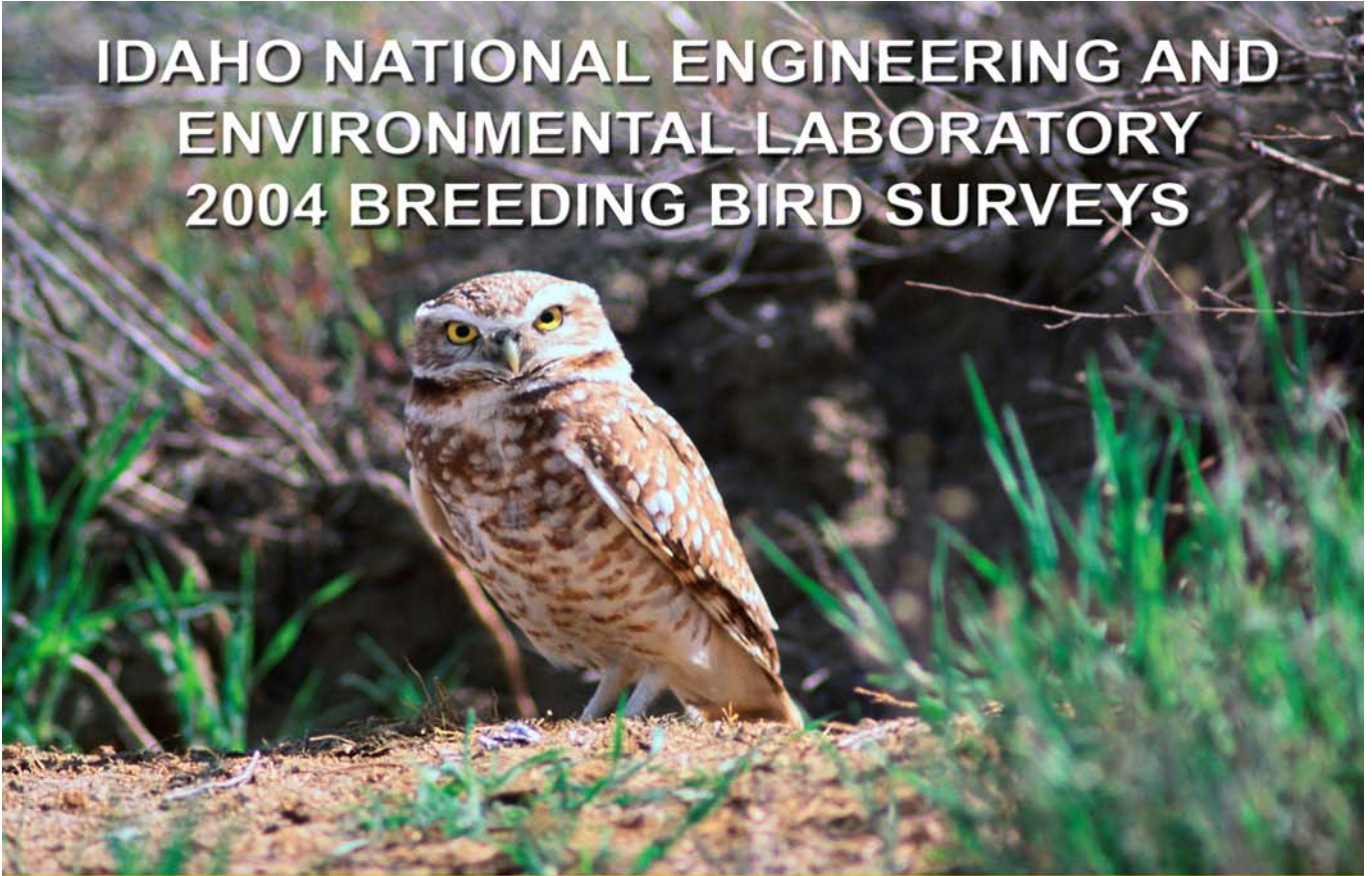


IDAHO NATIONAL ENGINEERING AND ENVIRONMENTAL LABORATORY 2004 BREEDING BIRD SURVEYS



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Executive Summary

From June 1-24, 2004, 14 permanent routes located at the Idaho National Engineering and Environmental Laboratory (INEEL) was surveyed for breeding birds. A total of 6,479 individuals representing 62 species of birds were recorded along the routes. This was higher than the average of 4,719 birds/year recorded from 1985-2003. Although current trends show that the total number of birds that breed on the INEEL are increasing with the greatest increases in grassland birds such as Horned Lark and Western Meadowlark, species of special concern show an overall decline since 1985. Species of special concern recorded in 2004 included Long-billed Curlew (N = 2), Ferruginous Hawk (N = 19), Swainson's hawk (N = 8), Sage Grouse (N=4), and Loggerhead Shrike (N = 44). Burrowing Owl (*Athene cunicularia*), a species of special concern, has not been observed on a Breeding Bird Survey at the INEEL since 2000.



