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National Atlas of Epiphytic Lichens in Forested Habitats of the United States

Sarah Jovan, Michael Haldeman, Susan Will-Wolf, Karen Dillman, Linda Geiser, Joel Thompson, Daphne Stone, and Jason Hollinger

Authors

Sarah Jovan is a research ecologist and serves as the national lichen indicator advisor for the Forest Inventory and Analysis program, U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, 620 SW Main Street, Suite 400, Portland, OR 97205; **Michael Haldeman** is an ecologist, U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, 810 Highway 20, Sedro-Woolley, WA 98284; **Susan Will-Wolf** is a former national lichen indicator advisor and currently is a senior scientist emerita, University of Wisconsin, Department of Botany, 430 Lincoln Drive, Madison, WI 53706; **Karen Dillman** is a forest ecologist, U.S. Department of Agriculture, Forest Service, Tongass National Forest, 123 Scow Bay Loop Road, PO Box 309, Petersburg, AK 99833; **Linda Geiser** is the national program leader for air resource management, U.S. Department of Agriculture, Forest Service, 201 14th Street SW, Yates Building 3 SC, Mailstop 1121, Washington, DC 20250; **Joel Thompson** is a geospatial systems specialist, U.S. Department of Agriculture, Forest Service, Pacific Northwest Region, Data Resources Management, 201 East 2nd Street, Joseph, OR 97846; **Daphne Stone** is a biological consultant, 30567 Le Bleu Road, Eugene, OR 97405; **Jason Hollinger** is an independent lichenologist, 11034 White Oak Road, Waynesville, NC 28785.

Cover (clockwise from upper left): *Letharia vulpina*, by Jason Hollinger; *Parmotrema arnoldii*, by Bruce McCune; *Usnea longissima*, by Richard Droker; and *Cladonia chlorophaea* group, by Jason Hollinger.

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Abstract

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Between 1989 and 2012, three Forest Service programs collected more than 8,300 surveys of epiphytic lichen communities, providing a baseline for tracking lichen responses to air quality, climate, and other changes on forest land in the United States. This national atlas of lichen species combines these datasets into distribution maps for more than 400 taxa and 6,000 forested locations across the country. All 115,500 lichen records presented in the maps link to voucher specimens, most of which can be accessed from herbaria. Unlike mapped herbarium records, most surveys were collected on a systematic national grid. Therefore, the absence of a species at a particular location can indicate meaningful information about its geographic distribution. Facets of the survey protocol, however, likely lead to the underrepresentation of rare, cryptic, and otherwise easily overlooked species in the dataset. Each species search lasted 2 hours, covering a nearly 1-a area in which surveyors aimed to capture all epiphytic macrolichens. Surveyors possessed various skill levels but underwent annual training, certification, and field audits by professional lichenologists. During the 23 years of data collection, many lichen names and species concepts have changed. This atlas dataset is the first to unite all records across the three parent programs by using a consistent taxonomic treatment. In some cases, maps represent "lumped" taxa or show only records from restricted timeframes. The species distribution maps, Atlas dataset, and tools for designing custom datasets are published online at https://www.fia.fs.fed.us/program-features/indicators/lichen.

Keywords: Air pollution, air quality, Air Resources Management Program, bioindicators, biomonitoring, climate change, epiphytic lichens, Forest Health Monitoring program, Forest Inventory and Analysis program, inventory, lichen, lichen distributions, macrolichens.

Contents

Introduction

Lichens are a significant part of the biodiversity in North America. To date, 5,561 species of lichens and allied fungi are known to inhabit the continental United States and Canada (Esslinger 2018). Lichens are formed by multiple organisms that live symbiotically—the main partners being a fungus and one or more photosynthetic organisms known as "photobionts." Photobionts may be green algae, a cyanobacterium, or both. The photobiont captures sunlight, providing sustenance in the form of carbohydrates, while the bulk of the lichen thallus ("body") is made up of fungal cells that surround the photobiont and provide protection from the environment.

Lichenologists have recently identified a variety of additional organisms occurring in some lichens, such as yeasts, bacterial microbiomes, and lichenicolous (i.e. parasitic) fungi, leading to the reconceptualization of lichens as "intricate metacommunities" rather than as simple two or three-partner symbioses (Lendemer et al. 2019). Depending upon which partners come together, lichens take on a wide variety of forms, ranging from large hair-like beards and leaf-like lobes to flat crusts and tiny pin-like bodies (fig. 1). Clearly, there is still much to discover about these unique assemblages of organisms.

In 1993, the USDA Forest Service's (Forest Service) national forest inventory began large-scale monitoring of epiphytic ("tree dwelling") lichen communities under the agency's Forest Health Monitoring (FHM) program (Stolte et al. 1993). Administration of the lichen inventory was later transferred to the Forest Service's Forest Inventory and Analysis (FIA) program, where it remains today. A third Forest Service program, the Air Resources Management (ARM) program administered by the National Forest System (NFS), uses a compatible protocol to provide air quality recommendations to Forest Service managers. The ARM program began monitoring lichens in southeast Alaska in 1989, expanding over time to include NFS and other lands in Oregon and Washington, and increasingly elsewhere in the United States.

The purpose of lichen surveys is to evaluate environmental health on forest lands using lichens as bioindicators (McCune 2000, McCune et al. 1997), with detection of air quality and climate change as the core goals. Lichens are some of the most pollution- and climate-sensitive organisms on Earth because they lack roots and are unable to store water, making them dependent on atmospheric sources of moisture and nutrients. The thallus lacks a protective covering and so moisture, nutrients, and air pollutants are absorbed over the lichen's entire surface. To date, the Forest Service and its partners have used the lichen surveys in more than 90 research and monitoring studies (Jovan et al. 2020).

Richard Droker

Figure 1—Lichens grow in a wide variety of forms. (Top) *Hypogymnia apinnata*; (left center) *Graphis scripta*; (right center) *Calicium viride*; (bottom) *Ramalina menziesii*.

This national atlas (hereafter, the Atlas) is the culmination of 23 years of surveys (1989–2012) and many years of effort merging data across the three parent programs in a user-friendly, consistent format. In the United States, 437 taxa were encountered in the 8,342 surveys conducted across 6,156 forested locations (figs. 2 and 3). The resulting lichen database is a vast resource of more than 115,500 records. Because most surveys were conducted on a national systematic grid, we expect the records for many species to be more geographically representative than herbarium records. Extenuating circumstances that potentially bias Atlas maps are discussed in the remaining subsections and also are noted in map captions. The 425 maps are available online as appendix 2 and can be downloaded at https://www.fia.fs.fed.us/program-features/indicators/lichen. The Atlas dataset is included in the national FIA lichen database (NFLD), which is available at the same website. All of the following topics are covered more extensively in the User Guide for the National FIA Lichen Database (Jovan et al. 2020).

Lichen Survey Method

The survey protocol was designed to employ non-expert crews for fieldwork. The goal is to capture all epiphytic macrolichen species (i.e., foliose and fruticose forms) within a 0.94-a circular area. The exceptions to this rule are ARM sites in Alaska, which are limited by their difficult terrain to a 0.12-a circular area. All surveys are timed, lasting a minimum of 30 minutes and a maximum of 2 hours, during which the surveyor collects a voucher specimen of each species occurring above 1.5 ft on natural woody substrates or in recent litterfall. Professional lichenologists train and certify surveyors, identify voucher specimens, and conduct most quality assurance (QA) measures, including resurveying some plots in each active region. These procedures are archived in full in the online appendixes of Jovan et al. (2020).

Surveyor expertise ranged from that of novice to professional lichenologist, although nearly all participants had at least some background in lichens or botany. Many participants surveyed lichens for 5 years or more. Each attended an annual 2- to 4-day training session that included both field forays and laboratory time to study lichen morphology using hand lenses and dissecting microscopes (fig. 4). Training focused on teaching the diagnostic features for differentiating species in the field with a 10 to 15× powered hand lens. For example, participants studied reproductive structural characteristics (size, shape, location, and type), lobe shape and branching patterns, and rhizine characteristics. Surveyors were encouraged to collect unusual and distinctive specimens. This helps boost the diversity of species captured and often results in multiple vouchers per species that show its morphological variability within a given plot. It also helps to capture small,

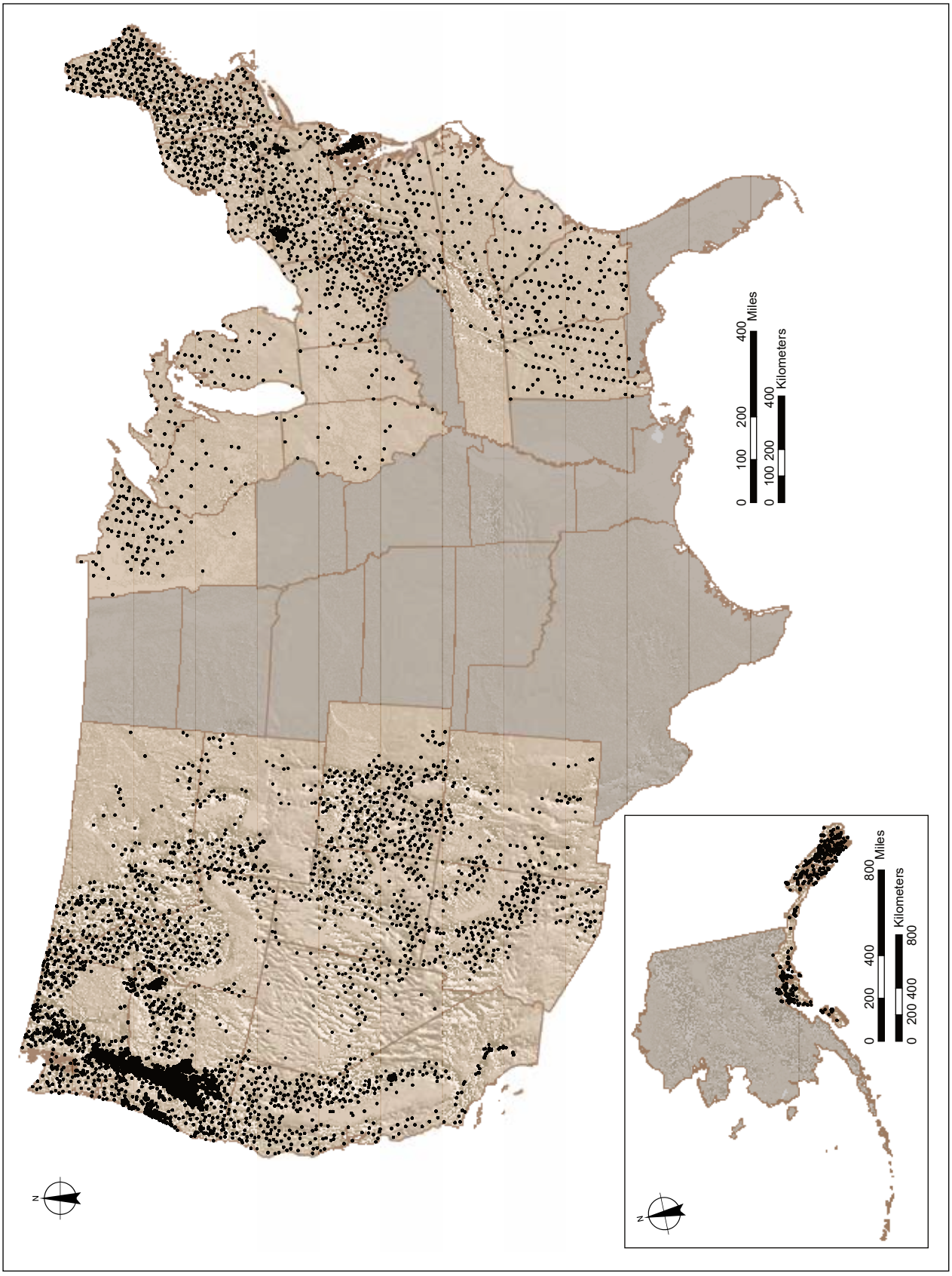

Figure 2—All lichen survey sites shown in the maps in the Atlas. Sites were visited up to four times, mostly on a systematic grid. States with low forest distributions (dominated by grass and shrub lands) do not have widespread or established Forest Inventory and Analysis surveys, and therefore remain unsampled for lichen. Other areas lacked sufficient funding to complete lichen surveys.

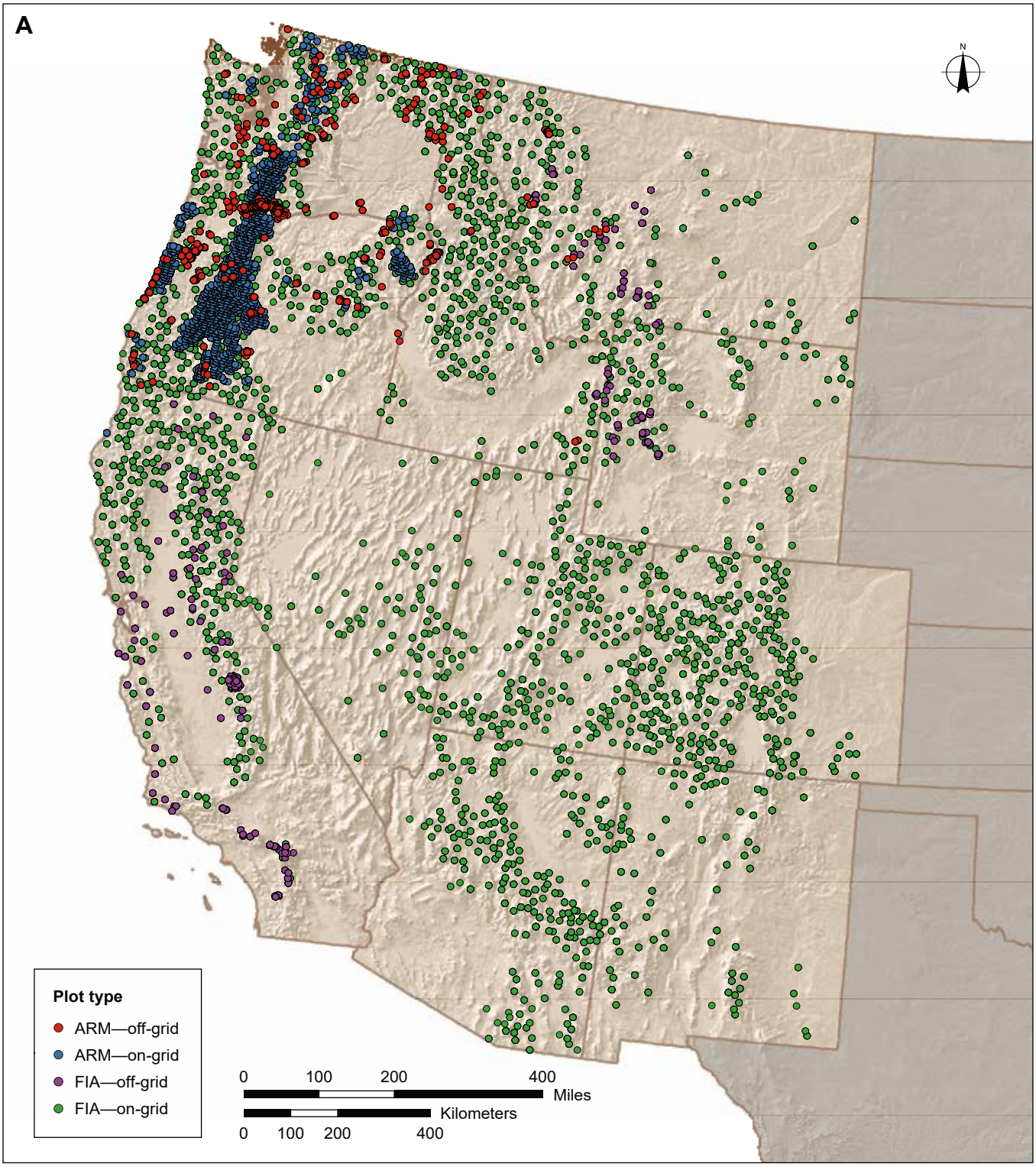

Figure 3—Lichen survey sites coded by plot type for (A) the western lower 48 States, (B) Alaska, and (C) the eastern lower 48 States. Forest Inventory and Analysis (FIA) plots include historical surveys conducted under the Forest Health Monitoring program. On-grid and off-grid refer to lichen survey sites located on and off the FIA national inventory grid, respectively. ARM = Air Resources Management.

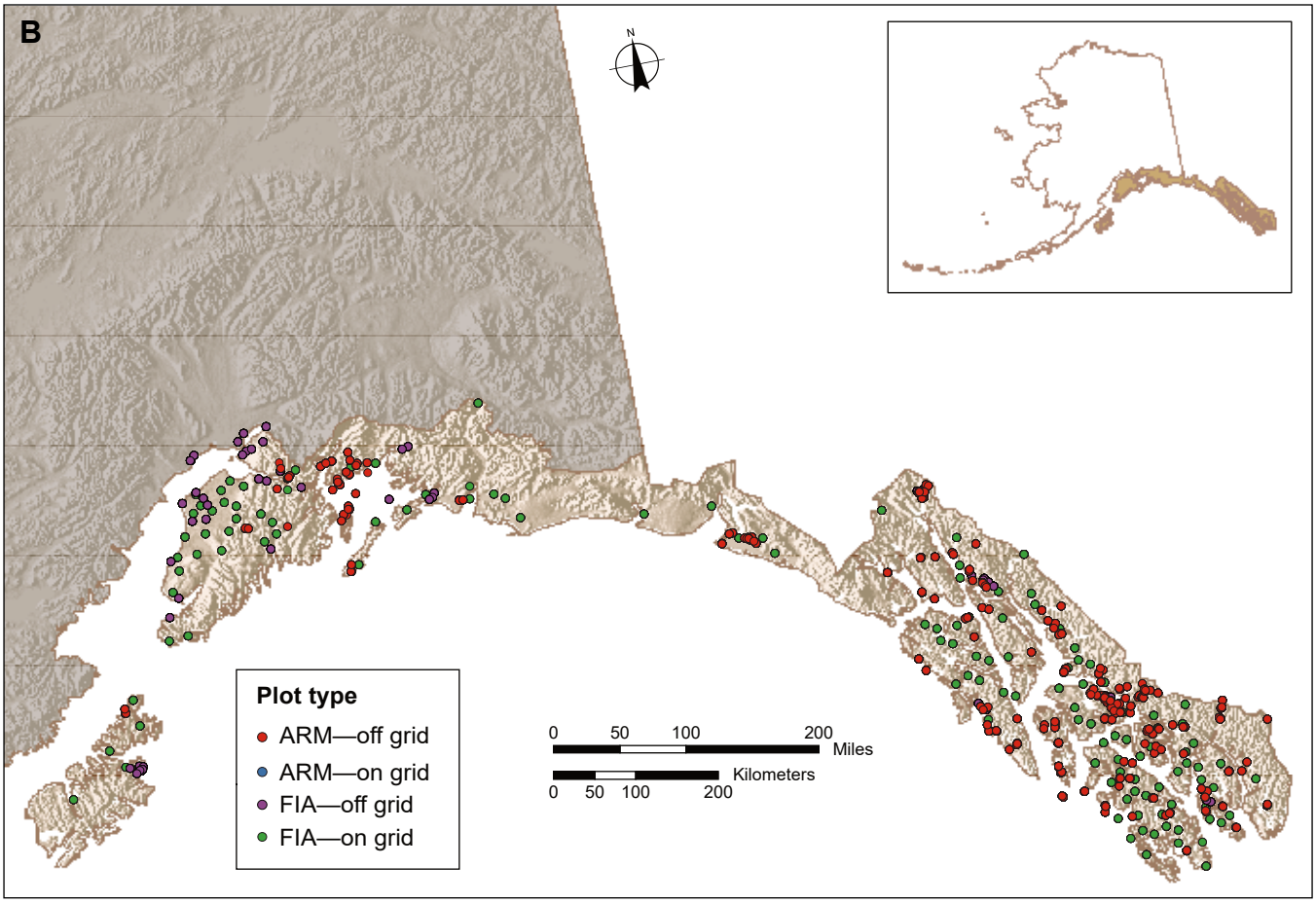

Figure 3—Continued.

inconspicuous species that were not noticed in the field but are nevertheless recorded by the lichenologist identifying the samples.

Training sessions for participants conducting lichen surveys concludes with a certification confirming that trainees successfully captured 65 percent of the species found by the expert lichenologist present. Species missed in practice surveys and field audits tend to be rare, diminutive, and difficult to distinguish from others; please be aware of this when viewing distribution maps. McCune et al. (1997) found that the 65 percent threshold gives repeatable results in studies relating lichen community responses to air quality and climate. Depending on region and program, 5 to 10 percent of lichen surveys are resurveyed to ensure the 65 percent diversity criterion is met (Patterson et al. 2009). Surveyors failing QA checks are given more training and then reevaluated. In the case of multiple failures, the surveyor abstains from further fieldwork but may attempt to recertify in future years.

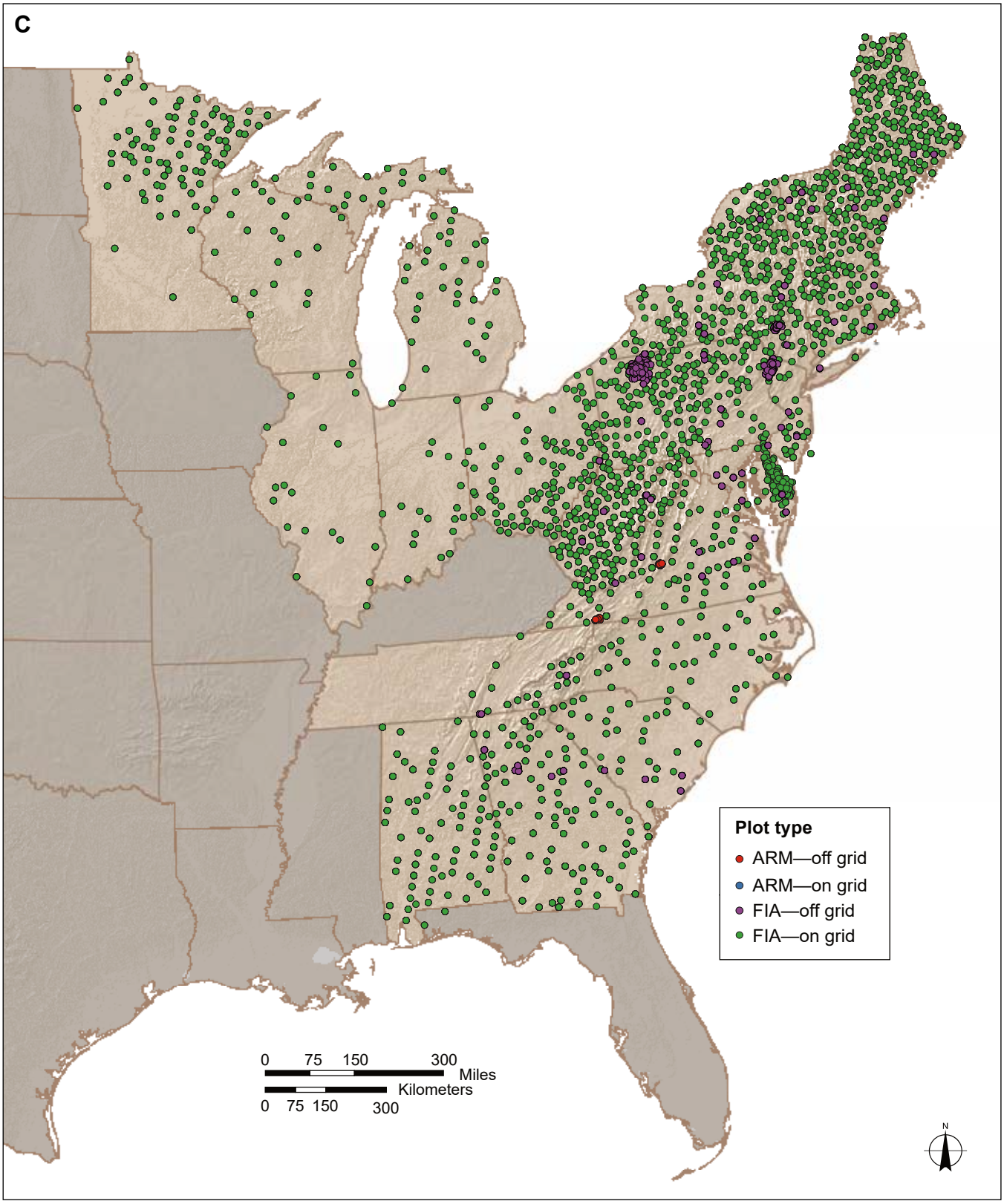

Figure 3—Continued.

USDA Forest Service photos

Figure 4—Lichen experts and Forest Service field crews in the process of learning survey protocols and collecting lichen vouchers.

Inventory Design

The Atlas brings together surveys on a national sampling grid with several hundred "off-grid" plots that were part of special studies by FIA and its partners (figs. 2 and 3). Not all States have been inventoried for lichens, and the number of surveys varies widely by State and by year (fig. 5). Because of shifting budgets, the number of revisits to each site ranges from zero to three across varied time intervals. In 2012, field activity was reduced and the focus narrowed to specific research questions or management needs. Thus, the large-scale Atlas dataset serves as a valuable baseline for ongoing research. Since the 2012 field season, FIA's partners have conducted an increasingly larger proportion of surveys. Partners who certify in the FIA method and follow the field and identification procedures described in Jovan et al. (2020) are encouraged to submit surveys to the NFLD. These more recent data will be included in future releases.

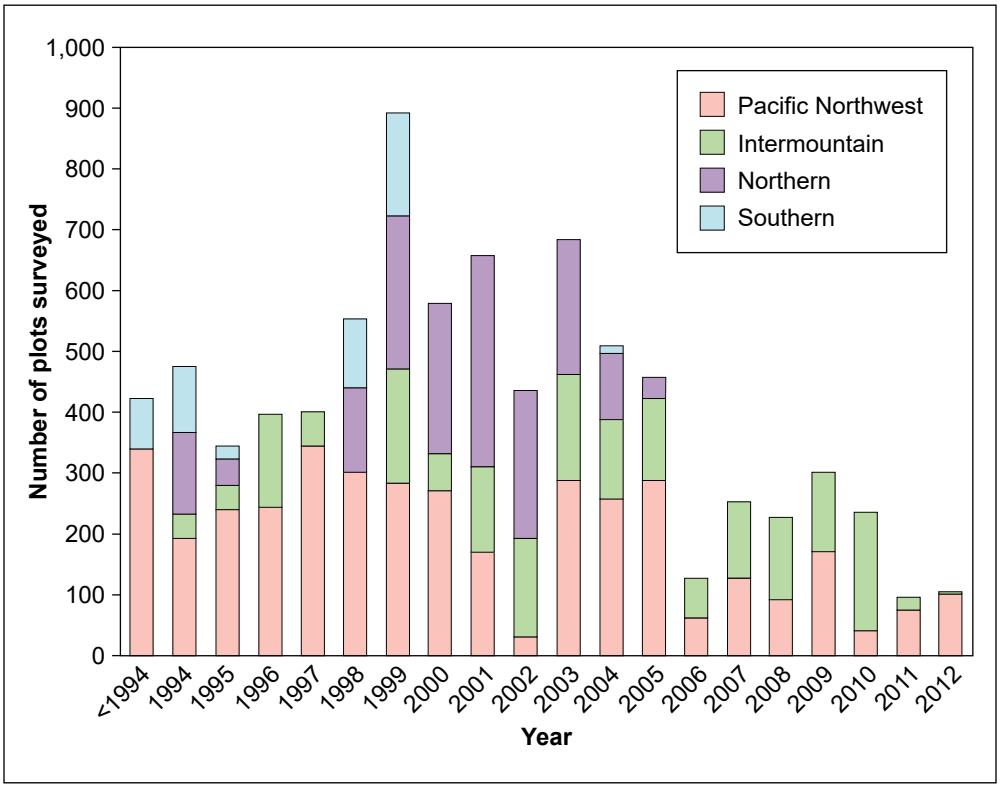

Figure 5—Number of standardized lichen surveys collected by the Forest Service by year and region.

The FIA program collects detailed measurements of forest structure on a systematic 2.1-mi (3.4-km) permanent sampling grid. Plots on the grid span all land ownerships and occur at a frequency of 1 plot per 6,000 a (Bechtold and Patterson 2005). Lichen surveys under FHM and FIA were typically conducted on every 16th plot on the FIA grid. All surveys on the grid can be linked to hundreds of other inventory measurements on trees, understory vegetation, soils, down woody debris, disturbance, and land ownership. As the FIA program's definition of forest requires the presence of at least a 10-percent canopy cover of live trees, certain habitats with characteristically low cover, such as oak woodlands, chaparral, and dryland scrub, are undersampled on the FIA grid. Thus, lichen species associated with these habitats (e.g., *Ramalina menziesii*) are underrepresented in the Atlas.

The ARM program primarily conducts lichen surveys in Oregon, Washington, and southeast Alaska, with revisits every 10 years to wilderness sites. Nonwilderness sites are also revisited periodically. Most ARM sites are on the FIA grid on national forest land and thus link to FIA's co-located forest measurements. The ARM program uses a separate sampling grid in Alaska (Geiser et al. 1994). Almost all ARM surveys link to measurements of heavy metals, nitrogen, and sulfur accumulated in lichen thalli, a valuable addition to air quality studies that use these lichen data.

Taxonomy and Identification

Professional lichenologists used dissecting microscopes, chemical spot tests, and ultraviolet lamps for species identification. The ARM program uses thin-layer chromatography (TLC) where appropriate, whereas FHM and FIA use TLC only occasionally. Thallus cross sections and examination of spores are not required for the identification of FHM and FIA specimens, although experts often do these anyway. In the Atlas maps, cryptic species requiring these extra steps or TLC for identification are often mapped together. Differences in species concepts used by the FHM, FIA, and ARM programs are noted in map captions and can be used for customizing datasets that combine records across programs.

