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
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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.
Abstract


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.
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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).
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.
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.
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.

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**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 16\textsuperscript{th} 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 inaccurate 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). The most notable divergence is our adoption of Divakar et al.’s (2017) phylogeny for cetarioid 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 barrenoa/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 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, 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.
Acknowledgments

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.

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Metric Equivalents

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Literature Cited


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.
Twocolour Horsehair Lichen

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

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

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

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

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

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

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

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

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

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

Photo Wanted!
**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
**Cetraria canadensis** (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 sepincola** (Ehrh.) Ach.
Brown Dwarf Wrinkle-Lichen

**Cetraria viridis** Schwein
Hidden Sunshine 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

**Canoparmelia texana** (Tuck.)
Canoparmelia texana (Tuck.)
Texas 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) Schäerer
Lipstick Powderhorn Lichen

Cladonia norvegica Tønsberg & Holien
Cladonia Lichen

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

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

Cladonia pleurota (Flörke) Schäerer
Red-Fruited Pixie-Cup Lichen

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

Cladonia ramulosa (With.) J.R. Laundon
Laundon Cladonia Lichen
Cladonia rei Schäerer  
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
**Dendroscenon intricatum** (Nyl.) Henssen
Olive-Thorn Lichen

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

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

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

**Enchylium conglomeratum** Hoffm.
Conglomerate Jelly Lichen

**Erioderma sorediatum** D.J. Galloway & P.M. Jorg.
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 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 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
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 anthrasis (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
**Loberia 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 septentrionalis (Lyng) O. Blanco et al.
Northern Brown Lichen

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

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

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

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

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
**Photo Wanted!**

*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 ambiguа* (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 diffracticum (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
Photo Wanted!

*Parmotrema haitiense* (Hale) Hale
Ruffle Lichen

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

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

Photo Wanted!

*Parmotrema louisianae* (Hale) Hale
Louisiana Ruffle Lichen

*Parmotrema margaritatum* (Hue) Hale
Margarite Ruffle Lichen

*Parmotrema mellissii* (C.W. Dodge) Hale
Melliiss’ 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
Hale Cracked Ruffle Lichen

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

Parmotrema subrigidum Egan
Ruffle Lichen

Parmotrema subtinctorum (Zahlbr.) Hale
Mottled Ruffle Lichen

Parmotrema sulphuratum (Nees& Flotow) Hale
Sulphur Ruffle Lichen

Parmotrema tinctorum (Delise ex Nyl.) Hale
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** (Merensch.) Essl.  
Hairy Shadow Lichen

**Phaeophyscia hirtella** Essl.  
Hairy Shadow Lichen

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

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

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

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

Phaeophyscia orbicularis (Necker) Moberg
Moberg Mealy Shadow Lichen

Phaeophyscia pusilloides (Zahlbr.) Essl.
Pompon Shadow Lichen

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

Physcia aipolia/lnophila (Ehrh. ex Humb.) Fürn./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 (Lyng) 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

**Pseudevernia aurata** (Ach.) Vainio
Yellow Specklebelly 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
Photo Wanted!

**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

Photo Wanted!

*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** Müller 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 fragiliscens Hav. ex Lyng
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 subfuscata 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) Sochting et al.
Hooded Sunburst Lichen

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

Xanthomendoza galericulata
L. Lindblom
Sunburst Lichen

Xanthomendoza hasseana (Räsänen)
Sochting et al.
Poplar Sunburst Lichen

Xanthomendoza montana
(L. Lindblom) Sochting et al.
Sunburst Lichen

Xanthomendoza oregana (Gyelnik)
Sochting, Kärnefelt & S. Kondr.
Sunburst Lichen
Xanthomendoza ulophyllodes (Räsänen) Sochting 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

