



Plant Community Composition and Structure Monitoring at Scotts Bluff National Monument

2022 Data Report

Natural Resource Data Series NPS/SCBL/NRDS—2023/1391





ON THIS PAGE

Overview of long-term monitoring plot PCM_0005 at Scotts Bluff National Monument in 2022.

Photograph courtesy of the National Park Service.

ON THE COVER

Soapweed yucca (*Yucca glauca*) growing at the base of a bluff on a misty day at Scotts Bluff National Monument.

Photograph courtesy of the National Park Service.

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Abstract

This report presents the results of vegetation monitoring efforts in 2022 at Scotts Bluff National Monument (SCBL) by the Northern Great Plains Inventory and Monitoring Network (NGPN) and Fire Ecology Program (NGPFire). NGPN began vegetation monitoring at SCBL in 2011, and this was the twelfth year of combined monitoring efforts between NGPN and NGPFire at SCBL. NGPN did not visit SCBL in 2020 or 2021 due to travel restrictions during the COVID-19 pandemic. However, NGPFire was able to do vegetation monitoring at SCBL during these two years.

Crew members from NGPN visited eight long-term monitoring plots to collect data on the plant communities at SCBL. This work is part of a long-term monitoring effort designed to provide a better understanding of the condition of the vegetation community and how it changes over time. NGPN staff measured species richness, herb-layer height, native and non-native species abundance, ground cover, and site disturbance at each of the plots. In plots where woody species were present, tree regeneration, tall shrub density, tree density, and woody fuel loads were also measured.

The NGPFire crew visited an additional seven plots in the Eagle Rock and North Platte burn units to better understand the effects of prescribed fire on vegetation. The NGPFire crew measured herb-layer height, native and non-native species abundance, ground cover, and site disturbance at each of the plots. The NGPFire crew conducted one prescribed fire in 2022, in the Eagle Rock burn unit, on April 25, 2022.

In 2022, the monitoring crews identified 73 unique plant species in 15 monitoring plots. Of those species, 12 were exotic species. Two species considered rare in Nebraska were observed in the plots, including spotted fritillary, *Fritillaria atropurpurea*. At every plot except for two, the absolute cover of native species was greater than the absolute cover of exotic species. Monitoring crews collected tree regeneration data in three plots and found one species of seedling (chokecherry) and one species of adult tree (Rocky Mountain juniper). Ground disturbances, observed in fourteen of the fifteen plots, included animal use, prescribed fire, erosion, and soil disturbance.

Acknowledgments

We thank all the authors of the NGPN Plant Community Monitoring Protocol, particularly A. Symstad, for outstanding guidance on data collection and reporting. Thank you to the staff at SCBL (A. Stiles and I. Notte) for joining us in the field and providing logistical support. The 2022 NGPN vegetation field crew—T. Bortz, A. Checchi, M. Davis, L.E. Dupret, N. Haeefe, A. Kuczera and A. Thorstenson—and the NGPFire crew—D. Swanson and I. Muirhead—collected the data included in this report.

Introduction

Scotts Bluff National Monument (SCBL) was established in 1919 to protect and preserve two iconic bluffs and the associated heritage of western expansion. It covers 3,003 acres and is dominated by mixed-grass prairie with smaller areas of juniper woodlands, badlands, and riparian forests.

Vegetation monitoring began at SCBL in 1997 by the Heartland Inventory & Monitoring Program (James 2010) and the Northern Great Plains Fire Ecology Program (NGPFire; Wienk et al. 2010). In 2010, SCBL was incorporated into the Northern Great Plains Inventory & Monitoring Network (NGPN). At that time, vegetation monitoring protocols and plot locations (Figure 1) were shifted to better represent the entire park and to coordinate efforts with NGPFire (Symstad et al. 2012b). A total of 34 plots were established by NGPFire and NGPN in SCBL and the combined sampling efforts began in 2011 (Ashton et al., 2011). In 2014, an additional 20 plots were established in the riparian forest to assess forest condition. The NGPFire crew conducted one prescribed fire in 2022, in the Eagle Rock burn unit, on April 25, 2022. In this report, we provide summaries of the data collected in 2022 from eight plant community plot visits and seven fire ecology plot visits. For a more in-depth data report on long-term trends in vegetation at SCBL, refer to the 2011-2015 summary report (Ashton and Davis, 2016).

