



Canadian National Vegetation Classification (CNVC) Classification nationale de la végétation du Canada (CNVC)

<http://cnvc-cnvc.ca>

Forest / Forêt

Association CNVC00093

Picea glauca* – *Abies balsamea* – *Betula papyrifera* – *Populus tremuloides* / *Rosa acicularis* / *Aralia nudicaulis

White Spruce – Balsam Fir – Paper Birch – Trembling Aspen / Prickly Rose / Wild Sarsaparilla

Épinette blanche – Sapin baumier – Bouleau à papier – Peuplier faux-tremble / Rosier aciculaire / Aralie à tige nue

Subassociations: none

CNVC Alliance: CA00025 *Picea glauca* – *Abies balsamea* – *Populus tremuloides* / *Rosa acicularis* / *Aralia nudicaulis*

CNVC Group: CG0011 Central Boreal Mesic-Moist Trembling Aspen – White Spruce Forest



Source: D. Downing

Type Description

Concept: CNVC00093 is a boreal mixedwood forest Association that ranges from Alberta to Manitoba. It has a closed canopy of white spruce (*Picea glauca*) and/or balsam fir (*Abies balsamea*), with paper birch (*Betula papyrifera*) and/or trembling aspen (*Populus tremuloides*). The shrub layer is usually moderately developed but varies depending on the patchiness of shrubs. Typically, regenerating balsam fir dominates this layer, accompanied by squashberry (*Viburnum edule*) and prickly rose (*Rosa acicularis*). The moderately developed herb layer commonly includes wild sarsaparilla (*Aralia nudicaulis*), bunchberry (*Cornus canadensis*), twinflower (*Linnaea borealis*), naked mitrewort (*Mitella nuda*), dwarf raspberry (*Rubus pubescens*), arctic sweet coltsfoot (*Petasites frigidus*), tall bluebells (*Mertensia paniculata*) and wild lily-of-the-valley (*Maianthemum canadense*). The moss layer is poorly to moderately developed depending on the amount of broad-leaf litter on the forest floor. It usually includes red-stemmed feathermoss (*Pleurozium schreberi*), knight's plume moss (*Ptilium crista-castrensis*) and stairstep moss (*Hylocomium splendens*). CNVC00093 is a mid-seral condition that typically succeeds an early seral, post-fire Association. It occurs in a region with a subhumid continental boreal climate, usually on mesic to moist, nutrient-medium to rich sites.

Vegetation: CNVC00093 is a mixedwood forest Association with a closed canopy consisting of the conifer species *Picea glauca* and/or *Abies balsamea* and the hardwood species *Betula papyrifera* and/or *Populus tremuloides*, in various combinations. *Populus balsamifera* can also be a minor canopy associate. The shrub layer varies from poorly to well developed depending on the patchiness of shrubs, particularly of *A. balsamea* which usually dominates. *Viburnum edule* and *Rosa acicularis* are also typically present. The moderately developed herb layer commonly includes *Aralia nudicaulis*, *Cornus canadensis*, *Linnaea borealis*, *Mitella nuda*, *Rubus pubescens*, *Petasites frigidus*, *Mertensia paniculata* and *Maianthemum canadense*. The moss layer is poorly to moderately developed and usually includes *Pleurozium schreberi*, *Ptilium crista-castrensis* and *Hylocomium splendens*. The moss layer is typically better developed in stands with less broad-leaf litter (i.e., greater conifer cover).

Environment: CNVC00093 occurs in a subhumid continental boreal climate. It is most frequently found on mesic to moist, nutrient-medium to rich sites. Stands are usually on level sites or gentle slopes, and occur on a wide range of topographies. Soils are typically deep, but textures and parent materials are variable (morainal, glaciofluvial, fluvial and lacustrine deposits). Mor humus forms are common.

Regional fire cycles are intermediate (100-270 years) within the range of CNVC00093. Stands are found most frequently on sites that have escaped fire for an extended period, such as on islands or in topographic breaks near rivers or lakes.

