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**HABITAT USE BY BREEDING BIRDS  
ON WESTERN MOBILE INC. LYONS PROPERTY**

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## INTRODUCTION

I conducted a one-season breeding bird study (17 May-20 July 1997) on the Western Mobile Inc. (WMI) Lyons property. The purpose of the study was to collect baseline information concerning habitat use by breeding bird populations on the property and to determine nesting locations of Boulder County avian species of special concern (Hallock 1993). Management recommendations in this report are directed toward maximizing species richness and breeding bird population density on the property while protecting habitat for species of special concern.

My previous work with Colorado breeding bird populations includes 8 years conducting breeding bird surveys for the City of Boulder as an independent consultant, 15 years participating in the Boulder County Nature Association Indian Peaks Bird Counts, and 10 years organizing and doing field work for the Colorado Breeding Bird Atlas project.

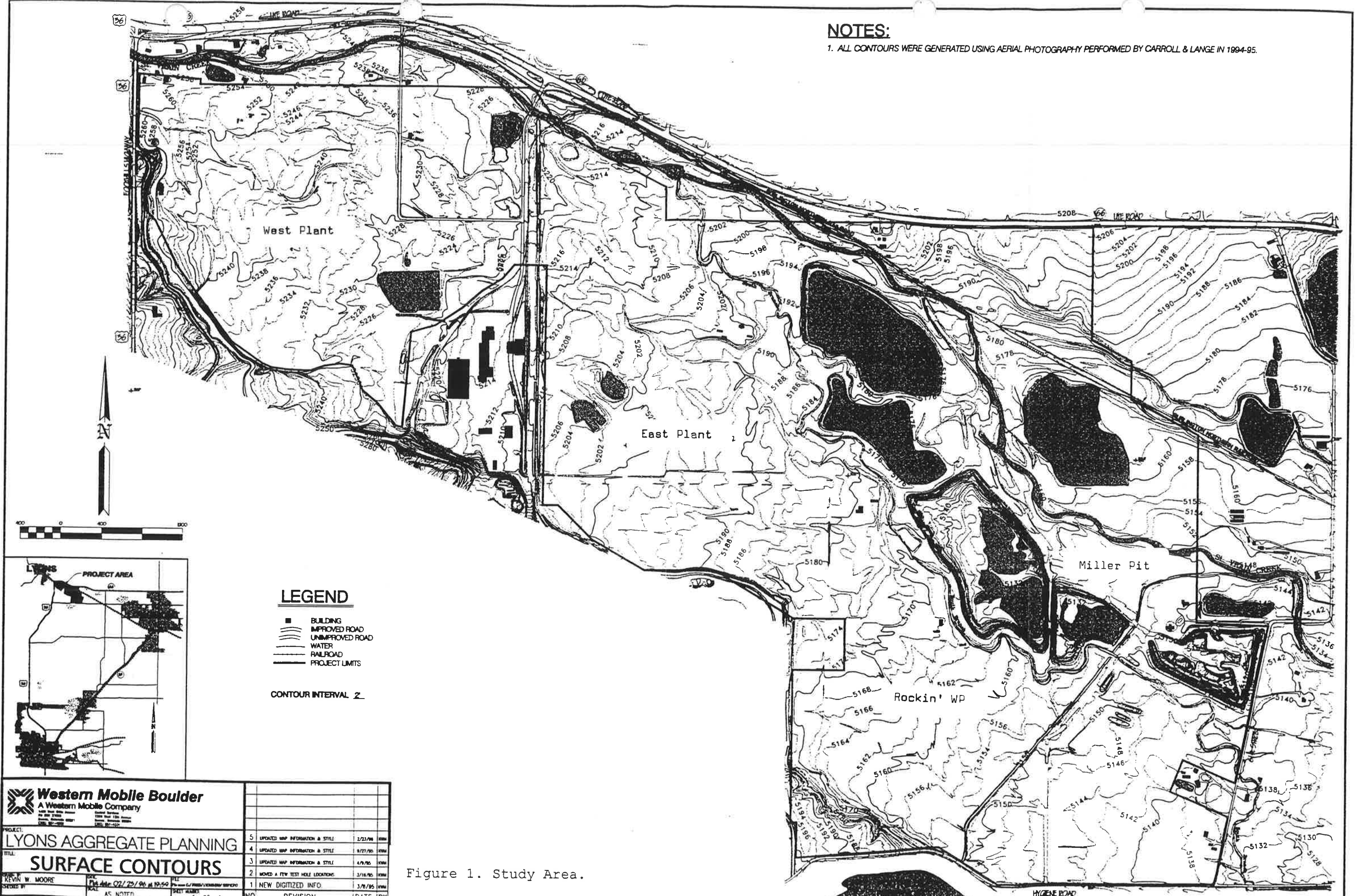
### Study Area

The WMI Lyons property lies east of Lyons and south of St. Vrain Creek. It is bordered to the north by SR 66, to the east by 61<sup>st</sup> and 63<sup>rd</sup> streets, to the south by Hygiene Road and the Southwest Portland Cement Plant, and to the west by US 36 (Figure 1). Current uses of the property include gravel mining, processing, and transport by truck and rail; cattle ranching; and farming (irrigated hay meadows). The current mining operation is confined to the eastern third of the property (Miller Pit) where several ponds have been created during the reclamation process.

Cattle grazing occurs throughout the property--on grasslands and irrigated hay meadows in the West Plant (Phase I), East Plant (Phase II), and Rockin' WP South (Phase III) areas, and within the St. Vrain Creek and South Branch riparian corridors. These

**NOTES:**

1. ALL CONTOURS WERE GENERATED USING AERIAL PHOTOGRAPHY PERFORMED BY CARROLL & LANGE IN 1994-95.



**LEGEND**

- BUILDING
- == IMPROVED ROAD
- UNIMPROVED ROAD
- WATER
- RAILROAD
- PROJECT LIMITS

CONTOUR INTERVAL 2'

**Western Mobile Boulder**  
A Western Mobile Company

PROJECT: LYONS AGGREGATE PLANNING  
TITLE: SURFACE CONTOURS

NO	REVISION	DATE	BY
5	UPDATED MAP INFORMATION & STYLE	2/23/98	FRM
4	UPDATED MAP INFORMATION & STYLE	9/27/95	FRM
3	UPDATED MAP INFORMATION & STYLE	4/9/95	FRM
2	MOVED A FEW TEST HOLE LOCATIONS	3/18/95	FRM
1	NEW DIGITIZED INFO	3/8/95	FRM

Figure 1. Study Area.

riparian corridors are dominated by cottonwoods (Populus spp.), willows (Salix spp.), and a scattered understory of chokecherries (Padus virginiana), hawthorns (Crataegus spp.), and other shrubs (Weber 1992). Scattered stands of cottonwoods, willows, and box elders (Negundo aceroides) grow in the grasslands and hay meadows. Small wetlands and prairie dog colonies occur throughout the property.

Located at the base of the Rocky Mountain foothills, the WMI Lyons property supports breeding birds typical of high plains grasslands (blue grosbeak, savannah sparrow, bobolink) as well as species typical of Rocky Mountain forests and shrublands (warbling vireo, lazuli bunting, lesser goldfinch). The St. Vrain Creek riparian corridors provide nesting habitat for cavity-nesting species (wood duck, eastern screech-owl, downy woodpecker) and canopy-nesting species (eastern kingbird, yellow warbler, Bullock's oriole) typical of western and eastern deciduous forests.

## **Methods**

Between 17 May-20 July, I walked three 1.2-3.2 km transects (four replications, 17-25 May, 1-18 June, 4-6 July, 18-20 July), noting all species seen or heard and marking sighting locations of Boulder County species of special concern on a 7½' topographic map (Figure 2). Surveys were conducted between 4:45 and 8:00 a.m. MST. I varied the order and direction of transect surveys to minimize seasonal and temporal biases. At 200 m intervals along each transect, I marked point-count stations with blue surveyor's tape. I stopped at each point-count station for five minutes, counting all birds seen or heard, excepting young of the year, within a 100 m radius.

Breeding behaviors were noted for each observed species. I used Colorado Breeding Bird Atlas protocol (see Appendix II) to



Figure 2. Transects and Point-Count Stations

classify each species as "migrant" (suitable nesting habitat does not exist on property), "observed" (suitable nesting habitat exists but no nesting behavior noted), "possible breeder" (exhibited nesting behavior in suitable habitat), or "confirmed breeder" (evidence of nesting).

I supplemented information from transect surveys and point counts with data from three raptor surveys I conducted during April-May 1997 and with data from an eastern screech-owl study carried out by the Boulder County Nature Association during fall-winter 1995-96.



## RESULTS AND DISCUSSION

I observed 60 species on the WMI Lyons property, 17 May-20 July (Table 1). Of this total, 28 species definitely nested on the property, 19 species may have nested, and 13 species were migrants or non-nesting summer visitants. Two Boulder County species of special concern, yellow warbler and savannah sparrow, definitely nested on the property. Four additional species of special concern, wood duck, eastern screech-owl, rock wren, and bobolink, exhibited nesting behavior in suitable nesting habitat. A blue grosbeak perched on the property but probably did not nest. A pair of bald eagles wintering on the property has constructed a nest along the South Branch of St. Vrain Creek. This nest has not been used to raise young. In 1997, the eagles were last seen on the property on 23 March (D. W. King, pers. commun.).

The South Branch riparian corridor supported relatively high numbers of breeding species and individuals (Table 2). This riparian corridor contains scattered trees and mixed shrubs. It is bordered on one side by reclaimed gravel ponds and on the other by wetlands and irrigated hay meadows. The St. Vrain Creek riparian corridor supported relatively low densities of breeding birds. Notably absent from this riparian corridor were shrub-nesting species such as common yellowthroat, yellow-breasted chat, and lazuli bunting. This corridor supports high numbers of urban-adapted generalists, such as American robin, European starling, and common grackle, and relatively low numbers of riparian woodland specialists, such as Bullock's oriole.