Alecia imshaugi, Jason Hollinger
Alecia lata, Stephen Sharnoff
Alecia sarmentosa, Jason Hollinger
Alecia 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 carlottae, Jason Hollinger
Cladonia coniocraea/ochrochlora
Cladonia chlorophaea group
Cladonia cenotea, Jason Hollinger
Cladonia chlorophae group, Richard Dröker
Cladonia coniocraea/ochrochlora, Jason Hollinger
Cladonia cristatella, Jason Hollinger
Cladonia deforinm, 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 pezziziformis, 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. subaquamosa, Jason Hollinger
Cladonia sulphurina, Stephen Sharnoff
Cladonia transandens, Stephen Sharnoff
Cladonia umbricola, Jason Hollinger
Coccocarpia erythroxyli, Bruce McCune
Coccocarpia palmicola, Bruce McCune
Collema curtisporum, Vitaly Charny
Collema furfuraceum, Jim Riley
Collema nigrescens, Jason Hollinger
Collema subflaccidum, Richard Dröker
Dendroiscocaulon intricatulum, Jason Hollinger
Dirinaria planatana, Jason Hollinger
Dirinaria picta, Jason Hollinger
Enchylema conglomeratum, Jason Hollinger
Enidioparmelia squamosa, Jason Hollinger
Evodia divaricata, Jason Hollinger
Evernia mesomorpha, Jason Hollinger
Evernia prunastri, Jason Hollinger
Flavoparmelia baltimorensis, Jason Hollinger
Flavoparmelia baltimorensis, Jason Hollinger
Flavoparmelia darrowi, Jason Hollinger
Flavoparmelia darrowi, Jason Hollinger
Flavoparmelia lophyrea, Bruce McCune
Fuscopannaria ramburii, Jason Hollinger
Heterodermia dieci, Jason Hollinger
Heterodermia echinata, Jason Hollinger
Heterodermia hypoleuca, Jason Hollinger
Hyperphyscia adglutinata/confusa, Annelie Burghause
Hyperphyscia syncolla, Jason Hollinger
Hypogymnia apinata, Jason Hollinger
Hypogymnia australodes, Jason Hollinger
Hypogymnia biterrri, Troy McMullin
Hypogymnia canadensis, Bruce McCune
Hypogymnia duplicata, Ryan Batten
Hypogymnia enteromorpha, Bruce McCune
Hypogymnia farinacea, Zaza Lepista
Hypogymnia heterophylla, Drew Henderson
Hypogymnia helmensii, Troy McMullin
Hypogymnia imshaugi, Bruce McCune
Hypogymnia inactiva, Bruce McCune
Hypogymnia krogiae, Jason Hollinger
Hypogymnia lophyrea, Bruce McCune
Hypogymnia ocellata, Jason Hollinger
Hypogymnia oceanica, Bruce McCune
Hypogymnia physodes, Jason Hollinger
Hypogymnia pulvigena, Bruce McCune
Hypogymnia rugosa, Jason Hollinger
Hypogymnia tubulosa, Ryan Batten
Hypogymnia viatica, Jason Hollinger
Hypogymnia wilfiana, Jason Hollinger
Hypotrichina africarotulata, Jason Hollinger
Hypotrichina catalbiensis, Jason Hollinger
Hypotrichina croceopustulata, Jason Hollinger
Hypotrichina horrescens, Jason Hollinger
Hypotrichina imbricatula, Jason Hollinger
Hypotrichina pseudothiohpula, Jason Hollinger
Hypotrichina echinata, Jason Hollinger
Hypotrichina livida, Jason Hollinger
Hypotrichina minarum, Jason Hollinger
Hypotrichina osseolata, 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 bifurmis, Jason Hollinger
Leioderma sorediatum, Stephen Sharnoff
Leptocodium albociliatum, Jason Hollinger
Leptogium contortum, Bruce McCune
Leptogium 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 amplexissima, Karen Dillman
LOBARIA anomala, Jason Hollinger
LOBARIA anthrapsis, Jason Hollinger
LOBARIA hallii, Jason Hollinger
LOBARIA linta, 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
MELANOHEALEA eleganata, Jason Hollinger
MELANOHEALEA exasperata, Christopher Quintin
MELANOHEALEA exasperatula, Jason Hollinger
MELANOHEALEA halei, Jason Hollinger
MELANOHEALEA olivacea, Kari Pihlaviita
MELANOHEALEA septentrionalis, Jim Riley
MELANOHEALEA subelegantula, Bruce McCune
MELANOHEALEA solubilicea/multispora, Jason Hollinger
MELANOHEALEA trabeculata, Sarah Friedrich
MENEGAZIA subminitis/terebrata, Richard Droker
MYELOCHROA aurulenata, Jason Hollinger
MYELOCHROA galbina, Stephen Sharnoff
NEPHROMA bellum, Troy McMullin
NEPHROMA helveticum, Jason Hollinger
NEPHROMA isidiosum, Bruce McCune
NEPHROMA laevigatatum, Bruce McCune
NEPHROMA occultum, Jim Riley
NEPHROMA parile, 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 sphaerosporea, 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 conopea, Troy McMullin
PANNARIA rubiginosa, Troy McMullin
PANNARIA tavaresii, Jason Hollinger
PARMELIA barrenae, 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
PARMELINIA coleae, Jason Hollinger
PARMELIOPSIS ambigua, Jason Hollinger
PARMELIOPSIS hyperopta, Jason Hollinger
PARMELIOPSIS subambigua, Jason Hollinger
PARMOTREMA arnoldii, Jason Hollinger
PARMOTREMA austrosinense, Chris Parrish
PARMOTREMA cetratum, Stephen Sharnoff
PARMOTREMA crinitum, Jason Hollinger
PARMOTREMA cristiferum, Jason Hollinger
PARMOTREMA dilatatum, Jason Hollinger
PARMOTREMA endosulphureum, Stephen Sharnoff
PARMOTREMA euryacum, Jason Hollinger
PARMOTREMA gardneri, Jason Hollinger
PARMOTREMA hypoleucinum, Gary Perlmuter
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 ramosdense, Jason Hollinger
PARMOTREMA reticulatum, Jason Hollinger
PARMOTREMA stuppeum, Jason Hollinger
PARMOTREMA subalpinales, Jason Hollinger
PARMOTREMA submarginale, Jason Hollinger
PARMOTREMA subrigida, Troy McMullin
PARMOTREMA subtilicornis, Jason Hollinger
PARMOTREMA sulphuratum, Jason Hollinger
PARMOTREMA tinctorum, Jason Hollinger
PARMOTREMA ultralucens, Vitaly Charny
PARMOTREMA xanthinum, Jason Hollinger
PARMOTREMA zolleriana, Jason Hollinger
PHELIGERA britannica, Jason Hollinger
PHELIGERA collina, Richard Droker
PHELIGERA elisabethae, Jason Hollinger
PHELIGERA membranacea, Jim Riley
PHELIGERA neopolydactyla, Jason Hollinger
PHELIGERA polyanctylon, Jason Hollinger
PHELIGERA praetextata, Jason Hollinger
PHAEOPHYSICA adiastola, Jason Hollinger
PHAEOPHYSICA ciliata, Jason Hollinger
PHAEOPHYSICA hirsuta, Jason Hollinger
PHAEOPHYSICA hirtella, Troy McMullin
PHAEOPHYSICA hispidula, Jason Hollinger
PHAEOPHYSICA insignis, Stephen Sharnoff
PHAEOPHYSICA kairamoi, Jason Hollinger
PHAEOPHYSICA nigricans, Jason Hollinger
PHAEOPHYSICA orbicularis, Jason Hollinger
PHAEOPHYSICA pusilloides, Stephen Sharnoff
PHAEOPHYSICA rubropulchra, Jason Hollinger
PHYSICA adscendens, Jim Riley
PHYSICA aipolia/aminophila, Richard Droker
PHYSICA americana, Jason Hollinger
PHYSICA biziana, Jason Hollinger
PHYSICA caesia, Richard Droker
PHYSICA crispa, Jason Hollinger
PHYSICA 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 melanarcha, Andrew Khitsun
Physcionia americana, Stephen Sharnoff
Physcionia californica, Jason Hollinger
Physcionia detera, Chris Parrish
Physcionia elegantula, Stephen Sharnoff
Physcionia enteroxantha, Jason Hollinger
Physcionia fallax, Jason Hollinger
Physcionia isidigera, Jason Hollinger
Physcionia leucoleptes, Andrew Khitsun
Physcionia perisidiosa, Jason Hollinger
Platismatia glauca, Jason Hollinger
Platismatia herrei, Jason Hollinger
Platismatia lacunosa, Bruce McCune
Platismatia norvegica, Jason Hollinger
Platismatia stemphylla, Jason Hollinger
Platismatia tuckermannii, Jason Hollinger
Platismatia wheeleri, Tim Wheeler
Pseudevernia cladonia, Jason Hollinger
Pseudevernia conscians, Jason Hollinger