		Soil Nutrient Regime		
		Poor	Medium	Rich
Soil Moisture Regime	Dry			
	Mesic			
	Moist			
	Wet			



Picea glauca* – *Abies balsamea* – *Betula papyrifera* – *Populus tremuloides* / *Rosa

Type Description (cont'd)

Dynamics: CNVC00093 is a mid-seral condition that can succeed early seral Associations that establish after fire (e.g., CNVC00094 [*Populus tremuloides* / *Rosa acicularis* – *Viburnum edule*]). *Picea glauca* and *Abies balsamea* are usually eliminated by fire, but the pioneer species *Betula papyrifera* and *Populus tremuloides* are adapted to disturbance. Following any disturbance that does not kill their roots, they can reproduce vegetatively, *B. papyrifera* from stump sprouts and *P. tremuloides* from root suckers. These species also produce abundant, light, wind-dispersed seeds that can readily colonize mineral soil seedbeds exposed by disturbance. Both species grow rapidly in full-light conditions but are intolerant of shade so do not replace themselves in a stand without further disturbance. The shade tolerant conifers *P. glauca* and *A. balsamea* become established in these stands when seeds are disseminated from nearby areas, with trees growing into the canopy and forming CNVC00093 as the pioneer hardwood species decline. If seed sources are available, *P. glauca* sometimes re-colonizes at approximately the same time as the hardwoods, but it grows more slowly so usually requires several decades to attain canopy height. Prolonged absence of fire can lead to the development of CNVC00103 [*Picea glauca* – *Abies balsamea* / *Rosa acicularis* / *Aralia nudicaulis*].

Harvesting and natural disturbances, such as outbreaks of spruce budworm (*Choristoneura fumiferana*) or windthrow events, help to maintain CNVC00093 on the landscape. Canopy openings that result from these disturbances can provide opportunities for the hardwood species to regenerate from seeds or sprouts, maintaining the mixedwood condition.

Forest tent caterpillar (*Malacosoma disstria*) and *Armillaria* root disease (*Armillaria* spp.) can have significant impacts on *P. tremuloides*. Defoliation by the caterpillar can reduce growth, cause dieback and sometimes lead to mortality. *Armillaria* spp. can weaken and/or kill trees or small groups of trees. Canopy openings that result from insect or pathogen disturbance can promote forest succession by enhancing the growth of *P. glauca* and *A. balsamea* in the understory.

Range: CNVC00093 occurs in the boreal region of west-central Canada from Alberta to Manitoba.

Conservation Status (NatureServe)

Global Conservation Rank: no applicable rank

National Conservation Rank: not yet determined

Subnational Conservation Rank: not yet determined



Canadian National Vegetation Classification (CNVC)
 Classification nationale de la végétation du Canada (CNVC)

<http://cnvc-cnvc.ca>

Forest / Forêt

Association CNVC00093

Picea glauca – *Abies balsamea* – *Betula papyrifera* – *Populus tremuloides* / *Rosa acicularis* / *Aralia nudicaulis*

White Spruce – Balsam Fir – Paper Birch – Trembling Aspen / Prickly Rose / Wild Sarsaparilla

Épinette blanche – Sapin baumier – Bouleau à papier – Peuplier faux-tremble / Rosier aciculaire / Aralie à tige nue

Distribution

Countries: Canada

Provinces / Territories / States: Alberta, Manitoba, Saskatchewan

Terrestrial Ecozones and Ecoregions of Canada: Boreal Plains: Boreal Transition, Mid-Boreal Lowland, Mid-Boreal Uplands, Wabasca Lowland, Western Boreal

Rowe's Forest Regions and Sections of Canada: Boreal: Manitoba Lowlands, Mixedwood, Upper Churchill, Upper Mackenzie

NAAEC CEC Ecoregions of North America (Levels I & II): Northern Forests: Boreal Plains