Ferruginous Hawk

Table of Contents

	<u>Page</u>
Executive Summary	i
Acronyms	iii
Introduction.....	1
Study Area	5
Methods.....	6
Results and Discussion	9
Bird abundance and species richness.....	9
Habitat and species assemblages	13
Species of special concern	15
Summary	16
Literature Cited	17
Appendix A – Summary of Species by Route	

Acronyms

ANLW	Argonne National Laboratory West
BBS	Breeding Bird Survey
CFA	Central Facilities Area
DOE	Department of Energy
INEEL	Idaho National Engineering and Environmental Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
NRF	Naval Reactor Facility
PBF	Power Burst Facility
RWMC	Radioactive Waste Management Complex
TAN	Test Area North
TRA	Test Reactor Area
USGS	United States Geological Survey

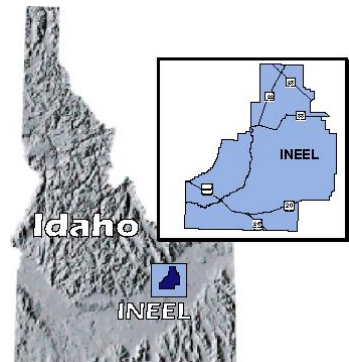
Introduction



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. Survey routes have been initiated recently 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.pwrc.usgs.gov/bbs.html).

The primary objective of the BBS is to determine population change for songbirds over large geographic regions. However, the data have many other potential uses and investigators have used the data to address a variety of research and management objectives such as determining ecosystem health, and constructing conservation and management plans.

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, breeding birds on 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 2004 at the INEEL and briefly compares findings to those from previous years. Common names for bird species observed are used throughout the report. Scientific names are given in Table 1.

Table 1. Birds observed along all 14 Breeding Bird Survey routes at the Idaho National Engineering and Environmental Laboratory during the 2004 census. Number and percentage of total for each species are indicated.

Common Name	Scientific Name	N	%
Horned Lark	<i>Eremophila alpestris</i>	1939	30
Western Meadowlark	<i>Sturnella neglecta</i>	1061	16
Brewer's Sparrow	<i>Spizella breweri</i>	525	8
Franklin's Gull	<i>Larus pipixcan</i>	517	8
Sage Sparrow	<i>Amphispiza belli</i>	483	7
Sage Thrasher	<i>Oreoscoptes montanus</i>	377	6
Mourning Dove	<i>Zenaida macroura</i>	216	3
Vesper Sparrow	<i>Pooecetes gramineus</i>	193	3
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>	174	3
Brown-headed Cowbird	<i>Molothrus ater</i>	169	3
Rock Dove	<i>Columba livia</i>	89	1
Common Raven	<i>Corvus corax</i>	56	0.9
Lark Bunting	<i>Calamospiza melanocorys</i>	51	0.8
Barn Swallow	<i>Hirundo rustica</i>	50	0.8
Mallard	<i>Anas platyrhynchos</i>	50	0.8
Killdeer	<i>Charadrius vociferus</i>	46	0.7
Loggerhead Shrike	<i>Lanius ludovicianus</i>	44	0.7
Common Nighthawk	<i>Chordeiles minor</i>	42	0.6

Table 1. Birds observed along all 14 Breeding Bird Survey routes at the Idaho National Engineering and Environmental Laboratory during the 2004 census. Number and percentage of total for each species are indicated. (*Continued*)

Common Name	Scientific Name	N	%
Rock Wren	<i>Salpinctes obsoletus</i>	37	0.6
European Starling	<i>Sturnus vulgaris</i>	35	0.5
House Finch	<i>Carpodacus mexicanus</i>	27	0.4
Say's Phoebe	<i>Sayornis saya</i>	26	0.4
Eared Grebe	<i>Podiceps nigricollis</i>	23	0.4
Gadwall	<i>Anas strepera</i>	20	0.3
Ferruginous Hawk	<i>Buteo regalis</i>	19	0.3
Gray Flycatcher	<i>Empidonax wrightii</i>	19	0.3
Black-billed Magpie	<i>Pica pica</i>	18	0.3
Red-tailed Hawk	<i>Buteo jamaicensis</i>	17	0.3
Wilson's Phalarope	<i>Phalaropus tricolor</i>	14	0.2
American Robin	<i>Turdus migratorius</i>	12	0.2
Western Kingbird	<i>Tyrannus verticalis</i>	12	0.2
Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	10	0.2
American Kestrel	<i>Falco sparverius</i>	9	0.1
Northern Shoveler	<i>Anas clypeata</i>	8	0.1
Swainson's Hawk	<i>Buteo swainsoni</i>	8	0.1
American Avocet	<i>Recurvirostra americana</i>	7	0.1
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	7	0.1
Chipping Sparrow	<i>Spizella passerina</i>	6	0.1
Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>	6	0.1
Prairie Falcon	<i>Falco mexicanus</i>	5	0.1
Lesser Scaup	<i>Aythya affinis</i>	5	0.1
Eastern Kingbird	<i>Tyrannus tyrannus</i>	4	0.1

Table 1. Birds observed along all 14 Breeding Bird Survey routes at the Idaho National Engineering and Environmental Laboratory during the 2004 census. Number and percentage of total for each species are indicated. (*Continued*)

