

Alberta Biodiversity
Monitoring Institute

www.abmi.ca

ABMI Species Pyramid: Guild Definitions and Species Lists

Version 2009-12-22

December 2009



Acknowledgements

The present document was created by Gillian Holloway and Jim Herbers. Technical input was provided by Erin Bayne, Jim Schieck, Scott Nielsen, Diane Haughland, and Dave Huggard.

Disclaimer

These standards and protocols were developed and released by the ABMI. The material in this publication does not imply the expression of any opinion whatsoever on the part of any individual or organization other than the ABMI. Moreover, the methods described in this publication do not necessarily reflect the views or opinions of the individual scientists participating in methodological development or review. Errors, omissions, or inconsistencies in this publication are the sole responsibility of ABMI.

The ABMI assumes no liability in connection with the information products or services made available by the Institute. While every effort is made to ensure the information contained in these products and services is correct, the ABMI disclaims any liability in negligence or otherwise for any loss or damage which may occur as a result of reliance on any of this material. All information products and services are subject to change by the ABMI without notice.

Suggested Citation: Alberta Biodiversity Monitoring Institute. 2009. Version 2009-12-22. Alberta Biodiversity Monitoring Institute, Alberta, Canada. Report available at: abmi.ca [Date Cited].

Use of this Material: This publication may be reproduced in whole or in part and in any form for educational, data collection or non-profit purposes without special permission from the ABMI, provided acknowledgement of the source is made. No use of this publication may be made for resale without prior permission in writing from the ABMI.

Contact Information

If you have questions or concerns about this publication, you can contact:

ABMI Information Centre
CW-405 Biological Sciences Centre
University of Alberta
Edmonton, Alberta, Canada, T6G 2E9
Phone: (780) 492-5766
E-mail: abmiinfo@ualberta.ca
Web: www.abmi.ca

Table of Contents

1. Background on ABMI	1
1.1 Information Pyramids	1
1.2. Information Pyramid Principles	2
1.3 Species Pyramid Framework	3
2 General Overview of the ABMI Species Pyramid	4
2.1 Identifying Species Indicator Groups	4
2.2 Guild Development	4
3. Species Pyramid	4
3.1 Level 6	4
3.2 Level 5	5
3.2.1 Taxonomic Groups Examined using Terrestrial Protocols	5
3.2.2 Taxonomic Groups Examined using Aquatic Protocols.....	5
3.3 Level 4	5
3.3.1 Broad Guilds — Vertebrates & Lichens.....	6
3.3.2 Broad Guilds — Vascular Plants	6
3.3.3 Broad Guilds — Bryophytes	7
3.4 Level 3	8
3.4.1 Mammals (Mammalia).....	8
3.4.2 Birds (Aves).....	9
3.4.2 Herptiles (Amphibia & Reptilia)	10
3.4.3 Vascular Plants (Magnoliopsida, Liliopsida, Pinopsida, Filicopsida, Equisetopsida, and Lycopodiopsida).....	10
3.4.4 Lichens (Ascomycetes).....	11
3.4.5 Bryophytes (Bryopsida & Hepatopsida).....	13
3.5 Level 2	14
3.6 Level 1	14
Literature Cited	14
Appendix 1a — Mammal Guild Membership (Level 4)	15
Appendix 1b — Mammals Guild Membership (Level 3)	16
Appendix 2a — Bird Guild Membership (Level 4)	18
Appendix 2b — Birds Guild Membership (Level 3)	20
Appendix 3a — Herptile Guild Membership (Levels 3 & 4)	26
Appendix 4a — Vascular Plant Guild Membership (Level 4)	27
Appendix 4b — Vascular Plant Guild Membership (Level 3)	33
Appendix 5a — Lichen Guild Membership (Level 4)	56
Appendix 5b — Lichen Guild Membership (Level 3)	58
Appendix 6a — Bryophytes Guild Membership (Level 4)	64
Appendix 6b — Bryophytes Guild Membership (Level 3)	66
Appendix 7— Resources Used To Develop ABMI Guilds	70
Appendix 8 — Taxonomic Breadth in the ABMI	75

1. Background on ABMI

The Alberta Biodiversity Monitoring Institute (ABMI) was initiated in 1997 through a broad partnership of industry, government and academia. ABMI is tasked with providing an effective way to track status and change to biodiversity at regional and provincial scales, and provide relevant and objective information to policy makers, scientists and the general public.

The institute collects information on thousands of terrestrial and aquatic species (mammals, birds, fish, invertebrates, vascular plants, lichens, moss, and fungi) and habitat structures at 1656 sites spaced systematically on a 20-kilometre grid across the entire province. Each of the 1656 sites is sampled once every 5 years using a set of scientifically reviewed protocols. This standardized data collection is designed to reduce duplication and increase cost efficiency for provincial and regional monitoring commitments, and provide a more complete understanding of cumulative impacts on the environment from multiple industries and human activities.

One of the main goals of the institute is to provide scientifically valid indices of biodiversity intactness for regions within the province and for the entire province of Alberta. These indices identify how the state of biodiversity (defined as individual species and species groups) has changed in comparison to a pre-determined reference condition. All ABMI data (raw species data plus summarized indices) will be freely available to everyone through the institutes' website.

This document will focus on the detailing the species groups (guilds) which ABMI uses to aggregate together data on the status of individual species. At present we present the guild definition and species lists for mammals, birds, herptiles, vascular plants and lichens. As work progresses, we will add additional taxa to this document (including moss, fungi, aquatic invertebrates, springtails, and mites). A companion document (ABMI 2008) details the statistical methods for development intactness indices for individual species.

1.1 Information Pyramids

Monitoring biodiversity results in information for thousands of species (Boyd and Murray 2001). This wealth of information leads to difficulty in communicating with public, resource managers, and policy makers (Cash et al. 2002). To improve management it is necessary to develop integrated measures of biodiversity. Overton et al. (2002) proposed Information Pyramids as a framework for aggregating and simplifying ecological knowledge (Fig 1). In this system, information is integrated into fewer and fewer groups as one moves up the pyramid. Each level of the pyramid is expected to be relevant to different stakeholders. For example, scientists might be interested in Level 2 to understand species population trends, while resource managers might be interested in the status of sensitive guilds (i.e. cavity nesters).

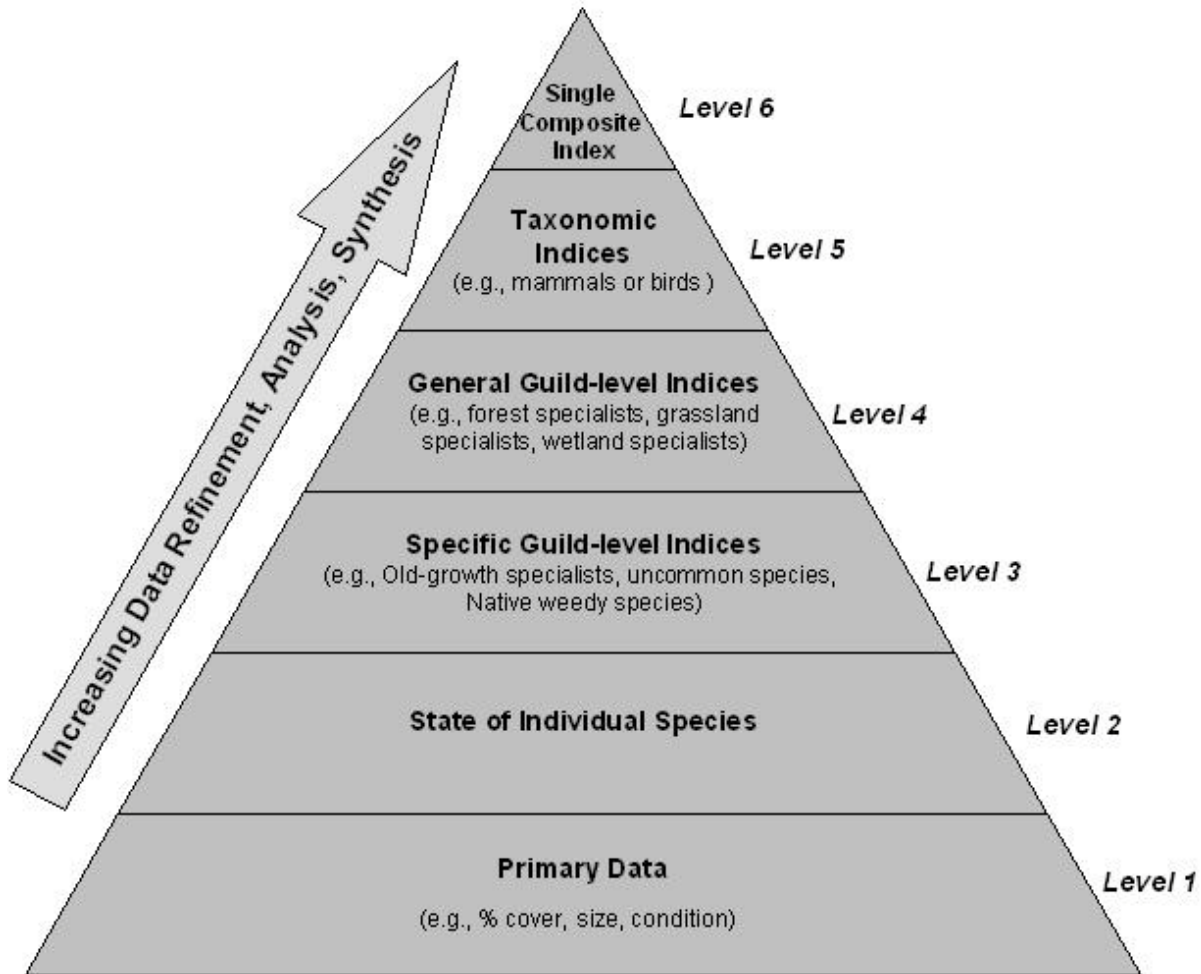


Figure 1. Alberta Biodiversity Monitoring Institute’s pyramid schematic for integrating biodiversity indices. Indices can be calculated for any of the levels except primary data (Level1).

Using Information Pyramids as a conceptual framework, ABMI has developed an innovative multimetric approach for aggregating and communicating ecological data (Fig 1). Pyramids have high intuitive appeal to both ecologists and decision-makers because they make it easy to communicate and understand the type of data being evaluated, how it is organized, and how it is being combined. Pyramids demonstrate a bottom up design, where the upper levels of the pyramid are based on lower levels, and their application is not tied to a particular spatial scale or level of biological organization.

1.2. Information Pyramid Principles

Overton et al. (2002) originally outlined four central principals to guide the aggregation and disaggregation of knowledge using Information Pyramids:

1. higher levels of information are entirely derived from an underlying foundation of primary data,

2. the processes of generalization and integration upward, and disaggregation downward must be scientifically rigorous and assumptions explicit (i.e., there should be complete access to the statistical methods, the data, and the assumptions that were used to conduct the aggregation),
3. information tools that are developed for different purposes often share common data and data aggregation methodologies, and
4. communication tools arising from Information Pyramids will benefit from the simultaneous development of all levels in the pyramid.

To these we add:

5. data used in information pyramids must be scientifically sound,
6. communication tools arising from Information Pyramids must be easily interpretable and meet the specific needs of decision makers,
7. aggregation methods must be robust to minor inconsistencies in data quality and quantity, and
8. communication tools arising from Information Pyramids should provide causal or correlative insight between change in biodiversity and environmental stressors; Decision-makers depend on causal or correlative relationships for making informed decisions.

1.3 Species Pyramid Framework

The Species Pyramid described in this report contains 6 levels. The upper levels (3–6) are designed to communicate the state of species groups to politicians, policy makers, managers, and the public. The lower levels (1 & 2) are expected to be of interest primarily to scientists and ENGO's for conducting original analysis, or for evaluating species-level trends. The top level of the pyramid (level 6) is a composite index of many taxonomic groups which follow the same pyramid framework. The six levels are described below:

Level 1: contains raw data (e.g., number, size, condition, or location) and forms the foundation for all subsequent data analyses in the species.

Level 2: describes the state of individual species or their reporting equivalent (e.g., subspecies or genera). Level 2 aggregates information from Level 1 into a single metric (*SI*) describing the state of a species. Species indices developed in level 2 form the building-blocks for indices in levels 3, 4, and 5. See ABMI 2008 for details and statistical methods used for determining species intactness indices.

Level 3: describes the state of a group of species that share a common characteristic (e.g., habitat, behavioural, or life-history). At level 3 in the pyramid, species can reside in none, one, or more than one guild.

Level 4: describes the state of a group of species that share a common habitat type (e.g., forests, grasslands, rivers, or wetlands). Guilds in this level also include “habitat generalists” (species common to two or more habitat types) and “non-native species”. Level 4 draws directly from level 2 indices. At level 4 in the pyramid, species can only reside in a single guild.

Level 5: describes the state of a species from a particular taxa (e.g., Division, Class, Order, or Family). Level 5 of the pyramid draws directly from indices developed in level 2.

Level 6: this is a single index that describes the state of many species from more than one taxonomic group. Level 6 aggregates indices developed in level 5 (i.e. combining composite index for the state of all bird, mammals, mosses, lichens, vascular plants, and fungi). We use the average state of level 5 indices rather than taking the average of all species indices in level 2 to ensure that particularly species-rich taxonomic categories do not disproportionately influence level 6 indices.

2. General Overview of the ABMI Species Pyramid

2.1 Identifying Species Indicator Groups

At level 5 of the Species Pyramid, taxonomic groups form the basis for presenting information. Here we follow common taxonomic classification schemes such as those available through NatureServe, the Integrated Taxonomic Information System, and the United States Department of Agriculture Plants Database.

“Guilds” form the basis for presenting information at levels 4 and 3 in the Species Pyramid. As used here, species guilds have a broader definition than originally outlined by Root (1967). We use the term to describe any species group that has relevance to sustainable resource decision-making. For example, species guilds need not be confined to groups of species that exploit environmental resources in a similar way or that have similar foraging strategies. Species guilds can also be built for endemic or non-native species, species commonly exploited by humans, or rare species. The critical criteria for establishing a guild are that they follow the 8 principles that guide data aggregation in Information Pyramids (above).

Objective methods for determining guild membership are uncommon and inconsistent. Where practical in the ABMI, we use of objective methods to establish guild membership. In the absence of objective methods, the process of establishing guild membership remains transparent, repeatable and defensible.

2.2 Guild Development

The ABMI seeks to continually improve the methodology used to assign species to guilds. To indicate the status of guild development, we have created 4 categories:

Status 1 — Preliminary guild categories have been identified and are awaiting species assignments.

Status 2 — Species have been assigned to guilds. The process of assigning species to guilds is largely based on the review of field guide books, reference guides, primary literature, and floras.

Status 3 — The assignment of species to guilds has been independently reviewed by third-party experts.

Status 4 — Guilds have been verified using quantitative analyses.

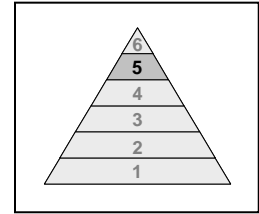
3. Species Pyramid

3.1 Level 6

Level 6 of the Terrestrial Species Pyramid is composite indicator of 2 or more of the 16 major taxonomic groups identified in Level 5. Level 6 Indices are calculated directly from Level 5 and each taxonomic group has equal weighting.

3.2 Level 5

Level 5 of the ABMI's Species Pyramid is designed to communicate the state of species that share a common taxonomic relationship. The ability to assess the state of any particular taxonomic group depends on the availability of species-level information. The ABMI will report on the status of any taxonomic level of organization that contains 5 or more species.



The major taxonomic groups examined are listed below with the senior uniting taxonomic level of organization shown in brackets. Where the most senior level of organization supersedes Class, appropriate ABMI Classes are also identified.

3.2.1 Taxonomic Groups Examined using Terrestrial Protocols

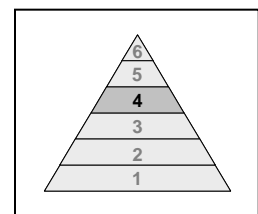
1. Mammals (Infraclass — Eutheria)
2. Birds (Class — Aves)
3. Vascular Plants (Subkingdom — Tracheobionta; Classes — Pinopsida, Magnoliopsida, Liliopsida, Equisetopsida, Filicopsida, and Lycopodiopsida)
4. Lichens (Class — Ascomycetes)
5. Bryophytes (Division — Bryophyta; Classes — Bryopsida, Sphagnopsida, Hepatopsida)
6. Polyporous Fungi (Class — Basidiomycetes)
7. Springtails (Order — Collembola)
8. Mites (Subclass — Acarina)

3.2.2 Taxonomic Groups Examined using Aquatic Protocols

9. Birds (Class — Aves)
10. Fish (Class — Osteichthyes)
11. Vascular Plants (Subkingdom — Tracheobionta; Classes — Pinopsida, Magnoliopsida, Liliopsida, Equisetopsida, Filicopsida, and Lycopodiopsida)
12. Benthic Macroinvertebrates (Classes — Insecta, Arachnida, Branchiopoda, Maxillopoda, and Ostracoda)
13. Diatoms (Classes — Bacillariophyceae, Coscinodiscophyceae, and Fragilariophyceae)
14. Water Column Macroinvertebrates (Classes — Insecta, Arachnida, Malacostraca, Maxillopoda, Gastropoda, Ostracoda, and Branchiopoda)
15. Phytoplankton (Classes — Cyanophyceae, Chlorophyceae, Cryptophyceae).
16. Zooplankton (Classes — Eurotatoria, Maxillopoda, Branchiopoda)

3.3 Level 4

Level 4 of the ABMI's species pyramid is designed to communicate the state of species that share an association with a major habitat type in Alberta. Each of the ABMI's 16 taxonomic groups (see **5.2 Level 5**) is divided into broad habitat guilds (Broad Guilds). Taxonomic groups monitored using terrestrial protocols are divided into 7-10 Broad Guilds. Within a taxonomic group, species can only be included in one of the Broad Guilds but do not need to be included in any of the guilds. With the exception of the Non-native Species guild, all Level 4 guilds are composed of native species only. At present we present the guild definitions and species lists only for mammals, birds, herptiles, vascular plants, bryophytes and lichens, but more groups for Level 5 above will be added as



work progresses. Seven guilds are tracked for vertebrates and lichens, 8 for bryophytes, and 10 for vascular plants.

3.3.1 Broad Guilds — Vertebrates & Lichens

1. **Forest Species** — species that depend on forests for living/reproduction and have higher densities in forest than in other vegetation types. For the species list for [Mammals](#), [Birds](#), [Herptiles](#), and [Lichens](#) follow the hyperlinks.
2. **Grassland/Meadow Species** — species that depend on non-alpine upland terrestrial habitat dominated by vegetation <1 m in height for living/reproduction during the breeding season and have higher densities in “grassland” than in other vegetation types. For the species list for [Mammals](#), [Birds](#), [Herptiles](#), and [Lichens](#) follow the hyperlinks.
3. **Alpine Species** — species that depend on alpine habitat (as defined by Beckingham and Archibald 1996) for living/reproduction during the breeding season and have higher densities in alpine than in other vegetation types. For the species list for [Mammals](#), [Birds](#), [Herptiles](#), and [Lichens](#) follow the hyperlinks.
4. **Peatland Species** — species that depend on peatland bogs and fens (as defined by Beckingham and Archibald 1996) for living/reproduction during the breeding season and have higher densities in peatlands than in other habitat types. For the species list for [Mammals](#), [Birds](#), [Herptiles](#), and [Lichens](#) follow the hyperlinks.
5. **Wetland/Aquatic Species** — species that depend on wetlands (defined marshes, ponds, and sloughs — Beckingham and Archibald 1996) for living/reproduction during the breeding season and have higher densities in wetlands than in other habitat types. For the species list for [Mammals](#), [Birds](#), [Herptiles](#), and [Lichens](#) follow the hyperlinks.
6. **Terrestrial Habitat Generalist Species** — species that do not have a clear habitat type with maximum density during the breeding season, and that have relatively high density in at least 2 of the previous 4 habitat categories. For the species list for [Mammals](#), [Birds](#), [Herptiles](#), and [Lichens](#) follow the hyperlinks
7. **Non-Native Species** — species that did not live/breed in the natural region prior to European settlement (Codes: 0=species native to the natural region, 1=species not native to North America prior to European settlement, and 9=species not native to Alberta but native to North America prior to European settlement (e.g., the Eastern gray squirrel)). For the species list for [Mammals](#), [Birds](#), [Herptiles](#), and [Lichens](#) follow the hyperlinks

3.3.2 Broad Guilds — Vascular Plants

1. **Forest Species[†]** — species that depend on forests for living/reproduction and have higher densities in forest than in other vegetation types. For the species list for [Vascular Plants](#) follow the hyperlinks.
2. **Grassland/Meadow Species** — species that depend on non-alpine upland terrestrial habitat dominated by vegetation <1 m in height for living/reproduction during the breeding season and have higher densities in “grassland” than in other vegetation types. For the species list for [Vascular Plants](#) follow the hyperlinks
3. **Alpine Species** — species that depend on alpine habitat (as defined by Beckingham and Archibald 1996) for living/reproduction during the breeding season and have higher densities in alpine than in other vegetation types. For the species list for [Vascular Plants](#) follow the hyperlinks.
4. **Peatland Species** — species that depend on peatland bogs and fens (as defined by Beckingham and Archibald 1996) for living/reproduction during the breeding season and have higher densities

in peatlands than in other habitat types. For the species list for [Vascular Plants](#) follow the hyperlinks.

5. **Wetland species** — species that depend on wetlands (fen, marshes; base rich with higher nutrients) for living/reproduction during the breeding season and have higher densities in wetland than in other habitat types. For the species list for [Vascular Plants](#) follow the hyperlinks.
6. **Aquatic Species** — species that depend on wetlands/lakes and grow in standing water (anaerobic conditions) for living/reproduction during the breeding season and have higher densities in aquatic habitats than in other habitat types. For the species list for [Vascular Plants](#) follow the hyperlinks.
7. **Wet Habitat Generalist Species** — species that do not have a clear habitat type with maximum density during the breeding season, and that have relatively high density in at least 2 of the previous 4 habitat categories, and prefer wet-moist soil. For the species list for [Vascular Plants](#) follow the hyperlinks.
8. **Dry Habitat Generalist Species** — species that do not have a clear habitat type with maximum density during the breeding season, and that have relatively high density in at least 2 of the previous 4 habitat categories, and prefer dry-moist soil. For the species list for [Vascular Plants](#) follow the hyperlinks.
9. **Non-Native Species** — species that did not live/breed in the natural region prior to European settlement (Codes: 0=species native to the natural region, 1=species not native to North America prior to European settlement, and 9=species not native to Alberta but native to North America prior to European settlement (e.g., the Eastern gray squirrel)). For the species list for [Vascular Plants](#) follow the hyperlinks.

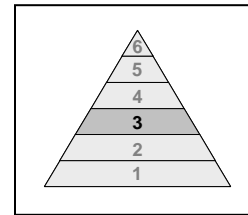
3.3.3 Broad Guilds — Bryophytes

1. **Forest Species** — species that depend on forests for living/reproduction and have higher densities in forest than in other vegetation types. For the species list for [Bryophytes](#) follow the hyperlinks.
2. **Grassland/Meadow Species** — species that depend on non-alpine upland terrestrial habitat dominated by vegetation <1 m in height for living/reproduction and have higher densities in “grassland” than in other vegetation types. For the species list for [Bryophytes](#) follow the hyperlinks
3. **Alpine/Arctic Species** — species that depend on alpine habitat (as defined by Beckingham and Archibald 1996) or arctic habitats for living/reproduction and have higher densities in the alpine/arctic than in other vegetation types. For the species list for [Bryophytes](#) follow the hyperlinks.
4. **Peat-forming Wetland Species** — species of peat forming wetlands that depend on bogs (low nutrients, pH < 5) and fens (groundwater rich in mineral elements, pH >7) for living/reproduction and have higher densities in peat-forming wetland than in other habitat types. For the species list for [Bryophytes](#) follow the hyperlinks.
5. **Non-peat Forming Wetland Species** - Species of non-peat forming wetlands that depend on shallow open water, marsh, and swamps for living/reproduction and have higher densities in peat-forming wetland than in other habitat types. For the species list for [Bryophytes](#) follow the hyperlinks.
6. **Aquatic/Riparian/Littoral Species**— species that grow in standing water (lakes) or flowing water (rivers) and their immediate margins/shorelines for living/reproduction and have higher densities in aquatic habitats than in other habitat types. For the species list for [Bryophytes](#) follow the hyperlinks.

7. **Habitat Generalist Species** — species that do not have a clear habitat type with maximum density during the breeding season, and that have relatively high density in at least 2 of the previous 4 habitat categories. For the species list for [Bryophytes](#) follow the hyperlinks.
8. **Non-Native Species** — species that did not live/breed in the natural region prior to European settlement (Codes: 0=species native to the natural region, 1=species not native to North America prior to European settlement, and 9=species not native to Alberta but native to North America prior to European settlement (e.g., the Eastern gray squirrel)). For the species list for [Bryophytes](#) follow the hyperlinks.

3.4 Level 3

Level 3 describes the state of a group of species that share a characteristic (e.g., habitat, behavioural, or life-history). At this can reside in none, one, or more than one guild. Guilds in level 3 species and are restricted to the aggregation species from a single category (e.g., within vascular plants or within fish).



common level, species contain >5 taxonomic

Level 3 guilds used by the ABMI were determined based on their relevance to decision-makers and clearly do not include all possible guilds. Many are habitat based while some are based on other common characteristics such as life-history or their management concern. Species can be included in as many of the guilds as they belong to, but do not necessarily need to be included in any of the guilds. Species in habitat based guilds will only be included if they require the habitat for living/reproduction (i.e., simply using the habitat is not sufficient, they must require it).

Native and non-native species are included in the guilds but, within the ABMI's online information service, users will be asked whether they wish to analyze only native, or all species.

3.4.1 Mammals (Mammalia)

ABMI Guild Development Status: 3

Level 3 Mammal Guilds

1. **Old-growth Forest**: Species requiring old-growth forests — defined as species that depend on forests > 80 years old for living/reproduction during the breeding season and have higher densities in old forest than in other vegetation type.
2. **Early Seral**: Forest Species requiring early seral forests — defined as species that depend on forests (areas with trees) <20 years old for living/reproduction during the breeding season and have higher densities in young forest than in other vegetation types.
3. **Forest Edge**: Specialists Forest edge species — defined as species that depend on the interface between forest and open habitat (where open habitat is terrestrial habitat such as agricultural and natural clearings and includes bogs and fens) during the breeding season, and have higher densities at forest edge than in other vegetation types.
4. **Uncommon Species**: Species of Concern in Alberta — defined as Extirpated, At Risk, May be at Risk, or Sensitive, by Alberta Sustainable Resource Development.
5. **High Responsibility**: Species for which Alberta has a high global responsibility — defined as species that had more than 10% of their breeding range in Alberta prior to European settlement.

6. **Human Modified Habitat:** Species associated with human modified habitats — defined as species that have higher densities in human modified habitats during the breeding season than in natural vegetation types.
7. **Riparian:** Riparian Specialists — defined as species that depend on riparian areas (terrestrial/aquatic edges of streams, rivers, marshes, bogs, ponds, and lakes) for living/foraging during the breeding season, and have higher densities in riparian areas than in other habitats.
8. **Cavity Nesting:** Cavity nesting species — defined as species that nest in tree cavities.
9. **Habitat Engineers:** — defined as species that create unique habitats structures (eg., cavities, burrows, kill trees, etc) that other species use. The modified habitat/structure must be used by many other taxa and be present for many years after it has been created.
10. **Irruptive Species:** Irruptive (cyclic) Species — defined as species that regularly fluctuate in density among years by more than 3-fold.
11. **Carnivorous Species:** Carnivores — defined as species that eat mainly vertebrates (includes picivores, carnivorous mammals, and birds of prey).
12. **Game Species:** — defined as species that are hunted, trapped, or fished for food or economic gain by humans.

5.4.2 Birds (Aves)

ABMI Guild Development Status: 3

Only species that live and breed in Alberta were included in these bird guilds. Thus, the guilds do not include species that are “Accidental/Vagrant” in the Alberta Rankings, or that were “SubSpecies”, or that simply migrated through Alberta.

Level 3 Bird Guilds

1. **Old-growth Forests***
2. **Forest Burns:** Species requiring regenerating forest burns — defined as species that depend on burned forest for living/reproduction during the breeding season and have higher densities in burned forest than in other vegetation types.
3. **Early Seral Forest***
4. **Interior Forest:** Interior forest species — defined as species that depend on large patches of forests for living/reproduction during the breeding season and have higher densities in the center of large forest patches than in other vegetation types, including the edge of forests
5. **Forest Edge Specialists**†
6. **Uncommon Species***
7. **High Responsibility***
8. **Human Modified Habitat***
9. **Riparian***
10. **Cavity Nesting***
11. **Habitat Engineers***
12. **Irruptive Species***
13. **Carnivorous Species***
14. **Game Species***
15. **Winter Residents:** — defined as birds that remain in Alberta during the winter, including species that remain in Alberta but that migrate from their breeding areas or those that may be nomadic in

* See 5.4.1 Mammal Guild for a definition

† See 5.4.1 Mammal Guild for a definition

the winter. Species that migrate from the Arctic to Alberta for the winter were included in this category.

16. **Neotropical Species:** — defined as birds that have >70% of their winter range in the neotropics (South America, Central America, Mexico, and the Caribbean).
17. **Short Distance Migrants:** — defined as birds that migrate to southern Canada, coastal Canada, or the USA for the winter.
18. **Cliff Species:** — species that depend on cliffs (rocky or mineral soil) or rocky outcrops (often along water courses) for living/reproduction during the breeding season and have higher densities on “cliffs” than in other habitat types.

5.4.2 Herptiles (Amphibia & Reptilia)

ABMI Guild Development Status: 2

Level 3 Herptiles Guilds

19. **Uncommon Species***
20. **High Responsibility***
21. **Riparian***
22. **Carnivorous Species***

5.4.3 Vascular Plants (Magnoliopsida, Liliopsida, Pinopsida, Filicopsida, Equisetopsida, and Lycopodiopsida)

ABMI Guild Development Status: 3

Level 3 Vascular Plant Guilds

1. **Old-growth Forest***
2. **Forest Burns***
3. **Early Seral***
4. **High Responsibility***
5. **Human Modified Habitat***
6. **Native Weedy Species:** — Species that are native to North America (and possibly Alberta) and considered noxious, invasive, or weedy in Alberta’s natural regions.
7. **Riparian***
8. **Form**— categories either [forbs](#), [ferns](#), [graminoid](#), [horsetails](#), [shrubs](#), or [trees](#).
9. **Nitrogen Fixers:** species that have mutualistic associations with nitrogen fixing bacteria in their roots or root nodules.
10. **Edible fruit producers:** species that produce fruits or seeds that generally are edible to both humans and animals.
11. **Fruit type** — categories either [achene](#), [berry](#), [capsule](#), [caryopsis](#), [cone](#), [drupe](#), [follicle](#), [nutlet](#), [pod](#), [schizocarp](#), or [utricle](#)
12. **Heterotrophs:** species that are saprophytes, parasites, or carnivores — plants that use means other than photosynthesis to subsist, either partially or completely.
13. **Nectar Producers:** Plants that were noted as important nectar-producing species for insects and/or birds by guidebooks.

* See 5.4.1 Mammal Guild for a definition

14. **Annuals/Biennials**: Species where individual plants live one or two years, completing their entire life cycle within that period
15. **Culturally Important — Construction & Crafts**: Plant species which were culturally important for native people for crafts, weaving and construction (i.e. shelters and canoes).
16. **Culturally Important — Food**: Plant species which were culturally important for native people for food
17. **Culturally Important — Medicine**: Plant species which were culturally important by native people as medicines and digestive aids.
18. Aquatic Forms: categories of aquatic growth form (aquatic plants only) **emergent**, **floating**, **submergent**.

5.4.4 Lichens (Ascomycetes)

ABMI Guild Development Status: 3

1. **Leaf Lichens**: Defined here as macrolichens (= chlorolichens) consisting of flattened, leaf-like lobes *and* containing a bright-green algal photopartner. Under a hand lens, the algal partner can be seen forming a thin green layer above the white inner portions of the lichen (= the medulla). Examples of leaf lichens include *Cetraria*, *Melanelia*, *Parmelia* and *Tuckermannopsis*.
2. **Gel Lichens**: Defined as macrolichens (= cyanolichens) consisting of flattened, leaf-like lobes *and* containing a dark greyish cyanobacterium as photopartner. Gel Lichens lack the white medulla of Leaf Lichens (above) and Felt Lichens (below), hence are uniformly dark throughout, as easily seen under a hand lens. When wet, most Gel Lichens are semi-translucent.
3. **Felt Lichens**: Defined here as macrolichens (= cyanolichens) consisting of flattened, leaf-like lobes *and* containing a dark greyish cyanobacterium as photopartner. Under a hand lens, the cyanobacterium forms a thin dark layer above the white inner portions of the lichen (= the medulla). Examples of Felt Lichen include *Nephroma*, *Peltigera*, *Solorina*. Some Felt Lichens have a green alga as *primary* photopartner, the cyanobacterium being confined to tiny gall-like outgrowths (= cephalodia). In all such cases, the lichen is easily recognized as a Felt Lichen by the presence of a thin nap of felt-like hairs located either over the lower surface (hand lens).
4. **Club or Shrub Lichens**: Defined as macrolichens with more or less cylindrical stems or branches. The stems are unbranched in the case of Club Lichens (*Baeomyces*, some *Cladonias*, *Thamnolia*, etc.), whereas Shrub Lichens (*Cladina*, some *Cladonias*, *Coelocaulon*, *Evernia*, etc.) have much-branched stems.
5. **Hair Lichens**: Defined as macrolichens with long slender branches of a hairlike appearance, e.g., *Alectoria*, *Bryoria*, *Ramalina (thrausta)*, *Usnea*.
6. **Old-growth Forest***
7. **Forest Burns** (Includes only certain ground-dwelling lichens).
8. **Young Forest**: Lichens requiring early seral forests — defined as species that depend on forested habitats < 20–30 years old, or that have higher densities in young forests than in other vegetation types. Among the macrolichens, or certain ground-dwelling species belong here.
9. **Rocky Outcrop/Talus Specialist**: : Ground-dwelling lichens requiring rocky outcrops — defined as species that depend on rocky substrates (including rock crevices) for living/reproduction, or at any rate that achieve higher densities in such habitats than in other habitat types.

* See 5.4.1 Mammal Guild for a definition

10. **Conifer/Birch Specialist**: Acid-demanding epiphytic lichens are usually restricted at boreal and subboreal latitudes to the bark or wood of standing conifers. Birch also generally has acidic bark (< pH 4–5), and so belongs here.
11. **Nutrient-enriched Conifers or Birches**: Nutrient-demanding lichens in northern forests are often restricted to the branches of trees subject to localized nutrient enrichment. Common nutrient sources include uptake of calcium from old lake sediments, exposure to calcareous dust, or dripzone leachates from nearby deciduous trees (see below). To qualify as nutrient-enriched, bark pH should be above 5–6.
12. **Deciduous Trees and Shrubs (except Birches)**: Deciduous trees and shrubs provide critical habitat for certain nutrient-demanding lichens. In some situations, leachates from deciduous trees can enrich the lower branches of conifers, thereby facilitating the establishment of lichens otherwise not likely to occur in a particular region.
13. **Stumps, Logs, or Tip-up Mounds**: In boreal ecosystems subject to deep winter snow, decaying wood elevates snow-sensitive lichens above the zone of maximal burial by the winter snowpack. Such woody structures are particularly important for lichens dependent exclusively or predominantly on decaying wood.
14. **Human-modified*** (Note that forest cutting is handled under Early Seral above)
15. **On Limestone or other Calcium-rich Rock**: Limestones and other rocks containing calcium carbonate support a small but essentially exclusive array of macrolichens including *Collema*, *Physcia*, *Physconia*, and *Xanthoria*. Applying a drop of hydrochloric acid (HCl) to such rocks causes them to fizz.
16. **On Granites or other Silica-rich Rock**: Acid rock supports a wide range of macrolichens, contributing significantly to total macrolichen diversity in some regions. Common genera include *Melanelia*, *Stereocaulon*, *Umbilicaria* and *Xanthoparmelia*. Siliceous rocks do not fizz with hydrochloric acid.
17. **On Calcium-rich Soil**: Most common on soil with a pH above about 6–7.
18. **On Acid Soil**: Most common on soil or humus with a pH below about 4–5.
19. **VIP wildlife**: Defined as lichens used by wildlife for food, shelter, nesting material, etc.
20. **Culturally Important**: Refers to lichens that have been used by humans either in the past or down to present time.
21. **Uncommon Species***
22. **High Responsibility***
23. **Wetland Forest Lichens**: Lichens requiring wetland forests — defined as species that depend on forests either containing small wetland patches or adjacent to wetlands. (Note: wetlands increase ambient air humidity in their vicinity, hence promote nighttime mist and dew, both of which in turn favour colonization by certain lichens).
24. **Riverine Forest Lichens**: Lichens dependent on certain chemical and microclimatic attributes of streamside localities — defined as species that depend on or are most abundant in forests in the immediate vicinity of fast-moving water.
25. **Dispersal Limited**: Refers primarily to lichens with poor powers of dispersal owing to reliance on large diaspores, but also includes certain species that establish with difficulty in Alberta, owing, e.g., to lack of suitable habitat or climatic conditions.
26. **Vulnerable to Snow Cover**: Included here are ground-dwelling lichens unable to establish or persist in localities subject to continuous deep snow cover (> 30 cm) for more than a few weeks each year.

