Natural Resources Canada | Ressources naturelles Canada

The Canadian National Vegetation Classification: Principles, Methods and Status

Baldwin, K., Chapman, K., Meidinger, D., Uhlig, P., Allen, L., Basquill, S., Faber-Langendoen, D., Flynn, N., Kennedy, C., Mackenzie, W., Major, M., Meades, W. (B.), Morneau, C., and Saucier, J-P.

Natural Resources Canada, Canadian Forest Service

Information Report GLC-X-23

Canada

The Canadian National Vegetation Classification: Principles, Methods and Status

Baldwin, K.[1*], Chapman, K.[1], Meidinger, D.[2*], Uhlig, P.[3*], Allen, L.[4*], Basquill, S.[5], Faber-Langendoen, D.[6], Flynn, N.[7], Kennedy, C.[7*], Mackenzie, W.[2], Major, M.[8], Meades, W.[1*], Morneau, C.[8], and Saucier, J-P.[8]
***retired**

[1]Natural Resources Canada, Canadian Forest Service, Great Lakes Forestry Centre.
1219 Queen Street East, Sault Ste. Marie, ON, Canada, P6A 2E5

[2]British Columbia Ministry of Forests, Lands, Natural Resource Operations & Rural Development

[3]Ontario Ministry of Natural Resources and Forestry

[4]Alberta Environment and Parks

[5]Nova Scotia Department of Natural Resources

[6]NatureServe

[7]Environment Yukon

[8]Québec Ministère des Forêts, de la Faune et des Parcs

Published by:
Natural Resources Canada
Canadian Forest Service
Great Lakes Forestry Centre
1219 Queen Street East
Sault Ste. Marie, Ontario P6A 2E5

Information Report Number: GLC-X-23

2019

Cataloguing information for this publication is available from Library and Archives Canada.

The Canadian National Vegetation Classification: Principles, Methods and Status
(Information Report, ISSN 2562-0738 GLC-X-23)

Issued also in French under the title: “Classification nationale de la végétation du Canada : principes, méthodes et état”.

Baldwin, K., Chapman, K., Meidinger, D., Uhlig, P., Allen, L., Basquill, S., Faber-Langendoen, D., Flynn, N., Kennedy, C., Mackenzie, W., Major, M., Meades, W., Morneau, C., and Saucier, J-P.

Electronic monograph in PDF format.

Includes bibliographical references.

ISBN 978-0-660-32174-5

Cat. no.: Fo123-2/23-2019E-PDF

TABLE OF CONTENTS

LIST OF TABLES AND FIGURES

ACKNOWLEDGEMENTS

A great many organizations and individuals have been involved in the CNVC project. Table 1 identifies the main partner organizations and their primary representatives who have contributed to the work over the years. In addition, we are grateful to a number of other individuals who have assisted with various aspects of the project. Russell Klassen provided essential database management expertise. Marilyn Anions researched botanical nomenclature, especially common species names, and helped make sense of many confusing data codes. Johanna Pfalz created the range maps used in the Macrogroup factsheets. Karen McKenna shared extensive field knowledge of Yukon boreal and subarctic ecosystems. Craig DeLong assisted with clarifying concepts of boreal forest ecology in British Columbia. Dave Downing was extremely generous with his time in discussions of the vegetation ecology of Alberta and Northwest Territories. Jeff Thorpe's expertise in prairie grassland and parkland ecology was essential to pulling these components of the classification together. Gerry Racey, Erin Banton and Rachelle Lalonde contributed to the development of new boreal forest types in Ontario. Carmen Cadrin assisted with the development of Vancouverian forest Associations and initiated the conservation ranking of CNVC Associations in British Columbia. Kristi Iverson and Alex Inselberg co-authored many of the factsheet descriptions for Vancouverian forest Associations. Dan Wovcha shared Minnesota ecological knowledge, data and photographs, especially for tallgrass prairie ecosystems. At various times, NRCan – CFS project staff at the Great Lakes Forestry Centre included Darcy Ortiz, Kristin Clark, Kate MacKenzie and Elaine Mallory; their diligence with the minutiae of building an ecological classification greatly contributed to the success of the project. The CNVC website was designed, developed and managed by NRCan – CFS staff at the Great Lakes Forestry Centre, including Dave Basham, Jim Dew, Andrew Eakett, Josh Hayes-Sheen, Karen Jamieson, Kevin Lawrence and Mark Primavera.

ABSTRACT

The Canadian National Vegetation Classification (CNVC) is an ecological classification of natural vegetation communities in Canada. Using eight hierarchical levels, it provides a nationally standardized framework for describing vegetation patterns within their ecological contexts at multiple conceptual and spatial scales. Natural Resources Canada, Canadian Forest Service (NRCan – CFS) has led the development of the CNVC since it began in 2000, working primarily on forest and woodland communities, and mainly at two levels of the hierarchy, the mid-level Macrogroup and the stand-level Association. CNVC development relies on partnerships with provincial and territorial government agencies for regional ecological expertise and data, and benefits from international collaborations for comparisons with other national classifications. This report introduces the CNVC, including its rationale, history and partnerships; presents the classification framework (hierarchy); documents methods employed to 2018 for the development of types, including information sources and the bioregional expert review process; and describes the products to date, available on the CNVC website (cnvc-cnvc.ca/) and the Natural Resources Canada – Canadian Forest Service Publications website (cfs.nrcan.gc.ca/publications). Developing and maintaining a national classification framework requires considerable resources, and ongoing funding is needed to sustain the effort summarized here.

INTRODUCTION

The Canadian National Vegetation Classification (CNVC) is a hierarchical ecological classification of natural vegetation communities in Canada. It provides a nationally standardized framework for describing vegetation patterns within their ecological contexts at multiple conceptual and spatial scales. Wherever possible, it links to provincial, territorial and regional ecological classifications, and to the United States National Vegetation Classification (USNVC). The CNVC uses eight formal levels in its hierarchy to systematically progress from the broadest level of classification, Formation Class, to the finest level, Association.

Natural Resources Canada, Canadian Forest Service (NRCan – CFS) has led the development of the CNVC since its inception in 2000, working primarily on the forest and woodland component of the CNVC. CNVC development relies on partnerships with provincial and territorial government agencies, both for regional ecological expertise and for data. This report documents CNVC standards and methods employed to date and provides a list of confirmed CNVC types at this stage of the classification's development.

In particular, this report:

1. Introduces the CNVC;
2. Presents the classification framework (hierarchy);
3. Documents CNVC methods for the development of Associations, Alliances, Groups and Macrogroups; and
4. Describes the products available and how they can be accessed.

CNVC Rationale

The primary purpose of the CNVC is to provide a nationally standardized and authoritative classification that identifies and describes Canadian vegetation diversity in relation to primary ecological determinants. The classification employs a consistent and systematic ecological approach, incorporating national and subnational (i.e., provincial, territorial and regional) perspectives to integrate knowledge of vegetation in relation to environmental gradients, such as regional-scale climate, site-scale moisture and nutrient conditions, disturbance regimes and temporal dynamics. It is intended to be a tool for coordinating the exchange of ecological information among multiple user groups to support research, conservation and land management activities in the following ways:

1. **Serve as a standardized ecological framework and language** – The CNVC provides a common language to support the exchange of ecological information between:
    a. national agencies, by providing a consistent national standard;
    b. subnational jurisdictions, by linking provincial/ territorial classifications;
    c. international agencies, by providing a structure to better link to international classifications (e.g., United States National Vegetation Classification [USNVC], International Vegetation Classification [IVC]); and
    d. researchers and land management practitioners, by providing an operational mechanism for evaluating ecological equivalence between locations.
2. **Provide ecologically meaningful types for reporting** – The CNVC aims to define nationally standardized vegetation types at various levels of taxonomic generalization across all ecological conditions. Use of these types will improve regional, national and international

assessment of, and reporting for, a variety of purposes such as: biodiversity conservation, ecosystem status and trends, habitat characterization, climate change risk assessment, ecosystem service valuation, site productivity measurement, and assessment of representativeness of protected areas for conservation.

3. **Monitor and predict change** – The CNVC can provide a benchmark of reference conditions for modelling and monitoring vegetation response to climate, invasive species, land use, fire, and other mechanisms of change.

4. **Inform ecosystem-based management** – Many Canadian provinces and territories have the information and ecological expertise to conduct ecosystem-based land management within their jurisdictions. Considerable efficiency can be derived from sharing knowledge and best management practices between political jurisdictions. The CNVC supports this by applying consistent terminology to areas of ecological equivalence. The CNVC can also provide perspective for determining the broader regional, national and international importance of particular ecosystems.

5. **Assist in conservation planning** – Knowledge of the diversity of ecosystems across multiple jurisdictions permits ranking of national and global conservation status, planning protected areas, developing conservation strategies and designing resource management practices for eco-certification.

6. **Provide information on historic conditions** – The CNVC has so far been developed using mainly high quality vegetation and site data obtained from provincial/ territorial ground plots sampled as early as the 1950s; the majority of plots were surveyed in the period 1970 to 2010. These data reflect vegetation – environmental relationships at the time of plot sampling; in some cases they record historical vegetation conditions that no longer exist.

CNVC Origin

Canada has a long history of ecological classification. Since the 1950s there have been efforts across the country to develop classifications at both federal and provincial/ territorial levels. Although undertaken independently, these projects showed substantial concordance in fundamental theory and purpose, as well as data collection and analysis methodologies. Some of the early concepts were espoused by Halliday (1937) and later Rowe (1959, 1972), Hills (1952), Hills and Pierpoint (1960), Krajina (1960a, 1960b, 1969), Loucks (1962), Damman (1963, 1964, 1967) and Grandtner (1966). Within many jurisdictions, provincial/ territorial agencies developed ecological classifications with a strong vegetation component. Pure vegetation classification (i.e., classification based solely on floristic/ physiognomic characters without emphasis on ecological context) has generally not been part of the Canadian tradition, with the exception of the "First Approximation of a Canadian Vegetation Classification" proposed in 1990 but never completed (National Vegetation Working Group 1990). A more detailed history of ecological classification in Canada, prior to the beginning of the CNVC, is described by Ponomarenko and Alvo (2001).

Development of the CNVC began in 2000 following a workshop held in Gatineau, QC that was organized by NRCan – CFS and Parks Canada (Alvo and Ponomarenko 2003). The "Vegetation Classification Standard for Canada" workshop included participants from federal, provincial and territorial government agencies, and conservation organizations from Canada and the United States (Alvo and Ponomarenko 2003). Participants presented their perspectives on the importance of a national vegetation classification, the development of an international classification

framework, the status of on-going classification work in provinces and territories, the initiation of a forest ecosystem classification for Canada (CFEC), and a proposal for a Canadian National Vegetation Classification (CNVC). The workshop resulted in the establishment of a partnership of international, federal, provincial and territorial governmental and non- governmental agencies that committed to the contribution of data, expertise, funding and in-kind support towards the development of the CNVC.

In 2000, many of the provinces/ territories had classifications with unique hierarchical frameworks that identified and described vegetation conditions (primarily forests and woodlands) within their jurisdictions. Each classification had been developed independently and the classification systems were not conceptually consistent between jurisdictions; even within jurisdictions, some classifications had not been harmonized. Although direct comparisons between hierarchies was not possible (Ponomarenko and Alvo 2001), each of the classifications had a hierarchical level describing vegetation at the scale of the plant community, and these types were conceptually similar enough to be correlated. The initial intent of the CNVC project was to build the national classification from the bottom up by correlating the plant community types of the various jurisdictions.

At the time of the Gatineau workshop, NRCan – CFS had initiated a project to classify forest ecosystems in Canada (CFEC). Because of this initiative, and because many CNVC partner agencies had a wealth of expertise and data available on forest ecosystems (Alvo and Ponomarenko 2003), mature (natural) forests were selected as the starting point for CNVC work, with NRCan – CFS providing leadership. Forest ecosystems have remained the focus of the CNVC for the past 19 years as NRCan – CFS has continued to be the lead federal government agency, providing project coordination and operating resources for the development of the CNVC.

Partnerships and Governance

The partnership that emerged from the Gatineau meeting consisted of representatives from all active provincial/ territorial ecological classification programs, some provincial/ territorial/ regional conservation data centres (CDCs), NatureServe (US) and NatureServe Canada, and two federal government agencies (NRCan – CFS and Parks Canada) (Table 1). Governance for the CNVC project was proposed to include a Steering Committee, to fundraise, provide strategic guidance and oversee the direction of the project, and a Technical Committee, to develop and implement classification principles and procedures, share resources and oversee the technical components of the work. The Steering Committee, co-chaired by NRCan – CFS and NatureServe Canada, was only active until 2012. The Technical Committee comprised individuals with expertise in ecological classification from across Canada and successfully guided CNVC development through 2018. Over this period, the Technical Committee:

- Developed the classification principles, standards and conventions that would be incorporated into CNVC procedures and products;
- Confirmed a hierarchy structure for the CNVC; and
- Oversaw the consistent application of CNVC principles, standards and conventions in the development and description of vegetation types at multiple levels of the hierarchy.

Table 1. CNVC partner organizations, contributions, representatives and timelines.

Agency	Contribution	Representative	Technical (T) or Steering (S) Committee	Peer Review Panel	Years of involvement
Alberta Environment and Parks	data, expertise	H. Archibald	no	yes	2000-2004
		L. Allen	2005-2016 (T)	yes	2005-2016
Atlantic Canada Conservation Data Centre	data, expertise, funds	S. Basquill	2000-2009 (T)	yes	2000-2009
British Columbia Ministry of Forests, Lands, Natural Resource Operations & Rural Development	data, expertise, funds	D. Meidinger	2000-2018 (T)	yes	2000-2018
		W. MacKenzie	2009-2018 (T)	yes	2000-2018
Environment Yukon	data, expertise, funds	C. Kennedy	2000-2017 (T)	yes	2000-2017
		N. Flynn	2016-2018 (T)	yes	2010-2018
Louisiana-Pacific Canada Ltd (Swan Valley MB – Forest Resources Division)	data, expertise	P. LeBlanc	no	no	2015-2018
Manitoba Sustainable Development, Forestry Branch	data, expertise	J. Boyd	no	yes	2010-2015
		T. Swanson	no	yes	2010-2011
Natural Resources Canada – Canadian Forest Service (GLFC: Great Lakes Forestry Centre, AFC-CB: Atlantic Forestry Centre, Corner Brook office)	data, expertise, funds, project coordination, co-chair Technical & Steering Committee	K. Baldwin (GLFC)	2000-2018 (T,S)	yes	2000-2018
		K. Chapman (GLFC)	2015-2018 (T)	yes	2005-2018
			2000-2012 (S)	yes	2000-2018
		B. Meades (GLFC)	no	no	2000-2007
		B. Pike (AFC-CB)			
NatureServe	expertise; co-chair Technical Committee	D. Faber-Langendoen	2000-2018 (T,S)	no	2000-2018
NatureServe-Canada	expertise; co-chair Steering Committee	S. Curtis	2000-2012 (S)	no	2000-2012
		M. Anions	2000-2007	no	2000-2012
New Brunswick Department of Energy and Resource Development	data, expertise	V. Zelazny	2004-2005 (T)	yes	2000-2006
Northwest Territories Department of Environment and Natural Resources	expertise	B. Oosenbrug	no	no	2000-2010
Nova Scotia Department of Natural Resources	data, expertise	S. Basquill	2009-2018 (T)	yes	2009-2018
		P. Neily	no	no	2000-2018
Ontario Ministry of Natural Resources and Forestry	data, expertise, funds	P. Uhlig	2000-2018 (T)	yes	2000-2018
		W. Bakowsky	2000-2018 (T)	yes	2000-2018
		M. Wester	no	yes	2000-2018
Parks Canada Agency, Ecological Integrity Branch	expertise; co-chair Technical Committee	S. Ponomarenko	2000-2018 (T)	yes	2000-2018
		D. McLennan	2005-2018 (T,S)	no	2005-2018
Prince Edward Island Environment, Energy & Forestry	data, expertise	W. Glen	no	no	2000-2005
Québec Ministère des Forêts, de la Faune et des Parcs	data, expertise, funds	J-P. Saucier	2000-2010 (T)	yes	2000-2010
		J. Gosselin	2010-2012 (T)	yes	2000-2017
		C. Morneau	no	yes	2000-2018
		M. Major	2012-2016 (T)	yes	2012-2016

CNVC PRINCIPLES AND HIERARCHY

At the inception of the project, there were no assumptions about CNVC classification principles or hierarchical structure. Initially, the CNVC Technical Committee's primary objective was to correlate existing provincial/ territorial/ regional ecological classifications within Canada, at the level of their plant community types, to develop Associations, the fundamental unit of the CNVC, and to do so from the classified plot data made available to the project by the various partner agencies (Table 1).

To facilitate the international exchange of ecological information, the Technical Committee undertook to adopt classification principles and a hierarchical structure consistent with those being simultaneously developed by the USNVC. In February 2007, the Technical Committee agreed to test a new eight-level USNVC hierarchy as a taxonomic structure for describing Canadian vegetation diversity. Ultimately, the Technical Committee decided to adopt the upper four hierarchical levels per se, and to modify slightly the bottom four levels to better fit the Technical Committee's interpretation of the ecology of vegetation in Canada. Classification principles shared by the USNVC and CNVC have now been articulated as the EcoVeg approach to vegetation classification (Faber-Langendoen et al. 2014).

Classification Principles

The CNVC uses the primary EcoVeg principles for natural vegetation classification (i.e., Faber-Langendoen et al. 2014; 2018), re-stated briefly below with modifications for Canadian application. CNVC does not treat cultural or ruderal vegetation. The core principles of the CNVC are as follows:

1. Types define and describe existing natural mature vegetation in relation to ecological processes.
2. Types are defined by vegetation characteristics and can be characterized by their physiognomy (i.e., dominant growth form and stand structure), diagnostic and dominant species, and overall floristic composition.
3. Types are based on the highest quality information available. In the best case, quantitative ecological plot data collected for classification purposes are employed. In the absence of such data, other information sources (e.g., incomplete plot data, literature sources, etc.) are used.
4. The hierarchical organization within the classification is based on ecological and biogeographical relationships expressed by the types. Types at different levels of the hierarchy use consistent diagnostic criteria within levels, but emphasize different criteria between levels.
5. Although the CNVC describes vegetation using nationally standardized criteria and nomenclature, it integrates with provincial/ territorial and regional classifications where possible and the integrity of antecedent subnational classification units is maintained.
6. Types are intended to be revised and expanded as new information and type concepts become available.

Hierarchy Structure

The CNVC, together with the USNVC, uses the eight-level EcoVeg hierarchical structure that was developed by an international group of scientists from the western hemisphere (Faber-Langendoen et al. 2014). Generally, the CNVC Technical Committee has interpreted the hierarchy levels in the same way as does the USNVC, and the CNVC has adopted all types in the upper four levels that occur in Canada. For the bottom four levels, the Technical Committee has emphasized the ecological context for Canadian vegetation conditions (for a comparison of USNVC and CNVC interpretive approaches, see Faber-Langendoen et al. 2018, Supplement S3). Table 2 provides the CNVC definitions for each level of the hierarchy, with examples.

Table 2. CNVC hierarchy levels and their definitions.

	Hierarchy Level & Example	Definition
1.	**Formation Class** (e.g., Forest & Woodland)	A broad combination of general dominant growth forms that are adapted to basic moisture, temperature, and/or substrate or aquatic conditions.
2.	**Formation Subclass** (e.g., Temperate & Boreal Forest & Woodland)	A combination of general dominant and diagnostic growth forms that reflect global mega- or macroclimatic factors driven primarily by latitude and continental position or that reflect overriding substrate or aquatic conditions.
3.	**Formation** (e.g., Boreal Forest & Woodland)	A combination of dominant and diagnostic growth forms that reflect global macroclimatic conditions as modified by altitude, seasonality of precipitation, substrates, and hydrologic conditions.
4.	**Division** (e.g., North American Boreal Forest & Woodland)	A combination of dominant and diagnostic growth forms and a broad set of diagnostic plant species that reflect biogeographic differences in composition and continental differences in mesoclimate, geology, substrates, hydrology, and disturbance regimes.
5.	**Macrogroup** (e.g., West-Central North American Boreal Forest)	*For upland vegetation that includes zonal vegetation:* A regionally distinct subset of plant species composition, abundance and/or dominance, representing primary regional climatic gradients as reflected in vegetation patterns on circum-mesic ("zonal") sites. *For azonal vegetation*: A vegetation unit that contains moderately large sets of diagnostic plant species and diagnostic growth forms that reflect subcontinental to regional biogeographic composition and subcontinental to regional mesoclimate, geology, substrates, hydrology, and disturbance regimes.
6	**Group** (e.g., Cordilleran Boreal Mesic Trembling Aspen – White Spruce Forest)	*For upland vegetation that includes zonal vegetation*: An aggregation of Alliances within the regional vegetation defined by a Macrogroup (or subtype), with consistency in dominant and/or diagnostic species. Groups describe regionally generalized vegetation patterns attributable to ecological drivers such as edaphic or geological conditions within the Macrogroup (subtype), successional relationships within the Macrogroup (subtype), etc. *For azonal vegetation*: A vegetation unit that is defined by a relatively small set of diagnostic plant species (including dominants and codominants), broadly similar composition, and diagnostic growth forms that reflect regional mesoclimate, geology, substrates, hydrology, and disturbance regimes.

	Hierarchy Level & Example	Definition
7.	**Alliance** (e.g., *Populus tremuloides (Picea glauca) / Shepherdia canadensis / Leymus innovatus*)	*For upland vegetation that includes zonal vegetation*: An aggregation of Associations, with consistency in dominant and/or diagnostic species, describing regionally repeating vegetation patterns at the local to sub-regional scale. Alliances are created by grouping Associations that are ecologically "related" into more generalized ecological units (e.g., successionally related Associations on similar edaphic conditions can be aggregated into more generalized Alliances). *For azonal vegetation*: A vegetation classification unit containing one or more associations and defined by a characteristic range of species composition, habitat conditions, physiognomy, and diagnostic species, typically at least one of which is found in the uppermost or dominant stratum of the vegetation. Alliances reflect regional to subregional climate, substrates, hydrology, moisture/ nutrient factors, and disturbance regimes.
8.	**Association** (e.g., *Populus tremuloides / Leymus innovatus*)	A plant community type with consistency of species dominance and overall floristic composition, having a clearly interpretable ecological context in terms of site-scale climate, substrate and/or hydrology conditions, moisture/nutrient factors and disturbance regimes, as expressed by diagnostic indicator species.

The upper three levels of the hierarchy, **Formation Class**, **Formation Subclass**, and **Formation**, use dominant and diagnostic growth forms as criteria to reflect environmental gradients at global to continental scales. The **Division** level uses dominant and diagnostic growth forms, as well as broad sets of diagnostic species, that reflect continental-scale biogeography and environmental factors.

At the fifth level of the hierarchy (**Macrogroup**), types reflect sub-continental to regional vegetation patterns; this is the broadest level at which the CNVC describes types based on characteristics expressed in their Canadian ranges. The **Macrogroup** uses plant species composition, abundance and/or dominance to reflect regional climatic distinctions. The lowest three levels of the hierarchy, **Group**, **Alliance**, and **Association**, use species dominance, diagnostic indicator value, and overall floristic compositional similarity to describe vegetation conditions that reflect site-scale environmental gradients. In the CNVC, Alliances and Groups are first- and second-order aggregates of Associations, respectively (i.e., Associations must be developed first). The Association (level 8) is the fundamental unit of the CNVC (Table 2). An Association describes a plant community with consistent species dominance and overall floristic composition. Each Association has a clearly interpretable ecological context in terms of site-scale climate, substrate and/or hydrologic conditions and seral status or disturbance regime, as expressed by a diagnostic combination of indicator species.

The CNVC permits subtypes for Macrogroups, Groups, Alliances and Associations but so far has only used them at the Macrogroup and Association levels. Subtypes describe vegetation conditions that are not distinct enough to be recognized as formal types at their respective levels. CNVC Macrogroup subtypes are commonly used for upland Macrogroups to distinguish vegetation patterns that represent secondary gradients of regional climate or biogeography. Association subtypes, "subassociations," describe consistent patterns of species occurrence or dominance

that are not sufficiently significant for Association level distinction. Table 3 summarizes the interpretive guidelines for developing CNVC types (or subtypes) at the Macrogroup, Group, Alliance and Association levels.

Table 3. Interpretive guidelines for CNVC hierarchy levels from Macrogroup to Subassociation. Bold text indicates criteria emphasized at each level.

Hierarchy Level	Biogeography / Floristics	Diagnostic Species	Physiognomy	Climate	Disturbance Regime / Succession	Edaphic / Geology / Hydrology
Macrogroup	**Sub-continental to regional**	**Sub-continental to regional subsets of species composition, abundance and/or dominance**	Broadly uniform; **differences distinguish Macrogroups** (e.g., forest vs woodland; mixedgrass vs tallgrass)	**Sub-continental to regional gradients distinguish Macrogroups**	Broadly consistent; indicative of regional climate (e.g., fire regime)	Broad range
Macrogroup subtype	**Subregional**	Subregional subsets of species composition, abundance and/or dominance	Broadly uniform	**Subregional gradients (e.g., continentality, elevation, latitude) distinguish subtypes**	Broadly consistent; **variation can distinguish subtypes** (e.g., maritime vs. continental fire regimes)	Broad range
Group	**Subregional to local**	**Stand-level dominant and/or diagnostic species**	Generally uniform; **subregional or local variation can distinguish Groups** (e.g., dry woodlands vs mesic forests)	**Local climate gradients (e.g., coastal) can distinguish Groups**	Typically consistent; may aggregate successionally related Alliances	**Moderate range; slightly broader than Alliances**
Alliance	**Subregional to local**	**Stand-level dominant and/or diagnostic species**	Uniform; **dominant growth form differences (e.g., conifer vs broadleaved) may distinguish Alliances**	Consistent local climate	Consistent; may aggregate successionally related Associations	**Narrow range; slightly broader than Associations**
Association	**Local**	**Stand-level dominant and diagnostic species**	Uniform	Consistent site-scale climate; may have microclimatic interpretation	Consistent; **may have disturbance or successional relationships to other Associations**	**Narrow range; indicative of locally significant site factors**
Subassociation	Local	**Stand-level dominant or diagnostic species that indicate, at most, weak ecological differences**	Uniform	Consistent site-scale climate; may have weak microclimatic interpretation	Consistent; **may have weak disturbance or successional interpretation**	Narrow range

METHODS FOR DEVELOPMENT OF CNVC TYPES

CNVC types have been confirmed at all eight levels of the hierarchy. Types at global and continental scales (i.e., the upper four levels of the hierarchy) were developed by the USNVC (see Faber-Langendoen et al. 2012, 2014; USNVC 2017) and have been accepted by the CNVC Technical Committee. Within the lower four hierarchy levels, CNVC types have been defined using methodologies developed by the Technical Committee for the CNVC. Methods of type development have varied according to the hierarchy level (Table 3) and the quality of source information available. Wherever possible, high quality ground plot data covering the range of the type's geographic and environmental variation (within Canada) have been considered when creating a type concept. These data have been subsequently summarized to provide a type description.

Development of CNVC types has followed three fundamental principles:

1. Types are based on the highest quality source information available;
2. Wherever possible, types are developed by correlating existing provincial/ territorial/ regional types that meet CNVC conceptual standards; and
3. Types are confirmed through review and consensus by a bioregional expert panel.

Natural Resources Canada – Canadian Forest Service (NRCan – CFS) has led the development of types, including developing and maintaining CNVC databases, conducting analyses and proposing initial type concepts, as well as sponsoring, organizing and leading expert meetings. NRCan – CFS has assigned CNVC codes and names, led the development and production of factsheets, and developed and maintained the CNVC website.

A list of Macrogroups developed to date is provided in Appendix 1, and a catalogue of all Associations to 2018 is provided in Appendix 2. Most of the confirmed Associations are for boreal forests and woodlands (i.e., within Divisions D014 [North American Boreal Forest & Woodland] and D016 [North American Boreal Flooded & Swamp Forest]) although Associations for Vancouverian forests (i.e., Divisions D192 [Vancouverian Forest & Woodland] and D193 [Vancouverian Flooded & Swamp Forest]) have also been developed. Alliances and Groups have been developed by aggregating these Associations. Macrogroups have been confirmed for all zonal vegetation in Canada and provisionally accepted by the Technical Committee for most azonal conditions.

Confirming types within Canada has been a higher priority than investigating relationships with other national and international classifications. Below level 4 of the hierarchy, the CNVC best links with the USNVC at the levels of Macrogroup (level 5) and Association (level 8; USNVC 2017). Levels 1-4 are the same as the USNVC.

Source Information

Each CNVC type is based on the best available source information. The order of preference for source information is as follows:

1. High quality ecological plot data collected for classification purposes that includes the following attributes: description of floristic composition/ abundance/ dominance and vegetation structure; habitat description (including abiotic environmental factors and ecological process drivers); geo-coordinates and eco-regional distribution; metadata for primary data sources.

2. Ground plot data suitable for empirical analysis but with only limited attributes (e.g., data from a portion of the type's range, or qualitative descriptions of vegetation and/or environmental attributes).

3. Published types developed from empirical ground plot data that have quantitative data summaries, but lack specific details of plot data (i.e., numerical data summaries may be available, but not individual plot data).

4. Published types developed from partial ground plot data or qualitative information sources, or types with descriptions that lack quantitative data summaries.

Expert Review

Expert review is an integral part of CNVC type development. Throughout the development of all types, a review process has been used to ensure consistency of approach in applying classification criteria. The review process serves to:

1. Confirm the ecological integrity of types across their Canadian range, based on regional and local knowledge of plant community species composition and structure within the context of habitat and ecological process relationships;

2. Confirm the ecological equivalency of antecedent subnational units that are proposed to be aggregated within CNVC types;

3. Maximize the expertise that is applied to the developmental phase of the CNVC.

Bioregional review panels are created, as necessary, to review types. These panels require individuals with expertise in regional and local ecology, as well as an understanding of the broader standards and structure of the CNVC, to ensure consistency in the development of types. Review panels are listed for each published CNVC type under the "Concept Authors" field (Appendix 2).

Data Collation and Standardization

To date, the largest component of CNVC data has been the forest plot data collected by provincial/ territorial ecological classification programs. In some regions, data have also been supplied by NRCan – CFS and conservation data centres (Table 1). Jurisdictional data have been used with permissions from authors and jurisdictional authorities under the auspices of data-use agreements (Appendix 3); data ownership is retained by the originating authors/ jurisdictions.

Provincial/ territorial classification programs have used similar sampling methodologies to collect georeferenced, quantitative plot data of vegetation, soil and site attributes. These data similarities have permitted NRCan – CFS staff to collate and standardize the data for use in comparisons of classification types between jurisdictions. In general, these data are collected from an area representative of a repeating and mature vegetation condition (i.e., plots are systematically placed

in homogeneous stands). Forest plots are typically at least 10 m x 10 m to ensure adequate representation of species (larger where there is greater species richness). Preferably, vegetation data include composition and percent cover by species for all strata (tree, shrub, herb and moss/ lichen) and composite cover for each of these strata (i.e., total tree, total shrub, total herb and total moss/ lichen stratum covers). Minimally, site data include location (geocoordinates), elevation, aspect, slope and meso topoposition. Ideal soil data include at least: depth to root restricting layer, texture, parent material, humus form and interpreted (i.e., relative) moisture and nutrient regimes.

Data were compiled into a standardized national database managed by NRCan – CFS. Despite similar data standards, each jurisdiction had its own terminology, and datasets required translation to a common standard. Ecological data management and classification software developed by the Research Branch of the British Columbia Ministry of Forests, Lands and Natural Resource Operations (VPro [MacKenzie & Klassen 2009]), was available for use at the outset of the project so the VPro (i.e., British Columbia) data syntax and coding standards became the basis for CNVC data standards. Exceptions were made for plant species taxonomy, which follows the standards provided in Appendix 4, and for humus form classes, which follow Expert Committee on Soil Survey (1982).

Site and soil data translations were generally straightforward, but translating plant species names and codes required considerable time and exchange of information between jurisdictional and national data managers because taxonomic standards varied among jurisdictions and over time. Taxonomic standards are provided in Appendix 4. CNVC vegetation codes were updated periodically over the duration of the project, most recently November, 2016. In certain cases, vegetation data had been collected by cover class, requiring conversion to class midpoints. In some jurisdictions, taxa that tend to be more difficult for field workers to identify were recorded at a coarser level of precision (e.g., *Sphagnum* spp., *Carex* spp., *Salix* spp.). In some datasets, cover values are provided for "mosses" or "unknown bryophyte". Other times, questionable identifications, particularly in areas of species' overlaps, required combining (lumping) them and assuming one or the other based on location, elevation, etc. Some examples are *Betula nana* vs. *B. glandulosa*; *Abies lasiocarpa* vs. *A. balsamea*; and *Pinus contorta, P. banksiana* and their hybrid *P. x murraybanksiana*. Total stratum cover values, useful metrics for describing stand structure, were calculated where missing.

VPro Overview

VPro software (MacKenzie and Klassen 2009) (available at: https://www.for.gov.bc.ca/hre/becweb/resources/software/vpro/overview.html) has been used for all CNVC data management and classification work by NRCan – CFS. VPro works within Microsoft Access and has several tables and forms useful for reviewing plot data. It provides a straightforward way of managing pre-classified data, by exporting vegetation and environmental data to Microsoft Excel to facilitate comparing pre-existing plant community types from different jurisdictions (i.e., "site units" in VPro terminology). It also has a "hierarchy" form, where these site units can be arranged in a hierarchical structure. The main VPro "reports" used in CNVC analyses of pre-classified plot data (i.e., comparing jurisdictional site units) are:

1. Summary vegetation – a phytosociological table of the constancy and average cover values for species based on all plots within a site unit. There are two options available for "average" cover; the normal CNVC convention is to use "characteristic" cover (i.e., average cover for plots where the species is present).

2. Summary environment – a table of environmental data summarized for all plots within a site unit.

VPro has also been used extensively in data analyses by various jurisdictions to develop site units from plot data, having several features useful for classifying plot data. Common practices employed during CNVC analyses have included:

1. Exporting plot coordinates to Google Earth (https://www.google.com/earth/versions/#download-pro) to show plot locations;
2. Exporting vegetation and environmental data to PC-Ord (McCune and Mefford 2009) for multivariate analyses;
3. Exporting plot vegetation and environmental data to Microsoft Excel as either:
    a. Long vegetation report – species and cover values for individual plots by site unit;
    b. Long environment report – environmental data for individual plots by site unit.

Both the summary and long vegetation reports can be generated by strata (tree [A], shrub [B], herb [C], moss [D]), by layer (A1, A2, A3, B1, B2, C, D), or by lifeform, and all of these are routinely used in CNVC data analyses. The CNVC standard for factsheet reporting is by stratum. Furthermore, there are Microsoft Excel add-ins available in VPro to facilitate interpretation of summary vegetation reports by coding cells with colour or symbols (Appendix 4).

Type Development

CNVC types have been developed at levels 5 to 8 of the hierarchy (Table 2 and 3). Analytical methods were selected to match the hierarchy level and the best available source information (i.e., exploratory numerical methods for empirical data that included cluster analysis, detrended correspondence analysis and nonmetric multidimensional scaling (McCune and Grace 2002; see also Appendix 5; subjective or semi-quantitative methods for non-empirical information). The general analysis process for types at all levels can be outlined as follows:

1. Identify a "core" type concept using the diagnostic criteria emphasized at a specific hierarchy level (Table 3); concept proposals are developed using existing published classifications, expert opinion, data summaries, etc.;
2. Utilize the highest quality source information available to explore and refine the type concept;
3. Submit the proposed type to expert review by a panel of ecologists with bioregional expertise in the vegetation condition being considered (Table 1);
4. Iterate steps 1 to 3 until the type is confirmed by consensus of the expert review panel;
5. When the type is confirmed, prepare a type description complete with summary data from its constituent plots (where available).

CNVC type development initially focused on Associations, then proceeded to Alliances and Groups, and later Macrogroups. Association development began in two areas of the country's forests, the Pacific coast and the boreal. Pacific coast Associations (described in the CNVC as "Vancouverian"; relevant types include all those in Divisions D192 [Vancouverian Forest & Woodland] and D193 [Vancouverian Flooded & Swamp Forest]) emerged from a collaborative international exercise to develop International Associations by correlating British Columbia coastal forest types with associations from Washington and Oregon. The boreal region (relevant types

include all those in Divisions D014 [North American Boreal Forest & Woodland] and D016 [North American Boreal Flooded & Swamp Forest]) was of particular interest to the Technical Committee, as this region occurs across Canada and has required coordination among all jurisdictions.

Alliances and Groups are first and second-order, respectively, aggregations of Associations. Associations can be aggregated in numerous ways for different purposes (e.g., by dominance, understory floristics, geography, etc.), but by testing different aggregations of Vancouverian and boreal Associations, the Technical Committee decided on the ecological criteria of Table 3. These criteria differ somewhat for upland conditions that include zonal vegetation (e.g., those in D192 and D014) and azonal conditions (e.g., D193 and D016).

Macrogroup development has been more of a focus in recent years, particularly for upland conditions that include zonal vegetation, which relate to the Canadian National Vegetation Zones map (Baldwin et al. 2019). Development of types at this hierarchy level has also been useful for establishing links with the USNVC.

Associations

Association development has been a priority for the Technical Committee from the outset. The decision was made early in the project to build these types from previously classified provincial/ territorial/ regional "plant community" types, to enhance the relevance and utility of the newly formed national Associations by maintaining links with the subnational classifications. All Associations confirmed to date have been developed from high quality ecological plot data (Appendix 2). Analysis methods are detailed in Appendix 5, but an overview is provided below. Although no Associations have so far been developed using other sources of information, the Technical Committee has proposed methods for doing so, also described below.

