopard frogs no longer occupy the sites mentioned

above, the recent observations by Charles Drost show that northern leopard frogs currently occupy the area below Lyman Lake dam (Drost, pers. comm.). In addition, this is the last known extant population of northern leopard frogs in the upper LCR drainage and it is thought to be declining (Drost, pers. comm.).

Broad Scale Analysis: The likelihood that northern leopard frogs could be exposed to dispersing fish from the LCR above Lyman buffered stocking complex is low. There are records from 2007-2009 for northern leopard frogs just below Lyman Lake within the LCR above Lyman buffered stocking complex and the likelihood that these frogs would be exposed to stocked sport fish in the buffered stocking complex is high (Drost, pers. comm.). However, there is only 1 other record downstream in the LCR at Salado Springs for northern leopard frogs (1939), but frogs were not observed at this site in 1997 and it is likely that northern leopard frogs no longer occupy this area or further downstream in the LCR or its tributaries (AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.).

Little Colorado Spinedace and Critical Habitat

Spinedace occupied habitat occurs in Nutrioso Creek from the Town of Nutrioso downstream to Nelson Reservoir (Lopez et al. 2001; Sweetser et al. 2002). Occupied habitat may be as close as 4.3 miles downstream of Hulsey Lake via Hulsey Creek, Milk Creek and upper Nutrioso Creek. Designated critical habitat for spinedace is located on Nutrioso Creek beginning just below Nelson Reservoir Dam and continuing downstream for approximately 5 miles to the Apache-Sitgreaves Forest boundary.

Potential Impacts

The proposed stocking activity could potentially impact Little Colorado spinedace if any stocked trout were able to escape during a flooding event. These interactions could occur as predation on adults and juvenile spinedace, or competition for space. Since rainbow trout are stocked as catchables, they would not likely compete for food with spinedace (refer to the interactions discussion in Chapter 4). Stocked trout also do not reproduce in the lake or in Nutrioso Creek in the habitat where spinedace occur, thus, no progeny of stocked trout would be expected to occur that might compete for food.

The proposed action would not be anticipated to directly impact Little Colorado spinedace designated critical habitat, which occurs downstream of Nelson Reservoir. Constituent elements were identified as clean, permanent flowing water, with pools and a fine gravel or silt-mud substrate. Several types of activities were identified that would be considered an impact to critical habitat. These included any activity that would deplete the flow, lessen the minimum flow, or significantly alter the natural flow regime; any activity that would extensively alter the channel morphology; or any activity that would extensively alter the water chemistry. An escaped stocked trout would not contribute to any of these activities, directly or indirectly. Some

data show that rainbow trout can escape from Nelson Reservoir (which would be the more likely source for trout in downstream areas) and could have the potential to impact spinedace. In the numerous surveys conducted in Nutrioso Creek upstream of Nelson Reservoir, only six hatchery rainbow trout have ever been documented in 2 decades of numerous surveys. These rainbow trout are considered to have come from Nelson Reservoir as upstream emigrants (M. Lopez pers. comm.).

In addition, crayfish are extremely numerous in the reaches where spinedace occur and likely present a significant threat. Portions of Nutrioso Creek dry up during low precipitation years, especially with water diversions occurring in and around the Town of Nutrioso, impacting habitat quality and availability to spinedace in Nutrioso Creek.

Mexican Spotted Owl and Critical Habitat

This stocking location is within Mexican spotted owl (MSO) critical habitat (CH).

Potential Impacts

The CH designation included most other protected and restricted habitats for the MSO. Indirect effects to CH may include actions that can affect forest structure and maintenance of adequate prey species identified as PCEs. These actions may include trampling of vegetation, soil compaction, removal of small woody debris or other physical degradation potentially altering the productivity and succession/regeneration of the vegetation. In the designation of critical habitat (USFWS 2004) most recreational activities, including angling, were not identified as requiring restrictions to protect the PCE's of critical habitat from destruction or adverse modification. In making that statement, recreational activities, including angling were assumed to not contribute to significant habitat-affecting activities such as cutting large trees or snags, removal of large woody debris from the forest floor, altering the tree species diversity, or other large-scale changes to habitat structure. The act of a relatively small number of people walking through habitat is not likely to cause the kind of effects that would result in adverse effects to the PCEs/KHCs of MSO CH and/or restricted and protected habitats.

Nelson Reservoir

Site Description

Nelson Reservoir dam was built on Nutrioso Creek, a tributary to the LCR, in 1892 at an elevation of 7412 feet. Nelson Reservoir is a 90 surface acre reservoir when full, with a maximum depth of 24.6 feet and an average depth of 8.3 feet. The reservoir is located on the Apache-Sitgreaves National Forest approximately 8 miles southeast of Springerville. The lake spills only during good snowpack runoff in the spring, but often does not spill in drier years. The lake maintains a fairly consistent water level because the Department owns the water rights, and has since 1966, and no water is released through the outlet in the dam.

Nelson Reservoir is accessed year round by a paved road (highway 180/191). Two boat ramps are present; however, the ramp near the dam is usually the only one used because the ramp at the upper end is in very shallow water. Three fishing platforms are also present on Nelson Reservoir on the east side near the highway. Restrooms are present at each boat ramp. A bird watching platform is present at the upper end of the lake.

Shore anglers congregate mostly at the dam and on the east side of the lake along the highway. The fishing platforms are also located on the east side. Few anglers fish from the west shore because of the limited access. Anglers must cross below the spillway and hike around to reach the west side. Anglers also do not congregate at the upper end of the lake because it is so shallow and full of macrophytes. The Department's weed harvester is also used annually on Nelson Reservoir to thin the thick aquatic weeds in the upper end of the lake. The lake ices over for short periods in the winter but receives very little ice fishing use because the ice is normally too thin to safely support people.

Management of Water Body

Nelson Reservoir is currently managed as an intensive use put-and-take coldwater rainbow trout fishery. Precautions identified in the previous consutation (USFWS 2001) include stocking to begin each year as soon as practical following spring runoff and outflow from reservoir ceases. Stocking would also be ceased if/when habitat conditions (temperature, pH) deteriorate. In addition, all stocked fish would continue to be tagged and creel census monitoring would continue. These trout are caught quickly, reducing the number of trout in the lake, with fairly poor catch rates for the rest of the year. Bag limits are lifted through the winter, but this likely does not have much impact on trout numbers as they are already low by the time those regulations take effect. By the time the next spring runoff and spill occurs, there are few trout left in the lake. Return to creel is up to 80% with the highest catch rates immediately after stocking.

From 1958 to 1994 Nelson Reservoir was managed as a put-grow-and-take fishery with various combinations of brook trout, brown trout, cutthroat trout, and rainbow trout stocked on a regular basis. Trout stocked as fingerlings grew to catchable size in the lake and were harvested by fishermen a year later. Early in the last decade, a secondary warm water fishery was created by the illegal introductions of black crappie, green sunfish, and largemouth bass. Only the crappie and sunfish became established in the reservoir.

In 1995 a formal Section 7 Endangered Species Act (ESA) Consultation with the USFWS over the stocking of Nelson Reservoir resulted in a likely to adversely affect determination for the threatened Little Colorado spinedace, which occurs in Nutrioso Creek both above and below Nelson Reservoir. Trout stocking and management of Nelson were modified in 1996 as a result of the consultation to minimize the potential for adverse effects to Little Colorado spinedace. Modifications dictated by the consultation included the following:

1. Adjust stocking schedule as necessary to avoid stocking until water level is below the spillway and expected to remain so until the end of the stocking season. Unexpected spills may interrupt prescheduled stockings.

2. Stock only hatchery-reared catchable size rainbow trout that have been tagged with coded wire tags.

3. Stock trout to coincide with the summer fishing season, the approximate period being Memorial Day to Labor Day.

4. Conduct stream surveys, upstream and downstream of the reservoir, to determine whether tagged rainbow trout are moving to the connecting stream. If tagged trout are collected from areas occupied by spinedace, stomachs are to be taken and attempts made to determine if spinedace are being consumed by the tagged trout. Surveys of the reservoir fish population, to determine survival and carryover of stocked trout, is encouraged.

5. Provide the Arizona Ecological Services Office with results of monitoring activities listed in number 4 annually.

Intensive monitoring conducted in Nutrioso Creek from 1996 through 2000 determined that these management modifications on Nelson Reservoir were working to greatly reduce potential impacts on Little Colorado spinedace (Novy et al. 2001; Sweetser et al. 2002). Few stocked trout had escaped the reservoir, and only during high spill events (Lopez et al. 2001; Sweetser et al. 2002), and stomach analysis of those trout found no fish remains (Robinson et al. 2000).

In 1998, a regulation change was made at Nelson Reservoir and Nutrioso Creek to attempt to further minimize adverse effects to Little Colorado spinedace resulting from the Nelson Reservoir stocking program. Unlimited rainbow and brown trout harvest was allowed from September 1 to May 1 in Nutrioso Creek from its confluence with the LCR upstream to Highway 180 in the Town of Nutrioso, including Nelson Reservoir. This regulation was developed to change the management direction from sport fish to native fish within designated critical habitat, and to encourage harvest of trout out of the reservoir just prior to the spring spill events, to minimize the chance of escape, and to remove trout from the creek if trout do escape.

Consultation was re-initiated in 2001 to consider the monitoring results on the effectiveness of the management modifications. This resulted in new management guidelines that were generally similar, but slightly modified, to those developed in 1995.

2001 recommendations included:

1. Continue the current put-and-take rainbow trout stocking program. Stock approximately 20,000 fish in late spring/early summer when the lake level is below the spillway and when seasonal restrictive bag limits are in place.

2. Evaluate the stocking program at five year intervals through creel census and fish population surveys.

3. Monitor fish populations in Nutrioso Creek with backpack electrofishing equipment at five year intervals at 18 permanently established 50-meter stations downstream of Nelson Reservoir, and 12 permanently established 50-meter stations located upstream of the reservoir between Nelson Reservoir and the Town of Nutrioso.

4. If an unusual spill event occurs in early summer (June or July) following restocking, electrofish the entire length of critical habitat downstream of Nelson Reservoir and remove all trout and other non native predators sampled.

5. Eliminate the regulation that removes bag limits seasonally at Nelson Reservoir and Nutrioso Creek. It accomplishes nothing biologically and is confusing to anglers. It also further restricts the limited stocking window at Nelson because initiation of stocking cannot begin prior to May 1. This would become critical should another drought year occur like in 1996.

From 1996-2009, a total of approximately 262,958 catchable size rainbow trout were stocked into Nelson Reservoir. Stocking took place in May and June each year, following the cessation of spring runoff and spill, except for 1996 when low water levels and drought conditions allowed stocking to take place in April, in 2002-2004 and 2006-2007 when the reservoir did not spill. Seasonal elevation in pH levels associated with growth of aquatic vegetation generally precluded stocking past mid-June, to allow trout enough time to acclimate and avoid associated mortality. Fish were marked at the hatchery of origin, Page Springs, with coded wire tags in 1996, 1997, and 1998. Tetracycline was used to mark trout stocked into Nelson Reservoir after 1998 when permission was secured from the Fish and Wildlife Service to eliminate the coded wire tag requirement. Table 11 provides a summary of all stockings in Nelson reservoir.

Table 11. Stocking history in Nelson Reservoir.

Species	First Year	Last Year	Num. of Stockings	Num. Stocked
Brook trout	1977	1994	27	545,641
Brown trout	1978	1992	11	83,170
Channel catfish	1975	1975	1	10,000
Cutthroat trout	1987	1993	14	283,757
Rainbow trout	1958	2009	184	3,810,414

Species	First Year	Last Year	Num. of Stockings	Num. Stocked
Bullfrog Tadpole	1968	1969	2	9,450
Total			239	4,742,432

Angler creel surveys were conducted at Nelson Reservoir in each year from 1996-2000 (Novy et al 2001), and also in 2001 (17,406 angler use days) and 2005. A mail-out survey conducted for 2001 reported a use of 21,618 AUDs (Pringle 2004).

The Integrated Fisheries Management Plan for the LCR Watershed identifies the management emphasis for Nelson Reservoir as intensive use sport-fish, with a desired fish assemblage of rainbow trout and bluehead sucker.

Proposed Action

The Department proposes to stock rainbow trout for the period covered by this consultation.

Catchable rainbow trout would be stocked from April through July annually following the cessation of the spring spill; numbers of trout stocked may be from 0 to 20,000 fish annually.

Water Distribution / Connectivity

Nelson Reservoir is fed by upper Nutrioso Creek, which stretches 13.3 miles upstream from the reservoir to the very headwaters. Nutrioso Creek flows from its origin near the Alpine Divide for 0.6 miles to the confluence with Paddy Creek. Paddy Creek is a perennial tributary that provides most of the flow from that point down in Nutrioso Creek. Nutrioso Creek continues downstream for 1.6 miles to the confluence with Milk Creek. Milk Creek appears to have a low but permanent flow, and is fishless as determined by Department surveys in 1976, 1995, and 1996. Hulsey Creek is an intermittent tributary off Milk Creek, with Hulsey Lake located on the creek approximately 2.1 miles upstream of Milk Creek. There is no irrigation or other type of water releases from Nelson Reservoir.

From the confluence of Milk Creek, Nutrioso Creek flows downstream through the Town of Nutrioso for 11.1 miles to Nelson Reservoir. This flow is perennial going into the Town of Nutrioso; however, numerous water diversions exist through the town and the creek does not always flow continuously into Nelson Reservoir during the summer irrigation season, with occasional drying to isolated pools.

There are two other major tributaries entering Nutrioso Creek between the confluence with Milk Creek and Nelson Reservoir; Auger Creek and Colter Creek enter at 1.9 miles and 3.5 miles, respectively, downstream of the Milk Creek confluence. Both of these tributaries have permanent flow; however, a number of water diversions often keep this permanent flow from reaching Nutrioso Creek during the summer irrigation season.

Paddy Creek, Milk Creek, upper Nutrioso Creek, Auger Creek, Colter Creek, and Nelson Reservoir are all connected during snowmelt runoff during the spring. However, at base flows, Hulsey Lake does not spill, Hulsey Creek is dry, and permanent flows in Nutrioso Creek, Auger Creek, and Colter Creek often are not connected with each other or to Nelson Reservoir because of numerous water diversions around the Town of Nutrioso. The diverted water is used to irrigate fields throughout the old floodplain from the Town of Nutrioso down to the Forest boundary just above Nelson Reservoir. Nutrioso Creek is incised/downcut from the lower end of Nutrioso almost down to Nelson Reservoir, up to 10 feet below the old floodplain in some places.

Nelson Reservoir spills during spring snowmelt runoff when there is a sufficient snowpack to fill the reservoir. The lake has spilled 5 times in the last 10 years, as shown in Table 12.

Table 12. Spill history of Nelson Reservoir from 2001-2008.

Year	**Spill description**
2000	Spilled 106 days
2001	Spilled “spring” to 5/23
2002	No spill
2003	No spill
2004	No spill
2005	Spilled 3/16 to 5/20
2006	No spill
2007	No spill
2008	Spilled 1/28 to 5/1
2009	Spilled 1/13 to 5/6

When the reservoir does spill, it flows downstream for 13.0 miles to the confluence with the LCR. A major tributary, Rudd Creek, enters at 1.2 miles downstream of the Nelson Reservoir dam. A culvert barrier is located on Rudd Creek 3.1 miles upstream of its confluence with Nutrioso Creek. During spring snowmelt runoff, Rudd Creek flows continuously into Nutrioso and on down to the LCR. Nutrioso Creek for 1.2 miles downstream of Nelson Dam maintains surface flow both when the reservoir spills and when it does not spill; post-spill surface flows are maintained by seepage through the earthen dam.

During base flows when the reservoir is not spilling, much of Nutrioso Creek within designated critical habitat, approximately 5 miles from the dam downstream to the Forest boundary, has perennial water, but it usually dries up downstream of this on private property. The very lower

portion of Rudd Creek often dries up as well during the dry season. During extreme drought years, such as 2002, Nutrioso Creek below the reservoir was reduced to isolated pools.

The LCR is perennial at the confluence with Nutrioso Creek and all the way upstream to River Reservoir near Greer and above. Downstream of Nutrioso Creek the confluence of the LCR is perennial all the way to Lyman Lake near St. Johns.

Fish Movement

There is documentation that stocked rainbow trout have escaped upstream and downstream from Nelson Reservoir. It is more difficult for stocked trout to move upstream than downstream. Initially, Nutrioso Creek enters the lake through a shallow marsh mostly without a defined channel. This marshy area is much thicker in the last decade after the Forest fenced off that area to elk and cattle, resulting in a dense area of willows, reeds and grasses. Once in the defined channel of Nutrioso Creek, a fish could move upstream during high flows mostly unobstructed to the Town of Nutrioso, where there are a number of low elevation surface water diversions that are likely not fish barriers. At higher flows escaped trout could potentially swim up into perennial Colter Creek, perennial Auger Creek, or up into the headwaters of Nutrioso Creek. At base flows, a trout could not escape upstream from the reservoir because of the undefined channel in the shallow marsh, but mostly because the lower portion of the creek coming into the reservoir is often dry due to water diversion upstream during the summer months. At base flows, a trout could also not get into Colter Creek, Auger Creek, or upper Nutrioso above the Town of Nutrioso because summertime water diversions take most of the base flows.

Rainbow trout from Nelson Reservoir were documented a short distance above the reservoir in 2000, with 5 marked trout in one pool. A brook trout collected in the headwaters of Nutrioso Creek in 1994 was also likely from Nelson Reservoir. No other stocked trout have been documented in upper Nutrioso Creek above the reservoir during many surveys.

Stocked trout can only move downstream into lower Nutrioso Creek when the lake spills, and likely only when it spills significantly because of the shallow depth of water over the spillway. Trout do not reproduce so there are no small trout, larvae or eggs that would be transported over the spillway. Because the stocked trout are catchable or larger sized rainbow trout there would have to be an increase in depth, greater than what is usual for the lake, for escapement to occur. An escaped rainbow trout could swim all the way down to the LCR during high flows if it escapes Nelson Reservoir. Once in the LCR, a fish could swim upstream through Springerville, but may be slowed down by a number of large water diversions, although these are likely not complete fish barriers during high flows. However, the stocked trout would not get past River Reservoir dam. Moving downstream in the LCR, a fish could theoretically travel to Lyman Lake, although the habitat in the LCR downstream of Springerville becomes unsuitable for trout in most years. Lyman Lake last spilled in the early 1990s, and only barely; thus Lyman Lake is

likely a fish barrier to downstream movement of fish in that part of the LCR, except for irrigation releases into the LCR below Lyman. Irrigation releases are also made to a canal that does not re-connect to the river channel. The frequency, volume or timing of the two types of releases is not known. After leaving the downstream end of Nelson Reservoir, stocked trout could also swim up into Rudd Creek, but only until they reach a culvert barrier, which is at least a 6 foot drop.

At Base flows, the lower portion of Nutrioso Creek dries up and is not connected to the LCR. Flow between pools in the perennial section is typically very low and often ceases altogether during dry years. Isolated pools may persist during very dry years, making it difficult for a catchable size trout to move upstream or downstream. Fish could move into lower Rudd Creek at high flows, but would not be able to get past the culvert barrier 3.1 miles upstream of the confluence with Nutrioso Creek.

Community Description
Nelson Reservoir contains rainbow trout, green sunfish, black crappie, fathead minnow, bluehead sucker, and crayfish (Table 13).

Green sunfish, black crappie, channel catfish, and largemouth bass were illegally stocked in the mid-1990s following a change in the management of Nelson Reservoir; however, only green sunfish and black crappie are established.

Table 13. Survey history for Nelson Reservoir, using experimental gillnets.

Date	Species	Num. Collected	Size Range (mm TL)
April 2005	Rainbow trout	19	360-427
	Black crappie	3	276-315
March 2003	Green sunfish	2	149-181
	Rainbow trout	1	355
	Black crappie	1	240
March 2002	Green sunfish	4	133-155
	Rainbow trout	14	300-347
April 2001	Green sunfish	6	130-160
	Rainbow trout	1	413
	Bluehead sucker	1	150
	Black crappie	1	142
April 2000	Green sunfish	90	118-206
	Rainbow trout	18	335-445
	Bluehead sucker	5	201-254
	Black crappie	30	211-337
May 1999	Rainbow trout	6	288-430
	Bluehead sucker	10	193-246
	Black crappie	7	291-306
April 1998	Channel catfish	1	463

Date	Species	Num. Collected	Size Range (mm TL)
	Green sunfish	3	127-145
	Rainbow trout	4	355-390
	Bluehead sucker	1	215
	Black crappie	7	267-297
May 1997	Green sunfish	4	159-201
	Largemouth bass	1	382
	Rainbow trout	3	374-440
	Bluehead sucker	12	187-234
	Black crappie	24	247-272

Nutrioso Creek above and below the reservoir contains Little Colorado spinedace, speckled dace, bluehead sucker, fathead minnow, numerous crayfish, and occasional green sunfish and rainbow trout, according to surveys conducted in the last ten years. Brown trout, cutthroat trout, and brook trout have been collected in Nutrioso Creek in the early-mid 1990s when they were still stocked in the reservoir (Lopez et al., 2001). Table 14 provides a summary of fish surveys from Nutrioso Creek above Nelson Reservoir from 1997 to present. The 1997-2000 surveys were conducted in the spring and fall with a backpack electroshock with results detailed in the 2001 Nutrioso Creek Fish Management Report, AGFD Technical Report 01-01 (Lopez et al, 2001). The 2005 survey was conducted in May with a backpack electroshocker, with results detailed in a trip report (McKell 2005e). The 2006 surveys were conducted in April-June with a backpack electroshocker and 1/8” mesh seines, with results described in two trip reports (Carter et al 2006a) and (Carter et al 2006b). The 2007and 2008 surveys were conducted in July of each year with 1/8” mesh seines, with results described in the 2007 Nutrioso Survey Report (Weiss 2007c) and 2008 Nutrioso and Rudd Creeks Survey Report (Weiss and Lopez 2008). The 2009 survey was conducted in May-June with a backpack electroshocker and 1/8” mesh seines (Mike Lopez, per. comm.).

Table 14. Fish survey summary from 1997-present for Nutrioso Creek from Nelson Reservoir upstream to the town of Nutrioso.

Species	Native fish			Non native fish			Total
	Little Colorado spinedace	Bluehead sucker	Speckled dace	Rainbow trout	Fathead minnow	Green sunfish	
Spring 1997	146	411	69	0	86	0	712
Fall 1997	59	229	14	0	139	0	441
Spring 1998	3	20	10	0	22	0	55
Spring	4	38	11	0	144	0	197

Species	Native fish			Non native fish			Total
	Little Colorado spinedace	Bluehead sucker	Speckled dace	Rainbow trout	Fathead minnow	Green sunfish	
1999							
Fall 1999	50	36	40	0	273	0	399
Spring 2000	147	358	74	5	2390	3	2,977
2005	7	7	48	0	145	0	207
2006	895	109	234	0	1,374+	0	2,612+
2007	60	4	39	0	1090	0	1,193
2008	57	38	46	0	432	2	575
2009	19	0	15	0	766	2	802

The aquatic community in Nutrioso Creek downstream of Nelson Reservoir consists of speckled dace, bluehead sucker, Little Colorado spinedace, fathead minnow, green sunfish, rainbow trout, and crayfish according to surveys conducted by the Department (Table 15).

Table 15. Fish survey summary from 1996-present of Nutrioso Creek downstream of Nelson Reservoir.

(Table 14 provides survey gear types used and referenced reports.)

Species	Native fish			Non native fish			Total
	Little Colorado spinedace	Bluehead sucker	Speckled dace	Rainbow trout	Fathead minnow	Green sunfish	
Fall 1996	176	200	304	0	368	4	1,052
Spring 1997	3	41	30	0	208	0	282
Fall 1997	9	25	19	1	242	3	299
Spring 1998	2	44	114	0	616	3	779
Fall 1998	3	76	47	0	1,300	3	1,429
Spring 1999	111	present	present	0	present	1	N/A
Fall 1999	61	289	601	0	2,053	3	3,007
Spring 2000	162	543	1,467	0	11,137	22	13,331
2005	0	1	26	10	958	60	1,055
2006	0	0	89	1	3,888	52	4,030
2008	0	0	106	2	344	2	454
2009	1	2	165	9	3,783	6	3,966

Rainbow trout accounted for just 28 of the 39,854 fish (0.07%) sampled in Nutrioso Creek over 9 years of intensive monitoring since the implementation of new management approaches to reduce escapement of trout from Nelson Reservoir in 1996 (Lopez et al. 2001; Sweetser et al. 2002). Since 1996, only 5 tagged trout were captured upstream of Nelson, in a single pool in May 2000, and are considered escapees from Nelson Reservoir. In that same time, 23 trout were captured downstream of Nelson. Only 1 of these downstream trout was collected in the first 5 years of intensive survey and 22 were collected in the last 4 years of surveying, due to the more frequent occurrence of high spill events. None of the rainbow trout sampled from Nutrioso Creek were found to contain spinedace in stomach analyses (Robinson et al. 2000), although 3 out of 28 trout contained fathead minnows (Table 17). Sweetser et al. (2002) examined stomach contents of 54 rainbow trout, 24 brown trout, and 4 brook trout in Nutrioso Creek, Rudd Creek, and the LCR upstream of Lyman Lake, and 6% of the rainbow trout, 33% of the brown trout, and 24% of the brook trout had fish remains in their GI tract.Twenty-four of the 28 trout collected in Nutrioso Creek were marked with coded wire tags or tetracycline markers and were considered to have escaped from Nelson Reservoir. Five of the rainbow trout collected during the most recent survey conducted in 2009 were large individuals, from 391 mm and 462 mm TL, and had tetracycline marks. The other 4 rainbow trout were smaller, with sizes ranging from 166 mm to 232 mm TL, and did not have tetracycline marks when checked in a lab setting. The smaller trout also had no fin wear, further indicating that they were not of hatchery origin. Stocked trout in Nelson Reservoir have excessive fin wear from the Page Springs Hatchery, the only hatchery stocking Nelson Reservoir since 1996. It was thought that the “wild” trout could have come from a wild population of rainbow trout that may still be persisting in Rudd Creek, since 3 of the small trout were collected very near the confluence with Rudd Creek. Another small wild trout was collected in lower Rudd Creek during surveys there in May-June 2009, and a strong wild population existed in the headwaters of Rudd Creek in 1994 (Table 16).

Electrofishing surveys conducted in upper Rudd Creek in reaches 5-8 in July-August 2003 found only 2 rainbow trout throughout 19 50-meter stations (3 pass depletion), in a year following an extreme dry year in 2002 when much of upper Rudd Creek dried up. A recent electrofishing survey in upper Rudd Creek in May-June 2009 found only 5 brook trout and no rainbow trout in two 200 meters stations in the headwaters (1 pass), indicating that the wild population of rainbow trout in upper Rudd Creek may no longer exist. If wild rainbow trout still persist in upper Rudd Creek, they may not be numerous enough to explain the numbers of wild trout found downstream in Nutrioso Creek and lower Rudd Creek. Another explanation is that large trout that had escaped from Nelson Reservoir were able to reproduce in lower Nutrioso Creek, something that had not been considered possible or observed since extensive monitoring began in 1996. Additional monitoring is needed to verify successful trout spawning in lower Nutrioso Creek. Other fish documented in lower Rudd Creek in 2009 included Little Colorado spinedace, speckled dace, and bluehead sucker, all of which were located downstream of the culvert barrier.

Surveys conducted at Nelson Reservoir and Nutrioso Creek since 1996 indicate that changes in fish management at Nelson to comply with Section 7 ESA consultation requirements relating to stocking have generally achieved the objectives. Rainbow trout stocked into Nelson have had minimal escapement overall, and impacts to the threatened Little Colorado spinedace, which occupies Nutrioso Creek above and below Nelson Reservoir, is likely minimal. Escapement of rainbow trout into Nutrioso Creek was extremely limited during the first five years since new management practices were implemented (Lopez et al. 2001; Sweetser et al. 2002), but were higher in the last 4 years of survey due to the greater occurrence of spills due to high flow events. Although the occurrence of escaped trout has been greater in recent years, the relative occurrence has been low. Angler harvest of trout stocked into Nelson has been high and most trout were removed over the course of the summer and fall following stocking in the spring. Seasonal trends in catch rates and surveys of the reservoir's fish population both indicated that most trout had been caught prior to spring overflows, which occur almost annually at Nelson.

Table 16. Fish collected in Rudd Creek in 1994 by 3 pass depletion electrofishing at 40 survey sites, beginning at the confluence of Nutrioso Creek and progressing upstream.

Reach number	**Species collected**	**Num. of fish collected**
1	Little Colorado spinedace Bluehead sucker Speckled dace	36 11 49
2	Little Colorado spinedace Bluehead sucker Speckled dace	104 45 206
3	Little Colorado spinedace Bluehead sucker Speckled dace	161 61 298
4	Speckled dace	11
5	Rainbow trout Brook trout	73 32
6	Rainbow trout Brook trout	17 35
7	No fish	0
8	Rainbow trout Brook trout	1 2

Table 17. Summary of trout captured (and stomach contents) in Nutrioso Creek, from 1996 through 2009.

Date	**Species**	**Size (mm TL)**	**Stomach content**
1996	No trout		

Date	Species	Size (mm TL)	Stomach content
8/19/1997	Rainbow trout	306	Invertebrates
1998	No trout		
1999	No trout		
5/2000	Rainbow trout	198	No fish
	Rainbow trout	201	No fish
	Rainbow trout	214	No fish
	Rainbow trout	224	No fish
	Rainbow trout	228	No fish
5/16/2005	Rainbow trout	413	1 crayfish
	Rainbow trout	392	1 fathead minnow (48 mm)
	Rainbow trout	343	Aquatic insects, 8 snails, 1 ant, 1 fathead minnow (39 mm), 4 notonectids
	Rainbow trout	390	Empty
5/18/2005	Rainbow trout	412	16 damselfly larvae, 1 amphipod
	Rainbow trout	378	Empty
5/19/2005	Rainbow trout	380	Beetles, notonectids, corixids, bees, snail
	Rainbow trout	375	3 beetle larvae, ant
	Rainbow trout	406	1 fathead minnow (32 mm), 58 ants, 9 notonectids, 5 corixids, beetles, 24 snails
	Rainbow trout	346	Notonectids, damselfly nymph
4/18/2006	Rainbow trout	380	Invertebrates
2007	No trout		
7/21/2008	Rainbow trout	525	1 crayfish, 5 corixids
	Rainbow trout	350	Empty
5/19/2009	Rainbow trout	211	Chironomid larvae, 2 mayfly larvae
	Rainbow trout	462	1 rock, 5 crayfish
5/20/2009	Rainbow trout	222	6 corixids, sticks, 1 caddisfly larvae
	Rainbow trout	166	1 crayfish, sticks, 2 corixids
5/27/2009	Rainbow trout	232	30 corixids, 1 blackfly larvae, 1 scud, 1 mayfly larvae, crayfish pieces
6/8/2009	Rainbow trout	452	6 crayfish, some aquatic invertebrates, sticks
	Rainbow trout	423	5 crayfish
	Rainbow trout	419	6 crayfish
6/9/2009	Rainbow trout	391	50 corixids, 1 crayfish claw
Lower Rudd	Rainbow trout	184	10 corixids, 2 crayfish

Date	Species	Size (mm TL)	Stomach content
Creek 6/9/2009			

There is no evidence trout reproduce in Nelson Reservoir, but they do persist through the summer and winter months. However, most are caught out before the reservoir spills in the spring. Based on survey data from years of monitoring, trout may move upstream into upper Nutrioso Creek, but no evidence exists that they reproduce or persist in the reach from the lake upstream to the Town of Nutrioso. Trout may persist and reproduce if they are able to reach the headwaters of Nutrioso Creek, above the Town of Nutrioso. New evidence shows that trout may persist and reproduce in lower Nutrioso Creek, below the reservoir, but in fairly low numbers and very infrequently. Reproduction of trout in lower Nutrioso Creek has not been verified and the origin of 4 small, unmarked rainbow trout remains unexplained. However, the potential that escaped trout have reproduced and recruited progeny into lower Nutrioso Creek must be considered.

Consultation Species or Critical Habitat
Potential impacts from the proposed action to candidate and listed species are described below. Please refer to Chapter 4 for a detailed description of the nature of the impacts (which may include predation, competition for space and food, and hybridization etc.).Subsequent responses (resulting from the frequency, magnitude and duration of the impacts) between proposed stocked and candidate and listed species, and any site or complex factors that provide context for determining the meaningfulness of the impacts, are discussed below. Impacts from the proposed action resulting from angler related recreation and/or potential introduction of disease, pathogen or invasive species are evaluated at a broad scale for the entire action area and are described in Chapter 4. If potential impacts specific to a stocking site or complex have been identified they are discussed below.

Chiricahua and Northern leopard frogs are analyzed at the local site and broad scale level due to the movement potential into the stocked area and fish movement potential up or downstream into areas where frogs may occur.

Chiricahua Leopard Frog

Local Analysis: Although Nelson Reservoir and the LCR above Lyman buffered stocking complex are within the historical range of the Chiricahua leopard frog, the likelihood that Chiricahua leopard frogs could be exposed to fish stocked in Nelson Reservoir is low because it is likely that frogs no longer occupy Nelson Reservoir. The likelihood of frogs being exposed to fish stocked in other sites within the LCR above Lyman buffered stocking complex is also low. There is an historical record for Chiricahua leopard frogs at Nelson Reservoir (SE Corner) from

1971, although frogs have not been observed during subsequent surveys at the reservoir (1987, 1992, 1993, and 1995). There are historical records for Chiricahua leopard frogs from 2 other sites in the buffered complex; Nutrioso Creek (Correjo Crossing - 1979), and Unnamed Creek (1 MI S of Alpine Divide Campground - 1974). In addition, Chiricahua leopard frogs were released at Trinity Reservoir in 1996 by the Department as part of ongoing recovery activities (AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). There have been 68 surveys at 39 sites within the buffered stocking complex between 1935 and 2009, with most of them taking place between 1971 and 2009 (Figure 2, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). Chiricahua leopard frogs were not observed during subsequent surveys at Nutrioso Creek (Correjo Crossing) (1995), or Unnamed Creek (1 MI S of Alpine Divide Campground) (1995) (AGFD Riparian Herpetofauna Database, M. Sredl pers.comm.). Although the LCR above Lyman buffered stocking complex has not been adequately surveyed, the Rudd Creek and Trinity Reservoir area was surveyed adequately for frogs after the 1996 release and no frogs were observed after the 1997 field season (D. Groebner and M.Sredl pers.comm.). In addition, the LCR above Lyman buffered stocking complex lies at the edge of the range for the Chiricahua leopard frog and the presence of crayfish and non native fish makes the habitat less suitable for leopard frogs. Therefore it is likely that Chiricahua leopard frogs no longer occupy this area.

Broad Scale Analysis: The likelihood that Chiricahua leopard frogs could be exposed to dispersing fish from stocking sites in the LCR above Lyman buffered stocking complex could have an impact on Chiricahua leopard frogs is low. The northernmost part of the LCR above Lyman buffered stocking complex is just outside of the range of the Chiricahua leopard frog, therefore further downstream in the LCR is outside of the range of the Chiricahua leopard frog. There are records for Chiricahua leopard frogs just south of the LCR above Lyman buffered stocking complex, but these sites are in different watersheds and it is not feasible for stocked fish in the LCR above Lyman buffered stocking complex to reach these areas. The likelihood of frogs traveling the overland distance to the headwater of the tributaries to the LCR is low. These Chiricahua leopard frog localities will be assessed in different complex documents.

Northern Leopard Frog

Local Analysis: Nelson Reservoir and the LCR above Lyman buffered stocking complex are within the historical range of the northern leopard frog and the likelihood that frogs could be exposed to fish stocked in Nelson Reservoir or elsewhere in the buffered stocking complex is high. There are records for northern leopard frogs from 2007-2009 just downstream of Lyman Lake, which is within the LCR above Lyman buffered stocking complex (Drost, pers. comm.). There is a historical record for northern leopard frogs at Nelson Reservoir (SE Corner) from 1971; although frogs have not been observed during subsequent surveys at the reservoir (1987, 1992, 1993, and 1995), it is possible for frogs within the buffered stocking complex to be exposed to dispersing stocked fish. There are historical records for northern leopard frogs from 8 other sites in the buffered stocking complex; Benny Creek (1979), Iris Spring (1979), LCR (Foot

of Lyman Dam) (1935), LCR (Johnson Ranch) (1938), LCR (4.35 MI W of Eager) (1979), Nutrioso Creek (Correjo Crossing) (1979), Sheep Springs (1942), and Unnamed Creek (1 MI S of Alpine Divide Campground) (1974, 1979). Northern leopard frogs were not observed during subsequent surveys at Benny Creek (1992 and 1995), Iris Spring (1992, 1995, and 1997), LCR (Foot of Lyman Dam) (1997), LCR (Johnson Ranch) (1997), Nutrioso Creek (Correjo Crossing) (1995), Sheep Springs (1995), or Unnamed Creek (1 MI S of Alpine Divide Campground) (1995) (AGFD Riparian Herpetofauna Database, M. Sredl pers.comm.). There have been 68 surveys at 39 sites within the buffered stocking complex between 1935 and 2009, with most of them taking place between 1971 and 2009 (Figure 2, AGFD Riparian Herpetofauna Database, M. Sredl pers.comm.). Although the LCR above Lyman buffered stocking complex has not been adequately surveyed and it is likely that northern leopard frogs no longer occupy the sites mentioned above, the recent observations by Charles Drost show that northern leopard frogs currently occupy the area below Lyman Lake dam (Drost, pers. comm.). In addition, this is the last known extant population of northern leopard frogs in the upper LCR drainage and it is thought to be declining (Drost, pers. comm.).

Broad Scale Analysis: The likelihood that northern leopard frogs could be exposed to dispersing fish from the LCR above Lyman buffered stocking complex is low. There are records from 2007-2009 for northern leopard frogs just below Lyman Lake within the LCR above Lyman buffered stocking complex and the likelihood that these frogs would be exposed to stocked sport fish in the buffered stocking complex is high (Drost, pers. comm.). However, there is only 1 other record downstream in the LCR at Salado Springs for northern leopard frogs (1939), but frogs were not observed at this site in 1997 and it is likely that northern leopard frogs no longer occupy this area or further downstream in the LCR or its tributaries (AGFD Riparian Herpetofauna Database, M. Sredl pers.comm.).

Little Colorado Spinedace and Critical Habitat

Little Colorado spinedace occur in Nutrioso Creek above and below Nelson Reservoir. Spinedace have been documented above the reservoir in nearly every survey from 1988-2009. Spinedace below the reservoir had not been found from 2002-2008, but were rediscovered recently in 2009.

Potential Impacts

The proposed stocking activity at Nelson Reservoir would be anticipated to have direct and/or indirect impacts on Little Colorado spinedace due to occurrences of Little Colorado spinedace upstream and downstream of the reservoir, since no barriers exist to limit upstream movement and the dam only prevents downstream movement when it is not spilling. However, monitoring has shown that very few stocked rainbow trout escape the reservoir, and only during very high spill events. In addition, several diversions exist on upper Nutrioso Creek, limiting the potential for upstream movement of trout to suitable habitat in extreme upper Nutrioso.

Stipulations from the last Section 7 consultation in 2001 directed that Nelson Reservoir could only be stocked after the lake stopped spilling in the spring and only with marked catchable rainbow trout; that creel surveys are done every 5 years; and that fish surveys for escaped rainbow trout be done if the lake spills during the stocking season. Implementation of these management practices and removal of trout during surveys was thought to reduce impact/exposure.

Critical Habitat

Spinedace critical habitat continues to support variable populations of spinedace (USFWS 2001, 2008e) and when critical habitat areas for spinedace were designated, these areas were reported as "…presently support(ing) healthy self-perpetuating populations of the Little Colorado spinedace" (USFWS 1987). Since that time, habitat degradation, introduction of non native fishes, and scarcity of water have resulted in low numbers of spinedace in East Clear Creek and Leonard Canyon. The act of stocking catchable rainbow trout upstream and downstream of critical habitat is reversible and does not diminish or preclude the role of that habitat for the survival and recovery of the spinedace. In years of high precipitation or during periods of high runoff, trout have the opportunity to move out of the stocked area into spinedace habitat. Similarly, spinedace may move into trout areas. In either case, some spinedace could be consumed by rainbow trout or other non native species.

Critical habitat that is potentially affected by this action includes the five miles of Nutrioso Creek below Nelson Reservoir dam to the Apache-Sitgreaves National Forest boundary. The paragraphs below were taken from the USFWS 2001 BO for stocking of Nelson Reservoir:

> Blinn et al. (1993) conducted experiments in Nutrioso creek enclosures. Wild rainbow trout and spinedace (all from Nutrioso Creek) were placed in 6.6 to 9.8 ft (2 by 3 meter) enclosures and fish interactions monitored. Although spinedace disappeared from enclosures with and without trout, significantly more spinedace were lost from enclosures that contained wild rainbow trout (Blinn et al. 1993). Even though macroinvertebrates were abundant in the enclosed areas, trout consumed spinedace. However, Robinson et al. (2000) examined stomach contents of 54 rainbow trout captured from Rudd, Nutrioso Creek, and the LCR and detected no predation on spinedace. Blinn et al. (1993) also noted trout presence modified spinedace behavior. In the presence of trout, spinedace moved into open water, possibly making them more vulnerable to a wide variety of predators (Blinn and Runck 1990; Blinn et al. 1993). Robinson et al. (2000, 2003) also documented changes in spinedace habitat use when in the presence of rainbow trout, and the shifts appeared to be dependent on the density of rainbow trout present.

Blinn et al. (1993) documented an inverse relationship between trout and spinedace abundance and distribution throughout Nutrioso Creek. This pattern is also noted with the consistent presence of spinedace in Dines Tank and the absence of rainbow trout. The uppermost area of Nutrioso Creek contained a healthy population of trout, the area downstream had a few trout and spinedace, while the area still farther downstream had only spinedace (Blinn and Runck 1990). In addition to predation, competition between spinedace and rainbow trout may occur. Robinson et al. (2000, 2003) documented both species selecting for the same habitats (pools with undercut banks) in both field and lab observations. With downsteam flow being limited during the summer months, competition for space could occur[1].

Spills from the reservoirs are more likely to transport large numbers of fathead minnows, as evidence by the previous sampling reports (Lopez et al. 2001; Benedict 2000; Robinson et al. 2000). While native fishes are adapted to flood events, small bodied fish like the fathead minnow are readily transported downstream into spinedace habitat (Minckley and Meffe 1987). Fatheads mainly feed on detritus and algae on soft bottoms (Minckley 1973). High numbers of fathead minnows would continue to have a negative effect on Little Colorado spinedace through competition for food and habitat, and by predation on larval fishes. While it is recognized that other variables such as water temperatures, stream gradient, etc. may affect abundance and distribution of all fish species, it is possible that the spinedace population may not be able to maintain or increase their numbers in the presence of non native fishes. In addition, introduced crayfish likely pose yet another threat to spinedace, since they both prey on and cause spinedace to modify their habitat use (Robinson et al. 2000, 2003). Providing habitat free of non native fish may be crucial to spinedace recovery.

Nelson Reservoir does spill, and trout can overwinter. In addition, spinedace can move into the reservoir. However, escapement of rainbow trout from Nelson Reservoir into Nutrioso Creek was extremely limited in 1996-2000 and was higher in 2005-2009, but still considered to be low. Just 24 tagged trout originating from Nelson Reservoir out of 262,958 stocked from May 1996 through 2008 was recaptured in Nutrioso Creek, 5 found upstream of the reservoir and 19 downstream. Four unmarked trout were also collected below the reservoir and remain unexplained, but could potentially be progeny from recently escaped stocked trout. Additional

[1] Competition for food was reported to be low between full size trout and spinedace (Robinson et al 2000), likely because of the difference in body size between the 2 species. Diet overlap between similar sized spinedace and trout may be greater, however, only catchable size trout are stocked into Nelson Reservoir. Potential reproduction by escaped trout below the reservoir may produce progeny that could compete for food with spinedace; however, this natural recruitment has not been verified.

work will be needed to verify possible reproduction. Overall, the number of escaped rainbow trout from Nelson Reservoir since the implementation of new management approaches in 1996 has been low. Twenty-eight rainbow trout, including both marked and unmarked fish, have been collected out of 39,854 total fish from 1996 to 2009, just 0.07% of the total collected. Angler harvest of trout stocked into Nelson is expected to remain high with most trout being removed over the course of the summer and fall following stocking. Seasonal trends in catch rates and surveys of the reservoir's fish population both indicated that most trout had been caught prior to spring overflows in previous years, and is expected to continue in the future (USFWS 2001).

Southwestern Willow Flycatcher

The stocking site does not occur within the designated critical habitat for the Southwestern willow flycatcher. The nearest occurrence was documented at the north end of the lake in 1994 and is considered a historic record as no birds have been documented near the lake since.

Potential Impacts

There may be some limited amount of habitat degradation and some amount of disturbance to nesting flycatchers from anglers using or creating new trails to access the stocking site.

Becker Lake

Site Description

Becker Lake is a 107 surface acre reservoir created in an abandoned oxbow of the LCR on the southern edge of the Town of Springerville. Originally created in 1880, a dam was constructed at a later date, increasing the size of the lake to its current dimensions. The lake is off the main channel and is filled by diverting water from the LCR. The Department owns the property and water rights associated with Becker Lake. The lake was purchased from private ownership in 1973 and turned into a public fishery, and is currently managed as part of the Becker Wildlife Area.

Management of Water Body

Primary fishery is a cold water put-grow-and-take rainbow trout fishery, with emphasis on growing Blue Ribbon/trophy trout. This is a year round fishery with peak use in spring and fall. Sub-catchable and catchable rainbow trout are stocked several times in the spring. This water also hosts special events and fishing clinics periodically throughout the year, although it is not stocked specifically for these clinics. Table 18 provides a summary of stocking history for Becker Lake.

Secondary fishery is a cold water featured species fishery for Apache trout and Arctic grayling. Catchable Apache trout and sub-catchable grayling would be stocked occasionally, only if there was a surplus of these species in the hatchery and another place was needed to stock them, or if the Department wanted to develop broodstock for these species. The secondary fishery proposed

in this document is intended in part to give the Department flexibility in developing a broodstock of Apache trout and/or Arctic grayling within the lake from which to take eggs if needed.

Most angler use in Becker Lake is by boat, with shore fishermen concentrated on the north and west shoreline. The lake freezes over only for a short period during the winter, but receives no ice fishing use because of the thin ice. Anglers can fish open water at Becker Lake 11-12 months of the year.

Rainbow trout are currently stocked in Becker Lake at relatively low levels to support a put-grow-and-take fishery, with a low bag limit to produce blue ribbon size trout. Table 19 shows the reduction from high stocking levels in 2004 and 2005 to the current stocking levels in 2006 and 2007 with the regulation change. Current stocking levels include 2,000-6,000 sub-catchable and 2,000-10,000 catchable size rainbow trout. Trout are not known to spawn in the reservoir because water flowing into the lake through the ditch from September through April does not provide appropriate timing for a spawn in that flowing water, plus the dirt substrates in the ditch are unsuitable for spawning.

Table 18. Stocking history in Becker Lake.

Species	First Year	Last Year	Num. of Stockings	Num. Stocked
Apache trout	1974	2000	14	17,328
Brook trout	1985	1985	1	10,000
Brown trout	1978	1988	14	121,672
Cutthroat trout	1979	1993	11	236,903
Fathead minnow	1979	1980	2	750
Largemouth bass	1937	1937	1	510
Rainbow trout	1973	2009	154	2,572,601
Total			197	2,959,764

Table 19. Detailed stocking history at Becker Lake from 2003 through 2008, showing the reduction in numbers stocked with more restrictive regulations.

Year	Species stocked	Fingerlings	Sub-catchables	Catchables
2003	Rainbow trout	130,525	15,310	5098
2004	Rainbow trout	112,761	3654	6840
2005	Rainbow trout		4000	5000
2006	Rainbow trout			9915
2007	Rainbow trout		6000	5000
2008	Rainbow trout		3000	2000

Apache trout were previously approved for Becker Lake and were stocked regularly from 1993 to 2002; however, this species did not return well to creel, making up only 6.5% of the total catch in 1993, 8.2% in 1995, 12.6% in 1996, and 7.4% in 1999, based on angler creel surveys.

Becker Lake is accessed year round by paved road (Highway 180/191). The lake has restrooms, a dirt parking lot, fishing pier, and a proposed boat courtesy dock. One boat launch is located at the parking lot. The entrance road accesses the north side of the lake only, with the rest of the lake accessed by boat or hiking the shoreline.

The Integrated Fisheries Management Plan for the LCR Watershed identifies the management emphasis for Becker Lake as Blue Ribbon and Intensive Use sport fish, with a desired species assemblage of rainbow trout, Apache trout and Little Colorado sucker (Young et al. 2001). The proposed species rainbow trout and Apache trout are consistent with this management plan. However, Arctic grayling was not identified as a desired species because the need for a grayling broodstock had not been identified at the time the plan was developed. Adding Arctic grayling would not impair the ability to meet the main management objectives, since the numbers would be fairly low and the fish do not grow large and would not compete for food resources in the lake at an unacceptable level.

Proposed Action

The Department proposes to stock rainbow trout, Apache trout, and arctic grayling for the period covered by this consultation.

Catchable and sub-catchable rainbow trout would be stocked from March to May annually; numbers of rainbow trout stocked may be from 0 to 16,000 trout annually.

Catchable Apache trout would be stocked from March to May annually; numbers of Apache trout may be from 0 to 8,000 annually.

Subcatchable Arctic grayling would be stocked from March to May annually; numbers of Arctic grayling may be from 0 to 5,000 annually.

Water Distribution / Connectivity

Becker Lake is located off the main channel of the upper LCR, just on the southern edge of the Town of Springerville. The lake is filled with water diverted from the LCR during the “fill season” from September 15 through April 15 to replace losses from the lake through evaporation and seepage, and occasional irrigation use, per the water rights held by the Department. The diversion dam for the ditch leading to Becker Lake is located on the LCR in the town of Springerville approximately 0.2 miles upstream of Airport Road. Diverted water flows through an open ditch for 1.7 miles and dumps into the southeast site of the lake. There are no other

water users taking water from this diversion ditch and there is no natural drainage or other water coming into the lake.

During the fill season, water is diverted into the lake until the lake fills, or April 15, whichever comes first. The diversion is shut as the lake level approaches the spillway, to prevent spillage. The lake level remains fairly constant through the year since the Department owns all water rights in the lake.

The Department occasionally releases water from Becker Lake into the LCR across Highway 180/191, and diverts water back out of the LCR to be used for irrigation downstream on the Wenima Wildlife Area to maintain existing state water rights. This irrigation use occurs primarily during drier years, with no irrigation releases in better precipitation years. This irrigation use has occurred 5 years out of the last 10 years. Water is released through a large diameter (14-16") outlet pipe at the dam, flows through a similar diameter pipe to a control box and valve on the west side of Highway 180/191, then back into a pipe, under the highway, then into an open ditch and on to the LCR, approximately 0.2 miles from the lake, and approximately 1.3 miles downstream of the confluence with Nutrioso Creek. The valve at the control box as managed by the Department is only opened approximately 1 inch to release water, because of the large diameter of the pipe/valve, and water is typically released for approximately 5 days at a time, and no more than 2-3 times in a dry year. During years with good precipitation the valve is never opened. After the water is released into the LCR, another diversion on the LCR approximately 1.4 miles downstream of the return ditch from Becker Lake takes water back out of the river and into a combination piped and open ditch system on the Wenima Wildlife Area. This ditch/pipe splits after the diversion and runs for approximately 2 miles each, with one ditch on each side of the river. Water is taken out of this ditch to irrigate fields on each side of the river within the Wenima Wildlife Area. The ditch does not return to the LCR and all the diverted water soaks into the fields.

For a description of water continuity within the upper LCR, see the details within the Lyman Lake analysis, below.

Fish Movement

Stocked trout have the ability to swim up into the diversion ditch while water is running into the lake during the "fill season" from September 15 to April 15; however, a rock gabion fish barrier was constructed on the ditch 0.1 mile up from the lake to prevent trout from swimming up the ditch and into the LCR. This rock gabion structure is completely effective at preventing up-ditch movement of stocked trout. This barrier is not subject to the issues that have caused failures of other rock gabion barriers on Apache trout streams. Those issues were larger fish jumping over the barrier during high flow events, and tiny fish swimming through the interstitial spaces between the rocks in the barrier. The ditch where the barrier is located is not subject to the

flooding that occurs in natural streams, since water entering the ditch is controlled at the diversion. Plus, the ditch does not have a deep jump/plunge pool at the base of the barrier that facilitates large fish jumping over, because the flow in the ditch is constantly controlled and never great enough to erode a deep jump/plunge pool below the barrier. Small trout are not present in the size that can fit through the interstitial spaces in the barrier, since fingerling trout are no longer stocked, but only sub-catchables or catchables are stocked, and trout do not reproduce in the lake or in the ditch coming into the lake because the lake and ditch are silty with no suitable substrates.

Very small fish could escape the lake and into the LCR when water is occasionally released for irrigation use downstream via the outlet in the dam and pipe/valve/ditch to the LCR. However, the valve in the control box on the pipe coming from the lake is not opened more than 1 inch, because the large diameter of the pipe allows for passage of sufficient flow at that opening. This opening would not allow subcatchable or catchable size trout to escape through the valve without some level of physical harm. The outlet through the dam is located in shallow water, which would prevent trout from being near the outlet at the times when water is released. Trout feed in the shallows during the winter, spring and fall; however, they retreat to the deep water for the hot summer months to escape the warm water at the surface or in shallow water, and do not come into the shallows during those months. For these reasons, stocked fish are not likely to escape or survive if they escaped during an irrigation release.

Community Description
Becker Lake contains rainbow trout, green sunfish, Little Colorado sucker, fathead minnow, an occasional brown trout, and crayfish (Table 20).

Table 20. 5 Year survey history at Becker Lake with experimental gillnets.

Species	**2004**	**2005**	**2006**	**2007**	**2008**
Rainbow trout	171	30	58	16	29
Green sunfish	19				
LC sucker	10		1	1	
Brown trout	1				

The LCR in the vicinity of Becker Lake contains Little Colorado spinedace, Little Colorado sucker, bluehead sucker, speckled dace, fathead minnow, numerous crayfish, brown trout, and an occasional rainbow trout. Green sunfish are found in the LCR further downstream starting around the Wenima Wildlife Area. Spinedace have been documented in the LCR from just downstream of St. Johns upstream to Airport Road in Springerville. Spinedace are assumed to be present in the LCR at the location where the dam outflow enters the river, approximately 0.2 miles from the lake. Although that exact location has not been surveyed, recent surveys in 2009

found spinedace not far downstream and upstream of that location. The upstream range of Little Colorado spinedace is at Airport Road in Springerville. This most upstream location of spinedace is 0.2 miles downstream of the diversion dam that feeds the ditch leading to Becker Lake. A different water diversion that spans the entire width of the stream is located next to the Airport Road bridge and may be somewhat of a fish barrier to smaller fish, but not to trout. Surveys in 2009 found spinedace numerous below and up to this diversion, but no spinedace upstream of the diversion (see Table 23in the LCR in the Lyman Lake analysis). This location at the Airport Road Bridge is the furthest upstream verified record of spinedace in the LCR since 1938. Thus, if this diversion does act as a fish barrier, there is no potential for spinedace to get into the ditch flowing into Becker Lake.

Brown trout have been recorded regularly in the LCR from Wenima Wildlife Area, located a short distance downstream of Springerville, up to and above River Reservoir (see Table 24 in the LCR in the Lyman Lake analysis). A healthy population of wild brown trout is present in the upper reaches of the LCR above Springerville, mostly from a section of State Trust Land and above, where they likely reproduce. Brown trout, usually larger individuals, are consistently present but not in high numbers below this section of State Trust Land, where they don't appear to reproduce.

Rainbow trout have rarely been found in occupied spinedace habitat in the LCR. Three rainbow trout have been collected over years of survey, two in 1993 (Dorum and Young 1995) and one in 1999 (T. Robinson, pers. comm.). Occasional rainbow trout have been collected upstream of occupied habitat, but are not numerous and normally not found below the section of State Trust Land upstream of the Highway 261 bridge. In 2009, 1 rainbow trout was found at the Highway 260 bridge and State Land section above the Highway 261 bridge. Wild rainbow trout are established and reproducing in the upper reaches of the LCR just below River Reservoir. Rainbow trout likely do not reproduce in the LCR downstream of the South Fork LCR confluence.

Crayfish are numerous in the LCR from Springerville downstream to Lyman Lake and downstream from there.

Consultation Species or Critical Habitat
Potential impacts to Apache trout, Chiricahua and northern leopard frogs and little Colorado Spinedace are discussed below.

Potential impacts from the proposed action to candidate and listed species are described below. Please refer to Chapter 4 for a detailed description of the nature of the impacts (which may include predation, competition for space and food, and hybridization etc.).Subsequent responses (resulting from the frequency, magnitude and duration of the impacts) between proposed stocked and candidate and listed species, and any site or complex factors that provide context for

determining the meaningfulness of the impacts, are discussed below. Impacts from the proposed action resulting from angler related recreation and/or potential introduction of disease, pathogen or invasive species are evaluated at a broad scale for the entire action area and are described in Chapter 4. If potential impacts specific to a stocking site or complex have been identified they are discussed below.

Chiricahua and Northern leopard frogs are analyzed at the local site and broad scale level due to the movement potential into the stocked area and fish movement potential up or downstream into areas where frogs may occur.

Apache Trout

Catchable Apache trout and sub-catchable grayling would be stocked occasionally, only if there was a surplus of these species in the hatchery and another place was needed to stock them, or if the Department wanted to develop broodstock for these species. Stocked Apache trout are not expected to escape the lake and get into the Little Colorado River due to the presence of a gabion barrier at the ditch. Apache trout do not spawn in Becker Lake.

Potential Impacts

Stocked Apache trout co-stocked with other species:

Apache trout stocked from the hatcheries are for the specific purpose of providing fishing opportunities. Recovery streams are managed for self-sustaining Apache trout populations and regular stocking is not part of that management except with wild trout to initiate and augment the population as needed until it becomes self-sustaining. Apache trout stocked for recreational purposes are considered excess to the survival and recovery of the species. Take of these stocked fish via harvest by anglers is allowed under the section 4(d) rule contained in the designation of the Apache trout as a Threatened species. That rule allows take of Apache trout if such take is in accordance with State law; in this case through possession of a valid Arizona fishing license and trout stamp.

Impacts from wild populations on stocked Apache trout:

The action of stocking Apache trout is considered a conservation action in furtherance of the Endangered Species Act whereby a special 4(d) rule is in place. AGFD may take any federally listed threatened fish or wildlife for conservation purposes that are consistent with the purposes of the Act and the Section 6 Cooperative Agreement between USFWS and AGFD and therefore take of Apache trout from the proposed stocking of Apache trout is legally permitted.

Impacts to stocked Apache trout from species of fish currently existing as wild, self reproducing populations at or in proximity to proposed stocking locations may include predation, hybridization with other trout and/or competition.

Chiricahua Leopard Frog

Local Analysis: Although Becker Lake and the LCR above Lyman buffered stocking complex are within the historical range of the Chiricahua leopard frog, the likelihood that Chiricahua leopard frogs could be exposed to fish stocked in Becker Lake is low because there are no historical records for Chiricahua leopard frogs at Becker Lake. The likelihood that Chiricahua leopard frogs could be exposed to fish stocked in other sites within the LCR above Lyman buffered stoking complex is also low. There are historical records for Chiricahua leopard frogs from 3 sites in the buffered complex; Nelson Reservoir (SE Corner) (1971), Nutrioso Creek (Correjo Crossing (1979), and Unnamed Creek (1 MI S of Alpine Divide Campground) (1974). In addition, Chiricahua leopard frogs were released at Trinity Reservoir in 1996 by the Department as part of ongoing recovery activities (AGFD Riparian Herpetofauna Database, M. Sredl pers.comm.). There have been 68 surveys at 39 sites within the buffered stocking complex between 1935 and 2009, with most of them taking place between 1971 and 2009 (Figure 2, AGFD Riparian Herpetofauna Database, M. Sredl pers.comm.). Chiricahua leopard frogs were not observed during subsequent surveys at Nelson Reservoir (SE Corner) (1987, 1992, 1993, and 1995), Nutrioso Creek (Correjo Crossing) (1995), or Unnamed Creek (1 MI S of Alpine Divide Campground) (1995) (AGFD Riparian Herpetofauna Database, M. Sredl pers.comm.). Although the LCR above Lyman buffered stocking complex has not been adequately surveyed, the Rudd Creek and Trinity Reservoir area was adequately surveyed for frogs after the 1996 release and no frogs were observed after the 1997 field season (D. Groebner and Sredl pers.comm.). In addition, the LCR above Lyman buffered stocking complex lies at the edge of the range for the Chiricahua leopard frog and the presence of crayfish and non native fish make the habitat less suitable for leopard frogs.Therefore, it is likely that Chiricahua leopard frogs no longer occupy this area.

Broad Scale Analysis: The likelihood that Chiricahua leopard frogs could be exposed to dispersing fish from stocking sites in the LCR above Lyman buffered stocking complex is low. The northernmost part of the LCR above Lyman buffered stocking complex is just outside of the range of the Chiricahua leopard frog, therefore further downstream in the LCR is outside of the range of the Chiricahua leopard frog. There are records for Chiricahua leopard frogs just south of the LCR above Lyman buffered stocking complex, but these sites are in different watersheds and it is not feasible for stocked fish in the LCR above Lyman buffered stocking complex to reach these areas and the likelihood of frogs traveling the overland distance to the headwater of the tributaries to the LCR is low. These Chiricahua leopard frog localities will be assessed in different complex documents.

Northern Leopard Frog

Local Analysis: Becker Lake and the LCR above the Lyman buffered stocking complex are within the historical range of the northern leopard frog and the likelihood that frogs could be exposed to fish stocked in Becker Lake or elsewhere in the buffered stocking complex is high. There are records for northern leopard frogs from 2007-2009 just downstream of Lyman Lake,

which is within the LCR above Lyman buffered stocking complex (Drost, pers. comm.). Although there are no historical records for northern leopard frogs at Becker Lake, it is possible for frogs within the buffered stocking complex to be exposed to dispersing stocked fish. There are historical records for northern leopard frogs from 9 sites within the buffered stocking complex; Benny Creek (1979), Iris Spring (1979), LCR (Foot of Lyman Dam) (1935), LCR (Johnson Ranch) (1938), LCR (4.35 MI W of Eager) (1979), Nelson Reservoir (SE Corner) (1971), Nutrioso Creek (Correjo Crossing) (1979), Sheep Springs (1942), and Unnamed Creek (1 MI S of Alpine Divide Campground) (1974, 1979). Northern leopard frogs were not observed during subsequent surveys at Benny Creek (1992 and 1995), Iris Spring (1992, 1995, and 1997), LCR (Foot of Lyman Dam) (1997), LCR (Johnson Ranch) (1997), Nelson Reservoir (SE Corner) (1987, 1992, 1993, and 1995), Nutrioso Creek (Correjo Crossing) (1995), Sheep Springs (1995), or Unnamed Creek (1 MI S of Alpine Divide Campground) (1995) (AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). There have been 68 surveys at 39 sites within the buffered stocking complex between 1935 and 2009, with most of them taking place between 1971 and 2009 (Figure 2, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). Although the LCR above Lyman buffered stocking complex has not been adequately surveyed and it is likely that northern leopard frogs no longer occupy the sites mentioned above, the recent observations by Charles Drost show that northern leopard frogs currently occupy the area below Lyman Lake dam (Drost, pers. comm.). In addition, this is the last known extant population of northern leopard frogs in the upper LCR drainage and it is thought to be declining (Drost, pers. comm.).

Broad Scale Analysis: The likelihood that northern leopard frogs could be exposed to dispersing fish from the LCR above Lyman buffered stocking complex is low. There are records from 2007-2009 for northern leopard frogs just below Lyman Lake within the LCR above Lyman buffered stocking complex and the likelihood that these frogs would be exposed to stocked sport fish in the buffered stocking complex is high (Drost, pers. comm.). However, there is only 1 other record downstream in the LCR at Salado Springs for northern leopard frogs (1939), but frogs were not observed at this site in 1997 and it is likely that northern leopard frogs no longer occupy this area or further downstream in the LCR or its tributaries (AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.).

Little Colorado Spinedace and Critical Habitat

Little Colorado spinedace do not appear to be able to enter the lake through the Department's water diversion from the LCR. Another water diversion structure located approximately 0.2 miles downstream of the Department's diversion spans the entire river and appears to be a fish barrier to upstream movement for smaller fishes. Spinedace are currently not found upstream of the lower diversion and are not present at the site of the Department's diversion The nearest documented occurrence of spinedace to Becker Lake is approximately 0.2 miles away overland, but indirectly connected to the lake.

Designated critical habitat is located approximately 8 miles away upstream in Nutrioso Creek where the outflow of water from the Becker dam, via the pipe/ditch, enters the LCR approximately 1.3 miles downstream of the confluence with Nutrioso Creek. Constituent elements for all areas of critical habitat include clean, permanent flowing water with pools and a fine gravel or silt-mud substrate (FWS, 1987; Federal Register Rule to Determine LC Spinedace to be a Threatened Species with Critical Habitat).

Potential Impacts

The proposed stocking activity is unlikely to have direct impacts on the Little Colorado spinedace. Stocked trout and grayling are not able to escape from Becker Lake and impact Little Colorado spinedace that exist in the LCR. A rock gabion fish barrier was constructed on the diversion ditch, just upstream of the lake, to prevent trout stocked in Becker Lake from swimming upstream in the ditch to the LCR. In addition, when filling the reservoir, the total control of water coming in is manually controlled, and the reservoir is not allowed to spill. There is no natural drainage or watershed that drains into the lake, and the diversion ditch is the only significant source of water. The lake does not spill due to the manual control of the inflow. Some water is released directly into the LCR for irrigation downstream during the summer months of dry years; however, the location of the outlet structure and operation of the valve on the outlet pipe (see description in earlier text) would make it unlikely for a trout to escape the lake through this route.

Surveys in the LCR have found only 3 rainbow trout within spinedace occupied habitat, two in 1993 and one in 1999 (T. Robinson pers.comm.) all within the Wenima Wildlife Area, approximately 2.1 miles downstream of the outlet flow into the LCR. These trout could have come from Becker Lake during a period of operating the lake differently and allowing it to spill, or they could have come from stockings further upstream in the LCR at South Fork, the Greer lakes, or wild fish in the upper LCR. Rainbow trout were stocked annually in the South Fork LCR, very near the confluence with the mainstem LCR, up through 1993. That stocking location was discontinued after 1993. Unusually high flows during the spring of 1993 could have washed some of these stocked trout downstream from this old stocking location; such high flows are not be expected to occur on a regular basis. Rainbow trout are stocked annually in the Greer lakes, which release water for irrigation use in Springerville. Plus, a healthy population of wild rainbow trout exists in the LCR from the National Forest boundary up to River Reservoir.

The trout in 1993 could possibly also have come up from Lyman Lake. Lyman Lake is approximately 17 miles downstream of Wenima Wildlife Area. Trout were stocked up to 1996 in Lyman Lake, after which rainbow trout stocking was discontinued.

It is unlikely that a spinedace would enter the lake through the diversion ditch because they are not present at that diversion site, only downstream from it and an additional irrigation.

Critical Habitat

No impacts to critical habitat are anticipated because stocked trout and grayling are not able to escape from Becker Lake and move into designated critical habitat.

Lyman Lake

Site Description

Lyman Lake is a 1400 acre lake impounded on the LCR at an elevation of 5978 feet, approximately 15 miles south of St. Johns. The dam forming Lyman Lake was constructed in 1910 and was rebuilt in 1920 and 1949. The lake has a maximum depth of 57 feet and an average depth of 22 feet when full. The water rights are owned by Lyman Irrigation and water is released for irrigation use downstream. Lyman Lake is filled by the LCR, which is perennial from the lake upstream to the headwaters on Mt. Baldy. However, the lake is rarely full and does not often spill; the last time was 1993, and then only slightly. The size of the lake is usually much smaller than identified on maps. Although it does not spill on an annual basis, water is released directly into the LCR downstream of the lake and also into a diversion ditch. Access to the lake year-round is by paved road (Highway 180/191) and through Lyman Lake State Park, although other parts of the lake is located on State Trust, BLM, and private lands. The state park offers campsites, a store, boat launch, fish cleaning station, and swimming area. Lyman Lake is also the only lake in this area that allows water skiing because no motor restrictions are in effect.

