

**IDAHO NATIONAL ENGINEERING AND
ENVIRONMENTAL LABORATORY
2003 BREEDING BIRD SURVEYS**



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Executive Summary

From June 1st to June 25th 2003, 14 permanent survey routes located at the Idaho National Engineering and Environmental Laboratory (INEEL) were censused for birds. A total of 5,844 individuals representing 67 species of birds were recorded along the routes. This is above the average of 4,629 birds/year recorded from 1985-2002. Horned Lark and Western Meadowlark comprised more than 50% of all birds counted on the INEEL. Both of these species have increased in recent years, most likely as a consequence of large fires converting sagebrush to grassland habitat. Species of special concern recorded in 2003 included Long-billed Curlew (N = 1), Ferruginous Hawk (N = 13), Swainson's hawk (N = 3), Sage Grouse (N=19), and Loggerhead Shrike (N = 39). Burrowing Owl, a species of special concern, was not observed in 2003.



Swainson's Hawk

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Introduction



The Breeding Bird Survey (BBS) is a large-scale survey of North American birds. It is a roadside route survey of avifauna designed to monitor abundance and distribution of birds primarily covering the continental United States and southern Canada, although survey routes have recently been initiated in Alaska and northern Mexico (Sauer et al. 2003). The BBS was started in the eastern U.S. in 1966, with over 3,500 routes currently surveyed each June by experienced birders (see United States Geological Survey (USGS) BBS data; web site: www.mbr-pwrc.usgs.gov/bbs/bbs.html).

The primary objective of the BBS has been the estimation of population change for songbirds. However, the data have many potential uses, and investigators have used the data to address a variety of research and management objectives.

The Idaho National Engineering and Environmental Laboratory (INEEL), located in southeastern Idaho, is comprised of large expanses of relatively undisturbed shrubsteppe and grassland habitat. This area was designated as a National Environmental Research Park in 1975 and serves as an outdoor laboratory to assess environmental impacts of nuclear energy development technologies. Since 1985, official BBS and unofficial facility routes have been surveyed at the INEEL. These surveys have yielded useful information about population



dynamics, effects of weather and fire on avian abundance, effects of INEEL facilities on avifauna, and the breeding status of a number of bird species of concern, including sagebrush obligate species and other species exhibiting declines throughout their range (e.g., see Belthoff and Ellsworth 1996, 1999 and 2000, Belthoff et al. 1998, and Ellsworth 2001).

This report summarizes results of surveys conducted in 2003 at the INEEL and briefly

compares findings to those from previous years. Common names for bird species are used throughout the report but scientific names are given in Table 1.

Study Area

The 2,315 km² INEEL is located approximately 48 km west of Idaho Falls on the upper Snake River Plain in southeastern Idaho, and occupies portions of Bingham, Bonneville, Butte, Clark, and Jefferson counties. The area is a semi-arid, cold desert with an average elevation of

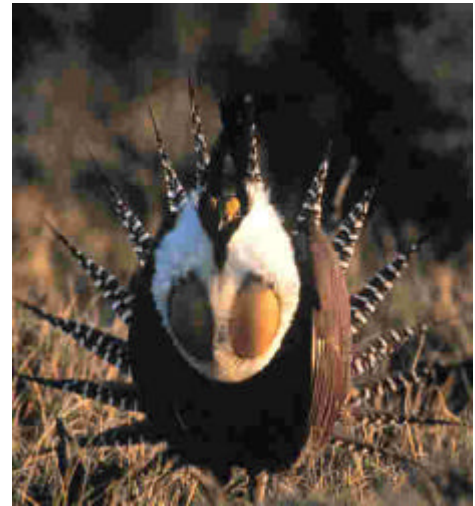


approximately 1500 m above sea level. Anderson et al. (1996) detailed the climate, geology, and vegetation of the INEEL. Briefly, vegetation in the study area is typical of shrubsteppe ecosystems and is dominated by woody, mid-height shrubs and perennial bunchgrasses. Big sagebrush (*Artemisia tridentata*) dominates much of the vegetation on the site, but other principle shrubs include green rabbitbrush (*Chrysothamnus viscidiflorus*), shadscale (*Atriplex confertifolia*), and winterfat (*Krascheninnikovia lanata*). Native grasses that are dominant throughout the site are bottle brush squirreltail (*Elymus elymoides*), thickspike wheatgrass (*Elymus lanceolatus*), needle-and-thread grass (*Hesperostipa comata*), Indian ricegrass (*Achnatherum hymenoides*), and bluebunch wheatgrass (*Pseudoroegneria spicata*). Basalt lava flows dominate the geology of the region, and the topography is flat to gently rolling, with the exception of East and Middle Buttes, which protrude from the southern portion of the area. The southern extensions of two of the largest mountain ranges in Idaho (Lost River and Lemhi Mountains) rise above the INEEL site and Snake River Plain to the north and west. The area experiences hot, dry summers and cold winters (Short 1986). Annual precipitation averages

approximately 20 cm, and most of this occurs during the spring. Surface water in the summer is limited to residual flows of the Big Lost River and Birch Creek, each of which are diverted upstream of the site for agriculture and flood prevention. During the spring, the Big Lost River may flow into an ephemeral wetland known as the Lost River Sinks, which can provide nesting and migratory stopover habitat for waterfowl and shorebirds. Several human-made wastewater treatment ponds occur near research facilities which attract birds that prefer aquatic habitats.

Methods

Fourteen Breeding Bird Survey routes were surveyed June 1-25, 2003 (Figure 1). Five remote routes are standard 40-km BBS routes, from which data are reported to the USGS Biological Resources Division annually. These routes traverse the remote areas of the INEEL and include major habitat types throughout the site. Eight facility routes are located in and around major INEEL facility complexes. An additional survey route was



Sage Grouse

established in 1997 around the CFA Wastewater Treatment Facility as part of an experiment designed to monitor how application of wastewater affects flora and fauna.

