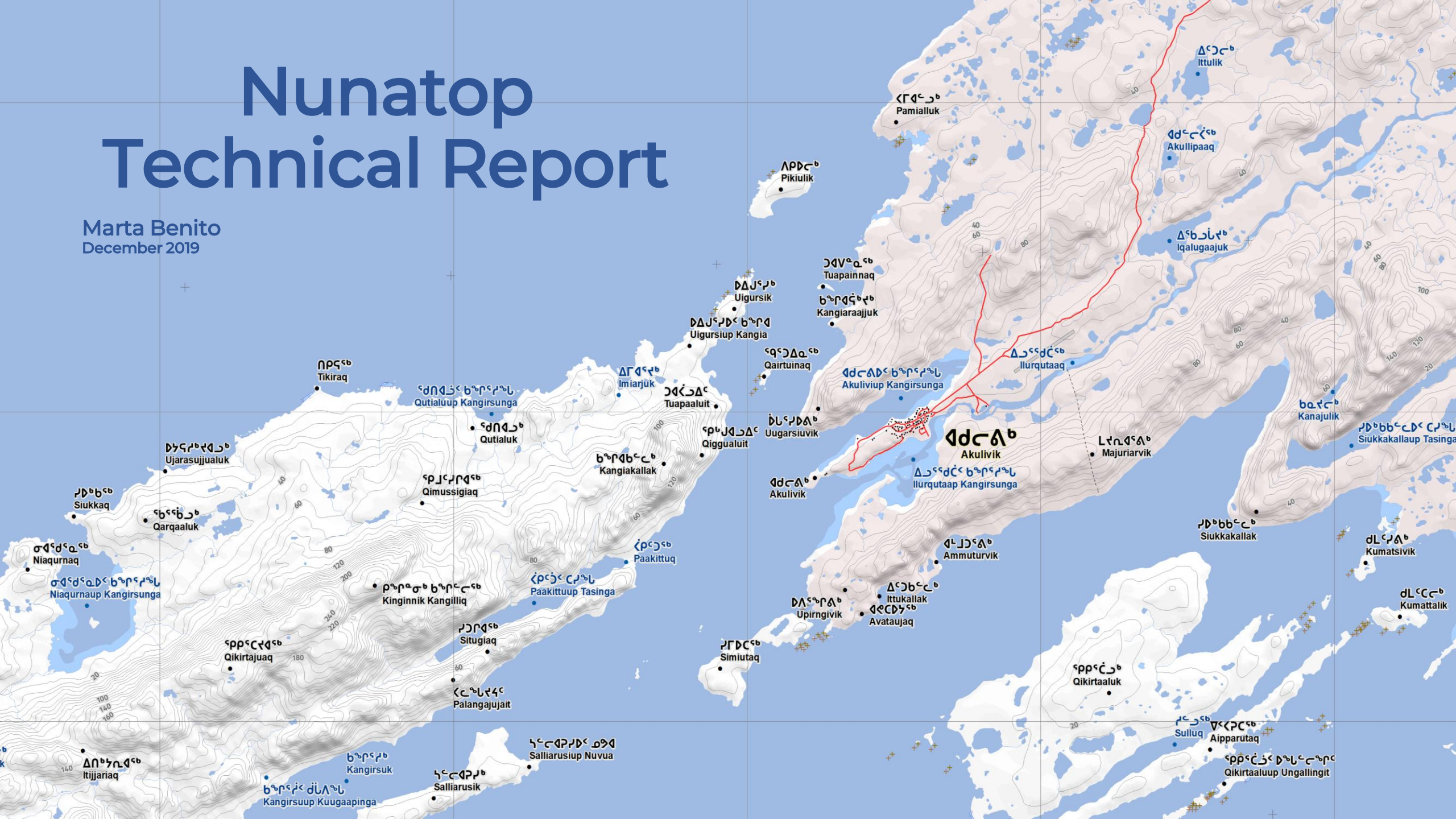# Nunatop
Technical Report

Marta Benito
December 2019

The Origin

The Nunatop Project was initiated in 1981 to provide a tool that would enable land users to keep alive Inuit place-names through the publication and distribution of place-name maps and a gazetteer of Nunavik and offshore islands place-names. Nunatop was relaunched in 2012 in collaboration with Makivik Corporation, and in 2014 in partnership with Air Inuit. This ambitious project was achieved through the collection of information, interviews, and validation of data with Elders and hunters.

Long-term work on the project continued this year to improve the database (correcting place-names and improving readability of place-names on the maps, etc.) Some maps were commissioned, especially by Quaqtaq's landholding corporation. We also produced and installed two large-format Nunavik maps: one at Ullivik, the Module du Nord du Québec's new accommodation center, and the other at the Nunavik Sivunitsavut premises.

Finally, along 2019, with the collaboration of GIS Expert Marta Benito, the final collection of maps has been completed and released via the website www.nunatop.com.

Here is the **Technical Report** explaining the details of this process, from the cartographic and spatial database management point of view.

The Place-Names Database

The place-names labels are written in both alphabets: syllabic and roman. This information is stored in the place-names database, along with more details concerning the recording of each of the 7400 points currently collected.

In order to read the syllabic names, it is necessary to install the "**Boreal**" font in the computer.
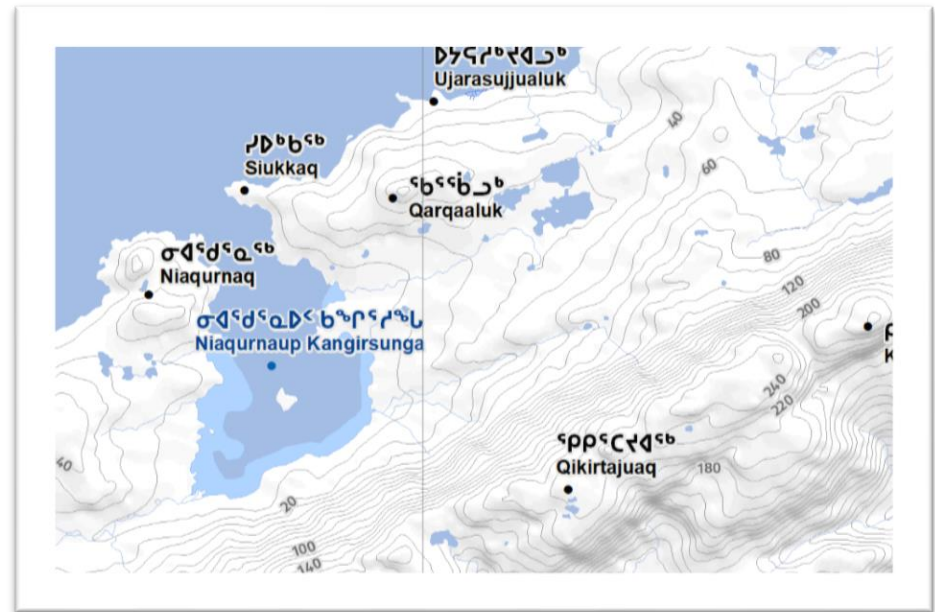
	A	B	C	D	E	F	G	H	I	J	R	CONF
1	FID	Name_Syllabic	Name_Roman	ENTITY_NOR	TRANSLATIO	OFFICIAL_N	ACR_EX	ACR_IN	NAME_INT	NAME_EX	CONFIRMATI	CONF
2	10	ᓄᓄᕐᑑᖅ	Nanurtuuq	Cape	Always has many polar bea	White Handkerch	ZZZ	SDA	Bernard Saladin	Saladin d'Ang	Unconfirmed	
3	11	ᓴᐳᒐᔅᓯᐊᖅ	Sapugassiaq	Bay	Good fish weir	Sapogatsiak Bay	LAB				Unconfirmed	
4	286	ᐆᒻᒪᓇᖅ	Uummanaq	Islet	Looks like a heart		GK			George Kone	Confirmed	Kangi
5	287	ᑐᑦᑐ�ุᑉ ᓄᕙ	Tuttutuup Nuvua	Point	Tuttutuuq's point(Tuttutuu	Tuttutuuq, Point	TS	GK	George Koneak	Sequaluk, Ta	Confirmed	Kangi
6	288	ᐅᒃᑮᕕᒃ	Ukkiivik	Reef	Big reef		TS	GK	George Koneak	Sequaluk, Ta	Corrected	Kangi
7	289	ᐃᒃᑲᕐᐊᓗᒃ	Ikkarualuk	Reef	Big reef		TS	GK	George Koneak	Sequaluk, Ta	Confirmed	Kangi
8	290	ᐅᑕᕐᖁᕕᒃ	Utarqiuvik	Islet	Place to wait		GK			George Kone	Confirmed	Kangi
9	291	ᖃᓯᒋᐊᓕᒃ	Qasigialik	Bay	It has harbour seal		GK			George Kone	Confirmed	Kangi
10	292	ᓄᓗᐊᕐᒥᐊᕕᒃ	Nuluarmiavik	Shore								
11	293	ᐅᔭᕋᓱᔾᔪᓕᒃ	Ujarasujjulik	Island	It has a boulder		CM	GK	George Koneak		Confirmed	Kangi
12	294	ᖅᑭᕐᑖᑉ ᐃᒃᑲᕐᐊᖏᑦ	Qikirtaapit Ikkariangit	Reef	Small islands		JS	GK	George Koneak		Corrected	Kangi
13	295	ᐅᔅᓯᕇᑦ	Ursiriit	Lake	They are handling seal oil	Ursiriq, Lac	JS	GK	George Koneak		Confirmed	Kangi
14	296	ᐅᔅᓯᕇᑦ ᑯᖕᒐ	Ursiriit Kuunga	Creek	Ursiriit's river(Ursiriit - The	Ursiriq, Ruisseau	JS	GK	George Koneak		Confirmed	Kangi
15	297	ᖅᑭᕐᑕᖅ ᓄᕗᑯᑖᓕᒃ	Qikirtaq Nuvukutaalik	Island	Island that has a long point			JS	GK	George Koneak	Unconfirmed	
16	298	ᖃᓯᒋᔭᖅ ᓄᕙ	Qasigijaq Nuvua	Point	Harbour seal point	Qasirijaq, Pointe	JS	GK	George Koneak		Confirmed	Kangi
17	299	ᖅᑭᕐᑕᑲᓪᓚᒃ	Qikirtakallak	Island	Fat island		JS	GK	George Koneak		Confirmed	Kangi

Sheet1 Sheet2 Sheet3

The Place-Names Database Normalization

The original database had been classified in more that a hundred categories. It was almost impossible to create symbology for all this entities, and the display on the map would have been confusing, so we decided to create just 4 main categories as shown below:

Legend

REG_PlaceNames_2019
ENTITY_NOR, CATEGORY, LABEL_PRIO

- Airstrip, HUMAN-INFRA, 1 (11)
- Anchorage, COAST-MARK, 1 (63)
- Archipelago, ISLANDS, 1 (5)
- Arm, RIVERS, 3 (4)
- Artesian well, FRESH WATER, 1 (1)
- Basin, GEOMORPHOLOGY, 1 (1)
- Bay, BAY, 2 (463)
- Beach, COAST-MARK, 1 (6)
- Beacons, HUMAN-INFRA, 1 (1)
- Bedrock, FRESH WATER, 1 (1)
- Bend, FRESH WATER, 2 (48)
- Boulder, GEOMORPHOLOGY, 1 (5)
- Brigde, HUMAN-INFRA, 1 (4)
- Bush, VEGETATION, 1 (4)
- Cabin, HUMAN-INFRA, 1 (2)
- Cairns, HUMAN-INFRA, 1 (1)
- Campsite, HUMAN-INFRA, 2 (306)
- Canyon, GEOMORPHOLOGY, 1 (2)
- Cape, COAST-MARK, 2 (49)
- Cave, COAST-MARK, 1 (1)
- Channel, FRESH WATER, 1 (39)
- Cliff, GEOMORPHOLOGY, 2 (92)
- Coast, COAST-MARK, 1 (11)
- Confluence, FRESH WATER, 1 (25)
- Cove, COAST-MARK, 1 (52)
- Crater, GEOMORPHOLOGY, 1 (1)
- Creek, FRESH WATER, 3 (207)
- Current, FRESH WATER, 1 (18)
- Delta, COAST-MARK, 1 (1)