* See 5.4.1 Mammal Guild for a definition

27. **Vulnerable to Trampling**: Refers primarily to soil-dwelling lichens of limited occurrence in Alberta.
28. **Vulnerable to Industrial Air Pollution**: Included here are lichens intolerant of exposure to sulphur oxides or other gaseous byproducts of industrial processing, e.g., oil refineries.
29. **Vulnerable to Agricultural Air Pollution**: Belonging here are lichens vulnerable to changes in atmospheric chemistry as a result of aerosols from agricultural activities, e.g., certain pesticides, ammonia from feedlots.

5.4.5 Bryophytes (Bryopsida & Hepatopsida)

ABMI Guild Development Status: 3

1. **Old-growth Forest***
2. **Forest Burns***
3. **Young Forest***
4. **Uncommon Species***
5. **High Responsibility***
6. **Human-modified***
7. **Stumps, Logs, or Tip-up Mounds**[†]
8. **Prolonged Drought Sensitive**: Species which are not adapted to survive prolonged drought conditions.
9. **Epiphytic**: Epiphytic or bark growing bryophytes (on trees alone), not including tree bases, that have higher frequency on these substrates than on other substrates types.
10. **Grows on Tree Bases**: Bryophytes growing on tree bases for living/reproduction and that have higher frequency on these substrates than on other substrates types.
11. **Low productivity Specialists**: Species that predominant low productivity areas (low nutrients) for living/reproduction and that have higher frequency in these habitats than in other habitat types
12. **Terrestrial Riparian/Littoral Habitat**: Species that dominant riparian/littoral areas (terrestrial/aquatic edges of streams, rivers, marshes, bogs, ponds, and lakes) for living/reproduction, and that have higher frequency in riparian areas than in other vegetation types (i.e., within 10m of flowing or standing water).
13. **Calcium Rich/Base Substrates**: Species requiring calcium rich substrates (soil and rocks) – defined as species that depend on calcium rich, alkaline substrates (pH ≥ 7.5) for living/reproduction and that have higher frequency on these substrates than on other substrates types.
14. **Acid/Granitic Substrates**: Species requiring acidic soils and rocks – defined as species that depend on acid soils/rocks (pH ≤ 7) for living/reproduction and that have higher frequency on these substrates than on other substrates types.
15. **Rich organic substrates**: Species requiring rich organic substrates (animal remains, dung, and feces) for living/reproduction and that have higher frequency on these substrates than on other substrates types.
16. **Shade Intolerant**: Species that do not tolerate shade.

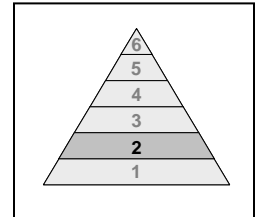
* See 5.4.1 Mammal Guild for a definition

[†] See 5.4.4 Lichen Guild for a definition

17. **Rocky Outcrops/Cliffs/Talus Slopes**: Species which grow predominantly on rocky outcrops, cliffs, or talus slopes – defined as species that depend on rocky substrates for living/reproduction and that have higher frequency in these habitats than in other habitat types.
18. **Sensitive to Pollution**: Bryophyte species which are intolerant of exposure to sulphur oxides or other gaseous byproducts of industrial processing (e.g., oil refineries) or to changes in atmospheric chemistry as a result of aerosols from agricultural activities (e.g. certain pesticides, ammonia from feedlots).

5.5 Level 2

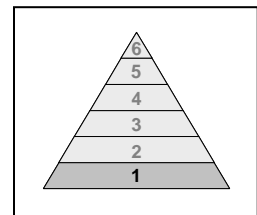
Level 2 is composed of indices that describe the state of individual species. An index value is calculated for every species that is detected at >10 sites within a natural region. See ABMI (2008) for a description of how species indices are calculated. Supporting data for Level 2 can be found in Level 1.



Level 2 indices form the foundation for index development in levels 3, 4, and 5. The relationship between indices in Level 2 and indices above is not strictly hierarchical as data from level 2 feeds directly into Levels 3, 4, and 5.

5.6 Level 1

Level 1 is made up of raw data and basic species metrics including: raw data in the form of spread sheets and range maps are provided for each species



Literature Cited

- Alberta Biodiversity Monitoring Institute. 2008. Manual for Estimating Biodiversity Intactness for Species (20029), Version 2008-12-23. Alberta Biodiversity Monitoring Institute, Alberta, Canada. Report available at: abmi.ca [January 15 2009].
- Beckingham, J.D., and J.H. Archibald. 1996. Field guide to the ecosites of northern Alberta. Can. For. Serv. North. For. Cent. Spec. Rep. 5.
- Overton, J. M., R. T. Theo Stephens, J. R. Leathwick, and A. Lehmann. 2002. Information pyramids for informed biodiversity conservation. *Biodiversity and Conservation* **11**:2093:2116.
- Root, R.B. 1967. The Niche Exploitation Pattern of the Blue-gray Gnatcatcher. *Ecological Monographs* **37**:317–350.

Appendix 1a — Mammal Guild Membership (Level 4)

Forest

Moose (*Alces alces*)
 Mule Deer (*Odocoileus hemionus*)
 Canada Lynx (*Lynx canadensis*)
 Cougar (*Felis concolor*)
 Fisher (*Martes pennanti*)
 Marten (*Martes americana*)
 Raccoon (*Procyon lotor*)
 Masked Shrew (*Sorex cinereus*)
 Pygmy Shrew (*Sorex hoyi*)
 Snowshoe Hare (*Lepus americanus*)
 Northern Flying Squirrel (*Glaucomys sabrinus*)
 Porcupine (*Erethizon dorsatum*)
 Red Squirrel (*Tamiasciurus hudsonicus*)
 Red-Tailed Chipmunk (*Tamias ruficaudus*)
 Southern Red-Backed Vole (*Clethrionomys gapperi*)
 Taiga (Yellow-cheeked) Vole (*Microtus xanthognathus*)
 Yellow-Pine Chipmunk (*Tamias amoenus*)

Grassland/Meadow

Pronghorn (*Antilocapra americana*)
 Badger (*Taxidea taxus*)
 Black-Footed Ferret (*Mustela nigripes*)
 Swift Fox (*Vulpes velox*)
 Prairie Shrew (*Sorex haydeni*)
 Nuttall's Cottontail (*Sylvilagus nuttallii*)
 White-tailed Jack Rabbit (*Lepus townsendii*)
 Meadow Vole (*Microtus pennsylvanicus*)
 Northern Grasshopper Mouse (*Onychomys leucogaster*)
 Northern Pocket Gopher (*Thomomys talpoides*)
 Olive-Backed Pocket Mouse (*Perognathus fasciatus*)
 Ord's Kangaroo Rat (*Dipodomys ordii*)

Prairie Vole (*Microtus ochrogaster*)
 Richardson's Ground Squirrel (*Spermophilus richardsonii*)
 Sagebrush Vole (*Lagurus curtatus*)
 Western Harvest Mouse (*Reithrodontomys megalotis*)
 White-Footed Mouse (*Peromyscus leucopus*)

Alpine

Mountain Goat (*Oreamnos americanus*)
 Pika (*Ochotona princeps*)
 Hoary Marmot (*Marmota caligata*)
 Water Vole (*Microtus richardsoni*)

Peatland

Caribou (*Rangifer tarandus*)
 Brown Lemming (*Lemmus sibiricus*)
 Northern Bog Lemming (*Synaptomys borealis*)

Aquatic/Wetland

Mink (*Mustela vison*)
 River Otter (*Lutra canadensis*)
 Wandering Shrew (*Sorex vagrans*)
 Water Shrew (*Sorex palustris*)
 Beaver (*Castor canadensis*)
 Meadow Jumping Mouse (*Zapus hudsonius*)
 Muskrat (*Ondatra zibethicus*)
 Western Jumping Mouse (*Zapus princeps*)

Habitat Generalist

American Bison (*Bos bison*)
 Bighorn Sheep (*Ovis canadensis*)
 Wapiti (*Cervus elaphus*)
 White-Tailed Deer (*Odocoileus virginianus*)
 Black Bear (*Ursus americanus*)
 Bobcat (*Lynx rufus*)
 Coyote (*Canis latrans*)

Ermine (*Mustela erminea*)
 Gray Wolf (*Canis lupus*)
 Grizzly Bear (*Ursus arctos*)
 Least Weasel (*Mustela nivalis*)
 Long-Tailed Weasel (*Mustela frenata*)
 Red Fox (*Vulpes vulpes*)
 Striped Skunk (*Mephitis mephitis*)
 Wolverine (*Gulo gulo*)
 Arctic Shrew (*Sorex arcticus*)
 Dusky Shrew (*Sorex monticolus*)
 Columbian Ground Squirrel (*Spermophilus columbianus*)
 Deer Mouse (*Peromyscus maniculatus*)
 Franklin's Ground Squirrel (*Spermophilus franklinii*)
 Golden-Mantled Ground Squirrel (*Spermophilus lateralis*)
 Heather Vole (*Phenacomys intermedius*)
 Least Chipmunk (*Tamias minimus*)
 Long-Tailed Vole (*Microtus longicaudus*)
 Thirteen-Lined Ground Squirrel (*Spermophilus tridecemlineatus*)
 Woodchuck (*Marmota monax*)

Non-Native

Domestic Cow (*Bos taurus*)
 Domestic Goat (*Capra hircus*)
 Domestic Sheep (*Ovis aries*)
 Wild Boar/Feral Hog (*Sus scrofa*)
 Domestic Cat (*Felis catus*)
 Domestic Dog (*Canis familiaris*)
 Feral Horse (*Equus caballus*)
 Black Rat (*Rattus rattus*)
 House Mouse (*Mus musculus*)
 Norway Rat (*Rattus norvegicus*)
 Domestic Cow (*Bos taurus*)
 Domestic Goat (*Capra hircus*)
 Domestic Sheep (*Ovis aries*)

Appendix 1b — Mammals Guild Membership (Level 3)

Old-growth Forest

Canada Lynx (*Lynx canadensis*)
 Fisher (*Martes pennanti*)
 Marten (*Martes americana*)
 Gray Squirrel (*Sciurus carolinensis*)
 Northern Flying Squirrel (*Glaucomys sabrinus*)
 Red Squirrel (*Tamiasciurus hudsonicus*)

Early Seral

Moose (*Alces alces*)
 Snowshoe Hare (*Lepus americanus*)
 Porcupine (*Erethizon dorsatum*)

Forest Edge

Caribou (*Rangifer tarandus*)
 Moose (*Alces alces*)
 Mule Deer (*Odocoileus hemionus*)
 Wapiti (*Cervus elaphus*)
 White-Tailed Deer (*Odocoileus virginianus*)
 Coyote (*Canis latrans*)
 Red Fox (*Vulpes vulpes*)
 Snowshoe Hare (*Lepus americanus*)
 Franklin's Ground Squirrel (*Spermophilus franklinii*)
 Golden-Mantled Ground Squirrel (*Spermophilus lateralis*)
 Meadow Jumping Mouse (*Zapus hudsonius*)
 Red-Tailed Chipmunk (*Tamias ruficaudus*)
 Thirteen-Lined Ground Squirrel (*Spermophilus tridecemlineatus*)
 Western Jumping Mouse (*Zapus princeps*)
 Yellow-Pine Chipmunk (*Tamias amoenus*)

Uncommon Species

American Bison (*Bos bison*)
 Caribou (*Rangifer tarandus*)
 Pronghorn (*Antilocapra americana*)

Badger (*Taxidea taxus*)
 Black-Footed Ferret (*Mustela nigripes*)
 Bobcat (*Lynx rufus*)
 Canada Lynx (*Lynx canadensis*)
 Cougar (*Felis concolor*)
 Fisher (*Martes pennanti*)
 Grizzly Bear (*Ursus arctos*)
 Long-Tailed Weasel (*Mustela frenata*)
 Swift Fox (*Vulpes velox*)
 Wolverine (*Gulo gulo*)
 Wandering Shrew (*Sorex vagrans*)
 Olive-Backed Pocket Mouse (*Perognathus fasciatus*)
 Ord's Kangaroo Rat (*Dipodomys ordii*)
 Red-Tailed Chipmunk (*Tamias ruficaudus*)
 Water Vole (*Microtus richardsoni*)

High Responsibility

American Bison (*Bos bison*)
 Mule Deer (*Odocoileus hemionus*)
 Arctic Shrew (*Sorex arcticus*)
 Dusky Shrew (*Sorex monticolus*)
 Wandering Shrew (*Sorex vagrans*)
 Columbian Ground Squirrel (*Spermophilus columbianus*)
 Golden-Mantled Ground Squirrel (*Spermophilus lateralis*)
 Heather Vole (*Phenacomys intermedius*)
 Least Chipmunk (*Tamias minimus*)
 Meadow Jumping Mouse (*Zapus hudsonius*)
 Northern Bog Lemming (*Synaptomys borealis*)
 Richardson's Ground Squirrel (*Spermophilus richardsonii*)
 Taiga (Yellow-Cheeked) Vole (*Microtus xanthognathus*)
 Water Vole (*Microtus richardsoni*)

Human Modified Habitat

Domestic Cow (*Bos taurus*)
 Domestic Goat (*Capra hircus*)
 Domestic Sheep (*Ovis aries*)
 Moose (*Alces alces*)
 White-Tailed Deer (*Odocoileus virginianus*)
 Wild Boar/Feral Hog (*Sus scrofa*)
 Black Bear (*Ursus americanus*)
 Bobcat (*Lynx rufus*)
 Coyote (*Canis latrans*)
 Domestic Cat (*Felis catus*)
 Domestic Dog (*Canis familiaris*)
 Raccoon (*Procyon lotor*)
 Striped Skunk (*Mephitis mephitis*)
 Black Rat (*Rattus rattus*)
 Franklin's Ground Squirrel (*Spermophilus franklinii*)
 Gray Squirrel (*Sciurus carolinensis*)
 House Mouse (*Mus musculus*)
 Least Chipmunk (*Tamias minimus*)
 Northern Pocket Gopher (*Thomomys talpoides*)
 Norway Rat (*Rattus norvegicus*)
 Thirteen-Lined Ground Squirrel (*Spermophilus tridecemlineatus*)
 Woodchuck (*Marmota monax*)

Riparian

Moose (*Alces alces*)
 Mink (*Mustela vison*)
 Wandering Shrew (*Sorex vagrans*)
 Water Shrew (*Sorex palustris*)
 Beaver (*Castor canadensis*)
 Brown Lemming (*Lemmus sibiricus*)
 Meadow Jumping Mouse (*Zapus hudsonius*)
 Muskrat (*Ondatra zibethicus*)
 Northern Bog Lemming (*Synaptomys borealis*)
 Water Vole (*Microtus richardsoni*)

Appendix 1b — Mammals Guild Membership (Level 3) continued

Cavity Nester

Fisher (*Martes pennanti*)
 Marten (*Martes americana*)
 Raccoon (*Procyon lotor*)
 Gray Squirrel (*Sciurus carolinensis*)
 Northern Flying Squirrel (*Glaucomys sabrinus*)
 Red Squirrel (*Tamiasciurus hudsonicus*)

Habitat Engineer

Beaver (*Castor canadensis*)
 Bushy-Tailed Woodrat (*Neotoma cinerea*)
 Columbian Ground Squirrel (*Spermophilus columbianus*)
 Northern Pocket Gopher (*Thomomys talpoides*)
 Red Squirrel (*Tamiasciurus hudsonicus*)
 Richardson's Ground Squirrel (*Spermophilus richardsonii*)
 Woodchuck (*Marmota monax*)
 Yellow-Bellied Marmot (*Marmota flaviventris*)

Irruptive Species

Canada Lynx (*Lynx canadensis*)
 Coyote (*Canis latrans*)
 Ermine (*Mustela erminea*)
 Fisher (*Martes pennanti*)
 Long-Tailed Weasel (*Mustela frenata*)
 Marten (*Martes americana*)
 Snowshoe Hare (*Lepus americanus*)
 Brown Lemming (*Lemmus sibiricus*)
 Deer Mouse (*Peromyscus maniculatus*)
 Franklin's Ground Squirrel (*Spermophilus franklinii*)
 Meadow Vole (*Microtus pennsylvanicus*)
 Muskrat (*Ondatra zibethicus*)
 Prairie Vole (*Microtus ochrogaster*)
 Sagebrush Vole (*Lagurus curtatus*)
 Southern Red-Backed Vole (*Clethrionomys gapperi*)
 Water Vole (*Microtus richardsoni*)

Carnivorous Species

Badger (*Taxidea taxus*)
 Black-Footed Ferret (*Mustela nigripes*)
 Bobcat (*Lynx rufus*)
 Canada Lynx (*Lynx canadensis*)
 Cougar (*Felis concolor*)
 Coyote (*Canis latrans*)
 Domestic Cat (*Felis catus*)
 Domestic Dog (*Canis familiaris*)
 Ermine (*Mustela erminea*)
 Fisher (*Martes pennanti*)
 Gray Wolf (*Canis lupus*)

Least Weasel (*Mustela nivalis*)
 Long-Tailed Weasel (*Mustela frenata*)
 Marten (*Martes americana*)
 Mink (*Mustela vison*)
 Red Fox (*Vulpes vulpes*)
 River Otter (*Lutra canadensis*)
 Swift Fox (*Vulpes velox*)
 Wolverine (*Gulo gulo*)

Game Species

Bighorn Sheep (*Ovis canadensis*)
 Caribou (*Rangifer tarandus*)
 Moose (*Alces alces*)
 Mountain Goat (*Oreamnos americanus*)
 Mule Deer (*Odocoileus hemionus*)
 Pronghorn (*Antilocapra americana*)
 Wapiti (*Cervus elaphus*)
 White-Tailed Deer (*Odocoileus virginianus*)
 Wild Boar/Feral Hog (*Sus scrofa*)
 Badger (*Taxidea taxus*)
 Black Bear (*Ursus americanus*)
 Bobcat (*Lynx rufus*)
 Canada Lynx (*Lynx canadensis*)
 Cougar (*Felis concolor*)
 Coyote (*Canis latrans*)
 Ermine (*Mustela erminea*)
 Fisher (*Martes pennanti*)
 Gray Wolf (*Canis lupus*)
 Grizzly Bear (*Ursus arctos*)
 Least Weasel (*Mustela nivalis*)
 Long-Tailed Weasel (*Mustela frenata*)
 Marten (*Martes americana*)
 Mink (*Mustela vison*)
 Raccoon (*Procyon lotor*)
 Red Fox (*Vulpes vulpes*)
 River Otter (*Lutra canadensis*)
 Striped Skunk (*Mephitis mephitis*)
 Wolverine (*Gulo gulo*)
 Nuttall's Cottontail (*Sylvilagus nuttallii*)
 Snowshoe Hare (*Lepus americanus*)
 White-Tailed Jack Rabbit (*Lepus townsendii*)
 Beaver (*Castor canadensis*)
 Gray Squirrel (*Sciurus carolinensis*)
 Muskrat (*Ondatra zibethicus*)
 Red Squirrel (*Tamiasciurus hudsonicus*)

Appendix 2a — Bird Guild Membership (Level 4)

Forest

American Kestrel (*Falco sparverius*)
 Broad-Winged Hawk (*Buteo platypterus*)
 Ruffed Grouse (*Bonasa umbellus*)
 Alder Flycatcher (*Empidonax alnorum*)
 American Redstart (*Setophaga ruticilla*)
 Baltimore (Northern) Oriole (*Icterus galbula*)
 Bay-Breasted Warbler (*Dendroica castanea*)
 Black and White Warbler (*Mniotilta varia*)
 Black-Capped Chickadee (*Poecile atricapilla*)
 Blackpoll Warbler (*Dendroica striata*)
 Black-Throated Green Warbler (*Dendroica virens*)
 Blue Jay (*Cyanocitta cristata*)
 Blue-Headed (Solitary) Vireo (*Vireo solitarius*)
 Bohemian Waxwing (*Bombycilla garrulus*)
 Boreal Chickadee (*Poecile hudsonica*)
 Brown Creeper (*Certhia americana*)
 Brown-Headed Cowbird (*Molothrus ater*)
 Canada Warbler (*Wilsonia canadensis*)
 Cape May Warbler (*Dendroica tigrina*)
 Cedar Waxwing (*Bombycilla cedrorum*)
 Chestnut-Sided Warbler (*Dendroica pensylvanica*)
 Chipping Sparrow (*Spizella passerina*)
 Common Grackle (*Quiscalus quiscula*)
 Connecticut Warbler (*Oporornis agilis*)
 Dark-Eyed Junco (*Junco hyemalis*)
 Evening Grosbeak (*Coccothraustes vespertinus*)
 Fox Sparrow (*Passerella iliaca*)
 Golden-crowned Kinglet (*Regulus satrapa*)
 Gray Jay (*Perisoreus canadensis*)
 Hammond's Flycatcher (*Empidonax hammondi*)
 Hermit Thrush (*Catharus guttatus*)
 Least Flycatcher (*Empidonax minimus*)
 Magnolia Warbler (*Dendroica magnolia*)
 Mountain Bluebird (*Sialia currucoides*)
 Mountain Chickadee (*Poecile gambeli*)
 Mourning Warbler (*Oporornis philadelphia*)
 Northern Shrike (*Lanius excubitor*)
 Northern Waterthrush (*Seiurus noveboracensis*)
 Olive-Sided Flycatcher (*Contopus cooperi*)
 Orange-Crowned Warbler (*Vermivora celata*)
 Ovenbird (*Seiurus aurocapillus*)
 Philadelphia Vireo (*Vireo philadelphicus*)
 Pine Siskin (*Carduelis pinus*)
 Purple Finch (*Carpodacus purpureus*)
 Red Crossbill (*Loxia curvirostra*)
 Red-Breasted Nuthatch (*Sitta canadensis*)
 Red-Eyed Vireo (*Vireo olivaceus*)
 Rose-Breasted Grosbeak (*Pheucticus ludovicianus*)
 Ruby-Crowned Kinglet (*Regulus calendula*)
 Song Sparrow (*Melospiza melodia*)
 Steller's Jay (*Cyanocitta stelleri*)

Swainson's Thrush (*Catharus ustulatus*)
 Tennessee Warbler (*Vermivora peregrina*)
 Tree Swallow (*Tachycineta bicolor*)
 Varied Thrush (*Ixoreus naevius*)
 Veery (*Catharus fuscescens*)
 Warbling Vireo (*Vireo gilvus*)
 Western Tanager (*Piranga ludoviciana*)
 White-Breasted Nuthatch (*Sitta carolinensis*)
 White-Crowned Sparrow (*Zonotrichia leucophrys*)
 White-Throated Sparrow (*Zonotrichia albicollis*)
 White-Winged Crossbill (*Loxia leucoptera*)
 Wilson's Warbler (*Wilsonia pusilla*)
 Winter Wren (*Troglodytes troglodytes*)
 Yellow Warbler (*Dendroica petechia*)
 Yellow-Rumped Warbler (*Dendroica coronata*)
 Black-Backed Woodpecker (*Picoides arcticus*)
 Downy Woodpecker (*Picoides pubescens*)
 Hairy Woodpecker (*Picoides villosus*)
 Northern Flicker (*Colaptes auratus*)
 Pileated Woodpecker (*Dryocopus pileatus*)
 Three-Toed Woodpecker (*Picoides tridactylus*)
 Yellow-Bellied Sapsucker (*Sphyrapicus varius*)
 Barred Owl (*Strix varia*)
 Great Gray Owl (*Strix nebulosa*)
 Great Horned Owl (*Bubo virginianus*)
 Western Wood Pewee (*Contopus sordidulus*)

Grassland/Meadow

Killdeer (*Charadrius vociferus*)
 Long-Billed Curlew (*Numenius americanus*)
 Northern Harrier (*Circus cyaneus*)
 American Goldfinch (*Carduelis tristis*)
 Baird's Sparrow (*Ammodramus bairdii*)
 Bobolink (*Dolichonyx oryzivorus*)
 Chestnut-Collared Longspur (*Calcarius ornatus*)
 Clay-Colored Sparrow (*Spizella pallida*)
 Grasshopper Sparrow (*Ammodramus savannarum*)
 Horned Lark (*Eremophila alpestris*)
 Lark Sparrow (*Chondestes grammacus*)
 Le Conte's Sparrow (*Ammodramus leconteii*)
 McCown's Longspur (*Calcarius mccownii*)
 Savannah Sparrow (*Passerculus sandwichensis*)
 Say's Phoebe (*Sayornis saya*)
 Vesper Sparrow (*Pooecetes gramineus*)

Alpine

American Pipit (*Anthus rubescens*)

Peatland

Palm Warbler (*Dendroica palmarum*)
 Yellow-Bellied Flycatcher (*Empidonax flaviventris*)

Appendix 2a — Bird Guild Membership (Level 4)

Aquatic/Wetland

American Wigeon (*Anas americana*)
 Barrow's Goldeneye (*Bucephala islandica*)
 Blue-winged Teal (*Anas discors*)
 Bufflehead (*Bucephala albeola*)
 Canada Goose (*Branta canadensis*)
 Canvasback (*Aythya valisineria*)
 Common Goldeneye (*Bucephala clangula*)
 Gadwall (*Anas strepera*)
 Hooded Merganser (*Lophodytes cucullatus*)
 Lesser Scaup (*Aythya affinis*)
 Mallard (*Anas platyrhynchos*)
 Northern Pintail (*Anas acuta*)
 Northern Shoveler (*Anas clypeata*)
 Redhead (*Aythya americana*)
 Ring-Necked Duck (*Aythya collaris*)
 Ruddy Duck (*Oxyura jamaicensis*)
 Surf Scoter (*Melanitta perspicillata*)
 American Avocet (*Recurvirostra americana*)
 Black Tern (*Chlidonias niger*)
 Bonaparte's Gull (*Larus philadelphia*)
 Common Tern (*Sterna hirundo*)
 Franklin's Gull (*Larus pipixcan*)
 Greater Yellowlegs (*Tringa melanoleuca*)
 Lesser Yellowlegs (*Tringa flavipes*)
 Mew Gull (*Larus canus*)
 Solitary Sandpiper (*Tringa solitaria*)
 Spotted Sandpiper (*Actitis macularia*)
 Willet (*Catoptrophorus semipalmatus*)
 Wilson's (Common) Snipe (*Gallinago delicata*)
 Wilson's Phalarope (*Phalaropus tricolor*)
 American Bittern (*Botaurus lentiginosus*)
 Great Blue Heron (*Ardea herodias*)
 Belted Kingfisher (*Ceryle alcyon*)
 Bald Eagle (*Haliaeetus leucocephalus*)
 Osprey (*Pandion haliaetus*)
 Common Loon (*Gavia immer*)
 American Coot (*Fulica americana*)
 Sandhill Crane (*Grus canadensis*)
 Sora (*Porzana carolina*)
 Red-winged Blackbird (*Agelaius phoeniceus*)
 Bank Swallow (*Riparia riparia*)
 Brewer's Blackbird (*Euphagus cyanocephalus*)
 Cliff Swallow (*Petrochelidon pyrrhonota*)
 Common Yellowthroat (*Geothlypis trichas*)
 Lincoln's Sparrow (*Melospiza lincolni*)
 Marsh Wren (*Cistothorus palustris*)
 Nelson's Sharp-Tailed Sparrow (*Ammodramus nelsoni*)
 Northern Rough-Winged Swallow (*Stelgidopteryx serripennis*)
 Rusty Blackbird (*Euphagus carolinus*)

Sprague's Pipit (*Anthus spragueii*)
 Swamp Sparrow (*Melospiza georgiana*)
 Yellow-Headed Blackbird (*Xanthocephalus xanthocephalus*)
 American White Pelican (*Pelecanus erythrorhynchos*)
 Double-Crested Cormorant (*Phalacrocorax auritus*)
 Eared Grebe (*Podiceps nigricollis*)
 Pied-Billed Grebe (*Podilymbus podiceps*)
 Red-Necked Grebe (*Podiceps grisegena*)
 Western Grebe (*Aechmophorus occidentalis*)

Habitat Generalist

Ruby-Throated Hummingbird (*Archilochus colubris*)
 Common Nighthawk (*Chordeiles minor*)
 California Gull (*Larus californicus*)
 Ring-Billed Gull (*Larus delawarensis*)
 Mourning Dove (*Zenaida macroura*)
 Merlin (*Falco columbarius*)
 Red-Tailed Hawk (*Buteo jamaicensis*)
 Herring Gull (*Larus argentatus*)
 American Crow (*Corvus brachyrhynchos*)
 American Robin (*Turdus migratorius*)
 Barn Swallow (*Hirundo rustica*)
 Black-Billed Magpie (*Pica hudsonia*)
 Common Raven (*Corvus corax*)
 Eastern Kingbird (*Tyrannus tyrannus*)
 House Wren (*Troglodytes aedon*)

Non-Native

Rock Dove (*Columba livia*)
 European Starling (*Sturnus vulgaris*)
 Domestic Chicken (*Gallus gallus*)

Appendix 2b — Birds Guild Membership (Level 3)

Old-growth Forest

Broad-winged Hawk (*Buteo platypterus*)
 Baltimore (Northern) Oriole (*Icterus galbula*)
 Bay-breasted Warbler (*Dendroica castanea*)
 Blackpoll Warbler (*Dendroica striata*)
 Black-Throated Green Warbler (*Dendroica virens*)
 Blue-Headed (Solitary) Vireo (*Vireo solitarius*)
 Boreal Chickadee (*Poecile hudsonica*)
 Brown Creeper (*Certhia americana*)
 Cape May Warbler (*Dendroica tigrina*)
 Evening Grosbeak (*Coccothraustes vespertinus*)
 Golden-Crowned Kinglet (*Regulus satrapa*)
 Hammond's Flycatcher (*Empidonax hammondi*)
 Least Flycatcher (*Empidonax minimus*)
 Magnolia Warbler (*Dendroica magnolia*)
 Northern Waterthrush (*Seiurus noveboracensis*)
 Philadelphia Vireo (*Vireo philadelphicus*)
 Pine Siskin (*Carduelis pinus*)
 Purple Finch (*Carpodacus purpureus*)
 Red Crossbill (*Loxia curvirostra*)
 Red-Breasted Nuthatch (*Sitta canadensis*)
 Rose-Breasted Grosbeak (*Pheucticus ludovicianus*)
 Ruby-Crowned Kinglet (*Regulus calendula*)
 Swainson's Thrush (*Catharus ustulatus*)
 Varied Thrush (*Ixoreus naevius*)
 Warbling Vireo (*Vireo gilvus*)
 Western Tanager (*Piranga ludoviciana*)
 White-Breasted Nuthatch (*Sitta carolinensis*)
 White-Winged Crossbill (*Loxia leucoptera*)
 Winter Wren (*Troglodytes troglodytes*)
 Yellow-Rumped Warbler (*Dendroica coronata*)
 Hairy Woodpecker (*Picoides villosus*)
 Pileated Woodpecker (*Dryocopus pileatus*)
 Yellow-Bellied Sapsucker (*Sphyrapicus varius*)
 Barred Owl (*Strix varia*)
 Great Gray Owl (*Strix nebulosa*)
 Great Horned Owl (*Bubo virginianus*)
 Western Wood Pewee (*Contopus sordidulus*)

Forest Burns

American Kestrel (*Falco sparverius*)
 Olive-Sided Flycatcher (*Contopus cooperi*)
 Black-Backed Woodpecker (*Picoides arcticus*)
 Three-Toed Woodpecker (*Picoides tridactylus*)

Early Seral

Ruffed Grouse (*Bonasa umbellus*)
 Alder Flycatcher (*Empidonax alnorum*)
 American Redstart (*Setophaga ruticilla*)
 Canada Warbler (*Wilsonia canadensis*)
 Cedar Waxwing (*Bombycilla cedrorum*)
 Chestnut-Sided Warbler (*Dendroica pensylvanica*)

Chipping Sparrow (*Spizella passerina*)
 Connecticut Warbler (*Oporornis agilis*)
 Dark-Eyed Junco (*Junco hyemalis*)
 Mourning Warbler (*Oporornis philadelphia*)
 Red-Eyed Vireo (*Vireo olivaceus*)
 Song Sparrow (*Melospiza melodia*)
 Tennessee Warbler (*Vermivora peregrina*)
 Veery (*Catharus fuscescens*)

Interior Forest

Broad-Winged Hawk (*Buteo platypterus*)
 Black-Throated Green Warbler (*Dendroica virens*)
 Brown Creeper (*Certhia americana*)
 Golden-Crowned Kinglet (*Regulus satrapa*)
 Hermit Thrush (*Catharus guttatus*)
 Magnolia Warbler (*Dendroica magnolia*)
 Ovenbird (*Seiurus aurocapillus*)
 Red-Breasted Nuthatch (*Sitta canadensis*)
 Swainson's Thrush (*Catharus ustulatus*)
 Veery (*Catharus fuscescens*)
 Western Tanager (*Piranga ludoviciana*)
 Winter Wren (*Troglodytes troglodytes*)
 Yellow-Rumped Warbler (*Dendroica coronata*)
 Hairy Woodpecker (*Picoides villosus*)
 Barred Owl (*Strix varia*)

Forest Edge

Ruby-Throated Hummingbird (*Archilochus colubris*)
 Greater Yellowlegs (*Tringa melanoleuca*)
 Lesser Yellowlegs (*Tringa flavipes*)
 Solitary Sandpiper (*Tringa solitaria*)
 Blue Jay (*Cyanocitta cristata*)
 Bohemian Waxwing (*Bombycilla garrulus*)
 Brewer's Blackbird (*Euphagus cyanocephalus*)
 Brown-Headed Cowbird (*Molothrus ater*)
 Canada Warbler (*Wilsonia canadensis*)
 Cedar Waxwing (*Bombycilla cedrorum*)
 Chestnut-Sided Warbler (*Dendroica pensylvanica*)
 Chipping Sparrow (*Spizella passerina*)
 Common Grackle (*Quiscalus quiscula*)
 Dark-Eyed Junco (*Junco hyemalis*)
 Eastern Kingbird (*Tyrannus tyrannus*)
 Evening Grosbeak (*Coccothraustes vespertinus*)
 Fox Sparrow (*Passerella iliaca*)
 Gray Jay (*Perisoreus canadensis*)
 House Wren (*Troglodytes aedon*)
 Lincoln's Sparrow (*Melospiza lincolni*)
 Mountain Bluebird (*Sialia currucoides*)
 Mourning Warbler (*Oporornis philadelphia*)
 Northern Shrike (*Lanius excubitor*)
 Northern Waterthrush (*Seiurus noveboracensis*)
 Olive-Sided Flycatcher (*Contopus cooperi*)

Appendix 2b — Birds Guild Membership (Level 3) Continued

Forest Edge (con't)

Orange-Crowned Warbler (*Vermivora celata*)
 Palm Warbler (*Dendroica palmarum*)
 Rose-Breasted Grosbeak (*Pheucticus ludovicianus*)
 Rusty Blackbird (*Euphagus carolinus*)
 Song Sparrow (*Melospiza melodia*)
 Swainson's Thrush (*Catharus ustulatus*)
 Tennessee Warbler (*Vermivora peregrina*)
 Tree Swallow (*Tachycineta bicolor*)
 Warbling Vireo (*Vireo gilvus*)
 White-Breasted Nuthatch (*Sitta carolinensis*)
 White-Crowned Sparrow (*Zonotrichia leucophrys*)
 White-Throated Sparrow (*Zonotrichia albicollis*)
 Wilson's Warbler (*Wilsonia pusilla*)
 Yellow Warbler (*Dendroica petechia*)
 Yellow-Bellied Flycatcher (*Empidonax flaviventris*)
 Domestic Chicken (*Gallus gallus*)
 Northern Flicker (*Colaptes auratus*)
 Great Gray Owl (*Strix nebulosa*)
 Great Horned Owl (*Bubo virginianus*)
 Western Wood Pewee (*Contopus sordidulus*)