More than 300 changes in species names or concepts occurred during the 23 years of data collection, each introducing discontinuity into the Atlas dataset. The FIA program maintains a list of accepted names, including instructions for how to reconcile them across different timeframes (see app. 1). Any divergence from those instructions, such as lumping taxa in different ways, mapping only records from a limited timeframe, or mapping only annotated specimens, is noted in the map captions. In a handful of cases (e.g., some *Xanthomendoza* species), distributions are innacurate because of unfortunate timing between field work activities and major

taxonomic revisions. This problem occurs because the timing of plot visits is not distributed evenly by State and over time. Extreme cases are noted in the map caption.

The Atlas dataset as provided in the NFLD does include original determinations for each specimen so that users can apply their own taxonomic rules. Our list of accepted lichen names largely agrees with the latest North American lichen checklist (version 23) (Esslinger 2018).[1] The most notable divergence is our adoption of Divakar et al.'s (2017) phylogeny for cetrarioid species, a group that has been in controversy for some time. We updated the Atlas dataset using the table in appendix 1 unless it was noted otherwise in map captions. Acceptance of new names to the list may lag a couple of years to ensure that new names gain wide acceptance. Longer lag periods are common because names are not always updated until the taxon is encountered in the field or data analysis. Accepted common names are mostly from Brodo et al. (2001).

For publication in the Atlas, we reexamined a large sample of vouchers for a few taxa (sorediate *Xanthomendoza*, *Platismatia glauca*/*wheeleri*, *Parmelia barrenoae*/*sulcata*) and, when possible, for species appearing far outside their known ranges. Generally, the three Forest Service parent programs do not systematically revisit all specimens. Many vouchers recently became available for public use because the National Science Foundation funded the transfer of tens of thousands of collections to the Oregon State University herbarium. Other herbaria housing significant vouchers include those at the Duke University Herbarium, University of Alaska Fairbanks, University of Alaska Anchorage, and Wisconsin State University, as well as a large collection of ARM specimens hosted by the Siuslaw National Forest. Annotations by lichenologists who are not affiliated with this project are not yet tracked in the NFLD but could be compiled for future data releases depending on interest. For now, annotations by experts are written on the specimens themselves and can be viewed through the relevant herbarium's Web portal. Often, multiple specimens are available for the same species at a plot, a prerequisite of using nonspecialist surveyors. The morphological variation captured may be valuable in taxonomic studies, although Forest Service specimens tend to be smaller than the typical field collections of experts.

[1] https://www.ndsu.edu/pubweb/~esslinge/chcklst/chcklst7.htm.

Data Use and Acquisition

A variety of studies use the Atlas dataset for air quality biomonitoring, such as mapping nitrogen pollution and effects (e.g., Jovan and McCune 2005; Jovan et al. 2012; Root et al. 2015; Will-Wolf et al. 2015, 2018), developing management guidelines for assessing threats to protected areas (e.g., critical loads) (Fenn et al. 2010; Geiser et al. 2010, 2019; Pardo et al. 2011; Root et al. 2015), and detecting effects of sulfur and acidic deposition (Geiser et al. 2019; Will-Wolf et al. 2006, 2015, 2018). The lichen data are increasingly used in policy development such as in the review of the national ambient air quality secondary standards for nitrogen and sulfur oxides (USEPA 2008) and as a tool for meeting Federal land monitoring mandates like the former Wilderness Challenge Program and more recent Wilderness Stewardship initiatives and regional monitoring plans. Their use in climate change research, such as in identifying vulnerable species (Root et al. 2014; Smith et al. 2017, 2019) and monitoring trends in survey data (Smith et al. 2017) is also under development. Other applications include habitat and species distribution modeling (Edwards et al. 2005, 2006; Glavich et al. 2005), floristics studies (Brodo 2016, Brodo et al. 2001, Hinds and Hinds 2007, McCune and Geiser 2009), and providing specimens for taxonomic revisions (e.g., Lindblom 2006, McCune et al. 2011, Velmala et al. 2014).

Obtaining Data

The Atlas dataset can be downloaded from a dedicated web page[2] serving as a hub for lichen inventory data as well as related publications and Forest Service websites. The Atlas, list of accepted lichen names, and recommendations for taxonomic reconciliation are all tables in the NFLD and are described in the User Guide (Jovan et al. 2020). The guide also provides information needed to build custom datasets and access the other forest inventory measurements collected at lichen survey locations. The hub for accessing more recent ARM data is the Forest Service Lichens and Air Quality website,[3] a work in progress that includes tools for on-the-fly mapping and houses several sources of data found nowhere else, including elemental data (nitrogen, sulfur, and heavy metals measured in lichens) as well as more than 4,000 other FS lichen surveys conducted using different survey protocols.

[2] https://www.fia.fs.fed.us/program-features/indicators/lichen.

[3] http://gis.nacse.org/lichenair.

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The FHM, FIA, and ARM lichen programs have relied on the dedication and hard work of more than 300 lichenologists, trainers, identification specialists, and surveyors.

Special thanks go to the founding scientists who established the program's objectives, methods, and procedures for implementation within the U.S. Forest Service: Bruce McCune, Linda Geiser, Jonathan Dey, Ken Stolte, Roger Rosentreter, and Karen Dillman; followed soon thereafter by Peter Neitlich and Susan Will-Wolf as lichen indicator advisors.

In addition to the continued investment of those above, many others played one or more critical leadership roles in keeping the lichen inventory going over the years, ranging from database management, taxonomic advising, field coordination, fulfilling analysis requests, and quality assurance to pioneering the data's use in regional gradient studies: Frank Bungartz, Ann DeBolt, Doug Glavich, Amanda Hardman, Sarah Jovan, Peter Nelson, Jerilyn Peck, Andrea Pipp, Jim Riley, Paul Rogers, Abby Rosso, Bruce Ryan, and Daphne Stone.

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Metric Equivalents

When you know:	Multiply by:	To get:
Feet (ft)	0.305	Meters
Miles (mi)	1.609	Kilometers
Acres (a)	.405	Hectares

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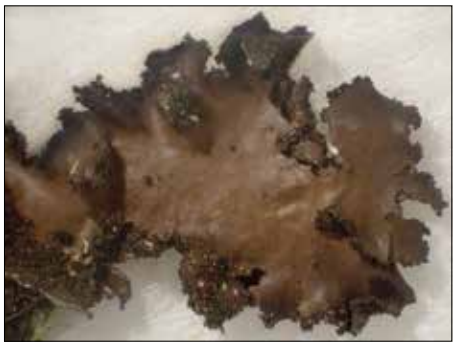
National Atlas Map Set

Maps for each lichen species, as depicted in figure 3, are available in appendix 2 at https://www.fia.fs.fed.us/program-features/indicators/lichen.

Gallery of Lichen Species Depicted in Atlas Maps

Note: A gray box indicates that no photo was available. Help us enhance our lichen photo collection by e-mailing your photos of these species to sarah.jovan@usda.gov.

***"Leptogium hirsutum"* C.W. Dodge**
Burnet's Jellyskin Lichen



***"Sticta weigelii"* (Ach.) Vainio**
Spotted Felt Lichen

***Alectoria imshaugii* Brodo & D. Hawksw.**
Spiny Witches Hair Lichen

***Alectoria lata* (Taylor) Lindsay**
Flowering Witches Hair Lichen

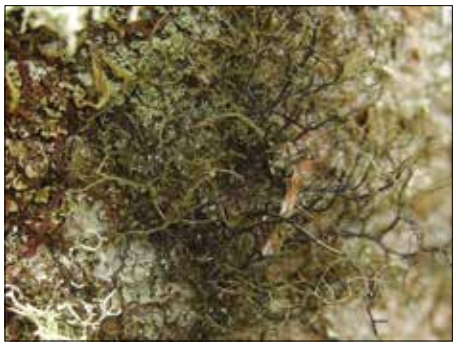
***Alectoria sarmentosa* (Ach.) Ach.**
Witches Hair Lichen

***Alectoria vancouverensis* (Gyelnik) Gyelnik ex Brodo & D. Hawksw.**
Vancouver Witches Hair Lichen

***Anaptychia palmulata* (Michaux) Vainio**
Shaggy-Fringed Lichen

***Anzia colpodes* (Ach.) Stizenb.**
Black-Foam Lichen

***Bryocaulon pseudosatoanum* (Asahina) Kärnefelt**
Long Foxhair Lichen



***Bryoria bicolor* (Ehrh.) Brodo & D. Hawksw.**
Twocolor Horsehair Lichen

***Bryoria capillaris/pikei* (Ach.) Brodo & D. Hawksw./Brodo & D.Hawksw.**
Gray Horsehair Lichen

***Bryoria carlottae* Brodo & D. Hawksw.**
Carlott's Horsehair Lichen

***Bryoria cervinula* Motyka ex Brodo & D. Hawksw.**
Horsehair Lichen

***Bryoria fremontii* (Tuck.) Brodo & D. Hawksw.**
Black Horsehair Lichen

***Bryoria friabilis* Brodo & D. Hawksw.**
Horsehair Lichen

***Bryoria furcellata* (Fr.) Brodo & D. Hawksw.**
Burred Horsehair Lichen

***Bryoria fuscescens* (Gyelnik) Brodo & D. Hawksw.**
Pale-Footed Horsehair Lichen

***Bryoria implexa* (Hoffm.) Brodo & D. Hawksw.**
Horsehair Lichen

***Bryoria nadvornikiana* (Gyelnik) Brodo & D. Hawksw.**
Spiny Gray Horsehair Lichen

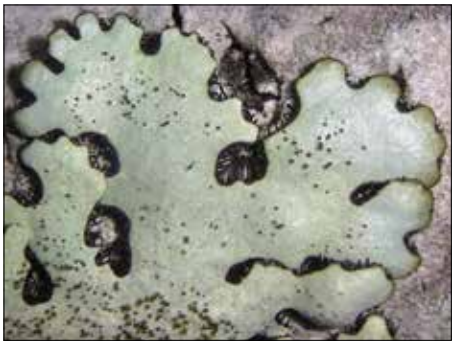
***Bryoria pseudofuscescens* (Gyelnik) Brodo & D. Hawksw.**
Mountain Horsehair Lichen

***Bryoria simplicior* (Vainio) Brodo & D. Hawksw.**
Horsehair Lichen

***Bryoria tenuis* (E. Dahl) Brodo & D. Hawksw.**
Horsehair Lichen

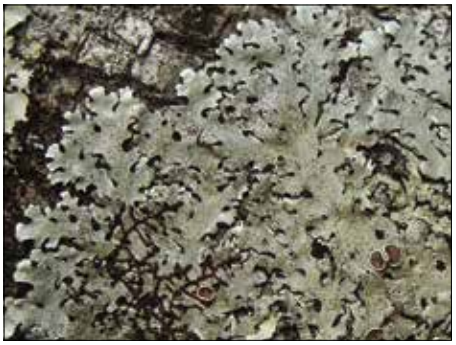
***Bryoria trichodes* (Michaux) Brodo & D. Hawksw.**
Horsehair Lichen

***Bulbothrix confoederata* (Culb.) Hale**
Smooth Eyelash Lichen



***Bulbothrix isidiza* (Nyl.) Hale**
Eyelash Lichen

***Bulbothrix laevigatula* (Nyl.) Hale**
Matted Eyelash Lichen



***Bulbothrix scortella* (Zenker) Hale**
Eyelash Lichen

***Bunodophoron melanocarpum* (Sw.) Wedin**
Bunodophoron Lichen

***Candelaria concolor/pacifica* (Dicks.) Stein/M. Westb. & Arup**
Lemon Lichen

***Candelaria fibrosa* (Fr.) Müll. Arg.**
Lemon Lichen

***Canoparmelia amazonica* (Nyl.) Elix & Hale**
Amazon Shield Lichen

***Canoparmelia caroliniana* (Nyl.) Elix & Hale**
Carolina Shield Lichen

***Canoparmelia crozalsiana* (de Lesd.) Elix & Hale**
Sorediate Shield Lichen

***Canoparmelia cryptochlorophaea* (Hale) Elix & Hale**
Sorediate Shield Lichen

***Canoparmelia salacinifera* (Hale) Elix & Hale**
Isidiate Shield Lichen

***Canoparmelia texana* (Tuck.) Elix & Hale**
Texas Shield Lichen

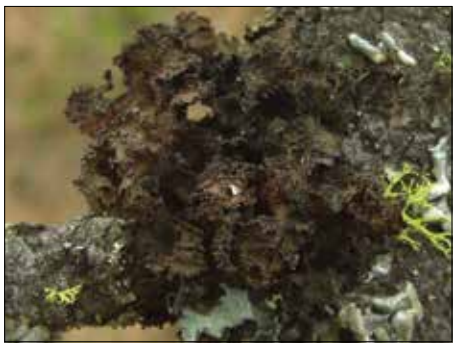
***Cetraria canadensis* (Räsänen) Räsänen**
Brown-Eyed Sunshine Lichen

***Cetraria ciliaris* Ach.**
Fringed Wrinkle-Lichen

***Cetraria oakesiana* Tuck.**
Yellow Ribbon Lichen

***Cetraria pallidula* Tuck. ex Riddle**
Pallid Candlewax Lichen

***Cetraria pinastri* (Scop.) Ach.**
Powdered Sunshine Lichen



***Cetraria platyphylla* Tuck.**
Broad Wrinkle-Lichen

***Cetraria sepincola* (Ehrh.) Ach.**
Brown Dwarf Wrinkle-Lichen

***Cetraria viridis* Schwein**
Hidden Sunshine Lichen

***Cetrelia cetrarioides* (Duby) W.L. Culb. & C.F. Culb.**
Giant Shield Lichen

***Cetrelia chicitae* (W.L. Culb.) W.L. Culb. & C.F. Culb.**
Chicita's Giant Shield Lichen

***Cetrelia olivetorum* (Nyl.) W.L. Culb. & C.F. Culb.**
Giant Shield Lichen

***Cladonia albonigra* Brodo & Ahti**
Cladonia Lichen

***Cladonia bellidiflora* (Ach.) Schaerer**
Toy Soldiers Lichen

***Cladonia caespiticia* (Pers.) Flörke**
Stubby-Stalked Cladonia Lichen

***Cladonia carneola* (Fr.) Fr.**
Crowned Pixie-Cup Lichen

***Cladonia cenotea* (Ach.) Schaerer**
Powdered Funnel Lichen

***Cladonia chlorophaea group* (Flörke ex Sommerf.) Sprengel**
Mealy Pixie-Cup Lichen

***Cladonia coniocraea/ochrochlora* (Flörke) Sprengel/Flörke**
Common Powderhorn Lichen

***Cladonia cristatella* Tuck.**
British Soldiers Lichen

***Cladonia cylindrica* (A. Evans) A. Evans**
Cylinder Cladonia Lichen

***Cladonia deformis* (L.) Hoffm.**
Lesser Sulphur-Cup Lichen

***Cladonia didyma* (Fée) Vainio**
Southern Soldiers Lichen

***Cladonia fimbriata* (L.) Fr.**
Trumpet Lichen

***Cladonia furcata* (Hudson) Schrader**
Many-Forked Cladonia Lichen

***Cladonia grayi* G. Merr. ex Sandst.'**
Gray's Cladonia Lichen

***Cladonia macilenta* Hoffm.**
Lipstick Powderhorn Lichen

***Cladonia macilenta* var. *bacillaris* (Ach) Schaerer**
Lipstick Powderhorn Lichen

***Cladonia norvegica* Tønsberg & Holien**
Cladonia Lichen

***Cladonia parasitica* (Hoffm.) Hoffm.**
Fence-Rail Cladonia Lichen

***Cladonia peziziformis* (With.) J.R.**
Laundon Turban Cladonia Lichen

***Cladonia pleurota* (Flörke) Schaerer**
Red-Fruited Pixie-Cup Lichen

***Cladonia pyxidata* (L.) Hoffm.**
Pebbled Pixie-Cup Lichen

***Cladonia ramulosa* (With.) J.R.**
Laundon Cladonia Lichen

***Cladonia rei* Schaerer**
Wand Cladonia Lichen

***Cladonia squamosa* Hoffm.**
Dragon Cladonia Lichen

***Cladonia sulphurina* (Michaux) Fr.**
Greater Sulphur-Cup Lichen

***Cladonia transcendens* (Vainio) Vainio**
Vainio Cladonia Lichen

***Cladonia umbricola* Tønsberg & Ahti**
Shaded Cladonia Lichen

***Cladonia verruculosa* (Vainio) Ahti**
Wand Cladonia Lichen

***Coccocarpia erythroxyli* (Sprengel) Swinscow & Krog**
Fruiting Shell Lichen

***Coccocarpia palmicola* (Sprengel) Arv. & D. J. Galloway**
Galloway Salted Shell Lichen

***Collema curtisporum* Degel.**
Blistered Jelly Lichen

***Collema furfuraceum* (Arnold) Du Rietz**
Blistered Jelly Lichen

***Collema nigrescens* (Hudson) DC.**
Blistered Jelly Lichen

***Collema subflaccidum* Degel.**
Tree Jelly Lichen

***Dendriscocaulon intricatulum* (Nyl.) Henssen**
Olive-Thorn Lichen

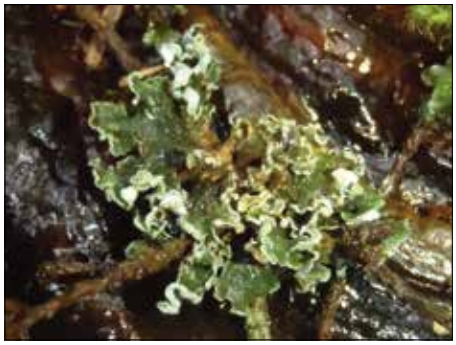
***Dirinaria applanata* (Fée) D.D. Awasthi**
Powdery Medallion Lichen

***Dirinaria confusa* D.D. Awasthi**
Medallion Lichen

***Dirinaria confusa* D.D. Awasthi**
Medallion Lichen

***Dirinaria picta* (Sw.) Clem. & Shear**
Powdery Medallion Lichen

***Enchylium conglomeratum* Hoffm.**
Conglomerate Jelly Lichen



***Erioderma sorediatum* D.J. Galloway & P.M. Jørg.**
Mouse-Ears Lichen

***Esslingeriana idahoensis* (Essl.) Hale & M.J. Lai**
Tinted Rag Lichen

***Evernia divaricata* (L.) Ach.**
Mountain Oakmoss Lichen

***Evernia mesomorpha* Nyl.**
Boreal Oakmoss Lichen

***Evernia prunastri* (L.) Ach.**
Oakmoss Lichen

***Flavoparmelia baltimorensis* (Gyelnik & Fóriss) Hale**
Rock Greenshield Lichen

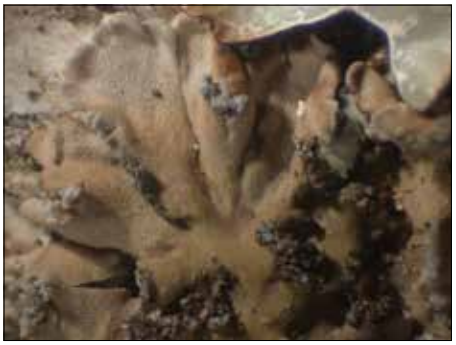
***Flavoparmelia caperata* (L.) Hale**
Common Greenshield Lichen

***Flavopunctelia darrowi* (J.W. Thomson) Hale Darrow's**
Speckled Greenshield Lichen

***Flavopunctelia flaventior* (Stirton) Hale**
Speckled Greenshield Lichen

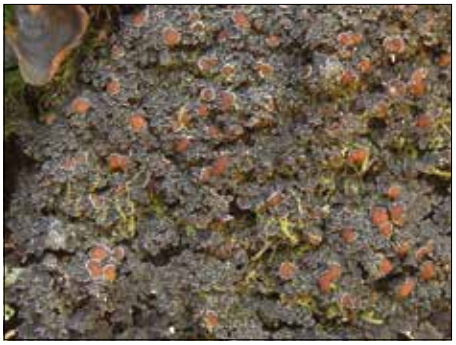
***Flavopunctelia praesignis* (Nyl.) Hale**
Fruiting Speckled Greenshield Lichen

***Flavopunctelia soredica* (Nyl.) Hale**
Powder-Edged Speckled Greenshield Lichen



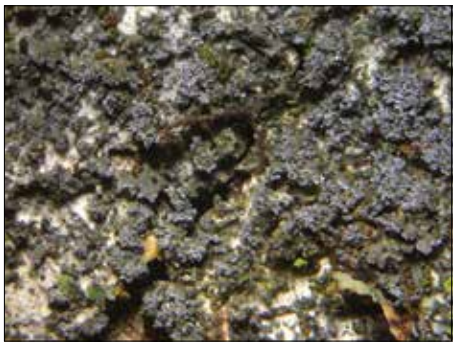
***Fuscopannaria ahlneri* (P.M. Jørg.) P.M. Jørg.**
Shingle Lichen

***Fuscopannaria laceratula* (Hue) P.M. Jørg.**
Shingle Lichen



***Fuscopannaria leucosticta* (Tuck.) P.M. Jørg.**
Rimmed Shingle Lichen

***Fuscopannaria leucostictoides* (Ohlsson) P.M. Jørg.**
Petaled Shingle Lichen



***Fuscopannaria mediterranea* (Tav.) P.M. Jørg.**
Shingle Lichen

***Fuscopannaria pacifica* P.M. Jørg.**
Shingle Lichen

***Fuscopannaria ramulina* P.M. Jørg. & Tønsberg**
Shingle Lichen

***Heterodermia albicans* (Pers.) Swinscow & Krog**
White Fringe Lichen

***Heterodermia appalachensis* (Kurok.) W.L. Culb.**
Appalachian Fringe Lichen

***Heterodermia casarettiana* (A. Massal.) Trevisan**
Purple-Bottomed Fringe Lichen

***Heterodermia echinata* (Taylor) W. L. Culb.**
Flowering Fringe Lichen

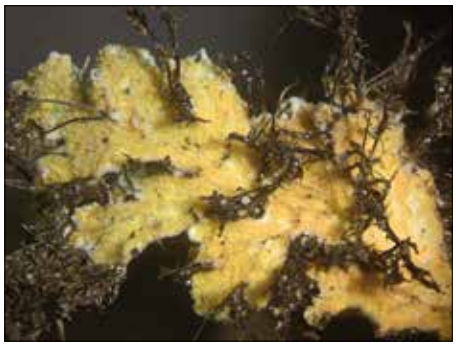
***Heterodermia galactophylla* (Tuck.) W. L. Culb.**
Fringe Lichen

***Heterodermia granulifera* (Ach.) W. L. Culb.**
Fingered Fringe Lichen

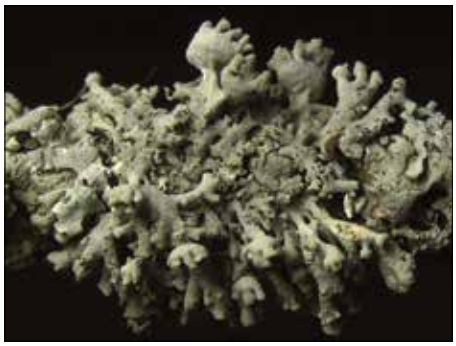
***Heterodermia hypoleuca* (Ach.) Trevisan**
Cupped Fringe Lichen

***Heterodermia japonica* (M. Satô) Swinscow & Krog**
Fringe Lichen

***Heterodermia leucomela* (L.) Poelt**
Elegant Fringe Lichen



***Heterodermia obscurata* (Nyl.) Trevisan**
Orange-Tinted Fringe Lichen



***Heterodermia podocarpa* (Bél.) Awasthi**
Fringe Lichen

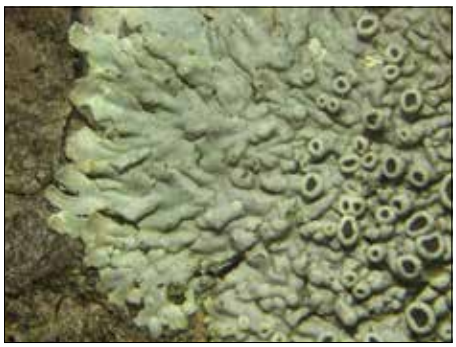
***Heterodermia rugulosa* (Kurok.) Wetmore**
Dusted Cupped Fringe Lichen

***Heterodermia speciosa* (Wulfen) Trevisan**
Powdered Fringe Lichen

***Heterodermia squamulosa* (Degel.) W.L. Culb.**
Scaly Fringe Lichen

***Heterodermia tropica* (Kurok.) Sipman**
Tropic Fringe Lichen

***Hyperphyscia adglutinata/confusa* (Flörke) H. Mayrhofer & Poelt/Essl. et al.**
Grainy Shadow-Crust Lichen



***Hyperphyscia syncolla* (Tuck. ex Nyl.) Kalb**
Smooth Shadow-Crust Lichen

***Hypogymnia apinnata* Goward & McCune**
Beaded Tube Lichen

***Hypogymnia austerodes* (Nyl.) Räsänen**
Varnished Tube Lichen

***Hypogymnia bitteri* (Lynge) Ahti**
Powdered Tube Lichen

***Hypogymnia canadensis* Goward & McCune**
Tube Lichen

***Hypogymnia duplicata* (Ach.) Rass.**
Ticker-Tape Tube Lichen

***Hypogymnia enteromorpha* (Ach.) Nyl.**
Budding Tube Lichen

***Hypogymnia farinacea* Zopf**
Tube Lichen

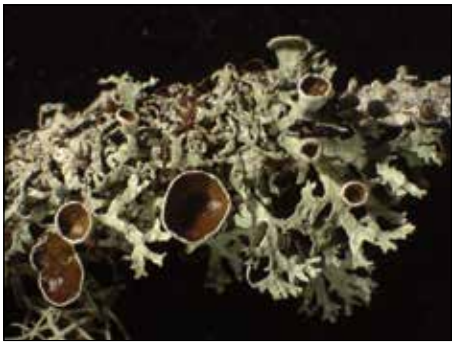
***Hypogymnia heterophylla* L. Pike**
Seaside Tube Lichen

***Hypogymnia hultenii* (Degel.) Krog**
Hulten's Pitted Lichen

***Hypogymnia imshaugii* Krog**
Forked Tube Lichen

***Hypogymnia inactiva* (Krog) Ohlsson**
Mottled Tube Lichen

***Hypogymnia krogiae* Ohlsson**
Freckled Tube Lichen



***Hypogymnia lophyrea* (Ach.) Krog**
Pitted Tube Lichen

***Hypogymnia occidentalis* L. Pike**
Lattice Tube Lichen

***Hypogymnia oceanica* Goward**
Seaside Tube Lichen

***Hypogymnia physodes* (L.) Nyl.**
Hooded Tube Lichen

***Hypogymnia pulverata* (Nyl. ex Crombie) Elix**
Solid Tube Lichen

***Hypogymnia rugosa* (G. Merr.) L. Pike**
Wrinkled Tube Lichen

***Hypogymnia tubulosa* (Schaerer) Hav.**
Powder-Headed Tube Lichen

***Hypogymnia vittata* (Ach.) Parrique**
Brownish Monk's-Hood Tube Lichen

***Hypogymnia wilfiana* Goward, T. Spribille & Ahti**
Tube Lichen

***Hypotrachyna afrorevoluta* (Krog & Swinscow) Krog & Swinscow**
Loop Lichen

***Hypotrachyna catawbiensis* (Degel.) Hale ex Sipman**
Powder-Tipped Loop Lichen

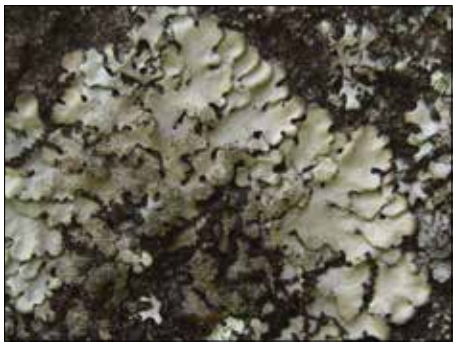
***Hypotrachyna croceopustulata* (Kurok.) Hale**
Yellow-Cored Loop Lichen

***Hypotrachyna horrescens* (Taylor) Elix & Hale**
Hairy-Spined Loop Lichen

***Hypotrachyna imbricatula* (Zahlbr.) Hale**
Loop Lichen

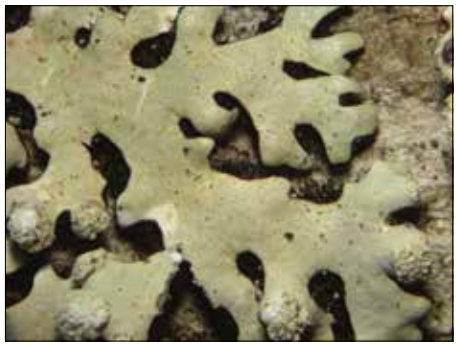
***Hypotrachyna laevigata* (Sm.) Hale**
Grainy Loop Lichen

***Hypotrachyna livida* (Taylor) Hale**
Wrinkled Loop Lichen



***Hypotrachyna minarum* (Vainio) Elix & Hale**
Hairless-Spined Loop Lichen

***Hypotrachyna osseoalba* (Vainio) Park & Hale**
Grainy Loop Lichen

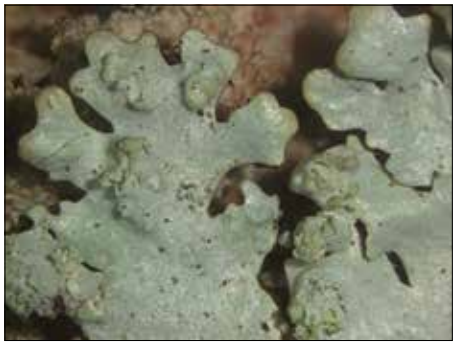


***Hypotrachyna pseudosinuosa* (Asahina) Hale**
Loop Lichen

***Hypotrachyna pulvinata* (Fée) Hale**
Smooth Loop Lichen

***Hypotrachyna pustulifera* (Hale) Skorepa**
Grainy Loop Lichen

***Hypotrachyna revoluta* (Flörke) Hale**
Powdered Loop Lichen



***Hypotrachyna showmanii* Hale**
Loop Lichen

***Hypotrachyna sinuosa* (Sm.) Hale**
Green Loop Lichen

***Hypotrachyna spumosa* (Asahina) Elix & Hale**
Pustuled Loop Lichen

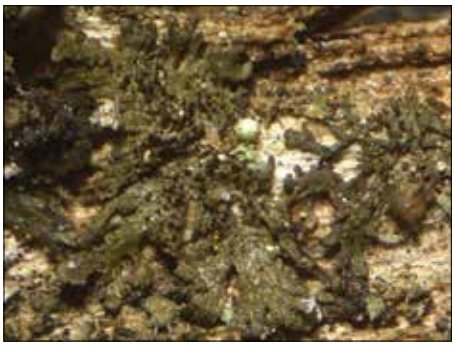
***Hypotrachyna swinscowii* (Hale) Elix & Hale**
Loop Lichen