- Ditch, FRESH WATER, 1 (1)
- Dock, HUMAN-INFRA, 1 (1)
- Dump, HUMAN-INFRA, 1 (1)
- Dune, GEOMORPHOLOGY, 1 (19)
- Esker, GEOMORPHOLOGY, 1 (26)
- Estuary, GEOMORPHOLOGY, 1 (1)
- Falls, FRESH WATER, 1 (41)
- Fiord, COAST-MARK, 1 (11)
- Flats, GEOMORPHOLOGY, 1 (2)
- Foothills, GEOMORPHOLOGY, 1 (1)
- Ford, HUMAN-INFRA, 1 (4)
- Foreshore flat, COAST-MARK, 1 (7)
- Fox den, FAUNA, 2 (88)
- Gap, GEOMORPHOLOGY, 1 (3)
- Gorge, GEOMORPHOLOGY, 1 (6)
- Grave, HUMAN-INFRA, 1 (5)
- Gully, GEOMORPHOLOGY, 1 (1)
- Harbour, HUMAN-INFRA, 1 (9)
- Headland, GEOMORPHOLOGY, 1 (1)
- Hill, GEOMORPHOLOGY, 3 (309)
- Hillock, GEOMORPHOLOGY, 1 (16)
- Hillside, GEOMORPHOLOGY, 1 (7)
- Ice Field, GEOMORPHOLOGY, 1 (2)
- Inlet, COAST-MARK, 2 (51)
- Island, ISLANDS, 2 (1,207)
- Islet, ISLANDS, 3 (86)
- Isthmus, GEOMORPHOLOGY, 2 (31)
- Lake, FRESH WATER, 3 (1,749)
- Land, GEOMORPHOLOGY, 1 (3)
- Landfall, GEOMORPHOLOGY, 1 (5)
- Landing, HUMAN-INFRA, 1 (17)

- Lead, HUMAN-INFRA, 1 (2)
- Lighthouse, HUMAN-INFRA, 1 (6)
- Marsh, FRESH WATER, 1 (2)
- Meander, FRESH WATER, 1 (1)
- Mine, HUMAN-INFRA, 1 (2)
- Morraine, GEOMORPHOLOGY, 1 (1)
- Mountain, GEOMORPHOLOGY, 3 (250)
- Mountains, GEOMORPHOLOGY, 2 (42)
- Narrow, GEOMORPHOLOGY, 2 (140)
- Otter den, FAUNA, 2 (1)
- Palsa Bog, FRESH WATER, 1 (1)
- Pass, GEOMORPHOLOGY, 1 (43)
- Penninsula, COAST-MARK, 3 (44)
- Phising, FAUNA, 2 (60)
- Plain, GEOMORPHOLOGY, 1 (1)
- Plateau, GEOMORPHOLOGY, 1 (16)
- Point, POINTS, 2 (816)
- Pond, FRESH WATER, 1 (56)
- Pool, HUMAN-INFRA, 1 (6)
- Portage, GEOMORPHOLOGY, 1 (6)
- Power house, HUMAN-INFRA, 1 (1)
- Promontory, HUMAN-INFRA, 1 (4)
- Quarry, HUMAN-INFRA, 1 (20)
- Rapids, FRESH WATER, 1 (40)
- Reef, COAST-MARK, 1 (69)
- Reservoir, HUMAN-INFRA, 1 (1)
- Ridge, GEOMORPHOLOGY, 1 (14)
- River channel, RIVERS, 2 (16)
- River mouth, RIVERS, 2 (16)
- River section, RIVERS, 2 (62)
- River, RIVERS, 3 (406)

- Rock, GEOMORPHOLOGY, 1 (19)
- Route, HUMAN-INFRA, 1 (61)
- Sand Bar, GEOMORPHOLOGY, 1 (3)
- Shallow, COAST-MARK, 1 (15)
- Shipwreck, HUMAN-INFRA, 1 (1)
- Shoal, FAUNA, 2 (7)
- Shore, COAST-MARK, 2 (107)
- Site, HUMAN-INFRA, 2 (139)
- Slope, GEOMORPHOLOGY, 2 (48)
- Snowfield, GEOMORPHOLOGY, 1 (2)
- Sound, COAST-MARK, 1 (5)
- Strait, COAST-MARK, 1 (47)
- Swamp, FRESH WATER, 1 (3)
- Terrace, GEOMORPHOLOGY, 1 (14)
- Terrain, GEOMORPHOLOGY, 1 (2)
- Tidal bar, COAST-MARK, 1 (7)
- Tidal current, COAST-MARK, 1 (1)
- Tidal dam, COAST-MARK, 1 (1)
- Tidal flat, COAST-MARK, 1 (10)
- Tidal lagoon, COAST-MARK, 1 (1)
- Tidal line, COAST-MARK, 1 (1)
- Tidal pool, COAST-MARK, 1 (2)
- Trail, HUMAN-INFRA, 1 (4)
- Trough, COAST-MARK, 1 (1)
- Valley, GEOMORPHOLOGY, 2 (61)
- Water point, FRESH WATER, 1 (3)
- Wheather Station, HUMAN-INFRA, 1 (1)
- Whirlpool, FRESH WATER, 1 (1)
- Wolf den, FAUNA, 2 (1)
- Woods, VEGETATION, 1 (21)

ᓯ�▷ᓯ⁰ᑎᶜ / Légende / Legend

- ᓄᓇᐃᑦ ᐊᑎᵇᒋᑦ / Toponyme / Place-Name
- ᓄᓇᐃᑦ ᐊᑎᵇᒋᑦ (ᐃᒪᕐᕿᒃ) — Toponyme (plan d'eau) Place-Name (body of water)
- ᒪᓕᑦᑦ, ᑯᑦ, ᕼᕿᕝᑦ, ᐊᵇᒋᓯ ᓄᑦᕼᵇ — Courant, chute, rapides, tourbillon Current; Falls; Rapids; Whirlpool
- ᕿᕼᕿᐆᵇ / Mouillage / Anchorage

Place-Names Location Correction

The place-names were collected using a topographic map that had been printed, scanned, printed again, etc. Because of this it was distorted and less accurate than the digital cartography we use today, so it was necessary to correct the position of many of the points to be sure they are accurately placed.

This task was performed by **Nicolas Pirti-Duplessis**, who also corrected the Inuktitut spelling. Now we can be sure we are working from the most accurate database possible.
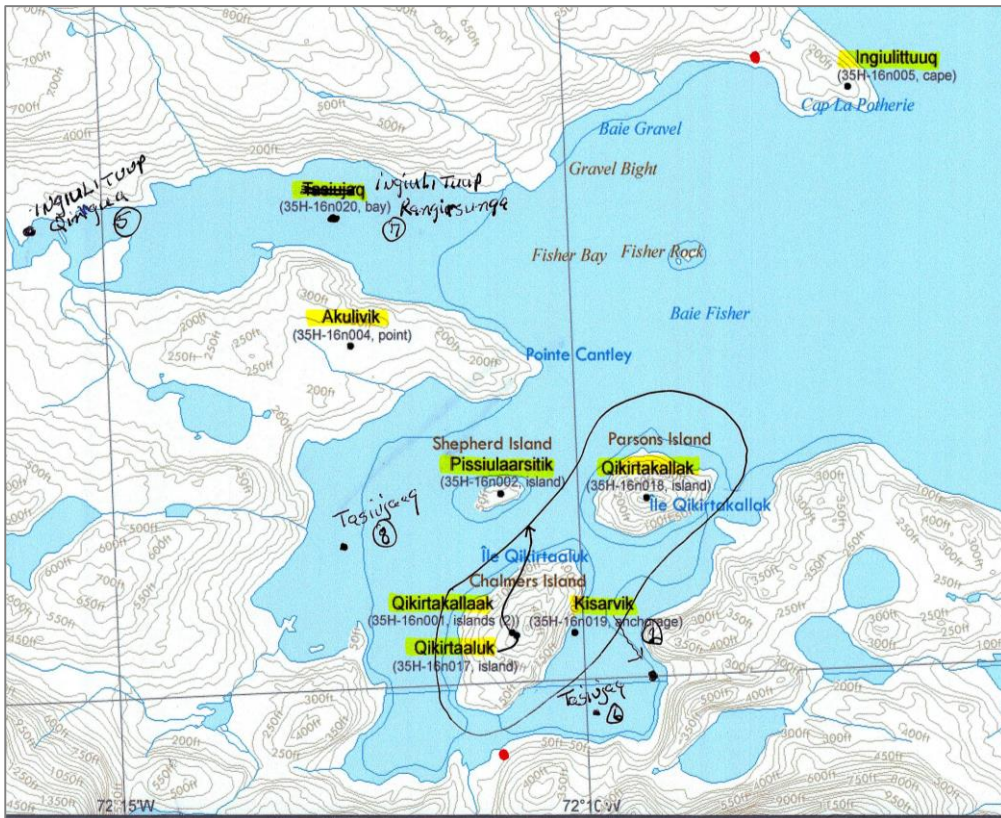
Siasi Annahatak, Johnny Akpahatak, Nicolas Pirti-Duplessis, Eva Grey, David Angutinguak, Lizzie Annahatak-Gordon (Aupaluk, 2012).