Uncommon Species

Common Nighthawk (*Chordeiles minor*)
 Black Tern (*Chlidonias niger*)
 Long-Billed Curlew (*Numenius americanus*)
 American Bittern (*Botaurus lentiginosus*)
 Great Blue Heron (*Ardea herodias*)
 Bald Eagle (*Haliaeetus leucocephalus*)
 Broad-Winged Hawk (*Buteo platypterus*)
 Osprey (*Pandion haliaetus*)
 Sandhill Crane (*Grus canadensis*)
 Baird's Sparrow (*Ammodramus bairdii*)
 Bay-Breasted Warbler (*Dendroica castanea*)
 Black-Throated Green Warbler (*Dendroica virens*)
 Bobolink (*Dolichonyx oryzivorus*)
 Canada Warbler (*Wilsonia canadensis*)
 Cape May Warbler (*Dendroica tigrina*)
 Grasshopper Sparrow (*Ammodramus savannarum*)
 Sprague's Pipit (*Anthus spragueii*)
 Western Tanager (*Piranga ludoviciana*)
 American White Pelican (*Pelecanus erythrorhynchos*)
 Black-backed Woodpecker (*Picoides arcticus*)
 Pileated Woodpecker (*Dryocopus pileatus*)
 Pied-Billed Grebe (*Podilymbus podiceps*)
 Western Grebe (*Aechmophorus occidentalis*)
 Barred Owl (*Strix varia*)
 Great Gray Owl (*Strix nebulosa*)

High Responsibility

Bufflehead (*Bucephala albeola*)

Northern Shoveler (*Anas clypeata*)
 Redhead (*Aythya americana*)
 Black Tern (*Chlidonias niger*)
 California Gull (*Larus californicus*)
 Franklin's Gull (*Larus pipixcan*)
 Greater Yellowlegs (*Tringa melanoleuca*)
 Lesser Yellowlegs (*Tringa flavipes*)
 Wilson's Phalarope (*Phalaropus tricolor*)
 Sandhill Crane (*Grus canadensis*)
 Baird's Sparrow (*Ammodramus bairdii*)
 Bay-Breasted Warbler (*Dendroica castanea*)
 Black-Billed Magpie (*Pica hudsonia*)
 Black-Throated Green Warbler (*Dendroica virens*)
 Bohemian Waxwing (*Bombycilla garrulus*)
 Canada Warbler (*Wilsonia canadensis*)
 Cape May Warbler (*Dendroica tigrina*)
 Chestnut-Collared Longspur (*Calcarius ornatus*)
 Clay-Colored Sparrow (*Spizella pallida*)
 Connecticut Warbler (*Oporornis agilis*)
 Evening Grosbeak (*Coccothraustes vespertinus*)
 Le Conte's Sparrow (*Ammodramus leconteii*)
 Magnolia Warbler (*Dendroica magnolia*)
 McCown's Longspur (*Calcarius mccownii*)
 Mountain Bluebird (*Sialia currucoides*)
 Mourning Warbler (*Oporornis philadelphia*)
 Palm Warbler (*Dendroica palmarum*)
 Philadelphia Vireo (*Vireo philadelphicus*)
 Red Crossbill (*Loxia curvirostra*)
 Rose-Breasted Grosbeak (*Pheucticus ludovicianus*)
 Sprague's Pipit (*Anthus spragueii*)
 Tennessee Warbler (*Vermivora peregrina*)
 Western Tanager (*Piranga ludoviciana*)
 White-Throated Sparrow (*Zonotrichia albicollis*)
 Winter Wren (*Troglodytes troglodytes*)
 Yellow-Bellied Flycatcher (*Empidonax flaviventris*)
 Yellow-Headed Blackbird (*Xanthocephalus xanthocephalus*)
 American White Pelican (*Pelecanus erythrorhynchos*)
 Double-Crested Cormorant (*Phalacrocorax auritus*)
 Yellow-Bellied Sapsucker (*Sphyrapicus varius*)
 Eared Grebe (*Podiceps nigricollis*)
 Red-Necked Grebe (*Podiceps grisegena*)
 Western Grebe (*Aechmophorus occidentalis*)

Human Modified Habitat

Mallard (*Anas platyrhynchos*)
 California Gull (*Larus californicus*)
 Franklin's Gull (*Larus pipixcan*)
 Killdeer (*Charadrius vociferus*)
 Ring-Billed Gull (*Larus delawarensis*)
 Mourning Dove (*Zenaida macroura*)

Appendix 2b — Birds Guild Membership (Level 3) Continued

Human Modified Habitat

Rock Dove (*Columba livia*)
 American Kestrel (*Falco sparverius*)
 Red-Winged Blackbird (*Agelaius phoeniceus*)
 Herring Gull (*Larus argentatus*)
 American Crow (*Corvus brachyrhynchos*)
 American Robin (*Turdus migratorius*)
 Bank Swallow (*Riparia riparia*)
 Barn Swallow (*Hirundo rustica*)
 Black-Billed Magpie (*Pica hudsonia*)
 Black-Capped Chickadee (*Poecile atricapilla*)
 Blue Jay (*Cyanocitta cristata*)
 Bobolink (*Dolichonyx oryzivorus*)
 Brewer's Blackbird (*Euphagus cyanocephalus*)
 Brown-Headed Cowbird (*Molothrus ater*)
 Cedar Waxwing (*Bombycilla cedrorum*)
 Chipping Sparrow (*Spizella passerina*)
 Cliff Swallow (*Petrochelidon pyrrhonota*)
 Common Grackle (*Quiscalus quiscula*)
 Eastern Kingbird (*Tyrannus tyrannus*)
 European Starling (*Sturnus vulgaris*)
 Gray Jay (*Perisoreus canadensis*)
 House Sparrow (*Passer domesticus*)
 House Wren (*Troglodytes aedon*)
 Purple Finch (*Carpodacus purpureus*)
 Savannah Sparrow (*Passerculus sandwichensis*)
 Song Sparrow (*Melospiza melodia*)
 Steller's Jay (*Cyanocitta stelleri*)
 Tree Swallow (*Tachycineta bicolor*)
 Warbling Vireo (*Vireo gilvus*)
 Yellow Warbler (*Dendroica petechia*)
 Domestic Chicken (*Gallus gallus*)

Riparian

American Wigeon (*Anas americana*)
 Blue-Winged Teal (*Anas discors*)
 Canada Goose (*Branta canadensis*)
 Canvasback (*Aythya valisineria*)
 Gadwall (*Anas strepera*)
 Lesser Scaup (*Aythya affinis*)
 Mallard (*Anas platyrhynchos*)
 Northern Pintail (*Anas acuta*)
 Northern Shoveler (*Anas clypeata*)
 Redhead (*Aythya americana*)
 Ring-Necked Duck (*Aythya collaris*)
 Ruddy Duck (*Oxyura jamaicensis*)
 American Avocet (*Recurvirostra americana*)
 Black Tern (*Chlidonias niger*)
 Bonaparte's Gull (*Larus philadelphia*)
 Greater Yellowlegs (*Tringa melanoleuca*)
 Lesser Yellowlegs (*Tringa flavipes*)
 Mew Gull (*Larus canus*)

Solitary Sandpiper (*Tringa solitaria*)
 Spotted Sandpiper (*Actitis macularia*)
 Willet (*Catoptrophorus semipalmatus*)
 Wilson's (Common) Snipe (*Gallinago delicata*)
 Wilson's Phalarope (*Phalaropus tricolor*)
 American Bittern (*Botaurus lentiginosus*)
 Great Blue Heron (*Ardea herodias*)
 Belted Kingfisher (*Ceryle alcyon*)
 American Coot (*Fulica americana*)
 Sandhill Crane (*Grus canadensis*)
 Sora (*Porzana carolina*)
 Red-winged Blackbird (*Agelaius phoeniceus*)
 Alder Flycatcher (*Empidonax alnorum*)
 Brewer's Blackbird (*Euphagus cyanocephalus*)
 Canada Warbler (*Wilsonia canadensis*)
 Common Yellowthroat (*Geothlypis trichas*)
 Le Conte's Sparrow (*Ammodramus leconteii*)
 Lincoln's Sparrow (*Melospiza lincolni*)
 Marsh Wren (*Cistothorus palustris*)
 Nelson's Sharp-Tailed Sparrow (*Ammodramus nelsoni*)
 Northern Waterthrush (*Seiurus noveboracensis*)
 Orange-Crowned Warbler (*Vermivora celata*)
 Palm Warbler (*Dendroica palmarum*)
 Rusty Blackbird (*Euphagus carolinus*)
 Sprague's Pipit (*Anthus spragueii*)
 Swamp Sparrow (*Melospiza georgiana*)
 Tree Swallow (*Tachycineta bicolor*)
 Wilson's Warbler (*Wilsonia pusilla*)
 Yellow Warbler (*Dendroica petechia*)
 Yellow-Bellied Flycatcher (*Empidonax flaviventris*)
 Yellow-Headed Blackbird (*Xanthocephalus xanthocephalus*)
 Eared Grebe (*Podiceps nigricollis*)
 Pied-Billed Grebe (*Podilymbus podiceps*)
 Red-Necked Grebe (*Podiceps grisegena*)

Cavity Nester

Barrow's Goldeneye (*Bucephala islandica*)
 Bufflehead (*Bucephala albeola*)
 Common Goldeneye (*Bucephala clangula*)
 Hooded Merganser (*Lophodytes cucullatus*)
 Ruddy Duck (*Oxyura jamaicensis*)
 American Kestrel (*Falco sparverius*)
 Black-Capped Chickadee (*Poecile atricapilla*)
 Boreal Chickadee (*Poecile hudsonica*)
 European Starling (*Sturnus vulgaris*)
 House Wren (*Troglodytes aedon*)
 Mountain Bluebird (*Sialia currucoides*)
 Mountain Chickadee (*Poecile gambeli*)
 Red-breasted Nuthatch (*Sitta canadensis*)
 Tree Swallow (*Tachycineta bicolor*)

Appendix 2b — Birds Guild Membership (Level 3) Continued

White-breasted Nuthatch (*Sitta carolinensis*)
 Black-backed Woodpecker (*Picoides arcticus*)
 Downy Woodpecker (*Picoides pubescens*)
 Hairy Woodpecker (*Picoides villosus*)
 Northern Flicker (*Colaptes auratus*)
 Pileated Woodpecker (*Dryocopus pileatus*)
 Three-toed Woodpecker (*Picoides tridactylus*)
 Yellow-Bellied Sapsucker (*Sphyrapicus varius*)
 Barred Owl (*Strix varia*)

Habitat Engineer

Belted Kingfisher (*Ceryle alcyon*)
 Black-backed Woodpecker (*Picoides arcticus*)
 Downy Woodpecker (*Picoides pubescens*)
 Hairy Woodpecker (*Picoides villosus*)
 Northern Flicker (*Colaptes auratus*)
 Pileated Woodpecker (*Dryocopus pileatus*)
 Three-Toed Woodpecker (*Picoides tridactylus*)
 Yellow-Bellied Sapsucker (*Sphyrapicus varius*)

Irruptive Species

Ruffed Grouse (*Bonasa umbellus*)
 Red Crossbill (*Loxia curvirostra*)
 White-Winged Crossbill (*Loxia leucoptera*)
 Great Horned Owl (*Bubo virginianus*)
 Hooded Merganser (*Lophodytes cucullatus*)
 Common Tern (*Sterna hirundo*)

Carnivorous Species

American Bittern (*Botaurus lentiginosus*)
 Great Blue Heron (*Ardea herodias*)
 Belted Kingfisher (*Ceryle alcyon*)
 American Kestrel (*Falco sparverius*)
 Bald Eagle (*Haliaeetus leucocephalus*)
 Broad-Winged Hawk (*Buteo platypterus*)
 Merlin (*Falco columbarius*)
 Northern Harrier (*Circus cyaneus*)
 Osprey (*Pandion haliaetus*)
 Red-Tailed Hawk (*Buteo jamaicensis*)
 Common Loon (*Gavia immer*)
 Northern Shrike (*Lanius excubitor*)
 American White Pelican (*Pelecanus erythrorhynchos*)
 Double-Crested Cormorant (*Phalacrocorax auritus*)
 Western Grebe (*Aechmophorus occidentalis*)
 Barred Owl (*Strix varia*)
 Great Gray Owl (*Strix nebulosa*)
 Great Horned Owl (*Bubo virginianus*)

Game Species

American Wigeon (*Anas americana*)
 Barrow's Goldeneye (*Bucephala islandica*)

Blue-Winged Teal (*Anas discors*)
 Bufflehead (*Bucephala albeola*)
 Canada Goose (*Branta canadensis*)
 Canvasback (*Aythya valisineria*)
 Common Goldeneye (*Bucephala clangula*)
 Gadwall (*Anas strepera*)
 Hooded Merganser (*Lophodytes cucullatus*)
 Lesser Scaup (*Aythya affinis*)
 Mallard (*Anas platyrhynchos*)
 Northern Pintail (*Anas acuta*)
 Northern Shoveler (*Anas clypeata*)
 Redhead (*Aythya americana*)
 Ring-Necked Duck (*Aythya collaris*)
 Ruddy Duck (*Oxyura jamaicensis*)
 Surf Scoter (*Melanitta perspicillata*)
 Wilson's (Common) Snipe (*Gallinago delicata*)
 Rock Dove (*Columba livia*)
 Ruffed Grouse (*Bonasa umbellus*)
 American Coot (*Fulica americana*)
 Sandhill Crane (*Grus canadensis*)
 Domestic Chicken (*Gallus gallus*)

Winter Residents

Rock Dove (*Columba livia*)
 Ruffed Grouse (*Bonasa umbellus*)
 Black-Billed Magpie (*Pica hudsonia*)
 Black-Capped Chickadee (*Poecile atricapilla*)
 Blue Jay (*Cyanocitta cristata*)
 Boreal Chickadee (*Poecile hudsonica*)
 Brown Creeper (*Certhia americana*)
 Common Raven (*Corvus corax*)
 Evening Grosbeak (*Coccothraustes vespertinus*)
 Gray Jay (*Perisoreus canadensis*)
 House Sparrow (*Passer domesticus*)
 Mountain Chickadee (*Poecile gambeli*)
 Red Crossbill (*Loxia curvirostra*)
 Red-Breasted Nuthatch (*Sitta canadensis*)
 Steller's Jay (*Cyanocitta stelleri*)
 White-Breasted Nuthatch (*Sitta carolinensis*)
 White-Winged Crossbill (*Loxia leucoptera*)
 Domestic Chicken (*Gallus gallus*)
 Black-Backed Woodpecker (*Picoides arcticus*)
 Downy Woodpecker (*Picoides pubescens*)
 Hairy Woodpecker (*Picoides villosus*)
 Pileated Woodpecker (*Dryocopus pileatus*)
 Three-Toed Woodpecker (*Picoides tridactylus*)
 Barred Owl (*Strix varia*)
 Great Gray Owl (*Strix nebulosa*)
 Great Horned Owl (*Bubo virginianus*)

Appendix 2b — Birds Guild Membership (Level 3) Continued

Neotropical Species

Blue-Winged Teal (*Anas discors*)
 Ruby-Throated Hummingbird (*Archilochus colubris*)
 Common Nighthawk (*Chordeiles minor*)
 American Avocet (*Recurvirostra americana*)
 Black Tern (*Chlidonias niger*)
 Common Tern (*Sterna hirundo*)
 Franklin's Gull (*Larus pipixcan*)
 Greater Yellowlegs (*Tringa melanoleuca*)
 Lesser Yellowlegs (*Tringa flavipes*)
 Long-Billed Curlew (*Numerius americanus*)
 Solitary Sandpiper (*Tringa solitaria*)
 Spotted Sandpiper (*Actitis macularia*)
 Willet (*Catoptrophorus semipalmatus*)
 Wilson's (Common) Snipe (*Gallinago delicata*)
 Wilson's Phalarope (*Phalaropus tricolor*)
 American Kestrel (*Falco sparverius*)
 Broad-Winged Hawk (*Buteo platypterus*)
 Osprey (*Pandion haliaetus*)
 American Redstart (*Setophaga ruticilla*)
 Baltimore (Northern) Oriole (*Icterus galbula*)
 Bank Swallow (*Riparia riparia*)
 Barn Swallow (*Hirundo rustica*)
 Bay-Breasted Warbler (*Dendroica castanea*)
 Black and White Warbler (*Mniotilta varia*)
 Blackpoll Warbler (*Dendroica striata*)
 Black-Throated Green Warbler (*Dendroica virens*)
 Bobolink (*Dolichonyx oryzivorus*)
 Canada Warbler (*Wilsonia canadensis*)
 Cape May Warbler (*Dendroica tigrina*)
 Chestnut-Sided Warbler (*Dendroica pensylvanica*)
 Clay-Colored Sparrow (*Spizella pallida*)
 Cliff Swallow (*Petrochelidon pyrrhonota*)
 Connecticut Warbler (*Oporornis agilis*)
 Eastern Kingbird (*Tyrannus tyrannus*)
 Hammond's Flycatcher (*Empidonax hammondi*)
 House Wren (*Troglodytes aedon*)
 Least Flycatcher (*Empidonax minimus*)
 Magnolia Warbler (*Dendroica magnolia*)
 Mourning Warbler (*Oporornis philadelphia*)
 Northern Rough-Winged Swallow (*Stelgidopteryx serripennis*)
 Northern Waterthrush (*Seiurus noveboracensis*)
 Olive-Sided Flycatcher (*Contopus cooperi*)
 Ovenbird (*Seiurus aurocapillus*)
 Palm Warbler (*Dendroica palmarum*)
 Philadelphia Vireo (*Vireo philadelphicus*)
 Red-Eyed Vireo (*Vireo olivaceus*)
 Rose-Breasted Grosbeak (*Pheucticus ludovicianus*)
 Swainson's Thrush (*Catharus ustulatus*)
 Tennessee Warbler (*Vermivora peregrina*)
 Tree Swallow (*Tachycineta bicolor*)
 Veery (*Catharus fuscescens*)

Warbling Vireo (*Vireo gilvus*)
 Western Tanager (*Piranga ludoviciana*)
 Wilson's Warbler (*Wilsonia pusilla*)
 Yellow Warbler (*Dendroica petechia*)
 Yellow-Bellied Flycatcher (*Empidonax flaviventris*)
 Yellow-Headed Blackbird (*Xanthocephalus xanthocephalus*)
 Pied-Billed Grebe (*Podilymbus podiceps*)
 Western Wood Pewee (*Contopus sordidulus*)

Short Distance Migrants

American Wigeon (*Anas americana*)
 Barrow's Goldeneye (*Bucephala islandica*)
 Bufflehead (*Bucephala albeola*)
 Canada Goose (*Branta canadensis*)
 Canvasback (*Aythya valisineria*)
 Common Goldeneye (*Bucephala clangula*)
 Gadwall (*Anas strepera*)
 Hooded Merganser (*Lophodytes cucullatus*)
 Lesser Scaup (*Aythya affinis*)
 Mallard (*Anas platyrhynchos*)
 Northern Pintail (*Anas acuta*)
 Northern Shoveler (*Anas clypeata*)
 Redhead (*Aythya americana*)
 Ring-Necked Duck (*Aythya collaris*)
 Ruddy Duck (*Oxyura jamaicensis*)
 Surf Scoter (*Melanitta perspicillata*)
 Bonaparte's Gull (*Larus philadelphia*)
 California Gull (*Larus californicus*)
 Killdeer (*Charadrius vociferus*)
 Mew Gull (*Larus canus*)
 Ring-Billed Gull (*Larus delawarensis*)
 American Bittern (*Botaurus lentiginosus*)
 Great Blue Heron (*Ardea herodias*)
 Mourning Dove (*Zenaidura macroura*)
 Belted Kingfisher (*Ceryle alcyon*)
 Bald Eagle (*Haliaeetus leucocephalus*)
 Merlin (*Falco columbarius*)
 Northern Harrier (*Circus cyaneus*)
 Red-Tailed Hawk (*Buteo jamaicensis*)
 Common Loon (*Gavia immer*)
 American Coot (*Fulica americana*)
 Sandhill Crane (*Grus canadensis*)
 Red-Winged Blackbird (*Agelaius phoeniceus*)
 Herring Gull (*Larus argentatus*)
 American Crow (*Corvus brachyrhynchos*)
 American Goldfinch (*Carduelis tristis*)
 American Pipit (*Anthus rubescens*)
 American Robin (*Turdus migratorius*)
 Baird's Sparrow (*Ammodramus bairdii*)
 Blue-Headed (Solitary) Vireo (*Vireo solitarius*)
 Bohemian Waxwing (*Bombycilla garrulus*)

Appendix 2b — Birds Guild Membership (Level 3) continued**Short Distance Migrants (cont'd)**

Brewer's Blackbird (*Euphagus cyanocephalus*)
 Brown-Headed Cowbird (*Molothrus ater*)
 Cedar Waxwing (*Bombycilla cedrorum*)
 Chestnut-Collared Longspur (*Calcarius ornatus*)
 Chipping Sparrow (*Spizella passerina*)
 Common Grackle (*Quiscalus quiscula*)
 Common Yellowthroat (*Geothlypis trichas*)
 Dark-Eyed Junco (*Junco hyemalis*)
 European Starling (*Sturnus vulgaris*)
 Fox Sparrow (*Passerella iliaca*)
 Golden-Crowned Kinglet (*Regulus satrapa*)
 Grasshopper Sparrow (*Ammodramus savannarum*)
 Hermit Thrush (*Catharus guttatus*)
 Horned Lark (*Eremophila alpestris*)
 Lark Sparrow (*Chondestes grammacus*)
 Le Conte's Sparrow (*Ammodramus leconteii*)
 Lincoln's Sparrow (*Melospiza lincolni*)
 Marsh Wren (*Cistothorus palustris*)
 McCown's Longspur (*Calcarius mccownii*)
 Mountain Bluebird (*Sialia currucoides*)
 Nelson's Sharp-tailed Sparrow (*Ammodramus nelsoni*)
 Northern Shrike (*Lanius excubitor*)
 Orange-Crowned Warbler (*Vermivora celata*)
 Pine Siskin (*Carduelis pinus*)
 Purple Finch (*Carpodacus purpureus*)
 Ruby-Crowned Kinglet (*Regulus calendula*)
 Rusty Blackbird (*Euphagus carolinus*)
 Savannah Sparrow (*Passerculus sandwichensis*)
 Say's Phoebe (*Sayornis saya*)
 Song Sparrow (*Melospiza melodia*)
 Sprague's Pipit (*Anthus spragueii*)
 Swamp Sparrow (*Melospiza georgiana*)
 Varied Thrush (*Ixoreus naevius*)
 Vesper Sparrow (*Pooecetes gramineus*)
 Western Meadowlark (*Sturnella neglecta*)
 White-Crowned Sparrow (*Zonotrichia leucophrys*)
 White-Throated Sparrow (*Zonotrichia albicollis*)
 Winter Wren (*Troglodytes troglodytes*)
 Yellow-Rumped Warbler (*Dendroica coronata*)
 American White Pelican (*Pelecanus erythrorhynchos*)
 Double-Crested Cormorant (*Phalacrocorax auritus*)
 Northern Flicker (*Colaptes auratus*)
 Yellow-Bellied Sapsucker (*Sphyrapicus varius*)
 Eared Grebe (*Podiceps nigricollis*)
 Red-Necked Grebe (*Podiceps grisegena*)
 Western Grebe (*Aechmophorus occidentalis*)

Appendix 3a — Herptile Guild Membership (Levels 3 & 4)

Forest

not applicable

Grassland/Meadow

Prairie Rattlesnake (*Crotalus viridis*)
 Western Hognose Snake (*Heterodon nasicus*)
 Eastern Short-Horned Lizard (*Phrynosoma hernandesi*)
 Bullsnae (*Pituophis catenifer*)

Alpine/Arctic

Racer (*Coluber constrictor*)

Peatland

not applicable

Wetland/Aquatic

Tailed Frog (*Ascaphus truei*)
 Western Toad (*Bufo boreas*)
 Great Plains Toad (*Bufo cognatus*)
 Canadian Toad (*Bufo hemiophrys*)
 Boreal Chorus Frog (*Pseudacris triseriata*)
 Columbia Spotted Frog (*Rana luteiventris*)
 Northern Leopard Frog (*Rana pipiens*)
 Wood Frog (*Rana sylvatica*)
 Plains Spadefoot Toad (*Spea bombifrons*)
 Long-Toed Salamander (*Ambystoma macrodactylum*)
 Tiger Salamander (*Ambystoma tigrinum*)
 Wandering Garter Snake (*Thamnophis elegans*)
 Western Plains Gartersnake (*Thamnophis radix*)
 Snapping Turtle (*Chelydra serpentina*)
 Western Painted Turtle (*Chrysemys picta*)

Habitat Generalists

Rubber Boa (*Charina bottae*)
 Red-Sided Garter Snake (*Thamnophis sirtalis*)

Non-Native Species

not applicable

Uncommon

Western Toad (*Bufo boreas*)
 Great Plains Toad (*Bufo cognatus*)
 Canadian Toad (*Bufo hemiophrys*)
 Columbia Spotted Frog (*Rana luteiventris*)

Northern Leopard Frog (*Rana pipiens*)
 Plains Spadefoot Toad (*Spea bombifrons*)
 Long-Toed Salamander (*Ambystoma macrodactylum*)
 Prairie Rattlesnake (*Crotalus viridis*)
 Western Hognose Snake (*Heterodon nasicus*)
 Eastern Short-Horned Lizard (*Phrynosoma hernandesi*)
 Bullsnae (*Pituophis catenifer*)
 Wandering Garter Snake (*Thamnophis elegans*)
 Red-Sided Garter Snake (*Thamnophis sirtalis*)
 Western Painted Turtle (*Chrysemys picta*)

High Management Responsibility

Western Toad (*Bufo boreas*)
 Canadian Toad (*Bufo hemiophrys*)
 Prairie Rattlesnake (*Crotalus viridis*)
 Wandering Garter Snake (*Thamnophis elegans*)

Riparian

Tailed Frog (*Ascaphus truei*)
 Western Toad (*Bufo boreas*)
 Great Plains Toad (*Bufo cognatus*)
 Canadian Toad (*Bufo hemiophrys*)
 Boreal Chorus Frog (*Pseudacris triseriata*)
 Columbia Spotted Frog (*Rana luteiventris*)
 Northern Leopard Frog (*Rana pipiens*)
 Wood Frog (*Rana sylvatica*)
 Plains Spadefoot Toad (*Spea bombifrons*)
 Long-Toed Salamander (*Ambystoma macrodactylum*)
 Tiger Salamander (*Ambystoma tigrinum*)
 Wandering Garter Snake (*Thamnophis elegans*)
 Western Plains Gartersnake (*Thamnophis radix*)
 Snapping Turtle (*Chelydra serpentina*)
 Western Painted Turtle (*Chrysemys picta*)

Carnivorous

Rubber Boa (*Charina bottae*)
 Prairie Rattlesnake (*Crotalus viridis*)
 Western Hognose Snake (*Heterodon nasicus*)
 Bullsnae (*Pituophis catenifer*)
 Wandering Garter Snake (*Thamnophis elegans*)
 Western Plains Gartersnake (*Thamnophis radix*)
 Red-Sided Garter Snake (*Thamnophis sirtalis*)

Appendix 4a — Vascular Plant Guild Membership (Level 4)

Forest

Abies balsamea
Actaea rubra
Adoxa moschatellina
Amerorchis rotundifolia
Anemone riparia
Angelica dawsonii
Angelica genulflexa
Aralia nudicaulis
Arceuthobium americanum
Arnica cordifolia
*Aster umbellatus**
Astragalus americanus
Astragalus canadensis
Athyrium filix-femina
Barbarea orthocera
Betula neoalaskana
Betula occidentalis
Betula papyrifera
Calypso bulbosa
Carex concinna
Carex deweyana
Carex peckii
Carex richardsonii
Castilleja raupii
Cerastium nutans
Chrysosplenium tetrandrum
Cinna latifolia
Circaea alpina
Clematis occidentalis
Coptis trifolia
Corallorrhiza maculata
Corallorrhiza striata
Cornus canadensis
Corydalis sempervirens
Cypripedium passerinum
Diervilla lonicera
Diphasiastrum complanatum
Disporum trachycarpum
Dryopteris carthusiana
Dryopteris expansa+
Equisetum scirpoides
Fraxinus pennsylvanica
Galium triflorum
Geocaulon lividum
Geranium bicknellii
Goodyera repens
Gymnocarpium dryopteris
Hackelia jessicae
Halenia deflexa
Larix occidentalis
Lathyrus venosus
Leymus innovatus

Linnaea borealis
Listera borealis
Lonicera dioica
Luzula parviflora
Lycopodium clavatum
Lycopodium obscurum
Maianthemum canadense
Maianthemum racemosum ssp.
amplexicaule
Matteuccia struthiopteris
Melampyrum lineare
Menziesia ferruginea
Mitella nuda
Moehringia lateriflora
Moneses uniflora
Monotropa uniflora
Oplopanax horridum
Orthilia secunda
Oryzopsis asperifolia
Osmorhiza depauperata
Osmorhiza longistylis
Picea engelmannii
Picea glauca
Picea pungens
Pinus banksiana
Pinus contorta
Platanthera orbiculata
Populus balsamifera
Populus grandidentata
Populus tremuloides
Potentilla tridentata
Prunus pennsylvanica
Prunus virginiana
Pyrola asarifolia
Pyrola chlorantha
Pyrola elliptica
Pyrola minor
Ranunculus uncinatus
Rhamnus alnifolia
Ribes americanum
Ribes glandulosum
Ribes hirtellum
Ribes hudsonianum
Ribes oxyacanthoides
Ribes triste
Rubus parviflorus
Rubus pedatus
Rubus pubescens
Salix scouleriana
Sambucus racemosa
Sanicula marilandica
Schizachne purpurascens
Shepherdia canadensis

Sorbus scopulina
Spiraea betulifolia
Stellaria longifolia
Stellaria longipes
Stenanthium occidentale
Streptopus amplexifolius
Symphoricarpos albus
Thalictrum sparsiflorum
Tiarella trifoliata
Trientalis borealis
Trientalis europaea
Vaccinium caespitosum
Vaccinium membranaceum
Vaccinium myrtilloides
Vaccinium ovalifolium
Viburnum edule
Viburnum opulus
Viola canadensis
Viola renifolia

Grassland/Meadow

Acer negundo
Allium textile
Androsace occidentalis
Anemone patens
Arnica chamissonis
Artemisia cana
Artemisia frigida
Artemisia ludoviciana
Aster laevis
Astragalus drummondii
Astragalus flexuosus
Astragalus pectinatus
Astragalus purshii
Bouteloua gracilis
Calamovilfa longifolia
Carex filifolia
Carex pennsylvanica
*Carex stenophylla**
Carex xerantica
Castilleja occidentalis
Chamaerhodos erecta
Cirsium flodmanii
Cirsium hookerianum
Cirsium undulatum
*Coryphantha vivipara**
Dalea purpurea
Dalea purpurea var. purpurea
Distichlis stricta
*Coryphantha vivipara**
Dalea purpurea
Dalea purpurea var. purpurea
Distichlis stricta

Appendix 4a – Vascular Plant Guild Membership (Level 4) con't

Grassland/Meadow (con't)

Dodecatheon conjugens
Elymus elymoides
Elymus lanceolatus
Erigeron caespitosus
Erigeron pumilus
Eurotia lanata
Festuca altaica
Festuca campestris
Festuca idahoensis
Gaura coccinea
Geranium viscosissimum
Geum triflorum
Gutierrezia sarothrae
Hedeoma hispida
*Helianthus subrhomboideus**
Iva axillaris
Liatris punctata
Linum rigidum
Lithospermum ruderale
Lygodesmia juncea
Muhlenbergia richardsonis
Opuntia fragilis
Opuntia polyacantha
Orobanche fasciculata
Orthocarpus luteus
Oxytropis sericea
Paronychia sessiliflora
Pascopyrum smithii
Penstemon albidus
Penstemon gracilis
Phlox alyssifolia
Phlox hoodii
Plantago patagonica
Poa arida
Poa pratensis
*Poa sandbergii**
Potentilla bipinnatifida
Potentilla concinna
Potentilla hippiana
Potentilla pensylvanica
*Psoralea argophylla**
Ratibida columnifera
Rosa arkansana
Senecio integerrimus
Solidago missouriensis
Solidago mollis
Sphaeralcea coccinea
*Stipa columbiana**
*Stipa curtiseta**
*Stipa viridula**
Thermopsis rhombifolia
Trisetum spicatum

Verbena bracteata
Viola nuttallii
Zigadenus venenosus
Poa pratensis
*Poa sandbergii**
Potentilla bipinnatifida
Potentilla concinna
Potentilla hippiana
Potentilla pensylvanica
*Psoralea argophylla**
Ratibida columnifera
Rosa arkansana
Senecio integerrimus
Solidago missouriensis
Solidago mollis
Sphaeralcea coccinea
*Stipa columbiana**
*Stipa curtiseta**
*Stipa viridula**
Thermopsis rhombifolia
Trisetum spicatum
Verbena bracteata
Viola nuttallii
Zigadenus venenosus

Alpine

Abies bifolia
Arnica angustifolia
Arnica lonchophylla
Artemisia norvegica
Astragalus vexilliflexus
Cassiope tetragona
Diphasiastrum sitchense
Epilobium leptocarpum
Juncus albescens
Penstemon albertinus
Poa alpina
Salix reticulata
Senecio pauperculus
Stellaria crispa
Veronica alpina

Peatland

Andromeda polifolia
*Aster borealis**
Betula glandulosa
Betula pumila
Carex brunnescens
Carex canescens
Carex chordorrhiza
Carex lasiocarpa
Carex limosa
Carex livida

Carex loliacea
Carex magellanica ssp. irrigua
Carex pauciflora
Carex tenuiflora
Chamaedaphne calyculata
Drosera anglica
Drosera rotundifolia
Empetrum nigrum
Eriophorum chamissonis
Eriophorum vaginatum
Galium trifidum
Kalmia microphylla
Kalmia polifolia
Kobresia simpliciuscula
Larix laricina
Ledum palustre
Menyanthes trifoliata
Myrica gale
Pedicularis parviflora
Rubus chamaemorus
Salix discolor
Salix myrtilifolia
Salix pedicellaris
Salix planifolia
Salix pseudomyrsinites
Sarracenia purpurea
Scheuchzeria palustris
Vaccinium oxycoccos
Vaccinium vitis-idaea

Wetland

Betula glandulosa
Betula pumila
Carex brunnescens
Carex canescens
Carex lasiocarpa
Carex limosa
Carex loliacea
Carex pauciflora
Carex tenuiflora
Drosera anglica
Drosera rotundifolia
Galium trifidum
Menyanthes trifoliata
Pedicularis parviflora
Salix discolor
Salix myrtilifolia
Salix pedicellaris
Salix planifolia
Salix pseudomyrsinites
Scheuchzeria palustris
Vaccinium oxycoccos
Vaccinium vitis-idaea

Appendix 4a – Vascular Plant Guild Membership (Level 4) con't

Wetland (con't)

Castilleja raupii
Alopecurus aequalis
Aster brachyactis
Aster hesperius
Aster modestus
Aster puniceus
Beckmannia syzigachne
Bidens cernua
*Calamagrostis stricta**
Calla palustris
Caltha natans
Caltha palustris
Carex aquatilis
Carex atherodes
Carex aurea
Carex bebbii
Carex crawfordii
Carex diandra
Carex interior
Carex lacustris
Carex microglochin
Carex pellita
Carex prairea
Carex pseudocyperus
Carex rostrata
Carex utriculata
Carex viridula
Cicuta bulbifera
Cicuta maculata
Comandra umbellata
Eleocharis palustris
Eleocharis quinqueflora
Epilobium ciliatum
Epilobium leptophyllum
Epilobium palustre
Equisetum fluviatile
Equisetum palustre
Equisetum variegatum
Eriophorum brachyantherum
Eriophorum gracile
*Eriophorum polystachion**
Eriophorum viridicarinatum
Geum rivale
Glyceria borealis
Glyceria grandis
Glyceria striata
Juncus balticus
Juncus tenuis
Juncus vaseyi
Lathyrus palustris
Lonicera caerulea
Lycopus americanus

Lycopus asper
Lycopus uniflorus
Lysimachia thyrsoiflora
Mentha arvensis
Parnassia palustris
Pedicularis groenlandica
Petasites frigidus
Petalasites sagittatus
Phalaris arundinacea
Phragmites australis
Platanthera dilatata
Polygonum amphibium
*Potentilla anserina**
Puccinellia nuttalliana
Ranunculus gmelinii
Ranunculus macounii
Ranunculus pensylvanicus
Ranunculus sceleratus
Rorippa palustris
Rumex britannica
Rumex occidentalis
Salix athabascensis
Salix candida
Salix exigua
Salix glauca
Salix glauca var. villosa
Salix lucida
Salix maccalliana
Salix serissima
Scirpus cyperinus
Scirpus microcarpus
Scutellaria galericulata
Senecio congestus
Senecio triangularis
Sium suave
Solidago graminifolia
Stachys palustris
Suaeda calceoliformis
Triglochin maritima
Triglochin palustre
Typha latifolia
Valeriana dioica
Veronica americana
Veronica scutellata
Viola palustris

Aquatic

Acorus americanus
Alisma gramineum
Alisma triviale
Callitriche hermaphroditica
Callitriche palustris
Callitriche verna