Livestock grazing and road and home construction may have reduced shrub vegetation within this riparian corridor. Mean plot densities along the St. Vrain Creek corridor were 40% lower than plot densities along a relatively undisturbed stretch of



**Table 1**

**1997 BREEDING SEASON OBSERVATIONS  
17 MAY-20 JULY**

**Boldface:** Boulder County species of special concern

Habitat Codes (where each species was seen):

A: agricultural field      R: riparian woodland  
G: grassland                U: urban (structure)  
L: lake                        W: wetland

<u>Species</u>	<u>Habitats</u>	<u>Breeding Status</u>
Double-crested Cormorant	L	Observed <sup>1</sup>
Great Blue Heron	L	Observed
Black-crowned Night Heron	L	Observed
Canada Goose	G, L, W	Fledged young
Mallard	G, L, R, W	Occupied nest
<b>Wood Duck</b>	L, R	Pair
Lesser Scaup	L	Migrant <sup>2</sup>
Red-tailed Hawk	G, R, U, W	Used nest
Turkey Vulture	R	Observed
American Kestrel	G, R, U	Occupied nest
Killdeer	G, L, W	Territory
Spotted Sandpiper	L, R	Fledged young
Common Snipe	G, W	Territory
Ring-billed Gull	L	Migrant
Franklin's Gull	G	Migrant
Rock Dove	R, U	Observed
Mourning Dove	R, U	Occupied nest
<b>Eastern Screech-Owl</b>	R	Territory
Great Horned Owl	R	Fledged young
Belted Kingfisher	R	Observed
Broad-tailed Hummingbird	R	Observed

Downy Woodpecker	R	Fledged young
Northern Flicker	R, U	Occupied nest
Olive-sided Flycatcher	R	Migrant
Western Wood-Pewee	R	Fledged young
Say's Phoebe	G, U	Pair
Western Kingbird	R	Territory
Eastern Kingbird	R	Singing male
Tree Swallow	L, R	Observed
Rough-winged Swallow	R	Observed
Cliff Swallow	L, R, U	Nest building
Barn Swallow	L, R, U	Nest building
Blue Jay	R	Territory
Black-billed Magpie	U	Occupied nest
Black-capped Chickadee	R	Occupied nest
<b>Rock Wren</b>	R	Singing male
House Wren	R, U	Feeding young
American Robin	G, R, U	Nest building
European Starling	G, R, U	Occupied nest
Warbling Vireo	R	Singing male
<b>Yellow Warbler</b>	R	Feeding young
Yellow-rumped Warbler	G	Migrant
Northern Waterthrush	L	Migrant
Common Yellowthroat	W	Singing males
Western Tanager	R	Migrant
<b>Blue Grosbeak</b>	G	Observed
Lazuli Bunting	R	Singing male
<b>Savannah Sparrow</b>	G, W	Fledged young
Song Sparrow	R	Fledged young
<b>Bobolink</b>	G, W	Singing males
Red-winged Blackbird	G, L, R	Feeding young
Western Meadowlark	G	Feeding young
Brewer's Blackbird	G, R	Feeding young

Common Grackle	G, R, U	Fledged young
Brown-headed Cowbird	G, R, U	Fledged young
Bullock's Oriole	R	Fledged young
House Finch	R, U	Fledged young
Lesser Goldfinch	R	Fledged young
American Goldfinch	R, U	Fledged young
House Sparrow	R, U	Courtship

Additional Sightings:

Common Merganser	R	Fledged young <sup>3</sup>
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<sup>1</sup>"Observed:" no breeding behavior noted.

<sup>2</sup>"Migrant:" study area does not contain suitable nesting habitat.

<sup>3</sup>Summer 1996, Dallas Glasser, pers. commun.

Table 2

PLOT DENSITIES OF BREEDING BIRDS

Location	Mean Species Per Plot	Mean Indiv. Per Plot	Total Species	Total Special Concern
St. Vrain Cr. West Plant	6.96	10.71	29	1
St. Vrain Cr. WP North	7.33	12.54	37	2
St. Vrain Cr. South Branch	8.31	14.41	41	4
West Plant Meadow	6.79	12.00	31	2
Phase II-III Meadow	5.81	12.03	36	6

Species of Special Concern

St. Vrain Creek West: yellow warbler

St. Vrain Creek WP North: wood duck, yellow warbler

St. Vrain Creek South Branch: wood duck, rock wren, yellow warbler, savannah sparrow

West Plant Meadow: yellow warbler, savannah sparrow

Phase II-III Meadow: wood duck, rock wren, yellow warbler, blue grosbeak, savannah sparrow, bobolink

lower Boulder Creek that was surveyed using the same methodology (Jones 1997a). In contrast to the St. Vrain corridor, the Boulder Creek corridor had been fenced to exclude livestock, had not been fragmented by roads or houses, and contained many mature cottonwoods and willows.

Fencing of the St. Vrain corridor to exclude cattle should result in a rapid increase in numbers of nesting birds. In a study of shrubland-nesting birds at the Malheur National Wildlife Refuge in southeastern Oregon, densities of nesting yellow warblers and willow flycatchers increased dramatically after cattle were removed (Taylor and Littlefield 1986). Knopf, Sedgewick, and Cannon (1988) observed greatly reduced densities of habitat specialists such as Lincoln's sparrow and willow flycatcher in summer-grazed willow shrublands at the Arapahoe National Wildlife Refuge in Colorado. Duff (1979) noted a 350% increase in songbird and raptor use in a Utah riparian community after eight years of rest from grazing. Exclusion of cattle from the St. Vrain corridor will have immediate benefits for shrub-nesting and lower canopy-nesting species, including western woodpeewees, yellow-breasted chats, lazuli buntings, and song sparrows.

The Phase II and III meadows supported relatively low numbers of nesting species but supported several species of special concern. Savannah sparrows (Boulder County isolated populations) nested successively and bobolinks (Boulder County isolated populations) attempted nesting in irrigated hay meadows. Rock wrens (Boulder County isolated populations) attempted nesting on rock faces of dams and dikes. Yellow warblers (Audubon "blue list" of species with nationally declining populations) nested successively in scattered groves of deciduous trees. Wood ducks (Boulder County isolated populations) and a male blue grosbeak (State special concern) also were observed in this area.

Reclaimed gravel pits in the Rockin' WP North area supported

nesting Canada geese, mallards, killdeer, spotted sandpipers, and common yellowthroats. However, a number of species that typically nest in cattails and rushes on the borders of Boulder County lakes and ponds were absent from this area. American bitterns, pied-billed grebes, cinnamon teal, northern shovelers, soras, Virginia rails, American coots, and yellow-headed blackbirds nest in and around reclaimed gravel pits at Walden and Sawhill Ponds Wildlife areas in eastern Boulder County (Boulder County Audubon Society 1978-97). None of these species nested around reclaimed ponds in the Rockin' WP area.

Shorelines of reclaimed ponds in the Rockin' WP area were graded at about 7 to 1 (Dallas Glasser, pers. commun.). These gradients may be too steep to support extensive growth of cattails or rushes. As existing ponds fill in with sediment (as have ponds at Walden and Sawhill, most of which were reclaimed during the 1960s), more cattails and rushes may become established.

Gravel mining of the remainder of the Lyons property (excluding riparian areas, which will not be mined) will result in removal of some habitat for grassland-nesting birds (savannah sparrow, bobolink, meadowlark) and creation of habitat for wetland-nesting birds (American bittern, blue-winged and cinnamon teal, northern harrier, common yellowthroat, yellow-headed blackbird). Successful completion of the proposed reclamation plan should result in increased species diversity and density of nesting birds on the property. However, nesting habitat for two Boulder County species of concern, savannah sparrow and bobolink, will be disturbed by mining.

Improved management of the property prior to and during mining can contribute to increasing species richness and breeding bird abundance. Management measures that can be instituted immediately include the following:

- (1) Fencing of riparian corridors to exclude cattle.

(2) Creation of cattail/rush wetlands along the shores of reclaimed ponds.

(3) Delayed haying to protect nesting savannah sparrows and bobolinks.

(4) Aggressive weed control to protect and help restore native vegetation.

These management options are discussed in detail in the Management Recommendations section at the end of this report.

### **Species of Special Concern**

The Boulder County Avian Species of Special Concern List (Hallock 1993) includes birds in the following categories:

- (1) Boulder County rare and declining.
- (2) Boulder County rare.
- (3) Boulder County declining but not yet rare.
- (4) Boulder County isolated populations.
- (5) Federal endangered, threatened, or special concern.
- (6) State endangered, threatened, or special concern.
- (7) Rocky Mt. region (U.S. Forest Service) special concern.
- (8) Audubon "blue list" of species declining nationally.

The following species meet one or more of the above criteria and were observed on the WMI Lyons property between 17 May and 20 July.

#### 1. Wood Duck (Boulder County isolated populations)

Wood ducks nest in tree cavities along prairie streams and around reservoirs in eastern Boulder County. Local nesting populations have increased since the 1970s (Boulder County Audubon Society, 1978-97). Populations are limited by availability of tree cavities or nest boxes (Ehrlich et al 1988).

I observed a pair of wood ducks flying over the South Branch of St. Vrain Creek on 18 June and a female flying over St. Vrain



Creek on 16 June (Figure 3). I observed no evidence of nesting on the WMI Lyons property. Wood ducks may nest along St. Vrain Creek, north and east of the property.

Management: Since the South Branch and St. Vrain Creek riparian corridors lie outside the area to be mined, mining should have little impact on this species. Standing dead trees along these corridors should be protected.

## 2. Eastern Screech-Owl (Audubon "blue list")

Eastern screech-owls nest in tree cavities along streams and in urban areas in eastern Boulder County. Audubon Christmas count data indicate numbers may be declining in some regions of North America (Ehrlich et al 1992). Population status in Boulder County is not known (Boulder County Audubon Society 1978-97).

Boulder County Nature Association volunteers heard one or more eastern screech-owls calling along St. Vrain Creek near the northwestern corner of the property during winter, 1995-96 (Joe Harrison, pers. commun., Figure 4). I observed no eastern screech-owls on the property during breeding bird surveys. Since eastern screech-owls often nest in urban environments and often hunt around artificial lakes and wetlands (Johnsgard 1988, Dorn 1994, Gelbach 1995), mining and subsequent reclamation should have little impact on their nesting success.