Common Name	Scientific Name	N	%
Lark Sparrow	<i>Chondestes grammacus</i>	4	0.1
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	4	0.1
Sage Grouse	<i>Centrocercus urophasianus</i>	4	0.1
Cliff Swallow	<i>Hirundo pyrrhonota</i>	3	<0.1
Northern Flicker	<i>Colaptes auratus</i>	3	<0.1
Green-wing Teal	<i>Anas crecca</i>	3	<0.1
House Sparrow	<i>Passer domesticus</i>	3	<0.1
Bank Swallow	<i>Riparia riparia</i>	2	<0.1
Long-billed Curlew	<i>Numenius americanus</i>	2	<0.1
Savannah Sparrow	<i>Passerculus sandwichensis</i>	2	<0.1
Willet	<i>Catoptrophorus semipalmatus</i>	2	<0.1
California Gull	<i>Larus californicus</i>	2	<0.1
Canada Goose	<i>Branta canadensis</i>	2	<0.1
American Crow	<i>Corvus brachyrhynchos</i>	1	<0.1
Green-tailed Towhee	<i>Pipio chlorurus</i>	1	<0.1
Common Poorwill	<i>Phalaenoptilus nuttallii</i>	1	<0.1
Short-eared Owl	<i>Asio flammeus</i>	1	<0.1
Spotted Sandpiper	<i>Actitis macularia</i>	1	<0.1
Western Grebe	<i>Aechmophorus occidentalis</i>	1	<0.1
Ring Neck Duck	<i>Aythya collaris</i>	1	<0.1
TOTAL	6,479 Individuals 62 Species		

Study Area

The 2,305 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. Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) dominates much of the vegetation on the site, but other principal 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



INEEL Landscape

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 INEEL 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 1-24, 2004 (Figure 1). Five remote routes are standard 25-mile (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 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 (0.32-km) intervals. Every route counted starts with the traditional



Long-eared Owl

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 within a 400m radius during a 3-minute period were recorded. Individual birds known or strongly suspected to have been counted at a previous stop were not re-counted. Each route took from 1 to 6 hours to complete.

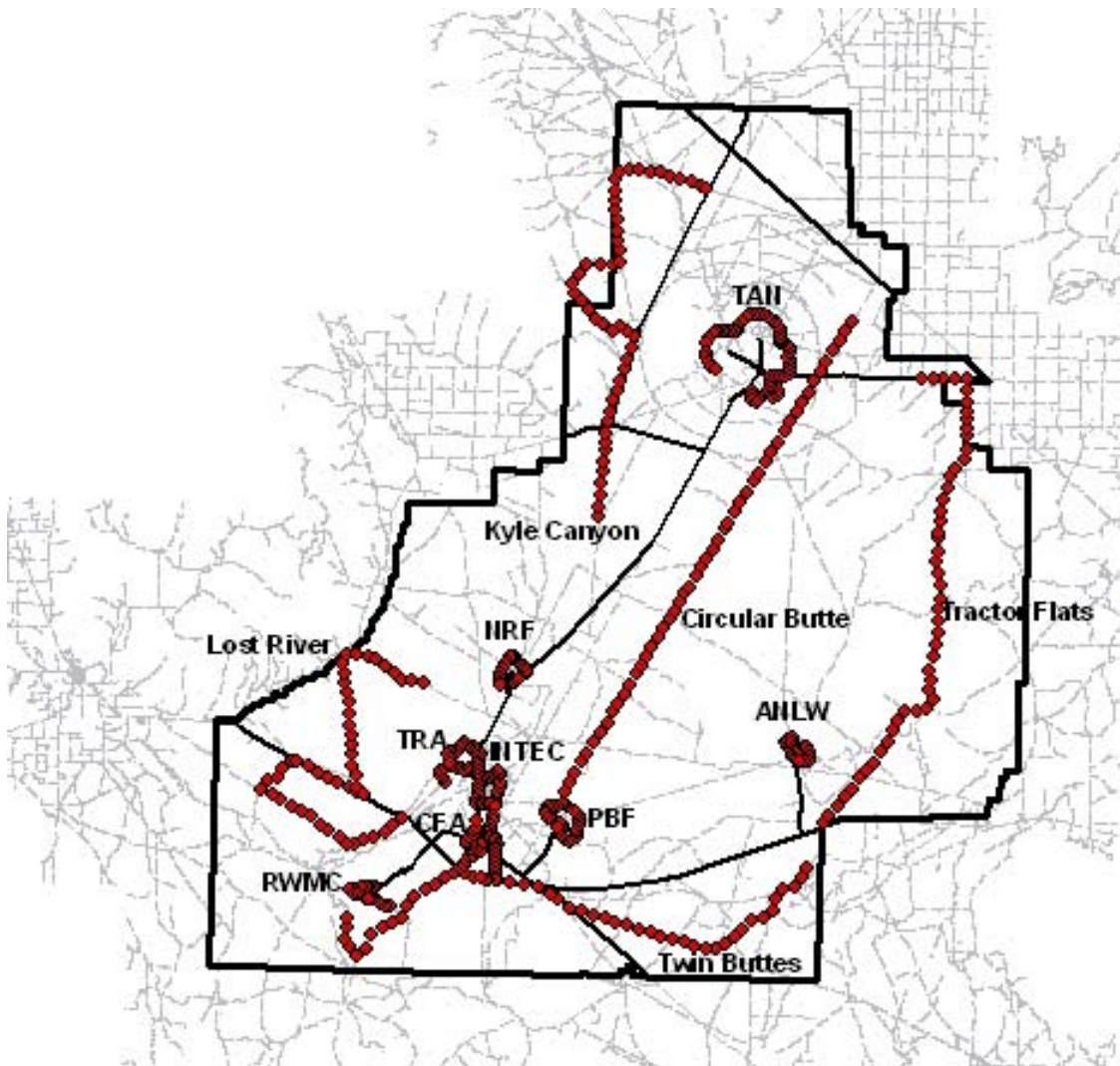


Figure 1. Facility and remote routes on the INEEL

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.