Pseudevernia intensa, Jason Hollinger
Pseudevernia aurata, Jason Hollinger
Pseudevernia citrina group, Jason Hollinger
Pseudevernia mallota, Bruce McCune
Pseudevernia rainierensis, Jim Riley
Pseudoparmelia uleana, Jason Hollinger
Punctelia appalachensis, Jason Hollinger
Punctelia bolliana, Andrew Khitsun
Punctelia borreri, Zaca Lepista
Punctelia caseana, Jason Hollinger
Punctelia graminicola, Jason Hollinger
Punctelia hypoleucites, Chris Parrish
Punctelia jeckeri, Jason Hollinger
Punctelia missouriensis, Jason Hollinger
Punctelia reddena, Jason Hollinger
Punctelia rudecta, Jason Hollinger
Punctelia sorediata, Jason Hollinger
Punctelia subcinerea, Vitaly Charny
Punctelia sorediosa, Jason Hollinger
Punctelia tenella, Jason Hollinger
Punctelia stellaris, Jason Hollinger
Ramalina americana/culbersoniorum, Jason Hollinger
Ramalina americana, Jason Hollinger
Ramalina dilacerata, Jason Hollinger
Ramalina farinacea, Jason Hollinger
Ramalina leptocarpha, Jason Hollinger
Ramalina menziesii, Jason Hollinger
Ramalina obtusata, Bruce McCune
Ramalina pollinaria, Jason Hollinger
Ramalina roesleri, Jason Hollinger
Ramalina sinensis, Sarah Jovan
Ramalina stenospora, Jason Hollinger
Ramalina subleptocarpha, Jason Hollinger
Ramalina thrausta, Jason Hollinger
Ramalina willeyi, Jason Hollinger
Rostania occultula, Matthias Schultz
Scytinium cellulosum, Bruce McCune
Scytinium lichenoides, Jason Hollinger
Scytinium palmatum, Richard Droker
Scytinium polycarpum, Bruce McCune
Sphaerophorus tuckermannii, 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
Thulina dissimilis, Jason Hollinger
Usnea cavernosa, Jason Hollinger
Usnea ceratina, Jason Hollinger
Usnea cornuta, Jason Hollinger
Usnea dasaeu, Jason Hollinger
Usnea esperantiana, Stephen Sharnoff
Usnea filipendula group, Jim Riley
Usnea flavocardia, Bruce McCune
Usnea fragilicens, Stephen Sharnoff
Usnea glabrata, Bruce McCune
Usnea glabrescens/fulvoreagens, Andrew Khitsun
Usnea hirta, Jason Hollinger
Usnea intermedia, Stephen Sharnoff
Usnea lapponica, Jason Hollinger
Usnea longissima, Noah Siegel
Usnea merrillii, Jason Hollinger
Usnea nidulans, Bruce McCune
Usnea pacifica, Bruce McCune
Usnea parvula, Jason Hollinger
Usnea rubicunda, Jason Hollinger
Usnea scabrata, Jason Hollinger
Usnea silesiaca, Stephen Sharnoff
Usnea strigosa, Jason Hollinger
Usnea subflorida, 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).
<table>
<thead>
<tr>
<th>LICH_SPPACRONYM</th>
<th>GENUS</th>
<th>SPECIES</th>
<th>YEAR START</th>
<th>YEAR END</th>
<th>SPP_COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>Aht</td>
<td>Ahtiana</td>
<td>1993</td>
<td>2019</td>
<td>ACTION 0: 100 <em>Ahtiana</em> was renamed to 100 <em>Nephromopsis</em> (Divakar et al. 2017).</td>
</tr>
<tr>
<td>100</td>
<td>Aht</td>
<td><em>Nephromopsis</em></td>
<td>2019</td>
<td></td>
<td>ACTION 0: 100 <em>Ahtiana</em> was renamed to 100 <em>Nephromopsis</em> (Divakar et al. 2017).</td>
</tr>
<tr>
<td>101</td>
<td>Ahtsph</td>
<td><em>Ahtiana</em></td>
<td>1993</td>
<td>2019</td>
<td>ACTION 0: 101 <em>Ahtiana sphaerosporella</em> was renamed to 101 <em>Nephromopsis sphaerosporella</em> (Divakar et al. 2017)</td>
</tr>
<tr>
<td>101</td>
<td>Ahtsph</td>
<td><em>Nephromopsis</em></td>
<td>2019</td>
<td></td>
<td>ACTION 0: 101 <em>Ahtiana sphaerosporella</em> was renamed to 101 <em>Nephromopsis sphaerosporella</em> (Divakar et al. 2017)</td>
</tr>
<tr>
<td>601</td>
<td>Bryabb</td>
<td><em>Bryoria</em></td>
<td>1993</td>
<td>1995</td>
<td>ACTION 2: 601 <em>Bryoria abbreviata</em> is a synonym and should be combined with 4551 <em>Nodobryoria abbreviata</em> for all analyses.</td>
</tr>
<tr>
<td>603</td>
<td>Brycap</td>
<td><em>Bryoria</em></td>
<td>1993</td>
<td></td>
<td>ACTION 0: 603 <em>Bryoria capillaris</em> includes the K- chemotype described as <em>B. pikei</em>.</td>
</tr>
<tr>
<td>606</td>
<td>Brycha</td>
<td><em>Bryoria</em></td>
<td>1993</td>
<td></td>
<td>ACTION 0: The name 610 <em>Bryoria fuscescens</em> was used in a broad sense for most specimens in the <em>B. fuscescens</em> complex. Only specimens which clearly fit the morphology of 606 <em>B. chalybeiformis</em> were assigned the latter name. It is debatable whether these species can be reliably differentiated, so for most studies we recommend mapping them under 610 <em>B. fuscescens</em>.</td>
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<td>ACTION 0: 624 <em>Bryoria tortuosa</em> is considered a synonym and should be combined with 607 <em>B. fremontii</em> for all analyses (Velmala et al. 2009).</td>
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<td><em>Bryoria</em></td>
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<td></td>
<td>ACTION 0: Western United States: The name <em>Bryoria fuscescens</em> was used in a broad sense for most specimens in the <em>B. fuscescens</em> complex. Only specimens which clearly fit the morphology of <em>B. chalybeiformis</em> or <em>B. glabra</em> 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 under 610 <em>B. fuscescens</em>.</td>
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<td>ACTION 0: The name <em>Bryoria fuscescens</em> was used in a broad sense for most specimens in the <em>B. fuscescens</em> complex. Only specimens which clearly fit the morphology of <em>B. glabra</em> were assigned the latter name. It is debatable whether these species can be reliably differentiated, so for most studies we recommend mapping them under 610 <em>B. fuscescens</em>.</td>
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<td>ACTION 2: 617 <em>Bryoria pseudocapillaris</em> was renamed to 617 <em>Sulcaria spiralifera</em> (Myllys et al. 2014).</td>
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<td>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).</td>
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<tr>
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<td>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).</td>
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<td>1993</td>
<td>ACTION 0: 8151 Vulpicida canadensis is a synonym (Divakar et al. 2017) and should be combined into 1004 Cetraria canadensis for all analyses.</td>
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<td>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).</td>
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<td>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).</td>
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<td>1993</td>
<td>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).</td>
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<tr>
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<td>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).</td>
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<td>ACTION 0: 1009 Cetraria inermis was renamed to 1009 Nephromopsis inermis (Divakar et al. 2017).</td>
