

Lichen Survey of Bryant Creek State Park

Douglas County, Missouri



Report to Missouri Department of Natural Resources

NatureCITE

Center for Integrative Taxonomy and Ecology

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Porpidia albocaerulescens (smoky-eye boulder lichen), a common and characteristic crustose lichen of mesic, lightly shaded sandstone outcrops and boulders in wooded ravines throughout the park. (D. Ladd photo)

Summary

A comprehensive survey of lichens and lichen-associated fungi was conducted at Bryant Creek State Park during 18 field days from October 2020 through May 2022, documenting a total of 331 taxa.

Despite areas of previous intensive logging and other impacts, the site contains an impressive level of lichen biodiversity, ranking among the highest lichen diversity recorded for a single site in the Interior Highlands and lower Midwest. Of the 331 taxa documented, there were 297 lichens (274 chlorolichens and 23 cyanolichens), 16 lichenicolous fungi (including one lichenized lichen parasite), and 18 non-lichenized, non-lichenicolous fungi often associated with lichens. Several of these taxa are new records for Missouri and/or the Ozark Ecoregion, and some are significant extensions of the known North American ranges for the species.

Bryant Creek State Park constitutes a unique complex of extensive mesic sandstone ravine systems in a landscape context of contiguous intact or recoverable woodlands. In addition to the stunning scenic aspects of the extensive, seasonally flowing mesic ravines with diverse bedrock expressions, this system supports an unusual diversity of cryptogams, including lichens and associated fungi, with some uncommon and conservative species in abundances not known elsewhere in the Ozarks.

Several small patch natural communities, such as seeps, glades, and bluffs of both sandstone and dolomite, occur at the park, further enhancing microhabitat diversity and supporting a diverse biota of lichens and associated fungi. With continuing, ecologically based management and restoration of degraded sites, as well as careful, sustainable development of visitor facilities and trails, this site will exemplify a distinct component of the Ozark landscape created by the characteristics of the region's Roubidoux bedrock system, which is typified here more completely than perhaps any other area in the Ozarks.

Introduction

Bryant Creek State Park encompasses 2,927 acres in southern Douglas County, in south-central Missouri ca. 21 miles north of the Arkansas state line. The entire park lies within the White River Hills Subsection of the Ozark Highlands, and is characterized by steeply dissected terrain with narrow ridges and valleys, and high gradient streams (Nigh & Schroeder 2002). Bedrock within the park is all Ordovician age; most of the park is Roubidoux Sandstone, with some glade-forming exposures of Jefferson City Dolomite in the west-central portions of the park and smaller, but more extensively distributed, exposures along a significant graben in the east half of the park, through which state highway N runs. Narrow exposures of Gasconade Dolomite occur in the lower portions of major ravines in both the northern and southern portions of the park, as well as the extensive dolomite bluff and woodland system along the south shore of Bryant Creek at the north edge of the park, including the massive north-facing

dolomite exposures of Coon Den Bluff and Pearce Bluff, with cliff faces exceeding 100 feet high. Soils on ridges and upland slopes have high concentrations of chert residuum and small chert boulders. Occasional chert and cherty dolomite outcrops also occur on lower slopes in parts of the park.

With the exception of a region of mostly overgrown dolomite glades, and some small openings associated with seepages, ridgetops, a few small glades, and bluff summits, the natural vegetation of the park is woodland, with a combination of various oak and oak-pine upland types, and more mesophytic hardwoods on the mesic slopes and floodplains. A complex of old fields and pastures is associated with a former residence in the west-central part of the park, parts of which are reverting to woody succession. There are also some small clearings from former log landings in the southern half of the park. McCarty (2021) and Nelson (2021) provide comprehensive accounts and descriptions of the physical and biotic aspects of the park, including detailed natural community and habitat information as well as a historical summary of land use and impacts including logging activities prior to acquisition as a state park.

Microhabitat diversity in the park is high as a result of the diversity of elevation, topography, landforms, exposure, aspect, hydrology, and natural communities, and the presence of various sizes and exposures of both siliceous and carbonate substrates. Additionally, several different woodland natural community types, and smaller occurrences of glades, seeps, and other small patch habitats, provides habitat for a diverse suite of corticolous cryptogams not found in most areas of the Ozarks.

Materials and Methods

Field surveys were conducted to document the lichens and lichenicolous fungi occurring within Bryant Creek State Park. Additionally, a few non-lichenicolous, non-lichenized fungi normally treated by lichenologists are also included; most of these are included in Esslinger (2021) and/or Index Fungorum (Kirk 2022).

A total of 18 field days¹ was spent surveying lichens throughout the park. Attempts were made to systematically survey all geographies, representative natural communities, microhabitats, and lichen substrates within the park. Because of access difficulties, only portions of the upper and lower parts of the massive north-facing dolomite cliffs of Coon Den Bluff and Pearce Bluff along Bryant Creek were surveyed; without technical climbing equipment it is physically impossible to survey the sheer bluff faces and old-growth *Juniperus virginiana* leaning over the bluff summits.

¹ 2020: 8-9 October, 7-8 November; 2021: 26-28 March, 12-14 May, 6-9 October; 2022: 15-16 March, 1-2 May

At least one permanent voucher specimen was prepared to document each lichen taxon recorded in this study² (see **Appendix 1**). A number of duplicate collections were also made, especially for taxa where field determinations to species were not possible because microscopic or chemical characters were necessary for identification, although not all of these were retained as permanent specimens. Collections were stored and processed using standard herbarium protocols for cryptogam and fungal collections. Microscopic analyses for ascomal, spore, and other taxonomic characters were conducted using hand-prepared thin sections mounted in water, 10% potassium hydroxide, and/or Lugol's iodine solution (IKI) and examined under a compound light microscope with oil immersion capability. Standard spot tests for chemical constituents were completed using the reagents and techniques of Brodo et al. (2001) and Orange et al. (2001). When necessary, detailed chemical data were obtained through thin-layer chromatography, using glass silica gel plates and a standardized three solvent system (Culberson 1972, 1974; Culberson & Johnson 1982 — see also Orange et al. 2001), with the substitution of methyl-tert-butyl ether for diethyl ether, and toluene for benzene, in solvent system A.

A total of 695 collections were made during this study; 572 of these were retained as determined vouchers and are cited in this report. Among the other collections were some that were subsequently discarded, a few (<10) bryophytes, hepatics and vascular plants not discussed here, and some currently unidentified specimens not included here that will likely result in a few additions to the park list.

Results

A total of 331 taxa (274 chlorolichens, 23 cyanolichens, 15 non-lichenized lichenicolous fungi, 1 lichenized lichenicolous fungus, and 18 non-lichenized, non-lichenicolous fungi) were documented from Bryant Creek State Park, demonstrating both the high lichen diversity of the site, and its significance as a concentration of cryptogam biodiversity from a state and regional perspective.

Lichens were common on suitable substrates throughout the park, except in deeply shaded areas or on highly dynamic substrates. The substrate class hosting the most taxa was corticolous (trees and shrubs), with 157 species. Siliceous rocks (sandstone and chert) hosted 116 taxa, while 57 taxa occurred on dolomite. Terricolous substrates hosted 19 taxa, lignicolous substrates 46 taxa, and 18 taxa grew on bryophytes and humus. Another 32 taxa occurred on other substrates, including anthropogenic substrates such as concrete, bricks, and old iron; this category also includes the 16 lichenicolous species that grow on or within the thalli of other lichens. Note that the aggregate numbers of taxa from these substrate categories sum to more than the number of taxa in the park because several species occur on multiple substrate types.

² Except for *Caloplaca flavocitrina*, which only occurred on the high face of an inaccessible bluff.

Appendix 1 provides an annotated list of all taxa documented for this project, with information about habitats, substrates, abundance, and other information for each taxon. **Appendix 2** provides a table of all taxa from the park, with substrate data. **Appendix 3** is an annotated list of some lichens not documented from the park, but predicted to occur at the site based on their Ozark distribution, habitats, and substrate affinities. Even if several of these taxa are eventually documented from the park, the current project provides confidence that they are not common at the site. Comparing the lichen biota among the relative spectrum of abundance described in **Appendix 1**, there is an essentially equitable distribution for all but the abundant category:

<u>Abundance category</u>	<u># of taxa</u>
Rare (found in <5 sites and nowhere common)	92 (27.8%)
Uncommon (found in 5-10 sites park and nowhere common)	61 (18.4%)
Occasional (sporadic but widespread, usually with more than 10 occurrences)	81 (24.5%)
Common (widespread in the park and likely to occur on any suitable habitat/substrate)	77 (23.3%)
Abundant (essentially ubiquitous on suitable habit/substrates throughout; almost always present in suitable conditions)	20 (6.0%)

Assessing conservation significance and rarity of lichens and fungi is difficult because of major data gaps regarding distribution and abundance for most taxa. However, the Ozark ecoregion (particularly Missouri portion) has been the focus of intensive lichen research since the early 1980's (e.g., Harris & Ladd 2005, Ladd 1996a, Ladd 2019, Peck et al. 2004), resulting in extensive data about lichen composition, diversity, abundance, and distribution in the region. Several species documented during this study represent new records for both Missouri and the Ozark Ecoregion, or are otherwise noteworthy from a regional, national, or global perspective, as shown in **Table 1**.

The 331 taxa documented from the park in this study demonstrate the high level of diversity at the site. **Table 2** provides some comparative data regarding lichen diversity at other sites within and beyond the region, highlighting the park's high level of diversity, especially for a site of this size. Note that the sites with higher diversity than the park are all much larger areas, sometimes comprising orders of magnitude larger landscapes. Note also that many areas with significantly larger land area still have lower total diversity than has been documented from Bryant Creek State Park. These data reinforce the significance of both the park, and of intact landscapes in the Ozark region as reservoirs for high levels of lichen diversity.

Table 1. New and noteworthy lichens and associated fungi at Bryant Creek State Park. Distribution information largely compiled from CNALH (2022) records.

Taxon	New to MO	New to Ozark Ecoregion*	Comments
<i>Buellia cf. vilis</i>	X	X	Significant range extension from nearest records in southern Wisconsin and eastern Colorado.
<i>Catinaria atropurpurea</i>	X	X	Although apparently frequent in the Great Lakes region and both eastern and western North America, this is the first report from the Interior Highlands; according to CNALH (2022), the nearest reports are from southeastern Illinois.
<i>Chaenotheca</i> sp. (cf. <i>C. hispidula</i> ?)	X	X	This collection contains only a single ascoma, so was not sectioned for determination; it represents a new record for the state and region.
<i>Chaenothecopsis perforata</i>			Second report from Missouri, the Ozarks, and the Interior Highlands; both reports are from <i>Rhus copallinum</i> , a previously unknown substrate for this species — see Ladd (2019).
<i>Chrysothrix onokoensis</i>	X		Known from a few sites in the Arkansas Ozarks
<i>Erythricium aurantiacum</i>			With the exception of one previous report from the St. Louis area, the nearest other report of this lichenicolous fungus is from central Ohio, although it is likely more common and widespread than this indicates, given its potential confusion with <i>Marchandiomyces corallinus</i> .
<i>Myrionora albidula</i>	X	X	The few other North American records for this lichen are a single record each from Connecticut, Maine and northeastern Ohio, and two records from southern Alaska.
<i>Plectocarpon diedertianum</i>			Second report from Missouri, the Ozarks, and the Interior Highlands; see Ladd (2019).
<i>Pseudosagedia chlorotica</i>	X	X	Although there are numerous records of this lichen from the Appalachians and western North America, there are few reports from the interior, with the nearest being in northeastern Oklahoma and northern Illinois; also new to the Interior Highlands.
<i>Scytinium tenuissimum</i>			Although a few additional Midwestern records have emerged since Ladd (2019), and it occurs across much of North America, in the Midwest this is still a seldom reported lichen that may be overlooked because of its small size and cryptic coloration; in addition to Bryant Creek State Park, in the region it is known from two other sites in the Missouri Ozarks, one in eastern Kansas, and three in central Illinois.
<i>Sphaerellothecium?</i> sp.	X	X	A distinctive but as yet unidentified lichen parasite not resembling anything previously known to parasitize <i>Usnea</i> in North America.
<i>Tremella parmeliarum</i>			In the Interior Highlands known only from a single record in Christian County, Missouri; the nearest other records are from central Louisiana and central Tennessee, although this species is likely more common than indicated by current records.

*Ozark Ecoregion *sensu* Harris & Ladd (2005), including parts of Arkansas, Illinois, Kansas, Missouri, and Oklahoma. References to the Interior Highlands include both the Ozarks and the neighboring Ouachita region of Arkansas and Oklahoma; except for the much smaller Black Hills of South Dakota and Wyoming, this is the only significant highland region in midcontinental North America.

Table 2. Lichen diversity at selected U.S. sites, in approximate order of increasing distance from the study site. Note that the spot survey methods used in the Wetmore studies underrepresent actual site lichen richness. For instance, the number cited below for Hercules Glades Wilderness includes ca. 40 additional taxa added by the author and colleagues since Wetmore’s 1992 survey, representing an increase of 22%.

Site (source)	Distance ¹	Size (acres)	Species
Bryant Creek State Park, MO (this study)	0	2,927	331
Hercules Glades Wilderness (MO) (Wetmore 1992, plus additions)	30	12,315	219
Mark Twain National Forest Flatwoods, MO [2 proximal tracts] (Ladd 1996b)	70	1,231	201
Johnson’s Shut-Ins State Park, MO (Ladd 2019, plus additions)	100	8,781	356
Upper Buffalo River Wilderness (AR) (Wetmore 2001)	140	10,590	132
Cuivre River State Park, MO (Ladd 2003, plus additions)	170	6,400	190
Hot Springs National Park (AR) (Wetmore & Bennett 2002)	170	5,840	161
Pine Bluff Arsenal (AR) (Ladd 2009)	190	14,944	161
Great Smoky Mountains National Park (NC/TN) (Lendemer et al. 2013)	510	520,976	770
Apostle Islands National Lakeshore (WI) (Wetmore 1988)	590	42,000	306
Okefenokee National Wildlife Refuge (GA) (Wetmore 1991)	730	119,680	187
Boundary Waters Canoe Area (MN) (Wetmore 1987)	760	1,090,000	370
Mercer County, New Jersey conservation lands (Waters & Lendemer 2019)	990	8,000	174
Glacier Bay National Park, Alaska (Spribille et al. 2020)	2,500	1,488,313 ²	947
¹ Approximate air distance from study site, in miles			
² Including only lands not currently covered by glaciers			

Impacts to Lichen Biota

Previous land use history at the site, including logging, grazing, and clearing of limited areas for pasture, have undoubtedly impacted the site’s cryptogam biota, but the overall intact woodland context plays a major role in maintaining a diverse cohort of lichens at the site. The relatively recent intensive logging of large portions of the park south of highway N has removed mature trees and disrupted the woodland context of the landscape, but even here the more significant landscape features, such as the major ravines and sandstone outcrops, have been left unlogged.

Perhaps the most significant impact to patterns, abundance, and diversity of lichens at the site is the contiguously shaded character of the woodlands. These woodlands exhibit the effects of decades of fire suppression, and in many areas have become closed growth forested landscapes, with stocking rates and aggregate shading far exceeding the pre-Eurosettlement context of the region. Even on xeric ridges and exposures of bedrock, tree canopy is largely continuous, reducing the habitats for lichens associated with open areas to some dolomite glades, minute sandstone glade openings and tiny areas on exposed bluff summits.

While a number of invasive species are present at the site, with the exception of extensive populations of *Lespedeza cuneata* in old fields and the post-logging successional tracts south of highway N, there are no problematical infestations of invasives currently threatening cryptogam diversity at the site. Continued vigilance and control efforts will be required to ensure this continues, preventing impacts from species with potential to adversely impact woodland habitats, such as *Alliaria petiolata*, *Microstegium vimineum*, feral hogs, armadillos, and a suite of invasive woody shrubs and vines, including most notably *Lonicera maackii*, with the potential to disrupt woodland habitats, ground layer vegetation, and tree replacement demographics.

A critical aspect of both the park's character and its ability to support a diverse biota is the intact hydrological systems and the microhabitat diversity it supports. It is imperative that watershed protection ensures functional hydrological patterns, including the relative lack of erosion on steep mesic side slopes and corresponding lack of sediment deposition, erosion, and scouring in the ravines.

Management Recommendations

Despite previous impacts, the lichen biota of Bryant Creek State Park comprises one of the more diverse constellations of lichen diversity documented from a single site in midcontinental North America. This is likely due to a combination of high topographic, porophyte, hydrological, and microclimate diversity, as well as moderate geological diversity and a relatively intact landscape context of minimally fragmented intact native habitat.

Many lichens at the park, especially rare and conservative species, are associated with high-quality natural vegetation in relatively undisturbed habitats within the park. These include:

1. All of the major ravine systems, which host a repeating series of habitats and associated biota, but differ subtly in their expression in each ravine system. These ravines provide a range of microhabitats across short distances, due to the steep slopes and associated hydrological, exposure, and substrate diversity. Of particular note are the extensive undulations of low sandstone bluff outcrops along the upper and mid slopes of many ravines; these host a characteristic lichen biota and, especially on their massive, sheltered faces under overhanging summits, include several regionally uncommon and habitat-restricted taxa such as *Chrysothrix onokoensis*, *Cresponea premnea* var. *saxicola*, *Cystocoleus ebeneus*, *Lepraria vouauxii*, and *Ramalina labiosorediata*. Perhaps the best and most diverse expression of these habitats in the north-facing sandstone outcrops on the upper slopes above the Coon Den Bluff bordering the south side of Bryant Creek. The dolomite and sandstone outcrops associated with ravine bottoms, including small intermittent waterfalls and pool features, also provide unique microhabitats and are vulnerable to erosional and sedimentation issues.