North American Breeding Bird Survey protocol, provided by USGS Patuxent Wildlife Research Center, was followed in completing each of these surveys. Each remote route consists of 50 stop locations at approximately 0.5-mile (0.8 km) intervals. Facility routes consist of 18–60 stop locations at approximately 0.2-mile (0.32km) intervals. Every route counted starts with the traditional stop location numbered ‘1’. Surveys began approximately ½ hour before official sunrise as given by the Astronomical Applications Department, U.S. Naval

Observatory. Counting was conducted from outside of the vehicle. A certified Breeding Bird Survey observer relayed counts verbally to an assistant who recorded the information on an official data sheet. All individual birds (except dependent young) of all species seen or heard during a 3-minute period were recorded.



Individuals known or strongly suspected to have been counted at a previous stop were not counted. Each route took approximately 1- 6 hours to complete.

Temperature, wind speed (based on protocol description ranking 1-5), and cloud cover were recorded at the start and end of each survey route. Surveys were conducted only under



satisfactory weather conditions including good visibility, little or no precipitation, and light winds in order to be comparable to previous years. Survey dates for each route can be found in Appendix A.

Loggerhead Shrike Chicks

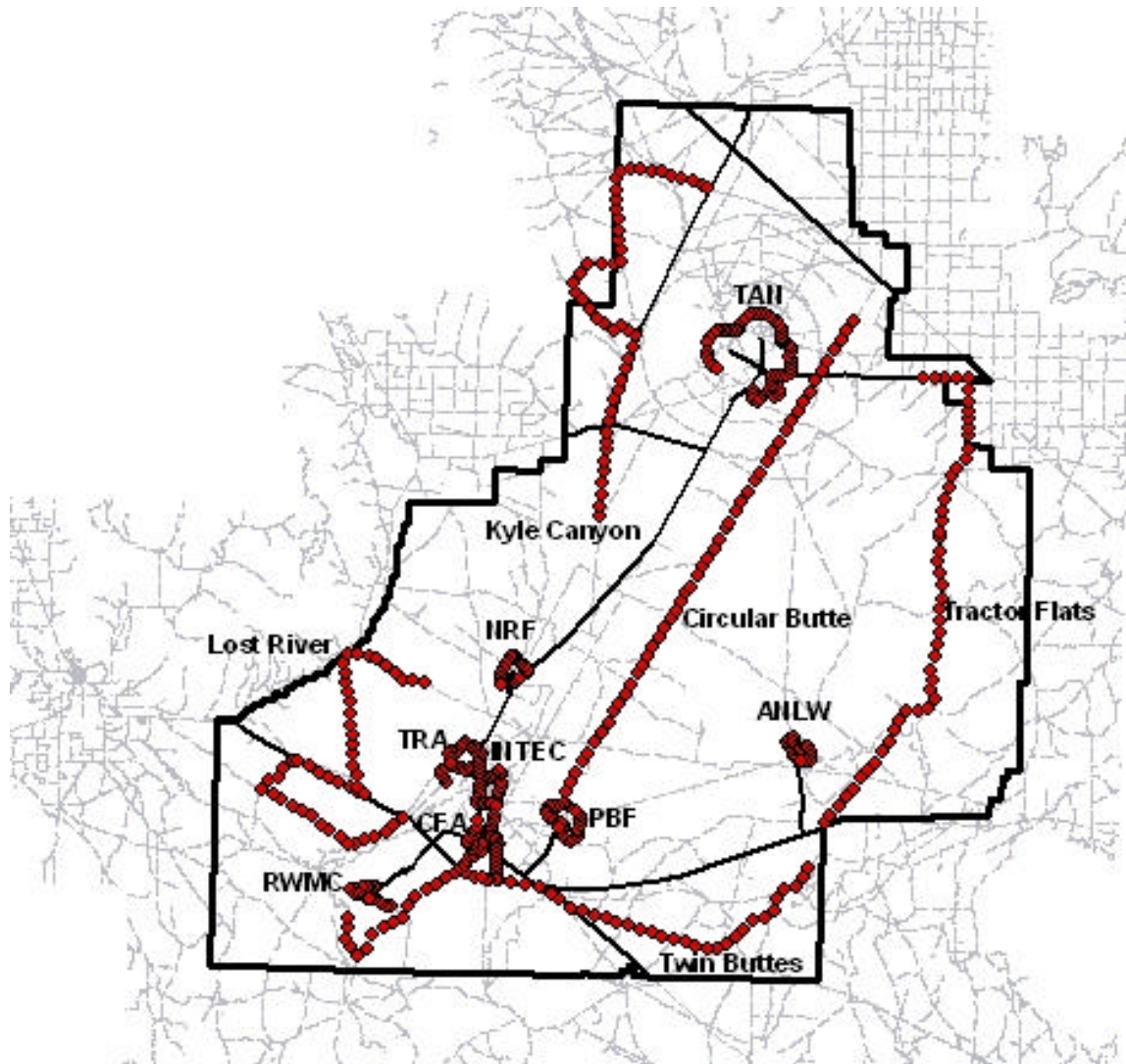


Figure 1. Facility and remote routes on the INEEL

Results and Discussion

Bird abundance and species richness

Abundance ? A total of 5,844 individual birds were recorded along the 13 survey routes (the CFA Wastewater Facility Route was not used in these comparisons) (Figure 2). This is above the 1985-2002 average of 4,375 birds/year (no surveys were conducted in 1992 or 1993).

