KUURURJUAQ PARK PROJECT

STATUS REPORT SEPTEMBER 2005

KATIVIK

Reference

KRG. 2005. *Kuururjuaq Park Project (Monts-Torngat-et-Rivière Koroc). Status Report.* Kativik Regional Government, Renewable Resources, Environmental and Land Use Planning Department, Parks Section, Kuujjuaq, Québec.

English Translation

Boreal Expressions

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Photographs

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Legal Deposit – 3rd Quarter
Library and Archives Canada
ISBN: 0-9738056-1-7

ᑰᕈᑦᔪᐊᑉ ᒥᕐᖑᐃᓯᕐᕕᖓᑕ ᐱᓇᓱᐊᕐᑕᐅᒍᑎᖓ

ᖃᓄᐃᓕᖓᓂᖓᑕ ᑐᓴᕐᑕᐅᒍᑎᖓ

ᓯᑎᒻᐱᕆ 2005

ᓄᓪᓕᑎᕐᓯᒪᔪᑦ

ᐁᕆᓕ 2002-ᒥ, ᐱᓇᓱᐊᖃᑎᒌᓐᓂᒧᑦ ᐊᖏᖃᑎᒌᒍᑎᒃ ᒪᑭᑕᒐᓯᐊᕐᓂᒧᑦ ᐊᒻᒪᓗ ᓄᓇᓕᐅᑉ ᐱᕙᓪᓕᐊᓂᖓᓄᑦ ᓄᓇᕕᒻᒥ (ᓴᓇᕐᕈᑎᒃ) ᐊᑎᓕᐅᕐᕕᐅᓚᐅᔪᖅ. ᓴᓇᕐᕈᑎᒃ ᐃᓗᓕᖃᕐᐳᖅ ᑐᕌᒐᓯᐊᕐᑕᖏᓐᓂᒃ ᐊᑦᔨᒋᔭᐅᔪᖅ ᐅᑯᓄᖓ ᑯᐯᒃ ᑲᕙᒪᒃᑯᖏᑦᑕ, ᒪᑭᕝᕕᒃ ᑯᐊᐳᕇᓴᓐ ᐊᒻᒪᓗ ᑲᑎᕝᕕᒃ ᓄᓇᓕᓕᒫᑦ ᑲᕙᒪᖓᑕ ᑎᒍᒥᐊᕈᒪᑦᓯᑎᒃ “ᒪᑭᑕᒐᓯᐊᕐᓂᑯᑦ ᐱᕙᓪᓕᐊᓂᕐᒧᑦ, ᐱᓇᓱᒐᑦᓴᓂᒃ ᓄᐃᑦᓯᐸᓪᓕᐊᓂᕐᒧᑦ ᐊᒻᒪᓗ ᒪᑭᑕᒐᓯᐊᕐᓂᑯᑦ ᑮᓇᐅᔭᕐᑖᑎᑕᐅᖃᑕᓂᖏᓐᓄᑦ ᓄᓇᕕᒻᒥ ᐃᓄᖏᓐᓄᑦ”. ᑐᑮᕐᑕᖏᑦᑕ ᐃᓚᖏᑦ ᐅᑯᐊᖑᔪᑦ, ᓴᓇᕐᕈᑎᒃ ᑕᑯᓐᓇᑕᖃᕐᑐᖅ ᐱᕙᓪᓕᐊᑎᑦᓯᒪᓕᐊᕐᓂᒥᒃ ᓄᓇᕕᒻᒥ ᐳᓛᕆᐊᕐᑐᓕᕆᓂᕐᒧᑦ ᐱᓇᓱᕝᕕᑖᕐᑯᓯᒥᑦ ᐅᑯᑎᒎᓇ ᒥᕐᖑᐃᓯᕐᕖᑦ ᐱᕙᓪᓕᐊᑎᑕᐅᓂᖏᑎᒍᑦ. ᐱᓇᓱᒐᑦᓴᒥᑎᒍᓪᓕ, ᐊᖏᖃᑎᒌᓐᓂᖅ ᐃᓚᖓᓯᖅ ᐊᑎᓕᐅᕐᑕᐅᓚᐅᔪᖅ ᔫᓂ 2002-ᒥ. ᑖᓐᓇ ᐁᑉᐱᐅᑎᒥᓕᕐᑕᖓ ᐊᖏᖃᑎᒌᒍᑎᒃ ᓄᐃᑦᓯᒍᑕᐅᕗᖅ ᓇᓚᐅᓕᓯᐊᕐᓯᒍ ᖃᓄᖅ ᑲᒪᒋᔭᐅᓂᖃᕐᓂᐊᒪᖓᑦ ᒥᕐᖑᐃᓯᕐᕕᐅᑉ ᐱᕙᓪᓕᐊᑎᑕᐅᓂᖓ ᑲᑐᑦᔨᔭᐅᓗᓂ ᑲᑎᕝᕕᒃ ᓄᓇᓕᓕᒫᑦ ᑲᕙᒪᖓᓄᑦ ᐊᒻᒪᓗ ᑯᐯᒃ ᒥᕐᖑᐃᓯᕐᕕᓕᕆᔨᖏᑦ.

ᐃᓕᒥᐊᕈᑕᐅᑎᓪᓗᒍ ᓯᖏᐅᓯᓴᒍᑎᖏᓐᓄᑦ ᓴᓇᕐᕈᑎᒃ ᐊᑖᓂᑦᓯᑎᒃ, ᐁᑉᐸᖓ ᑐᑮᕐᑕᐅᒥᔪᖅ ᑰᕈᑦᔪᐊᑉ ᒥᕐᖑᐃᓯᕐᕕᒃ ᐱᓇᓱᐊᕐᑕᐅᓂᑦᓴᖓ ᓴᐳᒻᒥᒥᐊᖃᓚᖓᔪ ᐱᖓᓱᐃᓕᕿᖓᔪᓂ ᓄᓇᐅᔪᓂ : ᑑᕐᖕᒉᑦ ᖃᕐᖄᓗᖏᓐᓂᒃ, ᑲᖏᕐᓱᐊᓗᑦᔪᐊᑉ ᓇᑎᕐᓇᖓᓂ ᐊᒻᒪᓗ ᐅᖓᕙᐅᑉ ᓯᑦᔭᖓᓂ. ᓄᓇᖁᑎᒥᓴᖓ ᒥᕐᖑᐃᓯᕕᓕᐊᖑᒍᒪᔪᑉ (figure 1.1) ᐆᒪ ᓴᓂᒥᔭᖓᓂᓕᑦᑐᖅ 20 ᑭᓚᒦᑕᓂ ᖃᓂᖕᖏᓂᖃᕐᓯᓂ ᑲᖏᕐᓱᐊᓗᑦᔪᐊᑉ ᓄᓇᓕᖓᑕ. ᑕᑭᓂᖃᕐᓯᓂ ᐅᖓᕙᐅᑉ ᓯᓈᖓᓄᑦ ᑎᑭᑦᓯᓂ ᑑᕐᖕᒉᑦ ᖃᕐᖄᓗᖏᓐᓄᑦ. ᖃᐅᔨᒪᔭᑦᓴᐅᒥᔪᖅ ᑖᒃᑯᐊ ᑲᓇᑕᒥ ᒥᕐᖑᐃᓯᕐᕕᓕᕆᔨᒥᑦ ᐃᓱᒪᖃᕐᓯᒪᒥᒪᑕ ᓄᐃᑦᓯᒥᐊᒥᒃ ᑲᕙᒪᑐᖃᑯᑦ ᒥᕐᖑᐃᓯᕕᓴᖓᓂ ᐋᐸᑐᐊᒥ, ᑭᖑᓂᐊᐱᐊᒍᑦ ᑰᕈᑦᔪᐊᑉ ᒥᕐᖑᐃᓯᕐᕕᖓᑕ ᐱᓇᓱᐊᕐᑕᐅᓂᖓᓄᑦ. (figure 1.2).

ᐃᓕᒥᐊᕐᓯᒍ ᐊᖏᖃᑎᒌᒍᑎᒃ ᐱᑦᔪᑎᖃᕐᓯᓂ ᐱᕙᓪᓕᐊᑎᑕᐅᓂᖏᓐᓄᑦ ᒥᕐᖑᐃᓯᕐᕖᑦ ᓄᓇᕕᒻᒥ, ᑲᑎᕝᕕᒃ ᓄᓇᓕᓕᒫᑦ ᑲᕙᒪᖓᓂ ᒥᕐᖑᐃᓯᕐᕕᓂ ᐱᓇᓱᕝᕕᖓ ᑲᒪᒋᔭᕐᑯᑦ ᑲᑎᕐᓯᐃᓯᓂ ᑐᑭᓯᒪᒍᑎᓴᓂᒃ ᐃᓕᖓᑎᓪᓗᒥᑦ ᐃᓅᓯᖁᑦ-ᒪᑭᑕᒐᓯᐊᕐᓂᑯᑦ ᖃᓄᐃᓕᖓᓚᓚᓯᕐᓂᖓᓂ ᐃᓗᐊᓂ ᐊᒻᒪᓗ ᐊᕙᑎᖓᓂ ᑰᕈᑦᔪᐊᑉ ᒥᕐᖑᐃᓯᕐᕕᖓᑕ ᐱᓇᓱᐊᕐᑕᐅᓂᖓᓄᑦ, ᓄᓇᐅᑉ ᐱᐅᓯᖏᑎᒍᑦ ᑕᐅᑦᑐᖓᑎᒍᑦ ᐊᒻᒪᓗ ᐱᑭᑦᑐᖏᑎᒍᑦ,ᑦ ᐊᒻᒪᓗ ᐃᓄᓐᓄᑦ ᓄᓇᒥᓴᐅᓂᖓᑎᒍᑦ. ᑖᓐᓇ ᐊᓪᓚᓯᒪᔪᖅ, ᐃᓚᑕᕆᔭᐅᓂᖃᕐᓯᓂ ᖃᐅᔨᒪᔭᐅᔪᖅ ᖃᓄᐃᓕᖓᓂᖓᑎᒍᑦ ᑐᓴᕐᑎᓯᒍᑕᐅᑦᓯᓂ, ᓄᐃᑕᐅᓚᐅᕐᑐᖅ ᑲᑎᕐᓯᐃᒍᑕᐅᑦᓯᓂ ᐱᓇᓱᐊᕐᑕᐅᓚᐅᕐᑐᖅ ᑲᑎᕝᕕᒃ ᓄᓇᓕᓕᒫᑦ ᑲᕙᒪᖓᑕ ᒥᕐᖑᐃᓯᕐᕕᓂᑦ ᐱᓇᓱᕝᕕᖓᓂ ᐅᑭᐅᓂᒃ ᐊᒥᓱᓕᕆᓂᒃ ᐱᓇᓱᐊᖃᑎᒋᑦᓯᒋᑦ ᑲᖏᕐᓱᐊᓗᑦᔪᐊᒥᐅᑦ, ᖃᐅᔨᓴᕐᑎᓗ ᐊᒻᒪᓗ ᑯᐯᒃ ᒥᕐᖑᐃᓯᕐᕕᓕᕆᔨᖏᑦ.

ᐃᓅᓯᖁᑦ-ᒪᑭᑕᒐᓯᐊᕐᓂᑯᑦ ᐋᕐᕿᓯᒪᓂᖓ

ᑖᓐᓇ ᐊᕕᑦᑐᓯᒪᓂᖓ ᑰᕈᑦᔪᐊᑉ ᒥᕐᖑᐃᓯᕐᕕᖓᑕ ᐱᓇᓱᐊᕐᑕᐅᓂᖓ: ᖃᓄᐃᓕᖓᓕᕐᒪᖔᑦ ᑐᓴᕐᑎᓯᒍᑎᒃ ᓄᐃᑕᑎᑦᓯᔪᖅ ᓯᓇᓪᓗᑐᓂᖏᓐᓂᒃ ᖃᐅᔨᓴᕐᑕᐅᒪᖓᑕ ᓴᓂᒥᔭᖓᓂ ᐊᒻᒪᓗ ᑲᖏᕐᓱᐊᓗᑦᔪᐊᑉ ᓄᓇᓕᖓᑕ ᐅᑯᑎᒎᓇ ᐊᐅᓚᑦᓯᓂᕐᑎᒍᑦ ᖃᓄᐃᓕᖓᓂᖓᓂ ᐊᒻᒪᓗ ᓄᓇᓕᕆᓂᕐᒧᑦ ᒪᓕᒉ, ᓄᓇᐅᑉ ᐊᑐᕐᑕᐅᓂᖓᓄᑦ ᐊᒻᒪᓗ ᓄᓇᐅᑉ ᐊᑐᕐᑕᐅᓂᖓ ᐋᕐᕿᓯᒪᒍᓯᖓ, ᓄᓇᓕᐅᑉ ᐃᓄᖏᑦ ᐊᒻᒪᓗ ᓇᐅᓕᒫᓂᒃ ᐱᒍᑦᔨᓃᑦ, ᐊᕐᖁᑎᖓ ᐊᒻᒪᓗ ᒪᑭᑕᒐᓯᐊᕐᓂᒧᑦ ᐱᓇᓱᐊᕐᑕᐅᓂᖓ.

ᐊᐅᓚᑦᓯᓂᕐᑎᒍᑦᐋᕐᕿᓯᒪᓂᖏᑦ ᐅᖃᕐᑕᐅᓯᒪᔪᑦ ᖃᓄᐃᓕᖓᓕᕐᒪᖔᑦ ᑐᓴᕐᑎᓯᒍᑎᓂ ᓄᐃᑕᐅᓚᐅᔪᑦ ᐊᕐᖁᑎᒥᑦᓯᒍ ᔦᒥᓯ V ᐊᒻᒪᓗ ᑯᐯᒃ ᑕᕐᙯᖓᓂ ᐊᖏᖃᑎᒌᓐᓂᒧᑦ ᐊᒻᒪᓗ ᐱᖁᓴᓕᕆᕕᖓᓄᑦ. ᑖᒃᑯᐊ ᐋᕐᕿᓯᒪᔪᑦ ᐅᑯᓂᖓ ᐃᓚᖃᓇᑫᑦ ᒪᑭᕝᕕᒃ ᑯᐊᐳᕇᓴᓐ, ᑲᑎᕝᕕᒃ ᓄᓇᓕᓕᒫᑦ ᑲᕙᒪᖓ, ᑲᖏᕐᓱᐊᓗᑦᔪᐊᑉ ᓄᓇᓕᖓ, ᐃᓚᐅᖃᑕᐅᒻᒥᑎᑐᒥᑦ ᕿᓂᕐᑎᑦ ᐊᒻᒪᓗ ᐃᑉᐱᒥᑦᑐ ᓄᓇᒥ ᑎᒍᒥᐊᕐᑏᑦ ᑯᐊᐳᕇᓴᖏᓐᓂᒃ.

ᐊᑐᕐᑕᐅᒥᐊᓖᑦ ᓄᓇᓕᓚᓂᕐᒧᑦ ᒪᓕᒡᒋᑦ ᓄᐃᑕᑎᑕᐅᔪᑦ ᓄᓇᖕᖑᐊ 2.1-ᒥ ᐊᒻᒪᓗ ᓄᐃᑕᑎᑦᓯᒥᑦᓯᑎᒃ ᓄᓇᓕᐅᑉ ᑲᑎᑯᓚ 1 ᐊᓐᒪᓗ 2-ᖏᓐᓂᒃ ᐃᓕᖓᑎᓪᓗᒥᑦ ᑰᒋᑦᔪᐊᑉ ᒥᕐᖕᖑᐃᓯᕕᒃ ᐱᓇᓯᑦᑕᐅᓂᖓᓄᑦ. ᓇᐅᓗᓐᓃᑦ ᑲᑎᑯᓚ 1-ᒦᖏᑐᑦ ᒥᕐᖕᖑᐃᓯᕐᕕᓕᐊᖑᒍᒪᔪᓄᑦ ᐊᑦᑐᐊᓂᕐᑲᖏᑐᑦ, ᑎᓚᕐᑯᕐᑲᕿᓗᐊᕐᓯᑎᒃ ᑰᒋᕐᔪᐊᑉᑉ ᐹᖓᓄᑦ. ᐁᑉᐸᖓᑎᒍᑦ, 1413 ᑭᓕᒦᑕᖓ ᑲᑎᑯᓚ 2-ᒥ ᓄᓇᕐᑯᑎᒥᔭᖓᓂ ᐃᓗᐊᓃᑦᑐᑦ ᒥᕐᖑᐃᓯᕐᕕᓕᐊᖑᒍᒪᔪᒥ. ᑖᒃᑯᐊ ᓄᓇᐅᔪᑦ 24 ᐳᓴᓐᑎᒥᔭᖏᑦ ᕐᑭᓂᕐᑎᑦ ᓄᓇᒥᒃ ᑎᒍᒥᐊᕐᑎᑦ ᓄᓇᕐᑯᑎᒥᓴᖏᑦ ᐊᒻᒪᓗ 33 ᐳᓴᓐᑎᒥᑦᓯᒥᑦ ᒥᕐᖑᐃᓯᕐᕕᓕᐊᖑᒍᒪᔪᑦ. ᑲᑎᑯᓚ 3 ᓄᓇᕐᑯᑎᖓ 67 ᐳᓴᓐᑎᒥᓴᐅᒐᓕᑦᑐᑦ ᒥᕐᖑᓯᕐᕕᓕᐊᖑᒍᒪᔪᑦ. ᑲᑎᑦᓯᑎᒃ ᓄᓇᕐᑯᑎᓴᖓ ᑰᒋᑦᔪᐊᑉ ᒥᕐᖑᐃᓯᓕᐊᖑᒍᒪᔪᑦ ᐱᓇᓯᐊᕐᑕᐅᓂᖓ 4274 ᑭᓕᒦᑕᓂ ᐊᖏᓂᕐᑲᕐᑐᖅ. ᕐᑲᐅᔨᒪᔭᐅᑦᓯᐊᓚᐊᕐᑲᑐᖅ ᑲᑎᑯᓚ ᓄᓇᕐᑯᑎᖓ ᐊᒻᒪᓗ ᒥᕐᖑᐃᓯᕐᕕᐅᑉ ᓄᓇᕐᑯᑎᖓ ᐱᒐᓗᐊᕐᑎᓗᒥᑦ ᐃᓄᐃᑦ ᐊᖏᕐᑲᑎᒦᓐᓂᒧᑦ ᐃᓕᐅᔪᑦ ᓂᕐᑭᑦᓴᔨᐅᑭᓐᓇᓕᖕᒪᔪᑦ ᓯᕐᑯᐃᔭᐊᕐᑐᒥᒃ ᐊᑖᓂᑦᓯᑎᒃ ᐊᕕᑦᑐᓯᒪᓂᖓᑕ ᐃᓕᖓᓂ 24.3-ᒥ ᐊᖏᕐᑲᑎᒦᓐᓂᒥ ᐊᒻᒪᓗ ᐊᕕᑦᑐᓯᒪᓂᖅ 21 ᒪᓕᒐᕐᒥ ᐱᑦᔪᑎᕐᑲᕐᑐᒥ ᐆᒪᔪᕐᓂᐊᕐᓂᕐᒥᒃ ᐊᒻᒪᓗ ᐃᕐᑲᓗᖕᓂᐊᓂᕐᒧᑦ ᐱᒍᓐᓇᐅᑎᓂ ᔪᒥᒥ V ᐊᒻᒪᓗ ᓄᑖᒥ ᑯV ᓄᓇᕐᑯᑎᖓᓂ (R.S.Q.c.,D-13.1). ᑖᓐᓇ ᐱᒍᓐᓇᐅᑎᒃ ᓄᓇᕕᓕᒫᖅ ᐃᑳᓚᕐᓯᒍ ᐊᑐᕐᑕᐅᒍᓐᓇᑐᑦ ᐆᒪᔪᕐᓂᐊᓂᕐᒧᑦ, ᐃᕐᑲᓗᖕᓂᐊᓂᕐᒧᑦ ᐊᒻᒪᓗ ᒥᑭᒥᐊᕐᓂᐊᓂᕐᒧᑦ ᓇᐅᓕᒫᓂᒃ ᓂᕐᔪᑎᓂᒃ ᐊᒻᒪᓗ ᓇᑉᐸᐃᒍᑕᐅᓗᑎᒃ ᒪᕐᕿᐊᕕᓂ ᓂᕐᑭᑦᓴᓯᐅᕕᐅᕐᑲᑕᓕᖕᒪᔪᓂ.

ᐅᕐᑲᕐᑕᐅᓂᖓ **ᓄᓇᐅᑉ ᐊᑐᕐᑕᐅᓂᖓ** ᕐᑲᐅᔨᓴᕐᑕᐅᔪᒥ ᓄᓇᒥ ᐊᒻᒪᓗ ᑲᖏᕐᓱᐊᓗᑦᔪᐊᑉ ᓄᓇᖓᓂ ᐅᕐᑲᕐᓯᒪᔪᖅ ᒪᕐᑮᓂ ᐱᓇᓯᐊᕐᑕᐅᓕᖕᒪᔪᓐᓂ. ᐁᑉᐸᖓᓕ, ᑲᖏᕐᓱᐊᓗᑦᔪᐊᑉ ᓄᓇᕐᑯᑎᖓᑕ ᐃᓗᐊᓂ, ᑖᒃᑯᐊ ᐱᓇᓯᐊᕐᓂᐅᔪᑦ ᓇᐅᓕᒫᓂᒃ ᐱᒍᑦᓴᓂᐅᔪᑦ ᐱᒍᑦᓴᒍᑕᐅᒥᐊᕐᑲᕐᐳᑦ ᕐᑲᐅᑕᒫᑦ ᐊᕐᕌᒍᑉ ᐃᓗᐊᓂ. ᓄᓇᓕᐅᑉ ᓄᓇᕐᑯᑎᖓᑕ ᓯᓕᑖᓂ , ᓄᓇᐅᑉ ᐊᑐᕐᑕᐅᓂᖓ ᐃᒪᒃ ᐅᕐᑲᕐᐳᑦ ᐅᐱᕐᖓᒃᑯᑦ ᐅᑭᐊᒃᑯᑦᓴᓐᓂ ᐱᓇᓯᐊᕐᑕᐅᔪᑦ ᐃᓄᖕᓄᑦ ᓂᕐᑭᑦᓴᓂᒃ ᐊᒻᒪᓗ ᓇᑉᐸᐃᒍᑕᐅᓗᑎᒃ ᒪᕐᕿᐊᕕᓂᒃ ᐃᓗᐊᓂ ᐊᒻᒪᓗ ᐊᕝᕗᓗᐊᓂ ᒥᕐᖑᐃᓯᕕᐅᑉ. ᐃᓕᒥᐊᕐᓯᒥᑦ,ᕐᑲᐅᔨᓴᓕᐅᒥᔪᑦ ᑖᒃᑯᐊ ᓄᓇᕐᑯᑎᕐᒥᑦ ᒪᕐᑮᒃ ᒪᕐᕿᐊᕕᐅᔪᑦ ᐃᓗᐊᓂᑦᑐᑦ ᒥᕐᖕᖑᐃᓯᕕᓕᐊᖑᒍᒪᔫᑦ. ᓯᕗᓕᖅ, ᐊᒥᓱᐅᔪᖅ ᑲᖏᕐᓱᐊᓗᑦᔪᐊᕐᒥᐅᑦ ᑯᐊᑉᐸᓗᐊᑦ, ᓯᑦᓴᓗᓐᓂᑦᑐᑦ ᐅᑭᐅᓂᓗ ᐊᒥᓱᓚᓕᓐᓂᒃ ᐃᖏᕐᕿᒍᖕᒍᓯᓂ, ᐱᒥᓴᐅᔪᖅ Alummi Adventures-ᑯᓄᑦ, ᐃᓂᕐᓯᓂ ᑰᒋᕐᔪᐊᑉ ᐹᖓᓂ, ᒥᕐᖑᐃᓯᕕᓴᓕᐊᖑᒍᒪᔪᑉ ᓄᓇᖓᓂᑦᓯᓂ. ᒪᕐᑮᒥᔫᓪᓗ ᒪᕐᕿᐊᕕᒃ ᓴᓂᐋᓐᒥᔫᒃ Rapid Lake Lodge & Ammarok Outfiters.

ᐊᑐᕐᕕᒥᓕᖓᓴᖓᑎᒍᓪᓕ ᐊᑯᓂᓚᔪᑦᓴᐅᑎᓪᓗᒍ ᓄᓇᐅᑉ ᐸᕐᓇᑕᐅᓂᖓ, ᐸᕐᓇᑕᐅᒍᑎᖓ ᓄᓇᐅᑉ ᐊᑐᕐᑕᐅᓂᑦᓴᖓᓄᑦ ᑲᑎᕕᐅᑉ ᓄᓇᕐᑯᑎᖓᓂ. ᑲᔪᓯᑎᑕᐅᔪᕕᓂᖅ 1998-ᒥ ᑲᑎᕕᒃ ᓄᓇᓕᓕᒫᑦ ᑲᕙᒪᖓᓄᑦ, ᐊᓪᓚᒪᔨᕐᑯᑎᕐᑲᕐᑐᖅ ᓄᓇᐅᑉ ᐊᑐᕐᑕᐅᓂᖓᓄᑦ ᐊᒻᒪᓗ ᐅᓕᒥᕐᒥᔭᐅᔪᓂ ᓄᓇᕕᓕᒫᒥ, ᐃᓕᐅᑎᓪᓗᒍ ᐃᓗᐊᓂ ᐊᒻᒪᓗ ᐊᕙᑎᖓᓂ ᒥᕐᖑᐃᓯᕐᕕᓕᐊᖑᒍᒪᔫᑦ. ᐸᕐᓇᓯᒪᐅᑎᒃ ᐅᕐᑲᕐᓯᒪᑦᓯᐊᕐᐳᖅ ᓯᑦᓴᖕᓗᓂ ᐊᒻᒪᓗ ᕐᑭᑎᖓᑕ ᐃᓕᖓᓂ ᑯᕐᓯᐊᒃ ᑰᖓᑦ ᓇᑎᕐᓇᖓᓂ ᓂᕐᑭᑦᓴᓯᐅᕕᐅᓂᖓᓂᒃ ᐊᒻᒪᓗ ᐅᐊᖕᓂᖓᑕ (Eastern) ᐃᓕᖓᓂ ᒥᕐᖕᖑᐃᓯᕐᕕᓕᐊᖑᒍᒪᔫᑦ ᐊᑐᕐᑕᐅᒪᓇᖕᖑᓂᖓᓂ ᓂᕐᑭᑦᓴᓯᐅᕕᐅᓯᓂ. ᐸᕐᓇᓯᒪᐅᑎᒃ ᐃᓕᑕᕐᓯᓯᒪᓂᕐᑲᓚᕐᐳᖅ ᓄᓇᕐᑯᑎᖓ ᒥᕐᖑᐃᓯᕐᕕᓕᐊᖑᒍᒪᔫᑦ ᐳᓖᓚᐊᕐᑎᓄᑦ, ᐅᓕᕐᓂᓯᒪᓯᐊᕐᓂᑯᑦ, ᑌᓯᒪᓂᑕᓕᓇᓂᒃᑯᑦ ᐊᒻᒪᓗ ᐃᓕᖕᓂᐊᑎᓯᒍᑕᐅᓗᑎᒃ ᐊᑐᖕᓇᓯᑐᐃᖕᓇᓇᐊᕐᑲᕐᓂᕐᓂᒃ.

2001-ᒥ, ᓄᓇᕕᐅᑉ **ᐃᓄᖏᑦ** 9632-ᖑᓕᐅᔪᑦ 90 ᐳᓴᓐᑎᖏᑦ ᐃᓄᑐᐃᓐᓇᑦ. ᓄᓇᓕᓐᓄᑦ ᑕᓪᓕᒪᓄᑦ ᐊᖏᓂᕐᐸᐅᕐᑲᑦᑐᓂ ᓄᓇᓕᐅᕐᑲᑕᐅᔪᑦ 710ᓂᑦ ᐃᓄᒃᓯᓂ (ᐊᓪᓚᓕᒪᔪᑦ 21). ᓄᓇᓕᐅᑉ ᐃᓄᖏᑦ ᕐᑲᐅᔨᓴᐅᒍᑎᕐᑲᕐᑐᑦ ᐊᑦᔨᐅᖏᓂᖏᑎᒍᑦ ᐊᓯᓕᒫᖏᓐᓂᒃ ᑯᐯᒻᒥᐅᓂᒃ ᐱᑦᔪᑎᒥᑦᓯᒥᑦ ᐃᓅᓯᓐᓂᐸᐅᓂᖏᖓᓄᑦ ᐃᓄᕐᑯᑎᖏᑦ: ᐅᑭᐅᕐᑲᕐᑐᑦ 20-ᓂᑦ ᐊᒥᓲᑦ ᓄᓇᕕᒻᒥ. ᐃᓕᒥᐊᕿᑕᐅᑎᓪᓗᒋᑦ ᕐᑲᐅᑕᒫᑦ **ᓇᐅᓕᒫᓂᒃ ᐱᒍᑦᓴᓃᑦ** ᐃᓕᖓᔪᑦ ᐃᒥᕐᑕᓂᕐᒧᑦ, ᒥᑦᑐᐊᕐᐳᓚᓂᕐᒧᑦ, ᐃᑯᓕᓚᓂᕐᒧᑦ ᐊᒻᒪᓗ ᕐᑲᖕᓕᑦᑕᑕᐅᔪᓕᐅᑎᒍᑦ-ᑐᓴᕈᑎᕐᑲᓃᑦ, ᑲᖏᕐᓱᐊᓗᑦᔪᐊᕐᒥᐅᑦ ᐅᑯᓂᖓ ᐱᑦᓴᕐᑐᖅ ᒥᕐᕕᒃ, ᐅᔨᖕᒥᐊᕐᕕᒃ, ᑐᑦᓯᐊᕕᒃ, ᐳᒃᑭᓂᕐᓯᒥ ᐊᒻᒪᓗ ᐳᕐᑐᓂᕐᓯᒥ ᐃᓕᓐᓂᐊᕕᒃ, ᐋᓐᓂᐊᕕᒃ, ᐳᓖᓯᑦ, ᐊᓪᓕᑖᕐᕕᒃ, ᐱᐊᕿᓕᓇᕕᒃ, ᑐᓴᐅᑎᑉ, ᐊᒻᒪᓗ ᐱᖕᖑᐊᕕᒃ, ᐊᑕᐅᓯᐅᕐᒥᑐᒥᓪᓗ ᓂᐅᕕᕐᓂᐊᕕᐅᕐᓯᓂ. ᓄᓇᓕᐅᑉ ᐃᓗᐊᓂ ᐆᓕᕐᓯᓂᐊᑏᑦ ᓴᐳᒻᒥᔭᐅᓂᖓᑕ ᐱᔪᑦᓴᑉ ᑲᒪᒋᔭᕐᑲᒥᐊᑦᓚᓚᖅ ᐊᖕᒍᑕᐅᓂᕐᒥᖓᓂᒃ ᓂᕐᑭᑦᓴᑖᕕᓂᕐᓂᒃ ᐊᒻᒪᓗ ᒥᕐᓯᓯᒪᔭᓂᒃ.

ᐊᕐᕌᒍᑎᓕ ᐅᕐᑲᓕᒪᒍᑎᒥᒍᒥᑦ, ᐊᕐᕌᒍᑏᑦ ᓂᑦᔫᒪᑕ ᐃᓗᓐᓇᖕᒥᖕᓂ ᓄᓇᓕᓐᓂ, ᕐᑲᖕᓚᑦᑕᒃᑲᕐᑯᑦ ᐊᐅᓪᓚᑲᑦᑕᓂᖅ ᐊᑐᕐᓂᕐᐸᐅᔪᖅ ᓄᓇᕕᒻᒥ. ᐅᒥᐊᕐᔪᐊᑯᑦ ᐅᔪᐅᑎᑦᓯᓂᖓ ᐊᑐᓂᐸᐅᒥᐳᖅ ᓯᔪᐊᓯᔪᕐᒥᑐᓂᒃ ᐅᓯᒐᖑᑎᒃ ᐊᑦᑐᒃᓴᒃ ᐊᒻᒪᓗ ᐊᕐᒥᔪᒦᑦ, ᐃᓕᐅᑦ ᐅᕐᓯᓗᒃ.

70 ᐳᓴᓐᑎᖓ ᓄᓇᕕᐅᑉ **ᒪᑭᑕᒐᓱᐊᕐᓂᖁᑦ ᐱᓇᓱᐊᕐᑕᖓ** ᐱᒋᐊᕐᕕᓂᕐᓯᒪᔪᖅ ᐱᒍᑦᔨᓃᑦ ᐱᓇᓱᑦᑕᐅᓂᖏᑎᒍᑦ. ᐊᒥᓲᓂᕐᓭᑦ ᐱᓇᓱᒫᑦ ᑕᑯᔭᐅᒍᓐᓇᑐᑦ ᓇᐅᓕᒫᓂᒃ ᐊᒻᒪᓗ ᐃᓅᓐᓇᓛᓕᖏᓐᓂ ᐱᒍᑦᔨᓂᕐᓂᒃ (ᖃᓄᐃᖏᓯᐊᕐᓂᒥᒃ, ᐃᓕᓐᓂᐊᕕᓐᓂ, ᐊᐅᓚᑦᓯᓂᕐᑎᒍᑦ), ᐃᓚᐅᒻᒥᑎᓗᒥᑦ ᓇᒻᒥᓂᖅᓴᐅᔪᑦ ᓂᐅᕕᕐᓂᐊᕖᑦ, ᐱᒍᑦᔨᓂᑦ ᐊᒻᒪᓗ ᓴᓇᓃᑦ ᐱᓇᓱᕝᕕᖏᑦ. ᑖᒃᑯᐊ ᐱᓇᓱᕝᕕᐅᔪᑦ ᐱᓇᓱᑦᑎᕐᑲᓲᖑᔪᑦ ᐊᒥᓱᓂᒃ ᐊᑕᐅᓯᕐᑎᒃ ᐊᒻᒪᓗ ᐅᓪᓗᐃᑦ ᐃᓗᓐᓇᖏᓐᓂ ᐱᓇᓱᒐᐅᔪᓂ. ᐱᐅᓯᑐᕐᑲᕐᑎᒍᑦ ᓂᕐᑭᑦᓴᓯᐅᕐᓃᑦ (ᐆᒪᔪᕐᓯᐅᓂᒃᑯᑦ, ᐃᕐᖃᓐᓂᐊᓂᒃᑯᑦ, ᒥᑭᒋᐊᕐᓂᐊᓂᒃᑯᑦ ᐊᒻᒪᓗ ᓄᐊᑦᓯᓂᕐᑎᒍᑦ) ᐊᑐᕐᑕᐅᑎᑕᐅᓂᖏᓪᓗ ᓂᕐᔪᑏᑦ ᐳᓖᕆᐊᕐᑐᓕᕆᓂᖅ (ᒪᕐᑫᑎᓯᕚᑦ) ᐃᓗᓕᖅᑲᕆᕗᖅ ᐱᓪᒪᕆᐅᔪᓂ ᐱᓇᓱᕝᕕᐅᓯᑎᒃ ᒪᑭᑕᒐᓱᐊᕐᓂᒧᑦ ᐱᒐᓱᐊᕋᑎᓂᒃ. ᖃᐅᔨᒪᔭᐅᒥᐊᖅᑲᕆᕗᖅ ᓂᕐᑭᓴᓯᐅᕐᓂᒧᑦ ᐱᓇᓱᐊᕐᓃᑦ ᑯᐯᒃ ᑕᕐᖁᖓᓂ ᐊᑦᔨᒥᓴᐅᓚᓗᐃᓐᓇᒍᖅ ᐱᕈᕐᔫᕕᓕᓐᓄᑦ ᑯᐯᒥ ᓄᓇᓕᐅᔪᓄᑦ; 75 ᐳᓴᓐᑎᓂᒃ ᓂᕐᑭᒍᐃᓐᓇᓂᒃ ᓂᖏᕈᔾᔪᑦ ᐃᓄᐃᑦ. ᐅᔭᖁᕐᓂᐊᕕᓕᖕᓂᑎᒍᓪᓕ, ᐊᖅᒥᔪᓚᓕᕐᒪᖕ ᐅᔭᖁᓂᐊᓃᑦ ᐱᓇᓱᐊᕐᑕᐅᔪᑦ ᓄᓇᕕᓕᒫᒥ, ᐃᓚᐅᑎᓪᓗᒍ ᑲᖏᕐᓱᐊᓗᑦᔪᐊᑉ ᓄᓇᓕᖓᑕ ᓴᓂᐊᓂ.

ᐳᖓᓐᓇᐊᕐᑐᓕᖓᓂᖅ ᐱᓪᒪᖓᐅᒥᓱᓂ ᓄᐃᑕᕐᑲᑕᐅᔪᖅ ᒪᑭᑕᒐᓱᐊᕐᓂᖓᑎᒍᑦ ᓄᓇᕕᐅᑉ; ᐅᒣᓕᖓᓚᓗᐊᕐᓱᓂ, ᐃᓅᓇᓯᐊᖓ ᒪᕐᑫᑎᓯᓂᕐᒦᑐᖅ, ᑐᑦᑐᓯᐅᕐᑎᓯᓂᖅ ᓄᐃᑦᑎᓯᔪᖅ ᐱᐅᓂᕐᐹᒥ ᓄᐃᑦᓯᓱᓂ. ᐊᒥᓱᑦ ᓄᐃᕚᓪᓕᐊᒥᔪᑦ ᓱᕐᑲᑦᓯᒍᐃᑦ ᓄᐃᑕᐅᔪᑦ (ᕿᒧᑦᓯᓂᑦ, ᖃᔭᕐᑐᑎᑦᓯᓃᑦ, ᓯᑭᕐᑐᕐᓯᓃᑦ, ᐅᒥᐊᕐᑐᑎᓯᓃᑦ, ᐱᓱᑎᓯᓃᑦ ᐊᒻᒪᓗ ᖃᔭᖕᓇᐊᑐᑎᑦᓯᓃᑦ, ᐱᐅᓯᖃᑎᒌᖕᒥᑐᑦ ᐳᖓᖃᑎᒌᑦᑎᓱᒥᑦ, ᐃᓚᐅᒻᒥᑎᓪᓗᒥᑦ ᓂᕐᔪᑎᓂᒃ ᑕᑯᓐᓇᓇᐊᕐᑎᓯᓃᑦ) ᓈᒻᒪᓈᕐᓯᒪᔪᑦ ᐱᓇᓱᐊᕐᑕᐅᒍᓐᓇᓱᑎᒃ ᒥᖕᒍᐃᓯᕐᕕᓕᐊᖕᒍᒍᒪᔫᑉ ᓄᓇᕐᑯᑎᖓᓂ.

ᑭᖑᓪᓕᕚᒥ *ᑰᑭᑦᔪᐊᑉ ᒥᖕᒍᐃᓯᕐᕕᖓᑕ ᐱᓇᓱᐊᕐᑕᐅᓂᖓᑕ : ᖃᓄᐃᓕᖓᓂᖓᑕ ᑐᓴᕐᑕᐅᒍᑎᖓ* ᐅᖃᕐᓯᒪᔪᖅ, ᑲᖏᕐᓱᐊᓗᑦᔪᐊᒥ 2004-ᖑᑎᓪᓗᒍ, 140 ᐃᓄᐃᑦ ᐊᓪᓚᑕᐅᓯᒪᓚᐅᔪᑦ ᐃᓚᐅᖃᑕᕕᓂᐅᑦᓯᑎᒃ **ᑮᓇᐅᔾᔭᑖᓯᐊᕐᑲᑕᐅᑦᓯᑎᒃ** , 85-ᖑᔪᑦ ᐃᑲᔪᕐᑕᐅᑎᑖᕐᑖᕐᑕᑎᓪᓗᒥᑦ (ᖃᐅᔨᒪᔪᑕᐅᔪᖅ ᑲᖏᕐᓱᐊᓗᑦᔪᐊᑉ ᓄᓇᓕᖓᑕ ᐅᖃᕐᓯᒪᔭᖓ). ᐃᓯᒪᒋᑦᓯᒋᑦ ᐃᓅᓐᓇᑎᒃ ᐃᓄᓕᒫᖕᒥᑦ ᐱᓇᓱᒍᓐᓇᑐᑦ ᓈᒻᒪᑐᓂ ᐅᑭᐅᖃᕐᓯᑎᒃ, ᐱᓇᓯᓚᖃᖕᒥᑐᓂᖅ 69 ᐳᓴᓐᑎᐅᓚᐅᕐᑐᑦ, ᐳᕐᑐᓂᕐᐸᐅᓯᑎᒃ ᐱᓇᓯᓚᖃᖕᒥᑐᑦ ᓄᓇᓕᓕᒫᓂᒃ ᐅᖓᕙᐅᑉ ᓯᑦᔭᖓᓂ. ᖃᐅᔨᔭᐅᓚᐅᕐᒥᔪᖅ ᐊᒥᓱᓚᐅᔪᑦ ᐃᓄᐃᑦ ᐃᓚᐅᖃᑕᐅᔪᑦ ᐱᓇᓱᒍᓐᓇᑐᓄᑦ ᐅᑭᐅᖕᒥᑦ ᓈᒻᒪᓯᑎᒃ ᑮᓇᐅᔾᔮᓯᖕᒍᔪᑦ ᐅᒪᔪᕐᓂᐊᓂᒥᒍᑦ, ᐃᖃᓗᓐᓂᐊᓂᒥᒍᑦ, ᒥᑭᒋᐊᕐᓂᐊᓂᒥᒍᑦ, ᓄᐊᑦᓯᓯᑎᒃ ᐊᒻᒪᓗ ᓴᓇᖖᖑᐊᓂᒃᑯᑦ ᒥᕐᓯᓂᒃᑯᓗ ᐱᓇᓱᐊᕐᓯᑎᒃ.

ᓄᐃᑕᔪᒃᑯᑦ ᐊᕙᑎᒃ

ᐃᓚᒥᔭᐅᒪᑦ ᒥᖕᒍᐃᓯᕕᐅᑉ ᐱᐅᓯᓇᒥᐊᓕᖓᑕ ᓴᐳᒥᓂᐅᔪᖅ ᐊᒻᒪᓗ ᐃᓱᐊᕐᓯᒥᐊᕐᓗᒍ ᑖᓐᓅᑦᓯᓂ ᐊᒻᒪᓗ ᑕᑯᑦᓴᐅᓗᐊᖁᑎᒃ ᐱᐅᓯᕐᓯᑐᑦ ᑕᑯᔭᓴᐅᔪᑦ ᓄᓇᖁᑎᖓᓄᑐᐊᕐᐸᑕ, ᐱᓪᒪᖓᐅᑦᓯᓂ ᐱᓇᓱᐊᖓᐊᖃᕐᐸᖓ ᓇᐅᑐᐃᓐᓇᐅᑉ ᒥᖕᒍᐃᓯᕐᕕᐅᑉ ᓱᕐᖁᐃᓯᐊᕐᓗᒥᑦ ᐊᒻᒪᓗ ᐊᓪᓚᑕᐅᑎᑦᓯᐊᖓᐊᖃᕐᐸᖕᒥᑦ ᑕᒪᒃᑯᐊ ᑕᑯᑦᓴᐅᔪᑦ. ᑕᒪᓐᓇ ᐱᓇᓱᐊᒥᐊᓕᖓ *ᑰᑭᑦᔪᐊᑉ ᒥᖕᒍᐃᓯᕐᕕᖓᑕ ᐱᓇᓱᐊᕐᑕᐅᒍᑎᖓ : ᖃᓄᐃᓕᖓᓂᖓᑕ ᑐᓴᕐᑕᐅᒍᑎᖓ* ᑲᒪᒋᔭᖃᕐᑐᖅ ᓱᓇᓪᓗᑐᐊᐱᐅᓂᖏᓐᓂᒃ ᑕᑯᑦᓴᐅᔪᓂ ᓄᐃᑕᔪᒃᑯᑦ ᐊᕙᑎᒥ ᑕᒫᓂ ᓄᓇᖓᓂ ᒥᖕᒍᐃᓯᕐᕕᓕᐊᖕᒍᒍᒪᔪᑉ. ᐃᓚᖃᕐᒥᔪᖅ ᐊᓪᓚᑕᐅᓯᒪᑦᓯᐊᑐᓂ ᑐᑭᓯᒪᒋᐊᓕᓐᓂᒃ ᖃᐅᔨᓴᕐᓃᑦ ᓯᓚᐅᑉ ᐱᐅᓯᖓᓂᑦ, ᓄᓇᐅᑉ ᐱᐅᓯᖓ, ᓄᓇᐅᑉ ᖃᓄᖅ ᓴᓇᓯᒪᓂᖓᓂᑦ, ᓄᓇᐅᑉ ᖃᓄᐃᓕᖓᓂᖓᑕ ᐊᑦᔨᒌᖕᒋᓂᖏᓐᓂᑦ ᐊᒻᒪᓗ ᐃᒪᐅᑉ ᐊᐅᓚᔪᓯᖓᓂᑦ.

ᐃᓚᖏᑦ ᓄᓇᐅᑉ ᐋᕿᓯᒪᓂᖏᑦ, ᐆᑦᑐᕐᑎᒥᒍᑦ ᒪᓐᑐᐃᑦ ᖃᐅᔨᓴᕐᑕᐅᑉ ᓄᓇᖓᓂ, ᓯᕐᖁᐃᓂᖃᕐᓂᖓᑦᑐᔪᑦ ᓄᓇᓕᐅᑉ ᐃᓗᐊᓂ **ᓯᓚᐅᑉ ᐱᐅᓯᖓ** (ᐊᓪᓚᓯᓚᔾᔪᖅ 3.1). ᐳᕐᑐᓂᕐᓴᒥᓪᓕ, ᑰᑭᑦᔪᐊᑉ ᓇᑎᕐᓇᖓ ᐊᒻᒪᓗ ᑑᕐᖓᑦ ᖃᕐᖄᓗᖏᓐᓂ ᕿᐅᔭᓇᕐᑐᑦ, ᑯᑉ ᐊᓪᒧᐊᓂᖓ ᑰᑭᑦᔪᐊᑉ ᓇᑎᕐᓇᖓ ᐊᒻᒪᓗ ᓯᑦᔭᖓ ᒥᖕᒍᐃᓯᐅᓕᐊᖕᒍᒍᒪᔪᑉ ᑕᖅᑭᕐᒥ ᐱᔪᒧᑦ ᐊᐅᓚᑕᐅᑎᓪᓗᒍ. ᐅᖓᕙᐅᑉ ᓂᕈᒥᓐᓂᖓ ᓯᕐᖁᐃᓂᖃᕐᓂᖓᓪᒥᔪᖅ ᑭᓯᐊᓂ ᖃᑦᓯᓂᓕᓪᓗᑦ ᑎᑭᒪᒥ ᐊᓯᑦᔨᖃᑦᓯᓂ. ᓯᖅᑯᐃᒪᑦ, ᐳᕐᑐᓕᕚᓪᓕᐊᓂᖓ ᑑᕐᖓᑦ ᖃᕐᖄᓗᖏ, 1600ᒦᑕᓂᑦ ᐳᕐᑐᓂᕐᓴᐅᔪᖅ, ᓴᓇᒦᕐᑐᒥ ᓵᓗᑕᖃᕐᑐᑦ ᐊᑦᑏᑎᒃ ᐃᒪᕐᐱᐊᓗᖓ ᐱᔪᒥᑦ. ᑦᓯᓇᕐᓂᓴᐅᓯᓂ ᐊᒻᒪᓗ ᓯᕈᔪᖃᑕᓂᓴᐅᓯᓂ ᐊᓄᖕᒥᓪᓗ ᓲᖑᓂᓴᐅᓯᑎᒃ ᑑᕐᖓᑦ ᖃᕐᖄᓗᖏᓐᓂ ᐊᒻᒪᓗ ᓇᑎᕐᓇᖓ ᒥᖕᒍᐃᓯᕕᓕᐊᖕᒍᒍᒪᔪᑉ.

ᖃᐅᒪᖃᑕᓂᖓ, ᐊᕐᖁᒍᕐᒥ ᓯᓚᖓᑕ ᐅᕐᑰᓂᖓ, ᓯᕈᔭᓂᖓ ᐊᒻᒪᓗ ᐊᓄᖓ ᐊᖅᒥᔪᒪᓂᒥ ᓯᕐᖁᐃᓂᖃᕐᐸᒥᔪᑦ ᓯᓚᐅᑉ ᐱᐅᓯᖓ (ᐊᓪᓚᓯᒪᔪᑦ 3.1-ᒥ 3.4-ᒧᑦ). ᐅᐱᕐᖕᒫᒥ ᖃᐅᔨᓴᕐᕕᐅᔫᑉ ᓄᓇᖓ 18-ᓂ ᑫᕙᓪᓗᓯᓂᒃ ᖃᐅᒪᓂᖃᕐᓗᐃᑦ: ᐅᑭᐅᖑᓪᓗᕐᒪᑦ ᐱᖓᓗᐊᔪᕐᑐᓂ ᑫᕙᓪᓗᓯᓂᒃ ᖃᐅᒪᑦᓯᓂ. ᖁᖓᓂ ᑰᑭᑦᔪᐊᑉ ᐊᒻᒪᓗ ᑑᕐᖓᑦ ᖃᕐᖄᓗᖏᓐᓂ, ᒥᑦᓴᐅᖕᕿᑕᐅᒪᔪᑦ ᐊᕐᖁᒍᓕᒫᒥ ᓯᓚᐅᑉ ᓂᕈᒥᓐᓂᕙ 7.5ᒥ ᕿᐅᔭᓇᕐᓂᕐᖃᕐᓯᓂ ᓇᑎᕐᓇᖓ ᓂᕈᒥᓐᓂᓴᐅᑎᓪᓗᒍ. ᖁᐊᕐᓂᖓ ᐊᐅᓚᓗᕐᑐᖅ

40 -60-ᓂ ᐅᓪᓗᓂ ᐊᕐᑳᒍᑕᓖᑦ ᐅᖓᕙᐅᑉ ᓯᑦᔭᖓᓂ, 20-40 ᐅᓪᓗᐃᑦ ᑰᕈᑦᔪᐊᑉ ᓇᑎᕐᓇᖓᓂ ᐊᒻᒪᓗ ᓇᑎᒃᓇᖏᓐᓂ, 20 ᐅᓪᓗᓄᑦ ᐃᑭᓐᓂᓴᐅᑎᓪᓗᒋᑦ ᑑᕐᖏᑦ ᖃᕐᖄᓗᖏᓐᓂ, ᒥᖑᐃᓯᕐᕕᓕᐊᖑᒍᒪᔫᖅ 500ᒪ ᓱᕈᔫᖃᑦᑕᑎᓪᓗᒍ, 49 ᐳᓴᓐᑎᖓ ᐊᐳᑎᖕᒍᖃᑦᑕᑎᓪᓗᒍ. ᓄᓇᑐᐃᓐᓇᒥ 600ᒪ ᓱᕈᔫᖃᑦᑕᑎᓪᓗᒍ ᐊᒻᒪᓗ 700ᒪ -ᖑᑎᓪᓗᒍ ᑰᕈᑦᔪᐊᑉ ᓇᑎᕐᓇᖓᓂ. ᐅᑐᓚᓗᐊᕐᑎᓗᒍ, ᐳᕐᑐᔫᒥᓐᓂᓴᑦ ᐊᓄᕆᒧᑦ ᓱᐱᔭᐅᖃᑕᓪᓗᒋᑦ, ᐊᐳᑎᖃᓂᓴᐅᖃᑦᑐᑦ ᓇᑎᕐᓇᒥ, ᐃᑎᕐᓴᓂ ᐊᒻᒪᓗ ᕿᖕᒍᓂ. ᖃᐅᔨᒪᔭᑦᓴᐅᒥᔫᖅ ᐊᐳᑎᑐᕐᑫᑦ ᑕᑯᔭᐅᒍᓐᓇᒥᒪᑕ ᑰᕈᑦᔪᐊᑉ ᐊᒻᒪᓗ ᑑᕐᖏᑦ ᖃᕐᖄᓗᖏᓐᓂ.

ᐃᓱᒪᒋᑦᓱᒍᑎ ᓱᑯᑎᑎᓯᔪᑦ ᐊᒻᒪᓗ ᓱᐱᔫᑦ, ᖃᓄᐃᑎᖓᑎᕐᒪᖓᑕ ᑐᓴᕐᑎᓯᒍᑎᒃ ᓄᐃᑕᑎᑦᓯᔫᖅ ᑕᓲᑦ ᓱᑯᓲᖑᑎᓪᓗᒋᑦ ᓅᕕᒻᐱᕆ 10-ᒥ20-ᒧᑦ ᓱᐱᑦᓯᑎᓪᓗᒍ ᔫᓂ 10-20-ᒥ. ᑯᑦ ᓱᑯᓲᖑᔫᑦ ᐂᓯᒻᐱᕆ 1-ᒥ, ᓱᐱᑦᓯᑎᓪᓗ ᒣ 20 ᐊᒻᒪᓗ ᔫᓂ 1 ᐊᑯᓐᓂᖓᓂ. ᐅᖓᕙᐅᑉ ᐃᑎᕕᐊᑕ ᐃᓚᖓ ᖁᐊᖑᓲᖅ ᐂᓯᒻᐱᕆᐅᑉ ᕿᑎᖓᓂ ᔪᓗ ᕿᑎᖓᓄᑦ ᑎᑭᑦᓯᓂ.

ᑰᕈᑦᔪᐊᑉ ᒥᕐᖑᐃᓯᕐᕕᖓᑕ ᐱᓇᓱᐊᕐᑕᐅᒍᑎᖓ: ᖃᓄᐃᓕᖓᓂᖓᑕ ᑐᓴᕐᑕᐅᒍᑎᖓ ᐃᓗᓕᖃᕐᒥᔫᖅ ᑐᑭᓯᒪᒍᑎᓴᓂᒃ ᓄᓇᐅᑉ ᖃᓄᐃᓕᖓᓂᖓᓂ ᓄᓇᖁᑎᖓᑕ ᒥᕐᖑᐃᓯᕐᕕᓕᐊᖑᒍᒪᔫᑉ. ᖃᐅᔨᔭᐅᓚᐅᕐᑐᑦ ᐅᔭᕋᖏᑦ ᑰᕈᑦᔪᐊᑉ ᐊᒻᒪᓗ ᑑᕐᖏᑦ ᖃᕐᖄᓗᖏᓐᓂ ᓄᑕᐅᖏᓂᕐᐹᓄᑦ ᓯᓚᕐᔪᐊᒥ ᐃᓚᐅᖃᑕᐅᔫᑦ, ᐱᒋᔭᐅᑦᓱᑎᒃ Canadian Shield-ᑯᓄᑦ ᐊᒻᒪᓗ ᐱᓗᐊᕐᑐᒥ ᓄᓇᐅᑉ ᓯᕐᒥᖓ ᖃᐅᔨᒪᔭᐅᔫᖅ ᐅᓕᕐᓐᓂᓯᔨᓄᑦ ᐃᒣᑦᑑᑎᓪᓗᒍ Churchill Province (ᐊᓪᓚᓯᒪᔫᑦ 3.8). ᒥᕐᖑᐃᓯᕐᕕᓕᐊᖑᒍᒪᔫᑉ ᓄᓇᖁᑎᖓ, Churchill Province ᐃᓚᖃᕐᐳᖅ Far North Craton ᐊᒻᒪᓗ Torngat Orogen-ᑦ (ᓄᓇᙳᐊᖅ 3.1). Far North Craton ᐅᒫᑦᓴᓇᓕᐅᓚᕐᑐᖅ ᐃᓂᖃᕐᓯᓂᓗ ᐃᑎᕕᐊᖓᓂ ᒥᕐᖑᐃᓯᕐᕕᓕᐊᖑᒍᒪᔫᑉ. ᐃᓚᖃᕐᓯᓂᓗ ᕿᕐᑐᒥ ᓴᓇᔭᐅᔪᕕᓂᕐᓂᒃ ᐊᒻᒪᓗ ᐱᓇᓯᒥᐊᓪᓚᑕᐅᓯᒪᑦᓯᑎᒃ Archean ᐱᒋᐊᕐᐸᓕᐊᓕᕐᑎᓗᒋᑦ Proterozoic -ᑯᑦ ᐅᑭᐅᒥᓯᒪᔭᖏᓐᓂ, 2.9 -ᒥ 1.8 ᐱᓕᐊᓐ ᐅᑭᐅᑦ ᓈᓯᒪᓕᕐᑐᑦ (ᐊᓪᓚᓯᒪᔫᖅ 3.5) Torngat Orogen-ᑯᑦ ᐅᒪᑦᓴᓈᓕᙵᒥᑐᑦ ᐊᒻᒪᓗ ᑯᑉ ᖁᑏᓂᑦᓯᓂ ᑰᕈᑦᔪᐊᑉ ᑎᑭᑲᓴᑦᓱᒍ ᑑᕐᖏᑦ Orogen ᓄᓇᒦᑦᑐᖅ Churchill ᐊᒻᒪᓗ ᐊᓯᖏᑦ ᓄᓅᑦ ᐊᕕᑦᑐᓯᒪᓂᖏᑦᑕ ᐸᕐᓯᒪᐅᑎᖓᓂ ᑭᓯᐊᓂ ᐱᑐᑦᓯᒪᖃᑎᒦᓚᐅᕐᑐᑦ Magmatic and sedimentary -ᑎᒍᑦ ᐱᓇᓱᐊᕐᓂᑎᒍᑦ. Far North Craton ᐊᒻᒪᓗ Torngat Orogen-ᑯᑦ ᑐᓴᕐᓂᑐᕋᑕᕐᒥ ᐅᖃᐅᓯᖃᕐᒥᔪᑦ ᓯᓚᐅᑉ ᐊᐅᓚᑦᓯᓂᖓᓄᑦ ᓴᓇᔭᐅᓯᒪᓂᖓᓂ ᑑᕐᖏᑦ ᖃᕐᖄᓗᖏᑦ, ᖃᓄᐃᓕᖓᓕᕐᓂᖓᓂ ᑐᓴᕐᑎᓯᒍᑎᒃ ᐃᓱᓕᑦᑎᓗᒍ ᓯᑦᑎᒻᐱᕆ 2005-ᒥ ᐱᑦᓴᑕᕐᑲᕋᔭᕐᓂᖓᓂ ᖄᖏᕐᓂᑯᓕᐅᕈᑎᒥᓗᒍ ᐊᒻᒪᓗ ᐱᑦᓴᔭᐅᓯᑎᒃ ᑭᑭᐊᑦᓴᕉᑦ ᑕᒫᓂ ᓄᓇᒥ ᐱᑦᓴᑕᖃᕐᒥᓂᕋᕐᓱᒍ ᐊᒻᒪᓗ ᕿᓂᕐᕕᐅᒍᒪᓚᓂᓗ.

ᐱᓇᓱᐊᕐᑕᐅᓂᖓ ᑰᕈᑦᔪᐊᑉ ᒥᕐᖑᐃᓯᕐᕕᖓᑕ ᐱᓇᓱᐊᕐᑕᐅᒍᑎᖓ: ᖃᓄᐃᓕᖓᓂᖓᑕ ᑐᓴᕐᑕᐅᒍᑎᖓ ᐱᑦᔪᑎᖃᕐᓯᓂ ᓄᓇᐅᑉ ᖃᓄᖅ ᓴᓇᓯᒪᒍᓯᖓᓂᑦ ᑐᑭᓯᑎᑦᓯᒍᑕᐅᕗᖅ ᖃᓂᖕᖑᒥᑕᓖᓚᓗᐊᕐᑎᓗᒋᑦ ᑕᑯᑦᓴᑎᒍᑦ ᐋᕐᕿᓯᒪᓂᖏᑦ ᓄᓇᖁᑎᖓᓂ ᒥᕐᖑᐃᓯᕐᕕᓕᐊᖑᒍᒪᔫᑉ. ᐱᖓᓱᑦ ᓄᓇᐅᑉ ᖃᓄᖅ ᓴᓇᓯᒪᒍᓯᖓᓂᑦ ᓱᕐᖁᐃᑕᐅᓚᐅᕐᑐᑦ: ᓂᐸᑐᐊ ᐸᓐᓇᖓᓂ, ᑰᕈᕐᔪᐊᑉ ᓇᑎᕐᓇᖓᓂ, ᐊᒻᒪᓗ ᐅᖓᕙᐅᑉ ᓯᓈᖓ (ᓄᓇᙳᐊᖅ 3.2) ᓂᐸᑐᐊ ᐸᓐᓇᖓᓂ, ᑑᕐᖏᑦ ᖃᕐᖄᓗᖏᑦ ᐳᕐᑐᓂᕐᐸᐅᓯᑎᒃ ᖃᕐᖄᓗᐃᑦ ᐅᐊᓐᓂᖓᓂ ᑲᓇᑕᐅᑉ ᐃᓚᖃᕐᓯᑎᓪᓗ Mount D'Iberville-ᒥᒃ ᑕᑭᓂᖃᕐᑐᖅ 1646ᒪ-ᓂᒃ ᐊᒻᒪᓗ ᑕᑭᓂᕐᐸᐅᓯᓂ ᑯᐯᓕᒫᒥ. ᓄᓇᐅᑉ ᓴᓇᒪᓂᖓ ᑕᒫᓂ ᒪᓕᓂᑦᑐᖅ ᐊᒻᒪᓗ ᖃᐅᔨᒪᔭᐅᒍᑎᖃᕐᓯᓂ ᐊᑦᔨᒥᖕᖏᓂᖏᑦ ᐳᕐᑐᓕᓐᓂᖏᑦ. ᓄᓇᖓᓕ ᑰᕈᑦᔪᐊᑉ ᒪᓃᑦᑑᓗᐊᖕᖏᑐᖅ ᐳᒃᑭᓂᕐᓴᐅᓯᓂᓗ ᐅᑐᓕᕿᔭᐅᑦᓯᓂ ᓯᑑᖃᑦᑐᓄᑦ. ᐅᖓᕙᐅᑉ ᓯᓈᖓᓂ ᓄᓇᖓ ᐳᒃᑭᓂᕐᓴᒦᑦᑐᖅ ᓄᐃᑕᕕᐅᑦᓯᓂᓗ ᒪᓂᕐᕋᑕᐅᓯᒪᓂᖓ ᓱᑯᒧᑦ ᓯᑑᖃᑦᑐᓄᑦ, ᓇᑎᕐᓇᐅᔪᑦ ᑭᐱᓯᑦᓯᑎᒃ ᐊᕐᖑᑎᔭᖓᓂ ᐱᖓᓲᔪᑦ ᐅᔭᐅᑲᐃᓐᓇᑐᑦ ᖁᑏᓂ ᐃᓱᒪᒥᔭᐅᔫᖅ

ᓄᓇᐅᑉ ᐃᑭᐊᖓᓅᑦᓯᑎᒃ ᓄᓇᐅᑉ ᓴᓇᓯᒪᓂᖓᑎᑐᑦ.

ᓄᓇᐅᑉ ᐊᑦᔨᒥᖕᖏᓂᖓᑦ ᑰᕈᑦᔪᐊᑉ ᒥᕐᖑᐃᓯᕐᕕᖓᑕ ᐱᓇᓱᐊᕐᑕᐅᒍᑎᖓ ᐅᖃᕐᑕᐅᓯᒪᔫᖅ ᓱᓇᒥᑦᓯᐊᑎᓪᓗᒍ ᖃᓄᐃᓕᖓᓂᖓᑕ ᑐᓴᕐᑕᐅᒍᑎᖓᓂ. ᐱᓗᐊᕐᑐᒥᒃ, ᐊᒥᓱᓗ ᐊᔪᖏᑐᓗᑦ ᐊᓯᑦᔨᕈᑕᐅᒪᔫᑦ ᓄᓇᐅᑉ ᖃᓄᐃᓕᖓᓂᖓᓂ ᒥᕐᖑᐃᓯᕐᕕᓕᐊᖑᒍᒪᔫᑉ ᓄᓇᖓᓂ ᑐᑭᓯᑎᑦᓯᒥᐊᕈᑕᐅᔫᑦ, ᐃᓚᖏᑦ ᐊᔪᖏᑐᓗᑦ ᐅᓪᓗᖓ ᖃᖓᐅᓂᖓ ᐅᖃᕐᑕᐅᒪᔫᑦ 10,000 ᐅᑭᐅᑦ ᓈᓯᒪᓕᕐᑐᑦ ᐊᓯᑦᔨᓚᐅᕐᓯᒪᑎᓪᓗᒍ. ᑕᒪᓐᓇ ᒪᕐᕈᓚᓐᓂᓐᓂᒃ ᐱᑦᔪᑎᖃᕐᓯᓂ ᐊᓯᑦᔨᓯᒪᔪᖅ (ᓯᑯᔪᕕᓂᕐᒧᑦ ᐊᒻᒪᓗ ᐊᐅᑉᐸᓕᐊᓂᖓᓄᑦ ᓯᑰᑉ) ᓄᐃᑕᐅᓯᒪᓂᖏᑦ ᐅᑐᓕᕿᔭᐅᓯᒪᔫᑦ ᐊᔪᖏᑦ ᓱᒃᑫᑐᒥ ᐊᓯᑦᔨᐸᓪᓕᐊᕈᑎᖃᕐᑐᑦ, ᐅᔭᕆᑦ ᐃᓚᖕᖏᐊᑎᕐᐸᓕᐊᓂᖏᓐᓄᑦ, ᓄᓇᔭᑦᓴᔭᕐᒥ, ᑯᑉ ᑰᓐᓂᖓᓄᑦ ᐊᒻᒪᓗ ᓯᐅᕋᕐᓄᑦ. ᑕᒪᒃᑯᐊ ᐊᔪᖏᑦᑐᑦ ᓅᖃᔭᖏᑦᑐᑦ ᐊᓯᑦᔨᐸᓪᓕᐊᓅᑦ ᐅᑐᓕᕿᔭᑦᓯᑎᒃ ᖁᐊᖃᑦᑕᒧᑦ ᐊᐅᖃᑦᑕᒧᓪᓗ, ᑯᑉ ᑰᓐᓂᖓᓄᑦ, ᐊᓄᕆᒧᑦ, ᓯᑑᖃᑦᑐᓄᑦ ᐊᒻᒪᓗ ᓯᑯᒃ ᓱᐱᓕᑐᐊᕐᒪᑦ ᐊᓯᑦᔨᑕᐅᖃᑦᑐᑦ. ᓇᓅᓐᓂᖏᑦ ᑕᒪᒃᑯᐊ

ᐊᔪᒉᑦ ᒥᕐᖑᐃᓯᕐᕕᓕᐊᖑᒍᒪᔫᑉ ᓄᓇᖓᓂ ᓯᕐᖁᐃᑕᐅᒪᔪᑦ ᓄᓇᖕᖑᐊ 3.5-ᒥ.
ᒥᕐᖑᐃᓯᕐᕕᓕᐊᖑᒍᒪᔫᑉ ᓄᓇᖓᓂ

ᖃᐅᔨᒪᔭᑦᓴᐅᒥᔪᖅ ᑕᒪᓐᓇ ᓯᑯᓯᒪᓂᖅ ᐊᒻᒪ ᐊᐅᐸᓕᐊᓂᖓ ᐱᒋᐊᓚᐅᕐᑐᕕᓂᖅ ᓯᓚᕐᔪᐊᖅ ᐃᓘᓐᓇᖓ ᓯᑯᑦᑐᕕᓂᐅᑎᓪᓗᒍ, ᐅᑯᐊ ᐃᓚᐅᔪᑦ ᐊᓯᑦᕆᐸᓪᓕᐊᒍᑎᖃᕐᑐᑦ ᓇᑎᕐᓄᑦ ᐊᐅᔪᐃᑦᑐᓖᑦ ᓯᑯᒥᑉ ᐃᓚᐅᑎᓪᓗᒍ ᐊᐅᓯᐃᑦᑐᖅ,ᓇᕐᕚᒃ ᒥᑦᓴᓂ ᐊᒻᒪ ᐊᓯᑦᕆᐸᓪᓕᐊᔪᑦ ᐃᒪᕐᕕᐅᑉ ᑎᓂᓐᓂᖓᓄᑦ. ᖃᐅᔨᒍᒥᓇᕐᑐᖅ, ᓄᐃᑕᓂᖓ ᓇᓂᓐᓂᖕᒥᑦ ᐊᒥᓯᑦ ᖃᐅᔨᓴᕐᑕᐅᔪᓴᐅᓯᑎᒃ ᓄᐊᑕᐅᔪᕕᓃᑦ ᑌᒪᖕᖓᓕᓛᖅ ᓯᑯᖃᓲᖑᔪᖅ ᑑᕐᖕᒉᑦ ᑐᑭᓯᔭᐅᒍᑎᖃᕈᓐᓇᑐᖅ ᒪᖀᓂᒃ. ᑲᑎᓛᕐᓯᑎᒃ ᓯᑯᑦᔭᐅᓯᒪᔪᑦ ᐃᓗᓐᓇᓕᒫᖏᓐᓂᒃ ᖃᕐᖄᔪᐊᑦ ᖁᓖᖏᑦ ᑯᐯᒥ ᖁᐊᓚᐅᕐᑐᕕᓃᑦ ᓯᓚᕐᔪᐊᖅ ᓯᑯᒍᑎᖓᓂ, ᒥᑭᓂᕐᓴᓕ ᓯᑯᐃᑦ ᓯᑯᓚᐅᕐᑎᓇᒍ ᓯᑯᓯᒪᔪᕕᓂᐅᓂᖏᑦ ᐅᓕᕐᓄᓯᒐᓯᐊᕐᑎᓄᑦ ᐊᓕᐊᒥᔭᐹᑐᓚᐅᕐᑐᑦ.

ᑭᖑᓪᓕᐹᓇᓕᕐᑕᖓ ᐱᓇᓱᐊᕐᑕᐅᓂᖓᑕ ᑰᕈᑦᔪᐊᑉ ᒥᕐᖑᐃᓯᕐᕕᖓᑕ ᐱᓇᓱᐊᕐᑕᐅᒍᑎᖓ : ᖃᓄᐃᓕᖓᓂᖓᑕ ᑐᓴᕐᑕᐅᒍᑎᖓ ᐱᑦᔪᑎᖃᕐᓯᓂ ᑕᑯᑦᓴᐅᓯᓂ ᐊᕙᑎᖓ ᖃᐅᔨᓴᕐᑕᐅᓚᐅᕐᒥᔪᖅ ᐃᑯᒪᓕᐅᕐᕕᐅᒍᓐᓇᓂᖓ ᑕᒫᓂ ᓄᓇᖓᓂ ᒥᕐᖑᐃᓯᕐᕕᓕᐊᖑᒍᒪᔫᑉ, ᑰᖏᑦ, ᑕᓯᖏᑦ ᐊᒻᒪ ᓯᑦᔭᖓᑕ ᖃᓄᐃᓕᖓᓂᖓ (ᓄᓇᖕᖑᐊᖅ 3.6). ᐆᑦᑐᑎᒥᓗᒍ ᑰᕈᑦᔪᐊᑉ ᐃᒪᖓ ᐅᓕᑦᓯᓯᒪᔪᖅ 4011 ᑭᓚᒦᑕᓂᒃ, 98 ᐳᓴᓐᑎᖓ ᐃᓗᐊᓃᑦᑐᖅ ᓄᓇᖓᓂ ᒥᕐᖑᐃᓯᕐᕕᓕᐊᖑᒍᒪᔫᑉ. ᐊᒻᒪᒋᐊᓪᓚᑕᐅᖅ, ᒥᑭᓂᕐᓴᓂ ᑕᓪᓕᒪᓂᒃ ᐃᓚᖃᕐᒥᔪᑦ ᐊᖏᓂᕐᐸᐅᖃᕐᑕᐅᔪᓂ ᐅᑯᐊᖑᑦᓯᑎᒃ ᓯᑲᓕᐅᒃ ᑰᒐᔭᒃ ᐃᒪᖓ ᐊᒻᒪ ᓇᕐᕚᓕᐊᓇᐊᑉ ᑰᖕᒫᑕ ᐃᒪᖓ. ᐃᓯᒪᒥᑦᓯᒍᓕ ᓄᓇᐅᑉ ᑕᓯᖏᑦ, 6700 ᓴᓂᐊᓃᑦᑐᑦ ᑕᓰᑦ ᐊᖏᓕᓈᕐᓯᑎᒃ ᖃᐅᔨᔭᐅᓯᒪᔪᑦ, ᑕᓰᑦ ᐃᒪᖃᕐᑎᓯᒍᑕᐅᒥᔪᑦ ᐃᑯᒪᓕᐅᕐᕕᐅᑐᐃᓐᓇᓇᐊᖃᕐᓂᓴᐅᔪᑦ ᐅᖓᕙᐅᑉ ᓯᓈᖓᓂ (11.2 ᐳᓴᓐᑎᓄᑦ) ᐳᕐᑐᓂᕐᓴᐅᔪᖅ ᔮᐸᑐᐊᑉ ᒥᑦᓵᓂ (1,09 ᐳᓴᓐᑎᑦ) ᑰᕈᑦᔪᐊᑉ ᓇᑎᕐᓇᖓᓂᓪᓗ (2.3 ᐳᓴᓐᑎᑦ). ᐃᑭᑦᑐᐊᐱᐅᓚᐅᕐᑐᑦ ᑕᓰᑦ ᐊᑦᓯᑕᐅᒪᔪᑦ ᖃᐅᔨᓴᕐᑕᐅᔪᑦ ᐃᓚᐅᓚᐅᕐᑐᑦ ᐅᑯᐊ ᖃᕐᓃᒃ (1565 ᐊᖏᓂᖓ) Thoynard (284 ᐊᖏᓂᖓ) ᑕᓯᒍᓗᒃ (248 ᐊᖏᓂᖓ),

ᐱᕈᑦᑐᖃᕐᓂᖓ ᐊᕙᑎᖓᑕ

ᐊᕙᑎᖓ ᓄᐃᑕᑦᓯᓂ ᑕᑉᐱᑯᐊ ᐱᕈᑦᑐᖏᓐᓂᒃ ᖃᓄᖅ ᐱᕈᑉᐸᓕᐊᓂᖏᓐᓂᒃ ᑲᒪᔪᑑᔪᖅ, ᓄᓇᑦᓯᒪᕕᐅᑦᓯᓂ ᐊᑦᔨᒦᖏᑐᓄᑦ. ᐅᑭᐅᕐᑐᒦᓕᓗᐊᕐᓯᑎᒃ, ᓄᓇᖁᑎᖓ ᒥᕐᖑᐃᓯᕐᕕᓕᐊᖑᒍᒪᔪᖅ ᓄᓇᖁᑎᖓ ᐱᑕᖃᕐᒥᔪᖅ ᐊᑦᔨᒦᖏᑐᓂ ᐆᒪᔪᖃᕐᓯᓂ ᐊᒻᒪ ᐱᕈᑦᑐᖃᕐᓯᓂ, ᐅᓕᕐᓄᓯᒍᑕᐅᓯᑎᒃ ᖃᐅᔨᓴᕐᑕᕕᓃᑦ ᐊᓪᓚᑕᐅᒍᑎᖏᓐᓂ, ᖃᐅᔨᓴᕐᑐᕕᓃᑦ 2003-ᒥ ᐊᒻᒪ 2004-ᒥ, ᐃᓚᖃᕐᓯᑎᒃ ᑐᑭᓯᒐᑦᓴᓂᒃ ᐱᔪᕕᓂᕐᓂᒃ ᐃᓄᓐᓂ ᖃᐅᔨᒪᔪᓂ ᑲᖏᕐᓯᐊᓗᑦᔪᐊᒥ, ᐃᓘᓐᓇᑎᒃ ᑖᒃᑯᐊ ᐱᕈᑦᑐᐃᑦ ᓯᕐᖁᐃᑕᐅᓚᐅᕐᑐᑦ ᐊᒻᒪ ᐅᖃᑦᑕᐅᒪᑦᓯᑎᒃ *ᑰᕈᑦᔪᐊᑉ ᒥᕐᖑᐃᓯᕐᕕᖓᑕ ᐱᓇᓱᐊᕐᑕᐅᒍᑎᖓ : ᖃᓄᐃᓕᖓᓂᖓᑕ ᑐᓴᕐᑕᐅᒍᑎᖓ.*

ᓯᕗᓪᓕᐹᒥ, ᓄᓇᖓᓂ ᒥᕐᖑᐃᓯᕐᕕᓕᐊᖑᒍᒪᔫᑉ ᒪᖀᓄᑦ ᐱᕈᕐᕕᐅᔪᖅ : ᓇᐹᕐᑐᓂᒃ ᐊᒻᒪ ᑎᖓᐅᔭᓂᒃ, ᓇᐹᕐᑐᐃᑦ ᖃᐅᔨᒪᒍᑕᐅᔪᑦ ᐊᓯᑦᕆᐸᓪᓕᐊᓂᖓᓂ ᐅᑭᐅᕐᑕᑐᒥ ᓇᐹᕐᑐᐃᑦ ᐊᒻᒪ ᐅᑭᐅᕐᑕᑐᒥ ᓴᕐᖃᑐᔫᑦ. ᖃᐅᔨᒪᔭᐅᒍᑎᖃᕈᓐᓇᑐᑦ ᓄᐃᑕᓂᖏᑦ ᓇᐹᕐᑐᐃᑦ ᐃᑎᕐᓴᒦᑦᓯᑎᒃ, ᓇᑎᕐᓇᒦᑦᓯᑎᒃ, ᐊᒻᒪ ᐅᑭᐅᕐᑕᑐᒦᑦᓯᑎᒃ ᐱᕈᑦᑐᖃᕐᓯᓂ. ᐅᑭᐅᕐᑕᑐᒥ ᑎᖓᐅᑫᑦ ᖃᐅᔨᒪᔭᐅᒍᑎᖃᓇᕗᑦ ᓇᐹᕐᑐᖏᑐᒦᑦᑐᑦ. ᐱᕈᑦᑐᐃᑦ ᖃᐅᔨᒪᔭᐅᒍᑎᖃᑐᑦ ᐅᑯᐊᖑᔪᑦ ᐊᕚᓗᕿᐊᑦ ᐊᒻᒪ ᑎᖓᐅᑫᑦ ᐊᒻᒪ ᐃᕕᐅᔭᐅᑦᓯᑎᒃ ᐊᒻᒪ ᐃᑭᑦᑐᐊᐲᑦ ᐅᕐᐲᑦ. ᖃᐅᔨᓴᕐᕕᐅᔪᓂ ᑎᖓᐅᔭᖃᕐᓂᓴᐅᓚᐅᕐᑐᑦ,

ᐊᒻᒪᑕᐅᖅ, ᐃᓗᐊᓂ ᒪᖀ ᖃᐅᔨᔭᐅᓚᐅᕐᑐᑦ ᐱᕈᑦᑐᖃᕐᑐᑦ, ᑕᓪᓕᒪᐅᓚᐅᕐᑐᑦ ᐱᕈᑦᑐᐃᑦ ᖃᐅᔨᒪᓇᑦᓯᐊᓚᐅᕐᑐᑦ; ᑎᖓᐅᑫᑦ ᐊᒻᒪ ᓄᓇᒧᑦ ᓯᓚᒻᒪᓯᒪᔪᑦ ᐊᕚᓗᕿᐊᑦ, ᐱᕈᒍᐊᕐᑐᑦ ᐊᕚᓗᕿᐊᑦ ᐊᒻᒪ ᓇᐹᕐᑐᐃᑦ (ᓄᓇᖕᖑᐊᖅ 4.1). ᑖᒃᑯᐊ ᐱᕈᑉᐸᓕᐊᓂᖏᑦ ᓯᕐᑫᑕᐅᓯᒪᓂᖃᖃᑦᑕᑐᑦ ᖃᓄᖅ ᐳᕐᑐᔪᒦᓐᓂᒥᓄᑦ ᓯᕐᑫᑕᐅᓯᒪᓂᖃᕐᓯᑎᒃ, ᓯᕐᒥᒥᓄᑦ ᐊᒻᒪ ᐊᓄᕆᒦᓐᓂᒥᓄᑦ (ᐊᓪᓚᓯᒪᔪᑦ 4.2-ᒥ 4.7-ᒧᑦ). ᑎᖓᐅᑫᑦ ᖃᕐᖄᓗᐃᑦ ᐃᓯᐊᓐᓃᓂᓴᐅᔪᑦ, ᐊᑭᓐᓇᔫᖓᓂ ᐊᒻᒪ ᐃᓐᓈᕿᓂᖏᓐᓂᒃ, ᓄᓇᒧᓪᓕ ᓯᓚᒻᒪᓯᒪᔪᑦ ᐊᕚᓗᕿᐊᑦ ᑕᑯᔭᐅᓂᕐᓴᐅᖃᑦᑕᓚᐅᕐᑐᑦ ᓇᑎᕐᓇᓂ, ᐃᒪᖃᖕᖏᑐᒥ ᐊᒻᒪ ᐃᓚᖏᑦ ᐊᐅᓚᔭᐅᖃᑕᓯᒪᓚᐅᕐᑐᑦ ᐊᓄᕆᒧᑦ. ᐅᖃᐅᔭᓖᑦ ᐱᓐᓂᓴᐅᑎᓪᓗᒥᑦ ᓄᓇᔭᑦᓯᐊᕐᑭᓐᓂᓴᒥ ᐊᒻᒪ ᐁᔪᖓᓂᕐᓴᒥ. ᐱᕈᒍᐊᕐᑐᑦ ᐊᕚᓗᕿᐊᑦ ᑰᑭᕐᔪᐊᑉ ᓇᑎᕐᓇᖓᓂᑦᑐᑦ 300ᒦᑕᓂᑦ ᐳᒃᑭᓂᖃᕐᓯᓂ. ᓇᐹᕐᑐᐃᑦ ᐊᑯᓚᐃᓐᓂᓴᐅᔪᑦ ᓇᑎᕐᓇᒦᑦᓯᑎᒃ 200 ᒦᑕᓂᑦ ᐳᒃᑭᓂᓴᐅᓯᑎᒃ. ᑖᒃᑯᐊ ᐱᒥᐅᓂᕐᓴᐅᖃᑕᓚᐅᕐᑐᑦ ᓇᐹᕐᑐᐃᑦ, ᕐᑫᑭᓃᑦ ᑕᑯᑦᓴᐅᓚᐅᕐᒥᔪᑦ ᑰᑭᕐᔪᐊᑉ2 ᓴᓂᐊᓂ, ᑕᒪᓐᓇ ᖃᐅᔨᒍᑕᐅᓚᐅᕐᑐᖅ ᕿᐅᔭᓇᕐᑐᒦᓐᓂᐸᐅᒥᐊᖏᑦ ᕐᑫᑭᓃᑦ ᑯᐯᒦᑦᓯᑎᒃ.

ᐃᓯᒪᒥᑦᓯᒥᓪᓕ, ᐱᕈᑦᑐᐃᑦ, ᖃᓄᐃᓕᖓᓂᖓᓂ ᑐᓴᕐᑎᓯᒍᑎᒃ ᓄᐃᑕᑎᑦᓯᕗᖅ ᓯᓇᐅᓂᖏᓐᓂᒃ ᑕᑯᑦᓴᐅᔪᑦ ᒥᕐᖑᐃᓯᕐᕕᓕᐊᖑᒍᒪᔫᑉ ᓄᓇᖁᑎᖓᓃᑦᑐᑦ. ᐁᔪᖓᔪᐃᑦ ᐱᕈᑦᑐᐃᑦ ᐅᑯᐊᖑᔪᑦ ᐃᕕᑦᓯᑲᐃᑦ, ᐱᕖᑦ,

ᐊᕙᓪᓕᕐᑭᐊᑦ ᐊᒻᒪᓗ ᓇᐹᑐᐃᑦ. ᐁᔭᖓᕆᑐᑦ ᐅᑯᐊᖑᑎᓪᓗᒥᑦ ᑎᖓᐅᓯᑦ, Liverworts ᐊᒻᒪᓗ ᑐᑐᐃᑦ ᓂᕿᖏᑦ.)

ᐊᒥᓲᑎᒥᓕᐅᕐᑐᑦ 269 ᐁᔭᖓᔭᐃᑦ ᐱᕈᑦᑐᐃᑦ ᓱᕐᖁᐃᑕᐅᓕᐅᕐᑐᑦ ᒥᕐᖑᐃᓯᕐᕕᓕᐊᖑᔪᒪᔫᑉ ᓄᓇᕐᖁᑎᖓᓅᑦᑐᑦ, ᐱᓗᐊᕐᑐᒥ ᐳᕐᑐᓂᓕᒻᒦᑐᑦ 275ᒦᑕᓂᑦ. ᓇᕐᑳᑐᐃᑦ ᑭᓪᓕᖓᓂ ᐱᒥᐊᕐᓯᑎᒃ. ᖃᔪᐃᓕᖓᓂᖓᓂ ᑐᓴᕐᑎᓯᒍᑎᒃ ᖃᐅᔨᓕᐅᕐᒥᔭᖅ ᐃᓕᖏᑦ ᕿᐅᔮᓇᕐᑐᒥ ᐱᕈᑐᐃᑦ (59,5 ᐳᓴᓐᑏᑦ) ᐳᕐᑐᓂᕐᓴᐅᒥᔭᑦ ᐅᑭᐅᕐᑕᑐᒥ ᐱᕈᑦᑐᓂ (40,5 ᐳᓴᓐᑎᒍᑦ), ᓄᐃᑕᑎᑦᓯᒍᑕᐅᓯᓂ ᑰᕈᕐᔭᐊᑉ ᓇᑎᕐᓇᖓ ᕿᐅᔮᓇᕐᑐᒥ ᐱᕈᑦᑐᕐᑲᑐᖅ ᐅᑭᐅᕐᑕᑐᒦᑦᑐᓂ. ᐊᒻᒪᑕᐅᖅ, ᖃᐅᔨᓴᕐᓂᐅᓕᐅᔭᑦ 2003 ᐅᐱᕐᖔᖓᓂ, ᐃᓕᒥᐊᖅᓕᐅᒻᒥᔭᑦ ᒪᕐᕉᓂ ᐱᕈᑦᑐᓂ ᑯᐸᐃᒥ ᐊᒻᒪᓗ ᓯᑕᒪᐅᔭᑦ ᑲᓇᑕᒥ ᑕᑯᓕᑭᑕᕐᑕᐅᒐᑎᒃ. 59 ᐱᕈᑦᑐᐃᑦ ᑕᑯᑦᓴᐅᓯᐊᖑᒥᓂᖁᑕᐅᓕᐅᕐᑐᑦ, ᓄᐊᑕᐅᓕᐅᕐᑐᑦ ᐊᒻᒪᓗ ᖃᐅᔨᓴᕐᑕᐅᓯᑎᒃ ᐊᑕᐅᓯᐊᕐᓯᑎᒃ ᒪᕐᕈᕕᑦᓯᑎᓪᓗᓂ 2003-ᒥ, ᑳᒃᑯᐊᑕᒐ ᕿᐅᔮᓇᕐᑐᒥ ᐱᕈᓲᖑᔭᑦ ᑯᐯᑉ ᑕᕐᖃᖓᓂ ᐅᕙᓘᓐᓅᑦ ᑲᓇᑕᐅᑉ ᐃᑎᕕᐊᓂ.

ᐅᓪᓗᒥᒎᑦ ᑎᑭᑦᓯᒍ ᖃᐅᔨᒪᔭᐅᑦᓯᐊᖑᒥᑐᑦ ᐁᔭᖓᕆᑐᐃᑦ ᐱᕈᑦᑐᐃᑦ ᒥᕐᖑᐃᓯᕐᕕᓕᐊᖑᔪᒪᔫᑉ ᓄᓇᕐᖁᑎᖓᓅᑦᑐᑦ. ᐃᓕᐅᑎᓐᓇᒍ, ᖃᐅᔨᓴᕐᕕᐅᔭᒥ ᑰᕈᕐᔭᐊᒥ, ᐁᔭᖓᕆᑐᐃᑦ ᐱᕈᑦᑐᐃᑦ ᐱᕈᓲᖑᔭᑦ ᐃᒪᕐᓯᒥ ᐊᒻᒪᓗ ᐃᒪᕐᓯᕐᑲᖑᑐᒥ. ᐃᓕᒥᐊᕈᑕᐅᓯᑎᒃ 1951-ᒥ ᖃᐅᔨᓴᕈᑎᕕᓂᖑᓐᓄᑦ ᔭᒃ ᕈᓯᐸ ᑐᑭᓕᐊᕐᓯᓯᓂ ᑰᕈᕐᔭᐊᒥ ᐊᒻᒪᓗ ᑕᓯᕕᐊᔪᑉ ᓄᕗᖓᓂ, ᐊᒻᒪᓗ 2003 ᐊᒻᒪᓗ 2004-ᒥ ᖃᐅᔨᓴᕐᑐᕕᓂᐅᑎᓪᓗᒍ ᑲᑎᕕᒃ ᓄᓇᓕᓕᒫᑦ ᑲᕙᒪᖓ, 100 ᐊᑦᔨᒌᖕᒥᑐᑦ ᑐᑐᐃᑦ ᓂᕿᑦᓴᔭᖏᑦ, 40 ᑎᖓᐅᓯᑦ ᐊᒻᒪᓗ ᐊᓯᖏᑦ 50 ᐊᑦᔨᒌᖕᒥᑐᑦ ᐱᕈᕐᑐᐊᐅᑎᓪᓗᒋᑦ ᓱᕐᖁᐃᑕᐅᓕᐅᕐᑐᑦ (ᐃᓕᒥᐊᕈᑎᒃ 3). ᑳᒃᑯᐊ ᐃᓗᐊᓂ, 14 ᑎᖓᐅᓯᑦ ᐊᒻᒪᓗ ᒪᕐᕈᒃ ᐊᑦᔨᒌᒐᑎᒃ ᐱᕈᕐᑐᐊᐅᑎᓪᓗᒥ ᓄᐊᑕᐅᓕᐅᕐᑐᑦ ᑯᐯᒥ, ᐊᑕᐅᓯᕐᖅ ᑲᓇᑕᒥ ᑕᑯᓕᑭᑕᕐᑕᐅᖏᑐᖅ, ᖃᐅᔨᒪᔭᐅᒥᐊᕐᑲᓇᕗᑦ ᓯᑕᒪᐅᔭᑦ ᐱᕈᕐᑐᐊᐅᐱᐅᑦᓯᓂ ᓄᐊᑕᐅᔭᕕᓃᑦ ᑕᑯᑦᓴᐅᓯᐊᖑᒥᑐᑦ ᑲᓇᑕᒥ.

ᐃᓕᒥᐊᕈᑕᐅᑦᓯᑎᒃ ᐱᕈᑦᑐᓄᑦ, ᒥᕐᖑᐃᓯᕐᕕᓕᐊᖑᔪᒪᔫᑉ ᓄᓇᕐᖁᑎᖓ ᐊᓂᕐᕿᒥᔭᐅᒥᕗᕐᖅ ᐊᑦᔨᒌᖕᒥᑐᓄᑦ ᐆᒪᔪᓄᑦ. 25 ᓄᓇᒥᐅᑌᑦ ᐊᒻᒪᓗ ᐃᒪᕐᒥᐅᑕᐅᓯᑎᒃ, 126 ᑎᒻᒥᐊᑦ 24 ᐃᖃᓗᐃᑦ ᐃᓂᖃᕐᐸᑐᑦ ᐊᕐᖀᔫᑉ ᖃᔪᐃᓕᖓᓂᖓ ᒪᓕᑦᓯᒍ. ᐆᒪᔭᐃᑦ ᑕᑯᑦᓴᐅᓲᖑᔭᑦ ᓯᑦᔭᒥ ᐅᑯᐊᖑᔭᑦ ᓇᔪᐃᑦ, ᖃᓯᒥᐊᑦ, ᕿᓕᓗᒉᑦ ᐊᒻᒪᓗ ᐊᒥᓯᐊᓘᑦᓯᑎᒃ ᑎᒻᒥᐊᕐᒥᑦᐊᕐᒥᑦ. ᓄᓇᒥᓪᓕ ᐅᑯᐊᖑᔭᑦ ᑕᑯᔭᐅᕐᑲᑕᓕᐅᕐᑐᑦ ᑐᑦᑐᐃᑦ, ᑎᓇᓐᓂᐊᑦ ᑲᔪᕐᑐᐃᑦ ᐊᒪᕈᐃᑦ, ᐊᑦᓴᑦ, ᐃᓪᓛᕐᑯᑦᓯᑦ, ᐅᑲᓕᐊᑦᓯᐊᑦ, ᐅᑳᓪᓗ, ᐃᓕᐅᒻᒥᑎᓗᒥᑦ ᐊᒥᓱᑦ ᑎᒻᒥᐊᑦ ᐆᑦᑐᑎᒥᓗᒍ ᓇᓴᐅᓪᓕᓛᑦ, ᐊᕐᑭᒡᒥᕖᑦ, ᐊᕐᕿᑏᑦ, ᕿᓐᓄᐊᔭᐊᑦ, ᐅᒃᐱᑦ ᓇᕐᑐᖄᓪᓗ. ᐱᓗᐊᕐᑐᒥ ᐊᑦᓴᑦ, ᐃᓪᓕᕐᑯᑦᓯᑦ ᐊᒻᒪᓗ ᐊᕐᑭᒡᒥᓀᑦ ᓄᓇᒥᓲᒥᓂᒃ ᐅᑭᐅᕐᑕᑐᒦᓐᓂᐸᐅᔭᑦ. ᐊᒥᓯᓂ ᐊᑦᔨᒌᖕᒥᑐᓂ ᑰᕈᕐᔭᐊᒦᑦᑐᑦ ᐊᒻᒪᓗ ᐊᓯᖏᓐᓂ ᑕᓯᕐᓂᒃ, ᐃᖃᓗᐸᖏᑦ ᐱᒻᒪᓇᐅᓂᕐᐸᐅᑎᓪᓗᒋᑦ. ᐊᕐᖀᔪᕐᒥ ᐊᐅᓚᓲᖑᓂᖏᑦ ᐅᖃᓕᒪᔪᐅᒻᒥᔭᑦ ᖃᔪᐃᓕᖓᓂᖓᑕ ᑐᓴᕐᑕᐅᔪᑎᖏᓐᓂ. ᓱᓇᒥᑦᓯᑎᒃ ᐊᓪᓚᑕᐅᓯᒪᔭᑦ ᐆᒪᔭᐃᑦ ᐃᓗᐊᓂ ᐊᒻᒪᓗ ᓴᓂᐊᓂ ᒥᕐᖑᐃᓯᕕᓕᐊᖑᔪᒪᔫᑉ ᓄᓇᕐᖁᑎᖓᓅᑦᑐᑦ ᓄᐃᑕᑎᑕᐅᕗᑦ ᐃᓕᒥᐊᕈᑎᒃ 4-ᒥ 9-ᒧᑦ, ᑳᒃᑯᐊ ᐃᓕᖃᕐᑐᑦ ᐃᓄᑦᑎᑐᑦ, ᖃᓪᓗᓈᑎᑐᑦ, ᒍᐃᒍᐃᑎᑐᑦ ᐊᒻᒪᓗ ᓛᑎᓄᕐᑎᑐᑦ ᐊᑎᖏᓐᓂᒃ. ᖃᐅᔨᒪᔭᐅᒥᐊᕐᑲᓇᕗᑦ ᑕᒪᒃᑯᐊ ᐆᒪᔭᐃᑦ ᐃᓄᓐᓄᑦ ᓂᕿᑦᓴᔭᐊᖑᓲᖑᔭᑦ ᐱᐅᓯᑐᕐᖃᕐᒥᓂ ᐊᑐᕐᓯᑎᒃ (ᓂᕿᖓ, ᐊᒥᖓ, ᐊᓐᓄᕌᓕᐊᑦᓴᓇᑦᓯᒥᑦ, ᓴᓇᕐᕈᑎᓕᐊᓇᑦᓯᒥᑦ, ᓴᓇᖕᖑᐊᓯᒥᑦ). ᑕᒪᒃᑯᐊ ᐅᑯᐊ ᐃᓗᐊᓅᑦᑐᑦ ᕿᓕᓗᒉᑦ, ᑐᑦᑐᐃᑦ ᐊᒻᒪᓗ ᐃᖃᓗᑉᐲᑦ.