Association Development from Jurisdictional Types using Plot Data

Ecosystem classification plot data from various jurisdictions were collated and standardized as described previously. Association analyses then consisted of comparisons/ correlations between antecedent jurisdictional "plant community" types ("site units") using VPro data summaries. The details of this process, and of the jurisdictional types, are described in Appendix 5. The goal of the analyses was to group ecologically equivalent and floristically similar jurisdictional types into conceptual CNVC Associations. The analyses were based on the jurisdictional type summaries, i.e., not on primary analysis of individual plot data, and the integrity of jurisdictional types was not modified by the CNVC correlation analysis.

Data analyses were usually led by NRCan – CFS staff, in consultation with provincial/ territorial experts (Table 1). Once a core Association concept was proposed, the data analysis involved the following steps:

1. Identify the jurisdictional types to be compared.
2. Prepare initial phytosociological summary tables that group ecologically equivalent and floristically similar jurisdictional types. Conduct a preliminary sorting of these types using the following criteria:
    a. Bioregional distribution – determine geographic areas within which to correlate types (i.e., floristically similar types are correlated within a bioclimatic region first, then compared to similar conditions between bioclimatic regions at a later stage of analysis); wherever possible, provincial/ territorial ecoregionalizations are used to stratify the data;

b. Major physiognomic class (i.e., treed vs. non-treed, using a 10% canopy closure threshold in the tree layer);
c. Dominant environmental factor(s), if known (e.g., soil moisture regime);
d. Species dominance or repeating combinations of species (i.e., mixed stands) in the canopy stratum.

3. Further sort these subsets of types using more detailed criteria:
    a. Similarity in abundance and constancy (within specified numerical ranges) of:
        i. diagnostic species or groups of species; diagnostic species receive more 'weight' than non-diagnostic species; using jurisdictional expertise, species with known indicator relationships are documented (Figure 1);
        ii. dominant/ codominant species:
            1. *uppermost strata*: dominance or codominance of canopy species reflecting the ecological similarity of stands, their successional dynamics, etc.; individual codominant species may vary in their constancy and abundance;
            2. *other strata*: dominance or codominance of species in non-canopy strata reflecting other ecological similarities (e.g., shrub-rich stand structure vs shrub-poor);
        iii. total floristics across all strata;
    b. Habitat 'uniformity', including both over-riding process factors (e.g., local climate, flooding regime, fluctuating water table, cold soils, snow accumulation, disturbance regime, etc.) and an assessment of compensating habitat conditions that result in a specified range of interpreted site moisture, nutrients, and/or other characteristics associated with specific vegetation characteristics;
    c. Physiognomy and structure that is an expression of an underlying ecological condition (e.g., forest vs. woodland).
4. Submit proposed groupings of jurisdictional types to bioregional expert review.

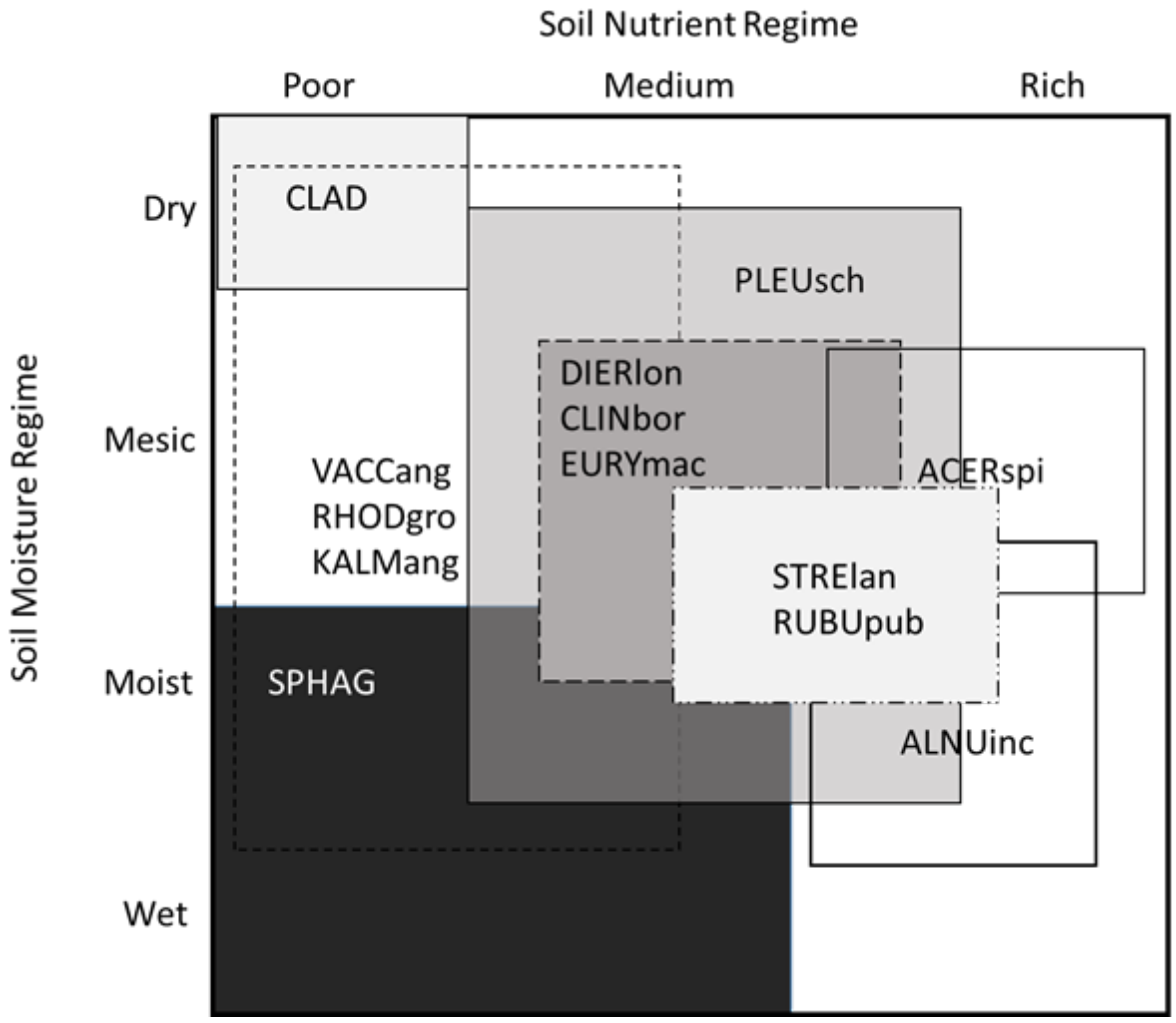

Figure 1. Example edatope of diagnostic species indicative of different relative moisture and nutrient regimes for CM495b Ontario - Quebec Boreal Forest.

Taxa abbreviations are: ACERspi=*Acer spicatum*; ALNUinc=*Alnus incana* ssp. *rugosa*; CLAD=*Cladina* and *Cladonia* spp.; CLINbor=*Clintonia borealis*; DIERlon=*Diervilla lonicera*; EURYmac=*Eurybia macrophylla*; KALMang=*Kalmia angustifolia*; PLEUsch=*Pleurozium schreberi*; RHODgro=*Rhododendron groenlandicum*; RUBUpub=*Rubus pubescens*; STRElan=*Streptopus lanceolatus*; SPAG=*Sphagnum* spp.; and VACCang=*Vaccinium angustifolium*.

Suggested Protocol for Association Development from Other information Sources

In the absence of high quality ecological plot data, other information sources can be utilized to create Associations (see ***Source Information***). Development of Associations from lower quality information should follow the same general principles outlined at the beginning of the ***Type Development*** section, except all assessment and evaluation steps for the proposed Associations should be by expert opinion in the absence of data summaries. Under these circumstances, it is imperative that specialists with expertise in the vegetation condition under consideration are consulted, especially to obtain knowledge of variability across the geographic range of the Association. An efficient way of consulting a group of specialists with expertise in different aspects of the subject (e.g., knowledge from different provinces/ territories) is to convene expert workshops. Some principles for this type of analysis are as follows:

1. Emphasis should be placed on Associations that are known to recur across the landscape in a consistent manner and in recognizable and uniform habitats or site conditions;
2. Information should be compiled into a standardized table structure designed to facilitate comparison between similar types;
3. Information should be compiled into the CNVC factsheet format, completing as many fields of the template as possible;
4. All source reports/ publications with similar types should be referenced in the factsheet;
5. Where information is very limited, Associations should be accepted provisionally, pending evaluation with additional data.

Alliance and Group Development by Aggregating Associations

Associations can be aggregated for different purposes, using various criteria. To date, CNVC criteria for aggregating Associations into Alliances and then Groups (Table 3) have emphasized the ecological relatedness of types at successively more generalized levels within a Macrogroup (or Macrogroup subtype).

Alliances and Groups were developed for Vancouverian (D192 and D193) and boreal (D014 and D016) forests. To develop these types, NRCan – CFS submitted proposals of types (i.e., VPro summary tables of Associations arranged in columns) to the Technical Committee for review. Once there was consensus among the Committee members on the Associations to be aggregated into Alliances and Groups, these data were summarized to describe the new types at each level and reviewed again by the Technical Committee. Alliance and Group factsheets have not been developed, but relationships are shown within the CNVC hierarchy (see ***CNVC Products: Hierarchy***) and Appendix 2.

If Associations will be developed from lower quality data (i.e., other information sources), provisional Alliances and Groups could be proposed within the conceptual scope of the Macrogroup (or Macrogroup subtype) following a similar expert aggregative process as outlined for Associations above.

Macrogroups

The CNVC recognizes two classes of Macrogroups (Table 2):

1. Macrogroups for upland vegetation that include vegetation on zonal sites. These types reflect regional-scale vegetation patterns, including successional trends that are primarily attributable to climatic influences, such as latitudinal, elevational and continentality gradients.
2. Macrogroups that describe vegetation on azonal sites. These types reflect vegetation patterns that are primarily attributable to site-scale environmental factors, such as edaphic or disturbance conditions.

Macrogroup development has been a more recent priority for the Technical Committee, as it has sought to harmonize types at this level with those of the USNVC. Although the original intent was to build CNVC Macrogroups by aggregating Associations, this approach has not been possible in parts of the classification where Associations are not yet developed. Where Associations exist (e.g., primarily within Divisions D014, D016, D192, D193), Macrogroups have been developed by aggregating lower hierarchical levels. In other cases, ecological plot data have been used to develop Macrogroups from core concepts derived from existing USNVC Macrogroups and/or from published federal/ provincial/ territorial or international bioclimatic classifications (e.g., Rowe 1972; Damman 1983; Ecoregions Working Group 1989; Meidinger and Pojar 1991; Circumpolar Arctic Vegetation Map Team 2003; Natural Regions Committee 2006; Ecosystem Classification Group 2007, 2008, 2010, 2012, 2013; Crins et al. 2009; Saucier et al. 2009; McLaughlan et al. 2010b; Ecological and Landscape Classification Program 2015; Neily et al. 2017). When data are available, they are used to better understand, refine and document the Canadian condition. In cases where data are not available, or have not yet been analyzed, USNVC Macrogroups have provisionally been accepted for Canada. This last case pertains especially to azonal conditions. For any Macrogroup to be accepted for the CNVC, it must meet CNVC criteria (Table 3) and be confirmed by bioregional expert review.

CNVC often invokes Macrogroup subtypes to reflect vegetation patterns attributable to subregional bioclimatic or biogeographic variation. In many cases, subtypes facilitate harmonization with the USNVC while allowing for recognition of existing Canadian bioclimatic divisions within the broader concept of a Macrogroup. Protocols used to propose and confirm subtypes are similar to those for Macrogroups, but subtypes are only developed if they are supported by plot data.

To date, 76 Macrogroups have been confirmed or provisionally accepted for the CNVC (Appendix 1). In the vast majority of cases, the CNVC has provisionally accepted USNVC Macrogroups. In a few cases where USNVC Macrogroups did not meet CNVC criteria, they were not accepted. Instead, new CNVC types were developed either by adapting the concept of the USNVC Macrogroup to better fit the CNVC criteria and/or Canadian vegetation, or by data analysis, including the aggregation of lower level CNVC types (Appendix 6). All Macrogroup subtypes are unique to the CNVC since the USNVC does not currently recognize this hierarchy level.

Analysis methods are described below, first for types developed from plot data and then for types developed using other sources of information.

Macrogroup development from plot data

Where high quality ecological plot data were available, they were used to develop Macrogroups and subtypes. Macrogroup and subtype development was led by NRCan – CFS staff, in consultation

with provincial/ territorial experts (Table 1) and ultimately reviewed by members of the Technical Committee with expertise in the vegetation condition under consideration. Two methods were used, depending on whether or not comprehensive development of Associations within a regional bioclimate had been completed (Appendices 1 and 6).

1. In cases where Associations existed, Macrogroups and subtypes were defined by aggregating Groups of Associations that shared diagnostic species indicators (e.g., M495 [Eastern North American Boreal Forest]).
2. In cases where Associations did not exist, plot data were assembled into regional bioclimatic datasets (e.g., eastern temperate forests) and then filtered using conceptual vegetation characteristics (e.g., diagnostic indicator species or overstory dominant species) to define Macrogroup (or subtype) core concepts (e.g., CM014 [Eastern North American Temperate Hardwood – Conifer Forest). Core type concepts were cross-compared to assess distinctiveness and, if considered strong enough, further developed by finalizing the full membership of constituent plots for the Macrogroup (or subtype).

Macrogroup development from other information sources

In the absence of plot data, Macrogroups have been developed by expert evaluation of core concepts against CNVC Macrogroup criteria, using other sources of information (Appendices 1 and 6). In some cases, existing types in the USNVC or Canadian bioclimatic classifications have been confirmed as CNVC Macrogroups (e.g., CM332 [Great Plains Rough Fescue Prairie]). In other cases, types have been proposed from the USNVC or literature review and provisionally accepted for the CNVC pending evaluation of suitable plot data (e.g., M109 [Western North American Freshwater Aquatic Vegetation]).

CNVC Type Name and Code Standards

Each CNVC type is assigned an alphanumeric code and descriptive name. Where CNVC and USNVC types are equivalent, the two classifications share names and codes. The format for USNVC names is presented in Jennings et al. (2009) and Faber-Langendoen et al. (2014). When a CNVC type differs in concept from a similar USNVC type, or when the CNVC recognizes a type that is not recognized in the USNVC, a unique CNVC name and code is assigned. Names can include ecological, (bio) geographic and/or physiognomic terms as well as names of plant taxa (see Appendix 7 for CNVC-defined terms and Appendix 4 for sources of taxa nomenclature). CNVC type names are intended to be both unique and descriptive, using the most parsimonious combination of appropriate terms. All CNVC type names are provided in both English and French; for names that include specific plant taxa, scientific names are also provided.

CNVC Type Names

CNVC types at the four uppermost levels of the classification hierarchy, Formation Class, Formation Subclass, Formation and Division, are equivalent to USNVC types. For these types, the CNVC uses the USNVC codes and English colloquial names, following USNVC nomenclatural rules (Faber-Langendoen et al. 2014). The CNVC also provides a French name.

CNVC Macrogroups and Groups that are equivalent to USNVC types share the USNVC English colloquial names; the CNVC also provides a French name. Types that are specific to the CNVC are assigned a unique name, in English and French. For Macrogroups and Groups, names contain a (bio) geographic term (e.g., Vancouverian; Eastern North American), a bioclimatic term (e.g., boreal, temperate, high montane) and a physiognomic term (e.g., forest, grassland). For Groups, the name also includes common names of dominant plant taxa, and in some cases, a term describing site condition (e.g., dry, mesic-moist). Macrogroup subtypes are usually named using climatic (e.g., dry, moist, etc.) and/or geographic terms (e.g., northern, southern), but '*typic*' may be used for the subtype that is most typical of the Macrogroup.

Alliances and Associations are named using plant taxa, preferably at the species rank. Sometimes taxa are grouped and named at the rank of genus (e.g., *Salix* spp., *Carex* spp., *Sphagnum* spp.) or family (e.g., *Poaceae*); names of sub-specific taxa are provided at the species rank. The CNVC uses type names that require the least number of taxa to clearly distinguish among similar types and to provide regional context. Names include dominant and diagnostic taxa, with at least one taxon from the uppermost stratum. Taxa are listed in order of stratum, with a slash (/) differentiating strata (e.g., dominant tree species / dominant shrub species / dominant moss species). Within the same stratum, the order of taxa generally reflects decreasing dominance. These taxa are typically separated by an en-dash (–) unless they occur with lower constancy, in which case they are placed in parentheses. A general floristic, ecological, environmental or geographic term, or one that is descriptive of the height of the vegetation, can also be used as a modifier when such a term is necessary to adequately characterize the type (e.g., woodland, krummholtz). Scientific, English common and French common names are provided for each Alliance and Association.

Subassociations are named using a dominant or diagnostic taxon that characterizes the subassociation, or a subordinate term. Subordinate terms may include '*typic*', when the subassociation typifies the Association, or '*nudum*' or '*inops*', when the subassociation is species-poor with no strongly diagnostic taxa.

CNVC Codes

For CNVC types that are equivalent to USNVC types, the two classifications use the same alphanumeric code. Types that are specific to the CNVC are assigned unique codes with CNVC prefixes. Thus:

1. Formation Class, Formation Subclass, Formation, Division – CNVC types have USNVC codes;
2. Macrogroup – If the CNVC type is equivalent to a USNVC Macrogroup, the USNVC code is used (prefix 'M' plus 3 numeric digits); a type that is specific to the CNVC is assigned a 3-digit numeric code with a 'CM' prefix;
3. Group – If the CNVC type is equivalent to a USNVC Group, the USNVC code is used (prefix 'G' plus 3 numeric digits); a type that is specific to the CNVC is assigned a 3-digit numeric code with a 'CG' prefix;
4. Alliance – Currently, all types are unique to the CNVC and assigned 5-digit numeric codes with a 'CA' prefix; future crosswalk efforts with the USNVC may reveal type equivalencies, allowing for a common code.
5. Association – Currently, all types are unique to the CNVC and assigned 5-digit numeric codes with a 'CNVC' prefix; future crosswalk efforts with the USNVC may reveal type equivalencies, allowing for a common code.

Subtype codes typically include the parent code and a lower-case letter, assigned from 'a' to 'z'. Macrogroup subtype codes include 'CM' rather than 'M', as this is a hierarchical level not recognized by the USNVC. For example, M500 is the Macrogroup code for Central Rocky Mountain Mesic Lower Montane Forest, recognized in both the CNVC and USNVC. Macrogroup subtypes, however, are only recognized in the CNVC, so the subtype codes begin with CM500, rather than M500, and have a suffix appended (e.g., CM500b is the *typic* subtype).

CNVC subassociation codes include the Association number and a lower-case letter. For example, CNVC00079 *Picea glauca – Betula papyrifera (Populus tremuloides) / Equisetum arvense – E. pratense* has two subassociations, 79a *typic* and 79b *Alnus incana*.

CNVC PRODUCTS

The primary products of the CNVC are the classification hierarchy and factsheets of confirmed types. CNVC classification products and supporting documentation are available on the CNVC website (**cnvc-cnvc.ca**) as well as on the Natural Resources Canada, Canadian Forest Service Publications site (**cfs.nrcan.gc.ca/publications**). At present, factsheets are available for some Associations and Macrogroups (Appendices 1 and 2).

A secondary product of the CNVC is the map and accompanying report of **Vegetation Zones of Canada: A Biogeoclimatic Perspective** (Baldwin et al. 2019).

CNVC Website (cnvc-cnvc.ca)

The CNVC website (**cnvc-cnvc.ca**) includes background information about the CNVC, a glossary of terms, botanical standards, links to other ecological classifications, the Vegetation Zones of Canada map and report, and all CNVC publications, including factsheets. The website is currently the only place where the CNVC hierarchy is maintained, including the English and French names for all types. The goal is to update the website as new types are developed or as names of types change (e.g., because of botanical nomenclatural changes).

Hierarchy

The CNVC Hierarchy can be perused using the "Explore the Classification" feature at **cnvc-cnvc.ca**. This feature allows the user to view and search the CNVC hierarchy by expanding nodes on the hierarchy tree, or by searching on various criteria (e.g., a particular type code, species or region). Clicking on the triangle to the left of the type name expands the hierarchy tree under that type. Where factsheets have been published, type names are bolded in the hierarchy tree; clicking on the bolded name loads the abstract for the type and a pdf icon for the factsheet, which is downloadable by clicking on the icon. For types at the Formation levels (Formation Class, Subclass & Formation), and the Division level, concept abstracts are provided from the USNVC (http://usnvc.org/explore-classification/; derived from Faber-Langendoen et al., 2016).

Factsheets

CNVC factsheet series have been initiated for two levels of the hierarchy, Association and Macrogroup (Appendices 1 and 2). Subtypes, where they exist, are described in their respective Association or Macrogroup factsheets. Factsheets are available for download from the CNVC website (**cnvc-cnvc.ca**), as well as from NRCan – CFS Publications (cfs.nrcan.gc.ca/publications).

Each factsheet provides a conceptual overview of the 'essence' of the type as well as more detailed descriptions of vegetation structure and species composition, representative environmental characteristics, critical ecological process relationships (e.g., disturbance regime and successional trends), and geographic range in Canada. Factsheets are presented in either Association (Appendix 8) or Macrogroup templates (Appendix 9) and use standardized CNVC terminology (Appendix 7), syntax and data summary conventions (Appendix 4). Where types are derived from plot data, tabular summaries of vegetation and environmental attributes are provided, as well as recognition of data sources. The factsheet shows the placement of the type within the CNVC hierarchy and, where CNVC types have concepts that are similar to, or synonymous with, other published types (e.g., provincial/ territorial types or USNVC types), these are identified.

CONCLUSIONS

The CNVC provides a comprehensive, hierarchical vegetation classification that can be used to catalogue and communicate information about the vegetation of Canada. The classification principles and protocols articulated here facilitate application of the CNVC approach for those wishing to employ it. Extensive collaborations between and within provinces/ territories, agencies and organizations have contributed to the integrity of the classification and its acceptance by users. Providing both colloquial (i.e., English and French common names) and scientific names increases the user base. The primary use of original plot-based analyses (while maintaining the integrity of fine-scale provincial/ territorial types), as well as accommodating expert knowledge, has ensured that the legacies of previous classification efforts have been fully accessed and incorporated. Looking ahead, the CNVC structure allows for ongoing improvement of the classification by vegetation ecologists, while retaining authoritative versions for users. The eight-level hierarchy of types allows users to select the levels most applicable to their needs.

REFERENCES

Alberta Environment and Parks. 2014. Ecological Site Information System (ESIS). Govt. AB, Edmonton, AB.

Archibald, J.H.; Klappstein, G.D.; Corns, I.G.W. 1996. Field guide to ecosites of southwestern Alberta. Nat. Resour. Can., Can. For. Ser., North. For. Cent., Edmonton, AB. Spec. Rep. 8.

Anderson, L.E. 1990. A checklist of Sphagnum in North America north of Mexico. The Bryologist 93(4): 500-501.

Anderson, L.E.; Crum, H.A.; Buck, W.R. 1990. List of the mosses of North America north of Mexico. The Bryologist 93: 448-499.

Arnup, R.W.; LeBlanc, P.A.; Becker, G. 2006. Field guide to ecosites of the Mid-Boreal Upland ecoregion of Manitoba. Louisiana-Pacific Canada Ltd., For. Resour. Div. and Man. Conserv., For. Branch. Swan River and Winnipeg, MB.

Alvo, R.; Ponomarenko, S. 2003. Vegetation classification standard for Canada workshop: 31 May - 2 June 2000. Canadian Field-Naturalist 117: 125-139.

Baldwin, K.; Allen, L.; Basquill, S.; Chapman, K.; Downing, D.; Flynn, N.; MacKenzie, W.; Major, M.; Meades, W.; Meidinger, D.; Morneau, C.; Saucier, J-P.; Thorpe, J.; Uhlig, P. 2019. Vegetation Zones of Canada: a Biogeoclimatic Perspective. [Map] Scale 1:5,000,000. Nat. Resour. Can., Can. For. Ser., Sault Ste. Marie, ON.

Basquill, S.P. (compiler). 2018. Maritime provinces of Canada regional forest ecosystem plot database. Standardized forest ecosystem plot data compilation and classification from N.B. Dept. Nat. Resour.; P.E.I. For., Fish, & Wildlife Div., Dept. Commun., Land, & Environ.; N.S. Dept. Nat. Resour.; N.S. Environ.; Parks Can.; the Atlantic Can. Conserv. Data Cent.; and other sources. Atlantic Can. Conserv. Data Cent., Sackville, NB.

Basquill, S.; Beaudette, D.; Cameron, R.; Curley, R.; Fenton, N.; Glen, W.; Gordon, S.; Hutchinson, J.; Kelly, G.; Loo, J.; Lynds, A.; MacAskill, D.; MacKinnon, D.; MacQuarrie, K.; Makepeace, S.; Matson, B.; Neily, P.; Quigley, E.; Zelazny, V. 2009 (updated 2015). Forest communities of the Maritime provinces of Canada. Atlantic Can. Conserv. Data Cent., Sackville, NB.

Beckingham, J.D.; Archibald, J.H. 1996. Field guide to ecosites of northern Alberta. Nat. Resour. Can., Can. For. Serv., North. For. Cent., Edmonton, AB. Spec. Rep. 5.

Beckingham, J.D.; Corns, I.G.W.; Archibald, J.H. 1996a. Field guide to ecosites of west-central Alberta. Nat. Resour. Can., Can. For. Serv., North. For. Cent., Edmonton, AB. Spec. Rep. 9.

Beckingham, J.D.; Nielsen, D.G.; Futoransky, V.A. 1996b. Field guide to ecosites of the mid-boreal ecoregions of Saskatchewan. Nat. Resour. Can., Can. For. Serv., North. For. Cent., Edmonton, AB. Spec. Rep. 6.

Biogeoclimatic Ecosystem Classification Program of British Columbia. 2011. BECMaster ecosystem plot database [VPro13/MSAccess 2010 format]. W.H. MacKenzie (ed.) B.C. Min. For., Lands, and Nat. Resour. Ops., Smithers, BC. Available at: www.for.gov.bc.ca/hre/becweb/resources/information-requests (accessed: June 2015).

Boulanger, Y.; Gauthier, S.; Burton, P.J. 2014. A refinement of models projecting future Canadian fire regimes using homogeneous fire regime zones. Can. J. For. Res. 44: 365-376.

Cadrin, C.; Meidinger, D.; Kittel, G. 2018. Boreal and Coastal Conifer Correlation Project: A Quantitative Crosswalk of conifer dominated Plant Associations of coastal areas of British Columbia, Washington and Oregon (update of 2004 report). USNVC Proceedings.

Circumpolar Arctic Vegetation Map Team. 2003. Circumpolar Arctic vegetation map. Conservation of Arctic Flora and Fauna (CAFF) Map No. 1. U.S. Fish and Wildlife Serv., Anchorage, AK.

Chambers, B.A.; Naylor, B.J.; Nieppola, J.; Merchant, B.; Uhlig, P. 1997. Field guide to forest ecosystems of central Ontario. Ont. Min. Nat. Resour., South-central Science Development and Transfer Branch, North Bay, ON. SGSS Field Guide FG-01. 200 p.

Commission for Environmental Cooperation. 1997. Ecological regions of North America, toward a common perspective. 71p. ISBN 2-922305-18-X.

Crins, W.J.; Gray, P.A.; Uhlig, P.W.C.; Wester, M. 2009. The ecosystems of Ontario, Part 1: Ecozones and ecoregions. Ont. Min. Nat. Resour., Inven. Monit. Assess. Peterborough, ON. SIB TER IMA TR-01.

Damman, A.W.H. 1963. A reconnaissance survey of the ecological conditions in the forests of the Roddickton area, Newfoundland. For. Res. Branch, Can. Dept. For., Newfoundland. Mimeo 63-N-1.

Damman, A.W.H. 1964. Some forest types of central Newfoundland and their relation to environmental factors. The Society of American Foresters, US. Monogr. 8.

Damman, A.W.H. 1967. The forest vegetation of western Newfoundland and site degradation associated with vegetation change. PhD thesis, Univ. of Michigan, Ann Arbor, MI, US.

Damman, A.W.H. 1983. An ecological subdivision of the Island of Newfoundland. Pp. 163-206 in: G.R. South (ed.) Biogeography and ecology of the Island of Newfoundland. Dr. W. Junk Pub., London, UK.

DeLong, C.; Banner, A.; MacKenzie, W.H.; Rogers, B.J.; Kaytor, B. 2011. A field guide to ecosystem identification for the Boreal White and Black Spruce zone of British Columbia. B.C. Min. For. Range, For. Sci. Prog., Victoria, BC. Land Manage. Handb. No. 65.

Demarchi, D.A. 2011. An introduction to the ecoregions of British Columbia, 3rd ed. Ecosystem Information Section, Min. of Environ. Victoria, BC. 163p.

Ecological and Landscape Classification Program. 2015. Bioclimate Zones of Yukon - Version 6 (November 2015). Report and map at 1:250,000 scale. Dep. of Environ., Whitehorse, YT.

Ecological Stratification Working Group. 1995. A national ecological framework for Canada. Agriculture and Agri-Food Canada, Res. Br., Cent. for Land and Biological Resour. Res. and Environ. Can., State of the Environ. Directorate, Ecozone Analysis Branch, Ottawa/Hull. Report and national map at 1:7 500 000 scale.

Ecoregions Working Group. 1989. Ecoclimatic regions of Canada, 1st approx. Ecoregions Working Group of the Canada Committee on Ecological Land Classification. ELC Series, No. 23, Sust. Dev. Br., Can. Wildlife Serv., Conservation and Protection, Environ. Can., Ottawa, ON. 119 p and map at 1:7500000.

Ecosystem Classification Group. 2007 (revised 2009). Ecological regions of the Northwest Territories - Taiga Plains. Govt. N.W.T., Dept. Environ. & Nat. Resour., Yellowknife, NT.

Ecosystem Classification Group. 2008. Ecological regions of the Northwest Territories – Taiga Shield. Gov. N.T., Dept. Env. & Nat. Resour., Yellowknife, NT.

Ecosystem Classification Group. 2010. Ecological regions of the Northwest Territories – Cordillera. Gov. N.T., Dept. Env. & Nat. Resour., Yellowknife, NT.

Ecosystem Classification Group. 2012. Ecological regions of the Northwest Territories – Southern Arctic. Gov. N.T., Dept. Env. & Nat. Resour., Yellowknife, NT.

Ecosystem Classification Group. 2013. Ecological regions of the Northwest Territories – Northern Arctic. Gov. N.T., Dept. Env. & Nat. Resour., Yellowknife, NT.

Environment Yukon. 2016a. Boreal Low Zone of Yukon: a field guide to ecosite identification. Part 1: Introduction. Dep. of Environ., Govt. YT., Whitehorse, YT. 113 p.

Environment Yukon. 2016b. Flynn, N. and Francis. S., editors. Yukon Ecological and Landscape Classification and Mapping Guidelines. Version 1.0. Dep. of Environ., Govt YT. Whitehorse, YT.

Environment Yukon. 2018. Yukon Biological Information System (YBIS). Govt. YT. Whitehorse, YT.

Esslinger, T.L. 2015. A cumulative checklist for the lichen-forming, lichenicolous and allied fungi of the continental United States and Canada. North Dakota State University: Available at: http://www.ndsu.edu/pubweb/~esslinge/chcklst/chcklst7.htm. Version #20 19 April 2015. Fargo, North Dakota (accessed: November, 2015).

Expert Committee on Soil Survey. 1982. The Canada Soil Information System (CanSIS): manual for describing soils in the field, 1982 Rev. Land Resour. Res. Institute, Res. Br. Ag. Can., Ottawa, ON. LRRI Contribution no 82-52. 166 p.

Faber-Langendoen, D.; Keeler-Wolf, T.; Meidinger, D.; Josse, C.; Weakley, A.; Tart, D.; Navarro, G.; Hoagland, B.; Ponomarenko, S.; Saucier, J.-P.; Fults, G.; Helmer, E. 2016. Classification and description of world formation types. Gen. Tech. Rep. RMRS-GTR-346. Fort Collins, CO: US Dept. of Agriculture, For. Ser., Rocky Mountain Research Station. 222 p.

Faber-Langendoen, D.; Keeler-Wolf, T.; Meidinger, D.; Tart, D.; Hoagland, B.; Josse, C.; Navarro, G.; Ponomarenko, S.; Saucier, J.-P.; Weakley, A.; Comer, P. 2014. EcoVeg: A new approach to vegetation description and classification. Ecol. Monogr. 84: 533-561.

Faber-Langendoen, D.; Baldwin, K.; Peet, R.K.; Meidinger, D.; Muldavin E.; Keeler-Wolf, T.; Josse, C. 2018. The EcoVeg Approach in the Americas: U.S., Canadian and International Vegetation Classifications. Phytocoenologia 48: 215-237. DOI: 10.1127/phyto/2017/0165.

Flora of North America Editorial Committee. 2007+. Flora of North America north of Mexico, vols 27, 28, 29. Oxford University Press, New York and Oxford. Available at: http://www.mobot.org/plantscience/bfna/BFNAmenu.htm (accessed: November, 2015).

Grandtner, M.M. 1966. La vegetation forestiere du Quebec meridional. Presses de l'Universite Laval, Quebec, QC. 216 p.

Halliday, W.E.D. 1937. A forest classification for Canada. Can. Dept. Mines & Resour., Lands, Parks & For. Br. Forest Serv. Bull. 89. Ottawa, ON. 50 p + map.

Hills, G.A. 1952. The classification and evaluation of site for forestry. Ont. Dept. Land For., Res. Rep. No. 24. Toronto, ON. 41 p.

Hills, G.A.; Pierpoint, G. 1960. Forest site evaluation in Ontario. Ont. Dept. Land For., Res. Rep. No. 42. Toronto, ON. 63 p.

Jennings, M. D.; Faber-Langendoen, D.; Loucks, O. L.; Peet, R. K.; Roberts, D. 2009. Standards for Associations and Alliances of the U.S. National Vegetation Classification. Ecol. Monogr. 79: 173-199.

Krajina, V. J. 1960a. Can we find a common platform for the different schools of forest type classification? Silva Fennica 105: 50-55.

Krajina, V. J. 1960b. Ecosystem classification of forests (summary of contributions to the Forest Ecosystem Symposium). Silva Fennica 105: 107-110.

Krajina, V. J. 1969. Ecology of forest trees in British Columbia. Ecology of Western North America 2(1): 1-47.

Li, T.; Hélie, R. (compilers). 2014. Ecozones of Canada / Écozones du Canada [map]. Canadian Council on Ecological Areas / Conseil Canadien des Aires Écologiques, CA. Scale 1:25,000,000.

Loucks, O.L. 1962. A forest classification for the Maritime provinces. Proc. Nova Scotia Inst. Sci. 25(2): 87-167.

MacKenzie, W. H.; Klassen, R. 2009. VPro 13: Software for management of ecosystem data and classification. Version 6.0. British Columbia Ministry of Forestry and Range, Research Branch, Victoria B.C. https://www.for.gov.bc.ca/hre/becweb/resources/software/vpro/index.html. [accessed: March 23, 2018].

MacKenzie, W.H.; Meidinger, D.V. 2017. The biogeoclimatic ecosystem classification approach: an ecological framework for vegetation classification. Phytocoenologia 48:203-213. DOI: 10.1127/phyto/2017/0160.

McCune, B.; Mefford, M.J. 2009. PC-ORD. Multivariate analysis of ecological data. Version 5.0. MjM Software, Gleneden Beach, OR, USA.

McCune, B.; Grace, J.B. 2002. Analysis of ecological communities. MjM Software Design, Gleneden Beach, OR, USA.

McLaughlan, M.S.; Wright, R.A.; Jiricka, R.D. 2010a. Saskatchewan forest ecosystem classification [data set]. Sask. Min. Environ. For. Serv., Prince Albert, SK.

McLaughlan, M.S.; Wright, R.A.; Jiricka, R.D. 2010b. Field guide to the ecosites of Saskatchewan's provincial forests. Sask. Min. Environ., For. Serv. Prince Albert, SK.

McMurray, S. C., Johnson, J.A., Zhou, K., Uhlig, P.W.C. 2015. Ontario ecological land classification program - Ecological Data Repository (EDR). Sault Ste. Marie, ON, Ont. Min. Nat. Resour. & For., Sci.& Info. Branch.

Meades, W.J. 1976. Vegetation of Terra Nova National Park. In: Biophysical classification of Terra Nova National Park: environmental component 3c. Can. Dept. Indian & North. Aff., Parks Branch, Canada.

Meades, W.J. 1986. Successional status of ericaceous dwarf-shrub heath in eastern Newfoundland. PhD thesis, Univ. of Connecticut, Storrs, CT, USA.

Meades, W.J.; Moores, L. 1994. Forest site classification manual: a field guide to the Damman forest types of Newfoundland. 2nd ed. Corner Brook, Western Newfoundland Model Forest, Inc. NL. FRDA Rep. 003. Newfoundland.

Meidinger, D.; Pojar, J. (eds.). 1991. Ecosystems of British Columbia. B.C. Min. For., Res. Branch, BC. Spec. Rep. Series No. 6. 330 p.

Ministère des Ressources naturelles, de la Faune et des Parcs, Forêt Québec. 2003. Base de données des points d'observation écologique (version 2003). QC, Gouv. du Qué., Min. des Res. nat., de la Faune et des Parcs, Forêt Qué., Dir. des inv. for. QC.

National Vegetation Working Group. 1990. Canadian vegetation classification system, first approximation. Strong, W. L., E. T. Oswald, and D. J. Downing (editors). Nat. Veg. Working Group of the Can. Comm. Ecol. Land. Class., Environ. Can. ELC Series, No. 25. Ottawa, ON.