Management of Water Body

The primary objective is to manage Lyman Lake as a naturally reproducing warm-water fishery. Although there appears to be natural reproduction of channel catfish occurring, growth is extremely slow and recruitment to catchable size may not be enough to sustain a good fishery. Channel catfish and rainbow trout have not been stocked in the last 14 years, with the last stocking in 1996 (Table 21). However, fishing has not been good since then. The secondary objective is to manage a put-and-take coldwater fishery on an opportunistic basis if conditions were suitable.

The conditions at Lyman Lake are not currently suitable for trout or a coldwater fishery. The water is perpetually turbid, mostly due to numerous carp in the lake, which has reduced primary productivity significantly. With very little primary productivity, the zooplankton, which is the main food for reservoir trout, occur at very low levels. Angler creel surveys in 1996 documented only a 2% return to creel of the 5,000 catchable size trout stocked into Lyman Lake, thus, the Department has not stocked rainbow trout since then. However, the lake was drained in 1990-1991 to repair the dam, which reduced the carp population. Water quality and productivity was very good for several years and supported a good trout fishery. The water quality, productivity, and suitability for coldwater fishery crashed in the mid 1990s as the carp population expanded to original levels.

Table 21. Stocking history for Lyman Lake.

Species	First Year	Last Year	Num. of Stockings	Num. Stocked
Black crappie	1978	1978	1	20,000
Bluegill	1935	1992	5	14,493
Brown trout	1953	1968	8	219,026
Channel catfish	1965	1996	29	1,733,973
Cutthroat trout	1952	1966	4	369,000
Fathead minnow	1978	1978	1	40,000
Largemouth bass	1935	1991	8	40,445
Northern pike	1967	1973	8	303,118
Rainbow trout	1952	1996	112	3,278,295
Redear sunfish	1979	1979	1	15,000
Bullfrog tadpole	1967	1967	1	5,000
Threadfin shad	1959	1959	1	750
Walleye	1973	1984	6	3,250,000
Yellow perch	1979	1979	1	100,000
Total			186	9,389,100

The Integrated Fisheries Management Plan for the LCR Watershed (Young et al. 2001) identifies the management emphasis for Lyman Lake as warm water sport fishery, with a desired fish assemblage of channel catfish, largemouth bass, bluegill, walleye, black crappie, and Little Colorado sucker.

Proposed Action

The Department proposes to stock rainbow trout for the period covered by this consultation.

Catchable rainbow trout would be stocked year round, if the water quality and lake conditions are suitable; numbers of trout may be from 0 to 10,000 annually.

Water Distribution / Connectivity

The LCR draining into Lyman Lake is perennial from the lake upstream to the headwaters of the West and East Forks of the LCR, approximately 48 miles upstream on Mt. Baldy. Coyote Creek enters the LCR several miles upstream of Lyman Lake. The lower 39 miles of Coyote Creek is normally dry, with the only perennial water located upstream of a constructed fish barrier at the lower end of the perennial reach, upstream from Pratt lake. A large water diversion structure is located in the LCR approximately 17 miles upstream of Lyman Lake at the bottom end of Round Valley, just downstream of Springerville. This diversion structure is approximately 4-5 feet tall and is likely a fish barrier to upstream movement for some species. Nutrioso Creek enters the LCR approximately 1.5 miles upstream of the diversion structure, but is usually dry in its lower reaches. Nelson Reservoir dam is located on Nutrioso Creek approximately 13.0 miles upstream

of the LCR and is a barrier to upstream movement of fish. Permanent water is found within the several miles just downstream of the reservoir. Rudd Creek, a tributary of Nutrioso Creek, is located about 1.2 miles downstream of the Nelson Reservoir dam with a culvert fish barrier located 3.1 miles upstream of Nutrioso Creek.

Upstream of Nutrioso Creek, the LCR flows through the Town of Springerville, which has a number of smaller water diversion structures. A large water diversion structure is located approximately 10.1 miles upstream of the confluence with Nutrioso Creek, and is likely a fish barrier for some species. Perennial South Fork LCR flows into the mainstem LCR approximately 1.3 miles upstream of the large diversion structure. A constructed fish barrier is located on the South Fork LCR for Apache trout recovery 0.9 miles upstream of the confluence with the LCR. Upstream of the South Fork confluence is River Reservoir dam, which is a barrier to upstream movement. Between the South Fork and River Reservoir, two smaller tributaries, Fish Creek and Hall Creek, flow into the LCR. Fish Creek is often dry in its lower reaches. Hall Creek is perennial in its lower reaches, but is blocked by a private dam several miles upstream. Additional discussion on this area is provided in the West Fork LCR Complex section.

Lyman Lake rarely spills. The last spill event was in 1993 during an extreme flood event, and even then the lake barely spilled a couple inches over the spillway (according to Lyman Lake Irrigation Company board members). Prior to that small spill event, the irrigation board members could not remember how long it had been since it had spilled. Water is released for irrigation during the irrigation season April 15 to September 15 directly into the river below the dam and then is diverted downstream in St. Johns for irrigating pastures for cattle grazing. Irrigation releases are also made directly into a large irrigation ditch that starts immediately below the dam. Some permanent water does exist upstream of St. Johns that supports native fishes, but the LCR is often dry just downstream of St. Johns, as confirmed by a survey on July 10, 2009. In this area, a channel is barely noticeable and was dry at the time of that July survey because water released from Lyman for irrigation is all diverted by the time it reaches St. Johns. Thirty-one miles downstream of Lyman Dam is Zion Reservoir, which is more of a marshy area than a reservoir and is often dry. The LCR downstream of Zion Reservoir is ephemeral for the next 54.2 miles to the confluence with Silver Creek. Silver Creek is perennial in its lower reaches; however, the Woodruff Dam on Silver Creek just up from the confluence is a barrier to upstream movement of fish into Silver Creek. From the confluence with Silver Creek, the LCR is alternately ephemeral with several locations of permanent pools downstream for 51.1 miles to the confluence with Chevelon Creek. Chevelon Creek is perennial, but has a diversion dam structure located 1.7 miles upstream of the confluence that would be a barrier to fish movement upstream. The LCR is then perennial for 9.1 miles to the confluence with Clear Creek, then perennial for another dozen miles where it sinks into the sand at base flows.

During extreme summer monsoon events, the LCR may flow through much of its length directly below the reservoir to St. Johns. Irrigation releases also may support this surface flow but only during the irrigation season. Snowmelt runoff from the Zuni River and the Rio Puerco River (both of which are normally dry) and from Silver Creek, Chevelon Creek, and Clear Creek, would cause the LCR to flow continuously down to the Colorado River approximately 297 miles downstream of Lyman Lake.

Fish Movement

Fish have the opportunity to move upstream from Lyman Lake into the LCR because of the perennial flow, but also during flooding. There is no known barrier to upstream movement until the large diversion structure at the bottom end of Round Valley, just downstream of Springerville, and 17 miles upstream of Lyman Lake. This structure is 4-5 foot tall and may not prevent large trout from moving upstream during a high flow event. The next barrier to upstream movement would be another large diversion structure upstream of the Highway 261 bridge, on a section of State Trust land, 28.6 miles upstream of Lyman Lake. This structure is definitely a barrier to upstream movement for catfish, and likely for trout, but it may be possible for large trout to get past it during extreme high flow events (Mike Lopez, pers.observation). Several other low flow diversions exist on the LCR through Springerville. The River Reservoir dam is the ultimate barrier to upstream movement.

Stocked trout are not likely to go downstream over the Lyman Lake spillway because it rarely spills. However, water is released downstream for irrigation, of which most is diverted into fields above and around St. Johns. Some permanent water does exist upstream of St. Johns that supports native fishes. Flood flows could theoretically carry fish downstream to the Colorado River; however, this is a long distance through mostly intermittent habitat. Some perennial water is located for a short distance downstream of Silver Creek, a short reach just upstream of Holbrook, and about a dozen miles downstream of Chevelon Creek, which could hold a fish moving downstream. Otherwise a fish would have to make the entire journey all in one flood season. Woodruff Dam on Silver Creek, a large diversion structure on Chevelon Creek, and Clear Creek Reservoir dam on Clear Creek are all barriers to upstream movement of fish within those tributaries.

Trout have the ability to move upstream long distances and are known to be able to jump over obstacles that would prevent the movement of other fish.

Community Description

Lyman Lake contains largemouth bass, green sunfish, bluegill, channel catfish, carp, fathead minnow, walleye, crayfish and occasionally northern pike, all of which naturally reproduce in the reservoir (Table 22). Trout have not been documented in Lyman Lake since it was last stocked in

1996 and do not reproduce in the reservoir or in the river as it comes into the lake. The LCR is too warm and silty at this point, unsuitable for spawning salmonids.

Table 22. Survey history for Lyman Lake with experimental gill nets.

Date	Species	Number Collected	Size range (mm TL)
May 2008	Carp	41	310-533
	Channel catfish	19	325-505
	Green sunfish	7	70-213
	Largemouth bass	1	332
	Walleye	13	451-536
May 2003	Carp	5	213-580
	Channel catfish	30	245-449
	Green sunfish	15	130-191
	Largemouth bass	4	229-424
	walleye	1	600
April-May 2002	Carp	3	378-496
	Channel catfish	6	306-640
	Largemouth bass	2	195-445
	walleye	1	660
April 2001	Carp	7	442-477
	Channel catfish	26	215-420
	walleye	1	575
May 2000	Carp	2	422-444
	Channel catfish	46	220-428
	walleye	1	502

The LCR upstream and downstream of Lyman Lake contains Little Colorado spinedace, bluehead sucker, Little Colorado sucker, speckled dace, carp, green sunfish, fathead minnow, and numerous crayfish. Plains killifish is also present downstream of the reservoir. Herpetological surveys have documented Northern leopard frogs immediately below Lyman Lake dam, and painted turtles further downstream near Salado Springs.

In numerous years of survey, no rainbow trout has been collected in the LCR near Lyman Lake. The closest record for rainbow trout in the LCR is about 14 miles upstream at the Wenima Wildlife Area bridge where 2 were caught in 1993 (Dorum and Young 1995) and 1 in 1999 (T. Robinson, per. com). However, these may have more likely come from closer sources upstream like Becker Lake, when it was allowed to spill, River Reservoir, wild populations in the upper LCR, or from private ponds in the Springerville area.

There is one record of channel catfish in the LCR upstream of Lyman Lake where 2 fish were reported in the Springerville area in 1991 (Table 23). This record is an error; the collection actually occurred downstream of Lyman Lake at the Hwy 666/191 bridge area in St. Johns.

These fish may have been from Lyman Lake, or from Little Reservoir, which is a private off-channel reservoir connected to the LCR just upstream of this collection site, and is known to have had channel catfish when historically managed by the state.

Table 23. Summary of recent (2006-09) surveys in the LCR upstream of Lyman Lake, with closest locations to the lake listed first and farthest locations upstream listed last.

Date	Location and survey gear	Species collected	Num.
6/30/2008	Wiltbank property Backpack electroshocker, 1/8” mesh seines	Little Colorado spinedace Little Colorado sucker Speckled dace Fathead minnow Green sunfish Unidentified sucker fry	36 94 55 676 50 8
6/30/2008	Nielson property Backpack electroshocker, 1/8” mesh seines	Little Colorado spinedace Little Colorado sucker Bluehead sucker Fathead minnow Green sunfish Unid sucker fry	3 43 7 1,510 114 50
8/3/2009	Richville Valley Backpack electroshocker	Little Colorado sucker Bluehead sucker Fathead minnow Green sunfish	2 2 43 12
8/3/2009	The Corral Backpack electroshocker	Little Colorado spinedace Little Colorado sucker Speckled dace Bluehead sucker Fathead minnow	27 9 79 7 23
7/30/2009	Wenima Wildlife Area – lower Slade Backpack electroshocker	Little Colorado spinedace Little Colorado sucker Speckled dace Bluehead sucker Fathead minnow	75 22 108 67 48
7/30/2009	Wenima Wildlife Area – upper Slade Backpack electroshocker	Little Colorado spinedace Little Colorado sucker Speckled dace Bluehead sucker Fathead minnow Green sunfish Unidentified fry	50 12 99 55 55 2 1
7/29/2009	Wenima Wildlife Area – Fence Backpack electroshocker	Little Colorado spinedace Little Colorado sucker Speckled dace	70 20 104

Date	Location and survey gear	Species collected	Num.
		Bluehead sucker Fathead minnow Brown trout Unidentified sucker fry	57 109 3 1
7/9/2009	Wenima Wildlife Area – Bridge Backpack electroshocker	Little Colorado spinedace Little Colorado sucker Speckled dace Bluehead sucker Fathead minnow Brown trout Green sunfish Unidentified sucker fry Unidentified fry	46 8 85 16 64 2 2 2 4
7/30/2009	Wenima Wildlife Area – upper end Backpack electroshocker	Little Colorado spinedace Little Colorado sucker Speckled dace Bluehead sucker Fathead minnow Brown trout Green sunfish	22 7 94 9 29 3 101
6/11/2009	Rest Area Backpack electroshocker	Little Colorado spinedace Little Colorado sucker Speckled dace Bluehead sucker Fathead minnow Brown trout	16 30 196 25 39 1
4/18/2007	Downstream of Wastewater Treatment Backpack electroshocker	Little Colorado sucker Speckled dace Fathead minnow	1 198 102
6/10/2009	Becker Wildlife Area - #1 1/8” mesh seine	Little Colorado spinedace Speckled dace Bluehead sucker Fathead minnow	21 20 2 15
7/8/2009	Becker Wildlife Area - #1 Backpack electroshocker, 1/8” mesh seine	Little Colorado spinedace Little Colorado sucker Speckled dace Bluehead sucker Fathead minnow Unidentified fry	55 5 139 22 87 2
7/8/2009	Becker Wildlife Area - #2 Backpack electroshocker, 1/8” mesh seine	Little Colorado spinedace Little Colorado sucker Speckled dace Bluehead sucker	30 9 30 2

Date	Location and survey gear	Species collected	Num.
		Fathead minnow Unidentified sucker fry Unidentified fry	41 1 7
7/8/2009	Becker Wildlife Area - #3 Backpack electroshocker, 1/8” mesh seine	Little Colorado spinedace Little Colorado sucker Speckled dace Bluehead sucker Fathead minnow	5 3 52 5 13
3/22/2007	Becker Wildlife Area 1/8” mesh seine	Little Colorado spinedace Little Colorado sucker Speckled dace Bluehead sucker Fathead minnow Brown trout	80 6 154 11 321 1
6/11/2009	Airport Road – below diversion Backpack electroshocker	Little Colorado spinedace Little Colorado sucker Speckled dace Bluehead sucker Fathead minnow Brown trout	50 20 142 8 123 2
6/11/2009	Airport Road-above diversion Backpack electroshocker	Little Colorado sucker Speckled dace Bluehead sucker Fathead minnow	3 3 4 7
4/12/2007	Above Airport Road Backpack electroshocker	Little Colorado sucker Speckled dace Bluehead sucker Fathead minnow Brown trout	3 139 3 94 3
6/10/2009	Hwy 260 Bridge Backpack electroshocker	Speckled dace Bluehead sucker Fathead minnow Brown trout Rainbow trout	89 1 4 1 1
6/10/2009	Hwy 261 Bridge Backpack electroshocker	Speckled dace Bluehead sucker Fathead minnow Brown trout	109 5 18 2
6/10/2009	State Land Section 16 Backpack electroshocker	Little Colorado sucker Speckled dace Brown trout Rainbow trout	1 63 1 1
11/6/2007	State Land Section 16	Little Colorado sucker	6

Date	Location and survey gear	Species collected	Num.
	Backpack electroshocker	Speckled dace Bluehead sucker Brown trout	1,166 9 51
4/4/2006	USFS downstream of Fish Creek Backpack electroshocker	Speckled dace Brown trout Rainbow trout	9 164 19
4/4/2006	USFS between Fish Ck. and River Res. Backpack electroshocker	Brown and rainbow trout Speckled dace	225 6

Two channel catfish have also been recorded in the LCR downstream of Lyman Lake near Woodruff, in 1994. These could have come from Lyman Lake or from White Mountain Lake on Silver Creek, which flows into the LCR just upstream of Woodruff. An additional 5 channel catfish were collected in the LCR at Winslow in 2007. These fish were most likely from Clear Creek Reservoir or from lower Chevelon Creek, where channel catfish are naturally reproducing.

Table 24. Summary of recent (2007-09) surveys in the LCR downstream of Lyman Lake.

(closest locations to the lake are listed first and farthest locations downstream listed last).

Date	Location	Species collected	Num.
8/10/2009	Downstream of Salado Springs #1 Backpack electroshocker	Common carp	2
8/10/2009	Downstream of Salado Springs #2 Backpack electroshocker	Common carp	1
8/10/2009	Downstream of Salado Springs #3 Backpack electroshocker	Common carp Green sunfish Fathead minnow	1 1 3
4/10/2007	Downstream of Salado Backpack electroshocker	Fathead minnow Green sunfish Plains killifish Common carp	6 1 2 1
7/28/2009	Carl Pew property #1 Backpack electroshocker	Little Colorado spinedace Little Colorado sucker Speckled dace Fathead minnow Green sunfish Plains killifish Unid. fry	21 5 1 9 1 1 5
7/28/2009	Carl Pew property #2 1/8” mesh seine	Fathead minnow Plains killifish	5 9
7/28/2009	Carl Pew property –adobe house Backpack electroshocker, 1/8” mesh seine	Little Colorado sucker Fathead minnow Plains killifish	1 19 10
7/10/2009	Carl Pew property #4	Little Colorado spinedace	1

Date	Location	Species collected	Num.
	1/8” mesh seine	Fathead minnow Plains killifish	9 4
7/10/2009	Carl Pew property #5 1/8” mesh seine	Little Colorado spinedace Fathead minnow	2 6
7/10/2009	St. Johns-upstream of Hwy 191 Bridge 1/8” mesh seine	Fathead minnow Common carp Green sunfish	5 2 1
6/17/2009	Silver Creek confluence 1/8” mesh seine	Little Colorado sucker Fathead minnow Common carp Yellow bullhead	7 14 4 21
6/17/2009	Downstream of Woodruff 1/8” mesh seine	Fathead minnow	38
6/17/2009	Holbrook	Dry	-
5/14/2007	Holbrook Backpack electroshocker	Fathead minnow	1
4/25/2007	Holbrook 1/8” mesh seine	Fathead minnow Plains killifish	10 1
6/17/2009	Winslow – upstream of I-40 1/8” mesh seine	Little Colorado sucker Plains killifish Fathead minnow Red shiner Unid. fry	4 104 39 22 1
7/11/2007	Winslow – downstream of I-40 1/8” mesh seine	Fathead minnow Green sunfish Plains killifish Bluegill Channel catfish Red shiner	703 1 1,587 1 5 10

Consultation Species or Critical Habitat

Potential impacts from the proposed action to candidate and listed species are described below. Please refer to Chapter 4 for a detailed description of the nature of the impacts (which may include predation, competition for space and food, and hybridization etc.).Subsequent responses (resulting from the frequency, magnitude and duration of the impacts) between proposed stocked and candidate and listed species, and any site or complex factors that provide context for determining the meaningfulness of the impacts, are discussed below. Impacts from the proposed action resulting from angler related recreation and/or potential introduction of disease, pathogen or invasive species are evaluated at a broad scale for the entire action area and are described in Chapter 4. If potential impacts specific to a stocking site or complex have been identified they are discussed below.

Chiricahua and Northern leopard frogs are analyzed at the local site and broad scale level due to the movement potential into the stocked area and fish movement potential up or downstream into areas where frogs may occur.

Chiricahua leopard frog

Local Analysis: Although Lyman Lake and the LCR above Lyman buffered stocking complex are within the historical range of the Chiricahua leopard frog, the likelihood that Chiricahua leopard frogs could be exposed to fish stocked in Lyman Lake is low. The likelihood that Chiricahua leopard frogs could be exposed to fish stocked in other sites within the LCR above Lyman buffered stoking complex is also low. There are no historical records for Chiricahua leopard frogs at Lyman Lake. There are historical records for Chiricahua leopard frogs from 3 sites within the buffered stocking complex; Nelson Reservoir (SE Corner) (1971), Nutrioso Creek (Correjo Crossing) (1979), and Unnamed Creek (1 MI S of Alpine Divide Campground) (1974). In addition, Chiricahua leopard frogs were released at Trinity Reservoir in 1996 by the Department as part of ongoing recovery activities (AGFD Riparian Herpetofauna Database, M. Sredl per. Comm.). There have been 68 surveys at 39 sites within the buffered stocking complex between 1935 and 2009, with most of them taking place between 1971 and 2009 (Figure 2, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). Chiricahua leopard frogs were not observed during subsequent surveys at Nelson Reservoir (SE Corner) (1987, 1992, 1993, and 1995), Nutrioso Creek (Correjo Crossing (1995), or Unnamed Creek (1 MI S of Alpine Divide Campground) (1995) (AGFD Riparian Herpetofauna Database, M. Sredl pers.comm.). Although the LCR above Lyman buffered stocking complex has not been adequately surveyed, the Rudd Creek and Trinity Reservoir area was adequately surveyed for frogs after the 1996 release and no frogs were observed after the 1997 field season (D. Groebner and Sredl pers.comm.). In addition, the LCR above Lyman buffered stocking complex lies at the edge of the range for the Chiricahua leopard frog and the presence of crayfish and non native fish make the habitat less suitable for leopard frogs.Therefore, it is likely that Chiricahua leopard frogs no longer occupy this area.

Broad Scale Analysis: The likelihood that Chiricahua leopard frogs could be exposed to dispersing fish from stocking sites in the LCR above Lyman buffered stocking complex is low. The northernmost part of the LCR above Lyman buffered stocking complex is just outside of the range of the Chiricahua leopard frog, therefore further downstream in the LCR is outside of the range of the Chiricahua leopard frog. There are records for Chiricahua leopard frogs just south of the LCR above Lyman buffered stocking complex, but these sites are in different watersheds and it is not feasible for stocked fish in the LCR above Lyman buffered stocking complex to reach these areas and the likelihood of frogs traveling the overland distance to the headwater of the tributaries to the LCR is low. These Chiricahua leopard frog localities will be assessed in different complex documents.

Northern Leopard Frog

Local Analysis: Lyman Lake and the LCR above Lyman buffered stocking complex are within the historical range of the northern leopard frog and the likelihood that frogs could be exposed to fish stocked in Lyman Lake or elsewhere in the buffered stocking complex is high. Although there are no historical records for northern leopard frogs at Lyman Lake, there are records for northern leopard frogs from 2007-2009 immediately downstream of Lyman Lake. (Drost, pers. comm.). There are historical records for northern leopard frogs from 9 sites within the buffered stocking complex; Benny Creek (1979), Iris Spring (1979), LCR (Foot of Lyman Dam) (1935), LCR (Johnson Ranch) (1938), LCR (4.35 MI W of Eager) (1979), Nelson Reservoir (SE Corner) (1971), Nutrioso Creek (Correjo Crossing) (1979), Sheep Springs (1942), and Unnamed Creek (1 MI S of Alpine Divide Campground) (1974, 1979). There have been 68 surveys at 39 sites within the buffered stocking complex between 1935 and 2009, with most of them taking place between 1971 and 2009 (Figure 2, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). Northern leopard frogs were not observed during subsequent surveys at Benny Creek (1992 and 1995), Iris Spring (1992, 1995, and 1997), LCR (Foot of Lyman Dam) (1997), LCR (Johnson Ranch) (1997), Nelson Reservoir (SE Corner) (1987, 1992, 1993, and 1995), Nutrioso Creek (Correjo Crossing) (1995), Sheep Springs (1995), or Unnamed Creek (1 MI S of Alpine Divide Campground) (1995) (AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). Although the LCR above Lyman buffered stocking complex has not been adequately surveyed and it is likely that northern leopard frogs no longer occupy the sites mentioned above, the recent observations by Charles Drost show that northern leopard frogs currently occupy the area below Lyman Lake dam (Drost, pers. comm.).

Broad Scale Analysis: The likelihood that northern leopard frogs could be exposed to dispersing fish from the LCR above Lyman buffered stocking complex is low. There are records from 2007-2009 for northern leopard frogs just below Lyman Lake within the LCR above Lyman buffered stocking complex and the likelihood that these frogs would be exposed to stocked sport fish in the buffered stocking complex is high (Drost, pers. comm.). However, there is only 1 other record downstream in the LCR at Salado Springs for northern leopard frogs (1939), but frogs were not observed at this site in 1997 and it is likely that northern leopard frogs no longer occupy this area or further downstream in the LCR or its tributaries (AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.).

Little Colorado Spinedace and Critical Habitat

Little Colorado spinedace has been documented as occurring within the LCR above and below Lyman Lake as recently as 2009. Spinedace occupy the LCR from Lyman Lake upstream to the Airport Road in Springerville and the LCR from Salado Springs downstream to St. Johns. Critical and occupied habitat is found in Nutrioso Creek approximately 22 miles upstream of the Lyman Lake, and in Chevelon Creek approximately 100 miles downstream of Lyman Lake, and

in East Clear Creek, about 105 miles downstream of Lyman Lake and 45 miles up East Clear Creek past the confluence.

Potential Impacts

The proposed stocking activity could have potential direct and/or indirect impacts on the Little Colorado spinedace. Stocked rainbow trout have the ability to swim upstream into the LCR, where they would not have to travel far to reach occupied spinedace habitat immediately above the lake. Predation could occur on adult and juvenile Spinedace, larvae and eggs. Stocked trout could potentially compete for food and space (refer to the interactions discussion in Chapter 4).

There is also potential for fish to move into the LCR below the lake through irrigation releases during the summer months. Trout do not reproduce in the lake or in the LCR at that elevation.

Spinedace could disperse downstream into the lake from occupied habitat just upstream and be eaten by a stocked trout. However, multitudes of other non native sport fish, including largemouth bass, bluegill, green sunfish, black crappie, walleye, an occasional pike, and channel catfish that are self sustaining in the lake, would likely prey upon a dispersing spinedace.

The assembledge of non native sport fish in Lyman Lake reduce the potential for connectivity between spinedace populations above and below the lake. Spinedace could never get up over Lyman dam, but would have the potential of dispersing downstream through Lyman Lake if the predators were not there. However, predation by stocked trout would be low in comparison to predation potential by the many other non-stocked sport fish.

Spinedace critical habitat in Nutrioso Creek, Chevelon Creek, and East Clear Creek has little potential to be impacted by stocked fish in Lyman Lake. The creek immediately downstream of the lake is consistently wet, but it is not likely stocked fish would survive the travel past this reach through a consistently dry reach and access critical habitat in Chevelon Canyon over 100 miles away. Stocked trout are also unlikely to migrate upstream out of the reservoir, over the large water diversion barrier, and into Nutrioso Creek, past sections that are typically dry, and into Little Colorado spinedace critical habitat over 22 miles upstream from the reservoir. Rainbow trout have been recorded in Nutrioso Creek downstream of Nelson Reservoir but these fish or their progeny probably originated from upstream sources such as Nelson Reservoir. In addition, there were no Primary Constituent Elements identified when critical habitat was designated for spinedace; however, several types of activities were identified that would be considered an impact to critical habitat. These included any activity that would deplete the flow, lessen the minimum flow, or significantly alter the natural flow regime; any activity that would extensively alter the channel morphology; or any activity that would extensively alter the water chemistry. An escaped stocked trout would not contribute to any of these activities, directly or indirectly, even if they were to reach critical habitat.

Carnero Lake

Site Description

Carnero Lake is a 65 acre headwater impoundment of Carnero Creek on the Apache-Sitgreaves National Forest. The lake is located at an elevation of 9033 feet, approximately 8 miles northwest of Greer. Carnero Lake is a closed system with no hydrologic connection to this complex, LCR, or other natural system. Originally, Carnero Creek flowed towards and into the LCR a short distance upstream of Lyman Lake; however a permanent diversion on the creek below Carnero Lake diverts all flow into an irrigation ditch system and it never reaches the LCR.

Management of Water Body

Primary fishery is a cold water put-grow-and-take rainbow trout fishery in spring through fall, with focus on a blue ribbon experience when the lake does not winter kill. Sub-catchable and catchable rainbow trout are stocked several times in a short period in the spring and early summer.

The lake is very shallow, with a maximum depth of 10 feet, and grows extensive aquatic macrophytes. These conditions result in elevated pH levels for much of the summer and often into the fall, limiting the timeframe to stock the lake. The weed beds are very extensive along the shorelines, even at the road access location, making it even more difficult to stock the lake from a hatchery truck. The shallowness also makes the lake very productive, growing very large trout. For these reasons, the regulations on Carnero Lake consist of artificial lure and fly only with barbless hooks, and a 2 fish limit, to keep the fish in the lake without frequent restocking and to provide a quality fishery for the anglers willing to navigate the weeds.

The shallow features and the extensive weed growth have lead to frequent fish kills. In the recent stocking history, the lake has winter killed in 2004, 2007, and 2008. Rainbow trout do not reproduce in the reservoir.

Carnero Lake has a short history as a sport fishery. The water rights were previously entirely owned by private parties and the lake was nearly drained on a regular basis. The lake was stocked in 1979-1981, then not again until 2003-2008 when the Department acquired approximately 75% of the water rights (Table 25).

Carnero Lake is accessed by an all-weather road, Forest Road 117A, via Forest Roads 117 or 118, typically from April through November. There is a dirt parking lot on the west side of the lake. There are no boat ramps, restrooms, or developed camping/picnic facilities at the lake. Primitive camping is allowed at the lake. The lake ices over and the lake is accessible by snowmobile during the winter months. The lake receives very little ice fishing use because of the artificial lure and fly-only regulations.

Table 25. Stocking history for Carnero Lake.

Species	First Year	Last Year	Num. of Stockings	Num. Stocked
Brook trout	1980	1980	1	15,000
Rainbow trout	1979	2009	18	72,758
Total			19	87,758

The entrance road is the main access to the lake. Most spur roads have been closed to vehicle use to help control damage and erosion. Only one spur road exists to the spillway/headgate location, but this road is very rough and not used much by the public. Boat motors on the lake are restricted to electric motors only. Because of the extensive aquatic macrophyte growth on the lake, anglers typically use inflatable pontoon boats or canoes.

There have been no creel surveys conducted on Carnero Lake.

The Integrated Fisheries Management Plan for the LCR Watershed (Young et al. 2001) identified the management emphasis for Carnero Lake as Blue Ribbon sport fish, which is consistent with the proposed action.

Proposed Action

The Department proposes to stock rainbow trout for the period covered by this consultation.

Catchable and sub-catchable rainbow trout would be stocked from April to June each year; numbers of rainbow trout stocked may be from 0 to 20,000 fish annually.

Water Distribution / Connectivity

Carnero Lake is considered a closed system. Carnero Lake's principal water sources are runoff from its small 6 mile watershed and Carnero Spring above the lake. Carnero Creek is perennial from Carnero Spring into the lake but contains no fish because of its very small size. No fish are present other than stocked species. The creek below the lake runs regularly from spill out of the lake in the spring, seepage through the earthen dam, and irrigation releases in the summer to a point approximately 2 miles east of the lake. At that point the entire flow of the small (base flow of 1 cfs) creek is diverted into a manmade drainage system used for irrigation, additional storage, and numerous stock ponds. Once diverted, this water has no connection to the LCR and there is no return flow to Carnero Creek, and therefore the system is considered closed. The diversion on Carnero Creek is very large, 4.5 to 5 feet tall and captures all flow, constantly, even during heavy flood events. Since the Carnero Lake drainage is so small, the flows down to the diversion are relatively small even during extreme events, which occur primarily during the winter and snow melt. The 16.6 miles of Carnero Creek downstream of the diversion to the LCR is normally dry. The middle and lower portion of Carnero Creek runs only during extreme flood events, but with water from other parts of the watershed and not from the flow from Carnero Lake. Brian

Crawford, Wildlife Area Manager for Department Wildlife Areas around Springerville has ridden horseback along the entire drainage during extreme events and reports a fair amount of water flowing in the lower section but coming in from the numerous tributaries of Carnero Creek below the diversion. He has stated that flows coming downstream from Carnero Lake would never breach the diversion because of its size. In the very extreme case that the diversion is breached, it is very unlikely that a live fish would travel downstream to the LCR from Carnero Lake. Carnero Lake experiences frequent fish kills, which are related to the winter precipitation levels. A recent project investigating winter kills in high elevation lakes, including Carnero Lake, shows that winter kills are closely related to the amount of snowpack on top of the ice cover during the winter. A small amount or no snow allows some light penetration and phytoplankton/macrophyte photosynthesis that would support fish through the winter. However, a deep snowpack blocks almost all sunlight, resulting in no photosynthesis under the ice and a rapid depletion of oxygen. An extreme snowpack that would be required for extreme flood flows down upper Carnero Creek would cause a fish kill prior to those high spring flows.

Water can be released from Carnero Lake through a headgate into upper Carnero Creek, and all flow is diverted out into the ditch system described above for the operation of a spinedace refuge pond on the Grasslands Wildlife Area, and for irrigation on the wildlife area and cattle use on private property. The Department holds approximately 75% of the water rights, with the other 25% privately owned by local ranchers. When the lake is full, the spill follows the same path as the released irrigation water, with the diversion operating year round. The lake spills regularly during good precipitation years, and water is released annually for irrigation during the summer months.

Fish Movement

Stocked trout may be able to swim up the very short distance to the spring during spring runoff, but would not persist there because of the very low flows in the summer months. They could also leave the reservoir and into upper Carnero Creek when it spills, which is never very extensive, or when water is released for irrigation use downstream only to get diverted into the irrigation ditch at the diversion structure along with all the flow from the lake. Once in the ditch system, they could potentially spread throughout the irrigation system but would not persist because of the mostly shallow features of the ditch system and lack of water when not actively irrigating. The sand filter located on the pipeline leading to a Little Colorado spinedace refuge pond on the Grasslands Wildlife Area would keep all fish from reaching the refuge pond.

Carnero Lake is considered a closed system because the water in the lake and associated fish are not hydrologically connected to the LCR or its tributaries.

Community Description

Carnero Lake contains stocked rainbow trout and tiger salamander. No other fish species or crayfish are found in the lake. Fathead minnow exist in the lower ditch system and most of the stock ponds, most likely introduced into the ponds to control mosquitoes. Stocked trout only persist in Carnero Lake until there is an extensive fish kill. They are not known to reproduce in the lake or persist in the ditch system or spring. Table 26 provides a summary of recent fish surveys at Carnero Lake.

Table 26. Survey History of Carnero Lake with experimental gillnets.

Date	*Species collected*	*Number Collected*	*Size Range (mm TL)*
April 2008	*No fish*	-	-
April 2007	*No fish*	-	-
October 2006	*Rainbow trout*	*17*	*233-596*
May 2005	*Rainbow trout*	*66*	*308-501*
April 2004	*No fish*	-	-

Several surveys at the Grasslands Wildlife Area spinedace refuge pond have documented only spinedace for fish species, confirming that the sand filter is successful in keeping non native fish from entering the refuge from the irrigation ditches. Table 27 provides a recent survey history of the refuge pond. The surveys have also documented tiger salamander and wandering gartersnake.

Table 27. Survey history at the Grasslands Wildlife Area spinedace refuge pond.

Date	Survey gear	Species	Number collected/observed
October 2007	Hoop nets, minnow traps	Little Colorado spinedace Tiger salamander	1 Numerous
April 2008	Seine	No fish collected or observed No herps collected or observed	-
July 2009	Bank visual	Little Colorado spinedace Tiger salamander Wandering gartersnake	7 Abundant 20
July 2009	Snorkel	Little Colorado spinedace Tiger salamander	20 Abundant
July 2009	Hoop nets, minnow	Little Colorado spinedace	9

Date	Survey gear	Species	Number collected/observed
	traps	Tiger salamander Wandering gartersnake	3 2

Consultation specie or Critical habitat
Carnero Lake is considered a closed system with no aquatic species of concern in the area for analysis. Chiricahua and Northern leopard frogs were analyzed and discussed below. The lake is within Mexican spotted owl designated critical habitat and discussed below.

Potential impacts from the proposed action to candidate and listed species are described below. Please refer to Chapter 4 for a detailed description of the nature of the impacts (which may include predation, competition for space and food, and hybridization etc.).Subsequent responses (resulting from the frequency, magnitude and duration of the impacts) between proposed stocked and candidate and listed species, and any site or complex factors that provide context for determining the meaningfulness of the impacts, are discussed below. Impacts from the proposed action resulting from angler related recreation and/or potential introduction of disease, pathogen or invasive species are evaluated at a broad scale for the entire action area and are described in Chapter 4. If potential impacts specific to a stocking site or complex have been identified they are discussed below.

Chiricahua and Northern leopard frogs are analyzed at the local site and broad scale level due to the movement potential into the stocked area and fish movement potential up or downstream into areas where frogs may occur.

Chiricahua leopard frog
Local Analysis: Although Carnero Lake and the LCR above Lyman buffered stocking complex are within the historical range of the Chiricahua leopard frog, the likelihood that Chiricahua leopard frogs could be exposed to fish stocked in Carnero Lake is low because there are no historical records for Chiricahua leopard frogs at Carnero Lake and it is a closed system. The likelihood of frogs being exposed to fish stocked in other sites within the LCR above Lyman buffered stocking complex is also low. There are historical records for Chiricahua leopard frogs from 3 sites in the buffered complex; Nelson Reservoir (SE Corner) (1971), Nutrioso Creek (Correjo Crossing) (1979), and Unnamed Creek (1 MI S of Alpine Divide Campground) (1974). In addition, Chiricahua leopard frogs were released at Trinity Reservoir in 1996 by the Department as part of ongoing recovery activities (AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). There have been 68 surveys at 39 sites within the buffered stocking complex between 1935 and 2009, with most of them taking place between 1971 and 2009 (Figure 2, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). Chiricahua leopard frogs were not observed during subsequent surveys at Nelson Reservoir (SE Corner) (1987, 1992, 1993, and

1995), Nutrioso Creek (Correjo Crossing) (1995), or Unnamed Creek (1 MI S of Alpine Divide Campground) (1995) (AGFD Riparian Herpetofauna Database, M. Sredl pers.comm.). Although the LCR above Lyman buffered stocking complex has not been adequately surveyed, the Rudd Creek and Trinity Reservoir area was adequately surveyed for frogs after the 1996 release and no frogs were observed after the 1997 field season (D. Groebner and Sredl pers.comm.). In addition, the LCR above Lyman buffered stocking complex lies at the edge of the range for the Chiricahua leopard frog and the presence of crayfish and non native fish make the habitat less suitable for leopard frogs.Therefore, it is likely that Chiricahua leopard frogs no longer occupy this area.

Broad Scale Analysis: The likelihood that Chiricahua leopard frogs could be exposed to dispersing fish from stocking sites in the LCR above Lyman buffered stocking complex is low. The northernmost part of the LCR above Lyman buffered stocking complex is just outside of the range of the Chiricahua leopard frog, therefore further downstream in the LCR is outside of the range of the Chiricahua leopard frog. There are records for Chiricahua leopard frogs just south of the LCR above Lyman buffered stocking complex, but these sites are in different watersheds and it is not feasible for stocked fish in the LCR above Lyman buffered stocking complex to reach these areas and the likelihood of frogs traveling the overland distance to the headwater of the tributaries to the LCR is low. These Chiricahua leopard frog localities will be assessed in different complex documents.

Northern Leopard Frog

Local Analysis: Although Carnero Lake and the LCR above Lyman buffered stocking complex are within the historical range of the northern leopard frog, the likelihood that frogs could be exposed to fish stocked in Carnero Lake is low because there are no historical records for northern leopard frogs at Carnero Lake and it is a closed system. There are records from 2007-2009 just downstream of Lyman Lake, which is within the LCR above Lyman buffered stocking complex. There are historical records for northern leopard frogs from 9 sites within the buffered stocking complex; Benny Creek (1979), Iris Spring (1979), LCR (Foot of Lyman Dam) (1935), LCR (Johnson Ranch) (1938), LCR (4.35 MI W of Eager) (1979), Nelson Reservoir (SE Corner) (1971), Nutrioso Creek (Correjo Crossing) (1979), Sheep Springs (1942), and Unnamed Creek (1 MI S of Alpine Divide Campground) (1974, 1979). There have been 68 surveys at 39 sites within the buffered stocking complex between 1935 and 2009, with most of them taking place between 1971 and 2009 (Figure 2, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). Northern leopard frogs were not observed during subsequent surveys at Benny Creek (1992 and 1995), Iris Spring (1992, 1995, and 1997), LCR (Foot of Lyman Dam) (1997), LCR (Johnson Ranch) (1997), Nelson Reservoir (SE Corner) (1987, 1992, 1993, and 1995), Nutrioso Creek (Correjo Crossing) (1995), Sheep Springs (1995), or Unnamed Creek (1 MI S of Alpine Divide Campground) (1995) (AGFD Riparian Herpetofauna Database, M. Sredl pers.comm.). Although the LCR above Lyman buffered stocking complex has not been adequately surveyed, the Rudd Creek and Trinity Reservoir area was adequately surveyed for frogs after the 1996 release and no

frogs were observed after the 1997 field season (D. Groebner and Sredl pers.comm.). In addition, the LCR above Lyman buffered stocking complex lies at the edge of the range for the Chiricahua leopard frog and the presence of crayfish and non native fish make the habitat less suitable for leopard frogs.Therefore, it is likely that northern leopard frogs no longer occupy this area.

Broad Scale Analysis: The likelihood that northern leopard frogs could be exposed to dispersing fish from the LCR above Lyman buffered stocking complex is low. There are records from 2007-2009 for northern leopard frogs just below Lyman Lake within the LCR above Lyman buffered stocking complex and the likelihood that these frogs would be exposed to stocked sport fish in the buffered stocking complex is high (Drost, pers. comm.). However, there is only 1 other record downstream in the LCR at Salado Springs for northern leopard frogs (1939), but frogs were not observed at this site in 1997 and it is likely that northern leopard frogs no longer occupy this area or further downstream in the LCR or its tributaries (AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.).

Mexican Spotted Owl and Critical Habitat

This stocking location is within Mexican spotted owl (MSO) critical habitat (CH).

Potential Impacts

The CH designation included most other protected and restricted habitats for the MSO. Indirect effects to CH may include actions that can affect forest structure and maintenance of adequate prey species identified as PCEs. These actions may include trampling of vegetation, soil compaction, removal of small woody debris or other physical degradation potentially altering the productivity and succession/regeneration of the vegetation. In the designation of critical habitat (USFWS 2004) most recreational activities, including angling, were not identified as requiring restrictions to protect the PCE's of critical habitat from destruction or adverse modification. In making that statement, recreational activities, including angling were assumed to not contribute to significant habitat-affecting activities such as cutting large trees or snags, removal of large woody debris from the forest floor, altering the tree species diversity, or other large-scale changes to habitat structure. The act of a relatively small number of people walking through habitat is not likely to cause the kind of effects that would result in adverse effects to the PCEs/KHCs of MSO CH and/or restricted and protected habitats.

LITTLE COLORADO RIVER ABOVE LYMAN COMPLEX ANALYSIS

Water Distribution / Connectivity

The hydrology of the LCR above Lyman Lake was provided in the various site specific sections, specifically in the discussion for Lyman Lake. Water flow in the LCR downstream of Lyman

Lake was also discussed. Additional discussion on the LCR below Zion Reservoir would occur for each additional complex and tributary where stocking is occurring, below.

Fish Movement
Fish movement in the LCR above Lyman Lake was provided in the various site specific sections, specifically in the discussion for Lyman Lake. Movement in the LCR downstream of Lyman Lake was also discussed. Additional discussion on the LCR below Zion Reservoir would occur for each additional complex and tributary where stocking is occurring, below.

Community Description
The aquatic community above and below Lyman Lake has been previously discussed. Downstream of Lyman Lake in the LCR, through Zion Reservoir, and past Chevelon Canyon, East Clear Creek and into the Grand Canyon would be discussed in those respective sections or in the Watershed analysis summary for the Grand Canyon.

Consultation Species or Critical Habitats
Impacts to consultation species at the site level were previously discussed, and included areas downstream of Lyman Lake. Potential impacts to consultation species further downstream in the LCR (humpback chub, additional spinedace populations, roundtail chub, etc.) are discussed in other LCR complex sections and the Lower LCR Analysis of Impacts summary. It is not known with certainty which stocking site is the source of a stocked species, if they should be found in the LCR in the vicinity of a consultation species below Lyman Lake.

Potential impacts from the proposed action to candidate and listed species are described below. Please refer to Chapter 4 for a detailed description of the nature of the impacts (which may include predation, competition for space and food, and hybridization etc.).Subsequent responses (resulting from the frequency, magnitude and duration of the impacts) between proposed stocked and candidate and listed species, and any site or complex factors that provide context for determining the meaningfulness of the impacts, are discussed below. Impacts from the proposed action resulting from angler related recreation and/or potential introduction of disease, pathogen or invasive species are evaluated at a broad scale for the entire action area and are described in Chapter 4. If potential impacts specific to a stocking site or complex have been identified they are discussed below.

Chiricahua and Northern leopard frogs are analyzed at a local and broad scale level within the site analysis, due to the movement potential into the stocked area and fish movement potential up or downstream into areas where frogs may occur.

Mexican spotted owl and critical habitat and Southwestern willow flycatcher and critical habitat was discussed within the site analysis.

Little Colorado Spinedace and Critical Habitat

Spinedace occupied habitat occurs in Nutrioso Creek from the Town of Nutrioso downstream to Nelson Reservoir and from Nelson Reservoir dam downstream to the Forest boundary (Lopez et al. 2001; Sweetser et al. 2002). Spinedace also occupy lower Rudd Creek from a culvert near the Sipe Wildlife Area headquarters downstream to the confluence with Nutrioso Creek. Spinedace occupy the LCR from Lyman Lake upstream to the Airport Road in Springerville and the LCR from Salado Springs downstream to St. Johns. The specific distances to occupied habitats from Hulsey, Becker, Nelson and Lyman were discussed site by site above.

Surveys in the Little Colorado River have found only 3 rainbow trout within spinedace occupied habitat, two in 1993 and one in 1999 (T. Robinson pers.comm.) all within the Wenima Wildlife Area. Rainbow trout were stocked annually in the South Fork LCR, very near the confluence with the mainstem LCR, up through 1993. That stocking location was discontinued after 1993. Unusually high flows during the spring of 1993 could have washed some of these stocked trout downstream from this old stocking location; such high flows are not be expected to occur on a regular basis. Rainbow trout are stocked annually in the Greer lakes, which release water for irrigation use in Springerville. Plus, a healthy population of wild rainbow trout exists in the LCR from the National Forest boundary up to River Reservoir.

Surveys in Nutrioso Creek have found 28 rainbow trout within spinedace occupied habitat since the implementation of new management approaches in 1996. Five of these were marked trout found upstream of the reservoir, while 23 were found downstream of the reservoir in designated critical habitat, of which 19 were marked and 4 unmarked. The 24 total marked trout were obvious escapees from the reservoir. The origin of the 4 unmarked trout is still unexplained. They could have come downstream from a wild population of rainbow trout in upper Rudd Creek, since 3 of the unmarked trout were found at the confluence of Rudd and Nutrioso. Or they could be progeny from potential successful reproduction by escaped trout from Nelson; however, this has not been verified or previously documented.

In addition, crayfish are extremely numerous in the reaches where spinedace occur and likely present a significant threat. Portions of Nutrioso Creek and Rudd Creek dry up during low precipitation years, especially with water diversions occurring in and around the Town of Nutrioso, impacting habitat quality and availability to spinedace in Nutrioso Creek. Also, wild brown trout exist in the upper reaches of occupied habitat in the Little Colorado River.

Designated critical habitat for spinedace is located on Nutrioso Creek beginning just below Nelson Reservoir Dam and continuing downstream to the Apache-Sitgreaves Forest boundary and in East Clear Creek past the confluence of Chevelon Creek. The specific distances of designated critical habitat from Hulsey, Becker, Nelson and Lyman were discussed site by site above.

Potential Impacts

The proposed stocking activities could potentially impact Little Colorado Spinedace, if any stocked trout were able to escape during flooding events or in the case of Nelson Reservoir with no barriers to upstream movement and limited downstream barrier (dam if not during spill event) and Lyman where trout have potential to move upstream (see previous site by site discussion for further detail). These interactions could occur as predation on adults and juvenile Spinedace, larvae or eggs, or competition for space (refer to interactions discussion in Chapter 4). Since rainbow trout are stocked as catchables, they would not likely compete for food with spinedace. Stocked trout also do not reproduce in the lakes or in Nutrioso Creek in the habitat where spinedace occur, thus, there would be no impact from juvenile trout. The continuing implementation of the precautions identified in the previous Section 7 consultation in 2001, would continue to reduce impact/exposure from trout in Nelson (see previous site discussion).

Critical Habitat

Spinedace critical habitat in Nutrioso Creek, Chevelon Creek, and East Clear Creek has little potential to be impacted by stocked fish in the stocked lakes. There were no Primary Constituent Elements identified when critical habitat was designated for spinedace; however, several types of activities were identified that would be considered an impact to critical habitat. An escaped stocked trout would not contribute to any of these activities, directly or indirectly. Below is the critical habitat information for the effects analysis from the 2001 BO:

Critical habitat designation for spinedace occurred before the requirement to identify constituent elements or habitat qualities necessary to allow a species to survive and recover from extinction was added. Therefore, the best scientific and commercial data available were used to determine those characteristics of the designated critical habitat that support the species' survival and recovery (USFWS 1987). Currently no barriers exist to prevent upstream movement of trout into designated critical habitat upstream of Blue Ridge reservoir. Likewise there are no barriers to prevent downstream movement of trout from Blue Ridge or Nelson Reservoirs other than the dams that impound the stream. When critical habitat areas for spinedace were designated, these areas were reported as "…presently support(ing) healthy self-perpetuating populations of the Little Colorado spinedace" (USFWS 1987). Since that time, habitat degradation, introduction of non native fishes, and scarcity of water have resulted in low numbers of spinedace in East Clear Creek and Leonard Canyon. In years of high precipitation or during periods of high runoff, trout have the opportunity to move out of stocked area into spinedace habitat. Similarly, spinedace may move into trout areas. In either case, some spinedace could be consumed by rainbow trout or other non native species. Movement of predaceous fish into designated critical habitat may contribute to the disjunct distribution patterns and retreat of spinedace to suboptimal habitats. Results may include competition, predation, harassment or further loss of spinedace.

The act of stocking catchable rainbow trout upstream and downstream of critical habitat is reversible and does not diminish or preclude the role of that habitat for the survival and recovery of the spinedace.

WEST FORK LITTLE COLORADO RIVER COMPLEX

Drainage Area and Elevations

This complex drains off the northeast quarter of Mt. Baldy, with 4 out of the 5 main drainages originating on Mt. Baldy itself, and forms the uppermost headwaters of the Little Colorado River (Figure 3). These drainages are Hall Creek, West Fork LCR, Lee Valley Creek, and East Fork LCR. The fifth, the South Fork LCR, drains high elevation grassland and forest to the northeast of Mt. Baldy.

The highest elevations of the drainage within this complex are on Mt. Baldy, over 11,000 feet elevation. The lowest elevation within the complex is 7525 feet, at the confluence where the South Fork LCR drains into the LCR. The highest stocking site is at Lee Valley Lake, at 9418 feet elevation, and the lowest is River Reservoir at 8221 feet.

The West Fork Complex is composed of 8 stocking sites in the headwaters of the Little Colorado River (Figure 4), including White Mountain Reservoir, Mexican Hay Lake, River Reservoir, Tunnel Reservoir, Bunch Reservoir, LCR in Greer, Sheep's Crossing, and Lee Valley Lake.

The uppermost stocking site, Lee Valley Lake is located on Lee Valley Creek. The natural flow of Lee Valley Creek entered the East Fork LCR, however, water is not released from the dam and the lake's spillway leads into the West Fork LCR. The Sheep's Crossing stocking site is located on the West Fork LCR immediately upstream of where the spill from Lee Valley Lake enters the West Fork. The East Fork LCR and West Fork LCR come together in the Town of Greer to form the mainstem Little Colorado River. The LCR Greer stocking site is a series of release points centrally located around this confluence, ranging down onto the uppermost Little Colorado River and up into the lowermost reaches of the East Fork LCR and West Fork LCR, all within the Town of Greer.

The Little Colorado River drains directly into River Reservoir, one of the 3 Greer Lakes, at the bottom end of the Town of Greer. The other 2 Greer Lakes, Tunnel and Bunch Reservoirs, are located off channel in close proximity to River Reservoir. They are filled by a diversion coming off the Little Colorado River in the center of Greer. River Reservoir drains directly into the LCR, while Tunnel Reservoir runs into River Reservoir and Bunch Reservoir drains into a tributary that leads to Benny Creek, then Hall Creek, then into the LCR approximately 2.6 miles downstream of River Reservoir. White Mountain Reservoir is located on the upper reaches of Hall Creek and drains directly into Hall Creek. This flow runs for 5.7 miles where it joins with Benny Creek and the outflow coming from Bunch Reservoir, then for 0.3 miles to the LCR, where it joins the outflow from River Reservoir and everything above that.

Mexican Hay Lake is located in the headwaters of a tributary of the South Fork LCR. Water cannot escape Mexican Hay Lake in its current condition and operation; however, it does have the potential to be operated for irrigation storage. If that irrigation use occurs in the future, the outflow drains into Joe Baca Draw, then into the South Fork LCR, then into the Little Colorado River 5.6 miles downstream of River Reservoir (3.0 miles downstream of Hall Creek confluence) where it joins the outflow coming from all other stocking sites upstream (White Mountain Reservoir and Bunch Reservoir via Hall Creek, and River Reservoir, Tunnel Reservoir, LCR Greer, Sheep's Crossing, and Lee Valley Lake via the Little Colorado River).

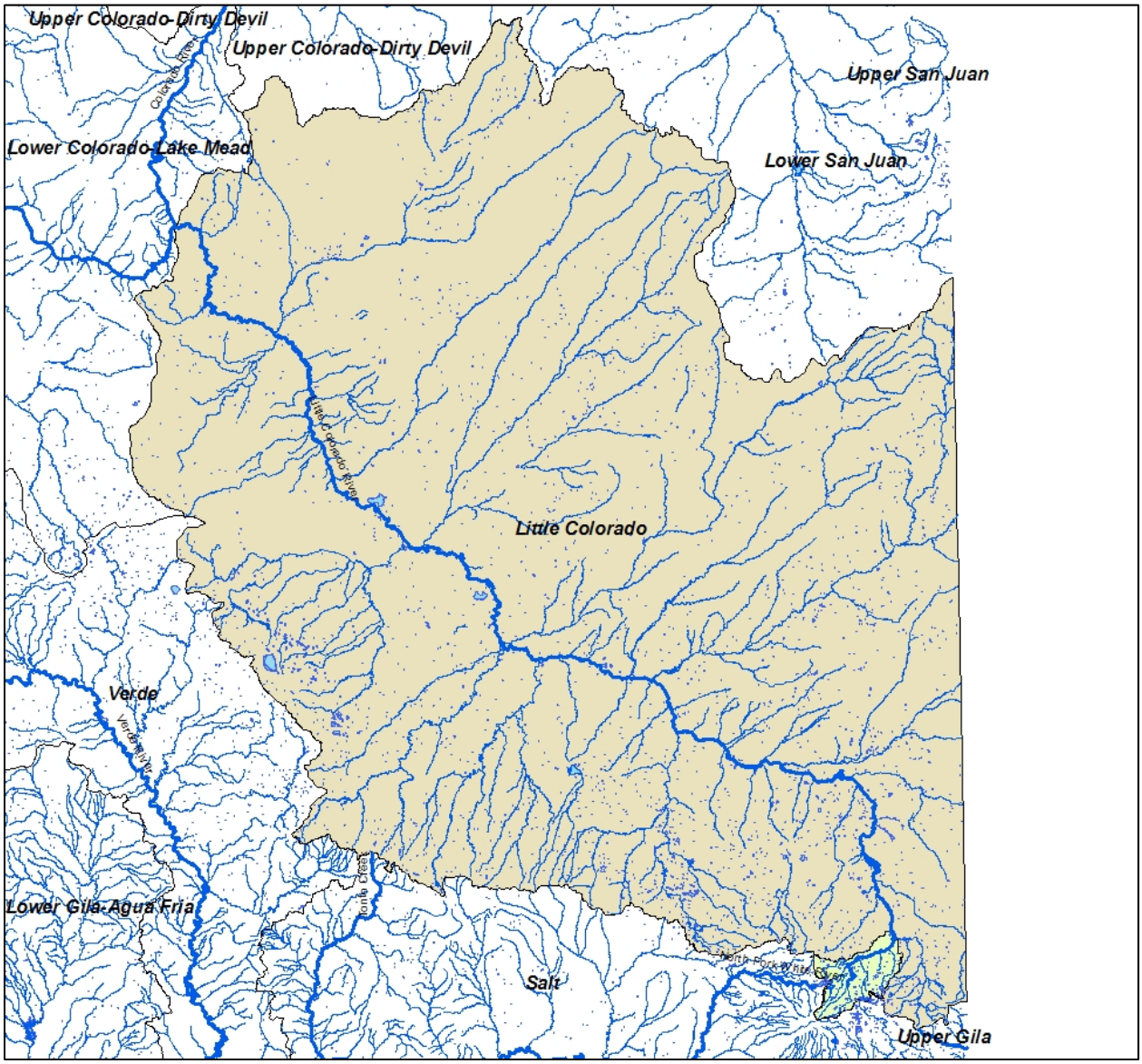

Figure 3. The West Fork Little Colorado River complex (green) is located in the headwaters of the Little Colorado River (brown).

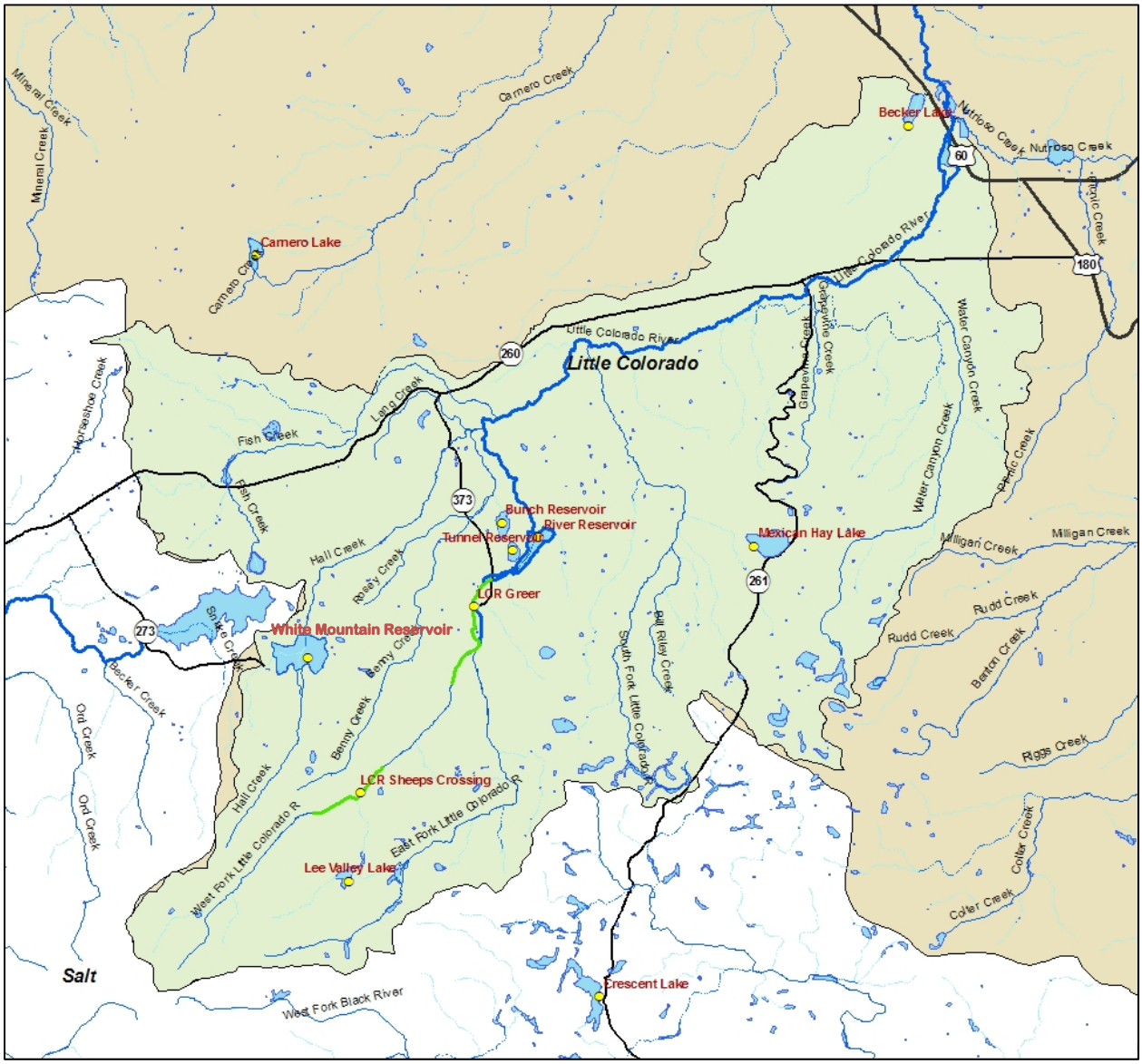

Figure 4. West Fork of the LCR Complex Overview Map.

<u>White Mountain Reservoir</u>

Site Description

White Mountain Reservoir is located on Hall Creek, a tributary of the Little Colorado River (LCR). The reservoir is located approximately 3 miles west of Greer on the Apache-Sitgreaves National Forest. The dam was built in 1929 and the reservoir is 20 surface acres, when full, at an elevation of 9164 feet. White Mountain Reservoir is an irrigation reservoir and water is released during the irrigation season from April 15 through September 15.

White Mountain Reservoir is located in open high elevation grasslands and is accessed by an all-weather gravel road, Forest Road 112, from April through November. There is a dirt parking lot near the east side of the dam, but no boat launch, restrooms, or other facilities, although primitive camping is allowed in the general area. The reservoir receives very little angler use, either summer or winter, because it is stocked so infrequently. The reservoir freezes over during the winter and is inaccessible from November through April.

Management of Water Body

White Mountain Reservoir has been managed previously as a put-grow-and-take cold water fishery, primarily stocking fingerling rainbow trout when water levels were going to persist through the summer irrigation season. Historically, brook, rainbow, and brown trout have been stocked (Table 28). During the wet cycle years of the 1960s through the early 1990s, the reservoir held enough water to manage a good fishery. However, the water levels are not as reliable as they once were. Currently, water levels do not persist like they used to. The reservoir would be better stocked with catchable or sub-catchable size trout, because there is not enough time to grow fingerling trout into a catchable size, even though the reservoir is very shallow and very productive and can grow trout quickly. The reservoir could be stocked with catchable rainbow trout opportunistically to support an occasional put-grow-and-take cold water fishery when conditions allow for it. Trout can overwinter in the reservoir if the water levels are sufficient, growing to 5-6 pounds if able to overwinter 2 years, but the current water management in the reservoir, as an irrigation reservoir drained extremely low every year, has not allowed recent overwintering to occur.

Table 28. Stocking history for White Mountain Reservoir.

Species	First Year	Last Year	Num. of Stockings	Num. Stocked
Brook trout	1980	1980	1	15,000
Rainbow trout	1969	2000		120,556
Brown trout	1966	1967	2	20,000
Total			13	155,556

No creel surveys have been conducted at White Mountain Reservoir because of the sporadic stocking and low angler use.

White Mountain Reservoir fills, or nearly fills, every year with snowmelt runoff from Mt. Baldy. The reservoir is usually drained down very low by Round Valley Irrigation for use in the Springerville area, and is usually the first of a number of irrigation lakes to be utilized. White Mountain Reservoir is not stocked most years because of the way its water is managed.

Flexibility to stock annually is desired if water management changes at the reservoir would allow suitable stocking conditions. The reservoir is only stocked when it is anticipated to hold enough water to support trout past the summer irrigation season, usually only in very high precipitation years when little irrigation water is needed.

The Integrated Fisheries Management Plan for the LCR Watershed (Young et al. 2001) identifies the management objective at White Mountain Reservoir as basic-yield sport fish with a desired species assemblage of rainbow trout, which is consistent with the proposed action.

Proposed Action

The Department proposes to stock catchable and sub-catchable rainbow trout from April to June, only during years when the reservoir would hold enough water to support trout through the summer; numbers of rainbow trout stocked may be from 0 to 30,000 fish annually.

Water Distribution/Connectivity

White Mountain Reservoir is filled by upper Hall Creek draining off the high elevations of Mt. Baldy. There is normally a good snowmelt runoff coming down Hall Creek to fill or nearly fill White Mountain Reservoir every year except for extreme drought years. The very headwater of Hall Creek on Mt. Baldy is perennial, but becomes intermittent just above the reservoir, and flows into the reservoir only during the spring snowmelt; the 2 miles of Hall Creek immediately above the reservoir dries in the summer months. Hall Creek is intermittent below the reservoir, except when releasing water, until the final stretch about 3 miles above the LCR.

When water is released for irrigation from White Mountain Reservoir during the irrigation season from April 15 to September 15, it flows down Hall Creek for 6.0 miles and then into the LCR at a point 2.6 miles downstream of the confluence with River Reservoir.

At base flows, Hall Creek is mostly intermittent in the 2.9 miles just downstream of the reservoir as it flows through high elevation grassland and into a canyon. The lower 3.1 miles are located deep in a canyon and is perennial to the confluence with the LCR. There are a series of private ponds on Hall Creek approximately 1.2 miles upstream of the confluence with the LCR that impound the creek flow and spill out.

A tributary called Benny Creek enters Hall Creek approximately 0.3 miles above the confluence with the LCR. Bunch Reservoir is located on an unnamed tributary which flows for 0.4 miles to Benny Creek, then down Benny Creek for 1.4 miles to Hall Creek. At base flows, Benny Creek is perennial but has very low flows. However, the lowest 1.4 miles of Benny Creek flows with a substantial amount of water during the summer months when water is released for irrigation out of Bunch Reservoir. See the Greer lakes section for additional discussion of water flow in the area and in the Little Colorado River downstream of River Reservoir. Rosey Creek is a tributary to Benny Creek; the two streams meet just east of State Route 373, approximately 0.6 miles

upstream of the tributary that drains from Bunch Reservoir. Hydrographic status of these streams is not known, but fish survey results indicate that they support fish at least for some periods (Table 29).

Table 29. Surveys of tributaries to Hall Creek conducted in 2008 using a backpack electroshocker.

Stream Surveyed	Species Collected	Num. Collected
Benny Creek	Speckled dace	50
	Bluehead sucker	1
	Fathead minnow	164
	Brown trout	11
Rosey Creek	Speckled dace	71
	Fathead minnow	56

Fish Movement

Stocked trout can move upstream into upper Hall Creek, but only in the spring during the snowmelt high flow runoff. Surveys in 1999 did not find any rainbow trout in upper Hall Creek.

Stocked trout likely move downstream into Hall Creek when the reservoir spills or during irrigation releases during the irrigation season. During these high flows, a fish could move downstream for 6.0 miles into the LCR. Fish would have to also navigate through the private ponds on lower Hall Creek before reaching the LCR. The lower 3.1 miles of Hall Creek is perennial and has suitable trout habitat, but surveys in 1999 only found rainbow trout near the confluence below the private ponds. These trout could have come up from the LCR, down from the private ponds, or from White Mountain Reservoir. Trout would not persist long in the 2.9 miles of Hall Creek immediately below the reservoir because this reach dries up during base flows.

Trout that escape from White Mountain Reservoir and make it through the private reservoirs into the lowest section of Hall Creek could swim up Benny Creek during high flows or irrigation releases, but recent surveys in 2008 did not find any rainbow trout (Table 29). The dam and outlet would prevent any trout from getting up into Bunch Reservoir on the unnamed tributary to Benny Creek.

Once in the LCR, a trout could swim up the LCR for 2.6 miles until it got to River Reservoir dam. For downstream movement in the LCR, see the Greer lakes analysis, below.

Community Description

White Mountain Reservoir contains tiger salamanders and, only if stocked, rainbow trout (M. Lopez pers. comm.). Table 30 shows the survey history in White Mountain Reservoir.

Table 30. Survey history in White Mountain Reservoir using experimental gillnets.

Survey Date	Species Collected	Number Collected	Size Range (mm TL)
April 1967	Brown trout	4	173-216
June 1988	Rainbow trout	18	204-385
May 1993	Rainbow trout	14	209-318
April 1994	Rainbow trout	18	355-526

Hall Creek holds wild brook trout in the very upper 2 miles on Mt. Baldy. However, the 2 miles of Hall Creek immediately upstream of the reservoir and the 2.9 miles immediately below the reservoir are fishless because they go dry at base flows. Table 31 shows the distribution of fish in Hall Creek in 1999.