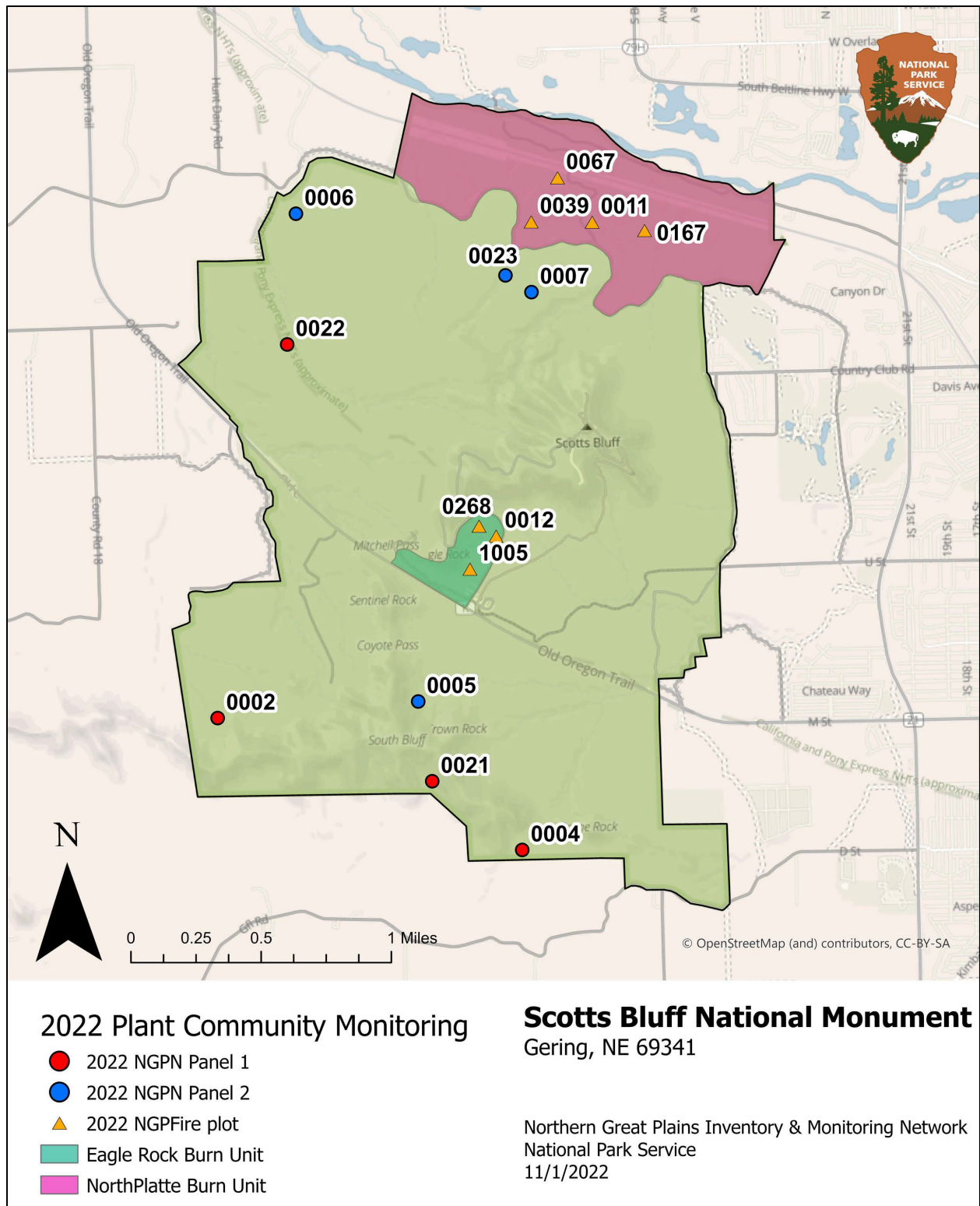


Figure 1. Map of Scotts Bluff National Monument plant community monitoring plots visited in 2022 by the Northern Great Plains Network Inventory & Monitoring Program (red and blue circles) and the Fire Ecology Program (orange triangles).

Methods

The NGPN Plant Community Composition and Structure Monitoring Protocol (Symstad et al. 2012b, a) describes in detail the methods used for sampling long-term plots. The general approach is briefly described below. For more detail, please see Symstad et al. 2012a, available at <https://www.nps.gov/im/ngpn/plant-communities.htm>.

Sample Design

The NGPN team implemented a survey to monitor plant community structure and composition at SCBL using a spatially balanced probability design (Generalized Random Tessellation Stratified [GRTS]; Stevens and Olsen 2003, 2004). Using a GRTS design, 20 randomly located sites were selected within SCBL to be established as Plant Community Monitoring plots (PCM plots). These sites were split into five panels, with four sites in each panel. An NGPN crew visits four plots from each panel (eight PCM plots total) during late May every year, using a rotating sampling scheme that consists of half the plots visited the previous year, and the remaining plots having been visited four years prior. Data from these randomly selected sites can be used to estimate the condition of vegetation communities for the whole park and to discern trends in condition over time. NGPN last visited SCBL in 2019, at which time they monitored plots in panels 3 and 4. In 2020 and 2021, NGPN did not visit the park due to travel restrictions because of the COVID-19 pandemic. With travel restrictions lifted in 2022, the NGPN crew was able to visit eight sites in panels 1 and 2 (Figure 1). Sampling was completed by seven NGPN crew members with assistance from two park staff members over three days (Table 1).

Table 1. Field journal for plant community monitoring plot visits at Scotts Bluff National Monument in 2022. A total of 8 plots were visited by the Northern Great Plains Network Inventory & Monitoring (NGPN) crew.

Date Visited	Plot Name	Field Notes
May 23, 2022	PCM_0005	9 person crew
May 24, 2022	PCM_0002	5 person crew
May 24, 2022	PCM_0004	4 person crew
May 24, 2022	PCM_0021	4 person crew
May 24, 2022	PCM_0022	5 person crew
May 25, 2022	PCM_0006	4 person crew
May 25, 2022	PCM_0007	5 person crew
May 25, 2022	PCM_0023	9 person crew

When a site was located within an active burn unit, NGPFire added additional visits based on a pre-burn, 1, 2, 5, and 10-year post-burn sampling schedule using the GRTS sampling schema and establishing fire plant community monitoring (FPCM) plots. Post-burn monitoring by the NGPFire crew took place at three plots in the Eagle Rock burn unit, and pre-burn surveys were performed at four plots in the North Platte unit. (Table 2).