Place-Names Location Correction

We used ArcGIS Online to correct the position of every point representing a place-name with the highest accuracy. This web-based mapping tool allows us to underlie a base map with satellite images or a detailed topographic map.
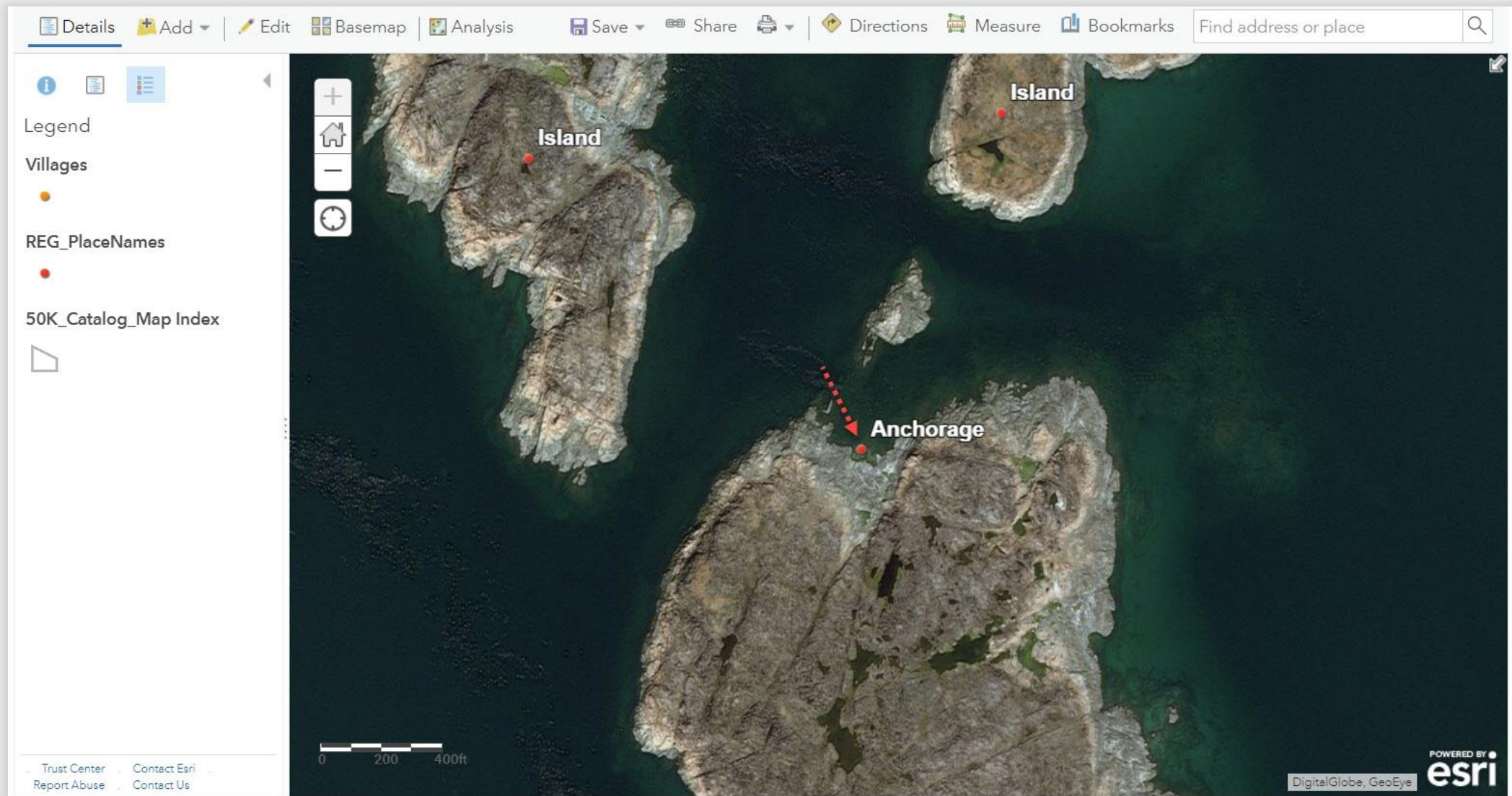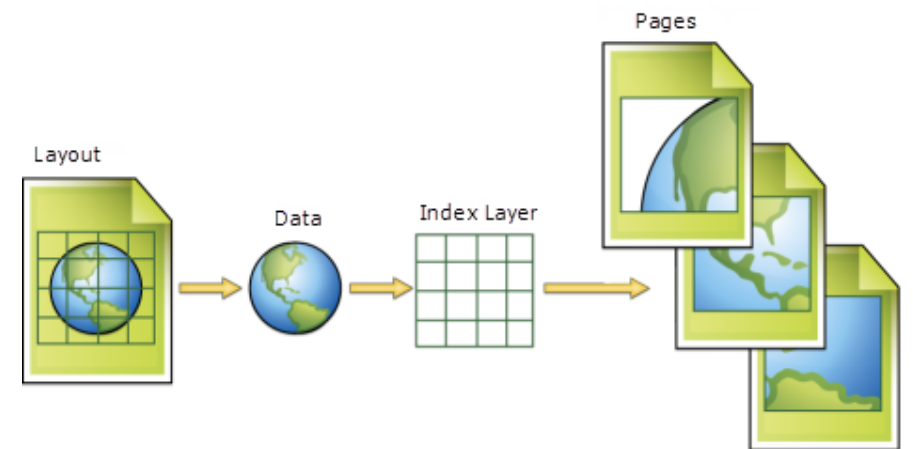
Where To Start?

We needed to find a way to share the Place-names historical database in a format that could satisfy different uses and users, such as citizens, scientists, institutions, schools, hunters, etc.

We decided to create a **map series** scale 1:50 000 that covers all the Nunavik region. This was done using ArcGIS suite (a Geographical Information System program) to generate maps in digital formats (MXD, PDF and PNG). These can then be printed on various types of paper.

A **map series** is a group of topographic or thematic maps or charts, usually with the same scale and cartographic specifications, and with each sheet appropriately identified by its publisher as belonging to the same series.

Map series occur when the area to be covered, due to its scale, must be spread over several sheets. Nevertheless, the individual sheets of a map series can also be used quite independently, as they generally **have full map surround details and legends.**

We decided to use the same grid limits as the official Canadian topographic maps scale 50 000. In order to be able to begin the production, we needed to decide on many other previous definitions presented in this document.

Extension and Scale

This shows the distribution of place-names in the Nunavik region.

This is the 250,000 scale official grid for topographic maps. We selected those with place-names within.

The distribution of place-names is concentrated along the coast and in populated areas, so a scale of 50 000 or smaller was necessary to show these high-density zones.

Here we see the 50 000 scale official grid for the region selected.

From the 910 maps, only 640 have land or a place-name, so only those have been done.

Finally, the extension of this collection is outlined by the official 50 000 scale grid limits.

Initial Definitions

There are 1001 ways to design a map.

Once the extension of the area to be covered was decided and the scale had been set at 1 : 50 000, it was still necessary to **define some other key aspects of the map,** cartography- and design-wise, like the list shown in the table:

Scale	50 000
Paper Size	25" tall x 29" wide (64 cm x 74 cm)
Projection	NAD83_UTM: zones_17,18,19,20 North
Languages	Inuktitut, French and English
Grids	Lat-Long (degrees), and UTM (meters)
Location Map	Nunavik Map Series extension
Index Map	Group of 16 maps (limit of official map, scale 250,000)
Elevation contours	Yes, every 10 meters, labeled.
Elevation colors (DEM)	No
Hill shade	Yes, soft grey.
Other layers, apart of the topography.	Villages, Land Categories
Titles, logos, texts, legends, etc.	All had to be defined to release the first Pilot map.

This step is one of the most relevant of the project.

Now, let's review every item in detail.

Datum & Projections

Projecting the earth onto a flat surface requires choosing from a selection of many datums and projections.

For this project we have chosen **Datum: North_American_1983**, because this is used for most of the geospatial information provided by the Canadian Ministry of Natural Resources.

Once the datum is chosen, it is necessary to choose the projection. There are several projections available and each one of them will produce a different kind of distortion, as we can see in the figure below:

Projection: Lambert_Conformal_Conic

Used for Murals, and big extension maps, like Nunavik Region, or scales over 100.000.

This projection is not ideal, the distortion on the horizontal is too strong.

Projection: GCS_North_American_1983
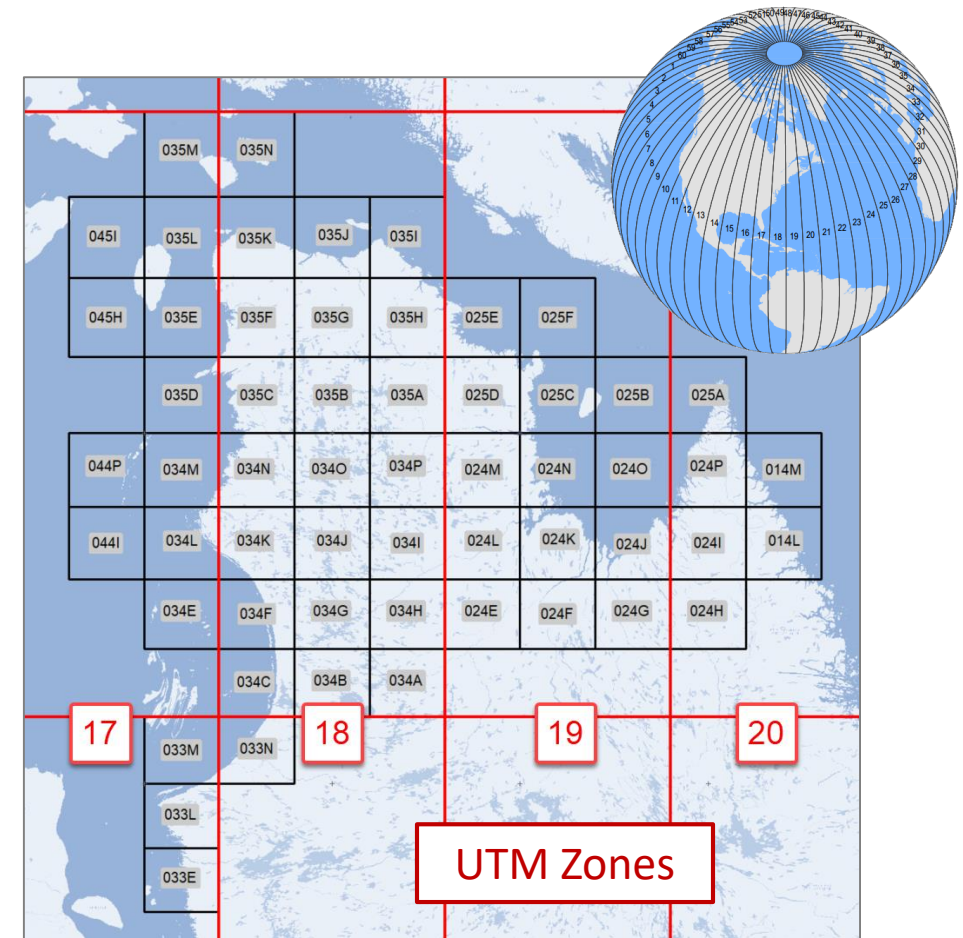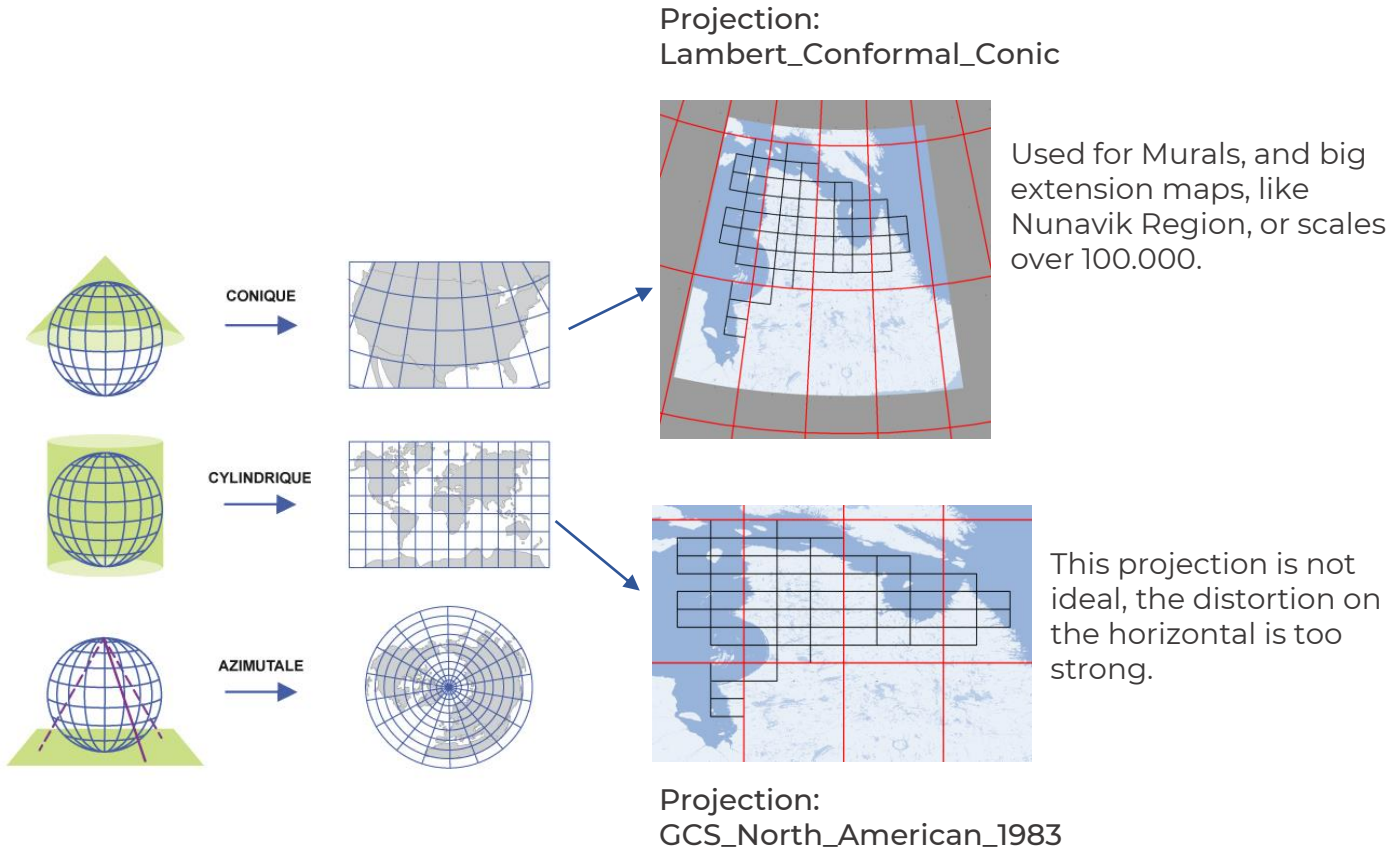
UTM Zones

