LACS-GUILLAUME-DELISLE-ET-À-L'EAU-CLAIRE
PARK PROJECT

STATUS REPORT
NOVEMBER 2007

ᑲᑎᕕᒃ ᓄᓇᓕᓕᕆᒫᑦ ᑲᕙᒪᖓ
Administration régionale KATIVIK Regional Government
Renewable Resources, Environmental and Land Use,
Planning Department, Parks Section

Reference

KRG. 2007. Lacs-Guillaume-Delisle-et-à-l'Eau-Claire Park Project. Status Report. Kativik Regional Government, Renewable Resources, Environmental and Land Use Planning Department, Parks Section, Kuujjuaq, Québec.

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ᑐᕐᓱᔪᖅ ᒥᕐᖑᐃᓯᕐᕕᓴᖕᖓᑕ

ᓀᓪᓕᑎᕐᓯᒪᔪᑦ ᑐᓴᕐᑎᓯᐅᑏᑦ

ᐁᐸᔾᔪ 2002-ᒍᑎᓪᓗᒍ, ᐱᓇᓱᐊᖃᑎᒌᓐᓂᓄᑦ ᐊᕐᒥᖃᑎᒋᒍᑎᒃ ᒪᑭᑕᒐᓱᐊᕐᓂᒧᑦ ᓄᓇᓃᓪᓗ ᐱᕙᓪᓕᐊᓂᕐᒥᓄᑦ ᓄᓇᕕᒻᒥ (ᓴᓇᕐᕿᑎᒃ) ᐊᑎᓕᐅᕿᑎᐅᓯᒪᔫᖅ. ᓴᓇᕐᕿᑎᒃ ᐊᕐᒥᖃᑎᒋᒍᑎᒃ ᓄᐃᑦᓯᓯᒪᔪᖅ ᑖᑦᓱᒥᖕᒪᑦᓴᓇᖅ ᑐᖁᓕᓐᓂᒃ ᑯᐯᒃ ᑲᕙᒪᖓ, ᒪᑭᕝᕕᒃ ᑯᐊᐳᓴᒃᑯᑦ, ᑲᑎᕝᕕᒃ ᓄᓇᓕᓕᒫᑦ ᑲᕙᒪᖓᓗ ᐱᕙᓪᓖᒥᐊᕿᒪᑦᓯᑎᒃ "ᒪᑭᑕᒐᓱᐊᕐᓂᒥᒃ ᐱᕙᓪᓕᐊᑎᑦᓯᓂᕐᒥᒃ, ᐱᓇᓱᒐᑦᓴᓂᒃ ᓄᐃᑎᕆᓂᕐᓂᒃ ᐊᒻᒪᓗ ᒪᑭᑕᒐᓱᐊᕿᑎᑎᒍᑦ ᐱᕙᓪᓕᕿᑎᑦᓴᑖᕐᑕᐅᓂᖏᓐᓂᒃ ᓄᓇᕕᒻᒥᐅᑦ ᐃᓄᐃᑦ." ᑐᖁᓕᕐᒥᑦᑕ ᐃᓕᒋᔭᖕᓕᓂ, ᓴᓇᕐᕿᑎᒃ ᐊᕐᒥᖃᑎᒋᒍᑎᖓ ᑲᒪᒋᔭᕐᑲᓪᓚᓐᓂᑦᑐᖅ ᐱᕙᓪᓕᐊᓂᕐᒥᓐᓂᒃ ᓄᓇᓕᓕᒫᓂᒃ ᑕᑯᔭᕐᑐᓕᓇᓂᕐᒥᒃ ᐊᕐᕐᑯᑎᒥᓗᒥᑦ ᒥᕐᖑᐃᓯᕐᕕᒥᒃ ᐱᕙᓪᓕᐊᑎᑦᓯᓃᑦ. ᑕᒪᑦᓯᒥᖓ ᐱᑦᔪᑎᖃᕐᑎᓗᒍ, ᐊᕐᒥᖃᑎᒋᒍᑎᒃ ᐃᓕᖕᒐᔪᖅ ᓄᓇᕕᒻᒥ ᒥᕐᖑᐃᓯᕐᕕᓂ ᐱᕙᓪᓕᐊᑎᑦᓯᓂᕐᒧᑦ ᐊᑎᓕᐅᕿᑎᐅᓚᐅᕐᓯᒪᔪᖅ ᔫᓂ 2002-ᒍᑎᓪᓗᒍ. ᑖᓐᓇ ᑐᖕᓕᖓ ᐊᕐᒥᖃᑎᒋᒍᑎᐅᑉ ᓄᐃᑦᓯᒍᑕᐅᔪᖅ ᖃᓄᖅ ᑲᒪᒋᔭᕐᑲᓇᐊᕐᑲᕐᓂᖓ ᒥᕐᖑᐃᓯᕐᕕᓂᒃ ᐱᕙᓪᓕᐊᑎᑦᓯᓂᕐᓄᑦ ᐊᕕᑦᑐᑕᐅᓯᒪᒍᒪᒻᒪᑦ ᑲᑐᑦᔾᔭᕆᔭᐅᓗᓂ ᑲᑎᕝᕕᒃ ᓄᓇᓕᓕᒫᑦ ᑲᕙᒪᖓᓄᑦ, ᒥᓂᔅᑕᖓᓄ ᒪᑭᑕᒐᓱᐊᕐᓂᓂᒃ ᐱᕙᓪᓕᐊᑎᑦᓯᓂᖅ, ᐊᕙᑎᓕᕆᓂᖅ ᒥᕐᖑᐃᓯᕐᕕᓕᕆᔾᔪᑎᓄᓪᓗ (*Ministère du Développement durable, de l'Environnement et des Parcs* MDDEP). ᖃᓪᓗᓈᑎᑐᑦ ᐅᔾᔨᕈᓯᖅ sustainable development, environment and parks, MDDEP.

ᓴᓇᕐᕿᑎᒃ ᐊᕐᒥᖃᑎᒋᒍᑎᐅᑉ ᐃᓗᐊᓂ ᐃᓂᓪᓚᑎᕆᒥᐊᓪᓚᓂᕐᒧᑦ ᐃᓕᒥᔾᔪᑎᑕᐅᒥᔪᖅ, ᑐᖁᓕᒥᔾᔪ ᐅᒥᐊᓪᓚᒥᑦᓯᓂ ᐱᓇᓱᐊᕐᑕᐅᔫᑉ ᒥᕐᖑᐃᓯᕐᕕᓴᖓ ᑐᕐᓱᔪᖅ (*lac-Guillaume-Delisle-et-à-l'Eau-Claire*) ᖃᓪᓗᓈᑎᑐᑦ ᐅᔾᔨᕈᓯᖅ Richmond Gulf and Clear Water Lake ᐅᖑᒪᔾᔪᒥᐊᖃᕐᓂᒥᒃ ᓄᓈᒃ ᒪᕿᐃᒃ ᐋᓂᓇᕐᓯᑎᒃ ᓄᓇᐅᓂᒥᒃ: ᑕᓯᐅᔭᕐᔦᐊᑉ ᐱᖑᕐᒥᑦ ᐊᒻᒪᓗ ᑕᓯᐅᔭᕐᔦᐊᑉ ᐃᓇᓕᕐᒥᑦ. ᖃᐅᔨᓴᕐᕕᐅᔦᖅ (ᐊᑦᔨᖑᐊᖅ 1.1) ᓇᔦᑕᖓ ᓂᒻᒥᕐᓚᓃᑦᑐᖅ ᐅᒥᐅᔭᐅᑉ ᓄᓇᓕᖓᑕ. ᐅᑯᓇᓂ ᑰᓚᔫᕐᕕᐅᓲᖅ ᑕᓯᐅᔭᒧᑦ (*Lac-Guillaume-Delisle*) ᖃᓪᓗᓈᑎᑐᑦ ᐅᔾᔨᕈᓯᖅ Richmond Gulf ᑰᖓᓗᓗ ᐸᑎᕐᑐᐸ (*rivière Nastapoka*), ᖃᓪᓗᓈᑎᑐᑦ ᐅᔾᔨᕈᓯᖅ Nastapoka River ᑰᓚᔫᕐᕕᐅᓲᒧᒻᒥᓯᓂ ᐊᓯᕐᒥᓐᓂᑦ ᐱᔦᓂᑦ ᐋᓇᐊᖓᓂᑦ ᕿᓚᓗᓚᕐᓯᕕᐅᑉ ᑰᖓᑕ (*Petite rivière de la Baleine*) ᖃᓪᓗᓈᑎᑐᑦ ᐅᔾᔨᕈᓯᖅ Little Whale River.

ᓄᐃᑕᐅᔦᕕᓂᐅᑎᓪᓗᒍ ᐊᕐᒥᖃᑎᒋᒍᑎᒃ ᐃᓕᖓᔪᖅ ᐱᕙᓪᓕᐊᔭᐅᓂᕐᒥᓄᑦ ᒥᕐᖑᐃᓯᕖᑦ ᓄᓇᕕᒻᒥ, ᑲᑎᕝᕕᒃ ᓄᓇᓕᓕᒫᑦ ᑲᕙᒪᖓᑕ ᒥᕐᖑᐃᓯᕐᕕᓕᕆᔨᖓ ᑲᒪᒋᔭᖃᕆᐊᓕᒃ ᖃᐅᔨᓴᕐᓂᕐᖃᓗᓂ ᑐᑭᓯᒍᑎᑦᓴᓂᑦ ᐃᓅᖃᑎᒌᓐᓂᒧᓕᖓᔪᐃᑦ-ᒪᑭᑕᒐᓱᐊᕐᓂᓅᓕᖓᔪᐃᑦ ᖃᓄᐃᓕᖓᓪᓚᖓᑕ ᓄᓇᖁᑎᖓᓂ, ᓄᓇᖓᑕ ᖃᓄᐃᓕᖓᓂᖓᓂᒃ, ᐱᕿᑐᑕᕐᒥᑦ ᐃᓚᐅᒪᑎᓪᓗᒥᑦ, ᐃᓄᑦᑕᕐᒥᓪᓗ. ᑖᒃᑯᐊ ᐊᑐᐊᕋᑦᓴᑦ, ᐱᖁᔭᑎᒍᑦ ᐃᓕᑕᕆᔭᐅᕙᑦ ᖃᓄᐃᓕᖓᓕᕐᓂᕐᒥᓂᒃ ᑐᓴᕐᑎᓯᐅᑏᑦ, ᓄᐃᑕᐅᒍᑎᕐᒥᑦᑕ ᑲᑎᕐᓯᑕᐅᓂᕐᒥᑦᑕ ᐱᓇᓱᐊᕋᑦᓴᑦ ᑲᔦᓯᑎᑕᐅᓯᒪᑦᓯᑎᒃ ᑲᑎᕝᕕᒃ ᓄᓇᓕᓕᒫᑦ ᑲᕙᒪᖓᓄᑦ ᐱᓇᓱᐊᖃᑎᖃᕐᓯᑎᒃ ᐃᓄᕐᒥᓂᒃ ᐅᒥᐅᔭᕐᒥᐅᑦ, ᑰᑦᔪᐊᕐᕿᐱᒻᒥᐅᑦ ᕗᐊᐸᒪᑰᔅᑐᐃᒥᐅᑦ ᐃᓚᐅᒪᑎᓪᓗᒥᑦ ᐊᐳᕐᖁᕐᓴᓂᕐᒥᒃ ᖃᐅᔨᓴᕐᑏᑦ, ᒥᓂᔅᑕᖓᓄᓪᓗ ᒪᑭᑕᒐᓱᐊᕐᓂᓂᒃ ᐱᕙᓪᓕᐊᑎᑦᓯᓂᖅ, ᐊᕙᑎᓕᕆᓂᖅ ᒥᕐᖑᐃᓯᕐᕕᓕᕆᔾᔪᑎᓄᓪᓗ.

ᐃᓅᖃᑎᒌᓐᓂᑎᒍᑦ-ᒪᑭᑕᒐᓱᐊᕐᓂᑎᒍᑦ ᐋᕐᕿᓯᒪᓂᖏᑦ

ᒥᕐᖑᐃᓯᕐᕕᖓ ᑐᕐᓱᔪᖅ ᐱᓇᓱᐊᕐᑕᐅᓂᖓᓂ: ᖃᓄᐃᓕᖓᓕᕐᒪᖔᑦ ᑐᓴᕐᑎᓯᐅᑎᑕᖏᑦ (ᒥᕐᖑᐃᓯᕐᕕᓕᕆᓂᖅ ᖃᓄᐃᓕᖓᓕᕐᒪᖔᑦ ᑐᓴᕐᑎᓯᐅᑏᑦ) ᑐᑭᓯᓇᕐᑎᓯᔾᔪᖅ ᖃᓄᐃᓕᖓᓂᖏᓐᓂᒃ ᐃᓅᖃᑎᒌᓐᓂᑎᒍᑦ, ᐃᓗᕐᕿᓯᑎᒍᑦ ᐊᒻᒪᓗ ᒪᑭᑕᒐᓱᐊᕿᑎᕐᕐᓂᑎᒍᑦ ᓄᓇᕕᒻᒥ.

ᐃᓕᑦᓯᐅᒪᒥᓯᑎᒃ ᑲᕙᒪᑐᖅᑯᓄᑦ, ᑯᐯᒃ ᑲᕙᒫᒃᑯᖏᓐᓄᓗ, ᐃᓕᖕᒥᑦ ᓄᓇᓕᓕᒫᓂᒃ ᓄᓇᓕᓐᓂᓗ **ᐊᐅᓚᑦᓯᕖᑦ ᑎᒦᑦ** ᐊᐅᓚᑦᓯᕖᕐᑭᓇᑉᐱᔾᔭᑦ ᐊᑦᔨᒌᖕᖏᑐᑎᒍᑦ ᑲᒪᒍᓇᕕᖏᓯᑎᒃ ᓄᓇᓂᑦ ᖃᐅᔨᓴᕕᐅᕙᓂᒃ ᓴᓂᐊᓃᑦᑐᓂᓪᓗ. ᑖᒃᑯᓄᖓ ᑎᒥᓄᑦ ᐅᑯᐊ ᐃᓕᕆᔭᐅᕙᑦ ᒪᑭᕝᕕᒃ ᑯᐊᐳᓴᓐ, ᑲᑎᕝᕕᒃ ᓄᓇᓕᓕᒫᑦ ᑲᕙᒪᖓ, ᐅᒥᐅᔭᐅᑉ ᓄᓇᓕᖓ, ᑰᑦᔪᐊᕐᕿᐱᐅᑉ ᓄᓇᓕᖓ, ᕗᐊᐸᒪᑰᔅᑐᐃᒥᐅᑦ ᐊᓪᓗᑦ ᓄᓇᓕᖓ, ᐊᓐᓂᑐᕐᕕᒃ ᐊᒻᒪᓗ ᓴᒃᑯᖅ ᓄᓇᒥᒃ ᑎᒍᒥᐊᕐᑎᑯᑦ ᐊᒻᒪᓗ ᕗᐊᐸᒪᑰᔅᑐᐃ ᓄᓇᖃᕐᖃᑐᕕᓃᑦ. ᑖᒃᑯᐊ ᐊᐅᓚᑦᓯᔨᑦ ᑎᒦᑦ ᐃᓕᑕᓇᓴᐅᔪᑦ ᔪᒻᒥ V ᐊᒻᒪᓗ ᑯᐯᒃ ᑕᕐᕋᖓᑕ ᐊᕐᒥᖃᑎᒌᓐᓂᖓᓄᑦ, ᑖᒃᑯᓄᖓᓄᓐᖓᔪᓂᒃ ᐱᕐᑯᓴᓕᓇᔫᓄᓗ.

ᓄᓇᒧᑦ ᐊᑕᓐᓂᐅᒉᑦ ᐊᑑᑎᓴᐅᒥᐊᖅᓯᑎᒃ ᐃᓗᐊᓂ ᐊᒻᒪᓗ ᓴᓂᐊᓂ ᖃᐅᔨᓴᕐᑕᐅᔫᑉ ᓄᓇᐅᑉ ᑕᑯᔅᓴᐅᑎᑕᐅᔦᑦ ᓄᓇᖕᖑᐊᒥ 2.1ᒥ ᒥᕐᖑᐃᓯᕐᕕᐅᑉ ᐱᓇᓱᐊᕐᑕᐅᔫᑉ ᖃᓄᐃᓕᖓᓕᕐᒪᖔᑦ ᑐᓴᕐᑎᓯᐅᑎᓂ. ᑲᑎᑯᐃ I ᓄᓇᖁᑎᖓ ᐃᓚᐅᖕᒥᑲᓗᐊᕐᑎᓗᒍ ᖃᐅᔨᓴᕐᑕᐅᔦᒍᑦ ᓄᓇᒧᑦ, ᑲᑎᑯᐃ I–ᒥ ᓄᓇᖓ ᐅᒥᐅᔭᐅᑉ ᐃᓗᓐᓈᒍᑦ ᐊᑉᐸᕆᕐᑕᐅᓯᒪᔪᖅ

ᐱᓇᓱᐊᕐᑕᐅᔪᒧᑦ. ᑲᑎᑯᕆ II–ᒥᒃ ᐅᒥᐅᔭᐅᑉ ᑰᑦᔪᐊᕌᐱᐅᓪᓗ ᓄᓇᐅᑉ ᖃᐅᔨᓴᕐᕕᐅᔪᑉ ᐅᐊᓐᓂᖕᒐᓂᑦᑑᒃ, ᐃᓚᒥᔭ ᐅᒻᒥᑎᓪᓗᒥᒃ ᑕᓯᐅᔭᖅ, ᐸᑎᕐᑑᑉ ᑯᖕᒐᑕ ᐋᓇᐊᖕᒐᓗ. ᑲᑎᑯᕆ II–ᒥ ᓄᓇᕐᑯᑎᖕᒐ ᖁᐊᑉᒪᒍᔅᑐᐃ ᖃᓂᑕᕐᖃᕐᑯᖅ, ᑕᕐᕿᖕᒐᓃᑦᓯᓂ ᖃᐅᔨᓴᕐᑕᐅᔪᑉ ᓄᓇᐅᑉ ᑭᓪᓕᖕᒐᓂ, ᕿᓚᓗᓚᕐᓯᐅᕕᐅᑉ ᓄᓇᕐᑯᑎᖕᒐᓂ. ᑲᑎᑯᕆ II–ᒥ ᓄᓇᒥᒃ ᐅᒥᐅᔭ ᐅᑉ ᑰᑦᔪᐊᕌᐱᐅᓪᓗ ᐊᖕᒋᓃᒃ 3,738 ᑭᓚᒥᑕᓂᒃ ᐊᕙᑕᖕᒥᕐᑕᐅᒪᔪᖅ ᐅᕝᕙᓗᓐᓂᑦ 145 ᓗᐊᒥᒃ ᐊᖕᒥᓂᓕᒃ ᓄᓇᒥᒃ ᖃᐅᔨᓴᕐᑕᒥᒃ. ᑲᑎᑯᕆ III ᒥ ᓄᓇᕐᑯᑎᖕᒐ 865-ᒍᓇᐅᓚᓚᐅᕗᖅ (23,494 ᑭᓚᒥᑕ) ᓄᓇᐅᑉ ᖃᐅᔨᓴᕐᑕᐅᔫᑉ.

ᐆᒪᔪᕐᓯᐅᑭᓐᓇᓂᕐᒧᑦ ᐱᔪᓐᓇᐅᑎᖕᒋᑦ ᓄᓇᖃᕐᖄᓯᒪᔪᑦ ᓄᐃᑕᐅᓯᒪᕗᖅ ᔮᐢ V ᐊᒻᒪᓗ ᑯᐯᒃ ᑕᕐᕿᖕᒐᑕ ᐊᖕᒥᕐᖃᑎᒦᓐᓂᖕᒐᓄᑦ ᐊᒻᒪᓗ ᐱᕐᑯᔭᕐᓂ ᐃᓕᖕᒐᔪᓂᒃ ᐆᒪᔪᕐᓯᐅᑭᓐᓇᓂᕐᓄᑦ ᐃᕐᑲᓗᑦᓯᐅᑭᓐᓇᓂᕐᓄᑦ ᐱᔪᓐᓇᐅᑎᓄᑦ ᔮᐢ V ᐊᒻᒪᓗ ᑯᐯᒃ ᑖᕐᖁᒥᐅᑉ ᓄᓇᖕᒐᓐᓂ (R.S.Q., c. D-13.1). ᑖᒃᑯᐊ ᐱᔪᓐᓇᐅᑏᑦ, ᖃᓄᐃᓕᔭᐅᒥᐊᕿᓐᓇᕈᑦ ᒪᓕᒐᕐᓄᑦ ᓄᖕᒍᐃᓐᓇᑎᑦᓯᑌᓕᓂᕐᒧᑦ, ᐊᑑᑎᔭᐅᑦᓯᓂᓗ ᓄᓇᕕᓕᒫᒥ. ᐱᕕᖃᕐᑎᓯᔪᖅ ᐃᓄᓐᓂᑦ ᐊᓪᓚᓂᓪᓗ ᐆᒪᔪᕐᓯᐅᕿᓐᓇᓗᑎᑦ ᐃᕐᑲᓗᑦᓯᐅᕿᓐᓇᓗᑎᑦ ᒥᑭᒥᐊᕐ-ᓂᐊᕿᓐᓇᓗᑎᓗ, ᖃᓄᐃᑦᑐᑐᐃᓐᓇᓂᒃ ᐆᒪᔪᓂᒃ ᐃᕐᑲᓗᓐᓂᓗ. ᒥᕐᖑᐃᓯᕐᕕᐅᑉ ᓄᐃᑕᐅᓂᖕᒐ ᖃᓄᕐᓅᓃᑦ ᑖᒃᑯᓂᖕᒐ ᐆᒪᔪᕐᓯᐅᕿᓐᓇᓂᕐᓂᑦ ᐱᔪᓐᓇᐅᑎᓂᒃ ᐹᕐᓯᖕᒐᐅᑎᕐᖃᖕᖕᒋᑐᖅ.

ᐱᖕᒐᓯᐃᒍᕗᑦ ᐱᒻᒪᕆᑦ **ᓄᓇᐅᑉ ᐊᑐᕐᑕᐅᓂᖕᒐᓄᐊᖕᒐᔪᑦ** (ᐆᒪᔪᕐᓯᐅᓂᖅ ᓂᕆᔭᑦᓴᓂᒃ, ᓂᐅᕐᕿᑎᑦᓴᓂᒃ ᐊᒻᒪᓗ ᖃᐅᔨᓴᖁᑦᓴᓂᒃ) ᓄᓇᒥ ᖃᐅᔨᓴᕐᑕᐅᔪᒥ ᓴᓂᐊᓂᓗ. ᑖᒃᑯᐊ ᓄᓀᑦ ᓄᐃᑕᑎᑕᐅᔪᑦ ᓄᓇᖕᖕᒍᐊᓂ ᑭᑎᑦᔪᑎᓕᓐᓂ 2.2.ᒥ. ᐆᒪᔪᕐᓯᐅᓂᖕᒥᑦ ᓂᕿᑦᓴᓂᒃ ᐃᓄᐃᑦ ᐊᓪᓛᓗ ᖃᓄᑐᐃᓐᓈᖕᒥᑦᑐᑦ, ᐸᕐᓀᓯᒪᓂᕐᑕᕐᖃᕐᓯᑎᒃ, ᓯᓚᓗ ᒪᓕᑦᓯᒍ ᐊᑑᑎᔭᐅᔫᒍᑦᓯᑎᒃ. ᑭᖕᖕᒍᒪᒥᔭᖕᒥᑦ ᐱᒻᒪᕆᖕᑯᑎᒥᔭᐅᑦᓯᑎᓗ ᐃᓄᐃᑦ ᓂᕿᑦᓴᓯᐅᕐᓂᖕᒥᓐᓄᑦ ᐊᑐᕐᑕᐅᔫᑦ ᓄᓀᑦ, ᓇᓗᓇᐃᕐᑕᐅᓯᒪᕗᑦ ᓄᓇᓂ ᖃᐅᔨᓴᕐᕕᐅᔪᓂ ᐅᑯᓇᓃᑦᓯᑎᒃ ᐸᕐᓀᓯᒪᐅᑎᒻᒪᕆᑦ ᓄᓇᐅᑉ ᐊᑐᕐᑕᐅᓂᖕᒥᓐᓄᑦ ᑲᑎᕕᐅᑉ ᓄᓇᕐᑯᑎᖕᒐᓂ. ᐊᓪᓗᑦ ᐃᓚᑕᓇᔭᐅᒻᒥᔪᓂᒃ ᑌᑲᓂ ᓄᓇᓂ ᒥᑭᒥᐊᕐᓂᐊᕕᕐᑯᑎᕐᖃᕐᒥᔪᑦ. ᐊᑦᔩᖕᖕᒥᑐᑦ ᐃᓄᐃᑦ ᐊᓪᓗᓗ ᐆᒪᔪᕐᓯᐅᕕᖕᒥᑦ ᓄᐃᑕᑎᑕᐅᔪᑦ ᓇᓗᓐᓂᕐᑕᐅᓯᒪᑦᓯᑎᒃ ᓄᓇᖕᖕᒍᐊᓂ 2.2ᒥᑦ, 2.5ᒧᑦ. ᒪᑭᑕᒐᓯᐊᕐᓂᒧᓕᖕᒐᔪᓂᓕ, ᒪᕐᖁᕝᕚᑦ ᓯᑕᒪᐅᔪᖕᖕᒥᒐᕐᑐᑦ ᐃᓕᒫᓇᒐᖕᒐᔪᑦ ᖃᐅᔨᓴᕐᑕᐅᕕᒻᒥᐳᑦ, ᐊᒥᓯᐃᒧᑦᓯᑎᓪᓗ ᑲᒪᒥᔭᐅᔪᑦ ᐅᔭ ᖁᕐᓂᐊᕕᑦᓴᐅᓚᔭᕐᒪᖕᒐᑕ ᑕᓯᐅᔭᐅᑉ ᑕᕐᕿᖕᒐᓃᑦᑐᑦ ᐊᒻᒪᓗ ᑯᐯᒃ ᑲᕙᒪᖕᒐ ᐱᒥᐊᕐᑎᓯᓯᒪᑦᓯᓂ ᓇᐅᑦᓯᑐᕐᓂᒥᒃ ᐃᑯᒪᐅᑎᓕᐅᕐᕕᓴᐅᒍᓐᓇᖁᔭᕐᒪᖕᒐᑦ ᑯᓐᓄᑦ ᐊᐅᓚᑕᐅᔪᓂᒃ ᐸᑎᕐᑑᑉ ᑯᖕᒐᓂ ᑐᖕᖕᒐᕕᖃᕐᓯᑎᒃ ᐊᖕᒥᕐᖃᑎᒦᒍᑎᖕᒐᓂᒃ ᓴᓇᕐᕿᑎᒃ. ᑭᖕᒍᓪᓕᐹᒥ ᐃᓕᖕᒐᔪᖅ ᐋᑉᐳᖕᖁᔭᕐᓂᕐᓄᑦ ᖃᐅᔨᓴᕐᑐᓄᑦ, ᐊᑦᔩᖕᖕᒥᑐᑦ ᓄᓇᑦ ᖃᐅᔨᓴᕐᑕᐅᔫᑉ ᓄᓇᐅᑉ ᐃᓗᐊᓂ ᑲᒥᔭᐅᓂᖕᒋᒪᓯᒪᔪᑦ ᐋᑉᐳᖕᖁᕐᓯᓂᕐᓄᑦ ᖃᐅᔨᓴᕐᑎᓄᑦ ᐊᒥᓯᑦ ᐱᑦᔪᑎᐅᑎᓪᓗᒥᑦ ᐊᕐᖀᒍᓂᓗ ᐊᒥᓯᓂ ᑌᒣᒧᒪᓯᒪᓕᕐᓯᑎᓗ. 2007 ᐊᕐᖀᒍᖕᒐᑕ ᐃᓯᐊᓂ, ᑲᑎᕕᒃ ᓄᓇᓕᓕᒫᑦ ᑲᕙᒪᖕᒐ, ᒪᑭᕝᕕᒃ ᑯᐊᐳᔮᓴᓐ ᐊᒻᒪᓗ ᑕᕐᕿᒥ ᖃᐅᔨᓴᕐᓂᓂᒃ ᐱᓇᓱᕝᕕᖕᒐ ᓚᕚᓪ ᐃᓕᓐᓂᐊᕕᕐᔪᐊᖕᒐᓂᒃ (Centre d′études nordiques) ᖃᓪᓗᓈᑎᑐᑦ ᑌᔭᐅᔫᖅ Northern Studies Centre ᐱᓇᓱᐊᕐᖃᑎᒌᖃᑦᑕᕐᑯᑦ ᑲᑐᑦᔨᓯᑎᒃ ᖃᐅᔨᓴᕐᓯᑎᒃ ᓄᓇᕕᒻᒥ, ᐊᕐᕈᑎᖃᕐᓯᑎᒃ ᖃᐅᔨᓴᕐᕕᒃ ᐱᓇᓱᑦᑐᐃᑦ ᐱᑐᑦᓯᒪᐅᑎᖃᕐᕕᖕᒐᓂᒃ.

2001-ᒥ, **ᐃᓅᖕᒥᑦ** ᐅᒥᐅᔭᐅᑉ, ᑰᑦᔪᐊᕌᐱᐅᑉ ᐊᒻᒪᓗ ᖁᐊᑉᒪᑰᔅᑐᐃᑉ ᐅᓅᕐᓂᖃᕐᓯᒪᔪᑦ 350, 550 ᐊᒻᒪᓗ 780 ᑌᒫᒃ ᑐᖕᒐᓕᓐᓂᑦᓯᑎᒃ (ᒪᖕᒥᑦᑕᖅ 2.1). ᐃᓅᖕᒥᑦ ᑖᒃᑯᐊ ᓄᓇᖔᑦ ᐊᑦᔨᒥᔭᐅᖕᖕᒋᑐᑦ ᓄᓇᓕᐅᖃᑎᒥᓂᑦ ᑯᐯᒃ ᓄᓇᖕᒐᓃᑦᑐᓂ ᐅᕕᒃᑲᕝᕙᓘᓂᑯᖕᒋᓐᓄᑦ. ᓄᓇᕕᒻᒥ ᐱᓗᐊᕐᑐᒥ, ᐅᑭᐅᖃᕝᕙᓗᑦ 20-ᓂᒃ, 60%-ᒐᓕᖕᒍᕗᑦ ᐃᓅᖕᒥᑦ ᐅᑭᐅᓃᑦ 25 ᐊᑖᓂ. ᓄᓇᕕᒻᒥᓗ ᐃᓚᒦᑦ ᐊᒥᓲᓂᕐᐹᑦ ᑲᑎᒪᔪᑦ ᐅᓅᕐᓂᖃᕈᑦ 4.3 ᐃᓕᒃᑯᑎᕐᑐᓂᒃ ᐊᒻᒪᓗ 40% ᐅᖕᒐᑖᓄᑦ ᐃᓚᒦᑦ ᑲᑎᒪᔪᑦ ᐃᓕᒃᑰᑎᕐᑐᑦ ᑕᓪᓚᒪᕝᕚᓃᑦ ᐅᖕᒐᑕᓅᓐᓂᑦ. ᐃᓅᒃᑎᑐᑦ ᐅᖃᐅᓯᕆᔭᐅᕝᕙᓗᔪᒍᕗᖅ ᓄᓇᕕᒻᒥ ᓄᓇᓕᓐᓂ. ᐊᒥᓱᑦ ᐃᓄᐃᑦ ᖃᓪᓗᓈᑎᑐᑦ ᐅᕝᕙᓘᓐᓃᑦ ᒧᐃᒧᐃᑎᑐᑦ ᐅᖃᐅᒻᒪᕆᒃᑯᑦ.

ᓄᓇᕕᒻᒥ ᕿᓇᐅᔭᑎᒍᑦ ᒪᑭᑕᒐᓯᐊᑭᑎᑦᓴᖃᕐᓂᖅ ᐅᓂᑦᓯᒪᐅᑎᖃᓲᖅ ᐊᕝᕕᐊᓗᑕᐅᑎᓪᓗᒥᑦ ᓯᓚᐅᑉ ᐱᐅᓯᖕᒐ, ᐱᕕᑦᓴᑦ ᐃᕐᕌᑎᕐᓯᒪᓂᖕᒥᑦ ᐊᒻᒪᓗ ᓄᓇᐅᑉ ᐅᖕᒐᓯᑦᑕᖃᕐᓂᖕᒐ ᓂᐅᕕᕐᕕᓚᓐᓇᓂᒃ. 70%-ᖕᒥᑦ ᓄᓇᕐᑯᑎᖕᒐᑕ ᒪᑭᑕᒐᓯᐊᑭᑎᑕᖕᒥᑦ ᐱᒍᑦᓴᓂᐅᔪᓂᑦ ᐱᓯᒪᔫᑦ. ᐊᒥᓲᓂᕐᓯᑦ ᐱᓇᓱᒣᑦ ᐃᓕᒪᔪᑦ ᐃᓄᓕᓇᕕᓐᓂ ᐊᒻᒪᓗ ᐃᓄᐃᑦ ᑭᒡᒐᑐᕐᑕᐅᕕᖕᒥᓐᓂ (ᐋᓐᓂᐊᓯᐅᕐᓂᓕᓇᕕᒃ, ᐃᓕᓭᕐᓂᓕᓇᕕᒃ, ᐊᐅᓚᑦᓯᓂᓕᓇᕕᒃ), ᐊᒻᒪᓗ ᓇᒻᒥᓂᓇᔭᐅᔪᓂ ᓂᐅᕕᕐᕕᐅᔪᓂᑦ ᐱᒍᑦᓴᓂᐅᔪᓂᓗ, ᐆᒪᔪᓂᒃ ᐱᑦᓴᑦᓯᓂᓄᑦ ᐊᒻᒪᓗ ᓴᓇᕕᓐᓂ. ᐃᓄᐃᑦ ᐃᑲᔪᕐᓯᔭᐅᒍᑎᒥᓕᕿᔫᖕᒥᑦ ᕿᓇᐅᔭᑎᒍᑦ ᐱᓯᒪᔫᒍᓪᒥᔪᑦ ᐱᑦᓴᑦᓯᕕᓂ ᓄᓇᕕᒻᒥ (ᐅᔭᖁᕐᓂᐊᓂᖅ ᐊᒻᒪᓗ ᐃᑯᒪᐅᑎᖃᕐᓂᖅ) ᑖᓐᓇᓗ ᐱᓕᕐᕿᑎᑦᓯᓯᖕᒍᓂᕐᓭᑦ ᐱᕝᕙᓕᐊᑎᑦᓯᑦᓯᓂᒃ ᐊᒻᒪᓗ ᒪᑭᑕᒐᓯᐊᑭᑎᓭᑦ ᑯᐯᒥᐅᓄᑦ ᐊᓯᖕᒥᓈᕝᕙᓗᓯᑎᒃ. ᐃᓚᒥᔭᐅᔫᒧᒥᔪᑦ, ᑌᒣᑦᑐᐃᑦ ᐱᓇᓱᒣᑦ ᓄᓇᒥᒃ ᐆᒪᔪᓐᓂᓗ ᓯᒃᑯᐃᕝᕙᓕᐊᔪᑦ, ᒪᕿᐃᒃ ᑖᒃᑯᑐᐊᓕᓐᓂᒃ ᐃᓄᐃᑦ ᐃᓅᒍᓯᑐᐊᓕᓇᒥᒃ. ᑕᑯᔭᑐᑐᓕᓇᓂᑎᒍᑦ ᕿᓇᐅᑦᔭᖁᓯᐊᕐᓂᖅ ᐱᒪᓇᕐᑯᑎᒥᔭᐅᒪᔪᖅ ᓄᓇᒥ ᒪᑭᑕᒐᓯᐊᑭᑎᑦᓴᓂᒃ ᐱᕕᑦᓴᐅᓚᔭᕐᓯᑎ. ᑕᒐᑕᒐ, ᐃᓘᓐᓇᑲᓅᖕᒥᑦ ᒪᕐᖁᕝᕚᕐᖃᕐᑎᓯᓂᕐᒥᕐᑯᑦ, ᑐᑦᑐᓯᐅᕐᑎᓯᓂᖅ ᓯᕗᓪᓕᐸᐅᑎᓗᒍ, ᑐᖕᒐᓕᐅᑎᓪᓗᒍ ᐋᓈᓯᐅᕐᓂᖅ, ᐃᖃᓗᒃᐱᓯᐅᕐᓂᖅ ᖄᒪᓯᐅᕐᓂᓗ. ᑭᓯᐊᓂ, ᐊᒥᓲᒥᕗᑦ ᓄᐃᑕᐅᕝᕙᓕᐊᑦ ᐊᕝᕕᑎᒥᒃ ᓯᒃᑯᐃᓕᕿᐅᑕᐅᓂᐅᔭᖕᖕᒥᑐᑦ ᐃᓗᕿᓯᒧᓕᖕᒐᔪᐃᓪᓗ

ᑕᑯᔅᑐᑐᓂᒃ ᐊᑭᓖᑎᑦᓯᒍᑕᐅᒍᓐᓇᓯᑎᒃ (ᕿᒪᑦᓯᑎᑦᓯᓂᖅ, ᖃᒧᑎᑳᓚᑎᑦᓯᓂᖅ, ᖃᔭᕐᑐᑎᑦᓯᓂᖅ, ᐅᒥᐊᕐᑐᑎᑦᓯᓂᖅ, ᖃᔭᖓᐊᕐᑐᑎᑦᓯᓂᖅ, ᐃᔪᕐᐳᓯᓂᒃ ᑕᑯᓐᓇᑎᑦᓯᓂᖅ, ᐆᒪᔪᓂᒃ ᑕᑯᔅᑐᑎᑦᓯᓂᖅ, ᐊᓯᖏᓪᓗ) ᓇᓗᓀᕐᑕᐅᓯᒪᔪᑦ ᓯᕗᓂᕐᒥ ᐱᕙᓪᓕᐊᑎᑦᓯᐅᑎᑦᓴᐅᑎᓪᓗᒥᑦ ᓄᓇᕕᒻᒥ ᓄᓇᓖᓐᓂ. ᒥᕐᖑᐃᓯᕐᕕᓂ ᓱᖃᑦᓯᒍᑎᐅᓱᑦᓴᖃᑦ ᐊᑦᔨᐸᓱᖃᕐᐳᑦ ᑖᒃᑯᓂᖓ ᐃᑲᔪᕐᓯᓚᖓᑦᓱᑎᓗ ᓄᓇᕐᑯᑎᖓᑕ ᑕᑯᔅᑐᑕᐅᓂᑦᓴᖓᓂᒃ.

ᐊᕙᑎᐅᑉ ᐋᕐᕿᓯᒪᓂᖓ

ᐃᓚᒥᔭᐅᕗᖅ ᒥᕐᖑᐃᓯᕐᕕᐅᓚᕿᐅᑕᐅᑦᓯᓂ ᐅᖑᒪᔭᐅᒥᐊᕐᑳᓂᖏᑦ ᓄᐃᑖᓚᓇᑦᑎᒥᐊᕐᔪᒥᔪ ᐊᑦᔨᖃᖏᒃᑐᑦ, ᑕᑯᓚ-ᐅᕐᓯᒪᓇᖏᒃᑐᓛ ᓄᓇᐅᑉ ᐋᕐᕿᓯᒪᓂᖏᑦ. ᐅᑯᓪᒪᑦ, ᑲᔪᓯᔪᓂ ᑭᓯᐊᓂᐅᓰᒍᑦᓯᓂ ᒥᕐᖑᐃᓯᕐᕕᓕᐅᓚᖓᔪᑎᒃ ᐸᕐᓂᑐᓄᑦ ᐃᓚᒥᔭᐅᒥᐊᕐᑳᓰᒍᓪᒥᔪᖅ ᓇᓗᓀᕐᑐᐃᓂᖅ ᐋᓚᓯᒪᔪᖕᖏᒍᓂᔪ ᑖᒃᑯᓂᖓ. ᑖᒃᑯᐊ ᐃᓚᖏᑦ ᒥᕐᖑᐃᓯᕐᕕᓕᐅᕐᓂᒍᑦ ᐱᓇᓱᐊᕐᓃ ᖃᓄᐃᓕᖓᓕᕐᒪᖕᖏᑦ ᑐᓴᕐᑎᓯᐅᑏᑦ ᑲᒥᔭᕐᑳᕐᑐᑦ ᐱᔪᐊᕐᑐᒥᒃ ᓄᓇᐅᑉ ᐋᕐᕿᓯᒪᓂᖓᓂᒃ ᖃᐅᔨᓴᕐᕕᐅᔪᒥ. ᐃᓚᐅᑎᓪᓗᒥᑦ ᓇᓗᓀᕐᑐᑕᐅᓂᖏᑦ ᓯᓚᐅᑉ, ᓄᓇᐅᑉ ᓱᓇᑦᑳᕐᓂᖓᑕ, ᓄᓇᐅᑉ ᐅᔭᖁᖏᑦᑕ ᖃᓄᐃᓕᖓᓂᖏᑦ, ᓄᓇᐅᑉ ᓯᓚᕐᔪᐊᒧᑦ ᐃᓚᒥᔭᐅᑦᓯᓂ ᐱᐅᓯᖏᑦ ᐋᕐᕿᓯᒪᓂᖏᑦ ᐊᒻᒪᓗ ᐃᒪᖏᑦᑕ ᖃᓄᐃᓕᖓᓂᖏᑦ.

ᓯᓚᕐᔪᐊᖅ ᓂᑉᐱᑦᓯᐸᓪᓕᐊᓚᐅᕐᐊᕐᑎᐅᒍ, ᓄᓇᕕᐅᑉ **ᓯᓚᖓ** ᐅᑯᑦᑐᓴᓐᓇᖅ ᐃᑦᔨᓕᒪᓐᓂᖅ ᐋᒃᑮᓇᕐᓯᓂ ᐊᕐᕿᒍᓕᒫᒥ ᓯᕿᓐᓂᓯᐊᓲᒍᖕᖏᓂᕐᒥᓄᑦ ᐊᒻᒪᓗ ᓯᓚᕐᔪᐊᑉ ᑲᑦᔨᖓᓂᑦ ᐱᔪᒧᑦ ᐊᓄᓇᔭᐅᖏᓐᓇᓂᑯᒥᓄᑦ. ᖃᐅᔨᓴᕐᕕᐅᔫᑉ ᓄᓇᐅᑉ ᐊᖏᓂᖓ ᑐᑭᓯᓐᓇᒃᑫᔪᖅ ᐊᑦᔨᒌᖕᖏᑐᓂᒃ ᓯᓚᐅᑉ ᐱᐅᓯᓇᓱᖏᓐᓂᒃ ᖃᐅᔨᓴᕐᕕᐅᔫᑉ ᓄᓇᐅᑉ ᐊᑦᔨᒌᖕᖏᓂᖏᓐᓄᑦ: ᓯᑦᔭ, ᓄᓇᑐᐃᓐᓇᖅ (ᓇᕐᓴᑦ ᖃᕐᖄᔪᐃᓪᓗ), ᐊᒻᒪᓗ ᑕᓯᖅ ᐊᓪᓗᑦ ᖃᓯᒥᐊᓕᖓ.

ᐅᑭᐅᒥ ᕿᓚ ᓄᕙᔭᖃᑦᓯᐊᓲᒍᖕᖏᑐᖅ ᕿᓚᐅᑉ ᖁᓖᒥᐊᓪᓚᖓ ᐅᑐᓕᖓᑦᓴᓇᕙᓪᓗᓱᒍᒻᒪᑦ. ᓯᑯᓯᒪᕙᓂᖓ ᑕᓯᐅᔅᔭᕐᔪᐊᑉ ᐅᒫᒃ ᕿᓚᐅᑉ ᖁᓖᓂᒥᐊᓪᓚᒃ ᐅᑐᓕᖓᑯᑖᓚᕿᓱᒍᑎᓪᓗᒍ, ᑭᓯᐊᓂ ᑕᓇᐅᑉ ᓯᓚᒥᒃ ᐊᓯᑦᔩᓯᒪᒍᓐᓇᓂᖓᓂᒃ ᐊᕝᕕᐊᕿᓐᓇᒥᔪᖅ. ᐊᓄᓈᑦ ᑲᑎᕐᓯᓯᒪᔪᑦ ᐅᐊᓐᓂᒥᑦ ᐱᑦᓯᑎᒃ ᐊᓄᓇᕐᔪᐊᓇᖕᖏᑐᓂᒃ ᐊᑦᔭᓯᓲᑦ (ᐋᒃᑮᓇᕐᑐᒥᒃ, ᐸᓂᕐᑐᒥᒃ ᐊᒻᒪᓗ ᐊᓄᓇᒥᒃ). ᓂᑉᐱᑦᑐᖅ ᐊᓄᓇ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᑯᓪᓚᑦ ᖁᓖᓂ, ᑕᑦᓯᓚᕿᒃᑫᒍᓐᓇᒥᑎᓪᓗᒍ. ᐊᐅᔭ ᑭᑦᑐᖅ ᐊᒻᒪᓗ ᕿᓚᐅᑉ ᖁᓖᒥᐊᓪᓚᖓᓂ ᓂᒪᕐᓃᑦ ᓯᓚᒥᒃ ᐊᓯᑦᔨᑲᑦᑕᐅᑭᑕᐅᓰᑦ. ᓯᑯᐊᔪᒃ ᐊᐅᒪᑦ, ᐃᒪᖓ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓂᑉᐱᑦᓯᓂᕐᓴᐅᓰᖅ, ᐅᒪ ᓯᑦᔭᓕᒫᖅ ᑕᑦᓯᑲᑦᑕᓂᐊᓕᕐᒪᑦ. ᐅᑭᐊᑲᐱᓰᖅ ᐅᑭᐊᑦᓴᐅᓕᕿᒥᑐ ᐅᓐᓄᐊᒥ ᓯᑯᑦᑕᓯᑦᓯᓂ. ᑕᓯᐅᔭᕐᔪᐊᖅ ᓃᕕᒪᐱᓇ ᐱᒥᐊᕐᖃᒥᐅᑎᓪᓗᒍ ᓯᑯᕙᓪᓕᐊᓯᓰᖅ, ᕿᓚᐅᑉ ᖁᓖᒥᐊᓪᓚᑦᑕ ᖃᐅᓯᕐᓇᖓ ᐊᒻᒪᓗ ᖃᓐᓃᑦ ᐃᑯᓪᓚᑎᑦᓯᒥᑦ. ᐊᓯᐊᒥᒻᒥᔭᖓᓂᒃ ᓯᓚᖓ ᐱᐅᓯᖃᓰᖅ ᑕᓯᐅᔭᕐᒥ ᓴᓂᖓᓂᓗ; ᖃᕐᖄᓗᖏᑦ ᓄᕙᓚᑳᓗᑦ ᐳᕐᑐᔫᓚᒥᒃ ᐅᕐᖁᐊᓕᓈᕐᑕᐅᑎᑦᓯᓯᑦ ᐋᒃᑮᓇᕐᑐᒥᒃ ᐊᓄᓇᓕᕐᒪᑦ ᑕᓯᐅᔭᕐᔪᐊᓕᒫᒥ ᐊᒻᒪᓗ ᐅᕐᖁᐊᓕᓈᒍᓯᒍᒪᑦ ᓯᓚᖓ ᐅᒫᕿᓗᖕᖏᓂᕐᓴᐅᓂᐊᓕᕐᒪᑦ.

ᐊᕐᕿᒍᓕᒫᒥ ᑲᑎᕐᓯᑕᐅᔪᓂᒃ ᐊᑯᓐᓈᕐᑲᓰᖅ ᓂᓪᓕᓇᕐᓂᕗᕐᑲᕐᓯᓂ ᖃᐅᔨᓴᕐᕕᐅᔪᖅ ᓄᓇᒃ -5°Cᒥᒃ ᓄᓇᕙᓯᖓᓂ ᓄᓇ ᓂᓪᓕᒪᓂᕐᓴᐅᕙᓪᓗᓱᒍᑎᓪᓗᒍ ᓯᑦᔭᒥᒃ (ᐊᑦᔨᖑᐊ 3.1). ᖃᐅᔨᓴᕐᕕᐅᔪᖅ ᓄᓇ ᓄᓇᐅᑉ ᐊᑖᖓᑎᒍᑦ ᐊᐅᓯᐃᑦᑐ-ᑦᓴᕐᒥᔪᖅ. ᐊᓪᓗᑦ ᖃᓯᒥᐊᓕᖓᑕ ᓄᓇᖓ, ᐊᕐᕿᒍᑕᓖᑦ ᓯᓚᓗᑐᕕᓂᐅᒍᓐᓇᑐᖅ 600-ᒥ 650-ᒪᒪ ᕙᓪᓗᓂᒃ, ᑕᓯᐅᔭᕐᔪᐊᓕ ᓯᑦᔭᖓ ᓯᓚᓗᑦᓴᖃᕙᓪᓗᓱᒍᑎᓪᓗᒍ 600 ᒪᒪ ᕙᓪᓗᓂᒃ. ᖃᓐᓂᐅᓯᑎᒃ 37% ᑲᑕᒪᓱᖅ ᐊᕐᕿᒍᑕᓖᑦ ᓯᓚᓗᑦᓴᕕᓂᐅᑦᓯᑎᑦ.

ᐃᒪᖅ ᑕᕐᓯᓂ ᖃᐅᔨᓴᕐᕕᐅᔪᓂ ᓄᓇᒥ ᓯᑯᓱᖅ ᓅᕕᒻᐱᓇ 1-ᐅᓚᐅᕐᑎᓇᒍ ᓯᑯᐃᓱᒍᑦᓯᓂᓗ ᔪᓂᒥ. ᑕᓱᑦ ᓯᑯᓯᒪᓱᒍᖕᖏᑐᑦ 130-ᐆᑦ ᐅᓪᓗᐃᑦ ᒥᑦᓴᓂ ᐊᕐᕿᒍᑕᓖᑦ. ᑕᓯᐅᔭᖅ ᑎᓯᒻᐱᓇᐅᑉ ᕿᑎᖕᒐᓂᑦ ᔫᓂᐅᑉ ᕿᑎᖕᒐᓄᑦ ᓯᑯᓯᒪᓂᕐᑲᓱᖅ ᐊᕝᕕᑭᓐᓂᖓᖅ ᑕᓯᕐᓂᑦ ᓴᓂᐊᓃᑦᑐᓂᑦ. ᓯᑯᓯᒪᓂᖓ ᓀᓐᓂᓴᐅᓚᕿᓲᖅ ᐱᑦᔪᑎᐅᑎᓪᓗᒥᑦ ᐆᑦᑑᑎᒥᓗᒥᑦ ᐅᓕᑦᑕᓃᑦ ᑎᓂᑦᑕᓃᑦ, ᑑᕝᕕᐅᓯᓂ ᑐᑦ ᐃᓗᓕᖕᒥᓐᓄᑦ ᑕᓯᐅᔭᖅ, ᐊᐅᓚᓂᕐᒥᓐᓄᓗ, ᐃᒪᐅᓪᓗ ᑕᓇᐅᒍᓂᕐᓴᐅᓂᖓᓄᑦ, ᐅᑲᓂᓗ ᓯᓚᐅᑉ ᐊᑦᔨᒥᔭᐅᖕᖏᓂᐊᐱᖓᓄᑦ. ᐃᒪᖅ ᓱᖑᔫᑦᓯᓂ ᓄᕐᑲᐃᑦᑐᓯᓂᓗ ᓂᓪᓕᓂᖃᕐᒪᑦ ᑎᑭᑦᓯᒍ ᑕᓯᐅᔭᐅᑉ ᑐᕐᓯᔪᖓ, ᑕᒪᒥᓐᓄᒃ ᐱᑐᑦᓯᒪᔭᐅᔪᖅ ᑕᓯᐅᔭᕐᒧᑦ ᑕᓯᐅᔭᕐᔪᐊᒧᓗ, ᓯᑯᓈᕐᓂᓴᐅᑎᑦᓯᓲᖅ ᑖᑦᓯᒥᖓ ᑕᓯᐅᔭᒥᒃ. ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᑦᔭᖓ ᓯᑯᕙᓪᓕᐊᓯᓲᖅ ᑎᓯᒻᐱᓇᐅᑉ ᕿᑎᓚᖕᖓᓂ ᐊᐅᑉᐸᓪᓕᐊᓯᑦᓯᓂᓗ ᓯᑯ ᐃᕗᓯᑦᓯᓂ ᔪᓗ ᕿᑎᖕᒐᓂ. ᐃᑦᔪᓂᕐᑲᓱᖅ ᓯᑯ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᑦᔭᖓᓂ 1.5 ᒥᑦ ᒥᑦᓴᓂ.

ᐃᓕᖓᔪᓪᓕ **ᓄᓇᐅᑉ ᖃᓄᐃᓕᖓᓂᖓᓄᑦ** ᐅᕙᓗᓐᓃᑦ ᓄᓇᒦᑦᑐᑦ ᖃᕐᖁᑦ ᐃᒣᑦ ᓄᓂᑦ ᖃᓄᐃᓕᖓᓂᖏᓐᓄᑦ, ᖃᐅᔨᓴᕐᕕᐅᔪᖅ ᓄᓇ ᐊᕙᓗᔭᐅᒪᕗᖅ ᓄᐃᑦᕕᐅᔪᖅ ᒪᕐᑭᐃᓄᑦ ᑯᕙᒻᒥ ᓄᓇᐅᑉ ᖃᓄᐃᓕᖓᓂᖏᓐᓄᑦ: ᑕᓯᐅᔭᕐᔪᐊᒥ ᖃᕐᖁᑦ ᐱᖑᐃᑦ ᐊᒻᒪᓗ ᑕᓯᐅᔭᕐᔪᐊᒥ ᐃᓐᓇᓖᑦ. ᐅᑯᑦᑐᓴᔭᐅᓂᖓ ᑎᑭᓪᓚᓯᒪᔪᖅ ᐅᖓᕙᐅᑉ ᐱᖑᖏᓐᓄᑦ (ᓄᓈᕐᖑᐊᖅ 3.1).

ᑕᓯᐅᔭᕐᔪᐊᑉ ᐱᖑᖏᑦ ᓄᓇᐅᑉ ᐋᕐᕿᓯᒪᓂᖓ ᐊᕙᓗᔭᐅᒪᔪᖅ ᓄᓇᐅᑉ ᖃᐅᔨᓴᑦᑕᐅᔫᑉ ᓇᔪᕐᑕᓕᒫᑲᓵᖓᓂᒃ. ᐳᑭᓕᕙᓪᓕᐊᕋᐱᑦᑐᑦ ᑕᓴᒧᖓᓂᑦ ᐅᐊᓐᓂᖓᓄᑦ ᑕᓯᐅᔭᕐᔪᐊᒧᑦ ᐊᒻᒪᓗ ᑭᓯᒪᑦᓴᐅᖏᑦᑐᓂᒃ ᖁᓐᓈᑦᑲᕐᓯᓂ

ᓇᑲᑎᕐᓂᑯᑦᑕᖃᕐᓯᓂᓗ ᑌᒣᑎᑕᐅᔪᓂᒃ ᓱᔪᑉᐸᓕᐊᓂᕐᒧᑦ ᑰᓚᔫᓄᓗ. ᐱᖑᐃᑦ ᐳᕐᑐᓂᖃᕙᓪᓗᑦ 300 ᒥᑕᓚᑖᓂᒃ. ᐱᖑᐃᑦ ᑕᑯᑦᓴᐅᒍᑎᑖᑦ ᐊᑦᔨᒦᖅᖅᒥᓂᖃᕐᓯᑎᒃ ᒪᕐᕈᐃᓂᒃ: ᑕᓯᖅ (lac Loups Marins) ᓄᓇᖓ, ᐊᓪᓚᑦ ᖃᓯᒥᐊᓕᖓ ᑕᓯᖓᑕ ᓄᓇᖓ. ᐱᐅᓯᖓ (lac à l'Eau Marins) ᐃᓕᑦᑕᕐᓇᕈᑎᖃᕐᒥᔪᖅ ᐊᒥᓱᐃᓂᒃ ᑕᓯᕐᑦᑕᖃᕐᓯᓂ, ᐅᓄᕐᓂᓴᓪᓗ ᑖᒃᑯᓇᓂ ᐊᖏᓂᖃᕐᓯᑎᒃ 100 ᑭᓗᒥᑕ ᐅᖓᑖᓂ ᐊᒻᒪᓗ ᐊᖏᔪᕐᓚᓂᒃ ᖁᕐᑐᓂᒃ ᒪᓂᕿᐅᓂᕐᐸᐅᔫᕐᑐᓂᒃ ᑕᑯᑦᓯᒍ ᓄᓇᐅᑉ ᖃᖅᖃᖅᒥᑦᑕ ᓄᓇᖅᒥᑦᑕ ᐊᑦᔨᒦᖅᖅᒥᓄᖅᒥᓐᓄᑦ. ᐊᓪᓚᑦ ᖃᓯᒥᐊᓕᖓᑕ ᓄᓇᖓ ᖃᖅᖃᓂᒃ ᐳᕐᑐᓂᕐᐹᖃᕐᒥᔪᖅ ᓄᓇᒥ ᖃᐅᔨᓴᕐᐱᐅᔪᒥ. ᓄᓇᐅᑉ ᐋᖅᑭᓯᒪᓂᖓ ᐊᑦᔨᒦᖅᖅᒥᐅᑎᓕᒃ ᓄᓇᑕᖓ ᑰᓚᔫᓂᑦ ᐃᒃᑲᓐᓂᑦ ᓂᕈᑭᑦᑑᓂᓪᓗ ᓇᕐᓴᓂᑦ ᐱᑕᕐᑲᕐᒪᑦ. ᖁᕐᑐᐃᑦ ᒪᓂᕿᕐᑐᐃᑦ ᐊᒥᓲᓂᕐᓴᑦ ᓇᕐᓴᓂ ᐊᒻᒪᓗ ᒪᓂᕿᖅᖅᒍᓯᒪᑦᓯᑎᒃ ᐅᔭᕿᓪᓚᓇᑦ ᕐᑯᑖᖅᒥᑎᒍᑦ ᓇᓂᑐᐃᓈᓐᑐᑦ. ᑌᒣᓚᓗᐊᕐᑎᓗᒍ, ᐊᒥᓯᑦ ᕐᑯᕐᓗᑐᐃᑦ ᓴᕐᕙᓗ ᖁᕐᑑᑉ ᓴᓇᒪᓂᖓᓂᒃ ᒪᓕᑦᑐᑦ ᓇᕐᓴᑦ ᑰᖅᒥᓐᓂ. ᑕᓯᖓᓂ ᐊᓪᓚᑦ ᖃᓯᒥᐊᓕᖓᑕ ᕿᑎᖓᓂ ᐅᐊᓐᓂᖓᓕᖑᑦᑐᑉ, ᓂᒡᒥᒥᑦ-ᐅᐊᓐᓂᕐᔪᐊᖓᓕᔪᑦ ᑕᑭᔪᐃᑦ ᕿᑭᕐᑌᑦ ᐊᒻᒪᓗᑭᑕᐅᓕᖓᓕᔪᑦ. ᒪᕐᕈᒃ ᐃᑎᕐᓵᒃ ᓇᓗᓄᒃᑯᑕᑖᒃ ᐊᒥᓯᒻᒪᓇᓐᓂᒃ ᕿᑭᕐᑖᕈᕐᓂᑦ.

ᑕᓯᐅᔫᕐᔪᐊᒥ ᐃᓐᓇᑖᑦ ᐅᖓᓯᓐᓂᑖᑦ 650 ᑭᓗᒥᑕᓂ ᓯᑦᔫᖓᓂ ᑕᓯᐅᔫᕐᔪᐊᑉ ᐱᒥᐊᕐᓯᑎᑦ ᓄᓇᑐᐃᓐᓇᒧᑦ, ᑰᑦᔪᐊᕞᐱᐅᑉ ᐃᓄᑦᔪᐊᓗ ᐊᑯᓐᓂᖓᓂ, ᓄᓇᑐᐃᓐᓇᒥᓕ ᒥᑭᓕᕙᓪᓕᐊᔪᑦ ᓄᖑᑐᐃᓐᓇᕋᑕᕐᓯᑎᑦ ᐅᒥᐅᔭᐅᑉ ᑕᕐᕋᖓᓂ. ᐃᓐᓇᑖᑦ ᑕᓯᐅᔭᐅᑉ ᐅᐊᓐᓂᖓᓂ, ᐅᒥᐅᔭᐅᑉ ᑐᕐᓯᔪᕐᓗ Goulet ᐊᑯᓐᓂᖓᓂ, ᖃᐅᔨᓴᕐᑕᐅᔪᒧᑦ ᐃᓕᒥᔭ ᐅᖅᖅᒥᑲᓗᐊᕐᓯᑎᒃ ᐃᓂᕐᑯᓇᓪᓚᓈᑦᑐᑦ. ᐊᑕᑯᑖᕐᑐᑦ, ᒪᔪᕐᕐᑲᓚᑖᒍᑦᓯᑎᒃ ᐅᔭᕋᕐᑕᖅᒥᑦ ᐊᑭᓐᓇᖅᒥᑦᑕ ᐊᑦᑕᑦᓯᐊᕋᑎᒃ ᐊᒻᒪᓗ ᖀᖅᒥᑦ ᓯᑎᔩᑦᓯᑎᒃ. ᐃᓐᓇᑖᑦ ᐅᓄᕐᓂᓴᑦ ᐳᕐᑐᓂᖃᕙᓪᓗᑦ 300 ᒥᑕᓂ, ᕿᖅᓖᓗᑉ ᖃᕐᖃᖓ ᐳᕐᑐᓂᖃᕐᑎᓗᒍ 420 ᒥᑕᓂᒃ. ᐃᓐᓇᑖᑦ ᑌᒣᑕᐅᓯᒪᔪᑦ ᓱᔪᑉᐸᓕᐊᓂᖅᒥᓐᓄᑦ ᓄᓇᐅᑉ ᓂᒪᕈᐊᕐᓂᕚᓃᑦᑐᑦ, ᑕᑯᑦᓴᐅᑎᑦᓯᓚᕐᑭᓯᑦᓯᑎᒃ ᓄᓇᐅᑉ ᐋᕐᑭᓯᒪᓂᖓᑕ ᐊᑦᔨᐅᖅᒥᓐᓂᖅᒥᓐᓂᒃ. ᓂᒡᒥᒧᑦ ᕿᖅᖅᓚᓂᖅᒥᑦ ᑲᑕᑲᓪᓚᕐᑯᑦ ᓅᑦᑑᓯᑎᒃ ᑐᓄᖅᒥᓪᓕ ᐅᐊᓐᓂᕐᔪᑦ ᕿᖅᖅᓚᔪᑦ ᐳᒃᑭᓕᕙᓪᓕᐊᓚᐅᑕᕐᑎᓗᒥᑦ (ᐊᑦᔨᖑᐊᖅ 3.5). ᓄᓇᐅᑉ ᐃᓕᖅᒥᑦ, ᐆᑦᑑᑎᒥᓗᒍ ᕿᓗᓗᓚᕐᓯᐅᕕᒃ, ᑲᔪᕐᑐᐃᑦ ᑰᖓ (rivière Kajurtuit) ᑐᕐᓯᔪᕐᓗ ᐊᓂᑰᑎᓯᒪᔾᔪᑦ ᐃᓐᓇᓕᑎᑰᕐᓯᑎᒃ ᑯᒍᑦᓯᑎᑦ. ᑐᕐᓯᔪᖅ ᐱᑐᑦᓯᒪᑎᑦᓯᔪᖅ ᑕᓯᐅᔭ ᒥᒃ ᑕᓯᐅᔫᕐᔪᐊᒧᑦ. ᑰᑯᑖᖅ ᕐᑯᑭᑦᑑᓯᓂ ᐃᓈᕈᕐᑲᕐᓯᓂ 200 ᒥᑕᓂᒃ ᐳᕐᑐᓂᓐᓇᓂᒃ. ᑕᓯᐅᔭᖅ ᐃᒪᕐᑕᕐᑲᕐᑎᓯᔪᖅ ᓄᓇᒥᒃ ᑲᑕᓐᓂᑯᒥᒃ. ᑖᓇ ᑲᑕᓐᓂᑰᒍᑎᓕᒃ ᓇᓄᓅᓇᐊᕐᓗᒍ, ᓄᓇᐅᑉ ᓯᓇᕐᕈᑎᖓ ᑲᑦᑕᓯᒪᔪᖅ. ᓄᓇ ᑲᑦᑕᓯᒪᔪᖅ ᐳᕐᑐᓂᖃᕐᐳᖅ 200 ᐊᒻᒪᓗ 300 ᒥᑕᓂᒃ ᐊᑖᓂ ᐃᒪᕐᑕᖃᖅᖅᒥᑑᕕᖅᒥᓐᓂ ᑕᓯᐅᔫᕐᔪᐊᑉ ᐱᖑᖅᒥᑦᑕ. ᐊᑦᑐᐊᖃᑦᑕᐅ-ᑎᓂᖅᒥᑦ ᐱᖑᐃᑦ ᐊᒻᒪᓗ ᓄᓇᐅᑉ ᑲᑦᑕᓐᓂᑯᖅᒥᑦ ᐃᓕᑦᑐᕐᓇᕈᑎᖃᕐᐳᑦ ᐊᑭᓐᓇᓂᒃ ᐳᕐᑐᔪᓂᒃ ᐅᖓᑖᖅᒥᑦ ᑲᑉᐸᓕᐊᓂᖅᒥᑦ ᓇᕐᑭᓕᕙᓪᓕᐊᓂᖃᕐᓯᑎᒃ.

ᑭᖑᓪᓕᒥᓕ, ᐅᖓᕙᐅᑉ ᐱᖑᖅᒥᑦᑕ ᓄᓇᖓ ᐊᕙᓗᔭᐅᒪᔾᔪᖅ ᐅᐊᓐᓂᖓᓂᒃ ᐸᑎᕐᑑᑉ ᑰᖓᑕ ᐃᑎᕐᓴᖓᓄᑦ ᑎᑭᑦᑐᓂᒃ. ᑖᓇ ᐃᑎᕐᓴᖅ ᐃᓕᑦᑐᕐᓇᕈᑎᓕᒃ ᐃᒃᑲᓐᓂᒃ, ᐊᒻᒪᓯᒪᔪᓂᒃ ᑭᓯᓚᑦᓴᐅᖅᒥᑦᑐᓂᒃ ᐊᖏᔪᓂᒃ ᑕᓯᕐᓂᒃ ᑰᓚᔫᓂᓪᓗ.

ᒥᖅᖑᐃᓯᕐᕕᓴᖅ ᐱᓇᓱᐊᕐᑕᐅᔪᖅ ᖃᐅᔨᓴᕐᓚᓂᕐᒪᖅᓖᑦ ᑐᓴᕐᑎᓯᐅᑏᑦ ᐃᓗᓂᖃᕐᒥᔪᑦ ᑐᑭᓯᐅᑎᑦᓴᓂᒃ ᑲᐅᔨᓴᕐᕕᐅᔫᑉ **ᐅᔭᕋᖅᒥᑦ ᖃᕐᖃᖅᒥᑦ** ᖃᐅᔨᓴᕐᓂᓪᒪᖅᓖᑕ. ᐅᔭᕋᖅᒥᑦ ᓯᑎᔪᑦ ᓄᓇᒥ ᐃᓂᓪᓚᓗᐅᕐᑐᕕᓃᑦ ᑭᑎᑦᓯᒍᑎᓂ ᑌᔭᐅᔪᒥ Archean period, ᐅᓇ ᑭᑎᑦᓯᒍᑎᒃ ᑌᔭᐅᒻᒥᔪᖅ ᐊᑐᕐᓂᖃᕙᓪᓗᑎᓪᓗᒍ Kenoran Orogeny (ᒥᑦᓕᓂ 2.7 Ga) ᑖᕙᓇ ᓄᓇ ᐊᓯᑦᔨᑉᐸᓪᓕᐊᖅᒥᓈᑐᕕᓂᖅ ᓄᓇ ᐃᓂᓪᓚᑉᐸᓪᓕᐊᑎᓪᓗᒍ ᐊᒻᒪᓗ ᖃᕐᖃᓗᐃᑦ ᐃᓗᖅᒥᑦ ᐃᑯᐊᓚᔪᑦ ᐊᐅᒪᐅᕐᑐᑦ ᓯᓕ ᓄᐃᑕᑎᓪᓗᒥᑦ Proterozoic period 2.5 Ga-570 Ma)-ᒧᑎᓪᓗᒍ. ᓯᕗᓪᓕᒥ, ᒪᓂᕿᖅᖅᒍᑉᐸᓪᓕᐊᓯᒪᓪᒪᑦ ᐊᑯᓂ ᓱᓄᕈᑉᐸᓪᓕᐊᑦᓯᓂ ᖃᖅᖃᓂᒃ Kenoran Orogeny ᐊᑐᕐᓂᖃᕐᑎᓗᒍ, ᑕᓇᐅᖅ ᐱᑕᑦᓯᑐᕐᐸᓪᓕᐊᑎᓪᓗᒍ ᑲᑕᓚᕐᕕᐅᓯᓂ ᓯᑑᖅᑲᑐᓄᑦ ᐃᖅᑲᒨᖅᑲᓯᑎᒃ. ᑕᒪᓇ ᐃᖅᑲᒨᖅᑲᓯᒪᔪᖅ, ᑕᓯᐅᔭᐅᑉ ᓄᓇᖓᑕ ᐃᓕᑦᓴᔭᖅᒥᑦ, ᐊᕙᓗᔭᐅᑎᓪᓗᒍ ᐊᖅᒥᓕ-ᐅᒥᑎᓪᓗᒍ ᖁᕐᑐᖅᖑᕐᓯᒪᔪᖅ ᓯᑎᔫᖅ. ᑭᖑᓂᖓᒍᑦ, ᐊᖅᒥᓕᐅᒥᓯᒪᔩᑉ ᓄᓇᐅᑉ ᐃᓕᕕᓂᖓ ᑲᑕᓐᓂᑰᖅᖅᒍᑐᕕᓂᖅ. ᑕᓯᐅᔭᐅᑉ ᓄᓇᕕᓂᖓᑕ ᐃᓕᖓ ᓂᑦᑕᓯᐊᖅᒥᓈᕐᓯᓂ ᐃᖅᑲᖓᓖᑦᑐᖅ ᑲᑕᓐᓂᑰᑉ, ᓴᓂᕐᕙᑕᐅᓂᑰᑦᓯᓂ ᑕᓯᐅᔫᕐᔪᐊᑉ ᐱᖑᖅᒥᓐᓄᑦ. ᑭᖑᓂᖓᓂ, ᐅᔭᕋᖅᒥᑦ ᑕᓯᐅᔭᐅᑉ ᓄᓇᖓᑕ ᐃᓕᖅᒥᑦ ᐅᔭᕋᓪᓚᓇᐅᓗ ᓯᑎᔪᔭᐅᑉ ᐅᑲᓂ ᐊᕙᓗᔭ ᐅᔪᕕᓃᑦ ᐸᑎᕐᑑᒥ ᓄᓇᖓᑕ ᐃᓕᖅᒥᓐᓄᑦ. ᐸᑎᕐᑑᒥ ᖃᖅᑫᑦ ᐃᑯᐊᓚᑕᓕᕕᓃᑦ ᐃᓗᖅᒥᑦ ᐊᐅᒪᐅᑦᓯᑎᒃ ᓯᒃᑭᓰᒍᑦᓯᑎᒃ ᑲᑕᓚᕐᓂᑯᖅᒥᓪᓗ ᐃᖅᑲᒨᕐᐸᓕᐊᑦᓯᑎᒃ.

ᑭᖑᓂᖓᓂ ᑕᓯᐅᔫᕐᔪᐊᑉ ᐱᖑᖅᒥᑦ ᖃᐅᔨᓴᕐᕕᐅᓪᓚᓖᕐᓂᖅᒥᑦᑐᑦ 1.5 ᐱᓕᐊᓐ ᐊᕐᖑᐃᑦ ᒥᓕᓂ. ᑌᒪ, ᑭᖑᓂᖓᒍᑦ ᓱᔪᑦᑕᐅᕙᓪᓕᐊᓂᐊᓕᕐᒥᒪᑦ ᑌᑲᓂ ᓄᓇᖓ ᒪᓂᕿᖅᖅᒍᕋᑦᓯᒍ, ᒪᕐᕉᓐᓄᑦ ᐅᓪᓗᓇᐊᓄᑦ ᑐᖅᓕᓈᑐᐃᓐᓈᓄᑦ ᑲᑦᕙᐅᓕᕐᓂᒥᔪᖅ Paleozoic period ᐃᓯᓕᓕᕐᑎᓗᒍ. ᓂᒡᒥᖓᓂ ᐊᓪᓚᑦ ᖃᓯᒥᐊᓕᖓᑕ ᐃᑎᕐᓴᖅ ᑲᑦᕙᐅᓚᐅᕐᑐᕕᓃᑦ ᐅᓪᓗᓇᐊᒧᑦ ᐊᒻᒪᓗᑭᑕᐅᓂᖓ ᑕᑭᓂᓕᒃ 22 ᑭᓗᒥᑕᓂᒃ ᐊᒻᒪᓗ ᐃᑎᓂᖃᕐᓯᓂ 187 ᒥᑕᓂᒃ. ᐊᓪᓚᑦ ᖃᓯᒥᐊᓕᖓᑕ ᑕᓯᖓᑕ ᐅᐊᓐᓂᖓᓂ ᐊᒻᒪᓗᑭᑕᐅᓕᖓᓪᒥᔪᖅ ᐊᑦᔨᐅᖅᒥᓐᓂᓴᐅᒪᔪᖅ ᐊᖅᒥᓂᕐᓴᐅᓯᓂ ᓂᒡᒥᒦᑦᑐᒥᑦ ᐃᑎᕐᓴᖅ ᑲᑦᕙᐅᓚᐅᕐᑐᕕᓃᑦ ᐅᓪᓗᓇᐊᒧᑦ (32 ᑭᓗᒥᑕᓂᒃ ᐊᒻᒪᓗᑭᑕᐅᓂᖓ ᑕᑭᓂᓕᒃ) ᐃᒃᑲᓂᕐᓴᐅᓯᓂ (103 ᒥᑕ). ᑲᑦᕙᐅᓯᒪᓂᕐᒥᓄᑦ ᒪᓃᓪᓚᑦᑐᖅᒥᑦ ᐊᓯᐅᕙᓪᓕᐊᓯᒪᔪᑦ ᓱᔪᕙᓪᓕᐊᓂᕐᒥᓄᑦ, ᑲᑦᕙᐅᓚᐅᕐᑐᕕᓂᐅᓗᓗᐊᕐᓯᓂ ᐅᓪᓗᓇᐊᒧᑦ ᕿᑎᖓᓃᑦᑐᑦ ᕿᑭᕐᑌᑦ ᖅᒥᒃᑲᓗᐊᕐᑎᓗᒥᑦ ᐅᐊᓐᓂᖓᓂ ᐃᑎᕐᓴᖓᑕ ᐊᓪᓚᑦ ᖃᓯᒥᐊᓕᖓᓂ. ᑖᒃᑯᐊ ᕿᑭᕐᑌᑦ ᐅᔭᕋᕐᓚᐅᓯᑎᒃ ᓄᐃᑕᐅᓚᐅᕐᑐᕕᓃᑦ ᑲᑦᕙᐅᑎᓪᓗᒍ, ᖃᓄᐃᓕᖓᓂᕐᑖᑕᐅᕙᓪᓕᐊᓯᒪᑦᓯᑎᒃ ᐆᓇᕐᑐᒧᑦ ᓯᓚᒧᑦ ᐃᒪᕐᒧᓗ. ᑭᖑᓪᓕᖐᖓᓂᓕ, ᖃᓪᒥᐅᓂᕐᐹᑦ ᐅᔭᖏᑦ ᐊᓯᑦᔨᑐᕐᐸᓪᓕᐊᓯᒪᓂᖅᒥᑦ ᐅᓪᓗᒥ ᓄᓇᒥᓕᕐᑕᖓᓂᒃ

ᐱᐅᓯᖅᑳᖅᑎᓯᔪᑦ ᓄᓇᒥ ᖃᐅᔨᓴᕐᕕᐅᔪᒥ ᐱᒋᐊᓚᐅᖅᓂᖅᑯᖅ ᑭᖑᓪᓕᕚᒍᓯᒪᔪᒥ ᓯᑯᑐᐃᓐᓈᓗᓯᒪᔪᒥᒃ Quaternary period ᐊᑑᑎᑎᓪᓗᒍ.

ᐅᔭᖅᑕᖏᓪᓕ, ᖃᐅᔨᓴᕐᕕᐅᔪᒥ ᓄᓇᒥ ᐅᔭᖅᓂᐊᐱᑦᓴᖅᑲᖅᓂᐸᐅᔪᖅ ᓄᓇᒥ ᑲᑕᒐᖅᓯᒪᓂᑯᒥ ᐊᒻᒪᓗ ᓄᓇᒥ ᑯᓐᓂᖕᖓᓃᑦᑐᒥ ᓯᑯᑐᐃᓐᓈᓃᑎᓪᓗᒍ ᐅᔭᖁᐅᓚᐅᖅᑐᐱᓃᑦ ᐊᒻᒪᓗ ᓄᓇᐅᑉ ᑲᑕᒐᖅᓯᒪᓂᑯᖏᑦᑕ ᐊᑯᓐᓂᖓᓂ. ᐅᔭᕈᑦ ᖃᓄᐃᓕᖓᓂᖏᑦ ᓄᐃᑕᑎᑦᓯᒐᓗᐊᖅᑐᑦ ᓂᒪᓪᓚᓇᐸᓂᐱᓂᖏᓐᓂᒃ, ᑖᒃᑯᐊ ᐱᑕᖏᑦ ᐊᑑᑎᖅᑳᑦᓯᐊᖏᑦᑐᑦ ᐊᒻᒪᓗ ᒪᑭᑕᒐᓯᐊᑭᑎᑎᒍᑦ ᐃᓘᓐᓇᒍᑦ ᐱᑦᓴᑕᖅᑳᓪᓚᓇᒐᑎᒃ.

ᓄᓇᐅᑉ ᐱᑕᖏᑦᑕ ᐊᓯᑦᔨᐸᓪᓕᐊᓯᒪᓂᖏᑦ ᓄᓇᒥ ᖃᐅᔨᓴᕐᕕᐅᔪᒥ ᖃᓄᐃᓕᖕᖓᑕᐅᕙᓪᓕᐊᓯᒪᔪᑦ ᑐᖓᓕᓃᓄᑦ ᓄᓇᖅᔪᐊᑉ ᓯᑯᑕᖅᑲᑦᑕᓚᐅᖅᑐᐱᓂᐅᓂᖏᓐᓄᑦ ᓯᓚᐅᓗ ᓂᕈᒥᑦᓯᐸᓪᓕᐊᓯᒪᓂᖓᓄᑦ ᑌᑎᓯᒪᒪᑦ ᐅᓇ ᐊᑑᑎᓂᖅᑲᖅᑎᓗᒍ Quaternary period. ᐊᒥᓯᐱᑦᓯᓂ ᓯᓚᖅᔪᐊᖅ ᐱᒋᐊᓕᖅᓂᒪᑦ, ᑳᓇᑕ ᐊᕙᓗᔭᐅᖅᑲᑦᑐᐱᓂᖅ ᓯᑯᐊᓗᓐᓄᑦ ᐊᖏᔪᖅᓚᒪᓇᓐᓄᑦ. ᑌᑦᐱᐅᕙᑦᑐᐱᓃᓪᓗ ᓇᓗᓇᖅᑕᐅᓯᒪᑦᓯᑎᒃ ᒪᖏᑦᑕᒥ 3.7-ᒥ, ᐊᑦᔨᖑᐊᖏᓪᓗ ᓄᐃᑕᑦᓯᑎᒃ ᓄᓇᖕᖑᐊᒥ ᑭᑎᑦᔪᑎᓕᒻᒥ 3.5ᒥ.

ᑭᖑᓪᓕᕚᖅ ᓯᑯᐊᔫᐱᐅᓚᐅᖅᑐᐱᓂᖅ ᐅᔭᐅᓃᖅ Laurentide Ice Cap (80-10) ka) ᑖᓐᓇ ᐊᑑᑎᑎᓪᓗᒍ ᐃᔫᓐᓇᖏᑦ ᓯᑯᐊᔫᕙᑦᑐᐱᓂᓕᖅ ᐃᓕᑕᖅᓇᓂᖏᑦ ᐋᔭᖅᑕᐅᓯᒪᕙᓪᑐᑦ. ᖄᑎᖓ ᓄᓇᐅᑉ ᖃᐅᔨᓴᕐᕕᐅᕚᑉ ᐊᓪᓗᑦ ᖃᓯᒋᐊᓕᖓᑕ ᓄᓇᖓ ᑕᑯᓴᐅᑎᑦᓯᐱᓕᒃ ᓄᓇᐅᑉ ᓱᕙᑉᐸᓕᐊᓯᒪᓪᓚᓇᓐᓂᖓᓂᒃ ᐊᒻᒪᓗ ᓯᑯᐊᓗᐃᑦ ᓂᒪᖅᐱᒋᕙᓪᓕᐅᖅᑕᐱᓂᖏᓐᓂᒃ, ᐃᓚᐅᑎᓪᓗᒋᑦ ᓯᑯᐃᑦ ᐃᖏᖅᑭᐱᐱᓂᖏᑦ ᐅᔭᖅᓗᑦ ᓯᑯᐊᓗᓐᓄᑦ ᐊᐅᓚᑕᐅᓚᐅᖅᓂᐱᓂᖏᓪᓗ. ᑲᑉᐸᓕᐊᓂᖓ ᓄᓇᐅᑉ ᖃᐅᔨᓴᕐᕕᐅᕚᑉ ᑰᖏᓐᓂ ᐃᑎᖅᓱᖏᓐᓂ ᐊᒻᒪᓗ ᓯᑦᔭᖓ, ᓱᕙᑉᐸᓕᐊᓯᒪᔪᖅ ᓄᓇ ᑲᑎᖅᓯᐱᐅᓭᓪᓕᐊᓯᒪᔪᓪᓗ ᓄᓇᓄᑦ ᖄᖅᑲᓄᑦ ᐅᔭᖅᓚᓄᑦ ᓄᐃᑕᑦᓯᔪᖅ ᓇᒧᑦ ᐃᖏᖅᑭᐸᓪᓕᐊᓚᐅᖅᑐᐱᓂᐅᒪᖓᑕ ᓯᑯᐊᓗᐃᑦ ᓂᒪᑦᓯᑎᒃ.

ᖃᓄᐃᓕᕙᓪᓕᐊᐱᐅᓯᒪᑦᓯᓂ ᓇᓗᓇᒃᑯᑕᖅᑎᑕᐅᒥᔪᖅ Holocene period ᐱᒋᐊᖅᐱᖅᑲᓚᐅᖅᑐᐱᓂᖅ 10 ka-ᒥ ᑕᑯᑦᓴᐅᒍᑎᖅᑲᖅᓯᓂ ᓂᕈᒥᑦᓯᕙᓪᓕᐊᒪᓇᓚᐅᖅᑐᐱᓂᐅᓂᖑᓂᒃ 6 ka-ᒥᒃ ᓇᓗᓇᒃᑯᑕᖅᒥᔪᒥ ᑌᒪ ᐊᐅᐸᓪᓕᐊᓂᐊᓕᖅᑕ ᐊᒥᐊᒃᑯᐱᓃᑦ ᓯᑯᐊᓗᐃᑦ Laurentide Ice Sheet ᑯᐯᑉ ᖄᑎᖓᓂ. ᓄᓄᑦ ᖃᓄᐃᓕᖓᓕᖅᓂᖏᑦ ᐃᑎᖅᓱᖃᖅ-ᑐᐃᓗ ᑌᑎᑕᐅᓯᒪᑦᓯᑎᒃ ᓯᑯᐊᓗᐃᑦ ᐊᐅᑦᑎᓗᒋᑦ ᐃᒻᒥᒃᑲᑦᑕᓂᖏᓐᓄᑦ, ᓄᖑᑉᐸᓕᐊᓂᑯᐱᓃᑦ ᐊᒥᐊᒃᑰᓯᒪᔪᐃᓪᓗ ᐃᓂᖅᑲᕙᓪᓗᑐᑦ ᖁᑏᓪᓚᖕᖏᓐᓂ ᓇᓪᓕᖁᐊᖅᑲᓚᐅᖅᑐᐱᓂᐅᑦᓯᑎᒃ Tyrrell Sea-ᒥᒃ. ᐆᑦᑑᑎᒋᑦᓯᒋᑦ, ᓯᑯᐊᓗᐃᑦ ᐊᕐᕌᑎᐱᓂᖏᑦ ᓯᐅᖅᖕᖑᓯᒪᔭᖏᓪᓗ ᑐᐊᐸᖕᖑᑎᓯᒪᔭᖏᑦ ᐅᔭᖅᓚᖑᖅᑎᓯᒪᔭᖏᑦ ᓇᓂᓖᖅᓯᑎᒃ ᐃᓚᒪᓂᖏᑦ ᐊᑦᔨᒌᑦᓯᐊᑦ ᑕᓯᐅᔭᖅᓱᐊᑉ ᐱᖑᖏᓐᓂ, ᑭᓯᐊᓂ ᓄᐃᑕᓚᖕᖏᑐᑦ ᓯᑦᔭᐅᑉ ᓄᓇᖓᓂ. Tyrrell Sea ᑕᓇᐅᖅ ᐅᓕᓚᐅᖅᑐᐱᓂᖅ ᓄᓇᒥ ᖃᐅᔨᓴᕐᕕᐅᔪᒥ 8 ka-ᒍᑎᓪᓗᒍ ᑕᓯᐅᔭᖅᓱᐊᑉ ᓯᑦᔭᖓ ᓯᓚ ᓯᑯᐊᓗᑦᑕᖅᑎᓪᓗᒍ. ᐃᒪᖅᐱᖅ ᐅᓕᓚᐅᖅᑐᐱᓂᖅ ᐅᑲᓂᑦᓴᓇᖅ ᓯᑯᐊᓗᒃ ᐊᐅᑉᐸᓕᐊᓕᖅᑎᓪᓗᒍ, ᑕᒫᓇ ᖃᐅᔨᒪᔭᐅᒍᑎᓕᒃ ᑕᓇᐅᑉ ᐅᓕᓐᓂᓇᓚᐅᖅᑕᐱᓂᖑᓂᒃ ᓯᑯᐊᓅᑉ ᑭᓪᓕᖓᓄᑦ ᑎᑭᑦᓯᓂ ᓂᒪᒐᒥ ᓂᑉᐱᓕᐊᖅᐸᓕᐊᑦᓯᓂ. ᐃᒪᖅᐱᐅᑉ ᐅᓕᓐᓂᐅᑉ ᓱᕙᑉᐸᓕᐊᓂᖑᓄᑦ ᐊᐅᑲᐱᑦᑎᑕᐅᓚᐅᖅᑐᐱᓃᑦ ᓯᑯᐊᓗᐃᑦ. ᐃᓕᐅᖅᖃᓯᒪᓂᖏᑦ ᓯᐅᕈᑦ, ᐅᔭᕈᑦ ᐃᓚᖑᓐᓂᓗ ᐊᒃᐱᐊᑲᑦᑕᓂᐱᓂᖏᑦ ᓄᐃᑎᑦᓯᔪᑦ ᐊᑦᔨᖏᖕᖏᑑᖅᑲᑦᑎᓯᒪᓂᖑᓂᒃ ᐃᑎᓂᖓᑕ Tyrrell Sea ᑕᓇᐅᑉ. ᑖᒃᑯᐊ ᐃᓚᐅᖅᑲᓂᑯᐃᑦ ᑯᓚᔫᓗ ᑕᐃᕗᖑᑦᓴᓇᖅ ᑯᑦᑐᑦ ᑕᑯᑦᓴᐅᕗᑦ ᐊᑦᔨᖏᖕᖏᑐᓂ ᐳᖅᑐᓕᓐᓂᐱᖏᓐᓂ ᑕᓯᐅᔭᐅᑉ ᑕᓯᖓᑕ ᓴᓂᓖᖏᓐᓂ ᕿᓚᓗᒐᖅᓂᐊᕙᐅᓗ ᓴᓂᐊᓂ. ᐃᒃᑲᓕᕙᓪᓕᐊᓯᒪᔪᖅ Tyrrell Sea ᑕᓇᐅᖅ ᓯᑯᐊᓗᒃ ᓄᓪᓚᓪᓗᑦ ᐃᖏᖅᑭᕙᓪᓕᐊᓯᑎᓪᓗᒍ ᐃᒃᑲᓕᕙᓪᓕᐊᓯᔭᐱᓂᐅᑦᓯᓂ; ᓯᑯᐊᓗᐃᑦ ᐅᖁᒣᓂᖏᑦ ᐹᖅᑕ ᓄᓇᐅᑉ ᖄᖓ ᐱᑌᑉᐱᑦ, ᐅᔭᕈᑦ ᐊᐅᓚᑦᔭᒎᓇᓯᕙᓪᓕᐊᓂᕐᒥᓄᑦ ᐃᓂᑖᖅᑲᓯᒪᔪᑦ.

ᓯᑯᐊᓗᐃᑦ ᐊᐅᓚᐅᕐᑐᐃᓂᐅᑎᓪᓗᒥᑦ, ᐊᑦᔨᒌᖕᖏᑐᑦ ᐱᐅᓯᐅᖅᑳᑦᑕᓯᔪᑦ ᓄᓇᖓᓂ ᖃᐅᔨᓴᕐᕕᐅᔫᑉ ᖃᓄᐃᓕᖕᖓᑕᐅᕙᓪᓕᐊᓯᓂ, ᐃᓕᒋᔭᐅᑎᓪᓗᒋᑦ ᐃᓕᕙᓪᓕᐊᔪᓄᑦ ᑰᓐᓃᓲᑦᓴᔪᑦ, ᓄᓂᑦ ᐅᔭᕈᑦ ᓯᑐᕐᕿᑦ ᑭᓪᓕᖏᓐᓂ ᐊᑖᖏᓐᓂ, ᐊᓄᓇᒍᑦ ᓴᓂᕙᐅᖅᑳᑦᑕᐅᓯᒪᔪᑦ ᓄᐃᑕᐅᕙᓪᓕᐊᓯᒪᔪᐃᓪᓗ, ᐃᒪᖅᐱᒥᐅᑦ ᐆᒪᔪᐊᕈᐃᓪᓗ. ᐊᒥᓱᐃᓂᒃ ᐊᑦᔨᒌᖕᖏᑐᓂᒃ ᐅᑲᓂ ᓄᓇᒥ ᑲᑦᑐᓴᐅᔪᑦ, ᐊᑭᓐᓂᑦ ᐊᑖᖏᓐᓂ ᐅᔭᕈᑦ, ᐅᔭᕈᑦ ᖃᑦᓯᑐᖕᖑᓯᒪᔪᑦ, ᓯᑐᕐᕿᑦ ᓄᓇᐅᓗ ᑲᑕᖅᓯᒪᓂᖏᑦ.

ᑰᖏᑦ ᑕᓯᖏᓪᓗ ᖃᐅᔨᓴᕐᕕᐅᔫᑉ ᓄᓇᒥ ᑖᓪᓕᒪᐅᔫᖕᖏᓴᑑᓚᓇᐅᑦᓯᒪᓂᖅ ᐃᑎᖅᓱᒍᑦ ᑰᑦᑐᑦ ᐃᓕᐅᑎᓪᓗᒍ ᓯᑦᔭᖅ ᓄᓇᐅᑉ (ᓄᓇᖕᖑᐊᖅ 3.6, ᒫᑦᑕᖅ 3.8). ᑖᒃᑯᐊ ᓴᓇᒪᖏᑦ ᐃᑎᖅᓯᑦ ᐃᓕᑕᖅᓇᕈᑎᖅᑲᖅᑎᓗᒋᑦ ᐅᔭᕈᑦ ᐋᖅᖁᖅᓯᒪᓂᖏᓐᓄᑦ, ᓄᓇᖓᑕ ᓴᓇᒪᓂᖓ ᓇᒧᖕᖓᐅᖅᑲᖅᓯᒪᓂᖏᓐᓄᓪᓗ ᑲᑎᖕᖓᐅᑎᖕᖏᑐᑦ. ᒪᖅᑮᒃ ᐊᖏᓂᖅᐹᒃ ᐃᒪᓪᓗᖅᑰᒃ ᐃᑎᖅᓱᒃ ᐸᑎᖅᑰᑉ ᑰᖓ (13,048 ᑭᓛᒥᑕᓂᒃ) ᐊᒻᒪᓗ ᐊᓪᓗᑦ ᖃᓯᒋᐊᓕᖓᑕ ᑰᖓ (5,275 ᑭᓛᒥᑕᓂᒃ) ᑰᐱᐅᕖᒃ ᐃᑎᖅᓱᒃ ᒪᖅᑭᐃᓕᖅᑭᖓᑎᓪᓗᒋᒃ: ᑕᓯᐅᓕᖅᑭᑦᓯᑎᒃ ᑰᒍᓕᖅᑭᑦᓯᑎᓗ. ᖃᐅᔨᓴᕐᕕᐅᔪᖅ ᓄᓇ 1,450-ᖑᓚᖓᓂᒃ ᑕᓯᓕᒃ, ᐊᒥᓲᓂᖅᓴᒪᓃᑦ ᑖᒃᑯᐊ ᑕᓰᑦ ᐊᖏᓂᖅᑲᖅᑎᓗᒋᑦ 10 ᑭᓛᒥᑕᓂᒃ ᒥᑭᓂᖅᓴᒥᒃ (ᒫᑦᑕᖅ 39). ᐱᖑᓯᐃᑦ ᑕᓯᒻᒪᓃᑦ ᐅᑯᐊ (lac Loups Marins), ᑕᓯᐅᔭᖅ, ᐊᓪᓗᑦ ᖃᓯᒋᐊᓕᖓᓗ. ᑕᓯᖓ Loups Marins ᐊᖏᔪᒪᓇᒃ ᐃᒃᑰᑦᓯᓂ ᑕᓯᖅᒥᐅᔭᐅᑦᓯᓂ ᐃᒪᑐᐃᓐᓇᖅ ᑰᑦᓯᓂ ᐸᑎᖅᑰᑉ ᑰᖓᓄᑦ. ᐊᖏᓂᓕᒃ

1,226 ᑭᓚᒥᑕᓂᒃ ᐊᓪᓗᑦ ᖃᓯᒥᐊᓕᖕᒐ ᑕᓯᖅ ᑯᐯᓖᒥ ᑕᓯᐅᑉ ᐊᖕᒥᓂᕐᐹᑉ ᑐᖕᒐᓕᐊ. ᑕᓯᐅᑉ ᐃᑎᓂᐊᓗᖕᒐ ᐆᒪᔪᕐᑕᖃᖖᒥᓗᐊᕐᑎᓯᔪᖅ, ᐃᒪᖕᒐᓗ ᑲᑭᐊᑦᑑᓯᓂ. ᑕᓯᐅᔭᖅ ᐱᑐᑦᓯᒪᒐᒥ ᑕᓯᐅᔭᕐᔪᐊᒍ ᐊᕐᖁᑎᒥᑦᓯᒍ ᑐᕐᓯᔪᖅ ᐃᒪᖕᒐ ᑕᓇᐅᒪᓖᒃ. ᑰᒃ ᐋᓇᐊᖕᒐᓂ ᑕᓯᕐᒧᑦ ᑰᑦᑑᑉ ᐃᒪᖕᒥᑦᑕ ᖄᖕᒥᓐᓂ ᑕᓇᐅᕐᑕᖕᒐ 0 ᔾᔭᔾᔾ ᒥᑦᓵᓂ, ᑭᓯᐊᓂ ᑐᕐᓯᔪᕐᒧᑦ ᒪᔪᕐᐸᓕᐊᓂᖕᒐᓂ ᑕᓇᐅᒍᓂᖕᒐ 15 ᔾᔭᔾᔾᒧᕙᓪᓕᐊᓰᖅ. ᐃᑎᓂᖕᒐ 75ᒦᑦ, ᐃᒪᖕᒐᑦ ᑕᓇᐅᒍᓂᖕᒐ ᑎᑭᐅᑎᓯᒪᓰᖅ 27ᔾᔭᔾᔾᒧᑦ, ᑕᓯᐅᔭᕐᔪᐊᑉ ᑕᓇᐅᖕᒐᑦ ᖁᓛ ᑌᒣᓪᓗᐊᒐᓚᑦᑐᒥᒃ ᑕᓇᐅᖃᓰᖅ.

ᐱᕈᕐᑐᐃᑦ ᐊᕙᑎᖕᒐ

ᓄᓇᖕᒐᑦ ᓴᓇᒪᓂᖕᒐ ᓇᓗᓀᕐᑕᐅᔪᖅ ᒥᕐᖑᐃᓯᕐᕕᐅᑉ ᐱᓇᓯᐊᕐᑕᐅᔫᑉ ᖃᓄᐃᓕᖕᒐᓕᕐᓂᖕᒐᓄᑦ ᑐᓴᕐᑎᓯᐅᑎᓂ ᐊᓪᓚᑕᐅᒪᔪᖅ ᓱᕐᕗᓯᒪᕗᖅ ᓄᓇᐅᑉ ᐱᕈᕐᑐᖕᒥᓂᒃ ᐊᕙᑎᖕᒐᓂᓪᓗ, ᐱᓗᐊᕐᑐᒥᒃ ᐱᕈᕐᑐᖕᒥᓂᒃ, ᐃᓚᐅᑎᓪᓗᒥᑦ ᐱᕈᕐᑐᐃᑦ ᐃᓗᓕᓃᑦ ᐃᒪᕈᕕᐊᓂᒃ ᐃᒻᒨᔭᕐᓂᓗ ᐃᒪᕈᕕᐊᕐᑕᖃᖖᒥᑐᐃᓪᓗ, ᐆᒪᔪᓂᓪᓗ.

ᓄᓇ ᖃᐅᔨᓴᕐᕕᐅᔪᖅ ᒪᕐᕈᐃᓂᒃ **ᐱᕈᕐᑐᑕᖃᓃᖅ** ᓄᓇᒥᒃ ᐊᑦᔨᒌᖖᒥᑐᓄᑦ ᐱᕈᕐᕕᐅᓃᑦᓴᔭᐅᑎᓪᓗᒥᒃ: ᓇᕉᕐᑐᑕᓕᒃ ᑲᑭᓪᓚᐅᑎᑕᖃᓃᑦᓴᔭᓂᒃ ᐊᒻᒪᓗ ᐃᓚᖕᒐ ᐅᕐᐱᖃᓃᑦᓴᔭᖅ ᓄᓇᖕᒐ ᐅᑭᐅᕐᑕᑐᒥ ᐱᕈᕐᕕᐅᓯᐊᓃᑦᓴᔭᐅᖖᒥᑐᖅ. ᓇᕉᕐᑐᑕᓕᒃ ᐃᓅᓇᖕᒐ ᖃᐅᔨᓴᕐᕕᐅᔪᒦᑦᑐ, ᑭᓯᐊᓂ ᑕᑭᑦᑑᑲᖅ ᓄᓇ, ᓯᑦᔭᖕᒐᓃᑦᑐᖅ ᑕᓯᐅᔭᐅᑉ ᑕᖁᖕᒐᓂ, ᐱᕈᕐᕕᐅᓯᐊᓃᑦᓴᔭᐅᖖᒥᑐᖅ ᐅᕐᐱᑕᖃᕐᓯᓂ ᑌᒣᑦᑐᑦᑕᖃᕐᓂᓴᖅ (ᐊᑦᔨᖕᒍᐊᖅ 4.1). ᐃᕐᐸᓯᒪᓂᖕᒥᑦ ᐱᕈᕐᑐᐃᑦ ᓄᓇᒥ ᖃᐅᔨᓴᕐᕕᐅᔪᒥ ᑕᑯᑦᓴᐅᒍᑎᓃᑦ ᓄᓇᒧᑦ ᐊᐅᓚᑕᐅᑦᓯᑎᒃ ᓄᓇᑦᑕᖕᒐᓄᑦ ᓴᓇᒪᓂᖕᒐᓄᑦ ᓯᓚᐅᑉ ᐱᐅᓯᖕᒐᓄᑦᑐ. ᑕᓯᐅᔭᐅᑉ ᓄᓇᖕᒐ ᐊᒥᓃᓂᕐᐹᓂᒃ ᐊᑦᔨᒌᖖᒥᑐᓂᒃ ᐱᕈᕐᑐᑕᓕᒃ ᐅᔭᕐᑫᓅᑦᑐᓂᒃ, ᐃᒪᕐᒦᑐᓂᑦᑐ. ᐃᓚᒥᔭᐅᓃᑦ ᐱᕈᕐᑐᖕᒥᓐᓄᑦ ᓇᕉᕐᑐᕐᑦ, ᓄᓇᑐᐃᓐᓇᒃ ᓯᓇᑕᖃᖖᒥᑐᑦ, ᓇᕉᕐᑐᐊᑭᕐᑕᓕᓪᒥ ᓯᕐᒥᓂᑦᑐ ᐱᕉᑦᓴᑦ, ᐅᔭᕗᑦᑐ ᐊᕙᓗᔭᐅᒪᔪᑦ ᖁᐊᔭᐅᑎᓄᑦ. ᖃᐅᔨᓴᕐᕕᐅᑉ ᐃᓚᖕᒐ ᓄᓇ ᖃᐅᔨᓴᕐᑕᐅᔪᖅ ᓄᓇᑐᐃᓐᓇᓕᒃ ᓯᓇᑕᖃᖖᒥᑐᒥᒃ, ᓇᕉᕐᑐᐊᑭᓕᒃ, ᓄᓇᓂᑦᑐ ᐃᑯᐊᓪ-ᓚᓂᕐᓂᒃ (ᓄᓇᖖᒍᐊᖅ 4.1 ᐊᒻᒪᓗ ᒪᖕᒥᑦᑕᖅ 4.1).

ᑲᑎᕐᓯᑕᐅᓯᒪᓂᖕᒥᑦ **ᐱᕈᕐᑐᐃᑦ ᐃᓗᓕᑦᓴᓃᑦ ᐃᒪᕈᕕᐊᓂᒃ ᐃᒻᒨᔭᕐᓂᒃ** ᖃᐅᔨᓴᕐᕕᐅᔪᒥ ᓄᓇᒥ ᓇᓗᓀᕐᑕᐅᓯᒪᕗᑦ 503 ᐃᓕᒃᑰᑎᕐᑐᓂᒃ ᓱᓇᔭᐅᓂᖕᒥᑦ. ᐃᓅᓈᒍᑦ, ᑕᕐᑫᒦᓃᑦᓴᔭᐅᓂᖕᒥᑦ ᐊᒥᓃᓂᕐᓴᑲᓴᑦ ᓇᓗᓀᕐᑕᐅᓯᒪᑦᓯᑎᒃ. ᑭᓯᐊᓂᓕ, ᓯᓚᐅᑉ ᐱᐅᓯᖕᒐᓄᑮᑦ ᓄᓇᐅᓗ ᓴᓇᒪᓂᖕᒐᓄᑦ ᐅᓄᕐᓂᖕᒥᑦᑐ ᐅᑭᐅᕐᑕᑐᒥ ᐱᕈᓃᑦᓴᔭᑦ ᐊᑦᔨᒌᖖᒥᑐᑦ, ᐃᓐᓇᓕᓐᓂ ᐃᓕᖕᒥᑦᑐ ᕿᑭᕐᑌᑦ ᓄᐃᑕᔪᑦ ᑕᓯᐅᔭᒥ, ᐊᓪᓗᑦ ᖃᓯᒥᐊᓕᖕᒐᑦ ᑕᓯᖕᒐᑦ ᕿᑎᖕᒐᓃᑦᑐᐃᓗ ᐅᑭᐅᕐᑕᑐᒥᐅᑦᓴ ᐅᓂᕋᕐᑕᐅᒍᓐᓇᑐᑦ. 51 ᐱᕈᕐᑐᑦ ᐊᑦᔨᒌᖖᒥᑐᑦ ᐱᕈᓃᑦᓴᔭᑦ ᖃᐅᔨᓴᕐᕕᐅᔪᒥ ᓄᓇᒥ ᐃᓕᓯᒪᔪᒥ ᓴᐅᓂᑯᓂᒃ ᑕᓇᐅᕐᒥᐅᑕᕕᓂᕐᓂᓅᓐᓂᑦ ᑕᓪᓗᕈᓐᓇᓴᔭᓂᒃ. 27-ᖕᒥᑦ ᑳᒃᑯᐊ ᓇᓗᓀᕐᑕᐅᓚᐅᔪᑦ ᑕᓯᐅᔭᐅᑉ ᓄᓇᖕᒐᓂᑭᓯᐊᓂᒥᐅᔭ ᐅᓂᕋᕐᑕᐅᕗᑦ. ᑭᓯᐊᓂ 21-ᖕᒥᑦ ᓇᓗᓀᕐᑕᐅᑎᓪᓗᒥᑦ ᑕᒪᒥᓐᓂ ᑕᓯᐅᔭᒥ ᐊᓪᓗᑦ ᖃᓯᒥᐊᓕᖕᒐᓂᓗ ᓄᓈᓐᓂᓂᖁᕐᑕᐅᓯᑎᒃ. ᓄᓇ ᖃᐅᔨᓴᕐᕕᐅᔪᖅ ᐃᓂᖃᕐᒪᑦ ᐱᒥᐊᕐᕕᖕᒥᓐᓂ ᐅᑭᐅᕐᑑᑉ ᓇᕉᕐᑐᖁᑎᑦᓴᔭᖕᒥᓂᒃ ᐅᑭᐅᕐᑑᑦᑐ ᓯᓇᑕᖃᖖᒥᑐᑦᓴᔭᖕᒐᓂ, ᐊᒥᓯᑦ ᐊᑦᔨᒌᖖᒥᑐᑦ ᐱᕈᕐᑐᐃᑦ ᑎᑭᐅᑎᓯᒪᔪᑦ ᑕᕐᑫᖕᒐᓄᑦ, ᓯᕿᓂᖕᒐᓄᑦ ᐅᕙᕙᓈᓃᑦ ᓂᒻᒥᖕᒐᓄᑦ ᑭᓪᓕᖕᒥᖕᒐᓄᑦ ᑯᐯᒃ-ᓛᐸᑐᐊᓪᓗ ᐊᒥᐊᕆᑲᐅᓪᓗ ᑕᕐᑫᖕᒐᓂ. ᖃᐅᔨᓴᕐᕕᐅᔪᒥᒃ ᓄᓇᒥ ᐊᕙᑖᓂᓗ, 77 ᐱᕈᕐᑐᓴᔭᖕᒥᑦ ᐱᑕᖃᑦᓯᐊᓃᒍᖖᒥᒎᓂᖁᕐᑕᐅᔪᑦ ᓇᓃᓐᓂᖕᒥᑦ ᐃᓯᒪᒥᔭᐅᑦᓯᑎᒃ ᐳᑯᑦᑕᐅᓯᒪᔪᓂ ᐆᑦᑐᕋᐅᑎᑦᓴᐅᑎᓪᓗᒥᑦ. ᒪᖕᒥᑦᑕᖅ 4.4 ᓇᓗᓀᕐᓯᓯᒪᔪᖅ ᖃᓄᐃᑦᑐᓕᓇᐅᓂᖕᒥᓐᓂᒃ ᓱᓇᑦᓴᔭᕐᑕᖃᕐᓂᖕᒥᑦᑕ 11 ᓄᓇᑦ ᑕᑯᕙᓪᓚᑕᐅᕐᑲᑦᑐᕕᓃᑦ ᐱᕈᕐᑐᖕᒥᑦ ᐃᒪᕈᕕᐊᕐᑕᖃᓃᑦᓴᑦ, ᑐᖖᒐᕕᒥᑦᓯᒥᑦ ᑕᒐᑕᒐ ᖃᐅᔨᒪᔭᐅᔪᑦ.

ᐃᒪᕈᕕᐊᕐᑕᖃᓃᑦᓴᔭᐅᖖᒥᑐᑦ ᐱᕈᕐᑐᐃᑦ ᑲᑎᕐᓯᑕᐅᓂᖕᒥᑦ ᐱᔭᕇᕐᑕᐅᓯᒪᔪᑦ ᐱᖕᒐᓃᔪᕐᑐᓂ ᓄᓇᐅᑉ ᐃᓚᖕᒥᓂ ᖃᐅᔨᓴᕐᕕᐅᔪᒥ ᓄᓇᒥ: ᐊᓪᓗᑦ ᖃᓯᒥᐊᓕᖕᒐ, ᑕᓯᐅᔭᖅ, ᐸᑎᕐᑐᖅ ᑰᖕᒐ, ᕿᓚᓗᒐᕐᓯᐅᑉ ᑰᖕᒐ, ᐊᓪᓗᑦ ᖃᓯᒥᐊᓕᖕᒐᑦ ᑰᖕᒐ ᐊᒻᒪᓗ ᑰᖕᒐ (rivière Sheldrake) Sheldrake River. ᐃᓅᓈᒍᑦ, 659 ᐱᕈᕐᑐᓴᑦ ᐊᑦᔨᒌᖖᒥᑐᑦ ᓇᓗᓀᕐᑕᐅᓯᒪᔪᑦ ᖃᐅᔨᓴᕐᕕᐅᔪᒥ ᓄᓇᒥ 9ᒪᖕᒥᕐᑕᖅ 4.5ᒥ0 ᐱᓗᐊᕐᑐᒥᒃ, 324 ᐱᕈᕐᓯᐊᑕᖃᓃᒍᖖᒥᑐᑦᓴᑦ ᑎᖕᒐᐅᓴᓪᓗ ᓇᓗᓀᕐᑕᐅᓯᒪᔪᑦ: 100 ᖁᐊᔭᐅᑎᑦᓴᑦ, 31 ᐃᒪᓴᓕᖂᓂᓪᓗ ᐱᕈᓯᑦ ᐊᒻᒪᓗ 193 ᑎᖕᒐᐅᓴᑦ. 335 ᖁᐊᔭᐅᑎᑦᓴᑦ ᓇᓗᓀᕐᑕᐅᓯᒪᔪᑦ: 171 ᖁᐊᔭᐅᑎᐊᕈᐃᑦ 164 ᖁᐊᔭᐅᑎᑦᓴᔭᐅᑦᓯᑎᒃ ᓯᑎᕚᓂᕐᓴᑦ. 324 ᐱᕈᕐᓯᐊᑕᖃᓃᒍᖖᒥᑐᑦ ᓇᓗᓀᕐᑕᐅᓯᒪᔪᑦ ᓄᓇᒥ ᖃᐅᔨᓴᕐᕕᐅᔪᒥ, 52-ᖕᒥᑦ ᐱᕈᕐᑐᐃᑦ ᐊᑦᔨᒌᖖᒥᑐᑦ (16%) ᐃᓯᒪᒥᔭᐅᔪᑦ ᑕᑯᑦᓴᐅᓯᐊᓃᒍᖖᒥᒥᐊᖕᒥᑦ ᑯᐯᒻᒥ. ᒪᖕᒥᑦᑕᖅ 4.7 ᓇᓗᓀᕐᓯᓯᒪᔪᖅ ᖃᐅᔭᐅᓯᒪᓂᖕᒥᓐᓂᒃ ᐃᒪᕈᕕᐊᕐᑕᖃᓃᒍᖖᒥᑐᓂᒃ ᐱᕈᕐᑐᓂᒃ ᖃᐅᔨᓴᕐᕕᐅᔪᒥ ᓄᓇᒥ, ᓇᓗᓀᕐᑕᐅᓯᒪᑦᓯᑎᒃ ᓄᓇᓂ ᖃᐅᔨᕕᐅᒍᒪᔪᓂ ᑕᑯᑦᓴᐅᑎᑕᐅᑦᓯᑎᒃ ᓄᓇᖖᒍᐊᓂ 4.4-ᒥᒃ ᑭᑎᑦᔪᑎᓕᒻᒥ.

38 ᑕᓇᐅᒥᐅᑌᑦ ᓄᓇᒥᐅᑌᓪᓗ ᐊᒫᒪᑦᑎᓯᔩᑦ, 131 ᑎᒻᒥᐊᑦ ᐊᒻᒪᓗ 29 **ᐆᒪᔪᐃᑦ** ᐊᑦᔨᒌᖖᒥᑐᑦ (ᐃᓚᖃᕐᒥᓯᑎᒃ 13-ᒥᐊᓪᓚᓂᒃ ᐊᑦᔨᒌᖖᒥᑐᓂᒃ ᐃᖃᓗᓐᓂᒃ ᑕᓯᐅᔭᕐᔪᐊᒥ), ᐃᒪᕐᒥᐅᑕᐅᑦᓯᑎᓗ ᓄᓇᒥᐅᑌᑦ ᐱᖕᒐᓃᔪᕐᑐᑦ ᐊᒻᒪᓗ ᐊᑕᐅᓯᖅ ᖁᐱᕐᕈᕈᐊᖅ ᓂᐅᑲᓪᓚᓚᑦᓴᔭᖅ ᓇᓗᓀᕐᑕᐅᓯᒪᔪᖅ ᓄᓇᒥ ᖃᐅᔨᓴᕐᕕᒥ ᓇᓗᓀᒃᑯᓯᕐᑐᑕᐅᒪᓪᓕᒥᓯᑎᓪᓗ ᒥᕐᖑᐃᓯᕐᕕᓕᐅᕐᓂᒧᑦ ᐱᓇᓯᐊᕐᑕᐅᓂᕐᒥᒃ ᖃᓄᐃᓕᖕᒐᓕᕐᒪᖕᒎᑦ ᑐᓴᕐᑎᓯᐅᑎᓂ (ᐃᓚᒥᐊᕈᑏᑦ 5-ᒥᑦ 10-ᒧᑦ). ᐊᒥᓯᑦ ᐱᑦᔪᑎᐅᕗᑦ ᑌᓖᒃ ᐊᒥᓯᐃᓂᒃ ᐆᒪᔪᕐᑕᖃᕐᓂᖕᒐᓄᑦ. ᐆᑦᑑᑎᒥᑦᓯᒥᑦ, ᐃᓐᓇᓖᑦ ᑎᒻᒥᐊᓄᑦ ᒪᓐᓂᓕᐅᕐᕕᐅᓃᑦ; ᑐᕐᓯᔪᖅ

ᐊᖅᑯᑎᒋᑦᓯᒍ ᑕᓇᐅᖅ ᐃᒪᖅ ᐃᑎᕈᓐᓇᑐᖅ ᑕᓯᐅᔭᒧᑦ, ᑕᓇᐅᓛᒍᓯᑎᓗᒍ ᐃᒪᖓ ᑌᒪ ᐅᒪᕕᐅᒍᓐᓇᓂᐊᓕᕐᒥ ᑕᒪᕐᒥᓐᓃᓯᑦᓴᔭᓄᑦ ᑕᓇᐅᒥ ᑕᓇᐅᒍᖏᕐᒥᑐᒥᓗ; ᑭᖑᒪᖢᕝᒥᖢ, ᐊᑦᔨᕐᒦᖏᕐᒥᑐᑦ ᐱᕈᕐᑐᐃᑦ ᐊᒥᓯᓄᑦ ᐅᒪᔪᓄᑦ ᐊᑦᔨᕐᒦᖏᕐᒥᑐᓄᑦ ᓈᒻᒪᒋᔭᐅᑦᓯᐊᓯᑎᒃ.

ᐃᓚᒃᑯᒥᑎᓪᓗᒍ ᖃᐅᔨᔭᐅᓯᒪᒻᒥᔪᑦ ᐃᒪᕐᐱᒥᐅᑕᑦ ᑕᓇᐅᒥᐅᑕᑦ ᐊᒫᒪᑦᑎᓯᔾᔪᑦ, ᐱᖓᓯᐃᒍᑎᓪᓗᒥᑦ **ᓇᑦᓰᑦ** ᑕᑯᑦᓴᐅᓰᑦ ᖃᐅᔨᓴᕐᕕᐅᔫᑉ ᐃᒪᖓᓂ. ᑖᒃᑯᐊ ᓇᑦᓯᑦ, ᐅᑦᔪᐃᑦ ᕿᕈᕐᓃᓪᓗ. ᓇᑦᓯᑦ ᐊᒪᓗ ᐅᑦᔪᐃᑦ ᑕᑯᑦᓴᐅᕙᓪᓗᓰᑦ ᐃᓄᓐᓄᓗ ᐱᒪᓇᐅᓂᕐᐸᐅᓯᑎᒃ. ᕿᕈᕐᓃᑦ ᖃᐅᔨᒪᔭᐅᒥᐊᕐᖃᕐᒥᔪᑦ ᑕᓇᐅᒍᖏᕐᒥᑑᒍᓐᓇᓯᑎᒃ ᐳᐊᔨᐅᓚᒥᒃ ᐃᓂᖃᓖᒍᑦᓯᑎᒃ (Petit lac des Loups Marins), Lake Loups Marins, ᐊᓪᓗᑦ ᖃᓯᒋᐊᓕᖓ, (lac Bourdel) ᐊᒪᓗ ᑰᓐᓂᓗ ᐃᑭᑦᑐᓂ ᐃᓚᐅᑎᓪᓗᒍ ᐸᑎᕐᑑᑉ ᑯᖓ. ᑖᒃᑯᐊᓗ ᐳᐃᔾᑦ ᕿᕈᕐᓃᑦ ᐊᑦᑕᓇᕐᑐᕕᓐᓂᕿᑦᑕᐅᓯᑎᒃ ᖃᓄᐃᓕᖕᖓᑕᐅᒍᐊᕐᑑᓂᕐᒥᓄᑦ ᐃᓄᓐᓄᑦ ᐸᕝᕕᑎᑦᑕᐅᓗᑎᒃ ᐊᒪᓗ ᓄᓇᐅᑉ ᓯᒃᑯᓂᖓᓄᑦ. ᐅᒃᑯᐊᓗ ᑖᒃᑰᑐᐃᓐᓇᓇᐊᕐᑲᓕᕐᓯᑎᒃ ᓯᓕᕐᔪᐊᓕᓛᒥ ᑕᓇᐅᒍᖏᕐᒥᑐᒥᒍᓐᓇᓯᑎᒃ ᑕᓯᕐᒥᐅᑕᐅᑐᐃᓐᓇᓕᕐᓯᑎᑦ. ᐱᓯᒪᔪᓇᔭᐅᔪᑦ ᑕᓇᐅᒥᐅᑕᐅᓯᒪᔪᓂᑦ ᓄᓇᓕᐊᕐᐸᓕᐊᔪᕕᓂᐅᑦᓯᑎᒃ ᐅᓕᑎᓗᒍ Tyrrell Sea, ᑕᓇᐅᒧᓪᓗ ᐅᑎᕈᓐᓇᖕᒋᕐᓯᑎᒃ ᑕᓇᐅᖅ ᑎᓂᒻᒪᑦ, 8000 3000-ᓗ ᐊᕐᕿᒧᐃᑦ ᐊᑯᓐᓂᖓᓂ. ᐱᓪᓗᑯᒋᐊᓕᑎᒍᑦ ᐊᕝᕕᐊᓗᐅᑦ ᐊᒪᓗ ᑕᓯᕐᓅᖃᓯᐊᓇᐊᒥᒃ ᐃᓚᕐᒥᓐᓄᑦ ᐊᔪᕐᓇᓂᕐᒧᑦ, ᑐᑭᓯᐅᑎᑦᓴᓕᓇᖅᑲᕐᒥᑐᖅ ᐃᓚᖓᔪᓂᒃ ᖃᓄᐃᓕᖠᓕᐊᓯᒪᓂᕐᒥᓐᓄᑦ ᑖᒃᑯᐊ ᑕᓇᐅᒥᐅᑕᐅᕐᒥᑐᑦ ᕿᕈᕐᓃᑦ, ᐅᓄᕐᓂᓪᓗ ᒥᑦᓴᐅᓂᕐᑕᐅᓚᓇᖅᑲᔭᕿᑎᒃ ᓈᒪᓈᕐᓗᒥᑦ.

ᑐᑦᑐᐃᑦ ᐅᓄᕐᓂᐸᐅᔪᑦ ᐅᒪᔪᓂᑦ ᐊᒫᒪᑦᑎᓯᔨᓂᑦ ᖃᐅᔨᓴᕐᕕᐅᔪᒥ ᓄᓇᒥ, ᐅᐱᖓᓴᒥ ᑕᕐᕿᓕᐊᓱᒍᓂᕐᒥᑦ ᐅᑭᐊᕐᒪᓗ ᓯᕿᓂᓕᐊᓱᒍᓂᕐᒥᑦ. ᑐᑦᑐᐃᑦ ᖃᐅᔨᓴᕐᕕᐅᔪᒥ ᓄᓇᒦᓱᑦ ᐃᓚᒋᔭᐅᕙᓪᓗᓱᑦ ᑲᑎᒪᓱᓄᑦ ᑕᓯᐅᔭᐅᑉ ᑯᖓᑕ ᑐᑦᑐᖁᑎᕐᒥᐅᓂᕿᐅᑦ Leaf river herd. ᑖᒃᑯᐊ ᐃᓚᒥᒍᓱᑦ ᓇᔪᕐᑕᕐᖃᓱᑦ ᑯᐯᒃ ᑕᕿᖓᑕ ᐅᐊᓐᓂᖓᓂᒃ. ᓄᕿᑖᓇᐊᕐᑐᓱᑦ 20,000 ᑭᓕᒥᑕᓂᒃ ᐅᖓᓯᓐᓂᓕᒻᒧᑦ ᐱᖑᐊᓗᐃᑦ ᓄᓇᖓᓄᑦ. ᑕᕐᕿᒥ ᐊᐅᔭᕐᓯᐅᓯᑦ ᓯᓇᑕᒃᑲᕐᒥᑐᑦᓴᔭᒥ ᐊᒪᓗ ᓯᕿᓂᓕᐊᕐᓂᐊᓕᕐᒥᓪᒥᒃ ᐅᑭᐅᕐᑕᔾᔪᑦ ᓇᕙᕐᑐᓴᔭᕐᒥᓐᓄᑦ ᐅᑭᐅᕐᓯᓕᖓᓚᑦᓯᑎᒃ ᔦᓪᓴ V ᓄᓇᖓᓂ. ᑐᑦᑐᐃᑦ ᖃᐅᔨᓴᕐᑕᐅᕙᓪᒥ ᓄᓇᒥ ᐊᑦᔨᒌᒍᖕᒥᑐᑦ ᓯᓕᐅᑉ ᖃᓄᐃᓂᖓ ᐃᐸᒋᑦᓯᒍ. ᓄᕿᓕᐅᓐᓇᓯᒍᑦᓴᐅᓚᒥ (ᑌᒫᑦ ᔩᓂᐅᑉ ᕿᑎᖓᓂ) ᓯᑉᑎᓪᐱᓇ ᑎᑭᑦᓯᒍ, ᐊᒥᓱᑦ ᑐᑦᑐᐃᑦ ᑕᑯᑦᓴᐅᒃᑕᕿᔭᕐᑐᓴᐅᔪᑦ ᖃᐅᔨᓴᕐᕕᐅᔪᒥ ᓄᓇᒥ, ᑭᓯᐊᓂ ᐸᓐᓃᑦᑦ ᓇᓗᐃᓐᓈᓂᕐᓴᐅᓰᑦ. ᓯᑦᑎᓪᐱᓇᐅᑉ ᐅᑦᑑᐱᓇᐅᓪᓗ ᐊᑯᓐᓂᖓᓂ, ᓯᕗᓪᓕᖢᑦ ᐊᒥᓯᓪᒪᓅᑦ ᑐᑦᑐᐃᑦ ᑎᑭᓰᑦ ᖃᐅᔨᓴᕐᕕᐅᔪᒧᑦ ᓄᓇᒧᑦ ᓄᓕᐅᓂᓕᒫᕐᒥᓗ ᐅᒃᑯᓕᖓᓚᑦᓯᑎᒃ, ᑎᑭᓪᓗᒍ ᐅᑦᑐᐱᓇᐅᑉ ᕿᑎᖓ ᑕᓯᐅᔭᐅᑉ ᑯᖓᑕ ᑐᑦᑐᖁᑎᕐᒥᐅᑦ ᐅᓄᕐᓯᐅᒥᓯᒪᔪᑦ ᓇᓗᓐᓂᑦᑕᐅᓚᐅᕐᑐᕕᓂᑦᓯᑎᒃ ᖃᐅᔨᓴᕐᑎᓄᑦ 1975-ᒥ. 1983-ᒥ, ᐅᓄᕐᓂᖅᑲᑦ ᒥᑦᓴᐅᓵᕐᑕᐅᔪᕕᓃᑦ 101,000ᒧᓂᕿᑦᑕᐅᓯᑎᒃ, 2001-ᒥᓕ ᓄᕿᓕᐅᕆᕐᓯᒪᓕᕐᑎᓗᒥᑦ ᐊᑦᔨᓕᐅᕈᑎᑎᒧᑦ ᑭᑎᑕᐅᑦᓯᑎᒃ ᑖᒃᑯᐊ ᑐᑦᑐᐃᑦ ᑲᑎᒪᓰᑦ ᑯᐯᒻᒥ ᐅᓄᕐᓂᐸᐅᓕᐅᕐᑐᕕᓂᐅᓂᕿᑦᑕᐅᔪᑦ, ᐅᓄᕐᓂᖃᕐᓯᑎᒃ 628,000ᓂᒃ.

ᒥᕐᖑᐃᓯᕐᕕᓕᐅᕐᓂᒧᑦ ᐱᓇᓯᐊᕐᓂᐅᑉ ᖃᓄᐃᓕᖓᓕᕐᒪᖔᑦ ᑐᓴᕐᑎᓯᐅᑏᑦ ᐃᓕᕐᒥᓐᓂ ᐅᖃᐅᓯᓇᔭᐅᓂᕐᒥᑦ ᓄᐃᑕᒋᔮᑦ ᑕᓇᐅᒥᐅᑕᑦ ᓄᓇᒥᐅᑕᓪᓗ ᐊᒫᒪᑦᑎᓯᔾᔪᑦ ᓄᐃᑎᓪᓗᒥᑦ ᓇᓗᓂᕐᑐᑕᐅᓂᕐᒥᑦ ᕿᑭᓗᒐᑦ, ᓇᓄᐃᑦ, ᐊᒪᕈᐃᑦ, ᐊᑦᓴᑦ, ᑐᑦᑐᕓᑦ, ᐅᒥᒻᒐᑦ, ᑲᔪᕐᑐᐃᑦ ᐊᒪᓗ ᑎᓇᒐᓐᓂᐊᑦ ᖃᑯᕐᑕᑦ, ᐅᑲᓕᐊᑦᓯᐊᑦ ᐊᒪᓗ ᐅᑭᐅᕐᑐᒥᔾᔪᑦ ᐅᑲᓖᑦ, ᕿᓪᓚᕐᑯᑦᓯᑦ, ᐸᒥᐅᕐᑑᑉ ᑰᓐᓃᓱᑦ, ᓇᐹᕐᑐᓃᓱᑦ, ᑭᒥᐊᑦ, ᑎᓇᐊᑦ, ᐃᑲᓐᓂᐸᐅᑎᓪᓗᒥᓪᓗ ᑎᓇᐊᑦ ᒥᑭᓂᕐᓴᑦ ᐱᕐᑐᓯᒐᓪᓗ. ᓇᓗᓂᕐᓯᓯᒪᕙᐅᑦᓯᐊᑐᑦ ᑐᑭᓯᐅᑎᑦᓴᑦ ᐃᓚᖓᓯᑦᓯᑎᒃ ᐅᒪᔪᓄᑦ ᐊᒫᒪᑦᑎᓯᔨᓄᑦ ᐊᑦᔨᕐᒦᖏᕐᒥᑐᓄᑦ ᐊᑦᑕᓇᕐᑐᒦᑦᑐᓄᑦ ᓇᓗᓂᕐᑐᑕᐅᓯᒪᓪᒥᔾᔪᑦ.

ᐃᓕᖓᔪᑦ **ᑎᒻᒥᐊᓄᑦ**, ᓄᓇᐅᑉ ᓇᔪᕐᑦᓴᐅᑉ ᐊᖏᓂᖓ ᓄᓇᒥ ᖃᐅᔨᓴᕐᕕᐅᔪᒥ ᐅᓪᓗᐅᕐᐱᓴᑦᓯᐊᑕᕐᑲᕐᐳᑦ ᓂᓇᓚᑦᓴᖃᑦᓯᐊᓯᑎᓪᓗ ᓄᓇᒦᑐᐃᓐᓇᓯᓄᑦ ᑎᒻᒥᐊᓄᓪᓗ ᐊᐅᓪᓚᑕᓯᓄᑦ. ᐃᒪᕐᒦᓯᑦᓴᔭᓂ, ᓂᕐᓃᑦ ᑕᑯᑦᓴᐅᓂᕐᐹᓱᑦ. ᖃᐅᔨᔭᐅᓯᒪᕗᖅ ᐊᑦᑕᐅᓯᑦ ᓂᕐᓃᑦ ᐃᓕᒌᑦᓴᕐᑦ ᒫᓂᓕᐅᓇᐊᕐᑐᓯᒧᒋᐊᕐᒥᑦ ᓄᓇᒥ ᖃᐅᔨᓴᕐᕕᐅᔪᒥ, ᑰᓐᓂᑦ ᐃᒻᒥᑕᐅᑦᑕᑐᓂ ᓯᕐᒥᕐᒥᑦ ᓯᓕᓗᒻᒧᓗ ᐃᒻᒥᑕᐅᑦᑕᑐᓂ ᓯᕐᒥᓂ ᐅᑭᐅᕐᑕᑐᒥ ᓇᑦᓯᕐᑐᓂ ᐅᑌᑦᑐᓂ ᑭᓯᐊᓂ ᒫᓂᓕᐅᑭᓐᓇᓯᑎᒃ ᐊᒪᓗ ᕿᑭᕐᑖᕿᕐᓂ ᐅᔭᖃᕐᒥᑦ ᖁᐊᔭᐅᑎᑕᓕᓐᓂ ᓯᑎᕙᑦᓕᐅᓂᕐᓴᐅᓯᑎᒃ ᐅᑭᐅᕐᑕᔾᔪᑦ ᐱᕈᕐᑐᖃᑦᓯᐊᕐᒥᑦᑐᖓᓂ. ᓂᕐᓃᓪᓕ ᐅᓄᕐᓂᓴᐅᓯᑦ ᐅᐱᕐᖓᒥ ᐅᑭᐊᒥᓗ ᓅᓚᓯᐊᓕᕐᒥᒃ ᐊᒪᓗ ᓂᕿᒥᔭᐅᓕᓇᑦᓯᑎᒃ ᐊᓪᓚᓄᑦ ᐃᓄᓐᓄᓪᓗ. ᑎᒻᒥᐊᑦ ᐱᓐᓂᐊᓯᑦᓴᔭᓂᕐᓕ ᓂᕿᑦᑕᓯᐊᕐᓂᒥᑎᒍᑦ, ᒫᓂᓕᐅᕐᕕᖕᒥᑦ ᐊᒪᓗᑦᑕᖅ ᐃᕐᑲᓯᒪᓂᓇᓯᖕᒥᑦ ᐅᑉᐱᐊᓗᐃᑦ, ᕿᓐᓄᐊᔪᐊᑦ, ᑭᓚᕚᑦ ᑭᓚᓗᐃᓪᓗ, ᐊᓯᖃᕐᒥᓯᑎᒃ ᓇᓗᓂᕐᑐᑕᐅᓯᒪᓪᒥᔪᑦ. ᑐᑭᓯᒍᑎᑦᓴᑦ ᑖᒃᑯᖓ ᑎᒻᒥᐊᓂᒃ ᐊᑦᑕᓇᕐᑐᒦᑦᑐᓂᒃ ᓇᓗᓂᕐᑕᐅᓯᒪᓪᒥᔪᑦ ᐃᓚᕐᒥᓂ ᑖᒃᑯᐊ ᒥᕐᖑᐃᓯᕐᕕᓕᐅᕐᓂᖅ ᖃᓄᐃᓕᖓᓕᕐᒪᖔᑦ ᑐᓴᕐᑎᓯᐅᕐᒥᓂ.

ᐃᓕᖓᔪᑦ **ᐃᖃᓗᓐᓄᑦ**, ᒥᕐᖑᐃᓯᕐᕕᓕᐅᕐᓂᒧᑦ ᐱᓇᐊᕐᓂᐅᔪᖅ ᖃᓄᐃᓕᖓᓕᕐᒪᖔᑦ ᑐᓴᕐᑎᓯᐅᑎᓂ ᓄᐃᑕᔪᑦ ᑐᑭᓯᐅᑎᑦᓴᑦ ᐊᑦᔨᕐᒦᖏᕐᒥᑐᓄᑦ ᐃᖃᓗᓐᓄᑦ ᐸᑎᕐᑑᑉ ᑯᖓᓂᓯᑦ, ᐊᓪᓗᑦ ᖃᓯᒋᐊᓕᖓᓂ ᑕᓯᐅᔭᒥᓗ, ᐊᓯᕐᒥᓐᓂᓗ. ᐃᒪᐅᑉ ᑕᓇᐅᐸᓯᒪᓂᕐᒥᑦ ᐊᑦᔨᕐᒦᖏᕐᒥᓂᕐᒥᑦ ᑕᓯᐅᔭᒥ ᐃᖃᓗᖃᕐᓯᐊᑎᑦᓯᔪᑦ ᓇᔪᓇᐊᒥᒃ ᐃᓯᓇᒥᔭᖃᓂᕐᒥᓐᓄᑦ ᑕᓇᐅᐱᓯᒪᓂᕐᒥᑦ ᑕᓯᕐᒥ ᐊᑦᔨᕐᒦᖏᕐᒪᑕ. ᐊᒥᓱᑦ ᑕᓇᐅᕐᒥᓱᑦ ᑕᓇᐅᒍᖏᕐᒥᑐᒥᓱᓗ ᐅᑲᓐᓂᓱᑦ ᑕᓯᕐᒥ. ᑕᓯᐅᔭᖅ ᐃᓄᐃᑦ ᓂᕿᑦᓴᓯᐅᕐᕕᒋᓇᕆᐅᒃ. ᐃᖃᓗᑦᑕᐅᕙᓪᓗᓰᑦ ᐋᓈᒃᑭᑦ ᑰᓯᐅᑏᑦ, ᐃᒃᑲᔾᔪᓯᐅᑏᑦ ᐃᖃᓗᐊᐲᑦ ᓂᕿᕐᒥᑦ ᖃᑯᕐᑕᑦ, ᑕᓯᕐᒥᐅᑦ ᑲᐱᓯᓖᑦ, ᓯᑕᒪᓂᒃ ᑲᑭᓪᓚᐅᑎᓃᑦ ᑲᓇᔪᐃᑦ, ᓂᑦᑐᓂᒃ ᑲᑭᓪᓚᐅᑎᓃᑦ ᑲᓇᔪᐃᑦ, ᐅᑭᐅᕐᑕᑐᒥᐅᑦᓴᑦ

ᐆᒣᑦ, ᐊᑯᑭᑦᑐᒥᐅᑦᓴᔦᑦ ᐆᒣᑦ ᐊᒻᒪᓗ ᐃᖃᓗᐱᐋᑦ. ᐸᑎᕐᑑᐸ ᑰᖅᒐᓂᓕ 30ᒥᑕᓂᒃ ᐳᕐᑐᓂᓕᒻᒥᒃ ᖁᕐᓗᑐᖃᖅᖁᖅ ᐊᕙᑦᓯᒪᑎᑦᓯᔪᖅ ᑰᒻᒥᒃ ᒪᕐᕈᐃᓕᑎᑦᓯᒍ ᑰᒃ, ᐋᓇᐊᕐᒐᓂ1.4 ᑭᓛᒥᑕᓂᒃ ᐅᖓᓯᓐᓂᓕᒃ: ᑰᑉ ᐃᓯᐊ ᐅᕝᕙᓘᓐᓃᑦ ᑰᑉ ᐋᓇᐊᕐᒐ ᑕᑉᐸᓇᒥᐊᕐᒐᓪᓗ. ᐋᓇᐊᕐᒐᓂ, ᐋᓈᒃᑭᓕᒃ, ᓵᒪᓕᒃ ᑕᓇᐅᕐᓯᐅᑎᐅᖅᒥᑐᓂᒃ ᑕᓯᕐᒥᐅᑕᑦᓴᔭᓂᓪᓗ ᑲᐱᓯᓕᓕᒃ ᐊᒥᓯᓂᒃ. ᖃᓄᐃᓕᕐᒐᓂᓕᒫᕐᒥᑦ ᐊᓪᓚᑕᐅᓯᒪᔫᒐᓗᐊᑦ ᓵᒣᑦ ᑕᓇᐅᕐᒥᐅᖑᖅᒥᑐᑦ, ᑐᑭᓯᐅᑎᑦᓴᑕᖅᖅᒥᑐᑦ ᓇᑭᑦ ᐱᓯᒪᒻᒪᕐᒫᑕ. ᑰᑉ ᐋᓇᐊᕐᒐ ᑕᓇᐅᒪᓛᒍᒐᓗᐊᖅ, ᑖᒃᑯᐊ ᓵᒣᑦ ᓯᑦᔫᒦᑦᑎᑐᐃᓐᓇᐅᓂᕋᕐᑕᐅᔦᑦ ᑎᒥᕐᒥᑦ ᐱᐅᓯᕐᒥᓪᓗ ᐊᑦᔨᑐᐃᓐᓇᐅᒪᑕ ᐃᒪᑦᓯᐊᒥᐅᑕᕐᓂᑦ ᓵᒪᓂᑦ. ᑖᒃᑯᑐᐊᒍᔪᓇᔭᐅᔦᑦ ᑕᓯᐅᔭᕐᔦᐊᑉ ᓂᒻᒥᖅᒐᑕ ᓯᑦᔭᕐᒐᓃᓲᑦᓯᑎᒃ. ᑐᑭᓯᐅᑎᑦᓴᑦ ᐃᖃᓗᓐᓄᐊᕐᒐᔦᑦ ᐊᑦᑕᓇᕐᑐᒦᓐᓂᖁᕐᑕᐅᔪᓄᑦ ᓇᓗᓃᕐᑕᐅᓯᒪᒻᒥᔦᑦ ᒥᕐᖑᐃᓯᕐᕕᒧᑦ ᐱᓇᓯᐊᕐᑕᐅᑉ ᖃᓄᐃᓕᕐᒐᓕᕐᒪᕐᓛᑦ ᑐᓴᕐᑎᓯᐅᑎᑕᕐᒥᓐᓂ.

ᐃᓄᑦᑕᖃᕐᓯᒪᓂᖓ

ᓄᓇ ᖃᐅᔨᓴᕐᕕᐅᔪᖅ ᐃᓄᑦᑕᖃᕐᓯᒪᒻᒥᔪᖅ ᐊᑦᔨᒌᖕᖏᑐᓂ ᑌᑲᓃᑉᐸᑐᕕᓂᐅᒻᒪᑕ, ᑕᒪᒥᒃ ᐅᑭᐅᕐᑐᑐᒥᐅᑦ ᐊᒻᒪᓗ ᐊᓪᓗᑦ. 1750-ᐅᓂᒪᑦ, ᓄᓇ ᓇᔪᕐᑕᐅᓕᐅᒥᔫᕐᓯᒪᔪᖅ ᖃᓪᓗᓈᓄᓪᓗ. ᖃᐅᔨᒪᔭᐅᓕᕐᑐᑦ ᐃᐸᒥᑦᓯᒥᑦ, ᓄᓇ ᓄᓇᑐᕐᓕᑕᓕᒃ 38-ᓂᒃ ᐃᓂᒋᔭᐅᕙᑦᑐᕕᓂᕐᓂᒃ ᐅᑭᐅᕐᑐᑐᒥᐅᓄᑦ ᐃᓄᖕᓄᑦ, 62 ᓄᓇᑐᕐᓃᑦ ᐃᓂᒋᔭᐅᕙᑐᕕᓂᐅᑎᓪᓗᒋᑦ ᐊᓪᓚᓄᑦ, ᐊᒻᒪᓗ ᑕᓪᓕᒪᑦ ᖃᓪᓗᓈᓄᑦ. ᐊᒻᒪᓗᑕᐅᖅ ᐊᓯᖏᑦ 10 ᓄᓇᑐᕐᓃᑦ ᐃᓂᒋᔭᐅᖃᑦᑕᕐᓯᒪᔪᑦ ᐊᑦᔨᒌᖕᖏᑐᓂᒃ ᐃᓗᕿᓯᓕᖕᓄᑦ, 12-ᓗ ᐃᓂᑐᕐᓃᑦ ᓇᓪᓕᖏᓪᓗᓃᑦ ᐃᒣᑦᑐᔭᐅᕗᓚᔭᐅᖅᑲᔭᖅᒥᑐᐃᑦ. ᒪᖏᑦᑕᖅ 5.1 ᓄᐃᑕᑎᑦᓯᔪᖅ ᑐᑭᓯᐅᑎᑦᓴᓂᒃ ᓇᓗᓂᕐᑕᐅᓯᒪᔪᓄᑦ ᓄᓇᑐᕐᓕᓄᑦ, ᓄᓇᖕᖑᐊᑦ 5.1 ᐊᒻᒪᓗ 5.2 ᑕᑯᑦᓴᐅᑎᑦᓯᑎᓪᓗᒋᑦ ᓇᔪᕐᑕᖏᓐᓂᒃ ᖃᐅᔨᓴᕐᕕᐅᔪᒥ ᓴᓂᐊᓂᓗ. ᒪᖏᑦᑕᖅ 5.2 ᑕᑯᑦᓴᐅᑎᑦᓯᔪᖅ ᐊᑐᐃᓐᓇᓂᒃ ᑐᑭᓯᐅᑎᑦᓴᓂᒃ ᑌᒃᑯᓄᖓᐅᓕᖓᔪᓂᒃ ᓄᓇᑐᕐᓕᓄᑦ.