2. The massive dolomite bluffs of Coon Den Bluff and Pearce Bluff along the south side of Bryant Creek are unique features and provide habitat for several lichens not found elsewhere in the park, including species such as *Caloplaca flavocitrina* and *Leproplaca chrysodeta*. This bluff system ranges from open dolomite exposures to mesic shaded dolomite habitats on the lower bluff, with significant inclusions of chert and cherty dolomite bedrock. There are also a few old-growth *Juniperus virginiana* on the bluff summits, particularly on Pearce Bluff, which should be protected. The only major threat to this feature is the potential for woodland disruption on the steep slopes above the bluff to result in extensive erosion and impacts to the bluff summit.
3. The dolomite glade complex straddling highway N near the west edge of the park contains a disproportionate number of lichen taxa not found elsewhere in the park. These lichens often have extremely specific microhabitat conditions, in terms of substrate, humidity levels, exposure, and light. Even subtle changes in these features can result in decline or loss of cryptogams in an area (Ladd 2020). Once lost from a system because of disturbance or site changes, these same lichens are often incapable of recolonizing a site even over a period of decades.
4. Rich mesic woodlands in steeply sloping coves, particularly along the slopes above Bryant Creek, harbor old growth trees and several restricted lichen taxa, and represent a habitat type and condition seldom found in the contemporary landscape.
5. The extensive, broad, wooded floodplains in the mid and lower portions of several of the major ravines, such as Major Hollow and Pike Hollow, provide critical habitat for a suite of woodland lichens associated with mesic habitats.

Management and restoration activities at the park should attempt to maintain microhabitat conditions, habitat integrity, and landscape connectivity. In particular, the fire management that is an essential ecological process for the long-term synecological integrity of woodland and glade systems in the park should be insightfully implemented to minimize adverse effects to cryptogam populations. These considerations are even more critical in that current fuel loads and configurations in the area are unlike their pre-Eurosettlement conditions, with potentially severe adverse consequences if these differences are not taken into account. For instance, the loss of contiguous fine fuels in most of the woodlands, accompanied by an increase in heavy fuels, can result in hotter fires with longer residence times and more smoke production. Many lichens are extremely sensitive to atmospheric contaminants, and could be negatively impacted in these situations. Similarly, heavy leaf litter accumulations on ravine slopes have the potential to create hot, smoky fires, especially under upslope headfire conditions, with the potential of impacting the unique suite of lichen species occupying sheltered faces of sandstone bluffs and linear outcrops on upper slopes.

For these reasons, fire management at the site, particularly in areas with high cryptogam diversity, should aim to minimize: 1) long residence time fire events, 2) prolonged production or persistence of heavy smoke, which has a known negative impact on many

species, and 3) intense fire with extreme flame lengths and high scorch heights. As much as possible in keeping with ecological management goals, fires should be conducted in drier fine fuels, but with higher fuel moistures in heavier (100+ hour) fuels to reduce their probability of ignition. Extensive upslope headfires should be avoided as much as possible in mesic ravines and on lower and mid slopes along the river. Fires should generally be restricted to dormant season events, especially given increasing anecdotal evidence of the damages of even early spring fires in local systems.

As the park is developed for public use, care should be taken to protect the most sensitive areas and resources. To the extent that major infrastructure development occurs, such as roads, campgrounds, and buildings, it should be located in previously impacted sites and designed to minimize off-site perturbations and maintain watershed integrity, precluding altered hydrology and associated erosion, or serving as vectors for invasive species. The only area of the park north of Highway N suitable for development is the old pasture and residence complex near the north end of Douglas County 337-D. The ridge and ravine topography through much of the park, especially north of highway N, is highly sensitive to erosion from even moderate road and trail development, particularly on side slopes and at the summits and bases of bluffs and linear outcrop systems; many of the most visually striking rock outcrops and cliffs are extremely sensitive to impacts from constant foot traffic. Public use should be designed to keep visitors on carefully designed trails, including the use of walkways and railings where appropriate to protect sensitive cryptogam habitats. Activities such as bouldering and rock climbing should be prohibited in the park, and equestrian use, if allowed at all, should be confined to the more gently sloped portions of the areas of the park south of highway N.

In the aggregate, Bryant Creek State Park provides a unique biological and aesthetic resource exemplifying a phase of the Ozark landscape not well represented in current conservation protection. Included in this is a diversity and abundance of lichens that contribute to both overall ecosystem integrity and function, and enhance the visual character of landscapes throughout the park.

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Literature Cited

- Advaita, M.K., C.A. Morse & D. Ladd. 2016. Lichens, lichenicolous fungi, and allied fungi of Pipestone National Monument, Minnesota, U.S.A., revisited. *Opuscula Philolichenum* 15: 56-81.
- Arup, U., U. Söchting, & P. Frödén. 2013. A new taxonomy of the family Teloschistaceae. *Nordic Journal of Botany* 31: 16-83.
- Brodo I.M., S.D. Sharnoff & S. Sharnoff. 2001. *Lichens of North America*. Yale University Press, New Haven, CT. xxiv + 795 pp.
- CNALH. 2022. Consortium of North American Lichen Herbaria. <http://lichenportal.org/portal/>. [Accessed 25 March 2022]
- Culberson, C.F. 1972. Improved conditions and new data for the identification of lichen products by a standardized thin-layer chromatographic technique for lichen products. *Journal of Chromatography* 72: 113-125.
- Culberson, C.F. 1974. Conditions for the use of Merck silica gel 60 F254 plates in the standardized thin-layer chromatographic technique for lichen products. *Journal of Chromatography* 97: 107-108.
- Culberson, C.F. & A. Johnson. 1982. Substitution of methyl tert.-butyl ether for diethyl ether in the standardized thin-layer chromatographic method for lichen products. *Journal of Chromatography* 238: 483-487.
- Esslinger, T.L. 2021. A cumulative checklist for the lichen-forming, lichenicolous and allied fungi of the continental United States and Canada, version 24. *Opuscula Philolichenum* 20: 100-394.
- Etayo J. 2017. Hongos liquenícolas de Ecuador. *Opera Lilloana* 50: 1-535.
- Harris, R.C. & D. Ladd. 2005. Preliminary draft: Ozark lichens, enumerating the lichens of the Ozark highlands of Arkansas, Illinois, Kansas, Missouri, and Oklahoma. Published for the 14th Tuckerman Lichen Workshop, Eureka Springs, Arkansas. Corrected printing November 2005, 249 pp.
- Kirk, P.M. 2022. Species Fungorum version Jan 2016. In: Y. Roskov, L. Abucay, T. Orrell, D. Nicolson, C. Flann, N. Bailly, P. Kirk, T. Bourgoin, R. E. DeWalt, W. Decock, & A. De Wever (eds.), *Species 2000 & ITIS Catalogue of Life, 2016 Annual Checklist*. <http://www.speciesfungorum.org/>. [Accessed 25 March 2022]
- Ladd, D. 1996a. Checklist and bibliography of Missouri lichens. *Missouri Department of Conservation Natural History Series* 4: 92 pp.
- Ladd, D. 1996b. Lichen assessment and monitoring in two oak woodlands, Mark Twain National Forest, Missouri. Final Report, USDA Forest Service contract 40-64R7-3-50. 68 pp.
- Ladd, D. 2003. Lichens of Cuivre River State Park, Lincoln County, Missouri. Report to Missouri Department of Natural Resources. 37 pp.

- Ladd, D. 2009. Lichens and related fungi of Pine Bluff Arsenal, Arkansas. *Opuscula Philolichenum* 7: 101-120.
- Ladd, D. 2019. Lichen survey of Johnson's Shut-In State Park, Reynolds Co., Missouri. NatureCITE report to Missouri Department of Natural Resources under contract 4NRP-10192018. 36 pp.
- Ladd, D. 2020. It's the small things that matter: cryptogam conservation and Natural Areas. *Missouri Natural Areas Newsletter* 20(1): 33-39.
- Ladd, D. & C.A. Morse. 2022. A new species of *Phaeocalicium* (Mycocaliciaceae) on black walnut in central North America. *Bryologist* 125(1): 36-42.
- Lendemer, J.C., R.C. Harris & E.A. Tripp. 2013. The Lichens and Allied Fungi of Great Smoky Mountains National Park. *Memoirs of the New York Botanical Garden* 104: vii + 156 pp.
- McCarty, K. 2021. Bryant Creek State Park natural resource management plan. Jefferson City: Missouri Department of Natural Resources, Division of State Parks. 87 pp.
- Nelson, P.W. 2021. The flora of Bryant Creek State Park, Douglas County, Missouri. Report to Missouri Department of Natural Resources, Division of State Parks. 172 pp.
- Nigh, T.A. & W.A. Schroeder. 2002. Atlas of Missouri ecoregions. Missouri Department of Conservation, Jefferson City. xii + 212 pp.
- Orange, A., P.W. James & F.J. White. 2001. Microchemical methods for the identification of lichens. *British Lichen Society*. 101 pp.
- Peck, J.E., J. Grabner, D. Ladd & D.R. Larsen. 2004. Microhabitat affinities of Missouri Ozarks lichens. *Bryologist* 107(1): 47-61.
- Spribille, T., A.M. Fryday, S. Pérez-Ortega, M. Svensson, T. Tønsberg, S. Ekman, H. Holien, P. Resl, K. Schneider, E. Stabentheiner, H. Thüs, J. Vondrák & L. Sharman. 2020. Lichens and associated fungi from Glacier Bay National Park, Alaska. *Lichenologist* 52(2): 61-181.
- Waters, D.P. & J.C. Lendemer. 2019. The lichens and allied fungi of Mercer County, New Jersey. *Opuscula Philolichenum* 18: 17-51.
- Wetmore, C.M. 1987. Lichens and air quality in Boundary Waters Canoe Area of the Superior National Forest. Final Report, USDA Forest Service contract 43-63A9-5-867. ii + 40 pp.
- Wetmore, C.M. 1988. Lichens and air quality in Apostle Islands National Lakeshore. Final report, U.S. National Park Service contract CX0001-22-0034. ii + 40 pp.
- Wetmore, C.M. 1991. Lichens and air quality in Okefenokee National Wildlife Refuge. Final Report, U.S. Fish and Wildlife Service contract 14-16-0009-1566 #4. ii + 37 pp.
- Wetmore, C.M. 1992. Lichens and air quality in Hercules Glades Wilderness of Mark Twain National Forest. Final Report, USDA Forest Service contract 42-649. ii + 29 pp.
- Wetmore, C.M. 2001. Lichens and air quality in Caney Creek and Upper Buffalo River wilderness areas. Final report, USDA Forest Service purchase order 08-99-09-CCS-008. i + 33 pp.
- Wetmore, C.M. & J.P. Bennett. 2002. Lichens and air quality in Hot Springs National Park. Report to U.S. National Park Service under purchase order 1MWSA00129. 29 pp. + appendix.
- Wilhelm, G. 2021. Lichens of the Southern Lake Michigan Region. Unpublished report, Conservation Research Institute, Sandpoint, ID. 207 pp.

Appendix 1: Annotated list of the lichens, lichenicolous fungi, and select associated fungi of Bryant Creek State Park.

Taxa in the list are arranged alphabetically by genus, largely following the nomenclature and authorities of Esslinger (2021), or, for some non-lichenized taxa, Index Fungorum (Kirk 2022). Provisional names for some undescribed taxa follow Harris and Ladd (2005). For each taxon, a brief summary of general habitat affinities and substrates is provided; this information is based solely on occurrences within Bryant Creek State Park and may not reflect ecological proclivities for the taxa elsewhere. Each taxon is also assigned a qualitative assessment of abundance within the park at the time of study, along a relative conceptual spectrum of **rare**, **uncommon**, **occasional**, **common**, **abundant** (see text for definitions of categories). Taxonomic, chemical, and other issues are discussed for individual species where relevant. Application of names for some genera, notably *Caloplaca* s.l. and *Verrucaria*, is tentative, as there is considerable uncertainty about taxonomy and application of existing names for local material in these groups. The genus *Caloplaca* is in the process of being divided into multiple genera (e.g., Arup et al. 2013), but the process is incomplete, so all taxa are included under *Caloplaca* in this list, with revised names included in brackets as appropriate. Collection numbers for voucher specimens are provided in brackets at the end of the entry for each taxon; some as yet undetermined specimens are not included. All collection numbers are those of the author. Specimens are held at the herbarium of the Missouri Botanical Garden (MO) pending final disposition. Note that the number of collections for a given taxon depends on multiple unrelated factors and is not associated with local abundance. Taxa preceded by an asterisk (*) are nonlichenized fungi; those preceded by a dagger (†) are lichenicolous fungi.

†*Abrothallus cladoniae* R. Sant. & D. Hawksw. --- Uncommon, but possibly overlooked; parasitizing apothecia and sometimes thallus squamules of *Cladonia peziziformis*. [35767]

Acarospora americana H. Magn. --- Rare; known from exposed sandy dolomite along a roadbank. [35834B]

Acarospora atromarginata *sensu* Harris & Ladd (2005) --- Known only from a single record in the park, on an exposed chert ledge; possibly rare, but potentially overlooked and more common than indicated by observations. [35824]

Acarospora tuckerae K. Knudsen --- Rare and local; restricted to exposures of chert and sandstone on bluff summits and in glades. [36087]

Agonimia flabelliformis Halda, Czarnota & Guzow-Krzemińska --- Uncommon; in somewhat mesic sites, on shaded bryophytes growing over decorticate logs and sandstone outcrops. [35786]

Agonimia opuntiella (Buschardt & Poelt) Vězda --- Occasional; on shaded bryophyte mats growing over dolomite and sandstone outcrops and ledges, tree bases, and established stable moss mats over soil in wooded uplands. [35949]

Agonimia sp. #1 *sensu* Harris & Ladd (2005) --- Occasional in habitats and substrates similar to those for *Agonimia opuntiella*. [35907, 35944, 35947]

- **Agyrium rufum*** (Pers.) Fr. --- Uncommon on decorticate conifer wood of dead branches, standing snags and fallen logs; typically on *Juniperus virginiana*, and rarely on *Pinus echinata*. [35470, 36073]
- Alyxoria varia*** (Pers.) Ertz & Tehler --- Common on bases and lower boles of a variety of softer-barked hardwoods, often in sheltered areas with minimal direct wetting, and typically in somewhat mesic microhabitats. Common substrates include *Gymnocladus dioica*, *Nyssa sylvatica*, *Quercus* section *Quercus* (white oak group), and *Ulmus americana*. There is considerable variation in the shape and pruinosity of local populations, which range from narrowly lirelliform to broadly oval, and from virtually epruinose to densely beset with greenish yellow pruina. [35673, 35814, 35869, 35892, 35894, 35925]
- Amandinea 'lignicola'*** *sensu* Harris & Ladd (2005) --- Known only from a single occurrence on the weathered cut at the top of an old wooden fence post bordering an overgrown old pasture. [35657]
- Amandinea polyspora*** (Willey) E. Lay & P. May --- Occasional on small twigs of hardwoods, typically in exposed sites and along woodland edges. [35692]
- Amandinea punctata*** (Hoffm.) Coppins & Scheid. --- Common, particularly on scales of old fallen cones of *Pinus echinata*, almost always in association with *Lecanora strobilina*. *Amandinea punctata* also occurs occasionally on decorticate *Pinus* logs and bark of living pine trees. [35654, 35808, 35916]
- **Amphisphaeria bufonia*** (Berk & Broome) Ces. & DeNot. --- Occasional on shaded boles of *Quercus alba* in woodlands. [35695]
- Anaptychia palmulata*** (Michaux) Vainio --- Uncommon and widely scattered in woodlands in the park, occurring on mesic, lightly shaded, mossy, sandstone outcrops and chert boulders, as well as (often mossy) bases of mature hardwoods. [35863, 35948]
- Anisomeridium biforme*** (Borrer) R.C. Harris --- Apparently rare, although in the field seemingly identical to the more common *A. polypori*, so perhaps overlooked. Known only from the lower bole of a large *Nyssa sylvatica* in a mesic cove above Bryant Creek. [sub 36211 (*Opegrapha* sp. #2)]
- Anisomeridium distans*** (Willey) R.C. Harris --- Occasional on lightly shaded sandstone in wooded uplands, typically occurring on horizontal surfaces of boulders and low outcrops. This inconspicuous taxon is never abundant at a given site, and typically occurs as small areas of scattered perithecia. [35716, 36165]
- Anisomeridium polypori*** (Ellis & Everh.) M.E. Barr --- Uncommon on shaded boles of hardwoods in mesic habitats such as ravines. Typical substrates include *Carya cordiformis* and various red oaks (*Quercus* section *Lobatae*). [35895, 36131]
- Anzia colpodes*** (Ach.) Stizenb. --- Rare; known only from the lightly shaded bole of a mature *Quercus velutina* in an open wooded upland on the south side of the park. [35492]
- Arthonia anglica*** Coppins --- Common on hardwood boles in mesic woodlands and along shaded drainages, often growing on smooth-barked trees such as *Amelanchier arborea* and *Carpinus caroliniana*; also known from *Morus rubra* and *Quercus* section *Lobatae*. [35736, 35890]

