

Fig. 13. Southwestern Willow Flycatcher survey area at Graveyard Gulch, Saguache County, Colorado.

Pass Creek—We surveyed approximately 4.7 km of Pass Creek ranging in elevation from 2591 to 2804 m in Saguache County (Fig. 14 and Appendix A). The Pass Creek survey area was divided into two sections due to time constraints and length of survey area. Willow, aspen, and rabbitbrush (approximately 5 m tall) dominate both sections (Digital Appendix C.12-17). Very little water flowed in Pass Creek during the first survey period and became increasingly drier in subsequent survey periods.

Saguache Creek—Saguache Creek contains 0.3 km of survey area in Saguache County, Colorado (2450 m) (Fig. 15 and Appendix A). This area is dominated by willow (3 – 4 m tall) and cottonwood with sections of standing water throughout the survey area (Digital Appendix C.18). In subsequent surveys the water levels decreased in the survey area.

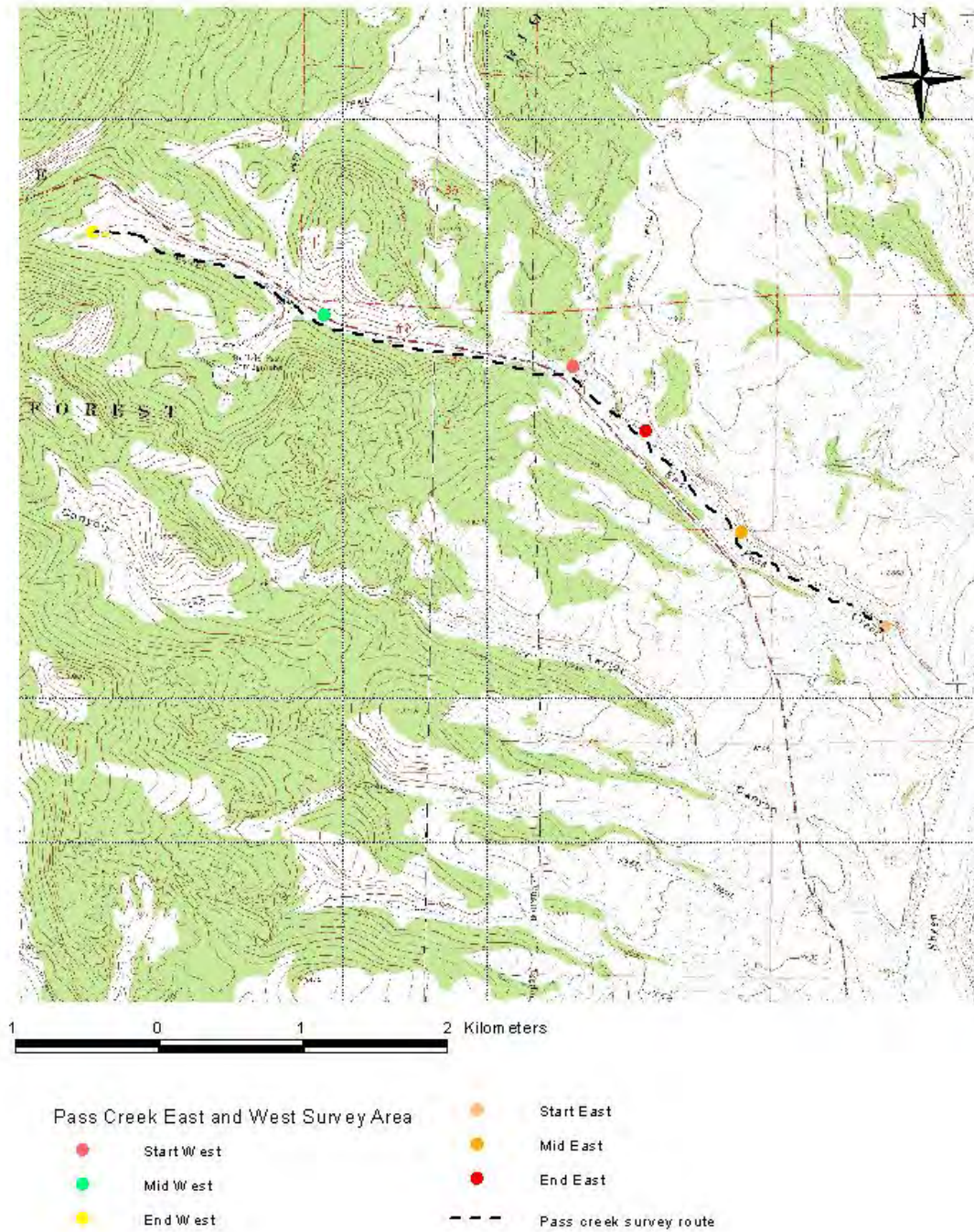


Fig. 14. Southwestern Willow Flycatcher survey area at Pass Creek, Saguache County, Colorado.