Ceratophyllum demersum
Chenopodium rubrum
Elodea canadensis
Hippuris vulgaris
Lemna minor
Lemna trisulca
Lemna turionifera
Myriophyllum alterniflorum
Myriophyllum sibiricum
Myriophyllum verticillatum
Nuphar lutea (L.) Sm. ssp. variegata
Nymphaea tetragona
*Polygonum coccineum**
Potamogeton alpinus
*Potamogeton filiformis**
Potamogeton friesii
Potamogeton gramineus
Potamogeton natans
Potamogeton nodosus
Potamogeton obtusifolius
Potamogeton pectinatus
Potamogeton praelongus
Potamogeton pusillus
Potamogeton richardsonii
Potamogeton robbinsii
Potamogeton vaginatus
Potamogeton zosteriformis
Ranunculus aquatilis
*Ruppia cirrhosa**
Sagittaria cuneata
Schoenoplectus acutus
Schoenoplectus tabernaemontani
Scolochloa festucacea
Sparganium angustifolium
Sparganium eurycarpum
Sparganium fluctuans
Sparganium minimum
Spirodela polyrhiza
Utricularia intermedia
Utricularia minor
Utricularia vulgaris

Sand flats and dunes

Arabis lyrata
Atriplex nuttallii
Calamovilfa longifolia
Carex backii
Carex siccata
Carex tonsa
Lupinus pusillus
Salix sitchensis

Appendix 4a – Vascular Plant Guild Membership (Level 4) con't

WetGeneralist

<i>Salix discolor</i>	<i>Epilobium glaberrimum</i>	<i>Platanthera dilatata</i>
<i>Achillea sibirica</i>	<i>Epilobium hornemannii</i>	<i>Platanthera hyperborea</i>
<i>Aconitum delphiniifolium</i>	<i>Equisetum pratense</i>	<i>Platanthera obtusata</i>
<i>Agastache foeniculum</i>	<i>Equisetum sylvaticum</i>	<i>Poa palustris</i>
<i>Alnus incana</i>	<i>Erigeron acris</i>	<i>Polemonium acutiflorum</i>
<i>Alnus incana ssp. tenuifolia</i>	<i>Erigeron elatus</i>	<i>Polygonum bistortoides</i>
<i>Anemone canadensis</i>	<i>Erigeron glabellus</i>	<i>Polygonum erectum</i>
<i>Arctostaphylos rubra</i>	<i>Erigeron philadelphicus</i>	<i>Polygonum lapathifolium</i>
<i>Artemisia biennis</i>	<i>Erigeron speciosus</i>	<i>Polygonum viviparum</i>
<i>Asclepias ovalifolia</i>	<i>Eriophorum scheuchzeri</i>	<i>Populus deltoides</i>
<i>Astragalus dasyglottis*</i>	<i>Erysimum cheiranthoides</i>	<i>Potentilla diversifolia</i>
<i>Botrychium lunaria</i>	<i>Fragaria vesca</i>	<i>Potentilla fruticosa</i>
<i>Botrychium virginianum</i>	<i>Fragaria virginiana</i>	<i>Potentilla norvegica</i>
<i>Calamagrostis canadensis</i>	<i>Galium boreale</i>	<i>Potentilla paradoxa</i>
<i>Cardamine pennsylvanica</i>	<i>Galium labradoricum</i>	<i>Primula incana</i>
<i>Carex aenea</i>	<i>Gaultheria hispidula</i>	<i>Prunella vulgaris</i>
<i>Carex arcta</i>	<i>Gentianella amarella</i>	<i>Ranunculus cymbalaria</i>
<i>Carex athrostachya</i>	<i>Geum aleppicum</i>	<i>Ranunculus abortivus</i>
<i>Carex brevior</i>	<i>Geum macrophyllum</i>	<i>Ranunculus cardiophyllum</i>
<i>Carex capillaris</i>	<i>Glycyrrhiza lepidota</i>	<i>Ranunculus inamoenus</i>
<i>Carex crawei</i>	<i>Gnaphalium palustre</i>	<i>Ranunculus lapponicus</i>
<i>Carex disperma</i>	<i>Hedysarum alpinum</i>	<i>Ranunculus reptans</i>
<i>Carex garberi</i>	<i>Helianthus nuttallii</i>	<i>Rhinanthus borealis</i>
<i>Carex gynocrates</i>	<i>Heracleum maximum</i>	<i>Ribes lacustre</i>
<i>Carex heleonastes</i>	<i>Impatiens capensis</i>	<i>Rubus arcticus</i>
<i>Carex leptalea</i>	<i>Juncus alpinoarticulatus</i>	<i>Rumex maritimus</i>
<i>Carex microptera</i>	<i>Juncus bufonius</i>	<i>Rumex triangulivalvis*</i>
<i>Carex norvegica</i>	<i>Juncus dudleyi</i>	<i>Salix arbusculoides</i>
<i>Carex praegracilis</i>	<i>Juncus longistylis</i>	<i>Salix barclayi</i>
<i>Carex raymondii</i>	<i>Juncus nodosus</i>	<i>Salix bebbiana</i>
<i>Carex sartwellii</i>	<i>Lactuca tatarica</i>	<i>Salix farriae</i>
<i>Carex saxatilis</i>	<i>Ledum groenlandicum</i>	<i>Salix lutea</i>
<i>Carex scirpoidea</i>	<i>Liatis ligulistylis</i>	<i>Salix petiolaris</i>
<i>Carex spregelii</i>	<i>Lilium philadelphicum</i>	<i>Salix prolixa</i>
<i>Carex tenera</i>	<i>Listera cordata</i>	<i>Salix pyrifolia</i>
<i>Carex trisperma</i>	<i>Lobelia kalmii</i>	<i>Scirpus hudsonianus</i>
<i>Carex vaginata</i>	<i>Lonicera involucrata</i>	<i>Scirpus pungens*</i>
<i>Catabrosa aquatica</i>	<i>Lonicera oblongifolia</i>	<i>Senecio eremophilus</i>
<i>Chenopodium pratericola</i>	<i>Luzula multiflora</i>	<i>Senecio pauciflorus</i>
<i>Chenopodium simplex</i>	<i>Lycopodium annotinum</i>	<i>Sisyrinchium montanum</i>
<i>Coeloglossum viride</i>	<i>Lysimachia ciliata</i>	<i>Solidago canadensis</i>
<i>Corallorrhiza trifida</i>	<i>Maianthemum stellatum</i>	<i>Solidago gigantea</i>
<i>Cornus stolonifera</i>	<i>Maianthemum trifolium</i>	<i>Spartina gracilis</i>
<i>Corydalis aurea</i>	<i>Mertensia paniculata</i>	<i>Sphenopholis intermedia</i>
<i>Crepis runcinata</i>	<i>Monarda fistulosa</i>	<i>Spiraea alba</i>
<i>Cystopteris fragilis</i>	<i>Pedicularis bracteosa</i>	<i>Spiranthes romanzoffiana</i>
<i>Delphinium glaucum</i>	<i>Pedicularis labradorica</i>	<i>Stellaria borealis</i>
<i>Deschampsia caespitosa</i>	<i>Penstemon confertus</i>	<i>Stellaria calycantha</i>
<i>Dodecatheon pulchellum</i>	<i>Penstemon procerus</i>	<i>Stellaria crassifolia</i>
<i>Eleocharis acicularis</i>	<i>Petasites frigidus var. palmatus</i>	<i>Thalictrum dasycarpum</i>
<i>Eleocharis erythropoda</i>	<i>Petasites X vitifolius</i>	<i>Thalictrum occidentale</i>
<i>Elymus piperi*</i>	<i>Physostegia parviflora</i>	<i>Thalictrum venulosum</i>
	<i>Picea mariana</i>	<i>Tofieldia glutinosa*</i>

Appendix 4a – Vascular Plant Guild Membership (Level 4) con't

Wet Generalist -cont'd

Tofieldia pusilla
Urtica dioica
Vaccinium uliginosum
Veronica serpyllifolia?
Vicia americana
Viola nephrophylla
Xanthium strumarium

Dry Generalists

Achillea millefolium
Agoseris aurantiaca
Agoseris glauca
Agrimonia striata
Agrostis scabra
Allium cernuum
Alnus viridis
Alnus viridis ssp. crispa
Amaranthus albus
Amelanchier alnifolia
Androsace septentrionalis
Anemone cylindrica
Anemone multifida
Antennaria anaphaloides
Antennaria microphylla
Antennaria neglecta
Antennaria rosea
Apocynum androsaemifolium
Aquilegia brevistyla
Arabis hirsuta
Arctostaphylos uva-ursi
Artemisia campestris
*Aster ascendens**
Aster ciliolatus
Aster conspicuus
Aster ericoides
Astragalus alpinus
Astragalus australis
Astragalus bodinii
Astragalus eucosmus
Astragalus laxmannii
Astragalus miser
Bahia oppositifolia
Bromus carinatus
Bromus ciliatus
Bromus inermis ssp. pumpellianus
Calamagrostis purpurascens
Campanula rotundifolia
Carex adusta
Carex douglasii
Carex praticola
Carex rossii

Castilleja hispida
Castilleja miniata
Cerastium arvense
Chenopodium capitatum
Chenopodium leptophyllum
Chenopodium salinum
Cirsium drummondii
Collomia linearis
Comarum palustre
Corylus cornuta
Cypripedium acaule
Danthonia californica
Dracocephalum parviflorum
Dryas drummondii
Elaeagnus commutata
Elymus canadensis
Elymus trachycaulus
Elymus trachycaulus ssp. subsecundus
Elymus trachycaulus ssp. trachycaulus
Epilobium angustifolium
Equisetum arvense
Equisetum hyemale
Equisetum laevigatum
Eriogonum flavum
Erysimum inconspicuum
Festuca rubra
Festuca saximontana
Gaillardia aristata
Geranium richardsonii
Grindelia squarrosa
Hedysarum boreale
Hedysarum sulphurescens
Helianthus annuus
Heterotheca villosa
Heuchera richardsonii
Hieracium umbellatum
Hierochloa hirta ssp. arctica
Hordeum jubatum
Hymenoxys richardsonii
Juniperus horizontalis
Koeleria macrantha
Lathyrus ochroleucus
Lepidium densiflorum
Linum lewisii
Lithospermum incisum
Lupinus sericeus
Machaeranthera canescens
Monolepis nuttalliana
Oligoneuron rigidum
Onosmodium molle
Oxytropis deflexa

Oxytropis monticola
Oxytropis splendens
Panicum capillare
Pastinaca sativa
Piptatherum pungens
Poa nemoralis ssp. interior
Potentilla arguta
Potentilla bimundorum
Potentilla gracilis
Rosa acicularis
Rosa woodsii
Rubus idaeus
Schedonnardus paniculatus
Selaginella densa
Senecio canus
Silene menziesii
Solanum triflorum
Solidago multiradiata
Solidago nemoralis
Solidago simplex ssp. simplex
*Stipa comata**
Symphoricarpos occidentalis
Verbena bracteata
Viola adunca
Zigadenus elegans
Zizia aptera

Non-native species

Agropyron cristatum
Agrostis stolonifera
Alopecurus pratensis
Amaranthus retroflexus
Anethum graveolens
Arctium minus
Avena fatua
Axyris amaranthoides
Betula pendula
Brassica kaber
Brassica napus
Brassica rapa
Bromus inermis
Bromus japonicus
Bromus tectorum
Camelina microcarpa
Capsella bursa-pastoris
Caragana arborescens
Carum carvi
Cerastium vulgatum
Chenopodium album
Chrysanthemum leucanthemum
Cirsium arvense
Cirsium vulgare
Crepis tectorum

Appendix 4a – Vascular Plant Guild Membership (Level 4) con't

Non-native species

Cynoglossum officinale
Dactylis glomerata
Descurainia sophia
*Elymus repens**
Euphorbia esula
Festuca ovina
Festuca rubra
Galeopsis tetrahit
Galium aparine
Gnaphalium uliginosum
Gypsophila paniculata
Hordeum vulgare
Juncus compressus
Kochia scoparia
Lactuca serriola
Lappula squarrosa
Linaria vulgaris
Lolium perenne
Lolium pratense
Malva rotundifolia
Matricaria matricarioides
Matricaria perforata
Medicago lupulina
Medicago sativa
*Melilotus alba**
Mentha spicata
Myriophyllum spicatum
Neslia paniculata
Onobrychis viciifolia
Phalaris canariensis
Phleum pratense
Plantago major
Poa annua
Poa compressa
Polygonum arenastrum
Polygonum aviculare
Polygonum convolvulus
Polygonum salicifolium
Potentilla argentea
Potentilla recta
Psathyrostachys juncea
Ranunculus acris
Ranunculus repens
Rumex acetosella
Rumex crispus
Rumex pseudonatronatus
Rumex stenophyllus
Salsola kali
Senecio vulgaris
Silene noctiflora
Silene pratensis
Silene vulgaris
Sisymbrium altissimum
Solanum tuberosum
Sonchus arvensis
Sonchus asper
Sorbus aucuparia
Spergula arvensis
Stellaria media
Syringa reticulata
Syringa vulgaris
Taraxacum officinale
Thlaspi arvense
Tragopogon dubius
Tragopogon pratensis
Trifolium hybridum
Trifolium pratense
Trifolium repens
Triticum aestivum
Ulmus pumila
Vaccaria pyramidata
Vicia cracca
Zea mays

Appendix 4b — Vascular Plant Guild Membership (Level 3)

Old Forest

Abies balsamea
Abies bifolia
Amerorchis rotundifolia
Aralia nudicaulis
Trientalis europaea

Burn Specialists

Alnus viridis
Alnus viridis ssp. crispa
Amelanchier alnifolia
Calamagrostis purpurascens
Chenopodium capitatum
Cirsium arvense
Corydalis aurea
Corylus cornuta
Epilobium angustifolium
Geranium bicknellii
Heracleum maximum
Picea mariana
Pinus banksiana
Pinus contorta
Populus tremuloides
Prunus pensylvanica
Rubus idaeus
Salix arbusculoides
Salix scouleriana
Trifolium hybridum

Early Seral

Alnus incana
Alnus incana ssp. tenuifolia
Alnus viridis
Alnus viridis ssp. crispa
Amelanchier alnifolia
Arctostaphylos uva-ursi
Aster laevis
Bromus inermis
Calamagrostis purpurascens
Castilleja hispida
Castilleja miniata
Corydalis aurea
Corylus cornuta
Dryas drummondii
Epilobium angustifolium
Equisetum laevigatum
Fragaria virginiana
Galium labradoricum
Geranium bicknellii
Pedicularis labradorica
Plantago major
Populus grandidentata
Prunus pensylvanica

Prunus virginiana
Salix scouleriana
Solidago canadensis
Sorbus scopulina
Taraxacum officinale
Urtica dioica
Viola adunca
Viola nephrophylla

Interior

Angelica dawsonii
Osmorhiza longistylis
Abies balsamea

High Responsibility

Astragalus purshii
Carex backii
Epilobium glaberrimum
Festuca campestris
Sarracenia purpurea
Stellaria crispa
Vaccinium uliginosum

Human-modified

Agropyron cristatum
Agrostis scabra
Agrostis stolonifera
Alopecurus pratensis
Amaranthus albus
Amaranthus retroflexus
Androsace septentrionalis
Anethum graveolens
Apocynum androsaemifolium
Arctium minus
Artemisia biennis
Artemisia campestris
Artemisia frigida
Artemisia ludoviciana
*Aster ascendens**
Avena fatua
Axyris amaranthoides
Bahia oppositifolia
Bidens cernua
Botrychium lunaria
Brassica kaber
Brassica napus
Brassica rapa
Bromus inermis
Bromus inermis ssp. pumpellianus
Bromus japonicus
Bromus tectorum
Camelina microcarpa

Capsella bursa-pastoris
Caragana arborescens
Carex bebbii
Carum carvi
Cerastium vulgatum
Chenopodium album
Chenopodium capitatum
Chenopodium leptophyllum
Chenopodium salinum
Chenopodium simplex
Chrysanthemum leucanthemum
Cinna latifolia
Cirsium arvense
Cirsium flodmanii
Cirsium vulgare
Collomia linearis
Corydalis aurea
Corylus cornuta
Crepis tectorum
Cynoglossum officinale
Dactylis glomerata
Descurainia sophia
Dracocephalum parviflorum
Elymus repens
Elymus trachycaulus
Elymus trachycaulus ssp. subsecundus
Elymus trachycaulus ssp. trachycaulus
Epilobium angustifolium
Epilobium palustre
Equisetum arvense
Equisetum hyemale
Erigeron acris
Erigeron philadelphicus
Erysimum cheiranthoides
Euphorbia esula
Fragaria virginiana
Galeopsis tetrahit
Galium aparine
Galium boreale
Gentianella amarella
Geranium bicknellii
Glyceria grandis
Glycyrrhiza lepidota
Gnaphalium palustre
Gnaphalium uliginosum
Grindelia squarrosa
Gutierrezia sarothrae
Gypsophila paniculata
Hedysarum alpinum
Helianthus annuus
*Helianthus subrhomboides**

Appendix 4b — Vascular Plant Guild Membership (Level 3) con't

Human-modified (con't)

Hieracium umbellatum
Hierochloa hirta ssp. *arctica*
Hippuris vulgaris
Hordeum jubatum
Hordeum vulgare
Juncus bufonius
Juncus compressus
Kochia scoparia
Lactuca serriola
Lactuca tatarica
Lappula squarrosa
Lepidium densiflorum
Lilium philadelphicum
Linaria vulgaris
Lolium perenne
Lolium pratense
Lysimachia ciliata
Malva rotundifolia
Matricaria matricarioides
Matricaria perforata
Matteuccia struthiopteris
Medicago lupulina
Medicago sativa
*Mellilotus alba**
Mentha spicata
Menyanthes trifoliata
Monarda fistulosa
Monolepis nuttalliana
Onobrychis viciifolia
Orobanche fasciculata
Orthocarpus luteus
Panicum capillare
Pastinaca sativa
Phalaris canariensis
Phleum pratense
Plantago major
Plantago patagonica
Poa annua
Poa compressa
Poa palustris
Poa pratensis
Polygonum amphibium
Polygonum arenastrum
Polygonum aviculare
Polygonum convolvulus
Polygonum erectum
Polygonum lapathifolium
Polygonum salicifolium
Potentilla argentea
Potentilla arguta
Potentilla fruticosa
Potentilla norvegica

Potentilla recta
Prunella vulgaris
Prunus pensylvanica
Prunus virginiana
Psathyrostachys juncea
Ranunculus acris
Ranunculus gmelinii
Ranunculus pensylvanicus
Ranunculus repens
Ranunculus sceleratus
Rhinanthus borealis
Rosa acicularis
Rosa woodsii
Rubus idaeus
Rubus pubescens
Rumex acetosella
Rumex britannica
Rumex crispus
Rumex maritimus
Rumex pseudonatronatus
Rumex stenophyllus
Salix bebbiana
Salsola kali
Schedonnardus paniculatus
Scutellaria galericulata
Senecio congestus
Senecio eremophilus
Senecio vulgaris
Silene noctiflora
*Silene pratensis**
Silene vulgaris
Sisymbrium altissimum
Solanum triflorum
Solanum tuberosum
Solidago canadensis
Solidago mollis
Sonchus arvensis
Sonchus asper
Sorbus aucuparia
Spergula arvensis
Spiraea alba
Stellaria borealis
Stellaria calycantha
Stellaria media
Suaeda calceoliformis
Symphoricarpos occidentalis
Syringa reticulata
Syringa vulgaris
Taraxacum officinale
Thermopsis rhombifolia
Thlaspi arvense
Tragopogon dubius
Tragopogon pratensis

Trifolium hybridum
Trifolium pratense
Trifolium repens
Trisetum spicatum
Triticum aestivum
Typha latifolia
Ulmus pumila
Urtica dioica
*Vaccaria pyramidata**
Verbena bracteata
Veronica americana
Vicia americana
Vicia cracca
Xanthium strumarium
Zea mays

Weedy (Native to North America)

Agrostis scabra
Amaranthus albus
Amaranthus retroflexus
Apocynum androsaemifolium
Artemisia biennis
Artemisia campestris
Artemisia frigida
Artemisia ludoviciana
Bahia oppositifolia
Bidens cernua
Bromus carinatus
Bromus inermis ssp.
pumpellianus
Calamagrostis canadensis
Ceratophyllum demersum
Cinna latifolia
Corydalis aurea
Corylus cornuta
Epilobium angustifolium
Equisetum hyemale
Erysimum cheiranthoides
Geranium bicknellii
Gnaphalium palustre
Grindelia squarrosa
Gutierrezia sarothrae
Helianthus annuus
Hieracium umbellatum
Hippuris vulgaris
Hordeum jubatum
Hordeum vulgare
Juncus bufonius
Lactuca tatarica
Lemna minor
Lepidium densiflorum
Lygodesmia juncea

Appendix 4b — Vascular Plant Guild Membership (Level 3) con't

Human-modified (con't)

Monarda fistulosa
Monolepis nuttalliana
Oplopanax horridum
Orobanche fasciculata
Panicum capillare
Pastinaca sativa
Physostegia parviflora
Plantago patagonica
Poa pratensis
Polygonum erectum
Polygonum lapathifolium
Potentilla fruticosa
Potentilla norvegica
Rosa acicularis
Schedonnardus paniculatus
Senecio eremophilus
Solanum triflorum
Solidago canadensis
Suaeda calceoliformis
Thermopsis rhombifolia
Urtica dioica
Verbena bracteata
Xanthium strumarium

Form - Forb

Achillea millefolium
Achillea sibirica
Aconitum delphiniifolium
Acorus americanus
Actaea rubra
Adoxa moschatellina
Agastache foeniculum
Agoseris aurantiaca
Agoseris glauca
Agrimonia striata
Alisma gramineum
Alisma triviale
Allium cernuum
Allium textile
Amaranthus albus
Amaranthus retroflexus
Amerorchis rotundifolia
Andromeda polifolia
Androsace occidentalis
Androsace septentrionalis
Anemone canadensis
Anemone cylindrica
Anemone multifida
Anemone patens
Anemone riparia
Anethum graveolens

Angelica dawsonii
Angelica genuflexa
Antennaria anaphaloides
Antennaria microphylla
Antennaria neglecta
Antennaria rosea
Apocynum androsaemifolium
Aquilegia brevistyla
Arabis hirsuta
Arabis lyrata
Aralia nudicaulis
Arctium minus
Arnica angustifolia
Arnica chamissonis
Arnica cordifolia
Arnica lonchophylla
Artemisia biennis
Artemisia campestris
Artemisia frigida
Artemisia ludoviciana
Artemisia norvegica
Asclepias ovalifolia
Aster ascendens
Aster borealis
Aster brachyactis
Aster ciliolatus
Aster conspicuus
Aster ericoides
Aster hesperius
Aster laevis
Aster modestus
Aster puniceus
Aster umbellatus
Astragalus alpinus
Astragalus americanus
Astragalus australis
Astragalus bodinii
Astragalus canadensis
*Astragalus dasyglottis**
Astragalus drummondii
Astragalus eucosmus
Astragalus flexuosus
Astragalus laxmannii
Astragalus miser
Astragalus pectinatus
Astragalus purshii
Astragalus vexilliflexus
Axyris amaranthoides
Bahia oppositifolia
Barbarea orthocera
Bidens cernua
Brassica kaber

Brassica napus
Brassica rapa
Calla palustris
Callitriche hermaphroditica
*Callitriche palustris**
*Callitriche verna**
Caltha natans
Caltha palustris
Calypto bulbosa
Camelina microcarpa
Campanula rotundifolia
Capsella bursa-pastoris
Cardamine pensylvanica
Carum carvi
Castilleja hispida
Castilleja miniata
Castilleja occidentalis
Castilleja raupii
Cerastium arvense
Cerastium nutans
Cerastium vulgatum
Ceratophyllum demersum
Chamaerhodos erecta
Chenopodium album
Chenopodium capitatum
Chenopodium leptophyllum
Chenopodium pratericola
Chenopodium rubrum
Chenopodium salinum
Chenopodium simplex
Chrysanthemum leucanthemum
Chrysozplenium tetrandrum
Cicuta bulbifera
Cicuta maculata
Circaea alpina
Cirsium arvense
Cirsium drummondii
Cirsium flodmanii
Cirsium hookerianum
Cirsium undulatum
Cirsium vulgare
Clematis occidentalis
Coeloglossum viride
Collomia linearis
Comandra umbellata
Comarum palustre
Coptis trifolia
Corallorrhiza maculata
Corallorrhiza striata
Corallorrhiza trifida
Cornus canadensis
Corydalis aurea

Appendix 4b — Vascular Plant Guild Membership (Level 3) con't

Form - Forb (con't)

<i>Corylus cornuta</i>	<i>Geum aleppicum</i>	<i>Lycopodium annotinum</i>
<i>Crepis runcinata</i>	<i>Geum macrophyllum</i>	<i>Lycopodium clavatum</i>
<i>Crepis tectorum</i>	<i>Geum rivale</i>	<i>Lycopodium obscurum</i>
<i>Cynoglossum officinale</i>	<i>Geum triflorum</i>	<i>Lycopus americanus</i>
<i>Cypripedium acaule</i>	<i>Glycyrrhiza lepidota</i>	<i>Lycopus asper</i>
<i>Cypripedium passerinum</i>	<i>Gnaphalium palustre</i>	<i>Lycopus uniflorus</i>
<i>Dalea purpurea</i>	<i>Gnaphalium uliginosum</i>	<i>Lygodesmia juncea</i>
<i>Delphinium glaucum</i>	<i>Goodyera repens</i>	<i>Lysimachia ciliata</i>
<i>Descurainia sophia</i>	<i>Grindelia squarrosa</i>	<i>Lysimachia thyrsoiflora</i>
<i>Diphasiastrum complanatum</i>	<i>Gypsophila paniculata</i>	<i>Machaeranthera canescens</i>
<i>Diphasiastrum sitchense</i>	<i>Hackelia jessicae</i>	<i>Maianthemum canadense</i>
<i>Disporum trachycarpum</i>	<i>Halenia deflexa</i>	<i>Maianthemum racemosum</i> ssp. <i>amplexicaule</i>
<i>Dodecatheon conjugens</i>	<i>Hedeoma hispida</i>	<i>Maianthemum stellatum</i>
<i>Dodecatheon pulchellum</i>	<i>Hedysarum alpinum</i>	<i>Maianthemum trifolium</i>
<i>Dracocephalum parviflorum</i>	<i>Hedysarum boreale</i>	<i>Malva rotundifolia</i>
<i>Drosera anglica</i>	<i>Hedysarum sulphurescens</i>	<i>Matricaria matricarioides</i>
<i>Drosera rotundifolia</i>	<i>Helianthus annuus</i>	<i>Matricaria perforata</i>
<i>Elodea canadensis</i>	<i>Helianthus nuttallii</i>	<i>Medicago lupulina</i>
<i>Epilobium angustifolium</i>	<i>Helianthus subrhomboideus</i>	<i>Medicago sativa</i>
<i>Epilobium ciliatum</i>	<i>Heracleum maximum</i>	<i>Melampyrum lineare</i>
<i>Epilobium glaberrimum</i>	<i>Heterotheca villosa</i>	<i>Melilotus alba</i>
<i>Epilobium hornemannii</i>	<i>Heuchera richardsonii</i>	<i>Mentha arvensis</i>
<i>Epilobium leptocarpum</i>	<i>Hieracium umbellatum</i>	<i>Mentha spicata</i>
<i>Epilobium leptophyllum</i>	<i>Hierochloa hirta</i> ssp. <i>arctica</i>	<i>Menyanthes trifoliata</i>
<i>Epilobium palustre</i>	<i>Hippuris vulgaris</i>	<i>Mertensia paniculata</i>
<i>Erigeron acris</i>	<i>Hymenoxys richardsonii</i>	<i>Mitella nuda</i>
<i>Erigeron caespitosus</i>	<i>Impatiens capensis</i>	<i>Moehringia lateriflora</i>
<i>Erigeron elatus</i>	<i>Iva axillaris</i>	<i>Monarda fistulosa</i>
<i>Erigeron glabellus</i>	<i>Kochia scoparia</i>	<i>Moneses uniflora</i>
<i>Erigeron philadelphicus</i>	<i>Lactuca scariola</i>	<i>Monolepis nuttalliana</i>
<i>Erigeron pumilus</i>	<i>Lactuca tatarica</i>	<i>Monotropa uniflora</i>
<i>Erigeron speciosus</i>	<i>Lappula squarrosa</i>	<i>Myriophyllum alterniflorum</i>
<i>Eriogonum flavum</i>	<i>Lathyrus ochroleucus</i>	<i>Myriophyllum sibiricum</i>
<i>Erysimum cheiranthoides</i>	<i>Lathyrus palustris</i>	<i>Myriophyllum spicatum</i>
<i>Erysimum inconspicuum</i>	<i>Lathyrus venosus</i>	<i>Myriophyllum verticillatum</i>
<i>Euphorbia esula</i>	<i>Lemna minor</i>	<i>Neslia paniculata</i>
<i>Eurotia lanata</i>	<i>Lemna trisulca</i>	<i>Nuphar lutea</i> (L.) Sm. ssp. <i>variegata</i>
<i>Fragaria vesca</i>	<i>Lemna turionifera</i>	<i>Nymphaea tetragona</i>
<i>Fragaria virginiana</i>	<i>Lepidium densiflorum</i>	<i>Oligoneuron rigidum</i>
<i>Gaillardia aristata</i>	<i>Liatris ligulistylis</i>	<i>Onobrychis viciifolia</i>
<i>Galeopsis tetrahit</i>	<i>Liatris punctata</i>	<i>Onosmodium molle</i>
<i>Galium aparine</i>	<i>Lilium philadelphicum</i>	<i>Orobanche fasciculata</i>
<i>Galium boreale</i>	<i>Linaria vulgaris</i>	<i>Orthilia secunda</i>
<i>Galium labradoricum</i>	<i>Linnaea borealis</i>	<i>Orthocarpus luteus</i>
<i>Galium trifidum</i>	<i>Linum lewisii</i>	<i>Osmorhiza depauperata</i>
<i>Galium triflorum</i>	<i>Linum rigidum</i>	<i>Osmorhiza longistylis</i>
<i>Gaura coccinea</i>	<i>Listera borealis</i>	<i>Oxytropis deflexa</i>
<i>Gentianella amarella</i>	<i>Listera cordata</i>	<i>Oxytropis monticola</i>
<i>Geocaulon lividum</i>	<i>Lithospermum incisum</i>	<i>Oxytropis sericea</i>
<i>Geranium bicknellii</i>	<i>Lithospermum ruderale</i>	<i>Oxytropis splendens</i>
<i>Geranium richardsonii</i>	<i>Lobelia kalmii</i>	<i>Parnassia palustris</i>
<i>Geranium viscosissimum</i>	<i>Lupinus pusillus</i>	
	<i>Lupinus sericeus</i>	

Appendix 4b — Vascular Plant Guild Membership (Level 3) con't

Form - Forb (con't)

<i>Pastinaca sativa</i>	<i>Potentilla bipinnatifida</i>	<i>Senecio canus</i>
<i>Pedicularis bracteosa</i>	<i>Potentilla diversifolia</i>	<i>Senecio congestus</i>
<i>Pedicularis groenlandica</i>	<i>Potentilla gracilis</i>	<i>Senecio eremophilus</i>
<i>Pedicularis labradorica</i>	<i>Potentilla hippiana</i>	<i>Senecio integerrimus</i>
<i>Pedicularis parviflora</i>	<i>Potentilla norvegica</i>	<i>Senecio pauciflorus</i>
<i>Penstemon albertinus</i>	<i>Potentilla paradoxa</i>	<i>Senecio pauperculus</i>
<i>Penstemon albidus</i>	<i>Potentilla pensylvanica</i>	<i>Senecio triangularis</i>
<i>Penstemon confertus</i>	<i>Potentilla recta</i>	<i>Senecio vulgaris</i>
<i>Penstemon gracilis</i>	<i>Potentilla tridentata</i>	<i>Silene menziesii</i>
<i>Penstemon procerus</i>	<i>Primula incana</i>	<i>Silene noctiflora</i>
<i>Petasites frigidus</i>	<i>Prunella vulgaris</i>	<i>Silene pratensis*</i>
<i>Petasites frigidus var. palmatus</i>	<i>Psoralea argophylla</i>	<i>Silene vulgaris</i>
<i>Petasites sagittatus</i>	<i>Pyrola asarifolia</i>	<i>Sisymbrium altissimum</i>
<i>Petasites X vitifolius</i>	<i>Pyrola chlorantha</i>	<i>Sisyrinchium montanum</i>
<i>Phlox hoodii</i>	<i>Pyrola elliptica</i>	<i>Sium suave</i>
<i>Physostegia parviflora</i>	<i>Pyrola minor</i>	<i>Solanum triflorum</i>
<i>Plantago major</i>	<i>Ranunculus cymbalaria</i>	<i>Solanum tuberosum</i>
<i>Plantago patagonica</i>	<i>Ranunculus abortivus</i>	<i>Solidago canadensis</i>
<i>Platanthera dilatata</i>	<i>Ranunculus acris</i>	<i>Solidago gigantea</i>
<i>Platanthera dilatata</i>	<i>Ranunculus aquatilis</i>	<i>Solidago graminifolia</i>
<i>Platanthera hyperborea</i>	<i>Ranunculus cardiophyllus</i>	<i>Solidago missouriensis</i>
<i>Platanthera obtusata</i>	<i>Ranunculus gmelinii</i>	<i>Solidago mollis</i>
<i>Platanthera orbiculata</i>	<i>Ranunculus inamoenus</i>	<i>Solidago multiradiata</i>
<i>Polemonium acutiflorum</i>	<i>Ranunculus lapponicus</i>	<i>Solidago nemoralis</i>
<i>Polygonum amphibium</i>	<i>Ranunculus macounii</i>	<i>Solidago simplex ssp. simplex</i>
<i>Polygonum arenastrum</i>	<i>Ranunculus pensylvanicus</i>	<i>Sonchus arvensis</i>
<i>Polygonum aviculare</i>	<i>Ranunculus repens</i>	<i>Sonchus asper</i>
<i>Polygonum bistortoides</i>	<i>Ranunculus reptans*</i>	<i>Spergula arvensis</i>
<i>Polygonum coccineum</i>	<i>Ranunculus sceleratus</i>	<i>Sphaeralcea coccinea</i>
<i>Polygonum convolvulus</i>	<i>Ranunculus uncinatus</i>	<i>Spiranthes romanzoffiana</i>
<i>Polygonum erectum</i>	<i>Ratibida columnifera</i>	<i>Spirodela polyrhiza</i>
<i>Polygonum lapathifolium</i>	<i>Rhinanthus borealis</i>	<i>Stachys palustris</i>
<i>Polygonum salicifolium</i>	<i>Rorippa palustris</i>	<i>Stellaria borealis</i>
<i>Polygonum viviparum</i>	<i>Rubus arcticus</i>	<i>Stellaria calycantha</i>
<i>Potamogeton alpinus</i>	<i>Rubus chamaemorus</i>	<i>Stellaria crassifolia</i>
<i>Potamogeton filiformis</i>	<i>Rubus pedatus</i>	<i>Stellaria crispa</i>
<i>Potamogeton friesii</i>	<i>Rubus pubescens</i>	<i>Stellaria longifolia</i>
<i>Potamogeton gramineus</i>	<i>Rumex acetosella</i>	<i>Stellaria longipes</i>
<i>Potamogeton natans</i>	<i>Rumex britannica</i>	<i>Stellaria media</i>
<i>Potamogeton nodosus</i>	<i>Rumex crispus</i>	<i>Stenanthium occidentale</i>
<i>Potamogeton obtusifolius</i>	<i>Rumex maritimus</i>	<i>Streptopus amplexifolius</i>
<i>Potamogeton pectinatus</i>	<i>Rumex occidentalis</i>	<i>Suaeda calceoliformis</i>
<i>Potamogeton praelongus</i>	<i>Rumex pseudonatronatus</i>	<i>Taraxacum officinale</i>
<i>Potamogeton pusillus*</i>	<i>Rumex stenophyllus</i>	<i>Thalictrum dasycarpum</i>
<i>Potamogeton richardsonii</i>	<i>Rumex triangulivalvis*</i>	<i>Thalictrum occidentale</i>
<i>Potamogeton robbinsii</i>	<i>Ruppia cirrhosa*</i>	<i>Thalictrum sparsiflorum</i>
<i>Potamogeton vaginatus*</i>	<i>Sagittaria cuneata</i>	<i>Thalictrum venulosum</i>
<i>Potamogeton zosteriformis</i>	<i>Salsola kali</i>	<i>Thermopsis rhombifolia</i>
<i>Potentilla anserina*</i>	<i>Sanicula marilandica</i>	<i>Thlaspi arvense</i>
<i>Potentilla argentea</i>	<i>Sarracenia purpurea</i>	<i>Tiarella trifoliata</i>
<i>Potentilla arguta</i>	<i>Scheuchzeria palustris</i>	<i>Tofieldia glutinosa</i>
<i>Potentilla bimundorum</i>	<i>Scutellaria galericulata</i>	<i>Tofieldia pusilla</i>
	<i>Selaginella densa</i>	<i>Tragopogon dubius</i>

