

2016 Spatially-balanced Landbird Surveys within the Craters of the Moon National Monument and Preserve



Lava flow in the Craters of the Moon National Monument and Preserve - *photo by Heidi Ware*

2016 Annual Report

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ABSTRACT: The Intermountain Bird Observatory conducted spatially-balanced landbird surveys across the Craters of the Moon National Monument and Preserve (CRMO) in south-central Idaho between May 24-28, 2016. Specifically, we conducted surveys at 13, 1km-x-1km grids. We distributed effort such that 10 grids were placed in areas not dominated by lava flows and 3 grids were in lava flows. We followed the spatially-balanced sampling design and the survey protocol of the Integrated Monitoring of Bird Conservation Regions (IMBCR) program coordinated by the Bird Conservancy of the Rockies (BCR, formerly Rocky Mountain Bird Observatory) such that our data are comparable to IMBCR data collected throughout the West. We detected a total 1,910 individuals of 51 different species on counts during the 2016 breeding season. The 10 most frequently detected species were: Western Meadowlark (n = 456), Horned Lark (365), Brewer's Sparrow (317), Rock Wren (120), Common Raven (92), Mourning Dove (92), Brown-headed Cowbird (59), Vesper Sparrow (57), Sage Thrasher (47), and Lark Sparrow (40). We detected 14 species listed by the BLM as species of concern during 2016 surveys, including Black-throated Sparrow, Brewer's Sparrow, Burrowing Owl, Cassin's Finch, Ferruginous Hawk, Golden Eagle, Grasshopper Sparrow, Greater Sage-grouse, Green-tailed Towhee, Loggerhead Shrike, Long-billed Curlew, Sage Thrasher, Sagebrush Sparrow, and Short-eared Owl.



Sagebrush Sparrow in the CRMO – photo by Heidi Ware

INTRODUCTION

The Craters of the Moon National Monument and Preserve (CRMO) is located in south-central Idaho and contains a vast extent and impressive diversity of lava flows as well as adjacent habitats composed primarily of shrubsteppe and grassy rangeland (USDI-NPS/BLM 2007). The CRMO and the Shoshone Field Office of Bureau of Land Management (BLM) are looking to improve the natural resource dataset across the full extent of the monument and preserve. To gain a better understanding of the distribution and abundance of breeding birds within CRMO, we conducted surveys at 13, 1km-x-1km survey grids during the 2016 breeding season (following previous surveys of 30 grids in 2011, 15 grids in 2012, and 28 grids in 2015). We distributed effort such that 10 grids were placed in areas not dominated by lava flows and 3 grids were in lava flows. We followed the spatially-balanced sampling design and the survey protocol of the Integrated Monitoring of Bird Conservation Regions program (IMBCR; BCR 2016) such that our data are comparable to data collected across the region.

METHODS

After discussion with BLM Shoshone Field Office personnel prior to the 2011 field season, we developed two strata within which to conduct bird surveys: “lava” and “non-lava”. We decided to distribute effort such that 80% of effort was focused on the more accessible habitats (primarily shrubsteppe and grassland) that occur away from the lava flows (non-lava) and 20% of effort in lava flow areas (lava). This follows an 80:20 ratio used by the IMBCR program in northern Idaho and western Montana, distributing 80% of effort to more accessible “front-country” areas and 20% of effort to the harder to access “back-country” areas.

Methods that follow are drawn extensively from BCR (2016), with author permission. We used generalized random-tessellation stratification (GRTS), a spatially-balanced sampling algorithm, to select sample units (Stevens and Olsen 2004). BCR (2016) points out that the GRTS design is well-suited to long-term monitoring of birds. Importantly, all sample units in the sampling frame are ordered, such that any set of consecutively numbered units is a spatially well-balanced sample (Stevens and Olsen 2004). The GRTS design is also robust to fluctuating budgets in that it’s possible to adjust the sampling effort among years within each stratum while still preserving a random, spatially-balanced sampling design (BCR 2016).