For the Nunatop 50,000 collection we have used the **Universal Transverse Mercator (UTM)** projection. This reduces the distortion in distances, over areas or directions. But the extension of Nunavik is so wide that we need to change the UTM Zone several times.

The information about projection can be found bellow the numeric scale

1 : 50.000

ᐊᖕᒋᓂᖕᒃ / Échelle / Scale

NAD83-UTM19N   025E12

Trilingual Maps

Inuktitut, French and English.

Inuktitut is the language spoken by Inuit. In 1976, the Inuit Cultural Institute (ICI) approved a new standardized writing system that could be used to write Inuktitut consistently. ICI orthography has two forms, one in roman orthography (using the Latin alphabet) and one in syllabics.

All of the Inuktitut texts on the map elements are written using the syllabic alphabet since the translation to French and English is beside.

The place-names labels on the map are written in both alphabets, syllabic and roman, to facilitate pronunciation, but the translations (the meaning) are not provided.

ᓄᓇᐄᕝᒥ ᓄᓇᖅᓲᒐᓂ ᓄᓄᑦ ᐊᑎᖅᑯᑦ ᐃᓄᒃᑎᔅᑐ�

**Série de cartes toponymiques inuites du Nunavik
Inuit Place-Names Map Series of Nunavik**

ᑖᓐᓇ ᓄᓇᖅᓲᒐᖅ ᑐᓴᖕᓇᑎᑦ ᖃᐅᔨᓴᕈᑎᓂᒃ ᓄᐊᑕᐅᓂᐅᕐᑎᒃ ᓄᓇᐄᕝᒥ ᓄᓇᒥᒃ ᐊᑐᔨᑦ ᐊᐱᕐᓱᑕᐅᑎᓗᒋᑦ, ᐊᒻᓗ ᐱᑦᓛᑲᑐᑎᒍᑦ ᓄᓇᐄᕝᑎᐅ ᐃᓂᓪᓃᑦ ᐃᑲᔪᕐᑎᑐᓗᒋᑦ, ᐊᒻᓗ ᑐᖅ ᒥᑐ-ᒍᐃᓕ, ᐱᕐᓇ ᓴᑕᑏᖅᓲᒃ, ᖅᐊᑕ ᐅᐱᑦᓗᑐᕐᖅ, ᔪᓂ ᐸᑦᓯ ᐊᒻᓗ ᓂᑯᐃ ᐱᕐᑎ ᑐᐸᑯᑦ. ᑖᓐᓇ ᐱᓕᕆᖅᑕᐅᓂᖅ ᑭᐅᐅᕐᖀᑐᑎᒍᑦ ᐃᑲᔪᕐᑕᐅᕐᓂ ᒪᑮᕝᐃᑐᖄᓐᒃ, ᓄᓇᐅᑦ ᓄᓇᒥ ᑎᒍᒐᕐᑎᒐᖅᖁᓛᓐᒃ ᐊᒻᓗ ᐃᓄᐃᑦ ᖃᖕᓛᑦᑕᕐᖁᓛᓐᒃ.

Cette carte est basée sur des informations collectées durant des entrevues menées avec les utilisateurs du territoire du Nunavik, avec l'importante contribution des ainés, ainsi que Ludger Müller-Wille, Bernard Saladin d'Anglure, Helen Oweetaluktuk, Johnny Palliser and Nicolas Pirti-Duplessis.
Ce travail fut supporté financièrement par la Corporation Makivik, l'Association des corporations foncières du Nunavik et Air Inuit.

This map is based upon information collected through interviews with Nunavik land users, and with the important contribution of the elders, as well as Ludger Müller-Wille, Bernard Saladin d'Anglure, Helen Oweetaluktuk, Johnny Palliser and Nicolas Pirti-Duplessis. This work was supported financially by Makivik Corportation, the Nunavik Landholding Corporation Association and Air Inuit.

The Topographic Background

The information used for the topographic background is available on the [Natural Resources Canada](#) website.

This data is public, free of cost, and is available in several digital formats. In our case we used *shapefiles*, which is the native format for ArcGIS.

Because the variety of information available on this site is overwhelming, it was necessary to spend a lot of time reviewing the vector and raster databases and choosing what was relevant for this project.

Now we have a very complete cartographic collection of layers, in scales from 50 000 to 5 000 000, that allows the creation of maps with different combinations for background and any paper size or scale.

	A	B	C	D	E	F	G	H	I
	Entity	Attributes combination	Specification Code Point	Specification Code Line	Specification Code Area	Generic Code	Theme	GML - Entity name Shape - File name Point	GML - Entity name Shape - File name Line
59	Elevation point	Precise altitude	1200010			1200009	FO	FO_1200009_0	
60	Elevation point	Spot height	1200030			1200009	FO	FO_1200009_0	
61	Elevation point imperial	Precise altitude	2610010			2610009	FO	FO_2610009_0	
62	Elevation point imperial	Spot height	2610020			2610009	FO	FO_2610009_0	
63	Esker	Esker		1080021		1080029	FO		FO_1080029_1
64	Exhibition ground	Fairground			2510022	2510009	LX		
65	Exhibition ground	Other			2510012	2510009	LX		
66	Extraction area	Unknown	1350030		1350032	1350039	IC	IC_1350039_0	
67	Ferry connection segme	Ferry connection segment		1750011		1750009	TR		TR_1750009_1
68	Footbridge	Footbridge		2280011		2280009	LX		LX_2280009_1

Nevertheless, this information is codified, so no direct information is stored on the shapefiles, just the numeric codes. The only way to batch symbolize all the layers is to run an application that can be downloaded from the same website. This app is named **RNCanNRCanStyles.esriAddIn**

Also, the "styles" files that allow manual symbolization are available in English and French.

The Topographic Background

Here we can see, on the left panel, the organization of the database directories in ArcCatalog.

On the right panel, the attribute table accompanying the shapefiles. It does not give information about its content, only the CNR code.

Once the script mentioned before runs over all the layers of the map, we can finally see the entities and read the map. After that, the symbology can be modified manually.

We had to run this script on all the layers included in each 250 000 dataset (55 groups) before creating the map books (explained later).

Elevation & Relieve

In GIS, the elevation can be provided in two ways. One way uses a raster layer called **Digital Elevation Model (DEM)** that stores the value of the elevation over sea level on every pixel. It is possible to apply a color ramp to this kind of format in order to get a better understanding of the landscape.

Natural Resources Canada provides a high-resolution DEM for each map of the 250 000 scale. All 55 files covering Nunavik have been processed to obtain a **Hill-Shade** using the software **ENVI**, specific for raster geoprocessing. The combination of both layers gives an even better understanding of the relief.

Digital Elevation Model   Hill-Shade   Elevation contours   Relief effect
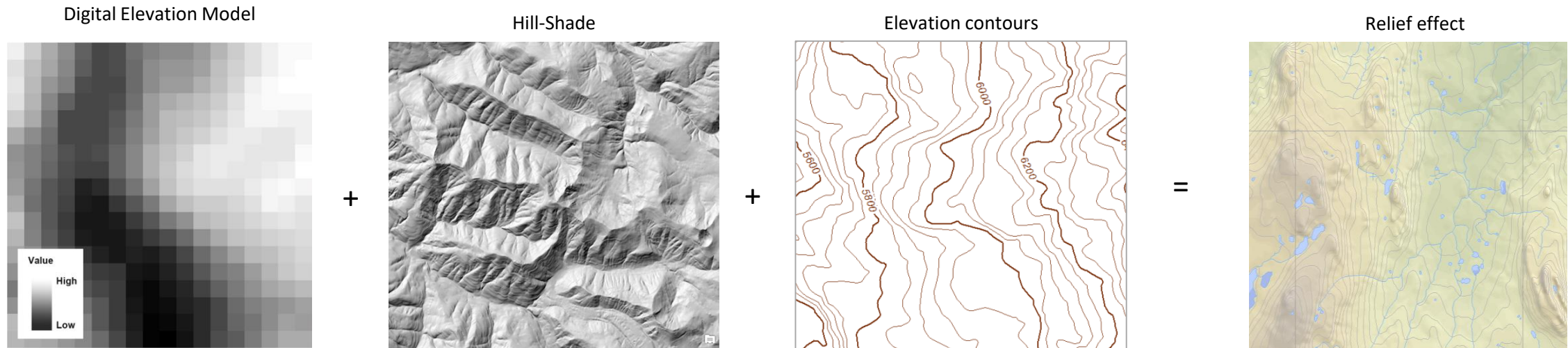
The second way uses a vector layer called **elevation contours.** The contours are downloaded from the same source. Most of the other topographic layers were built in *feet*, so we have used the DEM to regenerate all the contour lines in *meters* for every group, using the application **Global Mapper.**

This combination provides a very natural relief effect that helps the user to read and understand the map easily.

Also, for large extensions such as the Nunavik map, it was necessary to create a mosaic of all the DEMs in one file. This was then resampled to reduce the size of each pixel and therefore the size of the file.

The Symbology

Shown below is the official symbology for the Canadian topographic maps, once you have run the script mentioned before. However, for a project of this magnitude it was necessary to soften the symbology for most of the layers and search for a look and feel that will be appealing and useful to all potential users.

Shown at right is the final symbology.