Management: Avoid disturbance of riparian corridor along St. Vrain Creek. Protect standing dead trees along South Branch and St. Vrain Creek.

## 3. Rock Wren (Boulder County isolated populations)

Rock wrens typically nest in rocky areas in the tundra and foothills of Boulder County (Boulder County Audubon Society 1978-97). They uncommonly nest on rock faces of dams on the plains (Andrews and Righter 1992).

I observed a singing male on the rock fill area around the

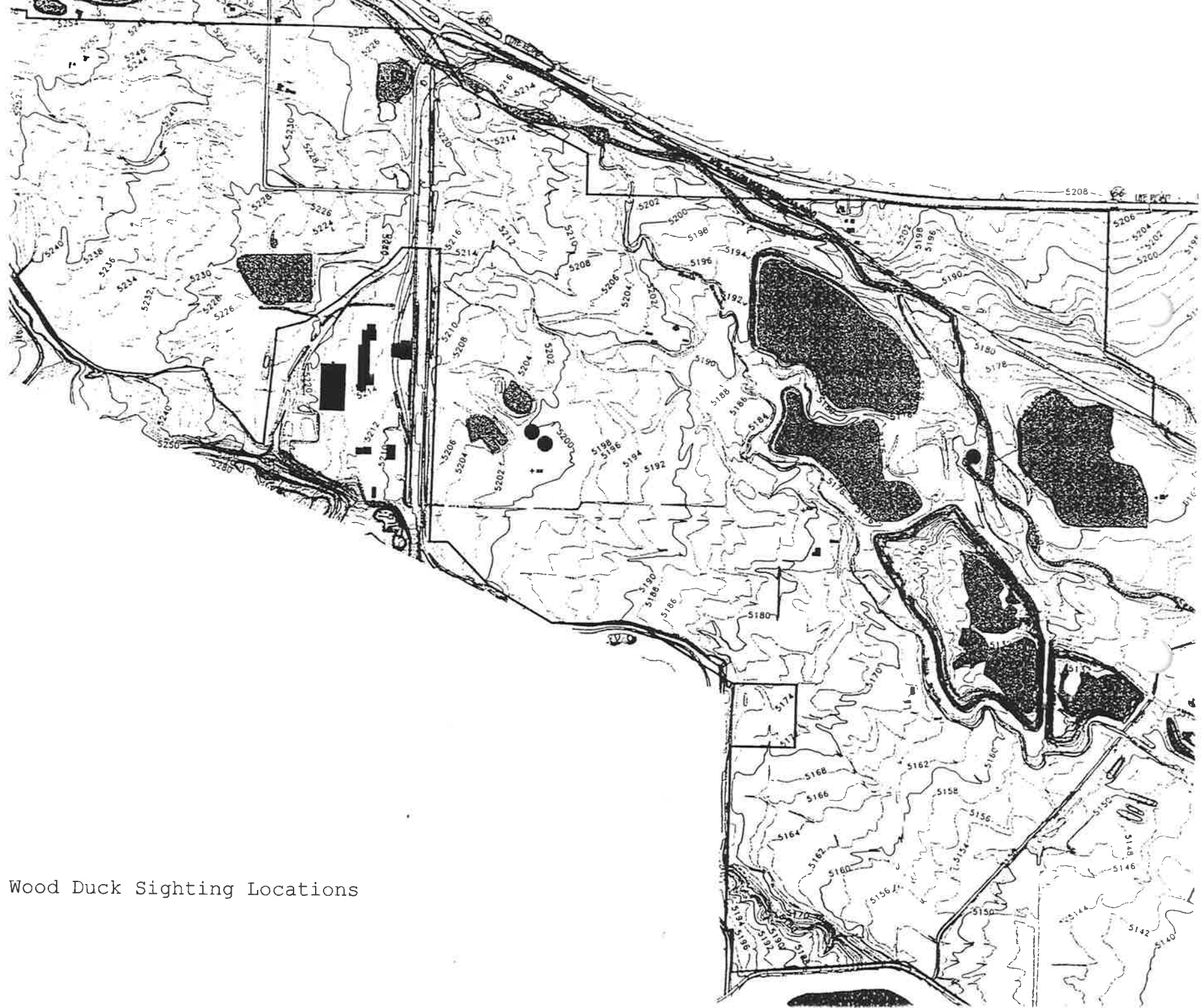


Figure 3. Wood Duck Sighting Locations

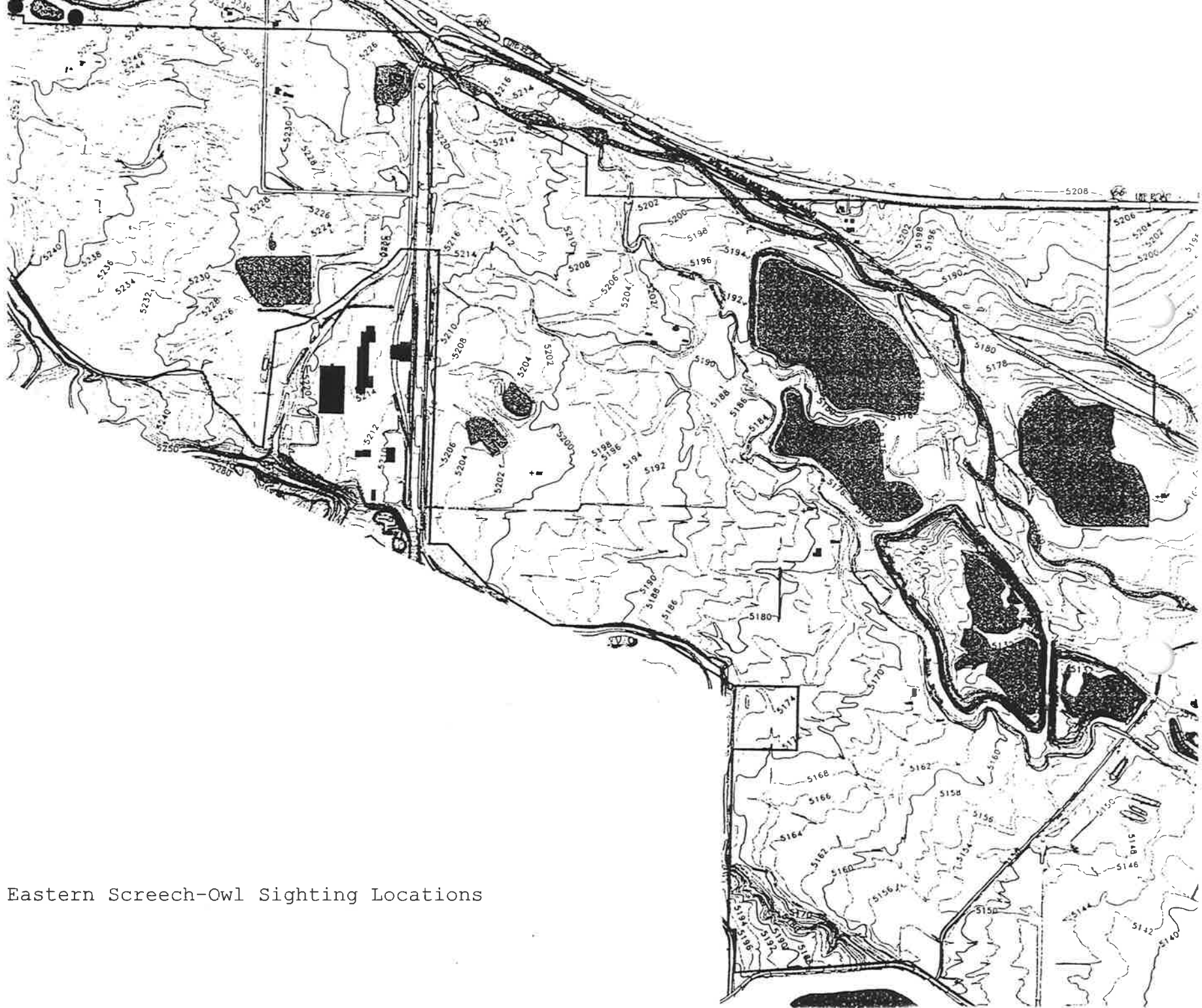


Figure 4. Eastern Screech-Owl Sighting Locations

large reservoir in the reclaimed Rockin' WP North area on 18 June. I observed a second singing male on the rocky dike separating the Southwest Portland Cement Plant quarry from the Phase II meadow on 6 July (Figure 5). I observed no other evidence of nesting.

Management: Prior mining has created nesting habitat for this species. Construction of additional reservoirs during reclamation may create additional nesting habitat.

#### 4. Yellow Warbler (Audubon "blue list")

Yellow warblers nest in lowland and mid-elevation riparian woodlands, in urban woodlands, and around farmhouses throughout Boulder County. Brood parasitism by cowbirds and loss of riparian woodland habitat have diminished populations in parts of North America (Ehrlich et al 1992). However, data from the U.S. Fish and Wildlife breeding bird surveys suggest a slight increase in U.S. populations from 1966-93 (U.S. Fish and Wildlife Service 1993). Status of nesting populations in Boulder County and Colorado has not been sufficiently documented to indicate a downward trend (Boulder County Audubon Society 1978-97, U.S. Fish and Wildlife Service 1993, Hallock 1997).