Table 2. Field journal for fire plant community monitoring plot visits at Scotts Bluff National Monument in 2022. A total of 7 plots were visited by the Northern Great Plains Fire Ecology Program (NGPFire) crew.

Date Visited	Plot Name	Burn Unit	Field Notes
May 5, 2022	FPCM_0268	Eagle Rock	1 person crew; Immediate post-burn severity survey
May 5, 2022	FPCM_1005	Eagle Rock	1 person crew; Immediate post-burn severity survey
May 5, 2022	PCM_0012	Eagle Rock	1 person crew; Immediate post-burn severity survey
May 31, 2022	FPCM_0268	Eagle Rock	3 person crew; Post-burn plant cover and disturbances monitoring
May 31, 2022	FPCM_1005	Eagle Rock	2 person crew; Post-burn plant cover and disturbances monitoring
May 31, 2022	PCM_0012	Eagle Rock	3 person crew; Post-burn plant cover and disturbances monitoring
June 1, 2022	FPCM_0067	North Platte	2 person crew; Pre-burn survey
June 1, 2022	FPCM_0167	North Platte	3 person crew; Pre-burn survey
June 1, 2022	PCM_0011	North Platte	2 person crew; Pre-burn survey
June 1, 2022	PCM_0039	North Platte	3 person crew; Pre-burn survey

Plot Layout and Sampling

At each site visited, the NGPN crew recorded plant species cover and frequency in a rectangular, 50 m x 20 m (0.1 ha), permanent plot (Figure 2). Data on ground cover, herb-layer height (≤ 2 m), and plant cover were collected on two 50 m transects (the long sides of the plot) using a point-intercept method (Figure 3). Species richness data from the point-intercept method were supplemented with species presence data collected in five 1 m² quadrats located systematically along each transect (Figure 2). If a plant species was identified in the plot but was not included on the verified park species list, a voucher plant specimen was collected when possible and submitted to a botanist for independent verification. NGPFire did not collect quadrat data but did collect point-intercept data.

When woody species were present within 38 m of plot center, tree regeneration and tall shrub density data were collected within a 10 m radius subplot centered in the larger 50 m x 20 m (0.1 ha) plot. Trees within the entire 0.1 ha plot with a diameter at breast height (DBH) of > 15 cm were mapped and tagged. For each tree, the species, DBH, status (live or dead), and condition (e.g., leaf-discoloration, insect-damaged) were recorded. For all poles ($2.54 \leq \text{DBH} \leq 15$ cm) located within the 10 m radius subplot, only DBH and status were recorded. Tree and tall shrub species with $\text{DBH} < 2.54$ cm (seedlings) were tallied by species within the 10 m radius subplot. Dead and downed woody fuel load data were collected along two perpendicular, 100 ft (30.49 m) transects (fuel lines) with midpoints at the center of the plot (Figure 2), following Brown's Line methods (Brown 1974, Brown et al. 1982). Fuel load data were only collected if at least one piece of woody litter or fuel intersected a fuel line.