Natural Regions Committee. 2006. Natural regions and subregions of Alberta. D.J. Downing and W.W. Pettapiece (compilers). Gov. AB, Min. Environ., AB. Pub. No. T/852.

Natural Resources Canada, Canadian Forest Service, Atlantic Region. 2006. Forest vegetation plot descriptions from the following publications: Damman, A.W.H. (1963, 1964, 1967); Meades, W.J. (1976, 1986). Nat. Res. Canada, Corner Brook, NL.

Neily, P.; Basquill, S.; Quigley, E.; Stewart, B.; Keys, K. 2011. Forest ecosystem classification for Nova Scotia, Part 1: Vegetation types. N.S. Dept. Nat. Resour., Renew. Resour. Branch, NS.

Neily, P.; Basquill, S.; Quigley, E.; Keys, K. 2017. Ecological land classification for Nova Scotia. N.S. Dept. Nat. Resour., Renew. Resour. Branch, NS. Rep. FOR 2017-13.

Pojar, J.; Klinka, K.; Meidinger, D. 1987. Biogeoclimatic ecosystem classification in British Columbia. Forest Ecology and Management 22: 119-154.

Ponomarenko, S. and R. Alvo. 2001. Perspectives on developing a Canadian classification of ecological communities. Natural Resources Canada, Canadian Forest Service, Headquarters, Science Branch. Information Report ST-X-18E. Ottawa, ON.

Rivas-Martinez, S. and Rivas-Saenz, S. 2017. World Bioclimatic Classification System. University Complutense of Madrid and The Phytosociological Research Centre, Spain. http://www.globalbioclimatics.org/ (accessed September 27, 2018).

Rowe, J.S. 1972. Forest Regions of Canada. Dept. Environ., Can. For. Serv., Publ. No. 1300. Publishing Division, Information Canada. 172 p.

Sanchez-Mata, D.; Rivas-Martinez, S. 2010. Bioclimatic dossier for the 'Circumboreal Vegetation Mapping Project' (CBVM). Pages 42-52 in: S.S. Talbot (ed.) Proc. 7th Intl. Conserv. Arctic Flora and Fauna (CAFF) Flora Gp. Workshop. January 28-February 3, 2011. Akureyri, Iceland. CAFF International Secretariat, CAFF Flora Expert Group (CFG), CAFF Proc. Series Rep. No. 8.

Saucier, J.-P.; Robitaille A.; Grondin, P. 2009. Cadre bioclimatique du Québec. pp. 186-205 dans: Manuel de foresterie, Chapitre Écologie forestière, 2e éd. Éditions Multimondes, Ordre des ingénieurs forestiers du Québec, QC

Sims, R. A.; Towill, W.D.; Baldwin, K.A.; Wickware, G.M. 1997. Field guide to the forested ecosystem classification for northwestern Ontario. Ont. Min. Natur. Resour., Northwest Sci. & Technol. Thunder Bay, ON. 191 p.

Smith, C.A.; Meikle, J.C.; Roots, C.F. (eds.). 2004. Ecoregions of the Yukon Territory: biophysical properties of Yukon landscapes. Agric. And Agri-Food Can., Summerland, BC. PARC Tech. Bulletin No. 04-01.

Stotler, R.; Crandall-Stotler, B. 1977. A checklist of the liverworts and hornworts of North America. The Bryologist 80: 405-428.

Taylor, K.C.; Arnup, R.W.; Merchant, B.G.; Parton, W.J.; Nieppola, J. 2000. A field guide to forest ecosystems of northeastern Ontario, 2nd ed. NEST Field Guide FG-001. Ont. Min. Natur. Resour., Northeast Sci. & Technol. ON. 325 p.

The Ecosystem Classification Working Group. 2007. Our landscape heritage: the story of ecological land classification in New Brunswick. V.F. Zelazny (ed.). N.B. Dept. Nat. Resour., Fredericton, NB.

Thornthwaite, C.W. 1931. The climates of North America: according to a new classification. Geogr. Rev. 21: 633-655.

Uhlig, P.W.C.; Chapman, K.; Baldwin, K.; Wester, M.; Yanni, S. 2016. Draft boreal treed vegetation type factsheets. Ecol. Land Class. Prog., Ont. Min. Nat. Resour. & For., Sci. & Info Branch. Sault Ste. Marie, ON.

USNVC [United States National Vegetation Classification]. 2017. United States National Vegetation Classification Database ver. 2.0. Fed. Geogr. Data Comm., Veg. Subcomm., Washington DC, US. Available at: http://usnvc.org (accessed: November 30, 2018).

Wester, M.C.; Henson, B.L.; Crins, W.J.; Uhlig, P.W.C.; Gray, P.A. In prep. The ecosystems of Ontario, Part 2: Ecodistricts. Ont. Min. Nat. Resour. & For., Sci. & Res. Branch, For. Res. & Monit. Sect., Sault Ste. Marie, ON.

Zelazny, V.F.; Ng, T.T.M.; Hayter, M.G.; Bowling, C.L.; Bewick, D.A. 1989. Field guide to forest site classification in New Brunswick, Big Bald-Sevogle site regions. N.B. Dept. Nat. Resour. Energy, Fredericton, NB. 43 p.

Zoladeski, C.A.; Wickware, G.M.; Delorme, R.J.; Sims, R.A.; Corns, I.G.W. 1995. Forest ecosystem classification for Manitoba: field guide. Nat. Res. Can., Can. For. Serv., North. For. Cent., Edmonton, AB. Special Rep. 2.

Zoladeski, C. A.; Cowell, D.W.; Ecosystem Advisory Committee. 1996. Ecosystem classification for the southeast Yukon: field guide, first approximation. Yukon Renew. Resour., Can. For. Serv., Dept. Indian Affairs and North. Dev. Whitehorse, YT.

APPENDICES

LIST OF APPENDICES

Appendix 1. Status of CNVC Macrogroups to 2018

Tables 1-17 show the status of CNVC Macrogroup development, organized hierarchically by Class (C), Subclass (S), Formation (F) and Division (D) (see ***Table 2*** in report section ***Hierarchy Structure*** for a description of hierarchy levels). Macrogroups shared with the USNVC are preceded by 'M'; those unique to Canada, by 'CM' (see ***CNVC Type Name and Code Standards*** for more information). The method of determination is also described and where factsheets exist, authors are listed. CNVC factsheets are available from cnvc-cnvc.ca and cfs.nrcan.gc.ca/publications. USNVC factsheets are available from http://usnvc.org/explore-classification/.

INDEX OF APPENDIX 1

A1 Table 1. C01 Forest & Woodland, S15 Temperate & Boreal Forest & Woodland, F001 Boreal Forest & Woodland

Formation	Division	Macrogroup		Status for CNVC (2018)	Method of CNVC Determination	CNVC Factsheet Authors
F001 Boreal Forest & Woodland	D014 North American Boreal Forest & Woodland	M156	Alaskan-Yukon North American Boreal Forest & Woodland	USNVC concept adapted for CNVC	Aggregation of Associations	D. Meidinger, K. Baldwin, K. Chapman
		M179	North American Northern Boreal Woodland	USNVC concept adapted for CNVC	Analysis of data & other information sources	K. Baldwin, B. Meades, D. Downing, D. Meidinger
		M495	Eastern North American Boreal Forest	Concept derived by CNVC; shared with USNVC	Aggregation of Associations	K. Baldwin, J.-P. Saucier, B. Meades, K. Chapman
		M496	West-Central North American Boreal Forest	Concept derived by CNVC; shared with USNVC	Aggregation of Associations	K. Baldwin, D. Meidinger, D. Downing, K. Chapman

A1 Table 2. C01 Forest & Woodland, S15 Temperate & Boreal Forest & Woodland, **F036 Boreal Flooded & Swamp Forest**.

Formation	Division	Macrogroup		Status for CNVC (2018)	Method of CNVC Determination	CNVC Factsheet Authors
F036 Boreal Flooded & Swamp	D016 North American Boreal Flooded & Swamp Forest	M299	North American Boreal Conifer Poor Swamp	USNVC concept adapted for CNVC	Aggregation of Associations	K. Baldwin, D. Downing
		M300	North American Boreal Flooded & Rich Swamp Forest	USNVC concept confirmed for Canada	Requires analysis	see USNVC factsheet

A1 Table 3. C01 Forest & Woodland, S15 Temperate & Boreal Forest & Woodland, **F008 Cool Temperate Forest & Woodland**.

Formation	Division	Macrogroup		Status for CNVC (2018)	Method of CNVC Determination	CNVC Factsheet Authors
F008 Cool Temperate Forest & Woodland	D008 Eastern North American Forest & Woodland	CM014	Eastern North American Temperate Hardwood - Conifer Forest	Unique CNVC Macrogroup	Data analysis	K. Baldwin, J.-P. Saucier, P. Uhlig
		CM742	Eastern Canadian Temperate Deciduous Forest	Unique CNVC Macrogroup	Data analysis	K. Baldwin, P. Uhlig, M. Wester
		CM744	Acadian Temperate Forest	Unique CNVC Macrogroup	Data analysis	S. Basquill, K. Baldwin
	D192 Vancouverian Forest & Woodland	M024	Vancouverian Coastal Rainforest	USNVC concept adapted for CNVC	Aggregation of Associations	D. Meidinger, K. Baldwin
		M025	Vancouverian Subalpine - High Montane Forest	USNVC concept adapted for CNVC	Aggregation of Associations	D. Meidinger, K. Baldwin
		M886	Southern Vancouverian Dry Foothill Forest & Woodland	USNVC concept adapted for CNVC	Aggregation of Associations	D. Meidinger, K. Baldwin
	D194 Rocky Mountain Forest & Woodland	M020	Rocky Mountain Subalpine - High Montane Forest	USNVC concept adapted for CNVC	Data analysis	D. Meidinger, D. Downing, K. Baldwin
		M500	Central Rocky Mountain Mesic Lower Montane Forest	USNVC concept adapted for CNVC	Data analysis	D. Meidinger, K. Baldwin
		M501	Central Rocky Mountain Dry Lower Montane-Foothill Forest	USNVC concept adapted for CNVC	Data analysis	D. Meidinger, K. Baldwin
		M890	Rocky Mountain Intermontane Subboreal Forest	Concept derived by CNVC; shared with USNVC	Data analysis	D. Meidinger, K. Baldwin
	D326 North American Great Plains Forest & Woodland	M151	Great Plains Forest & Woodland	USNVC concept confirmed for Canada	Other information sources	J. Thorpe, K. Baldwin, L. Allen

A1 Table 4. C01 Forest & Woodland, S15 Temperate & Boreal Forest & Woodland, **F026 Temperate Flooded & Swamp Forest**.

Formation	Division	Macrogroup		Status for CNVC (2018)	Method of CNVC Determination	CNVC Factsheet Authors
F026 Temperate Flooded & Swamp Forest	D011 Eastern North American-Great Plains Flooded & Swamp Forest	M028	Great Plains Floodplain Forest	USNVC concept confirmed for Canada	Other information sources	J. Thorpe, K. Baldwin, L. Allen
		M029	Central Hardwood Floodplain Forest	USNVC concept; possibly occurs in Canada	Requires analysis	see USNVC factsheet
		M503	Central Hardwood Swamp Forest	USNVC concept; possibly occurs in Canada	Requires analysis	see USNVC factsheet
		M504	Laurentian-Acadian Flooded & Swamp Forest	USNVC concept confirmed for Canada	Requires analysis	see USNVC factsheet
	D193 Vancouverian Flooded & Swamp Forest	M035	Vancouverian Flooded & Swamp Forest	USNVC concept confirmed for Canada	Aggregation of Associations	D. Meidinger, K. Baldwin
	D195 Rocky Mountain-Great Basin Montane Flooded & Swamp Forest	M034	Rocky Mountain-Great Basin Montane Riparian & Swamp Forest	USNVC concept confirmed for Canada	Aggregation of Associations	D. Meidinger, K. Baldwin

A1 Table 5. C02 Shrub & Herb Vegetation, S18 Temperate & Boreal Grassland & Shrubland, **F005 Temperate to Polar Scrub & Herb Coastal Vegetation**.

Formation	Division	Macrogroup		Status for CNVC (2018)	Method of CNVC Determination	CNVC Factsheet Authors
F005 Temperate to Polar Scrub & Herb Coastal Vegetation	D026 Eastern North American Coastal Scrub & Herb Vegetation	M057	Eastern North American Coastal Dune & Grassland	USNVC concept provisionally accepted for CNVC	Requires analysis	see USNVC factsheet
		M060	Eastern North American Coastal Beach & Rocky Shore	USNVC concept provisionally accepted for CNVC	Requires analysis	see USNVC factsheet
	D027 Pacific North American Coastal Scrub & Herb Vegetation	M058	Pacific Coastal Cliff & Bluff	USNVC concept provisionally accepted for CNVC	Requires analysis	see USNVC factsheet
		M059	Pacific Coastal Beach & Dune	USNVC concept provisionally accepted for CNVC	Requires analysis	see USNVC factsheet
	D146 Arctic & Boreal Coastal Scrub & Herb Vegetation	M402	North American Arctic & Boreal Coastal Shore	USNVC concept provisionally accepted for CNVC	Requires analysis	see USNVC factsheet

A1 Table 6. C02 Shrub & Herb Vegetation, S18 Temperate & Boreal Grassland & Shrubland, **F028 Boreal Grassland & Shrubland**.

Formation	Division	Macrogroup		Status for CNVC (2018)	Method of CNVC Determination	CNVC Factsheet Authors
F028 Boreal Grassland & Shrubland	D025 North American Boreal Grassland & Shrubland	M055	North American Boreal Shrubland & Grassland	USNVC concept provisionally accepted for CNVC	Requires analysis	see USNVC factsheet

A1 Table 7. C02 Shrub & Herb Vegetation, S18 Temperate & Boreal Grassland & Shrubland, F012 Temperate Grassland & Shrubland.

Formation	Division	Macrogroup		Status for CNVC (2018)	Method of CNVC Determination	CNVC Factsheet Authors
F012 Temperate Grassland & Shrubland	D022 Western North American Grassland & Shrubland	M048	Central Rocky Mountain Montane-Foothill Grassland & Shrubland	USNVC concept confirmed for Canada	Other information sources	see USNVC factsheet
		M050	Southern Vancouverian Lowland Grassland & Shrubland	USNVC concept provisionally accepted for CNVC	Requires analysis	see USNVC factsheet
		M168	Rocky Mountain-Vancouverian Subalpine-High Montane Mesic Meadow	USNVC concept provisionally accepted for CNVC	Requires analysis	see USNVC factsheet
		M172	Northern Vancouverian Lowland-Montane Grassland & Shrubland	USNVC concept provisionally accepted for CNVC	Requires analysis	see USNVC factsheet
	D023 Central North American Grassland & Shrubland	CM051	Great Plains Mixedgrass Prairie	USNVC concept adapted for CNVC	Other information sources	J. Thorpe, K. Baldwin, L. Allen
		M054	Central Lowlands Tallgrass Prairie	USNVC concept confirmed for Canada	Other information sources	J. Thorpe, K. Baldwin
		CM332	Great Plains Rough Fescue Prairie	Unique CNVC Macrogroup	Other information sources	J. Thorpe, K. Baldwin, L. Allen
	D024 Eastern North American Grassland & Shrubland	M505	Laurentian-Acadian Acidic Rocky Scrub & Grassland	USNVC concept provisionally accepted for CNVC	Requires analysis	see USNVC factsheet
		M507	Laurentian-Acadian Calcareous Scrub & Grassland	USNVC concept provisionally accepted for CNVC	Requires analysis	see USNVC factsheet

A1 Table 8. C02 Shrub & Herb Vegetation, S44 Shrub & Herb Wetland, **F013 Temperate to Polar Freshwater Marsh, Wet Meadow & Shrubland**.

Formation	Division	Macrogroup		Status for CNVC (2018)	Method of CNVC Determination	CNVC Factsheet Authors
F013 Temperate to Polar Freshwater Marsh, Wet Meadow & Shrubland	D031 Western North American Temperate & Boreal Freshwater Marsh, Wet Meadow & Shrubland	M073	Vancouverian Lowland Marsh, Wet Meadow & Shrubland	USNVC concept provisionally accepted for CNVC	Requires analysis	see USNVC factsheet
		M074	Western North American Vernal Pool	USNVC concept provisionally accepted for CNVC	Requires analysis	see USNVC factsheet
		M075	Western North American Montane-Subalpine-Boreal Marsh, Wet Meadow & Shrubland	USNVC concept provisionally accepted for CNVC	Requires analysis	see USNVC factsheet
	D320 Circumpolar Arctic & Subarctic Freshwater Marsh & Wet Meadow	M870	North American Arctic & Subarctic Freshwater Marsh & Wet Meadow	USNVC concept provisionally accepted for CNVC	Requires analysis	see USNVC factsheet
	D323 Eastern North American Temperate & Boreal Freshwater Marsh, Wet Meadow & Shrubland	M061	Eastern Cool Temperate Seep	USNVC concept provisionally accepted for CNVC	Requires analysis	see USNVC factsheet
		M069	Eastern North American Marsh, Wet Meadow & Shrubland	USNVC concept provisionally accepted for CNVC	Requires analysis	see USNVC factsheet
		M071	Great Plains Marsh, Wet Meadow, Shrubland & Playa	USNVC concept provisionally accepted for CNVC	Requires analysis	see USNVC factsheet
		M880	Eastern North American Wet Shoreline Vegetation	USNVC concept provisionally accepted for CNVC	Requires analysis	see USNVC factsheet
		M881	Eastern North American Riverscour Vegetation	USNVC concept provisionally accepted for CNVC	Requires analysis	see USNVC factsheet

A1 Table 9. C02 Shrub & Herb Vegetation, S44 Shrub & Herb Wetland, **F016 Temperate to Polar Bog & Fen**.

Formation	Division	Macrogroup		Status for CNVC (2018)	Method of CNVC Determination	CNVC Factsheet Authors
F016 Temperate to Polar Bog & Fen	D029 North American Bog & Fen	M063	North Pacific Bog & Fen	USNVC concept confirmed for Canada	Other information sources	see USNVC factsheet
		M876	North American Boreal & Sub-boreal Acidic Bog & Fen	USNVC concept confirmed for Canada	Other information sources	see USNVC factsheet
		M877	North American Boreal & Sub-boreal Alkaline Fen	USNVC concept provisionally accepted for CNVC	Requires analysis	see USNVC factsheet

A1A1 Table 10. C02 Shrub & Herb Vegetation, S44 Shrub & Herb Wetland, **F035 Salt Marsh**.

Formation	Division	Macrogroup		Status for CNVC (2018)	Method of CNVC Determination	CNVC Factsheet Authors
F035 Salt Marsh	D033 North American Great Plains Saline Marsh	M077	Great Plains Saline Wet Meadow & Marsh	USNVC concept provisionally accepted for CNVC	Requires analysis	see USNVC factsheet
	D034 North American Atlantic & Gulf Coastal Salt Marsh	M079	North American Atlantic & Gulf Coastal Salt Marsh	USNVC concept provisionally accepted for CNVC	Requires analysis	see USNVC factsheet
	D035 Temperate & Boreal Pacific Coastal Salt Marsh	M081	North American Pacific Coastal Salt Marsh	USNVC concept provisionally accepted for CNVC	Requires analysis	see USNVC factsheet
	D036 North American Western Interior Brackish Marsh, Playa & Shrubland	M082	Warm & Cool Desert Alkali-Saline Marsh, Playa & Shrubland	USNVC concept provisionally accepted for CNVC	Requires analysis	see USNVC factsheet
	D187 Arctic Coastal Salt Marsh	M403	North American Arctic Tidal Salt Marsh	USNVC concept provisionally accepted for CNVC	Requires analysis	see USNVC factsheet

A1 Table 11. C03 Desert & Semi-Desert, S11 Cool Semi-Desert Scrub & Grassland, **F033 Cool Semi-Desert Scrub & Grassland**.

Formation	Division	Macrogroup		Status for CNVC (2018)	Method of CNVC Determination	CNVC Factsheet Authors
F033 Cool Semi-Desert Scrub & Grassland	D040 Western North American Cool Semi-Desert Scrub & Grassland	M169	Great Basin-Intermountain Tall Sagebrush Steppe & Shrubland	USNVC concept confirmed for Canada	Other information sources	see USNVC factsheet
		M171	Great Basin-Intermountain Dry Shrubland & Grassland	USNVC concept provisionally accepted for CNVC	Requires analysis	see USNVC factsheet

A1 Table 12. C04 Polar & High Montane Scrub, Grassland & Barrens, S12 Temperate to Polar Alpine & Tundra Vegetation, **F031 Polar & Tundra Barrens**.

Formation	Division	Macrogroup		Status for CNVC (2018)	Method of CNVC Determination	CNVC Factsheet Authors
F031 Polar Tundra & Barrens	D044 Arctic Tundra & Barrens	M173	North American Arctic & Subarctic Tundra	Concept shared with USNVC, but CNVC provisionally proposes 3 subdivisions	Requires analysis	no CNVC factsheet
		M175	Arctic Cliff, Scree & Rock Vegetation	USNVC concept provisionally accepted for CNVC	Requires analysis	see USNVC factsheet

A1 Table 13. C04 Polar & High Montane Scrub, Grassland & Barrens, S12 Temperate to Polar Alpine & Tundra Vegetation, **F037 Temperate & Boreal Alpine Tundra**.

Formation	Division	Macrogroup		Status for CNVC (2018)	Method of CNVC Determination	CNVC Factsheet Authors
F037 Temperate & Boreal Alpine Tundra	D042 Eastern North American Alpine Tundra	M131	Eastern North American Alpine Tundra	USNVC concept confirmed for Canada	Analysis of data & other information sources	see USNVC factsheet
	D043 Western North American Alpine Tundra	M099	Rocky Mountain-Sierran Alpine Tundra	USNVC concept confirmed for Canada	Data analysis	see USNVC factsheet
		M101	Vancouverian Alpine Tundra	USNVC concept confirmed for Canada	Data analysis	see USNVC factsheet
		M404	Western Boreal Alpine Tundra	USNVC concept confirmed for Canada	Data analysis	see USNVC factsheet
		CM366	Subarctic Alpine Tundra	Unique CNVC Macrogroup	Data analysis	no CNVC factsheet

A1 Table 14. C05 Aquatic Vegetation, S09 Saltwater Aquatic Vegetation, **F053 Benthic Macroalgae Saltwater Vegetation**.

Formation	Division	Macrogroup		Status for CNVC (2018)	Method of CNVC Determination	CNVC Factsheet Authors
F053 Benthic Macroalgae Saltwater	D047 Temperate Intertidal Shore	M104	Temperate Atlantic Intertidal Shore	USNVC concept provisionally accepted for CNVC	Requires analysis	see USNVC factsheet
		M106	Temperate Pacific Seaweed Intertidal Vegetation	USNVC concept provisionally accepted for CNVC	Requires analysis	see USNVC factsheet

A1 Table 15. C05 Aquatic Vegetation, S09 Saltwater Aquatic Vegetation, **F054 Benthic Vascular Saltwater Vegetation**.

Formation	Division	Macrogroup		Status for CNVC (2018)	Method of CNVC Determination	CNVC Factsheet Authors
F054 Benthic Vascular Saltwater Vegetation	D064 Temperate Seagrass Aquatic Vegetation	M183	Temperate Eel-grass Vegetation	USNVC concept provisionally accepted for CNVC	Requires analysis	see USNVC factsheet
		M184	Temperate Pacific Seagrass Intertidal Vegetation	USNVC concept provisionally accepted for CNVC	Requires analysis	see USNVC factsheet
	D065 Temperate Estuarine & Inland Brackish Aquatic Vegetation	M186	Ditchgrass Saline Aquatic Vegetation	USNVC concept provisionally accepted for CNVC	Requires analysis	see USNVC factsheet

A1 Table 16. C05 Aquatic Vegetation, S13 Freshwater Aquatic Vegetation, **F057 Temperate & Boreal Freshwater Aquatic Vegetation**.

Formation	Division	Macrogroup		Status for CNVC (2018)	Method of CNVC Determination	CNVC Factsheet Authors
F057 Temperate & Boreal Freshwater Aquatic Vegetation	D049 North American Freshwater Aquatic Vegetation	M108	Eastern North American Freshwater Aquatic Vegetation	USNVC concept provisionally accepted for CNVC	Requires analysis	see USNVC factsheet
		M109	Western North American Freshwater Aquatic Vegetation	USNVC concept provisionally accepted for CNVC	Requires analysis	see USNVC factsheet
		M871	Arctic & Northern Boreal Freshwater Aquatic Vegetation	USNVC concept provisionally accepted for CNVC	Requires analysis	see USNVC factsheet

A1 Table 17. C06 Open Rock Vegetation, S04 Temperate & Boreal Open Rock Vegetation, **F034 Temperate & Boreal Cliff, Scree & Other Rock Vegetation**.

Formation	Division	Macrogroup		Status for CNVC (2018)	Method of CNVC Determination	CNVC Factsheet Authors
F034 Temperate & Boreal Cliff, Scree & Other Rock Vegetation	D051 Eastern North American Temperate & Boreal Cliff, Scree & Rock Vegetation	M111	Eastern North American Cliff & Rock Vegetation	USNVC concept provisionally accepted for CNVC	Requires analysis	see USNVC factsheet
		M115	Great Plains Badlands Vegetation	USNVC concept provisionally accepted for CNVC	Requires analysis	see USNVC factsheet
		M116	Great Plains Cliff, Scree & Rock Vegetation	USNVC concept provisionally accepted for CNVC	Requires analysis	see USNVC factsheet
	D052 Western North American Temperate & Boreal Cliff, Scree & Rock Vegetation	M887	Western North American Cliff, Scree & Rock Vegetation	USNVC concept provisionally accepted for CNVC	Requires analysis	see USNVC factsheet

Appendix 2. Status of CNVC Associations to 2018

Tables 1a – 13 list Associations developed to 2018 by hierarchical level, Macrogroup ('M'or 'CM'), and where they exist, Macrogroup subtype, Group ('CG') and Alliance ('CA') (refer to ***Table 2*** in report section ***Hierarchy Structure*** for a description of hierarchy levels and section ***CNVC Type Name and Code Standards***, for more information on naming and coding conventions). The number of plots classified to the Association is shown (n plots), along with Concept Authors and Date, author confidence (Conf.) in the Association concept, provinces and territories of occurrence and, where factsheets have been published, factsheet authors and language of publication. Factsheets are available from cnvc-cnvc.ca and cfs.nrcan.gc.ca/publications.

INDEX OF APPENDIX 2

A2 Table 1a. Associations of M024 Vancouverian Coastal Rainforest, CM024a Drier Vancouverian Rainforest, CG0240 North Pacific Maritime Coast Douglas-fir - Western Hemlock Rainforest.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00002	*Pseudotsuga menziesii – Pinus contorta (Tsuga heterophylla) / Vaccinium membranaceum / Arctostaphylos uva-ursi*	14	High	November 2005	BC	D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	D. Meidinger, K. Iverson, C. Cadrin and K. Baldwin	English
CNVC00006	*Tsuga heterophylla – Pseudotsuga menziesii – Thuja plicata / Achlys triphylla – Gymnocarpium dryopteris*	14	High	November 2005	BC	D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	D. Meidinger, A. Inselberg, C. Cadrin and K. Baldwin	English
CNVC00008	*Pinus contorta* var. *contorta / Gaultheria shallon – Vaccinium alaskaense / Cladina* spp.	15	High	November 2005	BC	D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	D. Meidinger, A. Inselberg, C. Cadrin and K. Baldwin	English
CNVC00009	*Tsuga heterophylla – Pseudotsuga menziesii – Abies amabilis / Hylocomium splendens*	87	High	November 2005	BC	K. Klinka, J. Pojar, D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	D. Meidinger, A. Inselberg, C. Cadrin and K. Baldwin	English
CNVC00010	*Thuja plicata – Pseudotsuga menziesii – Abies grandis / Berberis nervosa / Polystichum munitum – Achlys triphylla*	21	High	November 2005	BC	D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	D. Meidinger, K. Iverson, C. Cadrin and K. Baldwin	English
CNVC00014	*Pseudotsuga menziesii (Abies grandis -Thuja plicata) / Berberis nervosa – Gaultheria shallon*	83	High	November 2005	BC	D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	D. Meidinger, K. Iverson, C. Cadrin and K. Baldwin	English
CNVC00019	*Thuja plicata – Pseudotsuga menziesii – Tsuga heterophylla / Acer circinatum / Polystichum munitum*	50	High	November 2005	BC	D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	D. Meidinger, K. Iverson, C. Cadrin and K. Baldwin	English

A2 Table 1a (cont'd). Associations of M024 Vancouverian Coastal Rainforest, CM024a Drier Vancouverian Rainforest, CG0240 North Pacific Maritime Coast Douglas-fir - Western Hemlock Rainforest.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00021	*Pseudotsuga menziesii – Pinus contorta* var. *contorta / Festuca occidentalis / Niphotrichum canescens – Racomitrium lanuginosum – Cladina* spp.	18	High	November 2005	BC	D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	D. Meidinger, M. Ryan, C. Cadrin and K. Baldwin	English
CNVC00030	*Pseudotsuga menziesii – Tsuga heterophylla (Thuja plicata) / Paxistima myrsinites – Vaccinium membranaceum / Rhytidiopsis robusta*	37	High	November 2005	BC	D. Meidinger, K. Klinka, J. Pojar	D. Meidinger and K. Baldwin	English
CNVC00031	*Pseudotsuga menziesii – Tsuga heterophylla (Thuja plicata) / Hylocomium splendens (Rhytidiadelphus triquetrus)*	40	High	November 2005	BC	K. Klinka, J. Pojar, D. Meidinger	D. Meidinger and K. Baldwin	English
CNVC00039	*Pseudotsuga menziesii – Tsuga heterophylla / Gaultheria shallon – Berberis nervosa*	123	High	November 2005	BC	D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	No factsheet	n/a
CNVC00043	*Pseudotsuga menziesii – Tsuga heterophylla (Thuja plicata) / Gaultheria shallon – Vaccinium parvifolium*	141	High	November 2005	BC	D. Meidinger, K. Klinka, J. Pojar	No factsheet	n/a
CNVC00071	*Pseudotsuga menziesii (Tsuga heterophylla) / Holodiscus discolor / Polystichum munitum*	6	High	November 2005	BC	D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	No factsheet	n/a
CNVC00074	*Pseudotsuga menziesii – Tsuga heterophylla – Thuja plicata / Berberis nervosa / Polystichum munitum – Achlys triphylla*	85	High	November 2005	BC	D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	No factsheet	n/a

A2 Table 1a (cont'd). Associations of M024 Vancouverian Coastal Rainforest, CM024a Drier Vancouverian Rainforest, CG0240 North Pacific Maritime Coast Douglas-fir - Western Hemlock Rainforest.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00075	*Pseudotsuga menziesii – Tsuga heterophylla – Thuja plicata / Rubus spectabilis / Polystichum munitum – Athyrium filix-femina*	145	High	November 2005	BC	K. Klinka, J. Pojar, D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	No factsheet	n/a
CNVC00188	*Pseudotsuga menziesii - Tsuga heterophylla / Gaultheria shallon - Vaccinium parvifolium / Niphotrichum canescens - Cladina* spp.	4	High	November 2005	BC	D. Meidinger, K. Klinka, J. Pojar	No factsheet	n/a

A2 Table 1bi. Associations of M024 Vancouverian Coastal Rainforest, CM024b Typic Vancouverian Rainforest, CG0237 North Pacific Red Alder - Big-leaved Maple - Coast Douglas-fir Rainforest.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00015	*Abies grandis – Thuja plicata – Acer macrophyllum / Oemleria cerasiformis / Polystichum munitum*	23	High	November 2005	BC	D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	D. Meidinger, K. Iverson, C. Cadrin and K. Baldwin	English

A2 Table 1bii. Associations of M024 Vancouverian Coastal Rainforest, CM024b Typic Vancouverian Rainforest, CG0241 North Pacific Maritime Pacific Silver Fir - Western Hemlock Rainforest.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00005	*Tsuga heterophylla (Picea sitchensis – Abies amabilis) / Rubus spectabilis / Polystichum munitum*	12	High	November 2005	BC	D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	D. Meidinger, A. Inselberg, C. Cadrin and K. Baldwin	English
CNVC00027	*Tsuga heterophylla – Abies amabilis / Vaccinium alaskaense / Blechnum spicant / Rhytidiadelphus loreus*	275	High	November 2005	BC	K. Klinka, J. Pojar, D. Meidinger	No factsheet	n/a

A2 Table 1bii (cont'd). Associations of M024 Vancouverian Coastal Rainforest, CM024b Typic Vancouverian Rainforest, CG0241 North Pacific Maritime Pacific Silver Fir - Western Hemlock Rainforest.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00028	*Tsuga heterophylla – Abies amabilis / Oplopanax horridus / Gymnocarpium dryopteris*	196	High	November 2005	BC	D. Meidinger, K. Klinka, J. Pojar	D. Meidinger and K. Baldwin	English
CNVC00034	*Tsuga heterophylla – Abies amabilis – Pseudotsuga menziesii / Achlys triphylla / Rhytidiopsis robusta*	12	High	November 2005	BC	D. Meidinger, K. Klinka, J. Pojar	No factsheet	n/a
CNVC00035	*Tsuga heterophylla – Abies amabilis / Vaccinium alaskaense / Rubus pedatus / Rhytidiopsis robusta*	143	High	November 2005	BC	D. Meidinger, K. Klinka, J. Pojar	D. Meidinger, A. Inselberg, and K. Baldwin	English
CNVC00036	*Tsuga heterophylla – Abies amabilis / Blechnum spicant – Tiarella trifoliata – Polystichum munitum*	304	High	November 2005	BC	D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	A. Inselberg, D. Meidinger, and K. Baldwin	English
CNVC00040	*Tsuga heterophylla – Abies amabilis (Pseudotsuga menziesii) / Vaccinium alaskaense / Rhytidiopsis robusta*	73	High	November 2005	BC	D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	No factsheet	n/a

A2 Table 1biii. Associations of M024 Vancouverian Coastal Rainforest, CM024b Typic Vancouverian Rainforest, CG0751 North Pacific Western Hemlock - Sitka Spruce - Western Red Cedar Rainforest.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00001	*Tsuga heterophylla – Thuja plicata / Gaultheria shallon – Vaccinium alaskaense / Hylocomium splendens*	78	High	November 2005	BC	D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner T. DeMeo	D. Meidinger, A. Inselberg, C. Cadrin and K. Baldwin	English
CNVC00007	*Tsuga heterophylla – Thuja plicata (Pseudotsuga menziesii – Abies amabilis) / Gymnocarpium dryopteris – Clintonia uniflora*	22	High	November 2005	BC	D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	D. Meidinger, A. Inselberg, C. Cadrin and K. Baldwin	English

A2 Table 1biii (cont'd). Associations of M024 Vancouverian Coastal Rainforest, CM024b Typic Vancouverian Rainforest, CG0751 North Pacific Western Hemlock - Sitka Spruce - Western Red Cedar Rainforest.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00013	*Tsuga heterophylla – Thuja plicata – Pseudotsuga menziesii / Polystichum munitum – Blechnum spicant*	23	High	November 2005	BC	D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	D. Meidinger, K. Iverson, C. Cadrin and K. Baldwin	English
CNVC00029	*Tsuga heterophylla – Thuja plicata – Chamaecyparis nootkatensis / Coptis aspleniifolia / Rhytidiadelphus loreus*	154	High	November 2005	BC	K. Klinka, J. Pojar, D. Meidinger	No factsheet	n/a
CNVC00037	*Tsuga heterophylla – Thuja plicata – Picea sitchensis / Rhytidiadelphus loreus*	330	High	November 2005	BC	K. Klinka, J. Pojar, D. M	No factsheet	n/a
CNVC00038	*Tsuga heterophylla – Thuja plicata – Pseudotsuga menziesii / Vaccinium alaskaense / Gymnocarpium dryopteris – Clintonia uniflora*	3	High	November 2005	BC	K. Klinka, J. Pojar, D. Meidinger	No factsheet	n/a
CNVC00041	*Tsuga heterophylla – Thuja plicata / Gaultheria shallon / Blechnum spicant*	373	High	November 2005	BC	D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	No factsheet	n/a
CNVC00046	*Thuja plicata – Pseudotsuga menziesii – Tsuga heterophylla / Oplopanax horridus / Polystichum munitum / Plagiomnium insigne*	15	High	November 2005	BC	K. Klinka, J. Pojar, D. Meidinger	D. Meidinger, A. Inselberg, and K. Baldwin	English
CNVC00055	*Thuja plicata (Abies grandis) / Polystichum munitum – Achlys triphylla*	38	High	November 2005	BC	D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	No factsheet	n/a