Appendix 4b — Vascular Plant Guild Membership (Level 3) con't

Form - Forb (con't)

Tragopogon pratensis
Trientalis borealis
Trientalis europaea
Trifolium hybridum
Trifolium pratense
Trifolium repens
Triglochin maritima
Triglochin palustre
Urtica dioica
Utricularia intermedia
Utricularia minor
Utricularia vulgaris
Vaccaria pyramidata
Valeriana dioica
Verbena bracteata
Veronica alpina
Veronica americana
Veronica peregrina
Veronica scutellata
Veronica serpyllifolia
Vicia americana
Vicia cracca
Viola adunca
Viola canadensis
Viola nephrophylla
Viola nuttallii
Viola palustris
Viola renifolia
Xanthium strumarium
Zigadenus elegans
Zigadenus venenosus
Zizia aptera

Form - Fern

Athyrium filix-femina
Botrychium lunaria
Botrychium virginianum
Cystopteris fragilis
Dryopteris carthusiana
Dryopteris expansa+
Gymnocarpium dryopteris
Matteuccia struthiopteris

Form - Graminoid

Agropyron cristatum
Agrostis scabra
Agrostis stolonifera
Alopecurus aequalis
Alopecurus pratensis
Avena fatua
Beckmannia syzigachne
Bouteloua gracilis

Bromus carinatus
Bromus ciliatus
Bromus inermis
Bromus inermis ssp.
pumpellianus
Bromus japonicus
Bromus tectorum
Calamagrostis canadensis
Calamagrostis purpurascens
Calamagrostis stricta
Calamovilfa longifolia
Carex adusta
Carex aenea
Carex aquatilis
Carex arcta
Carex atherodes
Carex athrostachya
Carex aurea
Carex backii
Carex bebbii
Carex brevior
Carex brunnescens
Carex canescens
Carex capillaris
Carex chordorrhiza
Carex concinna
Carex crawei
Carex crawfordii
Carex deweyana
Carex diandra
Carex disperma
Carex douglasii
Carex filifolia
Carex garberi
Carex gynocrates
Carex heleonastes
Carex interior
Carex lacustris
Carex lasiocarpa
Carex leptalea
Carex limosa
Carex livida
Carex loliacea
Carex magellanica ssp. irrigua
Carex microglochin
Carex microptera
Carex norvegica
Carex pauciflora
Carex peckii
Carex pellita
Carex pensylvanica
Carex praegracilis
Carex prairea

Carex praticola
Carex pseudocyperus
Carex raymondii
Carex richardsonii
Carex rossii
Carex rostrata
Carex sartwellii
Carex saxatilis
Carex scirpoidea
Carex siccata
Carex sprengelii
Carex stenophylla
Carex tenera
Carex tenuiflora
Carex tonsa
Carex trisperma
Carex utriculata
Carex viridula
Carex xerantica
Catabrosa aquatica
Cinna latifolia
Dactylis glomerata
Danthonia californica
Deschampsia caespitosa
Distichlis stricta
Eleocharis acicularis
Eleocharis erythropoda
Eleocharis palustris
Eleocharis quinqueflora
Elymus elymoides
Elymus piperi
Elymus repens
Elymus trachycaulus
Elymus trachycaulus ssp.
subsecundus
Elymus trachycaulus ssp.
trachycaulus
Eriophorum brachyantherum
Eriophorum chamissonis
Eriophorum gracile
Eriophorum polystachion
Eriophorum scheuchzeri
Eriophorum vaginatum
Eriophorum viridicarinatum
Festuca altaica
Festuca campestris
Festuca idahoensis
Festuca ovina
Festuca rubra
Festuca saximontana
Glyceria borealis
Glyceria grandis

Appendix 4b — Vascular Plant Guild Membership (Level 3) con't

Form - Graminoid (con't)

Glyceria striata
Hordeum jubatum
Hordeum vulgare
Juncus albescens
Juncus alpinoarticulatus
Juncus balticus
Juncus bufonius
Juncus compressus
Juncus dudleyi
Juncus longistylis
Juncus nodosus
Juncus tenuis
Juncus vaseyi
Kobresia simpliciuscula
Koeleria macrantha
Leymus innovatus
Lolium perenne
Lolium pratense
Luzula multiflora
Luzula parviflora
Muhlenbergia richardsonis
Oryzopsis asperifolia
Panicum capillare
Pascopyrum smithii
Phalaris arundinacea
Phalaris canariensis
Phleum pratense
Phragmites australis
Piptatherum pungens
Poa alpina
Poa annua
Poa arida
Poa compressa
Poa nemoralis ssp. interior
Poa palustris
Poa pratensis
Poa sandbergii
Psathyrostachys juncea
Puccinellia nuttalliana
Schedonnardus paniculatus
Schizachne purpurascens
Schoenoplectus acutus
Schoenoplectus
tabernaemontani
Scirpus cyperinus
Scirpus hudsonianus
Scirpus microcarpus
Scirpus pungens
Scolochloa festucacea
Sparganium angustifolium
Sparganium eurycarpum
Sparganium fluctuans

Sparganium minimum
Spartina gracilis
Sphenopholis intermedia
Stipa columbiana
Stipa comata
Stipa curtisetata
Stipa viridula
Trisetum spicatum
Triticum aestivum
Typha latifolia
Zea mays

Form - Horsetail

Equisetum arvense
Equisetum fluviatile
Equisetum hyemale
Equisetum laevigatum
Equisetum palustre
Equisetum pratense
Equisetum scirpoides
Equisetum sylvaticum
Equisetum variegatum

Form - Shrub

Alnus incana
Alnus incana ssp. tenuifolia
Alnus viridis
Alnus viridis ssp. crispa
Amelanchier alnifolia
Arceuthobium americanum
Arctostaphylos rubra
Arctostaphylos uva-ursi
Artemisia cana
Atriplex nuttallii
Betula glandulosa
Betula occidentalis
Betula pumila
Caragana arborescens
Cassiope tetragona
Chamaedaphne calyculata
Cornus stolonifera
Corydalis sempervirens
Coryphantha vivipara
Diervilla lonicera
Elaeagnus commutata
Empetrum nigrum
Gaultheria hispidula
Gutierrezia sarothrae
Juniperus horizontalis
Kalmia microphylla
Kalmia polifolia
Ledum groenlandicum
Ledum palustre

Lonicera caerulea
Lonicera dioica
Lonicera involucrata
Lonicera oblongifolia
Menziesia ferruginea
Myrica gale
Oplapanax horridum
Opuntia fragilis
Opuntia polyacantha
Paronychia sessiliflora
Potentilla concinna
Potentilla fruticosa
Prunus pensylvanica
Prunus virginiana
Rhamnus alnifolia
Ribes americanum
Ribes glandulosum
Ribes hirtellum
Ribes hudsonianum
Ribes lacustre
Ribes oxycanthoides
Ribes triste
Rosa acicularis
Rosa arkansana
Rosa woodsii
Rubus idaeus
Rubus parviflorus
Salix arbusculoides
Salix athabascensis
Salix barclayi
Salix bebbiana
Salix candida
Salix discolor
Salix drummondiana
Salix exigua
Salix farriae
Salix glauca
Salix glauca var. villosa
Salix lucida
Salix lutea
Salix maccalliana
Salix myrtilifolia
Salix pedicellaris
Salix petiolaris
Salix planifolia
Salix proluxa
Salix pseudomonticola
Salix pseudomyrsinites
Salix pyrifolia
Salix reticulata
Salix scouleriana
Salix serissima
Salix sitchensis

Appendix 4b — Vascular Plant Guild Membership (Level 3) con't

Form - Shrub (con't)

Shepherdia canadensis
Sorbus scopulina
Spiraea alba
Spiraea betulifolia
Symphoricarpos albus
Symphoricarpos occidentalis
Syringa vulgaris
Vaccinium caespitosum
Vaccinium membranaceum
Vaccinium myrtilloides
Vaccinium ovalifolium
Vaccinium oxycoccos
Vaccinium uliginosum
Vaccinium vitis-idaea
Viburnum edule
Viburnum opulus

Form - Tree

Abies balsamea
*Abies bifolia**
Acer negundo
Betula neoalaskana
Betula papyrifera
*Betula pendula**
Fraxinus pennsylvanica
Larix laricina
Larix occidentalis
Picea engelmannii
Picea glauca
Picea mariana
Picea pungens
Pinus banksiana
Pinus contorta
Populus balsamifera
Populus deltoides
Populus grandidentata
Populus tremuloides
Sambucus racemosa
Sorbus aucuparia
Syringa reticulata
Ulmus pumila

Riparian

Acer negundo
Achillea sibirica
Aconitum delphiniifolium
Acorus americanus
Actaea rubra
Agrostis scabra
Alnus incana
Alnus incana ssp. tenuifolia
Alnus viridis

Alnus viridis ssp. crispa
Alopecurus aequalis
Amelanchier alnifolia
Amerorchis rotundifolia
Anemone canadensis
Angelica genuflexa
Arabis hirsuta
Artemisia campestris
*Aster brachyactis**
Aster hesperius
Aster modestus
Aster puniceus
Astragalus alpinus
Astragalus americanus
Astragalus australis
Astragalus bodinii
Astragalus canadensis
Astragalus eucosmus
Athyrium filix-femina
Atriplex nuttallii
Barbarea orthocera
Beckmannia syzigachne
Betula neoalaskana
Betula occidentalis
Betula papyrifera
Betula pumila
Bidens cernua
Botrychium virginianum
Bromus ciliatus
Calamagrostis canadensis
Calamagrostis stricta
Callitriche hermaphroditica
Campanula rotundifolia
Cardamine pennsylvanica
Carex aquatilis
Carex arcta
Carex atherodes
Carex aurea
Carex bebbii
Carex canescens
Carex capillaris
Carex chordorrhiza
Carex concinna
Carex crawei
Carex diandra
Carex disperma
Carex garberi
Carex lasiocarpa
Carex limosa
Carex loliacea
Carex norvegica
Carex peckii
Carex pellita

Carex prairea
Carex raymondii
Carex saxatilis
Carex sprengei
Carex tenera
Carex utriculata
Carex viridula
Castilleja raupii
Catabrosa aquatica
Chenopodium capitatum
Cicuta maculata
Cinna latifolia
Comandra umbellata
Cornus stolonifera
Corydalis aurea
Corylus cornuta
Cystopteris fragilis
Delphinium glaucum
Deschampsia caespitosa
Disporum trachycarpum
Dryas drummondii
Dryopteris carthusiana
Elaeagnus commutata
Eleocharis acicularis
Elymus canadensis
*Elymus piperi**
Epilobium ciliatum
Epilobium glaberrimum
Epilobium hornemannii
Epilobium leptophyllum
Epilobium palustre
Equisetum arvense
Equisetum fluviatile
Equisetum hyemale
Equisetum palustre
Equisetum pratense
Equisetum sylvaticum
Equisetum variegatum
Erigeron acris
Erigeron philadelphicus
Eriophorum polystachion
Erysimum cheiranthoides
Euphorbia esula
Festuca rubra
Fragaria vesca
Fraxinus pennsylvanica
Galium trifidum
Galium triflorum
Geocaulon lividum
Geranium bicknellii
Geum aleppicum
Geum rivale
Glyceria borealis

Appendix 4b — Vascular Plant Guild Membership (Level 3) con't

Riparian (con't)

<i>Glyceria grandis</i>	<i>Polygonum amphibium</i>	<i>Salix petiolaris</i>
<i>Glyceria striata</i>	<i>Polygonum bistortoides</i>	<i>Salix planifolia</i>
<i>Gnaphalium palustre</i>	<i>Polygonum viviparum</i>	<i>Salix proluxa</i>
<i>Gymnocarpium dryopteris</i>	<i>Populus balsamifera</i>	<i>Salix pseudomyrsinites</i>
<i>Heracleum maximum</i>	<i>Populus deltoides</i>	<i>Salix pyrifolia</i>
<i>Hippuris vulgaris</i>	<i>Potamogeton alpinus</i>	<i>Salix scouleriana</i>
<i>Juncus alpinoarticulatus</i>	<i>Potamogeton friesii</i>	<i>Salix serissima</i>
<i>Juncus balticus</i>	<i>Potamogeton gramineus</i>	<i>Salix sitchensis</i>
<i>Juncus bufonius</i>	<i>Potamogeton natans</i>	<i>Scheuchzeria palustris</i>
<i>Juncus compressus</i>	<i>Potamogeton obtusifolius</i>	<i>Schoenoplectus</i>
<i>Juncus dudleyi</i>	<i>Potamogeton pectinatus</i>	<i>tabernaemontani</i>
<i>Juncus longistylis</i>	<i>Potamogeton richardsonii</i>	<i>Scirpus hudsonianus</i> *
<i>Juncus nodosus</i>	<i>Potamogeton zosteriformis</i>	<i>Scirpus microcarpus</i>
<i>Kalmia polifolia</i>	<i>Potentilla anserina</i>	<i>Scolochloa festucacea</i>
<i>Leymus innovatus</i>	<i>Potentilla bimundorum</i>	<i>Scutellaria galericulata</i>
<i>Lobelia kalmii</i>	<i>Potentilla norvegica</i>	<i>Senecio pauciflorus</i> *
<i>Lonicera caerulea</i>	<i>Primula incana</i>	<i>Shepherdia canadensis</i>
<i>Lonicera dioica</i>	<i>Prunus pensylvanica</i>	<i>Solidago gigantea</i>
<i>Lonicera involucrata</i>	<i>Prunus virginiana</i>	<i>Solidago graminifolia</i>
<i>Lonicera oblongifolia</i>	<i>Ranunculus cymbalaria</i>	<i>Solidago simplex ssp. simplex</i>
<i>Luzula multiflora</i>	<i>Ranunculus abortivus</i>	<i>Sparganium angustifolium</i>
<i>Luzula parviflora</i>	<i>Ranunculus gmelinii</i>	<i>Sparganium eurycarpum</i>
<i>Lycopus americanus</i>	<i>Ranunculus inamoenus</i>	<i>Sparganium fluctuans</i>
<i>Lycopus asper</i>	<i>Ranunculus pensylvanicus</i>	<i>Sphenopholis intermedia</i>
<i>Lycopus uniflorus</i>	<i>Ranunculus reptans</i> *	<i>Spiraea alba</i>
<i>Lysimachia ciliata</i>	<i>Ranunculus sceleratus</i>	<i>Stachys palustris</i>
<i>Lysimachia thyriflora</i>	<i>Ranunculus uncinatus</i>	<i>Stellaria borealis</i>
<i>Maianthemum racemosum ssp.</i>	<i>Rhamnus alnifolia</i>	<i>Stellaria calycantha</i>
<i>amplexicaule</i>	<i>Ribes americanum</i>	<i>Stellaria longipes</i>
<i>Maianthemum stellatum</i>	<i>Ribes hudsonianum</i>	<i>Stenanthium occidentale</i>
<i>Matteuccia struthiopteris</i>	<i>Ribes lacustre</i>	<i>Streptopus amplexifolius</i>
<i>Mentha arvensis</i>	<i>Rorippa palustris</i>	<i>Thalictrum occidentale</i>
<i>Mertensia paniculata</i>	<i>Rosa acicularis</i>	<i>Tiarella trifoliata</i>
<i>Mitella nuda</i>	<i>Rubus idaeus</i>	<i>Typha latifolia</i>
<i>Moehringia lateriflora</i>	<i>Rumex maritimus</i>	<i>Urtica dioica</i>
<i>Moneses uniflora</i>	<i>Rumex pseudonatronatus</i>	<i>Valeriana dioica</i>
<i>Muhlenbergia richardsonis</i>	<i>Rumex stenophyllus</i>	<i>Veronica americana</i>
<i>Myrica gale</i>	<i>Rumex triangulivalvis</i> *	<i>Veronica scutellata</i>
<i>Myriophyllum sibiricum</i>	<i>Salix arbusculoides</i>	<i>Viburnum edule</i>
<i>Myriophyllum verticillatum</i>	<i>Salix athabascensis</i>	<i>Viburnum opulus</i>
<i>Onosmodium molle</i>	<i>Salix barclayi</i>	<i>Viola nephrophylla</i>
<i>Oryzopsis asperifolia</i>	<i>Salix bebbiana</i>	<i>Viola palustris</i>
<i>Osmorhiza longistylis</i>	<i>Salix candida</i>	<i>Zizia aptera</i>
<i>Oxytropis deflexa</i>	<i>Salix discolor</i>	
<i>Oxytropis monticola</i>	<i>Salix drummondiana</i>	Nitrogen fixers
<i>Oxytropis splendens</i>	<i>Salix exigua</i>	<i>Alnus incana</i>
<i>Pedicularis groenlandica</i>	<i>Salix farriae</i>	<i>Alnus incana ssp. tenuifolia</i>
<i>Petasites frigidus</i>	<i>Salix glauca</i>	<i>Alnus viridis</i>
<i>Physostegia parviflora</i>	<i>Salix glauca var. villosa</i>	<i>Alnus viridis ssp. crispa</i>
<i>Picea mariana</i>	<i>Salix lucida</i>	<i>Astragalus alpinus</i>
<i>Platanthera hyperborea</i>	<i>Salix lutea</i>	<i>Astragalus australis</i>
<i>Poa palustris</i>	<i>Salix maccalliana</i>	<i>Astragalus bodinii</i>
	<i>Salix myrtillifolia</i>	<i>Astragalus dasyglottis</i>

Appendix 4b — Vascular Plant Guild Membership (Level 3) con't

Nitrogen Fixers cont'd

Astragalus drummondii
Astragalus eucosmus
Astragalus flexuosus
Astragalus laxmannii
Astragalus miser
Astragalus pectinatus
Astragalus purshii
Dalea purpurea
Dalea purpurea var. *purpurea*
Hedysarum alpinum
Hedysarum boreale
Hedysarum sulphurescens
Lathyrus ochroleucus
Lathyrus palustris
Lathyrus venosus
Lupinus pusillus
Lupinus sericeus
Medicago lupulina
Medicago sativa
Melilotus alba
Myrica gale
Oxytropis deflexa
Oxytropis monticola
Oxytropis sericea
Oxytropis splendens
Psoralea argophylla
Trifolium hybridum
Trifolium pratense
Trifolium repens
Vicia americana
Vicia cracca

Edible fruit producers

Alnus incana ssp. *tenuifolia*
Alnus viridis
Alopecurus aequalis
Alopecurus pratensis
Amelanchier alnifolia
Aralia nudicaulis
Arctostaphylos rubra
Arctostaphylos uva-ursi
Beckmannia syzigachne
Bromus carinatus
Bromus ciliatus
Bromus inermis
Bromus tectorum
Calamagrostis canadensis
Calamagrostis purpurascens
Calamagrostis stricta
Calamovilfa longifolia
Catabrosa aquatica
Comarum palustre

Cornus canadensis
Cornus stolonifera
Corydalis sempervirens
Danthonia californica
Elaeagnus commutata
Empetrum nigrum
Fragaria vesca
Fragaria virginiana

Edible fruit producers (con't)

Fragaria virginiana
Gaultheria hispidula
Geocaulon lividum
Glyceria borealis
Glyceria grandis
Helianthus annuus
Helianthus nuttallii
Helianthus subrhomboideus
Hordeum jubatum
Hordeum vulgare
Juniperus horizontalis
Lonicera caerulea
Lonicera involucrata
Maianthemum canadense
Maianthemum racemosum ssp.
amplexicaule
Muhlenbergia richardsonis
Opuntia fragilis
Opuntia polyacantha
Poa arida
Poa palustris
Poa pratensis
*Poa sandbergii**
Prunus pensylvanica
Prunus virginiana
Psathyrostachys juncea
Ribes americanum
Ribes glandulosum
Ribes hirtellum
Ribes hudsonianum
Ribes lacustre
Ribes oxycanthoides
Ribes triste
Rosa acicularis
Rosa arkansana
Rosa woodsii
Rubus arcticus
Rubus chamaemorus
Rubus idaeus
Rubus parviflorus
Rubus pedatus
Rubus pubescens
Sambucus racemosa

Shepherdia canadensis
Solanum triflorum
Solanum tuberosum
Sorbus aucuparia
Sorbus scopulina
Stipa columbiana
Streptopus amplexifolius
Triticum aestivum
Vaccinium caespitosum
Vaccinium membranaceum
Vaccinium myrtilloides
Vaccinium ovalifolium
Vaccinium oxycoccos
Vaccinium uliginosum
Vaccinium vitis-idaea
Viburnum edule
Viburnum opulus

Fruit type — achene

Achillea millefolium
Achillea sibirica
Agoseris aurantiaca
Agoseris glauca
Agrimonia striata
Alisma gramineum
Alisma triviale
Anemone canadensis
Anemone cylindrica
Anemone multifida
Anemone patens
Anemone riparia
Anethum graveolens
Antennaria anaphaloides
Antennaria microphylla
Antennaria neglecta
Antennaria rosea
Arctium minus
Arnica angustifolia
Arnica chamissonis
Arnica cordifolia
Arnica lonchophylla
Artemisia biennis
Artemisia campestris
Artemisia cana
Artemisia frigida
Artemisia ludoviciana
Artemisia norvegica
Aster ascendens
Aster borealis
Aster brachyactis
Aster ciliolatus
Aster conspicuus
Aster ericoides

Appendix 4b — Vascular Plant Guild Membership (Level 3) con't

Fruit type — achen (cont'd)

<i>Aster hesperius</i>	<i>Carex richardsonii</i>	<i>Eriophorum polystachion*</i>
<i>Aster laevis</i>	<i>Carex rossii</i>	<i>Eriophorum scheuchzeri</i>
<i>Aster modestus</i>	<i>Carex rostrata</i>	<i>Eriophorum vaginatum</i>
<i>Aster puniceus</i>	<i>Carex sartwellii</i>	<i>Eriophorum viridicarinatum</i>
<i>Aster umbellatus</i>	<i>Carex saxatilis</i>	<i>Gaillardia aristata</i>
<i>Bahia oppositifolia</i>	<i>Carex scirpoidea</i>	<i>Geum aleppicum</i>
<i>Bidens cernua</i>	<i>Carex siccata</i>	<i>Geum macrophyllum</i>
<i>Carex adusta</i>	<i>Carex sprengei</i>	<i>Geum rivale</i>
<i>Carex aenea</i>	<i>Carex stenophylla*</i>	<i>Geum triflorum</i>
<i>Carex aquatilis</i>	<i>Carex tenera</i>	<i>Gnaphalium palustre</i>
<i>Carex arcta</i>	<i>Carex tenuiflora</i>	<i>Gnaphalium uliginosum</i>
<i>Carex atherodes</i>	<i>Carex tonsa</i>	<i>Grindelia squarrosa</i>
<i>Carex athrostachya</i>	<i>Carex trisperma</i>	<i>Gutierrezia sarothrae</i>
<i>Carex aurea</i>	<i>Carex utriculata</i>	<i>Helianthus annuus</i>
<i>Carex backii</i>	<i>Carex vaginata</i>	<i>Helianthus nuttallii</i>
<i>Carex bebbii</i>	<i>Carex viridula</i>	<i>Helianthus subrhomboideus*</i>
<i>Carex brevior</i>	<i>Carex xerantica</i>	<i>Heterotheca villosa</i>
<i>Carex brunnescens</i>	<i>Ceratophyllum demersum</i>	<i>Hieracium umbellatum</i>
<i>Carex canescens</i>	<i>Chamaerhodos erecta</i>	<i>Hierochloa hirta</i> ssp. <i>arctica</i>
<i>Carex capillaris</i>	<i>Chenopodium capitatum</i>	<i>Hymenoxys richardsonii</i>
<i>Carex chordorrhiza</i>	<i>Chenopodium leptophyllum</i>	<i>Iva axillaris</i>
<i>Carex concinna</i>	<i>Chenopodium pratericola</i>	<i>Kobresia simpliciuscula</i>
<i>Carex crawei</i>	<i>Chenopodium rubrum</i>	<i>Lactuca serriola</i>
<i>Carex crawfordii</i>	<i>Chenopodium salinum</i>	<i>Lactuca tatarica</i>
<i>Carex deweyana</i>	<i>Chenopodium simplex</i>	<i>Liatris ligulistylis</i>
<i>Carex diandra</i>	<i>Chrysanthemum leucanthemum</i>	<i>Liatris punctata</i>
<i>Carex disperma</i>	<i>Cirsium arvense</i>	<i>Lygodesmia juncea</i>
<i>Carex douglasii</i>	<i>Cirsium drummondii</i>	<i>Machaeranthera canescens</i>
<i>Carex filifolia</i>	<i>Cirsium flodmanii</i>	<i>Matricaria matricarioides</i>
<i>Carex garberi</i>	<i>Cirsium hookerianum</i>	<i>Matricaria perforata</i>
<i>Carex gynocrates</i>	<i>Cirsium undulatum</i>	<i>Oligoneuron rigidum</i>
<i>Carex heleonastes</i>	<i>Cirsium vulgare</i>	<i>Petasites frigidus</i>
<i>Carex interior</i>	<i>Clematis occidentalis</i>	<i>Petasites frigidus</i> var. <i>palmatus</i>
<i>Carex lacustris</i>	<i>Comandra umbellata</i>	<i>Petasites sagittatus</i>
<i>Carex lasiocarpa</i>	<i>Coptis trifolia</i>	<i>Petasites X vitifolius</i>
<i>Carex leptalea</i>	<i>Crepis runcinata</i>	<i>Polygonum amphibium</i>
<i>Carex limosa</i>	<i>Crepis tectorum</i>	<i>Polygonum arenastrum</i>
<i>Carex livida</i>	<i>Dryas drummondii</i>	<i>Polygonum aviculare</i>
<i>Carex loliacea</i>	<i>Eleocharis acicularis</i>	<i>Polygonum bistortoides</i>
<i>Carex magellanica</i> ssp. <i>irrigua</i>	<i>Eleocharis erythropoda</i>	<i>Polygonum coccineum*</i>
<i>Carex microglochis</i>	<i>Eleocharis palustris</i>	<i>Polygonum convolvulus</i>
<i>Carex microptera</i>	<i>Eleocharis quinqueflora</i>	<i>Polygonum erectum</i>
<i>Carex norvegica</i>	<i>Erigeron acris</i>	<i>Polygonum lapathifolium</i>
<i>Carex pauciflora</i>	<i>Erigeron caespitosus</i>	<i>Polygonum salicifolium</i>
<i>Carex peckii</i>	<i>Erigeron elatus</i>	<i>Polygonum viviparum</i>
<i>Carex pellita</i>	<i>Erigeron glabellus</i>	<i>Potamogeton alpinus</i>
<i>Carex pensylvanica</i>	<i>Erigeron philadelphicus</i>	<i>Potamogeton filiformis*</i>
<i>Carex praegracilis</i>	<i>Erigeron pumilus</i>	<i>Potamogeton friesii</i>
<i>Carex prairea</i>	<i>Erigeron speciosus</i>	<i>Potamogeton gramineus</i>
<i>Carex praticola</i>	<i>Eriogonum flavum</i>	<i>Potamogeton natans</i>
<i>Carex pseudocyperus</i>	<i>Eriophorum brachyantherum</i>	<i>Potamogeton nodosus</i>
<i>Carex raymondii</i>	<i>Eriophorum chamissonis</i>	<i>Potamogeton obtusifolius</i>
	<i>Eriophorum gracile</i>	<i>Potamogeton pectinatus*</i>

Appendix 4b — Vascular Plant Guild Membership (Level 3) con't

Fruit type — achene (con't)

Potamogeton praelongus
*Potamogeton pusillus**
Potamogeton richardsonii
Potamogeton robbinsii
*Potamogeton vaginatus**
Potamogeton zosteriformis
*Potentilla anserina**
Potentilla argentea
Potentilla arguta
Potentilla bimundorum
Potentilla bipinnatifida
Potentilla concinna
Potentilla diversifolia
Potentilla fruticosa
Potentilla gracilis
Potentilla hippiana
Potentilla norvegica
Potentilla paradoxa
Potentilla pensylvanica
Potentilla recta
Potentilla tridentata
Ranunculus cymbalaria
Ranunculus abortivus
Ranunculus acris
Ranunculus aquatilis
Ranunculus cardiophyllus
Ranunculus gmelinii
Ranunculus inamoenus
Ranunculus lapponicus
Ranunculus macounii
Ranunculus pensylvanicus
Ranunculus repens
*Ranunculus reptans**
Ranunculus sceleratus
Ranunculus uncinatus
Ratibida columnifera
Rumex acetosella
Rumex britannica
Rumex crispus
Rumex maritimus
Rumex occidentalis
Rumex pseudonatronatus
Rumex stenophyllus
*Rumex triangulivalvis**
Sagittaria cuneata
Schoenoplectus acutus
Schoenoplectus
tabernaemontani
Scirpus cyperinus
*Scirpus hudsonianus**
Scirpus microcarpus
*Scirpus pungens**

*Senecio canus**
Senecio congestus
Senecio eremophilus
Senecio integerrimus
*Senecio pauciflorus**
*Senecio pauperculus**
Senecio triangularis
Senecio vulgaris
Solidago canadensis
Solidago gigantea
Solidago graminifolia
Solidago missouriensis
Solidago mollis
Solidago multiradiata
Solidago nemoralis
Solidago simplex ssp. simplex
Sonchus arvensis
Sonchus asper
Sparganium angustifolium
Sparganium eurycarpum
Sparganium fluctuans
*Sparganium minimum**
Suaeda calceoliformis
Taraxacum officinale
Thalictrum dasycarpum
Thalictrum occidentale
Thalictrum sparsiflorum
Thalictrum venulosum
Tragopogon dubius
Tragopogon pratensis
Typha latifolia
Ulmus pumila
Urtica dioica
Valeriana dioica
Xanthium strumarium

Fruit type — berry

Acorus americanus
Actaea rubra
Amelanchier alnifolia
Arceuthobium americanum
Arctostaphylos rubra
Arctostaphylos uva-ursi
Calla palustris
*Coryphantha vivipara**
Disporum trachycarpum
Elaeagnus commutata
Fragaria vesca
Fragaria virginiana
Gaultheria hispidula
Lonicera caerulea
Lonicera dioica
Lonicera involucrata

Lonicera oblongifolia
Maianthemum canadense
Maianthemum racemosum ssp.
amplexicaule
Maianthemum stellatum
Maianthemum trifolium
Oplanax horridum
Opuntia fragilis
Opuntia polyacantha
Ribes americanum
Ribes glandulosum
Ribes hirtellum
Ribes hudsonianum
Ribes lacustre
Ribes oxyacanthoides
Ribes triste
Sambucus racemosa
Shepherdia canadensis
Solanum triflorum
Solanum tuberosum
Streptopus amplexifolius
Vaccinium caespitosum
Vaccinium membranaceum
Vaccinium myrtilloides
Vaccinium ovalifolium
Vaccinium oxycoccos
Vaccinium uliginosum
Vaccinium vitis-idaea

Fruit type — capsule

Allium cernuum
Allium textile
Amerorchis rotundifolia
Andromeda polifolia
Androsace occidentalis
Androsace septentrionalis
Calypto bulbosa
Camelina microcarpa
Campanula rotundifolia
Cassiope tetragona
Castilleja hispida
Castilleja miniata
Castilleja occidentalis
Castilleja raupii
Cerastium nutans
Cerastium vulgatum
Chamaedaphne calyculata
Chrysosplenium tetrandrum
Circaea alpina
Coeloglossum viride
Collomia linearis
Corallorrhiza maculata

Appendix 4b — Vascular Plant Guild Membership (Level 3) con't

Fruit type — capsule (con't)

<i>Corallorrhiza striata</i>	<i>Lobelia kalmii</i>	<i>Salix discolor</i>
<i>Corallorrhiza trifida</i>	<i>Luzula multiflora</i>	<i>Salix drummondiana</i>
<i>Corydalis aurea</i>	<i>Luzula parviflora</i>	<i>Salix exigua</i>
<i>Corylus cornuta</i>	<i>Lysimachia ciliata</i>	<i>Salix farriae</i>
<i>Cypripedium acaule</i>	<i>Lysimachia thyrsoiflora</i>	<i>Salix glauca</i>
<i>Cypripedium passerinum</i>	<i>Melampyrum lineare</i>	<i>Salix glauca var. villosa</i>
<i>Diervilla lonicera</i>	<i>Menyanthes trifoliata</i>	<i>Salix lucida</i>
<i>Dodecatheon conjugens</i>	<i>Mitella nuda</i>	<i>Salix lutea</i>
<i>Dodecatheon pulchellum</i>	<i>Moehringia lateriflora</i>	<i>Salix maccalliana</i>
<i>Drosera anglica</i>	<i>Moneses uniflora</i>	<i>Salix myrtillofolia</i>
<i>Drosera rotundifolia</i>	<i>Monotropa uniflora</i>	<i>Salix pedicularis</i>
<i>Elodea canadensis</i>	<i>Nuphar lutea (L.) Sm. ssp. variegata</i>	<i>Salix petiolaris</i>
<i>Epilobium angustifolium</i>	<i>Nymphaea tetragona</i>	<i>Salix planifolia</i>
<i>Epilobium ciliatum</i>	<i>Orobanche fasciculata</i>	<i>Salix prolixa</i>
<i>Epilobium glaberrimum</i>	<i>Orthilia secunda</i>	<i>Salix pseudomonticola</i>
<i>Epilobium hornemannii</i>	<i>Orthocarpus luteus</i>	<i>Salix pseudomyrsinites</i>
<i>Epilobium leptocarpum</i>	<i>Parnassia palustris</i>	<i>Salix pyrifolia</i>
<i>Epilobium leptophyllum</i>	<i>Pedicularis bracteosa</i>	<i>Salix reticulata</i>
<i>Epilobium palustre</i>	<i>Pedicularis groenlandica</i>	<i>Salix scouleriana</i>
<i>Euphorbia esula</i>	<i>Pedicularis labradorica</i>	<i>Salix serissima</i>
<i>Fraxinus pennsylvanica</i>	<i>Pedicularis parviflora</i>	<i>Cerastium nutans</i>
<i>Gaura coccinea</i>	<i>Penstemon albertinus</i>	<i>Cerastium vulgatum</i>
<i>Gentianella amarella</i>	<i>Penstemon albidus</i>	<i>Chamaedaphne calyculata</i>
<i>Geranium bicknellii</i>	<i>Penstemon confertus</i>	<i>Chrysosplenium tetrandrum</i>
<i>Geranium richardsonii</i>	<i>Penstemon gracilis</i>	<i>Circaea alpina</i>
<i>Geranium viscosissimum</i>	<i>Penstemon procerus</i>	<i>Coeloglossum viride</i>
<i>Goodyera repens</i>	<i>Phlox alysseifolia</i>	<i>Collomia linearis</i>
<i>Gypsophila paniculata</i>	<i>Phlox hoodii</i>	<i>Corallorrhiza maculata</i>
<i>Halenia deflexa</i>	<i>Plantago major</i>	<i>Corallorrhiza striata</i>
<i>Heuchera richardsonii</i>	<i>Plantago patagonica</i>	<i>Corallorrhiza trifida</i>
<i>Impatiens capensis</i>	<i>Platanthera dilatata</i>	<i>Corydalis aurea</i>
<i>Juncus albescens</i>	<i>Platanthera dilatata</i>	<i>Corylus cornuta</i>
<i>Juncus alpinoarticulatus</i>	<i>Platanthera hyperborea</i>	<i>Cypripedium acaule</i>
<i>Juncus balticus</i>	<i>Platanthera obtusata</i>	<i>Cypripedium passerinum</i>
<i>Juncus bufonius</i>	<i>Platanthera orbiculata</i>	<i>Diervilla lonicera</i>
<i>Juncus compressus</i>	<i>Polemonium acutiflorum</i>	<i>Dodecatheon conjugens</i>
<i>Juncus dudleyi</i>	<i>Populus balsamifera</i>	<i>Dodecatheon pulchellum</i>
<i>Juncus longistylis</i>	<i>Populus deltoides</i>	<i>Drosera anglica</i>
<i>Juncus nodosus</i>	<i>Populus grandidentata</i>	<i>Drosera rotundifolia</i>
<i>Juncus tenuis</i>	<i>Populus tremuloides</i>	<i>Elodea canadensis</i>
<i>Juncus vaseyi</i>	<i>Primula incana</i>	<i>Epilobium angustifolium</i>
<i>Kalmia microphylla</i>	<i>Pyrola asarifolia</i>	<i>Epilobium ciliatum</i>
<i>Kalmia polifolia</i>	<i>Pyrola chlorantha</i>	<i>Epilobium glaberrimum</i>
<i>Ledum groenlandicum</i>	<i>Pyrola elliptica</i>	<i>Epilobium hornemannii</i>
<i>Ledum palustre</i>	<i>Pyrola minor</i>	<i>Epilobium leptocarpum</i>
<i>Lilium philadelphicum</i>	<i>Rhinanthus borealis</i>	<i>Epilobium leptophyllum</i>
<i>Linaria vulgaris</i>	<i>Salix arbusculoides</i>	<i>Epilobium palustre</i>
<i>Linum lewisii</i>	<i>Salix athabascensis</i>	<i>Euphorbia esula</i>
<i>Linum rigidum</i>	<i>Salix barclayi</i>	<i>Fraxinus pennsylvanica</i>
<i>Listera borealis</i>	<i>Salix bebbiana</i>	<i>Gaura coccinea</i>
<i>Listera cordata</i>	<i>Salix candida</i>	<i>Gentianella amarella</i>
		<i>Geranium bicknellii</i>