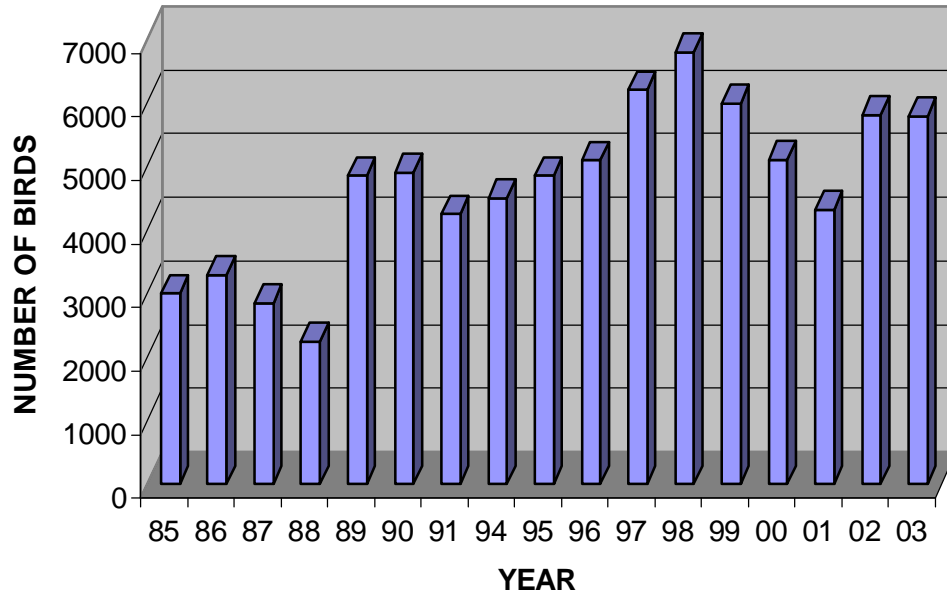


Figure 2. Total number of birds recorded by year (1985-2003) along 13 permanent routes at the INEEL.

Although bird numbers remained relatively unchanged from the 2002 survey, drought conditions continued during 2003 with higher than normal rainfall occurring in April and lower than normal in May and June. Horned Larks and Meadow Larks comprised more than 50% of all birds counted on the 2003 survey. Horned Larks are a dominant component of grassland communities on the INEEL (Ellsworth 2002). The conversion from sagebrush to grassland, due to large fires, has allowed this species to increase in abundance (Peterson and Best 1987). At the same time sagebrush obligate species (e.g. Brewer’s Sparrow, Sage Sparrow, and Sage Thrasher) have remained relatively stable but slightly decreased (Figure 3).



Horned Lark

All Routes Top 5 Species Observed

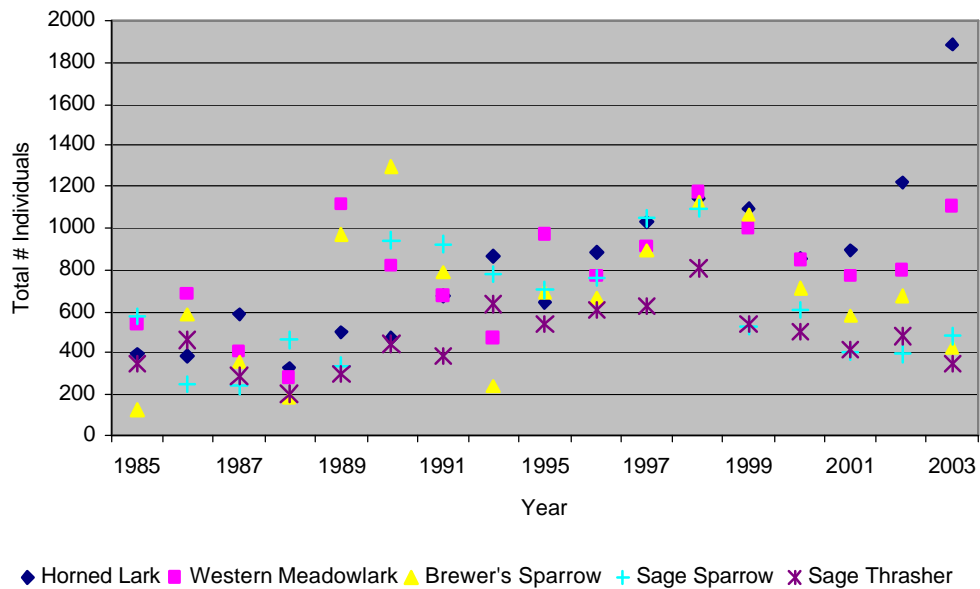


Figure 3. Total number of the 5 most abundant species recorded by year at the INEEL from 1985-2003.

The downward trend in the number of sagebrush obligate species is consistent with the notion that sagebrush habitat is being lost and may be negatively affecting these populations of birds. This trend is very evident on the Big Lost River route where in 2000 a wildfire consumed sagebrush on more than 60% of the route. Before the 2000 fire more than 82% of the vegetation on the route was dominated by sagebrush. After the fire, only 22% of the route remained in sagebrush dominated habitat. Figure 4 illustrates the dramatic increase in Horned



Sage Thrasher

Lark numbers and the general decrease in the sagebrush obligate species such as Brewer's Sparrow, Sage Sparrow, and Sage Thrasher. Although large expanses of sagebrush habitat remain of the INEEL and fire is a natural part of the Snake River Plain

ecosystem, concern for the preservation of sagebrush habitat is valid given that much of this habitat has been lost by conversion to agriculture or development. At the very least, further sagebrush habitat loss should continue to be monitored.