A2 Table 1c. Associations of M024 Vancouverian Coastal Rainforest, CM024c Northern Vancouverian Rainforest, CG0750 North Pacific Maritime Western Hemlock - Sitka Spruce Rainforest.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00003	*Picea sitchensis – Tsuga heterophylla / Oplopanax horridus – Rubus spectabilis / Gymnocarpium dryopteris*	110	High	November 2005	BC	D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	D. Meidinger, K. Iverson, C. Cadrin and K. Baldwin	English
CNVC00012	*Tsuga heterophylla / Hylocomium splendens – Pleurozium schreberi (Rhytidiadelphus triquetrus)*	18	High	November 2005	BC	D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	D. Meidinger, K. Iverson, C. Cadrin and K. Baldwin	English
CNVC00016	*Picea sitchensis / Gaultheria shallon / Maianthemum dilatatum*	29	High	November 2005	BC	D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	D. Meidinger, K. Iverson, C. Cadrin and K. Baldwin	English
CNVC00003	*Picea sitchensis – Tsuga heterophylla / Oplopanax horridus – Rubus spectabilis / Gymnocarpium dryopteris*	110	High	November 2005	BC	D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	D. Meidinger, K. Iverson, C. Cadrin and K. Baldwin	English
CNVC00012	*Tsuga heterophylla / Hylocomium splendens – Pleurozium schreberi (Rhytidiadelphus triquetrus)*	18	High	November 2005	BC	D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	D. Meidinger, K. Iverson, C. Cadrin and K. Baldwin	English
CNVC00016	*Picea sitchensis / Gaultheria shallon / Maianthemum dilatatum*	29	High	November 2005	BC	D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	D. Meidinger, K. Iverson, C. Cadrin and K. Baldwin	English
CNVC00017	*Picea sitchensis – Tsuga heterophylla / Rubus spectabilis / Maianthemum dilatatum*	8	High	November 2005	BC	D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	D. Meidinger, K. Iverson, C. Cadrin and K. Baldwin	English

A2 Table 1c (cont'd). Associations of M024 Vancouverian Coastal Rainforest, CM024c Northern Vancouverian Rainforest, CG0750 North Pacific Maritime Western Hemlock - Sitka Spruce Rainforest.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00018	*Picea sitchensis / Trisetum cernuum*	33	High	November 2005	BC	D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	D. Meidinger, K. Iverson, C. Cadrin and K. Baldwin	English
CNVC00024	*Picea sitchensis / Rubus spectabilis – Malus fusca / Carex obnupta*	11	High	November 2005	BC	K. Klinka, J. Pojar, D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	D. Meidinger, K. Iverson, C. Cadrin and K. Baldwin	English
CNVC00025	*Picea sitchensis – Tsuga heterophylla / Eurhynchium oreganum*	7	High	November 2005	BC	D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	D. Meidinger, K. Iverson, C. Cadrin and K. Baldwin	English
CNVC00026	*Tsuga heterophylla – Picea sitchensis / Rhytidiadelphus loreus – Hylocomium splendens*	36	High	November 2005	BC	D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	No factsheet	n/a
CNVC00042	*Picea sitchensis – Tsuga heterophylla / Blechnum spicant / Rhizomnium glabrescens*	23	High	November 2005	BC	K. Klinka, J. Pojar, D. Meidinger	No factsheet	n/a
CNVC00052	*Tsuga heterophylla / Vaccinium alaskaense / Dryopteris expansa*	47	High	November 2005	BC	K. Klinka, J. Pojar, D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	No factsheet	n/a
CNVC00053	*Tsuga heterophylla / Vaccinium alaskaense / Hylocomium splendens*	11	High	November 2005	BC	K. Klinka, J. Pojar, D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	A. Inselberg, D. Meidinger, and K. Baldwin	English

A2 Table 1c (cont'd). Associations of M024 Vancouverian Coastal Rainforest, CM024c Northern Vancouverian Rainforest, CG0750 North Pacific Maritime Western Hemlock - Sitka Spruce Rainforest.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00054	*Tsuga heterophylla – Picea sitchensis / Vaccinium alaskaense / Dryopteris expansa*	16	High	November 2005	BC	K. Klinka, J. Pojar, D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	No factsheet	n/a
CNVC00056	*Tsuga heterophylla – Picea sitchensis / Oplopanax horridus / Athyrium filix-femina*	42	High	November 2005	BC	K. Klinka, J. Pojar, D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	No factsheet	n/a
CNVC00056	*Tsuga heterophylla – Picea sitchensis / Oplopanax horridus / Athyrium filix-femina*	42	High	November 2005	BC	K. Klinka, J. Pojar, D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	No factsheet	n/a
CNVC00057	*Picea sitchensis / Gaultheria shallon / Polystichum munitum*	24	High	November 2005	BC	K. Klinka, J. Pojar, D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	A. Inselberg, D. Meidinger, and K. Baldwin	English
CNVC00058	*Tsuga heterophylla – Picea sitchensis / Polystichum munitum*	51	High	November 2005	BC	K. Klinka, J. Pojar, D. Meidinger	No factsheet	n/a
CNVC00065	*Malus fusca / Maianthemum dilatatum / Rhytidiadelphus squarrosus*	5	High	November 2005	BC	W. MacKenzie, J. Moran	No factsheet	n/a
CNVC00189	*Tsuga heterophylla - Picea sitchensis / Blechnum spicant - Tiarella trifoliata*	59	High	November 2005	BC	D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	No factsheet	n/a

A2 Table 2a. Associations of M025 Vancouverian Subalpine - High Montane Forest, CM025a Typic Vancouverian High Montane & Subalpine Forest, CG0245 North Pacific Mountain Hemlock - Pacific Silver Fir Forest & Tree Island.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00011	*Tsuga mertensiana – Chamaecyparis nootkatensis / Vaccinium alaskaense / Coptis aspleniifolia*	8	High	November 2005	BC	D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	D. Meidinger, A. Inselberg, C. Cadrin and K. Baldwin	English
CNVC00020	*Pinus contorta var. contorta – Chamaecyparis nootkatensis / Racomitrium spp.*	19	High	November 2005	BC	D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	D. Meidinger, A. Inselberg, C. Cadrin and K. Baldwin	English
CNVC00022	*Chamaecyparis nootkatensis – Tsuga mertensiana / Calamagrostis nutkaensis*	6	High	November 2005	BC	D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	D. Meidinger, A. Inselberg, C. Cadrin and K. Baldwin	English
CNVC00047	*Tsuga mertensiana – Abies amabilis (Abies lasiocarpa) / Vaccinium ovalifolium / Gymnocarpium dryopteris*	10	High	November 2005	BC	K. Klinka, J. Pojar, D. Meidinger	No factsheet	n/a
CNVC00048	*Abies amabilis – Tsuga mertensiana / Streptopus lanceolatus*	29	High	November 2005	BC	K. Klinka, J. Pojar, D. Meidinger	No factsheet	n/a
CNVC00049	*Tsuga mertensiana – Abies amabilis / Vaccinium alaskaense / Rubus pedatus / Rhytidiopsis robusta*	156	High	November 2005	BC	K. Klinka, J. Pojar, D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	No factsheet	n/a
CNVC00050	*Tsuga mertensiana / Elliottia pyroliflora / Nephrophyllidium crista-galli*	3	High	November 2005	BC	D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	No factsheet	n/a

A2 Table 2a (cont'd). Associations of M025 Vancouverian Subalpine - High Montane Forest, CM025a Typic Vancouverian High Montane & Subalpine Forest, CG0245 North Pacific Mountain Hemlock - Pacific Silver Fir Forest & Tree Island.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00051	*Tsuga mertensiana – Abies amabilis (Chamaecyparis nootkatensis) / Elliottia pyroliflora – Vaccinium membranaceum*	22	High	November 2005	BC	D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	No factsheet	n/a
CNVC00133	*Abies lasiocarpa (Tsuga mertensiana) / Gymnocarpium dryopteris – Valeriana sitchensis*	n/a	n/a	n/a	BC	n/a	No factsheet	n/a
CNVC00141	*Abies lasiocarpa - Tsuga mertensiana / Vaccinium membranaceum / Streptopus roseus*	n/a	n/a	n/a	BC	n/a	No factsheet	n/a

A2 Table 2b. Associations of M025 Vancouverian Subalpine - High Montane Forest, CM025b Hypermaritime Vancouverian High Montane & Subalpine Forest.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00004	*Tsuga mertensiana – Picea sitchensis (Chamaecyparis nootkatensis) / Vaccinium alaskaense – V. parvifolium / Rhytidiadelphus loreus – Scapania bolanderi*	32	High	November 2005	BC	D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	No factsheet	n/a
CNVC00032	*Chamaecyparis nootkatensis – Tsuga mertensiana (Picea sitchensis) / Veratrum viride – Nephrophyllidium crista-galli*	3	High	November 2005	BC	K. Klinka, J. Pojar, D. Meidinger	No factsheet	n/a
CNVC00033	*Tsuga mertensiana – Picea sitchensis (Chamaecyparis nootkatensis) / Calamagrostis nutkaensis – Veratrum viride*	20	High	November 2005	BC	K. Klinka, J. Pojar, D. Meidinger	No factsheet	n/a

A2 Table 3. Associations of M035 Vancouverian Flooded & Swamp Forest.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00023	*Populus trichocarpa – Picea sitchensis – Acer macrophyllum / Oplopanax horridus – Rubus spectabilis / Maianthemum dilatatum*	9	High	November 2005	BC	D. Meidinger, C. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, T. DeMeo	D. Meidinger, K. Iverson, C. Cadrin and K. Baldwin	English
CNVC00059	*Thuja plicata – Alnus rubra – Tsuga heterophylla / Rubus spectabilis / Lysichiton americanus*	35	High	November 2005	BC	W. MacKenzie, J. Moran	No factsheet	n/a
CNVC00060	*Tsuga heterophylla – Picea sitchensis / Vaccinium ovalifolium – V. alaskaense / Lysichiton americanus*	22	High	November 2005	BC	D. Meidinger, C. Chappell, C. Cadrin, and G. Kittel	No factsheet	n/a
CNVC00061	*Chamaecyparis nootkatensis – Tsuga mertensiana – Tsuga heterophylla / Vaccinium ovalifolium – V. alaskaense / Lysichiton americanus*	28	High	November 2005	BC	W. MacKenzie, J. Moran	No factsheet	n/a
CNVC00062	*Tsuga heterophylla – Thuja plicata / Lysichiton americanus*	162	High	November 2005	BC	W. MacKenzie, J. Moran	No factsheet	n/a
CNVC00064	*Alnus rubra / Rubus spectabilis / Lysichiton americanus*	3	High	November 2005	BC	W. MacKenzie, J. Moran	No factsheet	n/a
CNVC00066	*Alnus rubra / Rubus spectabilis – Ribes bracteosum*	18	High	November 2005	BC	W. MacKenzie, J. Moran	No factsheet	n/a
CNVC00067	*Chamaecyparis nootkatensis – Pinus contorta* var. *contorta / Trichophorum caespitosum*	43	High	November 2005	BC	W. MacKenzie, J. Moran	No factsheet	n/a
CNVC00068	*Pinus contorta* var. *contorta / Empetrum nigrum / Sphagnum* spp.	13	High	November 2005	BC	W. MacKenzie, J. Moran	No factsheet	n/a
CNVC00069	*Populus trichocarpa – Alnus rubra / Rubus spectabilis – Cornus stolonifera*	80	High	November 2005	BC	W. MacKenzie, J. Moran	No factsheet	n/a

A2 Table 3 (cont'd). Associations of M035 Vancouverian Flooded & Swamp Forest.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00072	*Salix sitchensis / Equisetum arvense*	9	High	November 2005	BC	W. MacKenzie, J. Moran	No factsheet	n/a
CNVC00073	*Salix lucida – S. sitchensis – Rubus spectabilis / Oenanthe sarmentosa – Lysichiton americanus*	6	High	November 2005	BC	W. MacKenzie, J. Moran	No factsheet	n/a

A2 Table 4. Associations of M075 Western North American Montane-Subalpine-Boreal Marsh, Wet Meadow & Shrubland.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00336	*Alnus incana – Salix bebbiana / Calamagrostis canadensis*	9	High	March 2012	(AB), BC	K. Baldwin, K. Chapman, W. Mackenzie, D. Meidinger	No factsheet	n/a
CNVC00131	*Alnus incana / Equisetum arvense*	19	High	March 2012	(AB), BC	L. Allen, J. Archibald, K. Baldwin, K. Chapman, N. Flynn, W. Mackenzie, D. Meidinger	No factsheet	n/a
CNVC00185	*Salix lucida – Cornus stolonifera / Equisetum pratense*	5	High	March 2012	(AB), BC	L. Allen, J. Archibald, K. Baldwin, K. Chapman, N. Flynn, W. Mackenzie, D. Meidinger	No factsheet	n/a

A2 Table 5a. Associations of M156 Alaskan-Yukon North American Boreal Forest & Woodland, CM156a Low Montane Alaskan-Yukon Boreal Forest.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00354	*Picea glauca / Arctostaphylos uva-ursi / Cladina* spp.	26	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00356	*Pinus contorta – Picea mariana (P. glauca) / Vaccinium vitis-idaea / Cladina* spp.	24	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00360	*Pinus contorta / Calamagrostis purpurascens*	14	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a

A2 Table 5a (cont'd). Associations of M156 Alaskan-Yukon North American Boreal Forest & Woodland, CM156a Low Montane Alaskan-Yukon Boreal Forest.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00361	*Pinus contorta / Poaceae – Arctostaphylos uva-ursi*	14	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00362	*Pinus contorta – Picea glauca / Vaccinium vitis-idaea / Hylocomium splendens*	42	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00363	*Pinus contorta – Picea glauca / Festuca altaica – Arctostaphylos uva-ursi*	14	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00364	*Pinus contorta – Picea glauca / Calamagrostis purpurascens*	11	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00365	*Pinus contorta – Picea glauca / Arctostaphylos uva-ursi / Cladina* spp.	58	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00369	*Picea glauca / Poaceae – Arctostaphylos uva-ursi*	10	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00370	*Picea glauca / Hylocomium splendens*	166	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00371	*Picea glauca / Rhododendron groenlandicum / Vaccinium vitis-idaea – Empetrum nigrum / Hylocomium splendens*	19	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00372	*Picea glauca / Rhododendron groenlandicum – Arctous rubra / Hylocomium splendens*	6	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00373	*Picea glauca / Equisetum arvense – E. pratense – Arctous rubra / Hylocomium splendens*	26	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00382	*Picea glauca / Salix* spp. */ Empetrum nigrum – Arctous rubra / Hylocomium splendens*	39	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a

A2 Table 5a (cont'd). Associations of M156 Alaskan-Yukon North American Boreal Forest & Woodland, CM156a Low Montane Alaskan-Yukon Boreal Forest.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00383	*Picea glauca / Salix* spp. – *Betula glandulosa / Arctous rubra / Hylocomium splendens*	37	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00384	*Pinus contorta / Shepherdia canadensis*	14	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00385	*Populus tremuloides / Arctostaphylos uva-ursi*	27	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00386	*Populus tremuloides / Poaceae – Arctostaphylos uva-ursi*	53	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00387	*Populus tremuloides / Rosa acicularis / Chamerion angustifolium*	35	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00388	*Populus tremuloides – P. balsamifera / Festuca saximontana – Lupinus kuschei*	4	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00390	*Populus tremuloides / Salix* spp. / *Calamagrostis purpurascens / Gemmabryum caespiticium*	26	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00399	*Populus tremuloides – Pinus contorta (Picea glauca) / Poaceae – Arctostaphylos uva-ursi*	15	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00400	*Populus tremuloides – Pinus contorta (Picea glauca) / Vaccinium vitis-idaea – Geocaulon lividum / Hylocomium splendens*	20	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00401	*Populus tremuloides – Pinus contorta (Picea glauca) / Arctostaphylos uva-ursi / Cladina* spp.	10	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a

A2 Table 5a (cont'd). Associations of M156 Alaskan-Yukon North American Boreal Forest & Woodland, CM156a Low Montane Alaskan-Yukon Boreal Forest.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00402	*Populus tremuloides – Pinus contorta – Picea glauca / Alnus viridis / Vaccinium vitis-idaea /* Feathermoss	21	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00403	*Populus tremuloides – Picea glauca (P. mariana) / Rhododendron groenlandicum / Geocaulon lividum*	18	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00404	*Populus tremuloides – Picea glauca / Arctostaphylos uva-ursi*	31	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00405	*Populus tremuloides – Picea glauca / Calamagrostis purpurascens – Arctostaphylos uva-ursi*	60	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00406	*Populus tremuloides – Picea glauca / Shepherdia canadensis / Mertensia paniculata*	41	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00407	*Populus tremuloides – Picea glauca / Chamerion angustifolium – Linnaea borealis – Arctostaphylos uva-ursi*	52	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00408	*Picea mariana – P. glauca – Betula neoalaskana / Rosa acicularis / Mertensia paniculata / Hylocomium splendens*	9	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00409	*Picea mariana – P. glauca – Betula neoalaskana / Alnus* spp. */ Equisetum* spp. */ Hylocomium splendens*	6	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00410	*Picea glauca – Betula neoalaskana / Alnus viridis / Hylocomium splendens*	8	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00411	*Picea glauca – Betula neoalaskana / Rhododendron groenlandicum / Hylocomium splendens*	20	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a

A2 Table 5a (cont'd). Associations of M156 Alaskan-Yukon North American Boreal Forest & Woodland, CM156a Low Montane Alaskan-Yukon Boreal Forest.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00416	*Betula neoalaskana / Rosa acicularis – Alnus viridis*	7	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00421	*Betula neoalaskana / Ribes* spp. / *Equisetum* spp. / *Hylocomium splendens*	3	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00436	*Picea mariana – P. glauca / Vaccinium vitis-idaea / Hylocomium splendens*	14	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00437	*Picea mariana / Rhododendron groenlandicum / Vaccinium vitis-idaea / Cladina* spp.	14	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00438	*Picea mariana – P. glauca / Rhododendron groenlandicum / Vaccinium vitis-idaea / Hylocomium splendens*	10	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00439	*Picea mariana – P. glauca / Arctous rubra – Vaccinium vitis-idaea / Hylocomium splendens*	15	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a

A2 Table 5b. Associations of M156 Alaskan-Yukon North American Boreal Forest & Woodland, CM156b High Montane Alaskan-Yukon Boreal Woodland.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00108	*Picea glauca / Betula glandulosa / Hylocomium splendens*	76	High	March 2017	BC, YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00357	*Pinus contorta / Betula glandulosa / Empetrum nigrum / Cladina* spp.	9	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00358	*Pinus contorta / Betula glandulosa / Pleurozium schreberi*	3	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00359	*Pinus contorta / Betula glandulosa / Festuca altaica*	9	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00366	*Picea glauca / Betula glandulosa / Empetrum nigrum / Cladina* spp.	16	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00367	*Picea glauca / Salix* spp. / *Arctagrostis latifolia / Pleurozium schreberi*	6	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00368	*Picea glauca / Betula glandulosa – Salix glauca / Festuca altaica*	7	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00389	*Populus tremuloides / Betula glandulosa / Festuca altaica*	8	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00391	*Populus tremuloides – Abies lasiocarpa – Pinus contorta / Betula glandulosa – Juniperus communis / Arctostaphylos uva-ursi*	4	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00392	*Populus tremuloides – Picea glauca / Betula glandulosa / Empetrum nigrum / Cladina* spp.	8	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00393	*Picea mariana – Betula neoalaskana / Vaccinium vitis-idaea / Hylocomium splendens*	6	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a

A2 Table 5b (cont'd). Associations of M156 Alaskan-Yukon North American Boreal Forest & Woodland, CM156b High Montane Alaskan-Yukon Boreal Woodland.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00394	*Picea mariana – Picea glauca – Betula neoalaskana / Salix* spp. – *Rhododendron groenlandicum / Vaccinium vitis-idaea /* Feathermoss – *Cladina* spp.	4	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00396	*Picea glauca – Betula occidentalis / B. glandulosa / Juniperus communis / Artemisia norvegica*	3	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00397	*Picea glauca – Betula occidentalis / Vaccinium uliginosum / Empetrum nigrum / Hylocomium splendens*	5	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00412	*Populus balsamifera / Juniperus communis / Mertensia paniculata – Festuca altaica*	6	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00419	*Picea mariana - Betula neoalaskana / Alnus viridis – Rhododendron groenlandicum / Hylocomium splendens – Sphagnum* spp.	10	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00426	*Abies lasiocarpa / Betula glandulosa / Empetrum nigrum / Cladina* spp.	39	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00427	*Abies lasiocarpa / Betula glandulosa / Cassiope tetragona / Cladina* spp.	14	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00428	*Abies lasiocarpa – Pinus contorta – Picea glauca / Betula glandulosa / Empetrum nigrum / Cladina* spp.	14	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00429	*Abies lasiocarpa– Picea glauca – Pinus contorta / Juniperus communis – Salix* spp. */ Arctostaphylos uva-ursi*	7	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00430	*Abies lasiocarpa – Picea glauca / Betula glandulosa / Empetrum nigrum / Cladina* spp.	6	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a

A2 Table 5b (cont'd). Associations of M156 Alaskan-Yukon North American Boreal Forest & Woodland, CM156b High Montane Alaskan-Yukon Boreal Woodland.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00431	*Abies lasiocarpa - Picea mariana / Betula glandulosa / Cladina* spp.	7	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00432	*Abies lasiocarpa (Picea glauca – Pinus contorta) / Betula glandulosa / Empetrum nigrum / Hylocomium splendens*	20	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00433	*Abies lasiocarpa (Picea glauca) / Betula glandulosa / Empetrum nigrum / Hylocomium splendens*	18	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00434	*Abies lasiocarpa / Juniperus communis / Empetrum nigrum / Pleurozium schreberi*	3	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00435	*Abies lasiocarpa / Empetrum nigrum / Hylocomium splendens*	26	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00441	*Abies lasiocarpa / Empetrum nigrum / Cassiope tetragona / Hylocomium splendens - Nephroma arcticum*	19	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00442	*Abies lasiocarpa – Picea glauca / Empetrum nigrum / Hylocomium splendens*	12	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00443	*Picea mariana – Abies lasiocarpa / Rhododendron groenlandicum / Hylocomium splendens - Cladina* spp.	8	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00444	*Abies lasiocarpa – Picea glauca / Alnus spp. / Hylocomium splendens*	8	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00446	*Abies lasiocarpa / Salix* spp. / *Aconitum delphiniifolium – Artemisia norvegica*	12	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a

A2 Table 5b (cont'd). Associations of M156 Alaskan-Yukon North American Boreal Forest & Woodland, CM156b High Montane Alaskan-Yukon Boreal Woodland.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00447	*Abies lasiocarpa / Ribes triste / Hylocomium splendens*	11	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00448	*Abies lasiocarpa – Picea glauca / Equisetum* spp. *– Mertensia paniculata / Hylocomium splendens*	3	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00449	*Abies lasiocarpa – Picea glauca / Salix* spp. */ Petasites frigidus / Hylocomium splendens*	3	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00450	*Abies lasiocarpa / Empetrum nigrum – Cassiope tetragona / Hylocomium splendens*	6	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00451	*Abies lasiocarpa / Pleurozium schreberi*	12	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00452	*Abies lasiocarpa / Betula glandulosa / Empetrum nigrum / Feathermoss* krummholtz	12	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00453	*Abies lasiocarpa – Salix* spp. */ Rubus arcticus – Polemonium acutiflorum / Hylocomium splendens*	4	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00454	*Abies lasiocarpa / Salix* spp. *- Betula glandulosa / Empetrum nigrum - Petasites frigidus / Aulacomnium palustre*	5	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00455	*Abies lasiocarpa / Spiraea stevenii / Rubus chamaemorus / Hylocomium splendens – Nephroma arcticum – Sphagnum* spp.	11	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00456	*Abies lasiocarpa – Picea glauca / Betula glandulosa / Rubus chamaemorus / Sphagnum* spp. *– Nephroma arcticum*	5	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a

A2 Table 5b (cont'd). Associations of M156 Alaskan-Yukon North American Boreal Forest & Woodland, CM156b High Montane Alaskan-Yukon Boreal Woodland.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00457	*Picea mariana / Betula glandulosa (Vaccinium uliginosum) / V. vitis-idaea / Hylocomium splendens*	20	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00459	*Picea mariana / Rhododendron groenlandicum / Empetrum nigrum / Hylocomium splendens – Sphagnum* spp.	21	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a

A2 Table 6. Associations of M179 North American Boreal Woodland.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00200	*Pinus banksiana / Saxifraga tricuspidata*	6	Medium	November 2011	SK	K. Baldwin, K. Chapman, M. McLaughlan	No factsheet	=TS1 in McLaughlan et al. 2010
CNVC00206	*Picea mariana / Betula glandulosa / Cladina* spp.	152	High	March 2012	NL, QC	K. Baldwin, K. Chapman, M. Major, B. Meades, C. Morneau	No factsheet	n/a
CNVC00254	*Picea glauca / Empetrum nigrum*	9	High	November 2011	SK	K. Baldwin, K. Chapman, M. McLaughlan	No factsheet	=BS12 in McLaughlan et al. 2010
CNVC00257	*Picea mariana / Vaccinium vitis-idaea / Pleurozium schreberi (Cladina* spp.*)*	57	Medium	November 2011	SK	K. Baldwin, K. Chapman, M. McLaughlan	No factsheet	=TS4 in McLaughlan et al. 2010
CNVC00258	*Pinus banksiana – Picea mariana / Vaccinium vitis-idaea*	19	Medium	November 2011	SK	K. Baldwin, K. Chapman, M. McLaughlan	No factsheet	=TS2 in McLaughlan et al. 2010
CNVC00259	*Picea mariana – Betula papyrifera / Vaccinium vitis-idaea*	10	Medium	November 2011	SK	K. Baldwin, K. Chapman, M. McLaughlan	No factsheet	=TS7 in McLaughlan et al. 2010
CNVC00266	*Betula papyrifera / Alnus incana (Viburnum edule)*	2	Medium	November 2011	SK	K. Baldwin, K. Chapman, M. McLaughlan	No factsheet	=TS8 in McLaughlan et al. 2010

A2 Table 6 (cont'd). Associations of M179 North American Boreal Woodland.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00267	Populus tremuloides / Rosa acicularis (Shepherdia canadensis)	5	Medium	November 2011	SK	K. Baldwin, K. Chapman, M. McLaughlan	No factsheet	=TS5 in McLaughlan et al. 2010
CNVC00318	*Picea mariana / Rhododendron groenlandicum / Empetrum nigrum / Pleurozium schreberi (Cladina* spp.*)*	20	High	February 2012	NL, QC	K. Baldwin, K. Chapman, M. Major, B. Meades, C. Morneau	No factsheet	n/a
CNVC00321	*Picea mariana / Empetrum nigrum / Pleurozium schreberi (Nephroma arcticum)*	2	Medium	March 2011	NL	K. Baldwin, K. Chapman, B. Meades	No factsheet	n/a
CNVC00329	*Betula papyrifera / Rhododendron groenlandicum / Vaccinium vitis-idaea / Cladina* spp.	13	Medium	November 2011	SK	K. Baldwin, K. Chapman, M. McLaughlan	No factsheet	=TS3 in McLaughlan et al. 2010
CNVC00374	*Picea glauca / Dasiphora fruticosa / Arctostaphylos uva-ursi – Rhododendron lapponicum – Dryas integrifolia*	39	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00375	*Picea glauca / Dryas integrifolia – D. octopetala - Arctous alpina*	3	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00376	*Picea glauca / Vaccinium uliginosum / Dryas integrifolia – Rhododendron lapponicum*	59	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00377	*Picea glauca / Alnus viridis – Vaccinium uliginosum / Dryas integrifolia – Rhododendron lapponicum*	11	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00378	*Picea glauca / Equisetum palustre – Salix reticulata – Arctous alpina – Carex bigelowii*	9	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00379	*Picea glauca / Equisetum arvense – Arctous rubra*	26	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a

A2 Table 6 (cont'd). Associations of M179 North American Boreal Woodland.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00380	*Picea glauca / Vaccinium uliginosum / Dryas integrifolia – Rhododendron lapponicum – Carex* spp.	19	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00381	*Picea glauca / Rhododendron tomentosum / Empetrum nigrum – Arctous rubra / Sphagnum* spp.	5	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00395	*Picea glauca – Betula occidentalis / B. glandulosa / Empetrum nigrum / Cladina* spp.	12	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00415	*Populus balsamifera / Salix* spp. – *Shepherdia canadensis / Hedysarum alpinum*	22	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00417	*Betula neoalaskana / Alnus viridis – Rhododendron tomentosum*	4	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00418	*Picea glauca – Populus balsamifera / Salix* spp. */ Equisetum* spp.	9	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00424	*Picea glauca – Populus balsamifera / Shepherdia canadensis / Arctous rubra – Hedysarum alpinum*	10	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00425	*Populus balsamifera / Alnus incana / Equisetum* spp.	6	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00458	*Picea mariana / Rhododendron groenlandicum - Vaccinium uliginosum / Cladina* spp.	17	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00460	*Picea mariana / Alnus viridis – Rhododendron tomentosum / Sphagnum* spp. – *Cladina* spp.	20	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a

A2 Table 7ai. Associations of M299 North American Boreal Conifer Poor Swamp, CG0016 Atlantic Boreal Black Spruce – Balsam Fir Poor – Intermediate Treed Wetland, CA00040 *Picea mariana* (*Abies balsamea*) / *Kalmia angustifolia* / *Sphagnum capillifolium*.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00335	*Picea mariana / Kalmia angustifolia / Pleurozium schreberi – Sphagnum capillifolium*	12	High	May 2012	NL	K. Baldwin, K. Chapman, B. Meades	B. Meades, K. Chapman and K. Baldwin	English
CNVC00339	*Picea mariana – Kalmia angustifolia – Ilex mucronata / Sphagnum* spp. – *Cladina* spp. – *Pleurozium schreberi*	9	High	May 2012	NL, NS	K. Baldwin, S. Basquill, K. Chapman, B. Meades	B. Meades, K. Chapman, K. Baldwin and S. Basquill	English

A2 Table 7aii. Associations of M299 North American Boreal Conifer Poor Swamp, CG0016 Atlantic Boreal Black Spruce – Balsam Fir Poor – Intermediate Treed Wetland, CA00041 *Abies balsamea – Picea mariana / Osmundastrum cinnamomeum – Carex trisperma / Sphagnum* spp.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00312	*Picea mariana – Abies balsamea / Osmundastrum cinnamomeum – Carex trisperma / Sphagnum* spp.	22	High	February 2014	NL	K. Baldwin, K. Chapman, B. Meades	B. Meades, K. Chapman and K. Baldwin	English
CNVC00334	*Abies balsamea / Osmundastrum cinnamomeum – Carex trisperma / Sphagnum* spp.	13	High	February 2012	NL, NS	K. Baldwin, S. Basquill, K. Chapman, B. Meades	B. Meades, K. Chapman, S. Basquill and K. Baldwin	English

A2 Table 7bi. Associations of M299 North American Boreal Conifer Poor Swamp, CG0019 Ontario-Quebec Boreal Black Spruce Poor – Intermediate Treed Wetland, CA00043 *Picea mariana / Chamaedaphne calyculata – Vaccinium angustifolium / Sphagnum fuscum*.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00283	*Picea mariana / Chamaedaphne calyculata – Vaccinium angustifolium / Sphagnum* spp.	163	High	December 2012	MB, ON, QC	K. Baldwin, K. Chapman, M. Major, C. Morneau, P. Uhlig, M. Wester	K. Baldwin and K. Chapman	English and French

A2 Table 7bii. Associations of M299 North American Boreal Conifer Poor Swamp, CG0019 Ontario-Quebec Boreal Black Spruce Poor – Intermediate Treed Wetland, CA00044 *Picea mariana / Rhododendron groenlandicum – Vaccinium angustifolium / Sphagnum* spp.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00282	*Picea mariana / Rhododendron groenlandicum – Kalmia angustifolia / Sphagnum* spp.	930	High	December 2012	MB, ON, QC	K. Baldwin, K. Chapman, M. Major, C. Morneau, P. Uhlig, M. Wester	K. Baldwin and K. Chapman	English and French
CNVC00288	*Picea mariana – Larix laricina / Rhododendron groenlandicum / Gaultheria hispidula / Sphagnum* spp.	72	High	November 2011	MB, ON, QC	K. Baldwin, K. Chapman, M. Major, C. Morneau, P. Uhlig, M. Wester	K. Baldwin and K. Chapman	English and French

A2 Table 7biii. Associations of M299 North American Boreal Conifer Poor Swamp, CG0019 Ontario-Quebec Boreal Black Spruce Poor – Intermediate Treed Wetland, CA00045 *Picea mariana / Alnus incana – Rhododendron groenlandicum / Sphagnum* spp.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00298	*Picea mariana / Alnus incana / Gaultheria hispidula / Sphagnum* spp.	534	High	November 2011	MB, ON, QC	K. Baldwin, K. Chapman, C. Morneau, P. Uhlig, M. Wester	K. Baldwin and K. Chapman	English and French
CNVC00300	*Larix laricina – Picea mariana / Alnus incana / Gaultheria hispidula / Sphagnum* spp.	61	High	January 2011	QC	K. Baldwin, K. Chapman, C. Morneau	K. Chapman, K. Baldwin and J. -P. Saucier	English and French
CNVC00326	*Larix laricina / Alnus incana / Rubus pubescens*	11	High	November 2011	ON	K. Baldwin, K. Chapman, P. Uhlig, M. Wester	K. Chapman and K. Baldwin	English

A2 Table 7biv. Associations of M299 North American Boreal Conifer Poor Swamp, CG0019 Ontario-Quebec Boreal Black Spruce Poor – Intermediate Treed Wetland, CA00046 *Picea mariana (Abies balsamea) / Carex* spp. */ Sphagnum* spp.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00271	*Picea mariana – Abies balsamea – Betula papyrifera / Rhododendron groenlandicum / Sphagnum* spp.	64	High	January 2011	QC	K. Baldwin, K. Chapman, C. Morneau	No factsheet	n/a
CNVC00290	*Picea mariana (Abies balsamea) / Rhododendron groenlandicum / Sphagnum* spp.	267	High	January 2011	QC	K. Baldwin, K. Chapman, C. Morneau	No factsheet	n/a

A2 Table 7ci. Associations of M299 North American Boreal Conifer Poor Swamp, CG0022 West-Central Boreal Black Spruce – Tamarack Poor – Intermediate Treed Wetland, CA00049 *Picea mariana / Rhododendron groenlandicum / Vaccinium vitis-idaea / Sphagnum* spp.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00112	*Picea mariana / Vaccinium vitis-idaea / Sphagnum* spp.	247	High	March 2012	AB, BC, MB, ON, SK	L. Allen, J. Archibald, K. Baldwin, K. Chapman, W. MacKenzie, M. McLaughlan, D. Meidinger, P. Uhlig, M. Wester	D. Downing, K. Baldwin and K. Chapman	English
CNVC00113	*Picea mariana / Equisetum arvense / Sphagnum* spp. – *Hylocomium splendens*	47	High	March 2012	AB, BC	L. Allen, J. Archibald, K. Baldwin, K. Chapman, W. MacKenzie, D. Meidinger	No factsheet	n/a

A2 Table 7cii. Associations of M299 North American Boreal Conifer Poor Swamp, CG0022 West-Central Boreal Black Spruce – Tamarack Poor – Intermediate Treed Wetland, CA00050 *Picea mariana (Larix laricina) / Vaccinium vitis-idaea – Equisetum* spp.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00114	*Picea mariana / Salix myrtillifolia / Hylocomium splendens – Aulacomnium palustre*	42	High	March 2017	AB, BC, YT	L. Allen, K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, W. MacKenzie, K. McKenna, D. Meidinger	D. Downing, D. Meidinger, K. Chapman and K. Baldwin	English
CNVC00130	*Picea mariana / Equisetum arvense (E. pratense) / Hylocomium splendens*	50	High	March 2013	AB	L. Allen, J. Archibald, K. Baldwin and K. Chapman	D. Downing, K. Chapman and K. Baldwin	English
CNVC00327	*Picea mariana – Larix laricina / Vaccinium vitis-idaea – Mitella nuda*	47	High	November 2011	MB, SK	K. Baldwin, K. Chapman, M. McLaughlan	No factsheet	=BP18 in McLaughlan et al. 2010

A2 Table 7ciii. Associations of M299 North American Boreal Conifer Poor Swamp, CG0022 West-Central Boreal Black Spruce – Tamarack Poor – Intermediate Treed Wetland CA00051 *Picea mariana – Larix laricina / Carex* spp. */ Aulacomnium palustre*.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00116	*Larix laricina – Picea mariana / Betula pumila – B. glandulosa / Tomentypnum nitens*	204	High	March 2017	AB, BC, MB, SK, YT	L. Allen, J. Archibald, K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, W. MacKenzie, K. McKenna, M. McLaughlan, D. Meidinger	K. Baldwin, K. Chapman, D. Downing and D. Meidinger	English

A2 Table 7d. Associations of M299 North American Boreal Conifer Poor Swamp, CG0025 Subarctic Black Spruce Poor – Intermediate Treed Wetland.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00319	*Picea mariana / Chamaedaphne calyculata – Vaccinium uliginosum / Rubus chamaemorus / Sphagnum* spp.	10	High	February 2012	NL, QC	K. Baldwin, K. Chapman, M. Major, B. Meades, C. Morneau	No factsheet	n/a
CNVC00320	*Larix laricina / Alnus incana / Carex trisperma / Sphagnum* spp.	2	Low	February 2012	NL	K. Baldwin, K. Chapman, B. Meades	No factsheet	n/a
CNVC00314	*Picea mariana / Betula glandulosa / Vaccinium vitis-idaea / Sphagnum* spp.	121	Medium	March 2017	SK, YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00355	*Picea glauca / Betula glandulosa / Carex aquatilis*	24	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00440	*Picea mariana / Vaccinium uliginosum / Equisetum* spp. */ Hylocomium splendens*	13	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00445	*Picea mariana – Abies lasiocarpa / Rubus chamaemorus / Pleurozium schreberi – Sphagnum* spp.	25	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00461	*Picea mariana / Carex bigelowii / Sphagnum* spp.	8	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00462	*Picea mariana / Rhododendron tomentosum / Eriophorum vaginatum / Sphagnum* spp.	29	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a