Appendix 4b — Vascular Plant Guild Membership (Level 3) con't

Fruit type — capsule (con't)

Geranium richardsonii
Geranium viscosissimum
Goodyera repens
Gypsophila paniculata
Halenia deflexa
Heuchera richardsonii
Impatiens capensis
Juncus albescens
Juncus alpinoarticulatus
Juncus balticus
Juncus bufonius
Juncus compressus
Juncus dudleyi
Juncus longistylis
Juncus nodosus
Juncus tenuis
Juncus vaseyi
Kalmia microphylla
Kalmia polifolia
Ledum groenlandicum
Ledum palustre
Lilium philadelphicum
Linaria vulgaris
Linum lewisii
Linum rigidum
Listera borealis
Listera cordata
Lobelia kalmii
Luzula multiflora
Luzula parviflora
Lysimachia ciliata
Lysimachia thyrsiflora
Melampyrum lineare
Menyanthes trifoliata
Mitella nuda
Moehringia lateriflora
Moneses uniflora
Monotropa uniflora
Nuphar lutea ssp. variegata
Nymphaea tetragona
Orobanche fasciculata
Orthilia secunda
Orthocarpus luteus
Parnassia palustris
Pedicularis bracteosa
Pedicularis groenlandica
Pedicularis labradorica
Pedicularis parviflora
Penstemon albertinus
Penstemon albidus
Penstemon confertus
Penstemon gracilis

Penstemon procerus
Phlox alyssefolia
Phlox hoodii
Plantago major
Plantago patagonica
Platanthera dilatata
Platanthera dilatata
Platanthera hyperborea
Platanthera obtusata
Platanthera orbiculata
Polemonium acutiflorum
Populus balsamifera
Populus deltoides
Populus grandidentata
Populus tremuloides
Primula incana
Pyrola asarifolia
Pyrola chlorantha
Pyrola elliptica
Pyrola minor
Rhinanthus borealis
Salix arbusculoides
Salix athabascensis
Salix barclayi
Salix bebbiana
Salix candida
Salix discolor
Salix drummondiana
Salix exigua
Salix farriae
Salix glauca
Salix glauca var. villosa
Salix lucida
Salix lutea
Salix maccalliana
Salix myrtillifolia
Salix pedicellaris
Salix petiolaris
Salix planifolia
Salix prolixa
Salix pseudomonticola
Salix pseudomyrsinites
Salix pyrifolia
Salix reticulata
Salix scouleriana
Salix serissima
Salix sitchensis
Sarracenia purpurea
Scheuchzeria palustris
Silene menziesii
Silene noctiflora
Silene pratensis
Silene vulgaris

Sisyrinchium montanum
Spergula arvensis
Sphaeralcea coccinea
Spiranthes romanzoffiana
Stellaria borealis
Stellaria calycantha
Stellaria crassifolia
Stellaria crispa
Stellaria longifolia
Stellaria longipes
Stellaria media
Stenanthium occidentale
Syringa reticulata
Syringa vulgaris
Tofieldia glutinosa
Tofieldia pusilla
Trientalis borealis
Trientalis europaea
Triglochin maritima
Triglochin palustre
Utricularia intermedia
Utricularia minor
*Utricularia vulgaris**
*Vaccaria pyramidata**
*Veronica alpina**
Veronica americana
Veronica peregrina
Veronica scutellata
Veronica scrypyllifolia?
Viola adunca
Viola canadensis
Viola nephrophylla
Viola nuttallii
Viola palustris
Viola renifolia
Zigadenus elegans
Zigadenus venenosus
Zizia aptera

Fruit type — caryopsis

Agropyron cristatum
Agrostis scabra
Agrostis stolonifera
Alopecurus aequalis
Alopecurus pratensis
Avena fatua
Beckmannia syzigachne
Bouteloua gracilis
Bromus carinatus
Bromus ciliatus
Bromus inermis
Bromus inermis ssp. pumpellianus

Appendix 4b — Vascular Plant Guild Membership (Level 3) con't

Fruit type—caryopsis (cont'd)

Bromus japonicus
Bromus tectorum
Calamagrostis canadensis
Calamagrostis purpurascens
*Calamagrostis stricta**
Calamovilfa longifolia
Catabrosa aquatica
Cinna latifolia
Dactylis glomerata
Danthonia californica
Deschampsia caespitosa
Distichlis stricta
Elymus canadensis
Elymus elymoides
Elymus lanceolatus
Elymus piperi
Elymus repens
Elymus trachycaulus
Elymus trachycaulus ssp.
subsecundus
Elymus trachycaulus ssp.
trachycaulus
Festuca altaica
Festuca campestris
Festuca idahoensis
Festuca ovina
Festuca rubra
Festuca saximontana
Glyceria borealis
Glyceria grandis
Glyceria striata
Hordeum jubatum
Hordeum vulgare
Koeleria macrantha
Leymus innovatus
Lolium perenne
Lolium pratense
Muhlenbergia richardsonis
Oryzopsis asperifolia
Panicum capillare
Pascopyrum smithii
Phalaris arundinacea
Phalaris canariensis
Phleum pratense
Phragmites australis
Piptatherum pungens
Poa alpina
Poa annua
Poa arida
Poa compressa
Poa nemoralis ssp. interior
Poa palustris

Poa pratensis
Poa sandbergii
Psathyrostachys juncea
Puccinellia nuttalliana
Schedonnardus paniculatus
Schizachne purpurascens
Scolochloa festucacea
Spartina gracilis
Sphenopholis intermedia
Stipa columbiana
Stipa comata
Stipa curtisetia
Stipa viridula
Trisetum spicatum
Triticum aestivum
Zea mays

Fruit type — cone

Abies balsamea
Abies bifolia
Juniperus horizontalis
Larix laricina
Larix occidentalis
Picea engelmannii
Picea glauca
Picea mariana
Picea pungens
Pinus banksiana
Pinus contorta

Fruit type — drupe

Adoxa moschatellina
Aralia nudicaulis
Comarum palustre
Cornus canadensis
Cornus stolonifera
Empetrum nigrum
Geocaulon lividum
Prunus pensylvanica
Prunus virginiana
Rhamnus alnifolia
Rubus arcticus
Rubus chamaemorus
Rubus idaeus
Rubus parviflorus
Rubus pedatus
Rubus pubescens
Rupia cirrhosa
Symphoricarpos albus
Symphoricarpos occidentalis
Viburnum edule
Viburnum opulus
Adoxa moschatellina

Aralia nudicaulis
Comarum palustre
Cornus canadensis
Cornus stolonifera
Empetrum nigrum
Geocaulon lividum
Prunus pensylvanica
Prunus virginiana
Rhamnus alnifolia
Rubus arcticus
Rubus chamaemorus
Rubus idaeus
Rubus parviflorus
Rubus pedatus
Rubus pubescens
Rupia cirrhosa
Symphoricarpos albus
Symphoricarpos occidentalis
Viburnum edule
Viburnum opulus

Fruit type — follicle

Aconitum delphinifolium
Apocynum androsaemifolium
Aquilegia brevistyla
Caltha natans
Caltha palustris
Delphinium glaucum
Spiraea alba
Spiraea betulifolia

Fruit type — nutlet

Agastache foeniculum
Alnus incana
Alnus incana ssp. tenuifolia
Alnus viridis
Alnus viridis ssp. crispa
Betula glandulosa
Betula neoalaskana
Betula occidentalis
Betula papyrifera
*Betula pendula**
Betula pumila
*Callitriche palustris**
*Callitriche verna**
Chenopodium album
Corydalis sempervirens
Cynoglossum officinale
Draccephalum parviflorum
Galeopsis tetrahit
Galium aparine
Galium boreale
Galium labradoricum

Appendix 4b — Vascular Plant Guild Membership (Level 3) con't

Fruit type — nutlet (cont'd)

Galium trifidum
Galium triflorum
Hackelia jessicae
Hedeoma hispida
Hippuris vulgaris
Lappula squarrosa
Linnaea borealis
Lithospermum incisum
Lithospermum ruderale
Lycopus americanus
Lycopus asper
Lycopus uniflorus
Mentha arvensis
Mentha spicata
Mertensia paniculata
Monarda fistulosa
Myrica gale
Myriophyllum alterniflorum
Myriophyllum sibiricum
Myriophyllum spicatum
Myriophyllum verticillatum
Onosmodium molle
Physostegia parviflora
Prunella vulgaris
Scutellaria galericulata
Stachys palustris
Verbena bracteata

Fruit type — pod

Arabis hirsuta
Asclepias ovalifolia
Astragalus alpinus
Astragalus americanus
Astragalus australis
Astragalus bodinii
Astragalus canadensis
Astragalus dasyglottis
Astragalus drummondii
Astragalus eucosmus
Astragalus flexuosus
Astragalus laxmannii
Astragalus miser
Astragalus pectinatus
Astragalus purshii
Astragalus vexilliflexus
Barbarea orthocera
Brassica kaber
Brassica napus
Brassica rapa
Capsella bursa-pastoris
Caragana arborescens
Cardamine pensylvanica

Dalea purpurea
Dalea purpurea var. purpurea
Descurainia sophia
Erysimum cheiranthoides
Erysimum inconspicuum
Glycyrrhiza lepidota
Hedysarum alpinum
Hedysarum boreale
Hedysarum sulphurescens
Lathyrus ochroleucus
Lathyrus palustris
Lathyrus venosus
Lepidium densiflorum
Medicago lupulina
Medicago sativa
*Melilotus alba**
Menziesia ferruginea
Neslia paniculata
Onobrychis viciifolia
Oxytropis deflexa
Oxytropis monticola
Oxytropis sericea
Oxytropis splendens
*Psoralea argophylla**
Rorippa palustris
Sisymbrium altissimum
Thermopsis rhombifolia
Thlaspi arvense
Tiarella trifoliata
Trifolium hybridum
Trifolium pratense
Trifolium repens
Vicia americana
Vicia cracca
Lupinus pusillus
Lupinus sericeus
Sorbus aucuparia
Sorbus scopulina

Fruit type — schizocarp

Angelica dawsonii
Angelica genuflexa
Callitriche hermaphroditica
Carum carvi
Cicuta bulbifera
Cicuta maculata
Heracleum maximum
Malva rotundifolia
Osmorhiza depauperata
Osmorhiza longistylis
Pastinaca sativa
Sanicula marilandica
Sium suave

Fruit type — utricles

Amaranthus albus
Amaranthus retroflexus
Atriplex nuttallii
Axyris amaranthoides
Eurotia lanata
Kochia scoparia
Lemna minor
Lemna trisulca
Lemna turionifera
Monolepis nuttalliana
Paronychia sessiliflora
Spirodela polyrhiza

Heterotrophs

Castilleja hispida
Castilleja miniata
Castilleja occidentalis
Castilleja raupii
Comarum palustre
Corallorrhiza maculata
Corallorrhiza striata
Corallorrhiza trifida
Cypripedium acaule
Drosera anglica
Drosera rotundifolia
Geocaulon lividum
Monotropa uniflora
Pedicularis bracteosa
Pedicularis groenlandica
Pedicularis labradorica
Pedicularis parviflora
Rhinanthus borealis
Sarracenia purpurea
Utricularia intermedia
Utricularia minor
Utricularia vulgaris

Nectar Producers

Achillea millefolium
Achillea sibirica
Aconitum delphiniifolium
Agastache foeniculum
Agoseris glauca
Agrimonia striata
Alisma gramineum
Alisma triviale
Allium cernuum
Allium textile
Amelanchier alnifolia
Amerorchis rotundifolia
Androsace occidentalis

Appendix 4b — Vascular Plant Guild Membership (Level 3) con't

Nectar Producers (cont'd)

<i>Androsace septentrionalis</i>	<i>Campanula rotundifolia</i>	<i>Elaeagnus commutata</i>
<i>Anemone riparia</i>	<i>Capsella bursa-pastoris</i>	<i>Empetrum nigrum</i>
<i>Angelica dawsonii</i>	<i>Cardamine pensylvanica</i>	<i>Epilobium angustifolium</i>
<i>Angelica genuflexa</i>	<i>Carum carvi</i>	<i>Epilobium ciliatum</i>
<i>Apocynum androsaemifolium</i>	<i>Cassiope tetragona</i>	<i>Epilobium glaberrimum</i>
<i>Aquilegia brevistyla</i>	<i>Castilleja hispida</i>	<i>Epilobium hornemannii</i>
<i>Arabis hirsuta</i>	<i>Castilleja miniata</i>	<i>Epilobium leptocarpum</i>
<i>Arceuthobium americanum</i>	<i>Castilleja occidentalis</i>	<i>Epilobium leptophyllum</i>
<i>Arctium minus</i>	<i>Castilleja raupii</i>	<i>Epilobium palustre</i>
<i>Arctostaphylos rubra</i>	<i>Cerastium arvense</i>	<i>Erigeron acris</i>
<i>Arctostaphylos uva-ursi</i>	<i>Cerastium nutans</i>	<i>Erigeron caespitosus</i>
<i>Arnica angustifolia</i>	<i>Cerastium vulgatum</i>	<i>Erigeron elatus</i>
<i>Arnica chamissonis</i>	<i>Ceratophyllum demersum</i>	<i>Erigeron glabellus</i>
<i>Arnica cordifolia</i>	<i>Chamaerhodos erecta</i>	<i>Erigeron philadelphicus</i>
<i>Arnica lonchophylla</i>	<i>Chrysanthemum leucanthemum</i>	<i>Erigeron pumilus</i>
<i>Artemisia campestris</i>	<i>Chrysosplenium tetrandrum</i>	<i>Erigeron speciosus</i>
<i>Asclepias ovalifolia</i>	<i>Cicuta bulbifera</i>	<i>Eriogonum flavum</i>
<i>Aster ascendens*</i>	<i>Cicuta maculata</i>	<i>Erysimum cheiranthoides</i>
<i>Aster borealis</i>	<i>Circaea alpina</i>	<i>Erysimum inconspicuum</i>
<i>Aster brachyactis</i>	<i>Cirsium arvense</i>	<i>Euphorbia esula</i>
<i>Aster ciliolatus</i>	<i>Cirsium drummondii</i>	<i>Fragaria vesca</i>
<i>Aster conspicuus</i>	<i>Cirsium flodmanii</i>	<i>Fragaria virginiana</i>
<i>Aster ericoides</i>	<i>Cirsium hookerianum</i>	<i>Gaillardia aristata</i>
<i>Aster hesperius</i>	<i>Cirsium undulatum</i>	<i>Galeopsis tetrahit</i>
<i>Aster laevis</i>	<i>Cirsium vulgare</i>	<i>Galium aparine</i>
<i>Aster modestus</i>	<i>Clematis occidentalis</i>	<i>Galium boreale</i>
<i>Aster puniceus</i>	<i>Coeloglossum viride</i>	<i>Galium labradoricum</i>
<i>Aster umbellatus</i>	<i>Comandra umbellata</i>	<i>Galium trifidum</i>
<i>Astragalus alpinus</i>	<i>Comarum palustre</i>	<i>Galium triflorum</i>
<i>Astragalus americanus</i>	<i>Coptis trifolia</i>	<i>Gaultheria hispidula</i>
<i>Astragalus australis</i>	<i>Corallorrhiza maculata</i>	<i>Gaura coccinea</i>
<i>Astragalus bodinii</i>	<i>Corallorrhiza striata</i>	<i>Gentianella amarella</i>
<i>Astragalus canadensis</i>	<i>Corallorrhiza trifida</i>	<i>Geocalcaon lividum</i>
<i>Astragalus dasyglottis*</i>	<i>Corydalis aurea</i>	<i>Geranium bicknellii</i>
<i>Astragalus drummondii</i>	<i>Corylus cornuta</i>	<i>Geranium richardsonii</i>
<i>Astragalus eucosmus</i>	<i>Coryphantha vivipara*</i>	<i>Geranium viscosissimum</i>
<i>Astragalus flexuosus</i>	<i>Crepis runcinata</i>	<i>Geum aleppicum</i>
<i>Astragalus laxmannii</i>	<i>Crepis tectorum</i>	<i>Geum macrophyllum</i>
<i>Astragalus miser</i>	<i>Cynoglossum officinale</i>	<i>Geum rivale</i>
<i>Astragalus pectinatus</i>	<i>Cypripedium acaule</i>	<i>Geum triflorum</i>
<i>Astragalus purshii</i>	<i>Cypripedium passerinum</i>	<i>Glycyrrhiza lepidota</i>
<i>Astragalus vexilliflexus</i>	<i>Dalea purpurea</i>	<i>Gnaphalium palustre</i>
<i>Barbarea orthocera</i>	<i>Dalea purpurea var. purpurea</i>	<i>Gnaphalium uliginosum</i>
<i>Bidens cernua</i>	<i>Delphinium glaucum</i>	<i>Goodyera repens</i>
<i>Brassica kaber</i>	<i>Descurainia sophia</i>	<i>Grindelia squarrosa</i>
<i>Brassica napus</i>	<i>Diervilla lonicera</i>	<i>Gutierrezia sarothrae</i>
<i>Brassica rapa</i>	<i>Disporum trachycarpum</i>	<i>Gypsophila paniculata</i>
<i>Calla palustris</i>	<i>Dodecatheon conjugens</i>	<i>Hackelia jessicae</i>
<i>Caltha natans</i>	<i>Dodecatheon pulchellum</i>	<i>Halenia deflexa</i>
<i>Caltha palustris</i>	<i>Dracocephalum parviflorum</i>	<i>Hedeoma hispida</i>
<i>Calyso bulbosa</i>	<i>Drosera anglica</i>	<i>Hedysarum alpinum</i>
<i>Camelina microcarpa</i>	<i>Drosera rotundifolia</i>	<i>Hedysarum boreale</i>
	<i>Dryas drummondii</i>	<i>Hedysarum sulphurescens</i>

Appendix 4b — Vascular Plant Guild Membership (Level 3) con't

Nectar Producers (con't)

<i>Helianthus annuus</i>	<i>Matricaria matricarioides</i>	<i>Plantago patagonica</i>
<i>Helianthus nuttallii</i>	<i>Matricaria perforata</i>	<i>Platanthera dilatata</i>
<i>Helianthus subrhomboides</i>	<i>Medicago lupulina</i>	<i>Platanthera dilatata</i>
<i>Heracleum maximum</i>	<i>Medicago sativa</i>	<i>Platanthera hyperborea</i>
<i>Heterotheca villosa</i>	<i>Melampyrum lineare</i>	<i>Platanthera obtusata</i>
<i>Heuchera richardsonii</i>	<i>Melilotus alba*</i>	<i>Platanthera orbiculata</i>
<i>Hieracium umbellatum</i>	<i>Mentha arvensis</i>	<i>Polemonium acutiflorum</i>
<i>Hierochloa hirta</i> ssp. <i>arctica</i>	<i>Mentha spicata</i>	<i>Polygonum amphibium</i>
<i>Hymenoxys richardsonii</i>	<i>Menyanthes trifoliata</i>	<i>Polygonum arenastrum</i>
<i>Impatiens capensis</i>	<i>Menziesia ferruginea</i>	<i>Polygonum aviculare</i>
<i>Iva axillaris</i>	<i>Mertensia paniculata</i>	<i>Polygonum bistortoides</i>
<i>Kalmia microphylla</i>	<i>Mitella nuda</i>	<i>Polygonum coccineum*</i>
<i>Kalmia polifolia</i>	<i>Moehringia lateriflora</i>	<i>Polygonum convolvulus</i>
<i>Lactuca serriola</i>	<i>Monarda fistulosa</i>	<i>Polygonum erectum</i>
<i>Lactuca tatarica</i>	<i>Moneses uniflora</i>	<i>Polygonum lapathifolium</i>
<i>Lappula squarrosa</i>	<i>Monotropa uniflora</i>	<i>Polygonum salicifolium</i>
<i>Lathyrus ochroleucus</i>	<i>Nuphar lutea</i> ssp. <i>variegata</i>	<i>Potentilla anserina*</i>
<i>Lathyrus palustris</i>	<i>Nymphaea tetragona</i>	<i>Potentilla argentea</i>
<i>Lathyrus venosus</i>	<i>Oligoneuron rigidum</i>	<i>Potentilla arguta</i>
<i>Ledum groenlandicum</i>	<i>Onobrychis viciifolia</i>	<i>Potentilla bimundorum</i>
<i>Ledum palustre</i>	<i>Onosmodium molle</i>	<i>Potentilla bipinnatifida</i>
<i>Liatris ligulistylis</i>	<i>Opuntia fragilis</i>	<i>Potentilla concinna</i>
<i>Liatris punctata</i>	<i>Opuntia polyacantha</i>	<i>Potentilla diversifolia</i>
<i>Lilium philadelphicum</i>	<i>Orobanche fasciculata</i>	<i>Potentilla fruticosa</i>
<i>Linaria vulgaris</i>	<i>Orthilia secunda</i>	<i>Potentilla gracilis</i>
<i>Linnaea borealis</i>	<i>Orthocarpus luteus</i>	<i>Potentilla hippiana</i>
<i>Linum lewisii</i>	<i>Osmorhiza depauperata</i>	<i>Potentilla norvegica</i>
<i>Linum rigidum</i>	<i>Osmorhiza longistylis</i>	<i>Potentilla paradoxa</i>
<i>Listera borealis</i>	<i>Oxytropis deflexa</i>	<i>Potentilla pensylvanica</i>
<i>Listera cordata</i>	<i>Oxytropis monticola</i>	<i>Potentilla recta</i>
<i>Lithospermum incisum</i>	<i>Oxytropis sericea</i>	<i>Potentilla tridentata</i>
<i>Lithospermum ruderales</i>	<i>Oxytropis splendens</i>	<i>Primula incana</i>
<i>Lobelia kalmii</i>	<i>Parnassia palustris</i>	<i>Prunella vulgaris</i>
<i>Lonicera caerulea</i>	<i>Paronychia sessiliflora</i>	<i>Prunus pensylvanica</i>
<i>Lonicera dioica</i>	<i>Pastinaca sativa</i>	<i>Prunus virginiana</i>
<i>Lonicera involucrata</i>	<i>Pedicularis bracteosa</i>	<i>Pyrola asarifolia</i>
<i>Lonicera oblongifolia</i>	<i>Pedicularis groenlandica</i>	<i>Pyrola chlorantha</i>
<i>Lupinus pusillus</i>	<i>Pedicularis labradorica</i>	<i>Pyrola elliptica</i>
<i>Lupinus sericeus</i>	<i>Pedicularis parviflora</i>	<i>Pyrola minor</i>
<i>Lycopus americanus</i>	<i>Penstemon albertinus</i>	<i>Ranunculus cymbalaria</i>
<i>Lycopus asper</i>	<i>Penstemon albidus</i>	<i>Ranunculus abortivus</i>
<i>Lycopus uniflorus</i>	<i>Penstemon confertus</i>	<i>Ranunculus acris</i>
<i>Lygodesmia juncea</i>	<i>Penstemon gracilis</i>	<i>Ranunculus aquatilis</i>
<i>Lysimachia ciliata</i>	<i>Penstemon procerus</i>	<i>Ranunculus cardiophyllus</i>
<i>Lysimachia thyrsoiflora</i>	<i>Petasites frigidus</i>	<i>Ranunculus gmelinii</i>
<i>Machaeranthera canescens</i>	<i>Petasites frigidus</i> var. <i>palmatus</i>	<i>Ranunculus inamoenus</i>
<i>Maianthemum canadense</i>	<i>Petasites sagittatus</i>	<i>Ranunculus lapponicus</i>
<i>Maianthemum racemosum</i> ssp. <i>amplexicaule</i>	<i>Petasites X vitifolius</i>	<i>Ranunculus macounii</i>
<i>Maianthemum stellatum</i>	<i>Phlox allysifolia</i>	<i>Ranunculus pensylvanicus</i>
<i>Maianthemum trifolium</i>	<i>Phlox hoodii</i>	<i>Ranunculus repens</i>
<i>Malva rotundifolia</i>	<i>Phragmites australis</i>	<i>Ranunculus reptans</i>
	<i>Physostegia parviflora</i>	<i>Ranunculus sceleratus</i>
	<i>Plantago major</i>	<i>Ranunculus uncinatus</i>

Appendix 4b — Vascular Plant Guild Membership (Level 3) con't

Nectar Producers (con't)

<i>Ratibida columnifera</i>	<i>Senecio congestus</i>	<i>Thalictrum venulosum</i>
<i>Rhinanthus borealis</i>	<i>Senecio eremophilus</i>	<i>Thermopsis rhombifolia</i>
<i>Rorippa palustris</i>	<i>Senecio integerrimus</i>	<i>Thlaspi arvense</i>
<i>Rosa acicularis</i>	<i>Senecio pauciflorus</i>	<i>Tiarella trifoliata</i>
<i>Rosa arkansana</i>	<i>Senecio pauperculus</i>	<i>Tofieldia glutinosa</i>
<i>Rosa woodsii</i>	<i>Senecio triangularis</i>	<i>Tofieldia pusilla</i>
<i>Rubus arcticus</i>	<i>Senecio vulgaris</i>	<i>Tragopogon dubius</i>
<i>Rubus chamaemorus</i>	<i>Shepherdia canadensis</i>	<i>Tragopogon pratensis</i>
<i>Rubus idaeus</i>	<i>Silene menziesii</i>	<i>Trientalis borealis</i>
<i>Rubus parviflorus</i>	<i>Silene noctiflora</i>	<i>Trientalis europaea</i>
<i>Rubus pedatus</i>	<i>Silene pratensis*</i>	<i>Trifolium hybridum</i>
<i>Rubus pubescens</i>	<i>Silene vulgaris</i>	<i>Trifolium pratense</i>
<i>Rumex acetosella</i>	<i>Sisymbrium altissimum</i>	<i>Trifolium repens</i>
<i>Rumex britannica</i>	<i>Sisyrinchium montanum</i>	<i>Utricularia intermedia</i>
<i>Rumex crispus</i>	<i>Solanum triflorum</i>	<i>Utricularia minor</i>
<i>Rumex maritimus</i>	<i>Solanum tuberosum</i>	<i>Utricularia vulgaris*</i>
<i>Rumex occidentalis</i>	<i>Solidago canadensis</i>	<i>Vaccinium caespitosum</i>
<i>Rumex pseudonatronatus</i>	<i>Solidago gigantea</i>	<i>Vaccinium membranaceum</i>
<i>Rumex stenophyllus</i>	<i>Solidago graminifolia</i>	<i>Vaccinium myrtilloides</i>
<i>Rumex triangulivalvis*</i>	<i>Solidago missouriensis</i>	<i>Vaccinium ovalifolium</i>
<i>Sagittaria cuneata</i>	<i>Solidago mollis</i>	<i>Vaccinium oxycoccos</i>
<i>Salix arbusculooides</i>	<i>Solidago multiradiata</i>	<i>Vaccinium uliginosum</i>
<i>Salix athabascensis</i>	<i>Solidago nemoralis</i>	<i>Vaccinium vitis-idaea</i>
<i>Salix barclayi</i>	<i>Solidago simplex ssp. simplex</i>	<i>Valeriana dioica</i>
<i>Salix bebbiana</i>	<i>Sonchus arvensis</i>	<i>Verbena bracteata</i>
<i>Salix candida</i>	<i>Sonchus asper</i>	<i>Veronica alpina*</i>
<i>Salix discolor</i>	<i>Sorbus aucuparia</i>	<i>Veronica americana</i>
<i>Salix drummondiana</i>	<i>Sorbus scopulina</i>	<i>Veronica peregrina</i>
<i>Salix exigua</i>	<i>Spergula arvensis</i>	<i>Veronica scutellata</i>
<i>Salix farriae</i>	<i>Sphaeralcea coccinea</i>	<i>Veronica serpyllifolia?</i>
<i>Salix glauca</i>	<i>Spiraea alba</i>	<i>Viburnum edule</i>
<i>Salix glauca var. villosa</i>	<i>Spiraea betulifolia</i>	<i>Viburnum opulus</i>
<i>Salix lucida</i>	<i>Spiranthes romanzoffiana</i>	<i>Vicia americana</i>
<i>Salix lutea</i>	<i>Stachys palustris</i>	<i>Vicia cracca</i>
<i>Salix maccalliana</i>	<i>Stellaria borealis</i>	<i>Viola adunca</i>
<i>Salix myrtillifolia</i>	<i>Stellaria calycantha</i>	<i>Viola canadensis</i>
<i>Salix pedicellaris</i>	<i>Stellaria crassifolia</i>	<i>Viola nephrophylla</i>
<i>Salix petiolaris</i>	<i>Stellaria crispa</i>	<i>Viola nuttallii</i>
<i>Salix planifolia</i>	<i>Stellaria longifolia</i>	<i>Viola palustris</i>
<i>Salix prolixa</i>	<i>Stellaria longipes</i>	<i>Viola renifolia</i>
<i>Salix pseudomonticola</i>	<i>Stellaria media</i>	<i>Xanthium strumarium</i>
<i>Salix pseudomyrsinites</i>	<i>Stenanthium occidentale</i>	<i>Zigadenus elegans</i>
<i>Salix pyrifolia</i>	<i>Streptopus amplexifolius</i>	<i>Zigadenus venenosus</i>
<i>Salix reticulata</i>	<i>Suaeda calceoliformis</i>	<i>Zizia aptera</i>
<i>Salix scouleriana</i>	<i>Symphoricarpos albus</i>	
<i>Salix serissima</i>	<i>Symphoricarpos occidentalis</i>	
<i>Salix sitchensis</i>	<i>Syringa reticulata</i>	
<i>Sambucus racemosa</i>	<i>Syringa vulgaris</i>	
<i>Sarracenia purpurea</i>	<i>Taraxacum officinale</i>	
<i>Scutellaria galericulata</i>	<i>Thalictrum dasycarpum</i>	
<i>Senecio canus</i>	<i>Thalictrum occidentale</i>	
	<i>Thalictrum sparsiflorum</i>	

Appendix 4b — Vascular Plant Guild Membership (Level 3) con't

Culturally Important –**Construction Materials**

Acer negundo
Alnus incana
Alnus incana ssp. tenuifolia
Alnus viridis
Alnus viridis ssp. crispa
Amelanchier alnifolia
Apocynum androsaemifolium
Athyrium filix-femina
Betula neoalaskana
Betula papyrifera
Calamagrostis canadensis
Carex chordorrhiza
Cassiope tetragona
Chenopodium capitatum
Corydalis sempervirens
Deschampsia caespitosa
Elaeagnus commutata
Equisetum arvense
Eriophorum brachyantherum
Eriophorum chamissonis
*Eriophorum polystachion**
Eriophorum vaginatum
Eriophorum viridicarinatum
Festuca idahoensis
Fraxinus pennsylvanica
Galium trifidum
Galium triflorum
Hymenoxys richardsonii
Juniperus horizontalis
Larix laricina
Larix occidentalis
Linum lewisii
Lithospermum ruderales
Lonicera dioica
Lonicera involucrata
Lupinus sericeus
Machaeranthera canescens
*Melilotus alba**
Orthocarpus luteus
Phalaris arundinacea
Picea engelmannii
Picea glauca
Picea mariana
Pinus contorta
Populus balsamifera
Populus deltoides
Potentilla tridentata
Rosa acicularis
Rosa woodsii
Rubus parviflorus
Salix arbusculoides

Salix bebbiana
Salix discolor
Salix exigua
Salix maccalliana
Salix myrtillifolia
Salix petiolaris
Salix pseudomyrsinites
Salix pyrifolia
Salix serissima
Salix sitchensis
Schoenoplectus tabernaemontani
Scirpus cyperinus
Scirpus microcarpus
Shepherdia canadensis
Symphoricarpos occidentalis
Typha latifolia
Urtica dioica

Culturally Important - Food

Agastache foeniculum
Alnus viridis
Alnus viridis ssp. crispa
Amaranthus albus
Amaranthus retroflexus
Amelanchier alnifolia
Arctostaphylos uva-ursi
Astragalus miser
Athyrium filix-femina
Barbarea orthocera
Beckmannia syzigachne
Bromus carinatus
Calla palustris
Caltha natans
Caltha palustris
Cardamine pensylvanica
Carex rostrata
Castilleja occidentalis
Catabrosa aquatica
Chenopodium album
Chenopodium capitatum
Agastache foeniculum
Alnus viridis
Alnus viridis ssp. crispa
Amaranthus albus
Amaranthus retroflexus
Amelanchier alnifolia
Arctostaphylos uva-ursi
Astragalus miser
Athyrium filix-femina
Barbarea orthocera
Beckmannia syzigachne
Bromus carinatus

Calla palustris
Caltha natans
Caltha palustris
Cardamine pensylvanica
Carex rostrata
Castilleja occidentalis
Catabrosa aquatica
Chenopodium album
Chenopodium capitatum
Chenopodium pratericola
Chenopodium rubrum
Chenopodium salinum
Cirsium drummondii
Cirsium hookerianum
Comandra umbellata
Comarum palustre
Cornus canadensis
Cornus stolonifera
Corydalis sempervirens
Disporum trachycarpum
Elaeagnus commutata
Elymus canadensis
Empetrum nigrum
Epilobium angustifolium
Equisetum arvense
Fragaria vesca
Fragaria virginiana
Galeopsis tetrahit
Galium boreale
Gaultheria hispidula
Geocalaon lividum
Geum rivale
Glyceria grandis
Glyceria striata
Glycyrrhiza lepidota
Hedysarum alpinum
Hedysarum boreale
Helianthus annuus
Heracleum maximum
Heuchera richardsonii
Hippuris vulgaris
Hordeum vulgare
Impatiens capensis
Larix occidentalis
Lathyrus palustris
Ledum groenlandicum
Ledum palustre
Liatris punctata
Lithospermum incisum
Lithospermum ruderales
Lycopus asper
Lysimachia thyrsoiflora
Machaeranthera canescens

Appendix 4b — Vascular Plant Guild Membership (Level 3) con't

Culturally Important – Food

(cont'd)

Matricaria matricarioides
Matteuccia struthiopteris
Melilotus alba
Mentha arvensis
Menyanthes trifoliata
Mertensia paniculata
Moneses uniflora
Monolepis nuttalliana
Opuntia fragilis
Orobanche fasciculata
Osmorhiza depauperata
Panicum capillare
Petasites sagittatus
Picea engelmannii
Picea glauca
Pinus banksiana
Pinus contorta
Plantago patagonica
Poa annua
Poa arida
Poa palustris
Poa pratensis
Polygonum bistortoides
Populus deltoides
*Potentilla anserina**
Prunus pensylvanica
Prunus virginiana
Ratibida columnifera
Ribes americanum
Ribes glandulosum
Ribes hirtellum
Ribes hudsonianum
Ribes lacustre
Ribes oxyacanthoides
Ribes triste
Rorippa palustris
Rosa acicularis
Rosa woodsii
Rubus arcticus
Rubus chamaemorus
Rubus idaeus
Rubus parviflorus
Rubus pedatus
Rubus pubescens
Rumex maritimus
Rumex occidentalis
Sagittaria cuneata
Salix lutea
Sambucus racemosa
Schoenoplectus
tabernaemontani
Scirpus microcarpus

Senecio congestus
Shepherdia canadensis
Solidago canadensis
Sonchus arvensis
Sorbus scopulina
Sparganium eurycarpum
Stachys palustris
Stellaria longifolia
Stellaria media
Suaeda calceoliformis
Taraxacum officinale
Trifolium hybridum
Triglochin maritima
Triglochin palustre
Typha latifolia
Urtica dioica
Vaccinium caespitosum
Vaccinium membranaceum
Vaccinium myrtilloides
Vaccinium ovalifolium
Vaccinium oxycoccos
Vaccinium uliginosum
Vaccinium vitis-idaea
Veronica americana
Viburnum edule
Viburnum opulus
Viola renifolia

**Culturally Important -
Medicine**

Abies balsamea
Acer negundo
Achillea millefolium
Achillea sibirica
Aconitum delphiniifolium
Acorus americanus
Actaea rubra
Agastache foeniculum
Agoseris aurantiaca
Agoseris glauca
Agrimonia striata
Alisma triviale
Allium cernuum
Alnus incana
Alnus incana ssp. tenuifolia
Amaranthus retroflexus
Anemone canadensis
Anemone multifida
Anemone patens
Angelica dawsonii
Antennaria microphylla
Antennaria rosea
Aralia nudicaulis
Arceuthobium americanum