ᓯᕗᓪᓕᐹᑦ ᐃᓕᑕᕐᓇᕈᑎᖏᑦ **ᓄᓇᓯᒪᕙᓐᓂᕕᓂᖏᑦ ᐅᑭᐅᕐᑐᑐᒥᐅᑦ ᐃᓄᐃᑦ** ᓄᓇᕕᒻᒥ ᐃᒣᓪᓗᐊᑎᓪᓗᒎᓕᔭᐅᒍᑎᖏᑦ ᓈᒻᒪᓈᕐᑕᐅᓯᒪᑦᓯᐊᕈᓐᓇᖅᑐᑦ ᑎᑭᑦᓯᒥᑦ 3900 ᐊᕐᖀᒍᐃᑦ ᐅᓪᓗᒥᒧᑦ. ᑐᕐᓂᑕᓂᐊᕐᓃᑦ ᑌᔭᒐᖃᓲᑦ ᑖᑦᓯᒥᖓ ᓯᕗᓪᓕᐹᕕᓂᕐᒥᒃ ᓄᓇᓕᐊᕐᓂᐅᓚᐅᕐᑐᕕᓂᕐᒥᒃ ᑐᓂᖃᓚᐅᕐᑎᓇᒍ. ᑐᓂᖃᓚᐅᕐᑎᓇᒍ ᐃᓅᓯᒪᔪᑦ ᐃᓗᕿᓯᕕᓂᖓ ᓇᓚᐅᑕᐅᓯᒪᒍᓐᓇᓲᖅ ᐊᑯᓂᓂᑕᕐᓄᑦ ᓯᓇᑐᐃᓐᓇᓄᑦ ᐃᓚᐅᑎᓪᓗᒋᑦ ᑐᒪᐅᑎᕕᓃᑦ, ᖂᑭᑦᑐᐃᑦ ᓄᕗᑲᓪᓚᓃᑦ ᖃᔦᑎᑐᑦ, ᕿᓇᓕᐊᐲᑦ ᑐᖁᓴᒍᑎᑦᓴᔦᑦ, ᐊᒻᒪᓗᑭᑖᑉ ᖁᑉᐸᕐᒥᑎᑑᓕᖓᔦᑦ ᕿᓇᓃᑦ, ᓇᐅᓗᑦ ᐊᒻᒪᓗᑭᑕᐅᓕᖓᔪᓪᓗ ᑐᒥᐅᔦᓪᓗ ᖁᓪᓕᓴᔦᑦ ᐃᓗᓃᑦ, ᐊᓯᖃᕐᒥᓯᑎᒃ. ᑐᓂᐅᓕᒍᓐᓇᓯᒪᔪᑦ ᐃᓗᕿᓯᖏᑎᒍᑦ ᑕᑯᑦᓴᐅᓯᒪᔪᑦ ᓄᓇᕕᒻᒦᑐᐃᓐᓇᐅᓂᐅᑦᓯᑎᒃ ᑎᑭᑦᓯᒍ 2700 ᐅᕝᕙᓘᓐᓃᑦ 2800 BP-ᒧᑎᓪᓗᒍ, ᑌᒪ ᐊᓯᖏᑦ ᐃᓚᖀᒧᒻᒥᔦᑦ ᖃᐅᔨᒪᔭᐅᔦᑦ ᑭᖑᓪᓕᕕᓃᑦ ᑐᓂᖃᓚᐅᕐᑎᓇᒍ ᐃᓗᕿᓯᓃᑦ ᐃᓕᑕᕐᓇᕈᑎᖃᕐᓯᓐᓂᒥᔦᑦ, ᐊᓯᒥᒻᒥᔭᖏᑎᒍᓪᓗ, ᐊᑦᔨᒦᓂᒃ ᓄᕝᕙᓐᑐᓂᒃ ᖃᕐᔫᔭᕐᓂᒃ ᐱᖃᑐᕕᓂᐅᑦᓯᑎᒃ ᐊᑦᓴᒥᔭᐅᓪᓗᑐᖕᖏᒥᔦᒃ ᐃᓚᐅᑎᓪᓗᒋᑦ ᒪᓂᕋᐅᓴᒧᑎᖃᓪᓚᓇᑦᓯᑎᒃ ᑌᒣᑦᑐᓂᒃ, ᐃᕐᓯᕕᐅᔭᕐᓂᓗ ᐊᑖᖏᑦ ᖃᕐᔫᔭᓂᒃ ᐊᒻᒪᓗ ᐊᒻᒪᓗᑭᑖᑉ ᖁᑉᐸᖏᑦᑕ ᓴᓇᒻᒪᓕᓐᓂᒃ ᓇᑲᑎᓇᐅᑎᑦᓴᔭᓂᒃ, ᐊᑐᕐᐸᑐᕕᓂᐅᑦᓯᑎᓪᓗ ᐊᒥᓯᐃᓂᒃ ᐆᒪᔦᕕᓂᑦᓴᔭᓂᒃ ᐊᓯᖏᓐᓂᓗ ᓄᓇᒥᓂᑕᕐᓂᒃ. ᖃᐅᔨᓴᕐᓯᒪᓂᖏᑦ ᖃᒻᒥᐅᓂᕐᓴᖅ ᑐᓂᕐᑕᓂᐊᕐᓃᑦ ᖃᐅᔨᒥᐅᕈᑎᖃᓕᕐᓂᒥᔦᑦ ᑐᓂᕕᓂᓪᓚᓐᓇᓂᒃ ᓯᕗᓪᓕᐸᐅᑦᓯᑎᒃ ᓄᐃᔦᕕᓂᐅᕙᓪᓗᓕᕐᒪᑕ ᐃᓄᑦᑖᐸᓪᓕᐊᓂᐅᔭᓪᓕᕐᑎᓗᒍ ᓄᓇᕕᒃ. ᑖᒃᑯᐊ ᑐᓂᕕᓂᓪᓚᓐᓃᑦ ᑲᔪᓯᑐᐃᓐᓇᑐᕕᓂᐅᔫᖕᖏᑐᑦ ᑌᑲᓃᑐᐃᓐᓇᑑᔭᕐᓯᒪᖕᖏᑐᑦ ᐊᒻᒪᓗ ᑭᖑᓪᓕᕕᓂᖏᑦ ᑐᓃᑦ ᑭᖑᓪᓕᕕᓃᑦ, ᓂᒪᕐᓂᖏᑦ ᐊᑦᔨᒌᖕᖏᑐᓂᒃ ᐃᓗᒃᒧᓯᓃᑦ ᑕᑯᑦᓴᐅᒧᑎᖃᕐᒪᑕ ᐊᓯᑦᔨᐸᓪᓕᐊᓕᓯᒪᓂᕐᒥᑎᒍᑦ. ᑐᓃᑦ ᓴᓇᕐᕈᑎᕕᓂᖏᑦ ᐃᓚᖃᕐᒥᔦᑦ ᑑᖑᔫᕐᑐᓂᒃ ᓴᓕᒍᐃᒍᑎᑦᓴᔭᕕᓂᕐᓂᒃ, ᖃᔦᑎᑐᑦ ᓴᓇᒻᒪᓕᓐᓂᒃ ᓄᕝᕙᓐᑑᓯᑎᒃ, ᒥᑭᔦᕐᓚᓂᒃ ᕿᓇᓕᐊᐱᓐᓂᒃ, ᓴᕕᓐᓂᓗ ᐊᑦᔨᒌᖕᖏᑐᓂᒃ ᐊᒻᒪᓗ ᓄᕝᕙᓃᑦ ᓯᕐᒥᐅᔭᕐᑕᖃᕐᓯᑎᒃ ᓵᑦᑐᔭᑦ, ᐊᑦᔨᒌᖕᖏᑐᑦ ᓴᓇᖀᑦ ᓄᓇᒥᐅᑌᑦ ᐊᑐᕐᓯᒥᑦ ᓴᓇᓯᒪᔦᑦ, ᑕᑯᒥᓇᕐᑐᐊᓇᓯᒪᔦᐃᓪᓗ, ᐊᓯᖃᕐᒥᓯᑎᒃ. ᑖᒃᑯᐊᒍᖂᑐᑦ ᐃᓄᐃᑦ ᑐᓂᐅᓂᕐᑕᖏᑦ ᐅᖃᐅᓯᕐᒥᑎᒍᑦ ᐳᐃᒍᕐᑕᐅᓯᒪᔭᐊᓇᖕᖏᓯᒥᑦ.

1300 ᐊᕐᖀᒍᓚᓖᖓᓂ, ᑑᓪᓖᑦ (Thule) ᐃᓗᕿᓯᓃᑦ ᐊᓯᒥᔭᐅᒻᒥᔦᓂᒃ ᑕᕐᕋᒥ ᓄᐃᒥᐊᑲᓪᓚᓚᐅᕐᑐᐱᓃᑦ. ᑑᓪᓖᑦ, ᑌᔭᐅᒍᓯᖃᕐᒥᔦᑦ Neo-Eskimo, ᐃᓄᓐᓂᒃ ᑭᖑᐹᖅᑐᐱᓂᐅᒥᐊᖏᑦ ᐃᓯᒪᒥᔭᐅᑦ. ᑖᒃᑯᐊ ᑎᑭᓚᐅᕐᑐᐱᓃᑦ Berengia ᓄᓇᖓᓂᑦ ᐊᑯᑭᑦᑐᒥ ᖃᓂᖕᖏᓂᕐᐸᒥᑦᓯᒍ ᐱᓯᒪᑦᓯᑎᒃ, ᑌᑯᖕᖓᓕᐊᕐᓯᑎᒃ ᖁᕐᓯᑕᓂᒃ ᓄᔭᓕᐊᓗᓐᓂᒃ ᑲᑎᓯᖃᑦᑕᓚᐅᕐᑐᐱᓃᑦ. ᑑᓪᓖᑦ ᐃᓕᑕᕐᓇᕈᑎᖃᕐᐳᑦ ᐊᑦᔨᒌᖕᖏᑐᓂᒃ ᓴᓇᕐᕿᑎᖃᕐᓯᒪᓂᐅᓕᒥᒃ, ᐃᓚᐅᑎᓪᓗᒋᑦ ᐃᒎᑕᖅ, ᐅᓗᒃ, ᐱᑎᑦᓯᓂᒃ ᖃᔦᓂᓪᓗ, ᖃᔦᑦ ᐅᒥᐊᓪᓗ, ᖁᓪᓃᑦ ᐊᒻᒪᓗ ᐃᑐᓃᑦ. ᓂᐅᕐᕈᓴᐱᐅᑉ ᓄᐃᑕᐅᓂᕕᓂᒃ ᐱᕐᐊᕕᕕᓂᐅᓂᕐᑕᐅᒍᓐᓄ ᑌᑦᓯᒪᓂᓂᑌᑦ ᐊᓂᒍᕐᓯᒪᓕᕐᑎᓗᒥᑦ ᐃᓄᐃᓪᓗ ᓄᓇᕕᒻᒥ ᓄᓇᓯᒪᓕᓚᓇᓯᑎᓗᒥᑦ. ᑕᕝᕙᓂ, ᐃᓄᐃᑦ ᓂᐅᕐᕈᓴᐱᐊᑦ ᐊᓯᐊᓃᕐᓯᕐᐹᑐᕕᓂᖕᖏᑦᑑᖕᖑᐊᕐᓯᐊᓂᓕᑕ. ᐃᓄᐃᑦ ᐱᐅᓯᓇᓯᒪᔭᕐᒥᖓ ᐊᓯᑦᔨᐸᓪᓕᐊᓚᓇᓯᔭᕕᓃᑦ 1950-ᐄᑦ ᓄᖕᖑᐊᓂ ᓅᑦᑎᕐᑲᑭᑐᕚᓪᓕᐊᓯᒪᓂᒪᑕ. ᑐᓂᕐᑕᓂᐊᕐᓃᑦ ᐅᕐᑲᐅᓯᕐᑲᓲᑦ ᑌᑦᓯᒪᓂᑕᐅᓂᕈᒧᑎᕐᑲᕐᓯᑎᒃ ᐃᓄᐃᑦ ᓂᒪᕐᓇᖕᒥᕐᐸᓕᐊᓯᓂᕕᓂᖕᓂᒃ, ᐊᒻᒪᓗ ᑕᒪᑕᒪᕐᓂᑕᐅᓂᕈᑦᓯᑎᒃ 1950-ᐄᑦ ᑭᖑᓂᖕᖓᓂᑦ ᐅᓪᓗᒥᒧᑦ.

ᐊᓪᓚᑕᖃᕐᐸᓂᕕᓂᖓ ᓄᓇᐅᑉ ᖃᐅᔨᓴᕐᕕᐅᔫᑉ ᓄᐃᑕᑦᓯᐊᑐᑦ. ᐃᓚᐅᑎᓪᓗᒋᑦ ᑐᓂᕐᑕᓂᐊᕐᓂᑎᒍᑦ ᖃᐅᔨᒪᑦᓴᐅᒍᑎᓕᓐᓂᒃ, ᑐᑭᓯᒋᐊᓪᓚᑎᑕᐅᓯᒪᔪᒧᑦ ᐅᖃᐅᓯᑎᒍᑦ ᐅᓂᒃᑳᑕᐅᓯᒍᓂᖏᓐᓄᑦ, ᓄᓂᑦ ᐊᑦᓯᔭᐅᓯᒪᓂᖏᓐᓄᑦ,

ᖃᐅᔨᓴᕐᑕᐅᓯᒪᓂᖕᒥᓐᓄᓪᓗ ᐊᓪᓗᑦ ᑯᔩᑦ ᓄᓇᒥᒃ ᐊᑐᕐᐸᑐᐱᓂᐅᓂᖕᒥᑎᒧᑦ. ᐃᓅᓐᓈᒧᑦ, ᐊᓪᓗᑦ ᐊᓯᖃᓚᐅᕋᑎᒃ ᓄᓇᓯᒪᕖᑦᑐᐱᓂᐅᓂᖕᒥᑦ ᐊᐱᑦᓯᒪᑎᑕᐅᒧᓐᓇᔫᒃ ᒪᕿᐱᑦᑐᐱᓂᐅᓂᕋᕐᑕᐅᓗᑎᒃ: ᖃᓪᓗᓈᖃᕐᓂᐅᔭᕐᑎᓇᒧ, 4000-ᓂᑦ 1600-ᓄᑦ BP, ᖃᒻᒥᐅᓂᕐᓴᓪᓗ ᖃᓪᓗᓈᖃᕐᓂᐅᔭᕐᓂᓴᐅᓕᕐᑎᓗᒧ, 1600-ᓂᑦ 300-ᓄᑦ BP. ᐊᑯᓂᓂᑕᐅᓂᕐᓴᑦ ᐃᓕᑕᕐᓇᕈᑎᓖᑦ ᓄᐃᑕᓂᖕᒥᓐᓄᑦ ᒥᑭᔪᕐᓗᑦ, ᐊᑕᐅᓰᓄᑦ ᐃᓕᒦᓄᑦ ᐃᑎᕐᕕᓴᐅᕙᑦᑐᐱᓃᑦ ᐊᑐᕐᐸᑐᐱᓂᐅᓂᖕᒥᓐᓄᓗ ᐅᔭᕋᕐᓂᒃ ᐅᑲᓂᒥᐅᔭᓂᒃ ᖃᑯᕐᑕᐅᓯᑎᒃ. ᖃᓪᓗᓈᖃᕐᓂᐅᔭᕐᓂᓴᐅᓕᕐᑎᓗᒧ ᐃᓕᕆᑉᐸᑐᐱᓃᑦ ᓯᕗᓪᓕᕕᓂᖏᔭᐅᕐᖁᑐᑦ ᐅᓪᓗᒥᐅᓕᕐᑐᖅ ᐊᓪᓚᓄᑦ ᑯᔩᓄᑦ. ᔦᓯ ᐯᒥᐅᕕᓃᑦ ᐊᒪᓗ ᐅᖃᐅᓯᖃᕐᓯᑎᒃ ᐊᓪᓚᑎᑐᑦ ᐊᓪᑳᖅᑯᐃᑎᑐᑦ ᐊᑦᔨᒥᔭ ᐅᓚᓵᒪᑦ ᑖᓐᓇ ᐅᖃᐅᓯᖅ ᐅᓪᓗᒥ ᐊᓪᓚᑎᑐᑦ ᑯᔨᑎᑐᑦ ᐅᖃᐅᓯᕐᒧᑦ ᓴᓂᓪᓕᓕᕕᓂᐅᑦᓯᑎᓪᓗ, ᐃᓐᓄᓂᒃ (Innu) ᐊᓪᓚᐅᓯᑎᒃ ᓇᕐᑳᐱᓂᒧ. ᑐᓂᕐᑕᓂᐊᕐᑏᑦ ᐃᓚᖕᒥᑦ ᑖᒃᑯᓂᖓ ᐊᓪᓚᓂᒃ ᑎᑭᑦᑐᕕᓂᐅᔭᓇᑦᓯᔩᑦ ᓯᕿᓂᒥᐊᒥᑦ ᐱᑦᓯᑎᒃ. ᓄᓇᑐᐃᓐᓇᒥᓗ ᐃᓂᑐᕐᑏᑦ ᐃᓕᑕᕐᓇᕈᑎᖃᕐᓯᑎᒃ ᐊᑐᕐᑕᐅᓚᓇᐸᑐᐱᓂᐅᓂᖕᒥᓐᓄᒃ ᐅᔭᕈᑦ ᓯᑎᔪᕌᑦ ᖃᑯᕐᑕᐅᓯᑎᒃ, ᐃᓚᖕᒥᓗ ᐱᐅᓕᓂᐊᒐᐅᓯᒪᔪᑦ ᑌᑲᓂ ᐸᑎᕐᑑᒥᓂᑕᕐᓂᒃ ᐅᔭᕋᕐᓂᒃ. ᐊᒪᓗ ᓄᐃᑕᓂᖕᒥᑦ ᐊᑐᕐᑕᐅᓯᒪᓂᖕᒥᓗ ᐅᔭᕈᑦ Ramah quartzite ᐱᓯᒪᔪᑦ ᑏᐸᑐᐊᑉ ᑕᕐᕋᖕᒐᓂᑦ ᐃᓗᕐᕿᓯᑎᒧᑦ ᐱᐅᓯᖃᖃᑎᒌᓚᑏᑦᑐᐱᓂᐅᓂᖕᒥᓂᒃ ᑯᐯ ᑕᕐᕋᖕᒐᓃᑦᑐᑦ ᓚᑰᑐᐊᒦᐸᑐᐱᓃᓪᓗ, ᓄᐃᑕᑎᑦᓯᓯᑎᒃ ᐊᓪᓗᑦ ᐃᓂᖃᓪᓚᓇᐸᑐᐱᓂᐅᓂᖕᒥᓂᒃ ᓄᓇᒥ ᖃᐅᔨᓴᕐᐱᐅᔪᒥ ᓂᐅᕐᕈᓴᖃᑎᖃᐸᑐᐱᓂᐅᓂᖕᒥᓂᓗ ᐅᔭᕋᑦᓴᔭᓂᒃ ᐱᐅᒃᑯᑎᖃᕈᒪᓂᕐᒥᓄᑦ. ᖃᒥᐅᓂᕐᓴᒥ ᖃᓪᓗᓈᑦ ᑎᑭᓚᐅᕐᑎᓇᒥᑦ ᑎᑭᑦᓯᒧ ᖃᒥᐅᕙᓪᓕᐊᔪᑦ, ᐊᑦᔨᒌᓕᓖᓂᒃ ᐱᓇᓱᐊᕿᓯᖃᕐᐸᑐᐱᓂᐅᓂᖕᒥᑦ ᓄᓇᕐᓖᓗᒻᒦᒐᓗᐊᕋᒥᒃ ᔦᓯ ᐯᒥ ᐊᒪᓗ ᑯᐯᒃ ᑕᕐᕋᖕᒪᑕ ᐃᓚᖕᒐᓂ. ᐃᓗᐱᓂᖕᒥᑦ ᐃᑯᐊᓚᑦᓯᕕᐱᓂᖕᒥᓗ ᐊᑦᔨᒦᒐᓖᑦ, ᐱᓗᐊᕐᑐᒥᒃ ᒪᕿᐃᓗᐊᖖᒍᐊᒃ ᐃᓗᓇᓴᐅᕙᑦᑐᐱᓃᑦ ᐊᓪᓚᓄᑦ ᑯᔩᓄᑦ. ᐅᑦᓯᒪᓂ, miichiwaahps ᓴᓇᔭᐅᕙᑦᑐᐱᓃᑦ ᐊᓇᕐᖁᕐᒥᑦᑕ ᐃᓗᐊᓂ ᓄᓇ ᒪᓂᖁᐅᓯᕐᓯᒍ ᕿᑎᖕᒐᓗ ᓄᓇ ᐃᓗᕐᓴᓕᕐᑐᓯᒍ, ᐅᔭᖁᖅ ᕿᑎᖕᒐᓄᑦ ᐃᓗᖕᒐᑕ ᐃᑯᐊᓚᑦᓯᕕᒃ ᐃᓕᑦᓯᒍ.

ᖃᓪᓗᓈᑦ ᑎᑭᓯᒪᓚᓕᕐᓂᖕᒥᑦ ᐱᒥᐊᓚᐅᕐᑐᐱᓂᐅᑦᓯᑎᒃ ᑕᓯᐅᔭᐅᑉ ᓄᓇᖁᑎᖕᒐᓂ 1740 ᐊᕐᕌᒍᖕᒥᓐᓂ, ᖃᑦᓴᓐ V ᑲᒥᐸᓂᒃᑯᑦ ᓄᓇᒥᒃ ᖃᐅᔨᒥᐊᕈᒪᓕᕐᓯᑎᒃ ᑕᕐᕋᖕᒐᓂᒃ (pointe Louis XIV) Louis XIV Point, ᖃᓪᓗᓈᑎᑐᑦ ᑌᔭᐅᔾᔫᖅ Cape Jones. ᐃᑉᐱᒥᑦᓯᒥᑦ ᐊᑐᐃᓐᓂᑦ ᐱᕙᓪᓕᐊᓯᒪᔭᓂᒃ ᓇᓗᓂᕐᑐᐃᕕᐅᓯᒪᔪᑦ, ᖃᑦᓴᓐ V ᑲᒥᐸᓂᒃᑯᑦ ᓇᑉᐸᐅᖃᕐᑕᐱᓂᖕᒐ ᓂᐅᕐᕈᓴᕕᒃ ᑰᑉ ᐋᔅᑌᓐ ᑕᕐᕋᖕᒐᓃᓚᐅᕐᑐᐱᓂᖅ ᓴᓇᔭᐅᓚᐅᕐᑐᐱᓂᖅ 1750ᐅᑎᓪᓗᒍ ᕿᑭᕐᑖᓗᒻᒥ ᓯᕿᓂᖕᒐᓂ ᓯᑦᔭᖕᒐᑕ ᑕᓯᐅᔭᐅᑉ ᐊᑎᖃᕐᑎᑕᐅᓚᐅᕐᑐᐱᓂᖅ Richmond Fort. ᐅᑦᓯᒪᓂᑦᓴᓇᑲᔫᒃ, ᖃᑦᓴᓐ V ᑲᒥᐸᓂᒃᑯᑦ ᐅᔭᕋᕐᓂᐊᕐᑲᑕᓚᐅᕐᑐᐱᓃᑦ ᕿᓚᓗᒐᕐᓂᐊᕌᒍᓯᑎᓪᓗ ᕿᓚᓗᒐᕐᓯᐅᕕᒻᒥ. ᕿᒣᓚᐅᕐᑐᐱᓃᑦ ᐅᔭᕋᕐᓂᐊᕕᕕᓂᕐᒥᓂᒃ 1751ᒍᑎᓪᓗᒍ, ᐅᑲᓂ ᓴᕕᕋᔭᕐᑕᑕᖕᒥᑦ ᐱᐅᑦᓯᐊᓚᐅᕐᓂᖕᒥᒻᒪᑕ, ᐃᓗᐊᐱᒃ ᓴᓇᔭᐅᓚᐅᕐᑐᐱᓂᖅ ᐅᔭᕋᕐᓂᐊᑎᓄᑦ ᐃᓗᒥᔭᐅᕚᓕᕐᓂᒥᔪᖅ ᕿᓚᓗᒐᕐᓂᐊᓇᐅᓕᕐᒪᑦ. 1756ᒥ ᖃᑦᓴᓐ V ᑲᒥᐸᓂᒃᑯᑦ ᓅᑦᓯᓕᓚᐅᕐᑐᐱᓃᑦ Richmond Fort-ᒥᒃ ᕿᓚᓗᒐᕐᓯᐅᕕᒻᒧᑦ ᒥᖁᓕᑦᓴᔭᓂᒃ ᐱᓂᕐᓴᐅᖃᑦᑕᕈᒪᒧᑦ. ᓄᑖᖅ ᓂᐅᕐᕈᓴᕕᒃ ᐃᖕᒥᕐᖁᓯᑦᓯᐊᓕ-ᐅᕐᓂᖕᒥᑦᑐᖅ 1758ᒍᓚᐅᕐᑎᓇᒍ. ᐅᒪ ᑭᖑᓂᖕᒐᒍᑦ, ᖃᑦᓴᓐ V ᑲᒪᓂ ᑐᑭᑖᓕᕐᑐᐱᓂᖅ ᐅᒃᑯᐊᓯᓕᖕᒐᒥᐊᒥᒃ ᓂᐅᕐᕈᓴᕕᒥᓂᒃ Cape Jones ᑕᕐᕋᖕᒐᓃᑦᑐᒥᒃ, ᒥᖁᓕᔭᕐᑖᓯᐊᖕᖏᒥᓂᑯᒥᓄᑦ ᑖᕗᖖᒐᓕᐊᕐᓂᖕᒥᑦ ᐊᑭᖃᕐᓂᓴ-ᐅᓐᓂᒪᑕ ᓂᐅᕐᕈᓯᐊᒥᓂᑦ ᒥᖁᓕᔭᕐᓄᑦ ᐊᑭᓂᖅᑲᔭᕐᓇᒥᑦ. 1800 ᐊᕐᕌᒍᖕᒥᑦᑕ ᕿᑎᓕᖓᖕᒐᓂᑭᓯᐊᓂ ᖃᑦᓴᓐ V ᑲᒪᓂ ᐱᒥᐊᓕᖅᑭᒥᐊᓪᓚᕋᓯᐊᓯᔦᕕᓂᖅ ᑖᕙᓂ ᓄᓇᒥ, ᐃᓄᐃᑦ ᓂᐅᕐᕈᖃᑕᖕᒥᑦ ᐱᒥᐊᕐᓯᒪᑦᓯᐊᓕᕐᒪᑕ ᑭᓯᐊᓂ. ᐅᓕᒃ, 1851-ᒥ, ᒥᑭᔪᒥᒃ ᓂᐅᕕᕐᕕᒥᒃ ᓄᐃᑦᓯᓕᕐᑐᕕᓃᑦ ᐱᖕᒐᓯᓂᒃ ᐱᓇᓯᑦᑎᕐᑲᕐᓯᑎᒃ ᕿᓚᓗᒐᕐᓯᐅᕕᐱᒃ ᑰᖕᒐᑕ ᑰᓇᐊᖕᒐᓂ. ᐊᑦᔨᖑᐊᑦ 1800 ᐊᕐᕌᒍᖕᒥᑦᑕ ᓇᓂᖕᒥᓐᓂ ᑕᑯᑦᓴᐅᑎᑦᓯᔪᑦ ᕿᓚᓗᒐᕐᓯᐅᕕᒻᒥ ᓂᐅᕐᕈᕕᒃ ᓴᓇᔭ ᐅᓯᒪᓂᕕᓂᖕᒐᓂᒃ ᑰᑉ ᓯᕿᓂᖕᒐᑕ ᓯᑦᔭᖕᒐᓂ ᐊᖕᒥᔪᓕᓖᕕᓂᐅᑦᓯᓂᒧ. ᑖᓐᓇ ᓂᐅᕐᕈᕕᒃ ᐅᒃᑯᐊᑕᐅᓚᐅᕐᑐᐱᓂᖅ 1891ᒍᑎᓪᓗᒍ. 1921ᒥ, ᖃᑦᓴᓐ V ᑲᒥᐸᓂᒃᑯᑦ ᐅᒃᑯᐃᓯᒥᐊᓪᓚᓪᓚᕐᑐᐱᓂᐅᒪᒥᔪᑦ ᓂᐅᕐᕈᕕᒪᒥᒃ ᑕᓯᐅᔭᒥ, ᓂᕈᐊᕐᓯᑎᑦ ᐃᓂᑦᓴᖕᒐᓂᒃ ᓯᕗᕐᕗᓃᓐᓂᕐᑕᐅᔪᖅ ᑐᖖᒐᕕᕕᓂᖕᒐᑕ ᓂᐅᕐᕈᕕᐅᓚᐅᕐᓂᒥᔫᑉ Richmond Fort ᐊᑎᖃᕐᑎᑕᐅᓚᐅᕐᑐᐱᓂᐅᑉ.

ᑭᖑᓕᕚᕐᒥᑦ ᐃᓚᖕᒥᑦᑕ ᒥᖅᑯᐃᓯᕐᕕᓕᐅᕐᓂᒧᑦ ᐱᓇᓱᐊᕐᓂᐅᑉ ᖃᓄᐃᓕᖓᓕᕐᒪᖔᑦ ᑐᓴᕐᑎᓯᐅᑏᑦ ᓄᐃᑕᑎᑦᓯᔪᑦ ᓇᓗᓂᕐᑐᓯᐊᕐᓯᒪᔪᒻᒪᕆᓐᓂᒃ **ᐱᕙᓪᓕᐊᓯᒪᓃᑦ ᕿᒥᕐᕈᔭᐅᓂᖕᒥᓐᓂᒃ ᐃᓅᓐᓇᖕᒥᑦᑕ** (1740ᒥᑦ 1970 ᒧᑦ ᐱᐅᓯᐅᕐᑲᑦᑕᓯᒪᔪᓂᒃ) ᐅᑭᐅᕐᑕᐅᒨᓕᖕᒐᔪᓂᒃ ᐊᓪᓚᓄᐊᖕᒐᔪᓕᕐᓗ ᐅᒥᐅᔭᐅᑉ ᒍᑦᔪᐊᕐᕉᐱᐅᓗ ᓴᓂᓖᖕᒐᓂ, ᐱᓗᐊᕐᑐᒥᒃ, ᖃᓪᓗᓈᑦ ᖃᓄᐃᓕᖖᒉᕙᓪᓕᐊᓯᒪᓂᖕᒥᓐᓂᒃ. ᑖᒃᑯᐊ ᓇᓗᓀᒃᑯᑌᑦ ᓇᓗᓀᕐᑐᐃᓯᐊᕐᕕᐅᓯᒪᔪᑦ ᐊᑦᔨᒌᖕᖏᑐᓂᒃ ᐃᓕᒃᑰᑎᕐᓯᑎᒃ ᓄᓇᓯᒪᕙᓪᓚᐅᕐᑐᕕᓃᕐᓄᑦ, ᓈᒻᒥᒋᐅᑎᖕᖏᓂᐅᕙᓪᓚᐅᕐᑐᕕᓃᕐᓂᓗ, ᑭᖑᓂᖕᒐᓂᓗ ᐃᑲᔪᕐᑎᒌᓯᕙᓪᓕᐊᓂᕕᓂᖕᒥᓄᑦ ᖃᓄᐃᑦᓴᖃᑎᒌᖕᖏᒍᕙᓪᓕᐊᓯᓂᕕᓂᖕᒥᓄᑦ, ᑖᒃᑯᐊ ᓄᐃᑕᐅᓯᒪᔪᑦ ᓄᓇᒥ-ᐅᒍᖃᑕᐅᖕᖏᑐᓄᑦ ᐊᒥᐃᓄᑦ (ᒥᕐᑯᓕᔭᓂᒃ ᓂᐅᕐᕈᓰᑦ. ᐊᔪᕿᕐᑐᐃᓰᑦ, ᓄᓇᐅᑉ ᖃᓄᐃᓕᖕᒐᓂᖕᒥᓂᒃ ᖃᐅᔨᓴᕐᑏᑦ, ᐅᔭᕋᓂᐊᕐᑏᑦ, ᑕᑯᔭᕐᑐᑏᑦ, ᑲᕙᒪᒃᑯᑦ ᑭᒻᒪᖕᒥᑦ ᐃᓗᕐᕈᓯᖃᑎᒌᖕᖏᑐᓂᓪᓗ ᖃᐅᔨᓴᕐᑏᑦ, ᑖᒃᑯᐊᓕ ᓇᓪᓕᖕᒥᓪᓗᓃᑦ ᐃᓄᑐᐃᓐᓇᐅᓂᖕᖏᓪᓚᑦ ᐊᓪᓚᐅᓚᑎᓗ).

1700 ᐊᕐᕋᒍᒥᑦᑕ ᕿᑎᖕᒐᓂᓚᐃᖕᒐᓂ ᑕᔨᐅᔭᖅ, ᐊᓪᓗᑦ ᖃᔨᒥᐊᓕᖕᒐ ᐊᒻᒪᓗ Lake Loups Marins ᐱᐅᔪᑦᑯᕐᒥᑎᒧᑦ ᑭᓪᓕᕐᑯᑎᒥᔭᐅᓕᕐᑐᐃᓐᓂᑦ ᐊᓪᓚᓄᑦ ᐃᓄᓐᓄᓗ, ᐅᒃᑯᐊᓗ ᓄᓃᑦ ᑕᕐᕋᒥ ᑭᓪᓕᒥᔭᐅᑦᔨᑎᒃ ᓇᕚᕐᑐᓄᑦ. ᐊᓪᓚᓂᒃ ᓂᐅᕐᕈᓴᕐᑲᑎᕐᑲᕐᑲᑦᑐᐃᓂᐅᓕᓈᓚᓗᐊᕐᓯᑎ ᖃᑦᓴᓐ V ᑲᒥᐸᓂᒃᑯᑦ, ᖃᔨᒥᐊᑦ ᐊᒥᖕᒥᓐᓂᒃ ᑕᓇᐅᐸ ᐊᑭᐊᓂᒥᐅᑦ ᐱᔪᒪᓂᖕᒥᓐᓄᑦ ᐃᓄᓐᓂᒃ ᓂᐅᕐᕈᓴᕐᑲᑎᕐᑲᕋᔪᐊᕐᑐᐃᓐᓂᑦ. ᑖᒃᑯᐊ ᐱᖕᒐᔪᐃᑦ ᐊᓪᓗᑦ, ᐃᓄᐃᑦ ᖃᓪᓗᓈᓪᓗ ᐃᓖᓐᓂᑯᑦ

ᐊᑭᕋᒦᓕᐅᒥᔻᕐᓂᓇᖃᑦᑕᓯᒪᔭᖕᒥᑦ, ᐅᑎᕐᕕᐅᓯᐊᖅᖃᔭᖖᒥᓂᕐᒥᓄᓪᓗ ᒥᖅᑯᓕᔭᓄᑦ ᐅᕐᓯᓄᓪᓗ, ᖃᑦᓴᓐ V ᑲᒥᕙᓂᒃᑯᑦ ᕿᒐᓕᕐᓂᒥᔪᑦ ᓇᔪᕐᕙᓕᕐᑕᕕᓂᓇᑦᓯᒍ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓂᒻᒥᖕᒐᓂ ᓯᕐᑭᓂᕐᒥ.

1821-ᒥ, ᓵᓕᒋᐅᑎᒐᓯᐊᖃᑎᖃᕐᓂᖕᒐ ᓄᐊᔅ ᒍᐃᐊᔅ ᑲᒻᕙᓂᑯᓗ Northwest Company ᐃᓯᓕᑎᓪᓗᒍ ᓲᖕᒍᓯᐅᒥᓕᕐᓂᒥᔪᑦ ᖃᑦᓴᓐ V ᑲᒥᕙᓂᒃᑯᑦ ᐊᐅᓚᑦᓯᓂᖕᒐ ᒥᖅᑯᓕᔭᕐᓂᒃ ᓂᐅᕐᕿᑎᕐᑎᓂᒃ ᑳᓇᑕᐅᑉ ᑕᕐᑫᖕᒐᓂ. ᐱᓕᐅᑎᓂᕐᒍᑦ ᓄᓇᖅᑳᓯᒪᔪᑦ ᖃᓄᐃᓕᖕᖏᓯᒪᖃᑦᑕᓕᕐᑐᕕᓃᑦ ᓂᐅᕐᕿᓯᕐᓂᒍᑦ ᒪᓕᒐᕐᓂᒃ, ᑭᓯᐊᓂ ᑕᒪᓐᓇ ᐃᓯᓕᒻᒪᑦ, ᑲᒻᕙᓂᒥᒃ ᑲᒪᔪᑦᓴᐅᔻᕐᓂᖕᒥᑦ ᐊᓯᑦᔅᓕᕐᓂᒥᔪᑦ. ᓄᓇᑐᕐᖁᓪᓗ ᐆᒪᔪᕐᓯᐅᕕᐅᓗᐊᕐᓯᒪᓕᕐᒪᑕ, ᖃᑦᓴᓐ V ᑲᒥᕙᓂᒃᑯᑦ ᓄᑖᓂᒃ ᐆᒪᔪᕐᓯᐅᕕᐅᓚᐅᕐᓯᒪᖕᖕᒥᓂᕐᓴᓂᒃ ᐊᖕᒥᓕᒥᐊᕐᐱᖃᕿᒪᓯᔪᕕᓃᑦ. ᕗᐊᑦ ᓴᔫ Fort Chimo (ᐅᓪᓗᒥ ᑌᔭᐅᓕᕐᑐᖅ ᑰᑦᔪᐊᖅ) ᐅᖕᒐᕚᐅᑉ ᓯᑦᔭᖕᒐᓃᑦᑐᖅ ᐅᒃᑯᐃᑕᐅᓕᕐᓂᒥᔪᖅ 1830-ᐅᑎᓪᓗᒍ, ᑎᑭᐅᑎᔻᒍᑦᓯᓂᓗ ᓄᓇᑎᒍᑦ ᑭᓯᐊᓂ ᖃᓪᓗᓂᐊᕐᕕᐅᒥᐊᒥᓪᓗ ᐱᔭᓇᐊᑐᔲᑦᓯᓂ ᐊᓪᓚᑦ ᖃᓯᒥᐊᓕᖕᒐᓂᒃ ᐱᔪᓂᒃ. ᑰᑦᔪᐊᖅ ᐃᓄᓐᓄᑦ ᐁᕕᐅᑦᑕᓯᐊᖃᑦᑕᓕᕐᑐᕕᓂᖅ ᑭᓯᐊᓂ ᑎᑭᑦᓯᑎᒃ ᐊᑦᔭᓯᑦᓯᐊᖃᑦᑕᓂᖖᒥᑐᑦ ᒥᖅᑯᓕᔭᓂᒃ ᐅᕐᓯᓂᓪᓘᓃᑦ ᓂᐅᕐᕿᑎᑦᓴᒥᓂᒃ. ᑌᑦᓯᒪᓂᑦᓵᓇᓚᒌᒃ ᒡᓕᓯᒃᑯᓂ ᑕᓯᐅᔭᕐᔪᐊᒥ, ᑲᒻᕙᓂ ᐱᕚᓪᓕᐊᒐᓯᐊᓯᓐᓂᓇᕗᑦ ᐃᓄᓐᓂᒃ ᓂᐅᕐᕿᓯᖃᑎᖃᕿᒪᓂᕐᒥᓄᑦ ᐊᒥᓲᓂᕐᓴᐅᒐᔭᕐᓂᖕᒥᓐᓂᒃ ᐃᓯᒪᑦᓯᑎᒃ ᓂᐅᕐᕿᓯᓇᐊᕐᑐᑦ. ᑌᑦᓯᒪᓂᐅᓕᕐᑎᓗᒍ, ᑲᒻᕙᓂᐅᑉ ᒪᓕᒐᕐᑖᓇᔾᔭᓕᕐᑕᕕᓂᖕᒐ ᐅᑭᐅᕐᑕᑐᒥᐅᑦ ᐊᓪᓗᓪᓗ ᓈᒻᒪᒥᐅᑎᕚᖖᒥᓂᖕᒥᓐᓂᒃ ᑌᒍᓐᓃᑎᑦᓯᒐᓯᐊᕐᑲᓕᕐᓯᑎᒃ. ᐋᖅᑮᕚᓪᓕᐊᒍᑕᐅᓕᕐᓂᕐᑯᖅ, ᐊᒻᒪᓗ ᐃᓄᐃᑦ ᓯᓕ ᒪᓕᑦᓯᒍ ᓂᐅᕐᕿᓯᓇᐊᕐᑐᑲᓕᕐᑐᕕᓂᐅᑦᓯᑎᒃ ᒣᓕᓯᒃᑯᓄᑦ. ᖃᑦᓴᓐ V ᑲᒻᕙᓂᒃᑯᑦ ᐱᒐᓯᐊᒻᒪᓇᑉᐸᓕᕐᑐᕕᓂᐅᑦᓯᓂ ᐃᓄᓐᓂᑦ ᐱᕕᖃᕋᓯᐊᕐᓯᓂ ᓇᑦᓰᑦ ᕿᓕᓗᒡᓗ ᐅᕐᓯᖕᒥᓐᓂᒃ, ᑎᓇᓚᓐᓂᐊᔭᓂᒃ ᑐᑐᔭᓂᓪᓗ, ᑑᓚᖕᒥᓐᓂᓗ ᐁᕖᑦ, ᓇᑦᓯᔭᓂᒃ ᐊᑦᓯᓈᓂᒃ, ᑐᑦᑐᐃᑦ ᐃᕙᓗᖕᒥᓐᓂᒃ, ᑲᒥᑦᑖᑭᒪᔪᒻᒪᓇᐊᓘᑦᓯᑎᓪᓗ ᓇᑦᓯᔭᓂᒃ ᐃᐱᕿᒍᑎᐅᒍᓐᓇᓂᖕᒥᓐᓄᑦ. ᑕᑕᒥᓐᓇᑐᖅ ᐃᓅᓯᖅ ᓈᒻᒪᒥᐅᑎᖕᖕᒥᓂᓇᓯᒪᕐᑲᑦᑕᑕᕕᓂᖕᒥᑦ ᐃᓄᐃᓪᓗ ᐊᓪᓗᓗ ᓄᐃᑕᒍᓐᓂᒥᐊᑲᓪᓚᑐᕕᓂᐅᓂᖕᒥᑦ ᓈᒻᒪᒥᐅᑎᖕᖕᒥᑑᒍᓐᓃᓯᑎᒃ, ᖃᐅᔨᒪᓇᕐᓯᓂᓗ ᑕᒪᒃ ᐋᖅᑯᐅᑎᒐᓯᐊᑦᓯᐊᓂᕐᒪᑎᒃ. ᒣᓕᓯᒃᑯᓂ ᐊᓪᓚᑕᐅᖃᑦᑕᓯᒪᓕᔪᑦ ᐃᓄᐃᑦ ᐊᓪᓗᓗ ᓂᐅᕐᕿᓴᕕᒻᒍᑦ ᓄᕐᖃᓐᓇᕙᑦᑐᕕᓂᐅᓂᖕᒥᑦᑕ ᐊᑕᐅᑦᓯᑯᑦ ᓇᓗᓐᕐᑕᐅᓯᒪᐅᑎᖕᒥᓐᓂᒃ ᑕᑕᑦᑐᑦ ᐊᓪᓗᓗ ᑲᑎᒪᑦᓯᑎᒃ ᐆᒪᔪᕐᓯᐅᖃᑎᕿᕙᑐᕕᓂᐅᓕᕐᓂᖕᒥᓐᓂᒃ. ᑭᓯᐊᓂ ᐆᒪᔪᕐᓯᐅᕙᓐᓂᖕᒥᑦ ᑖᒃᑯᐊ ᑕᒪᒃ ᒪᓕᑦᓯᒥᑦ ᐊᑕᐅᑦᓯᑰᖕᒥᑐᖅ ᐊᒥᓲᓈᕐᑎᓯᑎᒃ ᐊᓪᓚᑦ ᐃᓄᐃᓪᓗ ᓂᐅᕐᕿᓴᒥᐊᕐᑐᐸᑦᑐᕕᓃᑦ .

ᑭᖑᓪᓕᕖᑦ ᐊᕕᑦᑐᓯᒪᓂᖕᒥᑦᑕ ᒥᖅᑯᐃᓯᕐᕕᓕᐅᕐᓂᕐᒍᑦ ᐱᓇᓱᐊᕐᑕᐅᔻᑉ ᖃᓄᐃᖕᒐᓕᕐᒪᖕᒋᑦ ᑐᓴᕐᑎᓯᐅᑏᑦ ᐃᓕᖕᒐᔪᓄᑦ ᐃᓄᑦᑕᕐᑲᕐᐸᑐᕕᓂᐅᓂᖕᒐᓄᑦ ᐱᑕᕐᑲᕐᒥᔪᑦ ᓇᓗᓐᕐᑕᐅᒍᑎᖕᒥᓐᓂᒃ ᐊᒥᓯᐃᑦ ᐊᑑᑎᖃᑦᑐᕕᓃᑦ ᖃᓄᐃᓕᖖᒉᕿᖃᑦᓯᑎᒃ ᖃᓄᐃᓕᖖᒉᕿᓂᖕᒥᓪᓗ ᑲᔪᓯᑦᓯᑎᒃ ᐊᓯᑦᔅᑭᖃᓪᓕᐊᒍᑕᐅᑦᓯᑎᒃ ᐅᑭᐅᕐᑕᑐᒥᐅᑦ– ᑰᑦᔪᐊᖀᐱᓪᒥᐅᓗ ᓄᓇᖕᒐᓂ ᓴᓂᐊᓂᓗ. ᑖᒃᑯᐊ ᐊᑑᑎᖃᑦᑐᕕᓃᑦ ᐃᓚᕐᑲᕐᐳᑦ ᕿᓚᓗᒐᕐᓂᐊᕐᑐᕕᓂᕐᓂᒃ 1851 1890 ᐊᑯᓐᓂᖕᒐᓂ, ᐊᔪᕿᕐᑐᐃᔾᔪᓪᓗ ᑎᑭᓐᓂᕕᓂᖕᒥᓐᓂᒃ 1800 ᐊᕐᕈᖕᒥᑦᑕ ᕿᑎᖕᒐᓂ, ᑕᕐᕋᒥᓗ ᑲᕙᒪᑐᕐᑲᒃᑯᑦ ᑯᐯᒃᑯᓗ ᑲᕙᒪᖕᒐ ᑲᒪᒍᒪᔪᕚᓪᓕᐊᔪᓂᕕᓂᖕᒥᑦ, ᖃᓂᒪᓐᓇᐅᕚᑦᑐᕕᓂᕐᓂᓗ ᐃᓚᐅᑎᓪᓗᒍ ᐳᕚᓪᓗᓐᖅ ᐋᓐᓂᐊᓯᐅᕐᑕᐅᓂᖕᒥᓪᓗ, ᐃᑲᔪᕐᓯᔭᐅᒍᑎᑖᕐᑕᐅᑏᑦ, ᑎᓪᒥᔫᕐᓃᑦ, ᐅᓪᓗᒥᓂᑌᑦ ᒪᑭᑕᒐᓯᐊᑭᑏᑦ, ᓄᓇᒥ ᑖᕚᓂᑦᓵᓈᕚᓪᓕᐊᓂᕕᓂᖕᒥᑦ, ᔦᔅ V ᐊᓪᓚᓗ ᑯᐯᒃ ᑕᕐᕋᖕᒐᑦ ᐊᖕᒥᖃᑎᒦᒍᑎᖕᒐ ᐊᑎᓕᐅᕿᑎᕕᓂᐅᑎᓪᓗᒍ 1975-ᒥ.

ᐃᓗᕐᕿᓯᖅ ᐊᑬᑎᖃᑦᑕᓯᒪᔪᐃᓪᓗ ᐱᐅᓕᐊᕐᑕᐅᓂᖕᒐ

ᑭᖑᓪᓕᖡᕐᓲᒥᐊᑭᕖᑦ, ᒥᖅᑯᐃᓯᕐᕕᓕᓇᓂᕐᒍᑦ ᐱᓇᓱᐊᕐᑕᐅᔪᖅ ᖃᓄᐃᖕᒐᓕᕐᒪᖕᒋᑦ ᑐᓴᕐᑎᓯᐅᑏᑦ ᓄᑦᑐᓂᒃ ᐅᓂᒃᑲᐅᓯᕐᑲᓇᓪᓚᑐᑦ **ᖃᐅᔨᒪᒍᒥᓇᕐᓂᖕᒥᓐᓂᒃ** ᓄᓇᒥ ᖃᐅᔨᓴᕐᕕᐅᔪᒥ ᐊᒥᓯᐃᓂᓗ ᐃᓕᑕᕐᓇᕿᑎᖃᕐᓂᖕᒐᓂᒃ ᑯᕙᓪᒥ ᐊᑦᔨᖃᖖᒥᔫᓂᕐᒥᓄᑦ (ᓄᓇᖖᒍᐊᖅ 6.1) ᓇᓗᓐᕐᓯᓯᓂᓗ **ᑲᒪᒋᔭᐅᒥᐊᕐᑐᓴᐅᓕᕐᒥᔪᓂᒃ ᒥᖅᑯᐃᓯᕐᕕᐅᑉ ᓄᐃᑦᓕᐊᓂᖕᒐ ᒪᓕᓪᓗᒍ.** ᑐᖖᒐᕕᖃᕐᑎᓗᒥᑦ ᑐᑭᓯᐅᑎᓕᐊᒍᓯᒪᔪᓂᒃ ᒥᖅᑯᐃᓯᕐᕕᓕᓇᓂᕐᒍᑦ ᐱᓇᓯᒐᕐᒍᑦ ᖃᓄᐃᖕᒐᓕᕐᒪᖕᒋᑦ ᑐᓴᕐᑎᓯᐅᑎᓂᒃ ᐱᓇᓱᐊᕐᑲᑕᐅᓂᖕᒥᓐᓄᓗ ᓄᓇᓕᖕᒥᑦᑕ ᐅᒥᐅᔭᐅᑉ, ᑰᑦᔪᐊᖀᐱᐅᑉ ᕗᐊᑉᒪᑰᔅᑐᐃᓗ, ᐆᑦᑐᕋᐅᑎᓂᒃ ᐸᕐᓄᓯᒪᐅᑎᓂᒃ ᓄᐃᑦᓯᓯᒪᔪᑦ MDDEP-ᑯᓄᑦ ᑖᒃᑯᐊ ᓯᑯᑦᓴᔦᑦ ᕿᓄᒍᑎᑦᑲᕐᐳᑦ ᑭᓪᓕᓴᖕᒥᓐᓂᒃ, ᓄᓇᖕᒐᑕ ᐊᖕᒥᓂᑦᓴᖕᒐᓄᑦ ᐸᕐᓄᓯᒪᐅᑎᑦᓴᓂᒃ ᐋᕐᑭᒥᐊᕐᑕᐅᒥᐊᓕᓐᓂᓪᓗ ᐃᑲᔪᕐᓯᒪᐅᑎᐅᒐᔭᕐᓯᑎᒃ ᐅᖖᒍᒪᔭ ᐅᓂᖕᒐᓂᒃ ᐱᕚᓪᓕᐊᑎᑕᐅᓂᖕᒐᓂᓗ ᓄᓇᐅᑉ ᖃᐅᔨᓴᕐᕕᐅᔫᑉ ᐊᕚᑎᒥᓗ ᐃᓄᓐᓂᓗ ᖃᓄᐃᖕᒐᓂᐅᔭᕐᑐᓂᒃ ᖃᐅᔨᓴᕐᓂᐅᒐᔭᕐᑐᖅ ᐊᑐᐃᓐᓇᕿᕐᑎᑕᐅᓕᕐᓯᓂ ᑲᑎᕕᒃ ᓄᓇᓕᓕᒫᑦ ᑲᕙᒪᖕᒐᓄᑦ ᐱᒍᑦᓴᓯᒥᑦ MDDEP-ᑯᑦ ᐊᓪᓚᓗᒐᔅ ᑲᑎᕕᒃ ᐊᕙᑎᖃᕐᓯᐊᓂᕐᒥᒃ ᑲᑎᒪᔾᔪᖕᒥᑦ Kativik Environmental Quality Commission ᐃᓄᐃᑦ ᑲᑎᒪᑎᑕᐅᒍ- ᑎᑦᓴᖕᒥᑦ ᐸᕐᓄᑕᐅᔪᑦ ᑖᒃᑯᐊ ᓄᓇᓖᑦ ᐃᓄᕐᑯᑎᖕᒥᑦ (ᐃᓚᐅᑎᓪᓗᒥᑦ ᐅᒥᐅᔭᖅ, ᑰᑦᔪᐊᖀᐱᒃ ᕗᐊᑉᒪᑰᔅᑐᐃ) ᐃᓯᒪᒋᔭ ᒥᓂᒃ ᐅᕐᑲᕐᕕᕐᑲᕿᓐᓇᑎᑕᐅᓗᑎᒃ ᓄᐃᑕᐅᓂᑦᓴᖕᒐᓄᑦ ᒥᖅᑯᐃᓯᕐᕕᐅᑉ. ᑖᒃᑯᐊᓗ ᐱᔭᓐᓂᕐᐸᑕ ᑐᕐᓯᔪᖅ ᒥᖅᑯᐃᓯᕐᕕᓴᖕᒐ (ᑯᐯᓪᒥ ᒥᖅᑯᐃᓯᕐᕕᒃ) ᓄᐃᒍᓂ ᐱᖕᒐᔪᒥᔭᐅᓕᕋᔭᕐᑐᖅ ᓄᓇᕕᓪᒥ ᒥᖅᑯᐃᓯᕐᕕᐅᓗᓂ (ᐱᖖᒍᐊᓗᐃᑦ ᒥᖅᑯᐃᓯᕐᕕᖕᒐ ᓄᐃᑕᐅᔪᕕᓂᖅ ᔻᓄᐊᓇ 2004-ᒍᑎᓪᓗᒍ, ᑰᑭᕐᔪᐊᖅ ᒥᖅᑯᐃᓯᕐᕕᓴᖕᒐ ᓄᐃᑕᐅᔪᑦᓴᖅ 2008-ᒍᑎᓪᓗᒍ), ᑲᑎᕕᒃ ᓄᓇᓕᓕᒫᑦ ᑲᕙᒪᖕᒐᑦ ᑲᒪᒋᔭᕐᑲᓯᓂᖕᒐ ᐊᐅᓚᑦᓯᓗᓂ ᑲᔪᓯᑖᕐᑐᖅ ᑲᒪᕐᑲᑎᕐᑲᕐᓗᓂ ᓄᓇᓕᖕᒥᓐᓂᒃ ᐅᒥᐅᔭᐅᑉ, ᑰᑦᔪᐊᖀᐱᐅᑉ ᕗᐊᑉᒪᑰᔅᑐᐃᓗ.

ᓅᒻ ᐧᐋᐦᑎᒫᒑᐧᐃᓐ

ᓂᔅᒋᐲᓯᒻ ᑳ ᐊᑯᒥᐦᒃ 2002, ᐋᑯᑎᐦ ᑳ ᒥᓯᓂᐦᐅᔑᓈᓂᐧᐃᒡ ᒑ ᐧᐄᒥᐦᐄᑐᓈᓂᐧᐃᒡ ᐋᐦ ᐱᒦᐦᑭᑭᓂᐧᐃᒡ ᐊᓂᑎᐦ ᒑ ᒌ ᐅᐦᒋ ᐱᑳᔅᒋᐦᐅᓈᓂᐧᐃᒡ ᑭᔮᐦ ᐃᐦᑖᐧᐃᓐᐦ ᒑ ᐧᐄᒥᐦᑖᑭᓂᐧᐃᒡᐦ ᐅᑖᐦ ᐄᔥᒌᒪᐅᔅᒌᐦᒡ *Partnership Agreement on Economic and Community Development in Nunavik* (ᓵᓈᕈᑎᒃ) ᑳ ᐄᔑᓂᐦᑳᑖᒡ᙮ ᐊᓐ ᒫᒃ ᓵᓈᕈᑎᒃ ᓂᔅᑯᒧᐧᐃᓐ ᐋᑯᑎᐦ ᐧᐋᐦᑖᑯᐦᒡ ᑖᐱᔥᑯᓐ ᐋᐦ ᐄᑖᔮᐦᑎᒥᐦᐄᑯᒡ ᑯᐯᒃ ᑎᐹᔮᐦᒋᒫᓯᐤ, ᒫᑭᕙᒃ ᐧᑳᕐᐳᓀᐃᔑᓐ ᑭᔮᐦ ᑳᑎᕙᒃ ᑎᐹᔮᐦᒋᒫᓯᐤ ᒑ ᒌᐦ ᐧᐄᒥᐦᑖᑭᓂᐧᐃᒡ ᐊᓂᑎᐦ ᒑ ᒌ ᐅᐦᒋ ᐱᑳᔅᒋᐦᐅᒡ ᐊᐧᐋᓂᒌ, ᒑ ᐃᐦᑎᑎᑭᓂᐧᐃᒡ ᐋᐱᑎᓰᐧᐃᓐ ᑭᔮᐦ ᐊᓂᑎᐦ ᒥᔥᑎᐤ ᒑ ᐃᐦᑎᑯᓂᔮᒡ ᐊᓂᑎᐦ ᐅᐦᒋ ᒑ ᒌᐦ ᐧᐄᒥᐦᐄᑯᒡ ᓅᓈᕕᒃ ᐄᔥᒌᒪᐅᒡ᙮ ᐊᓂᔮ ᒫᒃ ᐸᔮᒄ ᒫᐧᑳᔮᐤ ᑳᐦ ᑭᓂᐧᐊᐱᐦᑎᐦᒡ ᒑ ᒌᐦ ᐃᐦᑐᑖᑭᓂᐧᐃᐧᐃᔮᒡ ᐋᔪᐧᐃᒄ ᐋᐦ ᓅᒋᒪᓂᑖᐧᐊᓂᐧᐃᐧᐃᔮᒡ ᐋᐦ ᐱᒦᐦᑳᑭᓂᐧᐃᐧᐃᔮᒡ ᐊᓂᔮ ᐊᔅᒌᔮᐤ ᓈᔥᒡ ᐧᐋᐦᓈᑭᑎᐧᐋᔮᐦᑖᑯᓂᔮᒡ ᐋᑳ ᐊᑎᑎᐤ ᒑ ᐧᐃᓈᒥᐦᑖᑭᓂᐧᐃᐧᐃᔮᒡ᙮ ᐊᓐ ᒫᒃ ᒑ ᒌᐦ ᐃᐦᑐᑖᑭᓂᐧᐃᒡ ᒧᔖᐧᐋᐦᔮᐅᐲᓯᒻ 2002 ᐋᑯᑎᐦ ᑳ ᒥᓯᓂᐦᐅᔑᓈᓂᐧᐃᒡ ᐅᐦᒋ ᐊᓐ *Agreement concerning the Development of Parks in Nunavik* ᐊᔅᒌ ᐋᐦ ᐱᐦᑳᓂᔥᑖᒡ ᓈᔥᒡ ᒑ ᐧᐄᐦ ᓈᑭᑎᐧᐊᔮᐦᑖᑯᐦᒡ ᐅᑖᐦ ᓅᓈᕕᒃ᙮ ᐅ ᒫᒃ ᓃᐧᔫᐤ ᑳ ᒥᓯᓂᐦᐅᔑᓈᓂᐧᐃᒡ ᓂᔅᑯᒧᐧᐃᓐ ᐋᑯᑎᐦ ᐧᐋᐦᑖᑯᐦᒡ ᒥᒋᓐ ᐊᐧᐋᓐ ᐊᓐ ᐋᔑᓈᑯᓂᔮᒡ ᒑ ᑭᓂᐧᐊᐱᐦᑎᐦᒃ ᐊᓂᔮ ᐊᔅᒌᔮᐤ ᓈᔥᒡ ᐧᐋᐦ ᓈᑭᑎᐧᐋᔮᐦᑖᑯᓂᔮᒡ ᑭᔮᐦ ᒫᐧᑳᔮᐤ ᒑ ᐊᓄᑎᒧᐧᐊᑭᓂᐅᐧᐃᒡ ᑳᑎᕙᒃ ᐄᔥᒌᒪᐤ ᑎᐹᔮᐦᒋᒫᓯᐤ ᑭᔮᐦ ᐊᓐ ᐅᑖᐦ ᑯᐯᒃ ᑎᐹᔮᐦᒋᒫᓯᔫᐦᒡ ᐋᐦ ᐅᐦᒋ ᓈᓈᑭᒋᐦᑖᑭᓂᐧᐃᒡ ᐃᔮᐧᑳᐦ ᒑ ᒌᐦ ᐃᐦᑎᓈᓂᐧᐃᒡ ᐊᓂᑎᐦ ᐄᔮᔨᒥᓯᓈᓂᐧᐃᒡ ᑭᔮᐦ ᒫᒃ ᐄᔮᐱᑎᓰᓈᓂᐧᐃᒡ ᑭᔮᐦ ᐊᓂᑎᐦ ᐋᐦ ᐅᐦᒋ ᑭᓂᐧᐋᐱᐦᑎᑭᓂᐧᐃᒡ ᐊᔅᒌ ᐋᐦ ᐧᐄᐦ ᒥᓈᒋᐦᑖᑭᓂᐧᐃᒡ ᑭᔮᐦ ᐊᓐ ᐊᔅᒌ ᐋᐦ ᐱᐦᑳᓂᔥᑖᒡ ᓈᔥᒡ ᐋᐦ ᐧᐄᐦ ᓈᑭᑎᐧᐋᔮᐦᑖᑯᐦᒡ᙮

ᐊᓐ ᒫᒃ ᒦᓐ ᒫᐧᑳᓐ ᒫ ᑭᓂᐧᐋᐱᐦᑎᑭᓂᐧᐃᒡ ᐋᔑ ᒥᓯᓈᑖᒡ ᐊᓐ ᓵᓈᕈᑎᒃ ᓂᔅᑯᒧᐧᐃᓐ, ᐋᐅᒄ ᐊᓐ ᒦᓐ ᐧᐋᐦᑐᑎᑭᓂᐧᐃᒡ ᐊᓂᑎᐦ ᓈᔥᒡ ᐋᐦ ᐧᐄᐦ ᓈᑭᑎᐧᐋᔮᐦᑖᑯᐦᒡ ᑭᔮᐦ ᐧᐋᐦ ᐱᐦᑳᓂᓂᑭᓂᐧᐃᒡ ᐊᔅᒌ ᐊᓐ ᐄᔮᑎᐧᐄᓂᐸᒄ ᑭᔮᐦ ᐧᐃᔮᔔᑭᒦ ᐋᔑᓂᐦᑳᑖᒡ ᐃᐦᑎᑯᓐ ᒦᓐ ᓃᓴ ᒫᐧᑳᓐ ᓈᔥᒡ ᐧᐋᐦ ᓈᑭᑎᐧᐋᔮᐦᑖᑯᐦᒡ "ᐊᐢᓯᓐ ᐱᐦᒑᑐ ᑭᔮᐦ "ᐊᐢᓯᓐ ᑯᐧᐁᔅᑖᔅ: ᐊᓂᑎᐦ ᒫᒃ ᒫᐧᑳᒡ ᓂᔮᓂᑑᒋᔅᒫᔮᐦᑖᑯᐦᒡ (ᓅᑯᐦᒡ ᐊᓂᑎᐦ 1.1 ᑳ ᐄᑎᓯᓈᑖᒡ) ᐅᑖᐦ ᓂᐦᐊᐤ ᐧᐊᐳᓅᑖᐦᒡ ᐅᒦᐅᔮᒃ ᐋᑯᑎᐦ ᐊᐦᑎᑯᐦᒡ᙮ ᐋᑯᑎᐦ ᐋᔥᒋᐱᔮᒡ ᐊᓐ ᓂᐲ ᐋ ᐃᔑ ᐊᑯᐦᐱᑎᐦᒡ ᐊᓂᑖᐦ ᐄᔑ ᐄᔮᑎᐧᐄᓂᐸᑯᐦᒡ, ᓇᒋᒥᓐ ᑲᑦᐧᐁ ᐋᔑᓂᐦᑳᑖᒡ ᑭᔮᐦ ᐊᓐ ᓈᔅᑖᐳᑳᔥᑎᒄ, ᑭᔮᐦ ᐄᑎᐧᐃᑳᒻ ᐧᐊᐱᒫᑯᔥᒎᔑᔑᐦᒡ᙮

ᒦᓐ ᒫᒃ ᐋᔑ ᒥᓯᓈᑖᒡ ᐊᓐ ᓂᔅᑯᒧᐧᐃᓐ ᐅᐦᒋ ᐊᓐ ᐋ ᐧᐄᐦ ᐱᐦᑳᓂᔥᑖᑭᓂᐧᐃᒡ ᐊᔅᒌ ᓈᔥᒡ ᐧᐋᐦ ᓈᑭᑎᐧᐋᔮᐦᑖᑯᐦᒡ ᐅᑖᐦ ᓅᓈᕕᒃ *Agreement concerning the Development of Parks in Nunavik* ᑳ ᐄᔑᓂᐦᑳᑖᒡ, ᐊᓐ ᑳᑎᕙᒃ ᐄᔥᒌᒪᐤ ᑎᐹᔮᐦᒋᒫᓯᐤ ᐋᐅᒄ ᐸᒦᐦᑭᐦᒃ ᐋᐦ ᒥᓯᓂᐦᐄᑭᓂᐧᐃᐧᐃᔮᒡ ᐊᓂᔮ ᐋᔑ ᒥᔅᑭᐧᐋᐦᑖᑭᓂᐧᐃᐧᐃᔮᒡ ᐊᓂᔮᐦ ᒫ ᐃᔑ ᑖᐦᑭᐦᐄᒑᐱᔮᒡ ᐱᒫᑎᓰᐧᐃᓂᐦᒡ ᑭᔮᐦ ᐊᓂᔮ ᒫ ᐃᔑ ᐅᐦᑎᓰᐧᐊᒑᓂᐧᐃᐧᐃᔮᒡ ᐅᑎᐦ ᐊᓂᔮ ᐊᔅᒌᔮᐤ ᒫᐧᑳᒡ ᓂᔮᓂᑑᒋᔅᒫᔮᐦᑖᑯᓂᔮᒡ, ᐋᔑᓈᑯᓂᔮᒡ ᑭᔮᐦ ᒫᐧᑳᔮᐤ ᐊᓂᑎᐦ ᐋᐦ ᐃᐦᑎᑯᓂᔮᒡ ᐋᐦ ᓂᐦᑖᐅᒋᓂᔮᒡ ᑭᔮᐦ ᐊᓂᔮᐦ ᐊᐧᐋᓰᓯᔅᐦ ᐊᓂᑎᐦ ᐋᐦᑖᔮᒡᐦ ᑭᔮᐦ ᐊᐧᐋᔮᐤᐦ ᐊᓂᑎᐦ ᐋᑎ ᐃᔮᐦᑖᔮᒡᐦ᙮ ᐆ ᒫᒃ ᒥᓯᓂᐦᐄᑭᓐ, ᐋᐅᒄ ᒋᐦᒋᐧᐊ ᒫ ᐄᑖᐱᑎᐦᒡ ᑳᓂᐧᐊᐱᐦᑎᑭᓂᐧᐃᒡᐦ ᐊᓐ ᐋᑎ ᐃᔮᔅᐱᔮᒡ ᒫᐧᑳᓐ, ᐊᓂᑎᐦ ᐧᐋᐦᑖᑯᓂᔮᒡ ᑖᓐ ᑳ ᐃᔑ ᐋᐱᑎᓲᔥᑎᐦᒡ ᐊᓂᒌ ᑳᑎᕙᒃ ᐄᔥᒌᒪᐤ ᑎᐹᔮᐦᒋᒫᓯᔫᐦᒡ ᑳ ᐃᔑ ᒥᔅᑭᐧᐋᐦᑖᒡ ᐅᐦᒋ ᐊᓂᔮ ᐊᔅᒌᔮᐤ ᐧᐋᐦ ᐱᐦᑳᓂᔥᑖᑭᓂᐧᐃᐧᐃᔮᒡ ᓈᔥᒡ ᒑ ᒌᐦ ᓈᑭᑎᐧᐋᔮᐦᑖᑯᓂᔮᒡ ᐋᐦ ᒌᐦ ᐧᐄᒥᐦᐄᑯᒡ ᐊᐧᐋᔮᐤᐦ ᐊᓂᑖᐦ ᐅᒦᐅᔮᒃ, ᑰᐦᒋᐧᐋᔅᐱᒃ ᑭᔮᐦ ᐧᐊᐱᒫᑯᔥᑐ ᑭᔮᐦ ᑯᑎᒃᐦ ᐊᐧᐋᔮᐤᐦ ᐋᐦ ᐃᔮᑭᔮᒥᐦᑖᔮᒡᐦ ᑭᔮᐦ ᐋᐦ ᒌᐦ ᒋᔅᑯᑎᒫᑯᔮᒡᐦ ᐊᔅᒌᔮᐤ ᑭᔮᐦ ᑯᑎᒋᔮᐤ ᒫᐧᑳᔮᐤ ᐋᐦ ᒌᐦ ᒋᔅᑯᑎᒫᑯᔮᒡᐦ ᑭᔮᐦ ᒫᒃ ᐊᓂᑖᐦ ᑎᐹᔮᐦᒋᒫᓯᔫᐦᒡ ᐋᐦ ᐅᐦᒋ ᑭᓂᐧᐋᐱᐦᑎᑭᓂᐧᐃᐧᐃᔮᒡ ᐋᐦ ᐧᐄᐦ ᒥᓈᒋᐦᑖᑭᓂᐧᐃᐧᐃᔮᒡ ᐊᔅᒌᔮᐤ ᐋᐦ ᐱᐦᑳᓂᔥᑖᔮᒡ ᓈᔥᒡ ᐋᐦ ᐧᐄᐦ ᓈᑭᑎᐧᐋᔮᐦᑖᑯᓂᔮᒡ᙮

ᐋᔑ ᐱᒫᑎᓰᓈᓂᐧᐃᒡ ᑭᔮᐦ ᐋᔑ ᐱᑳᔅᒋᐦᐆᓈᓂᐧᐃᒡ

ᐋᑯᑎᐦ ᐅᑎᐦ ᒫᓯᓈᑖᒡ ᐋᐦ ᑎᐸᑎᑖᒡ ᐊᓐ ᐧᐋᐦ ᐋᔨᐦᑎᓈᓂᐧᐃᒡ ᐋᐦ ᐧᐄᐦ ᐱᐦᑳᓂᓂᑭᓂᐧᐃᒡ ᐊᓐ ᐊᔅᒌ ᓈᔥᒡ ᒑ ᓈᑭᑎᐧᐋᔨᐦᑖᑯᐦᒡ ᐅᑖᐦ ᐄᔮᑎᐧᐄᓂᐸᑯᐦᒡ ᑭᔮᐦ ᐧᐃᔮᔔᑭᒦᐦᒡ: ᐊᓐ ᒫᒃ ᑎᐸᒋᒧᐧᐃᓯᓂᐦᐄᑭᓐ *Lacs-Guillaume-Delisle-et-à-l'Eau-Claire Park Project: Status Report* (Park Project Status Report) ᐄᔑᓂᐦᑳᑖᐤ, ᐋᑯᑎᐦ ᐧᐋᐦᑖᑯᐦᒡ ᑖᓐ ᐋᔑᓈᑯᐦᒡ ᐱᒫᑎᓰᐧᐃᓐ ᐅᑖᐦ ᓅᓈᕕᒃ ᐅᐦᒋ ᐊᓂᒌ ᐊᐧᐋᓂᒌ ᐅᑖᐦ ᐋᐦᑖᒡ, ᐅᑎᔨᐦᑎᐧᐃᓂᐧᐋᐤ ᑭᔮᐦ ᐊᓂᔮ ᐋᔑ ᐱᐱᑳᔅᒋᐦᐄᔨᒡ᙮

ᑳᐦᓈᑖᐦ ᑭᔮᐦ ᑯᐯᒃ ᑎᐹᔮᐦᒋᒫᓯᔮᐅᒡ ᑭᓂᐧᐋᐱᐦᑎᒧᒡ ᐅᔮ ᑭᔮᐦ ᐊᓂᒌ ᒦᓐ ᒥᔥᑎᐤ ᐃᑖᐧᐃᒡ ᐧᐊᔨᓄᑎᐦᒡ ᐅᔮ ᐊᔅᒌᔮᐤ ᐊᓂᑎᐦ ᓈᐦᐋᐤ ᓂᔮᓂᑑᒋᔅᒫᔮᐦᑖᑯᓂᔮᒡ ᑭᔮᐦ ᐊᓂᑎᐦ ᐧᐋᔅᑲ᙮ ᐋᐅᑯᓂᒡ ᒫᒃ ᒫᑭᕙᒃ ᐧᑳᕐᐳᓀᐃᔑᓐ, ᑳᑎᕙᒃ ᐄᔥᒌᒪᐤ ᑎᐹᔮᐦᒋᒫᓯᐤ, ᐅᒦᐅᔮᒃ ᑭᔮᐦ ᑰᐦᒋᐧᐋᔅᐱᒃ ᐃᐦᑖᐧᐃᓐᐦ, ᐄᔮᔮᐤ ᐃᐦᑖᐧᐃᓐ ᐧᐊᐱᒫᑯᔥᑐᐃ, ᐊᓂᔅᑐᔅᐸᒃ ᑭᔮᐦ ᓵᑯᒃ ᐧᐊᔨᓄᑎᐦᒡ ᒑ ᒌᐦ ᐋᑖᐸᑎᓂᔮᒡ ᐊᔅᒌᔮᐤ ᑭᔮᐦ ᐧᐊᐱᒫᑯᔥᑑᐄᔮᔮᐤ ᒥᓯᓂᐦᐄᒫᐅᑭᒥᒄ᙮ ᐅᒌ ᒫᒃ ᒥᓯᐧᐊ ᒌᐦᑳᔮᐦᑖᓯᐧᐃᒡ ᐅᐦᒋ ᐊᓂᔮ ᒉᐃᒥᔅ ᐯᐃᐦ ᑭᔮᐦ ᐊᑎᒫᐱᓯᒻ ᑯᐯᒃ ᓂᔅᑯᒧᐧᐃᓂᔮᐤ ᑭᔮᐦ ᑎᐹᔅᑯᓂᒫᐧᐃᓂᓈᐦᒡ᙮

ᐊᓐ ᒫᒃ ᐊᔅᒋᐅᐧᐋᓇᐧᐋᐧᐃᓐ ᐅᑎᐦ ᑭᔮᐦ ᐊᓂᑎᐦ ᐧᐊᔅᑳ ᐋᐦ ᓈᓂᑑᒋᔅᒑᔑᐦᒉᑯᐦᒡ ᐊᔅᒌ ᒎᑯᓐ ᐊᓂᑎᐦ ᐊᔅᒌᐅᓯᓂᐦᐄᑭᓂᐦᒡ 2.1 ᑳ ᐄᑎᓯᓈᒑᒡ ᐊᓂᑎᐦ ᐋᐦ ᑎᐹᑎᒑᒡ ᐊᓐ ᐊᔅᒌ ᓈᓐᒡ ᐧᐋᐦᑭᓂᐧᐋᔑᐦᒉᑯᐦᒡ ᒫᐧᑳᒡ ᐹᒥᐦᑭᑭᓂᐧᐃᒡ ᓂᒧᐃ ᒫᒃ ᐊᓐᒋᐱᔑᐤ ᐊᓐ 1 ᑳ ᐄᒋᓐᒑᒡ ᐊᔅᒌ, ᒥᒄ ᒫᒃ ᐊᓐ 1 ᑳ ᐄᒋᓐᒑᒡ ᐊᔅᒌ ᓈᓐᑎᔑᒡ ᐲᐦᒡ ᐃᐦᑎᑯᓐ ᐊᓂᑎᐦ ᐧᐋᐦ ᐱᒥᐦᑳᑭᓂᐧᐃᒡ ᐅᒦᐅᔮᑉ ᐃᐦᒑᐧᐃᓂᐦᒡ ᐊᓂᒑᐦ ᒫᒃ ᐊᒋᓐᑎᐤ ᐄᒑᐦᒫ ᐊᓂᑎᐦ ᒫ ᓈᓂᑑᒋᔅᒑᔑᐦᒉᑯᐦᒡ ᐊᓐ 2 ᑳ ᐄᒋᓐᒑᒡ ᐊᔅᒌ ᐋᑯᑎᐦ ᐋᐦᑎᑯᐦᒡ ᐊᓂᑎᐦ ᐅᒦᐅᔮᑉ ᑭᔮᐦ ᑰᐦᒋᐧᐋᕌᐱᑉ, ᒋᒡ ᐊᓐ ᐃᔫᑎᐧᐋᓂᐸᑯ ᑭᔮᐦ ᐊᓂᑎᐦ ᐋᐦ ᐧᐃᔑᐧᐋᒡ ᓈᔅᒑᐳᑳᓐᑎᑯₓ ᐋᑯᐦ ᐊᓐ 2 ᑳ ᐄᒋᓐᒑᒡ ᐊᔅᒌ ᐧᐋᐱᒫᑯᓐᑐᐦᒡ ᐋᑯᑎᐦ ᐧᐋᐦᒋ ᐊᓐᒋᐱᔑᒡ ᐊᓂᑎᐦ ᒫ ᓈᓂᑑᒋᔅᒑᔑᐦᒉᑯᐦᒡ ᐧᐋᐱᒫᑯᓐᒍᔑᔑᐦᒡₓ ᐊᓐ 2 ᑳ ᐄᒋᓐᒑᒡ ᐊᔅᒌ ᐊᓂᑎᐦ ᐅᒦᐅᔮᑉ ᑭᔮᐦ ᑰᐦᒋᐧᐋᕌᐱᑉ 3,738 km2 ᐄᓐᐱᔖᐤ ᑭᔮᐦ 14 ᐱᕁ ᓭᓐᑦ ᐊᑯᓂᐦᐄᒫᐱᔑᐤ ᐊᓂᑎᐦ ᓈᐦᐋᐤ ᒫ ᓈᓂᑑᒋᔅᒑᔑᐦᒉᑯᐦᒡₓ ᐊᓐ ᒫᒃ 3 ᑳ ᐄᒋᓐᒑᒡ ᐊᔅᒌ 86 ᐱᕁ ᓭᓐᑦ (23,494 km²) ᒋᑭ ᐃᐦᑎᑯᓐ ᐊᓂᑎᐦ ᓈᐦᐋᐤ ᒫ ᓈᓂᑑᒋᔅᒑᔑᐦᒉᑯᐦᒡₓ

ᐊᓂᔮ ᒫ ᒌᐦ ᓂᑑᐦᐅᒡ ᐄᔑᔑᐅᒡ ᑭᔮᐦ ᐄᓐᒌᒫᐅᒡ ᐋᑯᑎᐦ ᒫᓯᓈᒑᔑᒡ ᐊᓂᑎᐦ *James Bay and Northern Québec Agreement* ᒣᐃᒥᔅ ᕓᐃᐦ ᑭᔮᐦ ᐊᑎᒫᐲᓯᒪ ᒍᕓᑉ ᓂᔅᑯᒨᐧᐃᓂᐦᒡ ᑭᔮᐦ ᐊᓂᑎᐦ ᐧᐋᓇᐧᐋᐧᐃᓂᐦᒡ ᒫ ᒌᐦ ᒋᔅᒑᔑᐦᒉᑭᓂᐧᐃᐧᐃᔑᒡ ᐋᔑ ᓂᑑᐦᐅᒡ ᑭᔮᐦ ᐋᔑ ᓅᑎᒫᔅᒪ ᒫᓯᓈᒑᔑᒡ ᐊᓂᑎᐦ ᒣᐃᒥᔅ ᕓᐃᐦ ᑭᔮᐦ ᐊᓐ ᑳ ᐋᐦᑎᔑᓂᐦᑳᑎᑭᓂᐧᐃᒡ ᐊᔅᒌ ᐋᐦ ᐋᔅᑎᓯᓈᒑᒡ ᐅᑎᐦ ᑯᕓᑉ *Hunting and Fishing Rights in the James Bay and New Québec Territories* (R.S.Q., c. D-13.1)ₓ ᐆ ᒫᒃ ᐋᔑ ᑭᓂᐧᐋᐱᐦᑎᑭᓂᐧᐃᒡ ᐋᑯᑎᐦ ᑭᔮᐦ ᒫ ᒌᐦ ᐄᔑᓈᑯᐦᒡ ᐄᑎᓇᐧᐊᓂᐧᐃᒫ ᓈᓐᒡ ᒫ ᒥᓈᒋᐦᒉᑭᓂᐧᐃᒡ ᐆ ᐊᔅᒌ, ᐅᒑᐦ ᐄᔑ ᓅᓈᕓᒃₓ ᐋᑯᑎᐦ ᒫᓯᓈᒑᔑᒡ ᐄᔑᔑᐅᒡ ᑭᔮᐦ ᐄᓐᒌᒫᐅᒡ ᒫ ᒌᐦ ᓂᑑᐦᐅᒡ, ᓅᑎᒫᔅᒡ ᑭᔮᐦ ᐧᐃᓂᐦᐄᒫᒡ ᒥᒄ ᐊᓂᔮ ᐋ ᐄᔑᓈᑯᓂᔑᒡ ᓂᑑᐦᐅᐧᐃᓂᔑᐤₓ ᐊᓐ ᒫᒃ ᐧᐋᐦ ᐅᔑᐦᒉᑭᓂᐧᐃᒡ ᓈᓐᒡ ᒫ ᓈᑭᑎᐧᐋᔑᐦᒉᑯᐦᒡ ᐊᔅᒌ ᓂᒧᐃ ᓈᓐᑎᔑᒡ ᒋᑭ ᐧᐃᓐᑎᐧᐃᔑᑯᐧᐃᒡ ᐄᔑᔑᐅᒡ ᑭᔮᐦ ᐄᓐᒌᒫᐅᒡ ᐋᐦ ᐧᐄᐦ ᓂᑑᐦᐄᓱᒡₓ

ᓂᓐᑐᔑᒡ ᒫᒃ **ᐄᔖᐱᑎᓐ ᐆ ᐊᔅᒌ** (ᐋᐦ ᓂᑑᐦᐅᓈᓂᐧᐃᒡ, ᐋᐦ ᐧᐃᐦᑎᓲᐧᐋᒫᓂᐧᐃᒡ ᑭᔮᐦ ᐋᐦ ᓈᓂᑑᒋᔅᒑᔑᐦᒉᑯᐦᒡ ᒫᐧᑳᓐ) ᓈᐦᐋᐤ ᐊᓂᑎᐦ ᑭᔮᐦ ᐊᓂᑎᐦ ᐧᐊᔅᑳₓ ᐋᑯᑎᐦ ᓅᑯᐦᒡ ᐊᓐ ᐋᒑᐱᑎᐦᒡ ᐊᔅᒌ ᐊᔅᒌᐅᓯᓂᐦᐄᑭᓂᐦᒡ 2.2 ᑳ ᐄᑎᓯᓈᒑᒡₓ ᐊᓂᔮ ᐋᔑᓂᑑᐦᐄᓱᒡ ᐄᔑᔑᐅᒡ ᑭᔮᐦ ᐄᓐᒌᒫᐅᒡ ᓂᒧᐃ ᐧᐋᐦᑎᓂᔑᐤ, ᒍᐃᔅᑯ ᐱᑎᒫ ᒫᒥᑐᓈᔑᐦᑎᒥᐦᐄᑯᐧᐃᒡ ᑭᔮᐦ ᑭᓂᐧᐋᐱᐦᑎᒧᒡ ᐊᓂᔮ ᐋᑎ ᐃᔑᔅᐱᐦᒑᔮᔑᒡₓ ᐊᓂᔮ ᒑᐧᐸᐦ ᓈᑎᐧᐋᔑᐦᑎᐦᒡ ᑭᔮᐦ ᒫᔅᑎᒫᐅᓂᔑᒡ ᐊᓂᔮ ᐧᐋ ᐃᔑ ᐱᑳᔅᒋᐦᐄᓱᒡ ᐄᓐᒌᒫᐅᒡ ᐊᓂᑎᐦ ᓈᐦᐋᐤ ᐋᐦᑎᑯᓂᔑᒡ ᐊᓂᔮ ᐊᔅᒌᔑᐤ ᓈᑑᒋᔅᒋᔑᐦᒉᑯᓂᔑᒡ ᐋᑯᑎᐦ ᒫᓯᓈᒑᔑᒡ ᐊᓂᑎᐦ ᐊᓂᔮ ᒥᓯᓂᐦᐄᑭᓂᔑᐤ *Master Plan for Land Use in the Kativik Region* ᑳ ᐄᔑᓂᐦᑳᒑᔑᒡₓ ᐄᔑᔑᐅᒡ ᑭᔮᐦ ᐋᑯᑎᐦ ᐋᐦᑎᑯᓂᔑᒡᐦ ᐅᓂᑑᐦᐅᔅᒌᐧᐋᐤᐦₓ ᐋᑯᑎᐦ ᐊᑎᑎᐤ ᒥᒋᓐ ᓅᑯᐦᒡ ᐊᓂᑎᐦ ᐋᑎ ᓂᓂᑑᐦᐅᒡ ᐄᓐᒌᒫᐅᒡ ᑭᔮᐦ ᐄᔑᔑᐅᒡ ᐊᓂᑎᐦ ᓅᑯᓂᔑᒡ 2.2 ᐲᐦᐃᒪ 2.5 ᑳ ᐄᑎᓯᓈᒑᔑᒡᐦₓ ᐊᓐ ᒫᒃ ᐧᐃ ᐋᐦ ᐧᐄᐦ ᐅᐦᑎᓲᐧᐋᒫᓂᐧᐃᒡ, ᓃᐧᔖᓐᒡ ᐃᐦᑎᐦᑎᓐᐦ ᐹᔅᒋᒫᐅᑭᒥᑯᐦ ᑭᔮᐦ ᐅᒋᐧᑳᒋᒫᐅᑭᒥᑯᐦ ᐊᓂᑎᐦ ᐊᓐ ᓈᐦᐋᐤ ᐋᐦ ᓈᓂᑑᒋᔅᒑᔑᐦᒉᑯᐦᒡ ᐊᔅᒌ, ᑭᔮᐦ ᐊᓂᑎᐦ ᒫ ᒌᐦ ᓅᒋᓯᓈᓂᐧᐃᒡ ᐊᓂᒑᐦ ᐊᑎᒫᐲᓯᒪ ᐄᒑᐦᒫ ᐄᔫᑎᐧᐋᓂᐸᑯᐦᒡ ᐋᑯᑎᐦ ᑳᓂᐧᐋᐱᐦᑎᑭᓂᐧᐃᒡ, ᑭᔮᐦ ᒍᕓᑉ ᑎᐹᔑᐦᒋᒫᓯᐤ ᑭᓂᐧᐋᐱᐦᑎᒪ ᒫ ᒌᐦ ᐅᔅᑯᑎᒥᐦᒪᓂᐧᐃᐧᐃᔑᐧᑳ ᐊᓂᑎᐦ ᓈᔅᒑᐳᑳᓐᑎᑯᐦᒡ ᐄᔅᑯᑎᑉ ᑳ ᒥᓯᓂᐦᐅᓲᓈᓂᐧᐃᐧᐃᔑᒡ ᐊᓂᔮ ᓴᓈᕈᑎᑉ ᓂᔅᑯᒨᐧᐃᓂᔑᐤₓ ᐊᓂᔮ ᒫᒃ ᒫᐦᒋᒡ ᐋᔦᐧᐃᑯ ᐊᓂᔮ ᑳ ᐃᔑ ᓈᓂᑑᒋᔅᒑᔑᐦᒉᑯᓂᔑᒡ ᒫᐧᑳᔑᐤ, ᒌᐦ ᒫᒥᑐᓈᔑᐦᑎᒥᐦᐄᑯᐧᐃᒡ ᐊᓂᒌ ᐋᔑᑭᔮᔮᔑᐦᑎᐦᒡ ᐋᑎ ᐃᔑᔅᐱᔑᔑᒡ ᐅᔮ ᐊᔅᒌᔑᐤ, ᓂᓈᐦᒋᐤ ᒫᐧᑳᔑᐤ ᒌᐦ ᐧᐄᐦ ᒋᔅᒑᔑᐦᑎᒧᒡ ᐅᐦᒋ ᐊᓂᔮ ᐊᔅᒌᔑᐤ ᑭᔮᐦ ᐊᓂᔮ ᒫᐧᑳᔑᐤ ᐊᓂᑎᐦ ᐋᐦᑎᑯᓂᔑᒡₓ ᐅᔮ ᒫᒃ ᑳ ᐄᓐᐧᑳᐱᔑᔑᒡ ᐊᓂᔮ ᐋᐦ ᐱᐳᓂᔑᒡ 2007, ᑳᑎᕓᒃ ᐄᓐᒌᒫᐤ ᑎᐹᔑᐦᒋᒫᓯᐤ, ᒫᑭᕓᒃ ᐧᑳᕁᐳᓪᐃᔑᓐ ᑭᔮᐦ ᐊᓂᒑᐦ ᐅᐦᒋ ᓛᐸᑦ ᔦᓂᕓᕁᓯᑗ ᐋᐦ ᓈᓂᑑᒋᔅᒑᔑᐦᒉᑯᐦᒡ ᒫᐧᑳᓐ ᐅᒑᐦ ᐊᑎᒫᐲᓯᒪ ᑳᐅᑭᓷᕁᕓᒃ ᓀᑎᐧᐃᖅ ᐋᐦ ᐋᐱᑎᐦᒡ ᒌᐦ ᐧᐄᐦᑎᒧᒡ ᒫ ᐧᐄᒫᐱᑎᓯᒥᑐᒡ ᐋᐦ ᓈᓂᑑᒋᔅᒑᔑᐦᑎᐦᒡ ᒫᐧᑳᔑᐤ ᐅᒑᐦ ᓅᓈᕓᒃₓ

ᐊᓐ ᑳ ᐱᐳᐦᒡ 2001, ᐊᓐ ᑳᐦ ᐃᐦᑎᔑᓈᓂᐧᐃᒡ ᐅᒦᐅᔮᑉ, ᑰᐦᒋᐧᐋᕌᐱᑉ ᑭᔮᐦ ᐧᐋᐱᒫᑯᓐᑐ 350, 550 ᑭᔮᐦ 780 (ᒫᓯᓈᒑᒡ ᐊᓂᑎᐦ 2.1)ₓ ᐅᔮ ᒫᒃ ᐋᐦᑎᔑᒡ ᐊᐧᐋᓂᒌ ᐱᐦᑳᓐ ᐄᔑᓈᑯᓐ ᐋᔑᓈᑯᐦᒡ ᐅᒑᐦ ᐃᔑᐦᒡ ᒍᕓᑉ ᑳᐅᔅᒋᐱᒫᑎᓰᒡ ᐋᐦ ᑭᓂᐧᐋᐱᒥᐦᒡₓ ᐊᓐ ᓅᓈᕓᒃ ᐋᐦ ᐋᔑᒧᒑᒡ, ᐊᓂᔮ ᒑᐱᑎᐤ ᐋᐦ ᑭᓂᐧᐋᐱᒫᑭᓂᐅᐧᐃᒡ ᐊᐧᐋᓂᒌ 20 ᐋᔦᐧᐃᑯ ᐋᔅᐱᐦᑎᓰᒡ ᑭᔮᐦ ᒫᑳᑦ 65 ᐱᕁ ᓭᓐᑦ ᓃᐦᒑᐦᒡ 25 ᐄᔅᐱᐦᑎᓰᐧᐃᒡₓ ᐋᑯᑎᐦ ᑭᔮᐦ ᐊᓂᑎᐦ ᓅᓈᕓᒃ, ᐊᓂᔮ ᐋᐦ ᐹᔑᑯᒑᐅᓰᒡ 4.3 ᐄᐦᑎᔑᐧᐃᒡ ᑭᔮᐦ ᐊᐅᔅᒑᐦ 40 ᐱᕁ ᓭᓐᑦ ᓂᔮᔦᐧᐃᒡ ᑭᔮᐦ ᒫᒃ ᒍᐧᒑᓐᒡ ᐃᐦᑎᔑᐧᐃᒡₓ ᐄᓐᒌᒫᐅᔑᒧᐧᐃᓐ ᒫᒃ ᒫᐅᒡ ᒥᓐᒍᐦ ᐋᐱᑎᓐ ᐊᓂᒑᐦ ᐃᐦᒑᐧᐃᓐᐦ ᓅᓈᕓᒃ ᐊᔅᒌᐦᒡ ᐋᐦᑎᑯᐦᒡᐦₓ ᒥᐦᒫᑐ ᒫᒃ ᐄᓐᒌᒫᐅᒡ ᓂᐦᒑᐅᐧᐋᒥᓐᑎᑯᔒᐅᔑᒧᐧᐃᒡ ᑭᔮᐦ ᐱᓐᑎᐧᑳᔮᐅᔑᒧᐧᐃᒡₓ

ᐊᓂᔮ ᒫᒃ ᒫ ᒌ ᐃᔑ ᐱᑳᔅᒋᐦᐅᐧᐋᑯᐱᓈ ᐊᐧᐋᓂᒌ ᐊᓂᒑᐦ ᓅᓈᕓᒃ ᓂᑳᐦᐅᑯᐧᐃᒡ ᐊᓂᔮ ᐋᒑᔑᐦᒉᑯᓂᔑᒡ ᒫᓐᐦ, ᐋᑳ ᐹᔑᑯᓂᐦᒡ ᐃᐦᑎᑯᓂᔑᒡ ᐊᓂᔮ ᒫᐧᑳᔑᐤ ᐊᓂᑎᐦ ᐧᐋᐦᑎᓂᑭᓂᐧᐃᐧᐃᔑᒡ ᑭᔮᐦ ᒫᒃ ᐧᐋᔮ ᐧᐋᐦᔑᐤ ᐋᐦ ᐃᐦᑎᑯᓂᔑᒡ ᐊᓂᒑᐦ ᒫ ᒌ ᐃᔑ ᐊᒑᐧᐋᒡ ᑭᔮᐦ ᐅᑎᓂᒫᒡₓ ᓃᐧᔖᓱᒥᓂᐤ ᐱᕁ ᓭᓐᑦ ᒫᒃ ᐊᓂᒑᐦ ᐄᔑ ᐋᐱᑎᓯᐧᐃᒡ ᐋᐦ ᐋᑐᔅᑭᐦᒡ ᐅᑎᐦᒑᐧᐃᓂᐧᐋᐤᐦₓ ᒫᑳᑦ ᒫᒃ ᒥᓯᐧᐊ ᐊᓐ ᐋᑎ ᐃᔑᒑᐱᑎᓯᓈᓂᐧᐃᒡ ᐋᐱᑎᔒᓐᑎᐧᐋᐧᐃᒡ

ᐅᑏᔨᔨᒥᐧᐋᐤ" (ᓂᑑ"ᑯᔨᓈᐱᑎᔫᐧᐃᓂ"ᒡ, ᒋᔅᑯᑎᒫᒌᐧᐃᓂ"ᒡ ᑭᔮ" ᒥᓯᓂ"ᐋᒫᐅᑭᒥᑯ"ᒡ ᐋ" ᐱᒥᐱᔨ"ᑖᑭᓂᐧᐃᐧᐃᔨᒡ ᒌᐧᑳᔨᐤ), ᑭᔮ" ᐊᓂᑖ" ᑯᑎᒃ" ᐊᐧᐋᔨᐤ" ᐋ" ᐱᒥᐱᔨ"ᐧᑖᓱᔨᒡ" ᑭᔮ" ᐋ" ᐋᑖᐧᐋᔨᒡ" ᒌᐧᑳᔨᐤ, ᓂᑑ"ᐅᐧᐃᓂᔨᐤ ᐋ" ᐱᒦ"ᑲᑭᓂᐧᐃᐧᐃᔨᒡ ᑭᔮ" ᐋ" ᐧᐃᔨᑳᐳ"ᑖᑭᓂᐧᐃᐧᐃᔨᒡ" ᑭᔮ" ᐋ" ᐅᔑ"ᑖᑭᓂᐧᐃᐧᐃᔨᒡ" ᓂᓈ"ᑭᐤ ᐧᐋᔅᑳ"ᐋᑭᓐ"ₓ ᐅᑖ" ᒫᒃ ᔫᓈᕕᒃ ᐋ" ᐅ"ᑎᓂᑭᓂᐧᐃᒡ ᒌᐧᑳᓐ ᐋᔅᑏ"ᒡ, ᐅᔅᑎᔅᑭᒥᒡ ᑭᔮ" ᐋᑖᒥᔅᑭᒥᒡ ᑭᔮ" ᓂᒥᔅᑏᐅᔑᑯᑖᐤ ᐋ" ᐅᔑᑖᒫᐱᔨ"ᑖᑭᓂᐧᐃᒡ ᐅᓭ ᐊᓂᑖ" ᐋᓯᒫ"ᑖ"ᒡ ᑯᐯᒃ ᐋᑯᑖ" ᐋᔑ ᐋᐱᑎ"ᒡ ᑭᔮ" ᐋᔑ ᐋᑖᐧᐋᓂᐧᐃᒡₓ ᒦᓐ ᒫᒃ, ᐆ ᐸᒦ"ᑭᑭᓂᐧᐃᒡ" ᒌ"ᑭ"ᐋᒫᐱᔨᐤ ᐋᔅᑏ ᐋ ᐧᐋ" ᒥᓈ"ᑖᑭᓂᐧᐃᒡ ᑭᔮ" ᒌ"ᑭ"ᐅᑯᐧᐃᒡ ᐋᐧᐋᔫᔫᒡ ᑭᔮ" ᓂᒫᔫᒡ ᐅᑖ" ᐊᑎᒫᐋᔫᒪ, ᐊᓂᔮ" ᓈᔑᒡ ᐧᐋ" ᓈᑭᑎᐧᐋᔨ"ᑎ"ᒃ ᐧᐄ ᐄᔑᑏᒫᐤ ᐅ"ᒋ ᐊᓂᔮ ᐋ ᐃᔑ ᐱᒫᑎᓰᐨₓ ᐋ" ᔫᒋᒫᓂᑖᐧᐋᓂᐧᐃᒡ ᓈᔑᑖᐧᐋ ᒋᔅᑎᒫᐧᐃᓐ ᑭᔮ" ᐧᐄᒋ"ᐄᐧᐋᐱᔨᐤ ᒌ ᒌ" ᐧᐄᒋ"ᐄᑯᒡ ᐊᐧᐋᓂᒌ ᐅᑖ" ᐊᑎᒫᐋᔫᒪₓ ᒫᐧᑳᒡ ᒫᒃ ᐆ, ᐋᑯᑎ" ᓈᔑᒡ ᔫᒋᒫᓂᑖᐧᐋᓂᐧᐃᒡ ᐋ" ᐋᒋ ᓂᑑ"ᐅᒡ ᐊᐧᐋᓂᒌ, ᒫᔑᐧᐃ"ᐊᑳ ᐊᓂᔮ ᐋ" ᓂᑑᑎ"ᐧᑳᒡ ᐊᐧᐋᓂᒌ ᒦᓐ ᒌᐧᐋ"ᒡ ᐋ" ᐅᒋᐧᑳᒋᒫᒡ ᒫᔨᒫᔅ", ᑭᔮ" ᔪᔅᓯᐤ" ᓃᔐᔨᒡ ᐋ ᐋᓯᓇᑯᔨᔨᒡ"ₓ ᐋᓐ ᒫᒃ ᒦᓐ ᒌᐧᑳᓐ ᐋ" ᒍᒋᒋ"ᐄᐧᐋᒡ ᑳᓂᐧᐋᐱ"ᑎᑭᓂᐧᐃᒡ ᑭᔮ" ᐋᑳ ᓈᔑᒡ ᒌ ᐋᔫᔦᐧᐃ"ᑖᑭᓂᐧᐃᒡ ᐋᔅᑏ ᑭᔮ" ᐋᓐ ᒌᐧᑳᓐ ᒌ ᒌ" ᐅ"ᑎᓰᐧᐋᒌᓂᐧᐃᒡ, (ᐋᐅᑯ ᐋ" ᓅᒋᓐᑎᒫᓂᐧᐃᒡ, ᑳᐅᔅᑖᑯᓂᒋᐱ"ᑖᒡ ᐋ" ᐱᐸᒥᐱᔨᐧᐋᒌᓂᐅᐧᐃᒡ, ᐋᔑᑏᒫᐤ ᐆᑖ" ᐋ" ᐱᒥᔑᑲᐧᐋᒌᓂᐧᐃᒡ", ᑳᐱᒥᐱᔨᔑᒡ" ᐋ" ᐋᐱᑎ"ᒡ" ᓂᐲ"ᒡ, ᐋ" ᐱᐸᒥᔑᑳᓂᐅᐧᐃᒡ, ᐋ" ᐧᐋᐱ"ᑎᔨᐧᐋᓂᐧᐃᒡ ᐋ ᐃᔑ ᐱᒫᑎᓰᒡ ᐋᔨᔨᐅᒡ ᑭᔮ" ᐋᔑᑏᒫᐅᒡ, ᐋ" ᐧᐊᐧᐋᐱ"ᑎᑭᓂᐧᐃᒡ ᐋᔅᑏ ᑭᔮ" ᐋᐧᐋᔫᔫᒡ ᑭᔮ" ᒫᒃ ᑯᑎᒡ ᒌᐧᑳᓐ)ₓ ᐅ"ᐄ ᒫᒃ ᒌᐧᑳᓂ"ᐄ ᐋᑯᑖ" ᒌᑳᑦ ᒥᓯᐧᐋ ᐋᔑᓈᑯ"ᒡ" ᐊᓂᑖ" ᐋ" ᐱ"ᑳᓂᔑᑖᒡ ᐋᔅᑏ ᓈᔑᒡ ᐋ" ᓈᑭᑎᐧᐋᔨ"ᑖᑯ"ᒡ ᐋᑯᑖ" ᐋ"ᑐᑎᑭᓂᐧᐃᒡ" ᑭᔮ" ᒋᑭ ᒌ" ᐧᐄᒋ"ᐄᐧᐋᐱᔨᐤ ᐋ" ᔫᒋᒫᓂᑖᐧᐋᓂᐧᐃᒡₓ

ᐋᑎ ᐄᑎᔅᑭᒥᑳᒡ ᐋᔅᑏ ᑭᔮ" ᐋᑎ ᐄᑎᔑᑖᒡ ᓂᐋ

ᐹᔨᑯ ᐊᓐ ᒌᐧᑳᓐ ᐧᐋ"ᒋ ᐃ"ᑐᑖᑭᓂᐧᐃᒡ ᐋᔅᑏ ᐋ" ᐱ"ᑳᓂᓂᑭᓂᐧᐃᒡ ᓈᔑᒡ ᒌ ᒌ" ᒥᓈᒋ"ᑖᑭᓂᐧᐃᒡ ᐋᐅᑯ ᓈᔑᒡ ᐧᐋ" ᓈᑭᑎᐧᐋᔨ"ᑖᑯ"ᒡ ᑭᔮ" ᐋᑳ ᐧᐄ" ᐧᐃᓈᒋ"ᑖᑭᓂᐧᐃᒡ ᐊᓐ ᓈ"ᐋᐤ ᑳ ᐄᔑᓈᑯᓂᑯᐱᓈ ᐅᔑᑭᒡ ᑭᔮ" ᒥᑯ ᐅᑎ" ᐊᓐ ᐋ ᐄᔑᓈᑯ"ᒡₓ ᐋᑯᑎ" ᒫᒃ, ᐊᓐ ᐹᔨᑯ ᒌᐧᑳᓐ ᔮᔨᑖ ᐧᐋ" ᐃ"ᑐᑖᑭᓂᐧᐃᒡ ᐋᐅᑯ ᒌ ᒋᔅᒌᔨ"ᑖᑯ"ᒡ ᑭᔮ" ᔮᔨᑖ ᒌ ᒥᓯᓂ"ᐄᑭᓂᐧᐃᒡ ᐊᓐ ᒌᐧᑳᓐ ᐊᓂᑎ" ᐋᑎ ᐃᔨ"ᑎᑯ"ᒡₓ ᐋᔨᒍᑖᐤ ᒫᒃ ᐊᓂᑎ" ᑎᐸᒋᒍᐧᐃᔨᓯᓂ"ᐄᑭᓂ"ᒡ ᐹᔨᑯ ᐊᓐ ᒌᐧᑳᓐ ᒫᐅᒡ ᑳ ᐧᐄ" ᒥᓯᓂ"ᐄᑭᓂᐧᐃᒡ ᐋᐅᑯ ᐆ ᐋ" ᒥᓯᓂ"ᐄᑭᓂᐧᐃᒡ ᐊᓐ ᒌᐧᑳᓐ ᐊᓂᑎ" ᐋᑎ ᐃᔨ"ᑎᑯ"ᒡₓ ᐋᑯᑎ" ᑭᔮ" ᒥᒋᓐ ᒫᓯᓂ"ᐄᑭᓂᐧᐃᒡ ᐊᓐ ᐋᑎ ᐄᑖᔨ"ᑖᑯ"ᒡ ᐋᔑᑯᒥᒌᔑᑳᐤ", ᐋᑎ ᐄᑎᔅᑭᒥᑳᒡ ᐋᔅᑏ, ᐋᑎ ᐃᔨᑖᐱᔅᑳᒡ, ᒌᐧᑳᓐ ᐊᓐ ᐧᐋ"ᒋ ᐃᔨᑎᔅᑭᒥᑳᒡ ᑭᔮ" ᑖᓂᑖ" ᐧᐋ"ᒋ ᒌ" ᐄᑎᔅᑭᒥᑳᒡ, ᐋ" ᑎᐸᑎᑖᒡ ᒌᐧᑳᓐ ᐊᓐ ᐧᐋ"ᒋ ᐃᔨᑎᔑᑖᒡ ᓂᐋ ᑭᔮ" ᐊᓂᑎ" ᒫᐧᔮᒡ ᒌ ᒌ" ᐋᑎ ᐃᔨ"ᑖᓂᐧᐃᒡ ᑭᔮ" ᐱᒍᐧᐃᑖᓂᐧᐃᒡₓ

ᐋᑦ ᐊᓐ ᓈᓈᓂᒌᒻ ᐋᑳ ᑎ"ᑳᔮᒡ ᐆ ᒥᓯ"ᑖ ᐋᔅᑏ, ᐅᑖ" ᔫᓈᕕᒃ ᐋᔮᐱᒡ ᐊᐧᑳᑖᔨ"ᑖᑯ"ᒡ ᐋᑳ ᒥ"ᒌᐧᑖᐤ ᒋᔑᑖᒡ ᐅ"ᒋ ᐊᓐ ᐋ" ᐱᐸᒥᐱᔨᒡ ᐊᓐ ᒌ ᐊᑎ ᐃᔨᑖᔨ"ᑖᑯ"ᒡ ᒌᔑᑯ ᐅᑖ" ᐊᑎᒫᐋᔫᒪₓ ᐊᓐ ᒫᒃ ᑳ ᐃᔑ ᓈᓂᑑᒋᔅᒌᔨ"ᑖᑯ"ᒡ ᐋᑯᑎ" ᐧᐋ"ᑖᑯ"ᒡ ᒌᐧᑳᓐ ᐊᓐ ᐧᐋ"ᒋ ᐊᑎ ᐃᔨᑖᔨ"ᑖᑯ"ᒡ ᐊᓂᑎ" ᓈ"ᐋᐤ ᓂᔮᓂᑑᒋᔅᒌᔨ"ᑖᑯ"ᒡ: ᐧᐄᓂᐹᑯ"ᒡ, ᓅ"ᒋᒦ"ᒡ (ᐋ" ᑎᐧᐃᑎᓈᒡ ᑭᔮ" ᐲ"ᑎᐧᐃᑎᓈᒡ), ᑭᔮ" ᐊᓂᑖ" ᐧᐃᔮᔔᑭᒦ"ᒡₓ

ᐅᔒ ᐊᐧᑳᑖᔨ"ᑖᑯ"ᒡ ᐋ" ᐱᐳ"ᒡ ᐋ" ᐧᐋᔒᔅᑯ"ᒡ ᐅ"ᒋ ᐊᓐ ᒌᔑᑯ ᒫᑳᑦ ᐹᔨᑯᓂ"ᒡ ᐋ" ᐄᑖᔨ"ᑖᑯ"ᒡ ᐊᓂᑖ" ᒋ"ᒋᐧᐋ ᐃᔑᐱᒥ"ᒡₓ ᐋᑯᑖ" ᐋᔑ ᐧᐄᒋ"ᐄᐧᐋᐱᔨᒡ ᐊᓐ ᐋ" ᒥᔑᑭᐧᐃᑎ"ᒡ "ᐋᑦᓯᓐ ᐯᐃ", ᑭᔮ" ᒌ ᓂᑳ"ᐄᒫᐱᔨᒡ ᐊᓐ ᒌ ᐄᑖᔨ"ᑖᑯᓂᑯᐱᓈ ᐋᑳ ᒥᔑᑭᐧᐃᑎ"ᒫₓ ᐅᑖ" ᐊᒋᔑᑎᐤ ᐧᐋ"ᑎ"ᒡ, ᐋ" ᒌᐧᐋᑎ"ᒡ (ᐋᑯᑎ" ᑖ"ᑳᔮᒡ, ᐱᔮ"ᑯᔨᐧᐋᒡ ᑭᔮ" ᔫᑎ"ᒡ)ₓ ᐋ" ᒌᔑᐧᐸᒡ ᒫᒃ ᐅᑖ" ᒥᔅᑯᒦ"ᒡ "ᐋᑦᓯᓐ ᐯᐃ", ᐋᑯᑎ" ᒌ ᒌ" ᑭᔑᑭᐧᐃ"ᒡₓ ᐸᔕᓃᐱᓐ ᑭᔮ" ᓂᒥ ᒋᔅᒌᔨ"ᑖᑯᓐ ᒌ ᐊᑎ ᐄᔨᔑᒌᔑᑳᒡₓ ᒥᔑᐤ ᒫᒃ ᐋᑳ ᐊᑎ ᐃ"ᑖᒡ" ᒥᔅᑯᒦ ᐅᑖ" "ᐋᑦᓯᓐ ᐯᐃ", ᐋᑎ ᐋᐳᐧᐋᑭᒥᒡ ᐧᐄᓂᐹᒃ, ᑭᔮ" ᒫᔅᑭᑦ ᑳᔑᑭᐧᐃ"ᒡ ᐊᓂᑖ" ᔮᔮᐤ ᐧᐄᓂᐹᑯ"ᒡₓ ᐹᔓᔫᑯᓐ ᑭᔮ" ᒥ"ᒌᐧᑖᐤ ᐧᐋᐱᔑᑭᑎᓐₓ ᐋᑯᑎ" ᒫᔑᑭᐧᐃᑎ"ᒡ "ᐋᑦᓯᓐ ᐯᐃ" ᐧᐋᔑᑭᑯᒋ"ᒃ" ᑭᔅᑭᑎᓂᐋᐱᔨᒻ, ᑭᔮ" ᓂᒥ ᒦ"ᐧᑳᒡ ᒥᔅᐳᓐₓ ᒥᒫᓐ ᒫᒃ ᐃᔨ"ᒡ ᐊᑎ ᐃᔨᑖᔨ"ᑖᑯᓐ ᐊᓂᑖ" ᐃᔮᑎᐧᐄᓂᐹᑯ"ᒡ; ᐊᓂᑖ" ᐋ ᐄᔑᐱᑖᐅ"ᑳᒡ ᑖᐱᓂᐧᐋᒡ, ᐅᑖ" ᑖᐅᒡ ᐧᐋ"ᑎ"ᒡ" "ᐋᑦᓯᓐ ᐯᐃ" ᓂᒥ ᓈᔑᒡ ᒌ" ᐄᑖᔨ"ᑖᑯᓐ ᑭᔮ" ᑖᐱᓂᐧᐋᒡₓ

ᐹᔨᑯᐱᐳ" ᒫᒃ ᑖᐱᑎᐤ ᐋ" ᑭᓂᐧᐋᐱ"ᑎᑭᓂᐧᐃᒡ ᐅᑎ" ᓂᔮᓂᑑᒋᔅᒌᔨ"ᑖᑯ"ᒡ ᐋ" ᐄᑖᔨ"ᑖᑯ"ᒡ -5°C ᐃ"ᑎᑯᓐ ᓂᑐᒋᑭᓐ, ᑭᔮ" ᐊᑎᑎᐤ ᑎ"ᑳᔮᐤ ᐅᑖ" ᓅ"ᒋᒦ"ᒡ ᐋ"ᒡ ᐅᑖ" ᐧᐄᓂᐹᑯ"ᒡ (ᓅᑯ"ᒡ ᐊᓂᑎ" 3.1 ᑳ ᐄᑎᓯᓈᑖᒡ)ₓ ᐋᑯᑎ" ᑭᔮ" ᐋ"ᑎᑯ"ᒡ ᐅᑎ" ᐋ" ᓈᓂᑑᒋᔅᒌᔨ"ᑖᑭᓂᐧᐃᒡ ᐋᑳ ᓂ"ᑖ ᒌ" ᐋᐳᐧᐃᐱᔨᒡ ᐋᔅᑏ, ᑳᒋᒡ ᐋ" ᒥᔑᑭᐧᐃᑎ"ᒡₓ ᐅᑖ" ᒫᒃ ᐧᐄ ᐧᐃᔮᔔᑭᒦ"ᒡ 600 ᐲ"ᐃᒻ 650 mm ᐃᔑᐱᔑ ᒋᒍᐧᐃᓐ ᑭᔮ" ᒫᒃ ᐃᔑᐱᔑ ᒥᔅᐳᓐ ᐹᔨᑯᐱᐳᓐ", ᐋᑯ" ᐧᐄ ᐅᑖ" ᔮᔮᐤ "ᐋᑦᓯᓐ ᐯᐃ" 600 mm ᐃᔑᐱᔑ ᒋᒍᐧᐃᓐ ᑭᔮ" ᒫᒃ ᐃᔑᐱᔑ ᒥᔅᐳᓐ ᐹᔨᑯᐱᐳᓐ"ₓ 37 ᐱᕐ ᔅᐊᓐᑦ ᐃᔑᐱᔑ ᒥᔅᐳᓐ ᑭᔮ" ᒋᒍᐧᐃᓐ ᐹᔨᑯᐱᐳᓐ"ₓ

ᐊᓂᑖ" ᒫᒃ ᓅ"ᒋᒦ"ᒡ ᐋᑖ"ᒫ ᐋ"ᑎᑯ"ᒡ" ᓵᑭ"ᐄᑭᓐ" ᓈᑑᒋᔅᒌᔨ"ᑖᑯ"ᒡ" ᐋᑯᑎ" ᒫᔑᑭᐧᐃᑎ"ᒡ" ᐧᐋᔑᑭᑯᒋ"ᒃ" ᑭᔅᑭᑎᓂᐋᐱᔨᒻ ᐹᑎᔑ ᐋᑎ ᐄᔑᐧᑳᑯᒋ"ᒃ" ᒍᔔᐧᐋ"ᔫᐅᐋᐱᔨᒻ ᐄᔫᑯ ᐧᒫᔔᐹᔫᒡ"ₓ ᐊᓂ"ᐄ ᒫᒃ ᓵᑭ"ᐄᑭᓐ" 130

ᑎᐦᑐᕆᔑᑳᐤᐦ ᒧᔒᐹᔮᐤᐦ ᐹᔨᑯᐱᐳᓐᐦ᙮ ᐊᓐ ᒫᒃ ᐃᔮᑎᐧᐄᓂᐹᒄ ᐋᑯᑎᐦ ᒫᔥᑮᐧᐃᑎᐦᒡ ᐃᔮᐱᐦᑎᐧᐃᑯᒥᐦᒃᐦ ᒥᑯᔒᕆᔑᑭᓂᐋᐱᔨᒻ ᐋᐦᐃᒻ ᐋᑎ ᐋᐱᐦᑎᐧᐃᑯᒥᐦᒃᐦ ᒧᔒᐧᐋᐦᔮᐳᐋᐱᔨᒻ, ᐊᑎᑎᐤ ᐧᐋᔨᐱᔥᕆᔥ ᒥᔥᑭᐧᐃᑎᓐ ᐋᐦᒡ ᐊᓂᐦᐋ ᐹᓴᒡ ᐊᓂᑎᐦ ᐋᑎ ᐃᔭᐦᑎᑯᐦᒡᐦ ᓵᑭᐦᐄᑭᓐᐦ ᐅᑖᐦ ᓅᐦᒋᒦᐦᒡ ᐊᑎᑎᐤ ᐃᔮᐱᔑᑭᒫᔑᒡᐦ᙮ ᐋᐅᒄ ᐊᑎᑎᐤ ᐧᐋᔨᐱᔥᕆᔥ ᐧᐋᐦᒋ ᒥᔥᑭᐧᐃᑎᐦᒡᐦ ᐅᐦᒋ ᐊᓐ ᐋᐦ ᐹᐱᔨᒡ ᑭᔮᐦ ᐋᐦ ᒌᐧᐋᒋᐧᐃᐦᒡ, ᐊᓐ ᓈᐧᑳᓐ ᐱᔮᑖᐳᑖᒡ ᐊᓂᑖᐦ ᐅᐦᒋ ᔫᐋᐦᒡ ᐊᓂᑖᐦ ᐋ ᐅᐦᒋ ᓵᕆᐧᐃᒡ ᑭᔮᐦ ᐊᓐ ᐊᔥᐱᔥ ᒋᔑᒋᐧᐃᐦᒡ, ᐊᔥᐱᔥ ᔑᐧᐋᐳᐧᐃᒡ, ᑭᔮᐦ ᐊᓐ ᒥᒫᓐ ᓂᓈᐦᑭᐤ ᐋᑎ ᐃᔭᑖᔭᐦᑖᑯᐦᒡ ᐊᔑᑯᒥᒌᔑᑳᐤᐦ᙮ ᐊᓐ ᒫᒃ ᐋᐦ ᒋᔑᒋᐧᐃᐦᒡ ᑭᔮᐦ ᑳᒋᒡ ᐋᐦ ᐱᒥᒥᐧᐃᐦᒡ ᐊᓐ ᐧᑳᑭᔨᔅᒋᐧᐃᓐ, ᐅᑖᐦ ᐃᔮᑎᐧᐄᓂᐹᑯᐦᒡ ᐧᐋᐦᑖᒋᐧᐃᐦᒡ ᐅᑖᐦ "ᐊᑦᔨᓐ ᐯᐃ" ᐋᔑᑯᐦᐱᑎᐦᒡ, ᓂᒥ ᓂᐦᑖ ᒌᐦ ᒥᔥᑭᐧᐃᑎᓐ ᐅᑎᐦ᙮ ᐅᑖᐦ ᔮᔮᐤ "ᐊᑦᔨᓐ ᐯᐃ", ᐋᑯᑎᐦ ᒫᔥᑮᐧᐃᑎᐦᒡ ᐃᔮᐱᐦᑎᐧᐃᑯᒥᐦᒃᐦ ᒥᑯᔒᕆᔑᑭᓂᐋᐱᔨᒻ ᑭᔮᐦ ᐊᓐ ᐹᐹᒫᐦᐅᑯᑦ ᒥᔅᑯᒦ ᐸᑯᐱᔨᑦ ᐃᔮᐱᐦᑎᐧᐃᑯᒥᐦᒃᐦ ᐅᐱᔥᑰᐋᐱᔨᒻ᙮ ᐊᓂᔮ ᒫᒃ ᐊᔥᐱᔥ ᒋᔅᐱᒋᔩᑦ ᐊᓐ ᒥᔅᑯᒦ ᐹᐹᒫᐦᐅᑯᑦ ᐧᐄᔅᐧᐊ 1.5 ᒦᑎᕐᔅ᙮

ᐊᓐ ᒫᒃ ᐧᐋ ᐋᑎ ᐋᑎᔅᑭᒥᑳᓐ ᐊᔅᒌ, ᐋᑯᑎᐦ ᓅᓴᔑᓐ ᓈᑑᒋᔅᓛᔑᐦᑖᑯᐦᒡ "ᐊᑦᔨᓐ ᐱᐦᓚᑐ ᑭᔮᐦ ᐊᓂᐦᐋ ᒥᓂᔥᑎᒄᐦ ᒥᓂᑑᓂᒄ ᐋᔑᓈᑯᐦᒡ ᐋ ᐄᔑᓈᑯᐦᒡᐦ᙮ ᑭᔮᐦ ᐋᐅᒄ ᒦᓐ ᐋᑯᓂᐦᐄᓛᐱᔨᒡ ᐊᓐ ᐊᓐᑳᐹ ᐱᐦᓛᑐ ᑳ ᐃᔑᓂᐦᑳᑖᒡ (ᓅᑯᐦᒡ ᐊᔅᒌᐅᔨᓂᐦᐄᑭᓂᐦᒡ 3.1 ᑳ ᐃᑎᔨᓈᑖᒡ)᙮

ᐊᓐ ᒫᒃ "ᐊᑦᔨᓐ ᐱᐦᓛᑐ ᐋᑯᑎᐦ ᓛᑳᑦ ᒥᔨᐧᐋ ᐋᐦᑎᑯᐦᒡ ᐊᓂᑎᐦ ᓂᔮᓂᑑᒋᔅᓚᔑᐦᑖᑯᐦᒡ ᐊᔅᒌ᙮ ᐹᐦᑳᒡ ᐋᑎ ᓅᐦᑎᒋᐧᐋᔮᒡ ᐊᓂᑖᐦ ᐄᔑ "ᐊᑦᔨᓐ ᐯᐃ" ᐅᑖᐦ ᐅᐦᒋ ᐧᐋᐱᓅᑖᐦᒡ ᐊᓂᑖᐦ ᐄᔑ ᐊᒋᔥᑎᐤ ᑭᔮᐦ ᐊᐧᑳᔑᓈᑯᐦᒡ ᐋᐦ ᑭᑖᔅᑳᐱᔅᑳᒡ ᑭᔮᐦ ᐋᐦ ᑭᑖᔅᑳᐱᔅᒋᐱᔨᒡ ᐅᐦᒋ ᐊᓐ ᐋᑎ ᐃᔭᑖᔭᐦᑖᑯᐦᒡ ᑭᔮᐦ ᐊᓐ ᓂᐲ ᐋᐦ ᐱᓛᔑᑭᐧᐃᒡ᙮ ᐊᓐ ᒫᒃ ᐋᔅᐱᐦᑎᔅᑭᒥᑳᒡ ᐋᐦᒋᐱᔭᐤ ᒫᓐ ᐧᐊᐧᐄᔅᐧᐊ 300 ᒦᑎᕐᔅ᙮ ᐊᓐ ᒫᒃ ᐋᐅᔒᔮᒡ ᓅᓴᔑᓐ ᐃᔑ ᑎᐹᓂᔥᑖᐤ: ᐋᐦᒋᑯᓂᐲ ᑭᔮᐦ ᐧᐃᔮᔒᑭᒦ᙮ ᐊᓐ ᒫᒃ ᐋᔑᓈᑯᐦᒡ ᐊᓂᑎᐦ ᐧᐋᔅᑳ ᐧᐃᔮᔒᑭᒦᐦᒡ ᓈᔥᑖᐧᐹᐦ ᒥᐦᓛᑐᑭᒫᐤᐦ ᓵᑭᐦᐄᑭᓐᐦ, ᒥᐦᓛᑐ ᒫᒃ ᑭᔮᐦ ᐊᐅᔅᑖᐦ 100 km^2 ᐄᔥᐱᔑᑭᒫᐤᐦ, ᑭᔮᐦ ᐊᐧᑳᔑᓈᑯᐦᒡ ᐋᐦ ᓅᑯᐦᒡ ᐊᓐ ᓈᐧᑳᓐ ᐋᑎ ᐃᔭᐦᑎᑯᐦᒡ ᐋᐦ ᑭᓂᐧᐋᐱᐦᑎᑭᓂᐧᐃᒡ ᐊᓐ ᐋᑎ ᐃᔭᑎᔅᑭᒥᑳᒡ᙮ .ᐊᓂᑖᐦ ᒫᒃ ᐧᐋ ᐧᐋᔅᑳ ᐧᐃᔮᔒᑭᒦᐦᒡ, ᐋᑯᑎᐦ ᒫᐅᒡ ᐋᔥᐱᑎᓈᒡ ᐊᓂᑎᐦ ᑭᔮᐧᐸ ᓛᐧᑳᒡ ᓈᑑᒋᔅᓛᔑᐦᑖᑯᐦᒡ᙮ ᐊᓂᑎᐦ ᒫᒃ ᒋᔥᑎᐧᐃᒡ ᐅᑎᐦ ᐋ ᐄᔑ ᐊᑯᐦᐱᑎᐦᒡᐦ ᔒᐲᔑᔥᐦ ᐊᐧᑳᔑᓈᑯᐦᒡᐦ ᐋᐦ ᐹᓴᑭᒫᔮᔑᒡᐦ ᑭᔮᐦ ᐹᐦᐹᐧᑳᐤ ᐊᓐ ᐋᐦ ᑎᐧᐃᑎᓈᒡ᙮ ᐋᑯᑎᐦ ᒫᒃ ᐋᐦᑎᑯᐦᒡ ᓂᓈᐦᑭᐤ ᓈᐧᑳᓐ ᐊᓂᑖᐦ ᐋᐦ ᑎᐧᐃᑎᓈᒡ ᑭᔮᐦ ᔒᔥ ᐊᓂᑖᐦ ᐋ ᐄᔑ ᑎᑯᐱᔨᒡ ᐊᓐ ᒫᐅᒡ ᐋᓈᐦᒡ ᐋᐦᑎᑯᐦᒡ ᐊᔨᓅ᙮ ᐊᓂᑖᐦ ᒫᒃ ᐋᐦ ᑎᐧᐃᑎᓈᒡ ᐋᑯᑎᐦ ᒥᐦᓛᐧᑖᐤ ᑳᔥᑭᔒᒋᒋᐧᐃᐦᒡ ᑭᔮᐦ ᐋᑯᑎᐦ ᒥᐦᓛᑐ ᐋᐦᑎᑯᐦᒡᐦ ᐹᐅᔥᑎᑯᐃᐦ᙮ ᐊᓐ ᒫᒃ ᐧᐃᔮᔒᑭᒦ ᐊᓂᑖᐦ ᐋᐦ ᐧᐋᔭᑖᐅᐦᒡ ᐋᑯᑎᐦ ᐋᐦᑎᑯᐦᒡ, ᐊᓐ ᐧᐋᐦᒋ ᐃᔭᔑᓈᑯᐦᒡ ᐊᓂᑎᐦ ᓅᓴᔑᓐ ᐋᐦ ᒌᐦ ᐱᐦᒋᔅᑎᐦᒡ ᓈᐧᑳᓐ ᐊᓂᑖᐦ ᐅᐦᒋ ᒌᔑᑯᐦᒡ᙮ ᐊᓂᑖᐦ ᒫᒃ ᑖᑖᐅᒡ ᐊᒋᔥᑎᐤ ᐄᑖᐦᓚ ᐆ ᓵᑭᐦᐄᑭᓐ ᐋᑯᑎᐦ ᐋᑯᐦᑎᐦᒡᐦ ᐱᒥᒡ ᐋ ᐃᔑ ᒋᐧᓈᐅᐦᑳᒡᐦ ᒥᓂᔥᑎᒄᐦ ᐊᐦ ᐧᐊᐅᔮᔮᑯᐦᑎᐦᒡᐦ᙮ ᐅᑎᐦ ᒫᒃ ᓅᓴᔑᓐ ᐋᐦ ᐧᐋᔭᑖᐅᐦᒡ ᒥᐦᓛᑯᐦᑎᓐᐦ ᒥᓂᔥᑎᑯᔥᐦ᙮

ᐅᑖᐦ ᒫᒃ "ᐊᑦᔨᓐ ᐯᐃ" ᐋᑯᐦᑎᐦᒡᐦ ᒥᓂᔥᑎᒄᐦ ᒥᓂᑑᓂᒄ ᐋᔑᓈᑯᐦᒡ ᐋ ᐄᔑᓈᑯᐦᒡᐦ 650 ᑎᐦᑐ ᑎᐱᐦᐄᑭᓐ ᐃᔥᐱᔥ, ᐋᑯᑎᐦ ᐋᑯᐦᑎᐦᒡᐦ ᐊᓂᑖᐦ "ᐊᑦᔨᓐ ᐯᐃ" ᑰᐦᒋᐧᐋᕿᐱᒃ ᐅᑖᐦ ᐄᔑ ᐄᓅᒋᐧᐋᒃ, ᐋᑯᐦ ᐅᑖᐦ ᐊᔅᑎᔅᑭᒥᑯᐦᒡ, ᐅᑖᐦ ᐊᔅᒌᐦᒡ ᐋᑯᑖᐦ ᐋᐦᑎᑯᐦᒡᐦ ᓈᓈᓂᒌᒻ ᐊᑎ ᐊᐱᔒᔑᐤᐦ ᓛᒃ ᓂᒥ ᐊᑎ ᐃᐦᑎᑯᓐᐦ ᐅᑖᐦ ᐊᑎᓛᐲᔨᒻ ᐄᑖᐦᓚ ᐅᒦᐅᔮᒃ᙮ ᐅᐦᐄ ᒫᒃ ᑳ ᐄᔑᓈᑯᐦᒡᐦ ᒥᓂᔥᑎᒄᐦ ᑭᔮᐦ ᐋᐦ ᐱᔅᑯᑖᐅᐦᑳᒡ ᐋᐦᑎᑯᐦᒡᐦ ᐅᑖᐦ ᐊᒋᔥᑎᐤ ᐄᑖᐦᓚ ᐃᔮᑎᐧᐄᓂᐹᑯᐦᒡ, ᒋᔥᑎᐧᐃᒡ ᐅᒦᐅᔮᒃ ᑭᔮᐦ ᐧᑳᑭᔨᔅᒋᐧᐃᓂᐦᒡ, ᐋᑦ ᐋᑲ ᐧᐄᐦᑖᑯᐦᒡ ᐋᐦ ᑎᐸᑎᑖᑭᓂᐧᐃᐦᒡᐦ ᐊᓂᑎᐦ ᐧᐊᐦ ᓈᓂᑑᒋᔅᓛᔑᐦᑖᑯᐦᒡ, ᓈᔥᑖᐧᐹᐦ ᒥᔦᐧᐃᓈᓈᑯᓐᐦ᙮ ᐊᐧᑳᔑᓈᑯᐦᒡ ᐅᑎᐦ ᒧᔮᒻ ᐋᐦ ᑖᐱᑎᐧᐊᒡ ᑭᔮᐦ ᐹᐦᑳᒡ ᐋᐦ ᓅᐦᑎᒋᐧᐋᔮᒡ ᑭᔮᐦ ᐊᐧᑳᔑᓈᑯᐦᒡ ᐊᓂᐦᐋ ᐊᔨᓅᐦ ᒧᔮᒻ ᐋᑲ ᒥᔥᑭᐧᐊᐱᔅᑳᐦ ᒥᑯ ᐊᓂᑎᐦ ᐅᔥᒋᒡ ᐋᐦ ᒥᔥᑭᐧᐊᐱᔅᑳᐃᐦ᙮ ᐊᓐ ᒫᒃ ᑖᐱᑎᐤ ᐋᐦ ᑭᓂᐧᐊᐱᐦᑎᑭᓂᐧᐃᒡᐦ ᐊᔥᐸᓂᑳᒡᐦ ᐅᐦᐄ ᒥᓂᔥᑎᒄᐦ ᐧᐄᔅᐧᐊ 300 ᒦᑎᕐᔅ, ᐋᑯᐦ ᐊᓐ ᑭᓐᑳᓘᒃ ᐋᔑᓂᐦᑳᑖᒡ ᐋᐦ ᐱᔅᑯᑖᐅᐦᑳᒡ 420 ᐃᔥᐱᔥ ᒌᐱᑖᓂᑳᐤ᙮ ᐆ ᒫᒃ ᐋ ᐄᔑᓈᑯᐦᒡ ᒥᓂᔥᑎᒄ ᑭᔮᐦ ᒫᒃ ᐋᐦ ᐱᔅᑯᑖᐅᐦᑳᒡ ᐋᐅᒄ ᐧᐋᐦᒋ ᐄᔑᓈᑯᐦᒡ ᐊᓐ ᐋᐦ ᒫᔥᑖᐳᑖᒡ ᐊᔅᒌ ᑭᔮᐦ ᒫᒃ ᐊᔨᓅ ᑭᔮᐦ ᒫᒃ ᐊᓐ ᐋᐦ ᔩᑎᐦᒡ ᐊᓂᑎᐦ ᑭᔮᐧᐸ ᒨᔥ ᐋᐦ ᐋᐦᒋᐱᔭᐤ ᐊᔅᒌ ᐊᓂᑖᐦ ᐅᐦᒋ ᐋᓈᐦᒡ, ᐋᑯᐦ ᐃᔭᐦᒡ ᐋᑎ ᐄᔑᓈᑯᐦᒡ ᑭᔮᐦ ᓂᒥ ᐹᔭᑯᓂᐦᒡ ᐃᔥᐱᔥ ᒌᐱᑖᓂᑳᐤ ᐊᓐ ᐋᐦ ᐱᔅᑯᑖᐅᐦᑳᒡ᙮ ᐅᑖᐦ ᐧᐋᐱᓅᑖᐦᒡ ᐊᐧᑳᔑᓈᑯᐦᒡ ᓈᔥᒡ ᐋᐦ ᒌᔥᑳᒡ ᐋᑯᐦ ᐅᑖᐦ ᐊᒋᔥᑎᐤ ᐄᑖᐦᓚ ᐹᐦᑳᒡ ᐋᑎ ᓅᐦᑎᒋᐧᐋᔮᒡ (ᓅᑯᐦᒡ ᐊᓂᑎᐦ 3.5)᙮ ᐊᓂᑖᐦ ᒫᒃ ᐱᔥᒡ, ᐱᑯᓂᓚ ᐧᐊᐱᓛᑯᔥᒍᔑᔑᐦᒡ, ᑳᒍᕐᑐᐄᑦ ᔩᐲᐦᒡ ᑭᔮᐦ ᐧᑳᑯᔨᔅᒋᐧᐃᓂᐦᒡ, ᐋᑯᑎᐦ ᐹᒥᒥᐧᐃᐦᒡ ᐅᑎᐦ ᐆ ᐋᐦ ᐊᑎ ᐱᐱᑯᔅᑯᑖᐅᐦᑳᒡ᙮ ᐊᓐ ᐧᑳᑯᔨᔅᒋᐧᐃᓐ ᐋᑯᑖᐦ ᐋᑎ ᐊᑯᐦᐱᑎᐦᒡ ᐅᑖᐦ ᐄᔑ "ᐊᑦᔨᓐ ᐯᐃ"᙮ ᒋᐧᓈᐤ ᑭᔮᐦ ᔒᑭᐧᐋᐤ ᐊᓐ ᐋᐦ ᔒᐹᐧᐋᔮᒡ ᐄᑎᐤ ᒫᒃ ᐊᓂᑎᐦ ᒌᔥᑳᔮᐱᔅᑳᐤ 200 ᒦᑎᕐᔅ ᐃᔥᐱᔥ ᑭᔅᑭᑖᒥᔅᑳᐤ᙮ ᐊᓂᑖᐦ ᒫᒃ ᐃᔮᑎᐧᐄᓂᐹᑯᐦᒡ ᐋᑯᑖᐦ ᐋᔒᒥᑖᐅᐦᒋᐱᔭᒡ ᐊᔅᒌ᙮ ᐊᓐ ᒫᒃ ᑳ ᐋᒥᑖᐅᐦᒋᐱᔭᒡ ᐊᔅᒌ 200 ᐋᐦᐃᒻ 300 ᒦᑎᕐᔅ ᐃᑖᒥᐦᒡ ᐃᐦᑎᑯᓐ ᐊᓂᑎᐦ ᐊᓐ "ᐊᑦᔨᓐ ᐱᐦᓛᑐ ᐋᔑᓂᐦᑳᑖᒡ᙮ ᐊᓐ ᒫᒃ ᐱᐦᓛᑐ ᑭᔮᐦ ᐊᓐ ᐊᔅᒌ ᐋᐦ ᒌᐦ ᐋᒥᑖᐅᐦᒋᐱᔭᒡ ᐄᑎᐤ ᐊᓂᑎᐦ ᒌᔅᑳᒥᔅᑳᐤ᙮

ᒫᐦᒋᒡ ᒫᒃ, ᐊᓐ ᐊᓐᑳᐹ ᐱᐦᒑᑐ ᒨᔥ ᐊᓐ ᐋᐦ ᒌᐦ ᐄᔑᓈᑯᐦᒡ ᐅᑖᐦ ᐊᒋᔥᑎᐤ ᐄᑖᐦᓕ ᓈᔅᑖᐳᑳᔥᑎᑯᐦᒡ ᐋᑯᑎᐦ ᐋᐦᑎᑯᐦᒡ᙮ ᐊᓐ ᒫᒃ ᐊᓂᑎᐦ ᐋᐦ ᐧᐋᔨᑖᐅᐦᑳᒡ ᒧᔑᐧᐋᐤ ᑭᔮᐦ ᒥᐦᓚᑐᑭᒫᐤᐦ ᐋᐦ ᒥᒥᔖᑭᒫᒡᐦ ᓵᑭᐦᐄᑭᓐᐦ ᑭᔮᐦ ᒥᐦᓚᑐᔥᑎᐧᑳᔑᐤᐦ ᔒᐲᔑᔥᐦ᙮

ᐊᓐ ᒫᒃ ᐧᐋᐦ ᐱᐦᑳᓂᓂᑭᓂᐧᐃᒡ ᐊᔅᒌ ᓈᔥᒡ ᓚ ᐧᐄᐦ ᒥᓈᒋᐦᑖᑭᓂᐧᐃᒡ ᐋᐦᑎᐹᑎᑖᒡ ᐊᓐ ᑳ ᐃᔑ ᒥᔅᑭᐧᐋᐦᑖᑭᓂᐧᐃᒡ ᑳ ᓈᓂᑑᒋᔅᓚᔨᐦᑖᑯᐦᒡ ᐋᑯᑎᐦ ᐧᐋᐦᑖᑯᐦᒡ ᐊᓐ ᑭᔮᐦ ᐊᔨᓃ ᐋᑎ ᐃᔨᔑᓈᑯᐦᒡ ᐋᐦ ᒌᐦ ᓈᓂᑑᒋᔅᓚᔨᐦᑖᑯᐦᒡ᙮ ᐋᑯᑎᐦ ᒌᒥᓈ ᓛᔅᓚᔨᐦᑖᑯᐦᒡ ᑖᓐ ᓂᐦᐋᐤ ᑳ ᐊᑎ ᐄᔅᐱᔨᑯᐱᓈ ᐅᐦᒋ ᐊᓐ ᐊᔨᓃ ᐋᐦ ᐧᐋᐧᐋᐱᐦᑖᑭᓂᐧᐃᒡ᙮ ᐋᑯᑎᐦ ᑭᔮᐦ ᐧᐋᐦᒋ ᒋᔅᓚᔨᐦᑖᑯᐦᒡ ᑖᐃᔅᐸ ᐊᓐ ᑳ ᐊᑎ ᐃᔨᔅᐱᔨᒡ ᓚᐧᑳᓐ ᐊᓐ ᐊᔨᓃ ᐋᐦ ᑭᓂᐧᐋᐱᐦᑎᑭᓂᐧᐃᒡ ᐅᑎᐦ ᐊᓐ ᐧᐋᐦᑎᑖᑭᓂᐧᐃᒡ ᐊᓐ ᐊᔅᒌ ᓈᔥᒡ ᐧᐋᐦ ᒥᓈᒋᐦᑖᑭᓂᐧᐃᒡ᙮

ᐊᓐ ᒫᒃ ᐦᐊᑦᔨᓐ ᐱᐦᒑᑐ ᓂᒧᐃ ᐅᐦᒋ ᐋᐦᒋᐱᔨᐦᑖᑯᐱᓐ ᐊᓂᑎᐦ ᐅᔥᒋᒡ ᐧᐄᓵᐧᐊ 1.5 ᐱᓀᔨᓐ ᑎᐦᑐᐱᐳᓐᐦ ᐅᑖᐦ ᐄᔑ ᐅᑖᐦᒡ᙮ ᐊᓐ ᒫᒃ ᐋᐦ ᒌᐦ ᐊᑎ ᑖᐱᑎᐧᐃᐱᔨᒡ ᐊᓐ ᐊᔅᒌ, ᓃᐧᔓᐤ ᒌᐦ ᐹᒋ ᐱᒋᔅᑎᓂᐦᑖᑯᐱᓐ ᓚᐧᑳᓐ ᐅᑎᐦ ᑭᔮᐦ ᓈᑖᐦ ᐋᓈᐦᒡ ᐋᑯᑖᐦ ᑳ ᐃᔑ ᑖᐦᑭᐦᐄᓚᐱᔨᒡ᙮ ᐊᓂᑖᐦ ᐧᐋᐱᔫᑖᐦᒡ ᐄᑖᐦᓕ ᐧᐃᔮᔑᑭᒦ ᐋᑯᑎᐦ ᐧᐃᔮᐅᑖᐦᑳᒡ 22 ᑎᐱᐦᐄᑭᓐ ᐃᔥᐱᔒᐤ ᑭᔮᐦ 178 ᒦᑎᑦᔅ ᐃᔥᐱᔥ ᒨᑖᔫᐤ᙮ ᐋᑯᐦ ᐅᑖᐦ ᐊᒋᔥᑎᐤ ᐄᑖᐦᓕ ᐋᐦ ᐧᐋᔨᑖᐅᐦᑳᒡ ᐆ ᐧᐃᔮᔑᑭᒦ ᐊᑎᑎᐤ ᒌᐦ ᒥᔒᐦᑖᑯᐱᓐ ᐊᓐ ᑳ ᐱᐦᒋᔅᑎᐦᒡ 32 ᑎᐱᐦᐄᑭᓐ ᐃᔥᐱᔒᐤ ᑭᔮᐦ ᐊᑎᑎᐤ ᐹᐦᐸᐧᑳᐤ 103 ᒦᑎᑦᔅ ᐃᔥᐱᔥ ᒨᑖᔫᐤ᙮ ᐊᓐ ᒫᒃ ᑳ ᐄᑎᐦᐄᓚᐱᔨᒡ ᐊᓐ ᑳ ᐱᐦᒋᔅᑎᐦᒡ ᔒᔥ ᓂᒥ ᐊᑎ ᐙᑯᓐ ᒥᑯ ᐋᑯᑎᐦ ᐧᐋᐦᒋ ᒋᔅᓚᔨᐦᑖᑯᐦᒡ ᐊᓂᑎᐦ ᑖᑖᐳᒡ ᐊᓐ ᐋᐦ ᐧᐋᔨᑖᐅᐦᑳᒡ ᐧᐃᔮᔑᑭᒦ ᐋᐦᑎᑯᐦᒡ᙮ ᐋᓐ ᑳ ᐋᐦᒋᐱᔨᒡ ᐊᓐ ᐊᔨᓃ ᐄᔅᑯᑎᑉ ᑳ ᐹᒋ ᐱᐦᒋᔅᑎᐦᒡ ᐊᓐ ᓚᐧᑳᓐ ᐅᑖᐦ ᐅᐦᒋ ᒌᔑᑯᐦᒡ ᐋᑯᑎᐦ ᐧᐋᐦᒋ ᒌᐦᑎᑯᐦᒡᐦ ᐊᓂᐦᐄ ᒥᓂᔥᑎᑯᐦ᙮

ᐊᓐ ᒫᒃ ᐧᐄ ᐊᔨᓃ, ᐋᑯᑖᐦ ᐋᔑᓈᑯᐦᒡ ᐊᓂᑎᐦ ᓚ ᒌᐦ ᐙᒋᔨᓈᓂᐧᐃᒡ ᒋᔥᑎᐧᐃᒡ ᐊᓐ ᐊᔨᓃ ᐋᐦ ᒌᐦ ᐱᐦᒋᔅᑎᐦᒡ ᑭᔮᐦ ᐊᓐ ᒫᐅᒡ ᐋᓈᐦᒡ ᐋᐦᑎᑯᐦᒡ ᐊᔨᓃ᙮ ᐋᑦ ᒫᒃ ᐃᐦᑎᑯᐦᒡ ᐊᓂᑎᐦ ᐋᐦ ᒥᐧᔮᒡ ᓚ ᒌᐦ ᐅᐦᑎᓂᑭᓂᐧᐃᒡ ᓚᐧᑳᓐ ᓂᒧᐃ ᐄᔑᓈᑯᓐ ᓈᔥᒡ ᓚ ᒌᐦ ᐅᐦᑎᔩᐧᐋᓕᓂᐧᐃᒡ᙮