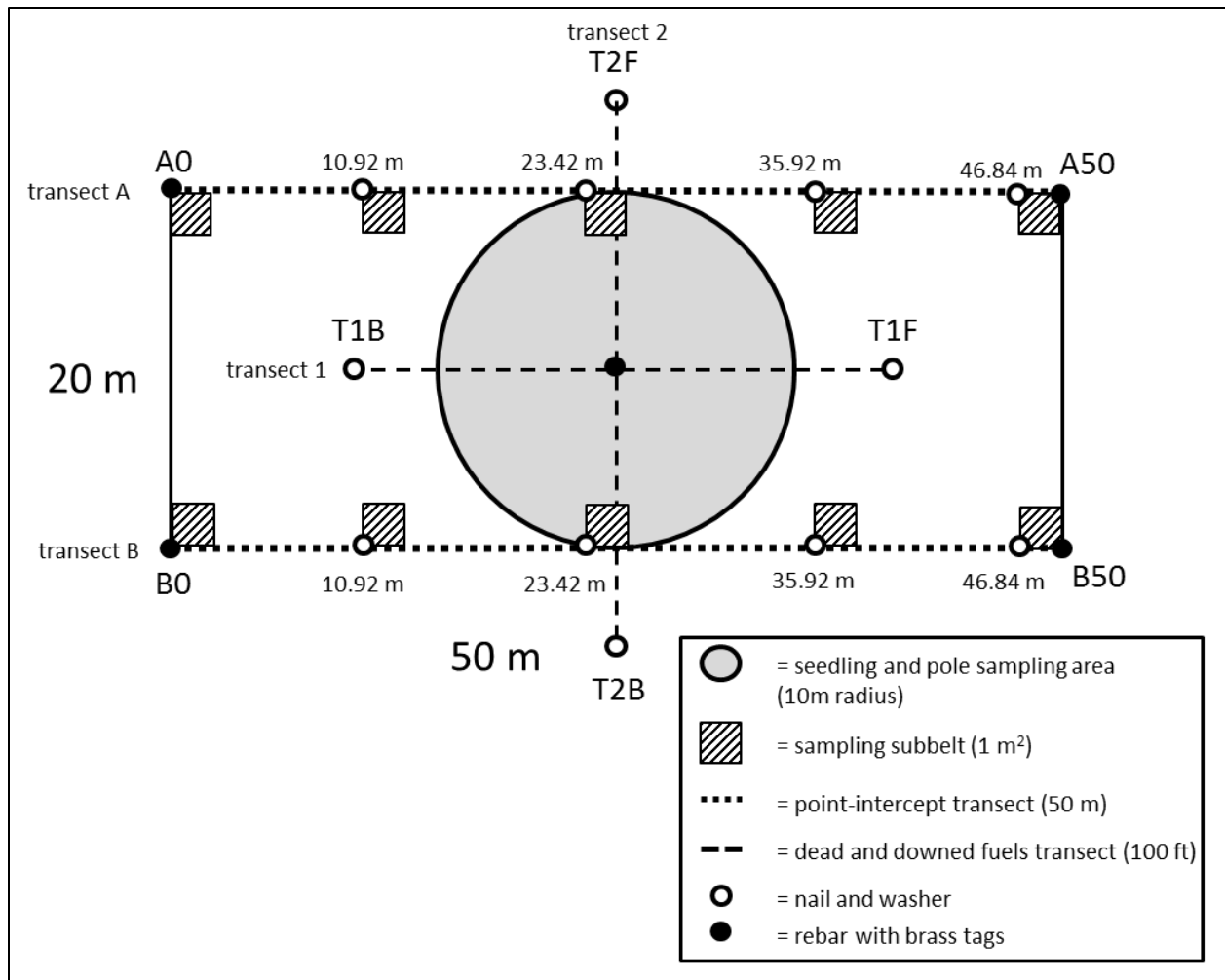


Figure 2. Long-term monitoring plot layout used for sampling vegetation used by the Northern Great Plains Inventory and Monitoring vegetation crew.

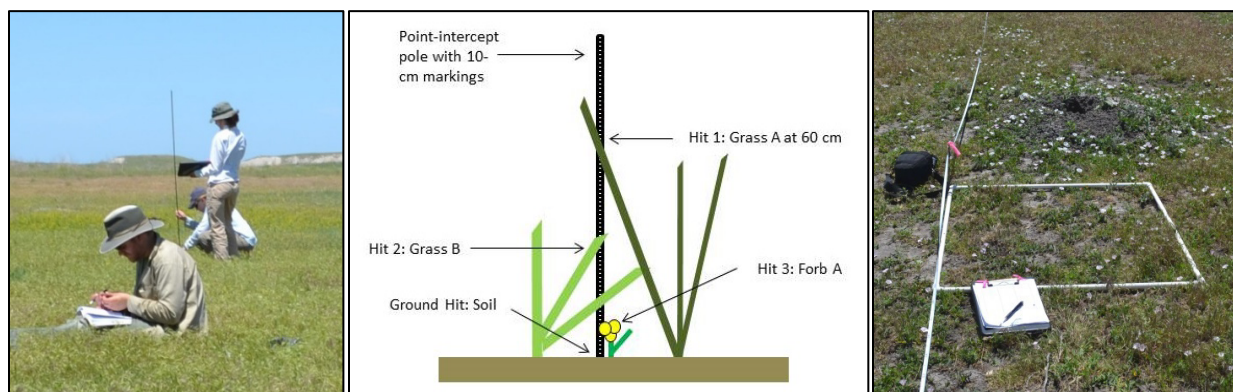


Figure 3. The Northern Great Plains Inventory & Monitoring vegetation crew used point-intercept (left and center panel) and quadrats (right panel) to document plant diversity and abundance.

Common disturbances were assessed and documented at each plot. The type, which included animal trails and fire, was recorded. Plots were also assessed for the presence and abundance of target exotic species (Table 3), which is critical for early detection and rapid response to exotic species threats. These species were chosen in collaboration with the Midwest Invasive Plant Network, Northern Great Plains Invasive Plant Management Team, park managers, and local weed experts. Each target species was assigned an abundance class from 1–5, based on an ocular estimate of cover, where 1 = one individual, 2 = few individuals, 3 = cover of 1–5%, 4 = cover of 5–25%, and 5 = cover > 25% of the plot.

Table 3. Exotic species included in the Northern Great Plains Network’s early detection and rapid response program.

Habitat	Scientific Name	Common Name
Riparian	<i>Heracleum mantegazzianum</i>	giant hogweed
Riparian	<i>Alliaria petiolata</i>	garlic mustard
Riparian	<i>Lepidium latifolium</i>	perennial pepperweed
Riparian	<i>Pueraria montana</i> var. <i>lobata</i>	kudzu
Riparian	<i>Myriophyllum spicatum</i>	Eurasian Watermilfoil
Riparian	<i>Iris pseudacorus</i>	yellow iris
Riparian	<i>Arundo donax</i>	giant reed
Riparian	<i>Polygonum cuspidatum</i> ; <i>P. sachalinense</i> ; <i>P. x bohemicum</i>	knotweeds
Riparian	<i>Rhamnus cathartica</i>	common buckthorn
Riparian	<i>Ailanthus altissima</i>	tree of heaven
Upland	<i>Falcaria vulgaris</i>	Sickle Weed
Upland	<i>Pastinaca sativa</i>	Wild Parsnip
Upland	<i>Acroptilon repens</i>	Russian Knapweed
Upland	<i>Centaurea solstitialis</i>	yellow star thistle
Upland	<i>Centaurea virgata</i> ; <i>C. diffusa</i> ; <i>C. jacea</i>	knapweeds
Upland	<i>Chondrilla juncea</i>	rush skeletonweed
Upland	<i>Hieracium aurantiacum</i> ; <i>H. caespitosum</i> ; <i>H. piloselloides</i>	orange, meadow, and tall hawkweed
Upland	<i>Senecio jacobaeae</i>	Tansy Ragwort
Upland	<i>Isatis tinctoria</i>	Dyer’s woad
Upland	<i>Gypsophila paniculata</i>	baby’s breath
Upland	<i>Dipsacus fullonum</i> & <i>D. laciniatus</i>	common teasel
Upland	<i>Euphorbia myrsinites</i> & <i>E. cyparissias</i>	myrtle spurge
Upland	<i>Salvia aethiopis</i> ; <i>S. pratensis</i>	Mediterranean and Meadow sage
Upland	<i>Lythrum salicaria</i>	Purple Loosestrife