The study design defined sampling units as 1-km² cells that were used to create a uniform grid over the entire study area. Within each 1-km² grid cell we established a grid of 16 survey points spaced 250 m apart. In 2016, we were able to build on the effort of 2011-12 and 2015 and conduct surveys at 13 grids (Figure 1). Most non-lava grids were accessed relatively easily using existing roads and 2-tracks, although several occurred in areas of especially rocky roads (requiring high clearance and 4WD) and/or areas that turned very muddy and slick after rain. Thus, we were able to access non-lava grids 1-10 (Figure 1). In the case of lava flows, some potential grid sites occur quite far from roads and access rules were pre-determined during consultation with BLM Shoshone Field Office personnel. It was determined that if a lava sample unit selected to be surveyed occurred more than 3 miles (5 km) from an accessible road and/or behind private property for which access could not be granted, we would move to the next ordered sample. Thus, we surveyed lava grid numbers 2, 5, and 6 (Figure 1). We surveyed each grid once between May 24 and May 28, 2016 - within the peak singing period for the majority of breeding bird species.

Field technicians conducted point counts (Buckland et al. 2001) following the protocol established by the Bird Conservancy of the Rockies (Hanni et al. 2009). Observers surveyed the transects in the morning, beginning up to 15 minutes before sunrise and concluding their survey no later than 1030 or when bird activity had significantly decreased. The survey duration at each point was six minutes because an even number of minute intervals facilitates the estimation of site occupancy. For every bird detected during the six minute period, we recorded species, sex, horizontal distance from the observer, the minute in which we detected the bird, and type of detection (e.g., call, song, visual). Observers measured distances using laser rangefinders. When it was not possible to measure the distance to a bird, observers estimated distance by measuring to a nearby object. We also recorded the presence of species which are rare or difficult to detect (i.e., grouse, owls, raptors) while we traveled between points within a grid cell as incidental detections. We considered all non-independent detections of birds (i.e., flocks or pairs of conspecific birds together in close proximity) as part of a 'cluster' rather than as independent observations. Observers recorded the number of birds detected within the cluster along with a letter code to keep track of each distinct cluster. At the start and end of each transect, observers recorded time, ambient temperature, cloud cover, precipitation and wind speed. Technicians

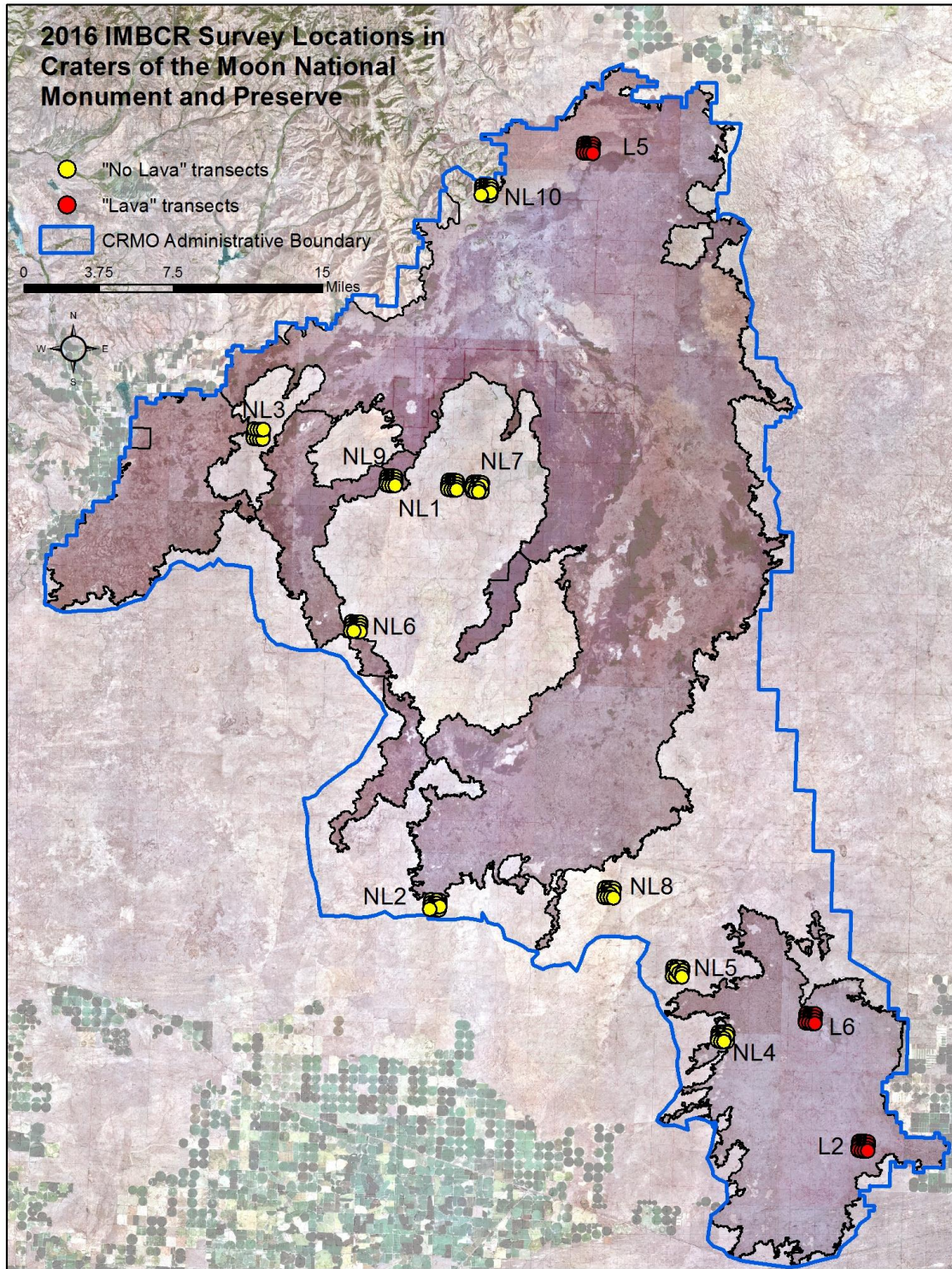
navigated to each point using hand-held Global Positioning System (GPS) units. Before beginning each six-minute count, surveyors recorded vegetation data (within a 50 meter radius) including: the dominant habitat type and structural stage; the relative abundance, percent cover and mean height of trees and shrubs (by species); and grass/forb height and groundcover. We recorded vegetation data quietly to allow birds, potentially disturbed by our approach, time to return to their normal habits prior to beginning each count.