ᕿᓕᓗᒉᑦ ᐊᐅᓚᔪᓯᖏᑦ ᓇᓪᓕᐅᑎᒍᓯᓃᑦ. ᐅᐱᕐᖔᑯᓪᓕ ᐊᕐᖁᓵᓕᐅᕐᑐᓲᑦ ᖃᐅᔨᓴᕐᕕᐅᔭᒥ ᐊᒻᒪᓗ ᐃᓕᖓᓂ ᒥᕐᖁᐃᔭᓇᐊᕐᑐᓲᖑᑦᓯᑎᒃ ᑰᕈᕐᔭᐊᑉ ᐹᖓᓄᑦ (ᐊᓪᓚᑕᐅᓯᒪᔭᑦ 4,8). ᐊᐅᓚᓂᖃᓪᓚᓇᓲᖑᔭᑦ ᔭᓗᒥ ᐊᒻᒪᓗ ᐊᐅᒡᒍᓯᒥ. *ᑰᕈᑦᔭᐊᑉ ᒥᕐᖑᐃᓯᕐᕕᖓᑕ ᐱᓇᓯᐊᕐᑕᐅᔪᑎᖓ : ᖃᔪᐃᓕᖓᓂᖓᑕ ᑐᓴᕐᑕᐅᔪᑎᖓ*. ᐅᖃᕐᓯᒪᒪᑦ ᑕᒪᓐᓇ ᖄᖕᒥᕐᓂᑯᓕᐅᕿᓯᐊᕐᓯᑎᒃ ᐆᒪᔪᕐᓂᐊᐸᑦᑐᕕᓃᑦ ᖃᑦᓴᓐᐸᐃᒃᑯᑦ ᑎᑭᑦᓯᒍ 19 ᖃᓐᑕᓂ ᐊᒻᒪᓗ ᐱᒥᐊᓯᑎᓪᓗᒍ 2000ᒥ ᐃᑭᓪᓕᑎᑦᓯᓯᒪᔭᖅ ᕿᓕᓗᓚᕐᓂ ᐅᖓᕙᒦᑦᑐᓂᒃ. ᑳᒃᑯᐊ ᕿᓕᓗᒉᑦ ᑌᒪᖕᖓᓂ ᐊᒥᓯᖕᖑᓚᓇᓚᐅᕐᓯᒪᖕᒥᑐᑦ, ᐅᓪᓗᒥ, ᓄᓇᕕᒻᒥᐅᑦ ᐃᓄᐃᑦ (ᑭᒡᒐᑐᕐᑕᐅᓯᑎᒃ ᒪᑭᕝᕕᒃ ᑯᐊᐳᓐᓴᒧᑦ ᐊᒻᒪᓗ ᑲᑎᕕᒃ ᓄᓇᓕᓕᒫ ᑲᕙᒪᖓᓄᑦ). ᐃᖃᓗᓐᓂᐊᓂᕐᒥᒃ ᐊᒻᒪᓗ ᐃᒪᕐᐱᓕᓇᓂᕐᒥᒃ ᑲᓇᑕᒥ ᐊᒻᒪᓗ ᓄᓇᕗᒃᑯᑦ ᑲᕙᒪᖓ ᐱᓇᓯᐊᕐᑲᑎᒦᓕᕐᑐᑦ ᑳᒃᑯᐊ ᕿᓕᓗᒉᑦ ᐅᖑᒪᔭᐅᑎᓪᓗᓯᐊᕐᓯᒥᑦ ᑐᖁᕐᑕᐅᓗᐊᑐᐃᓐᓇᑎᑦᑌᓕᑦᓯᒥ. ᐊᓯᖏᑦ ᐱᓇᓯᐊᕐᑕᐅᔭᑦ ᐃᓕᖏᑦ, 1990-ᒥ ᓄᐃᑦᓯᓕᐅᔭᑦ ᒪᕐᕿᓕᒻᒥ ᕿᓕᓗᒐᕐᓂᐊᕕᐅᑎᑦᓯᑌᓕᓯᑦᓯᑎᒃ. ᐅᖓᕙᐅᑉ ᓯᕿᓂᖓᓅᑦᑐᖅ ᑕᒪᓐᓇ ᓄᓇᒃ.

ᑐᑐᐃᓕ ᐱᑦᔭᑎᒥᑦᓯᒥᑦ, ᓄᓇᕕᒃ ᑐᑦᑐᖃᕐᑐᖅ ᐊᒥᓲᓂᕐᐸᐅᔭᓂ ᓯᓚᕐᔭᐊᓕᒫᒥ, ᑲᑎᑦᑎᓯᒥᑦ ᑕᐅᓯᔭᐅᑉ ᑐᑦᑐᖏᑦ ᐊᒻᒪᓗ ᑲᖕᒥᕐᓯᐊᓗᑦᔭᐊᑉ ᑐᑦᑐᖏᑦ. ᒥᕐᖑᐃᓯᕐᕕᓕᐊᖑᔪᒪᔪᖅ ᑲᖕᒥᕐᓯᐊᓗᑦᔭᐊᑉ ᑐᑦᑐᖏᑕ ᓄᓇᕐᖁᑎᖓᓅᑦᑐᖅ ᐊᒻᒪᓗ ᓄᕐᕿᓕᐅᕐᐱᕐᑲᓲᖑᑦᓯᑎᒃ. 1999 ᐊᒻᒪᓗ 2001 ᐊᑯᓐᓂᖓᓂ,

ᓄᕐᕋᓕᐅᕐᕕᒋᕙᑦᑕᖏᑦ ᑲᖏᕐᓱᐊᓗᑦᔪᐊᑉ ᑐᑦᑐᖏᑦᑕ 3700 ᑭᓕᒻᑕ-ᓯᒃᑭᑕᐅᖔᔪᖅ ᐃᓗᐊᓅᑦᑐᑦ. ᐅᖓᕙᐅᑉ-ᓛᐸᑐᐊᑉ ᖃᖄᓗᒻᒥᐅᑕᓂ ᑐᑦᑐᖃᖏᔪᑦ ᑑᖕᒐᑦ ᑐᑦᑐᓴᔭᖏᑦ, ᑐᖕᒐ ᖃᖄᓗᖏᓐᓂ. (ᐊᓪᓚᓯᒪᔪᑦ 4.9) ᐅᓪᓗᒥᒧᑦ ᑎᑭᑦᓯᒍ, ᖃᐅᔨᒪᔭᐅᑦᓯᐊᖏᑐᑦ ᑐᑦᑐᓴᔭᖏᑦ. ᐃᓄᐃᑦ ᐅᖃᖅᓯᒪᒥᔪᑦ ᑐᑦᑐᐃᑦ ᐃᓚᖏᑦ ᓅᓰᖑᖖᒋᓂᕋᕐᓯᒋᑦ ᓄᓇᒥᔭᒥᓂ ᖃᐅᔨᓴᕐᑏᑦ ᑕᒪᑦᓯᒥᖓ ᖃᐅᔨᓴᓕᐅᔪᑦ 1975-ᒥ. ᑑᖕᒐᑦ ᑐᑦᑐᖏᑦᑕ ᐊᕐᓇᕕᐊᖏᑦ ᐅᖓᕙᐅᑉ-ᓛᐸᑐᐊᑉᒦᓯᖑᔪᑦ ᐊᒻᒪᓗ ᑕᒪᓐᓇ ᐊᑦᔨᒥᔭᐅᖏᒥᔪᒻ ᑲᖏᕐᓱᐊᓗᑦᔪᐊᑉ ᑐᑦᑐᖏᑦᑕ ᐊᕐᓇᕕᐊᖏᓐᓄᑦ. 1983 ᐊᒻᒪᓗ 1985 ᐊᑯᓐᓂᖓᓂ, ᓄᕐᕋᓕᐅᕐᕕᐅᓲ ᑑᖕᒐᑦ ᑐᑦᑐᖏᓐᓄᑦ 1200 ᑭᓕᒻᑕ-ᓯᒃᑭᑕᐅᖔᔪᖅ ᐃᓗᐊᓂ ᐊᖏᓂᖅᑐᖅ. (ᓄᓇᖕᖑᐊᖅ 4.3). ᒪᓕᑦᓯᒥᑦ ᐅᓕᕐᓀᓯᒐᓯᐊᕐᑏᑦ ᖃᐅᔨᓴᕐᓯᒪᔭᖏᑦ, ᓄᓇᖁᑎᖏᑦ ᑲᖏᕐᓱᐊᓗᑦᔪᐊᑉ ᑐᑦᑐᖏᑦᑕ ᐃᓚᖓᓂ ᑕᑯᔭᐅᕙᑦᑐᑦ ᐅᖓᕙᐅᑉ-ᓛᐸᑐᐊᑉ ᓄᓇᖓᓂ ᐁᓇᓕᐅ ᐊᒻᒪᓗ ᑎᓯᒻᐱᓇᓗ ᐊᑯᓐᓂᖓᓂ, ᓄᕐᕋᓕᐅᕆᕋᒥ ᑑᖕᒐᑦ ᑐᑦᑐᖏᑦᑕ ᐊᒻᒪᓗ ᑲᖏᕐᓱᐊᓗᑦᔪᐊᑉ ᑐᑦᑐᖏᑦᑕ ᐅᐊᕈᑎᕆᒐᓕᓲᑦ. ᖃᐅᔨᔭᐅᕙᓪᓕᐊᓂᖏᑦ ᑕᑯᑦᓯᒥᑦ, ᓇᑦᔪᐃᔭᓕᕋᒥ ᐅᑭᐅᑯᑦ ᐃᒻᒪᖄ ᐃᓚᑦᓴᔭᕆᖏᑕᒥᓂ ᐃᓚᖏᑦ ᓄᕐᕋᓕᐅᕐᕕᖃᑐᐃᓐᓇᕆᐊᓖᑦ, ᖃᐅᔨᔭᐅᕙᓪᓕᐊᓂᖏᑦ ᑕᑯᑦᓯᒥᑦ ᑑᖕᒐᑦ ᑐᑦᑐᖏᑦ ᓯᖅᑯᐃᓯᒥᐊᓪᓚᕈᑕᐅᒍᒪᔪᑦ ᑖᒃᑯᐊ ᐆᒪᔪᐃᑦ ᒥᖕᖑᐃᓯᕐᕕᓕᐊᖑᒍᒪᔪᒧᑦ ᓯᒃᑯᑕᐅᑐᐃᓐᓇᕋᔭᖅᑯᓇᒥᑦ; ᖃᖃᒥᐅᕞᑦ ᓯᕐᕙᓛᓂᖏᓐᓄᑦ ᖁᓕᒥᒧᑦ ᐊᒻᒪᓗ ᓯᑭᑐᑦ ᓯᕐᕋᑕᐅᒍᐊᕐᑑᒪᑕ.

ᑭᖑᓪᓕᕞᒥ, ᐃᖃᓗᐸᑦ ᐱᒻᒪᕆᐅᓂᕐᐸᐅᕗᑦ ᐊᒻᒪᓗ ᒪᒪᕐᓂᐸᐅᓯᑎᒃ ᐃᖃᓗᓐᓂ ᑕᓖᓂ ᓄᓇᒥ. ᐃᓄᐃᑦ ᑳᒃᑯᓂᖓ ᓱᖏᕐᑑᑎᖃᓪᓕᕇᑦᑐᑦ ᐃᓅᒐᓯᐊᕈᑎᒋᑦᓯᒋᑦ ᐊᒻᒪᓗ ᑰᕈᕐᔪᐊᖅ ᐃᓄᓐᓄᑦ ᐊᕐᖁᑎᒥᔭᐅᕗᖅ ᐅᑭᐅᓂᒃ ᐊᒥᓯᕐᔪᐊᓂ, ᐃᖃᓗᐹᑦ ᓯᕓᔮᖑᔪᑦ ᒥᖕᖑᐃᓯᕐᕕᓕᐊᖑᒍᒪᔫᑉ ᓄᓇᖁᑎᖓᓂ ᓯᑦᑎᒻᐸᐅᑉ ᓄᖕᖑᐊᓂ, ᑕᕐᑭᓕᒫᒥ ᐊᑖᓂᑦᓯᑎᒃ. ᓯᕓᔭᓯᖑᔪᑦ ᑰᕈᕐᔪᐊᒥ, ᓇᕐᕼᓘᑉ ᐊᒻᒪᓗ ᓯᑲᓕᐅᑉ ᑯᕋᔩᖏᓐᓂ ᑎᑭᑲᓴᑦᓯᒍ ᖁᕐᓗᑑᑉ ᓴᕐᕙᖓ (ᓄᓇᖕᖑᖅ 4,3). ᓯᕓᔭᕐᓯᑎᒃ, ᐊᖑᑎᐅᓂᖏᑦ ᐃᖃᓗᐹᑦ ᐊᐅᐸᕐᑑᑎᓪᓗᒋᑦ ᐊᕐᓇᖏᑦ ᐊᐅᐸᓛᖓᔪᓲᑦ.

ᖃᐅᔨᒪᔭᐅᒥᐊᖃᕐᒥᔪᖅ ᒥᖕᖑᐃᓯᕐᕕᓕᐊᖑᒍᒪᔫᑉ ᓄᓇᖁᑎᖓ ᓂᓇᕕᐅᓲᖑᒥᕗᖅ ᐊᑦᔨᒌᖏᑐᓄᑦ ᐆᒪᔪᕐᓄᑦ ᐊᑦᑕᓇᕐᑐᒦᓕᕐᑐᓄᑦ, ᐃᓚᐅᑎᓪᓗᒋᑦ ᐅᖓᕙᐅᑉ ᕿᓕᓗᒐᖏᑦ, ᐊᕐᕖᑦ, ᓇᓄᐃᑦ, ᐱᕐᑐᓯᓃ, ᑎᒻᒥᐊᑦ, ᕿᖑᑐᖅ ᖁᕐᓯᑕᓂ ᐃᔾᔫᑦ, ᓇᕐᑐᕋᓕᓐᓄᓗ, ᐅᓐᓄᐊᓯᐅᑎᑦ ᓯᐅᑎᑭᑦᑐᑦ, ᖄᖁᕐᑕᒥ ᓂᐊᖁᓖᑦ ᓇᕐᑐᕋᓖᑦ ᐊᒻᒪᓗ ᑭᒡᒐᕖᑦ.

ᓄᓇᒥᔭᐅᖃᑕᓯᒪᓂᖓ ᐃᓄᓐᓄᑦ

ᐅᓂᒃᑳᑕᐅᓂᖓ ᑰᕈᑦᔪᐊᑉ ᒥᖕᖑᐃᓯᕕᖓᑕ ᐱᓇᓱᐊᕐᑕᐅᒍᑎᖓ : ᖃᓄᐃᓕᖓᓂᖓᑕ ᑐᓴᕐᑕᐅᒍᑎᖓ. ᑐᖕᖓᕕᖃᕐᑐᑦ ᐊᕙᑕᐅᑉ ᐱᐅᓯᑐᖃᓕᕆᓂᖓᑕ ᖃᐅᔨᓴᕐᓯᒪᔭᖏᑦ ᒪᓕᑦᓯᒥᑦ ᐱᓇᓱᐊᖃᑎᖃᕐᓯᑎᒃ ᐃᓄᖏᓐᓂᒃ ᓄᓇᕕᒻᒥ, ᐱᓗᐊᕐᑐᒥ ᖃᐅᔨᒪᔩᔪᓂ ᐱᓯᒪᑦᓯᑎᒃ ᑲᖏᕐᓱᐊᓗᑦᔪᐊᒥ. ᖃᓄᐃᓕᖓᓂᖓᑕ ᑐᓴᕐᑎᓯᒍᑎᒃ ᒪᕐᕈᐃᓕᕿᖓᑎᑦᓯᔪᖅ ᓄᓇᐅᑉ ᐃᓄᓐᓄᑦ ᓄᓇᒥᔭᐅᖃᑕᓯᒪᓂᖓᓂ : ᓯᕗᓂᐊᒍᑦ ᖃᓪᓗᓈᖃᓕᐅᕐᑎᓇᒍ ᐊᒻᒪᓗ ᖃᓪᓗᓈᑦ ᑎᑭᓕᐅᕐᑎᓗᒥᑦ.

ᖃᓪᓗᓈᑦ ᑎᑭᓕᐅᕐᑎᓇᒥᑦ ᐃᓄᓐᓄᑦ ᓄᓇᒥᔭᐅᕐᑲᑕᓯᒪᔪᖅ, ᑐᐊᓴᑯᑦ ᐊᒻᒪᓗ ᑐᓖ ᐅᑭᐅᒥᔭᐅᑎᑕᖏᓐᓂ ᐊᒻᒪᓗ 4000-ᓄᑦ ᐅᑭᐅᓂᒃ ᑕᑯᓐᓇᑕᐅᓂᖃᕐᓯᑎᒃ ᑎᑭᑦᓯᒍ 16ᖃᓐᑕᓂᑦ 20 ᒥᑦᓵᓅᑦᑐᑦ ᑕᑯᔭᐅᖃᑕᓯᒪᔪᑦ ᖃᓪᓗᓈᑦ ᓯᕗᓂᐊᒍᑦ ᓄᓇᒥᔭᐅᖃᑕᓯᒪᔪᑦ ᒥᖕᖑᐃᓯᕐᕕᓕᐊᖑᒍᒪᔪᒃ ᓄᓇᖁᑎᖓᓂ, ᐱᓗᐊᕐᑐᒥ ᓯᑦᔭᖓᓂ ᐊᒻᒪᓗ ᑰᕈᕐᔪᐊᒥ ᑐᑭᓕᐊᕐᓯᒍ (ᓄᓇᖕᖑᐊᖅ 5.1)

Paleo-Eskimo phase-ᖓ ᓄᓇᕕᒻᒥ 4000 ᐊᒻᒪᓗ 2500 ᐅᑭᐅᑦ ᓈᓯᒪᓕᕐᑐᑦ ᐅᓪᓗᒥᒧᑦ ᑎᑭᑦᓯᒍ, ᐃᓱᓕᓐᓂᖅᓯᑎᒃ ᕿᐅᔭᓇᕐᓯᑉᐸᓪᓕᐊᓯᑎᓗᒍ, ᓴᓇᔭᐅᓯᒪᔪᑦ ᕿᑦᓯᓇᒍᑦᓴᐅᓯᑎᒃ ᓴᓇᓯᒪᔪᑦ ᑕᑯᔭᐅᖃᑦᓯᒪᔪᑦ ᐅᔭᕋᐃᑦ, ᓴᐅᑎᐅᑦᓯᑎᓪᓗ ᑑᓕᐊᖑᓯᒪᑦᓯᑎᓪᓗ. ᐅᔭᕋᕐᓄᑦ ᐃᓚᑎᓪᓗᒥᑦ ᐃᓄᐃᑦ ᐱᓇᓱᐊᕐᐸᓂᕐᒥᔪᑦ ᕿᔪᓐᓂᒃ, ᓴᐅᓂᕐᓂᒃ ᐊᒻᒪᓗ ᓇᑦᔪᓂᒃ ᓴᓇᒍᑎᒋᑦᓯᒋᑦ ᐱᑎᑦᓯᓕᐅᕐᓯᑎᒃ, ᓇᐅᓕᓕᐅᕐᓯᑎᓪᓗ. ᑖᒃᑯᐊ ᐱᓇᓱᒍᑕᐅᔪᕕᓅᑦ ᐊᑐᕐᑕᐅᖃᑕᕕᓅᑦ ᐃᖃᓗᑦᓯᐅᕈᑕᐅᓯᑎᒃ. ᓯᓚᖓ ᓂᕈᒥᓐᓂᓴᐅᔪᕕᓂᐅᓗᐊᕐᑎᓗᒍ ᐆᑐᑎᒥᓗᒍ ᐅᓪᓗᒥ ᓯᓚᒥᓕᕐᑕᕗᓐᓂ, Paleo-Eskimo -ᑯᑦ ᐊᓂᕐᕋᖏᑦ ᐅᑭᐅᕐᑐᒧᑦ ᓇᒻᒪᑎᑕᐅᕙᓐᓂᒥᔪᑦ. ᐊᒥᕐᓂᒃ ᑐᐱᖃᕐᓯᑎᒃ ᐅᔭᕋᕐᓅᕙᑦᑐᕕᓅᑦ ᖃᒪᖃᕐᓯᑎᓗ, ᐊᒻᒪᓗ ᓂᕿᖃᐅᑎᖃᕐᐸᓯᑎᒃ. ᐃᓚᖏᑦ ᐅᑦᓯᒪᓂᑕᓕᓇᕗᑦ ᐃᓯᒪᒥᔭᖃᕐᑐᖅ ᓯᕗᓪᓕᒪᕕᓃ ᓛᐸᑐᐊᒥ ᐱᓯᒪᑯᓇᐅᔪᖁᑎᖏᑦ, ᐹᓯᖕᒐᑎᓗᒍ ᓄᓇᕕᒻᒥ ᐃᓄᖃᓇᑐᕕᓂᐅᓂᕋᑕᐅᕙᑦᑐᒥ. (ᐊᓪᓚᓯᒪᔪᑦ 5,1)

ᑑᓕᒃ ᐱᓇᓱᐊᕐᑕᐅᓯᒪᓂᖓ ᐊᑯᓐᓂᖓᓂᑦᑐᖅ 2000 ᐊᒻᒪᓗ 900 ᐅᑭᐅᓂᒃ ᐅᓪᓗᒥᒧᑦ ᑎᑭᑦᓯᒍ. ᐃᓕᑕᓇᔭᐅᒍᑎᖃᕐᓯᒪᒥᔪᖅ ᐅᔭᕈᑦ ᓴᓇᕐᕈᑎᓕᐊᕕᓂᖏᑦ ᐱᐅᓂᕐᓴᐅᒪᑕ ᑕᑯᑦᓯᒥᑦ, ᐃᓕᖃᕐᑎᓗᒥᑦ

ᓇᑲᑎᑦᓯᐊᓯᒪᓂᖕᒥᑦ ᑮᓇᓕᐅᕐᓯᒥᑦ ᐃᓯᖕᒥᑦ ᐊᒥᓕᕙᓪᓕᐊᑎᓪᓗᒥᑦ ᑑᖕᒥᓪᓗ ᑮᓇᓴᑦᓯᐊᓯᒪᑦᓯᑎᒃ ᓇᑲᑕᐅᑐᐃᓐᓇᓯᒪᒐᑎᒃ ᐊᒻᒪᓗ ᓯᑎᓂᕐᓴᐅᓯᑎᒃ ᐅᔭᕋᖕᒥᑦ. ᑭᓕᐅᑕᖕᒥᑦ ᐊᒻᒪᓗ ᒥᕐᕐᑯᑎᖕᒥᑦ ᖃᐅᔨᒍᑕᐅᓚᐅᕐᑐᑦ ᐊᒦᑦ ᓴᓗᒻᒪᓴᕐᑕᐅᔫᕕᓂᐅᓂᖕᒥᓐᓂᒃ ᐊᒻᒪᓗ ᒥᕐᓯᑕᐅᑦᓯᑎᒃ. ᐊᒻᒪᑕᐅᖅ, ᑑᓴᒃᑯᑦ ᐃᓄᖕᒥᑦ ᐃᓪᓗᓕᐅᕐᐸᑐᕕᓅᑦ ᕿᐅᔮᕐᓂᖕᒐ ᒪᓕᑦᓯᒍ ᓯᓚᐅᑉ /ᐊᓪᓚᓯᒪᔪᑦ 5.2 ᐊᒻᒪᓗ 5.4) ᐊᒻᒪᓗ ᐃᒪᐅᑉ ᓯᓈᖕᒐᓂᒥᐅᑐᐃᓐᓇᐅᔪᓇᔭᐅᔪᑦ ᓄᓇᓕᐊᓚᐅᕐᓯᒪᑦᓯᐊᕋᑎᒃ. ᖃᐅᔨᒪᔭᐅᒍᑎᖃᕐᒥᔪᑦ ᐃᓪᓗᕕᒐᓕᐅᔫᕕᓂᐅᓂᖕᒥᑦ, ᖃᔭᕐᓕᐅᓯᑎᒃ ᐊᒻᒪᓗ ᖃᒧᑎᓕᐅᕐᐸᓯᑎᒃ, ᑭᓯᐊᓂ ᑭᖕᒍᓪᐸᖅ ᐱᒐᓯᐊᕈᑕᐅᔪᖅ ᕿᒻᒥᓄᑦ ᐅᓂᐊᕐᑕᐅᕙᕐᑯᓂᖕᒥᑐᖅ.

ᑑᓕ ᓄᓇᕕᒻᒦᑐᖅ, 1100-1500 ᐊᕐᕿᒍᐃᑦ ᐊᑯᓐᓂᖕᒐᓂ. ᑖᒃᑯᐊ ᓄᑖᑦ ᑎᑭᑦᑐᕕᓂᐅᔪᑦ ᓯᕗᓪᓕᕕᓂᕐᒥᒃ ᔨᖕᒥᐅᓯᒪᓂᕐᓴᕕᓅᑦ ᒪᓅᑦᑐᒥ ᓄᓇᒥ ᐊᒻᒪᓗ ᓯᓚᐅᑉ ᐊᓯᑦᔨᑭᐊᕐᓂᖕᒐᓂ ᔨᖕᒥᐅᓯᒪᓂᕐᓴᐅᓯᑎᒃ. ᐱᒐᓯᐊᕈᑎᖕᒥᑦ, ᑑᒐᕕᓂᐅᑦᓯᑎᒃ, ᓴᐅᓂᕕᓂᕐᓂᒃ ᐊᒻᒪᓗ ᑮᓐᓇᓴᕐᓯᒪᑦᓯᑎᓪᓗ, ᖃᐅᔨᒪᔭᐅᒍᑎᖃᕐᑐᑦ ᓯᓇᓪᓗᑐᐊᐱᖕᒥᑦ ᓴᓇᒪᓂᖃᕐᒪᑕ ᐱᓗᐊᕐᑐᒥ ᐆᒪᔪᕐᓯᐅᕈᑎᖕᒥᑦ ᐃᒪᕐᒥᐅᑕᓂᒃ. ᑖᒃᑯᐊ ᐃᓄᐃᑦ ᐊᑐᕐᐸᓂᕐᒥᔪᑦ ᕿᕙᓗᐊᕐᑐᓂ ᐳᑑᓇᒍᑎᖃᕐᓂᒪᑕ, ᐅᒥᐊᖅ, (ᐊᒥᓯᓂ ᐃᓄᖃᕈᓐᓇᓯᓂ) ᐊᒻᒪᓗ ᕿᒧᑦᓯᑭᑎᓂᒃ ᖃᒧᑎᖃᕐᓯᑎᒃ, ᓴᓇᒍᓐᓇᓯᑎᓪᓗ ᐅᔭᕋᕐᒥ ᐃᓪᓗᒥᒃ ᑐᕐᓯᖃᑦᑎᓗᒥᑦ (ᐃᓚᖕᒐᓂ ᕿᐅᔭᓇᕐᑐᑯᕕᖃᕐᐸᑐᕕᓃᑦ) ᐃᓪᓕᖃᕐᓯᑎᓪᓗ (ᐊᓪᓚᓯᒪᔪᖅ 5.5 ᐊᒻᒪᓗ, 5.6). ᑑᓕ ᓄᓇᕕᓕᒦᒥ ᓄᓇᖃᕐᓯᒪᔪᑦ ᖃᐅᔨᒪᔭᐅᒐᓗᐊᕐᑎᓪᓗᒥᑦ ᐊᑕᐅᓯᖅ ᓄᓇᐅᔪᖅ ᑑᓕᖃᐅᑎᐅᓯᒪᓂᖕᒐ ᖃᐅᔨᔭᐅᓚᐅᔪᖅ ᒥᕐᖑᐃᓯᕐᕕᓕᐊᖕᒍᒍᒪᔩᑉ ᓄᓇᕐᑯᑎᖕᒐᓂ, ᐱᓗᐊᕐᑐᒥ ᑕᓯᐅᔭᑯᓘᑉ ᐅᕐᕐᑯᐊᓂ. ᑑᓕᑦ ᐃᓄᐃᑦ ᓯᕗᓪᓕᕕᓂᓪᓚᖕᒥᑦ.

ᖃᓄᐃᖕᒥᓕᖕᒐᓂᖕᒐᓂ ᑐᓴᕐᑕᐅᑎᑦᓯᒍᑎᒃ ᖃᐅᔨᓴᐅᓚᐅᕐᒥᔪᑦ ᑯᑭᕐᔪᐊᒥ ᑲᑎᓯᔪᖅ ᐅᖕᒐᕙᒍᑦ ᐊᒻᒪᓗ ᓵᐸᑐᐊᑉ ᐃᒪᕐᕕᖕᒐᓄᑦ ᑰᓐᓂᖕᒐ. ᑖᓇ ᖃᐅᔨᓴᐅᓕᕋᒥ ᐊᕐᕐᑯᑎᒥᓴᕕᓂᐅᔪᑦᓴᐅᔪᓇᔭᐅᔪᖅ ᑌᑦᓯᒪᓂᑕᓕᓇᕗᓄᑦ ᐊᐅᓪᓛᑲᑦᑕᑐᓄᑦ ᖃᓪᓗᓈᑦ ᑎᑭᓚᐅᕐᑎᓇᖕᒥᑦ. ᖃᐅᔨᓴᐅᒍᑎᖃᒥᐊᓪᓚᓚᐅᕐᑐᑦ ᒫᓇᖃᕐᒥᖅ ᑕᑯᔭᐅᕐᕐᑲᒥᐅᓚᐅᕐᑐᓄᑦ **metachert-ᓂ** ᓯᕐᑯᓐᒥᓂᒃ ᐃᒥᓯᕕᕕᓂᖕᒐ ᑰᑭᕐᔪᐊᑉ ᓯᓈᓕᒫᖕᒐᓂ. Ramah Bay ᓵᐸᑐᐊᑉ ᓯᑦᔭᖕᒐᓂᑦᑐᖅ **metachert-ᓂ** ᓄᐊᑦᓯᕕᐅᕙᑦᑐᕕᓂᖅ (ᐊᓪᓚᓯᒪᔪᖅ 5.7) **metachert-ᓂ** ᐊᑐᕐᑕᐅᕙᑦᑐᕕᓂᖅ ᑮᓐᓇᓴᐅᑎᐅᓯᓂ ᑕᑯᔭᐅᓯᒪᔪᖅ ᑌᓯᒪᓂᑕᓕᓇᕕᓄᑦ ᑕᒪᒥᓐᓂ ᐅᖕᒐᕙᒥ, ᕿᑭᕐᑕᔪᐊᒥᓪᓗ ᖃᓂᖕᖕᒥᑐᐊᓗᒻᒧᑦ Southampton Island ᑎᑭᑦᓯᒍ.

ᑲᑎᑐᐊᕐᒪᓃᒃ ᐃᓄᐃᓪᓗ ᑕᓇᐅᑉ ᐊᑭᐊᓂᒥᐅᓪᓗ ᐅᑭᐅᕐᑑᑉ ᑲᓐᓇᖕᒐᓂ ᓄᐃᑦᓯᒍᑕᐅᓕᓕᐅᔪᖅ ᒫᓇᖃᕐᒥᒃ **ᐃᓅᓯᐅᓕᕐᑑᑉ ᐅᓂᒃᑳᑕᐅᒍᑎᖕᒐ** ᐅᖃᕐᑕᐅᒪᔪᑦ *ᑯᑭᑦᔪᐊᑉ ᒥᕐᖑᐃᓯᕐᕕᖕᒐᑕ ᐱᓇᓯᐊᕐᑕᐅᒍᑎᖕᒐ : ᖃᓄᐃᓕᖕᒐᓂᖕᒐᑕ ᑐᓴᕐᑕᐅᒍᑎᖕᒐᓂ.* ᑕᒪᓇ ᖃᐅᔨᒪᒍᑕᐅᔪᖅ ᐊᑦᔨᒥᐊᓪᓚᕖᕈᓐᓂᖕᒐ ᐃᓄᐃᑦ ᐱᐅᓯᖕᒐ ᑕᑯᑦᓯᒍ. 1497-ᒥ ᔭᓐ ᑲᐸᑦ ᓯᕗᓪᓕᐸᐅᑦᓯᓂ ᑕᓇᐅᑉ ᐊᑭᐊᓂᒥᐅᔭᐅᑦᓯᓂ ᑕᑯᒥᐅᕐᑐᕕᓂᖅ ᓵᐸᑐᐊᑉ ᓯᑦᔭᖕᒐᓂ ᑭᖕᒍᓂᖕᒐᒍᑦ ᑎᑭᑦᑐᖃᕐᐸᓕᕐᓂᒥᔪᖅ ᑕᓇᐅᑉ ᐊᑭᐊᓅᖕᖕᒫᑐᓂ ᕿᓂᕐᓯᑎᒃ ᐊᕐᕐᑯᑎᑦᓴᐅᓚᔭᕐᑐᒥᒃ ᐅᒥᐊᓄᑦ. ᐃᓄᐃᑦ ᓂᐅᕐᕈᓯᒥᐊᕐᑐᓕᕋᒥ ᑭᓯᐊᓂ ᖃᓪᓗᓈᓅᕐᐸᑎᓪᓗᒥᑦ.

1752-ᒥ ᒍᕈᕕᐊᓐᑯᑦ ᓯᕗᓪᓖᒥ ᑎᑭᒥᐅᕐᑐᕕᓃᑦ ᐅᐯᒥᐊᖕᖕᒐᓯᑎᒃ Baie des Esquimaux ᒥᒃ ᓴᓂᐊᓂ Strait of Belle Isle. 1 ᑕᐅᓴᐃᑦ ᕿᑎᕐᕐᑲᖕᒐᓂᓪᓗ ᐅᑭᐅᓂᒃ, ᐊᒥᓯᑦ ᐊᑦᔨᒦᖕᒥᑐᑦ ᓄᐃᑕᐅᒪᓕᓚᐅᔪᑦ, ᓵᐸᑐᐊᑉ ᓯᑦᔭᖕᒐᓂ (ᐊᓪᓚᓯᒪᔪᑦ 5.8). ᐃᓚᒥᐊᕈᑎᖃᕐᓯᑎᒃ ᓂᐅᕕᕐᓂᐊᕕᐊᓐᓂᒃ, ᑖᒃᑯᐊ ᒍᕈᕕᐊᓐᑯᑦ ᐃᓄᓐᓂᒃ ᓂᐅᕕᕐᑎᓯᒐᓯᐊᖃᑦᑐᕕᓃᑦ ᐅᖕᒐᕙ-ᓵᐸᑐᐊ ᑎᑭᑦᓯᒍ. 18 ᖃᓐᑌᑦ-ᑎᑭᑦᓯᒍ, ᒍᕈᕕᐊᓐᑯᑦ ᐃᓄᓐᓂᒃ ᖃᓪᓗᓈᓕᑦᑑᒪᑎᑦᓯᖃᑐᕕᓃᑦ. ᓯᕗᓪᓖᒥ ᐃᑭᑦᑐᕕᓂᐅᓚᐅᕐᓯᑎᒃ ᐊᒻᒪᓗ ᐊᐅᓚᐃᓐᓇᓲᖕᒍᑦᓯᑎᓪᓗ ᓯᓚᐅᑉ ᐱᐅᓯᖕᒐ ᒪᓕᑦᓯᒍ, ᖃᓂᖕᖕᒥᑐᐊᓗᒻᒧᑦ ᐊᐅᓪᓚᕙᑦᓯᑎᒃ, ᐃᓄᐃᑦ ᓵᒥᐊᕐᑎᑕᐅᒪᓕᕐᑫᒥ ᓄᓇᑉᐸᓕᐊᓯᔪᕕᓃᑦ ᒍᕈᕕᐊᓐᑯᓂ ᐱᐅᓯᑐᖃᕐᒥᓂᒃ ᕿᒪᒃᑫᓕᐊᓯᑦᓯᑎᒃ ᓯᒃᑫᑐᒥᒃ.

ᑐᓴᕐᑎᓯᒍᑕᐅᔪᖅ ᖃᓄᐃᓕᖕᒐᓂᖕᒐᓂ ᐅᖃᕐᓯᒪᒻᒥᔪᖅ ᐊᐅᒡᒍᓯ 7, 1811-ᒥ, ᒍᕈᕕᐊᓐᑯᑦ ᐅᒥᐊᓕᑦᑕᖃᕐᓯᑎᒃ Kohlmeister & Kmoch-ᑯᑦ ᑎᑭᓚᐅᕐᑐᕕᓃᑦ "ᑲᖕᒍᕐᔪᐊᓗᑦᔪᐊᒍᑦ", ᑲᑎᓯᓚᐅᕐᑐᕕᓃᑦ ᐃᓄᓐᓂᒃ ᑖᕙᓂ ᐊᒻᒪᓗ ᓄᓇᖕᒐ ᕿᒥᕐᕈᓚᐅᕐᑐᓯᒍ ᐅᓪᓗᓂ ᐃᑭᑦᑑᓚᓗᐊᓂᒃ. ᐃᓯᒪᒥᔭᐅᓚᐅᔪᖅ ᐃᓄᓐᓄᑦ ᑲᑎᑦᑕᕕᒥᐊᖕᒐ, ᐊᕐᕕᑕᕐᕿᑦ ᐊᑦᓯᔪᕕᓃ ᐊᑕᓂᐊᓗᒻᒥᒃ George -ᒥ ᐊᑦᓯᓯᒍ George River-ᒥᒃ ᓵᒥᐊᕐᑎᑕᐅᒪᓯᑦᓯᒪᒐᓗᐊᕐᓯᑎᒃ ᐃᓄᐃᑦ ᓄᓇᖃᕐᑐᑦ ᐅᖕᒐᕙᒥ ᑭᖕᒍᓂᐊᓗᐊᒍ ᑭᓯᐊᓂ ᑎᑭᓕᓕᐅᕐᑐᕕᓂ ᐊᖕᓕᑲᒃᑯᑦ ᓵᒥᐊᕐᑎᓯᒥᐊᕐᑐᑦᓯᑎᒃ. ᓯᕗᓪᓖᑦ ᑐᑦᓯᐊᕕᑦ ᓇᑉᐸᑕᐅᓚᐅᔪᑦ ᑭᓪᓕᓂᕐᒥ 1898-ᒥ ᐊᒻᒪᓗ Fort Chimo-ᒥ 1990-ᖕᒍᑎᓪᓗᒍ, 30-ᑲᓴᐅᔪᓂ ᐅᑭᐅᓂᒃ Reverend S.M. Stewart ᐊᔪᕿᑦᑐᐃᔨᐅᓯᒪᔪᖅ ᐃᓄᓐᓂ ᐃᑲᔫᑎᖃᕐᓯᓂ ᐃᓄᓐᓂ ᑐᓵᔨᖃᕐᓯᓂ. ᐊᒥᓲᓂᓴ ᐃᓄᐃᑦ ᓄᓇᖃᕐᑐᑦ ᑲᖕᒥᕐᓯᐊᓗᑦᔪᐊᑉ ᓴᓂᐊᓂ ᐸᑦᑎᑕᐅᒪᓕᕐᑐᕕᓃᑦ ᐊᒥᓯᓂ ᐅᑭᐅᓂᒃ 1965-ᒥ ᑭᓯᐊᓂ ᑐᑦᓯᐊᕕᖕᒐ ᓴᓇᔭᐅᔪᕕᓂᖅ.

ᓄᐃᑎᑕᐅᓂᖅᑭᑦ ᓂᐅᕐᕿᓯᕐᕖᑦ ᐅᖓᕙᒥ ᐱᒻᒪᕆᐅᔪᒥ ᐃᓄᐃᑦ ᐃᓅᓯᖅᑭᓐᓂᒃ ᓱᕐᕈᓂᖃᕐᓯᒪᒥᔪᑦ. ᓂᐅᕐᕿᓯᕐᕖᑦ ᐊᑐᕐᑐᒪᓇᐅᓚᐅᔪᑦ ᐊᒻᒪ ᐱᕕᑦᓴᐅᓯᑎᒃ ᓂᐅᕐᕿᓯᕐᐱᒥᖃᑕᓯᒥᑦ ᐊᒻᒪ ᑕᐅᕐᓰᕐᖃᑕᐅᕐᖃᑕᓯᑎᒃ ᓴᓇᓯᒪᔪᓂ. ᓯᕗᓪᓕᐹᖅ ᓂᐅᕐᕿᓯᕐᕕᒃ ᐅᒃᑯᐃᑕᐅᔪᕕᓂᖅ 1838 -ᒥ ᑲᖏᕐᓱᐊᓗᑦᔪᐊᒥ ᖃᑦᓴᓐᐯ ᑲᒻᐸᓂᒃᑯᑦ ᐊᒻᒪ ᐅᒃᑯᐊᑕᐅᑦᓯᓂ 1842-ᒥ; ᐊᐃᑉᐸᖓ ᐅᒃᑯᐃᓕᓚᐅᒻᒥᔪᖅ 1869-ᒥ ᐅᒃᑯᐊᓯᓂ 1915-ᒥ ᐱᖓᔪᐊᑦ ᐅᒃᑯᐃᓕᓚᐅᒻᒥᔪᖅ 1925-ᒥ ᐅᒃᑯᐊᓯᓂᓗ 1952-ᒥ. ᐅᒪᖕᖓᑦ ᐅᒃᑯᐊᑐᐊᕐᒪᑕ ᐃᓄᐃᑦ ᓄᓇᖃᑐᑦ ᑕᒫᓂᑦ ᑰᑦᔪᐊᑐᖃᕐᒥᑦ ᖃᓪᓗᓂᐊᓇᐊᖅᑲᑕᓚᐅᔪᑦ, ᑭᓪᓕᓂᕐᒧᑦ Hebron-ᒧᓪᓗᓃᑦ.

ᐅᑭᐅᑦ 60 ᐃᓗᐊᓂ ᑲᖏᕐᓱᐊᓗᑦᔪᐊᑉ ᐊᒻᒪ ᑭᓪᓕᓂᐅᑉ ᐊᑯᓐᓂᖓᓂ, ᒫᓐᓇᖃᒻᒥᖅ ᐱᐅᓯᓇᔭᐅᓯᒪᔪᑦ ᖃᐅᔨᒪᔭᐅᒍᑎᖃᕐᑐᑦ ᑲᓇᑕᐅᑉ ᐊᒻᒪ ᑯᐯᒃᑯᑦ ᐱᓪᓕᐅᑎᒋᐊᓯᓂᕕᓂᖅᑭᑦ ᑕᑯᓐᓇᓯᒥᑦ. 1958-ᒥ, DIAND-ᑯᑦ ᐱᔭᓈᕐᓯᒪᓕᕐᑐᑦ ᐊᑕᓐᓂᐅᕈᑎᐅᔪᓂ ᒪᑭᑕᒐᓯᐊᕈᑎᑦᓴᐅᒐᔭᕐᑐᓂ ᓄᓇᓕᐅᑉ ᐃᓗᐊᓂ ᐱᕕᑦᓴᓕᐅᕐᕕᓂ, ᐊᑎᖃᕐᑐᖅ ᐅᖓᕙᒥ : ᐱᕕᑦᓴᐅᒐᔭᕐᑐᓂ ᖃᐅᔨᓴᕐᓂᖅ. ᖃᐅᔨᓴᕐᓂᐅᔪᕕᓂᖅ ᓄᐃᑕᐅᕐᑯᔨᓚᐅᔪᖅ ᐱᕙᓪᓕᐊᑎᑕᐅᕐᑯᔨᑦᓯᓂ ᓄᓇᓕᐅᑉ ᐃᓗᐊᓂ ᖄᖏᕐᓂᑯᓕᐅᒐᓯᐊᕐᕕᒥ ᑯᐊᐸᒃᑯᑎᑐᑦ ᐋᕐᕿᓯᒪᓂᖃᕐᑎᓗᒍ. ᐱᓗᐊᕐᑐᒥᒃ, ᐃᒣᓕᒋᐊᕐᑯᔨᒍᑎᖃᓚᐅᔪᖅ ᐃᖃᓗᑉᐱᓕᕆᕕᒻᒥ ᓴᓇᔭᐅᕐᑯᔨᑦᓯᓂ ᐊᒻᒪ ᕿᔪᓐᓂᐊᕕᓕᐅᕐᑯᔨᑦᓯᑎᒃ. ᓇᓅᓂᓴᖓ ᑖᒃᑯᐊ ᐱᓇᓯᕝᕕᐅᒐᔭᕐᑐᑦ ᐃᓄᐃᑦ ᓄᓇᓕᖓ ᓂᕈᐊᕐᑕᐅᓯᒪᔪᖅ ᑲᖏᕐᓱᐊᐱᒻᒦᓯᓂ ᑲᑭᓚᓴᑲᓪᓚᒃ (ᑲᖏᕐᓱᐊᓗᑦᔪᐊᖅ) ᓴᓇᔭᐅᓯᓚᐅᔪᑦ 1962-ᒥ. ᐅᐱᖕᖓᓴᒥ ᓯᕗᓪᓕᐹᑦ ᐃᓪᓗᐃᑦ ᓴᓇᔭᐅᓚᐅᔪᑦ ᐃᓄᓐᓄᑦ ᐃᓪᓗᓴᐅᓯᑎᒃ, ᒥᑭᔪᐊᐱᒻᒥᒃ ᐊᐅᓚᔪᖃᕐᓯᑎᒃ, ᑭᓪᓗᕕᒃ ᓴᓇᔭᐅᓚᐅᔪᖅ ᕿᔪᐃᑦ ᓴᕐᕙᐅᓯᑎᒃ ᓄᕐᖃᑕᕐᕕᖓᓄᑦ. ᕿᔪᓐᓂᐊᓚᐅᔪᑦ ᕿᒧᑦᓯᓄᑦ ᐃᑲᔪᕐᑕᐅᓯᑎᒃ, ᐊᕐᖀᒍᑉ ᐁᑉᐸᓇᓕᕐᑕᖓᓂ, ᓄᓇᓕᒃ ᐅᑯᓂᖓ ᐃᓪᓗᖃᓕᓚᐅᔪᖅ ᑯᐊᐸᒃᑯᑦ ᓂᐅᕕᕐᓂᐊᕕᖓᓂ, ᑲᕙᒪᑐᖅᑯᑦ ᐃᓕᓐᓂᐊᕕᖓᓂᒃ, ᐊᓪᓚᕕᒃ, ᑐᓴᐅᑎᒃ ᐊᒻᒪ ᐃᑭᑦᑐᓂᒃ ᓱᓇᒐᓚᖃᐅᑎᖃᕐᓯᑎᒃ. ᑯᐊᐸᒃᑯᑦ ᐃᓅᒡᒍᑕᐅᓯᒪᓪᓚᓐᓇᑦᑐᖅ ᓄᓇᓕᐅᑉ ᐃᓗᐊᓂ, ᓯᕗᓕᕐᑎᐅᒍᓐᓇᓕᕐᒥ ᐊᒻᒪ ᓄᐃᑦᓯᒍᓐᓇᓯᓂ ᒪᑭᑕᒐᓯᐊᕈᑎᑦᓴᓂᒃ ᐊᒻᒪ ᑎᒥᐅᔪᑦ ᐋᕐᕿᓯᒪᓂᖃᓇᐊᖃᓂᖅᑭᓂ ᖃᐅᔨᒪᓕᕐᓯᒥᑦ. ᑭᖑᓂᐊᒍᑦ ᔪᒥᓯ V ᐊᖏᖃᑎᑮᒍᑕᕕᓂᐅᓪᑎᓪᓗᒍ 1975-ᒥ, ᑖᓐᓇ ᓄᓇᓕᐅᔪᖅ ᐃᓕᑕᕆᔭᐅᓂᓕᒻᒥᒃ ᓄᓇᖓ ᑲᖏᕐᓱᐊᓗᑦᔪᐊᖑᓚᐅᔪᖅ.

ᐱᐅᓯᑐᖃᕐᑎᒍᑦ ᐱᑑᑎᓯᒪᓂᖅ ᐊᑕᐅᓯᐅᒍᑕᐅᔪᖅ ᑲᖏᕐᓱᐊᓗᑦᔪᐊᒧᑦ ᐊᒻᒪ ᑭᓪᓕᓂᕐᒧᑦ ᖃᐅᔨᒪᔭᐅᖕᖏᑐᖅ ᖃᓄᖅ ᐱᒋᐊᕐᓯᒪᒻᒪᖔᑦ. ᑖᓐᓇ ᓄᓇᓕᐅᑉ ᐁᑉᐸᖓ ᐅᖓᕙᐅᑉ ᐃᓯᓪᓗᑐᖓᓃᑦᑐᖅ. 1800ᓂᑦ ᑎᑭᑦᓯᒍ 1978, ᐊᑐᕐᑕᐅᒪᓇᓚᐅᔪᖅ ᐱᕙᓪᓕᐊᓯᓂᖓᓂ ᑕᒪᑦᓯᒪ ᓄᓇᐅᑉ, ᖃᐅᔨᒪᔭᐅᒍᑎᖃᕐᓯᓂ ᓯᓚᓐᓂᐊᕕᐅᓂᕐᒥᑎᒍᑦ, ᒍᔭᕕᐊᓐᑯᑦ ᑐᑦᓯᐊᕕᖓ, ᐊᒃᓐᓕᑲᒃᑯᑦ ᑐᑦᓯᐊᕕᖓ, ᓂᐅᕐᕿᓯᕐᕕᒃ ᐊᒻᒪ ᐃᖃᓗᓐᓂᐊᕕᐅᑦᓯᓂ, ᐳᓖᓯᖃᕐᓯᓂᓗ ᐋᓰᐊᓪᐲᒃᑯᓂᒃ, ᑯᐊᐸᖃᕐᓯᓂᓗ, ᐊᓯᖃᕐᒥᓯᑎᓪᓗ. 1978-ᒥ, ᐃᓄᖏᑦ 50-ᓂ ᐃᑭᓐᓂᓴᐅᓚᐅᔪᑦ. ᑲᓇᑕᐅᑉ ᑲᕙᒪᖓ ᐅᒃᑯᐊᓯᒍᒪᓯᓚᐅᔪᖅ ᑖᑦᓯᒥᖓ ᓄᓇᓕᒻᒥᒃ ᐃᓄᖏᓪᓗ ᓄᓇᕕᓕᒫᒧᑦ ᐃᕐᐹᔭᕐᑎᓯᒥᑦ. ᓯᒐᒥ ᐅᒃᑯᐊᑕᐅᓚᕐᑭᓐᓂᒪᖓ ᖃᐅᔨᔭᐅᓪᓚᓇᓚᐅᕐᓯᒪᖏᑐᖅ. ᐊᒥᓯᑦ ᑭᓪᓕᓂᕐᒥᐅᑦ ᑲᖏᕐᓱᐊᓗᑦᔪᐊᒧᑦ ᓅᑦᑎᓯᒪᔪᑦ.

ᖃᐅᔨᒪᓇᕈᑎᖓ ᐃᓄᐃᑦ ᓄᓇᖃᕐᓯᒪᓂᖅᑭᑦ ᐅᖓᕙᓕᒫᒥ ᐱᒋᐊᕐᓯᒪᔪᑦ ᓯᕗᓂᐊᒍᑦ ᖃᓪᓗᓅᓂᒃ ᑲᑎᓯᓚᐅᕿᑎᒃ ᑲᑎᕐᓯᐸᓪᓕᐊᓯᓂᕕᓂᖅᑭᑦ ᑐᑭᓯᒪᔭᐅᓕᕐᑐᑦ ᑕᑯᑦᓯᒥᑦ ᐊᒻᒪ ᑐᑭᓯᕕᒋᑦᓯᒥᑦ ᐃᓄᖏᑦ ᐅᑦᓯᒪᓂᑕᕐᓂᐊᑎᓪᓗ ᑕᑯᓯᒪᔭᖏᑦᑎᒍᑦ. ᐱᓗᐊᕐᑐᒥᒃ ᑰᑭᑦᔪᐊᑉ ᒥᕐᖑᐃᓯᕐᕕᐅᑉ ᐱᓇᓯᐊᕐᑕᐅᓂᖓ, ᖃᓄᐃᓕᖓᓕᕐᓂᖓᓂ ᑐᓴᕐᑎᓯᒍᑎᒃ ᐅᖃᕐᓯᒪᔪᖅ ᓯᕗᓪᓕᐹᒥ ᖃᐅᔨᓕᓯᐊᕐᑕᐅᑎᓪᓗᒥᑦ ᓯᑦᔭᖏᑦ ᐊᑯᓐᓂᖓᓂ ᑲᖏᕐᓱᐊᓗᑦᔪᐊᑉ ᐊᒻᒪ ᐊᓪᓗᕕᐊᒥ ᑲᑎᕐᓯᑕᐅᔪᕕᓃᑦ 1986-ᒥ ᓯᕐᑯᐃᓯᒍᑕᐅᔪᕕᓃᑦ 7-ᓂ ᒫᓐᓇᖃᒻᒥᑯᑦ ᓄᓇᒥᔭᐅᖃᑕᓯᒪᔪᓂ. 2004-ᒥ ᐱᓇᓯᑦᑕᐅᔪᕕᓃᑦ ᓄᓇᒥᔭᖓᓂ ᒥᕐᖑᐃᓯᕐᕕᓕᐊᖑᒍᒪᔫᑉ ᑰᑭᕐᔪᐊᒥ ᐊᕐᑯᑎᒥᔭᐅᖃᑕᓯᒪᓂᖁᕐᑕᖓ ᓈᐸᑐᐊᒥᐅᓄᑦ ᐊᒻᒪ ᐅᖓᕙᒥᐅᓄᑦ. ᐅᓯᒪᓂᑕᕐᓂᐊᑕᐅᓯᒪᔪᑦ ᓄᓇᑐᐃᓐᓇᒥ ᓯᓂᑦᑕᕕᐅᖃᑕᓯᒪᔪᓂ ᑕᑯᖃᑕᓯᒪᔪᑦ ᐊᐅᓪᓈᕕᕕᓂᕐᓂᒃ. ᑰᑭᕐᔪᐊᑉ ᓴᓇᒪᓂᕐᓴᐅᔪᑦ ᐊᒻᒪ ᓄᐃᑕᓪᓚᓐᓇᑦᓯᑎᒃ ᐊᑦᔨᑮᖏᑐᓂ ᐱᓇᓯᐊᕐᕕᐅᖃᑕᓯᒪᔪᑦ.

ᖃᐅᔨᒪᒍᑎᐅᒥᐊᓪᓚᒥᔪᖅ ᐃᓄᐃᑦ ᓄᓇᖃᕐᓯᒪᓂᖅᑭᓐᓂᒃ ᑕᒫᓂ ᓄᓇᖃᕐᑑᔪᑦ ᖃᐅᔨᒪᔭᖃᕐᒪᑕ ᓄᓂᓪᓗ ᐊᑦᔨᑮᖅᑐᑦ ᐊᑎᖏᓐᓂᒃ ᖃᐅᔨᒪᑦᓯᑎᒃ. ᐊᑎᖃᕐᑎᑕᐅᕙᑦᑐᑦ ᓯᓇᓂ ᐆᒪᔪᕐᓂᐊᕕᐅᒍᓐᓇᓂᖅᑭᑦ ᒪᓕᑦᓯᒥᑦ, ᑐᑭᓯᒪᓇᒍᑎᖃᕐᑎᓯᒥᑦ ᐃᓕᒪᓇᕐᒪᖕᒫᑕᓗ ᖃᐅᔨᒪᒍᑎᒥᑦᓯᒥᑦ (ᓄᓇᖕᖑᐊᖅ 5.2): ᑕᐃᒪᖕᖓᓂ ᓄᓇᐅᑉ ᐊᑎᖓ ᐊᖓᔪᕐᖄᒥᔭᐅᔪᓂ ᕿᑐᖕᖓᖏᓐᓄᑦ ᖃᐅᔨᒪᔭᐅᑎᑕᐅᔨᖑᔪᑦ.

ᐃᓕᒋᐊᕐᓯᒍ, ᖃᓄᐃᓕᖓᓂᖓᓂ ᑐᓴᕐᑎᓯᒍᑎᑦ ᐅᖃᕐᓯᒪᒥᔪᖅ ᐃᓄᐃᑦ ᑲᐅᔨᒪᓂᖅᓯᒥᑦ ᐊᑦᔨᑮᖏᑐᒥ ᐱᕈᑦᑐᓂ ᐊᒻᒪ ᓯᓇᐅᓂᓪᓚᓇᖏᓐᓂᒃ ᖃᐅᔨᒪᑦᓯᑎᒃ ᐆᒪᔪᓂ ᐊᒻᒪ ᐱᕈᑦᑐᓂᒃ. ᐱᓗᐊᕐᑐᒥ, ᐆᒪᔪᓕᓇᓂᕐᒥᒃ ᐊᕕᑦᑐᑕᐅᓯᒪᔪᑦ ᐱᖓᓯᐃᓕᕐᑭᖓᑦᓯᑎᒃ ᐊᑎᕐᓯᑎᑕᐅᑦᓯᑎᒃ ᑎᓪᒥᐊᑦ, (ᑎᖏᒪᒌᑦ)

ᐱᓱᑦᑏᑦ (ᓄᓇᒥᐅᑌᑦ) ᐊᒻᒪᓗ ᐃᒪᕐᒥᐅᑌᑦ (ᐳᐃᑦᔪᓲᑦ) ᑖᒃᑯᐊ ᐱᖓᓱᐃᓕᕿᖓᑎᑕᐅᔪᑦ ᐊᕕᑦᑐᑕᐅᓯᒪᓂᖃᕆᕗᑦ ᐆᑦᑐᑎᒋᓗᒍ ᑰᒻᒥᐅᑌᑦ, ᑕᓯᕐᒥᐅᑌᑦ, ᖃᒪᓂᕐᒥᐅᑌᑦ ᐊᒻᒪᓗ ᑕᕆᐅᕐᒥᐅᑌᑦ. ᐆᒪᔪᖏᑦ ᐃᓂᒋᕙᑦᑕᖏᑦ ᒪᓕᑦᓯᒋᑦ ᐊᑎᖃᕐᑎᑕᐅᒻᒥᔪᑦ. ᐱᕈᑦᑐᖏᑦ ᐱᕈᐊᓗᑦᑐᑦ ᐱᕈᐊᓗᑦᑑᓂᕋᕐᑕᐅᔪᑦ ᐃᓚᖏᑦ ᐱᕈᐊᓚᓂᕋᕐᑕᐅᑎᓪᓗᒋᑦ ᐃᕕᑦᓯᑲᑎᑐᑦ. ᐳᑦᔪᐃᓗ. (ᐊᓪᓚᓯᒪᔪᑦ 5.12) ᑭᖑᓪᓕᐹᒥ ᐊᑦᔨᒌᖏᑐᑦ ᐱᕈᑦᓯᐊᑦ ᐊᑦᔨᒌᖏᑐᓂ ᐊᑎᖃᕐᒥᔪᑦ. ᖃᓄᐃᓕᖓᓕᕐᓂᖓ ᑐᓴᕐᑎᓯᒍᑎᒃ ᐅᖃᕐᓯᒪᒻᒥᔪᖅ ᐊᒥᓱᓂ ᐊᑦᔨᒌᖏᑐᓂ ᐱᕈᑦᑐᐃᑦ ᐊᑎᖏᓐᓂᒃ.

ᑭᖑᓪᓕᐹᒥ, ᖃᓄᐃᓕᖓᓕᕐᓂᖓ ᑐᓴᕐᑎᓯᒍᑎᖓᓂ, ᖃᐅᔨᓯᒪᒻᒥᔪᖅ ᐃᓄᐃᑦ ᐅᓂᒃᑲᐅᓯᖏᓐᓂ ᑐᓴᕐᓇᑐᑦᓯᐊᖑᓱᑎᒃ ᐅᓂᒃᑲᐅᓯᖃᕐᒥᔪᑦ. ᐊᒥᓱᑦ ᐅᓂᒃᑳᖑᔪᑦ ᐊᓪᓚᑕᐅᓯᒪᓕᕐᑐᑦ ᓄᓇᖃᕐᓯᒪᔪᑦ ᒥᕐᖑᐃᓯᕐᕕᓕᐊᖑᒍᒪᔫᑉ ᓄᓇᖁᑎᖓᓂ ᐊᒥᓱᒐᓗᑦ ᐅᓂᒃᑲᐅᓰᑦ ᑑᕐᖓᓂ ᐃᓚᐅᑎᓪᓗᒋᑦ.

ᐃᓱᓕᒍᑎᒃ

ᐃᓱᓕᒍᑎᒋᑦᓱᒍ ᑰᕈᑦᔪᐊᑉ ᒥᕐᖑᐃᓯᕐᕕᖓᑕ ᐱᓇᓱᐊᕐᑕᐅᒍᑎᖓ : ᖃᓄᐃᓕᖓᓂᖓᑕ ᑐᓴᕐᑕᐅᒍᑎᖓ. ᓇᐃᑦᑐᒥ ᐅᖃᕐᓯᒪᒻᒪᑦ ᐱᐅᓂᒋᔭᖓᓂ ᑕᒪᑦᓱᒪ ᓄᓇᐅᑉ ᒥᕐᖑᐃᓯᕐᕕᓕᐊᖑᒍᒪᔫᑉ ᐊᒻᒪᓗ ᐊᒥᓱᑦ ᑕᑯᑦᓴᐅᓗᐊᕋᑎᒃ ᑯᐸᐃᒥ. (ᓄᓇᙳᐊᖅ 6.1 ᐊᒻᒪᓗ ᐊᓪᓚᓯᒪᔪᖅ 6.1). ᐃᓚᒋᐊᕐᓱᒍ ᒪᕐᕉ ᐊᓯᒥᒃ ᓄᓇᐅᔫᒃ ᐃᓚᐅᓚᖓᑎᑐᒋᒃ ᒥᕐᖑᐃᓯᕐᕕᓕᐊᒧᑦ (ᓄᓇᙳᐊᖅ 6.12) ᑖᒃᑯᐊ ᓄᓇᐃᑦ ᐊᑦᔨᖅᖏᑐᑦ ᐊᒻᒪᓗ ᐅᖓᕙᐅᑉ ᓯᑦᔪᖓᑕ ᐊᑦᔨᖅᙱᑑᒍᑎᖏᑦᑕ ᐃᓚᒋᔭᐅᔪᑦ.

ᑭᖑᓪᓕᐹᒥ, ᖃᓄᐃᓕᖓᓕᕐᓂᖓ ᑐᓴᕐᑎᓯᒍᑎᖓᓂ, ᐅᖃᕐᓯᒪᔪᖅ **ᑭᖑᓂᐊᒍᑦ ᐱᓇᓱᐊᕐᑕᐅᓂᐊᕐᑐᓂ ᒥᕐᖑᐃᓯᕐᕕᒥᒃ ᓴᓇᓕᕈᑎᒃ**, ᑐᙵᕕᒋᑦᓱᒋᑦ ᑐᑭᓯᔭᐅᓯᒪᔪᑦ ᓄᐃᑕᐅᒪᑦᓱᑎᒃ ᐃᑲᔪᕐᑎᒋᑦᓱᒋᑦ ᑲᖏᕐᓱᐊᓗᑦᔪᐊᒥᐅᑦ. ᓄᐃᑦᓯᓚᐅᔪᑦ ᐸᕐᓇᓯᒪᐅᑎᒥᒃ ᐊᓪᓚᓯᒪᔪᕐᑎᒍᑦ ᓄᐃᑎᑕᐅᓚᕐᑎᓗᒍ ᑯᐯᒃ ᒥᕐᖑᐃᓯᕐᕕᓕᕆᔨᖏᑦ. ᑖᓐᓇ ᐊᓪᓚᓯᒪᔪᖅ ᐊᑕᓐᓂᐅᕈᑎᖃᑕᓖᕐᑐᖅ ᑭᓪᓕᒥᒐᓴᕐᑕᖏᓐᓂᒃ ᓄᓇᐅᑉ ᓯᕐᖄᑎᕐᑕᐅᓂᖓᓄᑦ, ᐃᓚᐅᑎᓪᓗᒋᑦ ᓯᖏᐅᓯᓴᒍᑎᑦᓴᑦ ᐃᑲᔪᕐᓯᒍᑕᐅᒐᓴᕐᓗᑎᒃ ᓴᐳᒻᒥᒍᑕᐅᓗᑎᒃ ᐊᒻᒪᓗ ᐱᕙᓪᓕᐊᑎᑦᓯᒍᑕᐅᓗᑎᒃ ᒥᕐᖑᐃᓯᕐᕕᐅᑉ ᐱᓇᓱᐊᕐᑕᐅᓂᖓᓂᒃ. ᐊᒻᒪᑕᐅᖅ, ᐊᕙᑎᓕᕆᓂᑎᒍᑦ ᐊᒻᒪᓗ ᐃᓅᓯᒃᑯᑦ ᓯᕐᓗᓂᖓᓂ ᖃᐅᔨᓴᕐᑕᐅᔪᑎᓴᖅ ᐊᑐᐃᓐᓇᕈᑎᑕᐅᓚᕐᑐᖅ ᑲᑎᕕᒃ ᓄᓇᓕᓕᒫ ᑲᕙᒪᖓᓄᑦ ᐱᒍᑦᔨᑐᒥᑦ ᑯᐯᒃ ᒥᕐᖑᐃᓯᕐᕕᓕᕆᔨᖏᑦ ᐊᒻᒪᓗ ᑐᓂᔭᐅᓗᑎᒃ ᐊᕙᑎᓕᕆᔨᒃᑯᓄᑦ. ᐊᓪᓚᑎᒍᑦ ᓄᐃᑎᑕᐅᒌᕐᓯᒪᓕᕐᐸᑦ ᓯᕗᓪᓕᐹᒥ ᐸᕐᓇᓯᒪᐅᑎᒃ ᐊᓪᓚᑕᐅᓚᕐᑐᖅ ᐊᒻᒪᓗ ᓯᕐᕋᐃᓂᖓᓂ ᖃᐅᔨᓴᕐᓗᑎᒃ, ᓇᐅᓕᒫᑦ ᑲᑎᒪᑎᑕᐅᖃᑕᓖᕐᑐᑦ ᓄᓇᕕᐅᑉ ᐃᓄᖏᑦ (ᐃᓚᐅᑎᓪᓗᒋᑦ ᑲᖏᕐᓱᐊᓗᑦᔪᐊᒥᐅᑦ), ᐃᓯᒪᒥᓴᒥᓂ ᐅᖃᕐᕕᖃᕐᖁᓯᒥᑦ ᒥᕐᖑᐃᓯᕐᕕᓕᐊᖑᒍᒪᔫᑉ ᒥᑦᓵᓄᑦ. ᑖᒃᑯᐊ ᐃᑑᓐᓇᑎᒃ ᐱᔭᓈᕐᑕᐅᑐᐊᕐᐸᑦᑕ, ᑰᕈᑦᔪᐊᑉ ᒥᕐᖑᐃᓯᕐᕕᖑᒍᓯᓕᕐᑐᖅ ᓄᓇᕕᒥ ᐁᑉᐸᓇᔭᐅᑐᓂ (ᐱᖑᐊᑐᐃᑦ ᐅᒃᑯᐃᑕᐅᓂᖃᑕᐅᔪᓪᒪᑦ ᔭᓄᐊᕆ 2004-ᒥ) ᑲᑎᕕᒃ ᓄᓇᓕᓕᒫᑦ ᑲᕙᒪᖓᑕ ᑎᒍᒥᐊᓕᖓᑦᓯᓂ ᑲᒪᔨᐅᓂᕐᒥᒃ ᑲᒪᒋᔭᐅᓂᖓᓂ ᐃᑲᔪᕐᑎᒋᓗᒋᑦ ᑲᖏᕐᓱᐊᓗᑦᔪᐊᑉ ᓄᓇᓕᖓ.

EDITOR'S NOTE

In April 2002, the Gouvernement du Québec and Nunavik authorities signed the *Partnership Agreement on Economic and Community Development in Nunavik* (also known as Sanarrutik). One of the objectives contained in Sanarrutik was to stimulate the development of the region's tourism industry through the creation of national parks. In June of that same year, a specific agreement concerning park development in Nunavik was signed by the Société de la faune et des parcs du Québec (FAPAQ), known today as the Direction of Sustainable Development, Ecological Heritage and Parks within the Ministère du Développement durable, de l'Environnement et des Parcs, and the Kativik Regional Government (KRG). The specific agreement defines the roles of each organization with respect to the development and management of parks in Nunavik. For its part, the KRG Parks Section is responsible for compiling information about the natural environments of the parks to be created and for drafting related status reports. This document, which is based on preliminary information put together by the FAPAQ, has therefore been produced by the KRG.

The name Kuururjuaq has been conferred on the proposed park provisionally, following consultations with the members of the Kangiqsualujjuaq park working committee. More thorough consultations are to be carried out with the entire community to select a permanent name.

In this document, the term Ungava–Labrador Peninsula (Makivik, 1992a) has been employed to denote the geographical zone situated north of the 55th parallel between Ungava Bay and the Labrador Sea. The term Labrador refers to the geographical zone included in the province of Newfoundland and Labrador.

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ACKNOWLEDGEMENTS

Many people have contributed both directly and indirectly to the production of this document. The team at the Kativik Regional Government (KRG) would like to take this opportunity to thank them.

The councillors of the Northern Village of Kangiqsualujjuaq as well as the members of the Qiniqtiq Landholding Corporation and the Epigituk (Taqpangayuk) Landholding Corporation have provided their expertise and backing. Marie Maggie Etok and Tommy George Etok assisted with the compilation of information in the village itself.

The following individuals with the Société de la faune et des parcs du Québec (wildlife and parks) were involved in the preparation of a preliminary version of this document in 2001: Annie Caron, Jean Boisclair, Raymonde Pomerleau, Denise Paradis, Julie Martel, Francis Moisan and André Lafrenière.

The following specialists took part in fieldwork: Pierre Verpaelst (geology), James T. Gray (geomorphology), Mireille Desponts (vegetation), Norman Dignard (vascular plants), Jean Gagnon (invascular plants) and Clément Fortin (trail inventory).

The Avataq Cultural Institute co-ordinated and carried out several studies: Scott Heyes and Christine LaBond (history), Daniel Gendron, Claude Pinard and Amélie Langlais (pre-contact and early contact occupation), Alain Cuerrier of the Plant Biology Research Institute at the Montreal Botanical Garden (Inuit ecological knowledge), Sylvie Côté Chew (co-ordination and proofreading of this document), Minnie Amidlak (proofreading of Inuktitut animal, insect and plant names appearing in the appendices).

Several Inuit residents and translators from Kangiqsualujjuaq greatly contributed to the work carried out by the above-mentioned specialists.

Ida Saunders of the KRG performed a final verification of Inuit place names and the Inuktitut translation of the map legend.

The following individuals have been part of the team at the KRG Parks Section: Betsy Berthe, Violaine Lafortune, Marie-Pierre Patry and Kevin Webb.

Bruce Picotte and Hugo Hamel (Nunavik Rotors) ensured helicopter maintenance and were of service in many ways while fieldwork was being carried out.

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1 PRESENTATION OF THE PROPOSED PARK

The Torngat Mountains and Koroc River region possesses many unique and rare natural elements, making it an exceptional territory. In order to protect this important part of our national heritage, an area that is largely defined by the Koroc River basin (known to the Inuit as Kuururjuaq) has been reserved for the creation of a Québec national park. With its source in the Torngat Mountains, the Kuururjuaq flows for 160 km through a spectacular u-shaped valley marked by a variety of distinct eco-systems. In former times, this valley was used by paleo-Eskimo groups travelling between the coasts of Labrador and Ungava Bay.

Situated along the eastern coast of Ungava Bay, not far from the municipality of Kangiqsualujjuaq, the territory of the proposed park covers 4274 km^2 (Figure 1.1). It comprises representative sections of three natural regions, which is to say the Torngat Mountain Foothills, the George River Plateau and the Ungava Coast. In addition, Parks Canada is contemplating the creation of a federal park in Labrador, immediately adjacent to the Kuururjuaq proposed park (Figure 1.2).

In the most easterly part of the proposed park, the Torngat Mountains are characterized by an extremely rugged topography, comparable in certain areas to the Rocky Mountains. This region marks the highest elevations in eastern Canada, culminating in Mount D'Iberville which towers at 1646 m. The spectacular and breathtaking landscapes provide evidence of the events that make up the natural history of the region and the continent; the sheer summits, glacial cirques and valleys, and perched beaches are all remnants of former major glaciation. In fact, the highest peaks of the Torngat Mountains are currently a source of debate in the scientific community as concerns the possible existence of nunataks.

Despite the total absence of trees and the presence of perennial snow in a few places, the tundra setting of the Torngat Mountains presents a surprising diversity of plants; several moss and lichen have been identified for the first time in the area. The territory is also a haven for certain birds of prey and other wildlife, with several species considered at risk in Québec including beluga, polar bear, Canada lynx, harlequin ducks and golden eagles. Moreover, a herd of mountain caribou found in the park has been classified as distinct from the George River caribou herd due to its vertical migration pattern.

In contrast with this mountainous sector, the valley of the Kuururjuaq presents a rich ecological enclave. It possesses a boreal forest formed of spruce and tamarack, not to mention a few stands of white birch, and it nurtures a diversity of wildlife that is unusual at this latitude (58th parallel). Several wildlife species found in the valley are at the northern limit of their ranges.

Moving west, the coast of Ungava Bay presents a marine environment that further contributes to the biological diversity of the proposed park. In fact, this territory is one of the rare places in Québec where it is possible to observe both polar bear and black bear in a single day.

With respect to human activity, a series of different paleo-Eskimo groups have occupied the territory for thousands of years. The most recent group, known as Thule, are the direct ancestors of contemporary Inuit and, technologically speaking, were the most advanced. Archaeological excavation work has demonstrated that for a very long time the valley of the Kuururjuaq was an important route for the transportation of metachert, used throughout North America for stone tools. The source of this metachert is at Ramah Bay in Labrador, near the eastern boundary of the Kuururjuaq proposed park.

Thule cosmology echoes through many of the legends still recounted by Inuit elders. The Thule worldview provided for regular contact between humans and spirits. The word Tuurngaq originally denoted any spirit with extraordinary powers that could be called forth by shamans. These spirits could be very small or gigantic, kind or malefic. Today, in the region of Kangiqsualujjuaq, the term carries the connotation of malicious spirit or demon due to the influence of Christianity and the disappearance of shamans.

Contact with Europeans and Canadians of European descent has had a greater impact than simply transforming the Inuit belief system. Cultural and commercial exchanges intensified beginning in the 1800s with the establishment of trading posts,

Figure 1.1 Location of the Study Area

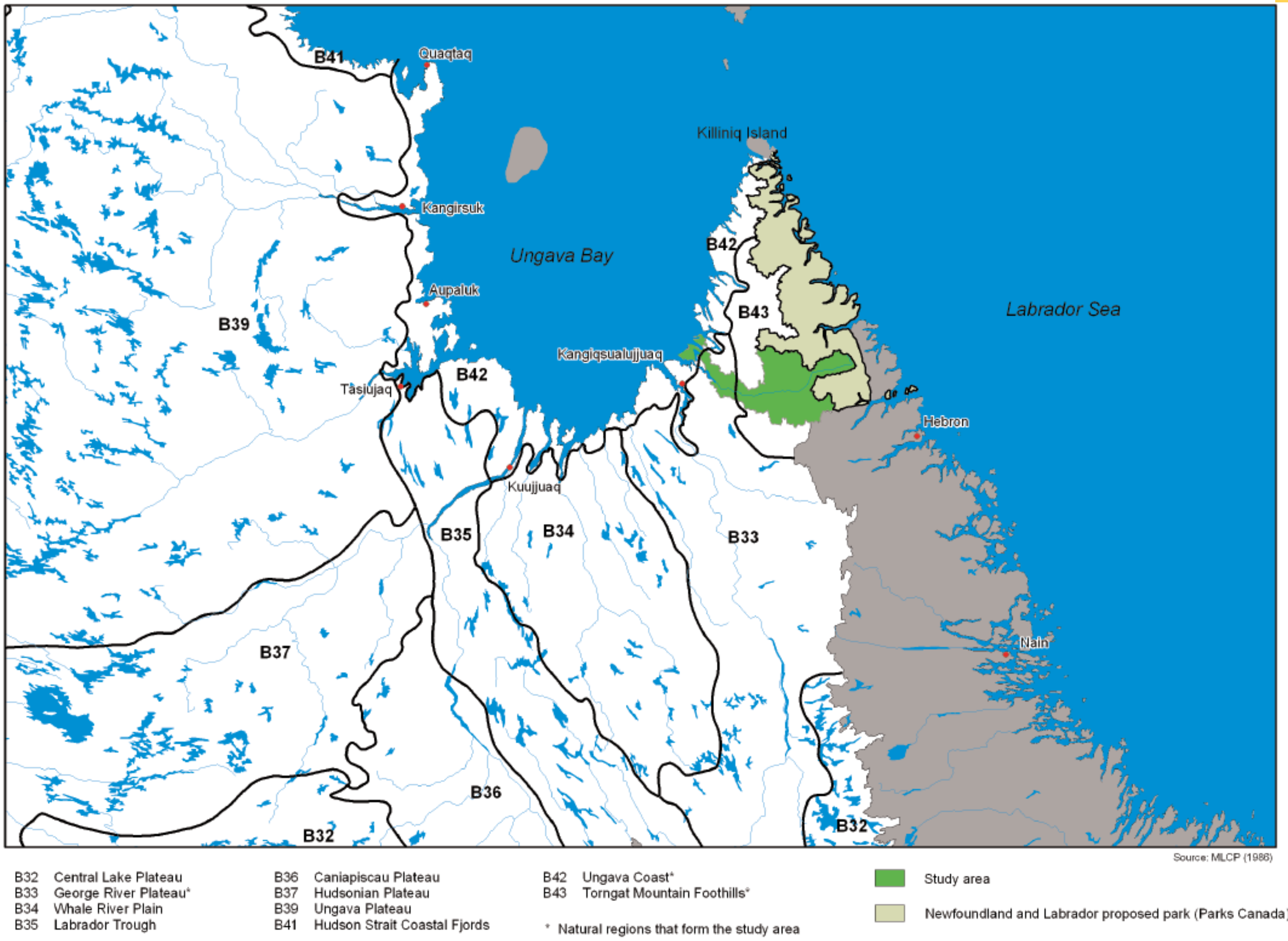


Figure 1.2 Natural Regions of the Study Area and Proposed Parks

causing considerable changes in the use of the territory. Notwithstanding, Inuit continue to criss-cross the region as part of their traditional hunting, fishing and trapping activities.

Relatively unknown by Québecers, the Torngat Mountains and Kuururjuaq comprise a vast and unique environment that is both rugged and imposing, where weather conditions can swing suddenly and unpredictably.

This document describes the current state of knowledge about the territory of the proposed park. It sets out the local socio-economic framework and goes on to provide information about the representative elements of the physical and biological environments. Human occupation of the territory is recounted through archaeological and historical records with specific reference to Inuit knowledge, as well as this culture's extensive myths and legends. The elements thus described should make it possible to identify the main opportunities and constraints present in the study area for the purpose of preparing a draft master plan that complies with national park policies and Inuit culture.

2 SOCIO-ECONOMIC FRAMEWORK

Nunavik and Kangiqsualujjuaq

Nunavik is part of the administrative region of Northern Québec (Region 10), which also includes the James Bay area to the south of Nunavik (Figure 2.1). Nunavik comprises the territory that stretches north of the 55th parallel, covering 500,164 km^2, or more than a third of Québec (1,357,743 km^2). From east to west, Ungava Bay, Hudson Strait and Hudson Bay flank Nunavik to create roughly 2500 km of coastline. This coastline is sprinkled with islets and cut by fjords and deep estuaries marked by significant tidal activity. In the east, Nunavik is bordered by Labrador.

Nunavik is characterized by vast, virgin expanses, countless lakes and major rivers including the Great Whale River, the Puvirnituq River, the Arnaud River (Payne), the Leaf River, the Koksoak River (which is fed by the Larch and Caniapiscau rivers), the George River and the Koroc River.

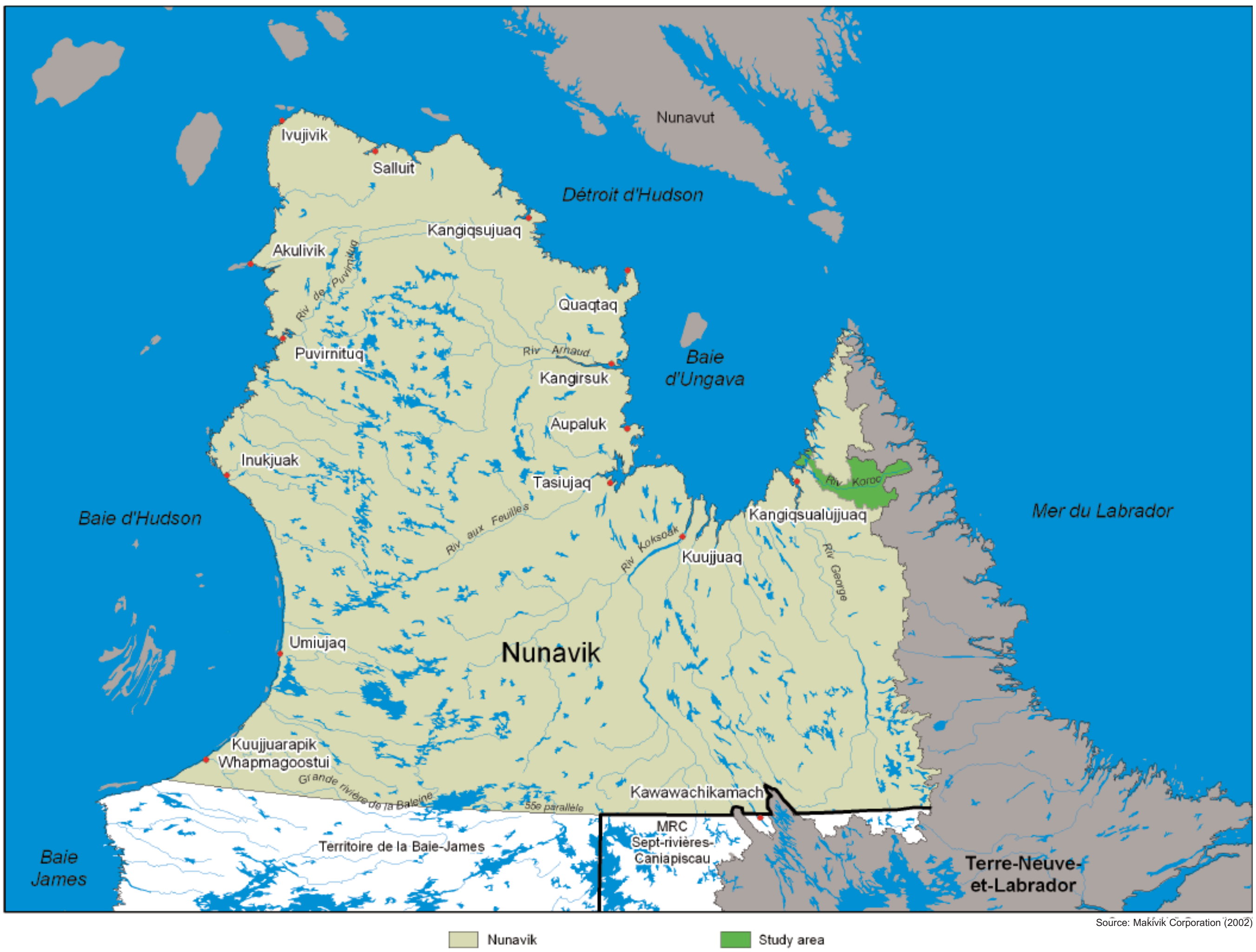


Figure 2.1 Land Regime and Northern Villages

Kangiqsualujjuaq, which has also been called George River and Port-Nouveau-Québec in the past, means "very large bay" and it is the closest community to the proposed park. On the eastern shores of Ungava Bay 160 km northeast of Kuujjuaq, Kangiqsualujjuaq sits at the mouth of the George River (Akilasakallak Cove), twenty or so kilometres from the Koroc River and roughly one hundred kilometres from the Torngat Mountains which tower in the east.

Administration and Land Regime

The once nomadic populations of Nunavik progressively settled in communities along the region's coasts over the 20th century, effecting changes to their traditional way of life. This mixture of nomadic and sedentary lifestyles is reflected in the organization of the region, which is established expressly in the *James Bay and Northern Québec Agreement* (JBNQA) signed in 1975 by the governments of Québec and Canada and by the Inuit, as well as in the JBNQA's attendant laws and agreements. The most prominent elements are described below.

ADMINISTRATIVE STRUCTURES

In addition to the federal and provincial governments, four other levels of organization are involved in the administration of Nunavik: the Makivik Corporation, the Kativik Regional Government (KRG), the Northern villages and the landholding corporations.

Makivik Corporation

The Makivik Corporation was created pursuant to the *Act respecting the Makivik Corporation* (R.S.Q., c. S-18.1). Makivik represents the Inuit of Nunavik and manages the compensation money directed to them through the JBNQA. Among other activities, Makivik owns the airline companies First Air and Air Inuit.

Kativik Regional Government

The KRG was established pursuant to Section 13 of the JBNQA and the *Act respecting Northern Villages and the Kativik Regional Government* (R.S.Q., c. V-6.1, Kativik Act). The Council of the KRG comprises representatives of each Northern village and the mayor of the Naskapi village of Kawawachikamach. The KRG's head office is located in Kuujjuaq, the region's largest administrative centre.

As regards the administration of Nunavik, the KRG acts like a regional county municipality and, for the territory outside of the boundaries of the region's Northern villages, like a municipality. In this respect, the KRG is responsible for the management and development of the region for which purpose it adopted the *Master Plan for Land Use in the Kativik Region* in 1998. As well, the KRG provides technical assistance to the Northern villages concerning local administration and infrastructure development. It is interesting to note that the entire land use development and planning regime north of the 55th parallel is currently being reviewed and should result in major amendments to the Kativik Act.

Northern Villages

Each of the Northern villages in Nunavik was created pursuant to the Kativik Act. The Northern Village of Kangiqsualujjuaq was incorporated by letters patent in 1980. The powers of the Northern villages are comparable to those of municipalities elsewhere in Québec. These powers include the right to acquire movable and immovable property required for municipal purposes, to found and maintain bodies for industrial, commercial or tourist promotion, and others.

Landholding Corporations

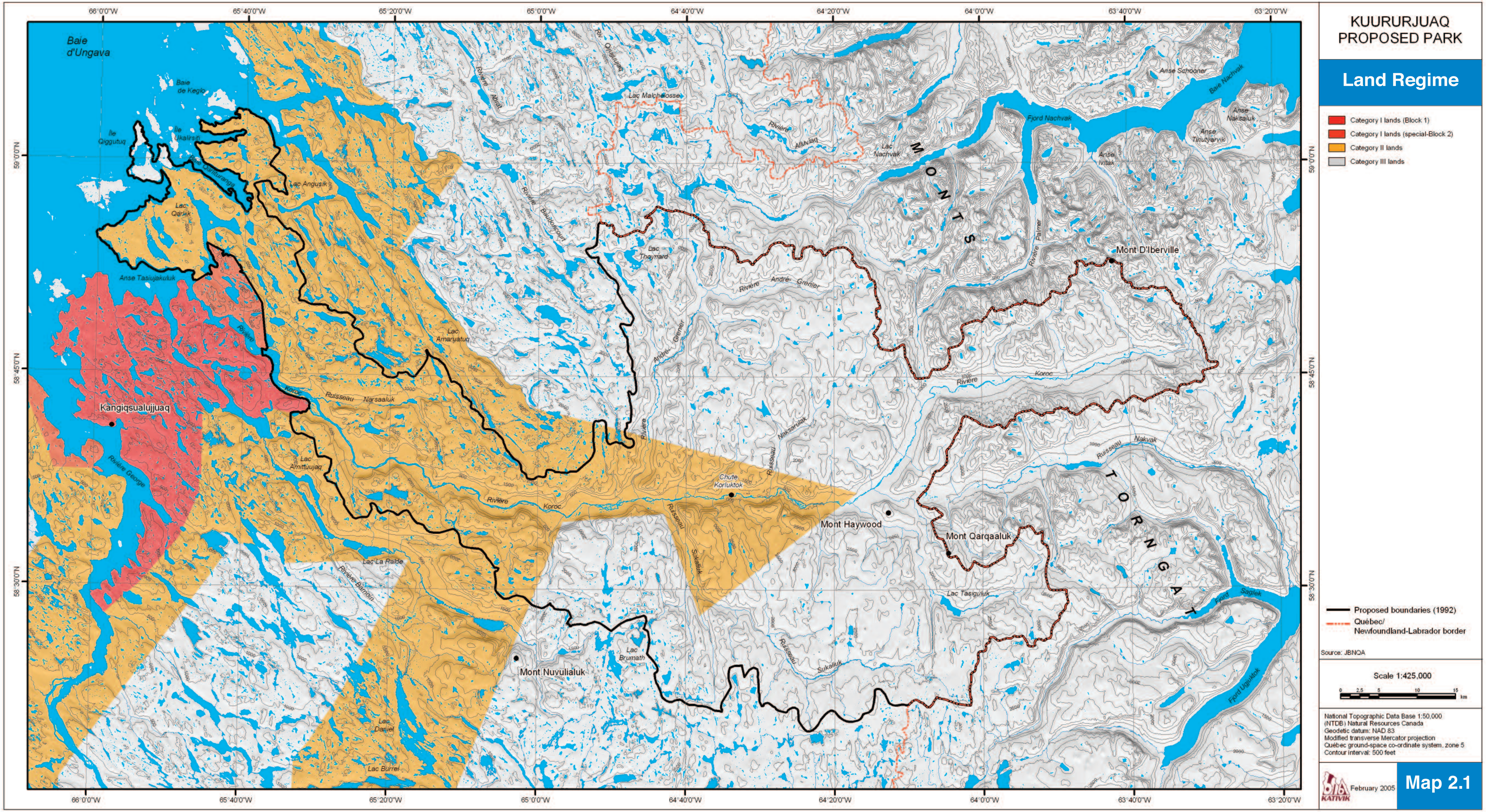
The landholding corporations hold title of ownership for the Category I lands that are described immediately below, and they manage with the Québec government the use of Category II lands. In Kangiqsualujjuaq, there are two landholding corporations. The Qiniqtiq Landholding Corporation is responsible for the lands around Kangiqsualujjuaq and the Epigituk Landholding Corporation is responsible for the lands near Killiniq, located north of the study area.

LAND REGIME

In accordance with the JBNQA and the *Act respecting the Land Regime in the James Bay and New Québec Territories* (R.S.Q., c. R-13.1), a land regime comprising three categories, which govern use as well as management conditions and responsibilities, is applicable in Nunavik (Map 2.1).

Category I lands are owned by the landholding corporations, with the exception of subsoil. The Northern villages are erected on Category I lands and are home to all the region's residents. Category I lands extend beyond municipal boundaries and include areas where there is intensive human activity. No Category I lands fall within the proposed park, but they abut the park at the mouth of the Koroc River.

Over Category II lands, which are public lands, Inuit have exclusive hunting, fishing, trapping and outfitting rights. Category II lands cover areas where Inuit generally carry out their subsistence harvesting activities in accordance with their right to harvest. Exactly 1413 km^2 of Category II lands fall within the proposed park. These lands represent 33% of the park's total territory (4274 km^2) and 24% of all the Category II lands of Kangiqsualujjuaq. The Category II lands that fall within the proposed park cover the valley of the Koroc River upstream to Mount Haywood.


KUURURJUAQ PROPOSED PARK
Land Regime
Category I lands (Block 1)
Category I lands (special-Block 2)
Category II lands
Category III lands
Proposed boundaries (1992)
Québec/ Newfoundland-Labrador border
Source: JBNQA
Scale 1:425,000
National Topographic Data Base 1:50,000 (NTDB) Natural Resources Canada
Geodetic datum: NAD 83
Modified transverse Mercator projection
Québec ground-space co-ordinate system, zone 5
Contour interval: 500 feet
February 2005
KATIVIK
Map 2.1
Baie d'Ungava
Baie de Keglo
Kangiqsualujjuaq
Rivière George
Monts Torngat
Mont D'Iberville
Mont Haywood
Mont Qarqaaluk
Mont Nuvulialuk
Rivière Koroc
Chute Korluktok
Lac Tasiguluk
Fjord Nachvak
Baie Nachvak
Lac Nachvak
Lac Malcheiosse
Lac Amaruatuq
Lac Amittujaq
Lac La Ralde
Lac Brumath
Lac Daniel
Lac Burrel
Anse Tasiujakuluk
Fjord Saglek
Fjord Ugjuktok
Anse Schooner
66°0'0"W
65°40'0"W
65°20'0"W
65°0'0"W
64°40'0"W
64°20'0"W
64°0'0"W
63°40'0"W
63°20'0"W
59°0'0"N
58°45'0"N
58°30'0"N

Over Category III lands, which are also public lands, Inuit may exercise their right to harvest; this right is not, however, exclusive. Category III lands represent roughly 67% (2774 km^2) of the study area.

Regardless of land category, subsection 24.3 of the JBNQA and section 21 of the *Act respecting Hunting and Fishing Rights in the James Bay and New Québec Territories* (R.S.Q., c. D-13.1) guarantee beneficiaries the right to harvest. This right extends across Nunavik and allows beneficiaries to hunt, fish and trap any species of wildlife and to establish camps for the practice of such activities. Activities related to the right of beneficiaries to harvest is not incompatible with the creation of a park (paragraph 24.3.6, JBNQA).

Numerous discussion and regulatory mechanisms have been provided for under the JBNQA including, in particular, the Hunting, Fishing and Trapping Co-ordinating Committee. As well, the principle of wildlife conservation applies to the hunting, fishing and trapping regime. Its purpose is to provide protection for threatened wildlife species and for the continuation of Aboriginal activities.

Land Use and Land Planning

LAND USE

Locally, land use is concentrated on Category I lands, which is to say within municipal boundaries and the built-up portion of Kangiqsualujjuaq where residents and services (described below) are congregated. Beyond the community's relatively limited boundaries, the land and its resources are also used extensively with harvesting activities being practised on a seasonal basis. Major land uses are indicated in Figure 2.2.

The areas most often used by residents for their hunting, fishing and trapping activities are situated in coastal areas and along the banks of large rivers, such as the Koroc River. These areas are characterized by extensive biological productivity (spawning, calving, feeding and nesting areas). They represent essential subsistence areas and are instrumental to the healthy survival of wildlife species and, consequently, the continuation of the Inuit way of life (KRG, 1998). Land and sea mammals, avian species and fish are harvested in these areas.

Several outfitting camps are located within 50 km of the study area. An abandoned camp (George River Co-operative Association) is located within the boundaries of the proposed park, along the Ungava coast, while an active camp (Alummi Adventures) is located on the Koroc River, almost on the boundary of the proposed park. Besides typical hunting and fishing activities, these outfitting camps offer guided excursions involving landscape, iceberg and wildlife observation. Near the coast, directly to the north of the proposed park, there are two Inuit camps that have been built through the local hunter support program.

Finally, roughly 50 km north of the study area, PGL/Diamond Discoveries has possessed mineral exploration rights (mineral titles) for several years. Mineral exploration activities generally take place in the summer and involve the installation of small, temporary camps for workers, equipment and supplies, such as fuel oil. Exploration excursions are often carried out over land (all-terrain vehicles, drilling machines) and by helicopter.

LAND PLANNING

The *Master Plan for Land Use in the Kativik Region* identifies land uses and areas of interest, including the proposed park. The Master Plan represents long-term land planning carried out by the region's residents and stakeholders concerned by land development (KRG, 1998). The JBNQA, laws applicable in the region and Québec government notices were all taken into account when land uses and areas of interest were defined in the Master Plan. The Master Plan was approved by the KRG with the adoption of By-law No. 9701 as modified by Bylaw No. 9801 dated September 1998, as well as by the Minister of Municipal Affairs (October 1998).

Subsistence Areas

While acknowledging the rules applicable on Category II and III lands, the coast and central portion of the Koroc River valley are defined as essential subsistence areas in the Master Plan. Other areas, including the eastern part of the proposed park, are defined as important subsistence areas. Subsistence areas were documented by the Makivik Corporation in a study concerning past and current land uses by the Inuit of Nunavik (Makivik, 1992b). These areas are necessary for activities such as hunting, fishing, trapping and gathering, and continue to be used regularly.

The Master Plan defines the objectives related to these areas:

- promote and ensure the continuation of subsistence activities;
- allow economic development projects to proceed, taking into account the characteristics of these areas to ensure their continuation.