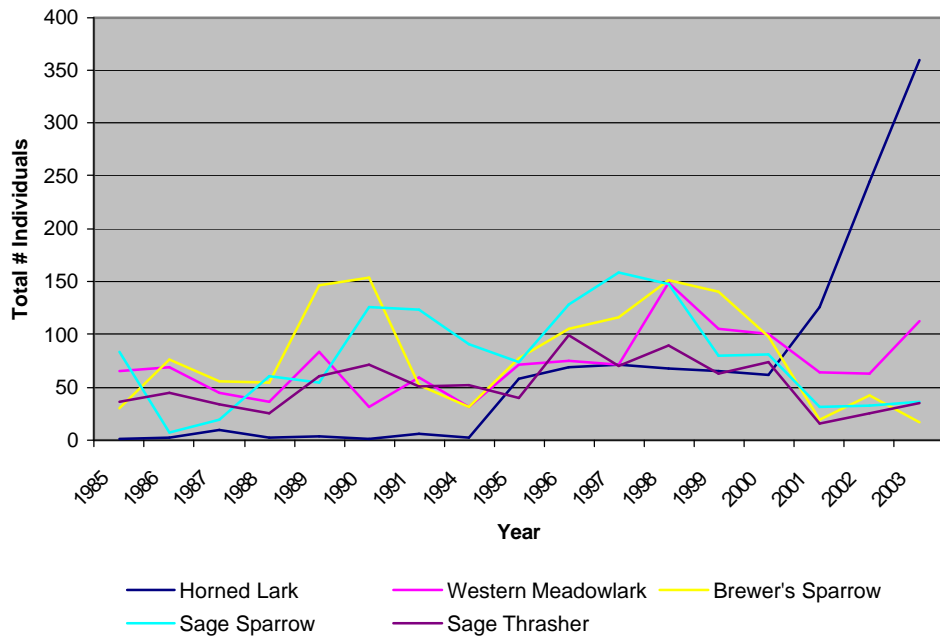


Figure 4. Total number of the 5 most abundant species recorded by year on the Big Lost River Route during 1985-2003. Notice the exponential increase of Horned Larks since the 2000 fire and decline of sagebrush obligate species.

The high numbers of birds counted in 2003, however, does not necessarily reflect large numbers of birds counted among all taxa. Several species were at or below long-term averages and a few species observed in six or more previous years were absent in 2003, including Burrowing Owl, Bank Swallow, and Blue-gray Gnatcatcher. Waterfowl counts at the INEEL were also low due to the lack of water in the Big Lost River over the past 4 years. The Big Lost River, Sinks and Spreading Areas have not held water since summer of 1999, thus reducing the number of birds that would normally use these areas. The only waterfowl observed in 2003 were at the facility wastewater treatment ponds.

Overall, 13 routes were surveyed on the INEEL with approximately 446 ± 162 total birds counted per route. On the five remote routes the average number of total birds observed was 595 ± 77 with an average of 12 ± 3 birds per stop. The eight facility complex routes averaged 352 ± 126 total number of total birds observed with an average of 12 ± 4 birds per stop (Table 2). The area surveyed at each stop on remote routes is greater than the area surveyed at each stop on the facility routes, so comparisons between facility and remote routes are not directly comparable. Appendix A contains a list of species observed and their relative abundance along the 14 survey routes.

Overall, the five most numerous species in order of abundance were Horned Larks, Western Meadowlarks, Brewer's Sparrows, Sage Sparrows, and Sage Thrashers. These species were the most frequently counted species each year and usually comprise >70% of all birds detected.



Western Meadowlark

Species Richness - In 2003, a total of 67 species were detected during the surveys. This is above the average of 56 ± 8 recorded from 1985-2002 (Figure 5). One new species for the BBS, the Ring-necked Duck, was observed at the NRF wastewater pond, increasing the total number of species detected along the routes (1985-2003) to 114. In 2003, there were 24 ± 5 species per route, with many similar species recorded along remote routes (23 ± 2) and facility routes (24 ± 6). Facility routes had the fewest (N=15 @ PBF) and the greatest (N=31 @ NRF & CFA) number of species observed. The number of species observed on remote routes was similar with 20-26 species observed on each route.

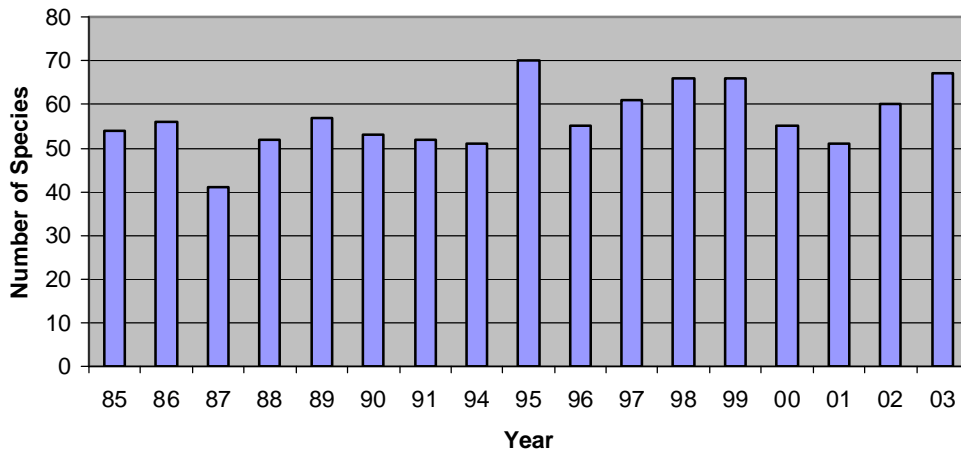


Figure 5. Total number of species recorded by year (1985-2003) along 13 permanent survey routes at the Idaho National Engineering and Environmental Laboratory.

Habitat and species assemblages

A limited assemblage of breeding bird species that are typical of sagebrush steppe or grassland communities within the Snake River Plain dominated the avifauna of the INEEL (Belthoff et al. 1998). These species included native species such as Sage Sparrow, Brewer’s Sparrow, Sage Thrasher and Sage Grouse in the sagebrush, Rock Wrens within rocky outcrops, Horned Larks and Vesper Sparrows in the grasslands, and the ubiquitous Western Meadowlark, Mourning Dove, Brown-headed Cowbird, Common Nighthawk, and Raven.

Other less common, but widespread species included the Common Poorwill, Loggerhead Shrike, Grasshopper Sparrow, Lark Sparrow, Great-horned Owl, Ferruginous Hawk, Red-tailed Hawk, Swainson’s Hawk, and Prairie Falcon.



Mourning Dove

There were also several other bird species that are

not usually found in sagebrush steppe or grasslands and are principally relegated to a variety of other distinct habitat types. For example, there were species of birds that were found on the INEEL only in junipers in patches near the buttes or along the base of the Lemhi and Lost River Mountains. These species, including Chipping Sparrow, and Gray Flycatcher, were counted at the same sites almost every year and nowhere else. Waterfowl and shorebirds were another group of birds that has limited distribution on the INEEL, either in natural areas along the Big Lost River (when it contains water) or in man-made ponds near the facilities.