In this report, we summarize the relative abundance of all species detected during 2016 surveys. Following the IMBCR methodology, Bird Conservancy of the Rockies staff and collaborators will conduct multi-scale occupancy analyses and calculate density estimates by strata, including for the CRMO. A detailed, final report containing this information will be made available in 2017; meanwhile, see BCR (2016).

Lastly, it is important to point out that because points are 250 m apart, it's likely that some individuals, especially of larger, louder, and/or more mobile species, were detected from ≥ 2 survey points within a grid but these multiple detections are allowable within the IMBCR design. To produce estimates on density, occupancy, and to explore avian species counts by strata or area of interest, please visit the Rocky Mountain Avian Data Center (RMADC):

<http://rmbo.org/v3/avian/Home.aspx>. A demonstration of how to use the RMADC can be found here: <http://rmbo.org/v3/avian/ExploretheData/UsageTips.aspx>. In order to download raw data, partners can request login information from Matthew McLaren, IMBCR Coordinator at Bird Conservancy of the Rockies (formerly Rocky Mountain Bird Observatory): matthew.mclaren@birdconservancy.org

Figure 1. Location of the 13 spatially-balanced survey grid locations surveyed in 2016 on the Craters of the Moon National Monument and Preserve.



RESULTS and DISCUSSION

Spatially-balanced landbird surveys across the Craters of the Moon National Monument and Preserve in 2016 showed a relatively diverse breeding bird community, especially consisting of species that rely on shrubsteppe, grassland, and/or rocky habitats. We detected a total 1,910 individuals of 51 different species during the 2016 breeding season (Table 1). Most species detected were local breeders but several passage migrants of species that normally breed in wooded and/or higher elevation areas were observed during our surveys in late May – a time when some Neotropical migrant landbird species are still actively migrating to breeding areas. The 10 most frequently detected species were: Western Meadowlark (n = 456), Horned Lark (365), Brewer's Sparrow (317), Rock Wren (120), Common Raven (92), Mourning Dove (92), Brown-headed Cowbird (59), Vesper Sparrow (57), Sage Thrasher (47), and Lark Sparrow (40). Only two species, Common Raven and Western Meadowlark, were detected on all 13 grids that we surveyed in 2016. Mourning Dove (12 of 13 grids), Horned Lark (11/13), and Brewer's Sparrow (11/13) were three other especially widespread species. We detected 14 species listed by the BLM as species of concern during 2016 surveys, including Black-throated Sparrow, Brewer's Sparrow, Burrowing Owl, Cassin's Finch, Ferruginous Hawk, Golden Eagle, Grasshopper Sparrow, Greater Sage-grouse, Green-tailed Towhee, Loggerhead Shrike, Long-billed Curlew, Sage Thrasher, Sagebrush Sparrow, and Short-eared Owl.

