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The 1991 Census of Least Terns and Piping Plovers in Nebraska

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THE 1991 CENSUS OF LEAST TERNS AND PIPING PLOVERS IN NEBRASKA

We counted least terns (*Sterna antillarum*) and piping plovers (*Charadrius melodus*) in Nebraska during June and July, 1991. This undertaking was part of an international effort to census the threatened piping plover throughout Canada and the United States. The U.S. Fish and Wildlife Service (USFWS) (1988) has called for the censusing of piping plovers every five years to monitor the status of the species and to gage the effectiveness of recovery efforts. This first international census of the piping plover has been organized by the USFWS's Great Lakes/Northern Great Plains Piping Plover recovery team. The census is one of the first attempts to complete a total count of one species of breeding shorebird.

The least tern in the Great Plains is endangered and also requires periodic censusing (USFWS 1990). Because both species nest on the same river sandbars and adjacent sand and gravel pits (sandpits) in Nebraska, least terns were counted during the census of piping plovers.

Study Area and Methods

The distribution of the least tern and piping plover in Nebraska has been well known for several years. The Nebraska Game and Parks Commission, Platte River Whooping Crane Habitat Maintenance Trust, USFWS, and others began censusing in the late 1970s. In the intervening years most stretches of river and sandpits used for nesting were identified.

Sandpits (Figure 1) are areas mined for the commercial sale of sand and gravel and are usually located within 2-3 miles of a river. Three areas we included as sandpits consisted of sand and gravel that had been side casted along diversion canals from the Loup River (Loup River Diversion), South Platte River (Korty Diversion), and from near the confluence of the North and South Platte rivers (Central Diversion). Periodic dredging to keep the canals open creates and maintains a large expanse of barren sand and gravel. The barren sand and gravel at pits is similar to the barren sandbar substrate found in rivers (Kirsch 1991, Lingle 1990, Wilson 1991). We also surveyed pits that were no longer being actively mined but contained some suitable nesting substrate. Vegetation eventually will cover inactive sand and gravel areas and render them unsuitable as nesting habitat.

In river channels the two species nest on sandbars kept clear of vegetation by the scouring action of periodic high flows. Such habitat has declined along some river segments such as the Platte River upstream of Columbus. River channels have narrowed, and riparian forest has replaced previously active channel. A few artificial sandbars have been constructed in this reach and we included these sites in our survey.

In 1990 and 1991 we conducted a preliminary aerial survey of the Loup River, North Loup River (below Brewster), Middle Loup River (below Dunning), Calamus River (below Highway 183), Elkhorn River (Platte River to O'Neill), and Platte River system (Platte River, South Platte River, North Platte River to Lake McConaughy) to search for potential nest sites that had not been identified in previous years. Identified areas were visited during the 1991 census. Most surveys on the rivers were conducted by airboat, but on part of the Loup River a hovercraft was used. The South Platte, Upper Platte (Lexington to North Platte), North Platte River to Lake McConaughy, and Elkhorn River were not visited by boat because they lacked suitable habitat found during the preliminary survey. The Missouri River boundary between Nebraska and South Dakota, where least terns and piping

plovers also occur (Dirks 1990, Schwalbach 1988) was censused by personnel from South Dakota.

Sandpits, sandbars, and reservoir shoreline (Lake McConaughy) were usually observed from a distance through binoculars and spotting scopes and the total number of birds were counted as well as the number of birds on nests. Therefore, observations of bands, color markers, and leg injuries were not always possible. We determined pairs based upon the observation of birds on nests, copulation, and other behavior.

Results

We searched for least terns and piping plovers during the first three weeks of June, the agreed period for the international piping plover census. High flows on the Loup and lower Platte (Columbus to Missouri River confluence) inundated all suitable nesting habitat and the census was confined to sandpits. A few birds were seen loafing on damp barely emerged bars in early June. By early July the flows subsided, nesting habitat appeared, and we counted the birds on the lower Platte on July 2-3 and on the Loup River on July 11. The dating of eggs in nests (Hays and LeCroy 1971, Schwalbach 1988) located on July 2-3 and July 11 indicated that nesting or renesting on sandbars had not begun again until the third week of June. Most least tern clutches consisted of two eggs, indicating renesting, and no chicks of either species were observed during the July survey. Nests in May would have been inundated by late May or June high flows. It is possible that some of the least terns and piping plovers counted at sandpits in early June renested on the river by July 2-3.

It is important to consider renesting and the effects of high flows on nesting chronology if one attempts to assign an overall number of least terns and piping plovers for Nebraska from this survey by simply adding all of the observations in Table 1. Table 1 displays the number of pairs of least terns and piping plovers as well as the total number of adults. The totals in Table 1 are not simply addition of numbers of pairs and total adults at each site but rather addition of pairs and adults at sites during the first three weeks of June.

We were not always able to determine pairs. Consequently, the difference between the number of pairs X 2 and total number of adults should not be viewed necessarily as the number of unpaired least terns and piping plovers. Moreover, many least terns and some piping plovers were not attached to any nesting area. For example, on June 13 we attempted to airboat the lower Platte. Many of the observed least terns and piping plovers were solitary and moving along the river in apparent response to inundation just occurring farther downstream. Indeed, heavy rains near Fremont on July 13 caused bank-full conditions and forced us to cancel the census by mid-afternoon near Leshara. The rains continued in the evening and we observed very high flows on the river the next day. There were no exposed sandbars.

We counted 302 pairs of least terns and 139 pairs of piping plovers and a total of 876 adult least terns and 398 adult piping plovers during the first three weeks of June (Table 1). Forty-eight percent of the least terns occurred on the river, 50% at the pits, and 2% on the shoreline of Lake McConaughy during the first three weeks of June. Forty-nine percent of the piping plovers occurred on the river, 35% at the sandpits, and 16% on the shoreline of Lake McConaughy during the first three weeks of June. One-hundred sixty-nine sandpits (90 active and 79 inactive) were surveyed and the birds were present at 45 active pits and 7 inactive pits. During the July 2-3 census on the lower Platte we counted 137 pairs of least terns, a total of 356 adult least terns, 33 pairs of piping plovers, and a total of 73 adult piping plovers. During later censuses (June 27, July 2-3, 9-10) at sandpits along the lower Platte we

counted 48 pairs of least terns, a total of 127 adult least terns, 4 pairs of piping plovers, and a total of 18 adult piping plovers. The July 11 census on the Loup River revealed 35 pairs of least terns, a total of 117 adult least terns, 14 pairs of piping plovers, and a total of 48 adult piping plovers.