ᐊᓐ ᒫᒃ ᐋᑎ ᐃᔨᔑᓈᑯᐦᒡ ᐊᔅᒌ ᐊᓂᑎᐦ ᑳ ᓈᓂᑑᒋᔅᓚᔨᐦᑖᑯᐦᒡ ᐋᑯᑎᐦ ᑳᐦ ᐋᐦᒋᐱᔨᒡ ᐊᓐ ᐊᔅᒌ ᐋᑎ ᐄᑎᔅᑭᒥᑳᒡ ᐅᐦᒋ ᐊᓐ ᓈᔥᒡ ᐋᐦ ᒌᐦ ᑎᐦᑳᔫᒡ ᑭᔮᐦ ᐊᓐ ᓚᒃ ᐋᐦ ᒌᐦ ᐊᑎ ᐋᐳᐧᐋᔫᒡ᙮ ᐋᔅᑭᐤ ᒫᒃ ᒫᓐᐦ, ᒥᔨᐧᐊ ᒌᐦ ᒥᔅᑯᒦᐤ ᐆ ᑳᐦᓈᑖᐦ᙮ ᐋᑯᑎᐦ ᓚ ᒌᐦ ᐧᐋᐱᐦᑎᑭᓂᐧᐃᒡ ᐊᓐ ᑳ ᐊᑎ ᐃᔨᔅᐱᔨᒡ ᐙᑯᐦᒡ ᐊᓂᑎ 3.7 ᑭᔮᐦ ᐙᑯᐦᒡ ᐊᓂᑎᐦ ᐊᔅᒌᐅᔨᓂᐦᐄᑭᓂᐦᒡ 3.5᙮

ᐊᓐ ᒫᒃ ᒫᐦᒋᒡ ᓈᔥᒡ ᑳ ᑎᐦᑳᔫᒡ ᐋᑯᑖᐦ ᒌᐦ ᐄᔑᓈᑯᐙᓕ ᐋᐦ ᐋᑯᓂᐦᐄᓚᐱᔨᒡ ᐊᓐ ᒫᐦᒋᒡ ᑳ ᐋᑎ ᐃᔨᑎᐦᐄᓚᐱᔨᒡ᙮ ᐊᓂᑎᐦ ᒫᒃ ᐧᐃᔮᔑᑭᒦᐦᒡ ᐋᑯᑎᐦ ᓈᔥᒡ ᐙᑯᐦᒡ ᒥᔥᒌᐦ ᐋᐦ ᒌᐦ ᐄᑎᐦᐄᓚᐱᔨᒡ ᐊᓐ ᐋᐦ ᔦᑎᐦᒡ ᑭᔮᐦ ᐊᓐ ᓂᐲ ᐋᑎ ᐄᑖᔑᑭᐧᐃᒡ, ᑭᔮᐦ ᐊᓂᔮ ᑳ ᐋᑎ ᐄᑎᔥᑭᐦᑉ ᐊᔅᒌᔨᐤ ᑭᔮᐦ ᐊᔨᓃᐦ ᐊᓐ ᒥᔅᑯᒦ ᐄᔅᑯᑎᑉ ᑳ ᐹᒋ ᓃᐦᑎᒋᐧᐋᐱᔨᑦ᙮ ᐊᓐ ᒫᒃ ᐋᐦ ᑭᓂᐧᐋᐱᐦᑎᑭᓂᐧᐃᒡ ᐋᑎ ᐄᔑᓈᑯᐦᒡ ᐊᓂᑖᐦ ᔩᐱᐦ ᐋᑎ ᐄᑖᒋᑭᐧᐃᐦᒡᐦ ᑭᔮᐦ ᐊᓂᑖᐦ ᔫᔫᐤ ᐧᐄᓂᐸᑯᐦᒡ ᐋᑯᑎᐦ ᐧᐋᐦᑎᒫᓚᐱᔨᔨᒡ ᐊᓂᑖᐦ ᑳ ᐋᑎ ᐃᔨᔅᐱᔨᑦ ᐊᓐ ᒥᔅᑯᒦ᙮

ᐋᓐ ᒫᒃ ᓂᓈᐦᑭᐤ ᐋᐦ ᑭᓂᐧᐋᐱᐦᑎᑭᓂᐧᐃᒡ ᐅᑖᐦ ᐧᐋᔥᑭᒡ ᐅᑖᐦᒡ ᑳ ᐹᒋ ᐃᔨᔅᐱᔨᑯᐱᓈ ᐊᓐ ᐋᑎ ᐄᑎᔅᑭᒥᑳᒡ ᑭᔮᐦ ᐋᑎ ᐄᑎᔥᑖᒡ ᓂᐲ ᐋᑯᑎᐦ ᐧᐋᐦᒋ ᒋᔅᓚᔨᐦᑖᑯᒡ ᓚᐧᑳᓐ ᐊᓐ ᐧᐋᐦᒋ ᒌᐦ ᐊᑎ ᐃᔨᔑᓈᑯᐦᒡ᙮ ᐊᓐ ᓈᔥᒡ ᐋᐦ ᒌᐦ ᑎᐦᑳᔫᒡ ᑭᔮᐦ ᐋᔅᑭᐤ ᐋᐦ ᒌᐦ ᐋᐳᐧᐋᔫᒡ ᐋᑯᑖᐦ ᑭᔮᐦ ᑳ ᐃᔑ ᐧᐄᒋᐦᐄᐧᐋᐱᔨᒡ ᐊᓐ ᐧᐋᐦᒋ ᐃᔨᔑᓈᑯᐦᒡ ᐆ ᐊᔅᒌ᙮ ᐊᓂᔮ ᒫᒃ ᐋᐦ ᒌᐦ ᓃᐦᑎᒋᐧᐋᐱᔨᑦ ᑭᔮᐦ ᐋᐦ ᒌᐦ ᐋᐦᒋᐱᔨᑦ ᒫᓐ ᐊᓐ ᒥᔅᑯᒦ ᐋᑯᑎᐦ ᓂᓈᐦᑭᐤ ᑳ ᐋᑎ ᐃᔨᐦᑎᑯᓂᔨᒡ ᔩᑳᔨᐤ, ᐊᔨᓈᒥᔅᑯᔨᐤ, ᐊᔨᓃᐦ ᑭᔮᐦ ᑯᑎᒋᔨᐤ ᓚᐧᑳᔨᐤ᙮ ᓚᒃ ᒫᒃ ᓈᓈᓂᒌᒻ ᐃᔨᐦᒡ ᑳ ᐋᑎ ᐃᔨᔑᓈᑯᐦᒡ ᐊᓐ ᐋᑎ ᐄᑎᔅᑭᒥᑳᒡ ᐊᔅᒌ ᑭᔮᐦ ᓂᐲ ᐋᑎ ᐄᑎᔥᑖᒡ᙮

ᐊᓐ ᒫᒃ ᑳ ᐃᔥᐱᔒᑳ ᑎᐦᑳᔫᒡ ᐋᑯᑎᐦ ᒦᓐ ᐃᔨᐦᒡ ᐋᑎ ᐃᔨᑎᔅᑭᒥᑳᒡ ᐊᔅᒌ ᑭᔮᐦ ᓂᓈᐦᑭᐤ ᒌᐦ ᐊᑎ ᐃᐦᑎᑯᓐ ᓚᐧᑳᓐ ᐊᓂᑖᐦ ᐊᔅᒌᐦᒡ᙮ ᐋᑯᑎᐦ ᑳ ᐧᐄᒋᐦᐄᐧᐋᐱᔨᒡ ᑭᔮᐦ ᐊᓐ ᓚ ᐊᑎ ᐃᔨᔑᓈᑯᐦᒡ ᐅᐦᒋ ᐊᓐ ᐋᐦ ᔦᑎᐦᒡ, ᓂᐲ ᐋᐦ ᐱᒫᒋᑭᐧᐃᒡ ᑭᔮᐦ ᐊᓐ ᓂᓈᐦᑭᐤ ᓚᐧᑳᓐ ᐋᑎ ᐃᔨᐦᑎᑯᐦᒡ ᐊᓂᑎᐦ ᐊᔅᒌᐦᒡ᙮

ᐊᓂᐦᐄ ᒫᒃ ᐧᐄ ᔩᐱᐦ ᑭᔮᐦ ᓵᑭᐦᐄᑭᓐᐦ ᐅᑎᐦ ᒫᐧᑳᒡ ᓂᔮᓂᑑᒋᔅᓚᔨᐦᑖᑯᐦᒡ ᐸᔨᑯᔥᑖᐤ ᐃᐦᑎᐦᑎᓐᐦ ᐊᓂᐦᐄ ᒫᐅᒡ ᑳᓂᐧᐋᐱᐦᑎᑭᓂᐧᐃᒡᐦ ᐙᑯᐦᒡ ᐊᓂᑎᐦ 3.6 ᑭᔮᐦ 3.8᙮ ᐊᓂᐦᐄ ᒫᒃ ᒫᐅᒡ ᒫᔑᒡᐦ ᐊᓐ ᐋᐦ ᐧᐋᔨᑖᐅᐦᑳᒡ ᐋᑯᑎᐦ ᐊᓂᑎᐦ ᓈᔅᑖᐳᑳᔥᑎᑯᐦᒡ (13,048 km^2) ᑭᔮᐦ ᐧᐃᔮᔑᑭᒦᐦᒡ (5,275 km^2)᙮ ᐊᓂᑎᐦ ᒫᒃ ᓂᔮᓂᑑᒋᔅᓚᔨᐦᑖᑯᐦᒡ 1,450 ᐃᐦᑐᑭᒫᐤᐦ ᓵᑭᐦᐄᑭᓐᐦ, ᓚᑳᑦ ᒫᒃ ᒥᔨᐧᐊ ᓃᐦᑖᐦᒡ 10 km^2 (ᐙᑯᐦᒡᐦ 3.9 ᑳ ᐄᑎᔨᓈᑖᒡ) ᐃᔥᐱᔑᑭᒫᐤᐦ᙮ ᐊᓂᐦᐄ ᒫᒃ ᓚᐦᑳᔮᐦᑖᑯᐦᒡᐦ ᓵᑭᐦᐄᑭᓐᐦ ᐋᐅᑯᓐᐦ ᐋᐦᒋᑯᓂᐱ, ᐧᐃᔮᔑᑭᒦ ᑭᔮᐦ ᐃᔮᑎᐧᐄᓂᐹᑯ᙮ ᐊᓐ ᒫᒃ ᐋᐦᒋᑯᓂᐱ ᒥᔑᑭᒫᐤ, ᐄᔨᐧᐋᐤ ᑭᔮᐦ ᓂᒥ ᔒᐧᐋᐳ ᐊᓂᑖᐦ ᐋᔑᑯᐦᐱᑎᐦᒡ ᓈᔥᑖᐳᑳᔥᑎᑯᐦᒡ᙮ ᐧᐃᔮᔑᑭᒦ ᐋᐅᑯ ᒫᐅᒡ ᓚᑳᑦ ᒫᔑᑭᒫᒡ ᓵᑭᐦᐄᑭᓐ ᐅᑎᐦ ᑯᐯᒃ, 1,226 km^2 ᐃᔥᐱᔑᑭᒫᐤ᙮ ᓈᔥᑖᐧᐸᐦ ᑎᒦᐤ ᑭᔮᐦ ᓈᔥᑖᐧᐸᐦ ᐧᐋᔒᔮᑭᒥᔑᐤ᙮ ᐊᓐ

ᒫᒃ ᐃᔮᑎᐧᐄᓂᐸᒌᵈ ᐊᓂᑖ" ᐋᔑᒋᐧᐃ"ᒡ ᐊᓐ ᓂᐲ "ᐊᑦᓯᓐ ᐯᐃ", ᐹᑯᓯᔅᒋᐧᐃᓂ"ᒡ ᐅ"ᒋ, ᓈᐢᒡ ᐋ" ᔒᐧᐋᐳᐧᐃᒡ᙮
ᐊᓂ"ᐄ ᒫᒃ ᓰᐱ" ᐋ" ᐧᐃᐦᐧᐋᒡ" ᐋᑯᑎ" ᓂᒥ ᔒᐧᐋᐴ, ᐋᑯ" ᐊᓂᑖ" ᓈᐢᒡ ᐋ" ᑎᒦᒡ (75 ᒦᑎᕽ) ᐋᑯᑎ"
ᔙᐧᐋᐳᐧᐃᒡ ᐊᓐ ᐃᔮᑎᐧᐄᓂᐸᒌᵈ ᐧᒫ"ᒡ ᐊᓂᑖ" ᐧᐄᓂᐸᒍ"ᒡ ᐊᐢᐱᐢ ᔒᐧᐋᐳᐧᐃᒡ ᐊᐧᑳᑖ"ᑖᑯ"ᒡ᙮

ᐋᐧᐋᓲᓯᒡ ᑮᔮ" ᒫᒃ ᑯᑎᒡ ᒫᐧᑳᓐ ᐋ" ᓂ"ᑖᐅᒋ"ᒡ

ᐊᓂᑎ" ᒫᒃ ᐋ ᐃᔑ ᓈᓂᑑᒋᔅᒑᐦ"ᑖᑯ"ᒡ ᐋᑯᑎ" ᐋᑎ ᓂᓂ"ᑖᐅᒋ"ᒡ ᒫᐧᑳᓐ ᑮᔮ" ᒫᒃ ᐋ"ᑖᒡ ᐋᐧᐋᓲᓯᒡ ᐊᓂᑎ"
ᐋᑎ ᐃᐦ"ᑎᑯᓂᐦᒡ ᑮᔮ" ᓂ"ᑖᐅᒋᓂᐦᒡ ᒫᐧᑳᐦᐤ ᒫ ᒌ" ᒦᒋᒡ᙮

ᐆᑎ" ᒫᒃ ᓈᑑᒋᔅᒑᐦ"ᑖᑯ"ᒡ ᓃᔓᐦᒡ ᐄᔑᓈᑯᓐ: ᐊᓂᑎ" ᐋ" ᒥᐢᑎᑯᔅᑳᒡ ᑮᔮ" ᒧᔑᐧᐋᔅᒌ᙮ ᒫᑳᑦ ᒥᓯᐧᐊ ᒥᐢᑎᑯᔅᑳᐤ
ᐊᓂᑎ" ᓂᔮᓂᑑᒋᔅᒑᐦ"ᑖᑯ"ᒡ ᒥᵈ ᐊᓂᑖ" ᔮᔮᐤ ᐊᑎᒫᐲᓯᒻ ᐃᔮᑎᐧᐄᓂᐸᒍ"ᒡ (ᓅᑯ"ᒡ 4.1)᙮ ᐊᓐ ᒫᒃ ᐋᑎ
ᓂᓂ"ᑖᐅᒋ"ᒡ ᒫᐧᑳᓐ ᐊᓂᑎ" ᐋᐅᵈ ᐧᐋ"ᒋ ᐃᐦᔑᓈᑯ"ᒡ ᐅ"ᒋ ᐊᓐ ᐊᔅᒌ ᐊᓂᑎ ᐋ"ᑎᑯ"ᒡ, ᐋᑎ ᐃᐦᑖᐅ"ᑳᒡ
ᑮᔮ" ᐋᑎ ᐃᐦᑖᐦ"ᑖᑯ"ᒡ᙮ ᐊᓂᑎ" ᒫᒃ ᐃᔮᑎᐧᐄᓂᐸᑯ"ᒡ ᐋᑯᑎ" ᒫᐅᒡ ᒫ"ᓛᒡ ᒫᐧᑳᓐ ᐋ" ᓂ"ᑖᐅᒋ"ᒡ ᐅ"ᒋ ᐊᓐ
ᐋᔑᓈᑯ"ᒡ ᐊᓯᓅ ᑮᔮ" ᐊᓐ ᒫᐧᑳᓐ ᐊᓂᑖ" ᐧᐄᓂᐸᑯ"ᒡ ᐧᐋ"ᒋᐱᐦᒡ᙮ ᐋᑯᑎ" ᓈ"ᑖᐅᒋᒡ ᒥᐢᒋᑯᔑᔑᒡ, ᒥᒫᓐ
ᒧᔑᐧᐋᐤ, ᒥᔅᒫᑰ ᑮᔮ" ᐧᐋ"ᑯᓂᒡ ᓂ"ᑖᐅᒋᐧᐃᒡ ᐊᓯᓅ"ᒡ᙮ ᐊᓂᑖ" ᒫᒃ ᐃᐦ"ᒡ ᐋ" ᓂᑑᒋᔅᒑᐦ"ᑖᑯ"ᒡ ᒧᔑᐧᐋᐤ, ᒥᒫᓐ
ᒋᒥᔖᐧᐃᒡ ᒥᐢᒋᑯᔑᔑᒡ ᑮᔮ" ᐧᐄᐳᔅᑳᐤ (ᓅᑯ"ᒡ ᐊᔅᒌᐅᓯᓂ"ᐄᑭᓂ"ᒡ 4.1 ᑮᔮ" 4.1 ᑳ ᐄᑎᓯᓈᑖᒡ)᙮

ᐊᓐ ᒫᒃ ᒫᐧᑳᓐ ᐋᑎ ᓂᓂ"ᑖᐅᒋ"ᒡ ᐅᑎ" ᒫᐧᑳᒡ ᓂᔮᓂᑑᒋᔅᒑᐦ"ᑖᑯ"ᒡ 503 ᓂᓈ"ᑭᐤ ᒫᐧᑳᓐ ᒌ" ᒥᓯᓂ"ᐄᑭᓂᐤ ᐅᑎ"
ᐋ" ᓂ"ᑖᐅᒋ"ᒡ᙮ ᒥᵈ ᒫᒃ ᐊᓐ ᐋᑎ ᐃᐦᔑᓈᑯ"ᒡ ᐊᓂᑎ" ᒫ ᒌ" ᓂ"ᑖᐅᒋ"ᒡ ᒫᐧᑳᓐ ᐋᑯᑎ" ᐋᑎ ᓂᓂ"ᑖᐅᒋ"ᒡ᙮
ᓅᑯᓐ ᒫᒃ ᐊᓂᑎ" 4.4 ᑳ ᐄᑎᓯᓈᑖᒡ ᒫᐧᑳᓐ ᐊᓐ ᐋᑎ ᐃᐦ"ᑎᑯ"ᒡ ᐊᓂᑎ" ᑳ" ᓈᓂᑑᒋᔅᒑᐦ"ᑖᑯ"ᒡ᙮

ᒦᓐ ᒫᓐ ᐊᓐ ᒫᐧᑳᓐ ᐋᑎ ᓂᓂ"ᑖᐅᒋ"ᒡ ᐋᐅᵈ ᓂᓈ"ᑭᐤ ᐋ ᐄᔑᓈᑯ"ᒡ ᐊᔅᒌ 31 ᑮᔮ" 193 ᒌ" ᒥᔅᑭᐧᐋ"ᑖᑭᓂᐤ
ᐅᑖ" ᐧᐃᔮᔙᑭᒦ"ᒡ, ᐃᔮᑎᐧᐄᓂᐸᑯ"ᒡ, ᓈᔅᑖᐳᑳᐢᑎᑯ"ᒡ, ᐧᐊᐱᒫᑯᐢᒍᔑᔑ"ᒡ ᑮᔮ" ᖸᑦᑎᒍᐃᒃ ᓰᐱ"ᒡ᙮ ᑮᔮ" ᒫᒃ
ᓂᓈ"ᑭᐤ ᐋ ᐄᔑᓈᑯᓯᒡ ᐧᐋ"ᑯᓂᒡ ᒌ" ᒥᔅᑭᐧᐋ"ᐋᑭᓂᐅᐧᐃᒡ᙮ ᐊᓂᑎ" ᒫᒃ ᐊᔅᒌᐅᓯᓂ"ᐄᑭᓂ"ᒡ 4.4 ᐋᑯᑎ"
ᒫᓯᓈᑖᒡ " ᐊᓂ"ᐄ ᒫᐧᑳᓂ"ᐄ ᐋᑎ ᓂᓂ"ᑖᐅᒋ"ᒡ" ᓅᑯ"ᒡ" ᐊᓂᑎ" 4.5 ᑮᔮ" 4.7 ᑳ ᐄᑎᓯᓈᑖᒡ"᙮

ᓂᐢᑐᒥᑎᓂᐅᓂᔮᓈᓈᐅᔙᑉ ᓂᐲ"ᒡ ᑮᔮ" ᐅᔅᑎᔅᑭᒥᒡ ᐃ"ᑖᐧᐃᒡ ᐋᐧᐋᓲᓯᒡ, 131 ᓂᓈ"ᑭᐤ ᐋ ᐄᓯᓈᑯᓯᒡ ᐱᔮᓯᐅᒡ
ᑮᔮ" ᐱᔮᔒᔑᒡ ᑮᔮ" 29 ᓂᓈ"ᑭᐤ ᐋ ᐄᓯᓈᑯᓯᒡ ᓂᒫᓯᒡ (ᑮᔮ" 13 ᑎ"ᑐ ᐊᓂᑖ" "ᐊᑦᓯᓐ ᐯᐃ"), ᓂᑯᐧᑖᐢᒡ
ᑖᐱᐢᑯᓐ ᓂᐲ"ᒡ ᑮᔮ" ᐅᔅᑎᔅᑭᒥᒡ ᐋ ᐄ"ᑖᒡ ᑮᔮ" ᐸᐦᐤ ᐊᒋᓈᐱᑯ"ᒡ ᐋ" ᐄᑖᐦ"ᑖᑯᓯᑦ ᒌ" ᒥᔅᑭᐧᐊᑭᓂᐅᐧᐃᒡ
ᐅᑎ" ᐋ ᐄ"ᑖᒡ ᑮᔮ" ᒌ" ᒥᓯᓂ"ᐧᐊᑭᓂᐅᐧᐃᒡ ᐅᔮ ᑎᐸᒋᒧᐧᐃᓯᓂ"ᐄᑭᓂᐦᐤ, (ᒥᐢᑎᐤ ᒫᑭᒧ"ᒡ" ᒥᓯᓂ"ᐄᑭᓐ 5
ᐲ"ᐃᒻ 10)᙮ ᐊᓐ ᒫᒃ ᐋᑎ ᐃᐦᔑᓈᑯ"ᒡ ᐆ ᐊᔅᒌ ᑮᔮ" ᓂᐲ ᐋᑯᑎ" ᐋ"ᑖᒡ ᓂᓈ"ᑭᐤ ᐊᐧᐋᓂᒌ, ᐱᔮᓯᐅᒡ
ᒥᐧᔮᐦᐤ ᐊᓂᑎ" ᐋ" ᐧᐋᐅᐧᐃᒡ, ᐊᓂᑎ" ᐹᑯᓯᔅᒋᐧᐃᓂ"ᒡ ᐋᑯᑎ" ᐧᐋ"ᒋ ᐲ"ᑎᑖᒋᐧᐃ"ᒡ ᔒᐧᐋᐳᐃ ᑮᔮ" ᐃ"ᑎᑯᓐ
ᐊᓂᑎ" ᓂᐲ ᐋᑳ ᔒᐧᐋᐳᐧᐃᒡ ᐋᑯᑎ" ᐋ"ᑖᒡ ᓂᓈ"ᑭᐤ ᓂᒫᓯᒡ ᑮᔮ" ᐊᓂᔮ ᓂᓈ"ᑭᐤ ᒫᐧᑳᐦᐤ ᐋ" ᓂ"ᑖᐅᒋᓂᐦᒡ
ᐋᑯᑎ" ᐋᑎ ᐃᐦ"ᑖᒡ ᑯᑎᑭᒡ ᐋᐧᐋᓲᓯᒡ᙮

ᐊᓂᒌ ᒫᒃ ᐊᓂᑖ" ᓂᐲ"ᒡ ᐋ"ᑖᒡ, ᓂᐢᑐᐦᒡ ᐄᓯᓈᑯᓯᐧᐃᒡ ᐋ"ᒋᑯᒡ ᐊᓂᒌ ᐅᑎ" ᐋ" ᓂᑑᒋᔅᒑᐦ"ᑖᑯᓂᐦᒡ ᐋ"ᑖᒡ᙮
ᐊᓂᑖ" ᒫᒃ ᐋ"ᒋᑯᓂᐲ"ᒡ, ᐧᐃᔮᔙᑭᒦ"ᒡ, ᐋ"ᒋᑯᓂᐲᔑᔑ"ᒡ ᑮᔮ" ᓈᔅᑖᐳᑳᐢᑎᑯ"ᒡ ᐋᑯᑎ" ᐋᑎ ᐃᐦ"ᑖᒡ᙮ ᐊᓂᒌ
ᒫᒃ ᐋ"ᒋᑯᒡ ᐊᓂᑎ" ᐋ"ᑖᒡ ᐋᑯᑖ" ᐋᑖᐦ"ᑎᑭᓂᐧᐃᒡ ᐊᓂᑖ" ᓃᐢᑎᒻ ᐧᐄᓂᐸᑯ"ᒡ ᐋ" ᒌ" ᐃ"ᑖᒡ᙮ ᒫᒃ ᒫᒃ
ᓈᑖ" ᐧᐄᓂᐸᑯ"ᒡ ᑳ ᐄᑖᒋᐧᐃᓂᐦᒡ ᓂᐲᐦᐤ ᐋᑯᑎ" ᒌ" ᐋᑐ"ᐅᒋᒫᓂᒌ ᑮᔮ" ᒫᒃ ᓂᒥ ᐅ"ᒋ ᐊᑎ ᔒᐧᐋᐳᐃᐦᐤ
ᐊᓂᔮ ᓂᐲᐦᐤ᙮ ᐊᐧᑳᑖᐦ"ᑎᑭᓂᐧᐃᒡ ᒫᒃ ᐅᒌ ᐋ"ᒋᑯᒡ ᐅᑖ" ᓅ"ᒋᒦ"ᒡ ᐋ"ᑖᒡ ᐋᑳ ᐃ"ᑖᒡ ᒦᓐ ᐊᓂᑖ" ᐃᐦ"ᒡ
ᐆ ᐊᔅᐱ"ᑎᔅᑭᒥᑳᒡ ᐊᔅᒌ᙮ ᓂᒥ ᓈᐢᒡ ᒌ" ᑎᐸᑎᑖᑭᓂᐅᐧᐃᒡ ᐅᒌ ᐋ"ᒋᑯᒡ ᐋᑳ ᓈᐢᒡ ᐧᐋ"ᑎᓂᐦᒡ ᒫ ᒌ"
ᐄᔅᐱᐦᓈᓂᐧᐃᐧᐃᐦᒡ ᐊᓂᑖ" ᐋ"ᑖᒡ ᑮᔮ" ᐋᑳ ᑖᐧᐸ" ᒋᔅᒑᐦ"ᑖᑯᓯᒡ ᐊᓂᔮ ᐋ"ᑎᔑᒡ᙮

ᐊᑎ"ᵈ ᐋᐅᵈ ᒫᐅᒡ ᐧᐃᔮᔪᑎᓰᑦ ᐋ"ᑎᔑᒡ ᐋᐧᐋᓲᓯᒡ ᐊᓂᑎ" ᓈ"ᐋᐤ ᓂᔮᓂᑑᒋᔅᒑᐦ"ᑖᑯᓂᐦᒡ ᐅ"ᒋ ᐊᓂᔮ ᐋ"
ᐱᒧ"ᑖᒡ ᐋ" ᓰᑯᓂᐦᒡ ᐊᑎᒫᐲᓯᒻ ᐋᑐ"ᑖᑖᐤ" ᑮᔮ" ᐋ" ᑎᐧᑳᒥᓂᐦᒡ ᐲᓯᐧᒫ"ᑖ"ᒡ ᐋᑐ"ᑖᑖᐤ"᙮ ᐊᓂᒌ ᒫᒃ ᐊᑎ"ᑯᒡ
ᐅᑎ" ᐹᒧ"ᑖᒡ ᓶᐸ ᓰᐱ"ᒡ ᐋ" ᒥᓈᐦᑎᒡ ᐋᑯᑖ ᐋᔑᐧᐄ"ᐄᐧᐊᐱᐦᒡ᙮ ᐋᑯᑎ" ᒫᒃ ᐋ"ᑖᒡ ᒫᓐ ᐅᒌ ᐊᑎ"ᑯᒡ
ᐊᑎᒫᐲᓯᒻ ᑯᐯᒃ᙮ ᐊᓂᑎ" ᒫᒃ ᐋ" ᐱᓃᒡ ᐧᐋᐄᔮᐧᐊ 20,000 km^2 ᐄᐢᐱᔙᐦᐤ ᐊᓂᑎ" ᐋ"ᑎᑯᓂᐦᒡ ᐊᓂᔮ
ᐋ" ᐧᐊᐦᑖᐅ"ᑳᐦᒡ ᐱᓐᑯᐊᑯᑖᑦ ᑮᔮ" ᒐᑉ ᑳ ᐄᔑᓂ"ᑳᑖᐦᒡ᙮ ᓈᐱᓂᐦᒡ" ᐊᓂᑖ" ᐊᑎᒫᐲᓯᒻ ᒧᔑᐧᐋᐳᔅᒌ"ᒡ ᐋᑯᑖ"
ᐋ"ᑖᒡ ᑮᔮ" ᐋᑎ ᐱᐳᓂᐦ"ᒡ ᐊᓂᑖ" ᐋ" ᒥᐢᑎᑯᔅᑳᐦᒡ ᐅᑖ" ᐄᑖ"ᒫ ᑫᒫᒥᔅ ᐯᐃ" ᐋᑯᑖ" ᐋᑐ"ᑖᒡ᙮ ᓂᓈ"ᑭᐤ ᒫᒃ
ᐋᑎ ᐃᐦ"ᑖᐧᐃᒡ ᐊᑎ"ᑯᒡ ᒥᵈ ᐊᓂᔮ ᐋᑎ ᐄᔅᐱ"ᑖᔮᐦᒡ᙮ ᐅᑎ" ᒫᒃ ᒫᐧᑳᒡ ᐋ" ᓈᑑᒋᔅᒑᐦ"ᑖᑯ"ᒡ ᐋᑯᑎ" ᐸᓃᒡ
ᐃᔮᐱ"ᑎᐧᐃᑯᓯᓂᐦᒡ" ᒧᔙᐧᐋ"ᔮᐅᐲᓯᒻ" ᐲ"ᐃᒻ ᒥᔑᑳᒫ"ᔮᐅᐲᓯᒻ", ᓂᒧᐃ ᓈᐢᒡ ᒥ"ᒫᑐ ᒋᑭ ᐧᐊᐱᒫᑭᓂᐅᐧᐃᒡ
ᐅᑎ" ᐊᑎ"ᑯᒡ, ᐱᔑᓇ ᒥᵈ ᐃᔮᐸᐅᑎ"ᑯᒡ ᒥᒫᓐ ᑭᑎ ᐃᐦ"ᑖᐧᐃᒡ᙮ ᒫᐧᑳᒡ ᐋ" ᐊᑯᒋᓂᐦᒡ" ᒥᔑᑳᒫ"ᔮᐅᐲᓯᒻ" ᑮᔮ"

ᐧᐄᔑᑯᐲᓯᒻᐦ, ᐋᑯᑎᐦ ᐋᑎ ᑎᑯᔑᐦᒡ ᐊᓂᒌ ᓃᔥᑎᒻ ᒥᔩᒥᐦᒉᑐᐦᑖᒡ ᐊᑎᐦᑯᒡ ᐊᓂᑎᐦ ᐋᐦ ᓈᓂᑐᒋᔅᒉᔨᐦᑖᑯᓂᔨᒡ ᑭᔮᐦ ᐋᑯᑎᐦ ᒉ ᒌᐦ ᐃᐦᑖᒡ ᒫᐧᑳᒡ ᐋᐦ ᐧᐄᔑᑯᒡ, ᐹᑎᔥ ᐊᑎ ᐃᔥᐧᑳᑯᒋᓂᔨᒋᐦᐊ ᐧᐄᔑᑯᐲᓯᒻᐦ᙮ ᐊᓂᒌ ᒫᒃ ᐊᓂᑖᐦ ᐋᔑ ᑎᑯᒡ ᓀᐤ ᔫᐲ ᐋᔑᒥᓈᔨᑎᒡ ᐊᑎᐦᑯᒡ ᒥᔥᑑᐦ ᐅᔑᐦᐅᐧᐃᒡ ᑳ ᐃᔥᐱᔑ ᒋᔅᒉᔨᐦᑖᑯᔨᒡ 1975 ᑳ ᐱᐳᓂᔨᒡ᙮ ᐊᓐ ᑳ ᐱᐳᐦᒡ 1983, ᐧᐄᓭᐧᐊ 101,000 ᒌᐦ ᐄᑎᒋᒫᑭᓂᐅᐧᐃᒡ, ᐋᑯᐦ 2001 ᑳ ᒌᔑ ᐱᓃᒡ ᒥᒄ ᐊᓂᑎᐦ ᐋᐦ ᒥᔨᓈᐱᔅᑭᐦᐧᐋᑭᓂᐅᐧᐃᒡ ᐋ ᐅᐦᒋ ᐊᒋᒫᑭᓂᐅᐧᐃᒡ 628,000 ᒌᐦ ᐄᑎᒋᒫᑭᓂᐧᐃᒡ, ᐋᐅᑯᓂᒡ ᒫᒃ ᒫᐅᒡ ᒫᐦᒉᑎᒡ ᐊᑎᐦᑯᒡ ᐅᑎᐦ ᑯᐯᒃ᙮

ᐊᓂᑎᐦ ᒫᒃ ᐹᔨᑯᔨᒡ ᐆ ᑎᐹᒋᒍᐧᐃᔨᓂᐦᐄᑭᓐ ᐋᑯᑎᐦ ᑖᐹᒋᒫᑭᓂᐅᐧᐃᒡ ᐊᓂᒌ ᓂᐲᐦᒡ ᑭᔮᐦ ᐹᐦᑯᔅᑭᒥᒡ ᐋᑎ ᐃᔨᐦᑖᒡ ᐋᐧᐊᔩᔨᒡ ᐋᐅᑯᓂᒡ ᐅᒌ ᐧᐋᐱᒫᑯᒡ, ᐧᐋᐱᔅᑯᒡ, ᒥᐦᐄᐦᑭᓂᒡ, ᒋᔒᔮᑯᒡ, ᒎᔨᒡ, ᒪᔅᐧᑳᑭᔅ, ᐅᔒᐅᐦᒉᔑᐅᒡ ᑭᔮᐦ ᐧᐋᐱᐦᒉᔑᔑᒡ, ᐧᐋᐳᔒᒡ ᑭᔮᐦ ᒥᔥᑖᐳᔒᒡ, ᐧᐋᐱᔥᑖᓂᒡ, ᐊᒋᑳᔑᒡ, ᔨᐦᑯᔨᒡ ᓃᔒᔨᒡ ᐋᐃᔨᓈᑯᔨᒡ, ᑭᔮᐦ ᑯᐃᐦᑯᐦᐋᒫᐅᒡ᙮ ᐊᓂᒌ ᑭᔮᐦ ᓈᔥᒡ ᐋᐦ ᑎᑭᐧᐊᔑᔑᒡ ᑭᔮᐦ ᓈᔥᒡ ᐧᐋᐦᓈᑭᑎᐧᐋᔨᐦᑖᑯᔨᒡ ᒥᔨᓈᔨᐧᐃᒡ᙮

ᐱᔫᔨᐅᒡ ᒫᒃ ᐧᐄ, ᐊᓂᑎᐦ ᓂᔫᓂᑐᒋᔅᒉᔨᐦᑖᑯᐦᒡ ᐋᑯᑎᐦ ᒥᐦᒉᑐ ᐋᐦ ᐃᐦᑎᑯᓂᔨᒡ ᐊᓂᑎᐦ ᒉ ᒌᐦ ᐧᐋᐅᐧᐃᒡ ᑭᔮᐦ ᒌᒋᔨᒡ ᐱᔫᔨᐅᒡ ᐊᓂᒌ ᐊᓂᑎᐦ ᑳᒋᒡ ᐋᐦᑖᒡ ᑭᔮᐦ ᐊᓂᒌ ᒉᐧᐋᐦᔫᒡ ᑖᐧᑳᒋᓂᔨᒡᐦ ᑭᔮᐦ ᐱᔫᐱᐦᔫᒡ ᒉᑯᓂᔨᒡᐦ᙮ ᐊᓐ ᒫᒃ ᒫᐅᒡ ᐧᐃᔫᔦᑎᔫᑦ ᐱᔫᔨᐤ ᐋᐅᒄ ᓂᔅᒃ᙮ ᐹᔨᑯᔨᒡ ᒫᒃ ᐊᓂᔫ ᐊ ᐄᔨᓈᑯᔨᑦ ᓂᔅᒃ ᐋᑯᑎᐦ ᐊᓂᑎᐦ ᓈᐦᐋᐤ ᐋᐦ ᓈᓂᑐᒋᔅᒉᔨᐦᑖᑯᓂᔨᒡ ᐧᐃᐧᔫᐧᐃᑦ, ᐊᓂᑖᐦ ᐋᐦ ᒥᔅᒉᑯᐧᐃᔨᒡ ᑭᔮᐦ ᐊᓂᑖᐦ ᐋᐦ ᐋᑎ ᐱᐱᔅᑯᑖᐅᐦᑳᔑᔨᒡ ᒍᔑᐧᐊᐅᔅᒌᐦᒡ᙮ ᒦᓐ ᒫᒃ, ᐋᑯᑎᐦ ᒫᐅᒡ ᒫᐦᒉᑎᒃ ᓂᔅᒃ ᒫᐧᑳᒡ ᐹᒥᐦᔫᒡᐦ ᐋᐦ ᔫᑯᓂᔨᒡ ᑭᔮᐦ ᐋᐦ ᑎᐧᑲᒋᓂᔨᒡ ᑭᔮᐦ ᐋᔦᐧᐃᑯᓐᐦ ᓈᔥᒡ ᓇᐱᐦᐋᒡ ᐄᔨᔨᐅᒡ ᑭᔮᐦ ᐄᔥᒌᒫᐅᒡ᙮ ᐊᓂᒌ ᒫᒃ ᓈᑐᐦᐄᔨᒡ ᐱᔫᔨᐅᒡ ᐧᐋᐱᑭᔨᐅᒡ, ᓅᒋᐦᔫᐧᐊᔨᐅᒡ, ᓴᐦᑯᑎᒍᒡ, ᑯᔨᒫᓴᐅᒡ ᐋᐅᑯᓂᒡ ᑖᐹᒋᒫᑭᓂᐅᐧᐃᒡ ᐊᓂᔫ ᐊᔑᒋᔅᒉᔨᐦᑖᑯᔨᒡ᙮ ᐋᑯᑎᐦ ᑭᔮᐦ ᑖᐹᒋᒫᑭᓂᐅᐧᐃᒡ ᐊᓂᒌ ᓈᔥᒡ ᐧᑳᔅᐱᓈᔨᐦᑖᑯᔨᒡ ᒉ ᒫᐦᒋᐦᐋᑭᓂᐅᐧᐃᒡ ᐊᓂᑎᐦ ᐊᓐ ᐧᐋᐦᑎᑖᑭᓂᐧᐃᒡ ᐊᓐ ᐊᔅᒌ ᓈᔥᒡ ᒉ ᐧᐄᐦ ᒥᓈᒋᐦᑖᑭᓂᐧᐃᒡ᙮

ᓂᒫᔅ ᐧᐄ, ᐆ ᒥᔨᓂᐦᐄᑭᓐ ᐋᐦ ᑎᐹᑎᑖᒡ ᐊᓂᑎᐦ ᓈᔥᒡ ᒉ ᐧᐄᐦ ᒥᓈᒋᐦᑖᑭᓂᐧᐃᒡ ᐊᑯᑎᐦ ᑖᐹᒋᒫᑭᓂᐅᐧᐃᒡ ᓂᐦᐋᑭᐤ ᐊ ᐄᔨᓈᑯᔨᒡ ᓂᒫᔨᒡ ᐊᓂᑎᐦ ᐋᐦᑖᒡ ᓈᔅᑖᐳᑳᔥᑎᑯᐦᒡ, ᐧᐃᔫᔒᑭᒦᐦᒡ ᑭᔮᐦ ᐃᔫᑎᐧᐄᓂᐹᑯᐦᒡ, ᑭᔮᐦ ᐊᓂᑖᐦ ᐃᔨᐦᒡ᙮ ᐊᓐ ᒫᒃ ᐃᔫᑎᐧᐄᓂᐹᒄ ᓂᒍᐃ ᐹᔨᑯᓂᐦᒡ ᐃᔑ ᔒᐧᐋᐳ ᑭᔮᐦ ᐋᑯᑎᐦ ᒫᐧᔫᔨᒡ ᓂᓇᐦᑭᐤ ᓂᒫᔨᒡ ᒉ ᒌᐦ ᐃᐦᑖᒡ᙮ ᐊᓂᒌ ᒫᒃ ᓂᒫᔨᒡ ᔒᐧᐊᐳᐦᒡ ᐋᐦᑖᒡ ᑭᔮᐦ ᐊᓂᒌ ᐋᑳ ᔒᐧᐊᐳᐧᐃᔨᒡ ᐋᐦᑖᒡ ᐋᑯᑎᐦ ᐅᑎᐦ ᐋᐦᑖᒡ ᐅᔫ ᓴᑭᐦᐄᑭᓂᔨᐤ᙮ ᐅᑎᐦ ᒫᒃ ᐃᔫᑎᐧᐄᓂᐹᑯᐦᒡ ᐋᑯᑎᐦ ᓈᔥᒡ ᓈᑐᒫᓴᔅ ᐄᔥᒌᒫᐅᒡ᙮ ᐊᓂᔫᐦ ᒫᒃ ᓂᒫᔅᐦ ᒫᓈᐦᐅᒡ ᐋᔦᐧᐃᑯᓐᐦ ᒫᔨᒫᑯᔅᐦ, ᓅᑎᒦᐧᐊᔨᐤᐦ, ᐊᑎᐦᑭᒫᒄᐦ, ᐆᑭᒫᔥᐦ, ᓃᔒᔨᒡ ᐊ ᐄᔨᓈᑯᔨᔨᒡᐦ ᑳᐦᑭᔮᐦᐧᑳᐤᐦ, ᓃᔒᔨᒡ ᐊ ᐄᔨᓈᑯᔨᔨᒡᐦ ᒦᔫᐦ ᑭᔮᐦ ᒎᓴᔨᐤᐦ᙮ ᐊᓐ ᒫᒃ ᓈᔅᑖᐳᑳᔥᑎᒄ 1.4 ᑎᐱᐦᐄᑭᓐ ᐊᓂᑎᐦ ᐅᐦᒋ ᐋᐦ ᐧᐃᔨᐧᐋᒡ ᐊᓂᑖᐦ ᐄᔑ ᓂᑎᒥᐦᒡ ᐋᑯᑎᐦ ᑳᔥᑭᔒᒋᒋᐧᐃᐦᒡ: ᓃᔒᔨᒡ ᐹᒥᒋᐧᐃᐦᒡ ᐊᓐ ᔫᐲ ᒫᒥᐦᒡ ᑭᔮᐦ ᓂᑎᒥᐦᒡ᙮ ᐅᑖᐦ ᒫᒥᐦᒡ ᐋᑯᑎᐦ ᐋᐦᑖᒡ ᐋᐦ ᒥᐦᒉᑎᒡ ᒫᔨᒫᑯᔨᒡ, ᒎᓴᔨᐅᒡ ᑭᔮᐦ ᐊᑎᐦᑭᒫᑯᒡ᙮ ᐊᓂᔫ ᒫᒃ ᐋᑦ ᒥᔥᑑᐦ ᒌᐦ ᓈᓂᑐᒋᔅᒉᔨᐦᑖᑯᔨᑦ ᐊᓐ ᒎᓴᔨᐤ ᓂᒍᐃ ᒋᔅᒉᔨᐦᑖᑯᓂᔨᐤ ᒉᐧᑳᔨᐤ ᐅᑎᐦ ᐧᐊᐦᒋ ᐃᔨᐦᑖᑦ ᑭᔮᐦ ᑖᓂᑖᐦ ᓈᐦᐋᐤ ᐧᐊᐦᒋᐱᔨᑦ᙮ ᐋᑯᑖᐦ ᒫᒃ ᐋᔑᓈᑯᐦᒡ ᐅᑎᐦ ᓂᐲ ᐊᐱᔒᔥ ᐋᐦ ᔒᐧᐋᐳᐧᐃᒡ, ᐊᓂᒌ ᒎᓴᔨᐅᒡ ᐅᑎᐦ ᐊᐦᑖᒡ ᐊᐧᑳᑖᔨᐦᑖᑯᔨᒡ ᐊᑖᔨᐦᑖᑯᔨᔨᒡᐦ ᐊᓂᔫᐦ ᒎᓴᔨᐤᐦ ᐋᑲ ᔒᐧᐊᐳᐦᒡ ᐊᐦᑖᔨᒡᐦ᙮ ᐋᐅᑯᓂᒡ ᒫᒃ ᐅᒌ ᒎᓴᔨᐅᒡ ᒥᒄ ᐃᐦᑖᒐᓂᒌ ᐅᑖᐦ ᐧᐊᐱᓅᑖᑲᒻ "ᐊᑦᔨᓐ ᐯᐃᐦ᙮ ᐋᑯᑎᐦ ᑭᔮᐦ ᒫᔨᓈᔨᒡ ᑭᔮᐦ ᑖᐹᑎᑖᑭᓂᐅᐧᐃᒡ ᐊᓂᒌ ᓂᒫᔨᒡ ᐋᑲ ᓂᑎᐧᐊᐦᑖᑯᔨᒡ ᒉ ᒫᐦᒋᐦᐋᑭᓂᐅᐧᐃᒡ᙮

ᐋᐦ ᑎᐹᑎᑖᒡ ᑖᓐ ᑳ ᐃᔥᐱᔥ ᐃᔨᐦᑖᑦ ᐅᑖᐦ ᐄᔥᒌᒫᐤ ᑭᔮᐦ ᐄᔨᔨᐤ

ᐊᓂᑎᐦ ᒫᒃ ᓂᔫᓂᑐᒋᔅᒉᔨᐦᑖᑯᐦᒡ ᐆ ᐊᔅᒌ ᐊᓂᑎᐦ ᒉ ᐃᐦᑎᑖᑭᓂᐧᐃᒡ ᐊᓐ ᐊᔅᒌ ᓈᔥᒡ ᒉ ᐧᐄᐦ ᒥᓈᒋᐦᑖᑭᓂᐅᐧᐃᒡ, ᒌᐦ ᒥᔅᑭᐧᐊᐦᑖᑭᓂᐧᐃᐧᐃᔨᐤ ᐊᓂᑎᐦ ᑳ ᐊᑎ ᐄᐦᑖᐧᐃᐋᑯᐱᓈ ᐊᐧᐋᓂᒌ, ᐄᔥᒌᒫᐅᒡ ᑭᔮᐦ ᐄᔨᔨᐅᒡ᙮ ᐊᓐ ᒫᒃ ᐋᔥᑎᒥᑖᐦ 1750 ᑳ ᐱᐳᐦᒡ ᐋᑯᑎᐦ ᐃᔅᐱᓐ ᑳ ᒌ ᐃᐦᑖᐧᐋᑯᐱᓈ ᐊᑳᒥᒋᐦᒋᑭᒦᐦᒡ ᐋᐦ ᐅᐦᒌᒡ ᐊᐧᐋᓂᒌ᙮ ᐊᓐ ᒫᒃ ᐊᓅᐦᒡ ᐋᔑ ᒋᔅᒉᔨᐦᑖᑯᐦᒡ ᐅᐦᒋ ᐆ ᐅᑎᐦ ᐊᔅᒌ, 38 ᒥᑐᑭᐦᐸᐦ ᐄᔥᒌᒫᐅᒡ, 62 ᒥᑐᑭᐦᐸᐦ ᐄᔨᔨᐅᒡ ᐋᐦ ᒌᐦ ᐃᐦᑖᐧᐋᑯᐱᓈ ᑭᔮᐦ 5 ᒥᑐᑭᐦᐸᐦ ᐋᐦ ᒌᐦ ᐃᐦᑖᐧᐋᑯᐱᓈ ᐊᓂᑖᐦ ᑳᒥᒋᐦᒋᑭᒦᐦᒡ ᐊ ᐅᐦᒌᒡ ᐊᐧᐋᓂᒌ᙮ ᒦᓐ ᒫᒃ 10 ᒥᑐᑭᐦᐸᐦ ᓂᓈᐦᑭᐤ ᐋᐦ ᐄᑎᔅᑳᓈᔨᒡ ᐊᐧᐋᓂᒌ ᐋᐦ ᒌᐦ ᐃᐦᑖᐧᐋᑯᐱᓈ ᑭᔮᐦ 12 ᒥᑐᑭᐦᐸᐦ ᐋᐦ ᒌᐦ ᐃᐦᑖᐧᐋᑯᐱᓈ ᐊᐧᐋᓂᒌ ᐋᑳ ᒋᔅᒉᔨᐦᑖᑯᓂᔨᒡ ᑳᐦ ᐄᑎᔅᑳᓈᔨᒡ᙮ ᐊᓐ ᒫᒃ ᐊᓂᑎᐦ 5.1 ᓅᑯᐦᒡ ᐋᑯᑎᐦ ᐧᐋᐦᑖᑯᐦᒡ ᐊᓂᐦᐄ ᑳ ᒥᔅᑭᑭᓂᐧᐃᒡᐦ ᒥᑐᑭᐦᐸᐦ, ᐋᑯᐦ ᐊᓐ 5.1 ᑭᔮᐦ 5.2 ᑳ ᐄᑎᔨᓈᑖᒡ ᐋᑯᑎᐦ ᐧᐋᐦᑖᑯᐦᒡ ᑖᓂᑎᐦ ᐊᓂᑎᐦ ᐋᐦᑎᑯᐦᒡᐦ ᐅᐦᐄ ᒥᑐᑭᐦᐸᐦ ᐊᓂᑎᐦ ᑭᔨᐧᐸ ᒫᐧᑳᓐ ᓂᔫᓂᑐᒋᔅᒉᔨᐦᑖᑯᐦᒡ᙮ ᐊᓐ ᒫᒃ 5.2 ᑳ ᐄᑎᔨᓈᑖᒡ ᐋᑯᑎᐦ ᐧᐋᐦᑖᑯᐦᒡ ᐊᓐ ᑳ ᐃᔑ ᒥᒥᔅᑭᐧᐊᐦᑖᑭᓂᐧᐃᒡ᙮

ᐊᓂᑎᐦ ᒫᒃ ᓃᔥᑎᒻ ᑳ ᒥᔅᑭᐧᐋᐦᑖᑭᓂᐧᐃᒡ ᐄᔥᒌᒫᐅᒡ ᐋᐦ ᒌᐦ ᐃᐦᑖᐧᐋᑯᐱᓈ ᐊᓂᑖᐦ ᓅᓈᓯᒃ 3900 ᑎᐦᑐ ᐱᐳᓐᐦ ᐅᑖᐦ ᐄᔑ ᐅᑖᐦᒡ᙮ ᐊᓂᒌ ᒫᒃ ᑳᓅᒋᑐᑭᐦᐸᒡ ᐋᑯᑖᐦ ᐋᔑᓂᐦᑳᑎᐦᒡ ᐅᔨ ᒫᐧᑳᒡ ᐱᐦᓇᐧᑖᑫᔨᑦ᙮ ᐊᓐ ᒫᒃ ᒫᐧᑳᒡ ᐱᐦᓇᐧᑖᔨᑦ ᑳᐦ ᐱᒫᑎᓯᒡ ᐊᐧᐋᓂᒌ ᐋᔦᐧᐃᑯᓐᐦ ᑳᐦ ᑭᓂᐧᐊᐱᐦᑎᑭᓂᐧᐃᐧᐃᔨᒡᐦ ᐊᓂᔫᐦ ᒉᐧᑳᔨᐤᐦ ᑳ

ᐋᑎ ᐋᔮᐱᒋᐦᒑᐤ ᐊᐦ ᒌᐦ ᐅᔑᐦᒑᐤ ᑭᔐᐧᐸ, ᓈ ᓂᑑᐦᐅᐧᐋᓈᐤ ᐅᔅᑭᓐᐦ ᐊᐦ ᐋᐱᒋᐦᒑᐤ ᑮᔮᐦ ᐊᓯᓂᔐᐤ ᑮᔮᐦ ᐊᐦ ᐋᑐᔅᑲᐧᐋᔐᐤᐦ ᓈᐧᑳᔐᐤᐦ ᓈ ᐃᔮᐱᒋᐦᒑᐤ ᐊᐦ ᒌᐦ ᐅᔑᐦᒑᐧᐋᑯᐱᓈᕽ ᐆ ᒫᒃ ᐱᐦᓇᐧᒌᓯᐨ ᑳ ᐄᔑᓂᐦᑳᑎᑭᓂᐧᐃᐤ ᒫᐧᑳᐤ ᐅᔮ ᑳ ᐱᒫᑎᓰᐤ ᐊᐧᐋᓂᕆ 2700 ᑮᔮᐦ 2800 ᑎᐦᑐᐱᔖᓐᐦ ᐅᒌᐦ ᐄᔑ ᐅᒌᐦᐤ, ᐋᔫᑦ ᒦᓐ ᐊᓂᕆ ᐸᑎᓈᐦ ᑳᐦ ᐋᑎ ᐃᐦᒌᐤ ᒣᐃᐨ ᐱᐦᓇᐧᒌᓯᐨ ᐊᐧᐋᓂᕆ ᑳ ᐃᔑ ᐧᐋᒋᓯᒪᑭᓂᐅᐧᐃᐤᕽ ᐅᕆ ᒫᒃ ᐋᑯᑎᐦ ᑳ ᐅᐦᒋ ᒋᔅᓈᔐᐦᒑᑯᓯᐤ ᐃᔐᐦᐤ ᐊᐦ ᒌᐦ ᐋᔑᓈᑯᐦᒑᐤ ᐅᓈᐧᑲᓂᒥᐧᐋᐤᐦ ᑮᔮᐦ ᐅᓂᑑᐦᐅᐧᐋᑭᓂᐧᐋᐤᐦ ᑮᔮᐦ ᐃᔐᐦᐤ ᓈᐧᑳᔐᐤ ᐊᐦ ᒌᐦ ᐋᐱᒋᐦᒑᐤᕽ ᐊᓐᐋᐦᐤ ᒫᒃ ᐊᓂᕆ ᑳᓐᒋᑐᑭᐦᐸᐤ ᐋᑯᒑᐦ ᑳ ᐃᔑ ᐧᐋᒋᓯᐦᑎᐤ ᐅᔮ ᒫᐧᑳᐤ ᑭᓖᓯᒃ ᐧᒌᓯᐨ ᐊᓂᔮ ᑳ ᐃᐢᐱᐢ ᐃᔐᐦᒑᓂᐧᐃᐧᐃᔐᐤ ᐅᑎᐦ ᓈᓈᐱᒃᕽ ᓂᒧᐃ ᒫᒃ ᓈᑯᓂᔐᐤ ᓈᐢᐤ ᐃᔐᐦᐤ ᓈ ᕆ ᐃᔑ ᐱᒫᑎᓰᐤ ᐅᕆ ᒫᐧᑳᐤ ᑳ ᐃᐦᒑᐤ ᐊᓂᔮ ᑭᓖᓯᒃ ᑮᔮᐦ ᒣᐃᐨ ᐧᒌᕐᓯᐨ ᑳ ᐄᔑᓂᐦᑳᒋᑭᓂᐧᐃᐧᐃᔐᐤ, ᑳᕆᐤ ᓅᐢᒋᒥᐦᐤ ᐊᐦ ᕆ ᐄᔑ ᒋᐦᒋᐱᔐᔐᐤ ᑮᔮᐦ ᐊᐦ ᒌᐦ ᐃᔑ ᒋᔅᓈᔐᐦᑎᐦᐤ ᓈᐧᑳᔐᐤᕽ ᐊᓂᔮ ᒫᒃ ᓈᐧᑳᔐᐤ ᐊᐦ ᒌᐦ ᐅᔑᐦᒑᐤ ᓂᓈᐦᑭᐤ ᓈᐧᑳᔐᐤ ᒌᐦ ᐋᐱᒋᐦᒑᐧᐃᐤ ᑮᔮᐦ ᓂᓈᐦᑭᐤ ᓈᐧᑳᔐᐤ ᒌᐦ ᐅᔑᐦᒑᐧᐃᐤᕽ ᐊᔦᐧᐃᑯᓐᐦ ᒫᒃ ᐅᔮᐦ ᑐᓃᐨ ᐧᑳᐧᓅᓐ ᑳ ᐄᔑᓂᐦᑳᒑᐤ ᐄᐢᒌᒫᐅᐤ ᐃᔮᑎᔦᐦᓈᐧᒌᐤ ᑮᔮᐦ ᒫᒃ ᒑᐸᒋᒧᐧᒌᐤᐦᕽ

ᐊᓐ ᒫᒃ ᐧᐋᓴᐧᐊ 1300 ᑳ ᐋᒋᐢᒑᐤ ᐊᐦ ᐱᐳᐦᐤ, ᑑᓖ ᑳ ᐄᔑᓂᐦᑳᒋᑭᓂᐅᐧᐃᐤ ᐊᐧᐋᓂᕆ ᒋᐦᒋᑯᐤ ᑳᐦᒑᐧᐋᑯᐱᓈ ᐅᒌᐦ ᐊᑎᒫᐱᓯᒻᕽ ᐅᕆ ᒫᒃ ᑑᓖ ᓅᔦ-ᐁᔅᑭᒨ ᒌᐦ ᐄᔑᓂᐦᑳᒋᑭᓂᐅᐧᐃᐤ, ᑮᔮᐦ ᐋᒑᔐᐦᑎᑭᓂᐤ ᐋᑯᑎᐦ ᐧᐋᐦᒋᐱᔐᔐᐤ ᐅᕆ ᐊᓅᐦᐤ ᐋᐢᕆᒫᐅᐤᕽ ᐊᓂᒑ ᑭᓇᓐᓚᓐ ᐋᑯᒑᐦ ᑳ ᐅᐦᑐᐦᒑᐧᐋᑯᐱᓈ, ᑮᔮᐦ ᐋᑯᑎᐦ ᑳ ᓂᒋᐢᑭᐧᐋᐤ ᓂᔮᓂᑯᑐᓐᐦ ᐊᓂᔮᐦ ᐧᓈᐢᐢ ᑳ ᐋᑎᔅᑳᓈᔦᔐᐤᐦ ᐊᐧᐋᔐᐤᐦᕽ ᐊᓐ ᒫᒃ ᓅᐢᑎᒻ ᑳ ᐅᔑᐦᒋᑭᓂᐧᐃᐤ ᓈ ᒌᐦ ᐱᒋᔅᑎᓂᐦᐤ ᐅᑎᔦᐧᐃᓂᐧᐋᐤ ᐋᐢᕆᒫᐅᐤ ᐅᒌᐦ ᓅᓈᓈᒃ ᐋᑯᑎᐦ ᐧᐋᐦᒋ ᒋᐦᒋᐱᔐᔐᐤ ᓈ ᕆ ᐋᒋᑭᓂᐅᐧᐃᐤ ᐧᐋᔐᐧᐋᐤ ᐊᐦ ᒌᐦ ᐃᐦᒑᐤ ᐅᑎᐦ ᓅᓈᓈᒃᕽ ᒫᐧᑳᐤ ᒫᒃ ᐅᔮ, ᐋᑯᑎᐦ ᓈᓈᓂᕆᒻ ᑳᐦ ᒥᒥᔖᐤ ᓈ ᒌᐦ ᐧᐋᒋᐦᐋᓱᐤ ᐅᑎᔦᐧᐃᓂᐧᐋᐤ ᐊᐦ ᐱᒋᔅᑎᓂᐦᐤ ᑯᑎᒋᔐᐤ ᓈᐧᑳᔐᐤ ᓈ ᒌᐦ ᐱᐦᑯᐦᑎᒫᓱᐤᕽ ᐋᑯᑎᐦ ᒫᒃ ᓈᐢᐤ ᐃᔐᐦᐤ ᑳ ᐃᔑᓈᑯᓂᔐᐤ ᐅᐱᒫᑎᓰᐧᐃᓂᐧᐋᐤ ᐋᔅᑯᑎᒃ ᓈᓈᓂᕆᒻ ᓈᐅᐢ ᐸᔐᑯᓂᐤ ᐊᐦ ᐃᔐᐦᒑᐤ ᑳ ᐋᑎ ᐃᐢᐧᑳᐱᔐᔐᐤᐦ 1950 ᑳ ᐋᑎᓯᓈᒑᔐᐤᐦ ᐊᐦ ᐱᐳᓂᔐᐤᐦᕽ ᑳᐦ ᐧᐋᐦᒋᓱᐦᑎᐦᐤ ᑭᔐᐧᐸ ᐅᕆ ᑳᓅᒋᑐᑭᐦᐸᐤ ᒫᐧᑳᐤ ᐅᔮ ᑳ ᐄᔑᓈᑯᓂᔐᐤ 1950 ᐲᐦᐃᒻ ᐅᔮ ᐊᓅᐦᐤᕽ

ᐊᓂᔮ ᒫᒃ ᐧᐋ ᑳ ᐃᐢᐱᐢ ᐹᒋ ᐃᔐᐦᒑᐤ ᐋᔐᔐᐅᐤ ᐅᔮ ᒫᐧᑳᐤ ᓂᔮᓂᑑᒋᔅᓈᔐᐦᒑᑯᓂᔐᐤ ᒥᒋᓐ ᒌᐦ ᒥᓯᓂᐦᐋᑭᓂᐧᐃᐧᐃᔐᐤ ᑮᔮᐦ ᒋᔅᓈᔐᐦᒑᑯᓂᔐᐤᕽ ᐋᐨ ᑭᔐᐧᐸ ᒥᐢᒌᐦ ᒌᐦ ᒥᓯᓂᐦᐋᐤ ᐊᓂᕆ ᑳᓅᒋᑐᑭᐦᐸᐤ, ᒥᐢᑎᐤ ᒦᓐ ᒋᔅᓈᔐᐦᒑᑯᓐ ᓈᐧᑳᓐ ᐅᐦᒋ ᐊᓂᔮᐦ ᐅᑎᐸᒋᒧᐧᐃᓂᐧᐋᐤ ᐊᐧᐋᓂᕆ, ᐊᓐ ᐋᑎ ᐄᔑᓂᐦᑳᒑᐤ ᐊᔅᒌ ᑮᔮᐦ ᐊᓂᔮ ᑳᐦ ᓈᓂᑑᒋᔅᓈᔐᐦᒑᑯᓂᔐᐤ ᐋᒑᐱᒋᐦᒑᐤ ᐋᔐᔐᐅᐤ ᐅᑎᐦ ᐊᔅᒌᔐᐤᕽ

ᓅᐢᑎᒻ ᑳ ᐹᒋ ᐃᔐᐦᒑᐤ ᐊᐧᐋᓂᕆ ᐅᒌᐦ ᐃᔭᑎᐧᐋᓂᐹᑯᐦᐤ ᐋᑳᒥᒋᐦᒋᑭᒦᐦᐤ ᐋ ᐅᐦᒌᔑᐤ ᐧᐋᓴᐧᐊ 1740 ᑳ ᐋᑎᐢᒑᔐᐤ ᐊᐦ ᐱᐳᓂᔐᐤ, ᐋᔅᑯᑎᒃ ᑳ ᐋᒑᔐᐦᑎᐦᒃ ᑲᒪᐱᓅ ᓈ ᐹᒋ ᓈᓂᑑᒋᔅᓈᔐᐦᑎᐦᒃ ᑮᔮᐦ ᐧᐊᐧᐊᐱᐦᑎᐦᒃ ᐅᑎᐦ ᐋᐦᒥᒋᐦᒑᐧᐋᔮᔐᐤᕽ ᐊᓐ ᒫᒃ ᐊᐦ ᒌᐦ ᒥᓯᓂᐦᐋᑭᓂᐧᐃᐤ ᑳ ᐹᒋ ᐃᔐᔅᐱᔐᐤ ᐅᒌᐦ ᐄᔑ ᐅᒌᐦᐤ, 1750 ᐋᑯᑎᐦ ᓅᐢᑎᒻ ᑳ ᐧᐃᔐᑳᐳᐧᐃᐦᒑᑯᐱᓈ ᑲᒪᐱᓅ ᐅᑎᒑᐧᐋᐅᑭᒥᑦ ᐅᒌᐦ ᑭᔐᐧᐸ ᐊᑎᒫᐱᓯᒻ ᐋᒌᐦᓈ ᐋᓯᒫᓂᐦᐤ, ᓈ ᒌᐦ ᐅᑎᓂᐦᒃ ᐊᔦᐧᐃᓂᔐᐤ, ᐋᑯᒑᐦ ᐅᒌᐦ ᐊᐅᑭᑳᒻ ᐃᔭᑎᐧᐋᓂᐹᑯᐦᕽ ᐋᑯᑎᐦ ᑮᔮᐦ ᑳᐦ ᓅᕆᓯᓈᐨ ᑮᔮᐦ ᑳᐦ ᓅᒑᐱᒫᐧᑳᐨ ᑲᒪᐱᓅ ᐊᓂᒑᐦ ᐧᐋᐱᒫᑯᐢᒍᔑᔑᐦᕽ ᑳ ᐱᐳᓂᔐᐤ 1751 ᐋᑯᑎᐦ ᑳᐦ ᐹᓅᐨ ᑲᒪᐱᓅ ᐊᐦ ᓅᕆᓯᓈᐨ ᐊᐦ ᒌᐦ ᐋᒑᔐᐦᑎᐦᒃ ᐋᑳ ᐅᐦᒋ ᒥᐧᔮᔐᐤ ᐊᓂᔮ ᐊᓯᓅᔐᐤᕽ ᐋᑯᐦ ᐊᓂᔮ ᐧᐊᐢᑳᐦᐋᑭᓂᔑᔐᐤ ᑳ ᕆ ᐃᐦᒑᔐᐤᐦ ᐊᓂᔮᐦ ᑳᓅᕆᓯᓈᔐᐤᐦ ᐊᔦᐧᐃᑦ ᑳᐦ ᒋᒥᒑᔐᐤ ᓈ ᐋᐱᑎᓂᔐᐤ ᓅᒑᐱᒫᐧᑳᓂᐧᐃᐧᐃᔐᓈᕽ ᐊᓂᔮ ᐹᐳᓂᔐᐤ 1756, ᐊᓂᒑᐦ ᐧᐋᐱᒫᑯᐢᒍᔑᔑᐦᐤ ᑳ ᐄᔑ ᐋᐦᑎᐱᐨ ᑲᒪᐱᓅ ᐊᑎᑎᐤ ᓈ ᒌᐦ ᐅᑎᓂᒫᓐ ᐊᔦᐧᐃᓐ ᐊᐦ ᒌᐦ ᐋᒑᔐᐦᑎᐦᒃᕽ ᓂᒧᐃ ᒫᒃ ᒋᐦᒋᐧᐊ ᐅᐦᒋ ᐋᐱᑎᓐ ᐹᑎᐢ 1758ᕽ ᐊᔮᐱᐤ ᒫᒃ, ᐹᔐᑯᐱᔖᓐᐦ ᑳ ᐃᐢᐱᐢ ᐃᐦᒑᐨ ᐅᑎᐦ ᑳᐦ ᒋᐹᐦᒃ ᐊᓂᔮᐦ ᐅᑎᒑᐧᐋᐅᑭᒥᑦ ᐅᒌᐦ ᐊᑎᒫᐱᓯᒻ ᐋᐦᒥᒋᐢᒑᐧᐋᔮᔐᐤ ᑳᐦ ᐃᐦᑎᑯᓂᔐᐤᐦ ᐅᑎᒑᐧᐋᐅᑭᒥᑦᐦ ᐧᐋᓵ ᐊᐦ ᒌᐦ ᐋᔐᒥᓂᔐᐤ ᓈ ᒌᐦ ᐱᒥᐱᔐᐦᒑᐨᕽ ᐹᑎᐢ ᒫᒃ ᐹᑎᒫᐦ ᐋᔫᑦ ᒦᓐ ᑳ ᑯᒋᐢᒑᐤ ᓈ ᒌᐦ ᐧᐃᔐᑳᐳᐧᐃᐦᒑᐨ ᐅᑎᒑᐧᐋᐅᑭᒥᑦᐦ ᐋᔅᑯᑎᒃ ᑳᐦ ᒋᔅᓈᔐᒫᐨ ᐋᐢᒋᒫᐤᐦ ᒑᐧᐸᐦ ᓈ ᒌᐦ ᐅᑎᓂᐧᒫᐨ ᐅᑎᔦᐧᐃᓂᔐᐤᕽ ᐋᑯᑎᐦ ᒫᒃ ᐋᔫᑦ 1851, ᑳᐦ ᐧᐃᔐᑳᐳᐧᐃᐦᒑᐨ ᒦᓐ ᐅᑎᒑᐧᐋᐅᑭᒥᑦ ᐊᓂᒑᐦ ᐧᐋᐱᒫᑯᐢᒍᔑᔑᐦᐤ, ᐊᐦ ᒌᐦ ᓂᐢᑎᓂᔐᐤ ᐅᒑᐱᒋᐦᐋᑭᓐᐦᕽ ᐹᑎᒫᐦ ᒫᒃ ᓈᐢᐤ, ᒥᓯᓈᐱᐢᑭᐦᐋᑭᓂᐦᐤ ᓅᑯᓐ ᐊᓂᒑᐦ ᐊᐅᑭᑳᒻ ᐅᑎᐦ ᐧᐋᐱᒫᑯᐢᒍᔑᔑᐦᐤ ᐊᐦ ᒌᐦ ᒋᒥᒑᔐᑯᐱᓈᓂᐦᐋ ᐅᐧᐋᔅᑳᐦᐋᑭᓂᒻᐦ ᑲᒪᐱᓅ ᑮᔮᐦ ᓂᐧᐃᐤ ᐊᐦ ᒌᐦ ᒥᔖᑯᐱᓈ ᐊᓐ ᐊᒑᐧᐋᐅᑭᒥᑦᕽ ᐋᑯᑎᐦ ᑳᐦ ᒋᐱᐦᐋᑭᓂᐧᐃᐤ ᐆ ᐊᒑᐧᐋᐅᑭᒥᑦ 1891ᕽ ᐋᑯᐦ ᒦᓐ 1921, ᐋᑯᑎᐦ ᒦᓐ ᑳ ᐋᐹᐦᒃ ᐅᑎᒑᐧᐋᐅᑭᒥᑦ ᐃᔭᑎᐧᐋᓂᐹᑯᐦ ᑲᒪᐱᓅᕽ

ᐊᓐ ᒫᒃ ᒫᐦᒋᐤ ᒫᓯᓈᒑᐤ ᐅᑎᐦ ᑎᐹᒋᒧᐧᐃᓯᓂᐦᐋᑭᓂᐦᐤ ᐋᐅᑦ ᐊᓐ ᑳ ᐹᒋ ᐃᔐᔅᐱᔐᐤ ᓈᐧᑳᓐ ᐊᓂᒑᐦ ᐄᔑ ᐅᒌᐦᐤ (1740 ᐲᐦᐃᒻ 1970) ᐅᐦᒋ ᐋᐢᒋᒫᐅᐤ ᑮᔮᐦ ᐋᔐᔐᐅᐤ ᐅᒌᐦ ᐅᒦᐅᔮᒃ ᑮᔮᐦ ᑯᐦᒋᐧᐊᕙᐱᒃ ᑮᔮᐦ ᒐᓐ ᑳ ᐃᔑ ᒑᐦᑭᐦᐅᑯᐤ ᓈᐧᑳᔐᐤ ᐋᔅᑯᑎᒃ ᑳ ᐹᒋ ᐃᔐᐦᒑᔐᐦᐤᐦ ᐃᔐᐦᐤ ᐊᐦ ᐋᑎᔅᑳᓈᔦᔐᐤᐦ ᐊᐧᐋᔐᐤᐦᕽ ᐋᑯᑎᐦ ᐧᐊᐦᒑᑯᐦᐤ ᐱᐦᑳᓐ ᐊᐦ ᕆ ᐃᔑ ᐱᒫᑎᓯᐤ, ᐋᑳ ᐅᐦᒋ ᓂᓂᐦᐋᐢᑳᑑᐤ, ᓈᒃ ᑳ ᐋᑎ ᐅᑐᒌᒫᔐᒥᑑᐤ ᑮᔮᐦ ᑳ ᐧᐊᐧᐋᒋᐦᐋᑑᐤᕽ ᐋᑯᑎᐦ ᑳ ᐅᐦᒋᐱᔐᐤ ᐆ ᑎᐹᒋᒧᐧᐃᓐ ᐧᐋᔐᐧᐋᐤ ᐊᓂᕆ ᐃᔐᐦᐤ ᑳ ᐅᐦᒌᐤ ᐊᐦ ᒌᐦ ᒥᓯᓂᐦᐊᐤ (ᐊᒑᐧᐊᓯᐅᐤ, ᐊᔐᒥᐦᐊᐅᒋᒫᐅᐤ, ᓅᕆᓯᓈᓯᐅᐤ, ᑳ ᓈᓂᑎᐧᐋᔐᐦᑎᐦᐤ ᓈᐧᑳᔐᐤ ᐊᐦᑎᑯᓂᔐᐧᑳ ᐅᒌᐦ ᐊᑎᒫᐱᓯᒻ ᓈ ᒌᐦ ᐅᐦᑎᓲᐧᐋᓈᐤ, ᒥᑦ ᐊᐦ ᐧᐋᐦ

ᐹᒋ ᐧᐋᐱᐦᑎᐦᒡ, ᑎᐹᔨᐦᒋᓈᓯᐅᐋᐱᒋᐦᐋᑭᓂᒡ ᑭᔮᐦ ᐊᓂᒌ ᓈᑑᒋᔅᓈᔨᐦᑎᐦᒡ ᑳ ᐹᒋ ᐃᔨᔅᐱᔨᔨᒡ ᓈᐧᑳᔨᐤ ᐊᓂᑖᐦ ᐄᔑ ᐅᑖᐦᒡ ᐋᑳ ᐧᐋᒋᐹᔨᒄ ᐄᔨᔨᐤ ᑭᔮᐦ ᐄᔥᒌᒫᐤ ᐄᑎᔅᑳᓈᔨᒡ᙮

ᐃᔫᑎᐧᐄᓂᐹᒄ, ᐧᐃᔫᔒᑭᒦ ᑭᔮᐦ ᐋᐦᒋᑯᓂᐲ ᐋᔪᐧᐃᒄ ᑳᐦ ᑭᓂᐧᐋᐱᐦᑎᐦᒡ ᐄᔨᔨᐅᒡ ᑭᔮᐦ ᐄᔥᒌᒫᐅᒡ ᐊᓂᑎᐦ ᓈ ᒌᐦ ᐊᑎ ᐃᔨᐦᑖᒡ, ᐹᔓᒡ ᐊᓂᑎᐦ ᐄᔅᒄ ᐋᐦ ᒥᔥᑎᑯᔅᑳᔨᒡ ᐋ ᐃᔨᐦᑎᑯᓂᔨᒡ᙮ ᐋᑦ ᑭᔨᐧᐸ ᔒᔥ ᒌᐦ ᐅᑎᓂᐧᒫᑦ ᐅᑎᔪᐧᐃᓂᐧᐋᔨᐤ ᐄᔨᔨᐤᐦ, ᐊᓂᔫ ᓈᓐᒡ ᐋᐦ ᒌᐦ ᓂᑎᐧᐋᔨᐦᑖᑯᔫᔨᒡᐦ ᐊᒥᔅᑯᔫᓐᐦ ᐅᑖᐦ ᐅᐦᒋ ᐊᑳᒥᒋᐦᒋᑭᒦᐦᒡ ᐊᓂᒌ "ᐊᑦᓯᓐ ᐯᐃ" ᒌᐦ ᑯᒋᐦᒋᐧᐃᒡ ᑭᔮᐦ ᓈ ᐅᑎᓂᒫᒡ ᐄᔥᒌᒫᐤᐦ ᐅᑎᔪᐧᐃᓂᔨᐤ᙮ ᒥᒄ ᒫᒃ, ᐋᑳ ᓂᔫᓂᑯᑐᓐᐦ ᐅᐦᒋ ᓂᐦᐄᔥᑳᑐᒡ ᐅᒌ ᓂᔥᑐᔨᒡ ᐋᑎᔅᑳᓈᔨᒡ ᑭᔮᐦ ᐋᑳ ᒥᔥᑏᐦ ᐅᐦᒋ ᒌᐦ ᐅᐦᑎᓂᐦᒡ ᐊᔪᐧᐃᓂᔨᐤ ᑭᔮᐦ ᐱᒥᔨᐤ, ᐋᑯᑎᐦ ᓈᓈᓂᒌᒻ ᓂᒥ ᐅᐦᒋ ᐅᑎᓂᒧᒡ ᐊᔪᐧᐃᓂᔨᐤ ᐅᑖᐦ ᐧᐋᐱᓈᑖᐦᒡ ᐄᑖᐦᓈᑳᒻ "ᐊᑦᓯᓐ ᐯᐃ"᙮

ᐊᓐ ᒫᒃ ᑳ ᐱᐳᐦᒡ 1821, ᐄᔅᑯᑎᒃ ᑳ ᐴᓃᒡ ᐊᓂᒌ ᐧᓈᔅᑫᐧᐁᔅᑦ ᑲᒻᐱᓃ ᐋᐦ ᐅᑎᓂᐦᒡ ᐊᔪᐧᐃᓂᔨᐤ ᐋᑯᑎᐦ ᐊᑎᑎᐤ ᑳ ᐋᑎ ᒥᒦᐦᐧᑳᒋᐱᔨᑦ "ᐊᑦᓯᓐ ᐯᐃ" ᑲᒻᐱᓃ ᐅᑖᐦ ᐊᑎᒫᐲᔨᒻ ᑳᐦᓈᑖᐦ ᐄᑖᐦᓈᒡ᙮ ᐊᓂᔫ ᒫᒃ ᐋᐦ ᐧᐄᐦ ᐱᔅᒋᔫᑐᒡ ᐊᓂᒌ ᐄᔨᔨᐅᒡ ᑭᔮᐦ ᐄᔥᒌᒫᐅᒡ ᒌᐦ ᐄᔑᓈᑯᓂᔨᐤ ᐃᔨᐦᒡ ᓈ ᒌᐦ ᐄᔑᓈᑯᓂᔨᒡ ᐋᐦ ᐧᐄᐦ ᓂᐦᐄᐧᐋᐦᐄᑐᓈᓂᐧᐃᔨᒡ, ᐋᑯᑎᐦ ᒫᒃ ᐅᑎᐦ ᐃᔨᐦᒡ ᑳᐦ ᐋᑎ ᐃᔨᔑᓈᑯᓂᔨᒡ ᐅᐦᒋ ᐊᓂᔫ ᐋᐦ ᐋᑖᐧᐋᒡ ᐅᑎᔪᐧᐃᓂᐧᐋᐤ᙮ ᒦᓐ ᒫᒃ, ᐊᓂᐦᐄ ᐱᔥᒡ ᓂᑑᐦᐆᔅᒌᐦ ᔒᔥ ᓈᑳᑦ ᒌᐦ ᒫᐦᒋᔥᒌᑭᓂᐤ ᐊᓂᑎᐦ ᓂᑑᐦᐅᐧᐃᓐ, ᑭᔮᐦ ᑳ ᐋᒌᔨᐦᑎᐦᒃ "ᐊᑦᓯᓐ ᐯᐃ" ᐋᐦ ᐅᔥᑳᔨᐤᐦ ᓂᑑᐦᐆᔅᒌᐦ ᓈ ᒥᒥᔑᑎᑎᐦᒃ᙮ ᐊᓐ ᐊᒑᐧᐊᐅᒥᒄ ᑑᐦᒋᐧᑳ ᐋᐦᑎᑯᐦᒡ ᐅᑖᐦ ᐋᑖᐦᓈ ᐊᓐᑳᐸ ᐋᐦ ᐧᐊᔒᒡ 1830 ᒌᐦ ᐊᐱᐦᐄᑭᓂᐤ, ᑭᔮᐦ ᒥᒄ ᐅᑖᐦ ᐸᐦᐧᑳᐦᒡ ᒌᐦ ᐅᐦᒋ ᓈᑎᑭᓂᐤ ᐆ ᐊᑖᐧᐊᐅᑭᒥᒄ ᑭᔮᐦ ᒌᐦ ᐋᔨᒥᔨᐧᐋᐤ ᐅᑖᐦ ᒥᒄ ᐃᔫᑎᐧᐄᓂᐹᒄᐦᒡ ᐋᐦ ᐧᐄᐦ ᐅᐦᒋ ᐱᒧᐃᑖᓂᐧᐃᒡ᙮ ᑭᔨᐸ ᑳ ᐅᒋᐱᑖᒡ ᐱᔥᒡ ᐄᔥᒌᒫᐤᐦ ᒥᒄ ᒫᒃ ᑖᐸ ᐅᐦᒋ ᐧᐊᔪᒋᐦᑖᐤᐦ ᐊᔪᐧᐃᓂᔨᐤ ᑭᔮᐦ ᐱᒦᔨᐤ᙮ ᐊᓂᔫ ᒫᒃ ᒫᐧᑳᒡ ᑳ ᐧᐄᐦ ᐧᐃᔨᑳᐳᐧᐃᐦᑖᒡ ᐅᑎᑖᐧᐊᐅᑭᒥᑯᐧᐊᐤ ᐅᑖᐦ ᒋᔅᔨᐲᐦᒡ, ᐊᑯᑎᐦ ᑭᔮᐦ ᓈᓐᒡ ᑳ ᐱᒦᐦᑭᐧᐋᒡ ᐄᔥᒌᒫᐤᐦ ᓈ ᒌᐦ ᐸᒋ ᐊᒌᒥᑯᒡ ᐅᑎᔪᐧᐃᓂᐧᐊᔨᐤ᙮ ᐊᑯᑎᐦ ᒫᒃ ᔑᔥ, ᑳ ᐃᔑᓈᑯᐦᑖᑦ ᑲᒻᐱᓃ ᓈ ᐧᐄᐦ ᓂᓂᑳᐦᐧᐋᐧᓛᑦ ᐄᔨᔨᐤᐦ ᑭᔮᐦ ᐄᔥᒌᒫᐤᐦ ᐊᓂᔫ ᐋᔑ ᐧᐃᔥᑖᔥᑳᑐᔨᒡᐦ᙮ ᐊᑯᑎᐦ ᒫᒃ ᑳ ᒌᐦ ᐃᐦᑐᑎᐦᒃ, ᑭᔮᐦ ᐊᑯᑎᐦ ᑳᐦ ᒋᐦᒋᐱᔨᐦᒋᐦ ᐄᔥᒌᒫᐅᒡ ᐋᐦ ᐱᒋᔅᑭᓂᐦᒡ ᑭᔮᐦ ᐧᐄᔨᐧᐊᐤ ᐅᑎᔪᐧᐃᓂᐧᐊᐤ ᐊᓂᑎᐦ ᒋᔅᔨᐲᐦᒡ᙮ ᒦᓐ ᒫᒃ, ᐊᓂᒌ "ᐊᑦᓯᓐ ᐯᐃ" ᓂᒦᔫᔨᐤ ᒥᒄ ᐧᐊᐱᒫᑯᐱᒦᔨᐤ ᑭᔮᐦ ᐋᐦᒋᑯᐱᒦᔨᐤ, ᒥᐦᓵᔑᐅᔫᐦ ᑭᔮᐦ ᒦᓐᑎᐦᑯᐃᐦ ᑳ ᐧᐄᐦ ᐅᐦᑎᓂᐦᒡ ᐅᑖᐦ ᐄᔥᒌᒫᐤᐦ ᐋ ᐃᔨᐦᒑᔨᐤᐦ, ᐊᔪᐧᐃᒄ ᒦᓐ ᓈᓐᒡ ᑳ ᐧᐄᐦ ᑳᐦᒋᒋᐦᒡ ᐊᓐᑭᓐᐦ, ᐊᐦᒋᐧᑳᔫᐃᐦ, ᐊᑎᐦᒄ ᐊᔅᑎᔨᔨᐤ, ᑭᔮᐦ ᐊᓂᔫᐦ ᐋᐦᒋᑯᔫᓂᔅᒋᔨᓐᐦ ᐋᑳ ᔒᐧᐸᐸᐧᐋᔨᐤᐦ᙮ ᒌᐦ ᑯᐦᐧᑳᔨᐦᒑᑯᓂᔨᐤ ᒫᒃ ᐊᓂᒌ ᐄᔨᔨᐅᒡ ᑭᔮᐦ ᐄᔥᒌᒫᐅᒡ ᐧᐄᐱᒡ ᐋᐦ ᒌᐦ ᓂᐦᐄᐧᐋᐦᐄᑐᒡ, ᒑᐱᐦᑯᓐ ᐋᐦ ᒌᐦ ᐧᐄᐦ ᐧᐊᐧᐃᒋᐦᐄᑐᒡ, ᓈᐅᐦ ᒫᒃ ᐋᐦ ᒌᐦ ᒥᒥᒫᔨᒥᑐᒡ᙮ ᐊᓂᐦᐄ ᒫᒃ ᑎᐹᒋᒧᐧᐃᔨᓂᐦᐄᑭᓐᐦ ᒋᔅᔨᐲᐦᒡ ᑳᐦ ᒥᔨᓂᐦᐄᑭᓂᐧᐃᐤᐦ ᐊᑯᑎᐦ ᒥᐦᓵᐧᒌᐤ ᐧᐊᐦᒑᑯᐦᒡ ᐄᔨᔨᐅᒡ ᑭᔮᐦ ᐄᔥᒌᒫᐅᒡ ᒑᐱᐦᑯᓐ ᐋᐦ ᒌᐦ ᐃᐦᑖᒡ ᐊᓂᑎᐦ ᒋᔅᔨᐲᐦᒡ ᑭᔮᐦ ᐋᐦ ᒌᐦ ᐧᐊᐧᐃᓛᐅᑐᒡ ᐋᐦ ᓂᑑᐦᐅᒡ᙮ ᐊᓂᔫ ᒫᒃ ᑳ ᐃᔑ ᐱᑳᔅᒋᐦᐄᔨᒡ ᒥᐦᓵᐧᒌᐤ ᑭᔮᐦ ᒌ ᐄᔑᓈᑯᓂᔨᐤ ᐋᐦ ᐸᒋ ᒥᐦᓵᑎᒡ ᐅᑎᐦ ᒋᔅᔨᐲᐦᒡ ᓂᓈᐦᑭᐤ ᐋᑎ ᐃᔨᔅᐱᐦᒑᔫᔨᒡᐦ᙮

ᐊᓐ ᒫᒃ ᒫᐦᒋᒡ ᐋᑎ ᑎᐹᑎᒑᒡ ᐅᑎᐦ ᑎᐹᒋᒧᐧᐃᔨᓂᐦᐄᑭᓂᐦᒡ ᐊᓐ ᑭᔨᐧᐸ ᑳ ᐃᔑ ᒥᒥᔅᑭᐧᐊᐦᒑᑭᓂᐧᐃᒡ ᐊᓂᐦᐄ ᐊᐧᐋᓂᐦᐄ ᑳ ᐋᑎ ᐃᔨᐦᒑᒡ ᐅᑎᐦ ᐋᑯᑎᐦ ᐧᐋᐦᒑᑯᐦᒡ ᒑᓐ ᑳ ᐃᔑ ᑭᒑᐦᑭᐦᐅᑯᒡ ᐊᐧᐋᓂᐦᐄ ᐅᑖᐦ ᐋᐦᒑᒡ ᐅᐱᒫᑎᓰᐧᐃᓂᐧᐋᐦᒡ ᐄᔥᒌᒫᐅᒡ ᑭᔮᐦ ᐄᔨᔨᐅᒡ ᐅᑖᐦ ᐅᒦᐅᔫᒃ ᑭᔮᐦ ᒎᐦᒋᐧᐊᕚᐱᒃ᙮ ᐊᑯᑎᐦ ᒑᐸᑎᒡ ᑳ ᒌ ᓅᑖᐱᒫᐧᑳᓂᐧᐃᒡ 1851 ᐲᐦᐃᒻ 1890, ᓃᔥᑎᒻ ᑳ ᐅᑎᐦᑎᐦᐅᐧᐋᒡ ᐊᔨᒥᐦᐊᐧᐃᓐ, ᓈᓈᓂᒌᒻ ᑳ ᐹᒋ ᐋᔨᒥᔨᑦ ᐅᑖᐦ ᐊᑎᒫᐲᔨᒻ ᑳᐦᓈᑖᐦ ᑭᔮᐦ ᑯᐯᒃ ᑎᐹᔨᐦᒋᒫᔨᐤ, ᑳᐦ ᐋᐦᑯᔨᓈᓂᐧᐃᒡ ᐅᐦᒋ ᐋᐦ ᒥᔦᑖᒧᓈᓂᐧᐃᒡ ᑭᔮᐦ ᑳ ᐹᒋ ᐅᑎᐦᒋᐱᔨᒡ ᓂᑐᐦᑯᔨᓈᐱᑎᓰᐧᐃᓐ, ᐧᐄᒋᐦᐄᐧᐋᐅᒦᒋᒻ ᑳ ᒥᔨᐧᐊᓂᐧᐃᒡ, ᑳ ᐹᐱᐦᔮᒥᑭᐦᒡ ᑳᐱᐹᒥᐦᔮᒥᑭᐦᒡ, ᐋᐦ ᐅᔥᑳᒡ ᐋ ᐃᔑ ᐱᑳᔅᒋᐦᐅᓈᓂᐧᐃᒡ, ᒋᐦᒋᐧᐊ ᐹᔨᑯᓂᐦᒡ ᑳ ᐋᑎ ᐅᐧᐄᒋᒡ ᐊᐧᐋᓂᒌ, ᑭᔮᐦ ᑳ ᒥᔨᓂᐦᐅᔫᓈᓂᐧᐃᒡ ᒉᐃᒥᔅ ᐯᐃᐦ ᑭᔮᐦ ᐊᑎᒫᐲᔨᒻ ᓂᔅᑯᒧᐧᐃᓐ *James Bay and Northern Québec Agreement* 1975 ᑳ ᐱᐳᐦᒡ᙮

ᐋᐦ ᓈᑭᑎᐧᐋᔨᐦᒌᑯᐦᒡ ᐄᔑᐦᐧᒑᐧᐃᓐ ᑭᔮᐦ ᐄᑎᔅᑳᓈᔫᐧᐃᓐ

ᐊᓐ ᒫᒃ ᒫᐦᒋᒡ ᐧᐋᐦ ᐧᐄᐦᒑᑯᐦᒡ, ᐆ ᑎᐹᒋᒧᐧᐃᔨᓂᐦᐄᑭᓐ ᐋᑯᑎᐦ ᒫᔨᓈᒑᒡ ᐊᓐ ᓈᐧᑳᓐ ᒥᔫᒥᑐᓈᔨᐦᑎᒥᐦᐄᐧᐋᒡ ᐅᑎᐦ ᐊᓐ ᐧᐋᐦᑎᒌᑭᓂᐧᐃᒡ ᐊᔅᒌ ᓈᓐᒡ ᓈ ᐧᐄᐦ ᒥᓈᒋᐦᒌᑭᓂᐧᐃᒡ ᑭᔮᐦ ᒥᐦᓈᑐ ᐊᓐ ᓈᐧᑳᓐ ᒥᒄ ᐅᑎᐦ ᑯᐯᒃ ᐋ ᐃᔨᐦᑎᑯᐦᒡ (ᐊᔅᒌᐅᔨᓂᐦᐄᑭᓐ 6.1 ᓅᑯᐦᒡ)᙮ ᐋᑯᑎᐦ ᑭᔮᐦ ᒫᔨᓈᒑᒡ ᐊᓐ **ᒦᓐ ᑎᐧᐋᐦᒡ ᓈᐧᑳᓐ ᓈ ᐱᒦᐦᑭᑭᓂᐧᐃᒡ᙮** ᐊᓐ ᒫᒃ ᐋᐦ ᑭᓂᐧᐋᐱᐦᑎᑭᓂᐧᐃᒡ ᐆ ᑳ ᐃᔑ ᒥᒥᔅᑭᐧᐊᐦᒑᑭᓂᐧᐃᒡ ᐊᓐ ᑳ ᐃᔑ ᓈᓂᑑᒋᔅᓈᔨᐦᒑᑯᐦᒡ ᐋᐦ ᐧᐄᒋᐦᐄᐧᐋᐅᒡ ᐊᐧᐋᓂᒌ ᐊᓂᑖᐦ ᐅᐦᒋ ᐅᒦᐅᔫᒃ, ᒎᐦᒋᐧᐊᕚᐱᒃ ᑭᔮᐦ ᐧᐋᐱᒫᑯᐦᑐᐃ, ᐋᑯᑎᐦ ᑳ ᐅᐦᒋ ᐅᔑᐦᒑᑭᓂᐧᐃᒡ ᒥᔨᓂᐦᐄᑭᓐ ᐋᐦ ᐧᐃᔫᔨᐦᒑᑯᐦᒡ ᐊᓐ ᓈ ᐃᔑᓈᑯᓂᑯᐱᓈ ᐅᑖᐦ ᐋᐦ ᐅᐦᒋᐱᔨᒡ ᑯᐯᒃ ᑎᐹᔨᐦᒋᓈᔫᓈᐦᒡ ᐋᐦ ᐅᐦᒋ ᓈᓈᑭᒋᐦᒌᑭᓂᐧᐃᒡ ᐃᔫᐧᑳᐦ ᓈ ᒌᐦ ᐃᐦᑎᓈᓂᐧᐃᒡ ᐊᓂᑎᐦ ᐃᔫᔨᒥᔫᓈᓂᐧᐃᒡ ᑭᔮᐦ ᒫᒃ ᐃᔫᐱᑎᓰᓈᓂᐧᐃᒡ ᑭᔮᐦ ᐊᓂᑎᐦ ᐋᐦ ᐅᐦᒋ ᑭᓂᐧᐋᐱᐦᑎᑭᓂᐧᐃᒡ ᐊᔅᒌ ᐋᐦ ᐧᐄᐦ ᒥᓈᒋᐦᒌᑭᓂᐧᐃᒡ ᑭᔮᐦ ᐊᓐ ᐊᔅᒌ ᐋᐦ ᐱᐦᑳᓂᔅᒑᒡ ᓈᓐᒡ ᐋᐦ ᐧᐄᐦ ᓈᑭᑎᐧᐋᔨᐦᒌᑯᐦᒡ᙮ ᐋᑯᑎᐦ ᒫᔨᓈᒑᒡ ᒑᓂᑎᐦ ᐊᓂᑎᐦ ᓈᐦᐊᐤ ᓈ ᐃᐦᑎᒌᑭᓂᐧᐃᒡ ᑭᔮᐦ ᐋᑯᑎᐦ ᐧᐋᐦᒑᑯᐦᒡ ᐊᓂᑖᐦ ᓈ ᐃᐦᑐᒌᑭᓂᐧᐃᒡ ᐄᔅᑯᑎᒃ ᐋᐱᑎᓰᓈᓂᐧᐃᓈ ᑭᔮᐦ ᓈ ᐃᔑ ᒥᓈᒋᐦᒌᑭᓂᐧᐃᒡ᙮ ᒦᓐ ᒫᒃ, ᐊᓂᑖᐦ ᓈ ᐃᔑ ᒑᐦᑭᐦᐄᓈᐱᔨᒡ ᐅᐦᒋ ᐊᔅᒌ ᐋᐦ ᐧᐄᐦ ᒥᓈᒋᐦᒌᑭᓂᐧᐃᒡ ᑭᔮᐦ ᒑᓐ ᓈ ᐃᔑ ᒑᐦᑭᐦᐅᑯᒡ ᐊᐧᐋᓂᒌ᙮ ᐊᔪᐧᐃᒄ ᐧᐄᔨᐧᐊᐤ

ᒑ ᐱᒦᐦᑭᐦᒡ ᑳᑎᕕᒃ ᐄᔥᒌᒫᐤ ᑎᐹᔨᐦᒋᒑᓯᐤ ᐃᐦᑐᑎᑭᓂᐎᐎᔨᒑ ᐅᔮ ᐋᐦ ᐱᐦᑳᓂᓂᑭᓂᐎᐎᔨᒡ ᐊᔅᒌᔨᐤ ᒑ ᒥᓈᒋᐦᒑᑭᓂᐎᐎᔨᒡ᙮ ᐊᓂᒑᐦ ᒑ ᐃᔑ ᐱᒋᔅᑎᓂᐦᒡ ᐅᒑᐦ ᑯᐯᒃ ᑎᐹᔨᐦᒋᒑᓯᓈᐦᒡ ᐋᐦ ᐅᐦᒋ ᓈᓈᑭᒋᐦᒑᑭᓂᐎᒡ ᐃᔮᒀᐦ ᒑ ᒌᐦ ᐃᐦᑎᓈᓂᐎᒡ ᐊᓂᑎᐦ ᐃᔮᔨᒥᓯᓈᓂᐎᒡ ᑭᔮᐦ ᒫᒃ ᐃᔮᐱᑎᓯᓈᓂᐎᒡ ᑭᔮᐦ ᐊᓂᑎᐦ ᐋᐦ ᐅᐦᒋ ᑭᓂᐙᐱᐦᑎᑭᓂᐎᒡ ᐊᔅᒌ ᐋᐦ ᐐᐦ ᒥᓈᒋᐦᒑᑭᓂᐎᒡ ᑭᔮᐦ ᐊᓐ ᐊᔅᒌ ᐋᐦ ᐱᐦᑳᓂᔥᒑᒡ ᓈᔥᒡ ᐋᐦ ᐐᐦ ᓇᑭᑎᐙᔨᐦᒑᑯᐦᒡ ᑭᔮᐦ ᒑ ᐙᐱᐦᑎᔮᒡ ᐊᓂᔮᐦ ᑳᑎᕕᒃ ᐄᔥᒌᒫᐤ ᑎᐹᔨᐦᒋᒑᓯᐤᐦ ᓂᔮᓈᑭᒋᐦᒑᔨᒡᐦ ᐊᔅᒌᔨᐤ ᐋᐦ ᐐᐦ ᒥᓈᒋᐦᒑᑭᓂᐎᐎᔨᒡ᙮ ᒋᑭ ᒋᔅᒑᔨᐦᑎᔮᑭᓂᐅᐎᒡ ᑭᔮᐦ ᐊᐙᓂᒌ, ᒑ ᒌᐦ ᐐᐦᑎᐦᒡ ᑭᔮᐦ ᐐᔨᐙᐤ ᒑᓐ ᐋᒑᔨᐦᑎᒥᐦᐄᑯᒡ ᐅᔮ ᒑ ᐱᐦᑳᓂᓂᑭᓂᐎᐎᔨᒡ ᐊᔅᒌᔨᐤ ᓈᔥᒡ ᒑ ᒥᓈᒋᐦᒑᑭᓂᐎᐎᔨᒡ (ᐋᐦ ᐋᔥᑎᒋᒫᑭᓂᐅᐎᒡ ᐊᓂᒌ ᐊᐙᓂᒌ ᐅᒑᐦ ᐅᒦᐅᔮᒃ, ᑰᐦᒋᐙᓭᐱᒃ ᑭᔮᐦ ᐗᐱᒫᑯᔥᑐᐦᒡ ᐙᐦᒌᒡ)᙮ ᐄᔅᑯᑎᒃ ᒫᒃ ᒌᔥᑐᒑᑭᓂᐎᐎᒑ ᐆ, ᐋᐅᒄ ᒫᒨ ᓂᔥᑐᔨᒡ ᒑ ᐃᐦᑎᑯᐦᒡ ᐆ ᐊᔅᒌ ᐋ ᐃᔑ ᑭᓂᐙᐱᐦᑎᑭᓂᐎᒡ ᐅᒑᐦ ᓅᓈᕕᒃ ᑭᔮᐦ ᒫᒃ ᑳᑎᕕᒃ ᐄᔥᒌᒫᐤ ᑎᐹᔨᐦᒋᒑᓯᐤ ᐊᐅᒄ ᒑ ᑭᓂᐙᐱᐦᑎᐦᒃ ᐊᓂᔮ ᐋᑎ ᐃᔨᔅᐱᔨᔨᒡ ᒑᒀᔨᐤ ᐋᐦ ᐐᒋᐦᐄᑯᒡ ᐊᓂᔮᐦ ᐃᐦᒑᐎᓐᐦ ᐅᒦᐎᔮᒃ, ᑰᐦᒋᐙᓭᐱᒃ / ᐗᐱᒫᑯᔥᑑ᙮

EDITOR'S NOTE

In April 2002, the *gouvernement du Québec*, the Kativik Regional Government (KRG) and the Makivik Corporation signed the *Partnership Agreement on Economic and Community Development in Nunavik* (Sanarrutik). One of the objectives of the Sanarrutik Agreement was to stimulate 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* (wildlife and parks, FAPAQ), known today as the *ministère du Développement durable, de l'Environnement et des Parcs* (sustainable development, environment and parks), and the KRG. This specific agreement was subsequently integrated as a mandate into the *Agreement concerning Block Funding for the Kativik Regional Government* (Sivunirmut) which was signed in March 2004. The mandate 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 Nunavik's park projects and for drafting the related status reports. The current document, which is based on preliminary information prepared by the FAPAQ in 2003, has been produced by the KRG.

The *Lacs-Guillaume-Delisle-et-à-l'Eau-Claire* Park Project is the working name attributed to the project. Another name has been proposed by the park project working group, and wider consultations with the involved communities are being carried out before a final name is chosen.

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The KRG thanks first of all the park project working group for its meaningful contributions to the project, through the expertise, comments and support of its members. The working group consists of council members and elders from the Northern Village of Umiujaq, representatives of the Anniturvik Landholding Corporation in Umiujaq, council members from the Northern Village of Kuujjuarapik, representatives of the Sakkuq Landholding Corporation in Kuujjuarapik, local representatives of the Makivik Corporation, representatives of the Whapmagoostui Cree First Nation, as well as representatives of the Parks Branch of the ministère du Développement durable, de l'Environnement et des Parcs (sustainable development, environment and parks, MDDEP).

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1 PRESENTATION OF THE STUDY AREA

The Lacs-Guillaume-Delisle-et-à-l'Eau-Claire Park Project is located along the west coast of Nunavik, next to Hudson Bay. Covering the drainage basins that empty into Lac Guillaume-Delisle (Lake Guillaume-Delisle, also known as Richmond Gulf) and the Rivière Nastapoka (Nastapoka River), as well as the areas on either side of the mouth of the Petite rivière de la Baleine (Little Whale River), the study area extends for close to 230 km eastward (Figure 1.1). It possesses several fragile, rare and exceptional natural elements, as well as including representative portions of two natural regions: the Hudson Plateau (B37) and the Hudson Cuestas (B38; Figure 1.2).

Situated on some of the oldest rocks of the Canadian Shield, the Hudson Plateau slopes gently towards Hudson Bay. Reworked by erosion, it is characterized by many faults. The Hudson Cuestas are especially scenic, not to mention the largest cuestas found anywhere in Québec.

Initially, two ministerial orders (91-192 and 92-170) set aside roughly 10,300 km^2 for the park project. Over time, these boundaries have been modified to allow for mineral exploration in certain zones, as well as in compliance with requests made by local representatives of the park project working group. As a result, the park project study area now covers an area of close to 27,000 km^2, which is to say roughly 18 times the area of Parc national du Mont-Tremblant. To ensure the short-term protection of the study area prior to its designation as a national park, the Québec government decided to enter a 14,946 km^2 area in the Registre des aires protégées (protected areas register).

Once completely covered by glaciers, the study area possesses a varied and complex drainage network. Lac Guillaume-Delisle, which is situated near the Northern Village of Umiujaq, is connected to Hudson Bay by a narrow channel known as Le Goulet. With its brackish waters, the vast lake is able to support seal and beluga. The cliffs of the cuestas around Lac Guillaume-Delisle provide important habitat for several species of birds considered at risk, including golden eagle and peregrine falcon.

Located inland to the east, Lac à l'Eau Claire (Clearwater Lake) is the second largest natural lake in Québec with an area of 1,226 km^2. The lake lies in the adjoining, circular basins created by a double meteoritic impact 287 million years ago. The double impact wrought considerable changes in the geology of the region.

A myriad of lakes of varying sizes lie in the easternmost part of the study area. Among these, Lacs des Loups Marins (Upper Seal Lake) and Petit lac des Loups Marins (Lower Seal Lake) nurture a fresh-water population of harbour seal, considered to be an endemic subspecies. This population is probably one of the rare stocks of seal on earth that is completely landlocked.

The many rivers that flow through the study area also possess many noteworthy elements of interest. The Rivière Nastapoka, situated in the northern part of the study area, is the largest of these. The distance from its headwaters, which is to say Lacs des Loups Marins, to its mouth comprises 170 km of ledges and spectacular waterfalls. The waters of the Rivière Nastapoka include landlocked salmon populations and its estuary is a sanctuary for beluga, a species at risk that congregates in this location from mid-July to mid-August in order to moult, rest and socialize.

For its part, the Rivière au Caribou (Caribou River) flows through a structural valley that is sometimes straight and other times sinuous. The river's course is punctuated by ledges and rapids before passing through a delta and emptying into Lac Guillaume-Delisle. This and the other river basins that empty into Lac Guillaume-Delisle are considered important areas for the protection of golden eagle, harlequin duck and peregrine falcon.

Situated in the southwestern corner of the study area, the mouth of the Petite Rivière de la Baleine is characterized by majestic cuestas that represent exceptional nesting sites for golden eagle. The estuary of the Petite Rivière de la Baleine, like that of the Rivière Nastapoka, is an important congregating area for beluga.

Due to its vast size, the study area possesses many distinct environments and varied climatic conditions that foster rich flora. Several new and rare invascular and vascular flora taxa have in fact been identified in the study area. Located in the transition zone between boreal forest and the subarctic, the study area marks the limit of the ranges of several species.

Figure 1.1 Location of the Study Area

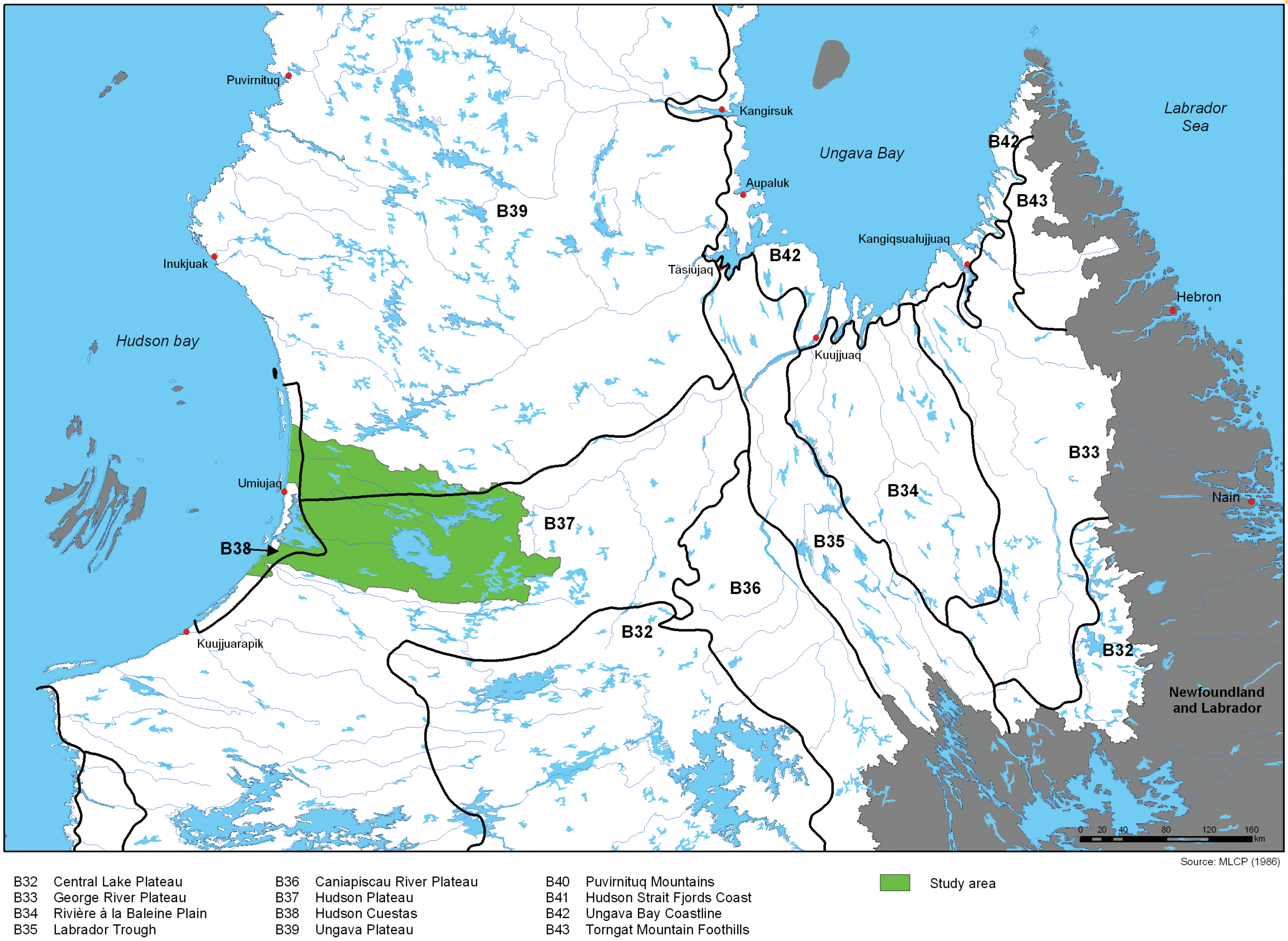


Figure 1.2 Natural Regions of the Study Area

Occupied for thousands of years by Arctic and then American Indian peoples, the study area possesses many historical elements of interest. More than 100 archaeological sites have been identified to date and bear witness to the occupations of past cultures. In 1750, Euro-Canadians furthermore arrived in the region to trade. Former trading posts and various artefacts discovered during archaeological research work provide evidence of this historical period. Still today, as their ancestors did for thousands of years, Cree and Inuit crisscross the study area in order to practise their subsistence activities.

This document describes the current state of knowledge for the study area of the Lacs-Guillaume-Delisle-et-à-l'Eau-Claire Park Project. It sets out the socio-economic situation of the region and goes on to present representative elements of the physical and biological environments. Past and contemporary human occupation of the study area is also retold through archaeological and historical records. Finally, a summary highlights all of the different elements described. This document should make it possible to identify the opportunities and constraints found in the study area for the preparation of a draft master plan that complies with the national parks policy as well as Inuit and Cree cultures.

Credit: Laina Grey (KRG)

2 SOCIO-ECONOMIC FRAMEWORK

Nunavik and Host Villages

Nunavik is a socio-cultural region situated north of the 55th parallel, and it is inhabited largely by Inuit (Figure 2.1). Nunavik covers the Kativik Region, created pursuant to the *James Bay and Northern Québec Agreement* (JBNQA) in 1975 (Québec, 2006), and the Nord-du-Québec administrative region (region no. 10). Stretching across roughly 500,000 km^2, a third of Québec, Nunavik is flanked on the east by Newfoundland and Labrador, on the north by Ungava Bay and the Hudson Strait, and on the west by Hudson Bay.

Administration and Land Regime

The organization applicable in the territory is established under the JBNQA, signed in 1975 by the Gouvernement du Québec, the Government of Canada, the Société d'énergie de la Baie James [energy corporation], the Société de développement de la Baie James [development corporation], Hydro-Québec, and the Inuit and Cree (Québec, 2006), as well as under the JBNQA's attendant laws and agreements.

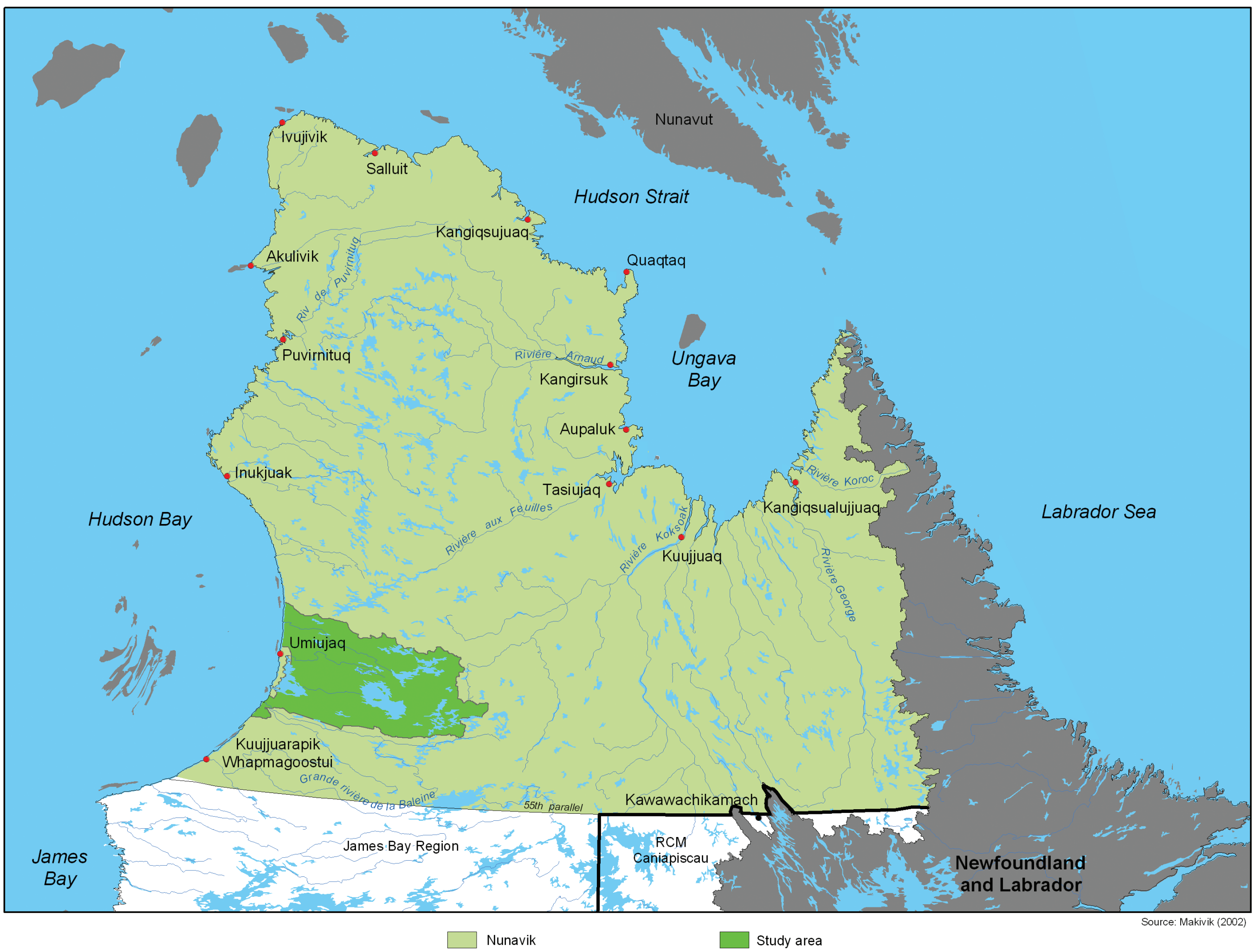


Figure 2.1 Land Regime and the Northern Villages

ADMINISTRATIVE STRUCTURES

In addition to the federal and provincial governments, other organizations and stakeholders are involved in the management and administration of the region.

Makivik Corporation

The Makivik Corporation, which was created by law[1] in 1978, represents the Inuit of Nunavik and ensures compliance with their rights and interests guaranteed under the JBNQA. It also administers compensation moneys paid to the Inuit further to the JBNQA. Finally, Makivik participates directly in the region's economic development through the operation of various companies. Makivik possesses a number of subsidiaries including the airlines First Air, Air Inuit and Nunavik Rotors which deliver scheduled and charter air services throughout the region. The Makivik Corporation is a signatory to the *Partnership Agreement on Economic and Community Development in Nunavik* (Sanarrutik) which includes an objective concerning park development in the region (refer to the "Editor's Note").

Kativik Regional Government

The Kativik Regional Government (KRG) was created in 1978 pursuant to Section 13 of the JBNQA and the *Act respecting Northern Villages and the Kativik Regional Government*[2]. Having its head office in Kuujjuaq, the KRG Council comprises one representative from each Northern village and the chief of the Naskapi Nation of Kawawachikamach.

The KRG has jurisdiction over the Kativik Region, which includes all the territory situated north of the 55th parallel. In addition to delivering technical assistance to the 14 Northern villages in the fields of municipal management and infrastructure construction, the KRG acts as a municipality for any part of the Kativik Region that is not under the jurisdiction of a Northern village. In this respect, it is responsible for land use planning and development based on the *Master Plan for Land Use in the Kativik Region* (KRG, 1998). Finally, the KRG has assumed several responsibilities related to the development and management of parks in Nunavik under an agreement signed with the Société de la faune et des parcs du Québec [wildlife and parks corporation] in 2002 (refer to the "Editor's Note").

Northern Villages

The Northern villages are municipalities pursuant to the Kativik Act. The powers and obligations of the Northern villages are comparable to those of municipalities elsewhere in Québec. Two Inuit communities and one Cree community are affected by the development of the Lacs-Guillaume-Delisle-et-à-l'Eau-Claire park project. These are the communities of Umiujaq, Kuujjuarapik and Whapmagoostui (Figure 2.1).

Established as a municipality in 1986, the Northern Village of Umiujaq is the community situated closest to the Lacs-Guillaume-Delisle-et-à-l'Eau-Claire Park Project. *Umiujaq* means 'resembling a boat that is flipped over'. Established in 1980 and 1978, Kuujjuarapik and Whapmagoostui are located roughly 170 km southwest of Umiujaq on the coast of Hudson Bay.

Landholding Corporations

In Inuit territory, landholding corporations are private entities that represent the beneficiaries of a given community as regards the management of Category I (owned exclusively by the beneficiaries) and Category II (public lands where the beneficiaries are guaranteed exclusive subsistence harvesting rights) lands. The Anniturvik Landholding Corporation, created in 2003, manages Umiujaq lands while the Sakkuq Landholding Corporation manages Kuujjuarapik lands. In Cree territory, Category I and II land management is handled by a First Nations band council, which in this case is the Whapmagoostui First Nation.

LAND REGIME

Pursuant to the JBNQA and the *Act respecting the Land Regime in the James Bay and New Québec Territories*[3], a land regime comprising three categories, which govern use as well as management conditions and responsibilities, is applicable in Nunavik and the James Bay region (Map 2.1).

Category I lands, with the exception of subsoil rights, are collectively owned by the beneficiaries of the community in question. These lands extend beyond municipal boundaries and include influence zones where subsistence harvesting is practised intensively by the beneficiaries. No Category I lands are part of the Lacs-Guillaume-Delisle-et-à-l'Eau-Claire Park Project.

Category II lands are public lands where, as is the case with Category I lands, the beneficiaries have exclusive hunting, fishing and trapping, commercial hunting and fishing, as well as outfitting rights. Category II lands cover areas where the beneficiaries generally exercise their harvesting rights. The Category II lands of Umiujaq and Kuujjuarapik cover the western portion of the study area, including Lac Guillaume-Delisle [Richmond Gulf] and the mouth of the Rivière Nastapoka [Nastapoka River]. The Category II lands of Whapmagoostui abut the southern boundary of the study area in the Petite Rivière de la Baleine [Little Whale River] zone (Map 2.1). The Category II lands of Umiujaq and Kuujjuarapik cover 3738 km^2, or roughly 14% of the study area.

Category III lands are also public lands. Aboriginals may exercise their harvesting rights on these lands; however, this right


LACS-GUILLAUME-DELISLE-
ET-À-L'EAU-CLAIRE
PARK PROJECT
Land Regime
Inuit lands
Category I lands-Umiujaq
Category II lands-Umiujaq
Category II lands-Kuujjuarapik
Cree lands
Category II lands-Whapmagoostui
Study area
Source: MNRF, Bureau de l'Arpenteur général du Québec (2006)
Scale 1:775,000
0 5 10 20 30 km
Base de données topographiques et administratives 1 : 250 000 (BDTA), Ministère des Ressources naturelles et de la Faune du Québec
Base de données de l'aménagement du territoire 1 : 100 000 (BDAT), Ministère des Ressources naturelles et de la Faune du Québec
Geodetic datum: NAD 83
Modified transverse Mercator projection
Québec ground-space co-ordinate system, zone 8
Contour interval: 60 m
KATIVIK
November 2007
Map 2.1
77°0'0"W
76°30'0"W
76°0'0"W
75°30'0"W
75°0'0"W
74°30'0"W
74°0'0"W
73°30'0"W
73°0'0"W
72°30'0"W
57°0'0"N
56°30'0"N
56°0'0"N
Hudson Bay
Îles Nastapoka
Umiujaq
Colline Qingaaluk
Presqu'île Castle
Le Goulet
Île Cairn
Lac Guillaume-Delisle
Lac Pamialluqusaup
Lac Persillon
Lac Tikirartuuq
Lac Kakiattualuk
Rivière Richard
Rivière Nastapoka
Rivière Devaux
Rivière Sheldrake
Rivière au Caribou
Rivière Guérin
Lac Mikinnguup
Rivière Kuuguluk
Petite rivière de la Baleine
Rivière Second
Lac Pintar
Lac Werden
Lac Natwakupaw
Rivière du Nord
Lac Tasiujualik
Rivière à l'Eau Claire
Rivière De Troyes
Lac Ichikami
Lac à l'Eau Claire
Lac Girardy
Lac Lamain
Lac Quéreur
Lac Rousselin
Lac D'Iberville
Lac Bourg
Lac Bourdel
Lacs des Loups Marins
Petit lac des Loups Marins
Lac Pikutachikw
Lac Achikunipi
Lac Audie
Lac Duplre
Lac Benita
Lac Amichinatwayach
Lac Saindon
Lac Nachisakus
Baie d'Ungava
Mer du Labrador
Baie d'Hudson
Kangiqsujuaq
Kuujjuaq
Inukjuak
Puvirnituq
Umiujaq
Kuujjuarapik
Schefferville

is not exclusive. Category III lands represent roughly 86% (23,494 km^2) of the study area.

Land Use and Land Planning

HARVESTING RIGHTS

The wildlife harvesting right of Aboriginals, which is subject to the principle of conservation, is set out in the JBNQA[4] and in the *Act respecting Hunting and Fishing Rights in the James Bay and New Québec Territories*[5]. This right extends throughout Nunavik, regardless of the land category. It allows Aboriginals to hunt, fish and trap any species of wildlife. The creation of a park does not conflict with activities related to subsistence harvesting[6].

URBANIZED ZONE

Land use is concentrated on Category I lands, which is to say within municipal boundaries where residents and municipal services are found. Outside of this urbanized zone, access is more difficult although resource use is intensive and subsistence activities are carried out year round in accordance with wildlife migration (Map 2.1).

MASTER PLAN FOR LAND USE

The *Master Plan for Land Use in the Kativik Region* specifies different land uses in the region (KRG, 1998). Taking into account the rules applicable to Category I, II and III lands, the Master Plan identifies essential and important areas for subsistence, multiple use areas, and areas of interest. The Lacs-Guillaume-Delisle-et-à-l'Eau-Claire Park Project is identified in the Master Plan as a zone with esthetic and ecological interest.

Subsistence Harvesting Areas

Essential[7] and important[8] areas for subsistence are situated in the western portion of the study area, and include the coast of Hudson Bay and Lac Guillaume-Delisle, which are characterized by high biological productivity (Map 2.2). These areas were identified by the Makivik Corporation in a study concerning traditional and current land use by Nunavik Inuit (Makivik Corporation, 1992). These areas are necessary for hunting, fishing, trapping and gathering activities, and are used regularly by beneficiaries. The overlapping of subsistence harvesting areas and Category I and II lands underscores the desire of Inuit to continue their traditional harvesting activities.

The objectives for these areas may be summarized as follows (KRG, 1998):

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

In addition to subsistence harvesting activities, other activities permitted in these areas include:

- activities related to research and archaeological digs;
- scientific, cultural, educational, tourist [. . .] activities [. . .];
- activities related to the conservation and protection of resources;
- other activities that do not compromise representative elements, biological resources and the practice of subsistence activities.

The main directives concerning land use in these areas state that any project, other than those related to subsistence harvesting activities, could involve specific agreements between the parties concerned. Consequently, all promoters must submit to the KRG comprehensive development plans and they must comply with conservation and environmental protection practices.

Areas of Interest

Areas of interest recognized by the Québec government were reserved for parks in 1992. These areas are representative examples of the natural regions of Québec and they possess unique features. They have furthermore been approved by the residents of Nunavik and are identified in the *Master Plan for Land Use in the Kativik Region* (KRG, 1998).

In addition to hunting, fishing, trapping and gathering, other activities permitted in these areas include (KRG, 1998):

- tourism activities that do not disturb resources;
- activities related to research and archaeological digs;
- scientific, cultural or educational activities;
- other activities that do not compromise representative elements of areas of interest, biological resources and the practice of subsistence activities.

GOVERNMENT-ISSUED LICENCES

Seven permanent outfitting camps are located in the study area for the Lacs-Guillaume-Delisle-et-à-l'Eau-Claire Park Project, and six more are located nearby (Map 2.2). In addition to typical hunting and fishing activities, these outfitting camps may offer eco-tourism activities, including river canoeing and kayaking, as well as guided landscape and wildlife observation. In 2004, the KRG purchased from Canadaventure Inc. the Le Paradis outfitting facilities at Lac à l'Eau Claire [Clearwater Lake], situated north of the lake's western basin, to be used for the park project and research activities.

Active mineral titles are mainly located north of Lac Guillaume-Delisle and total 319.27 km^2 (Map 2.2).

The Cree of Whapmagoostui possess traplines[10] in the study area, with a different tallyman responsible for each line[11] (Map 2.2).

The Rivière Nastapoka, which has its source at Lacs des Loups Marins [Upper Seal Lake], is one of the six rivers north of the 55th parallel identified in the *Partnership Agreement on Economic and Community Development in Nunavik* (Sanarrutik) (refer to the "Editor's Note") for which the Québec government has undertaken to evaluate the hydroelectric potential. Given their relative proximity, hydroelectric power development projects on the Grande rivière de la Baleine [Great Whale River] and the Rivière Nastapoka could be contemplated simultaneously (in order to generate savings on road and power transmission line construction costs, for example).

Finally, a resort lease issued by the Ministère des Ressources naturelles et de la Faune [natural resources and wildlife] exists for the zone adjacent to Lac Rousselin, between Lac à l'Eau Claire and Lac D'Iberville. A cottage has been constructed there.

SCIENTIFIC RESEARCH

Many scientific research projects have been carried out in the study area by the Centre d'études nordiques [northern studies] (CEN), the Makivik Corporation, the KRG and other contributors. The CEN is a research centre that brings together researchers from three main universities: the Université Laval, the Université du Québec à Rimouski and the Institut national de la recherche scientifique (Centre Eau, Terre et Environnement). The CEN has for several years already been conducting research in the study area in the field of natural sciences with focus on changes in the physical environment and Northern ecosystems due to climate, natural disturbances and human activity in their spatial and time dimensions. The CEN has a research station at Kuujjuarapik–Whapmagoostui, a satellite infrastructure at Radisson, and three field camps, including one at Lac à l'Eau Claire. The CEN also operates a network of 80 climatological and geocryological stations from the boreal forest to the High Arctic, although most are located in Northern Québec. Four such stations are located in the study area.

At the end of 2007, an agreement was signed by the KRG, the Makivik Corporation and the CEN to promote research partnership in Nunavik through the Qaujisarvik Network. The agreement fosters joint projects between the three parties and organizations wishing to carry out research in Nunavik. The agreement also permits the CEN to negotiate specific agreements with organizations concerning the use of its facilities. Finally, the CEN has signed a lease with the KRG concerning the use of the KRG's Lac à l'Eau Claire facilities for research purposes.

SUBSISTENCE HARVESTING ACTIVITIES

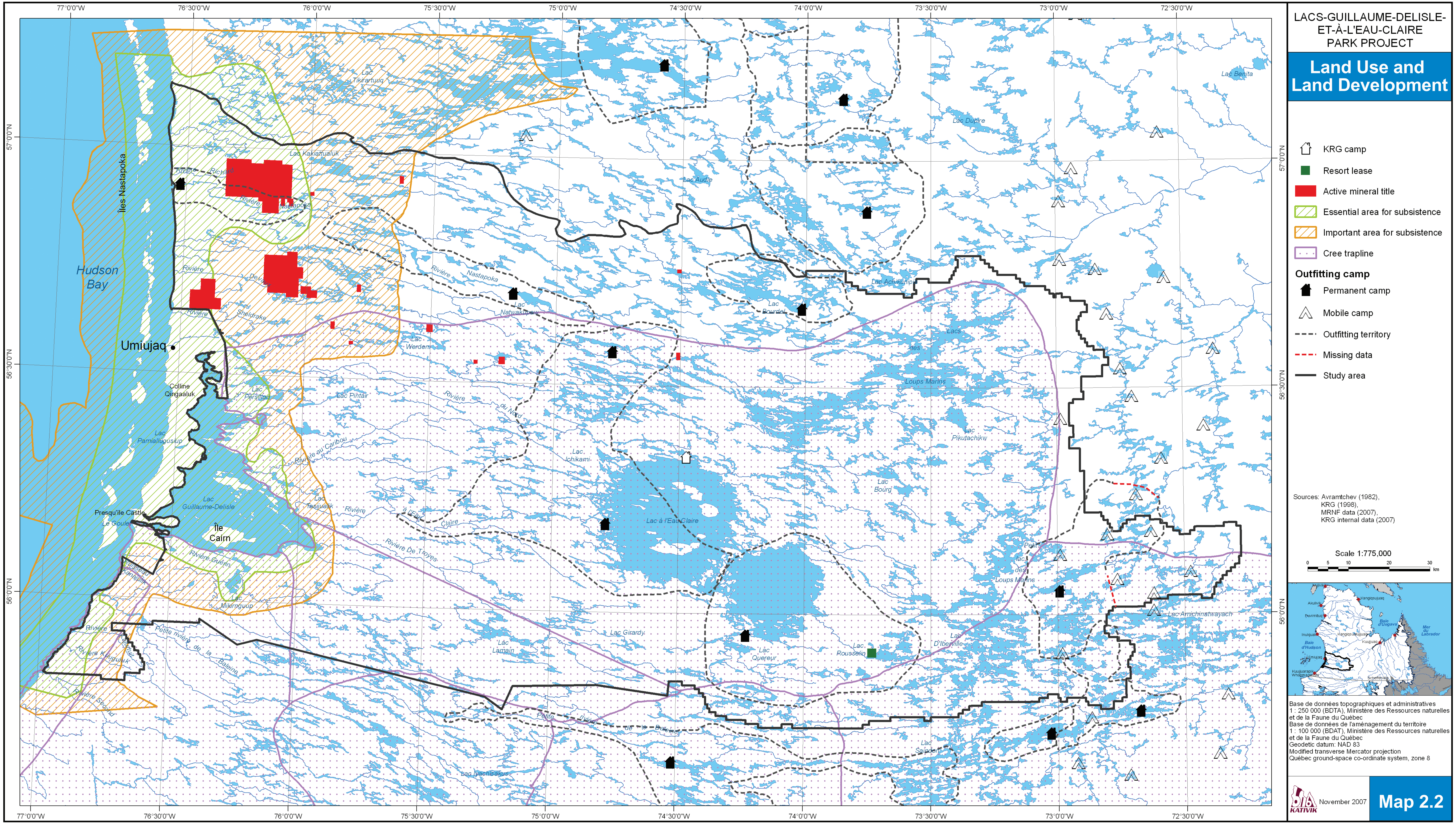
The traditional subsistence activities of the Inuit and the Cree are complex, strategic and opportune. Harvesting activities, such as hunting, are dependent on several factors including wildlife behaviour, the relationship between the environment and resources, environmental disturbances (Strata360, 2007), and so on. Due to this complexity, it is impossible to provide a comprehensive description of subsistence land use in this document. It should be noted that, in addition to Inuit from Umiujaq and Kuujjuarapik, Inuit from Inukjuak also make use of the study area for subsistence purposes.

The areas regularly used by Inuit beneficiaries for their hunting, fishing, and trapping activities are along the coast of Hudson Bay and rivers, as well as in and around Lac Guillaume-Delisle. These areas are characterized by high biological productivity (concentrations of belugas, spawning beds, calving and denning areas, foraging territories and nesting areas). Caribou hunting is practised as far inland as Lac à l'Eau Claire and the Category II lands north of the study area are used intensively for wildlife harvesting. Figures 2.2 to 2.5 provide an overall image of the seasonal land use by Inuit for subsistence purposes. The information for these figures was drawn from the Makivik Corporation's database and concerns current land use, which is to say land use since the 1970s (Lewis, 2006; Strata360, 2007).

The data on land use by the Cree is drawn from studies of the Cree Regional Authority carried out in 1991 and 2001. The 1991 study deals with all the land used by the Cree, while the 2001 study focuses essentially on land use along the coast, including the east shore of Lac Guillaume-Delisle. The time period covered by the two studies could not be established with certainty, but may date back to the 1930s (Strata360, 2007). The whole study area, along the coast and inland (Figure 2.6), is or has been used by the Cree for hunting and fishing. The Lac Guillaume-Delisle zone is still used by the Cree for ptarmigan and waterfowl harvesting, fishing, and egg gathering (on the lake's islands) (Strata360, 2007). The Lac à l'Eau Claire zone is still used by the Cree tallyman responsible for this zone.

ACCESS TO SUBSISTENCE HARVESTING AREAS

Access to subsistence harvesting areas takes several forms. The routes and camps used by Inuit are shown on Map 2.3. The information drawn from the Makivik Corporation's database concerns current camps and routes, which is to say those in use since the 1970s (Lewis, 2006). The information drawn from the KRG study on climate change in Nunavik shows


LACS-GUILLAUME-DELISLE-
ET-À-L'EAU-CLAIRE
PARK PROJECT
Land Use and
Land Development
KRG camp
Resort lease
Active mineral title
Essential area for subsistence
Important area for subsistence
Cree trapline
Outfitting camp
Permanent camp
Mobile camp
Outfitting territory
Missing data
Study area
Sources: Avramtchev (1982),
KRG (1998),
MRNF data (2007),
KRG internal data (2007)
Scale 1:775,000
0 5 10 20 30 km
Base de données topographiques et administratives
1 : 250 000 (BDTA), Ministère des Ressources naturelles
et de la Faune du Québec
Base de données de l'aménagement du territoire
1 : 100 000 (BDAT), Ministère des Ressources naturelles
et de la Faune du Québec
Geodetic datum: NAD 83
Modified transverse Mercator projection
Québec ground-space co-ordinate system, zone 8
KATIVIK
November 2007
Map 2.2
Hudson Bay
Îles Nastapoka
Umiujaq
Colline Qingaaluk
Lac Guillaume-Delisle
Presqu'île Castle
Le Goulet
Île Cairn
Lac à l'Eau Claire
Lac Tikirartuuq
Lac Kakiattualuk
Rivière Nastapoka
Lac Natwakupaw
Lac Werden
Lac Pihtair
Rivière au Caribou
Lac Ichikami
Lac Persillon
Lac Pamiallugsukup
Lac Mikinguup
Rivière Guérin
Rivière De Troyes
Lac Girardy
Lac Lamain
Lac Quereur
Lac Rousselin
Lac Bourg
Lac Pikutachikw
Loups Marins
Lac D'Iberville
Lac Amichinatwayach
Lac Bourdel
Lac Achikunipi
Lac Audie
Lac Duplre
Lac Benita
Lac Ivachisakus
Lac Saindon
Rivière Kuugaluk
Petite rivière de la Baleine
Rivière Sheldrake
Rivière Richard
77°0'0"W
76°30'0"W
76°0'0"W
75°30'0"W
75°0'0"W
74°30'0"W
74°0'0"W
73°30'0"W
73°0'0"W
72°30'0"W
57°0'0"N
56°30'0"N
56°0'0"N
Akulivik
Puvirnituq
Inukjuak
Umiujaq
Kuujjuarapik
Whapmagoostui
Kangiqsujuaq
Kuujjuaq
Baie d'Ungava
Mer du Labrador
Baie d'Hudson
Schefferville

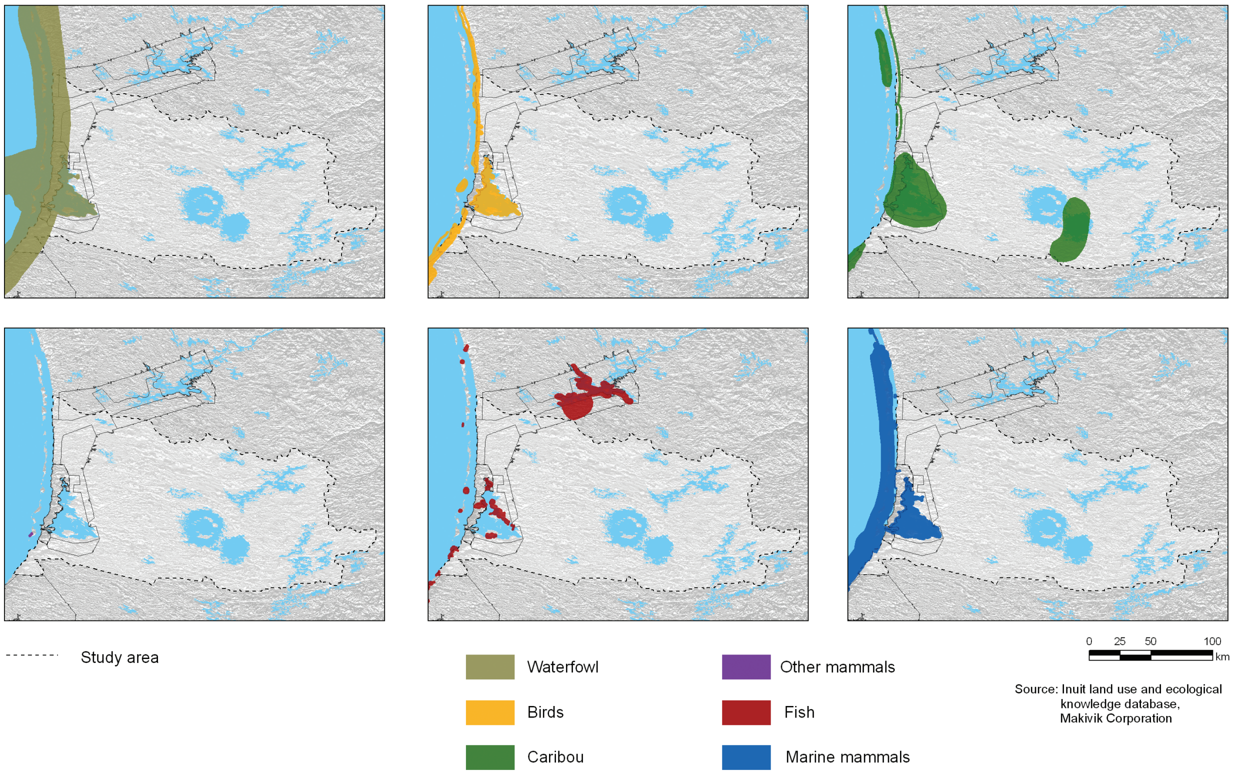


Figure 2.2 Overview of Inuit Land Use for Subsistence Harvesting, Spring

routes that were still being used in 2005, based on interviews with Inuit (Martin et al. 2006; 2007).

Regardless of the means of transportation, most travel is carried out along the coast of Hudson Bay to access Lac Guillaume-Delisle and the Rivière Nastapoka, as well as Lac Minto which lies outside of the study area. Several camps are used by Inuit on a seasonal basis.

Land use and occupation are closely tied to the environmental and ecological characteristics of the region. For example, the channel between Hudson Bay and Lac Guillaume-Delisle, Le Goulet, is subject to difficult conditions due to strong currents and tides. Access by water must therefore be carried out at times when current and tide conditions are conducive. In winter, ice conditions vary according to the location and the time of the season. Inuit and Cree travellers are obliged to assess these conditions whenever they travel (Strata360, 2007).

The Cree use inland subsistence harvesting areas more intensively than Inuit (Map 2.4). The Cree still have knowledge of canoe and foot routes through the study area, as well as portages. Today, the Cree use motorized canoes, instead of paddled canoes, and floatplanes to travel to areas that are remote and difficult to access. In winter, snowmobiles are used (Strata360, 2007). Cree camps are still used on a seasonal basis in the study area, as is the case at Lac à l'Eau claire.

Population and Services

POPULATION

According to the census completed by Statistics Canada in 2001, Nunavik's population totalled close to 10,000 inhabitants, of which Inuit represented 90%, living in 14 villages along the region's coasts (Statistics Canada, 2006). The population of these villages varies between 160 (Aupaluk) and 1930 (Kuujjuaq). The communities of Kuujjuaq, Inukjuak, Puvirnituq and Salluit combined account for close to 60% of the region's entire population. In 2001, Umiujaq ranked 10th with roughly 350 inhabitants and Kuujjuarapik ranked 6th with over 550 inhabitants. The population of Whapmagoostui was roughly 780 in 2001 (Table 2.1).

Nunavik's population is distinct from most other regions of Québec due to its youthfulness; the average age is 20. Close to 60% of inhabitants are under the age of 25, and roughly 40% are under the age of 15 (Makivik Corporation, 2000). In Nunavik, the average family comprises 4.3 individuals and more than 40% of families include five or more individuals (Makivik Corporation, 1999).