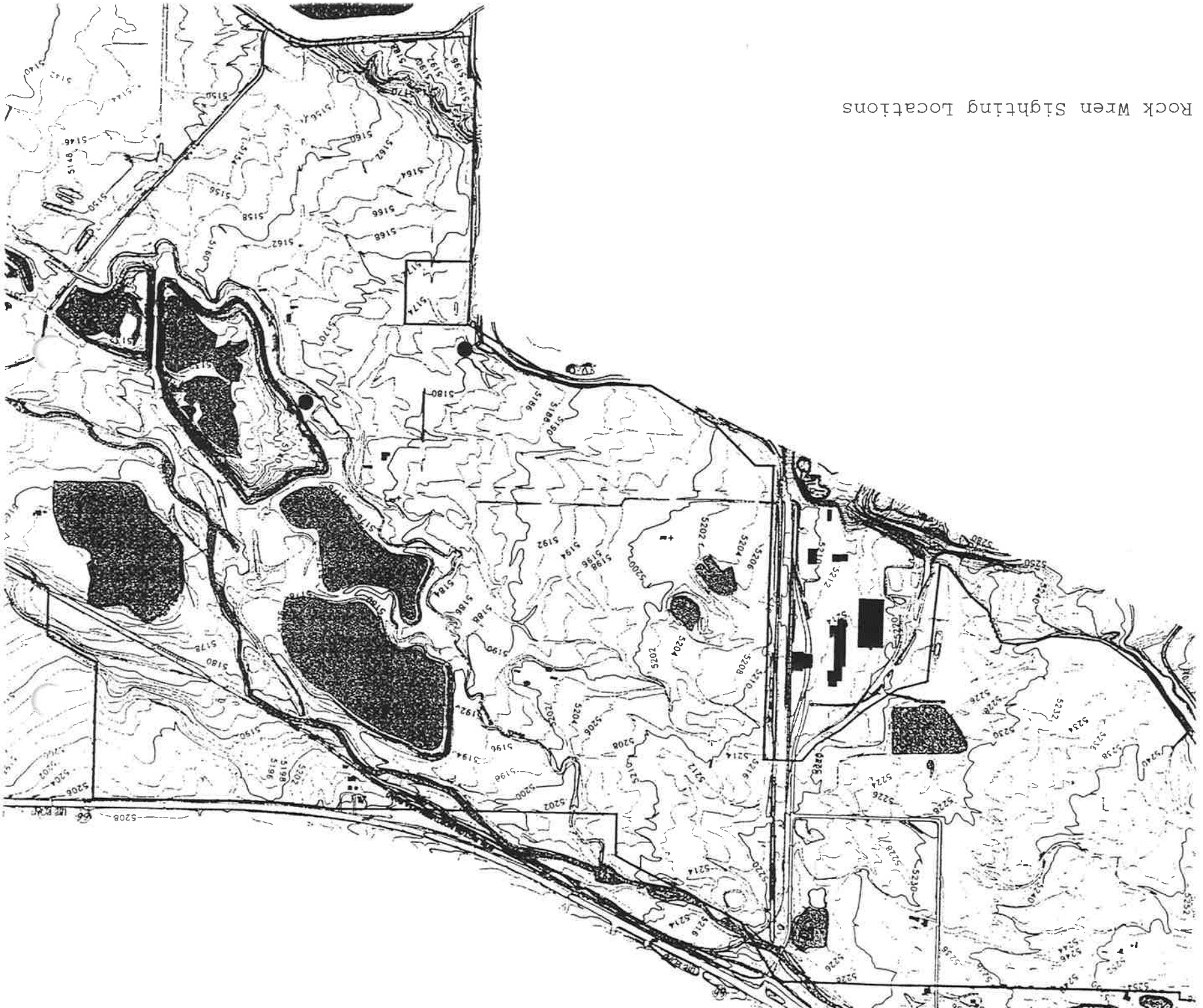
I observed nesting yellow warblers throughout the property along St. Vrain Creek, along the South Branch, and in groves of deciduous trees around houses and other structures. More than 90% of sightings occurred outside the area to be mined.

Management: Preserve mature trees and encourage shrub growth within riparian corridors. Mining should have little impact on overall nesting populations throughout the property.

#### 5. Blue Grosbeak (State concern, undetermined status)

This species appears on the Boulder County special concern list because it was listed as a species of concern by the state during the 1980s. It does not appear on the most recent Colorado

Figure 5. Rock Wren Sighting Locations



Natural Heritage Program list of rare and imperiled birds (Colorado Natural Heritage Program 1996). Blue grosbeaks are uncommon breeders in shrub habitat in eastern Boulder County.

I observed a male blue grosbeak just north of Hygiene Road, in the Phase III area, on 6 July (Figure 6). I observed no evidence of nesting on the property.

Management: The property is probably peripheral to this species' normal range in Boulder County.

#### 6. Savannah Sparrow (Boulder County isolated populations)

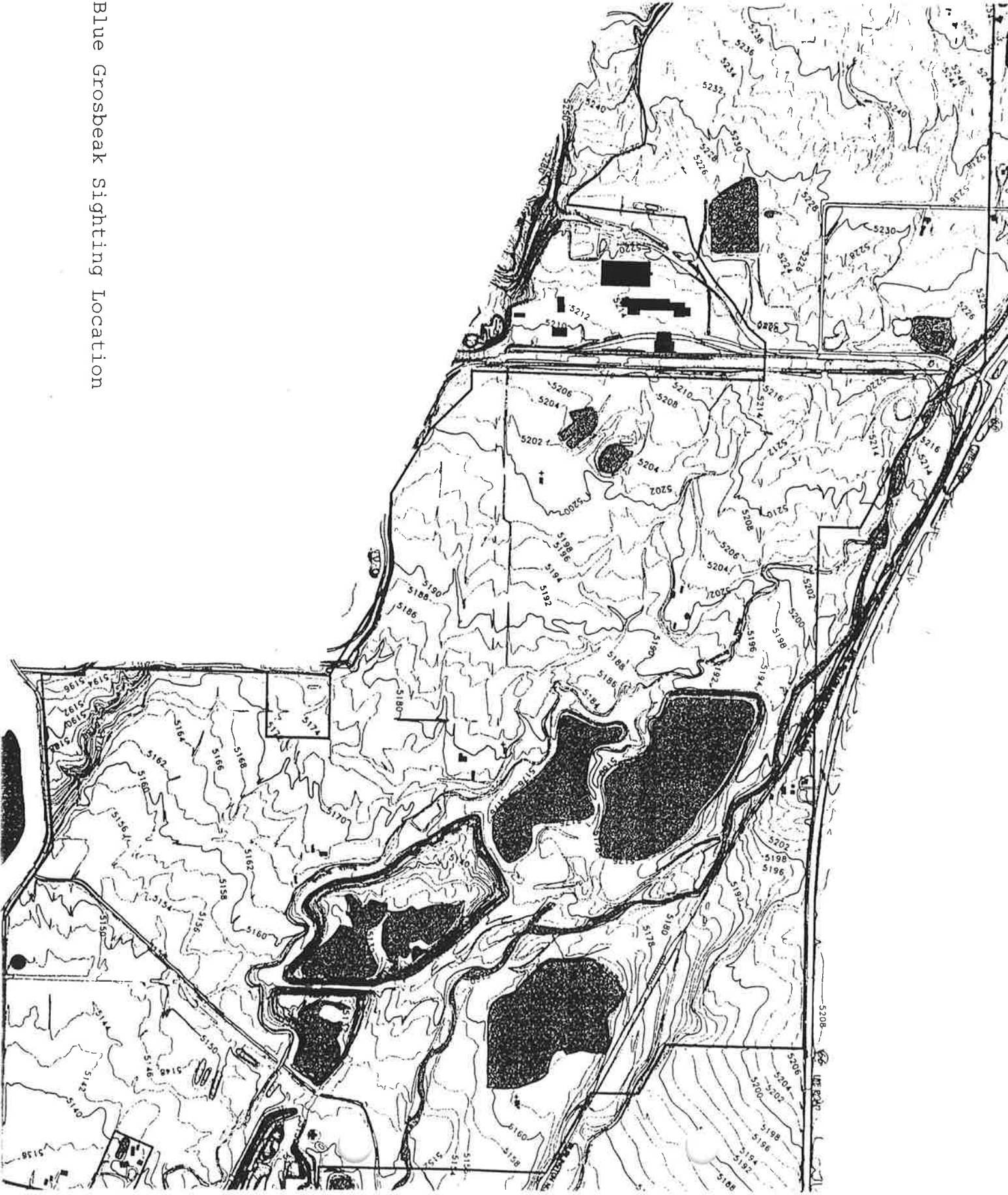
Savannah sparrows nest in saturated meadows, irrigated hay fields, and marsh edges throughout Colorado to about 11,000 feet (Andrews and Righter 1992). In Boulder County they nest in mid-elevation meadows and in wetlands on the plains. Nesting populations in the mountains appear to have declined since the early twentieth century (Dave Hallock, pers. commun.). North American nesting populations declined from 1966-93, probably due to draining of wetlands (Ehrlich et al 1992, U.S. Fish and Wildlife Service 1993).

I observed several pairs of savannah sparrows in irrigated hay meadows in the Phase II and Phase III areas (Figure 7). Several nests in this area successively fledged young. However, about half of the hay meadows in this area were cut prior to 1 July, and nests may have been destroyed. Fledging dates for savannah sparrows nesting on the plains of Boulder County have not been determined. In 16 nest observations reported by the Colorado Breeding Bird Atlas project, dates for occupied nests (those with eggs or young) ranged from 7 June to 10 July. Fledged young were observed as early as 7 June and as late as 15 August (Hugh Kingery, pers. commun.) However, most of these nests were in the mountains, where fledging probably occurs later than on the plains.