Almost twice the number of piping plovers (162) and over 100 more least terns (291) was observed on the Niobrara River than in 1988 (Nebraska Game and Parks Commission 1988). No birds were counted at sandpits along the South Platte River. The low level of Lake McConaughy in 1991 exposed extensive sandy beaches and the 63 piping plovers observed there were the largest number ever recorded at the reservoir. The water surface elevation at the reservoir on May 30, 1991 was 3245.3 ft above sea level, well below the mean elevation of 3261.5 ft for the end of May during the 1980s. High flows, due to precipitation, and a lack of habitat resulted in little nesting along the upper Platte and central Platte (Lexington to Columbus). Almost all river nesting on the central Platte occurred at two manmade islands (sites 67 and 80) (Table 1), and most nesting occurred at adjacent sandpits.

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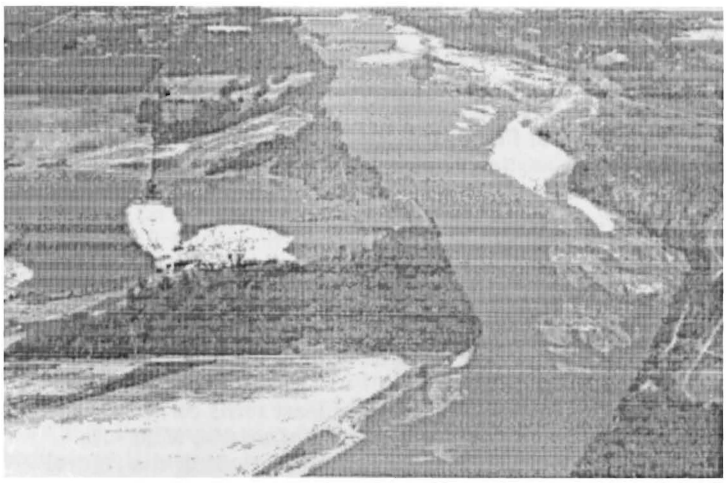


Figure 1.
Sand and gravel pit adjacent to the lower Platte River.

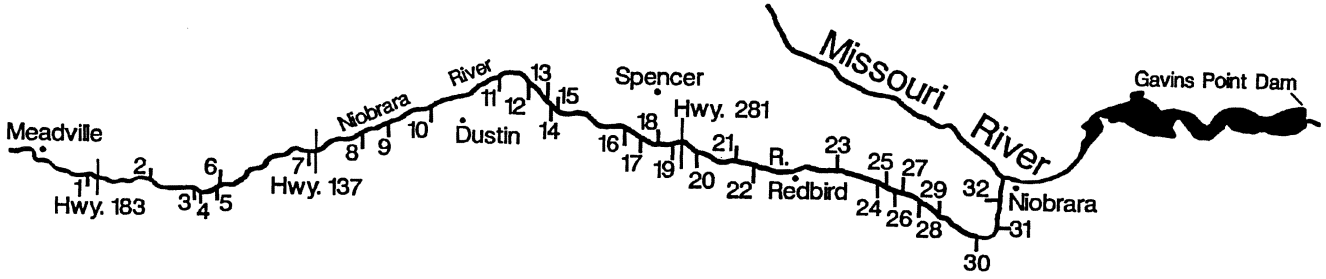
Footnotes for Tables
(Placed here for legibility)

1 Numbers correspond to the numbers on the maps (Figures 2-5).
2 U.S. Army Corps of Engineers river miles
3 U.S. Geological Survey 7.5 minute series quadrangle maps.
4 Man-made island
5 The totals for the Platte and Loups rivers and the grand totals for nebraska are only additions of Least Tern and Piping Plover pairs and total adults observed during the first three weeks of June, the official period for the international Piping Plover census. During the July 2-3 census on the Lower Platte (Columbus to the Missouri River), we counted 137 pairs of Least Terns, a total of 356 adult Least Terns, 33 pairs of Piping Plovers, and a total of 73 Piping Plovers. During censuses (June 27, July 2-3 and 9-10) at sandpits along the Lower Platte, we counted 48 pairs of Least Terns, a total of 127 adult Least Terns, 4 pairs of Piping Plovers, and a total of 18 Piping Plovers. The July 11 census on the Loup River revealed 35 pairs of Least Terns, a total of 117 adult Least Terns, 14 pairs of Piping Plovers, and a total of 48 adult Piping Plovers.
6 Side cast sand and gravel at the Loup River Diversion Canal.

Table 1. Locations of nesting (n) Least Terns and Piping Plovers and other locations of the birds on river sandbars (R), reservoir shoreline (S), and at sand and gravel pits (P) in Nebraska during June and July, 1991.