An additional array of bird species that would not normally be observed in sagebrush steppe or grassland habitats were found in altered or man-made habitats of the INEEL. Permanent water, different food resources, and buildings and planted trees for nest sites make these areas suitable for species that would otherwise not be located in this area. These species included House Finch, Barn Swallow, American Robin, and Bullock's Oriole. Most of these species are native to well-watered areas within the Snake River Plain and/or surrounding mountains, but the facilities provide habitat for these species as well as non-natives such as the Rock Dove, House Sparrow, and European Starling. Finally, there were birds, such as the Brewer's Blackbird, Black-billed Magpie, and Say's Phoebe that were found both near the facilities and in remote areas.



American Robin

Species of special concern

State and Federal species of special concern observed during the 2003 census included Long-billed Curlew (N = 1), Ferruginous Hawk (N = 13), Swainson's Hawk (N = 3), Loggerhead Shrike (N = 39), and Greater Sage Grouse (N = 19) (Table 1). The Burrowing

Owl has not been observed since 2000. The sagebrush steppe habitat on the INEEL continues to support species of birds that are low or declining in number throughout the Intermountain West.

Summary

A relatively high number of birds were counted along the BBS routes at the INEEL in 2003. However, record numbers of Horned Lark and Western Meadowlark were observed, boosting the overall total of birds considerably. Widespread and increasing populations of these species were not unexpected considering that recent fires that have converted extensive areas from sagebrush to the grasslands that they use. Most other bird species populations were comparable in number to recent years including sagebrush obligates and species of special concern.



2002 Wildfire

These annual surveys provide valuable long-term data for land managers to allow them to determine impacts of activities conducted at the INEEL and surrounding areas on breeding bird populations. Factors that may affect a population range from natural events such as drought and wildfires to non-natural events such as the removal of resources through development or chemical application. These data also contributed to a nationwide database of bird population trends that is used by state and federal agencies.

Literature Cited

- Anderson, J.E., K.T. Ruppel, J.M. Glennon, K.E. Holte, and R.C. Rope. 1996. Plant communities, ethnoecology, and flora of the Idaho National Engineering Laboratory. ESRF-005, Environmental Science and Research Foundation, Idaho Falls.
- Belthoff, J.R., and E.A. Ellsworth. 1996. 1996 Breeding bird surveys at the Idaho National Engineering Laboratory. Unpubl. Tech. Rept., Environmental Science and Research Foundation, Idaho Falls, Idaho.
- Belthoff, J.R., and E.A. Ellsworth. 1999. 1999 Breeding bird surveys at the Idaho National Engineering Laboratory. Unpubl. Tech. Rept., Environmental Science and Research Foundation, Idaho Falls, Idaho.
- Belthoff, J.R., and E.A. Ellsworth. 2000. 2000 Breeding bird surveys at the Idaho National Engineering Laboratory. Unpubl. Tech. Rept., Environmental Science and Research Foundation, Idaho Falls, Idaho.
- Belthoff, J.R., L.R. Powers, and T.D. Reynolds. 1998. Breeding birds at the Idaho National Engineering and Environmental Laboratory, 1985 – 1991. *Great Bas. Natural.* 58:167-183.
- Ellsworth, E.A. 2001. 2001 Breeding bird surveys at the Idaho National Engineering Laboratory. Unpubl. Tech. Rept., S.M. Stoller Corp., Idaho Falls, Idaho.
- Ellsworth, E.A. 2002. 2002 Breeding bird surveys at the Idaho National Engineering Laboratory. Unpubl. Tech. Rept., S.M. Stoller Corp., Idaho Falls, Idaho.
- Peterson, K.L., and L.B. Best. 1987. Effects of Prescribed Burning on Nongame Birds in a Sagebrush Community. *Wildl. Soc. Bull.* 15:317-329.
- Sauer, J. R., J. E. Hines, and J. Fallon. 2003. The North American Breeding Bird Survey, Results and Analysis 1966 - 2002. Version 2003.1, *USGS Patuxent Wildlife Research Center*, Laurel, MD

Short, H.L. 1986. Rangelands. Pages 93-122 *in* A.Y. Cooperrider, R.J. Boyd, and H.R. Stuart, eds., Inventory and monitoring of wildlife habitat. U.S. Department of Interior, Bureau of Land Management Service Center, Denver, Colorado.

Table 1. Birds observed along all 14 Breeding Bird Survey routes at the Idaho National Engineering and Environmental Laboratory during the 2003 census. Number and percentage of total for each species are indicated.

Common Name	Scientific Name	N	%
Horned Lark	<i>Eremophila alpestris</i>	1881	32.1
Western Meadowlark	<i>Sturnella neglecta</i>	1104	18.9
Sage Sparrow	<i>Amphispiza belli</i>	484	8.3
Brewer's Sparrow	<i>Spizella breweri</i>	419	7.2
Sage Thrasher	<i>Oreoscoptes montanus</i>	349	6.0
Vesper Sparrow	<i>Pooecetes gramineus</i>	233	4.0
Brown-headed Cowbird	<i>Molothrus ater</i>	226	4.0
Lark Sparrow	<i>Chondestes grammacus</i>	161	2.8
Mourning Dove	<i>Zenaida macroura</i>	154	2.6
Rock Dove	<i>Columba livia</i>	83	1.4
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>	69	1.2
Common Raven	<i>Corvus corax</i>	62	1.1
Franklin's Gull	<i>Larus pipixcan</i>	62	1.1
Common Nighthawk	<i>Chordeiles minor</i>	58	1.0
Killdeer	<i>Charadrius vociferus</i>	44	0.8
Barn Swallow	<i>Hirundo rustica</i>	42	0.7
Loggerhead Shrike	<i>Lanius ludovicianus</i>	39	0.7
House Finch	<i>Carpodacus mexicanus</i>	37	0.6
Say's Phoebe	<i>Sayornis saya</i>	28	0.5
Mallard	<i>Anas platyrhynchos</i>	20	0.3
Sage Grouse	<i>Centrocercus urophasianus</i>	19	0.3
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	16	0.3
Rock Wren	<i>Salpinctes obsoletus</i>	16	0.3
Black-billed Magpie	<i>Pica pica</i>	15	0.3