Lower Hall Creek contains rainbow trout and speckled dace (near the confluence with LCR), and many brown trout within the lowest 3.1 miles adjacent to the LCR. Brown trout and possibly specked dace reproduce in these lower reaches as evidenced by the small sizes caught by previous surveys (Table 29). The 2 rainbow trout in the lowest reach of Hall Creek were collected in the lowest 3 survey stations and likely originated from the Little Colorado River, where wild populations of rainbow and brown trout exist at the confluence with Hall Creek. However, it is possible that these rainbow trout could have escaped from White Mountain Reservoir, or from any of the Greer lakes.

Table 31. Distribution of fish in Hall Creek during comprehensive electrofishing survey (3 pass depletion) of 35 50-meter sites in 1999.

Reach 1 is located at the confluence of the LCR and Reach 8 is in the headwaters on Mt. Baldy. White Mountain Reservoir is located between reaches 5 and 6.

Location	Species	Num. Collected	Size Range (mm TL)
Reach 1 (LCR up to Hwy 373)	Rainbow trout	2	208-248
	Brown trout	58	75-303
	Speckled dace	11	55-98
Reach 2 (upstream of private property above Hwy 373)	Brown trout	176	67-305
Reach 3	Brown trout	110	74-260
Reach 4	-No fish	0	-
Reach 5	- No fish	0	-

Location	Species	Num. Collected	Size Range (mm TL)
White Mountain Reservoir			
Reach 6	Brook trout	31	52-147
Reach 7	Brook trout	27	51-207
Reach 8	Brook trout	18	53-165

Surveys of Benny Creek and Rosey Creek were conducted on May 15-16, 2008 (Table 29). These surveys found speckled dace, one bluehead sucker, fathead minnow, and brown trout. A historic record of Northern leopard frog in 1979 exists at a site on lower Benny Creek, located approximately 3.6 miles downstream of White Mountain Reservoir, however, recent herpetological surveys at that site documented only black necked garter snake and wandering garter snake in 1992 and bullfrogs in 1995. A survey conducted at a tank further up on the drainage on Benny Creek documented a tiger salamander in 1992 and nothing in 1993.

Water from White Mountain Reservoir flows down Hall Creek to the LCR and joins it very near the outflow from the Greer lakes. For this reason, refer to the Greer lakes analysis for a description of the fish communities lower down in the LCR.

Recovery populations of Apache trout are located in the East, West, and South Forks of the LCR, all above constructed fish barriers on each of the forks (3 barriers on East Fork, 2 on West Fork, and 2 on South Fork) above Greer.

Consultation species or Critical Habitat

Potential impacts from the proposed action to candidate and listed species are described below. Please refer to Chapter 4 for a detailed description of the nature of the impacts (which may include predation, competition for space and food, and hybridization etc.).Subsequent responses (resulting from the frequency, magnitude and duration of the impacts) between proposed stocked and candidate and listed species, and any site or complex factors that provide context for determining the meaningfulness of the impacts, are discussed below. Impacts from the proposed action resulting from angler related recreation and/or potential introduction of disease, pathogen or invasive species are evaluated at a broad scale for the entire action area and are described in Chapter 4. If potential impacts specific to a stocking site or complex have been identified they are discussed below.

Potential impacts to consultation to Apache trout are addressed below. Chiricahua and Northern leopard frogs are analyzed below at the local site and broad scale level due to the movement potential into the stocked area and fish movement potential up or downstream into areas where frogs may occur. Potential impacts on Little Colorado spinedace and critical habitat,

southwestern willow flycatcher and critical habiat are discussed in the West Fork Little Colorado River complex analysis.

Apache trout

Stocked rainbow trout can escape from White Mountain Reservoir when water is released for irrigation during the summer months, or when it spills, and likely reach the LCR approximately 2.6 miles below River Reservoir. Escaped stocked trout would be unable to travel upstream past River Reservoir and could have no impact on recovery populations of Apache trout above Greer in the West Forks and East Forks LCR. It is possible the stocked trout could travel downstream for another 3.4 miles to the South Fork LCR confluence and up into the South Fork for 0.9 miles, but they could not get past the constructed fish barrier and into another Apache trout recovery population in the South Fork LCR.

Potential Impacts

Stocked rainbow trout in White Mountain Reservoir likely escape the reservoir into Hall Creek because the reservoir is nearly drained downstream on an annual basis. These escaped trout have access to the LCR. Once in the LCR, they have the same overall possible impacts to Apache trout as fish from the Greer lakes, but likely at a lower probability because of the extra distance to the LCR. Fish barriers prevent upstream movement of potentially escaped rainbow trout into Apache trout recovery populations.

Stocked rainbow trout moving above failed barriers or moving into recovery reaches:

Impacts to recovery Apache trout are not expected occur because recovery populations are located above constructed barriers, which prevent upstream movement of all fish. Should barrier failure occur, the Forest Service and Department would attempt to repair the barrier and if necessary retreat the reach to remove non-native fish. During this period of time, if stocked fish move above the failed barrier, predation, hybridization with other trout and/or competition with Apache trout could occur.

Apache trout escapement from recovery areas and exposure to stocked sport fish:

If recovery Apache trout were to move out of designated recovery areas to areas where stocked rainbow trout may be present (if they escape White Mountain Reservoir and move downstream), they would be subject to the special 4(d) rule. They would no longer be distinguishable from stocked Apache trout, and would no longer contribute towards recovery. Impacts to these individuals would be assessed in the same manner as for stocked Apache trout in non-recovery areas

Northern Leopard Frog

Local Analysis: Although White Mountain Reservoir and the West Fork LCR buffered stocking complex are within the historical range of the northern leopard frog, the likelihood that fish

stocked in White Mountain Reservoir will have an impact on northern leopard frogs is low. There are no historical records for northern leopard frogs at White Mountain Reservoir. There are historical records for northern leopard frogs from 3 sites in the buffered complex: Benny Creek (SR 373) (1979), Little Colorado River (7 KM W of Eager) (1979), and Sheep Springs (FS 89 JCT W/HWY 260) (1942) (HDMS, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). There have been 32 surveys at 24 sites within the buffered stocking complex between 1942 and 2002 (Figure 5, HDMS, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). Northern leopard frogs were not observed during subsequent surveys at Benny Creek (SR 373) (1992 and 1995) or Sheep Springs (FS 89 JCT W/HWY 260) (1995) and it is likely that northern leopard frogs no longer occupy these sites (see previous survey discussion) (HDMS, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.).

Broad Scale Analysis: The likelihood that northern leopard frogs will be exposed to dispersing stocked fish from White River Reservoir and the West Fork buffered stocking complex is moderate. Stocked fish could disperse as far downstream as Lyman Lake and there are records from 2007-2009 for northern leopard frogs just downstream of Lyman Lake (Drost, pers. comm.). Although the main drainage does not provide suitable habitat for northern leopard frogs because of fast flowing water and presence of crayfish, the frogs are occupying a series of ponds and marshy meadows along the outflow from the Lyman Lake dam (Drost, pers. comm.). In addition, this population is the last known extant population of northern leopard frogs in the Upper Little Colorado River drainage and is thought to be declining (Drost, pers. comm.).

Chiricahua Leopard Frog

Local Analysis: Although White River Reservoir and the West Fork LCR buffered stocking complex are within the historical range of the Chiricahua leopard frog, the likelihood that Chiricahua leopard frogs will be exposed to fish stocked in White River Reservoir is low. There are no historical records for Chiricahua leopard frogs at White River Reservoir or within the West Fork buffered stocking complex. There have been 32 surveys at 24 sites within the buffered stocking complex between 1942 and 2002 (Figure 5, HDMS, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.) and no Chiricahua leopard frogs were observed. In addition, even though the West Fork LCR buffered stocking complex is within a Chiricahua leopard frog recovery unit, the majority of the complex is outside of the Black River Management Area, suggesting that habitat and conditions for recovery are less suitable in that area. Therefore, it is likely that Chiricahua leopard frogs do not occupy the West Fork buffered stocking complex.

Broad Scale Analysis: The likelihood that Chiricahua leopard frogs will be exposed to dispersing stocked fish from White Mountain Reservoir and the West Fork Complex is low. There are no records for Chiricahua leopard frogs in the Little Colorado River drainage where stocked fish could disperse to, but fish could travel downstream the Little Colorado River and upstream the tributary of Nutrioso Creek where there are 2 historical records for Chiricahua

leopard frogs: Nutrioso Creek (Correjo Crossing, 1979) and Nelson Reservoir (SE Corner, 1971). Chiricahua leopard frogs were not observed during subsequent surveys at Nutrioso Creek (Correjo Crossing) (1995) and Nelson Reservoir (SE Corner) (1987, 1992, 1993, and 1995) and it is not likely that Chiricahua leopard frogs currently occupy these sites or this area (HDMS, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.).

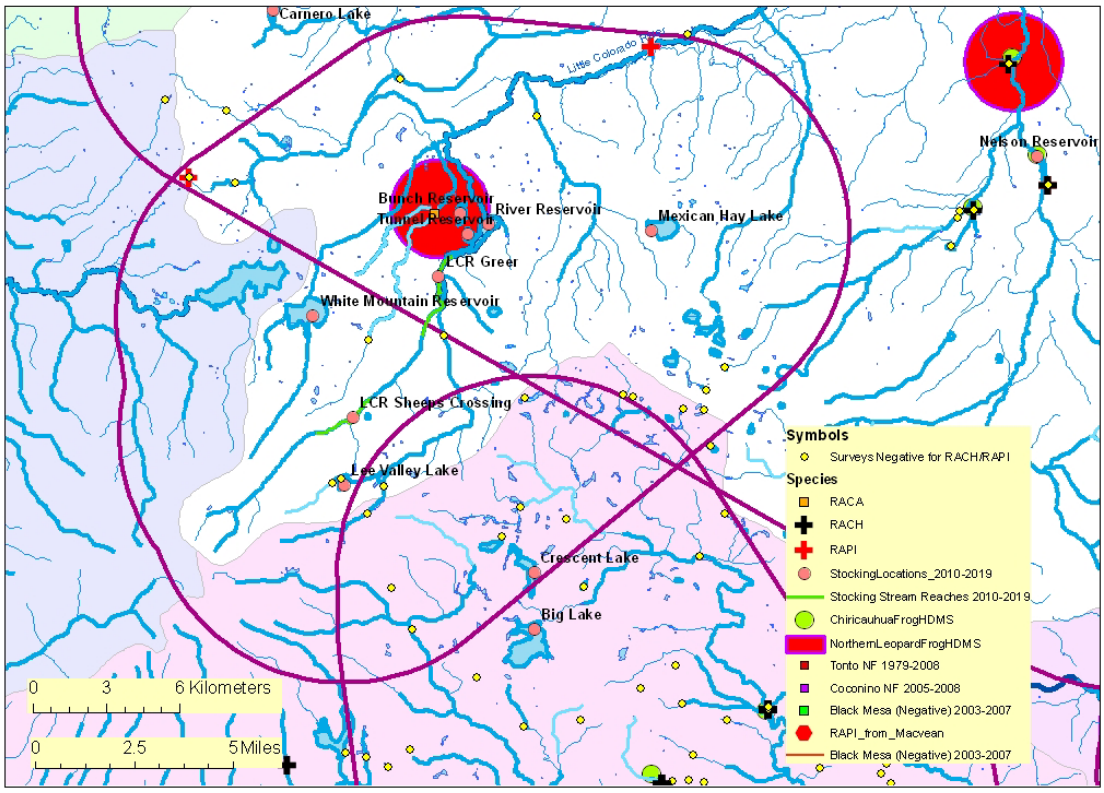

Figure 5. Map of West Fork Little Colorado buffered stocking complex:

The purple line illustrates the 5 mile buffer surrounding a stocking site, stocking reach, or a group of stocking sites. Blue lines symbolize streams and rivers (both perennial and intermittent). A black line represents a Chiricahua leopard frog Recovery Unit boundary. The background color represents the 8 digit Hydrologic Unit Code. Other data are described in the legend. (Note: HDMS data appear as buffered points and may appear larger than site records for other surveys).

Lee Valley Lake

Site Description

Lee Valley Lake is a 35 acre lake on Lee Valley Creek, a headwater tributary of the East Fork of the Little Colorado River (Figure 6). The lake is located at 9418 feet in elevation on the Apache-Sitgreaves National Forest about 6 miles southwest of Greer, and is filled by Lee Valley Creek

draining off the east slope of Mt. Baldy. The dam was constructed as an irrigation reservoir in 1899 and the water rights were later purchased by the Department and transferred to storage rights for wildlife and recreation in the lake.

Camping is not permitted at the lake, as it is located in the Lee Valley Recreation Area, which allows camping only in developed campsites. The closest developed campsites are at Winn Campground approximately 2 miles to the northeast of Lee Valley Lake.
Lee Valley Lake is accessed by an all-weather road (Hwy 273) from April through November, with this road closed to vehicles in the winter; however, it is currently being paved. The lake freezes over and is typically accessed only by snowmobile during the winter. Boat motors are restricted to the use of an electric motor only and the lake is popular with float tube fly fishers in the warmer season. A paved parking area and single boat ramp are located on the east side of the lake between the dam and the spillway. A vault toilet is present at the parking area.
The parking area and launch ramp is the only vehicle access to the lake. Anglers must hike or boat to other parts of the lake.

Figure 6. Photo of Lee Valley Lake.

Management of Water Body
Lee Valley Lake is managed as a featured species cold water fishery, offering only stocked Apache trout and Arctic grayling. The Apache trout in Lee Valley Lake are managed for recreation, not recovery, but must be compatible with recovery in the streams hydrologically connected to the lake. Arctic grayling are also considered compatible with Apache trout recovery

in the 3 connecting streams because they would not persist in the streams if they escape and have no trout hybridization potential.
Lee Valley Lake historically contained stocked brook trout, Apache trout, and Arctic grayling (Table 32). Brook trout were last stocked in 1985, but persisted for many years because they were able to spawn in the incoming stream. Lee Valley Lake was drained in 2003, in conjunction with chemical treatments in Lee Valley Creek (2003), East Fork LCR (2004-2005), and West Fork LCR (2006-2008) to remove non-native trout, with management focused on Apache trout recovery in the 3 streams.

Fish barriers for Apache trout recovery on the East Fork LCR and West Fork LCR are located downstream of the connection with Lee Valley Lake. A fish barrier is present on Lee Valley Creek, but is crumbling and is scheduled to be removed and replaced with a weir-type structure. One of the purposes of the fish barrier was to concentrate spawning grayling coming up from the lake to allow the Department to harvest eggs that would be hatched in a hatchery and later restocked into the lake. The barrier is located in a meadow reach, a poor location for a fish barrier, and experiences frequent problems because of the location. Replacement with a weir that can be open most of the year, then screened during the two week grayling spawning run would congregate the grayling for the spawn collection, keep the grayling from dispersing up into the stream, and reduce the erosion above the lake during high flows. Because non-native brook trout or rainbow trout are no longer present in the lake or above in Lee Valley Creek, the barrier is no longer necessary on the stream.

Catchable size Apache trout are stocked annually, 3,000-7,000 per year, usually in April-June. High pH levels usually prohibit stocking events in mid-summer. The lake experiences occasional winter kills, so fish are typically not stocked in the fall to prevent rapid use of oxygen under the ice cover. Plans are being developed that will help address the winterkill problems at Lee Valley Lake.

Arctic grayling are stocked opportunistically, when hatchery fish are available from the closest source in Wyoming. Grayling have been stocked only 3 times in the last 10 years, all at sub-catchable size. However, the Department prefers to stock grayling annually to maintain a robust fishery for this species, which are very popular with fly fishermen. Arctic grayling were hatched and raised in local state hatcheries in the 1980s on a regular basis when the lake did not winterkill, and a brood stock of grayling persisted in the reservoir. The Department is attempting to develop a brood stock of grayling again, and anticipate stocking both fingerling and sub-catchable grayling when that happens, up to 30,000 fingerlings per year, and/or up to 7,000 sub-catchables per year. Because sources of Apache trout and Arctic grayling are limited, the low bag limit and minimum size limit are expected to keep these fish in the reservoir for some time.

Table 32. Stocking history of Lee Valley Lake.

Species	First Year	Last Year	Num. of Stockings	Num. Stocked
Apache trout	1968	2009	38	70,212
Brook trout	1953	1985	28	356,286
Arctic grayling	1965	2008	17	149,179
Total			83	570,179

Lee Valley Lake received 11,468 angler use days in 2001 (Pringle 2004). Special regulations on the lake include artificial lure and fly only, 2 fish bag limit, with a minimum size of 12 inches. The lake freezes over and is typically accessed by snowmobile only during the winter, and the lake likely receives little ice fishing use because of the smaller fish available and artificial lure and fly regulation.

The Integrated Fisheries Management Plan for the LCR Watershed (Young et al. 2001) identifies the management emphasis for Lee Valley Lake as featured species sport fish, with a desired fish assemblage of Apache trout, Arctic grayling, and bluehead sucker. The proposed action is consistent with the emphasis identified in the plan.

Proposed Action

The Department proposes to stock Apache trout and Arctic grayling for the period covered by this consultation.

Catchable Apache trout would be stocked from April to June annually; numbers of Apache trout may be from 0 to 7,500 fish annually.

Fingerling and sub-catchable Arctic grayling would be stocked annually from April to October; numbers of grayling may be from 0 to 30,000 fish annually.

Water Distribution/Connectivity

Lee Valley Lake is the furthest upstream stocking site in this complex. The spillway drains into an unnamed drainage that goes into the West Fork LCR just downstream of Sheep's Crossing, then flows downstream into Greer, past the Greer lakes and on down towards Springerville. Lee Valley Creek flowing into Lee Valley Lake is mostly perennial, with the very lower reach drying up during drought years. There is approximately 2 miles of stream above the lake.

Lee Valley Creek below Lee Valley dam enters the East Fork LCR upstream of Colter Reservoir; however, water is not released out of the outlet valve. AGFD holds water rights at Lee Valley Lake and does not release this water for irrigation or other purposes. The spillway on the lake, however, spills overland into a shallow basin just northeast of the lake, then down a drainage for 1.5 miles into the West Fork of the LCR, just downstream of Sheep's Crossing (0.9 miles). This

unnamed drainage from the Lee Valley Lake spillway is intermittent and flows only when the lake is spilling, typically in the spring. However, the lake may not spill during drought years. From the point where this spillway drainage enters the West Fork LCR downstream, connectivity is discussed under the West Fork LCR at Sheep's Crossing stocking site.

Fish Movement

Currently, a constructed fish barrier is present on Lee Valley Creek a short distance upstream from the lake, which would prohibit upstream movement into Lee Valley Creek. This barrier was constructed when brook trout were present in the lake. Now that brook trout and rainbow trout have been removed, the barrier on Lee Valley Lake is being considered for removal.

An Apache trout swimming upstream into Lee Valley Creek could persist if it found a deep pool. The creek is suitable for trout, and is being used for recovery, but is extremely small. A catchable size Apache trout would be oversized for the habitat in Lee Valley Creek.

An Arctic grayling would likely not swim up into the creek until it was mature and ready to spawn. When they do attempt to spawn, the gravid fish tend to congregate in the lake near the creek, and then enter the creek in a group as the water temperatures warm in the late morning, typically in early May. Mature fish attempt to spawn, and then return back to the lake, based on observations made over several years in the late 1980s and early 1990s. Any grayling that do not return to the lake would not likely persist in the creek, because a mature grayling would be oversized for the habitat in Lee Valley Creek. Several surveys and two complete chemical treatments have never documented grayling persisting in Lee Valley Creek.

Stocked fish in Lee Valley Lake cannot get out through the dam and into the natural drainage and then into the East Fork LCR, but they can escape over the spillway into the West Fork LCR during spill events. In the very extremely low chance that a fish escaped into the East Fork during a brief valve check every 10 years, it would have no different impact than if a fish escaped out the spillway and into the West Fork. Both the East and West Fork LCR are managed for recovery populations of Apache trout, with barriers located downstream of the dam outlet on the East Fork and downstream of the spillway outlet on the West Fork. An escaped fish can swim upstream for several miles in either the East Fork or West Fork, depending upon which route it escaped, or it could swim downstream, over the barriers, and down to the confluence of the East and West Fork LCR, into the mainstem LCR, and down into River Reservoir. For downstream movement below River Reservoir, see the Greer Lake analysis.

Both the East and West Forks are suitable trout habitat, which is why they are being used for Apache trout recovery. An escaped Apache trout could persist in either of these streams above the barriers, in the absence of brown and rainbow trout. Downstream of the barriers, the habitat is suitable, but competition with brown trout keeps the Apache trout from establishing and reproducing in that area. This is similar in the Greer lakes as well. An Arctic grayling escaping

downstream might attempt to reproduce but would not persist. Numerous surveys and several complete chemical renovations have never found an Arctic grayling in the East or West Forks of the LCR.

Community Description

Lee Valley Lake currently contains pure hatchery Apache trout, Arctic grayling, and fathead minnow. The lake draining in 2003 removed all trout, but a few fathead minnow persisted in the remaining shallow pool, even through the winter. Tiger salamander and extremely low densities of crayfish were also documented during the draining effort in 2003. A herpetological survey at the lake in 1992 documented only tiger salamander. Fish surveys in Lee Valley Lake since 2000 are provided in Table 33.

Table 33. Survey history at Lee Valley Lake.

Survey date/gear type	**Species collected**	**Number collected**	**Size range (mm TL)**
May 2000 Trap nets (4)	Apache trout Arctic grayling Fathead minnow	1 120 540	300 236-378 Not measured
May, October, November 2003 Exp. gillnets/green meanie gillnets/bag seine	Apache trout Arctic grayling Fathead minnow	28 22 Thousands	233-388 220-372 Not measured
May 2005 Exp. gillnets (5)	Apache trout	10	102-390
April 2007 Exp. gillnets (3)	Apache trout Arctic grayling	17 2	405-565 260-262
May 2008 Exp. Gillnets (2)	Apache trout	35	327-405

Lee Valley Creek currently contains pure Apache trout that were stocked in 2004. A herpetological survey in Lee Valley Creek in 2002 did not collect amphibians or reptiles. The West Fork LCR currently contains pure Apache trout that were stocked in 2007, and annually at Sheep's Crossing, beginning in 2009. The East Fork LCR contains pure Apache trout that were stocked in 2006 and 2007. The chemical treatments removed wild brook trout from Lee Valley Creek in 2003, wild brook trout, speckled dace and bluehead sucker from the East Fork LCR above a third barrier at the Coulter Dam in 2004 and 2005, and wild brook trout and brown trout from the West Fork LCR above the barriers in 2006 and 2008. Speckled dace and bluehead sucker are scheduled to be repatriated into the East Fork LCR above the fish barriers because

they were present prior to the chemical treatment and native in the stream. Herpetological surveys conducted at 2 sites on the East Fork LCR at Colter and Phelps cabin in 1992 and 1995 documented only wandering garter snake at one site. Chiricahua leopard frog surveys were conducted throughout Lee Valley Creek and East Fork LCR in 2003, and West Fork LCR in 2006, prior to chemical treatments to remove non-native fishes, but found no leopard frogs.

Both the East Fork LCR and West Fork LCR below the barriers still contain wild brown trout and a few persisting rainbow and/or Apache trout seasonally from stocking the Greer site. The LCR through Greer and above River Reservoir contains wild brown trout, a few persisting rainbow and/or Apache trout seasonally from stocking the Greer site, and some speckled dace and bluehead suckers. Brown trout reproduce through this reach, but the rainbow and Apache trout do not appear to reproduce successfully.

River Reservoir contains stocked rainbow trout, wild brown trout, fathead minnows, yellow perch, and occasional common carp and bluehead sucker. The fatheads, yellow perch, and carp likely all spawn in the reservoir; however, trout likely do not. Some brown trout are known to run up into the river to spawn in the fall, but this has not been documented with the rainbow trout in River Reservoir, nor have young rainbow trout ever been collected from the reservoir. The aquatic community downstream of River Reservoir will be discussed in the Greer lakes analysis below.

Consultation Species or Critical Habitat

Potential impacts from the proposed action to candidate and listed species are described below. Please refer to Chapter 4 for a detailed description of the nature of the impacts (which may include predation, competition for space and food, and hybridization etc.).Subsequent responses (resulting from the frequency, magnitude and duration of the impacts) between proposed stocked and candidate and listed species, and any site or complex factors that provide context for determining the meaningfulness of the impacts, are discussed below. Impacts from the proposed action resulting from angler related recreation and/or potential introduction of disease, pathogen or invasive species are evaluated at a broad scale for the entire action area and are described in Chapter 4. If potential impacts specific to a stocking site or complex have been identified they are discussed below.

Potential impacts to consultation species including Apache trout and southwestern willow flycatcher are addressed below. Chiricahua and Northern leopard frogs are analyzed below at the local site and broad scale level due to the movement potential into the stocked area and fish movement potential up or downstream into areas where frogs may occur. Potential impacts due to the proposed action to Little Colorado spinedace and critical habitat are discussed in the West Fork Little Colorado River complex analysis.

Apache trout

Stocked Apache trout and Arctic grayling in Lee Valley Lake would have upstream access to Lee Valley Creek after the barrier is removed and to the West Fork LCR over the spillway. Emigration of Apache trout out of the reservoir is expected to be low, and those that do would either be assimilated into the pure Apache trout populations, move down past the barriers, or not persist. Stocked Apache trout would not be able to reach the East Fork LCR, except during the few minutes the valve is checked every 10 years, and this chance is extremely low. Again, even if they did, they would either be assimilated into the pure Apache trout population in the East Fork, move down past the barriers, or not persist.

Emigration of Arctic grayling is expected to occur, but at low levels. Escaped Arctic grayling would have little effect on recovery Apache trout populations in Lee Valley Creek and the West Fork LCR. Arctic grayling remain in the lake all year and observations indicate they only seek running water during a spawning run in early May, and only mature individuals that are ready to spawn enter the creek. Fish return to the lake immediately following spawning activities; they enter the creek during mid-day, spawn, and then return to the lake by late afternoon. There is the possibility for competition for resources between Arctic grayling and Apache trout during the several hours that grayling are in the stream, however competition would be extremely short term and not expected to have any measurable impact. Arctic grayling that went downstream over the spillway into the West Fork LCR would not be able to return to the lake, but would also not persist in the West Fork. It is possible for competition for resources between grayling and Apache trout in the West Fork, however, competition would be from very low numbers of grayling that might escape, and short term, possibly for a matter of several weeks, but this is unknown. No grayling have ever been detected in the 3 connecting streams. Food resources are also not known to be a limiting factor for Apache trout in this section of stream.

A comprehensive survey throughout the West Fork LCR in 1995, and 3 complete chemical treatments in 2006 found no Arctic grayling in West Fork LCR. Angler creel surveys in the West Fork LCR in 1982, 1987, 1998, 1999, and 2003 detected no Arctic grayling being caught by anglers. Arctic grayling have not been detected in Lee Valley Creek because the fish barrier has been in place since 1979. If and when the barrier is removed, it would be replaced with a weir that would be screened each year during the grayling spawning run, the only time they are inclined to exit the lake. If grayling are getting out of Lee Valley Lake since stocking them from 1965 through 2008, the numbers are so extremely small or they persist for such a short period that they are never found during surveys. Thus they would have very limited impact on the Apache trout populations.

The stocking of Arctic grayling does indirectly benefit Apache trout recovery in the connecting streams. Grayling are stocked partly to provide additional angling opportunity when the Apache trout in Lee Valley Lake are not biting. Grayling seem to handle the high pH levels in the

summer months better than the Apache trout. With just Apache trout in the lake, the fishing is good in the spring and early summer then is poor for the rest of the year. Grayling in the lake in sufficient numbers continue to provide decent fishing through the year even when the Apache trout stop biting. Anglers may be more likely to illegally stock another species if the fishing is not good. Stocking grayling and providing a better fishery may help to keep non-compatible non-native salmonids, like rainbow trout, brook trout, and brown trout from being illegally stocked.

Potential Impacts

Stocked Apache trout co-stocked with other species

Apache trout stocked from the hatcheries are for the specific purpose of providing fishing opportunities. Recovery streams are managed for self-sustaining Apache trout populations and regular stocking is not part of that management except with wild trout to initiate and augment the population as needed until it becomes self-sustaining. Apache trout stocked for recreational purposes are considered excess to the survival and recovery of the species. Take of these stocked fish via harvest by anglers is allowed under the section 4(d) rule contained in the designation of the Apache trout as a Threatened species. That rule allows take of Apache trout if such take is in accordance with State law; in this case through possession of a valid Arizona fishing license and trout stamp.

Arctic grayling do not appear to persist in streams in Arizona and their biology, feeding, and spawning behavior provide for only limited opportunity for overlap with Apache trout. The stocking of Arctic grayling could have a benefit to the recovery of Apache trout by maintaining good catch rates for anglers in the lake, which may deter anglers from illegally stocking other trout that are not compatible with Apache trout, such as rainbow trout, brook trout and brown trout. No Arctic grayling have been documented in Apache trout habitat downstream of Lee Valley Lake.

Impacts to stocked Apache trout from co-stocked Arctic grayling may include competition and less likely, predation of Apache trout eggs or juvenile fish. A detailed discussion of these impacts is found in Apache trout interactions section (Chapter 4).

Stocked Apache trout into recovery Apache trout

The action of stocking Apache trout is considered a conservation action in furtherance of the Endangered Species Act whereby a special 4(d) rule is in place. AGFD may take any federally listed threatened fish or wildlife for conservation purposes that are consistent with the purposes of the Act and the Section 6 Cooperative Agreement between USFWS and AGFD and therefore take of Apache trout from the proposed stocking of Apache trout is legally permitted.

Apache trout stocked for recreation into an Apache trout recovery stream will only occur at Sheep's Crossing on the Little Colorado River whereby Apache trout stocked into Lee Valley Lake, upstream of the recovery reach, could escape and move into the recovery population. Apache trout are also stocked directly into the recovery population at Sheep's Crossing. Stocked Apache trout would not be able to reach the East Fork LCR, except during the few minutes the valve is checked every 10 years, and this chance is extremely low. Again, even if they did, they would either be assimilated into the pure Apache trout population in the East Fork, move down past the barriers, or not persist. All other recreational stockings of Apache trout will occur in non-recovery areas for Apache trout. This recovery population is designated open to angling under the special 4(d) rule. Once stocked, Apache trout will be considered part of the recovery population. The Department would stock hatchery reared apache trout into the recovery population at densities expected to maintain angler satisfaction while minimizing impacts to the population as a whole. Some density dependent competition may occur in the stocking reach however not throughout the entire recovery reach since stocking only occurs at the lower end of the reach where angler access is possible.

Stocked Arctic grayling moving into recovery reaches

There are three stocking sites that are not separated by a barrier from a recovery Apache trout reach; they are: 1) Apache trout stocked for recreation into an Apache trout recovery stream will only occur at Sheep's Crossing on the Little Colorado River whereby Apache trout stocked into Lee Valley Lake, upstream of the recovery reach, could escape and move into the recovery population. Apache trout are also stocked directly into the recovery population at Sheeps Crossing (see #4 below), 2) a recovery population in the South Fork of the Little Colorado River. This recovery reach is located above a barrier; however, Mexican Hay Lake is located upstream of both the barrier and recovery reach. Apache trout stocked into Mexican Hay Lake may escape and reach the recovery population downstream, and 3) Ackre Lake, located in the headwaters of Fish Creek Fish Creek is a recovery stream, and Apache trout or Arctic grayling may escape Ackre lake and enter the recovery population downstream in Fish Creek.

It is possible for competition for resources between grayling and Apache trout in Lee Valley Lake or downstream in the West Fork, however, competition would be from very low numbers of grayling that might escape, and short term, possibly for a matter of several weeks, but this is unknown. No grayling have ever been detected in the 3 connecting streams. Food resources are also not known to be a limiting factor for Apache trout in this section of stream. Arctic grayling do not appear to persist in streams in Arizona and their biology, feeding, and spawning behavior provide for only limited opportunity for overlap with Apache trout. The stocking of Arctic grayling could have a benefit to the recovery of Apache trout by maintaining good catch rates for anglers in the lake, which may deter anglers from illegally stocking other trout that are not compatible with Apache trout, such as rainbow trout, brook trout and brown trout.

Impacts from wild populations on stocked Apache trout

The action of stocking Apache trout is considered a conservation action in furtherance of the Endangered Species Act whereby a special 4(d) rule is in place. AGFD may take any federally listed threatened fish or wildlife for conservation purposes that are consistent with the purposes of the Act and the Section 6 Cooperative Agreement between USFWS and AGFD and therefore take of Apache trout from the proposed stocking of Apache trout is legally permitted.

If Apache trout stocked in Lee Valley Lake escape and move downstream into the Sheeps Crossing recovery population or the East Fork LCR move further downstream into River Reservoir or the LCR impacts to stocked Apache trout from species of fish currently existing as wild, self reproducing populations at or in proximity to proposed stocking locations may include predation, hybridization with other trout and/or competition.

Northern Leopard Frog

Local Analysis: Although Lee Valley Lake and the West Fork LCR buffered stocking complex are within the historical range of the northern leopard frog, the likelihood that northern leopard frogs will be exposed to fish stocked in Lee Valley Lake is low. There are no historical records for northern leopard frogs at Lee Valley Lake. There have been 32 surveys at 24 sites within the buffered stocking complex between 1942 and 2002 (Figure 5, HDMS, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). There are historical records for northern leopard frogs from 3 sites in the buffered complex: Benny Creek (SR 373) (1979), Little Colorado River (7 KM W of Eager) (1979), and Sheep Springs (FS 89 JCT W/HWY 260) (1942) (AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). Northern leopard frogs were not observed during subsequent surveys at Benny Creek (SR 373) (1992 and 1995) or Sheep Springs (FS 89 JCT W/HWY 260) (1995) and it is likely that northern leopard frogs no longer occupy these sites (HDMS, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.).

Broad Scale Analysis: The likelihood that northern leopard frogs will be exposed to dispersing stocked fish from Lee Valley Lake and the West Fork buffered stocking complex is moderate. Stocked fish could disperse as far downstream as Lyman Lake and there are records from 2007-2009 for northern leopard frogs just downstream of Lyman Lake (Drost, pers. comm.). Although the main drainage does not provide suitable habitat for northern leopard frogs because of fast flowing water and presence of crayfish, the frogs are occupying a series of ponds and marshy meadows along the outflow from the Lyman Lake dam (Drost, pers. comm.). In addition, this population is the last known extant population of northern leopard frogs in the Upper Little Colorado River drainage and is thought to be declining (Drost, pers. comm.).

Chiricahua Leopard Frog

Local Analysis: Although Lee Valley Lake and the West Fork LCR buffered stocking complex are within the historical range of the Chiricahua leopard frog, the likelihood that frogs will be

exposed to fish stocked in Lee Valley Lake is low. There are no historical records for Chiricahua leopard frogs at Lee Valley Lake or within the West Fork buffered stocking complex. There have been 32 surveys and site visits at 24 sites within the buffered stocking complex between 1942 and 2002 (Figure 5, HDMS, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.); no Chiricahua leopard frogs were observed. In addition, even though the West Fork LCR buffered stocking complex is within a Chiricahua leopard frog recovery unit, the majority of the complex is outside of the Black River Management Area, suggesting that habitat and conditions for recovery are less suitable in that area. Therefore, it is likely that Chiricahua leopard frogs do not occupy the West Fork buffered stocking complex.

Broad Scale Analysis: The likelihood that Chiricahua leopard frogs will be exposed to dispersing stocked fish from Lee Valley Lake and the West Fork Complex is low. There are no records for Chiricahua leopard frogs in the Little Colorado River where stocked could disperse to, but stocked fish could travel downstream the Little Colorado River and upstream the tributary of Nutrioso Creek where there are 2 historical records for Chiricahua leopard frogs: Nutrioso Creek (Correjo Crossing, 1979) and Nelson Reservoir (SE Corner, 1971). Chiricahua leopard frogs were not observed during subsequent surveys at Nutrioso Creek (Correjo Crossing) (1995) and Nelson Reservoir (SE Corner) (1987, 1992, 1993, and 1995) and it is not likely that Chiricahua leopard frogs currently occupy these sites or this area (HDMS, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.).

Southwestern Willow Flycatcher and Critical Habitat

In the White Mountains, nesting flycatcher habitat can be found along the upper Little Colorado River (and a portion of its forks) downstream to the Town of Greer area. These areas primarily occur within the Apache Sitgreaves National Forest, although private land parcels are also included. Southwestern willow flycatchers have been documented nesting at three sites in the upper Little Colorado River drainage downstream to Eager.

Southwestern willow flycatcher critical habitat occurs within the White Mountains along the Little Colorado River drainage downstream to the Town of Greer. Lee Valley Lake is not located in critical habitat; the closest critical habitat is located approximately 1 mile due east on the East Fork of the Little Colorado River and approximately 1.2 miles due north on the West Fork Little Colorado River.

Potential Impacts

Stocking and angling at high elevation is most likely to occur in the late spring and summers because of the harsh winters and difficult access. Late spring and summer coincides with flycatchers nesting season.

In the White Mountains, the primary limit to angler use is the location of stocked trout and access. However, anglers are not anticipated to wander remarkably far from the stocked

locations. As a result, it is anticipated that most effects would occur near where trout are stocked. The Apache-Sitgreaves NF staff estimate that approximately 70,000 to 75,000 people use the recreation area in and around the Greer Area and forks of the Little Colorado River annually. Anglers will likely be on foot and either alone or in small parties. The proposed trout stocking actions are an ongoing action that has a long history of occurring in the headwaters of the Little Colorado River. As a result, it is anticipated that anglers will likely continue to visit areas that they have visited in the past. To facilitate ease of access to the stream, anglers are expected to primarily stay on existing primitive foot trails or cattle/wildlife trails and/or walk between patches of dense vegetation. Additionally, once anglers reach their destination, they are not anticipated to be fishing in tight areas where vegetation is dense that causes casting to be difficult.

There may be some limited amount of habitat degradation from anglers using or creating new trails to access the stocking site. There may be some amount of disturbance to nesting flycatchers from anglers accessing the stocking site.

Critical Habitat
No impacts to critical habitat are anticipated. Lee Valley Lake is not located in critical habitat and anglers are not anticipated to wander remarkably far from the stocked locations.

West Fork LCR at Sheep's Crossing

Site Description
Sheep's Crossing is a short reach of stream habitat on the West Fork of the Little Colorado River (LCR), approximately 4.8 miles upstream of Greer at an elevation of 9200 feet elevation. This reach of the West Fork is located at the crossing of Highway 273 (Forest Road 113) on the Apache-Sitgreaves National Forest. The West Fork LCR is also an Apache trout recovery stream, established in 2007, with 2 constructed fish barriers to keep out non-native trout, located 1.9 and 2.2 miles downstream of Sheep's Crossing. The stocking reach is approximately 0.5 miles long.

Sheep's Crossing is located on a heavily used highway that leads to the popular Lee Valley and Big Lake Recreation Areas. Sheep's Crossing previously included a spur road from the old bridge leading upstream to a dirt parking lot near the Mt. Baldy Wilderness boundary; however, this parking area and spur road were removed in the 1990s. This left parking primarily along the road near the bridge, although a Mt. Baldy trail parking area was created further up the hill. There are no restrooms or picnic facilities down by the stream. Restrooms and picnic facilities are present at the trailhead at the top of the hill. Camping is not permitted at this location as it is within the Lee Valley Recreation Area; however, Winn Campground is located approximately 3 miles away.

Sheep's Crossing is currently open to the public and accessed by all-weather paved road, Forest Road 113/Highway 273, from April through November. The road is typically closed to vehicular access from December to April; however, it is a popular route for snowmobiles traveling to the Big Lake area to ice fish. Sheep's Crossing is also accessible by a popular foot trail along the West Fork LCR from Greer.

After construction the main parking area will be at the trailhead at the top of the hill, away from the stream, where several handicapped parking spaces are being created. A new bridge was built over the stream to facilitate a better flow of traffic to and from the Big Lake area. The old bridge will be retained for hikers and mountain bikers. A large railroad grade that crossed the river upstream of the old bridge, long ago abandoned, was removed as part of mitigation for the highway project.

Management of Water Body

The West Fork of LCR above the two fish barriers will be managed as a self sustaining Apache trout recovery stream, with a put-and-take intensive use sport fishery utilizing pure strain hatchery Apache trout stocked only at Sheep's Crossing. The put-and-take fishery is being retained at Sheep's Crossing to meet angler demand at this high-use area on the highway, and to discourage illegal stocking of non-native trout if the fishing was not good enough to support the demand. Angler use has been measured at Sheep's Crossing by angler creel surveys in 2003 (7,290 angler use days from May through August), 1999 (9,141 AUDs from June through Sept), 1998 (11,037 AUDs from May through Nov), 1987 (8,176 AUDs from May through Sept), and 1982 (8,065 AUDs from May through Oct). Self sustaining wild Apache trout will be managed in the remainder of the stream, both upstream and downstream of Sheep's Crossing.

Sheep's Crossing was originally managed in conjunction with recreational trout stocking on the LCR in Greer, stocking catchable rainbow trout weekly from May to September up through 1998. In 1999-2001, rainbow trout were phased out and replaced with Apache trout at Sheep's Crossing, and then stocked exclusively with Apache trout starting in 2002 through 2006.
Two fish barriers were constructed on the West Fork LCR between Sheep's Crossing and Greer in 2004-2005, and the stream was chemically treated several times in 2006 with a piscicide to eliminate all non-native trout upstream of the barriers (brown trout and brook trout). No rainbow trout were found during the treatments, which resulted in a total fish-kill allowing identification of individuals. Sheep's Crossing had been closed to the public since summer 2006 and re-opened in 2009, due to construction on Highway 273 from Sunrise to Crescent Lake. Sheep's Crossing was not stocked with hatchery fish during 2006-2008, but stockings began again with pure Apache trout in 2009. The upper West Fork LCR in the wilderness area was stocked twice in 2007 with wild Apache trout of East Fork White River origin; one stocking directly from East Fork White River, and one stocking from the West Fork of Black River, which was originally established with hatchery Apache trout in 1997.

Sheep's Crossing will be managed separately from the LCR in Greer stocking site, now that the fish barriers are in place and wild Apache trout are being managed for recovery purposes. Only pure Apache trout of East Fork White River strain will be stocked at Sheep's Crossing for recreational fishing; they are considered compatible with the wild self sustaining population in the remainder of the stream. See below for LCR at Greer for information on historic stocking in this reach. The historic stocking data was combined with the LCR at Greer in the hatchery stocking database.

Sheep's Crossing was stocked with "native" cutthroat trout in 1921-1936, brook trout in 1935-1937, brown trout in 1940-1953, rainbow trout in 1936-2001, and Apache trout in 1999-2006. Wild Apache trout of East Fork White River strain were stocked in the wilderness portion of the West Fork LCR upstream of Sheep's Crossing in 2007. Catchable hatchery trout are normally stocked on a weekly basis at Sheep's Crossing from May to September, because they get caught and removed so quickly.

Proposed Action

The Department proposes to stock Apache trout for the period covered by this consultation. Catchable Apache trout would be stocked multiple times from May to September annually; numbers of Apache trout stocked may be from 0 to 12,000 fish annually.

Water Distribution/Connectivity

Sheep's Crossing is a short reach of stream habitat on the West Fork LCR, which drains off high elevations on the east slope of Mt. Baldy. As water flows down from Sheep's Crossing for 1.0 miles, it meets an unnamed tributary from the spillway from Lee Valley Lake. Lee Valley Lake is located 1.53 miles up the unnamed tributary, which only flows in the spring when Lee Valley Lake spills. From the unnamed tributary, the West Fork LCR flows downstream for 0.9 miles to the upper of 2 constructed fish barriers. The second constructed fish barrier is located 0.3 miles downstream of the upper barrier. Everything above this lower barrier is managed for Apache trout recovery, or is compatible with Apache trout recovery. Colter Dam, located 6.2 miles upstream of the confluence of the East and West Forks and 8.5 miles upstream of River Reservoir, is also used as a fish barrier for Apache trout recovery (upstream most barrier), but was not constructed for that purpose. Another irrigation lake existed at one time at Colter Dam, but was abandoned when the lake would not hold water due to fissures in the lake bottom. A vertical drop exists in the outlet pipe that is always left open, and is a functional fish barrier to upstream fish movement

From the lower fish barrier, water flows downstream for 2.8 miles to the confluence with the East Fork LCR, where it forms the mainstem LCR in Greer. The mainstem LCR flows downstream through the LCR Greer stocking site, flowing for 2.3 miles into River Reservoir. The LCR upstream of River Reservoir is perennial from the headwaters of the East and West

Forks on Mt. Baldy downstream to the confluence of the forks and down into the reservoir. For connectivity with tributaries below River Reservoir, refer to the Greer lakes section.

Fish Movement

Stocked Apache trout have the ability to move upstream to the headwaters of the West Fork LCR, or downstream over the fish barriers in the lower West Fork LCR. Once below the barriers, trout can move down into the LCR through Greer and into River Reservoir, or up the East Fork LCR at its confluence with the West Fork. Stocked Apache trout could only travel up the East Fork LCR until they reach the first of two constructed fish barriers. All these waters are suitable trout habitat and stocked Apache trout could persist.

Community Description

The West Fork of LCR, above the 2 constructed fish barriers, contains pure Apache trout. The piscicide treatments in 2006 removed wild brown and brook trout that were established in the river. Downstream of the two constructed fish barriers brown trout are still wild and self sustaining. Stocked Apache trout, fish that either moved down from the Sheep's Crossing stocking site or moved upstream from the LCR Greer stocking site, and rainbow trout are also present. Wild brown trout, speckled dace, fathead minnow, bluehead sucker, stocked Apache trout from the LCR Greer stocking site, and rainbow trout are present in the LCR in Greer (M. Lopez pers. comm.).

The East Fork LCR was chemically treated several times in 2004-2005 to remove a wild population of brook trout above Colter dam which serves as the upstream most barrier of three barriers located on the East Fork LCR. Pure Apache trout were reintroduced into the East Fork LCR above Colter cam in 2006-2007. Wild brown trout, speckled dace, and bluehead sucker, plus stocked rainbow trout and Apache trout still exist below Colter Dam. Future chemical treatments will remove browns and rainbows between Colter cam and the downstream most barrier and with the reach will be restocked pure Apache trout. The middle barrier provides extra protection and isolation of non-native fishes should the lowest barrier fail.

Consultation Species or Critical Habitat

Potential impacts from the proposed action to candidate and listed species are described below. Please refer to Chapter 4 for a detailed description of the nature of the impacts (which may include predation, competition for space and food, and hybridization etc.).Subsequent responses (resulting from the frequency, magnitude and duration of the impacts) between proposed stocked and candidate and listed species, and any site or complex factors that provide context for determining the meaningfulness of the impacts, are discussed below. Impacts from the proposed action resulting from angler related recreation and/or potential introduction of disease, pathogen or invasive species are evaluated at a broad scale for the entire action area and are described in

Chapter 4. If potential impacts specific to a stocking site or complex have been identified they are discussed below.

Potential impacts to consultation species including Apache trout, Mexican spotted owl, New Mexico meadow jumping mouse and southwestern willow flycatcher are addressed below. Chiricahua and Northern leopard frogs are analyzed below at the local site and broad scale level due to the movement potential into the stocked area and fish movement potential up or downstream into areas where frogs may occur. Potential impacts due to the proposed action to Little Colorado spinedace and critical habitat are discussed in the West Fork Little Colorado River complex analysis.

Apache Trout

Stocked hatchery Apache trout would likely mix with the wild Apache trout in the West Fork LCR, but are not expected to have any impact on the wild population. Wild Apache trout would potentially be suppressed by intensive stocking at Sheep's Crossing, as were brown trout when rainbow trout were stocked on top of them prior to 1999. However, the wild population of Apache trout is expected to be robust and healthy, largely unaffected by stocked Apache trout immediately upstream and downstream of the stocking site. An occasional stocked Apache trout may swim upstream or downstream and mix with the wild population, which is considered to be beneficial to the wild population. The wild population was established using wild fish from the same strain utilized in the hatchery, the East Fork White River strain. One stocking came directly from the East Fork White River and had no hatchery origin. The second stocking came from the West Fork Black River, which were originally established in 1997 with pure Apache trout directly from the hatchery. Both wild fish stockings in the West Fork LCR occurred in 2007.

The same strain of Apache trout would be used for stocking the West Fork of the LCR above the fish barrier as was used to establish the recovery population in this same reach. Other strains of Apache trout recovery populations in the East Fork LCR (Soldier Creek strain) and South Fork LCR (Big Bonito strain) are isolated by constructed fish barriers.

Potential impacts

Stocked Apache trout into recovery Apache trout

The action of stocking Apache trout is considered a conservation action in furtherance of the Endangered Species Act whereby a special 4(d) rule is in place. AGFD may take any federally listed threatened fish or wildlife for conservation purposes that are consistent with the purposes of the Act and the Section 6 Cooperative Agreement between USFWS and AGFD and therefore take of Apache trout from the proposed stocking of Apache trout is legally permitted.

Apache trout stocked for recreation into an Apache trout recovery stream will only occur at Sheep's Crossing on the Little Colorado River. All other recreational stockings of Apache trout

will occur in non-recovery areas for Apache trout. This recovery population is designated open to angling under the special 4(d) rule. Once stocked, Apache trout will be considered part of the recovery population. The Department would stock hatchery reared apache trout into the recovery population at densities expected to maintain angler satisfaction while minimizing impacts to the population as a whole. Some density dependent competition may occur in the stocking reach however not throughout the entire recovery reach since stocking only occurs at the lower end of the reach where angler access is possible.

Apache trout escapement from recovery areas and exposure to stocked sport fish

If recovery Apache trout were to move out of Sheeps Crossing downstream into the Greer stocking reach or further downstream into River Reservoir or the LCR (areas where stocked Apache trout or other stocked species may be present), they would be considered assimilated into the existing Apache trout population and subject to the special 4(d) rule. They would no longer be distinguishable from the stocked Apache trout, and would no longer contribute towards recovery. Impacts to these individuals would be assessed in the same manner as for stocked Apache trout in non-recovery areas (Stocked Apache trout co-stocked with other species).

Impacts from wild populations on stocked Apache trout

The action of stocking Apache trout is considered a conservation action in furtherance of the Endangered Species Act whereby a special 4(d) rule is in place. AGFD may take any federally listed threatened fish or wildlife for conservation purposes that are consistent with the purposes of the Act and the Section 6 Cooperative Agreement between USFWS and AGFD and therefore take of Apache trout from the proposed stocking of Apache trout is legally permitted.

Impacts to stocked Apache trout from species of fish currently existing as wild, self reproducing populations downstream of Sheep's Crossing, in River Reservoir or downstream in the LCR may include predation, hybridization with other trout and/or competition.

Northern Leopard Frog

Local Analysis: Although Sheep's Crossing and the West Fork LCR buffered stocking complex are within the historical range of the northern leopard frog, the likelihood that fish stocked in Sheep's Crossing will have an impact on northern leopard frogs is low. There are no historical records for northern leopard frogs at Sheep's Crossing; however, there are historical records for northern leopard frogs from 3 sites in the buffered complex: Benny Creek (SR 373) (1979), Little Colorado River (7 KM W of Eager) (1979), and Sheep Springs (FS 89 JCT W/HWY 260) (1942) (HDMS, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). There have been 32 surveys and site visits at 24 sites within the buffered stocking complex between 1942 and 2002 (Figure 5, HDMS, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). Northern leopard frogs were not observed during subsequent surveys at Benny Creek (SR 373) (1992 and

1995) or Sheep Springs (FS 89 JCT W/HWY 260) (1995) and it is likely that northern leopard frogs no longer occupy these sites (HDMS, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.).

Broad Scale Analysis: The likelihood that northern leopard frogs will be exposed to dispersing stocked fish from Sheep's Crossing and the West Fork buffered stocking complex is moderate. Stocked fish could disperse as far downstream as Lyman Lake and there are records from 2007-2009 for northern leopard frogs just downstream of Lyman Lake (Drost, pers. comm.). Although the main drainage does not provide suitable habitat for northern leopard frogs because of fast flowing water and presence of crayfish, the frogs are occupying a series of ponds and marshy meadows along the outflow from the Lyman Lake dam (Drost, pers. comm.).

Chiricahua leopard frog

Local Analysis: Although Sheep's Crossing and the West Fork LCR buffered stocking complex are within the historical range of the Chiricahua leopard frog, the likelihood that frogs will be exposed to fish stocked in Sheep's Crossing is low. There are no historical records for Chiricahua leopard frogs at Sheep's Crossing or within the West Fork buffered stocking complex. There have been 32 surveys at 24 sites within the buffered stocking complex between 1942 and 2002 (Figure 5, HDMS, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.), no Chiricahua leopard frogs were observed. In addition, even though the West Fork LCR buffered stocking complex is within a Chiricahua leopard frog recovery unit, the majority of the complex is outside of the Black River Management Area, suggesting that habitat and conditions for recovery are less suitable in that area. Therefore, it is likely that Chiricahua leopard frogs do not occupy the West Fork buffered stocking complex.

Broad Scale Analysis: The likelihood that Chiricahua leopard frogs will be exposed to dispersing fish from Sheep's Crossing and the West Fork Complex is low. There are no records for Chiricahua leopard frogs in the Little Colorado River where stocked fish could disperse to, but fish could travel downstream the Little Colorado River and upstream the tributary of Nutrioso Creek where there are 2 historical records for Chiricahua leopard frogs: Nutrioso Creek (Correjo Crossing, 1979) and Nelson Reservoir (SE Corner, 1971). Chiricahua leopard frogs were not observed during subsequent surveys at Nutrioso Creek (Correjo Crossing) (1995) and Nelson Reservoir (SE Corner) (1987, 1992, 1993, and 1995) and it is not likely that Chiricahua leopard frogs currently occupy these sites or this area (HDMS, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.).

Mexican Spotted Owl Critical Habitat

The stocking stream reach (1.8 miles of it) is within Mexican spotted owl (MSO) critical habitat (CH), with the remaining 1.5 miles of stream outside of critical habitat.

Potential Impacts

The CH designation included most other protected and restricted habitats for the MSO. Indirect effects to CH may include actions that can affect forest structure and maintenance of adequate prey species identified as PCEs. These actions may include trampling of vegetation, soil compaction, removal of small woody debris or other physical degradation potentially altering the productivity and succession/regeneration of the vegetation. In the designation of critical habitat (USFWS 2004) most recreational activities, including angling, were not identified as requiring restrictions to protect the PCE's of critical habitat from destruction or adverse modification. In making that statement, recreational activities, including angling were assumed to not contribute to significant habitat-affecting activities such as cutting large trees or snags, removal of large woody debris from the forest floor, altering the tree species diversity, or other large-scale changes to habitat structure. The act of a relatively small number of people walking through habitat is not likely to cause the kind of effects that would result in adverse effects to the PCEs/KHCs of MSO CH and/or restricted and protected habitats.

Southwestern Willow Flycatcher and Critical Habitat

In the White Mountains, nesting flycatcher habitat can be found along the upper Little Colorado River (and a portion of its forks) downstream to the Town of Greer area. These areas primarily occur within the Apache Sitgreaves National Forest, although private land parcels are also included. Suitable habitat may exist in this reach of the West Fork LCR. Dense stands of willows exist along the river at and around Sheep's Crossing. The most recent documented occurrences (2000 and 2005) were recorded below the reach near the town of Greer (AGFD HDMS) approximately 2.5 miles upstream. Southwestern willow flycatchers have been documented nesting at three sites in the upper Little Colorado River drainage downstream to Eager.

Critical Habitat is designated along the West Fork LCR beginning above Sheep's Crossing and extends downstream past the confluence of the East Fork LCR and including and past River Reservoir. The West Fork LCR stocking reach is located within critical habitat.

Potential Impacts

Stocking and angling at high elevation is most likely to occur in the late spring and summers because of the harsh winters and difficult access. Late spring and summer coincides with flycatchers nesting season.

In the White Mountains, the primary limit to angler use is the location of stocked trout and access. However, anglers are not anticipated to wander remarkably far from the stocked locations. As a result, it is anticipated that most effects would occur near where trout are stocked. The Apache-Sitgreaves NF staff estimate that approximately 70,000 to 75,000 people use the recreation area in and around the Greer Area and forks of the Little Colorado River annually. Anglers will likely be on foot and either alone or in small parties. The proposed trout

stocking actions are an ongoing action that has a long history of occurring in the headwaters of the Little Colorado River. As a result, it is anticipated that anglers will likely continue to visit areas that they have visited in the past. To facilitate ease of access to the stream, anglers are expected to primarily stay on existing primitive foot trails or cattle/wildlife trails and/or walk between patches of dense vegetation. Additionally, once anglers reach their destination, they are not anticipated to be fishing in tight areas where vegetation is dense that causes casting to be difficult.

There may be some amount of disturbance to nesting flycatchers from anglers accessing the stocking site.

Critical Habitat
There may be some limited amount of habitat degradation from anglers using or creating new trails to access the stocking site. Neither of the two primary constituent elements identified for Southwestern willow flycatcher critical habitat are affected by the proposed action.

New Mexico Meadow Jumping Mouse
Habitat for the New Mexico meadow jumping mouse at Sheep's Crossing and along the West Fork Little Colorado River is in the area affected by recreation use, including access for fishing by anglers. Frey (2008) did not conduct surveys along the West Fork because of heavy angler use of the site and the risk that traps would not be secure from interference.

Potential Impacts
Impacts to habitat for the jumping mouse are likely occurring at Sheep's Crossing due to angler use that may be affecting habitat quality. Impacts to the mouse from stocking sport fish are related to anglers accessing fishing areas within mouse habitats. Human access to mouse habitat may result in trampling of vegetation, fragmentation of habitat patches, and soil compaction that degrades or eliminates habitat for the mouse. Since the mouse has a limited active period, quality habitat for foraging must be available for the mouse to get sufficient food to rear young and survive hibernation (USFWS 2007). There is also an increased risk of predation if the mice must cross trails or other openings to reach habitat patches. These impacts are ongoing, and other recreation use contributes to the current conditions. Sheep's Crossing is the Trailhead for the Mt. Baldy Trail, a trail maintained by the Apache Sit-graves National Forest that parallels the creek upstream for several miles. The likelihood or extent of disturbance impacts is unknown at this site.

Little Colorado River at Greer
Site Description
The LCR Greer stocking site is a 2.7 mile reach of the Little Colorado River (LCR) and extreme lower portions of the East Fork LCR and West Fork LCR in the town of Greer. Land ownership

of this stocking reach is a mix of Apache-Sitgreaves National Forest and private property in the town of Greer.

The LCR in Greer is accessible year around by paved Highway 373, the lower West Fork LCR is accessed year around by all-weather gravel road Forest Road 575, and the East Fork LCR is accessed year around by all-weather gravel County Road 1121. There are no established facilities for anglers at stocking sites in Greer, except on Forest Service land at Government Springs, where there is dirt parking and a restroom. Greer is a popular tourist town and receives a fair amount of recreational use, including fishing, hiking, horseback riding, and more. Many users rent cabins or rooms in Greer, stay at nearby Benny Creek Campground and Rolfe C. Hoyer Campground just out of town off Hwy 373, or drive in for the day from surrounding communities and other campgrounds.

Camping is not permitted on the stream itself in Greer; however, the river is on private land through most of the town. Popular hiking trails follow the East Fork LCR and West Fork LCR upstream from Greer.

Management of Water Body
Table 7 provides a summary of historic stocking activity at West Fork LCR near Greer and at Sheep's Crossing. In the Department's Hatchery Stocking database, these two locations are grouped as one record, so separating historic stocking history was not possible. The primary fishery is a cold water summer intensive use put-and-take fishery. Catchable trout are stocked weekly from May through September. Apache trout stocking will be the focus; however, rainbow trout will be used when numbers of Apache trout in the hatchery are insufficient to meet the numbers identified for stocking the stream.

Table 34. Summary of stocking history at LCR Greer and Sheep's Crossing.

Species	First Year	Last Year	Num. of Stockings	Num. Stocked
Apache trout	1999	2009	122	53,475
Rainbow trout	19336	2003	1012	1,076,648
Brook trout	1935	1937	2	29,264
Brown trout	1940	1973	17	59,394
Coho salmon	1973	1973	1	480
Native trout	1933	1936	2	20,000
Total			1,344	2,802,377

Greer stockings occur at accessible locations on the LCR upstream and into the lower portions of the East and West Forks of the LCR, for a total of about 2.7 miles all within the town of Greer. Fish are stocked from the first road crossing upstream through several sites in town to the end of

forest road 575 on the West Fork LCR in the Government Springs area, and to the Montlure church camp at the end of County Road 1121 on the East Fork LCR.

The Integrated Fisheries Management Plan for the LCR Watershed (Young et al. 2001) identifies the management emphasis for the LCR mainstem above River Reservoir as intensive use (put-and-take) sport fish with a desired fish assemblage of Apache trout, rainbow trout, brown trout, speckled dace, and bluehead sucker, which is consistent with the proposed action.

Proposed Action

The Department proposes to stock Apache trout and rainbow trout for the period covered by this consultation.

Catchable Apache trout would be stocked multiple times from May to September annually; numbers of catchable Apache trout stocked may be from 0 to 35,000 fish annually. Should numbers of Apache trout produced by the hatchery be insufficient to meet the numbers identified for stocking, rainbow trout will be stocked to make up the difference such that a total of no more than 35,000 trout are stocked into the reach.

Water Distribution / Connectivity

The East Fork LCR and West Fork LCR both originate in the high elevation of Mt. Baldy and flow 17.8 miles and 9.1 miles, respectively, to their confluence in the town of Greer, where they form the mainstem LCR. The LCR flows through Greer for 2.3 miles, and then into River Reservoir. The exception is a small portion of the East Fork LCR near Colter Reservoir that may dry up during extreme drought years; however, most of the drainage is perennial and supports wild fish. For connectivity downstream of River Reservoir, refer to the Greer lakes analysis.

Fish Movement

Trout stocked into the LCR Greer stocking site can swim up either the West Fork LCR or the East Fork LCR until they reach constructed fish barriers for Apache trout recovery in these forks. Two fish barriers were constructed on the West Fork LCR, 2.8 and 3.1 miles upstream of the confluence of the forks. Two fish barriers were constructed on the East Fork LCR, 2.2 and 2.4 miles upstream of the forks, plus a dam at the old Colter Reservoir, 6.2 miles upstream of the confluence of the forks, functions as a fish barrier.

Stocked trout can also swim downstream into River Reservoir, 0.4 miles below the lowest point of the stocking reach. These dispersing trout have the ability to move into the LCR downstream of River Reservoir during spill events in the spring or during irrigation releases in the summer. For fish movement downstream of River Reservoir, refer to the Greer lakes analysis.

Community Description

The LCR in Greer contains wild brown trout, stocked rainbow and Apache trout, fathead minnow, speckled dace, and bluehead sucker. The lower East Fork and West Fork LCR within

the stocking area contain primarily wild brown trout, and stocked rainbow and Apache trout. A herpetological survey on the lower East Fork LCR in Greer in 1995 documented wandering garter snakes. For a description of the aquatic community in and downstream of River Reservoir (downstream of this stocking site at Greer), refer to the Greer lakes analysis.

Southwestern willow flycatchers have been observed in the vicinity of the town of Greer in dense willow patches along the stream channel (Figure 7).

Figure 7. Photo of Greer town area where flycatchers were detected (2003).

Consultation Species or Critical Habitat

Potential impacts from the proposed action to candidate and listed species are described below. Please refer to Chapter 4 for a detailed description of the nature of the impacts (which may include predation, competition for space and food, and hybridization etc.).Subsequent responses (resulting from the frequency, magnitude and duration of the impacts) between proposed stocked and candidate and listed species, and any site or complex factors that provide context for determining the meaningfulness of the impacts, are discussed below. Impacts from the proposed action resulting from angler related recreation and/or potential introduction of disease, pathogen or invasive species are evaluated at a broad scale for the entire action area and are described in Chapter 4. If potential impacts specific to a stocking site or complex have been identified they are discussed below.

Potential impacts to consultation species including Apache trout, Mexican spotted owl, New Mexican meadow jumping mouse and southwestern willow flycatcher are addressed below.

Chiricahua and Northern leopard frogs are analyzed below at the local site and broad scale level due to the movement potential into the stocked area and fish movement potential up or downstream into areas where frogs may occur. Potential impacts due to the proposed action to Little Colorado spinedace and critical habitat are discussed in the West Fork Little Colorado River complex analysis.

Apache Trout

Recovery populations of Apache trout occur a short distance upstream of the stocking site in the West Fork LCR and East Fork LCR; however, stocked trout cannot reach occupied habitat due to a number of constructed barriers. These structures were built exclusively to protect the recovery populations by prohibiting upstream movement of non-native salmonids. Another recovery population of Apache trout exists in the South Fork LCR which joins the mainstem LCR downstream of River Reservoir, but the South Fork also has constructed fish barriers to exclude non-native trout.

Potential Impacts

Stocked Apache trout co-stocked with other species:

Apache trout stocked from the hatcheries are for the specific purpose of providing fishing opportunities. Recovery streams are managed for self-sustaining Apache trout populations and regular stocking is not part of that management except with wild trout to initiate and augment the population as needed until it becomes self-sustaining. Apache trout stocked for recreational purposes are considered excess to the survival and recovery of the species. Take of these stocked fish via harvest by anglers is allowed under the section 4(d) rule contained in the designation of the Apache trout as a Threatened species. That rule allows take of Apache trout if such take is in accordance with State law; in this case through possession of a valid Arizona fishing license and trout stamp.

Impacts to stocked Apache trout from co-stocked rainbow trout may include predation, competition, and/or hybridization with stocked trout. A detailed discussion of these impacts is found in Apache trout interactions section (Chapter 4).

Stocked sport fishes moving above failed barriers or moving into recovery reaches:

Impacts to recovery Apache trout are not expected occur because recovery populations are located above constructed barriers, which prevent upstream movement of all fish. Should barrier failure occur, the Forest Service and Department would attempt to repair the barrier and if necessary retreat the reach to remove non-native fish. During this period of time, if stocked fish move above the failed barrier, predation, hybridization with other trout and/or competition with Apache trout could occur.

Apache trout escapement from recovery areas and exposure to stocked sport fish:

If recovery Apache trout were to move out of designated recovery areas to areas where stocked Apache trout or other stocked species may be present, they would be considered assimilated into the existing Apache trout population and subject to the special 4(d) rule. They would no longer be distinguishable from the stocked Apache trout, and would no longer contribute towards recovery. Impacts to these individuals would be assessed in the same manner as for stocked Apache trout in non-recovery areas

Impacts from wild populations on stocked Apache trout:

The action of stocking Apache trout is considered a conservation action in furtherance of the Endangered Species Act whereby a special 4(d) rule is in place. AGFD may take any federally listed threatened fish or wildlife for conservation purposes that are consistent with the purposes of the Act and the Section 6 Cooperative Agreement between USFWS and AGFD and therefore take of Apache trout from the proposed stocking of Apache trout is legally permitted.

Impacts to stocked Apache trout from species of fish currently existing as wild, self reproducing populations at or in proximity to proposed stocking locations may include predation, hybridization with other trout and/or competition.

Northern Leopard Frog

Local Analysis: Although LCR in Greer and the West Fork LCR buffered stocking complex are within the historical range of the northern leopard frog, the likelihood that frogs will be exposed to fish stocked in LCR in Greer is low. There are no historical records for northern leopard frogs at LCR in Greer. There are historical records for northern leopard frogs from 3 sites in the complex: Benny Creek (SR 373) (1979), Little Colorado River (7 KM W of Eager) (1979), and Sheep Springs (FS 89 JCT W/HWY 260) (1942). There have been 32 surveys at 24 sites within the buffered stocking complex between 1942 and 2002 (Figure 5, HDMS, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). Northern leopard frogs were not observed during subsequent surveys at Benny Creek (SR 373) (1992 and 1995) or Sheep Springs (FS 89 JCT W/HWY 260) (1995) and it is likely that northern leopard frogs no longer occupy these sites (HDMS, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.).

Broad Scale Analysis: The likelihood that northern leopard frogs will be exposed to dispersing stocked fish in the LCR in Greer and the West Fork buffered stocking complex is moderate. Stocked fish could disperse as far downstream as Lyman Lake and there are records from 2007-2009 for northern leopard frogs just downstream of Lyman Lake (Drost, pers. comm.). Although the main drainage does not provide suitable habitat for northern leopard frogs because of fast flowing water and presence of crayfish, the frogs are occupying a series of ponds and marshy meadows along the outflow from the Lyman Lake dam (Drost, pers. comm.).