Table 3 (continued). Exotic species included in the Northern Great Plains Network’s early detection and rapid response program.

Habitat	Scientific Name	Common Name
Upland	<i>Taeniatherum caput-medusae</i>	medusahead
Upland	<i>Ventenata dubia</i>	African wiregrass
Upland	<i>Ranunculus acris</i>	Tall Buttercup
Upland	<i>Linaria dalmatica</i> ; <i>L. vulgaris</i>	toadflax
Upland	<i>Thymelaea passerina</i>	Spurge Flax

Data Management and Analysis

FFI remote (FEAT/FIREMON Integrated; <http://frames.gov/ffi/>) was the primary software environment used for managing our sampling data. FFI is used by a variety of agencies (e.g., NPS, USDA Forest Service, U.S. Fish and Wildlife Service), has a national-level support system, and generally conforms to the [Natural Resource Database Template](#) standards established by the Inventory and Monitoring Program. Species scientific names, codes, common names, and native status are from the [USDA Plants Database](#) (USDA-NRCS 2022). However, nomenclature follows the [Integrated Taxonomic Information System](#) (ITIS). In the few cases where ITIS recognized a new name that was not in the USDA PLANTS database, the new name was used, and a unique plant code was assigned.

After data were entered in the database, 100% of records were verified with the original data sheets to minimize transcription errors, followed by a 10% review of records to confirm accuracy. When errors were identified by the crew, corrections were made to the original datasheets and the FFI database.

Data summaries were produced using the FFI reporting and query tools and R software (R version 4.2.1). The number of species encountered in each plot was calculated using data from point-intercept, quadrat, woody species, and target species protocols. Absolute cover was calculated using point-intercept data and is the total number of vegetation intercepts. This is often greater than 100% because more than one species can be intercepted per point due to overlapping vegetation.

The conservation status rank of plant species observed at SCBL in 2022 was determined by cross-referencing with the [NatureServe](#) conservation status list, as well as the Nebraska rare plant species lists. For this report, a species is considered rare or of conservation concern if its global (G) or state (S) conservation status rank is classified as critically imperiled (G1/S1), imperiled (G2/S2), or vulnerable (G3/S3). The 2022 species list was also cross-referenced with the list of noxious weeds maintained by the [Nebraska Department of Agriculture](#).

Results

There are 515 vascular plant species on the SCBL species list, and NGPN and NGPFire monitoring crews identified a total of 73 species from 15 monitoring plots in 2022 (Table 4). Of these species, 12 are exotic or unknown origin species for the park. The 2022 species list was cross-referenced with state-wide rare and noxious exotic species lists for Nebraska. We found one noxious weed, musk thistle, in our 2022 vegetation monitoring plots. Musk thistle was found at plot PCM_0006, located in the northwest corner of the park, on the edge of a prairie dog town. We identified two rare plant species in SCBL monitoring plots in 2022 (Table 4). One of these, slender wheatgrass (*Elymus trachycaulus*) is critically imperiled (S1) in Nebraska; however, only one subspecies of slender wheatgrass (*Elymus trachycaulus* var. *andinus*) is considered rare. Since our monitoring protocols are to only identify plants to the species level, it is possible, but unlikely, that the rare subspecies occurs in SCBL. A second species, spotted fritillary (*Fritillaria atropurpurea*), is ranked as imperiled (S2). All rare species observed are classified as secure (G5) at the global scale but are rare in the state because they exist on the edge of their global range in Nebraska. All the species we detected are on the SCBL species list.

Table 4. List of all plant species identified in Scotts Bluff National Monument plant community monitoring plots in 2022. In the Notes column, “Exotic” indicates that a species is not native to the park or, in the case where only the genus was identified, there are some species within that genus that are exotic. State or county noxious weed species are designated in the Notes column. Rare species are indicated in the Notes column with the Nebraska state ranking. Species that were not on the NPS species list for SCBL are indicated with “New” in the notes column.