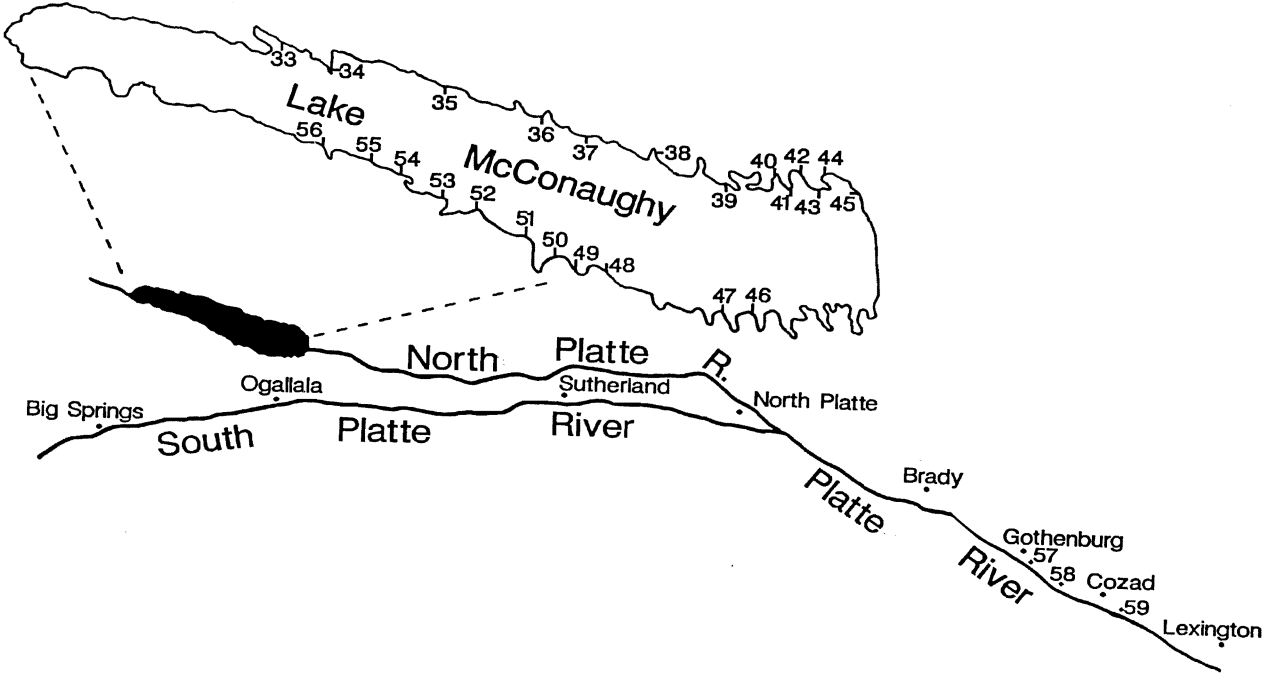
Site[1]	Twp-Range-Section, R. Mile[2]	County	USGS Quad[3]	Least Tern Prs	Least Tern Ads	Piping Plover Prs	Piping Plover Ads	Cen. Date
			Niobrara River					
1R	32N-21W-NE1/4-22, RM 104.2	Brown/Keya Paha	Dutch Creek	0	0	1	3	6/18
2R	32N-20W-E1/2-22, RM 97.7	Rock/Keya Paha	Bassett NW	0	18	0	22	6/18
3R	32N-19W-NE1/4-29, RM 93.6	Rock/Keya Paha	Riverview	0	0	1	2	6/18
4R	32N-19W-E1/2-28, RM 92.6	Rock/Keya Paha	Riverview	0	0	1	2	6/18
5Rn	32N-19W-SW1/4-23, RM 90.5	Rock/Keya Paha	Riverview	0	0	4	8	6/18
6R	32N-19W-E1/2-23, RM 90.0	Rock/Keya Paha	Riverview	0	3	0	9	6/18
7Rn	32N-17W-NW1/4-6, RM 80.9	Rock/Keya Paha	Mariaville	15	30	4	8	6/18
8R	33N-17W-E1/2-25, RM 75.3	Rock/Keya Paha	Mariaville	0	0	0	1	6/18
9Rn	33N-16W-NE1/4-21, RM 72.0	Boyd/Holt	Naper SW	19	38	10	20	6/18
10R	33N-15W-E1/2-7, RM 67.4	Boyd/Holt	Dustin	0	0	1	2	6/18
11R	34N-14W-NE1/4-29, RM 59.2	Boyd/Holt	Butte NW	0	3	0	0	6/18
12R	34N-14W-SE1/4-35, RM 55.8	Boyd/Holt	Butte SW	0	0	0	4	6/18
13Rn	33N-14W-NW1/4-1, RM 55.2	Boyd/Holt	Butte SW	5	14	5	13	6/18
14R	33N-14W-SE1/4-1, RM 54.8	Boyd/Holt	Butte SW	0	0	1	2	6/18
15R	33N-13W-W1/2-7, RM 53.8	Boyd/Holt	Butte SW	0	6	0	3	6/18
16Rn	33N-12W-NE1/4-20, RM 44.4	Boyd/Holt	Spencer South	13	26	0	8	6/18
17Rn	33N-12W-NE1/4-28, RM 43.0	Boyd/Holt	Spencer South	6	13	3	6	6/18
18R	33N-12W-SW1/4-26, RM 41.7	Boyd/Holt	Spencer South	0	2	0	0	6/18
19Rn	33N-12W-NE1/4-25, RM 39.7	Boyd/Holt	Spencer South	8	20	1	2	6/18
20Rn	33N-11W-NE1/4-32, RM 37.7	Boyd/Holt	Spencer South	3	8	3	6	6/19
21Rn	32N-11W-NW1/4-1, RM 33.5	Boyd/Holt	Bristow	6	12	2	6	6/19
22Rn	32N-10W-SE1/4-5, RM 30.5	Boyd/Holt	Bristow	2	6	1	2	6/19
23Rn	32N-9W-SW1/4-4, RM 24.3	Boyd/Holt	Lynch	3	9	1	6	6/19
24Rn	32N-8W-SW1/4-8, RM 20.2	Knox	Monowi	1	9	0	4	6/19
25Rn	32N-8W-SE1/4-16, RM 17.0	Knox	Pishelville	7	14	6	12	6/19
26R	32N-8W-NE1/4-22, RM 15.6	Knox	Pishelville	0	0	1	2	6/19
27R	32N-8W-NE1/4-23, RM 14.7	Knox	Pishelville	0	3	0	0	6/19
28R	32N-7W-NW1/4-30, RM 13.1	Knox	Pishelville	0	7	1	2	6/19
29Rn	32N-7W-W1/2-33, RM 10.5	Knox	Pishelville	2	6	0	1	6/19
30Rn	31N-7W-2, RM 7.9	Knox	Verdigre NE	5	12	1	4	6/19

Figure 2.
Locations of Least Terns and Piping Plovers along the Niobrara River during June 18-19, 1991. Numbers 1-32 refer to sites in Table 1.