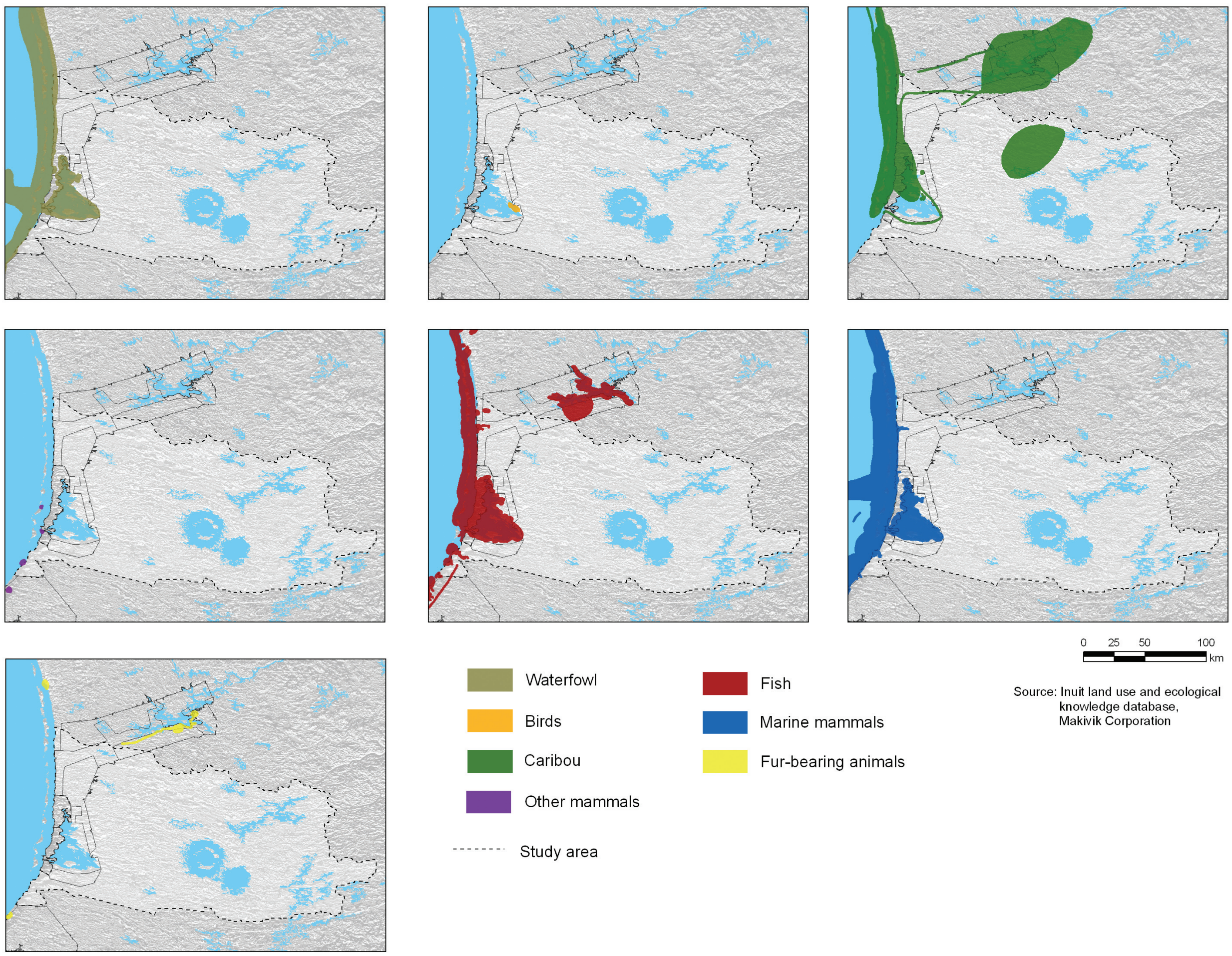
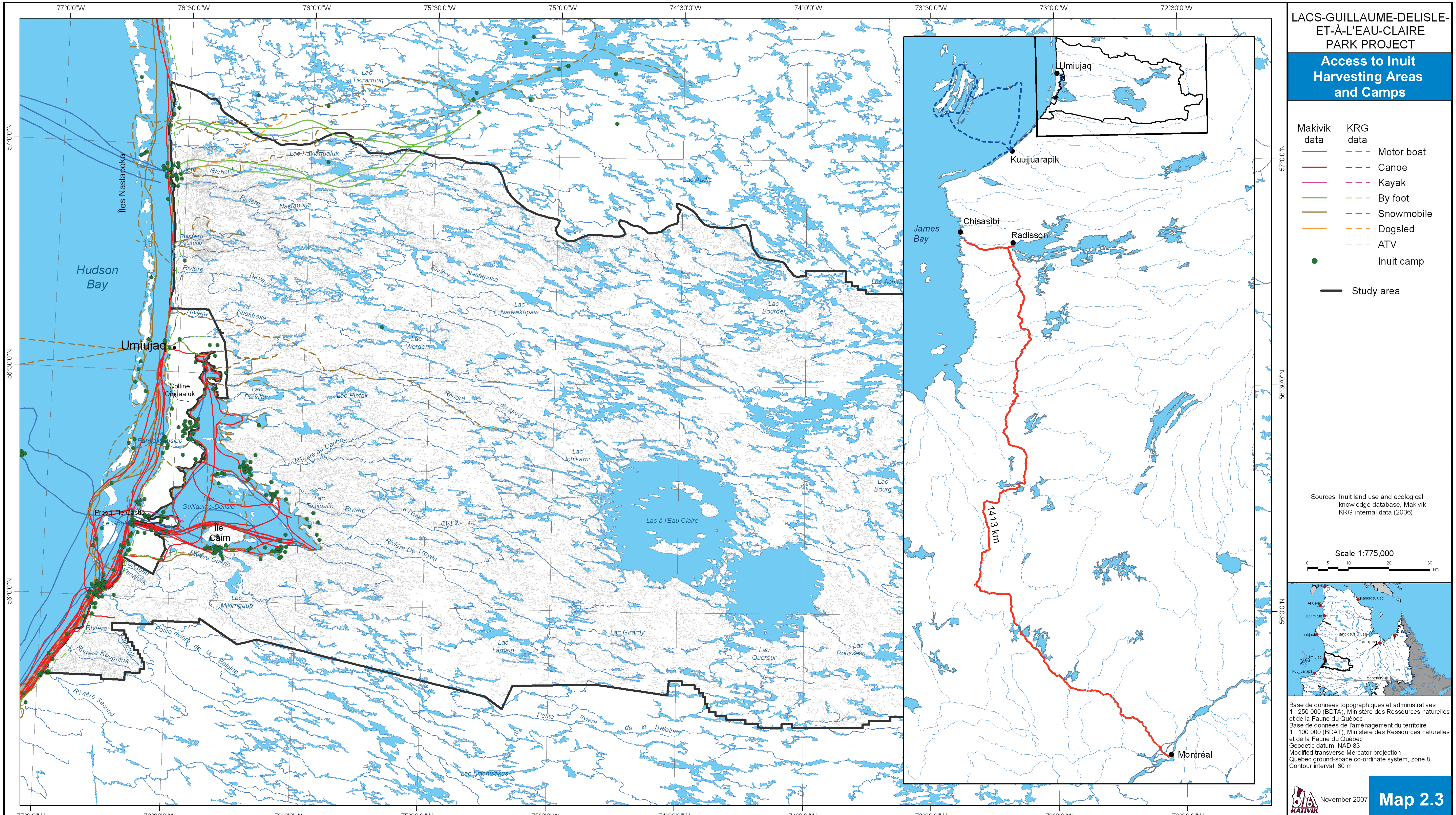


Figure 2.3 Overview of Inuit Land Use for Subsistence Harvesting, Summer

Table 2.1 Community Populations in Nunavik

	JUNE 1986[2]	JUNE 1991[2]	JUNE 1996[3]	2001[3]	POPULATION VARIATIONS BETWEEN 1996 AND 2001 (%)
Inukjuak	778	1 044	1 184	1 294	9.3
Kuujjuaq	1 066	1 405	1 726	1 932	11.9
Puvirnituq	868	1 091	1 169	1 287	10.1
Salluit	663	823	929	1 072	15.4
Kuujjuarapik[1]	616	605	579	555	-4.1
Umiujaq	59	284	315	348	10.5
Total Nunavik	**6 053**	**7 693**	**8 715**	**9 632**	**10.5**
Whapmagoostui	–	–	626[4]	778[4]	24.3[4]

Sources: (1): Population transfer with the creation of Umiujaq in 1986
(2): Census of Population (Cat. No. 93-304). Statistics Canada
(3): Community Profiles. Statistics Canada (2006)
(4): Population and Dwelling Counts, Canada, Provinces and Territories, and Census Subdivisions (Municipalities), 2001 and 1996 Censuses – 100% Data. Statistics Canada (2002)



LACS-GUILLAUME-DELISLE-ET-À-L'EAU-CLAIRE PARK PROJECT
Access to Inuit Harvesting Areas and Camps
Makivik data
KRG data
Motor boat
Canoe
Kayak
By foot
Snowmobile
Dogsled
ATV
Inuit camp
Study area
Sources: Inuit land use and ecological knowledge database, Makivik
KRG internal data (2006)
Scale 1:775,000
Base de données topographiques et administratives 1 : 250 000 (BDTA), Ministère des Ressources naturelles et de la Faune du Québec
Base de données de l'aménagement du territoire 1 : 100 000 (BDAT), Ministère des Ressources naturelles et de la Faune du Québec
Geodetic datum: NAD 83
Modified transverse Mercator projection
Québec ground-space co-ordinate system, zone 8
Contour interval: 60 m
November 2007
Map 2.3
Hudson Bay
Îles Nastapoka
Umiujaq
Colline Qingaaluk
Lac Guillaume-Delisle
Île Cairn
Presqu'île Castle
Lac Tikirartuuq
Lac Kakiattualuk
Rivière Nastapoka
Rivière Sheldrake
Lac Persillon
Lac Pintair
Rivière au Caribou
Lac Tasijualik
Rivière à l'Eau Claire
Rivière De Troyes
Rivière Guérin
Lac Mikirnguup
Lac Natwakupaw
Lac Werden
Rivière du Nord
Lac Ichikami
Lac à l'Eau Claire
Lac Bourdel
Lac Bourg
Lac Audie
Lac Girardy
Lac Lamain
Lac Quéreur
Lac Rousselin
Petite rivière de la Baleine
Rivière Kuuguluk
Rivière Second
Kuujjuarapik
James Bay
Chisasibi
Radisson
1413 km
Montréal
Schefferville

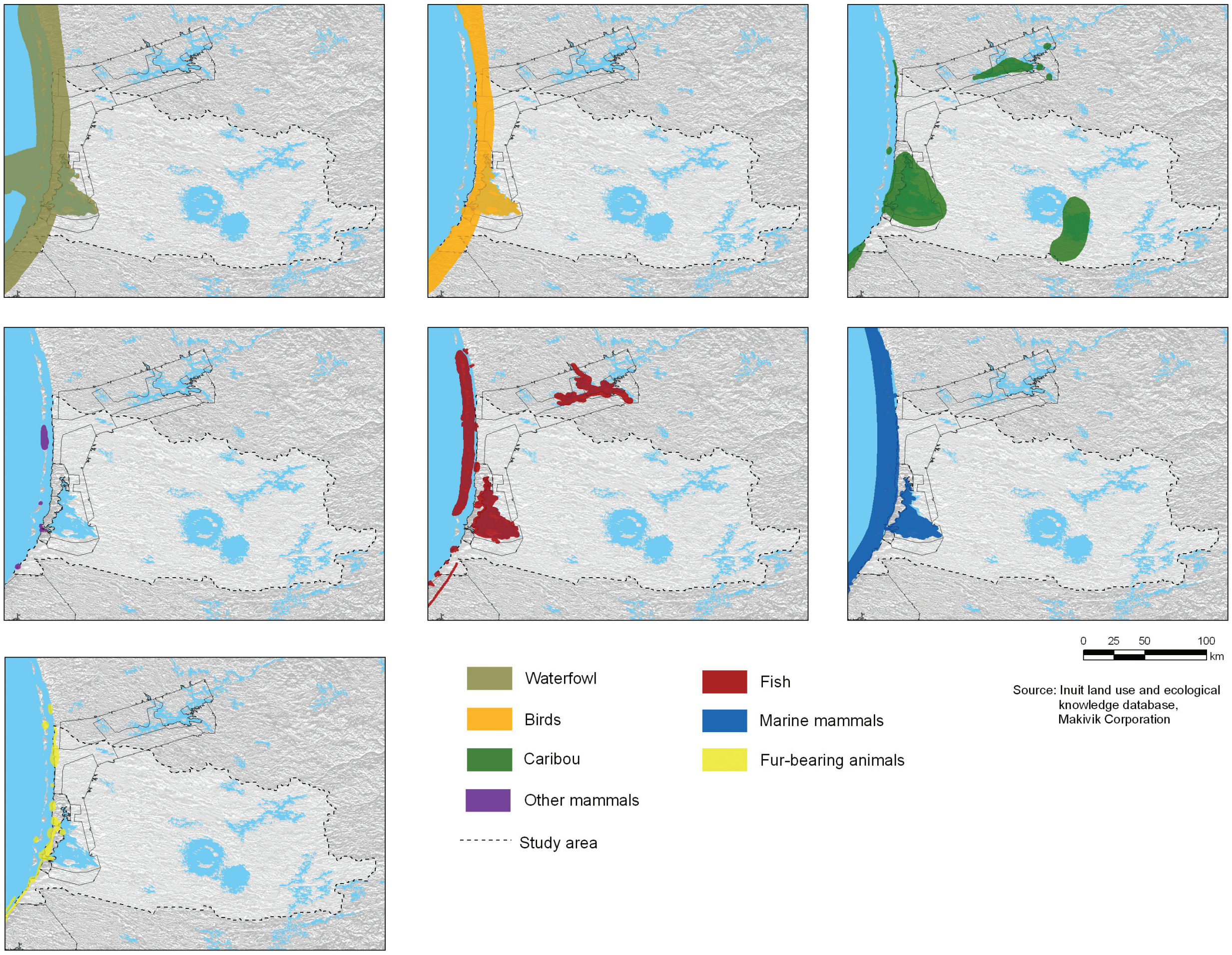


Figure 2.4 Overview of Inuit Land Use for Subsistence Harvesting, Autumn

Inuktitut is the language most often spoken in the communities and it is taught at elementary and secondary levels. Many Inuit are also able to communicate in English or French. At school, Inuktitut is the language of instruction until the end of grade 2. In grade 3, Inuktitut is the language of instruction for the first half of the year and then English or French, as decided by each child and his/her parents. As of grade 4, courses are taught solely in English or French, although Inuktitut continues to be taught during Inuit language and cultural classes. Nunavik's regular school population is over 3000 students, which is to say roughly a third of the total population.

SERVICES

Public services are delivered in every village of Nunavik, along with telecommunication and television broadcasting services. The public services delivered in each village are comparable with those delivered in municipalities elsewhere in Québec, and include: drinking water, wastewater and solid waste management, road and land planning, power, airports, churches, elementary and secondary schools, nursing stations, police stations, post offices, childcare centres, community radio stations, sports centres, and others.

Access and Transportation Infrastructure

It will be possible to access the future park by aircraft or by a combination of transportation means (road, aircraft, boat, snowmobile). The road between Montréal and Radisson is roughly 1413 km. The closest community to the future park is Umiujaq, and it may be accessed by aircraft from Québec [Quebec City], Montréal and Radisson. As the crow flies, the distances between the various centres are:

From Umiujaq:

Kuujjuarapik: 163 km
Radisson: 315 km
Montréal: 1250 km
Québec: 1143 km

From Kuujjuarapik:

Umiujaq: 163 km
Radisson: 165 km
Montréal: 1125 km
Québec: 1050 km

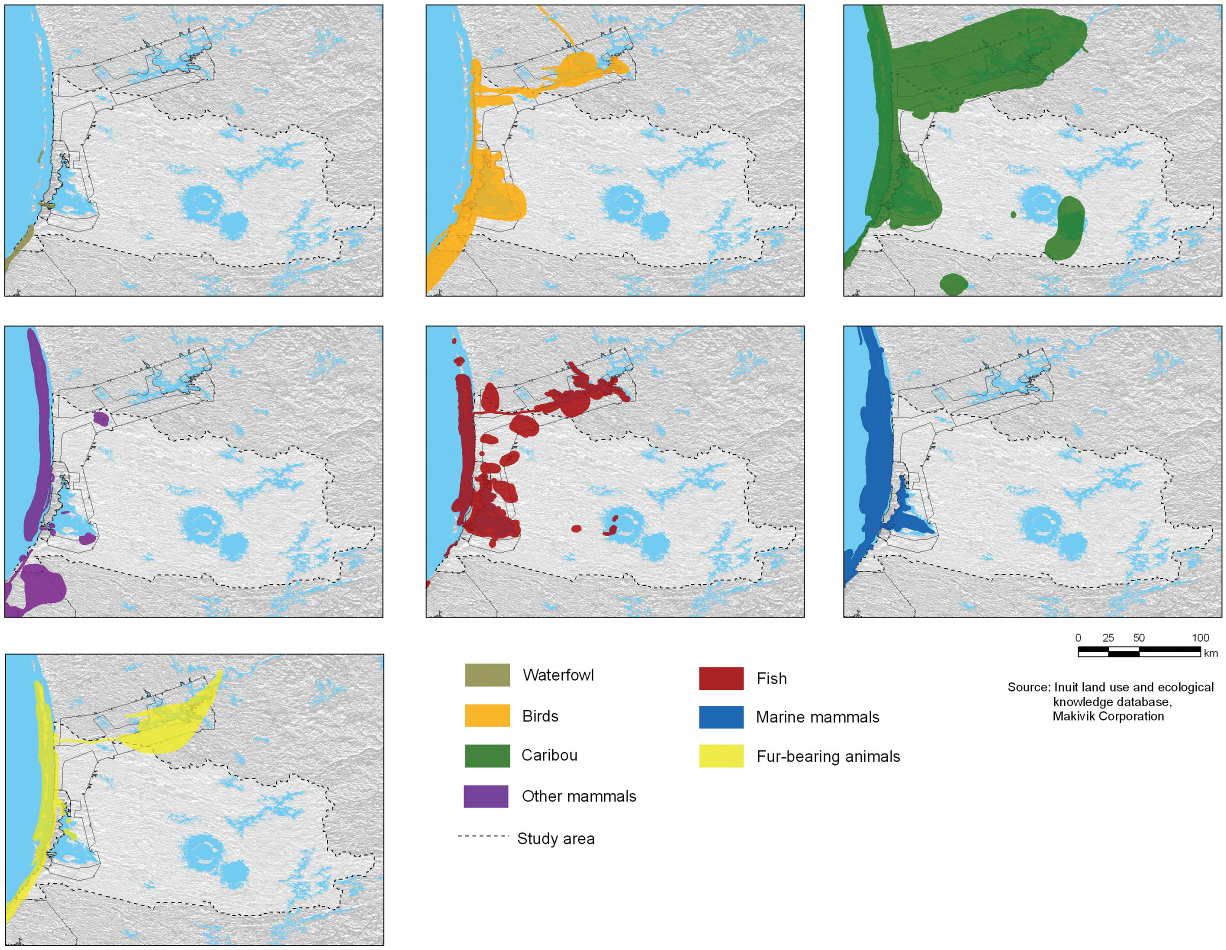


Figure 2.5 Overview of Inuit Land Use for Subsistence Harvesting, Winter

AIR TRANSPORTATION

Nunavik may be accessed mainly by air and each village possesses an airport. First Air offers daily flights between Montréal and Kuujjuaq while Air Inuit offers regular flights between Québec or Montréal to La Grande (airport for Radisson), Kuujjuarapik or Kuujjuaq. Passengers and cargo for other Nunavik destinations depart from the three latter airports. Connections are also ensured from Puvirnituq and Salluit. The airline Air Creebec connects Montréal and Whapmagoostui.

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. Local residents also use water routes to travel to neighbouring communities and harvesting areas.

ROAD TRANSPORTATION

No roads connect Nunavik's villages to one another or to the provincial road network. The roads of each village total only a few kilometres. Nonetheless, snowmobile and all-terrain vehicle trails, according to the season, link certain villages and offer access to harvesting areas.

As well, a road running not less than 10 km east from Umiujaq permits access to the area north of Lac Guillaume-Delisle. Certain sections of the road nonetheless need to be completed or upgraded.

ACCESS ROUTES TO THE FUTURE PARK

Various means of transportation may provide access to the future park. From Umiujaq and Kuujjuarapik, Lac Guillaume-Delisle is accessible by boat, kayak, dogsled and snowmobile according to the season (maps 2.3 and 2.4). An airstrip exists at Lac à l'Eau Claire next to the KRG camp, and several outfitting camps in the study area are accessible by floatplane.

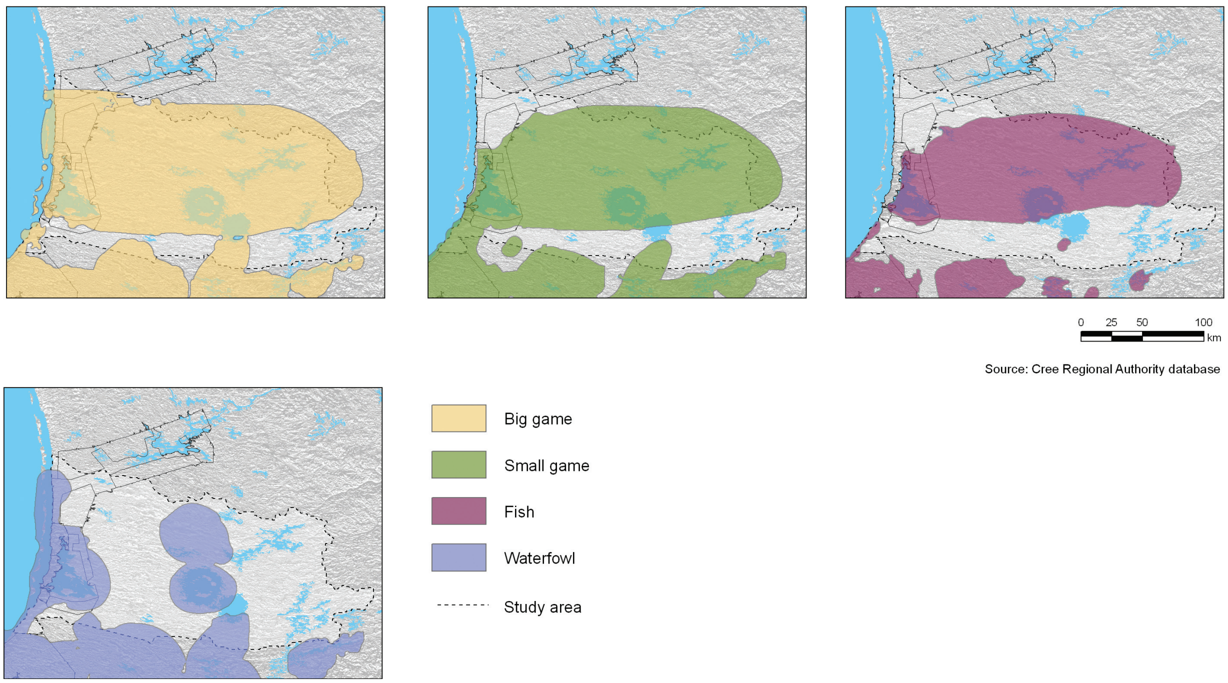


Figure 2.6 Overview of Cree Land Use for Subsistence Harvesting

Economic Activity

MARKETS

Nunavik is developing slowly and its poor economic performance is due to climate-related obstacles, scattered resources, as well as the region's remoteness from major markets and its reliance on government assistance (KRG, 1998).

Seventy percent of the region's economic activity 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 resource exploitation and construction sectors (Makivik, 1999). The labour market is characterized by a high number of casual and part-time positions.

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). These projects are in addition often detrimental to the environment and wildlife, two essential elements of the Inuit way of life. The Raglan mine (Xstrata Nickel) is the only mine in operation in Nunavik and its operations permit royalties to be paid to the communities most affected by the mine and to the other communities of the region in general[12].

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.

In Nunavik, outfitting activities are concentrated between the 55th and 58th parallels. On an annual basis, these activities draw between 2500 and 3000 visitors to the region; 80% of this clientele is American. Between 1991 and 2000, the outfitting market increased by 25% (FAPAQ, 2002). Outfitting activities take place for the most part in the fall and consist of one-week packages, 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 performance of regional tourism businesses.

Inventory and analysis work related to potential tourism products based in Nunavik's communities has identified several emerging eco-tourism projects, including adventure products such as dogsledding, snowmobiling, kayaking, boating, canoeing, cultural experiences, wildlife observation, etc. (Gestion Conseil J.-P. Corbeil Inc., 1998). The park project is in line with this trend and will increase the region's tourism offer.

Table 2.2 Jobs, Unemployment and Income in Nunavik in 2001

	UNEMPLOYMENT RATE (%)	MEDIAN INCOME FOR INDIVIDUALS AGED 15 AND OLDER ($)
Kuujjuarapik	13.0	16.939
Umiujaq	17.4	16.016
Whapmagoostui	12.1	18.912
Nunavik	16.2	16.541 *
Québec	8.1	20.665

Source: Statistics Canada (2006)

* Excluding Aupaluk and Tasiujaq (data not available)

JOBS, UNEMPLOYMENT AND INCOME

In June 2001, the unemployment rate in Québec was 8% while in Nunavik the rate was much higher at 16%. The unemployment rates that same year in the communities of Umiujaq, Kuujjuarapik and Whapmagoostui were 17%, 13% and 12% respectively. The income of individuals aged 15 and over was also lower in Nunavik compared with Québec. Personal income in Inuit communities was roughly $4000 less than in the province as a whole, where the median income was above than $20,500 (Table 2.2).

ENDNOTES

1 *Act respecting the Makivik Corporation*, R.S.Q., c. S-18.1

2 *Act respecting Northern Villages and the Kativik Regional Government*, R.S.Q., c. V-6.1, hereafter the Kativik Act

3 *Act respecting the Land Regime in the James Bay and New Québec Territories*, R.S.Q., c. R-13.1

4 JBNQA, R.S.Q. c. C-67, subsect. 24.3

5 *Act respecting Hunting and Fishing Rights in the James Bay and New Québec Territories,* R.S.Q., c. D-13.1, section 21

6 JBNQA, R.S.Q., c. C-67, para. 24.3.6

7 Essential area for subsistence: an area essential for the communities and for the practice of subsistence activities, consisting of habitats of high biological productivity and indispensable for the survival of wildlife.

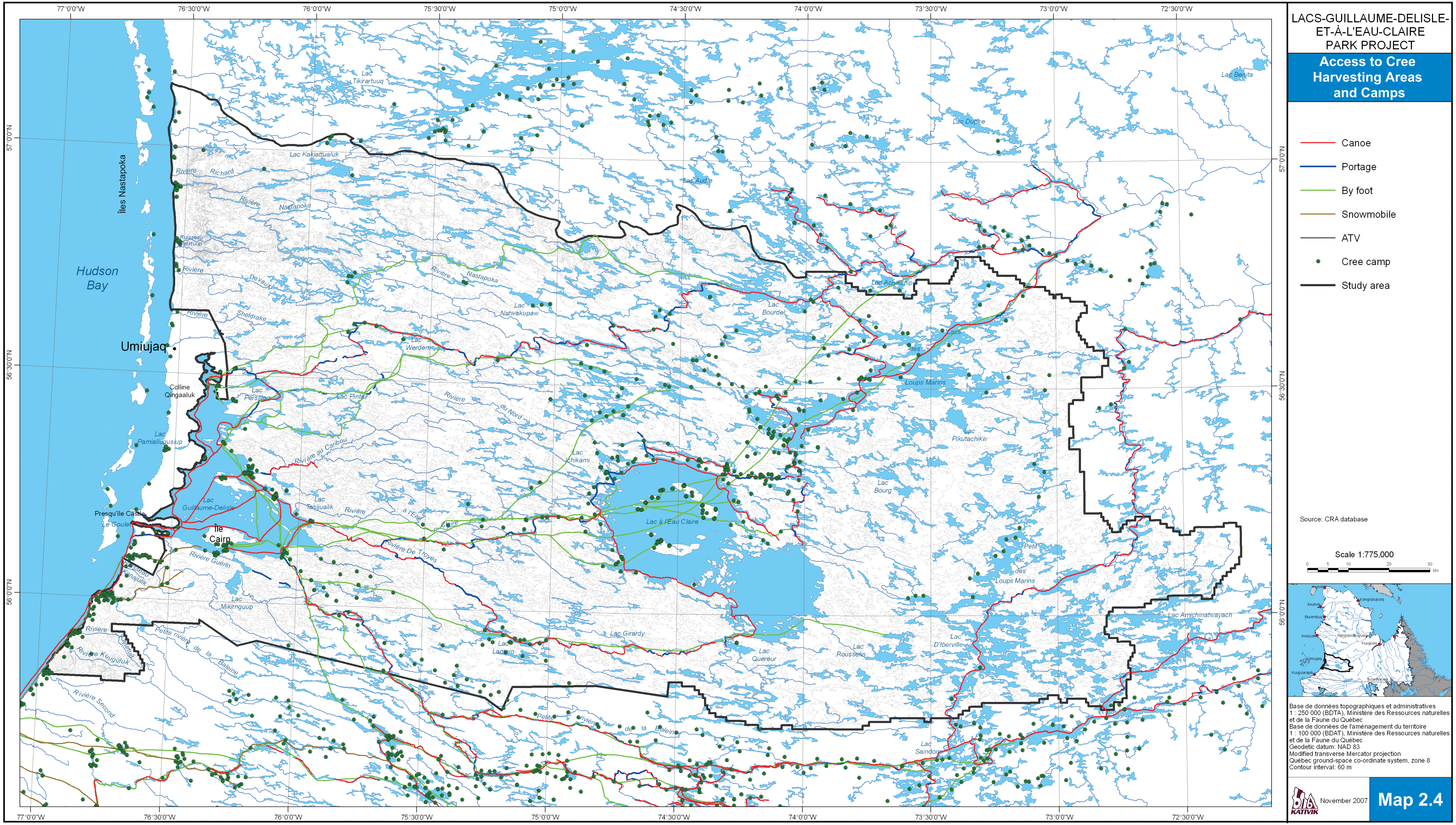
8 Important area for subsistence: an area important for the communities and for the practice of subsistence activities, consisting of less biodiversity than an essential area for subsistence.

9 Ministerial order nos. 91-192 and 92-170, concerning the prohibition of map designation, mineral exploration and mining in areas north of the 49th parallel, in Northern Québec *(Gazette officielle du Québec,* 1991; 1992)

10 Cree trapline: an area where the activities related to the exercise of the right to harvest are by tradition carried on under the supervision of a Cree tallyman (R.S.Q., c. D-13.1, sect. 1, subsect. (r)).

11 Cree tallyman: a Cree person recognized by a Cree community as responsible for the supervision of the activities related to the exercising of the right to harvest on a Cree trapline (R.S.Q., c. D-13.1, sect. 1, subsect. (n)).

12 Royalties are allocated as follows: 45% to the community of Salluit, 30% to the community of Kangiqsujuaq and 25% to the region.


LACS-GUILLAUME-DELISLE-
ET-À-L'EAU-CLAIRE
PARK PROJECT
Access to Cree
Harvesting Areas
and Camps
Canoe
Portage
By foot
Snowmobile
ATV
Cree camp
Study area
Source: CRA database
Scale 1:775,000
0 5 10 20 30
km
Base de données topographiques et administratives
1 : 250 000 (BDTA), Ministère des Ressources naturelles
et de la Faune du Québec
Base de données de l'aménagement du territoire
1 : 100 000 (BDAT), Ministère des Ressources naturelles
et de la Faune du Québec
Geodetic datum: NAD 83
Modified transverse Mercator projection
Québec ground-space co-ordinate system, zone 8
Contour interval: 60 m
KATIVIK
November 2007
Map 2.4
77°0'0"W
76°30'0"W
76°0'0"W
75°30'0"W
75°0'0"W
74°30'0"W
74°0'0"W
73°30'0"W
73°0'0"W
72°30'0"W
57°0'0"N
56°30'0"N
56°0'0"N
Hudson
Bay
Îles Nastapoka
Umiujaq
Colline
Qingaaluk
Lac
Pamiallugusiup
Presqu'île Castle
Le Goulet
Île
Cairn
Lac
Guillaume-Delisle
Lac
Tikirartuuq
Lac Kakiattualuk
Rivière Richard
Rivière Nastapoka
Rivière Devaux
Rivière Sheldrake
Lac
Natwakupaw
Lac
Werden
Lac
Persillon
Lac Pintail
Rivière du Nord
Rivière au Caribou
Lac
Tasiujualik
Rivière à l'Eau Claire
Rivière De Troyes
Rivière Guérin
Lac
Mikirnguup
Rivière Kuuguluk
Petite rivière de la Baleine
Rivière Second
Lac
Ichikami
Lac à l'Eau Claire
Lac Girardy
Lac
Lamain
Lac
Audie
Lac
Bourdel
Lac Achikunipi
Lac
Queneur
Lac
Rousselin
Lac
Bourg
Lac
Pikutachikw
Lacs
des
Loups Marins
Petit
lac
des
Loups Marins
Lac
D'Iberville
Lac Amichinatwayach
Lac
Saindon
Lac Duplre
Lac Benita
Petite rivière de la Baleine

3 PHYSICAL ENVIRONMENT

The study area for the Park Project totals 26,909 km^2. It stretches from the east coast of Hudson Bay to Lacs des Loups Marins [Upper Seal Lake] across one of the oldest portions of the Canadian Shield (Bostock, 1970) and includes arctic and hemi-arctic climatic zones (Rousseau, 1968).

The bedrock in the study area was initially flattened by erosion, creating a vast peneplain that lifted and fragmented to form the Hudson Plateau (Hocq, 1994). The unique geological elements that mark the area are the Lac Guillaume-Delisle graben [Richmond Gulf], the cuestas that stand along the coast of Hudson Bay and the meteorite craters of Lac à l'Eau Claire [Clearwater Lake].

Barely 10,000 years ago, the region was covered by continental glaciers that reworked surfaces and caused Hudson Bay to flood a part of the region. Unconsolidated deposits from the Quaternary cover the ancient rock structure and have created a varied and complex drainage pattern.

The glacial period was followed by a periglacial climate and the study area is situated in a permafrost zone (Brown, 1979; Allard and Seguin, 1987a, 1987b). In addition to the climatic agents that contribute to the evolution of the topography, marine and fluvial processes have been playing a dynamic role locally since the retreat of the continental ice sheets.

Climatic warming in the Northern hemisphere shows few signs in Nunavik in terms of air and lake water temperatures. These signs are however expected to intensify in the future (Serreze et al., 2000; Pienitz et al., 2004). Anticipated impacts include the early break-up of the ice-pack, changes in wildlife migratory routes, permafrost thawing and ground movement (Lafortune et al., 2004; Tremblay et al., 2006).

Climate

As no weather stations are found in the study area, statistically valid and representative regional climate information has been derived from data produced in Kuujjuarapik and Inukjuak, to the south and north of Umiujaq respectively. Climate information has also been derived from extrapolations and interpolations of data produced elsewhere in Nunavik and Canada.

The magnitude of the study area and its environmental diversity explain the climatic variations that exist between the study area's coastal, inland (valleys and plateau), and Lac à l'Eau Claire sectors. Wind chill is a year-round climatic factor.

CLIMATE OF NUNAVIK

Nunavik's climate is influenced by air masses, topography, and large water bodies (Table 3.1). The freeze-up of Hudson Bay and Ungava Bay in winter, combined with the region's topography, stimulates polar conditions inland. Snow generally melts in June throughout Nunavik (Allard et al., 1991). The late break-up of the ice-pack and cold sea currents can delay summer warming.

Despite warming trends, Nunavik's climate remains harsh, due to limited total annual sunshine and the nearness of polar air masses. Figures 3.1 to 3.4 illustrate climatic factor trends in Northern Québec as well as more southerly regions. From south to north, annual average temperatures in Nunavik range from -5°C to -10°C, with almost three times less precipitation in the North compared with southern Québec.

CLIMATE OF THE STUDY AREA

According to the bio-climatic classification proposed by Rousseau (1968), the arctic zone begins north of Lac à l'Eau Claire and Lac Guillaume-Delisle, west of Lacs des Loups Marins, and the hemi-arctic zone covers the rest of the study area.

Winter receives the most sunshine while atmospheric conditions are stable. Ice cover on Hudson Bay contributes to this stability, but simultaneously stymies the moderating effect of the sea. Air masses from the west carry anti-cyclonic conditions: cold, dry and windy (Wilson, 1968). Warm air over the Hudson Bay ice-pack on the other hand generates heavy fog (Klock et al., 2000). The late break-up of the ice-pack (June–July) and the cold sea currents delay warming along the coast. Maritime conditions characterize the summer including heavy rain, frequent fog and cyclonic conditions.

Summer is short and repeated arctic fronts along the coast of Hudson Bay create unstable atmospheric conditions. Once the ice-pack has disappeared, the water of Hudson Bay

Table 3.1 Main Geographic Factors Impacting on Climate

FACTORS	TEMPERATURES	CLOUDS AND FOG	WINDS	PRECIPITATIONS
Proximity to water bodies	Mild autumn and winter Cooler spring and summer	More frequent	Stronger and less gusting	More frequent in fall and winter (no impact if water is frozen)
Valleys	Warmer than the plateau during daytime Cooler than the plateau during night time	More convection-created fog in small valleys	Strong if in the same direction as the valley Weak if perpendicular to the direction of the valley	Greater if the prevailing winds are perpendicular to the direction of the valley
Mountains	Cooler as elevation increases	More frequent	Stronger, extremely variable and more gusting	Heavier and more frequent on slopes exposed to the wind

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

warms, leading to frequent fog along the coast (Klock et al., 2000). Autumn arrives early and is characterized by repeated overnight frost. Hudson Bay begins to freeze over at the start of November, reducing atmospheric humidity and snowfall. A microclimate exists in the Lac Guillaume-Delisle sector; high cuestas provide natural protection against the cold winds that blow across Hudson Bay and serve to moderate the local climate.

Wide discrepancies in daylight hours according to the season are another typical element of the North. At the 56th parallel, which passes through the southern part of the study area, the winter solstice is marked by six hours of daylight and the summer solstice by 17 hours and 37 minutes. In other words, there is almost three times more daylight in summer compared with winter (FAPAQ, 2003).

Further information on certain climatic factors along the coast of Hudson Bay is shown in tables 3.2 and 3.3. This data, combined with the information in the preceding figures, shows that regional climatic variation is greater in the south than in the north as well as in the west compared with the east. In the study area, this variation produces a more moderate climate in the valleys where vegetation is continuous and more diversified than on the tops of hills which are either covered with stunted spruce (krummholz) or are altogether bare of trees.

TEMPERATURES

The annual average temperature in the study area is below -5°C, with inland zones recording slightly colder temperatures than coastal zones (Figure 3.1). Because the annual average temperature is below 0°C, the study area is characterized by permafrost (Allard and Seguin, 1987a, 1987b). The average temperature in January and February is -24°C and daily lows can reach -50°C.

In May and June, the average temperature climbs above 0°C and by July and August reaches close to 10°C. During this season, daily highs around 30°C and lows around 5°C may be recorded. Variations in temperature can therefore be quite large during the course of even a single day (tables 3.2 and 3.3).

The frost-free season lasts roughly 70 days in the Lac Guillaume-Delisle sector and roughly 50 days in the Lac à l'Eau Claire sector. The annual growing season in the study area is roughly 100 days long. The first frosts arrive in September and winter freezing occurs between the middle of October and the middle of November.

The annual number of degree-days above 5°C (the temperature at which vegetation can grow) is roughly 600 (Environment Canada, 2004; Natural Resources Canada, 2006). In the area of Montreal, roughly 2000 degree-days above 5°C are recorded annually.

PRECIPITATIONS

In the Lac à l'Eau Claire sector, annual precipitation totals between 600 and 650 mm, while on the coast of Hudson Bay it totals roughly 600 mm. Snowfall represents 37% of total annual precipitation (data for Kuujjuarapik; Environment Canada, 2004).

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)

Table 3.2 Climatological Normals at Kuujjuarapik between 1971 and 2000

Latitude: 55°16′N Longitude: 77°45′W Altitude: 10.4 m

	JANUARY	FEBRUARY	MARCH	APRIL	MAY
TEMPERATURE					
Daily average (°C)	-23.4	-23.2	-17.3	-7.6	1.3
Daily high (°C)	-18.8	-17.6	-11.3	-2.3	5.8
Daily low (°C)	-27.9	-28.6	-23.3	-12.8	-3.2
Record high (°C)	3.3	25.3	11.1	21.9	32
Record low (°C)	-49.4	-48.9	-45	-33.9	-25
Degree-days above 5°C	0	0	0.1	2.2	30.4
PRECIPITATION					
Rainfall (mm)	0.1	0.5	2	6.4	21.3
Snowfall (cm)	28.7	22.6	19.1	17.8	14.2
Total precipitation (mm)	27.6	22.2	20.5	23.6	35.1
Average snow cover (cm)	34	40	40	26	3
WIND					
Average wind speed (km/h)	17.2	15.6	15	15.1	14.9
Prevailing wind direction	E	E	E	N	N
Record wind speed (km/h)	84	74	64	80	68
Record gusting speed (km/h)	108	106	95	105	89
Record wind-chill (°C)	-62.6	-62.3	-58.8	-44.5	-30.2
TOTAL HOURS OF DAYLIGHT	69.1	116.7	160.2	172.6	172.4

Source: Environment Canada (2004)

Between 1971 and 2000, total annual precipitation in Kuujjuarapik and Inukjuak was 648 mm and 460 mm respectively (tables 3.2 and 3.3). Nearly 74% of total annual precipitation falls between June and November. Snowfall occurs at the beginning of the winter at the same time that Hudson Bay and James Bay begin to freeze over (Bégin, 2001). Ice cover reduces precipitation by eliminating a major source of atmospheric humidity.

WINDS

Average wind speed is situated between 16 and 20 km/h along the coast of Hudson Bay, and is less than 16 km/h inland (Environment Canada, 2004). At Inukjuak, winds blow most often from Hudson Bay between June and February and from the northeast (and north) between March and June. At Kuujjuarapik, winds blow most often from the land (east) between November and March, from the north between April and June, and from the west and south between July and October.

Maximum wind speeds exceed 60 and 70 km/h each month and can reach 97 km/h (in November). Maximum gusting (sudden, brief increases in wind speed) is often greater than 100 km/h (tables 3.2 and 3.3). Taking into account the wind chill factor, extreme temperatures of -60°C have been recorded in Inukjuak and Kuujjuarapik.

WATER FREEZE-UP AND ICE BREAK-UP

Lakes in the study area freeze over before November 1 and re-open late in June (OPDQ, 1983). Lakes are free of ice for roughly 130 days annually. The break-up of the ice on Lac à l'Eau Claire may occur later than on smaller lakes since major

JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	YEAR
7	10.6	11.4	7.4	2.1	-5	-16.2	-4.4
12.1	15.5	15.7	10.7	4.7	-2.2	-12.2	0
1.8	5.7	7	4	-0.7	-7.8	-20.1	-8.8
33.9	33.3	33.3	33.9	23.9	11.8	7.2	
-7.8	-2.2	-1.1	-6.1	-15	-28.9	-46.1	
102	177.3	196.7	86.4	12.1	0.7	0	608
54.8	79.4	91.5	99	49.5	10	0.5	414.8
4.7	0.1	0	3.4	32.3	56.1	42.4	241.3
60	79.4	91.5	102.7	80.9	64.3	40.8	648.5
0	0	0	0	2	12	25	15
14.6	14.4	16.1	19.2	19.9	21.5	19.7	16.9
N	SW	W	W	S	E	E	E
64	72	77	82	80	97	84	
98	111	105	101	109	113	105	
12.2	-7.5	-5.4	-9.7	-21.3	-38	-56.4	
195.8	197	166.7	87.2	57.6	35.9	46.5	1477.7

winds can lead to the formation of thicker ice, up to 1.5 m thick (Bégin and Payette, 1989).

Lac Guillaume-Delisle is frozen over from the middle of December to the middle of June, which is to say for a shorter period of time than the study area's freshwater lakes (Von Mörs and Bégin, 1993). This shorter period is attributable to factors such as tides, the sediments carried by the rivers that empty into the lake and their currents, the higher salinity of the water, as well as the local microclimate. The strong and continuous movement of water through Le Goulet, which connects Lac Guillaume-Delisle and Hudson Bay, prevents ice from forming at this location.

Rivers generally freeze over between November 20 and December 1, and ice break-up occurs at the beginning of June. The data appearing in figures 3.1 and 3.3 suggest that freeze-up takes place a little earlier inland than on the coast, and that break-up occurs slightly later.

Along the coast of Hudson Bay in the study area, freeze-up occurs around the middle of December and the ice-pack breaks up in the middle of July. The average thickness of the ice-pack along the east coast of Hudson Bay is estimated at 1.5 m (Hydro-Québec, 1993b). Scattered blocks of ice may be found floating along Nunavik's northern coast up until the middle of August.

CLIMATE CHANGE

A recent period of climatic cooling known as the Little Ice Age (between 1550 and 1850) has been followed by significant warming. Permafrost deterioration which occurred

Table 3.3 Climatological Normals at Inukjuak between 1971 and 2000

Latitude: 58°28'N Longitude: 78°04'W Altitude: 24.4 m

	JANUARY	FEBRUARY	MARCH	APRIL	MAY
TEMPERATURE					
Daily average (°C)	-24.8	-25.8	-21.2	-11.7	-1.9
Daily high (°C)	-21	-21.6	-16.3	-7.1	1.2
Daily low (°C)	-28.6	-29.9	-26.1	-16.3	-5.1
Record high (°C)	0.6	5	3.9	7.2	23.3
Record low (°C)	-46.1	-49.4	-45	-34.4	-25.6
Degree-days above 5°C	0	0	0	0	2
PRECIPITATION					
Rainfall (mm)	0	0.1	0.1	3.6	12.6
Snowfall (cm)	15	12	16.1	19.4	14.6
Total precipitation (mm)	14.4	11.6	15.5	22.6	27
Average snow cover (cm)	34	39	44	48	25
WIND					
Average wind speed (km/h)	18.3	18	18.1	20.5	20.1
Prevailing wind direction	W	SW	NE	NE	NE
Record wind speed (km/h)	80	89	84	97	74
Record gusting speed (km/h)	100	97	96	117	85
Record wind-chill (°C)	-60.3	-57.7	-54.8	-45.6	-36.3
TOTAL HOURS OF DAYLIGHT	63.5	122.5	182.5	183.2	159.4

Source: Environment Canada (2004)

south of Inukjuak at the end of the 19th century was likely caused by increased temperatures and snowfall (Payette and Delwaide, 2000).

Temperatures have risen about 0.25°C in the North over the past 40 years (Serreze et al., 2000), reaching their highest levels in 400 years. Nonetheless, the climatic warming affecting the western Arctic has been less severe in Nunavik due to the cold seas and ice-packs that surround the region and serve to regulate its climate. At the weather stations in Kuujjuarapik and Inukjuak a cooling of a few tenths of a degree have been recorded for the periods of 1951 to 1980 and 1971 to 2000 (Environment Canada, 1982; Environment Canada, 2004).

At Umiujaq in recent years, less snowfall inland as well as an increasingly unstable ice-pack and its early break-up have been observed (Lafortune et al., 2004; Tremblay et al., 2006).

Climate models forecast a milder climate and more snowfall in the North, specifically in Arctic regions, by the end of the century. Certain models furthermore forecast that annual average temperatures will be from 2 to 4°C higher by 2050 compared with today (Scott and Suffling, 2000).

Physiography

According to the physiographic classification produced by the Ministère du Loisir, de la Chasse et de la Pêche [recreation, hunting and fishing] (1986; Figure 1.2), the study area straddles three natural regions of Québec: the Hudson Plateau (natural region B37) which covers most of the study area, the Hudson Cuestas (natural region B38) encompassing the Lac Guillaume-Delisle graben, and finally the southwest corner of the Ungava Plateau (natural region B39) including the western portion of the Rivière Nastapoka [Nastapoka River]

JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	YEAR
4.6	9.4	9.2	5.1	-0.3	-7.4	-18.9	-7
8.4	13.2	12.5	7.7	2	-4.2	-15	-3.4
0.8	5.5	5.9	2.5	-2.6	-10.6	-22.7	-10.6
30	27.8	25.6	22.8	16.7	8.3	16.1	
-9.4	-6.7	-2.8	-11.1	-22.8	-33.9	-43.3	
46	139.4	131.3	35.7	1.2	0	0	355.7
33.6	59.5	61	62.2	28.2	3.2	0.4	264.6
4.4	1	0	7.5	32.6	50	32	204.5
38.2	60.1	61.1	70.1	58.6	50.6	30.3	459.9
1	0	0	0	3	15	28	20
19.4	19	19.7	21.7	22.2	23.6	20.1	20.1
N	W	W	W	NW	N	W	
77	69	74	80	85	89	84	
83	93	109	104	111	102	116	
15.5	-7.2	-4.7	-11.7	-30.7	-46.9	-55.4	
209.4	226	171.7	97.9	50.4	31.8	35.2	1533.5

Basin which is described with the Hudson Plateau due to their similarities (Map 3.1).

Many researchers who have studied the topography of Québec describe the Hudson Bay region as a moderately rugged plateau with landforms determined by the geological structure and, to a smaller degree, by surface deposits. All researchers concur that the ancient Archean plateau is distinct from the coastal zone with its cuestas and vast tectonic trough referred to as a graben.

According to Bostock (1970), the study area is part of the Canadian Shield. The portion of the study area east of the cuestas and Lac Guillaume-Delisle is part of the Larch Plateau, a subdivision of the James Region, while Lac Guillaume-Delisle and the cuestas are part of the Hudson Region (Richmond Hills).

The entire Canadian Shield is an ancient erosion surface (peneplain) that formed during the Precambrian (Bostock, 1970). Sheet erosion (or washings) flattened the topography heedless of rock type and structure. This peneplanation process continued long after the end of the Archean. The events that created the landforms found in the study area are summarized chronologically in Table 3.4.

The greatest vertical drops are located: along the interfluve slopes of the plateau which, in the downstream sections of valleys, lead directly to the talweg; in the zone of contact between the plateau and the graben; and along the inland-facing slopes of the cuestas.

Despite the similarities in the landforms of the Hudson Plateau, certain distinctions exist between the Lacs des Loups Marins sector and the Lac à l'Eau Claire sector. As well, the

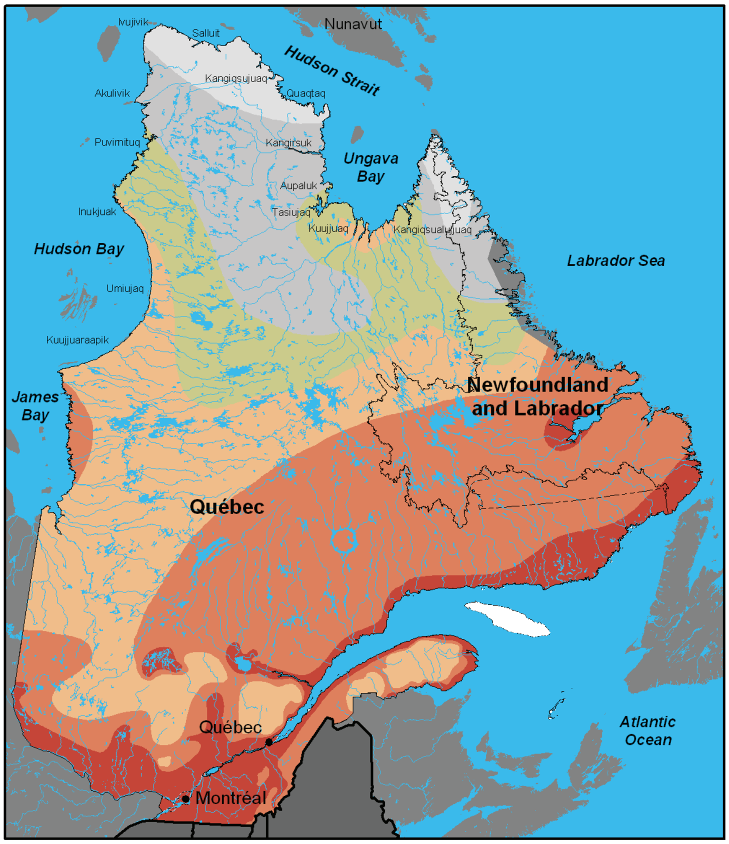


Figure 3.3 Frost-Free Period (days) 1931-1960

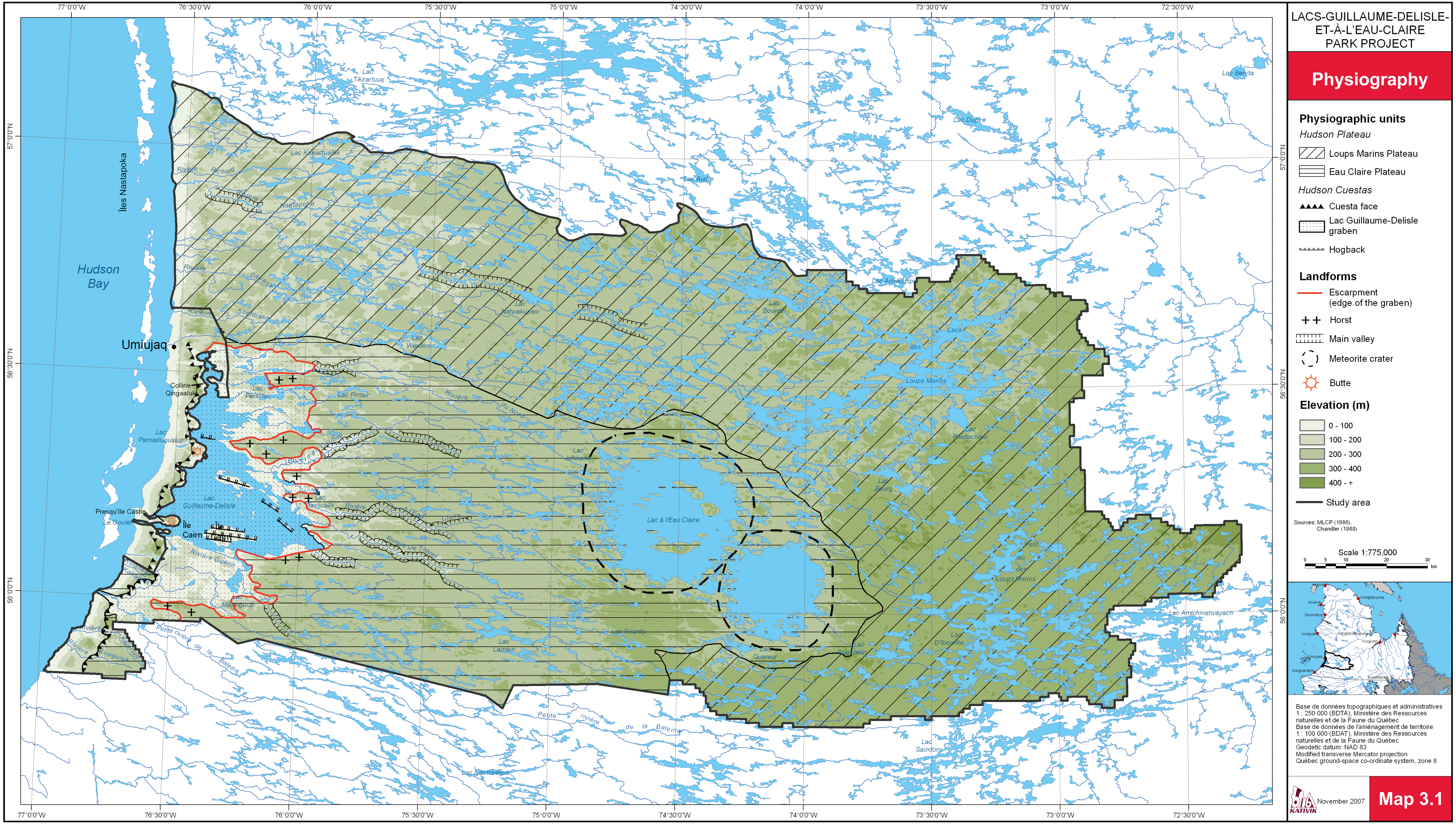
- Less than 20
- 20 to 40
- 40 to 60
- 60 to 80
- 80 to 100
- Over 100
- Data not available

Sources: Wilson (1971) and OPDQ (1983)

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

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

Source: Gagnon and Ferland (1967)



LACS-GUILLAUME-DELISLE-ET-À-L'EAU-CLAIRE PARK PROJECT
Physiography
Physiographic units
Hudson Plateau
Loups Marins Plateau
Eau Claire Plateau
Hudson Cuestas
Cuesta face
Lac Guillaume-Delisle graben
Hogback
Landforms
Escarpment (edge of the graben)
Horst
Main valley
Meteorite crater
Butte
Elevation (m)
0 - 100
100 - 200
200 - 300
300 - 400
400 - +
Study area
Sources: MLCP (1986), Chandler (1988)
Scale 1:775,000
0 5 10 20 30 km
Base de données topographiques et administratives 1 : 250 000 (BDTA), Ministère des Ressources naturelles et de la Faune du Québec
Base de données de l'aménagement de territoire 1 : 100 000 (BDAT), Ministère des Ressources naturelles et de la Faune du Québec
Geodetic datum: NAD 83
Modified transverse Mercator projection
Québec ground-space co-ordinate system, zone 8
KATIVIK
November 2007
Map 3.1
Hudson Bay
Îles Nastapoka
Umiujaq
Colline Qingaaluk
Lac Pamiallugusiup
Presqu'île Castle
Le Goulet
Île Cairn
Lac Guillaume-Delisle
Lac Persillon
Lac Pintair
Lac à l'Eau Claire
Lac Tikirartuuq
Lac Kakiattualuk
Lac Audie
Lac Duplre
Lac Benita
Lac Achikunip
Lac Bourdel
Lac Watwakupaw
Lac Wedeen
Lacs des Loups Marins
Lac Pikutachiw
Lac Ichikami
Lac Bourg
Petit lac des Loups Marins
Lac Amichinatwayach
Lac Girardy
Lac Lamain
Lac Querneur
Lac D'Iberville
Lac Saindon
Lac Iyachisakus
Rivière Nastapoka
Rivière Richard
Rivière Sheldrake
Rivière du Nord
Rivière à l'Eau Claire
Rivière De Troyes
Rivière Guérin
Petite rivière de la Baleine
77°0'0"W
76°30'0"W
76°0'0"W
75°30'0"W
75°0'0"W
74°30'0"W
74°0'0"W
73°30'0"W
73°0'0"W
72°30'0"W
57°0'0"N
56°30'0"N
56°0'0"N
Ivujivik
Akulivik
Kangiqsujuaq
Puvirnituq
Inukjuak
Kangiqsualujjuaq
Kuujjuaq
Umiujaq
Kuujjuarapik
Schefferville

Southeast of Lac Guillaume-Delisle (former trading post), a zone of contact between the Archean bedrock (background) and the Proterozoic graben. The rock strata inclined along the fault line when the block of bedrock collapsed. Note the hill (right) also known as a horst and the perched beaches (foreground) from the Holocene.

graben and cuesta zone is clearly different from the rest of the study area both in terms of visual appearance and geological composition.

HUDSON PLATEAU

The Hudson Plateau declines gently from east to west towards Hudson Bay. The average gradient is 0.2%. The plateau is characterized by countless crevasses and fractures weathered by erosion and streams. The average elevation of the plateau fluctuates around 300 m (± 50 m). The highest summits, which are located around Lac à l'Eau Claire and in the eastern portion of the study area, reach above 400 m.

Generally speaking, the plateau does not present deep gashes (Baron-Lafrenière, 1989) compared with other portions of the Canadian Shield, such as the Torngat Mountains, the coast of the Hudson Strait and the Laurentian Mountains, where valleys have been deeply etched into the ancient peneplains. Within the study area, the regularity of the rock surfaces, the average elevation and the roughly 100-m minor vertical drops are representative of the Hudson Plateau.

A closer examination of the physical environment reveals distinctions between the Lacs des Loups Marins sector which reaches to Hudson Bay and the Lac à l'Eau Claire sector which abuts the graben (Map 3.1). It should be noted that this subdivision of the plateau is not as clear-cut as suggested on the map; characteristics of the Lac à l'Eau Claire sector may be found in the Lacs des Loups Marins sector and vice versa.

Loups Marins Plateau

The Loups Marins Plateau covers the eastern and northern portion of the study area and is demarcated by the watershed between the Rivière Nastapoka and the Rivière à l'Eau Claire [Clearwater River]. It encompasses Lac D'Iberville, Lacs des Loups Marins and the Rivière Nastapoka valley. The average elevation of the plateau in the east is 350 m with a few hills rising to 400 m, which is a little higher than elsewhere in the study area.

The physiography of the Loups Marins Plateau is distinct from the rest of the study area due to its many lakes, a great number of which cover more than 100 km^2, and by widespread unconsolidated deposits that have smoothed over the irregularities of the topography. In this respect, the Lacs des Loups Marins sector, which extends into the upstream section of the Rivière Nastapoka valley, more closely resembles the landforms of the Central Lake Plateau (natural region B32) than the rest of the Hudson Plateau. The Rivière Nastapoka valley is characterized by a shallow, open profile and countless large lakes and streams. West of Lac Natwakupaw [Lake Natwakupaw], the rock structure is more exposed. According to the physiographic classification produced by the Ministère du Loisir, de la Chasse et de la Pêche, the downstream section of the Rivière Nastapoka is situated on the Ungava Plateau (natural region B39) but, based on its landform and hydrography, this zone in fact resembles more closely the Hudson Plateau.

Eau Claire Plateau and Meteorite Craters

The Eau Claire Plateau encompasses the Lac à l'Eau Claire basin and the zone between the Rivière Nastapoka valley and the Petite rivière de la Baleine [Little Whale River] valley generally situated at an elevation of 275 m (Map 3.1). The

Landforms of the Hudson Plateau in the Lacs des Loups Marins sector. The topography and geographical structure have been smoothed over by unconsolidated deposits. Note the irregular shorelines of the many lakes.
Credit: Josée Brunelle (KRG)

Table 3.4 Main Events in the Evolution of Landforms

GEOLOGICAL PERIOD	AGE (Ma)[1]	MAIN EVENTS IN THE EVOLUTION OF LANDFORMS (From most ancient, bottom of table, to most recent, top of table)
CENOZOIC	—	Localized erosion and sedimentation in marine, terrestrial and fluvial environments; periglacial phenomenon
Holocene	0.01	Deglaciation, invasion of the sea along the coast; isostatic lifting, retreat of the sea, erosion
QUATERNARY	0.01	Successive glaciation and climate warming: erosion and glacial deposits
TERTIARY	65	Warmer climate than today, localized peneplanation, formation of cuestas and hogbacks, erosion of bedrock; climatic cooling in the latter half of the Tertiary
MESOZOIC	65	—
CRETACEOUS	135	Selective erosion, formation of valleys; differential erosion, formation of cuestas and hogbacks
JURASSIC	190	Formation of the Atlantic Ocean; splitting of continents and movement towards their current positions
TRIASSIC	225	—
PALEOZOIC	225	Peneplanation
PERMIAN	286	Closing of oceans; continents joined; rebounding of the Canadian Shield
PENNSYLVANIAN	345	Double meteorite crater at Lac à l'Eau Claire (287 Ma); erosion, peneplanation
DEVONIAN	395	—
SILURIAN	435	Erosion, peneplanation
ORDOVICIAN	500	Generalized subsidence of the Superior, marine transgression and sedimentation over the Canadian Shield
CAMBRIAN	570	Positive topography (Canadian Shield uplifted) and peneplanation
PROTEROZOIC	570	End of the formation of the Canadian Shield; a vast undulating surface (peneplain)
(Precambrian)		Opening of the oceans (roughly 650–550 Ma)
Neoproterozoic	1000	Lifting of the Superior, peneplanation
		—
Mesoproterozoic	1600	—
	1800	Lifting of bedrock, inclination of strata
	?	Sedimentation and volcanism (formation of cuestas); peneplanation
	2000	Extension of the crust; faulting, Lac Guillaume-Delisle Graben, inclination of strata; peneplanation
	?	Sedimentation and volcanism, formation of volcanic and sedimentary rocks along the edge of the Superior; peneplanation
Paleoproterozoic	2500	Fracturing of the Archean continent; subsidence
ARCHEAN	2700	Kenoran Orogeny (Superior Province); structural alignment northwest–southeast and east–west
	4600	Approximate age of the Earth

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

Source: Bostock (1970), Chandler (1988), Landry and Mercier (1992), Rondot et al. (1993), Hocq (1994), Labbé and Lacoste (2004), Simard et al. (2004)

elevation of the plateau exceeds 300 m around Lac à l'Eau Claire with surfaces rising above 350 m and a few summits reaching 430 m.

The Eau Claire Plateau is extremely fragmented; its valleys are narrow and shallow. This complex structure is a series of interfluves characterized by linear depressions. Since fluvial and glacial erosion have scoured (without excessively gashing) the bedrock, it is more appropriate to speak of fluvial and structural valleys, or gorges in certain sections, than glacial u-shaped valleys. Even along the downstream, open section of the Rivière du Nord [North River] and the Rivière au Caribou [Caribou River], the transverse profile is more likely influenced by the nearby graben than by glacial action.

On the hilltops, unconsolidated deposits are discontinuous or thin, and generally comprised of till veneer or perched blocks set directly on the bedrock. In the valleys, these deposits are abundant and varied. In the downstream sections in particular, unconsolidated deposits limit the depth of the valleys and smooth over the irregularities of the bedrock. Nonetheless, many waterfalls and rapids punctuate the valley streams that closely follow the rock structure.

Although more pronounced than those on the Loups Marins Plateau, the vertical drops found on the Eau Claire Plateau are minor. On average, these vertical drops are between 50 and 100 m (Baron-Lafrenière, 1989). Vertical drops increase however along the downstream sections of the valleys and, in the zone of contact between the plateau and the graben can reach 250 m.

The meteorite craters form a lake that is surrounded by many small, isolated hills, making the zone distinct from the rest of the Eau Claire Plateau. In the centre of the western basin of Lac à l'Eau Claire, east-west elongated islands (created by the meteoritic impacts and glacial moraine action) form a circle. A myriad of islets are scattered around the lake just offshore, and they separate the eastern and western basins. The basins are both circular and almost completely separate; the only outlet is the Rivière à l'Eau Claire.

Of the roughly 172 meteorite craters known on the surface of the earth, 29 are found in Canada, including nine in Québec (MIAC/CCMI, 2006) (Table 3.5). According to this data, the western and eastern basins of Lac à l'Eau Claire rank 22nd and 35th in size.

CUESTAS AND THE GRABEN

The study area encompasses the Lac Guillaume-Delisle graben and a representative portion of the Hudson Cuestas, in the southwest corner of the study area. Overall, the cuestas

View of the Hudson Plateau, east of Lac Guillaume-Delisle (Lac à l'Eau Claire sector). The ancient peneplain is extremely fragmented; its valleys are straight, narrow and generally shallow. Streams are punctuated by waterfalls and rapids that closely follow the rock structure.
Credit: Josée Brunelle (KRG)

stretch offshore along 650 km of the coast of Hudson Bay between Kuujjuarapik and Inukjuak (Dionne, 1976; Guimont and Laverdière, 1980). On the main land, they progressively decrease in size before petering out north of Umiujaq (Chandler, 1988). Although cuestas are also present along the Côte-Nord (îles de Mingan or Mingan Islands) and in the Otish Mountains, the Hudson Cuestas are the most impressive in Québec.

The cuestas between Umiujaq and the proposed park south of the Petite rivière de la Baleine present a uniformly, lightly sloped topography made up of weak rocks capped by a hard layer. The cuestas located west of Lac Guillaume-Delisle, between Umiujaq and Le Goulet (péninsule de Low or Low Peninsula), although not included in the study area, are especially scenic.

The average height of the cuestas is roughly 300 m, and Qingaaluk Hill in particular reaches 420 m. This average height is similar to the average elevation of the Hudson Plateau, strongly suggesting that the two formations were subjected to the same peneplanation process. A few cuestas stand north and south of the mouth of the Petite rivière de la Baleine. At this location, the highest peaks reach 350 and 400 m.

The cuestas were formed by erosion along fault lines, creating a non-symmetrical topography. The cuestas are oriented north–south. The east faces are steep and short with an orthoclinal depression at the bottom of the slope. The back slopes decline gently to the west (Figure 3.5).

Table 3.5 Meteorite Craters in Québec

NAME	LATITUDE North	LONGITUDE Westt	DIAMETER (km)	AGE (Ma)[1]
Manicouagan	51°23′	68°42′	88	214 ±5
Charlevoix	47°32′	70°18′	56	360 ±25
Lac à l'Eau Claire (west basin)	**56°13′**	**74°30′**	**32**	**287 ±26**
Lac à l'Eau Claire (east basin)	**56°05′**	**74°07′**	**22**	**287 ±26**
Lac Couture	60°08′	75°20′	16	425 ±25
Presqu'île	49°43′	74°48′	12	< 1 000
Lac de la Moinerie	57°26′	66°37′	8	400 ±50
Île Rouleau (Lac Mistassini)	50°41′	73°53′	7	< 1 650
Pingualuit (Cratère du Nouveau-Québec)	61°17′	73°40′	3.4	1.4±0.1

Ma: *Mega annum* or millions of years
Adapted from Rondot (1995)

The gradient of the upper sections of the cuesta faces (hard layer) are sometimes close to vertical (90°). The lower sections may be either concave or convex. As the cuestas have been eroded over time, their former positions are often indicated by buttes (for example, Presqu'île Castle or Castle Peninsula situated north of Le Goulet; (Map 3.1). Unconsolidated deposits are largely absent from the cuesta faces, revealing alternating layers of hard and soft rock. Unconsolidated colluvial and talus deposits sometimes hide rock-steps (projecting hard layers of rock).

Hudson Cuestas along the west shore of Lac Guillaume-Delisle. The faces of the cuestas are short and steep while the back slopes are long and decline gently towards Hudson Bay. Note the concave profile at the foot of the cuesta face.

The back slopes of the cuestas slant at a gentle gradient of between 5 and 10° into Hudson Bay to a second series of cuestas off the coast that make up the Nastapoka Islands. The back slopes are formed largely of rock covered with scattered accumulations of till, perched blocks and fine deposits.

Cataclinal corridors traverse the cuestas following the slant of the strata, for example Le Goulet, the Petite rivière de la Baleine and the Rivière Kajurtuit [Kajurtuit River]. Le Goulet connects Lac Guillaume-Delisle to Hudson Bay. It is a long, narrow channel with 200-m high cliffs. Other east–west corridors that run opposite to the slant of the strata are described as anticlinal (Figure 3.5).

By definition, a graben is a block of the earth's crust that has collapsed, especially in the centre of the structure. The Lac Guillaume-Delisle graben is 75 km long (north–south axis) and roughly 45 km wide (east–west axis). The depression is between 200 and 300 m below the surface of the Hudson Plateau (Chandler, 1988) and is partially filled by Lac Guillaume-Delisle. Around the lake, most of the land is smoothed over by a layer of unconsolidated deposits. An interior plain with an average altitude of 100 m marks the east and south shores of the lake.

Inclined strata (between 10 and 30°) are exposed where the graben meets the bedrock. The inclination was produced by the collapse of a massive block of the bedrock. With a few exceptions, such as the peak of Île Cairn [Cairn Island] that stands at 195 m, most of the surfaces of the graben have an elevation of 150 m. In the Rivière au Caribou valley and south

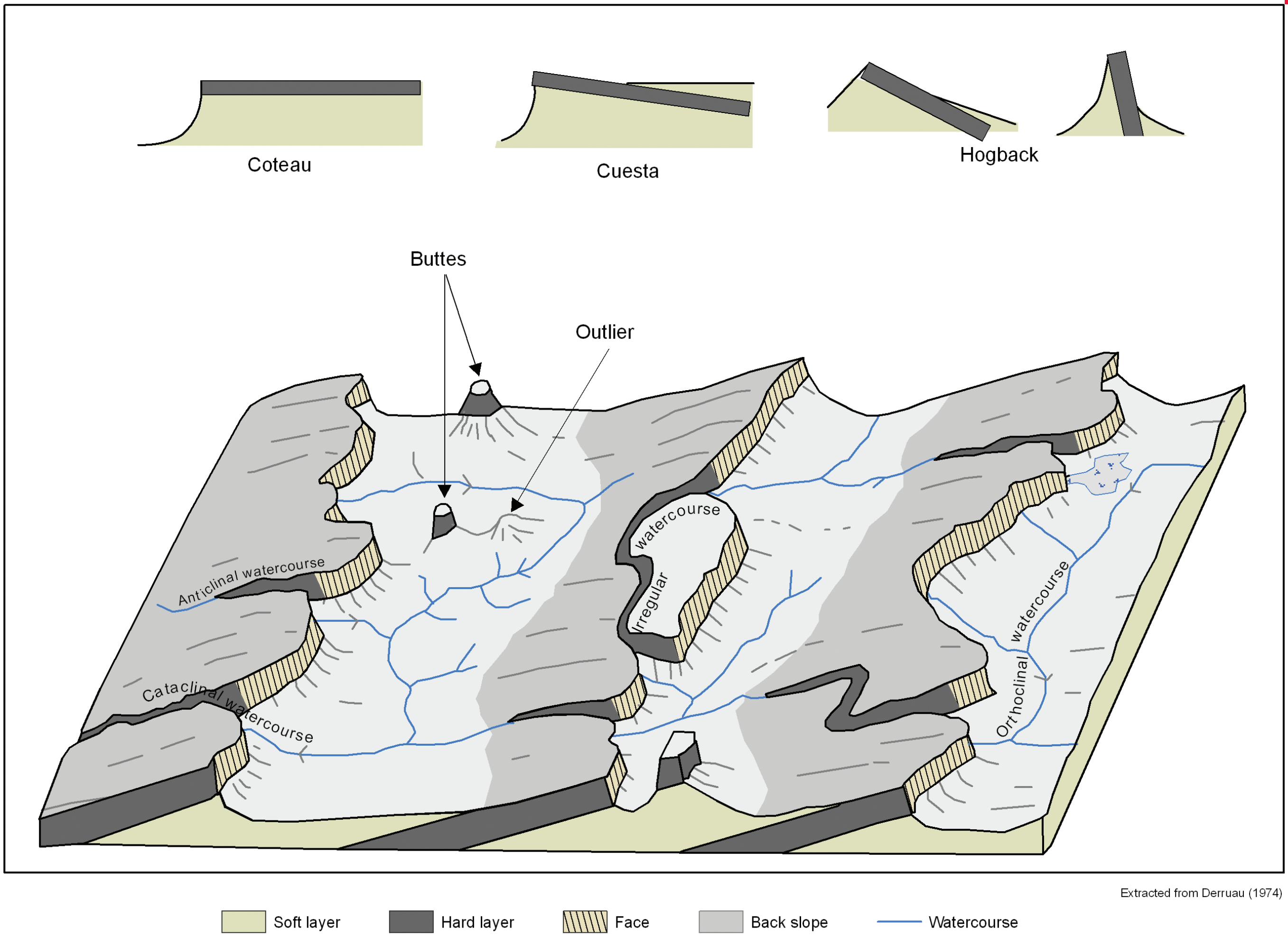


Figure 3.5 Structural Topography and Cuesta Terminology

of Lac Guillaume-Delisle, the inclined strata project through the unconsolidated deposits. The strata that form the islands of Lac Guillaume-Delisle and the exposed strata around the lake are low, sharp ridges known as hogbacks (Figure 3.5). The axes of these ridges vary between northwest–southeast and east–west, almost perpendicular to the orientation of the cuestas. "Mini-cuestas" are found wherever the inclination of the strata is less pronounced (Daigneault, 2001). Because they lay in a depression, the rocks of the graben have over time escaped certain erosion action.

Contact between the plateau and the graben has created escarpments with streams along their eastern bases, such as at the mouths of the Rivière du Nord and the Rivière Guérin [Guérin River]. By the process known as isostatic adjustment, the collapse of Archean bedrock forced the upward movement of blocks around the graben; these blocks are known as horsts (Map 3.1). The impressive escarpment thus created

The Hudson Cuestas are traversed in the southwest corner of the study area by the Petite rivière de la Baleine (cataclinal corridor). The cuestas separate the graben from Hudson Bay. On the plain, the reddish strata of the graben (centre) projects through the unconsolidated deposits.
Credit: Josée Brunelle (KRG)

is especially scenic. The surface of the horsts slope eastward causing streams to flow in this direction before veering back towards Lac Guillaume-Delisle.

PHYSIOGRAPHIC CHARACTERISTICS: SUMMARY

The study area covers two natural regions of Québec according to the classification produced by the Ministère du Loisir, de la Chasse et de la Pêch: the Hudson Plateau (including the southwest corner of the Ungava Plateau) and the Hudson Cuestas (MLCP, 1986). The study area possesses representative landforms of these natural regions.

The study area covers close to 15% of the Hudson Plateau. The surface of the plateau is uniformly flat with an average elevation of roughly 300 m. Sloping towards Hudson Bay, the surface is extremely fragmented and the main valleys (east–west axis) are relatively narrow and shallow. The geological structure generally dictates the hydrographic network. Over the interfluves, unconsolidated deposits are generally thin, but become thicker and more diversified closer to the coast of Hudson Bay. Unconsolidated deposits are more abundant in the eastern portion of the study area. These deposits affect the size of the lakes and drainage patterns. In this respect, this zone more closely resembles the Central Lake Plateau situated to the south.

Over this vast plateau with its countless lakes and streams of varying sizes, the element of interest is the double meteorite craters that form Lac à l'Eau Claire. It is not so much the circular shapes of the lake that are significant as their size. Lac à l'Eau Claire is the second largest natural lake in Québec. Meteoritic impact sites are in fact rare; only less than 200 have been identified on the earth, including more than 20 in Canada.

The study area also possesses representative landforms of the Hudson Cuestas. It encompasses roughly one third of the terrestrial portions of this natural region along the coast and almost the entire graben that holds Lac Guillaume-Delisle, the sixth largest lake in Québec. This coastal zone presents spectacular escarpments around a large interior plain and diversified features. These features contrast with those of the Hudson Plateau.

Geology

The study area is part of the tectonic province known as the Superior (Ciesielski and Plante, 1990; Hock, 1994; Clark, 2001; MRN, 2002). The Superior Province was formed during the Archean, which dates it among the oldest rocks on the earth (Dimroth, 1981 in OPDQ, 1983) and the oldest part of the Canadian Shield, to which other continental formations (Labrador Trough, Ungava Trough, Laurentian Mountains) subsequently attached themselves. The volcanic and sedimentary rock of the graben and the cuestas covered a portion of the Archean basement early in the Proterozoic. Therefore the study area was essentially created during the Precambrian. Two meteoritic impacts that occurred during the Paleozoic lead to the creation of Lac à l'Eau Claire. The geological elements of the study area are summarized in Table 3.6 and illustrated on Map 3.2.

ARCHEAN (4.6–2.5 GA): GRANITIC BASEMENT

The portion of the study area classified as the Hudson Plateau is part of the Bienville Subprovince, a subdivision of the Superior Province. The Bienville Subprovince also includes the Rivière Nastapoka valley which is situated in the southwest portion of the Ungava Plateau (natural region B39; MLCP, 1986; Figure 1.2).

The Archean basement consists of intrusive magmatic rocks that are composed of granite and possess a massive, foliated structure. The study area also contains remnants of metamorphosed volcanic and sedimentary rock from a proto-continental crust created more than 2.7 Ga (supra-crustal rock) (Hocq, 1994; Simard et al., 2004).

Most of the rocks are intrusive felsic and, in pockets, mafic to ultramafic (Gosselin et al., 2001; Gosselin et al., 2002; Roy et al., 2004; Simard et al., 2004; Leclair, 2005). In this respect, the geology of the study area is representative of the northern portion of the Hudson Plateau, modified at the end of the Archean during the Kenoran Orogeny which peaked in Québec around 2.7 Ga.

Four regional deformation phases of the Bienville Subprovince occurred during the Archean (Gosselin et al., 2001 and 2002; Simard et al., 2004). The Nastapoka and the Lamain are the most striking deformation zones and give the general structure of the study area a northwest–southeast and east–west orientation. Deformation took place deep below the earth's surface, shaping rocks without breaking them (ductile deformation). The metamorphism associated with the evolution of the Superior Province produced gneisses with amphibolite and granulite facies.

PROTEROZOIC (2.5 GA–570 MA): VOLCANIC AND SEDIMENTARY SEQUENCES

The Superior Province evolved through a series of events that followed its creation during the Archean. At the beginning of the Proterozoic, peneplanation wore down the Kenoran Orogeny. This erosion generated a considerable quantity of sediment (cover rock) that accumulated on the edge of the Superior Province. The rocks of the Richmond Gulf Group

Table 3.6 Geological History

GEOLOGICAL PERIOD	AGE (Ma)[1]	MAIN EVENTS IN THE EVOLUTION OF THE GEOLOGY (From most ancient, bottom of table, to most recent, top of table)
CENOZOIC	—	Erosion and sedimentation, organic deposits, unconsolidated formations (beaches, alluvion, colluvion, congelifract)
Quaternary	1.6	Successive glaciation and climatic warming; glacial and marine deposits
Tertiary	65	No Tertiary formation is present in the study area
MESOZOIC	65	No Mesozoic formation is present in the study area
Cretaceous	135	Erosion
Jurassic	190	Opening of the Atlantic Ocean, subdivision of the continents
Triassic	225	—
PALEOZOIC	225	—
Permian	286	Closing of the oceans
Pennsylvanian	345	Meteoritic impacts at Lac à l'Eau Claire (287 Ma), impactites and inclusion of Ordovician rocks in the bedrock
Devonian	395	End of filling and sinking of the Hudson Bay basin
Silurian	435	Erosion
Ordovician	500	Subsidence of the Canadian Shield and marine transgression; formation of limestone at Lac à l'Eau Claire
Cambrian	570	—
PROTEROZOIC	570	End of the formation of the Canadian Shield
(Precambrian)		
Neoproterozoic	1000	Grenvillian Orogeny (formation of Laurentian Mountains south of the Superior Province); emergence of the Canadian Shield
Mesoproterozoic	1600	Intense erosion
	1800	Hudsonian Orogeny along the edge of the Superior Province
	?	Sedimentation and volcanism following the formation of the graben; Nastapoka Group covers Richmond Gulf Group
	2000	Extension of the crust, faulting, Lac Guillaume-Delisle graben
(Aphebian)	?	Sedimentation/volcanism prior to formation of the graben; Richmond Gulf Group spreads across the Archean basement
Paleoproterozoic	2500	Splitting of the Superior Province (North American continental core)
ARCHEAN	2500	Intense erosion
	2700	Kenoran Orogeny (peak in Québec); Superior Province, general NW–SE and E-W structure
	2900	Beginning of the formation of the Superior Province; intrusions, metamorphism and ductile deformation
	3800	Formation of a proto-continental crust of volcanic and sedimentary rock (supra-crustal: 3800–2700 Ma)
	4600	Approximate age of the Earth

[1] Ma: Mega annum or millions of years

Sources: Chandler (1988), Landry and Mercier (1992), Rondot et al. (1993), Hocq (1994), Labbé and Lacoste (2004), Simard et al. (2004), Leclair (2005) were the first unconformity to blanket the Archean basement (Map 3.3, Figure 3.6).

The extension of the crust lead to a tectonic collapse, the Lac Guillaume-Delisle graben encompassed by faults in the Archean basement. The faulted structure is exposed east and south of Lac Guillaume-Delisle. The graben is described as an aulacogene (failed rift), the first stage leading to the opening of an ocean. The faults associated with the graben are generally oriented east–west and extend further eastward (Chandler, 1988). This structure was created during a phase of brittle deformation that occurred near the surface.

The rocks of the Richmond Gulf Group covering the floor of the graben escaped erosion while those covering the surrounding plateau were swept away. After another long period of peneplanation, the rocks of the Richmond Gulf Group and the Archean basement were blanketed by sequences associated with the Nastapoka Group. The actual period of the creation of the Nastapoka Group is relative, which is to say that the period is calculated according to adjacent geology.

Richmond Gulf Group

The study of paleo-currents (ripples, laminations) in the sediment and lava flow structures of the Richmond Gulf Group demonstrates that these rocks were transported from west to east: from an Archean craton situated west of the Belcher Islands in Hudson Bay (Chandler, 1988). The Richmond Gulf Group is roughly 1100 m thick and combines three main formations.

The Pachi Formation was the very first unconformity to blanket the Archean basement. It is made up of fluvial arkose and can reach 500 m thick. This sediment seems to have spread in a mountainous topography.

The Persillon Formation covers the Pachi Formation. This volcanic rock is composed of basalt and spread in a sub-aerial environment. Its maximum thickness is 70 m. The vastness of the formation suggests that the topography had deteriorated to resemble an alluvial-plain lake environment with a few granitic hills (Chandler, 1988).

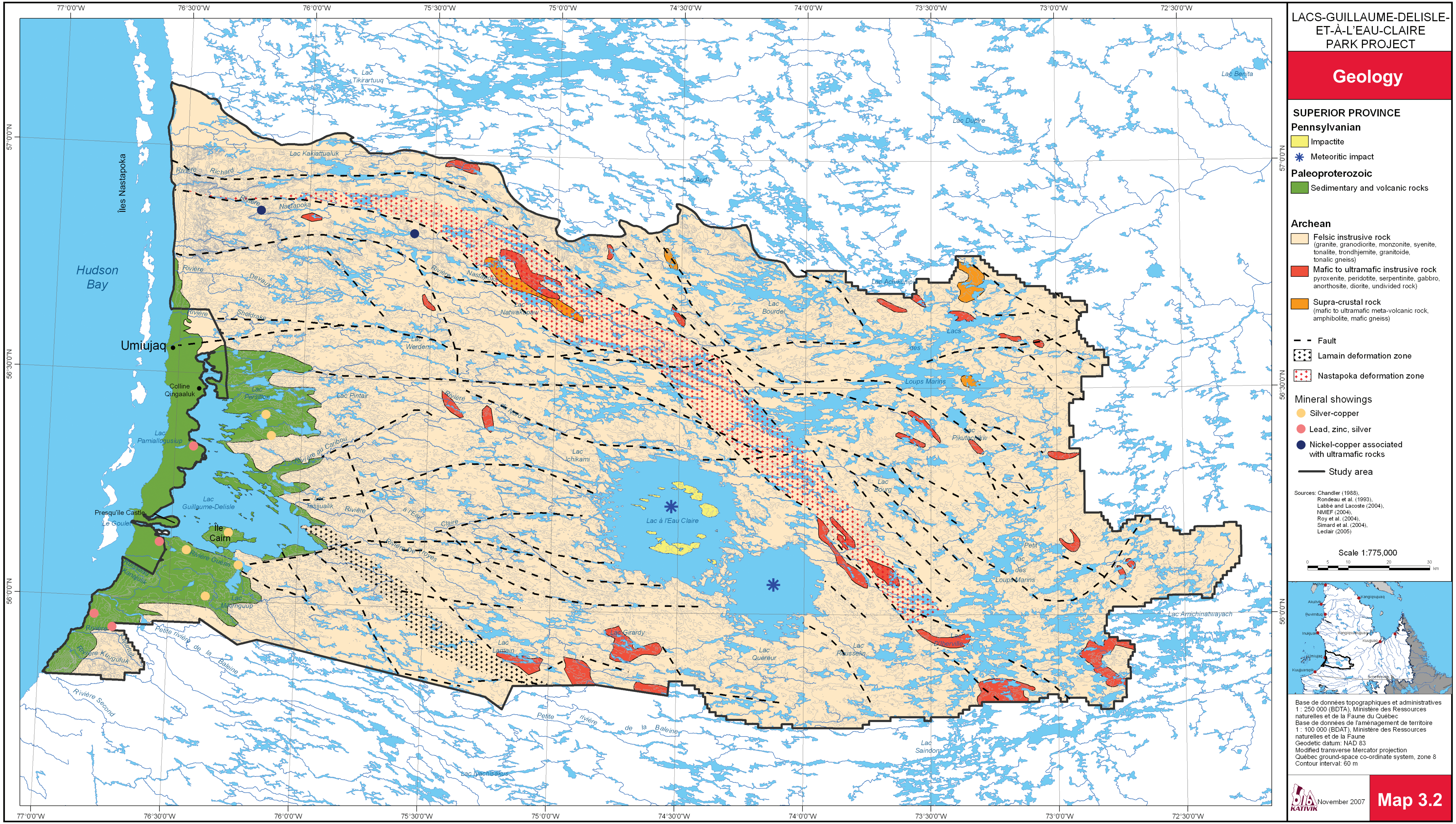
The Qingaaluk Formation reaches 500 m in thickness. It consists of arkose and sandstone interspersed with lava flows overtop of a smooth topography. The Qingaaluk Formation covers most of the islands of Lac Guillaume-Delisle and is present at the base of the cuestas on the west side of the lake. The upper portion of the formation, which is observable on the faces of the cuestas north of Le Goulet, provides evidence of the first marine transgression over the Richmond Gulf Group (Chandler, 1988).

Finally, the Richmond Gulf Group includes Wiachuan sheet veins (dykes) in the southern half of the graben, east and south of Lac Guillaume-Delisle. These veins represent magma infiltrations into the Archean basement prior to the tectonic collapse (Chandler, 1988).

Chandler and Parrish (1989) estimate that the graben was created roughly 2 Ga. According to Chandler (1988) as well as Labbé and Lacoste (2004), this event occurred between the casting of the formations of the Richmond Gulf Group and those of the Nastapoka Group, in particular for the following reasons:

- east–west faults are present only in the graben (Richmond Gulf Group), and not in the cuestas (Nastapoka Group);
- the strata of the Richmond Gulf Group were jostled during the creation of the graben;
- the veins that cut through all the formations of the Richmond Gulf Group, are present in none of the formations of the Nastapoka Group;
- the rocks of the Nastapoka Group cover the faults associated with the graben.

Steeply inclined strata (hogbacks) of the Richmond Gulf Group; Île Cairn in the southern part of Lac Guillaume-Delisle.



LACS-GUILLAUME-DELISLE-ET-À-L'EAU-CLAIRE PARK PROJECT
Geology
SUPERIOR PROVINCE
Pennsylvanian
Impactite
Meteoritic impact
Paleoproterozoic
Sedimentary and volcanic rocks
Archean
Felsic instrusive rock
(granite, granodiorite, monzonite, syenite, tonalite, trondhjemite, granitoide, tonalic gneiss)
Mafic to ultramafic instrusive rock
pyroxenite, peridotite, serpentinite, gabbro, anorthosite, diorite, undivided rock)
Supra-crustal rock
(mafic to ultramafic meta-volcanic rock, amphibolite, mafic gneiss)
Fault
Lamain deformation zone
Nastapoka deformation zone
Mineral showings
Silver-copper
Lead, zinc, silver
Nickel-copper associated with ultramafic rocks
Study area
Sources: Chandler (1988), Rondeau et al. (1993), Labbé and Lacoste (2004), NMEF (2004), Roy et al. (2004), Simard et al. (2004), Leclair (2005)
Scale 1:775,000
0 5 10 20 30 km
Base de données topographiques et administratives 1 : 250 000 (BDTA), Ministère des Ressources naturelles et de la Faune du Québec
Base de données de l'aménagement de territoire 1 : 100 000 (BDAT), Ministère des Ressources naturelles et de la Faune
Geodetic datum: NAD 83
Modified transverse Mercator projection
Québec ground-space co-ordinate system, zone 8
Contour interval: 60 m
KATIVIK
November 2007
Map 3.2
Hudson Bay
Îles Nastapoka
Umiujaq
Colline Qingaaluk
Lac Guillaume-Delisle
Presqu'île Castle
Le Goulet
Île Cairn
Lac à l'Eau Claire
Lacs des Loups Marins
Petit lac des Loups Marins
Rivière Nastapoka
Rivière Richard
Rivière Devaux
Rivière Sheldrake
Rivière au Caribou
Rivière Guérin
Rivière Kuugjuak
Petite rivière de la Baleine
Rivière Second
Lac Kakiattualuk
Lac Tikirartuuq
Lac Aubié
Lac Natwakapau
Lac Bourdel
Lac Werden
Lac Persillon
Lac Pamiallugusiup
Lac Pintair
Lac Ichikami
Lac Bourg
Lac Pikutamikw
Lac Lamain
Lac Girardy
Lac Quéreur
Lac Roussellin
Lac D'Iberville
Lac Amichinatwayach
Lac Saindon
Lac Iyachisakus
Lac Achikunipi
Lac Duplre
Lac Benita
Lac Maringuup
77°0'0"W
76°30'0"W
76°0'0"W
75°30'0"W
75°0'0"W
74°30'0"W
74°0'0"W
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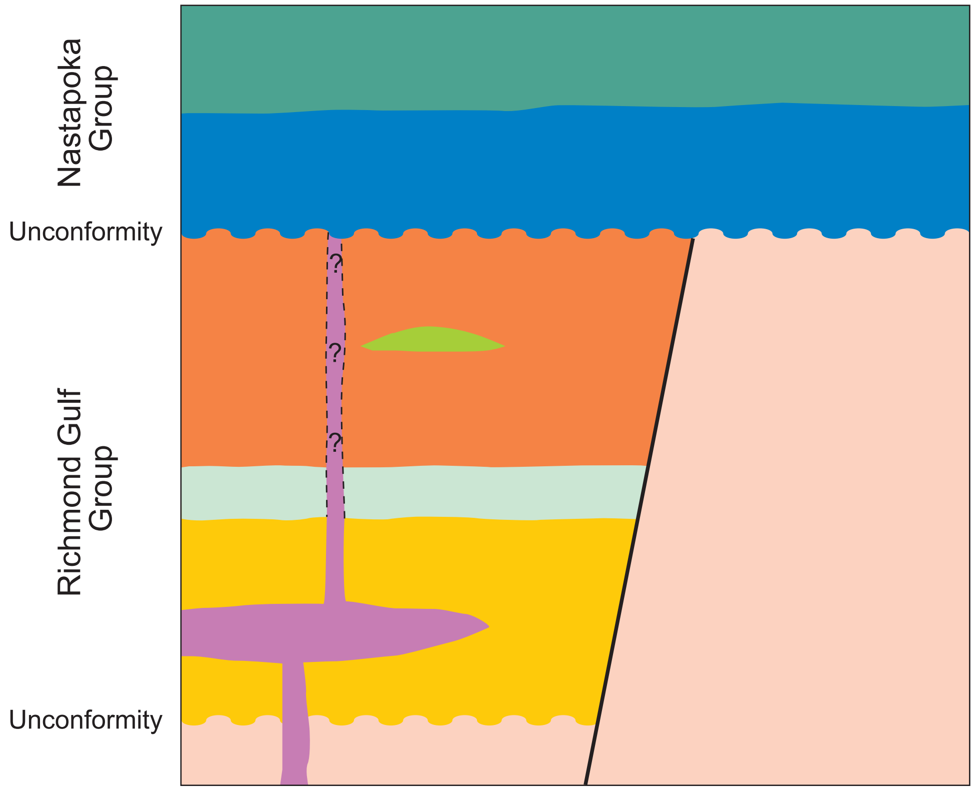
56°30'0"N
56°0'0"N



Fault

Paleoproterozoic

Nastapoka Group

Sub-aerial basalt lava flows

Sedimentary sequences: laminar and stromatolite carbonate rock; arkose and quartz-rich arenite; various mudstone and conglomerate levels

Richmond Gulf Group

Wiachuan sheet veins: finely grained gabbro

Qingaaluk Formation: cross-bedded coarse sandstone; red argillite and mudstone; monogenic conglomerate

Qingaaluk Formation: localized basalt lava flows

Persillon Formation: sub-aerial amygdaloidal and hematized basalt lava flows; red argillite

Pachi Formation: pink arkose-rich arenite and conglomerate

Archean Basement

Granite, foliated granodiorite and tonalite

Extracted from Labbé and Lacoste (2004)

Figure 3.6 Geological Cross-Section of the Lac Guillaume-Delisle Sector

Nastapoka Group

The rocks of the Nastapoka Group covered the rocks of the Richmond Gulf Group following the creation of the graben and a period of peneplanation (Figure 3.6). North of Umiujaq, these rocks are in contact with the granitic basement (Chandler, 1988). Having a total thickness of roughly 160 m in the Lac Guillaume-Delisle sector, the rocks of the Nastapoka Group are composed of strata sloped towards the west. They present no major deformations and do not reveal any faults associated with the graben which they cover.

The base unit of the Nastapoka Group is an unconformity lying overtop of the Richmond Gulf Group. Composed of carbonate-bearing stromatolite sedimentary rock (blue-green algae), the unit reveals various shallow sedimentary layers formed during the same marine transgression (Chandler, 1988). Stromatolite represents one of the first forms of life on the earth, along with bacteria. Stromatolite is not very common in Québec; it has also been identified in the Labrador Trough (to the east of the study area), near Lac Mistassini [Lake Mistassini] and in the Monts Otish [Otish Mountains] (MRN, 2002).

Mafic rocks subsequently blanketed these sedimentary rocks. Basalt lava flows indicate that prismatic (or columnar) structures cooled in a sub-aerial environment (Ciesielski, 1983, in Chandler, 1988). The thickness of these volcanic rocks reaches 100 m around Lac Guillaume-Delisle and roughly 230 m elsewhere in the region (Dimroth et al., 1970, in Chandler, 1988).

Volcanic and sedimentary sequences of the Nastapoka Group. From the foot to the centre of the cliff, the light-coloured stromatolite sedimentary unit is topped by a layer of dark-coloured lava. Talus forms steps along the slope.

PALEOZOIC (570–225 MA): METEORITIC IMPACTS

At the end of the Precambrian, the study area and the Canadian Shield were entirely formed. Only a few events would later complete their geological evolution. In particular, the young age and extraterrestrial origin of the meteoritic-impact craters of Lac à l'Eau Claire are distinct in the study area.

At the beginning of the Paleozoic, the seas covering the Canadian Shield deposited thick layers of sediment. Subsequent erosion erased this sediment from the study area, except on the floor of Lac à l'Eau Claire (Plante, 1986; Rondot et al., 1993).

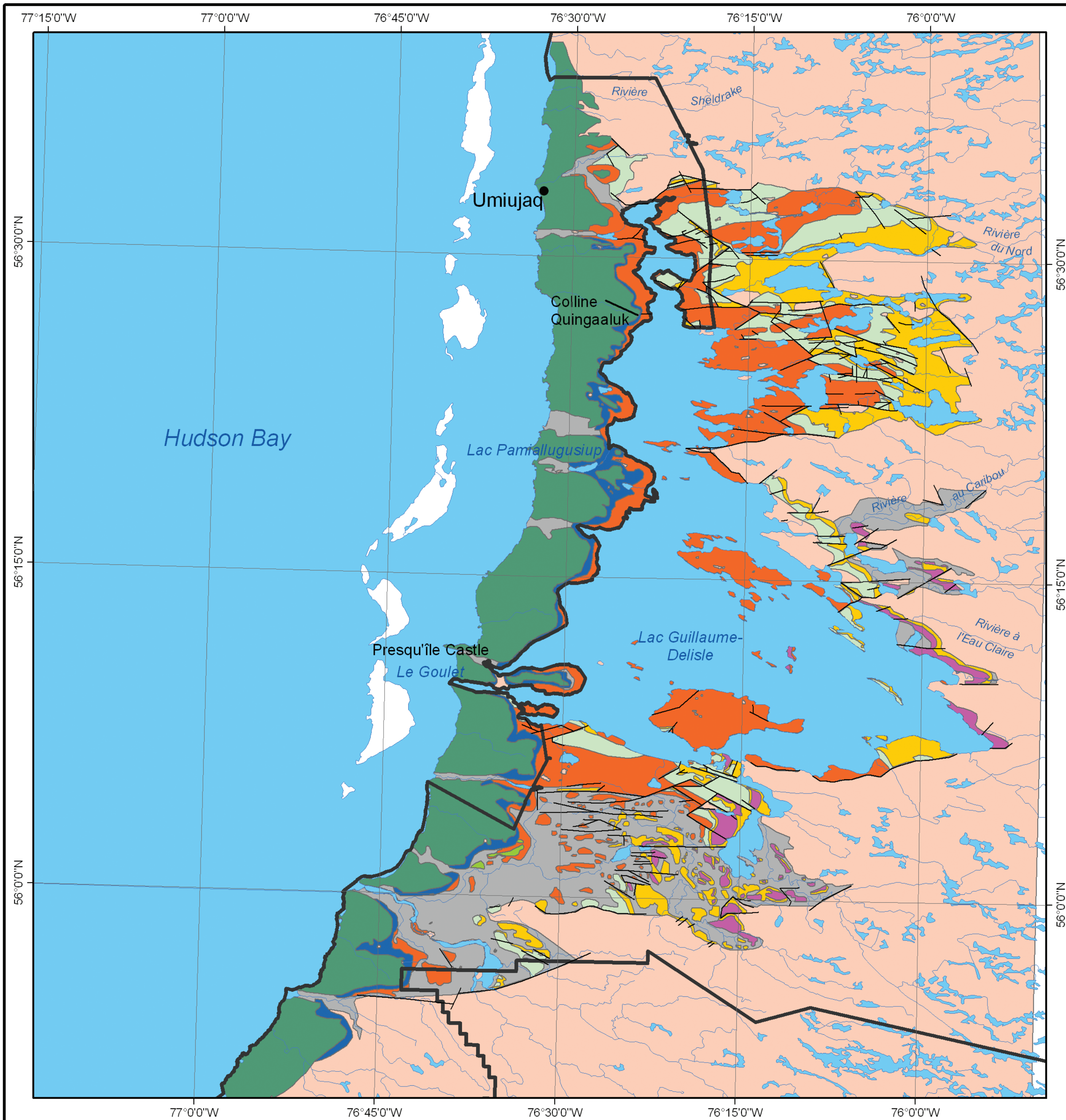
The two circular basins of Lac à l'Eau Claire were initially interpreted by Kranck and Sinclair (1963) and by Bostock (1969) as craters created by the collapse of the earth's crust as lava pushed through long fractures or due to the explosion of a volcanic vent (caldera). Field studies have however proven that the two basins were created by a double meteoritic impact (Dence, 1964; Grieve, 1979, in Rondot et al., 1993).

Specifically, around 287 Ma (Bostock, 1969; Reimold et al., 1981 in Rondot et al., 1993), towards the end of the Paleozoic, two asteroids struck the Archean basement at a velocity of between 20 and 25 km/sec (Grieve, 1982; Rondot et al., 1993). The double impact was either created by a single meteorite that split in two on entering the earth's atmosphere or by a pair of asteroids travelling side by side.

The eastern basin of Lac à l'Eau Claire has a diameter of 22 km and a depth of 178 m (Plante, 1986). It is a simple crater, like Pingualuit. The combined force of the impact and the resulting shockwaves blew apart the rock and displaced a large quantity of debris (Figure 3.7). The quantity of debris displaced equalled roughly 1000 times the size of the meteorite (Grieve, 1982).

The western basin of Lac à l'Eau Claire is larger than the eastern basin (32 km diameter) but shallower (103 m). It is a complex crater, like Manicouagan. At Manicouagan, the force of the impact equalled between 100 and 1000 times the energy of all the earthquakes recorded in a single year, focussed in a single location (Grieve, 1982). The western basin is one of the rare examples on the earth where rocks formed by a meteoritic impact are exposed. The basin is therefore described below.

Rondot et al. (1993) estimated that the meteorite that created the western basin would have been 1 km in diameter. The original crater would have had a diameter of 16 km and a depth of 3 km. The islands in the centre of the western basin would have marked the periphery of the original crater. These islands reveal a series of new rocks created through impact



Quaternary

- Unconsolidated deposits

Paleoproterozoic

Nastapoka Group

- Sub-aerial basalt lava flows
- Laminar carbonate rock

Richmond Gulf Group

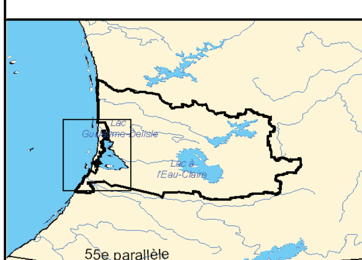
- Qingaaluk Formation (coarse sandstone)
- Wiachuan sheet veins
- Persillon Formation
- Pachi Formation

Archean

- Granite, granodiorite and tonalite
- Fault
- Study area

Sources:
Chandler (1988),
Labbé and Lacoste (2004)

LACS-GUILLAUME-DELISLE-
ET-À-L'EAU-CLAIRE
PARK PROJECT



Geology
Lac Guillaume-Delisle

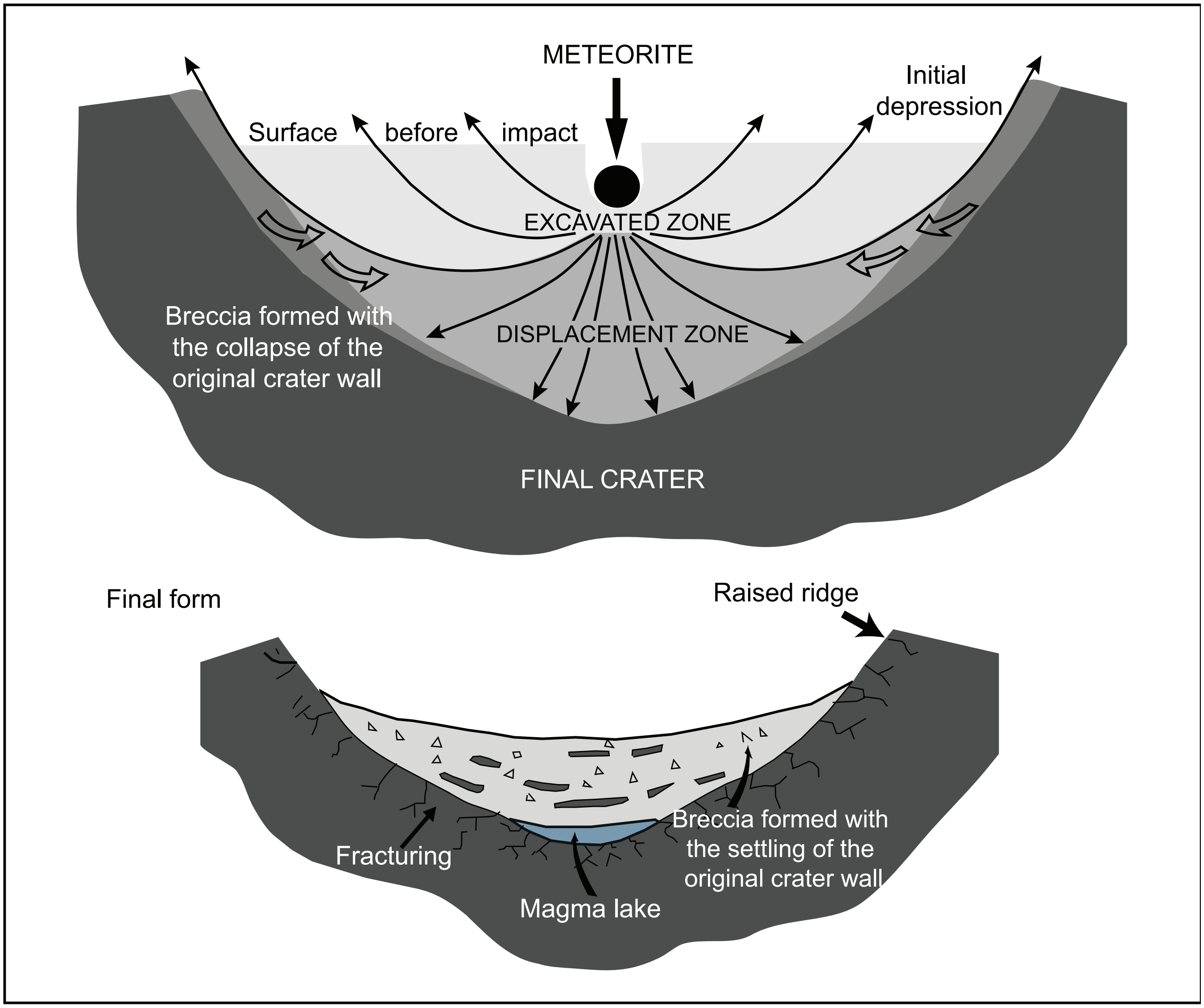
Base de données topographiques et administratives 1 : 250 000 (BDTA),
Ministère des Ressources naturelles et de la Faune du Québec
Base de données de l'aménagement de territoire 1 : 100 000 (BDAT),
Ministère des Ressources naturelles et de la Faune du Québec
Geodetic datum: NAD 83
Modified transverse Mercator projection
Québec ground-space co-ordinate system, zone 8

Scale: 1:480,000
0 2.5 5 10 15 20 km

KATIVIK

November 2007

Map 3.3



Adapted from Grieve (1982)

A simple crater is formed by the excavation of rock and displacement of debris, resulting from the combined force of a meteoritic impact and shockwaves. The depression is initially bowl-shaped and unstable. The walls tend to settle towards the center of the crater so that it becomes partially filled with breccia.

Figure 3.7 Formation of a Simple Crater: Eastern Basin, Lac à l'Eau Claire

metamorphism, fracturing, liquefaction and infiltration. The uplifting of the centre portion of the crater following the impact explains the relative shallowness of the western basin compared with the eastern basin. This uplifting of the basement furthermore caused the displacement of the host rock creating a void under the surface that collapsed around the periphery of the original crater (ring-shaped graben, between the islands and shores of the lake). The resulting diameter of the western basin is 32 km (Map 3.4; Figure 3.8).

These Archean and Ordovician rocks were therefore transformed during the Pennsylvanian as a result of the meteoritic impacts. All the rocks affected by the impacts formed a layer approximately 160 m thick (before erosion), which is to say 0.5% of the crater's diameter (Rondot et al., 1993). The transition between the different rock units is generally speaking quite evident (Figure 3.9).

The breccia is the rock unit that covers the floor of the crater. It is exposed at the foot of the steep cliffs on the islands in the centre of the basin and is made up of fragments of Archean basement and minerals (more than 80%) poorly held together by a clayey matrix. Only 1% of the fragments consist of blocks between 1 and 10 m in diameter.

Crevasses in the breccia and the Archean basement filled with liquefied rocks (brick red and greenish-grey) produced by the fusion of the meteoritic impact (veins, impactites). The other liquefied rock, which did not penetrate these crevasses, created impact-ignimbrite. Impact-ignimbrite covers the breccia and comprises a large variety of rock produced by impact metamorphism, including small glassy black debris. The fragments of this unit were welded together by extremely hot molten material that resembles volcanic rock (small fragments in a glassy matrix). The brick red impact-ignimbrite makes up the middle layer of the central islands in Lac à l'Eau Claire, observable along their cliffs (Figure 3.9).

The final rock unit, comprising impactites, was the upper layer of the crater's magma lake; it now makes up the upper portion of the islands. The quantity of fragments is clearly smaller than in the preceding rock unit. Small rock pieces melted and were absorbed into the pasty, massive and crystalline matrix, which represents 80% of the rock unit. Originally, the rock unit would have been close to 110 m thick, but erosion has scoured away close to 25 m (Figure 3.9).

Given the velocity of the meteorite, only a few seconds or minutes were needed to produce the crater. Notwithstanding, it would have taken not less than 10 years for the liquefied rock produced by the impact to cool and several centuries for the impactites. Impactites are produced through fusion and, after crystallization, resemble intrusive rock (Rondot et al., 1993). The meteorite would have been completely pulverized and vaporized, leaving no trace.

Finally, Ordovician limestone, metamorphosed by the impact, is present as small, enclosed fragments on Atkinson, Kamiskutanikaw and Wiskichanikw islands (Map 3.4). This evidence suggests that the basement was covered with a limestone layer during the Pennsylvanian, when the meteorite struck. Following the impact, it is believed that the Ordovician limestone layer would have been protected from erosion on the floor of the craters. In addition, limestone blocks have been found in Quaternary deposits (Rondot et al., 1993).

CENOZOIC: ICE AGES (65 MA–)

During the Mesozoic and Cenozoic, erosion continued to wear away at the surfaces of the study area (Hocq, 1994). No unconsolidated or consolidated formation dating later than the meteorite craters has been identified in the study area, with the exception of unconsolidated deposits from the end of the Quaternary. There is therefore a significant stratigraphic unconformity between the unconsolidated deposits and the Archean, Proterozoic and Paleozoic bedrock of the study area (Plante, 1986).

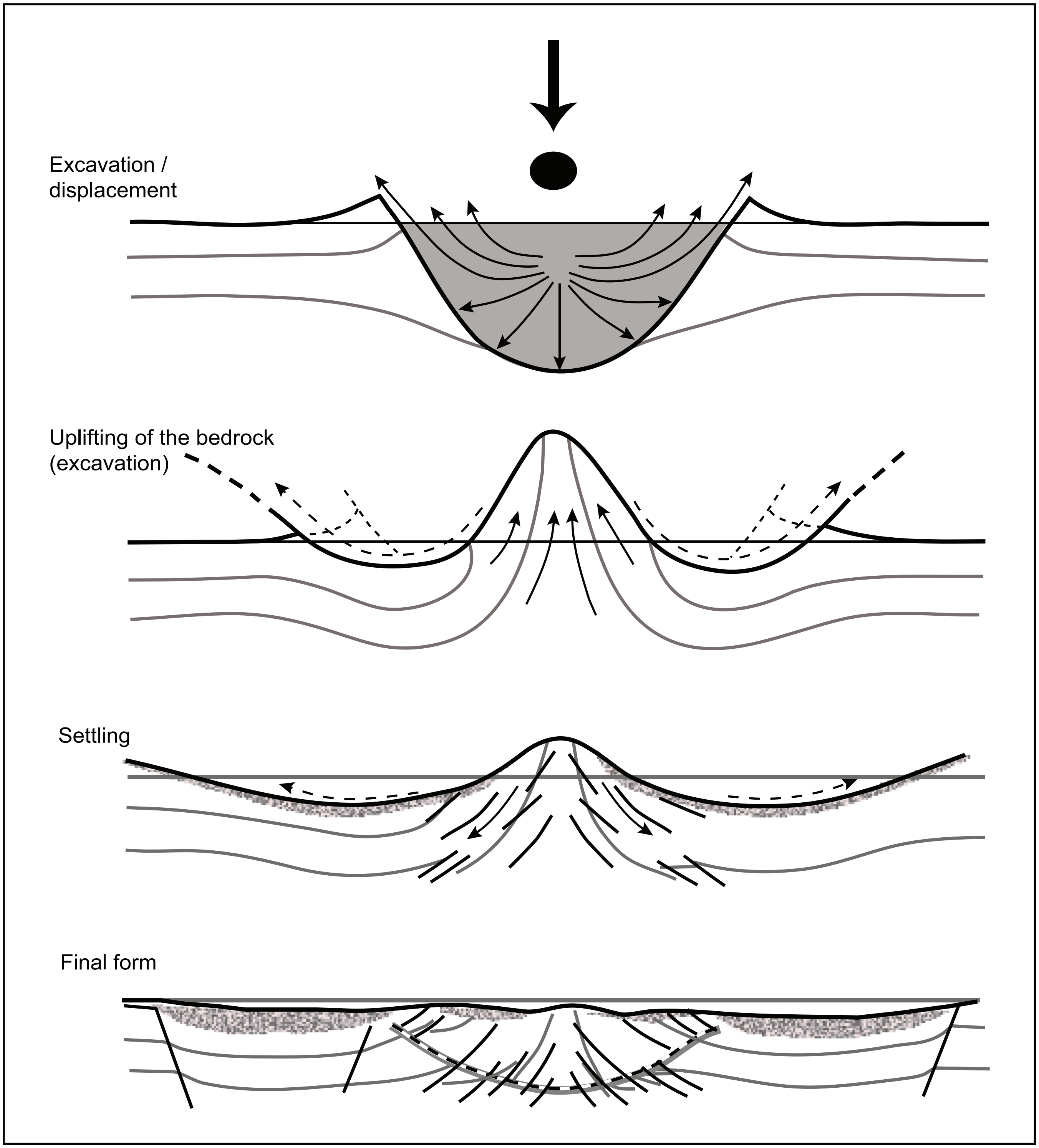
At the beginning of the Tertiary, average annual temperatures at sea level were slightly higher than 20°C (Tricart and Cailleux, 1965). These temperatures gradually began to dip after 30 Ma to reach close to 0°C by the end of the Tertiary. They dropped below the freezing point several times during the Quaternary.

The Quaternary was marked by successive periods of continental glaciation and climatic warming. On several occasions, Canada was covered by immense ice caps. Remnants of the last glaciation have been identified in the study area, although this last period likely erased all traces of previous glaciations. The events of the Quaternary that mark the landforms of the study area are described in the subsection "Geomorphology of the Quaternary".

MINERAL POTENTIAL

Several companies have carried out mineral exploration work in the region since the beginning of the last century, but ceased operations because they were not economically viable (Chandler, 1988; Simard et al., 2004). More recently, the Nunavik Mineral Exploration Fund and the Société québécoise d'exploration minière [mineral exploration corporation] assigned their mineral titles and withdrew from the Umiujaq exploration project south of Lac Guillaume-Delisle (NMEF, May 25, 2004, board of director resolution 05-05-01; MRNF, October 21, 2005, N/D 05293-010).

The islands in the centre of the western basin of Lac à l'Eau Claire mark the periphery of the original crater. The middle and upper layers of the islands comprise impact-ignimbrite and impactites, which with wearing have created talus.



Adapted from Grieve (1982)

The initial phases in the formation of a complex crater are similar to those for a simple crater (Figure 3.7), except the displacement is unstable: the floor of the crater lifts and then falls, creating a shallow crater (depht compared to diameter) with a raised centre.

Figure 3.8 Formation of a Complex Crater: Western Basin, Lac à l'Eau Claire

Quaternary

- Unconsolidated deposits (varying thickness)

Pennsylvanian

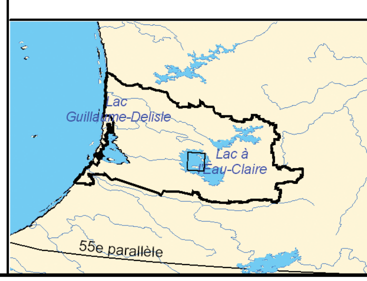
- Impactite (over 85 m)
- Impact-ignimbrite (15 to 20 m)
- Breccia (0 to 30 m)
- Ordovician limestone, enclosed
- Percussion cone
- Proterozoic dyke

Archean

- Host rock

Source: Rondot et al. (1993)

LACS-GUILLAUME-DELISLE-ET-À-L'EAU-CLAIRE PARK PROJECT



Geology
Western Basin, Lac à l'Eau Claire

Base de données topographiques et administratives 1 : 250 000 (BDTA), Ministère des Ressources naturelles et de la Faune du Québec
Base de données de l'aménagement de territoire 1 : 100 000 (BDAT), Ministère des Ressources naturelles et de la Faune
Geodetic datum: NAD 83
Modified transverse Mercator projection
Québec ground-space co-ordinate system, zone 8
Contour interval: 60 m

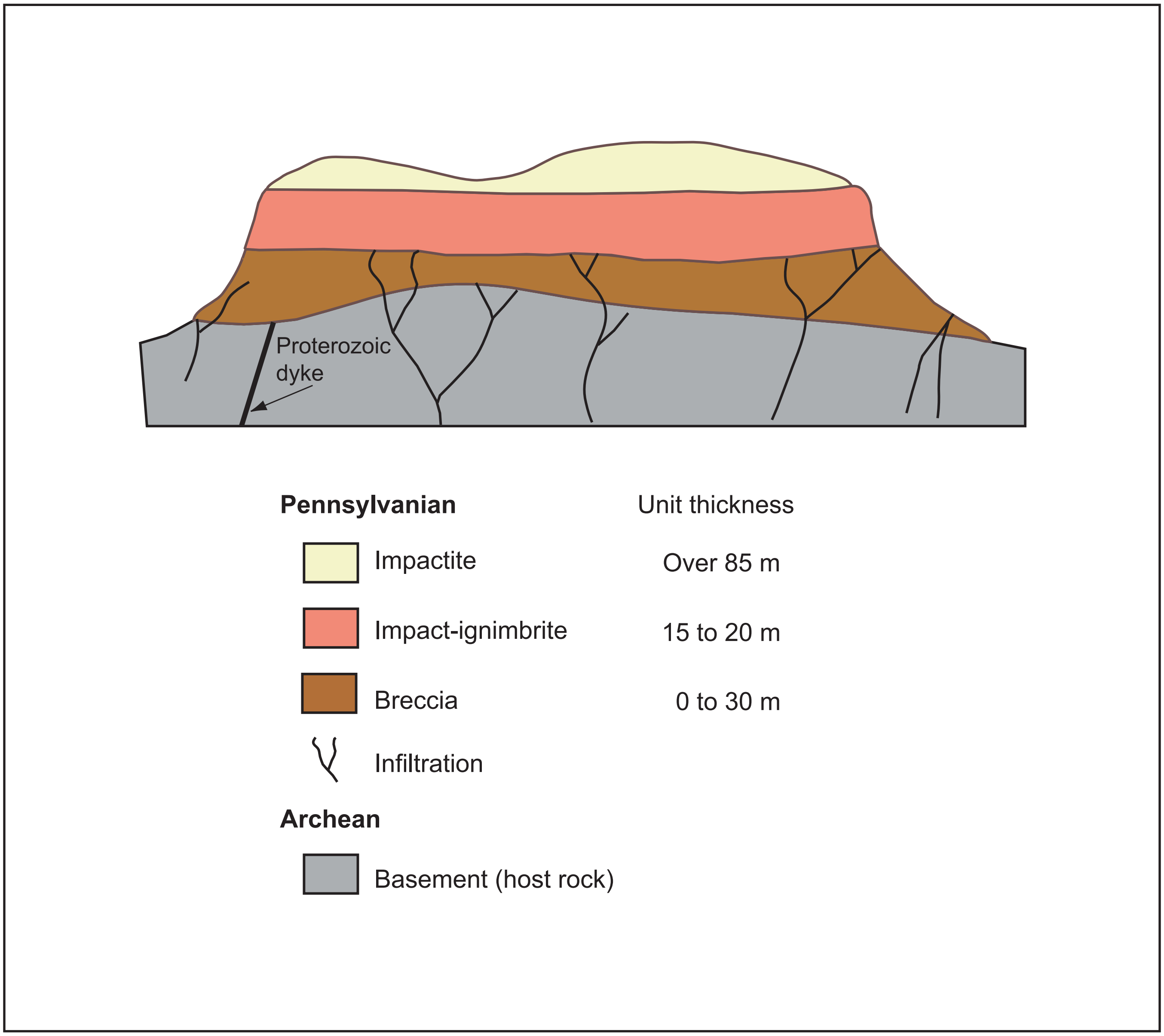
Scale: 1:120,000

0 0.5 1 2 3 4 5 km

KATIVIK

November 2007

Map 3.4



Extracted from Rondot et al. (1993)

Schematic cross-section of the three Pennsylvanian units associated with the meteoritic impact, as well as infiltrations in the Archean basement and breccia. Occasionnally, blocks of altered Ordovician limestone may be observed enclosed in the impactite. These blocks differ from other Ordovician limestone blocks that were not altered but were transported in the unconsolidated deposits of the Quaternary, observable along river banks.

Figure 3.9 Schematic Cross-Section of the Central Islands, Western Basin, Lac à l'Eau Claire

In the volcanic and sedimentary sequences of the Lac Guillaume-Delisle sector, copper and silver showings are concentrated in the upper layer of the basalt rock flows of the Persillon Formation in the Richmond Gulf Group (NMEF, 2004). The grades, while high in places, are discontinuous and of little economic interest (Map 3.2).

Occurrences of lead, zinc and silver are sometimes high in the cabonate-bearing horizons of the Nastapoka Group (cuestas) (Chandler, 1988), but the identified sites are situated in rugged territory under a thick layer of basalt on Umiujaq Category I lands (Labbé and Lacoste, 2004). These factors combined together represent serious development constraints.

The graben and aulacogene zone stretching from the coast of Hudson Bay to Lac D'Iberville in the eastern portion of the study area as well as the north–south corridor north of Lac à l'Eau Claire represent interesting sectors for diamond prospecting (Simard et al., 2004). Elsewhere, the mineral potential is less known and appears relatively poor (J.Y. Labbé, MRNF, written communication, October 2006).

In brief, the sectors that possess the greatest potential for exploration are situated in the graben and in the zone of contact between the Archean basement and the graben. Overall, although the geological conditions of the study area present certain high-grade occurrences, these are incongruous and offer little economic potential.

MAIN GEOLOGICAL EVENTS

The geology of the study area, lying on the Hudson Plateau, is representative of the Superior Province north of the La Grande Rivière [Great Whale River]. The granitic rocks were formed from magma during the Kenoran Orogeny, which occurred late in the Archean. South of the La Grande Rivière, the basement is older and comprised largely of metamorphosed sediment, including volcanic and intrusive rocks.

On the coast, the volcanic and sedimentary formations referred to as the Hudson Cuestas and the graben cover the Archean basement and date from the Proterozoic. They represent a subdivision of the Superior Province, but are clearly distinct from the rest of the study area in terms of their rock formation and their monoclinal structure.

Roughly 1.5 billion years elapsed before any further events disturbed the surface of the Hudson Plateau. After erosion had largely flattened the region, towards the end of the Paleozoic, two meteorites simultaneously struck the basement. Subsequent erosion cleared away most of the impactites, except on the islands located in the centre of the western basin of Lac à l'Eau Claire. These islands expose the rock units created by impact metamorphism.

The most recent geological events that created the landforms of the study area date from the end of the last glaciation during the Quaternary.

Geomorphology of the Quaternary

At the beginning of the Quaternary (circa 1.6 Ma), the study area likely looked much the same as today, which is to say a flat territory broken by the graben and many valleys. Climatic cooling and continental glaciers nonetheless etched cosmetic changes in the landforms. The main events of the Quaternary that marked the study area are described in Table 3.7 and illustrated on Map 3.5.

MAJOR GLACIATION

During the Quaternary, several periods of climatic cooling lead to the formation of ice caps in the Northern hemisphere. In Canada, the last glaciers of the Wisconsin erased most traces of previous glaciation.

The weight of these glaciers caused the earth's crust to sink (isostatic depression) and, as the earth's water was stocked in the growing ice caps, sea levels dropped (eustasy). With climatic warming, water returned to the oceans and sea levels rose, leading to the inundation of low-lying regions until the sunken continent began to rebound.

WISCONSIN GLACIATION

The Wisconsin (80–10 ka) began with the formation of the Laurentide Ice Sheet, the largest continental glacier to exist during the Quaternary (Dyke and Prest, 1987). The ice sheet possessed several dispersion centres across Canada all the way to the Rockies (Cordilleran Ice Sheet). In particular, the Labrador Dome (and partially the Hudson Dome in the south) covered the study area (Figure 3.10).

Dyke and Prest (1987) suggested in their paleo-geographic summary that the last major advance of the ice sheet took place between 23 and 18 ka. At that moment, the Labrador Dome was centred roughly 400 km south of the study area and was roughly 3000 m thick (Sugden, 1977). The Dome gradually moved northeastward before completely melting in the centre of Québec around 6 ka. A north–south ice divide ran along the eastern boundary of the study area, situated approximately along the current watershed between the Ungava Bay and Hudson Bay drainage basins.

Between the study area and Lac Bienville [Lake Bienville] to the south, Parent et al. (2002) identified early ice movement towards the north-northeast that gradually veered northward. Between roughly 18 and 9 ka (Dyke and Prest, 1987), the second to last glacier flowed towards the northwest (Parent et al., 2002) while, between 8.4 and 7 ka, the last and largest glacial flow moved across most of the region from east to west (from the northeast to the southwest in the Lacs des Loups Marins sector) (Prest et al., 1970; Allard and Seguin, 1985; Dyke and Prest, 1987; Gray et al., 1993; Parent et al., 2002).

Glacial Landforms

Sugden's maximum glacier dynamics model (1977) proposes that thermal regime contrast zones that existed at the base of the glacier are revealed in glacial landforms.

Table 3.7 Events of the Quaternary

GEOLOGICAL PERIOD	AGE (ka)[1]	MAIN EVENTS IN THE EVOLUTION OF THE QUATERNARY LANDFORMS (From most ancient, bottom of table, to most recent, top of table)
CENOZOIC		
		Climatic warming of a few degrees Celsius expected by 2050
QUATERNARY	**Today**	Periglacial, ice, fluvial and marine activity, associated landforms and deposits (talus, ground movement, wind activity, erosion and sedimentation); isostatic lifting of 1–1.2 m/century; permafrost degradation
Little Ice Age	0.5–0.1	Recent climatic cooling followed by warming after 1850
Neoglacial	4	Climatic cooling, expansion of permafrost
	5	Tyrrell Sea (marine regression); minor isostatic lifting; cutting of watercourses
	6	Disappearance of ice sheet (centre of Québec); moderate isostatic lifting
	7	Glacier on the craters (Eau Claire glacial lake) and in the Lacs des Loups Marins sector; first peat bogs
Hypsithermal	8-7.5 8.5	Warming; beginning of deglaciation of the study area; Tyrrell Sea transgression along the coast and in valleys; major isostatic rebounding; final glacial flow E–W (NE–SW, Lacs des Loups Marins sector)
Holocene	**10**	General climatic warming; rapid deglaciation across the continent Second last glacial flow towards the NW
Late Wisconsin	23-18	Last major expansion of the ice sheet: early flowing of ice N–NE, veering to the N
Middle Wisconsin	65-23	Erosion and deposit landforms (no direct evidence in the study area)
Early Wisconsin	80-65	Erosion and deposit landforms (no direct evidence in the study area)
Wisconsin	**80**	Glaciation: formation and expansion of the Laurentide Ice Sheet
Sangamonian	130-80	Interglacial stage (climatic warming)
Illinoian	?-130	Glaciation (no direct evidence in the study area)
	?	?
Pleistocene	**1.6 Ma[2]**	Onset of major glaciation in North America
TERTIARY	65-1.6 Ma	Climate warmer than today's climate, selective erosion; gradual climatic cooling (30–1.6 Ma)

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

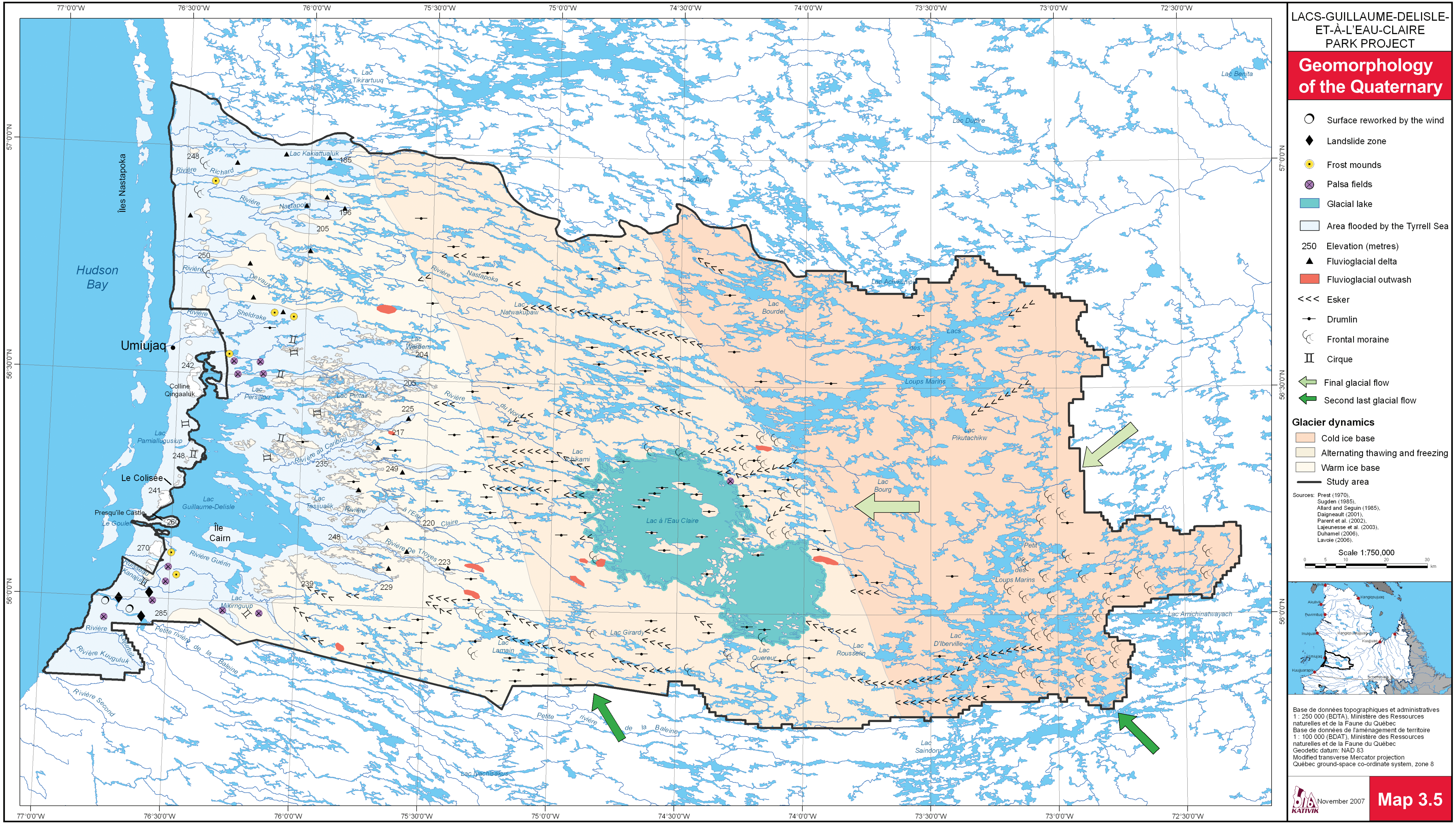
Sources: Allard and Seguin (1985), Dyke and Prest (1987), Fulton (1989), Daigneault (2001), Duhamel (2006), Lavoie (2006), Marchildon (2006)

In the eastern portion of the study area (Lacs des Loups Marins to Lac D'Iberville), the cold ice base of the glacier resulted in little or no erosion or ice movement. Consequently, the area is marked by major deposits (lodgement till, moraines).

In the central portion of the study area (Lac à l'Eau Claire sector and upstream section of the Rivière Nastapoka valley), the glacier possessed an active base (alternating thawing and freezing referred to as warm freezing ice) that resulted in major erosion and ice movement, as well as producing smooth rock surfaces and scattered till veneer (lodgement till and ablation). This area includes a concentration of drumlins and crag-and-tail moraines. In particular, the islands in the centre of the western basin of Lac à l'Eau Claire are good examples of rock drumlins (Map 3.5).

Along downstream sections of the study area's river valleys and in the coastal zone where the base of the glacier was relatively warm (warm melting ice), the axes of erosion and accumulation landforms indicate the direction travelled by the glacier.

On the Eau Claire Plateau, narrow structural valleys resemble, in places, sub-glacial gorges, with smooth polished walls, but not glacial u-shaped valleys. Over the interfluves, glacial till is thin and discontinuous.



LACS-GUILLAUME-DELISLE-ET-À-L'EAU-CLAIRE PARK PROJECT
Geomorphology of the Quaternary
Surface reworked by the wind
Landslide zone
Frost mounds
Palsa fields
Glacial lake
Area flooded by the Tyrrell Sea
250 Elevation (metres)
Fluvioglacial delta
Fluvioglacial outwash
Esker
Drumlin
Frontal moraine
Cirque
Final glacial flow
Second last glacial flow
Glacier dynamics
Cold ice base
Alternating thawing and freezing
Warm ice base
Study area
Sources: Prest (1970), Sugden (1985), Allard and Seguin (1985), Daigneault (2001), Parent et al. (2002), Lajeunesse et al. (2003), Duhamel (2006), Lavoie (2006).
Scale 1:750,000
0 5 10 20 30 km
Base de données topographiques et administratives 1 : 250 000 (BDTA), Ministère des Ressources naturelles et de la Faune du Québec
Base de données de l'aménagement de territoire 1 : 100 000 (BDAT), Ministère des Ressources naturelles et de la Faune du Québec
Geodetic datum: NAD 83
Modified transverse Mercator projection
Québec ground-space co-ordinate system, zone 8
KATIVIK
November 2007
Map 3.5
Hudson Bay
Îles Nastapoka
Umiujaq
Lac Guillaume-Delisle
Île Cairn
Lac à l'Eau Claire
Le Colisée
Presqu'île Castle
Colline Qingaaluk
Lac Kakiattualuk
Rivière Nastapoka
Lac Bourdel
Lacs des Loups Marins
Petit lac des Loups Marins
Lac Pikutachikw
Lac D'Iberville
Lac Rousselin
Lac Querceur
Lac Girardy
Lac Lamain
Lac Mikirnguup
Rivière Guérin
Rivière De Troyes
Rivière au Caribou
Rivière du Nord
Rivière Sheldrake
Rivière Devaux
Rivière Richard
Petite rivière de la Baleine
Rivière Kuuguluk
Rivière Second
Lac Saindon
Lac Achikunipi
Lac Amichinatwayach
Lac Audie
Lac Duplre
Lac Benita
Lac Tikirartuuq
Lac Natwakupaw
Lac Wardem
Lac Persillon
Lac Tasijualik
Lac Pamiallugusiup
Kangiqsujuaq
Akulivik
Puvirnituq
Inukjuak
Kangiqsualujjuaq
Kuujjuaq
Umiujaq
Kuujjuarapik
Schefferville

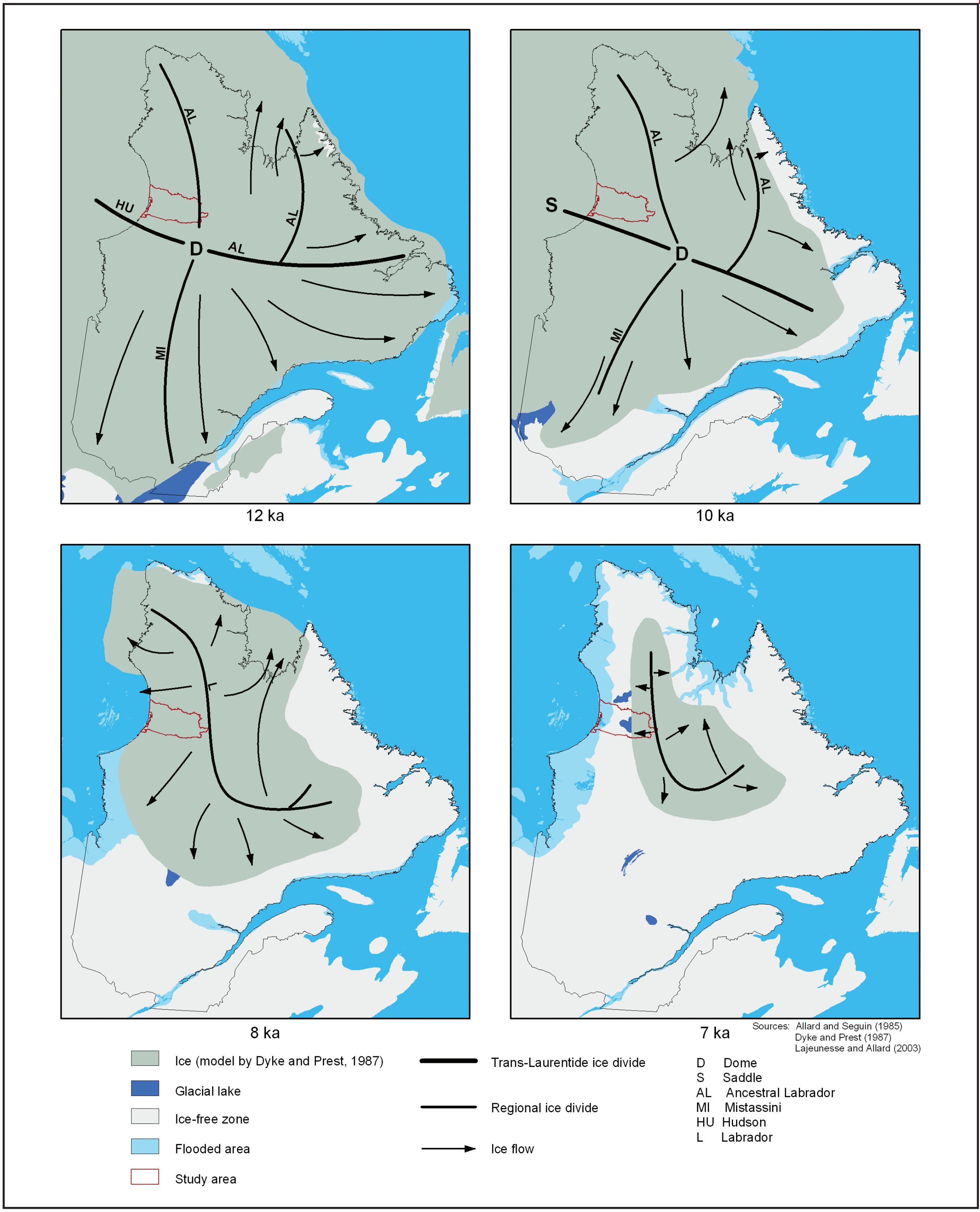


Figure 3.10 Paleography of Québec between 12 and 7 ka

Daigneault (2001) mapped the cirques around the graben, in areas with the strongest topographical energy. These cirques were eroded by small glaciers and have an average size of 10 ha (0.1 km^2). The largest is located southeast of Lac Mikirnguup [Lake Mikirnguup] and is 1 km^2 (Map 3.5). It is possible that the formation of these cirques began before the Wisconsin and ended with the Holocene.

Minor erosion (glacial polishing and striation) is observable on the back slopes of the cuestas and in the Rivière Sheldrake [Sheldrake River] zone (Allard and Seguin, 1985). Striation indicates glacial flow directions between 250 and 280°. It also appears that local flow was affected by significant topographical features (cuestas and the graben). In the southeast portion of Lac Guillaume-Delisle and on a few islets, glacial flow directions also varied between 270 and 280° (grooves, asymmetric rocks or stoss-and-lee forms, striation).

HOLOCENE AND DEGLACIATION

The Holocene began around 10 ka and was marked by significant climatic warming that lead to the melting of the continental glacier in the centre of Québec around 6 ka (Dyke and Prest, 1987). Between 8.4 and 8 ka, the continental glacier divided: the Labrador Dome, which is referred to as the Nouveau-Québec glacier at this stage (Hardy, 1976 in Hardy, 1982), became separated from the Hudson Dome to the west and the Canadian Arctic Dome to the north, exposing the region to flooding from the Tyrrell Sea (Figure 3.10).

Around 8 ka, the front of the Nouveau-Québec glacier halted its retreat on the coast of Hudson Bay north of Umiujaq, producing ice-contact deposits under the sea (Lajeunesse and Allard, 2003; Lavoie, 2006). The Le Goulet zone would have been freed from under the glacier a little earlier, circa 8.2 ka (Lavoie, 2006). Deglaciation of the Lac Guillaume-Delisle sector, for its part, began around 7.7 ka (Hilaire-Marcel, 1976; Allard and Seguin, 1985). As the glacier retreated and weight was removed from the earth's crust, isostatic rebounding occurred. This rebounding was not uniform in all zones (differential isostatic rebound) since the thickness of the glacier was greater in the graben than on the plateau.

The islands in the centre of the western basin of Lac à l'Eau Claire consist of rock created by the meteoritic impacts. Scouring the islands, the glaciers scattered long unconsolidated deposits (rock drumlins). Their axes provide evidence that the glaciers flowed westward [right to left].

Isostatic rebounding was rapid at the beginning of this period, averaging 10.4 m per century east of the cuestas at Lac Guillaume-Delisle, in the valley of the Rivière à l'Eau Claire (Allard and Seguin, 1985). In the valley of the Rivière Nastapoka, isostatic rebounding was roughly 9.6 m per century. By 7 ka, once the glacial front had retreated as far as Lac à l'Eau Claire, isostatic rebounding was 6.5 m per century. By 6.5 ka, the glacier was no longer present in the study area. Over the last 2800 years, the rate of isostatic rebound has been 1.2 to 1.5 m per century (Ricard and Bégin, 1999; Fraser, 2001).

Continental Glacier: Final Phase

The landforms and deposits produced during the final phase of glaciation, less than 10 ka, are drumlins, frontal moraines, eskers and fluvial outwash.

Drumlins have been mapped throughout the Archean plateau (Prest, 1970; Allard and Seguin, 1985; Daigneault, 2001) and are especially concentrated in the central portion (Map 3.5). Their axes provide evidence of the east to west direction of the final glacial flow.

The small frontal moraines identified between Umiujaq and the Rivière Nastapoka mark a halt in the glacier's retreat around 8 ka (Lajeunesse and Allard, 2003). A north–south morainic ridge crosses baie Crafton or Crafton Bay (Lac à l'Eau Claire, western basin, southwest portion) (Allard and Seguin, 1985).