Arctostaphylos uva-ursi
Arnica chamissonis
Artemisia campestris
Artemisia frigida
Aster ciliolatus
Astragalus americanus
Athyrium filix-femina
Bahia oppositifolia
Betula glandulosa
Betula pumila
Caltha natans
Caltha palustris
Campanula rotundifolia
Carex brevior
Carex douglasii
Castilleja miniata
Catabrosa aquatica
Collomia linearis
Comandra umbellata
Coptis trifolia
Cornus stolonifera
Crepis runcinata
Cypripedium acaule
Cystopteris fragilis
Delphinium glaucum
Diphasiastrum complanatum
Disporum trachycarpum
Dodecatheon pulchellum
Dracocephalum parviflorum
Drosera anglica
Drosera rotundifolia
Dryas drummondii
Elodea canadensis
Elymus canadensis
Empetrum nigrum
Epilobium angustifolium
Equisetum arvense
Equisetum fluviatile
Erigeron glabellus
Erigeron philadelphicus
Erigeron pumilus
Eriophorum brachyantherum
Eriophorum chamissonis
Eriophorum polystachion
Eriophorum scheuchzeri
Eriophorum vaginatum
Eriophorum viridicarinatum
Erysimum inconspicuum
Fragaria vesca
Fragaria virginiana
Fraxinus pennsylvanica
Gaillardia aristata
Galeopsis tetrahit
Galium boreale

Appendix 4b — Vascular Plant Guild Membership (Level 3) con't

**Culturally Important –
Medicine (cont'd)**

<i>Galium triflorum</i>	<i>Matteuccia struthiopteris</i>	<i>Rhamnus alnifolia</i>
<i>Gaultheria hispida</i>	<i>Mentha arvensis</i>	<i>Ribes americanum</i>
<i>Gaura coccinea</i>	<i>Menziesia ferruginea</i>	<i>Ribes hirtellum</i>
<i>Gentianella amarella</i>	<i>Mertensia paniculata</i>	<i>Ribes hudsonianum</i>
<i>Geocaldon lividum</i>	<i>Mitella nuda</i>	<i>Ribes lacustre</i>
<i>Geranium bicknellii</i>	<i>Moneses uniflora</i>	<i>Ribes oxyacanthoides</i>
<i>Geranium richardsonii</i>	<i>Monolepis nuttalliana</i>	<i>Ribes triste</i>
<i>Geranium viscosissimum</i>	<i>Monotropa uniflora</i>	<i>Rosa acicularis</i>
<i>Geum aleppicum</i>	<i>Muhlenbergia richardsonis</i>	<i>Rosa arkansana</i>
<i>Geum triflorum</i>	<i>Myrica gale</i>	<i>Rosa woodsii</i>
<i>Glycyrrhiza lepidota</i>	<i>Myriophyllum sibiricum</i>	<i>Rubus chamaemorus</i>
<i>Goodyera repens</i>	<i>Myriophyllum verticillatum</i>	<i>Rubus pubescens</i>
<i>Grindelia squarrosa</i>	<i>Opuntia fragilis</i>	<i>Rumex maritimus</i>
<i>Gymnocarpium dryopteris</i>	<i>Opuntia polyacantha</i>	<i>Rumex occidentalis</i>
<i>Helianthus nuttallii</i>	<i>Orobanche fasciculata</i>	<i>Sagittaria cuneata</i>
<i>Heracleum maximum</i>	<i>Orthilia secunda</i>	<i>Salix arbusculoides</i>
<i>Heuchera richardsonii</i>	<i>Oxytropis deflexa</i>	<i>Salix bebbiana</i>
<i>Hierochloa hirta</i> ssp. <i>arctica</i>	<i>Oxytropis monticola</i>	<i>Salix discolor</i>
<i>Hymenoxys richardsonii</i>	<i>Panicum capillare</i>	<i>Salix glauca</i>
<i>Impatiens capensis</i>	<i>Petasites frigidus</i>	<i>Salix glauca</i> var. <i>villosa</i>
<i>Iva axillaris</i>	<i>Petasites frigidus</i> var. <i>palmatus</i>	<i>Salix lucida</i>
<i>Juniperus horizontalis</i>	<i>Petasites sagittatus</i>	<i>Salix planifolia</i>
<i>Larix laricina</i>	<i>Phlox hoodii</i>	<i>Salix sitchensis</i>
<i>Larix occidentalis</i>	<i>Phragmites australis</i>	<i>Sanicula marilandica</i>
<i>Ledum groenlandicum</i>	<i>Physostegia parviflora</i>	<i>Sarracenia purpurea</i>
<i>Ledum palustre</i>	<i>Picea engelmannii</i>	<i>Schoenoplectus</i>
<i>Liatris punctata</i>	<i>Picea mariana</i>	<i>tabernaemontani</i>
<i>Lilium philadelphicum</i>	<i>Pinus banksiana</i>	<i>Scutellaria galericulata</i>
<i>Linnaea borealis</i>	<i>Pinus contorta</i>	<i>Selaginella densa</i>
<i>Linum lewisii</i>	<i>Plantago major</i>	<i>Senecio triangularis</i>
<i>Lithospermum incisum</i>	<i>Plantago patagonica</i>	<i>Shepherdia canadensis</i>
<i>Lithospermum ruderale</i>	<i>Poa palustris</i>	<i>Silene menziesii</i>
<i>Lobelia kalmii</i>	<i>Polemonium acutiflorum</i>	<i>Sisyrinchium montanum</i>
<i>Lonicera dioica</i>	<i>Polygonum lapathifolium</i>	<i>Sium suave</i>
<i>Lonicera involucrata</i>	<i>Populus balsamifera</i>	<i>Solidago canadensis</i>
<i>Lonicera oblongifolia</i>	<i>Populus deltoides</i>	<i>Solidago gigantea</i>
<i>Lupinus pusillus</i>	<i>Populus tremuloides</i>	<i>Solidago graminifolia</i>
<i>Lupinus sericeus</i>	<i>Potamogeton natans</i>	<i>Solidago multiradiata</i>
<i>Lycopodium annotinum</i>	<i>Potentilla anserina</i>	<i>Solidago simplex</i> ssp. <i>simplex</i>
<i>Lycopodium clavatum</i>	<i>Potentilla gracilis</i>	<i>Sorbus scopulina</i>
<i>Lycopodium obscurum</i>	<i>Prunella vulgaris</i>	<i>Sparganium eurycarpum</i>
<i>Lycopus americanus</i>	<i>Prunus pensylvanica</i>	<i>Sphaeralcea coccinea</i>
<i>Lycopus asper</i>	<i>Prunus virginiana</i>	<i>Spiraea alba</i>
<i>Lygodesmia juncea</i>	<i>Pyrola asarifolia</i>	<i>Stachys palustris</i>
<i>Lysimachia thyrsoiflora</i>	<i>Pyrola chlorantha</i>	<i>Stellaria crassifolia</i>
<i>Machaeranthera canescens</i>	<i>Pyrola minor</i>	<i>Stellaria media</i>
<i>Maianthemum canadense</i>	<i>Ranunculus cymbalaria</i>	<i>Symphoricarpos albus</i>
<i>Maianthemum racemosum</i> ssp. <i>amplexicaule</i>	<i>Ranunculus acris</i>	<i>Taraxacum officinale</i>
<i>Maianthemum stellatum</i>	<i>Ranunculus inamoenus</i>	<i>Thalictrum dasycarpum</i>
<i>Matricaria matricarioides</i>	<i>Ranunculus macounii</i>	<i>Thalictrum venulosum</i>
	<i>Ranunculus pensylvanicus</i>	<i>Thermopsis rhombifolia</i>
	<i>Ranunculus uncinatus</i>	<i>Trifolium hybridum</i>
	<i>Ratibida columnifera</i>	<i>Vaccinium myrtilloides</i>

Appendix 4b — Vascular Plant Guild Membership (Level 3) con't

**Culturally Important -
Medicine (con't)**

Vaccinium oxycoccos
Vaccinium vitis-idaea
Valeriana dioica
Viburnum edule
Viburnum opulus
Viola canadensis
Viola renifolia
Xanthium strumarium

Aquatic Form - Emergent

Acorus americanus
Alisma gramineum
Alisma triviale
Chenopodium rubrum
Eleocharis palustris
Eleocharis quinqueflora
Polygonum coccineum
Sagittaria cuneata
Schoenoplectus acutus

*Schoenoplectus
tabernaemontani*
Scolochloa festucacea
Sparganium angustifolium
Sparganium eurycarpum
Sparganium minimum

Aquatic Form - Floating

Lemna minor
Lemna trisulca
Lemna turionifera
Nuphar lutea ssp. variegata
Nymphaea tetragona
Potamogeton natans
Sparganium fluctuans
Spirodela polyrhiza

Aquatic Form – Submergent

Callitriche hermaphroditica
Callitriche palustris
Callitriche verna
Ceratophyllum demersum
Elodea canadensis

Hippuris vulgaris
Myriophyllum alterniflorum
Myriophyllum sibiricum
Myriophyllum verticillatum
Potamogeton alpinus
Potamogeton filiformis
Potamogeton friesii
Potamogeton gramineus
Potamogeton nodosus
Potamogeton obtusifolius
Potamogeton pectinatus
Potamogeton praelongus
Potamogeton pusillus
Potamogeton richardsonii
Potamogeton robbinsii
Potamogeton vaginatus
Potamogeton zosteriformis
Ranunculus aquatilis
Ruppia cirrhosa
Utricularia intermedia
Utricularia minor
Utricularia vulgaris

Appendix 5a — Lichen Guild Membership (Level 4)

Forest

Alectoria sarmentosa
Bryoria capillaris
Bryoria fremontii
Bryoria furcellata
Bryoria fuscescens
Bryoria glabra
Bryoria lanestris
Bryoria pseudofuscescens
Bryoria simplicior
Bryoria tortuosa
Bryoria trichodes
Candelaria concolor
Cladonia amaurocraea
Cladonia bacilliformis
Cladonia bellidiflora
Cladonia botrytes
Cladonia cenotea
Cladonia cervicornis
Cladonia cervicornis verticillata
Cladonia coniocraea
Cladonia cornuta
Cladonia cristatella
Cladonia cyanipes
Cladonia decorticata
Cladonia deformis
Cladonia digitata
Cladonia ecmocyna
Cladonia fimbriata
Cladonia furcata
Cladonia macilenta
Cladonia macrophyllodes
Cladonia ochrochlora
Cladonia pleurota
Cladonia squamosa
Cladonia umbricola
Collema furfuraceum
Evernia mesomorpha
Flavocetraria cucullata
Flavopunctelia flaventior
Flavopunctelia soredica
Heterodermia obscurata
Heterodermia speciosa
Hypogymnia austerodes
Hypogymnia bitteri
Hypogymnia enteromorpha
Hypogymnia metaphysodes
Hypogymnia occidentalis
Hypogymnia physodes
Hypogymnia tubulosa
Imshaugia aleurites
Imshaugia placorodia
Kaernefeltia merrillii

Leptogium saturninum
Letharia vulpina
Lobaria hallii
Lobaria pulmonaria
Melanelia subargentifera
Melanelia subolivacea
Melanelia trabeculata
Melanelixia subaurifera
Melanohalea elegantula
Melanohalea exasperata
Melanohalea exasperatula
Melanelia olivacea
Melanohalea septentrionalis
Melanohalea subelegantula
Nephroma bellum
Nephroma helveticum
Nephroma parile
Nephroma resupinatum
Nodobryoria abbreviata
Nodobryoria oregana
Parmeliopsis ambigua
Parmeliopsis hyperopta
Peltigera aphthosa
Peltigera britannica
Peltigera cinnamomea
Peltigera collina
Peltigera elisabethae
Peltigera extenuata
Peltigera horizontalis
Peltigera malacea
Peltigera membranacea
Peltigera neckeri
Peltigera neopolydactyla
Peltigera polydactyla
Peltigera praetextata
Peltigera retifoveata
Peltigera scabrosa
Peltigera venosa
Phaeophyscia adiastrata
Phaeophyscia ciliata
Phaeophyscia hirsuta
Phaeophyscia hispidula
Phaeophyscia orbicularis
Physcia adscendens
Physcia millegrana
Physcia tenella
Physconia detera
Physconia perisidiosa
Platismatia glauca
Punctelia subrudecta
Ramalina americana
Ramalina dilacerata
Ramalina farinacea

Ramalina intermedia
Ramalina obtusata
Ramalina pollinaria
Ramalina roesleri
Ramalina sinensis
Ramalina thrausta
Stereocaulon grande
Stereocaulon tomentosum
Tuckermannopsis americana
Tuckermannopsis chlorophylla
Tuckermannopsis ciliaris
Tuckermannopsis fendleri
Tuckermannopsis orbata
Tuckermannopsis platyphylla
Tuckermannopsis subalpina
Umbilicaria muehlenbergii
Usnea cavernosa
Usnea filipendula
Usnea glabrata
Usnea glabrescens
Usnea hirta
Usnea lapponica
Usnea scabrata
Usnea subfloridana
Usnea substerilis
Xanthomendoza fulva
Xanthoria candelaria
Xanthoria fallax
Xanthoria hasseana
Xanthoria polycarpa

Grassland/Meadow

Aspicilia hispidia
Cetraria arenaria
Cladonia mateocyatha
Cladonia rangiferina
Peltigera lepidophora
Peltigera ponojensis
Physcia biziana
Physcia caesia
Physcia convexa
Physcia dubia
Physcia phaea
Rhizoplaca chrysoleuca
Rhizoplaca melanophthalma
Xanthoparmelia chlorochroa
Xanthoparmelia wyomingica

Alpine

Solorina saccata

Appendix 5a — Lichen Guild Membership (Level 4) continued**Peatland**

Cladonia multiformis
Cladonia stygia
Peltigera kristinssonii

Wetland/Aquatic

not applicable

Habitat Generalist

Cetraria aculeata
Cetraria ericetorum
Cladonia acuminata
Cladonia arbuscula
Cladonia borealis
Cladonia cariosa
Cladonia carneola
Cladonia chlorophaea
Cladonia crispata
Cladonia gracilis elongata
Cladonia gracilis gracilis
Cladonia gracilis turbinata
Cladonia mitis
Cladonia phyllophora
Cladonia pocillum
Cladonia pyxidata
Cladonia ramulosa
Cladonia rei
Cladonia scabriuscula
Cladonia stellaris
Cladonia subulata
Cladonia sulphurina
Cladonia symphy carpia
Cladonia uncialis
Cladonia verruculosa
Flavocetraria nivalis
Lobaria linita
Melanelia albertana
Nephroma arcticum
Parmelia sulcata
Peltigera didactyla
Peltigera evansiana
Peltigera leucophlebia
Peltigera rufescens
Phaeophyscia constipata
Physcia aipolia
Physcia stellaris
Physconia muscigena
Stereocaulon alpinum
Tuckermannopsis sepincola
Vulpicida pinastri
Xanthoria elegans

Non-Native

not applicable

Appendix 5b — Lichen Guild Membership (Level 3)

Leaf Lichens

Candelaria concolor
Cetraria arenaria
Cetraria ericetorum
Flavocetraria cucullata
Flavocetraria nivalis
Flavopunctelia flaventior
Flavopunctelia soledica
Heterodermia obscurata
Heterodermia speciosa
Hypogymnia austerodes
Hypogymnia bitteri
Hypogymnia enteromorpha
Hypogymnia metaphysodes
Hypogymnia occidentalis
Hypogymnia physodes
Hypogymnia tubulosa
Imshaugia aleurites
Imshaugia placordia
Kaernefeltia merrillii
Lobaria pulmonaria
Melanelia albertana
Melanelia olivacea
Melanelia subargentifera
Melanelia subolivacea
Melanelia trabeculata
Melanelixia subaurifera
Melanohalea elegantula
Melanohalea exasperata
Melanohalea exasperatula
Melanohalea septentrionalis
Melanohalea subelegantula
Parmelia sulcata
Parmeliopsis ambigua
Parmeliopsis hyperopta
Phaeophyscia adiastrum
Phaeophyscia ciliata
Phaeophyscia constipata
Phaeophyscia hirsuta
Phaeophyscia hispidula
Phaeophyscia orbicularis
Physcia adscendens
Physcia aipolia
Physcia biziana
Physcia caesia
Physcia convexa
Physcia dubia
Physcia millegrana
Physcia phaea
Physcia stellaris
Physcia tenella
Physconia detersa
Physconia muscigena

Physconia perisidiosa
Platismatia glauca
Punctelia subrudecta
Rhizoplaca chrysoleuca
Rhizoplaca melanophthalma
Tuckermannopsis americana
Tuckermannopsis chlorophylla
Tuckermannopsis ciliaris
Tuckermannopsis fendleri
Tuckermannopsis orbata
Tuckermannopsis platyphylla
Tuckermannopsis sepincola
Tuckermannopsis subalpina
Umbilicaria muehlenbergii
Vulpicida pinastri
Xanthomendoza fulva
Xanthoparmelia chlorochroa
Xanthoparmelia wyomingica
Xanthoria candelaria
Xanthoria elegans
Xanthoria fallax
Xanthoria hasseana
Xanthoria polycarpa

Gel Lichens

Collema furfuraceum
Leptogium saturninum
Lobaria hallii
Lobaria linita

Felt Lichens

Nephroma arcticum
Nephroma bellum
Nephroma helveticum
Nephroma parile
Nephroma resupinatum
Peltigera aphthosa
Peltigera britannica
Peltigera canina
Peltigera cinnamomea
Peltigera collina
Peltigera didactyla
Peltigera elisabethae
Peltigera evansiana
Peltigera extenuata
Peltigera horizontalis
Peltigera kristinssonii
Peltigera lepidophora
Peltigera leucophlebia
Peltigera malacea
Peltigera membranacea
Peltigera neckeri
Peltigera neopolydactyla

Peltigera polydactyla
Peltigera ponojensis
Peltigera praetextata
Peltigera retifoveata
Peltigera retifoveata
Peltigera scabrosa
Peltigera venosa
Solorina saccata

Club/Shrub Lichens

Aspicilia hispidia
Cetraria aculeata
Cladonia acuminata
Cladonia amaurocraea
Cladonia arbuscula
Cladonia bacilliformis
Cladonia bellidiflora
Cladonia borealis
Cladonia botrytes
Cladonia cariosa
Aspicilia hispidia
Cetraria aculeata
Cladonia acuminata
Cladonia amaurocraea
Cladonia arbuscula
Cladonia bacilliformis
Cladonia bellidiflora
Cladonia borealis
Cladonia botrytes
Cladonia cariosa
Cladonia carneola
Cladonia cenotea
Cladonia cervicornis
Cladonia cervicornis verticillata
Cladonia chlorophaea
Cladonia coniocraea
Cladonia cornuta
Cladonia crispata
Cladonia cristatella
Cladonia cyanipes
Cladonia decorticata
Cladonia deformis
Cladonia digitata
Cladonia ecmocyna
Cladonia fimbriata
Cladonia furcata
Cladonia gracilis elongata
Cladonia gracilis gracilis
Cladonia gracilis turbinata
Cladonia macilenta
Cladonia macrophyllodes
Cladonia mateocyatha
Cladonia mitis

Appendix 5b — Lichen Guild Membership (Level 3) continued**Club/Shrub Lichens (con't)**

Cladonia multiformis
Cladonia ochrochlora
Cladonia phyllophora
Cladonia pleurota
Cladonia pocillum
Cladonia pyxidata
Cladonia ramulosa
Cladonia rangiferina
Cladonia rei
Cladonia scabriuscula
Cladonia squamosa
Cladonia stellaris
Cladonia stygia
Cladonia subulata
Cladonia sulphurina
Cladonia symphylicarpia
Cladonia umbricola
Cladonia uncialis
Cladonia verruculosa
Evernia mesomorpha
Ramalina americana
Ramalina dilacerata
Ramalina obtusata
Ramalina pollinaria
Ramalina sinensis
Stereocaulon alpinum
Stereocaulon grande
Stereocaulon tomentosum

Hair Lichen

Alectoria sarmentosa
Bryoria capillaris
Bryoria fremontii
Bryoria furcellata
Bryoria fuscescens
Bryoria glabra
Bryoria lanestrus
Bryoria pseudofuscescens
Bryoria simplicior
Bryoria tortuosa
Bryoria trichodes
Letharia vulpina
Nodobryoria abbreviata
Nodobryoria oregana
Ramalina farinacea
Ramalina intermedia
Ramalina roesleri
Ramalina thrausta
Usnea cavernosa
Usnea filipendula
Usnea glabrata
Usnea glabrescens
Usnea hirta

Usnea lapponica
Usnea scabrata
Usnea subfloridana
Usnea substerilis

Old-growth Forest

Alectoria sarmentosa
Bryoria capillaris
Bryoria fremontii
Cladonia scabriuscula
Cladonia stellaris
Cladonia umbricola
Heterodermia speciosa
Letharia vulpina
Nephroma arcticum
Peltigera britannica
Peltigera evansiana
Peltigera retifoveata
Peltigera scabrosa
Ramalina thrausta
Stereocaulon tomentosum
Usnea cavernosa
Usnea filipendula
Usnea scabrata

Forest Burn

Cladonia cervicornis verticillata
Cladonia cornuta
Cladonia crispata

Young Forest

Cetraria ericetorum
Cladonia arbuscula
Cladonia cariosa
Cladonia cornuta
Cladonia crispata
Cladonia mitis
Cladonia multiformis
Cladonia scabriuscula
Cladonia symphylicarpia
Parmelia sulcata
Peltigera didactyla
Peltigera evansiana
Peltigera lepidophora
Peltigera leucophlebia
Peltigera ponojensis
Peltigera rufescens

Rocky Outcrop/Talus

Cetraria aculeata
Cetraria ericetorum
Cladonia amaurocraea
Cladonia macilenta
Hypogymnia austerodes

Nephroma arcticum
Peltigera elisabethae
Peltigera leucophlebia
Phaeophyscia hispidula
Physcia caesia
Physcia dubia
Ramalina intermedia
Ramalina thrausta
Rhizoplaca chrysoleuca
Rhizoplaca melanophthalma
Stereocaulon tomentosum
Umbilicaria muehlenbergii
Xanthoparmelia chlorochroa
Xanthoria elegans

Conifer/Birch Specialist

Alectoria sarmentosa
Bryoria capillaris
Bryoria fremontii
Bryoria furcellata
Bryoria fuscescens
Bryoria glabra
Bryoria lanestrus
Bryoria pseudofuscescens
Bryoria simplicior
Bryoria tortuosa
Bryoria trichodes
Cladonia coniocraea
Cladonia pleurota
Evernia mesomorpha
Hypogymnia austerodes
Hypogymnia bitteri
Hypogymnia enteromorpha
Hypogymnia metaphysodes
Hypogymnia occidentalis
Hypogymnia physodes
Hypogymnia tubulosa
Imshaugia aleurites
Imshaugia placorodia
Kaernefeltia merrillii
Letharia vulpina
Lobaria linita
Lobaria pulmonaria
Melanelixia subaurifera
Melanohalea septentrionalis
Melanohalea subelegantula
Nephroma bellum
Nephroma helveticum
Nephroma parile
Nephroma resupinatum
Nodobryoria abbreviata
Nodobryoria oregana
Parmelia sulcata
Parmeliopsis ambigua

Appendix 5b — Lichen Guild Membership (Level 3) continued**Conifer/Birch Specialist
(con't)**

Parmeliopsis hyperopta
Peltigera apthosa
Peltigera collina
Peltigera neckeri
Peltigera scabrosa
Phaeophyscia hispidula
Physcia adscendens
Physcia tenella
Physconia detersa
Physconia perisidiosa
Platismatia glauca
Punctelia subrudecta
Ramalina americana
Ramalina dilacerata
Ramalina farinacea
Ramalina obtusata
Ramalina pollinaria
Ramalina roesleri
Ramalina thrausta
Tuckermannopsis americana
Tuckermannopsis chlorophylla
Tuckermannopsis ciliaris
Tuckermannopsis fendleri
Tuckermannopsis orbata
Tuckermannopsis platyphylla
Tuckermannopsis sepincola
Tuckermannopsis subalpina
Usnea cavernosa
Usnea filipendula
Usnea glabrata
Usnea glabrescens
Usnea hirta
Usnea lapponica
Usnea scabrata
Usnea subfloridana
Vulpicida pinastri
Xanthomendoza fulva

Nutrient-enriched**Conifer/Birches Trees**

Lobaria pulmonaria
Melanelia subargentifera
Melanelixia subaurifera
Melanohalea elegantula
Melanohalea exasperatula
Nephroma parile
Nephroma resupinatum
Parmelia sulcata
Phaeophyscia hirsuta
Physcia adscendens
Physcia aipolia
Physcia tenella

Ramalina dilacerata
Ramalina farinacea
Ramalina intermedia
Ramalina obtusata
Ramalina pollinaria
Ramalina sinensis
Xanthoria candelaria
Xanthoria fallax

Deciduous Trees

Candelaria concolor
Cladonia pleurota
Collema furfuraceum
Flavopunctelia flaventior
Flavopunctelia soledica
Heterodermia obscurata
Heterodermia speciosa
Hypogymnia tubulosa
Leptogium saturninum
Lobaria hallii
Lobaria pulmonaria
Melanelia albertana
Melanelia olivacea
Melanelia subargentifera
Melanelia subolivacea
Melanelia trabeculata
Melanelixia subaurifera
Candelaria concolor
Cladonia pleurota
Collema furfuraceum
Flavopunctelia flaventior
Flavopunctelia soledica
Heterodermia obscurata
Heterodermia speciosa
Hypogymnia tubulosa
Leptogium saturninum
Lobaria hallii
Lobaria pulmonaria
Melanelia albertana
Melanelia olivacea
Melanelia subargentifera
Melanelia subolivacea
Melanelixia subaurifera
Melanohalea elegantula
Melanohalea exasperata
Melanohalea exasperatula
Melanohalea septentrionalis
Melanohalea subelegantula
Nephroma helveticum
Nephroma parile
Parmelia sulcata
Peltigera collina
Phaeophyscia adiastrata

Phaeophyscia ciliata
Phaeophyscia hirsuta
Phaeophyscia hispidula
Phaeophyscia orbicularis
Physcia adscendens
Physcia aipolia
Physcia biziana
Physcia millegrana
Physcia stellaris
Physconia detersa
Physconia perisidiosa
Punctelia subrudecta
Ramalina americana
Ramalina dilacerata
Ramalina farinacea
Ramalina obtusata
Ramalina pollinaria
Ramalina roesleri
Ramalina sinensis
Tuckermannopsis sepincola
Usnea glabrata
Usnea glabrescens
Xanthomendoza fulva
Xanthoria candelaria
Xanthoria fallax
Xanthoria hasseana
Xanthoria polycarpa

Stump/Logs

Cetraria ericetorum
Cladonia bacilliformis
Cladonia bellidiflora
Cladonia borealis
Cladonia botrytes
Cladonia carneola
Cladonia cenotea
Cladonia cervicornis
Cladonia cervicornis verticillata
Cladonia chlorophaea
Cladonia coniocraea
Cladonia cornuta
Cladonia crispata
Cladonia cristatella
Cladonia cyanipes
Cladonia deformis
Cladonia digitata
Cladonia fimbriata
Cladonia gracilis turbinata
Cladonia macilenta
Cladonia ochrochlora
Cladonia pleurota
Cladonia pyxidata
Cladonia ramulosa
Cladonia rei

Appendix 5b — Lichen Guild Membership (Level 3) continued**Stumps/Logs (con't)**

Cladonia squamosa
Cladonia subulata
Cladonia sulphurina
Cladonia umbricola
Lobaria pulmonaria
Parmelia sulcata
Parmeliopsis ambigua
Parmeliopsis hyperopta
Peltigera horizontalis
Peltigera leucophlebia
Peltigera membranacea
Peltigera neckeri
Peltigera neopolydactyla
Peltigera praetextata
Physcia caesia
Physcia dubia
Ramalina dilacerata
Xanthomendoza fulva

Human-modified

Candelaria concolor
Cladonia verruculosa
Evernia mesomorpha
Parmelia sulcata
Peltigera didactyla
Peltigera leucophlebia
Phaeophyscia orbicularis
Vulpicida pinastri
Xanthoria candelaria
Xanthoria fallax

Limestone/Calcium-rich rocks

Aspicilia hispidia
Collema furfuraceum
Melanelia subargentifera
Nephroma bellum
Nephroma helveticum
Nephroma parile
Nephroma resupinatum
Parmelia sulcata
Peltigera horizontalis
Peltigera leucophlebia
Peltigera praetextata
Physcia biziana
Physcia caesia
Physcia dubia
Physcia tenella
Physconia muscigena
Ramalina obtusata
Ramalina pollinaria
Solorina saccata
Xanthoria candelaria

Granite/Silica rock

Cladonia amaurocraea
Cladonia furcata
Cladonia gracilis gracilis
Cladonia mitis
Cladonia pyxidata
Cladonia rangiferina
Cladonia scabriuscula
Cladonia uncialis
Collema furfuraceum
Nephroma bellum
Nephroma helveticum
Nephroma parile
Nephroma resupinatum
Parmelia sulcata
Peltigera aphthosa
Peltigera britannica
Peltigera praetextata
Peltigera scabrosa
Phaeophyscia adiaetola
Phaeophyscia constipata
Physcia millegrana
Physcia phaea
Physcia tenella
Punctelia subrudecta
Ramalina obtusata
Ramalina pollinaria
Rhizoplaca chrysoleuca
Rhizoplaca melanophthalma
Stereocaulon grande
Vulpicida pinastri
Xanthoparmelia wyomingica

Calcium-rich soils

Aspicilia hispidia
Cladonia cariosa
Cladonia pocillum
Cladonia symphy carpia
Peltigera didactyla
Peltigera horizontalis
Peltigera lepidophora
Peltigera leucophlebia
Peltigera ponojensis
Peltigera praetextata
Peltigera rufescens
Physconia muscigena
Ramalina intermedia
Solorina saccata
Xanthoparmelia chlorochroa

Acidic Soils

Cetraria aculeata
Cetraria arenaria
Cetraria ericetorum

Cladonia acuminata
Cladonia amaurocraea
Cladonia arbuscula
Cladonia bacilliformis
Cladonia bellidiflora
Cladonia borealis
Cladonia cervicornis
Cladonia cervicornis verticillata
Cladonia chlorophaea
Cladonia cornuta
Cladonia crispata
Cladonia cristatella
Cladonia cyanipes
Cladonia decorticata
Cladonia ecmocyna
Cladonia furcata
Cladonia gracilis elongata
Cladonia gracilis turbinata
Cladonia macilenta
Cladonia macrophyllodes
Cladonia mateocyatha
Cladonia mitis
Cladonia multiformis
Cladonia phyllophora
Cladonia pyxidata
Cladonia rangiferina
Cladonia rei
Cladonia scabriuscula
Cladonia stellaris
Cladonia subulata
Cladonia symphy carpia
Cladonia uncialis
Cladonia verruculosa
Flavocetraria cucullata
Flavocetraria nivalis
Lobaria linita
Nephroma arcticum
Peltigera aphthosa
Peltigera britannica
Peltigera canina
Peltigera cinnamomea
Peltigera elisabethae
Peltigera evansiana
Peltigera kristinssonii
Peltigera malacea
Peltigera neopolydactyla
Peltigera praetextata
Peltigera scabrosa
Peltigera venosa
Phaeophyscia constipata
Ramalina intermedia
Stereocaulon alpinum
Stereocaulon grande
Stereocaulon tomentosum

Appendix 5b — Lichen Guild Membership (Level 3) continued**Acidic Soils (cont'd)**

Xanthoparmelia chlorochroa
Xanthoparmelia wyomingica

Important for Wildlife

Alectoria sarmentosa
Bryoria capillaris
Bryoria fremontii
Bryoria furcellata
Bryoria fuscescens
Bryoria glabra
Bryoria lanestrus
Bryoria pseudofuscescens
Bryoria simplicior
Bryoria trichodes
Cetraria ericetorum
Cladonia amaurocraea
Cladonia arbuscula
Cladonia gracilis elongata
Cladonia gracilis gracilis
Cladonia gracilis turbinata
Cladonia mitis
Cladonia rangiferina
Cladonia stellaris
Cladonia stygia
Lobaria linita
Ramalina americana
Ramalina dilacerata
Ramalina farinacea
Ramalina intermedia
Ramalina obtusata
Ramalina pollinaria
Ramalina roesleri
Ramalina thrausta
Stereocaulon alpinum
Stereocaulon grande
Stereocaulon tomentosum
Usnea cavernosa
Usnea filipendula
Usnea glabrata
Usnea glabrescens
Usnea hirta
Usnea lapponica
Usnea scabrata
Usnea subfloridana

Culturally Important

Bryoria capillaris
Bryoria fremontii
Bryoria furcellata
Bryoria fuscescens
Bryoria glabra
Bryoria lanestrus
Bryoria pseudofuscescens

Bryoria simplicior
Bryoria tortuosa
Bryoria trichodes
Cladonia arbuscula
Cladonia mitis
Cladonia rangiferina
Cladonia stellaris
Cladonia stygia
Letharia vulpina
Nephroma arcticum
Peltigera aphthosa
Peltigera canina
Umbilicaria muehlenbergii
Usnea cavernosa
Usnea filipendula
Usnea glabrata
Usnea glabrescens
Usnea hirta
Usnea lapponica
Usnea scabrata
Usnea subfloridana
Xanthoria elegans

Uncommon

Cetraria arenaria
Cladonia cyanipes
Cladonia decorticata
Cladonia digitata
Cladonia gracilis gracilis
Cladonia macilenta
Cladonia rei
Cladonia squamosa
Cladonia stygia
Cladonia umbricola
Flavopunctelia soledica
Heterodermia obscurata
Heterodermia speciosa
Hypogymnia enteromorpha
Imshaugia placorodia
Lobaria hallii
Lobaria pulmonaria
Melanelia olivacea
Nephroma bellum
Peltigera collina
Peltigera horizontalis
Peltigera polydactyla
Phaeophyscia adiastrata
Phaeophyscia hirsuta
Physcia biziana
Ramalina dilacerata
Ramalina intermedia
Ramalina obtusata
Xanthomendoza fulva
Xanthoria hasseana

High Responsibility

Melanelia albertana
Melanelixia subaurifera
Peltigera kristinssonii

Wetland Forest

Bryoria capillaris
Cladonia digitata
Lobaria hallii
Melanelia trabeculata
Peltigera neopolydactyla
Ramalina thrausta
Usnea glabrata

Riverine Forest

Bryoria capillaris
Nephroma helveticum
Nephroma resupinatum
Peltigera collina
Peltigera venosa
Ramalina farinacea
Ramalina intermedia
Ramalina obtusata
Ramalina pollinaria
Ramalina roesleri
Solorina saccata

Dispersal Limited

Alectoria sarmentosa
Bryoria fremontii
Cetraria arenaria
Cladonia acuminata
Cladonia amaurocraea
Cladonia decorticata
Cladonia scabriuscula
Cladonia squamosa
Peltigera evansiana
Usnea cavernosa
Usnea filipendula
Xanthoparmelia chlorochroa

Vulnerable to Snow Cover

Cetraria aculeata
Cetraria arenaria
Cladonia arbuscula
Cladonia botrytes
Cladonia cariosa
Cladonia cervicornis
Cladonia cervicornis verticillata
Cladonia mitis
Cladonia multififormis
Cladonia rangiferina
Cladonia rei

Appendix 5b — Lichen Guild Membership (Level 3) continued**Vulnerable to Snow Cover
(con't)**

Cladonia scabriuscula
Peltigera collina
Peltigera didactyla
Peltigera elisabethae
Peltigera horizontalis
Peltigera kristinssonii
Peltigera lepidophora
Peltigera leucophlebia
Peltigera malacea
Peltigera neckeri
Peltigera ponojensis
Peltigera praetextata
Peltigera rufescens
Physcia caesia
Physcia dubia
Physconia muscigena
Physconia perisidiosa
Ramalina intermedia
Rhizoplaca chrysoleuca
Rhizoplaca melanophthalma
Xanthoparmelia chlorochroa
Xanthoria elegans

Vulnerable to Trampling

Cetraria aculeata
Cetraria arenaria
Cetraria ericetorum
Cladonia uncialis

**Sensitive to Industrial Air
Pollution**

Bryoria capillaris
Bryoria fremontii
Flavopunctelia flaventior
Flavopunctelia soledica
Heterodermia speciosa
Lobaria hallii
Lobaria linita
Lobaria pulmonaria
Melanelia albertana
Melanelia subargentifera
Nephroma helveticum
Nephroma parile
Nephroma resupinatum
Peltigera aphthosa
Phaeophyscia hirsuta
Phaeophyscia orbicularis
Punctelia subrudecta
Ramalina dilacerata
Ramalina farinacea
Ramalina intermedia
Ramalina obtusata
Ramalina pollinaria
Ramalina sinensis
Ramalina thrausta
Solorina saccata
Usnea cavernosa
Usnea filipendula
Usnea scabrata

**Sensitive to Agriculture Air
Pollution**

Alectoria sarmentosa
Bryoria capillaris
Bryoria fremontii
Bryoria furcellata
Bryoria fuscescens
Bryoria glabra
Bryoria lanestris
Bryoria pseudofuscescens
Bryoria simplicior
Bryoria tortuosa
Flavopunctelia flaventior
Flavopunctelia soledica
Hypogymnia metaphysodes
Imshaugia aleurites
Imshaugia placorodia
Kaernefeltia merrillii
Leptogium saturninum
Lobaria hallii
Lobaria linita
Lobaria pulmonaria
Ramalina thrausta
Tuckermannopsis americana
Tuckermannopsis ciliaris
Tuckermannopsis orbata
Tuckermannopsis platyphylla