The Place-Names Labels

ArcGIS has a special tool for advance labeling. The **Maplex Label Engine** lets you control how labels should be placed relative to features; how labels can be modified or reduced to allow more label placement when the available space is constrained; and how conflicts between labels are resolved.
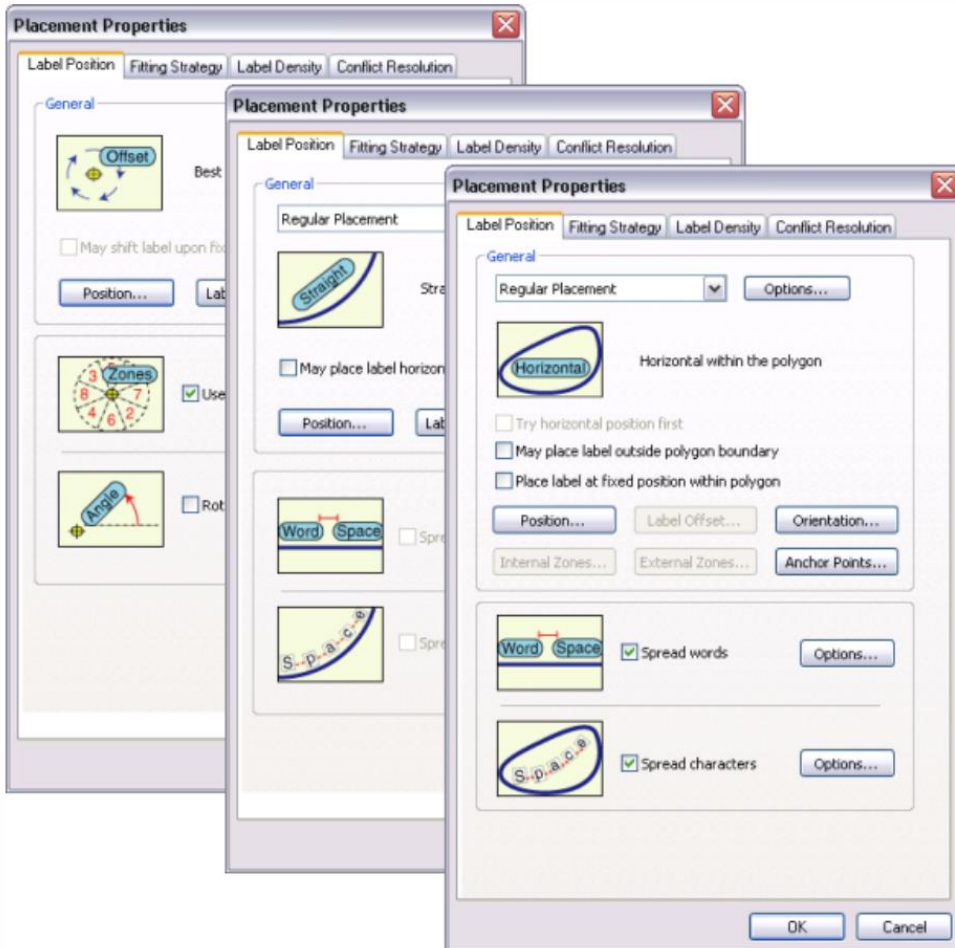
In some cases, where there are many place-names close to each other, it was necessary to convert the labels into *annotations*. This format allows for the manual movement of one individual label to reposition it in a clear zone.

This practice disconnects the label from the database, so if there are corrections needed it wouldn't work. For this reason we avoid that as much as possible.
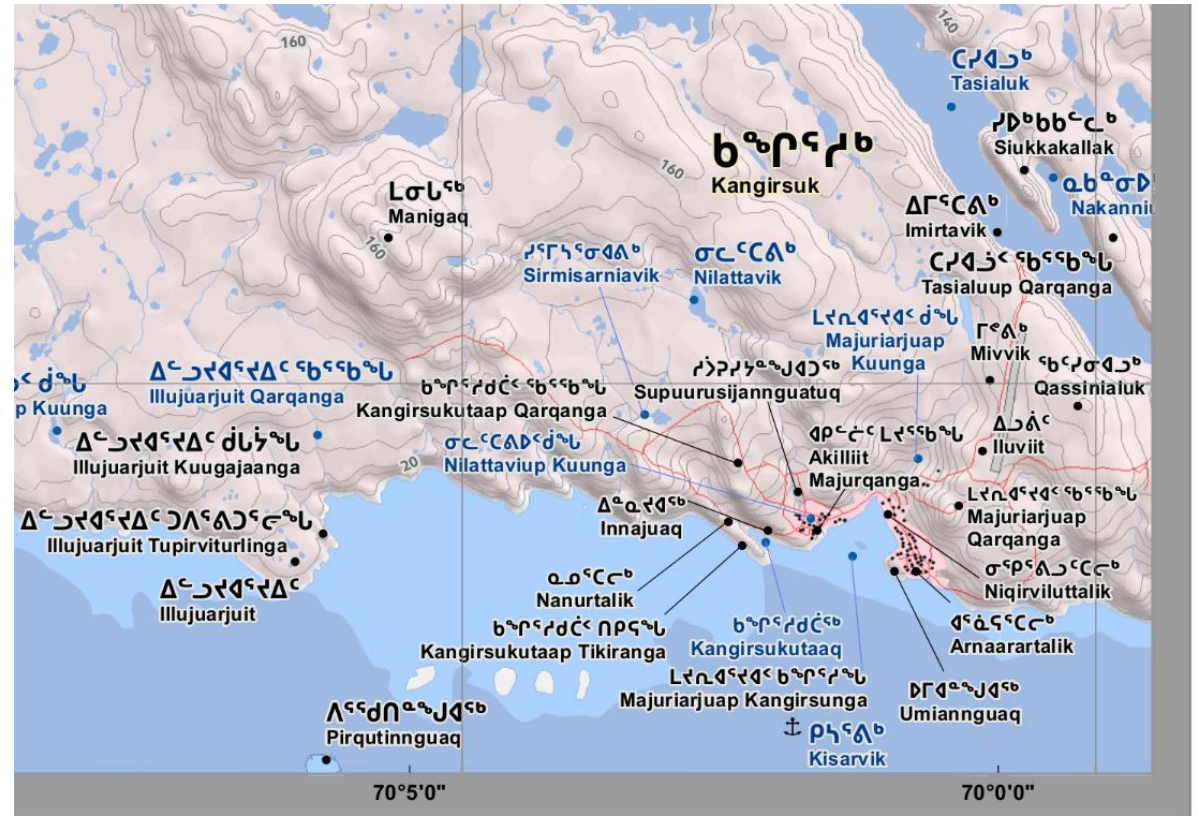
The Elevation Contours Labels

Adding labels to the elevation contours is a very time-consuming task when done manually. For this kind of project that was not an option, so we did the best possible labeling in a semi-automatic way, using the previous mentioned tool Maplex.
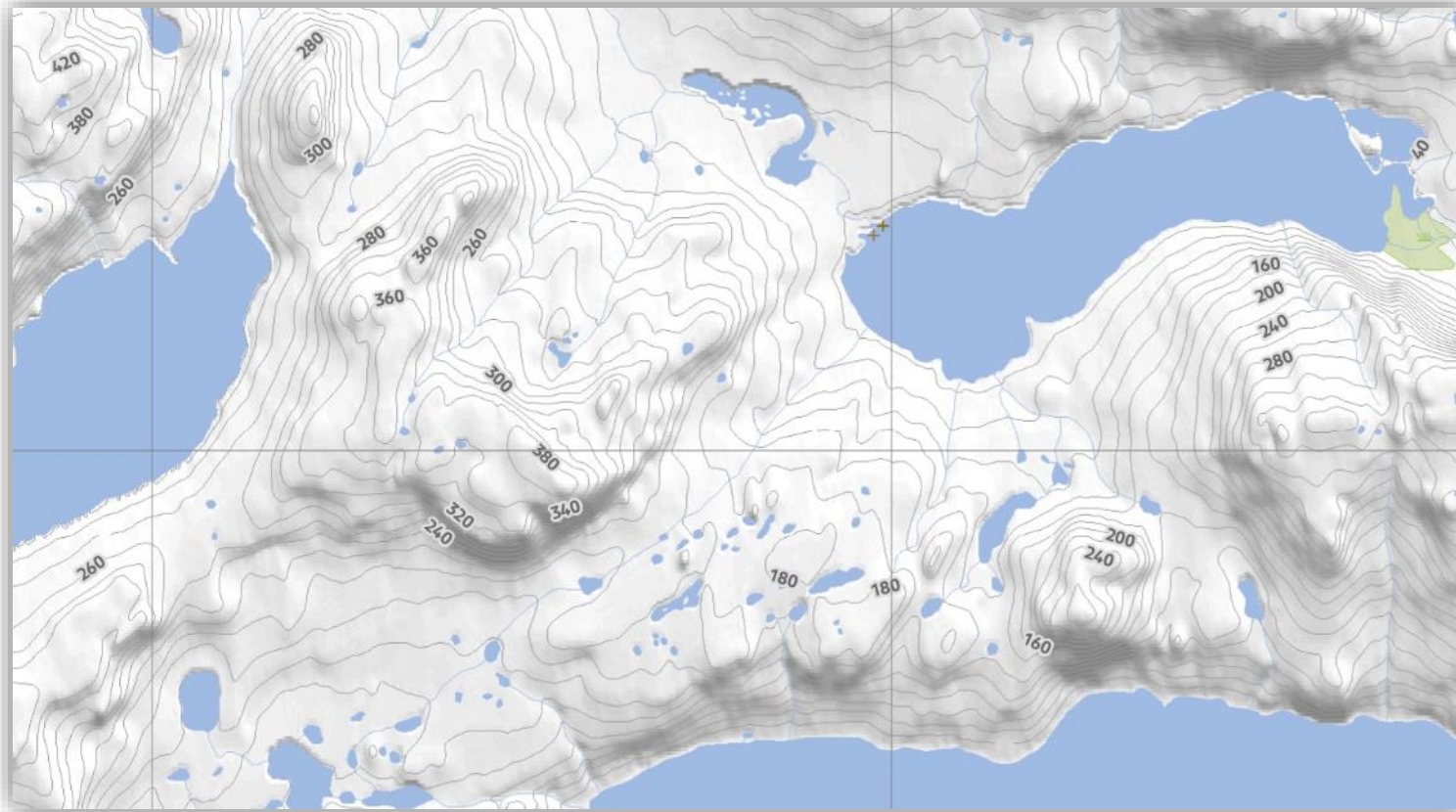
Once the parameters for the labels were defined in several Maplex windows, we used a very useful tool called:

import_labels_from_layer.esriaddin

This allows us to import the configuration from one layer to another.

The use of this tool was relevant for time-saving and avoiding mistakes in setting the parameters.

Naming the Map Groups

This was a very challenging task since the local cultural and natural invisible boundaries do not always match this rigid, square grid chosen to split the region.