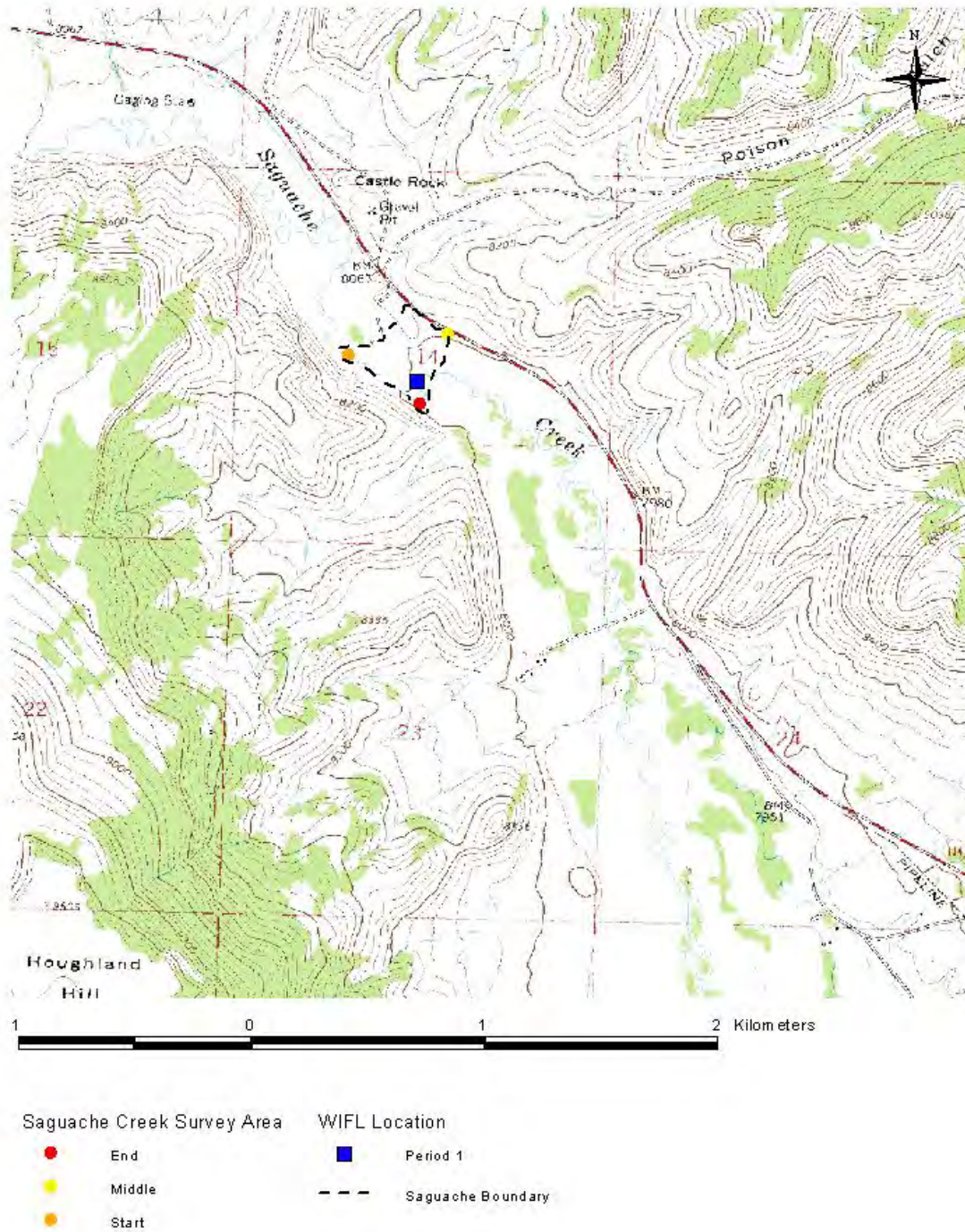


Fig. 15. Southwestern Willow Flycatcher survey area and locations of Willow Flycatchers at Saguache Creek, Saguache County, Colorado.

U.S. Fish and Wildlife Service

Alamosa National Wildlife Refuge South—The Alamosa National Wildlife Refuge (ANWR) South survey route begins at refuge headquarters and continues south along the Rio Grande for approximately 14.5 km (Fig. 16 and Appendix A). Average elevation along the survey area is 2286 m. This area of ANWR is dominated by coyote willow, narrow-leaf cottonwood, rabbitbrush, and elm species (*Ulmus* spp), with a mean canopy height of approximately 3.5 m. The first 3 km of the survey route contained almost continuous willow, interspersed with cottonwoods (Digital Appendix D.1), while the next 6.5 km contained mostly thin strips of vegetation (Digital Appendix D.2). Riparian habitat improved throughout the last several kilometers of the survey route (Digital Appendix D.3-4). Water was flowing in the Rio Grande during all three-survey periods.

Lil' Pop—We surveyed approximately 9.7 km of newly acquired ANWR riparian area in Alamosa County, Colorado (Fig. 17 and Appendix A). Lil' Pop sits at 2306 m and is dominated by willow (3 – 4 m tall) and cottonwood; however, much of the area is overgrazed and in poor condition (Digital Appendix D.5-7). Surface water was present only southeast of the dam in the north section of the survey.