Table 1. Birds observed along all 14 Breeding Bird Survey routes at the Idaho National Engineering and Environmental Laboratory during the 2003 census. Number and percentage of total for each species are indicated. (*Continued*)

Common Name	Scientific Name	N	%
Yellow-head Blackbird	<i>Xanthocephalus xanthocephalus</i>	15	0.3
European Starling	<i>Sturnus vulgaris</i>	14	0.2
Red-tailed Hawk	<i>Buteo Jamaicensis</i>	14	0.2
Cliff Swallow	<i>Hirundo pyrrhonota</i>	13	0.2
Ferruginous Hawk	<i>Buteo regalis</i>	13	0.2
American Robin	<i>Turdus migratorius</i>	12	0.2
Gray Flycatcher	<i>Empidonax wrightii</i>	12	0.2
House Sparrow	<i>Passer domesticus</i>	10	0.2
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	10	0.2
American Kestrel	<i>Falco sparverius</i>	8	0.1
California Gull	<i>Larus californicus</i>	8	0.1
Wilson's Phalarope	<i>Phalaropus tricolor</i>	8	0.1
Northern Harrier	<i>Circus cyaneus</i>	6	0.1
Chipping Sparrow	<i>Spizella passerina</i>	5	0.1
Gadwall	<i>Anas Strepera</i>	5	0.1
Northern Flicker	<i>Colaptes auratus</i>	5	0.1
Savannah Sparrow	<i>Passerculus sandwichensis</i>	5	0.1
Cinnamon Teal	<i>Anas cyanoptera</i>	4	<0.1
Green-wing Teal	<i>Anas crecca</i>	4	<0.1
Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	4	<0.1
Spotted Sandpiper	<i>Actitis macularia</i>	4	<0.1
Western Kingbird	<i>Tyrannus verticalis</i>	4	<0.1
American Coot	<i>Fulica americana</i>	3	<0.1
Bullock's Oriole	<i>Icterus bullockii</i>	3	<0.1

Table 1. Birds observed along all 14 Breeding Bird Survey routes at the Idaho National Engineering and Environmental Laboratory during the 2003 census. Number and percentage of total for each species are indicated. (*Continued*)

Common Name	Scientific Name	N	%
Eastern Kingbird	<i>Tyrannus tyrannus</i>	3	<0.1
Green-tailed Towhee	<i>Pipio chlorurus</i>	3	<0.1
Lark Bunting	<i>Calamospiza melanocorys</i>	3	<0.1
Prairie Falcon	<i>Falco mexicanus</i>	3	<0.1
Swainson's Hawk	<i>Buteo swainsoni</i>	3	<0.1
American Crow	<i>Corvus brachyrhynchos</i>	2	<0.1
American Wigeon	<i>Anas americana</i>	2	<0.1
Northern Mockingbird	<i>Mimus polyglottos</i>	2	<0.1
Ring Neck Duck	<i>Aythya collaris</i>	2	<0.1
Short-eared Owl	<i>Asio flammeus</i>	2	<0.1
American Avocet	<i>Recurvirostra americana</i>	1	<0.1
Common Poorwill	<i>Phalaenoptilus nuttallii</i>	1	<0.1
Dusky Flycatcher	<i>Empidonax oberholseri</i>	1	<0.1
Great-horned Owl	<i>Bubo virginianus</i>	1	<0.1
Long-billed Curlew	<i>Numenius americanus</i>	1	<0.1
Pine Siskin	<i>Carduelis pinus</i>	1	<0.1
Redhead	<i>Aythya americana</i>	1	<0.1
Northern Shoveler	<i>Anas clypeata</i>	1	<0.1
Cedar Waxwing	<i>Bombycilla cedrorum</i>	1	<0.1
TOTAL	5,844 Individuals 67 Species		

Table 2. Number of species, number of individual birds, and average number of individuals per stop along Remote Routes (N = 5) and Facility Complex Routes (N = 9) at the INEEL in 2002.

Route	Stops	Species	N	Birds/Stop
<i>Remote Routes</i>				
Circular Butte	50	21	590	11.8
Kyle Canyon	50	28	538	10.8
Big Lost River	50	22	659	13.8
Tractor Flats	50	24	685	13.7
Twin Buttes	50	22	505	10.1
Subtotal	250	45	2977	11.9
<i>Facility Complex Routes</i>				
CFA	42	31	337	8.0
ANLW	18	26	349	19.4
INTEC	25	21	280	11.2
Wastewater Treatment Facility	6	12	47	7.8
NRF	20	31	285	14.2
PBF	28	15	283	10.1
RWMC	20	26	233	11.6
TAN	60	17	631	10.5
TRA	32	26	422	13.2
Subtotal	251	55	2867	11.7
TOTAL	501	68	5844	11.8

Appendix A

**SUMMARY OF SPECIES BY ROUTE
2003**

Survey Route: CIRCULAR BUTTE

Survey Date: June 11, 2003

Species	Abundance	Percentage
Horned Lark	235	39.9
Western Meadowlark	143	24.3
Brewer's Sparrow	51	8.7
Sage Sparrow	47	8.0
Sage Thrasher	31	5.3
Mourning Dove	22	3.7
Lark Sparrow	15	2.5
Brown-headed Cowbird	15	2.5
Common Raven	6	1.0
California Gull	5	0.8
Vesper Sparrow	5	0.8
Common Nighthawk	4	7.0
Loggerhead Shrike	3	0.5
Northern Harrier	1	0.2
Red-tailed Hawk	1	0.2
Ferruginous Hawk	1	0.2
Sage Grouse	1	0.2
Common Poorwill	1	0.2
Rock Wren	1	0.2
Eastern Kingbird	1	0.2