In many cases it was possible, when not perfect, to conserve the grid limit and just assign a name. However, in some cases it was really necessary to divide or extend the area assigned to a name, as seen in this figure – in which the group 025C contains maps with three different names.
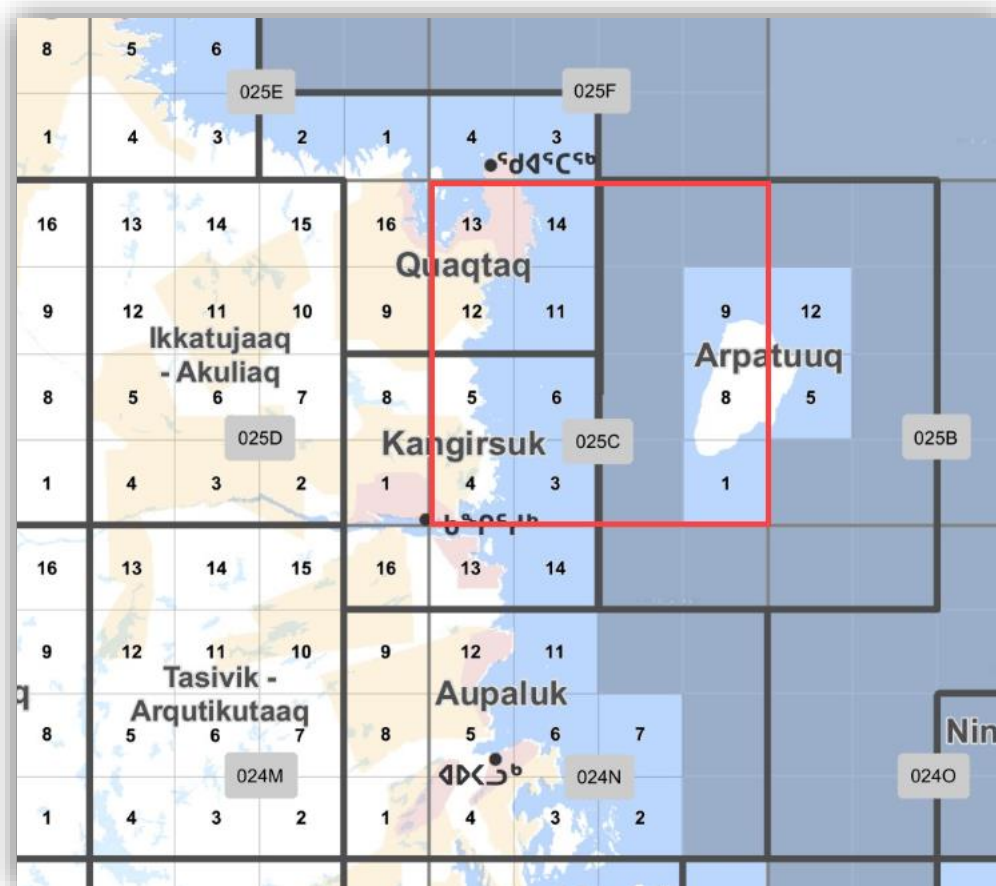
This way, each individual map can be identified in two ways:

- by the name + number:

  Arpatuuq - 1

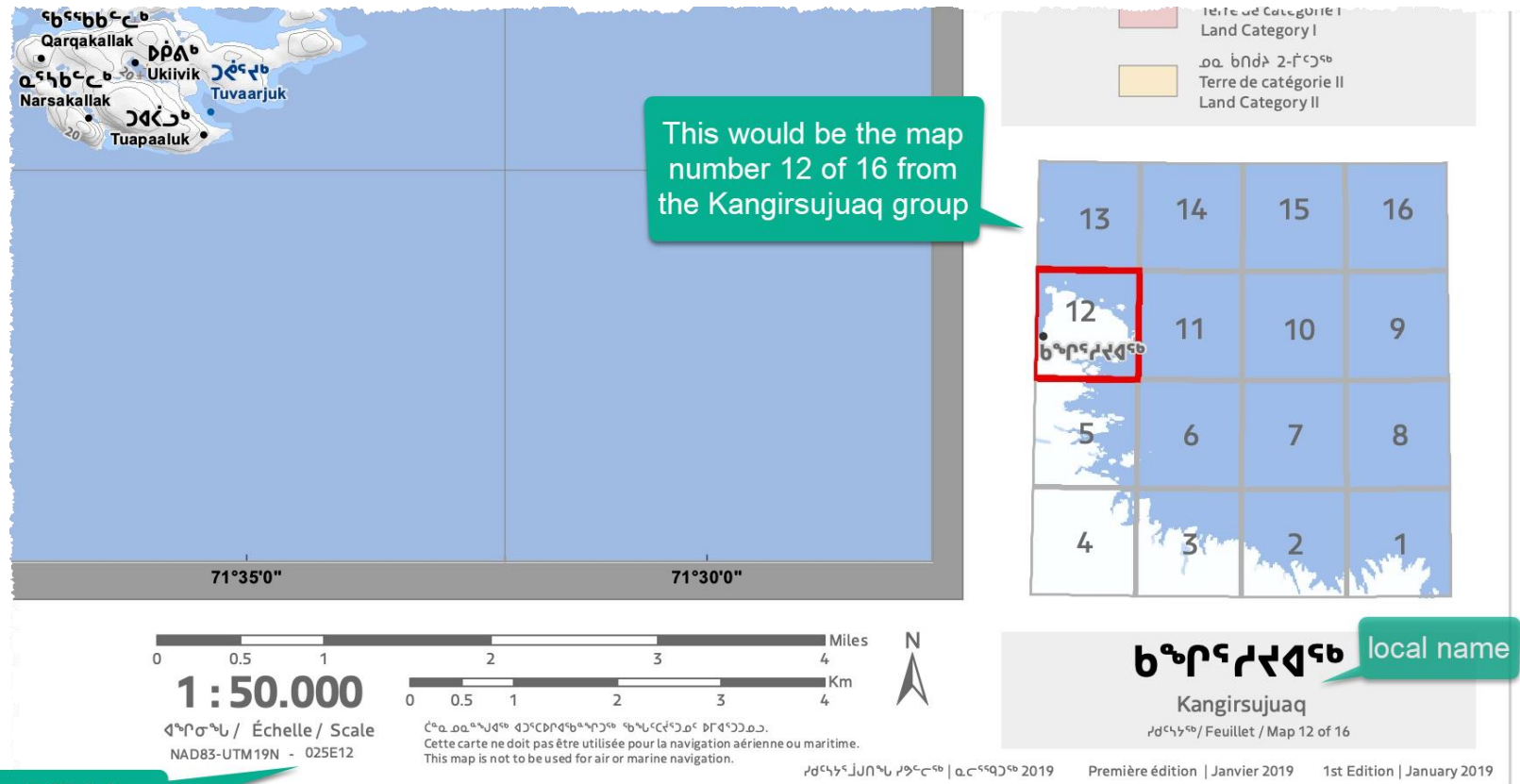- or by the official code:

  025C01

Map Books

The methodology used to create each map is known in the GIS world as "Map Books", briefly mentioned before. It uses a tool called **Data Driven Pages**, where a grid divides a region in cells and drives the way every cell becomes an independent map.

In this case, due to the enormous extent of the area to be covered and the detail of the various layers in the maps, it was not possible to create one single Map Book covering all of it. Instead, **55 Map Books** were created, one for each cell from the grid 250 000 scale. Each Map Book contains information for 16 maps at 50 000 scale.

That is why one of the elements of each map is the *Index* that indicates which one of these 16 maps we are looking at.
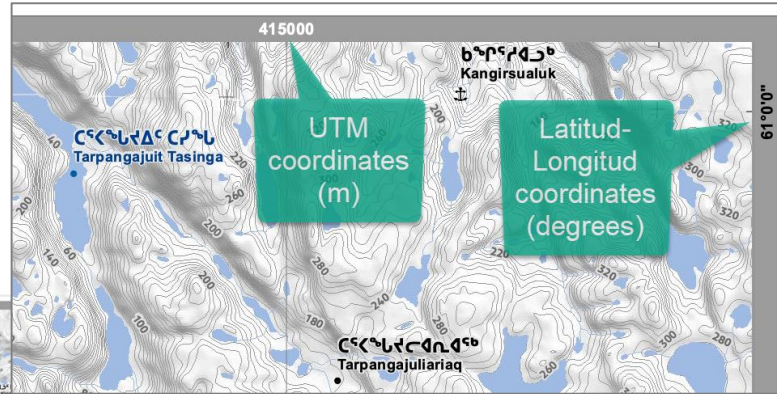
It was decided that each group of 16, instead being named with the official CODE, should have a meaningful name for the local people, but the CODE can still be found at the bottom of the scale besides the projection information.

This would be the map number 12 of 16 from the Kangirsujuaq group

local name

Official CODE

Map Pieces Composition

The scale definition dictates the paper size. We tried to make the paper size the smallest possible, rectangular and in landscape orientation, so it is more easily used outdoors.

Regarding the distribution of the elements on the map, there are unlimited ways to do this.

We decided to place as many as possible on the right side, allowing the user to fold it and just keep the main frame at sight.

The graphic information and main titles should remain under the main map frame.

29" / 74 cm

25" / 64 cm

- UTM coordinates (m)
- Project description
- Latitud-Longitud coordinates (degrees)
- Location map
- Lateral scale (km)
- Contact information
- Main map frame
- Symbology
- Graphic and numeric scales, projection, official CODE
- Index map for 16 maps group
- Logo and copyright
- Main Title
- Small Title (for folded maps)

Some Component Details : Grids, Location Map, Scales.

Even when one map can only be built on one projection, it is possible to display more than one **coordinates' grid** on the same map:
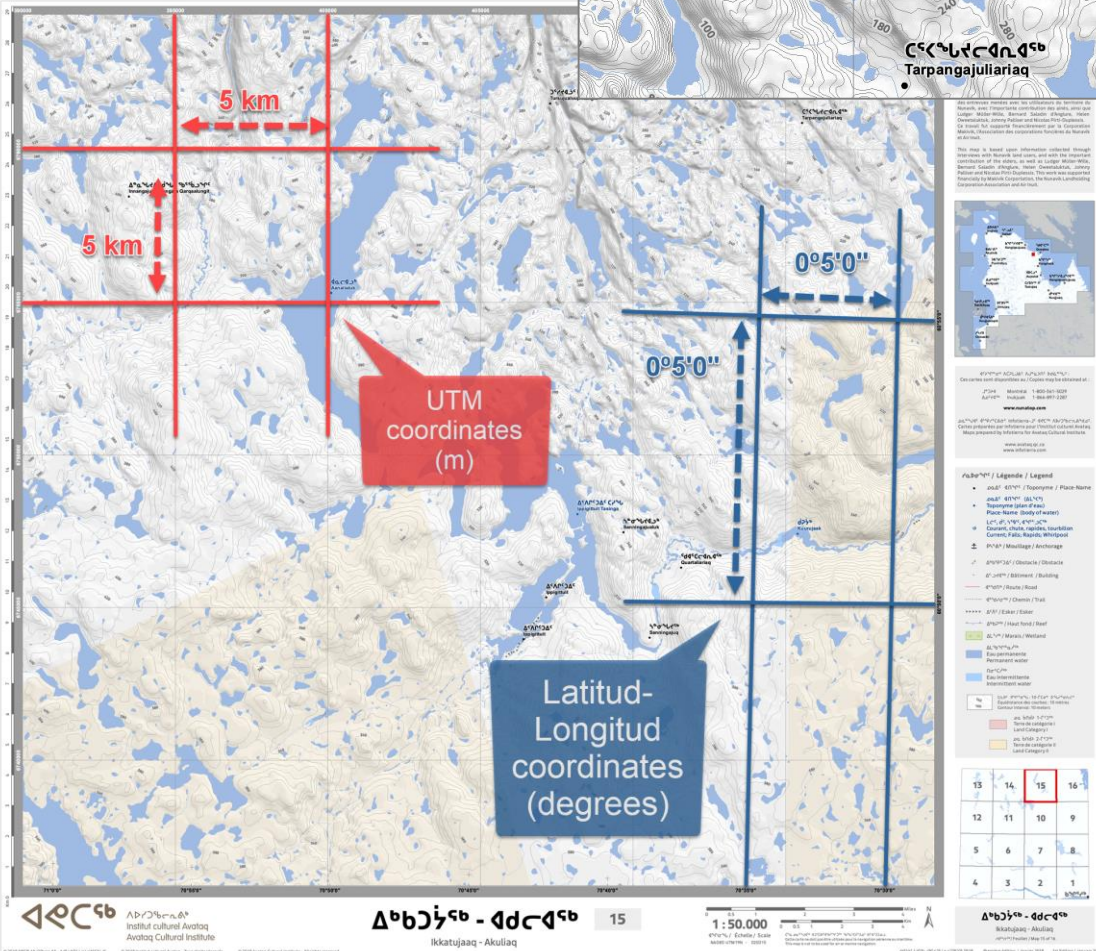

In Nunatop there are 2 grids:

The first one (red) is the same of the projection UTM it has being built with, the unit is meters and the interval (line equidistance) is **5 km**.