The Master Plan stipulates activities permitted in subsistence areas, including:

- activities related to research and archaeological digs;
- scientific, cultural, educational, tourist activities [. . .];
- activities related to harvesting and conservation of resources.

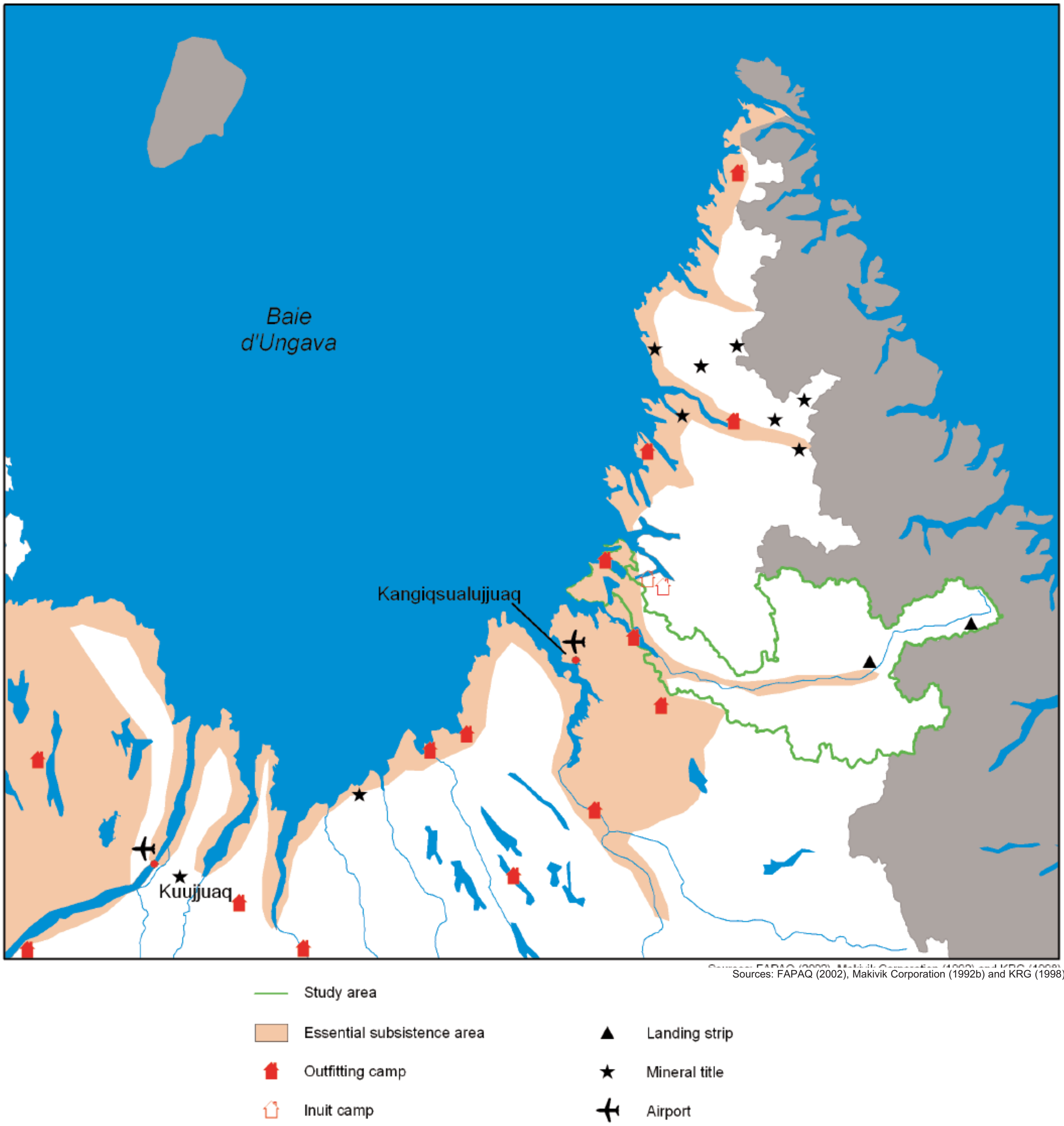


Figure 2.2 Land Use and Land Development

The main directives concerning the use of these areas are:

- any project, other than those related to subsistence activities, could involve specific agreements between the parties concerned;
- all promoters must submit to the KRG a comprehensive development plan and they must comply with generally agreed practices as concerns the conservation and protection of the environment;
- development projects will be assessed according to their conformance with the general aims and objectives of the Master Plan.

Areas of Interest

Areas of aesthetic interest recognized by the Québec government have been reserved for parks (Ministerial Order No. 91192 and No. 92170) and mining activities have been prohibited. These territories are representative examples of the natural regions of Nunavik and they possess unique landforms. They have been recognized by the residents of Nunavik and identified in the Master Plan to the extent that the rights and interests of the Inuit of the region are also protected. It should be underlined that the Torngat Mountains were mentioned in the tourism development plan prepared by Isogroup (1992) and in a tourism report prepared by the Makivik Corporation, the KRG and the Kativik Regional Development Council (1994).

In areas of aesthetic interest, in addition to hunting, fishing, trapping and gathering activities, permitted activities include (as defined under the Master Plan):

- tourism activities that do not destroy or disturb resources;
- activities related to research and archaeological digs;
- scientific, cultural or educational activities;
- other activities if it is demonstrated that they will not compromise the durability of the representative elements of the areas of interest, biological resources and the pursuit of subsistence activities.

Population and Services

POPULATION

In 2001, Nunavik's population was 9632 (of which Inuit represented 90%); these residents were living in 14 villages along the region's coasts. The communities of Kuujjuaq, Inukjuak, Puvirnituq and Salluit accounted for close to 60% of the region's total population. Kangiqsualujjuaq was the fifth largest community with 710 inhabitants (Table 2.1).

In 1998, life expectancy in Nunavik was 62 years for men and 69.3 years for women (for an average of 65.6 years) compared with 75.6 years and 81.1 years, respectively, in Québec (for an average of 77.8 years). The Canadian average was 78.8 years. In 2001, average life expectancy in Nunavik had increased to 66.7 years, while the average for Canada had increased to 79.3 years. Even though the difference was slightly less, life expectancy in Nunavik remains below that in Québec and Canada.

Since 1986, population growth in Nunavik has been slowing. Between 1986 and 1991 the population grew by 27.1%, while between 1991 and 1996 it grew by 13.2%, and between 1996 and 2001 by 10.5%. In Québec between 1996 and 2001, the population grew at a rate of 1.4%, which is to say 7.5 times slower than in Nunavik. Over a period of 15 years (1986 to 2001), the average annual growth rate of the population in Nunavik was 3.9%. At this rate, the region should have a population of 11,000 by 2006 and 12,200 by 2010. This expected growth will impact on public infrastructure and service needs, including housing, waste management, health care, education and employment.

In Kangiqsualujjuaq between 1986 and 2001, the rate at which the population grew was greater than elsewhere in the region; the average annual rate was 5.7%. Between 1996 and 2001, the population grew by 9.6%, which is to say almost seven times faster than the population of Québec as a whole. Updated figures provided by the municipality show that the local population has increased from 710 individuals in 2001 to 776 in January 2004, representing an increase of 9.3% over three years or 3.1% annually.

The population of Nunavik is distinct from most other regions of Québec due to its young age; the average age in Nunavik is 20. Nearly 60% of the population is under the age of 25, while roughly 40% are under the age of 15 (Makivik, 2000). Also in Nunavik, the average family size is 4.3 individuals and 41% of families comprise five individuals or more (Makivik, 1999).

With respect to language, Inuktitut is spoken most often in the communities of Nunavik and it is taught at school at every elementary and secondary level. Many Inuit are also able to communicate in English or French, since they are introduced to a second language at school beginning in grade 4. Currently, Nunavik's in-school population exceeds 3000 students, which is to say roughly 33% of the population.

In Kangiqsualujjuaq in January 2004, close to 260 students (33% of the total population) between the ages of five and fourteen were attending school; 180 were enrolled at the elementary level and 80 at the secondary level. The school drop-out

Table 2.1 Local Populations in Nunavik

	JUNE 1986[2]	JUNE 1991[2]	JUNE 1996[3]	2001[4]	VARIANCE BETWEEN 1996 AND 2001 (%)
Akulivik	337	375	411	472	14.8
Aupaluk	110	131	159	159	0
Inukjuak	778	1 044	1 184	1 294	9.3
Ivujivik	208	263	274	298	8.8
Kangiqsualujjuaq	383	529	648	710	9.6
Kangiqsujuaq	337	404	479	536	11.9
Kangirsuk	308	351	394	436	10.7
Kuujjuaq	1 066	1 405	1 726	1 932	11.9
Kuujjuarapik[1]	616	605	579	555	-4.1
Puvirnituq	868	1 091	1 169	1 287	10.1
Quaqtaq	185	236	257	305	18.7
Salluit	663	823	929	1 072	15.4
Tasiujaq	135	152	191	228	19.4
Umiujaq	59	284	315	348	10.5
Total Nunavik	**6 053**	**7 693**	**8 715**	**9 632**	**10.5**

Sources: [1] Population transfer with the creation of Umiujaq in 1986
[2] Population census (Cat., no. 93-304), Statistics Canada
[3] Population census (Cat., no. 93-357), Statistics Canada
[4] Community profiles, Statistics Canada (2001)

rate is very high and, as a result, few students obtained a diploma of secondary studies in 2004.

According to Statistics Canada (2001; profile modified in September 2003), the population of Kangiqsualujjuaq aged between 20 and 44 totals 245. Of this group, close to 50% possess a certain level of schooling but have never obtained a diploma of secondary studies; 20% possess a diploma of secondary studies or have studied at the post-secondary level. With respect to the segment of the population between the ages of 20 and 34, 13% possess a diploma of college studies or vocational training. Among those aged 35 to 44, 22% possess a certificate or diploma of vocational training, but not one possesses a diploma of college studies. Finally, roughly 10% of those aged between 20 and 44 possess a university certificate, diploma or degree.

SERVICES

Public services are delivered in every village in Nunavik, not to mention telecommunications and broadcasting services. Each municipality provides drinking water and is responsible for the management of wastewater and solid waste, as well as roadways and town planning. Electricity is produced by Hydro-Québec with autonomous diesel-fired power plants.

Like all the other villages of Nunavik, Kangiqsualujjuaq possesses an airport and a marine off-loading facility. The village also includes churches, an elementary and secondary school under the auspices of the Ministère de l'Éducation du Québec (Kativik School Board), a nursing station, a police station, a post office, a childcare centre, a community radio station and a sports centre. A few retail stores, including the Federation of Co-operatives of Northern Québec (FCNQ), sell food, clothing and hardware. Generally speaking, the local hunter support program ensures the distribution of harvested products and handicrafts.

In December 2003, the community celebrated the opening of a new FCNQ hotel. This hotel can accommodate up to 24 clients and includes a communal kitchen. The community also possesses another guest house which offers 11 beds, restaurant services, as well as vehicle rentals (trucks and all-terrain vehicles). This business is owned by Willie Emudluk and has applied for an operating permit from the Ministère de l'Agriculture, des Pêcheries et de l'Alimentation (agriculture, fisheries and food). Finally, a number of outfitters and experienced guides offer travel packages in the area around Kangiqsualujjuaq.

Access and Transportation Infrastructure

AIR TRANSPORTATION

Nunavik is accessed almost exclusively by air; each village is equipped with an airport. Kuujjuarapik (on the Hudson coast) and Kuujjuaq (situated next to Kangiqsualujjuaq on the Ungava coast) each possess regional airports with instrument landing systems. Daily commercial flights connect Montreal to Kuujjuarapik (1000 km) and to Kuujjuaq (1500 km) with an approximately two-hour flight. Since 2003, a weekly flight connects Schefferville and Kuujjuaq.

Nunavik's other villages may be accessed from within the region. Local airports are equipped with instrument approach systems only and do not possess 24 hour weather stations. Supplies are shipped to the region's communities daily by plane. In addition to the scheduled flights provided by Air Inuit, other airline companies based in Kuujjuaq provide small-plane and helicopter charter flights.

MARINE TRANSPORTATION

Marine transportation is especially important for the supply of non-perishable goods, heavy and bulky cargo, and fuel. Sealift operations to the region's communities are carried out during the summer when shipping lanes are free of ice and according to the tides. No village possesses deep-water off-loading facilities, making the use of barges necessary. Under a marine infrastructure program, recently launched to facilitate barge activities, the first improved infrastructure was constructed in Kangiqsualujjuaq.

ROAD TRANSPORTATION

Road transportation is limited to a few kilometres per village, including roadways used to access the local airport, drinking water intake facilities, and other community services. Notwithstanding, loyal to their nomadic roots, Inuit still travel a great deal and over great distances. Snowmobiles, all-terrain vehicles and motorized watercraft permit travel between communities and access to harvesting areas both inland and along the coast. The seasonal harvesting of local wildlife (avian, terrestrial, fresh water and marine resources) remains an important source of subsistence for the residents of Nunavik.

Economic Activity

MARKETS

As is the case with other outlying regions of Québec, Nunavik is developing slowly and its economic performance is very poor due to climatic hindrances, scattered resources, as well as the region's remoteness from major markets and its reliance on government assistance (KRG 1998).

Seventy percent of the economic activity of Nunavik is built on the service sector. The majority of jobs are found in the public and para-public sectors (health, education, administration), as well as in the private retail and services, wildlife resources exploitation and construction sectors (Makivik, 1999). The labour market is characterized by a high number of casual and part-time positions.

Beyond the boundaries of Nunavik's communities, economic activity is mainly connected to traditional harvesting activities (hunting, fishing, trapping, gathering) and the exploitation of wildlife resources for tourism (outfitting camps). It should be noted that the harvest of wildlife in Northern Québec is analogous to agriculture in the southern parts of the province; 75% of the protein consumed by Inuit is derived from harvested wildlife (KRG, 1998). Traditional harvesting activities are essential to the health of the Inuit and to local economies.

With respect to mining activities, only one mine is currently operational in Nunavik. The Raglan mine, which is located near Salluit, is operated by Falconbridge Ltd. for the nickel found there. Elsewhere in the region, mining activities involve mineral exploration. Close to $18 million was invested in these activities in 2003, creating 43 seasonal jobs for Inuit technicians. It is expected that $22 million will be invested in 2004 to create jobs for 65 technicians. Roughly 50 km north of the study area, diamond exploration is particularly intense (Nunavik Mineral

Exploration Fund, 2004). In this area in 2003, PGL/Diamond Discoveries invested $800,000 and employed four technicians. This same company intends to hire the same number of technicians and invest $1 million in 2004.

The economic spin-offs generated by projects that make use of Nunavik's primary resources (mineral or energy) are directed largely to developers and the economy of the rest of Québec (KRG, 1998), not to mention that such projects are often detrimental to the environment and wildlife, two essential elements of the Inuit way of life.

TOURISM INDUSTRY

The tourism industry plays an important role in the economy of Nunavik (KRG, 1998). Currently, it is based almost entirely on the outfitting sector, with caribou hunting representing the number-one product, followed by brook trout, arctic char and salmon fishing. According to the Société de la faune et des parcs du Québec (wildlife and parks corporation; FAPAQ, June 2002), Nunavik which is known as hunting and fishing zone 23 possesses fifty or so outfitters that generate more than $15 million in revenue annually (data for the 2000–2001 fall and winter season).

Outfitting activities are concentrated between the 55th parallel and Ungava Bay, which includes the area of the proposed park. On an annual basis, outfitters draw between 2500 and 3000 visitors to Nunavik; 80% of this clientele is American. Between 1991 and 2000, this clientele increased by 25%. Outfitting activities take place for the most part in the fall and consist of one-week packages varying in price between $3500 and $5000, including flights, accommodations at permanent or temporary camps, guiding services, etc. (Gestion Conseil J.-P. Corbeil Inc., 1998). Since 1997, the region's tourism operators have benefited from the support of the Nunavik Tourism Association to create a development strategy to improve the economic viability of regional tourism businesses.

Inventory and analysis work related to potential tourism products based in Nunavik's communities identified several emerging eco-tourism projects, including adventure tourism (Gestion Conseil J.-P. Corbeil Inc., 1998): dog sledding, kayak, snowmobile, boat, trekking and canoe excursions, cultural visits, wildlife observation, etc.

The proposed park is in line with these emerging products and should serve to enrich the supply of tourism products in the region. The report prepared by J.-P. Corbeil Inc. (1998) indicates that the outfitting activities offered in the area around Kangiqsualujjuaq should be revitalized and that eco-tourism activities based on cultural and natural assets could be implemented. These new activities could be developed to complement the activities of the proposed park and to increase tourism opportunities for visitors.

JOBS, UNEMPLOYMENT AND INCOME

In Canada in August 2004, unemployment was estimated to be 7% (Statistics Canada, 2004); in Québec, it was 8.1% (Institut de la statistique du Québec, statistics institute); and in Nunavik, it was 16.5% (Government of Canada, human resources service, KRG). The level of unemployment in Nunavik has been relatively stable over the years due to major government assistance and the significant number of jobs created in the public and para-public sectors.

In Kangiqsualujjuaq in 2004, 140 workers were identified as working in the following fields (data provided by the Northern Village of Kangiqsualujjuaq, 2004):

Education (elementary and secondary levels)	45 workers
Northern Village of Kangiqsualujjuaq	41 workers
Private sector (retail, co-operatives, etc.)	34 workers
Health	15 workers
Kativik Regional Government	3 workers
Hydro-Québec	2 workers
TOTAL:	**140 workers**

In Kangiqsualujjuaq in January 2004, 85 individuals were receiving social assistance benefits; 311 individuals aged 15 or older were ready to work; and unemployment stood at 69%, the highest level of unemployment in any village located on the Ungava coast (data provided by the Northern Village of Kangiqsualujjuaq, February 2004).

A certain number of individuals included in the community's employable population receive income for their hunting, fishing, trapping, gathering, as well as handicraft activities; or they receive additional income through the hunter support program (Groupe Urbatique and Genium, 1998). Government payments represent 24.1% of the income generated in Kangiqsualujjuaq compared with 14% for Québec as a whole (Statistics Canada, 2001, profile modified in September 2003).

In Kangiqsualujjuaq in 2001, the median income for individuals aged 15 or older was $12,784, which is to say almost $8000 less than the median income ($20,665) for the rest of Québec (Statistics Canada, 2001, profile modified in September 2003). The median income of families surveyed in Kangiqsualujjuaq was $35,456, while for Québec this amount was $50,242, representing a difference of close to $15,000. The difference in median income is, however, smaller when considering families headed by couples; $47,744 in Kangiqsualujjuaq and $54,938 in Québec.

3 PHYSICAL ENVIRONMENT

Climate

As no weather station has ever been set up in the territory of the proposed park and localized climatological information does not exist, the climatological data for this section was drawn from multiple sources, including from weather stations in Kuujjuaq, Kangiqsualujjuaq, Killiniq and Nain. This data, which was recorded sporadically between 1947 and 2003, is sometimes incomplete and may present extrapolations or approximate values.

CLIMATE OF NUNAVIK

According to the climate classification prepared by the Office de planification et de développement du Québec (planning and development bureau, OPDQ, 1983), the northern part of Nunavik is characterized by tundra and its southern part by taiga. The region's climate is influenced by the movement of air masses, topography, elevation and large surrounding bodies of water (Table 3.1). The harsh climate may be explained by the meagre amount of annual sunlight and the proximity of polar air masses that contribute to the low degree of humidity and scarce precipitation.

In Nunavik, average annual temperatures range between -5 and -10°C. Total annual precipitation is almost three times lower than in the southern regions of Québec with averages ranging between 600 mm in the south and roughly 200 mm in the north (Figures 3.1 and 3.2). This difference is mainly the result of the low degree of humidity of polar air masses.

The winter season lasts roughly 240 days (Proulx et al., 1987) and snowmelt occurs for the most part in June throughout Nunavik (Allard et al., 1991). The length of the frost-free season varies between 80 days in the southern part of the region and 20 days in the north, while winds average 20 km/h (Figures 3.3 and 3.4). The summer season is characterized by long hours of daylight and higher temperatures that nurture biological activity.

CLIMATE OF THE STUDY AREA

Certain geographic factors, which is to say the varied and rugged topography, of the study area have a considerable impact on the local climate (Table 3.1). At higher elevations, the Koroc River Plateau and the Torngat Mountains possess an arctic-alpine climate, while the downstream section of the Koroc River valley and the coastal area of the proposed park have a maritime climate. The moderating effect of Ungava Bay and the Labrador Sea influence temperatures but this influence diminishes at higher elevations. In addition, fog and precipitation occur more often and winds are stronger in the Torngat Mountains and along the coast compared with the valleys of the study area.

Polar-continental air masses and warmer maritime air masses alternate throughout the year. In Ungava Bay, the maritime climate is affected by strong ocean currents and large tides. These factors create areas of water that are free of ice in winter and act as local sources of heat and humidity.

Late in the fall, open water produces fog along the coast. Coastal areas may generally be characterized by a summer season that arrives late and is cooler and a winter season that is milder, than those experienced further inland (Hufty, 1996).

As well, the high elevations of the Torngat Mountains, which can exceed 1600 m, form a natural barrier, restricting the moderating effect of the Atlantic Ocean to the Labrador coast (Environment Canada, 2001).

Climatological data for the study area have been extrapolated using distribution maps for annual temperatures and precipitation, and according to geographic factors that affect climatic conditions.

DAYLIGHT AND GROWING SEASON

Depending on the season, the study area experiences a wide variation in daylight. This variation represents a unique characteristic of Nunavik's northern context. Between the 58th and 60th parallel, daylight in summer lasts for between 18 hours and 11 minutes or 18 hours and 53 minutes (Wilson 1975), and in winter between 6 hours and 27 minutes or 5 hours and 52 minutes.

Due to the meagre amount of annual sunlight and local climatic conditions, the average annual growing season is roughly 60 days along the coast and in the Koroc River valley, and

Table 3.1 Main Geographic Factors that Impact on Climate

GEOGRAPHIC FACTORS	TEMPERATURE	CLOUDS AND FOG	WINDS	PRECIPITATION
Proximity to bodies of water	Fall and winter milder Spring and summer colder	More frequent	Stronger Less gusting	More frequent in fall and winter (no impact while water is frozen)
Valleys	Warmer than plateau during daytime Cooler than plateau during night time	More convection-created fog in smaller valleys	Strong, if in the same direction as the valley Weak, if perpendicular to the direction of the valley	Greater, if prevailing winds are perpendicular to the direction of the valley
Mountains	Decreasing as elevation increases	More frequent	Stronger Extremely variable More gusting	Greater and more frequent on slopes exposed to the wind

Sources: Lalonde (1976), Phillips (1990), Proulx et al. (1987)

roughly 20 days in the Torngat Mountains (OPDQ, 1983). For the purpose of comparison, it is interesting to note that the annual number of degree-days above 5°C is 532 in the study area and 2079 in the Montreal area (Environment Canada, 1993; recording period 1941–1990).

TEMPERATURES

According to Environment Canada (2003), the average annual temperature in Kuujjuaq between 1971 and 2000 was -5.7°C (Table 3.2).

The average daily temperature was -24.3°C in January and 11.5°C in July. In Kuujjuaq, temperatures have dropped as low as -50°C in winter (recorded on 22 January 1991) and have exceeded 30°C in summer (high of 33°C recorded on 24 June 1999). As Kuujjuaq is located roughly 50 km from the coast, the temperatures recorded at this weather station may be considered typical for the southern coast of Ungava Bay and the western part of the proposed park.

At the Kangiqsualujjuaq airport, which is located at the mouth of the George River, the average annual daytime (8 a.m. to 6 p.m.) temperature between 1990 and 2003 was -3.8°C. At this weather station, the lowest daytime temperature was -39°C recorded in January 1994 and the highest was 31°C recorded in July 1999. As well, a slight increase in average daytime temperatures has been observed since 1993.

Over the Koroc River Plateau and in the Torngat Moutains, the average annual temperature is roughly -7.5°C (Figure 3.1). Based on estimated temperatures according to elevation (Table 3.3) as well as on the information contained in Table 3.1, temperatures are warmer in the valleys and along the coast of the proposed park as compared with those that may be experienced in the Torngat Mountains, where the annual average temperature is around -16°C. The frost-free period ranges between 40 and 60 days along the coast of Ungava Bay (Figure 3.3), between 20 and 40 days over the Koroc River Plateau and in its valleys, and less than 20 days in the Torngat Mountains.

In addition, wind chill can have a major impact on temperatures (Table 3.4). For example, in the area around Mount D'Iberville with a temperature of -35°C (average estimated temperature in January) and a wind blowing at 24 km/h (average annual wind speed), the temperature would actually feel more like 50°C.

Figure 3.1 Average Annual Temperatures (°C) 1951–1980

- -10 to -7.5
- -7.5 to -5
- -5 to -2.5
- -2.5 to 0
- 0 to 2.5
- 2.5 to 5
- 5 to 7.5

Source: Phillips (1984)

Figure 3.2 Average Annual Precipitation (mm) 1951–1980

- 200 to 400
- 400 to 600
- 600 to 800
- 800 to 1000
- 1000 to 1200
- 1200 to 1400
- 1400 to 1600

Source: Phillips (1984)

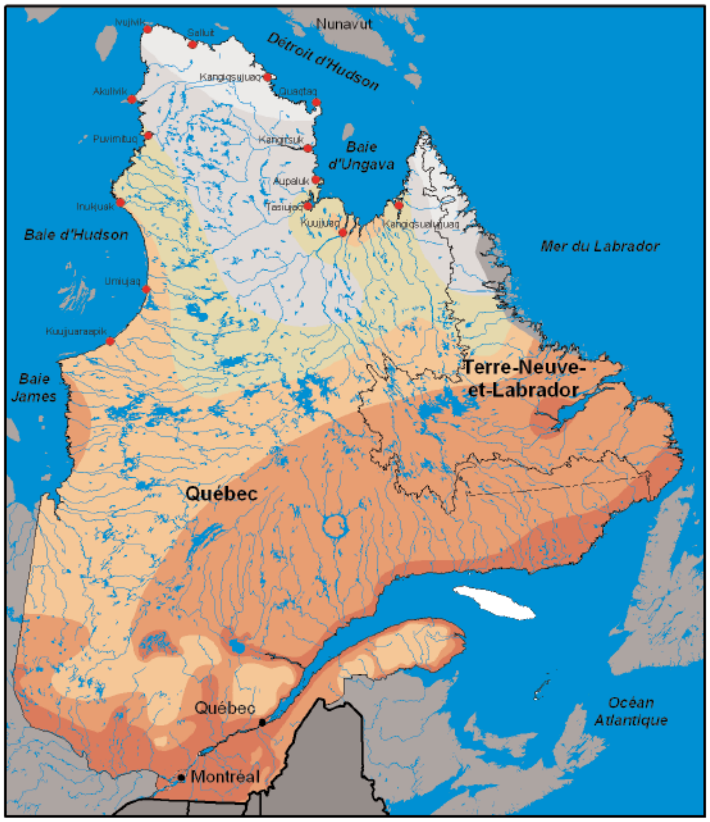


Figure 3.3 Frost-Free Period (days) 1931–1960

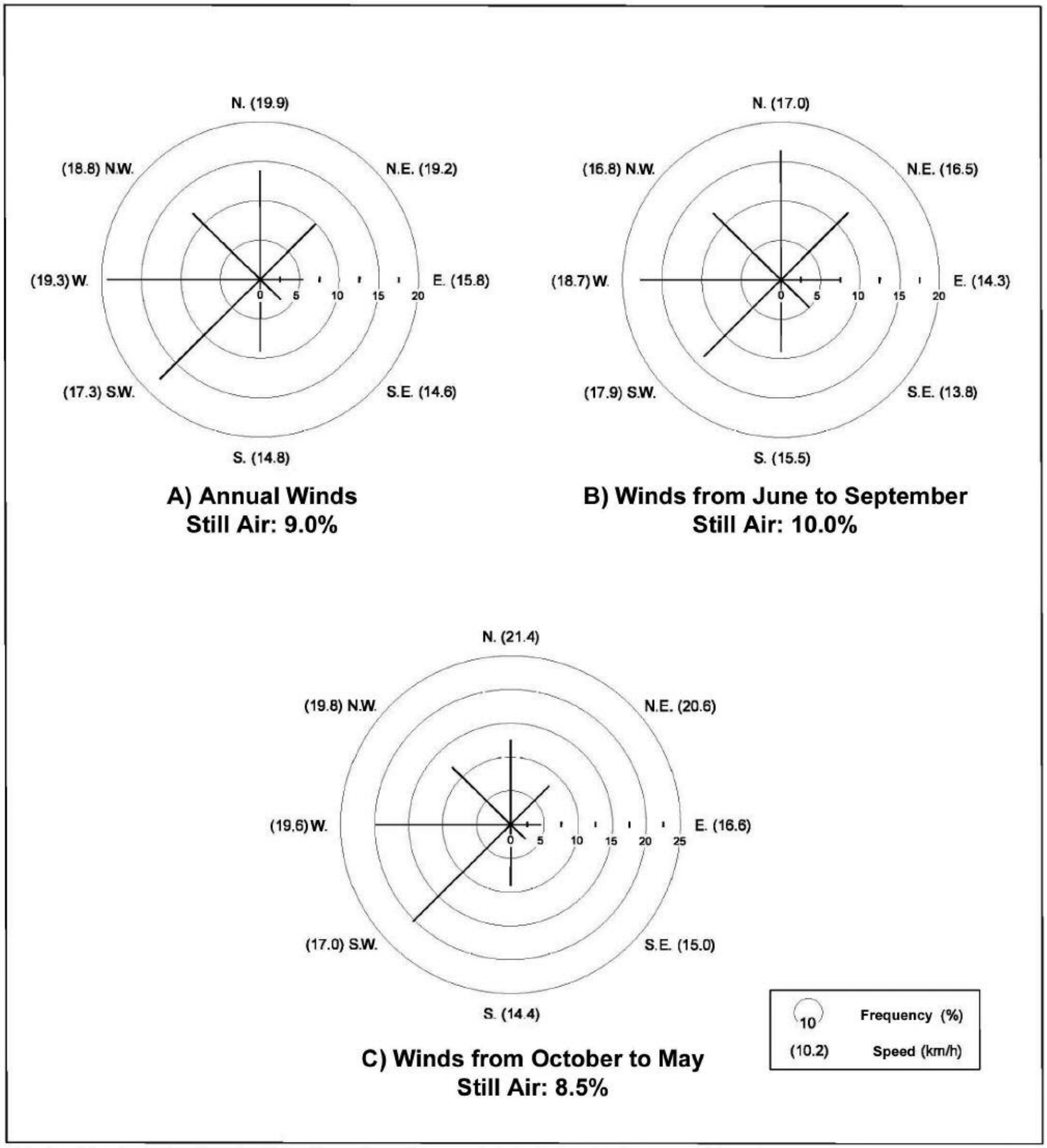
- Less than 20
- 20 to 40
- 40 to 60
- 60 to 80
- 80 to 100
- More than 100
- Data not available

Sources: Wilson (1971) and OPDQ (1983)

Figure 3.4 Annual Wind Speed (km/h) 1948–1963

- Less than 16
- 16 to 20
- 20 to 24
- Greater than 24
- Data not available

Source: Gagnon and Ferland (1967)



Note: Vectors indicate the direction from which the winds were blowing.

Source : Roche (1992)

Figure 3.5 Wind Rose for Kuujjuaq (1951–1980, Normal)

Table 3.2 Climatic Conditions in Kuujjuaq between 1971 and 2000

Latitude: 58º 06′ N
Longitude: 68º 25′ W
Altitude: 39.3 metres

	JANUARY	FEBRUARY	MARCH	APRIL	MAY
TEMPERATURE					
Daily average (ºC)	-24.3	-23.6	-18.3	-9.1	0.3
Standard deviation	3.5	3.4	3.7	2.7	2.0
Daily high (ºC)	-19.7	-18.7	-12.9	-4.1	4.3
Daily low (ºC)	-28.8	-28.4	-23.6	-14.1	-3.8
Record high (ºC)	5.6	7.8	12.1	14.7	31.1
Date (yyyy/dd)	1959/17	1981/25	1999/29	1984/28	1950/31
Record low (ºC)	-49.8	-43.9	-43.9	-34.1	-24.7
Date (yyyy/dd)	1991/22	1972/28	1968/08	1984/08	1992/01
PRECIPITATION					
Rainfall (mm)	0.1	0.6	0.6	2.5	14.8
Snowfall (cm)	33.7	29.0	31.4	25.3	14.7
Precipitation (mm)	33.2	28.4	30.7	27.3	29.6
Average snow coverage (cm)	38	43	45	40	12
Median snow coverage (cm)	37	43	46	41	10
Snow coverage, end of month (cm)	42	43	48	26	4
Record daily rainfall (mm)	5.1	6.0	2.6	9.2	22.6
Date (yyyy/dd)	1958/18	1981/23	1990/31	1988/06	1958/29
Record daily snowfall (cm)	76.2	29.5	31.0	17.8	20.8
Date (yyyy/dd)	1964/11	1975/10	1999/11	1948/03+	1987/08
Record daily precipitation (mm)	74.9	29.2	31.0	17.8	27.9
Date (yyyy/dd)	1964/11	1963/22	1999/11	1948/03+	1958/30
Record daily snow coverage (cm)	185	175	203	218	118
Date (yyyy/dd)	1964/13	1963/23+	1963/31	1963/06+	1985/01+
WIND					
Wind speed > = 52 km/h	2.8	2.5	2.0	1.2	0.93
Wind speed > = 63 km/h	1.1	0.83	0.48	0.27	0.28
Record speed of gusting	161.0	124.0	137.0	152.0	102.0
Date (yyyy/dd)	1975/20	1975/10	1974/25	1995/26	1992/16
Direction of record gusting	W	W	W	SE	SW

Source: Environment Canada (2003)

JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	YEAR
7.2	11.5	10.6	5.6	-0.7	-8.4	-19.3	-5.7
1.7	1.2	1.4	1.4	1.7	2.7	3.6	1.3
12.4	17.1	15.6	9.4	2.2	-4.9	-15.0	-1.2
2.0	5.8	5.6	1.9	-3.6	-11.9	-23.5	-10.2
33.1	32.2	30.3	28.3	18.3	1.2	8.3	
1999/24	1953/14	1984/15	1968/19	1962/06	1977/11	1957/21	
-8.3	-1.6	-1.7	-7.8	-20.0	-31.1	-43.9	
1970/01	1992/03	1950/31+	1975/29+	1972/28	1956/28	1972/28	

44.8	59.1	70.0	54.1	25.7	4.7	0.4	277.2
6.3	0.1	0.5	7.6	27.5	43.4	37.5	257.1
51.5	59.2	70.4	62.1	51.9	46.6	36.0	526.8
1	0	0	0	2	15	31	19
0	0	0	0	1	16	30	19
0	0	0	0	5	23	36	19
44.7	56.4	44.5	35.1	25.0	20.2	6.9	
1974/19	1991/16	1975/05	1950/18	1995/15	2000/10	1951/04	
20.6	1.3	9.4	25.7	21.1	27.4	36.6	
1947/12	1972/03	1972/29	1974/30	1974/16	1999/04	1964/02	
44.7	56.4	44.5	35.8	25.0	27.4	34.8	
1974/19	1991/16	1975/05	1950/18	1995/15	1999/04	1964/02	
54	0	0	14	46	84	94	
1985/01	1955/01+	1955/01+	1978/24+	1974/27+	1964/29+	1963/31	

0.77	0.63	0.70	1.3	1.3	2.3	2.1	18.5
0.17	0.17	0.20	0.43	0.48	0.76	0.69	5.8
124.0	100.0	103.0	145.0	130.0	127.0	129.0	
1993/28	1979/16	1967/16	1974/30	1984/29	1973/17	1973/23	
NE	SW	W	N	W	N	N	

Table 3.3 Estimated Temperatures in the Study Area according to Elevation

PHYSIOGRAPHIC UNIT	AVERAGE ANNUAL TEMPERATURE	AVERAGE TEMPERATURE IN JANUARY	AVERAGE TEMPERATURE IN JULY
Ungava-Labrador (regional isotherm)	-7.5°C	-23.3°C	10.0°C
Torngat Mountains (Maximum elevation: 1646 m)	-16.1°C[1]	-35.1°C[2]	-0.4°C[3]
Koroc River Plateau (Average elevation: 760 m)	-11.5°C[1]	-28.7°C[2]	5.2°C[3]
Koroc River Valley (Height of valley walls: between 420 and 1000 m)	Between –5.3 and –2.3°C[1]	Between -20.3 and –16.2°C[2]	Between 12.7 and 16.3°C[3]

[1] Less 1°C for every additional 192 m of elevation
[2] Less 1°C for every additional 140 m of elevation
[3] Less 1°C for every additional 158 m of elevation

Sources: Gagnon and Ferland (1967), Phillips (1984), Rousseau (1961)

PRECIPITATION

In Kuujjuaq, 527 mm of precipitation falls every year, of which close to 49% is snow. This data can be applied to the coastal part of the study area.

Inland, total annual precipitation is estimated to be around 600 mm, reaching 700 mm over the Koroc River Plateau (Figure 3.2). Nonetheless, because hilltops and mountain areas are regularly swept by winds, snow (which may reach a thickness of 4 m thick) tends to accumulate in valleys, depressions and along lee slopes. Wind action also tends to pack snow tightly. It should be noted that perennial snow can be found at higher elevations of the Koroc River Plateau and in the Torngat Mountains.

WINDS

Data collected in Kuujjuaq show that average wind speed is 18.5 km/h (Environment Canada, 2004; refer to Table 3.2). According to data recorded between 1955 and 1980 (Environment Canada, 1982), still air only occurs 9% of the time (Figure 3.5). On an annual basis, winds blow most often out of the west, southwest and north, which is to say 50% of the time. The maximum wind speed ever recorded, which occurred in January and was from the north, was 109 km/h. The highest recorded gusts were at 161 km/h from the west.

In Kangiqsualujjuaq, incomplete data recorded between June and October from 1993 to 1997 show that prevailing winds are from the west and northwest, while winds from the east and southeast occur often and can include gusts of up to 60 km/h (Groupe Urbatique and Genium, 1998).

The following extrapolations are based on wind data collected by Gagnon and Ferland (1967) in the study area:

Average wind speed, summer:	between 16 and 21 km/h
Average wind speed, winter:	between 21 and 25 km/h
Average annual wind speed:	between 21 and 25 km/h
Average maximum wind speed:	between 88 and 96 km/h

Source: OPDQ (1983)

Winds are often stronger in the Torngat Mountains (average speed 24 km/h) compared with the coastal area of the proposed park (average speed 20 km/h; refer to Figure 3.4). Wind speed increases with elevation. According to Lalonde (1976), wind speed can be as much as 20% greater at the top of mountains. Each time the team from the Parks Section of the Kativik Regional Government visited the study area between June and September in 2003 and 2004, it was noted that winds were blowing from east to west in the western part of the proposed park and

Table 3.4 Wind Chill for Temperatures between 5 and -50°C

V 10 (KM/ H)	T AIR (°C)											
	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50
5	4	-2	-7	-13	-19	-24	-30	-36	-41	-47	-53	-58
10	3	-3	-9	-15	-21	-27	-33	-39	-45	-51	-57	-63
15	2	-4	-11	-17	-23	-29	-35	-41	-48	-54	-60	-66
20	1	-5	-12	-18	-24	-30	-37	-43	-49	-56	-62	-68
25	1	-6	-12	-19	-25	-32	-38	-44	-51	-57	-64	-70
30	0	-6	-13	-20	-26	-33	-39	-46	-52	-59	-65	-72
35	0	-7	-14	-20	-27	-33	-40	-47	-53	-60	-66	-73
40	-1	-7	-14	-21	-27	-34	-41	-48	-54	-61	-68	-74
45	-1	-8	-15	-21	-28	-35	-42	-48	-55	-62	-69	-75
50	-1	-8	-15	-22	-29	-35	-42	-49	-56	-63	-69	-76
55	-2	-8	-15	-22	-29	-36	-43	-50	-57	-63	-70	-77
60	-2	-9	-16	-23	-30	-36	-43	-50	-57	-64	-71	-78
65	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79
70	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-80
75	-3	-10	-17	-24	-31	-38	-45	-52	-59	-66	-73	-80
80	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81

T air = Actual air temperature in °C **V** 10 = Wind speed at 10 metres in km/h

1. For a given combination of temperature and wind speed, the wind chill index corresponds roughly to the temperature that one would feel in a very light wind. For example, with a wind of 20 km/h and a temperature of -25°C, one would feel as if it were -37°C in a very light wind.

2. Wind chill does not affect objects and does not lower the actual temperature. It only describes how a human being would feel in the wind at the ambient temperature.

3. The wind chill index does not take into account the effect of sunshine. Bright sunshine may reduce the effect of wind chill (make it feel warmer) by 6 to 10 units.

Source: Environment Canada

from west to east in the eastern part. These wind directions are corroborated by the orientation of dunes and blow-out basins as discussed in the section of this document entitled "Geomorphology of the Quartenary," specifically the subsection "Active Geolmorphology and Recent Deposits – Wind Landforms."

FREEZE-UP AND ICE BREAK-UP SEASONS

The lakes in the study area generally freeze up between November 10 and 20, while ice break-up occurs between June 10 and 20 (OPDQ, 1983). For their part, rivers in the study area generally freeze up after December 1, while ice break-up occurs between May 20 and June 1. Variations may however occur depending on a lake or river's proximity to Ungava Bay or its location in a valley, on the Koroc River Plateau or in the Torgnat Mountains.

The eastern area of Ungava Bay normally freezes up around mid-December (pack ice). Break-up begins in mid-July (scattered ice) and ends around mid-August (chance of icebergs). Marine navigation and shipping are limited to roughly four months of the year (July to November).

BIOCLIMATIC ZONES AND PERMAFROST

The entire study area may be described as situated in an arctic bioclimatic zone (Rousseau, 1968) comprising tundra (Dansereau, 1972; Figure 3.6). Certain sections of the Koroc River, where patches of forest may be found, are described as hemi-arctic because they comprise taiga-tundra (open forest) also known as forest tundra. The topics of vegetation, plants and wildlife are discussed in the following section of this document.

As average annual temperatures are below freezing, the study area is marked by permafrost (Figure 3.7). This permafrost is continuous across the Koroc River Plateau and in the Torngat Mountains. It is discontinuous in the valley of the Koroc River and along the coast. The permafrost and cold climate foster the breaking apart of surfaces to create rock fragments (congelifracts) and talus, as well as the development of phenomena such as sorted congelifract formations and congelifluction (the slow sliding of soil down a slope).

The coexistence of arctic and hemi-arctic bioclimatic zones, characterized by boreal forests in some valleys and tundra vegetation including moss, lichen and small plants over the Koroc River Plateau and in the Torngat Mountains, is another unique characteristic of the region (Barré, 1987).

Geology

The rocks of the Torngat Mountains and Koroc River region are among the oldest in the world. The vast majority of the bedrock in this region is part of the Canadian Shield and forms a part of the Churchill Province, covering the area west of Mount D'Iberville (Figure 3.8). The upstream section of the Koroc River and Mount D'Iberville are part of the Nain Province (Stockwell, 1972; Verpaelst et al., June 2001).

CONTEXT

The rocks in this region date back to the Archean and Paleoproterozoic eras; they were deposited in sedimentary basins on the continental shelf of the pre-existing Superior Province to the west. This province is the oldest section of the Canadian Shield (Archaean, Kenoran Orogeny: 2.5 Ga or billion years ago). The Hudsonian Orogeny, which took place over close to 600 million years, is the tectonic event that deformed and reworked rock formations in the central and eastern regions of the Churchill Province and the western part of the Nain Province. The height of this orogeny (metamorphism and deformation) is thought to have occurred approximately 1.8 Ga (Verpaelst et al., 2000).

Major movements of the earth's crust, which produce continental collisions and the overlapping of rock complexes, can be explained in terms of plate tectonics (Figure 3.9). Shear areas and faults are terrain displacements generated by plate tectonics. Shear areas are the result of deformations that occurred at great depths under very high pressure and at very high temperatures at the beginning of the Proterozoic era.

In this region, shear areas are described as ductile because, initially, the terrain was stretched but did not break. Subsequently during the Proterozoic era, movements broke this terrain into pieces (Moorhead et al., 2000). The Blumath shear area runs north–south and separates the Far North Craton from the Torgnat Orogen. The faults were created through the process known as brittle tectonics; they are the result of the jostling of terrains against one another near the earth's surface. The rocks that are observable today were the foundations of the Hudsonian mountains and the continental crust.

CHURCHILL PROVINCE

The Churchill Province covers a portion of eastern Québec; it stretches north into the Canadian Arctic and west of Hudson Bay. The rocks of the Churchill Province sit on top of the Superior Province; these rocks were reworked and metamorphosed during the Hudsonian Orogeny.

The Churchill Province may be divided into two geological systems that meet through the centre of the study area (Map 3.1 and Figure 3.10): the Far North Craton to the west and the Torngat Orogen to the east (Verpaelst et al., 1999 and 2000; Moorhead et al., 2000).

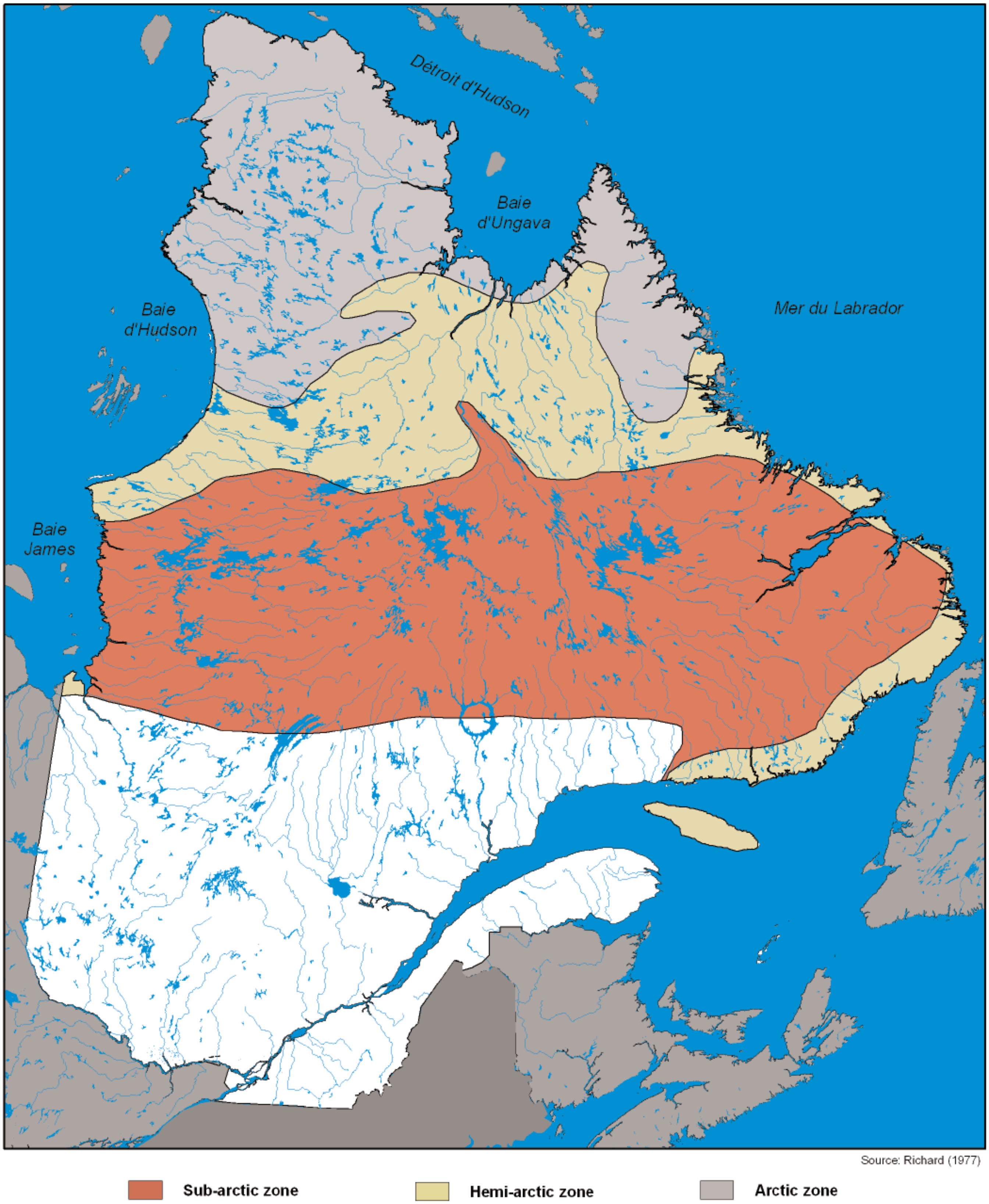


Figure 3.6 Bioclimatic Zones in the North (according to Rousseau, 1968)

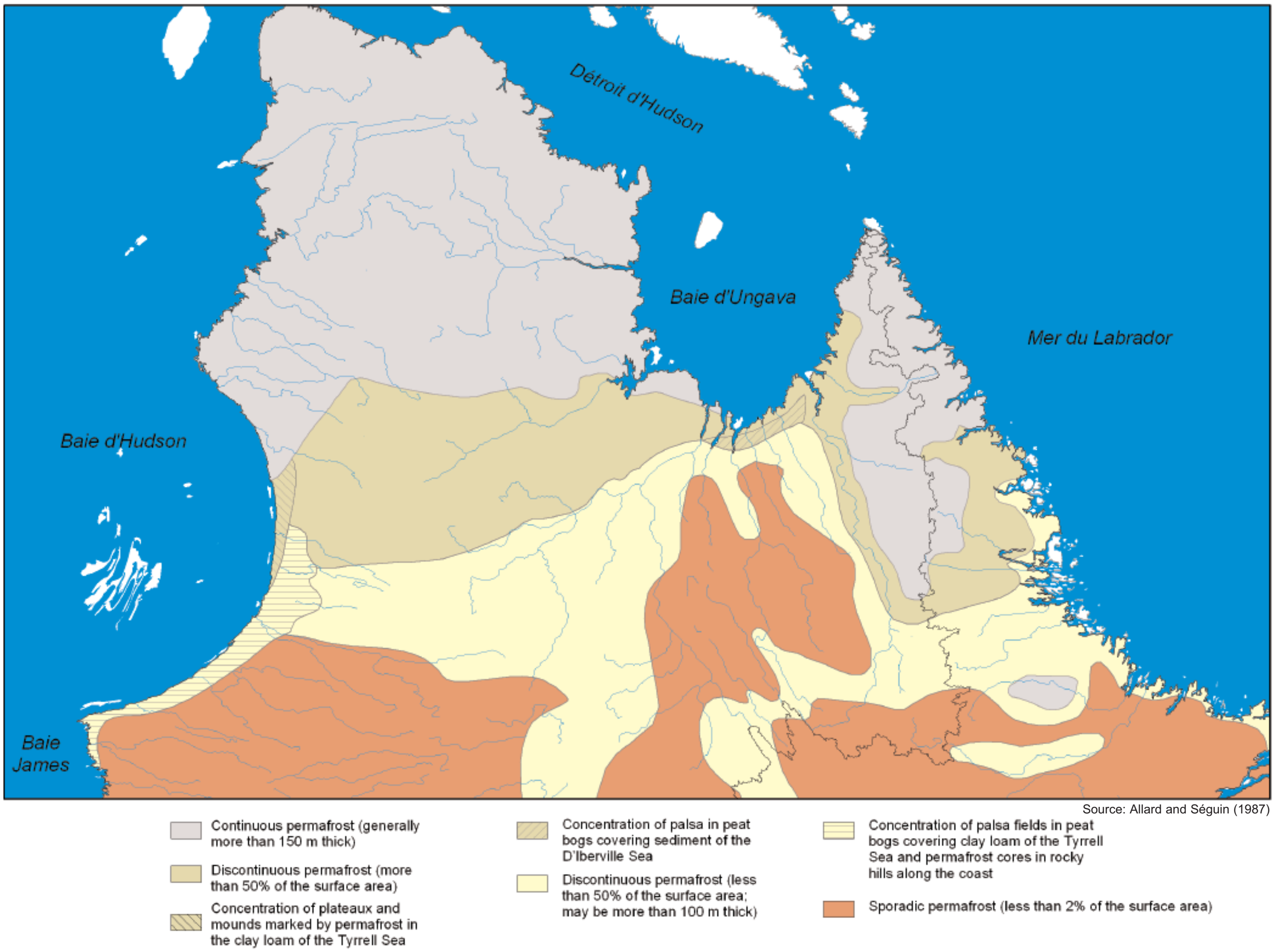


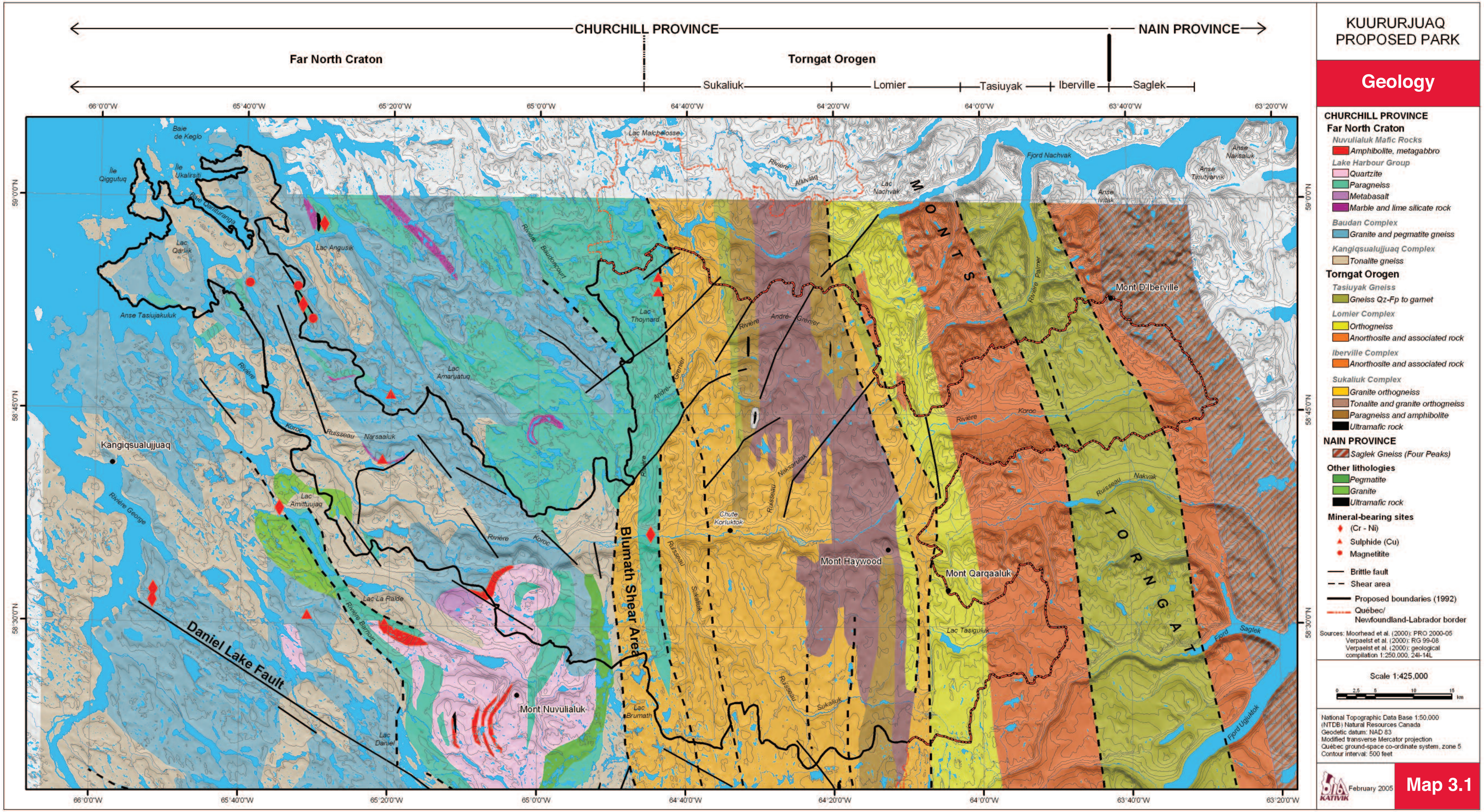
Figure 3.7 Permafrost

On the coast, a gneissic block in a formation of the Far North Craton
Credit: Louis Baron-Lafrenière (KRG)

Far North Craton

A craton is a stable portion of the continental crust. The Far North Craton occupies the western area of the proposed park. It is composed of granite rocks that were deformed during the Archean and the early Proterozoic eras. Its structure is oriented northwest–southeast, dipping roughly 20° to the southeast. The Far North Craton comprises Nuvulialuk mafic rocks, the Lake Harbour Group, the Kangiqsualujjuaq Complex and the Baudan Complex.

The Nuvulialuk mafic rocks are located in the eastern part of the Far North Craton and to the west of Mount Nuvulialuk (located outside of the study area, Verpaelst et al., 2000 and February 2002). They are rich in ferromagnesian elements (amphibolite, metagabbro). Amphibolites are ultra-mafic magmatic rocks that are dark green in colour and contain very little quartz. They infiltrated the quartzite of the Lake Harbour Group after 1.8 Ga (Verpaelst et al., 2000). They produce a wavy topography near Mount Nuvulialuk.



KUURURJUAQ PROPOSED PARK
Geology
CHURCHILL PROVINCE
NAIN PROVINCE
Far North Craton
Torngat Orogen
Sukaliuk
Lomier
Tasiuyak
Iberville
Saglek
CHURCHILL PROVINCE
Far North Craton
Nuvulialuk Mafic Rocks
Amphibolite, metagabbro
Lake Harbour Group
Quartzite
Paragneiss
Metabasalt
Marble and lime silicate rock
Baudan Complex
Granite and pegmatite gneiss
Kangiqsualujjuaq Complex
Tonalite gneiss
Torngat Orogen
Tasiuyak Gneiss
Gneiss Qz-Fp to garnet
Lomier Complex
Orthogneiss
Anorthosite and associated rock
Iberville Complex
Anorthosite and associated rock
Sukaliuk Complex
Granite orthogneiss
Tonalite and granite orthogneiss
Paragneiss and amphibolite
Ultramafic rock
NAIN PROVINCE
Saglek Gneiss (Four Peaks)
Other lithologies
Pegmatite
Granite
Ultramafic rock
Mineral-bearing sites
(Cr - Ni)
Sulphide (Cu)
Magnetitite
Brittle fault
Shear area
Proposed boundaries (1992)
Québec/
Newfoundland-Labrador border
Sources: Moorhead et al. (2000): PRO 2000-05
Verpaelst et al. (2000): RG 99-08
Verpaelst et al. (2000): geological compilation 1:250,000, 24I-14L
Scale 1:425,000
0 2,5 5 10 15 km
National Topographic Data Base 1:50,000
(NTDB) Natural Resources Canada
Geodetic datum: NAD 83
Modified transverse Mercator projection
Québec ground-space co-ordinate system, zone 5
Contour interval: 500 feet
KATIVIK
February 2005
Map 3.1
Kangiqsualujjuaq
Mont Nuvulialuk
Mont Haywood
Mont Qarqaaluk
Mont D'Iberville
Daniel Lake Fault
Blumath Shear Area
M O N T S
T O R N G A T
Fjord Nachvak
Fjord Saglek
Lac Amaruatuq
Lac Angusik
Lac Qarlik
Lac Amittuujaq
Lac La Ralde
Lac Thoynard
Lac Brumath
Lac Tasiguluk
Lac Nachvak
Lac Daniel
Rivière George
Rivière Koroc
Rivière Baudancourt
Rivière André-Grenier
Ruisseau Narsaaluk
Ruisseau Sukaliuk
Chute Korluktok
Baie de Keglo
Île Qiggutuq
Île Ukalirsiti
Anse Tasiujakuluk
Ruisseau Nakvak
66°0'0"W
65°40'0"W
65°20'0"W
65°0'0"W
64°40'0"W
64°20'0"W
64°0'0"W
63°40'0"W
63°20'0"W
59°0'0"N
58°45'0"N
58°30'0"N

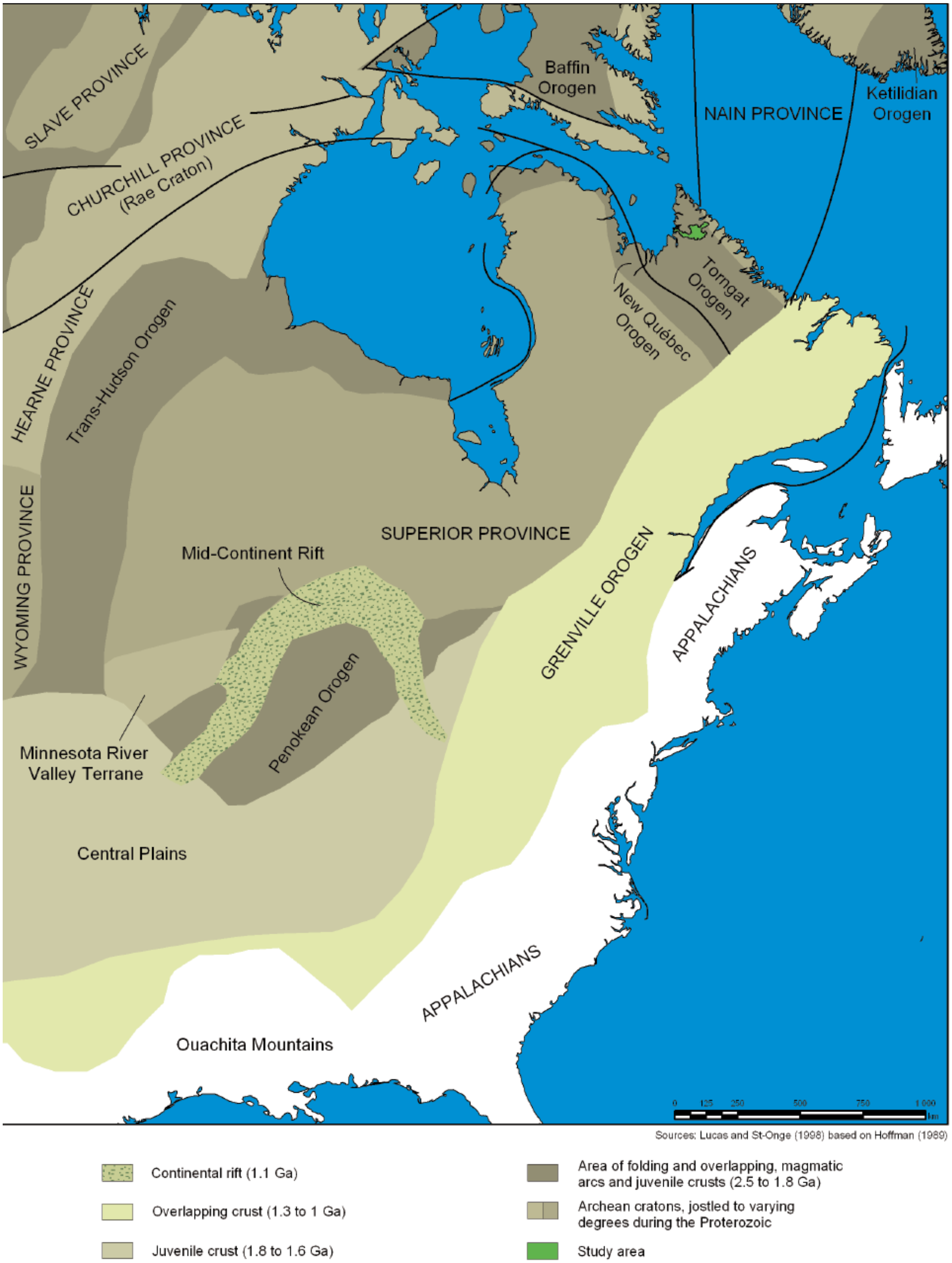
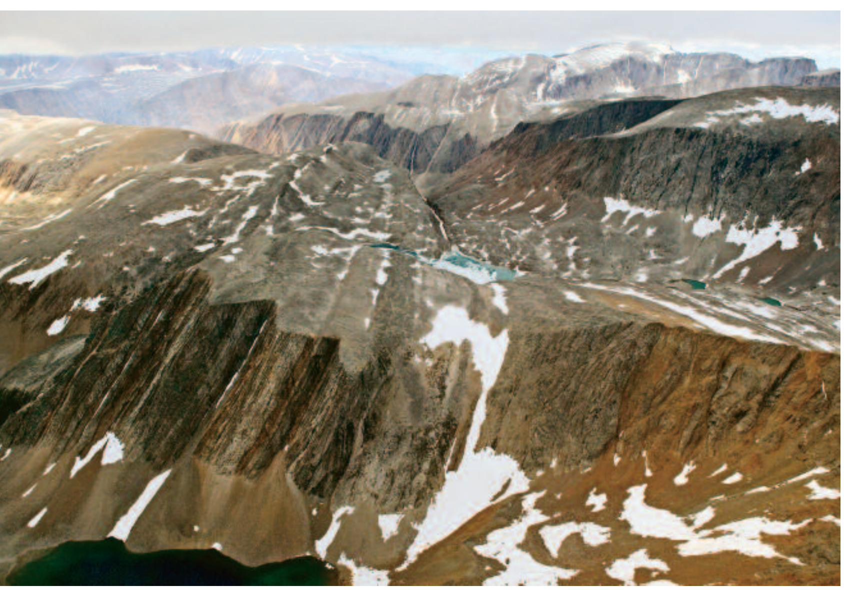


Figure 3.8 Tectonic Provinces of the Canadian Shield

The Lake Harbour Group, which is roughly 1 km thick, comprises quartzite sedimentary rocks and paragneisses. These rocks passed through only a single major metamorphic phase. Quartzite is a metasedimentary rock comprising silica (75–80% quartz) without gneissic structure. Smooth and vitreous, the quartzite located south of the Koroc River is distinctive in the region. This quartzite nonetheless resembles rocks of the Ramah Group in Labrador that the early inhabitants of this territory used to make tools.

The paragneisses of the Lake Harbour Group are metamorphic rocks created through granite sedimentation (quartz, biotite, feldspath, garnet). They are located in the eastern part of the Craton, including a north–south belt along the André-Grenier River. The gneissic structure (banded) is distinguishable by alternating dark beds (iron and magnesium) and clear beds (quartz and feldspath). The paragneiss is a fine and medium grain rock that when weathered becomes rusty brown in colour and contrasts with contiguous rocks. The mountain that stands at the mouth of the André-Grenier River on its east shore exhibits this type of weathering. The Lake Harbour Group also includes marble and metabasalt (located outside of the study area).

The Baudan Complex and the Kangiqsualujjuaq Complex are magmatic gneisses (orthogneiss: magma intrusion into the continental crust followed by deformation). The Baudan gneiss is located between the Lake Harbour Group and the Kangiqsualujjuaq Complex. It occupies eastern and western parts of the Far North Craton. The Kangiqsualujjuaq gneiss underwent major metamorphism. It comprises, among other



Contact between Tasiuyak Gneiss and the Iberville Complex west of Mount D'Iberville

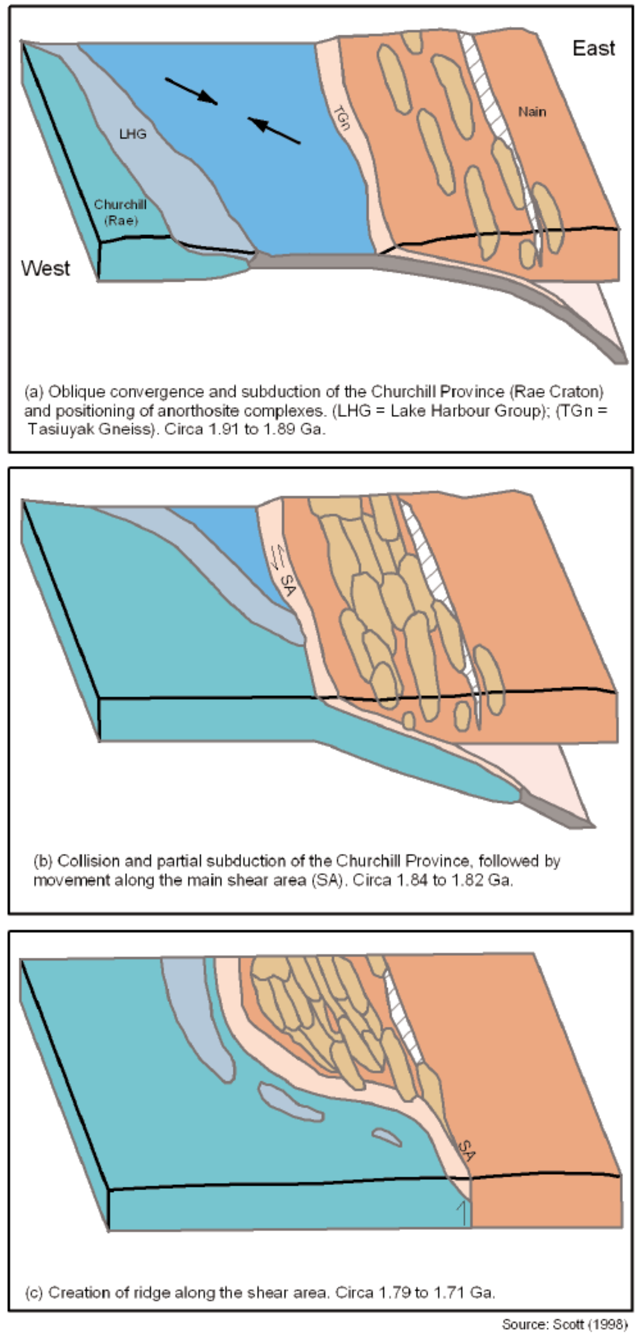


Figure 3.9 Diagram of Tectonic Movement in the Study Area

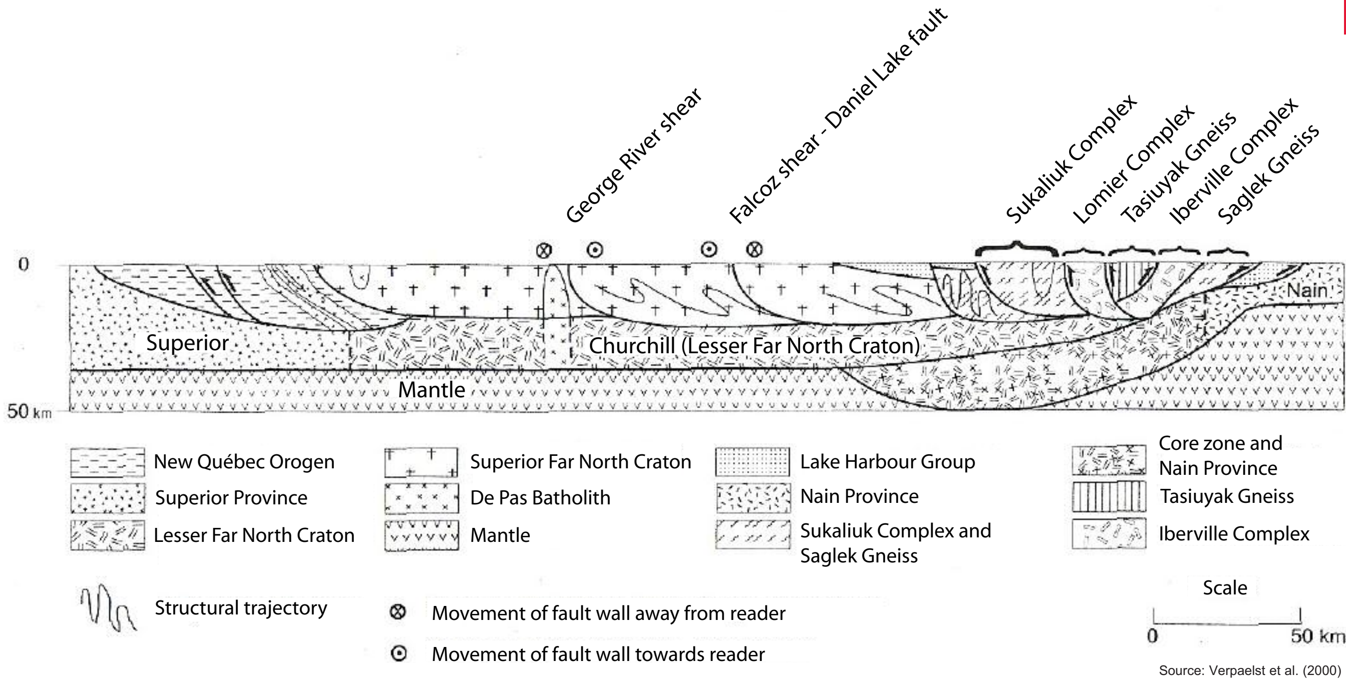


Figure 3.10 Geological Cross-Section of the Northern Churchill Province

things, fragments of paragneiss, quartzite and iron, and is located especially in the eastern part of the Craton and on the coast.

Torngat Orogen

An orogen is a range of mountains created on an unstable portion of the continental crust. The Torngat Orogen occupies the eastern portion of the study area. Its structure is oriented north-northwest–south-southeast with a sub-vertical dip. The Orogen spans the Québec–Newfoundland–Labrador border and reaches north to Baffin Island. Its total length is more than 1200 km (Clark, 1994).

The Torngat Orogen comprises reworked rocks of the Churchill and Nain provinces as well as a very deformed section of magmatic and sedimentary gneisses (Verpaelst et al., 2000). It forms a suture zone between the tectonic provinces. From west to east, it is made up of the Sukaliuk and Lomier complexes, the Tasiuyak Gneiss and the Iberville Complex.

The Sukaliuk Complex includes orthogneisses (which is to say magmatic gneisses), gneisses that resemble those of the Far North Craton, paragneisses (which is to say sedimentary gneisses), and fragments of ultra-mafic rock that run in a north–south direction between the Koroc River and the André-Grenier River.

The Lomier Complex comprises orthogneisses and anorthosite. These rocks have been dated to the Proterozoic era because they cut through the older rocks of the Lake Harbour Group. Anorthosite is a massive magmatic rock that possesses a very dark colour and large crystals.

The Tasiuyak Gneiss is near the Torngat Mountains. While very deformed, it is homogenous, rich in quartz and feldspath, and contains garnet (a pink to redish mineral). The Gneiss is observable in outcroppings at the summits of the slopes along the Koroc River and in blocks and pebbles scattered through loose deposits.

The Iberville Complex runs across the eastern area of the proposed park. It includes alternating gneiss and anorthosite that were metamorphosed into gneisses. They resemble those of the Lomier Complex. The Iberville Complex dates back to the Paleoproterozoic era and is especially observable along craggy cliffs and in talus found at the foot of the slopes in the very upstream section of the Koroc River.

NAIN PROVINCE

The Nain Province is found in the extreme eastern part of the proposed park. It forms the Archean basement that reaches to Greenland. Its edge follows the upstream section of the Koroc River where it runs northwest–southeast and includes Mount D'Iberville (Moorhead et al., 2000; Verpaelst et al., June 2001). The Saglek Gneiss comprises Archean gneisses (granulite) that were reworked during the Torgnat Orogeny (Verpaelst et al., 2000). Excellent examples of this rock and its structure may be observed at the summit and in the cirque of Mount D'Iberville.

MINERAL POTENTIAL

Within the boundaries of the proposed park, showings have been located in the rock formations of the Far North Craton (Verpaelst et al., 2000; refer to Map 3.1). Magnetite was discovered in the Kangiqsualujjuaq Complex, east of the mouth of the Koroc River. Geologists noted rusty zones in the rocks of the Lake Harbour Group, indicating a certain concentration of iron. Chrome showings were measured in lentils of ultra-mafic rock, at the mouth of the André-Grenier River. Although this type of rock naturally contains high grades of chrome, no chrome occurrences were identified. The only interesting copper occurrence is located south of the Narsaaluk River, in the marble of the Lake Harbour Group. These units however consist of thin, isolated fragments that do not suggest an economically viable quantity of mineral deposits.

In the opinion of Perreault (2002) from the Ministère des Ressources naturelles et de la Faune (natural resources and wildlife, MRNF), rocks that generally contain major showings (marble, paragneisses and ultra-mafic intrusions) revealed only poor mineral potential. Finally, the areas comprising Archean rocks in the eastern and western parts of the proposed park may be potential targets for diamond exploration.

In the areas located outside of the boundaries of the proposed park, research revealed iron and nickel showings (Verpaelst et al., 2000). The discovery in 1996 of a diamond on the shores of the Alluviaq Fjord, roughly 50 km north of the proposed park, lead certain mining companies to set up exploration camps (Moorhead et al., 2000). The horizons of dolomite marble identified near Keglo Bay (outside of the proposed park) are potential targets for dolomite exploration (Verpaelst et al., 2000). Currently, in the areas contiguous with the proposed park there is little interest in mineral exploration and no exploration permits are in effect.

In summary, within the boundaries of the proposed park, the mineral potential for usual and precious metals is poor (Perreault, 2002) and of little interest for exploration purposes. The work of mineral exploration companies outside of the boundaries of the proposed park and the work of the MRNF throughout the region have not revealed any major showings. To the north in the area of the Alluviaq Fjord, the economic value of diamond occurrences has not yet been determined exactly; these occurrences are not deep while operating and mining costs would be high. The park proposed by Parks Canada in Labrador also represents a major obstacle to mining activities.

GEOLOGICAL HISTORY: SUMMARY

The Superior Province, which is located to the west of the proposed park and which has an average age of 2.5 Ga (Archean era), is the oldest section of the Canadian Shield in Québec, covering practically the whole Hudson Bay and James Bay watershed. While the Nain Province also comprises Archean rocks, the source of these rocks is different than the source of the rocks of the Superior and Churchill provinces. The events that lead to the formation of the territory in the proposed park were long and complex, involving several organizational and metamorphic phases over close to 1.5 Ga.

The rocks of the Churchill Province, including the Far North Craton and the Torngat Orogen which fall within the proposed park, were formed for the most part by the erosion of the Superior Province. These rocks accumulated in nearby seas and were intercalated into volcanic and magmatic rocks that eventually joined to the continent.

Continental and oceanic crust movements deformed the rocks of the Far North Craton and, through an oblique collision with the Superior Province, oriented the Craton in a northwest–southeast direction. Later as the Nain and Churchill provinces converged, these east–west displacements oriented the rocks of the Torngat Orogen in a north–south direction. The suture zone resulting from the collision of the Nain and Churchill provinces is located in the extreme eastern part of the proposed park, near Mount D'Iberville.

At the height of this mountain forming period (Hudsonian Orogeny), circa 1.8 Ga, the mountains of the Churchill Province likely towered approximately 10,000 m high. During this orogeny, the rock formations created during the Archean era and the beginning of the Proterozoic eras were again jostled and subjected to a major phase of metamorphism.

The geological events that lead to the formation of the bedrock in the study area occurred for the most part during the Archean and Paleoproterozoic eras. No other younger consolidated geological formations can be found in this territory.

Through subsequent stages of the Precambrian, another main geological event was the opening of the Atlantic Ocean and the Labrador Sea during the Secondary era, which lead to the separation of the Ungava–Labrador region from Greenland and the creation of the Torngat Mountains.

During the Quaternary period, the immense glaciers that covered all of Canada etched cosmetic changes in the landscape and spread major quantities of moraine deposits (up to 50 m thick) throughout the territory. These loose and relatively recent formations (dating back roughly 100,000 years or less) sit directly on top of a 2 Ga basement. The series of geological events that have marked the region are summarized in Table 3.5.

Table 3.5 Summary of the Region's Geological History

GEOLOGICAL PERIOD	AGE	MAIN GEOLOGICAL EVENTS
Quaternary	1.6-0 Ma[1]	Glaciation and deglaciation: erosion and positioning of loose formations from various sources (glacial, marine, etc.).
Tertiary	65-1.6 Ma	Creation of the Torngat Mountains and displacement of formations along ancient faults.
Secondary	225-65 Ma	Opening of the Atlantic Ocean.
Primary	570-225 Ma	Immersion of the Canadian Shield and erosion.
PRECAMBRIAN	—	New movement of major ductile north–south structures and brittle deformation (faults).
Proterozoic (Neoproterozoic Mesoproterozoic)	—	Evolution of structural system leading to the creation of north–south and northwest–southeast shear areas (ex.: Daniel Lake fault and shear area) that cut and fill the north–south folds of the preceding phase. Possible intrusion of anorthosite into the suture zone.
Paleoproterozoic (Proterozoic)	1.8 Ga[2]	Hudsonian Orogeny: metamorphism and reworking of more ancient rocks to create the Baudan and Kangiqsualujjuaq complexes (Far North Craton); within the earth, creation of the Sukaliuk and Lomier complexes and the Tasiuyak Gneiss (Torngat Orogen). Deformation through east–west compression of the Nain and Churchill provinces creating north–south folds, then overlapping movement of eastern rocks to the west, thereby forcing deeper rocks closer to the surface. It is at this moment that the Lomier Complex attaches itself to the Far North Craton.
	1.9-1.85 Ga	Erosion and positioning of sediments and lava from the Lake Harbour Group and the Sukaliuk Complex.
	—	Collision of the Nain Province and the Far North Craton and subduction of the Craton, accompanied by the intrusion of granite rocks.
	2.2 Ga	Positioning of magmatic rocks (anorthosite and granite intrusion); rifting of the eastern edge of the Far North Craton.
Archean	2.62-2.6 Ga	Positioning of magmatic granite rocks, followed by metamorphism (granulite) and ductile deformation of the Far North Craton.
	2.9-2.7 Ga	Creation of a magmatic, sedimentary and volcanic basement – creation of the Nain Province.

[1] Ma: mega annum or millions of years; [2] Ga: giga annum or billions of years

Sources: Moorhead et al. (2000); Verpaelst et al. (2000)

Physiography

The territory of the proposed park covers in part three physiographic provinces of Québec (MLCP, 1986; refer to Figure 1.2). From east to west, the Torngat Mountain Foothills (B43) cover roughly 81% (3466 km^2) of the study area, the George River Plateau (B33) 12.5% (528.6 km^2), and the Ungava Coast (B42) 6.5% (278.4 km^2). The territory comprises a mountainous zone and a vast plateau that slopes towards Ungava Bay. The topography is deeply marked by glacial cirques and a network of valleys.

PHYSIOGRAPHIC UNITS

Many authors have studied the physiographic characteristics of Canada and Québec. To identify the physiographic units of the study area, the work of Bostock (1972), Douglas and Drummond (1966), and Barré and Lefebvre (1985, 1987) was employed. Three distinct physiographic units emerge from analysis of these works:

- To the east, the Labrador Uplands, including the Torngat Mountains and Mount D'Iberville, cover 17.3% (740.6 km^2) of the study area;
- In the middle, the Koroc River Plateau covers 66.2% (2831.6 km^2) of the study area;
- To the west, the Ungava Lowlands cover 16.4% (701.8 km^2) of the study area.

While in the east, the transition from uplands to plateau is relatively abrupt, the transition from plateau to lowlands is more gradual. Valleys constitute a subjacent physiographic unit since they cut through and are a feature of the units described above. These units are shown on Map 3.2, while Figure 3.11 illustrates typical topographical cross-sections of each unit. The elevation of the region, which diminishes from west to east, is detailed on Map 3.3 and slope gradient is shown on Map 3.4.

The Torngat Mountains tower over the Koroc River Plateau

LABRADOR UPLANDS

The Labrador Uplands (Torngat Mountains) form the highest mountain range in eastern Canada. They run north–south between Ungava Bay and the Labrador Sea over 500 km. These uplands cover 741 km^2 of the study area.

Mount D'Iberville, which towers at 1646 m, is the highest peak in Québec and second only to Mount Washington (1917 m) in eastern North America. The highest peak in North America is Mount McKinley (6194 m) in Alaska. Mount Logan (roughly 6000 m), in the Rocky Mountains, is Canada's highest peak. For comparison purposes, the elevations of a number of mountains are provided below.

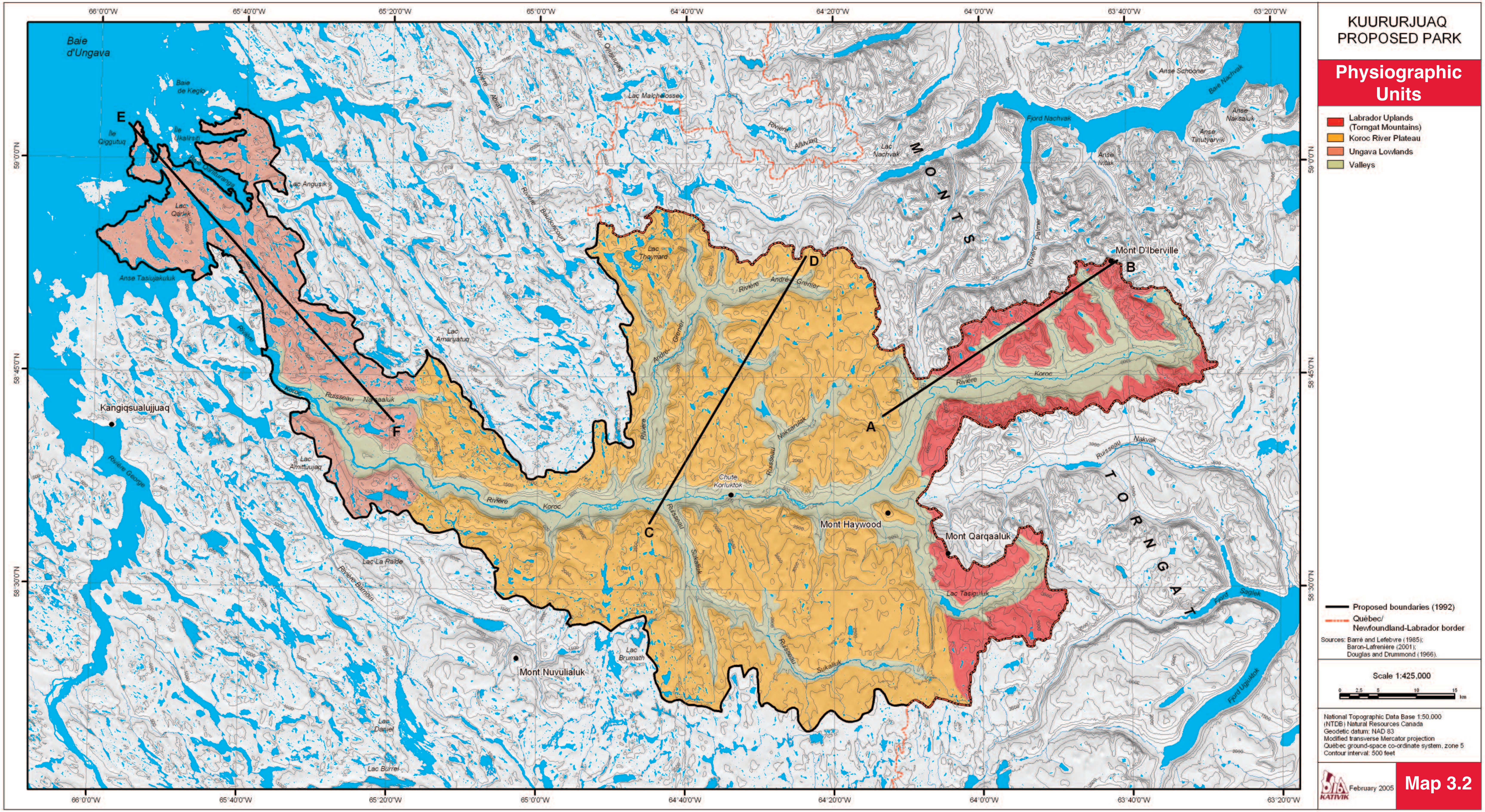
Elevation of certain well-known mountains

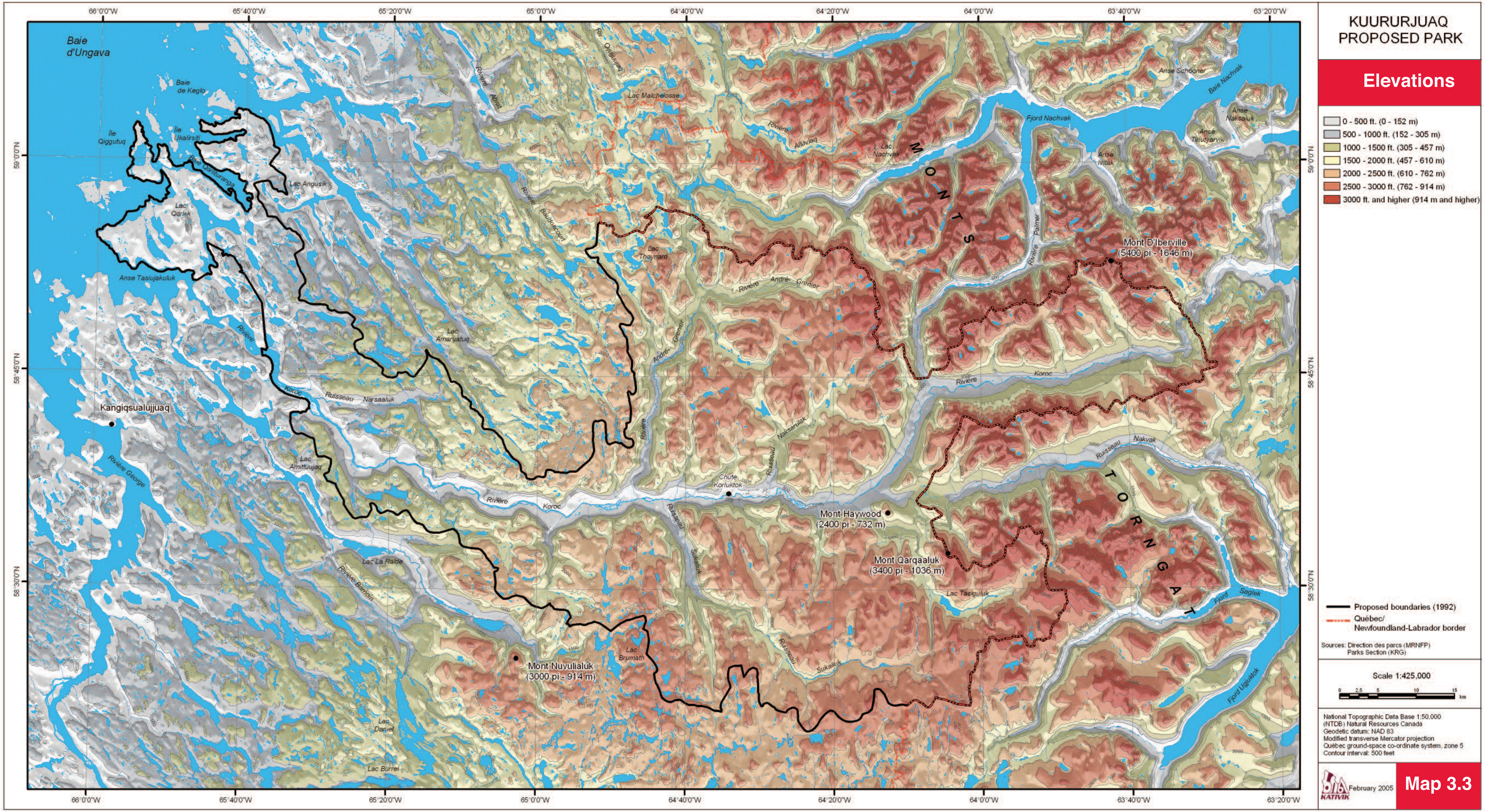
MOUNTAIN	ELEVATION (m)
Mount McKinley (Alaska, US)	6194
Mount Logan (Yukon)	≈ 6000
Mount Popocatepetl (Mexico)	5465
Mount Axel Heiberg (Nunavut)	2500
Mount Washington (New Hampshire, US)	1917
Mount D'Iberville (Nunavik, Québec)	1646
Mount Jacques-Cartier (Gaspé Peninsula, Québec)	1268
Mount Yapeitso (Otish Mountains, Québec)	1128
Mount Tremblant (Laurentian Mountains, Québec)	968
Mount Sainte-Anne (Quebec City area, Québec)	823

The Torngat Mountains run northeast–southwest, covering the upstream section of the Koroc River and a vast number of lesser valleys and glacial cirques separated by small interfluves. Together, these form a labyrinth, a mixed landscape that is distinctive from the rest of the territory. Except for Lake Tasiguluk and a few small bodies of water at the foot of some cirques, lakes are rare in this sector.

In the northeast portion of the proposed park (in the Mount D'Iberville area), the topography is very rugged and marked by great amplitude. Peaks often exceed 915 m. The cliffs of many glacial cirques are scarred by erosion and marked by avalanche chutes. Steep slopes are found throughout this sector with gradients exceeding 45%. Glacial, periglacial and fluvial landforms as well as talus mark most surfaces.