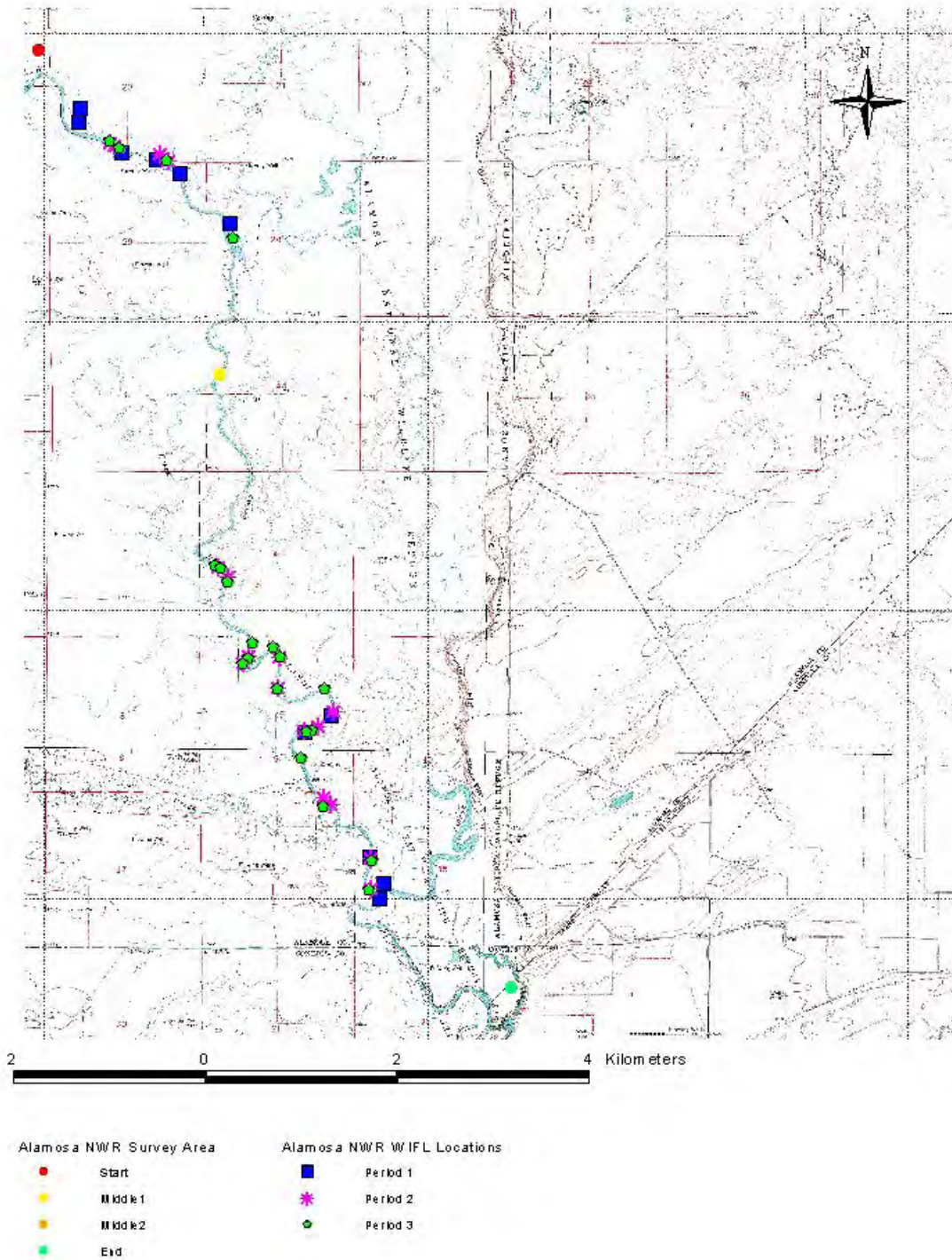


Fig. 16. Southwestern Willow Flycatcher survey area and locations of Willow Flycatchers at Alamosa National Wildlife Refuge South, Alamosa County, Colorado.

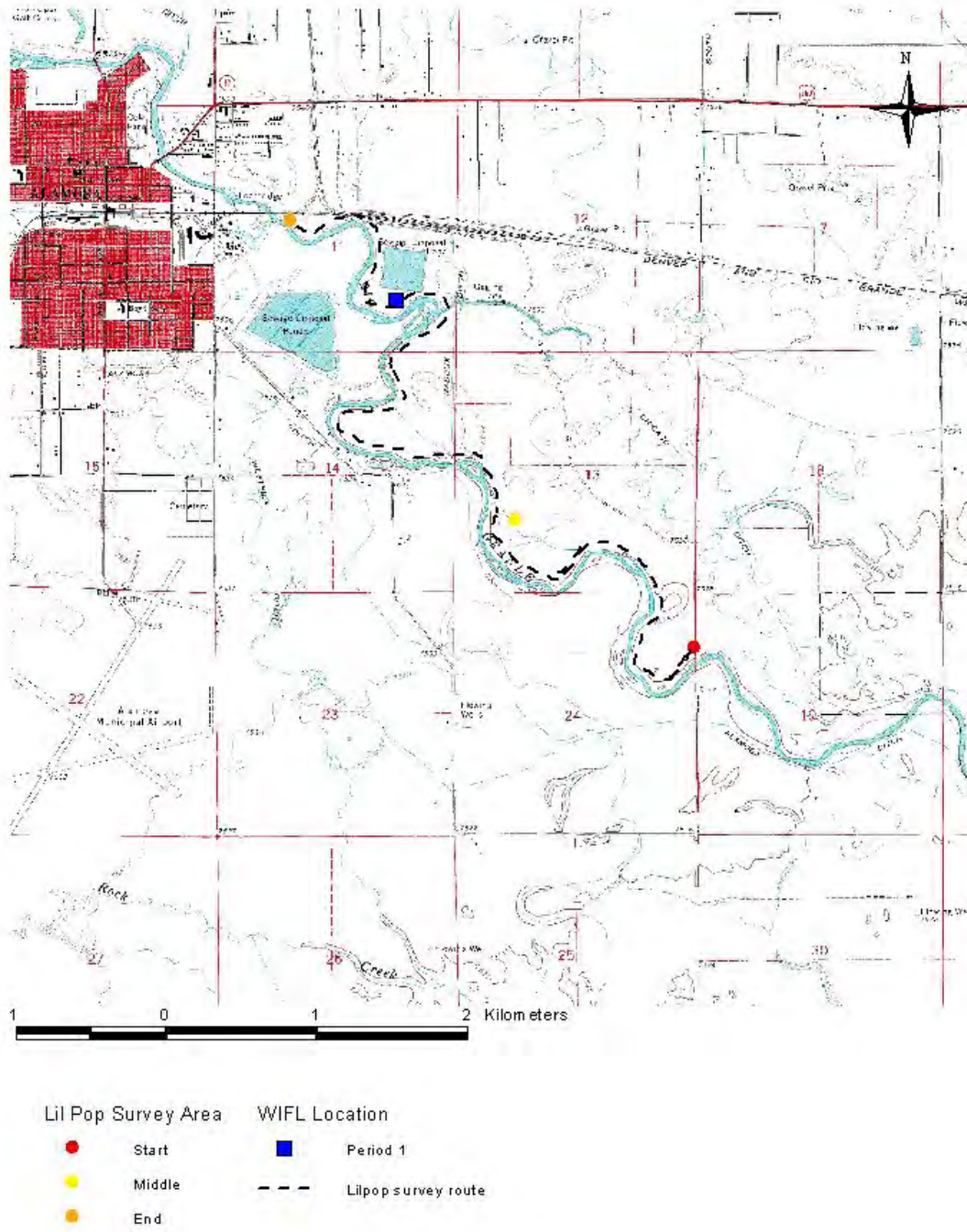


Fig. 17. Southwestern Willow Flycatcher survey area and locations of Willow Flycatchers at Lil' Pop, Alamosa County, Colorado.

METHODS

Southwestern Willow Flycatcher surveys followed the protocol developed by Sogge et al. (1997), in accordance with the Federal Endangered Species Act. Surveys were conducted during three survey periods, 15 - 31 May, 1 - 21 June, and 22 June – 10 July 2003. All surveys were conducted at least five days apart and began within a half hour of sunrise and concluded within four hours. Surveyors walked slowly through the survey area stopping every 20 to 30 m. At each stop, surveyors listened for Willow Flycatcher vocalizations. If no flycatchers were heard, vocalizations of a Southwestern Willow Flycatcher were played for 15 to 30 seconds, followed by one to two minutes of silence. Positive identification of a Willow Flycatcher requires hearing the distinctive, “fitz-bew” song. In addition to recording the presence/absence of Willow Flycatchers, observers also recorded other species seen or heard while conducting surveys (Appendices B - E).

RESULTS

Colorado Division of Wildlife

Higel State Wildlife Area—Willow Flycatchers were detected during all survey periods at Higel State Wildlife Area (Table 1 and Appendices F, G). During the first survey, five adults were detected in five distinct areas (Fig. 1). On the second survey, four additional adults were observed in the same vicinity as the previous visit (Fig. 1). On the final survey, eight birds were detected in the same vicinity as the previous visit and three more adults were detected just east of the first mid-point (Fig. 1). In total, 11 adults were detected, occupying approximately nine territories. Compared to surveys conducted in 2002, significantly more Willow Flycatchers were detected in 2003 than in 2002 (Table 2).