- Arthonia diffusa*** Nyl. --- Rare on bases of a few large canopy *Nyssa sylvatica* on steep, mesic, wooded cove slopes along Bryant Creek. [35452]
- Arthonia 'fontana'*** *sensu* Harris & Ladd (2005) --- Rare; known only from the bole of an *Amelanchier arborea* on a wooded upland slope, associated with *Buellia erubescens*, *Flavoparmelia caperata*, *Lecidea varians*, *Lecanora hybocarpa*, *Lecanora subpallens*, and *Physcia americana*. [35788]
- Arthonia susa*** R.C. Harris & Lendemer --- Common on lightly shaded branches and upper boles of hardwoods, often in the canopy layer, although boles of subcanopy *Acer rubrum* are also a frequent host. [35738, 35887]
- **Arthonia* sp.** --- This non-lichenized fungus is common on exposed twigs and small branches of a variety of hardwoods, often along edges and in openings and glades. It appears similar to *Arthonia quintaria* Nyl. which has 5-septate, macrocephalic ascospores, whereas all material seen from the park has non-macrocephalic, 3-septate ascospores ca. 17-22 × 5.5-7.5 µm. This concept was segregated into *Arthonia* sp. # 17036 and *Arthonia* sp. #44474 in Harris and Ladd (2005); the two elements appear to intergrade completely and probably represent a single taxon of uncertain relationship with *A. quintaria*. Only fertile material is reported here; most material in the park is sterile and thus impossible to determine with certainty. [35687, 35744, 35810, 35843]
- Arthothelium spectabile*** (Flotow) A. Massal. --- Uncommon on hardwood boles in lightly shaded mesic sites, such as along streams near woodland openings. Substrates include *Asimina triloba*, *Celtis occidentalis*, and *Nyssa sylvatica*. [35606, 35747]
- Aspicilia cinerea*** (L.) Körber --- Occasional on lightly shaded sandstone and chert boulders and outcrops in wooded uplands. [35823, 36054, 36088, 36120]
- Bacidia circumspecta*** (Nyl. ex Vainio) Malme --- Common; in shaded habitats on branches and occasionally boles of a variety of hardwoods as well as on both living and decorticate branches of *Juniperus virginiana*. This species occurs in intact woodlands, seral sites, and along woodland edges. [35568B, 35676B, 35679, 35842, 36070]
- Bacidia diffracta*** S. Ekman --- Although this lichen is regionally common, within the park it appears to be an uncommon species, occurring on lower boles of *Fraxinus*, *Juniperus virginiana*, and *Quercus alba*. [35846, 36112A]
- Bacidia eckmaniana*** R.C. Harris, Lendemer & Ladd --- Rare; known only from braches of *Asimina triloba* in the wooded floodplain along Bryant Creek. [35741]
- Bacidia granosa*** (Tuck.) Zahlbr. --- At the park, this species is restricted to shaded dolomite boulders and outcrops, where it is common to locally abundant in both in intact and disturbed sites. [35519, 35527, 35830]
- Bacidia polychroa*** (Th. Fr.) Körber --- Occasional in dry-mesic and mesic sites, on softer-barked hardwoods such as *Celtis*, *Nyssa*, and *Quercus* section *Lobatae* (red oak group). [35575, 35746]

- Bacidia schweinitzii*** (Fr. ex Tuck.) A. Schneider --- Common and often forming extensive patches on boles and bases of a wide variety of hardwoods in mesic and dry mesic woodlands, especially on lower slopes along streams and drainages. [35571, 35600, 35742, 35891, 35952, 36130]
- Bacidia suffusa*** (Fr.) A. Schneider --- Occasional, although locally frequent in some areas, growing on boles and sometimes branches of a variety of hardwoods, usually in mesic woodlands in ravines and along floodplains; also found once on a lightly shaded mesic dolomite ledge. [35568A, 35668, 35787, 35790, 35888]
- Bacidina delicata*** (Leighton) V. Wirth & Vězda --- Presumably common, but often vegetative or possessing only subconical pale pycnidia and thus overlooked; growing on tree bases, logs, and shaded siliceous boulders, usually in somewhat mesic microhabitats. [35714, 35749, 35784]
- Bacidina egenula*** (Nyl.) Vězda --- Known only from old, shaded bricks and mortar at the residence site. [35807]
- Bagliettoa calciseda*** (DC.) Gueidan & Cl. Roux --- Uncommon and restricted to lightly shaded dolomite outcrops, typically bordering openings such as glades. [36092]
- Biatoridium lasiothecium*** (C.A. Morse & Lendemer --- Uncommon and inconspicuous; on bases and lower boles of *Quercus* section *Quercus* in woodlands. [35555]
- Bilimbia sabulaetorum*** (Schreber) Arnold --- Occasional on lightly shaded terricolous mosses and stabilized humus, the latter typically needle humus under *Juniperus virginiana*. [35702, 35725]
- Botryolepraria lesdainii*** (Hue) Canals, Hernández-Mariné, Gómez-Bolea & Llimona --- Occasional and sporadic, occurring in sheltered crevices of mesic dolomite outcrops and lower portions of shaded dolomite bluff faces; particularly associated with the massive dolomite cliff system along the south side of Bryant Creek. Also found once in a deep sheltered cavity of a large old-growth *Nyssa sylvatica* on a mesic wooded slope above Bryant Creek. [35942]
- Bryobilimbia hypnorum*** (Lib.) Fryday, Printzen & S. Ekman --- Apparently rare; known only from a single site, growing over mossy humus of juniper needles in an overgrown dolomite glade. At first glance, the grayish thallus on needle humus appear identical to that of the more common *Bilimbia sabulaetorum*, so this species may be overlooked at the site. [36086]
- Buellia erubescens*** Arnold --- Abundant; characteristic of and typically occurring on exposed to lightly shaded hardwood twigs in woodlands, but less commonly occurring on boles of a variety of hardwoods and rarely on *Juniperus* branches. All material examined from the park contains norstictic acid. [35572, 35739]
- Buellia maculata*** Bungartz --- Abundant in wooded uplands throughout the park; a characteristic lichen of lightly shaded siliceous boulders and cobbles – especially chert although also on sandstone. Seldom occurring on large bluffs and ledges of these same substrates. [35711, 35816]
- Buellia spuria*** (Schaerer) Anzi --- Occasional on exposed to very lightly shaded siliceous rocks along bluff summits and woodland edges in uplands. [35822, 35834A, 36093]

- Buellia cf. vilis*** Th. Fr. --- Known only from the shaded face of a sandstone outcrop on a dry-mesic wooded slope, associated with *Anisomeridium distans* and *Thelopsis rubella*. According to CNALH (2022), the nearest records of this species are in southern Wisconsin and eastern Colorado. The name is applied here tentatively, and refers to a *Buellia* with a completely endolithic thallus, small apothecia to 0.25 mm broad, a dark brown epihymenium from the expanded, pigmented tips of the paraphyses, a pale hypothecium and thin-walled, 2-celled, pigmented ascospores ca. $9 \times 4.5 \mu\text{m}$. The hymenium is IKI+ blue, while the exciple is IKI-. In many respects, this specimen resembles a diminutive *Amandinea punctata*, but the conidiospores are ellipsoid and ca. $5 \times 2.2 \mu\text{m}$. [35774]
- Calicium abietinum*** Pers. --- Rare; known only from an old, lightly shaded, decorticate stump of *Pinus echinata* in an open wooded. [sub 36203 (*Xylopsora friesii*)]
- Calcium salicinum*** Pers. --- Rare; known only from standing decorticate hardwood snags in woodlands at a few scattered sites in the park. [35564]
- Caloplaca camptidia*** (Tuck.) Zahlbr. [= *Phaeoplaca camptidia* (Tuck.) S  chting, Arup & Bungartz] --- Occasional on boles, and sometimes branches, of hardwoods in woodlands. [35684A, 35852]
- Caloplaca cerina*** (Ehrh. ex Hedw.) Th. Fr. --- Common on lightly shaded to exposed twigs and branches of hardwoods and *Juniperus virginiana*, mostly on canopy branches, along woodland edges, or in stands of young regrowth. [35496]
- Caloplaca chrysophthalma*** Degel. [= *Solitaria chrysophthalma* (Degel.) Arup, S  chting & Fr  d  n] --- Uncommon on lightly shaded lower boles of white oaks (*Quercus* section *Quercus*) and *Juniperus virginiana*; typically on ridges and borders of woodland openings. [35670]
- Caloplaca conversa*** (Kremp.) Jatta --- Uncommon on exposed to lightly shaded chert, typically on chert nodules and boulders on dolomite. [35505]
- Caloplaca crenulatella*** (Nyl.) H. Olivier [= *Xanthocarpia crenulatella* (Nyl.) Fr  d  n, Arup & S  chting] --- Known only from a single occurrence on old concrete in an overgrown abandoned pasture. [35645]
- Caloplaca flavocitrina*** (Nyl.) H. Olivier [= *Flavoplaca flavocitrina* (Nyl.) Arup, Fr  d  n & S  chting] --- Although not vouchered from the park, there is a large population on a sheltered, massive face of cherty dolomite midway up the inaccessible face of Pearce Bluff, 36.8389  N 92.4197  W.
- Caloplaca flavovirescens*** (Wulfen) Dalla Torre & Sarnth. [= *Gyalolechia flavovirescens* (Wulfen) S  chting, Fr  d  n & Arup] --- Common on shaded rocks, including chert, dolomite and sandstone, in all but the driest habitats throughout the park. [35529]
- Caloplaca microphyllina*** (Tuck.) Hasse [= *Tayloriellina microphyllina* (Tuck.) S  chting & Arup] --- Rare; known only from weathered end grain on the tops of unshaded decorticate fence posts along an abandoned pasture, and once on an old decorticate branch stub on *Pinus echinata*. [35656]
- Caloplaca pollinii*** (A. Massal.) Jatta [= *Huneckia pollinii* (A. Massal.) S.Y. Kondr. et al.] --- Uncommon and local; on exposed to lightly shaded twigs of *Juniperus virginiana* in overgrown dolomite glades and along glade edges. [36181]

- Caloplaca pyracea*** (Ach.) Zwackh [= *Athallia pyracea* (Ach.) Arup, Frödén & Søbchting] --- Known only from the base of a large *Ulmus americana* in a mowed yard at the old residence site in the park. [35675]
- Caloplaca sideritis*** (Tuck.) Zahlbr. --- Occasional on exposed to lightly shaded boulder and outcrops; occurring on both sandstone and chert. [35649, 35650]
- Caloplaca subsoluta*** (Nyl.) Zahlbr. [= *Squamulea subsoluta* (Nyl.) Arup, Søbchting & Frödén] --- Common and locally abundant on all types of rocks as well as on concrete and even old asphalt shingles; in exposed to very lightly shaded conditions ranging from intact habitats such as glades to disturbed clearings. This lichen occurs on all rock sizes, ranging from tiny pebbles to massive bedrock exposures. [35536, 35637, 35648]
- Candelaria concolor*** (Dickson) Stein --- One of the most common and widespread lichens at the park; Abundant and nearly ubiquitous on most corticolous substrates, ranging from exposed canopy twigs to shaded mossy tree bases and fallen logs, occurring on hardwoods, softwoods, and lignum. This species also occurs occasionally on both siliceous and calcareous rocks and concrete, rusty old ironwork, old asphalt shingles, and even long abandoned rubber tires. [35849A]
- Candelaria fibrosa*** (Fr.) Müll. Arg. --- Common on exposed small branches of hardwoods, occurring on both canopy branches and exposed lower branches along woodland edges, as well as colonizing small trees such as *Diospyros virginiana* and *Gleditsia tricanthos* in old fields and other successional sites. [35683, 35751]
- Candelariella xanthostigma*** (Ach.) Lettau --- Occasional in woodlands; on lightly shaded boles and larger branches of hardwoods, particularly *Carya* and *Quercus*. [35550, 35865]
- Candelariella xanthostigmoides*** (Müll. Arg.) R.W. Rogers --- Occasional on exposed to very lightly shaded branches of hardwoods, including canopy branches of large trees, as well as on exposed boles and branches of smaller trees in glades, clearings, and along woodland edges. [35689, 35803]
- Canoparmelia caroliniana*** (Nyl.) Elix & Hale --- Occasional on lightly shaded bases and boles of *Pinus echinata*; rarely on boles and bases of hardwoods associated with these pines. [35587A]
- Canoparmelia texana*** (Tuck.) Elix & Hale --- Common in lightly shaded sites in woodlands; on bases, boles, and larger branches of hardwoods and especially *Pinus echinata*, as well as infrequently on decorticate logs, old stumps, and sandstone boulders and outcrops in these habitats. [35586, 35663]
- Carbonicola anthracophila*** (Nyl.) Bendiksby & Timdal --- Uncommon on lightly shaded, old, resin-rich decorticate pine stumps in wooded uplands. [36108]
- Catillaria chalybeia*** (Borrer) A. Massal. --- Rare; known only from lightly shaded old bricks in a wall bordering the residential site. [35639]
- Catillaria nigroclavata*** (Nyl.) Schuler --- Occasional on exposed to lightly shaded twigs and branches of hardwoods and softwoods, sometimes growing on dead decorticate branches. [35849B, 36036]

Catinaria atropurpurea (Schaerer) Vězda & Poelt --- Rare but inconspicuous and possibly overlooked; known only from bases of mature *Quercus alba* in dry-mesic woodlands. [35559, 35800]

***Chaenotheca* sp.** --- One of the more remarkable discoveries of this study was the collection of a single calicioid ascoma with abundant bright yellow pruina on the capitulum, from a sheltered nook at the base of a large *Quercus stellata* in an open wooded upland. The thallus is pale, obscure, and appears to be mostly endophloidal. The entire ascoma is dark brown and 0.5 mm tall; the capitulum is 130 µm broad by 160 µm tall. Since there is only a single ascoma (associated with several characteristically smaller and narrower ascomata of *Chaenothecopsis debilis*), no attempt was made to section it. The most likely identity is *Chaenotheca hispidula*, a species known from the Rocky and Appalachian mountains and Great Lakes region, with a single 1879 record from central Illinois (the Illinois record was verified by Leif Tibell, a world authority in the genus). [35868]

****Chaenothecopsis debilis*** (Sm.) Tibell --- Occasional; known from sheltered areas on bases and boles of both *Quercus alba* and *Q. stellata*, as well as on decorticate standing hardwood snags. [35793, 35867, 35900]

****Chaenothecopsis nana*** Tibell --- Common on lightly shaded boles of mature *Pinus echinata* in wooded uplands. [35588]

****Chaenothecopsis perforata*** Rikkinen & Tuovila --- Uncommon and sporadic; restricted to knots and crevices of older stems of *Rhus copallina* in post-logging shrubby succession zones and along roadsides. [35479]

Chromatochlamys muscorum (Fr.) H. Mayrhofer & Poelt --- Rare although possibly overlooked; known only from one site in the southeast part of the park, growing on pleurocarpous bryophytes over a sandstone ledge on a west-facing, dry-mesic wooded slope. This material is characterized by ca. 2 spores/ascus, and is referable to var. *muscorum*. [36197]

Chrysothrix caesia (Flotow) Ertz & Tehler --- Common in high light intensities on twigs and branches and boles of hardwoods and softwoods, as well as occasionally on exposed softwood lignum including old lumber, often in areas with a history of disturbance. [35653]

Chrysothrix onokoensis (Wolle) R.C. Harris & Ladd --- Rare; occurring as a few small, widely scattered populations on shaded sheltered faces under overhangs of sandstone bluff outcrops in wooded uplands above Pearce Bluff; associated with *Lepraria normandinoides* and *Lepraria* sp. [usnic acid & zeorin]. This is the first report from Missouri. [36212]

Chrysothrix xanthina (Vainio) Kalb --- Occasional in light shade on boles of hardwoods and *Pinus echinata*, as well as on massive sandstone faces, always in sites protected from direct wetting, such as on the undersides of leaning hardwood boles and on bluff faces under overhangs. Despite the occurrence of extensive sheltered sandstone faces at the park, *Chrysothrix insulizans* R.C. Harris & Ladd, a characteristic species of these habitats in the region, has not been documented from the site. [35626, 35791A, 35965, 36149]

Circinaria caesiocinerea (Nyl. ex Malbr.) A. Nordin, Savić & Tibell --- Apparently rare, but in the field strongly resembling the more common *Aspicilia cinerea* and occurring in the same habitats, thus possibly overlooked; on lightly shaded chert in woodlands. [36216]