Vertical drops of more than 600 m between summit and valley floor may be observed frequently. Between the depressions,


KUURURJUAQ PROPOSED PARK
Physiographic Units
Labrador Uplands (Torngat Mountains)
Koroc River Plateau
Ungava Lowlands
Valleys
Proposed boundaries (1992)
Québec/ Newfoundland-Labrador border
Sources: Barré and Lefebvre (1985); Baron-Lafrenière (2001); Douglas and Drummond (1966).
Scale 1:425,000
National Topographic Data Base 1:50,000 (NTDB) Natural Resources Canada
Geodetic datum: NAD 83
Modified transverse Mercator projection
Québec ground-space co-ordinate system, zone 5
Contour interval: 500 feet
KATIVIK
February 2005
Map 3.2
Baie d'Ungava
Kangiqsualujjuaq
Mont D'Iberville
Mont Haywood
Mont Qarqaaluk
Mont Nuvulialuk
MONTS TORNGAT
Rivière Koroc
Chute Korluktok
Fjord Nachvak
Lac Tasiqiuluk
A
B
C
D
E
F


KUURURJUAQ PROPOSED PARK
Elevations
0 - 500 ft. (0 - 152 m)
500 - 1000 ft. (152 - 305 m)
1000 - 1500 ft. (305 - 457 m)
1500 - 2000 ft. (457 - 610 m)
2000 - 2500 ft. (610 - 762 m)
2500 - 3000 ft. (762 - 914 m)
3000 ft. and higher (914 m and higher)
Proposed boundaries (1992)
Québec/ Newfoundland-Labrador border
Sources: Direction des parcs (MRNFP) Parks Section (KRG)
Scale 1:425,000
0 2,5 5 10 15 km
National Topographic Data Base 1:50,000 (NTDB) Natural Resources Canada
Geodetic datum: NAD 83
Modified transverse Mercator projection
Québec ground-space co-ordinate system, zone 5
Contour interval: 500 feet
KATIVIK
February 2005
Map 3.3
Baie d'Ungava
Baie de Keglo
Île Qiqqituq
Île Ukalirsiti
Lac Angusik
Lac Qarlik
Anse Tasiujakuluk
Kangiqsualujjuaq
Rivière George
Lac Amittuujaq
Lac Amaruatuq
Lac Malchelosse
Lac Thaymard
Lac Nachvak
Fjord Nachvak
Baie Nachvak
Anse Schooner
Anse Naksaluk
Anse Tinutyarvik
Anse Ivitak
Rivière André-Grenier
Rivière Koroc
Ruisseau Narsaaluk
Ruisseau Nakvak
Chute Korluktok
Mont D'Iberville (5400 pi - 1646 m)
Mont Haywood (2400 pi - 732 m)
Mont Qarqaaluk (3400 pi - 1036 m)
Mont Nuvulialuk (3000 pi - 914 m)
Lac Tasiguluk
Lac La Ralde
Rivière Barnoin
Lac Brumath
Lac Daniel
Lac Burrel
Fjord Saglek
Fjord Ugjuktok
MONTS TORNGAT
66°0'0"W
65°40'0"W
65°20'0"W
65°0'0"W
64°40'0"W
64°20'0"W
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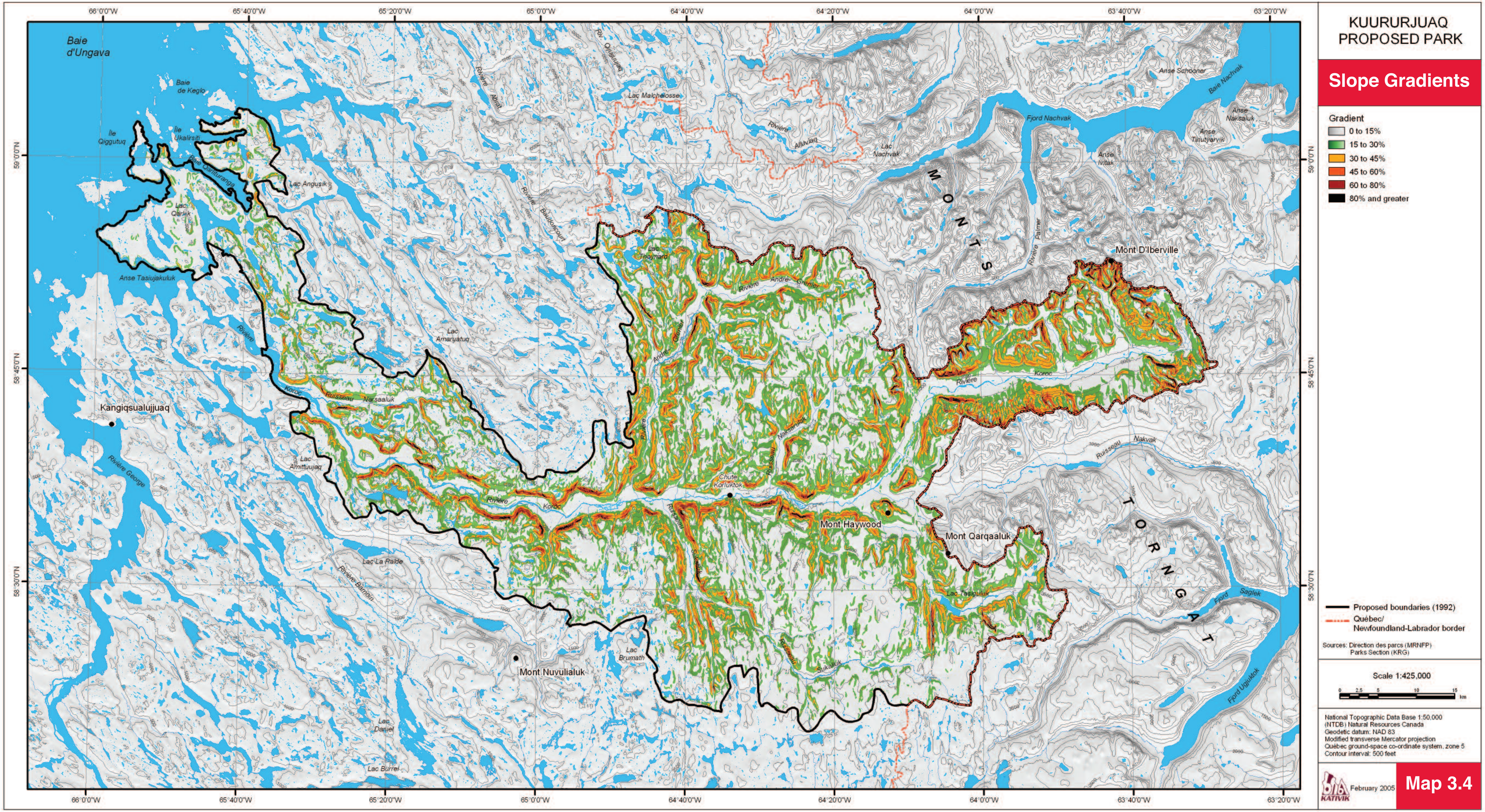
58°45'0"N
58°30'0"N


KUURURJUAQ
PROPOSED PARK
Slope Gradients
Gradient
0 to 15%
15 to 30%
30 to 45%
45 to 60%
60 to 80%
80% and greater
Proposed boundaries (1992)
Québec/
Newfoundland-Labrador border
Sources: Direction des parcs (MRNFP)
Parks Section (KRG)
Scale 1:425,000
National Topographic Data Base 1:50,000
(NTDB) Natural Resources Canada
Geodetic datum: NAD 83
Modified transverse Mercator projection
Québec ground-space co-ordinate system, zone 5
Contour interval: 500 feet
February 2005
Map 3.4
Baie d'Ungava
Kangiqsualujjuaq
Mont D'Iberville
Mont Haywood
Mont Qarqaaluk
Mont Nuvulialuk
M O N T S
T O R N G A T

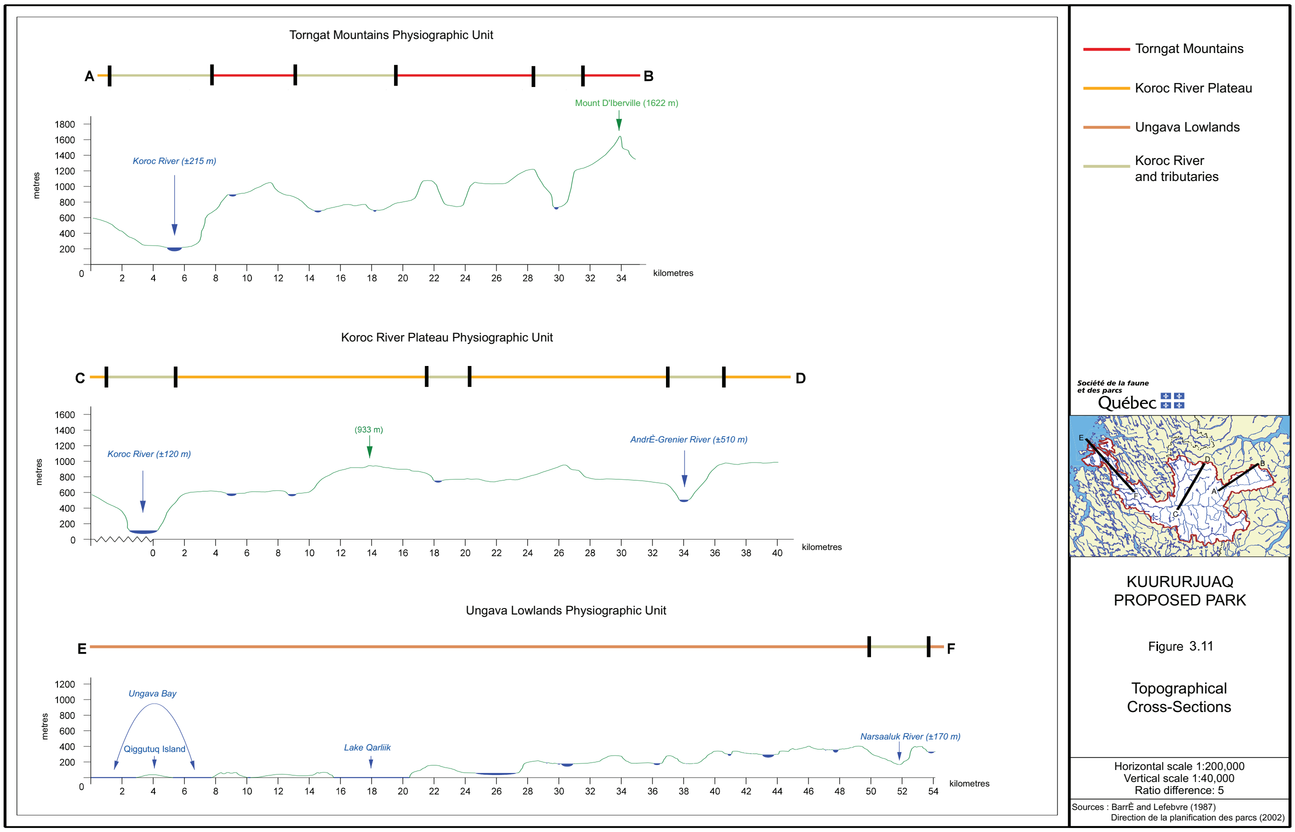


Figure 3.11 Topographical Cross-Sections

interfluves comprise rounded summits, rocky ridges, or flat or slightly domed surfaces that are camouflaged by blocks. Erosion has caused the rims of the cirques in this unit to become serrated. The acute angle of erosion is a result of the reworked layers of rocks and their stratified structure. Access to this zone of ridges is difficult.

In the southeast portion of the proposed park (to the east of Lake Tasiguluk), even though peaks may reach 1200 m, the topography of these uplands is more rounded and regular than in the Mount D'Iberville area with its cirques. Traces of glacial erosion are less evident, though the area is covered with moraine deposits.

KOROC RIVER PLATEAU

The Koroc River Plateau is a planation surface (peneplain) with an average elevation of 760 m. Its maximum elevation is nearly 1070 m; Mount Haywood (732 m) is located on the eastern edge of the plateau. Generally speaking, the plateau slopes gradually from east to west, towards Ungava Bay, and the amplitude of the topography is average. This physiographic unit covers 2832 km^2 or 66% of the proposed park; notwithstanding, lakes are small and few.

Although the landscape is less rugged than the Torngat Mountains with slope gradients that are generally less than 30%, the Koroc River Plateau is lacerated with valleys. It comprises several interfluves with rolling hills that follow the structural orientation. Former glacial action has left u-shaped valleys, gorges along fractures in the bedrock, and loose deposits of varying thicknesses that cover the surfaces of the unit. Glacial cirques are less frequent and less developed than in the uplands. Contact between plateau and valleys are marked by extreme nick points that may have gradients of 45, 60 and even 80%, if not more, over short distances.

UNGAVA LOWLANDS

The Ungava Lowlands are the western extension of the Koroc River Plateau. The amplitude of the topography diminishes from average to low. Former glacial action is less pronounced than may be witnessed in the proposed park's eastern physiographic units. The hills present rocky surfaces polished by glacial erosion, while loose deposits are concentrated in depressions and along the coast.

The maximum elevation of these lowlands rarely exceeds 470 m and average elevation is roughly 230 m. The surface is widely eroded and presents a series of small hills separated by rivers and numerous lakes.

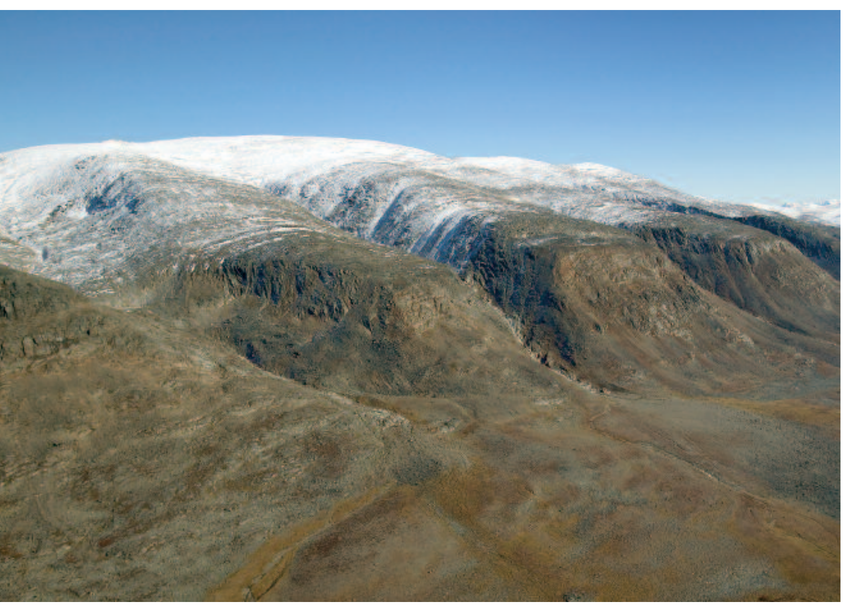
VALLEYS

The valleys of the Koroc River and its tributaries are called glacial valleys or u-shaped valleys. They are nearly as wide as deep, and their walls are steep. A large variety of loose deposits camouflage the valley floors. Glacial and fluvioglacial deposits are very common, producing an irregular landscape.

The Koroc River runs east–west and it represents the territory's main valley. It's total length is 165 km, of which 150 km falls within the boundaries of the proposed park. The difference in elevation between the headwaters of the Koroc River and Ungava Bay is roughly 760 m, which represents an average longitudinal gradient of 0.5%.

In the Torngat Mountains unit, topographical amplitude is roughly 700 m, diminishing to approximately 400 m in the Koroc River Plateau unit, and to 150 m in the Ungava Lowlands unit. In this latter physiographic unit which includes the coast, the floor of the main valley has been flattened by expanses of marine sand.

The valleys of the André-Grenier River, the Sukaliuk Creek, the Naksarulak Creek and Lake Tasiguluk are among the more impressive lesser valleys and they run in north–south directions. A majority of the tributaries of the Koroc River possess roughly 100–m vertical drops from their headwaters to the base level of the Koroc River valley, creating hanging valleys (this designation is also applied to glacial cirques).



View of the orthogonal organization of the Torngat Mountains

These structural and polygenetic valleys were carved from the base geological structure (characterized by an orthogonal organization) and at different moments throughout the Precambrian.

LANDSCAPES AND THEIR STRUCTURES

The main characteristics of the region's landscapes (mountains, plateau and valleys) and their orthogonal organization are the result of the geological structure produced with the creation of the Precambrian mountains and through the long periods of flattening, uplifting and erosion that took place up until the end of the Tertiary period.

The orthogonal appearance of the region's landforms is created by the valleys, as well as by the rocky ridges and fractures, that run north–south and east–west. The ridges are layers of reworked rocks, bordered by eroded surfaces or occurrences of geological contact. Escarpments are often the result of faults (Barré and Lefebvre, 1987; Verpaelst et al., 2000).

The term fracture designates any crack or rectilinear, eroded weak area in the bedrock that corresponds to a fault or displacement of the bedrock following the erosion of the overlying surface. In the proposed park, there are countless fractures. The valleys, depressions between the hills, as well as rivers and creeks follow the structure of the bedrock. Furthermore, many fractures channelled glacial waters to create gorges (Barré and Lefebvre, 1987). An excellent example of a gorge exists southwest of Lake Tasiguluk. In the Quaternary period, glaciers served to rejuvenate the landscape and camouflage surfaces with loose deposits.

LANDSCAPES BEFORE THE QUATERNARY PERIOD

Geological research into the types of landscapes that mark the Canadian Shield and neighbouring regions, as well as the topographical description of the territory of the proposed park make it possible to identify major moments in its evolution (Table 3.6).

During the Precambrian, mountain-building tectonic events gave the region its major north–south (in the east) and northwest–southeast (in the west) orthogonal structures. Even while these mountains were being erected, over a period of 600 million years, the topography was being eroded all the way to sea level to create a vast and single peneplain. This ancient erosion surface covers the entire territory, independently

Table 3.6 Major Events that Contributed to Changes in Landscapes

GEOLOGICAL TIME	AGE (Ma)[1]	MAJOR EVENTS THAT CONTRIBUTED TO CHANGES IN LANDSCAPES
CENOZOIC		
QUATERNARY	Today	Erosion and sedimentation in marine and fluvial environments, talus, original sea level, climatic variations, **periglacial process, degradation of slopes**
	0.005	Isostatic uplifting (regression of the D'Iberville Sea) Transgression of the D'Iberville Sea (Koroc River valley)
Holocene	0.01	**Climatic warming and deglaciation of the study area**
	0.08	**Wisconsin Glacial Stage:** glacial erosion, moraine deposits
Pleistocene	1.6	Onset of major glaciation
TERTIARY	1.6	
Neogene	25	Climatic cooling
Paleogene	65	Erosion
MESOZOIC	65	**Uplifting of the bedrock and the Torngat Mountains**
CRETACEOUS	135	Humid climate: **formation of valleys**
JURASSIC	190	Opening of the Atlantic Ocean (Labrador Sea)
TRIASSIC	225	**Erosion–planation**
PALEOZOIC	225	
PERMIAN	290	Closing of the Lapetus Ocean
CARBONIFEROUS	345	
DEVONIAN	395	Acadian Orogeny (Appalachians)
SILURIAN	435	**Erosion–planation**
ORDOVICIAN	500	Taconian Orogeny (Appalachians)
CAMBRIAN	570	Immersion of the Canadian Shield (no evidence in the study area)
PRECAMBRIAN	570	
PROTEROZOIC		
		Opening of the Lapetus Ocean (circa 650–550 Ma) End of the formation of the Canadian Shield
Neoproterozoic	1 000	Grenvillian Orogeny (formation of the Laurentians to the south)
		Erosion–planation
Mesoproterozoic	1 600	Evolution of the structural system
	1 800	**Hudsonian Orogeny** (collision of the Churchill and Nain provinces)
	2 200	Rifting of the eastern edge of the Far North Craton
		Formation of the **Churchill Province**
Paleoproterozoic	2 500	Kenorean Orogeny: Superior Province Commencement of the formation of the Canadian Shield and the **Nain Province**
ARCHEAN	2 500	
	4 500	Approximate age of the Earth

[1] Ma : *Mega annum* or millions of years

of rock types and their structures. After the creation of the mountains, the continent experienced very long periods of stability, during which only a few geological and climatic events reworked the peneplain to distinguish one physiographic unit from another.

During the Paleozoic era, the sea covered the continent. Sedimentary rocks were deposited over the peneplain forming regions around the Canadian Shield, such as the Saint Lawrence Lowlands and the Appalachians. Fragments of these rocks may still be found throughout the Shield. Akpatok Island, which is situated in the middle of Ungava Bay, is one example. No such fragment however exists in the study area since all sedimentary rocks were eroded, re-exposing the peneplain.

The absence of vegetation, or the absence of continuous vegetation with roots to hold the soil, contributed to the flattening of surfaces (non-selective erosion) from the Precambrian to the Triassic period (Mesozoic era) through sheet flow or sheet wash (Tricart and Cailleux, 1965). During the second half of the Mesozoic era, a humid, sub-tropical climate contributed to the concentration of waters (river) and the formation of valleys according to the geological structure (selective erosion), leading to the fragmentation of the landscape and the creation of separate hills. In this type of climate where chemical deterioration prevails, Barré (1987) indicates that the gneisses are sensitive and deteriorate more quickly than quartzite, while for its part through mechanical processes, like congelifraction, quartzite breaks more readily than gneisses (differential erosion).

During the Mesozoic era, the Atlantic Ocean opened, coinciding with the commencement of the formation of the Rocky Mountains. The distinct topographies of the Torngat Mountains and the Koroc River Plateau were produced when the mountains and plateau were uplifted unequally at the end of Mesozoic era or at the beginning of the Cenozoic era. At the same time, watersheds came to slope either towards the Labrador coast or Ungava Bay. This upheaval reinitiated erosion along creeks and rivers as they cut paths to the sea.

At the beginning of the Tertiary period, annual average temperatures were slightly above 20°C at sea level in central Europe (Tricart and Cailleux, 1965). Temperatures began to drop around 30 Ma to reach 0°C at the end of the period. During the glacial periods of the Quaternary, they dropped below the freezing point and had an impact on the different landscapes over a very short period of time. The events of the Quaternary period that marked the landscapes of the study area are described in the following section.

Geomorphology of the Quaternary

At the beginning of the Quaternary period, the mountains, the plateau and the river valleys of the study area likely looked much the same as today, which is to say a vast, flattened territory through which cut numerous valleys. Climatic cooling and major glaciation nonetheless etched cosmetic changes in these landscapes in less than 2 Ma. Glaciers created cirques, carved u-shaped valleys, and spread major quantities of moraine deposits throughout the territory. The main events of the Quaternary period that marked the landscapes of the study area are described in this section and summarized in Table 3.7.

MAJOR GLACIATION

As regards the Quaternary period, specifically the Pleistocene epoch, (1.6 Ma–10 ka), scientists have identified several ice cap advances (continental ice sheets) in the Northern hemisphere separated by spells of climatic warming. Based on the chronology proposed by Fulton (1989), remnants of glaciation in Canada date back to the Illinoian epoch (Table 3.7), however the last ice cap advance of the Wisconsin stage (80–10 ka) likely erased most traces of previous glaciation. The Sangamonian stage (130–80 ka) was marked by climatic warming and the melting of continental ice sheets (interglacial stage).

The continental ice sheets that covered Canada may have been 2000 to 3000 m thick (Sugden, 1977). As a direct result of the weight of this ice mass, the earth's crust sank (isostatic compensation) and, with the stocking of the earth's water in the ice caps, sea levels dropped (eustasy). During climatic warming, continental ice sheets melted and as the water returned to the oceans, sea levels rose. In addition, before the earth's crust was able to rebound to its original level, low-lying regions were momentarily inundated.

WISCONSIN GLACIAL STAGE

The Wisconsin glacial stage lasted from 80 to 10 ka. During this stage, an ice cap (known as the Laurentide Ice Sheet) formed in North America, covering most of Canada (Dyke and Prest, 1987). In the study area, this ice sheet lingered on until 10 ka over the Ungava Lowlands, the Koroc River Plateau and part of the Labrador Uplands. The peaks of the Torngat Mountains were one of the few regions of Canada that might not have been submerged under the continental ice sheet. This fact, among others, makes the proposed park of great interest to the scientific community.

TOTAL GLACIATION OR NUNATAKS

The presence of the continental ice sheet in the Labrador Uplands is subject to two main interpretations. The glacial

Table 3.7 Events of the Quaternary

GEOLOGICAL TIME	AGE (Ka)[1]	MAJOR EVENTS THAT CONTRIBUTED TO THE EVOLUTION OF LANDFORMS IN THE QUATERNARY
CENOZOIC		
QUATERNARY	Today	**Climatic warming**: periglacial, glacial, fluvial and marine activities; associated erosion and accumulation; slope degradation; wind activity; return to pre-Wisconsin sea level
Little Ice Age	0.5–0.1	**Recent cooling**: glacial activity in Mount D'Iberville cirque
Neoglacial	4	Cooling: glacial activity in Mount D'Iberville cirque
	5,2	**Isostatic rebound**, D'Iberville Sea, marine regression, creation of valleys
Hypsithermal	7.5–5	Warming: **D'Iberville Sea**: marine transgression along the coast and in the Koroc valley
	8	Deglaciation (continued and ended); terraces – proglacial deltas, rock steps, glacial lake drains in stages
Holocene	**10**	**Significant climatic warming**: deglaciation (continued), **Koroc Glacial Lake**, local glaciers
	11	**Onset of deglaciation**, periglacial climate in exposed areas
	18	**Glacier advance**; non-symmetrical rocks, striation, lodgement till, drumlins, cirques and valleys
Late Wisconsin	23	Total glaciation (summital till) or nunataks (alteration deposits – congelifracts – on summits)
Middle Wisconsin	65–23	Cirques and glacial valleys, erosion and deposits (?)
Early Wisconsin	80–65	Cirques and glacial valleys, erosion and deposits (?)
Wisconsin	**80**	**Glaciation** (total glaciation or nunataks) - cirques and glacial valleys
Sangamonian	130–80	Interglacial stage (climatic warming)
Illinoian	180–130	Glaciation (no evidence in the study area)
Yarmouthian	230–180	Interglacial stage (climatic warming)
Kansasin	300–230	Glaciation (no evidence in the study area)
Aftonian	330–300	Interglacial stage (climatic warming)
Nebraskian	470–330	Glaciation (no evidence in the study area)
		Onset of the formation of cirques and glacial valleys
Pleistocene	**1.6 Ma**[2]	Onset of major glaciation in North America: total glaciation or nunataks?
TERTIARY	65–1.6	Climatic cooling (second half of the Tertiary: 30-1.6 Ma)

[1] 1 ka: kilo annum or thousands of years [2] Ma: mega annum or millions of years

Sources: Ives (1978), Gangloff (1983), Mathieu (1983), Barré and Lefebvre (1985, 1987), Barré (1987), Fulton (1989), Baron-Lafrenière (2001, 2003), Gray et al. (2001, 2002) maximum model (total glaciation) holds that all the peaks of Québec were covered during the Wisconsin stage (Flint, 1971), while the glacial minimum model holds that these peaks evolved beyond the reach of the glaciers (nunataks; Ives, 1978; Figure 3.12).

The nunatak hypothesis is based on the combination of geomorphological and alteration phenomena at high elevations and over time, known as chronozones (Ives, 1978); the greater the alteration, the older the surfaces. From valley floors to mountain summits, traces of the last glaciers (moraines, striation, etc.) gradually fade and are replaced by periglacial landforms (tors, block fields, etc.). The advanced development of periglacial landforms supports the hypothesis that upland peaks (Torngat chronozones) escaped the glaciers of the Late Wisconsin (Ives, 1960, 1978).

Studies completed by Sugden (1977, 1978) as well as Sugden and John (1978) concerning the different thermal regimes that form the backdrop of glaciation require the nunatak hypothesis to be adjusted to field evidence.

Some authors (Sugden and Watts, 1977) have stated that block fields are evidence of protection against glacial erosion (cold-based ice) and not of nunataks. This interpretation does not challenge the variations of geomorphological phenomena according to elevation, but rather the history of the summital areas.

In the Torngat Mountains, Gangloff (1983) has shown that periglacial landforms in valleys withstood glacial action and that summital block fields are in fact glacial till that has been reworked by the cold climate. Analysis indicates that summit deposits date to the Wisconsin stage. Barré and Lefebvre (1985, 1987) concur. Notwithstanding, observations made in the proposed park suggest a combination of glacial and periglacial phenomena according to elevation (Baron-Lafrenière, 2003). To date, the cause of summital block fields in the study area has not been definitively determined (glacial deposits, alteration deposits, or a combination thereof).

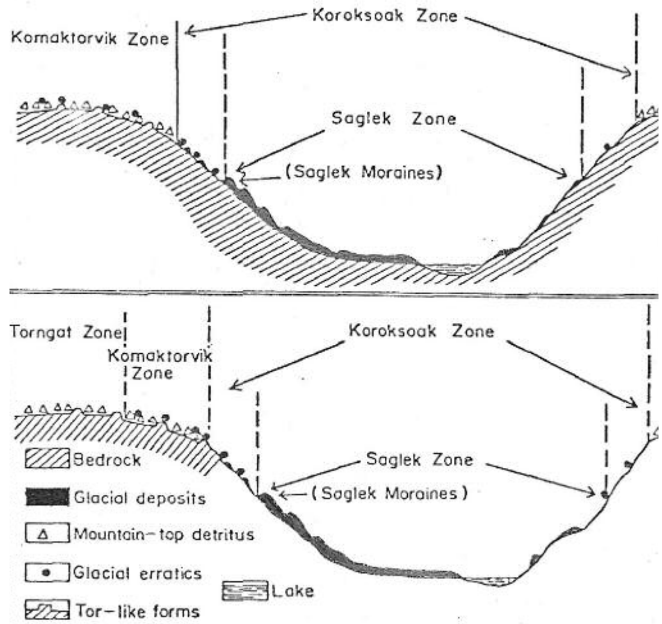


Figure 3.12 Glacial Model and Nunatak Hypothesis, Ives (1978)

Mount D'Iberville may have evolved as a nunatak during the last ice age

The technique of cosmic radiation dating could be employed to determine the cause of these summital block fields (Gray et al., 2001). Provisional results have shown that certain surfaces have been exposed for 140,000 years. The advanced development of felsenmeere have lead Gray et al. (2002) to propose that these deposits may have been covered and preserved during the last glacial period under cold-based ice (without erosion).

GLACIATION HISTORY

The Labrador Dome was a section of the Laurentide Ice Sheet centred over Québec with various regional glacier flows (Figure 3.13). These glaciers covered central Québec and Ungava Bay, reaching across the Torngat Mountains to Labrador. Within the study area during the Late Wisconsin to the east of the Ungava Lowlands, the general glacier flow was in an easterly direction (Dyke and Prest, 1987), which is to say in the opposite direction of the slope of the land. Over the lowlands and along the coast, glacier flow was to the northwest, the north and the northeast (Dyke and Prest, 1987; Allard et al., 1989; Baron-Lafrenière, 2003).

In the region, Parent and Paradis (1999, in Verpaelst et al., 2000) have recorded three successive glacial flows. The earliest moved in north-northeasterly and northeasterly directions; the second in an east-northeasterly direction; and the last in a northwesterly direction across the western part of the region. Along the coast, over the lower section of the George River, Allard et al. (1989) have demonstrated that the glacial flow that first moved to the northwest and then veered to the northeast was the last in the region. The placement of frontal moraines and the various directions of glacial flow suggest that the former Labrador Dome subdivided in the study area, as mapped by Dyke and Prest (1987). Based on Jansson's deglaciation model (2003), the ice covering Ungava Bay with a northwest–southeast flow broke away from the Labrador Dome around 8 ka.

The Torngat Mountains were free from the glacial ice around 10 ka, even while the continental ice sheet would have continued to cover the plateau all the way to Mount Haywood. After 10 ka, glacial flows from the south would have derived from the main section of the Labrador Dome. The entire study area would have been freed from the glacial ice by around 8 ka. However, as suggested by the major frontal moraines in the upper section of the Koroc River as well as by the minor moraines in the Mount D'Iberville cirque in Québec and remnant glaciers in Labrador, local glaciers survived into the Holocene epoch, following the disappearance of the continental ice sheets.

GLACIAL LANDFORMS

The main glacial phenomena that lie within the proposed park are shown on Map 3.5 and, in diagram form, in Figure 3.14.

North of the Koroc River in the Torngat Mountains, except for cirques and eroded valley slopes, visible glacial remnants are rare, not to say altogether non-existent, above a elevations of 900 to 1000 m. This suggests that there was once a high degree of glacial action in the valleys but only minimal or no such action on the summits of these mountains. According to Clark et al. (2003), former glaciers plied the valleys, leaving surfaces above 1000 m floating like nunataks.

South of the Koroc River along the Québec–Labrador border, the advanced alteration of fields of erratics at an elevation of 1340 m may indicate that these rocks were transported by glaciers early in the Wisconsin stage. The entire area east of Lake Tasiguluk is covered with glacial block fields that show few signs of alteration (maximum elevation: 1265 m). Over the Koroc River Plateau, an almost uniform layer of till and asymmetric rocks (stoss-and-lee form) may be observed, while the Ungava Lowlands exhibit many rock outcroppings, which point to major glacial erosion.

Glacial Erosion

Cirques and glacial valleys are beyond a doubt the most spectacular forms of glacial erosion. In the Labrador Uplands, cirques are well developed and frequent, with the Mount D'Iberville cirque being the most impressive. Through the Koroc River Plateau, cirques are less frequent and more modest, becoming rare in the Ungava Lowlands. The very elaborate form of the cirques in the uplands suggests longer development that probably began early in the Quaternary period.

In a majority of cases, small round or oval-shaped lakes occupy the hollowed floor of the cirque (umbilic), and are bordered by glacial deposits forming a dam. A beautiful example of this phenomenon may be found on the south side of Mount D'Iberville where block ridges were put in place during the Holocene epoch (Neoglacial and Little Ice Age moraines; Barré and Lefebvre, 1987).

The glacial valleys found in the study area are almost as wide as they are deep with continuous steep slopes. Valley floors are filled with loose deposits derived from diverse sources that produce a mixed topography. The over deepening of the main valleys has resulted in tributaries (suspended valleys) with 50 m nick points where they plunge into the main valleys. An excellent example of this phenomenon is observable at the mouth of the Naksarulak Creek where its path plunges roughly one hundred metres down to the Koroc River.

Glacial cirque and summital block field, Torngat Mountains

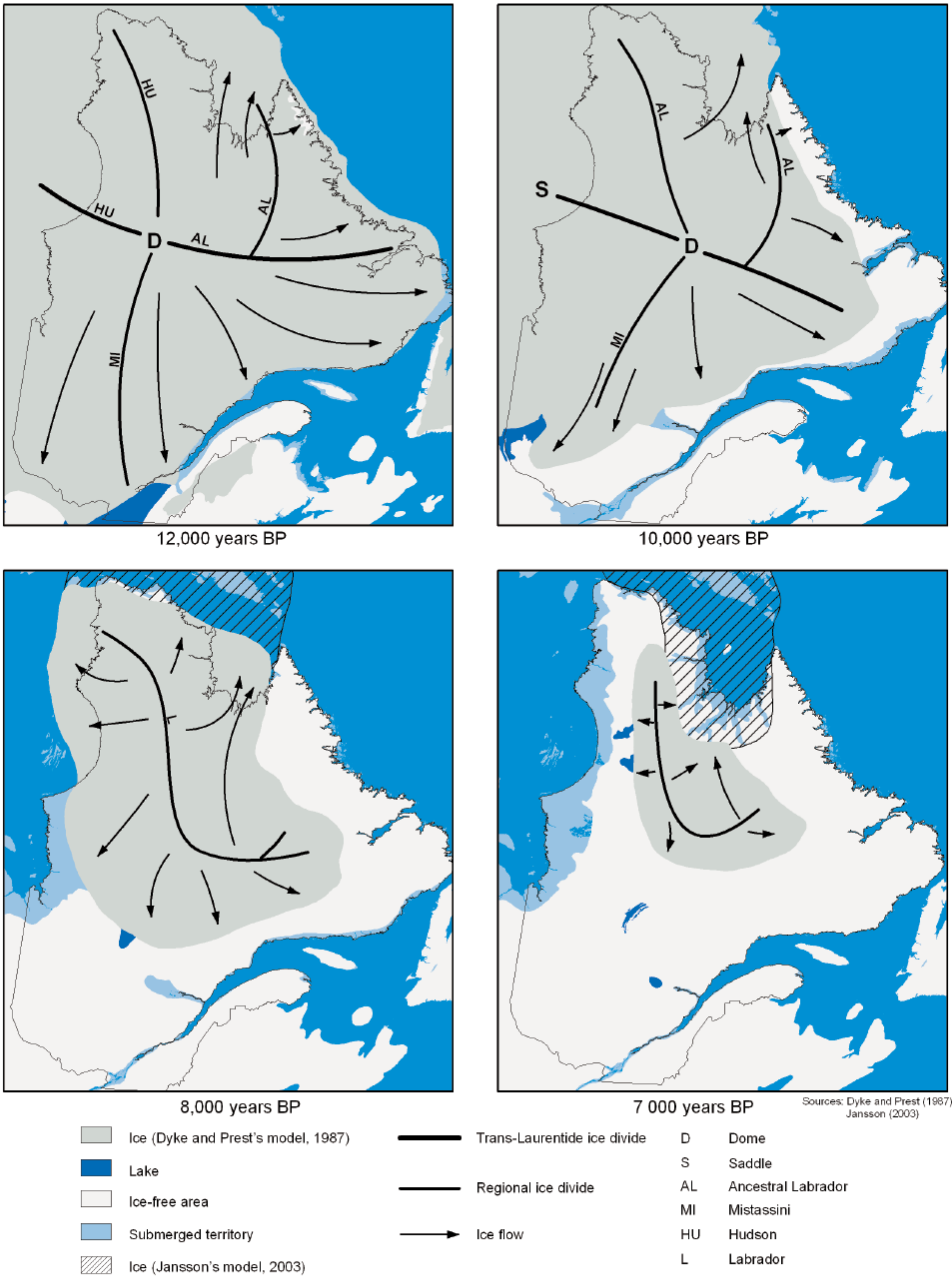
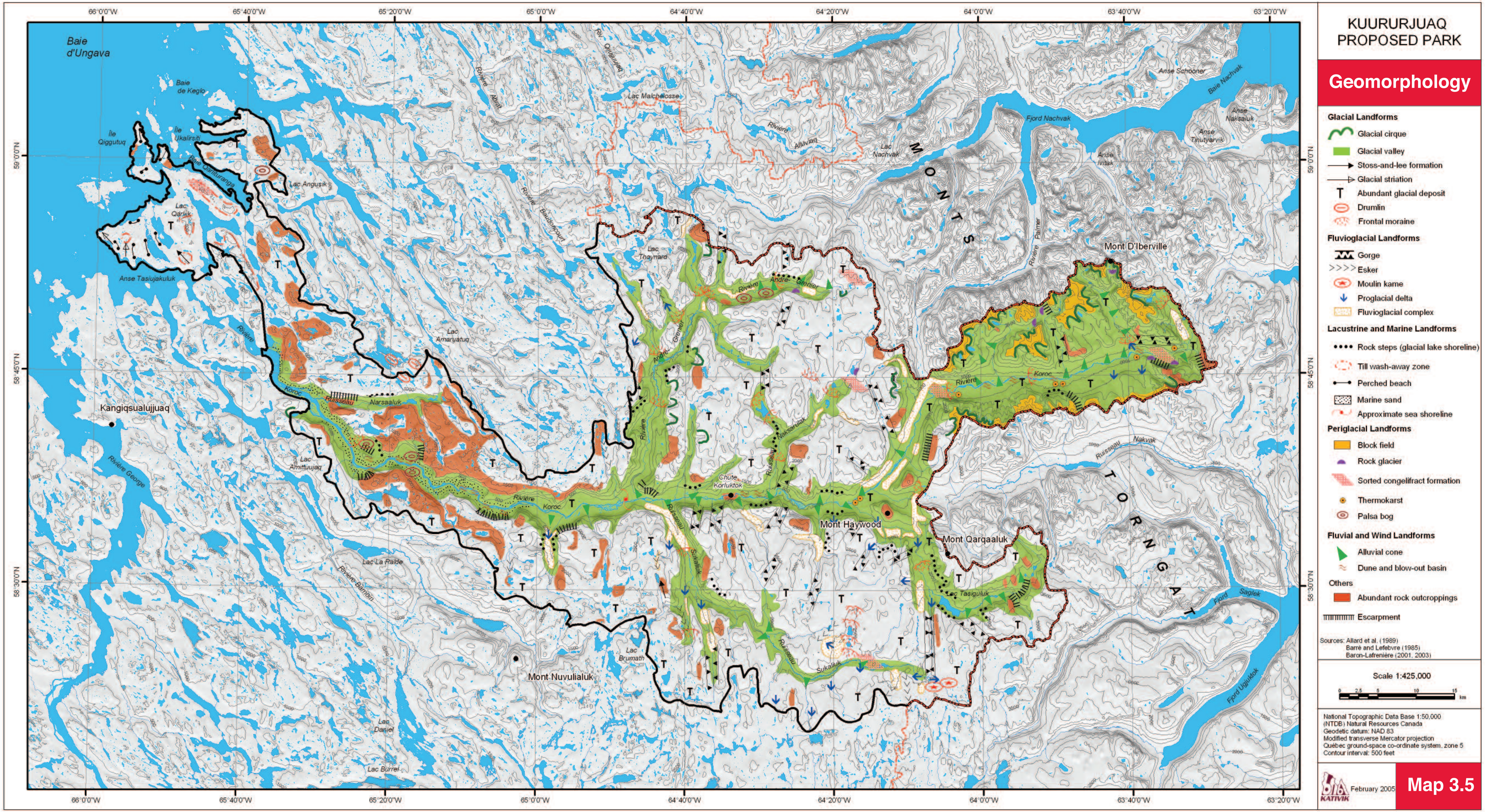


Figure 3.13 Paleogeography of Québec between 12,000 and 7,000 BP


KUURURJUAQ PROPOSED PARK
Geomorphology
Glacial Landforms
Glacial cirque
Glacial valley
Stoss-and-lee formation
Glacial striation
Abundant glacial deposit
Drumlin
Frontal moraine
Fluvioglacial Landforms
Gorge
Esker
Moulin kame
Proglacial delta
Fluvioglacial complex
Lacustrine and Marine Landforms
Rock steps (glacial lake shoreline)
Till wash-away zone
Perched beach
Marine sand
Approximate sea shoreline
Periglacial Landforms
Block field
Rock glacier
Sorted congelifract formation
Thermokarst
Palsa bog
Fluvial and Wind Landforms
Alluvial cone
Dune and blow-out basin
Others
Abundant rock outcroppings
Escarpment
Sources: Allard et al. (1989)
Barré and Lefebvre (1985)
Baron-Lafrenière (2001, 2003)
Scale 1:425,000
National Topographic Data Base 1:50,000
(NTDB) Natural Resources Canada
Geodetic datum: NAD 83
Modified transverse Mercator projection
Québec ground-space co-ordinate system, zone 5
Contour interval: 500 feet
February 2005
Map 3.5
Baie d'Ungava
Baie de Keglo
Kangiqsualujjuaq
Rivière George
Lac Angusik
Anse Tasiujakuluk
Mont D'Iberville
Mont Haywood
Mont Qarqaaluk
Mont Nuvulialuk
Chute Korluktok
Lac Tasiguluk
Fjord Nachvak
Baie Nachvak
Fjord Saglek
Fjord Ugjuktok
MONTS TORNGAT
Lac Malchelosse
Lac Nachvak
Lac La Ralde
Lac Brumath
Lac Daniel
Lac Burrel
66°0'0"W
65°40'0"W
65°20'0"W
65°0'0"W
64°40'0"W
64°20'0"W
64°0'0"W
63°40'0"W
63°20'0"W
59°0'0"N
58°45'0"N
58°30'0"N

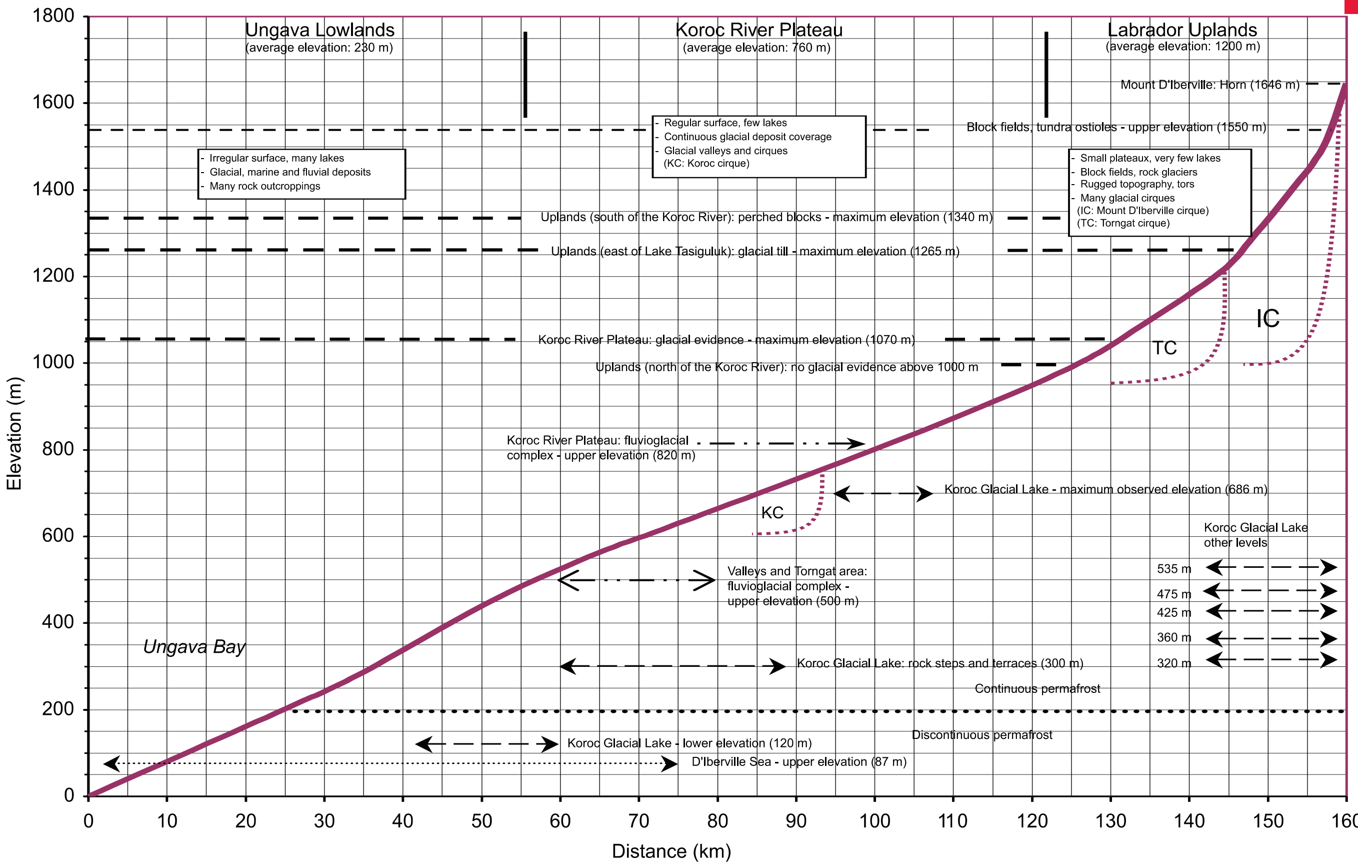


Figure 3.14 Diagram of Main Geomorphological Phenomena based on Elevation

For their part, the study area's asymmetric rocks are whale-back-shaped, several metres long and truncated on the side that corresponds to the direction of ice movement. To the west of the Sukaliuk Creek, asymmetric rocks indicate north–south glacial flow while, along the coast, they indicate southeast–northwest flow. Striation occurred where there was contact between blocks (dragged by the bases of glaciers) and rock outcroppings. These marks are also indicative of the direction of glacial flow. Striation found along the coast (Allard et al., 1989) is evidence of successive north-westerly and northerly glacial flows.

Glacial Accumulation

Glacial deposits (till, moraines, vallums) cover most of the study area and are so thick they camouflage the details of the rock structure.

Lodgement till comprises various sizes of material dragged by the bases of glaciers and it is often tightly compressed. It usually presents an undulating surface with scattered large blocks. This lodgement till may be several metres thick in depressions between hills and rocky ridges, thins on steep slopes, and is absent from the upper sections of valley and escarpment walls. On their map of the region, Barré and Lefebvre (1985) specify that lodgement till has formed felsenmeere through freeze-and-thaw action on most summits.

Lodgement till may present an ellipsoidal form (drumlins) that is elongated in the direction of glacial flow. Only one drumlin has been mapped in the study area, which is to say north of the Narsaaluk Creek (refer to Map 3.5). While this landform was identified on the glacial map by Prest et al. (Geological Survey of Canada, 1970), the direction of flow was not specified. The shape of the drumlin, slightly wider at its west end, may suggest that at that place glacial flow was from west to east.

Moraines are present on the plateau and in the valleys of the study area. They are more numerous in the central and eastern parts of the territory than in the west. These moraines are ridges of deposits that formed along the edges of the glaciers. Barré and Lefebvre (1985) mapped these landforms throughout the valley of the Koroc River and suggest that they were created by the retreating Laurentide Ice Sheet.

A majority of these moraines range in length from roughly a hundred metres to more than a kilometre or more, and in height from five to ten metres. Some ridges, which are approximately thirty metres high, mark the major stopping points of retreating glaciers. The best examples of this phenomenon are located to the northwest of Lake Tasiguluk, in the valley of the Sukaliuk Creek, at the mouth of the creeks that drain the series of lakes near Thoynard Lake, and south of Narsaaluk Creek (western part of the study area). The frontal moraines identified along the upper section of the Koroc River (east of the valley leading to the Palmer River) are imposing and were likely created by local glaciers that flowed from the Torngat Mountains.

FLUVIOGLACIAL LANDFORMS

The major fractures discussed in the preceding section on physiography served to channel glacial melt waters. Over time, sub-glacial rivers carved gorges of varying sizes. The most impressive of these in the study area are located along the upper section of the Koroc River, southwest of Lake Tasiguluk, at the mouth of the Naksarulak River, and south of the Sukaliuk Creek.

Fluvioglacial complexes comprise sand, gravel and blocks derived from till that was reworked by glacial melt waters. The surfaces of these deposits are often pockmarked with kettles. These deposits are often less tightly compressed than till and drainage is usually good. Fluvioglacial deposits may be as much as 30 m thick in the main valleys, forming terraces or deltas that are large in scale.

Terrace of the Koroc Glacial Lake situated at 300 m

Eskers are long ridges of loose deposit formed under glaciers by the forced evacuation of glacial melt waters. Such deposits are only loosely packed with good drainage. They often comprise a large proportion of sand, pebbles and small, rounded blocks. The orientation of eskers indicates the direction of retreating glaciers. Though not numerous in the region, some eskers may be found in the Thoynard Lake area, along the tributaries of the Sukaliuk Creek, and west of the mouth of the André-Grenier River.

The moulin kame located upstream from the gorge leading to Lake Tasiguluk possess a typical cone shape and consist almost exclusively of pebbles. They stand roughly thirty metres high and were formed by sediment-laden glacial melt waters that sunk through cracks in the ice.

Proglacial deltas are located at the front of glaciers and are indicative of the base level of either a former lake or sea. They are sometimes associated with eskers or fluvioglacial outwash. Many proglacial deltas may be observed along the tributaries of the Koroc River. As their elevations are situated between 90 and 686 m, these deltas may correspond to former levels of the Koroc Glacial Lake or the D'Iberville Sea (see below).

KOROC GLACIAL LAKE

The rock steps and terraces created through wave erosion at elevations between 120 and 686 m during this lacustrine event still mark the valley walls of the region (Barnett, 1967, in Jansson, 2003; Barré and Lefebvre, 1985; Baron-Lafrenière, 2001, 2003).

Furthermore, as the level of this lake once reached an elevation of 686 m, an elevation that is greater than some of the Koroc River's tributaries and different valleys that drain towards Labrador (Palmer River–275 m, Nakvak Creek–305 m), it may be concluded that the lake was created because certain glaciers blocked the lake's outlets, preventing drainage through adjacent watersheds, at least at the beginning of this glacial lacustrine event.

The length and consistency of the rock steps situated at 300 m between Mount Haywood and Korluktok Falls and at 686 m around Lake Tasiguluk make these the most remarkable of all. The lowest rock steps observed were situated at an elevation of 120 m in the narrow valley of the Narsaaluk Creek, roughly forty kilometres from Ungava Bay (Barré and Lefebvre, 1985). The different levels of the Koroc Glacial Lake provide evidence that the lake drained in stages as the glaciers retreated from the valleys. The lake took the form of these valleys and was likely relatively deep. The areas covered by glacial lakes in Québec are shown in Figure 3.15.

The Koroc Glacial Lake was created when the continental ice sheet retreated to the south, west and northwest, while natural drainage towards Ungava Bay remained blocked. The lake would have filled the entire valley of the Koroc River upstream from the Narsaaluk Creek as well as a large portion of the Koroc's lesser valleys between 10 and 8 ka (Dyke and Prest, 1987). Jansson (2003) has proposed that the Lake Naskaupi still existed more recently (6 ka) and would have been joined with the Koroc Glacial Lake. According to Jansson's model, the ice that blocked the valley of the Koroc River derived from the dome that covered Ungava Bay and Hudson Strait, rather than from the Labrador Dome. Moreover, to the south of the Koroc River (Barnouin River and Mount Nuvulialuk area), Barré and Lefebvre (1985) have mapped rock steps associated with the Koroc Glacial Lake.

POST-GLACIAL STAGE AND THE D'IBERVILLE SEA

Once the continental ice sheet had retreated from the coast of Ungava Bay, the Atlantic Ocean invaded coastal regions and valleys that were still depressed as a result of the weight of the ice. This post-glacial marine phase is referred to as the D'Iberville Sea (Figure 3.15). Around Ungava Bay, traces of the level of the former sea diminish in elevation from west to east.

In the southeastern part of Ungava Bay, the onset of this marine transgression took place around 7.4 ka (Allard et al., 1989). In the estuary of the George River which is situated roughly thirty kilometres southwest of the study area, the sea reached an elevation of 100 m. In this area, several other former beaches have been identified between 96 and 4 m above current sea level.

At the mouth of the Koroc River, the former level of the D'Iberville Sea is situated at 95 m while along the coast in the study area (Lake Qarliik), the former level sits at 87 m. A little ways to the north, in the Weymouth Fjord, the former sea level is 62 m. Around Lake Qarliik, the former sea level corresponds to the upper boundary of a till wash-away zone (Lauriol et al., 1982, Allard et al., 1989). Where the till has been washed away, there are many rock outcroppings and blocks; grains of sand would have been swept away by sea currents to form beaches. Other evidence of the D'Iberville Sea along the coast are perched beaches and sand deposits at elevations below 75 m. The step-like presence of beaches suggests that the continent rebounded and sea levels rose at similar rates.

Along the lower section of the Koroc River, Barré and Lefebvre (1985) have mapped marine deposits west of the André-Grenier River to an elevation of approximately 90 m. The thickness of these deposits is estimated to be between 20 and 30 m, while their surfaces are remarkably flat, making them distinct from glacial and fluvioglacial deposits observable elsewhere in the study area. Near Kangiqsualujjuaq, the rate of isostatic rebound was rapid between 7.5 and 6 ka (roughly 75 m) before continuing more slowly until the present day towards the continent's original level, which is to say that that existed before the Wisconsin stage (Dyke and Prest, 1987; Allard et al., 1989). According to Mathieu's work (1983), the sea began to withdraw from the valley of the Koroc River around 5.2 ka.

The traces of post-glacial sea level that diminish in elevation from west to east have lead Allard et al. (1989) to write: "[. . .] the upwards inclination [. . .] towards the northeast along the east coast suggests that the glaciers that covered the Torngat Mountains during the Late Wisconsin possessed a relatively limited mass." In other words, the ice covering the Torngat Mountains was thinner than that covering central Québec, this part of the continent was less depressed by the weight of the ice, and the degree of isostatic rebound was less significant than in the southern or western parts of Ungava Bay. This interpretation in turn supports the hypothesis of nunataks.

ACTIVE GEOMORPHOLOGY AND RECENT DEPOSITS

Since the onset of deglaciation in the study area at the beginning of the Holocene epoch (10 ka), changes in landforms have been effected by the action of freezing and thawing, rivers, the sea, the wind and gravity (refer to Map 3.5).

Erosion scar, talus, rock glacier, blow-out basin and thermokarsts, upper Koroc River

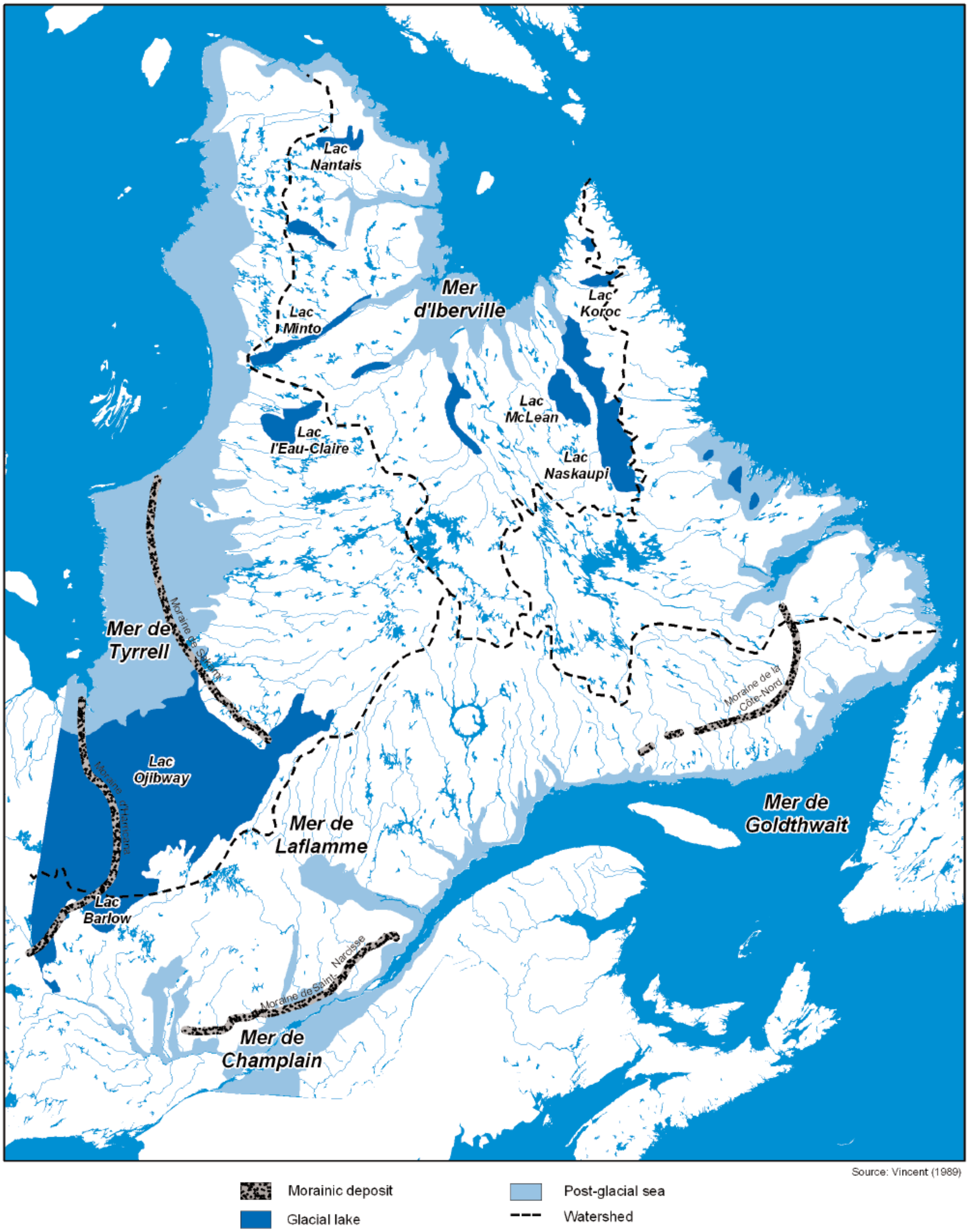


Figure 3.15 Marine and Lacustrine Regions

Periglacial Landforms

The periglacial landforms of the region continue to change to this day given the cold climate that prevails and the range of permafrost. Congelifracts are formed when rocks are broken apart by freeze-and-thaw action and may be found throughout the territory. They are of various sizes and angular in shape. They may comprise block fields, talus or other sorted congelifract formations (tundra ostiole and polygons).

Barré and Lefebvre (1985) describe summital block fields as glacial deposits that have been reworked by freeze-and-thaw action. Notwithstanding, as a result of the combination of surface phenomena observable today and the isostatic movements discussed above which suggest a relatively thin, not to say non-existent, and static layer of ice in the uplands, periglacial and alteration processes are likely to have created the block fields found on top of the peaks in the Torngat Mountains next to the Koroc River. The block fields shown on Map 3.5 correspond roughly to the peaks that may once have formed nunataks or that may have been covered by cold-based and static ice during the Late Wisconsin. On the other hand, the block fields found east of Lake Tasiguluk, on the Koroc River Plateau and in the lowlands were obviously derived from glaciers.

Rock glaciers are a mix of talus (congelifracts and colluvia) and ice that slowly slide down gentle gradients at the foot of steep walls. Rock glaciers are indicative of permafrost. They resemble rock lobes with visible ripples at a right angle to the direction of their flow. Barré and Lefebvre (1985) have mapped this phenomenon in the Torngat Mountains area, but it may also be found in the upper sections of the André-Grenier River and Naksarulak Creek. The rock glaciers found in the Mount D'Iberville cirque derive from the frontal moraines created by a local glacier that was still active as recently as a few centuries ago during the Little Ice Age.

Congelifract formations, such as stone circles as well as tundra ostioles and polygons, are widespread (Barré and Lefebvre, 1985, 1987). Congelifluction is the slow descent of loose fine matrix or sand deposits as a result of a freeze-and-thaw action over top of permafrost. This phenomenon forms a lobe or small terrace and may exist on slopes with gradients as low as 1%.

Palsa are found in peat bogs. They are tussocks containing ice lenses that may swell a few metres high. Eventually as they swell, the ice lenses crack open the tops of the tussocks and melt away with the next summer season. Palsa often form in groups and are not indicative of permafrost (Derruau, 1974). Palsa can develop in a single year or over decades. Palsa may be found along the upper section of the André-Grenier River, the lower section of the Koroc River and the coast.

In contrast, thermokarsts are small depressions that form in loose deposits with local melting of the permafrost. This phenomenon is observable in the uplands, on the terraces that border the Koroc River, and to the west of Mount Haywood.

Fluvial Landforms

Many alluvial fans may be found in the valleys and at the mouths of rivers in the study area. Some are also observable on the plateau where small tributaries with intermittent, but sometimes strong, currents rush down steep slopes. The largest fans likely began to form with the onset of deglaciation. The best examples are located in the valley of the Koroc River. Alluvial fans are formed where sediment-laden water from the plateau plunges into a valley before its speed decreases abruptly on the valley floor (base level). This reduction in flow obliges the water to deposit its sediment.

The vegetation that covers the alluvial fans indicates a certain slowing of this process. Nonetheless, where torrents have cut through ancient fans, block ridges next to the watercourses or small fans may be observed and are evidence of relatively recent action. Barré and Lefebvre (1985) have documented this phenomenon on their maps with a scale of 1:50,000. In addition, Lafortune et al. (August 2003) have mapped high-risk slush flow areas. These areas correspond to alluvial fans where the gradient is between 25 and 50% (refer to maps 3.4 and 3.5).

Stream terraces are created whenever a watercourse succeeds in cutting through loose deposit or bedrock. This process has been active in the study area since the onset of deglaciation and the draining of the Koroc Glacial Lake. Terrace tops are flat and the side slopes steep. Rivers wear away the loose deposit or bedrock, carrying the sediment (alluvia) downstream. The finest examples of this phenomenon may be found along the upper and lower sections of the Koroc River and at the mouth of the André-Grenier River. Terraces indicate former river levels.

Watercourses are active at the mouths of the main tributaries of the Koroc River or in gorges marked by sharp nick points where they join the main valley. At these points, watercourses plunge like torrents to carve their beds through loose deposit or bedrock. They may carry large volumes of loose deposit to create alluvial fans. Notwithstanding, the major erosion phases of the rivers in the study area have been replaced by sand silting. Finally, a number of cut-off meanders mark the former course of the Koroc River.

Wind Landforms

Wind landforms include dunes (accumulations) and blow-out basins (erosion). In the study area, the wind has reworked fluvial and fluvioglacial sand deposits (Barré and Levebvre, 1985). Along the upper section of the Koroc River, the most-developed examples of this phenomenon are oriented towards the east, which is indicative of strong west winds. Downstream, dunes are oriented towards the west, which is indicative of strong east winds. Study of these dunes demonstrates that they have been developing for thousands of years and that they are still active (Mathieu, 1983; Baron-Lafrenière, 2003). In the western portion of the main valley, sand dunes are progressively encroaching on adjacent vegetation.

Gravity

Talus or avalanche scars represent past and present evidence of topographical degradation. They are produced by congelifraction and gravity (which cause the material to fall) along escarpment fractures. Escarpments are most numerous in the Labrador Uplands and along the edge of the Koroc River Plateau. The deposits that collect at the foot of these slopes form fans or talus. Examples of this phenomenon are situated at the mouth of the André-Grenier River and on the east slope of the lower section of the Sukaliuk Creek. The risk of avalanche is high on slopes with gradients greater than 50%, which is the case for the walls of glacial valleys (Lafortune et al., 2003; refer to Map 3.4).

Ice Action

The action of floating ice occurs along the coast in the intertidal zone and inland along the shorelines of lakes and other watercourses. The action of ice feet or floating ice shapes these shorelines and loose deposits, producing alignments of boulders, pebbles and fine gravel or other typical accumulations. An interesting and active phenomenon generated by the tides and sea ice is the shifting and accumulation of blocks in intertidal zones (ice-rafted blocks).

CLIMATIC VARIATIONS DURING THE HOLOCENE EPOCH

On many occasions over the last two million years (period of major glaciation), Canada has been invaded by immense ice sheets. The last ice mass that covered Nunavik only completely disappeared from central Québec roughly 6000 years ago (Dyke and Prest, 1987). In the Northern hemisphere, climatic periods both warmer and colder than those today occurred during the Holocene epoch (which began in 10 ka) with the onset of deglaciation (O'Brien et al., 1995).

Current climatic conditions will change with climatic warming, affecting especially Northern regions (GIEC, 2001; Lafortune et al., 2004). The climate of Nunavik is unlikely to be the same in 50 or 100 years (Scott and Suffling, 2000).

Former Climates

On the one hand, climatic reconstructions based on ice samples on Devon Island and in Greenland where climatic variations are similar to Nunavik suggest that the climate that existed following deglaciation reached its warmest point roughly 5000 before present (BP) (Paterson et al., 1977; Dahl-Jensen et al., 1998). This epoch, which is known as the Climatic Optimum (or Hypsithermal), was characterized by annual average temperatures 2.5°C warmer than those that occur today (Dahl-Jensen et al., 1998).

On the other hand, climatic reconstructions based on pollen found in sediment from several Nunavik lakes suggest that temperatures during the Climatic Optimum were more favourable than during deglaciation, but cooler than those of the 20th century (Webb III et al., 1998). Subsequently, the warming trend halted and temperatures cooled beginning 4000 years ago with the onset of the Neoglacial (Filion et al., 1991; Dahl-Jensen et al., 1998; Kasper and Allard, 2001). According to pollen analysis and changes in vegetation, Mathieu (1983) has also demonstrated climatic oscillations in the valley of the Koroc River throughout this period.

Roughly 1000 years ago (which is to say 1000 CE), a favourable climate known as the Medieval Warm Epoch temporarily interrupted this cooling trend, generating temperatures that were slightly warmer than those recorded in the 20th century. (Arseneault and Payette, 1997; Dahl-Jensen et al., 1998). Following this episode, the cooling trend prevailed from the 16th to the 19th century (Payette et al., 1985; D'Arrigo et al., 2003). This cool period is marked by very thin annual growth rings in white spruce in Labrador and black spruce in Nunavik along the tree line. Towards the middle of the 19th century, temperatures began to rise to mark the end of the Little Ice Age.

While the entire Northern hemisphere warmed following the Little Ice Age, temperatures in the Ungava region were cool between 1950 and the beginning of the 1990s (Allard et al., 1995). Since 1993 however, the region has experienced a rapid increase in annual average temperatures and Nunavik now seems to be in step with the warming trend observable in the rest of northern Canada (Allard et al., 2002). Forecasts for the 21st century show a continuation of this trend. Average annual daytime temperatures (8 a.m. to 6 p.m.) recorded in Kangiqsualujjuaq between 1990 and 2003 are shown below (°C).

1990	1991	1992	1993	1994	1995	1996
-5.2	-5.2	-6.6	-5.1	-4.9	-3.4	-3.2

1997	1998	1999	2000	2001	2002	2003
-4.4	-1.7	-1.8	-3.0	-2.1	-5.0	-2.4

Future Climates

The latest climatic models forecast an increase of 2 to 4°C in average temperatures in Québec–Labrador by 2050 (Scott and Suffling, 2000). Climatic warming will be more noticeable in winter than in summer and more pronounced in Nunavik than in Labrador.

According to these models, average summer and winter temperatures in the study area could rise by as much as 4°C between now and 2050. They could rise by as much as 6°C in summer and 8°C in winter between now and 2090 (Scott and Suffling, 2000). These significant increases will bear directly on the ability of species to adapt and the range of permafrost. Impacts on ecological integrity will be strong and must be taken into consideration in relation to conservation and park development in Nunavik, since Northern regions are most vulnerable to climatic change (GIEC, 2001). The range of Northern biomes (tundra and forest tundra) may shrink; a 5 to 15% reduction of tundra area within the boundaries of Canada's national parks has been forecast by Scott et al. (2002). The creation of new parks in Nunavik should therefore contemplate these fragile biomes.

Mount D'Iberville Cirque

The glacial map prepared by Prest et al. (Geological Survey of Canada, 1970) identified the cirque located on the Québec-side of Mount D'Iberville as a glacier or an area of perennial snow. More recently, Barré and Lefebvre (1985, 1987) began to designate this glacier as Solo Glacier (unofficial name) and identified it as the only active glacier in Québec. On the east side of Mount D'Iberville (Labrador), there are glacial cirques that appear to be retreating (the edge of the ice is far from associated moraines – observations made from the summit of Mount D'Iberville and using aerial photographs). The cirque on the Québec-side faces the sun (south-southwest) and the microclimate is warmer than to the east in Labrador. Further glacial cirque analysis could provide more information on local climate variation.

In the area around the Mount D'Iberville cirque lake, ridges of blocks and pebbles were created by a glacial cirque, very likely following the major glaciation of the Holocene epoch. Knowledge of this area and the climatic history of the Northern hemisphere in general and of Québec in particular suggest that this glacier would have been active in the early part of the Neoglacial that began 4000 years ago as concerns the ridge located downstream from the lake, and during the Little Ice Age (from 1550 to 1850 CE) as concerns the ridge located upstream from the lake. Measurements of certain rock surfaces that were recorded in the summer of 2004 with respect to minerals (cosmogony) and lichens (lichenometry) could provide relatively accurate dates of the creation of local moraines and final glacial movements (work in progress).

As well, aerial photographs taken in July 1950, September 1964 and August 1979 (National Air Photo Library) as well as observations made by Barré and Lefebvre (1987) show the floor of the cirque covered in snow. On the other hand, observations made in September 2003 further to this study showed that the glacier (or perennial snow) on the floor of the cirque had completely disappeared, exposing blocks and pebbles. Subsequent visits to the site in the summer and fall of 2004 showed that the floor of the cirque was again covered with a layer of snow. It is therefore possible to confirm that, within the study area, there is no glacial cirque at the foot of Mount D'Iberville. Rather, a layer of snow sometimes lingers for more than a year and may be described as a névé.

The presence of lichen on blocks and the steep gradient of the morainic ripples that form the periphery of the cirque lake would suggest that these moraines advance a few centimetres every year and that they form rock glaciers, which is to say sliding masses of blocks and pebbles with ice cores. In order to test this hypothesis and measure block movement, if it exists, roughly 20 blocks were surveyed in August 2004. Follow-up to the observations and measurements made in 2003 and 2004 should be carried out regularly to record changes at this location.

Hydrography

The proposed park, which has an area of 4274 km^2, covers the entire Koroc River watershed with the exception of the

Mount D'Iberville cirque, perennial snow and neoglacial moraines mouth of the river (79 km^2) where it flows through lands classified as Category I under the *James Bay and Northern Québec Agreement*. In the western part of the study area, the waters of the coastal drainage area flow directly into Ungava Bay. All the waters in the study area flow from east to west, emptying into Ungava Bay which, in the north, adjoins the Hudson Strait and the Labrador Sea (Atlantic Ocean). Refer to Map 3.6.

WATERSHEDS

The Koroc River watershed covers a total area of 4011 km^2 and is almost completely comprised within the proposed park (3932 km^2 or 98%). The Koroc River watershed includes five lesser watersheds the largest of which are the Sukaliuk Creek watershed (659 km^2) and the André-Grenier River watershed (640 km^2). Refer to Table 3.8. The Ungava Bay drainage area (342 km^2) does not flow into the Koroc River. The coastline of this drainage area totals 160 km.

The Koroc River, which forms in the Labrador Uplands, is the main river in the study area and runs a total distance of 166 km; 151 km of the River fall within the proposed park. With respect to length, the Koroc River is followed in importance by the Sukaliuk Creek (58 km) and the André-Grenier River (52 km).

DRAINAGE PATTERNS

Within the proposed park, drainage patterns are angular and rectilinear due to the region's structural valleys (Barré and Lefebvre, 1985, 1987). Such patterns are not unusual in regions formed by metamorphic rock with extensive orthogonal systems of faults or fractures (Gagnon, 1974). In such cases, water drains along the fractures in the bedrock.

Throughout the study area, drainage patterns are marked by numerous, small watersheds that empty into larger ones. Valleys and rivers may change direction suddenly, which is to say at right angles (Map 3.7). As well and to a large extent, these patterns correspond to the units described in the earlier section on the physiography of the study area.

In the Labrador Uplands (eastern part of the study area), the drainage pattern has a rectangular-lattice form (Barré and Lefebvre, 1985, 1987). The Koroc River has many small tributaries. These tributaries flow either to the north or the south and feed the Koroc River which flows from east to west.

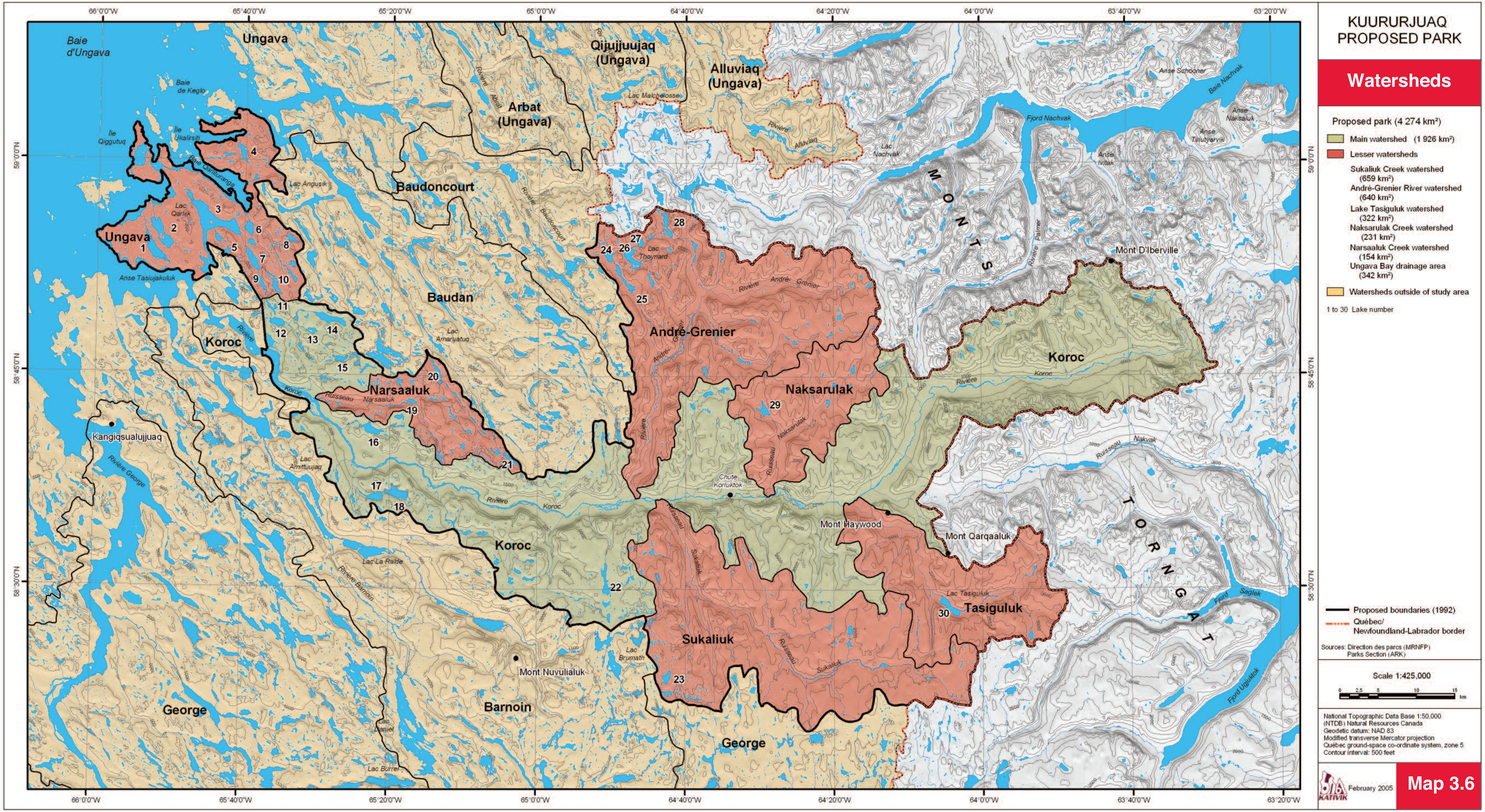
Throughout the Koroc River Plateau (central part of the study area), lattice patterns are present in the watersheds of the main river's tributaries. Notwithstanding, when contemplating the entire Plateau, the drainage pattern may better be described as dendritic (Baron-Lafrenière, 2001). This type of drainage pattern is characterized by many branches (like a tree) which are lesser watercourses on their way to the main river. The angular pattern evolves into a dendritic pattern (Gagnon, 1974). As well on closer inspection, it may be noted that lesser watersheds are divided into smaller sub-watersheds.

In the Ungava Lowlands (western part of the study area), the gentle gradient and many lakes create a disorderly drainage pattern (Barré and Lefebvre, 1985). This pattern is characterized by parallel organization due to southeast–northwest structural orientations and the placement of rocks that control the flow of water.

On closer inspection, watercourses meander as a result of the gentle gradient of the valley floors and the presence of loose deposits. In addition, the Koroc River sometimes possesses anastomotic channels (its upper section, above and below the Korluktok Falls, and its lower section). The weak current forces the River to abandon much of the sediment it is carrying and causes the formation of reaches. Finally, alluvial fans often possess splitting patterns, which is to say a watercourse flowing from a lesser valley can eventually divide into several

Table 3.8 River Watersheds and Distances

WATERSHED	WATERSHED AREA (KM^2)	RIVER LENGTH (KM)
Koroc River	1 926	151 (within park)
Sukaliuk Creek	659	58
André-Grenier River	640	52
Lake Tasiguluk	322	42
Naksarulak Creek	231	29
Narsaaluk Creek	154	22
Ungava Bay	342	160 (coastline)


KUURURJUAQ PROPOSED PARK
Watersheds
Proposed park (4 274 km²)
Main watershed (1 926 km²)
Lesser watersheds
Sukaliuk Creek watershed (659 km²)
André-Grenier River watershed (640 km²)
Lake Tasiguluk watershed (322 km²)
Naksarulak Creek watershed (231 km²)
Narsaaluk Creek watershed (154 km²)
Ungava Bay drainage area (342 km²)
Watersheds outside of study area
1 to 30 Lake number
Proposed boundaries (1992)
Québec/ Newfoundland-Labrador border
Sources: Direction des parcs (MRNFP) Parks Section (ARK)
Scale 1:425,000
0 2.5 5 10 15 km
National Topographic Data Base 1:50,000 (NTDB) Natural Resources Canada
Geodetic datum: NAD 83
Modified transverse Mercator projection
Québec ground-space co-ordinate system, zone 5
Contour interval: 500 feet
KATIVIK
February 2005
Map 3.6
Baie d'Ungava
Ungava
Qijujjuujaq (Ungava)
Alluviaq (Ungava)
Arbat (Ungava)
Baudoncourt
Baudan
Koroc
Narsaaluk
André-Grenier
Naksarulak
Sukaliuk
Tasiguluk
George
Barnoin
Kangiqsualujjuaq
Mont D'Iberville
Mont Haywood
Mont Qarqaaluk
Mont Nuvulialuk
Chute Korluktok
Lac Tasiguluk
Fjord Nachvak
Baie Nachvak
Fjord Saglek
Fjord Ugjuktok
MONTS TORNGAT
Rivière Koroc
Rivière George


KUURURJUAQ PROPOSED PARK
Drainage Patterns
Disorderly pattern with parallel tendency
Dendritic pattern
Rectangular-lattice pattern
Proposed boundaries (1992)
Québec/ Newfoundland-Labrador border
Sources : Barré and Lefebvre (1985) Baron-Lafrenière (2001)
Scale 1:425,000
National Topographic Data Base 1:50,000 (NTDB) Natural Resources Canada
Geodetic datum: NAD 83
Modified transverse Mercator projection
Québec ground-space co-ordinate system, zone 5
KATIVIK
February 2005
Map 3.7
Baie d'Ungava
Baie de Keglo
Lac Malcheflosse
Lac Nachvak
MONTS TORNGAT
Fjord Nachvak
Anse Schooner
Baie Nachvak
Mont D'Iberville
Lac Angusik
Anse Tasiujakuluk
Lac Amaruatuq
Kangiqsualujjuaq
Rivière George
Lac Amittuujaq
Chute Korluktok
Mont Haywood
Mont Qarqaaluk
Lac Tasiguluk
Lac La Ralde
Rivière Barnoin
Mont Nuvulialuk
Lac Brumath
Lac Daniel
Lac Burrel
Fjord Saglek
Fjord Ugjuktok
66°0'0"W
65°40'0"W
65°20'0"W
65°0'0"W
64°40'0"W
64°20'0"W
64°0'0"W
63°40'0"W
63°20'0"W
59°0'0"N
58°45'0"N
58°30'0"N

branches on reaching an alluvial fan. Examples of this phenomenon may be found at the mouths of the André-Grenier River and the Sukaliuk Creek, tributaries of the Koroc River.

LAKES

Close to 6700 bodies of water of all sizes are present in the study area. The area covered by any one lake is generally limited, rarely exceeding 300 ha (3 km^2). Refer to Table 3.9. Together, these lakes occupy 151.6 km^2, resulting in an overall hydric cover (ratio of water cover to land cover) of roughly 3.5%.

Analysis of the distribution of lakes demonstrates that hydric cover is much higher in the Ungava Lowlands (11.2%) than in the Labrador Uplands (1.09%) or over the Koroc River Plateau (2.3%). The absence of large lakes in the Labrador Uplands is one cause of the modest volume of water along the upper section of the Koroc River, east of Mount Haywood. The River's modest volume is also tied to the proportion of rain compared with snow and the presence of continuous permafrost in the uplands.

Only a few lakes in the study area possess names. These are Lake Qarliik (1565 ha) near the coast, Lake Thoynard (284 ha) in the central northern part of the proposed park (André-Grenier River) and Lake Tasiguluk (248 ha) in the southeastern part of the territory. The areas of the 30 largest lakes in the study area have been calculated and are shown in Table 3.9.

Lakes in the study area often have elongated forms (reflecting the rock structure) and irregular shorelines (due to the presence of surface deposits). In this respect, it should be noted that the outlets of many lakes in the study area are damned by loose deposit.

COASTAL CURRENTS AND TIDES

All the waters of the study area drain into Ungava Bay. Generally speaking, currents in the Bay flow from west to east (counter-clockwise, Dunbar, 1966).

Rectilinear valley of the Narsaaluk Creek

According to Dohler (1966), tidal ranges increase from north to south along the western coast of Ungava Bay and from south to north along the eastern coast. Along the southwest shore of Ungava Bay, the tides of Leaf Bay (Tasiujaq) regularly exceed 15 m and may reach 17 m, which makes them the highest tides in the world (Canadian Hydrographic Service, 1983).

Average tidal ranges are 8.5 m at the mouth of the Koroc River and 8.2 m in Keglo Bay located roughly 20 km to the north. Along the eastern shores of Ungava Bay, currents flow from the south-southwest towards the north-northeast at an annual average speed of six to eight nautical miles per day (Gouvernement du Québec, 1983).

The average temperature of the waters in this area of Ungava Bay is roughly 5°C. In the estuaries, water salinity, depth and temperature vary greatly. In addition, there is a high concentration of nutritious foods, which makes these diversified biological environments essential to the subsistence activities of Inuit (KRG, 1998).

Table 3.9 Lakes and Percentage of Hydric Cover

PHYSIOGRAPHIC UNIT	LAKE NO.	AREA (HA)
Ungava Lowlands	1	398
No. of lakes: 2 730**	2	463
Total area of lakes: 78.6 km^2	3 – Qarliik	1 566
Hydric cover: 11.2 %	4	147
	5	81
	6	152
	7	208
	8	76
	9	104
	10	155
	11	76
	12	165
	13	68
	14	306
	15	100
	16	214
	17	183
	18	286
	19	92
Koroc River Plateau	20	103
No. of lakes: 3697	21	84
Total area of lakes: 64.9 km^2	22	239
Hydric cover: 2.3%	23	118
	24	111
	25	186
	26 – Thoynard	284
	27	85
	28	113
	29	142
Labrador Uplands	30 – Tasiguluk	248
No. of lakes: 289		
Total area of lakes: 8.1 km^2		
Hydric cover: 1.09%		
TOTAL (study area)		
No. of lakes: 6700		
Total area of lakes: 151.6 km^2		
Hydric cover: 3.5%		

* Lake numbers and locations are indicated on Map 3.6

** Lakes and their areas were identified using maps with a scale of 1:20,000


Irregular coastline of Ungava Bay and ice-rafted blocks

4 BIOLOGICAL ENVIRONMENT

Despite its northerly latitude, the territory of the proposed park possesses a wide range of ecosystems, wildlife habitats, as well as animal and plant species. The proposed park's proximity to the sea, its topography, its altitude, the orientation of its valleys and its geology foster this diversity. From the mouth of the Koroc River to its source in the Torngat Mountains, there is a progression of distinct environments: a coastal environment with a jagged shoreline and sprinkling of islands that is influenced by pure sea water in places and water of variable salinity in other places; a dense forest environment dominated by coniferous trees through the valley of the Koroc River; and a vast, open tundra environment situated at higher elevations of the Koroc River Plateau and in the Torngat Mountains. The proposed park's aquatic habitats include a marine environment, the Koroc River and its tributaries (including waterfalls, rapids and creeks), as well as a major lake (Tasiguluk) and a number of oligotrophic lakes. The proposed park's wetland environments, represented by peatland and ponds, while not overly abundant, are situated especially along the downstream section of the Koroc River.

Few studies concerning the proposed park's biological environment have ever been conducted. Those that do exist focus on areas adjacent to the Koroc River and concern, among other things, flora, arctic char and avian species, or (if they extend a little further afield) the caribou herds of the George River and the Torngat Mountains. In order to further knowledge about the proposed park, fieldwork was carried out in the summer of 2003.

Vegetation

The first botanical specimens from the region were collected in 1811 during an initial expedition carried out by two Moravian missionaries, Kohlmeister and Kmoch. Their recorded observations concern the flora and wildlife of the Ungava coast. Although the two missionaries did not ascend the Koroc River, they did enter the George River, travelling only as far upstream as Kangiqsualujjuaq (Kohlmeister and Kmoch, 1814).

Subsequently, the botanist Jacques Rousseau studied the flora in what would become the territory of the proposed park during expeditions to Ungava Bay in 1947, 1948 and 1951. During his 1951 expedition, Rousseau's work was focussed in the valley of the Koroc River. Close to 800 specimens of vascular plants and 80 specimens of bryophytes were collected (Rousseau, 1953). Another expedition carried out in 1973 along the downstream section of the Koroc River permitted the collection of more than 50 vascular plant specimens (Ouellet, 1978).

Finally, fieldwork completed between July 14 and 26, 2003, permitted further investigation into the flora of the territory of the proposed park. Specimens were collected from the greatest possible diversity of areas and habitats situated in each of the territory's three major physiographic units (Dignard, 2004; Despont, 2004).

VEGETATION ZONES

Due to its geographical size and successive climatic zones (Figure 3.6), Québec comprises several plant formations that are more or less homogeneous in terms of their structure and composition. From the south of the province to the north, there exists the deciduous forest, the mixed-wood forest, the boreal coniferous forest and the arctic tundra (Figure 4.1).

Canoe on the Koroc River roughly 22 miles from Ungava Bay, July 26, 1951.
Credit: Jacques Rousseau
Courtesy of the archives branch at the Université Laval (DAUL), P/174/B,173 (A-VIII-12)

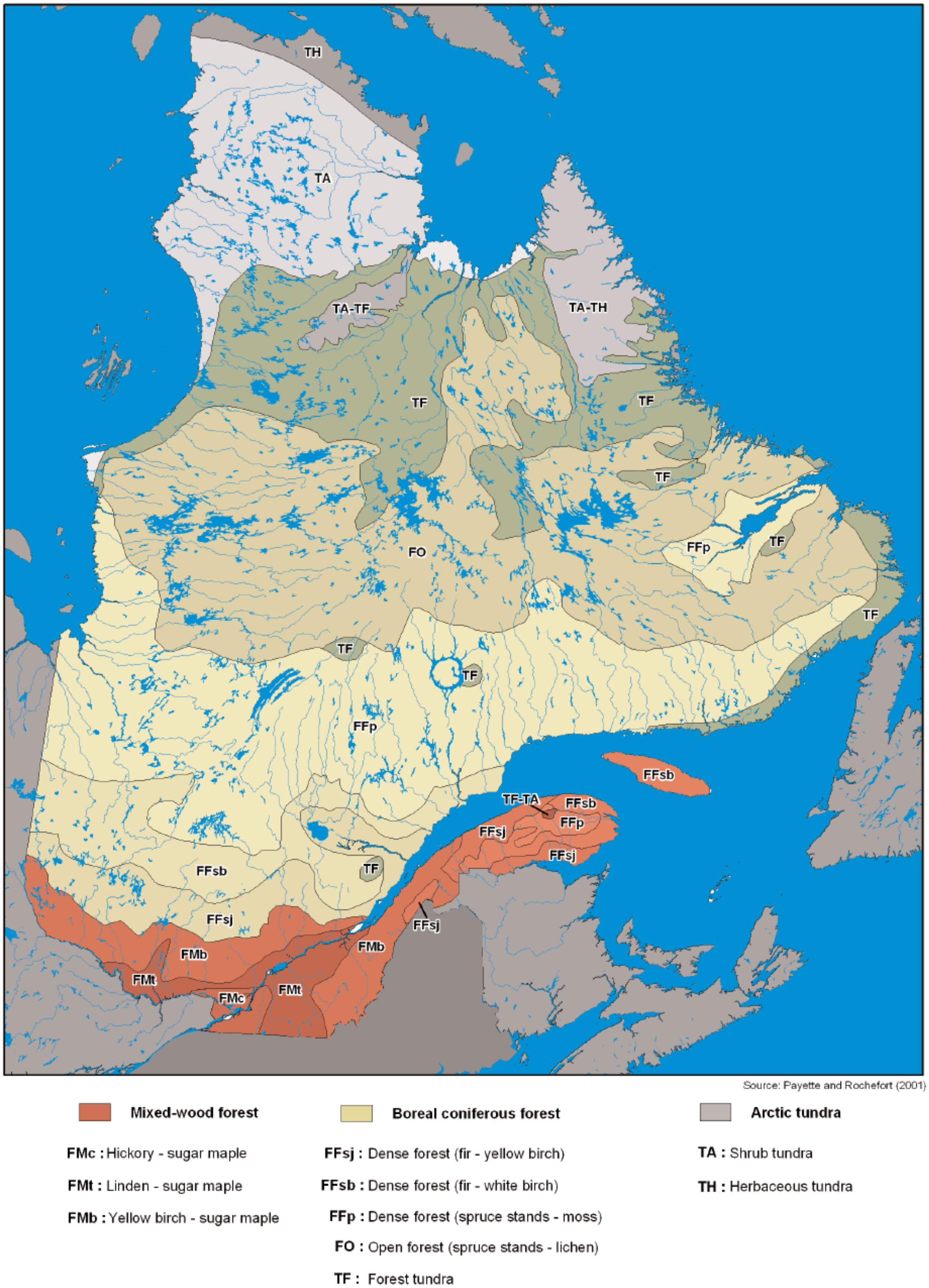


Figure 4.1 Major Vegetation Zones in Québec and Labrador

The territory of the proposed park straddles two vegetation zones: forest tundra and arctic tundra. Forest tundra marks the transition between the open boreal forest, or taiga, and the arctic tundra. It is identifiable by the presence of continuous forest stands situated in sheltered areas, such as valleys, and by predominantly boreal vascular plants (Payette, 1983; Lavoie and Payette, 1996). For its part, the arctic tundra zone is characterized by the absence of trees. Based on elevation or latitude, the predominant plant species may be lichen and shrubs (known as shrub tundra) or herbaceous plants (especially grass and sedge) and a few shrubs. In this latter case, the tundra is described as herbaceous.

MAJOR PLANT GROUPS

The vegetation found throughout the territory of the proposed park may be characterized mainly as arctic-alpine with increasing numbers of boreal elements closer to sheltered valley habitats. A basic classification of the major plant groups in the proposed park was established using satellite images (Table 4.1 and Map 4.1). The distribution of the major plant groups according to elevation is easily observable. Forest tundra prevails in the valley of the Koroc River all the way upstream to Mount Haywood, as well as along the downstream sections of the Koroc's main tributaries, including the André-Grenier River and the Sukaliuk and Naksarulak creeks. Tree stands peter out east of Mount Haywood (at approximately 150 m in elevation) to be replaced by shrub tundra and then herbaceous tundra. Along the valley slopes, this transition occurs more rapidly. The tops of steep slopes, as well as mountain and plateau summits, are generally barren or they may possess discontinuous moss cover and a few herbaceous plants. Map 4.1 shows that arctic tundra vegetation is clearly predominant throughout the study area.

Each major plant group is distinguishable by the preponderance of species of a particular stratum and each has a distinctive appearance. These groups occur in accordance with elevation, soil type and exposure to winds (Figures 4.2 to 4.7). The study area comprises five main groups: moss, herbaceous vegetation, low-growing scrubland, high-growing scrubland and tree vegetation.

With respect to **moss vegetation** (represented by the 'moss' and 'barren' categories shown on Map 4.1), *Rhacomitrium lanuginosum* is an important grouping on mountain summits, at higher elevations over plateaux, and along the upper portions of slopes, in places where surface flow occurs. Above 500 m, this moss may be found on rock outcroppings and felsenmeere along with epilithic lichen (crustaceous and foliose lichen) and the occasional bryophyte. At lower elevations, moss cover is greater and communities are more diverse with fructicose lichen, herbaceous plants and low-growing shrubs. It may also be noted that on a cliff terrace located at Mount Haywood, a lichen vegetation comprising *Cladonia* spp. and herbaceous plants was identified. The inaccessibility of the location has no doubt served to protect this lichen vegetation (with fructicose lichen) from caribou; this type of vegetation appears to be rare in the study area. Indeed, lichen vegetation in the shrub and forest tundra zones of the study area, with the exception of its downstream sector, has been subjected to considerable grazing (Morneau, 1999).

In the valleys of the study area, overtop of well-drained till and alluvial deposits, **low-growing scrubland** may be found (represented by the 'moss' category shown on Map 4.1). This vegetation cover is more or less continuous over these coarse deposits that are often exposed to the wind. It includes typical arctic-alpine groupings with many shrubs (*Salix uva-ursi*, *Diapensia lapponica*, *Silene acaulis*, *Ledum lacustre*, *Cassiope tetragona*, etc.) along with a sprinkling of grass and sedge (*Carex bigelowii*, *Anthoxanthum monticolum*) and a few herbaceous plants (*Pedicularis lapponica*, *Cerastium alpinum*, *Oxytropis campestris*).

Overtop of finer deposits and in valley wetland environments in the study area, **herbaceous vegetation** prevails. These communities are dominated by *Eriophorum angustifolium*, combined with *Carex* in flooded areas (*Carex aquatilis*) and, on dry tussocks, a few shrubs such as scrub birch and northern willow (*Betula glandulosa, Salix glauca*). Well-drained and often unstable areas are covered with sedge (*Carex bigelowii*, *Carex* sp.), typical grasses (*Poa arctica, Festuca brachyphylla*) and a few shrubs (*Arctostaphylos alpina, Silene acaulis*).

In the western section of the Koroc River valley, on slopes that are below 300 m, **high-growing scrubland** prevails. This vegetation covers most types of deposits, including talus, till, river alluvia and stabilized fluvioglacial deposits. Communities are dominated by scrub birch (*Betula glandulosa*), although green alder (*Alnus viridis* subsp. *crispa*) is more frequent closer to Ungava Bay, becoming predominant in the extreme western part of the study area. On low, wet slopes and flats, willows (*Salix glauca, Salix argyrocarpa, Salix planifolia*) prevail along with *Alnus viridis*. Shrubs provide almost continuous cover, leaving little room for herbaceous plants, although through clearings in the shrubs it is possible to observe *Solidago macrophylla* and *Rubus chamaemorus* along with *Dicranum* sp. and *Cladonia* spp.