A2 Table 8. Associations of M300 North American Boreal Flooded & Rich Swamp Forest.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00293	*Picea mariana / Sanguisorba canadensis / Rhytidiadelphus triquetrus*	18	High	August 2011	NL	K. Baldwin, K. Chapman, B. Meades	No factsheet	n/a
CNVC00303	*Picea mariana / Carex* spp. / *Rhytidiadelphus triquetrus*	7	High	January 2011	QC	K. Baldwin, K. Chapman, C. Morneau	No factsheet	n/a
CNVC00353	*Picea mariana / Alnus incana / Carex vaginata / Rhytidiadelphus triquetrus*	4	High	February 2014	NL	K. Baldwin, K. Chapman, B. Meades	No factsheet	n/a
CNVC00275	*Betula papyrifera – Abies balsamea – Picea mariana / Alnus incana / Sphagnum* spp.	123	High	January 2011	QC	K. Baldwin, K. Chapman, C. Morneau	No factsheet	n/a
CNVC00299	*Abies balsamea / Alnus incana / Sphagnum* spp.	37	High	January 2011	QC	K. Baldwin, K. Chapman, C. Morneau	No factsheet	n/a
CNVC00077	*Populus balsamifera (Picea glauca) / Alnus incana – Cornus stolonifera*	84	High	March 2017	AB, BC, YT	L. Allen, J. Archibald, K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, W. Mackenzie, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00101	*Picea glauca / Elaeagnus commutata*	2	Low	March 2012	AB	L. Allen, J. Archibald, K. Baldwin, K. Chapman	No factsheet	n/a
CNVC00413	*Picea glauca – Populus balsamifera / Shepherdia canadensis – Geocaulon lividum / Hylocomium splendens*	14	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00414	*Populus balsamifera / Salix* spp. / *Lupinus arcticus – Chamerion angustifolium*	3	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00422	*Picea glauca – Populus balsamifera / Viburnum edule / Equisetum* spp.	11	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a

A2 Table 9ai. Associations of M495 Eastern North American Boreal Forest, CM495a Atlantic Boreal Forest, CG0001 Atlantic Boreal Dry Black Spruce – Sheep Laurel Woodland, CA00001 *Picea mariana / Kalmia angustifolia – Rhododendron canadense / Cladina* spp.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00205	*Picea mariana / Kalmia angustifolia – Rhododendron canadense / Cladina* spp.	11	High	May 2010	NL	K. Baldwin, K. Chapman, B. Meades	B. Meades, K. Chapman and K. Baldwin	English

A2 Table 9aiia. Associations of M495 Eastern North American Boreal Forest, CM495a Atlantic Boreal Forest, CG0002 Atlantic Boreal Mesic-Moist Black Spruce – Balsam Fir – Paper Birch Forest, CA00002 *Picea mariana / Kalmia angustifolia / Pleurozium schreberi*.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00307	*Picea mariana (Abies balsamea) / Kalmia angustifolia / Pleurozium schreberi*	20	High	March 2012	NL	K. Baldwin, K. Chapman, B. Meades	B. Meades, K. Chapman and K. Baldwin	English
CNVC00338	*Picea mariana / Rhododendron canadense – Taxus canadensis / Pleurozium schreberi*	4	High	May 2012	NL	K. Baldwin, K. Chapman, B. Meades	B. Meades, K. Chapman and K. Baldwin	English

A2 Table 9aiib. Associations of M495 Eastern North American Boreal Forest, CM495a Atlantic Boreal Forest, CG0002 Atlantic Boreal Mesic-Moist Black Spruce – Balsam Fir – Paper Birch Forest, CA00003 *Picea mariana – Abies balsamea / Gaultheria hispidula / Pleurozium schreberi*.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00277	*Picea mariana – Abies balsamea / Pleurozium schreberi – Sphagnum* spp.	315	High	January 2011	QC	K. Baldwin, K. Chapman, C. Morneau	K. Chapman, K. Baldwin and J.-P. Saucier	English
CNVC00344	*Picea mariana – Betula papyrifera – Abies balsamea / Pleurozium schreberi*	226	High	December 2012	QC	K. Baldwin, K. Chapman, M. Major, C. Morneau	No factsheet	n/a
CNVC00350	*Picea mariana / Pleurozium schreberi – Hylocomium splendens*	207	High	October 2013	NL, QC	K. Baldwin, K. Chapman, M. Major, B. Meades, C. Morneau	B. Meades, K. Chapman, J.-P. Saucier and K. Baldwin	English and French
CNVC00351	*Picea mariana – Abies balsamea / Pleurozium schreberi (Hylocomium splendens)*	634	High	November 2013	NL, QC	K. Baldwin, K. Chapman, M. Major, B. Meades, C. Morneau	B. Meades, K. Chapman, J.-P. Saucier and K. Baldwin	English and French

A2 Table 9aiiia. Associations of M495 Eastern North American Boreal Forest, CM495a Atlantic Boreal Forest, CG0003 Atlantic Boreal Mesic Balsam Fir – Paper Birch – White Spruce Forest, CA00004 *Abies balsamea / Vaccinium vitis-idaea / Pleurozium schreberi – Bazzania trilobata*.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00226	*Picea glauca (Abies balsamea) / Pleurozium schreberi (Bazzania trilobata)*	19	High	May 2010	NB, NS, PEI	K. Baldwin, S. Basquill, K. Chapman	No factsheet	n/a
CNVC00292	*Picea mariana – Abies balsamea / Vaccinium vitis-idaea / Pleurozium schreberi – Bazzania trilobata*	36	High	January 2011	NS	K. Baldwin, S. Basquill, K. Chapman	No factsheet	n/a
CNVC00309	*Abies balsamea / Vaccinium vitis-idaea / Pleurozium schreberi – Bazzania trilobata*	28	High	August 2013	NL, NS	K. Baldwin, S. Basquill, K. Chapman, B. Meades	B. Meades, K. Chapman, K. Baldwin and S. Basquill	English

A2 Table 9aiiib. Associations of M495 Eastern North American Boreal Forest, CM495a Atlantic Boreal Forest, CG0003 Atlantic Boreal Mesic Balsam Fir – Paper Birch – White Spruce Forest, CA00005 *Abies balsamea* (*Betula papyrifera*) / *Pleurozium schreberi*.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00220	*Abies balsamea (Picea mariana) / Oxalis montana / Pleurozium schreberi*	82	High	May 2010	NB, NS, PEI	K. Baldwin, S. Basquill, K. Chapman	No factsheet	n/a
CNVC00222	*Abies balsamea / Pleurozium schreberi*	1229	High	May 2010	NB, NL, NS, QC	K. Baldwin, S. Basquill, K. Chapman, B. Meades, C. Morneau	B. Meades, K. Chapman, J.-P. Saucier and K. Baldwin	English and French
CNVC00232	*Abies balsamea – Betula papyrifera / Pleurozium schreberi*	164	High	May 2010	QC	K. Baldwin, K. Chapman, C. Morneau	K. Chapman, K. Baldwin and J.-P. Saucier	English and French
CNVC00233	*Abies balsamea – Betula papyrifera / Oxalis montana / Pleurozium schreberi*	312	High	May 2010	NB, NS, QC	K. Baldwin, S. Basquill, K. Chapman, C. Morneau	No factsheet	n/a
CNVC00278	*Abies balsamea / Pleurozium schreberi – Sphagnum* spp.	256	High	February 2013	NL, QC	K. Baldwin, K. Chapman, M. Major, B. Meades, C. Morneau	B. Meades, K. Chapman, K. Baldwin and J.-P. Saucier	English and French

A2 Table 9aiiic. Associations of M495 Eastern North American Boreal Forest, CM495a Atlantic Boreal Forest, CG0003 Atlantic Boreal Mesic Balsam Fir – Paper Birch – White Spruce Forest, CA00006 *Abies balsamea – Picea glauca / Acer spicatum / Oxalis montana*.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00225	*Abies balsamea (Picea glauca) / Acer spicatum / Oxalis montana*	300	High	May 2013	NB, NS, QC	K. Baldwin, S. Basquill, K. Chapman, M. Major, C. Morneau	K. Chapman, K. Baldwin and J.-P. Saucier	English and French

A2 Table 9aiiid. Associations of M495 Eastern North American Boreal Forest, CM495a Atlantic Boreal Forest, CG0003 Atlantic Boreal Mesic Balsam Fir – Paper Birch – White Spruce Forest, CA00007 *Abies balsamea (Betula papyrifera – B. alleghaniensis) / Dryopteris carthusiana*.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00310	*Abies balsamea / Dryopteris* spp. / *Hylocomiastrum umbratum*	35	High	February 2012	NB, NL, NS	K. Baldwin, K. Chapman, B. Meades, S. Basquill	B. Meades, K. Chapman and K. Baldwin	English
CNVC00311	*Abies balsamea (Betula alleghaniensis) / Dryopteris carthusiana*	13	High	February 2012	NL	K. Baldwin, K. Chapman, B. Meades	B. Meades, K. Chapman and K. Baldwin	English
CNVC00315	*Betula papyrifera – B. alleghaniensis / Dryopteris carthusiana*	6	High	February 2012	NL	K. Baldwin, K. Chapman, B. Meades	B. Meades, K. Chapman and K. Baldwin	English

A2 Table 9aiv. Associations of M495 Eastern North American Boreal Forest, CM495a Atlantic Boreal Forest, CG0004 Atlantic Boreal Moist Balsam Fir – White Spruce – Paper Birch Forest, CA00008 *Abies balsamea – Betula papyrifera / Rubus pubescens*.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00316	*Betula papyrifera / Alnus viridis / Solidago macrophylla*	3	High	August 2011	NL	K. Baldwin, K. Chapman, B. Meades	B. Meades, K. Chapman and K. Baldwin	English
CNVC00348	*Abies balsamea / Taxus canadensis / Rubus pubescens / Dicranum majus*	24	High	December 2013	NL	K. Baldwin, K. Chapman, B. Meades	B. Meades, K. Chapman and K. Baldwin	English
CNVC00349	*Betula papyrifera (Populus tremuloides) / Dryopteris carthusiana – Rubus pubescens*	10	High	May 2013	NL	K. Baldwin, K. Chapman, B. Meades	B. Meades, K. Chapman and K. Baldwin	English

A2 Table 9bi. Associations of M495 Eastern North American Boreal Forest, CM495b Ontario-Quebec Boreal Forest Ontario-Quebec Boreal Forest, CG0005 Ontario-Quebec Boreal Dry-Mesic Black Spruce – Jack Pine Forest, CA00009 *Pinus banksiana (Picea mariana) / Vaccinium angustifolium / Cladina* spp.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00201	*Pinus banksiana (Picea mariana) / Kalmia angustifolium (Rhododendron groenlandicum) / Cladina* spp.	171	High	May 2010	ON, QC	K. Baldwin, K. Chapman, C. Morneau, P. Uhlig, M. Wester	K. Chapman, K. Baldwin and J.-P. Saucier	English and French
CNVC00245	*Pinus banksiana / Vaccinium angustifolium / Cladina* spp.	31	High	November 2011	MB, ON	K. Baldwin, K. Chapman, P. Uhlig, M. Wester	K. Chapman and K. Baldwin	English

A2 Table 9bii. Associations of M495 Eastern North American Boreal Forest, CM495b Ontario-Quebec Boreal Forest Ontario-Quebec Boreal Forest, CG0005 Ontario-Quebec Boreal Dry-Mesic Black Spruce – Jack Pine Forest, CA00010 *Picea mariana / Vaccinium angustifolium / Cladina* spp.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00204	*Picea mariana / Rhododendron groenlandicum – Kalmia angustifolium / Cladina* spp.	158	High	May 2010	QC	K. Baldwin, K. Chapman, C. Morneau	K. Chapman, K. Baldwin and J.-P. Saucier	English
CNVC00246	*Picea mariana / Rhododendron groenlandicum – Vaccinium angustifolium / Cladina* spp.	12	High	November 2011	ON	K. Baldwin, K. Chapman, P. Uhlig, M. Wester	K. Chapman and K. Baldwin	English

A2 Table 9biiia. Associations of M495 Eastern North American Boreal Forest, CM495b Ontario-Quebec Boreal Forest Ontario-Quebec Boreal Forest, CG0006 Ontario-Quebec Boreal Mesic-Moist Black Spruce (Jack Pine) Forest, CA00011 *Betula papyrifera / Vaccinium angustifolium / Pleurozium schreberi*.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00237	*Betula papyrifera / Vaccinium angustifolium – Kalmia angustifolia / Pleurozium schreberi*	157	High	January 2011	NL, QC	K. Baldwin, K. Chapman, B. Meades, C. Morneau	B. Meades, K. Chapman, J.-P. Saucier and K. Baldwin	English and French
CNVC00269	*Betula papyrifera / Vaccinium angustifolium / Pleurozium schreberi*	3	Medium	January 2011	ON	K. Baldwin, K. Chapman, P. Uhlig, M. Wester	No factsheet	n/a

A2 Table 9biiib. Associations of M495 Eastern North American Boreal Forest, CM495b Ontario-Quebec Boreal Forest Ontario-Quebec Boreal Forest, CG0006 Ontario-Quebec Boreal Mesic-Moist Black Spruce (Jack Pine) Forest, CA00012 *Picea mariana (Pinus banksiana) / Vaccinium angustifolium / Pleurozium schreberi*.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00207	*Pinus banksiana (Picea mariana) / Vaccinium angustifolium / Pleurozium schreberi*	266	High	November 2011	MB, ON	K. Baldwin, K. Chapman, P. Uhlig, M. Wester	K. Baldwin and K. Chapman	English
CNVC00208	*Picea mariana – Pinus banksiana / Vaccinium angustifolium / Pleurozium schreberi*	744	High	November 2011	MB, ON	K. Baldwin, K. Chapman, P. Uhlig, M. Wester	K. Baldwin and K. Chapman	English
CNVC00209	*Pinus banksiana – Picea mariana / Kalmia angustifolia / Pleurozium schreberi*	853	High	February 2012	ON, QC	K. Baldwin, K. Chapman, M. Major, C. Morneau, P. Uhlig, M. Wester	K. Chapman, K. Baldwin and J.-P. Saucier	English and French
CNVC00211	*Picea mariana / Rhododendron groenlandicum – Kalmia angustifolia / Pleurozium schreberi*	2118	High	Oct. 2013	ON, QC	K. Baldwin, K. Chapman, M. Major, C. Morneau, P. Uhlig, M. Wester	K. Chapman, K. Baldwin and J.-P. Saucier	English and French
CNVC00214	*Picea mariana – Betula papyrifera / Kalmia angustifolia / Pleurozium schreberi*	282	High	May 2010	QC	K. Baldwin, K. Chapman, C. Morneau	K. Chapman, K. Baldwin and J.-P. Saucier	English and French
CNVC00217	*Picea mariana – Abies balsamea / Rhododendron groenlandicum / Pleurozium schreberi*	249	High	Nov. 2013	MB, ON, QC	K. Baldwin, K. Chapman, M. Major, C. Morneau, P. Uhlig, M. Wester	K. Chapman, K. Baldwin and J.-P. Saucier	English and French

A2 Table 9biiib (cont.). Associations of M495 Eastern North American Boreal Forest, CM495b Ontario-Quebec Boreal Forest Ontario-Quebec Boreal Forest, CG0006 Ontario-Quebec Boreal Mesic-Moist Black Spruce (Jack Pine) Forest, CA00012 *Picea mariana* (*Pinus banksiana*) / *Vaccinium angustifolium* / *Pleurozium schreberi*.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00276	*Picea mariana / Rhododendron groenlandicum – Vaccinium angustifolium / Pleurozium schreberi (Sphagnum* spp.*)*	823	High	Nov. 2011	MB, ON, QC	K. Baldwin, K. Chapman, C. Morneau, P. Uhlig, M. Wester	K. Chapman, K. Baldwin and J.-P. Saucier	English and French

A2 Table 9biiic. Associations of M495 Eastern North American Boreal Forest, CM495b Ontario-Quebec Boreal Forest Ontario-Quebec Boreal Forest, CG0006 Ontario-Quebec Boreal Mesic-Moist Black Spruce (Jack Pine) Forest, CA00013 *Betula papyrifera – Picea mariana – Abies balsamea / Pleurozium schreberi – Sphagnum* spp.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00270	*Betula papyrifera – Picea mariana – Abies balsamea / Pleurozium schreberi – Sphagnum* spp.	142	High	December 2012	ON, QC	K. Baldwin, K. Chapman, M. Major, C. Morneau, P. Uhlig, M. Wester	K. Chapman, K. Baldwin and J.-P. Saucier	English and French

A2 Table 9biva. Associations of M495 Eastern North American Boreal Forest, CM495b Ontario-Quebec Boreal Forest Ontario-Quebec Boreal Forest, CG0007 Ontario-Quebec Boreal Mesic Paper Birch – Balsam Fir – Trembling Aspen Forest, CA00014 *Betula papyrifera – Populus tremuloides – Abies balsamea / Clintonia borealis*.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00213	*Populus tremuloides – Betula papyrifera – Picea mariana – Pinus banksiana / Diervilla lonicera / Pleurozium schreberi*	387	High	November 2011	MB, ON, QC	K. Baldwin, K. Chapman, C. Morneau, P. Uhlig, M. Wester	K. Chapman, K. Baldwin and J.-P. Saucier	English and French
CNVC00218	*Pinus banksiana – Abies balsamea – Betula papyrifera / Diervilla lonicera / Pleurozium schreberi*	20	Medium	May 2010	QC	K. Baldwin, K. Chapman, C. Morneau	No factsheet	n/a
CNVC00231	*Abies balsamea – Betula papyrifera – Populus tremuloides / Clintonia borealis*	805	High	February 2012	MB, ON, QC	K. Baldwin, K. Chapman, M. Major, C. Morneau, P. Uhlig, M. Wester	K. Chapman, K. Baldwin and J.-P. Saucier	English and French
CNVC00234	*Picea mariana – Betula papyrifera – Abies balsamea / Clintonia borealis*	309	High	February 2014	ON, QC	K. Baldwin, K. Chapman, M. Major, C. Morneau, P. Uhlig, M. Wester	K. Chapman, K. Baldwin and J.-P. Saucier	English and French
CNVC00238	*Populus tremuloides (Betula papyrifera) / Diervilla lonicera*	259	High	August 2011	MB, ON, QC	K. Baldwin, K. Chapman, C. Morneau, P. Uhlig, M. Wester	K. Chapman, K. Baldwin and J.-P. Saucier	English and French

A2 Table 9bivb. Associations of M495 Eastern North American Boreal Forest, CM495b Ontario-Quebec Boreal Forest Ontario-Quebec Boreal Forest, CG0007 Ontario-Quebec Boreal Mesic Paper Birch – Balsam Fir – Trembling Aspen Forest, CA00015 *Betula papyrifera – Populus tremuloides – Abies balsamea / Acer spicatum*.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00215	*Betula papyrifera – Populus tremuloides – Pinus banksiana / Acer spicatum / Clintonia borealis*	83	High	March 2013	MB, ON, QC	K. Baldwin, K. Chapman, M. Major, C. Morneau, P. Uhlig, M. Wester	K. Chapman, K. Baldwin and J.-P. Saucier	English and French
CNVC00216	*Picea mariana – Betula papyrifera (Abies balsamea) / Acer spicatum*	151	High	May 2010	QC	K. Baldwin, K. Chapman, C. Morneau	K. Chapman, K. Baldwin and J.-P. Saucier	English and French
CNVC00235	*Abies balsamea – Betula papyrifera / Acer spicatum*	1040	High	Feb. 2012	MB, ON, QC	K. Baldwin, K. Chapman, M. Major, C. Morneau, P. Uhlig, M. Wester	K. Chapman, K. Baldwin and J.-P. Saucier	English and French
CNVC00239	*Betula papyrifera (Populus tremuloides) / Acer spicatum / Clintonia borealis*	1478	High	May 2013	MB, ON, QC	K. Baldwin, K. Chapman, M. Major, C. Morneau, P. Uhlig, M. Wester	K. Chapman, K. Baldwin and J.-P. Saucier	English and French
CNVC00256	*Picea glauca – Abies balsamea / Streptopus lanceolatus / Pleurozium schreberi*	82	High	Nov. 2011	MB, ON	K. Baldwin, K. Chapman, P. Uhlig, M. Wester	K. Chapman and K. Baldwin	English

A2 Table 9bva. Associations of M495 Eastern North American Boreal Forest, CM495b Ontario-Quebec Boreal Forest Ontario-Quebec Boreal Forest, CG0008 Ontario-Quebec Boreal Moist Black Spruce – Trembling Aspen – Balsam Fir – Paper Birch Forest, CA00016 *Picea mariana / Alnus incana – Rhododendron groenlandicum / Pleurozium schreberi*.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00294	*Pinus banksiana – Picea mariana / Alnus incana / Pleurozium schreberi*	47	High	January 2011	QC	K. Baldwin, K. Chapman, C. Morneau	No factsheet	n/a
CNVC00295	*Picea mariana / Alnus incana / Pleurozium schreberi*	196	High	November 2011	MB, ON, QC	K. Baldwin, K. Chapman, C. Morneau, P. Uhlig, M. Wester	K. Chapman, K. Baldwin and J.-P. Saucier	English and French

A2 Table 9bvb. Associations of M495 Eastern North American Boreal Forest, CM495b Ontario-Quebec Boreal Forest Ontario-Quebec Boreal Forest, CG0008 Ontario-Quebec Boreal Moist Black Spruce – Trembling Aspen – Balsam Fir – Paper Birch Forest, CA00017 *Populus tremuloides / Alnus incana / Eurybia macrophylla*.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00241	*Populus tremuloides (P. balsamifera) / Alnus incana / Eurybia macrophylla*	305	High	February 2014	MB, ON, QC	K. Baldwin, K. Chapman, M. Major, C. Morneau, P. Uhlig, M. Wester	K. Chapman, K. Baldwin and J.-P. Saucier	English and French
CNVC00272	*Populus tremuloides – Picea mariana / Alnus incana*	171	High	January 2014	MB, ON, QC	K. Baldwin, K. Chapman, M. Major, C. Morneau, P. Uhlig, M. Wester	K. Chapman and K. Baldwin	English and French

A2 Table 9bvc. Associations of M495 Eastern North American Boreal Forest, CM495b Ontario-Quebec Boreal Forest Ontario-Quebec Boreal Forest, CG0008 Ontario-Quebec Boreal Moist Black Spruce – Trembling Aspen – Balsam Fir – Paper Birch Forest, CA00018 *Betula papyrifera – Abies balsamea / Alnus incana*.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00242	*Betula papyrifera / Alnus incana*	93	High	January 2011	QC	K. Baldwin, K. Chapman, C. Morneau	K. Chapman, K. Baldwin and J.-P. Saucier	English and French
CNVC00273	*Populus tremuloides – Betula papyrifera – Abies balsamea / Alnus incana*	23	High	January 2011	QC	K. Baldwin, K. Chapman, C. Morneau	No factsheet	n/a
CNVC00274	*Betula papyrifera – Abies balsamea / Alnus incana*	119	High	January 2011	QC	K. Baldwin, K. Chapman, C. Morneau	K. Chapman, K. Baldwin and J.-P. Saucier	English and French
CNVC00296	*Picea mariana – Abies balsamea / Alnus incana*	56	High	December 2013	ON, QC	K. Baldwin, K. Chapman, M. Major, C. Morneau, P. Uhlig, M. Wester	K. Chapman and K. Baldwin	English and French
CNVC00297	*Abies balsamea / Alnus incana*	19	High	December 2013	QC	K. Baldwin, K. Chapman, M. Major, C. Morneau	No factsheet	n/a

A2 Table 10ai. Associations of M496 West-Central North American Boreal Forest, CM496a Central Boreal Forest, CG0009 Central Boreal Dry Jack Pine Forest, CA00019 *Pinus banksiana / Vaccinium myrtilloides / V. vitis-idaea / Cladina* spp.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00127	*Pinus banksiana / Vaccinium myrtilloides / Arctostaphylos uva-ursi / Cladina* spp.	272	High	November 2011	AB, MB, ON, SK	L. Allen, K. Baldwin, K. Chapman, M. McLaughlan, P. Uhlig, M. Wester	K. Chapman, D. Downing and K. Baldwin	English
CNVC00244	*Picea mariana – Pinus banksiana / Vaccinium myrtilloides / V. vitis-idaea / Cladina* spp.	33	High	November 2011	MB, ON, SK	K. Baldwin, K. Chapman, M. McLaughlan, P. Uhlig, M. Wester	K. Chapman and K. Baldwin	English

A2 Table 10aiia. Associations of M496 West-Central North American Boreal Forest, CM496a Central Boreal Forest, CG0010 Central Boreal Mesic-Moist Black Spruce – Jack Pine Forest, CA00020 *Populus tremuloides – Betula papyrifera – Pinus banksiana (Picea mariana) / Vaccinium myrtilloides / V. vitis-idaea*.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00125	*Populus tremuloides – Pinus banksiana / Vaccinium myrtilloides / V. vitis-idaea*	194	High	November 2011	AB, MB, ON, SK	L. Allen, K. Baldwin, K. Chapman, M. McLaughlan, P. Uhlig, M. Wester	K. Chapman, D. Downing and K. Baldwin	English
CNVC00243	*Betula papyrifera / Rhododendron groenlandicum / Vaccinium vitis-idaea*	32	High	November 2011	MB, SK	K. Baldwin, K. Chapman, M. McLaughlan	No factsheet	=BS14 in McLaughlan et al. 2010
CNVC00253	*Betula papyrifera – Picea mariana – Populus tremuloides / Alnus viridis / Vaccinium vitis-idaea*	35	High	November 2011	MB, SK	K. Baldwin, K. Chapman, M. McLaughlan	No factsheet	=BS13 in McLaughlan et al. 2010
CNVC00346	*Betula papyrifera / Picea mariana – Abies balsamea / Vaccinium myrtilloides*	9	High	March 2013	ON	K. Baldwin, K. Chapman, P. Uhlig, M. Wester	No factsheet	n/a

A2 Table 10aiib. Associations of M496 West-Central North American Boreal Forest, CM496a Central Boreal Forest, CG0010 Central Boreal Mesic-Moist Black Spruce – Jack Pine Forest, CA00021 *Picea mariana – Pinus banksiana / Vaccinium myrtilloides / V. vitis-idaea / Pleurozium schreberi*.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00128	*Picea mariana / Vaccinium vitis-idaea / Pleurozium schreberi (Hylocomium splendens)*	103	High	November 2011	AB, MB, SK	L. Allen, K. Baldwin, K. Chapman, M. McLaughlan	K. Baldwin and K. Chapman	English
CNVC00248	*Pinus banksiana (Picea mariana) / Vaccinium myrtilloides / Pleurozium schreberi*	268	High	November 2011	MB, ON, SK	K. Baldwin, K. Chapman, M. McLaughlan, P. Uhlig, M. Wester	K. Baldwin and K. Chapman	English
CNVC00249	*Picea mariana (Pinus banksiana) / Vaccinium myrtilloides / Pleurozium schreberi*	309	High	November 2011	AB, MB, ON, SK	L. Allen, K. Baldwin, K. Chapman, M. McLaughlan, P. Uhlig, M. Wester	K. Baldwin and K. Chapman	English
CNVC00252	*Picea mariana – Betula papyrifera – Pinus banksiana / Vaccinium myrtilloides / Pleurozium schreberi*	72	High	March 2013	MB, ON	K. Baldwin, K. Chapman, P. Uhlig, M. Wester	No factsheet	n/a
CNVC00323	*Pinus banksiana – Picea mariana / Vaccinium vitis-idaea / Pleurozium schreberi (Hylocomium splendens)*	95	High	November 2011	AB, MB, SK	L. Allen, K. Baldwin, K. Chapman, M. McLaughlan	K. Baldwin and K. Chapman	English

A2 Table 10aiiia. Associations of M496 West-Central North American Boreal Forest, CM496a Central Boreal Forest, CG0011 Central Boreal Mesic-Moist Trembling Aspen – White Spruce Forest, CA00022 *Populus tremuloides / Vaccinium myrtilloides / V. vitis-idaea*.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00088	*Populus tremuloides / Vaccinium myrtilloides / V. vitis-idaea*	71	High	November 2011	AB, MB, SK	L. Allen, K. Baldwin, K. Chapman, M. McLaughlan	K. Chapman and K. Baldwin	English
CNVC00265	*Populus tremuloides / Amelanchier alnifolia / Poaceae*	17	High	November 2011	MB, SK	K. Baldwin, K. Chapman, M. McLaughlan	No factsheet	=BP5 in McLaughlan et al. 2010

A2 Table 10aiiib. Associations of M496 West-Central North American Boreal Forest, CM496a Central Boreal Forest, CG0011 Central Boreal Mesic-Moist Trembling Aspen – White Spruce Forest, CA00023 *Picea glauca – Populus tremuloides / Vaccinium myrtilloides / V. vitis-idaea*.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00090	*Populus tremuloides – Picea glauca / Vaccinium myrtilloides / V. vitis-idaea*	14	High	November 2011	AB	L. Allen, J. Archibald, K. Baldwin, K. Chapman	No factsheet	n/a
CNVC00126	*Picea glauca – Pinus banksiana / Vaccinium myrtilloides / Arctostaphylos uva-ursi*	8	High	November 2011	AB	L. Allen, K. Baldwin, K. Chapman	No factsheet	n/a

A2 Table 10aiiic. Associations of M496 West-Central North American Boreal Forest, CM496a Central Boreal Forest, CG0011 Central Boreal Mesic-Moist Trembling Aspen – White Spruce Forest, CA00024 *Populus tremuloides / Rosa acicularis / Aralia nudicaulis*.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00305	*Populus tremuloides / Alnus viridis (Rosa acicularis)*	42	High	November 2011	MB, ON	K. Baldwin, K. Chapman, P. Uhlig, M. Wester	K. Chapman and K. Baldwin	English
CNVC00306	*Populus tremuloides – Betula papyrifera / Acer spicatum (Rosa acicularis)*	12	Medium	November 2011	MB, SK	K. Baldwin, K. Chapman, P. Uhlig, M. Wester	No factsheet	n/a
CNVC00347	*Populus tremuloides – Picea mariana – Pinus banksiana / Acer spicatum (Rosa acicularis)*	5	High	March 2013	MB, ON	K. Baldwin, K. Chapman, P. Uhlig, M. Wester	No factsheet	n/a

A2 Table 10aiiid. Associations of M496 West-Central North American Boreal Forest, CM496a Central Boreal Forest, CG0011 Central Boreal Mesic-Moist Trembling Aspen – White Spruce Forest, CA00025 *Picea glauca – Abies balsamea – Populus tremuloides / Rosa acicularis / Aralia nudicaulis*.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00093	*Picea glauca – Abies balsamea – Betula papyrifera – Populus tremuloides / Rosa acicularis / Aralia nudicaulis*	55	High	September 2011	AB, MB, SK	L. Allen, K. Baldwin, K. Chapman, M. McLaughlan	K. Chapman and K. Baldwin	English
CNVC00103	*Picea glauca – Abies balsamea / Rosa acicularis / Aralia nudicaulis*	97	High	November 2011	AB, MB, ON, SK	L. Allen, K. Baldwin, K. Chapman, M. McLaughlan, P. Uhlig, M. Wester	K. Chapman, D. Downing and K. Baldwin	English
CNVC00261	*Populus tremuloides – Picea glauca – Picea mariana / Shepherdia canadensis*	19	High	November 2011	AB	L. Allen, K. Baldwin, K. Chapman	No factsheet	n/a
CNVC00263	*Picea glauca – Populus tremuloides / Rosa acicularis / Aralia nudicaulis*	111	High	November. 2011	AB, MB, SK	L. Allen, K. Baldwin, K. Chapman, M. McLaughlan	K. Chapman, D. Downing and K. Baldwin	English

A2 Table 10aiiie. Associations of M496 West-Central North American Boreal Forest, CM496a Central Boreal Forest, CG0011 Central Boreal Mesic-Moist Trembling Aspen – White Spruce Forest, CA00026 *Populus tremuloides – P. balsamifera / Alnus incana – Cornus stolonifera*.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00333	*Populus tremuloides – P. balsamifera / Alnus incana – Cornus stolonifera*	8	High	February 2012	MB, ON	K. Baldwin, K. Chapman, P. Uhlig, M. Wester	K. Chapman and K. Baldwin	English

A2 Table 10aiiif. Associations of M496 West-Central North American Boreal Forest, CM496a Central Boreal Forest, CG0011 Central Boreal Mesic-Moist Trembling Aspen – White Spruce Forest, CA00053 *Acer negundo – Populus balsamifera (Ulmus americana)*.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00086	*Acer negundo – Populus balsamifera / Matteuccia struthiopteris*	38	High	November 2011	MB, SK	K. Baldwin, K. Chapman, M. McLaughlan	K. Baldwin, K. Chapman, M. McLaughlan	No factsheet

A2 Table 10bia. Associations of M496 West-Central North American Boreal Forest, CM496b Cordilleran Boreal Forest, CG0012 Cordilleran Boreal Dry Lodgepole Pine Forest, CA00027 *Pinus contorta / Arctostaphylos uva-ursi / Cladina* spp.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00118	*Pinus contorta / Vaccinium vitis-idaea – Arctostaphylos uva-ursi / Cladina* spp.	186	High	March 2017	AB, BC, YT	L. Allen, J. Archibald, K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, W. Mackenzie, K. McKenna, D. Meidinger	D. Downing, K. Baldwin, K. Chapman and D. Meidinger	English

A2 Table 10bib. Associations of M496 West-Central North American Boreal Forest, CM496b Cordilleran Boreal Forest, CG0012 Cordilleran Boreal Dry Lodgepole Pine Forest, CA00028 *Populus tremuloides / Shepherdia canadensis / Arctostaphylos uva-ursi*.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00089	*Populus tremuloides (Picea glauca) / Shepherdia canadensis / Arctostaphylos uva-ursi*	6	High	November 2015	BC	K. Baldwin, K. Chapman, W. MacKenzie, D. Meidinger	No factsheet	n/a
CNVC00330	*Populus tremuloides / Shepherdia canadensis / Arctostaphylos uva-ursi*	59	High	March 2017	BC, YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a

A2 Table 10biiia. Associations of M496 West-Central North American Boreal Forest, CM496b Cordilleran Boreal Forest, CG0013 Cordilleran Boreal Mesic-Moist Black Spruce – Lodgepole Pine Forest, CA00029 *Populus tremuloides / Vaccinium vitis-idaea / Hylocomium splendens*.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00268	*Populus tremuloides / Rhododendron groenlandicum / Vaccinium vitis-idaea / Hylocomium splendens*	28	Medium	March 2017	BC, YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, W. Mackenzie, K. McKenna, D. Meidinger	No factsheet	n/a

A2 Table 10biiib. Associations of M496 West-Central North American Boreal Forest, CM496b Cordilleran Boreal Forest, CG0013 Cordilleran Boreal Mesic-Moist Black Spruce – Lodgepole Pine Forest, CA00030 *Pinus contorta – Picea mariana / Vaccinium vitis-idaea / Pleurozium schreberi*.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00092	*Populus tremuloides – Pinus contorta / Rhododendron groenlandicum / Leymus innovatus – Vaccinium vitis-idaea / Hylocomium splendens*	26	High	March 2012	AB	L. Allen, J. Archibald, K. Baldwin, K. Chapman	D. Downing, K. Chapman and K. Baldwin	English
CNVC00111	*Picea mariana – Populus tremuloides – Pinus contorta / Vaccinium vitis-idaea / Hylocomium splendens*	15	High	March 2017	BC, YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00120	*Pinus contorta – Picea mariana / Vaccinium vitis-idaea / Pleurozium schreberi*	903	High	March 2017	AB, BC, YT	L. Allen, J. Archibald, K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, W. Mackenzie, K. McKenna, D. Meidinger	K. Chapman, K. Baldwin, D. Downing and D. Meidinger	English
CNVC00322	*Pinus contorta – Picea mariana / Vaccinium membranaceum / Pleurozium schreberi*	79	High	March 2012	AB, BC	L. Allen, K. Baldwin, K. Chapman, W. MacKenzie, D. Meidinger	No factsheet	n/a

A2 Table 10biiic. Associations of M496 West-Central North American Boreal Forest, CM496b Cordilleran Boreal Forest, CG0013 Cordilleran Boreal Mesic-Moist Black Spruce – Lodgepole Pine Forest, CA00031 *Picea glauca – P. mariana / Mertensia paniculata / Hylocomium splendens*.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00110	*Picea mariana – P. glauca / Mertensia paniculata / Hylocomium splendens*	40	High	March 2017	AB, BC, YT	L. Allen, J. Archibald, K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, W. MacKenzie, K. McKenna, D. Meidinger	D. Downing, K. Baldwin and K. Chapman	English

A2 Table 10biva. Associations of M496 West-Central North American Boreal Forest, CM496b Cordilleran Boreal Forest, CG0014 Cordilleran Boreal Mesic Trembling Aspen – White Spruce Forest, CA00032 *Populus tremuloides (Picea glauca) / Shepherdia canadensis / Leymus innovatus*.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00087	*Populus tremuloides / Leymus innovatus*	103	High	March 2012	AB, BC	L. Allen, J. Archibald, K. Baldwin, K. Chapman, W. MacKenzie, D. Meidinger	D. Downing, K. Chapman and K. Baldwin	English
CNVC00091	*Populus tremuloides – Picea glauca – Pinus contorta / Leymus innovatus*	40	High	November 2015	AB, BC	L. Allen, J. Archibald, K. Baldwin, K. Chapman, W. MacKenzie, D. Meidinger	K. Chapman, D. Downing and K. Baldwin	English