The five most frequently detected species from ***lava*** counts were: Rock Wren (68), Brown-headed Cowbird (45), Mourning Dove (29), Western Meadowlark (12), and Common Raven (10; Table 1). Also, there were four species detected during lava counts that were not found in the non-lava strata: Black-throated Sparrow, Gray Flycatcher, Northern Rough-winged Swallow, and Swainson's Hawk.

The five most frequently detected species from ***non-lava*** counts were: Western Meadowlark (444), Horned Lark (358), Brewer's Sparrow (309), Common Raven (82), and Mourning Dove (63). Additionally, there were 22 species detected during non-lava counts that were not found in the lava strata. The most noteworthy among these are Burrowing Owl, Bullock's Oriole, Ferruginous Hawk, Greater Sage-grouse, Loggerhead Shrike, Long-billed Curlew, and Northern Harrier.

Table 1. Detections by species and survey grid for 2016 spatially-balanced surveys on the Craters of the Moon National Monument and Preserve. “L” signifies grids **on** lava flows and “NL” signifies grids **away from** lava flows.

^a BLM Species of Concern: http://www.blm.gov/style/medialib/blm/id/about_blm/foia/directives/ibs_fy_20160.Par.88152.File.dat/IDIB2016-017a3.pdf

Transect Name	L2	L5	L6	NL1	NL2	NL3	NL4	NL5	NL6	NL7	NL8	NL9	NL10	Total # detections per species (<i>ALL</i> transects)
# points surveyed	7	6	11	16	14	13	13	14	14	16	16	12	14	
American Goldfinch	2					2		1				2		7
American Kestrel						1						1	1	3
Barn Swallow						4								4
Black-throated Sparrow ^a			3											3
Brewer's Blackbird													1	1
Brewer's Sparrow ^a		8		67	5	40	1	9	23	41	15	11	97	317
Brown-headed Cowbird	23		22			1	8		2			2	1	59
Bullock's Oriole													1	1
Burrowing Owl ^a					1						1			2
Cassin's Finch ^a			1											1
Chipping Sparrow	2		6											8
Clark's Nutcracker		2											2	4
Common Nighthawk	1		1									1		3
Common Raven	2	4	4	2	17	6	11	17	2	7	6	4	10	92
Dusky Flycatcher						1								1
Eastern Kingbird												2		2
Ferruginous Hawk ^a								1						1
Golden Eagle ^a													1	1
Grasshopper Sparrow ^a					5			14			11			30
Gray Flycatcher			1											1
Gray Partridge												2		2

Transect Name	L2	L5	L6	NL1	NL2	NL3	NL4	NL5	NL6	NL7	NL8	NL9	NL10	Total # detections per species (ALL transects)
# points surveyed	7	6	11	16	14	13	13	14	14	16	16	12	14	
Greater Sage-Grouse ^a										1			3	4
Green-tailed Towhee ^a													27	26
Horned Lark	1		6	34	83	21	8	68	24	42	71	7		365
Killdeer						1								1
Lark Sparrow	5		3			14	8		6			4		40
Loggerhead Shrike ^a					2	1		3	3			2	2	13
Long-billed Curlew ^a					1			9			1			11
Mountain Bluebird		1	2										2	5
Mourning Dove	19	4	6	4	11	10	13	1	12	5	1	6		92
Northern Harrier				1	3			1			4		5	14
Northern Rough-winged Swallow		1												1
Pine Siskin			1			4						1		6
Red Crossbill													2	2
Red-tailed Hawk			1										3	4
Rock Wren	27	5	36		4	6	25		4		3	5	5	120
Rufous Hummingbird						1								1
Sage Thrasher ^a		3	2	7		10		2	5	6			12	47
Sagebrush Sparrow ^a		1				1								2
Sandhill Crane						1								1
Say's Phoebe	2					1								3
Short-eared Owl ^a		1								1	2	2		6
Spotted Towhee													13	13
Swainson's Hawk			1											1
Turkey Vulture													1	1
Unknown Bird	1		1	5			3		1	2	14			27