Tree vegetation (represented by the 'spruce stands' category shown on Map 4.1) is frequent in flat valley areas below 200 m in elevation. This vegetation covers all types of deposits:

Table 4.1 Description of Elements appearing on Map 4.1

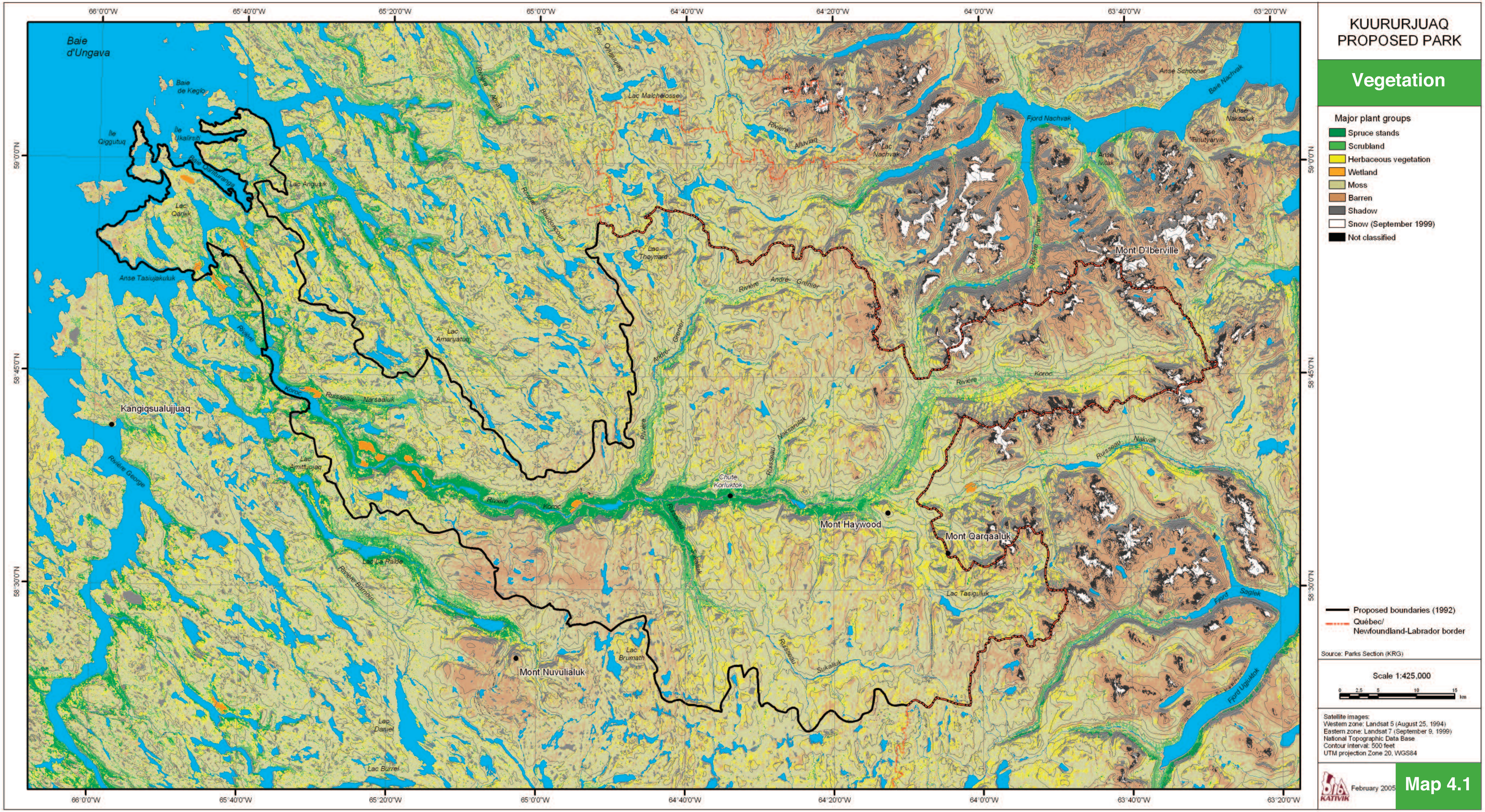
ELEMENT	DESCRIPTION
Spruce stands	Stands of spruce with varying coverage of tamarack, shrubs, herbaceous plants, moss and lichen.
Scrubland	Shrub vegetation comprising *Betula glandulosa* with varying coverage of other shrubs (such as *Salix* spp.), herbaceous plant, moss and lichen.
Herbaceous vegetation	Herbaceous vegetation dominated by sedge or grass, with varying coverage of shrubs, moss and lichen.
Moss	Moss vegetation with varying coverage of moss or lichen, herbaceous plants, and low-growing or other shrubs (such as *Betula glandulosa*)
Barren	Area where more than 75% of the ground is without vegetation (sand, stones or rocks) and with varying coverage of moss, lichen, herbaceous plants and low-growing shrubs. May possess major crustaceous lichen coverage.
Wetland	Fen; minerotrophic peatland.
Shadow	Areas hidden by shadow.
Not classified	Pixels that were not classified by analysis software

moderately drained colluvia and alluvia, as well as well-drained stream terraces. Tree vegetation is generally dominated by black spruce (*Picea mariana*) with varying proportions of tamarack (*Larix laricina*). Most of the tree stands visited appeared to be relatively old. Dominant trees have a diameter of between 20 and 25 cm and stand between 8 and 12 m high. Some tamarack may have a diameter of as much as 35 cm at breast height (dbh). The regeneration of spruce is assured by layering. Those areas that are more open possess a higher proportion of shrubs, in particular *Betula glandulosa* and *Salix glauca*. Herbaceous plants, represented by a few boreal species typical to this area such as *Ledum groenlandicum*, *Rubus chamaemorus* and *Solidago macrophylla*, are not very significant. Moss is generally more developed with *Cladonia* spp. in well-drained areas and hypnaceous mosses (*Pleurozium schreberi*, *Ptilium crista-castrensis*) in wetter areas.

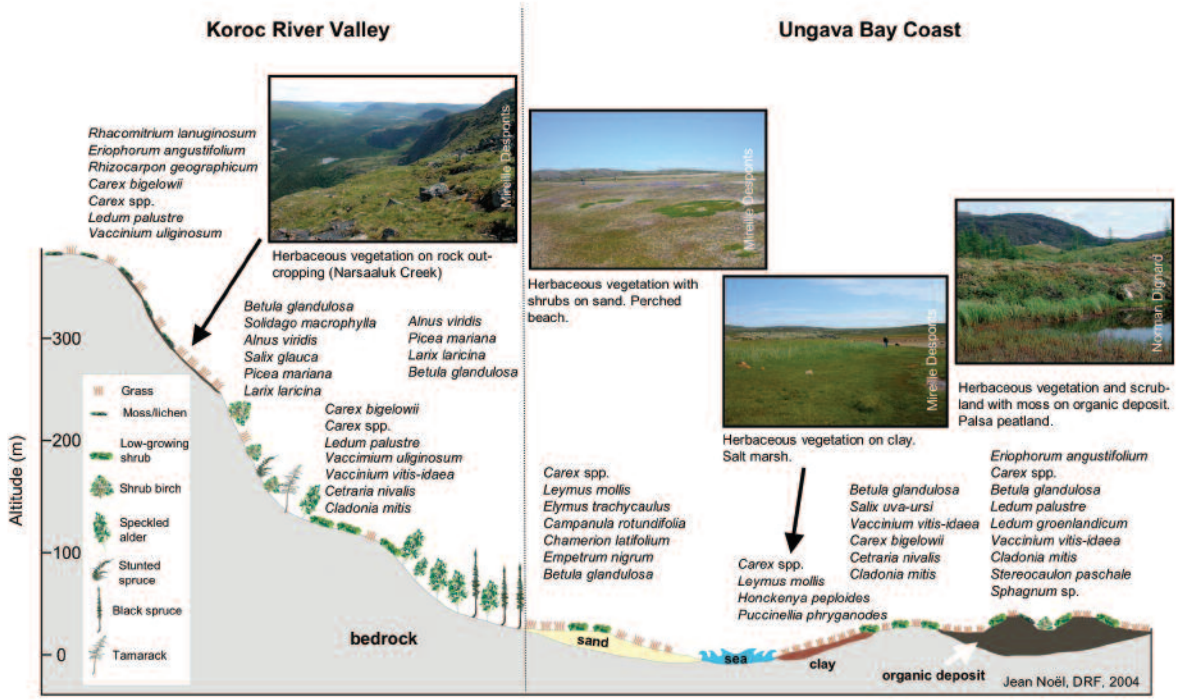
Cotton grass (*Eriophorum angustifolium*) in full bloom

A small stand of white birch (*Betula papyrifera*), pointed out by local residents and identified by Rousseau in 1951 (Rousseau, 1953), is situated near the river on a rocky, south-facing slope. This site stands on the edge of the Ungava Lowlands, at less than 100 m in elevation. These white birch may be the remnants of a period when birch were more frequent in the valley (Rousseau, 1953). It was estimated that this stand totals no more than 200 trees (Desponts, 2004), while Rousseau (1953) counted 70 back in 1951. The stand has therefore expanded and, furthermore, represents the most northerly stand of white birch known to exist in Québec. The largest trees have a diameter of 25 cm, but it was also noted that the upper most branches of these dominant trees are often damaged. Most of the trees that make up the stand are clump shoots; however a significant number of seedlings of all ages were also observed, suggesting healthy regeneration. Where there are clearings in the tree cover, it was observed that the understory is covered thickly with leaves as well as several herbaceous plants, such as *Solidago macrophylla*, *Ledum groenlandicum, Trientalis borealis, Cornus canadensis*, *Dryopteris* spp., *Streptopus* sp., *Alnus viridis* subsp. *crispa* and *Sorbus decora*.

The wetland environments of the study area are largely made up of fens (minerotrophic peatland). Their small size, however, means that they do not all appear on Map 4.1. Their development

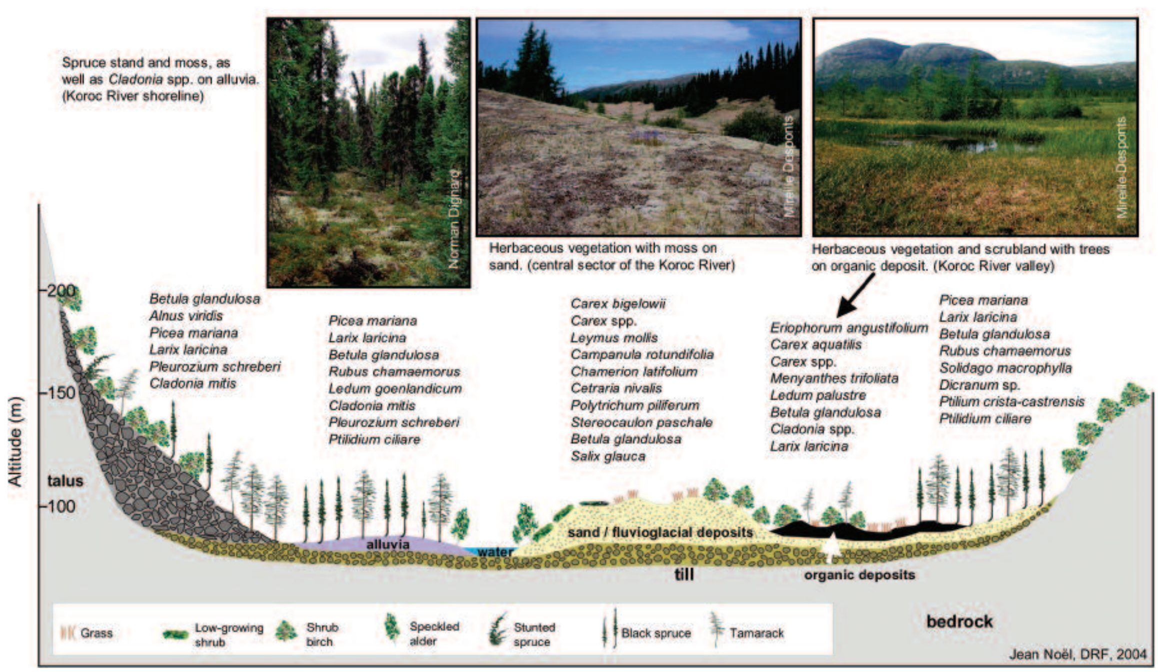


KUURURJUAQ PROPOSED PARK
Vegetation
Major plant groups
Spruce stands
Scrubland
Herbaceous vegetation
Wetland
Moss
Barren
Shadow
Snow (September 1999)
Not classified
Proposed boundaries (1992)
Québec/ Newfoundland-Labrador border
Source: Parks Section (KRG)
Scale 1:425,000
0 2.5 5 10 15 km
Satellite images:
Western zone: Landsat 5 (August 25, 1994)
Eastern zone: Landsat 7 (September 9, 1999)
National Topographic Data Base
Contour interval: 500 feet
UTM projection Zone 20, WGS84
KATIVIK
February 2005
Map 4.1
Baie d'Ungava
Kangiqsualujjuaq
Mont D'Iberville
Mont Haywood
Mont Qarqaaluk
Mont Nuvulialuk
Chute Korluktok
Lac Tasiguluk
Fjord Nachvak
Fjord Saglek
Rivière Koroc
Rivière George



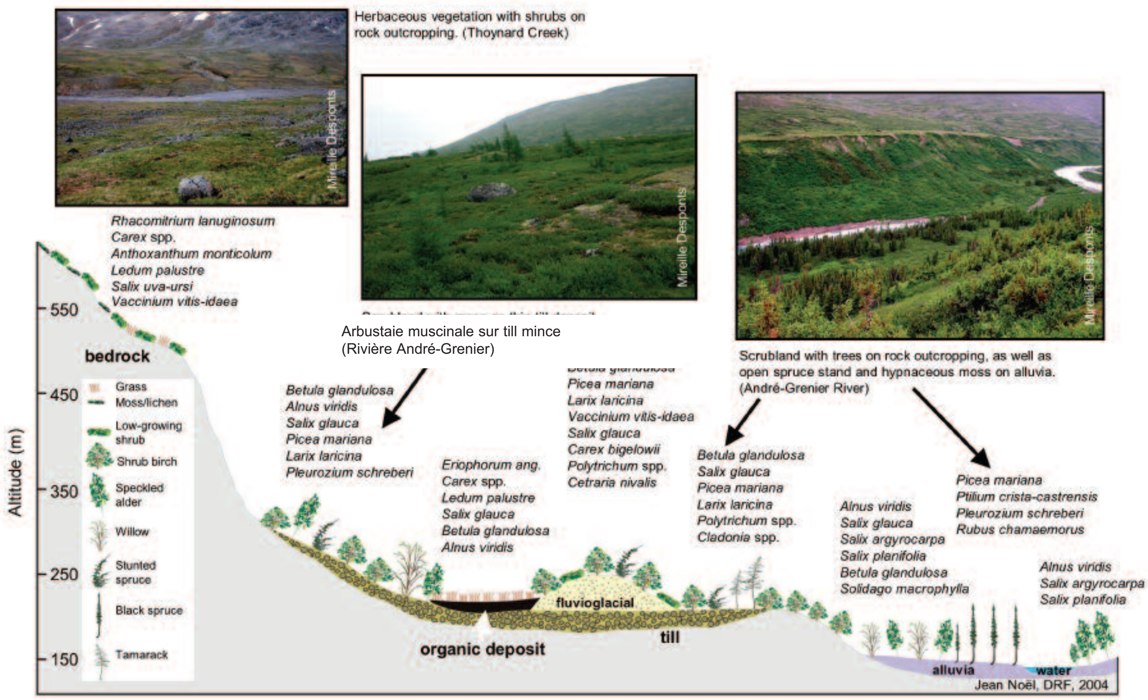
Extract from Desponts (2004)

Figure 4.2 Schematic Transect of Plant Communities in the Ungava Lowlands and the Koroc River Valley (downstream section)



Extract from Desponts (2004)

Figure 4.3 Schematic Transect of Plant Communities in the Koroc River Valley (central section)



Extract from Desponts (2004)

Figure 4.4 Schematic Transect of Plant Communities over the Koroc River Plateau (André-Grenier River)

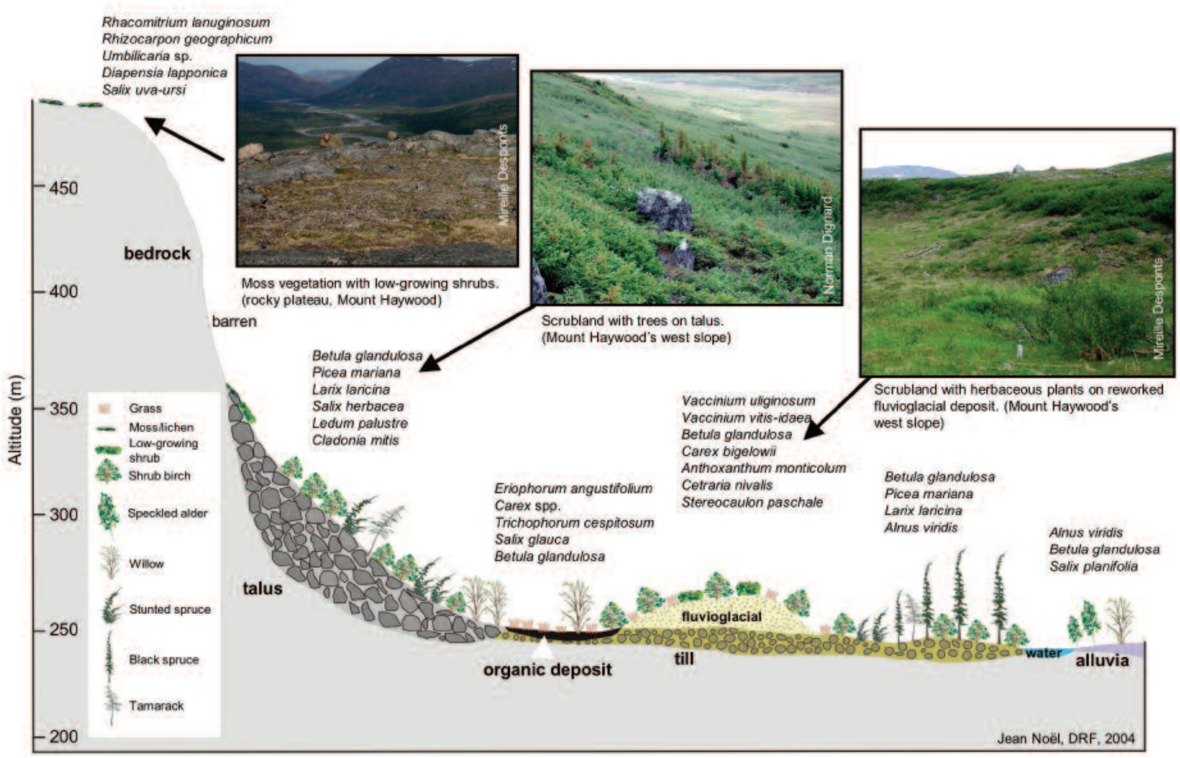
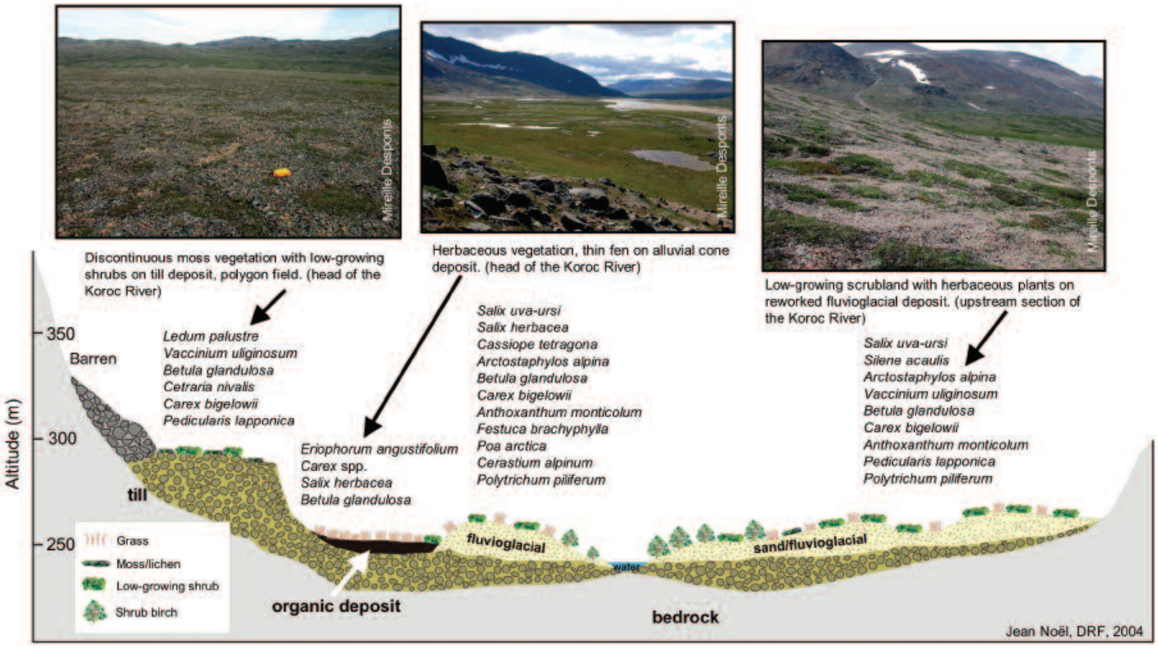


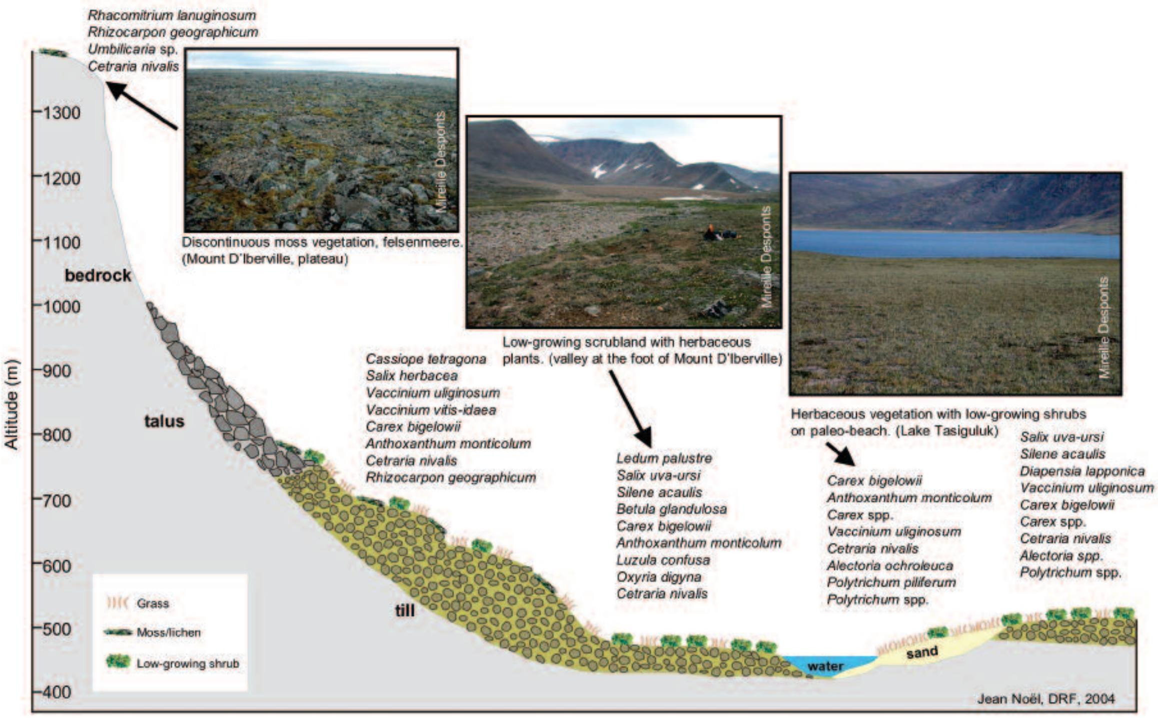
Figure tirée de Desponts (2004)

Figure 4.5 Schematic Transect of Plant Communities over the Koroc River Plateau (Mount Haywood)



Extract from Desponts (2004)

Figure 4.6 Schematic Transect of Plant Communities in the Koroc River Valley (upstream section)



Extract from Desponts (2004)

Figure 4.7 Schematic Transect of Plant Communities in the Torngat Mountains is nurtured by surface flow which is typical in the region, while they are often characterized by thin organic deposits, generally less than 50 cm thick. Structured fens that cover thicker deposits are relatively rare. Bogs (ombrotrophic peatland) are rare throughout the study area.

White birch (*Betula papyrifera*) in the Koroc River valley
Credit: Mireille Desponts (MRNF)

Carex and *Eriophorum* prevail in arctic peatland environments. In the palsa peatlands of the forest tundra and along the coast of Ungava Bay, vegetation is more varied. Communities of trees, shrubs, lichen or moss may be observed on tussocks. In fens, *Eriophorum* and *Carex* prevail around the tussocks while communities of sedge may be found around ponds and along water courses.

Vascular Plants

Dignard (2004) paints a fairly clear picture of the vascular plants found in the proposed park based on data collected in 1951 (Rousseau, 1953), in 1973 (Ouellet, 1978) and through fieldwork carried out in July 2003. The inventory completed in 2003 permitted 51 taxa[1] to be added to those that were recorded by Jacques Rousseau and Henri Ouellet's team, while it should be noted that 35 taxa (including two hybrids) recorded by these latter two researchers were not observed in 2003. Dignard's annotated list (2004) possesses 269 taxa with reference to locations, habitats and frequency.

The 269 vascular taxa recorded in the study area (Appendix 1) belong to 47 families. Cryptogams comprise 16 taxa (6%) and Spermatophyta 253 taxa (94%). Of the latter group, 89 (35.2%) are Monocotyledones and 164 (64.8%) are Dicotyledones. Eight families account for 56.9% of all the taxa: Cyperaceae (42 taxa), Poaceae (26 taxa), Asteraceae (21 taxa), Caryophyllaceae (15 taxa), Ericaceae (14 taxa), Rosaceae (13 taxa), Saxifragaceae (11 taxa) and Salicaceae (11 taxa).

Phytogeographic analysis of the vascular plants in the study area (Table 4.2) indicate a high proportion of boreal taxa (53%) compared with arctic taxa (47%). This result demonstrates that a segment of the Koroc River valley is a boreal pocket in an arctic zone. The topography of the study area affects the distribution of taxa. For example, the total number of taxa below 275 m is higher. This elevation also represents the tree limit, as presented by Payette (1983) and adapted by Dignard (2004).

Below 275 m, the proportion of boreal taxa (59.5%) is higher than that for arctic taxa (40.5%). These proportions are similar

Palsa in the Koroc River valley

A small limestone willow (*Salix vestita*) and orange crustaceous lichen of the *Xanthoria* genus

Rhodiola rosea, species occasionally found growing on rocky slopes in the valley of the Koroc River
Credit: Norman Dignard (MRNF)

to those observed near Lake Guillaume-Delisle (also known as Richmond Gulf, 56°15′N-76°17′W), the Leaf River (58°11′N-72°10′W) and Lake Chavigny (58°12′N-75°08′W), which are situated south of the tree limit (Cayouette, 1987; Deshaye and Morisset, 1985; Morrisset et al., 1983), and are characteristic of sub-arctic flora.

Above 275 m, the proportions of boreal and arctic taxa are inverted. Arctic taxa make up 65.6% of the vascular plants present while boreal taxa make up 34.4%. These proportions are similar to those observed around Puvirnituq (60°02′N-77°17′W) and Killiniq (60°21′N-64°31′W) (Morisset et al., 1983), which are situated north of the tree limit, and are characteristic of arctic flora.

Among the 269 taxa found in the study area, 22 (8.2%) are considered calcicolous, or at least basophilous. Base elements may be found here and there in the region's Precambrian rock, in particular in anorthosite containing calcium. While calcicoles occur only occasionally, they are of special interest. Certain grow only along the upper section of the Koroc River and others are found only at scattered sites in the study area. These calcicole may be found growing on talus comprising fine colluvia.

Dignard's work (2004) lead to the addition of two species to the flora known to exist in Québec. *Micranthes stellaris* was discovered along the south slope in the valley of the Narsaaluk River. In North America, this species had only ever been recorded in Greenland, on Baffin Island and along the Labrador coast (Scoggan, 1978–79; Argus and Pryer, 1990; data bank for the project entitled *Flore du Québec-Labrador nordique*). The other species discovered is located in the Thoynard Creek area, which feeds the André-Grenier River.

Table 4.2 Phytogeographic Spectrum of Vascular Plants in the Proposed Park (58°40′N – 64°30′W)

	GLOBAL		ALTITUDE < 275 M		ALTITUDE > 275 M	
PHYTOGEOGRAPHIC FIELD	NO.	%	NO.	%	NO.	%
Arctique *sensu lato*	124	47.0	85	40.5	99	65.6
Arctic sensu stricto	*34*	*12.9*	*20*	*9.5*	*17*	*11.3*
Arctic-alpine	*90*	*34.1*	*65*	*31.0*	*82*	*54.3*
Boreal	140	53.0	125	59.5	52	34.4
Total	264[1]	100.0	210	100.0	151	100.0

[1] Five taxa were excluded from the phytogeographic analysis: two actual or presumed hybrids, two specimens for which the species has not yet been identified, and the taxa *sensu lato* of which the subspecies or varieties are contemplated in the analysis.

Oxytropis podocarpa often grow on wind-swept terraces along the tributaries of the Koroc River
Credit: Norman Dignard (MRNF)

Bellflowers (*Campanula uniflora*) and pollinization

Table 4.3 Noteworthy Elements related to Vascular Plants in the Sectors of Interest

SECTOR	ELEMENTS OF INTEREST
1	Two taxa likely to be designated as threatened or vulnerable in Québec (*Draba crassifolia* and *Cerastium cerastioides*), one of which is rare in Canada (*Cerastium cerastioides*). Presence of calcicolous taxa (*Saxifraga oppositifolia*, *S. paniculata*, *Moehringia macrophylla*, etc.). Presence of taxa that are rare in the study area (*Carex supina* subsp. *spaniocarpa*, *Salix calcicola*, *Woodsia glabella*, *W. ilvensis*, *Solidago multiradiata*, *Draba aurea* and *Viola selkirkii*).
2	Two taxa likely to be designated as threatened or vulnerable in Québec (*Gentiana nivalis* and *Cerastium cerastioides*), one of which is rare in Canada (*Cerastium cerastioides*). Presence of calcicoles (*Saxifraga oppositifolia*, *S. paniculata*, *Carex rupestris,* etc.). Presence of taxa that are rare in the study area (*Carex norvegica, Dryopteris fragrans, Luzula arctica*, *Salix calcicola*, *Woodsia ilvensis* and *Pinguicula vulgaris*).
3	Newly identified taxon in eastern North America (*Botrychium pedunculosum*). Presence of a taxon that is rare in the study area (*Luzula arctica*).
4	A taxon likely to be designated as threatened or vulnerable in Québec (*Alchemilla glomerulans*).
5	The northern-most white birch stand (*Betula papyrifera*) known in Québec. A taxon at the northern edge of its range (*Rubus idaeus* subsp. *strigosus*). Presence of a taxon that is rare in the study area (*Betula minor*).
6	A taxon that is rare in Canada (*Gnaphalium norvegicum*). Three taxa at the northern edge of their range in Québec (*Carex echinata* subsp. *echinata*, *Salix pedicellaris* and *Sparganium natans*).
7	A taxon likely to be designated as threatened or vulnerable in Québec (*Alchemilla glomerulans*). A newly identified taxon in Québec and classified as rare in Canada (*Saxifraga stellaris*).
8	A taxon likely to be designated as threatened or vulnerable in Québec (*Alchemilla glomerulans*). A taxon at the northern edge of its range (*Carex vesicaria*).
9	A taxon likely to be designated as threatened or vulnerable in Québec (*Alchemilla glomerulans*).
10	A taxon at the northern edge of its range in Québec and in eastern North America (*Rumex salicifolius* var. *mexicanus*).

Botrychium pedunculosum, discovered for the first time in eastern North America
Credit: Jean Gagnon (MDDEP)

According to Donald Farrar, this plant is *Botrychium pedunculosum*, a Cordilleran species that is known in British Columbia, Alberta, Saskatchewan and Oregon. This is the first time it has been found in eastern North America (Dignard, 2004).

Data collected in the summer of 2003 also resulted in the identification of expanded ranges for seven species in Nunavik and of three species likely to be designated as threatened or vulnerable in Québec (*Alchemilla glomerulans*, *Draba crassifolia* and *Gentiana nivalis*). Four species are considered rare in Canada (*Cerastium cerastioides*, *Gentiana nivalis*, *Gnaphalium norvegicum* and *Micranthes stellaris*). On a regional scale, 19 species are considered rare, which is to say that they were collected or observed only once or twice during inventory work (Appendix 2). These are mainly boreal species whose ranges peter out in northern Québec or in eastern Canada. Besides these species, 40 others are scattered sporadically within their range in Québec as well as within the study area (Appendix 2). The sporadic presence of these species may be explained by intrinsic biological or ecological factors, in particular strict requirements related to habitat edaphic and microclimatic conditions.

On the whole, Dignard (2004) identifies 10 sectors that possess interesting flora elements and that should be protected. These sectors are shown on Map 4.2 while Table 4.3 describes their main characteristics.

[1] Taxonomic unit used at the different levels of a classification system. Taxon is used herein instead of species because it also refers to subspecies and varieties. For example, *Calamagrostis stricta* subsp. *inexpansa* and *Calamagrostis stricta* subsp. *stricta* are one species but two taxa.

Invascular Plants

To this day little is known about the invascular flora of the proposed park, which is to say its mosses, liverworts (hepatics) and lichen. Roughly 80 specimens of bryophytes (moss and liverwort) were collected by Jacques Rousseau during his 1951 expedition, along the Koroc River and through the Tassivialuk Strait, which is approximately eight kilometres north of the mouth of the Koroc River. These specimens, which have only recently been identified (Fortin, 2003), represent 53 distinct taxa (Appendix 3).

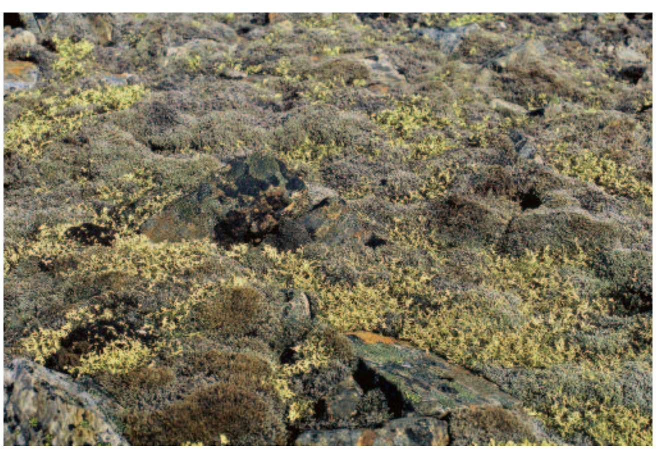
As part of the floristic inventories compiled more recently in the proposed park, which is to say in the summer of 2003, Dignard (2004) and Desponts (2004) identified 27 lichen, 23 mosses and 3 liverworts (Appendix 3). As well, roughly thirty composite specimens were collected by Desponts in the summer of 2004 (Desponts, 2004) and should be identified shortly (Jean Gagnon, MDDEP, work in progress).

During fieldwork carried out in the proposed park in August 2004, Jean Gagnon (Ministère du Développement durable, de l'Environnement et des Parcs; sustainable development, environment and parks; MDDEP) spent four days studying the invascular flora on Mount D'Iberville and in an adjacent valley, collecting close to 300 specimens. Analysis results of this inventory will be described in a separate report. Nonetheless, Gagnon has concluded that, at the source of the Koroc River, invascular plants prevail in both terrestrial and wetland eco-systems. In this area, terrestrial eco-systems comprise various kinds of rocky substrate (countless rocks, glacial deposits, congelifracts and block fields) where lichen are preponderant. Gagnon's conclusion resembles that of Gauthier and Dignard (2000) through their work on the flora in Pingualuit National Park. Crustaceous lichen (grafted onto rock) dominate over this kind of substrate, as do, though to a lesser extent, foliose lichen (which are often prostrate but not completely fixed to the substrate). As a case in point, on a ridge near Mount D'Iberville, species such as yellow map lichen (*Rhizocarpon geographicum*) and an orange type of lichen (*Porpidia flavocaerulescens*) are especially abundant. Nearby, on a plateau located at an elevation of greater than 1500 m, bryophytes and a few fructitose lichen may be observed standing upright in the shelter of rocks. The moss *Rhacomitrium lanuginosum,* which is associated with tundra ostioles, is especially prolific on a 1300-m summit. A few fructitose lichen (genera *Cetraria* and *Thalomnia*) were also sometimes observed in the mats created by this type of moss. Finally, in high-elevation combes with remnants of snow, a particular kind of liverwort (*Gymnomitrion apiculatum*) and moss (*Andreaea blytii*) are especially abundant.

In the dry heath at the bottom of one valley, terricolous fructitose lichen (criss-crossing over the ground) was found to prevail. The genera *Cladonia*, *Cetraria* and *Stereocaulon* as well as *Flavocetraria nivalis* and certain bryophytes were also particularly abundant. In this area, the few boulders present were colonized by crustaceous and foliose lichen as well as a few mosses.

In low-elevation wetlands, bryophytes are everywhere. In one outwash plain located near the source of the Koroc River, at 300 m, the embankments of a creek and the beds of intermittent watercourses nurture a large variety of mosses (including a few sphagnum and *Bryum* spp.) and liverworts. A few clearly aquatic bryophytes are also found in the running water of a rocky creek, firmly fixed to the rocky substrate.

While little is known about the bryophytes on the Québec side of the Torngat Mountains, on the Labrador side a detailed mountain-top inventory was complied by Hedderson in the summers of 1983 and 1986 (Hedderson and Brassard, 1986; Hedderson, 1988; Hedderson et al., 2001). In all, he identified 146 moss taxa and 83 liverwort taxa.

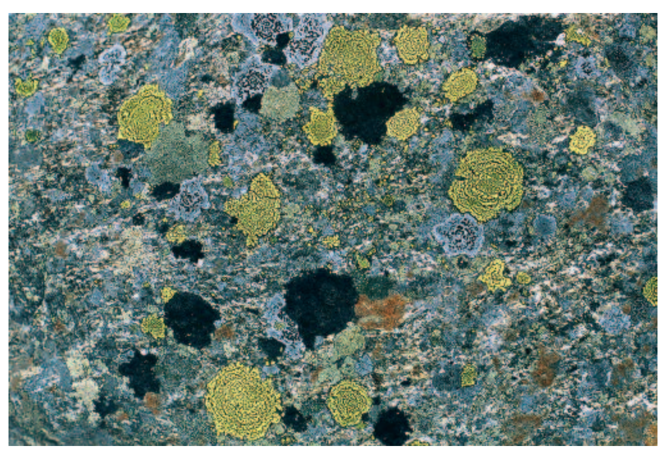


Alpine community dominated by the moss *Rhacomitrium lanuginosum* (greyish) and the lichen *Flavocetraria nivalis* (yellowish)
Credit: Jean Gagnon (MDDEP)

Among the mosses identified, 16 taxa are considered rare in Canada (Appendix 4). Such a high concentration of rare taxa is unusual. A few of these taxa are found in the High Arctic, while their presence in the Torngat Mountains marks the southern edge of their range in eastern North America. In addition, a few other taxa are most commonly found in the Cordilleran region of western North America and in Europe. The data shown in Table 4.4 suggest that, in all likelihood, several of these rare taxa will be found on the Québec side of the Torngat Mountains. In addition to these taxa considered rare in Canada, consultation of Hedderson's work suggests that, on the Québec side of the Torngat Mountains, several bryophytes are also likely to be found that, while not rare in Canada, are rare in Québec.

Among the 83 liverwort taxa identified by Hedderson (Hedderson et al., 2001) on the Labrador side of the Torngat Mountains, eight are considered rare in Canada, with reference to a preliminary list prepared by Belland (2004). This level of diversity in such a limited area is unusual in eastern Canada. Most of these taxa are found in snow-filled combes or along their melt-water creeks at elevations of greater than 600 m. Certain taxa are especially preponderant on humid cliffs. One of these taxa, *Eremonotus myriocarpus*, has been identified for the first time in eastern North America, though it was already known to exist in the western parts of the continent.

For their part, lichen have not been closely studied on the Labrador side of the Torngat Mountains, although in field description guides of the North American Arctic there are a few vague references to the Torngat Mountains (Thomson, 1984, 1998). It is therefore reasonable to suppose the presence of several taxa that are rare or still unknown in Québec, as was the case in Pingualuit National Park and its surrounding areas where 20 lichen were observed for the first time in Québec between



At least five species of crustaceous lichen in a valley that leads to Mount D'Iberville
Credit: Jean Gagnon (MDDEP)

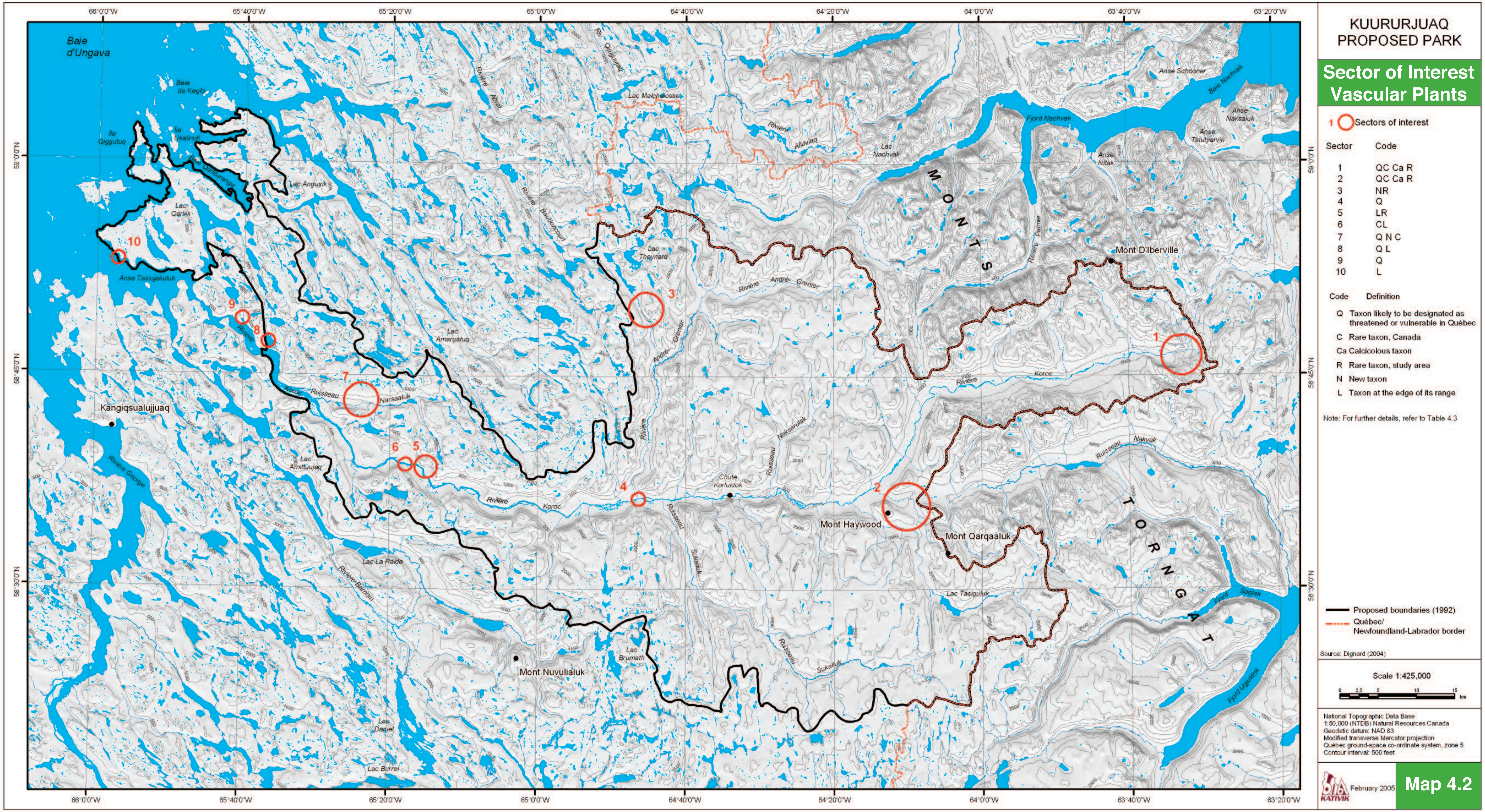
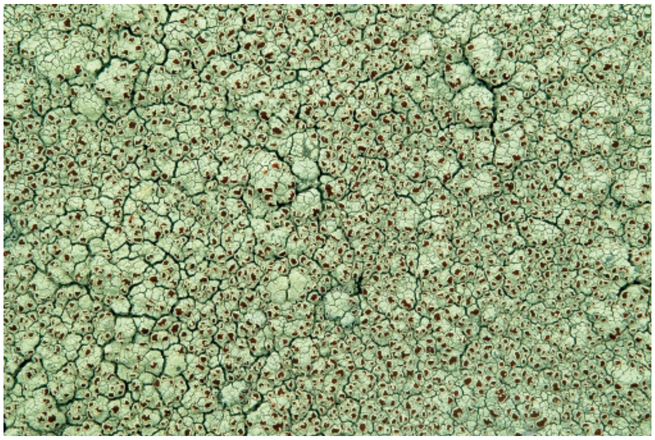

KUURURJUAQ PROPOSED PARK
Sector of Interest Vascular Plants
1 Sectors of interest
Sector Code
1 QC Ca R
2 QC Ca R
3 NR
4 Q
5 LR
6 CL
7 Q N C
8 Q L
9 Q
10 L
Code Definition
Q Taxon likely to be designated as threatened or vulnerable in Québec
C Rare taxon, Canada
Ca Calcicolous taxon
R Rare taxon, study area
N New taxon
L Taxon at the edge of its range
Note: For further details, refer to Table 4.3
Proposed boundaries (1992)
Québec/ Newfoundland-Labrador border
Source: Dignard (2004)
Scale 1:425,000
National Topographic Data Base 1:50,000 (NTDB) Natural Resources Canada
Geodetic datum: NAD 83
Modified transverse Mercator projection
Québec ground-space co-ordinate system, zone 5
Contour interval: 500 feet
February 2005
Map 4.2
Baie d'Ungava
Baie de Keglo
Kangiqsualujjuaq
Anse Tasiujakuluk
Lac Angusik
Lac Qarlek
Lac Amaruatuq
Lac Amittuujaq
Narsaaluk
Ruisseau
Rivière Koroc
Lac Thaymard
Rivière André-Grenier
Lac Malchelosse
Lac Nachvak
Fjord Nachvak
Baie Nachvak
Anse Schooner
Mont D'Iberville
MONTS TORNGAT
Chute Korluktok
Mont Haywood
Mont Qarqaaluk
Lac Tasiguluk
Lac La Ralde
Rivière Barnoin
Rivière George
Lac Brumath
Mont Nuvulialuk
Lac Daniel
Lac Burrel
Fjord Saglek
Fjord Ugjuktok
Ruisseau Nakvak
66°0'0"W
65°40'0"W
65°20'0"W
65°0'0"W
64°40'0"W
64°20'0"W
64°0'0"W
63°40'0"W
63°20'0"W
59°0'0"N
58°45'0"N
58°30'0"N

Table 4.4 Number of Invascular and Vascular Plant Taxa Identified in Three Northern Regions

GROUP	PINGUALUIT NATIONAL PARK	KUURURJUAQ PROPOSED PARK	TORNGAT MOUNTAINS (LABRADOR)
Liverwort	60	19[1]	83
Moss (including sphagnum)	147	47[1]	146
Lichen	171	27[1]	No data
Vascular plants	129	269	Not assessed

[1] Partial knowledge (Jean Gagnon, MDDEP-Parcs)

Sources: Gauthier and Dignard (2000), Hedderson and Brassard (1986), Hedderson (1988), Hedderson et al. (2001)



Ophioparma lapponica (a crustaceous lichen) as observed in the Torngat Mountains

On this boulder, crustaceous lichen (genera *Rhizocarpon* and *Porpidia*) dominate.
Credit: Norman Dignard (MRNF)

1998 and 2000 by Gauthier, Gagnon and Wong (Jean Gagnon, MDDEP, unpublished information). Preliminary identification of specimens collected by Gagnon in the Torngat Mountains in the summer of 2004 suggest that a few more species of lichen will be added to the list of those already known in Québec. In particular, research needs to be carried out in Québec on *Siphula ceratites* (a lichen), which is known on the Labrador side of the Torngat Mountains and specifically found on the edge of humid depressions associated with snow-filled combes.

In the area of the proposed park, there is a greater diversity of habitats as compared with Pingualuit National Park: alpine eco-systems above 1000 m, boreal forest eco-systems along the Koroc River and a coastal eco-system. This diversity in turn suggests greater diversity as regards invascular flora (Jean Gagnon, personal communication, 2004).

Obviously, invascular plants prevail over a large part of the proposed park. In this context, it would be interesting to continue related research with a view to describing major groupings.

Wildlife

Based on information drawn from scientific documentation and local Inuit residents, the territory of the proposed park is home to 39 mammal, 126 bird and 24 fish species.

Among the limited number of wildlife studies carried out in and around the study area, it is important to note the following on Arctic char in the Koroc River (Adams et al., 1988; Boivin, 1994; Boivin and Power, 1990; Cunjak et al., 1986), on salmon in Ungava Bay (Power, 1969), on the George River caribou herd (MRNFP, 2004b) and on the Torngat Mountains caribou herd (Schaefer and Luttich, 1998). An expedition in 1973 along the downstream section of the Koroc River identified 49 bird species (Ouellet, 1978). In connection with development of the proposed park, an inventory of wildlife was compiled in February 2004 based on tracks left in the snow (Fortin, 2004).

A large proportion of the knowledge about wildlife in the study area was derived from a number of Inuit residents from

Kangiqsualujjuaq, during fly-overs of the study area, and from a compilation of interviews prepared by Cuerrier (2003a). Inuit knowledge about wildlife is based on their observations over varied lengths of time in the areas where they travel. Not all Inuit possess the same knowledge and such knowledge may vary from individual to individual, depending on subsistence harvesting activities.

MARINE MAMMALS

Fourteen species of marine mammals may be found within the proposed park and adjacent areas (Appendix 5). Descriptions are provided below for those species that are most likely to be observed in the study area and for those that are particularly important to Inuit subsistence activities.

Seal

Seal is central to Inuit culture. For decades, Inuit have hunted seal for subsistence purposes. Four species of seal may be found along the coastal section of the study area: ringed seal (*Phoca hispida*; **natsiq**[1]), harp seal (*Phoca groenlandica*; **qairulik**), bearded seal (*Erignathus barbatus;* **utjuk**) and harbour seal (*Phoca vitulina*; **qasigiaq**). The most common seal species in the Canadian Arctic and in and around the study area, according to Inuit elders from Kangiqsualujjuaq, is ringed seal. The back of an adult ringed seal is dark grey, with a spattering of pale rings; its belly is silvery grey. Young ringed seal have an unblemished grey coat while newborns are white (Prescott and Richard, 1996).

Ringed seal inhabit the bays, coves and fjords of the coasts of Labrador and Ungava Bay year-round (Cuerrier, 2003a). In particular, every spring and fall, a large number of seal may be observed in the George River estuary and along the coast of Ungava Bay. In summer they are less present, migrating instead to the north. In November and December, many ringed seal may be found around Killiniq and then along the eastern shores of Ungava Bay, from Cape Kernertut to Port Burwell (Cuerrier, 2003a).

During the season of ice cover (November to July), ringed seal are often found on floating ice. As well, breathing holes are always present along the coast from north of Keglo Bay to Alluviaq Fjord (formerly Abloviak). From April-May until June-July, seal move away from the coast, while in August they return to feed and to seek protection from killer whales that congregate near Le Droit Point, approximately 70 km north of Keglo Bay (Cuerrier, 2003a).

Ringed seals give birth to their offspring in the bays, coves and fjords located from the middle of Keglo Bay north to Alluviaq Fjord, as well as north-east of Alukpaluk Bay (Figure 4.8). Seal pups are born in March in burrows dug into the snow next to breathing holes. Inuit hunters have explained that female ringed seal prefer to build their burrows at the mouths of rivers and in the centre of bays and coves where smooth sheets of ice facilitate digging. In June once their fur coats have turned grey, ringed seal pups begin to feed and travel independently (Cuerrier, 2003a).

Beluga

The migration patterns of beluga (*Delphinapterus leucas*; **qilalugaq**) are governed by seasonal ice cover (Figure 4.8). In Nunavik, beluga may be found in James, Hudson and Ungava bays and they migrate into shallow river estuaries during the summer months (Smith, 2000). In winter, they congregate in areas where sea currents prevent the formation of solid ice (Reeves, 1995), including the Hudson Strait and the area around Killiniq (Cuerrier 2003a). When temperatures warm in the spring and summer, beluga move closer to the coast, their preferred habitat. Then following ice break-up, they enter river estuaries (Reeves, 1995), including those of the George, Whale, Tunulic and Mucalic rivers, to moult (Cuerrier, 2003a). In summer, beluga may pass along the coast of the study area and they sometimes congregate at the mouth of the Koroc River (Figure 4.8). Major migration through this area takes place in July and August (Reeves, 1995; Smith, 2000). By August, beluga are spending less time in river estuaries and more time further from the coast (Smith, 2000). Migrating beluga may also be observed near the proposed park in October [sic] when beluga are generally moving from the Killiniq area towards Quaqtaq and, finally Hudson Bay. In May [sic], they travel in the opposite direction (Cuerrier, 2003a; Figure 4.8). In the past, the Koroc River estuary was an important beluga harvesting area (Reeves, 1995).

According to Inuit residents, calving occurs in May. While beluga are coal black at birth, this colour pales as the animal grows (Cuerrier, 2003a). According to Doidge (1990), the gestation period for beluga is 12.8 months with mating taking place at the beginning of May and calving occurring a little over a year later, towards the end of the month. Beluga feed on all sorts of fish including arctic char (*Salvelinus alpinus*; **iqaluppiq**), Atlantic salmon (*Salmo salar*; **saama**) and Arctic cod (*Boreogadus saida*; **uugaq**) (Cuerrier, 2003a).

Scientific research has identified separate stocks based on breeding areas and genetics. Several distinct stocks spend their winters in the pack ice, east of the Hudson Strait (Smith, 2000).

In addition to the western Hudson Bay beluga stock and a probable James Bay stock, two other stocks may be found along the coasts of Nunavik. These are the eastern Hudson Bay stock, which in 2001 was estimated at roughly 2100 individuals, and the Ungava Bay stock, which is so small in number it is impossible to accurately estimate its size; it is believed to comprise less than 200 individuals (Fisheries and Oceans Canada, 2004). Commercial hunting by the Hudson's Bay Company through the 19th century and at the beginning of the 20th century significantly reduced the number of beluga along the eastern coast of Hudson Bay and in Ungava Bay and the sizes of these stocks have remained low ever since (Reeves and Mitchell, 1987). Regular marine traffic in their habitats as well as predation are two factors that adversely affect the survival of this species (Beaulieu, 1992; Kingsley, 2000; Reeves, 1995).

According to Inuit residents of Kangiqsualujjuaq, in the 1940s beluga were more numerous in the estuaries of the Koroc and George rivers and in Keglo Bay. Inuit postulate that the diminished number of beluga in these areas is the result of the noise created by boat motors and the result of disease. Today, beluga are found most frequently off the coast. In addition, Inuit residents feel that, with the drop in salmon stocks, beluga are less inclined to approach the coast and river estuaries. Inuit state that more beluga are killed by killer whales than by human hunters. Some have suggested that a culling of killer whales might help the recovery of the beluga stock (Cuerrier, 2003a).

In Nunavik, beluga management is the responsibility of Fisheries and Oceans Canada, in co-operation with the Lumaq Beluga Management Working Group. This working group comprises representatives of Inuit communities and several organizations, including the Makivik Corporation, the Kativik Regional Government, the Sanikiluaq Hunters and Trappers Association and the Qikiqtaaluk Wildlife Board. Every year, Fisheries and Oceans Canada prepares a management plan that identifies hunting zones and defines the hunting regulations applicable in each zone. The plan is based on harvesting

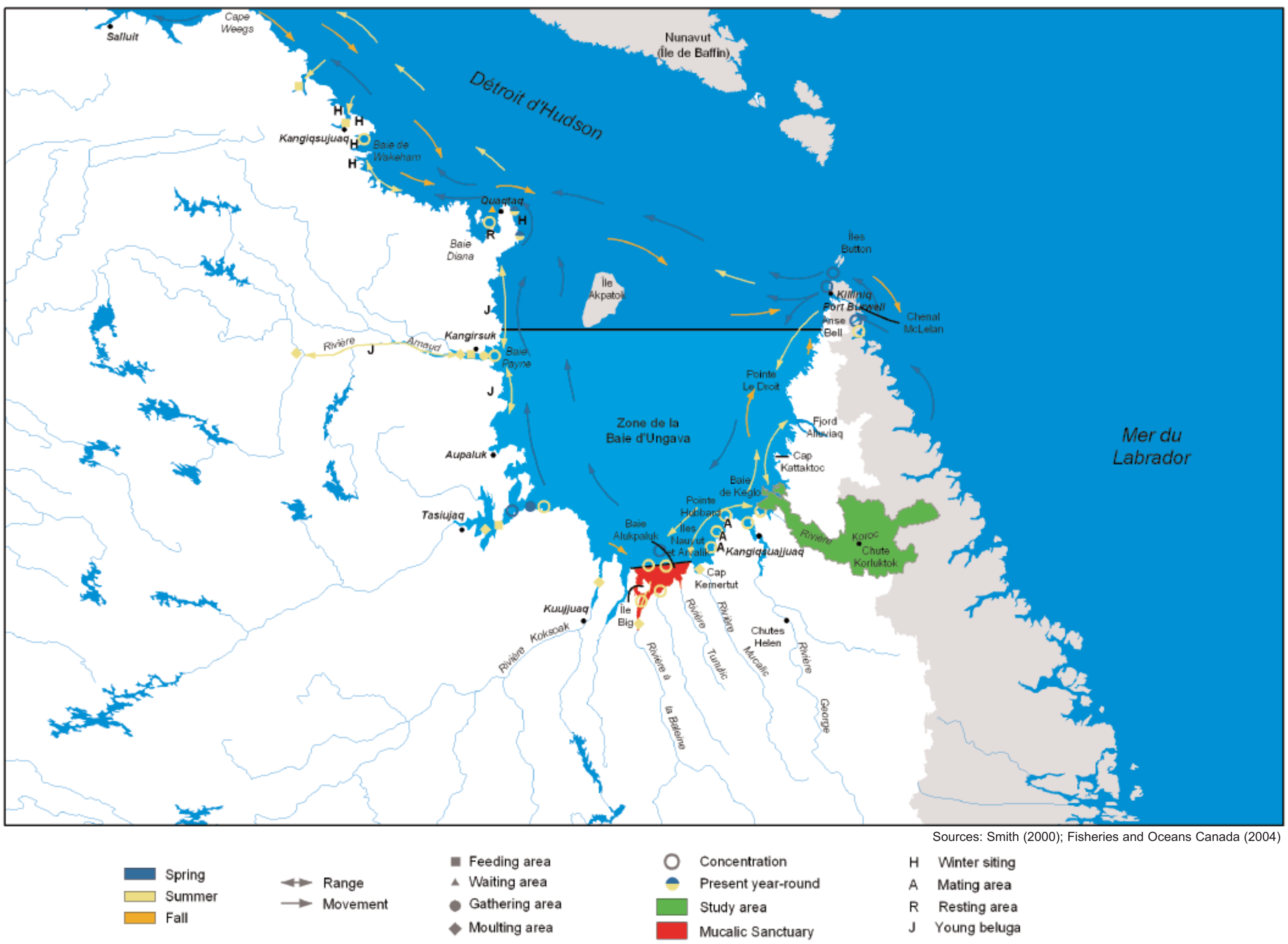


Figure 4.8 Beluga Movements in the Ungava Bay Region and Specific Zones

data provided by Inuit hunters. In 2004, the Ungava Bay zone (Figure 4.8) was open to hunting in July (Fisheries and Oceans Canada, 2004). In 1990, the Inuit of Nunavik (through the Makivik Corporation and the Kativik Regional Government) in co-operation with Fisheries and Oceans Canada, adopted measures to create the Mucalic Sanctuary (Nunavik, 1990), thus prohibiting harvesting activities in this rearing area (Figure 4.8) located along the southern shore of Ungava Bay (Reeves, 1995; Brooke, 1997; Fisheries and Oceans Canada, 2004).

Polar Bear

Polar bear (*Ursus maritimus*; **nanuq**) are observed from time to time in the study area. The origin of the individuals that reach the shores of Québec is not well known; they may come from the north Hudson Bay and western Hudson Strait stock or from the Davis District stock situated along the eastern shores of Baffin Island (Crête et al., 1987; Urquhart and Schweinsburg, 1984).

According to Inuit residents of Kangiqsualujjuaq, polar bear are more often sighted near Killiniq and along the coast of Labrador than along the east coast of Ungava Bay. Polar Bear seem to travel overland from one body of sea water to another. Specifically, the Alluviaq River (formerly Abloviak), situated north of the study area, and the Koroc River serve as passages through the Torgnat Mountains between Labrador and Ungava Bay (Audet, 1974; Cuerrier, 2003a; Map 4.3). Inuit say that polar bear tracks bearing west can sometimes be spotted in the valley of the Koroc River and polar bear have been shot at the mouth of the Koroc River. This information suggests that these polar bear would have come from the Labrador coast (Audet, 1974). A more recent report indicates that polar bear have been spotted and hunted at the mouth of the Koroc River and around Keglo Bay (Vandal, 1987).

This polar bear was observed swimming near the mouth of the Koroc River in July 2003.

In early summer, polar bear may be observed hunting seal on the pack ice of Ungava Bay. In June and August, they feed on fish found in the rivers between Kangiqsualujjuaq and Killiniq. Unlike black bear, polar bear do not eat berries (Cuerrier, 2003a).

Towards the end of October, pregnant females will enter their birthing dens, which are dug out of snow. These dens are generally located less than 50 km from the coast and, sometimes, on perennial ice (COSEWIC, 2004b). Females deliver their cubs in their dens around December or January and continue to use their dens to raise their young for a time. (COSEWIC, 2004b; Lentfer, 1982). Females give birth on average every 3.6 years and cubs remain with their mothers for roughly 28 months (Lentfer, 1982). According to Crête et al. (1987), there are no known birthing areas in Québec. Notwithstanding, the Inuit of Kangiqsualujjuaq say that birthing dens can be found along the Labrador coast and the western coast of Ungava Bay, around Diana Bay and south of Quaqtaq. Females construct their dens at the foot of bluffs, where snow becomes both deep and hard (Audet, 1974).

The foraging territory of polar bear is generally land-fast ice and pack ice located along or near continental or island shorelines. The polar bear's preferred prey is the ringed seal. When the sea ice begins to melt each summer, some polar bear will remain on the pack ice in order to hunt while others will move to shore, living off their fat reserves. These animals will only return to hunting when the sea ice re-forms in the fall.

In Nunavik, polar bear management is governed by the *James Bay and Northern Québec Agreement* which restricts harvesting to the beneficiaries of the Agreement: the Inuit, Cree and Naskapi. Harvesting levels are set by the Ministère des Ressources naturelles et de la Faune (natural resources and wildlife, MRNF). Aboriginal hunters are required to obtain a government tag if they want to sell the skin of a harvested polar bear (Vandal, 1987; Doidge et al., 2000). Certain polar bear research and monitoring programs are conducted jointly by the Government of Nunavut, the Makivik Corporation's Nunavik Research Centre and the MRNF. Hunters are required to submit harvesting data (location, date, sex and age class) and the animal's head for these purposes. A tooth can be used to estimate the age of the harvested polar bear, its tongue for parasite analysis, and muscles for genetics and contaminant testing (Doidge et al., 2000).

Anguvigak, which is to say Nunavik's hunting, fishing and trapping association, organizes regular annual meetings to discuss wildlife issues. In the mid-1980s at such a meeting, Anguvigak adopted resolutions aimed at protecting female polar bear with cubs and prohibiting summer hunting of the animal. These resolutions were renewed in 1997. Although these resolutions have no legal foundation, hunters are obliged to comply through consensus (Doidge et al., 2000).

Species at Risk

The proposed park and nearby areas may nurture certain marine mammals that appear on the list of species likely to be designated as threatened or vulnerable in Québec (MRNFP, 2004a). Included on this list are polar bear, blue whale (*Balaenoptera musculus*) and the Ungava Bay stock of beluga (Appendix 5). Beluga has in fact been classified as endangered by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC, 2004a).

Since 1991, COSEWIC has classified polar bear as a species of special concern (2004b). COSEWIC uses this classification when a species is likely to become threatened or endangered due to a specific set of biological characteristics and threats (COSEWIC, 2004b). Among the many threats faced by polar bear (including pollution, contaminants and industrial activity), it is important to mention that climate change is causing longer ice-free periods in the southern part of the polar bear's range. This change in their foraging territory could negatively impact on birth and mortality rates. In addition, polar bear stocks are able to sustain only minimal harvesting levels (COSEWIC, 2004b).

LAND MAMMALS

Twenty-five species of land mammals are thought to inhabit the proposed park and adjacent areas (Appendix 6). The presence of 18 of these species has been confirmed through the work of Ouellet (1978), Desrosiers et al. (2002), Cuerrier (2003a) and Fortin (2004), as well as during fieldwork in the study area in 2003 and 2004.

The distribution of these wildlife species in the study area is influenced by the various types of habitat. For example, in the valley of the Koroc River, forest-dwelling species are most often observed, including black bear (which is particularly abundant) and porcupine. In fact, the valley marks the northern edge of the ranges of both of these animals. On the other hand, Arctic wildlife such as the Arctic hare and the Arctic fox are most often observed on the tundra. Notwithstanding, land mammals may be found in a variety of the park's habitats in accordance with their annual cycles. For roughly ten of the land mammals found in the study area and generally identified with coniferous forest areas, the proposed park marks the northern limit of their ranges (Appendix 6).

Caribou

Nunavik is home to the largest herds of migrating caribou (*Rangifer tarandus*; **tuktuq**) on earth, taking into account both the Leaf River (LRH) and George River (GRH) herds. Results from an inventory compiled by the Ministère des Ressources renouvelables, de la Faune et des Parcs (natural resources, wildlife and parks, MRNFP) in 2001 put the population of these herds, combined, at slightly more than one million head (Couturier et al., 2004). According to Inuit residents of Kangiqsualujjuaq, caribou moved from the Schefferville–Fort MacKenzie area to the northern part of the George River in 1959. Then in 1970, they moved again, this time to the area north of the George River and south of Alluviaq Fjord. This slow northerly movement continues today. Inuit state that caribou are found everywhere these days, that migratory routes change with the seasons, and that certain caribou do not migrate at all (Cuerrier, 2003a). The caribou that originated from the Schefferville area might be the GRH.

Telemetry monitoring data shows that GRH caribou may be observed in the area of the proposed park between May and October (Boudreau et al., 2003) and possibly between April and December (S. Couturier, MRNF, personal communication, October 2003); the highest concentration of animals occurs from mid-May to mid-July (MRNFP, 2004b). During fieldwork carried out in July 2003 in the study area, thousands of caribou were observed. In fact, the study area marks the northern edge of the calving grounds of the GRH. Between 1999 and 2001, these calving grounds covered 37 000 km^2 (Figure 4.9; MRNFP, 2004b; Map 4.3).

The proposed park is also home to a herd of mountain caribou, the Torngat Mountains herd (TMH) which is also known as the Koroc River herd. Even to this day, little is known about this herd (Schaefer and Luttich, 1998; Courtois et al., 2001; S. Couturier, MRNF, personal communication). Initial observations identifying a herd that roams over the Ungava–Labrador Peninsula were made in 1975 (Le Hénaff, 1975).

During fly-overs of the territory in April 1976, Le Hénaff (1976) surveyed 168 caribou, including groups of males and females with young offspring, in a 13 000 km^2 area of the Ungava–Labrador Peninsula. These groupings were observed especially along the shores of Ungava Bay. In his results, Le Hénaff (1976) stated that he had made similar observations over the previous three years, but was unable to identify whether the animals observed belonged to the GRH or a local herd; he recommended that further research be carried out to determine the status of this local herd.

In 1980, a reconnaissance survey carried out over the Ungava–Labrador Peninsula estimated the size of the TMH to be roughly 5000 head (Le Hénaff, 1980). It should be noted however that this estimate may have included caribou from the GRH and the TMH (Bélanger and Le Hénaff, 1985). Although no specific study has yet been carried out to determine the size of the TMH, the population is thought to range from a few hundred to a few thousand (MRNFP, 2004b).

Between 1988 and 1997, Schaefer and Luttich (1998) used telemetry monitoring to study the movements and territory of six female, adult caribou of the TMH (Figure 4.10). The results of the study demonstrated that females will migrate within the Ungava–Labrador Peninsula depending on the season and that the territory of these animals is different from that of the GRH. Generally speaking, the females studied spent the fall months, the rutting season (October 15 to November 15) and the winter in the lowlands close to Ungava Bay; the calving season (June 5–25) and the period immediately preceding (May 3 to June 4) were spent in the Torngat Mountains area.

Field observations made by the MRNFP approximated the calving grounds of the TMH between 1983 and 1985 to be close to 1200 km^2 and situated in the Torngat Mountains (Figure 4.9; MRNFP, 2004b; Map 4.3). According to the study completed by Schaefer and Luttich (1998), the territories of the GRH and the TMH overlap following calving, in the eastern part of the Torngat Mountains, but not at other times of their annual cycles, including rutting, winter and calving seasons. Notwithstanding, as animals of the GRH may be found in the region between April and December, genetic exchanging could potentially occur during the fall rutting season.

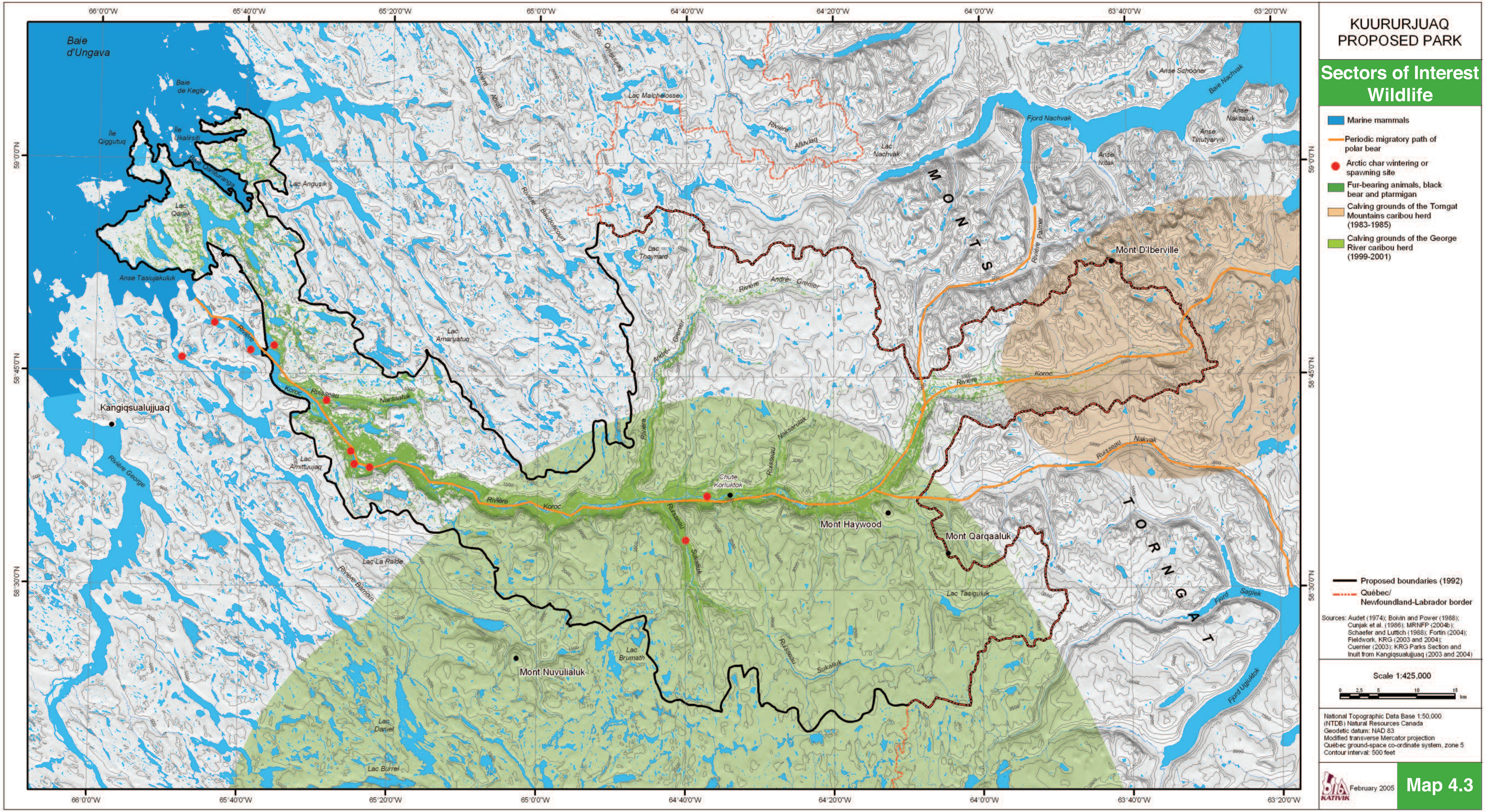
Many caribou were observed in the territory of the proposed park in July 2003.

The behaviour of major migratory herds, known as barren-ground caribou, and other types of herds, such as woodland and mountain caribou, differ. Courtois et al. (2001) demonstrated genetic, range and behavioural differences in three caribou ecotypes that they studied, which is to say barren-ground (GRH), woodland (five isolated herds) and mountain (the Gaspé Peninsula herd) caribou. This study may be used to support the hypothesis that the TMH is genetically distinct from the GRH, unless of course genetic exchanging occurs during the fall rutting season. In particular, Courtois et al. demonstrated that the mountain caribou of the Gaspé Peninsula reside in their mountainous range year-round, making vertical migrations over a few kilometres in order to take advantage of a tundra alpine habitat in winter and a boreal forest habitat in summer (Ouellet et al., 1996 in Courtois et al., 2001). The behaviour of the TMH may resemble that of the Gaspé Peninsula herd since both are mountain ecotypes.

The Parks Section of the Kativik Regional Government is currently working with hunters from Kangiqsualujjuaq and the MRNF to collect samples that will increase knowledge about caribou genetics. Increased knowledge of the TMH is needed to ensure that the survival of these animals is not jeopardized by future park activities. Mountain caribou are particularly sensitive to disturbances caused by motorized equipment involved in activities such as heli-skiing and snow-mobiling. Mountain caribou will move to habitat that is less favourable to their survival in order to avoid disturbances related to these kinds of activities (Payton, 2003).

Inuit from Kangiqsualujjuaq recognize that certain caribou will migrate over long distances while others tend to be sedentary (Cuerrier, 2003a). The annual cycle attributed to the TMH resembles that described by Schaefer and Luttich (1998). TMH caribou make use of the entire region bordered by Ungava Bay in the west, over the Torngat Mountains, to the Labrador coast in the east (Cuerrier, 2003a).

Inuit know that most TMH caribou will migrate north in the fall, abandoning wooded areas for the herbaceous tundra where snow accumulation is less and will not hinder their grazing of low-growing vegetation. Rutting season takes place in October and November. Through the fall and winter, these animals are found near Kangiqsualujjuaq. Around March, female caribou begin an eastward migration towards Labrador in order to calve, while males remain on the coast of Ungava Bay. Calving takes place in June in the uplands where mosquitoes and black flies are fewer. Female caribou continue to live for a little more time in the mountains with their newly born calves. Smaller groups also spend time along the coast (Cuerrier, 2003a).


KUURURJUAQ
PROPOSED PARK
Sectors of Interest
Wildlife
Marine mammals
Periodic migratory path of polar bear
Arctic char wintering or spawning site
Fur-bearing animals, black bear and ptarmigan
Calving grounds of the Torngat Mountains caribou herd (1983-1985)
Calving grounds of the George River caribou herd (1999-2001)
Proposed boundaries (1992)
Québec/ Newfoundland-Labrador border
Sources: Audet (1974); Boivin and Power (1988); Cunjak et al. (1986); MRNFP (2004b); Schaefer and Luttich (1988); Fortin (2004); Fieldwork, KRG (2003 and 2004); Cuerrier (2003); KRG Parks Section and Inuit from Kangiqsualujjuaq (2003 and 2004)
Scale 1:425,000
0 2.5 5 10 15 km
National Topographic Data Base 1:50,000
(NTDB) Natural Resources Canada
Geodetic datum: NAD 83
Modified transverse Mercator projection
Québec ground-space co-ordinate system, zone 5
Contour interval: 500 feet
KATIVIK
February 2005
Map 4.3
Baie d'Ungava
Baie de Keglo
Kangiqsualujjuaq
Rivière George
Mont Nuvulialuk
Mont Haywood
Mont Qarqaaluk
Mont D'Iberville
Chute Korluktok
Rivière Koroc
Ruisseau Narsaaluk
Ruisseau Sukaliuk
Rivière André-Grenier
Lac Amaryatuq
Lac Amittuujaq
Lac La Ralde
Lac Brumath
Lac Daniel
Lac Burrel
Lac Tasiguluk
Lac Thoymard
Lac Malchelosse
Lac Angusik
Anse Tasiujakuluk
Fjord Nachvak
Baie Nachvak
Anse Schooner
Fjord Saglek
Fjord Ugjuktok
MONTS TORNGAT
66°0'0"W
65°40'0"W
65°20'0"W
65°0'0"W
64°40'0"W
64°20'0"W
64°0'0"W
63°40'0"W
63°20'0"W
59°0'0"N
58°45'0"N
58°30'0"N

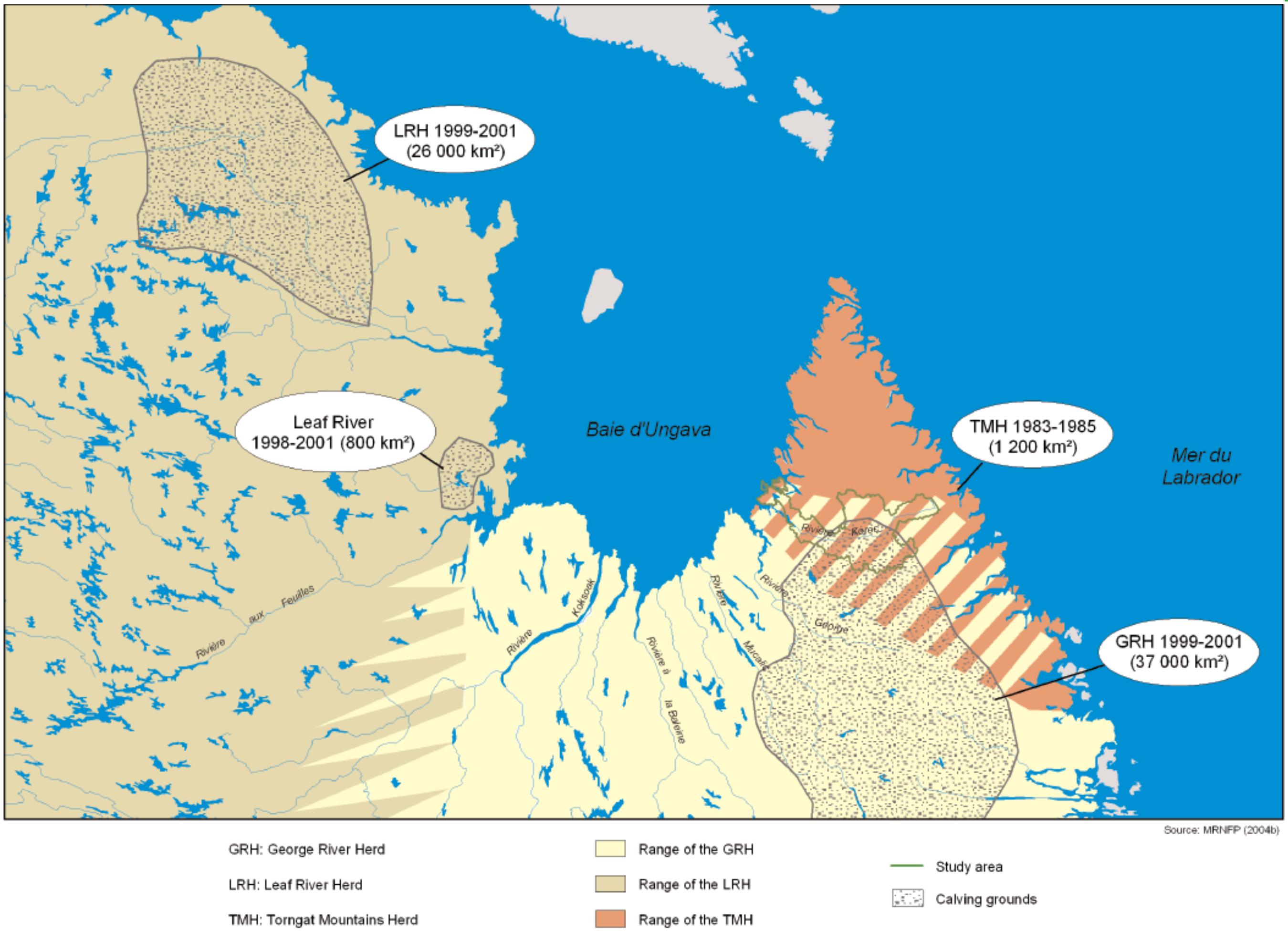


Figure 4.9 Annual Ranges and Calving Grounds of the Torngat Mountains, George River and Leaf River Caribou Herds in the Ungava Bay Region

Certain Inuit elders recount that, when Inuit still used dogsleds, caribou did not come as far as the George River, but remained around the upstream section of the Koroc River, below the tree line (Cuerrier, 2003a). These animals were probably from the TMH.

Inuit are also knowledgeable about caribou predators, which include wolf, black bear and polar bear. Wolves and Inuit, though, are the main competitors for this resource (Cuerrier, 2003a).

Caribou feed on herbaceous plants (**ivitsukait**), lichen (**tingaujait**) found on trees and along the ground, mushrooms, and willows (**urpiit**) in bud (Cuerrier, 2003a).

Black Bear

Black bear (*Ursus americanus*; **atsak**) thrive in the territory of the proposed park and were even observed on several occasions

Black bear thrive in the valleys of the Koroc River and its tributaries.

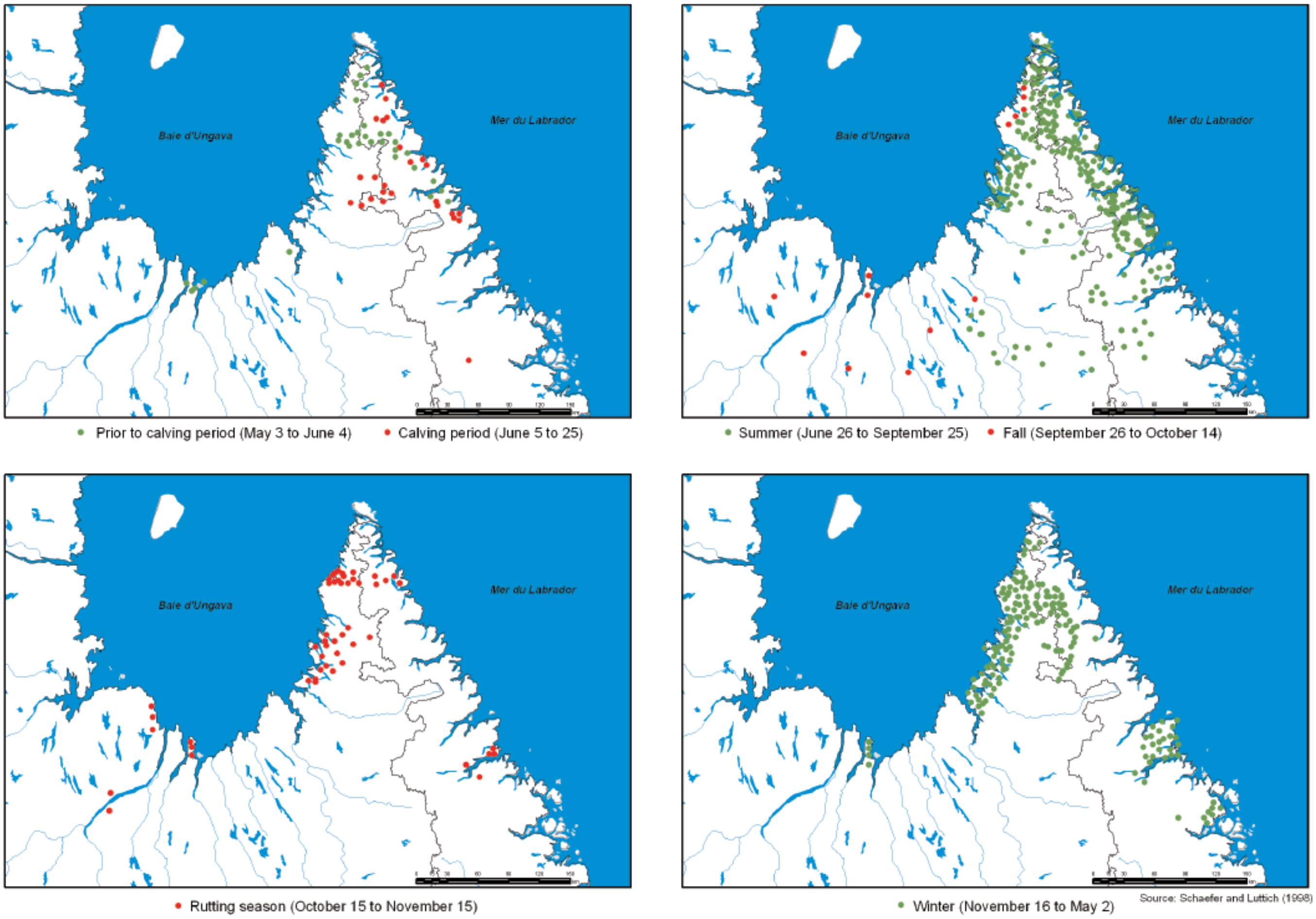


Figure 4.10 Seasonal Movements of a Few Female Caribou of the Torngat Mountains Herd, 1988 to 1997

during summer and fall fieldwork (July through September 2003; August 2004). This animal is most often found in the valleys of the Koroc River and its tributaries. It may be found in a variety of habitats such as coniferous forest, scrubland and less often tundra (Map 4.3). Black bear may be observed close to creeks and rivers, lakes and bogs. With the changing climate and the northerly advancement of the tree line, Inuit have noted more black bear in the Kangiqsualujjuaq area (Cuerrier, 2003a).

According to Inuit residents of Kangiqsualujjuaq, black bear may be found throughout the Ungava–Labrador Peninsula, especially in wooded areas. As well, their main sources of food are alpine bilberries (*Vaccinium uliginosum*; **kigutanginaq**), black crowberries (*Empetrum nigrum*; **paurngaq**), and cloudberries (*Rubus chamaemorus*; aqpiq or **arpik**), even before these berries become ripe (Cuerrier, 2003a).

Again according to Inuit, the black bear's annual cycle is as follows. In spring, black bear are thin and hungry; at this time, they feed on lemmings (*Dicrostonyx hudsonius*; **avinngaq**), fish (as they move downriver), as well as caribou calves and even adults. Towards the end of summer, they hunt fish as these fish move upriver. In the fall and winter, black bear are fatter, having gorged themselves on berries prior to hibernation. Without knowing why, Inuit state that black bear avoid eating berries located close to their dens and that berry patches are shared by family members. Black bears that wander into a family's berry patch will be chased away. Around October and November, black bear begin preparing for hibernation. Hibernation sites may be located near trees and in sandy areas where it is possible to dig deeply and easily. Black bear will sometimes reuse a den, if digging remains easy (Cuerrier, 2003a). Cubs are born in January and February during the hibernation period (Prescott and Richard, 1996; Pelton, 1982). Black bear abandon their dens at the end of winter, in April, when temperatures begin to warm. Some bear will sleep all winter long without waking, while others may wake, especially if disturbed. Black bear that are disturbed during hibernation are aggressive and can destroy cabins. Black bear are less dangerous following hibernation (Cuerrier, 2003a).

Black bear are active during the summer months; in fact, they are constantly on the move. Solitary animals, they do not congregate, except for mothers with their cubs, pairs of males and females during the rutting season, and around foraging areas (Pelton, 1982). If a black bear enters the territory of another, a fight will ensue (Cuerrier, 2003a). Black bear are generally most active at dusk. Because they are opportunistic animals, black bear can become an annoyance when "artificial" food is on-hand, including stealing from camps (Pelton, 1982). This kind of behaviour increases when natural sources of food are scarce. It seems however that black bear become aggressive and will attack only on rare occasions (Cadieux, 2001).

Red Fox and Arctic Fox

In the framework of the wildlife inventory compiled in February 2004 (Fortin, 2004), many red fox (*Vulpes vulpes*; **kajurtuq**) and Arctic fox (*Alopex lagopus*; **tiriganniaq**) tracks were observed, especially in the valleys of the Koroc River and its tributaries (Map 4.3). These tracks were most often found along with the tracks of snowshoe hare (*Lepus americanus*; **ukaliatsiaq**), Arctic hare (*Lepus arcticus*; **ukalik**), rock ptarmigan (*Lagopus muta*; **aqiggivik**) and willow ptarmigan (*Lagopus lagopus*; **aqiggiq**), four species that are regularly part of a fox's diet. While this inventory was being compiled, an Arctic fox was also observed. In addition, a family of red foxes was observed in August 2003 on the summit of a hill close to the Tasiguluk gorge and lake, and two foxes were observed at the head of the Koroc River in August 2004. Both species of fox appear to be abundant in the territory of the proposed park, given the number and frequency of tracks. Red fox may be found in a variety of habitats (Prescott and Richard, 1996). Further to observations made in the proposed park, this animal is equally at home on the bare summits of hills as in scrub and woodland valleys.

According to the Inuit of Kangiqsualujjuaq, all foxes behave similarly and enjoy the same habitats. Furthermore, foxes are more numerous around Kangiqsualujjuaq than in Labrador. The annual cycle of the Arctic fox is described as follows. In summer, Arctic fox move inland throughout the Ungava–Labrador Peninsula. By the end of the summer and in fall, they move west (Kuujjuaq) and then north, reaching Aupaluk and Payne Bay by winter. From this point, they venture out onto the pack ice of Ungava Bay, reaching shore again in the area around George River near the beginning of the summer. Arctic fox venture onto the bay's ice in search of seal carcasses left behind by polar bear. In advance of their return, which occurs in July, Inuit trappers set their traps along the shores of the bay. Arctic fox have been known to travel from Baffin Island to Ungava Bay across the pack ice. This species is also found frequently around Killiniq, near the ice there. Red fox and crossed fox, which are not as gregarious as Arctic fox, remain inland near wooded areas (Cuerrier, 2003a). Arctic fox feed on hare, mice (**nunivakkaq**), lemmings (**avinngaq**) and fish (brook trout, *Salvelinus fontinalis*; **aanak**) (Cuerrier, 2003a).

Fox construct their dens in sand, gravel and rock. Arctic and red fox breed along the Ungava–Labrador border, south of the Koroc River (Cuerrier, 2003a).

The red fox is equally at home on the bare summits of hills as in scrub and woodland valleys.

Red fox may possess a variety of colourings, although the tips of their tails are always white. The most common varieties have a yellowish red or dark red fur. In the case of the silver variety, the animal's fur is black at the base and white at the tip. Among the black variety, the fur is almost completely black, while the crossed variety (**akunnatuq**) has reddish brown fur mixed with black or white and dark shoulders. As regards Arctic fox, there exist two winter colourings: white and blue. The fur of the blue variety is blue-black to pearl grey in colour, while the white variety is completely white. Both varieties have the same colouring in summer, which is to say brownish slate or a yellowish colour (Prescott and Richard, 1996).

WOLF

Two sub-species of grey wolf (*Canis lupus*; **amaruq**) are known to be present in Québec: the Eastern wolf (*C. l. lycaon*) and the Labrador wolf (*C. l. labradorius*). The latter may be found in the proposed park. The Labrador wolf is larger, has a paler coloured fur and possesses a larger and stockier skull than the Eastern wolf (Hénault and Jolicoeur, 2003). The grey wolf's fur is both longer and thicker among Northern populations. The colouring of the grey wolf varies from individual to individual, from pure white to coal black. The usual colouring is a pale brown or cream colour mixed with brown, black and white. Wolves with a pale or white colouring prevail in a good part of the Arctic, although black coloured individuals may also be found (Paradiso and Nowak, 1982). Wolves moult in April and May but do not change colour (Cuerrier, 2003a).

Although their numbers in the study area are not known, it is possible that grey wolves are numerous since they are a predator of caribou. Wolf tracks were observed in February 2004 near the head of the Koroc River (Fortin, 2004) and wolf droppings were seen on a few occasions in July 2003. A canoeist reported seeing a whitish coloured wolf at the junction of the Koroc River and Naksarulak Creek (Jacques Bouffard, personal communication, July 2003). A wolf was also observed in the Mount D'Iberville cirque in July 2004. Grey wolves are at home in a wide variety of habitats, ranging from the open tundra to dense woodland (Prescott and Richard, 1996).

Inuit state that wolves move throughout the Torngat Mountains and may be found following caribou, their main source of food. Wolves also eat lemmings and fish. Wolf pups are born between March and May and their fur is the same colour as their parents' fur. Several dens are located near Kangiqsualujjuaq and on nearby hills (Cuerrier, 2003a).

Porcupine feed on the bark of black spruce.
Credit: Josée Brunelle (KRG)

PORCUPINE

According to Inuit elders from Kangiqsualujjuaq, porcupine (*Erethizon dorsatum*; **ilaaqutsiq**) have only recently arrived in the study area. When these elders were young, roughly 60 years ago, there were no porcupines in the area. Porcupine may be found in wooded areas, especially along the Koroc River. Numerous foraging sites were observed in black spruce and tamarack during fieldwork carried out in the summers of 2003 and 2004. In addition, porcupine were observed feeding on the bark of black spruce during the wildlife inventory compiled in February 2004 (Fortin, 2004).

Species at Risk

The proposed park and nearby areas may nurture certain wildlife that appear on the list of species likely to be designated as threatened or vulnerable in Québec (MRNFP, 2004a). Included on this list are Canada lynx (*Lynx canadensis*; **pirtusiraq**). Wolverine (*Gulo gulo*; **qavvik**), which is a threatened species in Québec, may also be found in the proposed park (Appendix 6).

Although no signs of Canada lynx were observed in the study area, this large member of the cat family could be present since its main prey, the snowshoe hare, is relatively common and since the habitat of the study area is suitable to them. Generally speaking, lynx are found in coniferous forests with good coverage and close to regenerating forest areas (MEF, 1995). In the boreal forest zone, lynx inhabit forests that are at a relatively advanced stage of development (roughly 20 years old), with a preference for areas where logging has taken place and that are populated by balsam fir (*Abies balsamea*), high-growing shrubs with trembling aspen (*Populus tremuloides*) and cherry trees (*Prunus* sp.). Lynx seem to avoid sectors characterized by mature softwood (Noiseux and Doucet, 1987).

In 1982, wolverine throughout Canada were classified as a single, homogeneous group. In April 1989, this group was divided into two populations (the western and eastern populations), and the eastern population whose range covers both Québec and Newfoundland and Labrador was designated as an endangered species by COSEWIC pursuant to the *Species at Risk Act*. This status was reviewed and confirmed in May 2003 (COSEWIC, 2004b). Wolverine have been designated as a threatened species in Québec pursuant to the *Act respecting Threatened or Vulnerable Species* and, since July 2002, in Newfoundland and Labrador pursuant to the *Endangered Species Act*.

Fortin (2004) has indicated that the entire area of the Torngat Mountains, which covers 40 000 km^2, for the most part in Labrador, represents a suitable habitat for wolverine: snow cover remains through April, glacial cirques and talus are present in abundance, human occupancy is sparse (<1 inhabitant/km^2), the wild habitat is immense, and members of the cervidae family may be found in the area for part of the year. According to Magoun and Copeland (1998), glacial cirques are the preferred habitat of female wolverine for their birthing dens.

In February 2004, a wildlife inventory based on tracks left in the snow was compiled in the study area. No wolverine tracks were observed (Fortin, 2004). Inuit residents of Kangiqsualujjuaq state that no wolverine or wolverine tracks have been observed in the territory of the proposed park for more than 30 years. In the past however, wolverine were known to live in wooded areas, foraging through carcasses left by other predators and even chasing wolves away from caribou carcasses. Wolverine were also known to break into food caches (Cuerrier, 2003a).

BIRDS

According to the *Québec Breeding Birds Atlas* (Gauthier and Aubry, 1995) and other sources (Y. Aubry, Canadian Wildlife Service, personal communication, September 2004), roughly 125 species of birds are thought to be present in the proposed park and adjacent areas (Appendix 7).