La Jara State Wildlife Area—We did not detect Willow Flycatchers at La Jara SWA during 2003 (Table 1 and Appendix G) or 2002 (Table 2). Few dense patches of willow were present along the survey route and little suitable habitat was found (Digital Appendix A.5-7).

Poso Creek—No Willow Flycatchers were detected at Poso Creek (Table 1 and Appendix G). Poso Creek was dry during all three visits, which may have contributed to lack of detections. Furthermore, this area contained few suitable willow patches (Digital Appendix A.8-10). Lack of detections in 2003 is consistent with our survey results from 2002 (Table 2).

Rio Grande State Wildlife Area—Several Willow Flycatchers were detected in the Rio Grande SWA (Appendices F, G). In total, ten Willow Flycatchers were observed in section one, occupying eight territories (Fig. 4 and Table 1). Seven flycatchers were detected during the first survey period. During the second survey three additional birds were detected, occupying a total of eight territories (Table 1). Nine of these birds were detected in similar locations as the first survey (Fig. 4). During survey three, ten flycatchers were detected in the same location where they were observed during surveys one and two; however, no birds were detected at the western end of the survey area. Numbers of Willow Flycatchers detected at Rio Grande SWA section one remained constant between 2002 and 2003 (Table 2).

In section two of the Rio Grande SWA, 11 Willow flycatchers were detected in the first survey period, occupying eight territories (Table 1 and Appendices F, G). During the second visit, 18 flycatchers were observed and eight of these occupied similar locations as the previous visit (Fig. 5). Fifteen Willow Flycatchers were detected during the third survey period, of which 14 were detected in close proximity to the areas occupied in either period

one or two. Compared to survey results from 2002, numbers of Willow Flycatchers detected remained relatively constant (Table 2).

A total of two Willow Flycatchers were detected in section three of the Rio Grande SWA (Table 1 and Appendices F, G). One was detected during the first survey period and the second was detected in the same location during the second period (Fig. 6). Because no bird was detected during the third survey period, it is unclear whether Willow Flycatchers were breeding at this location. Our observations from the 2003 surveys are the identical to our observations from 2002 (Table 2).

Sego Springs State Wildlife Area—No Willow Flycatchers were detected during the first survey period; however, three flycatchers were detected during the second survey period (Table 1 and Appendices F, G) near the north end of the survey route (Fig. 7). On the final survey, an additional flycatcher was detected in the same vicinity as the previous visit (Fig. 7). Because only one flycatcher was observed in the third survey period it is unclear how many territories exist at Sego Springs. In the previous year, only two flycatchers were detected during the first survey period, while in 2003, flycatchers were detected during the final two visits (Table 2).

Table 1. Number of adult Willow Flycatchers detected in the San Luis Valley in survey areas managed by the Colorado Division of Wildlife (CDOW), the Rio Grande National Forest (RGNF), the Saguache Bureau of Land Management (BLM), and the U.S. Fish and Wildlife Service (USFWS), 2003.

Survey area	Management agency	Survey length (km)	Survey period		
			1	2	3
Higel State Wildlife Area	CDOW	6.6	5	9	11
La Jara State Wildlife Area	CDOW	1.6	0	0	0
Poso Creek	CDOW	0.9	0	0	0
Rio Grande State Wildlife Area section one	CDOW	3.9	7	10	10
Rio Grande State Wildlife Area section two	CDOW	2.9	11	18	15
Rio Grande State Wildlife Area section three	CDOW	2.5	1	1	0
Sego Spring State Wildlife Area	CDOW	1.3	0	3	1
Conejos	RGNF	0.4	0	0	0
La Manga Creek	RGNF	2.3	0	0	0
Wolf Creek section one	RGNF	0.2	0	0	0
Wolf Creek section two	RGNF	0.1	0	0	0
Wolf Creek section three	RGNF	0.1	0	0	0
Four Mile Creek	BLM	6.4	0	0	0
Graveyard Gulch	BLM	0.9	0	0	0
Graveyard Gulch Eastern Fork	BLM	1.6	0	0	0
Graveyard Gulch Western Fork	BLM	0.45	0	0	0
La Garita	BLM	2.1	0	0	0
Pass Creek East	BLM	1.5	0	0	0
Pass Creek West	BLM	3.2	0	0	0
Saguache Creek	BLM	0.3	1	0	0
Alamosa National Wildlife Refuge South	USFWS	14.5	15	21	24
Lil' Pop	USFWS	9.7	1	0	0

Table 2. Comparison of the number of Willow Flycatchers detected in 2002 and 2003 in the San Luis Valley.

Survey area	2002			2003		
	Survey period			Survey period		
	1	2	3	1	2	3
Alamosa National Wildlife Refuge South	3	16	19	15	21	24
Higel State Wildlife Area	0	2	1	5	9	11
La Jara State Wildlife Area	0	0	0	0	0	0
Poso Creek	0	0	0	0	0	0
Rio Grande State Wildlife Area section one	5	9	10	7	10	10
Rio Grande State Wildlife Area section two	5	12	16	11	18	15
Rio Grande State Wildlife Area section three	1	1	0	1	1	0
Sego Spring State Wildlife Area	2	0	0	0	3	1

Rio Grande National Forest

Conejos—We did not detect flycatchers at the Conejos survey area (Table 1 and Appendix H). This area contains dense patches of willow; however, little standing water was present. In addition, the Conejos site appears to have been grazed sometime in the past (Digital Appendix B.1-3).

La Manga Creek—No Willow Flycatchers were detected along La Manga Creek (Table 1 and Appendix H). This area contains sparse willow patches that are < 5 m tall and sits at over 3000 m, which may have contributed to the lack of detections.

Wolf Creek—We did not detect Willow Flycatchers in either of the Wolf Creek survey areas (Table 1 and Appendix H). Wolf Creek contains dense patches of willow with standing water; however, the amount of suitable habitat was relatively small (Fig. 10).

Saguache Bureau of Land Management

Four Mile Creek—No Willow Flycatchers were observed along the Four Mile Creek survey route (Table 1 and Appendix I). Four Mile Creek is a high altitude site with very little water in the Creek. In addition, this area contains few large and dense willow patches (Digital Appendix C.1-3).

La Garita Creek—We did not observe Willow Flycatchers at La Garita Creek (Table 1 and Appendix I). La Garita Creek contains willow patches; however, patches are sparse and large gaps exist between patches (Digital Appendix C.4-6).