Site	Twp-Range-Section, R. Mile	County	USGS Quad	Least Tern Prs	Least Tern Ads	Piping Plover Prs	Piping Plover Ads	Cen. Date
31R	32N-6W-SW1/4-31, RM 5.0	Knox	Verdigre NE	0	2	0	0	6/19
32Rn	32N-6W-NE1/4-19, RM 2.2	Knox	Verdigre NE	15	30	1	2	6/19
TOTAL (R)				**110**	**291**	**49**	**162**	
		North Platte River (Lake McConaughy)						
33S	15N-40W-N1/2-9	Keith	Belmar	0	1	0	0	6/4
34Sn	15N-40W-W1/2-10	Keith	Belmar	0	1	6	13	6/4
35S	15N-40W-S1/2-12	Keith	Lemoyne	0	0	1	2	6/4
36Sn	15N-39W-SW1/4-17	Keith	Lemoyne	0	0	1	2	6/4
37S	15N-39W-SW1/4-16	Keith	Lemoyne	0	0	0	2	6/4
38S	15N-39W-SW1/4-23	Keith	Lemoyne	0	0	0	1	6/4
39S	15N-39W-N1/2-25	Keith	Ogallala	0	2	0	0	6/4
40S	15N-38W-NE1/4-30	Keith	Martin	0	0	0	1	6/4
41Sn	15N-38W-SW1/4-20	Keith	Martin	0	0	1	3	6/4
42S	15N-38W-SE1/4-20	Keith	Martin	0	0	0	1	6/4
43Sn	15N-38W-NW1/4-29	Keith	Ogallala	0	4	2	6	6/4
44Sn	15N-38W-NE1/4-29	Keith	Ogallala	0	1	1	2	6/4
45S	15N-38W-E1/2-28	Keith	Ogallala	0	1	0	2	6/4
46S	14N-38W-NW1/4-7	Keith	Ogallala	0	1	0	0	6/5
47Sn	14N-39W-N1/2-12	Keith	Ogallala	0	0	2	4	6/5
48Sn	14N-39W-NE1/4-4	Keith	Brule NE	0	0	1	3	6/5
49Sn	14N-39W-NE1/4-4	Keith	Brule NE	0	0	1	2	6/5
50Sn	15N-39W-S1/2-33	Keith	Brule NE	0	0	1	2	6/5
51Sn	15N-39W-32	Keith	Brule NE	0	2	1	5	6/4
52Sn	15N-39W-N1/2-31-30	Keith	Brule NE	0	0	1	5	6/4
53S	15N-40W-S1/2-25	Keith	Brule NE	0	2	0	2	6/4
54S	15N-40W-NE1/4-26	Keith	Brule NE	0	0	1	2	6/4
55S	15N-40W-SW1/4-23	Keith	Belmar	0	0	0	1	6/4
56S	15N-40W-NW1/4-22	Keith	Belmar	0	1	0	0	6/4
TOTAL (S)				**0**	**16**	**22**	**64**	

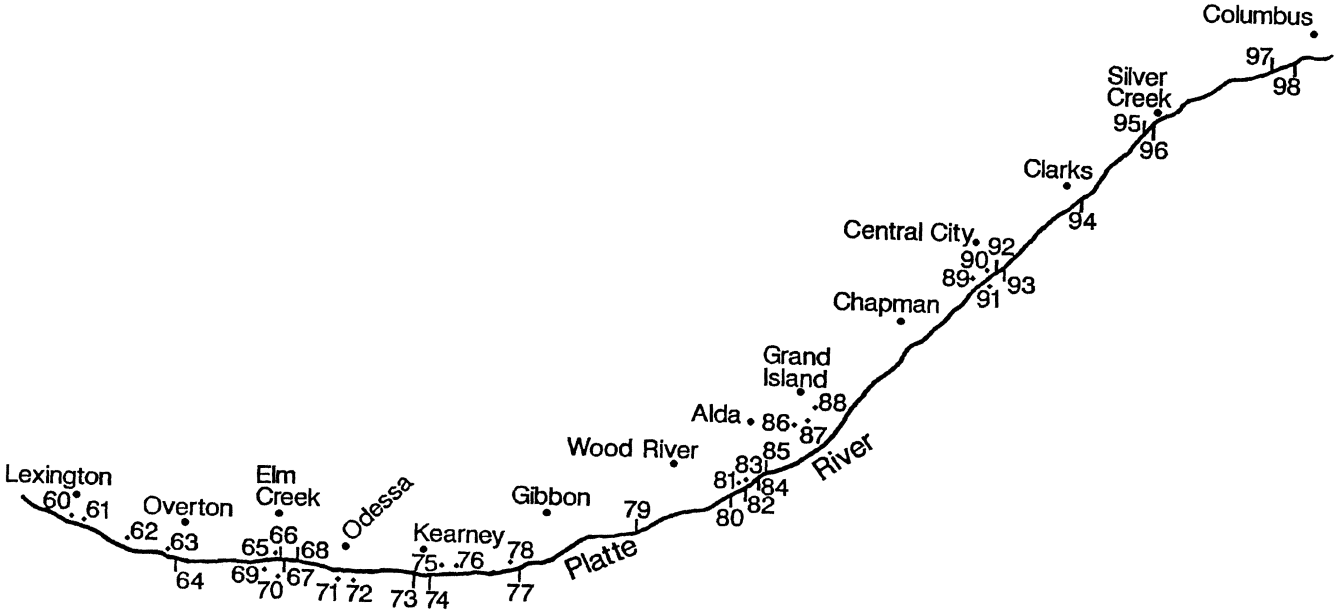
Figure 3.
Locations of Least Terns and Piping Plovers along Lake McConaughy and at adjacent sand and gravel pits along the upper Platte River during June 3-5, 1991. Numbers 33-59 refer to sites in Table 1.