From mid-June to the beginning of July in 1975, Ouellet (1978) compiled an inventory of birds for the Canadian Museum of Nature. His main objective was to identify the bird species that nest in the valley of the Koroc River, a wooded valley that is cut-off from more southerly wooded regions. Ouellet confirmed the presence of 49 species, including 34 nesting species. It is important to note that Ouellet's observations covered neither the coastal nor mountainous sectors of the proposed park.

Ouellet's observations (1978) revealed that the most abundant species of bird in the valley of the Koroc River is the white-crowned sparrow (*Zonotrichia leucophrys*; **nasaulligaaq**). This bird was observed throughout the study area, except in dense tree stands. In addition, during fieldwork carried out in July 2003, this species was heard and observed on many occasions, particularly in scrubland with scattered black spruce.

Inuit have indicated that the white-throated sparrow (*Zonotrichia albicollis*; **nasaulligaaq** or **quputaalik)** and the white-crowned sparrow feed on mosquitoes. Their nests, which are made of twigs, may often be found on the ground camouflaged under willow (*Salix* spp.) and birch (*Betula* spp.) bushes. The eggs of these species are small and brown. Both species migrate from the region with the coming of snow and return before the snow bunting (*Plectrophenax nivalis*; **amaulligaaq**). The snow bunting builds its nest under rocks, arriving in Kangiqsualujjuaq in April and migrating south in the fall (Cuerrier, 2003a).

According to Ouellet (1978), the American tree sparrow (*Spizella arborea*; **ukiursiulik**) is also abundant in several different types of habitat, while the dark-eyed junco (*Junco hyemalis*) may be found in coniferous tree stands, along with the ruby-crowned kinglet (*Regulus calendula*), the blackpoll warbler (*Dendroica striata*; **saksagiaq**), the yellow-rumped warbler (*Dendroica coronata*; **qupanuatuinnaq**), the boreal chickadee (*Poecile hudsonicus*; **kutsusiurqiit**), the gray jay (*Perisoreus canadensis*; **qupanuarjuaq**) and the pine grosbeak (*Pinicola enucleator*). This last species was observed in the valley of the Koroc River in February 2004 (Fortin, 2004).

The spruce grouse (*Falcipennis canadensis*; **aqikili**) may also be found in the coniferous tree stands of the study area, although its presence was unexpected in this valley which is isolated from other wooded areas. In fact, Ouellet (1978) proposed that, because the spruce grouse is a sedentary species, its presence is proof that the study area was once part of a larger continuous forest. Deteriorating climatic conditions have left an isolated wooded area that is nonetheless able to support this species. The presence of the spruce grouse near the George River was noted by Moravian missionaries during an expedition in 1811 (Cayouette, 1999). Like Ouellet, the Inuit of Kangiqsualujjuaq also state that the spruce grouse inhabits wooded areas in the region (Cuerrier, 2003a).

The white-crowned sparrow may be observed in scrubland with scattered black spruce.

Sitings of the tree swallow (*Tachycineta bicolor*), the barn swallow (*Hirundo rustica*), the bank swallow (*Riparia riparia*; **anurisiutik**), the belted kingfisher (*Ceryle alcyon*; **tuggajuuq**), the veery (*Catharus fuscescens*) and the brown thrasher (*Toxostoma rufum*; **papitukutaalik**) at such northerly latitudes surprised Ouellet; these species are generally observed at more southerly latitudes (Ouellet, 1978).

Along the banks of ponds and the Koroc River, next to tree stands, Ouellet (1978) observed the American robin (*Turdus migratorius*; **qupanuaraaluk**), the yellow warbler (*Dendroica petechia*), the northern waterthrush (*Seiurus noveboracensis*), the Wilson's warbler (*Wilsonia pusilla*) and the rusty blackbird (*Euphagus carolinus*; **tulugaujaq**). These species are widespread and found in southern Québec. The hoary redpoll (*Carduelis hornemanni*) and the common redpoll (*Carduelis flammea*; **saksagiaq** or **sirsigiaq**) may also be found in thickets of willow and alder.

On the tundra, Ouellet (1978) observed only three species of birds: the American pipit (*Anthus rubescens*; **ingittajuuq**), the horned lark (*Eremophila alpestris*; **qupanuarpaq**) and the willow ptarmigan (*Lagopus lagopus*; **aqiggiq**). With respect to willow ptarmigan, Inuit have identified their nesting areas in the valley of the Koroc River and in the area around Mount Haywood (fieldwork, July 2003). In July 2003, in the area near Mount Haywood, a female willow ptarmigan with nestlings was observed on several occasions. This species of bird was also seen in the valley of the Koroc River in February 2004 (Fortin, 2004). The Inuit of Kangiqsualujjuaq noted that willow and rock ptarmigan (*Lagopus muta*; **aqiggivik**) are abundant in March when migrating to their nesting areas. Some ptarmigan nest in the study area and others further north. At this time of the year, they may be found along the upstream sections of rivers, near wooded areas; by April, they have moved closer to the coast. Those birds that migrate north, return to the region in October and November. Rock ptarmigan have been known to migrate to Baffin Island in April and May (crossing the Hudson Strait) in order to nest (Cuerrier, 2003a). The habitat preferred by willow ptarmigan is low-growing shrubs, which is to say thickets of alder, willow and birch. During the breeding season, this bird is found on the tundra. In winter, it migrates to sheltered valleys and is often found in shrubs that grow along the banks of lakes and rivers and in forest clearings (Lamothe and Doyon, 1995). As concerns the rock ptarmigan, it typically breeds on the tundra, specifically on dry, rocky or barren ground located on a steep slope often with scattered rock outcroppings. The rock ptarmigan winters in the barren uplands (Cotter, 1995) and in areas where there is less vegetation, unlike its cousin the willow ptarmigan.

Willow ptarmigan nest in shrubby areas in summer and congregate in the valley of the Koroc River in winter.

Also in the valley of the Koroc River, Ouellet (1978) noted that waterfowl were scarce, with the exception of the Canada goose (*Branta canadensis*; **nirliq**); he did however observe the American black duck (*Anas rubripes*; **mitirluk**), the green-winged teal (*Anas crecca*; **ivugaapik** or **kuuksiutik**), the harlequin duck (*Histrionicus histrionicus*; **tullirunnaq**) and the common goldeneye (*Bucephala clangula*; **katjituk**). In fact though, it is not accurate to say that waterfowl are scarce in the region; Ouellet (1978) did not have an opportunity to observe them, probably, because he did not travel to the coast. Local Inuit regularly observe various species of waterfowl and shared the following knowledge about some of these species.

Inuit residents of Kangiqsualujjuaq indicated that the Canada goose moults in July and August, in the region near Le Droit Point. This bird is particularly abundant in the region in April and May but becomes scarce in the fall because it migrates south at the end of September through the beginning of October (Cuerrier, 2003a). This species may be found scattered along the coast from Whale River, which is roughly 100 km southwest of Kangiqsualujjuaq, all the way to Le Droit Point. Canada geese have four major nesting areas: between the Whale River and Hubbard Point; south of Keglo Bay; along the Davis Strait; and along Le Droit Point from the north shore of Alluviaq Fjord (refer to Figure 4.8). The Canada goose prefers to nest in damp habitats along the coast or on lakes, and it may also nest on islands off the coast. During the fieldwork carried out in the study area, Canada goose droppings were observed inland, specifically at Lake Tasiguluk. The snow goose (*Chen caerulescens*; **kanguq**) is scarce in the study area, passing by Killiniq during its fall migration (Cuerrier, 2003a).

According to Inuit residents of Kangiqsualujjuaq, a great number of common eider (*Somateria mollissima*; **mitiq**) may be found along the coast of Labrador in the spring, before migrating to Ungava Bay to nest, moult and feed between June and September. In July, the common eider may be observed on small islands in Ungava Bay and along the Labrador coast. Normally, it nests on islands that are smaller than those used by the Canada goose. Such islands offer better protection against predators such as fox. Inuit noted three major nesting areas. These are the Arrarlik Islands, the Nauyu Islands (all the way to Hubbard Point) and the islands found between Keglo Bay and Alluviaq Fjord. In October, the common eider moves north and may be observed in the polynya around Killiniq throughout the winter months (refer to Figure 4.8; Cuerrier, 2003a).

With respect to birds of prey, Ouellet (1978) indicated that they were scarce, having observed only a great horned owl (*Bubo virginianus*; **unnuasiutik**) and a golden eagle (*Aquila chrysaetos*; **natturalik**). This latter species was observed in-flight near Mount Haywood during fieldwork carried out in July 2003, but the most frequently observed species was the rough-legged hawk (*Buteo lagopus*; **kiggavik** or **qinnuajuaq**), both around Mount Haywood and at the mouth of the Koroc River, near rocky cliffs. In July 2003, nests were observed on the rocky walls of the valley that leads to Mount D'Iberville and near the gorge that leads to Lake Tasiguluk.

Inuit residents of Kangiqsualujjuaq also noted the presence of falcons and buteos (**kiggaviit**, which is the plural form of kiggavik) everywhere that there are mountains (Cuerrier, 2003a). In the region, these species may be gyrfalcon (*Falco rusticolus*), peregrine falcon (*Falco peregrinus;* **kiggavik** or **kiggaviarjuk**) or rough-legged hawk (*Buteo lagopus;* **kiggavik** or **qinnuajuaq**) (Appendix 7). *Kiggaviit* feed on ptarmigan, goose, duck, loon, hare and fish. In fall, they will attack young gulls and ducks as they migrate south. They sometimes attack ravens. *Kiggaviit* nest in hard-to-reach places, such as cliff walls, though these nests may often be observed from above. Their eggs, which are blue, are laid in May; if the parents are dark in colour, their eggs will also be dark. *Kiggaviit* do not change colour when they moult. They remain active throughout the year and do not migrate (Cuerrier, 2003a).

The snowy owl (*Nyctea scandiaca*; **ukpik**) was observed near the head of the André-Grenier River in August 2003. This species does not nest on cliffs, but instead in places where there are bushes. Its clutch can sometimes comprise a fair number of eggs (Cuerrier, 2003a). In fact, the size of a clutch will vary considerably depending on the abundance of food. For example, when the snowy owls' main food source, lemming, is abundant, a clutch may reach as many as 14 eggs (Henderson, 1995). In Labrador, the snowy owl is found in valleys with abundant shrub vegetation. This species is skilled at hunting and seems to prey on the same animals as *kiggaviit* (pergrine falcon and rough-legged hawk): ptarmigan, hare, lemming, mice, and fish (while these are ascending rivers and may be found in shallow water). When lemming are abundant, snowy owl populations also increase. The snowy owl is particularly active at dusk and early in the morning (Cuerrier, 2003a). Generally, adults do not migrate and they are almost

Rough-legged hawk nestlings perched on a rocky cliff near Lake Tasiguluk completely white. Young snowy owls may migrate over varying distances and they are white for the most part with streaks of black or dark brown (Y. Aubry, Canadian Wildlife Service, personal communication).

According to Inuit, the woodpecker (**tuggajuuq**) is observed only infrequently around Kangiqsualujjuaq (Cuerrier, 2003a). In the region, any of the following three species may be observed: the three-toed woodpecker (*Picoides tridactylus*), the black-backed woodpecker (*Picoides arcticus*) or the northern flicker (*Colaptes auratus*) (Appendix 7). For the most part, this species may be found nesting along the Koroc River, in holes made in trees. It feeds on insect larvae (**napartuuq qupirrunga**) that may be found living in trees (Cuerrier, 2003a).

According to the Inuit of Kangiqsualujjuaq, the common loon (*Gavia immer*; **tuulliq**), the red-throated loon (*Gavia stellata*; **qaarsauq**) and the pacific loon (*Gavia pacifica*; **kallulik**) always nest near water because they are not good walkers. Normally, a clutch comprises two eggs, rarely one or three, and all of these hatch or, sometimes, none at all if the summer has not been very warm. The main predator of the loon is the gyrfalcon (Cuerrier, 2003a).

With respect to seabirds, the Inuit of Kangiqsualujjuaq indicated that the black guillemot (*Cepphus grylle*; **pitsiulaaq**) may be found near Killiniq all winter long. The razorbill (*Alca torda*; **appaq)** may be observed between Le Droit Point and Killiniq (Cuerrier, 2003a). These species are sometimes observed in the study area, especially along the coast during migration periods.

Although highly unusual, the Inuit of Kangiqsualujjuaq noted that a tundra swan (*Olor columbianus*; **qutjuq**) was once observed near Cape Kattaktoc, roughly 55 km north of Keglo Bay (refer to Figure 4.8). In addition, KRG staff observed a great blue heron (*Ardea herodias*; **tatiggaq**) as it fed in a pond near the village of Kangiqsualujjuaq on 4 September 2004. The accompanying Inuit stated that such a bird had never before been seen in the region (C. Fortier-Pesant, KRG, personal communication, September 2004).

Species at Risk

The harlequin duck, which was observed in the study area by Ouellet (1978), is classified, in Canada, as a species of special concern and, in Québec, as a species likely to be designated as threatened or vulnerable (Environment Canada, 2004; MRNFP, 2004a). This duck reproduces near creeks and rivers with clear, fast-running water and is often observed in mountainous and wooded areas. Outside of its breeding period, the harlequin duck may be found in coastal areas. It is observed only rarely because it inhabits remote regions that are difficult to reach such as, among others, the watersheds of Ungava Bay (Robert, 1995b).

The barrow's goldeneye (*Bucephala islandica*; **qingutuq**) (eastern population) is classified, in Canada, as a species of special concern and, in Québec, as a species likely to be designated as threatened or vulnerable (Environment Canada, 2004; MRNFP, 2004a). It may be found in the study area, where it represents a migrating species (Appendix 7). It has been observed in the region of Ungava Bay, around the Koksoak, Whale and Arnaud (Payne) rivers (Todd, 1963; Savard, 1995). The main nesting sites of this species in Québec are along the North Shore. It may migrate over very long distances. From the beginning of July until the beginning of October, the Ungava Bay region is one area inhabited by the barrow's goldeneye while it moults. At this period of the year, this species is concentrated in rocky river estuaries; it may also moult inland, on lakes not far from the coast. Moulting takes place during the month of August (Benoit et al., 2001).

The golden eagle is not at risk in Canada, but has been classified as vulnerable in Québec since 16 March 2005 (Environment Canada, 2004; MRNF, 2005). Brodeur and Morneau (1999) noted that seven golden eagle nests were identified in the George River watershed between 40 and 190 km from Kangiqsualujjuaq. The golden eagle is generally found in mountainous regions cut by valleys and canyons with rocky cliffs. This species nests on such cliffs, hunting in open and semi-open environments such as bogs, marshes and on the tundra where small mammals are abundant including hare and rodents; it may also feed on galliformes (grouse and ptarmigan) and abandoned animal carcasses (Brodeur and Morneau, 1999; Robert, 1995a). Given the ecological needs of the golden eagle and our knowledge of the proposed park, it is highly probable that suitable nesting habitats for this species are present in the study area. This species is classified as a nesting migratory bird in the study area (Appendix 7). The Inuit have noted the presence of the golden eagle north of Kangiqsualujjuaq, everywhere where there are mountains and especially along the upstream sections of rivers like the Koroc (Cuerrier, 2003a).

The short-eared owl (*Asio flammeus*; **unnuasiutiapik**), is classified, in Canada, as a species of special concern and, in Québec, as a species likely to be designated as threatened or vulnerable (Environment Canada, 2004; MRNFP, 2004a). This species may be found in the study area as a migratory nesting bird (Appendix 7). This day-time owl hunts in open areas, fields and wetlands. In summer, it nests in grassy fields, grassy marshes, shrub vegetation, bogs and on the tundra. It feeds on small land mammals, mainly vole plus lemming in the North (Bélanger and Bombardier, 1995).

The bald eagle (*Haliaeetus leucocephalus*; **natturalik**) may also be found in the study area as a migratory nesting bird (Appendix 7). This species is not at risk in Canada, but has been classified as vulnerable in Québec since September 2004 (Environment Canada, 2004; MRNFP, 2004a). This bird of prey, which is mainly piscivorous, nests along wild coastline or along the shores of lakes and rivers less than 200 m from fresh or salt water where fish are abundant. Generally, the bald eagle nests in mature trees, normally choosing the highest in a given location (Bird and Henderson, 1995).

In Québec, there are two sub-species of peregrine falcon (**kiggavik** or **kiggaviarjuk**) according to the committee for the recovery of the peregrine falcon in Québec (2002). The northern sub-species, *Falco peregrinus tundrius*, has been classified, in Canada, as a species of special concern since September 2004; *Falco peregrinus anatum*, the southern sub-species, is classified as threatened in Canada and as vulnerable in Québec (Environment Canada, 2004; MRNFP, 2004a). The range of the *tundrius* sub-species in Québec includes the northern coastline of the province, in particular the coast of Ungava Bay. The boundary between the ranges of the two sub-species is not well defined; there may even exist a cross-species, in particular in the area of southern Ungava Bay (Bird et al., 1995). The area east of Ungava Bay and valleys next to bodies of water, like the Koroc River, seem to be conducive to nesting for the peregrine falcon (Bird, 1997). The nesting habits of the peregrine falcon may include nesting on the ground and in trees. Notwithstanding, cliffs, especially those near bodies of water, are the species' preferred habitat. In the Ungava Bay area, the peregrine falcon may inhabit the same cliffs as the gyrfalcon (*Falco rusticolus*) and the rough-legged hawk (*Buteo lagopus*), but rarely the common raven (*Corvus corax*) as is sometimes the case at more southerly latitudes. The peregrine falcon hunts birds most often but, on the tundra, it will also feed on small mammals (Bird et al., 1995).

FISH

Among the 24 species of fish that are potentially present in the study area, the Salmonidae family is the most numerous, with seven species represented, followed by the Cottidae family, with five species (Appendix 8).

According to Cunjak et al. (1986) and Adams et al. (1988), the species of fish that inhabit the Koroc River are the Arctic char (*Salvelinus alpinus*; **iqaluppiq**), the brook trout (*Salvelinus fontinalis*; **aanak**), the lake whitefish (*Coregonus clupeaformis*; **kapisilik**), the lake trout (*Salvelinus namaycush*; **isiuralittaaq**), the Atlantic salmon (*Salmo salar*; **saama**), the round whitefish (*Prosopium cylindraceum*; **kavisilik**), the three-spine stickleback (*Gasterosteus aculeatus*; **kakilasak**) and the nine-spine stickleback (*Pungitius pungitius*; **kakilasak**). Of these, Inuit rely mainly on Arctic char and Atlantic salmon for their subsistence. It appears that no study of the proposed park's marine ichthyfauna has ever been carried out. Dunbar (1952) nonetheless noted the presence of the Greenland shark (*Somniosus microcephalus*; **iqalutjuaq**) at the mouth of the Koroc River.

Lake trout seem to be scarce near Kangiqsualujjuaq. Inuit believe that a lack of food in the habitats of this species may account for their small numbers. Lakes connected to the Koroc and George rivers, as well as nearby small lakes, represent potential lake trout habitats (Cuerrier, 2003a). The burbot (*Lota lota*; **suluppaugaq**) and the northern pike (*Esox lucius*; **kigijuuq**) are present in the region's large rivers, above high-tide limits. The long-nose sucker (*Catostomus catostomus*; **milugiak**) is a bottom fish that is found in rivers which have a fair current (Cuerrier, 2003a).

Brook trout inhabit rivers of the study area including the Koroc River. This species feeds on mosquitoes, black flies and any other insects that may fall on the surface of the water. Certain Inuit speak of two types of brook trout: the first is a paler colour and migrates to the sea in summer; the second type is a darker colour and remains permanently in freshwater. Inuit have given both types of brook trout the same name. Sea-run brook trout remain in Ungava Bay for one month longer than Arctic char, before ascending the region's rivers (Cuerrier, 2003a).

The arctic sculpin (*Myoxocephalus scorpioides*; **kanajuq**) is one of the region's most abundant fish because its habitat is so common. It is a marine species that may be found anywhere along the coast where there are rocks for hiding. The arctic sculpin avoids areas where the bottom is sandy. In winter, it remains below the low-tide limit, below the ice. Otter and seal are two of the sculpin's predators. It is commonly called the "ugly fish" (Cuerrier, 2003a).

Arctic Char and Atlantic Salmon

Along with Atlantic salmon, Arctic char is the most important and prevalent of fish species in the region. Arctic char is the fish most often eaten in northern communities (Power et al., 1989). The region around Kangiqsualujjuaq possesses the highest concentration of Arctic char-inhabited rivers. The Koroc and George rivers have provided the Inuit with access to this resource for hundreds of years. According to subsistence catch figures compiled for these two rivers between 1987 and 1992, the annual number of Arctic char harvested was close to 5000. A study carried out in 1990 of sport fishing at outfitting camps put the number of Arctic char caught annually in the region around Kangiqsualujjuaq at roughly 800 (Tactical Plan Committee, 1997). Commercial harvesting was carried out on the Koroc River and Lake Qarliik through the winters of 1987–88 and 1988–89 with total annual catches of 250. Similar activities were carried out on the George River only in the winter of 1988–89 with a total catch of 300 (anonymous, 1990; Boivin, 1994). Over the last ten years, commercial or pilot project fishing permits have been issued for Arctic char on bodies of water in the region around Kangiqsualujjuaq, though not within the territory of the proposed park (M. Binet, MAPAQ; S. Roy, MRNF, personal communications, March 2005). Annually, the rules applicable to commercial fishing of Arctic char and other species are defined in a provincial fisheries management plan (Québec, 2004).

Inuit recognize three forms of Arctic char based on habitat and their biological cycle. This fish is known as **ivitaruk** or **aupiliak** when it takes on a redish colour during the spawning period. The sea-run form is known as **iqalupik** and the freshwater form is known as **nutillik** (Cuerrier, 2003a; Gillis et al., 1982). Both sea-run and freshwater forms spend the early years of their lives in freshwater. Once they have grown to at least 200 mm in length (two to nine years old), sea-run Arctic char make their first summer migration to the sea in order to feed. At the end of each summer or the beginning of fall, this fish returns to freshwater lakes and winters under the ice. Adult Arctic char repeat this annual migration for three to five more years before becoming sexually mature. Arctic char reproduce every two to three years in freshwater. Freshwater Arctic char spend their entire lives in freshwater (Power et al., 1989), where in fact they may be land-locked, as is the case with Lake Qarliik (Boivin, 1994).

Spawning female arctic char, a little downstream from Korluktok Falls

Atlantic salmon are in almost all cases a sea-run species. But like the Arctic char, a freshwater form does exist. Both sea-run and freshwater species spawn in rivers in fall (Bernatchez and Giroux, 2000). In the Ungava Bay region, the main salmon rivers are the Koksoak, the Whale and the George. Generally speaking, salmon enter these rivers during the first two weeks of August and spawning takes place at the end of September (Power, 1969). Following spawning, surviving salmon will often return immediately to the sea although some fish will winter in freshwater. These fish return to the sea the following spring or summer, along with salmon smolt which are between four and eight years old and at least 180 mm in length. These migrants will feed and grow at sea for one or more years before returning to freshwater in order to spawn (Power, 1969).

Inuit indicated that sea-run Atlantic salmon and Arctic char move down river to the sea in June and return upstream in July and August to spawn. The time they spend feeding at sea permits them to grow rapidly. Salmon spawn in the George River upstream from Helen's Falls (Cuerrier, 2003a). Arctic char are able to climb 87 km up the Koroc River. At this point, the Korluktok Falls is an impassable obstacle that limits their further migration (Adams et al., 1988; Boivin, 1994; Inuit residents, personal communication, 2003).

Arctic char spawn on the Koroc River from the end of September for roughly one month (Cunjak et al., 1986; Stenzel et al., 1989). An inventory of spawning sites was compiled by Cunjak et al. (1986) from the mouth of the river to a point 40 km upstream; the Korluktok Falls is located 87 km upstream. The spawning sites identified through this study and during a fly-over of the proposed park in September 2003 are located along the downstream section of the Koroc River, in the Narsaaluk Creek, in the Sukaliuk Creek, and a little ways downstream from the Korluktok Falls

(Map 4.3). Cunjak et al. (1986) noted that Arctic char choose to spawn where underground waters emerge, which serves to keep the area free of ice while the eggs are developing. This study did not identify spawning sites on any of the Koroc River's tributaries. During the spawning period, Arctic char may be observed a little ways downstream from Korluktok Falls. Males are bright red in colour and females are orange. Inuit call this place **Aupalijaartalik**, which means *where the Arctic char are red* (refer to Map 5.1).

Species at Risk

The cisco (*Coregonus artedi*; **kapisiliaruk**), which may be found in the proposed park and adjacent areas, is classified in Canada as a species of special concern and in Québec as a species likely to be designated as threatened or vulnerable (MRNFP, 2004a; Appendix 8). The cisco inhabits fast-running water and may sometimes be found in tidal areas (which is to say in brackish water) but never in salt water (Cuerrier, 2003a).

AMPHIBIANS AND REPTILES

In the *Atlas of Amphibians and Reptiles of Quebec*, maps illustrating the range of such animals stop short of Ungava Bay (Bider and Matte, 1996). Interviews conducted by Cuerrier (2003a) based on photos of frogs (**nirlinaujaq**), toads (**nirlinaujaq**), salamanders and snakes (**nimiriaq**) revealed that frogs or toads that hop and croak may be found near tundra ponds. It was not possible however to clearly identify the species in question. Inuit described these animals as very small with orange spotting and lines (ridges). Although scarce, this amphibia is found in inland marshes, ponds and small lakes beyond the tree line (Cuerrier, 2003a). In most likelihood, the species in question is the wood frog (*Rana sylvatica*). This species has been heard in spring near a pond close to Kuujjuaq (J. Brunelle, KRG, June 2004). It may also be a mink frog (*Rana septentrionalis*) since this species has been identified in Northern Québec in the James Bay and Caniapiscau Reservoir areas (Bider and Matte, 1996). The American toad (*Bufo americanus*) may also be present in the territory of the proposed park. This species has been identified (Bider and Matte, 1996) and heard (J. Brunelle, KRG, June 2004) in the Richmond Gulf area next to Hudson Bay.

INSECTS AND SPIDERS

Little research has been carried out on insects and spiders in the study area. In 1986, Morgan (1989) compiled an inventory of ground beetles in the eastern part of the Ungava Bay region. Inuit residents were also able to share some knowledge about insects (Appendix 9).

Biting insects, such as mosquitoes (*Aedes* spp.; **kitturiaq**), black flies (*Simulium* spp.; **nuviuvak**) and horse flies (deer flies; *Chysops* spp.; **milugiaq;** *Hybomitra* spp.; *Tabanus* spp.; **milugiakallak** or **miluriarjuaq**) may be found in the territory of the proposed park during the summer months. According to observations made during fieldwork, adult black flies and mosquitoes are abundant from the end of June or the beginning of July until the end of August or the beginning of September, depending on weather conditions. Inuit indicated that mosquito larvae develop in wetlands (where water collects temporarily) and that mosquitoes are less numerous when there is less precipitation. If there is heavy snow accumulation in winter, mosquitoes will be more abundant and larger the following summer (Cuerrier, 2003a). Once larvae are fully developed, they transform into pupa and then winged adults.

Among the 29 species of ground beetles identified by Morgan (1989), roughly twenty were collected near the territory of the proposed park, in particular in Kangiqsualujjuaq and at four stations that stand near the mouth of the Koroc River (Appendix 9). The results of this work permitted the known ranges of six species to be extended, including five species found in the proposed park. These are *Amara pseudobrunnea*, *Elaphrus lapponicus*, *Nebria suturalis*, *Patrobus stygicus* and *Trechus crassiscapus*.

Insects and spiders were not thoroughly reviewed with Inuit residents. The resulting lack of information makes it impossible, for the moment, to compare Inuit and scientific knowledge (Cuerrier, 2003a).

An insect larva, known as **napartuuq qupirrunga,** feeds on trees, especially black spruce (*Picea mariana*; **napaartutuinnaq**). This larva gouges cavities in trees and discards wood debris nearby on the ground. It also represents the preferred food of one species of woodpecker. With respect to spiders, two names were reported **aasivalaaq** and **mitjuajuk** or **mitjuaruk**. The former is large, while the latter is smaller. Both are found in ground-based habitats and they spin webs (Cuerrier, 2003a).

[1] The words shown in bold are Inuktitut names for the different animals (Kangiqsualujjuaq dialect).

5 HISTORY OF HUMAN OCCUPATION

Pre-contact Period: Successive Human Occupations in Nunavik

EARLY PALEO-ESKIMO OCCUPATION (4000–2500 YEARS BP)

Early paleo-Eskimo, comprising the pre-Dorset subgroups *Independence I* and *Saqqaq*, were the first humans to occupy the eastern Arctic. They crossed the Bering Strait from Siberia in search of wildlife, roughly 4500 years ago (Figure 5.1), arriving in Nunavik around 4000 years before present (BP), a time marked by the onset of cooler climatic conditions. (Table 5.1; Figure 5.1).

Carefully crafted stone implements such as scrapers, microblades, bifacial points and chisels characterize the paleo-Eskimo period. In addition to stone, they worked bone, wood and antler to produce bows and arrows, as well as harpoon points and spears. These implements, which were often composite constructions, were used for hunting seal, walrus and caribou, as well as for fishing. Although the climate was milder than today, paleo-Eskimo dwellings were adapted to the Arctic and took the form of skin tents held in place with rocks. On the inside, these dwellings possessed an axial layout with a boxed hearth and sometimes food caches.

As concerns the origins of these early inhabitants, a distinction has been made between those of the eastern part of Nunavik (Ungava–Labrador) and those of the western part (Hudson Bay), which is to say the Ungava population originated from Labrador (Plumet, 1976, 1981, 1986, 1994; Desrosiers, 1986; Gendron and Pinard, 2000). This hypothesis contradicts Taylor (1968) who originally proposed that the entire region had been inhabited from west to east.

Archaeological sites in the eastern part of Nunavik are characterized by dwellings that are less frequently associated with block fields, compared with the western part of the region (essentially the eastern coast of Hudson Bay; Gendron and Pinard, 2000; Desrosiers, 1986; Plumet, 1994; Avataq Cultural Institute, 1992e, 1996a, 1996b, 1998, 1999). In the eastern part of Nunavik, dwellings were more often tent structures without a specific interior layout or double-lobed structures based on an axial layout (Figure 5.2). The stone materials used were regional varieties of quartz and quartzite, including Diana quartzite in the Quaqtaq area (Plumet, 1981; Avataq Cultural Institute, 1999; Desrosiers and Rahmani, *printing in progress)*. Metachert quarried from an outcropping at Ramah in Labrador, near the boundary of the proposed park, has also been discovered in the form of carefully crafted objects (Plumet, 1981).

The presence of stone imported from Labrador and the various stone elements that correspond to the *Independence I* tradition in Labrador (generally associated with the early paleo-Eskimo occupation of the far north of Greenland and Ellesmere Island) appear to link the populations of eastern Nunavik and Labrador. Carbon-14 dating ranging between 3600 and 2500 BP is slightly more recent than the results of dating for the western part of Nunavik. The few pre-Dorset sites located in the proposed park are uncommon and archaeological excavation work should be carried out to more clearly understand their composition. Although the sites identified through fieldwork carried out in August 2004 are obviously paleo-Eskimo, it has not yet been possible to ascribe them to a precise period (Table 5.2; Map 5.1).

DORSET OCCUPATION (2000–1000-900 YEARS BP)

Around 2000 years BP, a colder climate again spread across the Arctic. Pack ice remained for an extended period of the year, facilitating seal hunting. Stone implements became more and more sophisticated and open-socket harpoon heads more and more effective. Stone implements included finely cut bifacial points with tip-fluting as well as chisels that were polished instead of cut and often made from nephrite. Polished points made of schist also appeared during this period, and scrapers and needles demonstrate that skins were being worked and sewn. For the preparation of meals and heating, rectangular containers made of soapstone were used. All these characteristics are generally ascribed to the Dorset period. But do these characteristics represent an evolution from the pre-Dorset culture or the arrival of a new wave of immigrants? Certain similarities with pre-Dorset culture may be identified, but the differences are more numerous. This question is still far from being resolved and the answer, even a partial answer, will require further research throughout Nunavik.

Dorset dwellings came in various forms and sometimes reflect the seasonal nature as well as the age of the site. From the simple oval tent structure to the pit house (**qarmak**) and even long houses, the Dorset people adapted their architecture to the arctic climate (Figures 5.3 and 5.4). The Dorset people occupied the same territory that had been inhabited by pre-Dorset populations and were essentially a maritime people who rarely travelled inland.

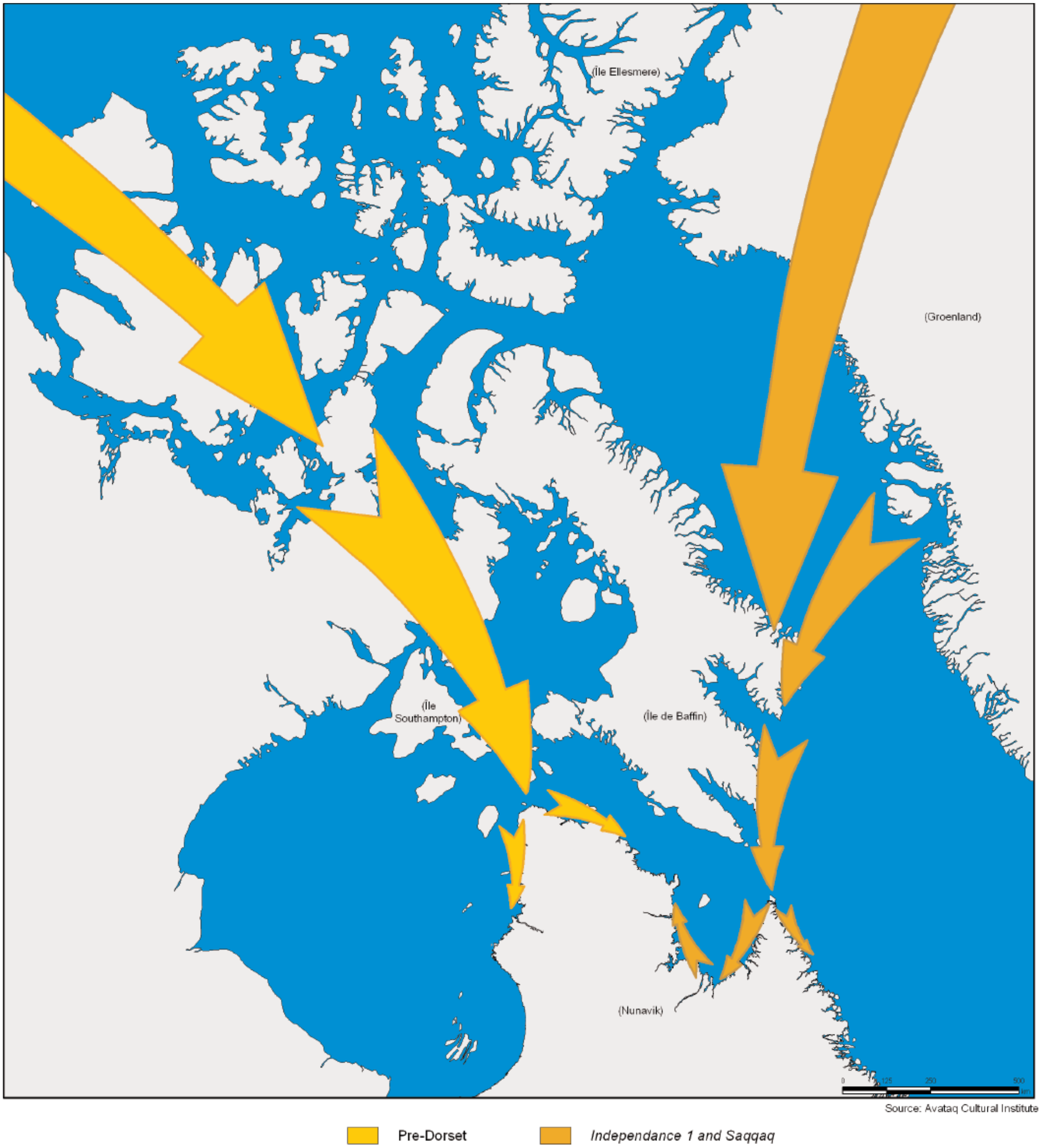


Figure 5.1 Inhabitation of Nunavik by Early Paleo-Eskimo Groups

Table 5.1 Major Occupation-Related Events

PERIOD	GROUP	DATE (before present)	EVENTS
Neo-eskimo (chiefly marine activities)	Contemporary Inuit (sedentarized)	100– (climatic warming)	Onset of settlement around fur trading posts (1900-1950). Regularization of relations between the governments of Canada and Québec and the Inuit (since 1950). Signature of the JBNQA (1975). Creation of Northern villages and organizations defined under the JBNQA.
	Transition from recent historical to contemporary Inuit (gradual sedentarization)	200–100	Increased contact between Euro-Canadians and Inuit (1800–1900). Establishment of fur trading posts early in 20th century.
	Recent historical Inuit (onset of sedentarization)	400–200 (climatic cooling)	Early contact with Europeans (1600–1800).
	Thule (less nomadic lifestyle; collecting in groups or villages during winter)	600–400	Thule, the direct ancestors of the Inuit, arrive in Nunavik from Baffin Island (1400).
		750–600	Arrival in the Canadian Arctic from Alaska. Transition from Dorset to Thule (1000–1250).
Recent Paleo-Eskimo (chiefly marine activities)	Dorset (nomadic lifestyle)	2000– 1000 or 900 (climatic cooling) (2200 in Nunavik)	A new group appears throughout the eastern Arctic. Some suggest a localized development of the Pre-Dorset culture. Temporary and seasonal occupation along the Koroc River.
Early Paleo-Eskimo (land and marine activities)	Pre-Dorset (western Nunavik) Independence I	4000–2500 (climatic cooling)	Pre-Dorset groups arrive in Nunavik from Baffin Island.
	Groswater (eastern Nunavik) Pre-Dorset (Baffin Island, Foxe Bassin) Independence I (north-eastern Greenland) Saqqaq (central western coast of Greenland) (nomadic lifestyle)	4500–4000 (milder climate than today)	First Pre-Dorset groups arrive in the eastern Arctic from Siberia.

Source: Avataq Cultural Institute

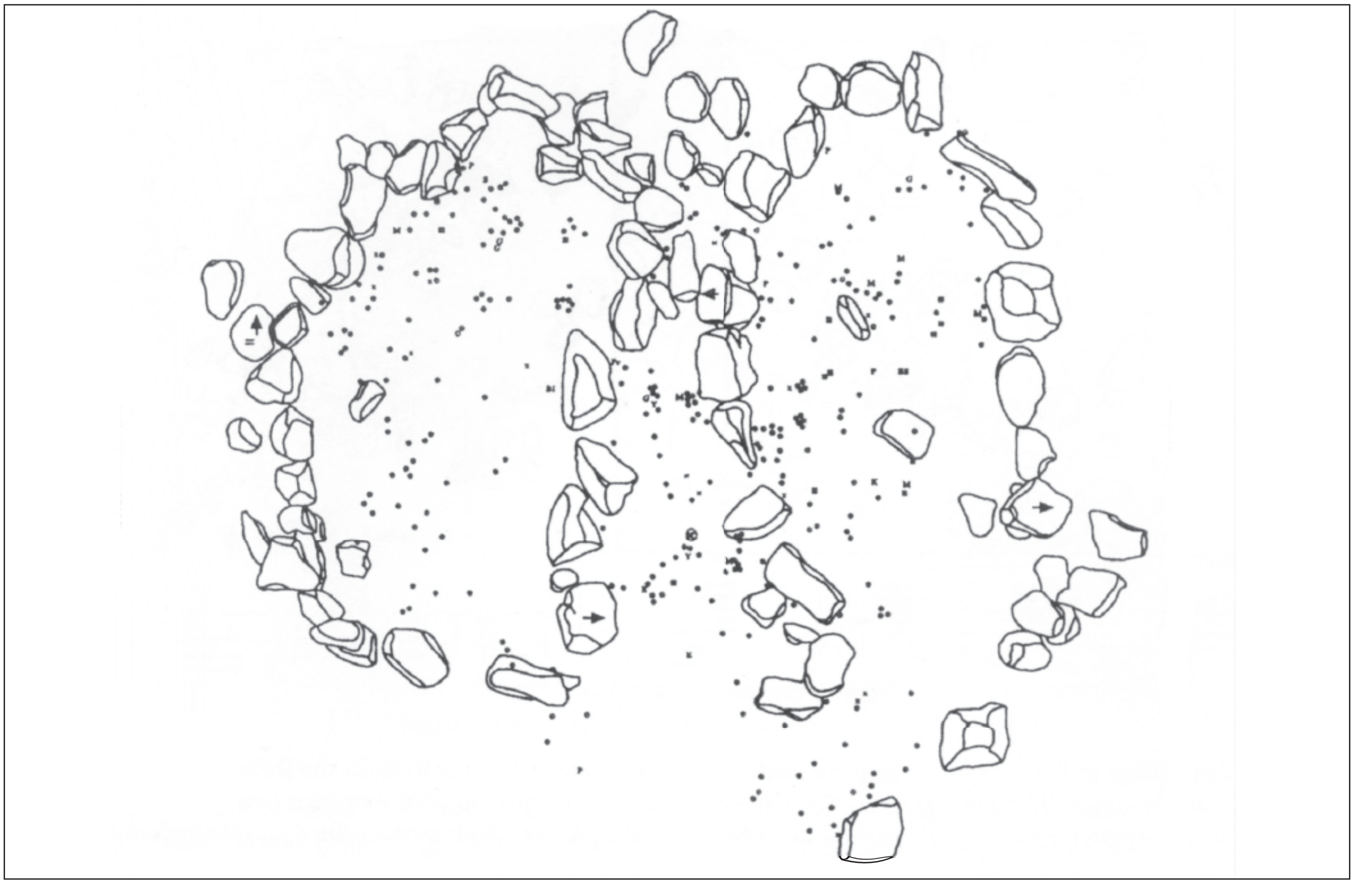


Figure 5.2 Double-Lobed Structure of the Pre-Dorset Period

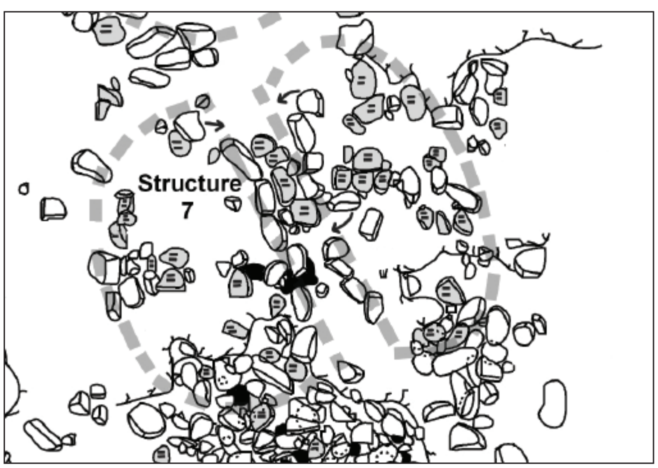


Figure 5.3 Tent Structure with Axial Layout from the Middle Dorset Phase

In addition to producing implements from stone, ivory and bone, the Dorset people carved animal and human figurines from ivory, antler, bone and wood. Both symbolic and naturalistic, such walrus, bear, seal and human figurines have often been ascribed to shamanistic ritual. The people of this period constructed snows knives from ivory and antler, and probably built igloos. Remnants of a sled found on Baffin Island is the only evidence that this means of transportation was used by the Dorset people. Notwithstanding, the surprising absence of skeletal dog remains with the remains of other wildlife suggests that these sleds would have been pulled by humans. Although the Dorset people seem to have been a seafaring people, their kayaks were small as demonstrated by the remnants and caches that have been discovered.

No overview of the entire region for this period has ever been completed. While many sites have been identified, archaeological excavation work has only been carried out at a few. As well, because several of these sites were occupied repeatedly by various groups, they present a mix of cultures. This mixture of cultures has in fact fuelled speculation about contact between paleo- and neo-Eskimo. To facilitate discussion of

Table 5.2 Occupation Sites Identified in the Proposed Park

BORDEN	NAME	LOCATION	MAP	AUTHOR (YEAR)	CLASSIFICATION
IfCw-1	KOR-24	Mount D'Iberville valley	14L/3	Avataq (2004)[1]	Neo-Eskimo
IdDb-1	Koroc River	East shore of river, north of Mount Haywood	24 I/9	Fitzhugh (1979)	Historical Neo-Eskimo Inuit (–1900)
IdDb-2	Koroc River	West shore of river, north of Mount Haywood	24 I/9	Fitzhugh (1979)	Historical Neo-Eskimo Inuit (–1900)
IdDb-3	Koroc River	West shore of river, west of Mount Haywood	24 I/9	Fitzhugh (1979)	Contemporary Neo-Eskimo or Historical Neo-Eskimo
IdDb-4	KOR-25	Koroc River	24 I/9	Avataq (2004)	Neo-Eskimo
IdDb-5	KOR-27	Koroc River	24 I/9	Avataq (2004)	Historical Neo-Eskimo Inuit
IdDb-6	KOR 28	Koroc River	24 I/9	Avataq (2004)	Historical Neo-Eskimo Inuit
IdDc-1	Koroc River	2.5 km from the junction of the Naksarulak and Koroc rivers	24 I/9	Fitzhugh (1979)	Dorset
IdDd-1	Koroc River	North shore of river, at Korluktok Falls	24 I/10	Fitzhugh (1979)	Contemporary Neo-Eskimo Inuit (+1900)
IdDd-2	Tivi Etok	Koroc River	24 I/10	Avataq (2004)	Historical Neo-Eskimo Inuit (1948)
IdDe-1	Koroc River	North shore of river, near the mouth of the Grenier River	24 I/10	Fitzhugh (1979)	Contemporary Neo-Eskimo Inuit (+1900)
IdDh-1	Koroc River	22.5 km as the crow flies from the mouth of river	24 I/11	Fitzhugh (1979)	Contemporary Neo-Eskimo Inuit or Dorset
IdDl-1	Ford Island	11 mi. up-river from the George River settlement, Ford Island	24 I/12	Pruden (1966)	Pre-contact Amerindian
IeCv-1	KOR-26	Koroc River	14L/13	Avataq (2004)	Neo-Eskimo
IeCv-2	KOR-29	Koroc River	14L/13	Avataq (2004)	Historical Neo-Eskimo Inuit
IeCv-3	KOR-30	Koroc River	14L/13	Avataq (2004)	Historical Neo-Eskimo Inuit
IeCx-1	KOR-31	Koroc River	14L/13	Avataq (2004	Historical Neo-Eskimo Inuit
IeDa-1	KOR-32	Koroc River	24I/9	Avataq (2004)	Historical Neo-Eskimo Inuit
IeDk-1	Koroc River	West shore, at the mouth of river	24 I/13	Fitzhugh (1979)	Dorset

Table 5.2 Occupation Sites Identified in the Proposed Park
(continued)

BORDEN	NAME	LOCATION	MAP	AUTHOR (YEAR)	CLASSIFICATION
IeDk-2	Koroc River	South shore, at the mouth of river	24 I/13	Fitzhugh (1979)	Contemporary Neo-Eskimo Inuit (+1900)
IeDl-1	Kangiqsualujjuaq	Roughly 100 m south of the village, west shore of Akilasakallak Cove	24 I/12	Avataq (1988, 1999)	Contemporary Neo-Eskimo or Historical Neo-Eskimo
IeDl-2	Kangiqsualujjuaq	Roughly 75 m north-east of the village	24 I/12	Avataq (1988)	Dorset
IfDk-1	Koroc 1	South shore, at the mouth of Koroc River	24 I/13	Avataq (1992)	Historical or Thule
IfDk-2	Koroc 2	North shore, at the mouth of Koroc River	24 I/13	Avataq (1992)	Thule or Dorset
IfDk-3	Koroc 3	North shore of Koroc River, in a little bay	24 I/13	Avataq (1992)	Historical or Dorset
IfDk-4	Koroc 4	North shore, at the mouth of Koroc River	24 I/13	Avataq (1992)	Dorset
IfDk-5	KOR-6	Koroc River	24I/13	Avataq (2004)	Historical Neo-Eskimo Inuit
IfDk-6	KOR-13	Koroc River	24I/13	Avataq (2004)	Historical Neo-Eskimo Inuit
IfDk-7	KOR-23	Koroc River	24I/13	Avataq (2004)	Historical Neo-Eskimo Inuit
IfDk-8	KOR-12	Koroc River	24I/13	Avataq (2004)	Neo-Eskimo
IfDl-1	Elson Point	7 km north of the point	24 I/13	Plumet (1980, 1981, 1991)	Historical Neo-Eskimo Inuit (–1900)
IfDl-2	Koroc River	Beach situated east of Elson Point	24 I/13	Fitzhugh (1979)	Paleo-Eskimo
IfDl-3	Qiggutuq	On an island	24 I/13	Avataq (1992)	Paleo-Eskimo
IfDl-4	KOR-1	Koroc River	24I/13	Avataq (2004)	Historical Neo-Eskimo Inuit
IfDl-5	KOR-2	Koroc River	24I/13	Avataq (2004)	Pre-Dorset or Historical
IfDl-6	KOR-4	Koroc River	24I/13	Avataq (2004)	Dorset or Historical
IfDl-7	KOR-8	Koroc River	24I/13	Avataq (2004	Historical Neo-Eskimo Inuit
IfDl-8	KOR-9	Koroc River	24I/13	Avataq (2004)	Historical Neo-Eskimo Inuit

BORDEN	NAME	LOCATION	MAP	AUTHOR (YEAR)	CLASSIFICATION
IfDl-9	KOR-10	Koroc River	24I/13	Avataq (2004)	Historical Neo-Eskimo Inuit
IfDl-10	KOR-17	Koroc River	24I/13	Avataq (2004)	Historical Neo-Eskimo Inuit
IfDl-11	KOR-20	Koroc River	24I/13	Avataq (2004)	Historical Neo-Eskimo Inuit
IfDl-12	KOR-21	Koroc River	24I/13	Avataq (2004	Historical Neo-Eskimo Inuit
IfDl-13	KOR-22	Koroc River	24I/13	Avataq (2004)	Historical Neo-Eskimo Inuit
IfDl-14	KOR-3	Koroc River	24I/13	Avataq (2004)	Historical Neo-Eskimo Inuit
IfDm-3	KOR-14	Koroc River	24J/16 & 15	Avataq (2004)	Pre-Dorset
IfDm-4	KOR-15	Koroc River	24J/16 & 15	Avataq (2004)	Pre-Dorset
IfDm-5	KOR-16	Koroc River	24J/16 & 15	Avataq (2004	Pre-Dorset
IfDm-6	KOR-18	Koroc River	24J/16 & 15	Avataq (2004)	Historical Neo-Eskimo Inuit
IfDm-7	KOR-19	Koroc River	24J/16 & 15	Avataq (2004)	Dorset
IgDk-1	Baudan River	Island, Keglo Bay	24 P/4	Plumet (1980a, 1981)	Contemporary Neo-Eskimo Inuit (+1900)
IgDk-2	Ungava 4	Island, Keglo Bay	24 P/4	Avataq (1992)	Historical Neo-Eskimo Inuit (-1900)
IgDk-3	AM-1	Island, Keglo Bay	24 P/4	Avataq (2004)	Dorset
IgDk-4	AM-2	Island, Keglo Bay	24 P/4	Avataq (2004)	Historical Neo-Eskimo Inuit
IgDl-1	Pikiuliguluk	Block field	24 P	Avataq (1992)	Historical Neo-Eskimo Inuit (-1900)
IgDl-2	Qiggutuq	On an island	24 P	Avataq (1992)	Dorset
IgDl-3	Ungava 3	Island, south of Keglo Bay	24 P/4	Avataq (1992)	Paleo-Eskimo

[1] Avataq Cultural Institute: fieldwork, August 2004

Source: Avataq Cultural Institute

Source: Plumet (1982)

Figure 5.4 Long House Structure from the Dorset Period

this period, it is sometimes divided into chronological phases. Although this breakdown of phases is presented herein for the sake of consistency with other published works (refer to Gendron and Pinard, 2000), it has been called into question.

The early phase, which was originally situated by Taylor (1962, 1968) at 2500 to 2300 years BP, is a hypothesis based primarily on the evolution of harpoon points between the end of the pre-Dorset period and the beginning of the Dorset period. This hypothesis implicitly assumes continuity between the two groups. Relevant sites were first identified close to Ivujivik and Salluit near the end of the 1950s. Since that time, archaeological work has shown that this evolution, although it appears quite simple, was very complex and varied from region to region. For example, near the proposed park in Labrador, it is possible that Dorset groups were present much earlier than elsewhere in Nunavik.

The middle phase, which was fairly long, is situated between 2000 and 1500 years BP. It marks initial occupation in Nunavik and is represented by a dozen archaeological sites along the shores of Ungava Bay. Notwithstanding, few relevant sites have been studied in detail. Several typical sites are located in the areas of Quaqtaq, Inukjuak and Kuujjuaraapik.

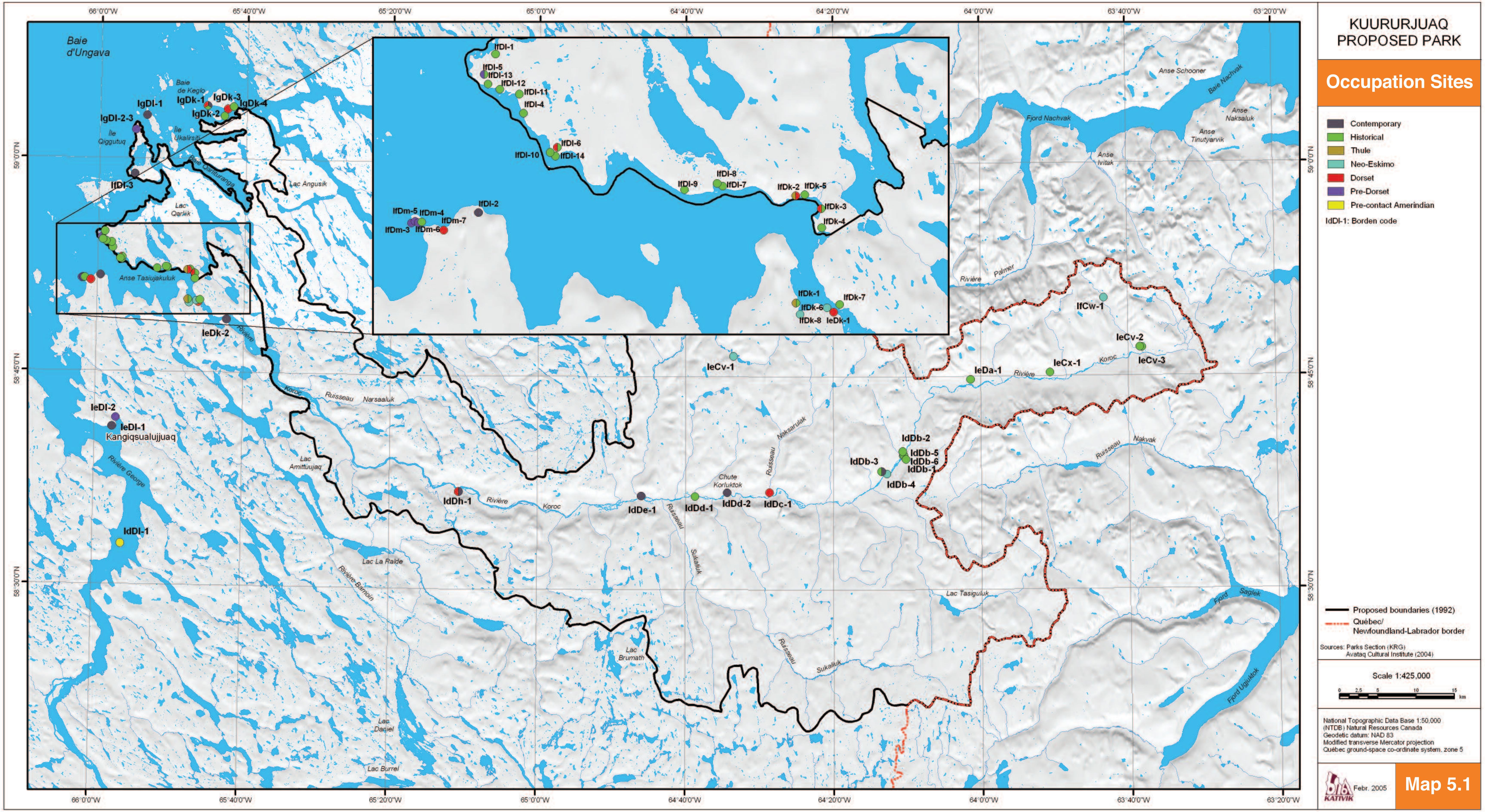
Finally, the late phase occurred between 1500 and 1000 years BP. It is represented by several sites spread throughout Nunavik, although most of these are found in the Ungava Bay area. While a few Dorset sites have been identified along the Koroc River and on the coast, it is currently difficult to ascribe them to the phases described above due to a lack of information. In fact, the Dorset sites identified in the proposed park are small, suggesting brief stopover sites possibly related to quarrying activities at Ramah, located a few kilometres to the south-east of Mount D'Iberville.

Archaeological research carried out near the proposed park in the 1970s and 1990s demonstrated that, unlike its west coast, the east coast of Ungava Bay was not heavily populated during the pre-contact period and the recent historical period. The rugged geography and tidal ranges, which are sometimes huge, probably deterred inhabitation and may have restricted the number of camps. Unlike the rest of Nunavik, geomorphologists believe that this area is sinking, leading to the erosion of archaeological sites near the sea (Plumet and Gangloff, 1991). This phenomenon would explain overlapping habitats and structures of different periods and cultures on the sites that have been identified (Plumet and Gangloff, 1991).

Despite the area's ruggedness and significant tidal ranges, certain sheltered areas would have fostered human occupation. The earliest pre-contact occupations have been dated at 4000 years BP and are ascribed to pre-Dorset groups based on the remains at the sites (Avataq Cultural Institute, 1992a). At sites where archaeological excavation work has been carried out, cut stone objects made of Ramah metachert prevail. The final phase of the early paleo-Eskimo period is marked here, as in Labrador (known as the Groswater period), by lateral-notched points with a straight base, cut (and sometimes polished) chisels, and double-lobed dwellings with an axial passage and boxed hearth.

Knives and micro-blades crafted from Ramah quartzite, end of the pre-Dorset period (*Groswater*)

Source: Avataq Cultural Institute (2004)


KUURURJUAQ
PROPOSED PARK
Occupation Sites
Contemporary
Historical
Thule
Neo-Eskimo
Dorset
Pre-Dorset
Pre-contact Amerindian
IdDl-1: Borden code
Proposed boundaries (1992)
Québec/
Newfoundland-Labrador border
Sources: Parks Section (KRG)
Avataq Cultural Institute (2004)
Scale 1:425,000
National Topographic Data Base 1:50,000
(NTDB) Natural Resources Canada
Geodetic datum: NAD 83
Modified transverse Mercator projection
Québec ground-space co-ordinate system, zone 5
Febr. 2005
KATIVIK
Map 5.1
Baie d'Ungava
Kangiqsualujjuaq
Rivière George
Rivière Koroc
Anse Tasiujakuluk
Lac Qarlik
Lac Angusik
Lac Amittuujaq
Lac La Ralde
Rivière Barnoin
Lac Brumath
Lac Dariel
Lac Burrel
Lac Tasiguluk
Chute Korluktok
Fjord Nachvak
Baie Nachvak
Anse Schooner
Fjord Saglek
Fjord Ugjuktok
Rivière Palmer
IgDl-1
IgDl-2-3
IgDk-1
IgDk-2
IgDk-3
IgDk-4
IfDl-3
IeDk-2
IeDl-2
IeDl-1
IdDl-1
IdDh-1
IdDe-1
IdDd-1
IdDd-2
IdDc-1
IeCv-1
IdDb-2
IdDb-3
IdDb-4
IdDb-5
IdDb-6
IdDb-1
IeDa-1
IeCx-1
IeCv-2
IeCv-3
IfCw-1
IfDl-1
IfDl-5
IfDl-13
IfDl-12
IfDl-11
IfDl-4
IfDl-6
IfDl-10
IfDl-14
IfDl-9
IfDl-8
IfDl-7
IfDk-2
IfDk-5
IfDk-3
IfDk-4
IfDl-2
IfDm-5
IfDm-4
IfDm-7
IfDm-3
IfDm-6
IfDk-1
IfDk-6
IfDk-7
IfDk-8
IeDk-1
66°0'0"W
65°40'0"W
65°20'0"W
65°0'0"W
64°40'0"W
64°20'0"W
64°0'0"W
63°40'0"W
63°20'0"W
59°0'0"N
58°45'0"N
58°30'0"N

The east coast of Ungava Bay also possesses certain evidence of a Dorset presence. Some sites were likely occupied first by pre-Dorset groups and subsequently by Thule and recent historical groups. The stone objects collected from these sites include bifacial points with tip-fluting and scrapers often made from Ramah metachert. In addition, this period is marked by the presence of what appear to be polished nephrite chisels, polished schist knives, soapstone lamps and pots, as well as the remnants of pit houses.

In short, in the area of the proposed park, there is evidence of localized evolution from the middle Dorset period (2000 to 1500 years BP) to the late Dorset period (1500 to 1000 years BP). The transition from the late Dorset to Thule period has yet to be clarified due to the absence of post-1000 AD Dorset sites and the absence of Thule sites between 1200 and 1400 AD. In addition, certain Thule sites were occupied continuously until the 19th and even 20th centuries. Due to their proximity to fjords, these sites demonstrate the importance of whale hunting during the pre-contact period and recent historical period.

The eastern boundary of the proposed park abuts Labrador, where the succession of pre-contact occupations are similar to the eastern coast of Ungava Bay, with the exception of occasional Amerindian cultures. This additional element is important because it marks those periods when direct access to the Ramah quarry would have been complicated. It was only very late in the paleo-Eskimo period that the direct exploitation of the Ramah quarry by Amerindians would have restricted paleo-Eskimo access to this resource (Fitzhugh, 1980, 2002). These Amerindian groups occupied the Labrador coast, all the way to Saglek Bay.

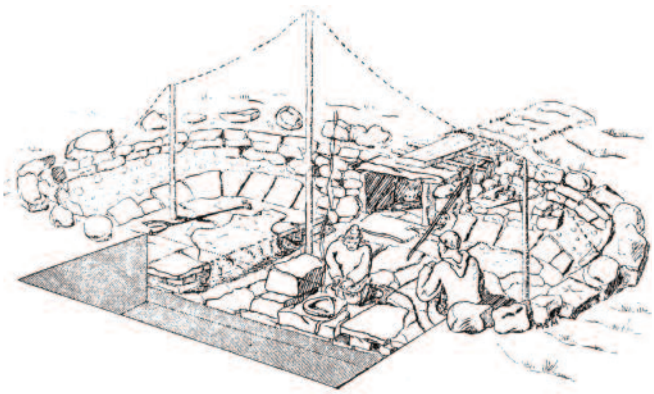
THULE OCCUPATION (750 YEARS BP–RECENT HISTORICAL PERIOD)

The Thule produced a second wave of migration that is well documented in the eastern Arctic. Like their paleo-Eskimo predecessors, the Thule arrived from Alaska between 800 (in Labrador) and 600 (in Nunavik) years BP and slowly occupied the territories which had been inhabited by Dorset groups. A few hypotheses have been put forward which suggest that there may have been contact between the two populations but, more and more, such supporting data is being rejected by archaeologists. The same may be said for another hypothesis which holds that an earlier group of Thule may have arrived around 1000 AD.

The new arrivals are known to have been better adapted than their predecessors to the rugged and less stable environment of the North. Their implements, which were essentially made from bone, ivory and polished stone, are characterized by a high-degree of specialization, specifically for the hunting of marine mammals. Thule implements, which combined diverse and novel technologies, are believed to have been well adapted to the environment. Among these novelties, it is possible to note mastery of the rotating drill, use of the dog sled, construction of pit houses with an entry passage (including occasionally a cold trap) and sleeping platform (Figures 5.5 and 5.6), marine navigation with group-sized watercraft such as the **umiaq**, and a social organization that seems to have been more complex than that of paleo-Eskimo populations. Thule sites are well represented in the eastern part of Nunavik, but only one such site has been identified within the boundaries of the proposed park, specifically along the shores of Tasiujakuluk Cove (Thule or Dorset: IfDk-2; refer to Table 5.2 and Map 5.1).

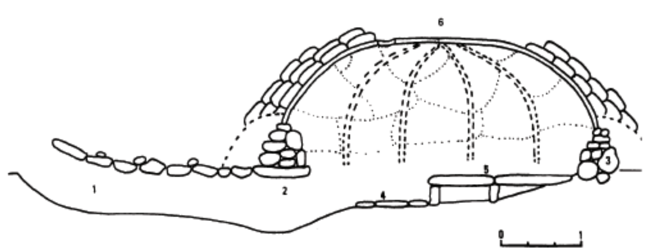
IMPORTANCE OF THE KOROC RIVER DURING THE PRE-CONTACT PERIOD

The source of the Koroc River is in the Torngat Mountains, near the Québec – Newfoundland and Labrador border, and it empties into Ungava Bay. The well-developed drainage system allows access, via lakes and small creeks, to Ramah Bay (location of the Ramah metachert outcropping) and it connects



Source: Maxwell (1985)

Figure 5.5 Sketch of a Pit House (*Qarmak*) from the Thule Period



1-2 entrance
3 rock foundation
4 cooking area
5 sleeping platform
6 roof structure made of driftwood or whale bone

Source: Tassé (2000)

Figure 5.6 Cross-Section of a Thule Dwelling

Remnants of a Thule *qarmak*, Nachvak Fjord, Labrador

Ungava Bay to Labrador (Figure 5.7). An hypothesis to the effect that the Koroc River was a route that permitted the circulation of Ramah metachert is supported by several recent discoveries. While its use throughout Labrador was common, the presence of metachert in distant regions demonstrates that this rock was being circulated during the pre-contact period and that it was a valuable commodity (Loring, 2002). This rock was especially used for bifacial points. It has been discovered at sites along the eastern and western shores of Ungava Bay, on Baffin Island and even on Southampton Island. In order to have reached these distant destinations, this rock must have been transported over a path that was accessible and known to humans.

Ramah metachert may have been obtained throughout the territory in two manners: through trade between different groups or by extraction directly at the source of the rock. Both manners are plausible, though the evidence found along the Koroc and more northerly Allurilik (now known as Alluviak) rivers suggests that the metachert was obtained directly from the source of the rock.

The discovery of paleo-Eskimo sites, inland and especially on the shores of rivers, with waste produced by the cutting of Ramah metachert makes it possible to postulate that the paleo-Eskimo transported the rock by waterways. Among these sites is the Dorset site IdDc1 on the shores of the Koroc River (refer to Table 5.2 and Map 5.1). Such an activity could as easily have taken place in summer as in winter, although it may have been more profitable in summer when groups would have moved inland to hunt caribou and fish arctic char in the region's lakes and rivers, just as Inuit do today.

During the pre-contact period, the Koroc River may have served as a handy route for transporting metachert not only to the eastern coast of Ungava Bay but farther afield, including to Hudson Strait and Southampton Island. The circulation of this rock furthermore implies the movement of humans and ideas. Interaction between different groups may have taken place and the inhabitation of the Arctic would have been enriched through new migrations.

This perspective serves to strengthen the theory of paleo-Eskimo occupation between the western coast of Ungava Bay and Labrador. Fieldwork carried out in 2004 in connection with the proposed park confirmed that the Koroc River was used for this purpose, although remnants are elusive along this major waterway. It is mainly downstream, at the mouth of the Koroc River, and on nearby islands, that the paleo-Eskimo built their camps. The few sites identified inland appear, on the other hand, to have been brief stopover sites. As this type of site generally contains few remnants, they are difficult to identify. Data concerning recent historical sites provides similar results in the coastal sector (western) of the Koroc River basin; the few sites located on the shores of the river mark stopovers. Recent historical sources mention that the Koroc River was used by the Inuit during the winter season, however few remains of winter camp sites exist because they essentially comprised igloos.

Dorset site IdDc-1 in the valley of the Koroc River near the mouth of the Naksarulak Creek

The archaeological and historical data gathered over the summer of 2004, in addition to information from past and recent interviews, confirm the importance of the Koroc River for east–west travel. The limited number of archaeological and historical sites identified is likely a result of the nature of these occupations, which were temporary and brief during the summer months and comprised of snow dwellings in the winter. These observations do not in any way, however, negatively affect the historical, heritage and natural value of the proposed park.

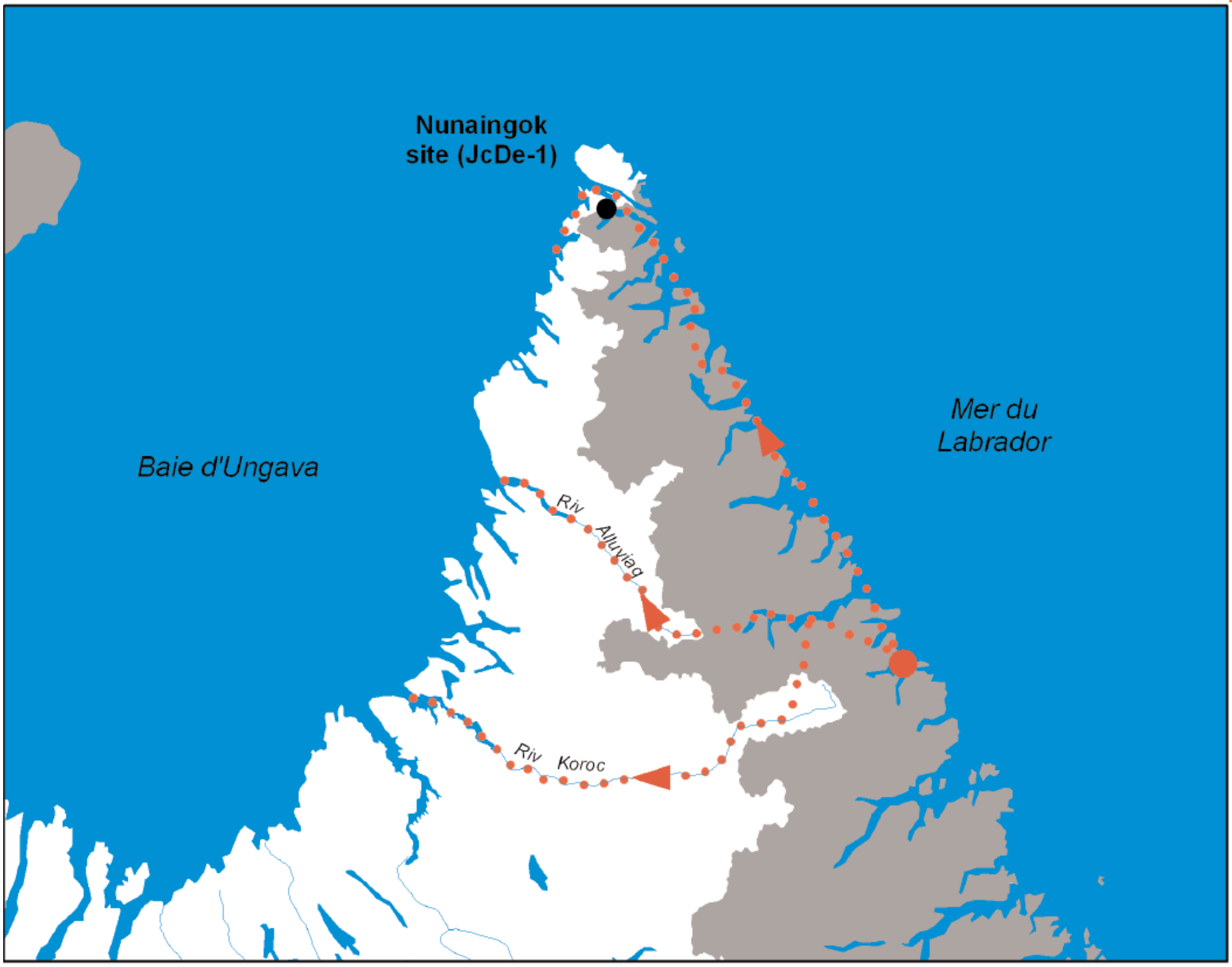


Figure 5.7 Routes Used to Transport Ramah Metachert

In August 2004, the Avataq Cultural Institute compiled an inventory of the occupation sites within the proposed park. The locations of these sites and their classification are presented in Table 5.1 and on Map 5.1. More detailed results of this inventory will be provided in a separate report, which is currently being prepared.

Recent hunting blind (historical site IeCv-2). This type of structure is often used to hunt Canada geese.

Recent Historical Period[1]

EARLY CONTACT

Shortly before the arrival of the first Thule in the eastern Arctic, circa 1000 AD, explorers from Greenland visited the coast of Labrador in search of building timber and land for pasture. These visitors were probably the only foreigners to ever encounter people of the Dorset culture, if in fact the paleo-Eskimo they met truly belonged to this culture.

The Greenlanders' accounts of their voyages identify a local group, that they called Skraelings, with whom relations were sometimes bitter. Based on certain evidence, this group was probably among the last of the Dorset groups in the eastern Arctic.

Between the 13th and 15th centuries, there was probably contact between the Norsemen of Greenland, Thule and possibly Dorset groups, as suggested by evidence recently discovered through archaeological excavation work along the northwest coast of Greenland. This contact evidently ceased with the disappearance of the Dorset and Norsemen. Shortly thereafter, however, new European arrivals began to have an irreversible impact on the way of life of Thule populations in Nunavik and the rest of the eastern Arctic.

EXPLORERS

In 1497, John Cabot (Giovanni Caboto) would have been the first modern European to set eyes on the Labrador coast. Up until 1550, several explorers in search of the northwest passage also sailed along the Labrador coast on their way to Hudson Strait. Some of these explorers recounted brief encounters with Thule groups but, until the first quarter of the 19th century, few Thule had direct contact with these new visitors. In 1683, Pierre-Esprit Radisson and Médard Chouart des Groseillers traded with Inuit in the area of Nain and Okak; Louis Jolliet, it seems, purchased seal meat and oil around Nain in 1694. Notwithstanding, the end of the Thule period is only recognized to have taken place after 1771 with the onset of regular contact with Europeans, specifically Moravian missionaries. These missionaries subsequently had a decisive impact on the cultural identity, social organization and economy of the groups of the Ungava–Labrador Peninsula.

MORAVIAN MISSIONARY WORK

The *Unitas Fratrum* (or United Brethren) movement, was established in Bohemia (today part of the Czech Republic) in 1415 to promote evangelical principles. In the centuries that followed, the members of this movement were persecuted and finally forced to scatter in 1620, but reassembled in 1722 in Germany and then in England. By this time, the movement was calling itself the Moravian Church and had prioritized the evangelization of Aboriginal people. In 1732, the Moravians began their missionary work among the Inuit of Greenland. In 1752, the English Moravian Mission Society asked the British Council of Churches for property in Labrador, which they finally obtained in 1769. That year, King George III granted the Moravians 100,000 acres in the area of Baie des Esquimaux and, subsequently, several other territories. Sometimes, the missionaries even purchased land around their missions directly from the Inuit. The Moravians had a strong desire to spread the word of God and, with the approval of the governor of Newfoundland, they were permitted to own the land around their missions and even select the sites for these missions. By incorporating trading posts into their missions, the Moravians hoped to attract Inuit from the northern reaches of the Ungava–Labrador Peninsula which was still beyond the circle of influence of French, British and other fishermen who congregated in the Strait of Belle Isle. The Moravian strategy was to smooth relations between Inuit and fishermen and, in so doing, make the developing fishing industry safer. At the end of the 19th century, roughly 30,000 foreign fishermen were present in the Strait every year.

The Moravian's evangelical aims lead to the establishment of missions at Nain (1771), Okak (1776), Hopedale (1782), Hebron (1830), Zoar (1866), Ramah Bay (1871), Makkovik (1896) and Killiniq (1903); missions at Saglek (1867) and Nachvak (1868) fjords were abandoned relatively quickly (Figure 5.8). Until the middle of the 19th century, Moravian missions continued to represent for the Inuit of Labrador major sources of European manufactured goods.

The Moravian missionaries that arrived in North America were often married. They had some knowledge of Inuktitut picked up in Greenland and were trained in all the basic trades. For these missionaries, the evangelization of the world's populations was their moral obligation. Moravian brothers and sisters followed strict religious practices. They celebrated holidays and rituals with singing, community feasts and sermons. They baptized Inuit converts to Christianity and invited these Inuit to live alongside them at their missions where marriage was mandatory. They also set up schools in which Inuktitut, music and certain trades were taught. Because manufactured goods were only made available to Inuit converts or to those who promised to convert, a large portion of the Inuit who travelled to the missions adopted Christianity. Originally organized as small, nomadic groups that moved according to the seasons, sometimes over great distances, these newly converted Christians began to settle, abandoning little by little their traditional way of life.

According to ethnographic data (compiled mainly by Hawkes 1916), the Thule universe was governed by a shamanistic belief system: a spiritual double, the *Innua* was the spirit or life force that inhabited objects and places; it could reside in an animal or a prominent land feature such as a rock, point or mountain. *Angakuks* (shamans) served as intermediaries between the Inuit and spirit worlds. The Thule practised rites to pacify the spirits of the animals that they hunted and they believed that, a very long time ago, humans and animals spoke the same language, had similar customs, were capable of transforming

Figure 5.8 European Settlements and Moravian Expedition

between animal and human forms, and intermarried. As Christian beliefs were radically opposed to Thule shamanistic beliefs, a scission developed between those Inuit who converted to Christianity and those who did not. It is possible that the Moravians contributed to the demonization of the Torngat Mountains by designating the region as a place of evil forces that sheltered pagans. They furthermore discouraged long voyages, fearing that their new converts might be tempted to return to their previous, traditional Inuit way of life. As a result, harvesting was carried out close to the missions. This shift

The abode of Torngak, observed by Moravian missionaries in 1811

from a subsistence economy to a mixed economy of commercial production and subsistence lead to changes in the way the land and its resources were used.

During the first half of the 19th century, the Ungava–Labrador Peninsula seemed to be divided into two regions: Christians in the east and pagans in the west; the meeting point of the two was at Killiniq (formerly known as Killinek).

MORAVIAN EXPEDITION OF 1811

On June 24, 1811, the Moravian missionaries Kohlmeister and Kmoch left from Okak on a journey to Ungava Bay. They intended to evaluate the feasibility of a mission in that distant region. Guided by an Inuk from Hopedale, who had been baptized Jonathan and was the owner of a small two-mast sailing craft, their journey lead them and four Inuit families along Labrador's dangerous northern coast.

En route they encountered several groups: at Saglek Fjord was a group of roughly thirty; at Nachvak Fjord was another group of roughly fifty; and at Komaktorvik Fjord, Inuit indicated that through westward leading valleys it was possible to reach Ungava Bay.

Near Killiniq, the travellers were awaited by Uttakiyok, his two wives and his younger brother. Uttakiyok, who had not converted to Christianity and was from the Ungava coast, had visited Okak a few years before and offered his services as a guide through the McLelan Strait and southward along the Ungava coast. On an island, near Taqpangayuk, the travellers met roughly fifty Inuit, including several who had never before set eyes on anyone of European origin.

Passing by the mouth of the Alluviaq Fjord, Uttakiyok pointed out a large triangle-shaped cavern that he informed the travellers was the residence of Torngak. That cliff is part of a range of black mountains. The missionaries described the area as sinister and terrifying. This was likely the very first time that any European had ever set eyes on the abode of Torngak.

According to the Inuit, the spirit Torngak[2] lives with his spouse in the Torngat Mountains. *Suporguksoak* has power over the earth and land animals, while *Torngak* commands the sea and marine animals (Borlase, 1993 in Heyes et al., 2003). According to legend, *Torngak* once had a daughter and son whom he loved very much. However, one day they both grew sick and died despite their father's effort to do everything in his power to relieve their suffering. Thereafter, Torngak became a malicious spirit intent on harming anyone that he encountered. As his children had died, he felt that everyone else should suffer the same fate (Turner, 2001 in Heyes et al., 2003).

Torngak attacks people of all ages, constantly foiling their desires and even pushing them beyond the limits of endurance until they become sick and die (Borlase, 1993 in Heyes et al., 2003).

However because they control all the animals, *Torngak* and *Suporguksoak* have the power to help Inuit in their hunting. When called on by shamans, *Suporguksoak* could attract caribou and *Torngak* seal and beluga. A successful hunt therefore depended entirely on the willingness of the spirits (Hawkes, 1916 in Heyes et al., 2003).

Finally, the Moravian expedition arrived at Kangertlualuksoak (Kangiqsualujjuaq) on August 7, 1811. The travellers encountered a few Inuit and explored the mouth of the river and the surrounding area for a few days. After having determined that there was a sufficient supply of wood to erect a mission and wildlife resources to ensure the subsistence of eventual missionaries, and that this was an important meeting place, the travellers took possession of the area in the name of King George III and named the river the George River. Thereafter, the Moravians travelled on as far as the Koksoak River where they encountered a group of 14 families. They began their return journey on September 2.

TRADING POSTS

The Moravian expedition of Kohlmeister and Kmoch pushed the Hudson's Bay Company (HBC) to organize a number of reconnaissance trips along the Koksoak River between 1819 and 1830. These lead to the establishment of a first trading post, called Fort Chimo, in 1830.

In the fall of 1838, another post was opened, this time on the east shore of the George River, approximately 16 km upstream. When John McLean, the manager of the Fort Chimo trading post, visited the new George River post the following summer, he named it Fort Siveright. This name did not however become firmly established before the post was closed in 1842, along with all the other trading posts around Ungava Bay. In the years that followed, the Inuit of George River and of Ungava Bay had to travel to Labrador to acquire manufactured goods. In 1869, the trading post re-opened under the name Fort George River. It continued to be operated until 1915. This second closing again forced local Inuit to travel either to Fort Chimo (which had also been re-opened), to Killiniq or to Hebron.

The beginning of the 20th century marked in certain respects the spread of trading posts in Nunavik. Certain were even established in isolated regions due to the competition generated by the arrival of new trading companies. In 1903, the Révillon Frères Trading Company opened shop at Fort Chimo. In 1905, it opened another post at Leaf Bay and was followed by the HBC. In 1921, the two companies opened posts at Kangirsuk and, in 1922, the Révillon Frères set up a last post at Quaqtaq.

The HBC finally re-opened its trading post at George River in 1925. In 1952, the post became a simple counter where only basic necessities could be acquired, again forcing local Inuit to travel to Fort Chimo.

During the first half of the 20th century, the trading post of the HBC and then that of the Révillon Frères at Fort Chimo became essential and represented an important meeting place. Inuit and Naskapi hunters visited this centre to trade pelts, oil, as well as soapstone and ivory handicrafts for food (lard, tea and salt), clothing, and winter equipment (including matches, soap, traps, ammunition, canvas for tents, needles and thread).

OTHER MISSIONARY WORK

In comparison with the Labrador coast, missions were established much later in the Ungava Bay region. The first missions were established by the Anglican Church at Killiniq in 1898 and at Fort Chimo in 1900. A reconnaissance trip that began in James Bay had lead the Reverend E.J. Peck to Fort Chimo in 1884. From this point, Inuit living throughout the region were visited at their seasonal camps. Trading posts lent themselves well to efforts to evangelize the Inuit. Though a distinct denomination, the Anglican Church continued to some extent the missionary work begun a century earlier on the opposite coast of the Ungava–Labrador Peninsula by the Moravian Church. In fact, the first Inuktitut version of the New Testament used by the Anglicans was supplied by the Moravians. For nearly thirty years, the Reverend S.M. Stewart carried out itinerant missionary work with the assistance of Inuit interpreters. Most of the Inuit living around Kangiqsualujjuaq had been Christians for several decades before a local church was constructed in 1965.

Catholic missionary work (Oblate Missionaries of Mary Immaculate) only arrived in Nunavik in 1938 with missions in Ivujivik and Kangiqsujuaq. This missionary work did not significantly affect Kangiqsualuajjuaq since, unlike most of the region's other villages, there was only one church and it was Anglican.

WORLD WARS

Except for the fact that Canadian authorities closely monitored German-born Moravian missionaries, the First World War had little impact on Nunavik. On the other hand, the Second World War left its mark on the region. Among other events, an American B26 crashed at Saglek Bay, Labrador, in

1942 and the following year the crew of a German U537 submarine built a secret Nazi weather station near Killiniq. Certain Inuit elders have mentioned that such a submarine was observed at Ramah Bay around the same period. However the event that had the greatest impact on the development of Nunavik was the construction of an American military air base at Kuujjuaq and its operation from 1941 to 1945. The base created a local economic boom that caught the attention of Inuit residents from George River for whom living conditions were very difficult.

In 1941, the population of the Ungava Bay region was estimated at 817 with 191 individuals living in the George River area.

HISTORY OF KANGIQSUALUJJUAQ

In 1958, the Department of Indian Affairs and Northern Development completed a study of the economic potential of this region, entitled *Ungava Bay: A Resource Survey*. The study proposed the development of local industries based on a co-operative model. Specifically, it was recommended that an Arctic char processing plant and a sawmill (to process the large trees found along the George River) be created. Tivi Etok's summary of these events is provided immediately below:

> "We started working on the Co-op concept in 1959. Two men from the Department of Indian Affairs [as it was then called] came to Kangiqsualujjuaq to facilitate the discussion and the establishment of a local co-operative. At the time, we were scattered in many small camps. My family was at Kuurujjuaq. There were other camps including Tasikallak, Tuunulliit, Tuututuuk and Marralik. Kangiqsualujjuaq had only two families, Willie Emudluk and Josephie Sammy Annanack." (Etok and Weetaluktuk, 2005; Figure 5.9)

For their part, the Inuit wished to discuss relocation options with the Government of Canada due to the scarcity of wildlife resources and the absence of a local trading post, which made necessary long trips to far-away Kuujjuaq. Joseph Annanack explained:

> "The Eskimos of the George River seriously considered relocating to another region, due to the hardship encountered living off the land in this area." (NFB, 1964)

The meeting between the Inuit and the Canadian government took place on the shores of the Koroc River in a tent. The government proposed that the Inuit remain where they were, that the government's economic report be followed up, and that a co-operative be created with the Inuit as owners. By processing lumber for the community of Killiniq, the Inuit would receive seal meat in return. As well, the harvesting of Arctic char for restaurants in Montreal and Toronto (where there was great demand for this kind of fish) was proposed. Following discussions, the Inuit accepted the government's proposal.

In 1959, the George River Eskimo Fishermen's Co-operative was established, marking the first Inuit co-operative in Canada (today included under the umbrella of the Federation of Co-operatives of Northern Québec which comprises all the co-operatives of Nunavik and has annual sales of several tens of millions of dollars). Even though at the outset, the management and operation of the George River co-operative were handled by the Canadian government, Inuit were entirely responsible for harvesting and processing activities. Eventually, Inuit acquired knowledge of how to operate a co-operative and were able to assume management with an Inuit board of directors.

With the increased interest and involvement of the Government of Québec in the North, the name of George River, which had been carried forward from the days of the former trading post, was replaced by the name Port-Nouveau-Québec, in 1961. However, as access for shipping is in fact quite limited, the name was not very fitting, and was never widely adopted.

A site for the village was chosen in the small cove called Akilasakallak and construction began in 1962. In the spring, the first eight homes for Inuit were built, along with a federal school and small power-generating plant. The sawmill was

Inuit girl standing beside Arctic char drying equipment, Kangiqsualujjuaq, 1960.

Credit: Rosemary Gilliat (APA 145054), National Archives of Canada
Courtesy of the Avataq Cultural Institute

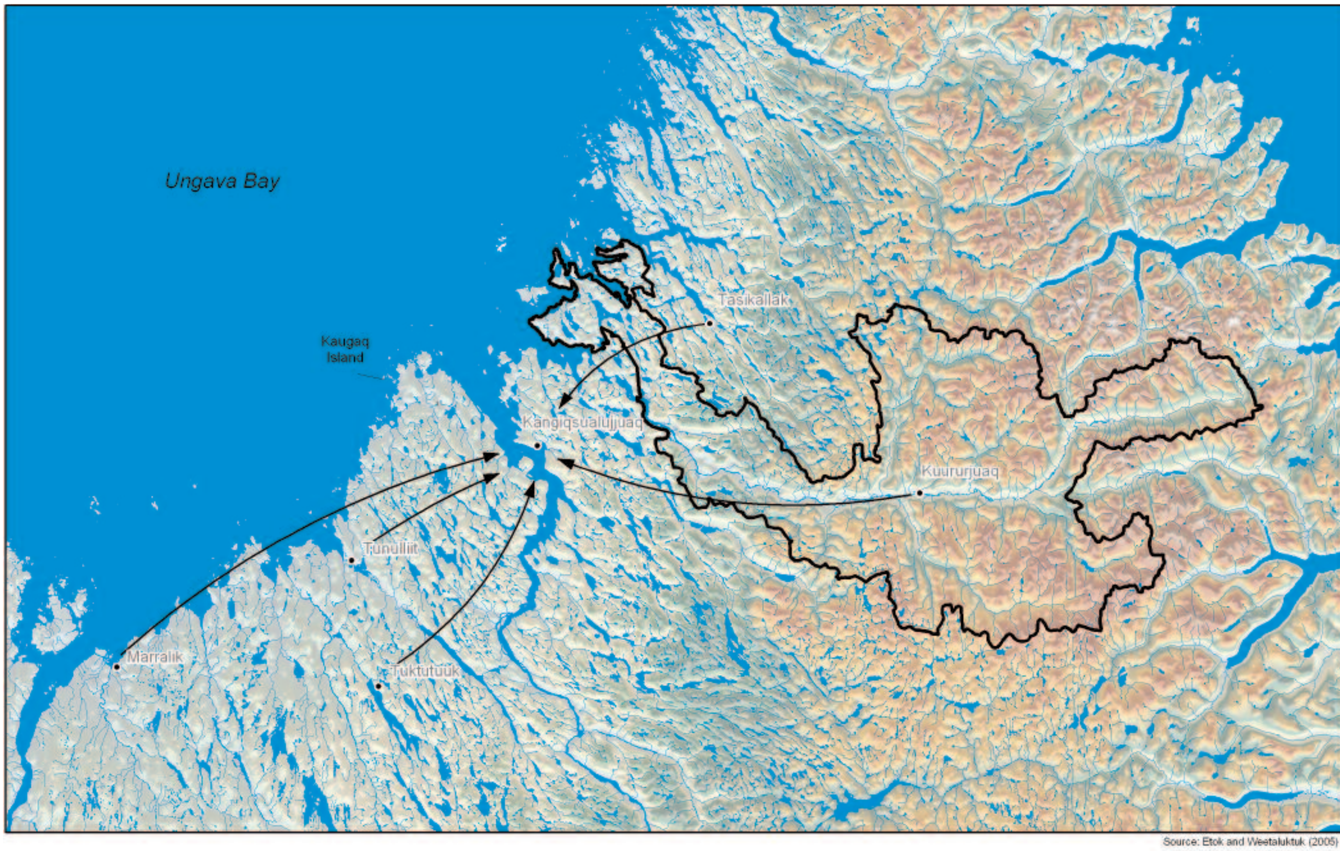


Figure 5.9 Location of Camps with the Creation of the Village of Kangiqsualujjuaq

constructed down in the cove where felled trees could be easily floated. Logging was carried out with the help of dogsleds. Several Inuit became log drivers. By the following year, the village comprised a co-operative store, a school, an office, a radio station and a few warehouses. As well, the five members of the board of directors met to elect a manager. Eva Varkony provided this description in 1966 of the central role of the co-operative in the community:

> "The cooperative acts as the major cohesive force in the village. It was organized and in operation for about three years before the village itself came into existence and was and is used as the major organ of communication between the villagers and the government, the Project Officers and the villagers, and village leaders and villagers. It is through the cooperative that the new concept and style of leadership has evolved, along with other new ideas in economic and social organization. It is in fact, an infrastructure without which the day to day operation and activities of the village are difficult to imagine. The cooperative was created by the government with the plan that it should later serve as the nucleus of a village, and the people of George River have lived up to the government's expectations in this respect." (Varkony, 1967)

In 1966, the village's population of 157 lived in roughly thirty dwellings. The following year, the Government of Québec built a provincial school. The Anglican Church was already standing.

Following the signing of the *James Bay and Northern Québec Agreement* in 1975, the village was incorporated as a municipality known as Kangiqsualujjuaq (very large bay). Subsequently, the village entered a period of consolidation, allowing modern municipal services to be developed (refer to Section 2).

At the very beginning of the 21st century, disaster struck Kangiqsualujjuaq. In the early hours of New Year's Day, an avalanche swept down the slope that marks the western edge of the village and crashed through the school gymnasium where close to 500 residents were celebrating. Twenty-five people were injured; nine lost their lives. A public inquiry was set up to investigate the causes of the disaster and the coroner in charge recommended that the Government of Québec adopt a public security policy for avalanche prevention. The following summer, the school and all nearby buildings were moved away from the dangerous slope.

Kangiqsualujjuaq, 1968. Sawmill and dock
Credit: Donat Savoie
Courtesy of the Avataq Cultural Institute (DSA 034)

In 2004, Kangiqsualujjuaq had a population of 776. It is interesting to note that part of this population hails originally from Labrador and that a majority of the residents deported from Killiniq also settled in Kangiqsualujjuaq, in 1978.

HISTORY OF KILLINIQ

The cultural and historical ties that unite the populations of Killiniq and Kangiqsualujjuaq date back to pre-contact times. This community was strategically situated at the mouth of Ungava Bay and it played an essential role in the development of the region.

At the end of the 19th century, Killiniq's population stood at roughly one hundred and remained relatively constant throughout subsequent years, while the region began to develop quickly. At Killinq, a weather station was established between 1884 and 1886, and the Job Brothers Fishery of Newfoundland operated a fishing station between 1898 and 1904, before selling out to Moravian missionaries who converted the facilities into a mission and trading post.

As well, in 1900 the Reverend Stewart set up an Anglican mission and in 1916 the HBC opened a trading post. Competition between the HBC and the Moravian trading posts continued until 1923 when the latter group closed up shop and sold all its facilities to its competitor.

In 1920, the Royal Canadian Mounted Police (RCMP) opened a detachment at Killiniq to mark Canadian sovereignty over the Arctic. At this period, only four or five families were living in the community, although 150 more individuals lived in the surrounding area and traded in the community. In 1936, the RCMP detachment was moved to Inukjuak. Three years later, the HBC closed its trading post, forcing Inuit to travel to George River to obtain supplies. In 1952, the George River trading post was also closed, making the Fort Chimo trading post the next closest. During this later period, only five families continued to live in the Killiniq area.

A co-operative (Kikitayok) was set up at Killiniq in 1959 further to the same study that urged the creation of a co-operative at George River. The following year, the community's population was estimated at between 20 and 30. In 1964, the population was 95 and a school was built. Again a year later, Killiniq was moved to Fox Harbour. Notwithstanding, because access remained very difficult and services were practically nonexistent, the community's population continued to oscillate.

In 1978, at a time when the community's population was less than 50, the Government of Canada decided to shut down the village and relocate its residents elsewhere in Nunavik. The reasons for this decision have never been fully explained. At the same time, analyses were initiated to select a new permanent location for the former residents of Killiniq. Taqpangayuk, which is located roughly forty kilometres south of Killiniq was selected, but the federal and provincial governments failed to provide adequate financing for relocation.

Notwithstanding, in 1985 a first family settled at Taqpangayuk and was followed in 1987 by five other families. A lack of funding and other resources however obliged these families to abandon Taqpangayuk in 1989.

A THOUSAND YEARS OF CONTINUED OCCUPATION

Archaeological data covering the period from early contact with Europeans (beginning of the 17th century) to sedentarization of the Inuit (beginning of the 1950s) demonstrate that Inuit occupied certain parts of Ungava Bay more or less extensively. It is important to note that many other parts remain as yet unexplored.

A preliminary inventory of the coast between Kangiqsualujjuaq and Alluviaq Fjord compiled in 1986 identified seven recent historical sites. As well north of Alluviaq Fjord, Plumet and Gangloff (1991) noted a number of sites possessing historical elements.