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<td>ACTION 0: <em>Collema curtisporum</em> and <em>C. nigrescens</em> 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 <em>C. nigrescens</em> (McCune and Geiser 2009, Sharnoff 2014). Specimens from east of the crest, including Idaho and Montana, are called <em>C. curtisporum</em>.</td>
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<td>ACTION 0: <em>Collema curtisporum</em> and <em>C. nigrescens</em> 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 <em>C. nigrescens</em> (McCune and Geiser 2009, Sharnoff 2014). Specimens from east of the crest, including Idaho and Montana, are called <em>C. curtisporum</em>.</td>
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<td>ACTION 0: 1413 <em>Collema occultatum</em> was renamed to 1413 <em>Rostania occultata</em> (Otálora et al. 2014).</td>
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<td>ACTION 1: Exclude for most analyses. Placodioid growth forms were not consistently collected.</td>
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</tr>
<tr>
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<td>ACTION 0: Before 2001, 2658 <em>Fuscopannaria pacifica</em> in the Pacific Northwest was misidentified as 4712 <em>F. saubinetii</em>. <em>F. saubinetii</em> does not occur in the Pacific Northwest (McCune &amp; Geiser 2009). Records of <em>F. saubinetii</em> should be changed to <em>F. pacifica</em>.</td>
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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 (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 Pelchl 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 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. 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 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. 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 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. 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.
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<td>ACTION 1: Exclude for most analyses. Squamulose and crustose growth forms were not consistently collected.</td>
<td></td>
</tr>
<tr>
<td>6705 Punmis</td>
<td>Punctelia</td>
<td>missouriensis</td>
<td>1993</td>
<td></td>
<td>ACTION 0: 6712 <em>Punctelia punctilla</em> should be combined into 6705 <em>P. missouriensis</em> for all analyses. <em>P. missouriensis</em> is the correct name for this taxon (Aptroot 2003, Lendemer &amp; Hodkinson 2010).</td>
<td></td>
</tr>
<tr>
<td>6706 Punper</td>
<td>Punctelia</td>
<td>perreticulata</td>
<td>1993</td>
<td></td>
<td>ACTION 0: Lendemer &amp; Hodkinson (2010) narrowed the species concept for <em>P. perreticulata</em>. ACTION 5/ACTION 2: WEST—6706 <em>P. perreticulata</em> should be combined into 6714 <em>P. jeckeri</em> for all analyses. ACTION 5/ACTION 4: EAST—for data collected before 2010, combine 6706 <em>P. perreticulata</em> into 6713 <em>P. caseana</em> for all analyses. It is likely that eastern specimens collected outside the Ozarks are <em>P. caseana</em>.</td>
<td></td>
</tr>
<tr>
<td>6709 Punsem</td>
<td>Punctelia</td>
<td>semansiana</td>
<td>1993</td>
<td>2014</td>
<td>ACTION 0: 6709 <em>Punctelia semansiana</em> was renamed to 6709 <em>Punctelia graminicola</em> (Egan 2003).</td>
<td></td>
</tr>
<tr>
<td>6709 Punsem</td>
<td>Punctelia</td>
<td>graminicola</td>
<td>2014</td>
<td></td>
<td>ACTION 0: 6709 <em>Punctelia semansiana</em> was renamed to 6709 <em>Punctelia graminicola</em> (Egan 2003).</td>
<td></td>
</tr>
<tr>
<td>6711 Punsbr</td>
<td>Punctelia</td>
<td>subrudecta</td>
<td>1993</td>
<td>2010</td>
<td>ACTION 0: <em>Punctelia subrudecta</em> is no longer a valid name for U.S. specimens (Lendemer &amp; Hodkinson 2010). ACTION 5/ACTION 2: EAST—6711 <em>Punctelia subrudecta</em> should be combined into 6712 <em>P. caseana</em> for all analyses. ACTION 5/ACTION 2: WEST—6711 <em>P. subrudecta</em> should be combined into 6713 <em>P. jeckeri</em> for all analyses.</td>
<td></td>
</tr>
<tr>
<td>LICH_SPP_CD</td>
<td>SPP_ACRONYM</td>
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<td>SPECIES</td>
<td>YEAR_START</td>
<td>YEAR_END</td>
<td>SPP_COMMENTS</td>
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<tr>
<td>6712</td>
<td>Punpun</td>
<td>Punctelia</td>
<td>punctilla</td>
<td>2000</td>
<td>2003</td>
<td>ACTION 2: 6712 <em>Punctelia punctilla</em> should be combined into 6705 <em>P. missouriensis</em> for all analyses. <em>P. missouriensis</em> is the correct name for this taxon (Aptroot 2003, Lendemer &amp; Hodkinson 2010).</td>
</tr>
<tr>
<td>6713</td>
<td>Puncas</td>
<td>Punctelia</td>
<td>caseana</td>
<td>2010</td>
<td></td>
<td>ACTION 5/ACTION 0: EAST—6711 <em>Punctelia subrudecta</em> should be combined into 6713 <em>P. caseana</em> for all analyses. This treatment follows Lendemer &amp; Hodkinson (2010). ACTION 5/ACTION 0: EAST—for data collected before 2010, combine 6706 <em>P. perreticulata</em> into 6713 <em>P. caseana</em> for all analyses. Lendemer &amp; Hodkinson (2010) narrowed the species concept for <em>P. perreticulata</em>, making it likely that specimens collected outside the Ozarks are <em>P. caseana</em>.</td>
</tr>
<tr>
<td>6714</td>
<td>Punjec</td>
<td>Punctelia</td>
<td>jeckeri</td>
<td>2010</td>
<td></td>
<td>ACTION 5/ACTION 0: WEST—6711 <em>Punctelia subrudecta</em> is no longer a valid name for U.S. specimens (Lendemer &amp; Hodkinson 2010). Records should be combined into 6714 <em>P. jeckeri</em> for all analyses. ACTION 5/ACTION 0: WEST—for data collected before 2010, combine 6706 <em>P. perreticulata</em> into 6713 <em>P. jeckeri</em> for all analyses (Lendemer &amp; Hodkinson 2010).</td>
</tr>
<tr>
<td>6801</td>
<td>Pyxalb</td>
<td>Pyxine</td>
<td>albovirens</td>
<td>1993</td>
<td></td>
<td>ACTION 5/ACTION 0: Southern (S) FIA Region—The names 6801 <em>Pyxine albovirens</em>, 6803 <em>P. caesiopruinosa</em>, and 6809 <em>P. subcinerea</em> 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, <em>P. albovirens</em> and <em>P. caesiopruinosa</em> should be combined into <em>P. subcinerea</em>.</td>
</tr>
<tr>
<td>6803</td>
<td>Pyxcae</td>
<td>Pyxine</td>
<td>caesiopruinosa</td>
<td>1993</td>
<td></td>
<td>ACTION 5/ACTION 0: Southern (S) FIA Region—The names 6801 <em>Pyxine albovirens</em>, 6803 <em>P. caesiopruinosa</em>, and 6809 <em>P. subcinerea</em> 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, <em>P. albovirens</em> and <em>P. caesiopruinosa</em> should be combined into <em>P. subcinerea</em>.</td>
</tr>
<tr>
<td>6809</td>
<td>PyxsuB</td>
<td>Pyxine</td>
<td>subcinerea</td>
<td>1993</td>
<td></td>
<td>ACTION 5/ACTION 0: Southern (S) FIA Region—The names 6801 <em>Pyxine albovirens</em>, 6803 <em>P. caesiopruinosa</em>, and 6809 <em>P. subcinerea</em> 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, <em>P. albovirens</em> and <em>P. caesiopruinosa</em> should be combined into <em>P. subcinerea</em>.</td>
</tr>
<tr>
<td>6901</td>
<td>Ramame</td>
<td>Ramalina</td>
<td>americana</td>
<td>1993</td>
<td></td>