Chiricahua Leopard Frog

Local Analysis: Although LCR in Greer and the West Fork LCR buffered stocking complex are within the historical range of the Chiricahua leopard frog, the likelihood that Chiricahua leopard frogs will be exposed to fish stocked in LCR in Greer is low. There are no historical records for Chiricahua leopard frogs at LCR in Greer or within the West Fork buffered stocking complex. There have been 32 surveys at 24 sites within the buffered stocking complex between 1942 and 2002 (Figure 5, HDMS, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.); no Chiricahua leopard frogs were observed. In addition, even though the West Fork LCR buffered stocking complex is within a Chiricahua leopard frog recovery unit, the majority of the complex is outside of the Black River Management Area, suggesting that habitat and conditions for recovery are less suitable in that area. Therefore, it is likely that Chiricahua leopard frogs do not occupy the West Fork buffered stocking complex.

Broad Scale Analysis: The likelihood that Chiricahua leopard frogs will be exposed to dispersing stocked fish from LCR in Greer and the West Fork Complex is low. There are no records for Chiricahua leopard frogs in the Little Colorado River where stocked fish could disperse to, but fish could travel downstream the Little Colorado River and upstream the tributary of Nutrioso Creek where there are 2 historical records for Chiricahua leopard frogs: Nutrioso Creek (Correjo Crossing, 1979) and Nelson Reservoir (SE Corner, 1971). Chiricahua leopard frogs were not observed during subsequent surveys at Nutrioso Creek (Correjo Crossing) (1995) and Nelson Reservoir (SE Corner) (1987, 1992, 1993, and 1995) and it is not likely that Chiricahua leopard frogs currently occupy these sites or this area (HDMS, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.).

Mexican Spotted Owl Critical Habitat

The stocking stream reach is within Mexican spotted owl (MSO) critical habitat (CH). The lower 0.5 miles of the stocking stream reach is within the buffer and is also within a PAC. The topography within the PAC is incredibly steep, reducing the ability for angler access.

Potential Impacts

The stocking site, extended area for fish movements from the stocking site, and/or the area of potential angler access are within boundary of at least one MSO PACs in the general vicinity of the site. There may be some disturbance of MSOs at the nest site, roosting or foraging areas within the PAC during the breeding season.

Indirect effects may include actions that can affect forest structure and maintenance of adequate prey species identified as PCEs or KHCs. These actions may include trampling of vegetation, soil compaction, removal of woody debris or other physical degradation potentially altering the productivity and succession/regeneration of the vegetation. In the designation of critical habitat (USFWS 2004) most recreational activities, including angling, were not identified as requiring restrictions to protect the PCE's of critical habitat from destruction or adverse modification. In

making that statement, recreational activities, including angling were assumed to not contribute to significant habitat-affecting activities such as cutting large trees or snags, removal of large woody debris from the forest floor, altering the tree species diversity, or other large-scale changes to habitat structure. The act of a relatively small number of people walking through habitat is not likely to cause the kind of effects that would result in adverse effects to the PCEs/KHCs of MSO CH and/or restricted and protected habitats.

The CH designation included most other protected and restricted habitats for the MSO. Indirect effects to CH may include actions that can affect forest structure and maintenance of adequate prey species identified as PCEs. These actions may include trampling of vegetation, soil compaction, removal of small woody debris or other physical degradation potentially altering the productivity and succession/regeneration of the vegetation. In the designation of critical habitat (USFWS 2004) most recreational activities, including angling, were not identified as requiring restrictions to protect the PCE's of critical habitat from destruction or adverse modification. In making that statement, recreational activities, including angling were assumed to not contribute to significant habitat-affecting activities such as cutting large trees or snags, removal of large woody debris from the forest floor, altering the tree species diversity, or other large-scale changes to habitat structure. The act of a relatively small number of people walking through habitat is not likely to cause the kind of effects that would result in adverse effects to the PCEs/KHCs of MSO CH and/or restricted and protected habitats.

Southwestern Willow Flycatcher

In the White Mountains, nesting flycatcher habitat can be found along the upper Little Colorado River (and a portion of its forks) downstream to the Town of Greer area. These areas primarily occur within the Apache Sitgreaves National Forest, although private land parcels are also included. Suitable and occupied habitat exists along the LCR in Greer, within the stocking reach. Angling activity occurs on the LCR near the Route 373 road crossing. However, because of the density of willow patches, few anglers fish within occupied habitat. In 9 years of summer flycatcher surveys by the Department, one angler was seen within the willow patch, but was within 50 feet of the road and not near occupied habitat (C. Paradzick pers. comm.). Southwestern willow flycatchers have been documented nesting at three sites in the upper Little Colorado River drainage downstream to Eager.

Critical Habitat is designated along the West Fork LCR beginning above Sheep's Crossing and extends downstream past the confluence of the East Fork LCR and including and past River Reservoir. The Little Colorado River at Greer stocking reach is located within critical habitat.

Potential Impacts

Stocking and angling at high elevation is most likely to occur in the late spring and summers because of the harsh winters and difficult access. This coincides with flycatchers nesting times.

In the White Mountains, anglers primarily use the area around the stocking site and the access to that area (e.g., paths). Anglers are not anticipated to wander remarkably far from the stocked locations. As a result, it is anticipated that most effects would occur near where trout are stocked. The Apache-Sitgreaves NF staff estimate that approximately 70,000 to 75,000 people use the recreation area in and around the Greer Area and forks of the Little Colorado River annually. Anglers will likely be on foot and either alone or in small parties. The proposed trout stocking actions are an ongoing action that has a long history of occurring in the headwaters of the Little Colorado River. As a result, it is anticipated that anglers will likely continue to visit areas that they have visited in the past. To facilitate ease of access to the stream, anglers are expected to primarily stay on existing primitive foot trails or cattle/wildlife trails and/or walk between patches of dense vegetation. Additionally, once anglers reach their destination, they are not anticipated to be fishing in tight areas where vegetation is dense and could cause casting to be difficult.

There may be some amount of disturbance to nesting flycatchers from anglers accessing the stocking site. Neither of the two primary constituent elements identified for Southwestern willow flycatcher critical habitat are affected by the proposed action.

Critical Habitat

There may be some limited amount of habitat degradation from anglers using or creating new trails to access the stocking site. Neither of the two primary constituent elements identified for Southwestern willow flycatcher critical habitat are affected by the proposed action.

New Mexico Meadow Jumping Mouse

Habitat for the New Mexico meadow jumping mouse at Sheep's Crossing and along the West Fork Little Colorado River is in the area affected by recreation use, including access for fishing by anglers. Frey (2008) did not conduct surveys along the West Fork because of heavy angler use of the site and the risk that traps would not be secure from interference. The newly located site on the East Fork Little Colorado River may also be affected by anglers as it is part of the area near Greer that is stocked.

Potential Impacts

Impacts to habitat for jumping mouse are likely occurring on the West Fork Little Colorado at Greer due to documented by heavy angler use that may be affecting habitat quality through maintaining degraded conditions. These impacts are ongoing, and other recreation use contributes to the current conditions. The stockings at Greer are made at several locations in the East and West Forks near the town, and it is likely that recreational access (including that by anglers) is also contributing to ongoing habitat degradation at the new East Fork Little Colorado River population. The likelihood or extent of disturbance impacts is unknown at either site.

Bunch, River, and Tunnel Reservoirs

Site Description

Bunch, River, and Tunnel Reservoirs are commonly known as the Greer lakes, located on the Apache-Sitgreaves National Forest approximately 1 mile northeast of Greer. These lakes are closely grouped together in the headwaters of the Little Colorado River (LCR), at the bottom of the West Fork complex.

River Reservoir is located on the mainstem LCR, with perennial flow from the river entering the reservoir year around. River Reservoir dam was constructed in 1896, rebuilt in 1950, and underwent a major repair in 2005. The reservoir sits at 8221 feet elevation, is 50 surface acres in size, and has maximum and average depths of 50 and 20 feet, respectively. River Reservoir spills directly into the LCR every year during the spring snowmelt.

Bunch and Tunnel Reservoirs are off-stream impoundments, filled by a diversion ditch from the LCR during the fill season from September 15 through April 15. Bunch Reservoir dam was built in 1929. The reservoir sits at 8256 feet elevation, is 20 surface acres in size, and has maximum and average depths of 20 and 10 feet, respectively. Tunnel Reservoir dam was built in 1951. The reservoir sits at 8261 feet elevation, is 15 surface acres in size, and has maximum and average depths of 15 and 10 feet, respectively.

Boat motors at River Reservoir are restricted to a single 10 horsepower gas motor, while Bunch and Tunnel Reservoirs are restricted to electric motors only.

Camping is not permitted at the lakes, but 2 Forest Service campgrounds, Benny Creek Campground and Rolfe C. Hoyer Campground, are located within a mile or two.
River, Bunch, and Tunnel Reservoirs are accessed year round by a paved road off Hwy 373 on National Forest Land, and are an integral part of the economy for the Town of Greer. The lakes freeze over from December through March and receive a fair amount of ice fishing use.

River Reservoir has 1 boat launch ramp, paved parking, 2 ramadas, and 1 restroom facility on the west side of the dam. It also has a dirt parking area, 2 ramadas, and another restroom facility on the east side about mid-lake, accessed by dirt Forest Road 245. Most of the shore fishing is centered at these main access points, plus a few anglers near a small pull-off of Forest Road 245 near the upper end of the lake.

Bunch Reservoir has 1 boat launch ramp, paved parking, 2 ramadas, and 1 restroom facility on the west side of the lake. Almost all the shore fishing use is concentrated along the west shoreline, as this is the only road access to the lake.

Tunnel Reservoir has 1 boat launch ramp, paved parking, 2 ramadas, and 1 restroom facility on the east side of the lake. A small paved parking area is also located right off Forest Road 245 on

the north side of the lake. Shoreline anglers use nearly the entire shoreline perimeter because the lake is so small and is usually drawn down for irrigation use first, making the lake even smaller during peak fishing season.

Management of Water Body
Bunch and Tunnel Reservoirs are managed primarily as put-and-take intensive use cold water fisheries, with some attempts at put-grow-and-take management in Bunch Reservoir. Bunch is typically stocked multiple times per year with catchable rainbow trout from April through June (Table 35). It has also been stocked opportunistically with sub-catchable and fingerling rainbow trout. Tunnel Reservoir has been stocked multiple times per year with catchable rainbow trout from April through June, with fingerling trout only stocked in 1999 in the last 10 years (Table 36).

River Reservoir is managed as a put-grow-and-take cold water fishery, and stocked multiple times per year with catchable, sub-catchable, and fingerling rainbow trout. Most trout were stocked in April through June (Table 37).

Table 35. Bunch Reservoir Stocking History.

Species	First Year	Last Year	Num. of Stockings	Num. Stocked
Brook trout	1940	1943	2	28,800
Brown trout	1938	1993	14	78,038
Rainbow trout	1933	2009	166	1,165,319
Total			182	1,272,157

Table 36. Tunnel Reservoir stocking history.

Species	First Year	Last Year	Num. of Stockings	Num. Stocked
Brown trout	1935	1993	19	127,665
Native trout	1937	1937	1	11,200
Rainbow trout	1937	2009	360	1,130,082
Total			380	1,268,947

Table 37. River Reservoir stocking history.

Species	First Year	Last Year	Num. of Stockings	Num. Stocked
Largemouth bass	1920	1920	1	150
Brook trout	1937	1943	2	34,300

Species	First Year	Last Year	Num. of Stockings	Num. Stocked
Brown trout	1949	1993	26	432,852
Rainbow trout	1935	2009	284	2,715,627
Total			313	3,182,929

A statewide mail-out survey reported that the Greer lakes received a combined use of 38,024 angler use days in 2001 (Pringle 2004), with most use occurring from May through September. On site angler creel surveys in 2001 showed River Reservoir had 25,065 angler use days, Bunch had 10,192 angler use days, and Tunnel had 17,209 angler use days.

The Department intends to stock Apache trout opportunistically, primarily looking for flexibility to stock hatchery Apache trout. Hatchery Apache trout are stocked primarily in streams in the White Mountains and two lakes managed for featured species that are connected to recovery Apache trout streams. Typically the Department does not have enough supply to meet these stocking needs; however, hatcheries occasionally have more Apache trout on station than places into which they can be stocked. This can be caused by very dry years that result in Forest Closures, or low/warm water conditions in some Apache trout stocking sites. The Greer lakes offer good water quality conditions during mid-summer, something that is uncommon amongst lakes in the White Mountains, the critical time when the Department needs additional stocking sites for this species in dry years. The Greer lakes are also adjacent to rainbow/Apache trout stocking site in the LCR at Greer.

These reservoirs are used for irrigation. Water is released into the LCR for use downstream in Springerville and Eagar. Water in River Reservoir is released from a headgate at the dam directly into the LCR. Water in Bunch Reservoir is released through a headgate in the dam and flows into a drainage for 0.4 miles to lower Benny Creek, down Benny Creek for 1.4 miles to Hall Creek, down Hall Creek for 0.3 miles, and into the LCR approximately 2.6 miles downstream of River Reservoir. Water in Tunnel Reservoir is released through a valve to a pipe that flows directly into River Reservoir and ultimately into the LCR through the works on River Reservoir. Most water released is diverted from the LCR at major diversions 7.2 and 11.4 miles downstream of River Reservoir to Round Valley, which may reduce the potential for transport of stocked salmonids into spinedace habitat further downstream (see Complex Analysis, below).

The three reservoirs maintain relatively good water quality year round and usually experience no fish kills. The exception is Tunnel Reservoir, which may be drawn down to approximately 4 to 5 feet of water. Tunnel Reservoir usually experiences strong blue-green algae blooms and sometimes elevated pH levels; extremely low oxygen was recently recorded towards the end of summer in 2008. River Reservoir also experiences strong blue-green algae blooms, but maintains good pH levels. Bunch Reservoir is often somewhat turbid and does not experience heavy algae blooms.

The Integrated Fisheries Management Plan for the LCR Watershed (Young et al. 2001) identifies the management emphases for the Greer lakes as intensive use sport fish with rainbow trout catchables at Tunnel Reservoir; basic yield/intensive use sport fish with rainbow trout fingerlings and catchables at Bunch Reservoir; and intensive use sport fish with rainbow trout fingerlings and catchables at River Reservoir. The proposed action is generally consistent with this plan.

The proposed action is for intensive use with catchables at Bunch instead of basic yield, because the reservoir has been drained down so quickly each year that fingerlings do not have time to grow to catchable size. The intensive use emphasis at River Reservoir in the IFM plan is likely a mistake because the plan also recommends continuing to stock fingerlings and catchables, which is a basic yield (put-grow-and-take) strategy. The proposed action includes sub-catchables instead of fingerlings at River Reservoir to allow these smaller fish to reach catchable size quicker and have better survival rates in the face of predators in the reservoir, such as brown trout and yellow perch. The proposed action also includes catchable Apache trout for all Greer lakes that was not identified in the plan. This action would still be consistent with the plan as Apache trout behave in much the same way as rainbow trout and would be harvested out the same; many anglers cannot distinguish between the two. The Department does not intend to market these lakes for feature species, especially because stocking Apache trout in these lakes would occur only under special circumstances, such as a surplus Apache trout in hatcheries and no other suitable approved site to stock them.

Proposed Action

The Department proposes to stock rainbow trout and Apache trout for the period covered by this consultation.

Catchable rainbow trout would be stocked multiple times from April to September annually in Bunch and Tunnel Reservoirs; catchable and sub-catchable rainbow trout would be stocked multiple times from April to September annually in River Reservoir. The numbers of rainbow trout stocked may be from 0 to 15,000 fish in Bunch Reservoir, 0 to 20,000 fish in Tunnel Reservoir, and 0 to 40,000 fish in River Reservoir annually.

Catchable, sub-catchable and fingerling Apache trout would be stocked from April to September only when a surplus occurs in the hatchery, and typical Apache trout stocking sites are not available or cannot support the surplus; numbers of Apache trout stocked may be from 0 to 15,000 fish total in the Greer lakes annually.

Water Distribution / Connectivity

River Reservoir is filled by the perennial flow of the LCR. The headwater tributaries of the LCR, the East and West Forks, both flow perennial from high elevation on Mt. Baldy down to their confluence in the town of Greer, where they form the mainstem of the LCR. The mainstem LCR then flows perennial for 2.3 miles into River Reservoir. Two constructed fish barriers are located

on the West Fork LCR for recovery of Apache trout in the stream above the barriers. The lower barrier is located 2.8 miles upstream of the confluence of the East and West Forks, 5.1 miles upstream of River Reservoir, and the upper barrier is located 3.1 miles upstream of the confluence of the East and West Forks, 5.4 miles upstream of River Reservoir. Spill from Lee Valley Lake enters the West Fork LCR approximately 0.9 miles upstream of the upper barrier. Two constructed fish barriers are located on the East Fork LCR for recovery of Apache trout in the stream above the barriers. The lower barrier is located 2.2 miles upstream of the confluence of the East and West Forks, 4.4 miles upstream of River Reservoir, and the upper barrier is located 2.4 miles upstream of the confluence of the East and West Forks, 4.7 miles upstream of River Reservoir.

Bunch and Tunnel Reservoirs are filled from a diversion ditch out of the LCR during the “fill season” from September 15 through April 15. They are off-channel irrigation reservoirs operated in conjunction with River Reservoir. The diversion takes water from the LCR approximately 1.8 miles upstream of River Reservoir. The ditch flows from the LCR for 1.6 miles then splits to fill either Tunnel Reservoir or Bunch Reservoir, each about 0.2 miles from the split in the ditch. Once these lakes are full, the irrigation ditch is shut down to let River Reservoir fill. During the time the irrigation ditch is operating, the river downstream from that diversion can be extremely low. Water is also released out of Tunnel and Bunch during the irrigation season (April 15-September 15) for use downstream in Springerville and Eagar. When water is released from the outlet at Bunch Reservoir, it flows down an unnamed tributary for 0.4 miles into Benny Creek, then down Benny Creek for 1.4 miles to Hall Creek, then down Hall Creek for 0.3 miles and directly into the LCR downstream of River Reservoir. This water travels down the LCR to be pulled back out towards Springerville and Eagar. When water is released from Tunnel Reservoir, it flows directly into the west side of River Reservoir and is metered out through the River Reservoir dam outlet. All 3 reservoirs are often drained down quite low by the end of the irrigation season, especially in dry years when more irrigation water is needed downstream.

River Reservoir spills annually in the spring during snowmelt runoff. Water is also released out the outlet in the dam directly into the LCR during the irrigation season of April 15 to September 15, to be pulled back out downstream near Springerville and Eagar. All three reservoirs are often drained down to the depth of the outlet structures, leaving a small minimum pool at the end of the summer. No legal minimum pool agreements are in place. The remaining pool level is left because it cannot be released without pumping up to the outlet.

Colter Dam, located 6.2 miles upstream of the confluence of the East and West Forks and 8.5 miles upstream of River Reservoir, is also used as a fish barrier for Apache trout recovery, but was not constructed for that purpose. Another irrigation lake existed at one time at Colter Dam, but was abandoned when the lake would not hold water due to fissures in the lake bottom. A

vertical drop exists in the outlet pipe that is always left open, and is a functional fish barrier to upstream fish movement.

River Reservoir fills and spills every year during the spring snowmelt runoff. While the reservoir does not spill at other times of the year, water is released directly into the LCR through an outlet structure in the dam for use downstream in Springerville during the irrigation season from April 15 to September 15. The LCR downstream of River Reservoir flows perennially all the way to Lyman Lake, even at base flows with or without irrigation releases. From River Reservoir dam, the LCR flows downstream for 16.1 miles to the upper extent of occupied spinedace habitat at Airport Road in Springerville. Along this reach, tributaries enter the LCR, Hall Creek at 2.6 miles downstream of River Reservoir, Fish Creek at 3.1 miles downstream of River Reservoir, and the South Fork LCR at 5.9 miles downstream of River Reservoir. A major water diversion is located 1.3 miles downstream of the South Fork LCR confluence, which diverts much of the irrigation water released from the Greer lakes during the summer. Continuing down the LCR in Springerville, another tributary, Nutrioso Creek, enters 1.7 miles downstream of Airport Road. Another major diversion structure is located approximately 1 mile downstream of Nutrioso Creek confluence, at which point the mainstem LCR continues downstream for another 17.0 miles to Lyman Lake. The tributary Coyote Creek enters the LCR a few miles upstream of Lyman Lake. A number of small water diversions exist throughout Springerville and downstream towards Lyman Lake and are not fish barriers for trout but may be for smaller sized species. For a detailed description of water connectivity below Lyman Lake, see the Lyman Lake analysis. Additional Information on water connectivity with Hall Creek, a tributary to the LCR below River Reservoir, was provided in the White Mountain Reservoir section. Additional information on water connectivity with the South Fork LCR, a tributary to the LCR below River Reservoir, will be provided in the Mexican Hay Lake section below.

Fish Movement

Fish have the ability to move upstream into the LCR from River Reservoir at all times of the year because it is perennial. They can move up the LCR for 2.6 miles largely unobstructed to the confluence of the East and West Fork LCR, although a number of beaver dams in the town of Greer can slow them down, and a small diversion structure to Bunch and Tunnel Reservoirs is an obstruction, but not a barrier. Further upstream, a fish could travel up the West Fork LCR for 2.8 miles until it reaches the lower constructed fish barrier for Apache trout recovery. Another constructed fish barrier is located 0.3 miles upstream on the West Fork in case the lower barrier fails. From the confluence of the East and West Forks, stocked trout may also travel up the East Fork LCR for 2.2 miles to a lower constructed fish barrier for Apache trout recovery. Another constructed fish barrier is located 0.2 miles upstream on the East Fork LCR in case the lower barrier fails. An old dam located 3.77 miles upstream of the upper barrier on the East Fork LCR also acts as a third fish barrier (Colter Dam). The constructed fish barriers were designed and

built to isolate and protect recovery populations of Apache trout above from non-native trout downstream of the barriers.

Fish can only escape upstream in the diversion ditch from Bunch and Tunnel Reservoirs during the fill season from September 15 to April 15 when the ditch is running with water. This ditch is empty during the irrigation season because it is only used to fill Bunch and Tunnel Reservoirs. Once in the LCR a fish could travel upstream much the same way as described above for River Reservoir.

Stocked trout could escape River Reservoir into the LCR downstream when it spills in the spring, or when irrigation water is released during the summer. Once in the LCR a fish could theoretically travel all the way to Lyman Lake because it runs perennial all the way. Two diversion structures on the LCR near Springerville could divert a downstream migrating fish into diversion ditches, but these ditches are only operating during the irrigation season and not during high spring runoff flows. A fish could also swim up tributaries of the LCR, such as perennial Hall Creek, but only up to the dam of a private pond 1.2 miles upstream of the LCR. A fish could also swim up Fish Creek but only during the spring runoff because the lower reaches are dry during the summer because water is diverted out of that creek directly for irrigation. A fish could swim up into perennial South Fork LCR, but only for 0.9 miles until it came to a constructed fish barrier for Apache trout recovery. A second constructed fish barrier is located 1.8 miles upstream of the first in case that lower barrier fails.

Stocked trout in Tunnel Reservoir could escape into River Reservoir when water is released for irrigation, then travel through similar routes as those trout escaping River Reservoir. Stocked trout in Bunch Reservoir could escape into the unnamed tributary when water is released for irrigation, then down to Benny Creek. Once in Benny Creek it could either go upstream, or downstream to Hall Creek. Once in Hall Creek it could either go upstream to a dam of a private pond a short distance upstream, or downstream to the Little Colorado River. Once in the Little Colorado River, an escaped trout could travel upstream for 2.6 miles to the base of River Reservoir dam, or move downstream along the same route as those trout escaping River Reservoir.

The 7.2 miles immediately downstream of River Reservoir is suitable trout habitat and escaped Apache and rainbow trout probably travel, persist, and reproduce within this reach, although recruitment from Apache trout is not expected. The next 8.9 miles downstream are somewhat marginal for trout, with findings of brown and rainbow trout consistently, but in low numbers and larger sizes, suggesting they do not reproduce within this reach. The next 7.5 miles is very marginal for trout, with findings of brown trout in very low numbers and rarely any rainbow trout. Three records of rainbow trout exist within this reach, 2 trout in 1993 and 1 in 1999.

Additional information on fish movement and occurrence can be found below in the Complex Analysis.

Community Description

River Reservoir contains stocked rainbow trout, plus fathead minnow, yellow perch, bluehead sucker, carp, brown trout, and crayfish (Table 38). The fathead minnow, yellow perch, and carp likely reproduce in the reservoir, but no evidence exists suggesting that trout do. Stocked trout can persist in the reservoir if it maintains good water quality, even at minimum pool, and if it does not experience fish kills. There has been no history of fish kills in River Reservoir.

Bunch and Tunnel Reservoirs contain stocked rainbow trout, plus fathead minnow, brown trout, and crayfish (Table 39 and Table 40, respectively). Only the fathead minnow reproduce in Tunnel and Bunch Reservoirs. Stocked trout can persist in Bunch Reservoir if it maintains good water quality, even at minimum pool, and if it does not experience fish kills. There has been no history of fish kills in Bunch Reservoir. Stocked trout may persist in Tunnel Reservoir, but this lake can experience very low oxygen levels when drawn down to minimum pool. Tunnel reservoir has experienced 4 fish kills in its history. Brown trout are most likely maintained in the reservoirs by wild fish spawning in the LCR and fish entering the lakes through the diversion ditch.

Table 38. Survey history at River Reservoir with experimental gillnets.

Survey date	Species collected	Number collected	Size range (mm TL)
April 2000	Rainbow trout	16	117-336
	Brown trout	10	361-691
	Yellow perch	9	178-248
April 2003	Rainbow trout	1	407
	Brown trout	1	826
	carp	1	Not measured
April 2004	Rainbow trout	36	295-447
	Brown trout	8	251-695
	Bluehead sucker	1	210
April 2007	Brown trout	4	306-634
	Apache trout	1	299
April 2008	Rainbow trout	7	205-370
	Brown trout	3	300-650
	carp	1	590

Table 39. Survey history at Bunch Reservoir using experimental gillnets.

Date surveyed	Species collected	Number collected	Size range (mm TL)
April 1988	Rainbow trout	39	195-259
	Brown trout	5	224-451
March 1989	Rainbow trout	15	214-324
	Brown trout	16	242-454
April 1990	Rainbow trout	5	208-268
	Brown trout	17	230-485
April 2003	Rainbow trout	7	185-263
	Brown trout	5	283-632
April 2008	Rainbow trout	36	210-340
	Brown trout	4	408-465

Table 40. Survey history at Tunnel Reservoir.

Survey date	Species collected	Number collected	Size range (mm TL)
March 1986	Brown trout	33	296-405
October 1988	Rainbow trout	13	239-304
	Brown trout	15	185-440
March 1989	Brown trout	8	312-345
April 1990	Brown trout	32	233-485
October 2008	Rainbow trout	25	232-351
	Brown trout	23	222-690

The LCR upstream of River Reservoir contains stocked rainbow and Apache trout, plus reproducing populations of brown trout, fathead minnow, speckled dace, and bluehead sucker.

Recovery populations of pure Apache trout are located in the West Fork LCR and East Fork LCR above the constructed fish barriers, 5.1 miles and 4.4 miles upstream of River Reservoir, respectively.

The LCR downstream of River Reservoir for 7.2 miles contains reproducing populations of brown trout, rainbow trout, speckled dace, bluehead sucker, Little Colorado sucker, fathead minnow and crayfish. The next 8.9 miles contains few but consistent rainbow and brown trout, and reproducing populations of fathead minnow, speckled dace, bluehead sucker, Little Colorado sucker and crayfish. The next 8.5 miles from Airport Road in Springerville (16.1 miles downstream of River Reservoir) to below Wenima Wildlife Area contains few but consistent brown trout, very rarely rainbow trout (only 3 documented records, 2 in 1993 and 1 in 1999), and

reproducing populations of Little Colorado spinedace, Little Colorado sucker, speckled dace, bluehead sucker, fathead minnow, green sunfish, and crayfish. The next 13.5 miles of the LCR down to Lyman Lake contains reproducing populations of Little Colorado spinedace, Little Colorado sucker, speckled dace, bluehead sucker, fathead minnow, green sunfish and crayfish. Table 41 provides a summary of recent fisheries surveys of the LCR from River Reservoir to Lyman Lake.

Table 41. Summary of recent (2006-09) surveys in the LCR from River Reservoir downstream to Lyman Lake, with downstream sites listed first and upstream sites listed last.

Date	Location	Species collected	Num.
6/30/2008	Wiltbank property	Little Colorado spinedace	36
		Little Colorado sucker	94
		Speckled dace	55
		Fathead minnow	676
		Green sunfish	50
		Unidentified sucker fry	8
6/30/2008	Nielson property	Little Colorado spinedace	3
		Little Colorado sucker	43
		Bluehead sucker	7
		Fathead minnow	1,510
		Green sunfish	114
		Unidentified sucker fry	50
8/3/2009	Richville Valley	Little Colorado sucker	2
		Bluehead sucker	2
		Fathead minnow	43
		Green sunfish	12
8/3/2009	The Corral	Little Colorado spinedace	27
		Little Colorado sucker	9
		Speckled dace	79
		Bluehead sucker	7
		Fathead minnow	23
7/30/2009	Wenima Wildlife Area – lower Slade	Little Colorado spinedace	75
		Little Colorado sucker	22
		Speckled dace	108
		Bluehead sucker	67
		Fathead minnow	48
7/30/2009	Wenima Wildlife Area – upper Slade	Little Colorado spinedace	50
		Little Colorado sucker	12

Date	Location	Species collected	Num.
		Speckled dace	99
		Bluehead sucker	55
		Fathead minnow	55
		Green sunfish	2
		Unidentified fry	1
7/29/2009	Wenima Wildlife Area - Fence	Little Colorado spinedace	70
		Little Colorado sucker	20
		Speckled dace	104
		Bluehead sucker	57
		Fathead minnow	109
		Brown trout	3
		Unidentified sucker fry	1
7/9/2009	Wenima Wildlife Area - Bridge	Little Colorado spinedace	46
		Little Colorado sucker	8
		Speckled dace	85
		Bluehead sucker	16
		Fathead minnow	64
		Brown trout	2
		Green sunfish	2
		Unidentified sucker fry	2
		Unidentified fry	4
7/30/2009	Wenima Wildlife Area – upper end	Little Colorado spinedace	22
		Little Colorado sucker	7
		Speckled dace	94
		Bluehead sucker	9
		Fathead minnow	29
		Brown trout	3
		Green sunfish	101
6/11/2009	Rest Area	Little Colorado spinedace	16
		Little Colorado sucker	30
		Speckled dace	196
		Bluehead sucker	25
		Fathead minnow	39
		Brown trout	1
4/18/2007	Downstream of Wastewater Treatment	Little Colorado sucker	1
		Speckled dace	198
		Fathead minnow	102

Date	Location	Species collected	Num.
6/10/2009	Becker Wildlife Area - #1 seine	Little Colorado spinedace	21
		Speckled dace	20
		Bluehead sucker	2
		Fathead minnow	15
7/8/2009	Becker Wildlife Area - #1 shock	Little Colorado spinedace	55
		Little Colorado sucker	5
		Speckled dace	139
		Bluehead sucker	22
		Fathead minnow	87
		Unidentified fry	2
7/8/2009	Becker Wildlife Area - #2 shock	Little Colorado spinedace	30
		Little Colorado sucker	9
		Speckled dace	30
		Bluehead sucker	2
		Fathead minnow	41
		Unidentified sucker fry	1
		Unidentified fry	7
7/8/2009	Becker Wildlife Area - #3 shock	Little Colorado spinedace	5
		Little Colorado sucker	3
		Speckled dace	52
		Bluehead sucker	5
		Fathead minnow	13
3/22/2007	Becker Wildlife Area	Little Colorado spinedace	80
		Little Colorado sucker	6
		Speckled dace	154
		Bluehead sucker	11
		Fathead minnow	321
		Brown trout	1
6/11/2009	Airport Road – below diversion	Little Colorado spinedace	50
		Little Colorado sucker	20
		Speckled dace	142
		Bluehead sucker	8
		Fathead minnow	123
		Brown trout	2
6/11/2009	Airport Road-above diversion	Little Colorado sucker	3
		Speckled dace	3
		Bluehead sucker	4

Date	Location	Species collected	Num.
		Fathead minnow	7
4/12/2007	Above Airport Road	Little Colorado sucker Speckled dace Bluehead sucker Fathead minnow Brown trout	3 139 3 94 3
6/10/2009	Hwy 260 Bridge	Speckled dace Bluehead sucker Fathead minnow Brown trout Rainbow trout	89 1 4 1 1
6/10/2009	Hwy 261 Bridge	Speckled dace Bluehead sucker Fathead minnow Brown trout	109 5 18 2
6/10/2009	State Land Section 16	Little Colorado sucker Speckled dace Brown trout Rainbow trout	1 63 1 1
11/6/2007	State Land Section 16	Little Colorado sucker Speckled dace Bluehead sucker Brown trout	6 1,166 9 51
4/4/2006	USFS downstream of Fish Creek	Speckled dace Brown trout Rainbow trout	9 164 19
4/4/2006	USFS between Fish Ck. and River Res.	Brown and rainbow trout Speckled dace	225 6

Historic records of Northern leopard frogs exist in or near this stretch of the Little Colorado River. They have been documented approximately 7 km upstream of Eagar in 1979, at the Johnson Ranch (4.4 miles upstream of Lyman Lake) in 1938, and in lower Benny Creek in 1979. Recent herp surveys within this reach of the LCR 1992 and 1997 have documented only wandering garter snake and Woodhouse's toad. Recent surveys in lower Benny Creek in 1992 and 1995 documented only black necked garter snake, wandering garter snake and bullfrogs.

The South Fork LCR contains a recovery population of Apache trout above the fish barriers. Wild brown trout and rainbow-Apache hybrids were present in the South Fork until it was

chemically treated in 2007 and 2008. Pure Apache trout were reintroduced in 2008 and 2009. Speckled dace, brown trout, rainbow trout, and bluehead sucker still exist in the lower portion of the South Fork below the fish barriers (Table 42). During the four chemical treatments needed to remove all fish above the barrier, brown trout and hybrid rainbow-Apache trout were documented. Herpetological surveys conducted in 1992 documented wandering garter snakes at the South Fork campground and striped chorus frogs in Pool Corral Lake near the headwaters of the South Fork. Chiricahua leopard frog surveys were conducted throughout the South Fork LCR in 2007, finding no leopard frogs, but documenting tiger salamander and non-ranid tadpoles.

Table 42. Number of fish collected in the lower South Fork LCR, below the constructed fish barrier, in 2007. A backpack electroshocker was used to sample fish. Fish collected were not measured.

Species	**Number collected**
Brown trout	74
RainbowXApache hybrid trout	22
Speckled dace	73
Bluehead sucker	1

Lower Hall Creek contains wild brown trout, speckled dace, and rainbow trout in the lower reaches (downstream of White Mountain Reservoir). Surveys in August 1999 collected 347 brown trout, 2 rainbow trout, and 11 speckled dace in 21 50-meter stations below White Mountain Reservoir (Table 3). All the dace and rainbow trout were collected in the lower 3 stations near the confluence with the LCR, indicating the 2 rainbow trout may have come upstream from the LCR.

Surveys of Benny Creek (a tributary to Hall Creek) and Rosey Creek (a tributary to Benny Creek), were conducted on May 15-16, 2008. These surveys found speckled dace, one bluehead sucker, fathead minnow and brown trout (Table 29).

Fish Creek was surveyed in July 1999, documenting speckled dace (n = 31) in the middle permanent reaches of the stream. Chorus frogs were also documented during this survey. Herpetological surveys near Fish Creek in 1992 and 1995 were negative.

Consultation Species or Critical Habitat

Potential impacts from the proposed action to candidate and listed species are described below. Please refer to Chapter 4 for a detailed description of the nature of the impacts (which may include predation, competition for space and food, and hybridization etc.).Subsequent responses (resulting from the frequency, magnitude and duration of the impacts) between proposed stocked

and candidate and listed species, and any site or complex factors that provide context for determining the meaningfulness of the impacts, are discussed below. Impacts from the proposed action resulting from angler related recreation and/or potential introduction of disease, pathogen or invasive species are evaluated at a broad scale for the entire action area and are described in Chapter 4. If potential impacts specific to a stocking site or complex have been identified they are discussed below.

Potential impacts to consultation species including Apache trout, Mexican spotted owl and southwestern willow flycatcher are addressed below. Chiricahua and Northern leopard frogs are analyzed below at the local site and broad scale level due to the movement potential into the stocked area and fish movement potential up or downstream into areas where frogs may occur. Potential impacts due to the proposed action to Little Colorado spinedace and critical habitat are discussed in the West Fork Little Colorado River complex analysis.

Apache Trout

Recovery populations of Apache trout are located in the West Fork LCR upstream of a fish barrier constructed 5.1 miles upstream of River Reservoir, and in the East Fork LCR upstream of Colter dam, which is a 3rd functional fish barrier, 8.5 miles upstream of River Reservoir. Stocked trout likely swim upstream from River Reservoir into the LCR in Greer and can get into the lower East and West Forks, but cannot get upstream of the constructed fish barriers and into the recovery populations of Apache trout.

Apache trout may disperse downstream below the barriers and experience competition for food and space, hybridization with stocked rainbow trout, reduced levels of recruitment, and possible predation on juvenile Apache trout for the life of those dispersing trout; however, this would not impact the recovery of the population above the barrier because that particular fish is lost to the population and because of the barrier separation. Recovery of Apache trout is designed to occur above isolation barriers from non-native trout, and as long as non-native trout do not invade above the barriers they will not impact the recovery. Dispersing individual Apache trout may be impacted below the barrier, but would never re-enter the gene pool of that population. The wild brown trout below the barriers, not part of the proposed action, are the main threat to Apache trout dispersing downstream of the barriers. The brown trout are much more of a threat because they are aggressive wild fish with established territories, they are very numerous, more so than stocked trout, and they exist in all size classes, therefore more levels of competition. Stocked trout in the LCR and lower East and West Forks are caught out quickly by high angler use in this resort town and rarely persist in the stream near town.

Upstream escape of stocked trout in Tunnel and Bunch reservoirs through the diversion ditches to the LCR is possible, but much less likely than trout swimming upstream in the LCR from River Reservoir. The ditch is not a natural channel; it is exposed, silt lined, and with no overhead

cover. A catchable size trout is not likely to swim upstream for 1.8 miles in such a channel with no cover. However, if one were to make that journey, it would enter into the same discussion as for the River Reservoir fish moving upstream, not being able to get upstream of the Apache trout barriers on the Forks of the LCR.

A recovery population of Apache trout is also located in the South Fork LCR upstream of a fish barrier constructed 0.9 miles upstream from the confluence with the LCR. Trout likely escape downstream into the LCR from all three Greer lakes, especially River Reservoir, as it is located right on the LCR. They likely persist in the 7.2 miles downstream of River Reservoir in suitable trout habitat and have access into the lower South Fork LCR. They cannot, however, get above the constructed Apache trout fish barriers, and therefore cannot impact the population above the barrier. Downstream dispersing Apache trout may face the same impacts as described above.

Potential Impacts
Stocked Apache trout co-stocked with other species

Apache trout stocked from the hatcheries are for the specific purpose of providing fishing opportunities. Recovery streams are managed for self-sustaining Apache trout populations and regular stocking is not part of that management except with wild trout to initiate and augment the population as needed until it becomes self-sustaining. Apache trout stocked for recreational purposes are considered excess to the survival and recovery of the species. Take of these stocked fish via harvest by anglers is allowed under the section 4(d) rule contained in the designation of the Apache trout as a Threatened species. That rule allows take of Apache trout if such take is in accordance with State law; in this case through possession of a valid Arizona fishing license and trout stamp.

Impacts to stocked Apache trout from co-stocked rainbow trout may include predation, competition, and/or hybridization with stocked trout. A detailed discussion of these impacts is found in Apache trout interactions section (Chapter 4).

Stocked sport fishes moving above failed barriers or moving into recovery reaches

Impacts to recovery Apache trout are not expected occur because recovery populations are located above constructed barriers, which prevent upstream movement of all fish. Should barrier failure occur, the Forest Service and Department would attempt to repair the barrier and if necessary retreat the reach to remove non-native fish. During this period of time, if stocked fish move above the failed barrier, predation, hybridization with other trout and/or competition with Apache trout could occur.

Impacts from wild populations on stocked Apache trout

The action of stocking Apache trout is considered a conservation action in furtherance of the Endangered Species Act whereby a special 4(d) rule is in place. AGFD may take any federally listed threatened fish or wildlife for conservation purposes that are consistent with the purposes of the Act and the Section 6 Cooperative Agreement between USFWS and AGFD and therefore take of Apache trout from the proposed stocking of Apache trout is legally permitted.

Impacts to stocked Apache trout from species of fish currently existing as wild, self reproducing populations at or in proximity to proposed stocking locations may include predation, hybridization with other trout and/or competition.

Northern Leopard Frog

Local Analysis: Although Bunch, River, and Tunnel Reservoirs and the West Fork LCR buffered stocking complex are within the historical range of the northern leopard frog, the likelihood that northern leopard frogs will be exposed to fish stocked in Bunch, River, and Tunnel Reservoirs is low. There are no historical records for northern leopard frogs at Bunch, River, or Tunnel Reservoirs. There are historical records for northern leopard frogs from 3 sites in the buffered complex: Benny Creek (SR 373) (1979), Little Colorado River (7 KM W of Eager) (1979), and Sheep Springs (FS 89 JCT W/HWY 260) (1942) (AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). There have been 32 surveys at 24 sites within the buffered stocking complex between 1942 and 2002 (Figure 5, HDMS, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). Northern leopard frogs were not observed during subsequent surveys at Benny Creek (SR 373) (1992 and 1995) or Sheep Springs (FS 89 JCT W/HWY 260) (1995) and it is likely that northern leopard frogs no longer occupy these sites (HDMS, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.).

Broad Scale Analysis: The likelihood that northern leopard frogs will be exposed to dispersing stocked fish in Bunch, River, and Tunnel Reservoirs and the West Fork buffered stocking complex is moderate. Stocked fish could disperse as far downstream as Lyman Lake and there are records from 2007-2009 for northern leopard frogs just downstream of Lyman Lake (Drost, pers. comm.). Although the main drainage does not provide suitable habitat for northern leopard frogs because of fast flowing water and presence of crayfish, the frogs are occupying a series of ponds and marshy meadows along the outflow from the Lyman Lake dam (Drost, pers. comm.). In addition, this population is the last known extant population of northern leopard frogs in the Upper Little Colorado River drainage and is thought to be declining (Drost, pers. comm.).

Chiricahua Leopard Frog

Local Analysis: Although Bunch, River, and Tunnel Reservoirs and the West Fork LCR buffered stocking complex are within the historical range of the Chiricahua leopard frog, the likelihood that Chiricahua leopard frogs will be exposed to fish stocked in Bunch, River, and Tunnel Reservoirs is low. There are no historical records for Chiricahua leopard frogs at Bunch,

River, or Tunnel Reservoirs or within the West Fork buffered stocking complex. There have been 32 surveys at 24 sites within the buffered stocking complex between 1942 and 2002 (Figure 5, HDMS, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.) and no Chiricahua leopard frogs were observed. In addition, even though the West Fork LCR buffered stocking complex is within a Chiricahua leopard frog recovery unit, the majority of the complex is outside of the Black River Management Area, suggesting that habitat and conditions for recovery are less suitable in that area. Therefore, it is likely that Chiricahua leopard frogs do not occupy the West Fork buffered stocking complex.

Broad Scale Analysis: The likelihood that Chiricahua leopard frogs will be exposed to dispersing fish from Bunch, River, and Tunnel Reservoirs and the West Fork Complex is low. There are no records for Chiricahua leopard frogs in the Little Colorado River where stocked fish could disperse to, but fish could travel downstream the Little Colorado River and upstream the tributary of Nutrioso Creek where there are 2 historical records for Chiricahua leopard frogs: Nutrioso Creek (Correjo Crossing, 1979) and Nelson Reservoir (SE Corner, 1971). Chiricahua leopard frogs were not observed during subsequent surveys at Nutrioso Creek (Correjo Crossing) (1995) and Nelson Reservoir (SE Corner) (1987, 1992, 1993, and 1995) and it is not likely that Chiricahua leopard frogs currently occupy these sites or this area (HDMS, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.).

Mexican Spotted Owl Critical Habitat

All three proposed reservoirs are within Mexican spotted owl (MSO) critical habitat (CH).

Potential Impacts

The CH designation included most other protected and restricted habitats for the MSO. Indirect effects to CH may include actions that can affect forest structure and maintenance of adequate prey species identified as PCEs. These actions may include trampling of vegetation, soil compaction, removal of small woody debris or other physical degradation potentially altering the productivity and succession/regeneration of the vegetation. In the designation of critical habitat (USFWS 2004) most recreational activities, including angling, were not identified as requiring restrictions to protect the PCE's of critical habitat from destruction or adverse modification. In making that statement, recreational activities, including angling were assumed to not contribute to significant habitat-affecting activities such as cutting large trees or snags, removal of large woody debris from the forest floor, altering the tree species diversity, or other large-scale changes to habitat structure. The act of a relatively small number of people walking through habitat is not likely to cause the kind of effects that would result in adverse effects to the PCEs/KHCs of MSO CH and/or restricted and protected habitats.

Southwestern Willow Flycatcher

In the White Mountains, nesting flycatcher habitat can be found along the upper Little Colorado River (and a portion of its forks) downstream to the Town of Greer area. These areas primarily occur within the Apache Sitgreaves National Forest, although private land parcels are also included. Suitable and occupied habitat for the Southwestern willow flycatcher occurs near the Greer lakes, along the LCR upstream in Greer. Suitable habitat may exist at the Reservoirs because of stands of willow present at those lakes; however, no known occurrences have been documented at the lakes themselves. Only Tunnel Reservoir has dense stands of willows and those are only located in a narrow band around the shoreline. Angling activity occurs on the LCR near Route 373 road crossing to target trout stocked at the LCR Greer sites. Some stocked trout in River Reservoir may swim upstream into the LCR and get caught by an angler, but the dispersing stocked trout from River Reservoir are not attracting the anglers in flycatcher habitat on the river. The anglers are attracted to trout stocked into the river itself. However, because of the density of willow patches, few anglers fish near or within occupied habitat. In 9 years of summer flycatcher surveys by the Department, one angler was seen within the willow patch, but was within 50 feet of the road and not near occupied habitat (C. Paradzick pers. comm.). Southwestern willow flycatchers have been documented nesting at three sites in the upper Little Colorado River drainage downstream to Eager.

Critical Habitat is designated along the West Fork LCR beginning above Sheep's Crossing and extends downstream past the confluence of the East Fork LCR and including and past River Reservoir. River Reservoir is located within critical habitat; however, Tunnel and Bunch reservoirs are not located within critical habitat.

Potential Impacts

Stocking and angling at high elevation is most likely to occur in the late spring and summers because of the harsh winters and difficult access. However, during these instances flycatchers could be nesting and it would be during the nesting habitat's growing season.

In the White Mountains, the primary limit to angler use is the location of stocked trout and access. However, anglers are not anticipated to wander remarkably far from the stocked locations. As a result, it is anticipated that most effects would occur near where trout are stocked. The Apache-Sitgreaves NF staff estimate that approximately 70,000 to 75,000 people use the recreation area in and around the Greer Area and forks of the Little Colorado River annually. Anglers will likely be on foot and either alone or in small parties. The proposed trout stocking actions are an ongoing action that has a long history of occurring in the headwaters of the Little Colorado River. As a result, it is anticipated that anglers will likely continue to visit areas that they have visited in the past. To facilitate ease of access to the stream, anglers are expected to primarily stay on existing primitive foot trails or cattle/wildlife trails and/or walk

between patches of dense vegetation. Additionally, once anglers reach their destination, they are not anticipated to be fishing in tight areas where vegetation is dense that causes casting to be difficult. There may be some amount of disturbance to nesting flycatchers from anglers accessing the stocking site.

Critical Habitat

There may be some limited amount of habitat degradation from anglers using or creating new trails to access the stocking site. Neither of the two primary constituent elements identified for Southwestern willow flycatcher critical habitat are affected by the proposed action.

Mexican Hay Lake

Site Description

Mexican Hay Lake is situated on Joe Baca Draw, a dry intermittent tributary to the South Fork of the Little Colorado River (LCR). The South Fork LCR drains into the mainstem LCR approximately 5.9 miles downstream of River Reservoir Dam, making Mexican Hay Lake the lowest water in the complex where it enters the LCR. The dam was constructed in 1908, creating the 100 acre lake, which is very shallow even when full, with a maximum depth of 8 feet. The lake is located at an elevation of 8890 feet on the Apache-Sitgreaves National Forest approximately 7 miles southwest of Springerville.

There are no recreational facilities at the lake; it is managed primitively because of the sporadic stocking and use. The lake can be accessed year round by paved Highway 261, which passes along the east side of the lake shoreline. The lake ices over in the winter, but the road is not closed to Mexican Hay Lake.

Management of Water Body

Primary fishery will be a cold water Apache trout put-and-take fishery when water levels are suitable. Catchable Apache trout would be stocked once per year in the spring/early summer, if the water level is suitable to sustain trout through the season. The main goal is to provide a fishery when the lake has sufficient water, to discourage anglers from illegally stocking the lake with a species that is not compatible with the recovery of the Apache trout population in the South Fork LCR. Mexican Hay Lake has previously been managed as a put-grow-and-take rainbow trout fishery, but will change to the proposed action because of the change in management of the South Fork LCR downstream of the lake.

A limited angler creel survey was conducted on-site at Mexican Hay Lake in 1980, reporting an average catch rate of 0.31 fish/hour. The survey did not have angler use calculated. A statewide mail-out creel survey in 2001 did not include Mexican Hay Lake because it had not been stocked since 1995 (Pringle 2004).

Mexican Hay Lake has been managed only occasionally as a sport fishery; water levels have not been suitable to support trout since the last stocking in 1995 (Table 43), and the irrigation headgate has not been operated for years prior to that date. When the lake level is suitable, the lake grows large trout quickly because of high nutrients, and it is very popular with anglers.

The Integrated Fisheries Management Plan for the LCR Watershed (Young et al. 2001) identifies the management emphasis for the lake as basic yield (put-grow-and-take) sport fish, with a desired species assemblage of rainbow trout. The proposed action is inconsistent with the plan in regards to species; however, the plan did not consider the slim chance of stocked fish escaping and getting into Apache trout habitat in the South Fork LCR. Rainbow trout are definitely not consistent with Apache trout recovery if they were to escape. The lake has been stocked only sporadically in the past because of poor water levels, but the proposed action is to stock annually if the conditions improve; if conditions continue as they have, the lake will be stocked only sporadically.

Table 43. Stocking history for Mexican Hay Lake

Species	First Year	Last Year	Num. of Stockings	Num. Stocked
Brook trout	1980	1980	1	15,000
Rainbow trout	1965	1995	37	214,556
Total			38	229,556

Proposed Action

The Department proposes to stock Apache trout during the period covered by this consultation. Catchable Apache trout would be stocked from April through June annually, when the water level is sufficient to support trout through the summer; numbers of Apache trout stocked may be from 0 to 10,000 fish annually.

Water Distribution / Connectivity

Mexican Hay Lake does not spill because it has no spillway, but water can be released from it for irrigation through the headgate into Joe Baca Draw and into the South Fork LCR. Irrigation water is no longer used from the lake, although the potential for future use exists. The headgate is currently silted in and would take a lot of work to make it functional. Except for irrigation delivery, there is no mechanism for salmonids to travel into occupied spinedace or Apache trout habitat within the LCR. In the event of irrigation delivery from Mexican Hay Lake, water would be diverted above Springerville through Round Valley. The potential for transport of salmonids from the Mexican Hay Lake to occupied Apache trout or spinedace habitat is extremely low.

The lake is “filled” primarily by snowmelt runoff from the small watershed above the lake, but no permanent stream feeds the lake. The lake is very shallow when it is full, with a maximum

depth of 8 feet; however the lake is often much shallower and not able to support fish during dry years. It does not go completely dry, but functions more as a waterfowl marsh in dry years.

If the lake were to fill and water were released for irrigation, which is unlikely within the timeframe of this consultation, water would flow down an unnamed tributary for 0.5 miles to Joe Baca Draw, then down Joe Baca Draw for 1.3 miles to the South Fork LCR. The unnamed tributary is intermittent, flowing only with snowmelt runoff coming from downstream of the dam. Joe Baca Draw is perennial but at an extremely low flow that is unsuitable for trout most of the year. The South Fork of the LCR is a good quality perennial trout stream that flows year round. From the confluence with Joe Baca, water flows down the South Fork for 3.5 miles to a lower constructed fish barrier for Apache trout recovery, then another 0.9 miles to the mainstem LCR.

There are 2 other main tributaries on the South Fork LCR coming in upstream of Joe Baca Draw, both having some perennial water suitable for trout. A second constructed fish barrier for Apache trout is located between the confluence of Joe Baca and the lowest barrier downstream.

The LCR flows perennial from the confluence of the East Fork and West Fork LCR, which originate on Mt. Baldy, down through the Town of Greer, through River Reservoir, and past the South Fork LCR confluence located 5.9 miles downstream of River Reservoir. Two other tributaries enter into the LCR between River Reservoir and the South Fork confluence; Hall Creek and Fish Creek (see the Bunch, River, and Tunnel section and the White Mountain Reservoir section for additional information on Hall Creek and its tributaries).

Downstream of the confluence with the South Fork, the mainstem LCR flows downstream for 1.3 miles to a major diversion structure, which diverts water into a main ditch, which feeds into fields in Springerville and Eagar. Downstream of the diversion structure the LCR flows into Springerville and into Little Colorado spinedace occupied habitat 10.2 miles, at Airport Road, downstream of the South Fork confluence. The LCR meets tributary Nutrioso Creek 1.7 miles downstream of Airport Road, then another major diversion structure approximately 1 mile downstream of Nutrioso Creek confluence, then on for another 17.0 miles to Lyman Lake. Tributary Coyote Creek enters the LCR a few miles upstream of the lake.

All the drainages described above flow well and are connected during snowmelt runoff in the spring. Some of the intermittent reaches described above become connected when irrigation water is released from an upstream reservoir during the irrigation season in the summer (April 15-September 15). These include Hall Creek from White Mountain Reservoir downstream to the Little Colorado River, an unnamed drainage and lower Benny Creek from Bunch Reservoir downstream to Hall Creek, and potentially, though not likely, an unnamed drainage from Mexican Hay Lake downstream to Joe Baca Draw.

Fish Movement
Stocked trout in Mexican Hay Lake likely will never get out of the lake, because the outlet is not currently functional. However, because the potential exists for a future irrigation release, an escaped trout could travel down the unnamed tributary and Joe Baca Draw. These 2 drainages do not have enough water or any at all during base flows to support a catchable size trout. Continuing downstream, a catchable size trout could reach the South Fork LCR, which is quality habitat for trout and it would have a good chance of persisting. At this point, stocked Apache trout become part of the recovery population located in the South Fork LCR. Traveling down the South Fork and into the mainstem LCR, a catchable Apache trout could persist in the 7.2 miles of the LCR below River Reservoir. This reach of stream is suitable for trout and already supports reproducing populations of wild brown and rainbow trout.

For details of connectivity and possible fish movement through the LCR and downstream to Lyman Lake, see the Greer Lakes analysis and the complex analysis below.

Community Description
Mexican Hay Lake is currently fishless and has not been stocked since 1995. Low water conditions in 1996 killed the remaining rainbow trout. Table 44 provides a summary of fish surveys at Mexican Hay Lake.

Table 44. Survey history at Mexican Hay Lake using experimental gillnets

Survey date	**Species collected**	**Num. collected**	**Size range (mm TL)**
April 1985	No fish	-	-
April 1988	Rainbow trout	19	262-425
March 1989	No fish	-	-
April 1991	Rainbow trout	14	375-434
April 1992	Rainbow trout	22	365-496

The South Fork Little Colorado River contains a recovery population of Apache trout. They occur above fish barriers on the lower part of the stream. Wild brown trout and rainbow-Apache hybrids were present in the South Fork until it was chemically treated in 2007 and 2008 (Table 42). Pure Apache trout were reintroduced above the fish barriers in 2008 and 2009. Speckled dace, brown trout, rainbow trout, and bluehead sucker exist in the lower portion of the South Fork below the fish barriers. During the four chemical treatments needed to remove all fish above the barrier, only brown trout and hybrid rainbow-Apache trout were documented.

Herpetological surveys conducted in and near the South Fork LCR in 1992 documented wandering garter snakes at the South Fork campground at the lower end and striped chorus frogs in Pool Corral Lake near the headwaters. Chiricahua leopard frog surveys were conducted

throughout the South Fork in 2007 prior to the chemical renovations, finding no leopard frogs, but did document tiger salamander and non-ranid tadpoles.

Little Colorado sucker are present in the LCR just downstream of the South Fork confluence, along with wild brown and rainbow trout, speckled dace, bluehead sucker, fathead minnow, and crayfish. The wild trout in the LCR persist and reproduce in the 7.2 miles of river downstream of River Reservoir. In the 8.9 miles of stream below the suitable habitat for trout but upstream of occupied spinedace habitat, there is a reach that supports Little Colorado sucker, speckled dace, bluehead sucker, a small number of likely not reproducing brown trout, even rarer rainbow trout, and crayfish. Occupied spinedace habitat occurs from 10.2 miles downstream of the South Fork confluence downstream for 19.7 miles to Lyman Lake, and also downstream of Lyman Lake.

Consultation Species or Critical Habitat
Potential impacts from the proposed action to candidate and listed species are described below. Please refer to Chapter 4 for a detailed description of the nature of the impacts (which may include predation, competition for space and food, and hybridization etc.).Subsequent responses (resulting from the frequency, magnitude and duration of the impacts) between proposed stocked and candidate and listed species, and any site or complex factors that provide context for determining the meaningfulness of the impacts, are discussed below. Impacts from the proposed action resulting from angler related recreation and/or potential introduction of disease, pathogen or invasive species are evaluated at a broad scale for the entire action area and are described in Chapter 4. If potential impacts specific to a stocking site or complex have been identified they are discussed below.

Potential impacts to consultation species including Apache trout are addressed below. Chiricahua and Northern leopard frogs are analyzed below at the local site and broad scale level due to the movement potential into the stocked area and fish movement potential up or downstream into areas where frogs may occur. Potential impacts due to the proposed action to Little Colorado spinedace and critical habitat are discussed in the West Fork Little Colorado River complex analysis.

Apache Trout
Stocked trout in Mexican Hay Lake likely will never get out of the lake, because the outlet is not currently functional. However, because the potential exists for a future irrigation release, an escaped trout could travel down the unnamed tributary and Joe Baca Draw. These 2 drainages do not have enough water or any at all during base flows to support a catchable size trout. Continuing downstream, a catchable size trout could reach the South Fork LCR, which is quality habitat for trout and it would have a good chance of persisting. At this point, stocked Apache trout become part of the recovery population located in the South Fork LCR. Traveling down the South Fork and into the mainstem LCR, a catchable Apache trout could persist in the 7.2 miles

of the LCR below River Reservoir. This reach of stream is suitable for trout and already supports reproducing populations of wild brown and rainbow trout.

Potential Impacts

Stocked sport fishes moving above failed barriers or moving into recovery reaches:

Impacts to recovery Apache trout are not expected occur because recovery populations are located above constructed barriers, which prevent upstream movement of all fish. Should barrier failure occur, the Forest Service and Department would attempt to repair the barrier and if necessary retreat the reach to remove non-native fish. During this period of time, if stocked fish move above the failed barrier, predation, hybridization with other trout and/or competition with Apache trout could occur.

There are three stocking sites that are not separated by a barrier from a recovery Apache trout reach; they are: 1) Apache trout stocked for recreation into an Apache trout recovery stream will only occur at Sheep's Crossing on the Little Colorado River whereby Apache trout stocked into Lee Valley Lake, upstream of the recovery reach, could escape and move into the recovery population. Apache trout are also stocked directly into the recovery population at Sheeps Crossing (see #4 below), 2) a recovery population in the South Fork of the Little Colorado River. This recovery reach is located above a barrier; however, Mexican Hay Lake is located upstream of both the barrier and recovery reach. Apache trout stocked into Mexican Hay Lake may escape and reach the recovery population downstream, and 3) Ackre Lake, located in the headwaters of Fish Creek Fish Creek is a recovery stream, and Apache trout or Arctic grayling may escape Ackre lake and enter the recovery population downstream in Fish Creek.

The potential for stocked fish to escape Mexican Hay Lake and move into occupied recovery waters is extremely unlikely since there is no function outlet (see fish movement discussion), although if future irrigation releases resulted in the potential escapement of fish and they did reach occupied habitat, these fish would become part of the recovery population and would be considered neither detrimental nor beneficial.

Impacts from wild populations on stocked Apache trout:

The action of stocking Apache trout is considered a conservation action in furtherance of the Endangered Species Act whereby a special 4(d) rule is in place. AGFD may take any federally listed threatened fish or wildlife for conservation purposes that are consistent with the purposes of the Act and the Section 6 Cooperative Agreement between USFWS and AGFD and therefore take of Apache trout from the proposed stocking of Apache trout is legally permitted.

If stocked Apache trout escaped Mexican Hay Lake and travelled downstream as far as the LCR below River Reservoir, impacts to stocked Apache trout from species of fish currently existing as

wild, self reproducing populations at or in proximity to proposed stocking locations may include predation, hybridization with other trout and/or competition.

Northern Leopard Frog

Local Analysis: Although Mexican Hay Lake and the West Fork LCR buffered stocking complex are within the historical range of the northern leopard frog, the likelihood that northern leopard frogs will be exposed to fish stocked in Mexican Hay Lake is low. There are no historical records for northern leopard frogs from Mexican Hay Lake. There are historical records for northern leopard frogs from 3 sites in the complex: Benny Creek (SR 373) (1979), Little Colorado River (7 KM W of Eager) (1979), and Sheep Springs (FS 89 JCT W/HWY 260) (1942) (AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). There have been 32 surveys at 24 sites within the buffered stocking complex between 1942 and 2002 (Figure 5, HDMS, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). Northern leopard frogs were not observed during subsequent surveys at Benny Creek (SR 373) (1992 and 1995) or Sheep Springs (FS 89 JCT W/HWY 260) (1995) and it is likely that northern leopard frogs no longer occupy these sites (HDMS, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.).

Broad Scale Analysis: The likelihood that northern leopard frogs will be exposed to dispersing stocked fish in Mexican Hay Lake and the West Fork buffered stocking complex is moderate. Stocked fish could disperse as far downstream as Lyman Lake and there are records from 2007-2009 for northern leopard frogs just downstream of Lyman Lake (Drost, pers. comm.). Although the main drainage does not provide suitable habitat for northern leopard frogs because of fast flowing water and presence of crayfish, the frogs are occupying a series of ponds and marshy meadows along the outflow from the Lyman Lake dam (Drost, pers. comm.).

Chiricahua leopard frog

Local Analysis: Although Mexican Hay Lake and the West Fork LCR buffered stocking complex are within the historical range of the Chiricahua leopard frog, the likelihood that Chiricahua leopard frogs will be exposed to fish stocked in Mexican Hay Lake is low. There are no historical records for Chiricahua leopard frogs at Mexican Hay Lake or within the West Fork buffered stocking complex. There have been 32 surveys at 24 sites within the buffered stocking complex between 1942 and 2002 (Figure 5, HDMS, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.) and no Chiricahua leopard frogs were observed. In addition, even though the West Fork LCR buffered stocking complex is within a Chiricahua leopard frog recovery unit, the majority of the complex is outside of the Black River Management Area, suggesting that habitat and conditions for recovery are less suitable in that area. Therefore, it is likely that Chiricahua leopard frogs do not occupy the West Fork buffered stocking complex.

Broad Scale Analysis: The likelihood that Chiricahua leopard frogs will be exposed to dispersing fish from Mexican Hay Lake and the West Fork Complex is low. There are no records for Chiricahua leopard frogs in the Little Colorado River where stocked fish could disperse to, but fish could travel downstream the Little Colorado River and upstream the tributary of Nutrioso Creek where there are 2 historical records for Chiricahua leopard frogs. Chiricahua leopard frogs were documented at Nutrioso Creek (Correjo Crossing, 1979) and Nelson Reservoir (SE Corner, 1971). Chiricahua leopard frogs were not observed during subsequent surveys at Nutrioso Creek (Correjo Crossing) (1995) and Nelson Reservoir (SE Corner) (1987, 1992, 1993, and 1995) and it is not likely that Chiricahua leopard frogs currently occupy these sites or this area (HDMS, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.).

Mexican Spotted Owl Critical Habitat

This stocking location is within Mexican spotted owl (MSO) critical habitat (CH).

The CH designation included most other protected and restricted habitats for the MSO. Indirect effects to CH may include actions that can affect forest structure and maintenance of adequate prey species identified as PCEs. These actions may include trampling of vegetation, soil compaction, removal of small woody debris or other physical degradation potentially altering the productivity and succession/regeneration of the vegetation. In the designation of critical habitat (USFWS 2004) most recreational activities, including angling, were not identified as requiring restrictions to protect the PCE's of critical habitat from destruction or adverse modification. In making that statement, recreational activities, including angling were assumed to not contribute to significant habitat-affecting activities such as cutting large trees or snags, removal of large woody debris from the forest floor, altering the tree species diversity, or other large-scale changes to habitat structure. The act of a relatively small number of people walking through habitat is not likely to cause the kind of effects that would result in adverse effects to the PCEs/KHCs of MSO CH and/or restricted and protected habitats.

WEST FORK LITTLE COLORADO RIVER COMPLEX ANALYSIS

Water Distribution / Connectivity

The headwater tributaries of the LCR, the East and West Forks, both flow perennial from high elevation on Mt. Baldy down for 17.8 miles and 9.1 miles, respectively, to their confluence in the town of Greer, where they form the mainstem of the LCR. Spill from Lee Valley Lake, which is filled by mostly perennial Lee Valley Creek from high elevation on Mt. Baldy, enters the West Fork LCR approximately 4.0 miles upstream of the confluence of the main forks. The mainstem LCR then flows perennial for 2.3 miles through the Town of Greer into River Reservoir.

Water flows perennially into River Reservoir, but is also diverted during the "fill season" into off channel reservoirs, Bunch and Tunnel Reservoirs, from September 15 through April 15. They are off-channel irrigation reservoirs operated in conjunction with River Reservoir. The diversion takes water from the LCR approximately 1.8 miles upstream of River Reservoir. The ditch flows from the LCR for 1.6 miles then splits to fill either Tunnel Reservoir or Bunch Reservoir, each about 0.2 miles from the split in the ditch. Once these lakes are full, the irrigation ditch is shut down to let River Reservoir fill. During the time the irrigation ditch is operating, the river downstream from that diversion can be extremely low, but still continuous and perennial. Water is also released out of Bunch and Tunnel Reservoirs during the irrigation season (April 15-September 15) for use downstream in Springerville and Eagar. When water is released from the outlet at Bunch Reservoir, it flows down an unnamed tributary for 0.4 miles into Benny Creek, then down Benny Creek for 1.4 miles to Hall Creek, then down Hall Creek for 0.3 miles and directly into the LCR downstream of River Reservoir. This water travels down the LCR to be pulled back out towards Springerville and Eagar. When water is released from Tunnel Reservoir, it flows directly into the west side of River Reservoir and is metered out through the River Reservoir dam outlet.

River Reservoir spills annually in the spring during snowmelt runoff. Water is also released out the outlet in the dam directly into the LCR during the irrigation season of April 15 to September 15, to be pulled back out downstream near Springerville and Eagar. All three reservoirs are often drained down to the depth of the outlet structures, leaving a small minimum pool at the end of the summer. No legal minimum pool agreements are in place. The remaining pool level is left because it cannot be released without pumping up to the outlet.

The LCR downstream of River Reservoir flows perennially all the way to Lyman Lake, even at base flows with or without irrigation releases. From River Reservoir dam, the LCR flows downstream for 16.1 miles to the upper extent of occupied spinedace habitat at Airport Road in Springerville. Along this reach, tributaries enter the LCR, Hall Creek at 2.6 miles downstream of River Reservoir, Fish Creek at 3.1 miles downstream of River Reservoir, and the South Fork LCR at 5.9 miles downstream of River Reservoir. A major water diversion is located 1.3 miles downstream of the South Fork LCR confluence, which diverts much of the irrigation water

released from the Greer lakes during the summer. Continuing down the LCR in Springerville, another tributary, Nutrioso Creek, enters 1.7 miles downstream of Airport Road. Another major diversion structure is located approximately 1 mile downstream of Nutrioso Creek confluence, at which point the mainstem LCR continues downstream for another 17.0 miles to Lyman Lake. The tributary Coyote Creek enters the LCR a few miles upstream of Lyman Lake. A number of small water diversions exist throughout Springerville and downstream towards Lyman Lake and are not fish barriers for trout but may be for smaller sized species.