Sage Thrasher

Results and Discussion

Bird abundance and species richness

Abundance — A total of 6,479 individual birds were recorded along the 14 survey routes in 2004 (Figure 2). This is the second highest year of bird abundance since the surveys began in 1985 (no surveys were conducted in 1992 or 1993).

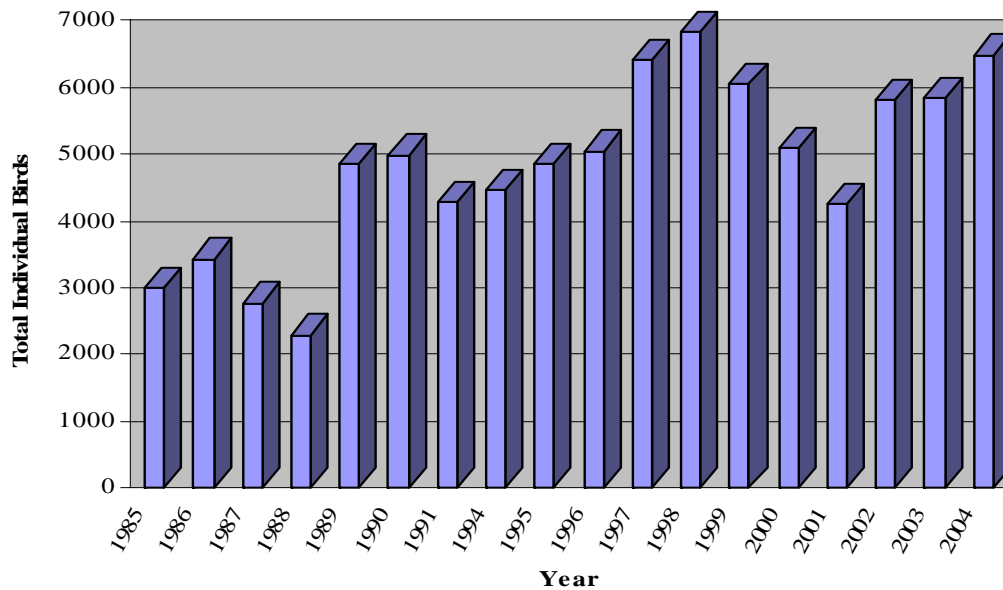


Figure 2. Total number of birds recorded by year (1985-2004) along 14 permanent routes at the INEEL.

Bird numbers increased slightly from 2003 which may be due to normal rainfall conditions during May and June which has not occurred since the drought began in 1999. Horned Larks and Meadow Larks were still the dominant species on the INEEL and represented almost 50% of all birds counted. These species appeared to be stabilizing since their numbers increased exponentially in 2003 in response to more available habitat created by the fires of 2000. The conversion of sagebrush steppe vegetation communities to grassland, due to large fires, has allowed these species, as well as other grassland species (e.g. Vesper Sparrow, and Mourning Dove), to increase in abundance.