- Circinaria contorta*** (Hoffm.) A. Nordin, Savić & Tibell --- Rare; known only from a massive dolomite slab in a glade. [36095]
- Cladonia apodocarpa*** Robbins --- Common in well-drained, acidic, exposed to lightly shaded soils in wooded uplands and along woodland edges, in areas with limited vascular vegetation. This species also occurs on lightly shaded mossy sandstone. [35718]
- Cladonia chlorophaea*** (Flörke ex Sommerf.) Sprengel. --- Apparently rare; known from mosses over shaded dolomite boulders and cherty soil over dolomite. [35839, 35950]
- Cladonia coniocraea*** (Flörke) Sprengel --- Common in somewhat mesic lightly shaded sites, growing on decorticate logs, tree bases; also on mossy sandstone boulders and outcrops in mesic ravines. [35502]
- Cladonia cristatella*** Tuck. --- Uncommon on well-drained acidic soils, stable humus, and decorticate stumps and logs of oaks, pines, and junipers. [35660]
- Cladonia cryptochlorophaea*** Asahina --- Uncommon; in lightly shaded habitats, on mossy sandstone and well-drained, mossy, rocky soils. [35770]
- Cladonia cylindrica*** (A. Evans) A. Evans --- Although elsewhere in the region this is an occasional species of decorticate logs, the only known occurrence in the park is from fallen, mossy, old treated softwood utility poles along a woodland edge. [35662B]
- Cladonia furcata*** (Hudson) Schrader --- Common on acidic mossy soils and mossy sandstone outcrops, in areas with minimal competition from herbaceous vascular vegetation; *Cladonia subtenuis* is a characteristic associate in habitats with higher light intensities, but *C. furcata* also occurs in more densely shaded sites. [35717]
- Cladonia grayi*** G. Merr. ex Sandst. --- Common in open woodlands, on siliceous rocks and rocky, well-drained soils with sparse vascular vegetation, stable well-drained humus and bryophyte mats, bases and lower boles of both hardwoods and softwoods, and decorticate logs. Chemotypes both with and lacking fumarprotocetraric acid occur in the park. [35542, 35872]
- Cladonia macilenta*** Hoffm. var. ***bacillaris*** (Ach.) Schaerer --- Abundant on shaded, decorticate fallen logs and stumps in woodlands, growing on both hardwoods and softwoods. This species is also common on lightly shaded bases and lower boles of *Pinus echinata* and occasionally on other trees. [35604, 35781, 35854, 35875]
- Cladonia ochrochlora*** Flörke --- Common on lightly shaded, typically mossy, fallen logs, stumps, and tree bases, occurring on both corticolous and lignicolous substrates of both hardwoods and softwoods; also on mossy siliceous outcrops and boulders in woodlands. [35501, 35772, 35908, 35955]
- Cladonia parasitica*** (Hoffm.) Hoffm. --- Rare; on shaded decorticate hardwood logs on mesic wooded slopes. [36195]
- Cladonia petrophila*** R.C. Harris --- Common on lightly shaded, often mossy, sandstone in woodlands, typically on lower slopes and in ravine bottoms, occurring on large boulders, outcrops, and ledges. [35762, 35881, 35955, 35962, 35609, 35618]

- Cladonia peziziformis*** (With.) J.R. Laundon --- Abundant in exposed to lightly shaded sites, growing on well-drained soil, humus, stable leaf litter and moss mats, decorticate logs and stumps of both hardwoods and softwoods, tree bases, and less commonly, on both siliceous rocks and mossy dolomite. [35522]
- Cladonia piedmontensis*** G. Merr. --- Occasional on exposed gravelly soil derived from both chert and sandstone; also found once on an old, mossy, fallen softwood utility pole. [35544, 35661]
- Cladonia pleurota*** (Flörke) Schaerer --- Uncommon in wooded uplands; on lightly shaded mossy acidic soil, and on mossy sandstone outcrops. [35778]
- Cladonia ramulosa*** (With.) J.R. Laundon --- Occasional on shaded, rotting decorticate hardwood logs in woodlands. This species also occurs on shaded bases of oaks and pines. [35727, 35750, 35931]
- Cladonia ravenelii*** Tuck. --- Uncommon; restricted to *Pinus echinata* and usually on lightly shaded bases and lower boles of trees in wooded uplands. Given the abundance of pines in the park, this species is surprisingly uncommon, and almost always occurs as masses of sterile squamules. [36045]
- Cladonia robbinsii*** A. Evans --- Occasional in lightly shaded sites, growing on well-drained rocky soils and stable humus. This species also occurs with some regularity on thin cherty soil or needle humus over dolomite bedrock. [35540, 35871]
- Cladonia squamosa*** Hoffm. --- Occasional on massive, lightly shaded, often mossy, sandstone outcrops and bluffs in intact woodlands, in dry-mesic to mesic habitats. Interestingly, the morphologically similar *C. beaumontii*, which occurs in these same habitats locally, has not been documented from the park. [35961, 36105, 36127]
- Cladonia subcariosa*** Nyl., fumarprotocetraric acid strain [= *Cladonia sobolescens* Nyl. ex Vainio] --- Apparently rare; known from an exposed sandstone boulder in a small sandstone glade. [36200]
- Cladonia subcariosa*** Nyl., norstictic acid strain [= *Cladonia polycarpoides* Nyl.] --- Common on exposed to slightly shaded, acid, well-drained, gravelly soils, often in formerly disturbed sites, as well as on chert rubble and humus over dolomite and sandstone bedrock and mossy sandstone faces of outcrops and bluffs. [35539, 35771, 36090]
- Cladonia subradiata*** (Vainio) Sandst. --- Uncommon on lightly shaded decorticate softwood and hardwood logs in dry-mesic and mesic woodlands. [35563, 35662A, 36129]
- Cladonia subtenuis*** (Abbayes) Mattick --- Common in exposed to lightly shaded, well-drained, acidic gravelly soils and litter with sparse herbaceous vegetation, including woodland edges and openings, sparsely wooded ridges, sterile old fields, and roadbanks. This species also occurs on decorticate logs and siliceous ledges and bluff summits. [35543]
- Clavascidium lacinulatum*** (Ach.) M. Prieto --- Occasional in the park, but locally common in dolomite glades, occurring on open soil associated with dolomite bedrock and outcrops; in exposed to slightly shaded conditions. [35541, 35081]

Coccocarpia palmicola (Sprengel) Arv. & D.J. Galloway --- Occasional; on shaded, mesic, mossy sandstone of bluffs, ledges, and outcrops, as well as both sandstone and chert boulders and mossy bases and lower boles of hardwoods in these habitats. [35601]

Coenogonium luteum (Dickson) Kalb & Lücking --- Rare; known only from a single site in the park, growing on the bole of *Quercus velutina* in a wooded ravine. [36051]

Coenogonium pineti (Ach.) Lücking & Lumbsch --- Occasional in shaded woodland sites, growing on exposed roots, humus, tree bases, decorticate fallen logs, and over bryophytes. [35558, 35785]

Collema furfuraceum (Arnold) Du Rietz --- Occasional in mesic shaded habitats such as wooded ravine bottoms, growing on massive, often mossy, outcrops and boulders of both sandstone and dolomite. Although this species also occurs on corticolous substrates elsewhere in the region, all populations found in the park are saxicolous. [35441, 35906, 35190]

Collema nigrescens (Hudson) DC. --- Rare; found once on the base of *Quercus velutina* in a wooded upland. [36172]

Collema pustulatum Ach. --- Rare; on lightly shaded dolomite outcrops bordering glades. [36189]

Collema subflaccidum Degel. --- Common on lightly shaded, often mossy, boles of hardwoods and *Juniperus virginiana* in mesic to upland sites. [35597]

Collema texanum Tuck. --- Uncommon and restricted to exposed to lightly shaded dolomite outcrops in and bordering glades. [35553, 36099]

Crespoa crozalsiana (B. de Lesd. Ex Harm.) Lendemer & Hodgkinson --- Uncommon and widely scattered; on lightly shaded hardwood boles. [36173]

Cresponea premnea (Ach.) Egea & Torrente var. ***saxicola*** (Leighton) Egea & Torrente --- Uncommon and restricted to lightly shaded, sheltered, somewhat mesic faces of extensive sandstone bluff outcrops such as those along the upper slopes above the south side of Bryant Creek. [35910]

Cystocoleus ebeneus (Dillwyn) Thwaites --- Rare and restricted to lightly shaded, deeply sheltered sandstone faces under overhangs of massive low bluffs, in sites protected from direct wetting. [35449]

Dermatocarpon arenosaxi Amtoft --- Uncommon on lightly shaded sandstone bedrock, such as at the heads of small intermittent waterfalls in ravines. This is a common and characteristic species of sandstone habitats, but despite the plethora of sandstone bedrock in the park, most of it is too shaded to provide habitat for this species. [35612]

Dermatocarpon dolomiticum Amtoft --- Uncommon and restricted to low, typically flat, dolomite exposures in glades. [35531]

Dermatocarpon muhlenbergii (Ach.) Müll. Arg. --- Common and scattered; occurring on lightly shaded, often vertical, dolomite and sandstone ledges, outcrops, and large boulders in light to moderate shade. [35528]

Diploschistes scruposus (Schreber) Norman --- Known only from sandstone boulders in small sandstone glade openings on the north slopes above Pike Hollow. [36199]

- Dirina* sp.** --- Common but restricted to massive sandstone faces in microhabitats with moderate to high light intensities but protected from direct wetting; *Dirinaria frostii* is a common associate. Ozark occurrences of this taxon were previously identified as *Dirina massaliensis* Durieu & Mont. f. *sorediata* (Müll. Arg.) Taylor, but that name applies to a taxon of calcareous rocks, and the taxonomic status of local material is uncertain. [35453]
- Dirinaria frostii*** (Tuck.) Hale & W.L. Culb. --- Common on massive sandstone exposures, growing on faces under overhangs and other areas with relatively high light intensity and protection from direct wetting. [35623]
- Enchylium bachmanianum*** (Fink) Otálora, P.M. Jørg. & Wedin --- Apparently rare; collected once from a mossy dolomite outcrop on a mesic wooded slope. [35878]
- Enchylium coccophorum*** (Tuck.) Otálora, P.M. Jørg. & Wedin --- Common; typically growing on thin soil, humus, or bryophytes over dolomite, but sometimes growing directly on lightly shaded dolomite. [35516, 35545, 36082]
- Enchylium conglomeratum*** (Hoffm.) Otálora, P.M. Jørg. & Wedin --- Uncommon; on lightly shaded to exposed boles of *Fraxinus*, *Quercus alba*, and *Q. stellata* in uplands and along edges of glades and openings. [35924]
- Enchylium polycarpon*** (Hoffm.) Otálora, P.M. Jørg. & Wedin --- Rare on lightly shaded dolomite outcrops and boulders in uplands. [36100]
- Endocarpon pallidulum*** (Nyl.) Nyl. --- Common but nowhere abundant; on shaded, often mossy, sandstone, dolomite, and tree bases, as well as on old shaded concrete and mossy soil. [35879]
- †Erythricium aurantiacum*** (Lasch) D. Hawksw. & A. Henrici --- Uncommon; parasitizing thalli of *Physcia millegreana*, *P. stellaris* and a juvenile thallus of *Parmotrema* sp. in lightly shaded disturbed areas near the old residence site. Although it is likely widespread and overlooked in the region, according to CNALH (2022), this taxon has been documented from only on other site in the region, near St. Louis, with the closest other location in central Ohio. [36034]
- Fellhanera silicis*** R.C. Harris & Ladd --- Common on lightly shaded sandstone and chert in woodlands, typically on boulders and cobbles of all sizes. Interestingly, this species is not known to occur on massive ledges and cliffs of these same substrates. [35836, 35903, 36136, 36170]
- Flavoparmelia baltimorensis*** (Gyelnik & Fóris.) Hale --- Abundant on lightly shaded sandstone in uplands, growing on boulders, outcrops, and sometimes on moss mats growing over sandy soil and sandstone; *Myelochroa galbina* and *Pertusaria plittiana* are common associates. This species also occurs rarely on mossy tree bases in purlieus to saxicolous populations. [35628]
- Flavoparmelia caperata*** (L.) Hale --- Abundant on all corticolous and lignicolous substrates, including bases, boles, larger limbs, and sometimes branches of both hardwoods and softwoods, as well as on old decorticate stumps and logs. [35481]

- Fuscopannaria leucosticta*** (Tuck.) P.M. Jørg. --- Uncommon and restricted to lightly shaded, mossy faces of sandstone outcrops, cliffs, and large boulders in mesic habitats on wooded slopes. [35956, 36146]
- Gassicurtia vernicoma*** (Tuck.) Marbach --- Occasional on lightly shaded sandstone of massive boulders and outcrops, almost always occurring with *Pertusaria plittiana*. [35627]
- Gomphillus americanus*** Essl. --- Rare; known only from two localities, both over mosses on low, lightly shaded sandstone boulders. [35937]
- Graphis scripta*** (L.) Ach. --- Abundant on a variety of shaded hardwoods throughout the park, in sites ranging from dry to mesic. This species occurs all portions of trees, ranging from small branches to bases of large boles. This lichen is characteristic on smooth-barked trees such as *Acer rubrum*, *Amelanchier arborea*, and *Carpinus caroliniana*, but grows on a variety of trees and shrubs, and is among the most shade-tolerant lichens in the region. [35487A, 35789]
- Gyalecta* sp. #1** *sensu* Harris & Ladd (2005) --- Uncommon and restricted to shaded, seepy or seasonally seepy, dolomite faces and ledges in mesic habitats. [35703, 36191]
- Hertelidea pseudobotryosa*** R.C. Harris, Ladd & Printzen --- Rare on weathered decorticate *Pinus echinata* stumps and logs in lightly shaded to exposed uplands. [sub 36203 (*Xylopsora friesii*)]
- Heterodermia granulifera*** (Ach.) W.L. Culb. --- Occasional on lightly shaded lower boles of hardwoods, especially of the red oak group (*Quercus* section Lobatae). [35548]
- Heterodermia hypoleuca*** (Muhl.) Trevisan --- Uncommon; on lightly shaded boles and branches of hardwoods and especially *Juniperus virginiana* in wooded uplands and glade margins. [35458]
- Heterodermia obscurata*** (Nyl.) Trevisan --- Common on lightly shaded boles, bases, and larger lower branches of hardwoods, *Juniperus virginiana*, and sometimes on lightly shaded mossy chert or sandstone in woodlands. [35732]
- Heterodermia speciosa*** (Wulfen) Trevisan --- Even more common than *H. obscurata*, in similar habitats and substrates, but also occurring regularly on shaded, often mossy, sandstone, chert, and dolomite. [35435, 35560, 35923]
- †*Homostegia hertelii*** D. Hawksw., V. Atienza & M.S. Cole --- Occasional; parasitizing lightly shaded thalli of *Flavoparmelia baltimorensis*. [35445]
- Hyperphyscia syncolla*** (Tuck. ex Nyl.) Kalb --- Locally common on exposed to lightly shaded hardwood branches, and occasionally on boles of smooth-barked hardwoods such as *Celtis*; typically in mesic sites and wooded floodplains along Bryant Creek. [35574]
- Hypotrachyna livida*** (Taylor) Hale --- Abundant on canopy hardwood branches in intact woodlands; a characteristic canopy lichen on tree branches of the red oak group (*Quercus* section Lobatae). [35482, 35500]
- Hypotrachyna minarum*** (Vainio) Krog & Swinscow --- Despite the abundance of suitable habitats and substrates at the park —lightly shaded siliceous rocks in wooded uplands — this is an apparently rare species known only from a few isolated small populations on a sandstone outcrop and chert boulders. [36164].