***Hypotrachyna taylorensis* (M.E. Mitch.) Hale**
Powdered Loop Lichen

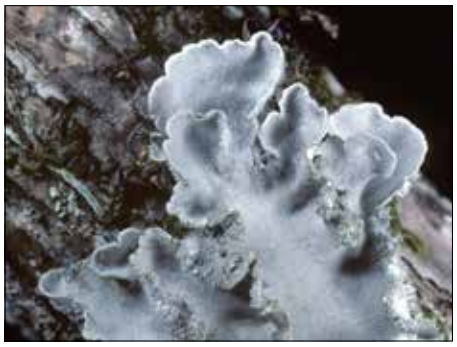
***Hypotrachyna virginica* (Hale) Hale**
Virginia Loop Lichen

***Imshaugia aleurites* (Ach.) S.F. Meyer**
Salted Starburst Lichen

***Imshaugia placorodia* (Ach.) S.F. Meyer**
American Starburst Lichen



***Koerberia biformis* A. Massal.**
Bark Brownette Lichen



***Leioderma sorediatum* D.J. Galloway & P.M. Jørg.**
Treepelt Mouse-Ears Lichen

***Leptochidium albociliatum* (Desm.) M. Choisy**
Whiskered Jelly Lichen

***Leptogidium contortum* (Henssen) T. Sprib. & Muggia**
Jelly Lichen

***Leptogidium dendriscum* (Nyl.) Nyl.**
Jelly Lichen

***Leptogium acadiense* J.W. Hinds, F.L. Anderson & Lendemer**
Jellyskin Lichen

***Leptogium arsenei* Sierk**
Ruffled Jellyskin Lichen

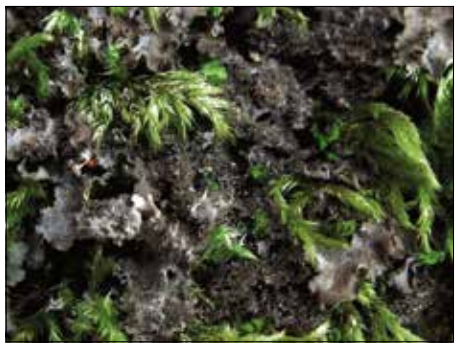
***Leptogium austroamericanum* (Malme) C.W. Dodge**
Dixie Jellyskin Lichen

***Leptogium corticola* (Taylor) Tuck.**
Blistered Jellyskin Lichen

***Leptogium cyanescens* (Rabenh.) Körber**
Blue Jellyskin Lichen

***Leptogium hirsutum* Sierk**
Hairy Jellyskin Lichen

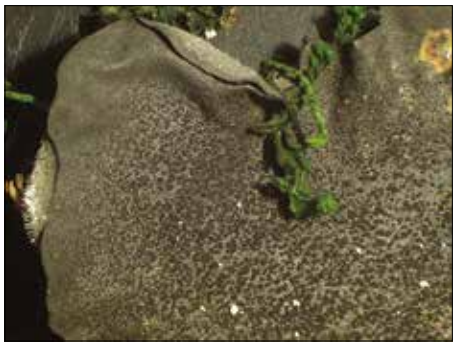
***Leptogium insigne* P.M. Jørg. & Tønsberg**
Jellyskin Lichen



***Leptogium laceroides* (B. de Lesd.) P.M. Jørg.**
Dimpled Jellyskin Lichen

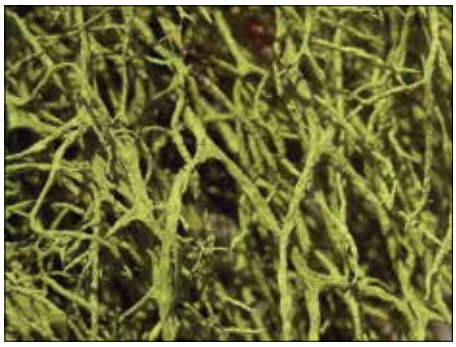
***Leptogium milligranum* Sierk**
Stretched Jellyskin Lichen

***Leptogium pseudofurfuraceum* P.M. Jørg. & Wallace**
Dimpled Jellyskin Lichen



***Leptogium saturninum* (Dickson) Nyl.**
Bearded Jellyskin Lichen

***Letharia columbiana* (Nutt.) J.W. Thomson**
Brown-Eyed Wolf Lichen



***Letharia vulpina* (L.) Hue**
Wolf Lichen

***Lobaria amplissima* (Scop.) Forssell**
Lung Lichen

***Lobaria anomala* (Brodo & Ahti) T. Spribille & McCune**
Netted Lung Lichen

***Lobaria anthraspis* (Ach.) T. Sprib. & McCune**
Dimpled Lung Lichen

***Lobaria hallii* (Tuck.) Zahlbr.**
Gray Lung Lichen

***Lobaria linita* (Ach.) Rabenh.**
Cabbage Lung Lichen

***Lobaria oregana* (Tuck.) Müll. Arg.**
Lettuce Lung Lichen

***Lobaria pulmonaria* (L.) Hoffm.**
Lung Lichen

***Lobaria quercizans* Michaux**
Smooth Lung Lichen

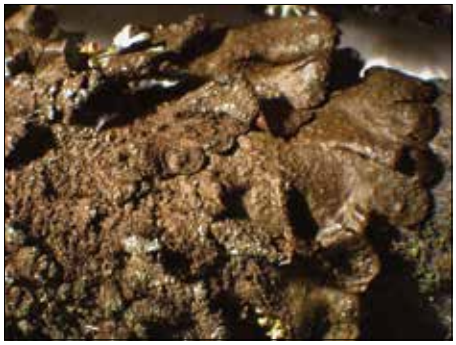
***Lobaria ravenelii* (Tuck.) Yoshim. Dixie**
Lung Lichen

***Lobaria retigera* (Bory) Trevisan**
Lung Lichen

***Lobaria scrobiculata* (Scop.) DC.**
Textured Lung Lichen

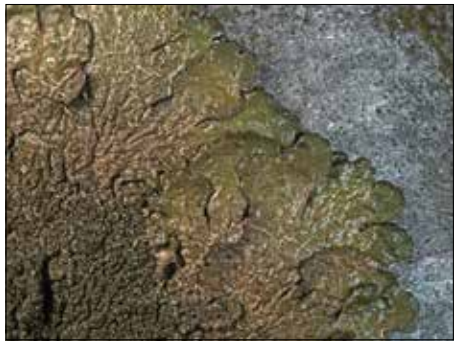
***Melanelixia albertana* (Ahti) O. Blanco et al.**
Powder-Rimmed Camouflage Lichen

***Melanelixia californica* (Schaerer) O. Blanco et al.**
Camouflage Lichen

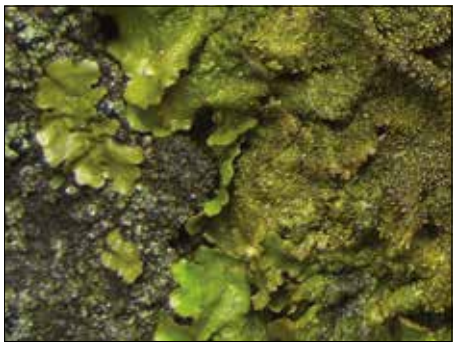


***Melanelixia glabratula* (Fr. ex Duby) O. Blanco et al.**
Shiny Camouflage Lichen

***Melanelixia subargentifera* (Nyl.) O. Blanco et al.**
Whiskered Camouflage Lichen

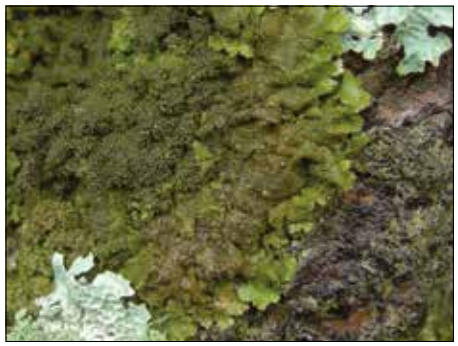


***Melanelixia subaurifera* (Nyl.) O. Blanco et al.**
Abraded Camouflage Lichen

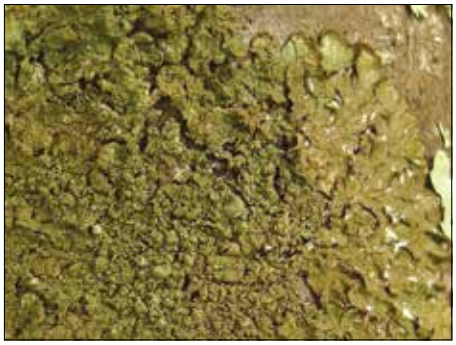


***Melanohalea elegantula* (Zahlbr.) O. Blanco et al.**
Elegant Brown Lichen

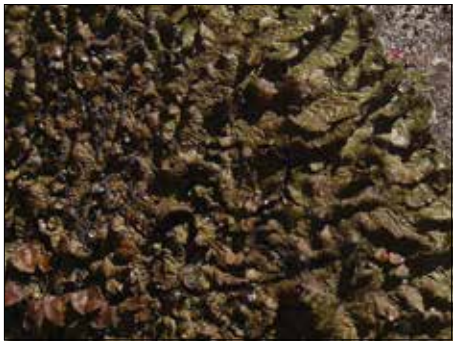
***Melanohalea exasperata* (De Not.) O. Blanco et al.**
Brown-Eyed Brown Lichen



***Melanohalea exasperatulai* (Nyl.) O. Blanco et al.**
Lustrous Brown Lichen



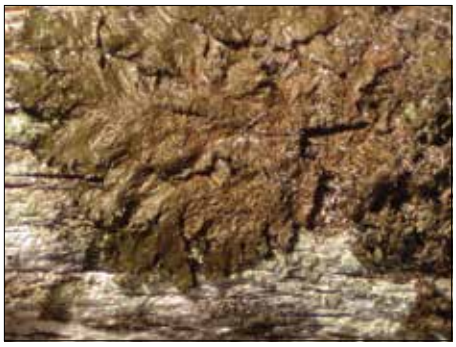
***Melanohalea halei* (Ahti) O. Blanco et al.**
Brown Lichen



***Melanohalea multispora* (A. Schneider) O. Blanco et al.**
Many-Spored Brown Lichen

***Melanohalea olivacea* (L.) O. Blanco et al.**
Spotted Brown Lichen

***Melanohalea septentrionalis* (Lynge) O. Blanco et al.**
Northern Brown Lichen



***Melanohalea subelegantula* (Essl.) O. Blanco et al.**
Lattice Brown Lichen

***Melanohalea subolivacea/multispora* (Nyl.) O. Blanco et al./(A. Schneid.) O. Blanco et al.**
Brown-Eyed Brown Lichen

***Melanohalea trabeculata* (Ahti) O. Blanco et al.**
Brown Lichen

***Menegazzia subsimilis/terebrata* (H. Magn.) R. Sant. /(Hoffm.) A. Massal**
Honeycombed Lichen

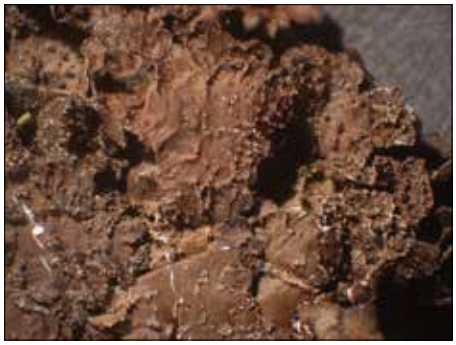
***Myelochroa aurulenta* (Tuck.) Elix & Hale**
Powdery Axil-Bristle Lichen

***Myelochroa galbina* (Ach.) Elix & Hale**
Smooth Axil-Bristle Lichen

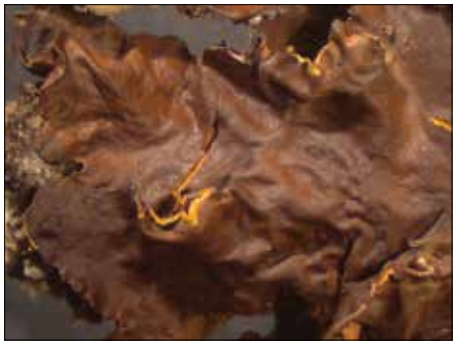
***Myelochroa metarevoluta* (Asahina) Elix & Hale**
Axil-Bristle Lichen

***Nephroma bellum* (Sprengel) Tuck.**
Naked Kidney Lichen

***Nephroma helveticum* Ach.**
Fringed Kidney Lichen



***Nephroma isidiosum* (Nyl.) Gyelnik**
Peppered Kidney Lichen



***Nephroma laevigatum* Ach.**
Mustard Kidney Lichen

***Nephroma occultum* Wetmore**
Cryptic Kidney Lichen

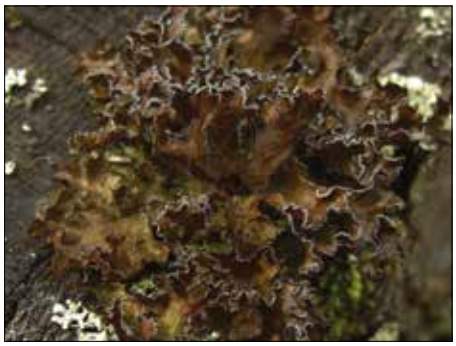
***Nephroma parile* (Ach.) Ach.**
Powdery Kidney Lichen

***Nephroma resupinatum* (L.) Ach.**
Pimpled Kidney Lichen

***Nephromopsis americana* (Nyl.) Divakar, A. Crespo & Lumbsch**
Fringed Wrinkle-Lichen

***Nephromopsis arizonica* (Essl.) Divakar, A. Crespo & Lumbsch**
Arizona Wrinkle-Lichen

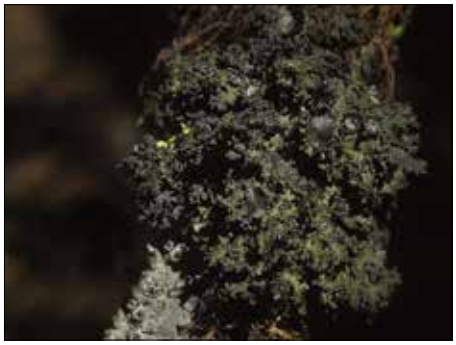
***Nephromopsis aurescens* (Tuck.) Divakar, A. Crespo & Lumbsch**
Eastern Candlewax Lichen



***Nephromopsis chlorophylla* (Willd.) Divakar, A. Crespo & Lumbsch**
Greenleaf (or Powdered) Wrinkle-Lichen

***Nephromopsis coralligera* (W.A. Weber) Divakar, A. Crespo & Lumbsch**
Coral-Edged Wrinkle-Lichen

***Nephromopsis fendleri* (Nyl.) Divakar, A. Crespo & Lumbsch**
Dwarf Wrinkle-Lichen



***Nephromopsis merrillii* (Du Rietz) Divakar, A. Crespo & Lumbsch**

Flattened Thornbush Lichen

***Nephromopsis orbata* (Nyl.) Divakar, A. Crespo & Lumbsch**

Variable Wrinkle-Lichen

***Nephromopsis sphaerosporella* (Müll. Arg.) Divakar, Crespo & Lumbsch**

Mountain Candlewax Lichen

***Nephromopsis subalpina* (Imshaug) Divakar, A. Crespo & Lumbsch**

Chestnut Wrinkle-Lichen

***Nephromopsis tuckermanii* (Tuck.) Divakar, A. Crespo & Lumbsch**

Coastal Thornbush Lichen

***Nephromopsis weberi* (Essl.) Divakar, A. Crespo & Lumbsch**

Dwarf Wrinkle-Lichen

***Niebla cephalota* (Tuck.) Rundel & Bowler**

Powdery Fog Lichen

***Nodobryoria abbreviata* (Müll. Arg.) Common & Brodo**

Tufted Foxtail Lichen

***Nodobryoria oregana* (Tuck.) Common & Brodo**

Pendant Foxtail Lichen

***Pannaria conoplea* (Ach.) Bory**

Many-Rimmed Matted Lichen

***Pannaria rubiginosa* (Thunb.) Delise**

Brown-Eyed Matted Lichen

***Pannaria tavaresii* P.M. Jørg.**

Coral-Rimmed Matted Lichen

***Parmelia barrenoae* Divakar, M.C. Molina & A. Crespo**
Hammered Shield Lichen

***Parmelia fertilis* Müll. Arg.**
Black-Eyed Shield Lichen

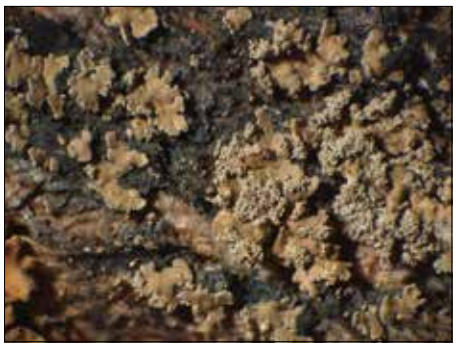
***Parmelia hygrophila* Goward & Ahti**
Western Shield Lichen

***Parmelia pseudosulcata* Gyelnik**
Salted Shield Lichen

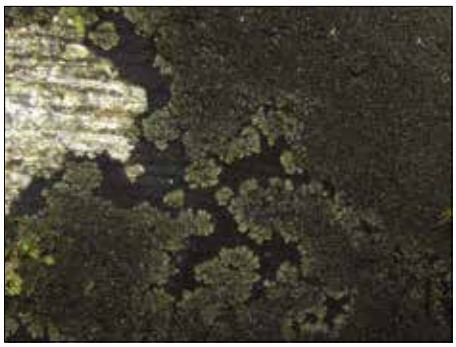
***Parmelia saxatilis* (L.) Ach.**
Salted Shield Lichen

***Parmelia squarrosa* Hale**
Bottlebrush Shield Lichen

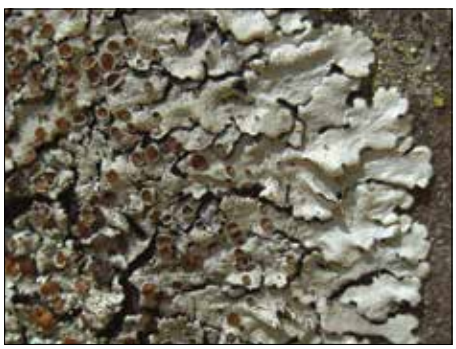
***Parmelia sulcata* Taylor**
Hammered Shield Lichen



***Parmeliella parvula* P.M. Jørg.**
Shingle Lichen



***Parmeliella triptophylla* (Ach.) Müll. Arg.**
Black-Bordered Shingle Lichen



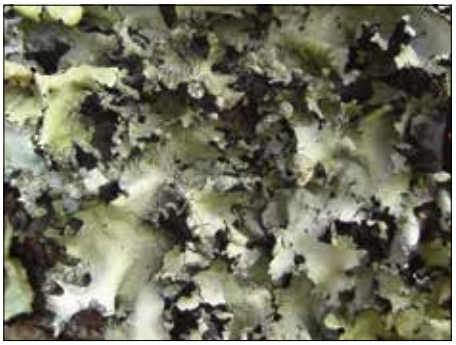
***Parmelina coleae* Arguello & A. Crespo**
Fringed Shield Lichen

***Parmeliopsis ambigua* (Wulfen) Nyl.**
Green Starburst Lichen

***Parmeliopsis capitata* R.C. Harris ex. J.W. Hinds & P.L. Hinds**
Green-Eyed Starburst Lichen

***Parmeliopsis hyperopta* (Ach.) Arnold**
Gray Starburst Lichen

***Parmeliopsis subambigua* Gyelnik**
Green Starburst Lichen



***Parmotrema arnoldii* (Du Rietz) Hale**
Powdered Ruffle Lichen

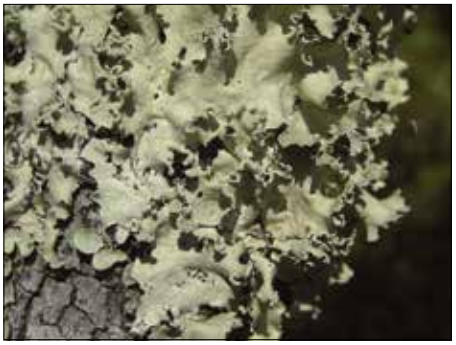
***Parmotrema austrosinense* (Zahlbr.) Hale**
Unwhiskered Ruffle Lichen

***Parmotrema cetratum* (Ach.) Hale**
Cracked Ruffle Lichen

***Parmotrema crinitum* (Ach.) M. Choisy**
Salted Ruffle Lichen

***Parmotrema cristiferum* (Taylor) Hale**
Unwhiskered Ruffle Lichen

***Parmotrema diffractaicum* (Essl.) Hale**
Cracked Ruffle Lichen



***Parmotrema dilatatum* (Vainio) Hale**
Cracked Ruffle Lichen

***Parmotrema endosulphureum* (Hillm.) Hale**
Yellow-Cored Ruffle Lichen

***Parmotrema eurysacum* (Hue) Hale**
Perforated Ruffle Lichen

***Parmotrema gardneri* (C.W. Dodge) Sérus.**
Cracked Ruffle Lichen

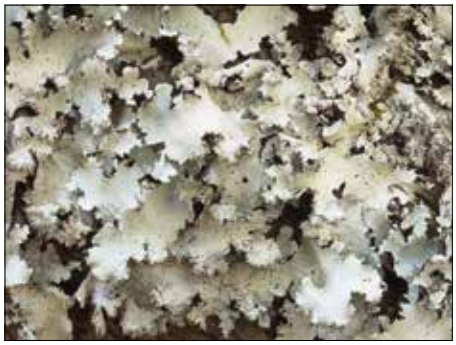
***Parmotrema haitiense* (Hale) Hale**
Ruffle Lichen

***Parmotrema hypoleucinum* (J. Steiner) Hale**
White-Dotted Ruffle Lichen

***Parmotrema hypotropum* (Nyl.) Hale**
Powdered Ruffle Lichen

***Parmotrema louisianae* (Hale) Hale**
Louisiana Ruffle Lichen

***Parmotrema margaritatum* (Hue) Hale**
Margarite Ruffle Lichen



***Parmotrema mellissii* (C.W. Dodge) Hale Melliss'**
Ruffle Lichen

***Parmotrema perforatum* (Jacq.) A. Massal.**
Perforated Ruffle Lichen

***Parmotrema perlatum* (Hudson) M. Choisy**
Powdered Ruffle Lichen

***Parmotrema praesorediosum* (Nyl.) Hale**
Powder-Crown Ruffle Lichen

***Parmotrema rampoddense* (Nyl.) Hale**
Long-Whiskered Ruffle Lichen

***Parmotrema reticulatum* (Taylor) M. Choisy**
Cracked Ruffle Lichen

***Parmotrema stuppeum* (Taylor) Hale**
Powder-Edged Ruffle Lichen

***Parmotrema subisidiosum* (Müll. Arg.)**
Hale Cracked Ruffle Lichen

***Parmotrema submarginale* (Michx.) DePriest & B. Hale**
Ruffle Lichen

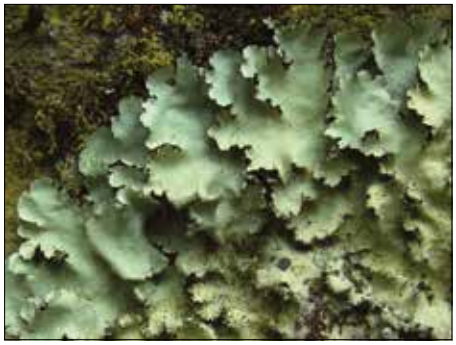
***Parmotrema subrigidum* Egan**
Ruffle Lichen

***Parmotrema subtinctorium* (Zahlbr.) Hale**
Mottled Ruffle Lichen

***Parmotrema sulphuratum* (Nees& Flotow) Hale**
Sulphur Ruffle Lichen

***Parmotrema tinctorum* (Delise ex Nyl.)**
Hale Palm Ruffle Lichen

***Parmotrema ultralucens* (Krog) Hale**
Spotted Ruffle Lichen

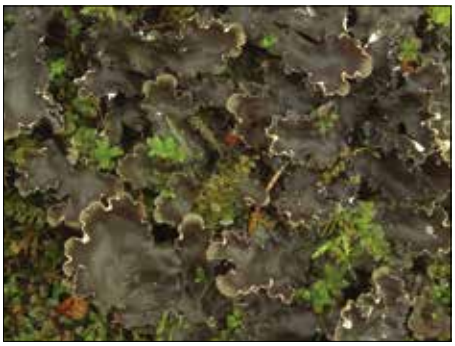


***Parmotrema xanthinum* (Müll. Arg.) Hale**
Green Ruffle Lichen

***Parmotrema zollingeri* (Hepp) Hale**
Ruffle Lichen

***Peltigera britannica* (Gyelnik) Holt.-Hartw. & Tønsberg**
Flaky Freckle Pelt Lichen

***Peltigera collina* (Ach.) Schrader**
Tree Pelt Lichen



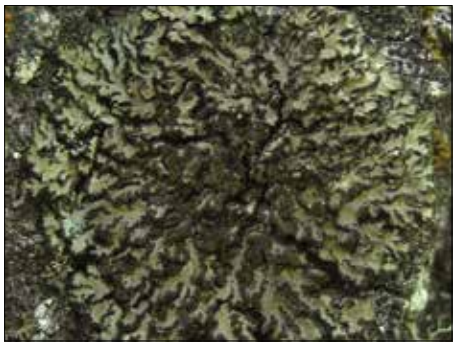
***Peltigera elisabethae* Gyelnik**
Concentric Pelt Lichen

***Peltigera membranacea* (Ach.) Nyl.**
Membranous Dog-Lichen

***Peltigera neopolydactyla* (Gyelnik) Gyelnik**
Carpet Pelt Lichen

***Peltigera polydactylon* (Necker) Hoffm.**
Many-Fruited Pelt Lichen

***Peltigera praetextata* (Flörke ex Sommerf.) Zopf**
Scaly Dog-Lichen



***Phaeophyscia adiastola* (Essl.) Essl.**
Powder-Tipped Shadow Lichen

***Phaeophyscia ciliata* (Hoffm.) Moberg**
Smooth Shadow Lichen

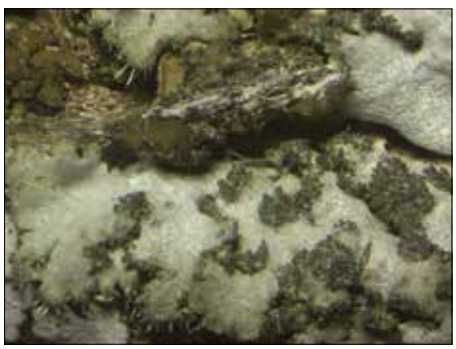
***Phaeophyscia erythrocardia* (Tuck.) Essl.**
Shadow Lichen

***Phaeophyscia hirsuta* (Mereschk.) Essl.**
Hairy Shadow Lichen

***Phaeophyscia hirtella* Essl.**
Hairy Shadow Lichen

***Phaeophyscia hispidula* (Ach.) Essl.**
Whiskered Shadow Lichen

***Phaeophyscia insignis* (Mereschk.)**
Moberg Mealy Dot Shadow Lichen



***Phaeophyscia kairamoi* (Vainio) Moberg**
Hairy-Tipped Shadow Lichen

***Phaeophyscia nigricans* (Flörke) Moberg**
Shadow Lichen

***Phaeophyscia orbicularis* (Necker)**
Moberg Mealy Shadow Lichen

***Phaeophyscia pusilloides* (Zahlbr.) Essl.**
Pompon Shadow Lichen

***Phaeophyscia rubropulchra* (Degel.) Essl.**
Orange-Cored Shadow Lichen

***Physcia adscendens* (Fr.) H. Olivier**
Hooded Rosette Lichen

***Physcia aipolia/alnophila* (Ehrh. ex Humb.) Fürnr./(Vainio) Loht. et al.**
Hoary Spotted Rosette Lichen

***Physcia americana* G. Merr.**
Powdery Rosette Lichen

***Physcia biziana* (A. Massal.) Zahlbr.**
Frosted Rosette Lichen

***Physcia caesia* (Hoffm.) Fürnr.**
Blue-Gray Rosette Lichen

***Physcia crispa* Nyl.**
Mealy-Edged Rosette Lichen

***Physcia dimidiata* (Arnold) Nyl.**
Mealy-Edged Rosette Lichen

***Physcia dubia* (Hoffm.) Lettau**
Powder-Tipped Rosette Lichen

***Physcia leptalea* (Ach.) DC.**
Hairy-Edged Rosette Lichen

***Physcia millegrana* Degel.**
Mealy Rosette Lichen

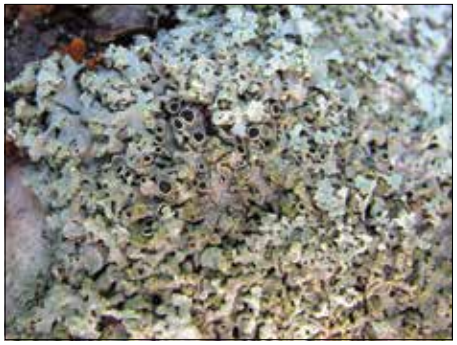
***Physcia neogaea* R.C. Harris**
Dwarf Rosette Lichen

***Physcia sorediosa* (Vainio) Lynge**
Black-Bottomed Rosette Lichen

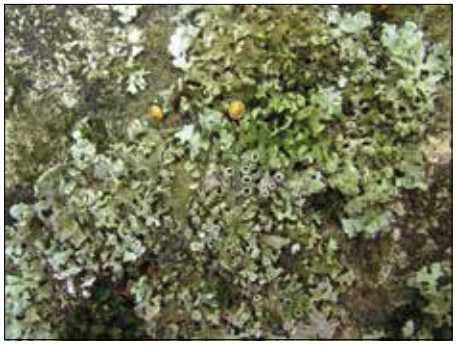
***Physcia stellaris* (L.) Nyl.**
Star Rosette Lichen