Management: Prior to mining and reclamation of the Phase II



Figure 6. Blue Grosbeak Sighting Location





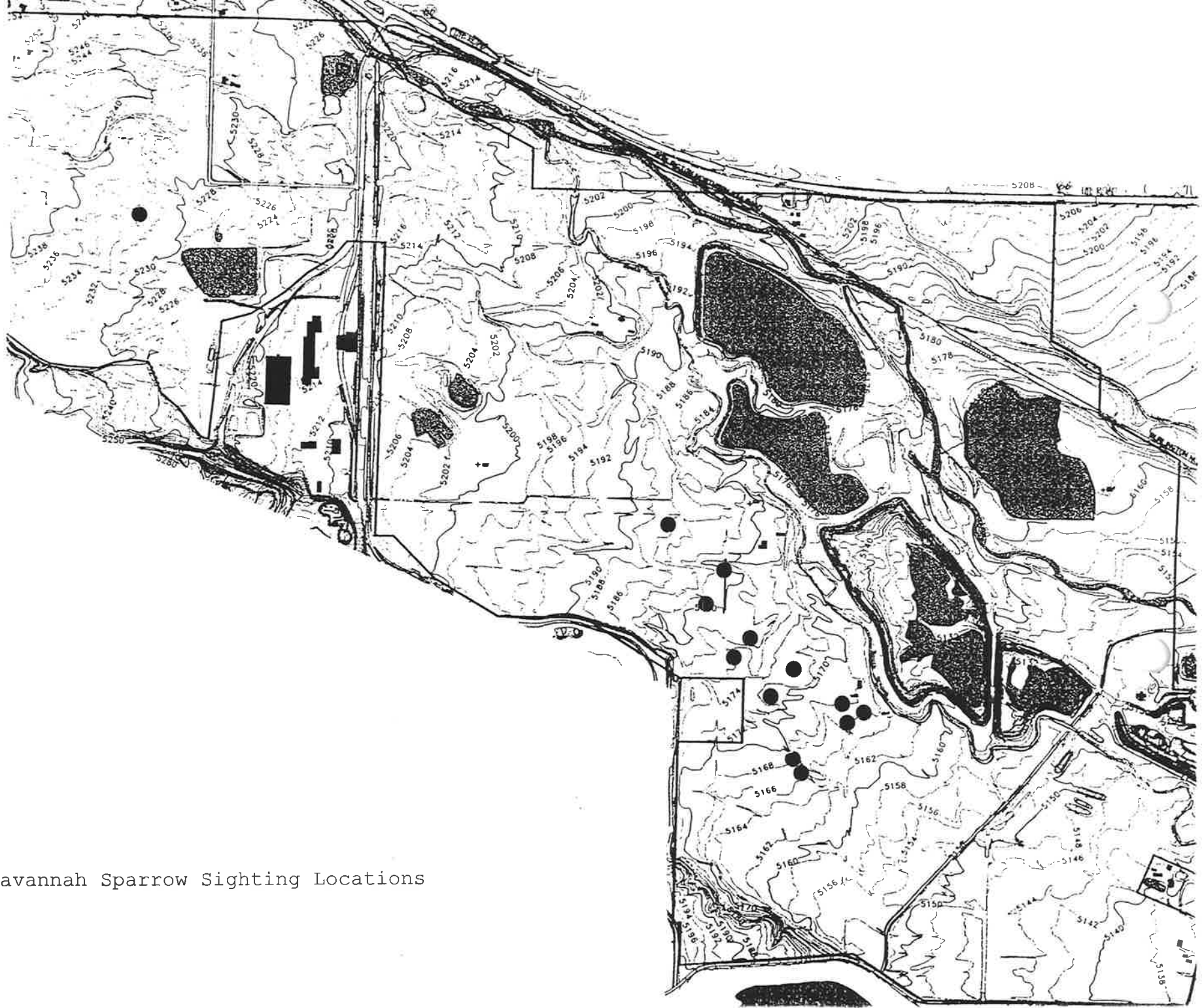


Figure 7. Savannah Sparrow Sighting Locations

and Phase III areas, delayed haying in savannah sparrow nesting habitat (Figure 7) will increase chances of nesting success. When growing and climatic conditions permit, it would be desirable for these areas to be hayed after July 5. During reclamation, at least 50 acres of wet meadows should be created in this area to mitigate for lost nesting habitat. Prior to initiating mining in each of these areas, I recommend that nest searches be carried out to determine the location and extent of nesting populations. Semi-annual monitoring of nesting populations in non-mined and reclaimed areas will help ensure that nesting populations are adapting to changes in nesting habitat.

#### 7. Bobolink (Boulder County isolated populations)

Bobolinks nest in saturated tallgrass meadows and irrigated hay meadows on the plains of Boulder County (Thompson and Strauch 1986, Andrews and Righter 1992). Five to six Boulder County nesting locations have been identified (Mark Gershman, City of Boulder Open Space, pers. commun.). Nesting bobolinks are considered rare within Colorado (21-100 occurrences, Colorado Natural Heritage Program 1996). Nesting populations declined throughout the United States from 1966-93 (U.S. Fish and Wildlife Service 1993). Bobolinks have disappeared from much of their former range in the eastern United States due to elimination of nesting habitat and poisoning of birds by rice farmers (Ehrlich et al 1988).

I observed three singing male bobolinks in irrigated hay meadows in the Phase II and Phase III areas, on 23 May and 18 June (Figure 8). I observed no evidence of successful nesting. However, approximately 50% of the hay meadows in these areas were cut prior to 1 July. In a study of bobolink nesting success in similar habitat on City of Boulder Open Space, fledging dates ranged from 2-16 July, with a mean estimated fledging date of 7 July (Thompson and Strauch 1986). In areas that were cut prior to

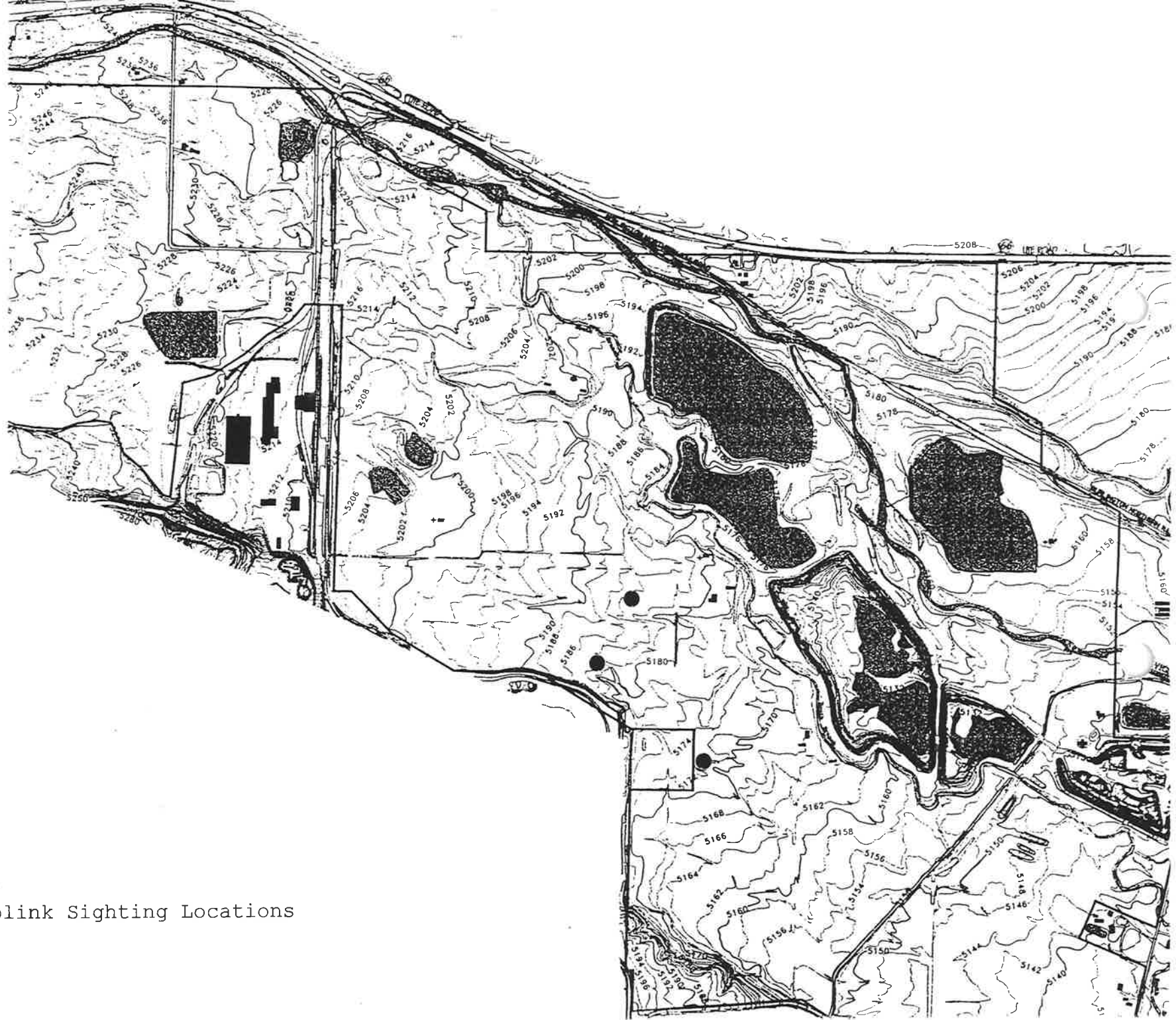


Figure 8. Bobolink Sighting Locations

fledging, young were killed and nests destroyed. Therefore, it is likely that early haying of fields on the WMI Lyons property limits bobolink nesting success.

Management: When environmental conditions permit, delay cutting of hay in bobolink nesting areas until 15 July. Carry out nest searches prior to mowing and monitor nesting populations at two year intervals (see savannah sparrow, above). Create a minimum of 50 acres of wet meadows during reclamation.

## MANAGEMENT RECOMMENDATIONS

Since breeding bird populations change over time, additional research should be conducted and management recommendations revised at the beginning of each phase of mining. I recommend the following work be carried out prior to beginning Phase II of mining:

(1) Determine status of the bald eagle winter nest along the South Branch of St. Vrain Creek and revise management plan accordingly.

(2) Search for active raptor nests in areas to be mined and protect them until all young have fledged.

(3) Conduct a thorough search for savannah sparrow and bobolink nests in Phase II and III grasslands and hay meadows so that populations can be monitored during reclamation.

(4) Evaluate success of Phase I reclamation and conduct point counts to determine status of breeding bird populations in reclaimed Phase I area.

The following management recommendations apply to the entire property during all three phases of mining.

### 1. Fence St. Vrain riparian corridor.

Fencing of the St. Vrain Creek and South Branch riparian corridors will benefit breeding bird populations by protecting shrub vegetation from grazing cattle. I recommend that Western Mobile discuss fencing options with Boulder County Parks and Open Space. The easiest and most cost effective way to exclude cattle from these areas probably would be to construct a barbed-wire fence along the southwest edge of the South Branch corridor. The fence should be at least 20 m (66 ft.) from the creek and outside the existing tree and shrub corridor. The fence could be constructed to allow cattle access to water at selected locations and gated to permit property managers to continue to use grazing

for weed control in reclaimed areas.