A2 Table 10bivb. Associations of M496 West-Central North American Boreal Forest, CM496b Cordilleran Boreal Forest, CG0014 Cordilleran Boreal Mesic Trembling Aspen – White Spruce Forest, CA00033 *Pinus contorta – Picea glauca / Shepherdia canadensis / Leymus innovatus*.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00104	*Picea glauca (Pinus contorta) / Shepherdia canadensis / Leymus innovatus / Hylocomium splendens*	60	High	March 2012	AB, BC	L. Allen, J. Archibald, K. Baldwin, K. Chapman, W. MacKenzie, D. Meidinger	D. Downing, K. Baldwin and K. Chapman	English
CNVC00119	*Pinus contorta (Picea glauca) / Shepherdia canadensis / Geocaulon lividum / Pleurozium schreberi*	43	High	March 2017	BC, YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, W. MacKenzie, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00121	*Pinus contorta / Shepherdia canadensis / Leymus innovatus*	81	High	March 2012	AB, BC	L. Allen, J. Archibald, K. Baldwin, K. Chapman, W. MacKenzie, D. Meidinger	D. Downing, K. Baldwin, K. Chapman and D. Meidinger	English
CNVC00337	*Picea glauca (Pinus contorta) / Arctostaphylos uva-ursi – Leymus innovatus*	19	Medium	March 2012	AB	L. Allen, K. Baldwin, K. Chapman	No factsheet	n/a

A2 Table 10bivc. Associations of M496 West-Central North American Boreal Forest, CM496b Cordilleran Boreal Forest, CG0014 Cordilleran Boreal Mesic Trembling Aspen – White Spruce Forest, CA00034 *Populus tremuloides (Picea glauca) / Rosa acicularis – Viburnum edule*.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00094	*Populus tremuloides / Rosa acicularis – Viburnum edule*	1053	High	March 2017	AB, BC, MB, SK, YT	L. Allen, J. Archibald, K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, W. MacKenzie, K. McKenna, M. McLaughlan, D. Meidinger	K. Chapman, K. Baldwin and D. Downing	English
CNVC00095	*Populus tremuloides – Picea glauca / Rosa acicularis – Viburnum edule*	480	High	March 2017	AB, BC, YT	L. Allen, J. Archibald, K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, W. MacKenzie, K. McKenna, D. Meidinger	K. Chapman, K. Baldwin and D. Downing	English

A2 Table 10bivd. Associations of M496 West-Central North American Boreal Forest, CM496b Cordilleran Boreal Forest, CG0014 Cordilleran Boreal Mesic Trembling Aspen – White Spruce Forest, CA00035 *Picea glauca – Pinus contorta / Hylocomium splendens*.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00102	*Picea glauca / Rosa acicularis / Hylocomium splendens*	487	High	March 2017	AB, BC, YT	L. Allen, J. Archibald, K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, W. MacKenzie, K. McKenna, D. Meidinger	K. Chapman, K. Baldwin, D. Downing and D. Meidinger	English
CNVC00105	*Abies lasiocarpa – Picea glauca – Pinus contorta / Hylocomium splendens*	36	High	November 2015	AB, BC	L. Allen, J. Archibald, K. Baldwin, K. Chapman, W. MacKenzie, D. Meidinger	No factsheet	n/a
CNVC00106	*Abies lasiocarpa – Picea glauca / Vaccinium membranaceum / Hylocomium splendens*	48	High	March 2017	AB, BC, YT	L. Allen, J. Archibald, K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, W. MacKenzie, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00107	*Pinus contorta / Alnus viridis / Arnica cordifolia / Pleurozium schreberi*	80	High	March 2012	AB, BC	L. Allen, K. Baldwin, K. Chapman, W. MacKenzie, D. Meidinger	D. Downing, K. Chapman, K. Baldwin and D. Meidinger	English
CNVC00122	*Pinus contorta / Viburnum edule – Rosa acicularis / Hylocomium splendens*	60	High	January. 2013	AB, BC	L. Allen, J. Archibald, K. Baldwin, K. Chapman	D. Downing, K. Baldwin and K. Chapman	English

A2 Table 10va. Associations of M496 West-Central North American Boreal Forest, CM496b Cordilleran Boreal Forest, CG0015 Cordilleran Boreal Moist White Spruce – Trembling Aspen (Balsam Poplar) Forest, CA00036 *Populus balsamifera – P. tremuloides / Equisetum arvense – E. pratens*e.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00078	*Populus balsamifera – P. tremuloides / Equisetum arvense – E. pratense*	50	High	March 2017	AB, BC, YT	L. Allen, J. Archibald, K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, W. MacKenzie, K. McKenna, D. Meidinger	D. Downing, K. Chapman, K. Baldwin and D. Meidinger	English

A2 Table 10vb. Associations of M496 West-Central North American Boreal Forest, CM496b Cordilleran Boreal Forest, CG0015 Cordilleran Boreal Moist White Spruce – Trembling Aspen (Balsam Poplar) Forest, CA00037 *Picea glauca / Equisetum arvense – E. pratense.*

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00079	*Picea glauca – Betula papyrifera (Populus tremuloides) / Equisetum arvense – E. pratense*	54	High	March 2017	AB, BC, YT	L. Allen, J. Archibald, K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, W. MacKenzie, K. McKenna, D. eidinger	D. Downing, K. Chapman and K. Baldwin	English
CNVC00096	*Picea glauca / Equisetum arvense – E. pratense*	248	High	March 2017	AB, BC, YT	L. Allen, J. Archibald, K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, W. MacKenzie, K. McKenna, D. Meidinger	D. Downing, K. Chapman, K. Baldwin and D. Meidinger	English

A2 Table 10vc. Associations of M496 West-Central North American Boreal Forest, CM496b Cordilleran Boreal Forest, CG0015 Cordilleran Boreal Moist White Spruce – Trembling Aspen (Balsam Poplar) Forest, CA00038 *Populus tremuloides – P. balsamifera / Lonicera involucrata / Mertensia paniculata*.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00080	*Populus tremuloides – P. balsamifera / Lonicera involucrata – Cornus stolonifera / Rubus pubescens*	222	High	November 2011	AB, BC, MB, SK	L. Allen, J. Archibald, K. Baldwin, K. Chapman, W. MacKenzie, M. McLaughlan, D. Meidinger	K. Chapman, K. Baldwin and D. Downing	English
CNVC00081	*Populus tremuloides / Lonicera involucrata / Gymnocarpium dryopteris*	7	Low	March 2012	BC	K. Baldwin, K. Chapman, W. MacKenzie, D. Meidinger	No factsheet	n/a
CNVC00082	*Populus tremuloides / Oplopanax horridus*	4	Low	March 2012	AB	L. Allen, J. Archibald, K. Baldwin, K. Chapman	No factsheet	n/a
CNVC00083	*Picea glauca – Populus tremuloides - P. balsamifera / Lonicera involucrata / Rubus pubescens*	153	High	March 2017	AB, BC, SK, YT	L. Allen, J. Archibald, K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, W. MacKenzie, K. McKenna, M. McLaughlan, D. Meidinger	K. Chapman, K. Baldwin and D. Downing	English

A2 Table 10vd. Associations of M496 West-Central North American Boreal Forest, CM496b Cordilleran Boreal Forest, CG0015 Cordilleran Boreal Moist White Spruce – Trembling Aspen (Balsam Poplar) Forest, CA00039 *Picea glauca – Pinus contorta / Lonicera involucrata / Gymnocarpium dryopteris*.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00084	*Pinus contorta – Populus tremuloides – Populus balsamifera / Gymnocarpium dryopteris*	5	Low	March 2012	AB	L. Allen, J. Archibald, K. Baldwin, K. Chapman	No factsheet	n/a
CNVC00085	*Pinus contorta – Betula papyrifera / Oplopanax horridus*	3	Low	March 2012	AB	L. Allen, J. Archibald, K. Baldwin, K. Chapman	No factsheet	n/a
CNVC00097	*Picea glauca / Lonicera involucrata / Rubus pubescens*	65	High	March 2017	AB, BC, YT	L. Allen, J. Archibald, K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, W. MacKenzie, K. McKenna, D. Meidinger	D. Downing, K. Chapman, K. Baldwin and D. Meidinger	English
CNVC00098	*Picea glauca / Gymnocarpium dryopteris*	11	High	March 2012	AB, BC	L. Allen, J. Archibald, K. Baldwin, K. Chapman, W. MacKenzie, D. Meidinger	No factsheet	n/a
CNVC00099	*Picea glauca / Oplopanax horridus*	21	Medium	March 2017	AB, BC, YT	L. Allen, J. Archibald, K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, W. MacKenzie, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00100	*Abies lasiocarpa – Picea glauca / Gymnocarpium dryopteris*	28	Low	March 2012	AB	L. Allen, J. Archibald, K. Baldwin, K. Chapman	No factsheet	n/a
CNVC00123	*Pinus contorta / Gymnocarpium dryopteris*	78	High	March 2012	AB	L. Allen, J. Archibald, K. Baldwin, K. Chapman	D. Downing, K. Baldwin and K. Chapman	English
CNVC00124	*Pinus contorta / Oplopanax horridus*	8	High	March 2012	AB	L. Allen, J. Archibald, K. Baldwin, K. Chapman	D. Downing, K. Baldwin and K. Chapman	English
CNVC00084	*Pinus contorta – Populus tremuloides – Populus balsamifera / Gymnocarpium dryopteris*	5	Low	March 2012	AB	L. Allen, J. Archibald, K. Baldwin, K. Chapman	No factsheet	n/a

A2 Table 10vd (cont'd). Associations of M496 West-Central North American Boreal Forest, CM496b Cordilleran Boreal Forest, CG0015 Cordilleran Boreal Moist White Spruce – Trembling Aspen (Balsam Poplar) Forest, CA00039 *Picea glauca – Pinus contorta / Lonicera involucrata / Gymnocarpium dryopteris*.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00085	*Pinus contorta – Betula papyrifera / Oplopanax horridus*	3	Low	March 2012	AB	L. Allen, J. Archibald, K. Baldwin, K. Chapman	No factsheet	n/a

A2 Table 11. Associations of CM014 Eastern North American Temperate Hardwood - Conifer Forest.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00345	*Abies balsamea / Alnus incana / Rubus pubescens*	29	Medium	December 2013	QC	K. Baldwin, K. Chapman, M. Major, C. Morneau	No factsheet	n/a

A2 Table 12. Associations of CM744 Acadian Temperate Forest.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00202	*Pinus banksiana / Kalmia angustifolia – Rhododendron canadense / Cladina* spp.	16	High	May 2010	NB, NS	K. Baldwin, S. Basquill, K. Chapman	No factsheet	n/a
CNVC00203	*Pinus banksiana / Gaylussacia baccata / Empetrum nigrum / Cladina rangiferina*	8	High	May 2010	NB, NS	K. Baldwin, S. Basquill, K. Chapman	No factsheet	n/a
CNVC00210	*Pinus banksiana (Picea mariana) / Kalmia angustifolia (Rhododendron canadense) / Pleurozium schreberi*	139	High	May 2010	NB, NS, PEI	K. Baldwin, S. Basquill, K. Chapman	No factsheet	n/a
CNVC00212	*Picea mariana / Rhododendron canadense / Pteridium aquilinum*	92	High	April 2012	NB, NS, PEI	K. Baldwin, S. Basquill, K. Chapman	No factsheet	n/a
CNVC00219	*Picea mariana – Abies balsamea / Ilex mucronata / Pleurozium schreberi*	207	High	Nov. 2013	NB, NS, PEI	K. Baldwin, S. Basquill, K. Chapman	No factsheet	n/a

A2 Table 12 (cont'd). Associations of CM744 Acadian Temperate Forest.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00227	*Picea glauca / Morella pensylvanica / Ammophila breviligulata*	5	High	May 2010	NB, NS, PEI	K. Baldwin, S. Basquill, K. Chapman	No factsheet	n/a
CNVC00228	*Picea glauca / Morella pensylvanica / Osmundastrum cinnamomeum*	6	High	May 2010	PEI	K. Baldwin, S. Basquill, K. Chapman	No factsheet	n/a
CNVC00229	*Picea glauca (Abies balsamea) / Oxalis montana / Pleurozium schreberi*	12	High	May 2010	NB, NS	K. Baldwin, S. Basquill, K. Chapman	No factsheet	n/a
CNVC00230	*Picea glauca (Abies balsamea) / Rubus pubescens – Galium triflorum*	22	High	May 2010	NB, NS	K. Baldwin, S. Basquill, K. Chapman	No factsheet	n/a
CNVC00236	*Populus tremuloides – Picea glauca / Corylus cornuta / Clintonia borealis – Rubus pubescens*	89	High	February 2012	NB, PEI	K. Baldwin, S. Basquill, K. Chapman	No factsheet	n/a
CNVC00240	*Populus tremuloides – Betula papyrifera / Cornus canadensis – Aralia nudicaulis*	39	High	January 2011	NB, PEI	K. Baldwin, S. Basquill, K. Chapman	No factsheet	n/a

A2 Table 13. Unplaced Associations.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00260	*Populus tremuloides – Picea glauca / Symphoricarpos occidentalis*	8	Medium	November 2011	SK	K. Baldwin, K. Chapman, M. McLaughlan	No factsheet	=PR7 in McLaughlan et al. 2010
CNVC00279	*Abies balsamea / Ilex mucronata / Osmundastrum cinnamomeum / Sphagnum* spp.	70	High	August 2013	NB, NS, PEI, QC	K. Baldwin, S. Basquill, K. Chapman, M. Major, C. Morneau	No factsheet	n/a
CNVC00284	*Picea mariana / Rhododendron canadense / Sphagnum* spp.	154	High	June 2012	NB, NS, PEI	K. Baldwin, S. Basquill, K. Chapman	No factsheet	n/a
CNVC00285	*Pinus banksiana – Picea mariana / Rhododendron canadense / Sphagnum* spp.	48	High	January 2011	NB, NS, PEI	K. Baldwin, S. Basquill, K. Chapman	No factsheet	n/a
CNVC00289	*Larix laricina – Picea mariana / Ilex mucronata / Sphagnum* spp.	78	High	January 2014	NB, NS, ON, PEI, QC	K. Baldwin, S. Basquill, K. Chapman, M. Major, C. Morneau, P. Uhlig, M. Wester	No factsheet	n/a
CNVC00291	*Picea mariana / Ilex mucronata / Sphagnum* spp.	337	High	January 2014	NB, NS, ON, PEI, QC	K. Baldwin, S. Basquill, K. Chapman, M. Major, C. Morneau, P. Uhlig, M. Wester	No factsheet	n/a
CNVC00302	*Larix laricina / Alnus incana – Spiraea alba / Rubus pubescens*	22	High	January 2011	NB, NS, PEI	K. Baldwin, S. Basquill, K. Chapman	No factsheet	n/a
CNVC00328	*Populus balsamifera – P. tremuloides – Fraxinus pennsylvanica / Corylus cornuta / Aralia nudicaulis*	4	Medium	November 2011	SK	K. Baldwin, K. Chapman, M. McLaughlan	No factsheet	=PR8 in McLaughlan et al. 2010
CNVC00331	*Populus balsamifera – Fraxinus nigra / Alnus incana / Matteuccia struthiopteris*	19	Medium	February 2012	NB, NL	K. Baldwin, S. Basquill, K. Chapman, B. Meades	No factsheet	n/a

A2 Table 13 (cont'd). Unplaced Associations.

Association		n Plots	Conf.	Concept Date	Province/ Territory	Concept Authors	Factsheet Authors	Factsheet Available
CNVC00398	*Picea glauca – Betula neoalaskana / Vaccinium vitis-idaea – Geocaulon lividum / Hylocomium splendens*	10	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00420	*Betula glandulosa – B. occidentalis – Rhododendron groenlandicum*	3	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a
CNVC00423	*Populus balsamifera – Picea glauca / Alnus viridis – Oplopanax horridus*	5	Medium	March 2017	YT	K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, K. McKenna, D. Meidinger	No factsheet	n/a

Appendix 3. Template for Data Sharing Letter of Agreement

Letter of Agreement

between

Natural Resources Canada, Canadian Forest Service

and

name of provincial / territorial data provider

The Canadian National Vegetation Classification (CNVC) will be a classification of Canadian vegetated ecosystems at the level of the community. It will contain standardized definitions and descriptions and provide a common framework for the exchange of ecological information about Canadian vegetation conditions at regional and national scales. The CNVC will be developed by correlating existing provincial and territorial ecosystem classifications utilizing, wherever possible, original provincial / territorial ecological plot data. The CNVC project is being coordinated by Natural Resources Canada – Canadian Forest Service (NRCan – CFS), with regional components of the work being directed by provincial / territorial governmental and non-governmental partners.

This Letter of Agreement will govern the use of provincial ecological plot data in the development of a CNVC. It will remain in force until ***year/month/day*** and may be renewed by an exchange of letters between representatives of the respective parties.

Terms of the Agreement:

1) The ***name of provincial / territorial database*** is provided to NRCan – CFS for the purpose of developing a CNVC.

2) NRCan – CFS will only use the provincial data for the purposes stated in term 1. Data will not be released by NRCan – CFS to other parties without the agreement of ***name of provincial / territorial data provider***.

3) Provincial / territorial ecological plot data will be employed by NRCan – CFS staff analytically in the development of vegetation types for the CNVC.

4) Provincial / territorial representatives will have the right of review and confirmation of vegetation types for the CNVC.

5) Once confirmed, vegetation types will be described by summaries of ecological attributes derived from the provincial / territorial ecological plot data. These summaries will be contained in successor databases developed by NRCan – CFS.

6) NRCan – CFS is authorized to distribute successor databases containing summaries of vegetation types comprising ecological attributes derived from the provincial / territorial ecological plot data.

7) Successor databases and ensuing publications of NRCan - CFS will be provided to ***name of provincial / territorial data provider*** when completed.

8) Data received from ***name of provincial / territorial data provider*** will be referenced and acknowledged when they are used, either singularly or integrated into larger or successor

databases, as: ***name of provincial / territorial database***.

9) This agreement must be signed and agreed upon, in duplicate, by representatives of NRCan – CFS and ***name of provincial / territorial data provider***.

10) The distribution of these ecological plot data to NRCan – CFS does not constitute data ownership. Proprietary rights to these data will remain with ***name of provincial / territorial data provider***.

11) Notwithstanding any other provision of this Agreement, either party may, by giving the other party thirty (30) days written notice, terminate this Agreement. NRCan – CFS shall immediately upon termination discontinue use of the provided data.

The ***NRCan-CFS contact*** for this agreement is:

The ***name of provincial / territorial data provider*** contact for this agreement is:

These conditions are mutually agreed upon and endorsed by:

_____ _____

name & title - representative NRCan-CFS Date

_____ _____

name & title - representative of province

Appendix 4. Reporting Conventions

INDEX OF APPENDIX 4

Botanical Nomenclature

*The following botanical no*menclature standards are applied to naming species in CNVC type names and factsheets.

Bryophytes

Anderson, L.E., H.A. Crum and W.R. Buck. 1990. List of the mosses of North America north of Mexico. The Bryologist 93: 448-499.

Anderson, L.E. 1990. A checklist of Sphagnum in North America north of Mexico. The Bryologist 93(4): 500-501.

Flora of North America Editorial Committee. 2007+. Flora of North America north of Mexico, vols 27, 28, 29. Oxford University Press, New York and Oxford. Available http://www.mobot.org/plantscience/bfna/BFNAmenu.htm (accessed: November, 2015).

Stotler, R. and B. Crandall-Stotler. 1977. A checklist of the liverworts and hornworts of North America. The Bryologist 80: 405-428.

Lichens

Esslinger, T.L. 2015. A cumulative checklist for the lichen-forming, lichenicolous and allied fungi of the continental United States and Canada. North Dakota State University: http://www.ndsu.edu/pubweb/~esslinge/chcklst/chcklst7.htm. Version 20 19 April 2015. Fargo, North Dakota (accessed: November, 2015).

Vascular Plants

Brouillet, L.; Desmet, P.; Coursol, F.; Meades, S.J.; Favreau, M.; Anions, M.; Bélisle, P.; Gendreau, C.; Shorthouse, D.; and contributors. 2010+. Database of Vascular Plants of Canada (VASCAN). Online at http://data.canadensys.net/vascan and http://www.gbif.org/dataset/3f8a1297-3259-4700-91fc-acc4170b27ce, released on 2010-12-10. GBIF key: 3f8a1297-3259-4700-91fc-acc4170b27ce. Data paper ID: doi: http://doi.org/10.3897/phytokeys.25.3100 [accessed: November, 2015].

Fire Cycle

For CNVC, we have used fire cycle as a metric of fire regime, defined as the time to burn an area equivalent to the study area. Although there have been many studies to determine fire cycle for different areas of Canada, the CNVC has required a consistent approach and national perspective,

so we have used fire cycle calculated from the homogeneous fire regime (HFR) zones of Boulanger et al. (2014). It would have been preferable to determine fire cycle using the Vegetation Zones map (Baldwin et al. 2019) rather than HFR zones, but it had not been completed at the time. We report fire cycles according to the following four classes that are based on timeframes related to forest composition and succession:
Short: <100 years, i.e., shorter than the lifespan of the shade-intolerant species that typically colonize these areas;

Intermediate: 100-270 years, i.e., sufficient time for a second cohort to establish and develop;

Long: 270-500 years, i.e., time for more than two cohorts to establish and develop;

Very long: >500 years, i.e., more than two cohorts can establish and develop and paludification processes may occur even on well-drained sites.

Fire cycle is reported in the Environment section of the Association factsheet (Appendix 8) and in the Vegetation section (dynamics subsection) of the Macrogroup factsheet (Appendix 9). A range of fire cycles (e.g., short to intermediate) is provided where the Association occurs in multiple HFR zones. Additional comments indicate if an Association is expected to have more or less frequent fires than reported for the area in which it occurs, because of particular site conditions.

Climate

For terminology describing the climatic conditions within which CNVC types occur, definitions of the Worldwide Bioclimatic Classification (WBC) System (Sanchez-Mata and Rivas-Martinez 2010; Rivas-Martinez and Rivas-Saenz 2017) are used.

At the broadest level, CNVC types (to date) are characterized by their placement within the three macrobioclimate zones that support forests and woodlands in Canada (mostly a north – south temperature gradient; Sanchez-Mata and Rivas-Martinez 2010): “boreal”, “temperate” and “Mediterranean”. Classes are as follows (where **Tp**, yearly positive temperature, is the sum of the monthly average temperature of those months whose average temperature is higher than 0°C):

Boreal: 380<**Tp**<800; characterized by long cold winters, and short warm to cool summers (depending on proximity to oceans); mean annual temperatures are typically <0°C.

Temperate: 800<**Tp**<2450; warmer than the boreal, with shorter winters; mean annual temperatures are typically >0°C.

Mediterranean: 900<**Tp**<2400; characterized by having at least two consecutive dry months during the summer (the warmest period in the year). In Canada, a cool Mediterranean climate occurs on part of the southern British Columbia coast where orographic rainshadow effects affect the seasonality of precipitation.

To describe regional variation within these broad macrobioclimate zones (mostly on east – west subgradients), two classes of continentality, “continental”, and “maritime” or “maritime-influenced”, and four classes of climatic moisture, “dry”, “subhumid”, “humid” and “very humid” are recognized.

Continentality is an indication of the influence of large water bodies on climatic temperatures. In the WBC system, the “continentality index (**Ic**)” is the difference between the average temperatures of the warmest (**Tmax**) and the coldest (**Tmin**) months of the year: **Ic** = **Tmax – Tmin**.

Continental, including Subcontinental: **Ic**>=21;

Maritime (Oceanic), including Hypermaritime: Ic<21

CNVC types that occur in a maritime climate but near marine coastlines receive additional moisture inputs from frequent fog. These situations are termed "hypermaritime" (Biogeoclimatic Ecosystem Classification, see: https://www.for.gov.bc.ca/hre/becweb/system/how/index.html).

Moisture classes designating "precipitation effectiveness" (sensu Thornthwaite 1931) give an estimate of the annual climatic water balance after accounting for evapotranspiration. For these purposes, the WBC system calculates an "ombrotrophic index (**Io**)" as **Io** = **(Pp/Tp) x 10**, where **Pp**, yearly positive precipitation, is the total average precipitation of those months whose average temperature is higher than 0°C. Classes are as follows:
Very Humid: **Io**>12;

Humid: 6<**Io**<12;

Subhumid: 3.6<**Io**<6;

Dry: 2.2<**Io**<3.6;

The climate characteristics associated with CNVC types are described in the Environment section of Association (Appendix 8) and Macrogroup factsheets (Appendix 9).

VPro Reporting Conventions for Summary Vegetation Reports

Using the VPro Diagnostic.xla add-in for Microsoft Excel enables some macros to be used in the VPro Summary Vegetation Report that facilitate comparisons of site units. All four macros, Diagnostic, Similarity, Conditional Colour and Veg Guide Summary, have been used at different times during CNVC vegetation type development. The Conditional Colour and Veg Guide Summary macros have been found to be particularly useful, and have been routinely employed during analyses. The Veg Guide Summary routine has been used in the presentation of vegetation reports for Macrogroup factsheets.

The Conditional Colour macro (simple version) calculates the product of presence x cover (characteristic cover for CNVC purposes) and shades the cells. The standard settings are:

Colour	Presence x Cover
	>=10
	>=4
	>=1
	>=0.5
	<0.5

The CNVC criteria commonly used in the Veg Guide Summary are:

Operator	Value	Criteria
>=	20	Minimum species constancy to include in summary
>=	50	Black bar constancy
>=	30	Gray bar constancy
>=	20	Star constancy
>=	100	Six bar percent cover
>=	25	Five bar percent cover
>=	10	Four bar percent cover
>=	3	Three bar percent cover
>=	1	Two bar cover
<	1	One bar cover

Appendix 5. Association Development

To date, all Associations have been developed from high quality ecological plot data. Associations have mainly been developed for boreal (within D014 [North American Boreal Forest & Woodland] and D016 [North American Boreal Flooded & Swamp Forest]) and Vancouverian ([D192 Vancouverian Forest & Woodland] and D193 [Vancouverian Flooded & Swamp Forest]) forests and woodlands in Canada. Most of the development has been for upland conditions (D014 and D192), although some treed wetlands have also been classified (D016 and D193).

Development of boreal Associations also guided the discrimination of Macrogroup level distinctions for boreal upland and wetland Macrogroups (i.e., M496 [West-Central North American Boreal Forest], M495 [Eastern North American Boreal Forest], M156 [Alaskan-Yukon North American Boreal Forest and Woodland], M179 [North American Northern Boreal Woodland], M299 [North American Boreal Conifer Poor Swamp Forest] and M300 [North American Boreal Flooded & Rich Swamp Forest]). The process of developing boreal Associations in eastern Canada further helped to distinguish between boreal and cool temperate forest Macrogroups (i.e., M495 from CM014 [Eastern North American Temperate Hardwood - Conifer Forest] and CM744 [Acadian Temperate Forest]).

In the following sections, boreal Associations are described first, followed by Vancouverian Associations. Development of boreal Associations involved most provinces/ territories in Canada, and is described separately for western and eastern Canada. Vancouverian Associations are all in British Columbia. The jurisdictional starting points (i.e., various plant community types) are also described.

INDEX OF APPENDIX 5

Development of boreal associations

Western Canada

The earliest prototypes for CNVC Associations were developed in a pilot exercise designed to test our ability to utilize provincial/ territorial Forest Ecosystem Classification (FEC) plot data for investigating similarities between existing types within different provincial classifications (years 2000-2001). Although Alberta, British Columbia (BC), Saskatchewan and Yukon data were initially compiled, the most informative correlations were between BC and Alberta types. At the time, these provinces had hierarchical ecological classifications nested within bioclimatic regions (this happened later in Yukon and Saskatchewan). Both Alberta and BC use vegetation indicators of edaphic conditions and represent their key indicator species in 2-way edatopic grids of site moisture vs. site nutrients. This way, each "site unit" (i.e., the Vpro term for a jurisdictional "plant community type" – a type that corresponds to a plant community in relation to its immediate environment) can be visualized as edatopic coordinates within a prevailing bioclimatic region. These concepts were ultimately embraced by the CNVC and became fundamental in the emerging definition of the Association concept.

In the early BC – Alberta pilot, analytical correlation procedures were explored for forests and woodlands within the "boreal" bioclimatic zone. In BC, this corresponded to the Biogeoclimatic Ecosystem Classification (BEC) Boreal White and Black Spruce (BWBS) and Spruce – Willow – Birch (SWB) zones; in Alberta, the boreal corresponded to the Boreal Forest, Canadian Shield, and Foothills Natural Regions. Provincial classification datasets (Alberta Environment and Parks 2014; Biogeoclimatic Ecosystem Classification Program of British Columbia 2011) were combined and harmonized (see ***Data Collation and Standardization*** section of the report). Then, plots classified to forest and woodland site units within the respective provincial BEC zones and Alberta natural regions were selected for analysis. The decision had been made to maintain the integrity of existing provincial site units, so comparisons between intact Alberta and BC units were the focus of the analysis. In other words, site units were compared between jurisdictions using the constituent plot data as the means of discerning the vegetation and environment characteristics of each site unit; plots were not analysed independently of their previously assigned site unit.

Analytical comparisons were made using two broad methodologies: phytosociological tabling and multivariate analyses. VPro was the data management tool utilized (see ***VPro Overview*** section of the report). Phytosociological tabling was conducted within the VPro software environment, but multivariate analyses were conducted elsewhere (e.g., PC-Ord; Excel) and included:

Cluster Analysis 1: Distance Measure – Sorensen (Bray-Curtis) / Group Linkage – Farthest Neighbour (Presence/Absence);

Cluster Analysis 2: Distance Measure – Euclidean (Pythagorean) / Group Linkage – Wards Method (Continuous);

Ordination Analysis 1: DCA – Detrended Correspondence Analysis;

Ordination Analysis 2: NMS – Non-metric Multidimensional Scaling (Sorensen distance measure); and,

Similarity Matrix: tabular comparison of selected types using Motyka's modification of Sorensen's coefficient.

Ultimately, the Technical Committee decided that phytosociological tabling of vegetation by site unit, in conjunction with summaries of environmental attributes, was the most efficient and reliable method for developing proposals for matching intact provincial site units. This technique best permitted the application of existing expertise among the provincial classification programs by presenting their site units in a recognizable numerical format with emphasis on the key indicator species. The standard CNVC analysis methodology outlined in the ***Association Development from Jurisdictional Types using Plot Data*** section of the report evolved from the results of this early pilot exercise and was applied subsequently to develop correlations between provincial/ territorial plant community types across the country. As the methodology was refined, and as other regional data became available for western Canada, the prototype boreal Associations developed during this pilot exercise were updated before publication in 2017:

1) In 2010, Saskatchewan published a new classification of forest "ecosites" and made these data available to the CNVC. These types were then correlated with the BC – Alberta boreal Association prototypes, thus expanding the range of boreal forest classification to include these three provinces.
2) In 2010, Yukon initiated an Ecological and Landscape Classification program (Ecological and Landscape Classification Program 2015, Environment Yukon 2016b) and started developing "vegetation associations" for the Territory, using standards similar to those of the CNVC. As the forest and woodland types were confirmed, the data were made available to the CNVC for correlation with the BC – Alberta boreal Association prototypes. This permitted the establishment of northwestern range limits for these CNVC Associations, and the identification of Macrogroup level distinctions between M496 [West-Central North American Boreal Forest], M156 [Alaskan-Yukon North American Boreal Forest and Woodland] and M179 [North American Northern Boreal Woodland].
3) In 2005, the Ecological Land Classification (ELC) Program of the Ontario Ministry of Natural Resources and Forestry (OMNRF) began to develop new provincial "vegetation types", using standards similar to those of the CNVC Association concept. As the boreal forest and woodland types were confirmed, the data were made available to the CNVC for correlation with the BC – Alberta – Saskatchewan boreal Association prototypes. This permitted the establishment of eastern range limits for these Associations, and the delineation of Macrogroup level distinctions between M496 [West-Central North American Boreal Forest] and M495 [Eastern North American Boreal Forest].
4) Since there were no plot data for boreal forest types in Manitoba, this jurisdiction was not represented in the development of boreal forest Associations. However, representatives of the Manitoba Sustainable Development, Forestry Branch attended peer review meetings for Associations that occur in Manitoba. Subsequently, in 2015, the CNVC was contacted by a representative of the Louisiana-Pacific Canada Ltd. forest products company, which had developed an "ecosite" classification for its forest management licence area in western Manitoba. The data for these ecosites were made available to the CNVC and the ecosites were evaluated by expert opinion for similarities with existing CNVC boreal forest Associations, thus extending the known range of a few CNVC Associations into western Manitoba.

Eastern Canada

At the outset of the CNVC, Newfoundland and Labrador was the only eastern Canadian province that had a classification of provincially standardized forest types (for the island) that were conceptually similar to the CNVC Association. In all jurisdictions, types had to be developed by

primary data analysis (i.e., analysis of unclassified plot data) before interjurisdictional correlations could be undertaken by the CNVC Technical Committee. During this phase of development, NRCan - CFS represented the CNVC to support and collaborate with the provincial/ regional analysts undertaking this work.

The earliest interjurisdictional prototypes for CNVC Associations in eastern Canada were developed in the Maritime Provinces (New Brunswick, Nova Scotia, Prince Edward Island) under the auspices of the Atlantic Canada Conservation Data Centre (Basquill et al. 2009). Although there had been previous forest classification efforts in each of the Maritime provinces, none was in active use in 2000 although considerable plot data had been collected, especially in New Brunswick and Nova Scotia. The Maritimes analysis benefited from the experience of the pilot exercise in western Canada regarding conceptual standards and techniques for defining new CNVC Associations. Unlike western Canada, however, there was no existing bioclimatic regionalization of the entire Maritimes area, so Associations were developed from all data before being segregated into temperate vs. boreal subsets using diagnostic indicator species. Subsequently, Nova Scotia started an Ecological Land Classification program that included the development of "vegetation types," which have since been evaluated for similarities with boreal CNVC Associations.

Jurisdictional plant community types with comparable concepts to the CNVC Association were developed in Ontario and Quebec during the period 2001-2016 (see ***Jurisdictional Starting Points for Association development*** below). Ontario developed new provincial "vegetation types" for its "treed" boreal ecosystems. Provincial "associations" in Quebec were completed for boreal forests and woodlands in 2014.

Ontario, Quebec, Maritimes and Newfoundland types were correlated to define CNVC Associations describing the variation of boreal forests and woodlands in eastern Canada. Association data summaries and concepts were subsequently submitted to Manitoba forest ecologists for assessment of potential range extension into eastern Manitoba.

Development of Vancouverian Associations

A collaborative international exercise was initiated between British Columbia and US ecologists in 2003-2004 to determine the distribution of forest associations in coastal Oregon, Washington, British Columbia (BC) and southern Alaska for assessment of their global conservation status (Cadrin et al. 2018). As in the initial boreal Association analysis, existing types were compared, using phytosociological tables, similarity matrices, and expert peer review. Peer review was conducted by vegetation ecologists from BC Ministry of Forests, BC Conservation Data Centre, US Forest Service, and the Alaska, Oregon and Washington State Natural Heritage Programs.

For the US, component types were forest associations developed for individual National Forests or other regions by the various participating agencies. For Canada, component types were site series of the BEC system (Meidinger and Pojar 1991), comprising BC vegetation associations. Data for the existing component types were imported into VPro for tabling and analysis.

Component types were separated into groups by tree species in the overstory and sorted within groups by similarity, using both visual sorting and similarity matrices using Goldstream coefficient (single value for a species based on constancy times square root of mean cover) and Motyka's modification of Sorensen's coefficient. Associations were proposed by experts leading the analysis (Meidinger, Chappell). Ecologists then reviewed the tables and similarity matrices, and correlation meetings were held to make decisions. Discussions were based on constancy and cover of species

characterizing proposed associations, as well as the environmental conditions represented by the plots in the individual component types. The iterative results of the correlation meetings led to revisions and, ultimately, finalization of definitions of ecological concepts and grouping of component types into new international plant associations. In many cases, specific local variations indicated by more subtle species differences were identified at the subassociation level.

Jurisdictional starting points for Association development

In the following sections, we provide a brief overview of the jurisdictional starting points used in forest and woodland Association development. For more in-depth descriptions of jurisdictional forest ecosystem classification products and their status at the outset of the CNVC, please see Ponomarenko and Alvo (2001) and Alvo and Ponomarenko (2003). For further information about any particular jurisdiction, refer to the references provided under each jurisdiction.

Yukon

At the beginning of the CNVC, regional classifications and plot data were available for south central (unpublished) and southeastern Yukon (Zoladeski et al. 1996). These data and descriptions were examined during early stages of boreal Association analysis, but they only covered a small portion of the Territory and were not conceptually compatible with the British Columbia and Alberta types for interjurisdictional comparisons. In 2010, Yukon initiated an Ecological and Landscape Classification program that has collated many datasets from biophysical inventory projects and earlier classifications, and begun a process of developing new "vegetation associations" that are consistent with the CNVC Association concept. These new vegetation associations have been developed by Yukon Environment staff and contractors, with input from NRCan – CFS, over a period of several years (2007 – present). The Yukon Environment partners have been Catherine Kennedy (2000-2017, Yukon Environment) and Nadele Flynn (2010-2018, Yukon Environment). In some regions, these types are still under development, published within "ecosite" guides, as they are completed (e.g., Environment Yukon 2016a). The CNVC database is current to 2018 (Environment Yukon 2018).

British Columbia

The Biogeoclimatic Ecosystem Classification (BEC) has been perhaps the biggest contributor of conceptual and methodological ideas to the CNVC. Although the "site series" is the fundamental provincial site unit used for CNVC Association correlation analyses, the CNVC Association concept closely approximates the "plant association" entity within the BEC hierarchy (Pojar et al. 1987, MacKenzie and Meidinger 2017). Descriptions of the site series are available in various regional field guides (available at: https://www.for.gov.bc.ca/HRE/becweb/resources/classificationreports/regional/index.html; for the boreal in particular, see Delong et al. 2011).