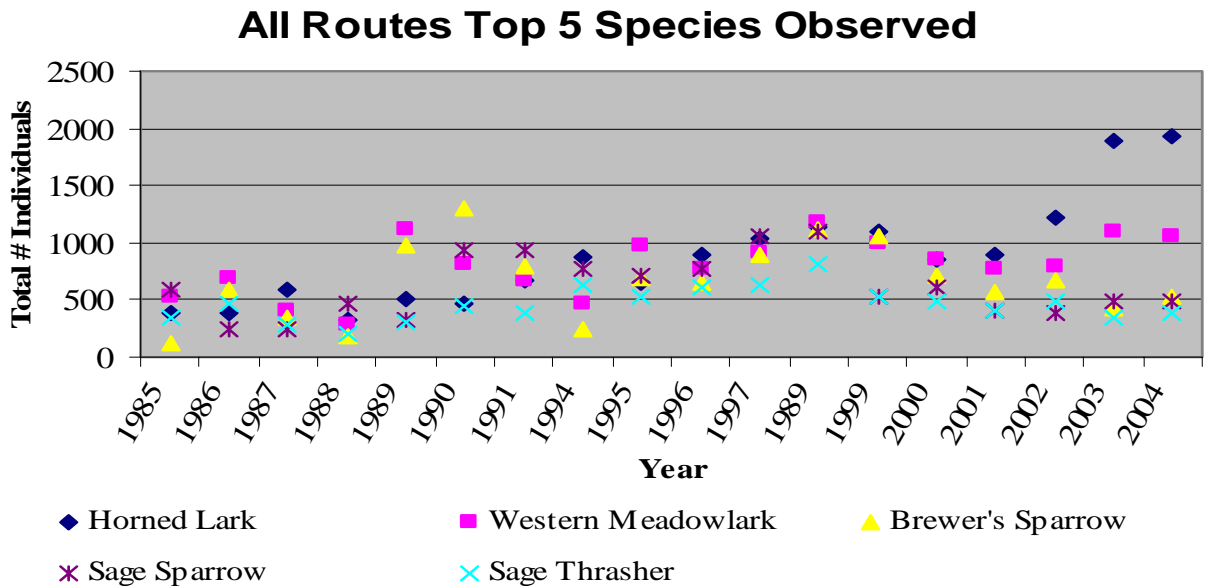


Figure 3. Total number of the 5 most abundant species recorded each by year at the INEEL from 1985-2004.

Although, sagebrush obligate species (e.g. Brewer’s Sparrow, Sage Sparrow, and Sage Thrasher) appeared to be recovering from a cyclic low (Figure 3) populations remained lower than the 18 year average. From 1994 to 2000 almost one-quarter (~546 km²) of the INEEL land has burned, replacing sagebrush steppe-dominated vegetation communities with those dominated by perennial grasses and forbs. It is estimated that recovery of Wyoming big sagebrush typically takes between 53 to 92 years (Colket 2003). Long recovery time for sagebrush means that sagebrush obligate vertebrates will also take a long time to fully recover from population lows. Although large expanses of sagebrush habitat remain on the INEEL and fire is a natural part of the Snake River Plain ecosystem, there is concern for the preservation of sagebrush steppe habitat given that much of this habitat has been lost by conversion to agriculture or development. At the very least, further sagebrush steppe habitat loss should be monitored.

The high numbers of birds counted in 2004 does not necessarily reflect large numbers of birds counted among all taxa. Many species were at or below long-term averages and a few species observed in six or more previous years were absent in 2004, including Burrowing Owl, Blue-gray Gnatcatcher, and Northern Harrier. Instead, the total count was inflated by high counts of Horned Lark and Franklin's Gull. In fact, the majority of Franklin's Gulls were counted while in transition between agricultural and other foraging areas. Waterfowl counts at the INEEL were slightly above the long term average. Waterfowl were observed only at the facility wastewater treatment ponds. Natural waterways located on the INEEL (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.

Overall, 14 routes were surveyed on the INEEL with approximately 180 km² total area surveyed (Table 2) which is about 8% of the INEEL. Each remote route surveyed an area of approximately 25 km² with an average of 28.9 birds observed per km².



Kestrel

The Tractor Flat route had the highest density of birds with 52.4 birds observed per km². The eight facility complex routes surveyed areas from 4 km² at ANLW and RWMC to more than 12 km² at TAN for a total of approximately 55 km² total facility area surveyed. The highest density of birds observed was at RWMC which averaged 66.2 birds observed per km². 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 analogous. 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, Franklin's Gull, and Sage Sparrows. Sage Thrashers were removed from the top 5 in 2004 because of the large number of Franklin's Gulls. More than 70% of all birds detected in 2004 were one of the above six species, which have, in the past, usually been the most frequently counted species on the INEEL.

Table 2. Number of species, number of individual birds, and average number of individuals km² along Remote Routes (N = 5) and Facility Complex Routes (N = 9) at the INEEL in 2004.

Route	Stops	Area Surveyed (km²)	Species	N	Birds/ km²
<i>Remote Routes</i>					
Circular Butte	50	25	18	595	23.7
Kyle Canyon	50	25	23	484	19.3
Big Lost River	50	25	21	663	26.4
Tractor Flats	50	25	27	1316	52.4
Twin Buttes	50	25	18	570	22.7
Subtotal	250	125	40	3628	28.9
<i>Facility Complex Routes</i>					
CFA	42	10	22	379	39.2
ANLW	18	4	23	249	61.9
INTEC	25	5	22	258	51.1
CFA Wastewater Treatment Facility	6	3	20	113	37.5
NRF	20	4	27	270	67.2
PBF	28	6	18	361	59.4
RWMC	20	4	24	266	66.2
TAN	60	12	19	551	44.9
TRA	32	7	23	404	61.3
Subtotal	251	55	52	2851	52.1
TOTAL	501	180	62	6479	35.9

Species Richness - In 2004, 62 species were detected during the surveys. Although there were slightly fewer species observed than in 2003 (Figure 4), it is above the average of 57 ± 4 recorded from 1985-2003. Many similar species were recorded for both remote routes (21 ± 4) and facility routes (22 ± 2). The fewest number of species (N=18) were observed along the Circular Butte, Twin Butte and PBF routes, while Tractor Flat and NRF had the greatest number of species (N=27).