Finally, the site JcDe-1 (Nunaingok) near Killiniq (Figure 5.7) and other sites in the surrounding area provide evidence of major recent historical occupation in the 19th and 20th centuries based on the results of excavation work of recent historical

qarmait (Avataq Cultural Institute, 1989) and other exploration reports (Bell, 1884; Leechman, 1945).

Inventory work carried out in the summer of 2004 within the territory of the proposed park has not yet permitted it to be proven, beyond simple observations, that this watershed was used to travel between Labrador and Ungava Bay. The sites identified inland represent simple stopover sites related undoubtedly to inter-coastal movements. As a case in point, a burial site to mark a sudden death has been identified. Traditionally, Inuit buried their members near their place of death, even if this was at a temporary camp. Inversely, sites located near the mouth of the Koroc River are much more developed and illustrate a greater variety of activities.

Up until 1959, the site of the village of Kangiqsualujjuaq would have been visited only occasionally. Summer camps were situated farther north and at the mouth of the Koroc River, while winter camps were situated roughly fifty kilometres upstream along the George River.

RECENT HISTORICAL OCCUPATION

Through the recent historical period, Inuit were semi-nomadic hunters, whose camps were seasonal. Given the varied habitats of the different aquatic and land wildlife resources and their annual cycles of abundance, Inuit would regularly relocate in order to make optimal use of these resources. Two main types of camps, corresponding to different seasons, were used: the winter camp and the summer camp (Figure 5.10). In winter, Inuit formed small hamlets that might sometimes have populations of over 50. In summer, the type of occupation was considerably different and involved the dispersion of groups that had gathered together the previous winter.

Inuit had a thorough knowledge of their territory and gave names to the hills, mountains, lakes, rivers, peninsulas and bays, as well as different sections of rivers and specific places, that often described the activities practised there, wildlife cycles, helpful characteristics or dangers. Place names were transmitted from one generation to the next orally. When travelling, Inuit did not use maps, but rather place names and traditional stories. It would seem that the use of traditional place names has decreased with time (Müller-Wille, 1987). Current place names used by Inuit in the territory of the proposed park (Map 5.2) illustrate how they describe the environment. For example, certain islands along the Koroc River are named **aqikiniavik**, meaning 'where ptarmigan are hunted; a section of the Koroc River is named **qurunnak**, meaning 'a narrow part of the river;' and a face of one hill is called **majuriarjuak**, meaning 'where the caribou climb up very quickly.'

ANNUAL SEASONAL CYCLES

In their study, Heyes et al. (2003) describe the typical annual cycle of Inuit who once lived in the area around George River. In the fall, Inuit would leave the trading post and move to their winter camps, carrying with them equipment, supplies and other basic necessities. Winter activities would include caribou hunting, fishing for Arctic char and trapping. Winter camps would be abandoned at the end of April or the beginning of May, with families returning to their camps along the George or Koroc rivers. Arctic char would be the main dish in summer. Salmon would be netted in August to feed the dogs. Seal hunting would be carried out throughout the summer, while eider and gull eggs would be collected in June. At the end of the summer when no trading post was present at George River, families would meet at Fort Chimo and the men would earn money by unloading the HBC ship. In September, the annual cycle would begin again.

In the area of the proposed park, the main wildlife resources harvested are: ringed seal, bearded seal, harp seal, beluga, caribou, fox, Arctic char, Atlantic salmon, lake trout, brook trout, Canada goose, various waterfowl, and ptarmigan. Other resources, such as Arctic cod and black guillemot, are harvested along the northern shores of Ungava Bay and in the area around Killiniq (Makivik, 1992 a, b).

The cycle of nature comprises both periods of abundance and scarcity. The latter used to lead to famine among local populations. The majority of elders in Kangiqsualujjuaq have themselves experienced periods of famine and seen members of their families die of starvation.

Figure 5.11 shows the typical movements of a resident of Kangiqsualujjuaq in the territory of the proposed park. The resident in question has been very active as a hunter and fisherman for more than 50 years, having been introduced to subsistence activities at a young age. He is still an active fox trapper and he continues to harvest Arctic char, lake trout and brook trout, as well as caribou and ptarmigan. In comparison, another hunter may have been more likely to harvest marine wildlife or other land resources. The valley of the Koroc River represents an important route. Certain routes indicated (but not shown in Figure 5.11) lead to the HBC trading post on the George River (Heyes et al., 2003).

TRADITIONAL KNOWLEDGE AND USES OF PLANTS AND ANIMALS

In addition to a thorough knowledge of their territory, Inuit had extensive knowledge of local plants and animals, including a distinctive system of classifying life forms in both the animal and plant kingdoms. In particular, the animal kingdom

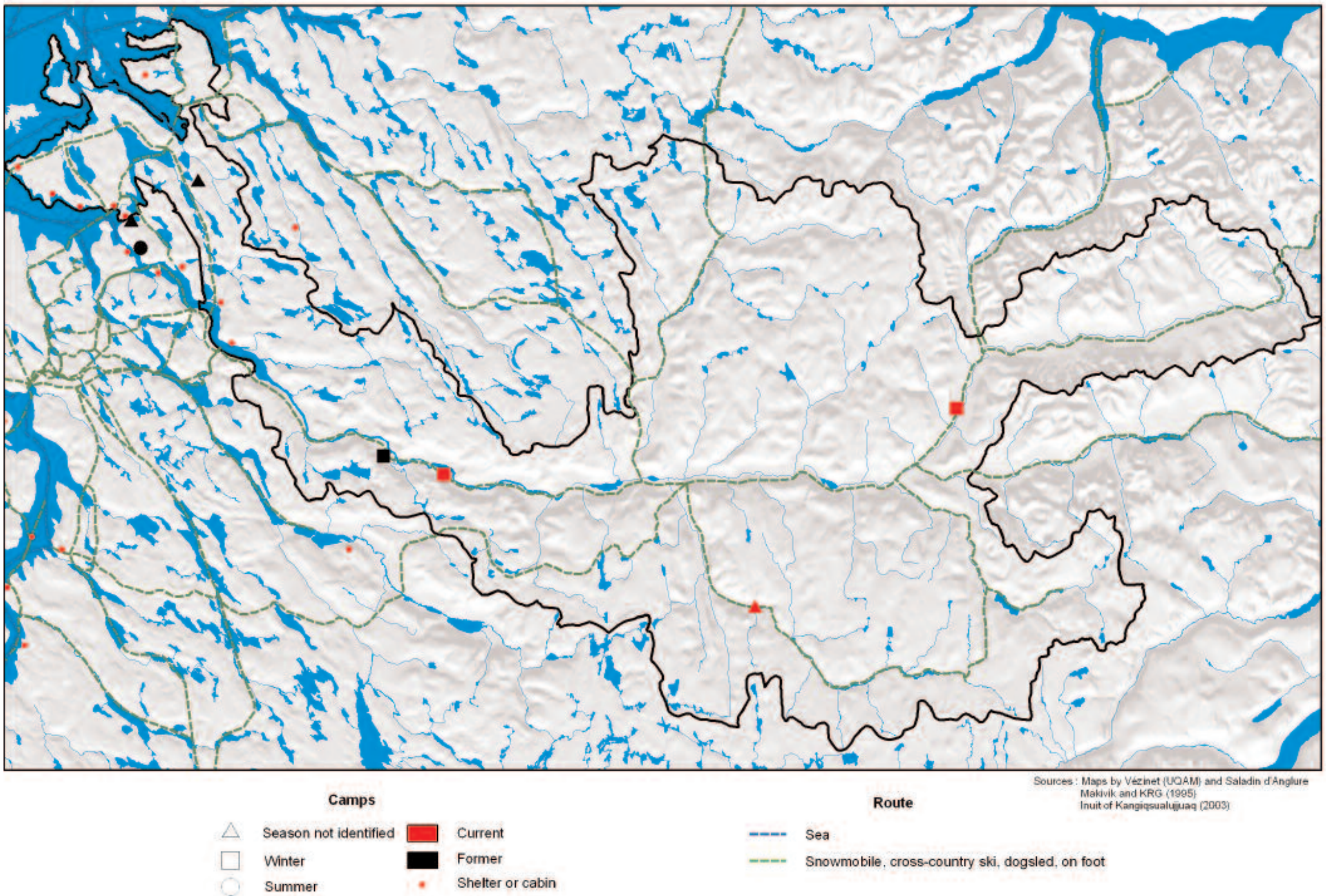


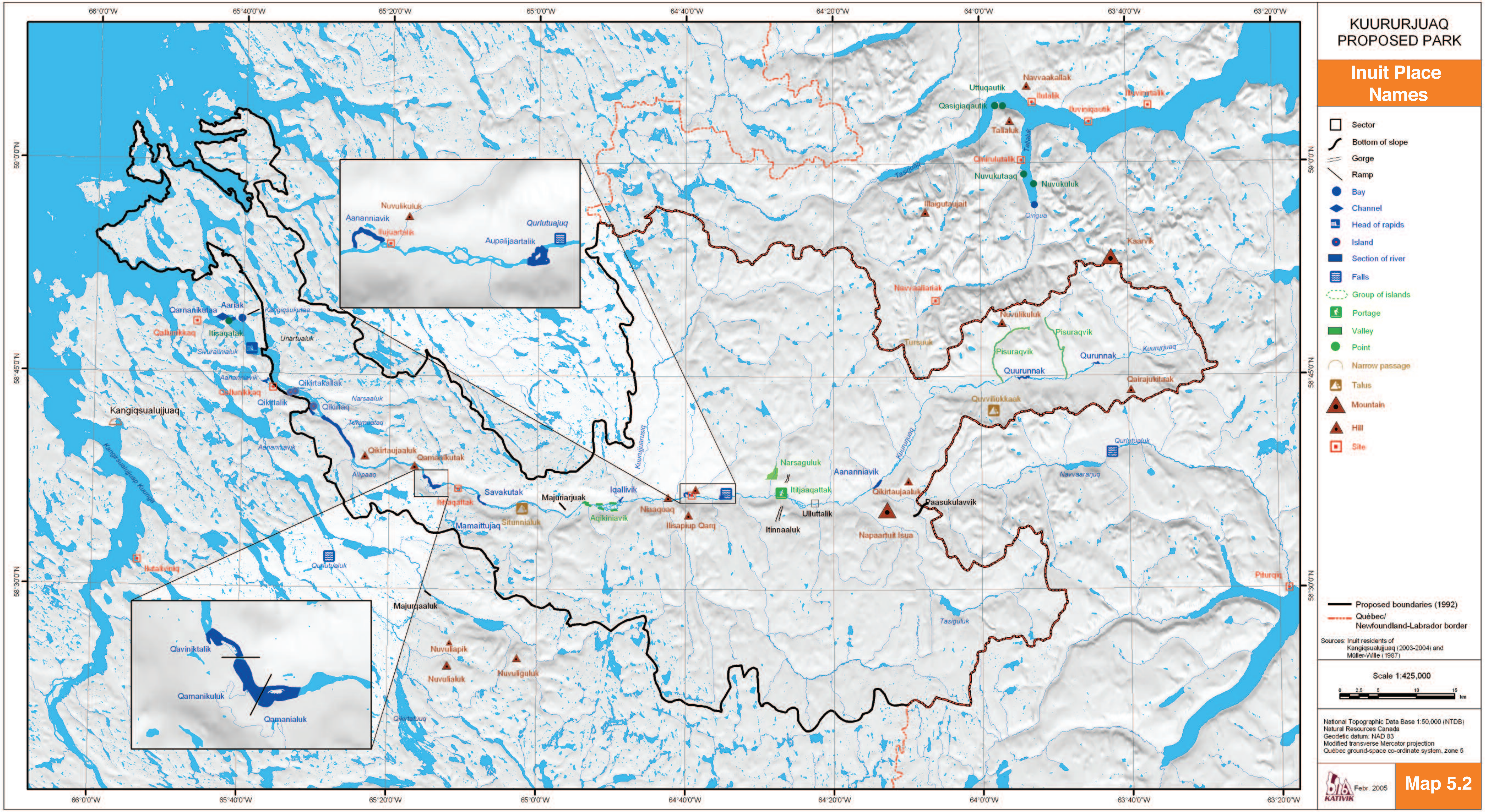
Figure 5.10 Routes Travelled and Inuit Camps in the Proposed Park

Moses Ituk and his family standing in front of their tent at the mouth of the Koroc River. July 22, 1951.
Credit: Jacques Rousseau
Courtesy of the archives branch at the Université Laval (DAUL), P/174/B,173 (IV-3)

(**umajuit**) was divided into three main categories based on the mode of locomotion: **timmiat** (those that fly), **pisuttit** (those that walk), **imarmiutait** (those that swim). These categories were not mutually exclusive; for example, birds that fly and walk would be called **timmiat pisuttit**. The simple term **pisuttit** would not be used in this case because, alone, it would not be complete in Inuktitut (Cuerrier, 2003a).

Each of these three categories was, in turn, divided into sub-categories. For example, **imarmiutait** comprised the following sub-categories: **kummiutait** (river fish), **tasirmiutait** (lake fish), **qamanirmiutait** (stream fish trapped between falls) and **tariurmiutait** (salt water fish), as well as **kaugaliat** (limpets), **uviluq** (mussels), **akkaujaq** (starfish), **miqqulik** (sea urchins) and **ammumajuq** (clams). Within each of these sub-categories, each type of animal possessed a specific name (Cuerrier, 2003a).

With respect to the plant kingdom, slow-growing plants were classified **pirualaittut**, while fast-growing plants were **pirualajuit**.


KUURURJUAQ PROPOSED PARK
Inuit Place Names
Sector
Bottom of slope
Gorge
Ramp
Bay
Channel
Head of rapids
Island
Section of river
Falls
Group of islands
Portage
Valley
Point
Narrow passage
Talus
Mountain
Hill
Site
Proposed boundaries (1992)
Québec/ Newfoundland-Labrador border
Sources: Inuit residents of Kangiqsualujjuaq (2003-2004) and Müller-Wille (1987)
Scale 1:425,000
National Topographic Data Base 1:50,000 (NTDB)
Natural Resources Canada
Geodetic datum: NAD 83
Modified transverse Mercator projection
Québec ground-space co-ordinate system, zone 5
Febr. 2005
KATIVIK
Map 5.2
66°0'0"W
65°40'0"W
65°20'0"W
65°0'0"W
64°40'0"W
64°20'0"W
64°0'0"W
63°40'0"W
63°20'0"W
59°0'0"N
58°45'0"N
58°30'0"N
Kangiqsualujjuaq
Qamanikuluk
Aariak
Itisaqatak
Unartualuk
Qikirtakallak
Qikiktalik
Qikirtaq
Narsaaluk
Qikirtaujaaluk
Qamanikutak
Aliipaaq
Savakutak
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Ilisapiup Qarq
Narsaguluk
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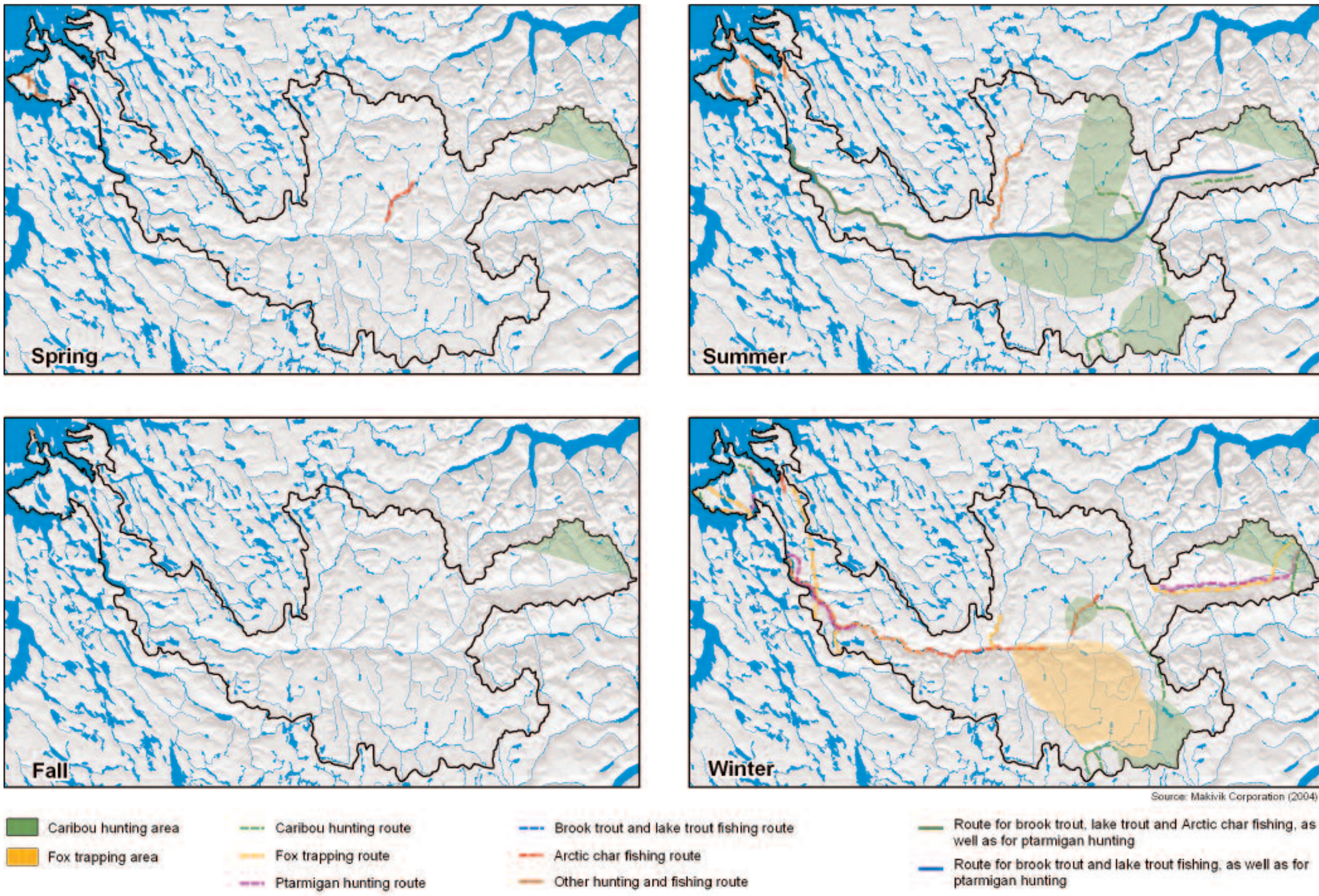


Figure 5.11 Seasonal Use of Resources and Routes of an Inuk Hunter from Kangiqsualujjuaq in the Proposed Park

Inuit also drew a distinction between trees (**napartuit**), shrubs (**urpiit**), flowering plants (**pirursiat**) and grass-like plants (**ivitsukait**). Mushrooms were classified as **pujuit** (Figure 5.12; Cuerrier and elders from Kangiqsujuaq, 2004; Blondeau and Roy, 2004). Finally, the different plants themselves had individual names, as did their different parts and organs (Appendix 10; Table 5.3). Plant names sometimes denoted their use. For example, white arctic mountain heather (*Cassiope tetragona* ssp. *tetragona*) was called **itsutiit.** Inuit collected this plant in fall and dried it in piles, which were called **qaksak** (Cuerrier and elders from Kangiqsujuaq, 2004; Blondeau and Roy, 2004).

Although the summer months do not last long in Nunavik, the Inuit made use of several plants for various purposes: food, tea, fuel, medicine, etc. (Cuerrier and elders from Kangiqsujuaq, 2004; Blondeau and Roy, 2004; Cuerrier, 2005). Inuit used to collect plants and store them in pouches made of caribou or seal skin. In this manner, plants would be conserved through the winter to be used when needed. Important plants were: **qisirtutaujaq** (common juniper), **paunnaq** (fireweed; river beauty; marsh willowherb), **avaalaqiaq** (dwarf birch), **kigutanginnaq** (alpine bilberry), **tullirunaq** (roseroot), **maniksajaq** (moss) and **maniq** (sphagnum) (Cuerrier, 2005).

Common juniper (*Juniperus communis* var. *depressa*) produces a tonic tea that was considered a remedy for all ailments. Inuit used it to treat tuberculosis, bladder infections and skin problems. This tea was also used as a diuretic. To make the tea, the entire plant was steeped; the berries were left on the plant to make the tea stronger but were never consumed. Fireweed (*Chamerion angustifolium* ssp. *angustifolium*) also produces a tonic tea that was used to relieve stomachaches and sore throats as well as to relieve fevers. It was administered to those who were very ill and refused to drink

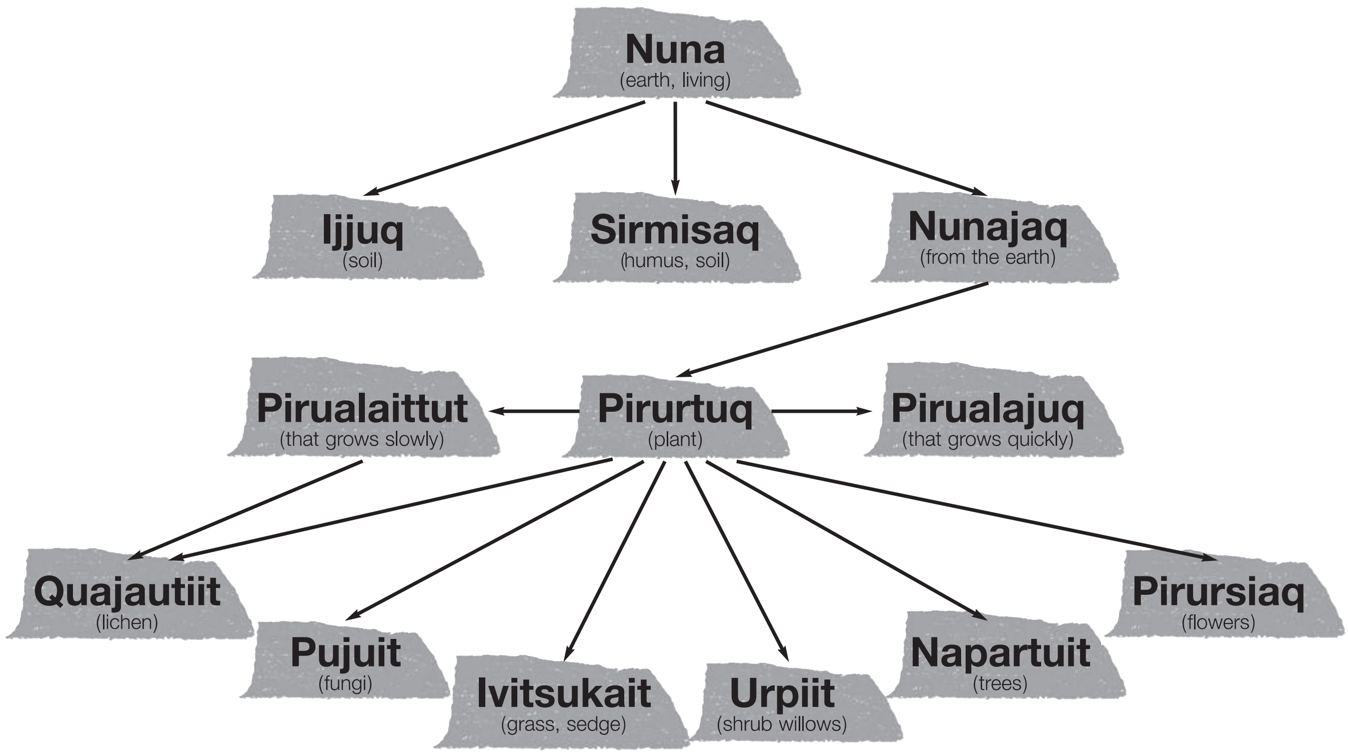


Figure 5.12 Ethnobotancial Classification of the Plant Kingdom

even water. Old river beauty leaves (*Chamerion latifolium*), collected in August, produce a pale-coloured tea. These leaves were also sometimes added to **suvaliq** (a dish of berries mixed with fish eggs, seal oil and water). Dwarf birch (*Betula glandulosa*) makes excellent firewood (**qijuq**), even when damp. Stripped of their leaves, the branches of this plant were used by the Inuit to make waterproof mattresses; the branches were tied together with caribou skin lacing (**namautik**). Subsequently, these mattresses were covered with caribou skins or the pelts of other animals. The branches of dwarf birch were also used for slingshots. Alpine bilberries (*Vaccinium uliginosum*), commonly known as blueberries, are tasty and were especially enjoyed with **suvaq** (fish eggs). They are sometimes mixed with black crowberries (*Empetrum nigrum;* **paurngaq**). The entire roseroot (*Rhodiola rosea*), including its flowers, was a treat to be eaten raw. Its rhizomes were sometimes added to **suvaq** or eaten with seal oil. The plant was an important source of nutrients during periods of famine. Bryophytes (moss) were used to make lamp-wicks. This plant was very important because it ensured that families, especially infants, had a source of heat. It was also used to smoke **pualuit** (mittens). Inuit collected this plant in the fall, dried it, and broke it into small pieces before using it. Sphagnum (**maniq)** was used in diapers (Cuerrier, 2005). Table 5.4 includes other examples of the former uses of plants.

The Inuit also used various parts of the animals that they harvested to make tools, clothing and handicrafts. For example, almost every part of the caribou was used. The stomach was eaten as is, soaked in blood and frozen or dried. Hooves were eaten boiled and bone marrow was also consumed. Traditionally, caribou skins were used to make tents, parkas (**qulittaq**), the liners (**alirtik**) worn inside of boots (**kamiit**), mittens (**pualuit**), blankets and bedding (**qak**). Fur was used for snowshoes. Carvings and buttons were made from caribou hooves and thread was made from its sinew. With respect to antlers, sections were used for the handles or blades of knives (**savik** and **panak** [snow knife]), the handles of **uluit** (knives traditionally used by women, in the shape of a half-moon), shovels, harpoon points and objects through which the lines for dog teams were thread. The fur of fox was used to line parka hoods (Cuerrier, 2003a).

TALES AND LEGENDS

Stories, myths and legends were transmitted orally from generation to generation. A report prepared by Heyes et al. (2003)

Table 5.3 English–Inuktitut Glossary of Plants and their Organs

PARTS, GROWTH STAGES OR ORGANS	
ENGLISH	INUKTITUT[1]
Entire plant	Pirurtuq, pirursiaq
Herbaceous plants with flowers or similar structures	Pirursiaq
Tree	Napartuq
Young plant	Nutaijurtuq
Old plant	Palliq
Root	Amaaq, mangnguq
Erect stem or flower stalk	Napajuq, naparutaq, akiruk
Prostrate stem	Amaalinaaq
Leaves (rosette)	Naka, nakak
Leaf	Uqaujaq
Leaf (large)	Uqaujarlak
Grass-like plant	Ivit
Flower or inflorescence	Pirursiaq
Petal or tepal	Nuivakliajuq
Pollen	Pirurtisigutiit
Catkin or cone	Killapak, gimmiguaq
Fruit which ceases to grow with the occurrence of frost, snow or rain	Qiuniq

[1] The Inuktitut spelling shown above is that used by the residents of Kangiqsujuaq (and may differ slightly from that used by the residents of Kangiqsualujjuaq).

Extract: Cuerrier and elders from Kangiqsujuaq (2004) as well as Blondeau and Roy (2004)

reviews some of the myths and legends of the Inuit of the Ungava–Labrador Peninsula. Two examples are provided below:

The following story, which is represented by the print appearing as Figure 5.13, is classified as a contemporary oral story. It tells of malicious beings dancing around a tent and scaring the tent's occupants. This extract describes the situation:

> "This is a story from the past in the time of my grandmother. In those times we lived in tents made from the skin of animals. At night when it was dark we would hear scratching sounds outside our tents and we would become so frightened we would hold our breath in silence. Those were the scratching sounds made by the evil spirits and their offspring. These scratchings would continue most of the night and would stop only in the early morning." (Etook, 1975)

Among those stories that may be qualified as myths or legends, the following (Figure 5.14) describes how a village was once protected from another malicious spirit:

> "It is said that in ancient times a creature resembling a polar bear was seen to come up from the sea. It walked on its hind legs like a polar bear. From the depths of the sea it came and was first seen by a hunter who became frightened and ran to his village as the thing was approaching. There were many people living in that village and the thing was coming to them. The hunter in great fright called "Oh great spirits help us for only you can protect us from this thing from the sea". There was great movement in the sea and waves smashed on the shore as the thing came to the land and the land was covered in darkness, but as the time for the destruction of the people had not come there came a great fog and the land opened under the thing and it was gone." (Etook, 1975)

Table 5.4 Uses of Plants by the Inuit of Kangiqsualujjuaq

SCIENTIFIC NAME	ENGLISH	INUKTITUT	USE
Populus balsamifera	Balsam poplar	Qairulik	Wood is used to smoke fish.
Ribes glandulosum	Skunk currant (plant) (red berry)	 Mirqualiqautik Mirqualik	 Red berries (ripe) are edible.
Salix glauca ssp. *callicarpaea*	Beautiful willow (plant) (leaf) (catkin)	 Urpik Uqaujaq Qimminguaq, mirqulik	Thicker branches are used to make whistles. Leaves are edible. Catkins are edible.
Sorbus americana	American mountain ash	Aupaalurtaluq	Berries are edible.

Source: Cuerrier (2005)

ORAL HISTORY

Inuit legends are part of an extremely rich oral tradition that has only been partially recorded. The history of the region from an Inuit perspective has yet to be fully explained; only after this has been done will it be possible to truly understand the essence of Nunavik. Even though several research projects are underway, a great deal of data remains to be collected, compiled and analyzed in order to gain an accurate description of family movements, and those ancestors who were of "mythic" proportions: such as the first Annanack, who travelled through the immense territory of the Ungava–Labrador Peninsula and the Ungava Bay region between Quaqtaq and Killiniq with tremendous courage and determination.

Major community hunts by kayak and umiaq, regional assemblies, competitions and games of skill are all facets of Inuit tradition. As too are various visual art forms and the skill and ingenuity with which everyday clothing and objects were made.

Over the coming years, research into Inuit traditions will continue and this compiled knowledge will eventually be published.

[1] Based mainly on: Kolmeister and Kmoch (1814), Davey (1905), Arbess (1967), Savoie (1969), Ray (1990), Fitzhugh (1994), Sable (1995), Turner (2001), Gendron (2003), Heyes et al. (2003), Avataq Cultural Institute (2004).

[2] Torngak is a written variant of Torngat and Torngait.

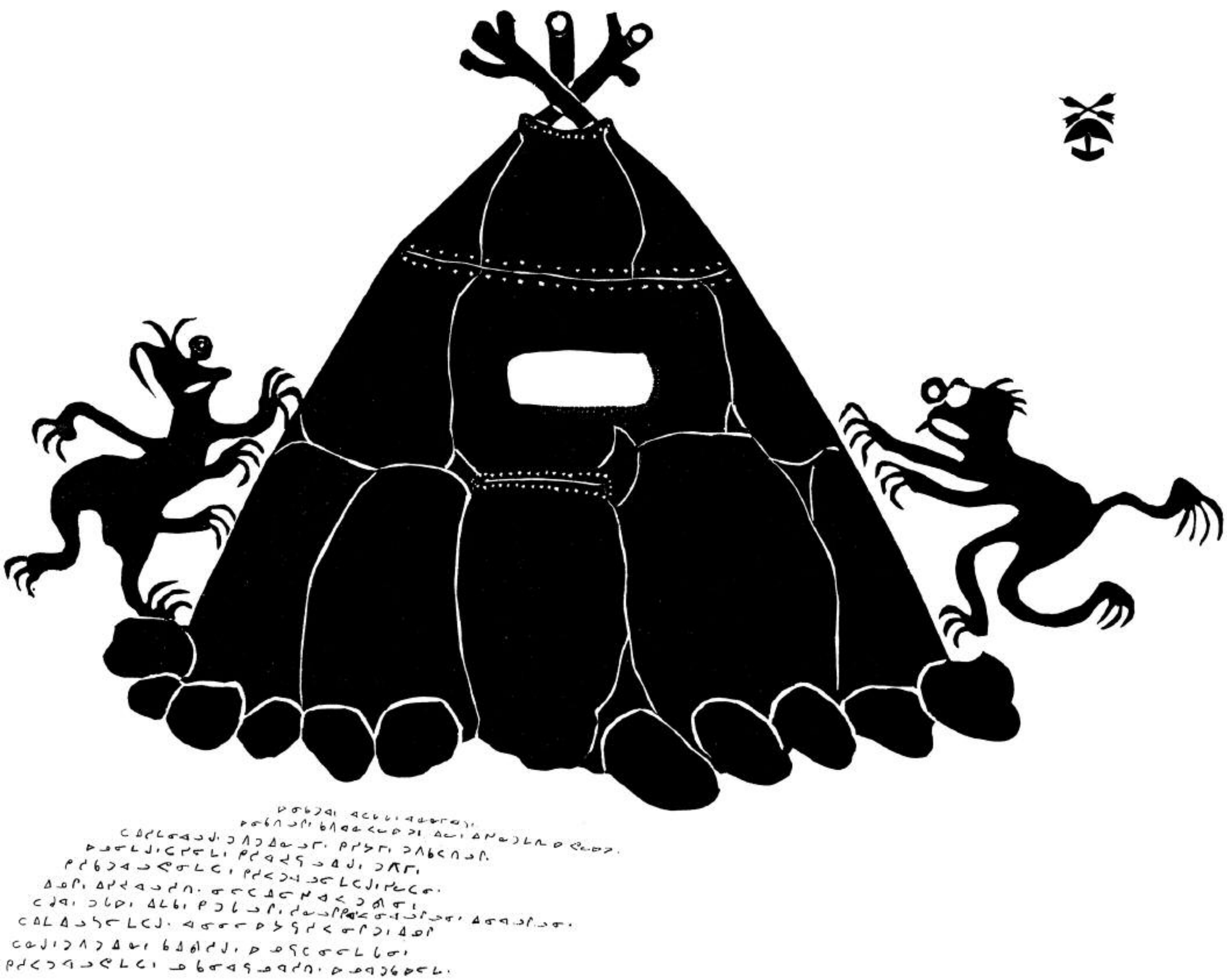


Figure 5.13 Torngats that Come Knocking in the Night

Figure 5.14 Shaman Protecting Village from a Spirit

Credit: Pierre Dunnigan

6 KUURURJUAQ – A PARK OF NATIONAL SCOPE

The territory reserved for the proposed park boasts many exceptional characteristics that make it a unique part of Québec. It covers representative sections of the natural regions known as the Torngat Mountain Foothills, the George River Plateau and the Ungava Coast. These regions are characterized by a series of distinct landforms and ecosystems, moving from high, rugged mountains, through the u-shaped valley of the Koroc River with its boreal vegetation and turquoise waters, to an irregular coastline.

The following sections provide an overview of the unique elements of this remarkable territory. Two additional sectors of interest that have been identified outside the boundaries of the proposed park are also described.

Sectors of Interest in the Proposed Park

Within the proposed park, five sectors of interest have been identified based on the presence of various elements of interest in terms of changing landforms, conservation, education and history (Map 6.1). Table 6.1 lists the elements of interest that have been taken into consideration, while the thematic maps found in the earlier sections of this document provide additional information.

The five proposed sectors nurture certain plants and animals that are deemed to be at risk and they possess sites that mark pre-contact and early-contact occupation by groups of paleo- and neo-Eskimo. Throughout the pre-contact period, the Koroc River would have served as a route for the transportation of metachert from Ramah. Furthermore, to this day, it continues to be an important area for the practice of Inuit subsistence activities.

SECTOR 1: D'IBERVILLE–TORNGAT

Situated in the physiographic unit known as the Labrador Uplands (Torngat Mountains), this first sector of interest contains the highest summit in eastern Canada, Mount D'Iberville.

From the summit of Mount D'Iberville, the view is breathtaking. To the north and east, the Torngat Mountains stretch all the way to the Labrador Sea. To the south and west, the mountain range towers over the plateau and valley of the Koroc River. The dry climate produces a tundra setting with low-growing and discontinuous vegetation as well as rocky outcroppings. This sector covers a part of the calving grounds of the Torngat Mountain caribou herd. A few species of invascular plants are also present, marking the southern edge of their ranges.

SECTOR 2: HAYWOOD–TASIGULUK

Situated in the physiographic unit known as the Koroc River Plateau, this second sector covers a section of the Koroc River valley and the valley of one of its tributaries, the valley of Lake Tasiguluk, as well as Mount Haywood. Typical of the vast and uniform plateau, this sector comprises several elements of geomorphological interest, including the frontal moraine found downstream from Lake Tasiguluk, the rock step that encircles the lake, the sub-glacial gorge, and exceptionally large moulin kame.

From the summit of Mount Haywood, the plateau and river of the Koroc River as well as the Torngat Mountains may be seen.

The Haywood–Tasiguluk sector possesses potential habitat for birds of prey. Finally, along the Koroc River, roughly five kilometres north of Mount Haywood, certain sites marking pre-contact and early-contact occupation have been identified.

SECTOR 3: KOROC–KORLUKTOK

In this third sector of interest, the middle section of the Koroc River valley, between the Naksarulak Creek and the André-Grenier River, is u-shaped. The valley walls are steep with talus rock steps and perched terraces observable in places.

The large alluvial fans located at the mouth of the André-Grenier River and the Sukaliuk creek are impressive. During periods of peak flow, these water courses divide into numerous channels. As well in this sector, the deep valley fosters a microclimate that is more moderate than the climate of the Koroc River Plateau. A forest of spruce and tamarack thrives, representing a boreal pocket in an arctic zone. The diversity of plants and animals is also greater in this sector than over the Plateau, with certain species at the northern edge of their ranges.

SECTOR 4: LOWER KOROC

Situated immediately downriver from the preceding sector, the geomorphological phenomena of this fourth sector of interest provide evidence of changing landforms. They include frontal moraines (which would have blocked the valley to form the Koroc Glacial Lake), as well as large, marine sand terraces and small dunes that appear to be active as they encroach on adjacent vegetation.

Table 6.1 Unique Elements of the Sectors of Interest in the Proposed Park

SECTORS OF INTEREST	PHYSICAL ENVIRONMENT
1 D'IBERVILLE–TORNGAT	Mount D'Iberville, the highest peak in Québec Contact between the provinces of Churchill and Nain Orthogonal bedrock structure Precambrian surfaces broken by erosion Ridges, reworked rock layers, rugged topography Summital block fields, sorted congelifract formations Suspended cirques and tributary valleys, moraines Erosion scarring, alluvial cones, talus, rock glaciers, terraces Blow-out basins, thermokarsts Calving grounds of the Torngat Mountains caribou herd
2 HAYWOOD–TASIGULUK	Highly developed frontal moraine downstream from Lake Tasiguluk Sub-glacial gorge oriented north–south Fluvioglacial complexes upstream and downstream from the gorge (lake delta) Moulin kame upstream from the gorge Rock step produced by the Koroc Glacial Lake at an elevation of 760 m around Lake Tasiguluk Glacial landform (microforms) on the shores of Lake Tasiguluk Fluvioglacial deposits and kettles, alluvial cone north of the Koroc River Thermokarst west of Mount Haywood
3 KOROC–KORLUKTOK	Gneiss rusted through weathering east of the mouth of the André-Grenier River U-shaped valleys and suspended tributary valleys Sub-glacial gorges, rock steps Erosion scarring on slopes and talus Deposits reworked by the wind upstream from the waterfalls Alluvial cones
4 LOWER KOROC	Marine terrace, dunes, palsa Meandering course of the Koroc River and cut-off section Talus
5 UNGAVA COAST	Asymmetric rocks (stoss-and-lee form) and striation indicative of glacial flow Till wash-away zone indicating the elevation of the D'Iberville Sea, perched beaches Lake Qarliik, largest lake in the proposed park Sorted congelifract formations, palsa peat bogs

BIOLOGICAL ENVIRONMENT	HUMAN ENVIRONMENT
Representative sector of arctic tundra Vascular plants: two taxa likely to be designated as threatened or vulnerable in Québec; one taxon considered rare in Canada; seven taxa considered rare in the proposed park; calcicolous taxa Invascular plants: taxa at the southern edge of their range; probable presence of rare taxa	Early-contact sites occupied by Inuit; myths and legends Pre-contact route for the transportation of metachert from Ramah Territory currently used by Inuit
Vascular plants: two taxa likely to be designated as threatened or vulnerable in Québec; one taxon considered rare in Canada; six taxa considered rare in the proposed park; calcicolous taxa Lake Tasiguluk: rich shrub-tundra eco-system Bird of prey nesting sites (Mount Haywood and gorge); probable presence of bird species at risk	Pre-contact and early-contact sites north of Mount Haywood Pre-contact route for the transportation of metachert from Ramah Territory currently used by Inuit
Boreal pocket in an arctic zone Vascular plants: one taxon likely to be designated as threatened or vulnerable in Québec Wildlife: species at the northern edge of their ranges; possible presence of species at risk Northern edge of the calving grounds of the George River caribou herd Arctic char spawning grounds	Pre-contact site at the mouth of the Naksarulak Creek; early-contact sites on the shores of the Koroc River Pre-contact route for the transportation of metachert from Ramah Territory currently used by Inuit Hunting and fishing outfitting activities
Boreal pocket in an arctic zone Most northerly stand of white birch known to exist in Québec Vascular plants: one taxon considered rare in Canada; one taxon considered rare in the proposed park; four taxa at the northern edge of their ranges in Québec Wildlife: species at the northern edge of their ranges; possible presence of species at risk Arctic char wintering and spawning grounds	Pre-contact and early-contact sites on the shores of the Koroc River Pre-contact route for the transportation of metachert from Ramah Territory currently used by Inuit Hunting and fishing outfitting activities
Vascular plants: one taxon at the northern edge of its range in Québec and in eastern North America Wildlife: species at risk (beluga, polar bear) Birds of prey nesting sites (rocky cliffs); probable presence of bird species at risk	Many pre-contact and early-contact sites Pre-contact route for the transportation of metachert from Ramah Territory currently used by Inuit Hunting and fishing outfitting activities

The entire sector is extremely susceptible to erosion. The cutting of trees or the exposure of soil could lead to wind erosion and the creation of gullies. The instability of the valley's steep walls is indicated by scarring caused by erosion as well as by talus and talus cones.

The wetlands and palsa found in the Lower Koroc sector are rare elsewhere in the study area. Moreover, this sector nurtures the most northerly stand of white birch known to exist in Québec. Similar to sector 3, sector 4 is a boreal pocket in an arctic zone and it marks the boundary of the calving grounds of the George River caribou herd.

SECTOR 5: UNGAVA COAST

The fifth sector of interest is a coastal environment that includes both marine and terrestrial eco-systems. Near the coast, the topography has little amplitude and is dotted with rocky crags, small valleys and headlands that stand up to 180 m high. The irregular shoreline possesses scattered active and perched beaches, the latter having been created by the D'Iberville Sea. Glacial phenomena (aligned boulders and pebbles, ridges, etc.) are visible along the shore and foreshore. The meeting of fresh, brackish and salt waters, as well as sea-air, foster a rich and diversified biological environment. According to the seasons, various mammal species may be found along the coast, including seal, the occasional polar bear and beluga. The Ungava Coast sector furthermore nurtures a vascular plant that is at the northern edge of its range in Québec and in eastern North America.

This sector also includes a high concentration of sites that mark pre-contact and early-contact occupation, in particular along the shores of Tasiujakuluk Cove. These sites provide evidence of paleo- and neo-Eskimo groups whose diet would have comprised mainly marine mammals.

Sectors of Interest Outside the Boundaries of the Proposed Park

During a number of helicopter flights over the areas next to the territory of the proposed park, certain additional unique or representative elements of the region were identified. These elements could justify the addition of new sectors to the proposed park, both to the north and south of it. Situated along the western part of the Koroc River, these elements are part of the Koroc River Plateau and the Ungava Lowlands (Map 6.2 and Table 6.2).

The two additional sectors are typcial of the natural region known as the Ungava Coast, which is currently under-represented in the proposed park. These two sectors include approximately ten lakes the size of Lake Tasiguluk. As lakes of this size are rare in the proposed park, the addition of these sectors would favour the protection of biodiversity. The two sectors cover roughly 1800 km^2. Their addition would represent a 42% increase in the area of the proposed park (4274 km^2) and bring the total area of the park to 6074 km^2.

Moreover, mineral potential in these two sectors is poor according to certain sources (refer to Map 3.1 and "Mineral Potential" in Section 3). While no inventory of archaeological sites has yet been compiled, some potential has been identified on the coast around Keglo Bay, on the shores of Lake Angusik (northern sector) and along the lower section of the Barnoin River (southern sector).

NORTHERN SECTOR

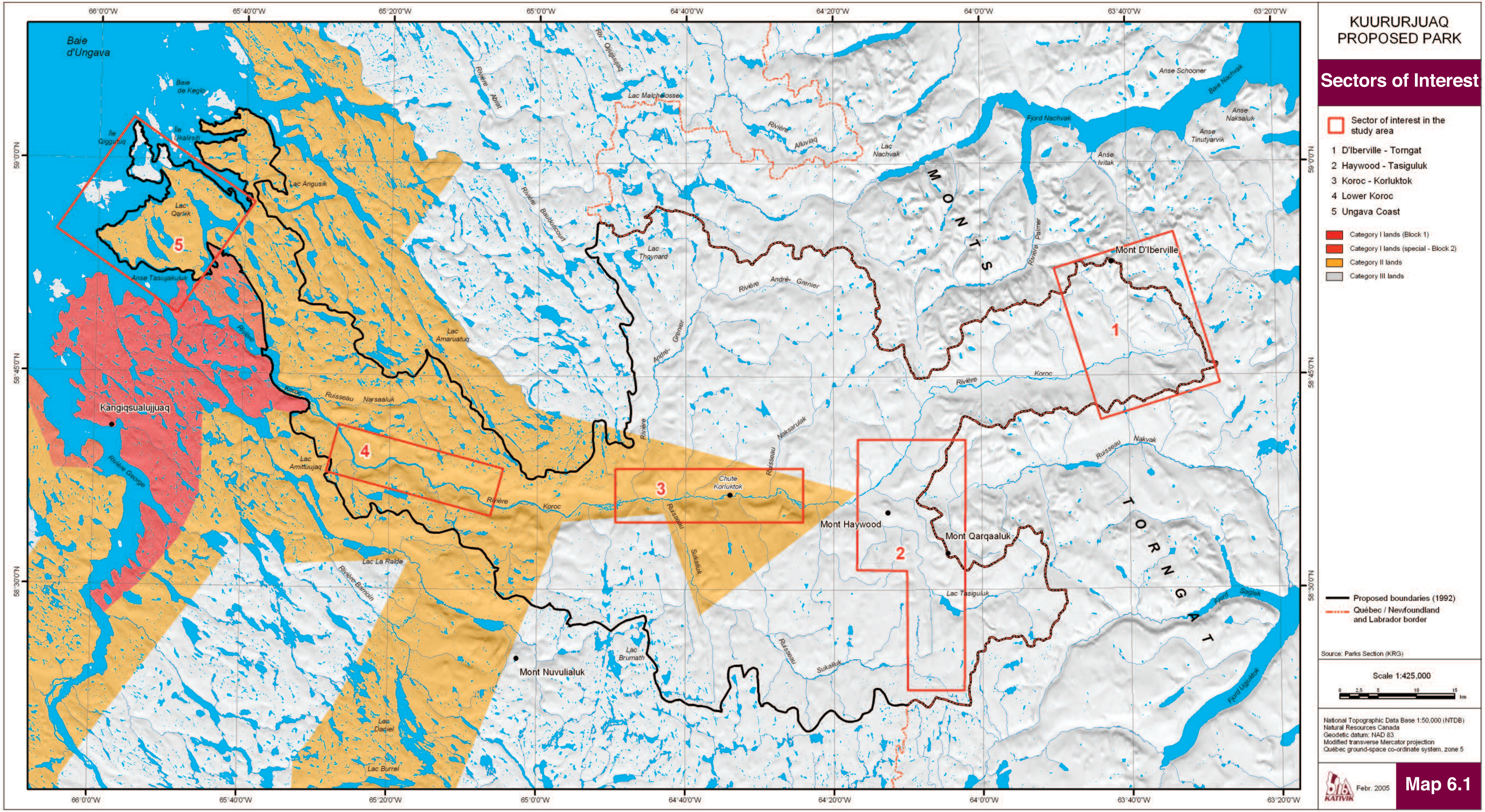
The sector of interest found north of the proposed park possesses certain unique geological phenomena, including a semi-circular lake that lies perpendicular to the general northwest–southeast structure of this sector. This structure has produced the shapes of the lakes (elongated form) and the configurations of the river systems (parallel networks). Typical in this area, these shapes and configurations are nonetheless distinct from those found in the eastern part of proposed park. Furthermore, a reversible rapid (which is an unusual phenomenon) is located at the mouth of the Baudan River, north of Lake Angusik. By reversible, it is meant that the current flows either downstream or upstream depending on whether the tide is ebbing or flowing. With respect to vegetation, this sector nurtures the most northerly stand of balsam poplar (*Populus balsamifera*) known to exist in Québec.

North of the Narsaaluk River, the direction of former glacial flow is revealed by drumlins. These landforms, which are essential to understanding geographical changes, are relatively rare in the territory of the proposed park. As well, this sector may possess rock steps and other phenomena that would point to the presence of a glacial lake around the same time as the Koroc Glacial Lake (refer to Section 3 of this document, "Geomorphology of the Quaternary").

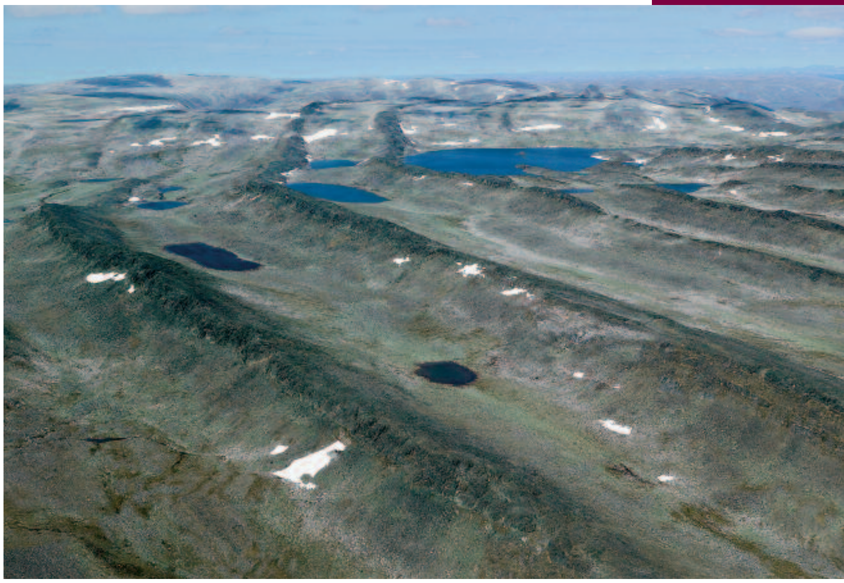
The boundaries currently proposed for the park could be modified to encompass the entire Baudan River system; the above-mentioned unique phenomena are located on both sides of this river. Covering roughly 980 km^2, the northern sector straddles Category II and III lands. This area is used for subsistence hunting, fishing and trapping, and two Inuit camps are located in this area.

SOUTHERN SECTOR

South of the proposed park, Mount Nuvulialuk and the surrounding area possess unique phenomena as well as a number


KUURURJUAQ PROPOSED PARK
Sectors of Interest
Sector of interest in the study area
1 D'Iberville - Torngat
2 Haywood - Tasiguluk
3 Koroc - Korluktok
4 Lower Koroc
5 Ungava Coast
Category I lands (Block 1)
Category I lands (special - Block 2)
Category II lands
Category III lands
Proposed boundaries (1992)
Québec / Newfoundland and Labrador border
Source: Parks Section (KRG)
Scale 1:425,000
0 2,5 5 10 15 km
National Topographic Data Base 1:50,000 (NTDB)
Natural Resources Canada
Geodetic datum: NAD 83
Modified transverse Mercator projection
Québec ground-space co-ordinate system, zone 5
KATIVIK
Febr. 2005
Map 6.1
Baie d'Ungava
Baie de Keglo
Kangiqsualujjuaq
Lac Qarlik
Anse Tasiujakuluk
Lac Angusik
Lac Amaruatuq
Ruisseau Narsaaluk
Lac Amittuujaq
Rivière George
Rivière Koroc
Chute Korluktok
Mont Haywood
Mont Qarqaaluk
Mont D'Iberville
Mont Nuvulialuk
Lac Tasiguluk
Lac Brumath
Lac La Ralde
Lac Daniel
Lac Burrel
Lac Nachvak
Lac Thoynard
Fjord Nachvak
Baie Nachvak
Anse Schooner
M O N T S
T O R N G A T
66°0'0"W
65°40'0"W
65°20'0"W
65°0'0"W
64°40'0"W
64°20'0"W
64°0'0"W
63°40'0"W
63°20'0"W
59°0'0"N
58°45'0"N
58°30'0"N

This steep slope is populated by the most northerly stand of balsam poplar known to exist in Québec.



The hard gabbro rock (intrusive igneous rock) has been exposed through the partial erosion of softer layers (quartzite)

Vast terrain formed by a multitude of morainic ripples northwest of Nuvulialuk

of elements of interest. From the summit to the foot of this mountain, rock falls and avalanches have formed long, spectacular talus. South of the mountain, the ridges produced through differential erosion with a north–south orientation are evidence of a broadly undulating monocline structure (stacked layers of rock).

Quite a number of easily observable phenomena that provide information about the geology and evolution of the region since the last glacial stage are concentrated in the small valleys of Lake La Ralde and the Barnoin River. A large number of frontal moraines and former shorelines are the remnants of a shrinking continental ice sheet and a glacial lake in the section of the valley situated northwest of Mount Nuvulialuk. In addition, eskers, perched deltas, waterfalls, rock glaciers, palsa and other phenomena formed by freeze-and-thaw action or permafrost action may be found here (Barré, 1984; Barré and Lefebvre, 1985, 1987).

Covering roughly 820 km^2, the southern sector occupies a large part of the Barnoin River system and includes several small lakes (roughly 5 km^2 or 500 ha) (such as Lake Brumath located to the east of Mount Nuvulialuk) and larger ones (such as lakes La Ralde [roughly 9 km^2 or 900 ha] and Amittuujaq [roughly 20 km^2 or 2000 ha]).

This sector straddles Category II and III lands and is adjacent to Kangiqsualujjuaq Category I lands, just north of Lake Amittuujaq. An existing snowmobile trail connects the village of Kangiqsualujjuaq with an outfitting camp located west of

Table 6.2 Unique Elements of the Sectors of Interest Identified Outside the Boundaries of the Proposed Park

	NORTHERN SECTOR Baudan River (roughly 980 km^2)[1]	SOUTHERN SECTOR Barnoin River (roughly 820 km^2)[1]
PHYSICAL ENVIRONMENT	Baudan River system Parallel river networks Semi-circular lake Several lakes Drumlins north of the Narsaaluk Creek A few chrome, nickel and copper showings	Barnoin River system Several lakes Mount Nuvulialuk (914 m high) Parallel rock ripples Lake La Ralde valley rich in Quaternary landforms and deposits Steep slopes and large talus or avalanche cones A few chrome, nickel, copper and magnetite showings
BIOLOGICAL ENVIRONMENT	Arctic bioclimatic zone: tundra–taiga (tree limit, balsam poplar stand) Plants and animals similar to those found in the proposed park	Semi-arctic bioclimatic zone: tundra–taiga (tree limit) Plants and animals similar to those found in the proposed park
HUMAN ENVIRONMENT	Category II (625 km^2) and III (355 km^2) lands Use of the territory for subsistence purposes Two Inuit camps Mineral titles (claims): none	Category II (508 km^2) and III (312 km^2) lands Use of the territory for subsistence purposes One outfitting camp (*Rapid Lake Lodge*): hunting, fishing and adventure tourism Mineral titles (claims): none

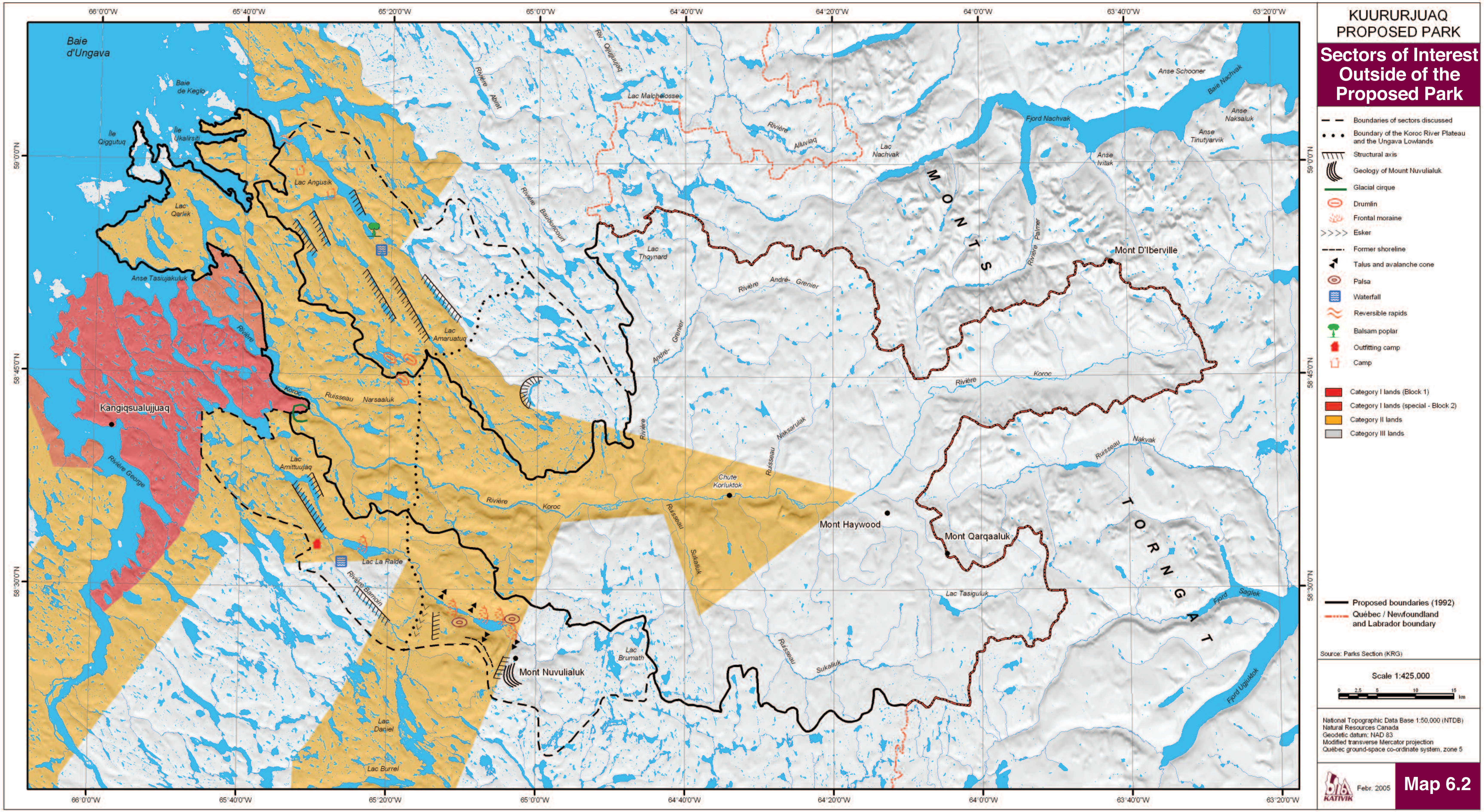
[1] Approximate area measured using maps with a scale of 1:425,000

Long slope covered with colluvia and talus (Mount Nuvulialuk)

Lake La Ralde (Rapid Lake Lodge). This area is used extensively by the residents of Kangiqsualujjuaq on a seasonal basis for subsistence hunting, fishing and trapping and, less extensively, for recreation activities. The camp of Rapid Lake Lodge is located on the Barnoin River and its territory extends all the way to Mount Nuvulialuk.

Further Steps towards the Creation of the Park

A complementary document entitled "Draft Master Plan" will be produced by the Direction of Sustainable Development, Ecological Heritage and Parks at the Ministère du Développement durable, de l'Environnement et des Parcs (sustainable development, environment and parks, MDDEP). This document will describe the main opportunities and constraints presented by the study area in order to propose boundaries for the future park, management orientations to assist with protection and development, a zoning plan, and a development scenario. This work will be carried out in co-operation with the community of Kangiqsualujjuaq through an existing working group. An environmental and social impact study will be prepared by the MDDEP with the assistance of the KRG and submitted to the Kativik Environmental Quality Commission. Following the publication of the draft master plan and the impact study, public hearings will be held to afford the members of the general public an opportunity to express themselves on the creation of this national park. Kuururjuaq national park will be the second park established in Nunavik (Pingualuit National Park was created in January 2004) and the community of Kangiqsualujjuaq will assume responsibility for its management.


KUURURJUAQ PROPOSED PARK
Sectors of Interest Outside of the Proposed Park
Boundaries of sectors discussed
Boundary of the Koroc River Plateau and the Ungava Lowlands
Structural axis
Geology of Mount Nuvulialuk
Glacial cirque
Drumlin
Frontal moraine
Esker
Former shoreline
Talus and avalanche cone
Palsa
Waterfall
Reversible rapids
Balsam poplar
Outfitting camp
Camp
Category I lands (Block 1)
Category I lands (special - Block 2)
Category II lands
Category III lands
Proposed boundaries (1992)
Québec / Newfoundland and Labrador boundary
Source: Parks Section (KRG)
Scale 1:425,000
0 2,5 5 10 15 km
National Topographic Data Base 1:50,000 (NTDB)
Natural Resources Canada
Geodetic datum: NAD 83
Modified transverse Mercator projection
Québec ground-space co-ordinate system, zone 5
KATIVIK
Febr. 2005
Map 6.2
Baie d'Ungava
Baie de Keglo
Île Qiggutuq
Île Ukalirsiti
Lac Qarliik
Lac Angusik
Anse Tasiujakuluk
Kangiqsualujjuaq
Rivière George
Rivière Koroc
Ruisseau Narsaaluk
Lac Amaruatuq
Lac Amittuujaq
Lac La Ralde
Rivière Barnoin
Mont Nuvulialuk
Lac Dariel
Lac Burrel
Lac Brumath
Lac Malchelosse
Rivière Alluviaq
Lac Nachvak
Lac Thoynard
Rivière André-Grenier
Rivière Baudancourt
Rivière Abloviak
Chute Korluktok
Ruisseau Naksaruluk
Ruisseau Sukaliuk
Mont Haywood
Mont Qarqaaluk
Lac Tasiguluk
Mont D'Iberville
MONTS TORNGAT
Rivière Palmer
Ruisseau Nakvak
Fjord Nachvak
Baie Nachvak
Anse Schooner
Anse Naksaluk
Anse Tinutyarvik
Anse Ivitak
Fjord Saglek
Fjord Ugjuktok
66°0'0"W
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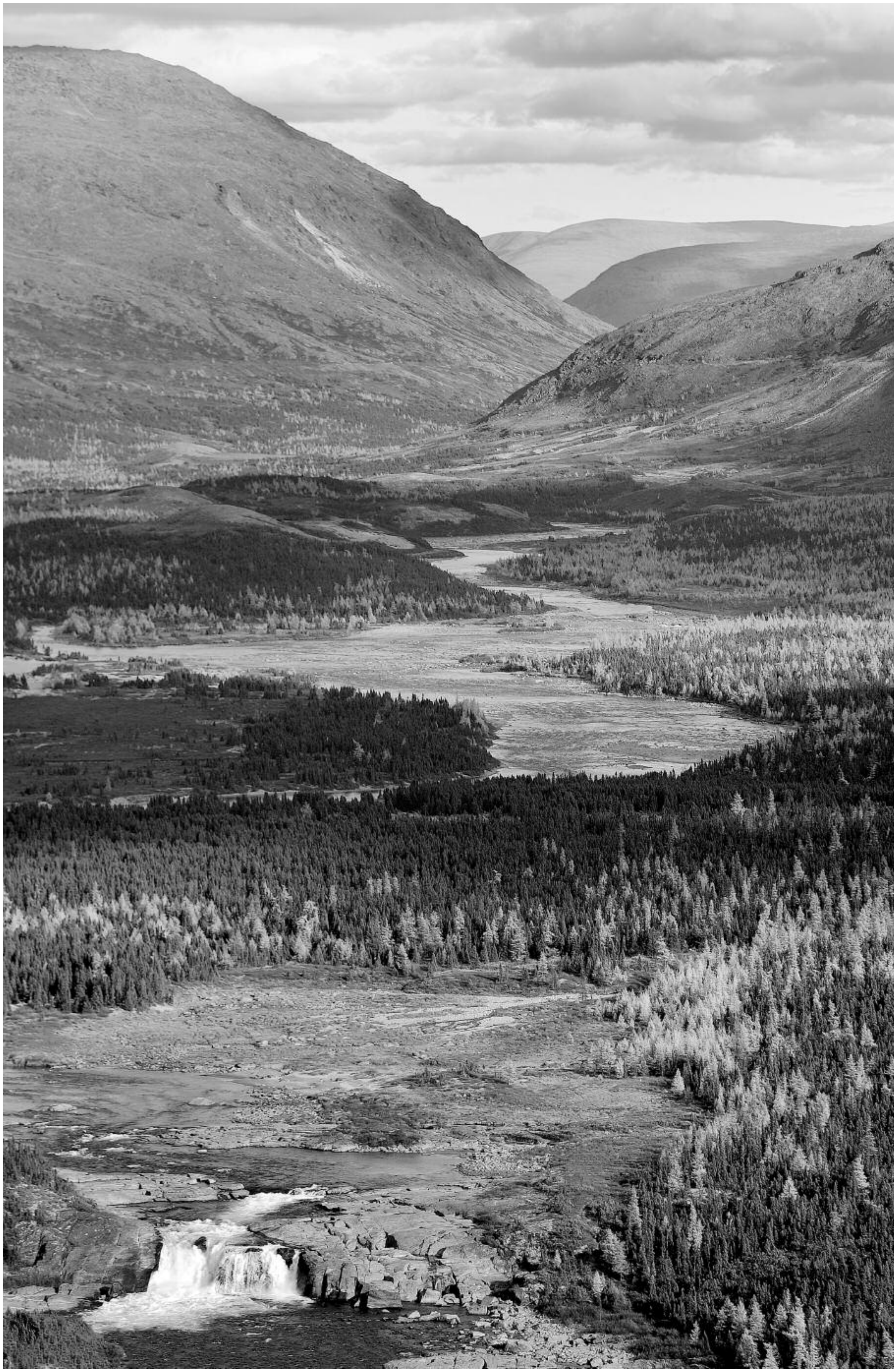

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Glossary[1]

Abbreviations

n.: noun; simple term	**abbr.**: abbreviation	**Ger.**: German
In.: Inuktitut	**t.**: complex term	**pr.**: proper
Ir.: Irish	**Sw.**: Swedish	**adj.**: adjective

Ablation or disintegration moraine: t. [glaciation] A knob-and-basin type moraine comprising especially flowtill hillocks, ablation melt-out till, plates of glacial drift and lacustrine sediment on an often irregular glacial surface.

Active glacier: t. [glaciation] A thick glacier that receives large accumulations of snow, moves rapidly and has a large outflow.

Alluvium: n. [erosion – sedimentation, running water] Detritus (pebbles, sand, silt, clay) transported and deposited according to the competence of a watercourse.

Archean: pr. n. [geological period] The first phase of the Precambrian, lower part of the Precambrian, from the creation of the Earth (4500 Ma) to 2500 Ma.

Avalanche track: t. [gravity, mountain domain] The path followed by an avalanche characterized by a narrow valley with a steep incline between a funnel-shaped depletion area and a cone-shaped accumulation area that has been carved or scraped by ice-covered congelifracts.

Biocoenosis: n. [ecology] An aggregate of living organisms, animals and plants, in a same biotope.

Biotope: n. [ecology] A well-defined geographic area, characterized by specific environmental conditions (soil, climate, etc.) that physically support the organisms which make up the biocoenosis.

Before present: An indication of time calculated from A.D. 1950. Abbr.: BP.

Bryophyte: n. [botany] A land or semi-aquatic plant that possesses neither vessels nor roots. Bryophytes include mosses and liverworts (hepatics).

Cirque: n. [glaciation, heritage] A snow catchment area that is bowl-shaped, has steep walls, and is located at a high elevation on the face of a mountain carved by glacial erosion and periglacial activity.

Cirque glacier: t. [glaciation] A small glacier in a bowl-shaped area with steep walls that is fed by avalanches and snowfall.

Colluvium: n. [slope, gravity] Various unconsolidated formations created by falling detritus; deposit on a slope that has been transported a short distance by gravity.

Congelifract: n. [periglacial] A jagged block fragment caused to detach from a slope by freeze-and-thaw action. A rock fragment created through freeze-and-thaw action (fragmentation of a rock through freeze-and-thaw action or extreme differences in temperature).

Continental ice sheet: n. [glaciation] A vast field of ice that may be a few kilometres thick at its centre and the edges of which form arms or ice barriers.

COSEWIC: abbr. [wildlife] Committee on the Status of Endangered Wildlife in Canada.

Craton: n. [geology] Bedrock formed largely of granite blocks or plutons. Large, stable portion of the continent as opposed to reworked, unstable portions (orogen).

Crustaceous: adj. [botany] Which grows on rock, which adheres to rock.

Cryoturbation: n. [periglacial] A collective term to describe the stirring and churning of soil due to freeze-and thaw action.

Dicotyledon: n. [botany] A plant that produces seeds with two cotyledons (that form the first leaves of the seedling).

Drumlin: Ir. n. [glaciation] An elongated hill formed by the remnants of a ground moraine of a former glacier.

Eco-system: n. [ecology] The structured aggregate made up of a biocoenosis and a biotope.

Endangered species: t. [wildlife] A species threatened with imminent extinction if protective measures are not put in place.

Endangered species in Canada: t. [wildlife] A species threatened with imminent extirpation throughout the Canadian portion of its range (COSEWIC, 2004b).

Esker: Sw. n. [glaciation] An elongated ridge that runs parallel to a valley or a retreating glacier, comprising detritus deposited by glacial melt waters and representing the former bed of a watercourse whose banks of ice no longer exist.

Felsenmeer: n. [periglacial] Sheet of pebbles and blocks created through freeze-and-thaw action action. Plural form: felsenmeere.

Fluvio-glacial: adj. [glaciation] Describes a phenomenon or the detritus produced by melt waters from a glacier or a continental ice sheet.

Foliose: adj. [botany] Which has the texture or appearance of a leaf.

Freeze-and-thaw action: t. [periglacial] The fragmentation of bedrock or unconsolidated deposit (blocks, pebbles, fine gravel, etc.) affected by water as it freezes and thaws in stratification planes or in cracks.

Frontal moraine: t. [glaciation] A ridge-shaped moraine standing at the face of a glacial lobe that is melting; its lobe-side slope is steep, while its lee-side slope is gentle. Refer to morainal loop.

Fructitose: adj. [botany] Which has the appearance of a shrub.

Geliturbation: n. [perglacial] A term to describe soil movement caused by freeze-and-thaw action.

Giga annum: t. [general] A Latin term meaning one billion years. Abbr., Ga.

Glacial lake: t. [glaciation] A lake created next to or near a glacier and fed by glacier melt waters.

Glacial rill: t. [glaciation] An elongated depression created on the surface of a glacier by melt waters.

Glacier: n. [glaciation] An existing glacier, regardless of size, that is still active.

Gneiss: Ger. n. [geology] A metamorphic rock that possesses variously sized alternating veins of clear minerals (quartz and feldspath) and dark minerals (hornblende, biotite, pyroxene, etc.). Orthogneiss, magmatic gneiss; paragneiss, sedimentary gneiss. Adj., gneissic.

Grass: n. [botany] A large family of monocotyledonous herbaceous plants, with erect cylindrical stems, that produce farinose fruit.

Granulite: n. [geology] A fine-grained, clear metamorphic rock comprising primarily quartz, feldspath and garnet formed in high temperature and high pressure zones (catazone). This type of rock is found in Precambrian bedrock. Adj., granulitic.

GRH: abbr. [wildlife] George River caribou herd.

Ground moraine: t. [glaciation] A moraine comprising angular and triturated blocks and detritus, located between the surface of the bedrock and the overlying glacier or continental ice sheet.

Heath: n. [biogeography] A closed-plant formation dominated by sedge and a few woody species (trees).

Horn: n. [topography] A pyramid-shaped peak found at the intersection of two ridges, generally higher than other nearby sections of the ridges. Horns are often associated with glaciation, occurring mainly where the receding walls of cirques met on a same summit.

Interfluve: n. [topography] Elevated zone between two valleys; an interfluve comprises two slopes, which may or may not be separated by a flat area.

Intrusive: adj. [geology] Which has been injected into existing rocks, such as liquid magmatic material that penetrated into existing rock before cooling or crystallizing.

Invascular: adj. [botany] Describes plants that do not possess vessels, including mosses, liverworts (hepatics) and lichens.

Isohyet: n. [meteorology] A line on a map that connects areas of equal rainfall. Adj., isohyetal

Isostasy: n. [geology] A general equilibrium in the earth's crust that occurs at a point known as the depth of compensation. Adj., isostasic. Isostatic compensation: The collapse of a portion of the earth's crust causes the lifting of another portion.

Isotherm: n. [meteorology] A line on a map that connects points of the same temperature at a given moment or period of time. Adj., isothermal.

Kangiqsualujjuamiut: In. n. [Inuit culture] Residents of Kangiqsualujjuaq.

Kettle: n. [glaciation] A kettle-shaped cavity found in fluvio-glacial sediments that was formed by melt waters. Kettles are roughly ten metres in diameter.

Killinirmiut: In. n. [Inuit culture] Residents of Killiniq.

Kilo annum: t. [general] A Latin term meaning one thousand years. Abbr., ka.

Lateral moraine: t. [glaciation] A moraine created by detritus that has fallen onto the glacier or been torn by the glacier from the walls of a valley and deposited at the edge of a glacial lobe.

Lichen: n. [botany] An extremely resistant plant, formed through a symbiotic association of filamentous fungus and microscopic algae, that grows on the substratum and does not possess vessels.

LRH: abbr. [wildlife] Leaf River caribou herd.

Mega annum: t. [general] A Latin term meaning one million years. Abbr., Ma.

Metabasalt: n. [geology] A fine-grained, dark-green or black magmatic rock (basalt) that has undergone some type of metamorphism.

Metamorphism: n. [geology] Transformation of a rock from a solid state due to high temperature or under extreme pressure, with the crystallization of new minerals and the acquisition of new textures and structures. Metamorphic rock may be created through sedimentation, magmatism.

Misiraq: In. n. [Inuit culture] Oil collected from marine mammals that is used as a condiment with raw meat and fish.

Monocotyledon: n. [botany] A flowering plant that produces a seed with only one cotyledon (that forms the first leaf of the seedling). Adj., monocotyledonous.

Morainal arc: t. [glaciation] A moraine that is shaped like the rounded face of a glacial lobe.

Morainal loop: t. [glaciation] A ridge-shaped moraine standing at the face of a glacial lobe that is melting; its lobe-side slope is steep, while its lee-side slope is gentle (frontal or terminal moraine). With respect to its shape, elongated hills running parallel to the former face of a glacier. With respect to its creation, major morainic formation that indicates the halting or progression of the face of a glacial lobe.

Moraine: n. [glaciation] **1.** A landform comprising glacial sediment, especially till, that has been deposited by the ice of a glacier into any number of shapes. **2.** a) Singular, the term moraine refers to the heterometric detritus of pebbles, gravel, sand and clay that covers large sub-rounded unpolished blocks. b) Plural, the term moraines refers to the landforms created by this heterometric detritus and large blocks.

Moss: n. [botany] A chlorophyllous cryptogam cellular plant, with leafy stems but without roots and vessels, capable of sexual and sometimes vegetative reproduction, which attaches itself to the substratum using root hairs.

Neve: n. [glaciation] Snow that remains through the summer without entirely melting. Compact granular material that forms the surface part of a glacier.

Non-symmetrical valley: t. [geomorphology] A valley where the opposing slopes are very different due more to the arctic climate than to tectonics and lithology. The north slope is steeper than the south slope, which may be explained by the unequal number of freeze-and-thaw cycles.

Nunatak: In. n. [glaciation] A mountain peak situated in a perennial snow zone but that remains free of snow and ice due to the steepness of the terrain. According to the glacial minimum model, nunataks evolved beyond the reach of glaciers.

Orogen: n. [geology] A mountain range created along an unstable portion of the continental crust where major folding has occurred. A mountain range created by lighter rocks pushed to the surface during geosynclinal magmatic activity.

Orogeny: n. [geology] Any mountain-forming process.

Orographic: adj. [geology] Describes a phenomenon or action that occurs in a mountainous area.

Paleoproterozoic: pr. n. [geological period] The first stage of the Proterozoic. The Paleoproterozoic lasted from 2500 to 1600 Ma. The beginning of this stage is marked by the earliest known fossils of micro-organisms and its ending is marked by the appearance of bacteria that would have required air or oxygen.

Peat bog: n. [biogeography] An area that is somewhat acidic, characteristic of wetlands, comprising grass and typical plants, where the rate at which organic materials accumulate is greater than the rate at which they decompose.

Peneplaine: n. [geomorphology] Vast flat surface created through the erosion of the surrounding topography regardless of the types of rocks or their structure.

Perennial snow: t. [periglacial] Snow that is present throughout the year and the limits of which vary according to local weather conditions.

Periglacial: adj. [periglacial] Describes a field in the science of geomorphology concerned with the geographic distribution of freeze-and-thaw actions, as well as related phenomena.

Polynya: n. [glaciology] **1.** An opening of water surrounded by pack ice. **2.** A permanently open body of water.

Plants: n. [botany] The plant species present in a region, a biotope.

Precambrian: pr. n. [geological period] A period of time. Formerly known as an era, the Precambrian comprises two eons: the Archean from 4600 to 2500 Ma and the Proterozoic from 2500 to 590 Ma. Adj. Describes a phenomenon or action related to the Precambrian.

Proglacial delta: t. [glaciation] A fan-shaped formation comprising heterometric detritus deposited downstream from a glacier or a continental ice sheet.

Proterozoic: pr. n. [geological period] The second phase of the Precambrian. The Proterozoic followed the Archean and lasted from 2500 to 590 Ma. This stage is subdivided into three stages: the Paleoproterozoic, the Mesoproterozoic and the Neoproterozoic.

Quaternary: pr. n. [geological period, glaciation] The fourth and last period of the Phanerozoic; it is the current era which began in 1.8 Ma and is marked by the appearance of human beings as well as by the recent partial retreat of continental ice sheets.

Ridge: n. [topography] Crest line at the highest elevation in an area, created at the intersection of two steep slopes. An elongated mountain summit.

Rock glacier: t. [glaciation] A lobe of ice and unsorted rock fragments torn from the wall of a cirque. Dynamic mass of detritus held together by ice. The surface of rock glaciers generally possesses ripples oriented at a right angle to the direction in which the glacier is flowing and a slip face made up of a steep wall of talus.

Sedge: n. [botany] A family of monocotyledonous perennial vascular plants (*Cyperacae*), with full knot-less triangular stems, that resembles grass.

Segregated ice: t. [periglacial] Ice formed by the capillary rise of moisture through soil made up of small particles; this moisture freezes in the form of lenses.

Spawn: n. [ichtyology] **1**. The breeding process among fish during which eggs are laid by the female and fertilized by the male. **2**. The fertilized eggs of fish or amphibians.

Spawning period: t. [ichtyology] The period during which the spawn takes place.

Species not at risk in Canada: t. [wildlife] A species which, following assessment, is judged not to be at risk (COSEWIC, 2004b).

Species of special concern in Canada: t. [wildlife] A species that is likely to become threatened or endangered due to a combination of biological characteristics and identified threats (COSEWIC, 2004b).

Taiga: n. [biogeography] A plant formation comprising especially conifers that forms an almost completely uninterrupted boundary between the arctic tundra and the boreal forest. The taiga represents a biome.

Taxon: n. [biology] Any unit (family, genus, species, etc.) of the zoological or botanical classification systems.

Threatened species in Canada: t. [wildlife] A species likely to become endangered throughout the Canadian portion of its range if nothing is done to reverse the factors leading to its extirpation or extinction (COSEWIC, 2004b).

Threatened species in Québec: t. [wildlife] A species likely to become endangered throughout the Québec portion of its range (MRNF, 2005).

Till or **glacial till**: n. [glaciation] The sedimentological and petrographic features of a glacial formation, comprising a loose mix of blocks, gravel, sand, silt and clay, deposited by the glacier, very heterometric and without stratification.

Tundra: n. [biogeography] A plant formation located in sub-arctic regions and sometimes in temperate zones, in alpine environments. Generally void of trees, the tundra comprises shrub, herbaceous and moss species. The tundra represents a biome.

Tundra ostiole: t. [periglacial] Metre-sized periglacial phenomenon, comprising liquefied mud of small particles, silt and sand that is easily disturbed. This feature has the shape of an unsorted circle.

TMH: abbr. [wildlife] Torngat Mountains caribou herd.

Umbilic: n. [glaciation] A lake basin created by a glacier and filled with fluvio-glacial detritus.

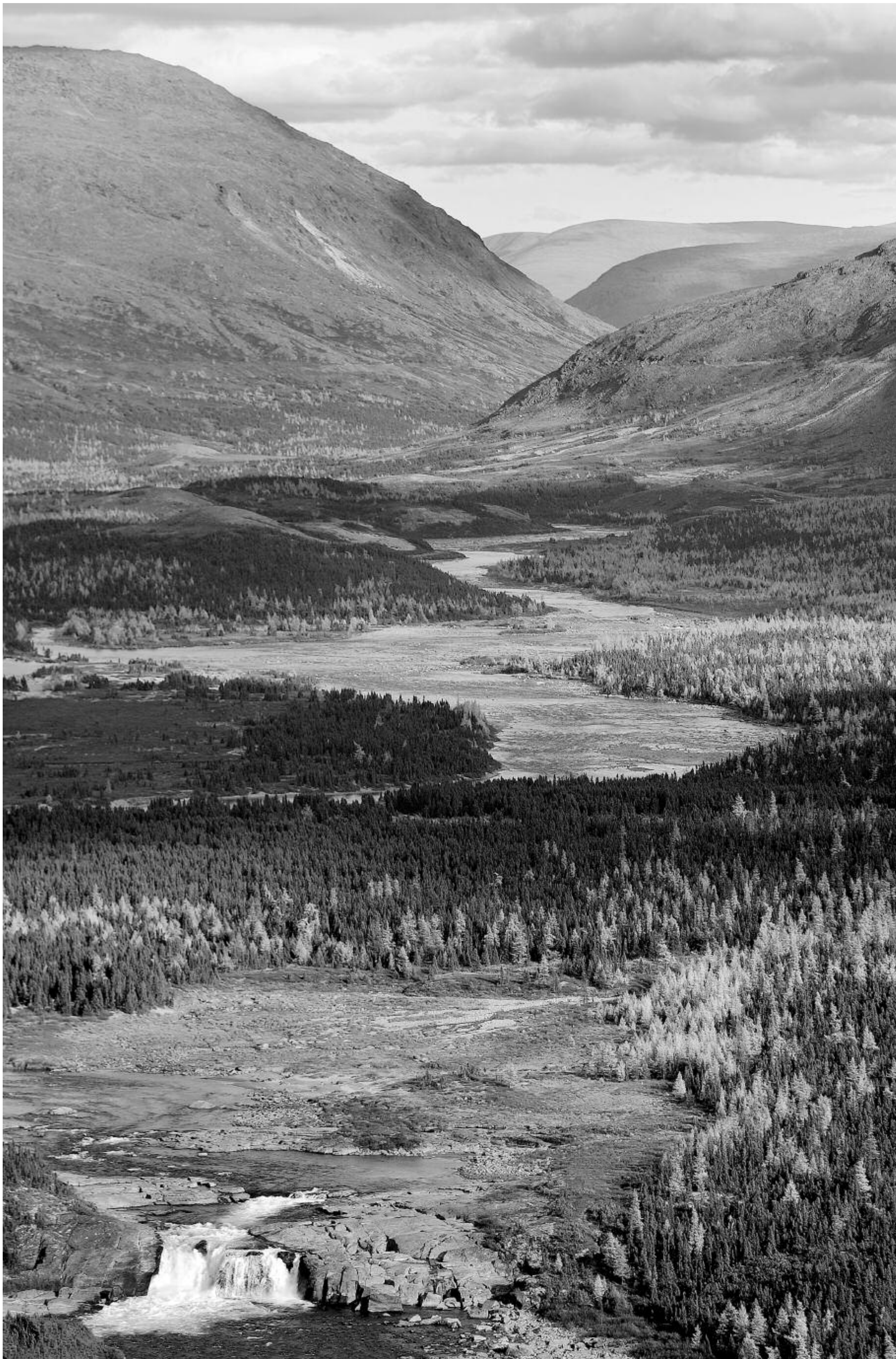
Vascular: adj. [botany] Describes plants that possess vessels (xylem and phloem) through which circulates sap.

Vulnerable species in Québec: t. [wildlife] A species whose survival is at risk even though it is not endangered in Québec (MRNF, 2005).

Ultra-mafic rock: n. [geology] A magmatic rock comprising SiO_2 (less than 45% of its weight; resulting in the absence of quartz crystals) but very rich in iron (Fe), magnesium (Mg) and calcium (Ca; 40% or more).

[1] Largely based on: Foucault and Raoult (1980), Genest (2000) and Parent (1990)

GLOSSARY



Glossary[1]

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Active glacier: t. [glaciation] A thick glacier that receives large accumulations of snow, moves rapidly and has a large outflow.

Alluvium: n. [erosion – sedimentation, running water] Detritus (pebbles, sand, silt, clay) transported and deposited according to the competence of a watercourse.

Archean: pr. n. [geological period] The first phase of the Precambrian, lower part of the Precambrian, from the creation of the Earth (4500 Ma) to 2500 Ma.

Avalanche track: t. [gravity, mountain domain] The path followed by an avalanche characterized by a narrow valley with a steep incline between a funnel-shaped depletion area and a cone-shaped accumulation area that has been carved or scraped by ice-covered congelifracts.

Biocoenosis: n. [ecology] An aggregate of living organisms, animals and plants, in a same biotope.

Biotope: n. [ecology] A well-defined geographic area, characterized by specific environmental conditions (soil, climate, etc.) that physically support the organisms which make up the biocoenosis.

Before present: An indication of time calculated from A.D. 1950. Abbr.: BP.

Bryophyte: n. [botany] A land or semi-aquatic plant that possesses neither vessels nor roots. Bryophytes include mosses and liverworts (hepatics).

Cirque: n. [glaciation, heritage] A snow catchment area that is bowl-shaped, has steep walls, and is located at a high elevation on the face of a mountain carved by glacial erosion and periglacial activity.

Cirque glacier: t. [glaciation] A small glacier in a bowl-shaped area with steep walls that is fed by avalanches and snowfall.

Colluvium: n. [slope, gravity] Various unconsolidated formations created by falling detritus; deposit on a slope that has been transported a short distance by gravity.

Congelifract: n. [periglacial] A jagged block fragment caused to detach from a slope by freeze-and-thaw action. A rock fragment created through freeze-and-thaw action (fragmentation of a rock through freeze-and-thaw action or extreme differences in temperature).

Continental ice sheet: n. [glaciation] A vast field of ice that may be a few kilometres thick at its centre and the edges of which form arms or ice barriers.

COSEWIC: abbr. [wildlife] Committee on the Status of Endangered Wildlife in Canada.

Craton: n. [geology] Bedrock formed largely of granite blocks or plutons. Large, stable portion of the continent as opposed to reworked, unstable portions (orogen).

Crustaceous: adj. [botany] Which grows on rock, which adheres to rock.

Cryoturbation: n. [periglacial] A collective term to describe the stirring and churning of soil due to freeze-and thaw action.

Dicotyledon: n. [botany] A plant that produces seeds with two cotyledons (that form the first leaves of the seedling).

Drumlin: Ir. n. [glaciation] An elongated hill formed by the remnants of a ground moraine of a former glacier.

Eco-system: n. [ecology] The structured aggregate made up of a biocoenosis and a biotope.

Endangered species: t. [wildlife] A species threatened with imminent extinction if protective measures are not put in place.

Endangered species in Canada: t. [wildlife] A species threatened with imminent extirpation throughout the Canadian portion of its range (COSEWIC, 2004b).

Esker: Sw. n. [glaciation] An elongated ridge that runs parallel to a valley or a retreating glacier, comprising detritus deposited by glacial melt waters and representing the former bed of a watercourse whose banks of ice no longer exist.

Felsenmeer: n. [periglacial] Sheet of pebbles and blocks created through freeze-and-thaw action action. Plural form: felsenmeere.

Fluvio-glacial: adj. [glaciation] Describes a phenomenon or the detritus produced by melt waters from a glacier or a continental ice sheet.

Foliose: adj. [botany] Which has the texture or appearance of a leaf.

Freeze-and-thaw action: t. [periglacial] The fragmentation of bedrock or unconsolidated deposit (blocks, pebbles, fine gravel, etc.) affected by water as it freezes and thaws in stratification planes or in cracks.

Frontal moraine: t. [glaciation] A ridge-shaped moraine standing at the face of a glacial lobe that is melting; its lobe-side slope is steep, while its lee-side slope is gentle. Refer to morainal loop.

Fructitose: adj. [botany] Which has the appearance of a shrub.

Geliturbation: n. [perglacial] A term to describe soil movement caused by freeze-and-thaw action.

Giga annum: t. [general] A Latin term meaning one billion years. Abbr., Ga.

Glacial lake: t. [glaciation] A lake created next to or near a glacier and fed by glacier melt waters.

Glacial rill: t. [glaciation] An elongated depression created on the surface of a glacier by melt waters.

Glacier: n. [glaciation] An existing glacier, regardless of size, that is still active.

Gneiss: Ger. n. [geology] A metamorphic rock that possesses variously sized alternating veins of clear minerals (quartz and feldspath) and dark minerals (hornblende, biotite, pyroxene, etc.). Orthogneiss, magmatic gneiss; paragneiss, sedimentary gneiss. Adj., gneissic.

Grass: n. [botany] A large family of monocotyledonous herbaceous plants, with erect cylindrical stems, that produce farinose fruit.

Granulite: n. [geology] A fine-grained, clear metamorphic rock comprising primarily quartz, feldspath and garnet formed in high temperature and high pressure zones (catazone). This type of rock is found in Precambrian bedrock. Adj., granulitic.

GRH: abbr. [wildlife] George River caribou herd.

Ground moraine: t. [glaciation] A moraine comprising angular and triturated blocks and detritus, located between the surface of the bedrock and the overlying glacier or continental ice sheet.

Heath: n. [biogeography] A closed-plant formation dominated by sedge and a few woody species (trees).

Horn: n. [topography] A pyramid-shaped peak found at the intersection of two ridges, generally higher than other nearby sections of the ridges. Horns are often associated with glaciation, occurring mainly where the receding walls of cirques met on a same summit.

Interfluve: n. [topography] Elevated zone between two valleys; an interfluve comprises two slopes, which may or may not be separated by a flat area.

Intrusive: adj. [geology] Which has been injected into existing rocks, such as liquid magmatic material that penetrated into existing rock before cooling or crystallizing.

Invascular: adj. [botany] Describes plants that do not possess vessels, including mosses, liverworts (hepatics) and lichens.

Isohyet: n. [meteorology] A line on a map that connects areas of equal rainfall. Adj., isohyetal

Isostasy: n. [geology] A general equilibrium in the earth's crust that occurs at a point known as the depth of compensation. Adj., isostasic. Isostatic compensation: The collapse of a portion of the earth's crust causes the lifting of another portion.

Isotherm: n. [meteorology] A line on a map that connects points of the same temperature at a given moment or period of time. Adj., isothermal.

Kangiqsualujjuamiut: In. n. [Inuit culture] Residents of Kangiqsualujjuaq.

Kettle: n. [glaciation] A kettle-shaped cavity found in fluvio-glacial sediments that was formed by melt waters. Kettles are roughly ten metres in diameter.

Killinirmiut: In. n. [Inuit culture] Residents of Killiniq.

Kilo annum: t. [general] A Latin term meaning one thousand years. Abbr., ka.

Lateral moraine: t. [glaciation] A moraine created by detritus that has fallen onto the glacier or been torn by the glacier from the walls of a valley and deposited at the edge of a glacial lobe.

Lichen: n. [botany] An extremely resistant plant, formed through a symbiotic association of filamentous fungus and microscopic algae, that grows on the substratum and does not possess vessels.

LRH: abbr. [wildlife] Leaf River caribou herd.

Mega annum: t. [general] A Latin term meaning one million years. Abbr., Ma.

Metabasalt: n. [geology] A fine-grained, dark-green or black magmatic rock (basalt) that has undergone some type of metamorphism.

Metamorphism: n. [geology] Transformation of a rock from a solid state due to high temperature or under extreme pressure, with the crystallization of new minerals and the acquisition of new textures and structures. Metamorphic rock may be created through sedimentation, magmatism.

Misiraq: In. n. [Inuit culture] Oil collected from marine mammals that is used as a condiment with raw meat and fish.

Monocotyledon: n. [botany] A flowering plant that produces a seed with only one cotyledon (that forms the first leaf of the seedling). Adj., monocotyledonous.

Morainal arc: t. [glaciation] A moraine that is shaped like the rounded face of a glacial lobe.

Morainal loop: t. [glaciation] A ridge-shaped moraine standing at the face of a glacial lobe that is melting; its lobe-side slope is steep, while its lee-side slope is gentle (frontal or terminal moraine). With respect to its shape, elongated hills running parallel to the former face of a glacier. With respect to its creation, major morainic formation that indicates the halting or progression of the face of a glacial lobe.

Moraine: n. [glaciation] **1.** A landform comprising glacial sediment, especially till, that has been deposited by the ice of a glacier into any number of shapes. **2.** a) Singular, the term moraine refers to the heterometric detritus of pebbles, gravel, sand and clay that covers large sub-rounded unpolished blocks. b) Plural, the term moraines refers to the landforms created by this heterometric detritus and large blocks.

Moss: n. [botany] A chlorophyllous cryptogam cellular plant, with leafy stems but without roots and vessels, capable of sexual and sometimes vegetative reproduction, which attaches itself to the substratum using root hairs.

Neve: n. [glaciation] Snow that remains through the summer without entirely melting. Compact granular material that forms the surface part of a glacier.

Non-symmetrical valley: t. [geomorphology] A valley where the opposing slopes are very different due more to the arctic climate than to tectonics and lithology. The north slope is steeper than the south slope, which may be explained by the unequal number of freeze-and-thaw cycles.

Nunatak: In. n. [glaciation] A mountain peak situated in a perennial snow zone but that remains free of snow and ice due to the steepness of the terrain. According to the glacial minimum model, nunataks evolved beyond the reach of glaciers.

Orogen: n. [geology] A mountain range created along an unstable portion of the continental crust where major folding has occurred. A mountain range created by lighter rocks pushed to the surface during geosynclinal magmatic activity.

Orogeny: n. [geology] Any mountain-forming process.

Orographic: adj. [geology] Describes a phenomenon or action that occurs in a mountainous area.

Paleoproterozoic: pr. n. [geological period] The first stage of the Proterozoic. The Paleoproterozoic lasted from 2500 to 1600 Ma. The beginning of this stage is marked by the earliest known fossils of micro-organisms and its ending is marked by the appearance of bacteria that would have required air or oxygen.

Peat bog: n. [biogeography] An area that is somewhat acidic, characteristic of wetlands, comprising grass and typical plants, where the rate at which organic materials accumulate is greater than the rate at which they decompose.

Peneplaine: n. [geomorphology] Vast flat surface created through the erosion of the surrounding topography regardless of the types of rocks or their structure.

Perennial snow: t. [periglacial] Snow that is present throughout the year and the limits of which vary according to local weather conditions.

Periglacial: adj. [periglacial] Describes a field in the science of geomorphology concerned with the geographic distribution of freeze-and-thaw actions, as well as related phenomena.

Polynya: n. [glaciology] **1.** An opening of water surrounded by pack ice. **2.** A permanently open body of water.