***Physcia tenella* (Scop.) DC.**
Fringed Rosette Lichen

***Physcia undulata* Moberg**
Mealy-Edged Rosette Lichen



***Physciella chloantha* (Ach.) Essl.**
Cryptic Rosette Lichen



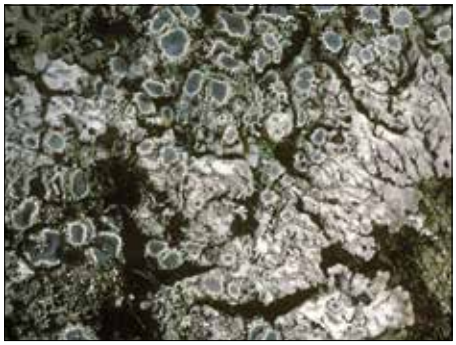
***Physciella melanchra* (Hue) Essl.**
Grainy Cryptic Rosette Lichen

***Physciella nepalensis* (Poelt) Essl.**
Cryptic Rosette Lichen

***Physconia americana* Essl.**
Fancy Frost Lichen

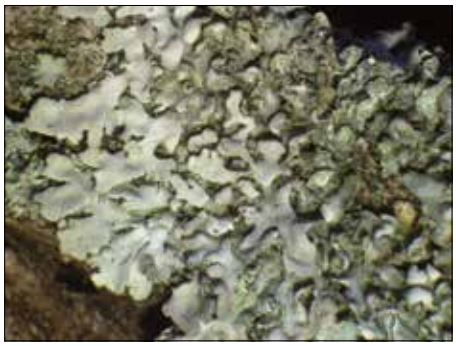
***Physconia californica* Essl.**
California Frost Lichen

***Physconia detersa* (Nyl.) Poelt**
Bottlebrush Frost Lichen



***Physconia elegantula* Essl.**
Elegant Frost Lichen

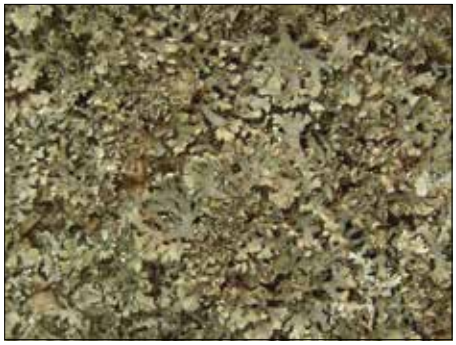
***Physconia enteroxantha* (Nyl.) Poelt**
Yellow-Edged Frost Lichen



***Physconia fallax* Essl.**
Frost Lichen

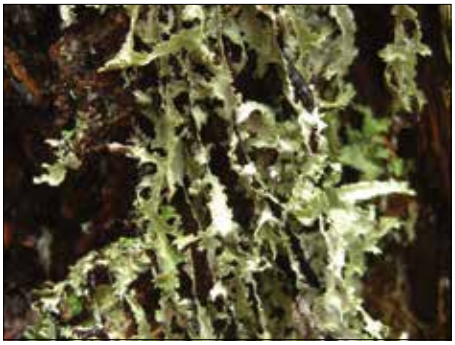
***Physconia isidiigera* (Zahlbr.) Essl.**
Bottlebrush Frost Lichen

***Physconia leucoleiptes* (Tuck.) Essl.**
Yellowish Crescent Frost Lichen



***Physconia perisidiosa* (Erichsen) Moberg**
Crescent Frost Lichen

***Platismatia glauca* (L.) W.L. Culb. & C.F. Culb.**
Varied Rag Lichen



***Platismatia herrei* (Imshaug) W.L. Culb. & C.F. Culb.**
Tattered Rag Lichen

***Platismatia lacunosa* (Ach.) W.L. Culb. & C.F. Culb.**
Crinkled Rag Lichen

***Platismatia norvegica* (Lynge) W.L. Culb. & C.F. Culb.**
Oldgrowth Rag Lichen

***Platismatia stenophylla* (Tuck.) W.L. Culb. & C. F. Culb.**
Ribbon Rag Lichen

***Platismatia tuckermanii* (Oakes) W.L. Culb. & C.F. Culb.**
Crumpled Rag Lichen

***Platismatia wheeleri* Goward, Altermann, C.R. Björk**
Rag Lichen

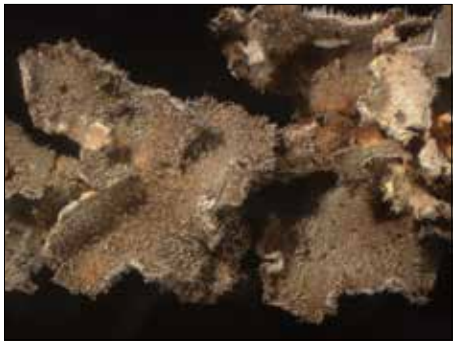
***Pseudevernia cladonia* (Tuck.) Hale & W.L. Culb.**
Ghost Antler Lichen

***Pseudevernia consocians* (Vainio) Hale & W.L. Culb.**
Common Antler Lichen

***Pseudevernia intensa* (Nyl.) Hale & W.L. Culb.**
Western Antler Lichen

***Pseudocyphellaria aurata* (Ach.) Vainio**
Yellow Specklebelly Lichen

***Pseudocyphellaria citrina group* (Gyeln.) Lücking, Moncada & S.Stenroos**
Specklebelly Lichen



***Pseudocyphellaria mallota* (Tuck.) H. Magn.**
Specklebelly Lichen

***Pseudocyphellaria rainierensis* Imshaug**
Oldgrowth Specklebelly Lichen

***Pseudoparmelia uleana* (Müll. Arg.) Elix & T.H. Nash**
Lemon-Lime Lichen

***Punctelia appalachensis* (W.L. Culb.) Krog**
Appalachian Speckled Shield Lichen

***Punctelia bolliana* (Müll. Arg.) Krog**
Eastern Speckled Shield Lichen

***Punctelia borreri* (Sm.) Krog**
Speckled Shield Lichen

***Punctelia caseana* Lendemer & Hodkinson**
Eastern Powdered Speckled Shield Lichen

***Punctelia graminicola* (B. de Lesd.) Egan**
Speckled Shield Lichen

***Punctelia jeckeri* (Roum.) Kalb**
Western Powdered Speckled Shield Lichen

***Punctelia missouriensis* G. Wilh. & Ladd**
Mealy Speckled Shield Lichen

***Punctelia reddenda* (Stirton) Krog**
Speckled Shield Lichen

***Punctelia hypoleucites* (Nyl.) Krog**
Southwestern Speckled Shield Lichen

***Punctelia rudecta* (Ach.) Krog**
Rough Speckled Shield Lichen

***Pyxine berteriana* (Fée) Imshaug**
Buttoned Rosette Lichen

***Pyxine caesiopruinosa* (Nyl.) Imshaug**
Buttoned Rosette Lichen

***Pyxine eschweileri* (Tuck.) Vainio**
Buttoned Rosette Lichen

***Pyxine sorediata* (Ach.) Mont.**
Mustard Buttoned Rosette Lichen

***Pyxine subcinerea* Stirton**
Buttoned Rosette Lichen

***Ramalina americana/culbersoniorum* Hale/LaGreca**
Sinewed Cartilage Lichen

***Ramalina complanata* (Sw.) Ach.**
Bumpy Cartilage Lichen

***Ramalina denticulata* Nyl.**
Southern Bumpy Cartilage Lichen

***Ramalina dilacerata* (Hoffm.) Hoffm.**
Punctured Cartilage Lichen

***Ramalina farinacea* (L.) Ach.**
Dotted Cartilage Lichen

***Ramalina leptocarpha* Tuck.**
Western Strap Cartilage Lichen

***Ramalina menziesii* Taylor**
Lacy/Fishnet Cartilage Lichen

***Ramalina obtusata* (Arnold) Bitter**
Hooded Cartilage Lichen

***Ramalina pollinaria* (Westr.) Ach.**
Chalky Cartilage Lichen

***Ramalina roesleri* (Hochst. ex Schaerer) Hue**
Frayed Cartilage Lichen

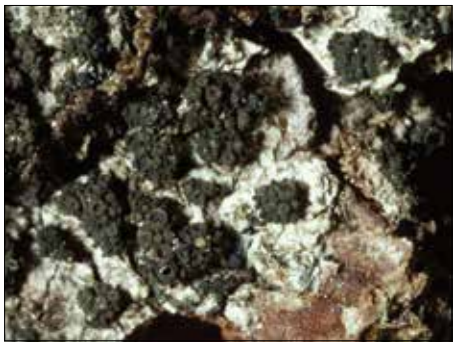
***Ramalina sinensis* Jatta**
Fan Cartilage Lichen

***Ramalina stenospora* Müll. Arg.**
Southern Strap Cartilage Lichen

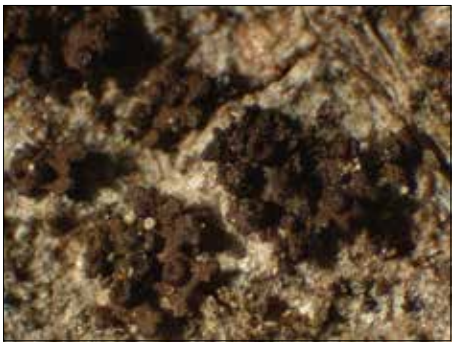
***Ramalina subleptocarpha* Rundel & Bowler**
Slit-Rimmed Cartilage Lichen

***Ramalina thrausta* (Ach.) Nyl.**
Angel's Hair Cartilage Lichen

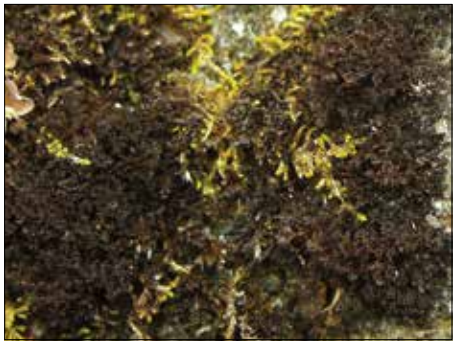
***Ramalina willeyi* R. Howe**
Thorny Cartilage Lichen



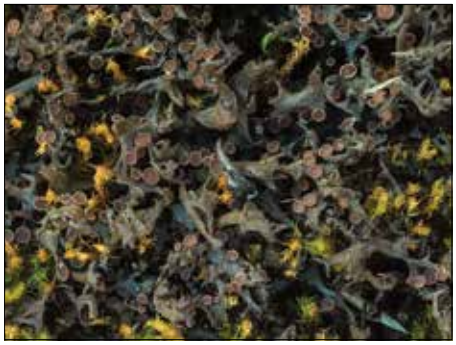
***Rostania occultata* Bagl.**
Occult Jelly Lichen



***Scytinium cellulosum* P.M. Jørg. & Tønsberg**
Jellyskin Lichen



***Scytinium lichenoides* (L.) Zahlbr.**
Tattered Jellyskin Lichen



***Scytinium palmatum* (Hudson) Mont.**
Jellyskin Lichen

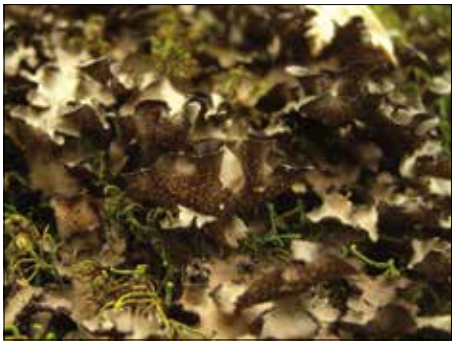
***Scytinium polycarpum* P.M. Jørg. & Goward**
Four-Spored Jellyskin Lichen

***Scytinium teretiusculum* (Wallr.) Arnold Terete**
Jellyskin Lichen

***Sphaerophorus tuckermanii* Räsänen**
Coral Lichen

***Sphaerophorus tuckermanii/venerabilis* Räsänen/Wedin et al.**
Coral Lichen

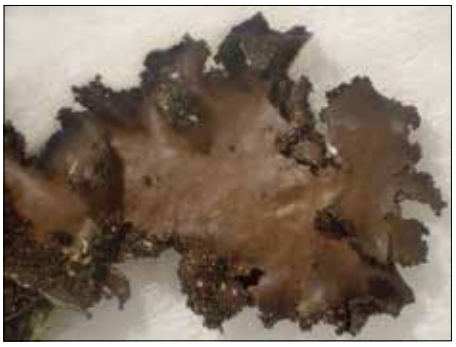
***Sphaerophorus venerabilis* Wedin, Högnabba & Goward**
Coral Lichen



***Sticta beauvoisii* Delise**
Fringed Spotted Felt Lichen

***Sticta fuliginosa* (Hoffm.) Ach.**
Peppered Spotted Felt Lichen

***Sticta limbata* (Sm.) Ach.**
Powdered Spotted Felt Lichen

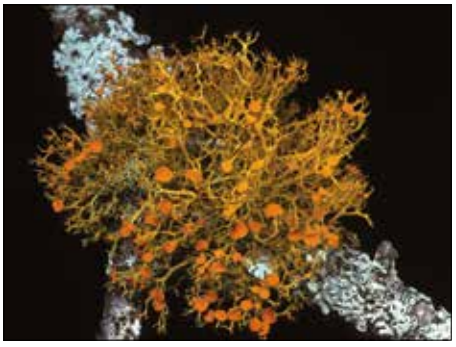


***Sticta wrightii* Tuck.**
Spotted Felt Lichen

***Sulcaria badia* Brodo & D. Hawksw.**
Bay Horsehair Lichen

***Sulcaria spiralifera* (Brodo & D. Hawksw.) Myllys, Velmala & Goward**
Grooved Horsehair Lichen

***Teloschistes chrysophthalmus* (L.) Th. Fr.**
Gold-Eye Orange Bush Lichen



***Teloschistes exilis* (Michaux) Vainio**
Slender Orange Bush Lichen

***Teloschistes flavicans* (Sw.) Norman**
Powdered Orange Bush Lichen

***Tholurna dissimilis* (Norman) Norman**
Urn Lichen

***Usnea cavernosa* Tuck.**
Pitted Beard Lichen

***Usnea ceratina* Ach.**
Warty Beard Lichen

***Usnea cornuta* Körber**
Inflated Beard Lichen

***Usnea cylindrica* P. Clerc**
Beard Lichen

***Usnea dasaea* Stirton**
Beard Lichen

***Usnea esperantiana* Clerc**
Beard Lichen

***Usnea filipendula group* Stirton**
Fishbone Beard Lichen

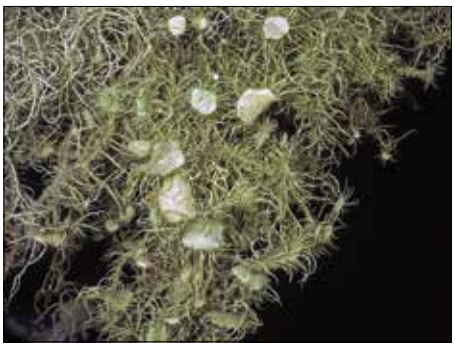
***Usnea flavocardia* Räsänen**
Beard Lichen

***Usnea fragilescens* Hav. ex Lynge**
Inflated Beard Lichen

***Usnea glabrata* (Ach.) Vainio**
Lustrous Beard Lichen

***Usnea glabrescens/fulvoreagens* (Nyl. ex Vainio) Vainio/(Räsänen) Räsänen**
Beard Lichen

***Usnea hirta* (L.) F.H. Wigg.**
Bristly Beard Lichen



***Usnea intermedia* (A. Massal.) Jatta**
Beard Lichen

***Usnea lapponica* Vainio**
Powdered Beard Lichen

***Usnea longissima* Ach.**
Methuselah's Beard Lichen

***Usnea merrillii* Motyka**
Beard Lichen

***Usnea mutabilis* Stirton**
Bloody Beard Lichen

***Usnea nidulans* Motyka**
Beard Lichen

***Usnea occidentalis* Motyka**
Western Beard Lichen

***Usnea pacificana* P. Halonen**
Beard Lichen

***Usnea parvula* Motyka**
Beard Lichen

***Usnea rubicunda* Stirton**
Red Beard Lichen

***Usnea scabrata* Nyl.**
Beard Lichen

***Usnea silesiaca* Motyka**
Beard Lichen

***Usnea strigosa* (Ach.) Eaton**
Bushy Beard Lichen

***Usnea subfloridana* Stirton**
Shrubby Beard Lichen

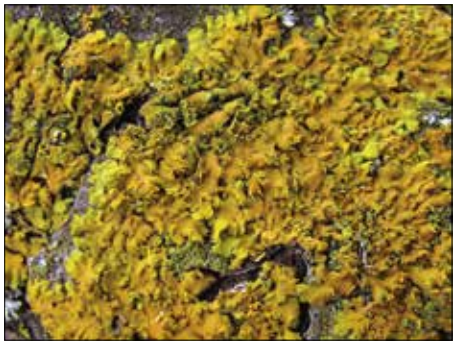
***Usnea subfusca* Stirton**
Beard Lichen

***Usnea subgracilis* Göpp. & Stein**
Beard Lichen

***Usnea subscabrosa* Nyl. ex Motyka**
Horny Beard Lichen

***Usnea trichodea* Ach.**
Bony Beard Lichen

***Usnea wasmuthii* Räsänen**
Beard Lichen



***Xanthomendoza fallax* (Hepp ex Arnold) Søchting et al.**
Hooded Sunburst Lichen

***Xanthomendoza fulva* (Hoffm.) Søchting et al.**
Bare-Bottomed Sunburst Lichen

***Xanthomendoza galericulata* L. Lindblom**
Sunburst Lichen

***Xanthomendoza hasseana* (Räsänen) Søchting et al.**
Poplar Sunburst Lichen

***Xanthomendoza montana* (L. Lindblom) Søchting et al.**
Sunburst Lichen

***Xanthomendoza oregana* (Gyelnik) Søchting, Kärnefelt & S. Kondr.**
Sunburst Lichen

***Xanthomendoza ulophyllodes* (Räsänen) Søchting et al.**
Powdery Sunburst Lichen

***Xanthoria candelaria* (L.) Th. Fr.**
Shrubby Orange Wall Lichen

***Xanthoria parietina* (L.) Th. Fr.**
Maritime Orange Wall Lichen

***Xanthoria polycarpa* (Hoffm.) Th. Fr.**
Pin-Cushion Orange Wall Lichen

***Xanthoria tenax* L. Lindblom**
Orange Wall Lichen

Lichen Photography Credits

Alectoria imshaugii, Jason Hollinger
Alectoria lata, Stephen Sharnoff
Alectoria sarmentosa, Jason Hollinger
Alectoria vancouverensis, Troy McMullin
Anaptychia palmulata, Jason Hollinger
Anzia colpodes, Jason Hollinger
Bryoria bicolor, Jason Hollinger
Bryoria capillaris/pikei, Jason Hollinger
Bryoria carlottae, Troy McMullin
Bryoria cervinula, Troy McMullin
Bryoria fremontii, Jason Hollinger
Bryoria friabilis, Bruce McCune
Bryoria furcellata, Jason Hollinger
Bryoria fuscescens, Jason Hollinger
Bryoria nadvornikiana, Jason Hollinger
Bryoria pseudofuscescens, Bruce McCune
Bryoria simplicior, Stephen Sharnoff
Bryoria trichodes, Troy McMullin
Bulbothrix confoederata, Jason Hollinger
Bulbothrix isidiza, Jason Hollinger
Bulbothrix laevigatula, Stephen Sharnoff
Bulbothrix scortella, Jason Hollinger
Bunodophoron melanocarpum, Tab Tannery
Candelaria concolor/pacifica, Jason Hollinger
Candelaria fibrosa, Jason Hollinger
Canoparmelia caroliniana, Jason Hollinger
Canoparmelia crozalsiana, Jason Hollinger
Canoparmelia cryptochlorophaea, Jason Hollinger
Canoparmelia texana, Chris Parrish
Cetraria canadensis, Jason Hollinger
Cetraria ciliaris, Jason Hollinger
Cetraria oakesiana, Jason Hollinger
Cetraria pallidula, Jason Hollinger
Cetraria pinastri, Jason Hollinger
Cetraria platyphylla, Jason Hollinger
Cetraria sepincola, Jason Hollinger
Cetraria viridis, Stephen Sharnoff
Cetrelia cetrarioides, Stephen Sharnoff
Cetrelia chicitae, Jason Hollinger
Cetrelia olivetorum, Jason Hollinger
Cladonia albonigra, Bruce McCune
Cladonia bellidiflora, Jason Hollinger
Cladonia caespiticia, Vitaly Charny
Cladonia carneola, Jim Riley
Cladonia cenotea, Jason Hollinger
Cladonia chlorophaea group, Richard Droker
Cladonia coniocraea/ochrochlora, Jason Hollinger
Cladonia cristatella, Jason Hollinger
Cladonia deformis, Jason Hollinger
Cladonia didyma, Jason Hollinger
Cladonia fimbriata, Jason Hollinger
Cladonia grayi, Jason Hollinger
Cladonia macilenta, Jason Hollinger
Cladonia macilenta var. *bacillaris,* Jason Hollinger
Cladonia parasitica, Chris Parrish
Cladonia peziziformis, Jason Hollinger
Cladonia pleurota, Jason Hollinger
Cladonia pyxidata, Jason Hollinger
Cladonia ramulosa, Jason Hollinger
Cladonia rei, Jason Hollinger
Cladonia squamosa, Jason Hollinger
Cladonia squamosa var. *subsquamosa,* Jason Hollinger
Cladonia sulphurina, Stephen Sharnoff
Cladonia transcendens, Stephen Sharnoff
Cladonia umbricola, Jason Hollinger
Cladonia verruculosa, Jason Hollinger
Coccocarpia erythroxyli, Bruce McCune
Coccocarpia palmicola, Jason Hollinger
Collema curtisporum, Vitaly Charny
Collema furfuraceum, Jim Riley
Collema nigrescens, Jason Hollinger
Collema subflaccidum, Richard Droker
Dendriscocaulon intricatulum, Jason Hollinger
Dirinaria applanata, Jason Hollinger
Dirinaria picta, Jason Hollinger
Enchylium conglomeratum, Jason Hollinger
Erioderma sorediatum, Jason Hollinger
Esslingeriana idahoensis, Jason Hollinger
Evernia divaricata, Jason Hollinger
Evernia mesomorpha, Jason Hollinger
Evernia prunastri, Jason Hollinger
Flavoparmelia baltimorensis, Jason Hollinger
Flavopunctelia darrowi, Jason Hollinger
Flavopunctelia flaventior, Chris Parrish
Flavopunctelia praesignis, Jason Hollinger
Flavopunctelia soredica, Bruce McCune
Fuscopannaria ahlneri, Karen Dillman
Fuscopannaria laceratula, Jason Hollinger
Fuscopannaria leucosticta, Jim Riley
Fuscopannaria leucostictoides, Jason Hollinger
Fuscopannaria mediterranea, Jason Hollinger
Fuscopannaria pacifica, Bruce McCune
Fuscopannaria ramulina, Jason Hollinger
Heterodermia albicans, Jason Hollinger
Heterodermia appalachensis, Jason Hollinger
Heterodermia casarettiana, Jason Hollinger
Heterodermia echinata, Troy McMullin
Heterodermia galactophylla, Jason Hollinger
Heterodermia granulifera, Jason Hollinger
Heterodermia hypoleuca, Jason Hollinger
Heterodermia japonica, Jason Hollinger
Heterodermia leucomela, Jason Hollinger
Heterodermia obscurata, Jason Hollinger
Heterodermia podocarpa, Jason Hollinger
Heterodermia rugulosa, Jason Hollinger
Heterodermia speciosa, Jason Hollinger
Heterodermia squamulosa, Jason Hollinger
Hyperphyscia adglutinata/confusa, Annelie Burghause
Hyperphyscia syncolla, Jason Hollinger
Hypogymnia apinnata, Jason Hollinger
Hypogymnia austerodes, Jason Hollinger
Hypogymnia bitteri, Troy McMullin
Hypogymnia canadensis, Bruce McCune
Hypogymnia duplicata, Ryan Batten
Hypogymnia enteromorpha, Bruce McCune
Hypogymnia farinacea, Zaca Lepista
Hypogymnia heterophylla, Drew Henderson
Hypogymnia hultenii, Bruce McCune
Hypogymnia imshaugii, Bruce McCune
Hypogymnia inactiva, Bruce McCune
Hypogymnia krogiae, Jason Hollinger
Hypogymnia lophyrea, Bruce McCune
Hypogymnia occidentalis, Jason Hollinger
Hypogymnia oceanica, Bruce McCune
Hypogymnia physodes, Jason Hollinger
Hypogymnia pulverata, Bruce McCune
Hypogymnia rugosa, Jason Hollinger
Hypogymnia tubulosa, Ryan Batten
Hypogymnia vittata, Jason Hollinger
Hypogymnia wilfiana, Jason Hollinger
Hypotrachyna afrorevoluta, Jason Hollinger
Hypotrachyna catawbiensis, Jason Hollinger
Hypotrachyna croceopustulata, Jason Hollinger
Hypotrachyna horrescens, Jason Hollinger
Hypotrachyna imbricatula, Jason Hollinger
Hypotrachyna laevigata, Jason Hollinger
Hypotrachyna livida, Jason Hollinger
Hypotrachyna minarum, Jason Hollinger
Hypotrachyna osseoalba, Jason Hollinger

Hypotrachyna pseudosinuosa, Jason Hollinger
Hypotrachyna pulvinata, Stephen Sharnoff
Hypotrachyna pustulifera, Stephen Sharnoff
Hypotrachyna revoluta, Jason Hollinger
Hypotrachyna showmanii, Jason Hollinger
Hypotrachyna sinuosa, Jim Riley
Hypotrachyna spumosa, Jason Hollinger
Hypotrachyna taylorensis, Jason Hollinger
Hypotrachyna virginica, Jason Hollinger
Imshaugia aleurites, Jason Hollinger
Imshaugia placorodia, Jason Hollinger
Koerberia biformis, Jason Hollinger
Leioderma sorediatum, Stephen Sharnoff
Leptochidium albociliatum, Jason Hollinger
Leptogidium contortum, Bruce McCune
Leptogidium dendriscum, Bruce McCune
Leptogium arsenei, Jason Hollinger
Leptogium austroamericanum, Jason Hollinger
Leptogium corticola, Jason Hollinger
Leptogium cyanescens, Jason Hollinger
Leptogium hirsutum, Jason Hollinger
Leptogium insigne, Bruce McCune
Leptogium laceroides, Jason Hollinger
Leptogium milligranum, Jason Hollinger
Leptogium pseudofurfuraceum, Jason Hollinger
Leptogium saturninum, Jason Hollinger
Letharia columbiana, Jason Hollinger
Letharia vulpina, Jason Hollinger
Lobaria amplissima, Karen Dillman
Lobaria anomala, Jason Hollinger
Lobaria anthraspis, Jason Hollinger
Lobaria hallii, Jason Hollinger
Lobaria linita, Jason Hollinger
Lobaria oregana, Jim Riley
Lobaria pulmonaria, Jason Hollinger
Lobaria quercizans, Jason Hollinger
Lobaria ravenelii, Vitaly Charny
Lobaria retigera, Sarah Jovan
Lobaria scrobiculata, Jason Hollinger
Melanelixia albertana, Jason Hollinger
Melanelixia californica, Jason Hollinger
Melanelixia glabratula, Bruce McCune
Melanelixia subargentifera, Stephen Sharnoff
Melanelixia subaurifera, Stephen Sharnoff
Melanohalea elegantula, Jason Hollinger
Melanohalea exasperata, Christopher Quintin
Melanohalea exasperatula, Jason Hollinger
Melanohalea halei, Jason Hollinger
Melanohalea olivacea, Kari Pihlaviita
Melanohalea septentrionalis, Jim Riley
Melanohalea subelegantula, Bruce McCune
Melanohalea subolivacea/multispora, Jason Hollinger
Melanohalea trabeculata, Sarah Friedrich
Menegazzia subsimilis/terebrata, Richard Droker
Myelochroa aurulenta, Jason Hollinger
Myelochroa galbina, Stephen Sharnoff
Nephroma bellum, Troy McMullin
Nephroma helveticum, Jason Hollinger
Nephroma isidiosum, Bruce McCune
Nephroma laevigatum, Bruce McCune
Nephroma occultum, Jim Riley
Nephroma parile, Jason Hollinger
Nephroma resupinatum, Jason Hollinger
Nephromopsis americana, Jason Hollinger
Nephromopsis aurescens, Jason Hollinger
Nephromopsis chlorophylla, Jason Hollinger
Nephromopsis coralligera, Jason Hollinger
Nephromopsis fendleri, Jason Hollinger
Nephromopsis merrillii, Jason Hollinger
Nephromopsis orbata, Jason Hollinger
Nephromopsis sphaerosporella, Jason Hollinger
Nephromopsis subalpina, Jason Hollinger
Nephromopsis tuckermanii, Stephen Sharnoff
Nephromopsis weberi, Jason Hollinger
Niebla cephalota, Tab Tannery
Nodobryoria abbreviata, Jason Hollinger
Nodobryoria oregana, Jason Hollinger
Pannaria conoplea, Troy McMullin
Pannaria rubiginosa, Troy McMullin
Pannaria tavaresii, Jason Hollinger
Parmelia barrenoae, Jason Hollinger
Parmelia hygrophila, Jason Hollinger
Parmelia pseudosulcata, Bruce McCune
Parmelia saxatilis, Jason Hollinger
Parmelia squarrosa, Jason Hollinger
Parmelia sulcata, Bruce McCune
Parmeliella parvula, Bruce McCune
Parmeliella triptophylla, Jason Hollinger
Parmelina coleae, Jason Hollinger
Parmeliopsis ambigua, Jason Hollinger
Parmeliopsis hyperopta, Jason Hollinger
Parmeliopsis subambigua, Jason Hollinger
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Parmotrema cetratum, Stephen Sharnoff
Parmotrema crinitum, Jason Hollinger
Parmotrema cristiferum, Jason Hollinger
Parmotrema dilatatum, Jason Hollinger
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Parmotrema eurysacum, Jason Hollinger
Parmotrema gardneri, Jason Hollinger
Parmotrema hypoleucinum, Gary Perlmutter
Parmotrema hypotropum, Jim Riley
Parmotrema margaritatum, Stephen Sharnoff
Parmotrema mellissii, Jason Hollinger
Parmotrema perforatum, Jason Hollinger
Parmotrema perlatum, Bruce McCune
Parmotrema praesorediosum, Troy McMullin
Parmotrema rampoddense, Jason Hollinger
Parmotrema reticulatum, Jason Hollinger
Parmotrema stuppeum, Jason Hollinger
Parmotrema subisidiosum, Jason Hollinger
Parmotrema submarginale, Jason Hollinger
Parmotrema subrigidum, Troy McMullin
Parmotrema subtinctorium, Jason Hollinger
Parmotrema sulphuratum, Jason Hollinger
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Parmotrema xanthinum, Jason Hollinger
Parmotrema zollingeri, Jason Hollinger
Peltigera britannica, Jason Hollinger
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Phaeophyscia ciliata, Jason Hollinger
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Phaeophyscia hirtella, Troy McMullin
Phaeophyscia hispidula, Jason Hollinger
Phaeophyscia insignis, Stephen Sharnoff
Phaeophyscia kairamoi, Jason Hollinger
Phaeophyscia nigricans, Jason Hollinger
Phaeophyscia orbicularis, Jason Hollinger
Phaeophyscia pusilloides, Stephen Sharnoff
Phaeophyscia rubropulchra, Jason Hollinger
Physcia adscendens, Jim Riley
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Physcia crispa, Jason Hollinger
Physcia dimidiata, Jason Hollinger