<td>ACTION 0: LaGrecia (1999) segregated 6941 <em>Ramalina culbersoniorum</em> from 6901 <em>R. americana</em>. It does not appear possible to distinguish the two taxa without TLC; specimens were only called <em>R. culbersoniorum</em> if TLC was used to confirm identification.</td>
</tr>
<tr>
<td>6912</td>
<td>Ramfar</td>
<td>Ramalina</td>
<td>farinacea</td>
<td>1993</td>
<td></td>
<td>ACTION 0: The name 6912 <em>Ramalina farinacea</em> may be occasionally misapplied to pollution-stunted or tiny specimens of 6934 <em>R. subleptocarpha</em> as their morphology becomes convergent when stressed.</td>
</tr>
<tr>
<td>6934</td>
<td>Ramsle</td>
<td>Ramalina</td>
<td>subleptocarpha</td>
<td>1993</td>
<td></td>
<td>ACTION 0: The name 6912 <em>Ramalina farinacea</em> may be occasionally misapplied to pollution-stunted or tiny specimens of 6934 <em>R. subleptocarpha</em> as their morphology becomes convergent when stressed.</td>
</tr>
<tr>
<td>LICH_SPPACRONYM</td>
<td>GENUS</td>
<td>SPECIES</td>
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<td>YEAR END</td>
<td>SPP_COMMENTS</td>
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<tr>
<td>6941 Ramcul</td>
<td>Ramalina</td>
<td>culbersoniorum</td>
<td>1999</td>
<td></td>
<td>ACTION 0: LaGreca (1999) segregated 6941 <em>Ramalina culbersoniorum</em> from 6901 <em>R. americana</em>. It does not appear possible to distinguish the two taxa without TLC; specimens were only called <em>R. culbersoniorum</em> if TLC was used to confirm identification.</td>
<td></td>
</tr>
<tr>
<td>7100 Rim</td>
<td>Rimelia</td>
<td></td>
<td>1993</td>
<td>2014</td>
<td>ACTION 0: 7100 <em>Rimelia</em> was renamed to 5300 <em>Parmotrema</em> (Blanco et al. 2005).</td>
<td></td>
</tr>
<tr>
<td>7101 Rimcet</td>
<td>Rimelia</td>
<td>cetrata</td>
<td>1993</td>
<td>2014</td>
<td>ACTION 2: 7101 <em>Rimelia cetrata</em> should be combined into 5338 <em>Parmotrema cetratum</em> (Blanco et al. 2005).</td>
<td></td>
</tr>
<tr>
<td>7102 Rimcom</td>
<td>Parmotrema</td>
<td>commensurata</td>
<td>1993</td>
<td>2014</td>
<td>ACTION 0: 7102 <em>Parmotrema commensuratum</em> was renamed to 7102 <em>Parmotrema commensuratum</em> (Blanco et al. 2005).</td>
<td></td>
</tr>
<tr>
<td>7103 Rimdif</td>
<td>Parmotrema</td>
<td>diffractaica</td>
<td>1993</td>
<td>2014</td>
<td>ACTION 0: 7103 <em>Rimelia diffractaica</em> was renamed to 7103 <em>Parmotrema diffractaicum</em> (Blanco et al. 2005).</td>
<td></td>
</tr>
<tr>
<td>7104 Rimret</td>
<td>Parmotrema</td>
<td>reticulata</td>
<td>1993</td>
<td>2014</td>
<td>ACTION 0: 7104 <em>Rimelia reticulata</em> was renamed to 7104 <em>Parmotrema reticulatum</em> (Blanco et al. 2005).</td>
<td></td>
</tr>
<tr>
<td>7105 Rimsim</td>
<td>Parmotrema</td>
<td>simulans</td>
<td>1993</td>
<td>2014</td>
<td>ACTION 0: 7105 <em>Parmotrema simulans</em> was renamed to 7105 <em>Parmotrema simulans</em> (Blanco et al. 2005).</td>
<td></td>
</tr>
<tr>
<td>7106 Rimsim</td>
<td>Parmotrema</td>
<td>simulans</td>
<td>1993</td>
<td>2014</td>
<td>ACTION 0: 7106 <em>Parmotrema simulans</em> was renamed to 7106 <em>Parmotrema simulans</em> (Blanco et al. 2005).</td>
<td></td>
</tr>
<tr>
<td>7106 Rimsub</td>
<td>Parmotrema</td>
<td>subsidiosa</td>
<td>1993</td>
<td>2014</td>
<td>ACTION 2: 7106 <em>Parmotrema subsidiosa</em> should be combined into 5337 <em>Parmotrema subsidiosum</em> (Blanco et al. 2005).</td>
<td></td>
</tr>
<tr>
<td>7400 Sph</td>
<td>Sphaerophorus</td>
<td></td>
<td>1993</td>
<td></td>
<td>ACTION 0: <em>Sphaerophorus globosus</em> was split into <em>S. tuckermanii</em> and <em>S. venerabilis</em> by Wedin et al. (2009) and <em>S. globosus</em> is no longer considered a valid name for epiphytic <em>Sphaerophorus</em> in North America. ACTION 0: For analyses crossing 2009 combine 7402 <em>S. globosus</em>, 7405 <em>S. tuckermanii</em>, and 7406 <em>S. venerabilis</em> into 7400 <em>Sphaerophorus</em>. ACTION 4: For analysis of data before 2009 combine all records of 7402 <em>S. globosus</em> into 7400 <em>Sphaerophorus</em> sp.</td>
<td></td>
</tr>
<tr>
<td>7402 Sphglo</td>
<td>Sphaerophorus</td>
<td>globosus</td>
<td>1993</td>
<td>2009</td>
<td>ACTION 2: Always combine 7402 <em>S. globosus</em> into 7400 <em>Sphaerophorus</em>. <em>Sphaerophorus globosus</em> was split into <em>S. tuckermanii</em> and <em>S. venerabilis</em> by Wedin et al. (2009). <em>Sphaerophorus globosus</em> is no longer considered a valid name for epiphytic <em>Sphaerophorus</em> in North America.</td>
<td></td>
</tr>
<tr>
<td>7403 Sphmel</td>
<td>Sphaerophorus</td>
<td>melanocarpus</td>
<td>1993</td>
<td>2006</td>
<td>ACTION 0: 7403 <em>Sphaerophorus melanocarpus</em> was renamed to 7403 <em>Bunodophoron melanocarpum</em> (Wedin 1995).</td>
<td></td>
</tr>
<tr>
<td>7403 Sphmel</td>
<td>Bunodophoron</td>
<td>melanocarpum</td>
<td>2006</td>
<td></td>
<td>ACTION 0: 7403 <em>Sphaerophorus melanocarpus</em> was renamed to 7403 <em>Bunodophoron melanocarpum</em> (Wedin 1995).</td>
<td></td>
</tr>
<tr>
<td>LICH_SZPPCD</td>
<td>SPP_ACRONYM</td>
<td>GENUS</td>
<td>SPECIES</td>
<td>YEAR</td>
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<tr>
<td>7405</td>
<td>Sptuc</td>
<td>Sphaerophorus</td>
<td>tuckermanii</td>
<td>2009</td>
<td></td>
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<tr>
<td>7406</td>
<td>Sphven</td>
<td>Sphaerophorus</td>
<td>venerabilis</td>
<td>2009</td>
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<tr>
<td>7450</td>
<td>Ste</td>
<td>Stereocaulon</td>
<td></td>
<td>2007</td>
<td></td>
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<td>7501</td>
<td>Stibe</td>
<td>Sticta</td>
<td>beauvoisii</td>
<td>1993</td>
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<tr>
<td>7505</td>
<td>Stiwei</td>
<td>Sticta</td>
<td>weigelii</td>
<td>1993</td>
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<td>7507</td>
<td>Sticar</td>
<td>Sticta</td>
<td>carolinensis</td>
<td>2004</td>
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<td>7508</td>
<td>Stifra</td>
<td>Sticta</td>
<td>fragilinata</td>
<td>2004</td>
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<td>7921</td>
<td>Tucari</td>
<td>Tuckermanella</td>
<td>arizonica</td>
<td>2003</td>
<td>2019</td>
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<tr>
<td>7921</td>
<td>Tucari</td>
<td>Nephromopsis</td>
<td>arizonica</td>
<td>2019</td>
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<tr>
<td>7922</td>
<td>Tucpse</td>
<td>Tuckermanella</td>
<td>pseudoweberi</td>
<td>2003</td>
<td>2019</td>
<td></td>
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<tr>
<td>LICH_SPP_CODE</td>
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<td>GENUS</td>
<td>SPECIES</td>
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<tr>
<td>7922</td>
<td>Tucps</td>
<td>Nephromopsis</td>
<td>pseudoweberi</td>
<td>2019</td>
<td></td>
<td>ACTION 0: Although FIA did not adopt several genus names split from Cetraria (Kaernefeltia, Tuckermanella, Tuckermanopsis), 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).</td>