Total Individuals = 589

Total Species = 21

Survey Route: KYLE CANYON

Survey Date: June 17, 2003

Species	Abundance	Percentage
Horned Lark	109	20.2
Sage Sparrow	85	15.8
Western Meadowlark	76	14.1
Franklin's Gull	62	11.5
Vesper Sparrow	61	11.3
Sage Thrasher	43	8.0
Brewer's Sparrow	23	4.3
Lark Sparrow	18	3.3
Mourning Dove	11	2.0
Loggerhead Shrike	10	1.9
Ferruginous Hawk	7	1.3
Sage Grouse	6	1.1
Common Raven	5	1.0
Black-billed Magpie	4	1.0
Gray Flycatcher	3	1.0
American Kestrel	2	0.4
Lark Bunting	2	0.4
Prairie Falcon	2	0.4
Red-tailed Hawk	2	0.4
Swainson's Hawk	2	0.4
Common Nighthawk	1	0.2
Dusky Flycatcher	1	0.2
N. Rough-winged Swallow	1	0.2
Pine Siskin	1	0.2
Rock Dove	1	0.2
Western Kingbird	1	0.2

Total Individuals = 539

Total Species = 28

Survey Route: BIG LOST RIVER

Survey Date: June 5, 2003

Species	Abundance	Percentage
Horned Lark	359	54.4
Western Meadowlark	113	17.1
Sage Sparrow	37	5.6
Sage Thrasher	35	5.3
Brown-headed Cowbird	26	4.0
Brewer's Sparrow	17	2.6
Common Raven	15	2.3
Lark Sparrow	11	1.7
Vesper Sparrow	11	1.7
Brewer's Blackbird	9	1.4
Loggerhead Shrike	5	0.8
Grasshopper Sparrow	4	0.6
Red-tailed Hawk	4	0.6
Ferruginous Hawk	3	0.5
Mourning Dove	3	0.5
Savannah Sparrow	3	0.5
American Kestrel	1	0.2
American Robin	1	0.2
Barn Swallow	1	0.2
House Finch	1	0.2
Northern Harrier	1	0.2

Total Individuals = 660

Total Species = 22

Survey Route: TRACTOR FLATS

Survey Date: June 25, 2003

Species	Abundance	Percentage
Horned Lark	249	36.4
Western Meadowlark	135	19.7
Sage Sparrow	48	7.0
Brewer's Sparrow	45	6.6
Rock Dove	43	6.3
Mourning Dove	34	5.0
Sage Thrasher	32	4.7
Lark Sparrow	26	3.8
Vesper Sparrow	18	2.6
Brown-headed Cowbird	15	2.2
Loggerhead Shrike	9	1.3
Black-billed Magpie	7	1.0
Sage Grouse	6	0.9
Common Nighthawk	5	0.7
Common Raven	3	0.4
Red-tailed Hawk	2	0.3
Northern Harrier	1	0.1
Ferruginous Hawk	1	0.1
American Kestrel	1	0.1
Long-billed Curlew	1	0.1
California Bull	1	0.1
American Crow	1	0.1
Barn Swallow	1	0.1
Grasshopper Sparrow	1	0.1

Total Individuals = 685

Total Species = 24

Survey Route: TWIN BUTTES

Survey Date: June 12, 2003

Species	Abundance	Percentage
Horned Lark	138	27.3
Western Meadowlark	128	25.3
Sage Sparrow	51	10.1
Sage Thrasher	36	7.1
Mourning Dove	29	5.7
Brewer's Sparrow	28	5.5
Common Nighthawk	21	4.2
Brown-headed Cowbird	14	2.8
Lark Sparrow	14	2.8
Gray Flycatcher	9	1.8
Loggerhead Shrike	7	1.4
Common Raven	5	1.0
Red-shafted Flicker	5	1.0
American Robin	3	0.6
Brewer's Blackbird	3	0.6
Chipping Sparrow	3	0.6
Green-tailed Towhee	3	0.6
Northern Mockingbird	2	0.4
Short-eared Owl	2	0.4
Vesper Sparrow	2	0.4
Grasshopper Sparrow	1	0.2
Savannah Sparrow	1	0.2

Total Individuals = 505

Total Species = 22

Survey Route: CFA

Survey Date: June 4, 2003

Species	Abundance	Percentage
Western Meadowlark	81	24.0
Brown-headed Cowbird	46	13.6
Brewer's Blackbird	27	8.0
Brewer's Sparrow	25	7.4
Sage Thrasher	15	4.5
Sage Sparrow	12	3.6
Common Raven	10	3.0
House Finch	7	2.1
Barn Swallow	6	1.8
House Sparrow	5	1.5
Sage Grouse	4	1.2
Red-winged Blackbird	4	1.2
European Starling	3	0.9
Vesper Sparrow	3	0.9
Bullock's Oriole	3	0.9
American Robin	2	0.6
Yellow-headed Blackbird	2	0.6
American Crow	1	0.3
Rock Wren	1	0.3
Loggerhead Shrike	1	0.3
Lark Sparrow	1	0.3
Grasshopper Sparrow	1	0.3

Total Individuals = 337

Total Species = 31

Survey Route: ANLW

Survey Date: June 16, 2003

Species	Abundance	Percentage
Western Meadowlark	106	30.4
Horned Lark	89	25.5
Brewer's Sparrow	21	6.0
Brown-headed Cowbird	18	5.2
Brewer's Blackbird	17	4.9
Barn Swallow	14	4.0
Sage Sparrow	10	2.9
Killdeer	8	2.3
Common Nighthawk	8	2.3
Sage Thrasher	8	2.3
European Starling	8	2.3
Mourning Dove	6	1.7
Vesper Sparrow	6	1.7
Say's Phoebe	5	1.4
House Finch	5	1.4
Green-winged Teal	4	1.1
Rock Wren	4	1.1
American Wigeon	2	0.6
Common Raven	2	0.6
Yellow-headed Blackbird	2	0.6
Great Horned Owl	1	0.3
American Avocet	1	0.3
Cedar Waxwing	1	0.3
Loggerhead Shrike	1	0.3
Lark Sparrow	1	0.3
Grasshopper Sparrow	1	0.3