Physcia dubia, Jason Hollinger
Physcia leptalea, Zaca Lepista
Physcia millegrana, Jason Hollinger
Physcia neogaea, Jason Hollinger
Physcia sorediosa, Stephen Sharnoff
Physcia stellaris, Jason Hollinger
Physcia tenella, Richard Droker
Physcia undulata, Jason Hollinger
Physciella chloantha, Andrew Khitsun
Physciella melanchra, Andrew Khitsun
Physconia americana, Stephen Sharnoff
Physconia californica, Jason Hollinger
Physconia detersa, Chris Parrish
Physconia elegantula, Stephen Sharnoff
Physconia enteroxantha, Jason Hollinger
Physconia fallax, Jason Hollinger
Physconia isidiigera, Jason Hollinger
Physconia leucoleiptes, Andrew Khitsun
Physconia perisidiosa, Jason Hollinger
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Platismatia herrei, Jason Hollinger
Platismatia lacunosa, Bruce McCune
Platismatia norvegica, Jason Hollinger
Platismatia stenophylla, Jason Hollinger
Platismatia tuckermanii, Jason Hollinger
Platismatia wheeleri, Tim Wheeler
Pseudevernia cladonia, Jason Hollinger
Pseudevernia consocians, Jason Hollinger
Pseudevernia intensa, Jason Hollinger
Pseudocyphellaria aurata, Jason Hollinger
Pseudocyphellaria citrina group, Jason Hollinger
Pseudocyphellaria mallota, Bruce McCune
Pseudocyphellaria rainierensis, Jim Riley
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Punctelia borreri, Zaca Lepista
Punctelia caseana, Jason Hollinger
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Punctelia missouriensis, Jason Hollinger
Punctelia reddenda, Jason Hollinger
Punctelia rudecta, Jason Hollinger
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Pyxine caesiopruinosa, Vitaly Charny
Pyxine eschweileri, Jason Hollinger
Pyxine sorediata, Jason Hollinger
Pyxine subcinerea, Vitaly Charny
Ramalina americana/culbersoniorum, Jason Hollinger
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Ramalina thrausta, Jason Hollinger
Ramalina willeyi, Jason Hollinger
Rostania occultata, Matthias Schultz
Scytinium cellulosum, Bruce McCune
Scytinium lichenoides, Jason Hollinger
Scytinium palmatum, Richard Droker
Scytinium polycarpum, Bruce McCune
Sphaerophorus tuckermanii, Jason Hollinger
Sphaerophorus venerabilis, Jason Hollinger
Sticta beauvoisii, Jason Hollinger
Sticta fuliginosa, Richard Droker
Sticta limbata, Richard Droker
"Sticta weigelii," Bruce McCune
Sulcaria badia, Jim Riley
Sulcaria spiralifera, Bruce McCune
Teloschistes chrysophthalmus, Jason Hollinger
Teloschistes exilis, Stephen Sharnoff
Teloschistes flavicans, Stephen Sharnoff
Tholurna dissimilis, Jason Hollinger
Usnea cavernosa, Jason Hollinger
Usnea ceratina, Jason Hollinger
Usnea cornuta, Jason Hollinger
Usnea dasaea, Jason Hollinger
Usnea esperantiana, Stephen Sharnoff
Usnea filipendula group, Jim Riley
Usnea flavocardia, Bruce McCune
Usnea fragilescens, Stephen Sharnoff
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Usnea glabrescens/fulvoreagens, Andrew Khitsun
Usnea hirta, Jason Hollinger
Usnea intermedia, Stephen Sharnoff
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Usnea strigosa, Jason Hollinger
Usnea subfloridana, Stephen Sharnoff
Usnea subgracilis, Bruce McCune
Usnea subscabrosa, Jason Hollinger
Usnea trichodea, Jason Hollinger
Xanthomendoza fallax, Andrew Khitsun
Xanthomendoza fulva, Jason Hollinger
Xanthomendoza galericulata, Jason Hollinger
Xanthomendoza hasseana, Jason Hollinger
Xanthomendoza montana, Jason Hollinger
Xanthomendoza oregana, Jason Hollinger
Xanthomendoza ulophyllodes, Andrew Khitsun
Xanthoria candelaria, Jason Hollinger
Xanthoria parietina, Daryl Thompson
Xanthoria polycarpa, Stephen Sharnoff
Xanthoria tenax, Jason Dart

Appendix 1: Reconciliation of Lichen Names

Copy of the [REF_LICHEN_SPP_COMMENTS] Table From the National FIA Lichens Database (Version 1.0) That Was Used to Reconcile Lichen Names for the Atlas

All applicable steps were followed unless noted otherwise in the Atlas map captions. Please note that the acceptance of new names or species concepts may lag a couple of years to ensure the new names gain wide acceptance. Longer lags are common because names are not always updated until the taxon is encountered in the field or in data analysis.

LICH_SPPCD = Lichen species code, a unique numerical code for each lichen species name used in the program.

SPP_ACRONYM = Species acronym, a unique three- to six-letter acronym for each lichen species used in the program.

SPP_NAME = This field includes the full species name corresponding to LICH_SPPCD.

YEARSTART = The year a particular SPP_NAME was put into use.

YEAREND = The year use of that SPP_NAME ended.

SPP_COMMENTS = Informational comments, explanations of changes in taxonomic nomenclature between years, and actions to perform before analyzing data.

Actions are defined as:
0 = No action,
1 = Exclude for most analyses,
2 = Always combine,
3 = crossing [YEAR]' conditional combine,
4 = Subset before or after [YEAR] conditional combine,
5 = Regional conditional combine,
6 = Unique complicated combination of actions 1–5,
7 = Complicated action not definable as a combination of other action codes.

For more information on using this table, please see Jovan et. al (2020).

LICH_ SPPCD	SPP_ ACRONYM	GENUS	SPECIES	YEAR START	YEAR END	SPP_COMMENTS
100	Aht	*Ahtiana*		1993	2019	ACTION 0: 100 *Ahtiana* was renamed to 100 *Nephromopsis* (Divakar et al. 2017).
100	Aht	*Nephromopsis*		2019		ACTION 0: 100 *Ahtiana* was renamed to 100 *Nephromopsis* (Divakar et al. 2017).
101	Ahtsph	*Ahtiana*	*sphaerosporella*	1993	2019	ACTION 0: 101 *Ahtiana sphaerosporella* was renamed to 101 *Nephromopsis sphaerosporella* (Divakar et al. 2017)
101	Ahtsph	*Nephromopsis*	*sphaerosporella*	2019		ACTION 0: 101 *Ahtiana sphaerosporella* was renamed to 101 *Nephromopsis sphaerosporella* (Divakar et al. 2017)
601	Bryabb	*Bryoria*	*abbreviata*	1993	1995	ACTION 2: 601 *Bryoria abbreviata* is a synonym and should be combined with 4551 *Nodobryoria abbreviata* for all analyses.
603	Brycap	*Bryoria*	*capillaris*	1993		ACTION 0: 603 *Bryoria capillaris* includes the K- chemotype described as *B. pikei.*
606	Brycha	*Bryoria*	*chalybeiformis*	1993		ACTION 0: The name 610 *Bryoria fuscescens* was used in a broad sense for most specimens in the *B. fuscescens* complex. Only specimens which clearly fit the morphology of 606 *B. chalybeiformis* were assigned the latter name. It is debatable whether these species can be reliably differentiated, so for most studies we recommend mapping all 606 *B. chalybeiformis* under 610 *B. fuscescens.*
607	Bryfre	*Bryoria*	*fremontii*	1993		ACTION 0: 624 *Bryoria tortuosa* is considered a synonym and should be combined into 607 *B. fremontii* for all analyses (Velmala et al. 2009).
610	Bryfus	*Bryoria*	*fuscescens*	1993		ACTION 0: Western United States: The name *Bryoria fuscescens* was used in a broad sense for most specimens in the *B. fuscescens* complex. Only specimens which clearly fit the morphology of *B. chalybeiformis* or *B. glabra* were assigned one of these names. It is debatable whether these three species can be reliably differentiated, so for most studies we recommend mapping them all under 610 *B. fuscescens*. ACTION 0: All 622 *B. subcana* is considered a synonym and should be combined into 610 *B. fuscescens* for all analyses (Velmala et al. 2014). ACTION 0: All 613 *B. lanestris* is considered a synonym and should be combined into 610 *B. fuscescens* for all analyses.
611	Brygla	*Bryoria*	*glabra*	1993		ACTION 0: The name *Bryoria fuscescens* was used in a broad sense for most specimens in the *B. fuscescens* complex. Only specimens which clearly fit the morphology of *B. glabra* were assigned the latter name. It is debatable whether these species can be reliably differentiated, so for most studies we recommend mapping all 611 *B. glabra* under 610 *B. fuscescens.*
613	Brylan	*Bryoria*	*lanestris*	1993	2019	ACTION 2: 613 *Bryoria lanestris* is considered a synonym and should be combined into 610 *B. fuscescens* for all analyses.
615	Bryore	*Bryoria*	*oregana*	1993	1995	ACTION 2: 615 *Bryoria oregana* is a synonym and should be combined with 4552 *Nodobryoria oregana* for all analyses.
617	Brypsc	*Bryoria*	*pseudocapillaris*	1993	2017	ACTION 2: 617 *Bryoria pseudocapillaris* was renamed to 617 *Sulcaria spiralifera* (Myllys et al. 2014).
617	Brypsc	*Sulcaria*	*spiralifera*	2017		ACTION 0: 617 *Bryoria pseudocapillaris* and 621 *Bryoria spiralifera* were renamed to 617 *Sulcaria spiralifera* (Myllys et al. 2014).

LICH_ SPPCD	SPP_ ACRONYM	GENUS	SPECIES	YEAR START	YEAR END	SPP_COMMENTS
621	Bryspi	*Bryoria*	*spiralifera*	1993	2017	ACTION 2: 621 *Bryoria spiralifera* was renamed to 617 *Sulcaria spiralifera* (Myllys et al. 2014).
622	Brysub	*Bryoria*	*subcana*	1993	2017	ACTION 2: 622 *Bryoria subcana* is considered a synonym and should be combined into 610 *B. fuscescens* for all analyses (Velmala et al. 2014).
624	Brytor	*Bryoria*	*tortuosa*	1993	2014	ACTION 2: 624 *Bryoria tortuosa* is considered a synonym and should be combined into 607 *B. fremontii* for all analyses (Velmala et al. 2009).
627	Bryoli	*Bryoria*	*mystery olive sp.*	1997	2010	ACTION 1: Exclude for all analyses. Starting 2010, this species code was dropped; only a small number of records are affected. Specimens collected after 2010 are called either 608 *Bryoria friabilis* or 618 *B. pseudofuscescens* (McCune and Geiser 2009). Older specimens have not been revisited to update names.
703	Bulgoe	*Bulbothrix*	*goebelii*	1993	2014	ACTION 0: 703 *Bulbothrix goebelii* was renamed to 703 *B. scortella* (Benatti & Elix 2012).
703	Bulgoe	*Bulbothrix*	*scortella*	2014		ACTION 0: 703 *Bulbothrix goebelii* was renamed to 703 *B. scortella* (Benatti & Elix 2012).
770	Cnm	*Canomaculina*		2002	2014	ACTION 2: 770 *Canomaculina* should be combined into 5300 *Parmotrema*. *Canomaculina* was renamed to *Parmotrema* (Blanco et al. 2005).
808	Canamb	*Canoparmelia*	*amabilis*	1999	2017	ACTION 2: 808 *Canoparmelia amabilis* is considered a synonym and should be combined 802 *C. caroliniana* for all analyses (Lendemer & Ruiz 2015).
850	Cat	*Catapyrenium*		2002		ACTION 1: Exclude for most analyses. Squamulose growth forms were not consistently collected.
851	Cattuc	*Catapyrenium*	*tuckermanii*	2002		ACTION 1: Exclude for most analyses. Squamulose growth forms were not consistently collected.
900	Cav	*Cavernularia*		1993	2014	ACTION 2: 900 *Cavernularia* should be combined into 3100 *Hypogymnia*. *Cavernularia* was renamed to *Hypogymnia* (Miadlikowska et al. 2011).
901	Cavhul	*Cavernularia*	*hultenii*	1993	2014	ACTION 0: 901 *Cavernularia hultenii* was renamed to 901 *Hypogymnia hultenii* (Miadlikowska et al. 2011)
901	Cavhul	*Hypogymnia*	*hultenii*	2014		ACTION 0: 901 *Cavernularia hultenii* was renamed to 901 *Hypogymnia hultenii* (Miadlikowska et al. 2011).
902	Cavlop	*Cavernularia*	*lophyrea*	1993	2014	ACTION 0: 902 *Cavernularia lophyrea* was renamed to 902 *Hypogymnia lophyrea* (Miadlikowska et al. 2011)
902	Cavlop	*Hypogymnia*	*lophyrea*	2014		ACTION 0: 902 *Cavernularia lophyrea* was renamed to 902 *Hypogymnia lophyrea* (Miadlikowska et al. 2011).
1001	Cetame	*Cetraria*	*americana*	1993	2019	ACTION 0: 1001 *Cetraria americana* is a synonym of *Tuckermannopsis americana*. FIA never adopted the latter name due to lack of scientific consensus. This species is now named 1001 *Nephromopsis americana* (Divakar et al. 2017).

LICH_ SPPCD	SPP_ ACRONYM	GENUS	SPECIES	YEAR START	YEAR END	SPP_COMMENTS
1001	Cetame	*Nephromopsis*	*americana*	2019		ACTION 0: 1001 *Cetraria americana* is a synonym of *Tuckermannopsis americana*. FIA never adopted the latter name due to lack of scientific consensus. This species is now named 1001 *Nephromopsis americana* (Divakar et al. 2017).
1002	Cetaur	*Cetraria*	*aurescens*	1993	2019	ACTION 0: 1002 *Cetraria aurescens* is a synonym of *Tuckermannopsis aurescens.* FIA never adopted the latter name due to lack of scientific consensus. This species is now named 1002 *Nephromopsis aurescens* (Divakar et al. 2017).
1002	Cetaur	*Nephromopsis*	*aurescens*	2019		ACTION 0: 1002 *Cetraria aurescens* is a synonym of *Tuckermannopsis aurescens.* FIA never adopted the latter name due to lack of scientific consensus. This species is now named 1002 *Nephromopsis aurescens* (Divakar et al. 2017).
1003	Cetcal	*Cetraria*	*californica*	1993	2019	ACTION 0: 1003 *Cetraria californica*, *Kaernefeltia californica*, and *Tuckermannopsis californica* are all synonyms. FIA data used *C. californica* due to lack of scientific consensus. This species is newly named 1003 *Nephromopsis tuckermanii* as per taxonomic rules (Divakar et al. 2017).
1003	Cetcal	*Nephromopsis*	*tuckermanii*	2019		ACTION 0: 1003 *Cetraria californica*, *Kaernefeltia californica*, and *Tuckermannopsis californica* are all synonyms. FIA data used *C. californica* due to lack of scientific consensus. This species is newly named 1003 *Nephromopsis tuckermanii* as per taxonomic rules (Divakar et al. 2017).
1004	Cetcan	*Cetraria*	*canadensis*	1993		ACTION 0: 8151 *Vulpicida canadensis* is a synonym (Divakar et al. 2017) and should be combined into 1004 *Cetraria canadensis* for all analyses.
1005	Cetchl	*Cetraria*	*chlorophylla*	1993	2019	ACTION 0: 1005 *Cetraria chlorophylla* and *Tuckermannopsis chlorophylla* are synonyms. FIA data used *C. chlorophylla* due to lack of scientific consensus. This species is now named 1005 *Nephromopsis chlorophylla* (Divakar et al. 2017).
1005	Cetchl	*Nephromopsis*	*chlorophylla*	2019		ACTION 0: 1005 *Cetraria chlorophylla* and *Tuckermannopsis chlorophylla* are synonyms. FIA data used *C. chlorophylla* due to lack of scientific consensus. This species is now named 1005 *Nephromopsis chlorophylla* (Divakar et al. 2017).
1007	Cetcor	*Cetraria*	*coralligera*	1993	2019	ACTION 0: 1007 *Cetraria coralligera* and *Tuckermanella coralligera* are synonyms. FIA data used the former name due to lack of scientific consensus. This species is now named 1007 *Nephromopsis coralligera* (Divakar et al. 2017).
1007	Cetcor	*Nephromopsis*	*coralligera*	2019		ACTION 0: 1007 *Cetraria coralligera* and *Tuckermanella coralligera* are synonyms. FIA data used the former name due to lack of scientific consensus. This species is now named 1007 *Nephromopsis coralligera* (Divakar et al. 2017).
1008	Cetfen	*Cetraria*	*fendleri*	1993	2019	ACTION 0: 1008 *Cetraria fendleri* and *Tuckermanella fendleri* are synonyms. FIA data used the former name due to lack of scientific consensus. This species is now named 1008 *Nephromopsis fendleri* (Divakar et al. 2017).
1008	Cetfen	*Nephromopsis*	*fendleri*	2019		ACTION 0: 1008 *Cetraria fendleri* and *Tuckermanella fendleri* are synonyms. FIA data used the former name due to lack of scientific consensus. This species is now named 1008 *Nephromopsis fendleri* (Divakar et al. 2017).
1009	Cetine	*Cetraria*	*inermis*	1993	2019	ACTION 0: 1009 *Cetraria inermis* was renamed to 1009 *Nephromopsis inermis* (Divakar et al. 2017).

LICH_ SPPCD	SPP_ ACRONYM	GENUS	SPECIES	YEAR START	YEAR END	SPP_COMMENTS
1009	Cetine	*Nephromopsis*	*inermis*	2019		ACTION 0: 1009 *Cetraria inermis* was renamed to 1009 *Nephromopsis inermis* (Divakar et al. 2017).
1010	Cetjun	*Cetraria*	*juniperina*	1993		ACTION 0: *Tuckermanopsis juniperina* is a synonym of 1010 *Cetraria juniperina* (Divakar et al. 2017) that was never adopted by FIA due to lack of scientific consensus.
1011	Cetmer	*Cetraria*	*merrillii*	1993	2019	ACTION 0: 1011 *Cetraria merrillii*, *Kaernefeltia merrillii*, and *Tuckermannopsis merrillii* are synonyms. FIA data used *C. merrillii* due to lack of scientific consensus. This species is now named 1011 *Nephromopsis merrillii* (Divakar et al. 2017).
1011	Cetmer	*Nephromopsis*	*merrillii*	2019		ACTION 0: 1011 *Cetraria merrillii*, *Kaernefeltia merrillii*, and *Tuckermannopsis merrillii* are synonyms. FIA data used *C. merrillii* due to lack of scientific consensus. This species is now named 1011 *Nephromopsis merrillii* (Divakar et al. 2017).
1012	Cetoak	*Cetraria*	*oakesiana*	1993		ACTION 0: 1012 *Cetraria oakesiana* was renamed to 1012 *Usnocetraria oakesiana* (Thell et al. 2009), then renamed back to *Cetraria oakesiana* (Divakar et al. 2017).
1012	Cetoak	*Usnocetraria*	*oakesiana*	2014	2019	ACTION 0: 1012 *Cetraria oakesiana* was renamed to 1012 *Usnocetraria oakesiana* (Thell et al. 2009), then renamed back to *Cetraria oakesiana* (Divakar et al. 2017).
1013	Cetorb	*Cetraria*	*orbata*	1993	2019	ACTION 0: 1013 *Cetraria orbata* is a synonym of *Tuckermannopsis orbata*. FIA data used *C. orbata* due to lack of scientific consensus. This species is now named 1013 *Nephromopsis orbata* (Divakar et al. 2017).
1013	Cetorb	*Nephromopsis*	*orbata*	2019		ACTION 0: 1013 *Cetraria orbata* is a synonym of *Tuckermannopsis orbata*. FIA data used *C. orbata* due to lack of scientific consensus. This species is now named 1013 *Nephromopsis orbata* (Divakar et al. 2017).
1014	Cetpal	*Cetraria*	*pallidula*	1993		ACTION 0: *Ahtiana pallidula* is a synonym of 1014 *Cetraria pallidula* (Divakar et al. 2017).
1015	Cetpin	*Cetraria*	*pinastri*	1993		ACTION 0: 8152 *Vulpicida pinastri* is a synonym (Divakar et al. 2017) and should be combined into 1015 *Cetraria pinastri* for all analyses.
1016	Cetpla	*Cetraria*	*platyphylla*	1993		ACTION 0: *Tuckermanopsis platyphylla* is a synonym of 1016 *Cetraria platyphylla* (Divakar et al. 2017) that was never adopted by FIA due to lack of scientific consensus.
1017	Cetsep	*Cetraria*	*sepincola*	1993		ACTION 0: *Tuckermanopsis sepincola* is a synonym of 1017 *Cetraria sepincola* (Divakar et al. 2017) that was never adopted by FIA due to lack of scientific consensus.
1019	Cetsub	*Cetraria*	*subalpina*	1993	2019	ACTION 0: 1019 *Cetraria subalpina* was renamed to 1019 *Nephromopsis subalpina* (Divakar et al. 2017).
1019	Cetsub	*Nephromopsis*	*subalpina*	2019		ACTION 0: 1019 *Cetraria subalpina* was renamed to 1019 *Nephromopsis subalpina* (Divakar et al. 2017).
1020	Cetvir	*Cetraria*	*viridis*	1993		ACTION 0: 8153 *Vulpicida viridis* is a synonym (Divakar et al. 2017) and should be combined into 1020 *Cetraria viridis* for all analyses.
1021	Cetweb	*Cetraria*	*weberi*	1993	2019	ACTION 0: *Tuckermanella weberi* is a synonym of 1021 *Cetraria weberi* that was never adopted by FIA due to lack of scientific consensus. This species is now named 1021 *Nephromopsis weberi* (Divakar et al. 2017).

LICH_ SPPCD	SPP_ ACRONYM	GENUS	SPECIES	YEAR START	YEAR END	SPP_COMMENTS
1021	Cetweb	*Nephromopsis*	*weberi*	2019		ACTION 0: *Tuckermanella weberi* is a synonym of 1021 *Cetraria weberi* that was never adopted by FIA due to lack of scientific consensus. This species is now named 1021 *Nephromopsis weberi* (Divakar et al. 2017).
1180	Cld	*Cladina*		2000	2004	ACTION 0: Ahti and DePriest (2001) shifted all *Cladina* species to *Cladonia*. All specimens identified as 1180 *Cladina* were renamed to 1180 *Cladina*-form.
1180	Cld	*Cladina-form*		2004		ACTION 0: If a specialist finds a small *Cladina*-like specimen unidentifiable to species, it is placed in the 1180 *Cladina*-form category. Ahti and DePriest (2001) shifted all *Cladina* species to *Cladonia*.
1181	Cldran	*Cladina*	*rangiferina*	2000	2004	ACTION 0: 1181 *Cladina rangiferina* was renamed to 1182 *Cladonia rangiferina* (Ahti and DePriest 2001).
1181	Cldran	*Cladonia*	*rangiferina*	2004		ACTION 0: 1181 *Cladina rangiferina* was renamed to 1181 *Cladonia rangiferina* (Ahti and DePriest 2001).
1182	Cldarb	*Cladina*	*arbuscula*	2003	2004	ACTION 0: 1182 *Cladina arbuscula* was renamed to 1182 *Cladonia arbuscula* (Ahti and DePriest 2001).
1182	Cldarb	*Cladonia*	*arbuscula*	2004		ACTION 0: 1182 *Cladina arbuscula* was renamed to 1182 *Cladonia arbuscula* (Ahti and DePriest 2001).
1183	Cldsub	*Cladina*	*subtenuis*	2003	2004	ACTION 0: 1183 *Cladina subtenuis* was renamed to 1183 *Cladonia subtenuis* (Ahti and DePriest 2001).
1183	Cldsub	*Cladonia*	*subtenuis*	2004		ACTION 0: 1183 *Cladina subtenuis* was renamed to 1183 *Cladonia subtenuis* (Ahti and DePriest 2001).
1200	Cla	*Cladonia*		1993		ACTION 0: If a specialist finds a small *Cladina*-like specimen unidentifiable to species, it is placed in the 1180 *Cladina*-form category. Ahti and DePriest (2001) shifted all *Cladina* species to *Cladonia*.
1203	Clabac	*Cladonia*	*bacillaris*	1993		ACTION 0: *Cladonia bacillaris* = *Cladonia macilenta* var. *bacillaris*. The former name is retained for brevity.
1210	Clachl	*Cladonia*	*chlorophaea*	1993		ACTION 0: Species in the *C. chlorophaea* morphological group that can't be distinguished without TLC are recorded as 1210 *C. chlorophaea*.
1211	Clacon	*Cladonia*	*coniocraea*	1993		ACTION 5/ACTION 2: WEST—1211 *Cladonia* coniocraea should be combined into 1228 *C. ochrochlora*. EAST—1228 *C. ochrochlora* should be combined into 1211 *C. coniocraea*, which is the more common taxon in the East. See (Pino-Bodas et al. 2011)—*C. ochrochlora* and *C. coniocraea* may be conspecific.
1220	Clagra	*Cladonia*	*grayi*	1993		ACTION 0: This name was assigned when UV testing or TLC distinguished it from the rest of the *C. chlorophaea* morphological group.
1228	Claoch	*Cladonia*	*ochrochlora*	1993		ACTION 5/ACTION 2: WEST—1211 *Cladonia coniocraea* should be combined into 1228 *C. ochrochlora*. EAST—1228 *C. ochrochlora* should be combined into 1211 *C. coniocraea*, which is the more common taxon in the East. See (Pino-Bodas et al. 2011)—*C. ochrochlora* and *C. coniocraea* may be conspecific.
1403	Colcon	*Collema*	*conglomeratum*	1993	2014	ACTION 0: 1403 *Collema conglomeratum* has been renamed to 1403 *Enchylium conglomeratum* (Otálora et al. 2014).

LICH_ SPPCD	SPP_ ACRONYM	GENUS	SPECIES	YEAR START	YEAR END	SPP_COMMENTS
1403	Colcon	*Enchylium*	*conglomeratum*	2014		ACTION 0: 1403 *Collema conglomeratum* was renamed to 1403 *Enchylium conglomeratum* (Otálora et al. 2014).
1404	Colcur	*Collema*	*curtisporum*	1993		ACTION 0: *Collema curtisporum* and *C. nigrescens* are reliably separated only by observing spores in thin sections. As their geographic overlap is minimal, Pacific Northwest specimens west of the Cascades crest and in California are usually called *C. nigrescens* (McCune and Geiser 2009, Sharnoff 2014). Specimens from east of the crest, including Idaho and Montana, are called *C. curtisporum*.
1412	Colnig	*Collema*	*nigrescens*	1993		ACTION 0: *Collema curtisporum* and *C. nigrescens* are reliably separated only by observing spores in thin sections. As their geographic overlap is minimal, Pacific Northwest specimens west of the Cascades crest and in California are usually called *C. nigrescens* (McCune and Geiser 2009, Sharnoff 2014). Specimens from east of the crest, including Idaho and Montana, are called *C. curtisporum*.
1413	Colocc	*Collema*	*occultatum*	1993	2014	ACTION 0: 1413 *Collema occultatum* was renamed to 1413 *Rostania occultata* (Otálora et al. 2014).
1413	Colocc	*Rostania*	*occultata*	2014		ACTION 0: 1413 *Collema occultatum* was renamed to 1413 *Rostania occultata* (Otálora et al. 2014).
1600	Deg	*Degelia*		1993		ACTION 1: Exclude for most analyses. Placodioid growth forms were not consistently collected.
1601	Degplu	*Degelia*	*plumbea*	1993		ACTION 1: Exclude for most analyses. Placodioid growth forms were not consistently collected.
2501	Evscat	*Everniastrum*	*catawbiense*	1993	2014	ACTION 0: 2501 *Everniastrum catawbiense* was renamed to 2501 *Hypotrachyna catawbiensis* (Divakar et al. 2013).
2501	Evscat	*Hypotrachyna*	*catawbiensis*	2014		ACTION 0: 2501 *Everniastrum catawbiense* was renamed to 2501 *Hypotrachyna catawbiensis* (Divakar et al. 2013).
2650	Fus	*Fuscopannaria*		2001		ACTION 0: Crews are trained to collect this group including *Fuscopannaria* species considered squamulose to subcrustose.
2658	Panpac	*Fuscopannaria*	*pacifica*	2001		ACTION 0: Before 2001, 2658 *Fuscopannaria pacifica* in the Pacific Northwest was misidentified as 4712 *F. saubinetii*. *F. saubinetii* does not occur in the Pacific Northwest (McCune & Geiser 2009). Records of *F. saubinetii* should be changed to *F. pacifica.*
2702	Fpufla	*Flavopunctelia*	*flaventior*	1993		ACTION 0: Some material is intermediate between *Flavopunctelia flaventior* and *F. soredica* (i.e. with only marginal soralia but also numerous pseudocyphellae). Starting with 1998 data, we follow Hale's heavier weighting of pseudocyphellae and class these intermediates with *F. flaventior*. For pre-1998 data, species names were assigned with heavier weighting on soralia characteristics.
2704	Fpusor	*Flavopunctelia*	*soredica*	1993		ACTION 0: Some material is intermediate between *Flavopunctelia flaventior* and *F. soredica* (i.e. with only marginal soralia but also numerous pseudocyphellae). Starting with 1998 data, we follow Hale's heavier weighting of pseudocyphellae and class these intermediates with *F. flaventior*. For pre-1998 data, species names were assigned with heavier weighting on soralia characteristics.