Site	Twp-Range-Section, R. Mile	County	USGS Quad	Least Tern Prs	Least Tern Ads	Piping Plover Prs	Piping Plover Ads	Cen. Date
			Platte River					
57Pn	11N-25W-22	Dawson	Gothenburg	4	15	1	2	6/3
58Pn	11N-24W-SW1/4-33	Dawson	Willow Island	0	2	0	1	6/3
59Pn	10N-23W-NE1/4-27	Dawson	Cozad	5	10	1	2	6/3
60Pn	9N-21W-NW1/4-20	Dawson	Bertrand NW	1	2	1	2	6/5
61Pn	9N-21W-NE1/4-20	Dawson	Bertrand NW	12	18	3	6	6/5
62Pn	9N-20W-NE1/4-31	Dawson	Bertrand NW	1	2	1	2	6/5
63Pn	8N-20W-S1/2-2	Dawson	Overton	2	4	1	2	6/5
64R	8N-20W-NW1/4-12, RM 239.5	Dawson	Overton	0	1	0	0	6/12
65P	8N-18W-SW1/4-4	Buffalo	Elm Creek East	0	3	0	0	6/5
66R	8N-18W-NW1/4-9, RM 230.3	Buffalo	Elm Creek East	0	1	0	2	6/12
67Rn[4]	8N-18W-NE1/4-9-NW1/4-10, RM 230	Buffalo	Elm Creek East	1	4	2	4	6/12
68R	8N-18W-NE1/4-11, RM 228	Buffalo	Elm Creek East	0	0	0	1	6/11
69Pn	8N-18W-N1/2-17	Buffalo	Elm Creek West	4	8	2	3	6/5
70Pn	8N-18W-N1/2-16	Buffalo	Elm Creek East	2	4	1	2	6/5
71Pn	8N-17W-S1/2-17	Phelps	Elm Creek East	2	5	3	6	6/5
72Pn	8N-17W-SW1/4-16	Phelps	Elm Creek East	0	2	3	5	6/5
73R	8N-16W-SW1/4-14, RM 215.5	Buffalo	Kearney	0	2	0	0	6/11
74Rn	8N-16W-SW1/4-13, RM 214.5	Buffalo	Kearney	0	1	1	2	6/11
75Pn	8N-15W-S1/2-7	Buffalo	Kearney	6	8	1	2	6/4
76Pn	8N-15W-S1/2-8	Buffalo	Kearney	2	3	0	0	6/4
77R	8N-14W-NW1/4-17, RM 207	Buffalo	Newark	0	0	0	1	6/11
78Pn	8N-14W-NW1/4-7	Buffalo	Newark	2	3	0	0	6/4
79R	9N-12W-NE1/4-30, RM 194	Hall	Denman	0	0	0	1	6/11
80Rn[4]	9N-11W-S1/2-11, RM 183	Hall	Wood River	10	16	4	8	6/4
81Pn	9N-10W-SW1/4-6	Hall	Alda	12	24	1	2	6/4
82R	9N-10W-S1/2-6, RM 181.5	Hall	Alda	0	9	0	1	6/11
83Pn	9N-10W-SE1/4-6	Hall	Alda	2	11	1	2	6/4
84R	9N-10W-NW1/4-5, RM 180	Hall	Alda	0	0	0	2	6/11
85R	9N-10W-SW1/4-33, RM 179	Hall	Alda	0	1	0	0	6/11
86P	11N-10W-SW1/4-36	Hall	Abbott	1	2	2	5	6/4
87Pn	11N-9W-W1/2-27	Hall	Grand Island	4	8	2	4	6/1
88P	11N-9W-N1/2-23	Hall	Grand Island	0	3	0	0	6/1
89Pn	13N-6W-SE1/4-21	Merrick	Central City West	7	14	2	3	6/3

Site	Twp-Range-Section, R. Mile	County	USGS Quad	Least Tern		Piping Plover		Cen. Date
				Prs	Ads	Prs	Ads	
90Pn	13N-6W-NW1/4-22	Merrick	Central City East	5	14	1	1	6/3
91Pn	13N-6W-S1/2-22	Hamilton	Central City East	3	10	1	2	6/3
92R	13N-6W-NE1/4, SW1/4-22, RM 146	Merrick	Central City East	0	11	0	0	6/11
93R	13N-6W-SE1/4-14, RM 145	Merrick	Central City East	0	2	0	0	6/11
94R	14N-4W-SE1/4-7, RM 134	Merrick	Clarks	0	2	0	0	6/11
95R	15N-3W-SW1/4-18, RM 127	Merrick	Silver Creek	0	4	0	0	6/11
96R	15N-3W-SW1/4-4, RM 124	Merrick	Silver Creek	0	1	0	0	6/11
97R	16N-2W-SE1/4-12, RM113	Platte	Columbus SW	0	1	0	0	6/11
98R	16N-1W-NE1/4-9, RM 110	Platte	Duncan	0	3	0	0	6/11
99Pn	16N-1E-13	Butler	Columbus SE	3	11	2	5	6/5
				0	5	1	2	7/2
100R	16N-1E-NW1/4-5, RM 105	Platte	Columbus	0	1	0	0	7/3
101Rn	17N-1E-SE1/4-33, RM 102.7	Platte	Columbus	0	0	0	2	6/13
				4	8	3	6	7/3
102R	17N-1E-SW1/4-35, RM 101.5	Platte	Columbus	0	1	0	0	7/3
103R	16N-2E-SW1/4-5, RM 99.0	Colfax	Richland	0	2	0	0	6/13
104R	16M-2E-NW1/4-10, RM 96.3	Colfax	Richland	0	1	0	0	6/13
105R	16N-3E-W1/2-6, RM 92.5	Colfax	Schuyler	0	2	0	0	6/13
106R	16N-3E-NE1/4-5, RM 91.7	Colfax	Schuyler	0	1	0	0	6/13
107Rn	16N-3E-NW1/4-4, RM 90.8	Colfax	Schuyler	5	15	1	2	6/13
108Rn	17N-3E-NE1/4-33	Colfax	Schuyler	5	10	1	2	6/5
				5	10	0	0	7/2
109Rn	17N-3E-NE1/4-27	Colfax	Schuyler	0	3	2	5	6/5
				0	0	0	0	7/3
110Rn	16N-3E-NE1/4-4, RM 90.6	Colfax	Schuyler	4	8	2	4	7/3
111R	17N-3E-SE1/4-27, RM 89.0	Colfax	Schuyler	0	1	0	1	6/13
112R	17N-3E-SE1/4-26, RM 87.8	Colfax	Schuyler	0	2	0	0	6/13
113R	17N-3E-W1/2-25, RM 87.2	Colfax	Schuyler	0	3	0	0	7/3
114R	17N-3E-E1/2-30, RM 86.8	Colfax	Schuyler	0	4	0	0	6/13
115Rn	17N-3E-SW1/4-30, RM 86	Colfax	Schuyler	0	3	0	0	6/13
				1	2	0	0	7/3
116Rn	17N-4E-NW1/4-21, RM 84	Colfax	Rogers	0	2	0	1	6/13
				1	2	0	0	7/3
117R	17N-4E-SE1/4-16, RM 83	Colfax	Rogers	1	2	0	0	7/3
118R	17N-4E-S1/2-11, RM 80.7	Colfax	Rogers	0	2	0	0	6/13

Figure 4.
Locations of Least Terns and Piping Plovers along the central Platte River and at adjacent sand and gravel pits during June 5-12, 1991. Numbers 60-98 refer to sites in Table 1.