Graveyard Gulch—Three areas of Graveyard Gulch were surveyed for Willow Flycatchers, resulting in no detections (Table 1 and Appendix I). Graveyard Gulch contains no suitable Willow Flycatcher habitat (Digital Appendix C.7-11), as no dense patches of willow or running water occurred at Graveyard Gulch.

Pass Creek—No Willow Flycatchers were observed along Pass Creek (Table 1 and Appendix I). Very few dense patches of Willow were found along Pass Creek (Digital Appendix C. 12-15); however, one section of Pass Creek West may provide potential future habitat (Digital Appendix C.16-17).

Saguache Creek—One Willow Flycatcher was observed during the first survey period (Fig. 15); however, no flycatchers were observed during subsequent visits (Table 1 and Appendices I and J). Because the bird was detected only during the first survey period, it was likely a migrant. The Saguache Creek survey area contains dense patches of willow with running water nearby and therefore, could provide future habitat.

U.S. Fish and Wildlife Service

Alamosa National Wildlife Refuge South—We detected 15 Willow Flycatchers at Alamosa National Wildlife Refuge South during the first survey period (Table 1 and Appendices K, L). During the second survey period, 10 flycatchers were observed in the same vicinity as the previous visit and 11 were observed in new locations (Fig. 16). Twenty-four Willow Flycatchers were detected during the final survey in close proximity to areas in which they were detected during periods one and two (Fig. 16). More Willow Flycatchers were detected in 2003 than in 2002 (Table 2).

Lil' Pop—We detected one Willow Flycatcher near the sewage disposal pond in the Lil' Pop survey area during the first survey period (Fig. 17); however, no Willow Flycatchers were detected in subsequent visits (Table 1 and Appendices K, L). Although detections only in the first survey period suggest migrant status, Lil' Pop may provide potential suitable habitat for breeding birds in the future.

DISCUSSION

We detected resident Willow Flycatchers in five riparian areas in the San Luis Valley. Resident or territorial status is assumed because flycatchers were detected in both the second and third survey periods. Breeding or territorial status can only be verified if a Willow Flycatcher is detected during the third survey period or if breeding behavior is observed (e.g., nest building) (Sogge et al. 1997). Additional Willow Flycatchers were observed in three different riparian areas during either the first or second survey period, which suggests that these birds are migrants. Areas where resident Willow Flycatchers were detected contained dense riparian vegetation greater than 10 m wide and were usually in close proximity to water or saturated soil (Digital Appendix E). Migrant Willow Flycatchers also were detected in areas with dense patches of willow; however, many of these willow patches were relatively small (Digital Appendix A.17-19 and C.18).

Compared to surveys conducted in 2002, numbers of Willow Flycatchers increased at Alamosa National Wildlife Refuge South and Higel State Wildlife Area. In particular, significantly more Willow Flycatchers were detected at Higel State Wildlife Area. Increases in detections may be due to increased survey effort or due to maturation of willow patches and/or increased water levels in 2003.

Because Southwestern Willow Flycatchers are riparian obligate species they are particularly sensitive to changes in riparian habitat. In fact, one of the primary causes for population decline is the loss and alteration of riparian habitat on the breeding grounds (Sogge et al 1997). Alteration of waterways, grazing, and brood parasitism by Brown-headed Cowbirds also have contributed to population declines (Sogge et al. 1997, Marshall and Stoleson 2000). In the San Luis Valley, damming and diversions have altered many of

the waterways, which often reduces the amount of water in riparian habitats (Marshall and Stoleson 2000). For example, Conejos and Poso Creek both contained dense patches of willow that appeared to be appropriate Willow Flycatcher habitat; however, these areas lacked surface water and saturated soil (Digital Appendix A.8-10 and B.1-3). Overgrazing also can significantly alter riparian vegetation (Kauffman and Krueger 1984) making it unsuitable habitat for Southwestern Willow Flycatchers. One of our study areas showed signs of grazing (Digital Appendix D.5-7). The willow patches at Lil' Pop were severely browsed and much of the riparian vegetation was trampled. However, several studies have shown that with the removal of cattle, riparian vegetation can regenerate (Taylor 1986). Willow Flycatcher numbers also have been shown to increase in areas where cattle have been excluded (Taylor 1986, Taylor and Littlefield 1986). Other areas that we surveyed lacked dense riparian vegetation and saturated soils perhaps due to a combination of grazing and water diversions.

Brood parasitism by Brown-headed Cowbirds also threatens Southwestern Willow Flycatcher populations (Sogge et al. 1997). Parasitism by Brown-headed Cowbirds reduces host bird nest success by causing nest abandonment, removing of host eggs and/or young, and reducing fledgling survivorship (Marshall and Stoleson 2000). We detected several Brown-headed Cowbirds in areas with territorial Willow Flycatchers. For example, large numbers of Brown-headed Cowbirds were detected at Alamosa NWR South and Higel State Wildlife Area. Although these areas had the highest detection rates, many of these flycatchers may not be successfully reproducing due to nest parasitism. Brown-headed Cowbirds also were detected at Rio Grande State Wildlife Area, Sego Springs, Lil' Pop, Saguache Creek, Four Mile Creek, La Garita, Graveyard Gulch East, and Pass Creek.

While all the Willow Flycatchers detected in the San Luis Valley exhibited the distinctive “fitz-bew” song, we cannot be certain that they were all Southwestern Willow Flycatchers. Because arrival dates of all subspecies of flycatchers vary spatially and temporally, such that migrating Willow Flycatchers (*E. t. adastus* or *E. t. campestris*) can overlap with breeding Southwestern Willow Flycatchers, confusion often exists regarding subspecies identification and breeding and/or migrating status (Finch et al. 2000, U.S. Fish and Wildlife Service 2002). Thus, it is unclear whether the species present were *E. t. extimus*, *E. t. adastus*, or *E. t. campestris*. Although there are subtle differences in song between the different subspecies, it is extremely difficult to accurately distinguish vocalizations in the field and no official protocol exists for subspecies determination.

Intergradations between subspecies also may exist along the northern range limits for the Southwestern Willow Flycatcher (U.S. Fish and Wildlife Service 2002). For example, presence of *E. t. extimus* was confirmed at Alamosa National Wildlife Refuge, but no southwestern characteristics were detected in Beaver Creek (Eagle County) or Clear Creek (Clear Creek County) (Andrews and Righter 1992, Owen and Sogge 1997). Moreover, the genetic structure of Willow Flycatchers may vary with elevation, such that at higher elevations flycatchers show characteristics of *E. t. adastus*. Although recent work by Paxton (2002) suggests that *E. t. extimus* is present in the San Luis Valley, he did not evaluate genetic differences along elevational gradients, thus it is unclear if the flycatchers detected at high elevations in the San Luis Valley are *E. t. extimus*.