The second one(blue) is a geographic grid, measured in degrees, and the interval is **5 minutes**.

The **location map** shows exactly the position and extension of each map 50 000 scale.
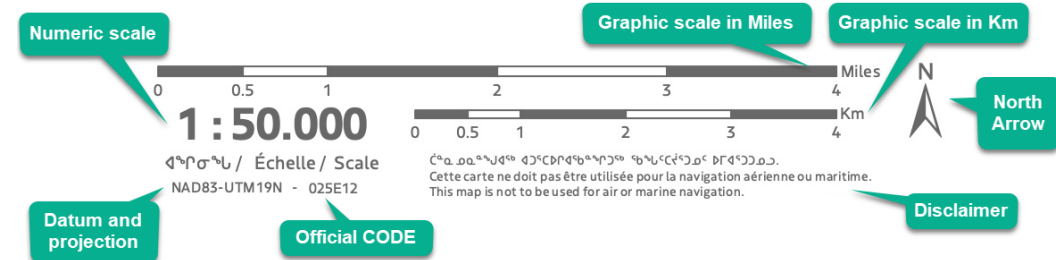
The **scales** block has a graphic scale also in miles, and the rest of the cartographic information.
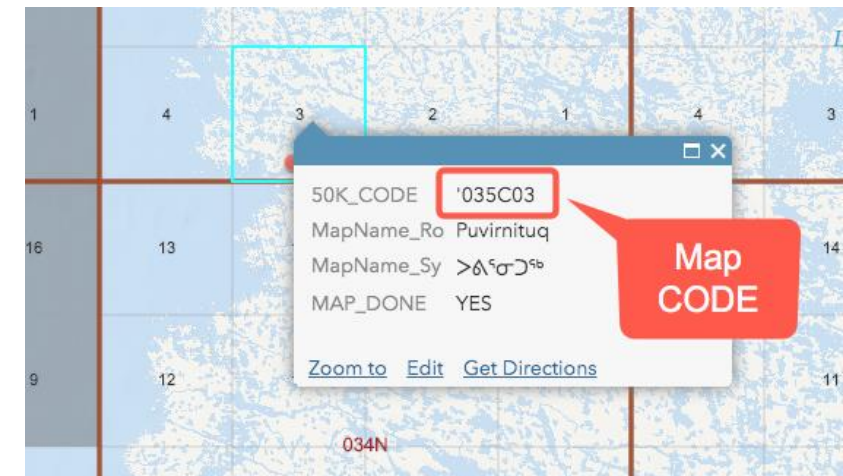
The Final Product

Is a collection of **640 maps**, covering most of the Nunavik region, and all the areas where Inuit place-names can be found.
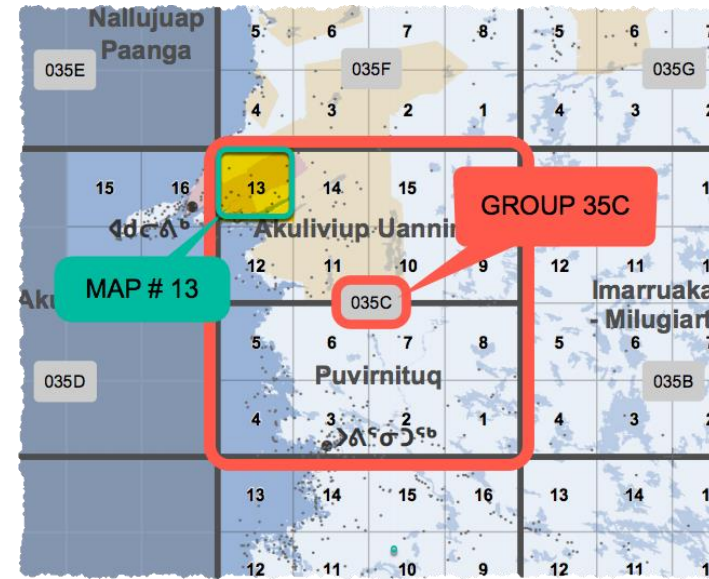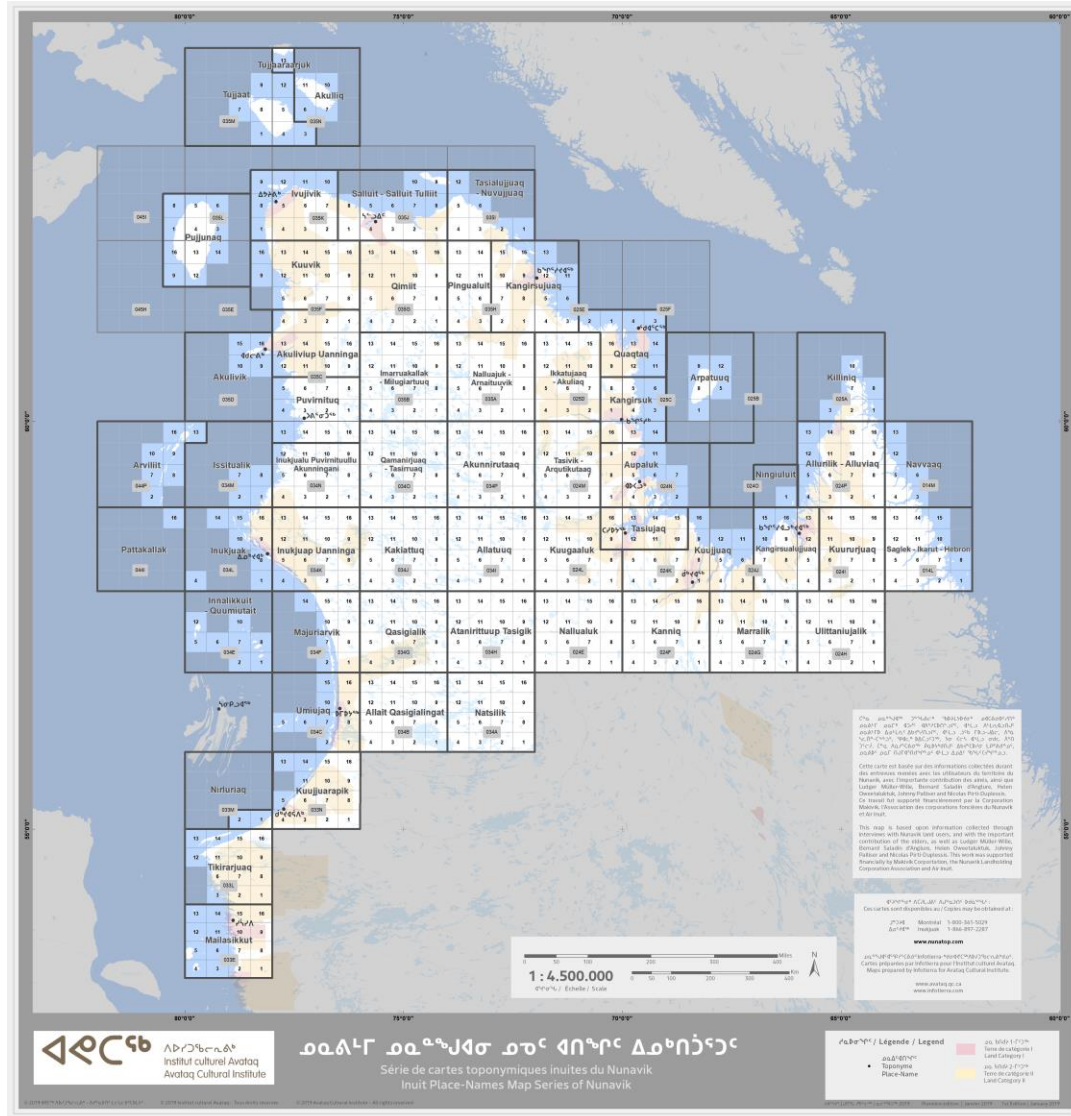
Each map belongs to a **group** of 16 maps, which together cover the same area as the official topographic 250 000 scale map.

Each map is identified with the **50K CODE**, which is the 250 000 official code plus a correlative number from 1 to 16, and a local Inuit name in Roman and Syllabic alphabets.

The Nunatop Collection

This is an example of one unit (1 of 640), containing all the information necessary to function independently.

For this collection, after asking several Inuit people visiting the Avataq office, we decided not to add color to the elevation.

This way it will be easy to see the limits of Land Categories. More importantly, since it is generally meant to be used outdoors, this allows the user to write notes, paths, more names, etc., on the map, while still keeping it easy to read.

25E-12
ᑲᖏᕐᓱᔪᐊᖅ - 12
Kangirsujuaq - 12

ᐊᖕᒋᓂᖓ / Échelle / Scale: 1:50.000
Dimensions: 25" tall x 29" wide
(64 cm x 74 cm)

Other Collections

Villages

Nunatop Map Series uses the official grid for 50 000 scale topographic maps in Canada, so in many cases, the villages of the different communities fall on the edge of a map or even split in two maps.

To solve that we made a new series of 15 maps where the community is centered on the map, keeping the same paper size and scale as the Nunatop Map Series.
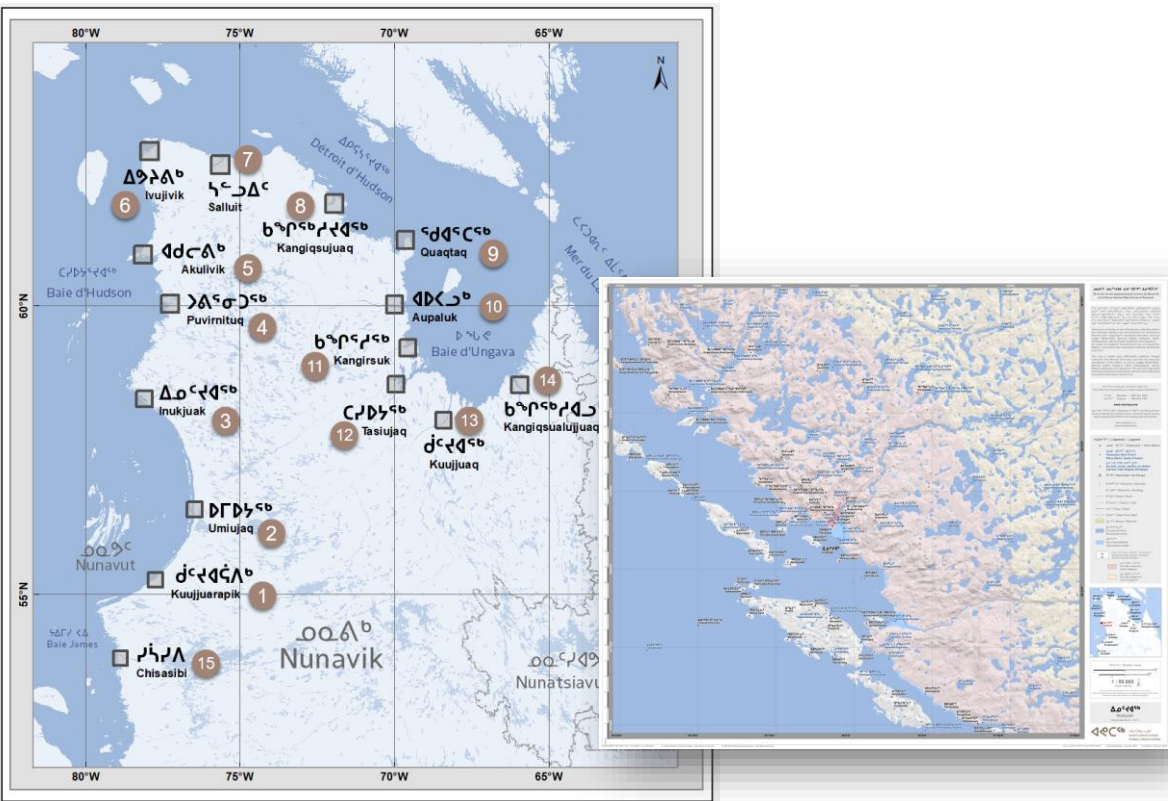
Islands

In some cases, the islands were not centered as they are too big for one single map, so we created another series of 8 maps containing all the main islands or archipelagos.