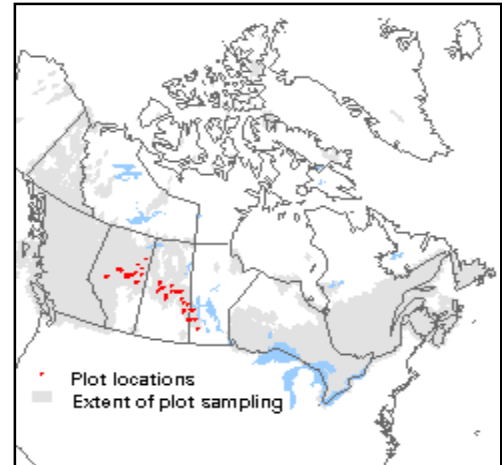
Nature Conservancy of Canada Ecoregions: Boreal Plains

Natural Regions and Subregions of Alberta: Boreal Forest: Central Mixedwood

Ecozones and Ecoregions of Saskatchewan: Boreal Plain: Boreal Transition, Mid-Boreal Lowland, Mid-Boreal Upland

Ecozones and Ecoregions of Manitoba: Boreal Plains

Manitoba Protected Areas Initiative Natural Regions: Manitoba Lowlands, Western Upland



Corresponding Types and Associations

CNVC00093	Alberta	NN/BM/D/01/09	Aw / balsam fir
		NN/BM/D/02/08	Aw - Sw / balsam fir / feather moss
		NN/BM/E/02/04	Pb - Sw / balsam fir / fern
	Saskatchewan	BP11	White birch - white spruce - balsam fir: Fresh sandy clay loam



Forest / Forêt

Association CNVC00093

***Picea glauca* - *Abies balsamea* - *Betula papyrifera* - *Populus tremuloides* / *Rosa acicularis*
 / *Aralia nudicaulis***

White Spruce - Balsam Fir - Paper Birch - Trembling Aspen / Prickly Rose / Wild Sarsaparilla

Épinette blanche - Sapin baumier - Bouleau à papier - Peuplier faux-tremble / Rosier aciculaire / Aralie à tige nue

Vegetation Summary*

Species Name [†]	Association CNVC00093	
	55 plots	
	% Cover [‡]	% Presence [^]
Overstory Trees		
<i>Picea glauca</i>	20	84
<i>Abies balsamea</i>	18	80
<i>Betula papyrifera</i>	33	73
<i>Populus tremuloides</i>	19	69
<i>Populus balsamifera</i>	11	42
Tree Stratum Cover (P₁₀ P₂₅ Mean P₇₅ P₉₀)[‡]	(36 58 70 89 100)	
Understory Woody Shrubs and Regenerating Trees		
<i>Viburnum edule</i>	5	85
<i>Abies balsamea</i>	19	82
<i>Rosa acicularis</i>	3	80
<i>Populus tremuloides</i>	2	45
<i>Picea glauca</i>	5	44
<i>Ribes triste</i>	1	40
<i>Lonicera involucrata</i>	3	36
<i>Betula papyrifera</i>	2	36
<i>Ribes lacustre</i>	1	31
<i>Populus balsamifera</i>	1	29
<i>Rubus idaeus</i>	2	27
<i>Ribes oxycanthoides</i>	1	25
<i>Alnus viridis</i>	5	24
<i>Symphoricarpos albus</i>	2	22
Shrub Stratum Cover (P₁₀ P₂₅ Mean P₇₅ P₉₀)[‡]	(5 16 32 44 58)	
Understory Herbs and Dwarf Shrubs		
<i>Aralia nudicaulis</i>	11	85
<i>Cornus canadensis</i>	6	84
<i>Linnaea borealis</i>	3	80
<i>Mitella nuda</i>	2	75
<i>Rubus pubescens</i>	3	69
<i>Petasites frigidus</i>	2	67
<i>Mertensia paniculata</i>	2	65
<i>Maianthemum canadense</i>	1	64
<i>Lysimachia borealis</i>	1	47
<i>Galium boreale</i>	1	45
<i>Pyrola asarifolia</i>	1	45
<i>Viola renifolia</i>	1	44



***Picea glauca* - *Abies balsamea* - *Betula papyrifera* - *Populus tremuloides* / *Rosa acicularis*
 / *Aralia nudicaulis* CNVC00093**