</tr>
<tr>
<td>8000</td>
<td>Usn</td>
<td>Usnea</td>
<td></td>
<td>1993</td>
<td></td>
<td>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 diploypus should be combined into 8000 Usnea. The name U. diploypus 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. diploypus 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. ACTIONS/ACTION 0: EAST—This taxon was used broadly to include all specimens that could not be positively identified to species.</td>
</tr>
<tr>
<td>8007</td>
<td>Usnari</td>
<td>Usnea</td>
<td>arizonica</td>
<td>1993</td>
<td>2010</td>
<td>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.</td>
</tr>
<tr>
<td>8014</td>
<td>Usncer</td>
<td>Usnea</td>
<td>ceratina</td>
<td>1993</td>
<td></td>
<td>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.</td>
</tr>
<tr>
<td>8016</td>
<td>Usncir</td>
<td>Usnea</td>
<td>cirrosa</td>
<td>1993</td>
<td></td>
<td>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).</td>
</tr>
<tr>
<td>8019</td>
<td>Usncor</td>
<td>Usnea</td>
<td>cornuta</td>
<td>1993</td>
<td></td>
<td>ACTION 0: The name 8032 Usnea fragiliscens 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.</td>
</tr>
<tr>
<td>LICH_SPP_CD</td>
<td>SPP_ACRONYM</td>
<td>GENUS</td>
<td>SPECIES</td>
<td>YEAR_START</td>
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<tr>
<td>8023</td>
<td>Usndip</td>
<td>Usnea</td>
<td>diplotypus</td>
<td>1993</td>
<td></td>
<td>ACTION 4: For any analysis including pre-2000 data, 8023 <em>U. diplotypus</em> should be combined into 8000 <em>Usnea</em>. 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 <em>Usnea</em>, this name was considered to be incorrectly applied in previous years. In 2000 and beyond, the name and code 8023 <em>U. diplotypus</em> are only used for specimens identified with TLC. ACTION 3: <em>Usnea diplotypus</em> is likely in the <em>U. filipendula</em> group (Marks et al. 2016). Until further work is done on this taxon, we recommend combining 8023 <em>U. diplotypus</em> collected in 2000 or after into 8029 <em>U. filipendula</em> for all analyses.</td>
</tr>
<tr>
<td>8029</td>
<td>Usnfil</td>
<td>Usnea</td>
<td>filipendula</td>
<td>1993</td>
<td></td>
<td>ACTION 0: FIA uses the name 8029 <em>U. filipendula</em> to represent the <em>U. filipendula</em> group in the Western United States, which includes <em>U. plicata</em>, <em>U. chaetophora</em>, <em>U. diplotypus</em>, and several others. ACTION 0: 8058 <em>Usnea plicata</em> should be combined into 8029 <em>U. filipendula</em> for analysis. Starting in 1998, this aggregate (mostly West) has been included in the broader aggregate <em>U. filipendula</em>; the name <em>U. plicata</em> is no longer used in FIA as it is nomenclaturally ambiguous. ACTION 0: For analyzing data from multiple years crossing 1998, 8087 <em>U. chaetophora</em> should be combined into 8029 <em>U. filipendula</em>. ACTION 0: WEST—Only specimens which clearly fit the morphology of 8065 <em>U. scabrata</em> were assigned the latter name. Less typical forms may be identified as 8029 <em>U. filipendula</em>.</td>
</tr>
<tr>
<td>8032</td>
<td>Usnfr</td>
<td>Usnea</td>
<td>fragilscens</td>
<td>1993</td>
<td></td>
<td>ACTION 0: The name 8032 <em>Usnea fragilscens</em> was first applied in the West in 2000. It is very close to 8019 <em>U. cornuta</em> in some material, and some specimens classified as that taxon in prior years may actually be this species.</td>
</tr>
<tr>
<td>8034</td>
<td>Usnful</td>
<td>Usnea</td>
<td>fulvoreagens</td>
<td>1993</td>
<td></td>
<td>ACTION 2: 8034 <em>Usnea fulvoreagens</em> should be combined into 8037 <em>U. glabrescens</em> for analysis. This taxon is impossible to distinguish from <em>U. glabrescens</em> without TLC and should be considered a synonym.</td>
</tr>
<tr>
<td>8036</td>
<td>Usngla</td>
<td>Usnea</td>
<td>glabrata</td>
<td>1993</td>
<td></td>
<td>ACTION 3: For analyzing data from multiple years crossing 2000, 8088 <em>Usnea esperantiana</em> should be combined into 8036 <em>U. glabrata</em>. <em>U. esperantiana</em> possibly intergrades with <em>U. glabrata</em>.</td>
</tr>
<tr>
<td>8037</td>
<td>Usngls</td>
<td>Usnea</td>
<td>glabrescens</td>
<td>1993</td>
<td></td>
<td>ACTION 0: 8034 <em>Usnea fulvoreagens</em> should be combined into 8037 <em>U. glabrescens</em> for analysis. This taxon is impossible to distinguish from <em>U. glabrescens</em> without TLC and should be considered a synonym. ACTION 0: The name <em>U. glabrescens</em> was first used in 1999 in the West. Previous material identified as 8000 <em>Usnea</em> sp. may include this taxon.</td>
</tr>
<tr>
<td>8040</td>
<td>Usnhes</td>
<td>Usnea</td>
<td>hesperina</td>
<td>1993</td>
<td>2014</td>
<td>ACTION 0: 8040 <em>Usnea hesperina</em> was renamed to 8040 <em>U. subgracilis</em>.</td>
</tr>
<tr>
<td>8040</td>
<td>Usnhes</td>
<td>Usnea</td>
<td>subgracilis</td>
<td>2014</td>
<td></td>
<td>ACTION 0: 8040 <em>U. hesperina</em> has been renamed to 8040 <em>Usnea subgracilis</em>.</td>
</tr>
<tr>
<td>LICH SPP ACRONYM</td>
<td>GENUS</td>
<td>SPECIES</td>
<td>YEAR</td>
<td>YEAR</td>
<td>SPP_COMMENTS</td>
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<tr>
<td>8042</td>
<td>Usnint</td>
<td>Usnea</td>
<td>intermedia</td>
<td>1993</td>
<td>ACTION 0: 8007 <em>Usnea arizonica</em> should be combined into 8042 <em>U. intermedia</em> for all analyses. These two species were synonymized by Clerc (2007). ACTION 0: According to Marks et al. (2016), <em>U. intermedia</em> is likely a fertile form of 8044 <em>U. lapponica</em> although we retain the former name until further work confirms this.</td>
<td></td>
</tr>
<tr>
<td>8044</td>
<td>Usnlap</td>
<td>Usnea</td>
<td>lapponica</td>
<td>1993</td>
<td>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 <em>Usnea substerilis</em>, a synonym, should be combined into 8044 <em>U. lapponica</em> (Marks et al. 2016).</td>
<td></td>
</tr>
<tr>
<td>8047</td>
<td>Usnmad</td>
<td>Usnea</td>
<td>madeirensis</td>
<td>1993</td>
<td>ACTION 0: 8047 <em>Usnea madeirensis</em> was renamed to 8047 <em>U. silesiaca</em>. ACTION 0: 8047 <em>Usnea madeirensis</em> was renamed to 8047 <em>U. silesiaca</em>. ACTION 0: Newly described <em>U. parafloridana</em> (Marks et al. 2016) likely has a broader distribution than northern Wisconsin. Eastern records of <em>U. silesiaca</em> in northern or montane habitats might be this species.</td>
<td></td>
</tr>
<tr>
<td>8047</td>
<td>Usnmad</td>
<td>Usnea</td>
<td>silesiaca</td>
<td>2005</td>
<td>ACTION 0: 8047 <em>Usnea madeirensis</em> was renamed to 8047 <em>U. silesiaca</em>. ACTION 0: 8047 <em>Usnea madeirensis</em> was renamed to 8047 <em>U. silesiaca</em>. ACTION 0: Newly described <em>U. parafloridana</em> (Marks et al. 2016) likely has a broader distribution than northern Wisconsin. Eastern records of <em>U. silesiaca</em> in northern or montane habitats might be this species.</td>
<td></td>
</tr>
<tr>