LICH_ SPPCD	SPP_ ACRONYM	GENUS	SPECIES	YEAR START	YEAR END	SPP_COMMENTS
2803	Hetbar	*Heterodermia*	*barbifera*	1993	2009	ACTION 2: 2803 *Heterodermia barbifera* is considered a synonym and should be combined into 2817 *H. podocarpa* (Lendemer 2009, Nash and Moberg 2002).
2817	Hetpod	*Heterodermia*	*podocarpa*	1993		ACTION 0: 2803 *Heterodermia barbifera* is considered a synonym and should be combined into 2817 *H. podocarpa* (Lendemer 2009, Nash and Moberg 2002).
2901	Hphadg	*Hyperphyscia*	*adglutinata*	1993		ACTION 0: For analyzing data from multiple years crossing 2012, 2904 *H. confusa* should be combined into 2901 *H. adglutinata*. 2901 *H. adglutinata* s. lat. has been shown to include two distinct species with broad overlap—*H. adglutinata* s. str. and *H. confusa* (Esslinger et al. 2012). Records for *H. adglutinata* from 2012 and prior may include some *H. confusa*.
2904	Hphcon	*Hyperphyscia*	*confusa*	2012		ACTION 3: For analyzing data from multiple years crossing 2012, 2904 *H. confusa* should be combined into 2901 *H. adglutinata*. 2901 *H. adglutinata* s. lat. has been shown to include two distinct species with broad overlap—*H. adglutinata* s. str. and *H. confusa* (Esslinger et al. 2012.). Records for *H. adglutinata* from 2012 and prior may include some *H. confusa*.
3000	Hce	*Hypocenomyce*		1993		ACTION 1: Exclude for most analyses. Squamulose/crustose growth forms were not consistently collected.
3001	Hceant	*Hypocenomyce*	*anthracophila*	1993		ACTION 1: Exclude for most analyses. Squamulose/crustose growth forms were not consistently collected.
3002	Hcecas	*Hypocenomyce*	*castaneocinerea*	1993		ACTION 1: Exclude for most analyses. Squamulose/crustose growth forms were not consistently collected.
3003	Hcefri	*Hypocenomyce*	*friesii*	1993		ACTION 1: Exclude for most analyses. Squamulose/crustose growth forms were not consistently collected.
3004	Hceleu	*Hypocenomyce*	*leucococca*	1993		ACTION 1: Exclude for most analyses. Squamulose/crustose growth forms were not consistently collected.
3005	Hcepra	*Hypocenomyce*	*praestabilis*	1993		ACTION 1: Exclude for most analyses. Squamulose/crustose growth forms were not consistently collected.
3006	Hcesca	*Hypocenomyce*	*scalaris*	1993		ACTION 1: Exclude for most analyses. Squamulose/crustose growth forms were not consistently collected.
3007	Hcesor	*Hypocenomyce*	*sorophora*	1993		ACTION 1: Exclude for most analyses. Squamulose/crustose growth forms were not consistently collected.
3008	Hcexan	*Hypocenomyce*	*xanthococca*	1993		ACTION 1: Exclude for most analyses. Squamulose/crustose growth forms were not consistently collected.
3112	Hypmet	*Hypogymnia*	*metaphysodes*	1993		ACTION 5/ACTION 2: WEST outside of AK—3112 *Hypogymnia metaphysodes* should be combined into 3126 *H. wilfiana*. *H. metaphysodes* from the lower 48 are probably *H. wilfiana* but may contain some *H. canadensis*. ACTION 5/ACTION 2: ALASKA—3112 *H. metaphysodes* from Alaska should be combined into 3125 *H. canadensis*. Alaska records for *H. metaphysodes* are likely *H. canadensis* but may contain some *H. wilfiana*. True *H. metaphysodes* has not been recorded in North America (Goward et al. 2010) although the name is retained because detection in Alaska is possible.

LICH_ SPPCD	SPP_ ACRONYM	GENUS	SPECIES	YEAR START	YEAR END	SPP_COMMENTS
3125	Hypcan	*Hypogymnia*	*canadensis*	2014		ACTION 0: 3112 *Hypogymnia metaphysodes* from Alaska should be combined into 3125 *H. canadensis*. Alaska records for *H. metaphysodes* are likely *H. canadensis* but may contain some *H. wil iana*. True *H. metaphysodes* has not been recorded in North America (Goward et al. 2012) although the name is retained because detection in Alaska is possible. ACTION 0: 3112 *Hypogymnia* metaphysodes should be combined into 3126 *H. wilfiana*. *H. metaphysodes* from the lower 48 are probably *H.wilfiana* but may contain *H. canadensis*.
3126	Hypwil	*Hypogymnia*	*wilfiana*	2014		ACTION 0: 3112 *H. metaphysodes* from Alaska should be combined into 3125 *H. canadensis*. Alaska records for *H. metaphysodes* are likely *H. canadensis* but may contain some *H. wil iana*. True *H. metaphysodes* has not been recorded in North America (Goward et al. 2012) although the name is retained because detection in Alaska is possible. ACTION 0: 3112 *Hypogymnia metaphysodes* should be combined into 3126 *H. wil iana*. *H. metaphysodes* from the lower 48 are probably *H. wil iana* but may contain *H. canadensis*.
3217	Htrroc	*Hypotrachyna*	*rockii*	1993	2002	ACTION 2. Code 3217 was reassigned from *Hypotrachyna rockii* to 3217 *H. taylorensis*. All FIA specimens were reexamined and verified as *H. taylorensis* according to the treatment of Groner & Dietrich (1996) and Brodo et al. (2001).
3217	Htrroc	*Hypotrachyna*	*taylorensis*	2002		ACTION 0. Code 3217 was reassigned from *Hypotrachyna rockii* to 3217 *H. taylorensis*. All FIA specimens were reexamined and verified as *H. taylorensis* according to the treatment of Groner & Dietrich (1996) and Brodo et al. (2001).
3218	Htrsho	*Hypotrachyna*	*showmanii*	1993		ACTION 0: The species concept for *Hypotrachyna showmanii* changed in 2006 (Lendemer and Harris, 2006). Older specimens identified as 5103 *Parmelinopsis spumosa* were reexamined in 2006–07 and reassigned to *H. showmanii* as appropriate.
3224	Htrafr	*Hypotrachyna*	*afrorevoluta*	2005		ACTION 0: 3224 *Hypotrachyna afrorevoluta* was first reported in the US in 2005 by Knudsen and Lendemer. All specimens for similar species were reexamined in 2005–06. Only the few *H. afrorevoluta* specimens confirmed by Lendemer have this name.
3575	Led	*Leptogidium*		2014		ACTION 0: Two species in the genus 6200 *Polychidium* have been renamed to the genus 3575 *Leptogidium* (Muggia et al. 2011). Older genus-level records for *Polychidium* might include *Leptogidium*.
3606	Lepbur	*Leptogium*	*burnetiae*	1993	2016	ACTION 5/ACTION 2: EAST—3606 *Leptogium burnetiae* does not occur in North America; specimens from the East should be combined into 3619 *L. hirsutum* (Stone et al. 2016). ACTION 0: WEST—specimens are provisionally called 3606 "*Leptogium hirsutum*" until the correct name can be determined.
3608	Lepcor	*Leptogium*	*corniculatum*	1993	2014	ACTION 0: 3608 *Leptogium corniculatum* was renamed to 3608 *Scytinium palmatum* (Otálora et al. 2014).
3608	Lepcor	*Leptogium*	*palmatum*	2011	2014	ACTION 0: 3608 *Leptogium palmatum* was renamed to 3608 *Scytinium palmatum* (Otálora et al. 2014).
3608	Lepcor	*Scytinium*	*palmatum*	2014		ACTION 0: 3608 *Leptogium corniculatum* was renamed to 3608 *Leptogium palmatum* which was renamed to 3608 *Scytinium palmatum* (Otálora et al. 2014).

LICH_SPPCD	SPP_ACRONYM	GENUS	SPECIES	YEAR START	YEAR END	SPP_COMMENTS
3619	Lephir	*Leptogium*	*hirsutum*	1993		ACTION 0: 3606 *Leptogium burnetiae* specimens from the East should be combined into 3619 *L. hirsutum* (Stone et al. 2016).
3606	Lepbur	*Leptogium*	*"hirsutum"*	2016		ACTION 0: WEST—3606 *Leptogium burnetiae* does not occur in North America (Stone et al. 2016). Specimens are provisionally called 3606 "*Leptogium hirsutum*" until the correct name can be determined.
3625	Leplic	*Leptogium*	*lichenoides*	1993	2014	ACTION 0: 3625 *Leptogium lichenoides* was renamed to 3625 *Scytinium lichenoides* (Otálora et al. 2014). ACTION 0: This name is used in the broad sense and may include *S. californicum*, *S. pulvinatum*, and *S. intermedium* (McCune et al. 2014).
3625	Leplic	*Scytinium*	*lichenoides*	2014		ACTION 0: 3625 *Leptogium lichenoides* was renamed to 3625 *Scytinium lichenoides* (Otálora et al. 2014). ACTION 0: This name is used in the broad sense and may include *S. californicum*, *S. pulvinatum*, and *S. intermedium* (McCune et al. 2014).
3631	Lepsat	*Leptogium*	*saturninum*	1993		ACTION 5/ACTION 2: NORTHEAST—3631 *Leptogium saturninum* was renamed to 3645 *L. acadiense* (Stone et al. 2016).
3634	Lepten	*Leptogium*	*tenuissimum*	1993	2014	ACTION 0: 3634 *Leptogium tenuissimum* was renamed to 3634 *Scytinium tenuissimum* (Otálora et al. 2014).
3634	Lepten	*Scytinium*	*tenuissimum*	2014		ACTION 0: 3634 *Leptogium tenuissimum* was renamed to 3634 *Scytinium tenuissimum* (Otálora et al. 2014).
3635	Lepter	*Leptogium*	*teretiusculum*	1993	2014	ACTION 0: 3635 *Leptogium teretiusculum* was renamed to 3635 *Scytinium teretiusculum* (Otálora et al. 2014).
3635	Lepter	*Scytinium*	*teretiusculum*	2014		ACTION 0: 3635 *Leptogium teretiusculum* was renamed to 3635 *Scytinium teretiusculum* (Otálora et al. 2014).
3636	Leppol	*Leptogium*	*polycarpum*	1993	2014	ACTION 0: 3636 *Leptogium polycarpum* has been renamed to 3636 *Scytinium polycarpum* (Otálora et al. 2014).
3636	Leppol	*Scytinium*	*polycarpum*	2014		ACTION 0: 3636 *Leptogium polycarpum* was renamed to 3636 *Scytinium polycarpum* (Otálora et al. 2014).
3638	Lepcel	*Leptogium*	*cellulosum*	1998	2014	ACTION 0: 3638 *Leptogium cellulosum* was renamed to 3638 *Scytinium cellulosum* (Otálora et al. 2014).
3638	Lepcel	*Scytinium*	*cellulosum*	2014		ACTION 0: 3638 *Leptogium cellulosum* was renamed to 3638 *Scytinium cellulosum* (Otálora et al. 2014).
3644	Lepbre	*Leptogium*	*brebissonii*	2006	2014	ACTION 0: 3644 *Leptogium brebissonii* was renamed to 3644 *L. insigne* (Jørgensen & Tønsberg 2010).
3645	Lepaca	*Leptogium*	*acadiense*	2017		ACTION 5/ACTION 0: NORTHEAST—3631 *Leptogium saturninum* was renamed to 3645 *L. acadiense* (Stone et al. 2016).
3701	Letcol	*Letharia*	*columbiana*	1993		ACTION 0: 3703 *Letharia gracilis* was recognized as a distinct species in 2009 by McCune and Altermann. However, *L. gracilis* is rare, making it unlikely that *L. columbiana* and *L. vulpina* collections prior to 2009 contain *L. gracilis*.

LICH_ SPPCD	SPP_ ACRONYM	GENUS	SPECIES	YEAR START	YEAR END	SPP_COMMENTS
3702	Letvul	*Letharia*	*vulpina*	1993		ACTION 0: 3703 *Letharia* gracilis was recognized as a distinct species in 2009 by McCune and Altermann. However, *L. gracilis* is rare, making it unlikely that *L. columbiana* and *L. vulpina* collections prior to 2009 contain *L. gracilis.* ACTION 0: This name is used in the broad sense and likely includes *L. lupina* (Altermann et al. 2016), which is not chemically or morphologically distinct.
3703	Letgra	*Letharia*	*gracilis*	2009		ACTION 0: 3703 *Letharia gracilis* was recognized as a distinct species in 2009 by McCune and Altermann. However, *L. gracilis* is rare, making it unlikely that *L. columbiana* and *L. vulpina* collections prior to 2009 contain *L. gracilis.*
4000	Mel	*Melanelia*		1993		ACTION 0: Starting in 2005, specimens identified to species were assigned to either *Melanoelixia* or *Melanohalea* (Blanco et al. 2004). All specimens too small to identify to species will remain 4000 *Melanelia* sp.
4001	Melalb	*Melanelia*	*albertana*	1993	2005	ACTION 0: 4001 *Melanelia* albertana was renamed to 4001 *Melanelixia albertana* (Blanco et al. 2004).
4001	Melalb	*Melanelixia*	*albertana*	2005		ACTION 0: 4001 *Melanelia albertana* was renamed to 4001 *Melanelixia albertana* (Blanco et al. 2004).
4002	Melele	*Melanelia*	*elegantula*	1993	2005	ACTION 0: 4002 *Melanelia elegantula* was renamed to 4002 *Melanohalea elegantula* (Blanco et al. 2004).
4002	Melele	*Melanohalea*	*elegantula*	2005		ACTION 0: 4002 *Melanelia elegantula* was renamed to 4002 *Melanohalea elegantula* (Blanco et al. 2004).
4003	Melexa	*Melanelia*	*exasperata*	1993	2005	ACTION 0: 4003 *Melanelia exasperata* was renamed to 4003 *Melanohalea exasperata* (Blanco et al. 2004).
4003	Melexa	*Melanohalea*	*exasperata*	2005		ACTION 0: 4003 *Melanelia exasperata* was renamed to 4003 *Melanohalea exasperata* (Blanco et al. 2004).
4004	Melexl	*Melanelia*	*exasperatula*	1993	2005	ACTION 0: 4004 *Melanelia exasperatula* was renamed to 4004 *Melanohalea exasperatula* (Blanco et al. 2004).
4004	Melexl	*Melanohalea*	*exasperatula*	2005		ACTION 0: 4004 *Melanelia exasperatula* was renamed to 4004 *Melanohalea exasperatula* (Blanco et al. 2004).
4005	Melful	*Melanelia*	*fuliginosa*	1993	2005	ACTION 0: 4005 *Melanelia fuliginosa* was renamed to 4005 *Melanelixia fuliginosa* in 2005, then renamed to 4005 *Melanelixia glabratula* in 2014 (Leavitt et al. 2012).
4005	Melful	*Melanelixia*	*fuliginosa*	2005	2014	ACTION 0: 4005 *Melanelia fuliginosa* was renamed to 4005 *Melanelixia fuliginosa* in 2005, then renamed to 4005 *Melanelixia glabratula* in 2014 (Leavitt et al. 2012).
4005	Melful	*Melanelixia*	*glabratula*	2014		ACTION 0: 4005 *Melanelia fuliginosa* was renamed to 4005 *Melanelixia fuliginosa* in 2005, then renamed to 4005 *Melanelixia glabratula* in 2014 (Leavitt et al. 2012).
4006	Melgla	*Melanelia*	*glabra*	1993	2005	ACTION 0: 4006 *Melanelia glabra* was renamed to 4006 *Melanelixia glabra* in 2005, then renamed to 4006 *Melanelixia californica* in 2014 (Divakar et al. 2010).
4006	Melgla	*Melanelixia*	*glabra*	2005	2014	ACTION 0: 4006 *Melanelia glabra* was renamed to 4006 *Melanelixia glabra* in 2005, then renamed to 4006 *Melanelixia californica* in 2014 (Divakar et al. 2010).
4006	Melgla	*Melanelixia*	*californica*	2014		ACTION 0: 4006 *Melanelia glabra* was renamed to 4006 *Melanelixia glabra* in 2005, then renamed to 4006 *Melanelixia californica* in 2014 (Divakar et al. 2010).

LICH_ SPPCD	SPP_ ACRONYM	GENUS	SPECIES	YEAR START	YEAR END	SPP_COMMENTS
4007	Melgld	*Melanelia*	*glabroides*	1993	2005	ACTION 0: 4007 *Melanelia glabroides* was renamed to 4007 *Melanelixia glabroides* (Blanco et al. 2004).
4007	Melgld	*Melanelixia*	*glabroides*	2005		ACTION 0: 4007 *Melanelia glabroides* was renamed to 4007 *Melanelixia glabroides* (Blanco et al. 2004).
4008	Melhal	*Melanelia*	*halei*	1993	2005	ACTION 0: 4008 *Melanelia halei* was renamed to 4008 *Melanohalea halei* (Blanco et al. 2004).
4008	Melhal	*Melanohalea*	*halei*	2005		ACTION 0: 4008 *Melanelia halei* was renamed to 4008 *Melanohalea halei* (Blanco et al. 2004).
4009	Melinf	*Melanelia*	*infumata*	1993	2005	ACTION 0: 4009 *Melanelia infumata* was renamed to 4009 *Melanohalea infumata* (Blanco et al. 2004).
4009	Melinf	*Melanohalea*	*infumata*	2005		ACTION 0: 4009 *Melanelia infumata* was renamed to 4009 *Melanohalea infumata* (Blanco et al. 2004).
4010	Melmul	*Melanelia*	*multispora*	1993	2005	ACTION 0: 4010 *Melanelia multispora* was renamed to 4010 *Melanohalea multispora* (Blanco et al. 2004).
4010	Melmul	*Melanohalea*	*multispora*	2005		ACTION 0: 4010 *Melanelia multispora* was renamed to 4010 *Melanohalea multispora* (Blanco et al. 2004). ACTION 2: 4010 *M. multispora* should be combined into 4017 *M. subolivacea* for all analyses; examination of spores is not required by the FIA program.
4011	Meloli	*Melanelia*	*olivacea*	1993	2005	ACTION 0: 4011 *Melanelia olivacea* was renamed to 4011 *Melanohalea olivacea* (Blanco et al. 2004).
4011	Meloli	*Melanohalea*	*olivacea*	2005		ACTION 0: 4011 *Melanelia olivacea* was renamed to 4011 *Melanohalea olivacea* (Blanco et al. 2004).
4012	Melold	*Melanelia*	*olivaceoides*	1993	2005	ACTION 0: 4012 *Melanelia olivaceoides* was renamed to 4012 *Melanohalea olivaceoides* (Blanco et al. 2004).
4012	Melold	*Melanohalea*	*olivaceoides*	2005		ACTION 0: 4012 *Melanelia olivaceoides* was renamed to 4012 *Melanohalea olivaceoides* (Blanco et al. 2004).
4013	Melsep	*Melanelia*	*septentrionalis*	1993	2005	ACTION 0: 4013 *Melanelia septentrionalis* was renamed to 4013 *Melanohalea septentrionalis* (Blanco et al. 2004).
4013	Melsep	*Melanohalea*	*septentrionalis*	2005		ACTION 0: 4013 *Melanelia septentrionalis* was renamed to 4013 *Melanohalea septentrionalis* (Blanco et al. 2004).
4014	Melsar	*Melanelia*	*subargentifera*	1993	2005	ACTION 0: 4014 *Melanelia subargentifera* was renamed to 4014 *Melanelixia subargentifera* (Blanco et al. 2004).
4014	Melsar	*Melanelixia*	*subargentifera*	2005		ACTION 0: 4014 *Melanelia subargentifera* was renamed to 4014 *Melanelixia subargentifera* (Blanco et al. 2004).
4015	Melsub	*Melanelia*	*subaurifera*	1993	2005	ACTION 0: 4015 *Melanelia subaurifera* was renamed to 4015 *Melanelixia subaurifera* (Blanco et al. 2004).
4015	Melsub	*Melanelixia*	*subaurifera*	2005		ACTION 0: 4015 *Melanelia subaurifera* was renamed to 4015 *Melanelixia subaurifera* (Blanco et al. 2004).
4016	Melsel	*Melanelia*	*subelegantula*	1993	2005	ACTION 0: 4016 *Melanelia subelegantula* was renamed to 4016 *Melanohalea subelegantula* (Blanco et al. 2004).

LICH_ SPPCD	SPP_ ACRONYM	GENUS	SPECIES	YEAR START	YEAR END	SPP_COMMENTS
4016	Melsel	*Melanohalea*	*subelegantula*	2005		ACTION 0: 4016 *Melanelia subelegantula* was renamed to 4016 *Melanohalea subelegantula* (Blanco et al. 2004).
4017	Melsol	*Melanelia*	*subolivacea*	1993	2005	ACTION 0: 4017 *Melanelia subolivacea* was renamed to 4017 *Melanohalea subolivacea* (Blanco et al. 2004).
4017	Melsol	*Melanohalea*	*subolivacea*	2005		ACTION 0: 4017 *Melanelia subolivacea* was renamed to 4017 *Melanohalea subolivacea* (Blanco et al. 2004). ACTION 2: 4010 *Melanohalea multispora* should be combined into 4017 *M. subolivacea* for all analyses; examination of spores is not required by the FIA program.
4018	Meltra	*Melanelia*	*trabeculata*	1993	2005	ACTION 0: 4018 *Melanelia trabeculata* was renamed to 4018 *Melanohalea trabeculata* (Blanco et al. 2004).
4018	Meltra	*Melanohalea*	*trabeculata*	2005		ACTION 0: 4018 *Melanelia trabeculata* was renamed to 4018 *Melanohalea trabeculata* (Blanco et al. 2004).
4101	Menter	*Menegazzia*	*terebrata*	1993		ACTION 3: For analyzing data for multiple years crossing 2009, 4101 *Menegazzia terebrata* should be combined into 4102 *M. subsimilis*. Specimens identified as *M. terebrata* before 2009 were most likely *M. subsimilis*, which is the more common species (Bjerke 2003).
4102	Mensub	*Menegazzia*	*subsimilis*	2004		ACTION 0: For analyzing data for multiple years crossing 2004, 4101 *Menegazzia terebrata* should be combined into 4102 *M. subsimilis*. Specimens identified as *M. terebrata* before 2004 were most likely *M. subsimilis*, which is the more common species (Bjerke 2003).
4551	Nodabb	*Nodobryoria*	*abbreviata*	1995		ACTION 0: 601 *Bryoria abbreviata* is a synonym and should be combined with 4551 *Nodobryoria abbreviata* for all analyses.
4552	Nodore	*Nodobryoria*	*oregana*	1995		ACTION 0: 615 *Bryoria oregana* is a synonym and should be combined with 4552 *Nodobryoria oregana* for all analyses.
4600	Nor	*Normandina*		1993		ACTION 1: Exclude for most analyses. Squamulose growth forms were not consistently collected.
4601	Norpul	*Normandina*	*pulchella*	1993		ACTION 1: Exclude for most analyses. Squamulose growth forms were not consistently collected.
4700	Pan	*Pannaria*		1993		ACTION 0: Crews are trained to collect this group, including *Pannaria* species with a squamulose growth form.
4712	Pansau	*Fuscopannaria*	*saubinetii*	2000		ACTION 5/ACTION 2: WEST—Before 2001, 2658 *Fuscopannaria pacifica* in the Pacific Northwest was misidentified as 4712 *F. saubinetii*. *F. saubinetii* does not occur in the Pacific Northwest (McCune & Geiser 2009). Records of *F. saubinetii* should be changed to *F. pacifica*.
4806	Parsul	*Parmelia*	*sulcata*	1993		ACTION 3: For analyzing data from multiple years crossing 2010, 4808 *Parmelia barrenoae* should be combined into 4806 *P. sulcata*. In 2010, *P. barrenoae* was split from *P. sulcata* (Hodkinson et al. 2010).
4808	Parbar	*Parmelia*	*barrenoae*	2010		ACTION 3: For analyzing data from multiple years crossing 2010, 4808 *Parmelia barrenoae* should be combined into 4806 *P. sulcata*. In 2010, *P. barrenoae* was split from *P. sulcata* (Hodkinson et al. 2010).

LICH_SPPCD	SPP_ACRONYM	GENUS	SPECIES	YEAR START	YEAR END	SPP_COMMENTS
4900	Pll	*Parmeliella*		1993		ACTION 0: Crews are trained to collect this group, including *Parmeliella* species with a squamulose growth form.
5001	Pnaque	*Parmelina*	*quercina*	1993	2014	ACTION 0: 5001 *Parmelina quercina* was renamed to 5001 *Parmelina coleae* (Argüello et al. 2007).
5001	Pnaque	*Parmelina*	*coleae*	2014		ACTION 0: 5001 *Parmelina quercina* was renamed to 5001 *Parmelina coleae* (Argüello et al. 2007).
5100	Pps	*Parmelinopsis*		1993	2014	ACTION 2: The genus 5100 *Parmelinopsis* should be combined into 3299 *Hypotrachyna* (Divakar et al. 2013).
5101	Ppshor	*Parmelinopsis*	*horrescens*	1993	2014	ACTION 0: 5101 *Parmelinopsis horrescens* was renamed to 5101 *Hypotrachyna horrescens* (Divakar et al. 2013).
5101	Ppshor	*Hypotrachyna*	*horrescens*	2014		ACTION 0: 5101 *Parmelinopsis horrescens* was renamed to 5101 *Hypotrachyna horrescens* (Divakar et al. 2013).
5102	Ppsmin	*Parmelinopsis*	*minarum*	1993	2014	ACTION 0: 5102 *Parmelinopsis minarum* was renamed to 5102 *Hypotrachyna minarum* (Divakar et al. 2013).
5102	Ppsmin	*Hypotrachyna*	*minarum*	2014		ACTION 0: 5102 *Parmelinopsis minarum* was renamed to 5102 *Hypotrachyna minarum* (Divakar et al. 2013).
5103	Ppsspu	*Parmelinopsis*	*spumosa*	1993	2014	ACTION 0: 5103 *Parmelionopsis spumosa* was renamed to 5103 *Hypotrachyna spumosa* (Divakar et al. 2013). ACTION 0: The species concept for *Hypotrachyna showmanii* changed in 2006 (Lendemer and Harris, 2006). Older specimens identified as 5103 *Parmelinopsis spumosa* were reexamined in 2006–2007 and reassigned to *H. showmanii* where appropriate.
5103	Ppsspu	*Hypotrachyna*	*spumosa*	2014		ACTION 0: 5103 *Parmelinopsis spumosa* was renamed to 5103 *Hypotrachyna spumosa* (Divakar et al. 2013). ACTION 0: The species concept for *Hypotrachyna showmanii* changed in 2006 (Lendemer and Harris, 2006). Older specimens identified as 5103 *P. spumosa* were reexamined in 2006–2007 and reassigned to 3218 *H. showmanii* where appropriate.
5104	Ppsswi	*Parmelinopsis*	*swinscowii*	1993	2014	ACTION 0: 5104 *Parmelinopsis swinscowii* has been renamed to 5104 *Hypotrachyna swinscowii* (Divakar et al. 2013).
5104	Ppsswi	*Hypotrachyna*	*swinscowii*	2014		ACTION 0: 5104 *Parmelinopsis swinscowii* was renamed to 5104 *Hypotrachyna swinscowii* (Divakar et al. 2013).
5300	Pmo	*Parmotrema*		1993		ACTION 0: 770 *Canomaculina* should be combined into 5300 *Parmotrema*. *Canomaculina* was renamed to *Parmotrema* (Blanco et al. 2005).
5303	Pmochi	*Parmotrema*	*chinense*	1993	2014	ACTION 0: 5303 *Parmotrema chinense* was renamed to 5303 *Parmotrema perlatum* (Hawksworth 2004).
5303	Pmochi	*Parmotrema*	*perlatum*	2014		ACTION 0: 5303 *Parmotrema chinense* was renamed to 5303 *Parmotrema perlatum* (Hawksworth 2004).
5304	Pmocon	*Parmotrema*	*conferendum*	1993		ACTION 0: 5304 *Parmotrema conferendum* was renamed to 5304 *Canomaculina conferenda* in 2002 but was moved back to 5304 *Parmotrema conferendum* based on Blanco et al. (2005).