2. Create cattail/rush marshes during reclamation.

Reclamation should result in creation of several large (5-10 acre) cattail/rush marshes along the shores of ponds and reservoirs. Some shorelines of reclaimed ponds should be graded to encourage establishment of cattails and rushes. These marshes will provide nesting habitat for least bitterns, American bitterns, pied-billed grebes, northern harriers, soras, Virginia rails, American coots, and yellow-headed blackbirds, none of which currently nest on the property.

3. Delay haying operations to protect nesting savannah sparrows and bobolinks.

I recommend that Western Mobile investigate the feasibility of delayed haying in areas where savannah sparrows and bobolinks nest. Most bobolink young should fledge by 15 July, and most savannah sparrow young should fledge by 5 July. I also recommend that nest searches be conducted prior to opening these areas to mining and that breeding populations be monitored during mining and reclamation.

4. Plant native shrubs around reclaimed ponds and wetlands and institute an aggressive weed control program.

Weed encroachment degrades habitat for grassland and shrub-nesting birds. Bare and disturbed ground around reclaimed ponds is currently infested with knapweed (Acosta spp.). Western Mobile is working with Boulder County Parks and Open Space to develop a weed management plan for the property.

5. Conduct annual raptor nest searches in mining areas.

All trees in active mining areas should be examined each spring (February-May) for raptor nests. Appropriate buffer zones should be established around nests until all young have fledged

(see Colorado Division of Wildlife. 1995. Recommended buffer zones and seasonal restrictions for Colorado raptor nests).

6. Carry out annual reviews of bald eagle and prairie dog management plans.

These plans are delineated in a previous report, "Habitat conservation for birds of prey on Western Mobile Boulder Inc. Lyons property" (Jones 1997b).



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**APPENDIX I**  
**PLOT SUMMARIES**

**WEST PLANT, ST. VRAIN CREEK, 1-5, 14**

**Plot 1 (5/25, 6/16, 7/4, 7/20)      50 m West of E. Plant Entrance**

Mallard	2			1	0.75
Rock dove	1				0.25
Belted kingfisher		1			0.25
Northern flicker		1			0.25
Western wood-pewee		1		1	0.50
Cliff swallow	5	5	10	7	6.75
Black-capped chickadee	1				0.25
House wren	1	1	1	1	1.00
American robin			1		0.25
European starling			3		0.75
Yellow warbler	2	2	1	2	1.75
Song sparrow		1			0.25
Western meadowlark	1		1	1	0.75
Brown-headed cowbird			1		0.25
Common grackle		4	1	3	2.00
American goldfinch			1		0.25
Lesser goldfinch		1		1	0.50
Species	7	9	9	8	8.25
Individuals	13	17	20	17	16.75

**Plot 2 (5/25, 6/16, 7/4, 7/18)      Fence 100 m West of Entrance Rd.**

Mallard	2				0.50
Mourning dove		1	1		0.50
Northern flicker				1	0.25
Western wood-pewee		1			0.25
Cliff swallow		1			0.25
Black-capped chickadee	1		2	2	1.25
House wren	1	2	1	1	1.25
American robin		1	1	1	0.75
European starling	2	2	2	2	2.00
Yellow warbler	1	1			0.50
Song sparrow				1	0.25
Western meadowlark	1				0.25
Common grackle	2	1			0.75
American goldfinch			2		0.50
Lesser goldfinch				1	0.25
Species	7	8	6	7	7.00
Individuals	10	10	9	9	9.50

**Plot 3 (5/25, 6/16, 7/4, 7/18)****Fence**

B. tailed hummingbird	1				0.25
Northern flicker	2	1	1	1	1.00
Western wood-pewee				1	0.25
Blue jay	1				0.25
Black-billed magpie	2				0.50
Black-capped chickadee				1	0.25
House wren	1	3	2	2	2.00
American robin			1		0.25
European starling	1				0.25
Yellow warbler		1			0.25
Song sparrow	1				0.25
Western meadowlark	2	1	1	1	1.25
Common grackle	2		2	2	1.00
Bullock's oriole		1		1	0.50
American goldfinch		2			0.50
Lesser goldfinch		1			0.25
Species	7	8	5	7	6.75
Individuals	10	12	7	9	9.50

**Plot 4 (5/25, 6/16, 7/4, 7/18)****Fence 30 m West of House**

Common snipe	1				0.25
Northern flicker				1	0.25
Western wood-pewee		1			0.25
Barn swallow	5				1.25
Black-capped chickadee	1				0.25
Blue jay			1		0.25
House wren	2	2	2	3	2.25
American robin		2	2	1	1.25
European starling	1	2			0.75
Yellow warbler			2		0.50
Western meadowlark		1	1	1	0.75
House finch			2		0.50
American goldfinch				1	0.25
Lesser goldfinch			1		0.25
Species	4	6	7	5	5.50
Individuals	9	9	11	7	9.00

**Plot 5 (5/25, 6/16, 7/4, 7/18)****Fence Near Pond**

Spotted sandpiper	1				0.25
Northern flicker			1		0.25
Western wood-pewee				1	0.25
Barn swallow	3				0.75
Black-capped chickadee			1		0.25
House wren				2	0.50
American robin		1	2	2	1.25
European starling	4	1	1	2	2.00
Yellow warbler	1	1	2		1.25
Western meadowlark				1	0.25
Common grackle		3	1		1.00
House finch		1	2	1	1.00
American goldfinch			1		0.25
Lesser goldfinch		2	1		0.75
Species	4	6	9	6	6.25
Individuals	9	9	12	9	9.75

**Summary**

Mean Species/Plot: 6.96

Mean Individuals/Plot: 10.71

Total Species: 29

Special Concern: eastern screech-owl, yellow warbler

\*Underlined species nested

**WEST PLANT MEADOW, 6-13****Plot 6 (5/25, 6/16, 7/4, 7/18)****Willow Grove**

Mallard	2				0.50
Northern flicker			1		0.25
Barn swallow				2	0.50
Western wood-pewee	2				0.50
Western kingbird	1				0.25
Black-capped chickadee		1	1	1	0.75
House wren	1	1	2	2	1.50
American robin			2		0.50
European starling	3	2	3	2	2.50
Warbling vireo			1		0.25
Yellow warbler	1	1	1	1	1.00
Red-winged blackbird	1			1	0.50
Western meadowlark	2	1		2	1.25
American goldfinch			2		0.50
Species	8	5	8	7	7.00
Individuals	13	6	13	11	10.75

**Plot 7 (5/25, 6/16, 7/4, 7/18)****Large Cottonwood**

Northern flicker			1		0.25
Barn swallow	5	1		2	2.00
Black-capped chickadee		1			0.25
Black-billed magpie			2		0.50
House wren		1	2	2	1.25
American robin		1	4	2	1.75
European starling		2	4	3	2.25
Common yellowthroat	1				0.25
Red-winged blackbird			1		0.25
Western meadowlark	2	3	1	2	2.00
Common grackle		1			0.25
Species	3	7	7	5	5.50
Individuals	8	10	15	11	11.00



**Plot 8 (5/25, 6/16, 7/4, 7/18)****Lone Tree**

Canada goose	7				1.75
American kestrel			1		0.25
Killdeer			1	1	0.50
Mourning dove		1			0.25
Northern flicker			2		0.50
Barn swallow	4	3			1.75
Black-billed magpie	2		2	2	1.50
House wren		2	1	2	1.25
American robin	1	1	2	1	1.25
European starling	1	5	3	3	3.00
Red-winged blackbird	2				0.50
Western meadowlark	2	3	1	2	2.00
Common grackle		1	1	1	0.75
Lesser goldfinch		1		1	0.50
Species	7	8	9	8	8.00
Individuals	19	17	14	13	15.75

**Plot 9 (5/25, 6/16, 7/4, 7/18)****Cattail Marsh--No Marker**

Canada goose	13				3.25
Common snipe		1		1	0.50
Northern flicker			1		0.25
Tree swallow	4				1.00
Barn swallow		1			0.25
European starling	2	2		1	1.25
Song sparrow			1		0.25
Red-winged blackbird	5	5	5	4	4.75
Yellow-headed blackbird			1		0.25
Western meadowlark	2	1	1	1	1.25
Brown-headed cowbird	1				0.25
American goldfinch	2			1	0.75
Species	7	5	5	5	5.50
Individuals	29	10	9	8	14.00

**Plot 10 (5/25, 6/16, 7/4, 7/20) 30 m North of Fence--No Marker**

Killdeer			1		0.25
Common snipe				1	0.25
Western wood-pewee			1		0.25
European starling		1	3	1	1.25
House wren			1		0.25
Savannah sparrow	1				0.25
Red-winged blackbird	2	1			0.75
Western meadowlark	3	2	1	2	2.00
American goldfinch				1	0.25
Species	3	3	5	4	3.75
Individuals	6	4	7	5	5.50

**Plot 11 (5/25, 6/16, 7/4, 7/20) Grove West of Road**

Mallard	1				0.25
Killdeer				1	0.25
Common snipe	2				0.50
Northern flicker		1			0.25
Western wood-pewee			1		0.25
Tree swallow	4				1.00
House wren		1	1	1	0.75
American robin	2	1		1	1.00
European starling	1		2	2	1.25
Yellow warbler	2	1		1	1.00
Western meadowlark	1	2	1	1	1.25
Common grackle	2				0.50
American goldfinch	2		1		0.75
Species	9	5	5	6	6.25
Individuals	17	6	6	7	9.00