The tributary Hall Creek, entering the LCR 2.6 miles downstream of River Reservoir, contains the spill and irrigation releases from White Mountain Reservoir. White Mountain Reservoir is filled by upper Hall Creek draining off the high elevations of Mt. Baldy. There is normally a good snowmelt runoff coming down Hall Creek to fill or nearly fill White Mountain Reservoir every year except for extreme drought years. The very headwater of Hall Creek on Mt. Baldy is perennial, but becomes intermittent just above the reservoir, and flows into the reservoir only during the spring snowmelt; the 2 miles of Hall Creek immediately above the reservoir dries in the summer months. Hall Creek is intermittent below the reservoir, except when releasing water, until the final stretch about 3 miles above the LCR.

When water is released for irrigation from White Mountain Reservoir during the irrigation season from April 15 to September 15, it flows down Hall Creek for 6.0 miles and then into the LCR. Lower Hall Creek also transports the irrigation releases from Bunch Reservoir, as described above. The tributary South Fork LCR has Mexican Hay Lake located near the headwaters of the South Fork tributary Joe Baca Draw. Mexican Hay Lake does not spill and has not been used as an irrigation reservoir for over 15 years, and is not likely to be used for irrigation anytime in the near future. However, because the potential exists, and if the buried outlet structure was dug out, released water would flow down an unnamed tributary for 0.5 miles to Joe Baca Draw, then down Joe Baca Draw for 1.3 miles to the South Fork LCR. The unnamed tributary is intermittent, flowing only with snowmelt runoff coming from downstream of the dam. Joe Baca Draw is perennial but at an extremely low flow that is unsuitable for trout most of the year. The South Fork of the LCR is a good quality perennial trout stream that flows year round. From the confluence with Joe Baca, water flows down the South Fork for 3.5 miles a lower constructed fish barrier for Apache trout recovery, then another 0.9 miles to the mainstem LCR. However, if the outlet works are not dug out and opened for irrigation, water in Mexican Hay Lake cannot leave the lake except by evaporation and seepage into the ground.

Fish Movement

Stocked Apache trout and Arctic grayling in Lee Valley Lake could disperse upstream into Lee Valley Creek once the unnecessary fish barrier is soon removed, with Apache trout assimilating into the recovery population of Apache trout in the stream. Arctic grayling likely would only move into the stream above the lake during spawning season for a short period (several hours)

then most returning to the lake after spawning. Those that could not return to the lake would not persist long in the stream, for weeks at the most. Lee Valley Creek is extremely small and not suitable habitat for a mature spawning Arctic grayling that is likely 13-14" in size. Smaller and not mature grayling are not likely to move up into the creek. The two stocked species could move down into the West Fork LCR when Lee Valley Lake spills on a regular basis (except during drought years). This likely happens, although very low numbers of fish are likely to move at any one time. Once in the perennial and high quality trout waters of the West Fork, a dispersing Apache trout would assimilate into the recovery population of Apache trout in the West Fork. A dispersing Arctic grayling would not persist long in the West Fork because grayling have not been documented to persist or establish in streams in Arizona.

Apache trout stocked into Sheep's Crossing on the West Fork LCR could move upstream and downstream in the perennial and high quality trout waters of the West Fork, assimilating into the recovery population of Apache trout. Those stocked trout moving downstream, including those that might be coming from Lee Valley Lake (Arctic grayling likely would never get past this point because they would persist for such a short period of time), could disperse downstream of 2 fish barriers on lower West Fork, and down into the Little Colorado River in the Town of Greer. They could then continue downstream into River Reservoir. Rainbow and Apache trout stocked into the LCR in Greer could also move downstream into River Reservoir or move upstream into the East and/or West Forks of the LCR. But the stocked trout in Greer could not get upstream of constructed fish barriers on the West Fork at 2.8 and 3.1 miles upstream of the confluence or upstream of fish barriers on the East Fork at 2.2, 2.4 and 6.2 miles upstream of the confluence and into recovery habitat for Apache trout.

Trout stocked into Tunnel Reservoir could disperse up the diversion ditch that feeds it, but it is not likely. They are much more likely to exit the lake by way of irrigation releases into River Reservoir. Trout stocked into Bunch Reservoir could disperse up the diversion ditch that feeds it, but it is not likely. They are much more likely to exit the lake by way of irrigation releases into an unnamed tributary, then into Benny Creek, then into Hall Creek, then down into the LCR at a point 2.6 miles downstream of River Reservoir.

Rainbow trout stocked into White Mountain Reservoir could swim up into upper Hall Creek during spring runoff, or they could escape downstream when the reservoir spills or releases irrigation water downstream. Going downstream, a dispersing trout could travel down lower Hall Creek into the LCR at a point 2.6 miles downstream of River Reservoir.

Trout stocked into River Reservoir likely move upstream occasionally, but not far (fish barriers on the forks). Trout likely escape from all the Greer lakes and White Mountain Reservoir when they spill, or more likely when water is released for irrigation. All four of these lakes are routinely drawn down very low during the irrigation season from April 15 through September

15, with trout having a good potential to escape downstream. Many of the trout escaping likely end up in the LCR, especially those coming out of River Reservoir because it drains directly into the LCR. Trout escaping from Bunch and White Mountain Reservoir have a little longer path to take in tributaries before they reach the LCR.

Once in the Little Colorado River, dispersing trout could persist in the suitable habitat for trout in the 7.2 miles downstream of River Reservoir, and possibly reproduce in this reach, although recruitment would not be expected for Apache trout in the face of the wild brown trout populations in the reach. Dispersing trout could move up into the tributary South Fork LCR, but only for 0.9 miles until it reached an impassable fish barrier constructed for Apache trout recovery on that stream. Another fish barrier was constructed 1.8 miles upstream of the lower barrier. Stocked Apache trout into Mexican Hay Lake will most likely never escape the lake except by angler harvest or predation. There is a remote possibility that the irrigation outlet could be restored after many years of disrepair and non-use and a stocked Apache trout disperses downstream into Joe Baca Draw, then into the perennial high quality trout habitat in the South Fork, where it would assimilate into the Apache trout population. It could also continue to disperse downstream over the barriers and into the LCR, where it could persist but likely not reproduce in the presence of wild brown trout. But more likely, stocked trout in Mexican Hay Lake would never even reach the South Fork.

Dispersing trout in the Little Colorado River, most likely from River Reservoir, the other Greer Lakes, or from White Mountain Reservoir, in that order, could move further downstream into an 8.9 mile reach upstream of the Town of Springerville. Trout could persist here for some time, but likely not reproduce because it is marginally suitable for trout, especially rainbow trout or Apache trout.

From that reach, dispersing trout could further move downstream into an 8.5 mile reach of the LCR from Airport Road in Springerville to just below Wenima Wildlife Area, which is occupied habitat for Little Colorado spinedace. This reach is marginally suitable for brown trout, where large individuals are found but in very low numbers, but is not suitable for rainbow trout. Only 3 rainbow trout have been documented in this reach through many years of surveys, 2 in 1993 and 1 in 1991. This very rare occurrence record for rainbow trout indicates that they disperse into this area very infrequently, in very low numbers, and do not persist.

It is within this reach that the tributary Nutrioso Creek enters. The lower reaches of Nutrioso Creek is normally dry, however does flow during a good spring runoff, potentially allowing dispersing trout to move upstream towards the closest Designated Critical Habitat for Little Colorado spinedace. But it is extremely unlikely that trout stocked anywhere in this complex would reach this point. The collections of rainbow trout found within this critical habitat (see Nelson Reservoir analysis in the LCR above Lyman complex) are more likely coming from

Nelson Reservoir. Dispersing trout from the West Fork Complex are very unlikely to get to this reach on the LCR, based on the very low numbers found in the survey history. If they do reach this area, it would be in very low numbers and likely only after a heavier than normal flood event that would transport fish long distances. The unsuitable habitat for rainbow and Apache trout would discourage them from dispersing this far downstream, or allow them to persist only for a very short period.

A trout could possibly disperse further downstream towards and into Lyman Lake, however, the remaining 13.5 miles of the LCR to Lyman and entirely unsuitable for trout because no trout have been documented in this reach, even wild brown trout.

Community Description

The West Fork LCR and East Fork LCR above the fish barriers contain only Apache trout following the chemical renovations that removed all the non-native trout. Lee Valley Creek also contains only Apache trout following chemical renovations there as well. Arctic grayling may enter Lee Valley Creek from Lee Valley Lake for very short periods to spawn, but do not stay more than several hours based on observations in the 1980s and 1990s. Those that cannot get back to the lake do not persist in the creek. Multiple surveys and several complete chemical renovations on Lee Valley Creek have never found an Arctic grayling in the stream. Arctic grayling may also end up in the West Fork LCR from dispersing over the spillway from the lake, but again will not persist in the stream. Intensive surveys and several complete chemical renovations have never documented a grayling in the West Fork LCR. For greater details, see the Lee Valley Lake and Sheep's Crossing stocking sites analyses.

Wild brown trout and stocked rainbow trout and Apache trout occur in the West Fork LCR below the barriers. Wild brown trout, stocked rainbow and Apache trout, and speckled dace, and bluehead sucker occur in the East Fork LCR downstream of the barriers. The same species as the East Fork below the barriers, plus fathead minnow, occur in the LCR through Greer and above River Reservoir. For greater details, see the analysis for the LCR Greer stocking site.

Stocked rainbow trout, and wild brown trout, yellow perch, carp, fathead minnow, bluehead sucker, and crayfish occur in River Reservoir. Stocked rainbow trout, and wild brown trout, fathead minnow, and crayfish occur in Tunnel and Bunch Reservoirs.

Wild brown and rainbow trout, speckled dace, bluehead sucker, LC sucker, fathead minnow, and crayfish occur in the 7.2 miles of the LCR downstream of River Reservoir. This stretch likely contains escaped rainbow trout as well, but is assimilated into an already wild population of rainbow trout.

Speckled dace, bluehead sucker, LC sucker, fathead minnow, crayfish, and consistent but low densities of brown trout and to a lesser extent rainbow trout, occur in the next 8.9 miles of the LCR to the upper end of Springerville.

Little Colorado spinedace, speckled dace, bluehead sucker, LC sucker, fathead minnow, crayfish, green sunfish, and occasionally brown trout occur in the next 7.5 miles of the LCR from Airport Road in Springerville downstream to just below Wenima Wildlife Area. Rainbow trout occur in this reach extremely infrequently. Only 3 records of rainbow trout exist, 2 in 1993 and 1 in 1999, indicating that the habitat is not suitable for rainbow trout, and that rainbow trout disperse into this habitat from upstream very rarely, in very low numbers, and do not persist. These collections of rainbow trout may have been from trout stocked into Becker Lake when it was managed differently that it is today (now cannot escape Becker), or dispersing from wild populations in the upper watershed or from stocked trout in the Greer area.

Little Colorado spinedace, speckled dace, bluehead sucker, LC sucker, fathead minnow, crayfish, green sunfish, and carp occur in the next 18 miles of the LCR down to Lyman Lake. There have been no records of any species of trout within this reach of the LCR. For greater details and references on the aquatic community in the Greer lakes and LCR downstream to Lyman Lake, see the Greer lakes analysis.

Brook trout occur in the headwaters of tributary Hall Creek, while rainbow trout (when stocked) and tiger salamander occur in White Mountain Reservoir. Brown trout, speckled dace, and rainbow trout occur in lower Hall Creek below White Mountain Reservoir. Rainbow trout were found only in sites near the confluence with the LCR, indicating that those fish were likely coming upstream from a wild population in the LCR at the confluence.

Apache trout occur in the South Fork LCR above the fish barriers. No fish currently occur in Mexican Hay Lake in the headwaters of the South Fork. Rainbow trout were most recently stocked in 1995, however, all trout died off when the long term drought began in 1996, and has not been stocked since. Wild brown and rainbow trout, speckled dace, bluehead sucker, and crayfish exist in the lowest reach of the South Fork downstream of the fish barriers.

As noted above, crayfish are widespread and numerous throughout much of the watershed. The exceptions are in the East Fork LCR, West Fork LCR, Lee Valley Creek, upper Hall Creek, Fish Creek, and upper South Fork LCR. Crayfish are uncommon in Lee Valley Lake and unknown in White Mountain Reservoir or Mexican Hay Lake.

Wandering garter snakes and tiger salamander are common throughout much of the watershed, and recent records exist for Woodhouse's toad, striped chorus frog, and Arizona mountain treefrog. Bullfrogs are known from lower Benny Creek and Lyman Lake, but are likely more widespread. No recent records of Chiricahua leopard frogs exist in the watershed. Historic

records of Northern leopard frogs exist on the Little Colorado River and lower Benny Creek, but recent surveys have not found them in the vicinity of this stocking complex.

Consultation Species or Critical Habitat
Potential impacts from the proposed action to candidate and listed species are described below. Please refer to Chapter 4 for a detailed description of the nature of the impacts (which may include predation, competition for space and food, and hybridization etc.).Subsequent responses (resulting from the frequency, magnitude and duration of the impacts) between proposed stocked and candidate and listed species, and any site or complex factors that provide context for determining the meaningfulness of the impacts, are discussed below. Impacts from the proposed action resulting from angler related recreation and/or potential introduction of disease, pathogen or invasive species are evaluated at a broad scale for the entire action area and are described in Chapter 4. If potential impacts specific to a stocking site or complex have been identified they are discussed below.

Potential impacts to Little Colorado spinedace and critical habitat is addressed below. Chiricahua and Northern leopard frogs are analyzed below at the local site and broad scale level due to the movement potential into the stocked area and fish movement potential up or downstream into areas where frogs may occur.

Little Colorado spinedace and Critical Habitat
The nearest occupied spinedace habitat is in the Little Colorado River in Springerville, about 14 miles from Mexican Hay Lake and 13 miles from Bunch Reservoir, which is the closest of these proposed stocking sites. Water from White Mountain Reservoir is drained through a headgate into Hall Creek to use for irrigation downstream in the Eager/Springerville area. Spinedace occupy the next 25.6 miles of the LCR downstream to Lyman Lake, and also from Lyman Lake to St. Johns. Spinedace also occupy Nutrioso Creek, where the confluence is 17.8 miles downstream of River Reservoir, above and below Nelson Reservoir.

The nearest designated critical habitat is located in 5 miles of Nutrioso Creek from the dam at Nelson Reservoir downstream to the Forest boundary. Constituent elements for all areas of critical habitat include clean, permanent flowing water with pools and a fine gravel or silt-mud substrate (USFWS 1987).

Potential Impacts
Rainbow trout likely escape downstream into the LCR from all 3 Greer lakes, especially River Reservoir because it is located right on the LCR, and they likely persist in the 7.2 miles of suitable trout habitat immediately below River Reservoir. However, several large diversions impede this downstream movement, by directing fish washing down into irrigation ditches. Plus, the stream habitat in Springerville, and downstream, is not suitable for Apache trout and they would likely not persist because the water temperatures exceed their thermal maxima.

This 7.2 mile reach of the LCR below River Reservoir has wild populations of brown trout and rainbow trout. Escaped trout, or wild trout from the LCR reach below River Reservoir, do get into the next 8.9 miles of marginal trout habitat in somewhat consistent but low numbers, but they apparently do not persist. Recent surveys in 2009 found 1 rainbow trout in 2 of 3 sites within this reach. They were not collected there in previous surveys. Escaped trout rarely get into occupied spinedace habitat in Springerville and below, and there is no evidence that they persist. Only 3 rainbow trout have been caught in occupied spinedace habitat in the LCR in nearly 2 decades of surveys; 2 in 1993 and 1 in 1999. These very infrequent rainbow trout found in the Springerville area could have come from one of the Greer lakes or from another stocking location closer to Springerville. These escaped trout could prey directly on adult or juvenile spinedace (Blinn et al. 1993) or compete for food and space. Blinn et al. (1993) and Robinson et al. (2000) reported changes in habitat use by spinedace when rainbow trout were present. Robinson et al. (2000) noted that there was little diet overlap between spinedace and larger trout, but noted that competition for food would likely occur between spinedace and trout of the same size.

There is no evidence that trout reproduce in the Greer lakes, and escaped trout would not likely reproduce in the LCR near Springerville, but escaped trout could spawn in the suitable trout habitat just below River Reservoir. Progeny from this area could possibly disperse downstream into spinedace occupied habitat and potentially compete for food, but there is no evidence this is occurring. If it does occur, it is at an extremely low level. There would be very little chance of impact to upstream dispersal of spinedace by stocked trout. Spinedace seem to be limited to upstream dispersal by numerous water diversion structures present on the LCR- see the discussion in the Mexican Hay Lake analysis. In addition, brown trout are more consistently found than rainbow trout in the reach above occupied habitat and are a greater threat due to their broader temperature tolerance and more piscivorous nature. Brown trout are not part of the proposed stocking action anywhere in the Headwaters or Upper LCR watersheds.

The proposed stocking activity could impact indirectly the Little Colorado spinedace due to the connectivity of habitat and some, but rare, documented occurrences of trout in occupied spinedace habitat. The level of impact would be very low as documented by the very low numbers of rainbow trout found in the surveys, and the fact that they do not persist in the occupied reach year-round because habitat conditions within spinedace occupied habitat are unsuitable for rainbow trout or Apache trout.

Stocked Arctic grayling could conceivably reach Little Colorado spinedace occupied habitat, but it is extremely unlikely. They would have to travel 1.5 miles over the spillway of Lee Valley Lake, and drainage to the West Fork LCR, down the West Fork for 4.0 miles through a recovery stream for Apache trout, which are also stocked, down the LCR for 2.3 miles to River Reservoir, through the Reservoir, then down the LCR 16.1 miles to occupied spinedace habitat.

The survey history shows that some trout may get washed downstream into spinedace occupied habitat during extreme flooding events, but do not persist. Only 3 rainbow trout and no Apache trout or Arctic grayling have been found within occupied spinedace habitat in over 2 decades of surveys(Table 41 for recent surveys; also see Young et al 2001, Dorum and Young 1995, Minckley 1984, McKell 2005d; KansasGap database). Additionally, because trout are also stocked into multiple locations located on private land, and exist in wild populations in connected streams, it is difficult to determine the source of any trout that might be surveyed.

The greatest threat to Little Colorado spinedace in the Little Colorado River is not from stocked trout, but from invasive crayfish, which are very numerous throughout occupied habitat in the LCR, from wild brown trout, which are present in low numbers only in the upper portions of occupied habitat from Airport Road in Springerville downstream to just below Wenima Wildlife Area, from wild green sunfish present throughout occupied habitat, from fathead minnows, which are numerous throughout occupied habitat, and from altered stream flows (dams/diversions) and habitat.

Critical Habitat

While Apache trout and Arctic grayling could survive in the West Fork, in the LCR down to River Reservoir, in River Reservoir, or in about 7 miles of stream below River Reservoir, they would not survive through the summer in the warm waters of the LCR as it flows through Springerville and known occupied spinedace habitat. It would be even more difficult for a stocked Apache trout or Arctic grayling to reach critical habitat located approximately 7 miles up a normally intermittent reach of Nutrioso Creek to perennial water. If an Apache trout did make it, it would be indistinguishable from a recovery trout emigrating from the West Fork, East Fork, or South Fork of the LCR. Arctic grayling have never been found in the West Fork LCR or the entire mainstem Little Colorado River downstream from Lee Valley Lake. Hatchery Apache trout have been collected and documented in the West Fork LCR, because they have been stocked at Sheep’s Crossing annually from 1999-2006, and in the LCR in Greer, because they have been stocked in Greer annually from 1999-2008. It is most likely these collections were Apache trout stocked directly in those locations. Apache trout have not been collected downstream of River Reservoir in recent times. Historically, Apache trout were native to the entire suitable trout habitat in this upper LCR drainage. The proposed action is not expected to impact any of the critical habitat constituent elements for LC spinedace.

Upper Little Colorado River Complex

The Upper LCR Complex consists of 2 stocking sites: Concho Lake and Little Ortega Lake. These lakes are downstream from the LCR and above Lyman and West Fork LCR complexes, but still in the relative vicinity of the LCR headwaters (Figure 8). These 2 stocking sites are not hydrologically connected and were grouped together in this complex because of their proximity

to each other (4.1 miles apart) and isolation/distance from the next closest stocking site (Figure 9). Concho Lake is located on the headwaters of Concho Creek, a tributary to the LCR; however, water and fish from Concho Lake never reach the LCR due to the operation of the lake as an irrigation reservoir, the small watershed, and the timing of irrigation releases that do not coincide with potential flood flow events. Little Ortega Lake is a natural depression with no outlet, and located at the terminus of Mineral Creek, with no hydrologic connection to the LCR.

Concho Lake

Site Description

Concho Lake is an 80 surface-acre irrigation storage reservoir on upper Concho Creek, formed by flow from Concho Springs. The dam was originally built in the 1880s and rebuilt in 1930. The lake has a maximum depth of 16.4 feet and an average depth of 8.2 feet. The lake is located on private and BLM lands, which are managed by the Department, at an elevation of 6296 feet, approximately 2.1 miles south of the town of Concho and 26 miles northeast of Show Low.

Concho Lake is accessed year around by paved Highway 61. The Department manages a portion of land on the east and west side of the lake, with a boat launch ramp, camping/picnic area, and toilet on the west side. The inlet and dam area of the lake are privately owned, but currently allow shoreline access. Boat motors are restricted to electric motors. The lake may ice over briefly in the winter, but the lake does not receive ice fishing use.

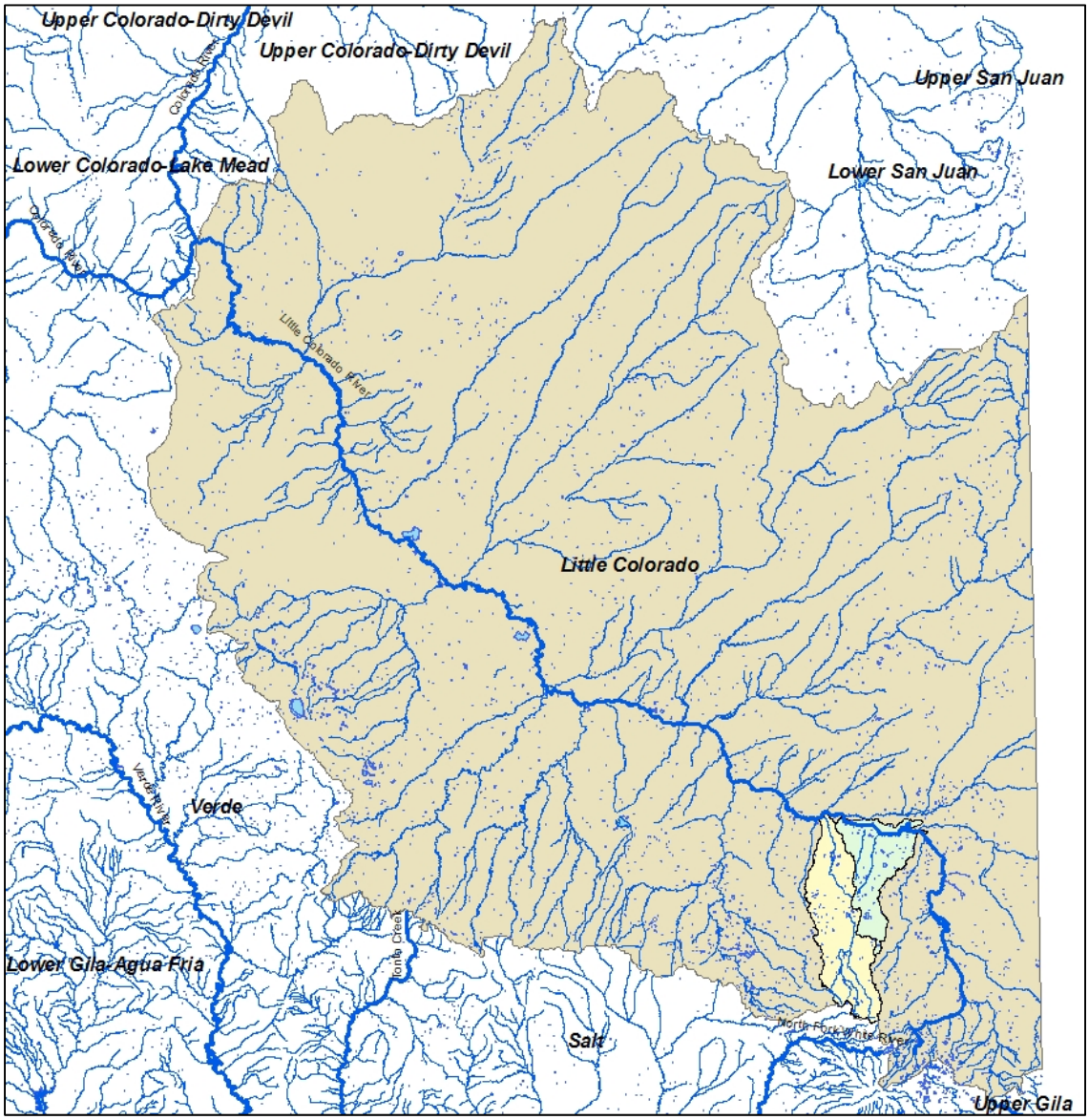

Figure 8. The Upper LCR complex is located near the headwaters of the LCR and consists of two sub-drainages.

Management of Water Body

Primary fishery is a cold water rainbow trout intensive use put-and-take fishery, with a proposed secondary warm water fishery of self sustaining largemouth bass and bluegill, and put-grow-and-take channel catfish fishery.

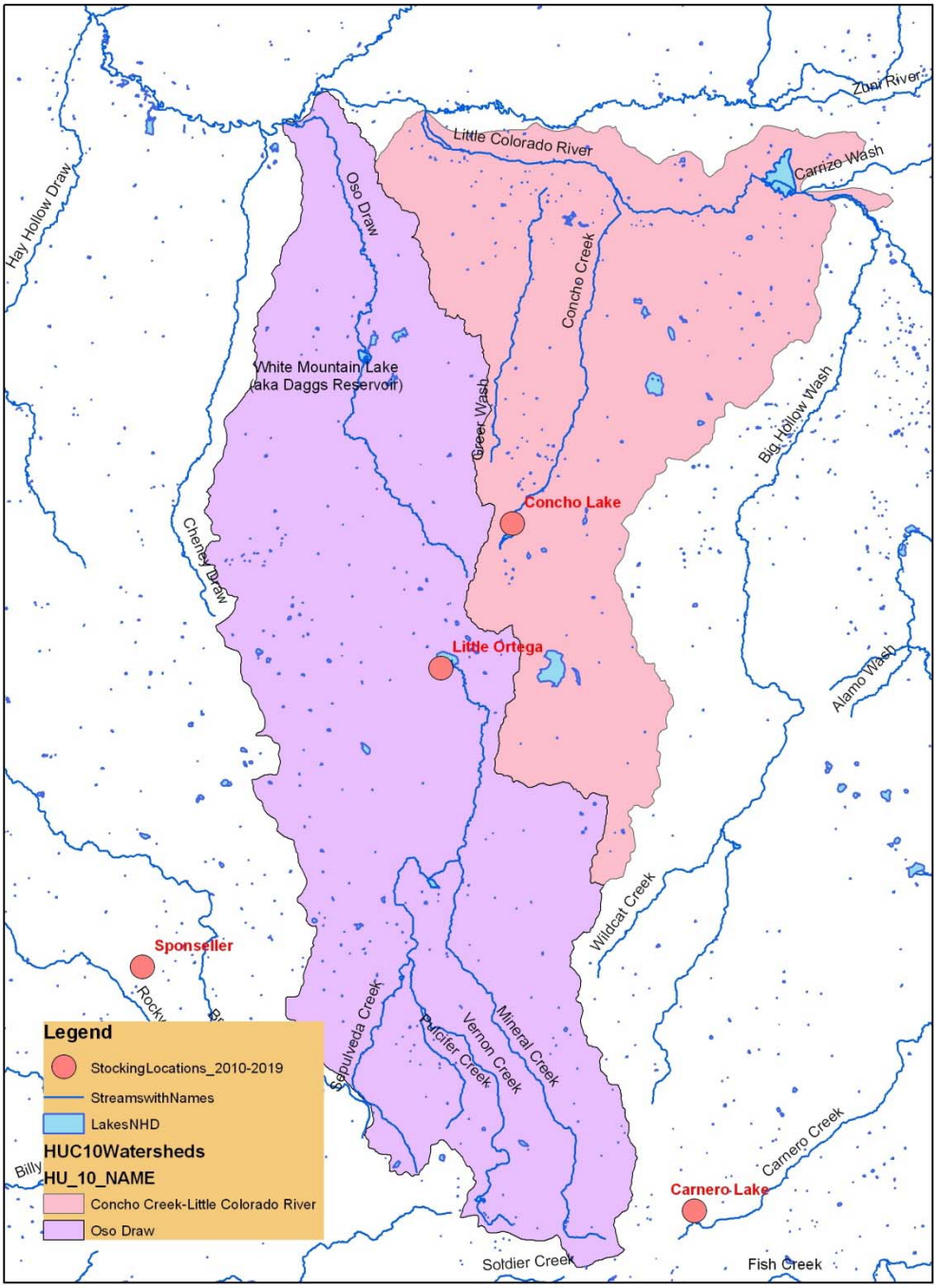

Figure 9. Overview of the Upper LCR stocking sites, Little Ortega and Concho lakes.

Historically, Concho Lake was managed as a cold water fishery utilizing rainbow trout (Table 45). The addition of several warm water species is proposed due to water chemistry, warm water conditions, and heavy irrigation draw-downs that impact trout survival. We will attempt to manage Concho Lake first as a cold water fishery with rainbow trout while trying to help form

an agreement to maintain a suitable minimum pool in the lake. If the water level issue cannot be resolved, we will add a secondary objective to provide a warm water fishery of largemouth bass, bluegill, and channel catfish to provide some angling opportunity when the water quality will not support trout. The Department may change the primary objective to a warm water fishery and drop managing trout altogether if the water conditions continues to be severe.

Catchable trout are stocked multiple times in the spring and early summer. The largemouth bass and bluegill are proposed to be stocked initially to start the populations, and then only when needed to augment or restart them after a catastrophic fish kill. Catchable, sub-catchable, and fingerling channel catfish would be stocked annually throughout the stocking season if the secondary warm water fishery is initialized.

Table 45. Stocking history at Concho Lake.

Species	First Year	Last Year	Num. of Stockings	Num. Stocked
Brook trout	1977	1994	31	734,757
Crayfish	1971	1971	1	325
Cutthroat trout	1980	1995	11	326,455
Rainbow trout	1957	2009	246	6,140,255
Total			289	7,201,792

Concho Lake is heavily used for irrigation, with all water rights privately held. The lake is often drawn down significantly, impacting fisheries in the lake. For example, the lake was drawn down so low in the summer of 2008, and again in 2009, that a fish kill occurred. The lake does retain water at times and the aquatic weeds grow aggressively and often become a nuisance. The Department uses a mechanical weed harvester to thin the weeds when the water level is high enough to launch the harvester. Lately, the lake is often too low and the weeds continue to grow. Concho Lake also experienced a couple of fish kills early in the season in May 2004 and May 2005, when water quality should have been good. High pH and strong blue-green algae blooms were documented in association with these kills. The problem has not re-occurred since 2005.

A developer has purchased the private parcels around Concho Lake and plans to build homes around the lake and on the private shoreline. However, the problem of draining the lake for irrigation on a regular basis is not helping to sell lots. A plan to provide irrigators with their full water rights, with an agreement to maintain a minimum pool of water, is being explored, but would have to be approved by water rights holders and the irrigation board.

Currently, catchable rainbow trout are stocked early in the year, providing good fishing until the lake is drawn down quickly and the water quality declines, leaving poor trout fishing until the next time the lake is stocked the following year. The Department would prefer to manage the

lake for a cold water fishery, as the lake produced good trout fishing in the past when water levels were maintained. However, if an agreement cannot be made with the irrigation company and water rights holders, it would be wise to provide an alternative angling opportunity such as largemouth bass, bluegill, and channel catfish. This would help discourage anglers from illegally stocking other species that might be a greater threat to other wildlife in the area.

The most recent on-site angler creel survey at Concho Lake was conducted in 2000, identifying a total angler use of 10,414 AUDs, and a statewide angler mail out survey reported 9,268 AUDs in 2001 (Pringle 2004).

The Integrated Fisheries Management Plan for the LCR Watershed (Young et al. 2001) identifies a management emphasis of cold water sport fish of basic yield, put-grow-and-take with rainbow trout, which is mostly consistent with the primary proposed action. The primary proposed action includes stocking catchable rainbow trout for an intensive use put-and-take fishery, while a basic yield fishery involves stocking smaller fish and utilizing growth in the lake. The 2001 plan was written prior to excessive draw downs of the reservoir, which no longer allows trout the ability to grow to catchable size, often not even surviving through the later summer months. The current stocking regime is providing fishing opportunity for approximately 4 months, after which the water quality becomes so poor due to excessive draw downs that trout fishing is meager until the next stocking the following spring. The secondary warm water fishery proposal would be implemented only if a solution to the water quantity and quality issues cannot be found. Warm water fishes would be better able to handle the extreme draw downs and associated water quality problems than would trout.

Proposed action

The Department proposes to stock rainbow trout, largemouth bass, bluegill sunfish, and channel catfish in Concho Lake for the period covered by this consultation.

Catchable rainbow trout would be stocked multiple times from March to June annually; numbers of trout stocked may be from 0 to 15,000 fish annually.

Largemouth bass (fingerling, sub-catchable, catchable) and bluegill sunfish (fingerling, sub-catchable, catchable) may be stocked initially to start naturally reproducing populations, then on an as-needed basis at any time during the year to augment or to recover the fishery following catastrophic events. Numbers of fish stocked for this purpose will be determined according to stocking guidelines identified in the sport fish stocking protocol.

Channel catfish (fingerling, sub-catchable, catchable) may be stocked from April to September each year; numbers of channel catfish stocked may be from 0 to 20,000 fish annually.

Water Distribution/Connectivity

Concho Creek flows north to the confluence with the LCR, with Concho Lake located in the headwaters. The drainage begins at Concho Spring 0.5 miles upstream of Concho Lake and runs through a private property golf course to the lake. The spring runs year around, with the 0.5 miles of upper Concho Creek running perennial; however, the flows are fairly low and subject to withdrawals from the golf course. The watershed above the lake is extremely small and does not contribute much water to the lake. Because of the low water input into Concho Lake, it never spills (W. Hooe, pers. comm.). Water is released from Concho Lake during the summer months for irrigation use downstream from April to September. All the released water is diverted into irrigation ditches within the Town of Concho during the irrigation season. Concho Creek below the lake is normally dry, except when water is released from a head gate in the dam for irrigation use in Concho. The creek can also flow towards the LCR when snowmelt and heavy winter precipitation flows that originate from the watershed downstream of Concho Lake. The two events never happen at the same time, because water is not being released from the lake for irrigation when snowmelt or heavy winter precipitation is flowing down lower Concho Creek because that is outside of the irrigation season and irrigation water is not needed at that time. By the time irrigation water is needed in the summer, the creek below the lake has dried. All water released for irrigation is diverted into ditches in Concho and no irrigation water flows north of Concho in the creek itself. Thus, fish stocked in Concho Lake will never have the opportunity to travel the 13.1 miles of Concho Creek from the lake to the LCR.

Fish Movement

Stocked fish have the ability to move upstream into upper Concho Creek because it is perennial, but cannot go any further than the 0.5 miles to the spring.

Trout have the potential to persist in Concho Lake if it retains enough water through the irrigation season; however, that has not been happening recently. Trout do not reproduce in the lake, and are not known to reproduce in the spring above the lake. Warm water fish will likely persist much longer in the lake than trout because they are not as sensitive to poor water quality problems; they may be able to reproduce in the spring.

The lake never spills, but fish can escape downstream into Concho Creek when water is released for irrigation from April to September. All released water is diverted for irrigation within or near the town of Concho and fish do not have the ability to travel downstream of Concho. By the time winter precipitation and spring snowmelt runoff arrives, the creek and diversion ditches have been dry and all escaped fish would have died.

Community Description

Concho Lake contains rainbow trout when stocked, plus naturally reproducing green sunfish, fathead minnow, common carp, and crayfish (Table 46). Concho Creek above the lake has not

been surveyed; however, it is known to have rainbow trout, common carp, and crayfish according to conversations with the golf course operators (M. Lopez, pers. comm.).

Concho Creek below the lake may have some escaped fish temporarily during irrigation releases down to the diversions, but this section dries up after irrigation releases stop. The creek downstream of Concho contains no fish because it dries up entirely and receives no irrigation released water.

Table 46. Survey history at Concho Lake with experimental gillnets (GN).*

Species	**March 2004 6 GN**	**March 2005 3 GN**	**May 2006* 3 GN**	**April 2007* 3 GN**	**March 2008 3 GN**
Rainbow trout	92 (200-414)	40 (250-505)	242 (118-353)	12 (175-343)	36 (285-448)
Carp			22 (206-443)	3 (439-481)	3 (258-525)
Channel catfish					1 (480)
Green sunfish	54 (81-216)		35 (70-245)	8 (119-151)	1 (158)
Black bullhead			1 (322 mm)	1 (344 mm)	
Fathead minnow			1 (81 mm)		

* Effort for each survey is listed as number of gillnet nights (GN). Size ranges are listed as mm TL in parenthesis for fish caught during the surveys. * Note: surveys in 2006 and 2007 were conducted after spring stocking had begun.

Consultation species or Critical Habitat

Potential impacts from the proposed action to candidate and listed species are described below. Please refer to Chapter 4 for a detailed description of the nature of the impacts (which may include predation, competition for space and food, and hybridization etc.).Subsequent responses (resulting from the frequency, magnitude and duration of the impacts) between proposed stocked and candidate and listed species, and any site or complex factors that provide context for determining the meaningfulness of the impacts, are discussed below. Impacts from the proposed action resulting from angler related recreation and/or potential introduction of disease, pathogen or invasive species are evaluated at a broad scale for the entire action area and are described in Chapter 4. If potential impacts specific to a stocking site or complex have been identified they are discussed below.

Chiricahua and Northern leopard frogs are analyzed below at the local site and broad scale level due to the movement potential into the stocked area and fish movement potential up or downstream into areas where frogs may occur.

Northern Leopard Frog

Local Analysis: Although Concho Lake and the Upper LCR buffered stocking complex are within the historical range of the northern leopard frog, the likelihood that northern leopard frogs could be exposed to stocked fish in Concho Lake is low. There is one historical record for northern leopard frogs from Concho Lake in 1958 and there have not been subsequent surveys. (Figure 10, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). Although there are available habitats that have not been surveyed, it is likely that northern leopard frogs no longer occupy sites within the Upper LCR buffered complex because the presence of non-native fish and crayfish make Concho Lake less suitable for northern leopard frogs.

Broad Scale Analysis*: The likelihood that northern leopard frogs could be exposed to fish stocked at Concho Lake that dispersed outside the buffered stocking complex is low. As mentioned in the Fish Movement and Water Distribution/Connectivity section, the lake never spills, fish can only travel upstream 0.5 miles to Concho Springs and cannot swim downstream to the Little Colorado River.*

Chiricahua leopard frog

Local Analysis: Concho Lake is not within the historical range of the Chiricahua leopard frog.

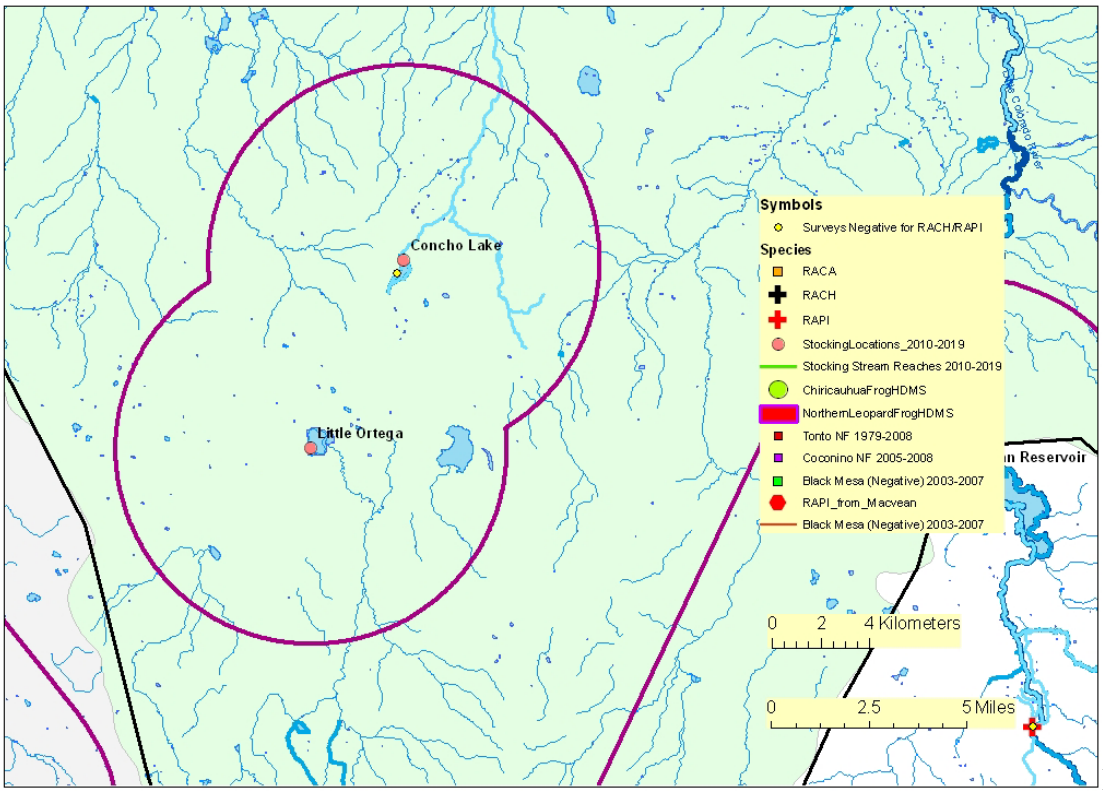

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Figure 10. Map of Upper Little Colorado River buffered stocking complex:

The purple line illustrates the 5 mile buffer surrounding a stocking site, stocking reach, or a group of stocking sites. Blue lines symbolize streams and rivers (both perennial and intermittent). A black line represents a Chiricahua leopard frog Recovery Unit boundary. The background color represents the 8 digit Hydrologic Unit Code. Other data are described in the legend. (Note: HDMS data appear as buffered points and may appear larger than site records for other surveys).

Ortega Lake

Site Description

Little Ortega Lake is located at the terminus of Mineral Creek, approximately 7 miles southwest of the town of Concho. The lake is a closed system formed by a natural shallow basin, with no spillway or outlet. The lake is located on State Trust land at an elevation of 6420 feet.

Little Ortega Lake is accessed year around by a short dirt road off paved Highway 61. There are no facilities, restrooms, signs, or a boat launch ramp at the lake. Camping is allowed at the lake with a valid fishing license and with the act of fishing because the lake is located on State Trust Land; however, camping is rarely practiced.

Management of Water Body

Primary fishery is a warm water channel catfish put-grow-and-take fishery when the lake contains enough water to support fish (Table 47). Catchable, sub-catchable, and fingerling channel catfish are stocked throughout the stocking season, opportunistically in years when the lake has sufficient water levels.

Table 47. Stocking history at Little Ortega Lake.

Species	First Year	Last Year	Num. of Stockings	Num. Stocked
Bluegill	1941	1986	2	16,000
Channel catfish	1975	2008	12	37,362
Largemouth bass	1920	1993	5	15,550
Total			19	68,912

Little Ortega Lake is often dry or extremely shallow and not stocked. During heavy precipitation years, the lake captures enough water to allow stocking channel catfish. The water is always turbid and productivity may be low, so the lake is under-stocked for its size. The lake receives very little angler use because of the infrequent stocking and lack of facilities.

The management of Little Ortega Lake has been minimal. The water coming into the lake itself is not controlled and cannot be released for irrigation. The lake is stocked with channel catfish when the lake level is suitable.

There have been no angler creel surveys conducted at Little Ortega Lake because the fishing opportunity has been so sporadic and angling use is low.

The Integrated Fisheries Management Plan for the LCR Watershed (Young et al. 2001) identified the management objective for Little Ortega Lake as warm water sport fish, with a desired species assemblage of channel catfish, bluegill, and largemouth bass. The proposed action is mostly consistent with this emphasis, with stocking channel catfish; however, bluegill and largemouth bass are not proposed.

Proposed action

The Department proposes to stock channel catfish for the period covered by this consultation.

Catchable, sub-catchable, and fingerling channel catfish will be stocked multiple times from April to September during years when the lake has sufficient water levels; numbers of channel catfish stocked may be from 0 to 10,000 fish annually.

Water Distribution/Connectivity

Little Ortega Lake is fed primarily by Mineral Creek, which originates from a series of springs on the Apache-Sitgreaves National Forest. Upper Mineral Creek is perennial, providing habitat for a recovery population of Apache trout. From the spring, Mineral Creek flows for 3.1 miles to a constructed fish barrier on Mineral Creek. A diversion located approximately 50 meters downstream of the fish barrier diverts all the base flow for private irrigation use year-round. The next 16.4 miles of Mineral Creek downstream of the diversion to Ortega Lake is dry most of the time, and in most years water never reaches Little Ortega Lake. Normal high spring flows would also be entirely diverted into the irrigation ditch. It would take a flood for water to flow over the diversion on Mineral Creek to connect perennial flows in upper Mineral Creek with Little Ortega Lake. More often heavy snowmelt runoff or heavy winter precipitation flows into the lake from other sources in the Mineral Creek watershed below the diversion.

Once water reaches Little Ortega Lake, which is a natural sink, there is no outlet or any way to release water. Water can persist in the lake if additional incoming flows offset evaporation and seepage; otherwise, the water in Little Ortega Lake eventually dries up. Water levels in Little Ortega Lake fluctuate significantly across years, occasionally being very full, then completely dry in other years. It is entirely dependent upon the winter precipitation and spring snowmelt runoff coming from the headwaters of Mineral Creek.

Fish Movement

Fish stocked in Little Ortega Lake may persist as long as the water persists. The fish die when the lake dries up, which occurs on a regular basis. The fish can only escape the lake one way, upstream in Mineral Creek, but only when flood flows coming down Mineral are sufficient to allow fish movement. Most years there is no flow or extremely low flow. It is possible for a fish

to swim up the 16.4 miles to the water diversion, which may be a partial barrier, but likely not a complete barrier. Fifty meters upstream of the diversion is a constructed fish barrier to prevent upstream movement of fish into Apache trout habitat above the barrier. Fish escaping upstream from Little Ortega Lake could not get past this fish barrier. The closed basin prevents the stocked fish from getting into any other waters than those already described.

Community Description

Little Ortega Lake currently contains stocked channel catfish. It is unknown if they reproduce within the lake (Table 48). Lower Mineral Creek does not support fish because it is dry most of the time. Any fish escaping the lake would die in the creek when it dries. Upper Mineral Creek contains a recovery population of Apache trout (Table 49) that are isolated by the intermittent drainage and a constructed fish barrier. Surveys in 1994-1995 found tiger salamander and striped chorus frog within the watershed near the headwaters, but not in the creek itself.

Table 48. Summary of fish surveys in Little Ortega Lake.

Date	**Gear type**	**Effort (net nights)**	**Species**	**Num. Collected**	**Size range (mm TL)**
Sept 1976	Trap net	1	Green sunfish	43	96-199
March 1977	Gill nets	2	Largemouth bass	1	254
April 1979	Gill and trap nets	4	Green sunfish Fathead minnows	29 many	105-156
April 1981	Gill net		Rainbow trout Green sunfish Fathead minnow	2 7 30	494-546 105-163
April 1987	Gill net	2	Largemouth bass Channel catfish Green sunfish	2 15 3	326-348 206-345 132-195

Table 49. Summary of fish surveys in upper Mineral Creek, using backpack electroshockers.

Date	**Species Collected**	**Num. Collected**	**Size Range (mm TL)**
October 1985	Apache trout	7	75-235
November 1986	Apache trout	8	85-278
July 1991	Apache trout	6	134-241
July 1996	Apache trout	10	88-156
October 2000	Apache trout	46	Not recorded
May 2001	Apache trout	1	86
May-June 2003	Apache trout	1	121

Consultation species or Critical Habitat
Potential impacts from the proposed action to candidate and listed species are described below. Please refer to Chapter 4 for a detailed description of the nature of the impacts (which may include predation, competition for space and food, and hybridization etc.).Subsequent responses (resulting from the frequency, magnitude and duration of the impacts) between proposed stocked and candidate and listed species, and any site or complex factors that provide context for determining the meaningfulness of the impacts, are discussed below. Impacts from the proposed action resulting from angler related recreation and/or potential introduction of disease, pathogen or invasive species are evaluated at a broad scale for the entire action area and are described in Chapter 4. If potential impacts specific to a stocking site or complex have been identified they are discussed below.

Potential impacts to Apache trout are discussed below and potential impacts to Chiricahua and Northern leopard frogs are analyzed below at the local site and broad scale level due to the movement potential into the stocked area and fish movement potential up or downstream into areas where frogs may occur.

Northern Leopard Frog
Local Analysis: Although Little Ortega Lake and the Upper LCR buffered stocking complex are within the historical range of the northern leopard frog, the likelihood that northern leopard frogs could be exposed to stocked fish in Little Ortega Lake is low. There are no historical records for northern leopard frogs from Little Ortega Lake (Figure 10, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). There is one record for northern leopard frogs from within the Upper LCR buffered complex; Concho Lake (1958) but there have been no subsequent surveys (AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). Although there are available habitats that have not been surveyed, it is likely that northern leopard frogs no longer occupy sites within the Upper LCR buffered complex because the presence of non-native fish and crayfish make Little Ortega Lake less suitable for northern leopard frogs.

Broad Scale Analysis: The likelihood that northern leopard frogs could be exposed to fish stocked at Little Ortega Lake that dispersed outside the buffered stocking complex is low. As mentioned in the Fish Movement and Water Distribution/Connectivity section, the lake is a closed system and fish that do escape cannot move upstream of a fish barrier in Mineral Creek. Additionally, Little Ortega Lake dries often, making the habitat less suitable for Chiricahua leopard frogs.

Chiricahua leopard frog
Local Analysis: Little Ortega Lake is not within the historical range of the Chiricahua leopard frog.

Apache Trout

Apache trout are located in the headwaters of Mineral Creek. Stocked channel catfish cannot get to the Apache trout habitat located upstream of a constructed fish barrier, 50 meters upstream of a major water diversion. Mineral Creek is normally dry for the 16.4 miles downstream of the diversion to the lake because the water diversion directs flows into an irrigation ditch year-round, even at normal high spring flows. Only flood flows would overtop this diversion, connecting upper Mineral Creek permanent flows with Ortega Lake. A catfish would have to swim the entire 16.4 miles in the short timeframe of intense spring flows, which would likely be difficult for a warm water fish in the very cold snowmelt runoff. If a catfish got over the diversion during flood flows, it could not get above the constructed fish barrier 50 meters upstream of the diversion. A fish could potentially reach the 50 meters of permanent flow between the diversion and the fish barrier, although likely would not survive. This habitat is not suitable for channel catfish, because of the very small base flows and lack of deep pools. A channel catfish large enough to make that journey 16.4 miles upstream in the short time required before the creek dried up, would not be able to find habitat deep enough to persist. The lower reach of Apache trout habitat in Mineral Creek does not even support trout because of the lack of pools, with most trout found in the upper higher gradient reaches where pool habitat is more abundant.

An Apache trout could disperse downstream to Little Ortega Lake when the creek floods and is connected with the lake. This fish is considered lost to the recovery population because it will never bet back above the fish barrier and will not establish/reproduce in Little Ortega Lake. Stocked channel catfish may impact an individual dispersed trout in the lake, but this would be very rare and would have no impact to the Apache trout recovery population. Potential impacts to the individual dispersed trout in the lake could be predation by channel catfish if the trout is small enough, or competition for food resources within the lake. Stocked catfish will not have anticipated competition for space within the lake because trout are open water fish while catfish occupy the bottom usually around structure. There are no issues with hybridization because these fish are from different families. A recruitment level of the listed species is not an issue because trout cannot spawn in Little Ortega Lake, and catfish cannot get to spawning habitat above the barrier. There would be no dispersal of the listed species because the creek and lake downstream of the diversion are unsuitable for trout because they both dry up regularly, nor is there a need for connectivity reduction between populations of Apache trout because no other populations with hydrologically connected waters.

Potential Impacts

Apache trout escapement from recovery areas and exposure to stocked sport fish:

If recovery Apache trout were to move out of designated recovery areas to areas where stocked Apache trout or other stocked species may be present, they would be considered subject to the

special 4(d) rule. They would no longer contribute towards recovery. Impacts to these individuals would be assessed in the same manner as for stocked Apache trout in non-recovery areas

Stocked sport fishes moving above failed barriers or moving into recovery reaches:

Impacts to recovery Apache trout are not expected occur because recovery populations are located above constructed barriers, which prevent upstream movement of all fish. Should barrier failure occur, the Forest Service and Department would attempt to repair the barrier and if necessary retreat the reach to remove non-native fish. During this period of time, if stocked fish move above the failed barrier, predation, hybridization with other trout and/or competition with Apache trout could occur.

UPPER LITTLE COLORADO RIVER COMPLEX ANALYSIS

Water Distribution / Connectivity

Concho Lake is located on the headwaters of Concho Creek, a tributary to the LCR; however, water and fish from Concho Lake never reach the LCR due to the operation of the lake as an irrigation reservoir, the small watershed, and the timing of irrigation releases that do not coincide with potential flood flow events. Little Ortega Lake is a natural depression with no outlet, and located at the terminus of Mineral Creek, with no hydrologic connection to the LCR.

Fish Movement

Stocked fish in Concho Lake and Little Ortega Lake can escape the lakes, during irrigation releases at Concho and during flood flows into the lake from Mineral Creek at Little Ortega Lake, but cannot reach where listed aquatic species are or may occur. The catfish at Little Ortega Lake can get to perennial water just below a constructed fish barrier for Apache trout above, but are unlikely to ever make it that far due to the distance of the normally dry stream because there is nowhere to persist until the next high flow.

Community Description

Concho Creek above the lake is known to have rainbow trout, common carp, and crayfish according to conversations with the golf course operators (M. Lopez, pers. comm.). The Creek below the lake may have some escaped fish temporarily during irrigation releases down to the diversions, but this section dries up after irrigation releases stop. The creek downstream of Concho contains no fish because it dries up entirely and receives no irrigation released water.

Little Ortega Lake currently contains stocked channel catfish, and it is unknown whether they reproduce. Lower Mineral Creek does not support fish because it is dry most of the time. Any fish escaping the lake would die in the creek when it dries. Upper Mineral Creek contains a recovery population of Apache trout (Table 49) isolated by the intermittent drainage and a constructed fish barrier.

Consultation Species or Critical Habitat

Potential impacts to Apache trout, Chiricahua leopard frog and northern leopard frog are addressed at the site specific stocking locations above. There are no anticipated impacts to listed species downstream from either Concho or Little Ortega lakes.

WHITE MOUNTAIN COMPLEX

The White Mountain Complex is a sub-drainage located within the Silver Creek drainage that flows into the Little Colorado River Watershed (Figure 11). The complex consists of 5 stocking sites; 4 reservoirs and one stream reach, located in or draining into Silver Creek, near Show Low, Arizona (Figure 12).

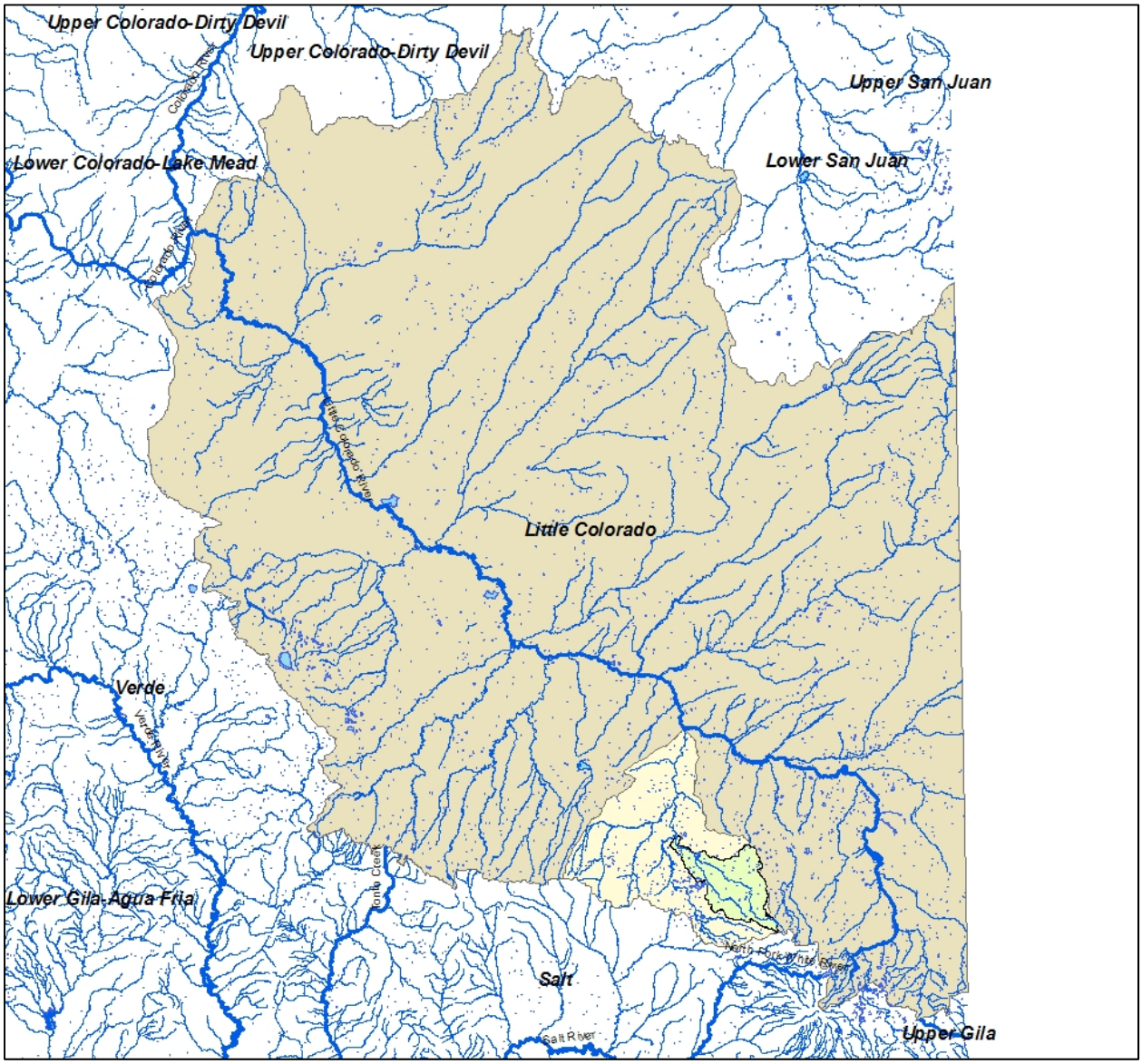

Figure 11. White Mountain Complex sub-drainage (green) is located within the Silver Creek drainage (yellow) of the Little Colorado River watershed.

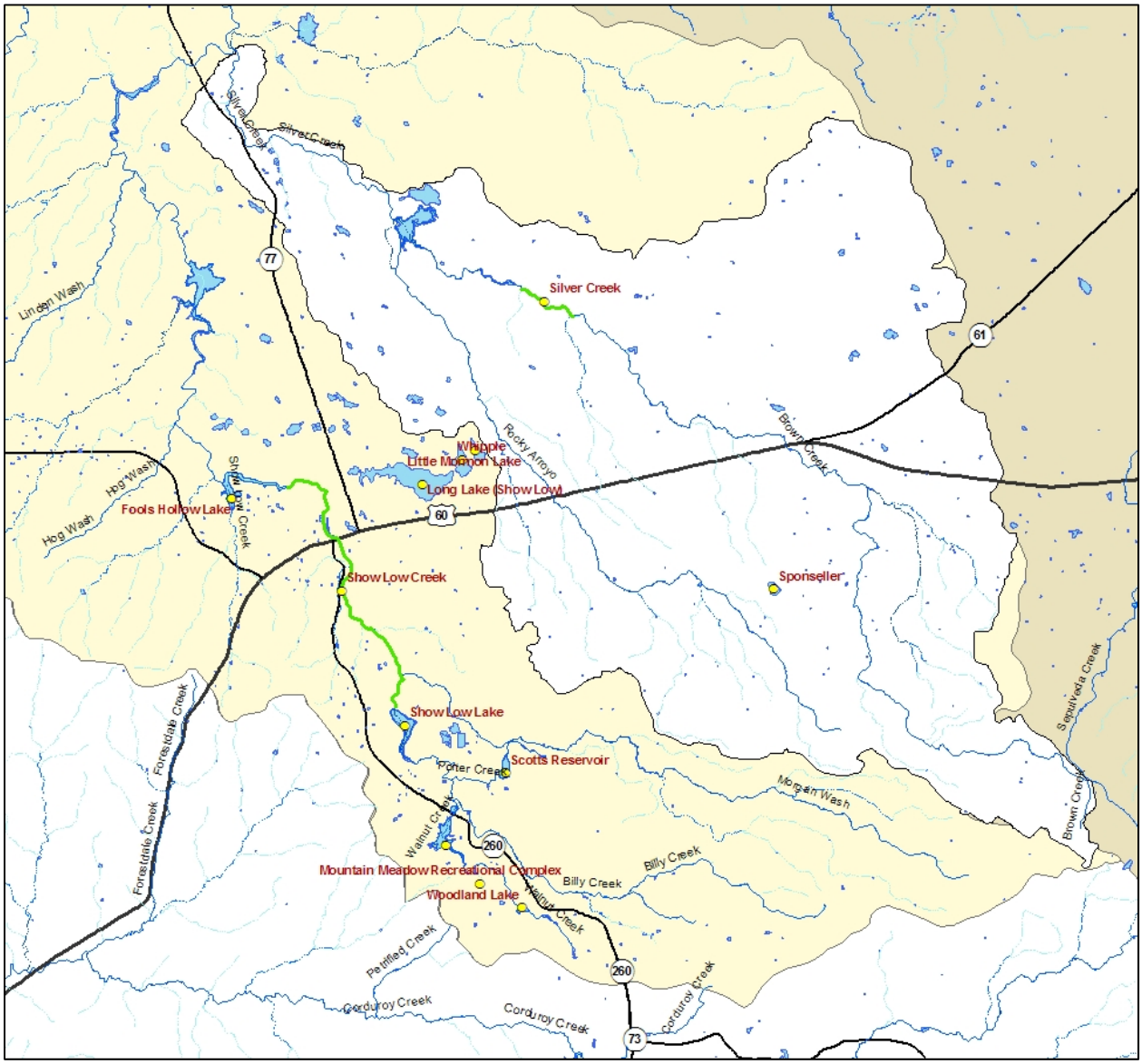

Figure 12. The White Mountain Complex sub-drainage contains 5 stocking locations and is located within or drainage diverted to the Silver Creek drainage.

Sponseller Lake

Site Description

Sponseller Lake is a natural closed basin, located at an elevation of 6960 feet on the Apache-Sitgreaves National Forest (Figure 13). The lake is about 34 surface acres in size when containing water, and located approximately 9 miles northeast of Pinetop-Lakeside. The lake is often dry and not stocked. Sponseller Lake is in a natural sinkhole and only catches enough water to create a lake during high snowpack in very wet years. Sponseller Lake is included in the

White Mountain Complex because it is in the vicinity of the other waters in the complex, but it is not hydrologically connected to them. Sponseller is located approximately 7.4 miles southeast of Little Mormon, Whipple, and Long lakes, and approximately 8.0 miles southeast of the Silver Creek stocking site.

Figure 13. Image of Sponseller Lake located in the White Mountain complex (©2009 ESRI, i-cubed, GeoEye).

Management of Water Body

Sponseller Lake is managed opportunistically as a put-grow-and-take cold water fishery; it is shallow and weedy, when it has water, creating productive conditions that grow large trout.

Trout stocked in 1993 were over 6 pounds by 1995. Sponseller Lake has only been stocked 9 times; in 1993, 1994, 1995, 2005, 2008, and 2009, all with catchable rainbow trout, except in 2005 when subcatchable rainbow trout were stocked (Table 50). The trout stocked in 1993-1995 did very well and persisted for a couple years, but were gone by 1996 when the lake dried up. Recent stockings have not done as well because water in the lake has not persisted long enough to grow large trout.

Table 50. Stocking history for Sponseller Lake.

Species	First Year	Last Year	Num. of Stockings	Num. Stocked
Rainbow trout	1993	2009	9	32,810
Total			9	32,810

The lake is monitored each spring to determine the amount of water collecting in the lake and only stocked if it will hold suitable water into the following year.

Sponseller Lake is accessed by a rough, primitive dirt spur road off Forest Road 45. Depending upon the road conditions, Sponseller could be reached most times of the year; however wet weather makes the road inaccessible. There are no boat launch ramps, restrooms, established parking, or picnic facilities at the lake. Primitive camping is allowed but not often practiced because of the proximity to Pinetop-Lakeside and the extremely low angler use.

There have been no angler creel surveys conducted at Sponseller Lake. The Integrated Fisheries Management Plan for the Little Colorado River Watershed (Young et al. 2001) and the Lakeside Area Fisheries Management Plan (Meyer et al. 2008) identify a management emphasis of basic yield put-grow-and-take sport-fish for Sponseller Lake, with a desired species assemblage of rainbow trout, which is consistent with this proposed action.

Proposed Action

The Department proposes to stock rainbow trout are proposed for the period covered by this consultation. Catchable and sub-catchable rainbow trout would be stocked up to multiple times per season, from March to June, only when the lake holds enough water to support trout through the summer; numbers of trout stocked may be from 0 to 10,000 fish annually.

Water Distribution/Connectivity

Sponseller Lake is fed by snowmelt runoff by a normally dry drainage coming off Marshall and Ziegler Mountains. Sponseller Lake sits in a natural depression and there is no spillway it is a closed basin. There is no hydrologic connection with other drainages or waters. The drainages

coming off Marshall and Ziegler Mountains are almost always dry, running only during spring runoff, and possibly during an extreme monsoon rain event.

Sponseller Lake is often completely dry, particularly during years with below average winter snowpack. In other years, Sponseller has some water but not enough to stock trout. Occasionally the lake catches enough water that persists through the summer fishing season and is stocked during that season.

Fish Movement

Trout stocked into Sponseller Lake have no way of escaping because it is a closed basin. It is remotely possible for a trout to swim up the un-named drainage towards Marshall and Ziegler Mountains during a heavy spring runoff, but they cannot reach any other drainage. The normally dry drainage is only 1.9 miles long up one fork to the extreme top of Marshall Mountain, and another fork goes for another 1.2 miles to the extreme top of Ziegler Mountain. If the trout did not immediately return to the lake before spring runoff ended, it would die as the drainage dried in late spring.

Trout can persist in Sponseller Lake if the lake holds sufficient water long enough. There are no records of winter kill; however the lake does dry up causing complete fish kills.

Community Description

Sponseller Lake contains only rainbow trout, when stocked, and tiger salamanders. The lake dries entirely in most years and rainbow trout are the only species restocked. Sponseller Lake currently contains rainbow trout, and reproduction has not been documented in the lake. The dry drainage coming from Marshall and Ziegler Mountains have no aquatic species present because they dry every year following the end of spring runoff. Two surveys were done on Sponseller Lake; one in 1995 resulted in the collection of 3 rainbow trout, and one in April 2009 resulted in the collection of 49 rainbow trout.

Consultation Species or Critical Habitat

Potential impacts from the proposed action to candidate and listed species are described below. Please refer to Chapter 4 for a detailed description of the nature of the impacts (which may include predation, competition for space and food, and hybridization etc.).Subsequent responses (resulting from the frequency, magnitude and duration of the impacts) between proposed stocked and candidate and listed species, and any site or complex factors that provide context for determining the meaningfulness of the impacts, are discussed below. Impacts from the proposed action resulting from angler related recreation and/or potential introduction of disease, pathogen or invasive species are evaluated at a broad scale for the entire action area and are described in Chapter 4. If potential impacts specific to a stocking site or complex have been identified they are discussed below.

Because Sponseller Lake is a closed system, there is no opportunity for movement of stocked fish out of the lake. Potential impacts to Chiricahua and Northern leopard frogs (analyzed below at the local site and broad scale level due to the movement potential into the stocked area and fish movement potential up or downstream into areas where frogs may occur), along with northern Mexican and narrow-headed garter snakes, are addressed below at the site level.