LICH_ SPPCD	SPP_ ACRONYM	GENUS	SPECIES	YEAR START	YEAR END	SPP_COMMENTS
5304	Pmocon	*Canomaculina*	*conferenda*	2002	2014	ACTION 0: 5304 *Parmotrema conferendum* was renamed to 5304 *Canomaculina conferenda* in 2002 but was moved back to 5304 *Parmotrema conferendum* based on Blanco et al. (2005).
5320	Pmomic	*Parmotrema*	*michauxianum*	1993	2014	ACTION 0: 5320 *Parmotrema michauxianum* was renamed to 5320 *Parmotrema submarginale* (Esslinger 2016).
5320	Pmomic	*Parmotrema*	*submarginale*	2014		ACTION 0: 5320 *Parmotrema michauxianum* was renamed to 5320 *Parmotrema submarginale* (Esslinger 2016).
5322	Pmoneo	*Parmotrema*	*neotropicum*	1993		ACTION 0: 5322 *Parmotrema neotropicum* was renamed to 5322 *Canomaculina neotropica* in 2002 but was moved back to 5322 *Parmotrema neotropicum* based on Blanco et al. (2005).
5322	Pmoneo	*Canomaculina*	*neotropica*	2002	2014	ACTION 0: 5322 *Parmotrema neotropicum* was renamed to 5322 *Canomaculina neotropica* in 2002 but was moved back to 5322 *Parmotrema neotropicum* based on Blanco et al. (2005).
5327	Pmorig	*Parmotrema*	*rigidum*	1993	2014	ACTION 0: 5327 *Parmotrema rigidum* was renamed to 5327 *Parmotrema subrigidum* (Egan et al. 2005).
5327	Pmorig	*Parmotrema*	*subrigidum*	2014		ACTION 0: 5327 *Parmotrema rigidum* was renamed to 5327 *Parmotrema subrigidum* (Egan et al. 2005).
5330	Pmosus	*Parmotrema*	*subsumptum*	1993		ACTION 0: 5330 *Parmotrema subsumptum* was renamed to 5330 *Canomaculina subsumpta* in 2002 but was moved back to 5330 *Parmotrema subsumptum* based on Blanco et al. (2005).
5330	Pmosus	*Canomaculina*	*subsumpta*	2002	2014	ACTION 0: 5330 *Parmotrema subsumptum* was renamed to 5330 *Canomaculina subsumpta* in 2002 but was moved back to 5330 *Parmotrema subsumptum* based on Blanco et al. (2005).
5331	Pmosub	*Parmotrema*	*subtinctorium*	1993		ACTION 0: 5331 *Parmotrema subtinctorium* was renamed to 5331 *Canomaculina subtinctoria* in 2002 but was moved back to 5331 *Parmotrema subtinctorium* based on Blanco et al. (2005).
5331	Pmosub	*Canomaculina*	*subtinctoria*	2002	2014	ACTION 0: 5331 *Parmotrema subtinctorium* was renamed to 5331 *Canomaculina subtinctoria* in 2002 but was moved back to 5331 *Parmotrema subtinctorium* based on Blanco et al. (2005).
5337	Pmosui	*Parmotrema*	*subisidiosum*	1994		ACTION 0: 7106 *Rimelia subisidiosa* should be combined into 5337 *Parmotrema subisidiosum* (Blanco et al. 2005).
5338	Pmocet	*Parmoterma*	*cetratum*	1994	2005	ACTION 2: The name 5338 *Parmoterma cetratum* is misspelled and should be corrected to 5338 *Parmotrema cetratum*.
5338	Pmocet	*Parmotrema*	*cetratum*	2005		ACTION 0: 7101 *Rimelia cetrata* should be combined into 5338 *Parmotrema cetratum* (Blanco et al. 2005). ACTION 0: The name 5338 *Parmoterma cetratum* has a spelling error and was corrected to 5338 *Parmotrema cetratum*.

LICH_ SPPCD	SPP_ ACRONYM	GENUS	SPECIES	YEAR START	YEAR END	SPP_COMMENTS
5602	Phacer	*Phaeophyscia*	*cernohorskyi*	1993	2003	ACTION 2: 5602 *P. cernohorskyi* is considered a synonym and should be combined into 5605 *P. hirsuta* for all analyses (Esslinger 2004).
5605	Phahir	*Phaeophyscia*	*hirsuta*	1993		ACTION 0: In arid western habitats, small specimens of 5605 *Phaeophyscia hirsuta*, 5611 *P. nigricans*, 5711 *Physcia dubia*, and 5801 *Physciella chloantha* may be morphologically indistinguishable. FIA does examine cells of the lower cortex to a limited extent in order to assign accurate abundance codes. ACTION 0: 5602 *P. cernohorskyi* is considered a synonym and should be combined into 5605 *P. hirsuta* for all analyses (Esslinger 2004).
5607	Phahis	*Phaeophyscia*	*hispidula*	1993		ACTION 0: 5608 *Phaeophyscia imbricata* should be combined into 5607 *P. hispidula* for all analyses (Moberg 1995).
5608	Phaimb	*Phaeophyscia*	*imbricata*	1993	2004	ACTION 2: 5608 *Phaeophyscia imbricata* should be combined into 5607 *P. hispidula* for all analyses (Moberg 1995).
5611	Phanig	*Phaeophyscia*	*nigricans*	1993		ACTION 0: In arid western habitats, small specimens of 5605 *Phaeophyscia hirsuta*, 5611 *P. nigricans*, 5711 *Physcia dubia*, and 5801 *Physciella chloantha* may be morphologically indistinguishable. FIA does examine cells of the lower cortex to a limited extent in order to assign accurate abundance codes.
5616	Phaend	*Phaeophyscia*	*endococcinea*	1997	2005	ACTION 0: The name 5616 *Phaeophyscia endococcinea* is misspelled and should be corrected to 5616 *Phaeophyscia endococcina*.
5616	Phaend	*Phaeophyscia*	*endococcina*	2005		ACTION 5/ACTION 3: WEST—for analyzing data from multiple years crossing 2005, 5616 *Phaeophyscia endococcina* should be combined into 5618 *P. endococcinodes*; *P. endococcina* is considered different from *P. endococcinodes* but is rare in North America (Esslinger 2004). ACTION 5/ACTION 4: WEST—for analyzing data collected before 2005, 5616 *P. endococcina* should be combined into 5618 *P. endococcinodes*.
5618	Phaedd	*Phaeophyscia*	*endococcinodes*	2005		ACTION 5/ACTION 0: WEST—for analyzing data from multiple years crossing 2005, 5616 *Phaeophyscia endococcina* should be combined into 5618 *P. endococcinodes*; *P. endococcina* is considered different from *P. endococcinodes* but is rare in North America (Esslinger 2004). ACTION 5/ACTION 0: WEST—for analyzing data collected before 2005, 5616 *P. endococcina* should be combined into 5618 *P. endococcinodes*.

LICH_ SPPCD	SPP_ ACRONYM	GENUS	SPECIES	YEAR START	YEAR END	SPP_COMMENTS
5702	Phyaip	*Physcia*	*aipolia*	1993		ACTION 0: The name *Physcia aipolia* is applied sensu lato. ACTION 0: For analyzing data for multiple years crossing 2014, 5728 *P. alnophila* should be combined into 5702 *P. aipolia*. Molecular data justify recognition of *P. aipolia* var. *alnophila* as a distinct species, *P. alnophila* (Lohtander et al. 2009). ACTION 5/ACTION 0: ALASKA—the name *P. alnophila* is applied for FIA data from Alaska without requiring TLC. ACTION 5/ACTION 0: OUTSIDE ALASKA—*P. alnophila* is applied only if identified using TLC, not normally done for FIA specimens. *P. alnophila* has a more northerly distribution than *P. aipolia* although there is consider geographic overlap in the lower 48 States and intermediate forms of these species can not be reliably separated without TLC (Brodo et al. 2013). ACTION 0: *P. aipolia* and *P. stellaris* are distinguished solely on the K reaction of the medulla; other characters are not reliably correlated with the K reaction. ACTION 0: Southeastern United States—Based on New York Botanical Garden herbarium records (http://sweetgum.nybg.org/science/vh), *Physcia aipolia* may not occur in the most Southeastern U.S. States. Reevaluation of specimens in other herbaria will be required to confirm this. See comment for *Physcia pumilior*.
5705	Phybiz	*Physcia*	*biziana*	1993		ACTION 0: *Physcia biziana* intergrades with *P. stellaris*, both having K- medulla. Moderately to heavily pruinose specimens with short, rounded, scalloped lobes were named *P. biziana*; moderately pruinose specimens with narrower lobes of *P. aipolia* type were named *P. stellaris*. Specimens with little or no pruinosity were named *P. stellaris* regardless of lobe size.
5710	Phydim	*Physcia*	*dimidiata*	1993		ACTION 0: For Utah and Nevada in 1999, reports of 5711 *Physcia dubia* were judged by T. Esslinger (1999) to be intermediate between *P. dimidiata* and *P. dubia*. Because the mean elevational distribution of this "species" was >1000 ft different than of *P. dimidiata*, we have retained the name *P. dubia* for these specimens pending further study.
5711	Phydub	*Physcia*	*dubia*	1993		ACTION 0: For Utah and Nevada in 1999, reports of 5711 *Physcia dubia* were judged by T. Esslinger (1999) to be intermediate between *P. dimidiata* and *P. dubia*. Because the mean elevational distribution of this "species" was >1000 ft different than of *P. dimidiata*, we have retained the name *P. dubia* for these specimens pending further study. ACTION 0: In arid West habitats, small specimens of 5605 *Phaeophyscia hirsuta*, 5611 *P. nigricans*, 5711 *Physcia dubia*, and 5801 *Physciella chloantha* may be morphologically indistinguishable. FIA examines cells of the lower cortex to a limited extent in order to assign accurate abundance codes.
5720	Phypum	*Physcia*	*pumilior*	1993		ACTION 0: Based on New York Botanical Garden herbarium records (http://sweetgum.nybg.org/science/vh), *Physcia aipolia* records for the most Southeastern U.S. States may actually be *Physcia pumilior*. Reevaluation of specimens in other herbaria are required to confirm this. See comment for *Physcia aipolia*.
5721	Physem	*Physcia*	*semipinnata*	1993	2003	ACTION 0: 5721 *Physcia semipinnata* was renamed to 5721 *P. leptalea* (Esslinger 2016).
5721	Physem	*Physcia*	*leptalea*	2003		ACTION 0: 5721 *Physcia semipinnata* was renamed to 5721 *P. leptalea* (Esslinger 2016).

LICH_ SPPCD	SPP_ ACRONYM	GENUS	SPECIES	YEAR START	YEAR END	SPP_COMMENTS
5723	Physte	*Physcia*	*stellaris*	1993		ACTION 0: *Physcia aipolia* and *P. stellaris* are distinguished solely on the K reaction of the medulla; other characters are not reliably correlated with the K reaction. *P. biziana* intergrades with *P. stellaris*, both having K- medulla. Moderately pruinose specimens with short, rounded, scalloped lobes were named *P. biziana*; moderately pruinose specimens with narrower lobes of *P. aipolia* type were named *P. stellaris*. Specimens with little or no pruinosity were named *P. stellaris* regardless of lobe size.
5728	Phyaln	*Physcia*	*alnophila*	2014		ACTION 3: For analyzing data for multiple years crossing 2014, 5728 *Physcia alnophila* should be combined into 5702 *P. aipolia*. Molecular data justify recognition of *P. aipolia* var. *alnophila* as a distinct species, *P. alnophila* (Lohtander et al. 2009). ACTION 5/ ACTION 0: ALASKA—the name *P. alnophila* is applied for FIA data from Alaska without requiring TLC. ACTION 5/ACTION 0: OUTSIDE ALASKA—*P. alnophila* is applied only if identified using TLC, not normally done for FIA specimens. *P. alnophila* has a more northerly distribution than *P. aipolia* although there is consider geographic overlap in the lower 48 States and intermediate forms of these species can not be reliably separated without TLC (Brodo et al. 2013).
5801	Pclchl	*Physciella*	*chloantha*	1993		ACTION 0: In arid West habitats, small specimens of 5605 *Phaeophyscia hirsuta*, 5611 *P. nigricans*, 5711 *Physcia dubia*, and 5801 *Physciella chloantha* may be morphologically indistinguishable. FIA examines cells of the lower cortex to a limited extent in order to assign accurate abundance codes.
5901	Phodet	*Physconia*	*detersa*	1993		ACTION 5/ACTION 3: WEST—5907 *Physconia isidiigera*, 5906 *P. perisidiosa*, and 5911 *P. leucoleiptes* were recognized for the West starting in 1998. Prior to the split these species were identified as 5901 *P. detersa*, which is rare in the West (Brodo et al. 2016). For analysis of data crossing 1998, 5901 *P. detersa* should be combined into 5906 *P. perisidiosa*, the most common species in the group. ACTION 5/ACTION 0: EAST—*P. detersa*, *P. isidiigera*, *P. leucoleiptes*, and *P. perisidiosa* have been distinguished in all inventory years.
5906	Phoper	*Physconia*	*perisidiosa*	1993		ACTION 5/ACTION 3: WEST—for analyzing data from multiple years crossing 1998, 5907 *Physconia isidiigera* and 5911 *P. leucoleiptes* should be combined into 5906 *P. perisidiosa*. See additional notes under 5901 *P. detersa*. In boreal forests, this taxon may include the rarer, similar-looking species 5920 *Physconia labrata* (Esslinger et al. 2017). See noted under *P. labrata*.
5907	Phoisi	*Physconia*	*isidiigera*	1993		ACTION 5/ACTION 3: WEST—for analyzing data from multiple years crossing 1998, 5907 *Physconia isidiigera* and 5911 *P. leucoleiptes* should be combined into 5906 *P. perisidiosa*. See additional notes under 5901 *P. detersa*.
5911	Pholeu	*Physconia*	*leucoleiptes*	1997		ACTION 5/ACTION 3: WEST—for analyzing data from multiple years crossing 1998, 5907 *Physconia isidiigera* and 5911 *P. leucoleiptes* should be combined into 5906 *P. perisidiosa*. See additional notes under 5901 *P. detersa*.
5920	Pholab	*Physconia*	*labrata*	2019		ACTION 3: For all analyses crossing 2019, 5920 *Physconia labrata* should be combined into 5906 *P. perisidiosa* (Esslinger et al. 2017). ACTION 0: It's unknown whether 5920 *Physconia labrata* can be consistently differentiated by FIA crews and ID specialists. Lumping with 5906 *P. perisidiosa* should be considered for most datasets until more is known about this species.

LICH_ SPPCD	SPP_ ACRONYM	GENUS	SPECIES	YEAR START	YEAR END	SPP_COMMENTS
6101	Plagla	*Platismatia*	*glauca*	1993		ACTION 0: For analyzing data for multiple years crossing 2014, 6107 *Platismatia wheeleri* should be combined into 6101 *P. glauca*. *Platismatia wheeleri* was recognized as a distinct species by Lumbsch et al. (2011).
6107	Plawhe	*Platismatia*	*wheeleri*	2014		ACTION 3: For analyzing data for multiple years crossing 2014, 6107 *Platismatia wheeleri* should be combined into 6101 *P. glauca*. *Platismatia wheeleri* was recognized as a distinct species by Lumbsch et al. (2011).
6200	Pol	*Polychidium*		1993		ACTION 0: Two species in the genus 6200 *Polychidium* have been renamed to the genus 3575 *Leptogidium* (Muggia et al. 2011). Older genus-level records for *Polychidium* might include *Leptogidium*.
6201	Polden	*Polychidium*	*dendriscum*	1993	2014	ACTION 0: 6201 *Polychidium dendriscum* was renamed to 6201 *Leptogidium dendriscum* (Muggia et al. 2011).
6201	Polden	*Leptogidium*	*dendriscum*	2014		ACTION 0: 6201 *Polychidium dendriscum* was renamed to 6201 *Leptogidium dendriscum* (Muggia et al. 2011).
6203	Polcon	*Polychidium*	*contortum*	1999	2014	ACTION 0: 6203 *Polychidium contortum* was renamed to 6203 *Leptogidium contortum* (Muggia et al. 2011).
6203	Polcon	*Leptogidium*	*contortum*	2014		ACTION 0: 6203 *Polychidium contortum* was renamed to 6203 *Leptogidium contortum* (Muggia et al. 2011).
6250	Pro	*Protopannaria*		2000		ACTION 0: Crews are trained to collect this group, including *Protopannaria* species with a squamulose growth form.
6401	Pcyano	*Pseudocyphellaria*	*anomala*	1993	2017	ACTION 0: 6401 *Pseudocyphellaria anomala* was renamed to 6401 *Lobaria anomala* (McCune et al. 2014).
6401	Pcyano	*Lobaria*	*anomala*	2017		ACTION 0: 6401 *Pseudocyphellaria anomala* was renamed to 6401 *Lobaria anomala* (McCune et al. 2014).
6402	Pcyant	*Pseudocyphellaria*	*anthraspis*	1993	2017	ACTION 0: 6402 *Pseudocyphellaria anthraspis* was renamed to 6402 *Lobaria anthraspis* (McCune et al. 2014).
6402	Pcyant	*Lobaria*	*anthraspis*	2017		ACTION 0: 6402 *Pseudocyphellaria anthraspis* was renamed to 6402 *Lobaria anthraspis* (McCune et al. 2014).
6404	Pcycro	*Pseudocyphellaria*	*crocata*	1993	2019	ACTION 0: 6404 *Pseudocyphellaria crocata* is now recognized as a complex of several species (Lücking et al. 2017), which we renamed to 6404 *Pseudocyphellaria citrina*, the most common and widely distributed of the species. *P. crocata* is not found in North America. For records prior to 2019, the name *P. citrina* (formerly *P. crocata*) may also include several newly described, but less common *Pseudocyphellaria* species: *P. holarctica*, *P. hawaiiensis*, *P. deyi*, *P. epiflavoides*, and *P. punctata*.
6404	Pcycro	*Pseudocyphellaria*	*citrina*	2019		ACTION 0: 6404 *Pseudocyphellaria crocata* is now recognized as a complex of several species (Lücking et al. 2017), which we renamed to 6404 *Pseudocyphellaria citrina*, the most common and widely distributed of the species. *P. crocata* is not found in North America. For records prior to 2019, the name *P. citrina* (formerly *P. crocata*) may also include several newly described, but less common *Pseudocyphellaria* species: *P. holarctica*, *P. hawaiiensis*, *P. deyi*, *P. epiflavoides*, and *P. punctata*.

LICH_SPPCD	SPP_ACRONYM	GENUS	SPECIES	YEAR START	YEAR END	SPP_COMMENTS
6408	Pcyper	*Pseudocyphellaria*	*perpetua*	2004	2017	ACTION 0: 6408 *Pseudocyphellaria perpetua* was renamed to 6408 *P. hawaiiensis* (Moncada et al. 2014). ACTION 3: For analyzing data from multiple years crossing 2019, 6408 *P. perpetua* or *P. hawaiiensis* should be combined into 6404 *P. citrina*.
6408	Pcyper	*Pseudocyphellaria*	*hawaiiensis*	2017		ACTION 0: 6408 *Pseudocyphellaria perpetua* was renamed to 6408 *P. hawaiiensis* (Moncada et al. 2014). ACTION 3: For analyzing data from multiple years crossing 2019, 6408 *P. perpetua* or *P. hawaiiensis* should be combined into 6404 *P. citrina*.
6409	Pcydey	*Pseudocyphellaria*	*deyi*	2019		ACTION 3: For analyzing data from multiple years crossing 2019, 6409 *Pseudocyphellaria deyi* should be combined with 6404 *P. citrina.*
6410	Pcyepi	*Pseudocyphellaria*	*epiflavoides*	2019		ACTION 3: For analyzing data from multiple years crossing 2019, 6410 *Pseudocyphellaria epiflavoides* should be combined with 6404 *P. citrina*.
6411	Pcyhol	*Pseudocyphellaria*	*holarctica*	2019		ACTION 3: For analyzing data from multiple years crossing 2019, 6411 *Pseudocyphellaria holarctica* should be combined with 6404 *P. citrina*.
6412	Pcypun	*Pseudocyphellaria*	*punctata*	2019		ACTION 3: For analyzing data from multiple years crossing 2019, 6412 *Pseudocyphellaria punctata* should be combined with 6404 *P. citrina*.
6501	Ppasph	*Pseudoparmelia*	*sphaerospora*	1993	2006	ACTION 0: 6501 *Pseudoparmelia sphaerospora* was renamed to 6501 *Pseudoparmelia uleana* (Esslinger 2016).
6501	Ppasph	*Pseudoparmelia*	*uleana*	2006		ACTION 0: 6501 *Pseudoparmelia sphaerospora* was renamed to 6501 *Pseudoparmelia uleana* (Esslinger 2016).
6600	Pso	*Psoroma*		1993		ACTION 1: Exclude for most analyses. Squamulose and crustose growth forms were not consistently collected.
6601	Psohyp	*Psoroma*	*hypnorum*	1993		ACTION 1: Exclude for most analyses. Squamulose and crustose growth forms were not consistently collected.
6705	Punmis	*Punctelia*	*missouriensis*	1993		ACTION 0: 6712 *Punctelia punctilla* should be combined into 6705 *P. missouriensis* for all analyses. *P. missouriensis* is the correct name for this taxon (Aptroot 2003, Lendemer & Hodkinson 2010).
6706	Punper	*Punctelia*	*perreticulata*	1993		ACTION 0: Lendemer & Hodkinson (2010) narrowed the species concept for *P. perreticulata*. ACTION 5/ACTION 2: WEST—6706 *P. perreticulata* should be combined into 6714 *P. jeckeri* for all analyses. ACTION 5/ACTION 4: EAST—for data collected before 2010, combine 6706 *P. perreticulata* into 6713 *P. caseana* for all analyses. It is likely that eastern specimens collected outside the Ozarks are *P. caseana.*
6709	Punsem	*Punctelia*	*semansiana*	1993	2014	ACTION 0: 6709 *Punctelia semasiana* was renamed to 6709 *Punctelia graminicola* (Egan 2003).
6709	Punsem	*Punctelia*	*graminicola*	2014		ACTION 0: 6709 *Punctelia semasiana* was renamed to 6709 *Punctelia graminicola* (Egan 2003).
6711	Punsub	*Punctelia*	*subrudecta*	1993	2010	ACTION 0: *Punctelia subrudecta* is no longer a valid name for U.S. specimens (Lendemer & Hodkinson 2010). ACTION 5/ACTION 2: EAST—6711 *Punctelia subrudecta* should be combined into 6712 *P. caseana* for all analyses. ACTION 5/ ACTION 2: WEST—6711 *P. subrudecta* should be combined into 6713 *P. jeckeri* for all analyses.

LICH_ SPPCD	SPP_ ACRONYM	GENUS	SPECIES	YEAR START	YEAR END	SPP_COMMENTS
6712	Punpun	*Punctelia*	*punctilla*	2000	2003	ACTION 2: 6712 *Punctelia punctilla* should be combined into 6705 *P. missouriensis* for all analyses. *P. missouriensis* is the correct name for this taxon (Aptroot 2003, Lendemer & Hodkinson 2010).
6713	Puncas	*Punctelia*	*caseana*	2010		ACTION 5/ACTION 0: EAST—6711 *Punctelia subrudecta* should be combined into 6713 *P. caseana* for all analyses. This treatment follows Lendemer & Hodkinson (2010). ACTION 5/ACTION 0: EAST—for data collected before 2010, combine 6706 *P. perreticulata* into 6713 *P. caseana* for all analyses. Lendemer & Hodkinson (2010) narrowed the species concept for *P. perreticulata*, making it likely that specimens collected outside the Ozarks are *P. caseana*.
6714	Punjec	*Punctelia*	*jeckeri*	2010		ACTION 5/ACTION 0: WEST—6711 *Punctelia subrudecta* is no longer a valid name for U.S. specimens (Lendemer & Hodkinson 2010). Records should be combined into 6714 *P. jeckeri* for all analyses. ACTION 5/ACTION 0: WEST—6706 *P. perreticulata* has a narrow distribution in the West. It should be combined into 6713 *P. jeckeri* for all analyses (Lendemer & Hodkinson 2010).
6801	Pyxalb	*Pyxine*	*albovirens*	1993		ACTION 5/ACTION 0: Southern (S) FIA Region—The names 6801 *Pyxine albovirens*, 6803 *P. caesiopruinosa*, and 6809 *P. subcinerea* may have been misapplied in early years in the Southeast. ACTION 5/ACTION 4: For any analysis including Southern data collected in 1999 or prior, *P. albovirens* and *P. caesiopruinosa* should be combined into *P. subcinerea*.
6803	Pyxcae	*Pyxine*	*caesiopruinosa*	1993		ACTION 5/ACTION 0: Southern (S) FIA Region—The names 6801 *Pyxine albovirens*, 6803 *P. caesiopruinosa,* and 6809 *P. subcinerea* may have been misapplied in early years in the Southeast. ACTION 5/ACTION 4: For any analysis including Southern data collected in 1999 or prior, *P. albovirens* and *P. caesiopruinosa* should be combined into *P. subcinerea*.
6809	Pyxsub	*Pyxine*	*subcinerea*	1993		ACTION 5/ACTION 0: Southern (S) FIA Region—The names 6801 *Pyxine albovirens*, 6803 *P. caesiopruinosa*, and 6809 *P. subcinerea* may have been misapplied in early years in the Southeast. ACTION 5/ACTION 0: For any analysis including Southern data collected in 1999 or prior, *P. albovirens* and *P. caesiopruinosa* should be combined into *P. subcinerea*.
6901	Ramame	*Ramalina*	*americana*	1993		ACTION 0: LaGreca (1999) segregated 6941 *Ramalina culbersoniorum* from 6901 *R. americana*. It does not appear possible to distinguish the two taxa without TLC; specimens were only called *R. culbersoniorum* if TLC was used to confirm identification.
6912	Ramfar	*Ramalina*	*farinacea*	1993		ACTION 0: The name 6912 *Ramalina farinacea* may be occasionally misapplied to pollution-stunted or tiny specimens of 6934 *R. subleptocarpha* as their morphology becomes convergent when stressed.
6934	Ramsle	*Ramalina*	*subleptocarpha*	1993		ACTION 0: The name 6912 *Ramalina farinacea* may be occasionally misapplied to pollution-stunted or tiny specimens of 6934 *R. subleptocarpha* as their morphology becomes convergent when stressed.

LICH_ SPPCD	SPP_ ACRONYM	GENUS	SPECIES	YEAR START	YEAR END	SPP_COMMENTS
6941	Ramcul	*Ramalina*	*culbersoniorum*	1999		ACTION 0: LaGreca (1999) segregated 6941 *Ramalina culbersoniorum* from 6901 *R. americana*. It does not appear possible to distinguish the two taxa without TLC; specimens were only called *R. culbersoniorum* if TLC was used to confirm identification.
7100	Rim	*Rimelia*		1993	2014	ACTION 0: 7100 *Rimelia* was renamed to 5300 *Parmotrema* (Blanco et al. 2005).
7101	Rimcet	*Rimelia*	*cetrata*	1993	2014	ACTION 2: 7101 *Rimelia cetrata* should be combined into 5338 *Parmotrema cetratum* (Blanco et al. 2005).
7102	Rimcom	*Rimelia*	*commensurata*	1993	2014	ACTION 0: 7102 *Rimelia commensurata* was renamed to 7102 *Parmotrema commensuratum* (Blanco et al. 2005).
7102	Rimcom	*Parmotrema*	*commensuratum*	2014		ACTION 0: 7102 *Rimelia commensurata* was renamed to 7102 *Parmotrema commensuratum* (Blanco et al. 2005).
7103	Rimdif	*Rimelia*	*diffractaica*	1993	2014	ACTION 0: 7103 *Rimelia diffractaica* was renamed to 7103 *Parmotrema diffractaicum* (Blanco et al. 2005).
7103	Rimdif	*Parmotrema*	*diffractaicum*	2014		ACTION 0: 7103 *Rimelia diffractaica* was renamed to 7103 *Parmotrema diffractaicum* (Blanco et al. 2005).
7104	Rimret	*Rimelia*	*reticulata*	1993	2014	ACTION 0: 7104 *Rimelia reticulata* was renamed to 7104 *Parmotrema reticulatum* (Blanco et al. 2005).
7104	Rimret	*Parmotrema*	*reticulatum*	2014		ACTION 0: 7104 *Rimelia reticulata* was renamed to 7104 *Parmotrema reticulatum* (Blanco et al. 2005).
7105	Rimsim	*Rimelia*	*simulans*	1993	2014	ACTION 0: 7105 *Rimelia simulans* was renamed to 7105 *Parmotrema simulans* (Blanco et al. 2005).
7105	Rimsim	*Parmotrema*	*simulans*	2014		ACTION 0: 7105 *Rimelia simulans* was renamed to 7105 *Parmotrema simulans* (Blanco et al. 2005).
7106	Rimsub	*Rimelia*	*subisidiosa*	1993	2014	ACTION 2: 7106 *Rimelia subisidiosa* should be combined into 5337 *Parmotrema subisidiosum* (Blanco et al. 2005).
7400	Sph	*Sphaerophorus*		1993		ACTION 0: *Sphaerophorus globosus* was split into *S. tuckermanii* and *S. venerabilis* by Wedin et al. (2009) and *S. globosus* is no longer considered a valid name for epiphytic *Sphaerophorus* in North America. ACTION 0: For analyses crossing 2009 combine 7402 *S. globosus*, 7405 *S. tuckermanii*, and 7406 *S. venerabilis* into 7400 *Sphaerophorus*. ACTION 4: For analysis of data before 2009 combine all records of 7402 *S. globosus* into 7400 *Sphaerophorus* sp.
7402	Sphglo	*Sphaerophorus*	*globosus*	1993	2009	ACTION 2: Always combine 7402 *S. globosus* into 7400 *Sphaerophorus*. *Sphaerophorus globosus* was split into *S. tuckermanii* and *S. venerabilis* by Wedin et al. (2009). *Sphaerophorus globosus* is no longer considered a valid name for epiphytic *Sphaerophorus* in North America.
7403	Sphmel	*Sphaerophorus*	*melanocarpus*	1993	2006	ACTION 0: 7403 *Sphaerophorus melaocarpus* was renamed to 7403 *Bunodophoron melanocarpum* (Wedin 1995).
7403	Sphmel	*Bunodophoron*	*melanocarpum*	2006		ACTION 0: 7403 *Sphaerophorus melaocarpus* was renamed to 7403 *Bunodophoron melanocarpum* (Wedin 1995).