<td>8050</td>
<td>Usnmir</td>
<td>Usnea</td>
<td>mirabilis</td>
<td>1993</td>
<td>ACTION 0: The name 8050 <em>Usnea mirabilis</em> has a spelling error and should be corrected to 8050 <em>U. mirabilis</em>. ACTION 0: The name 8050 <em>Usnea mirabilis</em> has a spelling error and should be corrected to 8050 <em>U. mirabilis</em>.</td>
<td></td>
</tr>
<tr>
<td>8050</td>
<td>Usnmir</td>
<td>Usnea</td>
<td>mirabilis</td>
<td>2014</td>
<td>ACTION 0: The name 8050 <em>Usnea mirabilis</em> has a spelling error and should be corrected to 8050 <em>U. mirabilis</em>. ACTION 0: The name 8050 <em>Usnea mirabilis</em> has a spelling error and should be corrected to 8050 <em>U. mirabilis</em>.</td>
<td></td>
</tr>
<tr>
<td>8058</td>
<td>Usnppl</td>
<td>Usnea</td>
<td>plicata</td>
<td>1993</td>
<td>ACTION 0: 8058 <em>Usnea plicata</em> should be combined into 8029 <em>U. filipendula</em> for analysis. Starting in 1998, this aggregate (mostly in the West) has been included in the broader aggregate <em>U. filipendula</em>; the name <em>U. plicata</em> is no longer used in FIA as it is nomenclaturally ambiguous.</td>
<td></td>
</tr>
<tr>
<td>8061</td>
<td>Usnret</td>
<td>Usnea</td>
<td>retifera</td>
<td>1993</td>
<td>ACTION 0: 8061 <em>Usnea retifera</em> should be combined into 8042 <em>U. intermedia</em> for all analyses. These species were synonymized by Clerc (2007). ACTION 0: According to Marks et al. (2016), <em>U. intermedia</em> is likely a fertile form of 8044 <em>U. lapponica</em> although we retain the former name until further work confirms this.</td>
<td></td>
</tr>
<tr>
<td>8065</td>
<td>Usnsca</td>
<td>Usnea</td>
<td>scabrata</td>
<td>1993</td>
<td>ACTION 0: WEST—8065 <em>U. scabrata</em> is difficult to differentiate from 8029 <em>U. filipendula</em>. Less typical forms may be misidentified as the latter.</td>
<td></td>
</tr>
<tr>
<td>8072</td>
<td>Usnsub</td>
<td>Usnea</td>
<td>subfloridana</td>
<td>1993</td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>8077</td>
<td>Usnsst</td>
<td>Usnea</td>
<td>substerilis</td>
<td>1993</td>
<td>ACTION 0: 8077 <em>Usnea substerilis</em>, a synonym, should be combined into 8044 <em>U. lapponica</em> (Marks et al. 2016).</td>
<td></td>
</tr>
<tr>
<td>8084</td>
<td>Usmwir</td>
<td>Usnea</td>
<td>wirthii</td>
<td>1993</td>
<td>ACTION 0: 8084 <em>Usnea wirthii</em> is a synonym and should be combined into 8094 <em>U. flavocardia</em> (Clerc 2004).</td>
<td></td>
</tr>
<tr>
<td>LICH_SPPCD</td>
<td>SPP_ACRONYM</td>
<td>GENUS</td>
<td>SPECIES</td>
<td>YEAR START</td>
<td>YEAR END</td>
<td>SPP_COMMENTS</td>
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<tr>
<td>8087</td>
<td>Usncha</td>
<td>Usnea</td>
<td>chaetophora</td>
<td>1997</td>
<td></td>
<td>ACTION 2: 8087 <em>Usnea chaetophora</em> should be combined into 8029 <em>U. filipendula</em>. In the Western United States, this taxon represents part of the <em>U. filipendula</em> group, which includes <em>U. plicata</em>, <em>U. diplopitys</em>, and several others.</td>
</tr>
<tr>
<td>8088</td>
<td>Usnesp</td>
<td>Usnea</td>
<td>esperantiana</td>
<td>1997</td>
<td></td>
<td>ACTION 3: For analyzing data from multiple years crossing 2000, 8088 <em>Usnea esperantiana</em> should be combined into 8036 <em>U. glabrata</em>. This taxon was first applied in 2000 in the West. It is a recognizable syndrome, but possibly intergrades with 8036 <em>U. glabrata</em>.</td>
</tr>
<tr>
<td>8091</td>
<td>Usnrig</td>
<td>Usnea</td>
<td>rigida</td>
<td>1997</td>
<td>2014</td>
<td>ACTION 0: 8091 <em>Usnea rigida</em> was renamed to 8091 <em>U. quasirigida</em> (Lendemer &amp; Tavares 2003).</td>
</tr>
<tr>
<td>8094</td>
<td>Usnfla</td>
<td>Usnea</td>
<td>flavocardia</td>
<td>2006</td>
<td></td>
<td>ACTION 0: 8084 <em>Usnea wirthii</em> is a synonym and should be combined into 8094 <em>U. flavocardia</em> (Clerc 2004).</td>
</tr>
<tr>
<td>8095</td>
<td>Usnpar</td>
<td>Usnea</td>
<td>parvula</td>
<td>2010</td>
<td></td>
<td>ACTION 0: For analyzing data from multiple years crossing 2010, 8016 <em>Usnea cirrosa</em> should be combined into 8095 <em>U. parvula</em>. <em>U. parvula</em> was segregated from <em>U. cirrosa</em> by Clerc (2007).</td>
</tr>
<tr>
<td>8096</td>
<td>Usncyl</td>
<td>Usnea</td>
<td>cylindrica</td>
<td>2014</td>
<td></td>
<td>ACTION 0: <em>Usnea cylindrica</em> has only recently been found to occur in North America (Dillman et al. 2012).</td>
</tr>
<tr>
<td>8100</td>
<td>Way</td>
<td>Wayne</td>
<td></td>
<td>1993</td>
<td></td>
<td>ACTION 1: Exclude for most analyses. Squamulose growth forms were not consistently collected.</td>
</tr>
<tr>
<td>8101</td>
<td>Waycal</td>
<td>Wayne</td>
<td>californica</td>
<td>1993</td>
<td></td>
<td>ACTION 1: Exclude for most analyses. Squamulose growth forms were not consistently collected.</td>
</tr>
<tr>
<td>8150</td>
<td>Vul</td>
<td>Vulpicida</td>
<td></td>
<td>1997</td>
<td>2019</td>
<td>ACTION 2: 8150 <em>Vulpicida</em> is a synonym (Divakar et al. 2017) and should be combined into 1000 <em>Cetraria</em> for all analyses.</td>
</tr>
<tr>
<td>8151</td>
<td>Vulcan</td>
<td>Vulpicida</td>
<td>canadensis</td>
<td>1997</td>
<td>2019</td>
<td>ACTION 2: 8151 <em>Vulpicida canadensis</em> is a synonym (Divakar et al. 2017) and should be combined into 1004 <em>Cetraria canadensis</em> for all analyses.</td>
</tr>
<tr>
<td>8152</td>
<td>Vulpin</td>
<td>Vulpicida</td>
<td>pinastri</td>
<td>1997</td>
<td>2019</td>
<td>ACTION 2: 8152 <em>Vulpicida pinastri</em> is a synonym (Divakar et al. 2017) and should be combined into 1015 <em>Cetraria pinastri</em> for all analyses.</td>
</tr>
<tr>
<td>8153</td>
<td>Vulvir</td>
<td>Vulpicida</td>
<td>viridis</td>
<td>1997</td>
<td>2019</td>
<td>ACTION 2: 8153 <em>Vulpicida viridis</em> is a synonym (Divakar et al. 2017) and should be combined into 1020 <em>Cetraria viridis</em> for all analyses.</td>
</tr>
<tr>
<td>8170</td>
<td>Xam</td>
<td>Xanthomendoza</td>
<td></td>
<td>2004</td>
<td></td>
<td>ACTION 3: For data analysis for multiple years crossing 2004, 8170 <em>Xanthomendoza</em> should be combined into 8200 <em>Xanthoria</em>. Specimens that cannot be identified to species are coded by default to 8200 <em>Xanthoria</em> unless the ID specialist is certain they belong to 8170 <em>Xanthomendoza</em> sp. Most of the <em>Xanthomendoza</em> species listed here were moved from <em>Xanthoria</em> by Söchting et al. (2002).</td>
</tr>
<tr>
<td>8200</td>
<td>Xan</td>
<td>Xanthoria</td>
<td></td>
<td>1993</td>
<td></td>
<td>ACTION 3: For data analysis for multiple years crossing 2004, 8170 <em>Xanthomendoza</em> should be combined into 8200 <em>Xanthoria</em>. Specimens that cannot be identified to species are coded by default to 8200 <em>Xanthoria</em> unless the ID specialist is certain they belong to 8170 <em>Xanthomendoza</em> sp.</td>
</tr>
<tr>
<td>LICH_SPP_ACRONYM</td>
<td>SPP_ACRONYM</td>
<td>GENUS</td>
<td>SPECIES</td>
<td>YEAR_START</td>
<td>YEAR_END</td>
<td>SPP_COMMENTS</td>