Site	Twp-Range-Section, R. Mile	County	USGS Quad	Least Tern		Piping Plover		Cen. Date
				Prs	Ads	Prs	Ads	
119R	17N-4E-E1/2-12, RM 80.0	Colfax	Rogers	0	1	0	0	6/13
120Pn	17N-4E-17	Colfax	Rogers	3	6	0	0	6/19
				4	8	0	0	7/3
121Rn	17N-5E-E1/2-8, RM 78	Dodge	Rogers	0	6	0	3	6/13
				10	24	2	4	7/3
122Rn	17N-5E-NW1/4-9, RM 75.5	Dodge	North Bend	5	10	1	2	7/3
123R	17N-5E-NW1/4-13, RM 74.2	Dodge	North Bend	0	1	0	0	6/13
124R	17N-6E-N1/2-18, RM 72.9	Dodge	North Bend	0	2	0	0	6/13
125Rn	17N-6E-NE1/4-16, RM 70.4	Dodge	Malmo NW	0	10	0	2	6/13
				6	12	2	4	7/3
126R	17N-6E-NW1/4-23, RM 68.8	Dodge	Malmo NW	0	1	0	0	6/13
127R	17N-6E-SE1/4-23, RM 68.0	Dodge	Malmo NW	0	2	0	0	6/13
128R	17N-6E-E1/2-24, RM 67.0	Dodge	Malmo NW	0	1	0	0	6/13
129R	17N-7E-N1/2-20, RM 65.3	Dodge	Malmo NW	0	1	0	0	6/13
130R	17N-7E-NE1/4-20, RM 64.9	Dodge	Malmo NW	0	2	0	0	7/3
131R	17N-7E-SE1/4-16, RM 64.5	Dodge	Malmo NW	0	1	0	0	6/13
132R	17N-7E-SW1/4-15, RM 63.2	Dodge	Malmo NW	0	2	0	0	6/13
133R	17N-8E-W1/2-19, RM 60.5	Dodge	Fremont West	0	1	0	0	6/13
134R	17N-8E-W1/2-33, RM 58.0	Dodge	Fremont West	0	1	0	0	6/13
135R	17N-8E-W1/2-33, RM 56.2	Dodge	Fremont East	0	3	0	0	6/13
136Pn	17N-7E-15	Dodge	Fremont West	2	4	0	0	6/4
				7	14	0	0	6/27
137Pn	17M-6E-18	Saunders	North Bend	2	4	1	2	6/4
				2	4	0	0	7/2
138Pn	17N-6E-16	Saunders	North Bend	4	8	1	3	6/4
				4	8	1	2	7/2
139P	17N-6E-16	Saunders	Malmo NW	1	2	0	0	6/5
				3	6	0	0	6/27
140P	17N-8E-17	Dodge	Fremont West	0	0	1	2	6/4
				0	0	0	0	6/27
141Pn	17N-8E-N1/2-35	Dodge	Fremont East	4	10	1	1	6/3
				8	10	0	1	6/27
142R	17N-8E-SE1/4-35, RM 56	Dodge	Fremont East	0	2	0	0	7/3
143Rn	16N-9E-N1/2-7, RM 53.6	Douglas/Saunders	Fremont East	0	8	0	1	6/13
				7	19	1	2	7/3

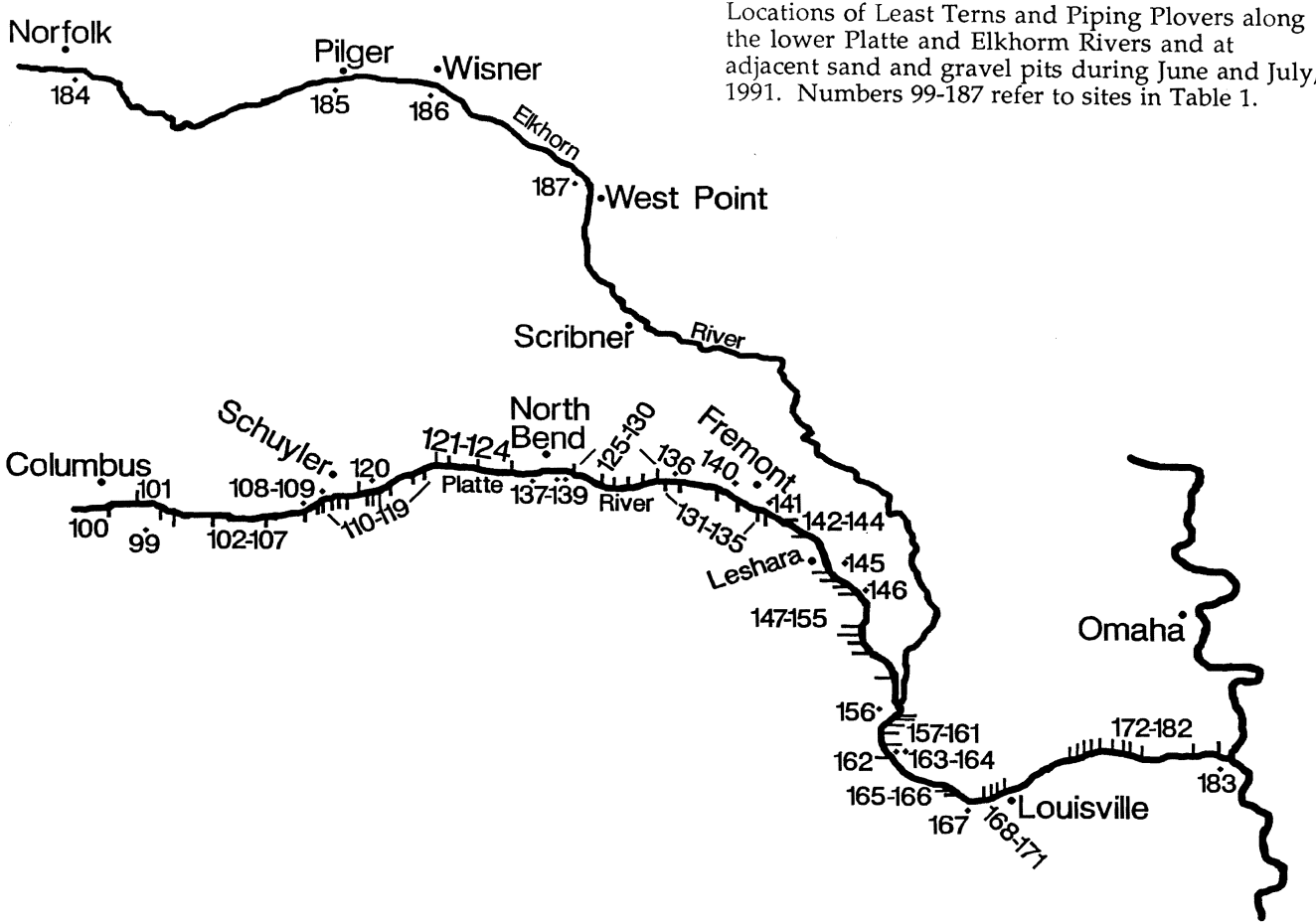
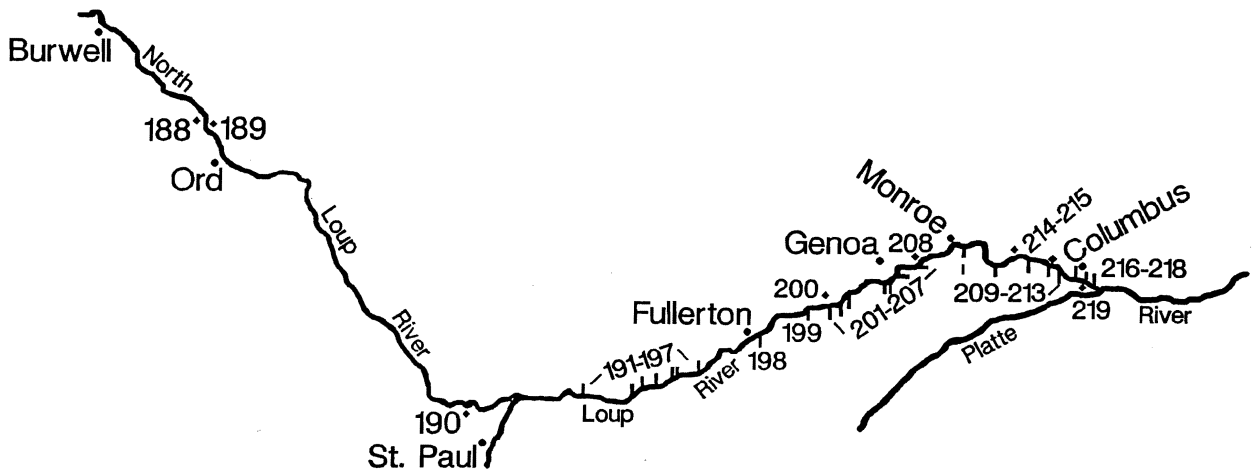