Vegetation Summary (cont'd)*

Species Name [†]	Association CNVC00093	
	% Cover [‡]	% Presence [^]
<i>Fragaria virginiana</i>	1	38
<i>Orthilia secunda</i>	1	35
<i>Calamagrostis canadensis</i>	3	33
<i>Lycopodium annotinum</i>	2	33
<i>Symphytotrichum ciliolatum</i>	1	25
<i>Lathyrus ochroleucus</i>	1	24
<i>Equisetum sylvaticum</i>	1	22
<i>Equisetum arvense</i>	1	22
<i>Galium tricornerutum</i>	1	22
Herb Stratum Cover (P₁₀ P₂₅ Mean P₇₅ P₉₀)[‡]	(7 13 31 40 60)	
Bryophytes and Lichens		
<i>Pleurozium schreberi</i>	9	75
<i>Ptilium crista-castrensis</i>	10	69
<i>Hylocomium splendens</i>	13	67
<i>Cladonia</i> sp.	1	44
<i>Brachythecium salebrosum</i>	1	36
<i>Pylaisia polyantha</i>	1	31
<i>Parmelia sulcata</i>	1	31
<i>Eurhynchium pulchellum</i>	1	29
<i>Plagiomnium cuspidatum</i>	1	29
<i>Evernia mesomorpha</i>	1	25
<i>Sanionia uncinata</i>	1	24
<i>Peltigera</i> sp.	1	24
<i>Ptilidium pulcherrimum</i>	1	24
Bryo-Lichen Stratum Cover (P₁₀ P₂₅ Mean P₇₅ P₉₀)[‡]	(0 6 28 34 81)	

* species present in > 20% of sample plots are listed

[†] see **Botanical Nomenclature** link at <http://cnvc-cnvc.ca> for botanical sources, synonyms and common names

[‡] average percent cover of a species within the plots in which it occurs (i.e., characteristic cover)

[^] percent frequency occurrence for a species within the total plots

[‡] P_x = Xth percentile (e.g., P₁₀ = 10th percentile)



Forest / Forêt

Association CNVC00093

Picea glauca – *Abies balsamea* – *Betula papyrifera* – *Populus tremuloides* / *Rosa acicularis* / *Aralia nudicaulis*

White Spruce – Balsam Fir – Paper Birch – Trembling Aspen / Prickly Rose / Wild Sarsaparilla

Épinette blanche – Sapin baumier – Bouleau à papier – Peuplier faux-tremble / Rosier aciculaire / Aralie à tige nue

Site / Soil Characteristics

Association

CNVC00093

55 plots

Elevation Range (min–mean–max meters)

274–552–890

missing data (13)

Slope Gradient (% frequency)

moderate (4)

gentle (24)

level (71)

missing data (2)

Aspect (% frequency)

north (7)

east (22)

south (20)

west (18)

level (29)

missing data (4)

Meso Toposition (% frequency)

crest / upper (24)

mid (27)

lower / toe (15)

depression (2)

level (29)

missing data (4)

Moisture Regime (% frequency)

dry (4)

mesic (65)

moist (27)

wet (2)

missing data (2)

Nutrient Regime (% frequency)

poor (11)

medium (33)

rich (13)

missing data (44)



***Picea glauca* – *Abies balsamea* – *Betula papyrifera* – *Populus tremuloides* / *Rosa acicularis* / *Aralia nudicaulis* CNVC00093**

Site / Soil Characteristics (cont'd)

Association
CNVC00093

Soil Parent Material (% frequency)

eolian (4)
moraine / till (29)
fluvial (18)
glaciofluvial (22)
lacustrine (13)
glaciolacustrine (5)
organic (4)
missing data (5)

Soil Rooting Zone Substrate (% frequency)

sandy (11)
coarse loamy (5)
fine loamy (15)
silty (4)
clayey (11)
organic (4)
missing data (51)

Root Restricting Depth (% frequency)

≥ 100 cm (42)
missing data (58)

Humus Form (% frequency)

mor (51)
moder (2)
missing data (47)



Canadian National Vegetation Classification (CNVC)
Classification nationale de la végétation du Canada (CNVC)