**Plot 12 (5/25, 6/16, 7/4, 7/18)****75 m South of House**

Canada goose	1				0.25
Mallard	2				0.50
Common snipe		1			0.25
American kestrel	1		1		0.50
Killdeer	1	1		1	0.75
Mourning dove			1		0.25
Northern flicker		1			0.25
Western wood-pewee			1		0.25
Barn swallow	1	1			0.50
Black-billed magpie	1				0.25
House wren		1	1	1	0.75
American robin		1	1	1	0.75
European starling	5	3	2	3	3.25
Yellow warbler				1	0.25
Common yellowthroat		1			0.25
Western meadowlark	2	2	1	2	1.75
Bullock's oriole	1				0.25
American goldfinch				1	0.25
Species	9	9	6	8	8.00
Individuals	15	12	7	11	11.25

**Plot 13 (5/25, 6/16, 7/4, 7/18)****50 m East of House**

American kestrel				1	0.25
Common snipe		1			0.25
Northern flicker		1	2		0.75
Western wood-pewee	1	1		1	0.75
Barn swallow	2	3			1.25
Black-billed magpie		1			0.25
Black-capped chickadee			1		0.25
House wren		1	2	1	1.00
American robin	2	1	4	2	2.25
European starling	5	8	6	6	6.25
Yellow warbler	2	1		1	1.00
Western meadowlark	2		1	1	1.00
Common grackle		2	4	2	2.00
Bullock's oriole		1			0.25
American goldfinch		2	2	1	1.25
Species	6	12	8	9	8.75
Individuals	14	23	22	16	18.75

## Summary

Mean Species/Plot: 6.79

Mean Individuals/Plot: 12.00

Total Species: 31

Special Concern: yellow warbler, savannah sparrow

\*Underlined species nested

**Plot 14 (5/25, 6/16, 7/4, 7/18)**

**Lone Tree north of Road**

American kestrel		1			0.25
Northern flicker		3	1	1	1.25
Western wood-pewee	1	1	1	1	1.00
Cliff swallow		2			0.50
Barn swallow		1			0.25
Black-billed magpie	1				0.25
Black-capped chickadee		1			0.25
House wren	1	1		1	0.75
American robin		1	1	1	0.75
European starling		1	2	1	1.00
Yellow warbler				1	0.25
Song sparrow			1		0.25
Western meadowlark	2	1		2	1.25
Bullock's oriole	1				0.25
American goldfinch	1	2		2	1.25
Lesser goldfinch			1		0.25
Species	6	11	6	8	7.75
Individuals	7	15	7	10	9.75

**PHASE II-III MEADOW, 15-23**

**Plot 15 (5/23, 6/18, 7/6, 7/20)**

**Lone Tree South of Road**

Canada goose	4				1.00
American kestrel				1	0.25
Mourning dove			2		0.50
Western wood-pewee	1	1	1	2	1.25
Cliff swallow				1	0.25
Black-capped chickadee				2	0.50
House wren	2	2	2	2	2.00
American robin	1		1	2	1.00
European starling	2	2	1	8	3.25
Yellow warbler	2	1	1		1.00
Western meadowlark	2	2	1		1.25
Common grackle	2	2			1.00
Bullock's oriole	3				0.75
American goldfinch		4			1.00
Lesser goldfinch		2		2	1.00
Species	9	8	7	8	8.00
Individuals	19	16	9	20	16.00

**Plot 16 (5/23, 6/18, 7/6, 7/20)**

**100 m West of Silo**

American kestrel	1				0.25
Killdeer			1		0.25
Mourning dove	3				0.75
Northern flicker			1	1	0.50
Western wood-pewee	1	1	1	3	1.50
Barn swallow				1	0.25
Black-billed magpie	1				0.25
Black-capped chickadee			1		0.25
House wren	2	2	2	2	2.00
American robin	2				0.50
European starling	3	1	1		1.25
Yellow warbler	2	1	1		1.00
Western meadowlark	3	1	1	1	1.50
Brown-headed cowbird	1				0.25
Common grackle	2				0.50
Bullock's oriole		1		1	0.50
American goldfinch		2		2	1.00
Lesser goldfinch			1	2	0.75
Species	11	7	9	8	8.75
Individuals	21	9	10	13	13.25

**Plot 17 (5/23, 6/18, 7/6, 7/20)****Abandoned Trailers**

Canada goose	6				1.50
Rock dove	10				2.50
Northern flicker		1			0.25
Western wood-pewee	1	1	1	1	1.00
Black-capped chickadee	1		1	1	0.75
House wren	2	2		1	1.25
American robin		1		1	0.50
European starling	3	4	1	3	2.75
Yellow warbler	2	1	1		1.00
Lazuli bunting				1	0.25
Western meadowlark	2	1	1	1	1.25
Common grackle	2	1	1		1.00
Bullock's oriole		1		2	0.75
House finch	4			2	1.50
American goldfinch	3			2	1.25
Lesser goldfinch		1	1	1	0.75
Species	11	10	7	11	9.75
Individuals	36	14	7	16	18.25

**Plot 18 (5/23, 6/18, 7/6, 7/20)****Willows**

Wood duck		2			0.50
Common snipe	1				0.25
Great horned owl	1				0.25
Rock dove	10		2		3.00
Mourning dove			3		0.75
Western kingbird				1	0.25
Say's phoebe				1	0.25
Barn swallow				2	0.50
Yellow warbler	1				0.25
Savannah sparrow				1	0.25
Red-winged blackbird	5	2	5		3.00
Western meadowlark	3	2	1	2	2.00
Common grackle	2				0.50
Bullock's oriole		1	1		0.50
Lesser goldfinch			1		0.25
Species	7	4	6	5	5.50
Individuals	23	7	13	7	12.50

**Plot 19 (5/23, 6/18, 7/6, 7/20)****Meadow--No Marker**

Mallard			1		0.25
Common snipe	1				0.25
Cliff swallow				2	0.50
Savannah sparrow		1	2	1	1.00
Bobolink	1				0.25
Red-winged blackbird	6		1		1.75
Western meadowlark	5			1	1.50
Common grackle				3	0.75
Species	4	1	3	4	3.00
Individuals	13	1	4	7	6.25

**Plot 20 (5/23, 6/18, 7/6, 7/20)****Telephone pole--No Marker**

Barn swallow		1	1	1	0.75
Rock wren			1		0.25
Savannah sparrow				2	0.50
Red-winged blackbird	7				1.75
Western meadowlark	5	1	1	2	2.25
Species	2	2	3	3	2.50
Individuals	12	2	3	5	5.50

**Plot 21 (5/23, 6/18, 7/6, 7/20)****Small P. Dog Town--No Marker**

Barn swallow		2		2	1.00
European starling			4		1.00
Savannah sparrow	1	1	2	2	1.50
Red-winged blackbird	10	3		4	4.25
Western meadowlark	5	2	2	3	3.00
Bullock's oriole			1		0.25
House finch			1		0.25
Species	3	4	5	4	4.00
Individuals	16	8	10	11	11.25



Plot 22 (5/23, 6/18, 7/6, 7/20)				Gate	
Barn swallow		1		2	0.75
European starling		1	1		0.50
Savannah sparrow	3	2	4	2	2.75
Bobolink		1	1		0.50
Red-winged blackbird	10	2		4	4.00
Western meadowlark	5	1	1	2	2.25
Brewer's blackbird	5				1.25
American goldfinch			1	1	0.50
Species	4	6	5	5	5.00
Individuals	23	8	8	11	12.50

Plot 23 (5/17, 6/1, 6/16, 7/4)				Cottonwood along Road	
American kestrel		1			0.25
Killdeer			1	1	0.50
Common snipe	2	2			1.00
Northern flicker		1	1		0.50
Barn swallow			5		1.25
American robin	3	2		2	1.75
European starling		5	2	1	2.00
Yellow-rumped warbler		1			0.25
Red-winged blackbird	5	10	5		5.00
Western meadowlark	2	2	2	2	2.00
Common grackle	1				0.25
Species	5	8	6	4	5.75
Individuals	13	24	16	6	14.75

### Summary

Mean Species/Plot: 5.81

Mean Individuals/Plot: 12.03

Total Species: 36

Special Concern: wood duck, rock wren, yellow warbler, blue grosbeak, savannah sparrow, bobolink

\*Underlined species nested

**SOUTH BRANCH, 24-31**

**Plot 24 (5/23, 6/18, 7/6, 7/20)**

**Fence Along Road**

Canada goose	8				2.00
Mallard	10				2.50
Ring-billed gull			1		0.25
Say's phoebe	1			1	0.50
Barn swallow	6	2	1	3	3.00
American robin	2				0.50
House wren	1	1	1	1	1.00
European starling		1			0.25
Yellow warbler	1	1		1	0.75
Savannah sparrow		2	1	1	1.00
Red-winged blackbird	8		2	3	3.25
Western meadowlark	4		2	2	2.00
Common grackle	5				1.25
House finch			1		0.25
Lesser goldfinch			1	1	0.50
Species	10	5	8	8	7.75
Individuals	46	7	10	13	19.00

**Plot 25 (5/23, 6/18, 7/6, 7/20)**

**Willow**

Canada goose	4				1.00
Mallard	2				0.50
Killdeer	1		1	1	0.75
Western wood-pewee				1	0.25
Barn swallow	5		1	2	2.00
Black-capped chickadee			1		0.25
Rock wren		1			0.25
House wren	2			1	0.75
American robin		1			0.25
European starling	3		2	2	1.75
Yellow warbler	2				0.50
Western meadowlark	2	1		1	1.00
Common grackle	2		1		0.75
American goldfinch		1			0.25
Species	9	4	5	6	6.00
Individuals	23	4	6	8	10.25

<b>Plot 26 (5/23, 6/18, 7/6, 7/20)</b>				<b>Gate</b>	
Canada goose	5				1.25
Wood duck		1			0.25
Red-tailed hawk	1				0.25
Killdeer	1				0.25
Western wood-pewee	1	1	1		0.75
Cliff swallow				5	1.25
Barn swallow			2		0.50
Rock wren		1			0.25
House wren	1		1		0.50
American robin	2	2	2		1.50
European starling		2	1	4	1.75
Yellow warbler	1	1	1		0.75
Red-winged blackbird			1		0.25
Western meadowlark	3		1	1	1.25
Common grackle	3	2			1.25
American goldfinch		2			0.50
Lesser goldfinch				1	0.25
Species	9	8	8	4	7.25
Individuals	18	12	10	11	12.75