The Rogen Moraine, which was created parallel to the glacial front, lies northeast of Lac à l'Eau Claire, northwest of Lac Lamain [Lake Lamain] and along the Rivière De Troyes [De Troyes River] (Daigneault, 2001; Map 3.5, refer to frontal moraine). The De Geer Moraine is smaller than the Rogen Moraine. The De Geer Moraine is a series of ridges produced by repeated annual accumulations of till in a body of water that had formed along the front of the retreating glacier (Sugden and John, 1979). West of Lac Pintair [Lake Pintair], till accumulated in the Tyrrell Sea (Daigneault, 2001). The distances between the moraine ridges vary between 100 and 150 m, suggesting an annual glacial retreat of roughly 150 m annually. In the Lac Guillaume-Delisle sector, Hilaire-Marcel (1976) measured glacial retreat at about the same rate. In the valley of the Rivière Nastapoka, Allard and Seguin (1985) measured the average rate of glacial retreat at 108 m annually based on a series of five ridges in the De Geer Moraine.

Ribbed moraines (small, arcuate moraines with irregular ridges; Map 3.5, refer to frontal moraine) were mapped by Prest (1970) west of Petit lac des Loups Marins. They were created on the edge of the final glacier of the Wisconsin.

Landforms and deposits created by melt-waters or by glacial disintegration and downwasting are generally located above the maximum elevation associated with the Tyrrell Sea (Daigneault, 2001).

Many eskers may be found south and east of Lac à l'Eau Claire. One in particular runs for 50 km between the Rivière De Troyes and Lac Girandy [Lake Girandy]. Other long eskers cross lakes in the eastern portion of the study area (Lac D'Iberville) and the valley of the Rivière Nastapoka (Lac Natwakupaw). Their axes, which run east–west or northeast–southwest (Lacs des Loups Marins sector) indicate the flow direction of melt-waters and the retreating glacier. They are often associated with kame terraces that cover wide areas of the upstream sections of the study area's river valleys.

Fluvial outwash formations comprise materials carried away from the glacier by melt-waters. They form wide, flat areas that are often pot-marked by kettles and slashed by melt-water channels. These formations can be found around Lac à l'Eau Claire and in most valleys of the Hudson Plateau at elevations above 200 or 250 m (Map 3.5).

Esker located not less than 20 km northeast of Lac à l'Eau Claire, on the Hudson Plateau
Credit: Josée Brunelle (KRG)

TYRRELL SEA

The Tyrrell Sea flooded the study area around 8 ka while the coast of Hudson Bay was still weighed down by the continental glacier (Allard and Seguin, 1985; Lavoie, 2006). The marine transgression occurred at the same time as deglaciation, which is to say that the sea flooded the area right up to the front of the glacier as the glacier was retreating eastward. Marine erosion would have accelerated the retreat of the glacier early in the deglaciation period. Fraser (2001) also concluded that post-glacial sea levels began to drop as soon as the glacier had retreated inland and isostatic rebounding began. In this respect, a study by Lavoie (2006) revealed the presence of ice-contact marine deposits on the bottom of Lac Guillaume-Delisle.

The emergence curve prepared by Lavoie (2006) shows that the Tyrrell Sea was largest as deglaciation reached the coast and regressed rapidly as the glacier continued to retreat (Figure 3.11). Between 8 and 6 ka, which is to say over a period of 2000 years, the sea level dropped by 150 m, from an elevation of 250 to 100 m. During this period, cataclinal corridors cut through the cuestas. One example is the Rivière Kajurtuit in the southern portion of the study area which, at one time, would have resembled Le Goulet today. The rate of isostatic rebounding slowed considerably after 6 ka. Approximately 3000 years ago, sea level was at an elevation of 50 m while 500 years ago it was only 10 m above its current level.

In the study area, the elevation of marine terraces or deltas provide evidence of the maximum elevations of the Tyrrell Sea. At Le Goulet, the sea's elevation was 270 m around 8.2 ka, and 250 m around 8 ka along the coast of Hudson Bay, north of Umiujaq (Lavoie, 2006). The sea once reached 239 m southeast of Lac Guillaume-Delisle and 285 m near the mouth of the Petite rivière de la Baleine (Prest, 1970; Hilaire-Marcel, 1980, in Allard and Seguin, 1985; Allard and Seguin, 1985; Dyke and Prest, 1987; Daigneault, 2001; Duhamel, 2006; Lavoie, 2006). Marine deposits have also been identified 45 km east of Lac Guillaume-Delisle at varying elevations (Map 3.5) :

- Rivière Nastapoka valley and coastal zone: 185–250 m
- Rivière du Nord valley: 205 m
- Rivière au Caribou valley: 225–249 m
- Rivière à l'Eau Claire valley: 220 m
- Rivière De Troyes valley: 223–248 m

At the height of the marine transgression, the peaks of the cuestas were islets or shoals, like the Nastapoka Islands today, while the graben and the downstream sections of the study area's river valleys were flooded by not less than a hundred metres of water. Unconsolidated deposits were swept from the back slopes of the cuestas by wave and current action (wash-away zones). The upper limit of these zones indicates the maximum elevation of the post-glacial sea (Lauriol, 1982; Lauriol and Gray, 1983).

Shallow-water deposits of sand, gravel, stones and sometimes blocks reveal the different levels of the Tyrrell Sea. Shoreline deposits and deltas are observable around Lac Guillaume-Delisle, near the Petite rivière de la Baleine and at the maximum elevations of the post-glacial sea (Parent and Paradis, 1994, on unconsolidated formations in the region).

Shoreline deposits created beaches while wave action formed erosion notches. Beaches are situated on the back slopes of the cuestas and around Lac Guillaume-Delisle, in particular at the Coliseum (informal name) and on the southeast side of Île Cairn. In the river valleys, beaches cover terraces, or they mark re-worked glacial and fluvioglacial deposits. Step beaches were formed during the repeated and irregular retreats of the Tyrrell Sea.

Deltaic deposits are largely composed of sand material (Daigneault, 2001) and are found in the study area's river valleys. Near the maximum limit of the Tyrrell Sea, these fluvioglacial deltas are observable as high as an elevation of 250 m (Lavoie, 2006). Along the eastern shore of Lac Guillaume-Delisle, at the mouths of the main rivers, other perched deltas are observable at elevations below 65 m. These formations are more recent than the deltas described immediately above. The perched delta at the mouth of the Rivière à l'Eau Claire covers roughly 8 km^2 and is the most impressive of all. Its step terraces below elevations of 50 m mark halts in the retreat of the Tyrrell Sea over the last 3000 years (Figure 3.11).

Deep-water deposits are common in the graben and in the downstream sections of the study area's river valleys. They form flat areas punctuated by rock mounds, and are largely composed of clay and silt as well as containing fossils (Paradis and Parent, 1997; Lavoie, 2006). Along the banks of the Petite rivière de la Baleine, these deposits are between 20 and 30 m thick and are often covered with sand deposits.

EAU CLAIRE GLACIAL LAKE

The melt-waters of the eastward retreating glacier filled the meteorite craters of Lac à l'Eau Claire around 7 ka (Dyke and Prest, 1987). While the glacial lake was not joined directly to the Tyrrell Sea as a result of differential isostatic rebounding during deglaciation, it emptied into the Tyrrell Sea through the Rivière à l'Eau Claire (Allard and Seguin, 1985).

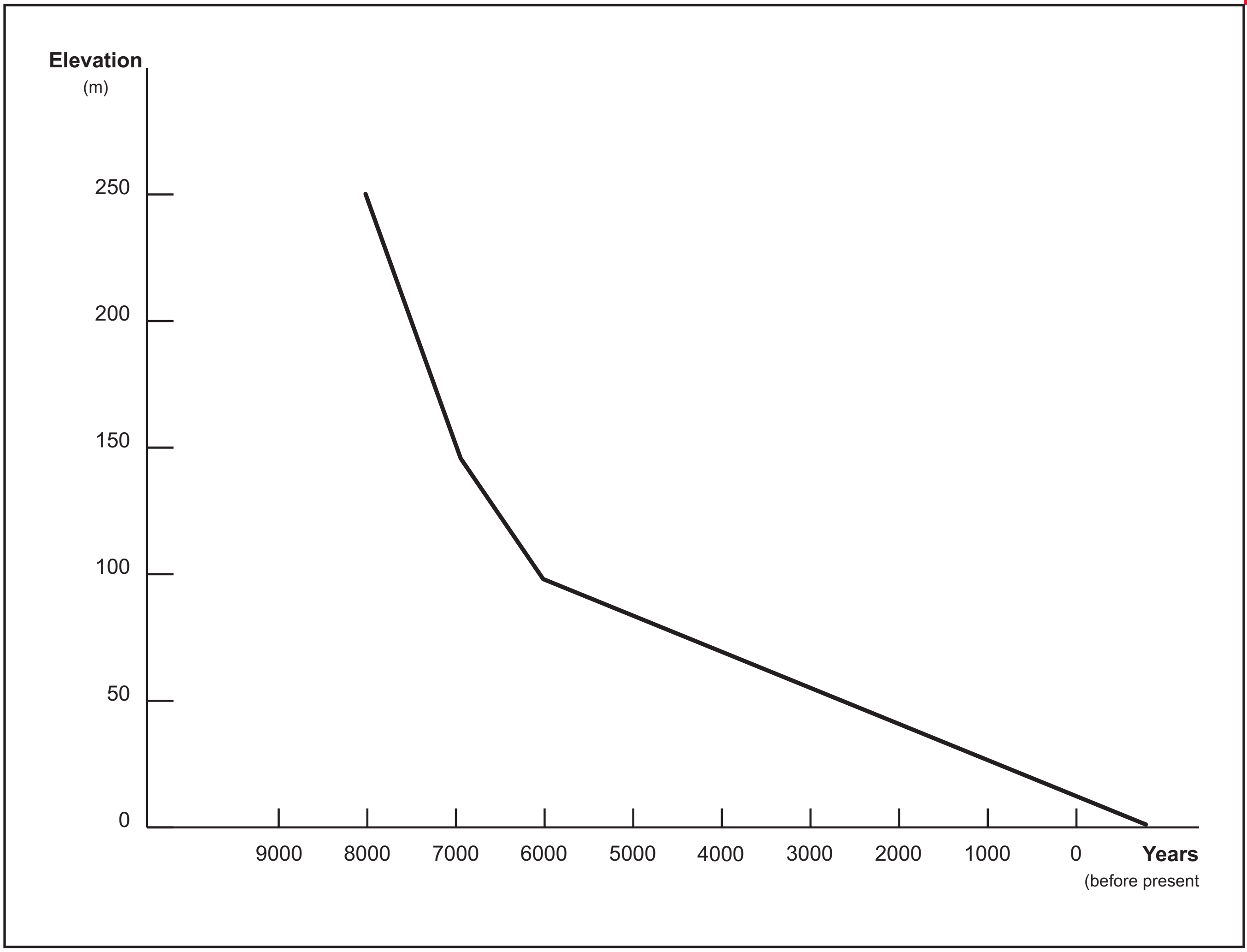
Shoreline phenomena such as deltas, beaches, notch erosion in till and reworked deposits are observable around the lake and on the islands in the centre of the western basin. They are located at elevations between 242 and 260 m (Allard and Seguin, 1985; Daigneault, 2001), or roughly 20 m higher than today. Deltas are concentrated along the east shore of the eastern basin and northeast shore of the western basin. To the west, the average elevation of the paleo-shoreline is 3.8 m above the lake's current level, while in the southeast the highest beaches are 16.8 m higher (Allard and Seguin, 1985). This incline from west to east can only be explained by differential isostatic rebounding; the western end of the lake was freed from the weight of the glacier earlier than the eastern end. Lac à l'Eau Claire settled at its current level of 238 m around 5 ka.

ACTIVE GEOMORPHOLOGY TO THE PRESENT

With deglaciation, various phenomena occurred and continue to evolve to this day in the study area. These phenomena include fluvial deposits, colluvial deposits, eolian deposits, marine deposits and organic deposits. Periglacial phenomena and landslides have acted on and continue to act on unconsolidated deposits to create new landforms. Information on this topic has been largely extracted from documents prepared by Daigneault (2001) and the Société de la faune et des parc du Québec [wildlife and parks corporation] (2003). Readers may also refer to Parent and Paradis (1994) on unconsolidated formations in the region.

Periglacial Landforms and Permafrost

The study area is situated in a discontinuous permafrost zone (less than 50% of the area is permafrost) (Allard and



Extract from Lavoie (2006)

Figure 3.11 Post-Glacial Emergence Curve of the Lac Guillaume-Delisle Sector

Seguin, 1987a). Specifically, the barren ground of the plateau is continuously frozen to a depth of 100 m, while in the study area's river valleys and under its lakes permafrost is absent or discontinuous, with the exception of the mid-stream section of the Rivière Nastapoka valley.

Marchildon (2006) has proposed that permafrost formed in the Rivière Sheldrake and Rivière Nastapoka zones in three phases: between 2.3 ka and 1.8 ka, between 1.5 ka and 1 ka and during the Little Ice Age (between 500 and 150 years before present). Since roughly 1850, the permafrost of the study area has been deteriorating; between 1957 and 2005 the area covered by permafrost has decreased by 43% while thermokarsts have increased by 65%.

Freezing and permafrost produce destructive processes that create congelifracts and talus, as well as unique formations such as frost mounds and palsen.

(Mineral) frost mounds, or hummocks produced by freezing, have developed in fine marine deposits (Lagarec, 1976, 1980, 1982; Allard et al., 1987). They may be observed along the Rivière Sheldrake, on the back slopes of the cuestas south of Umiujaq, and finally southwest of Lac Guillaume-Delisle (Map 3.5).

Palsen are also mounds produced by freezing, but they develop in organic material. Palsa fields stretch for a few square kilometres north of the Rivière du Nord and near the Petite rivière de la Baleine. Palsen appear not to have developed more than 20 km east of Lac Guillaume-Delisle, except on the east shore of the western basin of Lac à l'Eau Claire (Daigneault, 2001).

The deterioration of frost mounds and palsen in the study area has intensified since climatic warming began after 1850, resulting in the creation of many small, circular depressions referred to as thermokarst ponds (Marchildon, 2006).

Erosion and Accumulation

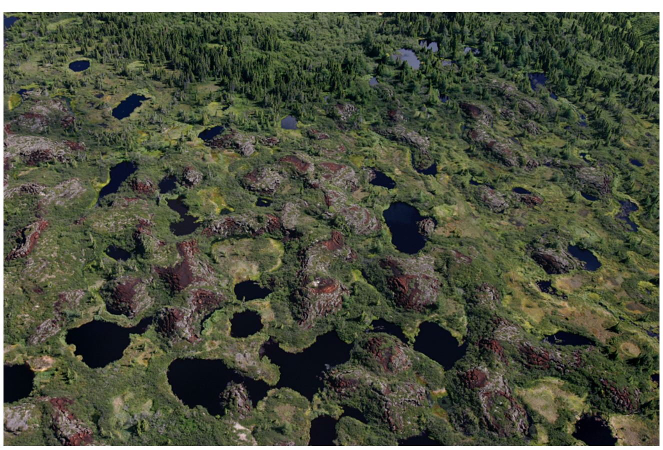
Mass wasting is observable in the marine deposits found in the coastal zone of the study area. Mass wasting is crescent-shaped scarring that transports talus to the base of slopes, creating a series of rims. This phenomenon is common along the Petite rivière de la Baleine, roughly 10 km from the coast. It is produced by gravity and unstable banks undercut by the river. The entire plain situated in the graben east and south of Lac Guillaume-Delisle is composed of deposits that are vulnerable to mass wasting (Map 3.5). This includes sandslides (Parent and Pineau, 1985) which affect sand talus and are common on the concave banks of rivers.

Colluvial deposits form cones and talus at the foot of especially frost-riven slopes. Specifically, the volcanic and sedimentary sequences create talus steps on the face of the cuestas, like in the Paleozoic bedrock of the islands in the centre of the western basin of Lac à l'Eau Claire (Dionne, 1976; Marion, 1994; Marion et al., 1995, Lafortune, 2001). These accumulations are imposing, and are sometimes over 100 m high. In the river valleys of the study area, where the ground is granitic, massive and less frost-sensitive, talus is less common. Talus may be observed at the foot of escarpments and vegetation is often present.

Fluvial deposits of sand, gravel and a certain quantity of organic material form alluvial plains, deltas and alluvial cones, or they may fill ancient river beds. They are produced by the erosion of rock or the reworking of unconsolidated deposits.

Thermokarsts and thermokarst ponds on the back slope of a cuesta. Frost mounds develop in fine marine deposits. When they deteriorate and melt, they create a slightly rimmed depression.

Landslide of marine deposits near the Petite rivière de la Baleine



Palsen and thermokarst ponds near the Petite rivière de la Baleine
Credit: Josée Brunelle (KRG)

South of the Petite rivière de la Baleine, sand deposits of the Tyrrell Sea have been reworked by wind along the base of this cuesta. Talus has formed [right].

Fluvial deposits cover small areas here and there along river banks. In the case of meandering rivers, fluvial deposits form on convex banks; the downstream section of the Rivière au Caribou provides a good example of this phenomenon.

The eolian deposits and deflation zones in the study area are marine and fluvioglacial sand deposits that have been reworked by the wind. On the back slopes of the cuestas, these deposits form eastward-pointing dunes, which means they were produced by winds from the west. Along the coast, the largest dunes are not less than 20 km south of Umiujaq. On both banks of the Petite rivière de la Baleine, terrace surfaces are wind swept (deflation zones). A few dune fields have also developed on the deltas of the paleo Lac à l'Eau Claire. The dunes observable northeast of the western basin have been produced by strong northeast winds (Filion and Morisset, 1983). The sandy surfaces, even when vegetation is present, are vulnerable to erosion.

Organic deposits and peat bogs in the study area are generally small in size, unlike the southern portion of the Hudson Plateau (James Bay region). Organic deposits cover gently sloping rock and unconsolidated deposits with poor drainage, which is to say low-lying areas and areas near lakes. They are present south of Lac Guillaume-Delisle where they often produce palsen, and around Lac à l'Eau Claire. According to Marchildon (2006), the first peat bogs in the study area developed between 7 and 5.5 ka and further expanded between 5 and 3.2 ka.

Recent and current marine deposits form the shoreline of Hudson Bay and Lac Guillaume-Delisle. They are worked by the tides, sea ice (drift ice phenomenon) and currents.

Isostatic Rebounding in Recent Centuries

Most recently, the rate of isostatic rebound has been 1 to 1.2 m per century (1 to 1.2 cm/year) on the east coast of Hudson Bay (Ricard and Bégin, 1999; Lavoie, 2006). This slow rate has created beach steps located at short intervals. If the rate of isostatic rebound remains unchanged Lac Guillaume-Delisle will be cut off from Hudson Bay within 2000 years and will transform into a fresh water lake (Archambault, 1997), like Lac Persillon [Lake Persillon] and Lac Mikirnguup, among others, which were separated from Lac Guillaume-Delisle as the continent rebounded. Notwithstanding, isostatic rebounding should at some point end, once the continent has returned to its pre-glaciation position.

MAIN EVENTS OF THE QUATERNARY

The study area reveals many representative paleo-geographic events that would have occurred during the Quaternary in the natural regions of the Hudson Plateau and Hudson Cuestas. First, the ice cap of the Wisconsin straddled the southern and eastern portions of the region and the last glacier advance flowed from east to west. Deglaciation occurred throughout the study area between 8 and 6.5 ka, while the glaciers retreated eastward. Moraines are uniformly spread throughout the plateau, but are almost entirely absent from the coastal zone.

When deglaciation reached the coast, the Tyrrell Sea followed the glacial front inland to an elevation of 240 m. With the retreat of the glacier, the rate of isostatic rebounding was rapid (averaging 7 cm/year), before slowing considerably after 6 ka. Today, the rate of isostatic rebounding is 1 cm year.

With respect to natural regions, evolution over the last few thousands of years has not been uniform in all zones. On the Hudson Plateau, the intensity and range of periglacial phenomena decrease from north to south, from a hemi-arctic climatic zone (lichen tundra) where permafrost is present in less than 50% of the area to a sub-arctic zone (taiga) where permafrost is present in less than 2% of the area.

The Hudson Cuestas are part of the hemi-arctic zone where permafrost is common with concentrations of palsen and frost mounds. As well, along the coast, the large variety of rock formations, topography and unconsolidated deposits that are affected differently by erosion and freezing foster a dynamic evolution of landforms, compared with the more homogeneous plateau. For example, in the Petite rivière de la Baleine zone, areas of talus, dunes, palsen and landslides are all observable. For these reasons, the cuestas offer more sites of interest than the plateau.

Hydrography

The rivers and lakes of the study area are part of the Hudson Bay drainage basin, which in turn empties into the Atlantic Ocean. The Hudson Bay drainage basin comprises several sub-basins. Their drainage patterns are determined by geological structure, topography and the distribution of unconsolidated deposits. As is the case for the entire Hudson Plateau, the study area is fragmented and angular making it difficult to precisely identify watersheds. Along the coast of Hudson Bay, drainage patterns are adapted to the cuesta-type rock structure and a plain filled with marine deposits. Water is an important element of the study area, covering close to 25%.

DRAINAGE BASINS

The study area consists of nine main drainage basins. The two largest are the Rivière Nastapoka (13,048 km^2) and the Rivière à l'Eau Claire (5,275 km^2) (Map 3.6, Table 3.8). The drainage basins of the study area are small compared to major drainage basins in Nunavik and Québec, which often exceed 30,000 km². The study area includes the mouth of the Petite rivière de la Baleine, but not the downstream section of the Rivière Sheldrake.

In certain cases, watersheds have been created by geological accidents. For example, the Rivière Nastapoka basin is separated from the Rivière à l'Eau Claire basin by the hills that surround the craters and by the Nastapoka's structural deformation zone (Map 3.2). The Lac Guillaume-Delisle basin is distinct from the study area's other basins due to the structure of the graben and the presence of the cuestas. The western portion of the Lac Guillaume-Delisle basin (cuesta faces) is not part of the study area since it is situated on Umiujaq Category I lands.

The source of the Rivière du Nord is 1 km northeast of the Lac à l'Eau Claire craters. The rocky hills that stand not less than 100 m above the surface of the lake and moraines mark the watershed.

Several streams along the coast are independent, draining directly into Hudson Bay. These are the Richard, Patirtuup, Devaux, Kanajulik, Kajurtuit and Kuuguluk. Lac Guillaume-Delisle is fed by five major rivers of the Eau Claire Plateau and is connected with Hudson Bay.

In the eastern portion of the study area, the Rivière Nastapoka basin is separated from the Rivière aux Mélèzes [also known as the Larch River] and Petite rivière de la Baleine basins by moraines. As well, situated southeast of the study area, the headwater lakes Amichinatwayach and Saindon drain into both the Petite rivière de la Baleine and the Rivière Nastapoka (Hydro-Québec, 1993a). This phenomenon is attributable to the flattened and elevated topography, the geographical position of the headwater lakes on the watershed between two drainage basins, the large size of the lakes and the arrangement of moraines which redefined the watershed and redirected flow. In Québec, which was once covered by glaciers, although this phenomenon is not uncommon, it is surprising.

LAKES

The study area includes roughly 1450 lakes (based on maps at a scale of 1:250,000) with a large majority covering less than 10 km². The sizes of the study area's largest lakes are provided in Table 3.9.

Lacs des Loups Marins Sector

In the eastern portion of the study area, the Lacs des Loups Marins basin represents an immense natural freshwater reservoir that empties into the Rivière Nastapoka. The basin comprises several large, but generally shallow lakes. The greatest depths measured were 60 m in Lacs des Loups Marins, 40 m in Petit lac des Loups Marins and 12 m in Lac D'Iberville (Hydro-Québec, 1993a). In this sector, the number of lakes, their irregular shape and their sizes seem to have been determined as much, if not more, by the distribution of unconsolidated deposits than by the bedrock structure.

Lac à l'Eau Claire Sector

The plateau between Lac Guillaume-Delisle and Lac à l'Eau Claire includes hundreds of generally small lakes. Except for the gigantic Lac à l'Eau Claire, very few of the other lakes are more than 30 km². They often have elongated shapes and may be confused with rivers.

The Lac à l'Eau Claire sub-basin covers roughly 3600 km², and represents 70% of the Rivière à l'Eau Claire basin. Lac à l'Eau Claire alone represents 25% of the basin. The lake receives water from many lakes and streams and, in turn, empties into the Rivière à l'Eau Claire. Several small lakes arch around the shore of Lac à l'Eau Claire, especially its western basin, and may reflect the meteoritic impact. Even if the unconsolidated deposits, especially present in low-lying areas, may have contributed to an irregular shoreline around Lac à l'Eau Claire, the shape of the shoreline is more a reflection of the zone's geological structure.

Covering 1226 km², Lac à l'Eau Claire is the second largest lake in Québec, after Lac Mistassini (2335 km²), and followed by Lac Bienville (1046 km²) and Lac Saint-Jean (1003 km²) (Natural Resources Canada, 2006).

The eastern basin of Lac à l'Eau Claire has a maximum depth of 178 m, located in the southern portion of the basin (Figure 3.12) (Plante, 1986). The deepest part of the western basin is 103 m, also located in the southern portion of the basin, while the central portion of the basin is relatively shallow. The extreme depth of the lake limits its biological productivity, contributing to the clarity of the water. Lac à l'Eau Claire is classified as an oligotrophic lake (Milot-Roy and Vincent, 1994, in FAPAQ, 2003; Maltais and Vincent, 1997). Lac à l'Eau Claire's average annual water-level range is 57 cm and the maximum measured range is 86 cm (Bégin and Payette, 1989). Spring flooding follows the rate of snowmelt (increases of 0.8 to 1 cm/day) while the water level drops slowly in the fall (less than 0.1 cm/day), suggesting relative stability.

Lac Guillaume-Delisle Sector

Lac Guillaume-Delisle covers 691 km² of the graben. According to the bathymetric chart produced by Lavoie (2006), the lake's maximum depth is 140 m at the foot of the cuestas, near Presqu'île Castle (Figure 3.13). The bottom of the lake

Table 3.8 Drainage Basin Characteristics

DRAINAGE BASIN	AREA (in the study area)* (km^2)	MAIN RIVER (length in kilometres in the study area, excluding headwater lakes)
Rivière Nastapoka	13,048	170
Rivière à l'Eau Claire	5,275	88
Rivière de Troyes	1,572	110
Rivière du Nord	1,357	110
Rivière au Caribou	1,071	80
Rivière Guérin	1,189	80
Petite rivière de la Baleine	572	10
Rivière Sheldrake	160	18
Hudson Bay (north to south)	2,844	–
Rivière Richard	–	20
Ruisseau Patirtuup	–	25
Rivière Devaux	–	50
Lac Guillaume-Delisle	1,641	–
Ruisseau Kanajulik	–	6
Rivière Kajurtuit	–	25
Rivière Kuuguluk	–	25

* Areas calculated using ARC-GIS software

is covered by tens of metres of unconsolidated deposits. This deep section of the lake is the central portion of the graben (north–south axis).

Lac Guillaume-Delisle is connected with Hudson Bay by a narrow channel known as Le Goulet, in the southwest corner of the lake. Le Goulet is a cataclinal corridor. Le Goulet is 5 km long, between 300 and 600 m wide, and 20 m deep. The walls of Le Goulet are 200 m cliffs. At either end of Le Goulet, water depth is greatest; at the Lac Guillaume-Delisle end, south of the peninsula, water depth is not less than 50 m (Lavoie, 2006). Currents in Le Goulet are strong enough to produce a polynya in winter while the rest of Lac Guillaume-Delisle is frozen.

Because it is in contact with salt water, Lac Guillaume-Delisle is considered a brackish-water lake. Surface salinity at the mouths of the rivers that flow into the lake is around 0 0/00 (Hydro-Québec, 1993a), but climbs to 15 0/00 at the inlet to Le Goulet (Granger, 1960). At depths of more than 75 m, salinity reaches 27 0/00, comparable to the surface water of Hudson Bay (Dutil and Power, 1980). Lac Guillaume-Delisle is subject to tides with an average range of 0.6 m; the maximum recorded range was 1.9 m in 1974 and 1980 (Von Mörs and Bégin, 1993). Currents in Lac Guillaume-Delisle rotate in a counter-clockwise direction, like the currents in Hudson Bay (Pelletier, 1969).

In the summer, surface water temperature in the northern portion of Lac Guillaume-Delisle reaches 17°C while it is 13°C in the Le Goulet zone. At depths of more than 75 m, temperatures fall below 0°C. The surface water of Hudson Bay near Lac Guillaume-Delisle is close to 5°C (Hydro-Québec, 1993b). Lac Guillaume-Delisle is fed by rivers of the Eau Claire Plateau and from not less than ten lakes in or near the graben.

RIVERS

All the rivers in the study area flow from east to west for most of their distances. In the Lacs des Loups Marins basin, water generally flows from south to north through a series of lakes before entering the Rivière Nastapoka. Rivers that flow into Lac Guillaume-Delisle pass through a series of waterfalls or rapids; the vertical drop from the granitic plateau to the lake is on average 200 m. The currents of these rivers slacken as they empty into the lake, causing sediment to be deposited and leading to the formation of deltas. The largest of these

Table 3.9 Large Lakes in the Study Area

LAKE	AREA (km^2)*
Lac à l'Eau Claire	1226
Eastern basin	442
Western basin	784
Lac Guillaume-Delisle	691
Lacs des Loups Marins	479
Lac D'Iberville (Lacs des Loups Marins sector)	170
Petit lac des Loups Marins	130
Lac Bourdel (Rivière Nastapoka sector)	101
Lake 1 (north of Lac Lamain)	26
Lac Bourg (Lacs des Loups Marins sector)	23
Lac Pikutachikw (south of Lacs des Loups Marins)	19
Lac Rousselin (southeast of Lac à l'Eau Claire)	18
Lac Mikirnguup (south of Lac Guillaume-Delisle)	17
Lac Natwakupaw (Rivière Nastapoka sector)	14
Lac Quereur (south of Lac à l'Eau Claire)	12
Lac Persillon (northeast of Lac Guillaume-Delisle)	10
Lake 2 (north of the Rivière au Caribou)	9
Lake 3 (15 km west of Lac à l'Eau Claire)	9

* Areas calculated, excluding the areas of islands, using ARC-GIS software and maps at a scale of 1:250,000

deltas is found at the mouth of the Rivière De Troyes. Vast zones of sand are also present on the coast of Hudson Bay at the mouths of the Rivière Nastapoka and the Rivière Devaux [Devaux River] (Lavoie, 2000).

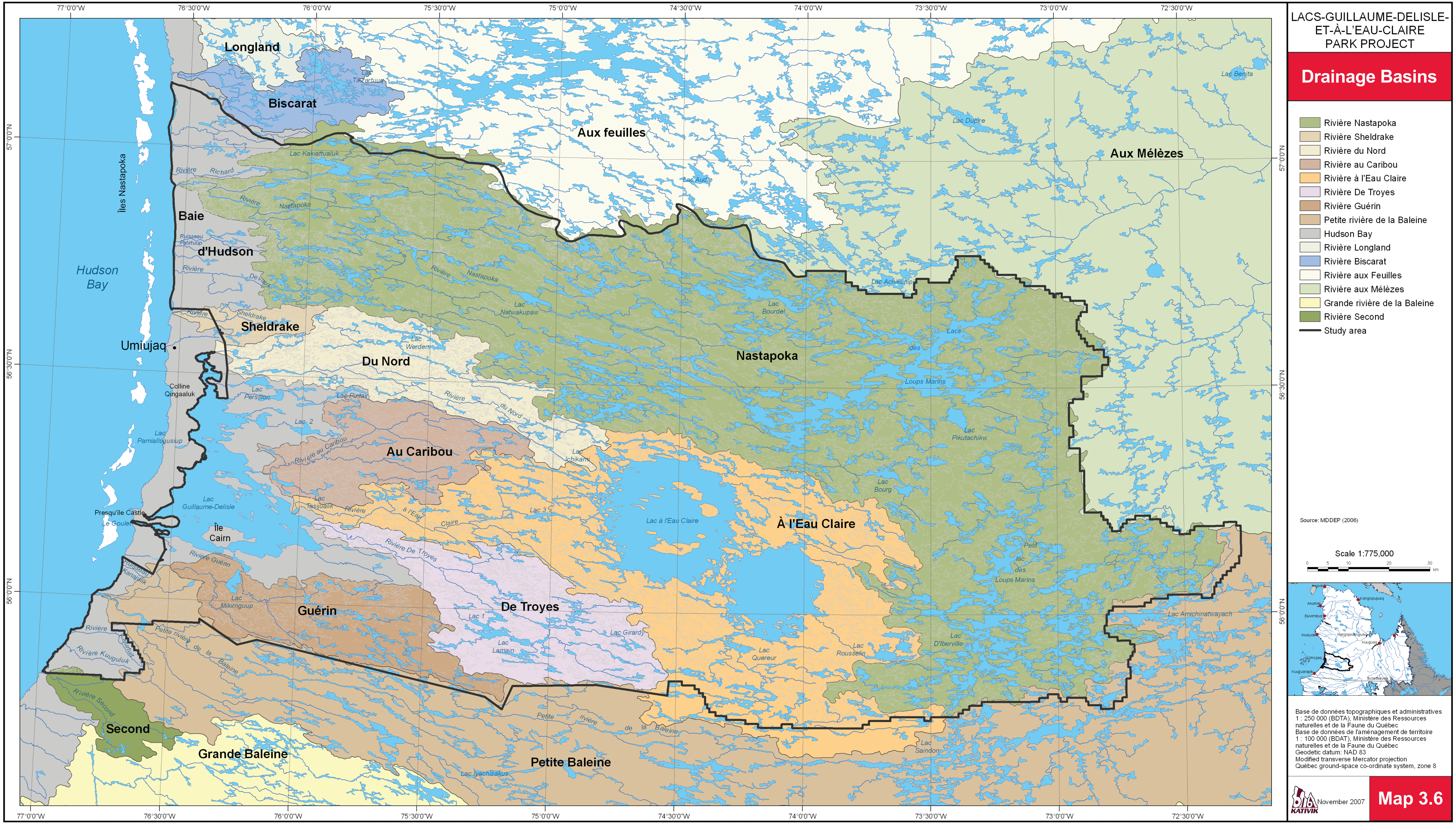
Covering a distance of roughly 170 km from the outlet of Lacs des Loups Marins to its mouth, the Rivière Nastapoka is the longest river in the study area and has an average flow of 258 m^3/s (Table 3.8). Taking into account all the lakes that feed it, including the entire length of Lac D'Iberville, the Rivière Nastapoka totals 400 km.

While the Rivière à l'Eau Claire is only 88 km long, when the headwater lake (Lac à l'Eau Claire) is taken into account the river's total length is roughly 175 km. The average flow of the Rivière à l'Eau Claire at its mouth is 100 m^3/s, or close to half the flow of the Petite rivière de la Baleine. The record low and high flows of the latter river are 45 m^3/s and 191 m^3/s (measurements recorded between 1963 and 1978, Hydro-Québec, 1982).

Spring flooding (June and July) accounts for between one third and one half of the annual water flow of rivers in the study area (SEBJ, 1978; Hydro-Québec in OPDQ, 1983; Hydro-Québec, 1993a). Water flow decreases gradually during the summer and remains relatively stable the rest of the year due to the large size of the basins and lakes that act as reservoirs and regulators. Rainfall has little impact on water flow in the summer. As well, low water flow in the summer (August and September) and limited fall flooding will result in a long period of low flow in the winter (as little as 10% of the annual flow). Along the stream sections of the Rivière Nastapoka, flow speed varies between 0.2 m/s in the summer and 1.5 m/s during the bi-annual flooding periods (Hydro-Québec, 1993a). Along the Petite rivière de la Baleine, the average flow speed is generally less than 1 m/s.

The rivers of the study area are relatively modest compared with the other rivers in Nunavik listed below (approximate lengths include headwater lakes and flow measurements were taken at the mouths of the rivers; Hydro-Québec, in OPDQ, 1983):

- Rivière Caniapiscau (805 km – flow: 1805 m^3/s, measurement recorded after the diversion of the upper portion of the basin towards James Bay)
- Rivière George (475 km – flow: 871 m^3/s)


LACS-GUILLAUME-DELISLE-ET-À-L'EAU-CLAIRE PARK PROJECT
Drainage Basins
Rivière Nastapoka
Rivière Sheldrake
Rivière du Nord
Rivière au Caribou
Rivière à l'Eau Claire
Rivière De Troyes
Rivière Guérin
Petite rivière de la Baleine
Hudson Bay
Rivière Longland
Rivière Biscarat
Rivière aux Feuilles
Rivière aux Mélèzes
Grande rivière de la Baleine
Rivière Second
Study area
Source: MDDEP (2006)
Scale 1:775,000
Base de données topographiques et administratives 1 : 250 000 (BDTA), Ministère des Ressources naturelles et de la Faune du Québec
Base de données de l'aménagement de territoire 1 : 100 000 (BDAT), Ministère des Ressources naturelles et de la Faune du Québec
Geodetic datum: NAD 83
Modified transverse Mercator projection
Québec ground-space co-ordinate system, zone 8
KATIVIK
November 2007
Map 3.6
Longland
Biscarat
Aux feuilles
Aux Mélèzes
Baie
d'Hudson
Hudson Bay
Îles Nastapoka
Sheldrake
Umiujaq
Du Nord
Nastapoka
Au Caribou
À l'Eau Claire
Lac Guillaume-Delisle
Lac à l'Eau Claire
Presqu'île Castle
Île Cairn
Colline Qingaaluk
De Troyes
Guérin
Second
Grande Baleine
Petite Baleine
Lacs des Loups Marins
Petit lac des Loups Marins
Lac Bienville
Lac Dupire
Lac Tikirartuuq
Lac Kakiattualuk
Lac Naturiaq
Lac Bourdel
Lac Werden
Lac Persillon
Lac Pamiallugusiup
Lac Tasiujalik
Lac Ichikami
Lac Pikutachikw
Lac Bourg
Lac Mikirnguup
Lac Lamain
Lac Girardy
Lac Quereur
Lac Rousselin
Lac D'Iberville
Lac Sandon
Lac Iyachisakus
Lac Amichinatwayach
Lac Achikunipi
77°0'0"W
76°30'0"W
76°0'0"W
75°30'0"W
75°0'0"W
74°30'0"W
74°0'0"W
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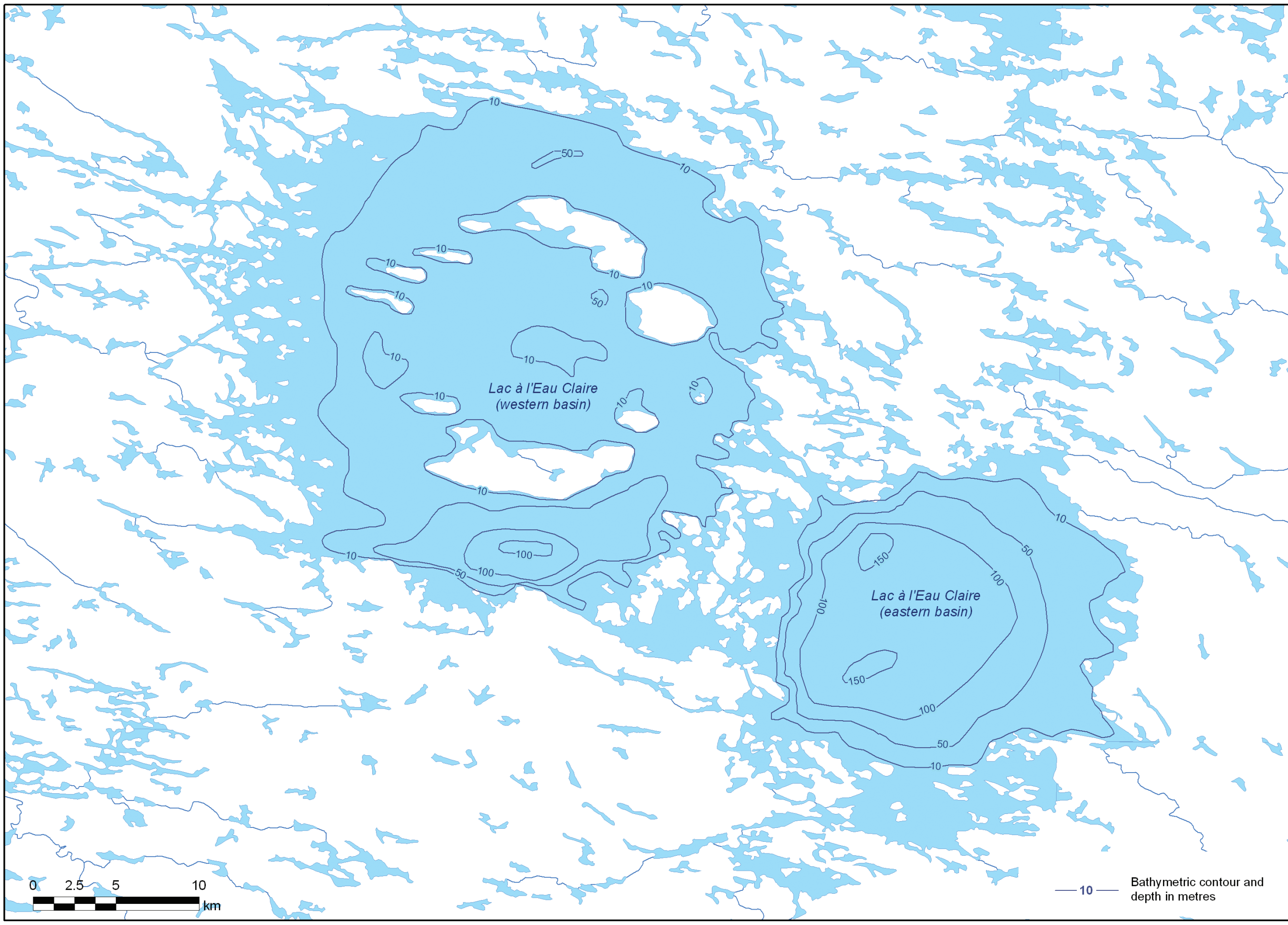
73°0'0"W
72°30'0"W
57°0'0"N
56°30'0"N
56°0'0"N



Source: Sylvain Arsenault
Department of Biology and Centre d'études nordiques
Université Laval– June 1993

Figure 3.12 Bathymetric Chart of Lac à l'Eau Claire

- Rivière aux Feuilles (386 km – flow: 556 m³/s)
- Petite rivière de la Baleine (290 km – flow: 225 m³/s)
- Rivière aux Mélèzes (272 km – flow: 654 m³/s)
- Rivière de Puvirnituq (257 km – flow: 311 m³/s)
- Rivière Koroc (166 km)
- Rivière Koksoak (134 km – flow: 2096 m³/s)

DRAINAGE PATTERNS

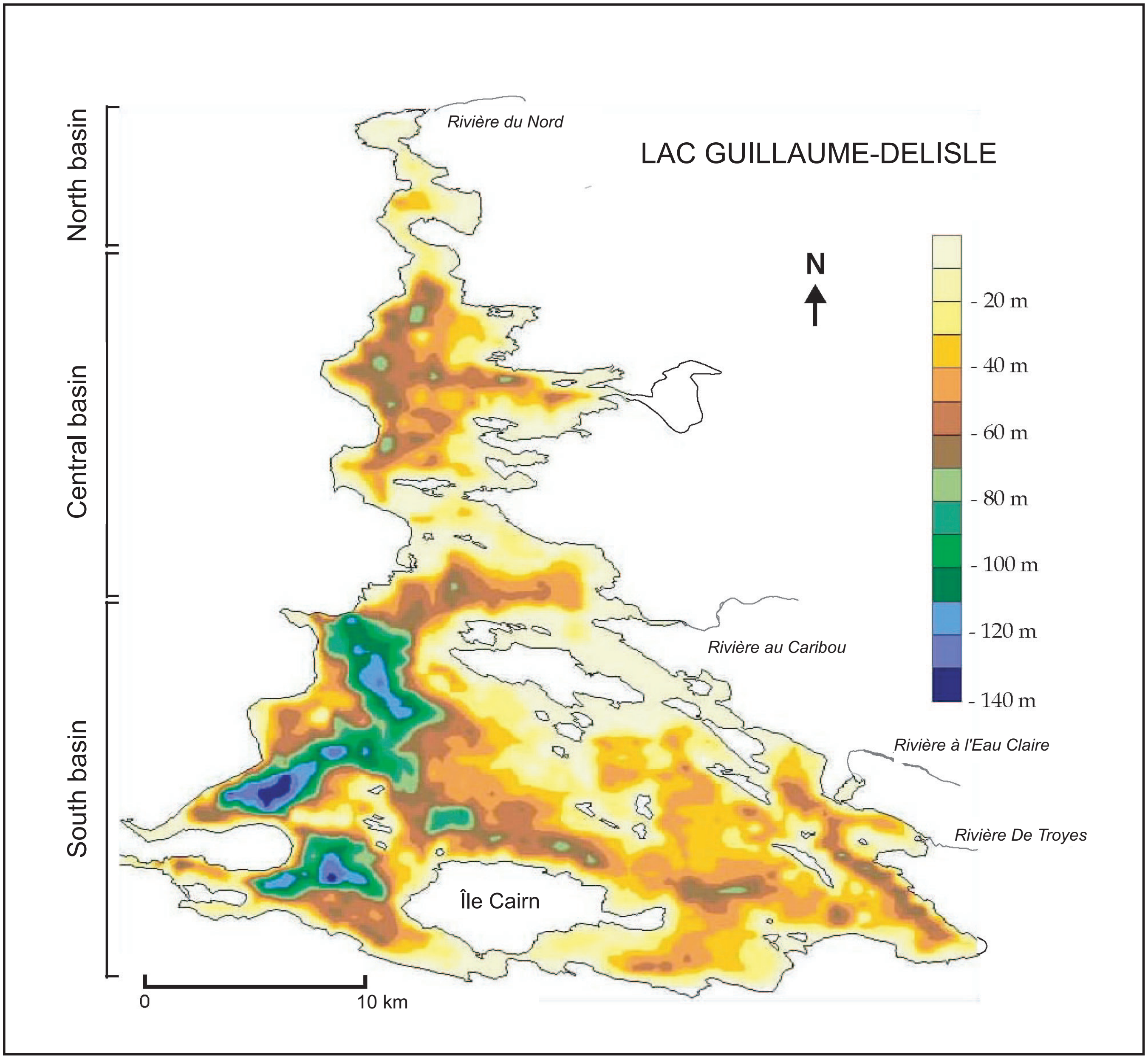
The drainage patterns of the study area vary in accordance with the diversity of landforms (Map 3.6; Map 3.1 shows the different physiographic units; Gagnon, 1974; Bérard, 1977; Genest, 2000). Generally speaking, the drainage patterns are not highly structured but resemble mazes. The configurations consist of many interconnected sub-basins that eventually flow into the main basin. As discussed elsewhere in this section, the hydrography of the Hudson Cuestas is distinct from the rest of the study area.

Hudson Plateau: An Angular Pattern

The Hudson Plateau covers the entire study area east of the Lac Guillaume-Delisle graben. The Rivière Nastapoka basin is distinct from the other basins of the plateau and the graben.

In the Lacs des Loups Marins and Rivière Nastapoka basins, the underlying drainage pattern is angular but is largely influenced by the maze of surface deposits. The paths of the streams as well as the shorelines and sizes of the lakes in these basins reflect successive moraine formations and in between these the bedrock structure with either a northeast–southwest axis or a northwest–southeast axis. Water initially flows from south to north on a very gentle slope before veering west along the Rivière Nastapoka.

The many water bodies combined create a lake landscape all the way to the upstream section of the Rivière Nastapoka. In this respect, the hydrographic characteristics of the Lacs



Source: Lavoie (2006)

Figure 3.13 Bathymetric Chart of Lac Guillaume-Delisle

des Loups Marins basin resemble more closely the Central Lake Plateau (natural region B32; Figure 1.2) than the rest of the Hudson Plateau. Downstream from Lac Natwakupaw, the bedrock structure is more apparent in the drainage pattern. Here then the basin resembles more closely the Eau Claire Plateau.

The Eau Claire Plateau includes the basins of the Lac à l'Eau Claire craters, the Rivière du Nord, the Rivière au Caribou, the Rivière à l'Eau Claire, the Rivière De Troyes and the Rivière Guérin. The plateau declines gently to the graben and the rivers flow through narrow and shallow structural valleys. Their rectilinear courses and right-angle bends cause the basin to be classified as angular (Baron-Lafrenière, 1989). The tributaries of the main rivers are often short and punctuated by many headwater lakes separated by moraines. The bedrock structure is also apparent in the many waterfalls and rapids.

The angular drainage pattern of the Eau Claire Plateau might also be described as parallel due to the east–west direction of the series of rivers created by the plateau's geological fault structure. This parallel pattern extends beyond the plateau to include the Rivière Nastapoka and the Petite rivière de la Baleine. As well, certain tributaries follow an indirect drainage pattern, flowing eastward initially (opposite to the usual direction of flow) before veering west. Examples of this pattern include the upstream sections of the Rivière du Nord, the Rivière à l'Eau Claire and the Rivière De Troyes, as well as on the horsts located around the edge of the graben.

The Lac à l'Eau Claire craters are characterized by an unusual centripetal drainage pattern attributable to the meteoritic depression. The waters of the tributaries flow towards a single point (Lac à l'Eau Claire) and then empty into the Rivière à l'Eau Claire.

Graben and Cuestas: A Diversified Drainage Pattern

While drainage north of the Rivière Sheldrake resembles the Rivière Nastapoka basin, drainage of the Lac Guillaume-Delisle basin is influenced by the graben and the cuestas.

The transition between the plateau and graben is quite precipitous. The gradient and the speed of water currents however decreases in the valleys where rivers meander through a calm topography shaped by fine and cohesive deposits (Gagnon, 1974). Meandering tends to increase in the downstream sections of these valleys. Erosion occurs on the concave banks (steep gradient) while beaches form on the convex banks (gentle gradient). Where two sinuosities join, the watercourse becomes rectilinear, abandonning the meander and eventually evolving into a small lake. The meandering drainage pattern is well developed along the downstream sections of the rivers au Caribou, De Troyes and Guérin.

The shape and the size of the Lac Guillaume-Delisle basin are dictated by the structure of the graben and the cuestas. Following the retreat of the glaciers and the Tyrrell Sea, the drainage pattern formed in a changing and diversified environment. In the graben zone, lakes are less common than on the Archean plateau, but are larger (for example, Lac Mikirnguup and Lac Persillon).

On the east side of Lac Guillaume-Delisle, the irregular or bevelled shoreline follows the broken structure and the uneven boundary between the graben and the plateau. On the west side of Lac Guillaume-Delisle, the shoreline follows the foot of the cuestas; its profile is regular and rounded.

South of Lac Guillaume-Delisle, the drainage pattern throughout the Petite rivière de la Baleine basin and west of Lac Mikirnguup is dentritic. This pattern which is more or less developed resembles the branches of a tree and has been etched into the clay plain (Gagnon, 1974; Bérard, 1977).

Finally, a specific nomenclature is required to describe the drainage pattern of the cuestas (Figure 3.5). The term cataclinal river is used to describe a watercourse that follows the slant of the cuesta strata. In this case, the strata slope towards Hudson Bay. Examples of cataclinal watercourses are found south of Le Goulet and include the Petite rivière de la Baleine and the Rivière Kuuguluk [Kuuguluk River]. Watercourses that flow opposite to the slant of the strata are described as anticlinal. Examples of this phenomenon are the streams that drop down the cuesta faces into Lac Guillaume-Delisle. Watercourses that flow along the face of the cuestas, perpendicular to the slant of the strata are termed orthoclinal and include the stream that empties at the mouth of the Petite rivière de la Baleine from the north. (It should be specified that this stream flows over Holocene deposits and in the graben, and not on the cuestas).

COASTAL ZONE: CURRENTS AND TIDES

In Hudson Bay, water currents move from west to east mainly from the Arctic Ocean, and very little from the Atlantic Ocean, towards Hudson Strait situated along the north coast of Nunavik and finally into the Atlantic Ocean (Hydro-Québec, 1993b). The counter-clockwise direction of currents has also been identified in Lac Guillaume-Delisle which connects to Hudson Bay through Le Goulet. The average speed of waters in Hudson Bay is 0.04 m/s, although tidal currents and winds can push this speed up to 1 m/s. Tidal surges originate in the Atlantic Ocean and pass through Hudson Strait. The east coast of Hudson Bay is subject to a tidal range of less than 1 m.

The study area includes almost 100 km of beaches, interspersed with the rocky back-slope outcroppings of cuestas, as well as a panoramic view of Hudson Bay. Due to isostatic rebounding, which is continuing at a rate of roughly 1 cm annually, the coastal zone of the study area is evolving in a context of marine regression (Lavoie, 2000), and the territory of the park project is growing little by little every year.

The downstream section of the Rivière au Caribou flows across the graben. The floor of the river valley is cover with unconsolidated deposits and slopes gently. The river meanders through the alluvial plain. Rock outcroppings (hogbacks) and terrace steps (background) may also be observed.

Credit: Norman Dignard (MRNF)

4 BIOLOGICAL ENVIRONMENT

The Lacs-Guillaume-Delisle-et-à-l'Eau-Claire Park Project is intended to protect representative portions of the natural regions known as the Hudson Cuestas (B38) and the Hudson Plateau (B37). The park project also covers a corner of the Ungava Plateau (B39) (Figure 1.2).

In terms of vegetation, the Hudson Cuestas are represented in the study area by white spruce stands (*Picea glauca*) that grow around Lac Guillaume-Delisle [Richmond Gulf], small scattered stands of tamarack (*Larix laricina*) and stunted (krummholz) black spruce (*Picea mariana*) on the back slopes of the cuestas, herbaceous plants and shrubs on the faces of the cuestas, as well as rocky peaks that are either barren or covered with herbaceous plants or moss. In terms of wildlife, the Hudson Plateau is represented by a population of freshwater seal at Lacs des Loups Marins [Upper Seal Lake] and large flocks of water birds including a few breeding species. The Ungava Plateau portion of the study area nurtures common shrub-tundra species including black spruce shrubs, arctic white heather (*Cassiope tetragona*), Ungava lemming (*Dicrostonyx hudsonius*), arctic hare (*Lepus arcticus*), arctic fox (*Alopex lagopus*) and snowy owl (*Nyctea scandiaca*) (MLCP, 1986).

Vegetation

The Kativik Regional Government mandated VIASAT GeoTechnologies to define the boundaries, map, classify, describe and calculate the area of each major class of vegetation in the study area, which covers 27,232 km^2. Specifically, the vegetation was mapped by analysis of Landsat ETM images for July and August from 1999 to 2001, as well as by image segmentation using *eCognition* software (VIASAT, 2005). The results of earlier studies (Deshaye et al., 1991; Hydro-Québec, 1993a, 1993c) and observations made during fieldwork served to enhance the classification. This electronic and map data could be used for future wildlife habitat studies and management purposes.

VEGETATION ZONES

Due to its vast size and the different climatic conditions that prevail, Québec comprises several plant formations, each possessing a more or less homogeneous structure and composition. From the south of the province to the north, there exists the mixed-wood forest, the boreal coniferous forest and the arctic tundra. These zones are furthermore divided into sub-zones according to their specific geographical and ecological characteristics (Figure 4.1).

The study area straddles two vegetation sub-zones: the forest tundra sub-zone of the boreal coniferous forest and the shrub tundra sub-zone of the arctic tundra. Forest tundra covers all of the study area, except a strip of land along the coast north of Lac Guillaume-Delisle where shrub tundra is dominant (Figure 4.1).

Forest tundra marks the transition between open boreal forest, or taiga, and the arctic tundra. It is distinguishable by the presence of continuous forest stands in sheltered areas, such as valleys, and by predominantly boreal vascular flora (Payette, 1983; Lavoie and Payette, 1996). For its part, arctic tundra is characterized by the absence of trees. Based on elevation or latitude, the dominant species may be lichens 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 study area is mainly boreal. The vegetation in the Lac Guillaume-Delisle sector, next to Hudson Bay, is subject to harsher climatic conditions and greater temperature variations than the vegetation around Lac à l'Eau Claire [Clearwater Lake] sector, which is well inland and subject to less severe conditions. Near the coast of Hudson Bay and north of the tree line, the proportion of arctic elements increases while the proportion of boreal elements diminishes.

The distribution of the major plant groups in the study area is dictated by edaphic, topographical and climatic conditions. The Lac Guillaume-Delisle sector possesses the greatest variety of plant groups due in large part to its geology and marine deposits. It includes spruce stands, barren areas, a variety of scrubland and peat bogs, as well as rocks covered with crustaceous lichens. The rest of the study area is especially characterized by barren areas, spruce stands and burned areas (maps 4.1 and 4.2). A description of each of these classes including photographs appear in Table 4.1.

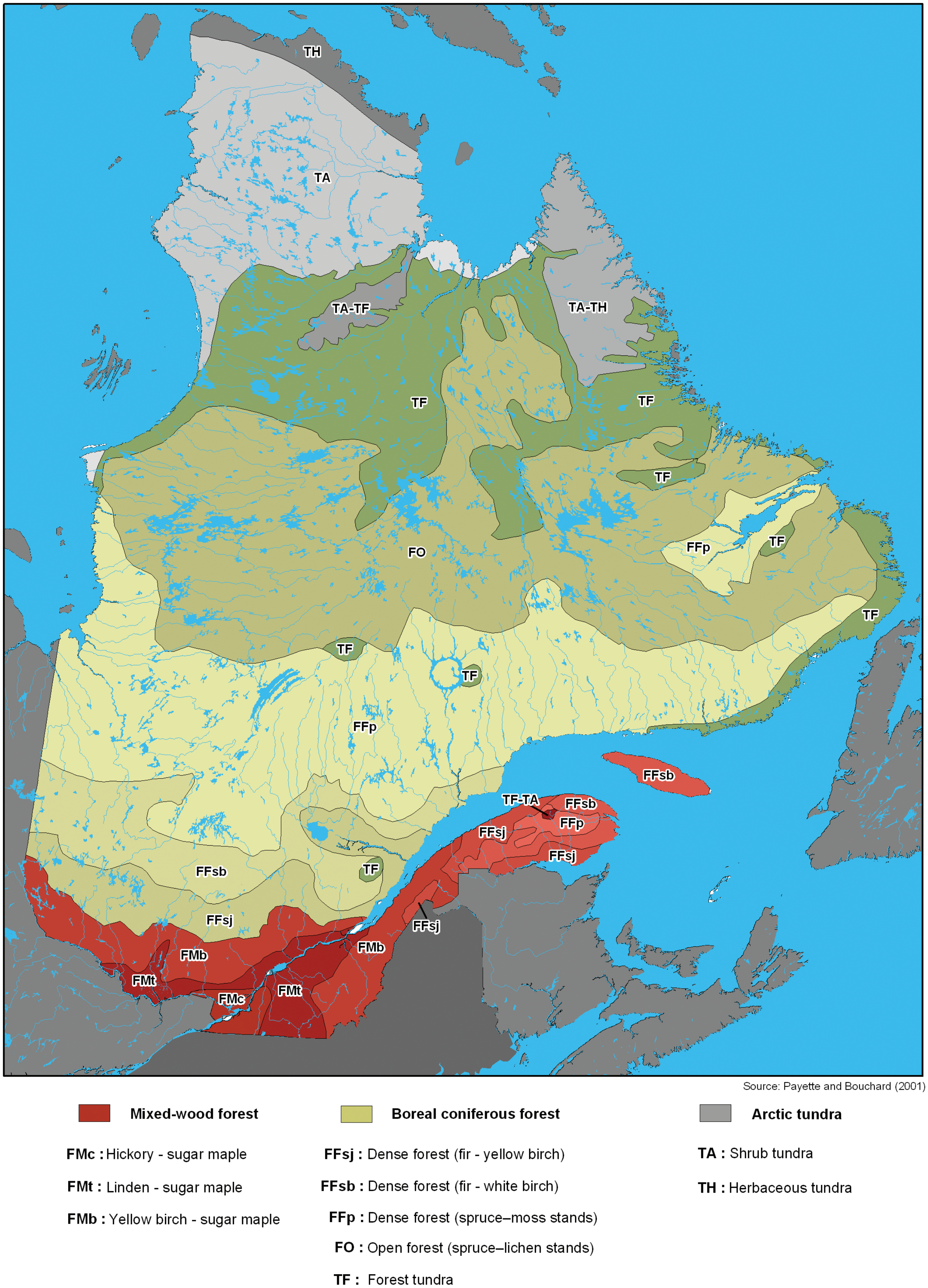
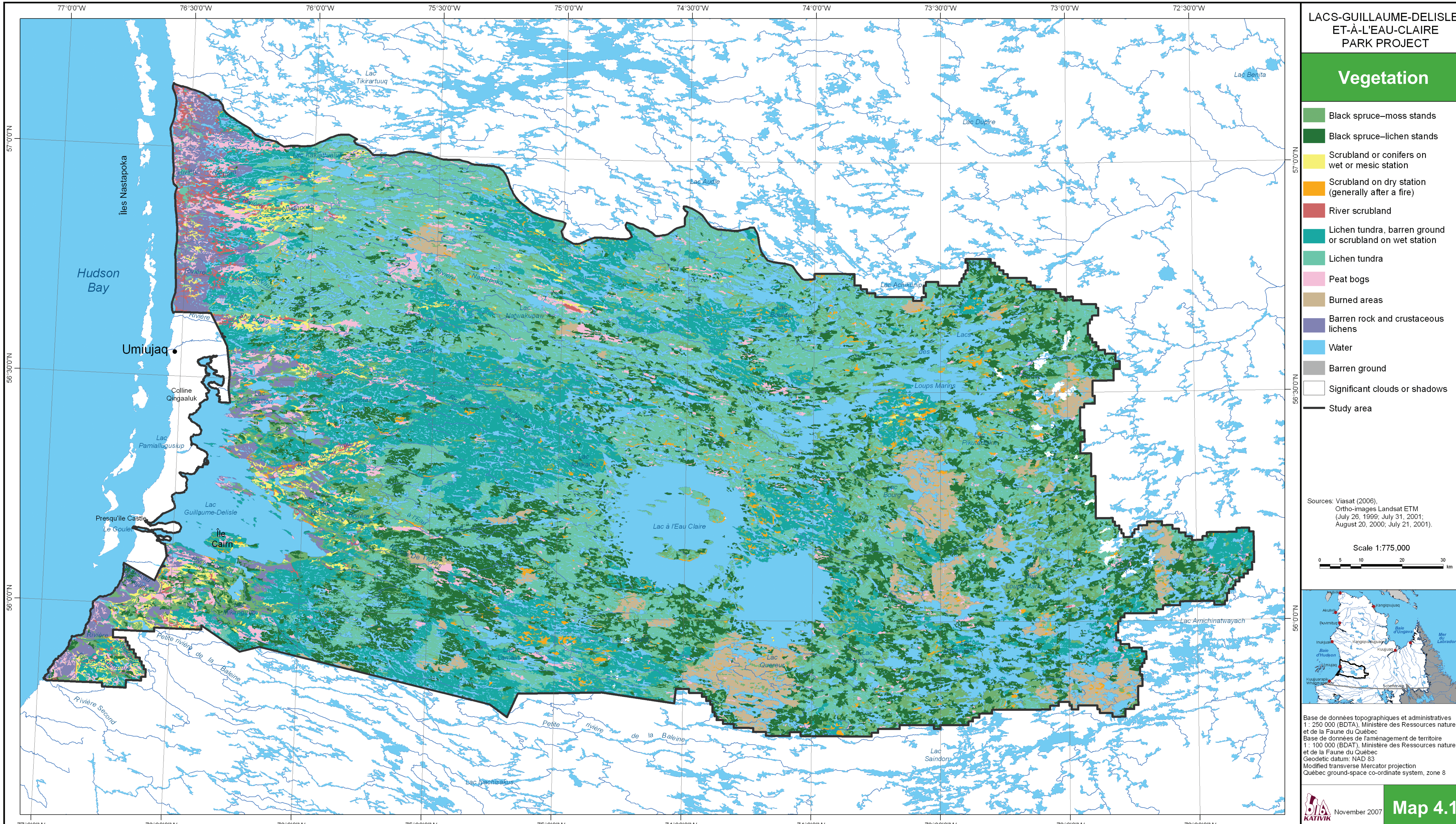


Figure 4.1 Major Vegetation Zones in Québec and Newfoundland and Labrador


LACS-GUILLAUME-DELISLE-
ET-À-L'EAU-CLAIRE
PARK PROJECT
Vegetation
Black spruce–moss stands
Black spruce–lichen stands
Scrubland or conifers on wet or mesic station
Scrubland on dry station (generally after a fire)
River scrubland
Lichen tundra, barren ground or scrubland on wet station
Lichen tundra
Peat bogs
Burned areas
Barren rock and crustaceous lichens
Water
Barren ground
Significant clouds or shadows
Study area
Sources: Viasat (2006),
Ortho-images Landsat ETM
(July 26, 1999; July 31, 2001;
August 20, 2000; July 21, 2001).
Scale 1:775,000
0 5 10 20 30 km
Base de données topographiques et administratives
1 : 250 000 (BDTA), Ministère des Ressources naturelles et de la Faune du Québec
Base de données de l'aménagement de territoire
1 : 100 000 (BDAT), Ministère des Ressources naturelles et de la Faune du Québec
Geodetic datum: NAD 83
Modified transverse Mercator projection
Québec ground-space co-ordinate system, zone 8
KATIVIK
November 2007
Map 4.1
Hudson Bay
Îles Nastapoka
Umiujaq
Colline Qingaaluk
Lac Pamiallugusiup
Lac Guillaume-Delisle
Presqu'île Castle
Le Goulet
Île Cairn
Lac Tikirartuuq
Lac Dupire
Lac Audie
Lac Benita
Lac Natwakupaw
Lac à l'Eau Claire
Loups Marins
Lac Querreur
Lac Amichinatwayach
Lac Saindon
Lac Iyachisakus
Petite rivière de la Baleine
Rivière Second
Rivière Nastapoka
Baie d'Hudson
Baie d'Ungava
Mer du Labrador
Ivujivik
Kangiqsujuaq
Akulivik
Puvirnituq
Inukjuak
Kangiqsualujjuaq
Kuujjuaq
Kuujjuarapik
Whapmagoostui
Schefferville
77°0'0"W
76°30'0"W
76°0'0"W
75°30'0"W
75°0'0"W
74°30'0"W
74°0'0"W
73°30'0"W
73°0'0"W
72°30'0"W
57°0'0"N
56°30'0"N
56°0'0"N

Classification work identified 10 plant groups. These groups are distinguishable by the preponderance of the species of a particular stratum which gives each a distinctive appearance. Tree strata comprise 24% of the study area and barren areas 38%. The four dominant groups are lichen: tundra (22%); lichen tundra, barren ground or scrubland on wet station (16%); black spruce–lichen stands (15%); and black spruce–moss stands (10%). The other plant groups combined cover roughly 13% of the study area, with burned areas and peat bogs representing respectively 3.8% and 3.4% (Table 4.2). The plant groups that are too limited to be illustrated or that are not distinguishable on satellite images are not shown on the map (including balsam poplar or *Populus balsamifera* and white spruce).

Flora

Over the years, several botanists have collected vascular plants as well as bryophytes and lichens in the study area. The botanical exploration of the area began with the naturalist William Spreadborough in 1896. While travelling between Lac Guillaume-Delisle and Fort Chimo with the geologist Albert Peter Low of the Geological Survey of Canada, Spreadborough botanized along the Rivière à l'Eau Claire [Clear Water River], at Lacs des Loups Marins and along the Rivière Koksoak to Fort Chimo (Low, 1898). In 1939, Ernest Cleveland Abbe, Lucy Elizabeth Boothroyd Abbe and John Marr of the University of Minnesota explored the southern portion of Lac Guillaume-Delisle, between Lac Pamiallugusiup and the Rivière De Troyes (Abbe, 1939; Marr, 1948). In 1944, Father Arthème Dutilly and Abbot Ernest Lepage contemplated a journey to Fort Chimo via the Rivière à l'Eau Claire. They travelled as far as Lac Guillaume-Delisle but, for a variety of reasons, could not undertake their journey that year. Instead, they explored the south shore of the lake for eight days, between Baie du Poste and the Rivière De Troyes (a few kilometres of the downstream section). The following year, they returned to Lac Guillaume-Delisle, followed the Rivière De Troyes and then the Rivière à l'Eau Claire all the way to Lacs des Loups Marins, botanizing the entire way. In mid-August, they completed their journey to Fort Chimo (Dutilly and Lepage, 1951).

Beginning early in the 1970s, the Centre d'études nordiques [northern studies] (CEN) of the Université Laval focussed its attention on the Lac Guillaume-Delisle and Lac à l'Eau Claire area. Over close to 20 years, several botanists and ecologists spent varying periods of time in the area. This work lead to the publication of a few studies on the flora and vegetation of the area (Payette and Lepage, 1977; Deshaye, 1985; Deshaye and Morisset, 1985, 1988). Among these researchers, Bégin made a significant contribution to the study of bryophytes on the shores of Lac à l'Eau Claire (Bégin, 1986; Bégin and Payette, 1989). The bryologist Robert R. Ireland of the Canadian Museum of Nature spent time at Lac à l'Eau Claire and Lac Guillaume-Delisle in July 1983, at the invitation of the CEN. Another CEN invitee was Robert Gauthier, then director of the Louis-Marie Herbarium at the Université Laval, who was present in the study area in the summers of 1981, 1982, 1983 and 2003. Gauthier studied bryophytes specifically in boggy environments, with particular emphasis on sphagnum (Gauthier et al., 2006). During the summer of 1983, Claude Roy of the Louis-Marie Herbarium travelled with Gauthier along the Nastapoka and Sheldrake, collecting several bryophytes and lichens. Other vegetation and flora inventory work carried out as part of the Grande rivière de la Baleine [Great Whale River] hydro-electric power development project also covered different portions of the study area (Foramec, 1990, 1992 and 1992a). New inventory work was carried out between 2004 and 2006 in specific zones of the study area in order to locate and document threatened or vulnerable species with several thousands of specimens being collected. Most of these specimens are stored at herbariums in Québec [Quebec City] (the Louis-Marie Herbarium [QFA], the Université Laval and the Herbier du Québec [QUE], Ministère des Ressources naturelles et de la Faune [natural resources and wildlife] and Ministère de l'Agriculture, des Pêcheries et de l'Alimentation [agriculture, fisheries and food]) and in Ottawa (the National Herbarium of Canada [CAN], the Canadian Museum of Nature and the Vascular Plant Herbarium [DAO], Agriculture and Food Canada).

VASCULAR FLORA

The compilations performed by Dignard (2005; 2007) establish a relatively accurate picture of the vascular flora in the study area. The annotated list comprises 503 taxa (Appendix 1) which have been confirmed by at least one supporting specimen per sector. These taxa belong to 77 families. Spermatophyta total 465 taxa (92.5%) and vascular Cryptogamia 38 taxa (7.5%). Gymnosperms are only represented by four taxa (0.8%). Angiosperms total 461 taxa, including 182 (36.3%) monocotyledons and 279 (55.4%) dicotyledons. Seven families account for 53.2% of all the taxa: Cyperaceae (87 taxa), Poaceae (51 taxa), Asteraceae (30 taxa), Ericaceae (27 taxa), Caryophyllaceae (26 taxa), Rosaceae (24 taxa) and Salicaceae (22 taxa).

Overall, boreal elements account for two thirds of the species identified in the study area. Contemplated separately, the proportion of boreal and arctic elements in the Lac Guillaume-Delisle and Lac à l'Eau Claire sectors differs slightly: 65.3% and 33.1% respectively in the former sector and 71.4% and 27.4% in the latter sector. Both sectors are situated at the same latitude (Table 4.3). The difference clearly reflects the

Table 4.1 Description of Major Plant Groups Identified on Map 4.1

GROUP	DESCRIPTION	PHOTO (©KRG)
Black spruce–moss stand	Dense or open spruce–moss vegetation. Tree cover represents more than 10% of the area. Includes black spruce and white spruce (near Lac Guillaume-Delisle).	
Black spruce–lichen stand	Dense or open spruce–lichen vegetation. Tree cover represents more than 10% of the area and lichen cover more than 50%.	
Scrubland and conifers on wet or mesic station	Bushes with conifers (black spruce, white spruce near the coast, tamarack) with mosses (between 5 and 25% of the area). Generally, located on gentle slopes.	
Scrubland on dry station	Bushes generally in burned areas, dominated by scrub birch. Located on medium to steep slopes.	

Table 4.1 Description of Major Plant Groups Identified on Map 4.1 (cont.)

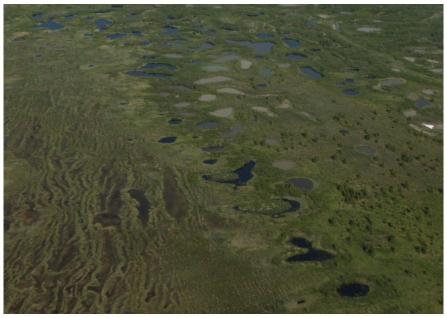
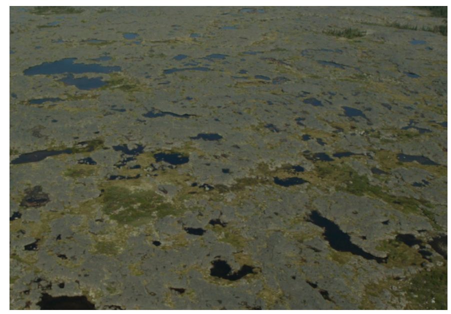
GROUP	DESCRIPTION	PHOTO (©KRG)
River scrubland	Bushes generally located along streams, including alder, willow and Myricaceae. Tree cover represents less than 10% of the area, and lichen cover is very low. Often includes a few balsam poplar clones in sheltered areas along certain rivers near Lac Guillaume-Delisle.	
Lichen tundra, barren ground or scrubland on wet station	Dominated alternately by lichen tundra and barren ground. Scrubland and limited wetland represent roughly 10 to 15% of the area and tree cover less than 10%.	
Lichen tundra	Tree cover represents less than 10% of the area and lichen cover at least 50% near Lac Guillaume-Delisle.	
Peat bog	Generally minerotrophic peat bogs with or without ponds. May include alternately peatbogs, herbaceous vegetation, scrubland and open spruce–moss vegetation.	

Table 4.1 Description of Major Plant Groups Identified on Map 4.1 (cont.)

GROUP	DESCRIPTION	PHOTO (©KRG)
Burned areas	Areas where forest fires have occurred within the past 15 to 20 years.	
Barren rock and crustaceous lichens	Barren rock and crustaceous lichens. May include limited wet areas in depressions.	
Water	Major lakes and rivers.	
Barren ground	Barren ground. Generally next to lakes or sandy areas.	
Significant clouds or shadows	Cloud or shadowed area appearing on the satellite image.	

Extracted from VIASAT (2006)

Table 4.2 Coverage of Major Plant Groups in the Study Area

GROUP	AREA (ha)	AREA (%)
Barren ground	219	0.01
Significant clouds or shadows	6,538	0.2
Scrubland or conifers on wet or mesic station	37,489	1.4
Arbustaies riveraines	19,389	0.7
River scrubland	91,829	3.4
Peat bogs	68,054	2.5
Scrubland on dry station (generally, after forest fires)	25,709	0.9
Burned areas	102,252	3.8
Black spruce–moss stands	259,688	9.5
Lichen tundra, barren ground or scrubland on wet station	445,303	16.3
Black spruce–lichen stands	396,935	14.6
Lichen tundra	592,792	21.8
Water	677,013	24.9
Total	**2,723,210**	**100**

geography, ecology and climate of the two sectors. One is situated close to Hudson Bay and is subject to harsher climatic conditions and greater temperature variations, while the second is well inland and is subject to less severe conditions. As one approaches the coast of Hudson Bay or the tree line, the proportion of arctic elements increases, while the proportion of boreal elements diminishes. Insular and coastal flora possess more arctic species and inland flora more boreal species (Morisset et al., 1983). Due to their climatic and topographical characteristics and the abundance of arctic taxa, the cuestas and certain exposed islands in Lac Guillaume-Delisle as well as the central islands of Lac à l'Eau Claire may be considered arctic pockets (Payette and Lepage, 1977; Deshaye and Morisset, 1985).

Fifty-one species in the study area are calcicole or calciphile (Appendix 2). Twenty-seven of these were recorded only in the Lac Guillaume-Delisle sector while 21 were recorded in both the Lac Guillaume-Delisle and Lac à l'Eau Claire sectors. In the Lac Guillaume-Delisle sector, calcicole plants are found most often on the dolomitic cuestas of the Nastapoka Group. In the Lac à l'Eau Claire sector, they are found most often on the rare Ordovician limestone remnants and escarpments, as well as the breccia and impact-ignimbrite talus on the Atkinson, Kamiskutanikaw and Wiskichanikw islands. Cyperaceae are dominant among the peat bog flora, totalling not less than 63 species. They are normally confined to boggy substatra and form scrub and herbaceous stratra in the study area's ombrotrophic and minerotrophic peat bogs. Snow beds are especially frequent on the faces of the cuestas situated south of the Ruisseau Kanajulik. Three chionophilous taxa, *Harrimanella hypnoides*, *Phyllodoce caerulea* and *Sibbaldia procumbens*, were observed only in this type of habitat. Other species, such as *Bartsia alpina, Cerastium cerastoides*, *Cystopteris montana*, *Omalotheca supina*, *Ranunculus allenii, Solidago macrophylla, Vaccinium cespitosum* and *Veronica wormskjoldii*, are also closely associated with this habitat. Over the plateau including Lac à l'Eau Claire, snow beds are more rare and nurture only one chionophilous taxon (*Phyllodoce caerulea*). Halophytes, which are found on the rocky shorelines, mudflats as well as in the salt and brackish marshes of Lac Guillaume-Delisle and Hudson Bay, total 39 species. Fresh-water aquatic flora, which generally speaking were under tallied, currently total 22 species.

The study area is situated in the transition zone between boreal forest and subarctic, which helps to explain the large number of species that reach the limit (Québec–Labrador or

Table 4.3 Phytogeographic Spectrum of Vascular Plants in the Study Area (56°15′N-74°30′W)

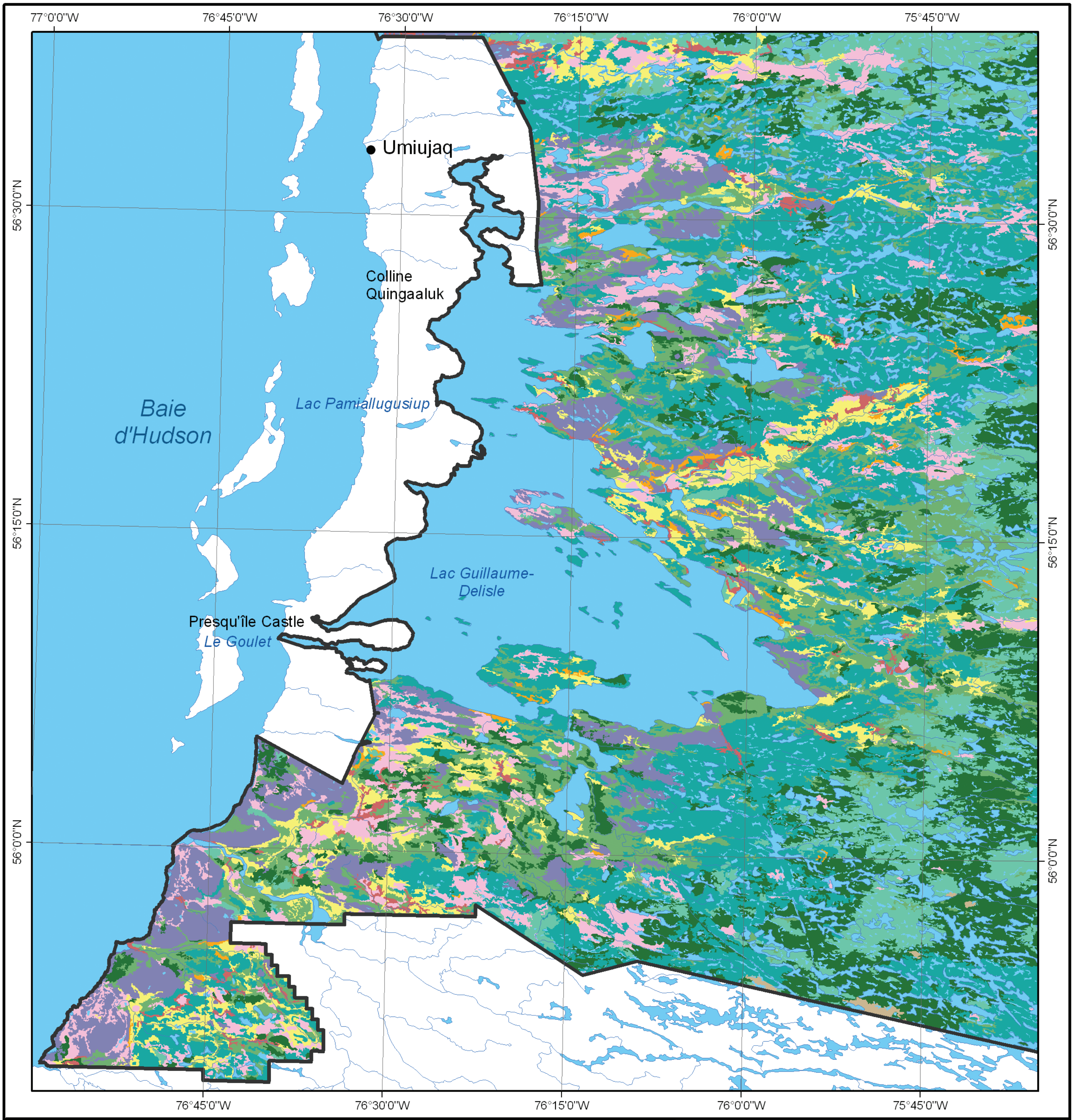
PHYTOGEOGRAPHIC FIELD	STUDY AREA NO.	STUDY AREA %	GUILLAUME-DELISLE NO.	GUILLAUME-DELISLE %	EAU CLAIRE NO.	EAU CLAIRE %
Arctic *sensu lato*	151	31.7	147	33.1	73	27.4
Arctic	45	9.4	42	9.5	14	5.2
Arctic-alpine	106	22.3	105	23.6	59	22.2
Boreal	317	66.9	290	65.3	190	71.4
Temperate and cosmopolite	7	1.4	7	1.6	3	1.2
Total	**475[1]**	**100**	**444**	**100**	**266**	**100**

[1] Twenty-eight taxa were excluded from the phytogeographic analysis. Twenty-five of these taxa are recognized or presumed hybrids, two are introduced species, and one has not been confirmed with a supporting specimen.

The arctic-alpine chionophilous taxon *Harrimanella hypnoides* is often observed in the snow beds of the Lac Guillaume-Delisle sector.
Credit: Norman Dignard (MRNF)

continental) of their ranges in the study area (Appendix 2). Specifically, in and around the study area 38 species reach the northern limit of their ranges, including *Angelica atropurpurea, Antennaria pulcherrima, Cicuta virosa, Cirsium muticum, Galium labradoricum, Galium triflorum, Gaultheria hispidula, Lycopodium clavatum, Oclemena nemoralis, Prunus pensylvanica, Ribes lacustre, Sceptridium multifidum* and *Valeriana dioica* subsp. *sylvatica*. Seven taxa reach the southern limit of their ranges in Québec–Labrador (*Carex holostoma, Carex rufina, Cassiope tetragona*, *Draba alpina, Eutrema edwardsii*, *Kobresia myosuroides* and *Ranunculus nivalis*). Seven taxa reach the eastern limit of their ranges in North America: *Athyrium filix-femina* subsp. *cyclosorum, Botrychium pinnatum, Castilleja raupii, Cicuta virosa, Oxytropis hudsonica, Polypodium sibiricum* and *Ribes hudsonianum*. And finally, *Pseudorchis albida* subsp. *straminea* reaches the western limit of its range in North America (at Lac Guillaume-Delisle and the Passage de Manitounuk [Manitounuk Sound].

In and around the study area, 77 taxa are considered rare essentially due to their frequency among the collected specimens. They represent 15% of the flora (Appendix 2). Of the 50 rare species identified in the study area, 34 are found in the Lac Guillaume-Delisle sector, six in the Rivière à l'Eau Claire sector and 16 in the Lac à l'Eau Claire sector. Only five rare species were identifed in both the Lac Guillaume-Delisle sector and the Lac à l'Eau Claire sector (*Capnoides sempervirens*, *Eriophorum viridicarinatum*, *Luzula arctica*, *Prunus pensylvanica* and *Ranunculus abortivus*). Twenty-seven other taxa identified outside of the study area, or at sites that can not be clearly considered in the study area due to unreliable data, are potentially located in the study area. The higher number of rare species located in the Lac Guillaume-Delisle sector is due, among other factors, to the presence of basic rocks, a greater diversity of habitats, more varied climatic conditions, as well as the brackish water of Lac Guillaume-Delisle and the salt water of Hudson Bay. Twenty-six of these rare taxa reach the northern, southern, eastern or western limit of their ranges in the study area. A majority of the remaining rare taxa are found sporadically throughout their range in Québec, and in the study area. Their sporadic presence is attributable to certain factors that are intrinsic to the biology and ecology of each species, specifically strict requirements related to edaphic and microclimatic conditions. It is also interesting to note that the distribution of boreal species which are either rare or close to the northern limit of their ranges (such as *Actaea rubra*,



- Black spruce–moss stands
- Black spruce–lichen stands
- Scrubland or conifers on wet or mesic station
- Scrubland on dry station (generally after forest fires)
- River scrubland
- Lichen tundra, barren ground or scrubland on wet station
- Lichen tundra
- Peat bogs
- Burned areas
- Barren rock and crustaceous lichens
- Water
- Barren ground
- Significant clouds or shadows
- Study area

Sources:
Viasat (2006),
Ortho-images Landsat ETM
(July 26, 1999; July 31, 2001;
August 20, 2000; July 29, 2001).

LACS-GUILLAUME-DELISLE-
ET-À-L'EAU-CLAIRE
PARK PROJECT

Vegetation
Lac Guillaume-Delisle

Base de données topographiques et administratives 1 : 250 000 (BDTA)
Ministère des Ressources naturelles et de la Faune du Québec
Base de données de l'aménagement du territoire 1 : 100 000 (BDAT)
Ministère des Ressources naturelles et de la Faune du Québec
Geodetic datum: NAD 83
Modified transverse Mercator projection
Québec ground-space co-ordinate system, zone 8

Scale 1:480,000
0 2.5 5 10 15 20 km

KATIVIK

November 2007

Map 4.2

An isolated population of *Cirsium muticum*, discovered on a cuesta face south of Ruisseau Kuugaa'uk, marks the new northern limit of this temperate-climate species' range in eastern North America.
Credit: Norman Dignard (MRNF)

Pseudorchis albida subsp. *straminea*, an extremely rare boreal orchid, reaches the western limit of its range in North America on the cuestas of Lac Guillaume-Delisle and the Passage de Manitounuk.
Credit: Norman Dignard (MRNF)

This cuesta face southeast of pointe Tikiraassiaq is the habitat of several species that are threatened or vulnerable in Québec (*Athyrium filix-femina* subsp. *cyclosorum*, *Carex petricosa* var. *misandroides*, *Polystichum lonchitis* and *Pseudorchis albida* subsp. *straminea*) or rare in Canada (*Carex petricosa* var. *misandroides*, *Cerastium cerastoides* and *Omalotheca norvegica*).
Credit: Norman Dignard (MRNF)

Lycopodium dendroideum, *Ranunculus abortivus*, *Urtica dioica* subsp. *gracilis* and *Ribes lacustre*) mirrors almost exclusively the distribution of balsam poplar clones (Comtois and Payette, 1987).

Ten taxa that are likely to be designated as threatened or vulnerable are present in and around the study area (Appendix 2), specifically in the Lac Guillaume-Delisle sector. These taxa are *Braya glabella*, *Carex petricosa* var. *misandroides, Castilleja raupii, Oxytropis hudsonica, Polystichum lonchitis, Pseudorchis alba* subsp. *straminea* as well as *Athyrium filix-femina* subsp. *cyclosorum*, *Botrychium pinnatum*, *Polypodium sibiricum* and *Rumex subarcticus* (Labrecque and Lavoie, 2002; J. Labrecque, personal communication, November 2006). Based on the number of times they were collected and observed, certain taxa are extremely rare while others are common in their habitat. Seven taxa identified in the study area are considered rare in Canada (*Carex adelostoma*, *Carex petricosa* var. *misandroides*, *Carex rufina*, *Cerastium cerastoides*, *Omalotheca norvegica*, *Pseudorchis albida* subsp. *straminea* and *Woodsia alpina*) (Argus and Pryer, 1990) (Appendix 2). Ten species identified in

The boreal calcicole taxa *Salix vestita* is observed frequently on the dolomitic formations of Lac Guillaume-Delisle. Elsewhere in the study area, this taxon is only observed on the limestone debris found on some Lac à l'Eau Claire islands. Crédit: Norman Dignard (MRNF)

the study area also appear on the list of candidate species prepared by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC, 2005). They are *Calamagrostis deschampsioides*, *Carex adelostoma*, *Carex heleonastes*, *Carex macloviana*, *Carex rufina*, *Cerastium cerastoides*, *Luzula groenlandica*, *Omalotheca norvegica*, *Potamogeton subsibiricus* and *Ranunculus allenii*).

Table 4.4 describes the notable elements of the 11 areas of interest for vascular flora, based on current knowledge. These areas are shown on Map 4.3. To these may be added the six locations of balsam poplar genetic diversity identified by Comtois (1982) at Lac Guillaume-Delisle and, by extension, any clones (Hydro-Québec, 1993a). Map 4.3 also identifies stands or isolated individuals of white spruce. Along the coast of Hudson Bay, this species reaches the northern limit of its range 1 km south of the village of Umiujaq (Serge Payette, personal communication, June 2003).

INVASCULAR FLORA

This section describes the lichens and bryophytes (moss, liverwort or hepatic, and sphagnum) identified in the study area for the Lacs-Guillaume-Delisle-et-à-l'Eau-Claire Park Project. Fungus and algae, which were not thoroughly researched, are not discussed.

Invascular flora inventories were completed for six sectors in the study area: Lac à l'Eau Claire, Lac Guillaume-Delisle, the Rivière Nastapoka, the Petite rivière de la Baleine [Little Whale River], the Rivière à l'Eau Claire and the Rivière Sheldrake. The goal of the inventory work was to study the greatest possible diversity of habitats.

Overall, 659 taxa were identified in the study area (Table 4.5 and Appendix 3). Specifically for bryophytes, 324 taxa were identified, which is to say 100 liverworts, 31 sphagnums and 193 mosses. For lichens, 335 taxa were identified, which is to say 171 macrolichens and 164 crustaceous lichens.

Other species may also be present in the study area. Fieldwork on the cuestas situated west of Lac Guillaume-Delisle, outside of the study area could increase the identified taxa by 29 for mosses, 4 for liverworts and 11 for lichens.

Bryophytes

Scientific documentation and fieldwork carried out in the study area between 1981 and 2006 have been combined to paint a picture of the area's bryophytic flora. It comprises 324 taxa, of which 50% were observed for the first time ever. These taxa represent 36% of the 892 byrophytic taxa known in Québec (Faubert, 2007).

The results of this latest inventory work point to 161 new taxa in the study area, including two taxa new to Québec and eastern North America (*Gymnomitrion obtusum* and *Bryum calobryoides*). Regarding liverworts, scientific documentation refers to 50 taxa while an equal number were observed in the study area for the first time. Regarding sphagnums, 13 of the 31 taxa identified were previously referred to in scientific documentation while the remaining 18 were newly observed in the study area. Regarding mosses, 193 taxa were identified, of which 93 are new.

The largest number of bryophytes were identified around Lac Guillaume-Delisle (208 taxa altogether: 116 mosses, 64 liverworts and 28 sphagnums) and Lac à l'Eau Claire (198 taxa altogether: 117 mosses, 53 liverworts and 28 sphagnums). These two sectors possessed, as well, the largest number of bryophytes found exclusively in a particular sector, specifically 40 exclusive taxa in the Lac Guillaume-Delisle sector and 33 taxa in the Lac à l'Eau Claire sector. The diversity of habitats and geological foundations in these sectors undoubtedly contributes to this richness.

Table 4.4 Noteworthy Vascular Plant Elements in the Areas of Interest in the Study Area

AREA	NOTEWORTHY VASCULAR PLANT ELEMENTS
1	**Jiaviniup Narsanga Cuesta.** Three species likely to be designated as threatened or vulnerable in Québec (*Athyrium filix-femina* subsp. *cyclosorum*, *Polystichum lonchitis* and *Pseudorchis straminea*). One rare species in Canada (*Woodsia alpina*). High concentration of calcicoles (*Anemone parviflora*, *Arabis alpina*, *Arctous rubra*, *Asplenium viride*, *Bartsia alpina*, *Campanula uniflora*, *Carex capillaris*, *Carex. nardina*, *Carex rupestris*, *Carex scirpoidea*, *Carex vaginata*, *Draba glabella*, *Dryas integrifolia*, *Pedicularis flammea*, *Pinguicula vulgaris*, *Polystichum lonchitis*, *Potentilla nivea*, *Salix calcicola*, *Salix vestita*, *Saxifraga aizoides*, *Saxifraga oppositifolia* and *Woodsia glabella*). Three taxa that are rare or at the limit of their ranges in the study area (*Fragaria virginiana*, *Ribes hudsonianum* and *Valeriana dioica* subsp. *sylvatica*). Potential presence of other species likely to be designated as threathened or vulnerable in Québec or rare in Canada.
2	**Rivière Guérin and Île Cairn.** Seven taxa that are rare or at the limit of their ranges in the study area (*Drosera longifolia*, *Drosera ×obovata*, *Euphrasia hudsonica*, *Fragaria virginiana*, *Gaultheria hispidula*, *Oclemena nemoralis* and *Prunus pensylvanica*). On the island, presence of two of the six locations of balsam poplar genetic variety identified in the Lake Guillaume-Delisle zone (Comtois 1982). High concentration of calcicoles (*Astragalus eucosmus*, *Bartsia alpina*, *Campanula uniflora*, *Carex capillaris, Carex gynocrates, Carex microglochin, Carex scirpoidea, Carex vaginata, Draba aurea, Draba glabella, Draba incana, Draba norvegica*, *Dryas integrifolia*, *Potentilla nivea*, *Salix vestita*, *Shepherdia canadensis* and *Tanacetum bipinnatum*).
3	**Baie and Rivière du Poste.** Two species likely to be designated as threatened or vulnerable in Québec (*Polypodium sibiricum* and *Rumex subarcticus*). One species that could be classified at risk in Canada (*Luzula groenlandica*). Three taxa that are rare in the study area (*Botrychium lanceolatum*, *Draba alpina* and ×*Elyleymus ungavensis*). High concentration of calcicoles (*Arenaria humifusa*, *Calamagrostis stricta* subsp. *inexpansa*, *Campanula uniflora*, *Carex bicolor*, *Carex nardina*, *Draba glabella*, *Draba incana*, *Draba norvegica*, *Saxifraga paniculata* subsp. *neogaea*, *Shepherdia canadensis* and *Woodsia glabella*). Presence of balsam poplar clones (Comtois, 1982).
4	**Hybrides Archipelago.** One species likely to be designated as threatened or vulnerable in Québec (*Rumex subarcticus*). Two species that could be classified at risk in Canada (*Potamogeton subsibiricus* and *Ranunculus allenii*). Twelve taxa that are rare or at the limit of their ranges in the study area (*Atriplex glabriuscula*, *Botrychium lanceolatum*, *Eleocharis kamtschatica*, *Eleocharis palustris*, *Epilobium davuricum*, *Juncus bufonius* var. *halophilus*, *Potentilla pulchella*, *Puccinellia nutkaensis*, *Puccinellia nuttalliana*, *Sceptridium multifidum*, *Spergularia canadensis* and *Stellaria longifolia*). High concentration of calcicoles (*Androsace septentrionalis*, *Arctous rubra*, *Arenaria humifusa*, *Astragalus eucosmus*, *Carex bicolor*, *Carex capillaris*, *Carex gynocrates*, *Carex microglochin*, *Carex rupestris*, *Carex scirpoidea*, *Draba aurea*, *Draba glabella*, *Draba incana*, *Draba norvegica*, *Kobresia simpliciuscula*, *Pedicularis flammea*, *Potentilla nivea*, *Salix calcicola*, *Salix vestita*, *Saxifraga aizoides*, *Saxifraga oppositifolia*, *Saxifraga paniculata* subsp. *neogaea*, *Shepherdia canadensis* and *Tanacetum bipinnatum*).
5	**Mouth of the Rivière à l'Eau Claire.** One rare species (*Urtica dioica* subsp. *gracilis*). Presence of *Geum macrophyllum* and *Lathyrus palustris* reported by Comtois (1982), and to be confirmed. Presence of two of the six locations of balsam poplar genetic variety identified in the Lake Guillaume-Delisle zone (Comtois, 1982).
6	**Baie and Rivière Crafton.** Five taxa that are rare or at the northern limit of their ranges in the study area (*Fragaria virginiana*, *Piptatherum pungens*, *Primula laurentiana*, *Prunus pensylvanica* and *Ranunculus abortivus*). Presence of balsam poplar clones (Comtois, 1982).
7	**Île Atkinson.** Four taxa that are rare or at the northern limit of their ranges (*Carex rufina* (also rare in Canada), *Drosera longifolia*, *Luzula arctica* and *Prunus pensylvanica*). Presence of calcicoles (*Arctous rubra*, *Carex capillaris*, *Carex vaginata*, *Draba aurea*, *Salix vestita*, *Saxifraga paniculata* subsp. *neogaea*). Presence of balsam poplar clones (Comtois, 1982).
8	**Île Kamiskutanikaw.** Three taxa that are rare or at the northern limit of their ranges (*Botrychium matricarifolium*, *Carex arcta* and *Carex ×firmior*). One species that could be classified at risk in Canada (*Luzula groenlandica*). Presence of calcicoles (*Arctous rubra*, *Campanula uniflora*, *Carex capillaris*, *Carex chordorrhiza*, *Carex scirpoidea*, *Cystopteris montana*, *Draba aurea*, *Moehringia macrophylla*, *Salix vestita*, *Saxifraga paniculata* subsp. *neogaea*). Presence of balsam poplar clones (Comtois, 1982).
9	**Rivière and Lac Noonish.** Three taxa that are rare in the study area (*Carex ×firmior*, *Eriophorum viridicarinatum* and *Rubus paracaulis*). Presence of two calcicoles (*Carex chordorrhiza* and *C. livida*).

Table 4.4 (continued) Noteworthy Vascular Plant Elements in the Areas of Interest in the Study Area

AREA	NOTEWORTHY VASCULAR PLANT ELEMENTS
10	**Tikiraassiaq Cuesta.** Three species likely to be designated as threatened or vulnerable in Québec (*Athyrium filix-femina* subsp. *cyclosorum*, *Polystichum lonchitis* and *Pseudorchis albida* subsp. *straminea*). Three species that are rare in Canada (*Cerastium cerastoides*, *Omalotheca norvegica* and *Pseudorchis albida* subsp. *straminea*). Five species at the northern limit of their ranges (*Athyrium filix-femina* subsp. *cyclosorum*, *Galium triflorum*, *Polystichum lonchitis*, *Pseudorchis albida* subsp. *straminea* and *Valeriana dioica* subsp. *sylvatica*). High concentration of calcicoles (*Anemone parviflora*, *Bartsia alpina*, *Campanula uniflora*, *Carex capillaris*, *Carex rupestris*, *Carex scirpoidea* subsp. *scirpoidea*, *Cryptogramma stelleri*, *Dryas integrifolia* subsp. *integrifolia*, *Kobresia simpliciuscula*, *Pedicularis flammea*, *Potentilla nivea* var. *nivea*, *Polystichum lonchitis*, *Pseudorchis albida* subsp. *straminea*, *Salix calcicola*, *Salix vestita*, *Saxifraga paniculata* subsp. *neogaea*).
11	**Kuuguluk Cuesta.** Two species likely to be designated as threatened or vulnerable in Québec (*Polystichum lonchitis* and *Pseudorchis albida* subsp. *straminea*). Four species that are rare in Canada or that could be classified at risk in Canada (*Cerastium cerastoides*, *Omalotheca norvegica*, *Pseudorchis albida* subsp. *straminea* and *Ranunculus allenii*). Two species at the northern limit of their ranges (*Polystichum lonchitis*, *Pseudorchis albida* subsp. *straminea*). High concentration of calcicoles (*Anemone parviflora*, *Bartsia alpina*, *Carex capillaris*, *Carex gynocrates*, *Carex scirpoidea* subsp. *scirpoidea*, *Carex vaginata*, *Cystopteris montana*, *Dryas integrifolia* subsp. *integrifolia*, *Kobresia simpliciuscula*, *Pedicularis flammea*, *Polystichum lonchitis*, *Pseudorchis albida* subsp. *straminea*, *Salix vestita* and *Saxifraga aizoides*).

The boulders at this waterfall on the Rivière Guérin are an ideal habitat for two taxa newly identified in eastern North America, the moss Bryum calobryoides and the crustaceous lichen *Koerberiella wiemmeriana*. This waterfall also nurtures a few other invascular plants that are rare in Québec.
Credit: Jean Gagnon (MDDEP)

Wetlands represent ideal habitat for bryophytes, in particular sphagnums. This photograph shows a minerotrophic peat bog and a palsa peat bog. Boggy complexes cover a considerable area next to the cuestas, in the southwest part of the study area.

Gauthier et al. (2006) mention that boreal elements are predominant (58%)[1] including a large proportion of mosses (65% of taxa) compared with liverworts (22% of taxa) and almost all the sphagnums identified (13% of taxa). In addition, arctic and alpine elements combined represent 21% of taxa including, in this case, a significant proportion of liverworts (59% of taxa) compared with mosses (39% of taxa). Finally, the presence of 18 temperate-climate bryophytes in such a northern area is of particular phytogeographic interest.

Gauthier et al. (2006) also mention that the bryophytic flora is most interesting on the surfaces of boulders (metasedimentary and igneous rocks) which nurture the greatest number of species. The two bryophytes identified for the first time in Québec were observed on boulders, *Gymnomitrion obtusum* and *Bryum calobryoides*. Boulder surfaces also nurture the largest number of arctic and alpine mosses and liverworts, generally speaking, and calciphile mosses.

Table 4.5 Number of Taxa in the Study Area by Sector

CATEGORY		NUMBER OF TAXA BY SECTOR[1]						TOTAL NUMBER OF TAXA IN THE STUDY AREA
		LEC	LGD	NAS	PRB	REC	SHE	
BRYOPHYTES								
	Liverworts	53	64	14	53	51	14	**100**
	Sphagnums	28	28	25	12	20	22	**31**
	Mosses	117	116	21	86	86	14	**193**
	Total bryophytes	**198**	**208**	**60**	**151**	**157**	**50**	**324**
LICHENS								
	Crustaceous lichens	65	70	10	92	64	11	**164**
	Macrolichens	100	86	52	80	84	56	**171**
	Total lichens	**165**	**156**	**62**	**172**	**148**	**67**	**335**
	Total invascular taxa	**363**	**364**	**122**	**323**	**305**	**117**	**659**

[1] LEC: Lac à l'Eau Claire; LGD: Lac Guillaume-Delisle; NAS: Rivière Nastapoka; LBR: Petite rivière de la Baleine; ECR: Rivière à l'Eau Claire; SHE: Rivière Sheldrake

The moss *Bryum calobryoides*, discovered in the summer of 2006 along the Rivière Guérin, is a new addition to the moss flora known in eastern North America. The species had previously only been observed in the Rocky Mountains in western North America growing along streams at high altitudes. This moss is always sterile.
Credit: Norman Dignard (MRNF)

For its part, the tundra possesses the second largest number of bryophytes. The number of liverworts observed on the tundra is very similar to the number observed on boulders, while the number of mosses is much lower. Notwithstanding, arctic and alpine liverworts and mosses are equally rich on the tundra and on boulders in the study area. The presence of these bryophytes is clearly less significant in all other habitats.

Finally, the richness of bryophytic elements of interest in minerotrophic peat bogs (fens) is similar to that for the tundra. Despite the presence of fewer liverworts and mosses, sphagnums make up the difference since they contain an unparalleled quantity of elements of interest.

Of the 324 bryophytes identified in the study area, 52 taxa (or 16%) are considered rare in Québec (Appendix 4) according to the classification produced by the Centre de données sur le patrimoine naturel du Québec [natural heritage centre]. The taxa are categorized as follows: 23 liverworts, two sphagnums and 27 mosses. Among the rare liverworts, 10 were observed in the cuesta zone at Petite rivière de la Baleine, 9 around Lac Guillaume-Delisle and 7 along the Rivière à l'Eau Claire. Regarding the sphagnums, one taxon, *Sphagnum arcticum*, was observed in the Rivière Nastapoka sector and another, *Sphagnum contortum*, in the Lac Guillaume-Delisle sector. Regarding rare mosses, 12 were identified around Lac Guillaume-Delisle, 10 around Lac à l'Eau Claire and 8 more in the cuesta zone at Petite rivière de la Baleine.

Lichens

A review of scientific documentation and the results produced by recent inventory work put the total number of taxa in the study area at 335. Among these, 222 (66%) were observed

LACS-GUILLAUME-DELISLE-ET-À-L'EAU-CLAIRE PARK PROJECT
Areas of Interest
Vascular Flora
Area of interest
1 Jiaviniup Narsanga Cuesta
2 Rivière Guérin and Île Cairn
3 Baie and Rivière du Poste
4 Hybrides Archipelago
5 Mouth of the Rivière à l'Eau Claire
6 Baie and Rivière Crafton
7 Île Atkinson
8 Île Kamiskutanikaw
9 Rivière and Lac Noonish
10 Tikiraassiaq Cuesta
11 Kuuguluk Cuesta
Boreal poplar stand, isolated individuals or clones
White spruce stand, isolated individuals or small stand
Sector boundaries
Area of interest
Note: For further details, refer to Table 4.4
Sources: Comtois (1982), Hydro-Québec (1993), Dignard (2007), Jean Gagnon (MDDEP)
Scale 1:775 000
0 5 10 20 30 km
Base de données topographiques et administratives 1 : 250 000 (BDTA), Ministère des Ressources naturelles et de la Faune du Québec
Base de données de l'aménagement du territoire 1 : 100 000 (BDAT), Ministère des Ressources naturelles et de la Faune du Québec
Geodetic datum: NAD 83
Modified transverse Mercator projection
Québec ground-space co-ordinate system, zone 8
KATIVIK
November 2007
Map 4.3
Hudson Bay
Îles Nastapoka
Umiujaq
Colline Qingaaluk
Lac Guillaume-Delisle Sector
Presqu'île Castle
Le Goulet
Île Cairn
Rivière à l'Eau Claire Sector
Lac à l'Eau Claire Sector
Lac à l'Eau Claire
Lac Tikirartuuq
Lac Kakiattualuk
Lac Benita
Lac Dupire
Lac Audie
Lac Achikunipi
Lac Bourdel
Lacs des Loups Marins
Lac Natwakupaw
Lac Werdem
Lac Persillon
Lac Pintair
Lac Ichikami
Lac Pikutachiku
Lac Bourg
Petit lac des Loups Marins
Lac Amichinatwayach
Lac D'Iberville
Lac Rousselin
Lac Quereur
Lac Girardy
Lac Lamain
Lac Mikirnguup
Lac Saindon
Lac Iyachisakus
Rivière Nastapoka
Rivière Richard
Rivière Devaux
Rivière Sheldrake
Rivière du Nord
Rivière au Caribou
Rivière à l'Eau Claire
Rivière De Troyes
Rivière Guérin
Rivière Kuuguluk
Petite rivière de la Baleine
Rivière Second
77°0'0"W
76°30'0"W
76°0'0"W
75°30'0"W
75°0'0"W
74°30'0"W
74°0'0"W
73°30'0"W
73°0'0"W
72°30'0"W
57°0'0"N
56°30'0"N
56°0'0"N

for the first time in the study area, including 24 which had never before been identified in Québec (Table 4.6). Of the 171 macrolichens, 80 already appeared in scientific documentation, which means that 91 taxa (53%) were observed for the first time in the study area. Of the 164 crustaceous lichens, 33 already appeared in scientific documentation while 131 (80%) were observed for the first time in the study area.

The greatest number of taxa (172) were observed on the faces of the cuestas situated north and south of the Petite rivière de la Baleine. Among these, 92 were crustaceous lichens and 80 macrolichens (Table 4.5). Moreover, this sector possessed the largest number of lichens found exclusively in a particular sector: 52 taxa altogether including 40 crustaceous lichens.

Among the macrolichens, the genus *Cladonia* comprises the greatest number of taxa in the study area, which is to say 42 were identified. This genus includes *Cladonia mitis*, *C. rangiferina* and *C. stellaris*, as well as *C. stygia*, a terricolous fructitose lichen commonly eaten by caribou. This genus of lichens is abundant in open black spruce stands, dry scrubland and exposed lichen tundra. The lichens of the *Stereocaulon* (12 taxa), *Cetraria* and *Cetrariella* (9 taxa) genera often grow with *Cladonia* lichens on the tundra. Open spruce–moss stands are an ideal habitat for lichens of the *Peltigera* genus, where 8 taxa were identified. Black spruce branches nurture a diversity of epiphytic lichens of which the most abundant are the fructitose lichens of the *Bryoria* genus.

Among crustaceous lichens, the *Lecanora* genus is best represented (19 taxa). The taxa of this genus grow only in specific substrata. Some grow only on tree trunks, others only on limestone rocks, and one in particular only on beluga bones (*Lecanora nordenskioeldii*). The crustaceous lichens of the *Rhizocarpon*, *Porpidia* and *Lecidea* genera are common on acidic rocks and erratic blocks, although a few of these taxa, which are more rare, are observed exclusively in calcicole substrata. The foliose lichens of the *Umbilicaria* genus are found only on boulders and igneous rock cliffs. The *Pertusaria* genus (7 taxa) is often associated with exposed lichen tundra on rocky peaks.

There is no classification for rare lichens in Québec, although three lichens that are classified as rare in Canada (according to Goward et al., 1998) were observed in the study area. These are *Collema glebulentum* (Lac Guillaume-Delisle), *Hypogymnia pulverata* (Rivière Sheldrake) and *Sticta arctica* (Rivière Nastapoka). A fourth lichen (*Lempholemma polyanthes*) is potentially present in the study area since it was observed on the cuestas on the west shore of Lac Guillaume-Delisle.

This arctic lichen, *Dactylina arctica*, was collected by the geologist Albert Peter Low on July 1, 1896, along the Rivière à l'Eau Claire. The Latin name, meaning "little fingers", refers to the lichen's shape. This species reaches the southern limit of its range in Québec along the Rivière à l'Eau Claire.
Credit: Photograph produced with permission from the Canadian Museum of Nature, Ottawa, Ontario

Areas of Interest

The faces of the cuestas in the study area possess a wide variety of invascular flora. The limestone cliffs, colluvial deposits and talus consisting of a mix of sedimentary and volcanic rocks which have fallen from the cuestas provide diverse habitats for several taxa of lichens, mosses and liverworts. This diversity of substrata, the closeness of the sea and the different altitudes combined are factors that contribute to the large number of taxa.

The shape of this lichen, *Thamnolia vermicularis*, resembles a white grub. It is an arctic element of the lichen flora found in the study area. In Québec, the sand terraces located near the mouth of the Petite rivière de la Baleine represent the southern limit of this species' range.
Credit: Jean Gagnon (MDDEP)

The foliose lichen *Nephroma arcticum* is common in wet, shaded undergrowth (in this case, black spruce) along with the moss *Pleurozium schreberi*.
Credit: Jean Gagnon (MDDEP)

The squamous lichen *Psora himalayana*, identified in the summer of 2006 at the foot of a limestone cuesta cliff at the Petite rivière de la Baleine, is an addition to the flora of eastern North America. It is known to grow in western North America and in Asia.
Credit: Norman Dignard (MRNF)

The crustaceous lichen *Porpidia melinodes* (orangish colour) is especially abundant on top of the talus of certain cuestas, on volcanic-rock blocks. The species competes fiercely with two other species of crustaceous lichen.
Credit: Norman Dignard (MRNF)

Elsewhere in the study area, wetlands and waterfalls offer ideal habitat for invascular flora. In particular, the moss *Bryum calobryoides* and the crustaceous lichen *Koerberiella wiemmeriana* were observed on the boulders at a waterfall on the Rivière Guérin [Guérin River]. Both taxa were identified in the study area for the first time in eastern North America.

Table 4.7 summarizes notable elements of the invascular flora of the study area, identified in the areas of interest shown on Map 4.4.

Wildlife

Roughly 38 mammal, 131 bird and 29 fish species (plus another 13 species of fish in Hudson Bay), as well as 6 amphibians and 1 reptile can be found in and around the study area. Appendices 5 to 10 list these species including their Inuktitut and Cree names.

Several factors contribute to the diversity of the wildlife habitats of the study area. For example, the cuestas offer ideal nesting sites for birds; Le Goulet (the channel between Hudson

Table 4.6 New Identified Lichens in Québec, found in the Study Area, by Sector[1]

	LEC	LGD	NAS	PRB	REC	SHE
MACROLICHENS						
Collema glebentulum[2]		✓				
Cystocoleus ebeneus	✓					
Parmelia skultii		✓				
Stereocaulon spathuliferum	✓					
CRUSTACEOUS LICHENS						
Acarospora veronensis				✓		
Aspicilia aquatica				✓		
Aspicilia candida		✓				
Biatora cuprea				✓		
Biatora subduplex				✓		
Buellia triphragmioides	✓	✓				
Carbonea atronivea				✓		
Eiglera flavida				✓		
Frutidella caesioatra				✓		
Hafellnera parasemella				✓		
Koerberiella wimmeriana					✓	
Lecanora meridionalis					✓	
Lecanora nordenskioeldii				✓		
Massalongia carnosa				✓		
Polyblastia sendtneri				✓		
Porpidia superba				✓	✓	
Psora himalayana				✓		
Rhizocarpon umbilicatum					✓	
Thelocarpon epibolum					✓	
Toninia arctica				✓		
Total lichens	**3**	**4**	**0**	**14**	**5**	**0**

1 LEC: Lac à l'Eau Claire; LGD: Lac Guillaume-Delisle; NAS: Rivière Nastapoka; LBR: Petite rivière de la Baleine; ECR: Rivière à l'Eau Claire; SHE: Rivière Sheldrake

2 Rare in Canada according to Goward et al. (1998)

Bay and Lac Guillaume-Delisle) allows salt water to enter the lake, creating a brackish water environment that nurtures both salt-water and fresh-water species; finally, the varied vegetation suits the behaviour of many animal species.

A large amount of current knowledge about wildlife in the study area was derived from scientific documentation and Inuit traditional knowledge (Avataq Cultural Institute, interviews conducted in 2005, unpublished data; Reeves, 1995b; Smith, 2000; Strata360, 2007). As well, fly-overs of the study area were carried out by members of the Parks Section of the Kativik Regional Government along with authoritative Inuit and Cree residents from Umiujaq and Whapmagoostui, respectively. Sectoral studies were also completed in the past further to the hydro-electric power development project on the Grande rivière de la Baleine (Hydro-Québec, 1993a, 1993b, 1993c), particularly in the areas of the Petite rivière de la Baleine, Lac D'Iberville, Petit lac des Loups Marins [Lower

Table 4.7 Noteworthy Invascular Plant Elements in the Areas of Interest in the Study Area

AREA	NOTEWORTHY INVASCULAR PLANT ELEMENTS
1	**Kuugaa'uk Cuesta** (outside the study area). A rare lichen in Canada *Lempholemma* polyanthes according to Goward et al. (1998). Three new lichens in Québec: *Protothelenella sphinctrinoidella*, *Toninia arctica* and *Toninia tristis* subsp. *asiae-centralis* (newly identified in eastern North America).
2	**Jiaviniup Narsanga Cuesta.** Two rare bryophytes in Québec: the liverwort *Gymnomitrion obtusum* (newly identified in eastern North America) and the sphagnum *Sphagnum obtusum*. Three new lichens in Québec: *Aspicilia aquatica*, *Carbonea atronivea* and *Porpidia superba* (newly identified in eastern Canada). Several calcicole bryophytes and lichens.
3	**Tikiraassiaq Cuesta.** Five rare bryophytes in Québec: the liverworts *Diplophyllum albicans*, *Mannia pilosa* and *Scapania gymnostomophila* and the mosses *Cyrtomnium hymenophyllum* and *Encalypta alpina*. Seven new lichens in Québec: *Biatora cuprea*, *Biatora subduplex*, *Frutidella caesioatra*, *Hafellnera parasemella*, *Lecanora nordenskioeldii*, *Polyblastia sendtneri* and *Psora himalayana* (newly identified in eastern North America). Several calcicole bryophytes and lichens.
4	**Kuuguluk Cuesta.** Three rare bryophytes in Québec: the liverwort *Lophozia polaris* and the mosses *Cnestrum alpestre* and *Encalypta affinis* subsp. *affinis*. Four new lichens in Québec: *Acarospora veronensis*, *Biatora cuprea*, *Eiglera flavida* and *Toninia arctica*. Several calcicole bryophytes and lichens.
5	**Rivière Guérin, steplike waterfall.** Two rare bryophytes in Québec: the liverwort *Hygrobiella laxiflora* and the moss *Bryum calobryoides* (rare in Canada according to Belland, 1998, and newly identified in eastern North America). One new lichen in Québec: *Rhizocarpon umbilicatum*.
6	**Rivière Guérin, waterfall 2.** Two rare bryophytes in Québec: the mosses *Bryum calobryoides* and *Hygrohypnum smithii*. Two new lichens in Québec: *Koerberiella wimmeriana* (newly identified in eastern North America) and *Thelocarpon epibolum*. A few calcicole species.
7	**Baie and Rivière du Poste.** Three rare mosses in Québec: *Grimmia trichophylla*, *Hygrohypnum smithii* and *Hypnum plicatulum* (rare in Canada according to Belland, 1998). One new lichen in Québec: *Aspicilia candida*.
8	**Île Cairn.** Four rare bryophytes in Québec: the liverworts *Lophozia obtusa* and *Marsupella sparcifolia* and the mosses *Dicranum condensatum* (rare in Canada according to Belland, 1998) and *Sanionia orthothecioides* (only occurrence in Québec).
9	**Lac Guillaume-Delisle, Persillon Formation.** Two new lichens in Québec: *Collema glebulentum* (rare in Canada according to Goward et al. 1998) and *Parmelia skultii*.
10	**Rivière à l'Eau Claire, rapids.** One rare bryophyte in Québec: the liverwort *Lophozia grandiretris*. Two new lichens in Québec: *Koerberiella wimmeriana* and *Porpidia superba*.
11	**Hills situated west of Lac à l'Eau Claire.** Two rare bryophytes in Québec: the liverwort *Lophozia ventricosa* var. *longiflora* and the moss *Cnestrum alpestre*. Two new lichens in Québec: *Stereocaulon spathuluferum* and *Cystocoleus ebeneus*.
12	**Central archipelago at Lac à l'Eau Claire.** One rare moss in Québec: *Cnestrum alpestre;* three calcicole mosses and 12 arctic-alpine-type mosses.
13	**Île Kamiskutanikaw (Île des Foreurs).** One rare sphagnum in Québec: *Sphagnum obtusum*.
14	**Île Kuchistiniwamiskahikan.** Sphagnums (23) extremely diverse in this location including five sphagnums that are rare in the study area: *Sphagnum centrale*, *S. fallax*, *S. fimbriatum*, *S. papillosum* and *S. rubellum*.
15	**Rivière Sheldrake.** One new lichen in North America, rare in Canada *Hypogymnia pulverata* (Brodo, 1989; Goward et al., 1998).
16	**Rivière Nastapoka.** Two new lichens in Québec: *Lobaria linita* and *Sticta arctica* (rare in Canada) (Roy, 2000; Goward et al., 1998). One rare sphagnum in Québec: *Sphagnum arcticum*.


LACS-GUILLAUME-DELISLE-
ET-À-L'EAU-CLAIRE
PARK PROJECT
Areas of Interest
Invascular Flora
Area of interest
1 Kuugaa'uk Cuesta
2 Jiaviniup Narsanga Cuesta
3 Tikiraassiaq Cuesta
4 Kuuguluk Cuesta
5 Rivière Guérin, steplike waterfall
6 Rivière Guérin, waterfall 2
7 Baie and Rivière du Poste
8 Île Cairn
9 Lac Guillaume-Delisle, Persillon Formation
10 Rivière à l'Eau Claire, rapids
11 Hills situated west of Lac à l'Eau Claire
12 Central archipelago at Lac à l'Eau Claire
13 Île Kamiskutanikaw
14 Île Kuchistiniwamiskahikan
15 Rivière Sheldrake
16 Rivière Nastapoka
Waterfall
Sector boundaries
Study Area
Note : For further details, refer to Table 4.7
Sources: Jean Gagnon (MDDEP)
Robert Gauthier
National Topographic Data Base
1:50,000 (NTDB), Geomatics Canada
Scale 1:775,000
Base de données topographiques et administratives
1 : 250 000 (BDTA), Ministère des Ressources naturelles et de la Faune du Québec
Base de données de l'aménagement du territoire
1 : 100 000 (BDAT), Ministère des Ressources naturelles et de la Faune du Québec
Geodetic datum: NAD 83
Modified transverse Mercator projection
Québec ground-space co-ordinate system, zone 8
November 2007
Map 4.4
Hudson Bay
Îles Nastapoka
Umiujaq
Rivière à l'Eau Claire Sector
Lac Guillaume-Delisle Sector
Lac à l'Eau Claire Sector
Lac à l'Eau Claire
Lac Guillaume-Delisle
Presqu'île Castle
Le Goulet
Île Cairn
Colline Qingaaluk
Lac Pamiallugusiup
Lac Persillon
Lac Pintair
Lac Mikirnguup
Rivière Guérin
Rivière De Troyes
Rivière au Caribou
Rivière du Nord
Rivière Nastapoka
Rivière Sheldrake
Rivière Devaux
Rivière Richard
Lac Kakiattualuk
Lac Tikirartuuq
Lac Natwakupaw
Lac Werden
Lac Ichikap
Lac Bourdel
Lacs des Loups Marins
Petit lac des Loups Marins
Lac Pikutachikw
Lac Bourg
Lac Achikunip
Lac Audie
Lac Duplre
Lac Benita
Lac Girardy
Lac Lamain
Lac Quereur
Lac Roussalin
Lac D'Iberville
Lac Amichinatwayach
Lac Saindon
Lac Iyachisakus
Petite rivière de la Baleine
Rivière Second
KATIVIK

Seal Lake], Lacs des Loups Marins, Lac Bourdel and the Rivière Nastapoka. Some of these studies incorporated Inuit and Cree knowledge on wildlife (Archéotec, 1990, 1992). The Lac Guillaume-Delisle, Rivière à l'Eau Claire and Lac à l'Eau Claire sectors on the other hand were not studied in depth as part of these sectoral studies.

The following sections provide brief descriptions of the wildlife species most commonly observed in the study area as well as those species that are particularly important for Inuit and Cree subsistence. Mindful of conservation, species at risk are also described.

MARINE MAMMALS

Six marine mammal species may be observed along the coast of Hudson Bay in the study area (Appendix 5). Some of these may also be found in the river estuaries of the study area and Lac Guillaume-Delisle. Three species are considered to be at risk.

Seal

Three species of seal are found in the study area. These are harbour seal (*Phoca vitulina*), ringed seal (*Phoca hispida*) and bearded seal (*Erignathus barbatus*). Ringed seal and bearded seal are the most common in the region and the most important to Inuit (Archéotec, 1992).

Scientific documentation describes five subspecies of harbour seal based on geographical distribution and morphology; two of these are found in the study area. The first subspecies is *Phoca vitulina concolor*; its range encompasses Québec, including Ungava Bay (Prescott and Richard, 1996), Lac Guillaume-Delisle and the Rivière Nastapoka (Mansfield, 1968 in Archéotec, 1992). The second subspecies, *Phoca vitulina mellonae*, is the fresh-water harbour seal population in Lacs des Loups Marins. This subspecies may be observed in Petit lac des Loups Marins, Lacs des Loups Marins, Lac à l'Eau Claire, Lac Bourdel and a few connected rivers including the Rivière Nastapoka. This population is of special interest because it is probably one of the only stocks of seal anywhere on earth that is fully adapted to a fresh-water environment and is completely landlocked (MRNF, 2005). Most of the already rare populations of fresh-water seal around the world are considered to be at risk. Examples include the probable population of harbour seal in Lake Iliamna in southwestern Alaska (Smith, 1999) as well as the ringed seal populations in Lake Baikal in Siberia (CAT, 2000), Lake Saimaa in Finland (VF, 2004; WWF, 2005) and Lake Ladoga in Russia (Smith, 1999).

The biology of the harbour seal population in Lacs des Loups Marins differs slightly from other harbour seal populations at the same latitude. The rutting period is earlier and birthing takes place on ledges under the ice rather than on the ice-pack. This seal population feeds exclusively in fresh water, with their main prey being brook trout (*Salvelinus fontinalis*), lake trout (*Salvelinus namaycush*) and whitefish (*Coregonus sp.*) (Smith, 1999). Also, Inuit can describe differences in the behaviours of fresh-water seal and salt-water seal, including their habit of crawling on the land to bypass obstacles or places where the current is too strong (Archéotec, 1992).

The subspecies *Phoca vitulina mellonae* was first observed in 1818 in the Lac D'Iberville and Petit lac des Loups Marins area by the explorer Atkingson II. Other explorers noted the same species later, mainly in Lacs des Loups Marins (SOMER, 1991). To explain this fresh-water seal, it is hypothesized that the population was originally a salt-water species that penetrated inland with the transgression of the Tyrrell Sea (a post-glacial sea created following the retreat of the last glaciers), before becoming trapped in Lacs des Loups Marins when the sea retreated, between 8000 and 3000 years ago (Smith, 1999; SOGEAM, 1985 in Consortium Gilles Shooner & Associés et al., 1991a).

In the environmental, technical and economic studies carried out by Hydro-Québec (1993a) for the hydro-electric power development project on the Grande rivière de la Baleine, several ledges used by harbour seal were identified at the mouth of Lac Pikutachikw, on the north shore of Île Doutt [Doutt Island], at the eastern end of Lac Bourdel, as well as in the southwestern and northeastern portions of Lacs des Loups Marins (Map 4.5). In fact, two or three months following the weaning period, during the moulting period which occurs between July and November, the seal congregate on these ledges (Consortium Gilles Shooner & Associés et al., 1991a). As well, these seal are not found in winter in areas where the ice is packed tightly; they prefer polynyas where they are able to breath more easily and exit from the water. Lacs des Loups Marins is a breeding area for the fresh-water population (Consortium Gilles Shooner & Associés et al., 1991a; Mansfield, 1968 in Archéotec, 1992).

Given technical obstacles and the difficulty accessing the lakes, there does not exist much data on the ecology of this fresh-water seal, and its population can not be estimated accurately (Consortium Gilles Shooner & Associés et al., 1991a). The population could be less than 500, or approximately 100, or roughly one seal per 10 km^2 in the Lacs des Loups Marins and Lac Bourdel area (Smith, 1999; Consortium Gilles Shooner & Associés et al., 1991a).

For its part, ringed seal are the most common pinniped in the Canadian Arctic, as well as in Hudson Bay (Mansfield, 1968 in Archéotec, 1992; Prescott and Richard, 1996). According to Inuit traditional knowledge, this seal does not follow a set migratory route. Its movements are determined rather by water currents during the different seasons. Consequently, it may be found in any part of Hudson Bay at any moment of the year. This species of seal is the one most commonly harvested by Inuit (Archéotec, 1992; Strata360, 2007).

Inuit possess knowledge of the seasonal biological cycle of ringed seal. In the spring, after the ice-pack has begun to break up, ringed seal gather near the coast in order to feed. When this ice begins to disappear, they congregate in larger groups and move offshore, where they tend to meet in the shallow waters around islands. In July, ringed seal are concentrated along the coasts although some may still be observed offshore in deep water. Seal are also common in the estuary of the Petite rivière de la Baleine. Autumn is the seal's rutting period. During this period, they are very active and congregate in large groups offshore. Seal pups are born in the spring. Around September with the first snowfalls, the groups tend to break apart and ringed seal move closer to the coast and warmer water. In winter, after the ice-pack has formed, ringed seal use their claws to dig breathing holes from Long Island (near Pointe Louis-XIV which marks the boundary between James Bay and Hudson Bay) all the way to Le Goulet. Lac Guillaume-Delisle, which nurtures a stock of ringed seal, offers sufficient food to maintain some members of the population year-round. (Kemp, 1983 in Archéotec, 1992; Wong, 2006; Strata360, 2007).

According to Inuit knowledge, bearded seal follow more definite migratory routes than ringed seal. In autumn, they are present in the eastern portion of Hudson Bay, moving in large groups from the north towards the south, all the way to James Bay where they winter on the ice. Also in autumn, some individuals which remain in open-water zones off the coastal islands near Kuujjuarapik will approach the coast and feed in the shallow waters at the mouths of rivers. This phenomenon is observed in particular at the Petite rivière de la Baleine where bearded seal may be observed feeding near the rapids that are a little way upstream. In winter, bearded seal are not observed in the study area. In spring, this species breeds in the southern portion of Hudson Bay, away from zones where the currents pack the ice tightly. The birthing of pups takes place the following spring. At the beginning of summer, they travel in small groups and feed in shallow coastal waters. After the ice-pack has broken up, bearded seal continue to travel north with the ice blocks floating in Hudson Bay (Kemp, 1983 in Archéotec, 1992; Strata360, 2007).

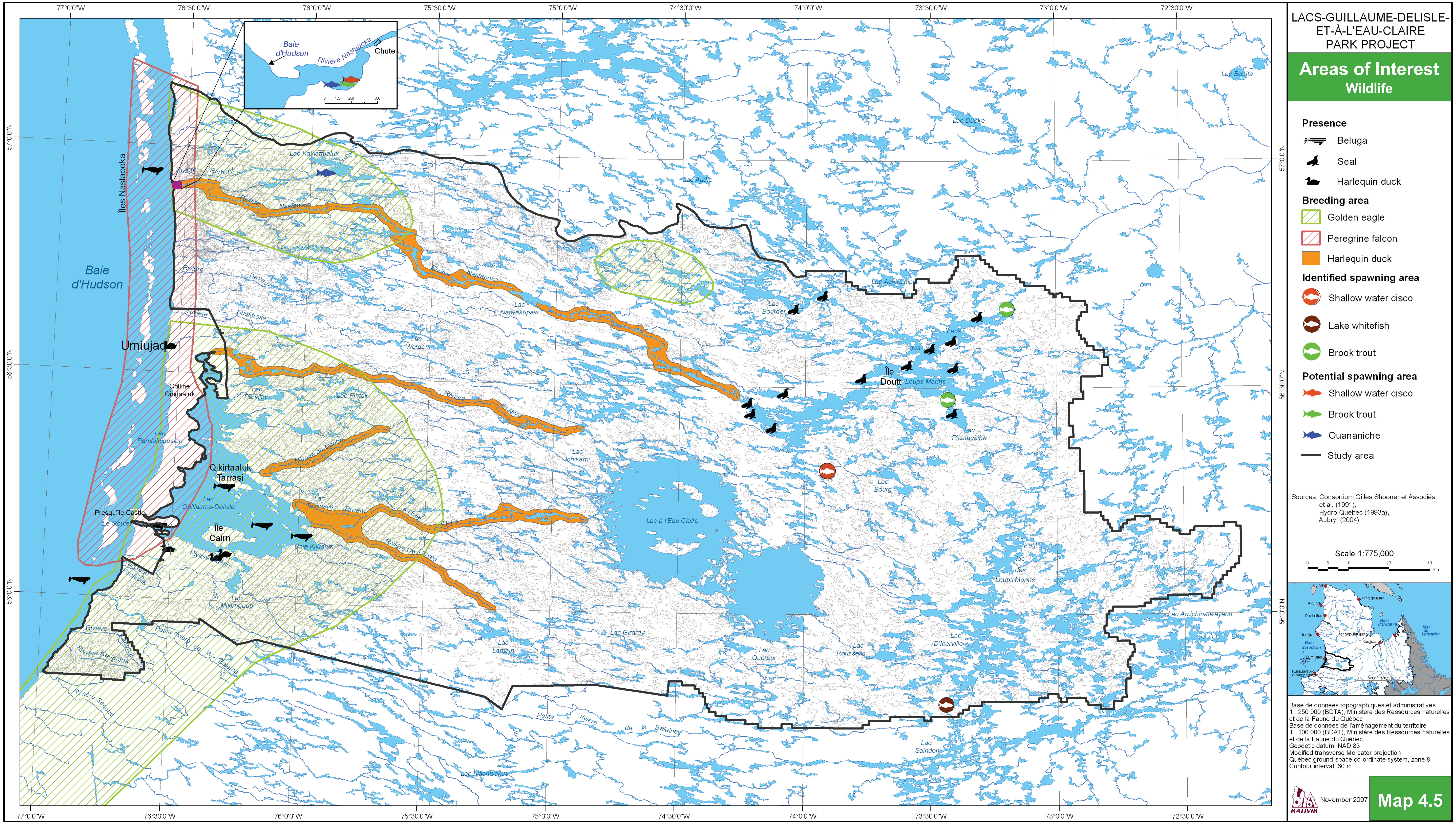
As seal are important for their subsistence, Inuit are concerned about pollutants and contaminants that could be detrimental to the health of seal, in particular contaminants released by hydro-electric power development projects (Archéotec, 1992).

Beluga

Around Northern Québec, scientists have identified at least three separate stocks of beluga (*Delphinapterus leucas*): the Ungava Bay, the eastern Hudson Bay and the western Hudson Bay stocks. They are classified according to beluga's habit of congregating in summer in a specific river estuary, or group of estuaries, and according to genetics. The beluga found in the study area belong to the eastern Hudson Bay stock (DFO, 2002, 2005a; Smith, 2000).

The migratory patterns of beluga follow the seasons of ice cover. In winter, they are present in zones where water currents prevent the ice from freezing solid, including Hudson Strait (Reeves, 1995b). In spring, beluga move into coastal waters, their preferred habitat, on the edge of the ice-pack at the entrance to Hudson Bay. They penetrate through channels in the ice-pack. A few weeks before the break-up of the ice, beluga seek refuge in river estuaries which are already free of ice. In July and August, once the ice-pack has broken up, beluga carry out migratory journeys between deep coastal waters where they feed and shallow estuaries where they moult. At this time, they may be observed along the coast and offshore around the Nastapoka Islands, between Inukjuak and Kuujjuarapik. The Rivière Nastapoka and the Petite rivière de la Baleine each possess major estuaries where concentrations of beluga may be observed between mid-July and the end of August (COSEWIC, 2004; Smith, 2000). A smaller number of beluga, which spend a longer period in the study area, may be observed in Lac Guillaume-Delisle, specifically in Le Goulet, along the south shore of Qikirtaaluk Tarrasi, as well as at the mouth of Baie Kilualuk (Map 4.5) (Hydro-Québec, 1993a). In addition, not less than 50 beluga were observed in a bay of Lac Guillaume-Delisle in the summer of 2004, as well as not less than 100 at the mouth of the Petite rivière de la Baleine in August 2006 (KRG fieldwork). Beluga enter these estuaries and Lac Guillaume-Delisle to rest, socialize and rub their bodies during the summer moulting period. Warm freshwater in fact helps the animal to shed its dead skin in addition to fostering the growth of new skin (Reeves, 1995b). Beluga actively assist in the moulting process by rubbing their bodies on the mud and rock bottoms in areas where the currents are turbulent (DFO, 2004).

By the beginning of August, beluga spend less time in the river estuaries and have begun their migration towards remote deep offshore regions in order to feed (Smith, 2000). In October, they migrate definitively to their winter grounds, situated east of Hudson Strait where the ice-pack covers



LACS-GUILLAUME-DELISLE-ET-À-L'EAU-CLAIRE PARK PROJECT
Areas of Interest
Wildlife
Presence
Beluga
Seal
Harlequin duck
Breeding area
Golden eagle
Peregrine falcon
Harlequin duck
Identified spawning area
Shallow water cisco
Lake whitefish
Brook trout
Potential spawning area
Shallow water cisco
Brook trout
Ouananiche
Study area
Sources: Consortium Gilles Shooner et Associés et al. (1991), Hydro-Québec (1993a), Aubry (2004)
Scale 1:775,000
Base de données topographiques et administratives 1 : 250 000 (BDTA), Ministère des Ressources naturelles et de la Faune du Québec
Base de données de l'aménagement du territoire 1 : 100 000 (BDAT), Ministère des Ressources naturelles et de la Faune du Québec
Geodetic datum: NAD 83
Modified transverse Mercator projection
Québec ground-space co-ordinate system, zone 8
Contour interval: 60 m
KATIVIK
November 2007
Map 4.5
Baie d'Hudson
Rivière Nastapoka
Chute
Îles Nastapoka
Umiujaq
Colline Qingaaluk
Qikirtaaluk Tarrasi
Presqu'île Castle
Le Goulet
Île Cairn
Lac Guillaume-Delisle
Baie Kiluaiuk
Lac Kakiattualuk
Lac Natwakupaw
Lac Werden
Lac Persillon
Lac Pintair
Lac Ichikami
Lac à l'Eau Claire
Lac Bourdel
Lacs des Loups Marins
Île Doutt
Lac Pikutachikw
Lac Bourg
Petit lac des Loups Marins
Lac Amichinatwayach
Lac D'Iberville
Lac Roussellin
Lac Quéreur
Lac Girardy
Lac Lamain
Lac Mikirnguup
Lac Saindon
Lac Tachisakus
Lac Audie
Lac Duplre
Lac Benita
Lac Achikunip
Rivière Kuujjuaq
Petite rivière de la Baleine
Rivière Sepond
Rivière De Troyes
Rivière au Caribou
Rivière au Nord
Rivière à l'Eau Claire
Rivière Sheldrake
Rivière Devaux
Rivière Richard
77°0'0"W
76°30'0"W
76°0'0"W
75°30'0"W
75°0'0"W
74°30'0"W
74°0'0"W
73°30'0"W
73°0'0"W
72°30'0"W
57°0'0"N
56°30'0"N
56°0'0"N

between 40 to 80% of the ocean's surface (COSEWIC, 2004; Smith, 2000).

The Hudson's Bay Company carried out commercial harvesting of beluga in James Bay and the eastern portion of Hudson Bay. Between 1854 and 1868, the number of beluga taken from the Petite rivière de la Baleine and the Grande rivière de la Baleine, where hunting was most intensive, was estimated at 8294 (Reeves and Mitchell, 1987). Commercial hunting was halted early in the 1870s as stocks had been depleted (DFO, 2005a). According to McTavish (1963), commercial hunters would run a net along the bottom of a river and hold it in place with anchors, chains and ropes. After the beluga had entered the river and before they turned back to the bay, the hunters would lift the net using a boat in order to form a barrier. The trapped beluga would then be harpooned and killed in large numbers.

In 2004, the size of the eastern Hudson Bay beluga stock was estimated at 3100, making it a species at risk. Subsistence harvesting by Inuit beneficiaries of the *James Bay and Northern Québec Agreement* is permitted. A beluga management plan, which was first released in 1996, stipulates subsistence harvesting quotas, sanctuaries and zones in which boat movements are restricted (DFO, 2007a, 2007b). The plan is prepared jointly with authorities from Nunavik and Nunavut. The estuaries of the Rivière Nastapoka and the Petite rivière de la Baleine are designated sanctuaries, which means that beluga harvesting is prohibited year-round (DFO, 2007a).

Polar Bear

Polar bear (*Ursus maritimus*) of the southern Hudson Bay population may be found in the study area. The range of this population extends between James Bay in the south to roughly Puvirnituq in the north (COSEWIC, 2002). Authoritative Inuit residents from Umiujaq and Kuujjuarapik indicated that they only observed polar bear on rare occasions, around the islands between Umiujaq and Sanikiluaq, a village located on the Belcher Islands. In 2004 however, a polar bear was observed at Lac Guillaume-Delisle. This sighting was unusual since polar bear are generally found in Hudson Bay where they hunt seal (P. Tookalook, KRG, personal communication, July 2006). In the bay, polar bear travel on landfast ice and the ice-pack, along the coast and over islands, and may also be found near polynyas were currents and upwellings increase biological productivity (Environment Canada, 2006; Schliebe et al., 2006).

Species at Risk

The study area and its surroundings nurture or may nurture certain marine mammals that appear on the list of species *likely to be designated as threatened or vulnerable* in Québec

The eastern Hudson Bay beluga (*Delphinapterus leucas*) stock is considered *likely to be designated as threatened or vulnerable* in Québec. Beluga may be observed in summer in the estuaries of the Rivière Nastapoka and the Petite rivière de la Baleine, as well as in Lac Guillaume-Delisle.

(MRNF, 2005) or on the list of species assessed by the Committee on the Status of Endangered Wildlife in Canada. In the study area (Appendix 5), the fresh-water harbour seal subspecies in Lacs des Loups Marins, the eastern Hudson Bay stock of beluga, and polar bear are all classified as species at risk (MRNF, 2005).

Hydro-electric power development represents a serious threat to marine mammals by modifying, among other factors, the ecological conditions that exist in river estuaries (Woodley et al., 1992).

The fresh-water harbour seal subspecies in Lacs des Loups Marins is considered a species *likely to be designated as threatened or vulnerable* in Québec (CDPNQ, 2005; MRNF, 2005). Since April 1996, it has been classified as a species of *special concern* in Canada, since it is an endemic subspecies of harbour seal, which is to say it has a limited range and small population. It is potentially vulnerable to human-induced interference and natural disasters (COSEWIC, 2006).

In Québec, the eastern Hudson Bay beluga stock is considered a species *likely to be designated as threatened or vulnerable* (MRNF, 2005). In May 2004, the species was classified as an *endangered* species, while it had been declared *threatened* in April 1988 (COSEWIC, 2006). The size of this stock is currently declining. In 1854, the stock totalled 12,500 beluga, and by 1985 only 4200. In 2004, the 3100 remaining beluga corresponded to 25% of the stock's historical level, leading it to be classified by the Committee on the Status of Endangered

Wildlife in Canada as an *endangered* species (2004). The causes of the decline could relate to the excessive commercial harvesting carried out between 1854 and 1870, the deterioration of estuary habitats resulting from hydro-electric power development, disturbances created by boat motors, and predation by polar bear and killer whale (*Orcinus orca*) (COSEWIC, 2006, 2007; MRNF, 2005). A Fisheries and Oceans Canada recovery team is developing a recovery strategy for the beluga stocks of Ungava Bay and the eastern Hudson Bay. Current projects involve the study of stock sizes, their movements and the effects of noise pollution. In its recovery plan for the beluga stock of eastern Hudson Bay, Fisheries and Oceans Canada has set an objective of 70% of the stock's historical level, which is to say 8750 beluga (DFO, 2005b; DFO, 2007a).

In Québec, polar bear is considered a species *likely to be designated as threatened or vulnerable* (MRNF, 2005). In April 1986, the Committee on the Status of Endangered Wildlife in Canada (2006) classified polar bear as a *species not at risk*. In April 1991, the species was listed as *threatened*, and in 2002 a re-assessment renewed this status. Despite pressure created by hunting and other activities such as military activities, housing construction, contamination and climate change, the population seems to be stable. Discussions take place between the Northwest Territories, Ontario and Québec concerning co-management and joint research of this species (COSEWIC, 2002).