Transect Name	L2	L5	L6	NL1	NL2	NL3	NL4	NL5	NL6	NL7	NL8	NL9	NL10	Total # detections per species (ALL transects)
# points surveyed	7	6	11	16	14	13	13	14	14	16	16	12	14	
Unknown Blackbird					2									2
Unknown Grouse						1								1
Unknown Hummingbird					1									1
Unknown Owl										1				1
Unknown Raptor				1			2				2	1		6
Unknown Sparrow			1	11	1		1			3	3	2		22
Unknown Swallow				1										1
Vesper Sparrow				12		3				31			11	57
Violet-green Swallow			2											2
Western Meadowlark	1	10	1	33	45	73	42	66	58	26	36	64	1	456
Western Tanager			1						1					2
Yellow-rumped Warbler	1		1			4						2	1	9
Total # birds per transect	94	46	114	194	195	220	135	206	155	182	186	133	216	1910 <i>(grand total # detections ALL transects)</i>
Average birds per point	13.43	7.67	10.36	12.13	13.93	16.92	10.38	14.71	11.07	11.38	11.63	11.08	15.43	11.51 <i>(avg birds/pt ALL transects)</i>

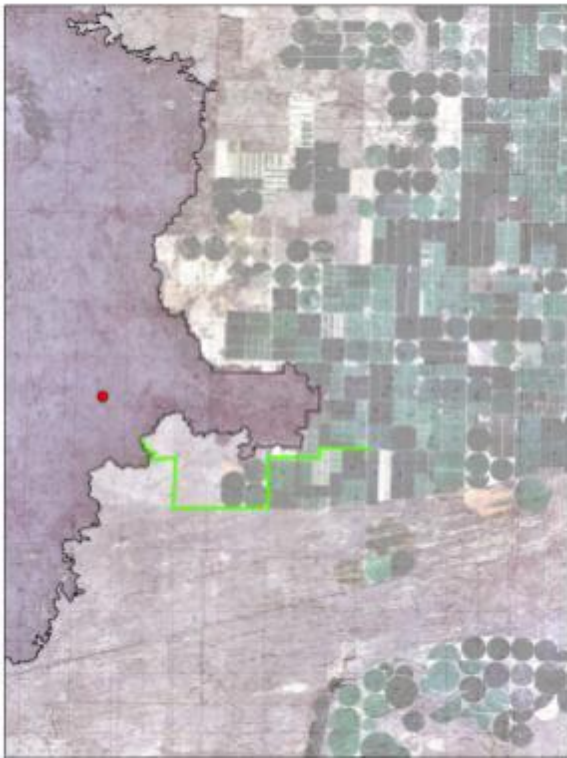
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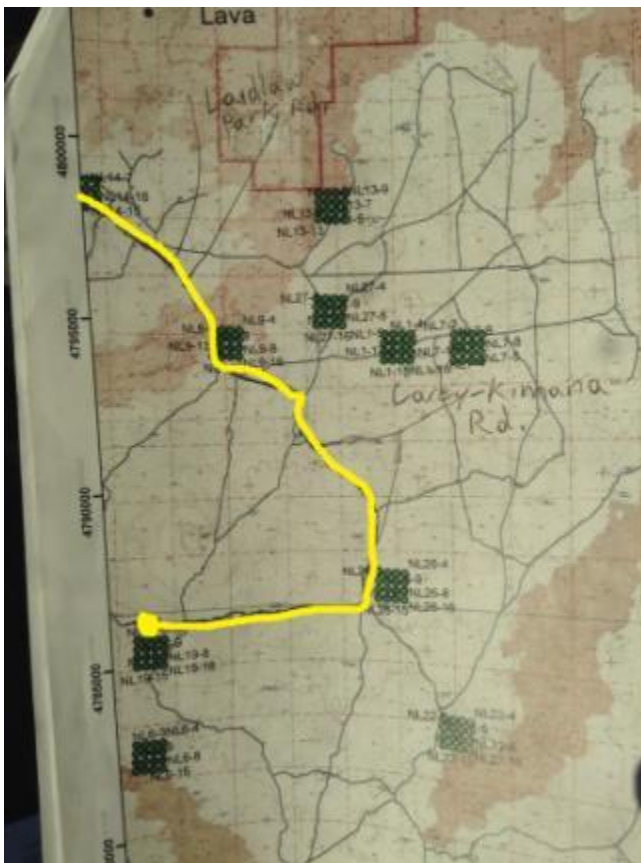
Appendix 1. Access notes for certain survey grid locations on Craters of the Moon National Monument and Preserve. Most routes require navigation on main gravel roads and/or rough 2-tracks using BLM maps to get as close as possible to the grid; high clearance and 4-WD preferred. If there has been recent significant rainfall, some of the 2-tracks can be impassable due to mud.