RECOMMENDATIONS

We recommend that Willow Flycatcher monitoring in the San Luis Valley continue (1) because absence of flycatchers in a single year does not indicate that the habitat is unsuitable and long-term monitoring must occur to ensure occupancy (Sogge et al. 1997) and (2) because loss of breeding riparian habitat is the primary cause of endangerment, it is crucial that potential future habitat be identified (U.S. Fish and Wildlife Service 2002). Potential future habitat includes areas that lack some components of prime Southwestern Willow Flycatcher habitat but, if effectively managed could be restored (Sogge and Marshall 2000, U.S. Fish and Wildlife Service 2002). Moreover, because the Willow Flycatcher population in the San Luis Valley may vary genetically, additional research needs to be conducted in this area.

ACKNOWLEDGMENTS

The U.S. Fish and Wildlife Service and the Colorado Division of Wildlife provided funding for Southwestern Willow Flycatcher surveys. We extend special Thanks to Kelli Stone and the staff at Alamosa/Monte Vista National Wildlife Refuge for providing logistical support. Kathi Borgmann, Pam Clark, Whitney Markham, Karen Epperson, and Geoff Evans conducted Willow Flycatcher surveys. This report was written by Kathi Borgmann, and edited by Gail Garber.

LITERATURE CITED

- Andrews, R., and R. Righter. 1992. Colorado Birds: a reference to their distribution and habitat. Denver Museum of Natural History. Denver, Colorado.
- Bureau of Land Management. 1998. Birds as indicators of riparian vegetation condition in the western U.S. Bureau of Land Management, Partners in Flight, Boise, Idaho. BLM/ID/PT-98/004+6635. Jamestown, ND: Northern Prairie Wildlife Research Center home page.
- Finch, D. M., and S. H. Stoleson, eds. 2000. Status, ecology, and conservation of the Southwestern Willow Flycatcher. Gen. Tech. Rep. RMRS-GTR-60. Ogden, UT. USDA, Rocky Mountain Research Station.
- Finch, D. M., J. F. Kelley, and J. E. Cartron. 2000. Migration and winter ecology. Pages 71-81 in Status, ecology, and conservation of the Southwestern Willow Flycatcher. D. M. Finch and S. H. Stoleson, eds. Gen. Tech. Rep. RMRS-GTR-60. Ogden, UT. USDA, Rocky Mountain Research Station.
- Kauffman, J. B., and W. C. Krueger. 1984. Livestock impacts on riparian ecosystems and streamside management implications: a review. *Journal of Range Management* 37:430-438.
- Marshall, R. M., and S. H. Stoleson. 2000. Threats. Pages 13 – 24 in Status, ecology, and conservation of the Southwestern Willow Flycatcher. D. M. Finch and S. H. Stoleson, eds. Gen. Tech. Rep. RMRS-GTR-60. Ogden, UT. USDA, Rocky Mountain Research Station.
- Owen, J. C., and M. K. Sogge. 1997. Banding and genetic sampling of Willow Flycatchers in Colorado – 1996 & 1997 summary report. U.S.G.S. Colorado Plateau Field Station/Northern Arizona University Report.
- Sedgwick, J. A. 2000. Willow Flycatcher (*Empidonax traillii*). In *The birds of North America*, no. 533 (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, PA, and The American Ornithologists' Union, Washington, D.C.
- Sogge, M., R. M. Marshall, S. J. Sferra, and T. J. Tibbitts. 1997. A Southwestern Willow Flycatcher natural history summary and survey protocol. National Park Service Technical Report NPS/NAUCPRS/NRTR-97/12.
- Taylor, D. M. 1986. Effects of cattle grazing on passerine birds nesting in riparian habitat. *Journal of Range Management* 39:254-258.
- Taylor, D. M., and C. D. Littlefield. 1986. Willow Flycatcher and Yellow Warbler response to cattle grazing. *American Birds* 40:1169-1173.

U.S. Fish and Wildlife Service. 1995. Final rule determining endangered status for the Southwestern Willow Flycatcher. Federal Register 60: 10694-10715 (February 27, 1995).

U.S. Fish and Wildlife Service. 2002. Southwestern Willow Flycatcher Recovery Plan. Albuquerque, New Mexico. i –ix + 210 pp.,. Appendices A – O.

Appendix A. Universal Transverse Mercator coordinates for Southwestern Willow Flycatcher Survey routes in the San Luis Valley, 2003.

Site	Location	Easting	Northing
Alamosa South	Start	428949	4143815
Alamosa South	Middle 1	430838	4140432
Alamosa South	Middle 2	431742	4136723
Alamosa South	End	433870	4134044
Conejos	Start	375337	4110987
Conejos	Middle	375212	4110993
Conejos	End	375065	4111257
Four Mile Creek	Start	364206	4215999
Four Mile Creek	Middle	363087	4216088
Four Mile Creek	End	361598	4216075
La Garita	Start	387326	4185924
La Garita	Middle	386332	4185866
La Garita	End	385211	4185849
Graveyard Gulch	Start	405677	4228743
Graveyard Gulch	End	405508	4227971
Graveyard Gulch Eastern Fork	Start	406115	4227920
Graveyard Gulch Eastern Fork	End	406262	4229151
Graveyard Gulch Western Fork	Start	404861	4228338
Graveyard Gulch Western Fork	End	404988	4227968
Higel SWA	Start	414422	4156795
Higel SWA	Middle 1	413393	4157212
Higel SWA	Middle 2	411549	4157120
Higel SWA	End	411549	4157349
La Jara SWA	Start	392634	4115455
La Jara SWA	Middle	392534	4114932
La Jara SWA	End	392645	411043
Lil' Pop	Start	427415	4143884
Lil' Pop	Middle	426230	4144731
Lil' Pop	End	424736	4146714
La Manga Creek	Start	375411	4105363
La Manga Creek	Middle	376354	4105129
La Manga Creek	End	377365	4105804
Pass Creek East	Start	371747	4225483
Pass Creek East	Middle	370759	4226134
Pass Creek East	End	370100	4226838
Pass Creek West	Start	369592	4227282
Pass Creek West	Middle	367875	4227641
Pass Creek West	End	366270	4228212
Poso Creek	Start	390071	4124954
Poso Creek	Middle	389733	4124977
Poso Creek	End	389200	4124715
Rio Grande SWA Section 1	Start	403453	4159830
Rio Grande SWA Section 1	Middle	404548	4159689

Appendix A. Cont.