- Hypotrachyna pustulifera*** (Hale) Skorepa --- Occasional on lightly shaded boles and larger branches of *Pinus echinata* in wooded uplands, and rarely on other trees in these habitats, such as *Sassafras albidum*. Also found once on the shaded, mossy vertical face of a massive sandstone slab. [35438, 35929, 36123]
- **Hysterium angustatum*** Pers. --- Occasional on lightly shaded twigs of *Vaccinium arboreum* in dry woodlands on ridges and upper slopes. [35580]
- **Hysterobrevium mori*** (Schwein.) Boehm & Schoch --- Known only from the lightly shaded boles of a large planted *Acer saccharinum* in the yards of the residence. [35813]
- Imshaugia aleurites*** (Ach.) S.F. Meyer --- Known only from a weathered, decorticate log of *Pinus echinata* in a sandstone glade, but likely rare on other exposures of pine lignum elsewhere in the park, and possibly on lignum or boles and larger branches of old-growth *Juniperus virginiana* along the summit line of Pearce Bluff, where were not safely accessible. [36202]
- Ionaspis alba*** Lutzoni --- Occasional in wooded uplands and along woodland edges, but cryptic and easily overlooked, as it blends perfectly with the small chert boulders that are its preferred substrate; also sometimes on small sandstone boulders in these habitats. [35759, 35957]
- **Julella fallaciosa*** (A. Massal.) Coppins --- Occasional in woodlands on exposed to lightly shaded boles of softer-barked trees such as *Nyssa sylvatica* and *Quercus alba*. [35561, 35748]
- Lecania croatica*** (Zahlbr.) Kotlov --- Uncommon on shaded boles of hardwoods in mesic woodlands, often on saplings and smaller trees; *Bacidia schweinitzii* is a common associate. [35756]
- Lecania turicensis*** (Hepp) Müll. Arg. --- Known only from old, weathered concrete in an old pasture. [35643]
- Lecanora hybocarpa*** (Tuck.) Brodo --- common in woodlands and more disturbed areas; on exposed to lightly shaded twigs, branches, and boles of a wide variety of hardwoods, and less commonly on branches of *Juniperus virginiana*. [35455, 35569, 36040, 36210]
- Lecanora imshaugii*** Brodo --- Uncommon on lightly shaded boles and branches of hardwoods in mesic woodlands; known from *Quercus* and *Celtis*. [35576, 35594, 36052]
- Lecanora minutella*** Nyl. --- Uncommon and restricted to bark and scales of old cones of *Pinus echinata* in wooded uplands. [35664, 36047]
- Lecanora nothocaesiella*** R.C. Harris & Lendemer --- Common on lightly shaded, sometimes mossy, boles and bases of hardwoods and *Juniperus virginiana* in woodlands, often along woodland edges or in sites with a history of previous disturbance. [35562, 35799]
- Lecanora oreinoides*** (Körber) Hertel & Rambold --- Uncommon and widely scattered; on exposed to lightly shaded siliceous rocks, including sandstone in wooded uplands and chert boulders on dolomite glades. [36124]
- Lecanora pseudistera*** Nyl. --- Rare on chert boulders in dolomite glades, typically associated with *Lecanora oreinoides*, *Psorula rufonigra* and *Xanthoparmelia* sp. [36217]

- Lecanora saxigena*** Lendemer & R.C. Harris --- Occasional on lightly shaded sandstone, occurring on boulders, outcrops, and bluffs. [35622, 35721, 35935]
- Lecanora strobilina*** (Sprengel) Keiffer --- Abundant on bark and wood of hardwoods and especially conifers in exposed to lightly shaded sites; rarely on lightly shaded chert boulders in woodlands. [35652, 35866, 35914A]
- Lecanora subimmergens*** Vainio --- Common on lightly shaded siliceous rocks, typically on boulders and outcrops of both chert and sandstone in wooded uplands. [35611, 35938]
- Lecanora subpallens*** Zahlbr. --- Abundant in dry-mesic and mesic woodlands, on lightly shaded boles and branches of hardwoods, especially smooth-barked trees including *Acer rubrum* and *Amelanchier arborea*. [35491, 35605, 35740]
- Lecanora thysanophora*** R.C. Harris --- Occasional on lower boles and bases of hardwoods in mesic sites in ravines and along floodplains. [35896]
- Lecanora valesiaca*** (Müll. Arg.) Stizenb. --- Uncommon and restricted to dolomite bedrock exposures in glades. [35535]
- Lecanora* sp.** --- Rare on sheltered faces under overhangs on the north-facing bluff outcrops just below the ridge above the south side of Bryant Creek. This species, which contains atranorin and gangaleoidin, was erroneously treated as *Lecanora cenisia* Ach. in Harris & Ladd (2005). [35621]
- Lecidea varians*** Ach. --- Abundant on exposed to lightly shaded branches and twigs, and less commonly boles, of hardwood trees and shrubs, as well as on branches and old cones of *Pinus echinata*, occurring in both disturbed areas and intact woodlands and glades. This lichen exhibits a bewildering diversity in the park, with some populations having densely pruinose apothecia, while other individuals are totally epruinose. Similar variability occurs in the presence of xanthonenes, with some individuals fluorescing UV^L + pinkish while many are UV^L-. [35487B, 35497, 35592, 35690, 35728, 36044]
- Lecidella euphorea*** (Flörke) Hertel --- Uncommon and widely scattered, occurring as small populations or single thalli on lightly shaded bark and wood of hardwood and softwood boles, limbs, and stumps. [35862, 35954]
- Lecidella stigmatea*** (Ach.) Hertel & Leuckert --- Occasional and widespread through the park, growing on exposed to lightly shaded chert and sandstone boulders and outcrops. [35512, 35761, 35776]
- Lempholemma polyanthes*** (Bernh.) Malme --- Rare; known only from two occurrences on shaded, mossy dolomite boulders on mesic wooded slopes. [35876]
- Lepra amara*** (Ach.) Hafellner --- Uncommon on lightly shaded boles of red oaks (*Quercus* section Lobatae), usually in mesic woodlands on lower slopes and in ravines; also collected once on a shaded sandstone boulder in a wooded upland. Local populations lack protocetraric acid. [36049, 36166]
- Lepra hypothamnolica*** (Dibben) Lendemer & R.C. Harris --- Common on lightly shaded branches of older *Juniperus virginiana*, and occasionally on lightly shaded boles and larger branches of a variety of hardwoods, especially *Quercus* and *Carya*. [35466, 35480, 35489, 35499]

- Lepra multipunctoides*** (Dibben) Lendemer & R.C. Harris --- Uncommon; occurring in the park as widely scattered populations, typically of a single thallus, on lightly shaded hardwood boles, usually in somewhat mesic sites on lower slopes and along drainages and Bryant Creek. [35591]
- Lepra pustulata*** (Brodo & W. Culb.) Lendemer & R.C. Harris --- Essentially restricted to intact woodlands, where it is abundant on all types of rocks and woody substrates, including bark and lignin, in moderate to light shade, in sites ranging from dry to mesic. [35504, 35595]
- Lepra thrachythallina*** (Erichsen) Lendemer & R.C. Harris --- Occasional on exposed to lightly shaded hardwood branches, typically in the canopy of intact woodlands. [35595]
- Lepraria caesiella*** R.C. Harris --- Apparently uncommon but possibly overlooked; on lightly shaded bases and lower boles of hardwoods in uplands. [35845]
- Lepraria finkii*** Lendemer, K. Knudsen & Elix --- Common in shaded, typically sheltered habitats, often in mesic or humid microhabitats; this is the most shade-tolerant lichen, and the most common species of *Lepraria*, in the park. Most frequently found on sheltered, shaded sandstone faces in wooded ravines and on north-facing slopes. Other substrates include moss mats, tree bases of both hardwoods and softwoods, mossy decorticate logs, sheltered soil banks, and shaded mossy dolomite and chert. [36043, 36060, 36069, 36116, 36117, 36121, 36147, 36150, 36169]
- Lepraria harrisiana*** Lendemer --- Rare; known only from decorticate branches on an old growth *Juniperus virginiana* at the summit of the massive dolomite bluff along the south side of Bryant Creek. [36109]
- Lepraria normandinoides*** Lendemer & R.C. Harris --- Characteristic of and locally abundant on lightly shaded massive sandstone, including bluff, outcrops, and large boulders; occurring on sheltered faces and other areas with moderately high light intensities but protected from direct wetting. [35775]
- Lepraria vouauxii*** (Hue) R.C. Harris --- This species has a similar abundance and habitat proclivity as *L. normandinoides* (above), with which it is usually associated, but *L. vouauxii* seems to be restricted to massive sandstone exposures, and is seldom found on even large sandstone boulders. [35617, 36148]
- Lepraria* sp.** [usnic acid and zeorin] --- restricted to shaded bluffs and massive outcrops of both sandstone and dolomite (including cherty dolomite strata and large boulders under bluff overhangs), typically in mesic microhabitats, where it is common and characteristic in sheltered, mesic microhabitats protected from direct wetting, usually under protecting overhangs, such as lower faces of vertical rock expanses. This apparently unnamed species, which can form large patches and sometimes occurs with other species of *Lepraria*, has a distinctive light green thallus and chemistry. [35526, 35620, 35758, 35939]
- Leprocaulon adhaerens*** (K. Knudsen, Elix & Lendemer) Lendemer & Hodkinson --- Uncommon on faces of sheltered, lightly shaded sandstone bluffs and large outcrops, usually associated with bryophytes and species of *Lepraria*. [35616]

- Leproplaca chrysodeta*** (Vainio) J.R. Laundon ex Ahti --- Rare and restricted to sheltered nooks in cherty dolomite on the lower portions of the massive north-facing dolomite face of Coon Den Bluff along Bryant Creek in the northeastern portion of the park. [35940]
- Leptogium austroamericanum*** (Malme) C.W. Dodge --- Common on lightly shaded boles and bases of hardwoods and *Juniperus virginiana*, and occasionally on shaded mossy sandstone boulders; typically in somewhat mesic sites but sometimes in drier habitats. [35472, 35885]
- Leptogium corticola*** (Taylor) Tuck. --- Rare; occurring on shaded hardwood boles in intact mesic woodlands. [35451]
- Leptogium cyanescens*** (Rabenh.) Körber --- Common on lightly shaded boles and bases of hardwoods and *Juniperus virginiana*, and on shaded, mossy boulders and outcrops of chert, dolomite, and sandstone. Although this species is typically more common in the Ozarks than the similar *L. austroamericanum*, within the park it appears to be the less common of the two. [36050, 36062].
- Leptogium hirsutum*** Sierk --- Uncommon on lightly shaded, mossy, dolomite and sandstone in mesic woodlands such as lower ravine slopes; sometime also occurring on hardwood bases and lower boles of hardwoods in these habitats. [36107]
- Leptogium milligranum*** Sierk --- Occasional on lightly shaded boles, and occasionally bases, of a variety of hardwoods, often in higher light exposures on ridges and bordering glades and openings. [35549]
- †*Lichenodiplis lecanoricola*** (M.S. Cole & D. Hawksw.) Diederich --- Common; parasitizing corticolous populations of *Lecanora strobilina*, where it is particularly common in the apothecia. [35659, 35914B, 35915]
- †*Lichenopeltella heterodermicola*** M.S. Cole & D. Hawksw. --- Uncommon; forming distinctive dark gray patches on thalli of *Heterodermia speciosa*, occurring on both corticolous and saxicolous populations of the host. [35602, 36132]
- **Lichenothelia* sp.** --- In wooded uplands throughout the Ozarks, including the park, lightly shaded siliceous cobbles and boulders are commonly inhabited by a thin, lustrous black filmy thallus appearing almost like a stain on the rock. These are invariably sterile and presumed to be a species of the nonlichenized fungus *Lichenothelia*. They constitute a ubiquitous component of the cryptogam biota of wooded uplands. Wilhelm (2021) has speculated that Midwestern populations may be referable to *L. scopularis* (Nyl.) D. Hawksw. [36140]
- Lichinella nigrifella*** (Lettau) P. P. Moreno & Egea --- Uncommon and restricted to exposures of dolomite associated with glades and exposed opening on bluffs. [36098]
- Lithothelium illotum*** (Nyl.) Aptroot --- Uncommon on shaded bases and lower boles of hardwoods in mesic woodlands; in the park known from *Acer saccharum* and *Quercus muehlenbergii*. [35735, 35926, 36209]
- †*Marchandiomyces corallinus*** (Roberge) Diederich & D. Hawksw. --- Known only from thalli of *Physcia stellaris* on an old wooden trellis at the Simpson residence site. [36035]
- **Marchandiomyces lignicola*** Lawry & Diederich --- Rare or overlooked, occurring on shaded, rotting, punky, decorticate logs of *Pinus echinata*. [35856]

- Maronea polyphaea*** H. Magn. --- Uncommon on exposed to lightly shaded branches and upper boles of canopy oaks in intact woodlands, less commonly occurring on branches of other hardwoods in these habitats. [35922B]
- Micarea misella*** (Nyl.) Hedl. --- Known only from a single record from a shaded, rotting, punky, decorticate log of *Pinus echinata* in a wooded upland. [35921]
- Micarea prasina*** Fr. [including *M. micrococca* (Körber) Gams ex Coppins] --- Occasional on shaded, rotting decorticate logs, usually on logs of *Pinus* and *Juniperus*. [35590, 35919, 35920, 36174]
- †*Minutoexcipula tuckerae*** V. Atienza & D. Hawksw. --- Uncommon; parasitizing thalli of *Pertusaria texana* in woodlands. [35579]
- †*Muellerella lichenicola*** (Sommerf. ex Fr.) D. Hawksw. --- An occasional parasite of species of *Caloplaca* s.l.; most populations observed in the park were from *Caloplaca flavovirescens* (= *Gyalolechia flavovirescens*), but it was also collected from *Caloplaca cerina*. [36162, 36187]
- **Mycocalicium albonigrum*** (Nyl.) Fink --- Known only from the sheltered bole of a few mature trees, such as *Nyssa sylvatica*, *Platanus occidentalis*, and *Quercus stellata*, in woodlands ranging from mesic coves to dry open ridges. [35791B, 36204]
- **Mycocalicium subtile*** (Pers.) Szatata --- Common on sound wood of standing oak and pine snags and occasionally on sheltered, well-drained portions of fallen logs, typically when most of the log is lodged above ground level. [35857, 35870]
- *cf. *Mycoporum eschweileri*?** (Müll. Arg.) R.C. Harris --- Known only from exposed young twigs of *Prunus* along a woodland edge. [35691]
- Myelochroa aurulenta*** (Tuck.) Elix & Hale --- Abundant in woodlands, growing on bases, lower boles, and shaded large lower branches of a wide variety of hardwoods, *Pinus*, and *Juniperus*, as well as on lightly shaded, often mossy, chert, sandstone, and dolomite. This species seems to prefer mesic habitats with relatively high light intensities, but is also widespread, although less abundant, on drier and wetter habitats. [35436]
- Myelochroa galbina*** (Ach.) Elix & Hale --- Common in woodlands; on lightly shaded branches and upper-to-mid-boles of hardwoods, particularly of the red oak group (*Quercus* section Lobatae). This lichen is typically associated with *Hypotrachyna livida*. Within the park, *Hypotrachyna* is the more common of the two, but through much of the Ozarks the opposite relationship exists. [35802]
- Myelochroa obsessa*** (Ach.) Elix & Hale --- Occasional on lightly shaded siliceous rocks in woodlands, occurring on both bedrock and large boulders of both sandstone and chert. [35624]
- Myriolecis dispersa*** (Pers.) Śliwa, Zhao Xin & Lumbsch --- Locally common on old, weathered, exposed to very lightly shaded, concrete of culverts, watering structures in old pastures, and pavement and foundations associated with the residence site. This species is also uncommon on exposed to lightly shaded dolomite bedrock in glades. [35642]

Myrionora albidula (Willey) R.C. Harris --- Known from two populations in the park, both from bark crevices on shaded boles of *Quercus* cf. *coccinea* in wooded uplands. This is the first report of this species from both the Ozarks and from Missouri. According to CNALH (2022), there are few records of this species from North America, with the nearest one to the park in northeastern Ohio; the other records are from New England and southern Alaska.

[35734]

Nadvornikia soorediata R.C. Harris --- Uncommon on shaded hardwood boles in mesic woodlands, typically growing on *Quercus alba*. [36112C, 36133]

Nephroma helveticum Ach. --- Common throughout the mesic portions of the park on shaded, often mossy, sandstone cliffs, outcrops, large boulders, and ravine bottoms. In the Ozarks, this is a species of intact, high-quality habitats that is seldom abundant. The park contains the most abundant population of this lichen known from the Ozark region. [35443]

Ochrolechia africana Vainio --- Occasional on exposed, often younger, branches of hardwoods in exposed to lightly shaded conditions, often growing in seral sites, glades, or along woodland edges. All thalli tested from the park lacked lichexanthone. [35474]

Ochrolechia arborea (Kreyer) Almb. --- Rare on exposed small twigs of *Juniperus virginiana* in overgrown dolomite glades and along glade edges. [35469]

Ochrolechia trochophora (Vainio) Oshio --- Occasional on lightly shaded, large sandstone substrates in intact woodlands, growing on outcrops, bluffs, and large boulders. [35460, 35766, 35905, 35913]

****Oedohysterium sinense*** (Teng) Boehm & Schoch --- Rare; occurring on lightly shaded decorticate stumps of *Quercus* in a disturbed wooded upland. [sub 35697 (*Lepra pustulata*), 36038]

†Opeggrapha diffracticola R.C. Harris & Ladd --- Apparently rare; parasitizing thalli, particularly the apothecia, of *Bacidia diffracta*. [36112B]

Opeggrapha vulgata Ach. --- Common on shaded hardwood boles in mesic woodlands; substrates include *Acer*, *Celtis*, *Carya*, and *Quercus*. [35859]

***Opeggrapha* sp. #1** --- Known only from the lower bole of a large *Nyssa sylvatica* in a mesic cove on the north-facing slopes above Bryant Creek near Pearce Bluff. This species is characterized by a thin, matte, mostly endophloideal, gray to brownish gray thallus, *Trentepohlia* photobiont, broadly expanded, elongate to subrotund, black, epruinose lirellae to 0.8 mm long, sometimes with short lateral protrusions; eiphymenium dark brownish gray, with the upper portions of the sparingly branches paraphyses gray, and the topmost portions brownish to gray brown with tips at most slightly expanded; hypothecium medium brown; ascospores 8/ascus, mostly straight, consistently 3-septate; 17-21 × 5.3-6.5 µm. The species is close to *O. herbarum* Mont., but the thallus is darker, and the ascospores smaller and more obtuse at the apices. [36211]

***Opeggrapha* sp. #2** --- Known in the park from a single specimen in a wooded upland, parasitizing thalli of *Punctelia rudecta* on a small *Sassafras albidum*. This species is occasional and widespread through the Ozarks, and was noted by Harris and Ladd (2005). [35928]