Figure 5.
Locations of Least Terns and Piping Plovers along the lower Platte and Elkhorn Rivers and at adjacent sand and gravel pits during June and July, 1991. Numbers 99-187 refer to sites in Table 1.

Site	Twp-Range-Section, R. Mile	County	USGS Quad	Least Tern Prs	Least Tern Ads	Piping Plover Prs	Piping Plover Ads	Cen. Date
144R	16N-9E-SE1/4-16, RM 51	Douglas/Saunders	Leshara	0	2	0	0	7/3
145P	16N-9E-SE1/4-35	Douglas	Valley	0	1	0	0	6/3
				0	0	0	0	7/3
146Pn	15N-10E-S1/2-18	Douglas	Valley	15	30	2	5	6/3
				11	18	1	1	7/2
147R	15N-9E-SW1/4-34, RM 48	Douglas/Saunders	Leshara	0	2	0	0	6/13
				0	3	0	0	7/2
148Rn	15N-9E-NE1/4-11, RM 45.7	Douglas/Saunders	Valley	4	13	2	4	7/2
149Rn	15N-9E-N1/2-12, RM 44.3	Douglas/Saunders	Valley	5	19	0	0	7/2
150Rn	15N-9E-NE1/4-24, RM 43	Douglas/Saunders	Valley	1	2	0	1	7/2
151Rn	14N-10E-NE1/4-7, RM 39.2	Douglas/Saunders	Wann	2	15	2	4	7/2
152Rn	14N-10E-SW1/4-8, RM 38	Douglas/Saunders	Wann	10	20	2	4	7/2
153Rn	14W-10E-W1/2-17, RM 37.7	Douglas/Saunders	Wann	3	10	0	4	7/2
154Rn	14N-10E-E1/2-29, RM 35.2	Sarpy/Saunders	Wann	4	8	1	2	7/2
155Rn	14N-10E-SE1/4-32, RM 33.8	Sarpy/Saunders	Wann	3	7	1	2	7/2
156Rn	13N-10E-NE1/4-6	Douglas	Wann	18	36	3	11	6/3
				0	7	0	3	7/10
157Rn	13N-10E-SW1/4-8, RM 31.3	Sarpy/Saunders	Ashland East	1	2	1	2	7/2
158Rn	13N-10E-NE1/4-18, RM 30.9	Sarpy/Saunders	Ashland East	0	10	1	2	7/2
159R	13N-10E-SE1/4-18, RM 29.5	Sarpy/Saunders	Ashland East	0	2	0	0	7/2
160Rn	13N-10E-SW1/4-29, RM 28	Sarpy/Saunders	Ashland East	2	5	0	0	7/2
161Rn	13N-10E-SW1/4-29, RM 27	Sarpy/Saunders	Ashland East	1	2	1	2	7/2
162Rn	12N-10E-E1/2-10, RM 24.5	Cass/Sarpy	Ashland East	3	8	1	2	7/2
163Pn	13N-10E-SE1/4-18	Sarpy	Ashland East	1	3	0	4	6/3
				1	15	0	1	7/10
164Pn	13N-10E-N1/2-18	Saunders	Ashland East	1	7	1	6	6/3
				2	15	11	5	7/3
165Rn	12N-10E-SE1/4-13, RM 21.0	Cass/Sarpy	Springfield	2	5	0	0	7/2
166R	12N-11E-NW1/4-19, RM 21	Cass	Springfield	0	3	0	0	6/4
167Pn	12N-11E-W1/2-19	Cass	Manley	0	8	2	4	6/4
				1	2	0	0	7/9
168Rn	12N-11E-NW1/4-20, RM 19.4	Cass/Sarpy	Manley	1	2	0	0	7/2
169R	12N-11E-SE1/4-16, RM 18	Cass/Sarpy	Springfield	0	4	0	2	6/4
170Rn	12N-11E-W1/2-15, RM 17.4	Cass/Sarpy	Springfield	8	16	2	4	7/2
171Rn	12N-11E-NW1/4-14, RM 16	Cass/Sarpy	Springfield	2	4	1	2	7/2

Figure 6.
Locations of Least Terns and Piping Plovers along the Loup River system and at adjacent sand and gravel pits along the upper Platte River during June and July, 1991. Numbers 188-219 refer to sites in Table 1.