Site	Location	Easting	Northing
Rio Grande SWA Section 1	End	405282	4159199
Rio Grande SWA Section 2	Start	408290	4158771
Rio Grande SWA Section 2	Middle	406996	4159014
Rio Grande SWA Section 2	End	405483	4159571
Rio Grande SWA Section 3	Start	405776	4158638
Rio Grande SWA Section 3	Middle	406678	4158628
Rio Grande SWA Section 3	End	408137	4157998
Saguache Creek	Start	387667	4223449
Saguache Creek	Middle	388096	4223541
Saguache Creek	End	387975	4223239
Sego Springs SWA	Start	421309	4116226
Sego Springs SWA	Middle	421608	4116679
Sego Springs SWA	End	422000	4117221
Wolf Creek Section 1	Start	370160	4097539
Wolf Creek Section 1	Middle	370072	4097580
Wolf Creek Section 1	End	370093	4097735
Wolf Creek Section 2	Start	370172	4097379
Wolf Creek Section 2	Middle	370202	4097423
Wolf Creek Section 2	End	370075	4097395
Wolf Creek Section 3	Start	370089	4097238
Wolf Creek Section 3	Middle	370148	4097179
Wolf Creek Section 3	End	370171	4097153

Appendix B. Species list for Southwestern Willow Flycatcher surveys in areas managed by the Colorado Division of Wildlife.

Common name	Scientific name
Pied-billed Grebe	<i>Podilymbus podiceps</i>
Double-crested Cormorant	<i>Phalacrocorax auritus</i>
American Bittern	<i>Botaurus lentiginosus</i>
Snowy Egret	<i>Egretta thula</i>
Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>
Canada Goose	<i>Branta canadensis</i>
Mallard	<i>Anas platyrhynchos</i>
Gadwall	<i>Anas strepera</i>
Cinnamon Teal	<i>Anas cyanoptera</i>
Redhead	<i>Aythya americana</i>
Ruddy Duck	<i>Oxyura jamaicensis</i>
Swainson's Hawk	<i>Buteo swainsoni</i>
Red-tailed Hawk	<i>Buteo jamaicensis</i>
Wild Turkey	<i>Meleagris gallopavo</i>
American Coot	<i>Fulica americana</i>
Sora	<i>Porzana carolina</i>
Killdeer	<i>Charadrius vociferus</i>
American Avocet	<i>Recurvirostra americana</i>
Common Snipe	<i>Gallinago gallinago</i>
Mourning Dove	<i>Zenaida macroura</i>
Great-Horned Owl	<i>Bubo virginianus</i>
Belted Kingfisher	<i>Ceryle alcyon</i>
Hairy Woodpecker	<i>Picoides villosus</i>
Northern Flicker	<i>Colaptes auratus</i>
Olive-sided Flycatcher	<i>Contopus cooperi</i>
Western Wood-Pewee	<i>Contopus sordidulus</i>
Willow Flycatcher	<i>Empidonax traillii</i>
Black-billed Magpie	<i>Pica hudsonia</i>
Common Raven	<i>Corvus corax</i>
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>
Violet-green Swallow	<i>Tachycineta thalassina</i>
Tree Swallow	<i>Tachycineta bicolor</i>
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>
Barn Swallow	<i>Hirundo rustica</i>
Black-capped Chickadee	<i>Poecile atricapilla</i>
Mountain Chickadee	<i>Poecile gambeli</i>
White-breasted Nuthatch	<i>Sitta carolinensis</i>
House Wren	<i>Troglodytes aedon</i>
Marsh Wren	<i>Cistothorus palustris</i>
Townsend's Solitaire	<i>Myadestes townsendi</i>
Mountain Bluebird	<i>Sialia currucoides</i>
Western Bluebird	<i>Sialia mexicana</i>
American Robin	<i>Turdus migratorius</i>

Appendix B. Cont.

Common name	Scientific name
European Starling	<i>Sturnus vulgaris</i>
Yellow Warbler	<i>Dendroica petechia</i>
Wilson's Warbler	<i>Wilsonia pusilla</i>
Western Tanager	<i>Piranga ludoviciana</i>
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>
Spotted Towhee	<i>Pipilo maculatus</i>
Green-tailed Towhee	<i>Pipilo chlorurus</i>
Savannah Sparrow	<i>Passerculus sandwichensis</i>
Vesper Sparrow	<i>Pooecetes gramineus</i>
Song Sparrow	<i>Melospiza melodia</i>
Western Meadowlark	<i>Sturnella neglecta</i>
Brown-headed Cowbird	<i>Molothrus ater</i>
Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>
Red-winged Blackbird	<i>Agelaius phoeniceus</i>
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>
Bullock's Oriole	<i>Icterus bullockii</i>
House Finch	<i>Carpodacus mexicanus</i>
American Goldfinch	<i>Carduelis tristis</i>

Appendix C. Species list for Southwestern Willow Flycatcher surveys in areas managed by the Rio Grande National Forest.

Common name	Scientific name
Canada Goose	<i>Branta canadensis</i>
Mallard	<i>Anas platyrhynchos</i>
Sharp-shinned Hawk	<i>Accipiter striatus</i>
Red-tailed Hawk	<i>Buteo jamaicensis</i>
American Kestrel	<i>Falco sparverius</i>
Spotted Sandpiper	<i>Actitis macularia</i>
Mourning Dove	<i>Zenaida macroura</i>
White-throated Swift	<i>Aeronautes saxatalis</i>
Black-chinned Hummingbird	<i>Archilochus alexandri</i>
Hairy Woodpecker	<i>Picoides villosus</i>
Northern Flicker	<i>Colaptes auratus</i>
Olive-sided Flycatcher	<i>Contopus cooperi</i>
Western Wood-Pewee	<i>Contopus sordidulus</i>
Cordilleran Flycatcher	<i>Empidonax occidentalis</i>
Dusky Flycatcher	<i>Empidonax oberholseri</i>
Say's Phoebe	<i>Sayornis saya</i>
Warbling Vireo	<i>Vireo gilvus</i>
Steller's Jay	<i>Cyanocitta stelleri</i>
Pinyon Jay	<i>Gymnorhinus cyanocephalus</i>
Black-billed Magpie	<i>Pica hudsonia</i>
Common Raven	<i>Corvus corax</i>
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>
Violet-green Swallow	<i>Tachycineta thalassina</i>
Tree Swallow	<i>Tachycineta bicolor</i>
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>
Barn Swallow	<i>Hirundo rustica</i>
Mountain Chickadee	<i>Poecile gambeli</i>
Pygmy Nuthatch	<i>Sitta pygmaea</i>
House Wren	<i>Troglodytes aedon</i>
Rock Wren	<i>Salpinctes obsoletus</i>
Ruby-crowned Kinglet	<i>Regulus calendula</i>
Townsend's Solitaire	<i>Myadestes townsendi</i>
Mountain Bluebird	<i>Sialia currucoides</i>
American Robin	<i>Turdus migratorius</i>
Hermit Thrush	<i>Catharus guttatus</i>
Gray Catbird	<i>Dumetella carolinensis</i>
Yellow Warbler	<i>Dendroica petechia</i>
Magnolia Warbler	<i>Dendroica magnolia</i>
Yellow-rumped Warbler	<i>Dendroica coronata</i>
Grace's Warbler	<i>Dendroica graciae</i>
Orange-crowned Warbler	<i>Vermivora celata</i>
MacGillivray's Warbler	<i>Oporornis tolmiei</i>
Wilson's Warbler	<i>Wilsonia pusilla</i>