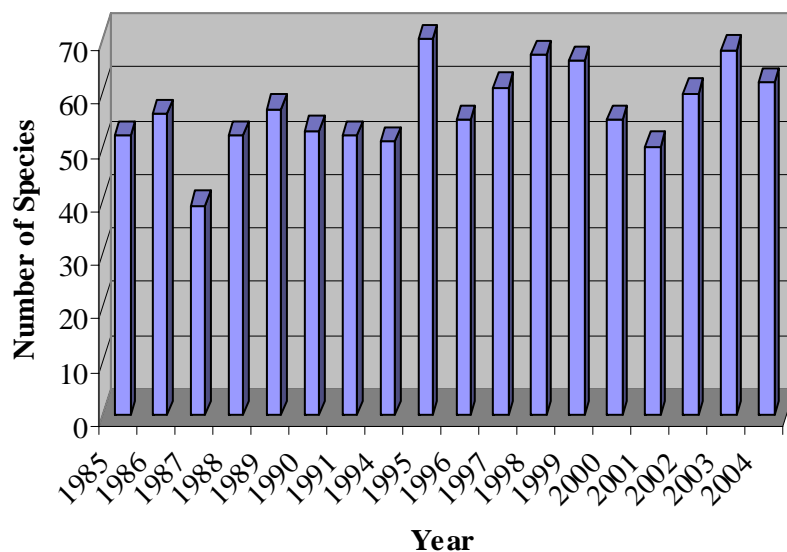


Figure 4. Total number of species recorded by year (1985-2004) along 14 permanent survey routes at the Idaho National Engineering and Environmental Laboratory.

Habitat and species assemblages

An 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 steppe communities, 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. 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 juniper 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 on the INEEL. 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.



Common Raven

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.

Species of special concern

State and Federal species of special concern observed during the 2004 census included Long-billed Curlew (N = 2), Ferruginous Hawk (N = 19), Swainson's Hawk (N = 8), Loggerhead Shrike (N = 44), and Greater Sage Grouse (N = 4) (Table 1). The Burrowing Owl has not been observed in the INEEL BBS since 2000. The sagebrush steppe habitat on the INEEL continues to support species of birds that are low or declining in number throughout the remainder of the Intermountain West.



Sage Grouse

Summary

A relatively high number of birds were counted along the BBS routes at the INEEL in 2004. Even though Horned Lark numbers appear to be stabilizing, record numbers of them continue to be observed, boosting the overall total of birds considerably. Widespread and increasing populations of Horned and Meadow Larks were not unexpected considering that recent fires that have converted extensive areas from sagebrush steppe to the grasslands that they prefer. 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.

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Appendix A

**SUMMARY OF SPECIES BY ROUTE
2004**

Survey Route: CIRCULAR BUTTE
Survey Date: June 14, 2004

Species	Abundance	Percentage
Horned Lark	203	34.1
Western Meadowlark	169	28.4
Sage Sparrow	57	9.6
Brewer's Sparrow	52	8.7
Sage Thrasher	40	6.7
Mourning Dove	26	4.4
Brown-headed Cowbird	20	3.4
Rock Wren	6	1.0
Common Nighthawk	5	0.8
Common Raven	3	0.5
Loggerhead Shrike	3	0.5
Sage Grouse	3	0.5
Lark Bunting	2	0.3
Red-tailed Hawk	2	0.3
Ferruginous Hawk	1	0.1
Grasshopper Sparrow	1	0.1
Common Poorwill	1	0.1
Western Kingbird	1	0.1

Total Individuals = 595
Total Species = 18

Survey Route: KYLE CANYON

Survey Date: June 22, 2004

Species	Abundance	Percentage
Horned Lark	118	24.4
Sage Sparrow	85	17.6
Western Meadowlark	70	14.5
Vesper Sparrow	52	10.7
Sage Thrasher	44	9.1
Brewer's Sparrow	29	6.0
Mourning Dove	19	3.9
Loggerhead Shrike	19	3.9
Gray Flycatcher	12	2.5
Ferruginous Hawk	7	1.4
Swainson's Hawk	6	1.2
Red-tailed Hawk	4	0.8
Grasshopper Sparrow	3	0.6
Prairie Falcon	3	0.6
Common Nighthawk	3	0.6
Common Raven	2	0.4
Lark Bunting	2	0.4
American Kestrel	1	0.2
Northern Flicker	1	0.2
Rock Wren	1	0.2
American Robin	1	0.2
Green-tail Towhee	1	0.2
Brown-headed Cowbird	1	0.2

Total Individuals = 484

Total Species = 23

Survey Route: BIG LOST RIVER

Survey Date: June 2, 2004

Species	Abundance	Percentage
Horned Lark	330	49.8
Western Meadowlark	122	18.4
Brewer's Sparrow	70	10.6
Sage Sparrow	36	5.4
Sage Thrasher	29	4.4
Vesper Sparrow	18	2.7
Lark Bunting	14	2.1
Brown-headed Cowbird	13	2.0
Rock Wren	6	0.9
Red-tailed Hawk	5	0.8
Ferruginous Hawk	5	0.8
Mourning Dove	3	0.5
Common Raven	2	0.3
Loggerhead Shrike	2	0.3
Chipping Sparrow	2	0.3
Swainson's Hawk	1	0.2
Say's Phoebe	1	0.2
American Robin	1	0.2
Prairie Falcon	1	0.2
Lark Sparrow	1	0.2
Short-eared Owl	1	0.2