Northern Leopard Frog

Local Analysis: Although Sponseller Lake and the White Mountain buffered stocking complex are within the historical range of the northern leopard frog, the likelihood that northern leopard frogs could be exposed to stocked fish in Sponseller Lake is low. There are no historical records for northern leopard frogs from Sponseller Lake or the buffered stocking complex. This area includes numerous habitats that have not been surveyed; however, four sites have each been surveyed once within the buffered stocking complex between 1984 and 1994 and northern leopard frogs were not observed (Figure 14, HDMS, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). It is likely that northern leopard frogs no longer occupy sites within the White Mountain buffered stocking complex because the presence of non-native fish, crayfish, and bullfrogs make the habitat less suitable for northern leopard frogs.

Broad Scale Analysis: The likelihood that northern leopard frogs could be exposed to fish stocked at Sponseller Lake that dispersed outside the buffered stocking complex is low, because Sponseller Lake is a closed basin. Although it is remotely possible for fish to swim towards Marshall and Ziegler Mountains, dispersing fish would be confined to those drainages and cannot disperse outside of the buffered complex.

Chiricahua leopard frog

Local Analysis: Although Sponseller Lake and the White Mountain buffered stocking complex are within the historical range of the Chiricahua leopard frog, the likelihood that Chiricahua leopard frogs could be exposed to stocked fish in Sponseller Lake is low. There are no historical records for Chiricahua leopard frogs from Sponseller Lake or the area within the buffered stocking complex. Four sites have each been surveyed once within the buffered stocking complex between 1984and 1994 and Chiricahua leopard frogs were not observed (Figure 14, HDMS, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). Although there are available habitats that have not yet been surveyed, it is likely that Chiricahua leopard frogs no longer occupy sites within the White Mountain buffered stocking complex because the presence of non-native fish, crayfish, and bullfrogs make the habitat less suitable for Chiricahua leopard frogs.

Broad Scale Analysis: The likelihood that Chiricahua leopard frogs could be exposed to fish stocked at Sponseller Lake that dispersed outside the buffered stocking complex is low, because Sponseller Lake is a closed basin. It is remotely possible for fish to swim towards Marshall and

Ziegler Mountains; however, fish that escape are confined to those drainages and cannot disperse outside of the buffered complex.

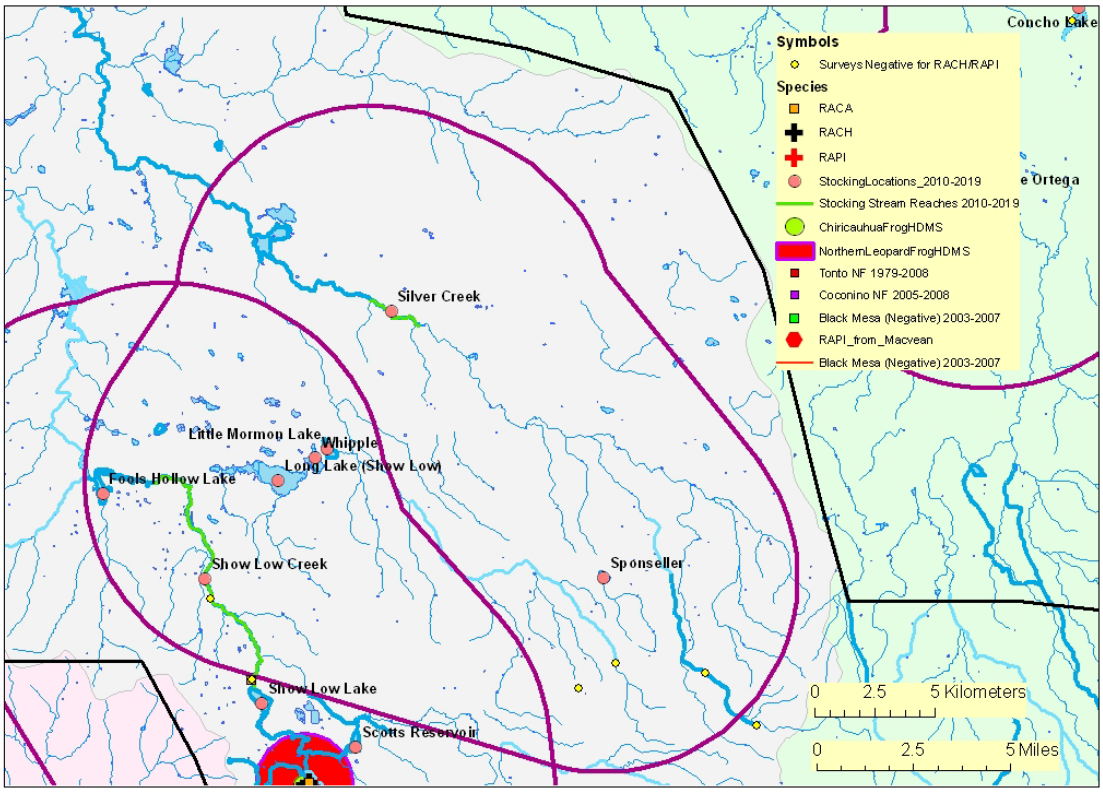

Figure 14. Map of White Mountain buffered stocking complex:

The purple line illustrates the 5 mile buffer surrounding a stocking site, stocking reach, or a group of stocking sites. Blue lines symbolize streams and rivers (both perennial and intermittent). A black line represents a Chiricahua leopard frog Recovery Unit boundary. The background color represents the 8 digit Hydrologic Unit Code. Other data are described in the legend. (Note: HDMS data appear as buffered points and may appear larger than site records for other surveys).

Northern Mexican Garter Snake
Analysis: See White Mountain Complex Analysis below.

Narrow-headed Garter Snake
Analysis: See White Mountain Complex Analysis below.

<u>Silver Creek</u>
Site Description

The Silver Creek stocking site is a 2.4 mile reach of upper Silver Creek on Department property, located immediately below the Silver Creek Fish Hatchery (Figure 15). The stocking site is located approximately 7 miles northeast of Show Low at an average elevation of approximately 6100 feet. This portion of Silver Creek has permanent flow. This stocking site is located at the very upper end of Silver Creek, although the headwater tributary of Brown Creek, a mostly dry drainage, enters at the upper end near the hatchery raceways.

The property is accessed by paved road year around, with a dirt parking area near the lower section of the 2.4 miles. Restroom and picnic benches are also located at the parking area. Anglers can hike to other parts of the stream on Department property.

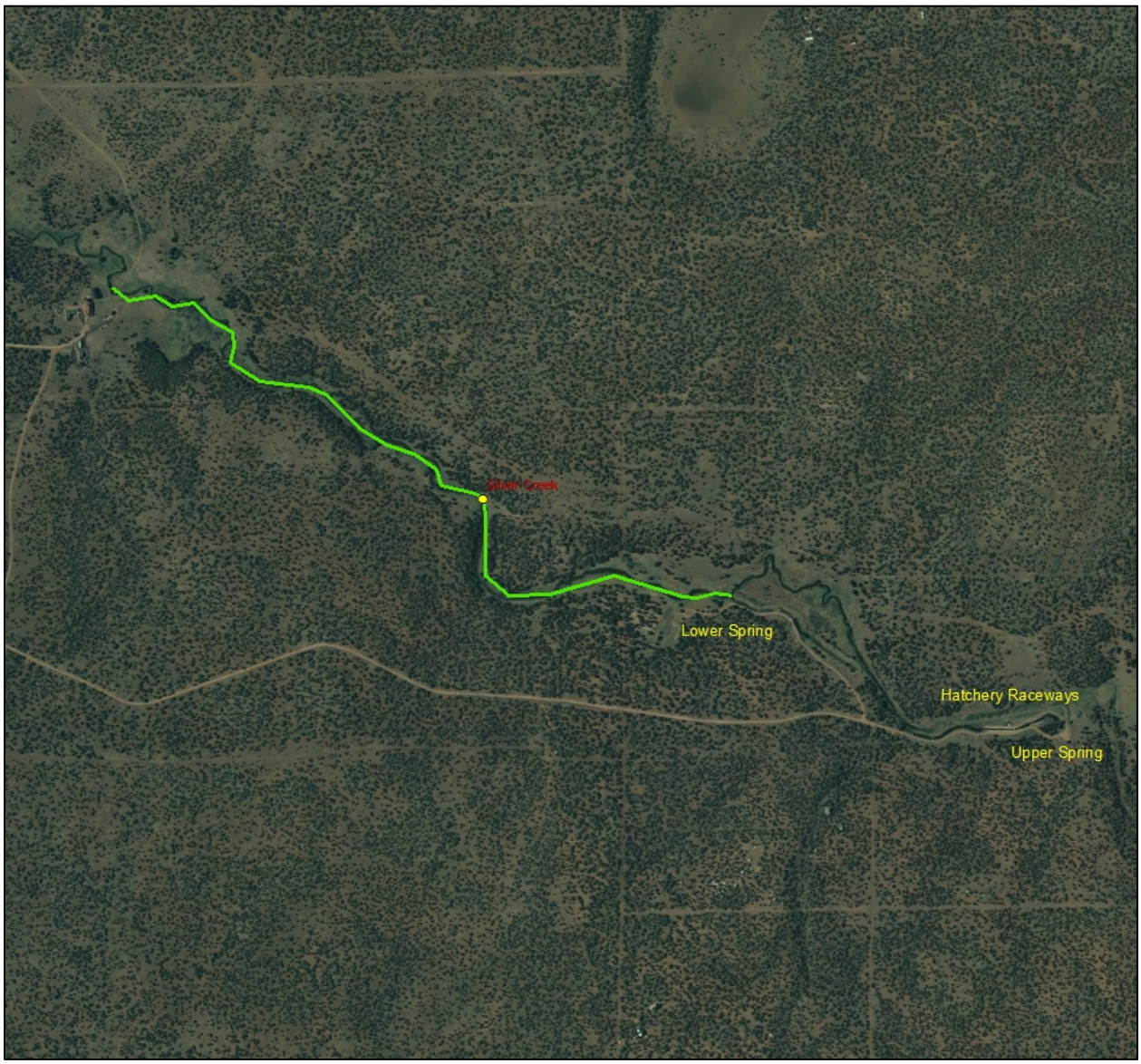

Figure 15. Image of the Silver Creek stocking reach located in the White Mountain complex (©2009 ESRI, i-cubed, GeoEye)

Silver Springs Hatchery raceways are located at the upstream most end just below the upper spring.

Management of Water Body
Primary fishery is a cold water intensive use put-and-take during the summer, and a cold water featured species catch-and-release fishery during the winter. *Table 51* provides a summary of stocking activity for Silver Creek. Catchable Apache and rainbow trout are stocked weekly from May through September, and several times from October through January. The Department also hosts numerous fishing clinics at this stream throughout the spring and summer.

Table 51. Stocking history in Silver Creek.

Species	**First Year**	**Last Year**	**Num. of Stockings**	**Num. Stocked**
Apache trout	1999	2009	130	68,457
Rainbow trout	1937	2009	388	535,145
Brown trout	1934	1963	14	194,830
Black Mt. Spotted Trout	1920	1921	2	6,000
Channel catfish	1969	1984	7	16,500
Total			541	820,932

Silver Creek is stocked with trout through 1.5 miles of stream on Department property just below the hatchery. Upper Silver Creek is a spring-fed creek, coming out of the spring at a constant 15.7 – 16.0 degrees Celsius, which is suitable to support stocked trout, but unsuitable for reproduction because trout generally spawn in water temperatures below 10 degrees Celsius. The water chemistry changes quickly as it flows and is slowly exposed to sunlight in this moderate elevation climate. White Mountain Lake, approximately 3.0 miles downstream of the Department's property, is a warm water lake, and unsuitable to support trout during the warm season. Silver Creek continues to warm as it flows downstream towards the Little Colorado River (LCR), becoming even more unsuitable for trout. Trout are only stocked in the upper (near

the lower spring and just downstream) and lower sections of the reach in the open meadow areas due to access; the middle section of the stream reach is not accessible by stocking truck.

The Department owned hatchery consists of "raceways" developed within the channel just below the large upper spring, plus another off-channel smaller (lower) spring. These hatchery areas are closed to fishing. Also, the upper 0.7 mile of stream, immediately below the main hatchery raceways, is closed to fishing during the summer and opens to fishing only during the winter. Silver Creek has a split season and management, open to bait fishing and 6 trout daily bag limit during the summer, from April 1 through September 30, then changes to catch-and-release regulations with artificial fly and lure only with barbless hooks.

Silver Creek has become a very popular location to fish, with different users depending upon the season. The creek is fished intensively during the summer and bait fishing season (April 1 – September 30 – no live baitfish) when the creek is stocked weekly from May through September. The intent of this stocking is to provide intensive use put-and-take cold water fishing, especially when children are out of school as this is an ideal place to interest children in fishing. The Department holds numerous fishing clinics for children, including handicapped and challenged children at Silver Creek. After summer fishing ends, winter stocking provides a fly fishing opportunity for larger trout when trout streams in higher elevations are inaccessible due to snow and freezing. Because the spring produces water at a constant temperature, the stocking site does not freeze.

During the winter catch-and-release season, Silver Creek has become popular with fly fishermen, attracting many anglers from the Tucson and Phoenix metro areas, as well as from other states.

The use of both rainbow and Apache trout has been a fishing success at Silver Creek. Rainbow trout are much easier to catch and grow more quickly than Apache trout, while Apache trout provide an opportunity to catch a unique native species during the winter when Apache trout waters in higher elevations are not accessible.

On site angler creel surveys were conducted at upper Silver Creek in 2001 and 2004-05, reporting 2,482 AUDs and 4,872AUDs, respectively (AGFD unpublished data). A statewide mailed questionnaire reported 3,167 AUDs at Silver Creek in 2001 (Pringle 2004).

The Integrated Fisheries Management Plan for the LCR Watershed (Young et al. 2001) identified a management emphasis of intensive use put-and-take and featured species sport fish, with an overall desired species assemblage of Apache trout, Little Colorado spinedace, bluehead sucker, roundtail chub, Little Colorado sucker, and speckled dace in upper Silver Creek. The proposed action of stocking Apache trout and rainbow trout partially deviates from the management plan in the species assemblage, because rainbow trout are stocked to make up for the shortage of Apache trout. The 2001 plan recommends evaluating a winter catch and release fishery, which

has been implemented. The Lakeside Area Fisheries Management Plan (Meyer et al. 2008) recommended stocking both Apache trout and rainbow trout, and to manage a put-and-take summer fishery and a trophy catch-and-release winter fishery, which is consistent with the proposed action.

Proposed Action

Apache and rainbow trout are proposed for the period covered by this consultation. Catchable Apache and rainbow trout would be stocked weekly from May to September each year, and then up to several times from October through January to support the catch-and-release season; numbers of trout stocked may be from 0 to 15,000 fish annually.

Water Distribution/Connectivity

Silver Creek begins at Silver Springs on Department property, then immediately flows through the Silver Creek Fish Hatchery main raceways. From the main raceways, this water flows into the 2.4 mile reach of stream that makes up the stocking site. A major tributary, Brown Creek, enters just below the main raceways and at the upper end of the stocking reach. Brown Creek is 18.8 miles in length but is nearly dry most of the year, with a few permanent pools at its origin at Brown Spring, and a couple of pools at the confluence with Silver Creek. During the spring snowmelt runoff, Brown Creek supplies a substantial flow into upper Silver Creek from this large watershed. Also within Department property, a minor spring, with minor hatchery raceways, enters into Silver Creek approximately 0.4 miles downstream from the top of the stocking reach. This minor tributary is permanent because of the spring, but is only 0.2 miles in length. The flows from Silver Spring and the minor spring are permanent through Department property, then along 3.0 miles of private property and into the private White Mountain Lake.

White Mountain Lake is a permanent irrigation lake that catches and stores water with irrigation water releases from April 15 through September 15 for use downstream in Shumway and Snowflake-Taylor. The lake does spill regularly in the spring during snowmelt runoff. During runoff, Silver Creek's flow is mostly perennial from White Mountain Lake downstream for 18.6 miles through Shumway, Taylor, and to Snowflake. Portions of this reach may dry when there are no irrigation releases or spills, but the reach can maintain perennial pools. A major tributary, Cottonwood Creek, enters Silver Creek in the town of Snowflake. This tributary is nearly dry, except during spring snowmelt runoff when it contributes a fair amount of snowmelt runoff from that large watershed, and for a large permanent pool created from a sand and gravel dredge business near the confluence with Silver Creek. There are numerous water diversions from Shumway through Snowflake used to irrigate hay fields, small farm crops, and orchards. From Snowflake, Silver Creek is mostly perennial for the next 22.5 miles to the confluence with the LCR. Silver Creek is 46.5 miles from its source to the LCR.

It is 43.3 miles downstream along the LCR from Silver Creek confluence to the confluence with Chevelon Creek, then another 9.1 miles to the confluence with Clear Creek, then another 154.1 miles to the confluence with the Colorado River. The LCR is mostly perennial from Silver Creek downstream towards Holbrook, where it becomes ephemeral and only flows during snowmelt runoff and heavy monsoon rain events. The LCR becomes perennial again from permanent flow coming in from Chevelon Creek for a short distance to Winslow, where the flows again sink into the sandy streambed during base flows. Upstream of the Silver Creek confluence, the LCR is intermittent for 54.2 miles to Zion Reservoir, then mostly dry with some perennial flow for 30.9 miles to just below Lyman Lake. Additional discussion on water flow is provided in the Complex analysis, below.

Fish Movement

Stocked trout in upper Silver Creek do persist in the stream reach where they are stocked, because it is suitable for trout year round; however, they do not reproduce in Silver Creek because the water temperature is too warm. The trout cannot swim far upstream in Silver Creek, before they are stopped by the screens on the bottom end of the hatchery raceways located at the upper end of the stocking reach. During spring runoff, fish could potentially swim up Brown Creek for many miles, but as the creek dries up they would likely die before reaching the few permanent pools at the headwaters of Brown Creek 18.8 miles upstream.

Stocked trout can swim downstream out of the stocking reach, and have the potential to reach White Mountain Lake. They could then be transported over or through the dam by spring spill or summer irrigation releases into middle and lower Silver Creek, and eventually into the LCR. However, conditions during the warmer months would make it unlikely that they would persist long enough to leave White Mountain Lake. White Mountain Lake is a turbid, warm lake that is unsuitable for trout during the summer. Silver Creek downstream of White Mountain Lake is silty, turbid and warm during the summer and, as such, mostly unsuitable for trout.

It is possible for trout to travel these waters during the winter and spring runoff when the water temperatures are colder; however, the multiple surveys in Silver Creek below White Mountain Reservoir have never documented a trout of any kind (See Table 3 for survey information). There have also been no records of trout collected in the LCR from the Navajo Reservation boundary (north of Winslow) upstream to Lyman Lake. The data suggest that trout are not moving into Silver Creek below White Mountain Reservoir, or if they do it is in low numbers and they persist for a very short period of time..

Community Description

Silver Creek on Department property contains stocked rainbow and Apache trout, which do not reproduce in the stream. This portion of Silver Creek lacks good spawning substrates, because it is composed mostly of silt, small cobble, boulder and bedrock. Constant water temperatures

might be a little too warm to be conducive for the development of viable eggs (J. Diehl, pers. comm.). This reach of Silver Creek also contains naturally reproducing populations of speckled dace, bluehead sucker, mosquitofish, golden shiner, green sunfish, and fathead minnow (Lopez et al. 1999a), plus bullfrogs, abundant crayfish, and tiger salamander.

Downstream of the stocked reach of Silver Creek is White Mountain Lake, which contains largemouth bass, green sunfish, bluegill, black crappie, channel catfish, yellow bullhead, fathead minnow, golden shiner, and common carp.

Between White Mountain Lake and Snowflake, Silver Creek a 2004 survey (McKell and Lopez 2005) found fathead minnow, golden shiner, green sunfish, common carp, Little Colorado sucker, and crayfish during, and fathead minnow, Little Colorado sucker, crayfish, and bullfrog tadpoles during a survey in 2009 (AGFD unpublished data). However, it likely also contains other species such as yellow bullhead and bluehead sucker in low numbers because these species can be found above and below this reach.

Downstream of Snowflake, Silver Creek was found to contain Little Colorado sucker, bluehead sucker, yellow bullhead, green sunfish, common carp, fathead minnow, largemouth bass, channel catfish, bullfrog tadpoles, and abundant crayfish (Lopez et al. 1999a; McKell and Lopez 2005; Weiss 2007d). Fifteen Little Colorado spinedace were found in intensive surveys in 1997, but have not been found in annual surveys since then. They also had not been found prior to that for 30 years, with the previous record in 1967 (Lopez et al. 1999a; McKell and Lopez 2005).

Table 52 summarizes the numerous surveys in lower Silver Creek below White Mountain Lake, considered to be the occupied habitat of Little Colorado spinedace. No trout have been captured in lower Silver Creek in any of these surveys. The 1991 and 1993 surveys were conducted with backpack electroshockers in August of each year (Dorum and Young 1995). The 1992 survey was conducted with a seine in May (AGFD unpublished data). The 1997 survey was conducted with a backpack electroshocker and seine in July; the 1999 survey was conducted with a backpack electroshocker in November-December; and the 2000, 2002 and 2003 surveys were conducted with seines in May, July and April, respectively (McKell and Lopez 2005). The 2004 (McKell and Lopez 2005) and 2006 (AGFD unpublished data) surveys were conducted with a backpack electroshocker in June-August and June, respectively. The 2007 surveys were conducted in March and October with a backpack electroshocker, seine, and hoop nets (Weiss 2007d), and the 2009 surveys were conducted with a backpack electro shocker and seine in June (AGFD unpublished data).

Although narrow-headed garter snakes are not known from the LCR, there are historical and recent (but unverified) records of northern Mexican garter snakes from the watershed (see analysis below).

Table 52. Summary of fish surveys in lower Silver Creek below White Mountain Lake.

Year	**Species**									
	LC spinedace	LC sucker	Bluehead sucker	Fathead minnow	Green sunfish	Yellow bullhead	carp	Largemouth bass	Golden shiner	Channel catfish
1991				19	9	2	2			
1992				22	6		13		1	
1993		4	64	106	12	1	5			
1997	15	142	2	2180	48	11	63			
1999		18	7	578	63	17	167	13		
2000		3		611	12	11	91			1
2002		present		present	present	present	present	present		
2003		3		516	55	35	24			
2004		58	1	898	314	25			3	
2006				present						
2007		3		369	59	26	77	3		
2009		40		502	55	6	25			

Consultation Species or Critical Habitat

Potential impacts from the proposed action to candidate and listed species are described below. Please refer to Chapter 4 for a detailed description of the nature of the impacts (which may include predation, competition for space and food, and hybridization etc.).Subsequent responses (resulting from the frequency, magnitude and duration of the impacts) between proposed stocked and candidate and listed species, and any site or complex factors that provide context for determining the meaningfulness of the impacts, are discussed below. Impacts from the proposed action resulting from angler related recreation and/or potential introduction of disease, pathogen or invasive species are evaluated at a broad scale for the entire action area and are described in Chapter 4. If potential impacts specific to a stocking site or complex have been identified they are discussed below.

Potential impacts from the proposed action to Apache trout, Chiricahua and Northern leopard frogs (analyzed below at the local site and broad scale level due to the movement potential into the stocked area and fish movement potential up or downstream into areas where frogs may occur), along with northern Mexican and narrow-headed garter snakes are discussed below. The Complex analysis includes discussion of Little Colorado spinedace and critical habitat.

Apache trout

Apache trout are raised in the hatchery raceways to catchable size and stocked into the stream for a recreational put-and-take fishery, but they are not expected to establish a viable population, because of the lack of suitable habitat and stream temperature, as well as the expectation that the management of the put-and-take fishery will result in significant harvest of the stocked Apache trout. Rainbow trout are not expected to reproduce in the stream for the same reasons as for Apache trout. Both are stocked for recreational fishing and eventual harvest. The majority of trout stocked on a weekly basis through the summer months are caught within the first couple of days following stocking. Those trout stocked in the catch-and-release season during the winter persist longer, but are mostly harvested out of the stream once it opens to bait and harvest again in the spring.

Potential impacts

Stocked Apache trout co-stocked with other species

Apache trout stocked from the hatcheries are for the specific purpose of providing fishing opportunities. Recovery streams are managed for self-sustaining Apache trout populations and regular stocking is not part of that management except with wild trout to initiate and augment the population as needed until it becomes self-sustaining. Apache trout stocked for recreational purposes are considered excess to the survival and recovery of the species. Take of these stocked fish via harvest by anglers is allowed under the section 4(d) rule contained in the designation of the Apache trout as a Threatened species. That rule allows take of Apache trout if such take is in accordance with State law; in this case through possession of a valid Arizona fishing license and trout stamp.

Impacts to stocked Apache trout from co-stocked sport fish species may include predation, competition, and/or hybridization with co-stocked rainbow trout. Likelihood of hybridization is extremely unlikely since trout are not expected to reproduce due to lack of suitable habitat and stream temperature.

Impacts from wild populations on stocked Apache trout

The action of stocking Apache trout is considered a conservation action in furtherance of the Endangered Species Act whereby a special 4(d) rule is in place. AGFD may take any federally listed threatened fish or wildlife for conservation purposes that are consistent with the purposes of the Act and the Section 6 Cooperative Agreement between USFWS and AGFD and therefore take of Apache trout from the proposed stocking of Apache trout is legally permitted.

Impacts to stocked Apache trout from species of fish currently existing as wild, self reproducing populations at or in proximity to proposed stocking locations may include predation, hybridization with other trout and/or competition.

Northern Leopard Frog

Local Analysis: Although Silver Creek and the White Mountain buffered stocking complex are within the historical range of the northern leopard frog, the likelihood that northern leopard frogs could be exposed to stocked fish in Silver Creek is low. There are no historical records for northern leopard frogs from Silver Creek or within the buffered stocking complex. Four sites have each been surveyed once within the buffered stocking complex between 1984 and 1994 and northern leopard frogs were not observed (Figure 14, HDMS, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm,). Although there are available habitats that have not been surveyed, it is likely that northern leopard frogs no longer occupy sites within the White Mountain buffered stocking complex because the presence of non-native fish, bullfrogs and crayfish make the habitat less suitable for northern leopard frogs.

Broad Scale Analysis: The likelihood that northern leopard frogs could be exposed to fish stocked at Silver Creek that dispersed outside the buffered stocking complex is low because it is likely northern leopard frogs no longer occupy sites outside of the stocking complex where fish could disperse (AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.).

Chiricahua leopard frog

Local Analysis: Although Silver Creek and the White Mountain buffered stocking complex are within the historical range of the Chiricahua leopard frog, the likelihood that Chiricahua leopard frogs could be exposed to stocked fish in Silver Creek is low. There are no historical records for Chiricahua leopard frogs from Silver Creek or the area within the buffered stocking complex.. Four sites have each been surveyed once within the buffered stocking complex between 1984 and 1994 and Chiricahua leopard frogs were not observed (Figure 14, HDMS, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). Although there are available habitats that have not been surveyed, it is likely that Chiricahua leopard frogs no longer occupy sites within the White Mountain buffered stocking complex because the presence of non-native fish, bullfrogs and crayfish make the habitat less suitable for Chiricahua leopard frogs.

Broad Scale Analysis: The likelihood that Chiricahua leopard frogs could be exposed to fish stocked at Silver Creek that dispersed outside the buffered stocking complex is low. Two surveys at 1 site along lower Silver Creek (downstream of the Silver Creek stocking site and outside the buffered stocking site area) reported one Chiricahua leopard frog in 1960. Chiricahua leopard frogs were not observed during a subsequent survey in 1987. It is likely that Chiricahua leopard frogs no longer occupy sites outside of the stocking complex where fish can disperse (AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.).

Northern Mexican Garter Snake
Analysis: See White Mountain Complex Analysis below.

Narrow-headed Garter Snake
Analysis: See White Mountain Complex Analysis below.

Little Mormon Lake

Site Description

Little Mormon Lake is a 70 acre irrigation reservoir built in the 1950s on the Apache-Sitgreaves National Forest (Figure 12; Figure 16). It is located approximately 2.5 miles northeast of Show Low at an elevation of 6343 feet. Little Mormon Lake is one of 3 closely grouped lakes that are somewhat connected to Silver Creek via Rocky Arroyo, a creek which drains into White Mountain Lake. There are no boat launch ramps, restrooms, or picnic facilities at Little Mormon Lake. Primitive camping is allowed, but not often practiced because of its proximity to Show Low.

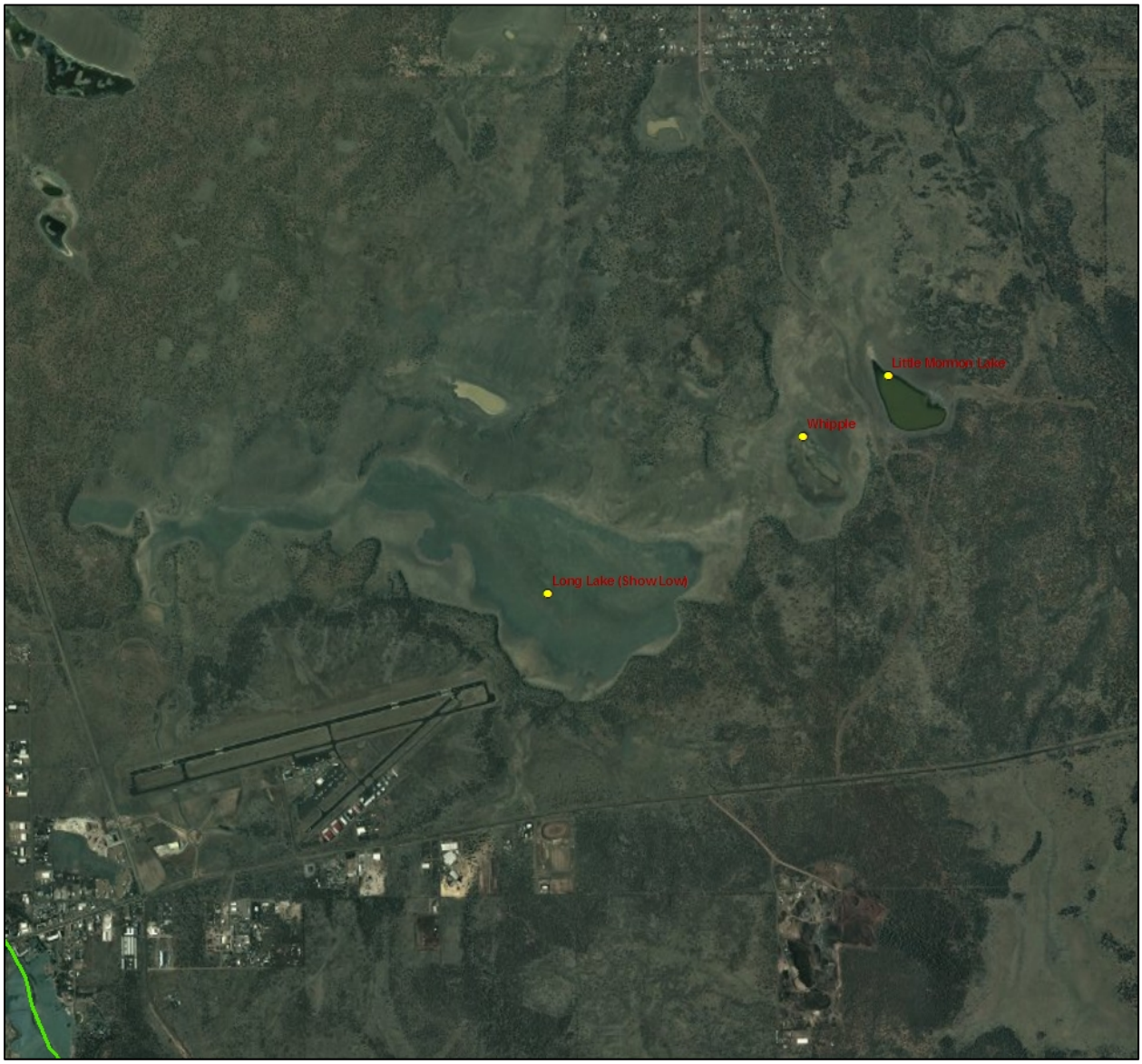

Figure 16. Image of Long Lake, Whipple Lake and Little Mormon Lake located in the White Mountain complex (©2009 ESRI, i-cubed, GeoEye).

Management of Water Body

The primary fishery is a warm water put-and-take channel catfish fishery when the lake has sufficient water to support fish. Catchable channel catfish are stocked opportunistically through the stocking season when the lake has enough water.

Little Mormon Lake has been stocked (*Table 53*) more frequently than Whipple Lake or Long Lake. Little Mormon Lake was stocked with brown trout and rainbow trout in 1949, with bullfrog tadpoles in 1967, and with channel catfish in18 separate years from 1965 through 2008.

The channel catfish stocked into Little Mormon Lake were mostly of fingerling size, ranging in numbers from 1250 to 18,000. Because of the grate size on the irrigation release structure, the Department proposes to stock only catchable size catfish, so that stocked fish cannot escape the lake.

Table 53. Stocking history in Little Mormon Lake.

Species	**First Year**	**Last Year**	**Num. of Stockings**	**Num. Stocked**
Rainbow trout	1949	1949	1	5,000
Brown trout	1949	1949	1	10,000
Channel catfish	1960	2008	19	97,660
Bullfrog tadpoles	1967	1967	1	5,000
Total			22	117,660

Little Mormon Lake is filled by a diversion off Rocky Arroyo, which is an intermittent drainage that flows into White Mountain Lake on Silver Creek. Rocky Arroyo flows only during snowmelt runoff and is dry the rest of the year; it has a low dirt diversion and a large gate structure that can release water into a ditch running approximately 1.6 miles to Little Mormon Lake. Runoff in Rocky Arroyo flows naturally over the low dirt diversion and continues down Rocky Arroyo to White Mountain Lake when the large gate structure is closed. The Silver Creek Irrigation District owns water rights and operates Little Mormon Lake along with White Mountain Lake. White Mountain Lake is their main irrigation storage. When White Mountain Lake fills and is ready to spill, the diversion to Little Mormon Lake is opened on Rocky Arroyo to store water in Little Mormon Lake that would otherwise go over the spillway at White Mountain Lake. Water in Little Mormon Lake can later be released out through a headbox located on the east side of the lake, back into Rocky Arroyo and into White Mountain Lake during the summer, for irrigation. A screen on the outlet structure has openings about 1-1.5 inches in diameter.

The ditch leading from the diversion on Rocky Arroyo to Little Mormon Lake was developed by constructing a large dirt berm on the north side of the ditch, approximately 6 feet high. The drainage connection indicated on a 7.5 minute USGS topo map (Silver Springs, AZ) approximately ½ mile upstream from Little Mormon is in fact not a hydrologic connection. That small tributary to Rocky Arroyo flows north towards White Mountain Lake and the large dirt berm on the north side of the ditch prevents any hydrologic connection with that drainage.

When Little Mormon Lake fills enough to spill, which means White Mountain Lake is also full, the water flows out of Little Mormon Lake over Forest Road 251 and into Whipple Lake. Pete Shumway, water manager with the Silver Creek Irrigation District and lifelong resident of the area for 75 years, says that Little Mormon Lake spills into Whipple approximately 2-3 times every 10 years, but has not spilled into Whipple since the early 1990s.

The outlet screen at Little Mormon Lake is at an elevation that leaves a minimum pool of unknown depth in the lake. When water is released from Little Mormon Lake, it is transferred back into Rocky Arroyo, which flows into White Mountain Lake. From White Mountain Lake, the irrigation company releases water into lower Silver Creek which is diverted further downstream in Shumway, Taylor, and Snowflake.

There have been no angler creel surveys conducted at Little Mormon Lake. The Integrated Fisheries Management Plan for the LCR Watershed (Young et al. 2001) identifies a management emphasis of warm water sport fish in Little Mormon Lake, with a desired species assemblage of channel catfish and bluegill. This management recommendation is mostly consistent with the proposed action, except for the bluegill, which is not part of this proposed action. The Lakeside Area Fisheries Management Plan (Meyer et al. 2008) recommends managing channel catfish in Little Mormon Lake, which is consistent with the proposed recommendation.

Proposed Action

The Department proposes to stock channel catfish for the period covered by this consultation. Catchable channel catfish will be stocked May to September, opportunistically when the lake has sufficient water; numbers of channel catfish stocked may be from 0 to 10,000 fish annually.

Water Distribution/Connectivity

Little Mormon Lake is filled by a diversion off Rocky Arroyo, which is normally dry and only runs during spring snowmelt runoff and possibly during extreme monsoon events. The diversion has a gate that has to be manually opened for water to flow towards Little Mormon Lake. This gate is normally closed, and water is diverted and stored in Little Mormon Lake only when White Mountain Lake at the end of Rocky Arroyo is full or nearly full. The ditch leading to Little Mormon Lake is 1.6 miles long from the diversion structure on Rocky Arroyo.

Water in Little Mormon Lake is released during the irrigation season through an outlet structure and into a pipeline leading back to Rocky Arroyo and eventually into White Mountain Lake. It is approximately 6 miles from Little Mormon Lake to White Mountain Lake, via the outlet structure, a pipeline, and Rocky Arroyo. For water connectivity downstream from White Mountain Lake, see the detailed description in the Silver Creek analysis.

When Little Mormon Lake fills, which occurs 2-3 times every 10 years according to Pete Shumway, it spills into Whipple Lake on the west side of the road. Water or fish in Whipple

Lake cannot get back up into Little Mormon Lake because of the 10 foot vertical drop coming from Little Mormon Lake. When Whipple Lake does fill, it can only spill into Long Lake through a swale between the two lakes. Water and fish in Long Lake cannot escape, except back into Whipple Lake when Long Lake and Whipple Lake are full enough to be connected. Thus, water can spill from Little Mormon Lake into Whipple and Long Lake, and water cannot be released from either lake

Little Mormon Lake occasionally goes dry when water is not diverted into the lake for several years. It usually holds some water, although is not always deep enough to stock with catfish. The diversion ditch and Rocky Arroyo go dry every year after spring runoff has ended. Rocky Arroyo may flow ephemerally with extreme monsoon events.

Fish Movement

Catfish stocked into Little Mormon Lake likely do not escape. However, it is possible for a small fish to escape out the outlet structure, through mesh that is 1.5 inches in diameter, down into Rocky Arroyo and be transported to White Mountain Lake when water is released. A catchable size catfish could not fit through the outlet mesh.

Catfish are not likely to move upstream during the cold conditions that are present during spring snowmelt runoff when water would be coming down the diversion ditch. Channel catfish are a warm water species and tend to be very lethargic during cold conditions. The diversion gate is also somewhat of a barrier. The downstream side of the gate slopes down a concrete pad with a vertical drop of about 1 foot; however, the width of each gate is about 10 feet wide. If the flow of water was slow enough down the concrete pad for a catfish to swim upstream in that temperature of water, the laminar flow 10 feet wide would be too shallow to allow a catfish to swim uphill. If the gate were opened enough to allow enough depth for a catfish to swim, the flow would be too fast for a catfish at those water temperatures. It would be extremely difficult for a stocked catfish in Little Mormon Lake to get up into Rocky Arroyo when it is flowing with snowmelt runoff, because they are not extremely strong swimmers like trout, especially during the cold conditions that would be present.

It is not known if catfish spawn in Little Mormon Lake. If they do, the fry and subcatchables could be transported through the outlet screen into Rocky Arroyo and then to White Mountain Lake. Because of their small size, most of them would likely be lost to predation in the warm water aquatic community of White Mountain Lake.

Community Description

Little Mormon Lake contains stocked channel catfish. Historically it has also been occupied by green sunfish and bluegill (Table 5). Channel catfish can persist in the lake if it holds enough water for a long enough length of time, although it is unknown if they can reproduce in the lake.

Rocky Arroyo does not support any fish because it regularly goes dry after the spring runoff has ended.

Table 54. Survey history at Little Mormon Lake using experimental gillnets

Species	**May 21, 1969**	**August 29, 1977**	**April 18, 1984**	**March 16, 1993**
Channel catfish	3		9	3
Green sunfish			3	
Bluegill		3		

White Mountain Lake, a privately owned lake, contains largemouth bass, bluegill, green sunfish, black crappie, channel catfish, fathead minnow, common carp, and bullfrogs. The channel catfish in White Mountain Lake are naturally reproducing, thus it may be likely that they can reproduce in Little Mormon Lake, although Little Mormon Lake has virtually no spawning habitat for channel catfish, which prefer cover in which to lay and protect their eggs.

For species composition in Silver Creek upstream and downstream of White Mountain Lake, refer to the Silver Creek analysis. Channel catfish could likely survive and persist in the cool water in upper Silver Creek, although catfish have not been documented there in the last two decades of surveys. Channel catfish could and likely do survive in lower Silver Creek, because it gets fairly warm, is silty and turbid, and has permanent pools that are capable of holding catfish. Only 1 channel catfish, in 2000, has been collected in lower Silver Creek in 19 years of surveys: 1991, 1992, 1993, 1997, 1999, 2000, 2002, 2003, 2004, 2006, 2007, and 2009. Yellow bullheads, which share the same habitat preferences as catfish, are consistently caught and are locally common in portions of lower Silver Creek, thus the habitat is suitable for catfish; however, channel catfish have not become established, based on the 1 record in 19 years.

Consultation Species or Critical Habitat

Potential impacts from the proposed action to candidate and listed species are described below. Please refer to Chapter 4 for a detailed description of the nature of the impacts (which may include predation, competition for space and food, and hybridization etc.).Subsequent responses (resulting from the frequency, magnitude and duration of the impacts) between proposed stocked and candidate and listed species, and any site or complex factors that provide context for determining the meaningfulness of the impacts, are discussed below. Impacts from the proposed action resulting from angler related recreation and/or potential introduction of disease, pathogen or invasive species are evaluated at a broad scale for the entire action area and are described in

Chapter 4. If potential impacts specific to a stocking site or complex have been identified they are discussed below.

Potential impacts from the proposed action to Chiricahua and Northern leopard frogs (analyzed below at the local site and broad scale level due to the movement potential into the stocked area and fish movement potential up or downstream into areas where frogs may occur), along with northern Mexican and narrow-headed garter snakes are discussed below. The Complex analysis includes discussion of Little Colorado spinedace and critical habitat.

Northern Leopard Frog

Local Analysis: Although Little Mormon Lake and the White Mountain buffered stocking complex are within the historical range of the northern leopard frog, the likelihood that northern leopard frogs could be exposed to stocked fish in Little Mormon Lake is low. There are no historical records for northern leopard frogs from Little Mormon Lake or the area within the buffered stocking complex. Four sites have each been surveyed once within the buffered stocking complex between 1984 and 1994 and northern leopard frogs were not observed (Figure 14, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). Although there are available habitats that have not been surveyed, it is likely that northern leopard frogs no longer occupy sites within the White Mountain buffered stocking complex because the presence of non-native fish and crayfish make the habitat less suitable for northern leopard frogs.

Broad Scale Analysis: The likelihood that northern leopard frogs could be exposed to fish stocked at Little Mormon Lake that dispersed outside the buffered stocking complex is low, because it is likely that northern leopard frogs no longer occupy areas outside of the stocking complex where fish can disperse (AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.).

Chiricahua leopard frog

Local Analysis: Although Little Mormon Lake and the White Mountain buffered stocking complex are within the historical range of the Chiricahua leopard frog, the likelihood that Chiricahua leopard frogs could be exposed to stocked fish in Little Mormon Lake is low. There are no historical records for Chiricahua leopard frogs from Little Mormon Lake or the area within the buffered stocking complex. Four sites have each been surveyed once within the buffered stocking complex between 1984 and 1994 and Chiricahua leopard frogs were not observed (Figure 14, HDMS, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). Although there are available habitats that have not been surveyed, it is likely that Chiricahua leopard frogs no longer occupy sites within the White Mountain buffered stocking complex because the presence of non-native fish and crayfish make the habitat less suitable for Chiricahua leopard frogs.

Broad Scale Analysis: The likelihood that Chiricahua leopard frogs could be exposed to fish stocked at Little Mormon Lake that dispersed outside the buffered stocking complex is low. Two surveys at 1 site along lower Silver Creek (downstream of the Silver Creek stocking site and outside the buffered stocking site area) reported one Chiricahua leopard frog in 1960. Chiricahua leopard frogs were not observed during a subsequent survey in 1987. It is likely that Chiricahua leopard frogs no longer occupy sites outside of the stocking complex where fish can disperse (AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.).

Northern Mexican Garter Snake
Analysis: See White Mountain Complex Analysis below.

Narrow-headed Garter Snake
Analysis: See White Mountain Complex Analysis below.

Whipple Lake

Site Description

Whipple Lake is a 50 acre lake, when full, in a natural depression on the Apache-Sitgreaves National Forest. It is located approximately 2.0 miles northeast of Show Low at an elevation of 6324 feet. Whipple Lake is one of two lakes, the other being Long Lake, that are connected during high water through a natural depression that has no outlet and is therefore considered a closed system. These two lakes receive overflow water from Little Mormon Lake, which is somewhat connected to Silver Creek via Rocky Arroyo and White Mountain Lake.

Whipple Lake is accessed by paved Forest Road 251. There are no boat launch ramps, restrooms, or picnic facilities at Whipple Lake. Primitive camping is allowed, but not often practiced because of its proximity to Show Low and the lake's usually dry condition.

Management of Water Body

Whipple Lake is opportunistically managed for channel catfish during wet climactic cycles; it is normally dry, and only collects enough water during extreme wet winters to allow stocking.

Primary fishery is a warm water put-grow-and-take channel catfish fishery, when the lake has enough water to support fish through the summer. Catchable and sub-catchable channel catfish are stocked opportunistically when the lake has enough water, with stockings potentially occurring throughout the stocking season.

Whipple Lake has been dry or nearly dry for many years. It was last stocked in 1995, and experienced a large fish kill in 1999 when it dried up. It has not held fish since then. Whipple has been stocked only 9 years in its history, with cutthroat trout in 1952, rainbow trout in 1966, and with fingerling channel catfish in 1983, 1985, 1987, 1988, 1989, 1990, 1993, and 1995 (*Table 55*).

Table 55. Stocking history for Whipple Lake.

Species	First Year	Last Year	Num. of Stockings	Num. Stocked
Cutthroat trout	1952	1952	1	2,000
Rainbow trout	1966	1966	1	990
Channel catfish	1983	1995	12	37,461
Total			14	40,451

There have been no angler creel surveys conducted at Whipple Lake.

The Integrated Fisheries Management Plan for the LCR Watershed (Young et al. 2001) identified a management emphasis of basic yield put-grow-and-take sport-fish with a desired species assemblage of rainbow trout, which is not consistent with this proposed action. However, trout were last stocked into Whipple Lake in 1966, but channel catfish were stocked regularly from 1983 through 1995. The Lakeside Area Fish Management Plan (Meyer 2008) recommended managing Whipple Lake for channel catfish when it has enough water, which is consistent with this proposed action.

Proposed Action

The Department proposes to stock channel catfish for the period covered by this consultation. Catchable, sub-catchable, and fingerling channel catfish will be stocked from May to September if the lake has sufficient water levels; numbers of catfish stocked may be from 0 to 8,000 catfish annually.

Water Distribution/Connectivity

Whipple Lake receives water only when Little Mormon Lake spills from the east or when Long Lake spills from the west. When Little Mormon Lake spills, the water spills into Whipple Lake. Pete Shumway, manager for the Silver Creek Irrigation Company and longtime resident for 75 years, stated that Little Mormon would spill 2-3 times within 10 years on average, but has not spilled into Whipple since the early 1990s; he also says that Whipple has spilled into Long Lake only about 5-6 times in his lifetime, and that once water entered Whipple and Long lakes, there was no mechanism for the irrigation district to get that water out. Therefore, there is also no way for fish to escape out of Whipple and Long lakes.

Whipple and Long lakes are located in a natural depression and are connected at high water over a shallow pass between the two, but together have no natural outlet. Water cannot get back

through the spill structure and back into Little Mormon Lake because of the 10 foot drop structure coming from Little Mormon Lake.

Whipple Lake and Long Lake often go dry. Whipple Lake has been dry or nearly dry since 1999, and was last stocked in 1995. Long Lake goes dry regularly, but does receive a little more water than Whipple Lake. Long Lake was last stocked in 2008.

Fish Movement
Fish stocked into Whipple Lake may persist in the lake if it retains water long enough. It is currently dry. It is unknown if the stocked fish will spawn in the lake. The only escape for stocked fish or their progeny is into Long Lake when both lakes are connected during high water, but there is no outlet or outflow for fish to escape from Whipple Lake or Long Lake. Fish are not able to get up the spill structure and into Little Mormon Lake because of the 10 foot vertical drop in a concrete spillway box coming from Little Mormon Lake.

When Whipple Lake fills, it spills over a small pass and into Long Lake. It is possible for Whipple and Long Lake to be connected with fish moving between the two, but only in very extreme wet periods.

Community Description
Whipple Lake currently contains no fish because it went dry in 1999 and has not collected enough water since then to be stocked. Historically this lake has supported, for unknown periods of time, the following species: largemouth bass, channel catfish, carp, green sunfish, and rainbow trout (*Table 56*). In the future it will only be stocked with channel catfish.

Table 56. Survey history at Whipple Lake using experimental gillnets.

Species	**April 1985**	**March 1989**	**March 1993**	**April 1994**	**March 1997**
Largemouth bass		9			8
Channel catfish	9	5	35	3	15
Carp		5		8	15
Green sunfish	2	1			
Rainbow trout				5	

Consultation Species or Critical Habitat

Potential impacts from the proposed action to candidate and listed species are described below. Please refer to Chapter 4 for a detailed description of the nature of the impacts (which may include predation, competition for space and food, and hybridization etc.).Subsequent responses (resulting from the frequency, magnitude and duration of the impacts) between proposed stocked and candidate and listed species, and any site or complex factors that provide context for determining the meaningfulness of the impacts, are discussed below. Impacts from the proposed action resulting from angler related recreation and/or potential introduction of disease, pathogen or invasive species are evaluated at a broad scale for the entire action area and are described in Chapter 4. If potential impacts specific to a stocking site or complex have been identified they are discussed below.

Potential impacts from the proposed action to Chiricahua and Northern leopard frogs (analyzed below at the local site and broad scale level due to the movement potential into the stocked area and fish movement potential up or downstream into areas where frogs may occur), along with northern Mexican and narrow-headed garter snakes are discussed below. The Complex analysis includes discussion of Little Colorado spinedace and critical habitat.

Northern Leopard Frog

Local Analysis: Although Whipple Lake and the White Mountain buffered stocking complex are within the historical range of the northern leopard frog, the likelihood that northern leopard frogs could be exposed to stocked fish in Whipple Lake is low. There are no historical records for northern leopard frogs from Whipple Lake or the area within the buffered stocking complex. Four sites have each been surveyed once within the buffered stocking complex between 1984 and 1994 and northern leopard frogs were not observed (Figure 14, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). Although there are available habitats that have not been surveyed, it is likely that northern leopard frogs no longer occupy sites within the White Mountain buffered stocking complex because the presence of non-native fish and crayfish make the habitat less suitable for northern leopard frogs.

Broad Scale Analysis: The likelihood that northern leopard frogs could be exposed to fish stocked at Whipple Lake that dispersed outside the buffered stocking complex is low, because dispersing fish can only reach Long Lake which has no outlet. In addition, it is likely that northern leopard frogs no longer occupy areas outside of the stocking complex where fish can disperse (AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.).

Chiricahua leopard frog

Local Analysis: Although Whipple Lake and the White Mountain buffered stocking complex are within the historical range of the Chiricahua leopard frog, the likelihood that Chiricahua leopard frogs could be exposed to stocked fish in Whipple Lake is low. There are no historical records for Chiricahua leopard frogs from Whipple Lake or the area within the buffered stocking

complex. Four sites have each been surveyed once within the buffered stocking complex from 1984-1994.and Chiricahua leopard frogs were not observed (Figure 14, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). Although there are available habitats that have not been surveyed, it is likely that Chiricahua leopard frogs no longer occupy sites within the White Mountain buffered stocking complex because the presence of non-native fish and crayfish make the habitat less suitable for northern leopard frogs.

Broad Scale Analysis: The likelihood that Chiricahua leopard frogs could be exposed to fish stocked at Whipple Lake that dispersed outside the buffered stocking complex is low, because dispersing fish can only reach Long Lake which has no outlet. In addition, it is likely that Chiricahua leopard frogs no longer occupy areas outside of the stocking complex where fish can disperse (AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.).

Northern Mexican Garter Snake
Analysis: See White Mountain Complex Analysis below.

Narrow-headed Garter Snake
Analysis: See White Mountain Complex Analysis below.

Long Lake (Show Low)

Site Description

Long Lake is a 200 acre lake, when full, in a natural depression on the Apache-Sitgreaves National Forest (Figure 17). It is located approximately 0.8 miles northeast of Show Low at an elevation of 6324 feet. Long Lake is one of two lakes; the other is Whipple Lake. They are connected at high water in a natural depression with no outlet and are therefore considered a closed sysem. These two lakes receive overflow water from Little Mormon Lake, which is somewhat connected to Silver Creek via Rocky Arroyo and White Mountain Lake.

Long Lake is accessed by a primitive and rough dirt road off paved Highway 77. The roads are often impassible during wet seasons due to very slick mud. There are no boat launch ramps, restrooms or picnic facilities at Long Lake. Camping is permitted, but usually not practiced because of its proximity to Show Low and usual dry condition. Long Lake receives very little angler use, even when it does hold water, due to the primitive conditions.

Figure 17. Long Lake (near Show Low) photograph.

Management of Water Body

Long Lake is opportunistically managed for put-grow-and-take rainbow trout during very wet climactic cycles.

Long Lake has been stocked only 4 years in the history of managing the lake; in 1981, 1993 (2), 2005, and 2008 (Table 57). The stocking in 1993 is the only one that lasted for any length of time. The trout grew large, because the lake is shallow and very productive. The lake has been historically stocked with catchable, fingerling, or subcatchable rainbow trout, attempting a put-grow-and-take opportunity because of the high productivity. However, the lake persists for so short of a period that it may be better to manage a put-and-take opportunity and not have to rely on trout persisting in the lake for a full year before they are catchable size, unless the lake collects sufficient water to persist.

Long Lake has not provided a fishery in many years because it does not normally receive enough water to allow fish to persist. In 2005 and 2008 the lake was stocked in the spring, but dried up by the end of each summer. The lake will be evaluated in the spring to determine the amount of water that has collected through the winter and spring snowmelt and to evaluate whether the lake might persist long enough to provide some fishing opportunities.

Table 57. Stocking history for Long Lake.

Species	First Year	Last Year	Num. of Stockings	Num. Stocked
Rainbow trout	1981	2008	5	147,062
Total			5	35,135

There have been no angler creel surveys conducted at Long Lake. The Integrated Fisheries Management Plan for the LCR Watershed (Young et al. 2001) and the Lakeside Area Fish Management Plan (Meyer et al. 2008) identify a management emphasis of put-grow-and-take cold water fishery with a desired species assemblage of rainbow trout, which are consistent with the proposed action.

Proposed Action

The Department proposes to stock rainbow trout are proposed for the period covered by this consultation. Catchable, sub-catchable, and fingerling rainbow trout would be stocked opportunistically from March to June when the lake has sufficient water levels; numbers of trout may be from 0 to 40,000 fish annually.

Water Distribution/Connectivity

Long Lake is normally dry and catches water only in very high precipitation winters. Long Lake is in a natural depression and can receive water from Whipple Lake in extreme wet periods, and it also receives snowmelt runoff from a very small and normally dry drainage from the south; this small dry drainage is not connected to any other waters, and it flows only during spring runoff during high snowpack years. There is no opportunity for water or fish to get back into Little Mormon from Whipple Lake and Long Lake because of the 10 foot vertical drop in the concrete spillway box coming from Little Mormon. For a detailed description, see the Little Mormon water distribution section.

Fish Movement

Trout stocked into Long Lake can only escape into Whipple Lake when the two are connected during extreme wet cycles, but cannot escape out of the two. There is no outlet or outflow from Long and Whipple lakes. Fish cannot get back into Little Mormon from Whipple Lake and Long Lake because of the 10 foot vertical drop in the concrete spillway box coming from Little Mormon Lake discussed above.

Community Description

Long Lake has no fish since it went dry late in the summer of 2008. Rainbow trout are stocked only when there is enough water to make it feasible. Normally it is dry and is used as a cattle pasture. Historically, it has supported several species of fish (Table 9).

Table 58. Survey history at Long Lake using experimental gillnets.

Species	April 1982	October 1993	April 1994	March 1995
Channel catfish		17	16	12
Rainbow trout	15	66	92	22
Largemouth bass			1	
carp		26	18	35

Consultation Species or Critical Habitat

Potential impacts from the proposed action to candidate and listed species are described below. Please refer to Chapter 4 for a detailed description of the nature of the impacts (which may include predation, competition for space and food, and hybridization etc.).Subsequent responses (resulting from the frequency, magnitude and duration of the impacts) between proposed stocked and candidate and listed species, and any site or complex factors that provide context for determining the meaningfulness of the impacts, are discussed below. Impacts from the proposed action resulting from angler related recreation and/or potential introduction of disease, pathogen or invasive species are evaluated at a broad scale for the entire action area and are described in Chapter 4. If potential impacts specific to a stocking site or complex have been identified they are discussed below.

Potential impacts from the proposed action to Chiricahua and Northern leopard frogs (analyzed below at the local site and broad scale level due to the movement potential into the stocked area and fish movement potential up or downstream into areas where frogs may occur), along with northern Mexican and narrow-headed garter snakes are discussed below. The Complex analysis includes discussion of Little Colorado spinedace and critical habitat.

Northern Leopard Frog

Local Analysis: Although Long Lake and the White Mountain buffered stocking complex are within the historical range of the northern leopard frog, the likelihood that northern leopard frogs could be exposed to stocked fish in Long Lake is low. There are no historical records for northern leopard frogs from Long Lake or the area within the buffered stocking complex. Four sites have each been surveyed once within the buffered stocking complex between 1984 and 1994 and northern leopard frogs were not observed (Figure 14, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). Although there are available habitats that have not been surveyed, it is likely that northern leopard frogs no longer occupy sites within the White

Mountain buffered stocking complex because the presence of non-native fish and crayfish make the habitat less suitable for northern leopard frogs.

Broad Scale Analysis: The likelihood that northern leopard frogs could be exposed to fish stocked at Long Lake that dispersed outside the buffered stocking complex is low. Dispersing fish can only reach Whipple Lake and cannot escape into Little Mormon Lake or back into Long Lake. In addition, it is likely that northern leopard frogs no longer occupy areas outside of the stocking complex where fish can disperse (AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.).

Chiricahua leopard frog

Local Analysis: Although Long Lake and the White Mountain buffered stocking complex are within the historical range of the Chiricahua leopard frog, the likelihood that northern leopard frogs could be exposed to stocked fish in Long Lake is low. There are no historical records for Chiricahua leopard frogs from Long Lake or the area within the buffered stocking complex. Four sites have each been surveyed once within the buffered stocking complex between 1984 and 1994 and Chiricahua leopard frogs were not observed (Figure 14, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). Although there are available habitats that have not been surveyed, it is likely that Chiricahua leopard frogs no longer occupy sites within the White Mountain buffered stocking complex because the presence of non-native fish and crayfish make the habitat less suitable for Chiricahua leopard frogs.

Broad Scale Analysis: The likelihood that Chiricahua leopard frogs could be exposed to fish stocked at Long Lake that dispersed outside the buffered stocking complex is low, because dispersing fish can only reach Whipple Lake and cannot escape into Little Mormon Lake or back into Long Lake. In addition, it is likely that Chiricahua leopard frogs no longer occupy areas outside of the stocking complex where fish can disperse (AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.).

Northern Mexican Garter Snake

Analysis: See White Mountain Complex Analysis below.

Narrow-headed Garter Snake

Analysis: See White Mountain Complex Analysis below.

WHITE MOUNTAIN COMPLEX ANALYSIS

Of the five stocking locations in White Mountain Complex, only Silver Creek and Little Mormon Lake have the potential to impact listed species downstream of the stocking sites. Sponseller, Whipple and Long Lakes are closed systems.

Water Distribution / Connectivity

Water flow in this drainage (above and below White Mountain Lake) is discussed in the site-specific sections, as is the hydrography of the Little Colorado River, downstream from the confluence with Silver Creek. The potential exists for a hydrologic connection between the LCR and into the Colorado River but there is no certainty about how often it connects or the condition of transport when it connects. Additional discussion is provided in a watershed summary impacts analysis in the LCR chapter.

Fish Movement
Rainbow and Apache trout could move from the Silver Creek stocking site into White Mountain Lake and downstream in Silver Creek. Fingerlings and subcatchables could be transported through the screen at the outlet of Little Mormon Lake, into Rocky Arroyo and finally to White Mountain Lake and downstream in Silver Creek.

As with the water connectivity, fish movement through Silver Creek, into and through White Mountain Lake and into the Little Colorado River is possible but the number of stocked fish that may move is not known. The fish would face impediments such as condition of transport, warm water, and drying pools of water and drying stream reaches. Schoens Complex also feeds into Silver Creek below White Mountain Lake.

Community Description
A comprehensive summary of the aquatic community in Silver Creek above the LCR confluence is provided in the site specific discussions. For the purpose of the complex discussion, the relevant information is that only one catfish and no trout have been found in Silver Creek below White Mountain Lake in surveys conducted from 1991 to 2009 (Table 3).

Consultation Species or Critical Habitat
Potential impacts from the proposed action to candidate and listed species are described below. Please refer to Chapter 4 for a detailed description of the nature of the impacts (which may include predation, competition for space and food, and hybridization etc.).Subsequent responses (resulting from the frequency, magnitude and duration of the impacts) between proposed stocked and candidate and listed species, and any site or complex factors that provide context for determining the meaningfulness of the impacts, are discussed below. Impacts from the proposed action resulting from angler related recreation and/or potential introduction of disease, pathogen or invasive species are evaluated at a broad scale for the entire action area and are described in Chapter 4. If potential impacts specific to a stocking site or complex have been identified they are discussed below.

Potential impacts from the proposed action to northern Mexican garter snake and narrow-headed garter snake as well as Little Colorado spinedace and critical habitat are described below.

Chiricahua Leopard Frog

See Local and Broad Scale analyses under each stocking location.

Northern Leopard Frog

See Local and Broad Scale analyses under each stocking location.

Northern Mexican Garter Snake

Stocking complex analysis: It is unknown whether northern Mexican garter snakes occupy the White Mountain Stocking Complex, though there have been no systematic surveys for the species in this area (USFWS 2008, Holycross et al. 2006). Within the 20 km buffer established for this stocking complex there are historical records of northern Mexican garter snakes from and near Lake of the Woods (1942, 1949) SE of Show Low, but none have been detected since then (Holycross et al. 2006). Those are the only records for northern Mexican garter snakes in the Little Colorado River watershed. Current habitat quality for northern Mexican garter snakes at Lake of the Woods is low. Silver Creek also supports a community of non-native fishes, crayfish and bullfrogs, thus making the habitat less suitable for northern Mexican garter snakes. Two recent (2004) but unverified northern Mexican garter snake records have been reported from the Fort Apache Indian Reservation, outside of the 20 km buffer, near White Paradise Creek and ~28 air km SE of Lake of the Woods. The likelihood that northern Mexican garter snakes will be exposed to fish stocked in Sponseller Lake, Silver Creek, Little Mormon Lake, Whipple Lake, and Long Lake (Show Low) is low.

Downstream analysis: Sponseller Lake, Whipple Lake and Long Lake are closed basins from which fish cannot escape. If fish were to disperse from Little Mormon Lake when waters are diverted back into White Mountain Lake they could enter Silver Creek. Any stocked fish moving downstream in Silver Creek would not likely encounter northern Mexican garter snakes. There are no northern Mexican garter snake records downstream of these sites and none elsewhere in the Little Colorado River watershed, thus it is unlikely that northern Mexican garter snakes will be exposed to stock sport fish (HDMS, AGFD Riparian Herpetofauna Database).

Narrow-headed Garter Snake

Stocking complex analysis: Narrow-headed garter snakes are not known to occupy the Little Colorado River or its tributary streams; therefore, it is unlikely the species will be exposed to fish stocked into Sponseller Lake, Silver Creek, Little Mormon Lake, Whipple Lake, and Long Lake (Show Low). The nearest historical (1965) narrow-headed garter snake record is on the Fort Apache Indian Reservation, about 4 km SE of McNary along the North Fork of the White River (Salt River drainage). Narrow-headed garter snakes are not known to move overland beyond about 200 m from a stream edge (Nowak 2006a) and therefore if they occur elsewhere in the North Fork of the White River watershed they are highly unlikely to move overland and disperse to the proposed stocking sites. In addition, the four lakes in this stocking complex are

closed basin, largely ephemeral lakes and therefore do not provide narrow-headed garter snake habitat. Silver Creek supports a community of non-native fishes, crayfish and bullfrogs, thus making the habitat less suitable for narrow-headed garter snakes.

Downstream analysis: Sponseller Lake, Whipple Lake and Long Lake are closed basins from which fish cannot escape. If fish were to disperse from Little Mormon Lake when waters are diverted back into White Mountain Lake they could enter Silver Creek. Any stocked fish moving downstream in Silver Creek would not likely encounter narrow-headed garter snakes. There are no narrow-headed garter snake records downstream of these sites, and none elsewhere in the Little Colorado River watershed, thus it is unlikely that narrow-headed garter snakes will be exposed to dispersing fish (HDMS, AGFD Riparian Herpetofauna Database).

Little Colorado Spinedace

Lower Silver Creek is considered occupied habitat for Little Colorado spinedace; however spinedace have not been collected in Silver Creek in nearly 12 years. The last known location was in Silver Creek approximately 33 miles below White Mountain Lake. This last record of spinedace in lower Silver Creek was in 1997, and they were not found in surveys conducted in 1999, 2000, 2002, 2003, 2004, 2006, 2007, and 2009 (*Table 52*). It is believed that changes to the habitat since 1997 have likely increased habitat for non-native fishes. If spinedace are still present in Silver Creek, it may be that they exist at such low numbers that current sampling techniques are insufficient to detect them in this altered habitat.

In 1997, the habitat in Silver Creek consisted primarily of shallow riffle/run habitat with occasional relatively small pools. The same area now consists of almost exclusively deep, wide pool habitat due to extensive beaver dams. In addition, the extensive pool habitat, which extends for miles has created prime habitat for non-native warm water fish and crayfish.

Potential impacts

It is conceivable that an occasional stocked Apache or rainbow trout could reach White Mountain Lake and even lower Silver Creek, although no trout have been documented in the surveys completed in lower Silver Creek. If an occasional trout did access spinedace occupied habitat in lower Silver Creek, it would not persist in the warm, silty water. However, if either Apache or rainbow trout did reach a population of Little Colorado spinedace the impacts would be infrequent and short-term, because the trout could not persist. Although trout are stocked year round, fishing pressure, condition of transport, distance from the stocking site to the occupied habitat, unsuitable water temperature and piscivory on the trout by warm water fishes in White Mountain Lake, would limit the opportunity for trout to access Silver Creek below White Mountain Lake.

It is not possible for stocked channel catfish to leave Little Mormon Lake, however, if catfish are reproducing in the lake, subcatchables and fry could be transported through the outlet screen and finally into Little Mormon Lake and to the lower Silver Creek. If the impacts discussed below occur, their magnitude is most likely ameliorated by the predation of the escaped progeny of the stocked fish by the warm water assemblage at White Mountain Lake. Survey data show that channel catfish are likely not established in large numbers in lower Silver Creek. This may be because they are bottom dwellers and would be less likely than other species to be transported from White Mountain Lake when it overflows.

Little Colorado Spinedace Critical Habitat

The nearest spinedace critical habitat is located in lower Chevelon Creek, which is 84.3 miles away, via 3 miles of Silver Creek, through White Mountain Lake, through 38.0 miles of lower Silver Creek, then downstream in the LCR for 43.3 miles to the confluence with Chevelon Creek.

Potential impacts

An escaped trout reaching critical habitat is extremely unlikely because of the unsuitable conditions of lower Silver Creek, the LCR, and lower Chevelon Creek for trout, and the lack of trout collections in lower Silver Creek, the LCR, and in lower Chevelon Creek (additional discussion on Chevelon Creek and fish distribution and critical habitat is provided in the Chevelon Creek complex section later in the Chapter).

No impacts are anticipated to critical habitat from stocked trout. The closest critical habitat is over 83 miles from the stocking site and stocked rainbow or Apache trout would not persist in the system long enough to reach critical habitat. Fishing pressure, condition of transport, unsuitable water temperature and piscivory on the trout by warm water fishes in White Mountain Lake and below the lake, and unsuitable habitat in Silver Creek below the lake would likely preclude the movement of trout from the stocking site to critical habitat.