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<tr>
<td>8201</td>
<td>Xan can</td>
<td>Xanthoria</td>
<td>candelaria</td>
<td>1993</td>
<td></td>
<td>ACTION 0: The name Xanthoria candelaria is used in the restricted sense of Lindblom (1997).</td>
</tr>
<tr>
<td>8203</td>
<td>Xan fal</td>
<td>Xanthoria</td>
<td>fallax</td>
<td>1993</td>
<td>2004</td>
<td>ACTION 0: 8203 Xanthoria fallax was renamed to 8203 Xanthomendoza fallax. See the latter for additional notes. ACTION 0: For analyzing data for multiple years crossing 1997, 8210 Xanthomendoza fulva, 8219 X. g. alericulata, 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.</td>
</tr>
<tr>
<td>8204</td>
<td>Xan has</td>
<td>Xanthoria</td>
<td>hasseana</td>
<td>1993</td>
<td>2004</td>
<td>ACTION 0: 8204 Xanthoria hasseana was renamed to 8204 Xanthomendoza hasseana. See the latter for additional notes. 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.</td>
</tr>
<tr>
<td>8207</td>
<td>Xan pol</td>
<td>Xanthoria</td>
<td>polycarpa</td>
<td>1993</td>
<td></td>
<td>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.</td>
</tr>
<tr>
<td>8209</td>
<td>Xan sub</td>
<td>Xanthoria</td>
<td>subramulosa</td>
<td>1993</td>
<td>2004</td>
<td>ACTION 0: 8209 Xanthoria subramulosa was renamed to 8209 Xanthomendoza subramulosa.</td>
</tr>
<tr>
<td>8209</td>
<td>Xan sub</td>
<td>Xanthomendoza</td>
<td>subramulosa</td>
<td>2004</td>
<td></td>
<td>ACTION 0: 8209 Xanthoria subramulosa was renamed to 8209 Xanthomendoza subramulosa.</td>
</tr>
<tr>
<td>LICH_SPPCD</td>
<td>SPP_ACRONYM</td>
<td>GENUS</td>
<td>SPECIES</td>
<td>YEAR_START</td>
<td>YEAR_END</td>
<td>SPP_COMMENTS</td>
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<tr>
<td>8210</td>
<td>Xanful</td>
<td>Xanthoria</td>
<td>fulva</td>
<td>1995</td>
<td>2004</td>
<td>ACTION 0: 8210 Xanthoria fulva was renamed to 8210 Xanthomendoza fulva. See the latter for additional notes.</td>
</tr>
<tr>
<td>8210</td>
<td>Xanful</td>
<td>Xanthomendoza</td>
<td>fulva</td>
<td>2004</td>
<td></td>
<td>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.</td>
</tr>
<tr>
<td>8211</td>
<td>Xanbor</td>
<td>Xanthoria</td>
<td>borealis</td>
<td>1997</td>
<td>2004</td>
<td>ACTION 0: 8211 Xanthoria borealis was renamed to 8211 Xanthomendoza borealis.</td>
</tr>
<tr>
<td>8211</td>
<td>Xanbor</td>
<td>Xanthomendoza</td>
<td>borealis</td>
<td>2004</td>
<td></td>
<td>ACTION 0: 8211 Xanthoria borealis has been renamed to 8211 Xanthomendoza borealis.</td>
</tr>
<tr>
<td>8212</td>
<td>Xancon</td>
<td>Xanthoria</td>
<td>concinna</td>
<td>1997</td>
<td>2004</td>
<td>ACTION 0: 8212 Xanthoria concinna was renamed to 8212 Xanthomendoza concinna.</td>
</tr>
<tr>
<td>8212</td>
<td>Xancon</td>
<td>Xanthomendoza</td>
<td>concinna</td>
<td>2004</td>
<td></td>
<td>ACTION 0: 8212 Xanthoria concinna was been renamed to 8212 Xanthomendoza concinna.</td>
</tr>
<tr>
<td>8213</td>
<td>Xanmen</td>
<td>Xanthoria</td>
<td>mendozae</td>
<td>1997</td>
<td>2005</td>
<td>ACTION 0: 8213 Xanthoria mendozae was renamed to 8213 Xanthomendoza mendozae. See the latter for additional notes.</td>
</tr>
<tr>
<td>8213</td>
<td>Xanmen</td>
<td>Xanthomendoza</td>
<td>mendozae</td>
<td>2005</td>
<td></td>
<td>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.</td>
</tr>
<tr>
<td>8214</td>
<td>Xanmon</td>
<td>Xanthoria</td>
<td>montana</td>
<td>1997</td>
<td>2004</td>
<td>ACTION 0: 8214 Xanthoria montana was renamed to 8214 Xanthomendoza montana. See the latter for additional notes.</td>
</tr>
<tr>
<td>8214</td>
<td>Xanmon</td>
<td>Xanthomendoza</td>
<td>montana</td>
<td>2004</td>
<td></td>
<td>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.</td>
</tr>
<tr>
<td>8215</td>
<td>Xanore</td>
<td>Xanthoria</td>
<td>oregana</td>
<td>1997</td>
<td>2004</td>
<td>ACTION 0: 8215 Xanthoria oregana was renamed to 8215 Xanthomendoza oregana. See the latter for additional notes.</td>
</tr>
<tr>
<td>LICH_SPPCD</td>
<td>SPP_ACRONYM</td>
<td>GENUS</td>
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<td>SPP_COMMENTS</td>
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</tr>
<tr>
<td>8215</td>
<td>Xanore</td>
<td>Xanthomendoza</td>
<td>oregana</td>
<td>2004</td>
<td></td>
<td>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. 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 0: In pre-2004 data, X. oregana data may have included some X. galericulata.</td>
</tr>
<tr>
<td>8218</td>
<td>Xanulo</td>
<td>Xanthoria</td>
<td>ulophyllodes</td>
<td>1997</td>
<td>2004</td>
<td>ACTION 0: 8218 Xanthoria ulophyllodes was renamed to 8218 Xanthomendoza ulophyllodes. See the latter for additional notes.</td>
</tr>
<tr>
<td>8218</td>
<td>Xanulo</td>
<td>Xanthomendoza</td>
<td>ulophyllodes</td>
<td>2004</td>
<td></td>
<td>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.</td>
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<tr>
<td>8219</td>
<td>Xangal</td>
<td>Xanthomendoza</td>
<td>galericulata</td>
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<td></td>
<td>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.</td>
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<tr>
<td>8301</td>
<td>Cndcon</td>
<td>Candelaria</td>
<td>concolor</td>
<td>1993</td>
<td></td>
<td>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 &amp; Nash 2002) but formally described by Westberg &amp; Arup (2011). ACTION 0: C. concolor data collected before 2002 likely includes some C. pacifica.</td>
</tr>
<tr>
<td>8303</td>
<td>Cndpac</td>
<td>Candelaria</td>
<td>pacifica</td>
<td>2002</td>
<td></td>
<td>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 &amp; Nash 2002) but formally described by Westberg &amp; Arup (2011).</td>
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<td>8600</td>
<td>Lec</td>
<td>Lecanora</td>
<td></td>
<td>2002</td>
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<td>ACTION 1: Exclude for most analyses. Crustose growth forms were not consistently collected.</td>
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<td>8601</td>
<td>Lecmur</td>
<td>Lecanora</td>
<td>muralis</td>
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<td>ACTION 1: Exclude for most analyses. Crustose growth forms were not consistently collected.</td>
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<td>9003</td>
<td>Xpmcol</td>
<td>Xanthoparmelia</td>
<td>coloradensis</td>
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<td>2014</td>
<td>ACTION 0: The name 9003 Xanthoparmelia coloradensis has a spelling error and should be corrected to 9003 Xanthoparmelia coloradoensis.</td>
</tr>
<tr>
<td>9003</td>
<td>Xpmcol</td>
<td>Xanthoparmelia</td>
<td>coloradoensis</td>
<td>2014</td>
<td></td>
<td>ACTION 0: The name 9003 Xanthoparmelia coloradensis has a spelling error and should be corrected to 9003 Xanthoparmelia coloradoensis.</td>
</tr>
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</table>
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.
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