Total Individuals = 663
Total Species = 21

Survey Route: TRACTOR FLATS

Survey Date: June 9, 2004

Species	Abundance	Percentage
Franklin's Gull	491	37.3
Horned Lark	296	22.5
Western Meadowlark	178	13.5
Brewer's Sparrow	82	6.2
Mourning Dove	62	4.7
Rock Dove	50	3.8
Sage Sparrow	39	3.0
Sage Thrasher	31	2.4
Black-billed Magpie	17	1.3
Brown-headed Cowbird	13	1.0
Common Raven	9	0.7
Vesper Sparrow	8	0.6
Western Kingbird	7	0.5
Common Nighthawk	4	0.3
Lark Bunting	4	0.3
Brewer's Blackbird	4	0.3
Loggerhead Shrike	3	0.2
House Sparrow	3	0.2
Grasshopper Sparrow	3	0.2
Long-billed Curlew	2	0.2
Lark Sparrow	2	0.2
Willet	2	0.2
Savannah Sparrow	2	0.2
American Crow	1	0.1
Ferruginous Hawk	1	0.1
American Kestrel	1	0.1
Say's Phoebe	1	0.1

Total Individuals = 1,316

Total Species = 27

Survey Route: TWIN BUTTES

Survey Date: June 15, 2004

Species	Abundance	Percentage
Horned Lark	149	26.1
Western Meadowlark	160	28.1
Sage Sparrow	69	12.1
Sage Thrasher	38	6.7
Brewer's Sparrow	34	6.0
Common Raven	28	4.9
Mourning Dove	26	4.6
Brown-headed Cowbird	22	3.9
Common Nighthawk	13	2.3
Loggerhead Shrike	10	1.8
Gray Flycatcher	7	1.2
European Starling	3	0.5
Northern Flicker	2	0.4
Red-tail Hawk	2	0.4
American Kestrel	2	0.4
Ferruginous Hawk	2	0.4
Vesper Sparrow	2	0.4
Western Kingbird	1	0.2

Total Individuals = 570
Total Species = 18

Survey Route: CFA
Survey Date: June 17, 2004

Species	Abundance	Percentage
Brewer's Blackbird	109	28.8
Horned Lark	68	17.9
Western Meadowlark	58	15.3
Sage Thrasher	24	6.3
Brewer's Sparrow	22	5.8
Sage Sparrow	21	5.5
Mourning Dove	12	3.2
Brown-headed Cowbird	9	2.4
Barn Swallow	9	2.4
Killdeer	8	2.1
European Starling	6	1.6
Say's Phoebe	5	1.3
American Kestrel	4	1.1
Common Nighthawk	4	1.1
House Finch	4	1.1
Common Raven	3	0.8
Vesper Sparrow	3	0.8
American Robin	3	0.8
Red-tail Hawk	2	0.5
Loggerhead Shrike	2	0.5
Lark Bunting	2	0.5
Sage Grouse	1	0.3

Total Individuals = 379
Total Species = 22

Survey Route: ANLW
Survey Date: June 24, 2004

Species	Abundance	Percentage
Horned Lark	62	24.9
Western Meadowlark	31	12.4
Brewer's Blackbird	29	11.6
Brewer's Sparrow	18	7.2
European Starling	17	6.8
Sage Sparrow	13	5.2
Killdeer	12	4.8
Barn Swallow	10	4.0
Sage Thrasher	9	3.6
Vesper Sparrow	8	3.2
Rock Wren	6	2.4
Lark Bunting	5	2.0
Common Nighthawk	5	2.0
Say's Phoebe	5	2.0
Brown-headed Cowbird	4	1.6
Mourning Dove	4	1.6
House Finch	2	0.8
Green-winged Teal	2	0.8
Mallard	2	0.8
Rough-wing Swallow	2	0.8
Gadwall	1	0.4
American Robin	1	0.4
Lark Sparrow	1	0.4

Total Individuals = 249
Total Species = 23

Survey Route: INTEC
Survey Date: June 11, 2004

Species	Abundance	Percentage
Horned Lark	76	29.5
Western Meadowlark	43	16.7
Brewer's Sparrow	31	12.0
Sage Sparrow	20	7.8
Sage Thrasher	19	7.4
Brown-headed Cowbird	16	6.2
Brewer's Blackbird	11	4.3
Killdeer	7	2.7
Common Nighthawk	5	1.9
Rock Wren	4	1.6
Say's Phoebe	4	1.6
Vesper Sparrow	4	1.6
Chipping Sparrow	3	1.2
Barn Swallow	3	1.2
American Robin	2	0.8
European Starling	2	0.8
Mallard	2	0.8
Mourning Dove	2	0.8
Black-billed Magpie	1	0.4
Common Raven	1	0.4
House Finch	1	0.4
Lark Bunting	1	0.4

Total Individuals = 258
Total Species = 22

Survey Route: CFA Wastewater Treatment Facility

Survey Date: June 24, 2004

Species	Abundance	Percentage
Eared Grebe	23	20.4
Mallard	19	16.8
Horned Lark	11	9.7
Brewer's Sparrow	9	8.0
Gadwall	9	8.0
Western Meadowlark	9	8.0
American Avocet	6	5.3
Brewer's Blackbird	5	4.4
Killdeer	4	3.5
Wilson's Phalarope	3	2.7
California Gull	2	1.8
Canada Goose	2	1.8
Sage Sparrow	2	1.8
Vesper Sparrow	2	1.8
Brown-headed Cowbird	2	1.8
Mourning Dove	1	0.9
Eastern Kingbird	1	0.9
Franklin's Gull	1	0.9
Ring-neck Duck	1	0.9
Western Grebe	1	0.9