LAND MAMMALS

Thirty-two species of land mammals are potentially present in and around the study area (Appendix 6). Two of these species are classified as species at risk.

Large Mammals

Caribou is the most abundant species in the study area during its northerly spring migration and southerly autumn migration. Moose reach the northern limit of their range in the study area, while black bear are more or less common. Small groups of muskox, from a population introduced to Nunavik between 1973 and 1983, may also be observed occasionally in the study area.

Caribou

There are significant differences between the habitat, behaviour, demographics, fur (Geist, 1998), morphology, health and genetics of the various herds of caribou (*Rangifer tarandus*) found in Québec (Boulet et al., 2005, 2007; Courtois et al., 2001, 2003; Couturier et al., 2006; S. Couturier, MRNF, personal communication, September 2007). Caribou is the most adaptable of all cervids (Geist, 1998), and this adaptability is observed in the species' range in Québec. Recent studies on genetics (Boulet et al., 2005, 2007; Courtois et al., 2003), demographics (Couturier et al., 2004), territory (Couturier, 2007; S. Couturier, MRNF, unpublished data), morphology (S. Couturier MRNF, unpublished data) and health (Couturier et al., 2006) have made it possible to more clearly define the differences between the various populations and groups. Bergerud (1996) first applied the concept of ecotype (or ecological race) to describe the diversity of caribou populations. He identified as a migratory ecotype those caribou that make spectacular north–south migrations and, regarding the female members, that congregate during their calving period. He also identified as a sedentary ecotype those caribou that make smaller migrations south of the tree line and, regarding the female members, that scatter during their calving period. Two further ecotypes have also been identified: the mountain ecotype and the insular ecotype (Mallory and Hillis, 1998). The only ecotype not present in Northern Québec is the insular ecotype, although it is found nearby, for example on Coats Island (Adamczewski et al., 1993) and Southampton Island in northern Hudson Bay (Ouellet et al., 1997).

Although the study area does not possess any sedentary or mountain caribou populations, two very large migratory caribou herds are present. These herds are known as the Rivière aux Feuilles [Leaf River] herd and the Rivière George [George River] herd. It is the Leaf River herd that is predominant in the study area during its spring and autumn migrations (Figure 4.2) (Boulet et al., 2005, 2007; Jean and Lamontagne, 2004).

The Leaf River herd was identified for the first time in 1975 by Le Hénaff (1976), who observed roughly 21,000 breeding females on a calving ground near the tree line along the Rivière aux Feuilles, which is the name still used to designate the herd (Couturier et al., 2004). Nonetheless, between 1975 and the beginning of the 1990s, the site of the herd's calving ground moved progressively north, 400 km onto the tundra (Couturier et al., 2004). The calving ground now spreads across roughly 20,000 km^2 in the region of Pingualuit Crater (Boulet et al., 2005, 2007; Jean and Lamontagne, 2004) and has covered Parc national des Pingualuit in its entirety since 1993 (MDDEP, 2005).

Based on historical documents (Low, 1896; Elton, 1942) and on dendroecological analysis, it was possible to confirm the scarcity of the Leaf River herd between the beginning of the 20th century and the herd's re-emergence in the 1960s and 1970s (Payette et al., 2004). The Leaf River herd has been growing since it was first identified by scientists in 1975. In 1983, the herd's population was estimated at 101,000 individuals (±43%), representing an increase of roughly 60% compared with the 1975 inventory. Further estimates put the herd's size in 1986 at 121,000 (±47%) and in 1991 at 276,000 (±27%) (Couturier et al., 2004). Finally, in 2001 a post-calving photographic inventory revealed that the herd had become Québec's largest with 628,000 head.

For its part, from a population of roughly 5,000 caribou in 1956 (Banfield and Tener, 1958), the George River herd was estimated at 263,000 head in 1976, 390,000 (±85,000) in 1980 (Couturier et al., 1990), 644,000 (±161,000) in 1984, 682,000 (±246,000) in 1988 (Crête et al., 1991), and 776,000 (±104,000) in 1993 (Couturier et al., 1996). As anticipated (Couturier et al., 1990), the George River herd subsequently diminished in size through the 1990s, dropping to a total population of only 385,000 (±108,000) in 2001 (Couturier et al., 2004). These demographic trends were confirmed by dendroecological studies (Boudreau et al., 2003) and by studies that point to the re-generation of vegetation for the first time since the beginning of the 1990s (Boudreau and Payette 2004a, b). The George River herd made heavy use of the study area at the height of its population growth, towards the end of the 1980s. Since its size has decreased by half, however, the range of the George River herd has retracted eastwards. It is possible that individuals of this herd will return to the study area if the herd's size increases again.

The Leaf River and George River herds combined make up the largest meta-population of migratory caribou in the world, totalling a little more than one million head (Jean and Lamontagne, 2004; Couturier et al., 2004). The two herds represent a significant proportion of this resource globally; more than one in five caribou on earth inhabit Northern Québec. As their numbers increase, the annual ranges of these migratory caribou grow also. The Leaf River herd currently occupies the western part of Northern Québec. It spends the summer months in the north on the tundra and migrates southwards to the boreal forest in order to winter in the James Bay region (Jean and Lamontagne, 2004).

In the study area, the distribution of caribou varies considerably depending on the season. During the calving period, which currently occurs around June 10, until September, it is very unlikely to observe large groups of caribou in the study area, except for a few scattered groups of males. Between September and October, the first large groups of caribou arrive in the study area and may stay for the entire rutting period, which is stay the second half of October (Boulet et al., 2005, 2007). It occurs frequently that individuals of the Leaf River herd, as well as the George River herd, may both be found in the study area during the rutting period (Boulet et al., 2005, 2007).

Caribou (*Rangifer tarandus*) is abundant in the study area during its northerly spring migration and southerly autumn migration.

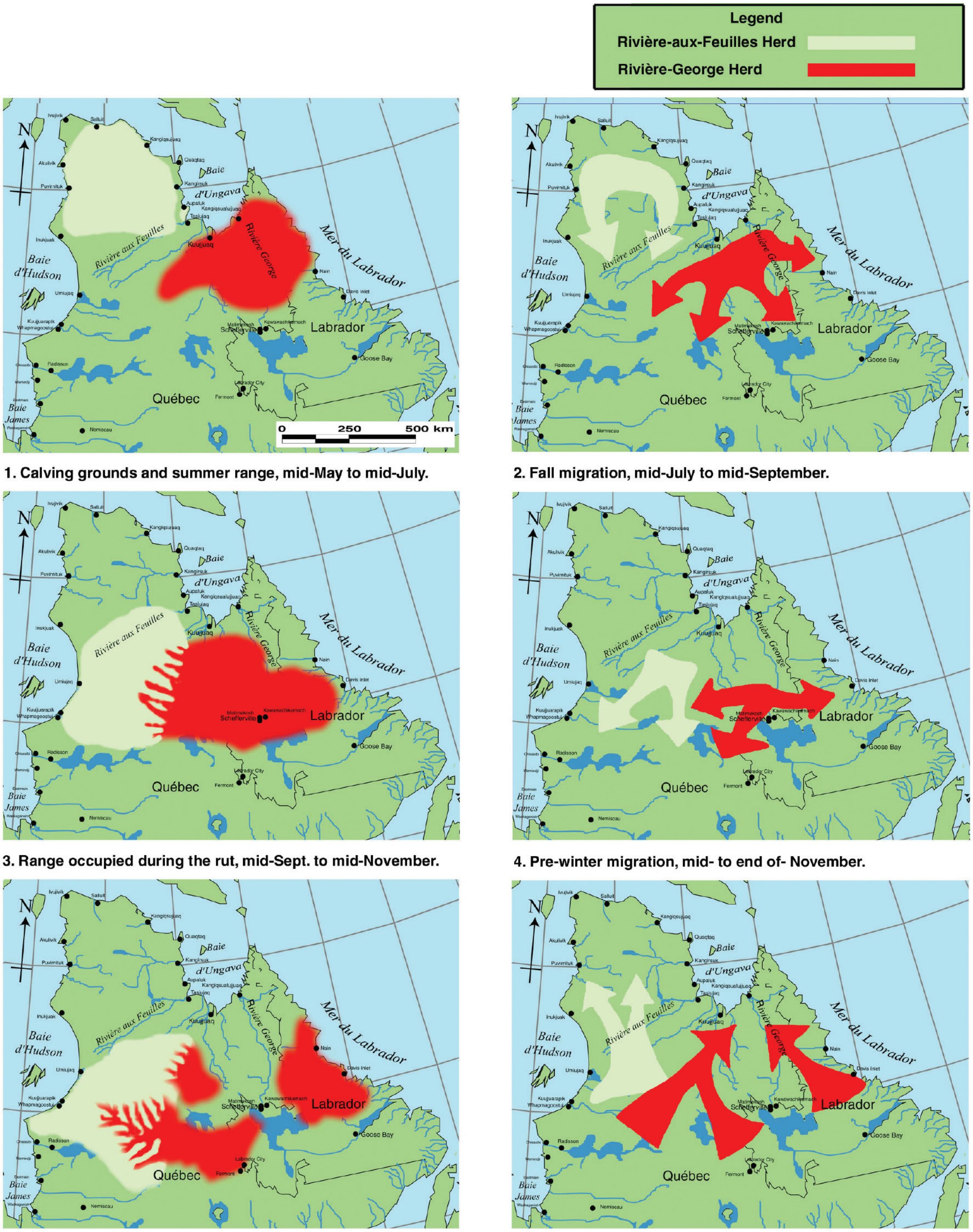
Once the rutting period has ended, caribou head southwards to winter, thus leaving the study area. It occurs occasionally that rather large groups of caribou may remain in the study area throughout the winter. This unusual situation occurred in 2006 (MRNF, 2003). In the spring, from February to May, caribou migrate northwards, passing through the study area on their way to their calving ground. Large groups wander through the study area over several weeks until the month of May (S. Roy, MRNF, personal communication, March 2006).

Members of the George River herd may also be observed in the study area, but their numbers are always low. A few females were identified with satellite telemetry monitoring in 2005 and 2006 in the Lac à l'Eau Claire sector (MRNF, 2003).

The eastern part of Lac à l'Eau Claire and the southern part of Petit lac des Loups Marins possess a high concentration of caribou in winter (Hydro-Québec, 1993a). Authoritative Inuit residents from Umiujaq have confirmed this statement. The high concentration may be due to the abundance of lichen in these zones (Gauthier & Guillemette Consultants Inc., 1991b). Caribou use Lac Guillaume-Delisle as a migration route when it is frozen (Lavalin Environnement, 1991).

Black bear

Black bear (*Ursus americanus*) is an opportunistic species that inhabits dense deciduous and coniferous forests, burned areas, brush, tundra and many other habitats. It thrives in areas close to water, such as streams, rivers, lakes and marshes (MRNF, 2004; Samson, 1996). The northern limit of the black bear's range corresponds to the tree line (Consortium Gauthier & Guillemette – G.R.E.B.E., 1992), although more and more



1. Calving grounds and summer range, mid-May to mid-July.

2. Fall migration, mid-July to mid-September.

3. Range occupied during the rut, mid-Sept. to mid-November.

4. Pre-winter migration, mid- to end of- November.

5. Winter range, December to mid-March.

6. Spring migration, mid-March to mid-May.

Extracted from Couturier et al. (2004)

Figure 4.2 Seasonal Movement Patterns of Migratory Caribou of Québec–Labrador, 1999–2001 frequent observations are placing black bear farther north on the tundra (S. Couturier, MRNF, personal communication, September 2007).

Black bear feed on plant stalks, buds, leaves, nuts, fruit and new sprouts. They excel at capturing fish and gathering honey (National Audubon Society, 1996). Black bear may sometimes attack young cervids, such as caribou and moose (Samson, 1996).

Black bear are observed mainly in the Lac Bienville zone, southeast of the study area (Consortium Gauthier & Guillemette – G.R.E.B.E., 1992). During fieldwork carried out by the Kativik Regional Government and the Ministère du Développement durable, de l'Environnement et des Parcs [sustainable development, environment and parks], black bear were observed throughout the study area (Lac Guillaume-Delisle, Lac à l'Eau Claire and Lac D'Iberville). This last zone possesses many lakes and rivers, as well as the plants and grasses preferred by black bear.

Black bear are generally most active at dusk. Because it is an opportunistic species, black bear can become an annoyance when "artificial" food is available, including stealing from camps (Pelton, 1982). This kind of behaviour increases when natural sources of food are scarce or when the density of the black bear population is high. It seems however that black bear become aggressive and will attack only on rare occasions (Cadieux, 2001).

Moose

Moose (*Alces alces*) may be present in a variety of habitats. Notwithstanding, the higher the latitude, the lower the density of moose (Lamontagne and Lefort, 2004). At the southern boundary of the study area, the density of moose is the lowest in Québec equalling 0.26 animals per 10 km^2. This low density is explained by the low carrying capacity of the environment and the presence of black spruce–moss stands and taiga, habitats that are more conducive to caribou (Lamontagne and Lefort, 2004). It remains rare to observe moose in the study area, but such rare observations are most likely to occur in the Lac Guillaume-Delisle sector, where tree cover is heaviest, and near rivers. Authoritative Inuit and Cree residents from Umiujaq and Whapmagoostui, respectively, have observed the species in this sector.

Observations of this species in the study area are fairly recent, probably due to the increased growth of shrubs nurtured by climate change. As its numbers increase, this species tends to expand its range further and further north, to the transition zone between boreal forest and tundra (FFDP, 2006).

Muskox

Musk ox (*Ovibus moschatus*) were introduced to Nunavik in 1967 when 15 young individuals, captured on Ellesmere Island, were transported to an experimental farm at Old Chimo, a few kilometres downstream from present-day Kuujjuaq. During the 1970s, not less than 50 descendants of these muskox were released in the region (Le Hénaff, 1986). The number of head has increased since and several small groups are now spread across the tundra and may on occasion be observed near the region's villages. Notwithstanding, muskox are most often observed near the village of Tasiujaq, while the animals are relatively scarce elsewhere in Nunavik.

The habitats preferred by this species are characterized by alternating plateaux under an elevation of 250 m and expansive coastal plains (Le Hénaff, 1986). Hills provide shelter from the wind, preventing snow from becoming compacted. In these areas, muskox are able to shovel away the thin snow cover in winter and feed. This type of environment is found in the coastal zone of Lac Guillaume-Delisle, as well as between the Petite rivière de la Baleine and the Rivière Nastapoka. In winter, muskox generally stay near the coast, where it is hilly. A few muskox have already been observed in this type of exposed environment on the barren hills south of Lac Guillaume-Delisle and north of Lac à l'Eau Claire. In summer, muskox move a little ways inland, seeking river zones and wetlands where they feed on willows (Gauthier & Guillemette Consultants Inc., 1992).

Fur-Bearing Animals and Small Mammals

Wolf

Two subspecies of wolf (*Canis lupus*) are found in Québec: the Eastern wolf (*C. l. lycaon*) and the timber wolf (*C. l. labradorius*). Hénault and Jolicoeur (2003) reported that, according to Harper (1961) and Hall (1981), the 55th parallel marks the boundary between the ranges of the two subspecies. According to Goldman (1944) as well as Hall and Kelson (1959), this boundary is situated a little further south. The timber wolf is the stockiest subspecies of wolf in Québec, and is the subspecies present in the study area.

Wolves can survive in a range of habitats, from arctic tundra to deciduous forests. Ungulates are the main prey of wolves, and therefore their abundance determines whether or not wolves are present in an area. (Hénault and Jolicoeur, 2003). The results of wildlife inventories carried out further to the hydro-electric power development project on the Grande rivière de la Baleine suggest that wolves are relatively abundant in the study area and that caribou herd migrations determine how wolves use the territory (G.R.E.B.E, 1990; Hydro-Québec, 1993c).

Human activity can also influence the abundance of wolves. Wolves may become accustomed to human beings, as long as tree cover is not destroyed and road networks are not too complex (Hénault and Jolicoeur, 2003). Even if prey is abundant and human activity does not disturb wolves in the study area, they are rarely observed by the Inuit of Umiujaq, who only hunt this species in winter if the opportunity presents itself (Lavalin Environnement, 1991). Authoritative Inuit residents from Umiujaq and Kuujjuarapik reported that wolves follow the caribou herds and that, when many caribou are around the villages, wolves are more common (Avataq Cultural Institute, unpublished data, summer 2005).

Red Fox and Arctic Fox

Authoritative Inuit residents from Umiujaq indicated that three types of fox are regularly observed around their village. In fact, red fox (*Vulpes vulpes*) and arctic fox (*Alopex lagopus*) possess a variety of colourings. Red fox, which are generally reddish, may also have a silver, black or brown fur, although the tips of their tails are always white. In winter, the fur of arctic fox may be white or blue, which is to say a shade between blue-black and pearl grey. In summer the fur of arctic fox is brown (Prescott and Richard, 1996).

Red fox are present throughout the study area, living in diverse habitats (G.R.E.B.E., 1990; Hydro-Québec, 1993c). Authoritative Inuit residents have observed foxes in summer digging their dens in the sand dunes found along the coast of the study area. In winter, red fox keep to relatively open spruce stands and river zones. The abundance of prey, including snowshoe hare, ptarmigan and small mammals, determines whether or not red fox are present in an area. In summer, red fox are most common in river zones inhabited by small mammals (G.R.E.B.E., 1990).

The behaviour of arctic fox is adapted to the harsh arctic environment. This fox can occupy diverse environments including coastal and marine, inland and alpine habitats. Living mainly on the tundra, the southern limit of the arctic fox is considered to be the tree line. An opportunistic species, it feeds on a variety of foods, and is both a predator and a scavenger (Garrott and Eberhardt, 1987). For example, in winter arctic fox may follow polar bears on the ice-pack to feast on the remains of seal carcasses but, if food is scarce, they will eat bear excrement. In summer, arctic fox eat squirrels, hare, birds, eggs and fish, as well as berries, grass and algae (Garrott and Eberhardt, 1987; Prescott and Richard, 1996). The size of the arctic fox population in the study area remains unknown.

Snowshoe Hare and Arctic Hare

The tree line marks the northern limit of the snowshoe hare's range (*Lepus americanus*) and the southern limit of the arctic hare's range (*Lepus arcticus*). In the study area, snowshoe hare may be found in wooded and shrub zones, as well as river zones; arctic hare for their part live on the tundra (Bittner and Rongstad, 1982; G.R.E.B.E., 1990). Snowshoe hare are most congregated in scrubland situated along streams and rivers, as well as in spruce stands (dense and open) (G.R.E.B.E., 1990). Arctic hare inhabit barren zones where there are no trees; such areas are common in the study area.

Porcupine

Porcupine (*Erethizon dorsatum*) seem to be relatively abundant in the study area, especially in the Lac Guillaume-Delisle sector, along the Rivière à l'Eau Claire and the Rivière au Caribou, as well as in the Rivière Nastapoka sector where foraging sites (sections of tree trucks with chewed bark) were observed during fieldwork carried out by the Kativik Regional Government. Studies completed further to the hydro-electric power development project on the Grande rivière de la Baleine suggest that porcupine occupy most of the study area, except the downstream section of the Rivière Nastapoka and the Lac à l'Eau Claire sector. The species also seems to be present in the Petit lac des Loups Marins sector (Consortium Gauthier & Guillemette – G.R.E.B.E., 1992b). Porcupine eat the cambium of black spruce (*Picea mariana*), white spruce (*P. glauca*), balsam fir (*Abies balsamea*) and tamarack (*Larix laricina*) (Hydro-Québec, 1993c).

Mustelids

The mustelids (weasel family) likely to be present in the study area include river otter (*Lutra canadensis*), pine marten (*Martes americana*), mink (*Mustela vison*), ermine (*Mustela ermina*), least weasel (*Mustela nivalis*) and wolverine (*Gulo gulo*).

River otter are found from the tree line to the tundra, which is to say throughout the study area. The preferred habitats of this species include rivers, streams and small lakes, as well as areas of open water in winter (G.R.E.B.E., 1990).

Regarding the other species of mustelids, they occupy areas near rivers and streams. Pine marten are especially associated with mature coniferous forests with abundant soil debris and mixed-wood forests. This species feeds on a variety of animals and plants including snowshoe hare, squirrel, lemming, vole, eggs, birds, amphibians and insects (Strickland and Douglas, 1987; Prescott and Richard, 1996). Ermine and least weasel occupy diverse habitats, but have a predilection for transition zones between different environments (ecotones). The abundance of small mammals, the ermine and least weasel's main source of food, determines the concentration of these species in an area (Hydro-Québec, 1993c; Fagerstone, 1987). Mink is more closely associated with aquatic environments characterized by considerable herbaceous vegetation or scrubland with abundant soil debris (Eagle and Whitman, 1987) and mainly river scrubland (Mason and MacDonald, 1983 in Hydro-Québec, 1993c).

Species at Risk

Least weasel and wolverine, which are both species at risk, might be present in and around the study area (Appendix 6) (MRNF, 2005).

In Canada, the eastern wolverine population, present in Québec and Newfoundland–Labrador, was declared an *endangered* species in 1989 by the Committee on the Status of Endangered Wildlife in Canada (2003, 2006). This status was renewed following re-assessment in May 2003 (COSEWIC, 2006). In Québec, wolverine are classified as *threatened* (MRNF, 2005). This population lives north of the 49th parallel in Québec (MNRF, 2001). Even though little information exists on its preferred habitats, scientists believe that wolverine occupy the boreal forest, forest tundra and arctic tundra (MRNF, 2005).

Notwithstanding, wolverine have never been very abundant in the study area (COSEWIC, 2003). This species was directly affected by trapping and hunting in the 20th century, and indirectly affected by the decline in caribou and wolf populations. The animal carcasses abandoned by wolves are an important source of food for wolverine in winter. Moreover, to kill wolves hunters use poisoned bate which also has negative impacts on the wolverine population (COSEWIC, 2003; MRNF, 2005).

Least weasel are considered a species *likely to be designated as threatened or vulnerable* in Québec (MRNF, 2005). In Canada, least weasel are not classified as a species at risk. This species occupies open and tundra habitats (Fagerstone, 1987).

BIRDS

A list of the birds that may be observed in the study area was prepared by Aubry (2004). This list was compiled with data from different sources (Gauthier and Aubry, 1995; Archambault, 1997; Lavalin Environnement, 1991) and from observational data collected in the study area in June 2004 by Yves Aubry of the Canadian Wildlife Service. Further data drawn from the database maintained under the Étude des populations des oiseaux du Québec [bird population study] (ÉPOQ) and another for birds at risk in Québec (SOS-POP) were also included on the list. These databases are managed by the Association québécoise des groupes d'ornithologues [association of ornithologist groups] (AQGO). The ÉPOQ database, which takes into account the bird species found in Québec, has been generated from the daily observation reports submitted by birders from around the province since 1955. For its part, the SOS-POP database was launched in 1993 to monitor known nesting sites for birds at risk in Québec (AQGO, 2006; Lepage, 2006; SOS-POP, 2006). The compiled list therefore identifies 131 bird species that have been observed and are likely to be present in the study area. Appendix 7 contains the compilation, indicating in particular Inuktitut and Cree names.

In June 2004, in only the Lac Guillaume-Delisle and Umiujaq zones, the presence of 51 bird species was confirmed during fieldwork organized by the Kativik Regional Government. No inventory work was carried out elsewhere in the study area at that time (Aubry, 2004).

Given its strategic location, the Lac Guillaume-Delisle sector possesses bird fauna associated with boreal, taiga and coastal environments. For its part, the Lac à l'Eau Claire sector, situated inland, is not subjected to any coastal influences. The diverse habitats of the study area offer many nesting and feeding sites for resident and migratory bird species. The following sections describe the different bird species according to their habitats.

Forest habitats

In spruce stands, the most common species are blackpool warbler (*Dendroica striata*), yellow-rumped warbler (*Dendroica coronata*), white-throated sparrow (*Zonotrichia albicollis*), dark-eyed junco (*Junco hyemalis*) and Swainson's thrush (*Catharus ustulatus*). Several species are also present in more southerly locations including American robin (*Turdus migratorius*), hermit thrush (*Catharus guttatus*), gray jay (*Perisoreus canadensis*), yellow-bellied flycatcher (*Empidonax flaviventris*), ruby-crowned kinglet (*Regulus calendula*) and pine grosbeak (*Pinicola enucleator*). Grey-cheeked thrush (*Catharus minimus*), a northern spruce species, may be observed in a habitat of mixed dense isolated spruce stands and shrubs. This species nests on or near the ground (Y. Aubry, Canadian Wildlife Service, personal communication, July 2006).

Scrub and Open Habitats

Several passersine species nest in the scrub and open environments of the study area. Several of these species are abundant, including common redpoll (*Carduelis flammea*), white-crowned sparrow (*Zonotrichia leucophrys*), fox sparrow (*Passerella iliaca*) and Wilson's warbler (*Wilsonia pusilla*). In open and sparse environments, snow bunting (*Plectrophenax nivalis*) are generally present, which is to say around Lac Guillaume-Delisle and near the village of Umiujaq (Y. Aubry, Canadian Wildlife Service, personal communication, July 2006). This species nests as isolated couples in cavities found on small rocky islands or among boulders situated near wetlands.

Snow bunting are one of the most common bird species in tundra and taiga environments. In winter, snow buntings are gregarious and can be observed at more southerly latitudes (Vincent, 1995). Regarding common redpoll, they mainly nest north of the 51st parallel (Seutin, 1995). Other species associated with scrub and open environments are Lincoln's sparrow (*Melospiza lincolnii*), American tree sparrow (*Spizella arborea*), savannah sparrow (*Passerculus sandwichensis*), yellow warbler (*Dendroica petechia*), orange-crowned warbler (*Vermivora celata*) and water pipit (*Anthus rubescens*).

Aquatic Habitats

The Canada goose (*Branta canadensis*) is the most common bird species in the aquatic environments of the study area. This species is regularly identified in the eastern part of Lac Guillaume-Delisle, near the village of Umiujaq and at Lac à l'Eau Claire (Aubry, 2004). The range of the Canada goose covers all of northern North America. Notwithstanding, only the subspecies *Branta canadensis interior* breeds in the study area. Specifically, this subspecies nests in ombrotrophic and minerotrophic peat bogs in the boreal forest or on islets with sphagnum hillocks on the arctic tundra (Y. Aubry, Canadian Wildlife Service, personal communication, July 2006). According to Inuit, groups of geese nest along the coast and on coastal islands; inland, they congregate around lakes and on islands. Nesting begins around mid-May and by mid-June eggs and chicks can be observed in nesting areas (Strata360, 2007). Canada geese are common in the study area during their spring and fall migrations. This species is important for the economy and culture of Aboriginals. It makes up a quarter of the game meat eaten by the Cree (Cotter et al., 1995). In June 2004, certain non-nesting waterfowl in the process of moulting and harvested by residents of the village of Umiujaq carried identification bands from the American eastern seaboard, confirming that many non-nesting bird species travel to the aquatic environments of the study area in order to moult. Such non-nesting groups may be found in coastal environments as well as around Lac Guillaume-Delisle and the many other water bodies in the study area (Y. Aubry, Canadian Wildlife Service, personal communication, July 2006). Inuit indicate that in autumn, Canada geese begin their southerly migration before snow geese. Groups from further north and from offshore islands in Hudson Bay converge on the coast for their southward journey (Strata360, 2007).

Several other species of waterfowl (Anatidae) are common in the study area. To begin, common eider (*Somateria mollissima* subsp. *sedentaria*) were observed in June 2004 at Lac Guillaume-Delisle and on its islands, both from the ground and during fly-overs (Aubry, 2004). Nests were also observed on islands where eider seek protection against predators, including fox. Whenever fox remain isolated on an island with the break-up of the ice-pack, they feed exclusively on nesting birds and their eggs, with eider often being the most abundant (Munro, 1995). Oldsquaw (*Clangula hyemalis*) is a migratory species that nests along the coast of Hudson and Ungava bays. Females choose the location of their nest, normally near ponds on the tundra, where their plumage blends into the surrounding environment. Oldsquaw winter along the middle and lower North Shore in Québec (Lamothe, 1995) and along the New England seaboard. Black scoter (*Melanitta nigra* subsp. *americana*) arrive at their nesting areas in May in the drainage basins of the Grande et Petite rivières de la Baleine as well as around Lac Guillaume-Delisle. Broods of chicks can be observed on small lakes. Black scoter are common along the coast of Hudson Bay until October (Morrier, 1995). Finally, common merganser (*Mergus merganser*), a species that is abundant and has a wide range throughout Québec, arrive in Nunavik towards the end of winter. They seek streams and rivers with an abundant supply of fish to feed their chicks. Females nest in cavities in tree trunks and, occasionally, on cliffs and on the ground under rocks (Alvo, 1995a).

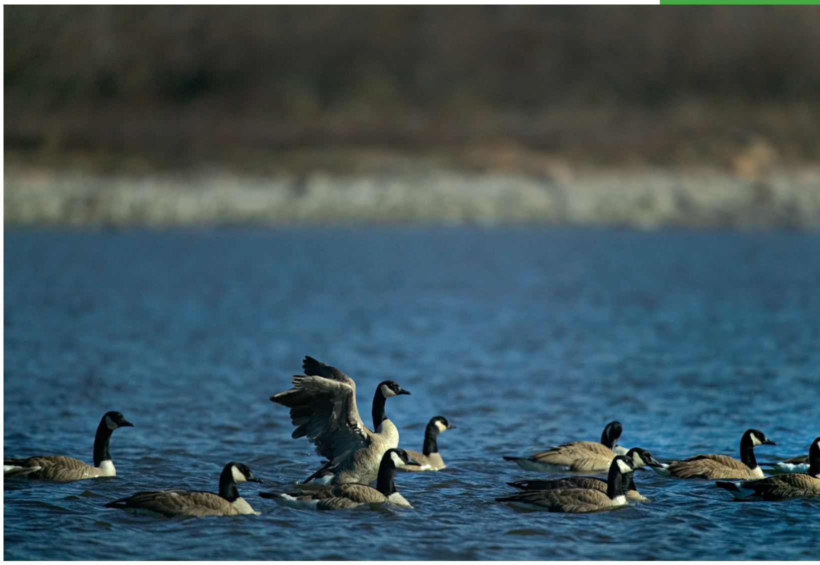
Authoritative Inuit residents from Umiujaq and Kuujjuarapik state that snow geese (*Chen caerulescens*) arrive in the region in May and June. They fly along the eastern coast of Hudson Bay, crossing a portion of the study area and making stop-overs. Snow geese nest further north, mainly on Bylot Island and on northern Baffin Island, although a small population is known to nest near Puvirnituq. When migrating, this species feeds on plants, including *Polygonum* spp. bulbs, *Oxytropis* spp. roots, and berries. In autumn, beginning in September or October, authoritative Inuit residents from Umiujaq and Kuujjuarapik again observe this species as it returns south, again making stop-overs in the study area along the coast, on islands and inland.

Several other species of waterfowl are also common in the study area and contribute to its biodiversity. Brant (*Branta bernicla*) and king eider (*Somateria spectabilis*) have been observed around Lac Guillaume-Delisle and Umiujaq. Mallard (*Anas platyrhynchos*), ring-necked duck (*Aythya collaris*), surf scoter (*Melanitta perspicillata*) and red-breasted merganser (*Mergus serrator*) have also all been observed around Lac Guillaume-Delisle and Umiujaq. Red-breasted merganser have been observed at the former trading post at Lac Guillaume-Delisle, and at Lac à l'Eau Claire (Aubry, 2004).

Herring gull (*Larus argentatus*) are common and nest throughout southern Québec as well as in the Far North. They were observed for example at Ivujivik in 2004. This species nests in different environments including on islands, sandy points and cliffs near the sea, as well as in coastal marshes and on the ground (Brousseau, 1995a). Other species of gull have also been observed in the study area, such as iceland gull (*Larus glaucoides kumlieni*) and glaucous gull (*Larus hyperboreus*). These species nest on cliff ledges (Alvo, 1995b; Alvo, 1995c) north of the study area. Great-black backed gull (*Larus marinus*) and ring-billed gull (*Larus delawarensis*) though less common may also be found in the study area on islands with herbaceous vegetation or partially barren ground, or in herbaceous meadows near rivers (Brousseau, 1995b; Brousseau, 1995c). If these two species nest in the study area, it is not common as most observations have been of sub-adult individuals. Two species of tern may be observed in the study area: arctic tern (*Sterna paradisaea*) are clearly the more abundant; for their part, common tern (*Sterna hirundo*) are more prevalent in the southerly parts of James Bay. Black guillemot (*Cepphus grylle*) are found in coastal environments and probably in the brackish and salt waters of Lac Guillaume-Delisle. Females lay two eggs in sheltered crevasses and under boulders (Y. Aubry, Canadian Wildlife Service, personal communication, July 2006).

Other species are also associated with wetlands, such as rusty blackbird (*Euphagus carolinus*) a species that has been at risk for a few years, northern waterthrush (*Seiurus noveboracensis*) and several species of nesting shorebirds. These include Wilson's snipe (*Gallinago delicata* subsp. *gallinago*), greater yellowlegs (*Tringa melanoleuca*), lesser yellowlegs (*Tringa flavipes*), spotted sandpiper (*Actitis macularia*) and solitary sandpiper (*Tringa solitaria*), northern phalarope (*Phalaropus lobatus*), least sandpiper (*Calidris minutilla*), semipalmated sandpiper (*Calidris pusilla*) and semipalmated plover (*Charadrius semipalmatus*).

Willow ptarmigan (*Lagopus lagopus*) and rock ptarmigan (*Lagopus mutus*) are also present in the study area. Although the main breeding area of willow ptarmigan is further south, the nesting of this species has been confirmed in the study area, specifically in the Rivière Nastapoka drainage basin. The southern limit of the range of rock ptarmigan is roughly the 55th parallel. This species is observed around Lac Guillaume-Delisle. While it may nest in the study area, its main breeding area is situated further north (G.R.E.B.E., 1990). The two species of ptarmigan are mainly found in the study area in winter, during their migrations. Willow ptarmigan congregate in dense river scrubland and on islets covered with willow where they feed on the buds and twigs of this plant. They are especially common along creeks and rivers (G.R.E.B.E., 1990). Rock ptarmigan are common on barren hilltops and in zones with few shrubs (Cotter, 1995).



Many Canada geese (*Branta canadensis*) are present around Lac Guillaume-Delisle during their spring and autumn migrations.

Birds of Prey

Snowy owl (*Nyctea scandiaca*) migrate through the study area between their northern nesting area and southern wintering area. Certain individuals probably winter in the study area when prey is abundant (Y. Aubry, Canadian Wildlife Service, personal communication, July 2006). As well, Archambault (1997) suggests that snowy owl may be observed north of the tree line in the eastern part of the study area, north of Lac à l'Eau Claire.

Gyrfalcon (*Falco rusticolus*) were observed in 1990 east of Lac Guillaume-Delisle as well as along the Rivière Boutin and the Rivière Nastapoka (Consortium Gauthier & Guillemette – G.R.E.B.E., 1990). This species is generally speaking a year-round resident of Northern Québec, except for a few individuals that may winter further south. Gyrfalcon nest on cliffs, rocky outcroppings or mountains near open environments, both inland and on islands as well as rocky coastal shores. From year to year, individuals re-use the same territory but do not return to the same nesting site. Gyrfalcon feed on other bird species especially ptarmigan, which make up 90% of their food source, as well as snowshoe and arctic hare (Henderson and Bird, 1995a).

Rough-legged hawk (*Buteo lagopus*) have been observed northwest of Lac à l'Eau Claire and east of Lac Guillaume-Delisle (Aubry, 2004). In 1990, 52 nests were identified between the Grande rivière de la Baleine and the north end of Lac Guillaume-Delisle (Consortium Gauthier & Guillemette – G.R.E.B.E., 1990 in Henderson and Bird, 1995b). From year to year, rough-legged hawk re-use the same nest. The 52nd parallel marks the southern limit of their nesting area. This species is generally observed on the open tundra, and it nests on cliff ledges, boulders, escarpments and ledges along river banks. It is extremely rare to find gyrfalcon nesting in trees or on flat ground. This species' diet consists mainly (90%) of lemming and vole. Rough-legged hawk hunt over marshes, peat bogs, wet meadows and open areas (Henderson and Bird, 1995b).

Osprey (*Pandion haliaetus*) and several of their nests were identified during various fly-overs of the study area. The shortage of nesting sites limits the presence of this species. Food on the other hand is generally abundant in the many streams, rivers and lakes of the study area (Y. Aubry, Canadian Wildlife Service, personal communication, July 2006).

A few merlin (*Falco columbarius*), northern harrier (*Circus cyaneus*), great horned owl (*Bubo virginianus*), boreal owl (*Aegolius funereus*), northern hawk owl (*Surnia ulula*) and northern shrike (*Lanius excubitor*) are present in the study area. The size of the populations of these species often reflects the size of the populations of their preferred prey, small mammals and passerines.

Species at Risk

Seven bird species classified as at risk have been observed in the study area. These are harlequin duck (*Histrionicus histrionicus*), Barrow's goldeneye (*Bucephala islandica*), bald eagle (*Haliaeetus leucocephalus*), golden eagle (*Aquila chrysaetos*), peregrine falcon (*Falco peregrinus*), short-eared owl (*Asio flammeus*) and rusty blackbird. The rivers that empty into Lac Guillaume-Delisle have been identified as important bird areas for golden eagle, harlequin duck and peregrine falcon. The Petite rivière de la Baleine has been identified as important for golden eagle and harlequin duck (Nature Québec/UQCN, 2007).

Declared a species of *special concern* in Canada in May 2001 and *likely to be designated as threatened or vulnerable* in Québec (COSEWIC, 2006; MNRF, 2005), harlequin duck have been observed around the village of Umiujaq, near Le Goulet, along rivers that empty into Lac Guillaume-Delisle (De Troyes, du Nord and à l'Eau Claire) as well as on the eastern shore of Lac Guillaume-Delisle (Aubry, 2004; Hydro-Québec,1993a; Map 4.5). This species nests near creeks and rivers with clear, turbulent water, and it is often observed in mountain and forest areas. Outside of its breeding period, harlequin duck are most often observed in coastal areas. During the last two weeks of June, while the females care for their eggs, the males abandon the nesting area, migrate to the sea to join the immature members of the species, and begin to moult. The females and juveniles will migrate to the sea at the end of the summer (Robert, 1995a). The study area is important for harlequin duck conservation given the large number of individuals found there.

Barrow's goldeneye have been observed in flight over Lac Guillaume-Delisle and on the eastern portion of Île Cairn [Cairn Island] (Aubry, 2004) as well as throughout the upstream section of the drainage basin of the Petite rivière de la Baleine (Savard, 1995). No confirmation of nesting in the study area has been made for this species. In Canada, the eastern population of Barrow's goldeneye has been classified as a species of *special concern* since November 2000 (COSEWIC, 2006). In Québec, the species is *likely to be designated as threatened or vulnerable*. The nests of Barrow's goldeneye are always located near small bodies of water so that nesting females are able to feed themselves. Headwaters which often lack fish are nonetheless rich with invertebrate, providing sustenance to adults and juveniles alike (Savard, 1995; MRNF, 2005). The nests of this species can be up to 3 km from a body of water. They are simple depressions in the ground or in a tree, if present. Like harlequin duck, male Barrow's goldeneye abandon the nesting area around mid-June, migrating to the sea in order to moult. They shed their feathers, lose their ability to fly, and finally re-grow feathers with colouring that matches the female members of the species (Savard, 1995).

Bald eagle were declared *vulnerable* in September 2003, in Québec (MRNF, 2005). This species has been observed in the Lac Guillaume-Delisle sector (Lepage, 2006) as well as in the drainage basin of the Grande rivière de la Baleine (Bird and Henderson, 1995). Bald eagle nests are always situated near lakes, rivers or salt water, generally within 200 m. Even if they prefer fish, bald eagle can feed on aquatic birds, hare, rats, beached cetaceans and other carcasses. This species constructs its nests under the crowns of trees that are mature enough to offer protective cover (Bird and Henderson, 1995).

Golden eagle are not considered at risk in Canada, but have been designated as *vulnerable* in Québec since March 2005 (COSEWIC, 2006; MRNF, 2005). This species nests between the Grande rivière de la Baleine and the Rivière Nastapoka. The preferred nesting area for golden eagle in the study area is along the cuestas next to the Petite rivière de la Baleine (Robert, 1995b). Moreover, individuals were observed around Lac Guillaume-Delisle during fieldwork carried out by the Kativik Regional Government in the summers of 2003 and 2004, near Umiujaq where there exist other major cuestas. This species nests on cliffs in mountainous areas cut by valleys and canyons with rocky cliffs. Golden eagle hunt in open and semi-open environments such as peat bogs, marshes and the tundra. A major predator, this species may attack geese, ducks, ravens, gulls and other birds of prey, plus woodchuck, hare and fox. It is also known to feed on the carcasses of caribou and seal (Robert, 1995b).

In Québec, there are two subspecies of peregrine falcon: *anatum* and *tundrius*. Only the *anatum* subspecies is present in the study area (SCF, 2007), specifically the Lac Guillaume-Delisle sector (Archambault, 1997) and according to authoritative Inuit residents of Umiujaq, around their village. Hydro-Québec (1993a) has reported the presence of this species in the study area along the coast of Hudson Bay. In Canada, peregrine falcon (*anatum* and *tundrius*) were classified as a species of *special concern* in April 2007 (COSEWIC, 2007). In Québec, the subspecies *anatum* has been classified as *vulnerable* since September 2003 while the subspecies *tundrius* has no status (MRNF, 2005). Peregrine falcon inhabit the same cliffs near streams and rivers as rough-legged hawk and gyrfalcon. On the tundra, peregrine falcon feed on birds (shorebirds, passerine, alcids and waterfowl), but especially on small mammals (Bird et al., 1995).

Golden eagle (*Aquila chrysaetos*), which have been designated *vulnerable* in Québec since March 2005, nest between the Grande rivière de la Baleine and the Rivière Nastapoka on cuestas and other cliffs.

Short-eared owl were observed in 1989 and 1990 in the drainage basin of the Petite et Grande rivières de la Baleine as well as along the upstream section of the Rivière Nastapoka (Bélanger and Bombardier, 1995). During fieldwork carried out by the Kativik Regional Government, an adult female and her nest were observed next to Lac à l'Eau Claire in the summer of 2004. Short-eared owl are *likely to be designated as threatened or vulnerable* in Québec, but are not considered to be at risk in Canada (MNRF, 2005; COSEWIC, 2006). Short-eared owl nest on the ground in dry, grassy areas. Nesting begins in April and May. The species' main prey is lemming. As lemming populations fluctuate locally so too do the number of short-eared owls. These fluctuations impact on the number of eggs laid by females; females require a minimum quantity of food to lay eggs (Bélanger and Bombardier, 1995).

Rusty blackbird have been observed in the study area. They were classified as a species of *special concern* in Canada in April 2006. This species' breeding area is largely situated in the boreal forest (COSEWIC, 2006).

FISH

Twenty-nine species of fish, including certain salt-water species, are found in and around the study area (Appendix 8).

The water of Lac Guillaume-Delisle possesses a varying degree of salinity depending on its proximity to Le Goulet, which connects the lake to Hudson Bay (Consortium Gilles Shooner & Associés et al., 1991b). McAllister (1964) sampled fresh-water and salt-water fish species in Lac Guillaume-Delisle for the National Museum of Canada. Regarding salt-water species, he caught thorny skate (*Raja radiata*), capelin (*Mallotus villosus*), Greenland cod (*Gadus ogac*), arctic staghorn sculpin (*Gymnocanthus tricuspis*), fourhorn sculpin (*Myoxocephalus quadricornis*), shorthorn sculpin (*Myoxocephalus scorpius*), arctic sculpin (*Myoxocephalus scorpioides*), lumpfish (*Cyclopterus lumpus*) as well as sand lance (*Ammodytes hexapterus*). In fresh-water sectors, three species that can inhabit brackish waters were caught: round whitefish (*Prosopium cylindraceum*), ninespine stickleback (*Pungitius pungitius*) and threespine stickleback (*Gasterosteus aculeatus*). The uniquely fresh-water species sampled were longnose sucker (*Catostomus catostomus*), longnose dace (*Rhinichthys cataractae*), mottled sculpin (*Cottus bairdi*) and slimy sculpin (*Cottus cognatus*).

Inuit also fish in Lac Guillaume-Delisle for subsistence purposes. The fish caught most often are brook trout (*Salvelinus fontinalis*), shallow water cisco (*Coregonus artedii*), lake whitefish (*Coregonus clupeaformis*), lake trout (*Salvelinus namaycush*), fourhorn sculpin, shorthorn sculpin, arctic cod (*Boreogadus saida*), Greenland cod and arctic charr (*Salvelinus alpinus*). Three species made up more than 60% of all the fish eaten by Inuit in 1980: lake whitefish, shallow water cisco and arctic charr (Boivin et al., 1985). Lake whitefish, brook trout and arctic charr may be considered anadromous, which is to say that they normally live in salt-water and reproduce in fresh-water. Shallow water cisco are essentially a lake-dwelling species but may also be found in large rivers in the study area that empty into Hudson Bay (Scott and Crossman, 1978).

Short-eared owl (*Asio flammeus*), a species *likely to be designated as threatened or vulnerable* in Québec, are present in the study area. They nest on the ground in dry, grassy areas.

In Lac Guillaume-Delisle, brook trout and arctic charr compete for the same habitat. Arctic charr is absent from all the rivers that flow into Lac Guillaume-Delisle (which are dominated instead by brook trout), except for a very small stream on the west side of the lake where this species is dominant (Dutil, 1976; Boivin et al., 1985). Arctic charr is absent from inland waters in the study area, living instead in the marine environment and visiting river estuaries on occasion (Legendre and Legendre, 1984 in Hydro-Québec, 1993c).

Lake trout is the dominant species in Lac à l'Eau Claire. Other species that inhabit the lake include: lake whitefish, round whitefish (*Prosopium cylindraceum*), brook trout, shallow water cisco, longnose sucker, American burbot (*Lota lota*), lake chub (*Couesius plumbeus*) and northern pike (*Esox lucius*). Although scientific sampling expeditions produced only small catches (5 fish/net/day in 1978 and 11 fish/net/day in 1991), most of the fish caught were large (11 and 15 kg/net/day) (Consortium Gilles Shooner & Associés et al., 1991b). Threespine stickleback, ninespine stickleback and sculpin (*Cottus* sp.) are also present in Lac à l'Eau Claire (Smith, 1999).

Consortium Gilles Shooner & Associés et al. (1990; 1991b) studied the ichthyological fauna of the lakes that feed the Grande rivière de la Baleine, including Lacs des Loups Marins. The latter lake is distinct from the drainage basin's other lakes due to its biodiversity. The most common species are: shallow water cisco, followed by lake whitefish and brook trout. Lake trout were only found in abundance in the upstream and central sections of the lake. Other species sampled in smaller numbers from Lacs des Loups Marins included round whitefish, longnose sucker, threespine stickleback and sculpin (species not indicated). The lakes around Lacs des Loups Marins are distinct because lake trout is the dominant species and longnose sucker are also abundant. The situation should not however be over generalized since certain lakes, Lac Bourdel for example, possess three dominant species: lake trout, shallow water cisco and brook trout. In Lac Pikutachikw and Lac Bourg, the most common species are shallow water cisco and lake chub (Consortium Gilles Shooner & Associés et al., 1991b).

Only 1.4 km upstream from the mouth of the Rivière Nastapoka, a roughly 30-m high waterfall separates the river in two sections: the estuary or downstream section and the river or upstream section. In the estuary, brook trout, ouananiche (a landlocked, fresh-water Atlantic salmon, *Salmo salar*) and lake whitefish are abundant. The shallow water cisco, round whitefish as well as the longnose sucker are present to a lesser degree. Potential spawning sites for brook trout, shallow water cisco and ouananiche were identified in the estuary, specifically in the second basin on the south shore, downstream from the waterfall (Map 4.5). Although researchers believe that the ouananiche population originated from a former inland route, one theory holds that the only source for ouananiche along the mid-section of the Rivière Nastapoka and the estuary could have been the Lac Kakiattualuk outlet stream (Map 4.5). While the entire life cycle of this fish has been observed, no explanation exists regarding its origin (Hydro-Québec, 1993b).

Ouananiche inhabit three sections of the Rivière Nastapoka, separated from one another by impassable waterfalls: the estuary, the section immediately upstream from the estuary and the Lac Kakiattualuk outlet stream. As the waterfalls are more than 20 m high, ouananiche are only able to migrate downstream, never back upstream. Even though the water of the estuary is brackish, these salmon are considered landlocked since they share the morphological and behavioural characteristics of fresh-water salmon (Hydro-Québec, 1993b). This is probably the only population of salmon on the eastern shores of Hudson Bay (Legendre, 1990).

In the estuary of the Petite rivière de la Baleine, sample catches included American burbot, lake chubb and white sucker (*Catostomus commersoni*) (Consortium Gilles Shooner & Associés, Somer and Environnement Illimité Inc., 1990).

Species at Risk

Fourhorn sculpin, which are present in Lac Guillaume-Delisle (Appendix 8), are the only fish in the study area that have been classified as at risk. In Québec, this species appears on the list of species *likely to be designated as threatened or vulnerable* (MRNF, 2005).

AMPHIBIANS AND REPTILES

According to Bider and Matte (1994) and the Société de la faune et des parcs du Québec [wildlife and parks] (FAPAQ, 2003a), six amphibian and one reptile species could be present in and around the study area (Appendix 9). Two of these seven species were observed during fieldwork organized by the Kativik Regional Government in the study area: American toad (*Bufo americanus*) heard at Lac Guillaume-Delisle in June 2004 and wood frog (*Rana sylvatica*) seen in August 2005 in peat bogs. The toad inhabits spruce–moss stands and river scrubland, while the frog inhabits wet forest zones (Bider and Matte, 1994; Hydro-Québec, 1993c).

The five other identified species have been observed further south along the Rivière La Grande [Great River]: blue-spotted salamander (*Ambystoma laterale*), northern spring peeper (*Pseudacris crucifer*), mink frog (*Rana septentrionalis*), northern leopard frog (*Rana pipiens*) and common garter snake (*Thamnophis sirtalis*) (FAPAQ, 2003a).

INSECTS AND SPIDERS

While biting insects (mosquitoes, black flies, Tabanidae) are abundant in the study area, little research has been focussed on this topic. Appendix 10 shows the samples collected by Koponen (1993a, 1993b, 1994) as well as Koponen and Lafontaine (1991) in the Kuujjuarapik zone, and samples collected by Francoeur (1983), Gauthier and Koponen (1987) as well as Maire (1984) cited by the Société de la faune et des parcs du Québec (FAPAQ, 2003b). Sampling work has dealt mainly with Lepidoptera (butterflies), Araneae (spiders), Tabanidae (flies) and Formicidae (ants). The total number of identified species (139) remains an arbitrary number.

Koponen and Lafontaine (1991) collected 55 species of Noctuidae over a five-year period at Kuujjuarapik. Two of these species, which originate on the west coast of Canada, *Lasionycta perplexa* and *Discestra farnhami*, were identified for the first time in Québec during this inventory work. The most common insects in 1990 were *Diarsia dislocata, Euxoa dissona, Euxoa lidia thanatologia, Rhyacia quadrangular*, *Xestia mixta*, *Apamea zeta exulis*, *Discestra trifolii*, *Parastichtis suspecta, Polia rogenhoferi* and *Syngrapha diasema*.

Overall, 34 spider species were caught by Koponen (1993a) in the Kuujjuarapik zone, but only twelve are listed. In 1994, Koponen (1994) caught 19 butterfly species between Lac Guillaume-Delisle and Lac Minto. This species are from four families: Pieridae, Nymphalidae, Lycaenidae and Hesperiidae.

Eight species of Tabanidae (better known as horse or deer flies) and four species of Formicidae (ants) have been identified in the study area.

ENDNOTES

1 This analysis does not take into account the results of inventory work carried out in 2006, as the results of this work are not yet complete.

Credit: Josée Brunelle (KRG)

5 THE HISTORY OF HUMAN OCCUPATION

The territory under study has undergone human occupation during various periods, by both Arctic peoples and American Indian peoples. Since 1750, the area has also been occupied from time to time by Euro-Canadians. According to current knowledge, the territory contains 38 sites that were occupied by Arctic peoples, 62 sites occupied by American Indians, and 5 by Euro-Canadians. Another 10 sites were occupied by diverse cultures, and there are 12 sites that cannot be associated with a specific culture. In the area surrounding the study area, 78 sites occupied by Arctic peoples and 2 by American Indian groups have been identified. Another 7 were occupied by undetermined cultures. In addition to archaeological findings, there is documented history of the study area for the period from 1740 to 1970.

Occupation by Arctic Peoples

GENERAL KNOWLEDGE OF THE HISTORY OF PALAEO-ESKIMO, NEO-ESKIMO AND INUIT PEOPLE IN NUNAVIK

The first traces of human occupation in Nunavik can be dated with certainty to about 3900 before present (BP).[1] Archaeologists refer to this first migration as the Pre-Dorset period, and it is thought that the source of migration was the Denbigh culture to the west, which is closely related. Pre-Dorset culture is associated with a group of artifacts that includes burins, narrow projectile points, microblades, lateral semi-circular blades, harpoon heads and round and oval soapstone containers, among other items. Figure 5.1 summarizes the cultural history of Nunavik compared to other Arctic regions.

The past presence of Pre-Dorset people is evident on the east and west coasts of Hudson Bay and as far south as the Kuujjuarapik area, where site GhGk-4 dates back to 3900 BP. For the moment, this site represents the southernmost geographic range of Palaeo-Eskimos during the first wave of migration (Avataq Cultural Institute, 1992a, b; Plumet, 1974, 1976, 1980). The early Pre-Dorset culture persisted in Nunavik until about 2700 or 2800 BP before ceding to a new group known as the Late Pre-Dorset. This latter culture is characterized by, among other things, standardized burins with a particular shape including frequent use of abrasion, box-based points, and lateral semi-circular blades, as well as the utilization of diverse raw materials (Desrosiers and Rahmani, 2007). This culture is closely linked with Independence II in the High Arctic and Groswater in Labrador (Gendron and Pinard,

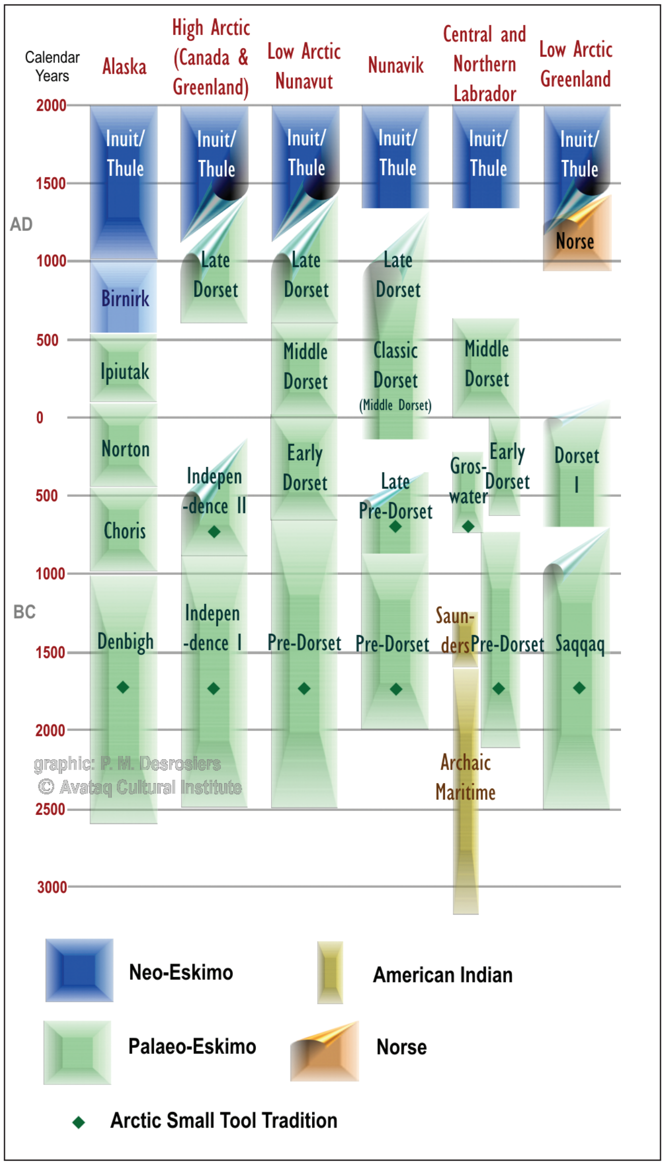


Chart created by P. M. Desrosiers (Avataq Cultural Institute)

Figure 5.1 Chrono-cultural Chart of the Palaeohistory of Nunavik and Other Arctic Regions

1999). However in Nunavik this was a short cultural period and there is still little precise information about it.

Recent research, especially in the Salluit region, has led archaeologists to introduce the term “Classic Dorset” to designate the first part of the Period following the Late Pre-Dorset in Nunavik, as opposed to other regions where the terms “Early and Middle Dorset” are used (Desrosiers et al., 2006). In the absence of an Early Dorset period in Nunavik, the term Classic Dorset is more appropriate, because it makes reference to the original definition of Dorset. It is possible that the Dorset people are the people called Tuniit in Inuit oral tradition.

There is no visible discontinuity between the Classic Dorset and Late Dorset periods, and it is impossible to ascertain exactly when the characteristics of the Late Dorset period made their appearance (Figure 5.1). In reality, there was probably a progressive evolution throughout the period. Dorset tools included pseudo-burins (burins that were completely abraded) tip-fluting points, microblades, an array of knives and tips in argillaceous schist, a variety of tools made from organic materials, and well-developed art, among other things. Again, the maximum southern range of this culture seems to have been the Kuujjuarapik region, with the GhGk-63 site being one of a number of sites. However, as suggested by the southern presence of this culture in Newfoundland, it is probable that eventually Dorset occupations will be discovered further south than Kuujjuarapik.

Around the year 1300 of the current era, a new group, the Thule culture, suddenly appeared on the scene. Thule, also called Neo-Eskimo, is considered direct ancestoral to the Inuit. This group migrated from the Berengia region as far as Greenland, where in some areas they encountered the Norse. Thule culture is characterized by a very different material culture that includes the bow drill, ulu, bow and arrow, kayak and umiaq as well as soapstone lamps and containers.

PALAEO-ESKIMO OCCUPATION (3900-800 BP)

Before work carried out by Avataq Cultural Institute in 2004 and 2006, no Pre-Dorset site had been identified in the study area (Gosselin et al., 1974; Harp, 1974-75, 1976). However, there was strong suspicion that such sites existed because there were archaeological finds attesting to Pre-Dorset occupation further south on the east coast of Hudson Bay (Gendron, 1991) and also further north. Most of the sites previously discovered can be attributed to the Late Dorset phase. Also, 16 Dorset sites have been recorded in the area of Lac Guillaume-Delisle [Richmond Gulf]. The majority of these, totalling 11 sites, are located on the north shore of Le Goulet (Tursujuq in Inuktitut, sometimes called the Narrows or the Channel in English; Figure 5.2) or on the northern tip of Île Bélanger [Bélanger Island] (Innalialuk), while 5 sites are located on the coast several kilometres north of Le Goulet and another is at the northern end of Lac Guillaume-Delisle (Tasiujaq). The final three Dorset sites (HdGd-1, 2 et 7) are located near the town of Umiujaq (Gosselin et al., 1974; Harp, 1970, 1972, 1976 and Arkéos, 1984). Table 5.1 provides information on the recorded sites, while Maps 5.1 and 5.2 show their locations in the region, including the study area and its immediate vicinity. Table 5.2 shows the available data for these sites.

In 2004, work carried out by Avataq Cultural Institute led to the identification of 13 new sites on Lac Guillaume-Delisle and on the shore and offshore islands of Hudson Bay. Another two new Palaeo-Eskimo sites were discovered in 2006, one at the mouth of Petite rivière de la Baleine [Little Whale River] and a possible one at Lac à l'Eau Claire [Clearwater Lake]. In the majority of cases, it is impossible to attribute a precise period of Palaeo-Eskimo occupation. However, the discovery of a burin at the Kimminait 1 site (HaGb-9, UMI110) suggests Pre-Dorset occupation. This site is on Île Qikirtaaluk [Qikirtaaluk Island] at 50 metres of elevation, which makes this interpretation compatible with the evolution of the profile of the coastlines in the area. The neighbouring site, Kimminait 2 (HaGb-10, UMI111), at an elevation of 52 metres, could also be Pre-Dorset, although no objects characteristic of the culture were found. Not far away, the Atsalik site (HaGb-13, UMI128), at an altitude of 63 metres, could also be Pre-Dorset, because it is located on one of the highest summits on the island. However, surveys did not turn up any characteristic materials. On the south shore of Lac Guillaume-Delisle, the Kingittuq Najuqtauvattuviniq site (HaGb-4, UMI124), at an altitude of 51 metres, could be more or less contemporary, but on the surface the site seems very poor. The site HaGe-20, at the mouth of Petite rivère de la Baleine, contains shaped burins that might indicate Pre-Dorset occupation. However, at 12 metres, its low elevation suggests more recent occupation (Marcoux and Roy, 2007: 72).

At 35 metres, the elevation of the Kenuayuak site (HaGb-7, UMI99), on Île Qikirtaaluk suggests an older occupation (Figure 5.3). The site contains particular axial structures accompanied by pavings made of flat stones. Characteristic materials found on this site include a lateral blade, pseudo-burins and a long projectile point with bilateral notches. The pseudo-burins are more characteristic of Late Dorset. Since these items were found on the surface, it is impossible to ascertain whether they represent different periods of occupation, but we do know that they are not characteristic of the Classic Dorset phase. It is interesting to note that the structures are similar to those at the Atchukaluk site (HcGc-3, UMI107),

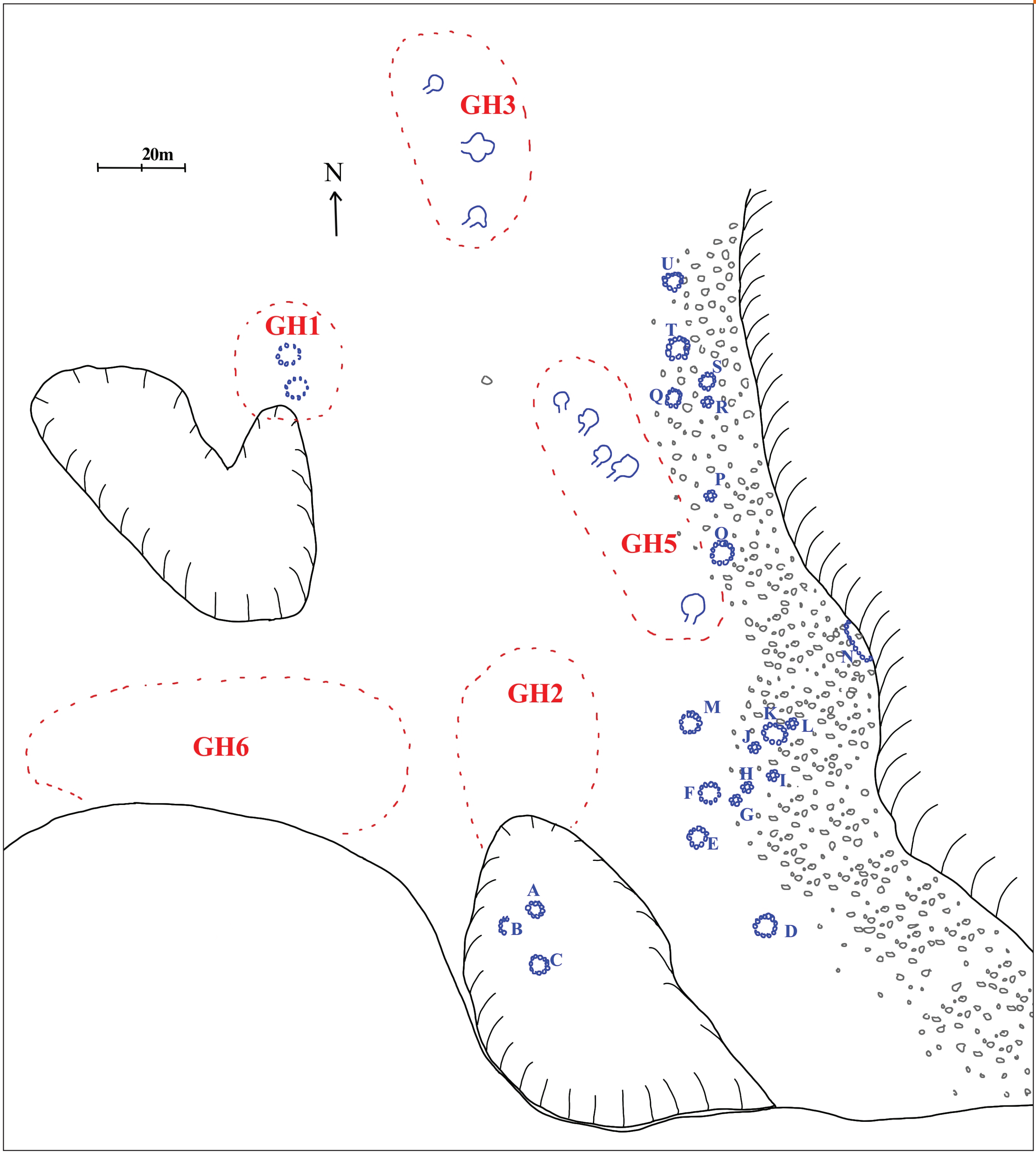


Figure prepared by P. M. Desrosiers (Avataq Cultural Institute)

A- cache, B- hunting blind, C- structure, D- structure, E- structure, F- structure, J, H and I- caches, K- structure, L- cache, M- structure, N- a special structure on the rock face, a sort of shelter beneath the rocks protected from the rain, O- structure, P- cache, Q- small structure, R- cache, S- small structure, T- structure, U- structure.

Figure 5.2 Plan of the Valley on the North Shore of Le Goulet and Lac Guillaume-Delisle Showing the Position of the Sites Discovered by Harp and the Various Structures Discovered in 2004.

Table 5.1 Archaeological Sites Inventoried in the Region

NO ON MAPS 5.1 AND 5.2	BORDEN CODE	LOCATION
1	N/A	NE quadrant of west basin of LEC[1]
2	N/A	NW quadrant of west basin of LEC
3	N/A	NE quadrant of west basin of LEC
4	N/A	NE quadrant of west basin of LEC
5	N/A	NE quadrant of west basin of LEC
6	GlGe-8	south coast of PRB[2], 2.7 km east of the outlet
7	GlGe-8	south coast of PRB, 3 km east of the outlet
8	HaGa-1	in Saami Kuruup Nunanga Bay, altitude about 4 m
9	HaGa-2	Saami Kuruup Nunanga, next to the trading post, SW of the small river, altitude 2 m
10	HaGa-3	near Papp, 4 km east of Pointe Kampanikkut [Kampanikkut Point]
11	HaGa-3	Saami Kuruup Nunanga, altitude 9 m, near Papp, 4 km east of Pointe Kampanikkut
12	HaGa-3	Saami Kuruup Nunanga, altitude 9 m, near Papp, 4 km east of Pointe Kampanikkut
13	HaGa-4	Saami Kuruup Nunanga, altitude 15 m
14	HaGa-5	Saami Kuruup Nunanga, altitude 20 m
15	HaGa-6	Saami Kuruup Nunanga, altitude 21 m
16	HaGa-7	Saami Kuruup Nunanga, altitude 6 m
17	HaGa-8	on a small island near the trading post, altitude about 5 m
18	HaGa-9	island near Saami Kuruup Nunanga, altitude about 15 m
19	HaGb-1	south shore, Île Cairn
20	HaGb-10	in the southern part of Île Qikirtaaluk, altitude 52 m
21	HaGb-11	south shore of Qikirtaaluk, altitude 1 to 15 m
22	HaGb-11	Île Cairn, east of Qumgu Pass
23	HaGb-12	on Île Qikirtaaluk, altitude 30 m
24	HaGb-13	on Île Qikirtaaluk, altitude 63 m
25	HaGb-14	Île Cairn, west of Qumgu Pass
26	HaGb-14	Île Qikirtaaluk, altitude 4 m
27	HaGb-2	small plateau at the mouth of the Rivière Guérin, altitude 12 m
28	HaGb-3	on a small band of land near Lac Jiap Tasialunga on the edge of a rocky hill, altitude 29 m
29	HaGb-4	on a small hill between Lac Jiap Tasialunga and lake Tasiujaq[3], altitude 51 m
30	HaGb-5	in a small valley near Quurngualuk Passage, altitude 36 m
31	HaGb-6	Île Qikirtaaluk, altitude 5 m
32	HaGb-7	Île Qikirtaaluk, altitude about 35 m
33	HaGb-8	Île Qikirtaaluk, altitude 5 m
34	HaGb-9	in the southern part of Île Qikirtaaluk, altitude 50 m

MAP	AUTHOR	CULTURE	PERIOD
34B/8	Marcoux and Roy (2007)	Cree	Contemporary
34B/7	Marcoux and Roy (2007)	Cree	Contemporary
34B/8	Marcoux and Roy (2007)	Cree	Contemporary
34B/8	Marcoux and Roy (2007)	Cree	Contemporary
34B/8	Marcoux and Roy (2007)	Cree	Contemporary
33N/15	Marcoux and Roy (2007)	Inuit, Cree, Euro-Canadian	Historic
33N/15	Marcoux and Roy (2007)	undetermined	Precontact
34C/1	Avataq (2005)	Euro-Canadian	Late Historic
34C/1	Avataq (2005)	Euro-Canadian	Late Historic
34C/1	Marcoux and Roy (2007)	Inuit, Cree, Euro-Canadian	Late Historic
34C/1	Avataq (2005)		
	Avataq (2005), Marcoux and Roy (2007)	Inuit, Cree, Euro-Canadian	Late Historic
34C/1	Avataq (2005)	Cree	Late Historic or Contemporary
34C/1	Avataq (2005)	Cree	Late Historic or Contemporary
34C/1	Avataq (2005)	Euro-Canadian	Late Historic
34C/1	Avataq (2005)	Cree	Late Historic or Contemporary
34C/1	Avataq (2005)	Inuit	Late Historic or Contemporary
34C/1	Avataq (2005)	Inuit	Late Historic
34C/1	Harp (1967)	Inuit	Historic or Late Historic
34C/1	Avataq (2005)	Palaeo-Eskimo	Precontact
34C/1	Avataq (2005), Marcoux and Roy (2007)	Inuit, Cree, Euro-Canadian	Historic
34C/1	Marcoux and Roy (2007)	Cree, Euro-Canadian	Late Historic
34C/1	Avataq (2005)	Inuit or Thule (Neo-Eskimo)	Precontact or Historic
34C/1	Avataq (2005)	Palaeo-Eskimo	Precontact
34C/1	Marcoux and Roy (2007)	Cree	Late Historic or moderne
34C/1	Avataq (2005)	Cree	Late Historic
34C/1	Avataq (2005)	Cree	Late Historic
34C/1	Avataq (2005)	Palaeo-Eskimo	Precontact
34C/1	Avataq (2005)	Palaeo-Eskimo	Precontact
34C/1	Avataq (2005)	Palaeo-Eskimo	Precontact
34C/1	Avataq (2005)	Inuit	Historic
34C/1	Avataq (2005)	Palaeo-Eskimo	Precontact
34C/1	Avataq (2005)	Euro-Canadian	Historic
34C/1	Avataq (2005)	Palaeo-Eskimo	Precontact

Table 5.1 (continued) Archaeological Sites Inventoried in the Region

NO ON MAPS 5.1 AND 5.2	BORDEN CODE	LOCATION
35	HaGc-1	east shore, Presqu'île Castle
36	HaGd-1	south shore, Presqu'île Castle
37	HaGd-10	valley on the north shore of Tasiujaq[3], altitude 36 m
38	HaGd-11	valley on the north shore of Tasiujaq, altitude 23 m
39	HaGd-12	valley on the north shore of Tasiujaq, altitude 36 m
40	HaGd-13	north shore, Le Goulet
41	HaGd-14	north shore of Pointe Tikiraujaq, altitude 5 m
42	HaGd-15	on flat ground (about 200 m by 200 m) along the beach and bordered by a river, altitude 5 m
43	HaGd-16	on top of a small cliff near the beach, altitude about 15 m
44	HaGd-17	on a gentle slope on a small point on the south shore of Le Goulet altitude 5 to 10 m
45	HaGd-18	on the edge of a cliff, altitude 33 m
46	HaGd-19	on Sivraaluk Point near the beach, altitude 3 to 6 m
47	HaGd-2	south shore of Presqu'île Castle
48	HaGd-20	on Sivraaluk Point in a fissure between two bedrock outcrops, altitude 7 m
49	HaGd-21	in a boulder field on Sivraaluk Point across from Le Goulet, altitude 4 m
50	HaGd-22	on Sivraaluk Point, altitude about 15 m
51	HaGd-23	on Sivraaluk Point, altitude 22 m
52	HaGd-24	on Sivraaluk Point near a beach facing west, altitude between 7 and 13 m
53	HaGd-25	in the valley to the west of Siukkaaluk, altitude 17 m
54	HaGd-26	in the valley west of Siukkaaluk, altitude 14 m
55	HaGd-27	east coast of Hudson Bay, altitude 24 m
56	HaGd-28	in a small sandy valley on the east coast of Hudson Bay, near Kuugaa'uk Stream, altitude 40 m
57	HaGd-29	in a small sandy valley on the east coast of Hudson Bay, near Kuugaa'uk Stream, altitude 40 m
58	HaGd-3	south shore of Presqu'île Castle
59	HaGd-30	east coast of Hudson Bay, altitude 15 m
60	HaGd-31	east coast of Hudson Bay, altitude between 12 and 16 m
61	HaGd-4	valley on the north shore of Le Goulet of Tasiujaq, altitude 15 m
62	HaGd-4	Le Goulet, north shore
63	HaGd-5	valley on the north shore of Tasiujaq, altitude 6 m
64	HaGd-5	Le Goulet, north shore
65	HaGd-6	valley on the north shore of Tasiujaq, altitude 27 m
66	HaGd-6	Le Goulet, north shore
67	HaGd-7	valley on the north shore of Tasiujaq, altitude 19 m

MAP	AUTHOR	CULTURE	PERIOD
34C/1	Harp (1967)	undetermined	Contemporary
34C/2	Harp (1967, 1972)	Inuit or Thule (Neo-Eskimo)	Precontact or Historic
	Avataq (2005)	Palaeo-Eskimo	Precontact
	Avataq (2005)	Palaeo-Eskimo	Precontact
	Avataq (2005)	Inuit	Historic
34C/2	Harp (1972)	Inuit	Historic
34C/2	Avataq (2005)	Inuit	Historic
34C/2	Avataq (2005)	Inuit	Late Historic
34C/2	Avataq (2005)	Inuit or Thule (Neo-Eskimo)	Precontact or Historic
34C/2	Avataq (2005)	Inuit or Thule (Neo-Eskimo)	Precontact or Historic
34C/2	Avataq (2005)	Inuit or Thule (Neo-Eskimo)	Precontact or Historic
34C/2	Avataq (2005)	Inuit	Late Historic or Contemporary
34C/2	Harp (1967, 1972)	Inuit or Thule (Neo-Eskimo)	Precontact or Historic
34C/2	Avataq (2005)	Inuit or Thule (Neo-Eskimo)	Precontact or Historic
34C/2	Avataq (2005)	Inuit or Thule (Neo-Eskimo)	Precontact or Historic
34C/2	Avataq (2005)	Inuit or Thule and Palaeo-Eskimo	Precontact and Historic
34C/2	Avataq (2005)	Inuit or Thule and Palaeo-Eskimo	Precontact and Historic
34C/2	Avataq (2005)	Inuit and Palaeo-Eskimo	Precontact and Historic
34C/2	Avataq (2005)	Palaeo-Eskimo	Precontact
34C/2	Avataq (2005)	Cree	Historic
34C/2	Avataq (2005)	Inuit or Thule (Neo-Eskimo)	Precontact or Historic
34C/2	Avataq (2005)	Palaeo-Eskimo	Precontact
34C/2	Avataq (2005)	Euro-Canadian	Historic
34C/2	Harp (1972)	Inuit or Thule (Neo-Eskimo)	Precontact or Historic
34C/2	Avataq (2005)	Palaeo-Eskimo	Precontact
34C/2	Avataq (2005)	Palaeo-Eskimo	Precontact
	Avataq (2005)	Palaeo-Eskimo	Precontact
34C/2	Harp (1967, 1972)		
	Avataq (2005)	Inuit	Historic
34C/2	Harp (1967)		
	Avataq (2005)	Palaeo-Eskimo	Precontact
34C/2	Harp (1967, 1972)		
	Avataq (2005)	Palaeo-Eskimo	Precontact

Table 5.1 (continued) Archaeological Sites Inventoried in the Region

NO ON MAPS 5.1 AND 5.2	BORDEN CODE	LOCATION
68	HaGd-7	Le Goulet, north shore
69	HaGd-8	valley on the north shore of Tasiujaq, altitude 12 m
70	HaGd-8	Le Goulet, north shore
71	HaGd-9	valley on the north shore of Tasiujaq, altitude between 3 and 5 m
72	HaGd-a	on the small narrow passage that connects Pointe Tikiraujaq with mainland, altitude 4 m
73	HaGd-b	above a steep slope near the passage that connects Pointe Tikiraujaq to the mainland, altitude about 20 m
74	HaGd-c	on the south shore of Pointe Tikiraujaq, altitude 5 m
75	HaGd-d	near the beach on bedrock, altitude 3 m
76	HaGd-f	on Sivraaluk Point, altitude 7 m
77	HaGd-g	in a valley near the east coast of Hudson Bay, altitude 97 m
78	HaGe-1	mouth of the PRB
79	HaGe-1	south shore of the PRB, near the outlet
80	HaGe-1	south shore of the PRB, near the outlet
81	HaGe-10	east coast of Hudson Bay, altitude 6 m
82	HaGe-11	east coast of Hudson Bay, altitude 12 m
83	HaGe-12	east coast of Hudson Bay, altitude 3 m
84	HaGe-13	east coast of Hudson Bay, altitude 8 m
85	HaGe-14	east coast of Hudson Bay, altitude 7 m
86	HaGe-15	east coast of Hudson Bay, altitude 9 m
87	HaGe-16	east coast of Hudson Bay in a boulder field, altitude 12 m
88	HaGe-17	Île Bélanger, altitude 53 m
89	HaGe-18	Île Bélanger, altitude between 5 and 25 m
90	HaGe-19	north shore of PRB near the outlet
91	HaGe-2	mouth of the PRB
92	HaGe-2	towards the western end of the terrace
93	HaGe-20	north coast of PRB, north of the terrace
94	HaGe-21	north coast of PRB, 2 km east of the outlet
95	HaGe-3	mouth of the PRB
96	HaGe-4	mouth of the PRB
97	HaGe-5	Île Bélanger, altitude 33 m
98	HaGe-6	Île Bélanger, NW shore
99	HaGe-7	Île Bélanger, altitude about 30 m
100	HaGe-9	east coast of Hudson Bay, altitude 5 m

MAP	AUTHOR	CULTURE	PERIOD
34C/2	Harp (1967)		
	Avataq (2005)	Thule (Neo-Eskimo)	Precontact
34C/2	Harp (1967, 19 72) ; Gosselin and coll. (1974)		
	Avataq (2005)	Inuit	Late Historic or Contemporary
34C/2	Avataq (2005)	Inuit	Late Historic
34C/2	Avataq (2005)	Inuit	Historic
34C/2	Avataq (2005)	Inuit	Late Historic
34C/2	Avataq (2005)	Inuit	Late Historic
34C/2	Avataq (2005)	Cree	Late Historic
34C/2	Avataq (2005)	Inuit or Thule (Neo-Eskimo)	Precontact or Historic
33N/15	Harp (1967)		
33N/15	Marcoux and Roy (2007)	Inuit, Cree, Euro-Canadian	Historic
33N/15	Marcoux and Roy (2007)	undetermined	Precontact or Historic
34C/2	Avataq (2005)	Cree	Historic
34C/2	Avataq (2005)	Inuit	Historic
34C/2	Avataq (2005)	Inuit	Historic
34C/2	Avataq (2005)	Inuit	Historic
34C/2	Avataq (2005)	Inuit or Thule (Neo-Eskimo)	Precontact or Historic
34C/2	Avataq (2005)	Inuit or Thule (Neo-Eskimo)	Precontact or Historic
34C/2	Avataq (2005)	Inuit	Historic
34C/2	Avataq (2005)	Inuit or Thule (Neo-Eskimo)	Precontact or Historic
34C/2	Avataq (2005)	Inuit	Historic
34C/2	Marcoux and Roy (2007)	Inuit, Cree, Euro-Canadian	Historic
34C/2	Harp (1967)	Euro-Canadian	Historic
33N/15	Marcoux and Roy (2007)	undetermined	Precontact or Historic
34C/2	Marcoux and Roy (2007)	undetermined and Palaeo-Eskimo	undetermined and Precontact
34C/2	Marcoux and Roy (2007)	Palaeo-Eskimo	Precontact
34C/2	Harp (1967)	undetermined	undetermined and Precontact
n/a	Harp (1973)	undetermined	Precontact or Historic
34C/2	Gosselin and coll. (1974); Avataq (2005)	Thule (Neo-Eskimo)	Precontact
34C/2	Gosselin and coll. (1974)	Thule (Neo-Eskimo)	Precontact
34C/2	Avataq (2005)	Palaeo-Eskimo	Precontact
34C/2	Avataq (2005)	Inuit	Historic

Table 5.1 (continued) Archaeological Sites Inventoried in the Region

NO ON MAPS 5.1 AND 5.2	BORDEN CODE	LOCATION
101	HaGe-b	in a boulder field near the east coast of Hudson Bay, altitude 93 m
102	HaGe-c	in a boulder field near the east coast of Hudson Bay, at the entrance to a valley, altitude 96 m
103	HaGe-d	east coast of Hudson Bay, altitude 10 m
104	HaGe-e	on a small hill near the beach, altitude 9 m
105	HaGe-e	east coast of Hudson Bay, altitude 11 m
106	HaGe-f	mouth of the Ruisseau Kuugaa'uk altitude 2 m
107	HaGe-g	east coast of Hudson Bay, altitude 27 m
108	HbFn-1	SE quadrant of west basin of LEC
109	HbFn-10	NE quadrant of west basin of LEC
110	HbFn-11	NE quadrant of west basin of LEC
111	HbFn-12	NE quadrant of west basin of LEC
112	HbFn-2	NE quadrant of west basin of LEC
113	HbFn-3	NE quadrant of west basin of LEC
114	HbFn-4	NE quadrant of west basin of LEC
115	HbFn-5	NE quadrant of west basin of LEC
116	HbFn-6	NE quadrant of west basin of LEC
117	HbFn-7	NE quadrant of west basin of LEC
118	HbFn-8	NE quadrant of west basin of LEC
119	HbFn-9	NE quadrant of west basin of LEC
120	HbFo-1	île de l'Université Laval
121	HbFo-2	île de l'Université Laval
122	HbFo-3	NE quadrant of west basin of LEC
123	HbFo-4	NE quadrant of west basin of LEC
124	HbFo-5	eastern extremity of Kamiskutankaw Island, to the west of LEC
125	HbFo-6	NE quadrant of west basin of LEC
126	HbFo-7	NE quadrant of west basin of LEC
127	HbFo-8	NE quadrant of west basin of LEC
128	HbFp-1	Îles Wiskichanikw
129	HbFp-2	NW extremity of île de l'Université Laval
130	HbFq-1	NW quadrant of west basin of LEC
131	HbFq-2	NW quadrant of west basin of LEC
132	HbFq-3	NW quadrant of west basin of LEC
133	HbFq-4	NW quadrant of west basin of LEC
134	HbFq-5	NW quadrant of west basin of LEC
135	HbFq-6	NW quadrant of west basin of LEC

MAP	AUTHOR	CULTURE	PERIOD
34C/2	Avataq (2005)	Inuit or Thule (Neo-Eskimo)	Precontact or Historic
34C/2	Avataq (2005)	Inuit or Thule (Neo-Eskimo)	Precontact or Historic
34C/2	Avataq (2005)	Inuit or Thule (Neo-Eskimo)	Precontact or Historic
34C/2	Avataq (2005)	Inuit or Thule (Neo-Eskimo)	Precontact or Historic
34C/2	Avataq (2005)	Inuit or Thule (Neo-Eskimo)	Precontact or Historic
34C/2	Avataq (2005)	Inuit	Late Historic or Contemporary
34C/2	Avataq (2005)	Inuit	Historic
34B/1	Marcoux and Roy (2007)	Cree	Late Historic or Contemporary
34B/8	Marcoux and Roy (2007)	American Indian or Cree	undetermined
34B/8	Marcoux and Roy (2007)	Cree	Late Historic or Contemporary
34B/8	Marcoux and Roy (2007)	Cree	Late Historic or Contemporary
34B/8	Marcoux and Roy (2007)	American Indian or Cree	Precontact
34B/8	Marcoux and Roy (2007)	American Indian or Cree	Precontact
34B/8	Marcoux and Roy (2007)	undetermined	Precontact
34B/8	Marcoux and Roy (2007)	American Indian or Cree	undetermined and Late Historic or Contemporary
34B/8	Marcoux and Roy (2007)	Cree	Late Historic or Contemporary
34B/8	Marcoux and Roy (2007)	American Indian or Cree	Precontact
34B/8	Marcoux and Roy (2007)	American Indian or Cree	Precontact
34B/8	Marcoux and Roy (2007)	Cree	Late Historic or Contemporary
34B/1	Marcoux and Roy (2007)	Inuit, Cree, Euro-Canadian	Late Historic or Contemporary
34B/1	Marcoux and Roy (2007)	American Indian or Cree	Precontact
34B/8	Marcoux and Roy (2007)	Cree	Late Historic or Contemporary
34B/8	Marcoux and Roy (2007)	Cree	Late Historic or Contemporary
34B/1	Marcoux and Roy (2007)	American Indian or Cree	Precontact and Historic
34B/8	Marcoux and Roy (2007)	Cree	Late Historic or Contemporary
34B/8	Marcoux and Roy (2007)	American Indian or Cree	Precontact or Late Historic
34B/8	Marcoux and Roy (2007)	American Indian or Cree	Precontact or Historic
34B/2	Marcoux and Roy (2007)	Cree	Late Historic or Contemporary
34B/7	Marcoux and Roy (2007)	Cree	Late Historic or Contemporary
34B/7	Marcoux and Roy (2007)	Cree	Late Historic or Contemporary
34B/7	Marcoux and Roy (2007)	American Indian or Cree	Precontact or Late Historic
34B/7	Marcoux and Roy (2007)	Cree	Late Historic or Contemporary
34B/7	Marcoux and Roy (2007)	American Indian or Cree	Precontact
34B/7	Marcoux and Roy (2007)	American Indian or Cree	Precontact
34B/7	Marcoux and Roy (2007)	Cree	Late Historic or Contemporary

Table 5.1 Archaeological Sites Inventoried in the Region
(continued)

NO ON MAPS 5.1 AND 5.2	BORDEN CODE	LOCATION
136	HbFq-7	NW quadrant of west basin of LEC
137	HbFx-1	mouth of the Rivière De Troyes
138	HbGa-1	entrance to Lac Tasiujalik, Rivière à l'Eau Claire
139	HbGa-1	Rivière à l'Eau Claire, west shore
140	HbGa-2	Rivière à l'Eau Claire, east shore
141	HbGa-3	Rivière à l'Eau Claire, north shore
142	HbGa-4	SE of LGD[3], mouth of the Rivière à l'Eau Claire
143	HbGa-5	SE of LGD, mouth of the Rivière à l'Eau Claire
144	HbGa-6	on the second terrace, Rivière à l'Eau Claire
145	HbGb-1	at the bottom of the largest bay on Île Saatujaaq, altitude 5 m
146	HbGb-2	on the smallest of the Qikirtakallaak Purtuuukallaak islands, altitude 7 m
147	HbGb-a	mouth of the Kuuk Ikkatujaalik River, altitude 2 to 5 m
148	HbGc-1	LGD, west shore
149	HbGc-2	LGD, west shore
150	HbGc-3	
151	HbGc-4	on the north side at the centre of the largest of the Anurituup Qikirtalukaangit islands, altitude about 5 m
152	HbGd-1	Cache Cove (3.2 km north of the mouth of the LGD)
153	HbGd-10	in a boulder field bordered by a small cliff, altitude a little more than 30 m
154	HbGd-11	west shore of Tasiujaq, altitude 25 m
155	HbGd-12	west shore of Tasiujaq, altitude 87 m
156	HbGd-2	Cache Cove (3.2 km north of the mouth of the LGD)
157	HbGd-3	Presqu'île Castle, north shore
158	HbGd-4	Char Lake, west shore
159	HbGd-5	on the coast facing Ross Island
160	HbGd-6	on the coast facing Ross Island
161	HbGd-7	on the coast facing Ross Island
162	HbGd-8	in a field of large angular boulders, the level above crystalline quartz, altitude 88 m
163	HbGd-9	on a gentle slope near the shore, altitude 3 to 7 m
164	HbGd-a	Tasiujaq west shore, altitude 2 m
165	HbGe-1	Île Anderson, south shore
166	HbGe-2	Île Anderson, south shore
167	HbGe-3	Île Anderson, north shore
168	HbGe-4	Île Bélanger, NE shore

MAP	AUTHOR	CULTURE	PERIOD
34B/7	Marcoux and Roy (2007)	Cree	Late Historic or Contemporary
34C/1	Marcoux and Roy (2007)	American Indian or Cree	Precontact or Late Historic
34C/1	Marcoux and Roy (2007)	Cree and Inuit	Late Historic
34C/1	Harp (1967)	Inuit	Historic or Late Historic
34C/1	Harp (1967)	Cree	Contemporary
34C/1	Harp (1967)	Cree	Contemporary
34C/1	Marcoux and Roy (2007)	Cree	Late Historic or Contemporary
34C/1	Marcoux and Roy (2007)	Cree	Late Historic or Contemporary
34C/1	Marcoux and Roy (2007)	American Indian or Cree	Precontact or Historic
34C/1	Avataq (2005)	undetermined	Late Historic or Contemporary
34C/1	Avataq (2005)	Inuit or Thule (Neo-Eskimo)	Precontact or Historic
34C/8	Avataq (2005)	Inuit	Late Historic or Contemporary
34C/8	Harp (1967)	Inuit	Contemporary
34C/8	Harp (1967)	Inuit	Contemporary
34C/8		undetermined	undetermined
34C/1	Avataq (2005)	Inuit	Historic
34C/2	Harp (1972)	Inuit or Thule (Neo-Eskimo)	Precontact or Historic
34C/2	Avataq (2005)	Inuit	Historic
34C/2	Avataq (2005)	Palaeo-Eskimo	Precontact
34C/8	Avataq (2005)	Inuit	Late Historic or Contemporary
34C/2	Harp (1972)	Inuit	Contemporary
34C/2	Harp (1972)	Inuit	Contemporary
34C/7	Harp (1972), Gosselin and coll. (1974)	Inuit	Contemporary
34C/2	Harp (1972), Gosselin and coll. (1974)	Palaeo-Eskimo	Precontact
34C/2	Harp (1972), Gosselin and coll. (1974)	Palaeo-Eskimo	Precontact
34C/2	Harp (1972)	undetermined	undetermined
34C/2	Avataq (2005)	Inuit or Thule (Neo-Eskimo)	Precontact or Historic
34C/2	Avataq (2005)	Inuit	Historic
34C/2	Avataq (2005)	Inuit	Historic
34C/7	Harp (1972)	Inuit	Contemporary
34C/7	Harp (1972)	Inuit	Historic
34C/7	Harp (1972)	Inuit	Historic
34C/2	Harp (1972)	Palaeo-Eskimo	Precontact

Table 5.1 Archaeological Sites Inventoried in the Region
(continued)

NO ON MAPS 5.1 AND 5.2	BORDEN CODE	LOCATION
169	HbGe-5	Île Bélanger, NE shore
170	HbGe-6	Île Bélanger, NE shore
171	HcFo-1	NE quadrant of west basin of LEC
172	HcFo-2	NE quadrant of west basin of LECC
173	HcFo-3	NE quadrant of west basin of LEC
174	HcFo-4	NE quadrant of west basin of LEC
175	HcFo-5	NE quadrant of west basin of LEC
176	HcFo-6	NE quadrant of west basin of LEC
177	HcFo-7	NE quadrant of west basin of LEC
178	HcFo-8	NE quadrant of west basin of LEC
179	HcFo-9	NE quadrant of west basin of LEC
180	HcFp-1	NW quadrant of west basin of LEC
181	HcFq-1	NW quadrant of west basin of LEC
182	HcGc-1	Char Lake, east shore
183	HcGc-2	LGD, west shore
184	HcGc-3	northwest shore of Tasiujaq, altitude 31 m
185	HcGc-4	on a point on the west shore of the northern part of Lac Tasiujaq, at the foot of the Colline Qingaaluk, a little higher than site HcGc-3, altitude 40 m
186	HcGc-a	west shore of Tasiujaq, in a valley facing Nangiarnatuliup Qikirtanga, altitude 61 m
187	HcGd-1	Chenal Nastapoka, east shore
188	HcGd-6	Clarke Island, altitude about 7 m
189	HcGd-7	Clarke Island, altitude 40 m
190	HdGd-11	Curran Island, altitude about 21 m
191	HdGd-12	Curran Island, altitude 25 m
192	HdGd-13	Curran Island, altitude 30 m
193	HdGd-14	Curran Island, altitude about 25 m
194	HdGd-15	Curran Island, altitude about 15 m
195	n/a	near the beach at the tip of Pointe Tikiraujaq, altitude 4 m
196	n/a	near the beach, altitude 3 m
197	n/a	small flat piece of terrain near the beach, bordered by a cliff and a river, altitude 4 m
198	n/a	on the edge of a cliff, near one of the few passages (perhaps the only one) where it is possible to get from one level to the other, altitude 67 m
199	n/a	on the edge of a cliff, altitude 85 m
200	n/a	west shore of Tasiujaq, in a valley facing Nangiarnatuliup Qikirtanga, altitude 50 m
201	n/a	west shore of Tasiujaq, altitude 2 m
202	n/a	east coast of Hudson Bay, altitude 9 m

MAP	AUTHOR	CULTURE	PERIOD
34C/2	Harp (1972)	Palaeo-Eskimo	Precontact
34C/2	Harp (1972)	Inuit	Historic
34B/8	Marcoux and Roy (2007)	Cree	Late Historic or Contemporary
34B/8	Marcoux and Roy (2007)	Cree	Late Historic or Contemporary
34B/8	Marcoux and Roy (2007)	American Indian or Cree	Precontact or Late Historic
34B/8	Marcoux and Roy (2007)	American Indian or Cree	Late Historic or Contemporary
34B/8	Marcoux and Roy (2007)	American Indian or Cree	Precontact or Historic
34B/8	Marcoux and Roy (2007)	American Indian or Cree	Precontact or Historic
34B/8	Marcoux and Roy (2007)	American Indian or Cree	Precontact or Late Historic
34B/8	Marcoux and Roy (2007)	Cree	Late Historic or Contemporary
34B/8	Marcoux and Roy (2007)	American Indian or Cree	Precontact or Late Historic
34B/7	Marcoux and Roy (2007)	Cree	Late Historic or Contemporary
34B/7	Marcoux and Roy (2007)	Cree	Late Historic or Contemporary
34C/8	Harp (1967)	Inuit	Late Historic or Contemporary
34C/8	Harp (1967)	Inuit	Historic
34C/8	Gosselin and coll. (1974); Avataq (2005)	Palaeo-Eskimo	Precontact
34C/8	Avataq (2005)	Palaeo-Eskimo	Precontact
34C/8	Avataq (2005)	Inuit	Historic
34C/7	Gosselin and coll. (1974)	Inuit	Late Historic
34C/7	Avataq (2005)	Inuit or Thule (Neo-Eskimo)	Precontact or Historic
34C/7	Avataq (2005)	Inuit or Thule (Neo-Eskimo)	Precontact or Historic
34C/10	Avataq (2005)	Inuit or Thule (Neo-Eskimo)	Precontact or Historic
34C/10	Avataq (2005)	Inuit or Thule (Neo-Eskimo)	Precontact or Historic
34C/10	Avataq (2005)	Palaeo-Eskimo	Precontact
34C/10	Avataq (2005)	Inuit or Thule (Neo-Eskimo)	Precontact or Historic
34C/10	Avataq (2005)	Inuit or Thule (Neo-Eskimo)	Precontact or Historic
34C/2	Avataq (2005)	Inuit	Contemporary
34C/2	Avataq (2005)	undetermined	Contemporary
34C/2	Avataq (2005)	Inuit and Euro-Canadian	Contemporary
34C/2	Avataq (2005)	Inuit or Thule (Neo-Eskimo)	Precontact or Historic
34C/2	Avataq (2005)	Inuit or Thule (Neo-Eskimo)	Precontact or Historic
34C/8	Avataq (2005)	Inuit or Thule (Neo-Eskimo)	Precontact or Historic
34C/8	Avataq (2005)	undetermined	Contemporary
34C/2	Avataq (2005)	Cree	Late Historic or Contemporary

Table 5.1 Archaeological Sites Inventoried in the Region
(continued)

NO ON MAPS 5.1 AND 5.2	BORDEN CODE	LOCATION
203	n/a	east coast of Hudson Bay, altitude 8 m
204	n/a	above a small sandy valley on the east coast of Hudson Bay, near the Kuugaa'uk stream, altitude 45 m
205	n/a	east coast of Hudson Bay, altitude 2 m
206	n/a	east coast of Hudson Bay, altitude 19 m
207	n/a	east coast of Hudson Bay, altitude 10 m
208	n/a	on the east beach of the largest of the Saatuyaap Qikirtalukaangit Islands, altitude 3 m
209	n/a	eastern end of Île Saatujaaq, altitude 3 m
210	n/a	mouth of the Rivière Kuuk Ikkatujaalik, altitude 3 m
211	n/a	east shore of Lac Tasiujaq, just above a rocky outcrop near the lake, altitude 2 m
212	n/a	bay at the mouth of the Rivière De Troyes, altitude 5 m
213	n/a	Île Qikirtaaluk, altitude 3 m
214	n/a	Île Qikirtaaluk, altitude 3 m

[1] LEC : Lac à l'Eau Claire
[2] PRB : Petite rivière de la Baleine
[3] LGD : Lac Guillaume-Delisle (also named as Tasiujaq in the table)

Table 5.2 Radiocarbon Data Available for Archaeological Sites

BORDEN CODE	NAME	CULTURE	CARBON 14 (standardized age) years BP	SAMPLE TYPE	SOURCE
HaGd-4	GH-1	Dorset	795 ± 120	Charcoal	Harp (1976)
HaGd-8	GH-5	Thule (structure 2)	470 ± 80	Charcoal	Taillon and Barré (1987)
HaGd-8	GH-5	Dorset (structure 4)	695 ± 90	Charcoal	Taillon and Barré (1987)
HaGd-10	GH-7	Dorset	845 ± 120	Charcoal	Harp (1976)
HaGd-11	GH-8	Dorset (structure 1)	550 ± 120	Wood	Harp (1976)
HaGd-11	GH-8	Dorset (structure 1)	780 ± 160	Burned fat	Harp (1976)
HbGe-4	Bel-1	Dorset	1130 ± 95	Burned fat	Harp (1976)
HbGe-5	Bel-2	Dorset	855 ± 95	Burned fat	Harp (1976)

Source: Canadian Archaeological Radiocarbon Database

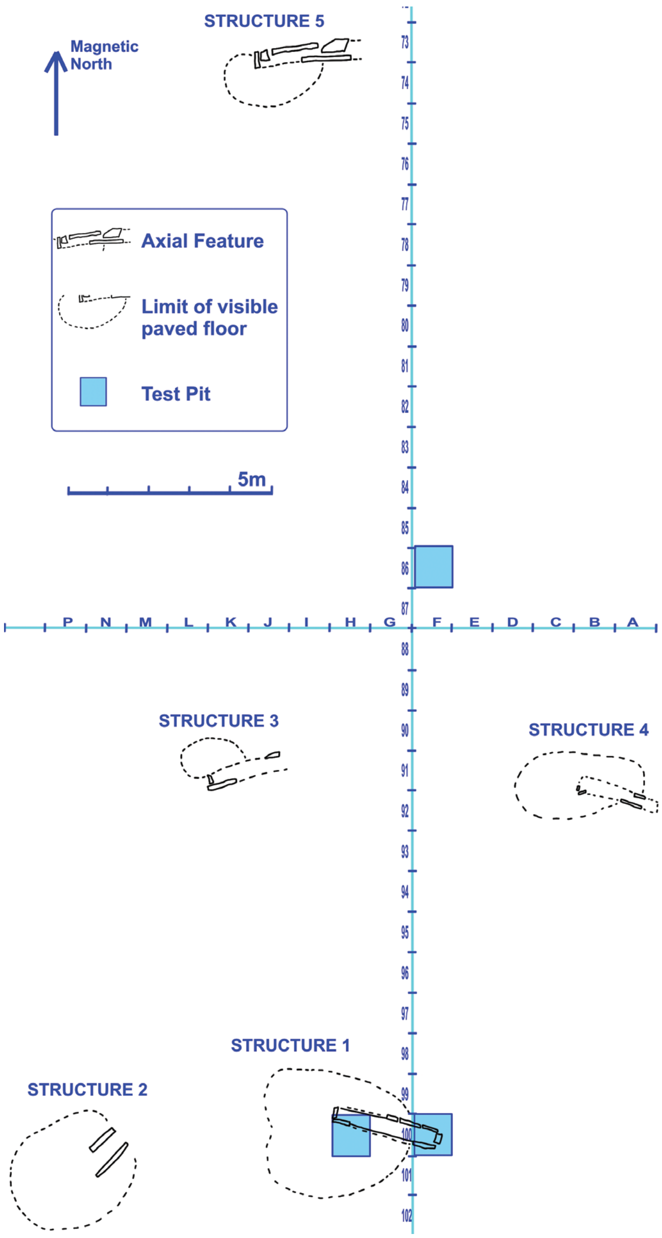
MAP	AUTHOR	CULTURE	PERIOD
34C/2	Avataq (2005)	Cree	Late Historic or Contemporary
34C/2	Avataq (2005)	undetermined	Late Historic or Contemporary
34C/2	Avataq (2005)	Inuit	Contemporary
34C/2	Avataq (2005)	undetermined	Contemporary
34C/2	Avataq (2005)	undetermined	Contemporary
34C/1	Avataq (2005)	Inuit	Contemporary
34C/1	Avataq (2005)	Cree	Contemporary
34C/8	Avataq (2005)	Inuit	Contemporary
34C/8	Avataq (2005)	Cree	Contemporary
34B/4	Avataq (2005)	Cree	Contemporary
34C/1	Avataq (2005)	Cree	Contemporary
34C/1	Avataq (2005)	undetermined	Contemporary

Structure 2, Atsalik Palaeo-Eskimo site (HaGb-13, UMI-13), Île Qikirtaaluk, view towards the south.
Credit: P. M. Desrosiers. Courtesy of Avataq Cultural Institute

Structure 1 at the Atchukaluk site (HcGc-3, UMI-107), already partially excavated in the 1970s (Gosselin et al., 1974), looking towards the northeast.
Credit: P. M. Desrosiers. Courtesy of Avataq Cultural Institute

located at an altitude of 31 metres on Atchukaluk Point in the northwest part of Lac Guillaume-Delisle. However, almost nothing has been published about the excavations carried out at one of these structures (Gosselin et al., 1974). Still, it is worth mentioning the discovery of a new site higher on the same point, the Nauya site (HcGc-4, UMI108), at an altitude of 40 metres; a structure with an axial arrangement at this site strongly resembles those observed at the GhGk-63 site (Desrosiers and Rahmani, 2003). The GhGk-63 site is obviously connected to the Classic Dorset phase (Figure 5.1). If elevations are taken into account, it is possible to conclude that the Atchukaluk and Kenuayuak sites were occupied towards the end of the Classic Dorset or the beginning of the Late Dorset phase (Figure 5.3).

Based on their altitudes, it is possible that the Siurayaaq site (HaGd-28, UMI145) at an altitude of 40 metres on the Hudson Bay coast, and the 36-metre high Napartuit site



Prepared by P. M. Desrosiers (Avataq Cultural Institute)

Figure 5.3 Kenuayuak Site Plan (HaGb-7, UMI-99)

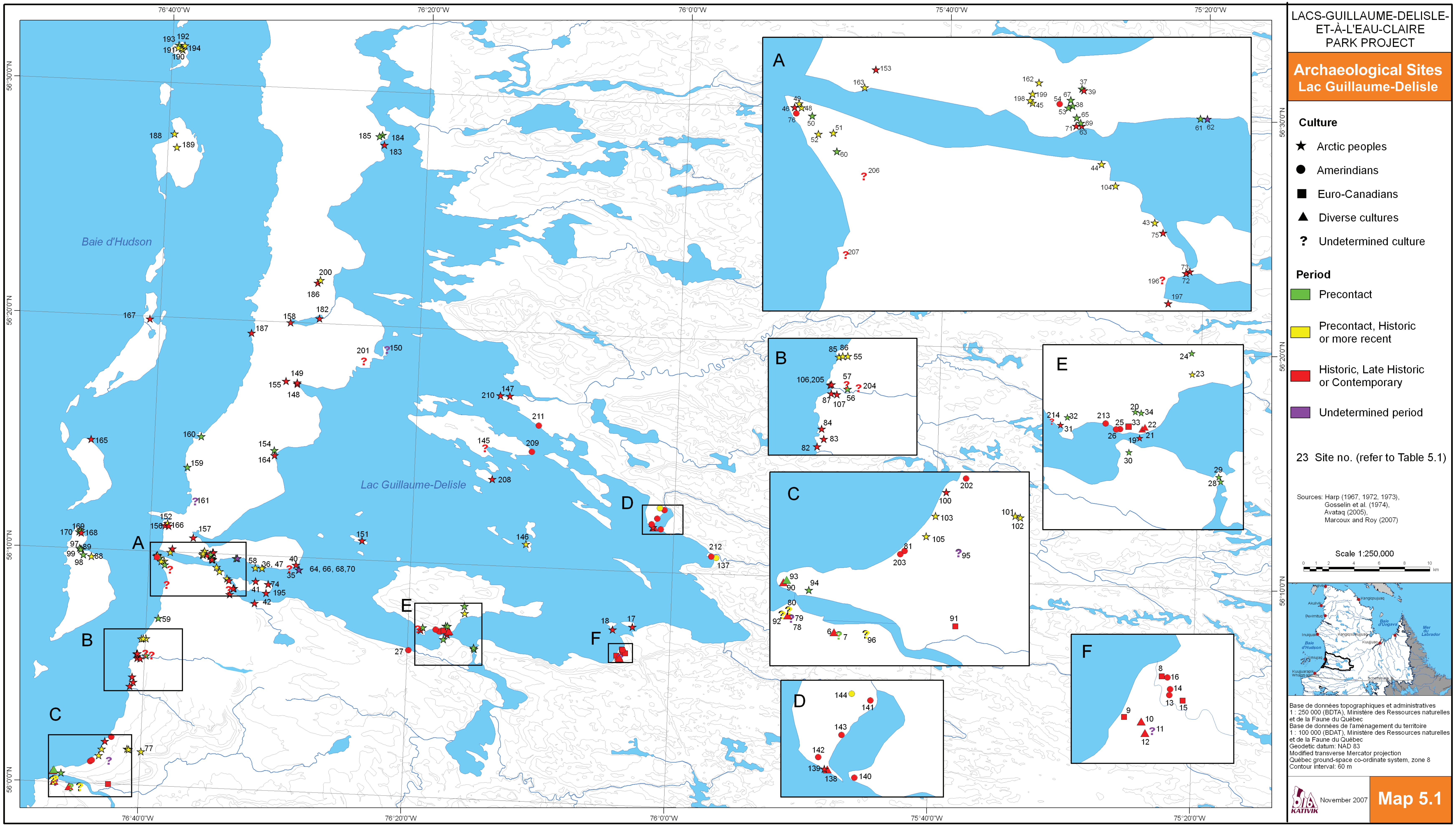
Structure with axial arrangement at the Nauya Palaeo-Eskimo site (HcGc-4, UMI-108), view towards the east.
Credit: P. M. Desrosiers. Courtesy of Avataq Cultural Institute

Nastapoka raw materials site HdGd-13 (UMI-3) for the extraction of chert and the preliminary preparation of tools before transport.
Credit: P. M. Desrosiers. Courtesy of Avataq Cultural Institute

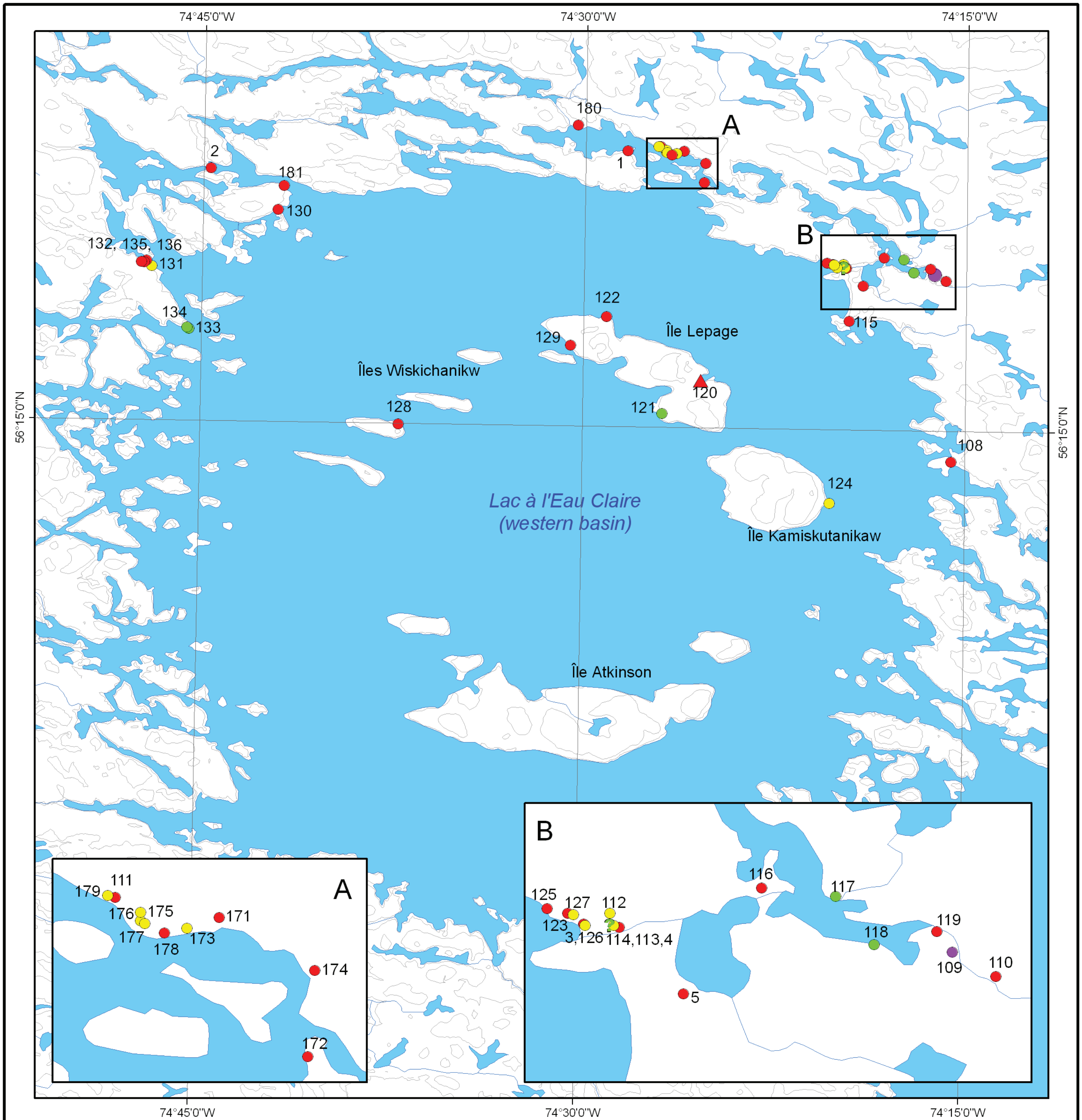
(HaGb-5, UMI125) on the south coast, both belong to the Classic Dorset phase. If this is the case, the majority of the other Palaeo-Eskimo sites in the region can be attributed to the Late Dorset phase. However, the surveys carried out on these other sites did not produce any objects characteristic of any particular period.

In addition to these habitation sites, three chert acquisition sites that were utilized during the Palaeo-Eskimo Period were discovered in 2004, and a fourth was found in 2006. The HdGd-13 site is located on île Curran at an elevation of about 30 metres. This site is reddish coloured due to the presence of iron in the formation of chert outcrops. The Palaeo-Eskimos used this cryptocrystalline rock to make a broad range of tools, including microblades, scrapers, points, etc. During excavations, the presence of knapping scatter (chert chips and debris) was observed on the ground, indicating the first steps in the transformation of the rock.

The second site, the Tookalook site (HbGd-11), is located in a narrow, steep valley on the southwest shore of Lac Guillaume-Delisle. It seems to be one of the only places in the Le Goulet area where it is possible to access chert outcrops, which are located on the cliff at an elevation of 80 metres. On examination, the site revealed, in addition to the chert, the presence of quartz crystals, another material that the Palaeo-Eskimos used, mainly for making microblades and scrapers. In the valley below, piles of stone chips were discovered, which



LACS-GUILLAUME-DELISLE-ET-À-L'EAU-CLAIRE PARK PROJECT
Archaeological Sites
Lac Guillaume-Delisle
Culture
Arctic peoples
Amerindians
Euro-Canadians
Diverse cultures
Undetermined culture
Period
Precontact
Precontact, Historic or more recent
Historic, Late Historic or Contemporary
Undetermined period
23 Site no. (refer to Table 5.1)
Sources: Harp (1967, 1972, 1973), Gosselin et al. (1974), Avataq (2005), Marcoux and Roy (2007)
Scale 1:250,000
0 1 2 4 6 8 10 km
Baie d'Hudson
Lac Guillaume-Delisle
76°40'0"W
76°20'0"W
76°0'0"W
75°40'0"W
75°20'0"W
56°30'0"N
56°20'0"N
56°10'0"N
56°0'0"N
A
B
C
D
E
F
Ivujivik
Kangiqsujuaq
Akulivik
Puvirnituq
Baie d'Ungava
Mer du Labrador
Inukjuak
Kangiqsualujjuaq
Kuujjuaq
Baie d'Hudson
Umiujaq
Kuujjuarapik
Whapmagoostui
Schefferville
Base de données topographiques et administratives 1 : 250 000 (BDTA), Ministère des Ressources naturelles et de la Faune du Québec
Base de données de l'aménagement du territoire 1 : 100 000 (BDAT), Ministère des Ressources naturelles et de la Faune du Québec
Geodetic datum: NAD 83
Modified transverse Mercator projection
Québec ground-space co-ordinate system, zone 8
Contour interval: 60 m
KATIVIK
November 2007
Map 5.1



Culture

- ★ Arctic peoples
- ● Amerindians
- ■ Euro-Canadians
- ▲ Diverse cultures
- ? Undetermined culture

Period

- Precontact
- Precontact, Historic or more recent
- Historic, Late Historic or Contemporary
- Undetermined period

122 Site no.
(refer to Table 5.1)

Sources:
Harp (1967, 1972, 1973),
Gosselin et al. (1974),
Avataq (2005),
Marcoux and Roy (2007)

LACS-GUILLAUME-DELISLE-ET-À-L'EAU-CLAIRE PARK PROJECT

Archaeological Sites
Lac à l'Eau Claire

Base de données topographiques et administratives 1 : 250 000 (BDTA)
Ministère des Ressources naturelles et de la Faune du Québec
Base de données de l'aménagement du territoire 1 : 100 000 (BDAT)
Ministère des Ressources naturelles et de la Faune du Québec
Geodetic datum: NAD 83
Modified transverse Mercator projection
Québec ground-space co-ordinate system, zone 8
Contour interval: 60 m

Scale 1:225,000

0 1 2 4 6 8 10 km

KATIVIK

November 2007

Map 5.2

no doubt were connected to the presence of chert. Erosion in the valley had covered the piles, so that they were almost unnoticeable on the surface.

The third site, HaGe-21, appears to have been a chert acquisition site and a habitation site. It is located at the mouth of the Petite rivêre de la Baleine and the chert used seems to have been from a secondary deposit, an erratic bloc (Marcoux and Roy, 2007: 73-76).

Numerous other sources of chert and crystalline quartz have been found in the region. The extraction of small quartz crystals does not leave much of a mark, and it is possible that some of these sites were used during prehistory but that there is today no visible trace.

Qammaq No 2, Thule site Gulf Hazard-5 (HaGd-8), view towards the northeast.
Credit: P. M. Desrosiers. Courtesy of Avataq Cultural Institute

NEO-ESKIMO OCCUPATION (800-300 BP)

Unlike the number of sites associated with Historic and Palaeo-Eskimo occupation, only seven sites in the region can be attributed to Neo-Eskimos. There are a number of other sites where it cannot be ascertained whether they are Historic or Thule (Table 5.1; Maps 5.1 and 5.2). However, there is good evidence of Neo-Eskimo presence in the valley, on the south shore of Le Goulet, and on Bélanger and Curran islands. A number of archaeological artifacts belonging to the municipality of Umiujaq, as well as the testimony of residents of Umiujaq who are familiar with the island sites, seem to indicate that the Thule, or Neo-Eskimos, mostly occupied the islands in the region. Three of the Thule sites, Gulf Hazard 5 (HaGd-8, Figure 5.2), Innalialuk-4 (HaGe-5) and HaGe-6 are composed of semi-subterranean *qammait* (Gosselin et al., 1974; Harp, 1972).

Qammaq, Thule site Innualialuk-4 (HaGe-5, UMI-163), view towards the east.
Credit: P. M. Desrosiers. Courtesy of Avataq Cultural Institute

Two dates are available for the HaGd-8 site, 470 ± 80 years and 695 ± 90 years BP (Taillon and Barré, 1987); these indicate a relatively early Thule presence in the region. Site HdGd-15 (UMI-5) on Île Curran is of particular interest because of the discovery of a complete bow and arrow as well as several structures and some *inukshuit*. Finally, since Thule material culture consisted mostly of objects made from perishable organic materials, it is difficult to differentiate Historic structures (especially summer ones) from Thule structures. At present, the Thule presence in the region is no doubt underestimated.

Inukshuk, HdGd-15 (UMI-5), Île Curran, view towards the northwest.
Credit: P. M. Desrosiers. Courtesy of Avataq Cultural Institute

INUIT OCCUPATION DURING THE HISTORIC AND CONTEMPORARY PERIODS (FROM 1750 UNTIL TODAY)

The establishment of the first trading post in Nunavik serves as a point of reference for establishing the beginning of the Historic Period and the Inuit occupation of the Nunavik region. During this period, the Inuit became more and more dependent on the trading post. The main turning point was

Inuit site with two heavy tent rings (HaGb-6, UMI-97) on Qikirtaaaluk Island.
Credit: P. M. Desrosiers. Courtesy of Avataq Cultural Institute

Traditional Inuit wooden bowl, site HaGe-12 (UMI-140).
Credit: P. M. Desrosiers. Courtesy of Avataq Cultural Institute

Willie Kumarluk near a grave at site HaGe-16 (UMI-166), view towards the northwest.
Credit: P. M. Desrosiers. Courtesy of Avataq Cultural Institute

Structure of a kayak at Inuit site HaGe-11 (UMI-139).
Credit: P. M. Desrosiers. Courtesy of Avataq Cultural Institute

the sedentarization of the Inuit in the park zone in the late 1950s. Archaeologists use the term 'Late Historic' for the period just before settlement, and 'Contemporary' for the period following the 1950s (see Table 5.1).

In the majority of cases, the subdivisions between Historic, Late Historic and Contemporary are uncertain. According to current knowledge, there are 5 sites that had combined Euro-Canadian and Inuit occupation, 55 Historic sites, 14 Late Historic sites and 19 Contemporary Inuit sites. The Historic and Contemporary sites are characterized by a great diversity of structure types. To date, about 100 food caches, 11 fox traps, 12 hunting blinds, 15 *inukshuit*, 110 tent circles, 6 heavy tent rings (tent rings heavily fortified with earth) and 50 graves (most of them located in boulder fields) have been found in the Lac Guillaume-Delisle area.

Late Historic sites are of particular interest to the residents of the region because they were inhabited by their parents and grandparents or during their own childhoods, and serve as a testament to a hunter-gatherer lifestyle quite different from current-day life. Among these, site HaGe-11 provides a record of the region's final winter encampment, in 1956, when a group of about 45 Inuit wintered there.

American Indian Occupation

The presence of American Indians in the study area is well established. In addition to actual archaeological evidence, further information is supplied by oral tradition, place-names, and studies of Cree utilization of the area. These topics will be explored further in the document.

The degree of Cree occupation during the Historic period[4] – combined with a rich oral tradition – suggest that the American Indian presence in the area is anchored in a rich past, the depth of which will hopefully be shown by further archaeological research.

PREVIOUS ARCHAEOLOGICAL WORK IN THE STUDY AREA

During the 20th century, few American Indian sites were discovered in the study area, because essentially, archaeology in the region was still in its infancy.

Previous research resulted in the discovery of only four Cree sites. Harp made a brief reference in the report of his investigations in the late 1960s. He mentioned the presence of two sites from the Historic Period located at the mouth of Petite rivière de la Baleine (HaGe-1 and HaGe-4) and two sites from the Contemporary Period[5] located at the mouth of the Rivière à l'Eau Claire (Harp, 1967 in Avataq Cultural Institute, 2006).

Between 1970 and 1990, archaeological inventories connected to work at the Great Whale hydroelectric complex led to the discovery of about a hundred sites from the Historic, Modern[6] and Contemporary periods, and also dozens of sites from earlier periods. These sites are located not far from the southern limit of the study area, notably on Lac Bienville, the Grande rivière de la Baleine [Great Whale River], and the Rivière Coats and the Rivière Geoffroy (Archéotec, 1979 and 1993).

In 2004, an inventory by Avataq Cultural Institute produced eight sites from the Historic or Modern[7] period and six Contemporary sites on the east coast of Hudson Bay and Lac Guillaume-Delisle.

Finally, an inventory carried out jointly by the Cree Regional Authority and Avataq Cultural Institute in July 2006 led to the discovery of 57 new sites and expanded our knowledge about two previously inventoried American Indian sites. Thirty-one of these sites contained tools and stone fragments that indicate an American Indian presence at the time of first European contact, as well as earlier (Table 5.1).

CHRONOLOGY OF AMERICAN INDIAN OCCUPATION IN THE BROADER JAMES BAY AND NUNAVIK REGIONS

American Indian occupation of Québec's subarctic is relatively recent compared to areas further south. In addition, such occupation does not square easily with the cultural and chronological sequences apparent in neighbouring regions. For example, the cultural succession of Palaeo-Indian groups – Archaic and Woodland – that is well recognized for more southern regions, is difficult to apply in the study area. Moreover, except for the Late Precontact period, the sites in the study area did not contain many diagnostic artifacts such as certain kinds of projectile points or ceramics.

As a result, despite the archaeological work carried out between the 1970s and 1990s in the regions adjoining Lac Guillaume-Delisle and Lac à l'Eau Claire, there is still very little known about American Indian prehistory in the area. However, it is possible to extrapolate from the information collected in the course of earlier archaeological work.

In general, researchers agree that precontact American Indian occupation can be divided into two main periods: the Early period, from 4000 to 1600 BP, and the Recent period, from about 1600 to 300 BP (Denton, 1988 and 1989; Cérane, 1995; McCaffrey, 2006).

EARLY PRECONTACT PERIOD (4000-1600 YEARS BP)

The Early Precontact period is characterized mainly by the presence of small, single-family dwellings and the utilization of locally available quartz. In the Caniapiscau area, an American Indian presence dating back to 3500 BP suggests that the interior of the peninsula was frequented nearly 4,000 years ago. The presence of Ramah quartzite indicates a link of some kind with the Labrador coast. In addition, a significant site on the Grande rivière de la Baleine has produced tools with affinities to the Maritime Archaic. Other sites, all containing Nastapoka chert, have been dated to 2500 to 3300 BP (McCaffrey, 2006: 173-176).

Some archaeologists have put forth the hypothesis that groups related to the Maritime Archaic were displaced from coastal Labrador towards the interior, arriving eventually at the Grande rivière de la Baleine basin, perhaps after following caribou herds (Denton, 1988, 1989; Archéotec, 1993). An equally plausible hypothesis is that people from the south contributed to populating the Québec-Labrador peninsula. To the south, new data from James Bay, especially Rivière Eastmain, show that the area was occupied as far back as 5000 BP (Izaguirre and coll., 2007).

THE RECENT PRECONTACT PERIOD (1600-300 BP)

The Late Precontact period began 1,600 years ago, when groups who were probably ancestors of today's Cree were living in the James Bay area; they spoke an Algonquian language similar to that spoken by the Cree and their close neighbours, the Innu (Montagnais) and the Naskapi. Some archaeologists believe that these populations arrived from areas farther south (Cérane, 1995). A parallel movement of populations from the same linguistic group moving north also occurred on the Labrador coast about 1400 BP (Fitzhugh, 1972).

In addition to indicating sustained occupation, American Indian occupation in this period shows links with both the east Coast of Hudson Bay and the Labrador coast (Denton, 1988, 1989; Nolin, 1989; Archéotec, 1985; Séguin, 1985; Samson, 1978). While some of the inland sites are characterized by a predominance of quartz, there are others that contain Nastapoka chert. Moreover, the circulation and utilization of Ramah quartzite from northern Labrador suggests that there were close cultural ties across the Québec subarctic and Labrador, and indicates that American Indian populations were well established in the territory and had already developed a trade network to supply their requirements for lithic materials.

After 1500 BP, some ceramics from the Middle and Late Woodland tradition appear at some sites on the Grande rivière de la Baleine and Lac Bienville. These shards do not seem to derive exclusively from trading, because in one case the clay used is local.

It is difficult to date the first occupations on the Hudson Bay coast because there are few radiocarbon dates available, but one in particular indicates that the coast near Whapmagoostui – Kuujjuarapik was occupied some 1040 years BP (Taillon and Barré, 1987: 354-355; Denton, 2001). Another site dating from 1400 BP in the La Grande-1 area contains Nastapoka chert exclusively, which could indicate the existence of a source similar to Nastapoka chert closer to the Grande rivière de la Baleine, or of some kind of link with the southeastern coast of Hudson Bay. Six sites in the area of Laforge to the west of Caniapiscau contain Nastapoka chert and have been dated to between 3400 and 2700 BP. A cache of blades from the Meadowood culture made of Nastapoka chert and dating to 2780 ± 110 years BP was discovered at site GcFb-22 (Cérane inc., 1995: 230-232, 371-378, 398; McCaffrey, 2006: 272). The same phenomenon has been observed at some sites in the region of Grande rivière de la Baleine, all of them containing Nastapoka chert and dating to between 2500 and 3300 BP (McCaffrey, 2006: 173-176). Finally, on Lac Bienville, chips of Nastapoka chert have been found in association with Ramah quartzite and some polished objects.

It is not known where and how Nastapoka chert was acquired. However, there are potential sources of Nastapoka chert on the entire coast at least as far as the Kuujjuarapik area and perhaps further south (Pierre Desrosiers, Avataq Cultural Institute, personal communication, May 2007). According to current knowledge about the distribution of sources of Nastapoka chert, a supply network could have reached the entire Hudson Bay Coast. The association of Nastapoka chert with the dates mentioned above raises the questions of how long American Indians had occupied the coast in general, and the possibility of trade with Palaeo-Eskimo groups.

Archaeological findings and oral tradition also suggest that utilization of the coastal zone near the outlets of certain rivers is one of the main characteristics of American Indian occupation in the Historic period and perhaps earlier. In a document dating from the mid 18th century, reference is made to the presence of 157 American Indians in three tents installed at the mouth of the Grande rivière de la Baleine to hunt beluga (Francis and Morantz, 1983: 66).

From the Recent Precontact period until the Historic or Modern, there are clear similarities in settlement patterns throughout the vast James Bay region and part of northern Québec (Denton, 1989). The types of habitations and the form of hearths are similar, especially with respect to the two main dwelling types used by the Cree, which are also found in the study area.

Primarily, *miichiwaahps* were built by levelling the interior of the dwelling in such a way as to create an earthen ridge around the periphery; a stone hearth was built in the centre of the structure.

The other style of habitation, the *shaapuhtwaan,* is a long dwelling of variable dimensions and that can sometimes include several hearths, each about two metres long and one metre wide.

NEW DATA CONCERNING AMERICAN INDIAN OCCUPATION IN THE STUDY AREA

A joint inventory in July-August 2006 by the Cree Regional Authority and Avataq Cultural Institute covered three sectors: 1) the mouth of Petite rivère de la Baleine, 2) Île Cairn [Cairn Island] and the south and east shores of Lac Guillaume-Delisle and 3) the northern half of the west basin of Lac à l'Eau Claire.

Miichiwaahp, Whapmagoostui, circa 1900.
Credit: A. A. Chesterfield. *Cree Indians repairing a canoe, circa 1900.* McCord Museum (MP-0000.1750.24.3)

Shaapuhtwaan, Waskaganish 2007.
Credit: Francis Marcoux. Courtesy of Cree Regional Authority

Location of an old *miichiwaahp*, Lac à l'Eau Claire.
Credit: Francis Marcoux. Courtesy of Avataq Cultural Institute and the Cree Regional Authority

Traditional Cree round heart characterizing the Late Historic or Modern period.
Credit: Francis Marcoux. Courtesy of Avataq Cultural Institute and the Cree Regional Authority

Petite rivère de la Baleine

Eight sites at the mouth of the Petite rivère de la Baleine were explored during the archaeological survey in 2006. Five of these were on the south shore of the river, and another three on the north shore, near the river's mouth (Map 5.1).

As shown on Table 5.1, three sites (HaGe-1, HaGe-19 and GlGe-8 station 1) belong to the Historic period and include Euro-Canadian, Historic Cree and Historic Inuit structures. Finally, three sites (HaGe-1 station 2, HaGe-1 station 3 and GlGe-8 station 2) contain lithic chips, mostly Nastapoka chert, of undetermined cultural origin.

The majority of Cree structures identified were tent rings. Artifacts discovered in these locations included bone, grinders and anvils (or grinding slabs) as well as some gun flints. Note that 106 structures from the Cree Historic period were discovered at the Petite rivère de la Baleine sites.

The Euro-Canadian artifacts found at the Historic sites on Petite rivère de la Baleine were all discovered in association with Cree structures, usually near the hearth. These could be related to Historic occupations in the second half of the 19th century (Christian Roy, personal communication, 2006). These Historic artifacts included forged and cut nails, gun flints, lead shot and shards of European pottery.

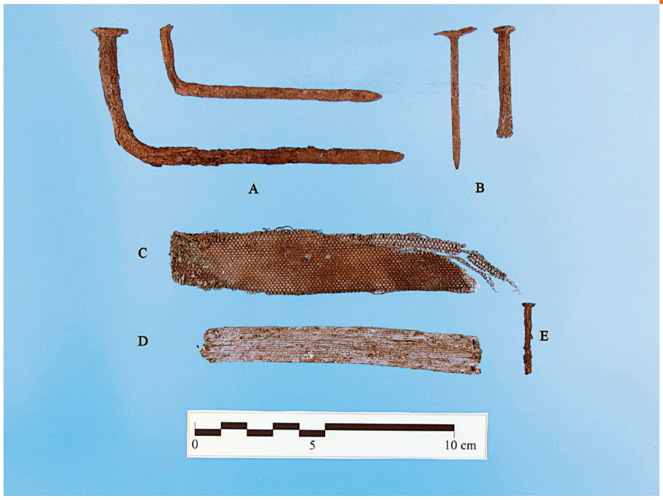
Certain stone tools were also discovered in these structures, including grinders, pestles, mortars, flints and quartz scrapers, as well as some chert chips. From this we can conclude that some lithic tools were still used occasionally during the Historic period.

Lac Guillaume-Delisle

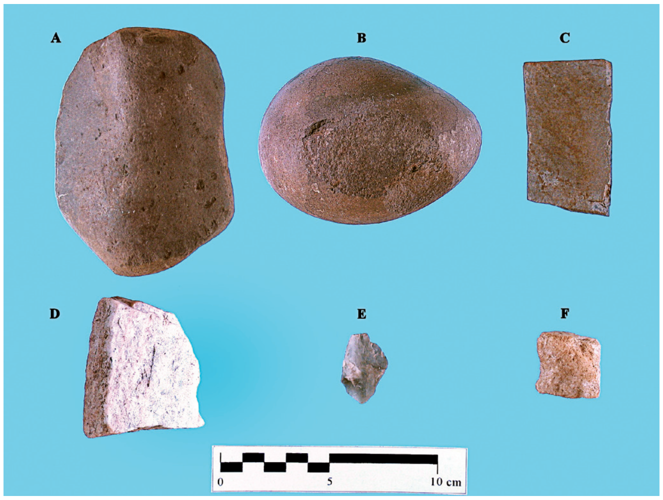
Eight sites in the Lac Guillaume-Delisle sector were explored: two are on the south shore of Île Cairn (HaGb-11, HaGb-14), three on the north shore at the mouth of the Rivière à l'Eau Claire (HbGa-1,4,5,6), one at the mouth of the Rivière De Troyes (HbFx-1), and the last one at the southeast of Lac Guillaume-Delisle (HaGa-3), south of the stream that separates the HBC trading post from the independent Papp post. In 2004, Avataq discovered four other sites (HaGa-4-5-6-7) near Papp's trading post (Map 5.1).

The materials found on the Lac Guillaume-Delisle sites illustrate two categories of occupation. The first, located on high terraces, includes two possibly Precontact occupations characterized by the presence of chert and quartz chips distributed around the hearths. The second is related to Historic or Modern occupation, characterized by the presence of some Euro-Canadian objects and dwelling structures with circular hearths (*pihkuteu*). Also found were some tools associated with traditional Cree activities such as the pounding of bone to extract marrow and grease. At Lac Guillaume-Delisle, 49 structures from this period were discovered.

Euro-Canadian artifacts, Historic sites on Petite rivère de la Baleine.
Credit: Francis Marcoux. Courtesy of Avataq Cultural Institute and Cree Regional Authority



Vestiges of a 20th century occupation associated with a canoe-building site, Île Cairn.
Credit: Francis Marcoux. Courtesy of Avataq Cultural Institute and the Cree Regional Authority



Euro-Canadian tools from the Historic sites at Petite rivère de la Baleine.
Credit: Francis Marcoux. Courtesy of Avataq Cultural Institute and the Cree Regional Authority

Pounders and pestles, site HbFx-1.
Credit: Francis Marcoux. Courtesy of Avataq Cultural Institute and the Cree Regional Authority

On Île Cairn, Euro-Canadian objects were found in the hearths of American Indian dwellings. These findings included glass beads, some forged nails and some kaolin pipe fragments, most of them dating from the 1750 occupation. Also found were traces of 20th century occupation, including some associated with canoe building.

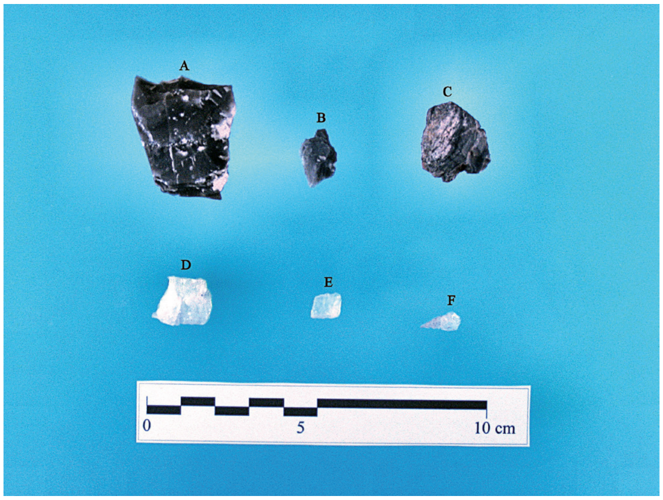
The HbGa-6 and HbFx-1 sites date possibly from the Precontact period. Lithic debitage was discovered. At site HbGa-6, situated on a high terrace, some stone chips were discovered near a hearth in a *shaapuhtwaan* built in a wind erosion zone. The type of chert found here resembles the type from a source near Petite rivère de la Baleine. Some chert flakes were also discovered at the HbFx-1 site, associated with numerous pounders and pestles in a structure where no Historic objects were found.

Lac à l'Eau Claire

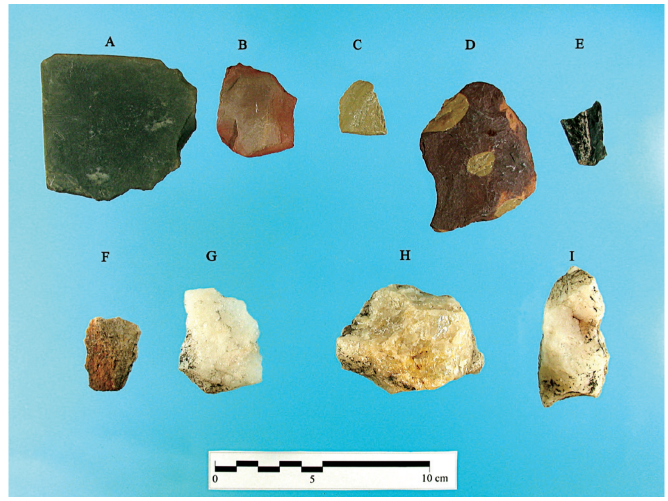
In July 2006, 45 sites were discovered in the northern portion of the west basin of Lac à l'Eau Claire. Ten of these are located on the northwest shore of the lake, while 18 are on the north-east shore. Another 11 sites are in the north-centre of the basin, while 6 sites were discovered on islands (Map 5.2).

As shown in Table 5.1, 39 structures were found on the 10 sites belonging to the Contemporary period; 84 structures were inventoried in 25 sites belonging to the Historic or Modern periods. Finally, 21 sites contained only lithic objects and likely belong to the Precontact period.

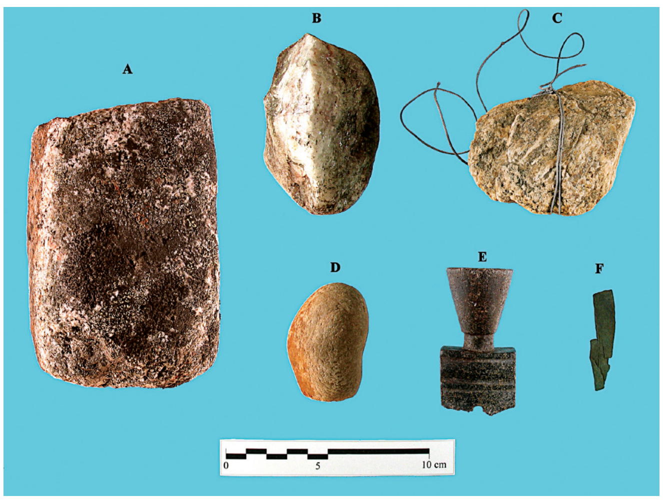
Very few Historic artifacts related to American Indians were found at Lac à l'Eau Claire. Only a soapstone pipe with a detachable stem[8] and a copper alloy strip are directly associated with



Chert and quartz chips found near a hearth in a *shaapuhtwaan*, site HbGa-6.
Credit: Francis Marcoux. Courtesy of Avataq Cultural Institute and the Cree Regional Authority



Various raw materials, Lac à l'Eau Claire.
Credit: Francis Marcoux. Courtesy of Avataq Cultural Institute and the Cree Regional Authority



Historic artifacts, Lac à l'Eau Claire.
Credit: Francis Marcoux. Courtesy of Avataq Cultural Institute and the Cree Regional Authority

Various artifacts, some related to hunting, site HbFn-2.
Credit: Francis Marcoux. Courtesy of Avataq Cultural Institute and the Cree Regional Authority

this period. However, it is possible that some quartz strike-a-lite stones, hammerstones, pestles and grinding slabs, as well as some net weights, also belong to this period.

The majority of artifacts found at Lac à l'Eau Claire are clearly associated with the Precontact period. Four raw materials were exploited at Lac à l'Eau Claire, including quartz, red brick impactite, different varieties of chert, and schist. Quartz was present at the majority of sites. There was also a degree of association between impactite and quartz. Tools fabricated from impactite and quartz were rough, but functional.

The HbFn-2 site in particular seems to have been connected with caribou hunting. Numerous projectile tips, knives and fragments give the impression that this was a good location for intercepting and ambushing caribou. The chert found at this site is associated with the east coast of Hudson Bay.

A HISTORY TO DISCOVER

This overview makes it clear that archaeological research regarding the history of American Indian occupation of the park territory is still very preliminary.

Although historical reports and oral tradition both document the presence of the ancestors of today's Cree in the area of Lac Guillaume-Delisle and Petite rivère de la Baleine as far back as the mid 18th century, there is not enough archaeological data to establish the depth of occupation. The numerous tent circles found in the study area seem to have been occupied from the 18th to the 20th century. However, the presence of Precontact occupations further south on the coast of Hudson Bay raise the possibility that these occupations may have extended to the park territory, or at least the mouths of certain rivers.

The 2006 intervention at Lac à l'Eau Claire, conducted jointly by the Cree Regional Authority and Avataq Cultural Institute, was the first inventory undertaken in this vast territory. Even though no excavations were carried out, and very few diagnostic artifacts were discovered, the number of sites that produced lithic objects exclusively suggests that American Indian occupation in this zone goes back quite far. Considering the significant number of American Indian sites that have been inventoried inland further south, not far from the park, some of them close to 4,000 years old, it would be extremely surprising if American Indians did not visit the study area at various times in the more distant past. The fact that American Indians used Nastapoka chert – and the connection with the Hudson Bay Coast – raises some fascinating questions. Did the American Indians know about sources of this material further south? Did they make special supply trips to the coast? Or was there a trade network between American Indians and Palaeo-Eskimos?

It is likely that the history of early occupation was much more complex than this brief outline, which is based on limited current information, portrays. Everything suggests that the study area underwent a long series of occupations by Inuit, Palaeo-Eskimo and American Indian cultures. In future research, it will be important to explore different ecological niches – on the coast and inland – which may have been exploited by these cultures at different times depending on various factors (climatic or other), as well as possible interactions between these groups over the years.

Euro-Canadian Occupations in the Petite Rivière de la Baleine and Lac Guillaume-Delisle area

The following pages present an historical and archaeological overview of Euro-Canadian occupations in the Petite rivière de la Baleine and Lac Guillaume-Delisle area from the 1740s, when the Hudson's Bay Company (HBC) began the exploration of the region to the north of Cape Jones [renamed as Pointe Louis-XIV in 1961], through the mid-20th century.

According to the historical records available, the earliest trading post erected by the HBC north of the Rivière Eastmain was built in 1750 on a large island off the south shore of Lac Guillaume-Delisle. This establishment, soon to be known as Richmond Fort, first appears on a map drawn in 1749 by William Coats, a senior HBC captain, and shows the settlement situated along the south shore of Cairn Island, directly to the east of the narrows (Figure 5.4).