Grid	Notes
L2	Far southeastern lava grid – see route map below for final few miles; includes driving through a rope gate onto a BLM allotment (permission granted by Burley Field Office). Need high clearance because primitive 2-track and some sections have sage growing in “roadway”.
L6	Park/camp at Wapi Park (beware muddy roads after rain) – grid is ~800m southeast
L7	Can walk Sunset Flow trail (old 2-track) from Hwy 20/26 south to within 1km of grid
L8	Need access via private land (but do not have landowner info). Can still do the minimum number of points on public land if private access is denied.
L10	Park at Hwy pullout about 7.7 miles west of visitor center (Zone 12, 284702, 4807392) and walk south.
NL2	Came up from Minidoka. Arco-Minidoka Rd. Took bear Trap Cave Rd but could probably come from Corey-Kimana Rd. Access anywhere about 1km from road south of transect. 12/ 0287969 4758500. Cattle fence between eastern-most 4 points and rest of grid.
NL4	From Hwy 24 (going north), turn right on Broadway street at Minidoka, when Hwy 24 takes a sharp left turn. Continue on Broadway until you reach your first left, which will take you over the railroad tracks. Directly after crossing the railroad tracks, take a right, and then soon afterwards, a left (it will be the first left hand turn). At the T-intersection, take a right on E1000N Rd, until you reach the Arco-Minidoka north (it may be labeled Desert Road on the road sign). Take a left on this road (go north) and continue on this road for approximately 10 miles, until the road takes a fairly hard left hand turn (on the map, look for the place where the Arco to Minidoka road turns towards the NW, and there is another road right at the curve). Turn on this road (it will be on your right) and continue on it until you reach a T intersection. WARNING: there are a lot of rocks on this road, as well as mud, so be very careful, especially if you do not have high clearance. Take a right at the T intersection, and continue down this road. I was forced to stop 5km short of the transect, due to a very large mud puddle. AP coordinates: 12 T 0306308 4751352
NL5	On the Arco-to-Minidoka road, continue approximately .65 miles (north) from the turnoff for NL4 and then take a right. This road is also very primitive and requires high clearance – beware of mud puddles. Continue straight on this road until you reach the transect. You can camp anywhere on the road near to the transect. AP coordinates: 12 T 0307443 4755041
NL6	Don’t take direct road. Two-track that is not always there. Go around and use Carey-Kimana road. Turn W on connecting road that goes to NL19. Then turn S at NL19. Access point: 12 T 0282697 4783374 1km out from grid. Easy hiking.
NL9	From Carey, drive east until you reach Laidlaw Park Rd (which will be on the right) and

	drive down this road until you reach the AP. The road can be very muddy depending on weather conditions, so be careful. The AP is within 15 meters of the first point. Because of that, I am not going to list an AP – simply navigate to the point nearest to the road.
NL10	Need gate access from NPS (Craters) to go north through gate past group camp area and follow road to grid, also point NL10-4 is on private land (no contact info).
NL11	From American Falls, take Hwy 39 until you reach N Pleasant Valley Road, and then take a left. Continue on this road and then you will take a right on Winters road. In approximately 3.75 miles, take a left on Crystal Ice Cave Rd. Continue on Crystal Ice Cave Rd for about 1.5-2.0 miles and then the grid will be on your left. You can either park somewhere along the main road, or take one of the smaller dirt roads off of Crystal Ice Cave Rd., to get a bit closer. AP coordinates: 12 T 0323257 4754267
NL15	Requires long, slow drive on rough 2-track with several large lava rocks on road. Road to grid starts at zone 12 285712/4758920, ~ 8 miles to camp spot at 286676/4769348. Need high clearance for last 2 miles.
NL16 & NL21	Not obvious turn to west (towards both grids) located as 314780/4774823; can camp at 310106/4773474, which is located between the two grids (1.6km to 16 and 800m to 21).
NL19	See photo below for suggested route
NL20	Took Arco-Minidoka Road To Bear Trap Cave Road. Access @ 12 T 0293176 4758228 about 1km out.
NL23	Came up from Minidoka. Took Arco-Minidoka Road. Turn W on Bear Trap Cave Road. Access point on road. 1 km S of grid. Access point: 12/ 0304519 4757240



Lava 2 access



NL-19 access