- Oviculispora parmeliae*** (Berk. & M.A. Curtis) Etayo --- Occasional on thalli of several woodland macrolichens in the park, including *Myelochroa aurulenta*, *Physcia americana*, *Punctelia missouriensis*, and especially *Punctelia rudecta*. [35792]
- Pachyphysis ozarkana*** R.C. Harris & Ladd --- Rare and restricted to a few widely scattered small populations on exposed dolomite boulders, bedrock and outcrops in glades south of highway N near the west edge of the park. [36097]
- Parmotrema austrosinense*** (Zahlbr.) Hale --- Uncommon on lightly shaded branches and sometimes boles of hardwoods and conifers, typically in sparsely wooded openings or along woodland edges. [35607]
- Parmotrema cetratum*** (Ach.) Hale --- Rare; known only from shaded decorticate branches of *Juniperus virginiana* in an overgrown dolomite glade, although this species regularly occurs on hardwoods elsewhere in the region. [36077]
- Parmotrema despectum*** Kurok. --- Apparently rare; known only from *Carya cordiformis* in a shaded mesic ravine. [35584]
- Parmotrema hypotropum*** (Nyl.) Hale --- Common in woodlands throughout the park, on lightly shaded canopy branches and lightly shaded upper- and mid-boles of all types of trees, and occasionally on lower portions of woodland trees in uplands with sufficient light. [35457, 35666]
- Parmotrema perforatum*** (Jacq.) A. Massal. --- Common on canopy branches of hardwoods in woodlands throughout the park, where it more common than *P. hypotropum*, which is not the case in much of the region. [35437]
- Parmotrema reticulatum*** (Taylor) M. Choisy --- Abundant throughout the park, in both intact habitats and disturbed woodlands and along woodland edges, on bases, boles, and larger branches of hardwoods and conifers, as well as on decorticate fallen logs and lightly shaded siliceous boulders of both chert and sandstone. [35461, 35678, 36161]
- Parmotrema subsidiosum*** (Müll. Arg.) Hale --- Rare; known only from a single record on a shaded, decorticate branch of *Juniperus virginiana* in an overgrown dolomite glade. [36175]
- Parmotrema submarginale*** (Michaux) DePriest & B. Hale --- Uncommon and scattered; known in the park from upper branches of *Quercus* in intact woodlands, and usually detected only from fallen canopy branches. [35607]
- Parmotrema subtinctorium*** (Zahlbr.) Hale --- Occasional, but sometimes locally common, on mid-boles and larger branches of hardwoods and *Juniperus virginiana* in woodlands. [35464, 35677]
- Parmotrema xanthinum*** (Müll. Arg.) Hale --- Rare and local on lightly shaded mesic faces of massive, north-facing sandstone bluff outcrops on north-facing wooded slopes along Bryant Creek. [35448]
- Peltigera polydactylon*** (Necker) Hoffm. --- Uncommon on shaded, mesic, mossy sandstone outcrops and large boulders in intact woodlands. [[35444, 35450, 35946]
- Peltigera praetextata*** (Flörke ex Sommerf.) Zopf --- Common on lightly shaded, well-drained acidic soil on mossy slopes in areas with minimal competition from herbaceous vegetation; also on mossy shaded siliceous rocks. [35442, 35456, 35701, 36102]

- Pertusaria ostiolata*** Dibben --- Occasional on shaded boles of hardwoods, especially *Quercus*, in dry to mesic woodlands. [35552]
- Pertusaria paratuberculifera*** Dibben --- Common on lightly to moderately shaded hardwood boles and bases, as well as occasionally on larger *Juniperus virginiana*; the most common *Pertusaria* in the park. [35551, 35755]
- Pertusaria plittiana*** Erichsen --- Common and locally abundant on massive, lightly shaded sandstone, including large mossy boulders, outcrops, ledges, and bluffs. *Flavoparmelia baltimorensis* and *Myelochroa aurulenta* are consistent associates. [35625]
- Pertusaria propinqua*** Müll. Arg. --- Occasional on lightly shaded hardwoods in wooded uplands, growing on both boles and branches. Also observed once on *Juniperus virginiana* branches. [36039]
- Pertusaria pustulata*** (Ach.) Duby --- Uncommon on lightly shaded small hardwood branches and rarely on hardwood boles in open woodlands. [35686]
- Pertusaria tetrathalamia*** (Fée) Nyl. --- Common in woodlands, especially on *Juniperus* boles and branches in woodlands associated with dolomite glades, as well as on a variety of hardwoods, often in mesic woodlands along intermittent drainages. [35462, 35465, 35593, 35667, 35757C]
- Pertusaria texana*** Müll. Arg. --- Common on twigs, branches, and lightly shaded boles of hardwoods in woodlands and along woodland edges. [35467, 35570, 35757A]
- Pertusaria valliculata*** Dibben --- Possibly rare — known in the park only from *Carpinus caroliniana* at the base of a mesic wooded slope bordering a small creek. In the field, this species appears identical to the much more common *P. paratuberculifera*, so its actual abundance in the park is uncertain. [35757B]
- **Phaeocalicium atenitikon*** Ladd & C.A. Morse --- At the park, this recently described species (Ladd & Morse 2022) is rare and limited to lightly shaded small twigs of *Juglans nigra* along woodland edges. [35811]
- **Phaeocalicium polyporaeum*** (Nyl.) Tibell --- Occasional on upper surfaces of thalli of the polyporous bracket fungus *Trichaptum biforme* — in the park, the bracket fungus is common on fallen logs and dead hardwood snags, especially in mesic woodlands. [35578]
- Phaeophyscia adiastrata*** (Essl.) Essl. --- Abundant on shaded boulders and outcrops of sandstone, chert, and dolomite; also occasionally on shaded hardwood bases. [35598, 35636, 35707]
- Phaeophyscia ciliata*** (Hoffm.) Moberg --- Common on exposed to lightly shaded hardwoods with less acidic bark, such as *Acer negundo* and *Celtis*, growing on canopy branches and upper boles, often along woodland edges, in floodplains, and in disturbed areas. [35557]
- Phaeophyscia hirsuta*** (Mereschk.) Essl. --- Occasional on exposed to lightly shaded hardwoods and *Juniperus virginiana*, often along edges or in areas with a history of previous disturbance. [35674]
- Phaeophyscia hirtella*** Essl. --- Occasional; with similar habitats and substrates to those of *P. ciliata*, with which it is sometimes associated. [35671, 35699]

- Phaeophyscia pusilloides*** (Zahlbr.) Essl. --- Occasional and nowhere abundant; on shaded boles and branches of hardwoods in woodlands, and less commonly on shaded boles of *Juniperus virginiana*. [35815]
- Phaeophyscia rubropulchra*** (Degel.) Essl. --- Common throughout the park in habitats ranging from dry to wet, on shaded hardwoods, *Juniperus*, and mossy chert, dolomite, and sandstone, usually growing in somewhat mesic microhabitats such as near the bases of trees. [35508]
- Phaeophyscia squarrosa*** Kashiw. --- Uncommon on lightly shaded boles and bases of hardwoods, as well as on shaded chert and sandstone boulders in these habitats. [36135]
- Phlyctis petraea*** R.C. Harris, Muskavitch, Ladd & Lendemer --- Occasional on lightly shaded, massive sandstone, usually associated with ledges and vertical faces protected from much direct rainfall. [35722, 35909]
- Phyllopsora kalbii*** Brako --- Rare; known only from the shaded base of a large *Quercus velutina* in a dry mesic woodland, and from mesic mossy dolomite in a ravine. [35556]
- Physcia americana*** G. Merr. --- Common in woodlands, occurring on lightly shaded boles and large branches of a variety of hardwoods, but especially *Carya* and *Quercus*, as well as on lightly shaded dolomite and, less commonly, siliceous rocks in overgrown glades and along glade edges, and sometimes on shaded boles of *Juniperus virginiana*. [35520]
- Physcia millegrana*** Degel. --- Although a common and somewhat weedy lichen in the region, at the park this is an uncommon species of exposed to lightly shaded hardwood branches and boles, often in disturbed woodlands and seral habitats, as well as upper branches of trees in the wooded floodplain along Bryant Creek. [35812]
- Physcia phaea*** (Tuck.) J.W. Thomson --- Rare; known only from small sandstone boulders in an open ridgetop woodland. [35760]
- Physcia pumilior*** R.C. Harris --- Occasional on small upper branches of hardwoods in woodlands. In the field, this species is indistinguishable from the more common *P. stellaris*, and so may be overlooked; *P. pumilior* seems to be more restricted to intact woodlands. [35546, 35850]
- Physcia stellaris*** (L.) Nyl. --- Abundant on exposed to lightly shaded small branches of hardwoods in all types of habitats, including ruderal sites and early successional woody regrowth. This species is also common on old boards and wooden fenceposts. [35475, 35658]
- Physcia subtilis*** Degel. --- Common on lightly shaded siliceous boulders in wooded uplands, but interestingly, very rare on outcrops and ledges of these substrates in the same habitats. [35818]
- Physcia thomsoniana*** Essl. --- Occasional on exposed to slightly shaded siliceous boulders in uplands, typically on thinly wooded ridges or exposed bluff summits. [35710]
- Physciella chloantha*** (Ach.) Essl. --- Occasional on shaded hardwoods, *Juniperus virginiana*, and both dolomite and siliceous boulders, often in disturbed areas or along edges, and also on old bricks along a woodland edge. [35523, 35698, 36180]

Physconia leucoleiptes (Tuck.) Essl. --- Occasional on lightly shaded tree bases, particularly *Juniperus virginiana* but also on hardwoods; also on lightly shaded dolomite boulders and outcrops. [35471, 35525]

Piccolia nannaria (Tuck.) Lendemer & Beeching --- Rare; known from *Quercus velutina* saplings in young post-logging successional regrowth in the south part of the park, and rarely on canopy hardwood branches in mature woodlands. [35495]

Placidium arboreum (Schwein. ex E. Michener) Lendemer --- Uncommon on lightly shaded boles of hardwoods on upland slopes and ridges; *Quercus stellata* and *Fraxinus* are favored substrates. This species also occurs rarely on lightly shaded mossy dolomite in gladey woodlands. [35943]

Placidium squamulosum (Ach.) Breuß --- Possibly occasional, but actual abundance unknown because of superficial similarity in the field to the more common *Clavascidium lacinulatum*; on thin cherty soil over dolomite associated with glades and roadcuts. [35873]

Placynthiella icmalea (Ach.) Coppins & P. James --- Occasional on decorticate rotting logs of both hardwoods and conifers in woodlands. [35782]

Placynthium petersii (Nyl.) Burnham --- Uncommon and associated with surfacing dolomite bedrock, where it grows on both exposed to lightly shaded dolomite and less commonly on siliceous cobbles over dolomite bedrock. [35532, 35841]

Plectocarpon diedertianum Y. Joshi, Upadhyay & Chandra --- Rare but likely overlooked; infesting thalli of *Myelochroa aurulenta* growing on both corticolous and saxicolous substrates in shaded, typically somewhat mesic, woodlands. [35629]

Porpidia albocaerulescens (Wulfen) Hertel & Knoph --- Common on mesic shaded sandstone and chert in dry-mesic to wet-mesic habitats, typically on mid and lower slopes and along drainages. [35712, 35056]

Porpidia subsimplex (H. Magn.) Fryday --- Apparently rare; known only from a shaded sandstone boulder on a mesic wooded slope. [36104]

Protoparmeliopsis gyrophorica (Lendemer) S. Y. Kondr. --- Uncommon and restricted to small boulders and fragments of chert and sandstone in close association with dolomite bedrock in glades. [36091, 36185]

Pseudosagedia cestrensis (Tuck.) R.C. Harris --- Common on a variety of hardwoods in mesic to wet-mesic habitats, such as in wooded ravines, floodplains, and along drainages. [35743, 35780]

Pseudosagedia chlorotica (Ach.) Hafellner & Kalb --- Rare; known only from a sandstone boulder in a wooded upland. This is the first report of this taxon from both the Ozark ecoregion and from Missouri; although common in the Appalachians and northeastern U.S., the only other interior reports are two records from Oklahoma and a single record from southwestern Minnesota (Advaita et al. 2016). [36119]

Pseudosagedia guentheri (Flotow) Hafellner & Kalb --- Occasional on lightly shaded chert and sandstone boulders in open woodlands. [35641]

- Psora pseudorussellii*** Timdal --- Occasional and restricted to exposed to slightly shaded dolomite bedrock, large boulders, and outcrops, but locally common in the dolomite glade complex south of highway N near the western edge of the park. [35538]
- Psorotichia schaeferi*** (A. Massal.) Arnold --- This inconspicuous black crust is apparently rare but possibly overlooked; restricted to exposed calcareous substrates and in the park known only from an exposed flat dolomite slab in a glade. [36094]
- Psorula rufonigra*** (Tuck.) Gotth. Schneider --- Rare on exposed sandstone boulders over dolomite bedrock in glades. Although lichenized, this species reported to be an obligate parasite of *Spilonema revertens*, with which it is invariably associated. [36089]
- Punctelia caseana*** Lendemer & Hodgkinson --- Uncommon and scattered; usually on lightly shaded boles of *Pinus echinata*, but more rarely on lightly shaded hardwood boles. [35953]
- Punctelia missouriensis*** G. Wilh. & Ladd --- Common on lightly shaded lower boles, larger branches, and bases of hardwoods, *Juniperus virginiana*, and *Pinus echinata*, as well as on lightly shaded boulder, outcrops, and cliff faces of sandstone, chert, and occasionally dolomite in woodlands. [35724]
- Punctelia rudecta*** (Ach.) Krog --- Abundant throughout the park; probably the most common lichen in terms of abundance and biomass, occurring on all types of rocks, as well as decorticate snags and fallen logs, and on both hardwoods and softwoods, ranging from tree bases to small canopy twigs; also occurring rarely on stable humus and bryophytes. [35468, 35503]
- Pyrenula caryae*** R.C. Harris --- Uncommon on lightly shaded branches and upper- and mid-boles of *Carya* in woodlands. [35897]
- Pyrenula pseudobufonia*** (Rehm) R.C. Harris --- Common on lightly shaded boles and, less commonly, branches, of hardwoods, especially *Quercus* section Lobatae (red oak group), in woodlands ranging from mesic to dry. [35486, 35493]
- Pyrenula subelliptica*** (Tuck.) R.C. Harris --- Uncommon and restricted to mesic lower slopes at the base of bluffs along Bryant Creek, growing on lightly shaded small hardwoods (*Acer saccharum*, *Fraxinus quadrangulata*). [36208]
- Pyxine sorediata*** (Ach.) Mont. --- Common on shaded bases, boles, and branches of hardwoods and *Juniperus virginiana* in both intact and disturbed woodlands; also occasional on lightly shaded, often mossy, boulders and outcrops of chert, sandstone, and dolomite. [35731, 35801]
- Pyxine subcinerea*** Stirton --- Common on lightly shaded boles and branches of hardwoods and conifers; rare on lightly shaded mossy sandstone boulders. [35463]
- Ramalina americana*** Hale --- Rare; known only from exposed branches of a small hardwood (*Prunus* sp.?) in an overgrown old pasture. [35688]
- Ramalina culbersoniorum*** LaGreca --- Occasional on canopy branches of hardwoods in woodlands, and also on branches and boles of small hardwoods along glade edges and in woodland openings. [35547]

- Ramalina labiosorediata*** Gasparyan, Sipman & Lücking [*≈Ramalina pollinaria* (Westr.) Ach.] --- Rare, local, and nowhere abundant; confined to sheltered faces and small ledges under overhanging, massive, lightly shaded sandstone bluff outcrops on upper slopes. [35964, 36125]
- Rhizocarpon reductum*** Th. Fr. --- Apparently rare; known from a lightly shaded chert boulder along a woodland edge. [35820]
- Rinodina cana*** (Arnold) Arnold --- Occasional on exposed to lightly shaded small boulder and fragments of chert and sandstone. [35511, 35720]
- Rinodina maculans*** Müll. Arg. --- Common on lightly shaded, usually small, branches of hardwoods (*Celtis*, *Juglans*, *Quercus*) and *Pinus echinata* in both intact and disturbed woodlands, as well as along woodland edges and in overgrown clearings and pastures. [35752, 35809, 35851, 36037]
- Rinodina oxydata*** (A. Massal.) A. Massal. --- Uncommon on small fragments and cobbles of chert and sandstone over dolomite bedrock; typically associated with dolomite glades. [36184]
- Rinodina papillata*** H. Magn. --- Occasional on lightly shaded boles of a variety of hardwoods, typically in intact woodlands, where trees of the red oak group (*Quercus* section *Lobatae*) are a preferred substrate. [35886]
- Rinodina siouxiana*** Sheard --- Common in wooded uplands, growing on lightly shaded boulders of both chert and sandstone. [35880, 35884]
- Rinodina subminuta*** H. Magn. --- Abundance unknown; found once on branches of *Celtis occidentalis* in a disturbed woodland. [35573]
- Rinodina tephrae*** (Tuck.) Herre --- Common on lightly shaded, and less commonly exposed, sandstone boulders, outcrops, and ledges in wooded uplands. [35723, 35765, 35768, 36122]
- **Robergea pupula*** (Nyl.) R.C. Harris --- Common on lightly shaded boles of *Quercus stellata*, particularly on younger trees in recent post-logging regrowth. This species also occurs less commonly on other hardwoods, such as *Carya cordiformis* and *Quercus alba*, in these same habitats. [35498, 35585]
- Sarcogyne regularis*** Körber --- Occasional, but sometimes locally abundant, on exposed dolomite in glade openings and along road cuts; also on old concrete. [35645A]
- Sarcogyne similis*** H. Magn. --- Occasional on exposed to lightly shaded, well-drained, sandstone boulders and outcrops in wooded uplands. [35936, 36126, 36194]
- **Sarea resinae*** (Fr.) Kuntze --- Rare; on old solidified resin flows on *Pinus echinata* — despite the abundance of the host tree at the park, this fungus was only found as a small group of ascomata at a few widely scattered locations through the park. [35665]
- Schismatomma glaucescens*** (Nyl. ex Willey) R.C. Harris --- Uncommon and restricted to bark crevices of mature *Quercus coccinea*, *Q. rubra*, and *Q. velutina* in intact dry-mesic woodlands. [35733]