If the location of Richmond Fort seems quite clear according to Coats' map, one has to turn to other archival documents to better understand the establishment's importance for

Figure 5.4 Enlargement of William Coats' Map of 1749 Showing Île Cairn and the Location of Richmond Fort to the East of the Narrows (HBCA: G.1/18)
Credit: Hudson's Bay Company Archives

the British company, its physical aspect and the history of construction at the fort. In this regard, the HBC Archives hold an interesting architectural drawing of Richmond Fort (Figure 5.5), which offers valuable information on the earliest trading post built on Île Cairn. Also drawn by William Coats in 1751, this sketch portrays a star-shaped fort surrounded by a tall palisade, enclosing a house with four bastions, with various buildings, such as a smith shop, a carpenter's room, cook rooms and storage facilities located in the northwest corner of the enclosure. According to the post journals, there is no doubt that Richmond Fort was intended not only as a well-fortified establishment, but also as a large and well equipped settlement with habitations areas, workshops, stores, a stable, and manned by a good number of craftsmen and laborers. Aside from those directly concerned with the construction of the post, like carpenters, sawyers and bricklayers, the journals also refer to the presence of an armourer, a smith, a cooper and a tailor (HBCA: B.182/a/1-11).

The location of the earliest HBC trading post at Lac Guillaume-Delisle was identified in 2006 directly to the east of the narrows on a gently rising terrace, known as HaGb-11 (Marcoux and Roy, 2007). Though this site was reoccupied during the first half of the 20th century, the archaeological evaluation undertaken here confirmed the presence of a mid-18th century occupation, producing time-sensitive artifacts that leave no doubt as to when this site was first inhabited. Furthermore, the excavation conducted at HaGb-11 revealed

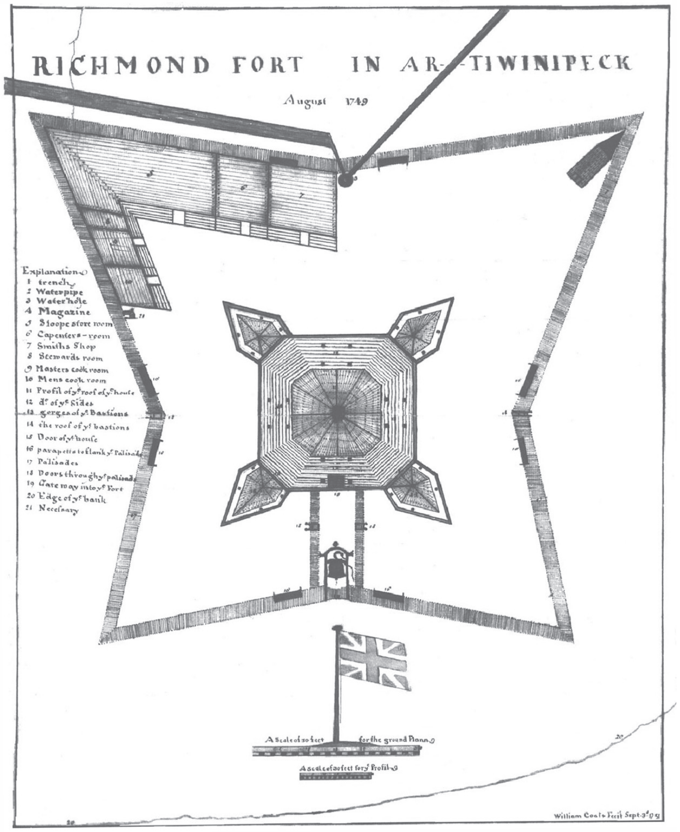


Figure 5.5 Architectural Drawing of Richmond Fort in Artiwinipeck, by William Coats, 1751. (HBCA : G.1/104)
Credit: Hudson's Bay Company Archives

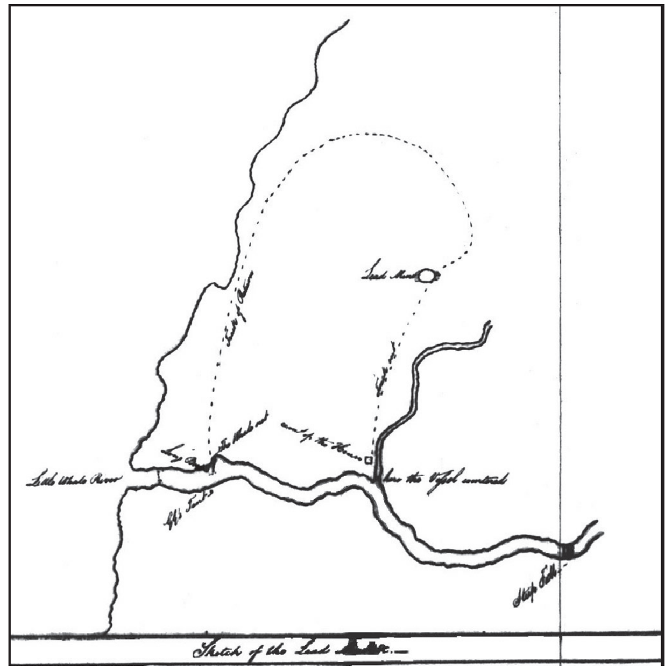


Figure 5.6 Sketch of the lead mine at Petite Rivière de la Baleine Drawn by George Gladman in 1818. (HBCA: B.77/e/2b)
Note the presence of a house on the way to the lead mine.
Credit: Hudson's Bay Company Archives

the general location of the fort's smith shop, where important concentrations of slag, mineral coal and brick fragments were unearthed in association with some tools, blanks and other iron debris. The position of this workshop should now help in locating the establishment's other structures by comparing with Coats' 1751 architectural drawing.

Meanwhile, the Euro-Canadian occupation at Petite rivière de la Baleine was also getting underway, where, as early as 1750, the HBC was involved in mining and summer whaling operations. After the abandonment of the lead mine in 1751, due to the poor quality of the ore, we read that the small house built to put up the miners was kept for the whaling season (Rich, 1954: 263n). But how big was this house and where was it located? In this regard, the written documents are a little confusing. First, the number of miners reported varies from three to eight. Then, it is mentioned that in 1752 the only building at Petite rivière de la Baleine was a log tent (HBCA: B.182/a/3, fo. 61). The following year a small storehouse was built with the foundation of a dwelling house, to be named Whale River House (HBCA: B.182/a/4, fo. 51). Was this outpost located on the same site as the log tent or the small house? Moreover, in 1756, the HBC chose to move Richmond Fort to Petite rivière de la Baleine in the hope of increasing the fur returns. Although the new establishment was not fully operational before 1758, some of the bastions erected on Île Cairn were taken apart and rebuilt further south. In any case, a year later, the HBC decided to close its establishments north of Cape Jones, having failed to procure enough furs to sustain the high cost of this venture.

Considering the historical data available, it is quite clear that all of these buildings were erected on the north shore of Petite rivière de la Baleine (Francis and Morantz, 1989: 73). This makes sense since the lead mine, which had first attracted the HBC to this river, was located along a small stream flowing from the north (Figure 5.6). In the light of such information, and notwithstanding the present lack of archaeological data for this area, the earliest Euro-Canadian occupations at Petite rivière de la Baleine could have taken place on as many as four different sites: that is, the log tent or small house used by the miners, the outpost built in 1753 for whaling operations, the factory moved from Lac Guillaume-Delisle between 1756 and 1758 and, finally, the building depicted on a sketch drawn in 1759 near the river's mouth. Though there are reasons to believe that some of these buildings were constructed on the same site, it is quite probable that the HBC occupied more than one spot on the north shore of Petite rivière de la Baleine during the early years. Only a thorough archaeological investigation could now permit the location and documentation of these occupations.

The presence of the HBC during the mid-18th century on the north shore of Petite rivière de la Baleine is also confirmed by an ill-fated party sent to the area in 1793. Arriving at the mouth of the river in late September, it is reported that the crew went upstream a few miles before finding the remains of a building on the north shore which looked to have been previously occupied by Europeans (Davies, 1963: 280). According to a letter sent to Eastmain Factory a few days later, the crew intended to build its "stockaded" house on the ruins of this earlier establishment.

After the second attempt at operating a trading post to the north of Cape Jones had failed, it was the mid-19th century before the HBC decided to reestablish itself in the area, once the Inuit trade had been secured. Thus, in 1851, a small establishment manned by three employees was erected at the mouth of Petite rivière de la Baleine. As usual, the written sources are not very loquacious about the position of this new post and only the cartographic records shed some light on its location and organization. A quick look at one of these plans shows that the trading post was standing on the south shore of the river and that it included more than 12 buildings by the end of the 1850s (Figure 5.7). According to the post journals and district reports, when Governor Simpson undertook his extensive whaling operation, quite a few buildings, including another dwelling house, an oil house with six furnaces and a cooperage, were added to the existing structures to support this new venture (Francis and Morantz, 1989: 144). Some of the late 19th century photographs available confirm that Little Whale River Post was constructed on the south shore of the river and that it was a fairly large establishment. This trading post was closed in 1891.

Then, in 1921, the HBC chose to reopen an establishment at Lac Guillaume-Delisle, picking a spot said to be in front of the stone foundations of the old post (HBCA: B.182/a/12). In view of this statement, it is clear that the second post was built on the site of the earliest settlement. This assertion is further supported by a plan of buildings and lands at Lac Guillaume-Delisle dating to 1932-1933, which depicts not only the Company's four buildings, but also the three structures of Revillon Frères and the ruins of an old HBC post.

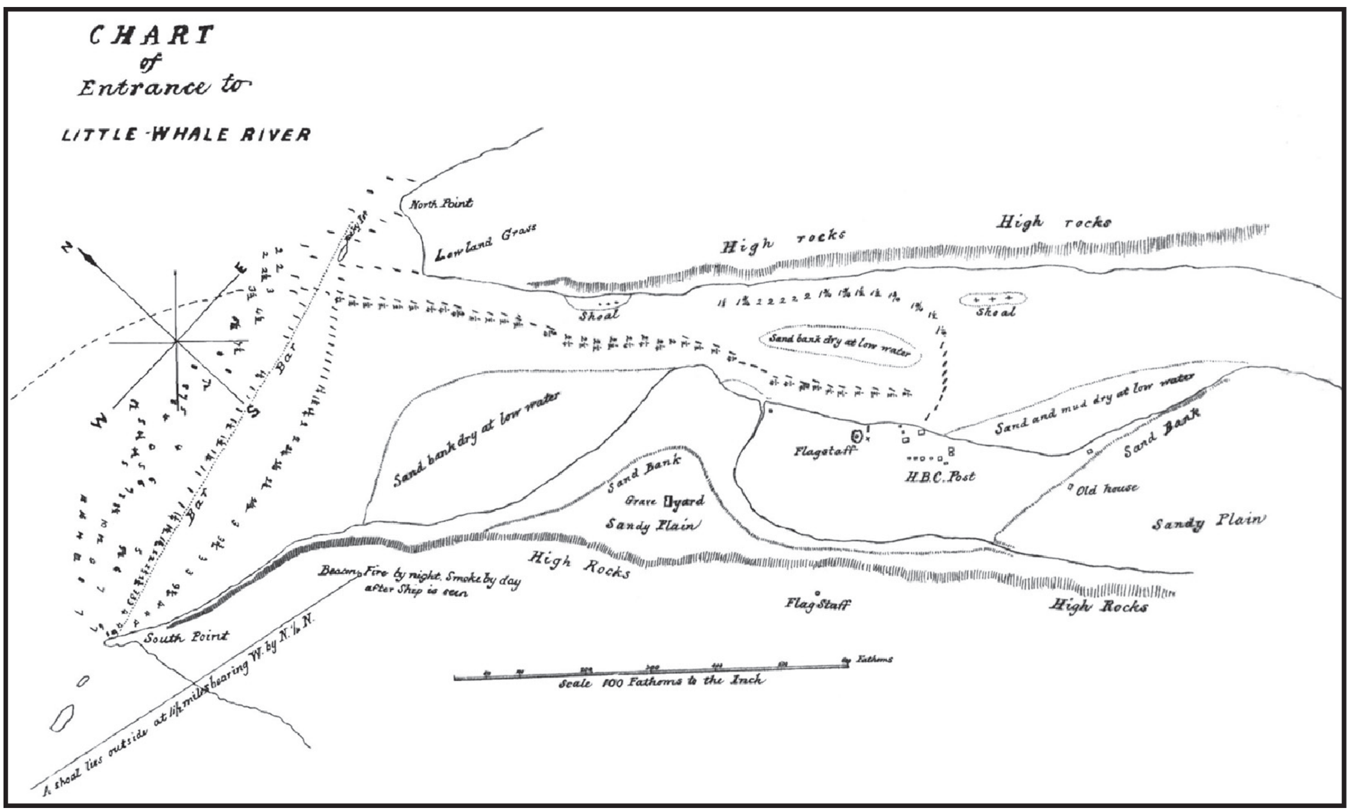


Figure 5.7 Chart of Entrance to Petite rivière de la Baleine, Drawn by Alexander McDonald around 1858 and Showing the Location of Little Whale River House on the South Shore (HBCA: G.1/284).
Credit: Hudson's Bay Company Archives

Moreover, this drawing confirms that the two modern posts were still in operation in 1935 when this plan was revised. In fact, the Summary of Lands and Buildings on Île Cairn dating to June 1940 reveals that the HBC post was still located at the narrows and that the Company had by then taken charge of Revillon's buildings (HBCA: RG7/7a/381). The visual inspection conducted by Avataq in 2004 and the archaeological evaluation undertaken by the CRA and Avataq in 2006 at HaGb-11 demonstrated the presence of at least 12 different structures, most of them clearly visible and belonging to the 20th century occupations.

Finally, as for the third and most recent HBC trading post at Lac Guillaume-Delisle and the establishment built by George Papp sometime during the 1930s, there is little information in the written records. Note that 1927 marks the last year for which HBC post journals are available for this area. The only map found portrays the two establishments side by side at the bottom of a small bay along the south shore of Lac Guillaume-Delisle. Located through oral tradition, these two sites were occupied until 1954 (HBC/HaGa-2) and 1956 (Papp and HBC after 1954/HaGa-1). Ruins of the various buildings can still be seen today.

To conclude with the Euro-Canadian occupations at Petite rivière de la Baleine and Lac Guillaume-Delisle, it should be noted that according to the historical and archaeological data presently available, no less than ten establishments belonging to three different concerns (HBC, Revillon Frères and Papp) were erected in this area. These settlements could have occupied six or seven different locations: that is, HaGb-11 on Île Cairn for the earliest and second HBC post, as well as Revillon Frères; HaGa-1 and HaGa-2 for Papp's establishment and the most recent HBC post at Lac Guillaume-Delisle; the north shore of Petite rivière de la Baleine for the mid and late-18th century HBC occupations and, finally, the south shore where Little Whale River Post was in operation between 1851 and 1891. It now goes without saying that Île Cairn and the Petite rivière de la Baleine area, especially its north shore, offer the greatest potential for understanding the region's recent history. Further archaeological investigations should definitely be conducted in these two areas in order to better document the earliest HBC trading post at Lac Guillaume-Delisle, most certainly one of the last fortified establishments built by the British company before the conquest of Canada, and to locate the other settlements erected along the Petite rivière de la Baleine.

During the summer of 2007, a four-week project was undertaken by the Cree Regional Authority and Avataq Cultural Institute to collect additional archaeological information concerning historic fur trading posts in the future park area. This work resulted in the identification of two HBC trading posts – one dating to the late 18th century, the other to the last half of the 19th century – near the mouth of the Petite rivière de la Baleine. It also led to the identification of architectural features at the mid-18th century post on Île Cairn, in Lac Guillaume-Delisle. A full report on this work is in preparation.

Historical Overview of the Life of Inuit and Cree in Southeastern Hudson Bay, 1600-1970

This region, the Umiujaq-Kuujjuaraapik[7] area, represents a considerable territory encompassing a number of biomes: boreal forest and tundra, coastal and inland, waterways and land, and, as well, two ancient populations, each of which devised different ingenious ways to inhabit the diverse ecosystems. This report presents the history of this region, looking at the peoples, the Inuit and Crees, and their subsistence strategies. It recounts the events they engineered and others that engulfed them. It is a history of separate existence, then conflict, followed by cooperation and tolerance. It is, regrettably, also a history seen through the lens of outsiders. Where oral tradition addresses the issues discussed it is drawn upon, but overwhelmingly the historical records are those of outsiders: fur traders, missionaries, geologists, prospectors, adventurers, government officials, anthropologists, all of whom were neither Inuit nor Cree.

Table 5.3 lists the historic English place names with their corresponding Inuit, Cree and Québec names. Table 5.4 summarizes the main events in the history of southeastern Hudson Bay from 1610 to 1986.

THE HUDSON'S BAY COMPANY INTRUDES IN JAMES AND HUDSON BAYS

Although the Richmond Gulf region, incorporating the Whale rivers, became a major focus of the Hudson's Bay Company (HBC) in the mid-1800s, the company did not begin its operations there. In the late 1600s, they were in search of beaver pelts because the beaver's undercoat of soft velvety fur, mixed with wool, was required to produce felt; felt hats, principally for men, were a long-enduring fashion in Europe where the beaver population was in decline. Henry Hudson had first discovered Hudson and James bays in 1610 and so the demand in Europe for the thicker coats of the beaver in the northern climes of James Bay prompted the HBC, based in England, to establish its first post, Charles Fort,[8] on the Rupert River in 1670 where they met and began a trade in beaver with the Crees. Due to financial difficulties and armed conflict with France, the post was closed in 1693 and only a sporadic trade occurred until 1723-24 and the establishment of Eastmain House (Davies 1963:xviii) on the lower

Table 5.3 Historical, Modern and Official Place Names[1]

HISTORICAL NAME (English)	MODERN NAME (Inuit, Cree or Québec)	OFFICIAL NAME[2]
Fort Richmond Richmond Gulf Post	Mitisinikuch aa upaashich waaskahiikan Maashimaakush pichistawhaakan (Cree names of the HBC, Revillon Frères and George Papp trading posts)	Umiujaq (Northern Village of)
Richmond Gulf Hazard Gulf Gulf of Hazard Artiwinipeck	Tasiujaq (Inuit) Iyaatiwiinipaakw (Cree)	Lac Guillaume-Delisle
Great Whale River Post	Kuujjuaraapik (Inuit) Waapmakustuuich waaskaahiikin (Cree) Poste-de-la-Baleine (Québec)	Kuujjuarapik (Northern Village of) Whapmagoostui (Cree Village of)
Great Whale River	Kuujjuaraapiup Kuunga (Inuit) Waapmakustuui (Cree)	Grande rivière de la Baleine
Little Whale River Post	Qilalugarsiuvik (Inuit) Waapmakustuusich waaskaahiikin (Cree)	
Little Whale River	Qilalugarsiuviup Kuunga (Inuit) Waapmakustuush (Cree)	Petite rivière de la Baleine
Clearwater Lake	Allait Qasigialingat (Inuit) Wiyaasaakimii (Cree)	Lac à l'Eau Claire
Lower Seal Lake	Muushiwaau aahchikunipii (Cree)	Petit lac des Loups Marins
Fort George		Chisasibi (Cree Village of)
Fort George River Big River Great River	Mailasikkut Kuunga (Inuit) Chisaasiipii (Cree)	La Grande Rivière
Fort George Post Big River Post	Mailasikkut (Inuit) Chisaasiipii waaskaahiikin (Cree)	
Cape Digges [Nunavut]	Qikirtasiup Anaulirvinga (Inuit)	Cape Digges
Hudson Strait		Détroit d'Hudson
Cape Jones	Qikirtakallak (Inuit) Aamichishtaawaayaach (Cree)	Pointe Louis-XIV
Cape Smith [Nunavut]	Qikirtajuap Nuvua (Inuit)	Cape Smith
Lake Minto	Qasigilialik (Inuit) Nipiischii (Cree)	Lac Minto
Nastapoka [Nunavut]	Patirtuuq (Inuit) Naastapukuu (Cree)	Nastapoka Islands
Clarke Island [Nunavut]	Taalutalik (Inuit)	Clarke Island
Belcher Islands [Nunavut]	Sanikiluaq (Inuit) Iischiimaau ministikwh (Cree)	Belcher Islands

Table 5.3 (continued) Historical, Modern and Official Place Names

HISTORICAL NAME (English)	MODERN NAME (Inuit, Cree or Québec)	OFFICIAL NAME[2]
South River	Kuujjuaq (Inuit)	Rivière Koksoak
Stillwater Branch of Koksoak		Rivière du Gué
Fort Chimo	Kuujjuaq (Inuit) Iischiimaau waaskaahiikin (Cree)	Kuujjuaq (Northern Village of)
George River	Kangiqsualujjuaq (Inuit) Muushiwaau shiipii (Cree) Port-Nouveau-Québec (Québec)	Kangiqsualujjuaq (Northern Village of)
Horse Island	Walrus Point	Pointe du Morse
Loon Islands [Nunavut]	Loon Islands	Loon Islands
Wastican Point	Waashtihkaan (Cree) Wastikun (Québec)	
Portland Promontory	Tikiraaluup Kangillinga (Inuit) Mintuunikw (Cree)	Promontoire Portland
Port Harrison	Inukjuak (Inuit) Itimaapisim ishchiimaau waaskaahiikin (Cree)	Inukjuak
Charles Fort Rupert House	Waskaganish (Cree) Fort Rupert (Québec)	Waskaganish
Rupert River	Waskaganish-sippi (Cree)	Rivière Rupert
Paint Hills	Wemindji (Cree) Nouveau Comptoir (Québec)	Wemindji (Cree Village of)

[1] Place names are listed in the order they appear in the text

[2] Commission de toponymie du Québec or Geographical Names Board of Canada (for place names in Nunavut)

James Bay coast. The more northern Hudson Bay coast was not unknown to them, as Company ships from England would have made periodic stops for provisions of fresh water and meat, as well as shelter from the storms, but these sojourns on the coast remained unrecorded. The Company had already had encounters with the “esquimeaux” by 1719 on the west coast of Hudson Bay, at Fort Churchill (Glover 1958:lxi) and evidently the Englishmen along the east coast had met Inuit over this period for they had no trouble identifying them in 1739 when their attention turned northwards along the Hudson Bay coast. Then, the postmaster at Eastmain was passing on information he had learned from some northern Crees, of “a large Lake near ye Latitude of 60 deg. N, about 100 Leagues in Compass which communicates with 2 other Lakes of a vast Circumference so that the greatest part of the Labradore is occupied by these 3 Lakes” (HBCA A.11/2:97d-98, quoted in Francis and Morantz 1983:65). While the measurements might not be accurate, it does seem as though the postmaster, Joseph Isbister, was writing to London in 1739 of Richmond Gulf,[9] Clearwater Lake,[10] and Lower Seal Lake.[11] He went on to inform them that the “Usquimows” lived on the northern shores of the lakes, whilst to the south lived groups of Indians who traded at Eastmain. These two peoples, he said, were believed to be enemies but should the company expand its trade in that region it might be beneficial to the company and to mediating peace between them (ibid). In his study, K.G. Davies (1963:xix, f.n.1) suggested that these three bodies of water formed the traditional boundary between Crees and Inuit, located as they are close to the northern limits of the tree line.[12] A few years passed before the HBC directors in London decided to explore this part of the coast, spurred on, in part, by competition from the French fur trading activities to the south. In July of 1744, Thomas Mitchell left Eastmain House, in his sloop, with Mustapacoss, head of the homeguard Crees, as his guide. The party headed northwards, entering La Grande River where Mitchell was

Table 5.4 Main Events in the History of Southeastern Hudson Bay from 1610 to 1986

YEAR(S)	EVENTS
1610-1611	Henry Hudson in James Bay at the mouth of the Rupert River
1668	London-based merchants send ship to Rupert River to trade with the Crees
1670	The Hudson's Bay Company (HBC) is established in London, England, and first post is built, Charles Fort, on the Rupert River. Closed in 1693
1723	Eastmain Post established on Eastmain River
1744	HBC explores Richmond Gulf
1750	Richmond Fort Post opened by HBC
1754	Little Whale River outpost opened
1759	Richmond Fort and Little Whale River Posts closed
1793	Little Whale River Post reopened
1803-1813	Big River Post, years open
1816-1859	Fort George Post, years open (former Big River Post)
1830-1843	Fort Chimo Post, years open
1840	30 Inuit families arrive at Fort George to trade
Mid 1840s	Syllabic script developed in N. Manitoba and spreads throughout north
1851	Little Whale River Post reopened
1856	Great Whale River Post opened – start of commercial whale fishery
1867	Confederation of Canada; Fort Chimo Post reopened
1870	Great Whale River Post closed; Fort George Post reopened; commercial whale fishery at GWR & LWR closed
1878	Rev. E. J. Peck establishes his Anglican mission work at Little Whale River
1880	Great Whale River Post reopened
1890	Little Whale River Post closed
1903	Revillon Frères Post at Fort George established
1909	Revillon Frères Post at Port Harrison established
1912	Quebec Boundaries Extension Act – Province of Quebec extended north to Ungava
1920	Revillon Frères Post at Great Whale River established
1921	Richmond Gulf Post reopened by HBC to 1927 and Post at Port Harrison opened
1922	Revillon Frères Post opened at Richmond Gulf; Eastern Arctic Patrol established by federal government (annual medical & relief services)
1924	Inuit placed under jurisdiction of Indian Affairs Branch
1930	Inuit administration transferred to Northwest Territories Branch
1933	Belcher Islands outpost of HBC established
1936	Closing of all Revillon Frères posts in Canada
1939	Supreme Court decision: "Eskimos are Indians"
1942	ID tags or discs issued to Inuit
1942-1949	U.S. Air Force Base established at Fort Chimo
1956-1968	Mid Canada Line defense base at Great Whale River
1958	Great Whale River – opening of federal day school

Table 5.4 Main Events in the History of Southeastern Hudson Bay from 1610 to 1986
(continued)

YEAR(S)	EVENTS
1961	Northern Health Service established
1963	Direction Générale du Nouveau Québec [DGNQ] administration established
1971	James Bay and Northern Quebec Hydroelectric Project launched
1971	Northern Quebec Inuit Association [NQIA] formed
1974	Grand Council of the Crees Association [GCCA] formed
1975	Signing of the James Bay and Northern Québec Agreement
1986	Umiujaq settlement founded

Compilation by Toby Morantz, April 2007

told the northern Indians caught all their furs, and then, after a perilous voyage, Great Whale River.[13] At this place the Crees were congregated "in 3 Tents 157 Indians and All Live Chiefly on what white whail they Kill in this River" (HBCA B.59/a/9:9d in Francis and Morantz 1983:66). There, Mitchell met a Cree leader who had traded at Eastmain House (200 miles to the south) (Davies 1963:xx), and another who gave him some lead that he had found to the north. Hoping this lead contained silver, Mitchell sailed north to Little Whale River[14] where he picked up crystals that he hoped were diamonds (ibid). Leaving Little Whale River, they sailed into the great salt lake the Crees called Artiwinipeck [dirty water] and the English named Richmond Gulf or the Gulf of Hazard. Mitchell suggested another name for it – "Muskeety Gulph for such Nombers I never See " (HBCA B.59/a/9:3 Aug.1744 in Francis and Morantz 1983:66). Mitchell, who remained there about a week, learned from the Crees that they come here in the summer to kill caribou and when the winter comes on they return to "ye Great River" while the Northern Crees winter in those regions and beyond (ibid).

Five years later the HBC acted on reports circulating in England that because of the distance to the trading posts, the Natives threw away their furs. Accordingly, they sent Capt. William Coats to sail south from Cape Digges, at the end of Hudson Strait, to search for a suitable location. The only site he found where he could moor the ship was at Richmond Gulf and there he also found signs that both Crees and Inuit frequented the area (Davies 1963:xxi). Accordingly, a house was erected on an island near the southern shore of the Gulf and opened in the summer of 1750, in anticipation of the trade to come. The postmaster discovered they had been overly optimistic about the trade, as well as the mining venture they established at Little Whale River. The three miners there expected the ore they dug to be copper, but a year later the results from England indicated the ore produced only some sulphur and low-quality brass and the miners were sent home. This venture was followed by a whaling one[15] at Little Whale River that continued more or less for the life of the post (until about 1870). Not all of the Northern Cree peoples were whale hunters; besides, the whaling season stretched into the caribou hunting season. This early fishery was dependent on the services of a large number of Crees who in their canoes (about twenty) were employed "to stop the mouth of the river" (HBCA B.182/a/4, 14 Aug. 1752). When the whales were inside the river, then the few experts would spear them and the others would chase the wounded whales out to sea, sometimes two to three miles (ibid:17 Aug. 1752).

CREE-INUIT-WHITE RELATIONS

Records of the hostilities between Inuit and Crees are first mentioned in 1686 and thereafter were termed by the Hudson's Bay Company postmasters as the "Esquimaux hunts." Those who initiated the attacks were Crees from Albany Fort and, often, Moose Fort, on the west coast of James Bay. Such attacks occurred periodically and were noted in the Eastmain journals, but with little detail given. Their journey, beginning in late May or early June, to Richmond Gulf covered some 500 miles, stopping in Eastmain to secure some fresh supplies of powder and ammunition from the Hudson's Bay Company. From the brief entries in the Company journals it seems as though the western Crees had the upper hand in these encounters because they had muskets while the Inuit, who were not yet trading with the Company, did not. It was the practice of these west James Bay Crees to kill a few people and take their scalps back to the bottom of the bay but also to sometimes take child captives. Not only were the Inuit the targets of the Albany and Moose hunters but we learn that it was common for these "Esquimaux hunters" to attack the northern Crees[16] when they could not find camps of Inuit, and so the local whalers feared not only the Inuit but also these sorties of western Crees (HBCA B.182/a/7:19 July 1755).

The late 1750s was a particularly tension-filled time in the Richmond Gulf/Little Whale River area because of an incident at Whale River House (later Little Whale River) in 1754. The new year began very promising for all: Inuit, Crees, English. At the end of January two HBC employees encountered a group of Inuit five or six miles north of Little Whale River. A passage from Potts' journals captures the excitement of a first encounter:

> . . . when the Eusquamays got Near Our Men they Lade down Their Bows and Arrows Calling Chimo, Chimo, Claping Their Breasts and Made all ye Signs of Friendship as the Esquamay did Them. Each party advanced and Embraced each other with Great Signs of Joy Our people got 4 of them to go to Whale River House. (B.182/a/6:30 Jan.1754)

At the establishment, the Inuit were provided with bread, raisins and whale oil "wch they Eat Very Heartily" (ibid) as well as an iron hoop and some partridges to take back with them. Over the days, more parties of Inuit arrived at the post and relations were friendly, leading Potts and his men to leave Whale River House to go hunting. Left behind was the young apprentice, Matthew Warden. They returned to find him missing and the house stripped of all the metal, powder and shot. The Company men took refuge at Richmond Fort and waited. Two weeks later, three Inuit men approached the post as though nothing had happened. They were welcomed and two were taken prisoner; the third was released and told, in an attempt at sign language, to return the boy or the two men would be executed. The two men were placed in irons and shut in the guardroom while the Company men paraded back and forth in changes of clothing, hoping to convince their prisoners there were at least 100 men. Entering the guard room, one of the Company men was attacked by one of the Inuit who had a knife concealed in his sleeve, and though the Inuit men "fought with Great Resolution and Fury" (HBCA B.182/a/6: 22 Feb. 1754) they were killed and their bodies dumped into the nearby river, but not before one ear was taken from each body to be sent to the (Cree) "Captains of Moose and Albany Forts" (ibid:2 Mar.1754). In May the apprentice boy's remains were found about 200 yards from Whale River House.

This incident was the explanation given by the Albany Crees for their sortie the following year when they killed a camp of Inuit and took four children as captives. These hostilities and subsequent ones contributed to the closing of Richmond Fort in 1759 because the Inuit were reluctant to be drawn in to the trade and the northern Crees were reluctant to give up their caribou hunting (A.11/-/57:38 in Francis and Morantz 1983:78).

LOCATIONS OF "NORTHERN" CREES

These northern Crees are actually said to belong to four groups, though their names quickly disappear from the records leaving designations based on locations such as "Cape Jones Indians" or "Great Whale River Indians" or "far-off northern," etc. The identification of the eastern James and Hudson Bay peoples as "Cree" appears for the first time in 1853 in the correspondence of the Anglican missionary E. A. Watkins (Francis and Morantz 1983:11), no doubt because he associated them with the Crees at Moose Factory even though the languages are noticeably different but intelligible to the other's speakers. Linguists working in James Bay in the mid-1900s classified the language as closer to that of the Montagnais [Innu] (ibid:12) though Cree remains as their name in English. In Cree, the people refer to themselves as "Iiyuu."

In the 1750s, Potts gathered information about the four groups surrounding the Richmond Gulf region. To the northeast lived a small group he called the Nepis'cu'the'nues (also known as the Northward Indians), whose lands were poor in beaver and marten. They lived chiefly off caribou which supplied them with their meat and clothing. Although encouraged to trap furs, they brought mainly hides and venison to the post and could not be persuaded to leave their caribou grounds to engage in whaling. To the south were the Pis'he'poce, who summered at Great Whale River and did engage in whaling. In winter they moved southward or inland to trap furs and had been suppliers to the post at Eastmain. The group who lived southeast of the Gulf, Potts called the Ear'ti'wi'ne'peck's and they rapidly became the mainstay of the trade at Richmond; previously they had taken their furs to Eastmain. They were also the middlemen for the Ne'pis'cu'the'nues whose few furs they took in trade. The fourth group were the Nashcoppees,[17] who hunted caribou in the interior and seldom came to the coast, trading instead with other groups, some of whom were situated closer to the French posts (ibid: 68-69). Research carried out in the 1930s by the linguist Truman Michelson indicates dialect differences that had endured, as between the Crees of Great Whale River and Fort George (Michelson Papers 1935: 78a). In 1978, John Mukash, a Cree elder at Great Whale River divided the Crees trading there into two groups. Those north of Great Whale River in the Richmond Gulf region he referred to as "id-de-ma-be-shom-aeyouch", that is "northern people." Those hunting south of Great Whale River were the "be-sho-ma-daow-aeyouch" (Archéotec 1978: 7.8).

RESUMPTION OF A NORTHERN TRADE

Both Inuit and Crees remained wary of each other since the west coast Crees periodically continued to launch raids northwards. This, along with the lacklustre returns in furs or oil, stalled the Hudson's Bay Company's re-establishing a post on the southeast coast of Hudson Bay until 1793. That year, George Jackman was assigned five men in late September to build a temporary stockaded house at Little Whale River. After an initial report to Moose Factory and before their house was built on the ruins of the previous one, no news was carried from there until a year later when two Crees arrived at Eastmain House to report that all had been killed and the post ransacked (Davies 1963:279-280). Although the Crees had accused the Inuit, the postmaster at Eastmain thought the perpetrators could be Crees looking for plunder, despite a Northern Cree having brought to Eastmain, in 1798, Jackman's watch, found on "an old Esquimaux man" he had shot dead the previous year (ibid:281, f.n.1). Not until 42 years later was it confirmed by an elderly Inuit woman arriving at Fort George with a trading party. She said the deed had been carried out by about twenty Inuit, all of whom were dead, and "the only reason they had for doing it was plunder" (Francis and Morantz 1983:117). In the 1790s, the news of the massacre spread to the Orkney Islands in Scotland, the source of most of the Company's contract labourers; thereafter recruitment of men to work on the east coast became difficult.

Although the Hudson's Bay Company withdrew from an active interest in the southeast coast of Hudson Bay, it had not forgotten it. What brought the Company north again was once more competition. In 1803 the HBC established Big River Post at the La Grande River[18] in response to one erected there by the Northwest Company;[19] the latter post in James Bay lasted only two years. Ten years later, with competition gone, the Company closed Big River Post and relocated the trading post to Great Whale River where the fishery had been ongoing since 1791. However, severe winter and ice conditions forced their removal from Great Whale River in 1816[20] and again Big River Post was reopened. Until 1824, it was the most northerly post, though the northern Crees could obtain their few supplies in the summer at the whale fishery at Great Whale River. At this time, the postmaster found plenty of evidence that the Inuit were using the Richmond Gulf area in the springtime to build their "canoes" (Davies 1963:281).

THE FIRST FORT CHIMO POST

The end of the competition with the Northwest Company (1821) strengthened the control the Hudson's Bay Company had over their fur suppliers. Competition had allowed the Native populations to influence the policies of the trade but once that ended, their relationship with the HBC changed. Such was the case in Ungava when the powerful Governor of the Company, George Simpson, took an interest in these lands. He had observed that the HBC's old territories had been over-hunted and wanted to expand into new ones. Simpson envisaged a line of inland posts from Ungava to the St. Lawrence. Thus he personally championed the opening of a new post at the mouth of the South River,[21] intending to exploit the beaver country to the south of it, as well as the Inuit trade of Hudson Strait. This Ungava post, Fort Chimo [Kuujjuaq], opened in 1830, was reached and supplied with great difficulty, overland, from Richmond Gulf.[22] Simpson thought it a good idea to induce some of the northern fur suppliers from Big River and Great Whale River to move to Fort Chimo, which would "rouse to habits of industry the indolent[23] Creatures by whom this Country is now occupied" (Francis and Morantz 1983:135). Five Cree families agreed to move in 1835 but others refused despite generous offers of trade goods; the Crees were apprehensive "of being butchered by the Esquemau" (HBCA B.59/a/113, 23 Jan.1829). An additional nine families moved in 1841 when informed that if they did not resettle there, they would be unable to trade at any of the posts. Thus the Company could bring its weight to bear on the Cree hunters, though not without their strong opposition despite the Company's monopoly. Two years later, in 1843, the post was closed and all the Crees returned to their original hunting grounds. Fort Chimo was successful in drawing some Inuit but they came without a significant trade in furs or oil (Francis and Morantz 1983:135; Davies 1963:lx-lxiii). The post was reopened in 1867 (Morantz 2002:38).

INUIT DRAWN INTO THE FUR TRADE

The postmaster at Fort George in the 1830s was Thomas Corcoran and he set about to achieve the hitherto elusive objective of bringing the Inuit into the trade. By then, it seems to have become HBC policy to actively discourage the murderous raids, at least by the Crees, over whom they had some control. Corcoran devised a system of rewards to any Cree hunter who guided an Inuk to the post. As well, he sent northwards Moses, an Inuk from the post at Churchill who had been assigned to Fort George as an interpreter, although he spoke no English and had an "imperfect" knowledge of Cree (HBCA B.77/a/16,12 Mar. 1842).[24] Corcoran's first strategy paid off in April of 1839 when Katsaytaysit, hunting near Cape Jones, came upon a family of six Inuit and convinced them to accompany him to the post. There the Inuit traded their furs, leather and sealskins for a gun, ice chisel, harpoon, axe, knives, a file and ammunition. Katsaytaysit indicated that he was from the islands off Richmond Gulf and would be returning with others. Moses, too, was successful, having spent a year crossing western Ungava in a triangle-shaped route. He reappeared at Fort George in March of 1840 with thirty families of Inuit. Here follows one of the accounts:

At about 8 in the morning 16 Esquimaux men and about three times the number of women, lads and children (there are as many women, girls, boys and children remaining at Horse Island as there are here) arrived on eight of their large sleds hauled by upwards of fifty dogs with 1 silver, 1 cross, 4 red and 15 white fox skins, 1 otter, 3 wolverines, 4 wolves, about 1 1/2 barrels of blubber, a few deerskins coats a few deersinews, 50 large deerskins in hair and about 1300 fathoms of seal skin line, for all of which they were paid with articles of no great value, except some tin kettles that did not answer well at this place for the Indian trade. In paying these people for the articles above enumerated I had only the assistance of Moses and although that was the case they were settled with at about four in the afternoon and they left here soon afterwards for their snow houses at Horse Island. Had Moses not been here we would be at a sad loss in dealing with these simple but seemingly happy people, and we would in all probability be also under some apprehension for the safety of the place and perhaps ourselves from so many of this class being in our own immediate neighbourhood, but it is tho' tolerably well prepared we are very easy on this score. (HBCA B.77/a/14, 13 Mar. 1840)

Inuit Summer Camp at Great Whale River.
Credit: Photograph by A.P. Low, 1896. Library and Archives Canada.
Courtesy of Avataq Cultural Institute (PA 051445)

The above account also bears witness to the HBC's different handling of the Inuit trade, providing them with articles of trifling value and a condescension that was to last a good many years.

Corcoran learned that these people came from the Cape Smith area and from what came to be known as the Belcher Islands.[25] He and his men were the first Europeans the Inuit encountered and the first post visited. The Fort George journals for the subsequent years indicate a great number of friendly encounters between the Crees and the Inuit.

LOCATION OF THE INUIT

Life at the Fort George post that now included Inuit in its seasonal round settled down quickly following these first encounters. The Inuit divided into those who lived along the coast or the islands off the coast and close enough to the post to arrive frequently, such as those at Cape Jones[26], Loon Island and Wastican Point, and others who wintered further north in the vicinity of the Whale rivers and Richmond Gulf. By 1849, Corcoran was convincing some Inuit to hunt seals south, at Paint Hills (HBCA B.77/a/23: 9 Mar. 1849). Some groups of Inuit said they were heading inland to "deer country" and probably would not visit the post next year (HBCA B.77/a/18, 27 Mar.1844). The Inuit rapidly adapted to the trapping of foxes[27] for the trade and devised their own stone traps with which to catch them (HBCA B.373/a/3, 14 May 1863). Corcoran summed up the location of the Inuit in this way: "Besides the Esquimaux that are living here (3 families) and at Cape Jones (3 families) there are twenty or more families of them expected in the Spring from Richmond Gulf and beyond" (HBCA B.77/b/3, 19 Jan.1842). As well, Corcoran sent Moses, in March of 1845-46, to "Whale River" with "a view to opening communication with the "Island Esquimaux"[28] who told him the islands were rich in fox and seals. Other Company employees sent over in subsequent years found few inhabitants and very little trade (Francis and Morantz 1983:142). In terms of linguistic divisions, Corcoran noted that the Inuktitut spoken by the people coming to Fort George was different from that of Churchill (Moses' place of origin) and even Ungava, using the example of the differences in the "idiom of the Indians of this place from that of the Indians of Moose or Albany" (HBCA B.77/a/16, 12 Mar.1842). The designation "Itivimyut"—"people of the other side"—is what Lucien Turner (1979 [1894]:15), a meteorologist/naturalist stationed at Fort Chimo from 1882-1884, said was the name for the Inuit of east Hudson Bay. He was there under the auspices of the U.S. Army Signal Corps.

NEW RELATIONS

It is evident the Hudson's Bay Company was highly desirous of maintaining and increasing their trade with Inuit, from whom they obtained not only seal and whale oil, foxskins and caribou hides but also ivory, sealskin lines and caribou sinews. Highly valued as an item that continued into recent times was the waterproof sealskin boot (*kamik*) favoured by the English and Crees. Thus, Corcoran made every effort to keep the lines of communication open.

A group of Crees, Inuit and Europeans at Great Whale River, c. 1920. Presumably these men form a joint work team, employed by the Hudson's Bay Company.
Credit: Library and Archives Canada.
Courtesy of Avataq Cultural Institute (PA 044221)

It is surprising how the age-old enmity seemed to melt away very rapidly, obviously due to the concerted efforts of both peoples. The Fort George journals are filled with references to Inuit and Cree sojourning at the post at the same time and even individuals engaging in activities together, such as Inuit and Cree heading off in a boat to hunt polar bears. However, the subsistence activities of each tended to bring large groups of Inuit and Crees to the post at different times. Thus, in the month of March many Inuit camped on Horse Island or adjacent areas to carry out their seal hunting but by mid-April they were heading north to the Whale rivers to prepare for the summer hunt. In June and July inland Crees were arriving at the post to trade their furs when most of the Inuit had several months earlier left the vicinity.

THE WHALING YEARS

The Belcher Islands figured into the reopening of a small three-man post at Little Whale River in 1851, as some of the HBC officials had wanted to establish a regular trade on the islands to help the impoverished inhabitants although others said they should be encouraged to come to Fort George. The compromise was Little Whale River, where a whale fishery could be started again and the Inuit trade expanded. At about the same time, Governor Simpson, encouraged by a successful whaling venture in the St. Lawrence, dispatched a Quebecer, Edouard Belanger, to identify the best whaling site which he deemed to be Little Whale River. Simpson had such high hopes for its success that he wrote to London that the trade in oil would soon exceed the beaver one. It was a highly substantial and expensive undertaking, with twelve Company men employed and dispatched there; the infrastructure involved six furnaces, coal fuel, and barrels, all shipped from England. Gradually the whale fishery began to enjoy a moderate success. The number of whales killed increased from 424 in 1854 to 743 in 1856 (Francis and Morantz 1983:144-45).

At Little Whale River the 20-25 Crees who visited the post throughout the year were the ones employed to set the nets, drive and shoot the beluga whales and do some of the cutting. The Inuit who came in also were engaged in the cutting of the blubber for boiling and hauling wood with their sleds. Most of the Inuit came between March and May, before the fishery, arriving by dogsled from the Belchers or from the coast up north. Their manner of transport, using sleds and dog teams, quickly made them an asset to the Company and they were employed in hauling goods and delivering the mail all the way from Great Whale River to Moose Factory (HBCA B.77/a/30, 28 May 1850).

The post at Great Whale River was constructed in 1856 and in 1859 the post at Fort George ceased to be a trading post (though it reopened again in 1870). The hunters were required to take their produce to Great Whale River where the Crees arrived in the summer and the Inuit in the spring. The bulk of the trade was in martens, foxes, whale, seal and caribou products. In addition to the trade, each hunter was given presents according to the amount of his trade and the trader's view of his reliability. The presents included awls, cloth, ammunition, knives, needles and thread, clothing, tobacco, sugar and tea (Francis and Morantz 1983: 145-46). As had always been the case in James Bay, the Crees received credit from the post but the Inuit did not until early in the 1900s, coincidentally the time of the entry of another fur trade company, the Revillon Frères Company.

Simpson's prediction about the whale fishery did not come to pass. As it happens, its best year was 1860, the year he died, when 1500 whales at Little Whale River and 800 at Great Whale were killed. Thereafter the number of whales taken declined due in large part to the mouth of the rivers becoming shallow so that the schooner could not get them – and the whales stopped ascending the rivers in large numbers (HBCA B.372/e/5, fo.21, 1901). What was not explained in the Company records was that whales return to the same river each year and overhunting could account for the decline (Michael Barrett, pers. comm. Dec. 2006). By 1870, whaling as a commercial venture had ceased at both rivers, though both Inuit and Crees continued to harvest them for their own use and the Company bought some of the products, including the meat for dog food. In interviews in the 1970s at Great Whale River, both Inuit and Crees described the whaling techniques they knew (Archéotec 1978). With the ending of the whale fishery at Great Whale River, its fur trading was returned to Fort George in 1870 although it continued at Little Whale River. In 1880 Great Whale River post was again reopened. Little Whale River post closed for good in 1890 (Morantz 2002:38).

THE FIRST CHRISTIAN MISSIONARIES

The Inuit were likely still adapting to the changes brought about by the fur trade and seasonal employment (such as altering their seasonal round of activities to incorporate hunting for small fur animals, such as foxes, or being available for employment at the post) when other winds of change were blowing in from the south. The first were the missionaries. Rev. George Barnley was sent by the Methodist Missionary Society to Moose Factory in 1840 but he was responsible for all of James Bay. He made several trips to Fort George and as he swept up the coast, baptized the Crees, changed names, and condemned bigamy and adultery. According to John Long (1986:122 ff.) he was not very effective. He was recalled in 1847. The next missionaries were Anglicans, sent out by the Church Missionary Society. Rev. E.A. Watkins was stationed at Fort George in 1852 and remained there for four years.

The Rev. John Horden, settled at Moose Factory in the 1850s and had some greater success. He traveled to Great Whale River in 1858 and although he did not win over any converts that year, he did take part in some of the whale drives and left us one of the most graphic accounts of how the fishery was conducted (Batty 1893:145). Importantly, he adapted the syllabic script to Inuktitut, providing literacy to the Inuit. This script was first developed for the Crees of Norway House (Manitoba) by the Rev. James Evans in the mid-1840s and it spread quickly among native groups. In 1890 when Bishop Horden traveled to Great Whale River he found that most of the Inuit he met knew how to read (ibid:196-197), as did the Crees on the James Bay coast.[29]

Two Anglican missionaries attracted the attention of the northern peoples, so much so that even today they are remembered by both Crees and Inuit. Rev. E. J. Peck arrived at Little Whale River in 1878, accompanied by a Cree crew and his interpreter, Adam Lucy, a Christian Inuk from Labrador. He also had there the help of John Melucto who had been converted earlier by Horden. Peck was very impressed by Melucto whom he considered "one of the most saintly men I have ever met" (Marsh 1964:428). Also of great assistance to him was the Inuk Thomas Fleming, who through the agency of one of the Company wives, had been baptized by Rev. Thomas Fleming in 1859 on a visit there with Horden. Fleming often took over the services when Peck was away. Peck set to work right away learning the Inuktitut language and tirelessly worked on translations, using the syllabic script. As Walton did after him, he wrote several dictionaries and grammars (ibid:430). Peck also arranged for the delivery of a small iron church from England and had it erected there. This church was dismantled, once again, when Little Whale River Post was abandoned; it was floated over on barges and re-erected at Great Whale River in 1895 (HBCA B. 372/a/13: 18 Apr.1895). Before having success with the Inuit, Peck converted Crees at Little Whale River and had others come to hear him talk about Jesus. His ministry also included those at Fort Chimo. Gradually, the Inuit began taking an interest because, he said, they "seem to have lost all faith in their conjurors . . . I told them plainly they cannot have Jesus and their idols" (Lewis 1905:105). In 1892, before Peck left the southeast Hudson Bay coast for a mission in Frobisher Bay, he reported that 140 adults were under instruction and 80 were baptized. He had trained five Inuit teachers (of whom three had died) and he had translated many portions of the New Testament. E. J. Peck came to be known as the "Apostle to the Eskimos" (Marsh 1964:430).

As Peck was leaving the region, the Rev. W.G Walton arrived and was stationed at Fort George. He remained there for the next 32 years, ministering both to the Crees and the Inuit in their own languages at Fort George and Great Whale River. In his work with the Inuit, he had the assistance of his "friend and helper," Nero Fleming. In the Spring he traveled to Great Whale River to meet with the Inuit and in the summer with the Crees, holding daily services and offering teachings. Walton remarked in 1900 that those who hunted near the post of Great Whale River had all been baptized (Walton Papers, 1900, fo.14). At each of the settlements where there were the three communities [Inuit, Cree, English], the services were offered three times, once in each language (Morantz 2002:84).

CANADA ENTERS THE NORTH

South of Nunavik in the mid–to-late 1800s, there were a great many changes: a new country and new policies. Canada was created in 1867 and through purchase and grants its land mass was extended to the Arctic Ocean, taking over the territory of Rupert's Land which had been the domain of the Hudson's Bay Company. This northern territory was known as the Northwest Territories. Over subsequent decades, the federal government transferred some of these lands to the provinces. In 1898, Québec's northern boundary was expanded to roughly about the Eastmain River and in 1912, the Boundaries Extension Act placed the rest of the peninsula within the confines of the Province of Québec. Thus, although they probably were not aware of it, in 1867, the northern peoples became residents of Canada and in 1912, of Québec.

Canada needed to know the nature of its vast territories so it called on the Geological Survey of Canada which had been founded for the old colony of Canada in 1842. Surveyors began mapping the region along the southeast coast of Hudson Bay in 1877. The surveyor who did the most extensive work in charting the Québec-Labrador Peninsula was A. P. Low, beginning in 1884. He was also responsible for many of the place names assigned, selecting, for example, the surnames of the principals of a mining company (Dominion Development) for which he briefly worked in the early 1900s, or renaming Lake Kasiagaluk, Lake Minto, after the Governor-General (Finkelstein and Stone 2004:82,77). Low surveyed the Hudson Bay coast and inland from the Whale Rivers in 1898-99. The surveys by Low and his party of the Great and Little Whale rivers and inland was very dependent on the services of Inuit guides and pilots, such as Comatook and Bill Fleming (HBCA B.372/a/14, 14 Mar.1899).

Geologists followed surveyors, and prospectors were close behind, helped by Low's having published an article on the iron ore deposits at Nastapoka (Finkelstein and Stone 2004:80). Other deposits were found in 1907 on Clarke Island in Nastapoka Sound (Curran and Calkins 1917). Mining activity came and went throughout the early 20th century in this region and up along Great Whale River and at Richmond Gulf, just as it had in the 1750s. The Hudson's Bay Company was not pleased, although they must have benefited from increased sales of goods. They were concerned that if the prospecting parties heading to Portland Promontory in 1901 remained in the area, then the Inuit would be drawn to them and not hunt for furs. Accordingly, the Company decided to send men with trade goods to stay at Little Whale River as a measure to encourage fur trapping (HBCA B.372/e/8, fo. 7, 1901).

FUR TRADE COMPETITION PRODUCES SIGNIFICANT CHANGES

This charting of the northlands served other purposes. Since 1821, the Hudson's Bay Company had enjoyed a monopoly in most parts of its vast domain. It did so in James and Hudson bays as well, but this changed in 1901 with the arrival of Revillon Frères, a French retail fur business intent on securing its own supply of fine furs for the fashion industry. The new company began carving out a foothold in James and Hudson bays in 1903 (HBCA B.77/a/50:24 Aug. – 15 Sept. 1903). It is no coincidence that by the end of September, the Hudson's Bay Company's district manager arrived at Fort George to announce the Company would be paying more for their furs (Morantz 2002:98).

The Revillon Frères' opposition proved to be a vigorous one and the Hudson`s Bay Company journals[30] are filled with stories of each trying to outdo the other, but they found each other honourable competitors. In 1923, both companies, suffering from the competition, came to a working arrangement (sharing transport, for example). Finally in 1936, with the depressed world economy, Revillon sold its fur-buying operations to the Hudson's Bay Company. Several of its employees stayed in the north and worked as independent fur buyers.

The entry of this formidable competitor had introduced changes to how the Hudson's Bay Company conducted its fur trade and these changes affected the lives of the Crees and Inuit, both coasters and inlanders. First there was the increased ship traffic which enabled more outsiders to venture north. Then, locally, right from the start, Gaston Herodier, the Revillon man in charge, hired trippers who, with dog teams, went out to the camps of the trappers to collect the furs and bring in supplies. Previously the inlanders had visited the post once a year. By 1905, the Hudson's Bay Company was running two dog teams to visit the various camps. Thus, trappers needed less debt at the start of the winter hunting season and did not have to make the arduous journeys for supplies. Employment at both posts increased as each company needed men and their dog teams for the transport. As well, the proliferation of posts along the Hudson Bay coast eased travel and increased employment opportunities. With prices of silver foxes sometimes as high as $200 a pelt (HBCA B.182/e/12, 14 Nov. 1921), one can see why the competition was vigorous.

Due to Revillon's determined and rapid expansion, which was fueled by the high prices for white and silver foxes, both companies expanded north of Fort George.[31] As early as 1909 Revillon opened a post at Port Harrison[32] with the help of David Louttit but only in 1921 did the Hudson's Bay Company counter with one there (HBCA B.77/a/54, 10 Feb.1910; B.77/a/57,15 Sept. 1921). The HBC also tried a white fox farming venture at Port Harrison in 1927 but abandoned it because of the scarcity of wild foxes and the difficulty of breeding foxes in captivity (HBCA E.93/1, 1930?). Port Harrison had other activities presumably to amuse the Inuit population. In 1920, Robert Flaherty, who had earlier worked as a miner/prospector on the Belcher Islands, was hired by the Revillon company to make a film for publicity purposes. He remained there for a year, filming the life of a (staged) family and in 1922 released the silent film "Nanook of the North" to much media acclaim (Harris 1976:201).

The other Revillon Frères posts to open in southeast Hudson Bay were at Great Whale River in 1920 (HBCA DFTR/13:6, 1921) and at Richmond Gulf in 1922 after the Hudson's Bay Company had reopened its post in 1921 on the foundations of the 18th century one (HBCA B.182/a/13, 18 Aug. 1922; B.182/a/12, 23 Aug.1921).

LIFE AT THE POSTS

The Hudson's Bay Company records from Richmond Gulf provide some insights into the life of the Inuit who were living nearby and trading there. With Inuk Nero Fleming as the Company's supervisor, the Inuit worked as assistants to the carpenters; one of the buildings they erected was called the "Husky House," intended as a temporary shelter for those arriving at the post to trade. Others such as Oomeraluk and Cookie traveled back and forth between the post and Great Whale River, transporting goods and materials. Periodically, groups of Inuit came to the post with a small trade in country food and a few foxes, or some came needing medical attention. Among those who arrived during October, November and December were Pootook and Big Head's boy, Jim Crow, Innutiak and Havkillich, Isaac Fleming, Nukki, and Amedlut Gull. From the south (Little Whale River) were Toolawak, Kumalook and Tomshi. Crees also arrived there, such as John Monkey, David Shem, Tommy Crow, and David and Benjamin Petagumskum. Of the Crees arriving at Richmond, it was the Petagumskum family that came most often; otherwise it was Inuit arriving from the region or as far off as Port Harrison. Many came in for Christmas when the Hudson's Bay Company held a "feast"– as it did at all its posts (HBCA B.182/a/12, 25 Dec. 1922). One exciting entry on 26 November referred to Big Head's Boy who had killed 53 white foxes and was all of ten years old (ibid: 26 Nov. 1924).

At Great Whale River there was much of the same round of activities and comings and goings but with one difference, Harold Udgarten. He was country born, of a Cree mother and Norwegian sailor father at Moose Factory, and was engaged by the Hudson's Bay Company to work at Great Whale River starting in 1883 (HBCA B.372/e/5, 1891, fo.11), when he was about 13 years old, and ending in 1950 when he died (Honigmann Papers, Box 29). He married an Inuk woman at Great Whale, sister to Nero and Bill Fleming and whom the Leiths (1912:46) regarded as the star snarer of hare and ptarmigan. Although never rising above the position of clerk at the post, Udgarten held a lot of influence because of his ability to speak the three languages. Undoubtedly, communication was smoother at this post because of him.

At the posts, the Crees and Inuit were cooperative and tolerant each of the other. There were occasions when they were on joint work forces and some intermarriages. There were even cultural exchanges as we see with the great demand for the sealskin boots or an account from Fort George that the "Indians hunt like Huskies; kill seals sometimes walrus; their women know how to make Husky boots . . . they never go far inland" (Michelson Papers 1935 #3396, fo.78). Of course, Inuit had taken up Cree practices in commercial trapping of

Richmond Gulf. Trading posts of the Hudson's Bay Company (foreground) and Revillon Frères (then abandoned). Note the encampment of the local hunters.
Credit: Photograph by L. T. Burwash, 1927. Library and Archives Canada.
Courtesy of Avataq Cultural Institute (PA 103939.)

fur animals and some complained that they had to walk (like the Crees) rather than travel by dog teams. To do so, they were also making their own showshoes. This longstanding adaptation to different modes of transport also helped keep the two peoples, generally speaking, in their more traditional zones: the Inuit hunting on the coast and the Crees inland in the more forested regions. Low (1896:44-45) was more explicit about the dividing line between the two peoples: "the northern limit of their territory is marked by the Koksoak River from its mouth to the Stillwater Branch and by this stream westward to its head in the neighbourhood of Clearwater Lake and thence westward to Richmond Gulf." The Inuit, he said, keep far to the North of it when hunting caribou inland and the Indians [Crees] rarely cross it from the southward. The coastal Indians were confined to a narrow margin from the bottom of James Bay to Little Whale River.

Coexistence between the two also resulted possibly from their common realization that life had changed dramatically, not just from the European fur trade but also due to the drastic decline of caribou – the resource that had sustained both peoples for hundreds of years. There is still no clear explanation for this sudden decline. Gillies at Fort George thought it was due to forest fires (Walton 1921: 9) while the Inuit suggested that the caribou became scarce because of surface icing and not getting to the moss (HBCA RG7, NSD 6-4-3, 8 Feb. 1949). Later, the anthropologist Asen Balikci (1961:69) proposed that with the introduction of firearms, overhunting was responsible for the decline. Low (1896:319) wrote of a herd that passed northward from Richmond Gulf and Clearwater Lake and in summers was on the highlands of the northeast coast of Hudson Bay. However, in later years this herd had become very small and as a result many of the

Crees had migrated from Hudson Bay to Fort Chimo, where the herd there was undiminished. Walton (1921:18) dates this decline in caribou to the post-1893 period. Moreover, the absence of caribou altered the Inuit subsistence strategies as they stopped making trips into the interior and remained on the coast, carrying out a more intensive seal hunt. Some came 250 miles from the north to settle near Great Whale River. Due to the end of their inland migration, relations between coastal Inuit and those of Ungava Bay were cut off (Balikci 1961:69,98,f.n.20; Walton 1921:18). The decline in caribou was a great loss to both peoples. One estimate, made in 1950, was that a family of five Inuit required about 100 caribou skins per year (LAC RG85 v.1088, f.401-32, pt.324/06/43, 30 May 1950).

EPIDEMICS AND MEDICAL CARE

Their loss of this extremely important source of food, clothing and sinew was compounded by waves of epidemics. With the increased traffic along the coast, the Crees and Inuit were more exposed to contagious diseases, especially in a physically weakened state. The Native population had not experienced such deseases or built up resistances and so were hit terribly hard, untold numbers dying from epidemics of whooping cough (1858), influenza (1885, 1900), measles (1902) (Morantz 2002:43-44, HBCA B.182/a14: 6 Mar.1925). These were all Old World diseases over which the conjurors or shamans would have had no effect. The only medical services were provided by the Hudson's Bay Company. They did have a considerable array of medicines and treatments at the posts but like the shamans, their medicine also was not "strong" enough. At Fort George, Walton took over the medical aid that formerly had been provided by whichever Company employee had the most medical knowledge.

Another type of disease also had serious ramifications for the peoples on the coast. This was the periodic epidemic that destroyed their dogs, called in 1891 "a kind of hydrophobia that makes periodical ravages" (HBCA B.372/e/5, fo.21, 1891). The loss of dogs affected the transport for everyone, hunters and traders, but for the Inuit it also hampered their seal hunting because where the snow is deep the dogs find the seal holes (HBCA B.373/a/1, 14 Mar. 1863).

RELIEF MEASURES

Medical care and relief were the first services the federal government provided to the people of the coast in the late 1920s. In 1924 it was decided that the Inuit should be placed under the jurisdiction of the Indian Affairs Branch, though the Indian Act would not apply (Titley 1986:58-59). In the beginning, in James and Hudson bays, the Department of Indian Affairs sent its Indian agent/doctor on the annual Hudson's Bay Company supply ship and sometimes accompanied by an RCMP officer, as in 1931. At Fort George, for example, the doctor did the interviewing and the constable vaccinated the population, and the same at Great Whale River (Morantz 2002:189). However, Inuit are not Indians and that came to the attention of the federal government in 1928, with mounting expenditures of relief given to Inuit in Québec. In 1930, control of Inuit was transferred to the Northwest Territories Branch of the Department of the Interior but it balked at the cost of the relief measures and asked the government of Québec to refund the costs for the care of the Inuit which, in 1931-32, were $22,000 or nearly $9 per person. The provincial government did reimburse the federal government but served notice it would no longer assume the care of the Inuit since they were Indians and therefore wards of the federal government. This matter was referred to the Supreme Court of Canada in 1935 and in 1939 the Court decreed that "Eskimos are Indians" for the purpose of the British North America Act (Jenness 1964:40-41). Thereafter the federal government assumed full responsibility for the Inuit in Québec.

THE AGE OF THE AIRPLANE

The motorized age came to James and Hudson bays with the appearance in the late 1800s of steamships and then in 1920 of outboard motors on canoes which were used by the Company only for short hauls, not being useful for hunters to take inland over portages or due to the steep cost or absence of fuel. Of more consequence was the appearance of bush planes, first remarked upon at Fort George in 1929 (Morantz 2002:136-138). These were not regular scheduled flights but ones commissioned for specific purposes. The Great Whale River region would have seen far more bush plane activity than other parts of the Hudson and James Bay coast because the mining companies seized upon this new form of transport to haul men and goods. As early as 1931, Hudson's Bay Company correspondence was lauding their convenience, indicating that to travel from Fort George to Moose Factory by dog sled took 12-14 days and by plane, 2 hours and 15 minutes. (HBCA RG3/3/13/1, 29 Mar. 1931). With the establishment of Austin Airways in the mid-1930s, based in Timmins, Ontario, the use of planes by all outside interests increased annually. After the Second World War they were a regular feature on Hudson Bay, providing the transport for the movement of officials and goods and with it a storm of activity over which the Native Peoples had no control.

THE TUBERCULOSIS PERIOD

Until after the Second World War, the government was providing little in the way of medical services. A change of thinking in 1945 resulted in the Canadian government making earnest efforts to provide adequate health care to *all* Canadians and to this end, it established the Department of National Health and Welfare.[33] Within it was the Indian and Northern Health Service, but in 1961 the Arctic component was the Northern Health Service (NHS) (Grygier 1994:132). The overwhelming problem was the soaring rates of tuberculosis. To place it in perspective, in 1959 the death rate from TB in Canada was 5.5 per 100,000 population while in the Northwest Territories (for all Native Peoples) it was 52.4. In 1962 the death rate for Inuit alone was 73.0 (Grygier 1994:14).[34] Thus, in 1950 on the annual ship patrols, Crees and Inuit were visited by medical parties, expanded to include a dentist, an eye surgeon and an X-ray technician and equipment (ibid:86-87). Those infected with TB were evacuated. In 1950, Crees and Inuit were sent to the newly opened 165-bed hospital at Moose Factory.[35] Insensitive to the history of the relations between the two peoples, the government health officials placed Crees and Inuit together in the wards. The Inuit were outnumbered 2:1 and several years later Balikci heard in Great Whale River of how Inuit perceived their treatment:

> Being taken away from home is almost as bad as death. I know many who would rather have died than have gone through the misery of the hospital. At Moose there are a great many Indians and they're not kind to the Eskimo. They tease the Eskimo and push them around. The nurses and doctors either don't know about it or they don't care . . . why do they sometimes put just one Eskimo in with the Indians? . . . And there are so many rules . . . The white people move us around as if we weren't human. We have no say. The Eskimo used to go where they wished and the great men (the old and the good hunters) were bosses . . . Under the control of whites we are no men . . . we are nothing. (Interview with Johanassie Crow in Balikci, field notes 1957)

Some (such as Rhoda Cookie) told Balikci they preferred being much further away in Hamilton (Ontario) at the sanitarium which was a reasonable place with friendly doctors and nurses and that it was "fun to be with so many Eskimo from other places" (ibid). Cookie added that the food was not bad, but there was not enough meat. However, one researcher was critical of the services provided to Inuit (Grygier 1994:105-113).

Not only was TB a serious problem but the communities continued to be plagued by epidemics of infectious diseases such as measles. In 1956, there were 144 cases in the month of November and 4 children died. Tapeworm was another serious medical problem, as were influenza and stomach disorders (Balikci field notes, Great Whale River, 1957).

HUNTING AND TRAPPING VS. INDUSTRIAL EMPLOYMENT

Whereas the Department of Indian Affairs pursued a vigorous policy of assimilation for Indians from the earliest days of their encounter (Miller 1989:95), the Northern Administration seemed intent on pushing the Inuit back to their traditional ways. Both employment and education were often questioned from the viewpoint that each would prevent the Inuit children from learning their traditional ways and being able to live off the land. It was almost an obsession with northern administration officials that the Inuit not lose their traditional lifestyle. To that end, the policy advanced was to distribute to able-bodied hunters ammunition in lieu of food rations that had been the standard allocation of family allowance[36] (LAC RG 85 v1130 f253-1, pt. 2, 22 Mar. 1948); a policy was implemented in 1949 whereby ammunition was substituted for flour and sugar (Honigmann 1951:5). Even housing came under such deliberation. In 1928 Archdeacon Fleming was an advocate of the Inuit maintaining "their traditional type of habitation" rather than being offered "wooden houses" (LAC RG85 v1130 f154-1, pt.1, 1928).

Although trying to keep the Inuit attuned to their traditional lifestyle, the bureaucrats in Ottawa were well aware that the Inuit were no longer content with just their own tools and were trading for imported goods that would help make life easier, such as rifles, motorboats, canvas tents, sewing machines, and primus stoves, though they had not discarded their harpoons, kayaks, snowshoes, stone lamps, etc. (LAC RG85 v863 f8276, pt.2A, 4 Aug. 1944). As well, there was a move away from Inuit subsistence strategies, as no doubt among the Crees, towards more individualized hunting due to firearms and relief payments. Long journeys to locate animal resources were reduced with the introduction of Peterhead boats and motorized canoes that a few could purchase in good fox years (Lucy Meeko, Avataq Oral History, #6, fo.9). Instead, Inuit remained more sedentary, living in camps along the coast, led by a headman.

At the same time as some in the Department of Northern Affairs and Natural Resources were trying to keep Inuit on the land, others were developing policies to enable them to adjust to the changing times. These latter were the Northern Service Officers (NSO), created in 1956 as an arm of the Department which had, in 1953, been established to bring under one department all Inuit affairs and to establish socio-economic programs (Crowe 1991:202). However, earlier and by chance, Inuit found themselves drawn into another commercial world, other than the fur trade. James Houston was an artist who sojourned in Port Harrison in 1948 to paint and discovered the Inuit art of soapstone carving. He brought this to the attention of the Canadian Handicraft Guild and with a government grant in 1951, he and his wife Alma were sent back to Port Harrison to collect more of the soapstone sculptures for sale in Montreal, where they sold very well (*Ottawa Citizen*, 21 Jan. 1954). Thus, Inuit were encouraged to produce crafts for the tourist trade.

The Inuit soapstone sculptures were well marketed in the south (as early as 1954 in the U.S) with Canadian government support (LAC RG22 v324 f40-8-5, pt.1, 18 Feb. 1954). The cooperative movement to market the char fishery as well as sculptures and handicrafts started in 1959 in Québec at George River [Kangiqsualujjuaq/Port-Nouveau-Québec]. By 1961, cooperatives were in place in both Fort Chimo and Great Whale River.[37] Craft products were encouraged, most of all at Port Harrison where Marjorie Hinds, the welfare teacher, was an indefatigable promoter of the crafts program.

It is in the report of Hinds that we see the tensions between encouraging traditional and more mainstream lifestyles spilling over into the field of education. She comments that it is undesirable to concentrate on formal education. "We want them to be, first of all, good Eskimos . . . " (LAC RG85 v1130 f254-1, pt. 1, 3 Mar.1952). Consistently, administrators in Ottawa were asking if the language of instruction should be "Eskimo or English" (LAC RG 85 v1130 f254-1. Pt. 1, 2 May 1952). Despite this dilemma, a day school was opened in Great Whale River in 1958, though prior to that the missionaries instructed Inuit and Crees in their own language and almost all, through their own efforts, were literate in syllabics. A few Crees trickled south to Fort George to study at either the Anglican or Catholic schools but did not remain long (Honigmann 1962:11). The school enrolment figures for 1961 at Great Whale River were 117 pupils including Crees (LAC RG85 v683 fA-633-1-pt.1, 31 July 1961). Until the 1970s, only elementary level education was offered in the communities.

Great Whale River. The establishment of the Mid Canada Line radar base brought wage employment to both Inuit and Crees.
Credit: Photograph by Asen Balikci, 1957.
Courtesy of Avataq Cultural Institute (ABA PC 6.08), with the authorization of Asen Balikci

Try as they might, the Ottawa bureaucrats in the Department of Northern Affairs and Natural Resources were helpless to stop the Inuit from abandoning their traditional way of life on the land to engage in employment. They could not stop the Second World War that created employment opportunities at Fort Chimo with the installation of a U.S. airforce base in 1942[38] (Zaslow 1988:221). The base provided employment ending the dire poverty of the Inuit there, for which they were grateful to the U.S. (Duhaime 1985:19). The Cold War had ramifications for the people of Great Whale River. Inuit from the coast were drawn there in the hope they could raise their families' standard of living.[39] Prior to the mid-1950s, Great Whale River was a fur trading community, primarily coming to life only in the summer and with a half a dozen white residents (Wills 1984:4). By 1955 it had become a town. It was (until 1968) the site of the Mid Canada Line, one of a number of radar defence stations. In constructing the base and runways, they employed about 50 Inuit and Crees and imported a labour force of 200 outsiders for two years (LAC RG85 v1931,fA160-1-6, pt. 1, 13 Feb. 1964; Barger 1977:473). In the early 1800s, Inuit were not to be found at Great Whale River, only Crees. In 1964, there were 455 Inuit residing there compared to 238 Crees (and the 200-250 whites employed mainly by the Canadian Marconi Company) (Wills 1984:4-5). The contractors favoured Inuit employees over Crees, considering the former "better workers" (ibid:7). Even much after the construction boom had finished, in 1964, Wills (ibid:19-21) found that 49-51 Inuit were employed in wage labour compared to 17 Crees. By this time, a number of Crees had returned to trapping[40] or were engaged in an ill-fated government wood carving program (Morantz, 2002:196) that pulled them off the land.

Prior to this wage employment, data gathered in 1949-50 for Great Whale River found the Inuit to be poorer than the Crees. Even in this late period, the Hudson's Bay Company maintained the disparity in the granting of credit to each. The Inuit were receiving credit of $25-$40, while the Crees were able to set off for the winter with debts of $300 and $400 (Honigmann 1962:18). However, what Wills found in 1964 was the opposite: the Inuit were more prosperous than the Crees. That year, he noted that seven Inuit bought Honda motorcycles but no Crees had one. The Cree income from trapping was far less than one could earn from employment. Furthermore, the Inuit, administered by the Department of Northern Affairs, received more generous relief rations of food, clothing and ammunition while Indian Affairs distributed only food to the Crees. As well, more housing units were supplied to the Inuit than to the Crees (Wills 1984:21).

Unlike Great Whale River or Fort Chimo, Port Harrison did not see the advent of a military complex and its Inuit residents entered the cash economy, such as it was in the 1950s, through craft production and government transfer payments.

The Inuit and Crees were not only introduced to wage labour but as well to outsiders, including people from as far away as Jamaica (LAC RG85 v1900 f1006-8, pt.6, 1964, referring to an article by Michel Brochu). Moreover, their view of the world must have changed when the immense infrastructure of the military base was deposited on a landscape that formerly was dotted with tents. Also, gone were the days when the Anglican ministers controlled the festivities in the community, for now the Crees and Inuit were attending dances and movies, but as Wills (1964:30-31) observed, they kept quite separate. Soccer was one of the joint activities the two communities enjoyed (Honigmann Papers, Box 29:5, 2 Aug. 1949) and competition was also at the root of a contest between "Huskies and Indians to decide whose lungs are the strongest. Chief Patageskum and Chief Crow [at Richmond Gulf] holding forth, The Indians won out by about 15 minutes" (HBCA B.182/a/15, 27 June 1927). This separation was, for some of the period, also observed in the workplace. Neither group had a good command of English and this also hindered not only their interaction with each other but also with the whites in the community. Although written about 70 years earlier, it seems Turner's view of Inuit-Cree relations was still applicable in the mid-20th century: "The Indians and Innuit of this region are more or less directly in contact . . . but do not intermix" (Turner 1979[1894]:20) and in fact in 1957 Balikci (field notes 1957, #71) would have said that each held an underlying suspicion and mistrust of the other.

Changes did occur in the relations with the whites. Wage labour provided the Crees and Inuit with cash. Balikci (1961:90) rightly points out that this demoted the role of the Hudson's Bay Company trader or any other one to serving as a storekeeper and not controlling credit to the same degree; trappers could go to other stores, do catalogue ordering and so forth. There was also a widening social distancing between trader and hunter. It used to be that older Inuit could spend time in the manager's house, looking at magazines, listening to the radio, but in 1946, it was reported that they were not even allowed in the house (LAC RG85 v863 f8276 pt3, 15 Sept. 1946). It is conjecture that perhaps this change in interpersonal relations was a result of Hudson's Bay Company personnel coming north to take up employment at the posts, bringing with them wives from the south, thereby creating a social barrier. Previously the traders intermarried locally and were socially dependent on the Native community. Needless to say, the whites lived quite apart from the Inuit and Crees in all the settlements. There was an immense disparity in their living standards.

Great Whale River. By 1957 the fur trading community had become a town. Note the mix of tents and small houses for its residents who by then numbered about 450 Inuit and Crees.
Credit: Photograph by Asen Balikci, 1957.
Courtesy of Avataq Cultural Institute (ABA 2.03), with the authorization of Asen Balikci

Although the federal government had tried hard to keep the Inuit in their traditional economy, the world events in the late 1950s forced them to alter their policies, and thus began concerted efforts to centralize and sedentarize the Inuit in villages with the provision of schools (and compulsory attendance), housing and government agencies.

ENTER QUÉBEC

If the Crees and Inuit had not previously thought about the differences among the white folks, they were forced to do so in the early 1960s. The province of Québec, under the Liberal leadership of Jean Lesage, decided in 1962 that they wished to take over the management of their northern lands and resources. They took notice that in the vast northern territory, there was almost no French presence. As Minister of Natural Resources, René Lévesque pursued this policy of "patriating" the north and taking its "rightful responsibility," and established the Direction Générale du Nouveau-Québec (DGNQ) on 10 April, 1963 (LAC RG85 v1451 f1006-8, pt. 3, 27 Dec. 1962; 10 Apr. 1963). In the next few years, he held a series of meetings with the federal government and in the north with the leaders of both the Indian and Eskimo Councils of Great Whale River[41] (LAC RG85 v1958f1006-8, pt. 4, 20 July 1965). It was a policy welcomed in French Canada if the *Le Devoir* article is any indication; the editorial was accusing the federal government of "génocide culturel" (ibid, 15 Apr. 1963). Initially the federal government took a stand in favour of the status quo, even suggesting a referendum in Nouveau-Québec on whether the population wanted their schooling and health services in English (*Thunder Bay*

Times News, 17 Sept.1977). Both cultural groups demanded these services in English and in doing so they were strongly supported by the Rev. D. B. Marsh, Anglican Bishop of the Arctic. (LAC RG85 v1958 fA-1006-8, pt. 4, 5 Mar.1965). The Québec government provided an alternate route: that schooling for the first few years would be in Inuktitut or Cree, wishing, they said, to preserve the Native cultures (ibid: 18 Mar. 1965). In their negotiations, what the Québec officials heard from the Native peoples was "thank you but we're happy as federal wards." The provincial government went ahead anyway and the Inuit and Crees realized that the federal government had abandoned them and "sidestepped its Québec wards" (*Thunder Bay Times News*, 17 Sept.1977).

DGNQ was set up to administer the northern territory that had been ceded to Québec in 1912. Calling it Nouveau-Québec only made sense to southerners; it was not "new" to those who had lived there for millennia. Initially DGNQ had concentrated its efforts in the Ungava region but established a regional headquarters at Great Whale River, now renamed Poste-de-la-Baleine, with a unit of the Québec provincial police posted there. Not until 1976 did DGNQ open offices at Fort George. By this time, the goal of this arm of the government was to aid communities by providing a range of services from education to welfare to town planning. As the two levels of government had never come to a practical agreement, two parallel sets of services were provided in education and social assistance (Morantz 2002: 180-181). Using the military facilities turned over to Québec by the federal government, DGNQ provided the municipal services and opened an elementary and trade school, making the government of Québec the largest employer in Great Whale River (Barger 1979:66).

The government of Québec initiated another set of events that eventually provided the Inuit and Crees with the opportunity to regain greater (but not absolute) control over their societies. The James Bay hydroelectric project, announced in 1971, was initially opposed by the Indians of Quebec Association (IQA). The Inuit formed their own organization, known as the Northern Quebec Inuit Association and affiliated with the national body, the Inuit Tapirisat, both formed in 1971. The Crees viewed the IQA, controlled by southern Native Peoples, as acting in their own southern interests and in 1974 they split from them to create their own political body, the Grand Council of the Crees. The negotiations between these Aboriginal groups and the federal and provincial governments concerning the hydroelectric project led to the signing of an historic treaty on November 11, 1975: the James Bay and Northern Québec Agreement. Each society's journey over the next thirty-five years to shape their future is yet another story to be told.

NOTES

1 Years before present (radiocarbon years before 1950).

2 For the purpose of American Indian research, the Historic period extends from first contact with Europeans until 1900.

3 The Contemporary period covers the 1950s until today.

4 The Modern period corresponds to the years between 1900 and 1950.

5 Historic and Modern periods are characterized by tent circles, making it difficult to determine the precise period due to the absence of vestiges on the surface. There is also a continuity of method between the two periods. Excavations might provide clarification.

6 Despite its name, this type of pipe is not strongly associated with "Micmacs" but with a broad range of American Indian cultures that were involved in the fur trade during the 18th and 19th centuries.

7 Umiujaq, the name of the modern town established in 1986, is located on Richmond Gulf. Kuujjuaraapik historically was Great Whale River. Here, the historic names will be used so that researchers can consult the original literature and find the references.

8 Later renamed Rupert House and by Québec, Fort Rupert; today the settlement is Waskaganish.

9 Lac Guillaume-Delisle, Tasiujaq (Inuktitut) and Iyaatiwiinipaakw (Cree).

10 Lac à l'Eau Claire, Allait Qasigialingat (Inuktitut) and Wiiyaasaakamii (Cree).

11 Lac des Loups Marins, Muushiwaau aahchikunipii (Cree).

12 Interviewed at Great Whale River in 1978, Josua Sala, an Inuk elder, said he had only been as far inland as Lake Minto; he only goes where there are no trees as it is difficult to travel through the forest (Archéotec 1978:28.17).

13 The present-day Inuit settlement is Kuujjuarapik; the Cree one is Whapmagoostui and in Québec it is called Poste-de-la-Baleine.

14 The Inuit name for Little Whale River is Qilalugarsiuvik and in Cree it is Whapmagoostuish.

15 The whales taken were beluga whales for the oil they produced. One ton of oil could be obtained from 7 whales (HBCA B.372/e/5:1901, fo.21). The whale skins were also commodities.

16 Potts brought to Richmond Gulf an Albany Cree woman to instruct him in the dialect of the area. One can only speculate that she was originally from the southeast Hudson Bay coast and had been taken as a child captive in lieu of an Inuit one. Also, one Cree told Potts that his brother and three others were killed by the Albany and Moose River Indians about 12 years earlier (HBCA B.182/a/7:19 July 1755).

17 The name is identifiable today as Naskapi though it may not refer to the same people. There were several groups with that name in the Québec-Labrador peninsula. Mailhot (1981) suggests the name refers to "people at the other end" which might explain the multiple designations.

18 Later renamed "Fort George," and today's community of Chisasibi or Mailasik.

19 The Northwest Company, formed in 1779 out of Montreal, was a vigorous rival to the Hudson's Bay Company throughout the north of Canada until its operations were terminated in 1821.

[20] The winter of 1815-16 proved to be a cruel one for northward peoples (HBCA B.77/a/3, 27 May 1817) and was likely linked to the severe disruption, worldwide, of weather patterns caused by the eruption of Mt. Tambora in Indonesia in 1815.

[21] The river is known today as the Koksoak River.

[22] The overland route starting at Great Whale River took 21 days (HBCA B.372/e/5, fo.24, 1891).

[23] The HBC officials labeled hunters "indolent" when they preferred living off caribou to trapping fur animals.

[24] The Cree spoken in Northern Manitoba is "Swampy Cree" and different from the East Cree of James and Hudson Bay (Pentland 1978).

[25] Today Sanikiluaq. It is in dispute if these islands were named after Edward Belcher who in the 1850s commanded the British rescue squadron in search of Franklin or an 18th century Hudson's Bay Company commander (Finkelstein and Stone 2004:278, f.n. 37). Given that the designation "Belchers" first appears in the Hudson's Bay Company records in 1860 (B.372/b/1) in correspondence from Great Whale River, it may well be the first explanation. The Inuit name is derived from a principal family there, Sanawkeyalook (HBCA B.388/a/1,13 Sept. 1938).

[26] In 1918, Flaherty (1918:436) identified Cape Jones as the southern boundary of the "habitat of the Inuit."

[27] According to the geoglogists, the Leiths (Leith and Leith, 1912:169), the Inuit eat foxes only if starving.

[28] It is understood that this designation "island Eskimo" refers to the Belcher Islands.

[29] It is very possible that at the end of the 19th century a greater percentage of Native Peoples were literate than Canadians to the south.

[30] Fort George was Revillon Frères' headquarters for the region, one of its strongest. Great Whale River and Fort George, both arctic fox posts, provided them with significant profits (Ray 1990:153).

[31] The first Revillon Frêres post, on the Ungava coast, was Fort Chimo, opened in 1903, close to the Hudson's Bay Company store (Harris 1976:25-28).

[32] Today known as Inukjuak. Port Harrison was named by Low after Mitchell Harrison, president of Dominion Development Company . (See Finkelstein and Stone 2004:82).

[33] The federal Department of Health had been created in 1919 (Morantz 2002:185). It seems as though during the Second World War, medical services to the north were unusually minimal; it was difficult to find doctors; moreover, planes and boats were in short supply (LAC RG22 v283 f40-8-1, pt.1, 11 Nov., 1943).

[34] The rates of those infected with TB in 1950 were (percentage of population): Great Whale River, 13.79%; Belchers 1.3%, Richmond Gulf 10.1%, Port Harrison, 5.4% (Anonymous 1950:46-47). Grygier (1994:156) suggests that in Québec there were fewer active cases of TB compared to elsewhere in the north.

[35] Other hospitals to which Inuit and Crees were sent were the Catholic mission one at Fort George where 8 Inuit were hospitalized in 1952 (LAC RG85 v1207 f201-1-8, pt.3, 1 May 1952) and a small 10-bed private one built for Bell Telephone employees at Great Whale River, the facilities of which were open to Crees and Inuit ((LAC RG85 v1476 f254-1-603, pt.9, Jan-Feb. 1956). By 1952 nursing stations were established in the communities (LAC RG85 v1130 f254-1,pt.1, 2 May 1952).

[36] Family Allowance payments, called "children's money" by the Crees, was a monthly grant made to all Canadians beginning in 1944, for each child 16 years old and younger. The Crees began receiving it in 1945 and the Inuit had to wait until 1947, it having taken longer to register them (I. Davies 1948:361). For Canadians in general, the monthly family allowance was paid by cheque; for the Native population it was paid through credit at the Hudson's Bay Company or other store and was given in basic food rations that would serve the needs of children (Morantz 2002:209). The family allowance and other transfer payments, such as old-age, made up a considerable portion of a family's annual income and for old people, their pensions enabled them to live at the post in the winter.

[37] There was also a fishery cooperative operating in Richmond Gulf in 1964 in which one Cree also participated (Wills 1984:11).

[38] Fort Chimo air basewas in operation for seven years, attracting Inuit, Crees and Montagnais. It was the first time people received cash, albeit \$2.00 per day but more than could be earned in trapping (Crowe 1991:174).

[39] Martin (2002) comments that the congregating of Inuit at Great Whale River from different parts of the region did not become permanent and he discusses the causes of the relocation to the new settlement of Umiujaq in 1986.

[40] See Wills (1984: 8, 14, 81-84) for maps of the hunting lands of Crees trading at both Richmond Gulf and Great Whale River prior to 1955 and then 1963-64.

[41] The chief of the Indian Council was Mr. John Padagumskum [Patageskum] and the president of the Eskimo Council was Mr. Paulosie Napartuk (LAC RG85 v1958 f1006-8, pt. 4, 20 July 1965).

6 CULTURAL AND NATURAL HERITAGE PROTECTION

The study area for the Park Project lies on some of the oldest rocks of the Canadian Shield and encompasses representative sections of the natural regions known as the Hudson Plateau and the Hudson Cuestas.

This exceptional area is characterized by geographical elements of interest, such as the Lac Guillaume-Delisle graben, the cuestas situated along the coast of Hudson Bay, and the Lac à l'Eau Claire [Clearwater Lake] meteorite craters. Also in this area, the many identified archaeological sites are proof of thousands of years of intermingled occupation by Arctic and American Indian peoples. For their part, the remains of trading posts (some of which may be over one hundred years old) provide evidence of the arrival of Euro-Canadians in the region. Straddling arctic and hemi-arctic climatic areas, the study area nurtures habitat for several rare or vulnerable species of vascular and invascular flora. The study area's wildlife is marked by the presence of several exceptional or at-risk species, including a stock of freshwater harbour seal.

This section of the Status Report presents an overview of the elements of interest that mark this majestic territory.

Areas of Interest

The Park Project possesses four areas of interest. The boundaries of these areas have been defined by the presence of elements that are noteworthy in terms of their geographical, biological or human characteristics (Map 6.1). Table 6.1 lists the identified elements of interest, while the maps appearing in the previous sections of the Status Report may be consulted for further information.

The four identified areas shelter at-risk species of flora and wildlife, and may contain archaeological sites associated with Arctic and American Indian peoples as well as Euro-Canadians. The identified areas also contain noteworthy or unique aesthetic elements. Finally, even today the entire study area is important to Inuit and Cree for their subsistence harvesting activities.

AREA 1: RIVIÈRE NASTAPOKA AND THE HUDSON BAY COAST

Situated in the northwestern part of the study area, this area of interest covers the Rivière Nastapoka [Nastapoka River] and a section of the Hudson Bay coast. The hills along the coast, which were once islets or shoals during the transgression of the Tyrell Sea, offer a spectacular view of Hudson Bay.

Not far upstream from the mouth of the Rivière Nastapoka, an impressive 35-m waterfall divides the river: the river or upstream section and the estuary or downstream section. The estuary is a major zone where concentrations of beluga may be observed between mid-July and the end of August. The estuary is moreover a designated sanctuary that offers this species protection from harvesting. For its part, ouananiche (landlocked, fresh-water Atlantic salmon) inhabit three sections of the Rivière Nastapoka, the longest river in the study area. This species is probably the only population of salmon on the eastern shores of Hudson Bay.

Straddling the arctic tundra and a discontinuous permafrost zone, this area of interest possesses a concentration of palsa and frost mounds. The invascular flora is characterized by a newly identified lichen in Québec and a rare sphagnum.

Several waterfalls punctuate the Rivière Nastapoka. The waterfall shown in this photograph, which is not less than 30 m, is the closest to the river's mouth, roughly 1.4 km from Hudson Bay.
Credit: Josée Brunelle (KRG)

Table 6.1 Elements of the Areas of Interest in the Study Area

AREA OF INTEREST	PHYSICAL ENVIRONMENT
1. RIVIÈRE NASTAPOKA AND THE COAST OF HUDSON BAY	Coast: marine action, beach and delta 35-m waterfall on the Rivière Nastapoka, near its mouth Waterfall across a fault, 15 km upstream Fluvioglacial delta, outwash plain, sand and gravel deposits Small frontal moraines that run north–south Coastal hills with peaks above 220 m
2. LAC GUILLAUME-DELISLE AND THE PETITE RIVIÈRE DE LA BALEINE	Second largest lake of the study area Palsa fields; horst; frontal moraines Rivière au Caribou: structural valley, plateau-graben transition Rivière à l'Eau Claire: a series of gorges and ledges, marine delta, perched terraces and beaches Île Cairn: sharp ridges that run east-west, glacial striation, wash-away area, panoramic view South of Lac Mikirnguup: glacial cirque and clay plain Le Goulet: high cliffs, talus, strong currents, polynya Cuestas and graben Petite rivière de la Baleine: clay deposits covered by sand and gravel; deposits reworked by the wind; landslides; cuesta faces and talus

BIOLOGICAL ENVIRONMENT	HUMAN OCCUPATION
Wildlife Rivière Nastapoka: major estuary where concentrations of beluga (a species likely to be designated as threatened or vulnerable in Québec; endangered in Canada) may be observed between mid-July and the end of August; the estuary is a beluga sanctuary (harvesting is prohibited) Nesting short-eared owl (species likely to be designated as threatened or vulnerable in Québec) Presence of ouananiche (freshwater salmon): probably the only population of salmon on the eastern shores of Hudson Bay **Flora** Invascular flora: a newly identified lichen in Québec and a rare sphagnum in Québec	Area currently used by Inuit and Cree Scenic area Sport hunting and fishing outfitter activities
Wildlife Caribou migration route when the lake is frozen Moose are sometimes observed breeding south of this area Species at risk (beluga, golden eagle, harlequin duck, peregrine falcon, barrow's goldeneye, bald eagle, short-eared owl, fourhorn sculpin) The rivers that drain into Lac Guillaume-Delisle are considered important areas for the conservation of golden eagle, harlequin duck and peregrine falcon Arctic charr are present in only one watercourse that flows into Lac Guillaume-Delisle, a stream on the western shores of the lake Confirmed observation of two amphibian species at Lac Guillaume-Delisle: American toad and wood frog Petite rivière de la Baleine: major estuary where concentrations of beluga (a species likely to be designated as threatened or vulnerable in Québec; endangered in Canada) may be observed between mid-July and the end of August; the estuary is a beluga sanctuary (harvesting is prohibited); important area for the conservation of golden eagle and harlequin duck; excellent nesting sites for golden eagle **Flora** Invascular flora: newly identified lichens in Québec; rare mosses in Québec; rare bryophytes in Québec Vascular flora: ten taxa likely to be designated as threatened or vulnerable; high concentration of calcicole plants; taxa that are rare or at the limit of their ranges; balsam poplar genetic diversity; species that may be designated as at risk in Canada; presence of balsam poplar clones	Sites occupied by Arctic peoples (precontact, historical, recent historical and contemporary periods) Sites occupied by American Indian peoples (precontact, historical, recent historical and contemporary periods) Sites occupied by Euro-Canadians Area currently used by Inuit and Cree Scenic area

Table 6.1 (continued) Elements of the Areas of Interest in the Study Area

AREA OF INTEREST	PHYSICAL ENVIRONMENT
3. LAC À L'EAU CLAIRE	Largest lake in the study area; second largest lake in Québec Northeast shoreline: glacial-lake delta, kettle, beach ridges, dunes, esker reworked by the Paleo-lake, palsa and thermokarst Central islands: drumlins with rock cores, impactites Île Atkinson: panoramic view of the lake and central islands, rocks metamorphosed by the meteoritic-impact, fragments of Ordovician rocks, crag-and-tail moraines, erosion notches, delta formed by the Paleo-lake
4. PETIT LAC DES LOUPS MARINS AND LACS DES LOUPS MARINS	**Petit lac des Loups Marins and Lac D'Iberville** Headwaters of the Rivière Nastapoka Watershed between the Petite rivière de la Baleine and Ungava Bay drainage basins Geological structure buried under glacial deposits Location of an ice divide of the Labrador Dome Frontal moraines, formations created by the Laurentide Ice Sheet as it disappeared from the study area and Québec **Lacs des Loups Marins** Third largest lake in the study area Southwestern shoreline: drumlins, eskers, fluvial outwash, Rogen Moraine, representative area of the Hudson Plateau where the structure is buried under deposits

AREA 2: LAC GUILLAUME-DELISLE AND THE PETITE RIVIÈRE DE LA BALEINE

Situated in the southwestern part of the study area, this vast area of interest covers the entire Lac Guillaume-Delisle [Richmond Gulf] graben and a section of the Hudson Cuestas. The area possesses many biological, geological, geomorphological and historical sites of interest, and the landscape is especially scenic.

Specifically, this area of interest includes habitat for several species considered at risk. The habitat found in the river basins that empty into Lac Guillaume-Delisle (the second largest lake of the study area) are considered important conservation areas for golden eagle, harlequin duck and peregrine falcon. The brackish waters of the lake, for their part, provide habitat for seal and beluga, and when frozen form a major migration route for caribou.

Given their physiographic characteristics, the cuestas near the Petite rivière de la Baleine [Little Whale River] offer the best nesting sites in the study area for golden eagle, a species considered vulnerable in Québec. Beluga for their part congregate in the estuary of the Petite rivière de la Baleine during their moulting period from mid-July to the end of August. The estuary is also a designated sanctuary that offers this species protection from harvesting.

The Lac Guillaume-Delisle and Petite rivière de la Baleine area of interest is of an exceptional beauty. Île Cairn [Cairn Island] simultaneously provides views of Lac Guillaume-Delisle to the north, cuestas to the south and northwest, and a transition zone between the Hudson Plateau and the graben to the south. The Hudson Cuestas are the largest in Québec and a very important aesthetic element of the study area. From the summits of these cuestas, the panoramic view of the entire region is breathtaking.

BIOLOGICAL ENVIRONMENT	HUMAN OCCUPATION
Wildlife High concentration of caribou in winter (on the eastern shores of the lake) Nesting short-eared owl (a species likely to be designated as threatened or vulnerable in Québec) **Flora** Invascular flora: rare bryophytes in Québec, a rare moss in Québec; a rare sphagnum in Québec; two newly identified lichens; especially rich area for sphagnum with 23 species (Île Kuchistiniwamiskahikan) Vascular flora: taxa that are rare or at the northern limit of their ranges; a species that may be designated as at risk in Canada; presence of balsam poplar clones; presence of calcicole plants	Sites occupied by American Indian peoples (precontact, historical, recent historical and contemporary periods) Traditional travel route between Hudson and Ungava bays Area currently used by Inuit and Cree
Wildlife High concentration of caribou in winter (on the southern shores of Petit lac des Loups Marins) Freshwater stock of harbour seal (a species likely to be designated as threatened or vulnerable in Québec) Several ledges located around Lac Bourdel and the southwestern and northwestern shores of Lacs des Loups Marins	Area currently used by Inuit and Cree Traditional travel route between Hudson and Ungava bays Sport hunting and fishing outfitter activities (Lac Bourdel)

The vascular flora of this area of interest contains several rare taxa. Of the 50 rare taxa identified throughout the study area, 34 are present in the Lac Guillaume-Delisle and Petite rivière de la Baleine area. Balsam poplar clones and centres of genetic diversity may be found along the shores and on the islands of Lac Guillaume-Delisle. Regarding invascular flora, the area nurtures newly identified lichens as well as mosses and bryophytes that are rare in Québec.

A good many archaeological sites provide evidence of the past occupation (thousands of years ago, in some cases) of Arctic and American Indian peoples. For their part, the arrival of Euro-Canadians in the study area is marked by the remains of trading posts dating from the 18th and 19th centuries. Finally, even today the Lac Guillaume-Delisle and Petite rivière de la Baleine area of interest is important to Inuit and Cree for their subsistence harvesting activities.

AREA 3: LAC À L'EAU CLAIRE

The third area of interest encompasses the two basins of Lac à l'Eau Claire, the second largest lake in Québec. Created by meteoritic impacts, the western and eastern basins are respectively the 22nd and 35th largest craters on the earth. The basins form two almost completely separate circular depressions, divided only by a myriad of islets. The vastness of the lake and central islands may be viewed from the hills that encircle the lake.

This area of interest is marked by several American Indian archaeological sites, both on the shores and islands of the lake. Although archaeological sites associated with Arctic peoples are also likely present, such sites have not yet been reliably documented. Still today, this area of interest is important to Inuit and Cree for their subsistence harvesting activities. The area also represents a traditional travel route between Hudson and Ungava bays.

In winter, caribou congregate around the eastern end of Lac à l'Eau Claire. Short-eared owl, a species likely to be designated as threatened or vulnerable in Québec, has been observed around the lake. A few rare species of invascular flora, including a moss and a liverwort, have also been identified. For their part, an incredible 23 sphagnums have been sampled on Île Kuchistiniwamiskahikan [Kuchistiniwamiskahikan Island], situated in the northeastern part of the lake. Finally, certain vascular flora taxa are rare or reach the northern limit of their ranges in this area of interest.

AREA 4: PETIT LAC DES LOUPS MARINS AND LACS DES LOUPS MARINS

Situated in the eastern part of the study area, this area of interest comprises Lacs des Loups Marins [Upper Seal Lake], Petit lac des Loups Marins [Lower Seal Lake] and Lac D'Iberville. These lakes represent the headwaters of the Rivière Nastapoka as well as the watershed between the drainage basins of the Petite rivière de la Baleine and the Rivière aux Mélèzes [Larch River].

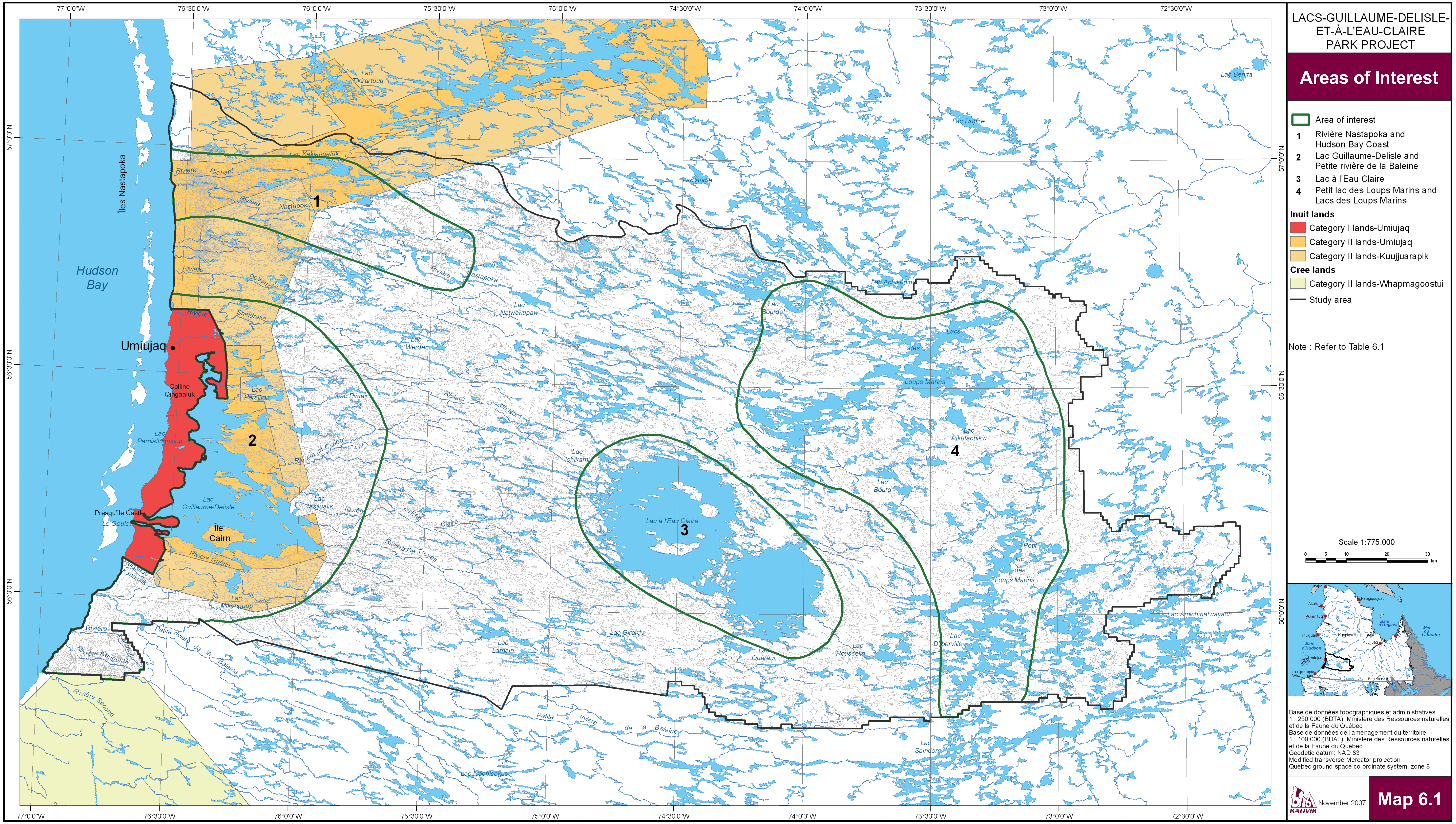
This area also contains a few geomorphological elements of interest. For example, drumlins, eskers, fluvial outwash and the highest peaks of the Rogen Moraine are present around Lacs des Loups Marins. Near Lac D'Iberville and Petit lac des Loups Marins, the small frontal moraines found in this area were formed by the retreating Laurentide Ice Sheet just before it disappeared completely from the study area and Québec during the Wisconsin period.

Wildlife in this area of interest is unique in the study area. Specifically, the lakes of the area are inhabited by a stock of freshwater harbour seal, a species of *special concern* in Canada and *likely to be designated as threatened or vulnerable* in Québec. Considered an endemic species, the stock is vulnerable to human-induced interference and natural disaster.

Still used today by Cree and Inuit for subsistence harvesting activities, this area of interest represents a traditional travel route between Hudson and Ungava bays.

Next Steps towards the Creation of the Park

A draft master plan, produced by the Direction of Sustainable Development, Ecological Heritage and Parks of the Ministère du Développement durable, de l'Environnement et des Parcs [sustainable development, environment and park] MDDEP, completes the Status Report. It describes 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. The draft master plan was developed in co-operation with the communities of Umiujaq, Kuujjurapik and Whapmagoostui through the 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. As well, 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. *Parc national des Lacs-Guillaume-Delisle-et-à-l'Eau-Claire* (national park) will be the third park established in Nunavik. *Parc national des Pingualuit* was created in January 2004 and *Parc national Kuururjuaq* should be created in 2008.


LACS-GUILLAUME-DELISLE-
ET-À-L'EAU-CLAIRE
PARK PROJECT
Areas of Interest
Area of interest
1 Rivière Nastapoka and Hudson Bay Coast
2 Lac Guillaume-Delisle and Petite rivière de la Baleine
3 Lac à l'Eau Claire
4 Petit lac des Loups Marins and Lacs des Loups Marins
Inuit lands
Category I lands-Umiujaq
Category II lands-Umiujaq
Category II lands-Kuujjuarapik
Cree lands
Category II lands-Whapmagoostui
Study area
Note : Refer to Table 6.1
Scale 1:775,000
0 5 10 20 30 km
Base de données topographiques et administratives 1 : 250 000 (BDTA), Ministère des Ressources naturelles et de la Faune du Québec
Base de données de l'aménagement du territoire 1 : 100 000 (BDAT), Ministère des Ressources naturelles et de la Faune du Québec
Geodetic datum: NAD 83
Modified transverse Mercator projection
Québec ground-space co-ordinate system, zone 8
KATIVIK
November 2007
Map 6.1
Hudson Bay
Îles Nastapoka
Umiujaq
Colline Qingaaluk
Lac Guillaume-Delisle
Presqu'île Castle
Le Goulet
Île Cairn
Lac à l'Eau Claire
Lac Tikirartuuq
Lac Kakiattualuk
Rivière Richard
Rivière Nastapoka
Rivière Devaux
Rivière Sheldrake
Lac Persillon
Lac Pamiallugusiup
Rivière au Caribou
Lac Tasijualik
Rivière à l'Eau Claire
Rivière De Troyes
Rivière Guérin
Lac Mikinnguup
Rivière Kanajulik
Rivière Kuugjuluk
Petite rivière de la Baleine
Rivière Second
Lac Natwakupaw
Lac Werden
Lac Pintair
Rivière du Nord
Lac Ichikami
Lac Girardy
Lac Lamain
Lac Quéreur
Lac Rousselin
Lac D'Iberville
Lac Bourg
Lac Pikutachikw
Lacs des Loups Marins
Petit lac des Loups Marins
Lac Bourdel
Lac Achikunipi
Lac Audié
Lac Duplre
Lac Benita
Lac Amichinatwayach
Lac Saindon
Lac Iyachisakus
Kangiqsujuaq
Akulivik
Puvirnituq
Inukjuak
Baie d'Hudson
Umiujaq
Kuujjuarapik
Whapmagoostui
Kangiqsualujjuaq
Kuujjuaq
Baie d'Ungava
Mer du Labrador
Schefferville

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HISTORICAL OVERVIEW OF THE LIFE OF INUIT AND CREE IN SOUTHEASTERN HUDSON BAY, 1740–1970

Archives

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Head office archives:
A.11 – London Inward Correspondence

Trading post archives:
B.59/a Eastmain Post Journals
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GLOSSARY[1]

Abbreviations

n.: noun; simple term	**pl.**: plural
adj.: adjective	**pr.**: proper
ph.: phrase; complex term	

Amphibolite: n. [geology, petrography] General metamorphic rock consisting of amphibole and plagioclase, with some cleavage and a relatively massive texture, coloured dark green.

Angular unconformity: ph. [geology] Erosion surface that breaks rock layers on an angle.

Anticyclonic: adj. [climatology] Pertaining to an anticyclone, an atmospheric high pressure zone with closed circulation, that rotates clockwise in the Northern hemisphere.

Archean: pr. n. [geological period] First eon of the Precambrian, from the creation of the earth roughly 4.5 billion years ago to 2.5 billion years ago.

Arkose: n. [geology, petrography] Sedimentary rock derived from the erosion of emergent rock containing quartz grains (up to 60%), feldspath (25%) and frequently some mica. Especially formed of clay, which cements the grains together and comprises close to 15% of the rock.

Artifact: n. [archaeology] Object produced and used by humans that provides information about the culture of its creator.

Aulacogen: n. [tectonics] Tectonic trough that is longer than wide, situated perpendicular to the edge of a continent. The collapse is often progressive and occurs simultaneously with sedimentary filling. Current sedimentary mantle has levelled the trough. The structure is interpreted as a failed rift.

Basaltic: adj. [volcanism] Pertaining to basalt, a black-coloured extrusive igneous rock composing 95% of all continental and oceanic lava.

Before present (abbreviation, BP): ph. Indication of time calculated conventionally from 1950 A.D.

Bioaccumulation: n. [ecology] Accumulation of a substance in a living organism, at concentrations that sometimes exceed those normally found in the environment of the organism.

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

Biotope: n. [ecology] Well-defined geographic area, characterized by specific ecological conditions (soil, climate, etc.) that physically support the organisms composing the biocoenosis.

Breccia: n. [geology] In geology, any rock that is composed of angular fragments with diameters exceeding 2 mm (at least 50%) held together by a cement (sedimentary, tectonic or volcanic breccia).

Bryophyte: n. [botany] Land or semi-aquatic plant that possesses neither vessels nor roots. Bryophytes include liverworts, mosses and anthocerotae. The latter are not found in Nunavik. (adj.: bryophytic)

Butte: n. [geological structure] Part of a ledge separated by a valley. A transitional form between plateau and outlier.

Caldera: n. [volcanism] Crater with a diameter exceeding 1.5 km, created by the collapse of the edge of a volcanic vent or sometimes by its explosion.

Calf: n. [zoology] Small beluga or caribou, from birth until it is weaned.

Chert: n. [geology] Hard but brittle cryptocrystalline rock with a conchoidal fracture.

Chionophilous: adj. [botany] Pertaining to a plant that can grow in snow.

Cirque: n. [glaciation] In mountain areas or at high elevations, semi-closed bowl-shaped depression carved by a small glacier, often from a snow niche.

Continental ice sheet: n. [glaciation] Vast field of ice that may be a few kilometres thick at its centre and the edges of which form arms or ice barriers. For example, the ice sheets in Antarctica and Greenland.

COSEWIC: Committee on the Status of Endangered Wildlife in Canada.

Craton: n. [geological phenomenon] Bedrock formed largely of granite blocks or plutons. Large, stable portion of the continent as opposed to reworked, unstable portions such as orogens.

Crustaceous lichen: ph. [botany] Lichen that adheres to the substratum (bark, rock or soil).

Cryptogam: n. [botany] Plant without flowers, seeds or apparent reproductive organs. Includes fungus, ferns and mosses. (adj.: cryptogamian)

Cuesta: n. [landform, structural geomorphology] Non-symmetrical landform with a steep slope (face) and a gentler slope (back), produced by the differential erosion of inclined layers of sediment along fault lines.

Cyclonic: adj. [climatology] Pertaining to a cyclone, an atmospheric low pressure zone with closed circulation, that rotates counter-clockwise in the Northern hemisphere.

Diagnostic artifact: ph. [archaeology] Artifact identified with a specific cultural period that indicates relative chronology (in comparison with radiocarbon dating).

Drumlin: Irish n. [glaciation] Hill that stretches in the direction of glacial flow, formed by the remnants of a ground moraine of a former glacier.

Dyke: n. [geology] Tabular body of igneous rock (tens or hundreds of metres thick) that cuts through the structures of the surrounding rock. After erosion, a dyke may remain to form a wall.

Ecosystem: n. [ecology] The structured aggregate consisting of a biocoenosis and a biotope.

Esker: Swedish n. [glaciation] An elongated ridge that runs parallel to a valley or a retreating glacier, composed of fluvio-glacial sediments and representing the former bed of a watercourse that was forced through a sub-glacial tunnel.

Eustasy: n. [geology, oceanography] 1. Worldwide fluctuations of sea level.
2. Phenomena responsible for such fluctuations. (adj.: eustatic)

Facies: n. (aspect) Classification of rock determined by one or more lithologic (lithofacies) or Paleontologic (biofacies) characteristics. Metamorphic facies include granulites and amphibolites.

Felsic: adj. [petrography] Pertaining to clear-coloured igneous rock, containing little iron or magnesium but large quantities of feldspath and quartz.

Flora: n. [botany] Aggregate of plant species present in a region.

Fluvio-glacial: adj. [glaciation] Pertaining to a phenomenon or the detritus produced by melt waters from a glacier (refer to outwash).

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

Foliation: n. [petrography, mineralogy] Structure visible in certain metamorphic rocks where the schistosity contains differentiated band-like layers. Especially present in rocks that have been subjected to relatively intense metamorphism.

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

Frontal moraine: ph. [glaciation] Formed at the front of a glacier, it marks precisely the glacier's former stationary phases. May be several tens of metres high and several hundreds of kilometres long.

Frost mound: ph. [periglacial phenomenon] Mound of mineral soil produced by the expansion of ice under the soil.

Frost sensitive: adj. [periglacial phenomenon] Pertaining to a phenomenon or a material that is likely to break or crumble as a result of freeze-and-thaw action. A rock fragment produced by freeze-and-thaw action is a congelifract.

Giga annum (abbreviation, Ga): ph. Latin term meaning one billion years.

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

Gneiss: n. [petrography] Very common metamorphic rock produced deep under the earth's surface and characterized by alternating dark layers (ferromagnesian minerals) and clear layers (quartz and feldspath). Paragneiss derives from sedimentary rocks, while orthogneiss derives from igneous rock.

Graben: n. [structural geomorphology] Collapsed section of the earth's surface that forms a trough and is bordered by a network of parallel and often step-like faults. Produced by pressure in the earth's crust.

Granite: n. [petrography] Very common clear-coloured (white, grey, pink, red, blue) plutonic igneous rock consisting essentially (close to 80%) of quartz and feldspath. Secondary minerals vary, including mica, amphibole, pyroxene, apatite, zircon and tourmaline.

Granulite: n. [geology] Fine-grained, clear-coloured 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)

Growing degree-day: ph. [climatology] Indicator of the total temperature above 5°C for plants on a daily basis during the growing season.

Hogback: n. [sedimentary rock, structure] Landform, ridge composed of very steep (predominantly vertical or subvertical) strata. Frequent in regions where tectonics are powerful.

Horst: n. [tectonics] Block raised between more or less parallel faults.

Hummock: n. [oceanography] Mass of ice raised by pressure.

Ice-contact: adj. [glaciation] Pertaining to a phenomenon or an action that occurs due to contact with a glacier, or on the edge of a glacier (deposit, terrace, esker).

Impactite: n. [geology] Rock produced at the time of impact of a large meteorite by fused metamorphism (formation of glass) and crystallization of specific minerals.

Inukshuk (pl., inukshuit): Inuktitut n. Markers built from rocks and serving various purposes such as to identify a location or a route.

Invascular: adj. [botany] Pertaining to cryptogams which do not possess vessels, including algae, fungus, liverworts, mosses and sphagnums.

Isostasy: n. [glaciation] General equilibrium that occurs at a certain depth under the earth's surface. The collapse of a portion of the earth's crust that causes the lifting of another portion is referred to as isostatic compensation. The rising of a continent as it regains its original position, with the melting of ice sheets, is referred to as isostatic rebound.

Kayak: Inuktitut n. Closed watercraft constructed of animal skins with one opening that permits entry of the lower body, and propelled with a paddle. Designed to transport a single person, it can nonetheless accommodate one other passenger.

Kettle: n. [glaciation] Kettle-shaped cavity found in fluvio-glacial sediment, formed by the melting of an under-lying ice block. Kettles are usually roughly ten metres in diameter, but can reach a few hundred metres in diameter.

Kilo annum (abbreviation, ka): ph. Latin term meaning one thousand years.

Krummholz: n. [botany] Stunted and twisted tree that is covered by snow in winter.

Lava: n. [geology] Rock that issues in a fused liquid or viscous state from a volcano, and that produces flows of variable distances.

Ledge: n. [oceanography] Area situated at or slightly above the waterline with conditions that encourage the gathering of colonies of amphibious marine mammals.

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

Liverwort: n. [botany] Invascular bryophytic plant, of which the thallus or leaves are often divided in two and resemble a liver.

Mafic: adj. [petrography] Pertaining to dark-coloured igneous rock that is rich in iron and magnesium.

Magma: n. [geology] Liquid at a high temperature (at least 660°C) that produces rock following solidification, either at great depth under the earth through a slow cooling (plutonic rock) or on the surface through the rapid cooling of lava (volcanic rock). (adj.: magmatic)

Meadowood: pr. n. [archaeology] Culture that developed from 1000 to 500 B.C. and identified at sites in Québec and New York state. Meadowood culture was revealed with the discovery of cemeteries. It is characterized by a slow evolution of funeral rites in which cremation became the common practice. Its burial sites often contain rich artifacts, including many triangular chert blades, carefully cut uniquely for placement at burial sites.

Meander: n. [watercourse] Asymmetrical banks of a watercourse that generally flows in a single direction while winding back and forth.

Mega annum (abbreviation, Ma): ph. Latin term meaning one million years.

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 or magmatism.

Meta-population: n. [ecology] In the context of caribou, a group of herds in a large region where gene flow between the herds is possible (Boulet et al., 2005).

Minerotrophic: adj. [botany] Pertaining to a peat bog that is fed by mineral-rich (generally surface runoff) water.

Monoclinal: adj. [structural geomorphology] Pertaining to structures where the layers are inclined in the same direction over vast stretches and, of course, have not been affected by folding.

Moraine: n. [glaciation] 1. A landform comprising glacial sediment, especially till, that has been deposited by a glacier into any number of shapes, including many closed depressions. 2. a) Refers to the heterometric detritus of pebbles, gravel, sand and clay that covers large sub-rounded unpolished blocks. b) Refers to the landforms created by the heterometric detritus and large blocks. (adj.: morainic)

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

Oligotrophic: adj. [botany, limnology] In botany, pertaining to a plant species that adapts well in poor-nutrient environments. In limnology (lake hydrology), pertaining to a lake with low levels of nutrients.

Ombrotrophic: adj. [botany] Pertaining to a peat bog fed exclusively by precipitation.

Ordovician: pr. n. [geological period] Second period of the Paleozoic (Primary age) that occurred between 500 and 435 million years before present and began with a glut of trilobites. The seas of the Ordovician covered the Canadian Shield.

Orogen: n. [tectonics] A mountain range created along an unstable portion of the earth's crust that has been compressed and folded.

Orogeny: n. [tectonics] Any process that produces landforms and in particular orogens. (adj.: orogenic)

Ortho-: [petrography] Prefix that signifies genuine. With metamorphic rocks, the prefix indicates that it is derived from magma (for example, orthogneiss).

Outwash: n. [water] Flat surface covered with fine sediment spread by a watercourse.

Paleo-current: n. [paleogeography] Ancient marine, lake or fluvial current.

Paleo-shoreline: n. [paleogeography] Ancient shoreline of a lake or sea that no longer exists.

Palsa: Russian n. [periglacial phenomenon] Peat hummock with an ice core. Palsen are generally found in bogs in discontinuous permafrost zones.

Peat bog: ph. [biogeography] An area that is somewhat acidic, consisting of peat and characteristic of wetlands. Peat bogs are colonized by typical low-growing plants, including moss, sedge, heath, etc.

Peneplain: n. [flattening, landform evolution] Vast flat surface created by erosion that wears away interfluves (peneplanation), regardless of rock type or structure.

Periglacial: [cold climates] 1. n. In geomorphology, periglacial action is the spatial movement of soil as its freezes and thaws, as well as related mechanisms and phenomena. 2. adj. Pertaining to the morphogenic activity of alternate freezing and thawing.

Polynya: n. [oceanography] 1. Opening of water surrounded by or next to pack ice. 2. Permanently open body of water.

Precambrian: [geological period] 1. pr. n. Period of time formerly known as an era, the Precambrian comprises two eons: the Archean from 4.5 to 2.5 Ga and the Proterozoic from 2.5 Ga to 570 Ma. 2. adj. Pertaining to a phenomenon of the Precambrian.

Prismatic (or columnar) lava: ph. [geology] Lava in which the prisms are oriented vertically.

Proterozoic: pr. n. [geological period] Second eon of the Precambrian, the Proterozoic lasted from 2500 to 570 Ma. It is subdivided into three eras: the Paleoproterozoic (2500–1600 Ma), the Mesoproterozoic (1600–1000 Ma) and the Neoproterozoic (1600–570 Ma).

Qammaq (pl., qammait): Inuktitut n. Semi-subterranean house, set in the ground and generally consisting of a sleeping bench and an entrance tunnel. The walls were often constructed of blocks of peat plus wood and bones, and the roofs were covered with animal skins or peat.

Quaternary: pr. n. [geological period, glaciation] Fourth and last era of the Phanerozoic; the current era which began in 1.6 Ma and is marked by the appearance of humans as well as by the expansion and then partial retreat of continental ice sheets.

Ribbed moraine: ph. [glaciation] Formed under the front of a glacier during deglaciation. Reaching above 10 m in height and aligned parallel to the glacier's front.

Rift: n. [geology] 1. Continental rift: collapsed trough (graben) circumscribed by raised edges, and more or less powerful volcanic activity. 2. Oceanic rift: collapsed central area in an undersea ridge.

Sphagnum: n. [botany] Type of moss that grows in bogs which, when it decomposes, produces peat.

Squamous: adj. [botany] Having the appearance of scales.

Stratigraphic: adj. [geology] Pertaining to stratigraphy, the study of sedimentary deposit sequences, generally arranged in layers (or strata). According to the principle of superposition, the lower layer is older.

Stromatolite: n. [paleontology] Disk- or mammillary-shaped unit of algae produced by cyanophyte (blue-green algae). One of the first forms of organized life on earth (after bacteria). (adj.: stromatolitic)

Sub-aerial: adj. [basic concept] Pertaining to a phenomenon or action that occurs between the surface of the earth and the atmosphere (process, formation, erosion).

Subsistence: n. [geology, lithosphere] Progressive, regular or saccadic sinking, over a long period, of the floor of a sedimentary, marine or other type of basin.

Talweg: n. Line connecting the lowest points along a valley.

Taxon: n. [biology] Unit (family, genus, species, form) of the zoological or botanical classification system. For example, *Cetraria islandica* subsp. *crispiformis* and *Cetraria islandica* subsp. *islandica* are two distinct taxa of the same species.

Tectonics: n. [geology, lithosphere] Aggregate of deformations occurring in rock after its formation (folds, breaks, faults, etc.).

Terricolous: adj. [botany, zoology] In botany, pertaining to lichens that grow directly in mineral or organic soil. In zoology, pertaining to animal organisms that live in the earth.

Thermokarst: n. [periglacial phenomenon] Shallow depression a few tens of metres in diameter, without a typical shape, produced by permafrost thawing. Such a depression filled with water is called a thermokarst pond.

Till (synonym: glacial till): n. [geology, sedimentology] Unconsolidated sediment deposited directly by a glacier and consisting of a loose mix of blocks, gravel, sand, silt and clay; very heterometric without stratification. Till is different from a moraine, which signifies the form taken by the till.

Topographical energy: ph. [measure, physical geography] Figure expressing the force of the topography and corresponding to the average elevation of summits above a surface defined by the floor of the main valley. Similar to the notion of vertical drop.

Stripes: n. [periglacial phenomenon] Periglacial landform produced by alternate freezing and thawing that slowly wears down saturated soil.

Ulu: Inuktitut n. Knife used by Inuit women that varies according to the Arctic region; the blade is generally semi-circular.

Umiaq: Inuktitut n. Open watercraft constructed of animal skins and propelled by paddles. The size of an umiaq varies according to the Arctic region and needs. A large umiaq can carry more than 30 individuals, while remaining lightweight.

Unconformity: n. [geology] Surface that corresponds to a gap (absence of one or two periods) in the chronological sequence of layers. Stratigraphic placement of a sedimentary formation on a folded or reworked substratum that is partially eroded.

Unit: n. [geology, stratigraphy] Aggregate of rocks that are considered distinct for tectonic (structural) or stratigraphic reasons. The first case involves areas circumscribed by abnormal contacts; the second case involves formations.

Upwelling: n. [oceanography] An area where sub-surface water rises; sub-surface water. Such water is especially conducive for the development of plankton.

Vascular: adj. [botany] Pertaining to plants that possess vessels (xylem and phloem) through which circulates sap, from roots to leaves.

[1] Mainly based on: Derruau (1988); Foucault and Raoult (1995); Genest (2000); Girault and Ledoux (1991); Hébert and Hébert (1994); Parent (1990); Robitaille and Allard (1997); Parent (1990); Ayotte (1994), various Internet sites.

APPENDICES

Appendix 1 Alphabetical List of Vascular Flora Taxa in the Study Area[1]

Achillea millefolium L.
Actaea rubra (Ait.) Wils. subsp. _rubra_
Agrostis mertensii Trin.
Agrostis scabra Willd.
Alnus viridis (Vill.) Lam. & DC. subsp. _crispa_ (Ait.) Turrill
Alopecurus aequalis Sobol.
Amelanchier bartramiana (Tausch) M. Roemer
Amelanchier bartramiana × _A. sanguinea_ var. _gaspensis_
Amelanchier sanguinea (Pursh) DC. var. _gaspensis_ Wieg.
Andromeda polifolia L. var. _glaucophylla_ (Link) DC.
Andromeda polifolia L. var. _polifolia_
Andromeda ×_jamesiana_ Lepage
Androsace septentrionalis L.
Anemone multifida Poir. var. _multifida_
Anemone parviflora Michx.
Anemone richardsonii Hook.
Angelica atropurpurea L.
Antennaria alpina (L.) Gaertn.
Antennaria monocephala DC. subsp. _angustata_ (Greene) Hult.
Antennaria howellii Greene subsp. _neodioica_ (Greene) Bayer
Antennaria pulcherrima (Hook.) Greene
Antennaria rosea Greene subsp. _pulvinata_ (Greene) R. J. Bayer
Anthoxanthum hirtum (Schrank) Y. Shouten & Veldkamp subsp. _arcticum_ (J. Presl) G. C. Tucker
Anthoxanthum monticolum (Bigel.) Veldkamp subsp. _alpinum_ (Sw. _ex_ Willd.) Soreng
Anthoxanthum monticolum (Bigelow) Veldkamp subsp. _monticolum_
Arabis alpina L.
Arabis arenicola (Richards. _ex_ Hook.) Gelert
Arctanthema arcticum (L.) Tzvelev subsp. _polare_ (Hult.) Tzvelev _in_ Tolm.
Arctous alpina (L.) Niedenzu
Arctous rubra (Rehd. & Wilson) Nakai
Arctous ×_victorinii_ (Rolland-Germain)
Arenaria humifusa Wahlenb.
Argentina anserina (L.) Rydb.
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. _canadensis_ (Michx.) Scoggan
Asplenium viride Huds.
Astragalus alpinus L. var. _alpinus_
Astragalus eucosmus B. L. Robins.
Athyrium filix-femina (L.) Roth subsp. _angustum_ (Willd.) Clausen
***_Athyrium filix-femina_ (L.) Roth subsp. _cyclosorum_ Rupr.**
Atriplex glabriuscula Edmondston

Barbarea orthoceras Ledeb.
Bartsia alpina L.
Betula ×_dutillyi_ Lepage
Betula glandulosa Michx.
Betula minor (Tuck.) Fern.
Betula pumila L.
Bistorta vivipara (L.) Delarbre
Botrychium lanceolatum (Gmel.) Angstr. subsp. _lanceolatum_
Botrychium lunaria (L.) Sw.
Botrychium matricariifolium (A. Braun _ex_ Dowell) A. Braun _ex_ Koch
* _Botrychium pinnatum_ H. St.John
* _Braya glabella_ Richards.

Calamagrostis canadensis (Michx.) Beauv. var. _canadensis_
Calamagrostis canadensis (Michx.) Beauv. var. _langsdorfii_ (Link) Inman
****_Calamagrostis deschampsioides_ Trin.**
Calamagrostis lapponica (Wahlenb.) Hartm.
Calamagrostis stricta (Timm) Koel. subsp. _inexpansa_ (Gray) C. W. Greene
Calamagrostis stricta (Timm) Koel. subsp. _stricta_
Callitriche palustris L.
Caltha palustris L.
Campanula rotundifolia L.
Campanula uniflora L.
Capnoides sempervirens (L.) Borkh.
Cardamine bellidifolia L.
Cardamine pratensis L. var. _angustifolia_ Hook.
Cardamine pratensis L. var. _pratensis_
** _Carex adelostoma_ Krecz.
Carex aquatilis Wahlenb. s. l.
Carex arcta Boott
Carex atratiformis Britt.
Carex atrofusca Schkuhr
Carex bicolor Bellardi _ex_ All.
Carex bigelowii Torr. _ex_ Schwein. subsp. _bigelowii_
Carex brunnescens (Pers.) Poir. subsp. _brunnescens_
Carex brunnescens (Pers.) Poir. subsp. _sphaerostachya_ (Tuck.) Kalela
Carex buxbaumii Wahlenb.
Carex canescens L. subsp. _canescens_
Carex capillaris L.
Carex capitata L. [incl. subsp. _arctogena_ (H. Sm.) Hiit.]
Carex chordorrhiza L.
Carex deflexa Hornem. var. _deflexa_
Carex diandra Schrank
Carex disperma Dewey
Carex echinata Murr. subsp. _echinata_
Carex exilis Dewey
Carex ×_firmior_ (J. M. Norm.) Holmb.

***Carex* ×*flavicans* F. Nyl. (pro parte)**
Carex fuliginosa Schkuhr
***Carex garberi* Fern.**
***Carex glacialis* Mack.**
Carex glareosa* Schk. *ex* Wahlenb. subsp. *glareosa
***Carex gynocrates* Wormsk. *ex* Drej.**
****Carex heleonastes* L. f.**
Carex holostoma Drej.
***Carex krausei* Boeck.**
***Carex lachenalii* Schk.**
Carex lenticularis* Michx. var. *lenticularis
Carex leptalea* Wahlenb. subsp. *leptalea
***Carex limosa* L.**
***Carex livida* (Wahlenb.) Willd.**
***Carex mackenziei* Krecz.**
***Carex macloviana* d'Urv.
***Carex magellanica* Lamb. subsp. *irrigua* (Wahlenb.) Hult.**
Carex marina Dewey
***Carex maritima* Gunn.**
Carex membranacea Hook.
***Carex microglochin* Wahlenb.**
***Carex nardina* Fr.**
Carex ×*neofilipendula* Lepage
***Carex norvegica* Retz. subsp. *inferalpina* (Wahlenb.) Hult.**
Carex norvegica* Retz. subsp. *norvegica
***Carex oligosperma* Michx.**
***Carex paleacea* Schreb. *ex* Wahlenb.**
***Carex pauciflora* Lightf.**
*/***Carex petricosa* Dewey var. *misandroides* (Fern.) Boivin
***Carex praticola* Rydb.**
***Carex quirponensis* Fern.**
***Carex rariflora* (Wahlenb.) Sm.**
***Carex recta* Boott**
***Carex rostrata* Stokes**
***Carex rotundata* Wahlenb.**
****Carex rufina* Drej.**
***Carex rupestris* All.**
***Carex salina* Wahlenb.**
***Carex saxatilis* L.**
***Carex saxatilis* × *C. rostrata*?**
Carex scirpoidea* Michx. subsp. *scirpoidea
***Carex stylosa* C. A. Mey.**
***Carex* ×*subpaleacea* J. Cayouette**
***Carex subspathacea* Wormsk. *ex* Hornem.**
***Carex supina* Willd. *ex* Wahlenb.**
subsp. *spaniocarpa* (Steud.) Hult.
***Carex tenuiflora* Wahlenb.**
***Carex trisperma* Dewey**
***Carex utriculata* Boott**
***Carex vaginata* Tausch**
Carex viridula* Michx. subsp. *viridula
Carex williamsii Britt.

Cassiope tetragona (L.) D. Don var. *tetragona*
***Castilleja raupii* Pennell**
***Castilleja septentrionalis* Lindl.**
***Catabrosa aquatica* (L.) Beauv.**
***Cerastium alpinum* L.**
***Cerastium arvense* L. subsp. *strictum* (L.) Ugborogho**
***Cerastium cerastoides* (L.) Britt.**
***Chamaedaphne calyculata* (L.) Moench**
Chamerion angustifolium* (L.) Holub subsp. *angustifolium
***Chamerion latifolium* (L.) Holub**
***Chrysosplenium tetrandrum* (Lund *ex* Malmgr.) Th. Fries**
***Cicuta bulbifera* L.**
***Cicuta virosa* L.**
***Cinna latifolia* (Trev.) Griseb.**
***Cirsium muticum* Michx.**
***Cochlearia officinalis* L.**
***Comarum palustre* L.**
***Coptis trifolia* (L.) Salisb.**
***Corallorhiza trifida* Chatelain**
***Cornus canadensis* L. subsp. *pristina* Gervais & Blondeau**
***Cornus* ×*lepagei* Gervais & Blondeau**
***Cornus suecica* L.**
***Cryptogramma stelleri* (Gmel.) Prantl**
***Cystopteris fragilis* (L.) Bernh.**
***Cystopteris montana* (Lam.) Bernh. *ex* Desv.**

***Danthonia intermedia* Vasey**
Deschampsia cespitosa* (L.) Beauv. *s.l.
***Deschampsia flexuosa* (L.) Trin.**
***Diapensia lapponica* L. subsp. lapponica**
***Diphasiastrum alpinum* (L.) Holub**
***Diphasiastrum complanatum* (L.) Holub**
***Diphasiastrum sabinifolium* (Willd.) Holub**
***Diphasiastrum sitchense* (Rupr.) Holub**
***Draba alpina* L.**
***Draba aurea* Vahl *ex* Hornem.**
***Draba glabella* Pursh**
***Draba incana* L.**
***Draba lactea* M. F. Adams**
***Draba nivalis* Lilj.**
***Draba norvegica* Gunn.**
***Drosera longifolia* L.**
***Drosera* ×*obovata* Mert. & Koch**
***Drosera rotundifolia* L.**
Dryas integrifolia* M. Vahl subsp. *integrifolia
***Dryopteris expansa* (K. Presl) Fraser-Jenkins & Jermy**
***Dryopteris fragrans* (L.) Schott**
×*Dupoa labradorica* (Steud.) J. Cayouette & S. J. Darbyshire
***Dupontia fisheri* R. Br.**

***Eleocharis acicularis* (L.) R. & S.**
***Eleocharis kamtschatica* (C. A. Mey.) Komarov**

Eleocharis palustris L.
Eleocharis quinqueflora (F. X. Hartmann) Schwarz
×*Elyleymus jamesensis* (Lepage) Barkworth
×*Elyleymus ungavensis* (Louis-Marie) Barkworth
Elymus trachycaulus (Link) Gould
subsp. *glaucus* (Pease & A. H. Moore) Cody
Elymus trachycaulus (Link) Gould
subsp. *novae-angliae* (Scribn.) Tzvel.
Elymus trachycaulus (Link) Gould *ex* Shinners subsp. *trachycaulus*
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.
Epilobium saximontanum Hausskn.
Equisetum arvense L.
Equisetum fluviatile L.
Equisetum palustre L.
Equisetum pratense Ehrh.
Equisetum scirpoides Michx.
Equisetum sylvaticum L.
Equisetum variegatum Schleich. *ex* F. Weber & D. M. H.
subsp. *variegatum*
Erigeron elatus (Hook.) Greene
Erigeron humilis Graham
Eriophorum angustifolium Honckeny subsp. *angustifolium*
Eriophorum brachyantherum Trautv. & C. A. Mey.
Eriophorum callitrix Cham. *ex* C. A. Mey.
Eriophorum ×*medium* Andersson subsp. *album* J. Cayouette
Eriophorum russeolum Fr. subsp. *russeolum*
Eriophorum scheuchzeri Hoppe subsp. *scheuchzeri*
Eriophorum vaginatum L. subsp. *spissum* (Fern.) Hult.
Eriophorum viridicarinatum (Engelm.) Fern.
Euphrasia disjuncta Fern. & Wieg.
Euphrasia frigida Pugsley
Euphrasia hudsoniana Fern. & Wieg.
Eurybia radula (Ait.) Nesom
Eutrema edwardsii R. Br.

Festuca brachyphylla J. A. Schultes *ex* J. A. & J. H. Schultes
Festuca prolifera (Piper) Fern.
Festuca rubra L. *s.l.*
Festuca saximontana Rydb.
Fragaria virginiana Duchesne *s.l.*

Galium labradoricum Wieg.
Galium trifidum L. *s.l.*
Galium triflorum Michx.
Gaultheria hispidula (L.) Bigel.
Gentianella amarella (L.) Boerner subsp. *acuta* (Michx.) J. Gillett
Gentianella propinqua (Richards.) J. Gillett subsp. *propinqua*
Geocaulon lividum (Richards.) Fern.
Geum macrophyllum Willd.
Geum rivale L.
Glyceria striata (Lam.) A. S. Hitchc.
Gymnocarpium dryopteris (L.) Newman

Harrimanella hypnoides (L.) Coville
Heracleum maximum Bartr.
Hieracium vulgatum Fries
Hippuris tetraphylla L. f.
Hippuris vulgaris L.
Honckenya peploides (L.) Ehrh. subsp. *diffusa* (Hornem.) Hult.
Huperzia selago (L.) Bernh. *ex* Mart. & Schrank s.l.

Iris hookeri Penny *ex* G. Don in J. C. Loudon
Isoetes echinospora Dur.

Juncus alpinoarticulatus Chaix
Juncus arcticus Willd. subsp. *arcticus*
Juncus arcticus Willd. subsp. *balticus* (Willd.) Trautv.
Juncus biglumis L.
Juncus brevicaudatus (Engelm.) Fern.
Juncus bufonius L. var. *halophilus* Buch. & Fern.
Juncus castaneus Sm.
Juncus filiformis L.
Juncus stygius L. var. *americanus* Buch.
Juncus subtilis E. Mey.
Juncus trifidus L.
Juncus triglumis L. var. *albescens* Lange
Juniperus communis L. var. *depressa* Pursh

Kalmia polifolia Wang.
Kobresia myosuroides (Vill.) Fiori
Kobresia simpliciuscula (Wahlenb.) Mack.
Koenigia islandica L.

Larix laricina (Du Roi) K. Koch
Lathyrus japonicus Willd. var. *japonicus*
[*Lathyrus palustris* L.]
Leymus mollis (Trin.) Pilger *s.l.*
Ligusticum scoticum L. subsp. *scoticum*
Limosella aquatica L.
Linnaea borealis L. subsp. *americana* (Forbes) Hult. *ex* Clausen
Listera cordata (L.) R. Br var. *cordata*
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 multiflora (Ehrh.) Lej. *s.l.*
Luzula parviflora (Ehrh.) Desv. subsp. *melanocarpa* (Michx.) Tolm.

Luzula spicata **(L.) DC.**
Luzula wahlenbergii **Rupr.**
Lycopodium annotinum **L.**
Lycopodium clavatum **L.**
Lycopodium dendroideum **Michx.**
Lycopodium lagopus **(Laestad. *ex* Hartm.) Zinserl. *ex* Kuzen**

Maianthemum trifolium **(L.) Sloboda**
Matricaria discoidea DC.
Menyanthes trifoliata **L. subsp. *verna* (Raf.) Gervais & Parent**
Mertensia maritima **(L.) S. F. Gray var. *maritima***
Micranthes nivalis **(L.) Small var. *nivalis***
Minuartia biflora **(L.) Schinz. & Thell.**
Minuartia dawsonensis **(Britt.) House**
Minuartia groenlandica **(Retz.) Ostenf.**
Minuartia rubella **(Wahlenb.) Graebn. *ex* Asch. & Graebn.**
Minuartia stricta **(Sw.) Hiern**
Mitella nuda **L.**
Moehringia macrophylla **(Hook.) Fenzl**
Moneses uniflora **(L.) Gray**
Montia fontana **L. subsp. *fontana***
Muhlenbergia uniflora **(Muhl.) Fern.**
Myrica gale **L.**
Myriophyllum alterniflorum **DC.**
Myriophyllum sibiricum **Komarov**
Myriophyllum tenellum Bigelow

Nuphar variegata **Dur. *in* G. W. Clinton**

Oclemena nemoralis **(Ait.) Greene**
*** *Omalotheca norvegica* (Gunn.) Schultz-Bip. & F. W. Schultz**
Omalotheca supina **(L.) DC.**
Orthilia secunda **(L.) House**
Oxyria digyna **(L.) Hill**
Oxytropis campestris **(L.) DC.**
subsp. *johannensis* (Fern.) M. Blondeau & C. Gervais
* *Oxytropis hudsonica* (Greene) Fern.

Packera aurea **(L.) A. & D. Löve**
Packera pauciflora **(Pursh) A. & D. Löve**
Parnassia kotzebuei **Cham. *ex* Spreng.**
Parnassia palustris **L. var. *tenuis* Wahlenb.**
Pedicularis flammea **L.**
Pedicularis groenlandica **Retz.**
Pedicularis labradorica **Wirsing.**
Pedicularis lapponica **L.**
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 glauca **(Moench) Voss**
Picea mariana **(P. Mill.) B. S. P.**
Pinguicula villosa **L.**
Pinguicula vulgaris **L.**
Piptatherum canadense **(Poir) Barkworth**
Piptatherum pungens **(Torr.) Barkworth**
Plantago maritima **L. var. *juncoides* (Lam.) Gray**
Platanthera aquilonis **Sheviak**
Platanthera dilatata **(Pursh) Lindl. *ex* Beck var. *dilatata***
Platanthera obtusata **(Banks *ex* Pursh) Lindl.**
Poa alpina **L.**
Poa arctica **R. Br. *s.l.***
Poa eminens **J. Presl**
Poa glauca **M. Vahl**
Poa interior **Rydb.**
Poa nemoralis **L.**
Poa palustris **L.**
Poa pratensis **L. *s.l.***
Polygonum aviculare L. *s.l.*
Polygonum fowleri **B. L. Robins.**
*** *Polypodium sibiricum* Sipl.**
*** *Polystichum lonchitis* (L.) Roth**
Populus balsamifera **L. subsp. *balsamifera***
Potamogeton alpinus **Balbis**
Potamogeton epihydrus **Raf.**
Potamogeton gramineus **L.**
Potamogeton praelongus Wulfen
Potamogeton pusillus **L. subsp. *tenuissimus* (Mert. & Koch) Haynes & C. B. Hellquist**
Potamogeton richardsonii (Benn.) Rydb.
**** *Potamogeton subsibiricus* Hagstr.**
Potentilla bimundorum **Soják**
Potentilla crantzii **(Crantz) G. Beck *ex* Fritsch**
Potentilla nivea **L. var. *nivea***
Potentilla norvegica **L.**
subsp. *monspeliensis* (L.) Aschers. & Graebn.
Potentilla pensylvanica **L. var. *litoralis* (Rydb.) Boivin**
Potentilla pulchella **R. Br. var. *pulchella***
Primula egaliksensis **Wormsk. *ex* Hornem.**
Primula laurentiana **Fern.**
Primula stricta **Hornem.**
Prunus pensylvanica **L. f.**
*** / ** *Pseudorchis albida* (L.) Á. Löve & D. Löve**
subsp. *straminea* (Fern.) Á. Löve & D. Löve
Puccinellia nutkaensis **(J. Presl) Fern. & Weath.**
Puccinellia nuttalliana **(J. A. Schultes) A. S. Hitchc.**
Puccinellia phryganodes **(Trin.) Scribn. & Merr.**
Puccinellia tenella **(Lange) Holmb. *ex* Porsild**
Puccinellia vaginata (Lange) Fern. & Weath.
Pyrola asarifolia **Michx. subsp. *asarifolia***
Pyrola grandiflora **Radius**

Pyrola minor L.