Total Individuals = 349

Total Species = 26

Survey Route: INTEC

Survey Date: June 9, 2003

Species	Abundance	Percentage
Horned Lark	59	21.1
Brewer's Sparrow	52	18.6
Western Meadowlark	51	18.2
Sage Sparrow	28	10.0
Sage Thrasher	25	8.9
Lark Sparrow	18	6.4
Common Nighthawk	7	2.5
Killdeer	6	2.1
Say's Phoebe	6	2.1
House Finch	6	2.1
Brown-headed Cowbird	5	1.8
Brewer's Blackbird	3	1.1
Barn Swallow	2	0.7
Black-billed Magpie	2	0.7
American Robin	2	0.7
Vesper Sparrow	2	0.7
Grasshopper Sparrow	2	0.7
Mallard	1	0.4
Mourning Dove	1	0.4
Common Raven	1	0.4
Rock Wren	1	0.4

Total Individuals = 280

Total Species = 21

Survey Route: CFA Wastewater Treatment Facility
Survey Date: June 13, 2003

Species	Abundance	Percentage
Western Meadowlark	17	36.2
Horned Lark	8	17.0
Sage Thrasher	4	8.5
Vesper Sparrow	4	8.5
Lark Sparrow	3	6.4
Brewer's Sparrow	2	4.3
Sage Sparrow	2	4.3
Say's Phoebe	1	2.1
Brewer's Blackbird	1	2.1

Total Individuals = 47

Total Species = 12

Survey Route: NRF

Survey Date: June 13, 2003

Species	Abundance	Percentage
Horned Lark	64	38.8
Western Meadowlark	62	37.6
Vesper Sparrow	20	12.1
Sage Sparrow	19	11.5
Sage Thrasher	18	10.9
Brewer's Sparrow	13	7.9
Killdeer	10	6.1
Yellow-headed Blackbird	8	4.8
Brown-headed Cowbird	8	4.8
Barn Swallow	7	4.2
Mourning Dove	5	3.0
Say's Phoebe	5	3.0
Lark Sparrow	5	3.0
House Finch	5	3.0
Mallard	4	2.4
Cinnamon Teal	4	2.4
Wilson's Phalarope	4	2.4
Nighthawk	4	2.4
American Coot	3	1.8
House Sparrow	3	1.8
Ring-necked duck	2	1.2
Western Kingbird	2	1.2
American Robin	2	1.2
Gadwall	1	0.6
Redhead	1	0.6
Northern Shoveler	1	0.6
Common Raven	1	0.6
European Starling	1	0.6
Grasshopper Sparrow	1	0.6
Brewer's Blackbird	1	0.6
Lark Bunting	1	0.6

Total Individuals = 285

Total Species = 31

Survey Route: PBF

Survey Date: June 3, 2003

Species	Abundance	Percentage
Western Meadowlark	69	24.4
Brewer's Sparrow	58	20.5
Sage Thrasher	36	12.7
Brown-headed Cowbird	32	11.3
Sage Sparrow	31	11.0
Horned Lark	28	9.9
Lark Sparrow	11	3.9
Mourning Dove	6	2.1
Say's Phoebe	3	1.1
Common Raven	2	0.7
Chipping Sparrow	2	0.7
Grasshopper Sparrow	2	0.7
Northern Harrier	1	0.4
Swainson's Hawk	1	0.4
Rock Wren	1	0.4

Total Individuals = 283

Total Species = 15

Survey Route: RWMC

Survey Date: June 2, 2003

Species	Abundance	Percentage
Western Meadowlark	42	18.0
Horned Lark	26	11.2
Sage Thrasher	25	10.7
Brewer's Sparrow	23	9.9
Sage Sparrow	14	6.0
Cliff Swallow	12	5.2
Barn Swallow	11	4.7
Brown-headed Cowbird	9	3.9
Mallard	8	3.4
Killdeer	8	3.4
Say's Phoebe	8	3.4
Rock Wren	7	3.0
Lark Sparrow	6	2.6
House Finch	6	2.6
Rock Dove	5	2.1
Red-winged Blackbird	4	1.7
Spotted Sandpiper	3	1.3
N. Rough-winged Swallow	3	1.3
Common Raven	3	1.3
American Kestrel	2	0.9
Sage Grouse	2	0.9
Vesper Sparrow	2	0.9
Wilson's Phalarope	1	0.4
Loggerhead Shrike	1	0.4
European Starling	1	0.4
Chipping Sparrow	1	0.4

Total Individuals = 233

Total Species = 26

Survey Route: TAN
Survey Date: June 18, 2003

Species	Abundance	Percentage
Horned Lark	289	45.8
Vesper Sparrow	92	14.6
Sage Sparrow	82	13.0
Brewer's Sparrow	35	5.5
Rock Dove	34	5.4
Lark Sparrow	31	4.9
Sage Thrasher	25	4.0
Western Meadowlark	19	3.0
Brown-headed Cowbird	11	1.7
Red-tailed Hawk	4	0.6
Common Raven	2	0.3
Northern Harrier	2	0.3
American Kestrel	1	0.2
Ferruginous Hawk	1	0.2
Killdeer	1	0.2
Prairie Falcon	1	0.2
Western Kingbird	1	0.2

Total Individuals = 631
Total Species = 17

Survey Route: TRA

Survey Date: June 10, 2003

Species	Abundance	Percentage
Horned Lark	190	45.0
Western Meadowlark	62	14.7
Brewer's Sparrow	28	6.6
Brown-headed Cowbird	27	6.4
Mourning Dove	19	4.5
Sage Sparrow	18	4.3
Sage Thrasher	16	3.8
Brewer's Blackbird	8	1.9
House Finch	8	1.9
Common Raven	7	1.7
Vesper Sparrow	7	1.7
Mallard	4	0.9
Gadwall	4	0.9
Killdeer	3	0.7
Common Nighthawk	3	0.7
Yellow-headed Blackbird	3	0.7
American Robin	2	0.5
Loggerhead Shrike	2	0.5
Grasshopper Sparrow	2	0.5
Red-winged Blackbird	2	0.5
House Sparrow	2	0.5
Swainson's Hawk	1	0.2
Rock Wren	1	0.2
European Starling	1	0.2
Lark Sparrow	1	0.2
Savannah Sparrow	1	0.2

Total Individuals = 422

Total Species = 26