- Scytinium dactylinum*** (Tuck.) Otálora, P. M. Jørg. & Wedin --- Common in shaded, mesic to wet sites in woodlands, typically associated with mosses, including tree bases and boulders and outcrops of chert, dolomite, and sandstone, as well as uncommonly on mossy soil in woodlands. [35596, 35614]
- Scytinium juniperinum*** (Tuck.) Otálora, P. M. Jørg. & Wedin --- Rare; known only from lightly shaded mossy soils on an old roadbank in a dry-mesic oak-pine woodland. [36182]
- Scytinium lichenoides*** (L.) Otálora, P. M. Jørg. & Wedin --- Common on mossy dolomite outcrops, bedrock, large boulders, and bluff summits; in exposed to more commonly lightly shaded conditions. [35530, 35704, 35945]
- Scytinium tenuissimum*** (Dickson) Otálora, P. M. Jørg. & Wedin --- Rare; in open mesic woodlands in ravines and on north-facing slopes, typically on mossy soil but found once on a mossy, hardwood root. [35933, 36101]
- †*Sphaerellothecium?* sp.** --- Rare; known only from a single collection in the park; growing on thalli of *Usnea strigosa* subsp. *strigosa* (psoromic acid strain) on a fallen hardwood limb in a dry-mesic woodland. The only *Sphaerellothecium* known to parasitize *Usnea* is *S. usneicola* Etayo, which occurs in Ecuador, but it lacks the distinctive reticulate pattern of filiform black hyphae over the host thallus that characterize this specimen. Additionally, the ascomata are aggregated in *S. usneicola* (Etayo 2017), whereas local material has small, widely scattered ascomata. [35779]
- †*Sphinctrina tubaeformis*** A. Massal. --- Occasional and restricted to thalli of *Pertusaria plittiana*. [35719, 36058, 36128]
- Spilonema revertens*** Nyl. --- Rare on exposed sandstone boulders over dolomite bedrock, associated with *Psorula rufonigra*; see discussion under that species. [sub 36089 (*Psorula rufonigra*)]
- Teloschistes chrysophthalmus*** (L.) Th. Fr. --- Rare on canopy branches of *Juglans nigra* and *Quercus* in intact woodlands. [35483]
- Thelidium incavatum*** Nyl. ex Mudd. --- Rare; on lightly shaded, mesic dolomite ledges and outcrops. [36192]
- Thelidium zwackhii*** (Hepp) A. Massal. --- Small, cryptic, and possibly overlooked; known only from a shaded chert cobble on mossy dolomite bedrock on a north-facing wooded slope. [35934]
- Thelopsis rubella*** Nyl. --- Rare; known only from the shaded face of a sandstone outcrop in a dry-mesic woodland; associated with *Anisomeridium distans*. [sub 35774 (*Buellia* cf. *vilis*)]
- Trapelia placodioides*** Coppins & P. James --- Occasional on lightly shaded chert rubble on ridge flats in wooded uplands. [35826, 35838]
- Trapeliopsis flexuosa*** (Fr.) Coppins & P. James --- Occasional on lightly shaded decorticate logs and snags of both hardwoods and more commonly conifers, as well as on boles and bases of *Pinus echinata* in wooded uplands. [35473]
- †*Tremella parmeliarum*** Diederich --- Rare; known only from a single occurrence, parasitizing thalli of *Parmotrema reticulatum* on branches of *Juniperus virginiana* bordering an overgrown dolomite glade. [36176]

- Usnea amblyoclada*** (Müll. Arg.) Zahlbr. --- Occasional on massive, mesic sandstone outcrops and bluffs in intact woodlands; also found once on *Quercus coccinea*. [35730]
- Usnea mutabilis*** Stirton --- Occasional; in woodlands on lightly shaded bases and boles of hardwoods and *Pinus echinata*. [35898, 35927]
- Usnea strigosa*** (Ach.) Eaton subsp. ***rubiginea*** (Michaux) I. Tav. --- Common – the most abundant species of *Usnea* in the park, growing on upper boles and branches of hardwoods in intact woodlands, as well as on boles and branches of small open hardwoods in overgrown old pastures and openings and along glade margins. All material from the park contains psoromic acid. [35454, 35901]
- Usnea strigosa*** (Ach.) Eaton subsp. ***strigosa*** --- Rare; known only from exposed upper branches of a large *Acer saccharinum* in the yard of the former Simpson residence (containing norstictic acid). [35681]
- Usnea subscabrosa*** Nyl. ex Motyka --- Rare; known only from the sheltered, lightly shaded face of a massive sandstone bluff on a wooded slope. [35459]
- Varicellaria velata*** (Turner) Schmitt & Lumbsch --- Occasional on lightly shaded boles and branches of a variety of hardwoods and *Juniperus virginiana*. [35902, 36048]
- Verrucaria calkinsiana*** Servít --- Uncommon on exposed to lightly shaded dolomite rubble in glade areas and along old roadbanks. [35828, 36151]
- Verrucaria fayettensis*** Servít --- Common on lightly shaded to somewhat exposed dolomite; also found once on a low boulder of quartzose sandstone over dolomite along a stream. [35518, 35524, 35877, 36067]
- Verrucaria* aff. *kalenskyi*** Servít --- Common on lightly shaded pebbles and cobbles of chert in lightly shaded woodlands with sparse vascular vegetation, such as on steep slopes and ridges and on cherty roadbanks. This species also occurs less commonly on more massive chert outcrops and larger boulders, and rarely on sandstone pebbles and cobbles. It is uncertain whether there is an existing name for this taxon, which is widespread in the Ozarks; it was designated as “*Verrucaria* sp. #1” in Harris and Ladd (2005) and Ladd (2019). Othmar Breuß (pers. Comm.) has examined Ozark material and noted its morphological resemblance to *V. kalenskyi* (= *V. fusca* auct.). [35514, 35640, 35825]
- Verrucaria muralis*** Ach. --- Occasional on exposed dolomite ledges and bedrock flats, although not typically found in dolomite glades, but in woodland openings and ledges on steep open slopes. [35833B, 36152]
- Verrucaria nigrescens*** Pers. --- Common on exposed to lightly shaded dolomite outcrops in glades and along woodland edges. [35534, 35537, 35831, 35832]

- Verrucaria* sp.** --- Known only from a single collection from a flat sandstone boulder in the bed of an intermittent stream at the base of a wooded ravine. Thallus areolate to subrimose, of grayish green areoles to 0.5 mm broad; perithecia black, broadly rounded, partially immersed, to 0.3 mm broad but typically to 0.2 mm broad, with an apical ostiole ca. 25 μ m wide; involucre absent or confluent with perithecial wall; perithecial wall dark brown throughout, the outer layer of small isodiametric cells ca 3 μ m diameter; ascospores ca. 20-23 \times 7.5-8 μ m. Locally, the species is unusual in that few members of the genus grow on sandstone, and the moist microhabitat, exposed to splashing and overflow during wet periods, is also atypical. [35764]
- Viridothelium virens*** (Tuck. ex Michener) Lücking, M. P. Nelsen & Aptroot --- Rare; on shaded lower boles of smooth-barked hardwood in mesic wooded ravines and at the base of the extensive north-facing dolomite bluff system along Bryant Creek; known from *Amelanchier arborea* and *Carpinus caroliniana*. [35583]
- Vulpicida viridis*** (Schwein.) J.-E. Mattsson & M.J. Lai --- Occasional; on canopy branches of hardwoods in woodlands, typically growing on oaks on the red oak group (*Quercus* section Lobatae). [35932]
- Willeya diffractella*** (Nyl.) Müll. Arg. --- Occasional in dry-mesic to mesic woodlands, on shaded outcrops and large boulders of both dolomite and chert; also collected once on the shaded lip of a mesic sandstone outcrop. [35706, 35715]
- Xanthomendoza weberi*** (S.Y. Kondr. & Kärnefelt) L. Lindblom --- Occasional, with a variety of habitats and substrates, including exposed to lightly shaded branches, boles, and dead wood of hardwoods in both intact woodlands and disturbed seral habitats, as well as in overgrown glades, open young secondary woodlands, and overgrown old pastures. This species also occurs on *Juniperus virginiana* and lightly shaded dolomite, sandstone, and chert. [35506, 35676A]
- Xanthoparmelia angustiphylla*** (Gyelnik) Hale --- Uncommon; known from exposed chert cobbles over dolomite in glades. [35513]
- Xanthoparmelia australasica*** D.J. Galloway --- Rare; known only from a single record from an exposed chert boulder over dolomite bedrock in a glade. [36072]
- Xanthoparmelia hypomelaena*** (Hale) Hale --- Occasional on exposed to lightly shaded siliceous boulders in open ridgetop woodlands, woodland openings, and along woodland edges. [35510, 35817, 35821]
- Xanthoparmelia subramigera*** (Gyelnik) Hale --- Occasional on exposed to lightly shaded chert boulders and outcrops in wooded uplands and dolomite glades; as yet unknown from sandstone in the park. [35507, 35882, 35883]
- Xyleborus sporodochifer*** R.C. Harris & Ladd --- Occasional on sound lignin of shaded decorticate logs of *Quercus* in woodlands. [35603, 36103]
- Xylopsora friesii*** (Ach.) Bendiksby & Timdal --- Known only from an old, decorticate stump of *Pinus echinata* on a lightly wooded upper slope; associated with *Carbonicola anthracophila*. [36203]

Appendix 2: Table of substrate affinities, arranged alphabetically by taxon.

The **Type** column refers to cryptogam type: C = cyanolichen; F = non-lichenized, non-lichenicolous fungus; L = chlorolichen; P = non-lichenized obligate lichen parasite; PL = lichenized obligate lichen parasite.

Taxon	Type	corticolous	sandstone	chert	dolomite	terricolous	lignicolous	bryophytes/ humus	Other
<i>Abrothallus cladoniae</i>	P								<i>Cladonia peziziformis</i>
<i>Acarospora americana</i>	L				X				
<i>Acarospora 'atromarginata'</i>	L			X					
<i>Acarospora tuckerae</i>	L			X					
<i>Agonimia flabelliformis</i>	L						X	X	
<i>Agonimia opuntiella</i>	L							X	
<i>Agonimia</i> sp. #1	L							X	
<i>Agyrium rufum</i>	F						X		
<i>Alyxoria varia</i>	L	X							
<i>Amandinea 'lignicola'</i>	L						X		
<i>Amandinea polyspora</i>	L	X							
<i>Amandinea punctata</i>	L	X					X		scales of old pinecones
<i>Amphisphaeria bufonia</i>	F	X							
<i>Anaptychia palmulata</i>	L	X	X	X					
<i>Anisomeridium bifforme</i>	L	X							
<i>Anisomeridium distans</i>	L		X						
<i>Anisomeridium polypori</i>	L	X							
<i>Anzia colpodes</i>	L	X							
<i>Arthonia anglica</i>	L	X							
<i>Arthonia diffusa</i>	L	X							
<i>Arthonia 'fontana'</i>	L	X							
<i>Arthonia</i> sp.	F	X							
<i>Arthonia susa</i>	L	X							
<i>Arthothelium spectabile</i>	L	X							
<i>Aspicilia cinerea</i>	L		X	X					
<i>Bacidia circumspecta</i>	L	X							
<i>Bacidia diffracta</i>	L	X							
<i>Bacidia eckmaniana</i>	L	X							
<i>Bacidia granosa</i>	L				X				
<i>Bacidia polychroa</i>	L	X							
<i>Bacidia schweinitzii</i>	L	X							
<i>Bacidia suffusa</i>	L	X			X				
<i>Bacidina delicata</i>	L						X		
<i>Bacidina egenlula</i>	L								old shaded bricks & mortar
<i>Bagliettoa calciseda</i>	L				X				
<i>Biatoridium lasiothecium</i>	L	X							
<i>Bilimbia sabulaetorum</i>	L							X	
<i>Botryolepraria lesdainii</i>	L	X		X			X		
<i>Bryobilimbia hypnorum</i>	L							X	
<i>Buellia cf vilis</i>	L		X						
<i>Buellia erubescens</i>	L	X							

Taxon	Type	corticolous	sandstone	chert	dolomite	terricolous	lignicolous	bryophytes/ humus	Other
<i>Buellia maculata</i>	L		X	X					
<i>Buellia spuria</i>	L		X	X	(X)				
<i>Calcium abietinum</i>	L						X		
<i>Calicium salicinum</i>	L						X		
<i>Caloplaca camptidia</i> (Flavoplaca)	L	X							
<i>Caloplaca cerina</i>	L	X							
<i>Caloplaca chrysophthalma</i> (Solitaria)	L	X							
<i>Caloplaca conversa</i>	L			X					
<i>Caloplaca crenulatella</i> (<i>Xanthocarpia</i>)	L				X				exposed concrete
<i>Caloplaca flavocitrina</i> (Flavoplaca)	L			X	X				
<i>Caloplaca flavovirescens</i> (<i>Gyalolechia</i>)	L		X	X	X				
<i>Caloplaca microphyllina</i> (<i>Tayloriellina</i>)	L						X		
<i>Caloplaca pollinii</i> (Huneckia)	L	X							
<i>Caloplaca pyracea</i> (Athallia)	L	X							
<i>Caloplaca sideritis</i>	L			X					
<i>Caloplaca subsoluta</i> (Squamulea)	L			X	X				old asphalt shingles
<i>Candelaria concolor</i>	L	X	X	X	X		X		shaded concrete, rusty iron, asphalt shingles, old tires
<i>Candelaria fibrosa</i>	L	X							
<i>Candelariella xanthostigma</i>	L	X							
<i>Candelariella xanthostigmoides</i>	L	X							
<i>Canoparmelia caroliniana</i>	L	X							
<i>Canoparmelia texana</i>	L	X	X				X		
<i>Carbonicola anthracophilla</i>	L						X		
<i>Catillaria chalybeia</i>	L								old bricks
<i>Catillaria nigroclavata</i>	L	X					X		
<i>Catinaria atropurpurea</i>	L	X							
<i>Chaenothecia</i> sp. (<i>hispidula</i> ?)	L	X							
<i>Chaenothecopsis debilis</i>	F						X		
<i>Chaenothecopsis nana</i>	F	X							
<i>Chaenothecopsis perforata</i>	F	X							
<i>Chromatochlamys muscroum</i>	L							X	
<i>Chrysothrix caesia</i>	L	X							
<i>Chrysothrix onokoensis</i>	L		X						
<i>Chrysothrix xanthina</i>	L	X	X						
<i>Circinaria caesiocinerea</i>	L			X					
<i>Circinaria contorta</i>	L				X				
<i>Cladonia apodocarpa</i>	L		X			X			
<i>Cladonia chlorophaea</i>	L			X	X	X			
<i>Cladonia coniocraea</i>	L						X	X	
<i>Cladonia cristatella</i>	L						X		
<i>Cladonia cryptochlorophaea</i>	L		X			X			
<i>Cladonia cylindrica</i>	L						X		
<i>Cladonia furcata</i>	L					X		X	
<i>Cladonia grayi</i>	L	X	X	X		X	X	X	

Taxon	Type	corticolous	sandstone	chert	dolomite	terricolous	lignicolous	bryophytes/ humus	Other
<i>Cladonia macilenta</i> var. <i>bacillaris</i>	L	X					X		
<i>Cladonia ochrochlora</i>	L		X						
<i>Cladonia parasitica</i>	L						X		
<i>Cladonia petrophila</i>	L		X						
<i>Cladonia peziziformis</i>	L				X	X			
<i>Cladonia piedmontensis</i>	L					X	X		
<i>Cladonia pleurota</i>	L		X			X			
<i>Cladonia ramulosa</i>	L	X					X		
<i>Cladonia ravenelii</i>	L	X							
<i>Cladonia robbinsii</i>	L					X			
<i>Cladonia squamosa</i>	L		X						
<i>Cladonia subcariosa</i>	L		X			X			
<i>Cladonia subradiata</i> [fumarprotocetraric acid]	L		X						
<i>Cladonia subradiata</i> [norstictic acid]	L						X		
<i>Cladonia subtenuis</i>	L		X			X	X	X	
<i>Claviscidium lacinulatum</i>	L					X			
<i>Coccocarpia palmicola</i>	C	X	X	X					
<i>Coenogonium luteum</i>	L	X							
<i>Coenogonium pineti</i>	L	X					X	X	
<i>Collema furfuraceum</i>	C		X		X				
<i>Collema nigrescens</i>	C	X							
<i>Collema pustulatum</i>	C				X				
<i>Collema subflaccidum</i>	C	X							
<i>Collema texanum</i>	C				X				
<i>Crespoa crozalsiana</i>	L	X							
<i>Cresponia premnea</i> var. <i>saxicola</i>	L		X						
<i>Cystocoleus ebeneus</i>	L		X						
<i>Dermatocarpon arenosaxi</i>	L		X						
<i>Dermatocarpon dolomiticum</i>	L				X				
<i>Dermatocarpon muhlenbergii</i>	L		X		X				
<i>Diploschistes scruposus</i>	L		X						
<i>Dirina</i> sp.	L		X						
<i>Dirinaria frostii</i>	L		X						
<i>Enchylium bachmanianum</i>	C				X				
<i>Enchylium coccophorum</i>	C				X	X			
<i>Enchylium conglomeratum</i>	C	X							
<i>Enchylium polycarpon</i>	C				X				
<i>Endocarpon pallidulum</i>	L	X	X	X	X	X			
<i>Erythrimum aurantiacum</i>	P								<i>Physcia millegrana</i> , <i>Physcia stellaris</i> , <i>Parmotrema</i> sp.
<i>Fellhanera silicis</i>	L			X					
<i>Flavoparmelia baltimorensis</i>	L		X	X					
<i>Flavoparmelia caperata</i>	L	X							
<i>Fuscopannaria leucosticta</i>	C		X						
<i>Gassicurtia vernicoma</i>	L		X						<i>Pertusaria plittiana</i>
<i>Gomphillus americanus</i>	L							X	