Family	Species Code	Scientific Name	Common Name	Notes
Agavaceae	YUGL	<i>Yucca glauca</i>	soapweed yucca	–
Anacardiaceae	RHAR4	<i>Rhus aromatica</i>	fragrant sumac	–
Asteraceae	ARDR4	<i>Artemisia dracunculus</i>	tarragon	–
Asteraceae	ARFI2	<i>Artemisia filifolia</i>	sand sagebrush	–
Asteraceae	ARFR4	<i>Artemisia frigida</i>	fringed sagewort	–
Asteraceae	CANU4	<i>Carduus nutans</i>	musk thistle	Exotic; Noxious
Asteraceae	GUSA2	<i>Gutierrezia sarothrae</i>	broom snakeweed	–
Asteraceae	LASE	<i>Lactuca serriola</i>	prickly lettuce	Exotic
Asteraceae	LYJU	<i>Lygodesmia juncea</i>	rush skeletonplant	–
Asteraceae	NOCU	<i>Nothocalais cuspidata</i>	prairie false dandelion	–
Asteraceae	SERI2	<i>Senecio riddellii</i>	Riddell's ragwort	–
Asteraceae	SYMPH4	<i>Symphyotrichum</i>	aster	–
Asteraceae	THME	<i>Thelesperma megapotamicum</i>	Hopi tea greenthread	–
Asteraceae	TRDU	<i>Tragopogon dubius</i>	yellow salsify	Exotic
Boraginaceae	LAOC3	<i>Lappula occidentalis</i>	flatspine stickseed	–
Boraginaceae	LIIN2	<i>Lithospermum incisum</i>	narrowleaf stoneseed	–
Brassicaceae	DEPI	<i>Descurainia pinnata</i>	western tansymustard	–
Brassicaceae	DESO2	<i>Descurainia sophia</i>	herb sophia	Exotic
Brassicaceae	DRRE2	<i>Draba reptans</i>	Carolina draba	–
Brassicaceae	SIAL2	<i>Sisymbrium altissimum</i>	tall tumbledmustard	Exotic
Cactaceae	OPFR	<i>Opuntia fragilis</i>	brittle pricklypear	–
Cactaceae	OPMA2	<i>Opuntia macrorhiza</i>	twistspine pricklypear	–

Table 4 (continued). List of all plant species identified in Scotts Bluff National Monument plant community monitoring plots in 2022. In the Notes column, “Exotic” indicates that a species is not native to the park or, in the case where only the genus was identified, there are some species within that genus that are exotic. State or county noxious weed species are designated in the Notes column. Rare species are indicated in the Notes column with the Nebraska state ranking. Species that were not on the NPS species list for SCBL are indicated with “New” in the notes column.

Family	Species Code	Scientific Name	Common Name	Notes
Cactaceae	OPPO	<i>Opuntia polyacantha</i>	plains pricklypear	–
Caprifoliaceae	SYOC	<i>Symphoricarpos occidentalis</i>	western snowberry	–
Caryophyllaceae	ERHO13	<i>Eremogone hookeri</i>	Hooker's sandwort	–
Chenopodiaceae	CHENO	<i>Chenopodium</i>	goosefoot	Exotic
Chenopodiaceae	KRLA2	<i>Krascheninnikovia lanata</i>	winterfat	–
Chenopodiaceae	SALSO	<i>Salsola</i>	Russian thistle	Exotic
Chenopodiaceae	SATR12	<i>Salsola tragus</i>	prickly Russian thistle	Exotic
Commelinaceae	TROC	<i>Tradescantia occidentalis</i>	prairie spiderwort	–
Cupressaceae	JUSC2	<i>Juniperus scopulorum</i>	Rocky Mountain juniper	–
Cyperaceae	CAFI	<i>Carex filifolia</i>	threadleaf sedge	–
Euphorbiaceae	CRTE4	<i>Croton texensis</i>	Texas croton	–
Fabaceae	ASGR3	<i>Astragalus gracilis</i>	slender milkvetch	–
Fabaceae	ASTRA	<i>Astragalus</i>	milkvetch	–
Fabaceae	DACA7	<i>Dalea candida</i>	white prairie clover	–
Fabaceae	LAPO2	<i>Lathyrus polymorphus</i>	manystem pea	–
Fabaceae	PSTE5	<i>Psoraleidum tenuiflorum</i>	slimflower scurfpea	–
Fabaceae	THRH	<i>Thermopsis rhombifolia</i>	golden pea	–
Fabaceae	VIAM	<i>Vicia americana</i>	American vetch	–
Hydrophyllaceae	ELNY	<i>Ellisia nyctelea</i>	Aunt Lucy	–
Lamiaceae	NECA2	<i>Nepeta cataria</i>	catnip	Exotic
Liliaceae	ALTE	<i>Allium textile</i>	textile onion	–

Table 4 (continued). List of all plant species identified in Scotts Bluff National Monument plant community monitoring plots in 2022. In the Notes column, “Exotic” indicates that a species is not native to the park or, in the case where only the genus was identified, there are some species within that genus that are exotic. State or county noxious weed species are designated in the Notes column. Rare species are indicated in the Notes column with the Nebraska state ranking. Species that were not on the NPS species list for SCBL are indicated with “New” in the notes column.