Plants: n. [botany] The plant species present in a region, a biotope.

Precambrian: pr. n. [geological period] A period of time. Formerly known as an era, the Precambrian comprises two eons: the Archean from 4600 to 2500 Ma and the Proterozoic from 2500 to 590 Ma. Adj. Describes a phenomenon or action related to the Precambrian.

Proglacial delta: t. [glaciation] A fan-shaped formation comprising heterometric detritus deposited downstream from a glacier or a continental ice sheet.

Proterozoic: pr. n. [geological period] The second phase of the Precambrian. The Proterozoic followed the Archean and lasted from 2500 to 590 Ma. This stage is subdivided into three stages: the Paleoproterozoic, the Mesoproterozoic and the Neoproterozoic.

Quaternary: pr. n. [geological period, glaciation] The fourth and last period of the Phanerozoic; it is the current era which began in 1.8 Ma and is marked by the appearance of human beings as well as by the recent partial retreat of continental ice sheets.

Ridge: n. [topography] Crest line at the highest elevation in an area, created at the intersection of two steep slopes. An elongated mountain summit.

Rock glacier: t. [glaciation] A lobe of ice and unsorted rock fragments torn from the wall of a cirque. Dynamic mass of detritus held together by ice. The surface of rock glaciers generally possesses ripples oriented at a right angle to the direction in which the glacier is flowing and a slip face made up of a steep wall of talus.

Sedge: n. [botany] A family of monocotyledonous perennial vascular plants (*Cyperacae*), with full knot-less triangular stems, that resembles grass.

Segregated ice: t. [periglacial] Ice formed by the capillary rise of moisture through soil made up of small particles; this moisture freezes in the form of lenses.

Spawn: n. [ichtyology] **1**. The breeding process among fish during which eggs are laid by the female and fertilized by the male. **2**. The fertilized eggs of fish or amphibians.

Spawning period: t. [ichtyology] The period during which the spawn takes place.

Species not at risk in Canada: t. [wildlife] A species which, following assessment, is judged not to be at risk (COSEWIC, 2004b).

Species of special concern in Canada: t. [wildlife] A species that is likely to become threatened or endangered due to a combination of biological characteristics and identified threats (COSEWIC, 2004b).

Taiga: n. [biogeography] A plant formation comprising especially conifers that forms an almost completely uninterrupted boundary between the arctic tundra and the boreal forest. The taiga represents a biome.

Taxon: n. [biology] Any unit (family, genus, species, etc.) of the zoological or botanical classification systems.

Threatened species in Canada: t. [wildlife] A species likely to become endangered throughout the Canadian portion of its range if nothing is done to reverse the factors leading to its extirpation or extinction (COSEWIC, 2004b).

Threatened species in Québec: t. [wildlife] A species likely to become endangered throughout the Québec portion of its range (MRNF, 2005).

Till or **glacial till**: n. [glaciation] The sedimentological and petrographic features of a glacial formation, comprising a loose mix of blocks, gravel, sand, silt and clay, deposited by the glacier, very heterometric and without stratification.

Tundra: n. [biogeography] A plant formation located in sub-arctic regions and sometimes in temperate zones, in alpine environments. Generally void of trees, the tundra comprises shrub, herbaceous and moss species. The tundra represents a biome.

Tundra ostiole: t. [periglacial] Metre-sized periglacial phenomenon, comprising liquefied mud of small particles, silt and sand that is easily disturbed. This feature has the shape of an unsorted circle.

TMH: abbr. [wildlife] Torngat Mountains caribou herd.

Umbilic: n. [glaciation] A lake basin created by a glacier and filled with fluvio-glacial detritus.

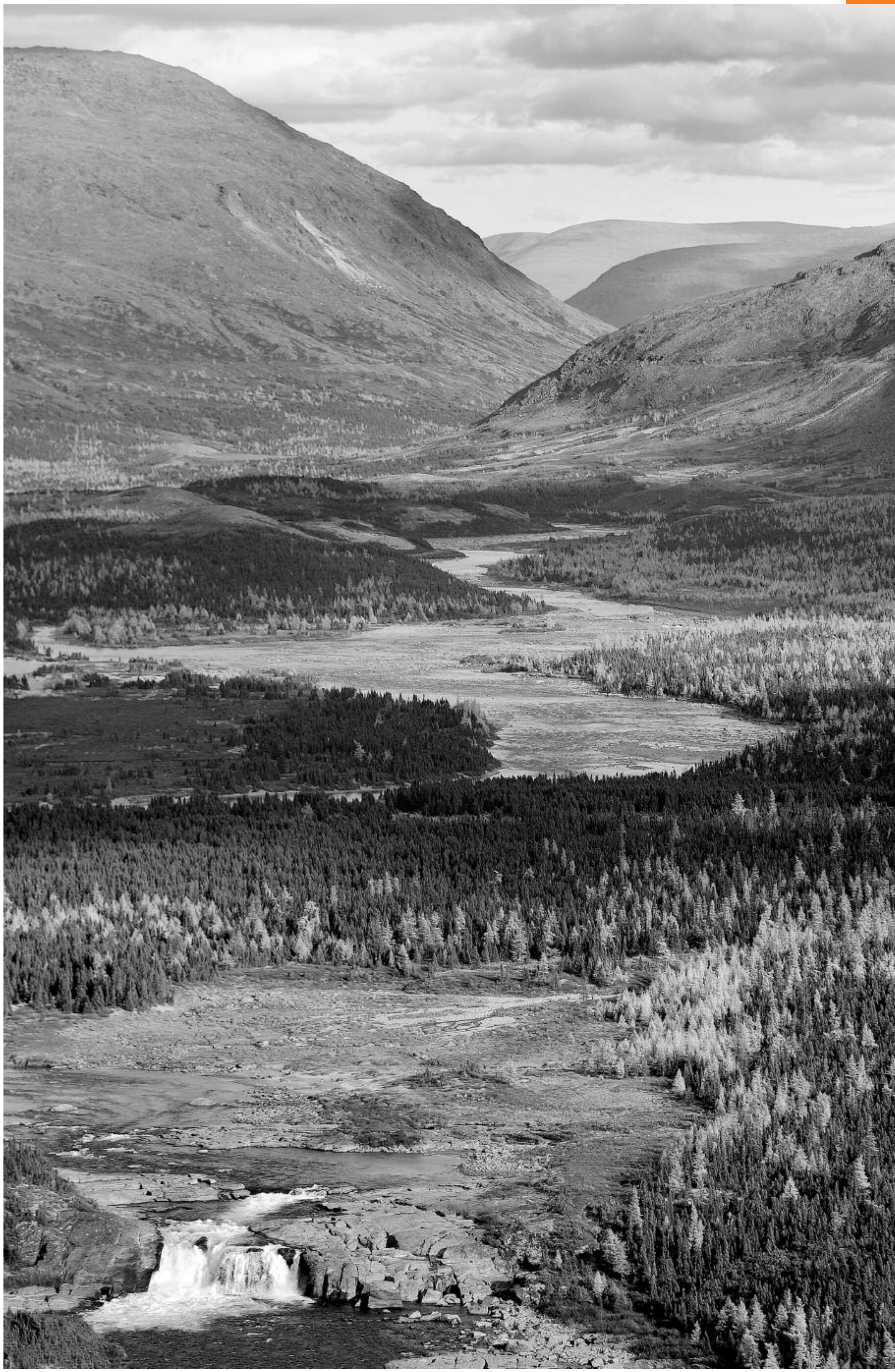
Vascular: adj. [botany] Describes plants that possess vessels (xylem and phloem) through which circulates sap.

Vulnerable species in Québec: t. [wildlife] A species whose survival is at risk even though it is not endangered in Québec (MRNF, 2005).

Ultra-mafic rock: n. [geology] A magmatic rock comprising SiO_2 (less than 45% of its weight; resulting in the absence of quartz crystals) but very rich in iron (Fe), magnesium (Mg) and calcium (Ca; 40% or more).

[1] Largely based on: Foucault and Raoult (1980), Genest (2000) and Parent (1990)

APPENDICES



Appendix 1 Alphabetical List of Vascular Plant Taxa in the Territory of the Proposed Park[1]

Agrostis mertensii Trin
Alchemilla filicaulis Buser subsp. *filicaulis*
* *Alchemilla glomerulans* Buser
Alnus viridis (Vill.) Lam. & DC. subsp. *crispa* (Ait.) Turrill
Andromeda polifolia L. var. **glaucophylla** (Link) DC.
Anemone parviflora Michx.
Anemone richardsonii Hook.
Antennaria alpina (L.) Gaertn.
Antennaria monocephala DC. subsp. *angustata* (Greene) Hult.
Antennaria rosea Greene s.l.
? *Antennaria Xrousseaui* Porsild
Anthoxanthum monticolum (Bigel.) Veldkamp subsp. *alpinum*
Anthoxanthum nitens (Weber) Y. Schouten & Veldkam
Arabis alpina L.
Arabis arenicola (Richards. *ex* Hook.) Gelert var. *arenicola*
Arctostaphylos alpina (L.) Spreng.
Argentina egedii (Wormsk.) Rydb.
Armeria maritima (P. Mill.) Willd. subsp. *sibirica* (Turcz. *ex* Boiss.) Nyman
Arnica angustifolia J. Vahl subsp. *angustifolia*
Artemisia campestris L.subsp. *borealis* (Pallas) Hall. & Clements
Astragalus alpinus var. *alpinus*
Astragalus eucosmus B.L. Robins.
Bartsia alpina L.
Betula glandulosa Michx.
Betula minor (Tuck.) Fern.
Betula papyrifera Marsh.
Botrychium pedunculosum W.H. Wagner
Calamagrostis canadensis (Michx.) Beauv. s.l
Calamagrostis canadensis (Michx.) Beauv. var. *canadensis*
Calamagrostis canadensis (Michx.) Beauv. var. *langsdorfii* (Link) Inman
Calamagrostis lapponica (Wahl.) Hartm.
Calamagrostis stricta (Timm) Koel. subsp. *inexpansa* (Gray) C.W. Greene
Calamagrostis stricta (Timm) Koel. subsp. *stricta*
Callitriche palustris L.
Campanula rotundifolia L.
Campanula uniflora L.
Cardamine bellidifolia L.
Carex aquatilis Wahl.
Carex bigelowii Torr. *ex* Schwein.
Carex brunnescens (Pers.) Poir. subsp. *brunnescens*
Carex brunnescens (Pers.) Poir. subsp. *sphaerostachya* (Tuck.) Kalela
Carex canescens L.subsp. *canescens*
Carex capillaris L.
Carex capitata L.
Carex chordorrhiza L.
Carex deflexa Hornem.
Carex echinata Murr. subsp. *echinata*
Carex glacialis Mack.
Carex glareosa Schk. *ex* Wahl. subsp. *glareosa*
Carex holostoma Drej.
Carex lachenalii Schk.
Carex leptalea Wahl.
Carex limosa L.
Carex mackenziei Krecz.
Carex macloviana d'Urv.
Carex magellanica Lamb. subsp. *irrigua* (Wahl.) Hult.
Carex maritima Gunn.
Carex misandra R. Br.
Carex nardina Fr.
Carex norvegica Retz.
Carex pauciflora Lightf.
Carex rariflora (Wahl.) Sm.
Carex rotundata Wahl.
Carex rupestris All.
Carex saxatilis L.
Carex scirpoidea Michx. subsp. *scirpoidea*
Carex stylosa C.A. Mey.
Carex subspathacea Wormsk. *ex* Hornem.
Carex supina Willd. *ex* Wahl. var. **spaniocarpa** (Steud.) Boivin
Carex tenuiflora Wahl.
Carex trisperma Dewey
Carex vesicaria L.
Cassiope tetragona (L.) D. Don var. **tetragona** Cas*tilleja septentrionalis* Lindl.
Cerastium alpinum L.
Cerastium arvense L. subsp. **strictum** (L.) Ugborogho
** *Cerastium cerastioides* (L.) Britt.
Chamerion angustifolium (L.) Holub subsp. *angustifolium*
Chamerion latifolium (L.) Holub
Cochlearia officinalis L.
Comarum palustre L.
Coptis trifolia (L.) Salisb.
Corallorhiza trifida Chatelain
Cornus canadensis L.
Cornus suecica L.
Cystopteris fragilis (L.) Bernh.
Deschampsia flexuosa (L.) Trin.
Diapensia lapponica L. subsp. *lapponica*

Diphasiastrum alpinum (L.) Holub
Diphasiastrum complanatum (L.) Holub
Draba aurea Vahl *ex* Hornem.
* **Draba crassifolia** Graham
Draba glabella
Draba lactea M.F. Adams
Draba nivalis Lilj.
Dryas integrifolia M. Vahl subsp. *integrifolia*
Dryopteris expansa (K. Presl) Fraser-Jenkins & Jermy
Dryopteris fragrans (L.) Schott
Elymus trachycaulus (Link) Gould subsp. *novae-angliae* (Scribn.) Tzvel.
Elymus trachycaulus (Link) Gould subsp. **glaucus** (Pease & A.H. Moore) Cody
Elymus trachycaulus (Link) Gould subsp. **violaceus** (Hornem.) Á. Löve & D.
Empetrum nigrum L. subsp. *hermaphroditum* (Lange) Böcher
Epilobium anagallidifolium Lam.
Epilobium davuricum Fisch. *ex* Hornem.
Epilobium hornemannii Reichenb. subsp. *hornemannii*
Epilobium lactiflorum Hausskn.
Epilobium palustre L.
Equisetum arvense L.
Equisetum fluviatile L.
Equisetum sylvaticum L.
Erigeron acris L. subsp. *politus* (Fries) Schinz & R. Keller
Erigeron humilis Graham
Eriophorum angustifolium Honckeny subsp. *angustifolium*
Eriophorum russeolum Fr. subsp. *russeolum*
Eriophorum scheuchzeri Hoppe subsp. *scheuchzeri*
Eriophorum vaginatum L. subsp. **spissum** (Fern.) Hult.
Euphrasia frigida Pugsley
Euphrasia hudsoniana Fern. & Wieg.
Festuca brachyphylla J.A. Schultes *ex* J.A. & J.H. Schultes
Festuca prolifera (Piper) Fern.
Festuca rubra L. s.l.
Festuca saximontana Rydb.
Galium trifidum L.
/ Gentiana nivalis* L.
*** Gnaphalium norvegicum* Gunn.
Gnaphalium supinum L.
Gymnocarpium dryopteris (L.) Newman
Harrimanella hypnoides (L.) Coville
Hieracium groenlandicum (Arv.-Touv.) Almquist
Hippuris vulgaris L.
Honckenya peploides (L.) Ehrh. subsp. **diffusa** (Hornem.) Hult.
Huperzia selago (L.) Bernh. *ex* Mart. & Schrank s.*l*.
Juncus albescens (Lange) Fern.
Juncus arcticus Willd. subsp. **arcticus**
Juncus biglumis L.
Juncus castaneus Sm.
Juncus filiformis L.
Juncus subtilis E. Mey.
Juncus trifidus L.
Kalmia polifolia Wang.
Kobresia myosuroides (Vill.) Fiori
Kobresia simpliciuscula (Wahl.) Mack.
Koenigia islandica L.
Larix laricina (Du Roi) K.
Ledum groenlandicum Oeder
Ledum palustre L.
Leymus mollis subsp. *villosissimus* (Scribn.) Á. Löve
Linnaea borealis L. subsp. *americana* (Forbes) Hult. *ex* Clausen
Listera cordata (L.) R. Br.
Loiseleuria procumbens (L.) Desv.
Lomatogonium rotatum (L.) Fries *ex* Fern.
Lonicera villosa (Michx.) J.A. Schultes
Luzula arctica Blytt
Luzula confusa Lindeb.
Luzula groenlandica Böcher
Luzula parviflora (Ehrh.) Desv.
Luzula spicata (L.) DC.
Lychnis alpina L. subsp. *americana* (Fern.) J. Feilberg
Lycopodium annotinum L.
Lycopodium lagopus (Laestad. *ex* Hartm.) Zinserl. *ex*
Menyanthes trifoliata L.
Mertensia maritima (L.) S.F. Gray var. **maritima**
Micranthes foliolosa (R. Br.) Gornall
Micranthes nivalis (L.) Small var. *nivalis*
** **Micranthes stellaris** (L.) Gornall
Micranthes tenuis (Wahl.) Small
Minuartia biflora (L.) Schinz. & Thell.
Minuartia groenlandica (Retz.) Ostenf.
Minuartia rubella (Wahl.) Graebn. *ex* Asch. & Graebn.
Moehringia macrophylla (Hook.) Fenzl
Myrica gale L.
Oxyria digyna (L.) Hill
Oxytropis campestris (L.) DC. subsp. *johannensis* (Fern.) M. Blondeau & C. Gervais
Oxytropis podocarpa Gray
Packera pauciflora (Pursh) A.& D. Löve
Papaver radicatum Rottb. subsp. *radicatum*
Parnassia kotzebuei Cham. *ex* Spreng.
Parnassia palustris L. var. **tenuis** Wahl.
Pedicularis flammea L.
Pedicularis groenlandica Retz.
Pedicularis labradorica Wirsing
Pedicularis lapponica L.
Persicaria vivipara (L.) Decraene

Petasites frigidus (L.) Fries var. *palmatus* (Ait.) Cronq.
Petasites frigidus (L.) Fries var. *sagittatus* (Banks *ex* Pursh) Cherniawsky
Petasites frigidus (L.) Fries var. *?vitifolius* (Greene) Cherniawsky
Phegopteris connectilis (Michx.) Watt
Phleum alpinum L
Phyllodoce caerulea (L.) Bab.
Picea mariana (P. Mill.) B.S.P.
Pinguicula vulgaris L.
Plantago maritima L. var. *juncoides* (Lam.) Gray
Platanthera dilatata (Pursh) Lindl. *ex* Beck var. dilatata
Poa alpina L.
Poa arctica R. Br. s.l
Poa glauca M. Vahl
Poa pratensis s.l.
Potentilla crantzii (Crantz) G. Beck *ex* Fritsch
Potentilla nivea L. var. *nivea*
Primula egaliksensis Wormsk. *ex* Hornem.
Primula stricta Hornem.
Puccinellia phryganodes (Trin.) Scribn. & Merr
Pyrola chlorantha Sw.
Pyrola grandiflora Radius
Pyrola minor L.
Ranunculus hyperboreus Rottb.
Ranunculus nivalis L.
Ranunculus pedatifidus Sm. subsp. *affinis* (R. Br.) Hult.
Ranunculus pygmaeus Wahl.
Rhodiola rosea L.
Rhododendron lapponicum (L.) Wahl.
Ribes glandulosum Grauer
Rubus arcticus L. subsp. *acaulis* (Michx.) Focke
Rubus chamaemorus L.
Rubus idaeus L. subsp. **strigosus** (Michx.) Focke
Rumex salicifolius Weinm var. **mexicanus** (Meisn.) C.L. Hitchc.
Sagina caespitosa (J. Vahl) Lange
Salix arctica Pall.
Salix arctica × *Salix glauca* subsp. *callicarpaea*
Salix arctophila Cockerell
Salix argyrocarpa Anderss.
Salix calcicola Fern. & Wieg. var. *calcicola*
Salix glauca L. subsp. *callicarpaea* (Trautv.) Böcher
Salix herbacea L.
Salix planifolia Pursh
Salix pedicellaris Pursh
Salix uva-ursi Pursh
Salix vestita Pursh
Saxifraga aizoides L.
Saxifraga cernua L.
Saxifraga cespitosa L.
Saxifraga hyperborea R. Br.
Saxifraga oppositifolia L. subsp. *oppositifolia*
Saxifraga paniculata P. Mill. subsp. *neogaea* (Butters) D. Löve
Saxifraga rivularis L.
Schizachne purpurascens (Torr.) Swallen
Sibbaldia procumbens L.
Sibbaldiopsis tridentata (Ait.) Rydb.
Silene acaulis (L.) Jacq. subsp. *acaulis*
Silene involucrata (Cham. & Schlecht.) Bocquet subsp. **involucrata**
Solidago macrophylla Pursh
Solidago multiradiata Ait.
Solidago uliginosa Nutt. var. *linoides* (Torr. & Gray) Fern.
Sorbus decora (Sarg.) Schneid.
Sparganium hyperboreum Laest.
Sparganium natans L.
Stellaria borealis Bigel. subsp. *borealis* [*S. calycantha* (Ledeb.) Bong.]
Stellaria humifusa Rottb.
Stellaria longipes Goldie subsp. *longipes*
Streptopus amplexifolius (L.) DC. var. *amplexifolius*
Symphiotrichum puniceum (L.) A.& D. Löve
Taraxacum sp.
Taraxacum lacerum Greene
Taraxacum lapponicum Kihlm. *ex* Hand.-Maz.
Tofieldia pusilla Richards.
Trichophorum cespitosum (L.) Hartm.
Trientalis borealis Raf. subsp. **borealis**
Triglochin maritima L.
Triglochin palustris L.
Trisetum spicatum (L.) Richter
Vaccinium caespitosum Michx. var. **caespitosum**
Vaccinium oxycoccos L.
Vaccinium uliginosum L.
Vaccinium vitis-idaea L. subsp. *minus* (Lodd.) Hult.
Vahlodea atropurpurea (Wahl.) Fries *ex* Hartm.
Veronica wormskjoldii Roemer & J.A. Schultes
Viburnum edule (Michx.) Raf.
Viola labradorica Schrank
Viola macloskeyi Lloyd subsp. *pallens* (Banks *ex* Ging) M.S. Baker
Viola palustris L.
Viola selkirkii Pursh *ex* Goldie
Woodsia glabella R. Br. *ex* Richards.
Woodsia ilvensis (L.) R. Br.

[1] The taxa indicated in bold have been added to the list compiled by Jacques Rousseau. The taxa preceded by an asterisk appear on the list of vascular plants likely to be designated as threatened or vulnerable in Québec (Labrecque and Lavoie, 2002). The taxa preceded by two asterisks appear on the list of vascular plants that are rare in Canada (Argus and Pryer, 1990).

Appendix 2 Vascular Plant Taxa of Special Interest in the Territory of the Proposed Park

Calcicolous taxa

Arabis arenicola var. *arenicola*	*Moehringia macrophylla*
Astragalus eucosmus	*Pedicularis flammea*
Bartsia alpina	*Pinguicula vulgaris*
Campanula uniflora	*Potentilla crantzii*
Carex nardina	*Potentilla nivea* var. *nivea*
Carex rupestris	*Salix vestita*
Carex scirpoidea subsp. *scirpoidea*	*Saxifraga aizoides*
Draba aurea	*Saxifraga oppositifolia* subsp. *oppositifolia*
Draba glabella	*Saxifraga paniculata* subsp. *neogaea*
Dryas integrifolia subsp. *Integrifolia*	*Tofieldia pusilla*
Kobresia simpliciuscula	*Woodsia glabella*

Taxa likely to be designated as threatened or vulnerable in Québec and taxa considered rare in Canada

	QUÉBEC	CANADA	LOCATION
Alchemilla glomerulans	x		Mouth of the André-Grenier River; mountain on south side of the Narsaaluk River; north shore of the Koroc River (Dignard, 2004).
Cerastium cerastioides		x	Saglek Pass (Rousseau, 1953); sources of the Koroc River, Des Fourches sector, south shore (Dignard, 2004).
Draba crassifolia	x		Sources of the Koroc River, Des Fourches sector, north shore (Dignard, 2004).
Gentiana nivalis	x	x	Saglek Pass (Rousseau, 1953).
Gnaphalium norvegicum		x	Roughly 20 mi. from Koroc Bay (Rousseau, 1953).
Micranthes stellaris		x	Mountain on the south side of the Narsaaluk River, roughly 4 km upstream from the river's mouth (Dignard, 2004).

Taxa considered rare in the study area or in the region, at the limit of their ranges in northern Québec or in eastern Canada

	NORTHERN LIMIT OF RANGE	
	IN THE STUDY AREA	IN THE REGION
Betula papyrifera	x	
*Botrychium pedunculosum**	x	
Carex deflexa	x	
Carex echinata subsp. *echinata*	x	
Carex stylosa		x
Carex vesicaria	x	
Elymus trachycaulus subsp. *novae-angliae*	x	
Epilobium hornemannii subsp. *hornemannii*		x
Epilobium lactiflorum		x
Festuca saximontana	x	
Gnaphalium norvegicum		x
Hieracium groenlandicum		x
Lycopodium lagopus	x	
Pyrola chlorantha	x	
Rubus idaeus subsp. *strigosus*	x	
Rumex salicifolius var. *mexicanus*	x	
Salix pedicellaris	x	
Schizachne purpurascens		x
Sparganium natans	x	

* Newly identified plant in eastern North America

Rare taxa scattered sporadically within their range in Québec and in the study area

Betula minor	*Juncus arcticus* subsp. *arcticus*
Calamagrostis lapponica	*Juncus subtilis*
Calamagrostis stricta subsp. *inexpansa*	*Kobresia simpliciuscula*
Callitriche palustris	*Luzula arctica*
Carex glacialis	*Menyanthes trifoliata*
Carex maritima	*Micranthes stellaris**
Carex misandra	*Moehringia macrophylla*
Carex norvegica	*Parnassia palustris* var. *tenuis*
Carex rotundata	*Pedicularis groenlandica*
Carex supina subsp. *spaniocarpa*	*Petasites frigidus* var. *sagittatus*
Corallorhiza trifida	*Pinguicula vulgaris*
Cornus suecica	*Ranunculus pedatifidus* subsp. *affinis*
Draba aurea	*Salix calcicola*
Draba crassifolia	*Saxifraga aizoides*
Dryopteris fragrans	*Solidago multiradiata*
Elymus trachycaulus subsp. *violaceus*	*Trientalis borealis* subsp. *borealis*
Epilobium davuricum	*Viola palustris*
Erigeron acris subsp. *politus*	*Viola selkirkii*
Galium trifidum	*Woodsia glabella*
Gentiana nivalis	*Woodsia ilvensis*

* Newly identified plant in Québec

Appendix 3 Invascular Plants Identified to Date in the Proposed Park[1]

Lichen, mosses and liverworts (hepatics) collected by Jacques Rousseau in 1951 and during fieldwork in July 2003

x: specimens collected by Jacques Rousseau, deposited with the Marie-Victorin herbarium, and identified by Lucie Fortin (Fortin, 2003)

o: specimens referred to in Dignard (2004) and Desponts (2004)

	ROUSSEAU	DIGNARD	DESPONTS
LICHEN			
Alectoria nigricans (Ach.) Nyl.		o	
Alectoria ochroleuca (Hoffm.) A. Massal		o	o
Arctoparmelia centrifuga (L.) Hale		o	
Brodoa oroarctica (Krog) Goward		o	
Bryocaulon divergens (Ach.) Kärnefelt		o	
Bryoria nitidula (Th. Fr.) Brodo & D. Hawksw.		o	
Cetraria islandica (L.) Ach.		o	
Cetraria nigricans Nyl.		o	
Cladonia gracilis (L.) Willd.		o	
Cladonia mitis Sandst.		o	o
Cladonia rangiferina (L.) F. H. Wigg.		o	
Cladonia stellaris (Opiz) Pouzar & Vzda		o	
Cladonia spp.		o	o
Dactylina arctica (Richardson) Nyl.		o	o
Flavocetraria nivalis (L.) Kärnefelt & Thell		o	o
Nephroma arcticum (L.) Torss.		o	
Ochrolecia frigida (Sw.) Lynge		o	
Peltigera spp.		o	
Pertusaria dactylina (Ach.) Nyl.		o	
Pertusaria spp.		o	
Pseudephebe pubescens (L.) M. Choisy		o	
Rhizocarpon cf. *geographicum* (L.) DC.		o	o
Solorina crocea (L.) Ach.		o	o
Sphaerophorus globosus (Hudson) Vainio		o	o
Stereocaulon paschale (L.) Hoffm.		o	o
Stereocaulon spp.		o	o
Umbilicaria spp.		o	o

	ROUSSEAU	DIGNARD	DESPONTS
MOSSES			
Abietinella abietina (Hedw.) M. Fleisch.		o	
Andreaea alpestris (Thed.) Schimp.	x		
Andreaea sp.		o	o
Aulacomnium palustre (Hedw.) Schwaegr.	x	o	
Aulacomnium turgidum (Wahlenb.) Schwaegr.	x	o	
Blindia acuta (Hedw.) B.S.G.	x		
Brachythecium plumosum (Hedw.) B.S.G.	x		
Brachythecium rivulare B.S.G.			
Bryum stenotrichum C. Müll.	x		
Bryum sp.	x		
Calliergon stramineum (Brid.) Kindb.	x		
Campylium spp.		o	
Conostomum tetragonum (Hedw.) Lindb.		o	
Dicranum elongatum Schleich. *ex* Schwaegr.		o	
Dicranum fuscescens Sm.	x		
Dicranum leioneuron Kindb.	x		
Dicranum majus Sm.	x		
Dicranum scoparium Hedw.	x		
Dicranum spp.		o	o
Distichium capillaceum (Hedw.) B.S.G.		o	
Drepanocladus exannulatus (B.S.G.) Warnst.	x		
Drepanocladus uncinatus (Hedw.) Warnst.	x		
Drepanocladus spp. (incl. *Limprichtia*)		o	
Hylocomium splendens (Hedw.) B.S.G.	x	o	
Hypnum lindbergii Mitt.	x		
Pleurozium schreberi (Brid.) Mitt.	x	o	o
Pohlia sp.	x		
Polytrichastrum alpinum (Hedw.)	x	o	
Polytrichastrum alpinum var. *septentrionale* (Brid.) Lindb.	x		
Polytrichum commune Hedw.	x	o	
Polytrichum juniperinum Hedw.		o	
Polytrichum piliferum Hedw.		o	
Polytrichum strictum Brid.	x	o	
Polytrichum swartzii C. Hartm.	x		
Polytrichum spp.	x	o	o

	ROUSSEAU	DIGNARD	DESPONTS
MOSSES (continued)			
Ptilium crista-castrensis (Hedw.) De Not.		o	o
Rhacomitrium canescens (Hedw.) Brid.		o	
Rhacomitrium fasciculare (Hedw.) Brid.	x		
Rhacomitrium lanuginosum (Hedw.) Brid.	x	o	o
Rhytidium rugosum (Hedw.) Kindb.		o	
Sphagnum angustifolium (C. Jens. *ex* Russ.) C. Jens. in Tolf	x		
Sphagnum fuscum (Schimp.) Klinggr.	x		
Sphagnum girgensohnii Russ.	x		
Sphagnum rubellum Wils.	x		
Sphagnum russowii Warnst.	x		
Sphagnum sp.	x	o	
Tomenthypnum nitens (Hedw.) Loeske	x		
Tetraplodon mnioides (Hedw.) B.S.G.	x		

	ROUSSEAU	DIGNARD	DESPONTS
LIVERWORTS (HEPATICS)			
Anastrophyllum minutum (Schreb.) Schust.	x		
Anthelia juratzkana (Limpr.) Trev.	x		
Barbilophozia binsteadii (Kaal.) Loeske	x		
Barbilophozia hatcheri (Evans) Loeske	x		
Barbilophozia kunzeana (Hüb.) Gams	x		
Barbilophozia lycopodioides (Wall.) Loeske	x		
Blasia pusilla L.	x		
Cephalozia pleniceps (Aust.) Lindb.	x		
Cephaloziella rubella (Nees) Warnst.	x		
Chandonanthus setiformis (Ehrh.) Lindb.	x	o	
Lophozia ventricosa (Dicks.) Dum.	x		
Marsupella emarginata (Ehrh.) Dum.	x		
Marsupella sp.	x		
Mylia anomala (Hook.) S. Gray	x		
Pellia epiphylla (L.) Corda	x		
Pleuroclada albescens (Hook.) Spruce	x		
Ptilidium ciliare (L.) Hampe	x	o	
Scapania irrigua (Nees) Gott.	x		
Scapania sp.	x	o	

[1] This compilation has been prepared by Jean Gagnon (MDDEP).

Crustaceous lichen collected in the territory of the proposed park in August 2004

Collected by **Jean Gagnon** (MDDEP)
Identified by P.Y. Wong (Canadian Museum of Nature, Ottawa, Ontario)

Indicated in bold: (1) newly identified species in Québec or (2) second reference to the species in Québec
Note: cf denotes doubtful identification, based on a vegetative specimen

Acarospora scabrida Hedl. ex H. Magn. (1)
Amygdalaria consentiens (Nyl.) Hertel, Brodo & Mas. (1)
Amygdalaria elegantior (H. Magn.) Hertel & Brodo
Amygdalaria panaeola (Ach.) Hertel & Brodo
Aspicilia caesiocinerea (Nyl. Ex Malbr.) Arnold (1)
Aspicilia cinerea (L.) Körber
cf. Aspicilia disserpens (Zahlbr.) Räsänen (1)
Aspilidea myrinii (Fr.) Hafellner
Bellemerea alpina (Sommerf.) Clauzade & Roux (2)
Bellemerea subsorediza (Lynge) R. Sant. (2)
Caloplaca ammiospila (Wahlenb.) H. Olivier (2)
Caloplaca fraudans (Th. Fr.) H. Olivier
Caloplaca tetraspora (Nyl.) H. Olivier (1)
Calvitimela aglaea (Sommerf.) Hafellner
Calvitimela armeniaca (DC.) Hafellner
Candelariella placodizans (Nyl.) H. Magn.
Candelariella vitellina (Hoffm.) Müll. Arg.
Carbonea vorticosa (Flörke) Hertel
Farnoldia micropsis (A. Massal.) Hertel (1)
cf. *Helocarpon crassipes* Th. Fr. (ou *Micarea* sp.)
Icmadophila ericetorum (L.) Zahlbr.
Ionapsis lacustris (With.) Lutzoni
Lecanora argentea Oksner & Volkova
Lecanora cenisea Ach.
Lecanora epibryon (Ach.) Ach.
Lecanora intricata (Ach.) Ach.
Lecanora polytropa (Hoffm.) Rabenh.
Lecidea auriculata Th. Fr.
Lecidea fuscoatra (L.) Ach. (1)
Lecidea lapicida (Ach.) Ach.
Lecidea tessellata Flörke
Lecidella stigmatea (Ach.) Hertel & Leuckert
Lecidoma demissum (Rutstr.) Gotth. Schneider & Hertel
Lepraria neglecta (Nyl.) Erichsen
Lopadium pezizoideum (Ach.) Körber
Micarea assimilata (Nyl.) Coppins
Miriquidica garovaglii (Schaerer) Hertel & Rambold (1)
Miriquidica leucophaea (Flörke ex Rabenh.) Hertel & Rambold
Miriquidica lulensis (Hellbom) Hertel & Rambold
Ochrolecia androgyna (Hoffm.) Arnold
Ochrolecia frigida (Sw.) Lynge
Ochrolecia upsaliensis (L.) A. Massal.
Ophioparma lapponica (Räsänen) Hafellner & R. W. Rogers
Orphniospora moriopsis (A. Massal.) D. Hawksw.
Pertusaria dactylina (Ach.) Nyl.
Pertusaria oculata (Dickson) Th. Fr.
Pertusaria panyrga (Ach.) A. Massal.
Pleopsidium chlorophanum (Wahlenb.) (2)
Porpidia flavocaerulescens (Hornem.) Hertel & A. J. Schwab (incl. *P. flavicunda* (Ach.) Gowan)
Porpidia melinoides (Körber) Gowan & Ahti
Porpidia thomsonii Gowan
Rhizocarpon alpicola (Anzi) Rabenh. (1)
Rhizocarpon badioatrum (Flörke ex Sprengel) Th. Fr.
Rhizocarpon cinereonigrum Vainio (1)
Rhizocarpon eupetraeoides (Nyl.) Blomb. & Forss.
Rhizocarpon ferax H. Magn. (1)
Rhizocarpon geminatum Körber
Rhizocarpon geographicum (L.) DC.
Rhizocarpon grande (Flörke ex Flotow) Arnold
Rhizocarpon hochstetteri (Körber) Vainio
Rhizocarpon inarense (Vainio) Vainio
Rhizocarpon jemtlandicum (Malme) Malme
Rhizocarpon microsporum Lynge (1)
Rhizocarpon obscuratum (Ach.) A. Massal.
Rhizocarpon riparium Räsänen
Rhizocarpon rittokense (Hellbom) Th. Fr.
Rhizocarpon superficiale (Schaerer) Vainio
Rinodina glauca Ropin
Sagiolechia rhexoblephara (Nyl.) Zahlbr.
Schaereria fuscocinerea (Nyl.) Clauzade & Roux
Sporastatia polyspora (Nyl.) Grummann (2)
Sporastatia testitudinae (Ach.) A. Massal.
Tremolecia atrata (Ach.) Hertel
Varicellaria rhodocarpa (Körber) Th. Fr.
Verrucaria arctica Lynge (1)
Verrucaria devergens Nyl. (1)

Other crustaceous lichen documented in the Torngat Mountains or at Killiniq (Thomson, 1997)

Caloplaca tiroliensis Zahlbr.
Caloplaca tornoënsis H. Magn.
Candelariella terrigena Räsänen
Pertusaria coriacea (Th. Fr.) Th. Fr.
Protomicarea limosa (Ach.) Hafellner

Liverworts (hepatics) collected in the territory of the proposed park in August 2004

Collected by **Jean Gagnon** (MDDEP)
Identified by **Linda M. Ley** (Ottawa, Ontario)

Indicated in bold: (1) newly identified species in Québec or (2) rare species in Canada
Note: cf denotes doubtful identification

Anastrophyllum michauxii (Web.) Buch & Evans
Anastrophyllum minutum (Schreb. ex Cranz) Schust.
Anastrophyllum saxicola (Schrad.) Schust.
Anthelia juratzkana (Limpr.) Trev.
Barbilophozia cf *barbata* (Schmid.) Loeske
Barbilophozia binsteadii (Kaal.) Loeske
Barbilophozia kunzeana (Hüb.) K. Müll.
Barbilophozia quadriloba (Lindb.) Loeske
Blepharostoma trichophyllum (L.) Dum.
Cephalozia bicuspidata (L.) Dum.
Cephalozia bicuspidata cf. ssp. *ambigua* (Mass.) Schust.
Cephalozia cf. *pleniceps* (Aust.) Lindb.
Cephaloziella arctica Bryhn & Douin
Cephaloziella cf. grimsulana (Jack) Lacouture (1)
Gymnomitrion apiculatum (Schiffn.) K. Müll.
Gymnomitrion concinnatum (Lightf.) Corda
Gymnomitrion corallioides Nees
Jungermannia cf. *atrovirens* Dum.
Jungermannia gracillima Sm.
Jungermannia polaris Lindb.
Lophozia bicrenata (Schmid. ex Hoffm.) Dum.
Lophozia excisa (Dicks.) Dum.
Lophozia cf. *opacifolia* Culm.
Lophozia cf. *polaris* (Schust.) Schust. in Schust. & Damsh.
Lophozia cf. schusterana Schljak. (2)
Lophozia ventricosa (Dicks.) Dum.
Marsupella arctica (Berggr.) Bryhn & Kaal. (2)
Marsupella emarginata (Ehrh.) Dum.
Marsupella sprucei (Limpr.) H. Bern.
Nardia geoscyphus (DeNot.) Lindb.
Odontoschisma elongatum (Lindb.) Evans
Pellia epiphylla (L.) Corda
Pleuroclada albescens (Hook.) Spruce
Ptilidium ciliare (L.) Hampe
Scapania cf. *hyperborea* Joerg.
Scapania cf. *irrigua* (Nees) Nees
Scapania kaurinii Ryan (1, 2)
Scapania mucronata Buch
Scapania obcordata (Berggr.) S. Arnell (2)
Scapania uliginosa (Sw. ex Lindenb.) Dum.
Scapania undulata (L.) Dum.
Scapania sp. [Sect. Curtae]
Tetralophozia setiformis (Ehrh.) Schljak.
Tritomaria quinquedentata (Huds.) Buch

Appendix 4 Rare Mosses and Liverworts (Hepatics) in Canada

Rare mosses in Canada according to the COSEWIC (Belland, 1998) and present along the Labrador coast of the Torngat Mountains (Newfoundland and Labrador), (Hedderson and Brassard, 1986)

Arctoa anderssonii Wich
Arctoa hyperborea (With.) B.S.G.
Brachythecium glaciale B.S.G.
Bryum longisetum Schwaegr. var. *labradorense* (Philib.) C. Jens.
Coscinodon cribrosus (Hedw.) Spruce
Encalypta brevipes Schljak.
Grimmia atrata Hoppe & Hornsch.
Grimmia elongata Kaulf.
Grimmia funalis (Schwaegr.) B.S.G.
Grimmia torngakiana Brassard & Hedders.
Hygrohypnum cochlearifolium (De Not.) Broth.
Mielichhoferia mielichhoferi (Hook.) Loeske
Oligotrichum falcatum Steere
Pohlia lescuriana (Sull.) Grout
Psilopilum laevigatum (Wahlenb.) Lindb.
Trichostomum arcticum Kaal.

Rare liverworts (hepatics) in Canada (Belland, 2004) and present along the Labrador coast of the Torngat Mountains (Newfoundland and Labrador), (Hedderson et al., 2001)

Eremonotus myriocarpus (Carring.) Pears.
Lophozia schusterana Schljak ?
Marsupella arctica (Berggr.) Bryhn & Kaal.
Marsupella boeckii (Aust.) Kaal.
Marsupella condensata (Aongstr.) Schiffn.
Marsupella revoluta (Nees) Dum.
Scapania serrulata Schust.
Tritomaria heterophylla Schust.

Rare liverworts (hepatics) in Canada (Belland, 2004) that might be present in the proposed park and known to be present in the Pingualuit National Park (J. Gagnon, MDDEP, personal communication 2004, based on the botanical work of Gauthier and Dignard in 1998 and of Gagnon and Dignard in 2000)

Diplophyllum apiculatum (Evans) Steph.
Jungermannia crenuliformis Aust. ?
Lophozia schusterana Schljak ?
Marsupella arctica (Berggr.) Bryhn & Kaal.
Marsupella revoluta (Nees) Dum.
Scapania kaurinii Ryan
Tritomaria heterophylla Schust.

Appendix 5 Marine Mammals in the Territory of the Proposed Park and Surrounding Areas

FAMILY	LATIN[1]	FRENCH[1]
Physeteridae	*Physeter catodon*	Cachalot macrocéphale
Monodontidae	*Delphinapterus leucas*	Béluga
Monodontidae	*Monodon monoceros*	Narval
Delphinidae	*Orcinus orca*	Épaulard
Balaenopteridae	*Balaenoptera borealis*	Rorqual boréal
Balaenopteridae	*Balaenoptera acutorostrata*	Petit rorqual
Balaenopteridae	*Balaenoptera musculus*	Rorqual bleu
Balaenidae	*Balaena mysticetus*	Baleine boréale
Odobénidae	*Odobenus rosmarus*	Morse
Phocidae	*Phoca vitulina*	Phoque commun
Phocidae	*Phoca hispida*	Phoque annelé
Phocidae	*Phoca hispida*	Phoque annelé (juvénile)
Phocidae	*Phoca hispida*	Phoque annelé (adulte)
Phocidae	*Phoca hispida*	Phoque annelé (gravide)
Phocidae	*Phoca groenlandica*	Phoque du Groenland
Phocidae	*Erignathus barbatus*	Phoque barbu
Ursidae	*Ursus maritimus*	Ours blanc*

[1] Desrosiers (1995)

[2] Avataq Cultural Institute and Inuit residents of Kangiqsualujjuaq

* Species or signs of presence observed (fieldwork 2003)

Other sources:

Burt and Grossenheider (1992); Avataq Cultural Institute (1988); Ministère des Transports (1988); Noëlle Lemos enr. (1994); OPDQ (1983); Prescott and Richard (1996); Reeves (1995)

Note: This list illustrates species that are present or that could be present in the territory

	INUKTITUT[2]	
ENGLISH[1]	SYLLABIC TYPE	ROMAN TYPE
Sperm whale	ᑭᒍᑎᓕᒃ (ᐋᕐᓗᖅ)	Kigutilik (Aarluq)
White whale	ᕿᓚᓗᒐᖅ	Qilalugaq
Narwhal	ᐊᓪᓚᖑᐊᖅ	Allanguaq
Killer whale	ᐋᕐᓗᐊᓯᐊᖅ	Aarluasiaq
Sei whale	?	?
Minke whale	ᐸᒥᐅᓕᒐᔪᒃ	Pamiuligajuk
Blue whale	ᐃᐸᒃ (ᑕᓪᓗᖕᒐᒍᑦ ᐃᐸᓖᑦ)	Ipak (Lines under chin)
Bowhead whale	ᐊᕐᕕᒃ	Arvik
Walrus	ᐊᐃᕕᖅ	Aiviq
Harbour seal	ᖃᓯᒋᐊᖅ	Qasigiaq
Ringed seal	ᓇᑦᓯᖅ	Natsiq
Ringed seal (Juvenile)	ᓇᑦᓯᐊᔪᖅ	Natsiajuq
Ringed seal (Adult)	ᓇᑦᓯᒪᕆᒃ	Natsimarik
Ringed Seal (gravid)	ᐃᓪᓚᐅᓕᒃ	Illaulik
Harp seal	ᖃᐃᕈᓕᒃ	Qairulik
Bearded seal	ᐅᑦᔪᒃ	Utjuk
Polar bear	ᓇᓄᖅ	Nanuq

Appendix 6 Land and Semi-Aquatic Mammals in the Territory of the Proposed Park and Surrounding Areas

FAMILY	LATIN[1]	FRENCH[1]
Soricidae	*Sorex cinereus*	Musaraigne cendrée*
Leporidae	*Lepus americanus*	**Lièvre d'Amérique***
Leporidae	*Lepus arcticus*	Lièvre arctique*
Sciuridae	*Tamiasciurus hudsonicus*	**Écureuil roux***
Castoridae	*Castor canadensis*	**Castor**
Cricetidae	*Peromyscus maniculatus*	Souris sylvestre
Cricetidae	*Dicrostonyx hudsonius*	Lemming d'Ungava*
Cricetidae	*Synaptomys borealis*	**Campagnol-lemming boréal***
Cricetidae	*Clethrionomys gapperi*	**Campagnol à dos roux de Gapper**
Cricetidae	*Ondrata zibethicus*	Rat musqué
Cricetidae	*Microtus pennsylvanicus*	Campagnol des champs*
Erethizontidae	*Erethizon dorsatum*	**Porc-épic d'Amérique***
Canidae	*Canis lupus*	Loup gris*
Canidae	*Alopex lagopus*	Renard arctique*
Canidae	*Vulpes vulpes*	Renard roux*
Canidae	*Vulpes vulpes*	Renard roux* (variété croisée)
Ursidae	*Ursus americanus*	**Ours noir***
Mustelidae	*Mustela erminea*	Hermine
Mustelidae	*Mustela nivalis*	Belette pygmée
Mustelidae	*Mustela vison*	**Vison d'Amérique***
Mustelidae	*Martes americana*	**Martre d'Amérique***
Mustelidae	*Gulo gulo*	Carcajou
Mustelidae	*Lontra canadensis*	Loutre de rivière*
Felidae	*Lynx canadensis*	**Lynx du Canada**
Cervidae	*Rangifer tarandus*	Caribou*
Bovidae	*Ovibos moschatus*	Bœuf musqué

According to Desrosiers et al. (2002) and Prescott and Richard (1996), the species shown in bold are at the northern limit of their ranges.

[1] Desrosiers (1995) ; Desrosiers et al. (2002)

[2] Avataq Cultural Institute and Inuit residents of Kangiqsualujjuaq

* Species or signs of presence observed [Ouellet (1978); Canadian Museum of Nature (2000); Desrosiers et al. (2002); Fortin (2004); fieldwork in 2003 and 2004

Autres sources :
Barré and Lefebvre (1986); Burt and Gossenheider (1992); Couturier et al. (1990); Couturier et al. (1988); Harrington (1994); Cuerrier (2003); Hood (1994); Avataq Cultural Institute (1988); La Fondation Caribou Québec (2001); Le Hénaff (1986); Ministère des Transports (1988); Morin (2000); Canadian Museum of Nature (2000); Noëlle Lemos enr. (1994); OPDQ (1983); Prescott and Richard (1996); Schaefer and Luttich (1998); Vandal (1987).

Note: This list illustrates species that are present or that could be present in the territory.

ENGLISH[1]	INUKTITUT[2] SYLLABIC TYPE	ROMAN TYPE
Common shrew	ᐅᑦᔪᓇᖅ	Utjunaq
Snowshoe hare	ᐅᑲᓕᐊᑦᓯᐊᖅ, ᐅᑭᐅᕐᓯᐅᑎ	Ukaliatsiaq, Ukiursiuti
Arctic hare	ᐅᑲᓕᖅ	Ukaliq
American red squirrel	ᓇᐹᕐᑐᓯᐅᑎᒃ	Napaartusiutik
Beaver	ᑭᒋᐊᒃ	Kigiak
Deer mouse	ᓄᓂᕙᒃᑲᖅ	Nunivakkaq
Ungava lemming	ᐊᕕᖕᖕᒐᖅ	Avinngaq
Northern bog lemming	ᑲᔪᕐᑕᖅ ?	Kajurtaq ?
Gapper's red-backed vole	ᓄᓂᕙᒃᑲᖅ	Nunivakkaq
Muskrat	ᑭᕝᕙᓗᒃ	Kivvaluk
Meadow vole	ᓄᓂᕙᒃᑲᖅ	Nunivakkaq
American porcupine	ᐃᓛᖁᑦᓯᖅ	Ilaaqutsiq
Wolf	ᐊᒪᕈᖅ	Amaruq
Arctic fox	ᑎᕆᒐᓐᓂᐊᖅ	Tiriganniaq
Red fox	ᑲᔪᕐᑐᖅ	Kajurtuq
Red fox (crossed)	ᐊᑯᓐᓇᑐᖅ	Akunnatuq
Black bear	ᐊᑦᓴᒃ	Atsak
Ermine	ᑎᕆᐊᖅ	Tiriaq
Least weasel	ᑎᕆᐊᖅ	Tiriaq
Mink	ᑰᑦᓯᐅᑎᒃ, ᑎᑲᕐᒍᓕᒃ	Kuutsiutik, Tikargulik
American marten	ᕿᒻᒥᖁᐊᕐᖁᑑᖅ, ᖃᕝᕕᐊᓯᐊᖅ	Kimmiquarqutuuq, Qavviasiaq
Wolverine	ᖃᕝᕕᒃᔭ, ᖃᕝᕕᑲᓪᓚᒃ	Qavvik, Qavvikallak
River otter	ᐸᒥᐅᕐᑑᖅ	Pamiurtuuq
Canada lynx	ᐱᕐᑐᓯᕋᖅ	Pirtusiraq
Caribou	ᑐᒃᑐᖅ	Tuktuq
Muskox	ᐅᒥᒻᒪᒃ	Ummimak

Appendix 7 Avian Wildlife in the Territory of the Proposed Park and Surrounding Areas

FAMILY	LATIN[1, 2]	FRENCH[1, 2]	ENGLISH[1, 2]
Gaviidae	*Gavia stellata*	Plongeon catmarin*	Red-throated Loon
Gaviidae	*Gavia pacifica*	Plongeon du Pacifique	Pacific Loon
Gaviidae	*Gavia immer*	Plongeon huard*	Common Loon
Ardeidae	*Ardea herodias*	Grand héron	Great Blue Heron
Anatidae	*Chen caerulescens*	Oie des neiges	Snow Goose
Anatidae	*Branta bernicla*	Bernache cravant	Brant
Anatidae	*Branta canadensis*	Bernache du Canada*	Canada Goose
Anatidae	*Cygnus columbianus*	Cygne siffleur	Tundra Swan
Anatidae	*Anas crecca*	Sarcelle d'hiver*	Green-winged Teal
Anatidae	*Anas rubripes*	Canard noir*	American Black Duck
Anatidae	*Anas platyrhynchos*	Canard colvert	Mallard
Anatidae	*Anas clypeata*	Canard souchet	Northern Shoveler
Anatidae	*Anas acuta*	Canard pilet	Northern Pintail
Anatidae	*Aythya collaris*	Fuligule à collier	Ring-necked Duck
Anatidae	*Aythya marila*	Fuligule milouinan	Greater Scaup
Anatidae	*Aythya affinis*	Petit fuligule	Lesser Scaup
Anatidae	*Somateria mollissima*	Eider à duvet*	Common Eider
Anatidae	*Somateria spectabilis*	Eider à tête grise	King Eider
Anatidae	*Histrionicus histrionicus*	Arlequin plongeur*	Harlequin Duck
Anatidae	*Clangula hyemalis*	Harelde kakawi	Oldsquaw
Anatidae	*Melanitta nigra*	Macreuse noire	Black Scoter
Anatidae	*Melanitta perspicillata*	Macreuse à front blanc	Surf Scoter
Anatidae	*Bucephala clangula*	Garrot à œil d'or*	Common Goldeneye
Anatidae	*Bucephala islandica*	Garrot d'Islande	Barrow's Goldeneye
Anatidae	*Lophodytes cucullatus*	Harle couronné	Hooded Merganser
Anatidae	*Mergus merganser*	Grand harle	Common Merganser
Anatidae	*Mergus serrator*	Harle huppé	Red-breasted Merganser
Accipitridae	*Pandion haliaetus*	Balbuzard pêcheur	Osprey
Accipitridae	*Haliaeetus leucocephalus*	Pygargue à tête blanche	Bald Eagle
Accipitridae	*Accipiter gentilis*	Autour des palombes	Northern Goshawk
Accipitridae	*Buteo lagopus*	Buse pattue*	Rough-legged Hawk
Accipitridae	*Aquila chrysaetos*	Aigle royal*	Golden Eagle
Falconidae	*Falco columbarius*	Faucon émérillon	Merlin

INUKTITUT[3] SYLLABIC TYPE	ROMAN TYPE	STATUS IN THE STUDY AREA [2, 4, 5]
ᖃᕐᓴᐅᖅ	Qarsauq	Migrant breeder
ᑲᓪᓗᓕᒃ	Kallulik	Migrant breeder?
ᑑᓪᓕᖅ	Tuulliq	Migrant breeder
ᑕᑎᒡᒐᖅ	Tatiggaq	Transient
ᑲᖕᒍᖅ	Kanguq	Transient
ᓂᕐᓕᓇᖅ	Nirlinaq	Transient
ᓂᕐᓕᖅ	Nirliq	Migrant breeder
ᖁᑦᔪᖅ	Qutjuq	Migrant breeder?
ᐃᕗᒑᐱᒃ, ᑰᒃᓯᐅᑎᒃ	Ivugaapik, Kuuksiutik	Migrant breeder
ᒥᑎᕐᓗᒃ	Mitirluk	Migrant breeder
ᐃᕗᒐᖅ	Ivugaq	Migrant breeder?
ᐃᕗᒐᖅ	Ivugaq	Migrant breeder?
ᖃᕐᓗᑐᖅ	Qarlutuq	Migrant breeder?
ᐃᖕᒍᑐᒃ	Ingutuk	Migrant breeder?
ᐃᖕᒍᑐᒃ	Ingutuk	Migrant breeder
ᐃᖕᒍᑐᒃ	Ingutuk	Migrant breeder?
ᒥᑎᖅ	Mitiq	Migrant breeder
ᐊᒪᐅᓕᔾᔪᐊᖅ	Amaulijjuaq	Migrant breeder?
ᑐᓪᓕᕈᓇᖅ, ᑰᒃᓯᐅᑐᒃ, ᑐᓪᓕᐅᕐᓈᐱᒃ	Tullirunnaq, Kuuksiutuk, Tulliurnaapik	Migrant breeder
ᐊᒡᒋᖅ, ᐊᒡᒋᐊᑲᓐᓇᖅ	Aggiq, Aggiakannaq	Migrant breeder
ᐃᖕᒋᐅᓂᕐᑎᐅᑎᒃ, ᕿᕐᓂᑕᖅ	Ingiulirsiutik, Qirnitaq	Migrant breeder?
ᕿᕐᓂᑕᑲᓪᓚᐃᑦ	Qirnitakallait	Migrant breeder
ᑲᑦᔨᑐᒃ	Katjituk	Migrant breeder
ᕿᖕᒍᑐᖅ	Qingutuq	Transient
ᐸᐃᖅ, ᓄᔭᓕᒃ	Paiq, Nujalik	Migrant breeder?
ᐊᕐᐸᖕᒋᔫᕐᓚᐃᑦ	Arpangijuurlait	Migrant breeder?
ᓄᔭᓕᒃ, ᐸᐃᖅ	Nujalik, Paiq	Migrant breeder
ᐃᖃᓗᑦᓯᐅᑎᒃ	Iqalutsiutik	Migrant breeder
ᓇᑦᑐᕋᓕᒃ	Natturalik	Migrant breeder?
?	?	Migrant breeder
ᑭᒡᒐᕕᒃ, ᕿᓐᓄᐊᔪᐊᖅ	Kiggavik, Qinnuajuaq	Migrant breeder
ᓇᑦᑐᕋᓕᒃ	Natturalik	Migrant breeder
ᑲᒃᑲᔫᖅ ?	Kakkajuuq ?	Migrant breeder

FAMILY	LATIN[1, 2]	FRENCH[1, 2]	ENGLISH[1, 2]
Falconidae	*Falco peregrinus*	Faucon pèlerin	Peregrine Falcon
Falconidae	*Falco rusticolus*	Faucon gerfaut	Gyrfalcon
Phasianidae	*Falcipennis canadensis*	Tétras du Canada*	Spruce Grouse
Phasianidae	*Lagopus lagopus*	Lagopède des saules*	Willow Ptarmigan
Phasianidae	*Lagopus muta*	Lagopède alpin*	Rock Ptarmigan
Charadriidae	*Pluvialis squatarola*	Pluvier argenté	Black-bellied Plover
Charadriidae	*Pluvialis dominica*	Pluvier bronzé	American Golden Plover
Charadriidae	*Charadrius semipalmatus*	Pluvier semipalmé*	Semipalmated Plover
Charadriidae	*Charadrius vociferus*	Pluvier kildir	Killdeer
Scolopacidae	*Tringa melanoleuca*	Grand chevalier	Greater Yellowlegs
Scolopacidae	*Tringa flavipes*	Petit chevalier	Lesser Yellowlegs
Scolopacidae	*Tringa solitaria*	Chevalier solitaire*	Solitary Sandpiper
Scolopacidae	*Actitis macularius*	Chevalier grivelé*	Spotted Sandpiper
Scolopacidae	*Arenaria interpres*	Tournepierre à collier	Ruddy Turnstone
Scolopacidae	*Calidris canutus*	Bécasseau maubèche	Red Knot
Scolopacidae	*Calidris alba*	Bécasseau sanderling	Sanderling
Scolopacidae	*Calidris pusilla*	Bécasseau semipalmé	Semipalmated Sandpiper
Scolopacidae	*Calidris minutilla*	Bécasseau minuscule*	Least Sandpiper
Scolopacidae	*Calidris fuscicollis*	Bécasseau à croupion blanc	White-rumped Sandpiper
Scolopacidae	*Calidris alpina*	Bécasseau variable	Dunlin
Scolopacidae	*Limnodromus griseus*	Bécassin roux	Short-billed Dowitcher
Scolopacidae	*Gallinago delicata*	Bécassine de Wilson*	Wilson's Snipe
Scolopacidae	*Phalaropus lobatus*	Phalarope à bec étroit*	Red-necked Phalarope
Scolopacidae	*Phalaropus fulicaria*	Phalarope à bec large	Red Phalarope
Laridae	*Stercorarius pomarinus*	Labbe pomarin	Pomarine Jaeger
Laridae	*Stercorarius parasiticus*	Labbe parasite	Parasitic Jaeger
Laridae	*Stercorarius longicaudus*	Labbe à longue queue	Long-tailed Jaeger
Laridae	*Larus argentatus*	Goéland argenté*	Herring Gull
Laridae	*Larus glaucoides*	Goéland arctique	Iceland Gull
Laridae	*Larus hyperboreus*	Goéland bourgmestre	Glaucous Gull
Laridae	*Larus marinus*	Goéland marin	Great Black-backed Gull
Laridae	*Rissa tridactyla*	Mouette tridactyle	Black-legged Kittiwake
Laridae	*Sterna paradisaea*	Sterne arctique	Arctic Tern
Laridae	*Alle alle*	Mergule nain	Dovekie
Alcidae	*Uria lomvia*	Guillemot de Brünnich	Thick-billed Murre
Alcidae	*Alca torda*	Petit pingouin	Razorbill

INUKTITUT[3] SYLLABIC TYPE	ROMAN TYPE	STATUS IN THE STUDY AREA [2, 4, 5]
ᑭᒡᒐᕕᒃ, ᑭᒡᒐᕕᐊᕐᔪᒃ	Kiggavik, Kiggaviarjuk	Migrant breeder
ᑭᒡᒐᕕᒃ	Kiggavik	Migrant breeder
ᐊᕐᑭᑭᓕ ?	Aqikili ?	Sedentary breeder
ᐊᕐᑭᒡᒋᖅ	Aqiggiq	Resident breeder
ᐊᕐᑭᒡᒋᕕᒃ	Aqiggivik	Resident breeder
ᑐᓪᓕᕕᒃ	Tullivik	Transient
ᑐᓪᓕᒑᕐᔪᖅ	Tulligaarjuq	Transient
ᕐᑯᓪᓕᕐᑯᓪᓕᐊᖅ, ᐊᕐᐸᑐᐊᕋᖅ	Qulliqulliaq, Arpatuaraq	Migrant breeder
ᕐᑯᓪᓕᕐᑯᓪᓕᐊᖅ	Qulliqulliaq	Migrant breeder?
ᑲᓈᑯᑖᓕᒃ	Kanaakutaalik	Migrant breeder?
?	?	Migrant breeder?
ᓯᑦᔭᕆᐊᖅ	Sitjariaq	Migrant breeder
ᓱᑦᓛᔪᒃ	Sutlaajuk	Migrant breeder
ᑕᓪᓕᕙᖅ, ᑲᓇᑲᑐᖅ	Tallivak, Kanakatuq	Transient
ᓗᕕᓗᕕᓛᖅ, ᓯᑦᔭᕆᐊᓚᖅ	Luviluvilaaq, Sitjarialaq	Transient
ᓗᕕᓗᕕᓛᖅ	Luviluvilaaq	Transient
ᓯᑦᔭᕆᐊᖅ	Sitjariaq	Migrant breeder
ᓗᕕᓗᕕᓛᖅ	Luviluvilaaq	Migrant breeder
ᓯᑦᔭᕆᐊᕐᔪᒃ	Sitjariarjuk	Transient
ᓗᕕᓗᕕᓛᒃ	Luviluvilaaq	Migrant breeder?
ᓯᒡᒍᑑᖅ	Siggutuuq	Migrant breeder?
ᓵᕐᕙᖅ	Saarvak	Migrant breeder
ᓴᐅᕐᕋᖅ	Saurraq	Migrant breeder
ᐊᐅᐸᓗᒃᑐᐊᕐᔪᒃ	Aupaluktuarjuk	Migrant breeder?
ᐃᓱᖕᖕᒐᖅ	Isunngaq	Migrant breeder?
ᐃᓱᖕᖕᒐᕐᓗᒃ	Isunngarluk	Migrant breeder
ᐱᓱᖕᖕᒐᖅ	Pisunngaq	Migrant breeder?
ᓇᐅᔭᖅ	Naujaq	Migrant breeder
ᓇᐅᔭᕐᓗᒐᖅ	Naujarlugaq	Transient
ᓇᐅᔮᕕᒃ	Naujaavik	Migrant breeder
ᑯᓕᓕᒃ	Kulilik	Migrant breeder
ᓇᐅᔭᕌᖅ	Naujaraaq	Migrant breeder
ᐃᒥᕐᕐᑯᑕᐃᓚᒃ	Imirqutailak	Migrant breeder
ᐊᒃᐸᓕᐊᕐᔪᒃ	Akpaliarjuk	Transient
ᐊᑉᐸᒃ	Appak	Transient
ᐊᑉᐸᒃ	Appak	Transient

FAMILY	LATIN[1, 2]	FRENCH[1, 2]	ENGLISH[1, 2]
Alcidae	*Cepphus grylle*	Guillemot à miroir	Black Guillemot
Strigidae	*Bubo virginianus*	Grand-duc d'Amérique*	Great Horned Owl
Strigidae	*Nyctea scandiaca*	Harfang des neiges*	Snowy Owl
Strigidae	*Surnia ulula*	Chouette épervière	Northern Hawk Owl
Strigidae	*Asio flammeus*	Hibou des marais	Short-eared Owl
Strigidae	*Aegolius funereus*	Nyctale de Tengmalm	Boreal Owl
Alcedinidae	*Ceryle alcyon*	Martin-pêcheur d'Amérique*	Belted Kingfisher
Picidae	*Picoides tridactylus*	Pic tridactyle*	Three-toed Woodpecker
Picidae	*Picoides arcticus*	Pic à dos noir	Black-backed Woodpecker
Picidae	*Colaptes auratus*	Pic flamboyant	Northern Flicker
Tyrannidae	*Contopus cooperi*	Moucherolle à côtés olive	Olive-sided Flycatcher
Tyrannidae	*Empidonax flaviventris*	Moucherolle à ventre jaune	Yellow-bellied Flycatcher
Tyrannidae	*Empidonax alnorum*	Moucherolle des aulnes	Alder Flycatcher
Alaudidae	*Eremophila alpestris*	Alouette hausse-col*	Horned Lark
Hirundinidae	*Tachycineta bicolor*	Hirondelle bicolore*	Tree Swallow
Hirundinidae	*Riparia riparia*	Hirondelle de rivage*	Bank Swallow
Hirundinidae	*Hirundo rustica*	Hirondelle rustique*	Barn Swallow
Corvidae	*Perisoreus canadensis*	Mésangeai du Canada*	Gray Jay
Corvidae	*Corvus brachyrhynchos*	Corneille d'Amérique	American Crow
Corvidae	*Corvus corax*	Grand corbeau*	Common Raven
Paridae	*Poecile hudsonicus*	Mésange à tête brune*	Boreal Chickadee
Regulidae	*Sitta canadensis*	Sittelle à poitrine rousse	Red-breasted Nuthatch
Regulidae	*Troglodytes troglodytes*	Troglodyte mignon	Winter Wren
Regulidae	*Regulus satrapa*	Roitelet à couronne dorée	Golden-crowned Kinglet
Regulidae	*Regulus calendula*	Roitelet à couronne rubis*	Ruby-crowned Kinglet
Muscicapdaes	*Oenanthe oenanthe*	Traquet motteux	Northern Wheatear
Muscicapdaes	*Catharus fuscescens*	Grive fauve*	Veery
Muscicapdaes	*Catharus minimus*	Grive à joues grises*	Gray-cheeked Thrush
Muscicapdaes	*Catharus ustulatus*	Grive à dos olive	Swainson's Thrush
Muscicapdaes	*Catharus guttarus*	Grive solitaire	Hermit Thrush
Muscicapdaes	*Turdus migratorius*	Merle d'Amérique*	American Robin
Mimidae	*Toxostoma rufum*	Moqueur roux*	Brown Thrasher
Sturnidae	*Sturnus vulgaris*	Étourneau sansonnet	European Starling
Motacillidae	*Anthus rubescens*	Pipit d'Amérique*	American Pipit
Bombycillidae	*Bombycilla garrulus*	Jaseur boréal	Bohemian Waxwing
Laniidae	*Lanius excubitor*	Pie-grièche grise*	Northern Shrike

INUKTITUT[3] SYLLABIC TYPE	ROMAN TYPE	STATUS IN THE STUDY AREA [2, 4, 5]
ᐱᑦᓯᐅᓛᖅ	Pitsiulaaq	Migrant breeder
ᐅᓐᓄᐊᓯᐅᑎᒃ	Unnuasiutik	Sedentary breeder
ᐅᒃᐱᒃ	Ukpik	Resident breeder
ᐃᒣᖕᖓᑕᖅ, ᐅᓐᓄᐊᓯᐅᑎᒃ	Imaingataq, Unnuasiutik	Resident breeder
ᐅᓐᓄᐊᓯᐅᑎᐊᐱᒃ	Unnuasiutiapik	Migrant breeder
ᐃᒣᖕᖓᑕᖅ, ᑐᒡᒐᓗᒃ	Imaingataq, Tuggaluk	Migrant breeder
ᑐᒡᒐᔫᖅ	Tuggajuuq	Migrant breeder
ᑐᒡᒐᔫᖅ	Tuggajuuq	Resident breeder
ᑐᒡᒐᔫᖅ	Tuggajuuq	Resident breeder?
ᑐᒡᒐᔫᖅ	Tuggajuuq	Migrant breeder?
?	?	Migrant breeder?
?	?	Migrant breeder?
?	?	Migrant breeder?
ᖁᐸᓄᐊᖅᐸᖅ	Qupanuarpaq	Migrant breeder
?	?	Migrant breeder
ᐊᓄᕆᓯᐅᑎᒃ	Anurisiutik	Migrant breeder
?	?	Migrant breeder?
ᖁᐸᓄᐊᖅᔪᐊᖅ	Qupanuarjuaq	Resident breeder
ᑐᓗᒐᖅ	Tulugaq	Migrant breeder
ᑐᓗᒐᖅ	Tulugaq	Sedentary breeder
ᑯᑦᓱᓯᐅᖅᖅᑭᑦ	Kutsusiurqiit	Resident breeder
?	Kutsusiurqiit	Migrant breeder?
?		Migrant breeder?
?	?	Migrant breeder?
?	?	Migrant breeder
ᐃᖅᑯᓕᒐᖅ	Iquligaq	Migrant breeder
?	?	Transient
ᒥᓴᖅᑕᖅ	Misartaq	Migrant breeder
ᒥᓴᖅᑕᖅ	Misartaq	Migrant breeder?
ᒥᓴᖅᑕᖅ	Misartaq	Migrant breeder?
ᖁᐸᓄᐊᖄᓗᒃ	Qupanuaraaluk	Migrant breeder
ᐸᐱᑐᑯᑖᓕᒃ	Papitukutaalik	Transient
ᑐᓗᒐᖅᓇᒃ	Tullugarnak	Migrant breeder
ᐃᖕᒋᑦᑕᔫᖅ	Ingittajuuq	Migrant breeder
?	?	Migrant breeder?
ᖁᐸᓄᐊᑭᓂᐅᑎᐅᑎᒃ	Qupanuakiniutiutik	Resident breeder

FAMILY	LATIN[1, 2]	FRENCH[1, 2]	ENGLISH[1, 2]
Parulidae	*Vermivora peregrina*	Paruline obscure	Tennessee Warbler
Parulidae	*Vermivora celata*	Paruline verdâtre	Orange-crowned Warbler
Parulidae	*Dendroica petechia*	Paruline jaune*	Yellow Warbler
Parulidae	*Dendroica coronata*	Paruline à croupion jaune*	Yellow-rumped Warbler
Parulidae	*Dendroica palmarum*	Paruline à couronne rousse	Palm Warbler
Parulidae	*Dendroica striata*	Paruline rayée*	Blackpoll Warbler
Parulidae	*Seiurus noveboracensis*	Paruline des ruisseaux*	Northern Waterthrush
Parulidae	*Wilsonia pusilla*	Paruline à calotte noire*	Wilson's Warbler
Emberizidae	*Spizella arborea*	Bruant hudsonien*	American Tree Sparrow
Emberizidae	*Passerculus sandwichensis*	Bruant des prés	Savannah Sparrow
Emberizidae	*Passerella iliaca*	Bruant fauve*	Fox Sparrow
Emberizidae	*Melospiza lincolnii*	Bruant de Lincoln	Lincoln's Sparrow
Emberizidae	*Melospiza georgiana*	Bruant des marais	Swamp Sparrow
Emberizidae	*Zonotrichia albicollis*	Bruant à gorge blanche	White-throated Sparrow
Emberizidae	*Zonotrichia leucophrys*	Bruant à couronne blanche*	White-crowned Sparrow
Emberizidae	*Junco hyemalis*	Junco ardoisé*	Dark-eyed Junco
Emberizidae	*Calcarius lapponicus*	Bruant lapon	Lapland Longspur
Emberizidae	*Plectrophenax nivalis*	Bruant des neiges*	Snow Bunting
Icteridae	*Euphagus carolinus*	Quiscale rouilleux*	Rusty Blackbird
Fringillidae	*Pinicola enucleator*	Durbec des sapins*	Pine Grosbeak
Fringillidae	*Loxia leucoptera*	Bec-croisé bifascié	White-winged Crossbill
Fringillidae	*Carduelis flammea*	Sizerin flammé*	Common Redpoll
Fringillidae	*Carduelis hornemanni*	Sizerin blanchâtre*	Hoary Redpoll

[1] Desrosiers (1995)

[2] Gauthier and Aubry (1995)

[3] Avataq Cultural Institute and Inuit residents of Kangiqsualujjuaq

[4] Yves Aubry, personal communication (Sept. 2004)

[5] Status

Sedentary breeder: A year-round resident species that breeds in the study area and usually does not undertake an annual migration. The adults' post-breeding movements, if they occur at all, are strictly local.

Resident breeder: A year-round resident species that breeds in the study area and for which all or most of the population winters within the Québec portion of its breeding range. Pre- and post-breeding movements usually involve only short distances and may be annual.

Migrant breeder: A summer resident species that breeds in the study area and for which most of the population winters outside the study area. Pre- and post-breeding movements are migrations in the true sense.

Transient: Species seen regularly in migration between its breeding and wintering grounds, both of which are located outside Québec.

? Species that could be present or have status in the study area; field verification required.

* Species observed [Ouellet (1978); Canadian Museum of Nature (2000); Fortin (2004); fieldwork in July 2003

INUKTITUT[3] SYLLABIC TYPE	ROMAN TYPE	STATUS IN THE STUDY AREA [2, 4, 5]
?	?	Migrant breeder?
?	?	Migrant breeder
?	?	Migrant breeder
ᖁᐸᓄᐊᑐᐃᓐᓇᖅ	Qupanuatuinnaq	Migrant breeder
?	?	Migrant breeder?
ᓴᒃᓴᒋᐊᖅ	Saksagiaq	Migrant breeder
?	?	Migrant breeder
?	?	Migrant breeder
ᐅᑭᐅᕐᓯᐅᓕᒃ	Ukiursiulik	Migrant breeder
ᐃᖕᒋᑦᑕᔪᖅ	Ingittajuq	Migrant breeder
?	?	Migrant breeder
ᓇᓴᐅᓪᓕᒑᖅ	Nasaulligaaq	Migrant breeder
ᓇᓴᐅᓪᓕᒑᖅ	Nasaulligaaq	Migrant breeder
ᓇᓴᐅᓪᓕᒑᖅ, ᖁᐳᑖᓕᒃ	Nasaulligaaq/Quputaalik	Migrant breeder
ᓇᓴᐅᓪᓕᒑᖅ, ᖁᐳᑖᓕᒃ	Nasaulligaaq/Quputaalik	Migrant breeder
?	?	Migrant breeder
ᓇᓴᐅᓪᓕᒑᖅ	Nasaulligaaq	Migrant breeder
ᐊᒪᐅᓪᓕᒑᖅ	Amaulligaaq	Migrant breeder
ᑐᓗᒐᐅᔭᖅ	Tulugaujaq	Migrant breeder
?	?	Resident breeder
?	?	Migrant breeder
ᓴᒃᓴᒋᐊᖅ, ᓯᕐᓯᒋᐊᖅ	Saksagiaq, Sirsigiaq	Resident breeder
?	?	Resident breeder

Other sources:

Barré and Lefebvre (1986); Bird (1997); Brodeur and Morneau (1999); Harper (1958); Nunavik Research Centre (1984); Malecki, Batt and Shaeffer (2001); Nakashima (1986); Noëlle Lemos enr. (1994)

Note: This list illustrates species that are present or that could be present in the territory.

Appendix 8 Piscifauna in the Territory of the Proposed Park and Surrounding Areas

FAMILY	LATIN[1]	FRENCH[1]
Liparidae	*Somniosus microcephalus*	Requin du Groenland
Cyprinidae	*Couesius plumbeus*	Méné de lac
Catostomidae	*Catostomus catostomus*	Meunier rouge
Catostomidae	*Catostomus commersoni*	Meunier noir
Esocidae	*Esox lucius*	Grand brochet
Lottidae	*Lota lota*	Lotte de rivière
Osméridae	*Mallotus villosus*	Capelan
Salmonidae	*Coregonus artedi*	Cisco de lac
Salmonidae	*Coregonus clupeaformis*	Grand corégone
Salmonidae	*Prosopium cylindraceum*	Ménomini rond
Salmonidae	*Salmo salar*	Saumon atlantique
Salmonidae	*Salvelinus alpinus*	Omble chevalier
Salmonidae	*Salvelinus fontinalis*	Omble de fontaine
Salmonidae	*Salvelinus namaycush*	Touladi
Gadidae	*Boreogadus saida*	Saïda franc
Gadidae	*Gadus ogac*	Ogac
Gasterosteidae	*Gasterosteus aculeatus*	Épinoche à trois épines
Gasterosteidae	*Pungitius pungitius*	Épinoche à neuf épines
Cottidae	*Cottus bairdi*	Chabot tacheté
Cottidae	*Cottus cognatus*	Chabot visqueux
Cottidae	*Myoxocephalus quadricornis*	Chaboisseau à quatre cornes
Cottidae	*Myoxocephalus scorpioides*	Chaboisseau arctique
Cottidae	*Myoxocephalus scorpius*	Chaboisseau à épines courtes
Liparidae	*Liparis tunicatus*	Limace des laminaires

[1] Desrosiers (1995)

[2] Avataq Cultural Institute and Inuit residents of Kangiqsualujjuaq

Other sources :
Adams (1988); Boivin (1994); Boivin and Power (1988); Cuerrier (2003); Cunjak, Power and Barton (1986); Dunbar and Hildebrand (1952); Harrington (1994); Scott and Crossman (1974); Noëlle Lemos enr. (1994); OPDQ (1983); Stenzel, Power and Barton (1989)

Note: This list illustrates species that are present or that could be present in the territory.

ENGLISH[1]	INUKTITUT[2] SYLLABIC TYPE	ROMAN TYPE
Greenland shark	ᐃᖃᓗᑦᔪᐊᖅ	Iqalutjuaq
Lake chub	ᐊᒻᒪᔭᖅ	Ammajaq
Longnose sucker	ᒥᓗᒋᐊᖅ	Milugiaq
White sucker	ᑲᕕᓯᓕᒃ	Kavisilik
Northern pike	ᑭᒋᔫᖅ	Kigijuuq
Burbot	ᓱᓗᑉᐸᐅᒐᖅ	Suluppaugaq
Capelin	ᐊᒻᒪᔭᖅ	Ammajaq
Cisco	ᑲᐱᓯᓕᐊᕈᒃ	Kapisiliaruk
Lake whitefish	ᑲᐱᓯᓕᒃ	Kapisilik
Round whitefish	ᑲᕕᓯᓕᒃ	Kavisilik
Atlantic salmon	ᓵᒪ	Saama
Arctic char	ᐃᖃᓗᑉᐱᖅ	Iqaluppiq
Brook trout	ᐋᓇᒃ	Aanak
Lake trout	ᐃᓯᐅᕋᓕᑦᑖᖅ	Isiuralittaaq
Arctic cod	ᐆᒐᖅ	Uugaq
Greenland cod	ᐆᒐᕐᓱᒃ	Uugarsuk
Threespine stickleback	ᑲᑭᓚᓴᒃ	Kakilasak
Ninespine stickleback	ᑲᑭᓚᓴᒃ	Kakilasak
Mottled sculpin	ᑲᓇᔪᖅ	Kanajuq
Slimy sculpin	?	?
Fourhorn sculpin	ᐸᐱᑦᔪᖅ	Papitjuq
Arctic sculpin	ᑲᓇᔪᖅ	Kanajuq
Shorthorn sculpin	ᑲᓇᔪᖅ	Kanajuq
Kelp snailfish	ᓂᐱᓴᖅ	Nipisaq

Appendix 9 A Few Insects and Spiders in the Territory of the Proposed Park and Surrounding Areas

FAMILY	LATIN	FRENCH
Arachnid	?	Araignée
Arachnid	?	Araignée
Diptera	*Aedes* spp.	Moustique (adulte)
Diptera	*Aedes* sp.	Larve de moustique
Diptera	*Chrysops* spp.	Taon, mouche à chevreuil, frappe-à-bord
Diptera	*Simulium* spp.	Mouche noire
Diptera	*Tabanus* spp.	Mouche à cheval, mouche à orignal
Hyménoptera	*Bombus* spp.	Bourdon
	?	Larve d'un insecte
	?	Larve
Lépidoptera	?	Papillon
Diplopoda	?	Mille-pattes

Sources: Avataq Cultural Institute (compilation of various sources) and Inuit residents of Kangiqsualujjuaq

Carabidae identified in the proposed park by Morgan (1989)

Amara alpina
Amara glacialis
Amara pseudobrunnea
Amara quenseli
Bembidion carinula
Bembidion hasti
Cymindis unicolor
Dyschirius hiemalis
Elaphrus lapponicus
Nebria gyllenhali castanipes
Nebria suturalis
Notiophilus borealis
Patrobus septentrionis
Patrobus stygicus
Pelophila borealis
Pterostichus arcticola
Pterostichus brevicornis
Pterostichus haematopus
Pterostichus punctatissimus
Trechus crassiscapus

Note: The species shown in **bold** are those for which the study area represents an extension of their range.

ENGLISH	INUKTITUT SYLLABIC TYPE	INUKTITUT ROMAN TYPE
Spider	ᐋᓯᕙᓛᖅ, ᐋᓯᕙ	Aasivalaaq, Aasiva
Ground spider	ᒥᑦᔪᐊᔪᒃ, ᒥᑦᔪᐊᕈᒃ	Mitjuajuk/Mitjuaruk
Mosquito (adult)	ᑭᑦᑐᕆᐊᖅ	Kitturiaq
Mosquitoe larvae	ᓂᒥᕐᑕᖅ	Nimirtaq
Deer fly	ᒥᓗᒋᐊᖅ	Milugiaq
Black fly	ᓄᕕᐅᕙᒃ	Nuviuvak
Horse fly	ᒥᓗᒋᐊᑲᓪᓚᒃ, ᒥᓗᒋᐊᕐᔪᐊᖅ	Milugiakallak/Miluriarjuaq
Bumblebee	ᐃᒍᑦᓴᖅ	Igutsaq
Larvae of an insect	ᓇᐹᕐᑑᑉ ᖁᐱᕐᕈᖓ	Napartuuq qupirrunga
Larvae	ᖁᓪᓗᒋᐊᖅ	Qullugiaq
Butterfly	ᑕᖅᑲᓕᑭᑖᖅ, ᓴᕋᓕᑭᑖᖅ	Taqalikitaaq/Saralikitaaq
Millepede	ᕿᑐᓚᐱᒃ	Qitulapik

Appendix 10 A Few Species of Plants in the Territory of the Proposed Park

LATIN	FRENCH	ENGLISH
Alectoria spp.	alectoire	witch's hair
Alnus viridis ssp. *crispa*	aulne	alder
Alnus viridis ssp. *crispa* (chaton)	aulne	alder
Arctous alpina	busserole alpine	alpine bearberry
Arctous alpina (baie)	busserole alpine	alpine bearberry
Betula glandulosa	bouleau glanduleux	scrub birch
Betula glandulosa (chaton)	bouleau glanduleux	scrub birch
Betula glandulosa (racine)	bouleau glanduleux	scrub birch
Campanula rotundifolia	campanule à feuilles rondes	harebell
Cetraria islandica	cétraire d'Islande	true Iceland lichen
Chamerion angustifolium ssp. *angustifolium*	épilobe à feuilles étroites	fireweed
Chamerion latifolium	épilobe à feuilles larges	broad-leaved fireweed
Chlorophyceae	algue verte	green algae
Cladina spp.	cladine	reindeer lichen
Cladonia spp.	mousse à caribou	reindeer lichen
Cladonia spp. (apothécie)	mousse à caribou	reindeer lichen
Cornus canadensis	quatre-temps	bunchberry
Diapensia lapponica ssp. *lapponica*	diapensie de Laponie	diapensia
Diphasiastrum alpinum	lycopode alpin	alpine club-moss
Dryopteris expansa	dryopteride dressée	northern wood fern
Empetrum nigrum	camarine noire	black crowberry
Empetrum nigrum (baie)	camarine noire	black crowberry
Epilobium palustre	épilobe palustre	marsh willowherb
Equisetum spp.	prêle	horsetail
Eriophorum angustifolium	linaigrette à feuilles étroites	tall cottongrass
Eriophorum angustifolium (fleur)	linaigrette à feuilles étroites	tall cottongrass
Fucus distichus evanescens	fucus évanescent	arctic wrack
Honckenya peploides	pourpier de mer commun	seabeach sandwort
	humus/terre noire	humus
Huperzia selago	lycopode sélagine	northern fir-moss
Juniperus communis var. *depressa*	genévrier commun	ground juniper
Laminariales	algue brune	kelp
Laminariales	algue brune	kelp

INUKTITUT[1]	
SYLLABIC TYPE	ROMAN TYPE
ᑎᖓᐅᔭᖅ	tingaujaq
ᐅᕐᐱᒐᖅ, ᐅᕐᐱᑐᐃᓐᓇᖅ, ᐅᕐᐱᓚᖅ, ᕿᔪᕕᒃ	urpigaq, urpituinnaq, urpilaq, qijuvik
ᕿᒻᒥᙳᐊᖅ	qimminguaq
ᑲᓪᓚᖁᑎᒃ	kallaqutik
ᑲᓪᓚᒃ	kallak
ᐊᕚᓚᕿᐊᖅ	avaalaqiaq
ᕿᒻᒥᙳᐊᖅ	qimminguaq
ᐊᒫᒃ	amaak
ᑎᑭᐅᔭᖅ	tikiujaq
ᑎᖓᐅᔭᖅ, ᑐᒃᑑᑉ ᓂᕿᖏᑦ	tingaujaq, tuttuup niqingit
ᐸᐅᓐᓇᖅ, ᐸᐅᓐᓇ	paunnaq, paunna
ᑏᕐᓗᒃ, ᐸᐅᓐᓇᖅ	tiirluk, paunnaq
ᐊᖃᔭᖅ	aqajaq
ᑎᖓᐅᔭᖅ, ᑐᒃᑑᑉ ᓂᕿᖏᑦ	tingaujaq, tuttuup niqingit
ᖁᐊᔭᐅᑎᒃ, ᑎᖓᐅᔭᕐᓚᖅ	quajautik, tingaujarlaq
ᐹᓚᒃ	paalak
ᓴᐅᓂᓕᒃ, (ᐅᕐᐱᑯᓕᒃ), ᐊᐅᐹᓗᑐᒃ	saunilik (urpikulik), aupaalutuk
ᐊᐃᕋᖅ	airaq
ᑲᑭᓚᖁᑎᒃ	kakilaqutik
ᓇᐹᕐᑐᔮᐱᒃ	napaartujaapik
ᐸᐅᕐᖓᖁᑎᒃ	paurngaqutik
ᐸᐅᕐᖓᖅ	paurngaq
ᐸᐅᓐᓇᖅ, ᐸᐅᓐᓇ	paunnaq, paunna
ᐃᕕᑦᓱᐊᓛᕋᖅ	ivitsualaaraq
ᓱᐳᑕᐅᔭᓕᒃ, ᓱᐳᑎᓴᖅ, ᐃᕕᑦᓱᑲᒃ	suputaujalik, suputisaq, ivitsukak
ᖃᑯᕐᑕᓕᒃ	qakurtalik
ᕿᕐᖁᐊ	qirqua
ᒪᓕᒃᓱᐊᒐᖅ	maliksuagaq
ᓯᕐᒥᓴᖅ, ᓯᕐᒥᓴᔭᖅ	sirmisaq, sirmisajaq
ᐃᑦᓱᑎᐅᔭᐃᑦ	itsutiujait
ᕿᓯᕐᑐᑕᐅᔭᖅ	qisirtutaujaq
ᑯᐊᓐᓂᖅ	kuanniq
ᐃᑦᓲᔭᖅ	itsuujaq

LATIN	FRENCH	ENGLISH
Larix laricina	mélèze laricin	tamarack
Larix laricina (branche)	mélèze laricin	tamarack
Larix laricina (strobile)	mélèze laricin	tamarack
Larix laricina (gall)	mélèze laricin	tamarack
Larix laricina (bois pourri)	mélèze laricin	tamarack
Leymus mollis ssp. *mollis*	élyme des sables d'Amérique	American dune grass
Leymus mollis ssp. *mollis* (épi)	élyme des sables d'Amérique	American dune grass
Lycoperdon spp.	vesse-de-loup	puffball
Lycopodium annotinum	lycopode innovant	bristly club-moss
Oxyria digyna	oxyrie de montagne	mountain sorrel
Oxytropis campestris var. *minor*	oxytrope mineur	Newfoundland oxytrope
Picea mariana	épinette noire	black spruce
Picea mariana (branche)	épinette noire	black spruce
Picea mariana (cône)	épinette noire	black spruce
Picea mariana (gomme)	épinette noire	black spruce
Picea mariana (vieux tronc ou branches)	épinette noire	black spruce
Populus balsamifera	peuplier baumier	balsam poplar
Racomitrium lanuginosum	racomitre laineux	racomitrium moss
Rhodiola rosea	orpin rose	roseroot
Rhododendron groenlandicum	thé du Labrador	Labrador tea
Rhododendron lapponicum	rhododendron de Laponie	Lapland rosebay
Rhododendron tomentosum ssp. *subarcticum*	petit thé du Labrador	northern Labrador tea
Ribes glandulosum	gadellier glanduleux	skunk currant
Ribes glandulosum (baie rouge)	gadellier glanduleux	skunk currant
Rubus arcticus	ronce arctique	arctic bramble
Rubus arcticus (fruit)	ronce arctique	arctic bramble
Rubus chamaemorus	chicouté	bake-apple
Rubus chamaemorus (fruit rouge)	chicouté	bake-apple
Rubus chamaemorus (fruit jaune)	chicouté	bake-apple
Salix arctophila	saule arctophile	northern willow
Salix arctophila (chaton femelle)	saule arctophile	northern willow
Salix discolor	saule discolore	pussy willow
Salix glauca ssp. *callicarpaea*	saule à beaux fruits	beautiful willow
Salix herbacea	saule herbacé	snowbed willow
Saxifraga tricuspidata (fleur)	saxifrage à trois dents	prickly saxifrage
Silene acaulis ssp. *acaulis*	silene acaule	moss campion

SYLLABIC TYPE	INUKTITUT[1]	ROMAN TYPE
ᐱᖕᒋᒃ		pingik
ᐊᑭᕈᖅ		akiruq
ᕿᒻᒥᖕᒍᐊᖅ		qimminguaq
ᐸᑦᑕᐅᔭᖅ, ᐊᑦᓯᑐᒧᐊᑦ, ᐊᑭᕈᖅ, ᐱᖕᒋᐅᑉ ᐅᖕᒎᓐᓇᖕᒐ		pattaujaq, atsitumuat, akiruq, pingiup unguunanga
ᐳᕙᐅᔭᖅ		puvaujaq
ᐃᕕᒃ, ᐃᕕᒐᒃ, ᐃᕕᑦᓱᑲᖅ		ivik, ivigak, ivitsukaq
ᐃᕕᐅᑉ ᓄᕗᖕᒐ, ᐃᕕᑦᓱᑲ		iviup nuvunga, ivitsuka
ᓱᐴᓱᐃᑦ, ᑐᒃᑑᑉ ᓂᕿᖕᒋᑦ, ᐳᔪᐃᑦ		supuusuit, tuttup niqingit, pujuit
ᐊᑭᕈᕕᓂᐅᔭᖅ		akiruviniujaq
ᖁᖕᒍᓕᒃ		qunguliq
ᐊᐃᕋᖅ		airaq
ᓇᐹᕐᑐᑐᐃᓐᓇᖅ, ᓇᐹᕐᑐᖅ		napaartutuinnaq, napaartuq
ᕿᓯᕐᑕᐅᑎ		qisirtauti
ᕿᒻᒥᖕᒍᐊᖅ		qimminguaq
ᑯᑦᓱᒃ, ᖁᓪᓕᐊᖅ, ᖁᕐᓕᐊᒃ		kutsuk, qulliaq, qurliak
ᐸᓪᓕᖅ		palliq
ᖃᐃᕈᓕᒃ		qairulik
ᓄᓇᔭᖅ, ᓄᓇᔭᑐᐃᓐᓇᖅ		nunajaq, nunajatuinnaq
ᑐᓪᓕᕈᓇᖅ, ᐅᑦᓱᖅᑲᒻᒪᑦ, ᐅᕐᓱᖅᑲᒻᒪ		tullirunaq, utsuqammat, utsuqamma
ᒪᒣᑦᑐᖁᑎᒃ, ᒥᓴᕐᑕᖅ		mamaittuqutik, misartaq
ᒪᒣᑦᑐᖁᑎᒃ		mamaittuqutik
ᒪᒣᑦᑐᖁᑎᒃ		mamaittuqutik
ᒪᒣᑦᑐᖁᑎᒃ, ᒥᕐᖁᐊᓚᖅᑲᐅᑎᒃ		mamaittuqutik, mirqualaqautik
ᒥᕐᖁᐊᓕᒃ		mirqualik
ᐊᕐᐱᓕᒐᖁᑏᑦ, ᐊᕐᐱᓕᒉᒃ		arpiligaqutiit, arpiligait
ᐊᕐᐱᓕᒐᖅ		arpiliqaq
ᐊᕐᐱᖁᑎᒃ		arpiqutik
ᐊᕐᐱᒃ		arpik
ᐊᐅᓂᖅ		auniq
ᐅᕐᐱᒃ		urpik
ᕿᒻᒥᖕᒍᐊᖅ, ᒥᕐᖁᓕᒃ		qimminguaq, mirqulik
ᐅᕐᐱᒃ		urpik
ᐅᕐᐱᒃ		urpik
ᐅᖃᐅᔭᖅ		uqaujaq
ᑲᑲᒍᑏᒃ		kakagutiit
ᓯᒐᓚᒃ		sigalak

LATIN	FRENCH	ENGLISH
Silene acaulis ssp. *acaulis* (racine)	silene acaule	moss campion
Sorbus americana	sorbier d'Amérique	mountainash
Sphagnum spp.	sphaigne	sphagnum
Taraxacum spp.	pissenlit	dandelion
Umbilicaria spp.	tripe-de-roche	rock tripes
Vaccinium caespitosum	airelle gazonnante	dawf bilberry
Vaccinium uliginosum	airelle des marécages	bog bilberry
Vaccinium uliginosum (baie)	airelle des marécages	bog bilberry
Vaccinium vitis-idaea ssp. *minus*	airelle vigne-d'Ida	mountain cranberry
Vaccinium vitis-idaea ssp. *minus* (baie)	airelle vigne-d'Ida	mountain cranberry

[1] Inuit residents of Kangiqsualujjuaq

List compiled by: Alain Cuerrier, ethnobotanist, Plant Biology Research Institute, Montreal Botanical Garden

INUKTITUT[1]	
SYLLABIC TYPE	**ROMAN TYPE**
ᐊᐃᕋᖅ	airaq
ᐊᐅᐹᓗᕐᑖᓗᒃ	aupaalurtaaluk
ᖁᐃᖏᓕᑕᕐᓴᔭᖅ, ᒪᓂᖅ, ᓄᓇᔭᖅ, ᐅᕐᔪᐊᖅ, ᒪᓂᒃᓴᔭᖅ	quingilitarsajaq, maniq, nunajaq, urjuaq, maniksajaq
ᐊᐃᕋᑦᓴᔭᖅ ᓱᐳᑕᐅᔭᓕᒃ	airarsajaq, suputaujalik
ᖁᐊᔭᐅᑏᒃ, ᑎᖓᐅᔭᕐᓚᖅ	quajautiit, tingaujarlaq
ᓇᓕᑲᒃ	nalikak
ᑭᒍᑕᖏᓐᓇᖁᑎᒃ	kigutanginnaqutik
ᑭᒍᑕᖏᓐᓇᖅ	kigutanginnaq
ᑭᒻᒥᓇᖁᑎᒃ, ᑭᒻᒥᓇᖃᐅᑎᒃ	kimminaqutik, kimminaqautik
ᑭᒻᒥᓇᖅ	kimminaq