Ranunculus abortivus L.
** *Ranunculus allenii* B. L. Robins.
Ranunculus aquatilis L. var. diffusus Withering
Ranunculus cymbalaria Pursh
Ranunculus flammula L. var. *reptans* (L.) E. Meyer
Ranunculus gmelinii DC.
Ranunculus hyperboreus Rottb.
Ranunculus lapponicus L.
Ranunculus nivalis L.
Ranunculus pedatifidus Sm. var. *affinis* (R. Br.) L. Benson
Ranunculus pygmaeus Wahlenb.
Rhinanthus minor L. subsp. *groenlandicus* (Ostenf.) Neum.
Rhododendron groenlandicum (Oeder) Kron & Judd
Rhododendron lapponicum (L.) Wahlenb.
Rhododendron tomentosum (Stokes) Harmaja
subsp. *subarcticum* (Harmaja) G. Wallace
Ribes glandulosum Grauer
Ribes hudsonianum Richards. var. *hudsonianum*
Ribes lacustre (Pers.) Poir.
Ribes triste Pallas
Rubus arcticus L. subsp. *acaulis* (Michx.) Focke
Rubus chamaemorus L.
Rubus idaeus L. subsp. *strigosus* (Michx.) Focke
Rubus ×*paracaulis* Bailey
Rumex occidentalis S. Wats.
* *Rumex subarcticus* Lepage
Rumex triangulivalvis (Danser) Rech. f.

Sagina caespitosa (J. Vahl) Lange
Sagina nivalis (Lindbl.) Fries
Sagina nodosa (L.) Fenzl subsp. *borealis* Crow
Sagina procumbens L.
Sagina saginoides (L.) Karst.
Salix arctica Pallas × *S. arctophila*
Salix arctica Pallas × *S. glauca* L.
subsp. *callicarpaea* (Trautv.) Böcher
Salix arctophila Cockerell *ex* Heller
Salix arctophila × *S. uva-ursi*
Salix argyrocarpa Anderss.
Salix argyrocarpa × *S. herbacea*
Salix ballii Dorn
Salix bebbiana Sarg.
Salix calcicola Fern. & Wieg.
Salix candida Fluegge *ex* Willd.
Salix ×*dutillyi* Lepage
Salix glauca L. subsp. *callicarpaea* (Trautv.) Böcher
Salix herbacea L.
Salix herbacea × *S. arctophila*
Salix humilis Marsh. var. *humilis*
Salix pedicellaris Pursh
Salix planifolia Pursh
Salix pyrifolia Anderss.
Salix reticulata L. subsp. *reticulata*
Salix uva-ursi Pursh
Salix vestita Pursh
Saxifraga aizoides L.
Saxifraga cespitosa L.
Saxifraga cernua L.
Saxifraga hyperborea R. Br.
Saxifraga oppositifolia L. subsp. *oppositifolia*
Saxifraga paniculata P. Mill. subsp. *neogaea* (Butters) D. Löve
Saxifraga rivularis L.
Saxifraga tricuspidata Rottb.
Sceptridium multifidum (Gmel.) Nishida *ex* Tagawa
Scheuchzeria palustris L. subsp. *americana* (Fern.) Hult.
Schizachne purpurascens (Torr.) Swallen
Selaginella selaginoides (L.) Beauv. *ex* Mart. & Schrank
Shepherdia canadensis (L.) Nutt.
Sibbaldia procumbens L.
Sibbaldiopsis tridentata (Ait.) Rydb.
Silene acaulis (L.) Jacq.
Silene involucrata (Cham. & Schlecht.) Bocquet subsp. *involucrata*
Silene suecica (Lodd.) Greuter & Burdet
Silene uralensis (Rupr.) Bocquet subsp. *uralensis*
Solidago macrophylla Pursh
Solidago multiradiata Ait.
Solidago uliginosa Nutt.
Sorbus decora (Sarg.) Schneid.
Sparganium angustifolium Michx.
Sparganium fluctuans (Engelm. *ex* Morong) B. L. Robins.
Sparganium hyperboreum Laest.
Spergularia canadensis (Pers.) G. Don var. *canadensis*
Stellaria borealis Bigel. subsp. *borealis*
Stellaria crassifolia Ehrh.
Stellaria humifusa Rottb.
Stellaria longifolia Muhl. *ex* Willd.
Stellaria longipes Goldie subsp. *longipes*
Streptopus amplexifolius (L.) DC.
Stuckenia filiformis (Pers) Boerner
subsp. *alpina* (Blytt) Haynes, D. H. Les & M. Kral
Subularia aquatica L. var. *americana* (Mulligan & Calder) Boivin
Symphyotrichum puniceum (L.) A. & D. Löve var. *puniceum*

Tanacetum bipinnatum (L.) Schultz-Bip.
Taraxacum ceratophorum (Ledeb.) DC.
Taraxacum lapponicum Kihlm. *ex* Hand.-Maz.
Tofieldia pusilla Richards.
Torreyochloa pallida (Torr.) G. L. Church
var. *fernaldii* (Hitchc.) Dore *ex* T. Koyama & Kawano
Trichophorum alpinum (L.) Pers.
Trichophorum cespitosum (L.) Hartm.
Trientalis borealis Raf. subsp. *borealis*

Triglochin maritima L.
Triglochin palustris L.
Trisetum spicatum (L.) Richter

Urtica dioica L. subsp. *gracilis* (Ait.) Seland.
Utricularia intermedia Hayne
Utricularia macrorhiza Le Conte
Utricularia minor L.
Utricularia ×*ochroleuca* R. W. Hartman

Vaccinium angustifolium Ait.
Vaccinium caespitosum Michx. var. *caespitosum*
Vaccinium oxycoccos L.
Vaccinium uliginosum L.
Vaccinium vitis-idaea L. subsp. *minus* (Lodd.) Hult.
Vahlodea atropurpurea (Wahlenb.) Fries *ex* Hartm.
Valeriana dioica L. subsp. *sylvatica* (Soland. *ex* Richards.) F. G. Mey.
Veronica scutellata L.
Veronica serpyllifolia L. subsp. *humifusa* (Dickson *ex* With.) Syme
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 renifolia Gray
Viola selkerkii Pursh *ex* Goldie

***Woodsia alpina* (Bolton) S. F. Gray
Woodsia glabella R. Br. *ex* Richards.
Woodsia ilvensis (L.) R. Br.

Zostera marina L.

[1] Taxa indicated in bold type were identified in the study area. Taxa indicated in regular type were identified a short distance outside of the study area. Taxa indicated with a single asterisk are likely to be designated as threatened or vulnerable in Québec (Labrecque and Lavoie, 2002). Taxa indicated with two asterisks are considered rare in Canada (Argus and Pryer, 1992).

Appendix 2 Vascular Flora Taxa of Special Interest in the Study Area

PRESENCE OF CALCICOLE TAXA BY SECTOR

	LGD[1]	REC[1]	LEC[1]		LGD	REC	LEC
Androsace septentrionalis	✓			*Cystopteris montana*	✓		✓
Anemone parviflora	✓			*Draba alpina*	✓		
Arabis alpina	✓		✓	*Draba aurea*	✓		✓
Arabis arenicola	✓			*Draba glabella*	✓		✓
Arctous rubra	✓		✓	*Draba incana*	✓		
Arenaria humifusa	✓			*Draba norvegica*	✓		✓
Asplenium viride	✓			*Dryas integrifolia* subsp. *integrifolia*	✓		✓
Astragalus eucosmus	✓	✓		*Kobresia simpliciuscula*	✓		✓
Bartsia alpina	✓		✓	*Moehringia macrophylla*			✓
Braya glabella	✓			*Pedicularis flammea*	✓		
Calamagrostis stricta subsp. *inexpansa*	✓	✓	✓	*Pinguicula vulgaris*	✓	✓	
Campanula uniflora	✓		✓	*Polystichum lonchitis*	✓		
Carex bicolor	✓			*Potentilla nivea* var. *nivea*	✓		
Carex capillaris	✓		✓	*Pseudorchis albida* subsp. *straminea*	✓		
Carex chordorrhiza	✓		✓	*Salix calcicola*	✓		
Carex garberi		✓		*Salix vestita*	✓	✓	
Carex gynocrates	✓	✓	✓	*Saxifraga aizoides*	✓		
Carex krausei	✓			*Saxifraga oppositifolia* subsp. *oppositifolia*	✓		
Carex livida	✓		✓	*Saxifraga paniculata* subsp. *neogaea*	✓	✓	
Carex microglochin	✓			*Shepherdia canadensis*	✓		
Carex nardina	✓			*Silene involucrata* subsp. *involucrata*	✓		
Carex petricosa var. *misandroides*	✓			*Silene uralensis* subsp. *uralensis*	✓		
Carex rupestris	✓			*Tanacetum bipinnatum*	✓		
Carex scirpoidea subsp. *scirpoidea*	✓		✓	*Woodsia alpina*	✓		
Carex vaginata	✓		✓	*Woodsia glabella*	✓		
Cryptogramma stelleri	✓						

[1] LGD: Lac Guillaume-Delisle; REC: Rivière à l'Eau Claire; LEC: Lac à l'Eau Claire

PRESENCE OF RARE TAXA IN OR NEAR THE STUDY AREA[2]

**Alopecurus aequalis*
**Amelanchier sanguinea* var. *Gaspensis*
**Anemone multifida* var. *Multifida*
Antennaria howellii subsp. *Neodioica*
Atriplex glabriuscula
Barbarea orthoceras
Botrychium lanceolatum subsp. *Lanceolatum*
Botrychium matricariifolium
**Botrychium pinnatum*
**Braya glabella*
Capnoides sempervirens
***Carex adelostoma*
Carex arcta
**Carex fuliginosa*
Carex ×flavicans
Carex garberi
***Carex heleonastes*
Carex holostoma
**Carex macloviana*
***Carex marina*
**Carex membranacea*
**Carex ×neofilipendula*
**Carex petricosa* var. *Misandroides*
Carex rufina
Carex viridula subsp. *Viridula*
**Carex williamsii*
**Cassiope tetragona* subsp. *Tetragona*
Castilleja raupii
Cicuta virosa
**Cirsium muticum*
**Danthonia intermedia*
Draba alpina
Drosera ×obovata
Eleocharis kamtschatica
×Elyleymus ungavensis
Epilobium davuricum
Epilobium saximontanum
**Eriophorum callitrix*
Eriophorum ×medium subsp. *Album*
**Eutrema edwardsii*
Eriophorum viridicarinatum
Euphrasia hudsoniana
Eurybia radula
Galium labradoricum
Geum macrophyllum
**Iris hookerii*
Juncus bufonius var. *halophilus*
**Kobresia myosuroides*
Luzula arctica
Lycopodium clavatum
Maianthemum trifolium
Myriophyllum alterniflorum
**Myriophyllum tenellum*
Oclomena nemoralis
Piptatherum pungens
Polypodium sibiricum
**Potamogeton praelongus*
Primula laurentiana
Prunus pensylvanica
Puccinellia nutkaensis
Puccinellia nuttalliana
**Puccinellia vaginata*
Ranunculus abortivus
***Ranunculus gmelinii*
Ranunculus nivalis
Rubus ×paracaulis
**Rumex triangulivalvis*
Sagina procumbens
Sceptridium multifidum
Scheuchzeria palustris
**Silene uralensis* subsp. *uralensis*
Sparganium fluctuans
Spergularia canadensis
Stellaria longifolia
Torreyochloa pallida var. *fernaldiana*
Urtica dioica subsp. *gracilis*
Veronica serpyllifolia subsp. *humifusa*

[2] The degree of scarcity of these taxa is based on the number of times they have been harvested and observed, taking into account currently available knowledge. Taxa that have only been identified once or twice in or near the study area are considered rare. New inventories will likely confirm or clarify the degree of scarcity of several of these taxa. Taxa indicated with an asterisk have, to date, only been observed near the territory. The location of taxa indicated with two asterisks is too vague to determine if they were harvested in or near the study area.

TAXA LIKELY TO DESIGNATED AS THREATENED OR VULNERABLE IN QUÉBEC, RARE TAXA IN CANADA AND CANDIDATE TAXA IDENTIFIED BY THE COMMITTEE ON THE STATUS OF ENDANGERED WILDLIFE IN CANADA (COSEWIC) IDENTIFIED IN OR NEAR THE STUDY AREA

	THREATENED OR VULNERABLE IN QUÉBEC[1]	RARE IN CANADA[2]	COSEWIC[3]	OBSERVATIONS (total [in/near])
Athyrium filix-femina subsp. *cyclosorum*	✓			4 [1/3]
Botrychium pinnatum[4]	✓			1 [0/1]
Braya glabella	✓			2 [0/2]
Calamagrostis deschampsioides			✓	4 [1/3]
Carex adelostoma		✓	✓	1 [1/0]
Carex heleonastes			✓	1 [1/0]
Carex macloviana			✓	2 [0/2]
Carex petricosa var. *misandroides*	✓	✓		4 [0/4]
Carex rufina		✓	✓	2 [1/1]
Castilleja raupii	✓		✓	1 [1/0]
Cerastium cerastoides		✓		5 [2/3]
Luzula groenlandica			✓	3 [3/0]
Omalotheca norvegica		✓	✓	4 [2/2]
Oxytropis hudsonica	✓			3 [0/3]
Polypodium sibiricum[4]	✓			1 [1/0]
Polystichum lonchitis	✓			9 [4/5]
Potamogeton subsibiricus			✓	3 [3/0]
Pseudorchis albida subsp. *straminea*	✓	✓		5 [3/2]
Ranunculus allenii			✓	7 [2/5]
Rumex subarcticus	✓			2 [1/1]
Woodsia alpina		✓		4 [1/3]

[1] Labrecque and Lavoie (2002)

[2] Argus and Pryer (1990)

[3] COSEWIC (2005)

[4] These two taxa have each been identified once in Québec, Umiujaq for *Botrychium pinnatum* and baie du Poste for *Polypodium sibiricum* (Centre de données sur le patrimoine naturel du Québec, 2007).

Appendix 3 Invascular Plants Identified in the Study Area by Sector

SECTORS: LEC: Lac à l'Eau Claire; LGD: Lac Guillaume-Delisle; NAS: Rivière Nastapoka; PRB: Petite rivière de la Baleine; REC: Rivière à l'Eau Claire; SHE: Rivière Sheldrake

IDENTIFICATION OF SPECIMENS: liverworts: Linda Ley; **sphagnums:** Robert Gauthier; **mosses:** Jean Faubert; **crustaceous lichens:** Pak Yau Wong, Canadian Museum of Nature; **macrolichens:** Claude Roy, Herbier Louis-Marie, Université Laval; **genus** *Stereocaulon*: Stephen Clayden, New Brunswick Museum.

LIVERWORTS

***Anastrophyllum helleranum* (Nees *ex* Lindenb.) Schust.** PRB
***Anastrophyllum minutum* (Schreb. *ex* Cranz) Schust.** (Synonymes : *Anastrophyllum minutum* var. *grandis* (Gott. *ex* Lindb.) Schust. *Sphenolobus minutus* (Schreb.) Berggr. et f. *cuspidata* Kaal. LEC, LGD, PRB, REC, SHE
***Anastrophyllum saxicola* (Achrad.) Schust.** (Synonyme : *Sphenolobus saxicola* (Schrad.) Steph.) LEC, LGD, SHE
***Aneura pinguis* (L.) Dum.** LEC, LGD, PRB
***Anthelia julacea* (L.) Dum.** LEC, LGD, PRB
***Anthelia juratzkana* (Limpr.) Trev.** LEC, LGD, NAS, PRB, SHE
***Barbilophozia atlantica* (Kaal.) Müll. Frib.** (Synonymes : *Orthocaulis atlanticus* (Kaal.) Buch ; *Lophozia atlantica* (Kaal.) K.M.) LEC, LGD, PRB, REC
***Barbilophozia attenuata* (Mart.) Loeske** (Synonyme : *Orthocaulis attenuatus* (Mart.) Evans) LEC, LGD, REC
***Barbilophozia barbata* (Schmid.) Loeske** (Synonyme : *Lophozia barbata (*Schmid.) Loeske) LEC, LGD, PRB, REC
***Barbilophozia binsteadii* (Kaal.) Loeske** (Synonymes : *Orthocaulis binsteadii* (Kaal.) Buch ; *Lophozia binsteadii* (Kaal.) Evans) LEC, LGD, PRB, REC, SHE
***Barbilophozia hatcheri* (Evans) Loeske** (Synonyme : *Lophozia hatcheri* (Evans) Steph.) LEC, LGD, PRB, REC, SHE
***Barbilophozia kunzeana* (Hüb.) Müll. Frib.** (Synonymes : *Lophozia kunzeana* (Hüb.) Buch ; *Orthocaulis kunzeana* (Hüb.) Buch) LEC, LGD, PRB, REC
***Barbilophozia lycopodioides* (Wallr.) Loeske** (Synonyme : *Lophozia lycopodioides* (Wallr.) Cogn.) LEC, NAS, PRB, REC
***Bazzania trilobata* (L.) S. Gray** LGD
***Blasia pusilla* L.** REC
***Blepharostoma trichophyllum* (L.) Dum.** LEC, LGD, PRB, REC, SHE
***Calypogeia muelleriana* (Schiffn.) Müll. Frib.** LEC, LGD, REC
***Calypogeia neesiana* (Mass. & Carest.) Müll. Frib.** LEC
***Calypogeia sphagnicola* (H. Arnell & J. Perss.) Warnst. & Loeske** LGD
***Cephalozia bicuspidata* (L.) Dum.** LEC, LGD, PRB, REC
***Cephalozia bicuspidata* (L.) Dum. subsp. *ambigua* (Mass.) Schust.** (Synonymes : *Cephalozia bicuspidata* (L.) Dum. subsp. *lammersiana* (Hüb.) Schust. ; *Cephalozia bicuspidata* (L.) Dum. var. *arctica* Bryhn & Kaal. ; *Cephalozia lammersiana* (Hüb.) Spruce) LGD, REC
***Cephalozia connivens* (Dicks.) Lindb.** SHE
***Cephalozia leucantha* Spruce** LGD
***Cephalozia lunulifolia* (Dum.) Dum.** LEC, LGD, PRB, REC
***Cephalozia pleniceps* (Aust.) Lindb.** LEC, LGD, PRB, REC
***Cephaloziella divaricata* (Sm.) Schiffn.** (Synonymes : Cephaloziella byssacea (Roth) Warnst.) LEC, LGD
***Cephaloziella grimsulana* (J. B. Jack *ex* Gottsche & Rabenh.) Sde.-Lac** LGD, PRB, REC
Cephaloziella hampeana *(Nees) Schiffn.* LGD
***Cephaloziella rubella* (Nees) Warnst.** LGD, NAS
***Cephaloziella starkei* (Funck *ex* Nees) Schiffn.** LEC, LGD
***Cephaloziella varians* (Gottsche) Steph.** (Synonyme : *Cephaloziella arctica* Bryhn & Douin) LEC, LGD, PRB, REC
***Chiloscyphus minor* (Nees) Engel & Schust.** (Synonyme : *Lophocolea minor* Nees) LEC
***Cladopodiella fluitans* (Nees) Buch** LEC, LGD, NAS, REC, SHE
***Diplophyllum albicans* (L.) Dum.** PRB
***Diplophyllum apiculatum* (Evans.) Steph.** LGD
***Gymnocolea inflata* (Huds.) Dum.** LEC, LGD, NAS, PRB, REC, SHE

***Gymnomitrion concinnatum* (Lightf.) Corda** LGD, PRB
Gymnomitrion corallioides *Nees* LEC, NAS, REC, SHE
***Gymnomitrion obtusum* (Lindb.) Pears.** PRB
***Harpanthus flotovianus* (Nees) Nees** LGD
***Hygrobiella laxifolia* (Hook.) Spruce** REC
***Jungermannia gracillima* Sm.** LEC
***Jungermannia hyalina* Lyell** LGD
***Jungermannia polaris* Lindb.** (Synonyme : *Solenostoma pumilum* (With.) K.Müll.) LEC
***Jungermannia pumila* With.** (Synonyme : *Jungermannia karl-muelleri* Grolle) LGD
***Jungermannia sphaerocarpa* Hook.** REC
***Jungermannia subelliptica* (Lindb. *ex* Kaal.) Lev.** REC
***Leiocolea bantriensis* (Hook.) Jörg.** (Synonymes : *Lophozia alpestris* (Schleich. *ex* Web.) Evans ; *Lophozia sudetica (*Nees) Grolle) LEC, LGD, PRB, REC
***Leiocolea collaris* (Nees) Schljakov** (Synonyme : *Lophozia collaris* (Nees) Dum.) PRB, REC
***Leiocolea gillmanii* (Austin) A. Evans** (Synonyme : *Lophozia gillmanii* (Aust.) Schust.) PRB
***Leiocolea heterocolpos* (Thed. *ex* C. Hartm.) M. Howe** (Synonyme : *Lophozia heterocolpos* (Thed. *ex* C. Hartm.) M. Howe) LGD, PRB, REC
***Leiomylia anomala* J. J. Engel & Braggins** (Synonyme : *Mylia anomala* (Hook.) Gray) LEC, LGD, PRB, REC
***Lepidozia reptans* (L.) Dum.** PRB
***Lophozia ascendens* (Warnst.) Schust.** REC
***Lophozia grandiretis* (Lindb. *ex* Kaal.) Schiffn.** REC
***Lophozia incisa* (Schrad.) Dum.** LEC, PRB, REC
***Lophozia longidens* (Lindb.) Mac.** REC
***Lophozia obtusa* (Lindb.) Evans** (Synonyme : *Leiocolea obtusa* (Lindb.) Buch) LGD
***Lophozia polaris* (Schust.) Schust. *in* Schust & Damsh.** PRB
***Lophozia ventricosa* (Dicks.) Dumort** LEC, LGD, PRB, REC
Lophozia ventricosa var. ***uliginosa* Breidl.** (Synonyme : *Lophozia ventricosa* var. *longiflora* (Nees) Macoun) LEC
***Lophozia wenzelii* (Nees) Steph.** REC
***Mannia pilosa* (Hornem.) Frye & Clark** PRB
***Marchantia polymorpha* L. subsp. *ruderalis* Bischl. & Boisselier** LGD, PRB
***Marsupella arctica* (Berggr.) Bryhn & Kaal.** PRB
***Marsupella emarginata* (Ehrh.) Dum.** NAS, REC
***Marsupella sparsifolia* (Lindb.) Dum.** LGD
***Marsupella sprucei* (Limpr.) Bernet** (Synonyme : *Marsupella ustulata* (Hüb.) Spruce) LEC
***Moerckia hibernica* (Hook.) Gott.** LGD
***Mylia taylorii* (L.) S. Gray** LEC, LGD, PRB, REC, SHE
***Nardia geoscyphus* (De Not.) Lindb.** LEC, LGD, PRB, REC
***Odontoschisma denudatum* (Mart.) Dum.** LEC, LGD, PRB, REC
***Odontoschisma elongatum* (Lindb.) Evans** LEC, LGD, NAS, SHE
***Odontoschisma macounii* (Aust.) Underw.** PRB
***Pellia epiphylla* (L.) Corda** LEC, LGD, NAS, REC, SHE
***Pellia neesiana* (Gott.) Limpr.** LEC, REC
***Plagiochila porelloides* (Torr. *ex* Nees) Lindenb.** (Synonyme : *Plagiochila asplenioides* (L.) Dum.) LGD, PRB
***Pleuroclada albescens* (Hook.) Spruce** LEC, PRB, REC
***Pleuroclada albescens* (Hook.) Spruce** var. ***islandica* (Nees) L. Söderstr. & Váňa** LGD
***Preissia quadrata* (Scop.) Nees** LEC, LGD, NAS, PRB, REC
***Ptilidium ciliare* (L.) Hampe** LEC, LGD, NAS, PRB, REC
Ptilidium pulcherrimum *(G.Web.) Vainio LEC, REC*
***Radula complanata* (L.) Dum.** LEC, LGD, PRB
***Riccardia latifrons* (Lindb.) Lindb.** LGD, PRB, REC
Scapania brevicaulis* Taylor var. *brevicaulis (Synonyme : *Scapania degenii* Schiffn. *ex* K. Müll.) LEC, LGD, PRB, REC
***Scapania curta* (Mart.) Dum.** LGD, PRB
***Scapania cuspiduligera* (Nees) Müll. Frib.** LGD

***Scapania gymnostomophila* Kaal.** PRB
***Scapania hyperborea* Joerg.** LGD
***Scapania irrigua* (Nees) Nees** LEC, LGD, PRB, REC
***Scapania mucronata* Buch** LEC, LGD, PRB, REC
***Scapania nemorea* (L.) Grolle** (Synonyme : *Scapania nemorosa* (L.) Dum.) LEC
***Scapania paludicola* Loeske & Müll.Frib.** LEC, LGD, NAS, REC
***Scapania simmonsii* Bryhn & Kaal.** REC
***Scapania undulata* (L.) Dum.** LEC, LGD, PRB, REC
***Tetralophozia setiformis* (Ehrh.) Schljak.** (Synonymes : *Chandonanthus setiformis* (Ehrh.) Lindb. ; *Temnoma setiforme* (Ehrh.) M. A. Howe) LEC, LGD, NAS, PRB, SHE
***Tritomaria exsectiformis* (Breidl.) Loeske** LEC, LGD
***Tritomaria polita* (Nees) Joerg.** (Synonyme : *Saccobasis polita* (Nees) Buch) LGD, PRB
***Tritomaria quinquedentata* (Huds.) Buch** LEC, LGD, NAS, PRB, REC
***Tritomaria scitula* (Tayl.) Joerg.** PRB

SPHAGNUMS

***Sphagnum angustifolium* (C. Jens. *ex* Russ.) C. Jens. *in* Tolf** LEC, LGD, NAS, REC
***Sphagnum arcticum* Flatberg & Frisvoll** NAS
***Sphagnum balticum* (Russ.) C. Jens.** LEC, LGD, NAS
***Sphagnum capillifolium* (Ehrh.) Hedw.** (Synonymes : *Sphagnum nemoreum* Scop. ; *S. capillaceum* (Weiss.) Schrank) LEC, LGD, NAS, PRB, REC, SHE
***Sphagnum centrale* C. Jens. *in* Arnell & C. Jens.** LEC, LGD, NAS, SHE
***Sphagnum compactum* DC. *in* Lam. & DC.** LEC, LGD, NAS, PRB, REC, SHE
Sphagnum contortum Schultz LGD
***Sphagnum denticulatum* Brid.** LEC
***Sphagnum fallax* (Klinggr.) Klinggr.** LEC, LGD, NAS, SHE
***Sphagnum fimbriatum* Wils.** LEC, LGD, NAS, SHE
***Sphagnum fuscum* (Schimp.) Klinggr.** LEC, LGD, NAS, PRB, REC, SHE
***Sphagnum girgensohnii* Russ.** LEC, LGD, NAS, REC, SHE
***Sphagnum jensenii* H. Lindb.** LEC, LGD, NAS, PRB, REC, SHE
***Sphagnum lenense* H. Lindb. *in* Pohle** LEC, LGD
***Sphagnum lindbergii* Schimp**. ***in* Lindb.** LEC, LGD, NAS, PRB, REC, SHE
***Sphagnum magellanicum* Brid.** LEC, LGD, NAS, REC, SHE
***Sphagnum majus* (Russ.) C. Jens.** LEC, LGD, REC, SHE
***Sphagnum obtusum* Warnst.** LEC, LGD, PRB
***Sphagnum papillosum* Lindb**. LEC, LGD, NAS, REC, SHE
***Sphagnum platyphyllum* (Lindb. *ex* Braithw.) Sull. *ex* Warnst.** LEC, LGD, NAS, PRB, REC, SHE
***Sphagnum pulchrum* (Lindb. *ex* Braithw.) Warnst.** LEC, LGD, NAS, REC, SHE
***Sphagnum riparium* Ångstr.** LEC, LGD, NAS, REC, SHE
***Sphagnum rubellum* Wils.** (Synonyme : *Sphagnum capillaceum* (Weiss.) Schrank var. *tenellum* (Schimp.) Andrews) LEC, LGD, NAS, SHE
***Sphagnum russowii* Warnst.** (Synonyme : *Sphagnum robustum* (Warnst.) Röll) LEC, LGD, NAS, PRB, REC, SHE
***Sphagnum squarrosum* Crome** LEC, LGD, NAS, REC, SHE
***Sphagnum subsecundum* Nees *in* Sturm** LEC, LGD, NAS, REC, SHE
***Sphagnum subfulvum* Sjörs** (Synonyme : *Sphagnum nitidum* Warnst.) LEC, LGD, NAS, PRB, REC, SHE
Sphagnum tenellum (Brid.) Bory **LGD, NAS, PRB, REC, SHE**
***Sphagnum teres* (Schimp.) Ångstr. *in* Hartm.** LEC, LGD, NAS, PRB, REC
***Sphagnum warnstorfii* Russ.** LEC, LGD, NAS, PRB, REC, SHE
***Sphagnum wulfianum* Girg.** LEC

MOSSES

Abietinella abietina **(Hedw.) Fleich.** (Synonyme : *Thuidium abietinum* (Hedw.) BSG) LGD
Amphidium lapponicum **(Hedw.) Schimp.** LEC, PRB, REC
Andreaea rupestris **Hedw**. LEC, LGD, NAS, PRB, REC, SHE
Andreaea rupestris **Hedw. var. *papillosa* (Lindb.) Podp.** (Synonyme : *Andreaea rupestris* var. *acuminata* (B.S.G.) Sharp *in* Grout) LEC
Aplodon wormskjoldii **(Hornem.) Kindb.** LGD
Aulacomnium palustre **(Hedw.) Schwägr.** LEC, LGD, NAS, PRB, REC
Aulacomnium turgidum **(Wahlendb.) Schwägr.** LEC, LGD, PRB
Bartramia ithyphylla **Brid.** LEC, LGD, NAS, PRB, REC
Blindia acuta **(Hedw.) Bruch & Schimp.** LEC, PRB, REC
Brachythecium albicans **(Hedw.) Schimp.** LGD
Brachythecium erythrorrhizon **Schimp.** LEC, REC
Brachythecium turgidum **(C. J. Hartm.) Kindb.** PRB
Bryum argenteum **Hedw.** REC
Bryum calobryoides **Spence** REC
Bryum lisae **De Not. var. *cuspidatum* (Schimp.) Margad.** PRB, REC
Bucklandiella heterosticha **(Hedw.) Ochyra & Bednarek-Ochyra** (Synonyme : *Racomitrium heterostichum* (Hedw.) Brid.) LGD, NAS, PRB, SHE
Bucklandiella microcarpa **(Hedw.) Ochyra & Bednarek-Ochyra** *(*Synonymes : *Racomitrium heterostichum* (Hedw.) Brid. var. *microcarpon* (Hedw.) Boul. et var. *ramulosum* (Lindb.) Corb.); *Racomitrium microcarpon* (Hedw.) Brid.) LEC, LGD, PRB, REC
Buxbaumia aphylla **Hedw.** REC
Calliergon cordifolium **(Hedw.) Kindb.** LEC, LGD, PRB, REC
Calliergon giganteum **(Schimp.) Kindb.** LEC, LGD, PRB
Calliergonella lindbergii **(Mitt.) Hedenäs** (Synonyme : *Hypnum lindbergii* Mitt.) LGD
Campylium stellatum **(Hedw.) C. Jens.** LEC, LGD, PRB, REC
Campylophyllum halleri **(Hedw.) Fleisch.** (Synonyme : *Campylium halleri* (Hedw.) Lindb.) REC
Campylophyllum hispidulum **(Brid.) Hedenäs** (Synonyme : *Campylium hispidulum* (Brid.) Mitt.) REC
Catoscopium nigritum **(Hedw.) Brid.** REC
Ceratodon purpureus **(Hedw.) Brid.** LEC, LGD, PRB, REC
Cinclidium stygium **Sw. *in* Schrad.** LEC, LGD, PRB
Climacium dendroides **(Hedw.) Web. & Mohr** LEC, REC
Cnestrum alpestre **(Wahlenb. *ex* Huebener) Nyholm *ex* Mogensen** (Synonymes : *Cynodontium alpestre* (Wahlenb.) Milde ; *Oncophorus strumulosus* (C. Müll. & Kindb.) E. G. Britton) LEC, PRB
Codriophorus fascicularis **(Hedw.) Bednarek-Ochyra & Ochyra** (Synonyme : *Racomitrium fasciculare* (Hedw.) Brid.) LEC, NAS, PRB, REC
Conostomum tetragonum **(Hedw.) Lindb.** (Synonyme : *Conostomum boreale* Swartz.) LEC, LGD, PRB, REC
Cratoneuron filicinum **(Hedw.) Spruce** PRB
Cynodontium polycarpon **(Hedw.) Schimp.** (Synonyme : *Oncophorus polycarpus* (Hedw.) Brid.) LEC, LGD
Cynodontium strumiferum **(Hedw.) Lindb.** (Synonyme : *Oncophorus polycarpus* (Hedw.) Brid. var. *strumiferus* (De Not.) Grout) LEC, LGD
Cyrtomnium hymenophyllum **(Bruch & Schimp.) Holmen** PRB
Dichelyma falcatum **(Hedw.) Myr.** LEC
Dichelyma pallescens **B.S.G.** LEC
Dichodontium pellucidum **(Hedw.) Schimp.** LGD, REC
Dicranella cerviculata **(Hedw.) Schimp.** PRB
Dicranella subulata **(Hedw.) Schimp.** LEC
Dicranoweisia crispula **(Hedw.) Lindb. *ex* Milde** LEC, LGD, NAS, PRB, REC, SHE
Dicranum acutifolium **(Lindb. & H.Arnell) C.Jens.** *ex* **Weinm.** LEC, LGD, PRB, REC
Dicranum bonjeanii **De Not. *in* Lisa** LEC, LGD
Dicranum condensatum **Hedw.** LGD
Dicranum elongatum **Schleich. *ex* Schwägr.** LEC, LGD, PRB, REC
Dicranum flagellare **Hedw.** LEC

***Dicranum fuscescens* Sm.** LEC, LGD, NAS, REC, SHE
***Dicranum groenlandicum* Brid.** LEC, LGD, PRB, REC
***Dicranum leioneuron* Kindb.** LEC, LGD
***Dicranum majus* Sm.** LGD
***Dicranum majus* Sm. var. *orthophyllum* A.Br. *ex* Milde** LEC, LGD
***Dicranum montanum* Hedw.** LEC, LGD, PRB, REC
***Dicranum muehlenbeckii* Buch & Schimp.** LGD
***Dicranum polysetum* Sw.** LEC, LGD
***Dicranum scoparium* Hedw.** LEC, LGD, PRB
***Dicranum spadiceum* Zett.** LEC, LGD, REC
***Dicranum undulatum* Brid.** (Synonyme : *Dicranum bergeri* Bland. in Sturm) LEC, LGD, PRB, REC
***Didymodon fallax* (Hedw.) Zand.** LEC
***Distichium capillaceum* (Hedw.) Bruch & Schimp.** LGD, NAS, PRB
***Distichium inclinatum* (Hedw.) Bruch & Schimp.** PRB
***Ditrichum flexicaule* (Schwägr.) Hampe** LGD
***Ditrichum lineare* (Sw.) Lindb.** REC
***Drepanocladus aduncus* (Hedw.) Warnst.** (Synonymes : *Drepanocladus aduncus* (Hedw.) Warnst. var. *polycarpus* (Bland. *ex* Voit) G. Roth et var. *kneiffii* (BSG) Mönk. ; *Drepanocladus polycarpus* (Voit) Warnst.) LEC, LGD, PRB, REC
***Drepanocladus polygamus* (Schimp.) Hedenäs** LGD
Encalypta affinis* R. Hedw. *subsp. affinis PRB
***Encalypta alpina* Sm.** PRB
***Encalypta brevicolla* (Bruch & Schimp.) Ångstr.** LEC, LGD
***Encalypta ciliata* Hedw.** PRB
***Encalypta rhaptocarpa* Schwägr.** LEC, LGD, PRB
***Fissidens adianthoides* Hedw.** REC
***Fissidens bryoides* Hedw.** REC
***Fissidens osmundioides* Hedw.** LEC, PRB, REC
***Fontinalis antipyretica* Hedw.** LGD
***Fontinalis dalecarlica* Schimp.** REC
***Grimmia longirostris* Hook.** (Synonymes : *Grimmia affinis* Hoppe & Hornsch. *ex* Hornsch. ; *Grimmia arctophila* Kindb. subsp. *labradorica* Kindb.) LEC, LGD, REC
***Grimmia ovalis* (Hedw.) Lindb.** (Synonyme : *Grimmia commutata* Hüb.) LEC, LGD
***Grimmia trichophylla* Grev.** LGD, PRB
***Helodium blandowii* (Web. & Mohr) Warnst.** LGD
***Hygroamblystegium varium* (Hedw.) Mönk.** (Synonyme : *Amblystegium varium* (Hedw.) Lindb.) LEC
***Hygrohypnum alpestre* (Hedw.) Loeske** LEC, LGD, PRB, REC
***Hygrohypnum bestii* (Ren. & Bryhn *ex* Ren.) Holz. *ex* Broth**. PRB
***Hygrohypnum smithii* (Sw. *ex* Lilj.) Broth.** LGD, REC
***Hylocomiastrum pyrenaicum* M. Fleisch** (Synonyme : *Hylocomium pyrenaicum* (Spruce) Lindb.) LEC, LGD, NAS, PRB
***Hylocomiastrum umbratum* M. Fleisch** (Synonyme : *Hylocomium umbratum* (Hedw.) BSG) REC
***Hylocomium splendens* (Hedw.) Schimp.** LEC, LGD, PRB, REC
***Hypnum bambergeri* Schimp.** PRB
***Hypnum fauriei* Card.** (Synonyme : *Hypnum fertile* Sendtn.) LEC
***Hypnum plicatulum* (Lindb.) Jaeg.** LGD
***Hypnum revolutum* (Mitt.) Lindb.** LEC
***Hypnum vaucheri* Lesq.** PRB
***Isopterygiopsis muelleriana* (Schimp.) Iwats.** LGD, REC
***Isopterygiopsis pulchella* (Hedw.) Iwats**. (Synonymes : *Isopterygium pulchellum* (Hedw.) Jaeg. & Sauerb. ; *Plagiothecium pulchellum* (Hedw.) BSG) LEC, LGD
***Kiaeria blyttii* (Schimp.) Broth.** LEC, PRB
***Kiaeria starkei* (Web. & Mohr) Hag.** LGD, PRB
***Leptobryum pyriforme* (Hedw.) Wilson** PRB

***Leptodictyum riparium* (Hedw.) Warnst.** (Synonyme : *Amblystegium riparium* (Hedw.) BSG) REC
***Lescuraea saxicola* (Schimp.) Molendo** (Synonymes : *Pseudoleskea frigida* (Kindb.) Sharp *in* Grout ; *Lescuraea frigida* Kindb.) LEC, PRB
***Loeskypnum badium* (Hartm.) Paul** (Synonyme : *Drepanocladus badius* (Hartm.) G. Roth) LEC, LGD, PRB, REC
***Meesia uliginosa* Hedw.** LEC, LGD, PRB
***Mnium hornum* Hedw.** LEC
***Mnium lycopodioides* Schwägr.** (Synonyme : *Mnium ambiguum* H.Müll.) LGD, REC
***Mnium marginatum* (Dicks.) P.Beauv.** LGD
***Mnium thomsonii* Schimp.** (Synonyme : *Mnium orthorrhynchum* Brid.) LGD, PRB, REC
***Myurella julacea* (Schwägr.) Schimp.** LGD, NAS, PRB
***Myurella sibirica* (Müll.Hal.) Reim.** LEC
***Myurella tenerrima* (Brid.) Lindb.** LEC
***Neckera oligocarpa* Bruch** *(Synonyme : Neckera pennata* Hedw. var *tenera* C. Müll.) LEC
***Neckera pennata* Hedw.** LEC
***Niphotrichum canescens* (Hedw.) Bednarek-Ochyra & Ochyra** (Synonyme : *Racomitrium canescens* (Hedw.) Brid.) LEC, PRB
***Oncophorus virens* (Hedw.) Brid.** LEC, LGD, PRB, REC
***Oncophorus wahlenbergii* Brid.** (Synonyme : *Oncophorus wahlenbergii* var. *compactus* (B.S.G.) Braithw.) LEC, LGD, PRB, REC
***Orthothecium chryseum* (Schwägr.) Schimp.** PRB
***Orthothecium intricatum* (C. J. Hartm.) Schimp.** LGD
***Orthotrichum elegans* Hook. & Grev.** (Synonyme : *Orthotrichum speciosum* Nees *in* Sturm var. *elegans* (Schwägr. *ex* Hook. & Grev.) Warnst. LEC
***Orthotrichum pylaisii* Brid.** (Synonyme : *Orthotrichum microblephare* (*-um*) Schimp.) LGD
***Orthotrichum speciosum* Nees.** LGD
***Paludella squarrosa* (Hedw.) Brid.** LEC, LGD, NAS, SHE
***Paraleucobryum longifolium* (Hedw.) Loeske** LEC, REC
***Philonotis fontana* (Hedw.) Brid.** LEC, LGD, PRB, REC
***Philonotis fontana* (Hedw.) Brid. var. *americana* (Dism.) Flowers *ex* H. A. Crum** NAS
***Philonotis tomentella* Molendo** (Synonyme : *Philonotis fontana* (Hedw.) Brid. var. *pumila* (Turn.) Brid.) LEC
***Plagiomnium cuspidatum* (Hedw.) T. J. Kop.** REC
***Plagiomnium drummondii* (Bruch & Schimp.) T. J. Kop.** LEC
***Plagiomnium ellipticum* (Brid.) T. J. Kop.** LEC, PRB
***Plagiopus oederianus* (Schrad.) T. J. Kop.** PRB
***Plagiothecium cavifolium* (Brid.) Iwats.** LEC, LGD, REC
***Plagiothecium denticulatum* (Hedw.) Schimp.** LEC, LGD, PRB, REC
***Platydictya jungermannoides* (Brid.) H. A. Crum** PRB, REC
***Pleurozium schreberi* (Brid.) Mitt.** LEC, LGD, PRB, REC, SHE
***Pogonatum dentatum* (Brid.) Brid.** (Synonyme : *Pogonatum capillare* (Michx.) Brid.) LEC, LGD
***Pogonatum urnigerum* (Hedw.) P. Beauv.** LEC, PRB, REC
***Pohlia bulbifera* (Warnst.) Warnst.** REC
***Pohlia cruda* (Hedw.) Lindb.** LEC, LGD, NAS, PRB, REC, SHE
***Pohlia crudoides* (Sull. & Lesq.) Broth.** LGD
***Pohlia elongata* Hedw.** REC
***Pohlia filum* (Schimp.) Mart.** LGD
***Pohlia nutans* (Hedw.) Lindb.** LEC, LGD, NAS, PRB, REC
***Pohlia obtusifolia* (Brid.) L. Koch** (Synonyme : *Pohlia cucullata* (Schwägr.) Lindb.) LGD
***Pohlia proligera* (Kindb.) Lindb. *ex* Broth.** LEC, LGD, REC
***Pohlia sphagnicola* (Bruch & Schimp.) Broth.** LGD, REC
***Pohlia wahlenbergii* (Web. & Mohr) Andrews** LEC
***Polytrichastrum alpinum* (Hedw.) G. L. Sm.** (Synonymes : *Pogonatum alpinum* (Hedw.) Röhling ; *Pogonatum alpinum* var. *septentrionale* (Sw.) Brid. et var. *arcticum* (Brid.) Brid.; *Polytrichum alpinum* Hedw. var *septentrionale* (Brid.) Lindb.) LEC, LGD, PRB, REC
***Polytrichastrum longisetum* (Sw. *ex* Brid.) G. L. Sm.** (Synonyme : *Polytrichum longisetum* Brid.) LEC, LGD
***Polytrichum commune* Hedw.** (Synonyme : *Polytrichum commune* Hedw. var. *nigrescens* Warnst.) LEC, LGD, NAS, REC
***Polytrichum hyperboreum* R. Br.** (Synonyme : *Polytrichum piliferum* Hedw. var. *hyperboreum* (R. Brown) C.Müll.) LEC

***Polytrichum juniperinum* R. Br.** LEC, LGD, NAS, PRB, REC
***Polytrichum piliferum* Hedw.** LEC, LGD, PRB, REC
***Polytrichum strictum* Brid.** LEC, LGD, PRB, REC, SHE
***Polytrichum swartzii* C. Hartm.** LEC, LGD, REC
***Pseudobryum cinclidioides* (Hüb.) T. J. Kop.** LGD, REC
***Pseudocalliergon trifarium* (Web. & Mohr) Loeske** (Synonyme : *Calliergon trifarium* (Web. & Mohr) Kindb.) PRB
***Pseudocalliergon turgescens* (T. Jensen) Loeske** (Synonyme : *Scorpidium turgescens* (T. Jens.) Loeske) PRB
***Pseudoleskeella nervosa* (Brid.) Nyh.** (Synonyme : *Leskeella nervosa* (Brid.) Loeske) LEC
***Pseudoleskeella rupestris* (Berggr.) Hedenäs & L. Söderstr.** (Synonymes : *Pseudoleskeella catenulata* (Brid. *ex* Schrad.) Kindb. ; *Pseudoleskeella sibirica* (Arnell) P. Wils. & Norris LEC
***Ptilium crista-castrensis* (Hedw.) De Not.** LEC, LGD
***Ptychostomum angustifolium* (Brid.) J. R. Spence & H. P. Ramsay** (Synonyme : *Bryum caespiticium* Hedw.) LGD, REC
***Ptychostomum inclinatum* (Sw. *ex* Brid.) J. R. Spence** (Synonyme : *Bryum stenotrichum* C.Müll.) PRB
***Ptychostomum pallens* (Sw.) J. R. Spence** (Synonyme : *Bryum pallens* (Brid.) Sw. *ex* Röhl) LGD
***Ptychostomum pseudotriquetrum* (Hedw.) J. R. Spence & H. P. Ramsay** (Synonyme : *Bryum pseudotriquetrum* (Hedw.) Gaertn. *et al.*) LEC, LGD, NAS
***Ptychostomum salinum* (Hag. *ex* Limpr.) J. R. Spence** (Synonymes : *Bryum salinum* Hag. *ex* Limpr. ; *Bryum archangelicum* Buch & Schimp.) LGD
***Ptychostomum turbinatum* (Hedw.) J. R. Spence** (Synonyme : *Bryum turbinatum* (Hedw.) Turn.) LGD
***Racomitrium lanuginosum* (Hedw.) Brid.** LEC, LGD, NAS, PRB, REC, SHE
***Rhizomnium appalachianum* T. J. Kop.** REC
***Rhizomnium gracile* T. J. Kop.** LEC, REC, SHE
***Rhizomnium magnifolium* (Horik.) T. J. Kop.** NAS
***Rhizomnium pseudopunctatum* (Bruch & Schimp.) T. J. Kop.** LEC, LGD, PRB, REC
***Rhizomnium punctatum* (Hedw.) T. J. Kop.** (Synonyme : *Mnium punctatum* Hedw.) LGD
***Rhytidium rugosum* (Hedw.) Kindb.** LEC, LGD, PRB
***Saelania glaucescens* (Hedw.) Bomanss. & Broth.** LGD
***Sanionia orthothecioides* (Lindb.) Loeske** LGD
***Sanionia uncinata* (Hedw.) Loeske** (Synonyme : *Drepanocladus uncinatus* (Hedw.) Warnst.) LEC, LGD, NAS, PRB, REC
***Schistidium agassizii* Sull. & Lesq. *in* Sull.** (Synonyme : *Grimmia agassizii* (Sull. & Lesq. *in* Sull.) Jaeg. LEC, LGD, PRB, REC
***Schistidium apocarpum* (Hedw.) Bruch & Schimp.** (Synonyme : *Grimmia apocarpa* Hedw.) LEC, LGD, PRB
***Schistidium rivulare* (Brid.) Podp.** (Synonyme : *Grimmia rivularis* Brid.) LEC
***Sciuro-hypnum populeum* (Hedw.) Ignatov & Huttunen** (Synonyme : *Brachythecium populeum* (Hedw.) Schimp. *in* BSG) LEC, LGD, PRB, REC
***Sciuro-hypnum reflexum* (Starke) Ignatov & Huttunen** (Synonyme : *Brachythecium reflexum* (Starke *in* Web. & Mohr) Schimp. *in* BSG) LEC, REC
***Scorpidium revolvens* (Sw. *ex* anonymo) Rubers** (Synonymes : *Drepanocladus revolvens* (Sw. *ex* anonymo) Warnst. ; *Limprichtia revolvens* (Sw. *ex* anonymo) Loeske) LEC, LGD, PRB, REC
***Scorpidium scorpioides* (Hedw.) Limpr.** LEC, LGD, PRB, REC
***Splachnum sphaericum* Hedw.** LEC
***Straminergon stramineum* (Brid.) Hedenäs** (Synonyme : *Calliergon stramineum* (Brid.) Kindb.) LEC, LGD, PRB, REC
***Syntrichia ruralis* (Hedw.) Web. & Mohr.** (Synonyme : *Tortula ruralis* (Hedw.) Gaertn, Meyer & Scherb.) LEC, LGD, PRB, REC
***Tetraphis pellucida* Hedw.** LEC, SHE
***Tetraplodon mnioides* (Hedw.) Bruch & Schimp.** LEC, LGD, NAS, REC
***Tetraplodon urceolatus* (Hedw.) Bruch & Schimp.** LEC, LGD
***Tomentypnum falcifolium* (Nichols) Tuomikoski *in* Ahti & Fagerstén** LEC, LGD, REC, SHE
***Tomentypnum nitens* (Hedw.) Loeske** LEC, LGD, PRB, REC, SHE
***Tortella fragilis* (Hook. & Wils. *in* Drumm.) Limpr.** LGD
***Tortella humilis* (Hedw.) Jenn.** LEC.
***Tortella tortuosa* (Hedw.) Limpr.** LEC, LGD, PRB
***Ulota curvifolia* (Wahlendb.) Lilj.** LEC, LGD

***Warnstorfia exannulata* (Schimp.) Loeske** (Synonymes : *Drepanocladus exannulatus* (Schimp. *in* BSG) Warnst. ; *Drepanocladus exannulatus* var. *rotae* (De Not.) Loeske) LEC, LGD, PRB, REC, SHE
***Warnstorfia fluitans* (Hedw.) Loeske** (Synonymes : *Drepanocladus fluitans* (Hedw.) Warnst. ; *Drepanocladus fluitans* var. *berggrenii* (C. Jens.) C.Jens. *in* Weim.) LEC, LGD
***Warnstorfia sarmentosa* (Wahlenb.) Hedenäs** (Synonyme : *Calliergon sarmentosum* (Wahlenb.) Kindb.) LEC, LGD, PRB, REC

LICHENS

***Acarospora fuscata* (Schrader) Arnold** LGD
***Acarospora peliscypha* Th. Fr.** PRB
***Acarospora smaragdula* (Wahlenb.) A. Massal.** REC
***Acarospora veronensis* A. Massal.** PRB
***Alectoria nigricans* (Ach.) Nyl.** LEC, NAS, PRB, REC, SHE
***Alectoria ochroleuca* (Hoffm.) A. Massal.** LEC, LGD, NAS, PRB, REC, SHE
Alectoria sarmentosa* (Ach.) Ach. subsp. *sarmentosa LEC, SHE
***Alectoria sarmentosa* subsp. *vexillifera* (Nyl.) D. Hawksw.** PRB
***Allantoparmelia almquistii* (Vainio) Essl.** (Synonyme : *Parmelia almquistii* Vainio) LEC, PRB, REC, SHE
***Allantoparmelia alpicola* (Th.Fr.) Essl.** (Synonyme : *Parmelia alpicola* Th.Fr.) LEC, LGD, NAS, PRB, REC, SHE
***Amandinea punctata* (Hoffm) Coppins & Scheid.** REC
***Amygdalaria elegantior* (H. Magn.) Hertel & Brodo** LGD
***Amygdalaria panaeola* (Ach.) Hertel & Brodo** LEC, LGD, NAS, PRB
***Arctocetraria andrejevii* (Oksner) Kärnefelt & Thell** (Synonyme : *Cetraria andrejevii* Oksner) NAS
***Arctoparmelia centrifuga* (L.) Hale** (Synonymes : *Xanthoparmelia centrifuga* (L.) Hale ; *Parmelia* centrifuga (L.) Ach.) LEC, NAS, REC, SHE
***Arctoparmelia incurva* (Pers.) Hale** (Synonymes : *Xanthoparmelia incurva* (Pers.) Hale ; *Parmelia incurva* (Pers.) Fr.) LEC, LGD, REC
***Arthrorhaphis alpina* (Schaerer) R. Sant.** PRB
***Aspicilia aquatica* Körber** PRB
***Aspicilia candida* (Anzi) Hue** LGD
***Aspicilia cinerea* (L.) Körber** LEC, LGD, PRB
***Aspicilia supertegens* Arnold** LEC, LGD, PRB, REC
***Aspicilia verrucigera* Hue** LGD, PRB
***Aspilidea myrinii* (Fr.) Hafellner** (Synonyme : *Aspicilia myrinii* (Fr.) Stein) LGD, PRB
***Bacidia coprodes* (Körber) Lettau** PRB
***Bacidia subincompta* (Nyl.) Arnold** LEC
***Bellemerea alpina* (Sommerf.) Clauzade & Cl. Roux**. PRB
***Bellemerea cinereorufescens* (Ach.) Clauzade & Cl. Roux** PRB
***Biatora cuprea* (Sommerf.) Fr.** PRB
***Biatora subduplex* (Nyl.) Printizen** PRB
***Brodoa oroarctica* (Krog) Goward** (Synonyme : *Hypogymnia oroactica* Krog) LGD, NAS, PRB, REC, SHE
***Bryocaulon divergens* (Ach.) Kärnefelt** (Synonyme : *Cornicularia divergens* Ach.) LEC, LGD, NAS, PRB, REC, SHE
***Bryoria capillaris* (Ach.) Brodo & D. Hawksw.** REC
***Bryoria furcellata* (Fr.) Brodo & D. Hawksw.** LEC
***Bryoria fuscescens* (Gyelnik) Brodo & D. Hawksw.** LEC
***Bryoria lanestris* (Ach.) Brodo & D. Hawksw.** REC, SHE
***Bryoria nadvornikiana* (Gyelnik) Brodo & D. Hawksw.** LEC
***Bryoria nitidula* (Th. Fr.) Brodo & D. Hawksw.** LEC, NAS, REC
***Bryoria simplicior* (Vainio) Brodo & D. Hawksw.** LEC, LGD, REC, SHE
***Bryoria trichodes* (Michaux) Brodo & D. Hawksw. subsp.** *americana* **(Mot.) Brodo & D. Hawksw.** LEC
***Buellia erubescens* Arnold** LEC
***Buellia papillata* (Sommerf.) Tuck.** LEC, LGD, PRB
***Buellia triphragmioides* Anzi** LEC, LGD
***Calicium trabinellum* (Ach.) Ach.** REC
***Caloplaca cerina* (Hedwig) Th. Fr.** (Synonyme : *C. stillicidiorum* (Vahl) Lynge) PRB, REC

***Caloplaca flavovirescens* (Wulfen) DallaTorre & Sarnth.** LEC, LGD
***Caloplaca sideritis* (Tuck.) Zahlbr.** PRB
***Caloplaca sinapisperma* (Lam. & DC.) Maheu & A. Gillet** LGD
***Calvitimela aglaea* (Sommerf.) Hafellner** (Synonyme : *Tephromela aglaea* (Sommerf.) Hertel & Rambold) LEC, PRB
***Calvitimela armeniaca* (DC.) Hafellner** (Synonyme : *Tephromela armeniaca* (DC.) Hertel & Rambold) PRB
***Candelariella placodizans* (Nyl.) H. Magn.** PRB, LGD
***Candelariella terrigena* Räsänen** PRB
***Candelariella vitellina* (Hoffm.) Müll. Arg.** LEC, LGD, REC
***Carbonea atronivea* (Arnold) Hertel** PRB
***Cetraria aculeata* (Schreber) Fr.** (Synonyme : *Cornicularia aculeata* (Schreber) Ach.) LEC, LGD, PRB
***Cetraria ericetorum* Opiz.**
***Cetraria islandica* (L.) Ach** LEC, LGD, REC
***Cetraria islandica* (L.) Ach. subsp. *crispiformis* (Räsänen) Kärnefelt** LEC, LGD, PRB, REC
Cetraria islandica* (L.) Ach. subsp. *islandica LEC, SHE
***Cetraria laevigata* Rass** LEC, REC, SHE
***Cetraria nigricans* Nyl.** LEC, LGD, PRB, REC, SHE
***Cetrariella delisei* (Bory *ex* Schaerer) Kärnefelt & Thell** (Synonyme : *Cetraria delisei* (Bory *ex* Schaerer) Nyl) LEC, LGD, NAS, PRB, REC
***Cetrariella fastigiata* (Delise *ex* Nyl.) Kärnefelt & Thell** (Synonyme : *Cetraria fastigiata* (Delise *ex* Nyl.) Kärnefelt) REC
***Cladonia amaurocraea* (Flörke) Schaerer** LEC, LGD, NAS, PRB, REC, SHE
***Cladonia arbuscula* (Wallr.) Flotow** PRB, SHE
***Cladonia bellidiflora* (Ach.) Schaerer** LEC, LGD, NAS, PRB, REC, SHE
***Cladonia borealis* S. Stenroos** LEC, LGD, PRB, REC
***Cladonia cariosa* (Ach.) Sprengel** NAS
***Cladonia cenotea* (Ach.) Schaerer** REC
***Cladonia cervicornis* (Ach.) Flotow subsp. *verticillata* (Hoffm.) Ahti** (Synonyme : *Cladonia verticillata* (Hoffm.) Schaerer) LGD, REC
***Cladonia chlorophaea* (Flörke *ex* Sommerf.) Sprengel s. l**. LGD, PRB
***Cladonia coccifera* (L.) Willd.** LEC, LGD, NAS, PRB, REC, SHE
***Cladonia cornuta* (L.) Hoffm. s. l.** LEC, REC
Cladonia cornuta* (L.) Hoffm. subsp. *cornuta LEC, LGD, REC
***Cladonia cornuta* (L.) Hoffm. subsp. *groenlandica* (E. Dahl) Ahti** LEC
***Cladonia crispata* (Ach.) Flotow** LEC, PRB, REC, SHE
***Cladonia cristatella* Tuck** REC
***Cladonia cyanipes* (Sommerf.) Nyl.** REC
***Cladonia deformis* (L.) Hoffm.** LEC, LGD, REC
***Cladonia ecmocyna* Leighton s. l.** LGD
Cladonia ecmocyna* Leighton subsp. *ecmocyna LGD, NAS, SHE
***Cladonia fimbriata* (L.) Fr.** LGD, REC
***Cladonia gracilis* (L.) Willd. s. l.** LEC, LGD, NAS, PRB, REC, SHE
***Cladonia gracilis* (L.) Willd. subsp. *elongata* (Jacq.) Vainio** (Synonyme : *Cladonia gracilis* subsp. *nigripes* (Nyl.) Ahti) LEC, LGD, NAS, PRB, REC, SHE
Cladonia gracilis* (L.) Willd. subsp. *gracilis NAS, PRB, REC, SHE
***Cladonia gracilis* (L.) Willd. subsp. *turbinata* (Ach.) Ahti** LEC
***Cladonia macilenta* Hoffm.** REC
***Cladonia macrophylla* (Schaerer) Stenh.** PRB
***Cladonia maxima* (Asah.) Ahti** PRB, SHE
***Cladonia mitis* Sandst.** (Synonyme : *Cladina mitis* (Sandst.) Hustich) LEC, LGD, NAS, PRB, REC, SHE
***Cladonia multiformis* G. Merr.** REC
***Cladonia ochrochlora* Flörke** LEC
***Cladonia pleurota* (Flörke) Schaerer** LEC, LGD, NAS, PRB, REC, SHE
***Cladonia pocillum* (Ach.) Grognot** LGD
***Cladonia pyxidata* (L.) Hoffm.** LEC, LGD, PRB, REC
***Cladonia rangiferina* (L.) F. H. Wigg** (Synonyme : *Cladina rangiferina* (L.) Nyl.) LEC, LGD, PRB, REC, SHE

***Cladonia squamosa* Hoffm.** LEC, LGD, NAS, PRB, REC, SHE
***Cladonia stellaris* (Opiz) Pouzar & Vzda** (Synonymes : *Cladina stellaris* (Opiz) Brodo; *Cladina alpestris* (L.) Nyl. ; *Cladonia alpestris* (L.) Rabenh.) LEC, LGD, NAS, PRB, REC, SHE
***Cladonia stricta* (Nyl.) Nyl.** (Synonyme : *Cladonia lepidota* (Nyl.) DR.) LEC, LGD, NAS, PRB, REC, SHE
***Cladonia stygia* (Fr.) Ruoss** (Synonyme : *Cladina stygia* (Fr.) Ahti) LEC, LGD, PRB, REC
***Cladonia subfurcata* (Nyl.) Arnold** LGD, REC, SHE
***Cladonia sulphurina* (Michaux) Fr.** (Synonyme : *Cladonia gonecha* (Ach.) Asahina) LEC, LGD, REC, SHE
***Cladonia turgida* Hoffm.** PRB, REC, SHE
***Cladonia uncialis* (L.) F. H. Wigg.** LEC, LGD, NAS, PRB, REC, SHE
***Cladonia wainioi* Savicz** (Synonyme : *Cladonia pseudorangiformis* Asahina), LGD, PRB, REC, SHE
***Collema glebulentum* (Nyl. *ex* Crombie) Degel.** LGD
***Collema undulatum* Laurer *ex* Flotow var. *granulosum* Degel** PRB
***Cystocoleus ebeneus* (Dillwyn) Thwaites** LEC
***Dactylina arctica* (Richardson) Nyl.** NAS, REC
***Dermatocarpon luridum* (With.) J. R. Laundon** REC
***Dibaeis baeomyces* (L.f.) Rambold & Hertel** (Synonyme : *Baeomyces roseus* Pers.) LEC
***Dimelaena oreina* (Ach.) Norman** (Synonyme : *Rinodina oreina* (Ach.) A.Massal. LGD, PRB
***Diploschistes muscorum* (Scop.) R. Sant.** LEC, LGD
***Diploschistes scruposus* (Schreber) Norman** LEC, PRB
***Eiglera flavida* (Hepp) Hafellner** PRB
***Ephebe lanata* (L.) Vainio** NAS, PRB, REC
***Evernia mesomorpha* Nyl.** PRB, SHE
***Flavocetraria cucullata* (Bellardi) Kärnefelt & Thell** (Synonymes : *Allocetraria cucullata* (Bellardi) Randlane & Saag ; *Cetraria cucullata* (Bellardi) Ach.) LEC, LGD, NAS, REC
***Flavocetraria nivalis* (L.) Kärnefelt & Thell** (Synonymes : *Allocetraria nivalis* (L.) Randlane & Saag ; *Cetraria nivalis* (L.) Ach.) LEC, LGD, NAS, PRB, REC, SHE
***Frutidella caesioatra* (Schaerer) Kalb** (Synonyme : *Lecidea caesioatra* Schaerer) PRB
Fulgensia bracteata* (Hoffm.) Räsänen subsp. *bracteata LGD
***Fuscidea lowensis* (H.Magn.) R. Anderson & Hertel** PRB
***Fuscopannaria praetermissa* (Nyl.) P. M. Jørg.** LEC
***Hafellnera parasemella* (Nyl.) Houmeau & Roux** PRB
***Hypogymnia austerodes* (Nyl) Räsänen** (Synonyme : *Parmelia austerodes* Nyl.) LEC, LGD, PRB
***Hypogymnia bitteri* (Lynge) Ahti** LEC, LGD, REC, SHE
***Hypogymnia physodes* (L.) Nyl.** LEC, LGD, PRB, REC, SHE
***Hypogymnia pulverata* (Nyl. *ex* Crombie) Elix** SHE
***Icmadophila ericetorum* (L.) Zahlbr.** LEC, LGD, REC, SHE
***Imshaugia aleurites* (Ach.) S. F. Meyer** (Synonyme : *Parmeliopsis aleurites* (Ach.) Nyl.) REC
***Ionaspis lacustris* (With.) Lutzoni** (Synonyme : *Hymenelia lacustris* (With.) M. Choisy) LGD, PRB, REC
***Japewia tornoënsis* (Nyl.) Tønsberg** (Synonyme : *Lecidea tornoënsis* Nyl.) LEC, LGD, PRB
***Koerberiella wimmeriana* (Körber) Stein** REC
***Lasallia papulosa* (Ach.) Llano** LEC, LGD, REC
***Lasallia pensylvanica* (Hoffm.) Llano** LEC, LGD, REC
***Lecanora albellula* Nyl.** (Synonyme : *Lecanora piniperda* Körber) LEC, REC
***Lecanora argentea* Oksner & Volkova** LEC, PRB
***Lecanora argopholis* (Ach.) Ach.** LGD
***Lecanora beringii* Nyl.** LGD
***Lecanora cenisia* Ach.** PRB
***Lecanora circumborealis* Brodo & Vitik.** LEC, REC
***Lecanora contractula* Nyl.** LEC, LGD
***Lecanora impudens* Degel.** LEC, REC
***Lecanora intricata* (Ach.) Ach.** LEC, LGD, PRB, REC
***Lecanora marginata* (Schaerer) Hertel & Rambold** PRB

***Lecanora meridionalis* H. Magn.** REC
***Lecanora nordenskioeldii* Vainio** PRB
***Lecanora perplexa* Brodo** LGD
***Lecanora polytropa* (Hoffm.) Rabenh.** LEC, LGD, PRB
***Lecanora pseudistera* Nyl.** REC
***Lecanora rupicola* (L.) Zahlbr.** LGD
***Lecanora straminea* Ach.** LGD
***Lecanora subintricata* (Nyl.) Th. Fr.** LEC, PRB, REC
***Lecanora symmicta* (Ach.) Ach.** LEC, PRB, REC
***Lecidea atrobrunnea* (Lam. & DC.) Schaerer** LGD, LEC, NAS, PRB
***Lecidea auriculata* Th. Fr.** LEC, LGD, REC
***Lecidea lapicida* (Ach.) Ach.** LEC, LGD, PRB, REC
***Lecidea paupercula* Th. Fr.** PRB
***Lecidea plana* (J. Lahm) Nyl.** PRB
***Lecidea tessellata* Flörke** LEC, LGD, PRB, REC
***Lecidella euphorea* (Flörke) Hertel** LGD, PRB
***Lecidella patavina* (A. Massal.) Knoph & Leuckert** LEC
***Lecidella stigmatea* (Ach.) Hertel & Leuckert** LEC, LGD, REC
***Lecidoma demissum* (Rutstr.) Gotth. Schneider & Hertel** PRB, REC
***Lepraria lobificans* Nyl.** REC
***Lepraria neglecta* (Nyl.) Erichsen** (Synonyme : *Crocynia neglecta* (Nyl.) Hue) LEC, LGD
***Leptogium saturninum* (Dickson) Nyl.** LEC, LGD
***Lichenomphalia hudsoniana* (H. S. Jenn.) Redhead, Lutzoni, Moncalvo & Vilgalys**
(Synonyme : *Omphalina hudsoniana* (H. S. Jenn.) H. E. Bigelow) LGD, REC
***Lobaria linita* (Ach.) Rabenh.** NAS
***Lobaria scrobiculata* (Scop.) DC.** LEC, NAS, PRB
***Lobothallia alphoplaca* (Wahlenb.) Hafellner** LGD
***Lopadium pezizoideum* (Ach.) Körber**. REC, PRB
***Massalongia carnosa* (Dickson) Körber** REC
***Megaspora verrucosa* (Ach.) Hafellner & V. Wirth** PRB
***Melanelia commixta* (Nyl.) Thell** (Synonyme : *Cetraria commixta* (Nyl.) Th. Fr.) LEC
***Melanelia disjuncta* (Erichsen) Essl.** (Synonyme : *Parmelia disjuncta* Erichsen) PRB, REC
***Melanelia hepatizon* (Ach.) Thell** (Synonyme : *Cetraria hepatizon* (Ach.) Vainio) LEC, LGD, NAS, PRB, REC, SHE
***Melanelia panniformis* (Nyl.) Essl.** (Synonyme : *Parmelia panniformis* (Nyl.) Vainio) LEC, NAS, PRB, REC
***Melanelia stygia* (L.) Essl.** (Synonyme : *Parmelia stygia* (L.) Ach.) LEC, LGD, NAS, PRB, REC
Melanohalea exasperatula* (Nyl.) O. Blanco *et al. (Synonymes : *Melanelia exasperulata* (Nyl.) Essl. ; *Parmelia exasperatula* Nyl.) LEC
Melanohalea olivacea* (L.) O. Blanco *et al. (Synonymes : *Melanelia olivacea* (L.) Essl. ; *Parmelia olivacea* (L.) Ach.) LGD
***Micarea assimilata* (Nyl.) Coppins** PRB, REC
***Micarea incrassata* Hedl.** PRB
***Micarea melaena* (Nyl.) Hedl.** LEC, LGD, PRB
***Miriquidica lulensis* (Hellbom) Hertel & Rambold** PRB
***Miriquidica leucophaea* (Flörke *ex* Rabenh.) Hertel & Rambold** PRB
***Mycobilimbia epixanthoides* (Nyl.) Vitik., Ahti, Kuusinen, Lommi & T. Ulvinen** LEC
***Mycobilimbia lobulata* (Sommerf.) Hafellner** (Synonyme : *Toninia lobulata* (Sommerf.) Lynge) LGD
***Mycoblastus alpinus* (Fr.) Kernst.** REC
***Mycoblastus sanguinarius* (L.) Norman** LEC, LGD, REC, SHE
***Mycocalicium subtile* (Pers.) Szatala** REC
***Nephroma arcticum* (L.) Torss.** LEC, LGD, PRB, REC, SHE
***Nephroma bellum* (Sprengel) Tuck.** LEC, LGD, REC
***Nephroma expallidum* (Nyl.) Nyl.** NAS, REC
***Nephroma parile* (Ach.) Ach.** LEC, REC
***Ochrolechia androgyna* (Hoffm.) Arnold**. LEC, LGD, PRB, REC, SHE

***Ochrolechia frigida* (Sw.) Lynge** LEC, LGD, NAS, PRB, REC, SHE
***Ochrolechia upsaliensis* (L.) A. Massal.** LEC, LGD, PRB
***Opegrapha varia* Pers.** REC
***Ophioparma lapponica* (Räsänen) Hafellner & R. W. Rogers** (Synonyme : *Haematomma lapponicum* Räsänen) LGD, NAS, PRB, SHE
***Ophioparma ventosa* (L.) Norman** LEC, LGD, PRB, REC
***Orphniospora moriopsis* (A. Massal.) D. Hawksw.** LEC, LGD, REC, SHE
***Pannaria conoplea* (Ach.) Bory** LEC, LGD
***Pannaria rubiginosa* (Ach.) Bory** LEC
***Parmelia omphalodes* (L.) Ach.** LEC, LGD, REC
***Parmelia saxatilis* (L.) Ach.** LEC, NAS, PRB, REC, SHE
***Parmelia skultii* Hale** LGD
***Parmelia squarrosa* Hale** PRB
***Parmelia sulcata* Taylor** LEC, LGD, PRB, REC, SHE
***Parmeliopsis ambigua* (Wulfen) Nyl.** LEC, LGD, REC, SHE
***Parmeliopsis capitata* R. C. Harris** LGD
***Parmeliopsis hyperopta* (Ach.) Arnold** LEC, LGD, NAS, PRB, REC, SHE
Peltigera aphthosa **(L.) Willd.** LEC, LGD, PRB, REC
***Peltigera canina* (L.) Willd.** LEC, LGD, PRB, REC
***Peltigera collina* (Ach.) Schrader** LEC
***Peltigera leucophlebia* (Nyl.) Gyelnik** LGD, PRB
***Peltigera malacea* (Ach.) Funck** LEC, LGD, PRB, REC
***Peltigera polydactylon* (Necker) Hoffm.** PRB
***Peltigera rufescens* (Weiss) Humb.** LEC
***Peltigera scabrosa* Th. Fr.** LEC, LGD, REC
***Peltigera venosa* (L.) Hoffm.** LGD, PRB
***Pertusaria bryontha* (Ach.) Nyl.** PRB
***Pertusaria coriacea* (Th. Fr.) Th. Fr.** LEC, LGD, PRB
***Pertusaria dactylina* (Ach.) Nyl.** LEC, LGD, PRB, REC
***Pertusaria geminipara* (Th. Fr.) C. Knight *ex* Brodo** LEC, REC, SHE
***Pertusaria oculata* (Dickson) Th. Fr.** PRB
***Pertusaria panyrga* (Ach.) A. Massal.** LEC, LGD, NAS, PRB, REC, SHE
***Pertusaria subobducens* Nyl.** LGD
***Phaeocalicium compressulum* (Nyl. *ex* Szatala) A. F. W. Schmidt** LEC
***Phaeocalicium populneum* (Brond. *ex* Duby) A. F. W. Schmidt** LEC
***Phaeophyscia decolor* (Kashiw.) Essl.** PRB
***Phaeophyscia kairamoi* (Vainio) Moberg** LEC
***Phaeophyscia sciatra* (Ach.) Moberg** PRB
***Physcia aipolia* (Ehrh. *ex* Humb.) Fürnr.** LEC
***Physcia caesia* (Hoffm.) Fürnr.** PRB
***Physcia dubia* (Hoffm.) Lettau** PRB
***Physcia phaea* (Tuck.) J. W. Thomson** (Synonyme : *Physcia melops* Duf.) LGD
***Physconia detersa* (Nyl.) Poelt** LEC
***Physconia muscigena* (Ach.) Poelt** (Synonyme : *Physcia muscigena* (Ach.) Nyl.) PRB
***Pilophorus dovrensis* (Nyl.) Timdal, Hertel & Rambold** (Synonyme : *Lecidea pallida* Th.Fr.) REC
***Placidium lacinulatum* (Ach.) Breuss** PRB
***Placynthiella oligotropha* (J. R. Laundon) Coppins & P. James** LGD, REC
***Placynthiella uliginosa* (Schrader) Coppins & P. James** LEC, REC
***Placynthium flabellosum* (Tuck.) Zahlbr.** LEC, PRB, REC
***Placynthium nigrum* (Hudson) Gray** REC
***Platismatia glauca* (L.) Culb. & C. Culb.** (Synonyme : *Cetraria glauca* (L.) Ach.) LGD, NAS, PRB, SHE
***Polyblastia cupularis* A. Massal.** PRB
***Polyblastia hyperborea* Th. Fr.** PRB

***Polyblastia sendtneri* Kremp.** PRB
***Porpidia cinereoatra* (Ach.) Hertel & Knoph** LGD
***Porpidia crustulata* (Ach.) Hertel & Knoph** PRB
***Porpidia flavocaerulescens* (Hornem.) Hertel & A. J. Schwab** LEC, LGD, NAS, PRB, REC
***Porpidia lowiana* Gowan** LEC, LGD, PRB
***Porpidia macrocarpa* (DC.) Hertel & A. J. Schwab** LEC, LGD, SHE
***Porpidia melinodes* (Körber) Gowan & Ahti** LGD, PRB, REC
***Porpidia superba* (Körber) Hertel & Knoph** PRB, REC
***Porpidia thomsonii* Gowan** PRB, REC
***Protopannaria pezizoides* (Weber) P. M. Jørg. & S. Ekman** (Synonyme : *Pannaria pezizoides* (Weber) Trevisan) LEC, LGD, NAS, REC
***Protoparmelia badia* (Hoffm.) Hafellner** LEC, LGD, NAS, PRB, SHE
***Protoparmelia cupreobadia* (Nyl.) Poelt** LGD
***Pseudephebe pubescens* (L.) M. Choisy** NAS, REC
***Psora decipiens* (Hedwig) Hoffm.** PRB
***Psora himalayana* (Church. Bab.) Timdal** PRB
***Psoroma hypnorum* (Vahl.) Gray** LEC, NAS, PRB, REC
***Pyrrhospora cinnabarina* (Sommerf.) M. Choisy** (Synonyme : *Lecidea cinnabarina* Sommerf.) NAS
***Ramalina roesleri* (Hochst. *ex* Schaerer) Hue** LEC, LGD, PRB
***Rhizocarpon badioatrum* (Flörke *ex* Sprengel) Th. Fr.** LEC, LGD, PRB, REC
***Rhizocarpon eupetraeoides* (Nyl.) Blomb. & Forss.** LGD
***Rhizocarpon ferax* H. Magn.** REC
***Rhizocarpon geminatum* Körber** LEC
***Rhizocarpon geographicum* (L.) DC.** LEC, LGD, NAS, PRB, REC
***Rhizocarpon grande* (Flörke *ex* Flotow) Arnold** LEC, PRB, REC
***Rhizocarpon hochstetteri* (Körber) Vainio** REC
***Rhizocarpon macrosporum* Räsänen** LGD, PRB
***Rhizocarpon obscuratum* (Ach.) A. Massal.** PRB, REC
***Rhizocarpon riparium* Räsänen** REC
***Rhizocarpon rittokense* (Hellbom) Th. Fr.** LEC REC
***Rhizocarpon superficiale* (Schaerer) Vainio** LGD
***Rhizocarpon umbilicatum* (Ramond) Flagey** REC
***Rhizoplaca chrysoleuca* (Sm.) Zopf** LGD, PRB
***Rinodina mniaraea* (Ach.) Körber**) PRB
***Rinodina turfacea* (Wahlenb.) Körber** LEC, LGD, PRB
***Ropalospora lugubris* (Sommerf.) Poelt** LEC, LGD, REC
***Sagiolechia rhexoblephara* (Nyl.) Zahlbr.** LEC
***Siphula ceratites* (Wahlenb.) Fr.** LEC
***Solorina crocea* (L.) Ach.** LEC, LGD, NAS, PRB
***Solorina saccata* (L.) Ach.** PRB, REC
***Sphaerophorus fragilis* (L.) Pers.** LEC, LGD, NAS, PRB, REC, SHE
***Sphaerophorus globosus* (Hudson) Vainio** LEC, NAS, PRB, REC, SHE
***Spilonema revertens* Nyl.** LGD, PRB
***Staurothele drummondii* (Tuck.) Tuck.** REC
***Staurothele fissa* (Taylor) Zwackh** REC
***Stereocaulon alpinum* Laurer *ex* Funck** SHE
***Stereocaulon arcticum* Lynge** PRB
***Stereocaulon arenarium* (Savicz) Lamb** LEC, NAS, PRB
***Stereocaulon botryosum* Ach.** NAS
***Stereocaulon glareosum* (Savicz) H. Magn.** LEC, LGD
***Stereocaulon grande* (H. Magn.) H. Magn.** LGD
***Stereocaulon paschale* (L.) Hoffm.** LEC, LGD, NAS, PRB, REC, SHE
***Stereocaulon saxatile* H. Magn.** NAS, REC

***Stereocaulon spathuliferum* Vainio** LEC
***Stereocaulon subcoralloides* (Nyl.) Nyl.** LGD
***Stereocaulon symphycheilum* Lamb** PRB
***Stereocaulon vesuvianum* Pers.** LGD, NAS
***Sticta arctica* Degel.** NAS
***Tephromela atra* (Hudson) Hafellner** LEC, REC
***Tetramelas geophila* (Sommerf.) Norman** (Synonyme : *Buellia geophila* (Flörke *ex* Sommerf.) Lynge) LEC
***Thamnolia vermicularis* (Sw.) Ach. *ex* Schaerer** PRB, NAS
***Thelocarpon epibolum* Nyl.** REC
***Toninia arctica* Timdal** PRB
***Toninia sedifolia* (Scop.) Timdal** LEC
***Trapelia placodioides* Coppins & P. James** REC
***Trapeliopsis granulosa* (Hoffm.) Lumbsch** (Synonyme : *Lecidea granulosa* (Hoffm.) Ach.) LEC, LGD, PRB, REC, SHE
***Tremolecia atrata* (Ach.) Hertel** LEC, LGD, PRB
***Tuckermannopsis americana* (Sprengel) Hale** (Synonyme : *Cetraria halei* Culb. & C. Culb.) REC, SHE
***Tuckermannopsis sepincola* (Ehrh.) Hale** (Synonyme : *Cetraria sepincola* (Ehrh.) Ach.) LEC, LGD, REC, SHE
***Umbilicaria arctica* (Ach.) Nyl.** LGD
***Umbilicaria cylindrica* (L.) Delise *ex* Duby** LGD, NAS, PRB, SHE
***Umbilicaria deusta* (L.) Baumg.** LEC, PRB
***Umbilicaria havaasii* Llano** NAS
***Umbilicaria hyperborea* (Ach.) Hoffm.** LEC, LGD, PRB, REC
***Umbilicaria mammulata* (Ach.) Tuck.** LGD
***Umbilicaria muehlenbergii* (Ach.) Tuck.** (Synonyme : *Actinogyra muehlenbergii* (Ach.) Schol.) LEC, LGD, REC
***Umbilicaria polyphylla* (L.) Baumg.** LEC
***Umbilicaria polyrhiza* (L.) Fr.** LEC
***Umbilicaria proboscidea* (L.) Schrader** LEC, LGD, NAS, PRB, REC, SHE
***Umbilicaria torrefacta* (Lightf.) Schrader** LEC, LGD, NAS, PRB
***Umbilicaria vellea* (L.) Hoffm.** LEC, SHE
***Varicellaria rhodocarpa* (Körber) Th.Fr.** LEC, LGD, REC
***Verrucaria muralis* Ach.** PRB
***Verrucaria nigrescens* Pers.** PRB
***Vulpicida pinastri* (Scop.) J.-E. Mattsson & M. J. Lai** (Synonyme : *Cetraria pinastri* (Scop.) Gray) LEC, LGD, SHE
***Xanthoria candelaria* (L.) Th. Fr.** LGD, PRB
***Xanthoria elegans* (Link) Th. Fr.** (Synonyme : *Caloplaca elegans* (Link.) Th.Fr.) LEC, LGD, PRB
***Xylographa parallela* (Ach. Fr.) Behlen & Desberger** (Synonyme : *Xylographa abietina* (Pers.) Zahlbr.) PRB
***Xylographa vitiligo* (Ach.) J. R. Laundon** LEC, REC

Appendix 4 Rare Bryophytes in Québec Identified in the Study Area by Sector

SECTORS: LEC: Lac à l'Eau Claire; LGD: Lac Guillaume-Delisle; NAS: Rivière Nastapoka; PRB: Petite rivière à la Baleine; REC: Rivière à l'Eau Claire; SHE: Rivière Sheldrake

TAXON	SECTOR					
	LEC	LGD	NAS	PRB	REC	SHE
LIVERWORTS						
***Calypogeia sphagnicola* (H. Arnell & J. Perss.) Warnst. & Loeske**		✓				
***Cephaloziella grimsulana* (J. B. Jack *ex* Gottsche & Rabenh.) Sde.-Lac**		✓		✓	✓	
***Cephaloziella varians* (Gottsche) Steph.** (Synonyme : *Cephaloziella arctica* Bryhn & Douin)	✓	✓		✓	✓	
***Diplophyllum albicans* (L.) Dum.**				✓		
***Diplophyllum apiculatum* (Evans.) Steph.**		✓				
***Gymnomitrion obtusum* (Lindb.) Pears.**				✓		
***Harpanthus flotovianus* (Nees) Nees**		✓				
***Hygrobiella laxifolia* (Hook.) Spruce**					✓	
***Jungermannia polaris* Lindb.** (Synonyme : *Solenostoma pumilum* (With.) K.Müll.)	✓					
***Jungermannia subelliptica* (Lindb. *ex* Kaal.) Lev.**					✓	
***Leiocolea collaris* (Nees) Schljakov** (Synonyme : *Lophozia collaris* (Nees) Dum.)				✓	✓	
***Lophozia grandiretis* (Lindb. *ex* Kaal.) Schiffn.**					✓	
***Lophozia obtusa* (Lindb.) Evans** (Synonyme : *Leiocolea obtusa* (Lindb.) Buch)		✓				
***Lophozia polaris* (Schust.) Schust. *in* Schust & Damsh.**				✓		
***Lophozia ventricosa* var. *uliginosa* Breidl.** (Synonyme : *Lophozia ventricosa var. longiflora* (Nees) Macoun)	✓					
***Mannia pilosa* (Hornem.) Frye & Clark**				✓		
***Marsupella arctica* (Berggr.) Bryhn & Kaal.**				✓		
***Marsupella sparsifolia* (Lindb.) Dum.**		✓				
***Marsupella sprucei* (Limpr.) Bernet** (Synonyme : *Marsupella ustulata* (Hüb.) Spruce)	✓					
***Pleuroclada albescens* (Hook.) Spruce var. *islandica* (Nees) L. Söderstr. & Váňa**		✓				
***Scapania gymnostomophila* Kaal.**				✓		
***Scapania simmonsii* Bryhn & Kaal.**					✓	
***Tritomaria polita* (Nees) Joerg.** (Synonyme : *Saccobasis polita* (Nees) Buch)		✓		✓		
SPHAGNUMS						
***Sphagnum arcticum* Flatberg & Frisvoll**			✓			
***Sphagnum contortum* Schultz**		✓				

TAXON	SECTOR					
	LEC	LGD	NAS	PRB	REC	SHE
MOSSES						
***Andreaea rupestris* Hedw. var. *papillosa* (Lindb.) Podp.** (Synonyme : *Andreaea rupestris* var. *acuminata* (B.S.G.) Sharp *in* Grout)	✓					
***Aplodon wormskjoldii* (Hornem.) Kindb.**		✓				
***Bryum calobryoides* Spence**					✓	
***Cnestrum alpestre* (Wahlenb. *ex* Huebener) Nyholm *ex* Mogensen** (Synonymes : *Cynodontium alpestre* (Wahlenb.) Milde ; *Oncophorus strumulosus* (C. Müll. & Kindb.) E. G. Britton)	✓			✓		
***Cynodontium polycarpon* (Hedw.) Schimp.** (Synonyme : *Oncophorus polycarpus* (Hedw.) Brid	✓	✓				
***Cyrtomnium hymenophyllum* (Bruch & Schimp.) Holmen**				✓		
***Dicranella cerviculata* (Hedw.) Schimp.**				✓		
***Dicranella subulata* (Hedw.) Schimp.**	✓					
***Dicranum condensatum* Hedw.**		✓				
Encalypta affinis* R. Hedw. *subsp. affinis				✓		
***Encalypta alpina* Sm.**				✓		
***Grimmia trichophylla* Grev.**		✓		✓		
***Hygrohypnum bestii* (Ren. & Bryhn *ex* Ren.) Holz. *ex* Broth**.				✓		
***Hygrohypnum smithii* (Sw. *ex* Lilj.) Broth.**		✓			✓	
***Kiaeria blyttii* (Schimp.) Broth.**	✓			✓		
***Neckera oligocarpa* Bruch** *(Synonyme : Neckera pennata* Hedw. var *tenera* C. Müll.)	✓					
***Orthotrichum pylaisii* Brid.** (Synonyme : *Orthotrichum microblephare* (*-um*) Schimp.)		✓				
***Philonotis fontana* (Hedw.) Brid. var. *americana* (Dism.) Flowers *ex* H. A. Crum**			✓			
***Philonotis tomentella* Molendo** (Synonyme : *Philonotis fontana* (Hedw.) Brid. var. *pumila* (Turn.) Brid.)	✓					
***Pohlia crudoides* (Sull. & Lesq.) Broth.**		✓				
***Pohlia obtusifolia* (Brid.) L. Koch** (Synonyme : *Pohlia cucullata* (Schwägr.) Lindb.)		✓				
***Pohlia sphagnicola* (Bruch & Schimp.) Broth.**		✓			✓	
***Pseudoleskeella rupestris* (Berggr.) Hedenäs & L. Söderstr.** (Synonymes : *Pseudoleskeella catenulata* (Brid. *ex* Schrad.) Kindb. ; *Pseudoleskeella sibirica* (Arnell) P. Wils. & Norris)	✓					
***Ptychostomum salinum* (Hag. *ex* Limpr.) J. R. Spence** (Synonymes : *Bryum salinum* Hag. *ex* Limpr ; *Bryum archangelicum* Buch & Schimp.)		✓				
***Rhizomnium gracile* T. J. Kop.**	✓				✓	✓
***Sanionia orthothecioides* (Lindb.) Loeske**		✓				
***Tortella humilis* (Hedw.) Jenn.**	✓					

Source: Based on the classification used by the Centre de données sur le patrimoine naturel du Québec

Appendix 5 Marine Mammals Found in and near the Study Area

FAMILY	LATIN	FRENCH	ENGLISH
Phocidés	*Phoca vitulina*	Phoque commun (2)	Harbour Seal
Phocidés	*Phoca hispida*	Phoque annelé (1)*	Ringed Seal
Phocidés	*Erignathus barbatus*	Phoque barbu (1)	Bearded Seal
Odonbénidés	*Odobenus rosmarus var. rosmarus*	Morse (3)	Walrus
Monodontidés	*Delphinapterus leucas*	Béluga (4)*	White Whale
Ursidés	*Ursus maritimus*	Ours blanc (1)	Polar Bear

* Species oserved (data Aubry, 2004; KRG field work, 2003, 2004)

Sources: (1) Archambault (1997)
(2) Lavalin Environnement (1991)
(3) Prescott and Richard (1996)
(4) DFO (2005a)
(5) Avataq Cultural Institute, personal communication (2006)
(6) http://www.eastcree.org/lex/index.php

	INUKTITUT (5)		CREE (6)
SYLLABIC TYPE	ROMAN TYPE	SYLLABIC TYPE	ROMAN TYPE
ᖃᓯᒋᐊᖅ	Qasigiaq	ᐋᐦᒋᒄ	aahchikw
ᓇᑦᓯᖅ	Natsiq	ᐋᐦᒋᒄ	aahchikw
ᐅᒡᔪᒃ	Ugjuk	ᐋᐦᒋᒄ	aahchikw
ᐊᐃᕕᖅ	Aiviq	ᐧᐄᐱᒋᐤ	wiipichiu
ᕿᓚᓗᒐᖅ	Qilalugak	ᐧᐋᐱᒫᒄ	waapimaakw
ᓇᓄᖅ	Nanuq	ᐧᐋᐱ ᒄ	waapiskw

Appendix 6 Land and Semi-Aquatic Mammals Found in and near the Study Area

FAMILY	LATIN	FRENCH	ENGLISH
Soricidés	*Sorex cinereus*	Musaraigne cendrée (1)	Masked Shrew
Soricidés	*Sorex palustris*	Musaraigne palustre (3)	Northern Water Shrew
Soricidés	*Sorex hoyi*	Musaraigne pygmée (1)	Pygmy Shrew
Talpidés	*Condylura cristata*	Condylure à nez étoilé (3)	Star-Nosed Mole
Lépirodés	*Lepus americanus*	Lièvre d'Amérique (1)*	Snowshoe Hare
Lépirodés	*Lepus arcticus*	Lièvre arctique (2)**	Arctic Hare
Sciuridés	*Tamiasciurus hudsonicus*	Écureuil roux (1)	Red Squirrel
Sciuridés	*Marmota monax*	Marmotte commune (1)	Woodchuck
Castoridés	*Castor canadensis*	Castor du Canada (1)**	American Beaver
Cricétidés	*Phenacomys intermedius*	Campagnol des bruyères (1)	Heather Vole
Cricétidés	*Microtus pennsylvanicus*	Campagnol des champs (2)	Meadow Vole
Cricétidés	*Clethrionomys gapperi*	Campagnol-à-dos-roux de Gapper (1)	Glapper's Red-backed Vole
Cricétidés	*Synaptomys borealis*	Campagnol-lemming boréal (2)	Northern Bog Lemming
Cricétidés	*Dicrostonyx hudsonius*	Lemming d'Ungava (2)**	Ungava Lemming
Cricétidés	*Ondatra zibethicus*	Rat-musqué commun (1)	Muskrat
Cricétidés	*Peromyscus maniculatus*	Souris sylvestre (1)	Deer Mouse
Dipodidés	*Zapus hudsonius*	Souris sauteuse des champs (1)	Meadow Jumping Mouse
Éréthizontidés	*Erethizon dorsatum*	Porc-épic d'Amérique (1)*	American Porcupine
Canidés	*Canis lupus var. labradorius*	Loup gris (2)	Timber Wolf, Gray Wolf
Canidés	*Alopex lagopus*	Renard arctique (2)	Arctic Fox
Canidés	*Vulpes vulpes*	Renard roux (2)	Red Fox
Ursidés	*Ursus americanus*	Ours noir (1)*	Americain Black Bear
Mustélidés	*Martes americana*	Martre d'Amérique (1)	Pine Marten
Mustélidés	*Mustela erminea*	Hermine (1)	Ermine
Mustélidés	*Mustala nilavis*	Belette pygmée (2)	Least Weasel
Mustélidés	*Mustela vison*	Vison d'Amérique (1)	Mink
Mustélidés	*Gulo gulo*	Carcajou (1)	Wolverine
Mustélidés	*Lutra canadensis*	Loutre des rivières (1)	River Otter
Félidés	*Lynx canadensis*	Lynx du Canada (1)	Lynx
Cervidés	*Rangifer tarandus var. caribou*	Caribou des bois (2)*	Woodland caribou
Cervidés	*Alces alces*	Orignal (3)	Moose
Bovidés	*Ovibos moschatus*	Boeuf musqué (1)	Muskox

* Species oserved (data Aubry, 2004; KRG field work, 2003, 2004)

** Species migration indicators (data Aubry, 2004; KRG field work, 2003)

Sources: (1) Archambault (1997) (2) Lavalin Environnement (1991) (3) Prescott and Richard (1996) (4) Avataq Cultural Institute, personal communication (2006) (5) Hydro-Québec (1993c) (6) http://www.eastcree.org/lex/index.php

NOM INUKTITUT (4)		NOM CRI (5, 6)	
SYLLABIC TYPE	ROMAN TYPE	SYLLABIC TYPE	ROMAN TYPE
ᐅᑦᔪᓇᖅ	Utjunaq	ᒌᓂᔥᑐᐧᐋᔮᐱᑯᔒᔥ	chiinishtuwaayaapikushiish
ᐅᑦᔪᓇᖅ ᒥᑭᓂᕐᓴᖅ	Utjunaq Mikinirsaq		
ᐅᑦᔪᓇᖅ	Utjunaq		
–	–	ᓈᓯᐹᑎᓂᔅᒑᓯᐤ	naasipaatinischaasiu
ᐅᑲᓕᐊᑦᓯᐊᒃ	Ukaliatsiak	ᐧᐋᐳᔥ	waapush
ᐅᑲᓕᖅ	Ukalik	ᒥᔅᑖᐳᔥ	mistaapush
ᕿᔪᑦᓯᐅᑎ	Qijutsiuti	ᐊᓂᑯᒑᔥ	anikuchaash
ᑰᑦᓯᐅᑎᒃ	Kuutsiutik		
ᑭᒋᐊᖅ	Kigiaq	ᐊᒥᔅᒄ	amiskw
ᐊᕕᖕᒐᐱᒃ	Avingaapik		
ᓄᓂᕙᒃᑲᒃ	Nunivakkak		
–	–		
ᐊᕕᖕᖕᒐᖅ	Avingak		
ᐊᕕᖕᖕᒐᖅ	Avinngak		
ᑭᒡᒐᓗᒃ	Avinngarjuaq	ᐧᐃᒋᔥᒄ	wichishkw
ᐅᑦᔪᓇᖅ	Utjunaq		
ᐅᑦᔪᓇᖅ	Utjunaq		
ᕿᓪᓛᓂᑦᓯᒃ	Qillaaritsik	ᑳᒄ	kaakw
ᐊᒪᕈᒃ	Amaruk		
ᑎᕆᒐᓐᓂᐊᖅ	Tiriganniaq	ᐧᐋᐱᐦᒑᔒᔥ	Wapmacesu, waapihchaashiish
ᑎᕆᒐᓐᓂᐊᖅ (ᑲᔪᖅᑐᒃ)	Tirigariarjuk	ᐅᔖᐅᐦᒑᔑᐤ	Macesu, ushaauhchaashiu
ᐊᒃᓴᖅ	Aksaq	ᒋᔖᔮᒄ	Maskw, chishaayaakw
ᑎᕆᐊ ᐊᐅᔭᑦᓯᐅᑎᒃ	Tiriaq Aujastiutik	ᐧᐋᐱᔥᑖᓐ	waapishtaan
ᑎᕆᐊᖅ	Tiriaq	ᓯᐦᑯ	Shiskushiish, sihkus
ᑎᕆᐊᖅ	Tiriaq		
ᐆᒐᕐᓯᐅᑎ	Uugarsiutik	ᐊᒋᑳᔥ	Achikoash, achikaash
ᖃᐅᕕᒃ	Qauvik		Kuiikuhaacheu
ᐸᒥᐅᕐᑑᒃ	Pamiurtuu	ᓂᒋᒄ	Nichikw
ᐱᕐᑐᓴᓕᒃ	Piqtuqsiraq	ᐱᔑᐤ	Pishuu, pishiu
ᑐᒃᑐᖅ	Tuktuq	ᐊᑎᐦᒄ	Atikw, atihkw
ᑐᒃᑐᕙᒃ	Tuttuvak	ᒨ	Mus, muus
ᐅᒥᒻᒪᖅ	Umimmak		

Appendix 7 Avifauna Found in and near the Study Area

FAMILY	LATIN	FRENCH	ENGLISH
Anatidés	*Chen caerulescens*	Oie des neiges (3, 7)	Snow Goose
Anatidés	*Branta canadensis*	Bernache du Canada (3, 5, 7)*	Canada Goose
Anatidés	*Branta bernicla*	Bernache cravant (2, 7)	Brant
Anatidés	*Cygnus colombianus*	Cygne siffleur (2)	Tundra Swan
Anatidés	*Anas americana*	Canard d'Amérique (2, 7)	American Wigeon
Anatidés	*Anas rubripes*	Canard noir (3, 5, 7)*	American black Duck
Anatidés	*Anas platyrhynchos*	Canard colvert (2, 7)	Mallard
Anatidés	*Anas clypeata*	Canard souchet (7)	Northern Shoveler
Anatidés	*Anas acuta*	Canard pilet (3, 7)	Northern Pintail
Anatidés	*Anas crecca*	Sarcelle d'hiver (à ailes vertes) (1, 5, 7)*	Green-winged Teal
Anatidés	*Aythya collaris*	Fuligule à collier (5, 7)*	Ring-necked Duck
Anatidés	*Aythya marila*	Fuligule milouinan (Grand morillon) (3, 5, 7)*	Greater Scaup
Anatidés	*Aythya affinis*	Petit Fuligule (7)	Lesser Scaup
Anatidés	*Somateria spectabilis*	Eider à tête grise (5)*	King Eider
Anatidés	*Somateria mollissima*	Eider à duvet (3, 5, 7)*	Common Eider
Anatidés	*Histrionicus histrionicus*	Arlequin plongeur (3, 4, 5, 7)*	Harlequin Duck
Anatidés	*Melanitta perspicillata*	Macreuse à front blanc (3, 5, 7)*	Surf Scoter
Anatidés	*Melanitta fusca*	Macreuse brune (3, 5, 7)*	White-winged Scoter
Anatidés	*Melanitta nigra*	Macreuse noire (à bec jaune) (2, 5, 7)*	Black Scoter
Anatidés	*Clangula hyemalis*	Harelde kakawi (3, 5, 7)*	Oldsquaw
Anatidés	*Bucephala albeola*	Petit Garrot (7)	Bufflehead
Anatidés	*Bucephala clangula*	Garrot à œil d'or (1, 5, 7)*	Common Goldeneye
Anatidés	*Bucephala islandica*	Garrot d'Islande (5, 7)*	Barrow's Goldeneye
Anatidés	*Lophodytes cucullatus*	Harle couronné (7)	Hooded Merganser
Anatidés	*Mergus merganser*	Grand harle (1, 5, 7)*	Common Merganser
Anatidés	*Mergus serrator*	Harle huppé (3, 5, 7)*	Red-breasted Merganser
Phasianidés	*Falcipennis canadensis*	Tétras du Canada (3, 7)	Spruce Grouse
Phasianidés	*Lagopus lagopus*	Lagopède des saules (3, 7)	Willow Ptarmigan
Phasianidés	*Lagopus mutus*	Lagopède alpin (3)	Rock Ptarmigan
Gaviidés	*Gavia stellata*	Plongeon catmarin (3,7)	Red-Throated Loon

NOM INUKTITUT (8)		NOM CRI (9, 10)		STATUS IN THE STUDY AREA (6)
SYLLABIC TYPE	ROMAN TYPE	SYLLABIC TYPE	ROMAN TYPE	
ᑲᖕᒍᖅ	Kanguq	ᐧᐋᐱᐧᐋᐦᐧᐋᐤ	Wawow, waapiwaahwaau	P
ᓂᕐᓕᒃ	Nirlik	ᓂᐢᐠ	Nisk	N
ᓂᕐᓕᓇᖅ	Nirlinaq	ᐃᔨᐧᐋᐳᐧᐋᐤ	Iiyaabihweyic, iyiwaapuwaau	P
ᖁᑦᔪᒃ	Qutjuk			N
				N
ᐃᕗᒐᖅ ᕿᕐᓂᑕᖅ	Ivugaq Qirnitaq		Sisip	N
ᐃᕗᒐᖅ	Ivugaq	ᒥᐦᑭᐦᑖᔑᑉ	mihkihtaaship	N
		ᑳᐃᔨᑭᔅᒋᑯᑖᑦ	kaaiyikischikutaat	N
	Ivurait siluluit	ᐅᒥᓂᒄ	Oapsis, uminikw	N
ᑰᑦᓯᐅᑎ	Kuutsiuti	ᒌᔥᒋᔑᐱᔑᔥ	chiishchishipishish	N
				N
	Ivugait	ᐧᑳᐦᐧᐋᑭᓐ	kwaahwaakin	N
		ᐧᑳᐦᐧᐋᑭᓐ	Iukiskutesup, kwaahwaakin	N
ᒥᑎᕐᓗᒃ	Mitirluk			N
ᒥᑎᖅ	Mitiq	ᒥᔑᔑᑉ	mishiship	N
	Tullirunnaq	ᓅᒋᐹᐅᔥᑎᑯᐧᐋᓯᐤ	nuuchipaaushtikuwaasiu	N
	Kinitakalait		Akuaikank	N
				N
		ᐄᔨᑯᐃᔥᑯᔑᐹᑎᒼ ᑯᐃᔥᑯᔑᐹᑎᒼ	iiyikuishkushipaatim kuishkushipaatim	N
	Aggiakannak	ᐋᐦᐋᐧᐋᔒᔥ	Awaaniiheysis, aahaawaashiish	N
ᓂᐊᖁᑲᓪᓚᐃᑦ	Niaqukallait			P
ᓂᐊᖁᑲᓪᓚᐃᑦ	Niaqukallait		Misukusko	P
ᓂᐊᖁᑲᓪᓚᐃᑦ	Niaqukallait			P
ᐊᕐᐸᖕᒋᔫᖅ	Arpangijuuq			P
ᐊᕐᐸᖕᒋᔫᖅ	Arpangijuuq	ᒥᔅᑎᓯᒄ	Aseko, mistisikw	N
ᐊᕐᐸᖕᒋᔫᖅ	Arpangijuuq	ᐅᓯᒄ	Kapsisit asuk, usikw	N
ᐊᕿᒡᒋᕕᒃ	Aqiggivik	ᒥᔥᑎᑯᐦᔮᐤ	mishtikuhyaau	N
ᐊᕿᒡᒋᕙᒃ	Aqiggivak		Waapihyeu	N
ᐊᕿᒡᒋᖅ	Aqiggiq			N
ᖃᕐᓴᐅᖅ	Qarsauq	ᐋᔑᐧᒫᒄ	As-mok, aashimwaakw	N

Appendix 7 Avifauna Found in and near the Study Area
(continued)

FAMILY	LATIN	FRENCH	ENGLISH
Gaviidés	*Gavia pacifica*	Plongeon du Pacifique (7)	Pacific Loon
Gaviidés	*Gavia immer*	Plongeon huard (3, 5, 7)*	Common Loon
Accipitridés	*Pandion haliaetus*	Balbuzard pêcheur (1, 5)**	Osprey
Accipitridés	*Haliaeetus leucocephalus*	Pygargue à tête blanche (7)	Bald Eagle
Accipitridés	*Circus cyaneus*	Busard Saint-Martin (2, 7)	Northern Harrier
Accipitridés	*Accipiter striatus*	Épervier brun (7)	Sharp-shinned Hawk
Accipitridés	*Accipiter gentilis*	Autour des palombes (1)	Northern Goshawk
Accipitridés	*Buteo jamaicensis*	Buse à queue rousse (3, 7)	Red-tailed Hawk
Accipitridés	*Buteo lagopus*	Buse pattue (2, 7)	Rough-legged Hawk
Accipitridés	*Aquila chrysaetos*	Aigle royal (3, 4, 5, 7)*	Golden Eagle
Falconidés	*Falco columbarius*	Faucon émerillon (3, 7)	Merlin
Falconidés	*Falco rusticolus*	Faucon gerfaut (1)	Gyrfalcon
Falconidés	*Falco peregrinus*	Faucon pèlerin (3, 4, 7)*	Peregrine Falcon
Gruidées	*Grus canadensis*	Grue du Canada (2)	Sandhill Crane
Charadriidés	*Pluvialis squatarola*	Pluvier argenté (7)	Black-bellied Plover
Charadriidés	*Pluvialis dominica*	Pluvier bronzé (6)	American Golden-Plover
Charadriidés	*Charadrius semipalmatus*	Pluvier semipalmé (3, 7)	Semipalmated Plover
Charadriidés	*Charadrius vociferus*	Pluvier kildir (2, 7)	Killdeer
Scolopacidés	*Tringa melanoleuca*	Grand chevalier (3, 7)	Greater Yellowlegs
Scolopacidés	*Tringa flavipes*	Petit Chevalier (2, 3, 7)	Lesser Yellowlegs
Scolopacidés	*Tringa solitaria*	Chevalier solitaire (2)	Solitary Sandpiper
Scolopacidés	*Actitis macularia*	Chevalier grivelé (3, 5, 7)*	Spotted Sandpiper
Scolopacidés	*Numenius phaeopus*	Courlis corlieu (6)	Whimbrel
Scolopacidés	*Arenaria interpres*	Tournepierre à collier (6)	Ruddy Turnstone
Scolopacidés	*Calibris canatus*	Bécasseau maubèche (7)	Red Knot
Scolopacidés	*Calibris alba*	Bécasseau sanderling (6)	Sanderling
Scolopacidés	*Calidris pusilla*	Bécasseau semipalmé (3, 7)	Semipalmated Sandpiper
Scolopacidés	*Calidris minutilla*	Bécasseau minuscule (3, 7)	Least Sandpiper
Scolopacidés	*Calidris fuscicollis*	Bécasseau à croupion blanc (6)	White-rumped Sandpiper
Scolopacidés	*Calidris bairdii*	Bécasseau de Baird (6)	Baird's Sandpiper
Scolopacidés	*Calidris melanotos*	Bécasseau à poitrine cendrée (6)	Pectoral Sandpiper
Scolopacidés	*Calidris maritima*	Bécasseau violet (6)	Purple Sandpiper

NOM INUKTITUT (8)		NOM CRI (9, 10)		STATUS IN THE STUDY AREA (6)
SYLLABIC TYPE	ROMAN TYPE	SYLLABIC TYPE	ROMAN TYPE	
		ᐅᑖᒹᒄ	utaamwaakw	N?
ᑑᓪᓕᖅ	Tuulliq	ᒹᒄ	Maak, mwaakw	N
ᐃᖃᓗᑦᓯᐅᑎᒃ	Iqalutsiutik		Akosameseo	N
ᓇᑦᑐᕋᓕᒃ	Natturalik	ᒥᔅᑎᓯᐤ	mistisiu	N
ᕿᓐᓄᐊᔪᐊᕌᓗᒃ	Qinnuajuaraaluk	ᓄᒋᐦᔮᐙᓯᐤ ᐱᐳᓂᓯᐤ	nuchihyaawaasiu, pipunisiu	N
ᑭᒡᒐᕕᒃ	Kiggavik			P
ᑭᒡᒐᕕᐊᕐᔪᖅ	Kiggaviarjuq		Pipunseo	N
ᑭᒡᒐᕕᒃ	Kiggavik	ᓵᐦᑯᑎᒻ	saahkutim	P
ᑭᒡᒐᕕᒃ	Kiggavik	ᓵᐦᑯᑎᒻ	saahkutim	N
ᓇᒃᑐᕋᓕᒃ	Nakturalik	ᒥᒋᓯᐤ	michisiu	N
	Kiggaviapiit		Pisakatamoo	N
ᕿᓐᓄᐊᔪᐊᖅ	Qinnuajuaq	ᓄᒋᐦᔮᐙᓯᐤ ᐱᐳᓂᓯᐤ	nuchihyaawaasiu, pipunisiu	N
ᕿᓐᓄᐊᔪᐊᖅ	Qinnuajuaq			N
		ᐅᒋᒑᐦᒄ	uchichaahkw	NP
ᖁᓪᓕᖁᓪᓕᐊᒃ	Qulliqulliak			P
ᖁᓪᓕᖁᓪᓕᐊᒃ	Qulliqulliak			P
ᖁᓪᓕᖁᓪᓕᐊᒃ	Qulliqulliak	ᒍᐙᔥᒃ	chuwaashk	N
				N
ᓴᓴᓱᖅ	Saasaasuq			N
ᓴᓴᓱᖅ	Saasaasuq			N
ᓯᑦᔭᕆᐊᖅ	Sitjariaq			N
				N
				P
				P
				P
				P
ᓯᑦᔭᕆᐊᖅ	Sitjariaq			N
ᓯᑦᔭᕆᐊᖅ	Sitjariaq			N
				P
				P
				P
				P

Appendix 7 Avifauna Found in and near the Study Area
(continued)

FAMILY	LATIN	FRENCH	ENGLISH
Scolopacidés	*Calidris alpina*	Bécasseau variable (6)	Dunlin
Scolopacidés	*Tryngites subruficollis*	Bécasseau roussâtre (6)	Buff-breasted Sandpiper
Scolopacidés	*Limnodromus griseus*	Bécassin roux (2)	Short-billed Dowitcher
Scolopacidés	*Gallinago delicata (gallinago)*	Bécassine de Wilson (des marais) (1, 5, 7)*	Wilson's Snipe
Scolopacidés	*Phalaropus lobatus*	Phalarope à bec étroit (3, 7)	Northern Phalarope
Laridés	*Stercorarius pomarinus*	Labbe pomarin (2)	Pomarine Jaeger
Laridés	*Stercorarius parasiticus*	Labbe parasite (2)	Parasitic Jaeger
Laridés	*Stercorarius longicaudus*	Labbe à longue queue (2, 7)	Long-tailed Jaeger
Laridés	*Larus philadelphia*	Mouette de Bonaparte (6)	Bonaparte's Gull
Laridés	*Larus delawarensis*	Goéland à bec cerclé (7)	Ring-billed Gull
Laridés	*Larus argentatus*	Goéland argenté (3, 5, 7)*	Herring Gull
Laridés	*Larus glaucoides kumlieni*	Goéland arctique (1, 7)	Iceland Gull
Laridés	*Larus hyperboreus*	Goéland bourgmestre (3, 5, 7)*	Glaucous Gull
Laridés	*Larus marinus*	Goéland marin (5, 7)*	Great-black backed Gull
Laridés	*Sterna hirundo*	Sterne pierregarin	Common Tern
Laridés	*Sterna paradisaea*	Sterne arctique (3, 7)	Arctic Tern
Alcidés	*Cepphus grylle*	Guillemot à miroir (3, 5, 7)*	Black Guillemot
Strigidés	*Bubo virginianus*	Grand duc d'Amérique (1)	Great Horned Owl
Strigidés	*Nyctea scandiaca*	Harfang des neiges (1)	Snowy Owl
Strigidés	*Surnia ulula*	Chouette épervière (7)	Northern Hawk Owl
Strigidés	*Asio flammeus*	Hibou des marais (3, 4)	Short-eared Owl
Strigidés	*Aegolius funereus*	Nyctale de Tengmalm (2)	Boreal Owl
Alcédinifés	*Ceryle alcyon*	Martin pêcheur d'Amérique (1)	Belted Kingfisher
Picidés	*Picoides tridactylus*	Pic tridactyle (7)	Three-toed Woodpecker
Picidés	*Colaptes auratus*	Pic flamboyant (7)	Northern Flicker
Tyrannidés	*Empidonax flaviventris*	Moucherolle à ventre jaune (5)*	Yellow-bellied Flycatcher
Tyrannidés	*Empidonax alnorum*	Moucherolle des aulnes (2)	Alder Flycatcher
Laniidés	*Lanius excubitor*	Pie-grièche grise (3, 7)	Northern Shrike
Corvidés	*Perisoreus canadensis*	Mésangeai du Canada (3, 5, 7)*	Gray Jay
Corvidés	*Corvus brachyrhynchos*	Corneille d'Amérique (7)	American Crow
Corvidés	*Corvux corax*	Grand Corbeau (3, 5, 7)*	Common Raven

NOM INUKTITUT (8)		NOM CRI (9, 10)		STATUS IN THE STUDY AREA (6)
SYLLABIC TYPE	ROMAN TYPE	SYLLABIC TYPE	ROMAN TYPE	
				P
				P
ᓯᑦᔭᕆᐊᕐᓚᒃ	Sitjariarlak			N
				N
				N
ᐃᓱᕐᖓᒃ	Isurngak			P
ᐃᓱᕐᖓᒃ	Isurngak			P
ᐃᓱᕐᖓᒃ	Isurngak			P
				N
				P
ᓇᐅᔭᖅ	Naujaq		Tciasko	N
ᓇᐅᔭᖅ	Naujaq			P
ᓇᐅᔮᓗᒃ	Naujaaluk			P
				N
ᑕᑲᑕᑭᐊᖅ/ᐃᒥᕐᖁᑕᐃᓚᒃ	Takatakiaq, Imirqutailak	ᐊᐱᔑᒋᔮᔥᑯᔥ	apishichiyaashkush	N
ᐱᑦᓯᐅᓛᖅ	Pitsiulaaq	ᓰᓰᒋᓯᐤ	siisiichisiu	N
ᐅᑲᓕᐊᑦᓯᐊᓂᐅᑎ	Ukaliatsianiuti		Oomiseo	N
ᐅᑉᐱᐊᓗᒃ	Uppialuk	ᐙᐱᑭᔨᐤ	Oapikaeo, waapikiyiu	RH
ᐅᑉᐱᒃ	Uppik			N
ᐅᓐᓄᐊᓯᐅᑎᐊᐱᒃ	Unnuasiutiapik			N
ᑮᒃᑲᓕᕆᑦ	Kiikkaliriit	ᐲᐦᐲᒋᓯᐤ	Ekak oapatakpiesis, piihpiichisiu	N
		ᐅᒌᔅᒋᒥᓂᓯᐤ	uchiischiminisiu	N
ᑯᒪᑦᑐᔫᖅ	Kumattujuuq	ᐹᔥᐹᔥᑖᐤ	paashpaashtaau	N
				N
		ᐊᑯᒥᔒᔥ	akumishiish	N
ᕿᔪᑦᓯᐅᑎᐊᐱᒃ	Qijutsiutiapik			N
		ᒫᔥᒋᔥᑭᒑᓂᔥ	maashchishkichaanish	N
ᖁᐸᓄᐊᕌᓗᒃ	Qupanuaraaluk	ᐧᐄᔥᑭᒑᓂᔥ	Wiskidjans, Kuekuesu, wiishkichaanish	N
ᑐᓗᒐᖅ	Tulugaq			N
ᑐᓗᒑᓗᒃ	Tulugaaluk	ᑳᐦᑳᒋᐤ	Aaseo, Kakadjou, kaahkaachiu	N

Appendix 7 Avifauna Found in and near the Study Area
(continued)

FAMILY	LATIN	FRENCH	ENGLISH
Alaudidés	*Eremophila alpestris*	Alouette hausse-col (3, 7)	Horned Lark
Hirundinidés	*Tachycineta bicolor*	Hirondelle bicolore (3, 7)	Tree Swallow
Hirundinidés	*Riparia riparia*	Hirondelle de rivage (7)	Bank Swallow
Paridés	*Peocile hudsonicus*	Mésange à tête brune (2, 7)	Boreal Chickadee
Régulidés	*Regulus calendula*	Roitelet à couronne rubis (1, 5, 7)*	Ruby-crowned Kinglet
Muscicapidés	*Oenanthe oenanthe*	Traquet motteux (7)	Northern Wheatear
Muscicapidés	*Catharus minimus*	Grive à joues grises (1, 5, 7)*	Grey-cheeked Thrush
Muscicapidés	*Catharus ustulatus*	Grive à dos olive (5)*	Swainson's Thrush
Muscicapidés	*Catharus guttatus*	Grive solitaire (5)*	Hermit Thrush
Muscicapidés	*Turdus migratorius*	Merle d'Amérique (2, 5, 7)*	American Robin
Sturnidés	*Sturnus vulgaris*	Étourneau sansonnet (2, 7)	European Starling
Motacillidés	*Anthus rubescens*	Pipit d'Amérique (3, 5, 7)*	Water pipit
Bombycillidés	*Bombycilla garrulus*	Jaseur boréal (2)	Bohemian Waxwing
Bombycillidés	*Bombycilla cedrodum*	Jaseur d'Amérique (7)	Cedar Waxwing
Parulidés	*Vermivora peregrina*	Paruline obscure (7)	Tennessee Warbler
Parulidés	*Vermivora celata*	Paruline verdâtre (5, 7)*	Orange-crowned Warbler
Parulidés	*Dendroica petechia*	Paruline jaune (3, 5, 7)*	Yellow Warbler
Parulidés	*Dendroica coronata*	Paruline à croupion jaune (1, 5, 7)*	Yellow-rumped Warbler
Parulidés	*Dendroica striata*	Paruline rayée (3, 5, 7)*	Blackpool Warbler
Parulidés	*Seiurus noveboracensis*	Paruline des ruissseaux (3, 5, 7)*	Northern Waterthrush
Parulidés	*Wilsonia pusilla*	Paruline à calotte noire (3, 5, 7)*	Wilson's Warbler
Embérizidés	*Spizella arborea*	Bruant hudsonien (3, 5, 7)*	American Tree Sparrow
Embérizidés	*Spizella passerina*	Bruant familier (7)	Chipping Sparrow
Embérizidés	*Passerculus sandwichensis*	Bruant des prés (3, 5, 7)*	Savannah Sparrow
Embérizidés	*Passerella iliaca*	Bruant fauve (3, 5, 7)*	Fox Sparrow
Embérizidés	*Melospiza lincolnii*	Bruant de Lincoln (1, 5, 7)*	Lincoln's Sparrow
Embérizidés	*Melospiza georgiana*	Bruant des marais (7)	Swamp Sparrow
Embérizidés	*Zonotrichia albicollis*	Bruant à gorge blanche (5, 7)*	White-throated Sparrow
Embérizidés	*Zonotrichia leucophrys*	Bruant à couronne blanche (3, 5, 7)*	White-crowned Sparrow
Embérizidés	*Junco hyemalis*	Junco ardoisé (2, 5, 7)*	Dark-eyed junco
Embérizidés	*Calcarius lapponicus*	Bruant lapon (3, 7)	Lapland Longspur
Embérizidés	*Plectrophenax nivalis*	Bruant des neiges (1, 7)	Snow bunting
Ictéridés	*Euphagus carolinus*	Quiscale rouilleux (3, 5, 7)*	Rusty Blackbird

NOM INUKTITUT (8)		NOM CRI (9, 10)		STATUS IN THE STUDY AREA (6)
SYLLABIC TYPE	ROMAN TYPE	SYLLABIC TYPE	ROMAN TYPE	
		ᐅᒋᐦᒋᐱᔒᔥ	uchihchipishiish	N
			Mitsuksis	NP
		ᒦᒋᔥᑯᔒᔥ	miichishkushiish	N
ᑎᑎᐊᑕ	Titiataa	ᐧᐄᒑᐱᔒᔥ	wiichaapishiish	N
		ᑳᐧᐋᓵᔅᑯᓈᐅᒋᔑᑦ	kaawaasaaskunaauchishit	N
				P
				N
		ᒋᒧᐧᐃᐧᓈᐅᑎᔒᔥ	chimuwinwaautishiish	N
		ᒋᒧᐧᐃᐧᓈᐅᑎᔒᔥ	chimuwinwaautishiish	N
ᖁᐸᓄᐊᕐᐸᒃ	Qupanuarpak	ᐲᐦᐲᐦᒑᐤ	piihpiihchaau	N
				N
ᖁᐸᓄᐊᖅ ᕿᔪᑦᓯᐅᑎ	Qupanuaq Qijutsiuti			N
				N
		ᒦᔓᐃ	miishui	N
				N
				N
			Osaooakopiesis	N
				N
				N
				N
				N
				N
				P
				N
				N
				N
				N
				N
ᖁᐳᑕᓕᒃ	Quputalik		Ismieopiesis	N
		ᐧᐋᔅᒑᓯᑯᑖᑭᓐ	waaschaasikutaakin	N
ᓇᓴᓕᐊᐱᒃ	Nasaliapik			N
ᐊᒪᐅᓪᓕᒑᖅ	Amaulligaaq			RH
		ᒋᐦᒋᑭᔨᐤ	chihchikiyiu	N

Appendix 7 Avifauna Found in and near the Study Area
(continued)

FAMILY	LATIN	FRENCH	ENGLISH
Ictéridés	*Quiscalus quiscala*	Quiscale bronzé (7)	Common Grackle
Fringillidés	*Pinicola enucleator*	Durbec des sapins (1, 5, 7)*	Pine Grosbeak
Fringillidés	*Carpodacus purpureus*	Roselin pourpré (7)	Purple Finch
Fringillidés	*Loxia leucoptera*	Bec-croisé bifascié (2)	White-winged Crossbil
Fringillidés	*Carduelis flammea*	Sizerin flammé (3, 5, 7)*	Common Redpoll
Fringillidés	*Carduelis hornemanni*	Sizerin blanchâtre (2)	Hoary Redpoll

* Species oserved (data Aubry, 2004 ; KRG field work, 2003, 2004)

** Species nest oserved (Aubry, 2004 ; KRG field work, 2003)

Legende : Confirmed breeder (N)
Probable breeder (NP)
Species reported in the region (P)
Winter resident (RH)

Sources: (1) Archambault (1997)
(2) Gauthier and Aubry (1995)
(3) Lavalin Environnement (1991)
(4) SOS-POP (2006)
(5) Aubry (2004)
(6) Y. Aubry, personal communication (2006)
(7) Étude des populations d'oiseaux du Québec (ÉPOQ) (Lepage, 2006)
(8) Avataq Cultural Institute, personal communication (2006)
(9) Hydro-Québec (1993c)
(10) http://www.eastcree.org/lex/index.php

INUKTITUT (8)		CREE(9, 10)		STATUS IN THE STUDY AREA (6)
SYLLABIC TYPE	ROMAN TYPE	SYLLABIC TYPE	ROMAN TYPE	
				P
				N
				P
				P
				N
				P

Appendix 8 Piscifauna Found in and near the Study Area

SPECIES PRESENT IN THE STUDY AREA (FRESH, SALT AND BRACKISH WATER

FAMILY	LATIN	FRENCH	ENGLISH
Rajidés	*Raja radiata*	Raie épineuse (2,7)	Thorny Skate
Cyprinidés	*Couesius plumbeus*	Mené de lac (1, 6)	Lake Chub
Cyprinidés	*Rhinichthys cataractae*	Naseux des rapides (1,2,6)	Longnose Dace
Catostomidés	*Catostomus catostomus*	Meunier rouge (1,2,6)	Longnose Sucker
Catostomidés	*Catostomus commersoni*	Meunier noir (1,6)	White Sucker
Ésocidés	*Esox lucius*	Grand brochet (1,2,6)	Northern Pike
Osmeridés	*Mallotus villosus*	Capelan (2,7)	Capelin
Salmonidés	*Salmo salar*	Saumon atlantique (Ouananiche) (4,6)	Atlantic Salmon (landlocked)
Salmonidés	*Coregonus artedii*	Cisco de lac (1,2,6)	Shallow Water Cisco
Salmonidés	*Coregonus clupeaformis*	Grand corégone (1,2,6,7)	Lake Whitefish
Salmonidés	*Prosopium cylindraceum*	Ménomini rond (1,2,6)	Round Whitefish
Salmonidés	*Salvelinus alpinus*	Omble chevalier (1,2,6,7)	Arctic Charr
Salmonidés	*Salvelinus fontinalis*	Omble de fontaine (1,2,7)	Brook Trout
Salmonidés	*Salvelinus namaycush*	Touladi (1,6)	Lake Trout
Gadidés	*Gadus ogac*	Ogac (1,2,7)	Greenland Cod
Gadidés	*Lota lota*	Lotte (1,6)	Americain Burbot
Gadidés	*Boreogadus saida*	Morue arctique (Saida) (3,7)*	Arctic Cod
Gastérostéidés	*Gasterosteus aculeatus*	Épinoche à trois épines (1,2,6,7)	Threespine Stickleback
Gastérostéidés	*Pungitius pungitius*	Épinoche à neuf épines (1,2,6,7)	Ninespine Stickleback
Cottidés	*Cottus bairdi*	Chabot tacheté (1,2,6)	Mottled Sculpin
Cottidés	*Cottus cognatus*	Chabot visqueux (1,2,6)	Slimy Sculpin
Cottidés	*Gymnocanthus tricuspis*	Tricorne arctique (2,7)	Arctic Staghorn Sculpin
Cottidés	*Myoxocephalus quadricornis*	Chaboisseau à quatre cornes (2,6,7)	Fourhorn Sculpin
Cottidés	*Myoxocephalus scorpius*	Chaboisseau à épines courtes (2,7)	Shorthorn Sculpin
Cottidés	*Myoxocephalus scorpioides*	Chaboisseau arctique (2,7)	Arctic Sculpin
Cycloptéridés	*Eumicrotremus spinosus*	Petite poule de mer (3,7)	Atlantic Spiny Lumpsucker
Cycloptéridés	*Cyclopterus lumpus*	Grosse poule de mer (2,7)	Lumpfish
Ammodytidés	*Ammodytes hexapterus*	Lançon d'Amérique (2,7)	Sand Lance

* Espêce également présente dans la baie d'Hudson

INUKTITUT (5)		CREE (8)	
SYLLABIC TYPE	ROMAN TYPE	SYLLABIC TYPE	ROMAN TYPE
ᖁᐊᕐᓕᒃ	Quarlêk		
	Unknown		
	Unknown		
ᖃᓂᓕᒃ	Qanilik		
ᒥᓗᒋᐊᒃ	Milugiak	ᓂᒫᐲ ᐃᔨᐦᐋᒑᐤ	nimaapii iyihaachaau
ᑭᒋᔫᖅ	Kigijuuq	ᒋᓄᔖᐤ	chinushaau
ᖁᓕᓕᒐᒃ	Quliligak	ᑖᐅᒌᓂᒫᑯᔥ	taauchiinimaakush
ᓵᒪᒃ	Saamak	ᐅᐧᐃᓈᓐ	uwinaan
ᑲᐱᓯᓕᒃ	Kapisilik	ᓅᑎᒥᔨᐧᐋᓯᐤ	nuutimiyiwaasiu
ᑲᐱᓯᓕᒃ	Kapisilik	ᐊᑎᐦᑭᒫᒄ	atihkimaakw
ᑲᐱᓯᓕᒃ	Kapisilik		
ᐃᖃᓗᑉᐱᒃ	Iqaluppik		
ᐊᓄᑭᒃ	Anokik	ᒫᓯᒫᑯᔅ	maasimaakus
ᐃᓱᕋᖅ	Isuuraq	ᑯᑭᒫᔑᔥ	kukimaashish
ᐆᒐᒃ	Uugak		
ᓱᓗᓗᐸᐅᓗᒃ	Sululupauluk	ᒥᔮᐦᑭᑐᐃ	miyaahkitui
ᐆᒐᒃ	Uugak		
ᐃᔨᓕᒐᐅᔭᒃ	Ijiligaujak		
ᑲᑭᓪᓚᐅᑎᓕᒃ	Kakillautilik		
ᑲᓇᔪᖅ	Kanajuq		
ᑲᓇᔪᖅ	Kanajuq		
ᑲᓇᔪᖅ	Kanajuq		
ᑲᓇᔪᖅ	Kanajuq	ᑳᐦᑭᔮᐦᒁᐤ	kaahkiyaahkwaau
ᖃᓂᒃᑰᑐᒃ	Qanirkuutuk		
ᑎᕙᕿᖅ	Tivaqiq		
ᖂᕐᓱᔫᖅ	Quursujuuq		
	Ammayaq		

Appendix 8 Piscifauna Found in and near the Study Area
(continued)

SPECIES PRESENT IN HUDSON BAY

FAMILY	LATIN	FRENCH	ENGLISH
Zoarcidés	*Lycodes reticulatus*	Lycode arctique (6)	Arctic Eelpout
Stichaeidés	*Eumesogrammus praecisus*	Quatre-lignes atlantique (6)	Fourline Snakeblenny
Stichaeidés	*Lumpenus fabricii*	Lompénie élancée (6)	Slender Eelblenny
Stichaeidés	*Lumpenus macalutus*	Lompénie tachetée (6)	Daubed Shanny
Stichaeidés	*Stichaeus punctatus*	Stichée arctique (6)	Arctic Shanny
Stichaeidés	*Pholis fasciata*	Sigouine rubanée (6)	Banded Gunnel
Triglidés	*Icelus bicornis*	Icèle à deux cornes (6)	Twohorn Sculpin
Triglidés	*Icelus spatula*	Icèle spatulée (6)	Spatulate Sculpin
Triglidés	*Triglops murrayi*	Faux-trigle armé (6)	Moustache Sculpin
Triglidés	*Triglops pingeli*	Faux-trigle bardé (6)	Ribbed Sculpin
Agonidés	*Aspidophoroides olriki*	Poisson-alligator arctique (6)	Arctic Alligatorfish
Cycloptéridés	*Eumicrotremus derjugini*	Petite poule de mer arctique (6)	Leatherfin Lumpsucker
Cycloptéridés	*Liparis gibbus*	Limace marbrée (6)	Dusky Snailfish

Sources : (1) Scott and Crossman (1974)
(2) McAllister (1964)
(3) CyberNatural Software - University of Guelph (2002)
(4) Lavalin Environnement (1991)
(5) Avataq Cultural Institute, personal communication (2006)
(6) Bernatchez and Giroux (2000)
(7) Scott and Scott (1988)
(8) http://www.eastcree.org/lex/index.php

Appendix 9 Amphibians and Reptiles Found in and near the Study Area

FAMILY	LATIN	FRENCH
Ambystomatidés	*Ambystoma laterale*	Salamandre à points bleus (1,2)
Bufonidés	*Bufo americanus*	Crapaud d'Amérique (1,2)*
Hylidés	*Pseudacris crucifer*	Rainette crucifère (1,2)
Ranidés	*Rana septentrionalis*	Grenouille du Nord (1,2)
Ranidés	*Rana sylvatica*	Grenouille des bois (1,2)*
Ranidés	*Rana pipiens*	Grenouille léopard (1)
Colubridés	*Thamnophis sirtalis*	Couleuvre rayée (1,2)

* Species oserved (data Aubry, 2004 ; KRG field work, 2003, 2004)

Sources: (1) Bider and Matte (1994)
(2) FAPAQ (2003a)
(3) Avataq Cultural Institute, personal communication (2006)
(4) Hydro-Québec (1993c)

	INUKTITUT (3)		CREE (4)
ENGLISH	SYLLABIC TYPE	ROMAN TYPE	
Blue-spotted Salamander			
American Toad	ᐱᓪᓕᕆᐊᖅ	Billiriaq	
Northern Spring Peeper	ᐱᓪᓕᕆᐊᖅ	Billiriaq	Maachishkuchish
Mink Frog	ᐱᓪᓕᕆᐊᖅ	Billiriaq	
Wood Frog	ᐱᓪᓕᕆᐊᖅ	Billiriaq	
Northern Leopard Frog	ᐱᓪᓕᕆᐊᖅ	Billiriaq	
Common Garter Snake	ᓂᒥᕆᐊᖅ	Nimiriaq	Achinaapikw

Appendix 10 A Few Insects and Spiders Found in and near the Study Area

FAMILY	LATIN	FRENCH	ENGLISH
Pieridés	*Colias pelidne*	Coliade commun du Nord (1)	Pelidne Sulphur
Pieridés	*Colias nastes*	Coliade verdâtre (1)	Labrador Sulphur
Pieridés	*Pieris napi*	Piéride des crucifères (1)	Mustard White
Nymphalidés	*Nymphalis antiopa*	Morio (1)	Mourning Cloak
Nymphalidés	*Oeneis bore taygete*	Nordique à nervures blanches (1)	White-veined Arctic
Nymphalidés	*Oeneis jutta*	Nordique des tourbières (1)	Jutta Arctic
Nymphalidés	*Oeneis melissa*	Nordique mélissa (1)	Melissa Arctic
Nymphalidés	*Oeneis polixenes*	Nordique alpin (1)	Polixenes Arctic
Nymphalidés	*Boloria selene*	Boloria à taches argentées (1)	Silver Bordered Fritillary
Nymphalidés	*Boloria frigga*	Boloria nordique (1)	Frigga Fritillary
Nymphalidés	*Boloria polaris*	Boloria polaire (1)	Polar Fritillary
Nymphalidés	*Boloria freija*	Boloria de Freya (1)	Freija Fritillary
Nymphalidés	*Boloria titania* (1)		Purple Lesser Fritillary
Nymphalidés	*Boloria eunomia*	Boloria des tourbières (1)	Bug Fritillary
Lycaénidés	*Lycaeides idas*	Bleu nordique (1)	Northern Blue
Lycaénidés	*Agriades glandon franklinii*	Bleu arctique (1)	« Mountain » Arctic Blue
Hespériidés	*Hesperia comma*	Hespérie commas (1)	Commun Branded Skipper
Hespériidés	*Carterocephalus palaemon*	Échiquier (1)	Arctic Skipper
Hespériidés	*Pyrgus centaureae*	Hespérie grisâtre (1)	Grizzled Skipper
Noctuidés	*Acronicta impressa*	Acronycte impressionnée (2)	Printed Dagger
Noctuidés	*Agrotis ruta* (2)		
Noctuidés	*Autographa ampla* (2)		
Noctuidés	*Diarsia dislocata* (2)		
Noctuidés	*Diarsia pseudorosaria freemani* (2)		
Noctuidés	*Eurois occulta* (2)		
Noctuidés	*Euxoa dissona* (2)		
Noctuidés	*Euxoa lidia thanatologia* (2)		
Noctuidés	*Euxoa ochrogaster*	Ver-gris à dos rouge (2)	Redbacked Cutworm
Noctuidés	*Hemipachnobia subporphyrea* (2)		
Noctuidés	*Ochropleura plecta* (2)		Flame-shouldered dart
Noctuidés	*Peridroma saucia*	Ver-gris panaché (2)	Variegated Cutworm
Noctuidés	*Rhyacia quadrangula* (2)		
Noctuidés	*Trichosilia mollis* (2)		
Noctuidés	*Xestia atrata* (2)		
Noctuidés	*Xestia mixta* (2)		
Noctuidés	*Xestia oblata* (2)		
Noctuidés	*Xestia okakensis* (2)		

FAMILY	LATIN	FRENCH	ENGLISH
Noctuidés	*Xestia rhaetica homogena* (2)		
Noctuidés	*Xestia sp. aff. laetabilis* (2)		
Noctuidés	*Anarta luteola* (2)		
Noctuidés	*Anarta melanopa* (2)		Broad-bordered white underwing
Noctuidés	*Anartomima secedens* (2)		
Noctuidés	*Andropolia contacta* (2)		
Noctuidés	*Apamea exornata* (2)		
Noctuidés	*Apamea zeta exulis* (2)		
Noctuidés	*Apamea sp. aff. lateritia* (2)		
Noctuidés	*Discestra farhnami** (2)		
Noctuidés	*Discestra trifolii*	Ver-gris du trèfle (2)	Clover Cutworm
Noctuidés	*Hada sutrina* (2)		
Noctuidés	*Hillia iris* (2)		
Noctuidés	*Hyppa sp.* (2)		
Noctuidés	*Lacanobia nevadae* (2)		
Noctuidés	*Lacanobia radix* (2)		
Noctuidés	*Lasionycta leucocycla moeschleri* (2)		
Noctuidés	*Lasionycta perplexa** (2)		
Noctuidés	*Lasionycta phoca* (2)		
Noctuidés	*Lasionycta subdita* (2)		
Noctuidés	*Lasionycta taigata* (2)		
Noctuidés	*Melanchra pulverulenta* (2)		
Noctuidés	*Mnitoype tenera* (2)		
Noctuidés	*Papestra quadrata* (2)		
Noctuidés	*Parastichtis suspecta* (2)		
Noctuidés	*Polia richardsoni* (2)		
Noctuidés	*Polia rogenhoferi* (2)		
Noctuidés	*Xylena thoracica* (2)		
Noctuidés	*Syngrapha diasema* (2)		
Noctuidés	*Syngrapha ignea* (2)		
Noctuidés	*Syngrapha interrogationis* (2)		
Noctuidés	*Syngrapha microgamma* (2)		
Noctuidés	*Syngrapha octoscripta* (2)		
Noctuidés	*Syngrapha selecta*	Autographe verdâtre (2)	Spruce False Looper
Noctuidés	*Syngrapha surena* (2)		
Noctuidés	*Syngrapha u-aureum* (2)		
Noctuidés	*Sympistis heliophila* (2)		

Appendix 10 A Few Insects and Spiders Found in and near the Study Area
(continued))

FAMILY	LATIN	FRENCH	ENGLISH
Gnaphosidés	*Gnaphosa muscorum* (3)		
Lycosidés	*Arctosa alpigena* (3)		
Lycosidés	*Pardosa hyperborea* (3)		
Lycosidés	*Pardosa uintana* (3)		
Linyphiidés	*Agyneta allosubtilis* (3)		
Linyphiidés	*Hilaira herniosa* (3)		
Linyphiidés	*Latithorax obtusus* (3)		
Linyphiidés	*Lepthyphantes alpinus* (3)		
Linyphiidés	*Lepthyphantes complicatus* (3)		
Linyphiidés	*Pocadicnemis americana* (3)		
Linyphiidés	*Sisicottus montanus* (3)		
Linyphiidés	*Sisis rotundus* (3)		
Hépialidés	*Gazoryctra hyperborea* (4)		
Sésiidés	*Alubuna pyramidalis* (4)		
Arctiidés	*Apantesis quenselii* (4)		
Arctiidés	*Platarctica parthenos* (4)		St-Lawrence Tiger Moth
Notodontidés	*Cerura occidentalis* (4)		
Notodontidés	*Pheosia rimosa* (4)		Black-rimmed Prominent Moth
Drépanidés	*Drepana bilineata* (4)		Two-lined Hooktip
Géométridés	*Ecliptopera siliaceata albolineata* (4)		
Géométridés	*Epelis truncataria* (4)		
Géométridés	*Semiothisa banksianae* (4)		
Géométridés	*Semiothisa hebetata* (4)		
Géométridés	*Semiothisa sexmaculata* (4)		
Géométridés	*Archiearis infans* (4)		Frist Born Geometer
Géométridés	*Aspilates conspersarius* (4)		
Géométridés	*Eufidonia discospilata* (4)		
Géométridés	*Itame anataria* (4)		
Géométridés	*Itame andersoni* (4)		
Géométridés	*Itame exauspicata* (4)		
Géométridés	*Carsia sororiata thaxteri* (4)		
Géométridés	*Dysstroma citrata* (4)	Arpenteuse verte élancée	Dark Marbled Carpet
Géométridés	*Dysstroma walkerata* (4)		Marbled Carpet
Géométridés	*Entephria aurata* (4)		
Géométridés	*Entephria polata bradorata* (4)		
Géométridés	*Epirrita autumnata* (4)		

FAMILY	LATIN	FRENCH	ENGLISH
Géométridés	*Eulithis destinata* (4)		
Géométridés	*Eulithis propulsata* (4)		
Géométridés	*Eupithecia interruptofasciata* (4)		
Géométridés	*Eupithecia perfusca* (4)		
Géométridés	*Hydriomena furcata* (4)		
Géométridés	*Lobophora nivigerata*	Arpenteuse bilignée (4)	Twolined Aspen Looper
Géométridés	*Rheumaptera hastata*	Géomètre noir du bouleau (4)	Spearmarked Black Moth
Géométridés	*Rheumaptera subhastata* (4)		
Géométridés	*Spargania luctuata obductata* (4)		
Géométridés	*Thera otisi* (4)		
Géométridés	*Xanthorhoe abrasaria* (4) *congregata*		
Géométridés	*Xanthorhoe algidata* (4)		
Géométridés	*Xanthorhoe ferrugata* (4)		Red Twin Spot
Géométridés	*Xanthorhoe munitata* (4)		Red Carpet
Géométridés	*Xanthorhoe ramaria* (4)		
Géométridés	*Mesothea incertata* (4)		
Géométridés	*Scopula frigidaria* (4)		
Formicidés	*Leptothorax acervorum* (6)		
Formicidés	*Leptothorax muscorum* (6)		
Formicidés	*Camponotus herculeanus* (6)		
Formicidés	*Formica neorufibarbis* (6)		
Tabanidés	*Chrysops ater (Macquart)* (7)		
Tabanidés	*Chrysops ater (Philip)* (7)		
Tabanidés	*Chrysops ater (Osten Sacken)* (7)		
Tabanidés	*Hybomitra aequetincta* (7)		
Tabanidés	*Hybomitra frontalis* (7)		
Tabanidés	*Hybomitra hearlei* (7)		
Tabanidés	*Hybromitra lurida* (7)		
Tabanidés	*Hybomitra zonalis* (7)		

* New species in Québec

Sources : (1) Koponen (1994)
(2) Koponen and Lafontaine (1991)
(3) Koponen (1993a)
(4) Koponen (1993b)
(5) Avataq Cultural Institute, personal communication (2006)
(6) Francoeur (1983) in FAPAQ (2003b)
(7) Maire (1984) in FAPAQ (2003b)