LICH_ SPPCD	SPP_ ACRONYM	GENUS	SPECIES	YEAR START	YEAR END	SPP_COMMENTS
7405	Sphtuc	*Sphaerophorus*	*tuckermanii*	2009		ACTION 3: For analyses crossing 2009 combine 7402 *Sphaerophorus globosus*, 7405 *S. tuckermanii*, and 7406 *S. venerabilis* into 7400 *Sphaerophorus*. *Sphaerophorus globosus* was split into *S. tuckermanii* and *S. venerabilis* in 2009 (Wedin et al.).
7406	Sphven	*Sphaerophorus*	*venerabilis*	2009		ACTION 3: For analyses crossing 2009 combine 7402 *Sphaerophorus globosus*, 7405 *S. tuckermanii*, and 7406 *S. venerabilis* into 7400 *Sphaerophorus*. *Sphaerophorus globosus* was split into *S. tuckermanii* and *S. venerabilis* in 2009 (Wedin et al.).
7450	Ste	*Stereocaulon*		2007		ACTION 0: Most *Stereocaulon* species need TLC to confirm identification, so specimens are recorded by genus only.
7501	Stibea	*Sticta*	*beauvoisii*	1993		ACTION 5/ACTION 0: EAST—7505 *Sticta weigelii* should be combined into 7501 *S. beauvoisii*. *S. weigelii* is considered a misidentification for North America (Brodo et al. 2001). ACTION 5/ACTION 0: EAST—For analyzing data from multiple years crossing 2004, 7505 *S. carolinensis* and 7508 *S. fragilinata* should be combined into 7501 *S. beauvoisii*. The latter two species were described in 2003 by McDonald et al.
7505	Stiwei	*Sticta*	*weigelii*	1993		ACTION 5/ACTION 2: EAST—7505 *Sticta weigelii* should be combined into 7501 *S. beauvoisii*. *S. weigelii* is considered a misidentification for the United States. (Brodo et al. 2001). ACTION 5/ACTION 0: WEST—7505 *S. weigelii* is undergoing taxonomic revision; for now we use the name for western specimens in a broad sense (McCune and Geiser 2009).
7507	Sticar	*Sticta*	*carolinensis*	2004		ACTION 3: For analyzing data from multiple years crossing 2004, 7505 *Sticta carolinensis* and 7508 *S. fragilinata* should be combined into 7501 *S. beauvoisii*. These species were first described in 2003 by McDonald et al.
7508	Stifra	*Sticta*	*fragilinata*	2004		ACTION 3: For analyzing data from multiple years crossing 2004, 7505 *Sticta carolinensis* and 7508 *S. fragilinata* should be combined into 7501 *S. beauvoisii*. These species were first described in 2003 by McDonald et al.
7921	Tucari	*Tuckermanella*	*arizonica*	2003	2019	ACTION 0: Although FIA did not adopt several genus names split from *Cetraria* (*Kaernefeltia*, *Tuckermanella*, *Tuckermannopsis*), the names 7921 *Tuckermanella arizonica* and 7922 *T. pseudoweberi* were special cases because these species had only been described in *Tuckermanella* (Esslinger 2003). 7921 *Tuckermanella arizonica* has since been renamed to 7921 *Nephromopsis arizonica* (Divakar et al. 2017).
7921	Tucari	*Nephromopsis*	*arizonica*	2019		ACTION 0: Although FIA did not adopt several genus names split from *Cetraria* (*Kaernefeltia*, *Tuckermanella*, *Tuckermannopsis*), the names 7921 *Tuckermanella arizonica* and 7922 *T. pseudoweberi* were special cases because these species had only been described in *Tuckermanella* (Esslinger 2003). 7921 *Tuckermanella arizonica* has since been renamed to 7921 *Nephromopsis arizonica*.
7922	Tucpse	*Tuckermanella*	*pseudoweberi*	2003	2019	ACTION 0: Although FIA did not adopt several genus names split from *Cetraria* (*Kaernefeltia*, *Tuckermanella*, *Tuckermannopsis*), the names 7921 *Tuckermanella arizonica* and 7922 *T. pseudoweberi* were special cases because these species had only been described in *Tuckermanella* (Esslinger 2003). 7922 *Tuckermanella pseudoweberi* has since been renamed to 7922 *Nephromopsis pseudoweberi* (Divakar et al. 2017).

LICH_ SPPCD	SPP_ ACRONYM	GENUS	SPECIES	YEAR START	YEAR END	SPP_COMMENTS
7922	Tucpse	*Nephromopsis*	*pseudoweberi*	2019		ACTION 0: Although FIA did not adopt several genus names split from *Cetraria* (*Kaernefeltia*, *Tuckermanella*, *Tuckermannopsis*), the names 7921 *Tuckermanella arizonica* and 7922 *T. pseudoweberi* were special cases because these species had only been described in *Tuckermanella* (Esslinger 2003). 7922 *Tuckermanella pseudoweberi* has since been renamed to 7922 *Nephromopsis pseudoweberi* (Divakar et al. 2017).
8000	Usn	*Usnea*		1993		ACTION 0: *Usnea* is a difficult genus that is continually undergoing taxonomic change. Over time, the FIA strategy has shifted towards lumping poorly resolved or cryptic "species" into groups (e.g. *Usnea filipendula* group) with common ranges and morphological characteristics. ACTION 0: For analyzing any data collected before 2000, 8023 *Usnea diplotypus* should be combined into 8000 *Usnea*. The name *U. diplotypus* was applied widely in the Pacific Northwest and California in 1998–1999 as per concepts in McCune and Geiser (1997). In 2000, based on considerable progress in *Usnea*, this name was considered to be incorrectly applied in previous years. In 2000 and beyond, the name *U. diplotypus* is only used for specimens identified with TLC. ACTION 5/ ACTION 0: WEST—For analyzing data from multiple years crossing 2000, 8014 *U. ceratina* should be combined into 8000 *Usnea*. This name was first applied in the West in 2000 data where it was most likely classified in previous years as *Usnea* sp. ACTION5/ ACTION 0: EAST—This taxon was used broadly to include all specimens that could not be positively identified to species.
8007	Usnari	*Usnea*	*arizonica*	1993	2010	ACTION 2: 8007 *Usnea arizonica* should be combined into 8042 *U. intermedia* for all analyses. These species were synonymized by Clerc (2007). ACTION 0: According to Marks et al. (2016), *U. intermedia* is likely a fertile form of 8044 *U. lapponica*, although we retain the former name until further work confirms this.
8014	Usncer	*Usnea*	*ceratina*	1993		ACTION 5/ACTION 3: WEST—For analyzing data from multiple years crossing 2000, 8014 *Usnea ceratina* should be combined into 8000 *Usnea*. This name was first applied in the West in 2000 data where it was most likely classified in previous years as *Usnea* sp.
8016	Usncir	*Usnea*	*cirrosa*	1993		ACTION 3: For analyzing data from multiple years crossing 2010, 8016 *Usnea cirrosa* should be combined into 8061 *U. parvula*. 8095 *U. parvula* was segregated from 8016 *U. cirrosa* by Clerc (2007).
8019	Usncor	*Usnea*	*cornuta*	1993		ACTION 0: The name 8032 *Usnea fragilescens* was first applied in the West in 2000. It is very close to 8019 *U. cornuta* in some material, and some specimens classified as that taxon in prior years may actually be this species.

LICH_ SPPCD	SPP_ ACRONYM	GENUS	SPECIES	YEAR START	YEAR END	SPP_COMMENTS
8023	Usndip	*Usnea*	*diplotypus*	1993		ACTION 4: For any analysis including pre-2000 data, 8023 *U. diplotypus* should be combined into 8000 *Usnea*. This species name was applied widely in the Pacific Northwest and California 1998–1999 as per concepts in McCune and Geiser (1997). In 2000, based on considerable progress in *Usnea*, this name was considered to be incorrectly applied in previous years. In 2000 and beyond, the name and code 8023 *U. diplotypus* are only used for specimens identified with TLC. ACTION 3: *Usnea diplotypus* is likely in the *U. filipendula* group (Marks et al. 2016). Until further work is done on this taxon, we recommend combining 8023 *U. diplotypus* collected in 2000 or after into 8029 *U. filipendula* for all analyses.
8029	Usnfil	*Usnea*	*filipendula*	1993		ACTION 0: FIA uses the name 8029 *U. filipendula* to represent the *U. filipendula* group in the Western United States, which includes *U. plicata*, *U. chaetophora*, *U. diplotypus*, and several others. ACTION 0: 8058 *Usnea plicata* should be combined into 8029 *U. filipendula* for analysis. Starting in 1998, this aggregate (mostly West) has been included in the broader aggregate *U. filipendula*; the name *U. plicata* is no longer used in FIA as it is nomenclaturally ambiguous. ACTION 0: For analyzing data from multiple years crossing 1998, 8087 *U. chaetophora* should be combined into 8029 *U. filipendula*. ACTION 0: WEST—Only specimens which clearly fit the morphology of 8065 *U. scabrata* were assigned the latter name. Less typical forms may be identified as 8029 *U. filipendula*.
8032	Usnfra	*Usnea*	*fragilescens*	1993		ACTION 0: The name 8032 *Usnea fragilescens* was first applied in the West in 2000. It is very close to 8019 *U. cornuta* in some material, and some specimens classified as that taxon in prior years may actually be this species.
8034	Usnful	*Usnea*	*fulvoreagens*	1993		ACTION 2: 8034 *Usnea fulvoreagens* should be combined into 8037 *U. glabrescens* for analysis. This taxon is impossible to distinguish from *U. glabrescens* without TLC and should be considered a synonym.
8036	Usngla	*Usnea*	*glabrata*	1993		ACTION 3: For analyzing data from multiple years crossing 2000, 8088 *Usnea esperantiana* should be combined into 8036 *U. glabrata*. *U. esperantiana* possibly intergrades with *U. glabrata*.
8037	Usngls	*Usnea*	*glabrescens*	1993		ACTION 0: 8034 *Usnea fulvoreagens* should be combined into 8037 *U. glabrescens* for analysis. This taxon is impossible to distinguish from *U. glabrescens* without TLC and should be considered a synonym. ACTION 0: The name *U. glabrescens* was first used in 1999 in the West. Previous material identified as 8000 *Usnea* sp. may include this taxon.
8040	Usnhes	*Usnea*	*hesperina*	1993	2014	ACTION 0. 8040 *Usnea hesperina* was renamed to 8040 *U. subgracilis*.
8040	Usnhes	*Usnea*	*subgracilis*	2014		ACTION 0: 8040 *U. hesperina* has been renamed to 8040 *Usnea subgracilis*.

LICH_ SPPCD	SPP_ ACRONYM	GENUS	SPECIES	YEAR START	YEAR END	SPP_COMMENTS
8042	Usnint	*Usnea*	*intermedia*	1993		ACTION 0: 8007 *Usnea arizonica* should be combined into 8042 *U. intermedia* for all analyses. These two species were synonymized by Clerc (2007). ACTION 0: According to Marks et al. (2016), *U. intermedia* is likely a fertile form of 8044 *U. lapponica* although we retain the former name until further work confirms this.
8044	Usnlap	*Usnea*	*lapponica*	1993		ACTION 0: In the Western United States, this name is used in the broad sense, including all specimens that were papillate, tufted, and had soredia erupting through concave craters in the cortex, with reflexed edges, and soralia often surrounding the central cord. ACTION 0: 8077 *Usnea substerilis*, a synonym, should be combined into 8044 *U. lapponica* (Marks et al. 2016).
8047	Usnmad	*Usnea*	*madeirensis*	1993	2005	ACTION 0: 8047 *Usnea madeirensis* was renamed to 8047 *U. silesiaca*.
8047	Usnmad	*Usnea*	*silesiaca*	2005		ACTION 0: 8047 *Usnea madeirensis* was renamed to 8047 *U. silesiaca*. ACTION 0: Newly described *U. parafloridana* (Marks et al. 2016) likely has a broader distribution than northern Wisconsin. Eastern records of *U. silesiaca* in northern or montane habitats might be this species.
8050	Usnmir	*Usnea*	*miriabilis*	1993	2014	ACTION 0: The name 8050 *Usnea miriabilis* has a spelling error and should be corrected to 8050 *U. mirabilis*.
8050	Usnmir	*Usnea*	*mirabilis*	2014		ACTION 0: The name 8050 *Usnea miriabilis* has a spelling error and should be corrected to 8050 *U. mirabilis*.
8058	Usnpli	*Usnea*	*plicata*	1993		ACTION 2: 8058 *Usnea plicata* should be combined into 8029 *U. filipendula* for analysis. Starting in 1998, this aggregate (mostly in the West) has been included in the broader aggregate *U. filipendula*; the name *U. plicata* is no longer used in FIA as it is nomenclaturally ambiguous.
8061	Usnret	*Usnea*	*retifera*	1993	2010	ACTION 2: 8061 *Usnea retifera* should be combined into 8042 *U. intermedia* for all analyses. These species were synonymized by Clerc (2007). ACTION 0: According to Marks et al. (2016), *U. intermedia* is likely a fertile form of 8044 *U. lapponica* although we retain the former name until further work confirms this.
8065	Usnsca	*Usnea*	*scabrata*	1993		ACTION 0: WEST—8065 *U. scabrata* is difficult to differentiate from 8029 *U. filipendula*. Less typical forms may be misidentified as the latter.
8072	Usnsub	*Usnea*	*subfloridana*	1993		ACTION 0: Before 1998 this name was applied broadly for all specimens that were papillate, tufted, and had both soredia and isidia, with the isidia projecting from the soralia. Starting with 1998 data, this taxon was applied sensu stricto after the concepts of Halonen et al. (1998), to the extent that chemotypes can be distinguished with spot tests alone.
8077	Usnsst	*Usnea*	*substerilis*	1993	2017	ACTION 2: 8077 *Usnea substerilis,* a synonym, should be combined into 8044 *U. lapponica* (Marks et al. 2016).
8084	Usnwir	*Usnea*	*wirthii*	1993	2006	ACTION 2: 8084 *Usnea wirthii* is a synonym and should be combined into 8094 *U. flavocardia* (Clerc 2004).

LICH_SPPCD	SPP_ACRONYM	GENUS	SPECIES	YEAR START	YEAR END	SPP_COMMENTS
8087	Usncha	*Usnea*	*chaetophora*	1997		ACTION 2: 8087 *Usnea chaetophora* should be combined into 8029 *U. filipendula*. In the Western United States, this taxon represents part of the *U. filipendula* group, which includes *U. plicata*, *U. diplotypus*, and several others.
8088	Usnesp	*Usnea*	*esperantiana*	1997		ACTION 3: For analyzing data from multiple years crossing 2000, 8088 *Usnea esperantiana* should be combined into 8036 *U. glabrata*. This taxon was first applied in 2000 in the West. It is a recognizable syndrome, but possibly intergrades with 8036 *U. glabrata*.
8091	Usnrig	*Usnea*	*rigida*	1997	2014	ACTION 0: 8091 *Usnea rigida* was renamed to 8091 *U. quasirigida* (Lendemer & Tavares 2003).
8091	Usnrig	*Usnea*	*quasirigida*	2014		ACTION 0: 8091 *Usnea rigida* was renamed to 8091 *U. quasirigida* (Lendemer & Tavares 2003).
8094	Usnfla	*Usnea*	*flavocardia*	2006		ACTION 0: 8084 *Usnea wirthii* is a synonym and should be combined into 8094 *U. flavocardia* (Clerc 2004).
8095	Usnpar	*Usnea*	*parvula*	2010		ACTION 0: For analyzing data from multiple years crossing 2010, 8016 *Usnea cirrosa* should be combined into 8095 *U. parvula*. *U. parvula* was segregated from *U. cirrosa* by Clerc (2007).
8096	Usncyl	*Usnea*	*cylindrica*	2014		ACTION 0: *Usnea cylindrica* has only recently been found to occur in North America (Dillman et al. 2012).
8100	Way	*Waynea*		1993		ACTION 1: Exclude for most analyses. Squamulose growth forms were not consistently collected.
8101	Waycal	*Waynea*	*californica*	1993		ACTION 1: Exclude for most analyses. Squamulose growth forms were not consistently collected.
8150	Vul	*Vulpicida*		1997	2019	ACTION 2: 8150 *Vulpicida* is a synonym (Divakar et al. 2017) and should be combined into 1000 *Cetraria* for all analyses.
8151	Vulcan	*Vulpicida*	*canadensis*	1997	2019	ACTION 2: 8151 *Vulpicida canadensis* is a synonym (Divakar et al. 2017) and should be combined into 1004 *Cetraria canadensis* for all analyses.
8152	Vulpin	*Vulpicida*	*pinastri*	1997	2019	ACTION 2: 8152 *Vulpicida pinastri* is a synonym (Divakar et al. 2017) and should be combined into 1015 *Cetraria pinastri* for all analyses.
8153	Vulvir	*Vulpicida*	*viridis*	1997	2019	ACTION 2: 8153 *Vulpicida viridis* is a synonym (Divakar et al. 2017) and should be combined into 1020 *Cetraria viridis* for all analyses.
8170	Xam	*Xanthomendoza*		2004		ACTION 3: For data analysis for multiple years crossing 2004, 8170 *Xanthomendoza* should be combined into 8200 *Xanthoria*. Specimens that cannot be identified to species are coded by default to 8200 *Xanthoria* unless the ID specialist is certain they belong to 8170 *Xanthomendoza* sp. Most of the *Xanthomendoza* species listed here were moved from *Xanthoria* by Søchting et al. (2002).
8200	Xan	*Xanthoria*		1993		ACTION 3: For data analysis for multiple years crossing 2004, 8170 *Xanthomendoza* should be combined into 8200 *Xanthoria*. Specimens that cannot be identified to species are coded by default to 8200 *Xanthoria* unless the ID specialist is certain they belong to 8170 *Xanthomendoza* sp.

LICH_ SPPCD	SPP_ ACRONYM	GENUS	SPECIES	YEAR START	YEAR END	SPP_COMMENTS
8201	Xancan	*Xanthoria*	*candelaria*	1993		ACTION 0: The name *Xanthoria candelaria* is used in the restricted sense of Lindblom (1997).
8203	Xanfal	*Xanthoria*	*fallax*	1993	2004	ACTION 0: 8203 *Xanthoria fallax* was renamed to 8203 *Xanthomendoza fallax*. See the latter for additional notes.
8203	Xanfal	*Xanthomendoza*	*fallax*	2004		ACTION 0: 8203 *Xanthoria fallax* was renamed to 8203 *Xanthomendoza fallax* in 2004. ACTION 0: For analyzing data for multiple years crossing 1997, 8210 *Xanthomendoza fulva*, 8219 *X. galericulata*, 8213 *X. mendozae*, 8215 *X. oregana*, and 8218 *X. ulophyllodes* should be combined into 8203 *X. fallax*. The name *X. fallax* was applied broadly prior to Lindblom (1997). ACTION 5/ACTION 0: WEST—In most Western States 8210 *X. fulva* is common, so pre-1997 *X. fallax* probably includes many specimens of *X. fulva*. Colorado specimens (1992–1996) were reexamined and only a few were found to be 8210 *X. fulva*; no names were changed in the database. ACTION 5/ACTION 0: EAST—Pre-1997 *X. fallax* probably includes many specimens of 8210 *X. fulva* and 8218 *X. ulophyllodes*.
8204	Xanhas	*Xanthoria*	*hasseana*	1993	2004	ACTION 0: 8204 *Xanthoria hasseana* was renamed to 8204 *Xanthomendoza hasseana*. See the latter for additional notes.
8204	Xanhas	*Xanthomendoza*	*hasseana*	2004		ACTION 0: 8204 *Xanthoria hasseana* was renamed to 8204 *Xanthomendoza hasseana* in 2004. ACTION 0: the name *X. polycarpa* was applied broadly prior to Lindblom (1997) and included *X. hasseana* and *X. montana*. The names *X. hasseana* and *X. montana* were applied starting with 1997 data. ACTION 5/ACTION 3: WEST—for analyzing data for multiple years crossing 1997, 8204 *X. hasseana* and 8214 *X. montana* should be combined into 8207 *X. polycarpa*. ACTION 5/ACTION 3: EAST—for data analysis for multiple years crossing 1997, 8207 *X. polycarpa* should be combined into 8204 *X. hasseana*. Most pre-1997 specimens were reexamined to confirm *X. hasseana* but names were not changed in the database. ACTION 5/ACTION 0: WEST—Separation of 8214 *X. montana* from 8204 *X. hasseana* requires a spore test via light microscope, not routinely done for FIA. Based on known geographic ranges, all Pacific Northwest specimens are assigned to 8204 *X. hasseana* and all Interior West specimens assigned to 8214 *X. montana*. Colorado 1992–1996 specimens were examined to confirm the name *X. montana.*
8207	Xanpol	*Xanthoria*	*polycarpa*	1993		ACTION 0: the name *Xanthoria polycarpa* was applied broadly prior to Lindblom (1997) and included *Xanthomendoza hasseana* and *X. montana*. The names *X. hasseana* and *X. montana* were applied starting with 1997 data. ACTION 5/ACTION 0: WEST—For analyzing data for multiple years crossing 1997, 8204 *X. hasseana* and 8214 *X. montana* should be combined into 8207 *X. polycarpa*. ACTION 5/ACTION 3: EAST—For data analysis for multiple years crossing 1997, 8207 *X. polycarpa* should be combined into 8204 *X. hasseana*. Most pre-1997 specimens were reexamined to confirm *X. hasseana* but names were not changed in the database.
8209	Xansub	*Xanthoria*	*subramulosa*	1993	2004	ACTION 0: 8209 *Xanthoria subramulosa* was renamed to 8209 *Xanthomendoza subramulosa*.
8209	Xansub	*Xanthomendoza*	*subramulosa*	2004		ACTION 0: 8209 *Xanthoria subramulosa* was renamed to 8209 *Xanthomendoza subramulosa*.

LICH_ SPPCD	SPP_ ACRONYM	GENUS	SPECIES	YEAR START	YEAR END	SPP_COMMENTS
8210	Xanful	*Xanthoria*	*fulva*	1995	2004	ACTION 0: 8210 *Xanthoria fulva* was renamed to 8210 *Xanthomendoza fulva*. See the latter for additional notes.
8210	Xanful	*Xanthomendoza*	*fulva*	2004		ACTION 0: 8210 *Xanthoria fulva* was renamed to 8210 *Xanthomendoza fulva* in 2004. ACTION 3: For analyzing data for multiple years crossing 1997, 8210 *Xanthomendoza fulva*, 8219 *X. galericulata*, 8213 *X. mendozae*, 8215 *X. oregana*, and 8218 *X. ulophyllodes* should be combined into 8203 *X. fallax*. Before 1997, *X. fulva* would have been mostly identified as *X. fallax*. In 1997 and after, Lindblom's much narrower concept of *X. fallax* was applied and the name *X. fulva* was used more frequently. ACTION 3: For data analysis for multiple years crossing 2004, 8219 *X. galericulata* should be combined into 8210 *X. fulva*; *X. galericulata* was recognized as distinct by Lindblom (2004) and Lindblom (2006). ACTION 5/ACTION 0: WEST—In most Western States *X. fulva* is common, so pre-1997 *X. fallax* probably includes many specimens of *X. fulva*. Colorado specimens (1992–1996) were reexamined and only a few were found to be 8210 *X. fulva*; no names were changed in the database. ACTION 5/ACTION 0: EAST—Pre-1997 *X. fallax* probably includes many specimens of *X. fulva* and *X. ulophyllodes*.
8211	Xanbor	*Xanthoria*	*borealis*	1997	2004	ACTION 0: 8211 *Xanthoria borealis* was renamed to 8211 *Xanthomendoza borealis*.
8211	Xanbor	*Xanthomendoza*	*borealis*	2004		ACTION 0: 8211 *Xanthoria borealis* has been renamed to 8211 *Xanthomendoza borealis*.
8212	Xancon	*Xanthoria*	*concinna*	1997	2004	ACTION 0: 8212 *Xanthoria concinna* was renamed to 8212 *Xanthomendoza concinna*.
8212	Xancon	*Xanthomendoza*	*concinna*	2004		ACTION 0: 8212 *Xanthoria concinna* was been renamed to 8212 *Xanthomendoza concinna*.
8213	Xanmen	*Xanthoria*	*mendozae*	1997	2005	ACTION 0: 8213 *Xanthoria mendozae* was renamed to 8213 *Xanthomendoza mendozae*. See the latter for additional notes.
8213	Xanmen	*Xanthomendoza*	*mendozae*	2005		ACTION 0: 8213 *Xanthoria mendozae* was renamed to 8213 *Xanthomendoza mendozae* in 2005. ACTION 3: For data analysis for multiple years crossing 1997, 8210 *Xanthomendoza fulva*, 8219 *X. galericulata*, 8213 *X. mendozae*, 8215 *X. oregana*, and 8218 *X. ulophyllodes* should be combined into 8203 *X. fallax*.
8214	Xanmon	*Xanthoria*	*montana*	1997	2004	ACTION 0: 8214 *Xanthoria montana* was renamed to 8214 *Xanthomendoza montana*. See the latter for additional notes.
8214	Xanmon	*Xanthomendoza*	*montana*	2004		ACTION 0: 8214 *Xanthoria montana* was renamed to 8214 *Xanthomendoza montana* in 2004. ACTION 0: The name *X. polycarpa* was applied broadly prior to Lindblom (1997) and included *X. hasseana* and *X. montana*. The names *X. hasseana* and *X. montana* were applied starting with 1997 data. ACTION 5/ACTION 3: WEST—for analyzing data for multiple years crossing 1997, 8204 *X. hasseana* and 8214 *X. montana* should be combined into 8207 *X. polycarpa*. ACTION 5/ACTION 0: WEST—Separation of 8214 X. *montana* from 8204 *X. hasseana* requires a spore test via light microscope, not routinely done for FIA. Based on known geographic ranges, all Pacific Northwest specimens are assigned to 8204 *X. hasseana* and all Interior West specimens assigned to 8214 *X. montana*. Colorado 1992–1996 specimens were examined to confirm the name *X. montana*.
8215	Xanore	*Xanthoria*	*oregana*	1997	2004	ACTION 0: 8215 *Xanthoria oregana* was renamed to 8215 *Xanthomendoza oregana*. See the latter for additional notes.

LICH_ SPPCD	SPP_ ACRONYM	GENUS	SPECIES	YEAR START	YEAR END	SPP_COMMENTS
8215	Xanore	*Xanthomendoza*	*oregana*	2004		ACTION 0: In 2004, 8215 *Xanthoria oregana* was renamed to 8215 *Xanthomendoza oregana*. ACTION 3: For analyzing data for multiple years crossing 1997, 8210 *X. fulva*, 8219 *X. galericulat*a, 8213 *X. mendozae*, 8215 *X. oregana*, and 8218 *X. ulophyllodes* should be combined into 8203 *X. fallax*. The name *X. fallax* was applied broadly prior to Lindblom (1997). ACTION 0: In pre-2004 data, *X. oregana* data may have included some *X. galericulata*.
8218	Xanulo	*Xanthoria*	*ulophyllodes*	1997	2004	ACTION 0: 8218 *Xanthoria ulophyllodes* was renamed to 8218 *Xanthomendoza ulophyllodes*. See the latter for additional notes.
8218	Xanulo	*Xanthomendoza*	*ulophyllodes*	2004		ACTION 0: 8218 *Xanthoria ulophyllodes* was renamed to 8218 *Xanthomendoza ulophyllodes* in 2004. ACTION 3: For data analysis for multiple years crossing 1997, 8210 *X. fulva*, 8219 *X. galericulata*, 8213 *X. mendozae*, 8215 *X. oregana*, and 8218 *X. ulophyllodes* should be combined into 8203 *X. fallax*. Starting with 1997 data, Lindblom's much narrower concept of *X. fallax* was applied and the name *X. ulophyllodes* was used. ACTION 5/ACTION 0: WEST—This species is uncommon; it would have been identified as *X. fallax* in pre-1997 data, if present. ACTION 5/ACTION 0: EAST—*X. ulophyllodes* is moderately common, so pre-1997 *X. fallax* probably includes many *X. ulophyllodes* specimens.
8219	Xangal	*Xanthomendoza*	*galericulata*	2005		ACTION 3: For data analysis for multiple years crossing 1997, 8210 *Xanthomendoza fulva*, 8219 *X. galericulata*, 8213 *X. mendozae*, 8215 *X. oregana*, and 8218 *X. ulophyllodes* should be combined into 8203 *X. fallax*. ACTION 3: For data analysis for multiple years starting in 1997 or later and crossing 2004, 8219 *X. galericulata* should be combined into 8210 *X. fulva*. This is a distinct species included in Lindblom (2004) and Lindblom (2006). ACTION 0: In pre-2004 data, *X. oregana* data may include some *X. galericulata*.
8301	Cndcon	*Candelaria*	*concolor*	1993		ACTION 0: When analyzing data from multiple years crossing 2002, 8303 *Candelaria pacifica* should be combined into 8301 *C. concolor*. This is a distinct species segregated from 8301 *C. concolor* in 2002 (Westberg & Nash 2002) but formally described by Westberg & Arup (2011). ACTION 0: *C. concolor* data collected before 2002 likely includes some *C. pacifica*.
8303	Cndpac	*Candelaria*	*pacifica*	2002		ACTION 5/ACTION 3: WEST—When analyzing data from multiple years crossing 2002, 8303 *Candelaria pacifica* should be combined into 8301 *C. concolor*. This is a distinct species segregated from 8301 *C. concolor* in 2002 (Westberg & Nash 2002) but formally described by Westberg & Arup (2011).
8600	Lec	*Lecanora*		2002		ACTION 1: Exclude for most analyses. Crustose growth forms were not consistently collected.
8601	Lecmur	*Lecanora*	*muralis*	2002		ACTION 1: Exclude for most analyses. Crustose growth forms were not consistently collected.
9003	Xpmcol	*Xanthoparmelia*	*coloradensis*	1993	2014	ACTION 0: The name 9003 *Xanthoparmelia coloradensis* has a spelling error and should be corrected to 9003 *Xanthoparmelia coloradoensis*.
9003	Xpmcol	*Xanthoparmelia*	*coloradoensis*	2014		ACTION 0: The name 9003 *Xanthoparmelia coloradensis* has a spelling error and should be corrected to 9003 *Xanthoparmelia coloradoensis*.

Appendix 2: Lichen Species Distribution Maps (Online Only)

Maps for 425 lichen species are available as a PDF file (9.25 MB) on the Web at https://www.fia.fs.fed.us/program-features/indicators/lichen.

Pacific Northwest Research Station

Website	https://www.fs.usda.gov/pnw
Telephone	(503) 808-2100
Publication requests	(503) 808-2138
FAX	(503) 808-2130
E-mail	sm.fs.pnw_pnwpubs@usda.gov
Mailing address	Publications Distribution Pacific Northwest Research Station USDA Forest Service 1220 SW 3rd Ave., Suite 1400 Portland, OR 97204

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USDA Forest Service
1220 SW 3rd Ave., Suite 1400
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