<http://cnvc-cnvc.ca>

Forest / Forêt

Association CNVC00093

Picea glauca* – *Abies balsamea* – *Betula papyrifera* – *Populus tremuloides* / *Rosa acicularis* / *Aralia nudicaulis

White Spruce – Balsam Fir – Paper Birch – Trembling Aspen / Prickly Rose / Wild Sarsaparilla

Épinette blanche – Sapin baumier – Bouleau à papier – Peuplier faux-tremble / Rosier aciculaire / Aralie à tige nue

Additional Characteristics

Species of High Conservation Concern:

Non-native Species:

Management Issues:

Type Statistics

Internal Similarity:

Confidence:

Strength:

Related Concepts

Similar CNVC Associations:

CNVC00103 [*Picea glauca* – *Abies balsamea* / *Rosa acicularis* / *Aralia nudicaulis*] is a similar coniferous Association that occurs on comparable sites in the same range (see Dynamics).

CNVC00263 [*Picea glauca* – *Populus tremuloides* / *Rosa acicularis* / *Aralia nudicaulis*] occurs on similar sites in the same range but has less *Abies balsamea* and *Betula papyrifera* in the overstory.

Related United States National Vegetation Classification Associations:

Relationships with Other Classifications:

In southwestern Manitoba, CNVC00093 best matches the concept of ES42 [White Spruce - Trembling Aspen - Balsam Fir Mixedwood on Moist Sandy to Silty Soil] and partially matches the concepts of ES34 [White Spruce - Balsam Fir Mixedwood on Fresh Fine Loamy Soil] and ES52 [White Spruce - Balsam Fir - Trembling Aspen Mixedwood on Moist Fine Loamy to Clayey Soil] in Arnup et al. 2006.

Comments

In the subhumid climate of CM496a [Central Boreal Forest], short to intermediate fire cycles limit the occurrence of *Abies balsamea* on the landscape to fire-sheltered locations, such as islands or topographic breaks near rivers or lakes.

On the Precambrian Shield in Saskatchewan, stands similar to CNVC00093 are classified to the provincial ecosite BS11, which is included in CNVC00103 [*Picea glauca* – *Abies balsamea* / *Rosa acicularis* / *Aralia nudicaulis*].

Source Information

Number of source plots for CNVC00093: 55

Information Sources:

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

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

Concept Authors: L. Allen, K. Baldwin, K. Chapman, M. McLaughlan

Description Authors: K. Chapman and K. Baldwin

Date of Concept: September, 2011

Date of Description: February, 2016



Canadian National Vegetation Classification (CNVC)
Classification nationale de la végétation du Canada (CNVC)

<http://cnvc-cnvc.ca>

***Picea glauca* – *Abies balsamea* – *Betula papyrifera* – *Populus tremuloides* / *Rosa acicularis* / *Aralia nudicaulis* CNVC00093**

Classification References:

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.

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

Characterization References:

Abrahamson, I. 2015. *Picea glauca*. In: Fire Effects Information System. U.S. Dept. Agric., For. Serv., Rocky Mt. Res. Stn., Fire Sci. Lab., Missoula, MT, US. Available: <http://www.fs.fed.us/database/feis/plants/tree/picgla/all.html> (accessed: October 2, 2015).

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.

Bergeron, Y.; Chen, H.Y.H.; Kenkel, N.C.; Leduc, A.; Macdonald, S.E. 2014. Boreal mixedwood stand dynamics: ecological processes underlying multiple pathways. *For. Chron.* 90(2):202-213.

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(4):365-376.

Brandt, J.P.; Cerezke, H.F.; Mallett, K.I.; Volney, W.J.; Weber, J.D. 2003. Factors affecting trembling aspen (*Populus tremuloides* Michx.) health in the boreal forest of Alberta, Saskatchewan, and Manitoba, Canada. *For. Ecol. Manage.* 178:287-300.

Caners, R.T.; Kenkel, N.C. 2003. Forest stand structure and dynamics at Riding Mountain National Park, Manitoba, Canada. *Community Ecology* 4(2):185-204.