Since the CNVC began, the BEC program has continued to develop and the CNVC has implemented updates including revisions to the classification twice since 2001, most recently in 2011 (Biogeoclimatic Ecosystem Classification Program of British Columbia 2011). Changes to the provincial classification for areas including Haida Gwaii, Vancouver and Prince Rupert forest regions (not boreal) have not yet been implemented in the Vancouverian CNVC Associations. Any further Association development should use an up-to-date version of the provincial data. Del Meidinger (2000-2009, BC Ministry of Forests) and Will MacKenzie (2000-2018, BC Ministry of Forests, Lands and Natural Resources Operations) have been the primary provincial authorities.

Alberta

Three regional "ecosite" classifications, described for northern Alberta (Beckingham and Archibald 1996), west-central Alberta (Beckingham et al. 1996a) and southwestern Alberta (Archibald et al. 1996), provided the provincial starting points in 2001. Alberta Environment and Parks provided the plot data to NRCan – CFS in 2001, although data standardization and cleaning were required over time and the date used in the CNVC citation is 2014 (Alberta Environment and Parks 2014). The fundamental provincial site unit used for CNVC Association correlation analyses is the "plant community type", but the CNVC Association concept lies approximately between the "ecosite phase" and the "plant community type" of the provincial hierarchy. Correlations were conducted between the three intra-provincial classifications, as well as between Alberta and neighbouring jurisdictions. Harry Archibald (2000-2004, Alberta Environment and Parks) and Lorna Allen 2005-2016, Alberta Environment and Parks) have been the primary provincial authorities.

Saskatchewan

At the outset of the CNVC project, "ecosites" from the Mid Boreal ecoregions of Saskatchewan were available for use (Beckingham et al. 1996b) and these data and descriptions, made available by Saskatchewan Ministry of Environment, were used in the earliest CNVC analyses. This agency, however, had begun development of a new ecosite classification for Saskatchewan forests; once the new data (McLaughlan et al. 2010a) and descriptions were available (McLaughlan et al. 2010b), they were imported into the CNVC database and correlated with the CNVC prototype BC - Alberta boreal Associations, guided by Michael McLaughlan.

Manitoba

Although "vegetation types" for a portion of Manitoba forests had been published prior to the outset of the CNVC (Zoladeski et al. 1995), the plot data had been lost and were therefore not available for CNVC use. Jason Greenall (Manitoba Conservation Data Centre) had developed a list of vegetation types with descriptions (unpublished) that were based on expert opinion (Alvo and Ponomarenko 2003). Without plot data, the Technical Committee opted to omit all Manitoba vegetation types from the initial CNVC Association analysis.

Instead, once CNVC Associations had been developed from data-derived units in adjacent jurisdictions, the Association data summaries and concepts were submitted to review by Manitoba forest ecologists (Tim Swanson 2011, Manitoba Sustainable Development; Jim Boyd, 2011 - 2015, Manitoba Sustainable Development). If Associations were thought likely to occur in Manitoba, this information was captured on the Distribution page of the Association factsheet (Appendix 8).

Independently, Louisiana-Pacific Canada Ltd. (Swan Valley – Forest Resources Division) developed an "ecosite" classification for its forest management licence area in western Manitoba (Arnup et al. 2006). These data and ecosites were not available to NRCan – CFS until after confirmation of CNVC boreal Associations (October, 2015). Conceptual differences between these ecosites and CNVC Associations further factored into the decision to not incorporate these data into the actual Association data summaries. We did however use an expert process (with assistance from Paul LeBlanc, 2015-2016, Louisiana-Pacific Canada Ltd.) to evaluate similarities between the ecosites and existing CNVC Associations and, where appropriate, we list relationships between the two classifications in Association factsheets on the References page under "Relationships with Other Classifications" (Appendix 8).

Ontario

Ontario had "vegetation types" for northwestern Ontario (Sims et al. 1997), northeastern Ontario (Taylor et al. 2000) and central Ontario (Chambers 1997) at the outset of the CNVC. Because these types had been developed independently, they were not consistent between provincial regions. Furthermore, they often were broader concepts than the CNVC Association, so were inappropriate for CNVC analyses. The forest ecosystem classification plot data were available, however, and there was expertise and willingness from Ontario Ministry of Natural Resources and Forestry (OMNRF) to develop new provincially standardized "vegetation types" that were compatible with the CNVC Association concept. The Ecological Land Classification (ELC) Program has also continued to add plot data over the years, particularly in northern Ontario, through ongoing data collection as well as by collating and digitizing old datasets. Since the beginning of the CNVC, new vegetation types have been developed by the Ontario MNRF ELC Program, led by Peter Uhlig (2000 - 2018) and Monique Wester (2008 - 2018), with the assistance of NRCan – CFS staff. These new vegetation types were used to develop CNVC Associations by interjurisdictional correlation, including by expert assessment with Manitoba. The plot data are current to 2015 (McMurray et al. 2015) and the new provincial vegetation types exist in draft form and are available from the lead author (Uhlig et al. 2016).

Quebec

At the outset of the CNVC, there were no CNVC-compatible jurisdictional types for Quebec. Quebec Ministère des Ressources naturelles, de la Faune et des Parcs, Forêt Québec undertook to develop new regional "associations" compatible with the CNVC Association concept with the assistance of NRCan – CFS staff, and these (unpublished) associations were then used in CNVC Association interjurisdictional correlation analyses. Jean-Pierre Saucier (2000 - 2010), Claude Morneau (2000 - 2018) and Mélanie Major (2012 - 2016) have provided data (Ministère des Ressources naturelles, de la Faune et des Parcs, Forêt Québec 2003), expertise and jurisdictional authority.

New Brunswick

Although classified plot data were available, the "vegetation types" of the New Brunswick forest site classification (e.g., Zelazny et al. 1989) were not conceptually compatible with the CNVC Association because they were developed in geological sub-regions and were not provincially harmonized. The Atlantic Canada Conservation Data Centre had expertise and willingness to undertake a regional classification of New Brunswick, Nova Scotia and Prince Edward Island data to develop Maritimes "associations" as antecedent units for CNVC comparison with other jurisdictions. Sean Basquill led both the data compilation (Basquill 2015) and the classification (Basquill et al. 2009) from 2000 - 2009, and this work was funded in part by NRCan – CFS. The Maritimes associations have not yet been published, but many exist as draft factsheets and are available from Sean Basquill (Nova Scotia Department of Lands and Forestry).

Nova Scotia

There were no antecedent units from Nova Scotia available for interjurisdictional comparison at the outset of the CNVC but there were ecosystem classification plot data available. These data were used in Sean Basquill's development of the Maritimes associations described above (Basquill et al. 2009), which were then used for CNVC comparison with other jurisdictions.

Since this time, Peter Neily and others have published "vegetation types" for Nova Scotia (Neily et al. 2011). In some cases, these types differ conceptually from the Maritimes associations and thus

CNVC Associations. For boreal Associations that occur in Nova Scotia, Sean Basquill has provided the expertise required to relate Nova Scotia vegetation types to CNVC Associations, as described in the "Relationships with Other Classifications" section on the References page of the Association factsheets (Appendix 8). Since Nova Scotia has an ongoing Ecological Land Classification Program and continues to collect and classify ecosystem plot data, any future work (e.g., for CNVC Associations in CM744 [Acadian Temperate Forest]) should use a current database. The version used for CNVC boreal Association development is current to 2018 (Basquill 2018).

Prince Edward Island

There were no plant community types from Prince Edward Island available for comparison at the outset of the CNVC but there were ecosystem classification plot data available. These data were included in Sean Basquill's development of the Maritimes associations described above (Basquill et al. 2009), which were then used for CNVC comparison with other jurisdictions.

Newfoundland and Labrador

The "forest types" developed by Antoni Damman for northern (Damman 1963), central (Damman 1964) and western (Damman 1967) Newfoundland, and by Bill Meades for eastern Newfoundland (Meades 1986) as well as Terra Nova Park (Meades 1976), were compatible with the CNVC Association concept and consistent between study areas on the island. They were used as antecedent sub-provincial units for development of CNVC-compatible associations for insular Newfoundland. The data were acquired from NRCan – CFS through Bill Meades and Bruce Pike (Natural Resources Canada, Canadian Forest Service, Atlantic Region, 2006). Bill Meades provided the provincial ecological expertise to correlate these types with Maritimes and Quebec associations for development of CNVC Associations. Furthermore, Bill Meades had personally collected ecosystem classification data from 43 plots in Labrador (in 1976, 1980 and 1982) that he made available to the CNVC and then worked with NRCan – CFS staff to develop provisional forest types for Labrador (unpublished) that were subsequently used as antecedent units in CNVC Association development.

At the outset of the CNVC, "Forest Site Classification Manual: A field guide to Damman forest types of Newfoundland" (Meades and Moores 1994) was also available. Since this publication deals only with merchantable forest types and non-forest vegetation occupying potentially merchantable sites, and is not explicitly tied to the original plot data, it was decided to use the forest types from the original publications for CNVC analyses. Links to Meades and Moores' types are provided in the "Relationships with Other Classifications" field of the References page of the Association factsheet (Appendix 8). We relied on Bill Meades for both intra-provincial correlation of the initial forest types and assessment of their links to Meades and Moores' types.

Northwest Territories

There are no forest ecosystem types developed for Northwest Territories. Some unclassified plot data exist from a variety of projects.

Nunavut

There are no forest ecosystem types developed for Nunavut. Some plot data may exist for low arctic ecosystems.

Appendix 6. Macrogroup Details

Information on 34 Macrogroups that have been confirmed by the CNVC Technical Committee are presented below. Details include subtypes, relationship to USNVC types, factsheet status, and information source(s) for confirmation of the type and development of the factsheet. For a complete listing of all CNVC Macrogroups (confirmed and provisional), see Appendix 1; USNVC Macrogroups that have been provisionally accepted for the CNVC, but still require confirmation for Canadian vegetation, are not included here. The following list of Macrogroups is organized hierarchically according to CNVC Division.

INDEX OF APPENDIX 6

D014 North American Boreal Forest & Woodland

M156 Alaskan–Yukon North American Boreal Forest & Woodland

The Macrogroup concept is shared with the USNVC, however CNVC recognizes two subtypes: CM156a [Low Montane Alaskan-Yukon Boreal Forest] and CM156b [High Montane Alaskan-Yukon Boreal Woodland]. For CNVC, M156 and its subtypes were derived from Associations developed by analysis of upland forest plot data from British Columbia and Yukon.

M179 North American Northern Boreal Woodland

The Macrogroup concept is shared with the USNVC, however CNVC recognizes two subtypes: CM179a [Alaskan-Yukon Northern Boreal Woodland] and CM179b [Central & Eastern Northern Boreal Woodland]. For CNVC, M179 and its subtypes were derived by analysis of northern boreal upland treed plot data from Quebec, Ontario, Manitoba, Saskatchewan, Northwest Territories and Yukon, as well as from literature sources.

M495 Eastern North American Northern Boreal Forest

The Macrogroup concept is shared with the USNVC, however CNVC recognizes two subtypes: CM495a [Atlantic Boreal Forest] and CM495b [Ontario-Quebec Boreal Forest]. For CNVC, M495 and its subtypes were derived from Associations developed by analysis of upland forest plot data from Ontario, Quebec, New Brunswick, Newfoundland & Labrador and Nova Scotia.

M496 West-Central North American Boreal Forest

The Macrogroup concept is shared with the USNVC, however CNVC recognizes two subtypes: CM496a [Central Boreal Forest] and CM496b [Cordilleran Boreal Forest]. For CNVC, M496 and its subtypes were derived from Associations developed by analysis of upland forest plot data from Ontario, Saskatchewan, Alberta, British Columbia and Yukon.

D016 North American Boreal Flooded & Swamp Forest

M299 North American Boreal Conifer Poor Swamp

The Macrogroup concept is shared with the USNVC. For CNVC, M299 was derived from Associations developed by analysis of wetland forest plot data from Yukon, British Columbia, Alberta, Saskatchewan, Ontario, Quebec, New Brunswick, Nova Scotia and Newfoundland & Labrador.

M300 North American Boreal Flooded & Rich Swamp Forest

The Macrogroup concept is shared with the USNVC, but a factsheet describing the Canadian expression has not been developed; the USNVC description is available at http://usnvc.org/explore-classification/. In Canada, these conditions occur in Yukon, Northwest Territories, British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, Nova Scotia and Newfoundland & Labrador.

D008 Eastern North American Forest & Woodland

USNVC Macrogroup treatment of upland cool temperate forests in eastern Canada is inconsistent with the CNVC Macrogroup definitions and guidelines. Consequently, analysis of upland forest plot data from Ontario, Quebec, New Brunswick, Nova Scotia and Prince Edward Island was undertaken to develop eastern temperate Macrogroups and subtypes for the CNVC. Three CNVC Macrogroups were derived:

CM014 Eastern North American Temperate Hardwood – Conifer Forest

The USNVC concept of M014 excludes oak-pine forests occurring within the range of the eastern temperate mixed forests, treating them as a separate Macrogroup; this is inconsistent with CNVC conventions because it separates zonal and azonal upland forests within the same bioclimatic region into two Macrogroups. CM014 [Eastern North American Temperate Hardwood - Conifer Forest] has three subtypes, CM014a [Subhumid Eastern Temperate Hardwood – Conifer Forest], CM014b [Humid Eastern Temperate Hardwood – Conifer Forest] and CM014c [Very Humid Eastern Temperate Hardwood – Conifer Forest], and includes forests from Ontario and Quebec.

CM742 Eastern Canadian Temperate Deciduous Forest

No USNVC Macrogroup clearly encompasses the forests of southern Ontario and Quebec in its concept. CM742 [Eastern Canadian Temperate Deciduous Forest] has two subtypes, CM742a [Warm Eastern Canadian Temperate Deciduous Forest] and CM742b [Cool Eastern Canadian Temperate Deciduous Forest] and includes forests from southernmost Ontario and Quebec.

CM744 Acadian Temperate Forest

The USNVC includes Acadian forests of the Maritime Provinces in M014; however, the CNVC recognizes these forests as a distinct Macrogroup. CM744 [Acadian Temperate Forest] has two subtypes, CM744a [Typic Acadian Temperate Forest] and CM744b [Cool Acadian Temperate Forest], and includes forests from New Brunswick, Prince Edward Island, Nova Scotia and part of Quebec.

D011 Eastern North American-Great Plains Flooded & Swamp Forest

M028 Great Plains Floodplain Forest

The Macrogroup concept is shared with the USNVC, and a CNVC factsheet describing the Canadian expression has been developed from literature sources. In Canada, these conditions occur in Alberta, Saskatchewan and Manitoba.

M504 Laurentian-Acadian Flooded & Swamp Forest

The USNVC concept of M504 is accepted for the CNVC, but development of the type for Canada, and its CNVC factsheet, requires analysis of forest plot data; the USNVC description is available at http://usnvc.org/explore-classification/. In Canada, these conditions occur in Ontario, Quebec, New Brunswick, Nova Scotia and Prince Edward Island.

D192 Vancouverian Forest & Woodland

M886 Southern Vancouverian Dry Foothill Forest & Woodland

The Macrogroup concept is shared with the USNVC. For CNVC, M886 was derived from Associations developed by analysis of upland forest plot data from British Columbia.

M024 Vancouverian Coastal Rainforest

The Macrogroup concept is shared with the USNVC, however CNVC recognizes three subtypes: CM024a [Drier Vancouverian Rainforest], CM024b [Typic Vancouverian Rainforest] and CM024c [Northern Vancouverian Rainforest]. For CNVC, M024 and its subtypes were derived from Associations developed by analysis of upland forest plot data from British Columbia.

M025 Vancouverian Subalpine – High Montane Forest

The Macrogroup concept is shared with the USNVC, however CNVC recognizes two subtypes: CM025a [Typic Vancouverian High Montane & Subalpine Forest] and CM025b [Hypermaritime Vancouverian High Montane & Subalpine Forest]. For CNVC, M025 and its subtypes were derived from Associations developed by analysis of upland forest plot data from British Columbia.

D193 Vancouverian Flooded & Swamp Forest

M035 Vancouverian Flooded & Swamp Forest

The Macrogroup concept is shared with the USNVC. For CNVC, M035 was derived from Associations developed by analysis of wet forest plot data from British Columbia.

D194 Rocky Mountain Forest & Woodland

M020 Rocky Mountain Subalpine – High Montane Forest

The Macrogroup concept is shared with the USNVC, however CNVC recognizes three subtypes: CM020a [Dry Rocky Mountain Mid-Montane Forest], CM020b [Dry Rocky Mountain High Montane & Subalpine Forest] and CM020c [Humid Rocky Mountain High Montane & Subalpine Forest]. For CNVC, M020 and its subtypes were developed by analysis of upland forest plot data from British Columbia and Alberta.

M500 Central Rocky Mountain Mesic Lower Montane Forest

The Macrogroup concept is shared with the USNVC, however CNVC recognizes three subtypes: CM500a [Southern Mesic Rocky Mountain Low Montane Forest], CM500b [Typic Mesic Rocky Mountain Low Montane Forest] and CM500c [Northern Mesic Rocky Mountain Low Montane Forest]. For CNVC, M500 and its subtypes were developed by analysis of upland forest plot data from British Columbia.

M501 Central Rocky Mountain Dry Lower Montane – Foothill Forest

The Macrogroup concept is shared with the USNVC, however CNVC recognizes two subtypes: CM501a [Warm Dry Rocky Mountain Low Montane Forest] and CM501b [Cool Dry Rocky Mountain Low Montane Forest]. For CNVC, M501 and its subtypes were developed by analysis of upland forest plot data from British Columbia, and from published sources in Alberta.

M890 Rocky Mountain intermontane Subboreal Forest

The Macrogroup concept is shared with the USNVC, however CNVC recognizes three subtypes: CM890a [Cool Dry Rocky Mountain Subboreal Forest], CM890b [Warm Rocky Mountain Subboreal Forest] and CM890c [Cool Humid Rocky Mountain Subboreal Forest]. For CNVC, M890 and its subtypes were developed by analysis of upland forest plot data from British Columbia.

D195 Rocky Mountain – Great Basin Montane Riparian & Swamp Forest

M034 Rocky Mountain – Great Basin Montane Riparian & Swamp Forest

The Macrogroup concept is shared with the USNVC. For CNVC, M034 was derived from Associations developed by analysis of wet forest plot data from British Columbia.

D326 North American Great Plains Forest & Woodland

M151 Great Plains Forest & Woodland

The Macrogroup concept is shared with the USNVC, and a CNVC factsheet describing the Canadian expression has been developed from literature sources. In Canada, these conditions occur in Alberta, Saskatchewan and Manitoba.

D022 Western North American Grassland & Shrubland

M048 Central Rocky Mountain Montane-Foothill Grassland & Shrubland

The USNVC concept is accepted for the CNVC, but a factsheet describing the Canadian expression has not been developed; the USNVC description is available at http://usnvc.org/explore-classification/. In Canada, these conditions occur in Alberta and British Columbia.

D023 Central North American Grassland & Shrubland

CM051 Great Plains Mixedgrass Prairie

The USNVC concept has been modified for the CNVC. USNVC M051 includes plains rough fescue prairie, which is climatically induced dominant vegetation. This is inconsistent with CNVC conventions; CNVC treats plains rough fescue prairie as a separate Macrogroup (CM332). CM051 occurs in Alberta and Saskatchewan.

M054 Central Lowlands Tallgrass Prairie

The Macrogroup concept is shared with the USNVC, and a CNVC factsheet describing the Canadian expression has been developed from literature sources. In Canada, these conditions occur in Manitoba and Ontario.

CM332 Great Plains Rough Fescue Prairie

The USNVC treats this condition at the Group level in USNVC M051, but as a climatically determined regional vegetation condition, it meets CNVC Macrogroup criteria and thus is treated at the Macrogroup level for the CNVC. CM0332 occurs in Alberta and Saskatchewan.

D029 North American Bog & Fen

M063 North Pacific Bog & Fen

The USNVC concept is accepted for the CNVC, but a factsheet describing the Canadian expression has not been developed; the USNVC description is available at http://usnvc.org/explore-classification/. In Canada, these conditions occur in British Columbia.

M876 North American Boreal & Sub-boreal Acidic Bog & Fen

The USNVC concept is accepted for the CNVC, but a factsheet describing the Canadian expression has not been developed; the USNVC description is available at http://usnvc.org/explore-classification/. These conditions occur throughout Canada.

D040 Western North American Cool Semi-Desert Scrub & Grassland

M169 Great Basin – Intermountain Tall Sagebrush Steppe & Shrubland

The USNVC concept is accepted for the CNVC, but a factsheet describing the Canadian expression has not been developed; the USNVC description is available at http://usnvc.org/explore-classification/. In Canada, these conditions occur in British Columbia.

D044 Arctic Tundra & Barrens

M173 North American Arctic & Subarctic Tundra

The USNVC concept is provisionally accepted for the CNVC, pending analysis of Canadian arctic data. The intention is to work with Polar Knowledge – Canadian High Arctic Research Station (McLennan et al. 2018) to develop a Canadian Arctic-Subarctic Biogeoclimatic Ecosystem Classification (CASBEC) and ensure harmonization of classification standards for Associations (and possibly Macrogroups). Plot data from Yukon, Northwest Territories, Nunavut, Quebec, Labrador and possibly Alaska will be employed in the analyses. It is anticipated that M173 will be subdivided into three (High, Mid- and Low Arctic) entities, either at the Macrogroup or subtype level.

D042 Eastern North American Alpine Tundra

M131 Eastern North American Alpine Tundra

The Macrogroup concept is shared with the USNVC, but a factsheet describing the Canadian expression has not been developed; the USNVC description is available at http://usnvc.org/explore-classification/.). In Canada, these conditions occur in Quebec and Newfoundland & Labrador.

D043 Western North American Alpine Tundra

M099 Rocky Mountain – Sierran Alpine Tundra

The Macrogroup concept is shared with the USNVC, but a factsheet describing the Canadian expression has not been developed; the USNVC description is available at http://usnvc.org/explore-classification/. In Canada, these conditions occur in British Columbia and Alberta.

M101 Vancouverian Alpine Tundra

The Macrogroup concept is shared with the USNVC, but a factsheet describing the Canadian expression has not been developed; the USNVC description is available at http://usnvc.org/explore-classification/. In Canada, these conditions occur in British Columbia.

M404 Western Boreal Alpine Tundra

The Macrogroup concept is shared with the USNVC, and its Canadian expression is currently incorporated into the USNVC description (available at http://usnvc.org/explore-classification/). In Canada, these conditions occur in British Columbia, Yukon and Northwest Territories.

CM366 Subarctic Alpine Tundra

CNVC recognizes this Macrogroup to distinguish subarctic alpine vegetation from that of M404 (i.e., boreal alpine vegetation) in the northwestern Cordillera (i.e., north of the MacKenzie Mountains in Yukon and Northwest Territories). Development of the type requires analysis of plot data.

Appendix 7. Glossary

Alliance (CNVC): 1) For upland vegetation that includes zonal vegetation: an aggregation of Associations, with consistency in dominant and/or diagnostic species, describing regionally repeating vegetation patterns at the local to sub-regional scale. Alliances are created by grouping Associations that are ecologically "related" into more generalized ecological units. For example, **CA00035 *Picea glauca – Pinus contorta / Hylocomium splendens* (White Spruce – Lodgepole Pine / Stairstep Moss)**. 2) For azonal vegetation: a vegetation classification unit containing one or more associations and defined by a characteristic range of species composition, habitat conditions, physiognomy, and diagnostic species, typically at least one of which is found in the uppermost or dominant stratum of the vegetation. Alliances reflect regional to subregional climate, substrates, hydrology, moisture/ nutrient factors, and disturbance regimes. The Alliance is the seventh (from the top) level in the CNVC hierarchy.

anthropogenic: refers to anything originating from human influence or interference with natural disturbance regimes. Also a class of soil parent material (see "soil parent material").

ash: see "soil rooting zone substrate".

aspect: the orientation of a slope face, expressed using a compass direction.

Association (CNVC): a plant community type with consistency of species dominance and overall floristic composition, having a clearly interpretable ecological context in terms of site-scale climate, substrate and/or hydrology conditions, moisture/nutrient factors or disturbance regimes, as expressed by diagnostic indicator species. For example, **CNVC00102 *Picea glauca / Rosa acicularis / Hylocomium splendens* (White Spruce / Prickly Rose / Stairstep Moss)**. The Association is the eighth (from the top) and most detailed level in the CNVC hierarchy.

azonal sites: sites where the primary ecological influences on vegetation reflect local topography and/or soil properties (e.g., wetlands); see "zonal sites".

azonal vegetation: vegetation characteristic of azonal sites.

bedrock: see "soil parent material".

bog: an oligotrophic peatland either receiving water exclusively from precipitation or minimally influenced by groundwater; bogs can be treed or non-treed, but vegetation is characterized by *Sphagnum* spp. and ericaceous shrubs. See "fen", "marsh", "swamp".

boreal (climatic): see "climate terms".

brown moss: a group of minerotrophic moss species that commonly occur together and are valuable classification indicators of richer, wetter habitat conditions. Species include *Aulacomnium palustre, Tomentypnum nitens, Scorpidium* spp.*, Drepanocladus* spp.*, and Campylium stellatum*.

Brunisolic soil: in the Canadian System of Soil Classification, an order of soils whose horizons are developed sufficiently to exclude the soils from the Regosolic order but that lack the degrees or kinds of horizon development specified for soils of the other orders. These soils which occur under a wide variety of climatic and vegetative conditions all have Bm or Btj horizons.

bryophyte: a division of nonvascular land plants (Bryophyta), including mosses, liverworts, and hornworts; bryophytes lack vascular tissues for circulating liquids, and reproduce via spores.

character species: a species with constancy class ≥ III that is clearly associated with only one particular vegetation type within a large geographic area.

Chernozemic soil: in the Canadian System of Soil Classification, an order of soils that have developed under xerophytic or mesophytic grasses and forbs, or under grassland-forest transition vegetation, in cool to cold subarid to subhumid climates. The soils have a dark-colored surface (Ah or Ahe or Ap) horizon and a B and/or C horizon of high base saturation. Chernozemic soils mainly occur in the Great Plains of west-central Canada.

clay: see "soil rooting zone substrate".

climate terms: see Appendix 4 for detailed definitions of the climatic terminology used in CNVC factsheets. Non-technical definitions follow:

boreal: the boreal climate is characterized by long cold winters, and short warm to cool summers (depending on proximity to oceans); mean annual temperatures are typically <0°C.

temperate: temperate climates are warmer than the boreal, with shorter winters; mean annual temperatures are typically >0°C.

Mediterranean: Mediterranean climates are characterized by having at least two consecutive dry months during the summer (the warmest period in the year). In Canada, a cool Mediterranean climate occurs on part of the southern British Columbia coast where orographic rainshadow effects affect the seasonality of precipitation.

continentality: an indication of the influence of large water bodies on climatic temperatures; CNVC uses 2 classes, "continental" and "maritime".

climatic moisture provides an estimate of annual climatic water balance after accounting for evapotranspiration; CNVC uses 4 classes, "dry", "subhumid", "humid" and "very humid".

climax vegetation: stable, self-perpetuating vegetation that represents the final stage of succession under existing environmental conditions.

coarse loam: see "soil rooting zone substrate".

coarse sand: see "soil rooting zone substrate".

cold-deciduous: dropping leaves in the autumn.

colluvium: see "soil parent material".

conifer: species that produces cones. Most conifer species in Canada are evergreen, but some (e.g., *Larix* spp.) are cold-deciduous; native conifer species in Canada have needle-like or scale-like leaves.

constancy: percentage of plots in which a species is found (e.g., a species found in 25 of 100 plots has a constancy of 25%); equivalent to “presence” and "frequency of occurrence".

constancy class: a class that groups a specific range of constancy values. In the CNVC, the constancy classes are:

I	1-20%
II	21-40%
III	41-60%
IV	61-80%
V	81-100%

constant species: a species of high constancy in a vegetation type; constancy class ≥ IV.

continentality (climatic): see “climate terms”.

cover: the area of ground covered by plants of one or more species, usually expressed as a percentage.

cryomorphic: pertaining to plants having structural or functional adaptations to survive cold temperatures and resist frost damage (e.g., alpine creeping dwarf shrubs, krummholtz).

Cryosolic soil: in the Canadian System of Soil Classification, an order of mineral or organic soils that have perennially frozen material within 1 m of the surface. The mean annual soil temperature is less than 0°C. These are the dominant soils of the zone of continuous permafrost in northern Canada, becoming less widespread in the zone of discontinuous permafrost further south. Their maximum development occurs in organic and poorly drained, fine-textured materials. Vegetation varies from sparse plant cover in the high arctic, through tundra, to subarctic and northern boreal forests.

cryptogam: a plant that reproduces by means other than the production of seeds (e.g., spore-producing bryophytes and pteridophytes).

cryptogamic vegetation: see “physiognomy”.

cryptophyte: a plant whose buds or shoot apices remain below the ground or water surface during unfavourable seasons.

cultural vegetation: a plant community introduced and actively maintained by humans; no clear natural analogue is known for the species composition or vegetation structure (e.g., lawn).

diagnostic species: any species or group of species whose relative constancy or abundance differentiates one vegetation type from another; these can include character, differential, constant, indicator or dominant species; in the CNVC, most diagnostic species are differential, constant, indicator or dominant species.

differential species: a species with constancy class ≥ III that because of its consistent occurrence is clearly associated with a particular vegetation type within a large geographic area. The species may also be a differential species in another type that has a different diagnostic combination of species.

Division (CNVC/USNVC): a combination of dominant and diagnostic growth forms and a broad set of diagnostic plant species that reflect biogeographic differences in composition and continental differences in mesoclimate, geology, substrates, hydrology, and disturbance regimes. For example, **D014 North American Boreal Forest & Woodland**. The Division is the fourth (from the top) level in the CNVC / USNVC hierarchy.

dominance: the extent to which a constant species predominates in a vegetation type because of its abundance (usually cover within a particular stratum).

dominant species: constant species with high percent cover in a vegetation type or layer; several species may co-dominate; the constancy class is typically ≥ IV.

dry (soil moisture): see "moisture regime classes".

dwarf shrub: a perennial woody plant that has a prostrate growth form and occurs within 10 cm of the ground. By CNVC convention, dwarf shrubs are included in the herb layer.

dwarf shrubland: see "physiognomy".

edaphic: resulting from, or influenced by, factors inherent in the soil or other substrates rather than climatic factors.

edatope: refers to a specific combination of soil moisture regime and soil nutrient regime.

eolian: see "soil parent material".

ericaceous species: species of the family Ericaceae (e.g., *Vaccinium myrtilloides*)

eutrophic: nutrient-rich, as in water or substrate.

existing vegetation: plant species and vegetation structure found at a given location at the time of observation (as opposed to potential vegetation).

feathermoss: a group of moss species with featherlike branches that often form extensive ground cover, especially under closed coniferous canopies. The main feathermoss species are *Pleurozium schreberi, Ptilium crista-castrensis,* and *Hylocomium splendens*. In parts of Canada *Kindbergia oregana, Brachythecium* spp., *Abietinella abietina, Rhytidiadelphus loreus* and *R. triquetrus* are sometimes included in the feathermoss group.

fen: a minerotrophic peatland receiving water enriched by dissolved minerals; water levels often fluctuate; fens can be treed or non-treed, but vegetation is typically dominated by shrubs, graminoid species and brown mosses. See "bog", "marsh", "swamp".

fidelity: the degree to which occurrence of a species is confined to a given vegetation type or habitat condition.

fine loam: see "soil rooting zone substrate".

fine sand: see "soil rooting zone substrate".

fire cycle: the theoretical time (in years) required to burn an area equivalent to the size of the area of interest. For CNVC factsheet descriptions, the areal units are the Homogeneous Fire Regime (HFR) zone(s), defined by Boulanger et al. (2014), in which the CNVC unit occurs. Within each HFR zone, fire cycle was calculated as: 100 / (percent annual area burned). For portions of some HFR zones, CNVC interpretation of fire cycle was modified by additional information from published regional studies. CNVC Fire cycle classes are:

short: (<100 years)

intermediate: (100-270 years)

long: (270-500 years)

very long: (>500 years)

fluvial: see "soil parent material".

folic: see "Folisolic soil".

Folisolic soil: in the Canadian System of Soil Classification, a great group of soils in the Organic order composed of upland organic (folic) materials, generally of forest origin, that are either 40 cm or more in thickness, or are at least 10 cm thick if overlying bedrock or fragmental material.

forb: a non-graminoid herb with relatively broad leaves and/or showy flowers, including monocots and dicots.

forb meadow: see "physiognomy".

forest: see "physiognomy".

Formation (CNVC/USNVC): a combination of dominant and diagnostic growth forms that reflect global macroclimatic conditions as modified by altitude, seasonality of precipitation, substrates, and hydrologic conditions. For example, **F001 Boreal Forest and Woodland**. The Formation is third (from the top) level in the CNVC / USNVC hierarchy.

Formation Class (CNVC/USNVC): a broad combination of general dominant growth forms that are adapted to basic moisture, temperature, and/or substrate or aquatic conditions. For example, **C01 Forest and Woodland**. The Formation Class is the first (top) level in the CNVC / USNVC hierarchy.

Formation Subclass (CNVC/USNVC): a combination of general dominant and diagnostic growth forms that reflect global mega- or macroclimatic factors driven primarily by latitude and continental position, or that reflect overriding substrate or aquatic conditions. For example, **S15 Temperate & Boreal Forest & Woodland**. The Formation Subclass is the second (from the top) level in the CNVC / USNVC hierarchy.

glacial outwash (soil and landform): sediments that were carried by glacial meltwater and deposited away from a receding glacier. See "soil parent material - glaciofluvial".

glaciofluvial: see "soil parent material".

glaciolacustrine: see "soil parent material".

glaciomarine: see "soil parent material".

Gleysolic soil: in the *Canadian System of Soil Classification*, soils in the Gleysolic order that are saturated with water and under chemical reducing conditions either continuously or during some period of the year, as indicated either by gleying (a greenish-blue-grey soil colour) or mottling in the soil profile.

graminoid: a flowering, monocotyledonous herb with relatively long, narrow leaves and inconspicuous flowers with some parts reduced to bracts, primarily including grasses (Poaceae), sedges (Cyperaceae), and rushes (Juncaceae).

grassland: see "physiognomy".

Group (CNVC): 1) for upland vegetation that includes zonal vegetation: an aggregation of Alliances within the regional vegetation defined by a Macrogroup, with consistency in dominant and/or diagnostic species. Groups describe regionally generalized vegetation patterns attributable to ecological drivers such as edaphic or geological conditions within the Macrogroup (subtype), successional relationships within the Macrogroup (subtype), etc. For example, **CG0014 Cordilleran Boreal Mesic Trembling Aspen - White Spruce Forest**. 2) for azonal vegetation: a vegetation unit that is defined by a relatively small set of diagnostic plant species (including dominants and codominants), broadly similar composition, and diagnostic growth forms that reflect regional mesoclimate, geology, substrates, hydrology, and disturbance regimes. The Group is the sixth (from the top) level in the CNVC hierarchy.

growth form: a plant's morphology as it reflects its physiological adaptation to the environment.

habitat: the living place of an organism or biological community, characterized by the combination of its physical and biotic properties together with intrinsic ecological processes.

hardwood: broad-leaved tree species; a term typically used in Canada to contrast with conifer tree species. Most broad-leaved species in Canada are cold-deciduous (e.g., *Populus* spp.) but some are evergreen (e.g., *Arbutus menziesii*).

heath species: see "ericaceous species".

herb: a nonwoody vascular plant; includes pteridophytes, forbs and graminoids.

herbaceous vegetation: vegetation dominated by herbs.

horizon (soil): a layer of soil or soil material approximately parallel to the land surface that differs from adjacent genetically related layers in properties such as colour, structure, texture, consistence, and chemical, biological, and mineralogical composition.

humus: the fraction of soil organic matter remaining after most of the plant and animal residues have decomposed. It is dark coloured and amorphous.

humus form: partially decomposed organic materials that accumulate at the soil surface on terrestrial and semi-terrestrial sites, classified according to occurrence and relative thickness of soil organic horizons as well as the degree and mechanism of humus incorporation into mineral soil horizons. The CNVC recognizes four classes of humus forms (Expert Committee on Soil Survey 1982):

moder: a terrestrial humus form characterized by unmatted, partially decomposed plant material; decomposition results primarily from the activity of soil fauna; in moder humus forms, decomposed organic matter is weakly incorporated into the surface mineral soil by soil fauna, but the organic layers are typically distinct from the mineral soil.

mor: a terrestrial humus form characterized by raw plant material, usually matted, with a distinctive boundary that occurs at the mineral soil surface; fungal activity is the primary method of decomposition.

mull: a terrestrial humus form characterized by an intimate mixture of well-humified organic matter and mineral soil; decomposition is primarily the result of soil faunal activity; mixing of organic matter with underlying mineral soil is the result of the activity of burrowing soil fauna (primarily earthworms).

peatymor: a semiterrestrial humus form that develops under conditions of prolonged soil saturation due to elevated water tables; characterized by an accumulation of peat that is less than 40 cm deep.

hydric: pertaining to a habitat that has or requires abundant moisture.

hydromorphic: pertaining to plants having structural or functional adaptations for living in water-dominated or aquatic habitats.

indicator species: a species with known fidelity to certain habitat conditions, and thus serving as an indicator of, for example, climate, soil moisture, soil nutrients, flooding regime, disturbance history, etc.

krummholtz: a scrubby, stunted growth form of trees, often forming a characteristic zone at the limit of tree growth in extreme environments.

layer (vegetation): a structural component of a plant community defined by dominant growth form(s) of approximately the same height (e.g., tree, shrub, herb, or non-vascular layer).

lacustrine: see “soil parent material”.

lichen: a composite plant consisting of a fungus living in symbiosis with an alga.

lithology: study or description of the macroscopic features of rocks or rock formations, e.g., grain size, mineral composition, colour, etc.

lithic layer: bedrock occurring below a depth of 10 cm of a soil surface, within the vertical section upon which soil classification is based (in most Canadian soils, according to the Canadian System of Soil Classification, the minimum depth to classify a soil in the absence of a lithic layer is usually 1 m for mineral soils and 1.6 m for organic deposits).

lithomorphic: pertaining to plants having structural or functional adaptations for living on rock surfaces or in rocky substrates, i.e., particle sizes larger than 2 mm in diameter.

liverwort: a class of bryophytes (Hepaticae), either leafy (like mosses) or flattened with no differentiated stems and leaves. See “bryophyte”.