				Least Tern		Piping Plover		Cen.
				Prs	Ads	Prs	Ads	Date
172Rn	13N-12E-SE1/4-31, RM 12.5	Cass/Sarpy	Cedar Creek	2	5	1	2	7/2
173Rn	13N-12E-SW1/4-32, RM 12.2	Cass/Sarpy	Cedar Creek	14	28	2	4	7/2
174R	13N-12E-NW1/4-6, RM 12	Cass	Cedar Creek	0	2	0	0	6/4
175R	13N-12E-NW1/4-33, RM 11	Cass/Sarpy	Cedar Creek	0	3	0	0	7/2
176R	13N-12E-SE1/4-28, RM 10	Cass/Sarpy	Cedar Creek	0	2	0	0	7/2
177Rn	13N-12E-E1/2-27, RM 9.1	Cass/Sarpy	Cedar Creek	4	8	1	2	7/2
178Rn	13N-12E-W1/2-26, RM 8.5	Cass/Sarpy	Cedar Creek	9	18	1	2	7/2
179R	13N-12E-E1/2-26, RM 8	Cass/Sarpy	Cedar Creek	0	1	0	1	6/4
180Rn	13N-12E-SE1/4-25, RM 6.7	Cass/Sarpy	Cedar Creek	5	10	0	0	7/2
181Rn	13N-13E-N1/2-34, RM 3	Cass/Sarpy	Plattsmouth	7	14	1	2	7/2
182R	13N-14E-NW1/4-31, RM 0.5	Cass/Sarpy	Plattsmouth	0	2	0	2	7/2
183Pn	13N-13E-36	Cass	Plattsmouth	2	9	1	2	6/4
				0	5	0	3	7/10
TOTAL[5] (P)				136	324	47	107	
TOTAL[5] (R)				11	132	7	35	
TOTAL[5]				147	456	54	142	
		Elkhorn River						
184Pn	23N-1W-3	Madison	Norfolk	4	10	1	2	6/20
185Pn	23N-4E-S1/2-13	Cuming	Wisner	0	4	1	2	6/20
186Pn	22N-6E-21	Cuming	West Point	4	4	0	0	6/20
187Pn	23N-3E-10	Stanton	Stanton NE	4	8	0	0	6/20
TOTAL (P)				12	26	2	4	
		Loup River System						
188Pn	20N-14W-W1/2-32	Valley	Ord NW	3	7	2	4	6/17
189Pn	20N-14W-SE1/4-32	Valley	Ord NW	2	4	0	0	6/17
190Pn	15N-10W-S1/2-17	Howard	Wolbach SW	7	18	3	6	6/5
191Rn	15N-9W-NE1/4-14	Howard	Cushing	1	2	1	2	7/11
192R	15N-8W-NE1/4-13	Nance	Belgrade SW	0	0	1	2	7/11
193Rn	15N-8W-SW1/4-7	Nance	Belgrade SW	6	12	2	4	7/11
194R	15N-7W-NE1/4-9	Nance	Belgrade SE	0	2	0	0	7/11
195Rn	15N-7W-NW1/4-3	Nance	Belgrade SE	4	8	5	10	7/11

Site	Twp-Range-Section, R. Mile	County	USGS Quad	Least Tern Prs	Least Tern Ads	Piping Plover Prs	Piping Plover Ads	Cen. Date
196R	15N-7W-E1/2-3	Nance	Belgrade SE	0	1	0	0	7/11
197R	15N-6W-NW1/4-6	Nance	Belgrade SE	0	1	0	0	7/11
198Rn	16N-5W-NW1/4-18	Nance	Fullerton	18	36	3	6	7/11
199R	16N-5W-NE1/4-2	Nance	Fullerton NE	1	2	1	2	7/11
200Pn[6]	17N-4W-S1/2-31	Nance	Fullerton NE	12	21	3	10	6/4
201R	17N-4W-NE1/4-6	Nance	Fullerton NE	0	1	0	0	7/11
202Rn	17N-4W-E1/2-32	Nance	Fullerton NE	4	11	0	2	7/11
203R	17N-4W-N1/2-33	Nance	Fullerton NE	0	0	0	2	7/11
204R	17N-3W-NW1/4-30	Nance	Genoa	0	1	0	0	7/11
205R	17N-3W-NE1/4-30	Platte	Genoa	0	1	0	0	7/11
206R	17N-3W-NE1/4-19	Platte	Genoa	0	1	0	0	7/11
207R	17N-3W-NW1/4-15	Platte	Genoa	0	6	0	2	7/11
208Pn	17N-3W-E1/2-16	Platte	Genoa	4	9	0	0	6/4
209R	17N-2W-SE1/4-8	Platte	Monroe	0	1	0	0	7/11
210R	17N-2W-N1/2-23	Platte	Monroe	0	0	0	2	7/11
211Rn	17N-1W-S1/2-17	Platte	Duncan	1	9	1	2	7/11
212R	17N-1W-SW1/4-23	Platte	Duncan	0	17	0	8	7/11
213R	17N-1W-NE1/4-26	Platte	Duncan	0	0	0	1	7/11
214Pn	17N-1W-NW1/4-18	Platte	Duncan	1	2	1	2	6/4
215Pn	17N-1W-NE1/4-22	Platte	Duncan	1	4	1	2	6/4
216R	17N-1E-SE1/4-30	Platte	Columbus	0	1	0	0	7/11
217R	17N-1E-SE1/4-32	Platte	Columbus	0	3	0	1	7/11
218R	17N-1E-SW1/4-33	Platte	Columbus	0	1	0	2	7/11
219Pn	17N-1E-S1/2-30	Platte	Columbus	3	22	2	2	6/4
TOTAL[5] (P)				33	87	12	26	
TOTAL[5] (R)				0	0	0	0	
TOTAL[5]				33	87	12	26	
TOTAL[5] (S)				0	16	22	63	
TOTAL[5] (P)				181	437	61	138	
TOTAL[5] (R)				121	423	56	197	
TOTAL[5]				302	876	139	398	