Family	Species Code	Scientific Name	Common Name	Notes
Liliaceae	FRAT	<i>Fritillaria atropurpurea</i>	spotted fritillary	S2
Malvaceae	SPCO	<i>Sphaeralcea coccinea</i>	scarlet globemallow	–
Melanthiaceae	TOVE2	<i>Toxicoscordion venenosum</i>	meadow deathcamas	–
Onagraceae	OESE3	<i>Oenothera serrulata</i>	yellow sundrops	–
Onagraceae	OESU99	<i>Oenothera suffrutescens</i>	scarlet beeblossom	–
Poaceae	ACHY	<i>Achnatherum hymenoides</i>	Indian ricegrass	–
Poaceae	AGCR	<i>Agropyron cristatum</i>	crested wheatgrass	Exotic
Poaceae	ANGE	<i>Andropogon gerardii</i>	big bluestem	–
Poaceae	BOCU	<i>Bouteloua curtipendula</i>	sideoats grama	–
Poaceae	BOGR2	<i>Bouteloua gracilis</i>	blue grama	–
Poaceae	BRJA	<i>Bromus japonicus</i>	Japanese brome	Exotic
Poaceae	BRTE	<i>Bromus tectorum</i>	cheatgrass	Exotic
Poaceae	CALO	<i>Calamovilfa longifolia</i>	prairie sandreed	–
Poaceae	ELLA3	<i>Elymus lanceolatus</i>	thickspike wheatgrass	–
Poaceae	ELTR7	<i>Elymus trachycaulus</i>	slender wheatgrass	S1
Poaceae	HECO26	<i>Hesperostipa comata</i>	needle and thread	–
Poaceae	KOMA	<i>Koeleria macrantha</i>	prairie Junegrass	–
Poaceae	MURA	<i>Muhlenbergia racemosa</i>	marsh muhly	–
Poaceae	PASM	<i>Pascopyrum smithii</i>	western wheatgrass	–
Poaceae	POPR	<i>Poa pratensis</i>	Kentucky bluegrass	Exotic
Poaceae	POSE	<i>Poa secunda</i>	Sandberg bluegrass	–

Table 4 (continued). List of all plant species identified in Scotts Bluff National Monument plant community monitoring plots in 2022. In the Notes column, “Exotic” indicates that a species is not native to the park or, in the case where only the genus was identified, there are some species within that genus that are exotic. State or county noxious weed species are designated in the Notes column. Rare species are indicated in the Notes column with the Nebraska state ranking. Species that were not on the NPS species list for SCBL are indicated with “New” in the notes column.

Family	Species Code	Scientific Name	Common Name	Notes
Poaceae	SCSC	<i>Schizachyrium scoparium</i>	little bluestem	–
Poaceae	SPCR	<i>Sporobolus cryptandrus</i>	sand dropseed	–
Poaceae	VUOC	<i>Vulpia octoflora</i>	sixweeks fescue	–
Polemoniaceae	PHAN4	<i>Phlox andicola</i>	prairie phlox	–
Polemoniaceae	PHHO	<i>Phlox hoodii</i>	spiny phlox	–
Rosaceae	PRVI	<i>Prunus virginiana</i>	chokecherry	–
Rosaceae	ROAR3	<i>Rosa arkansana</i>	prairie rose	–
Solanaceae	PHHI8	<i>Physalis hispida</i>	prairie groundcherry	–
Solanaceae	PHLO4	<i>Physalis longifolia</i>	longleaf groundcherry	–
Unknown Family	UNKFORB	Unknown forb	unknown forb	Exotic
Urticaceae	PAPE5	<i>Parietaria pensylvanica</i>	Pennsylvania pellitory	–
Vitaceae	PAVI5	<i>Parthenocissus vitacea</i>	woodbine	–

Based on the total count of unique species observed in all plots in 2022, PCM_0005 had the highest number of native species, with 29 total (Table 5). Plots PCM_0021 and PCM_0023 also had high numbers of native species, with 27 and 28 respectively. Absolute cover calculations (Table 6) showed a greater percent of native species cover compared to exotic species cover in all but two of the fifteen plots that were monitored. Very low exotic species cover was found in two of the three plots (FPCM_1005 and PCM_0012) burned during the Eagle Rock prescribed fire.

Table 5. Total number of plant species identified in each of the fifteen plots monitored at Scotts Bluff National Monument (SCBL) in 2022. This is a count of all unique species identified in the plot using species data from point-intercept, quadrat, woody species, and target species protocols. Note that quadrat data was not collected from the FPCM and the three PCM plots read by NGPFire (PCM_0011, PCM_0012, and PCM_0039), resulting in a lower species count.

Plot	Exotic Species	Native Species	Total
SCBL_FPCM_0067	1	17	18
SCBL_FPCM_0167	2	5	7
SCBL_FPCM_0268	1	6	7
SCBL_FPCM_1005	1	9	10
SCBL_PCM_0002	5	16	21
SCBL_PCM_0004	8	14	22
SCBL_PCM_0005	5	29	34
SCBL_PCM_0006	5	6	11
SCBL_PCM_0007	3	20	23
SCBL_PCM_0011*	4	10	14
SCBL_PCM_0012*	0	7	7
SCBL_PCM_0021	4	27	21
SCBL_PCM_0022	6	12	18
SCBL_PCM_0023	5	28	33
SCBL_PCM_0039*	3	14	17

* Quadrat data not collected in these PCM plots read by NGPFire, resulting in a lower species count.

Table 6. Absolute percent cover of native and exotic plant species in plots monitored at Scotts Bluff National Monument in 2022. Absolute percent cover is calculated using the point-intercept data. This includes overlapping species canopies, which can result in values greater than 100%.

Plot	Absolute % Native Cover	Absolute % Exotic Cover
SCBL_FPCM_0067	68	26
SCBL_FPCM_0167	71	37
SCBL_FPCM_0268	43	18
SCBL_FPCM_1005	63	1

Table 6 (continued). Absolute percent cover of native and exotic plant species in plots monitored at Scotts Bluff National Monument in 2022. Absolute percent cover is calculated using the point-intercept data. This includes overlapping species canopies, which can result in values greater than 100%.