Greene, D.F.; Zasada, J.C.; Sirois, L.; Kneeshaw, D.; Morin, H.; Charron, I.; Simard, M.J. 1999. A review of the regeneration dynamics of North American boreal forest tree species. *Can. J. For. Res.* 29:824-839.

Hamel, C.; Kenkel, N. 2001. Structure and dynamics of boreal forest stands in the Duck Mountains, Manitoba. Sustainable Forest Management Network, Edmonton, AB. 2001-4.

Hildahl, V.; Campbell, A.E. 1975. Forest tent caterpillar in the prairie provinces. Canadian Forestry Service, Northern Forestry Centre, Edmonton, AB. Inf. Rep. NOR-X-135.

Howard, J.L. 1996. *Populus tremuloides*. In: Fire Effects Information System. U.S. Dept. Agric., For. Serv., Rocky Mt. Res. Stn., Fire Sci. Lab., Missoula, MT, US. Available: <http://www.fs.fed.us/database/feis/plants/tree/poptre/all.html> (accessed: May 27, 2015).

Kabzems, A.; Kosowan, A.L.; Harris, W.C. 1986. Mixedwood section in an ecological perspective: Saskatchewan. 2nd ed. Can. For. Serv., Northwest Reg., Edmonton, AB. Canada-Saskatchewan For. Resour. Dev. Agreement Tech. Bull. No. 8.

Kenkel, N.C.; Walker, D.J.; Watson, P.R.; Caners, R.T.; Lastra, R.A. 1997. Vegetation dynamics in boreal forest ecosystems. *Coenoses* 12(2-3):97-108.

Nealis, V.G. 2015. Comparative ecology of conifer-feeding spruce budworms (Lepidoptera: Tortricidae). *Can. Entomol.* 00:1-25.

Parisien, M.A.; Hirsch, K.G.; Lavoie, S.G.; Todd, J.B.; Kafka, V.G. 2004. Saskatchewan fire regime analysis. Can. For. Serv., North. For. Cent., Edmonton, AB. Info. Rep. NOR-X-394.

Peters, V.S.; Macdonald, E.; Dale, M.R.T. 2006. Patterns of initial versus delayed regeneration of white spruce in boreal mixedwood succession. *Can. J. For. Res.* 36:1597-1609.

Stockdale, C. 2014. Fire regimes of western boreal Canada and the foothills of Alberta. A discussion document and literature review for the LANDWEB Project.



Canadian National Vegetation Classification (CNVC)
Classification nationale de la végétation du Canada (CNVC)

<http://cnvc-cnvc.ca>

***Picea glauca* – *Abies balsamea* – *Betula papyrifera* – *Populus tremuloides* / *Rosa acicularis* / *Aralia nudicaulis* CNVC00093**

Characterization References (cont'd):

Uchytel, R.J. 1991. *Betula papyrifera*. In: Fire Effects Information System. U.S. Dept. Agric., For. Serv., Rocky Mt. Res. Stn., Fire Sci. Lab., Missoula, MT, US. Available: <http://www.fs.fed.us/database/feis/plants/tree/betpap/all.html> (accessed: May 27, 2015).

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. Centre, Edmonton, AB. Special Rep. 2.

The information contained in this factsheet is based on data and expert knowledge that is current to the date of description. As new information becomes available, the factsheet will be updated.

For more information about the contents of this factsheet and definitions of attribute names and data classes, see the **Understanding the Factsheet** link at <http://cnvc-cnvc.ca>.

Suggested Citation: K. Chapman and K. Baldwin. *Picea glauca* – *Abies balsamea* – *Betula papyrifera* – *Populus tremuloides* / *Rosa acicularis* / *Aralia nudicaulis* [online]. Sault Ste. Marie, Ontario, Canada: Canadian National Vegetation Classification. February, 2016; generated Jun/10/2016; cited ENTER DATE ACCESSED. 10 p. Canadian National Vegetation Classification Association: CNVC00093. Available from <http://cnvc-cnvc.ca>. System Requirements: Adobe Acrobat Reader v. 7.0 or higher. ISSN 1916-3266.