Appendix C. Cont.

Common name	Scientific name
Western Tanager	<i>Piranga ludoviciana</i>
Scarlet Tanager	<i>Piranga olivacea</i>
Green-tailed Towhee	<i>Pipilo chlorurus</i>
Chipping Sparrow	<i>Spizella passerina</i>
Vesper Sparrow	<i>Pooecetes gramineus</i>
Fox Sparrow	<i>Passerella iliaca</i>
Lincoln's Sparrow	<i>Melospiza lincolni</i>
Song Sparrow	<i>Melospiza melodia</i>
Western Meadowlark	<i>Sturnella neglecta</i>
Brown-headed Cowbird	<i>Molothrus ater</i>
Red-winged Blackbird	<i>Agelaius phoeniceus</i>
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>
Pine Siskin	<i>Carduelis pinus</i>
Lesser Goldfinch	<i>Carduelis psaltria</i>
American Goldfinch	<i>Carduelis tristis</i>

Appendix D. Species list for Southwestern Willow Flycatcher surveys in areas managed by the Saguache Bureau of Land Management.

Common name	Scientific name
Mourning Dove	<i>Zenaida macroura</i>
Black-chinned Hummingbird	<i>Archilochus alexandri</i>
Downy Woodpecker	<i>Picoides pubescens</i>
Hairy Woodpecker	<i>Picoides villosus</i>
Northern Flicker	<i>Colaptes auratus</i>
Western Wood-Pewee	<i>Contopus sordidulus</i>
Dusky Flycatcher	<i>Empidonax oberholseri</i>
Warbling Vireo	<i>Vireo gilvus</i>
Steller's Jay	<i>Cyanocitta stelleri</i>
Pinyon Jay	<i>Gymnorhinus cyanocephalus</i>
Black-billed Magpie	<i>Pica hudsonia</i>
Common Raven	<i>Corvus corax</i>
Violet-green Swallow	<i>Tachycineta thalassina</i>
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>
Bushtit	<i>Psaltriparus minimus</i>
Pygmy Nuthatch	<i>Sitta pygmaea</i>
House Wren	<i>Troglodytes aedon</i>
American Robin	<i>Turdus migratorius</i>
Orange-crowned Warbler	<i>Vermivora celata</i>
Magnolia Warbler	<i>Dendroica magnolia</i>
Yellow-rumped Warbler	<i>Dendroica coronata</i>
Grace's Warbler	<i>Dendroica graciae</i>
Scarlet Tanager	<i>Piranga olivacea</i>
Green-tailed Towhee	<i>Pipilo chlorurus</i>
Song Sparrow	<i>Melospiza melodia</i>
Dark-eyed Junco	<i>Junco hyemalis</i>
Western Meadowlark	<i>Sturnella neglecta</i>
Brown-headed Cowbird	<i>Molothrus ater</i>
Red-winged Blackbird	<i>Agelaius phoeniceus</i>
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>

Appendix E. Species list for Southwestern Willow Flycatcher surveys in areas managed by the U.S. Fish and Wildlife Service.

Common name	Scientific name
Pied-billed Grebe	<i>Podilymbus podiceps</i>
American Bittern	<i>Botaurus lentiginosus</i>
Great Blue Heron	<i>Ardea herodias</i>
Great Egret	<i>Ardea alba</i>
Snowy Egret	<i>Egretta thula</i>
Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>
White-faced Ibis	<i>Eudocimus albus</i>
Canada Goose	<i>Branta canadensis</i>
Mallard	<i>Anas platyrhynchos</i>
Gadwall	<i>Anas strepera</i>
Northern Pintail	<i>Anas acuta</i>
Northern Shoveler	<i>Anas clypeata</i>
Cinnamon Teal	<i>Anas cyanoptera</i>
Blue-winged Teal	<i>Anas discors</i>
Green-winged Teal	<i>Anas crecca</i>
Redhead	<i>Aythya americana</i>
Common Merganser	<i>Mergus merganser</i>
Ruddy Duck	<i>Oxyura jamaicensis</i>
Northern Harrier	<i>Circus cyaneus</i>
Swainson's Hawk	<i>Buteo swainsoni</i>
Red-tailed Hawk	<i>Buteo jamaicensis</i>
American Kestrel	<i>Falco sparverius</i>
Ring-necked Pheasant	<i>Phasianus colchicus</i>
American Coot	<i>Fulica americana</i>
Virginia Rail	<i>Rallus limicola</i>
Sora	<i>Porzana carolina</i>
Killdeer	<i>Charadrius vociferus</i>
American Avocet	<i>Recurvirostra americana</i>
Black-necked Stilt	<i>Himantopus mexicanus</i>
Common Snipe	<i>Gallinago gallinago</i>
Wilson's Phalarope	<i>Phalaropus tricolor</i>
Mourning Dove	<i>Zenaida macroura</i>
Great-Horned Owl	<i>Bubo virginianus</i>
Northern Flicker	<i>Colaptes auratus</i>
Western Wood-Pewee	<i>Contopus sordidulus</i>
Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>
Cassin's Kingbird	<i>Tyrannus vociferans</i>
Black-billed Magpie	<i>Pica hudsonia</i>
Horned Lark	<i>Eremophila alpestris</i>
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>
Violet-green Swallow	<i>Tachycineta thalassina</i>
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>
Barn Swallow	<i>Hirundo rustica</i>