Plot	Absolute % Native Cover	Absolute % Exotic Cover
SCBL_PCM_0002	63	61
SCBL_PCM_0004	67	41
SCBL_PCM_0005	114	50
SCBL_PCM_0006	36	55
SCBL_PCM_0007	74	50
SCBL_PCM_0011	90	23
SCBL_PCM_0012	88	0
SCBL_PCM_0021	95	1
SCBL_PCM_0022	11	47
SCBL_PCM_0023	97	18
SCBL_PCM_0039	92	19

The NGPN monitoring crew collected woody species data in three plots in 2022: PCM_0002, PCM_0005, and PCM_0023 (Table 7). We found a total of four live Rocky Mountain juniper trees (*J. scopulorum*) and 183 chokecherry seedlings (*P.virginiana*). Plot PCM_0005 did not have any woody species present.

Surface fuels and dead and downed wood were measured at one plot, PCM_0023, in 2022 (Table 8).

Table 7. Woody species data from three long-term monitoring plots visited at Scotts Bluff National Monument (SCBL) in 2022. DBH categories are tree (DBH>15 cm), pole (2.54 cm≤DBH≤15 cm), and seedling (DBH<2.54 cm).

Plot	Species	Status	DBH	Count	Density/hectare
SCBL_PCM_0002	Rocky Mountain juniper	Live	Tree	1	10
SCBL_PCM_0023	chokecherry	Live	Seedlings	183	5824.32
SCBL_PCM_0023	Rocky Mountain juniper	Live	Tree	3	30

Table 8. Surface fuels summary for plots monitored at Scotts Bluff National Monument (SCBL) in 2022.

Macroplot	Monitoring Status	Average Tons per Acre										Avg. Depth (in.)		
		1-hr	10-hr	100-hr	1-100-hr	1000-hr sound	1000-hr rotten	1-1000- hr	Duff	Litter	Total	Duff	Litt	Total
SCBL_PCM_0023	2022_PlantCommunity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.21	1.92	3.13	0.1	0.2	0.3

Disturbances occurred in 14 of the 15 plots at SCBL visited by NGPN and NGPFire in 2022 (Table 9). There was a variety of disturbances observed, including animal use, prescribed fire, erosion, and soil disturbance (Figure 4 and Figure 5).

Table 9. Disturbance types and occurrence at monitoring plots visited in 2022 at Scotts Bluff National Monument (SCBL).

Plot	Disturbance Type	Area (m ²)
SCBL_FPCM_0067	Grazing	4
SCBL_FPCM_0067	Soil Disturbance	2.5
SCBL_FPCM_0268	Prescribed Fire (Eagle Rock Rx 4/25/2022). 90% of plot burned.	657
SCBL_FPCM_0268	Soil Disturbance	3
SCBL_FPCM_1005	Prescribed Fire (Eagle Rock Rx 4/25/2022). 88% of plot burned.	642
SCBL_FPCM_1005	Soil Disturbance	7
SCBL_PCM_0002	Small Mammal (one large hole—possibly badger)	10
SCBL_PCM_0002	Erosion	1
SCBL_PCM_0002	Soil Disturbance	24
SCBL_PCM_0004	Small Mammal	5
SCBL_PCM_0004	Soil Disturbance	5
SCBL_PCM_0005	Small Mammal	2
SCBL_PCM_0006	Grazing	10
SCBL_PCM_0006	Prairie Dog	300
SCBL_PCM_0007	Prairie Dog	3
SCBL_PCM_0007	Soil Disturbance	15
SCBL_PCM_0011	Soil Disturbance	2.8
SCBL_PCM_0012	Prescribed Fire (Eagle Rock Rx 4/25/2022). 98% of plot burned.	715
SCBL_PCM_0012	Soil Disturbance (mounds)	10
SCBL_PCM_0021	Erosion (rock fall)	50
SCBL_PCM_0021	Soil Disturbance	60
SCBL_PCM_0021	Other (crew disturbance)	5
SCBL_PCM_0022	Small Mammal	1
SCBL_PCM_0022	Erosion	5
SCBL_PCM_0023	Erosion	4.5
SCBL_PCM_0023	Soil Disturbance	25
SCBL_PCM_0039	Animal Trail	3
SCBL_PCM_0039	Soil Disturbance	2.3



Figure 4. Photograph of long-term monitoring plot FPCM_0268 taken at Scotts Bluff National Monument on May 5, 2022, ten days after the Eagle Rock prescribed fire. Blackened vegetation is in the foreground. Photograph courtesy of the National Park Service.



Figure 5. Photograph of long-term monitoring plot FPCM_0268 at Scotts Bluff National Monument, taken from the same vantage point shown in Figure 4. Photograph taken on May 31, 2022, five weeks after the Eagle Rock prescribed fire, showing substantial re-growth of grass and forbs. Photograph courtesy of the National Park Service.

Further Analysis

This Data Report is intended to provide a basic review of the data collected during the NGPN and NGPFire monitoring team's 2022 visit to Scotts Bluff National Monument. All data included in this report is available upon request from the Northern Great Plains Inventory and Monitoring Network, as well as in the archives found in the [IRMA Data Store](#).

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