Appendix 6a — Bryophytes Guild Membership (Level 4)**Forest**

Amblystegium serpens
Anastrophyllum helleranum
Aulacomnium androgynum
Brachythecium acutum
Brachythecium digastrum
Brachythecium erythrorrhizon
Brachythecium frigidum
Brachythecium reflexum
Brachythecium velutinum
Bryohaplocladium microphyllum
Bryum flaccidum
Callicladium haldanianum
Campylium chrysophyllum
Chiloscyphus pallescens
Chiloscyphus polyanthos
Dicranum fuscescens
Dicranum montanum
Dicranum polysetum
Dicranum scoparium
Eurhynchium pulchellum
Herzogiella turfacea
Hypnum pallescens
Jungermannia lanceolata
Lophocolea bidentata
Lophozia ascendens
Lophozia excisa
Lophozia incisa
Lophozia longidens
Lophozia ventricosa
Mnium marginatum
Mnium spinulosum
Myurella sibirica
Odontoschisma denudatum
Orthotrichum obtusifolium
Orthotrichum speciosum
Plagiomnium cuspidatum
Plagiomnium drummondii
Platygyrium repens
Ptilium crista-castrensis
Pylaisiella polyantha
Rhytidiadelphus triquetrus
Scapania glaucocephala
Schistostega pennata
Sphagnum girgensohnii
Thuidium delicatulum

Grassland/Meadow

Astomum muhlenbergianum
Polytrichum piliferum

Alpine/Arctic

Barbilophozia quadriloba

Bryoerythrophyllum recurvirostre
Nardia geoscyphus
Orthothecium chryseum

Peat-forming Wetlands

Calypogeja sphagnicola
Cephalozia lunulifolia
Cladopodiella fluitans
Lophozia laxa
Mylia anomala
Pohlia sphagnicola
Polytrichum strictum
Sphagnum angustifolium
Sphagnum fuscum
Sphagnum magellanicum
Sphagnum riparium

Non Peat-forming Wetlands

Aneura pinguis
Brachythecium mildeanum
Calliergon cordifolium
Calliergon giganteum
Calliergon richardsonii
Calliergon stramineum
Calypogeja muelleriana
Calypogeja neesiana
Campylium stellatum
Catoscopium nigrum
Cinclidium stygium
Drepanocladus aduncus
Drepanocladus brevifolius
Geocalyx graveolens
Hamatocaulis vernicosus
Helodium blandowii
Hypnum pratense
Lepidozia reptans
Limprichtia revolvens
Meesia triquetra
Moerckia hibernica
Plagiomnium ellipticum
Rhizomnium gracile
Scapania paludicola
Sphagnum fallax
Sphagnum russowii
Sphagnum squarrosum
Sphagnum teres
Sphagnum warnstorffii
Sphagnum wulfianum
Tomentypnum falcifolium
Tomentypnum nitens
Warnstorfia exannulata
Warnstorfia fluitans

Aquatic/Riparian/Littoral

Brachythecium rivulare
Conocephalum conicum
Cratoneuron filicinum
Dichodontium pellucidum
Hygrohypnum ochraceum
Leptodictyum riparium
Pohlia wahlenbergii

Habitat Generalist

Abietinella abietina
Aulacomnium palustre
Barbilophozia barbata
Barbilophozia hatcheri
Barbilophozia kunzeana
Barbilophozia lycopodioides
Barbula convoluta
Barbula unguiculata
Blepharostoma trichophyllum
Brachythecium albicans
Brachythecium campestre
Brachythecium plumosum
Brachythecium populeum
Brachythecium salebrosum
Brachythecium starkei
Brachythecium turgidum
Bryum algovicum
Bryum argenteum
Bryum caespiticium
Bryum lisae var. cuspidatum
Bryum pallens
Bryum pseudotriquetrum
Campylium hispidulum
Campylium polygamum
Campylium radicale
Cephalozia bicuspidata
Cephalozia catenulata
Cephalozia connivens
Cephalozia pleniceps
Cephaloziella divaricata
Cephaloziella hampeana
Cephaloziella rubella
Cephaloziella subdentata
Ceratodon purpureus
Climacium dendroides
Cynodontium strumiferum
Dicranella cerviculata
Dicranella schreberiana
Dicranum acutifolium
Dicranum bonjeanii
Dicranum elongatum
Dicranum flagellare

Appendix 6a — Bryophytes Guild Membership (Level 4) (con't)**HabitatGeneralist (con't)**

Dicranum fragilifolium
Dicranum muehlenbeckii
Dicranum spadiceum
Dicranum undulatum
Didymodon rigidulus
Distichium capillaceum
Ditrichum flexicaule
Funaria hygrometrica
Hylocomium splendens
Hypnum bambergeri
Hypnum cupressiforme
Hypnum lindbergii
Hypnum recurvatum
Hypnum revolutum
Isopterygiopsis pulchella
Jamesoniella autumnalis
Leptobryum pyriforme
Leptodictyum humile
Lophocolea heterophylla
Lophocolea minor
Lophozia heterocolpos
Lophozia obtusa

Marchantia polymorpha
Meesia uliginosa
Mnium lycopodioides
Myurella julacea
Oncophorus wahlenbergii
Plagiochila asplenioides
Plagiomnium medium
Plagiomnium rostratum
Plagiothecium denticulatum
Plagiothecium laetum
Platydictya jungermannioides
Pleurozium schreberi
Pogonatum dentatum
Pohlia bulbifera
Pohlia cruda
Pohlia nutans
Polytrichum commune
Polytrichum juniperinum
Ptilidium ciliare
Ptilidium pulcherrimum
Racomitrium canescens
Rhizomnium pseudopunctatum
Riccardia latifrons

Riccardia palmata
Sanionia uncinata
Scapania irrigua
Scapania mucronata
Sphagnum capillifolium
Sphagnum centrale
Sphagnum fimbriatum
Splachnum luteum
Splachnum rubrum
Splachnum sphaericum
Tetraphis pellucida
Tetraplodon angustatus
Tetraplodon mnioides
Thuidium recognitum
Timmia austriaca
Tortella fragilis
Tortula ruralis
Tritomaria exsectiformis
Tritomaria quinquedentata
Tritomaria scitula

Non-Native
not applicable

Appendix 6b — Bryophytes Guild Membership (Level 3)**Old-Growth**

Anastrophyllum helleranum
Barbilophozia lycopodioides
Brachythecium starkei
Callicladium haldanianum
Dicranum fuscescens
Dicranum polysetum
Dicranum scoparium
Hylocomium splendens
Mnium spinulosum
Oncophorus wahlenbergii
Plagiomnium cuspidatum
Pleurozium schreberi
Ptilidium pulcherrimum
Ptilium crista-castrensis
Rhytidiadelphus triquetrus
Schistostega pennata
Thuidium delicatulum

Forest Burns

Aulacomnium androgynum
Barbula convoluta
Ceratodon purpureus
Funaria hygrometrica
Marchantia polymorpha
Pohlia nutans
Polytrichum juniperinum
Polytrichum piliferum

Early Seral

Brachythecium salebrosum
Bryoerythrophyllum recurvirostre
Bryum argenteum
Bryum caespiticium
Bryum lisae var. cuspidatum
Ceratodon purpureus
Dicranella cerviculata
Funaria hygrometrica
Hypnum revolutum
Leptobryum pyriforme
Marchantia polymorpha
Pohlia bulbifera
Pohlia cruda
Pohlia nutans
Polytrichum juniperinum
Polytrichum piliferum
Racomitrium canescens
Tortula ruralis

Uncommon

Anastrophyllum helleranum
Astomum muhlenbergianum
Barbilophozia quadriloba

Brachythecium acutum
Brachythecium plumosum
Brachythecium reflexum
Bryum flaccidum
Callicladium haldanianum
Calypogeja muelleriana
Calypogeja neesiana
Campylium polygamum
Campylium radicale
Cephaloziella subdentata
Chiloscyphus pallescens
Chiloscyphus polyanthos
Cinclidium stygium
Conocephalum conicum
Dicranum muehlenbeckii
Dicranum spadiceum
Hygrohypnum ochraceum
Lophozia heterocolpos
Lophozia obtusa
Moerckia hibernica
Myurella sibirica
Pohlia bulbifera
Riccardia latifrons
Riccardia palmata
Scapania glaucocephala
Scapania paludicola
Schistostega pennata
Sphagnum fallax
Splachnum luteum
Splachnum rubrum
Splachnum sphaericum

High Responsibility

Not applicable

Human-modified

Astomum muhlenbergianum
Aulacomnium androgynum
Barbula convoluta
Barbula unguiculata
Brachythecium salebrosum
Bryoerythrophyllum recurvirostre
Bryum argenteum
Bryum caespiticium
Bryum lisae var. cuspidatum
Bryum pallens
Ceratodon purpureus
Dicranella schreberiana
Funaria hygrometrica
Leptobryum pyriforme
Marchantia polymorpha
Plagiomnium rostratum
Pogonatum dentatum

Pohlia cruda
Pohlia nutans
Polytrichum juniperinum
Polytrichum piliferum
Racomitrium canescens
Sphagnum riparium
Tortula ruralis

On Stumps, Logs, or Tip-up Mounds

Amblystegium serpens
Anastrophyllum helleranum
Aulacomnium androgynum
Barbilophozia lycopodioides
Brachythecium erythrorrhizon
Brachythecium frigidum
Bryohaplocladium microphyllum
Bryum algovicum
Bryum flaccidum
Callicladium haldanianum
Campylium chrysophyllum
Campylium hispidulum
Cephalozia catenulata
Cephalozia connivens
Cephalozia lunulifolia
Cephaloziella divaricata
Dicranum fragillifolium
Dicranum fuscescens
Dicranum montanum
Herzogiella turfacea
Hypnum cupressiforme
Isopterygiopsis pulchella
Jamesoniella autumnalis
Lepidozia reptans
Lophocolea bidentata
Lophocolea heterophylla
Lophozia ascendens
Lophozia incisa
Lophozia longidens
Lophozia ventricosa
Mnium lycopodioides
Mnium marginatum
Mnium spinulosum
Odontoschisma denudatum
Oncophorus wahlenbergii
Plagiothecium laetum
Platygyrium repens
Ptilidium pulcherrimum
Riccardia latifrons
Riccardia palmata
Scapania glaucocephala
Scapania irrigua
Schistostega pennata
Tetraphis pellucida

Appendix 6b — Bryophytes Guild Membership (Level 3) (con't)**Sensitive to prolonged drought**

Anastrophyllum helleranum
Aneura pinguis
Aulacomnium palustre
Blepharostoma trichophyllum
Brachythecium erythrorrhizon
Brachythecium frigidum
Brachythecium mildeanum
Brachythecium rivulare
Brachythecium turgidum
Bryum pseudotriquetrum
Calliergon cordifolium
Calliergon giganteum
Calliergon richardsonii
Calliergon stramineum
Calypogeja muelleriana
Calypogeja neesiana
Calypogeja sphagnicola
Campylium radicale
Campylium stellatum
Catoscopium nigratum
Cephalozia connivens
Cephalozia lunulifolia
Cephaloziella subdentata
Chiloscyphus pallescens
Chiloscyphus polyanthos
Cinclidium stygium
Cladopodiella fluitans
Climacium dendroides
Conocephalum conicum
Cratoneuron filicinum
Dichodontium pellucidum
Drepanocladus aduncus
Drepanocladus brevifolius
Geocalyx graveolens
Hamatocaulis vernicosus
Helodium blandowii
Hygrohypnum ochraceum
Hypnum pratense
Lepidozia reptans
Leptobryum pyriforme
Leptodictyum humile
Leptodictyum riparium
Limprichtia revolvens
Lophocolea bidentata
Lophocolea minor
Lophozia heterocolpos
Lophozia obtusa
Lophozia ventricosa
Marchantia polymorpha
Meesia triquetra
Meesia uliginosa

Moerckia hibernica
Mylia anomala
Plagiochila asplenioides
Plagiomnium ellipticum
Plagiomnium medium
Plagiothecium denticulatum
Plagiothecium laetum
Platydictya jungermannioides
Pohlia sphagnicola
Pohlia wahlenbergii
Polytrichum strictum
Rhizomnium gracile
Rhizomnium pseudopunctatum
Riccardia latifrons
Riccardia palmata
Scapania glaucocephala
Scapania paludicola
Schistostega pennata
Sphagnum angustifolium
Sphagnum capillifolium
Sphagnum centrale
Sphagnum fallax
Sphagnum fimbriatum
Sphagnum fuscum
Sphagnum girgensohnii
Sphagnum jensenii
Sphagnum magellanicum
Sphagnum riparium
Sphagnum russowii
Sphagnum squarrosum
Sphagnum teres
Sphagnum warnstorffii
Sphagnum wulfianum
Splachnum luteum
Splachnum rubrum
Splachnum sphaericum
Tomentypnum falcifolium
Tomentypnum nitens
Tritomaria exsectiformis
Warnstorfia exannulata
Warnstorfia fluitans

Low productivity

Abietinella abietina
Astomum muhlenbergianum
Bryum argenteum
Bryum caespitium
Cephaloziella hampeana
Ceratodon purpureus
Hypnum revolutum
Jungermannia lanceolata
Pogonatum dentatum
Pohlia nutans

Polytrichum juniperinum
Polytrichum piliferum
Racomitrium canescens
Sphagnum angustifolium
Sphagnum capillifolium
Sphagnum centrale
Sphagnum fallax
Sphagnum fimbriatum
Sphagnum fuscum
Sphagnum girgensohnii
Sphagnum jensenii
Sphagnum magellanicum
Sphagnum riparium
Sphagnum russowii
Sphagnum squarrosum
Sphagnum teres
Sphagnum warnstorffii
Sphagnum wulfianum
Tortula ruralis

Epiphytic

Brachythecium albicans
Orthotrichum obtusifolium
Orthotrichum speciosum
Pylaisiella polyantha

Grow on Tree Bases

Amblystegium serpens
Barbilophozia barbata
Brachythecium acutum
Brachythecium campestre
Brachythecium erythrorrhizon
Brachythecium frigidum
Brachythecium salebrosum
Callicladium haldanianum
Campylium chrysophyllum
Dicranum flagellare
Eurhynchium pulchellum
Hypnum pallescens
Mnium marginatum
Plagiomnium cuspidatum
Plagiomnium drummondii
Plagiothecium denticulatum
Plagiothecium laetum
Platygyrium repens
Ptilidium pulcherrimum
Thuidium delicatulum

Appendix 6b — Bryophytes Guild Membership (Level 3) (con't)**Terrestrial Riparian**

Barbula unguiculata
Brachythecium rivulare
Bryum pseudotriquetrum
Cephalozia bicuspidata
Conocephalum conicum
Cratoneuron filicinum
Dichodontium pellucidum
Dicranum flagellare
Hygrohypnum ochraceum
Isopterygiopsis pulchella
Leptodictyum humile
Leptodictyum riparium
Orthothecium chryseum
Plagiomnium medium
Plagiomnium rostratum
Pogonatum dentatum
Pohlia wahlenbergii

Calcareous/basic Substrates

Abietinella abietina
Aneura pinguis
Barbilophozia lycopodioides
Barbula convoluta
Barbula unguiculata
Blepharostoma trichophyllum
Brachythecium turgidum
Bryoerythrophyllum recurvirostre
Bryum algovicum
Bryum pallens
Bryum pseudotriquetrum
Calliergon giganteum
Campylium stellatum
Catoscopium nigrum
Cephalozia catenulata
Chiloscyphus pallescens
Chiloscyphus polyanthos
Cinclidium stygium
Cratoneuron filicinum
Dicranella schreberiana
Didymodon rigidulus
Distichum capillaceum
Ditrichum flexicaule
Hamatocaulis vernicosus
Helodium blandowii
Hypnum bambergeri
Hypnum cupressiforme
Hypnum lindbergii
Hypnum pratense
Hypnum recurvatum
Hypnum revolutum
Isopterygiopsis pulchella
Limprichtia revolvens

Lophocolea minor
Lophozia heterocolpos
Lophozia obtusa
Meesia triquetra
Meesia uliginosa
Mnium marginatum
Moerckia hibernica
Myurella julacea
Myurella sibirica
Orthothecium chryseum
Plagiochila asplenioides
Plagiomnium rostratum
Platydictya jungermannioides
Rhizomnium gracile
Rhizomnium pseudopunctatum
Scapania mucronata
Scapania paludicola
Sphagnum centrale
Sphagnum jensenii
Sphagnum squarrosum
Sphagnum teres
Sphagnum warnstorffii
Timmia austriaca
Tomentypnum nitens
Tortula ruralis
Tritomaria quinquedentata
Tritomaria scitula

Acid Substrates

Barbilophozia barbata
Barbilophozia hatcheri
Barbilophozia kunzeana
Barbilophozia lycopodioides
Brachythecium plumosum
Brachythecium populeum
Cephalozia bicuspidata
Cephalozia connivens
Cephalozia lunulifolia
Cephalozia divaricata
Cladopodiella fluitans
Dichodontium pellucidum
Dicranella cerviculata
Hygrohypnum ochraceum
Jungermannia lanceolata
Lophozia ascendens
Lophozia excisa
Lophozia ventricosa
Mylia anomala
Nardia geoscyphus
Odontoschisma denudatum
Pogonatum dentatum
Ptilidium ciliare
Racomitrium canescens
Scapania irrigua

Scapania mucronata
Sphagnum magellanicum
Tetraphis pellucida
Thuidium delicatulum
Tritomaria exsectiformis
Tritomaria quinquedentata
Warnstorffia fluitans

Rich Organic Substrates

Bryum algovicum
Splachnum luteum
Splachnum rubrum
Splachnum sphaericum
Tetraplodon angustatus
Tetraplodon mnioides

Shade intolerant

Abietinella abietina
Barbula convoluta
Barbula unguiculata
Brachythecium digastrum
Bryum argenteum
Bryum caespiticium
Catoscopium nigrum
Pogonatum dentatum

Rock Outcrops/Talus Slopes

Abietinella abietina
Barbilophozia barbata
Barbilophozia kunzeana
Brachythecium erythrorrhizon
Brachythecium frigidum
Bryoerythrophyllum recurvirostre
Bryum algovicum
Campylium chrysophyllum
Cynodontium strumiferum
Dicranella schreberiana
Dicranum fragilifolium
Dicranum muehlenbeckii
Didymodon rigidulus
Distichum capillaceum
Ditrichum flexicaule
Hypnum bambergeri
Hypnum cupressiforme
Hypnum recurvatum
Hypnum revolutum
Isopterygiopsis pulchella
Jungermannia lanceolata
Lophozia heterocolpos
Lophozia incisa
Lophozia longidens
Mnium lycopodioides
Mnium marginatum

Appendix 6b — Bryophytes Guild Membership (Level 3) (con't)**Rock Outcrops/Talus Slopes
(cont'd)**

Myurella julacea
Myurella sibirica
Odontoschisma denudatum
Orthothecium chryseum
Plagiomnium rostratum

Plagiothecium laetum
Pohlia cruda
Racomitrium canescens
Scapania mucronata
Tortella fragilis
Tortula ruralis
Tritomaria scitula

Sensitive to Pollution

Hylocomium splendens
Orthotrichum obtusifolium
Orthotrichum speciosum
Scapania mucronata

Appendix 7 — Resources Used To Develop ABMI Guilds Related and Supporting Resources for Mammals and Birds

Species Identification

NatureServe Code — From the NatureServe web site (<http://www.natureserve.org/getData/animalData.jsp>).

Missing species (eg. domestic and introduced species) given a number so they fit where they belonged taxonomically in the NatureServe list.

Class — from the NatureServe web site <http://www.natureserve.org/getData/animalData.jsp>.

Classes for species not included by NatureServe were determined from Godfrey 1986, Semenchuk 1992, Banfield 1974, Pattie and Hoffmann 1992, Russell and Bauer 1993, Smith 1993, plus the internet for species not present in the reference guides.

Order — same sources as that for Class.

Family — same sources as that for Class.

Scientific Name — Same sources as that for Class.

Common Name — From Alberta Sustainable Resource Development 2000.

Common names for species not included in Alberta Sustainable Resource Development 2000 were determined for birds from Godfrey 1986, Semenchuk 1992, for mammals from Banfield 1974, Pattie and Hoffmann 1992, and Smith 1993, and for amphibians and reptiles from Russell and Bauer 1993. Names from the internet were used for species that were not present in the reference guides.

Species Code — 4-letter code consisting of the first letters from the species “Common” name.

Where possible species codes for birds follow the American Ornithologists’ Union (<http://www.aou.org/resources/>).

Alberta Status — From Alberta Sustainable Resource Development 2000.

Introduced species that were not included in General Status of Alberta Wild Species 2000 were classified as exotic. Three species (Wood Duck, Eurasian Wigeon, House Finch) were classified incorrectly by Alberta Sustainable Resource Development 2000 — these species were classified exotic in the database.

Natural Regions In Which The Species Breeds — Species were classified as 1 for present through natural region, and 9 for present in only a small portion of the regions Shield, Boreal, Mountains, Foothills, Parkland, Grassland in Alberta. Classification was based on information for birds from Godfrey 1986, Semenchuk 1992, for mammals from Banfield 1974, Pattie and Hoffmann 1992, and Smith 1993, and for amphibians and reptiles from Russell and Bauer 1993.

Guilds Based On General Habitat Use

Forest Specialists — Classified based on information on birds from Bellrose 1980, Godfrey 1986, Semenchuk 1992, Gauthier and Aubry 1996, Campbell et al. 1990a, 1990b, 1997, 2001, for mammals from Banfield 1974, Pattie and Hoffmann 1992, Smith 1993, and for amphibians and reptiles from Nussbaum et al. 1983, Russell and Bauer 1993. This information was supplemented by information in Alberta Sustainable Resource Development 2000, and information in the NatureServe web site (<http://www.natureserve.org/explorer/servlet/NatureServe?init=Species>).

Grassland Specialists — The same information sources as used that for Forest Specialists.

Alpine Specialists — The same information sources as used that for Forest Specialists.

Bog Specialists — The same information sources as used that for Forest Specialists.

Wetland/Aquatic Specialists — The same information sources as used that for Forest Specialists.

Generalists Specialists — The same information sources as used that for Forest Specialists.

Exotic Species — The same information sources as used that for the Natural Regions Classification.

Guilds Based On Use Of Specific Habitat Characteristics

Old Forest Specialists — The same information sources as used that for Forest Specialists.

Forest Burn Specialists — The same information sources as used that for Forest Specialists.

Young Forest Specialists — The same information sources as used that for Forest Specialists.

Interior Forest Specialists — The same information sources as used that for Forest Specialists, plus Freemark and Collins 1991.

Forest Edge Specialists — The same information sources as used that for Forest Specialists, plus Freemark and Collins 1991.

Cavity Nesting Species — The same information sources as used that for Forest Specialists.

Guilds Based On Use Of Wetland Characteristics

Wetland Specialists — The same information sources as used that for Forest Specialists.

Aquatic Specialists — The same information sources as used that for Forest Specialists.

Guilds Based On Migratory Behavior

Neotropical Migrant — Based on information from Environment Canada's web site (<http://map.on.ec.gc.ca/wildspace/hemi-ims.html>) with supplementation from the NatureServe web site (<http://www.natureserve.org/explorer/servlet/NatureServe?init=Species>) for information was not presented by Environment Canada.

Short-Distance Migrant — The same information sources as used that for Neotropical Migrants.

Winter Resident — Based on information on birds from Godfrey 1986, Semenchuk 1992, for mammals from Banfield 1974, Smith 1993, and Pattie and Hoffmann 1992, and for amphibians and reptiles from Russell and Bauer 1993.

Cliff Specialists — The same information sources as used that for Forest Specialists.

Riparian Specialists — The same information sources as used that for Forest Specialists.

Human Associated Species — The same information sources as used that for Forest Specialists.

Irruptive (Cyclic) Species — Based on information from Boutin et al. 1995, with supplementation from Bellrose 1980, Godfrey 1986, Semenchuk 1992, Gauthier and Aubry 1996, Campbell et al. 1990a, 1990b, 1997, 2001, for mammals from Banfield 1974, Pattie and Hoffmann 1992, Smith 1993, and for amphibians and reptiles from Nussbaum et al. 1983, Russell and Bauer 1993.

Habitat Engineers — The same information sources as used that for Forest Specialists.

Carnivores — The same information sources as used that for Forest Specialists.

Game Species — The same information sources as used that for Forest Specialists.

Species Of Management Concern in Alberta — The same information sources as used that for Alberta Status.

Species That Alberta Has A High Responsibility For — Based on information for birds from Environment Canada's web site <http://map.on.ec.gc.ca/wildspace/hemi-ims.html> plus and Godfrey 1986, Semenchuk 1992, mammals from Banfield 1974, Pattie and Hoffmann 1992, and Smith 1993, and amphibians and reptiles from Russell and Bauer 1993. If information was not available from these primary sources, then NatureServe web site (<http://www.natureserve.org/explorer/servlet/NatureServe?init=Species>) was used.

Related and Supporting Resources for Vertebrates

- Alberta Environmental Protection. 1994. Natural regions, subregions and natural history themes of Alberta: a classification for protected areas management. Alberta Environmental Protection, Edmonton, AB.
- Alberta Sustainable Resource Development. 2000. The general status of Alberta wild species: 2000. Alberta Sustainable Resource Development, Edmonton, AB.
- Banfield, A.W. 1994. The mammals of Canada. University of Toronto Press, Toronto, ON.
- Beckingham, J.D., and Archibald, J.H. 1996. Field guide to ecosites of northern Alberta. Canadian Forest Service, Northwest Region, Special Report 5, Northern Forestry Centre, Edmonton, AB.
- Bellrose, F.C. 1980. Ducks, geese and swans of North America. Stackpole Books, Washington, DC.
- Boutin, S. C.J. Krebs, R. Boonstra, M.R. Dale, S.J. Hannon, K. Martin, A.R. Sinclair, J.N. Smith, R. Turkington, M. Blower, A. Byrom, F.I. Doyle, C. Doyle, D. Hik, L. Hofer, A. Hubbs, T. Karels, D.L. Murray, V. Nams, M. O'Donoghue, C. Rohner, and S. Schweiger. Population changes of the vertebrate community during a snowshoe hare cycle in Canada's boreal forest. *Oikos* 74:69–80.
- Campbell, R.W., N.K. Dawe, I. McTaggart-Cowan, J.M. Cooper, G.W. Kaiser, M.C. McNall, and G.J. Smith. 1990a. Birds of British Columbia. Volume I. Royal British Columbia Museum, Victoria, B.C.
- Campbell, R.W., N.K. Dawe, I. McTaggart-Cowan, J.M. Cooper, G.W. Kaiser, M.C. McNall, and G.J. Smith. 1990b. Birds of British Columbia. Volume II. Royal British Columbia Museum, Victoria, B.C.
- Campbell, R.W., N.K. Dawe, I. McTaggart-Cowan, J.M. Cooper, G.W. Kaiser, M.C. McNall, and G.J. Smith. 1997. Birds of British Columbia. Volume III. Royal British Columbia Museum, Victoria, B.C.
- Campbell, R.W., N.K. Dawe, I. McTaggart-Cowan, J.M. Cooper, G.W. Kaiser, A.C. Stewart, and M.C. McNall. 2001. Birds of British Columbia. Volume IV. Royal British Columbia Museum, Victoria, B.C.
- Freemark, K., and B. Collins. 1991. Landscape ecology of birds breeding in temperate forest fragments. Pages 443–454. *In Ecology and conservation of neotropical migrants*. Edt. J.M. Hagan and D.W. Johnston. Smithsonian Institution Press, Washington, DC.
- Godfrey, W.E. 1986. The birds of Canada. National Museums of Canada. Ottawa, Ont.
- Gauthier, J., and Y. Aubry. 1996. The breeding birds of Quebec. Canadian Wildlife Service, Montreal, QE.
- Nussbaum, R.A., E.D. Brodie, and R.M. Storm. Amphibians and reptiles of the Pacific northwest. University of Idaho Press, Moscow, ID.
- Pattie, D.L., and R.S. Hoffmann. 1992. Mammals of the North American parks and prairies. D.L. Pattie, Edmonton, AB.
- Russell, A.P., and A.M. Bauer. 1993. The amphibians and reptiles of Alberta. University of Calgary Press, Calgary, AB.
- Semenchuk, G.P. 1992. The atlas of breeding birds of Alberta. Federation of Alberta Naturalists, Edmonton, AB.
- Smith, H.G. 1993. Alberta mammals: an atlas and guide. The Provincial Museum of Alberta, Edmonton, AB.

Related and Supporting Resources for Vascular Plants, Lichens and Bryophytes

- Alberta Natural Heritage Information Centre's database. Community Development, Government of Alberta. Available at: <http://www.cd.gov.ab.ca/preserving/parks/anhic/flashindex.asp> [August 2006].
- Agriculture Canada. 1979. Budd's Flora of the Canadian Prairie Provinces.
- Asada, T., B.G. Warner, and A. Banner. 2004. Sphagnum invasion after clear-cutting and excavator mounding in a hypermaritime forest of British Columbia. *Canadian Journal of Forest Research* **34**:1730–1746.
- Beaudry, L., R. Coupe, C. Delong, and J. Pojar. 1999. Plant indicator guide for northern British Columbia: Boreal, Sub-boreal, and subalpine biogeoclimatic zones. Available at: <http://www.for.gov.bc.ca/hfd/pubs/Docs/Lmh/Lmh46.pdf> [August 2006].
- Best, K. F. and A. C. Budd. 1964. *Common Weeds of the Canadian Prairies: Aids to Identification by Vegetative Characteristics*.
- Brodo, I. M. 1991. Studies in the lichen genus *Ochrolechia*. 2. Corticolous species of North America.
- Brodo, I.M., S.D. Sharnoff, and S. Sharnoff. 2001. *Lichens of North America*.
- Budd, A. C., and K. F. Best. 1964. *Wild Plants of the Canadian Prairies*.
- Crum, H.A., and L.E. Anderson. 1981. *Mosses of Eastern North America*
- Cody, W. J. and D. M. Britton. 1989. *Ferns and Fern Allies of Canada*.
- Cormack, R. G. H. 1967. *Wild Flowers of Alberta*
- Currah, R., A. Smreciu and M. Van Dyk. 1983. *Prairie Wild Flowers*.
- Daniels, R.E., and A. Eddy. 1985. *Handbook of European Sphagna*.
- Farrar, J. L. 1995. *Trees in Canada*.
- Flora of North America. 2004. <http://www.fna.org/FNA/introduction.shtml> [August 2006].
- Goffinet, B. and R. Hastings. 1994. The Lichen Genus *Peltigera* ((Lichenized Ascomycetes) in Alberta.
- Goffinet, B., J. Miadlikowska, and T. Goward. 2003. Phylogenetic inferences based on nrDNA sequences support five morphospecies within the *Peltigera didactyla* complex (lichenized Ascomycota). *The Bryologist* **106**:349–364.
- Goward, T. 1999. *The Lichens of British Columbia, Part II - Fruticose species*.
- Hale, M.E. 1979. *How to Know the Lichens* (2nd ed.).
- Halonen, P. 1998. Synopsis of the genus *Usnea* (Lichenized Ascomycetes) in British Columbia, Canada. *Bryologist* **101**:36–60.
- Ireland, R.R. 1982. *Moss Flora of the Maritime Provinces*
- Johnson, D., L. Kershaw, A. MacKinnon, and J. Pojar. 1995. *Plants of the Western Boreal Forest and Aspen Parkland*.
- Kershaw, L., J. Gould, D. Johnson, and J. Lancaster. 2001. *Rare Vascular Plants of Alberta*.
- Kershaw, L., A. MacKinnon and J. Pojar. 1998. *Plants of the Rocky Mountains*.
- Klinka, K., V.J. Krajina, A. Ceska, and A.M. Scagel. 1989. *Indicator Plants of Coastal British Columbia*.
- Kulzer, L., S. Luchessa, S. Cooke, R. Errington, F. Weinmann, and D. Vitt. 2001. Characteristics of the low-elevation Sphagnum-dominated peatlands of western Washington: a community profile. Unpublished Report for Washington State.
- Lawton, E. 1971. *Moss Flora of the Pacific Northwest*.
- Lindblom, L. 1997. The genus *Xanthoria* (Fr.) Th. Fr. in North America. *Journal of the Hattori Botanical Laboratory* **83**:75–172.
- Lindblom, L. 2004. Xanthomendoza, pp. 561–566. In T. H. Nash III, B. D. Ryan, P. Diederich, C. Gries & F. Bungartz (eds.), *Lichen Flora of the Greater Sonoran Desert Region, Vol. 2. Lichens Unlimited*, Arizona State University, Tempe, Arizona.
- Looman, J. 1982. *Prairie Grasses: identified and described by vegetative characters*.

- MacKinnon, A., J. Pojar, and R. Coupe. 1999. Plants of Northern British Columbia.
- McQueen, C.B. 1990. Field Guide to the Peat Mosses of Boreal North America.
- Mills, S.E., and E. MacDonald. 2005. Factors influencing bryophyte assemblage at different scales in the western Canadian boreal forest. *The Bryologist* **108**: 86–100
- Montano, A.M. 1998 Suitability of *Hygrohypnum ochraceum* as an Indicator of Inorganic Pollutants in Streams and Rivers of North America: Laboratory Studies
- Moss, E.H., and J.G. Packer. 1992. Flora of Alberta, Second Edition Technical Memorandum No. 8220-98-15 available at: http://www.usbr.gov/pmts/eco_research/9815.html [August 2006].
- Parish, R., R. Coupe, and D. Lloyd. 1996. Plants of southern interior British Columbia and the inland northwest. Lone Pine Publishing, Edmonton, AB.
- Pavlick, L. 1995. Bromus L. of North America
- Pojar, J., and A. MacKinnon. 1994. Plants of Coastal British Columbia Including Washington, Oregon & Alaska.
- Reed P.B. 1988. National List of Plant Species that Occur in Wetlands. U.S. Fish and Wildlife Service Biological Report 88(26.3). U.S. Fish and Wildlife Service, Washington D.C., USA. 1996 update available at: <http://www.fws.gov/nwi/bha/list96.html>
- Royer, F. and R. Dickinson. 1999. Weeds of Canada and the Northern United States
- Scotter, G.W., and H. Flygare. 2007. Wildflowers of the Rocky Mountains
- Schofield, W.B. 1992. Some Common Mosses of British Columbia.
- The University of Montana-Missoula Invaders Database 2005.
http://invader.dbs.umt.edu/Noxious_Weeds/state_run.asp?state=Alberta [August 2006].
- Thomson, J. W. 1984. American Arctic Lichens. 1. The Macrolichens.
- Thomson, J. W. 1997. American Arctic Lichens. 2. The Microlichens.
- United States Department of Agriculture. Fire Effects Information System. Available at: <http://www.fs.fed.us/database/feis> [August 2006].
- United States Department of Agriculture, Forest Service. Plants Database. Available at: <http://plants.usda.gov> [August 2006].
- Vance, F. R., J. R. Jowsey, and J. S. McLean. 1977. Wildflowers Across the Prairies.
- Vitt, D.H., J.E. Marsh, and R.B. Bovey. 1988. Mosses, Lichens and Ferns of Northwest North America.
- Vitt, D.H., N.G. Slack. 1984. Niche diversification of Sphagnum relative to environmental factors in northern Minnesota peatlands. *Canadian Journal of Botany* **62**:1409–1430.
- Vujnovic, K., and J. Gould. 2002. ANHIC Tracking and Watch Lists — Vascular Plants, Mosses, Liverworts, and Hornworts.

Appendix 8 — Taxonomic Breadth in the ABMI

The Alberta Biodiversity Monitoring Program was designed to capture change in species from many different taxonomic groups, with a wide range of terrestrial habitat requirements, from a variety of trophic levels, and from a diversity of life history strategies and life spans. Listed below are the taxonomic groups (Class) for which 10 or more species are being monitored by the ABMI. Currently, the ABMI collects data on more than 10 species in at least 20 different classes (taxonomic source-www.itis.usda.gov):

- Magnoliopsida (Dicotyledons)
- Liliopsida (Monocotyledons)
- Pinopsida (Pines)
- Filicopsida (Ferns)
- Equisetopsida (Horsetails)
- Bryopsida (true mosses)
- Sphagnopsida (peat mosses)
- Hepatopsida (liverworts)
- Ascomycetes (lichen)
- Basidiomycetes (polyporous fungi)
- Chlorophyceae (green algae — aquatic streams)
- Insecta (caddisflies, stoneflies — aquatic streams)
- Maxillopoda (copepods — aquatic wetlands)
- Eurotatoria (rotifers — aquatic wetlands)
- Entognatha (springtails)
- Arachnida (mites)
- Branchiopoda (brine shrimp, fairy shrimp — aquatic wetlands)
- Osteichthyes (fish)
- Aves (birds)
- Mammalia (mammals)