Taxon	Type	corticolous	sandstone	chert	dolomite	terrillous	lignicolous	bryophytes/ humus	Other
<i>Graphis scripta</i>	L	X							
<i>Gyalecta</i> sp. #1	L				X				
<i>Hertelidea pseudobotryosa</i>	L						X		
<i>Heterodermia granulifera</i>	L	X							
<i>Heterodermia hypoleuca</i>	L	X							
<i>Heterodermia obscurata</i>	L	X	X	X					
<i>Heterodermia speciosa</i>	L	X	X	X	X				
<i>Homostegia hertelii</i>	P								<i>Flavoparmelia baltimorensis</i>
<i>Hyperphyscia syncolla</i>	L	X							
<i>Hypotrachyna livida</i>	L	X							
<i>Hypotrachyna minarum</i>	L		X						
<i>Hypotrachyna pustulifera</i>	L	X	X						
<i>Hysterium angustatum</i>	F	X							
<i>Hysterobrevium mori</i>	F	X							
<i>Imshaugia aleurotes</i>	L						X		
<i>Ionaspis alba</i>	L		X	X					
<i>Julella fallaciosa</i>	F	X							
<i>Lecania croatica</i>	L	X							
<i>Lecania turascensis</i>	L								concrete
<i>Lecanora hybocarpa</i>	L	X							
<i>Lecanora imshaugii</i>	L	X							
<i>Lecanora minutella</i>	L	X							old pine cones
<i>Lecanora nothocaesiella</i>	L	X							
<i>Lecanora oreinoides</i>	L		X						
<i>Lecanora saxigena</i>	L		X						
<i>Lecanora</i> sp. (gangaleoidin)	L		X						
<i>Lecanora strobilina</i>	L	X		X			X		old pine cones
<i>Lecanora subimmergens</i>	L		X	X					
<i>Lecanora subpallens</i>	L	X							
<i>Lecanora thysanophora</i>	L	X							
<i>Lecanora valesiaca</i>	L				X				
<i>Lecidea varians</i>	L	X							
<i>Lecidella euphorea</i>	L	X					X		
<i>Lecidella stigmataea</i>	L		X	X					
<i>Lempholemma polyanthes</i>	C				X				
<i>Lepra amara</i>	L	X	X						
<i>Lepra hypothamnolica</i>	L	X							
<i>Lepra multipunctoides</i>	L	X							
<i>Lepra pustulata</i>	L	X	X	X			X	X	
<i>Lepra trachythallina</i>	L	X							
<i>Lepraria caesiella</i>	L	X							
<i>Lepraria finkii</i>	L	X	X	X	X	X		X	
<i>Lepraria harrisiana</i>	L						X		
<i>Lepraria normandinoides</i>	L		X						
<i>Lepraria</i> sp. [isnic acid + zeorin]	L		X	X	X				
<i>Lepraria vouauxii</i>	L		X						
<i>Leprocaulon adhaerans</i>	L		X						

Taxon	Type	corticolous	sandstone	chert	dolomite	terrillous	lignicolous	bryophytes/ humus	Other
<i>Leproplaca chrysodeta</i>	L				X				
<i>Leptogium austroamericanum</i>	C	X							
<i>Leptogium corticola</i>	C	X							
<i>Leptogium cyanescens</i>	C	X	X	X	X				
<i>Leptogium hirsutum</i>	C	X	X		X				
<i>Leptogium milligranum</i>	C	X							
<i>Lichenodiplis lecanoricola</i>	P								<i>Lecanora strobilina</i>
<i>Lichenopeltella heterodermicola</i>	P								<i>Heterodermia speciosa</i>
<i>Lichinella nigritella</i>	C				X				
<i>Lichinothelia</i> sp.	F		X	X					
<i>Lithothelium hyalosporum</i>	L	X							
<i>Marchandiomyces corallinus</i>	P								<i>Physcia stellaris</i>
<i>Marchandiomyces lignicola</i>	F						X		
<i>Maronea polyphaea</i>	L	X							
<i>Micarea misella</i>	L						X		
<i>Micarea prasina</i> s.l.	L						X		
<i>Minutoexcipula tuckerae</i>	P								<i>Pertusaria texana</i>
<i>Muellerella lichenicola</i>	P								<i>Caloplaca cerina</i> , <i>C. flavovirescens</i>
<i>Mycocalicium albonigrum</i>	F	X							
<i>Mycocalicium subtile</i>	L	X							
<i>Mycoporum eschweileri</i>	F	X							
<i>Myelochroa aurulenta</i>	L	X							
<i>Myelochroa galbina</i>	L	X							
<i>Myelochroa obsessa</i>	L		X						
<i>Myriolecis dispersa</i>	L				X				concrete
<i>Myrionora albidula</i>	L	X							
<i>Nadvornikia soledata</i>	L	X							
<i>Nephroma helveticum</i>	C	X	X						
<i>Ochrolechia africana</i>	L	X							
<i>Ochrolechia arborea</i>	L	X							
<i>Ochrolechia trochophora</i>	L		X						
<i>Oedohysterium sinense</i>	F						X		
<i>Opegrapha diffracticola</i>	P								<i>Bacidia diffracta</i>
<i>Opegrapha vulgata</i>	L	X							
<i>Opegrapha</i> sp. #1	L	X							
<i>Opegraphs</i> sp. #2	P								<i>Punctelia rudecta</i>
<i>Oviculispora parmeliae</i>	P								<i>Punctelia rudecta</i>
<i>Pachyphysis ozarkana</i>	L				X				
<i>Parmotrema austrosinense</i>	L	X							
<i>Parmotrema cetratum</i>	L						X		
<i>Parmotrema despectum</i>	L	X							
<i>Parmotrema hypotropum</i>	L	X							
<i>Parmotrema perforatum</i>	L	X							
<i>Parmotrema reticulatum</i>	L	X	X	X	X			X	
<i>Parmotrema subsidiosum</i>	L						X		
<i>Parmotrema submarginale</i>	L	X							
<i>Parmotrema subtinctorium</i>	L	X							

Taxon	Type	corticolous	sandstone	chert	dolomite	terricolous	lignicolous	bryophytes/ humus	Other
<i>Parmotrema xanthinum</i>	L		X						
<i>Peltigera polydactylon</i> s.l.	L		X						
<i>Peltigera praetextata</i>	L		X	X	X	X			
<i>Pertusaria ostiolata</i>	L	X							
<i>Pertusaria paratuberculifera</i>	L	X							
<i>Pertusaria plittiana</i>	L		X						
<i>Pertusaria propinqua</i>	L	X							
<i>Pertusaria pustulata</i>	L	X							
<i>Pertusaria tetrathalamia</i>	L	X							
<i>Pertusaria texana</i>	L	X							
<i>Pertusaria valliculata</i>	L	X							
<i>Phaeocalicium atenitikon</i>	F	X							
<i>Phaeocalicium polyporaeum</i>	F								<i>Trichaptum biforme</i>
<i>Phaeophyscia adiastrum</i>	L	X	X	X	X				
<i>Phaeophyscia ciliata</i>	L	X							
<i>Phaeophyscia hirsuta</i>	L	X							
<i>Phaeophyscia hirtella</i>	L								old bricks
<i>Phaeophyscia pusilloides</i>	L	X							
<i>Phaeophyscia rubropulchra</i>	L	X	X	X	X		X		
<i>Phaeophyscia squarrosa</i>	L	X	X	X					
<i>Phlyctis petraea</i>	L		X						
<i>Phyllopsora kalbii</i>	L	X							
<i>Physcia americana</i>	L	X	X	X	X				
<i>Physcia millegrana</i>	L	X							
<i>Physcia phaea</i>	L		X						
<i>Physcia pumilior</i>	L	X							
<i>Physcia stellaris</i>	L	X					X		
<i>Physcia subtilis</i>	L		X	X					
<i>Physcia thomsoniana</i>	L		X	X					
<i>Physciella chloantha</i>	L	X	X	X	X		X		old bricks & mortar
<i>Physconia leucoleptes</i>	L	X			X				
<i>Piccolia nannaria</i>	L	X							
<i>Placidium arboreum</i>	L	X			X				
<i>Placidium squamulosum</i>	L					X			
<i>Placynthiella icmalea</i>	L						X		
<i>Placynthium petersii</i>	C				X				
<i>Plectocarpon diedertianum</i>	P								<i>Myelochroa aurulenta</i>
<i>Porpidia albocaerulescens</i>	L		X	X					
<i>Porpidia subsimplex</i>	L		X						
<i>Protoparmeliopsis gyrophorica</i>	L		X	X					
<i>Pseudosagedia cestrensis</i>	L	X							
<i>Pseudosagedia chlorotica</i>	L		X						
<i>Pseudosagedia guentheri</i>	L		X	X					
<i>Psora pseudorussellii</i>	L				X				
<i>Psorotichia schaeferi</i>	C				X				
<i>Psorula rufonigra</i>	PL			X					<i>Spilonema revertens</i>
<i>Punctelia caseana</i>	L	X							
<i>Punctelia missouriensis</i>	L	X	X	X	X				

Taxon	Type	corticolous	sandstone	chert	dolomite	terricolous	lignicolous	bryophytes/ humus	Other
<i>Punctelia rudecta</i>	L	X	X	X	X		X	X	
<i>Pyrenula caryae</i>	L								
<i>Pyrenula pseudobufonia</i>	L	X							
<i>Pyrenula subelliptica</i>	L	X							
<i>Pyxine sorediata</i>	L	X	X	X	X				
<i>Pyxine subcinerea</i>	L	X	X						
<i>Ramalina americana</i>	L	X							
<i>Ramalina culbersoniorum</i>	L	X							
<i>Ramalina labiosorediata</i>	L		X						
<i>Rhizocarpon reductum</i>	L			X					
<i>Rinodina cana</i>	L		X	X					
<i>Rinodina maculans</i>	L	X							
<i>Rinodina oxydata</i>	L		X	X					
<i>Rinodina papillata</i>	L	X							
<i>Rinodina siouxiana</i>	L		X	X					old asphalt shingles
<i>Rinodina subminuta</i>	L	X							
<i>Rinodina tephraeaspis</i>	L		X						
<i>Robergea pupula</i>	F	X							
<i>Sarcogyne regularis</i>	L								exposed concrete
<i>Sarcogyne similis</i>	L		X						
<i>Sarea resinae</i>	F	X							
<i>Schismatomma glaucescens</i>	L	X							
<i>Scytinium dactylinum</i>	L	X	X	X	X			X	
<i>Scytinium juniperinum</i>	C					X			
<i>Scytinium lichenoides</i>	L				X				
<i>Scytinium tenuissimum</i>	L					X		X	
<i>?Sphaerellothecium</i> sp.	P								<i>Usnea strigosa</i> subsp. <i>rubiginea</i>
<i>Sphinctrina tubaeformis</i>	P								<i>Pertusaria plittiana</i>
<i>Spilonema revertens</i>	C			X					
<i>Teloschistes chrysophthalmus</i>	L	X							
<i>Thelidium incavatum</i>	L				X				
<i>Thelidium zwackhii</i>	L			X					
<i>Thelopsis rubella</i>	L		X						
<i>Trapelia placodioides</i>	L			X					
<i>Trapeliopsis flexuosa</i>	L						X		
<i>Tremella parmeliarum</i>	P								<i>Parmotrema reticulatum</i>
<i>Usnea amblyoclada</i>	L	X	X						
<i>Usnea mutabilis</i>	L	X							
<i>Usnea strigosa</i> subsp. <i>rubiginea</i>	L	X							
<i>Usnea strigosa</i> subsp. <i>strigosa</i>	L	X							
<i>Usnea subscabrosa</i>	L		X						
<i>Varicellaria velata</i>	L	X							
<i>Verrucaria calkinsiana</i>	L				X				
<i>Verrucaria cf kalenskyi</i>	L			X					
<i>Verrucaria fayettensis</i>	L				X				
<i>Verrucaria muralis</i>	L				X				
<i>Verrucaria nigrescens</i>	L				X				

Taxon	Type	corticolous	sandstone	chert	dolomite	terricolous	lignicolous	bryophytes/ humus	Other
<i>Verrucaria</i> sp.	L		X						
<i>Viridothelium virens</i>	L	X							
<i>Vulpicida viridis</i>	L	X							
<i>Willeya diffractella</i>	L		X	X	X				
<i>Xanthomendoza weberi</i>	L	X	X	X	X		X		
<i>Xanthoparmeia australasica</i>	L			X					
<i>Xanthoparmelia angustiphylla</i>	L			X					
<i>Xanthoparmelia hypomelaena</i>	L		X	X					
<i>Xanthoparmelia subramigera</i>	L			X					
<i>Xyleborus sporodochifer</i>	L						X		
<i>Xylopsora friesii</i>	L						X		

Appendix 3: Ozark lichens commonly associated with similar habitats and substrates to those found within the park, but not yet documented from the site. Taxa documented from elsewhere in Douglas County, but not from the park, are preceded by an asterisk (*).

Acarospora fuscata (Schrader) Arnold --- A common and characteristic species of exposed to lightly shaded siliceous boulders in wooded uplands.

Chrysothrix insulizans R.C. Harris & Ladd --- This species is a characteristic lichen of lightly shaded, sheltered, massive siliceous rock faces protected from direct wetting, but has yet to be found within the park; likely habitats are occupied by *C. xanthina*, which is typically more common on corticolous substrates.

Cladonia caespiticia (Pers.) Flörke --- Common on well-drained, lightly shaded cherty soils in areas with minimal competition from vascular vegetation, such as on thinly wooded ridges and bordering trails and old roads in wooded uplands.

**Hyperphyscia adglutinata* (Flörke) H. Mayrhofer & Poelt --- A typically common, small foliose corticolous lichen with a broad ecological amplitude; on boles and branches of both hardwoods and *Juniperus* in woodlands and disturbed areas.

Parmotrema tinctorum (Delise ex Nyl.) Hale --- This foliose lichen is characteristic on lightly shaded, massive, often sheltered, siliceous substrates in intact woodlands. It is typically associated with high quality bluff and canyon systems. Although most of its usual associated occur on sheltered sandstone faces in the park, it has yet to be found there.

Pertusaria subpertusa Brodo – Typically found on smooth-barked hardwoods in mesic sites along streams, seeps, and in ravines, often occurring on *Carpinus caroliniana*. Despite multiple occurrences of apparently suitable habitat in the park, it has not been found.

Physcia halei J.W. Thomson --- An occasional but widespread species of large siliceous boulders and outcrops in wooded uplands, but yet to be documented from within the park.

**Placynthium nigrum* (Hudson) Gray --- This lichen is characteristic of exposed to lightly shaded dolomite, and the dolomite glade system in the western part of the park seems like an ideal habitat despite its not yet being documented there.

Protoblastenia rupestris (Scop.) J. Steiner --- A common lichen of lightly shaded carbonate substrates, including both dolomite in intact habitats to old concrete. Despite ample apparently suitable substrates occurrences in the park, it was not found during this study.

Psora decipiens (Hedwig) Hoffm. --- A characteristic species of thin, exposed soils over dolomite bedrock in glades, typically associated with *Clavascidium lacinulatum* and *Placidium squamulosum*, both of which occur in the park.

**Punctelia graminicola* (B. de Lesd.) Egan --- Frequent on lightly shaded, massive, siliceous rock faces in intact habitats; the sheltered sandstone bluff outcrop systems in much of the park would seem to be ideal habitat, making it puzzling that it has not been found in the park.

Trapelia glebulosa (Sm.) J.R. Laundon --- A common lichen of small siliceous pebbles in exposed areas in both natural habitats and disturbed sites that was surprisingly not found in this study.

**Tuckermanella fendleri* (Nyl.) Essl. --- An occasional species occurring in the Ozarks exclusively on boles, branches, and old cones of *Pinus echinata*; despite the abundance of the host tree in the park, it has not been found there.