Total Individuals = 113

Total Species = 20

Survey Route: NRF

Survey Date: June 3, 2004

Species	Abundance	Percentage
Horned Lark	51	18.9
Western Meadowlark	34	12.6
Sage Thrasher	24	8.9
Brewer's Sparrow	24	8.9
Vesper Sparrow	21	7.8
Mourning Dove	21	7.8
Sage Sparrow	17	6.3
Barn Swallow	13	4.8
Brown-headed Cowbird	12	4.4
Wilson's Phalarope	11	4.1
Gadwall	10	3.7
Lark Bunting	5	1.9
Mallard	5	1.9
Yellow-headed Blackbird	5	1.9
Cliff Swallow	2	0.7
American Robin	2	0.7
Killdeer	2	0.7
House Finch	2	0.7
Loggerhead Shrike	1	0.4
Northern Shoveler	1	0.4
Common Raven	1	0.4
European Starling	1	0.4
Chipping Sparrow	1	0.4
Green-wing Teal	1	0.4
Nighthawk	1	0.4
Ring-wing Blackbird	1	0.4
Unk. Gull	1	0.4

Total Individuals = 270

Total Species = 27

Survey Route: PBF

Survey Date: June 4, 2004

Species	Abundance	Percentage
Brewer's Sparrow	75	20.8
Western Meadowlark	74	20.5
Horned Lark	60	16.6
Sage Thrasher	44	12.2
Sage Sparrow	25	6.9
Mourning Dove	23	6.4
Brown-headed Cowbird	20	5.5
Lark Bunting	14	3.9
House Finch	6	1.7
Rough-wing Swallow	5	1.4
Say's Phoebe	4	1.1
Loggerhead Shrike	3	0.8
Common Raven	2	0.6
Nighthawk	2	0.6
Red-tail Hawk	1	0.3
Eastern Kingbird	1	0.3
American Robin	1	0.3
Vesper Sparrow	1	0.3

Total Individuals = 361

Total Species = 18

Survey Route: RWMC
Survey Date: June 1, 2004

Species	Abundance	Percentage
Horned Lark	53	19.9
Western Meadowlark	50	18.8
Brewer's Sparrow	31	11.7
Sage Thrasher	28	10.5
Mallard	19	7.1
Rock Wren	11	4.1
Killdeer	8	3.0
Barn Swallow	7	2.6
House Finch	7	2.6
Northern Shoveler	7	2.6
Mourning Dove	6	2.3
Sage Sparrow	6	2.3
Brown-headed Cowbird	5	1.9
Rock Dove	5	1.9
European Starling	5	1.9
Lesser Scaup	5	1.9
Common Raven	3	1.1
Vesper Sparrow	3	1.1
Bank Swallow	2	0.8
Say's Phoebe	1	0.4
Swainson's Hawk	1	0.4
American Avocet	1	0.4
Spotted Sandpiper	1	0.4
Brewer's Blackbird	1	0.4

Total Individuals = 266
Total Species = 24

Survey Route: TAN
Survey Date: June 18, 2004

Species	Abundance	Percentage
Horned Lark	271	49.2
Sage Sparrow	81	14.7
Vesper Sparrow	61	11.1
Sage Thrasher	36	6.5
Rock Dove	34	6.2
Franklin's Gull	25	4.5
Brewer's Sparrow	18	3.3
Brewer's Blackbird	7	1.3
Say's Phoebe	3	0.5
Ferruginous Hawk	3	0.5
Mourning Dove	2	0.4
Lark Bunting	2	0.4
Western Meadowlark	2	0.4
Barn Swallow	1	0.2
Prairie Falcon	1	0.2
Loggerhead Shrike	1	0.2
Brown-headed Cowbird	1	0.2
Red-tailed Hawk	1	0.2
American Kestrel	1	0.2

Total Individuals = 551

Total Species = 20

Survey Route: TRA
Survey Date: June 7, 2004

Species	Abundance	Percentage
Horned Lark	191	47.3
Western Meadowlark	61	15.1
Brown-headed Cowbird	31	7.7
Brewer's Sparrow	30	7.4
Sage Sparrow	12	3.0
Sage Thrasher	11	2.7
Vesper Sparrow	10	2.5
Mourning Dove	9	2.2
Brewer's Blackbird	8	2.0
Barn Swallow	7	1.7
House Finch	5	1.2
Killdeer	5	1.2
Mallard	3	0.7
Western Kingbird	3	0.7
Rock Wren	3	0.7
Rough-wing Swallow	3	0.7
Red-winged Blackbird	3	0.7
Common Raven	2	0.5
Say's Phoebe	2	0.5
Eastern Kingbird	2	0.5
American Robin	1	0.2
European Starling	1	0.2
Yellow-headed Blackbird	1	0.2

Total Individuals = 404
Total Species = 23