<b>Plot 27 (5/23, 6/18, 7/6, 7/20)</b>				<b>River Bend</b>	
Mallard		2			0.50
Killdeer	1				0.25
Western wood-pewee		1	1	2	1.00
Barn swallow	5				1.25
Black-capped chickadee		1			0.25
House wren	2	2	1		1.25
American robin		1	3	1	1.25
European starling	4		1	3	2.00
Yellow warbler	2	2	1	1	1.50
Song sparrow		2			0.50
Western meadowlark	3	1	1		1.25
Common grackle	2				0.50
Bullock's oriole				1	0.25
American goldfinch		1		2	0.75
Lesser goldfinch			1	2	0.75
Species	7	9	7	7	7.50
Individuals	19	13	9	12	13.25

**Plot 28 (5/23, 6/18, 7/6, 7/20)**

**Barbed Wire Fence**

Canada goose	2				0.50
Mallard	2				0.50
Turkey vulture	3				0.75
Mourning dove	3				0.75
Northern flicker		1		1	0.50
Western wood-pewee			1	2	0.75
Cliff swallow				2	0.50
Barn swallow	4				1.00
Tree swallow	5				1.25
Black-capped chickadee	1	1	1		0.75
House wren	2	1	1		1.00
American robin		1	1	4	1.50
European starling	3		2	1	1.50
Yellow warbler	2	2	1		1.25
Song sparrow		1	1	1	0.75
Western meadowlark	3	1	1	1	1.50
Common grackle	3	1			1.00
Bullock's oriole				2	0.50
American goldfinch				2	0.50
Lesser goldfinch		1	2		0.75
Species	12	9	9	9	9.75
Individuals	33	10	11	16	17.50

**Plot 29 (5/23, 6/18, 7/6, 7/20)****Eagle Nest**

Canada goose	2				0.50
Mallard	2				0.50
Turkey vulture	3				0.75
Northern flicker		1	1	1	0.75
Western wood-pewee	1		1		0.50
Barn swallow	5	1			1.50
Black-capped chickadee				2	0.50
Blue jay				1	0.25
House wren	2	1	1		1.00
American robin			3	1	1.00
European starling	3	1	3	5	3.00
Yellow warbler	2	2	2	1	1.75
Lazuli bunting				1	0.25
Song sparrow		2			0.50
Western meadowlark	2	1	1	1	1.25
Common grackle	5		2	2	2.25
Bullock's oriole			1		0.25
House finch	1				0.25
American goldfinch		2			0.50
Lesser goldfinch			2		0.50
Species	11	8	10	9	9.50
Individuals	28	11	17	15	17.75

**Plot 30 (5/23, 6/18, 7/6, 7/20)****200 m North of House**

Double-crested cormorant		1			0.25
Great blue heron		1			0.25
Canada goose	5				1.25
American kestrel	1				0.25
Northern flicker		1			0.25
Western wood-pewee			1	2	0.75
House wren	2	1	1	1	1.25
American robin		3	1	1	1.25
European starling	3	2	1	2	2.00
Yellow warbler			1		0.25
Western meadowlark	2	2	1	2	1.75
Common grackle	2				0.50
Brown-headed cowbird	1				0.25
Bullock's oriole	1		1	1	0.75
Lesser goldfinch				2	0.50
Species	8	7	7	7	7.25
Individuals	17	11	7	11	11.50

**Plot 31 (5/23, 6/18, 7/6, 7/20)****Willow Thicket**

Canada goose	4				1.00
Mallard	2	2	1	2	1.75
Spotted sandpiper	1				0.25
Northern flicker	1	1		1	0.75
Western wood-pewee	1		1	2	1.00
Olive-sided flycatcher	1				0.25
Cliff swallow			1	2	0.75
House wren	2	2	2	2	2.00
American robin		1	1	1	0.75
Western tanager	1				0.25
Yellow warbler	2	1		1	1.00
Lazuli bunting	1				0.25
Western meadowlark	2	1	1	1	1.25
Common grackle	3	1			1.00
Brown-headed cowbird		1	1	1	0.75
Lesser goldfinch			2		0.50
Species	12	8	8	9	9.25
Individuals	21	10	10	13	13.50

**Summary**

Mean Species/Plot: 8.31

Mean Individuals/Plot: 14.41

Total Species: 41

Special Concern: wood duck, rock wren, yellow warbler, savannah sparrow

**ST. VRAIN CREEK, 32-37**

**Plot 32 (5/17, 6/1, 7/4, 7/20)**

**Fence By Large Cottonwood**

Killdeer		1		2	0.75
Northern flicker		1	1		0.50
Rough-winged swallow			1		0.25
Barn swallow	1		1	1	0.75
House wren	1	1	1	1	1.00
American robin	1	2		1	1.00
European starling			1	3	1.00
Yellow warbler	2	1	1	1	1.25
Song sparrow			1		0.25
Western meadowlark	1	1	1	3	1.50
Brown-headed cowbird	1				0.25
Species	6	6	8	7	6.75
Individuals	7	7	8	12	8.50

**Plot 33 (5/17, 6/1, 7/4, 7/20)**

**450 m West of Bridge**

Great blue heron				1	0.25
Mallard		2			0.50
Killdeer		1			0.25
Mourning dove			1	1	0.50
Northern flicker			1		0.25
Western wood-pewee			1		0.25
Barn swallow				2	0.50
Black-capped chickadee				1	0.25
House wren	1	1	1	2	1.25
American robin	4	4	3		2.75
European starling	2	1		4	1.75
Yellow warbler	2	2	2	2	2.00
Western meadowlark	1		1	1	0.75
Common grackle	1				0.25
Brewer's blackbird				6	1.50
Lesser goldfinch				2	0.50
House sparrow	1				0.25
Species	7	6	7	10	7.50
Individuals	12	11	10	22	13.75

**Plot 34 (5/17, 6/1, 7/4, 7/20)                      250 m West of Bridge**

Double-crested cormorant	6	14			5.00
Great blue heron				1	0.25
Canada goose	4	2			1.50
Mallard	2				0.50
Spotted sandpiper	2				0.50
Mourning dove		1			0.25
Western wood-pewee			1		0.25
Barn swallow		1	2	1	1.00
Cliff swallow			5		1.25
House wren	1			1	0.50
American robin	2	2	4	2	2.50
Yellow warbler	2	2	3	3	2.50
Western meadowlark			1	1	0.50
Common grackle	1		1		0.50
Brown-heading cowbird		1			0.25
American goldfinch		1	1	1	0.75
Lesser goldfinch			1		0.25
Species	8	8	9	7	8.00
Individuals	20	24	19	10	18.25

**Plot 35 (5/17, 6/1, 7/4, 7/20)                      50 m West of Bridge**

Canada goose	2				0.50
Mallard		2			0.50
American kestrel	1				0.25
Killdeer				2	0.50
Mourning dove		2	1		0.75
Downy woodpecker				1	0.25
Northern flicker				1	0.25
Western wood-pewee			2	2	1.00
Cliff swallow				3	0.75
House wren	2	1	2	2	1.75
American robin	2	2	1	2	1.75
European starling		1		3	1.00
Warbling vireo			1	1	0.50
Yellow warbler	2	1	2	3	2.00
Common grackle	2				0.50
Brown-headed cowbird		1			0.25
House finch	2				0.50
American goldfinch	4	1	1	1	1.75
Lesser goldfinch			1	2	0.75
Species	8	8	8	12	9.00
Individuals	17	11	11	23	15.50



**Plot 36 (5/17, 6/1, 7/4, 7/20)****100 m East of Conveyor**

Mourning dove				1	0.25
Northern flicker		1			0.25
Western wood-pewee		1	1		0.50
Rough-winged swallow			1		0.25
Barn swallow			2		0.50
Cliff swallow			3	2	1.25
House wren	1	1	1	2	1.25
American robin	2		1	1	1.0
Yellow warbler	2	2	3	2	2.25
Song sparrow		1			0.25
Red-winged blackbird		3			0.75
Common grackle	2	1		2	1.25
Brown-headed cowbird			1		0.25
Lesser goldfinch			1	2	0.75
Species	4	7	9	7	6.75
Individuals	7	10	14	12	10.75

**Plot 37 (5/17, 6/1, 7/4, 7/20)****300 m East of Conveyor**

Mallard		1			0.25
Wood duck				1	0.25
Mourning dove			1		0.25
Northern flicker			1		0.25
Western wood-pewee			1	1	0.50
Barn swallow				1	0.25
Cliff swallow			1	1	0.50
European starling	2		1	1	1.00
House wren	2	1	2	2	1.75
Yellow warbler	2	2	1	2	1.75
Common grackle		3	2	1	1.50
Brown-headed cowbird				1	0.25
Species	3	4	8	9	6.00
Individuals	6	7	10	11	8.50

**Summary**

Mean Species/Plot: 7.33

Mean Individuals/Plot: 12.54

Total Species: 37

Special Concern: wood duck, yellow warbler

\*Underlined species nested

**ROCKIN' WP ENTRANCE MEADOW, 38**

**Plot 38 (5/17, 6/1, 7/4, 7/18)**

**Cottonwood Grove**

Mallard		2				0.50
Red-tailed hawk		1				0.25
Killdeer				1		0.25
Western wood-pewee			1			0.25
Cliff swallow	15	10	4	20		12.25
House wren	1		1			0.50
Yellow warbler	1	2	1	2		1.50
Red-winged blackbird		5				1.25
Western meadowlark	2	1	1	3		1.75
Common grackle		30		2		8.00
Brewer's blackbird		4	3			1.75
Species	4	8	6	5		5.75
Individuals	19	55	11	28		28.25

**APPENDIX II**  
**BREEDING CODES**

Migrant

- Seen or heard, but suitable breeding habitat does not exist within study area.

Observed

- Seen or heard in suitable breeding habitat.

Possible Breeder

- Exhibited territorial behavior in suitable breeding habitat. Behaviors include singing, territorial defense, copulation, and agitated behavior.

Confirmed Breeder

- Evidence of nesting: occupied nest, nest with young, feeding young, fledged young or used nest.