No impacts are anticipated to critical habitat from channel catfish. The closest critical habitat is over 83 miles from the stocking site, fingerling and subcatchable channel catfish would likely not persist in White Mountain Lake in large numbers, and their habitat preferences in lotic habitats would make it unlikely that they would be transported from White Mountain Lake. For these reasons channel catfish stocked at Little Mormon Lake are not believed to ever reach critical habitat.

SCHOEN'S COMPLEX

Physical Geographic Description

Schoen's Complex is located in the Silver Creek drainage in the Little Colorado River watershed (Figure 18). The Schoen's Complex consists of 7 stocking sites that are located on Show Low

Creek; on tributaries of Show Low Creek, which are Walnut Creek and Porter Creek; or waters which drain into a tributary of Show Low Creek (Figure 19). Three of the stocking sites, Fools Hollow Lake, Show Low Lake, and Show Low Creek, are located on Show Low Creek. Scott Reservoir is located on Porter Creek, which is a tributary. Rainbow Lake and Woodland Lake are located on another tributary, Walnut Creek. The Mountain Meadow Recreation Complex is on an un-named drainage that drains into tributary Walnut Creek.

There are 3 main headwater tributaries that join to form Show Low Creek: Walnut, Porter and Billy Creeks. Porter Creek originates at Porter Springs on private property with perennial flow for 1.2 miles to Scott Reservoir, flowing through several private ponds. From Scott Reservoir, Porter Creek flows for 1.4 miles to the confluence with Billy Creek, where Show Low Creek is formed.

Walnut Creek originates at Pine Lake, a private pond in Pinetop-Lakeside, although it does receive spill from private golf course ponds further up in the watershed 0.4 miles away, during heavy spring runoff. From Pine Lake, Walnut Creek flows downstream for 0.8 miles to Fred's Lake, a private fee-for-fishing business. From Fred's Lake, Walnut Creek flows for 0.8 miles to Woodland Lake. From Woodland Lake, it flows for 2.4 miles to Rainbow Lake. Within this reach between Woodland Lake and Rainbow Lake, significant flows from Big Springs enter at 0.4 miles upstream of Rainbow Lake. The Mountain Meadow Recreation Complex is located on an intermittent drainage that flows into Big Springs, 0.3 miles away. From Rainbow Lake, Walnut Creek immediately flows through a small private pond below Rainbow Lake dam, then into private Lake of the Woods, 0.2 miles down from Rainbow Lake. From Lake of the Woods, Walnut Creek flows for 0.3 miles to its confluence with Billy Creek, then down Billy Creek for 0.5 miles to the confluence with Porter Creek, where Show Low Creek is formed.

Billy Creek originates at Pinetop Springs, although it does receive spill from several private ponds further up in the watershed during heavy spring runoff. From Pinetop Springs, Billy Creek flows perennial for 0.4 miles to a diversion that takes nearly all of the base flows through a ditch and pipeline system and into Walnut Creek approximately 1.1 miles away; Billy Creek enters in the reach between Fred's Lake and Woodland Lake. Also, another diversion operates only part time just below Pinetop Springs that diverts water into the Pinetop State Fish Hatchery, but returns flows to Billy Creek above the main diversion that goes to Walnut Creek. Any flows that make it over the main diversion flow for 0.6 miles to the confluence with interrupted perennial Thompson Creek, then for 4.7 miles to the confluence with Walnut Creek, then for 0.5 miles to the confluence with Porter Creek, where Show Low Creek is formed.

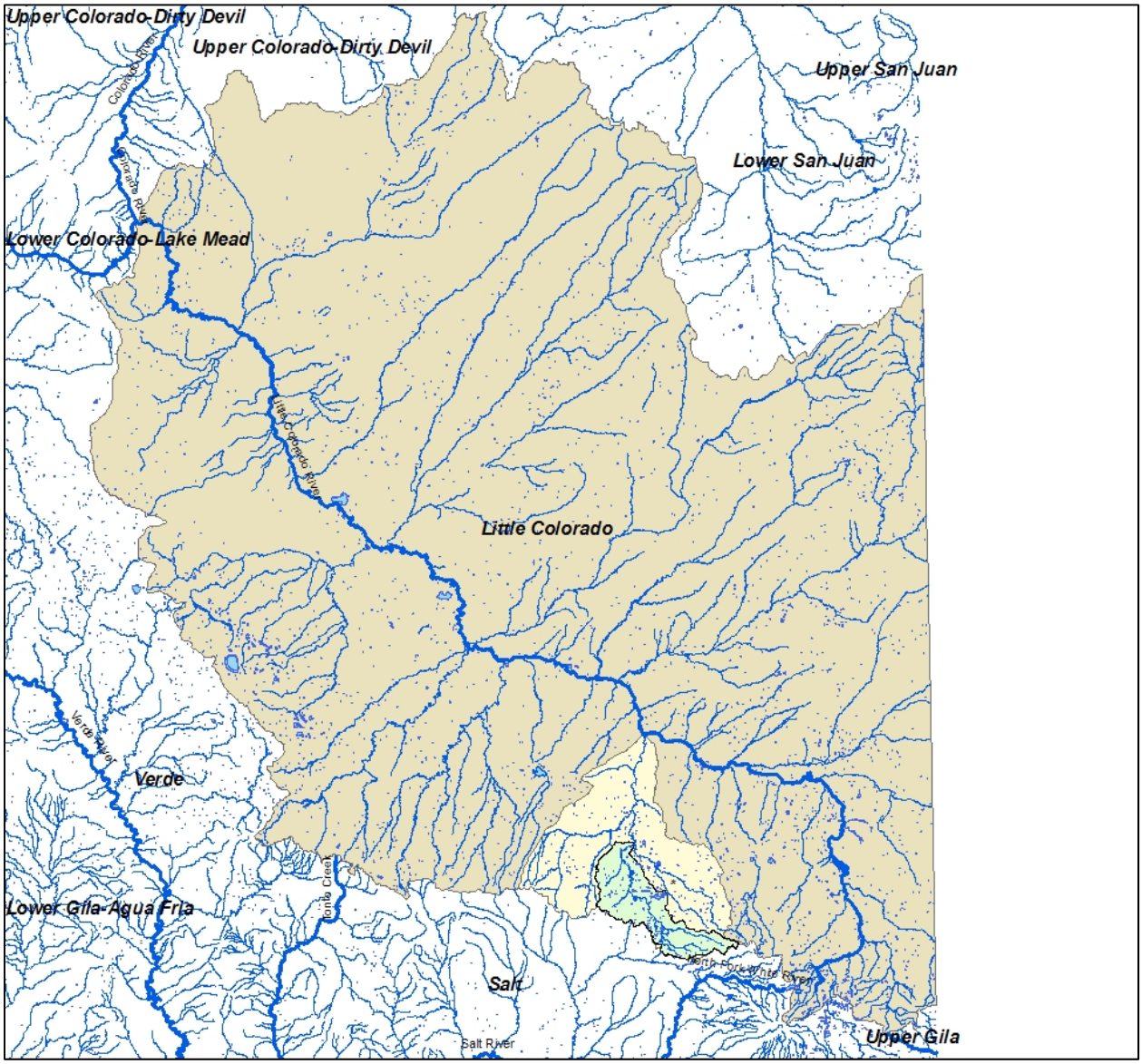

Figure 18. Map of Schoen's Complex (green) located within the Silver Creek drainage (yellow) in the Little Colorado River watershed (brown).

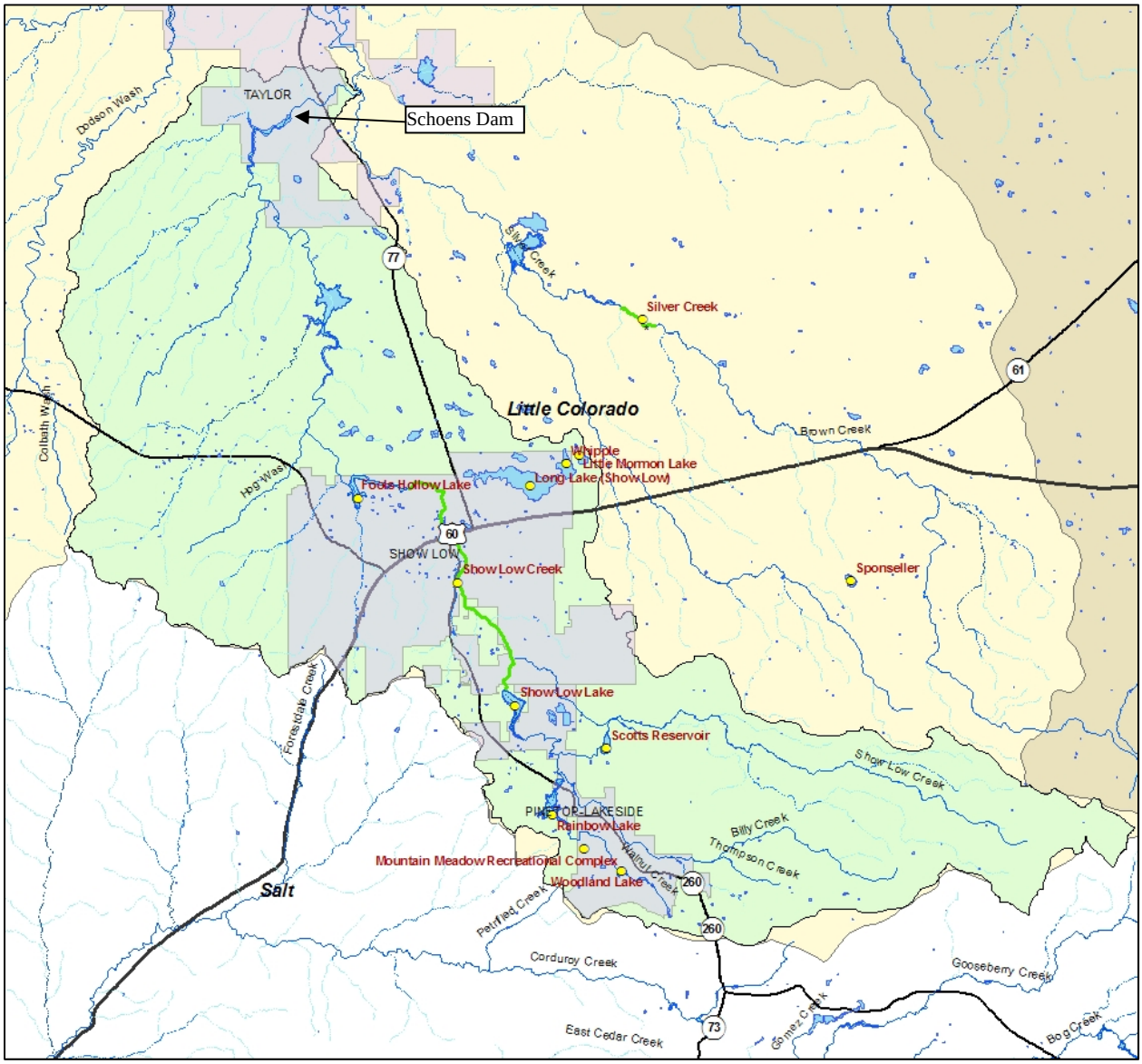

Figure 19. Overview map of Schoen's Complex within the Silver Creek drainage, depicting Show Low, Pinetop-Lakeside and Schoen's Dam.

Three of the lakes shown as being in the same watershed (Whipple, Little Mormon and Long) actually drain into the watershed to the east and not into Show Low Creek as a result of man-made dams and diversions.

From the confluence where Show Low Creek is formed, it flows for 2.4 miles to Show Low Lake, then from Show Low Lake for 7.7 miles to Fools Hollow Lake. The Show Low Creek stocking reach is located between Show Low Lake and Fools Hollow Lake. Fools Hollow Lake is the lowest stocking site in this complex, with all connected waters in this complex flowing through Fools Hollow Lake. From Fools Hollow Lake, Show Low Creek runs for 15.0 miles to

Schoen's Dam, a flood control structure, then for 2.7 miles to the confluence with Silver Creek, approximately 8.1 miles downstream of private White Mountain Lake; see White Mountain Complex for stocking sites upstream of White Mountain Lake. From the confluence, Silver Creek flows north for 10.5 miles to the town of Snowflake, then another 19.4 miles to the confluence with the Little Colorado River (LCR).

From the confluence with Silver Creek, the LCR flows downstream for 43.3 miles to the confluence with Chevelon Creek, then another 9.1 miles to the confluence with Clear Creek, then for 73.1 miles to Grand Falls. From Grand Falls, the LCR runs downstream for 81.0 miles to Blue Springs, then for 13.1 miles to the confluence with the Colorado River. Upstream of the confluence with Silver Creek, the LCR runs 85.1 miles from Lyman Lake.

Woodland Lake

Site Description

Woodland Lake is a small reservoir located on the Apache-Sitgreaves National Forest at an elevation of 6893 feet on the headwaters of Walnut Creek, a tributary of Show Low Creek, in the Town of Pinetop-Lakeside. The dam was constructed in 1914, creating a lake 18 surface acres in size, with a maximum of 20 feet (Figure 20). The lake is filled by Walnut Creek, which originates at very small springs on the east side of town, and is also supplemented with diverted water from upper Billy Creek. The diversion on Billy Creek is located at the bottom end of AGFD property in Pinetop and owned/operated by Woodland-Show Low Irrigation Company, which administers the privately held water rights in Woodland Lake. The diverted water is piped from Billy Creek under Highway 260 and drains into upper Walnut Creek and ultimately into Woodland Lake.

Woodland Lake is intensively used for all types of recreation, including angling. It is located on the Apache-Sitgreaves National Forest, but is cooperatively managed by the Town of Pinetop-Lakeside through a special use permit. A city park was built around Woodland Lake with many facilities, and is more of an urban lake than most other lakes in the White Mountains. A paved walking trail travels the perimeter of the lake and is heavily used in all seasons by residents and visitors. Several ball fields and tennis courts are located on the south side of the lake, including restrooms, a playground, and dirt parking. An American’s With Disabilities Act-accessible fishing pier and boat launch ramp are also located on the north side of the lake near the spillway. Numerous picnic areas are located on the north side of the park with several armadas, restrooms, parking, and another playground. There is also a network of hiking trails beginning at Woodland Park. Many events are held at the park and lake. Woodland Lake is managed as a city park, and the park and lake close to public use at night. Several fishing clinics are held at Woodland Lake each year because of the easy access, numerous facilities, and good fishing in early summer.

Boats are restricted to electric motors only, and a reduced bag limit for trout of 4 per day is in effect on the lake. The lake is accessed year around by paved town roads. The lake ices over for a month or two during the winter, but receives no ice fishing use because the ice is too thin to safely support a person. Camping is not permitted at the lake; however, town amenities are nearby.

Figure 20. Image of Woodland Lake located in the Schoen's complex (©2009 ESRI, i-cubed, GeoEye).

Management of Water Body

The primary fishery is a cold water rainbow trout intensive use put-and-take fishery nearly year around, with a secondary warm water fishery. Bluegill and largemouth bass are naturally reproducing, and channel catfish are supplementally stocked. Catchable rainbow trout are stocked multiple times during the stocking season. Catchable, sub-catchable, and fingerling channel catfish are stocked opportunistically during the stocking season.

Woodland Lake has been stocked extensively since the 1930s (Table 59). In the last 10 years, it has been stocked annually with catchable rainbow trout from May through early July and opportunistically in the fall if water quality is good. It has also been supplementally stocked with subcatchable channel catfish twice in the last 10 years, in 2000 and 2008.

Table 59. Stocking history for Woodland Lake.

Species	First Year	Last Year	Num. of Stockings	Num. Stocked
Bluegill	1986	1990	2	1,200
Brook trout	1933	1937	3	102,720
Brown trout	1941	1995	9	44,053
Channel catfish	1978	2008	19	15,290
Largemouth bass	1979	1991	3	2,035
Rainbow trout	1936	2009	231	537,077
Tadpole	1968	1968	1	2,000
Total			268	704,375

Several fishing clinics are held at Woodland Lake each year because of the easy access, numerous facilities, and good fishing in early summer. Supplemental stocking of bluegill is being considered to boost the sunfish populations and improve fishing in the mid summer when kids are out of school and the trout fishing declines in Woodland Lake. It would also help to support special fishing clinics if they were held during poor trout fishing conditions.

Walnut Creek, below the lake and at Big Springs, is being managed for native fishes because of the naturally occurring speckled dace population and the recently repatriated bluehead sucker. Woodland Lake will be managed with species that are not considered a threat to those non-listed native fishes. Rainbow trout have been stocked in Woodland Lake since 1936 and have not established in Walnut Creek, although an occasional individual is detected; the escaped trout do not persist. Despite being present in Woodland Lake since the late 1970s, channel catfish and largemouth bass have not established in Walnut Creek below the lake, thus are also not considered a major threat to the non-listed native fishes in the stream. Improving the fishing during the summer months will also discourage people from illegally stocking a species into

Woodland Lake that might be a greater threat to Big Springs (such as green sunfish or bullheads) than the species proposed for stocking.

Woodland Lake fills each year in the winter and spring, having good water quality in the spring and early summer. However, the lake experiences aggressive algae growth in the warm summer months in addition to being drawn down for irrigation use, which limits trout stocking and trout fishing in the summer. Depending upon the water level, the water quality usually improves in the fall. The lake receives a high amount of angling use for its size, especially from May through July, then the anglers thin out as the trout fishing becomes poor in the summer months. The lake is centrally located in town and easily accessible to visitors and local children who can get to the lake on their bikes or by walking. It is also a place where families feel comfortable dropping off older kids for an afternoon of fishing and using the park.

The current lake management plan identifies an emphasis on kids' fishing, where any beginner angler can stay interested by catching any fish, regardless of species and size. The most recent angler creel surveys were conducted on-site at Woodland Lake in 1992 and 2007, reporting 31,853 angler hours (21,057 AUDs) and 14,186 angler hours, respectively. A statewide mail-out creel survey reported 18,550 AUDs in 2001 (Pringle 2004).

The Integrated Fisheries Management Plan for the LCR Watershed (Young et al. 2001) identifies a management emphasis at Woodland Lake; a primary intensive use put-and-take cold water sport fish with rainbow trout, and a secondary warm water sport fishery with largemouth bass, channel catfish of basic yield, and bluegill, which is consistent with the proposed action. The Lakeside Area Fish Management Plan (Meyer et al. 2008) identifies an emphasis of promoting kids' and family fishing, with trout stocking in spring and early summer, and channel catfish and bluegill as an alternative to trout from July to September when the water quality is too poor for trout stocking, to maintain good catch rates through the fishing season. This is also consistent with the proposed action.

Proposed Action

The Department proposes to stock rainbow trout, channel catfish, and bluegill for the period covered by this consultation.

Catchable rainbow trout would be stocked multiple times from April to September each year; numbers of trout stocked may be from 0 to 20,000 fish annually.

Channel catfish (fingerling, sub-catchable, catchable) may be supplementally stocked from April to September each year; numbers of catfish stocked may be from 0 to 2,000 fish annually.

Catchable bluegill sunfish may be stocked annually from April to September in support of fishing clinics; numbers of bluegill stocked may be from 0 to 5,000 fish annually.

Water Distribution / Connectivity
See the explanation of the Schoen's Complex for a detailed description of water connectivity at Woodland Lake within the complex and beyond. Walnut Creek is mostly perennial coming into the lake, as it captures the flow coming down Walnut Creek from Pine and Fred's lakes, plus diverted water from upper Billy Creek. Walnut Creek coming into Woodland Lake is occasionally dry during drought years.

Woodland Lake fills and spills every year in the winter and spring and occasionally in the late summer and fall if the monsoon rains are heavy. This small lake is the only reservoir in the area that can be influenced by heavy monsoon rains. Water is also released out of Woodland Lake for irrigation, either directly into a ditch and pipeline system, or into Walnut Creek to be used further downstream, with the water rights entirely managed by the Woodland-Show Low Irrigation Company. The spill and some irrigation water flows down Walnut Creek, through Big Springs, and into Rainbow Lake, also located on Walnut Creek. Walnut Creek is occasionally dry above Woodland Lake and supports no fish; no surveys have been conducted because it goes dry and is on private property, except in private ponds in the upper drainage. Walnut Creek is often dry immediately below Woodland Lake when not spilling or releasing irrigation water, until Walnut Spring creates a permanent flow. Adaire Spring and Big Springs add to this permanent flow down into Rainbow Lake. See the section in Rainbow Lake for information below Woodland Lake in Walnut Creek.

Woodland Lake experiences water level fluctuations with the irrigation releases during the summer. The irrigation releases can occur during the irrigation season from April 15 to September 15, and is used to irrigate grazing pastures, gardens, orchards, and a private pond.

Fish Movement
Fish are able to move upstream into upper Walnut Creek during higher flows during spring runoff and extreme monsoon events, but the base flows are usually too small for fish larger than a few inches in size to move upstream. Fish that do move upstream may persist until the creek dries during a drought year, and likely would not get beyond the dam at private ponds a short distance upstream.

Fish are also able to disperse downstream into Walnut Creek, as the lake spills every winter and spring, and occasionally in the late summer, plus water is occasionally released into Walnut Creek for irrigation use downstream. Water is also released into a ditch and pipeline system for use further downstream where it is diverted out of the channel. A fish could disperse into the ditch and pipeline system and may end up in someone's garden, or potentially into Edler Lake, which is a private pond fed by the irrigation system. The only place a fish could persist in the irrigation ditch and pipeline system is in Edler Lake, but the outflow of Edler Lake goes back into the network of ditch and pipelines to gardens and orchards. A fish escaping directly into Walnut Creek could persist if it reaches larger pools downstream of Walnut Spring and around

Big Springs, but most escapees do not appear to persist. A survey in July 2009 in Walnut Creek found numerous speckled dace and low numbers of fathead minnow, largemouth bass, green sunfish, and black bullhead (Table 60). The fathead minnow, largemouth bass, and green sunfish likely were escapees from Woodland Lake. The fathead minnow and green sunfish have the potential to establish in Walnut Creek, although numbers are very low and they were not detected in the previous survey in 1997. Additional monitoring will be necessary to determine if these species will establish. The largemouth bass were all young-of-the-year size, which are more likely to disperse over the spillway or through irrigation releases, but will likely not establish because the base flows are low and the habitat is very limiting for them. However, additional monitoring would be necessary to confirm this.

Table 60. Summary of Walnut Creek survey in July 2009 with a backpack electroshocker.

Species	**Num. Collected**	**Size**
Speckled dace	94	Various sizes
Fathead minnow	6	Not measured
Largemouth bass	5	~70-100 mm (not measured)
Green sunfish	2	Largest was 131 mm TL
Black bullhead	12	85-153 mm TL
Total	119	-

A dispersing fish could potentially continue down through Rainbow Lake, into Show Low Creek, then Show Low Lake, then Show Low Creek again and into Fools Hollow Lake. From Show Low Creek, a fish could also swim upstream into Porter Creek, but could go no further upstream than the dam at Scott Reservoir. See the following site discussions for additional information downstream of Woodland Lake.

Community Description

Woodland Lake contains stocked rainbow trout, plus naturally reproducing populations of largemouth bass, bluegill, green sunfish, fathead minnow, crayfish, and bullfrogs (Table 61). The lake also contains occasionally-stocked channel catfish. Rainbow trout do not reproduce in the lake or in Walnut Creek (M. Lopez pers. comm.). It is unknown if channel catfish reproduce in Woodland Lake. If channel catfish are naturally reproducing in the lake, it is at very low recruitment levels. Bluegills reproduce naturally in Woodland Lake, but would likely not persist in Walnut Creek. No fish are present in Walnut Creek above Woodland Lake, although this reach has not been surveyed because it occasionally goes dry and is on private property. See the following stocking site sections for information on the aquatic community downstream of Woodland Lake.

There are native fish present in Walnut Creek downstream of the lake, self-sustaining speckled dace and recently re-introduced bluehead sucker, but no consultation species.

Table 61. Survey history at Woodland Lake with experimental gillnets.

Species	2001	2002	2003	2006	2008
Rainbow trout	34	27		36	
Largemouth bass	1	7	5	5	15
Channel catfish		1	1	3	1
Green sunfish		2	4		
Bluegill			1		

Consultation Species or Critical Habitat

Potential impacts from the proposed action to candidate and listed species are described below. Please refer to Chapter 4 for a detailed description of the nature of the impacts (which may include predation, competition for space and food, and hybridization etc.).Subsequent responses (resulting from the frequency, magnitude and duration of the impacts) between proposed stocked and candidate and listed species, and any site or complex factors that provide context for determining the meaningfulness of the impacts, are discussed below. Impacts from the proposed action resulting from angler related recreation and/or potential introduction of disease, pathogen or invasive species are evaluated at a broad scale for the entire action area and are described in Chapter 4. If potential impacts specific to a stocking site or complex have been identified they are discussed below.

Potential impacts due to the proposed action to Chiricahua and Northern leopard frogs are analyzed below at the local site and broad scale level due to the movement potential into the stocked area and fish movement potential up or downstream into areas where frogs may occur. Potential impacts to northern Mexican garter snake, narrow-headed garter snake, as well as Little Colorado spinedace located downstream in Silver Creek and Little Colorado critical habitat in lower Chevelon Creek are addressed in the complex analysis.

Northern Leopard Frog

Local Analysis: Although Woodland Lake and the Schoen's buffered stocking complex are within the historical range of the northern leopard frog, the likelihood that northern leopard frogs could be exposed to stocked fish in Woodland Lake is low. There are no historical records for northern leopard frogs for the Woodland Lake stocking site; however, there are historical records for northern leopard frogs from 2 sites in the buffered stocking complex; Lake of the Woods (Lake of the Woods Resort (1942) and Rainbow lake (= Boat Ramp) (1972) (AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). There have been 7 site records and surveys at 5 sites within the buffered stocking complex between 1942 and 2001, with most surveys conducted from 1984-2001. Northern leopard frogs were not observed at any sites, including Lake of the Woods Resort (1994) and Rainbow Lake (= Boat Ramp) (1994) (Figure 21, AGFD Riparian

Herpetofauna Database, M. Sredl pers. comm.) Although there are available habitats that have not been surveyed, it is likely that northern leopard frogs no longer occupy sites within the Schoen's buffered complex because they have not been detected during subsequent surveys and crayfish, bullfrogs and non-native fish, make the habitat within the buffered stocking complex less suitable for northern leopard frogs.

Broad Scale Analysis: The likelihood that northern leopard frogs could be exposed to fish stocked at Woodland Lake that dispersed outside the buffered stocking complex is low because subsequent surveys suggest northern leopard frogs no longer occupy surrounding lakes or stream where fish could disperse and habitats are less suitable for northern leopard frogs due to the presence of crayfish, bullfrogs and non-native fish.

Chiricahua leopard frog

Local Analysis: Although Woodland Lake and the Schoen's buffered stocking complex are within the historical range of the Chiricahua leopard frog, the likelihood that Chiricahua leopard frogs could be exposed to stocked fish in Woodland Lake is low. There are no historical records for Chiricahua leopard frogs at the Woodland Lake stocking complex; however, there is 1 historical record for Chiricahua leopard frogs from 1 site in the buffered stocking complex; Rainbow Lake (= Boat Ramp) (1972) (Figure 21, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). There have been 7 surveys and site records at 5 sites within the buffered stocking complex between 1942 and 2001, with most surveys conducted from 1984-2001. Chiricahua leopard frogs were not observed at any sites, including Rainbow Lake (= Boat Ramp) in 1994 (AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). Although there are available habitats that have not been surveyed, it is likely that Chiricahua leopard frogs no longer occupy sites within the Schoen's buffered complex because they have not been detected during subsequent surveys and habitats in the buffered complex have crayfish, bullfrogs and non-native fish, making it less suitable for Chiricahua leopard frogs.

Broad Scale Analysis: The likelihood that Chiricahua leopard frogs could be exposed to fish stocked at Woodland Lake that dispersed outside the buffered stocking complex is low because subsequent surveys suggest Chiricahua leopard frogs no longer occupy surrounding lakes or streams where fish could disperse. In addition, the habitat in these drainages is less suitable for Chiricahua leopard frogs due to the presence of crayfish, bullfrogs, and non-native fish.

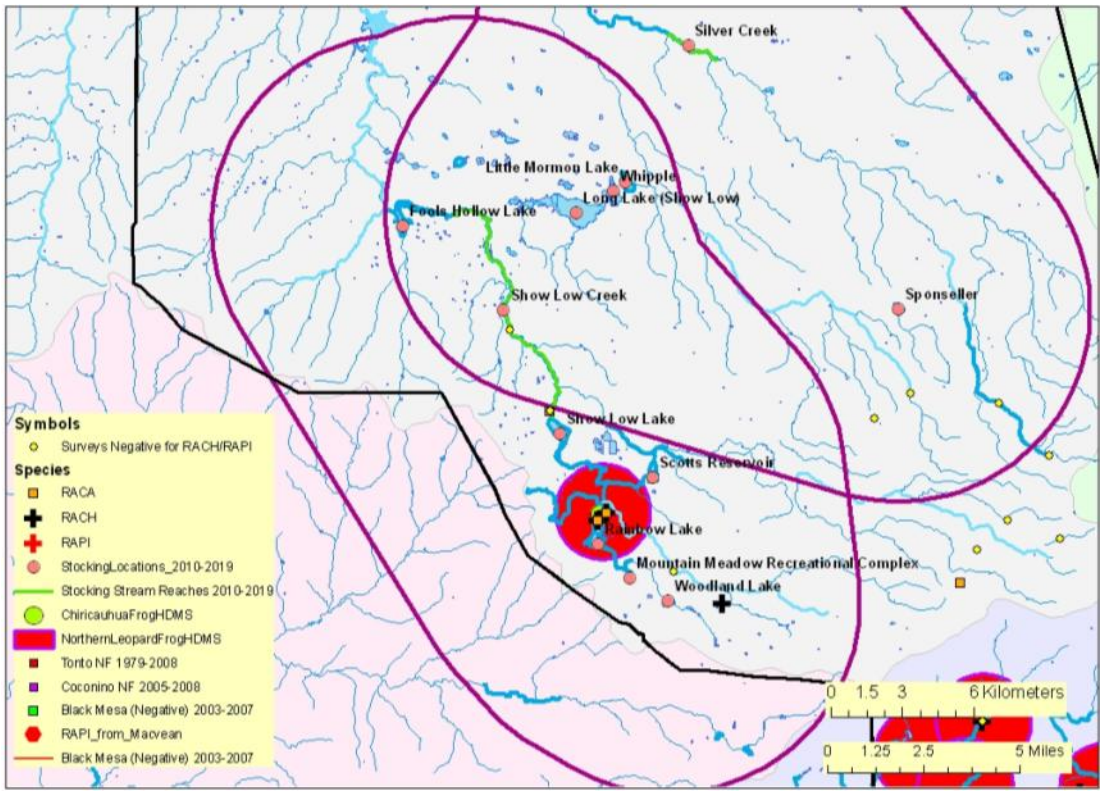

Figure 21. Map of Schoen's buffered stocking complex:

The purple line illustrates the 5 mile buffer surrounding a stocking site, stocking reach, or a group of stocking sites. Blue lines symbolize streams and rivers (both perennial and intermittent). A black line represents a Chiricahua leopard frog Recovery Unit boundary. The background color represents the 8 digit Hydrologic Unit Code. Other data are described in the legend. (Note: HDMS data appear as buffered points and may appear larger than site records for other surveys).

Mountain Meadow Recreation Complex

Site Description

The Mountain Meadow Recreation Complex (actual name of the facility, not a "complex" of proposed stocking sites) consists of one artificial pond constructed for irrigation purposes at the Town of Pinetop-Lakeside's recreational ball fields, at an elevation of 6730 feet. The pond is very small, measuring 40 x 60 yards, and is fairly shallow (Figure 22). The pond is mostly filled with well water that the city uses to irrigate the ball fields. The pond is located on a small ephemeral drainage and captures some runoff. The pond has a spillway and connects with Big Springs on Walnut Creek upstream of Rainbow Lake; however the drainage is usually dry and runs only during snowmelt runoff or extreme monsoon events. The pond is frequently drained

for irrigation and refilled during the summer months; therefore, this stocking site would only be utilized very short term to support particular special events like fishing clinics.

The pond can be accessed year around by paved town roads. It is located at the edge of a series of soccer and baseball fields that receive very high use during the warmer months. There is no boat launch ramp or fishing pier because the pond is so small and primary purpose of watering the fields. However, there are restroom, snack concession facilities, paved parking, and a playground, at the recreational complex. Camping is not permitted at the complex or pond; however town amenities are only a short distance.

Figure 22. Image of Mountain Meadow Recreation Complex located in the Schoen's complex (©2009 ESRI, i-cubed, GeoEye).

Management of Water Body
The pond is currently used exclusively to water the adjacent soccer and baseball fields and there is currently no fishery. However, because of its easy access and likely decent water quality, and because it is replenished frequently from a well, the Department desires to stock the pond in conjunction with special events like fishing clinics. It is anticipated that the fish would not persist very long in the pond because it is drained frequently for irrigation use. Because the pond drains down into Big Springs/Walnut Creek, it is desired to utilize species that are considered low threat to the native fish being managed in Big Springs; thus the proposed action only includes catchable rainbow trout and bluegill.

There is no stocking history. This is a fairly new pond, only constructed several years ago, and would be a new stocking site. The angling use would be very short term and associated with special events.

Proposed Action
The Department proposes to stock rainbow trout and bluegill for the period covered by this consultation.

Catchable rainbow trout and catchable bluegill may be stocked annually from March through November in conjunction with special events such as fishing clinics, total numbers of fish stocked would be from 0 to 5,000 fish annually.

Water Distribution / Connectivity
For most of the year, the Mountain Meadow Recreation pond is isolated, being filled primarily with well water from the Town of Pinetop-Lakeside. During spring snowmelt runoff and heavy monsoon events, the pool does catch water coming down an intermittent drainage; it spills into an intermittent drainage for 0.3 miles, where it enters Big Springs. Big Springs is a large permanent spring that flows into Walnut Creek upstream of Rainbow Lake. From the Big Springs-Walnut Creek confluence, the stream flows perennial for 0.4 miles to Rainbow Lake. For water distribution downstream of Rainbow Lake, refer to the Rainbow Lake detailed analysis.

Fish Movement
Stocked fish may move up the intermittent drainage from the pond during heavy runoff, but will die when it dries. Stocked fish will also have the ability to move down into Big Springs when there is a heavy enough spill. Rainbow trout and bluegill may persist for a short period in Big Springs and/or Walnut Creek, but not for long because the spring pool is too shallow and without suitable habitat. Once in Big Springs, an escaped fish could move up Walnut Creek, but only to

the base of Woodland Lake dam, or it could move down Walnut Creek and into Rainbow Lake. For fish movement from Rainbow Lake, refer to the Rainbow Lake detailed analysis. Woodland Lake, upstream of Big Springs, has been stocked with rainbow trout since 1936 and bluegill have been present since their stocking in 1986 (Table 59) and have not established in Big Springs.

Surveys in 1997 found 3 rainbow trout and naturally reproducing speckled dace downstream of Woodland Lake in Walnut Creek and below Big Springs (Lopez et al. 1998c; Table 3). The trout were located in the canyon just below the lake and the native dace were distributed throughout all perennial portions of this reach. This population of speckled dace is the first of only 2 populations of dace known from the area above Fools Hollow Lake, and was the only remaining native fish species in the entire Show Low Creek sub-watershed until, native bluehead suckers were recently repatriated in Big Springs in 2008. The trout do not appear to be established or persisting, as they were not detected in a recent survey in 2009 (see below); all 3 trout were fingerling size and likely escaped during a spill event from Woodland Lake, as fingerling rainbow trout were stocked into Woodland Lake at that time. They were all found at the same station high in the reach just below Woodland Lake. They likely did not persist in the small base flow of Walnut Creek. Fingerling trout are no longer stocked in Woodland Lake which may reduce the chance of escapement, as most spill events are slight and not likely to move a catchable size trout (M. Lopez pers. comm.). Trout are not known to reproduce in Woodland Lake or Walnut Creek, so there is limited potential dispersal of trout progeny.

Table 62. Summary of Walnut Creek survey in 1997 with a backpack electroshocker.

Species	**Num. Collected**	**Size Range (mm TL)**
Speckled dace	94	28-80
Rainbow trout	3	74-80
Total	97	-

The survey in July 2009 in Walnut Creek found numerous speckled dace and low numbers of fathead minnow, largemouth bass, green sunfish, and black bullhead (Table 4). The fathead minnow, largemouth bass, and green sunfish likely were escapees from Woodland Lake. The fathead minnow and green sunfish have the potential to establish in Walnut Creek, although numbers are very low and they were not detected in the previous survey in 1997. Additional monitoring will be necessary to determine if these species will establish. The largemouth bass were all young-of-the-year size, which are more likely to disperse over the spillway or through irrigation releases, but will likely not establish because the base flows are low and the habitat is very limiting for them. However, additional monitoring would be necessary to confirm this. The black bullhead are believed to be illegally stocked, as a small wildcat dam of rocks was placed

on National Forest land where the bullheads were collected, and a 5 gallon bucket discovered on the bank. Several passes were made to remove as many bullheads as could be found in an effort to keep them from becoming established. Black bullheads are not known to exist in Woodland Lake or previously in Walnut Creek. Black bullheads are very numerous downstream in Rainbow Lake; however, an old concrete structure hydroelectric dam is an effective fish barrier to species that are not proficient jumpers, like black bullhead. Swarms of young bullheads are easily observed in the shallows in Rainbow Lake in mid-summer.

Community Description
The pond is currently fishless because it is relatively new and has not yet been stocked. Information on aquatic assemblage in Big Springs and Walnut Creek downstream of Mountain Meadow was previously discussed to describe fish movement through this area. Several rainbow trout were found in Walnut Creek in 1997, but none in 2009. Additionally, no bluegill has been found in Walnut Creek during surveys in 1997 and 2009. Crayfish and bullfrogs are present in Walnut Creek and Big Springs between Woodland and Rainbow lakes.

Consultation Species or Critical Habitat
Potential impacts from the proposed action to candidate and listed species are described below. Please refer to Chapter 4 for a detailed description of the nature of the impacts (which may include predation, competition for space and food, and hybridization etc.).Subsequent responses (resulting from the frequency, magnitude and duration of the impacts) between proposed stocked and candidate and listed species, and any site or complex factors that provide context for determining the meaningfulness of the impacts, are discussed below. Impacts from the proposed action resulting from angler related recreation and/or potential introduction of disease, pathogen or invasive species are evaluated at a broad scale for the entire action area and are described in Chapter 4. If potential impacts specific to a stocking site or complex have been identified they are discussed below.

Potential impacts due to the proposed action to Chiricahua and Northern leopard frogs are analyzed below at the local site and broad scale level due to the movement potential into the stocked area and fish movement potential up or downstream into areas where frogs may occur. Potential impacts to northern Mexican garter snake, narrow-headed garter snake, as well as Little Colorado spinedace located downstream in Silver Creek and Little Colorado critical habitat in lower Chevelon Creek are addressed in the complex analysis.

Northern Leopard Frog

Local Analysis: Although Mountain Meadow Recreation Complex and the Schoen's buffered stocking complex are within the historical range of the northern leopard frog, the likelihood that northern leopard frogs could be exposed to stocked fish in Mountain Meadow Recreation Complex is low. There are no historical records for northern leopard frogs for the Mountain

Meadow Recreation Complex stocking site; however, there are historical records for northern leopard frogs from 2 sites in the buffered stocking complex; Lake of the Woods (Lake of the Woods Resort (1942) and Rainbow lake (= Boat Ramp) (1972). There have been 7 surveys and site records at 5 sites within the buffered stocking complex between 1942 and 2001, with most surveys conducted between 1984 and 2001. Northern leopard frogs were not observed at any sites, including Lake of the Woods Resort (1994) and Rainbow lake (= Boat Ramp) (1994) (Figure 21, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). Although there are available habitats that have not been surveyed, it is likely that northern leopard frogs no longer occupy sites within the Schoen's buffered complex, because they have not been detected during subsequent surveys (AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.) and crayfish, bullfrogs and non-native fish, make the habitat within the buffered stocking complex less suitable for northern leopard frogs.

Broad Scale Analysis: The likelihood that northern leopard frogs could be exposed to fish stocked at Mountain Meadow Recreation Complex that dispersed outside the buffered stocking complex is low, because subsequent surveys suggest northern leopard frogs no longer occupy surrounding lakes or stream where fish could disperse and the habitats are less suitable for northern leopard frogs due to the presence of crayfish, bullfrogs and non-native fish.

Chiricahua leopard frog

Local Analysis: Although Mountain Meadow Recreation Complex and the Schoen's buffered stocking complex are within the historical range of the Chiricahua leopard frog, the likelihood that Chiricahua leopard frogs could be exposed to stocked fish in Mountain Meadow Recreation Complex is low. There are no historical records for Chiricahua leopard frogs at the Mountain Meadow Recreation Complex stocking complex; however, there is 1 historical record for Chiricahua leopard frogs from 1 site in the buffered stocking complex; Rainbow Lake (= Boat Ramp) (1972). There have been 7 surveys and site records at 5 sites within the buffered stocking complex between 1942 and 2001, with most surveys conducted between 1984 and 2001. Chiricahua leopard frogs were not observed at any sites, including Rainbow Lake (= Boat Ramp) (1994) (Figure 21; AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). Although there are available habitats that have not been surveyed, it is likely that Chiricahua leopard frogs no longer occupy sites within the Schoen's buffered complex because they have not been detected during subsequent surveys (AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.) and crayfish, bullfrogs and non-native fish make the habitat within the buffered stocking complex less suitable for Chiricahua leopard frogs.

Broad Scale Analysis: The likelihood that Chiricahua leopard frogs could be exposed to fish stocked at Mountain Meadow Recreation Complex that dispersed outside the buffered stocking complex is low, because subsequent surveys suggest Chiricahua leopard frogs no longer occupy

surrounding lakes or streams where fish could disperse and the habitats are less suitable for Chiricahua leopard frogs due to the presence of crayfish, bullfrogs, and non-native fish.

Rainbow Lake

Site Description

Rainbow Lake dam was built on Walnut Creek in the Town of Pinetop-Lakeside in 1903 as an irrigation reservoir, and the dam was rebuilt in 1963. It created a 116 surface acre lake with a maximum depth of 14 feet and an average depth of 7 feet (Figure 23). The water rights are entirely privately owned, and the lake is still operated as an irrigation reservoir by the Woodland-Show Low Irrigation Company. Most of the shoreline is privately owned, with high value homes surrounding the lake. A small piece of property near the spillway is owned by the Department and is managed to supply public access to the lake. The property has paved parking, an ADA accessible fishing pier/boat dock, and a boat launch ramp. No other public facilities are offered.

Most of the shoreline is privately owned with no public access. The Department owns a small piece of property near the spillway, offering public access the lake. The Department property is accessed year around by paved town roads. The lake freezes over for a month or two in the winter, but the lake receives no ice fishing use because the ice is too thin to safely support a person.

The lake receives a fair amount of recreational boat use, because many of the residents along the shoreline have their personal docks and a boat. The lake is restricted to a single gas motor no larger than 10 horsepower.

Camping is not permitted at the lake; however town amenities are nearby. A Forest Service campground is located along Hwy 260 within walking distance of the lake.

Figure 23. Image of Rainbow Lake located in the Schoen's complex (©2009 ESRI, i-cubed, GeoEye).

Management of Water Body

Primary fishery is a cold water rainbow trout put-grow-and-take fishery nearly year around, with a secondary warm water fishery. Bluegill, green sunfish, and largemouth bass are naturally reproducing, and channel catfish are supplementally stocked. Table 63 provides a history of stocking activity at Rainbow Lake. Catchable and sub-catchable rainbow trout are stocked multiple times during the stocking season. Catchable, sub-catchable, and fingerling channel catfish are stocked opportunistically during the stocking season. Northern pike and black bullhead also inhabit the lake, but are planned to be removed by chemical treatment.

Table 63. Stocking history for Rainbow Lake.

Species	First Year	Last Year	Num. of Stockings	Num. Stocked
Bluegill	1986	1986	1	3,000
Brook trout	1933	1983	7	150,720
Brown trout	1934	1995	37	547,100
Channel catfish	1965	2009	31	222,541
Cutthroat trout	1972	1972	1	10,000
Rainbow trout	1933	2009	469	5,646,719
Total			546	6,580,080

Rainbow Lake is a very shallow lake with high nutrients, thereby creating perfect conditions for aggressive aquatic weed growth in the summer months. A Department weed harvester is used annually to thin the aquatic weeds, but usually cannot keep ahead of the growth. A Show Low Creek Watershed Committee is seeking to apply for grant funding to dredge the lake and remove much of the internally cycling nutrient load, as recommended by the Arizona Department of Environmental Quality in a report for Rainbow Lake (ADEQ 1999).

The lake fills and spills every year in the winter and spring and is used for irrigation. The irrigation company has been attempting to pull less water from Rainbow Lake because of complaining residents. The lake has good water quality in the spring and early summer, and consequently good trout fishing during this time. However, as water temperatures rise and water levels fall in the warm summer months, water quality and trout fishing declines. The weed growth also impacts warm water fishing by interfering with boats, the primary means of public angling on Rainbow Lake.

Recently, an illegal introduction of Northern pike has established in the lake, also impacting fishing by consuming stocked trout and recruiting sunfish and bass. The Department is currently proposing to treat the lake with piscicides to remove Northern pike and black bullhead. After the treatment, the lake will need to be restocked with desirable sport fish such as largemouth bass, bluegill, channel catfish, and rainbow trout. Largemouth bass would only need to be restocked following a complete loss of the population; however, rainbow trout and channel catfish would be stocked on a regular basis. Bluegill would be stocked either to restart the fishery following a piscicide treatment, and/or opportunistically for fishing clinics. While pike are present in the lake, only catchable rainbow trout would be stocked, to reduce the level of predation. However, if pike were eradicated, sub-catchable trout could be stocked to return to a put-grow-and-take management scheme that was present prior to the pike introduction.

On-site angler creel surveys were completed in 1992, 2006, and 2007, reporting 15,781 angler hours (9953 AUDs), 18,166 angler hours, and 16,786 angler hours, respectively (Meyer et al. 2008). A statewide angler mail-out survey reported 17,289 AUDs in 2001 (Pringle 2004).

The Integrated Fisheries Management Plan for the LCR Watershed (Young et al. 2001) identifies a primary management emphasis of intensive use cold water sport fish with rainbow trout, and a secondary emphasis on warm water sport fish with largemouth bass, bluegill, and basic yield channel catfish, which is consistent with the proposed action. The Lakeside Area Fish Management Plan (Meyer et al. 2008) identifies managing for intensive use rainbow trout, self-sustaining largemouth bass and sunfish, and to resume stocking channel catfish, which is also consistent with the proposed action.

Proposed Action

The Department proposes to stock rainbow trout, channel catfish, largemouth bass, and bluegill are proposed for the period covered by this consultation.

Catchable and sub-catchable rainbow trout would be stocked from April to September each year; numbers of trout stocked may be from 0 to 30,000 fish annually.

Channel catfish (fingerling, sub-catchable, catchable) may be opportunistically stocked depending on water quality and fish availability from April to September each year; numbers of catfish stocked may be from 0 to 15,000 fish annually.

Catchable bluegill may be stocked annually from April to September in support of fishing clinics; numbers of bluegill sunfish stocked would be from 0 to 5,000 fish annually.

Largemouth bass (fingerling, sub-catchable, catchable) and bluegill (fingerling, sub-catchable, catchable) may be stocked as needed at any time during the year to augment or to recover the fishery following catastrophic events. Numbers of fish stocked for this purpose will be determined according to stocking guidelines identified in the sport fish stocking protocol.

Water Distribution / Connectivity

Rainbow Lake is fed by perennial Walnut Creek, and permanent springs under the lake surface. Walnut Creek flows down to Rainbow Lake from Woodland Lake, picking up significant flow from Adaire Spring and Big Springs prior to reaching Rainbow Lake. Much of the water filling the lake comes during the spring snowmelt runoff, although Walnut Creek flows year-round into the lake.

Rainbow Lake fills and spills every year, flowing down into Walnut Creek and through a small private pond immediately below the dam, then through privately owned Lake of the Woods and down lower Walnut Creek where it joins Billy Creek. Billy Creek meets with Porter Creek to

form Show Low Creek, which then flows into Show Low Lake. Additional information on water connectivity can be found in subsequent site sections below.

Rainbow Lake is an irrigation reservoir and water is released during the irrigation season from April 15 to September 15. Irrigation water can be released into Walnut Creek and taken out into an irrigation ditch about 200 yards downstream. Water can also be sent downstream into Show Low Lake, where it can be stored or released again for irrigation below Show Low Lake. The irrigation water is used to irrigate grazing pastures, gardens, and orchards. Irrigation water can also come into Rainbow Lake from releases from Woodland Lake. Irrigation releases during the summer from Rainbow may drop the lake level only 3-5 feet, but that can have an impact on the lake because the average depth is only 7 feet. Fish kills, however, are not usually an issue at Rainbow Lake.

Fish Movement

Stocked fish may try to swim upstream into Walnut Creek towards Big Springs; however, they immediately come up against the obstacle of a concrete structure across the entire width of lower Walnut Creek right at the junction with Rainbow Lake. This concrete structure was an old hydroelectric dam and is approximately 3 feet high. This structure is likely not an effective fish barrier to upstream movement of trout during moderate or higher flows, but would be for warm water fishes such as channel catfish, bluegill and largemouth bass that are not prone to leaping high over barriers. Once above this barrier, trout could navigate the perennial flow of this reach of Walnut Creek, get into Big Springs, and/or swim up towards Woodland Lake. They could not get upstream of the dam at Woodland Lake though.

Because Rainbow Lake spills annually, and water is released regularly for irrigation use, stocked fish could disperse downstream. They could go down into the small private pond, then into Lake of the Woods, then down lower Walnut Creek, into lower Billy Creek, down into Show Low Creek, and into Show Low Lake. They could also swim upstream once in Billy Creek, likely only during high flows, and potentially get into the headwaters of Billy Creek, although they would not impact anything there. There are two concrete dam structures on Department property on Billy Creek that would preclude any upstream moving fish from reaching the springs and diversion into the hatchery. They could also swim upstream once at the confluence with Porter Creek, but could only get as far as Scott Reservoir dam.

From Show Low Lake, they could continue downstream during more infrequent spills, or by regular irrigation releases into perennial Show Low Creek, where they could continue down into Fools Hollow Lake. For a description of escape and movement of fish downstream of Fools Hollow Lake, see the Fools Hollow Lake analysis.

Community Description

Rainbow Lake currently contains stocked rainbow trout and channel catfish. Naturally reproducing populations of Northern pike, black bullhead, largemouth bass, bluegill, green sunfish, fathead minnow, and bullfrog tadpoles are also present (Table 64). Walleye and golden shiner are occasionally found, but not considered to be established in the lake. Stocked trout could persist year-round in Rainbow Lake if it were not for the high predation by pike, and they are expected to persist after pike are eradicated. Rainbow trout reproduction has not been documented in the lake or in the Walnut Creek upstream. Channel catfish have the opportunity to reproduce in the lake, although it has not been documented through the presence of offspring. Black bullhead, largemouth bass, bluegill, green sunfish, and fathead minnow reproduce naturally in the lake. The private ponds immediately downstream of Rainbow Lake, such as Lake of the Woods, contain the same species as Rainbow Lake, with the exception that northern pike have not been documented.

Table 64. Survey history of Rainbow Lake using experimental gillnets.

Species	**Apr. 2004**	**Mar. 2005**	**Apr. 2006**	**Mar. 2007**	**Mar. 2008**
Rainbow trout	1	37	11	1	1
Largemouth bass	9	25	13	3	5
Channel catfish	10	2	3	2	
Black bullhead	254	134	89	62	61
Northern pike	5	70	23	9	9
Bluegill	3	1	1		2
Green sunfish	2	2			
Golden shiner			1		
Walleye	2	1			

Billy Creek is a tributary to Walnut Creek, joining it just downstream from Rainbow Lake. In June-July 1997, Billy Creek contained green sunfish, golden shiner, fathead minnow, and brook trout (Lopez et al. 2000a; Table 65). The sunfish, shiner and fatheads are likely reproducing in the stream, however the brook trout likely are not. The larger sizes of the trout and collection location (all found in the headwaters of the creek on AGFD property near the old AGFD Pinetop hatchery outflow), indicate that they were likely escapees from that hatchery when it was operational. Crayfish and bullfrogs are also present in lower Billy Creek. Porter Creek is another tributary to Show Low Creek downstream from Rainbow Lake. Additional discussion on Porter Creek is provided in the Scott Reservoir sections, below.

Table 65. Summary of Billy Creek survey in June-July 1997 with a backpack electroshocker.

Species	Num. Collected	Size Range (mm TL)
Green sunfish	351	48-218
Golden shiner	12	65-115
Fathead minnow	123	32-79
Brook trout	6	194-315

Show Low Creek between Rainbow Lake and Show Low Lake contained green sunfish, largemouth bass, fathead minnow, rainbow trout, and brown trout based on surveys conducted in June 1996 (Lopez et al. 1998b; Table 66). The green sunfish and fathead minnow are likely reproducing in the stream. However the largemouth bass, rainbow trout, and brown trout are likely migrants from Show Low Lake, Rainbow Lake, or Scott Reservoir. The bass reproduce in these lakes; however the trout are not known to reproduce in these lakes or connecting streams. Crayfish and bullfrogs are present in upper Show Low Creek.

Table 66. Summary of Show Low Creek (upstream of Show Low Lake) in June 1996 with a backpack electroshocker.

Species	Num. Collected	Size Range (mm TL)
Green sunfish	85	43-185
Largemouth bass	2	117-323
Fathead minnow	127	16-77
Rainbow trout	1	237
Brown trout	3	202-222

Consultation Species or Critical Habitat

Potential impacts from the proposed action to candidate and listed species are described below. Please refer to Chapter 4 for a detailed description of the nature of the impacts (which may include predation, competition for space and food, and hybridization etc.).Subsequent responses (resulting from the frequency, magnitude and duration of the impacts) between proposed stocked and candidate and listed species, and any site or complex factors that provide context for determining the meaningfulness of the impacts, are discussed below. Impacts from the proposed action resulting from angler related recreation and/or potential introduction of disease, pathogen or invasive species are evaluated at a broad scale for the entire action area and are described in Chapter 4. If potential impacts specific to a stocking site or complex have been identified they are discussed below.

Potential impacts due to the proposed action to Chiricahua and Northern leopard frogs are analyzed below at the local site and broad scale level due to the movement potential into the stocked area and fish movement potential up or downstream into areas where frogs may occur. Potential impacts to northern Mexican garter snake, narrow-headed garter snake, as well as Little Colorado spinedace located downstream in Silver Creek and Little Colorado critical habitat in lower Chevelon Creek are addressed in the complex analysis.

Northern Leopard Frog

Local Analysis: Although Rainbow Lake and the Schoen's buffered stocking complex are within the historical range of the northern leopard frog, the likelihood that northern leopard frogs could be exposed to stocked fish in Rainbow Lake is low. There is 1 historical record for northern leopard frogs from the Rainbow Lake stocking site; Rainbow Lake (=Boat Ramp) (1972) and 1 historical record for northern leopard frogs from 1 site in the buffered stocking complex; Lake of the Woods (Lake of the Woods Resort (1942) (Figure 21, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). There have been 7 surveys and site records at 5 sites within the buffered stocking complex between 1942 and 2001, with most surveys conducted between 1984 and 2001. Northern leopard frogs were not observed at any sites, including Lake of the Woods Resort (1994) or Rainbow lake (= Boat Ramp) (1994) (AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). Although there are available habitats that have not been surveyed, it is likely that northern leopard frogs no longer occupy areas within the Schoen's buffered complex because frogs have not been detected during subsequent surveys and crayfish, bullfrogs and non-native fish, make the habitat within the buffered stocking complex less suitable for northern leopard frogs.

Broad Scale Analysis: The likelihood that northern leopard frogs could be exposed to fish stocked at Rainbow Lake that dispersed outside the buffered stocking complex is low, because previous surveys suggest that northern leopard frogs no longer occupy sites where fish would disperse and habitats are less suitable for northern leopard frogs due to the presence of crayfish and non-native fish.

Chiricahua leopard frog

Local Analysis: Although Rainbow Lake and the Schoen's buffered stocking complex are within the historical range of the Chiricahua leopard frog, the likelihood that Chiricahua leopard frogs could be exposed to stocked fish in Rainbow Lake is low. There is 1 historical record for Chiricahua leopard frogs from the Rainbow Lake stocking site; Rainbow Lake (=Boat Ramp) (1972); however, Chiricahua leopard frogs were not observed during subsequent surveys at Rainbow Lake (= Boat Ramp) (1994). There are no historical records for northern leopard frogs from the buffered stocking complex (Figure 21, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). There have been 7 surveys and site records at 5 sites within the buffered stocking complex between 1942 and 2001, with most surveys conducted between 1984 and

2001. Although there are available habitats that have not been surveyed, it is likely that Chiricahua leopard frogs no longer occupy sites within the Schoen's buffered complex because they have not been detected during subsequent surveys and crayfish, bullfrogs and non-native fish make the habitat within the buffered stocking complex less suitable for northern leopard frogs

Broad Scale Analysis: The likelihood that Chiricahua leopard frogs could be exposed to fish stocked at Rainbow Lake that dispersed outside the buffered stocking complex is low, because previous surveys suggest that Chiricahua leopard frogs no longer occupy sites where fish would disperse habitats are less suitable for northern leopard frogs due to the presence of crayfish and non-native fish.

Scott Reservoir

Site Description

Scott Reservoir dam was constructed in 1928 on Porter Creek on the north side of Pinetop-Lakeside. The lake is located at an elevation of 6715 feet, is 80 surface acres in size, and has an average depth of 10 feet (Figure 24). The lake is located on the Apache-Sitgreaves National Forest, and is located upstream of Show Low Lake, in the upper portions of the stocking complex.

Scott Reservoir is accessed off an all-weather gravel spur road year-round off paved town roads. A Forest Service campground is located at the lake, with restrooms, picnic tables, and a boat launch ramp concentrated on the north side of the lake. The south and east sides of the lake are accessible only by hiking, therefore, most of the shoreline angler use is located on the north shore near the campground and along the dam on the west shore. The lake is restricted to electric motors only.

Figure 24. Image of Scott Reservoir located in the Schoen's complex (©2009 ESRI, i-cubed, GeoEye).

Management of Water Body

Primary fishery is a cold water rainbow trout put-grow-and-take fishery nearly year around, with a secondary warm water fishery (Table 9). Bluegill, green sunfish, and largemouth bass are naturally reproducing, and channel catfish are supplementally stocked and likely naturally-reproducing. Catchable and sub-catchable rainbow trout are stocked multiple times during the stocking season. Catchable, sub-catchable, and fingerling channel catfish are stocked opportunistically during the stocking season.

Table 67. Stocking history for Scott Reservoir.

Species	First Year	Last Year	Num. of Stockings	Num. Stocked
Bluegill	1986	1986	1	3,000
Brook trout	1983	1983	1	30,000
Brown trout	1948	1995	34	475,460
Channel catfish	1964	2008	30	191,291
Rainbow trout	1945	2009	243	2,192,252
Total			309	2,892,003

Scott Reservoir fills and spills every year and usually maintains good water quality throughout the year. It receives fairly low use despite its proximity to town because of its low profile, because it cannot be seen from well-used roads and there are few signs, and is used mostly by locals and seasonal visitors. The reservoir is used as an irrigation reservoir, with water releases primarily in the summer months, sometimes resulting in significant water level changes, particularly in very dry years. The lake freezes for a month or two during the winter but receives no ice fishing use because the ice is too thin to safely support people.

On-site angler creel surveys were completed in 1993 and 2007, reporting 32,798 angler hours (14,035 AUDs) and 20,701 angler hours, respectively (Meyer et al. 2008). A statewide angler mail-out survey reported 4,860 AUDs in 2001 (Pringle 2004).

The Integrated Fisheries Management Plan for the LCR Watershed (Young et al. 2001) identifies a primary management emphasis of put-grow-and-take cold water sport fish with rainbow trout, and a secondary emphasis on warm water sport fish with largemouth bass, bluegill, and basic-yield channel catfish. The Lakeside Area Fish Management Plan (Meyer et al. 2008) identifies managing primarily for catfish and trout fishing.

Proposed Action

The Department proposes to stock rainbow trout, channel catfish, and bluegill for the period covered by this consultation.

Catchable and sub-catchable rainbow trout would be stocked from April to September each year; numbers of trout stocked may be from 0 to 30,000 fish annually.

Channel catfish (fingerling, sub-catchable, catchable) may be opportunistically stocked depending on fish availability from April to September each year; numbers of catfish stocked may be from 0 to 15,000 fish annually.

Catchable bluegill may be stocked annually from April to September in support of fishing clinics; numbers of fish stocked may be from 0 to 5,000 fish annually.

Bluegill (fingerling, sub-catchable, catchable) may be stocked as needed at any time during the year to augment or to recover the fishery following catastrophic events. Numbers of fish stocked for this purpose will be determined according to stocking guidelines identified in the sport fish stocking protocol.

Water Distribution / Connectivity

Scott Reservoir is filled by perennial flowing Porter Creek coming into the lake. Porter Creek originates at Porter Springs on private property and flows perennial for 1.2 miles to Scott Reservoir. The lake fills and spills every year in the winter and spring, plus is managed as an irrigation reservoir, so water is also released into Porter Creek below the lake. Porter Creek below the lake flows mostly perennial for 1.4 miles down to the confluence with Billy Creek. The stream is known as Show Low Creek below and is perennial. Show Low Lake is 2.4 miles downstream of the Billy/Porter confluence. The stream below Show Low Lake flows perennially for 7.7 miles downstream to Fools Hollow Lake. Refer to Fools Hollow Lake for a description of the connectivity below Fools Hollow Lake.

Fish Movement

Fish likely move upstream and downstream of Scott Reservoir since Porter Creek is perennial above the lake and it spills annually. Additionally, water is released for irrigation from Scott Reservoir. Fish dispersing upstream may travel for less than a mile until they reach a dam for one of several private ponds on upper Porter Creek; thus dispersing fish cannot reach Porter Springs which is upstream of the private ponds. Porter Springs supports a population of native speckled dace. Most fish species in the lake, even trout, could persist in upper Porter Creek, as it is perennial and maintains good water quality. Upper Porter Creek may be the only location in the entire Show Low Creek watershed where trout have the potential to reproduce because good water quality, flow and spawning habitat are available at the appropriate times of year. However, this has not been documented through surveys or detection of offspring. (See Table 11.)

Stocked species escaping from Scott Reservoir could travel through lower Porter Creek to the confluence with Billy Creek. They could continue down into Show Low Creek, then through Show Low Lake, then down to Fools Hollow Lake and beyond as will be discussed later. Alternately, stocked fish could move upstream in Billy Creek. In Billy Creek, they could likely only move upstream during high flows because of the very low base flows in that stream and potentially get into the headwaters of Billy Creek. However, there no consultation species present in that area. There are two concrete dam structures on Department property on Billy Creek that would prevent any escaped fish from reaching the springs and diversion into the hatchery. Fish moving upstream could also go into lower Walnut Creek, but only as far as Lake of the Woods dam, which is a barrier.

Most species in Scott Reservoir could persist in lower Porter Creek and upper Show Low Creek, although trout, bass, and channel catfish likely do not reproduce in the stream. Trout are not known to reproduce in the lakes, but bass, sunfishes, and channel catfish do.

For a description of fish movement downstream of Fools Hollow Lake, refer to the analysis for Fools Hollow Lake.

Community Description
Scott Reservoir currently contains stocked rainbow trout, plus naturally reproducing largemouth bass, bluegill, green sunfish, fathead minnow, crayfish, and bullfrogs, plus supplemental stocked and likely naturally reproducing channel catfish (Table 68). One northern pike was captured recently, but subsequent surveys have not found additional pike.

Table 68. Survey history for Scott Reservoir using experimental gillnets.

Species	**Apr. 2004**	**Apr. 2005**	**Mar. 2006**	**Apr. 2007**	**Mar. 2008**
Rainbow trout	17	10	63	39	18
Channel catfish	17	6	10	12	7
Largemouth bass	4	2	8	16	15
Bluegill				1	
Northern pike				1	

Based on surveys conducted in July 1998, upper Porter Creek upstream of Scott Reservoir contained green sunfish, largemouth bass, and fathead minnow (Lopez et al. 2000b; Table 69). The sunfish and fatheads likely reproduce in the stream and in the lake; however, the largemouth bass likely spawn only in the lake, with these small bass either coming upstream from Scott Reservoir, or downstream from the private ponds. This reach also contained crayfish.

Table 69. Summary of Porter Creek survey (upstream of Scott Reservoir) in July 1998 with a backpack electroshocker.

Species	**Num. Collected**	**Size Range (mm TL)**
Green sunfish	29	31-51
Largemouth bass	45	64-148
Fathead minnow	39	49-67

A population of native speckled dace, one of only 2 populations of native fish in the entire Show Low Creek watershed, is present at Porter Spring on private property. Although rainbow trout exist in the ponds on the same private property, a survey of the spring area in March 2002 found

only speckled dace and crayfish. Largemouth bass and green sunfish are also present in the lowermost private pond (M. Lopez pers. comm.).

Based on surveys conducted in July 1998, lower Porter Creek, downstream of Scott Reservoir, contained green sunfish, largemouth bass, rainbow trout, and fathead minnow (Lopez et al. 2000b; Table 70). The sunfish and fathead minnows are likely reproducing in the stream; however, the largemouth bass and rainbow trout are more likely escapees from Scott Reservoir, because they have not been documented to reproduce in the stream. The largemouth bass reproduce in Scott Reservoir, and Rainbow Lake, and progeny could easily escape the reservoirs. Rainbow trout are not known to reproduce in these lakes or connecting stream, but were more likely escapees of stocked fingerling trout into Scott Reservoir. Crayfish and bullfrogs are present in lower Porter Creek.

Table 70. Summary of Porter Creek survey (downstream of Scott Reservoir) in July 1998 with a backpack electroshocker.

Species	**Number Collected**	**Size Range (mm TL)**
Green sunfish	84	22-108
Largemouth bass	14	77-171
Rainbow trout	6	66-150
Fathead minnow	4	68-80

Consultation Species or Critical Habitat

Potential impacts from the proposed action to candidate and listed species are described below. Please refer to Chapter 4 for a detailed description of the nature of the impacts (which may include predation, competition for space and food, and hybridization etc.).Subsequent responses (resulting from the frequency, magnitude and duration of the impacts) between proposed stocked and candidate and listed species, and any site or complex factors that provide context for determining the meaningfulness of the impacts, are discussed below. Impacts from the proposed action resulting from angler related recreation and/or potential introduction of disease, pathogen or invasive species are evaluated at a broad scale for the entire action area and are described in Chapter 4. If potential impacts specific to a stocking site or complex have been identified they are discussed below.

Potential impacts due to the proposed action to Chiricahua and Northern leopard frogs are analyzed below at the local site and broad scale level due to the movement potential into the stocked area and fish movement potential up or downstream into areas where frogs may occur. Potential impacts to northern Mexican garter snake, narrow-headed garter snake, as well as Little Colorado spinedace located downstream in Silver Creek and Little Colorado critical habitat in lower Chevelon Creek are addressed in the complex analysis.

Northern Leopard Frog

Local Analysis: Although Scott's Reservoir and the Schoen's buffered stocking complex are within the historical range of the northern leopard frog, the likelihood that northern leopard frogs could be exposed to stocked fish in Scott's Reservoir is low. There are no historical records for northern leopard frogs for the Scott's Reservoir stocking site; however, there are historical records for northern leopard frogs from 2 sites in the buffered stocking complex; Lake of the Woods Resort (1942) and Rainbow Lake (= Boat Ramp) (1972). There have been 7 surveys at 5 sites within the buffered stocking complex between 1942 and 2001 with most surveys conducted between 1984 and 2001. Northern leopard frogs were not observed at any sites, including Lake of the Woods Resort (1994) and Rainbow lake (= Boat Ramp) (1994) (Figure 21, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). Although there are available habitats that have not been surveyed, it is likely that northern leopard frogs no longer occupy sites within the Schoen's buffered complex because they have not been detected during subsequent surveys (AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.) and crayfish, bullfrogs and non-native fish, make the habitat within the buffered stocking complex less suitable for northern leopard frogs.

Broad Scale Analysis: The likelihood that northern leopard frogs could be exposed to fish stocked at Scott's Reservoir that dispersed outside the buffered stocking complex is low, because subsequent surveys suggest northern leopard frogs no longer occupy surrounding lakes or stream where fish could disperse and habitats are less suitable for northern leopard frogs due to the presence of crayfish, bullfrogs and non-native fish.