Luvisolic soil: in the Canadian System of Soil Classification, an order of soils that have eluvial (Ae) horizons, and illuvial (Bt) horizons in which silicate clay is the main accumulation product. The soils develop in base-saturated parent materials under forest or forest-grassland transition vegetation in subhumid to humid, mild to very cold climates.

Macrogroup (CNVC): The Macrogroup is the fifth (from the top) level in the CNVC / USNVC hierarchy.
1) For upland vegetation that includes zonal vegetation: a regionally distinct subset of plant species composition, abundance and/or dominance, representing primary regional climatic gradients as reflected in vegetation patterns on circum-mesic ("zonal") sites. For example, **M496 West-Central North American Boreal Forest**. 2) For azonal vegetation: a vegetation unit that contains moderate sets of diagnostic plant species and diagnostic growth forms that reflect subcontinental to regional biogeographic composition and subcontinental to regional mesoclimate, geology, substrates, hydrology, and disturbance regimes.

marine: see “soil parent material”.

marsh: a non-treed mineral wetland with periodic or persistent standing water that is generally nutrient-rich; vegetation is dominated by graminoids, shrubs, forbs or emergent aquatic plants. See “fen”, “bog”, “swamp”.

matrix community: a plant community that forms extensive and often contiguous cover. Matrix communities occur on the most extensive landforms and typically have wide ecological tolerances. They are often influenced by large-scale processes such as climate and fire.

meadow: a vegetation community characterized by grass and/or forb species, often occurring on moist sites.

Mediterranean: see “climate terms”.

medium (nutrient regime): see “nutrient regime classes”.

mesic : see “moisture regime classes”.

meso topoposition: topoposition at the scale of the local landscape (see topoposition). By CNVC convention, the meso topoposition classes are: crest/upper slope, mid-slope, lower/toe slope, depression, and level.

mesomorphic: pertaining to plants requiring environmental conditions of moderate moisture and temperature or which are only partially protected against desiccation.

mesophyte: a plant that grows on mesic soil moisture conditions.

mineral wetland: a wetland ecosystem characterized by minimal or no peat accumulation.

minerotrophic: nourished by mineral water; referring to wetlands that receive nutrients from flowing or percolating groundwater (and surface water), in addition to precipitation.

mixedwood: forest stands composed of both conifer and broad-leaved tree species, each representing (by CNVC convention) > 10% of the total stand canopy cover. In many mapping

applications, the cover thresholds for mixedwood designation require between 25% and 75% composition by each of the conifer and broad-leaved components.

moder: see “humus form”.

moist: see “moisture regime classes”.

moisture (climatic): see “climate terms”.

moisture regime class: the available moisture supply for plant growth estimated in relative or absolute terms. The CNVC uses an index of relative moisture regime, defined as the potential capacity of a soil to hold, lose or receive water, as determined from the properties of the soil as well as site position on the landscape, regardless of climate. The CNVC recognizes five moisture regime classes.

> very dry: water removed extremely rapidly in relation to supply; soil is moist for a negligible time after precipitation; primary water source is precipitation.
>
> dry: water removed rapidly to very rapidly in relation to supply; soil is moist for brief periods following precipitation; primary water source is precipitation.
>
> mesic: water removed readily to somewhat slowly in relation to supply; soil may remain moist for a significant, but sometimes short, period of the year; in moderate to fine-textured soils, the primary water source is precipitation; in coarse-textured soils the primary water source is precipitation and/or limited seepage. In mesic soils, the available soil moisture reflects average climatic inputs.
>
> moist: water removed slowly enough to maintain a fairly constant moisture supply for a significant part of the growing season; soils are usually well aerated; seepage, mottling and gley colours common; primary water source is seepage.
>
> wet: water removed slowly enough to keep the water table at, above or near the soil surface for most of year; deep organic or organic over gleyed mineral soils; primary water source is the permanent water table, often with seepage.

mor: see “humus form”.

moraine: see “soil parent material”.

mottle (soil): spots or blotches of different colours or shades of colours interspersed with the dominant soil colour, usually the result of alternating aerobic and anaerobic soil conditions and indicative of poor drainage.

mull: see “humus form”.

natural vegetation: vegetation that occurs spontaneously without regular management, maintenance or species introductions / removals, and that generally has a strong component of native species; where anthropogenic impacts are apparent, the resulting physiognomic and floristic patterns have a clear, naturally maintained analogue.

non-soil: see "soil rooting zone substrate".

nutrient regime class: the relative level of nutrient availability for plant growth. The CNVC recognizes four nutrient regime classes.

poor: available nutrients are low to very low.

medium: available nutrients are average.

rich: available nutrients are abundant.

saline: excess salt accumulation.

ombrotrophic: an ecological system that derives its nutrients solely (or primarily) from precipitation.

organic: see "Organic soil", "soil parent material", "soil rooting zone substrate".

Organic soil: in the *Canadian System of Soil Classification*, an order of soils that have developed dominantly from organic deposits. The majority of Organic soils are saturated for most of the year, unless artificially drained, although some of them are not usually saturated for more than a few days. They include most of the soils commonly known as peat, muck, or bog and fen soils. Most organic soils are saturated with water for prolonged periods. These soils occur widely in poorly and very poorly drained depressions and level areas in regions of subhumid to perhumid climate and are derived from vegetation that grows in such sites. However, one group of Organic soils (Folisols) consists of upland (folic) organic materials, generally of forest origin. These Folisols are well to imperfectly drained, although they may become saturated after rainfall or snowmelt.

paludification: the process of gradual peat accumulation under poor drainage conditions and a slowly rising water table.

patch (landscape): an area in a landscape differing in appearance from its surroundings. See patch community.

patch community: a plant community that forms an area of interrupted cover differing from its surroundings. Large patch communities are associated with environmental conditions that are more specific than those of matrix communities, and that are less common or less extensive in the landscape. Large patch community types are influenced by large-scale processes, but these tend to be modified by specific site features that influence the community. Small patch community types are characterized by localized, small-scale ecological processes that can be quite different from the large-scale processes operating in the overall landscape.

peatland: a wetland ecosystem characterized by an accumulation of peat ≥ 40 cm deep.

peatymor: see "humus form".

physiognomy: the structure or outward appearance of vegetation or of a plant community as expressed by the dominant growth forms. The CNVC recognizes seven physiognomy types:

forest: a vegetation community characterized by tree species > 5 m tall (by CNVC convention), the crowns of which generally form a continuous canopy with typically > 25% cover (by CNVC convention); a large area of tree-dominated stands.

woodland: a vegetation community characterized by tree species > 5 m tall (by CNVC convention), the crowns of which form a sparse, discontinuous canopy as a result of ecological limitations such as climate, shallow soils, wetlands, etc; by CNVC convention, woodland canopies are typically between 10% and 25% cover.

shrubland: a vegetation community characterized by shrub species, > 10 cm tall.

grassland: a vegetation community characterized primarily by grass species, typically occurring on arid sites.

forb meadow: a vegetation community characterized by forb species, often occurring on moist sites.

dwarf shrubland: a vegetation community characterized by shrub species that have a prostrate growth form and are <10 cm tall.

cryptogamic vegetation: vegetation characterized by cryptogamic species, typically bryophytes and lichens.

wetland: terrain that is saturated with water for sufficient time to promote wetland or aquatic processes as indicated by poorly drained soils, hydrophytic vegetation and various kinds of biological activity that are adapted to a wet environment.

plant community: a combination of plants that are co-dependent on their local habitat, and that influence one another and modify their immediate environment; also, a concrete or real unit of vegetation for survey purposes (see stand).

plot (vegetation classification): a sampling area of defined size and shape that is intended for characterizing the vegetation and habitat of a stand.

Podzolic soil: in the *Canadian System of Soil Classification*, an order of soils having B horizons in which the dominant accumulation product is amorphous material composed mainly of humified organic matter combined in varying degrees with Al and Fe. Typically, Podzolic soils occur in coarse- to medium-textured, acid parent materials, under forest or heath vegetation in cool to very cold, humid to perhumid climates.

podzolization (soil development): the process of mobilization and removal (leaching) of dissolved compounds of organic matter, aluminum and iron, as well as clay minerals, from surface (A) horizons and deposition in lower (B) horizons.

poor (nutrient regime): see “nutrient regime classes”.

potential vegetation: the plant species and vegetation structure (i.e., plant community) that would become established if all successional sequences were completed at a given location without anthropogenic interference under the present climatic and edaphic conditions. Potential vegetation is conceptually similar to 'climax vegetation', however, in areas of frequent, on-going natural disturbance (e.g., boreal climatic regions with a short fire-return interval) 'climax' is a difficult concept to apply; in these situations, the potential vegetation concept can be applied to the community that theoretically best typifies the projected successional endpoint.

presence (vegetation): percentage of plots in which a species is found (e.g., a species found in 25 of 100 plots has a presence of 25%); equivalent to "constancy" and "frequency of occurrence".

pteridophyte: a vascular plant that reproduces by spores, e.g., ferns, horsetails, etc.

regolith: the unconsolidated mantle of weathered rock and soil material overlying solid rock.

Regosolic soil: in the *Canadian System of Soil Classification*, an order of soils having no horizon development or development of the A and B horizons insufficient to meet the requirements of the other soil orders.

rich: see "nutrient regime classes".

riparian: refers to terrain, vegetation or simply a landscape position adjacent to or associated with freshwater, generally rivers and streams, but can include the fringe of lakes, ponds and flood plains.

root restricting depth: the soil depth at which root development is restricted by physical obstruction (e.g., bedrock), temperature (e.g., permafrost), or excessive moisture or chemical accumulation that inhibit root growth.

saline : see "nutrient regime classes".

seral: recognizably different stages along a successional path or sere.

seral dynamics: see "succession".

shallow soil: see "soil rooting zone substrate".

shrub: a perennial woody plant, shorter than a tree (i.e., by CNVC convention < 5 m tall), that generally has several erect or prostrate stems which give it a bushy appearance. By CNVC convention, tree species < 5 m tall are classed as shrubs.

shrubland: see "physiognomy".

silt: see "soil rooting zone substrate".

site: the place or category of places, considered from an environmental perspective, that determines the type and quality of plants that can grow there.

slope: the steepness or the degree of incline of a surface expressed either in degrees or as a percentage. The CNVC convention is to express slope as a percentage.

soil: naturally occurring, unconsolidated mineral material or organic material greater than 10 cm thick that occurs at the earth's surface and is capable of supporting plant growth; soil development involves climatic and biotic factors, as conditioned by relief and hence water regime, acting through time on geological materials and thus modifying the properties of the soil parent material.

soil parent material: the unconsolidated and more or less chemically unweathered material from which soil develops by pedogenic processes. The CNVC recognizes thirteen classes of soil parent materials:

anthropogenic: human-made or human-modified materials such that their initial physical properties have been drastically altered.

bedrock: the solid rock underlying soil and the regolith or exposed at the ground surface.

colluvium: heterogeneous mixture of soil materials that has reached its present position as a result of direct, gravity-induced movement; usually associated with steep slopes.

eolian: referring to mineral particles moved and sorted by wind; usually fine sands and coarse silt.

fluvial: pertaining to rivers and streams, or to features produced by the actions of rivers and streams. Fluvial soil deposits are generally coarse textured and stratified.

glaciofluvial: deposits and landforms produced by meltwater streams flowing from wasting glacier ice. Glaciofluvial deposits are generally coarse textured.

glaciolacustrine: pertaining to or characterized by glacial and lacustrine conditions; deposits made in lakes affected by glacier ice or by meltwaters flowing directly from glaciers. Glaciolacustrine deposits are generally stratified silt, clay and/or fine sand.

glaciomarine: relating to process or deposits that involve the action of glaciers and the sea or the action of glaciers in the sea; sediments of a glacial origin laid down from suspension in a marine environment in close proximity to glacier ice. Glaciomarine sediments are generally fine textured.

lacustrine: referring to freshwater lakes; sediments deposited on a lake bed generally consisting of stratified fine sand, silt and/or clay.

marine: unconsolidated deposits of clay, silt, sand, or gravel that are well to moderately well sorted and well to moderately stratified (in some places containing shells) that have settled from suspension in salt or brackish water bodies or have accumulated at their margins through shoreline processes such as wave action and longshore drift.

moraine / till: a heterogeneous mixture of soil and rock, typically unsorted and unstratified, which has been transported and deposited directly by glacial ice; moraines form a variety of surficial landforms that can occur in both currently glaciated and formerly glaciated regions.

organic: sediments of mostly organic materials resulting from the accumulation of decayed vegetative matter; usually ≥ 40 cm thick.

undifferentiated: a layered sequence of more than three types of genetic material outcropping on a steep erosional escarpment.

soil rooting zone substrate: substrate classes within the zone of maximum rooting. For soil texture class definitions. The CNVC recognizes ten classes of soil rooting zone substrates:

non-soil: bedrock, or coarse colluvium e.g., talus.

shallow soil: soils that have a root restricting depth of < 20 cm.

coarse sand: soils with a B horizon texture of very coarse sand, coarse sand, medium sand, loamy sand, loamy coarse sand, or loamy medium sand.

fine sand: soils with a B horizon texture of fine sand or loamy fine sand.

coarse loam: soil with a B horizon texture of very fine sand, loamy very fine sand, loam, any sandy loam.

fine loam: soils with a B horizon texture of loam, silty clay loam, or any sandy clay loam.

silt: soils with a "B" horizon texture of silt or silt loam.

clay: soils with a B horizon texture of clay, heavy clay, silty clay, or sandy clay.

organic: organic soils (including Fibrisols, Mesisols and Humisols) that are ≥ 40 cm depth; or woody substrate.

ash: soils that consist of unconsolidated volcanic ash.

soil texture: see "texture".

Solonetzic soil: in the *Canadian System of Soil Classification*, an order of soils having B horizons that are very hard when dry and swell to a sticky mass of very low permeability when wet. They occur on saline parent materials in some areas of the semiarid to subhumid Great Plains of west-central Canada in association with Chernozemic soils and to a lesser extent with Luvisolic and Gleysolic soils. Most Solonetzic soils are associated with a vegetative cover of grasses and forbs.

stand: an uninterrupted unit of vegetation, homogeneous in species composition and vegetation structure, with uniform habitat conditions.

stratum: a distinct layer within a plant community; a component of structure. The four strata recognized in the CNVC are: overstory trees, understory woody shrubs and regenerating trees, understory herbs and dwarf shrubs, and bryophytes and lichens.

structure (vegetation): the spatial pattern of growth forms in vegetation or a plant community, especially with regard to height, abundance, or cover within individual layers.

subassociation: represents species occurrences or dominance patterns that do not indicate ecological differences strong enough to warrant recognition at the association rank.

submesic: a soil moisture condition between dry and mesic.

succession: the temporal progression within vegetation or a plant community whereby one plant species is replaced by another until a stable species assemblage (plant community) for a particular environment is attained.

swamp: a minerotrophic wetland with vegetation characterized by woody plants (trees and/or tall shrubs); swamps can be either peatlands or mineral wetlands. See "fen", "marsh", "bog".

telluric: of or proceeding from the earth or soil; telluric water is flowing groundwater.

temperate (climatic): see “climate terms”.

texture (soil): the relative proportions by weight of different-sized particles; soil texture classes are illustrated in the texture triangle, available: Agriculture and AgriFood Canada, Glossary of Terms in Soil Science, texture.

till: see “soil parent material”.

topoposition: position of a site along a topographic slope gradient. CNVC topoposition classes include crest/upper slope, mid-slope, lower-toe slope, depression, and level.

toposequence: a sequence of related soils and/or plant communities that differ due to the influence of relative topographic positions.

tree: a perennial woody plant, typically with a single stem and a more or less definite crown, that is capable of growing > 5 m tall (by CNVC convention).

type: see “vegetation type”.

undifferentiated soil: see “soil parent material”.

USNVC: United States National Vegetation Classification.

vegetation: the collective plant cover over an area; the total of the plant communities of a region; the mosaic of plant communities in the landscape.

vegetation type: an abstract grouping of plant communities (e.g., association, alliance) that have similarity in species composition, and physiognomy or structure.

Vertisolic soil: in the *Canadian System of Soil Classification*, an order of soils that occur in heavy textured materials (> 60% clay) that shrink and swell due to wetting and drying. As a result, horizons diagnostic of other soil orders have either been prevented from forming or have been severely disrupted. The major areas of Vertisolic soils occur in the cool, subarid to subhumid, grassland portion of the Great Plains of west-central Canada.

very dry: see “moisture regime classes”.

wet: see “moisture regime classes”.

wetland: see “physiognomy”.

woodland: see “physiognomy”.

xeromorphic: pertaining to plants having structural or functional adaptations to prevent water loss by evaporation.

zonal sites: sites that best reflect the regional climate and are least influenced by the local topography and/or soil properties. They tend to have intermediate soil moisture and nutrient regimes, mid slope positions on gentle to moderate slopes, with moderately deep to deep soils and free drainage; see "azonal sites".

zonal vegetation: potential vegetation characteristic of zonal sites.

Appendix 8. Association Factsheet

This Appendix describes the fields found on each of the five major sections of the Association factsheet template: 1) type description, 2) distribution, 3) vegetation summary, 4) site / soil characteristics and 5) references. This information is also provided on the CNVC website (http://cnvc-cnvc.ca/glossary.cfm?series=Understanding%20the%20Factsheet%20-%20Associations). Within each of the sections below, factsheet fields are explained from top to bottom, left to right. Definitions of various fields and their classes are provided in Appendix 7.

INDEX OF APPENDIX 8

Type Description Page(s)

Header

The header appears on every page of the factsheet and includes physiognomy, Association code and name.

Physiognomy

The Association's physiognomy, in English and French, is shown in the top left of the header. Physiognomy and class definitions are provided in Appendix 7. The physiognomy classes that have so far been used in Association factsheets include:

Forest / Forêt;

Shrubland / Arbustaie;

Wetland / Toubière boisée; and

Woodland / Forêt ouverte.

Association code

A unique identifier for the Association (see report section ***CNVC Type Name and Code Standards***).

Association name

A unique taxonomic name for the Association using scientific plant species nomenclature, followed by the English and French common species names (see report section ***CNVC Type Name and Code Standards***). Botanical nomenclature standards are provided in Appendix 4.

Subassociations, CNVC Alliance and CNVC Group

This section lists the CNVC hierarchy information for the Association. For more information on the CNVC hierarchy, see report section ***CNVC Principles and Hierarchy: Hierarchy***. Definitions of these terms are provided in Appendix 7.

Type Description

Concept

Conceptual description of the association. It includes statements summarizing the characteristic elements of the vegetation (using common and scientific names) as well as the habitat, the dynamics and distribution of the association.

Vegetation

A description of the vegetation characteristics of the Association, including common, dominant and diagnostic species, typical community structure and physiognomy (see also ***Vegetation Summary*** section below). Botanical nomenclature standards are provided in Appendix 4. Usually diagnostic, dominant and characteristic species are listed within strata (tree, shrub, herb, moss and lichen), in decreasing order of presence. Typically, only species present in > 60% of the plots are included in the Vegetation description. Total stratum cover, in both the Concept and Vegetation sections, are described using the following terms:

Stratum	Term	% Cover
Tree Stratum	Sparse	<25
	Open	25-40
	Moderately closed	41-60
	Closed	>60
Shrub and Herb Strata	Poorly or Lightly developed	<20
	Moderately developed	21-40
	Well developed	41-60
	Dense	>60
Moss and Lichen Stratum	Sparse, or Poorly or Lightly developed	<30
	Moderately developed	30-50
	Well developed	51-80
	Continuous	>80

Environment

A description of the site and soil characteristics of the Association, typically including climatic, site and soil conditions and any environmental factors that are important ecological process drivers of the Association (see also ***Site / Soil Characteristics*** section below). Climatic terms and fire cycle classes are described in Appendix 4.

Dynamics

A summary of the seral stage and known disturbance processes (e.g., fire, wind, flooding, biotic agent) that influence the development, temporal stability and within-stand structural and physiognomic patterns of the Association. When possible, an interpretive assessment of the successional relationships between the Association and other Associations is included.

Range

A description of the geographic range of the Association including areas represented by plot data, as well as the known range beyond the plot coverage. Plots with known coordinates are illustrated on a map of Canada in the Distribution Page(s) section of the factsheet.

Conservation Status (NatureServe)

Global (range-wide), National and Subnational (provincial/ territorial/ state) conservation status of the Association according to NatureServe's standard international protocol (http://www.natureserve.org/explorer/ranking). Conservation status is designated by a number from 1 to 5, preceded by a letter reflecting the appropriate geographic scale of the assessment (G = Global, N = National, and S = Subnational). The numbers have the following meaning:

1 = critically imperiled;

2 = imperiled;

3 = vulnerable;

4 = apparently secure; and

5 = secure.

If the conservation status of an Association has not yet been ranked at a particular geographic scale, then "NR" (Not Ranked) or "not yet determined" is used in place of rank. If the Association is not equivalent to any provincial/ territorial/ state or international community types that have been ranked by NatureServe, then "no applicable rank" is used.

Stand Photo

A photo of a representative stand of the Association is provided, when available. The photographer or agency is listed under "Source."

Edatopic Grid

An edatopic grid showing the conceptual placement of the Association on gradients of relative soil moisture and nutrient regimes is provided. The green rectangle is an estimate of the edatopic range typically occupied by the Association, inferred from soil moisture and soil nutrient regime data, where available, and expert knowledge of the vegetation condition. Edatopic representations are confirmed during the final review of each factsheet by the Description Authors (see ***References Page(s***) section below).

Footer

The footer appears on every page of the factsheet. It displays the date of factsheet generation and ISSN (International Standard Serial Number), the CNVC website address (http://cnvc-cnvc.ca), page number and copyright information. Note the date the factsheet was written may be found in the "Suggested Citation" in the References Page(s) section of the factsheet, and is also shown as the "Date of Description" in the "Source Information" section.

Distribution Page(s)

The Distribution page(s) of the factsheet provides additional information on the location of plots in Canada. It includes a list of relevant map units from various international, national and provincial/ territorial ecoregionalizations, a list of the jurisdictional units that make up the Association and a map of plot locations. In some cases, sample plots are missing coordinates, so some of the plots that make up the Association are missing from the distribution map or the ecoregionalization classes. Ecoregionalizations are reviewed by experts and edited as necessary before being finalized in the factsheet.

Distribution

The Association distribution information comes from the locations of sample plots in the jurisdictional units that form the Association. The various ecoregionalizations are either national or provincial/ territorial in scale. International and national ecoregionalization classes are given for each Association, provincial/ territorial map classes are provided where relevant.

For any of the ecoregionalizations with two levels, semi-colons distinguish level 1 classes, commas distinguish level 2 classes and colons distinguishes between level 1 classes and their nested level 2 classes.

Countries: this field is included as the intent was to include countries beyond Canada, where relevant. Distribution information currently is only provided for Canada, however.

Provinces/ Territories/ States: List of provinces and territories where the presence of the association was confirmed by statements taken into account in the description.

Terrestrial Ecozones and Ecoregions of Canada: Ecological Stratification Working Group (1995) ecozones and ecoregions (also Li et al. 2014).

Rowe's Forest Regions and Sections of Canada: Rowe (1972) forest regions and sections.

North American Agreement on Environment Cooperation (NAAEC) Commission for Environmental Cooperation (CEC) Ecoregions of North America (Levels I & II): Commission for Environmental Cooperation (1997) ecoregions.

Nature Conservancy of Canada Ecoregions: Nature Conservancy of Canada ecoregions (http://maps.tnc.org/gis_data.html).

The provincial/ territorial distribution classes are organized by jurisdiction:

Alberta: Natural Regions and Subregions of Alberta (Natural Regions Committee 2006).

British Columbia: British Columbia Ecoregion Classification Ecoregions (Demarchi 2011) and Biogeoclimatic Ecosystem Classification of British Columbia Zones and Subzones (https://www.for.gov.bc.ca/hre/becweb/system/how/index.html).

Manitoba: Ecozones and Ecoregions of Manitoba (https://www.gov.mb.ca/sd/pai/pdf/ecoregion_map_2014.pdf) and Manitoba Protected Areas Initiative Natural Regions (http://www.gov.mb.ca/sd/pai/images/maps/nat-regions.pdf). Initially no plot data were available for Manitoba so inclusion of Manitoba ecoregionalizations was done by expert process. Before publication of certain Associations in M496 West-Central Boreal Forest, some data became available and where plots were good fits with existing M496 Association concepts, these plots were added to distribution maps.

Ontario: Ecoregions (Crins et al. 2009) and Ecodistricts (Wester et al. In prep.) of Ontario.

New Brunswick: Ecological Land Classification of New Brunswick Ecoregions (The Ecosystem Classification Working Group 2007).

Newfoundland and Labrador: Ecozones and Ecoregions of Newfoundland (http://www.heritage.nf.ca/environment/ecoregions_nfld.html).

Nova Scotia: Ecological Land Classification of Nova Scotia Ecozones and Ecoregions (Neily et al. 2017).

Quebec: Bioclimatic Domains and Subdomains of Québec (https://mffp.gouv.qc.ca/forets/inventaire/inventaire-zones.jsp).

Saskatchewan: Ecozones and Ecoregions of Saskatchewan

Yukon: Ecozones and Ecoregions of the Yukon (Smith et al. 2004).

Distribution Map
A map of Canada depicting the distribution of plots used in the factsheet description. The grey background shows the extent of plot sampling.

Corresponding Types and Associations
A list of the provincial/ territorial/ regional plant community types that make up the CNVC Association and subassociations (Appendix 5). The references for these types are provided in the References section of the factsheet, under "Classification References."

Vegetation Summary Page(s)
The Vegetation Summary Page(s) of the factsheet provide a list of the plant species present in >=20% of the Association's (or subassociation's) constituent plots. Summaries are provided for the Association as well as for subassociations, where relevant. The number of plots included in the Association and subassociations are shown below the type name. Fields are described below:

Species Name and Strata
Scientific names of species are listed for each of the four strata: overstory trees, understory woody shrubs and regenerating trees, understory herbs and dwarf shrubs, and bryophytes and lichens (see Appendix 7 for definitions).
Botanical nomenclatural standards are provided in Appendix 4.
Bolding indicates species that are Diagnostic for the Association or subassociation and that appear in the Association or subassociation name (see "diagnostic species" in Appendix 7 for more information.

% Cover and % Presence
"% Cover" is the average percent cover of a species within the plots in which it occurs (i.e., characteristic cover; see also Appendix 7). "% Presence" is the percent frequency occurrence for the species within the total plots of the Association/ subassociation. These are metrics used to explain the abundance and constancy, respectively, of a species.

Species are listed in descending order of presence.

Stratum Cover Statistics, including the mean and the 10^{th}, 25^{th}, 75^{th} and 90^{th} percentile values, are provided for each of the four strata. These statistics are calculated from combined species % cover totals for each plot.

Site / Soil Characteristic Page(s)

Site and soil characteristics with their percent frequencies shown in parentheses. Definitions of each field attribute are provided in Appendix 7. Values are calculated from the Association/ subassociation constituent plots; the number of plots in the type is provided below the type name. Only classes that are relevant to the type are listed. The dominant class in each field is bolded.

Elevation Range

The minimum, mean and maximum elevations (mASL) of constituent plots. See the ***Type Description Page(s), Environment*** section above for additional comments about potential elevation range or variation throughout the geographic range.

Slope Gradient

Slope gradient classes are as follows:

Slope Gradient Class	Slope (%)
very steep	66 - 100
steep	35 - 65
moderately steep	20 - 34
moderate	11 - 19
gentle	4 - 10
level	< 4

Aspect

Aspect is the azimuth depicting site aspect, or orientation of slope face; aspect classes are as follows:

Aspect class	Azimuth (degrees)
north	316 - 45
east	46 - 135
south	136 - 225
west	226 - 315
level	slope < 4%

Meso Topoposition

Topoposition at the scale of the local landscape. The meso topoposition classes reported in Association factsheets include:

Crest / upper

Mid

Lower / toe

Depression

Level

Moisture Regime

Relative moisture regime refers to the potential capacity of a soil to hold, lose or receive water, as determined from the properties of the soil as well as site position on the landscape, regardless of climate. Reported moisture regime is usually a grouping of two data classes, as shown below. See Appendix 7 for definition of relative moisture regime classes.

Very dry (very xeric)

Dry (xeric and subxeric)

Mesic (submesic and mesic)

Moist (subhygric and hygric)

Wet (subhydric and hydric)

Nutrient Regime

Nutrient regime is the relative level of nutrients available for plant growth. Nutrient regime data were limited to Alberta, British Columbia, New Brunswick, Nova Scotia and Prince Edward Island datasets. The nutrient regime classes reported in factsheets are shown below. See Appendix 7 for definition of nutrient regime classes.

Poor (very poor and poor; oligotrophic and submesotrophic);

Medium (mesotrophic);

Rich (rich and very rich; permesotrophic and eutrophic); and

Excess saline (saline; hypereutrophic).

Soil Parent Material

Soil parent material is the unconsolidated and more or less chemically unweathered material from which soil develops by pedogenic processes. The soil parent material classes are shown below. See Appendix 7 for definition of soil parent material classes.

Anthropogenic
Bedrock
Colluvium (both colluvium and weathered bedrock)
Eolian
Fluvial
Glaciofluvial
Glaciolacustrine
Glaciomarine
Lacustrine
Marine
Moraine / till
Organic
Undifferentiated

Soil Rooting Zone Substrate

Substrate or soil texture classes within the zone of maximum rooting; classes are shown below. For definition of soil rooting zone substrate classes, see Appendix 7.

Non-soil

Sandy

Silty

Clayey

Coarse loamy

Fine loamy

Organic

Root Restricting Depth

The classes used to describe the average depth to a root restricting layer in the soil profile are: 0 - 20 cm (i.e., shallow); 21 – 100 cm (i.e., moderately deep); or > 100 cm (i.e., deep).

Humus Form

Humus form classes are defined in Appendix 7. The plot data were summarized and reported as follows.

No humus;

Mor: includes all mors, except those shown under Peatymor below;

Moder: all moders except the British Columbia (BC) class “Saprimoder” (see Peatymor);

Mull: all mulls and the BC class “Hydromull”; and

Peatymor: also incudes the BC classes “Fibrimor,” “Mesimor” and “Saprimoder”.

References Page(s)

Additional Characteristics

Where these fields have not yet been determined for an Association, this box remains blank.

Species of High Conservation Concern

A list of species with fidelity to the Association that have known conservation significance (e.g., known rare species, endemic species, etc.). Species whose significance is based on an external assessment (e.g., COSEWIC listed species, or species with S- or G-rankings indicating they are not secure), are noted in square brackets. This list could include wildlife species with conservation significance for which the Association is known to constitute critical habitat.

Non-native Species

A list of non-native species (including invasive species) with fidelity to the Association.

Management Issues

A list of considerations relating to management of the Association, including known invasive species, restoration requirements / activities, habitat-related management considerations, etc.

Type Statistics

Internal similarity: Statistic that indicates internal variability / similarity within the association / subassociations. Not yet developed.

Strength: Statistic that indicates variability / similarity between the association and similar CNVC associations. Not yet developed.

Confidence: An estimation of the confidence of the classification. It is determined by experts within the bioregional review teams that confirm the Association. Confidence classes and their definitions follow:

> **high:** classification of the Association is based on quantitative analysis of plot data that represents the geographic distribution and habitat range of the vegetation type. Plots that form the basis of closely related types have been compared.
>
> **medium:** classification of the Association is lacking in either geographic scope or degree of quantitative characterization and subsequent comparison with related types, or plot data are published only as a comprehensive summary (floristic) table.
>
> **low:** classification of the Association is based on plot data that are incomplete; or, based on informal analysis, anecdotal information, or community descriptions that are not accompanied by plot data, or if so, only in an incomplete summary (floristic) table such as only reporting dominant or characteristic species of a type.

Related Concepts

Comparisons to other similar CNVC Associations or types from other classifications are shown in this section.

Similar CNVC Associations: A list of CNVC Associations that share similar floristic characteristics to the Association described in the factsheet.

Related United States National Vegetation Classification Associations: A list of names and codes of USNVC associations that are conceptually related to the CNVC Association described in the factsheet. Comparisons to USNVC associations have not yet been made.

Relationships with Other Classifications: A list of types in other published classifications that are conceptually related to the CNVC Association, not including the provincial antecedent classification units listed on the Distribution page.

Comments

Background information that provides insight and improves understanding of the Association and/ or additional information on species nomenclature including sub-taxa.

Source Information

This section provides information on the data or other sources used to classify the Association. Authors and dates of both the concept and of the factsheet description are provided.

Number of source plots for Association: the number of plots included in the classification of the Association.

Information Sources: A list of source databases, with plots that are incorporated in the Association description. Other information sources may be listed here or in the Classification References subsection.

Concept Authors: Authors of the Association and its subassociations, including members of the analysis team and the bioregional peer review panel.

Description Authors: Authors of the current version of the factsheet.

Date of Concept: Date of confirmation of the Association and its subassociations by the bioregional peer review panel.

Date of Description: The date the factsheet was written. Note the date in the footer is the date the factsheet was printed to downloadable pdf format.

Classification References
A list of references for data and procedural stages employed in developing the Association.

Characterization References
A list of references associated with data and other information sources employed in developing the factsheet description.

Suggested Citation
Please use the suggested citation when citing this factsheet. The scientific name is the official name for the Association so should be used instead of the common name. When accessing the factsheet from the CNVC website or NRCan – CFS publications, please enter the date in "ENTER DATE ACCESSED".

The date that follows the scientific name is the date of description, which is the date the factsheet was written.

Appendix 9. Macrogroup Factsheet

This Appendix describes the fields of the Macrogroup factsheet. Fields are explained from top to bottom, left to right. Definitions of various fields and their classes are provided in the Appendix 7.

Header

The header appears on every page of the factsheet and includes the Macrogroup name in English and French and, on the right, its code (see report section ***CNVC Type Name and Code Standards***).

Hierarchy

This section lists the CNVC hierarchy information for the Macrogroup. It includes one level above the Macrogroup, the Division, and lists the Macrogroup subtypes (where relevant) and any classified Groups below it. For more information on the CNVC hierarchy, see report section: *CNVC Classification Principes and Hierarchy: Hierarchy*. Definitions of these terms are also provided in Appendix 7.

Map

A range map for the Macrogroup is provided.

Concept

An abstract (i.e., summary) of the Macrogroup's vegetation, environment, dynamics, range and sub-type characteristics.

Photos

Representative landscape and stand-level photos are provided, when available. Captions and photographer or agency sources are provided below the photos.

Footer

The footer appears on every page of the factsheet. It displays the ISSN (International Standard Serial Number), CNVC website address (http://cnvc-cnvc.ca), date of factsheet generation, page number and copyright information. Note the date the factsheet was written may be found in the "Suggested Citation" below the References section of the factsheet, and is also shown as the "Date of Description" in the "Source Information" section.

Vegetation

A description of the vegetation characteristics of the Macrogroup and its sub-types (if present), including sub-sections on physiognomy and structure, floristics and dynamics. Botanical nomenclature standards are provided in Appendix 4.

Environment

A description of the environment characteristics of the Macrogroup and its subtypes (if present), including sub-sections on climate and physical features (physiography, geology, topography and soils). Climate terms are explained in Appendix4.

Distribution and Geographic Range

This section describes the Canadian and global ranges of the Macrogroup and provides a map of the Canadian plots with known coordinates that constitute the CNVC type.

Related Concepts

This section includes a list of correlated provincial/ territorial types and notes about similar Macrogroups in both the CNVC and United States National Vegetation Classification (USNVC).

Comments

Various comments relevant to the Macrogroup are included in this section. Comments further explain relationships with other CNVC and USNVC Macrogroups, specific terminology used in the factsheet (e.g., "parkland") or a specific ecological or geographic context (e.g., risk status), as well as providing additional information about species biology or nomenclature, and Macrogroup subtypes and Groups.

Source Information

This section provides information on the data or other sources used to classify the Macrogroup. Authors and dates of both the concept and of the factsheet description are provided.

Number of source plots for Macrogroup: the number of plots included in the classification of the Macrogroup.

Information Sources: A list of source databases, with plots that are incorporated in the Macrogroup description. Other information sources may be listed here or in the References section.

Concept Authors: Authors of the Macrogroup and its subtypes, including members of the analysis team and the bioregional peer review panel.

Description Authors: Authors of the current version of the factsheet.

Date of Concept: Date of confirmation of the Macrogroup and its subtypes by the bioregional peer review panel.

Date of Description: The date the factsheet was written. Note the date in the footer is the date the factsheet was printed to downloadable pdf format.

References

A list of references employed in developing the factsheet description.

Suggested Citation

Please use the suggested citation when citing this factsheet. Enter the date you accessed the factsheet on the website where it says "ENTER DATE ACCESSED".

Note that both the date of description, which is the date the factsheet was written, and the date the factsheet was generated are included.

Comparison of Vegetation Characteristics

One or more summary tables of the "% constancy" and "% cover" of plant species by strata for a selected set of related types (i.e., Macrogroups within a Division; subtypes within a Macrogroup). A legend at the bottom of each table relates the symbols used in the table to their constancy and cover values. Botanical nomenclature standards are provided in Appendix 4.