Chiricahua leopard frog

Local Analysis: Although Scott's Reservoir and the Schoen's buffered stocking complex are within the historical range of the Chiricahua leopard frog, the likelihood that Chiricahua leopard frogs could be exposed to stocked fish in Scott's Reservoir is low. There are no historical records for Chiricahua leopard frogs at the Scott's Reservoir stocking complex; however, there is 1 historical record for Chiricahua leopard frogs from 1 site in the buffered stocking complex; Rainbow Lake (= Boat Ramp) (1972). There have been 7 surveys or site records at 5 sites within the buffered stocking complex between 1942 and 2001, with most surveys conducted between 1984 and 2001. Chiricahua leopard frogs were not observed at any sites, including Rainbow Lake (= Boat Ramp) (1994) (Figure 21, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). Although there are available habitats that have not been surveyed, it is likely that Chiricahua leopard frogs no longer occupy sites within the Schoen's buffered complex because they have not been detected during subsequent surveys (AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.) and crayfish, bullfrogs and non-native fish, make the habitat within the buffered stocking complex less suitable for Chiricahua leopard frogs.

Broad Scale Analysis: The likelihood that Chiricahua leopard frogs could be exposed to fish stocked at Scott's Reservoir that dispersed outside the buffered stocking complex is low, because subsequent surveys suggest Chiricahua leopard frogs no longer occupy surrounding lakes or streams where fish could disperse and habitats are less suitable for Chiricahua leopard frogs due to the presence of crayfish, bullfrogs, and non-native fish.

Show Low Lake

Site Description

Show Low Lake dam was constructed in 1953 on Show Low Creek in the town of Show Low to create the 100 surface acres (Figure 25). The lake is located at an elevation of 6542 feet, has a maximum depth of 50 feet, and an average depth of 33 feet. The water rights are currently owned by Show Low and cooperatively managed with the Woodland-Show Low Irrigation Company. Phelps Dodge owns most of the shoreline at Show Low Lake and there is no development on the shoreline. The Department owns a small portion of property on the west side of the lake at the boat ramp, and a portion of the upper arm of the lake is located on the Apache-Sitgreaves National Forest. Show Low Lake is located upstream of Fools Hollow Lake and downstream of Scott Reservoir and Rainbow Lake within the Schoen's Complex.

Show Low Lake is accessed year around by paved town roads. A dirt road accesses the north side of the lake by driving over the spillway and dam, and is accessible in good weather only. Another dirt road accesses the very upper end on the lake at the site of an old Phelps Dodge pump station. The Department owns a small portion of property on the west side of the lake, offering paved parking, a boat launch ramp, a fishing pier, soon-to-be-installed boat courtesy dock, restrooms, and some camping spots. The main access and most of the shoreline angler use is at this west side location. Show Low operates a campground, boat rentals, tackle/snack shop, and another fishing pier on the north side of the lake. Shoreline anglers also concentrate on the north side of the lake, especially because there is now a fishing pier. The lake is close to town, with nearby non-visible residences from the west shoreline of the lake. A Wal-Mart superstore is located just down the stream about 2 miles away.

Boats are restricted to the use of a single gas motor no larger than 10 horsepower. The lake freezes over for several weeks during the winter, but the lake receives no ice fishing use because the ice is too thin to safely support a person.

Figure 25. Image of Show Low Lake located in the Schoen's complex (©2009 ESRI, i-cubed, GeoEye).

Management of Water Body

Show Low Lake has been managed primarily for a put-grow-and-take cold water fishery utilizing all sizes and numbers of rainbow trout. It has been managed secondarily for a cool water fishery of naturally reproducing walleye, and warm water fishery of naturally reproducing largemouth bass, smallmouth bass, sunfish and black crappie, and supplementally stocked and likely naturally-reproducing channel catfish (Table 71). Trout fishing is fairly good, with carryover trout surviving through the winter and putting on growth. The species of trout could be expanded to provide additional opportunity, but mostly to give Department hatcheries some

flexibility when there infrequently is excess stocks of brook, cutthroat, and Apache trout that are difficult to stock out into the very few places approved for those species. Show Low Lake is a predator dominated lake, especially with the underutilized walleye. The numbers of largemouth and smallmouth bass, black crappie, and sunfish are fairly low, likely due to heavy predation by walleye.

Catchable, sub-catchable, and fingerling rainbow trout are stocked multiple times throughout the stocking season, and the Department is proposing to add brook, cutthroat, and Apache trout of multiple sizes. Catchable, sub-catchable, and fingerling channel catfish are supplementally stocked opportunistically throughout the stocking season.

Table 71. Stocking history for Show Low Lake

Species	First Year	Last Year	Num. of Stockings	Num. Stocked
Arctic grayling	1969	1969	1	5,000
Bluegill	1986	1986	1	3,000
Brook trout	1982	1989	5	138,725
Brown trout	1976	1994	37	555,311
Channel catfish	1976	2009	31	233,080
Cutthroat trout	1976	1972	1	15,000
Kokanee	1960	1960	1	20,000
Northern pike	1966	1970	3	125,024
Rainbow trout	1954	2009	706	5,872,600
Walleye	1975	1975	1	750,000
Total			787	7,717,740

On-site angler creel surveys were completed in 1993 and 2007, reporting 38,771 angler hours (23,032 AUDs) and 50,722 angler hours, respectively (Meyer et al. 2008). A statewide angler mail-out survey reported 44,714 AUDs in 2001 (Pringle 2004).

The Integrated Fisheries Management Plan for the LCR Watershed (Young et al. 2001) identifies a primary management emphasis of put-grow-and-take cold water sport fish with rainbow trout, and a secondary emphasis on warm water sport fish with largemouth bass, bluegill, walleye, and basic yield channel catfish, which is mostly consistent with the proposed action. Additional trout species have been added to the proposed action to add angling diversity and also to give flexibility to the state hatcheries in stocking locations for surplus trout. The Lakeside Area Fish Management Plan (Meyer et al. 2008) identifies managing for family fishing with high catch rates of any species, and for a quality walleye fishery.

Proposed Action

The Department proposes to stock rainbow trout, brook trout, cutthroat trout, Apache trout, channel catfish, and bluegill sunfish are proposed for the period covered by this consultation.

Catchable, sub-catchable, and fingerling rainbow trout, would be stocked from April to September each year depending on suitable water levels and quality as well as fish availability; numbers of trout would be up to 250,000 fish annually. The primary goal would be to stock rainbow trout, however if other species including Apache trout, brook trout or cutthroat trout became available, they may be stocked opportunistically; no more than a total of 250,000 trout would be stocked annually.

Channel catfish (fingerling, sub-catchable, catchable) may be opportunistically stocked depending on fish availability from April to September each year; numbers of catfish stocked may be from 0 to 15,000 fish annually.

Catchable bluegill may be stocked annually from April to September in support of fishing clinics; numbers of fish stocked would be from 0 to 5,000 fish annually.

Bluegill sunfish (fingerling, sub-catchable, catchable) may be stocked as needed at any time during the year to augment or to recover the fishery following catastrophic events. Numbers of fish stocked for this purpose will be determined according to stocking guidelines identified in the sport fish stocking protocol.

Water Distribution / Connectivity

Show Low Creek is perennial flowing into the lake as discussed in previous sections. Show Low Lake fills and spills only during good precipitation winters, but water is released into Show Low Creek below the lake for downstream irrigation. Water has been released a couple times at the request of the City of Show Low and the State Park, to supplement the low water level at Fools Hollow Lake. Phelps Dodge previously held some water rights in Show Low Lake and pumped water into Forest Dale Canyon, but this is no longer practiced after water rights were transferred to the City of Show Low. Show Low Creek below the lake drains 9 miles downstream into Fools Hollow Lake, and occasionally has dry sections between the lakes during dry years. Refer to Fools Hollow Lake for a description of connectivity below Fools Hollow dam.

The Show Low Lake water level fluctuates quite a bit, but because it is a deep lake with little vegetation, the water quality remains good year-round. This allows trout to be stocked through the warm summer months. The lake fills and spills infrequently and has only spilled 5 times in the last 14 years, as far back as the Department has records.

Table *72* shows the spill history of Show Low Lake during this period of time.

Table 72. Spill history for Show Low Lake.

Year	Spill	Timing
1996	No spill	
1997	No spill	
1998	Spilled	Mar.-Apr.
1999	No spill	
2000	No spill	
2001	Spilled	Feb-Apr.
2002	No spill	
2003	No spill	
2004	No spill	
2005	Spilled	Feb-Apr.
2006	No spill	
2007	No spill	
2008	Spilled	Jan-Feb
2009	Spilled	Feb-Apr.

Fish Movement

Fish, including stocked species, likely move upstream and downstream from Show Low Lake. Fish dispersing upstream into Show Low Creek could either swim up Porter Creek or up Billy creek and then into Walnut Creek as was previously described. Stocked species could disperse downstream during infrequent spills or by regular irrigation releases into perennial Show Low Creek, where they could continue down into Fools Hollow Lake. For a description of escape and movement of fish downstream of Fools Hollow Lake, see the Fools Hollow Lake analysis.

Show Low Lake and Fools Hollow Lake have the ability to support all fish species identified in this complex throughout the year. Portions of Walnut Creek, Billy Creek, Porter Creek, and upper and middle Show Low Creek have the ability to support most warm water species and trout for at least a good portion of the year.

Community Description

Show Low Lake currently contains stocked rainbow trout, which are not known to reproduce in the lake or the inflow stream. The lake also contains naturally reproducing largemouth bass, smallmouth bass, walleye, bluegill, green sunfish, black crappie, black bullhead, fathead minnow, crayfish, bullfrogs, and supplementally stocked and likely naturally-reproducing channel catfish (Table 73).

Table 73. Survey history on Show Low Lake using experimental gillnets.

Species	Apr. 2, 2004	Apr. 21, 2005	Mar. 31, 2006	Apr. 4, 2007	Mar. 26, 2008
Rainbow trout	24	9	22	33	41
Largemouth bass				2	2
Black crappie	1	1			1
Smallmouth bass	1				1
Channel catfish	9	1	2	3	3
Black bullhead			1		2
Walleye	103	19	12	32	14
Green sunfish				2	
Bluegill	1				

Fish assemblage information upstream from Show Lake was previously provided. Downstream of Show Low Lake, middle Show Low Creek to Fools Hollow Lake contained green sunfish, rainbow trout, brown trout, and walleye based on surveys conducted in May-June 1996 (Lopez et al. 1998b; Table 74). The green sunfish are likely the only species able to reproduce and persist long term in this reach of Show Low Creek. The trout and walleye are not known to reproduce in the stream, and the walleye likely don't persist long. Both walleye collected were large and found in a very large and uncharacteristic pool right below the Show Low Lake dam. Another large walleye was found dead on the bank further downstream where the base flows are very low. Two of the 3 rainbow trout were also found in this very large pool. Crayfish and bullfrogs are very abundant in this reach.

Table 74. Summary of Show Low Creek (downstream of Show Low Lake to Fools Hollow Lake) in May-June 1996 with a backpack electroshocker and gillnets.

Species	Number Collected	Size Range (mm TL)
Green sunfish	29	113-148
Rainbow trout	3	232-375
Brown trout	2	352-490
Walleye	2	655-700

Consultation Species or Critical Habitat

Potential impacts from the proposed action to candidate and listed species are described below. Please refer to Chapter 4 for a detailed description of the nature of the impacts (which may

include predation, competition for space and food, and hybridization etc.).Subsequent responses (resulting from the frequency, magnitude and duration of the impacts) between proposed stocked and candidate and listed species, and any site or complex factors that provide context for determining the meaningfulness of the impacts, are discussed below. Impacts from the proposed action resulting from angler related recreation and/or potential introduction of disease, pathogen or invasive species are evaluated at a broad scale for the entire action area and are described in Chapter 4. If potential impacts specific to a stocking site or complex have been identified they are discussed below.

Potential impacts to stocked Apache trout are analyzed below. Potential impacts due to the proposed action to Chiricahua and Northern leopard frogs are analyzed below at the local site and broad scale level due to the movement potential into the stocked area and fish movement potential up or downstream into areas where frogs may occur. Potential impacts to northern Mexican garter snake, narrow-headed garter snake, as well as Little Colorado spinedace located downstream in Silver Creek and Little Colorado critical habitat in lower Chevelon Creek are addressed in the complex analysis.

Apache Trout

Apache trout stocked opportunistically could disperse downstream during infrequent spills or by regular irrigation releases into perennial Show Low Creek, where they could continue down into Fools Hollow Lake. Apache trout dispersing upstream into Show Low Creek could either swim up Porter Creek or up Billy creek and then into Walnut Creek.

Apache trout are raised in the hatchery raceways to catchable size and stocked into the stream for a recreational put-and-take fishery, but they are not expected to establish a viable population in either the lake or downstream as stocked rainbow trout known are not known to reproduce in the lake, the inflow stream, or downstream. The primary goal would be to stock rainbow trout, however if other species including Apache trout, brook trout or cutthroat trout became available, they may be stocked opportunistically. Trout fishing is fairly good, with carryover trout surviving through the winter and putting on growth.

Potential impacts

Stocked Apache trout co-stocked with other species

Apache trout stocked from the hatcheries are for the specific purpose of providing fishing opportunities. Recovery streams are managed for self-sustaining Apache trout populations and regular stocking is not part of that management except with wild trout to initiate and augment the population as needed until it becomes self-sustaining. Apache trout stocked for recreational purposes are considered excess to the survival and recovery of the species. Take of these stocked fish via harvest by anglers is allowed under the section 4(d) rule contained in the designation of

the Apache trout as a Threatened species. That rule allows take of Apache trout if such take is in accordance with State law; in this case through possession of a valid Arizona fishing license and trout stamp.

Impacts to stocked Apache trout from co-stocked sport fish species may include predation, competition, and/or hybridization with stocked trout. Likelihood of hybridization is extremely unlikely since trout are not expected to reproduce due to lack of suitable habitat and stream temperature.

Impacts from wild populations on stocked Apache trout

The action of stocking Apache trout is considered a conservation action in furtherance of the Endangered Species Act whereby a special 4(d) rule is in place. AGFD may take any federally listed threatened fish or wildlife for conservation purposes that are consistent with the purposes of the Act and the Section 6 Cooperative Agreement between USFWS and AGFD and therefore take of Apache trout from the proposed stocking of Apache trout is legally permitted.

Impacts to stocked Apache trout from species of fish currently existing as wild, self reproducing populations at or in proximity to Show Low Lake and downstream Show Low Creek and Fools Hollow Lake may include predation, hybridization with other trout and/or competition. Likelihood of hybridization is extremely unlikely since trout are not expected to reproduce due to lack of suitable habitat and stream temperature.

Northern Leopard Frog

Local Analysis: Although Show Low Lake and the Schoen's buffered stocking complex are within the historical range of the northern leopard frog, the likelihood that northern leopard frogs could be exposed to stocked fish in Show Low Lake is low. There are no historical records for northern leopard frogs for the Show Low Lake stocking site; however, there are historical records for northern leopard frogs from 2 sites in the buffered stocking complex; Lake of the Woods (Lake of the Woods Resort (1942) and Rainbow lake (= Boat Ramp) (1972), (Figure 21, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). There have been 7 surveys or site records at 5 sites within the buffered stocking complex between 1942 and 2001, with most surveys conducted between 1984 and 2001. Northern leopard frogs were not observed at any sites, including Lake of the Woods Resort (1994) and Rainbow lake (= Boat Ramp) (1994) (Figure 21, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.) Although there are available habitats that have not been surveyed, it is likely that northern leopard frogs no longer occupy sites within the Schoen's buffered complex because they have not been detected during subsequent surveys and crayfish, bullfrogs and non-native fish, make the habitat within the buffered stocking complex less suitable for northern leopard frogs.

Broad Scale Analysis: The likelihood that northern leopard frogs could be exposed to fish stocked at Show Low Lake that dispersed outside the buffered stocking complex is low, because subsequent surveys suggest northern leopard frogs no longer occupy surrounding lakes or stream where fish could disperse and habitats are less suitable for northern leopard frogs due to the presence of crayfish, bullfrogs and non-native fish.

Chiricahua leopard frog

Local Analysis: Although Show Low Lake and the Schoen's buffered stocking complex are within the historical range of the Chiricahua leopard frog, the likelihood that Chiricahua leopard frogs could be exposed to stocked fish in the buffered stocking complex that includes is low. There are no historical records for Chiricahua leopard frogs at the Show Low Lake stocking complex; however, there is 1 historical record for Chiricahua leopard frogs from 1 site in the buffered stocking complex; Rainbow Lake (= Boat Ramp) (1972) (Figure 21, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). There have been 7 surveys and site records at 5 sites within the buffered stocking complex between 1942 and 2001, with most surveys conducted between 1984 and 2001. Chiricahua leopard frogs were not observed at any sites, including Rainbow Lake (= Boat Ramp) (1994) (AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). Although there are available habitats that have not been surveyed, it is likely that Chiricahua leopard frogs no longer occupy sites within the Schoen's buffered complex because they have not been detected during subsequent surveys and crayfish, bullfrogs and non-native fish make the habitat within the buffered stocking complex less suitable for Chiricahua leopard frogs.

Broad Scale Analysis: The likelihood that Chiricahua leopard frogs could be exposed to fish stocked at Show Low Lake that dispersed outside the buffered stocking complex is low, because subsequent surveys suggest Chiricahua leopard frogs no longer occupy surrounding lakes or streams where fish could disperse and habitats are less suitable for Chiricahua leopard frogs due to the presence of crayfish, bullfrogs, and non-native fish.

Show Low Creek

Site Description

Show Low Creek is a tributary of Silver Creek, with the confluence near Shumway. Silver Creek drains into the LCR south of Woodruff. The section of Show Low Creek proposed to be stocked is located between 2 managed reservoirs, upstream of Fools Hollow Lake and downstream of Show Low Lake. The stream flows from elevations 6530 to 6275 feet. This section of Show Low Creek between the reservoirs is approximately 7.7 miles long and located on a mix of city (Show Low), private, US Forest Service (Apache-Sitgreaves National Forest), and Department property (at inflow to Fools Hollow Lake). The stocking would be concentrated at two general sites, one located just below Show Low Lake and the other in the Show Low meadow area.

Management of Water Body
Currently the primary fishery is warm water naturally reproducing green sunfish fishery. The Department proposes to create a cold water rainbow trout summer intensive use put-and-take fishery. Catchable rainbow trout would be stocked multiple times during the stocking season.

Department records show that Show Low Creek was historically stocked, but not since 1974, and with no details of the specific stocking site. Bluegill and bass were stocked in 1937. Rainbow trout were stocked from 1943 to 1948. Brown trout were stocked from 1946 to 1974. This would be a new current stocking site.

This portion of Show Low Creek contains only non-native fish (Table 74). The reservoirs immediately above and below this section have been historically stocked and are proposed for future stocking with numerous trout and warm-water sport fish. Portions of Show Low Creek between Fools Hollow Lake and Show Low Lake can be accessed year around in several places. A reach just downstream of Show Low Lake dam is located on Forest Service land and is accessed by trail leading down from a dirt parking on the north side of Show Low Lake. Another portion of Show Low Creek, located in the Show Low Meadow area is owned by the City of Show Low and is accessed off paved Highway 260.

There are currently no facilities along Show Low Creek for anglers, although Show Low Lake does have facilities that anglers in that area can use. Also, the City of Show Low is proposing to make improvements and promote recreation along Show Low Creek in the Show Low Meadow area. Camping is allowed at the upper end of the stocking reach near the Show Low Lake dam, where campsites are available.

Water permanence along this section has improved since the City of Show Low acquired water rights in Show Low Lake from Phelps Dodge.

The stocking opportunities would depend upon permanence of the water and on water quality in the stream. The upper end of the stocking reach near Show Low Lake would not need any development and would remain primitive and low impact. The Show Low Meadow area could become a popular recreation area if the city follows through with plans to improve the site and access, and coordination between the Woodland-Show Low Irrigation Company and the City of Show Low result in improved conditions.

Proposed Action
The Department proposes to stock rainbow trout for the period covered by this consultation.

Catchable rainbow trout would be stocked from April to September annually; numbers of trout stocked may be from 0 to 10,000 fish annually.

Water Distribution / Connectivity
Water flowing through this section of Show Low Creek comes directly out of Show Low Lake, either by spill when the lake is full, by irrigation releases through the outlet structure in the dam, or by seepage through the earthen dam.

Water flows into Show Low Lake from upper Show Low Creek, and headwater tributaries, Porter Creek, Billy Creek, and Walnut Creek as previously discussed. For a detailed description and distances of the upper watershed connectivity, refer to the explanation at the beginning of this section on the Schoen's Complex.

Irrigation releases from Show Low Lake occur regularly during the summer irrigation season from April 15 to September 15. This section of Show Low Creek between Show Low and Fools Hollow lakes is mostly perennial, although may have small sections that go dry when water is not being released for irrigation. For a complete description of water connectivity below Fools Hollow Lake, refer to the Fools Hollow Lake analysis.

Fish Movement
Fish will be able to move up and downstream within this section of Show Low Creek, but will not be able to get past the Show Low Lake dam on the upstream side. Downstream, fish will be able to move into Fools Hollow Lake, and have the potential to move below Fools Hollow Lake into lower Show Low Creek when Fools Hollow Lake spills. For a description of fish movement downstream of Fools Hollow Lake, refer to the Fools Hollow Lake analysis.

Community Description
The reach of Show Low Creek proposed for stocking middle Show Low Creek upstream of Fools Hollow Lake and below Show Low Lake was previously described in the Show Low Lake section. In 1996 it contained green sunfish, rainbow trout, brown trout, and walleye (Lopez et al. 1998b; *Table 74*). Brown trout were last stocked in Fools Hollow Lake and Show Low Lake in 1994. Brown trout are likely no longer present because reproduction in these systems has not been documented and are no longer being stocked. Stocked brown trout likely have died of old age by now. Crayfish and bullfrogs are very abundant in this reach of Show Low Creek.

Consultation Species or Critical Habitat
Potential impacts from the proposed action to candidate and listed species are described below. Please refer to Chapter 4 for a detailed description of the nature of the impacts (which may include predation, competition for space and food, and hybridization etc.).Subsequent responses (resulting from the frequency, magnitude and duration of the impacts) between proposed stocked and candidate and listed species, and any site or complex factors that provide context for determining the meaningfulness of the impacts, are discussed below. Impacts from the proposed action resulting from angler related recreation and/or potential introduction of disease, pathogen or invasive species are evaluated at a broad scale for the entire action area and are described in

Chapter 4. If potential impacts specific to a stocking site or complex have been identified they are discussed below.

Potential impacts to stocked Apache trout that may escape from Show Low Lake and move downstream into Show Low Creek are analyzed below. Potential impacts due to the proposed action to Chiricahua and Northern leopard frogs are analyzed below at the local site and broad scale level due to the movement potential into the stocked area and fish movement potential up or downstream into areas where frogs may occur. Potential impacts to northern Mexican garter snake, narrow-headed garter snake, as well as Little Colorado spinedace located downstream in Silver Creek and Little Colorado critical habitat in lower Chevelon Creek are addressed in the complex analysis.

Apache Trout

Apache trout opportunistically stocked in Show Low Lake could disperse downstream during infrequent spills or by regular irrigation releases into perennial Show Low Creek. Apache trout are raised in the hatchery raceways to catchable size and stocked into the stream for a recreational put-and-take fishery, but they are not expected to establish a viable population in either the lake or downstream as stocked rainbow trout known are not known to reproduce in the lake, the inflow stream, or downstream.

Potential impacts

Stocked Apache trout co-stocked with other species

Apache trout stocked from the hatcheries are for the specific purpose of providing fishing opportunities. Recovery streams are managed for self-sustaining Apache trout populations and regular stocking is not part of that management except with wild trout to initiate and augment the population as needed until it becomes self-sustaining. Apache trout stocked for recreational purposes are considered excess to the survival and recovery of the species. Take of these stocked fish via harvest by anglers is allowed under the section 4(d) rule contained in the designation of the Apache trout as a Threatened species. That rule allows take of Apache trout if such take is in accordance with State law; in this case through possession of a valid Arizona fishing license and trout stamp.

Impacts to stocked Apache trout from co-stocked sport fish species may include predation, competition, and/or hybridization with stocked trout. Likelihood of hybridization is extremely unlikely since trout are not expected to reproduce due to lack of suitable habitat and stream temperature.

Impacts from wild populations on stocked Apache trout

The action of stocking Apache trout is considered a conservation action in furtherance of the Endangered Species Act whereby a special 4(d) rule is in place. AGFD may take any federally listed threatened fish or wildlife for conservation purposes that are consistent with the purposes of the Act and the Section 6 Cooperative Agreement between USFWS and AGFD and therefore take of Apache trout from the proposed stocking of Apache trout is legally permitted.

Impacts to stocked Apache trout from species of fish currently existing as wild, self reproducing populations at or in proximity to Show Low Creek may include predation, hybridization with other trout and/or competition. Likelihood of hybridization is extremely unlikely since trout are not expected to reproduce due to lack of suitable habitat and stream temperature.

Northern Leopard Frog

Local Analysis: Although Show Low Creek and the Schoen's buffered stocking complex are within the historical range of the northern leopard frog, the likelihood that northern leopard frogs could be exposed to stocked fish in Show Low Creek is low. There are no historical records for northern leopard frogs for the Show Low Creek stocking site; however, there are historical records for northern leopard frogs from 2 sites in the buffered stocking complex; Lake of the Woods (Lake of the Woods Resort (1942) and Rainbow lake (= Boat Ramp) (1972), (Figure 21, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). There have been 7 surveys and site records at 5 sites within the buffered stocking complex between 1942 and 2001, with most surveys conducted between 1984 and 2001. Northern leopard frogs were not observed at any sites, including Lake of the Woods Resort (1994) and Rainbow lake (= Boat Ramp) (1994) (AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.) Although there are available habitats that have not been surveyed, it is likely that northern leopard frogs no longer occupy sites within the Schoen's buffered complex because they have not been detected during subsequent surveys and crayfish, bullfrogs and non-native fish, make the habitat within the buffered stocking complex less suitable for northern leopard frogs.

Broad Scale Analysis: The likelihood that northern leopard frogs could be exposed to fish stocked at Show Low Creek that dispersed outside the buffered stocking complex is low, because subsequent surveys suggest northern leopard frogs no longer occupy surrounding lakes or stream where fish could disperse and habitats are less suitable for northern leopard frogs due to the presence of crayfish, bullfrogs and non-native fish.

Chiricahua leopard frog

Local Analysis: Although Show Low Creek and the Schoen's buffered stocking complex are within the historical range of the Chiricahua leopard frog, the likelihood that Chiricahua leopard frogs could be exposed to stocked fish in Show Low Creek is low. There are no historical records for Chiricahua leopard frogs at the Show Low Creek stocking complex; however, there is 1 historical record for Chiricahua leopard frogs from 1 site in the buffered stocking complex;

Rainbow Lake (= Boat Ramp) (1972) (Figure 21, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). There have been 7 surveys and site records at 5 sites within the buffered stocking complex between 1942 and 2001, with most surveys conducted between 1984 and 2001. Chiricahua leopard frogs were not observed at any sites, including Rainbow Lake (= Boat Ramp) (1994) (AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). Although there are available habitats that have not been surveyed, it is likely that Chiricahua leopard frogs no longer occupy sites within the Schoen's buffered complex because they have not been detected during subsequent surveys and crayfish, bullfrogs and non-native fish make the habitat within the buffered stocking complex less suitable for Chiricahua leopard frogs.

Broad Scale Analysis: The likelihood that Chiricahua leopard frogs could be exposed to fish stocked at Show Low Creek that dispersed outside the buffered stocking complex is low, because subsequent surveys suggest Chiricahua leopard frogs no longer occupy surrounding lakes or streams where fish could disperse habitats are less suitable for Chiricahua leopard frogs due to the presence of crayfish, bullfrogs, and non-native fish.

Fools Hollow Lake

Site Description

Fools Hollow Lake is located on Show Low Creek near the town Show Low, and is the lower most of 5 managed reservoirs in the upper Show Low Creek watershed. The dam was constructed in 1957 to create a 150 surface acre reservoir at an elevation of 6256 feet, with an average depth of 23 feet (Figure 26). Water rights are owned by the Department and no water is released for irrigation or other uses. The lake is located on the Apache-Sitgreaves National Forest, but the lake is managed cooperatively as a State Recreation Area by the Arizona State Parks, Forest Service, Arizona Game and Fish Department, and Show Low. A small portion of the upper arm of the lake is owned by Arizona Game and Fish Department.

Fools Hollow Lake is accessed year around by paved town roads. The lake is managed as a State Recreation Area by Arizona State Parks and park rangers are on site 24 hours a day, 365 days a year. They offer well developed campsites, including RV hookups, 2 boat launch ramps, 2 fishing platforms, 4 ADA accessible fishing piers, fish cleaning stations, hiking trails, numerous restrooms, two playgrounds, special event sites, day use sites, an interpretive amphitheater, and an RV dump site. Fools Hollow Lake is heavily used most of the year, particularly through the summer. Much of the use is camping, boating, and swimming, but some fishing does occur.

Boats are restricted to the use of a single gas motor no larger than 10 horsepower. The lake freezes over for several weeks during the winter, but the lake receives no ice fishing use because the ice is too thin to safely support a person.

Figure 26. Image of Fools Hollow Lake located in the Schoen's complex (©2009 ESRI, i-cubed, GeoEye).

Management of Water Body

Primary fishery is a warm water fishery, with a secondary cold water rainbow trout intensive use put-and-take fishery nearly year around (Table 75). Walleye, largemouth bass, smallmouth bass,

bluegill, green sunfish, black crappie, and carp are naturally reproducing. Channel catfish may reproduce in the lake, but the level of recruitment is not sufficient to maintain good catch rates; thus, catchable, sub-catchable, and fingerling channel catfish are supplementally stocked opportunistically throughout the stocking season from April to September, to keep up with demand. Catchable, sub-catchable, and fingerling rainbow trout are stocked multiple times throughout the stocking season. The proposed action will be adding brook, cutthroat, and Apache trout of multiple sizes to offer added opportunity and a variety of species, plus to give the state hatcheries more flexibility in available stocking locations when they have a surplus of a certain species.

Table 75. Stocking history for Fools Hollow Lake.

Species	First Year	Last Year	Num. of Stockings	Num. Stocked
Black crappie	1984	1986	2	1,000
Bluegill	1986	1989	2	25,000
Brown trout	1970	1994	35	525,249
Channel catfish	1961	2009	29	218,503
Cutthroat trout	1965	1972	4	93,000
Largemouth bass	1974	1985	3	23,100
Rainbow trout	1958	2009	259	1,763,444
Redear sunfish	1978	1978	2	20,000
Smallmouth bass	1987	1988	3	5,600
Walleye	1975	1985	2	259,700
Total			274	2,923,843

Fools Hollow Lake is a predator dominated system that is difficult to manage. Stocked trout provide an opportunity early in the year during spring and early summer, but return on trout during the summer peak season is low. Fools Hollow Lake is managed as a fee site, except for day-use anglers who can use the lake for free as long as they park in a designated parking area on the west side.

Fools Hollow Lake is also used frequently for kids' fishing clinics because of the excellent facilities and proximity to town. Often, trout are the target of most fishing clinics in the area and trout are stocked just prior to a clinic. However, trout often go into deep water in the summer months and are usually not caught during fishing clinics at that time. For this reason, the flexibility to stock a warm water species specifically for fishing clinics, such as bluegill, would greatly improve the success for kids participating in summer fishing clinics. The proposed action will include stocking catchable size bluegill for fishing clinics held at Fools Hollow Lake.

Northern pike have been illegally stocked into Fools Hollow Lake and threaten to impact recruitment levels of warm water sport fish, as well as preying on stocked trout. Efforts to control northern pike mechanically through gillnetting may be attempted. However, if mechanical methods are unsuccessful, piscicides may be considered. The Department would then want to restock with desirable warm water sport fish species, including largemouth bass, channel catfish, and bluegill to re-establish those populations, as well as to continue to stock regularly with rainbow trout, brook trout, cutthroat trout, Apache trout, and channel catfish, and stocking bluegill for fishing clinics. Thus, largemouth bass would only be stocked to re-establish the species following a catastrophic event or piscicide project that would result in the loss of the population.

On-site angler creel surveys were completed at Fools Hollow Lake in 1997 and 2006, reporting 34,425 angler hours (18,570 AUDs) and 39,778 angler hours, respectively (Meyer et al. 2008). A statewide angler mail-out survey reported 28,433 AUDs in 2001 (Pringle 2004).

The Integrated Fisheries Management Plan for the LCR Watershed (Young et al. 2001) identifies a management emphasis of intensive use cold water sport fish with rainbow trout, and warm water sport fishery with largemouth bass, bluegill, walleye, channel catfish, and black crappie, which is mostly consistent with the proposed action. Additional trout species have been added to the proposed action to add angling diversity and also to give flexibility to the state hatcheries in stocking locations for surplus trout. Plus, walleye and black crappie were identified in the 2001 plan but not included in the proposed action primarily because of the outcome of a more recent planning effort. The Lakeside Area Fish Management Plan (Meyer et al. 2008) identifies managing for family fishing with high catch rates of any species, and for bass fishing, which is also consistent with the proposed action. Walleye have very low catch rates and likely prey upon the young of other sport fish, thus are not contributing to an emphasis of family fishing/high catch rates and bass fishing.

Proposed Action

Rainbow trout, brook trout, cutthroat trout, Apache trout, channel catfish, and bluegill are proposed for the period covered by this consultation.

Catchable, sub-catchable, and fingerling rainbow trout, would be stocked from April to September each year depending on suitable water levels and quality as well as fish availability; numbers of trout would be up to 200,000 fish annually. The primary goal would be to stock rainbow trout, however if other species including Apache trout, brook trout or cutthroat trout became available, they may be stocked opportunistically; no more than a total of 200,000 trout would be stocked annually.

Channel catfish (fingerling, sub-catchable, catchable) may be opportunistically stocked depending on water quality and fish availability from April to September each year; numbers of catfish stocked may be from 0 to 15,000 fish annually.

Catchable bluegill may be stocked annually from April to September in support of fishing clinics; numbers of fish stocked would be from 0 to 5,000 fish annually.

Bluegill (fingerling, sub-catchable, catchable) may be stocked as needed at any time during the year to augment or to recover the fishery following catastrophic events. Numbers of fish stocked for this purpose will be determined according to stocking guidelines identified in the sport fish stocking protocol.

Water Distribution / Connectivity

Fools Hollow Lake is the end of a complex system of creeks and reservoirs in the Pinetop-Lakeside and Show Low area. Fools Hollow Lake may spill at about the same frequency as Show Low Lake (5 times in the last 14 years), but it does not release water for irrigation. When Fools Hollow Lake does spill water will travel through 15.0 miles of intermittent streambed through Lone Pine Dam to Schoen's Dam, located just above the confluence with Silver Creek. Additional discussion is located below in the Schoen's Complex analysis.

Fish Movement

Stocked fish in Fools Hollow Lake may move upstream into a perennial reach of Show Low Creek, but will only get as far as Show Low Lake dam, which is a barrier to natural upstream migration. Fish movement and assemblage information in Show Low Creek above Fools Hollow was previously provided. Movement of fish downstream of Fools Hollow Lake is discussed below in the Complex Analysis discussion.

Community Description

Fools Hollow Lake contains largemouth bass, smallmouth bass, walleye, northern pike, green sunfish, bluegill, black crappie, fathead minnow, channel catfish, black bullhead, common carp, crayfish, and bullfrogs (Table 76). Additional information on the aquatic community is provided in the Complex Analysis section below.

Table 76. Survey history on Fools Hollow Lake using experimental gillnets.

Species	**Apr. 2003**	**Apr. 2005**	**Apr. 2006**	**Apr. 2007**	**Mar. 2008**
Northern pike	2	8	1	3	4
Walleye	8	19	14	5	6
Largemouth bass	1	1	21	2	4
Smallmouth bass	1	1	8		2
Black crappie	1	2	25	10	6
Channel catfish	12	1	2	7	10

Species	Apr. 2003	Apr. 2005	Apr. 2006	Apr. 2007	Mar. 2008
Carp		7	4		1
Rainbow trout	5	7			6
Black bullhead	2				2
Bluegill	2	1	34	6	1
Green sunfish			18		

Consultation Species or Critical Habitat

Potential impacts from the proposed action to candidate and listed species are described below. Please refer to Chapter 4 for a detailed description of the nature of the impacts (which may include predation, competition for space and food, and hybridization etc.).Subsequent responses (resulting from the frequency, magnitude and duration of the impacts) between proposed stocked and candidate and listed species, and any site or complex factors that provide context for determining the meaningfulness of the impacts, are discussed below. Impacts from the proposed action resulting from angler related recreation and/or potential introduction of disease, pathogen or invasive species are evaluated at a broad scale for the entire action area and are described in Chapter 4. If potential impacts specific to a stocking site or complex have been identified they are discussed below.

Potential impacts to stocked Apache trout are analyzed below. Potential impacts due to the proposed action to Chiricahua and Northern leopard frogs are analyzed below at the local site and broad scale level due to the movement potential into the stocked area and fish movement potential up or downstream into areas where frogs may occur. Potential impacts to northern Mexican garter snake, narrow-headed garter snake, as well as Little Colorado spinedace located downstream in Silver Creek and Little Colorado critical habitat in lower Chevelon Creek are addressed in the complex analysis.

Apache Trout

Apache trout stocked opportunistically in Fools Hollow Lake may move upstream into a perennial reach of Show Low Creek, but will only get as far as Show Low Lake dam, which is a barrier to natural upstream migration. There is a possibility for stocked Apache trout to wash down into Show Low Creek, which flows continuous when Fools Hollow Lake spills, but is normally dry below the seepage area. There are no irrigation releases from Fools Hollow Lake. When Fools Hollow Lake does spill, it is generally in the spring during spring runoff, and usually not much water is lost at a time, mostly less than an inch over the wide spillway.

Apache trout are raised in the hatchery raceways to catchable size and stocked into the stream for a recreational put-and-take fishery, but they are not expected to establish a viable population in either the lake or downstream as stocked rainbow trout known are not known to reproduce in the lake or downstream. The primary goal would be to stock rainbow trout, however if other species

including Apache trout, brook trout or cutthroat trout became available, they may be stocked opportunistically.

Potential impacts

Stocked Apache trout co-stocked with other species

Apache trout stocked from the hatcheries are for the specific purpose of providing fishing opportunities. Recovery streams are managed for self-sustaining Apache trout populations and regular stocking is not part of that management except with wild trout to initiate and augment the population as needed until it becomes self-sustaining. Apache trout stocked for recreational purposes are considered excess to the survival and recovery of the species. Take of these stocked fish via harvest by anglers is allowed under the section 4(d) rule contained in the designation of the Apache trout as a Threatened species. That rule allows take of Apache trout if such take is in accordance with State law; in this case through possession of a valid Arizona fishing license and trout stamp.

Impacts to stocked Apache trout from co-stocked sport fish species may include predation, competition, and/or hybridization with stocked trout. Likelihood of hybridization is extremely unlikely since trout are not expected to reproduce due to lack of suitable habitat and stream temperature.

Impacts from wild populations on stocked Apache trout

The action of stocking Apache trout is considered a conservation action in furtherance of the Endangered Species Act whereby a special 4(d) rule is in place. AGFD may take any federally listed threatened fish or wildlife for conservation purposes that are consistent with the purposes of the Act and the Section 6 Cooperative Agreement between USFWS and AGFD and therefore take of Apache trout from the proposed stocking of Apache trout is legally permitted.

Impacts to stocked Apache trout from species of fish currently existing as wild, self reproducing populations at or in proximity to Fools Hollow Lake and downstream may include predation, hybridization with other trout and/or competition. Likelihood of hybridization is extremely unlikely since trout are not expected to reproduce due to lack of suitable habitat and stream temperature.

Northern Leopard Frog

Local Analysis: Although Fools Hollow Lake and the Schoen's buffered stocking complex are within the historical range of the northern leopard frog, the likelihood that northern leopard frogs could be exposed to stocked fish in Fools Hollow Lake is low. There are no historical records for northern leopard frogs for the Fools Hollow Lake stocking site; however, there are historical records for northern leopard frogs from 2 sites in the buffered stocking complex; Lake of the

Woods (Lake of the Woods Resort (1942) and Rainbow lake (= Boat Ramp) (1972), (Figure 21, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). There have been 7 surveys and site records at 5 sites within the buffered stocking complex between 1942 and 2001, with most surveys conducted between 1984 and 2001. Northern leopard frogs were not observed at any sites, including Lake of the Woods Resort (1994) and Rainbow Lake (= Boat Ramp) (1994) (AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). Although there are available habitats that have not been surveyed, it is likely that northern leopard frogs no longer occupy sites within the Schoen's buffered complex because they have not been detected during subsequent surveys and crayfish, bullfrogs and non-native fish, make the habitat within the buffered stocking complex less suitable for northern leopard frogs.

Broad Scale Analysis: The likelihood that northern leopard frogs could be exposed to fish stocked at Fools Hollow Lake that dispersed outside the buffered stocking complex is low, because subsequent surveys suggest northern leopard frogs no longer occupy surrounding lakes or stream where fish could disperse and habitats are less suitable for northern leopard frogs due to the presence of crayfish, bullfrogs and non-native fish.

Chiricahua leopard frog

Local Analysis: Although Fools Hollow Lake and the Schoen's buffered stocking complex are within the historical range of the Chiricahua leopard frog, the likelihood that Chiricahua leopard frogs could be exposed to stocked fish in Fools Hollow Lake is low. There are no historical records for Chiricahua leopard frogs at the Fools Hollow Lake stocking complex; however, there is 1 historical record for Chiricahua leopard frogs from 1 site in the buffered stocking complex; Rainbow Lake (= Boat Ramp) (1972) (Figure 21, AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). There have been 7 surveys and site records at 5 sites within the buffered stocking complex between 1942 and 2001, with most surveys conducted between 1984 and 2001. Chiricahua leopard frogs were not observed at any sites, including Rainbow Lake (= Boat Ramp) (1994) (AGFD Riparian Herpetofauna Database, M. Sredl pers. comm.). Although there are available habitats that have not been surveyed, it is likely that Chiricahua leopard frogs no longer occupy sites within the Schoen's buffered complex because they have not been detected during subsequent surveys and crayfish, bullfrogs and non-native fish, make the habitat within the buffered stocking complex less suitable for Chiricahua leopard frogs.

Broad Scale Analysis: The likelihood that Chiricahua leopard frogs could be exposed to fish stocked at Fools Hollow Lake that dispersed outside the buffered stocking complex is low, because subsequent surveys suggest Chiricahua leopard frogs no longer occupy surrounding lakes or streams where fish could disperse and habitats are less suitable for Chiricahua leopard frogs due to the presence of crayfish, bullfrogs, and non-native fish.

SCHOEN'S COMPLEX ANALYSIS

Water Distribution / Connectivity

All seven stocking sites within the Schoen's Complex are connected and flow downstream through Fools Hollow Lake as previously described. No irrigation water is released from Fools Hollow Lake. When Fools Hollow Lake does spill, water flows downstream over the concrete spillway. Show Low Creek immediately below the dam is perennial and is maintained by seepage through the earthen dam. Further downstream, Show Low Creek then flows during high flow events to Lone Pine Dam and on to Schoen's Dam, which is 15 miles downstream of Fools Hollow Lake, and which are two normally dry flood control structures.

Lone Pine Dam (Figure 27) is an earth fill flood control dam, owned and formerly operated by Navajo County for irrigation uses. It is located where Forest Road 134 crosses the creek several miles downstream from Fools Hollow Lake. As per the County Public Works Department's Floodplain Management Section, the reservoir does not maintain a permanent pool of water, and has a permanently open outlet because it is has been classed as an unsafe dam. Lone Pine has not been breached; however, there is concern over the failure of the fill material, for which reason it has only been allowed to fill once. Currently, Lone Pine Dam acts as a silt trap for Schoen's Dam further downstream. Similar concerns apply to Schoen's Dam, as it may not handle a potential failure of Lone Pine Dam. Both dam structures are made of and located on an unstable geologic formation. Schoen's Dam is a newer irrigation and flood control dam located downstream of Lone Pine Dam on Show Low Creek. The reservoir is used for flood control, recreation, and irrigation; it is owned and operated by the Silver Creek Irrigation District.

Figure 27. Lone Pine Dam aerial photograph.

The Schoen's Dam area is normally dry (Figure 28) but does receive water during very high precipitation years, and when Fools Hollow Lake spills significantly. The structure is operated by Navajo County and the Silver Creek Irrigation District under an emergency flood control plan. The dam will capture water coming down lower Show Low Creek and a few other minor

tributaries, and water is released only at certain fill levels. The dam can capture water in a sediment storage stage, up to 3,000 acre-feet of water, or a surface elevation of 5,740 feet. At this elevation, the pool of water is approximately 35 feet deep. Water is not released until the pool exceeds this capacity, which normally is not reached; the water captured up to 5,740 feet elevation that is not released evaporates and seeps into the ground, killing any fish stranded there when the pool dries out. The area above Schoen's dam on Show Low Creek is dry 75% of time according to the manager of Silver Creek Irrigation District, who is a long time resident of the area for 75 years (P. Shumway, pers. comm.). Any water in storage between top of minimum pool at 5,740 feet and flood stage at 5754' is held and released down to minimum pool by Silver Creek Irrigation during the summer months through the irrigation tower. Any level over flood stage (5,754 feet?) is released down to below flood stage through the tower release structure under a flood control plan. Navajo County steps in and releases water, to bring the pool back down to irrigation level during flood stage at the dam. The amount of release depends upon how much water is flowing through Snowflake and Taylor from upper Silver Creek and other drainages because the creek through these towns can't be allowed to exceed 2,500 cfs total flow. The operation of Schoen's Dam during flood stage is controlled by Navajo County Flood Control.

Figure 28. Schoen's Dam aerial photograph.

When the pool at Schoen's Dam exceeds 3,000 acre feet or 5,740 feet elevation, it enters the irrigation storage, which can be released slowly during the summer months by the Silver Creek Irrigation Company through a headgate in the dam down into Silver Creek. It is diverted out in Snowflake and Taylor for irrigation until the level drops back down to the sediment storage

stage, then the releases are shut off. The irrigation storage capacity ranges from 3,000 to 6,000 acre feet, or an elevation between 5,740 and 5,754 feet, and can be released down into Silver Creek for irrigation where it is diverted out of the stream.

From the confluence with Show Low Creek, about 2.5 miles below Schoen's Dam, Silver Creek flows north for 10.5 miles to the town of Snowflake, then another 19.4 miles to the confluence with the LCR. From the confluence with Silver Creek, the LCR flows downstream for 43.3 miles to the confluence with Chevelon Creek, then another 9.1 miles to the confluence with Clear Creek, then for 73.1 miles to Grand Falls. From Grand Falls, the LCR runs downstream for 81.0 miles to Blue Springs, then for 13.1 miles to the confluence with the Colorado River. Upstream of the confluence with Silver Creek, the LCR runs 85.1 miles from Lyman Lake. Additional discussion on areas downstream and upstream of the Silver Creek confluence with the LCR is provided in the Lyman Lake and Chevelon Creek Complex respectively.

Fish Movement

It is unknown how often Fools Hollow Lake spills but it is anticipated to spill occasionally within the next 10 years. The 15 miles of Show Low Creek below Fools Hollow Lake is normally dry except the first several hundred meters; fish could only navigate this reach during high flow events.

If trout do not make it all the way to Schoen's Dam during a spill event, they will not persist long in the intervening stream reach. It is low elevation, silty, and warm, and it goes dry on a regular basis. However, trout could get through to Silver Creek during irrigation releases or during flood level releases when Schoen's Dam is filled. Even if they do make it to Silver Creek, they are unlikely to persist there either due to poor habitat conditions. Many irrigation diversions occur in Taylor and Snowflake, and as a result Silver Creek gets very warm. There has never been a trout of any kind collected in Silver Creek downstream of White Mountain Lake in many years of survey: 1991, 1992, 1993, 1997, 1999, 2000, 2002, 2003, 2004, 2006, 2007, 2009, illustrating that if trout do make it to Silver Creek, it is in extremely low numbers and they do not persist.

There is a possibility for stocked species to wash down into Show Low Creek, which flows continuous when Fools Hollow Lake spills, but is normally dry below the seepage area. There are no irrigation releases from Fools Hollow Lake. When Fools Hollow Lake does spill, it is generally in the spring during spring runoff, and usually not much water is lost at a time, mostly less than an inch over the wide spillway. Sometimes the lake spills for longer periods when it has higher lake levels, but will always be at very low spill rates outside of spring season. At these spill levels, it is unlikely any fish would go over the spillway. Observational experience of AGFD biologists is that the lake has to spill heavily before fish would go over the spillway, especially warm water species. This spill rate has happened approximately 4-5 times in the last 15 years.

When stocked fish are able to go over, it is likely this would be limited to trout, sunfish, and bass. Catfish tend to be very sluggish in the spring because of the cold water temperatures and are along the bottom. The Department has not seen evidence of channel catfish moving downstream of lakes with spillways similar to Fools Hollow Lake, where there isn't a gradual incline to the spillway; however, it is still possible. Once in the pool above Schoen's Dam, fish would not have the opportunity to reach Silver Creek until the pool level reaches the irrigation level, which is at 3,000 acre feet, or an elevation of 5,740 feet (MSL). The irrigation company cannot release water through Schoen's Dam until the pool level reaches this elevation, which is about 35 feet deep at the dam and the top of the irrigation tower. The pool does not reach this depth often and usually dries up before releases occur, resulting in mortality of all the fish trapped in the pool.

When it does reach the irrigation level or higher, fish have the opportunity to escape down into Silver Creek when water is released for irrigation. The grate on the outlet structure is fairly large, approximately 6-7 inches wide. The outlet pipe through the dam is also very large, approximately 4 feet in diameter. However, some species would be more prone than others to escape because of the raised outlet; the bottom of the outlet grate is situated on the vertical tower approximately 25 feet above the lake bottom. Open water fishes like trout, if they were to persist in the pool, would be the most likely to go through. Bottom dwellers, like channel catfish, are not likely to come off the bottom of the lake to find the outlet, thus, they would be very unlikely to end up in Silver Creek from the Schoen's Complex. Only one channel catfish has been found in lower Silver Creek during surveys over the last 20 years. In addition, there are other sources of warm water fishes contributing to the Silver Creek assemblage. White Mountain Lake is located right on Silver Creek upstream of Shumway, spills nearly every year, has good flow from Silver Springs, and a very large watershed in Brown Creek and Rocky Arroyo. Bluegills have never been found in lower Silver Creek, likely because they do not persist in these stream environments. Green sunfish are common, being well suited to conditions like Silver Creek, but not bluegill. Ten bluegill reported in a recent survey (2007) were likely misidentified; that survey found 10 sunfish, all identified as bluegill by a new biologist not familiar with the area, who did not think to distinguish between sunfish species. Every other survey in Silver Creek has found all green sunfish and no bluegill; this one survey biologist found 10 bluegill but no green sunfish. Largemouth bass and sunfishes prefer cover, such as the brush, rocks, and debris present along the shorelines of the pool, away from the outlet in open water. Some bass and sunfish will likely use the tower in Shoens Lake itself for structure; however, these numbers are likely to be low especially due to the nature of flows during times when water levels would be high enough to result in release through the outflow structure and also due to the nature of the release structure (located in center area of Schoen's). It is possible for largemouth bass and sunfish to get through during irrigation and flood releases. Largemouth bass are only proposed to be stocked in Rainbow Lake which is located upstream of Scott Reservoir, Show Low Lake and Fools Hollow

Lake, all of which have naturally reproducing largemouth bass populations. Recently, largemouth bass have been more numerous in the collections in Silver Creek (see Table 19); however, these were more likely to have come from White Mountain Lake, which has thriving populations of warm water fishes, including largemouth bass, bluegill, and green sunfish, and it spills every year directly into Silver Creek.

If the pool behind Schoen's Dam ever reaches flood stage, which is defined as a capacity of over 6,000 acre feet or above 5,754 feet elevation, Navajo County steps in and releases water, to bring the pool back down to irrigation level. The amount of release depends upon how much water is flowing through Snowflake and Taylor from upper Silver Creek and other drainages because the creek through these towns can't be allowed to exceed 2,500 cfs total flow. The operation of Schoen's Dam during flood stage is controlled by Navajo County Flood Control.

Community Description

Show Low Creek immediately below Fools Hollow Lake contains green sunfish, fathead minnow and bullfrog tadpoles in several large beaver ponds that are supplied by seepage through the earthen dam (M. Lopez pers. comm.). Below these beaver ponds, the 15 miles of stream to Schoen's Dam is fishless because it is normally dry. Schoen's Dam pool, when there is water, sometimes contains an occasional largemouth bass, sunfish, or channel catfish before it dries up based on conversations with local anglers (M. Lopez pers. comm.). Schoen's Dam pool has never been surveyed.

Silver Creek between White Mountain Lake and Snowflake was found to contain fathead minnow, golden shiner, green sunfish, common carp, Little Colorado sucker, bullfrogs and crayfish during a survey in 2004 (McKell and Lopez 2005), and fathead minnow, Little Colorado sucker, crayfish, and bullfrog tadpoles during a recent survey in 2009 (AGFD unpublished data).

Downstream of Snowflake, Silver Creek was found to contain Little Colorado spinedace, Little Colorado sucker, bluehead sucker, yellow bullhead, green sunfish, common carp, fathead minnow, largemouth bass, channel catfish, bullfrogs, and abundant crayfish (Lopez et al. 1999a; McKell and Lopez 2005; Weiss 2007d). Fifteen Little Colorado spinedace were found in intensive surveys in 1997, but have not been found in nearly annual surveys since then: 1999, 2000, 2002, 2003, 2004, 2006, 2007, and 2009. They also had not been found prior to that for 30 years, with the previous record in 1967 (Lopez et al. 1999a; McKell and Lopez 2005).

Table 77 summarizes the numerous surveys in lower Silver Creek below White Mountain Lake in the last 20 years. Surveys sampled the stream both above and below the Show Low Creek confluence. Surveys show that trout and bluegill have not been captured in lower Silver Creek. The 1991 and 1993 surveys were conducted with backpack electroshockers in August of each year (Dorum and Young 1995); the 1992 survey was conducted with a seine in May (AGFD unpublished data); the 1997 survey was conducted with a backpack electroshocker and seine in

July; the 1999 survey was conducted with a backpack electroshocker in November-December; and the 2000, 2002, and 2003 surveys were conducted with seines in May, July, and April, respectively (McKell and Lopez 2005). The 2004 (McKell and Lopez 2005) and 2006 (AGFD unpublished data) surveys were conducted with a backpack electroshocker in June-August and June, respectively; the 2007 surveys were conducted in March and October with a backpack electroshocker, seine, and hoop nets (Weiss 2007d); and the 2009 surveys were conducted with a backpack electroshocker and seine in June (AGFD unpublished data).

Table 77. Summary of fish collection data from Silver Creek below White Mountain Lake since 1991.

Year	**Species**									
	LC spinedace	**LC sucker**	**Bluehead sucker**	**Fathead minnow**	**Green sunfish**	**Yellow bullhead**	**carp**	**Largemouth bass**	**Golden shiner**	**Channel catfish**
1991				19	9	2	2			
1992				22	6		13		1	
1993		4	64	106	12	1	5			
1997	15	142	2	2180	48	11	63			
1999		18	7	578	63	17	167	13		
2000		3		611	12	11	91			1
2002		present		present	present	present	present	present		
2003		3		516	55	35	24			
2004		58	1	898	314	25			3	
2006				present						
2007		3		369	59 *	26	77	3		
2009		40		502	55	6	25			

* Ten of these sunfish were originally reported as bluegill by a beginning biologist, however were considered to be mis-identified green sunfish when the situation was evaluated closely (Weiss 2007d).

Open-water fishes like trout, if they were to persist in the pool, would be the most likely to go through. Bottom dwellers, like channel catfish, are not likely to come off the bottom of the lake

that far to find the outlet, and thus would be very unlikely to end up in Silver Creek from the Schoen's Complex. Only one channel catfish has been found in lower Silver Creek in the last 20 years of surveys. This one catfish record more likely came from White Mountain Lake, which is located right on Silver Creek upstream of Shumway and spills nearly every year, has good flow from Silver Springs, and has a very large watershed in Brown Creek and Rocky Arroyo.

Largemouth bass and sunfishes prefer cover, such as the brush, rocks and debris present along the shorelines of the pool, away from the outlet in open water. Some bass and sunfish will likely use the tower itself for structure; however, these numbers are likely to be low. It is possible for largemouth bass and sunfish to get through during irrigation and flood releases, but likely in low numbers because of the location and elevation of the outlet above the bottom of the pool. Bluegill has never been found in lower Silver Creek, likely because they do not persist in these stream environments. Green sunfish are common, being well suited to conditions like Silver Creek. Recently largemouth bass have been more numerous in the collections in Silver Creek; however, these were more likely to have come from White Mountain Lake, which has thriving populations of warm water fishes, including largemouth bass, bluegill, and green sunfish, and spills every year directly into Silver Creek.

Once in Silver Creek, fish could move upstream, but can get no further upstream than at the dam at White Mountain Lake. Numbers of low diversions would likely be barriers to upstream movement of warm water species. Fish could also move downstream in to lower Silver Creek. At the bottom end of Silver Creek, just up from the confluence with the LCR, is Woodruff Dam, with a vertical drop of approximately 15 feet. This is a barrier to upstream movement of fish, but not downstream movement. Once in the LCR, fish could possibly move upstream to the dam at Lyman during high flows, or downstream towards Chevelon Creek confluence and beyond.

As mentioned before, escaped trout would not persist very long at all in the Schoen's Dam pool or in Silver Creek.

Although narrow-headed garter snakes are not known from the LCR, there are historical and recent (but unverified) records of northern Mexican garter snakes from the watershed (see analysis below).

Consultation Species or Critical Habitat

Potential impacts from the proposed action to candidate and listed species are described below. Please refer to Chapter 4 for a detailed description of the nature of the impacts (which may include predation, competition for space and food, and hybridization etc.).Subsequent responses (resulting from the frequency, magnitude and duration of the impacts) between proposed stocked and candidate and listed species, and any site or complex factors that provide context for determining the meaningfulness of the impacts, are discussed below. Impacts from the proposed action resulting from angler related recreation and/or potential introduction of disease, pathogen

or invasive species are evaluated at a broad scale for the entire action area and are described in Chapter 4. If potential impacts specific to a stocking site or complex have been identified they are discussed below.

Potential impacts due to the proposed action to Chiricahua and Northern leopard frogs are analyzed above at the local site and broad scale level due to the movement potential into the stocked area and fish movement potential up or downstream into areas where frogs may occur. Potential impacts to northern Mexican garter snake, narrow-headed garter snake, as well as Little Colorado spinedace located downstream in Silver Creek and Little Colorado critical habitat in lower Chevelon Creek are addressed below in the complex analysis.

Little Colorado Spinedace and Critical Habitat

Little Colorado spinedace were collected in Silver Creek in 1997, three miles upstream of Woodruff Dam, near the confluence with the LCR (Lopez et al. 1999a) and about 23 miles downstream of Schoen's Dam.

Six spinedace were collected in Cottonwood Wash, near the confluence with Silver Creek, in 1974 (Dorum and Young 1995). The confluence is approximately 38 miles downstream from Fools Hollow Lake. Cottonwood Wash flows into Silver Creek immediately north of Snowflake. Spinedace were collected in a single stagnant isolated pool below State Highway 77. The area has been heavily modified by sand and gravel mining in and around lower Cottonwood Wash since 1974 and is no longer suitable habitat for spinedace. Cottonwood Wash is an intermittent system and it is likely the 1974 collection location was in a pool more influenced by the water table in Silver Creek than the Cottonwood Wash system itself. Efforts to collect spinedace in Silver Creek, including attempts at this site, have occurred frequently (Table 77).

The Silver Creek spinedace population was considered extirpated until fish were collected from lower reaches of the creek in 1997, about 14 miles downstream from the 1974 collections. Although the Department has extensively surveyed suitable locations along Silver Creek in subsequent years, including the area spinedace were collected, no spinedace have been located since 1997. Extensive surveys were conducted in Silver Creek in 2004, and no spinedace were located; however, very few native fish were found at the sites surveyed (Table 77). Recent surveys were conducted in 2006, 2007, and 2009 without finding spinedace. Very heavy flows through lower Silver Creek in 2005 scoured out many of the beaver dams, making it difficult to survey the stream. While the habitat looked in much better shape, with good mix of run, riffle, and pools instead of miles of back-to-back beaver pools, the 2006 survey found very few fish using electrofishing equipment; only a small number of fathead minnow. It may be likely that the flood flows also flushed out many of the fish in the stream. The Department hopes this would create an opportunity for any native fishes that persisted through the flooding to re-establish

quicker in the absence of hoards of non-native fish. The 2007 and 2009 surveys did not detect that trend, again finding non-native fish to be dominating, with no evidence of spinedace.

The collection of spinedace in lower Silver Creek in 1997 is considered the closest occurrence of spinedace to the proposed stocking sites in the Schoen's Complex. Spinedace also occur in the LCR near St. Johns, approximately 66 miles upstream of the Silver Creek and LCR confluence.

Potential Impacts

Potential impacts from these stocked species: rainbow, brook, cutthroat, and Apache trout, channel catfish, largemouth bass, and bluegill, could be predation on young of the year or adult spinedace as a result of transport out of Fools Hollow Lake and into in Silver Creek. Competition for food and space between stocked and transported species may also occur. The historic survey data from Silver Creek (Table 77) indicate that spinedace may not be present anymore. The data also indicate that stocked trout species have not been detected in formerly occupied spinedace habitats. Additionally, the temporal nature of this stream system doesn't provide habitat suitable for trout persistence or reproduction through summer months.

Largemouth bass are only proposed to be stocked in Rainbow Lake which is located upstream of Scott Reservoir, Show Low Lake and Fools Hollow Lake, all of which have naturally reproducing largemouth bass populations. Fools Hollow Lake does spill in heavy precipitation years, allowing the opportunity for fish transport downstream, where they would end up in Schoen's Dam pool. Schoen's Dam presents a partial temporal barrier to further downstream movement of fish. The potential for fish to move out of Schoen's Dam pool is possible, although that potential is low and is expected to be infrequent for largemouth bass and bluegill when water is released at irrigation stage or flood stage. Largemouth bass may persist in Silver Creek, but not bluegill because there have been no verified records of bluegill in Silver Creek in numerous surveys (Table 77). Largemouth bass may prey directly upon adult or juvenile spinedace if the two species occur in the stream at the same time. However, this is unlikely to occur because spinedace are not likely to be present in the system anymore and few stocked fish get to this area. Numbers of escaped fish reaching Silver Creek is extremely low, and spinedace densities in Silver Creek are also extremely low, if they still exist there at all. Largemouth bass are not expected to reproduce in Silver Creek, thus progeny of these escaped fish are not likely to impact spinedace by predation or competition. Bryan et al. (2002) reported an increased potential for impacting habitat use of spinedace in the presence of multiple predators. Crayfish, green sunfish, and yellow bullhead are well established in lower Silver Creek. The US Fish and Wildlife Service (USFWS 2008e) states that the greatest non-native species threat to spinedace were green sunfish and smallmouth bass, two species not proposed for stocking.

Stocked trout may rarely reach Silver Creek and potentially impact Little Colorado spinedace through predation or competition. The probability of that event occurring and the events that

would need to happen for the interaction to occur was discussed previously. Lower Silver Creek and occupied spinedace habitat is very warm and unsuitable for trout during most months of the year. Twelve years of surveys (Table 77) have found no salmonids in Silver Creek downstream of White Mountain Lake, which is also downstream of Schoen's Dam. The steps needing to occur for trout movement to happen have also been discussed. The stocked species of trout are unlikely to have an opportunity to pass over the spillway at Fools Hollow Lake and make the trip to below Schoen's Dam most of the time. Many of the spill events are of very small flow (<1" over the wide spillway) and would not allow for passage of most fish. Warm water fish are not inclined to follow the current like trout, and are unlikely to have recently hatched fish at that time of year that could pass over a low spill event. It is only during the extreme flood events that fish have a realistic chance of getting moved around in connecting systems. Also, the operation and outlet works at Schoen's Dam present another obstacle for warm water fishes to reach Silver Creek, although it is still possible that largemouth bass and bluegill may reach Silver Creek. Bluegill will not persist, due to the fact that no verified records of bluegill in Silver Creek in 12 years of surveys, but bass could persist and have some effect.

Critical Habitat

The nearest designated critical habitat for spinedace is located in lower Chevelon Creek, approximately 90.9 miles downstream of Fools Hollow Lake, via 15.0 miles to Schoen's Dam, another 32.6 miles to the LCR-Silver Creek confluence, and another 43.3 miles to the LCR-Chevelon Creek confluence.

Potential Impacts

It is extremely unlikely for escaped stocked fish to impact critical habitat. The potential for escaped fish into Silver Creek is already extremely low, and would be even more unlikely, although possible, to further reach lower Chevelon Creek. Escaped fish could not reach designated critical habitat in East Clear Creek because of the dam at Clear Creek Reservoir in lower Clear Creek, or in Nutrioso Creek because of the dam at Lyman Lake on the LCR.

Trout would not persist in the Schoen's Dam pool or in Silver Creek, and have not been collected in Silver Creek in 12 years of surveys. Channel catfish would not be able to escape through Schoen's Dam outlet because of the configuration of the outlet approximately 25 feet above the lake bottom. Only 1 record of a channel catfish has been reported in Silver Creek in 12 years of survey, and this one record is likely from White Mountain Lake, which has a large population of channel catfish and other warm water species, and is located on and spills annually directly into Silver Creek upstream of Snowflake-Taylor.

Northern Mexican Garter Snake

Stocking complex analysis: It is unknown whether northern Mexican garter snakes occupy the Schoen's Complex, though there have been no systematic surveys for the species in this area (USFWS 2008, Holycross et al. 2006). Within the 20 km buffer established for this stocking complex there are historical records of northern Mexican garter snakes from and near Lake of the Woods (1942, 1949) SE of Show Low, but none have been detected since then (Holycross et al. 2006). Those are the only records for northern Mexican garter snakes in the Little Colorado River watershed. Current habitat quality for northern Mexican garter snakes at Lake of the Woods is low. Bullfrogs, crayfish and non-native fish communities occupy all of the proposed stocking sites, the creeks connecting them (Walnut Creek, Billy Creek, Porter Creek, Show Low Creek), as well as Silver Creek into which they drain. Therefore, it is unlikely that northern Mexican garter snakes persist at those sites. Two recent (2004) but unverified northern Mexican garter snake records have been reported from the Fort Apache Indian Reservation, outside of the 20 km buffer, near White Paradise Creek and ~28 air km SE of Lake of the Woods. The likelihood is low that northern Mexican garter snakes will be exposed to fish stocked in Woodland Lake, Rainbow Lake, Show Low Lake, Fools Hollow Lake, Scott Reservoir or Show Low Creek.

Downstream analysis: All seven stocking sites within Schoen's Complex are connected and flow downstream through Fools Hollow Lake. Because there are no northern Mexican garter snake records downstream of these sites and none elsewhere in the Little Colorado River watershed, it is unlikely that northern Mexican garter snakes will be exposed to dispersing fish (HDMS, AGFD Riparian Herpetofauna Database, M. Sredl pers.comm.).

Narrow-headed Garter Snake

Stocking complex analysis: Narrow-headed garter snakes are not known to occupy the Little Colorado River or its tributary streams, therefore, it is unlikely the species will be exposed to fish stocked into Woodland Lake, Rainbow Lake, Show Low Lake, Fools Hollow Lake, Scott Reservoir or Show Low Creek. The nearest historical (1965) narrow-headed garter snake record is on the Fort Apache Indian Reservation, about 4 km SE of McNary along the North Fork of the White River (Salt River drainage). Narrow-headed garter snakes are not known to move overland beyond about 200 m from a stream edge (Nowak 2006a), and therefore if they occur elsewhere in the North Fork of the White River watershed they are highly unlikely to move overland and disperse to the proposed stocking sites. Bullfrogs, crayfish and non-native fish communities occupy all of the proposed stocking sites, the creeks connecting them (Walnut Creek, Billy Creek, Porter Creek, Show Low Creek), as well as Silver Creek into which they drain. Narrow-headed garter snakes are unlikely to disperse to any of the stocking sites, and they are not considered suitable habitat.

Downstream analysis: All seven stocking sites within Schoen's Complex are connected and flow downstream through Fools Hollow Lake. Because there are no narrow-headed garter snake

records downstream of these sites and none elsewhere in the Little Colorado River watershed, it is unlikely that narrow-headed garter snakes will be exposed to dispersing fish (HDMS, AGFD Riparian Herpetofauna Database, M. Sredl pers.comm.).