This time, we kept the same paper size, but in some cases it was necessary to adapt the scale to 100 000 and 200 000.
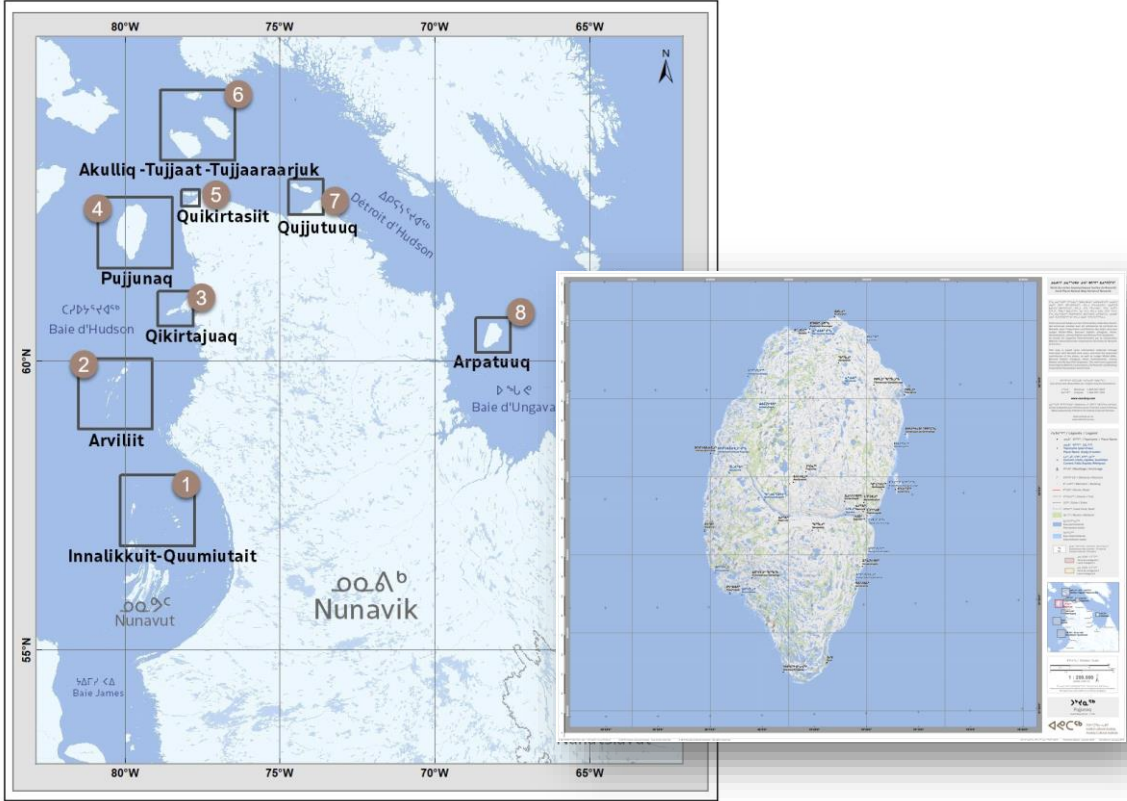
Other Collections

Murals

This series of 14 Maps in big format, 2 m tall by 3 m wide, was made as a special request by **Kativik Ilisarniliriniq,** the school board of Nunavik, with the objective of installing one mural in every school in the region.

This mural is 75 000 scale and comes in two options:

Place-names labels in **Syllabic Alphabet** (Ex. ᐃᓄᒃᔪᐊᖅ).
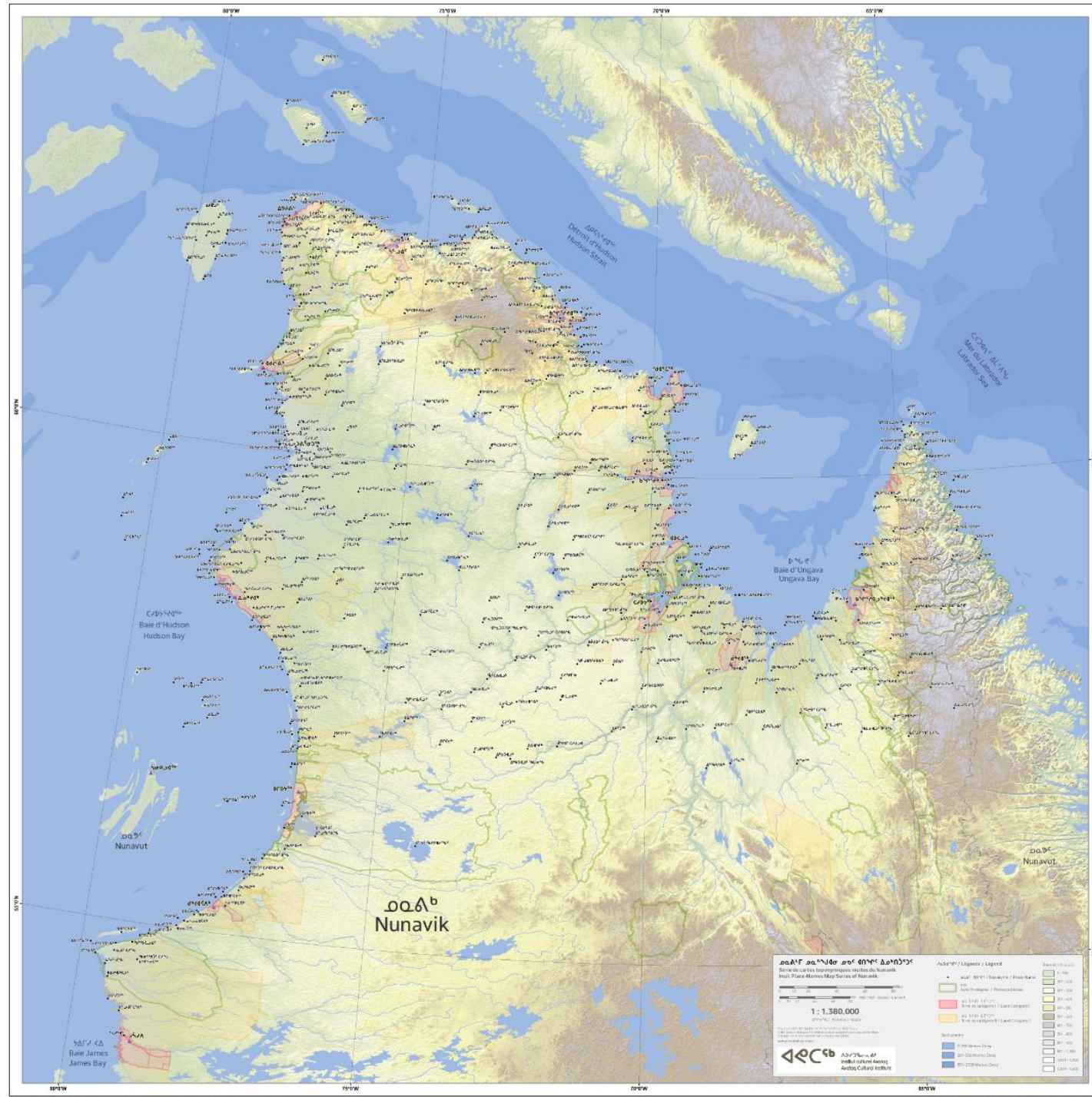Place-names labels in **Roman Alphabet** (Ex. *Inukjuak*).
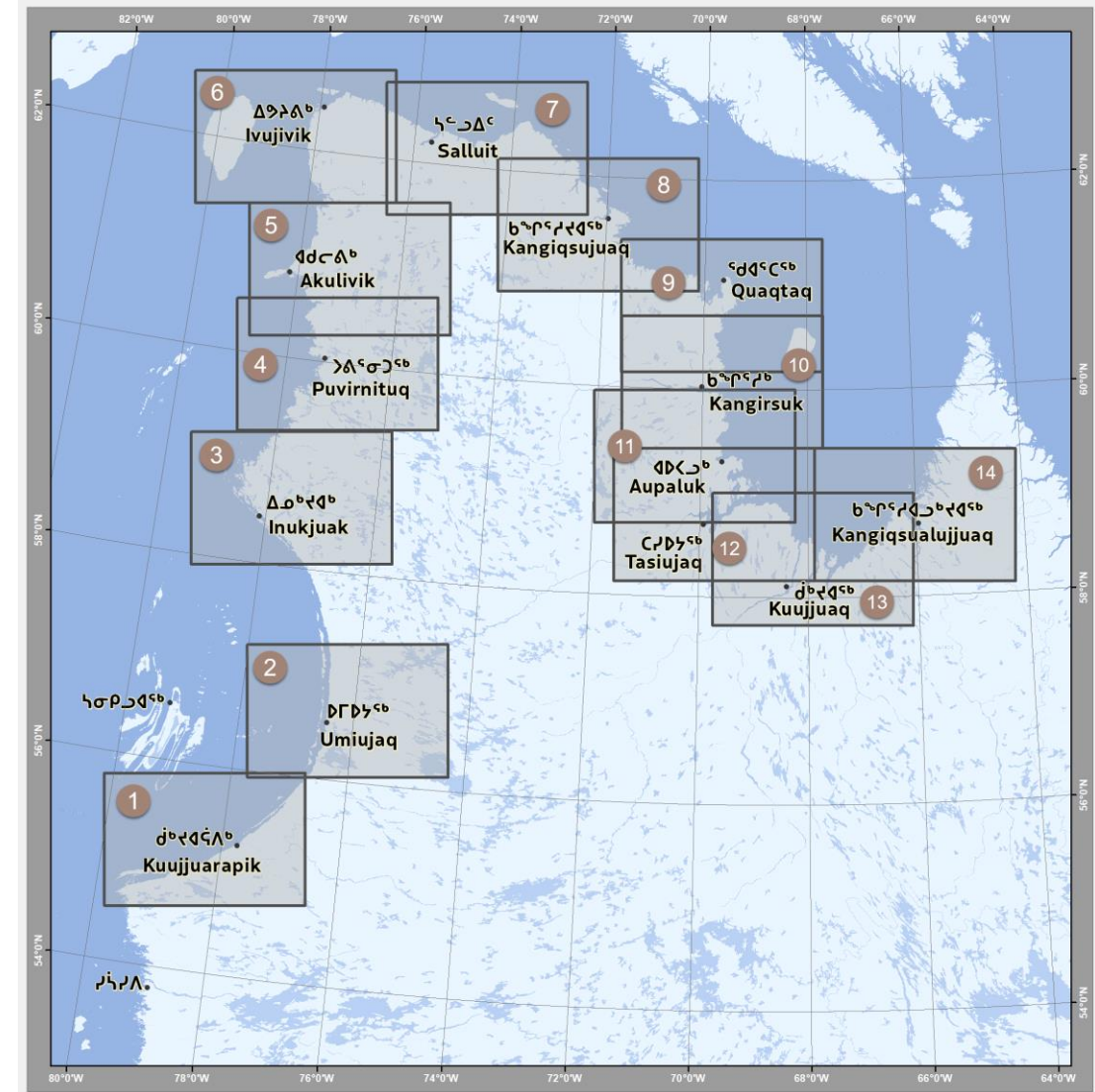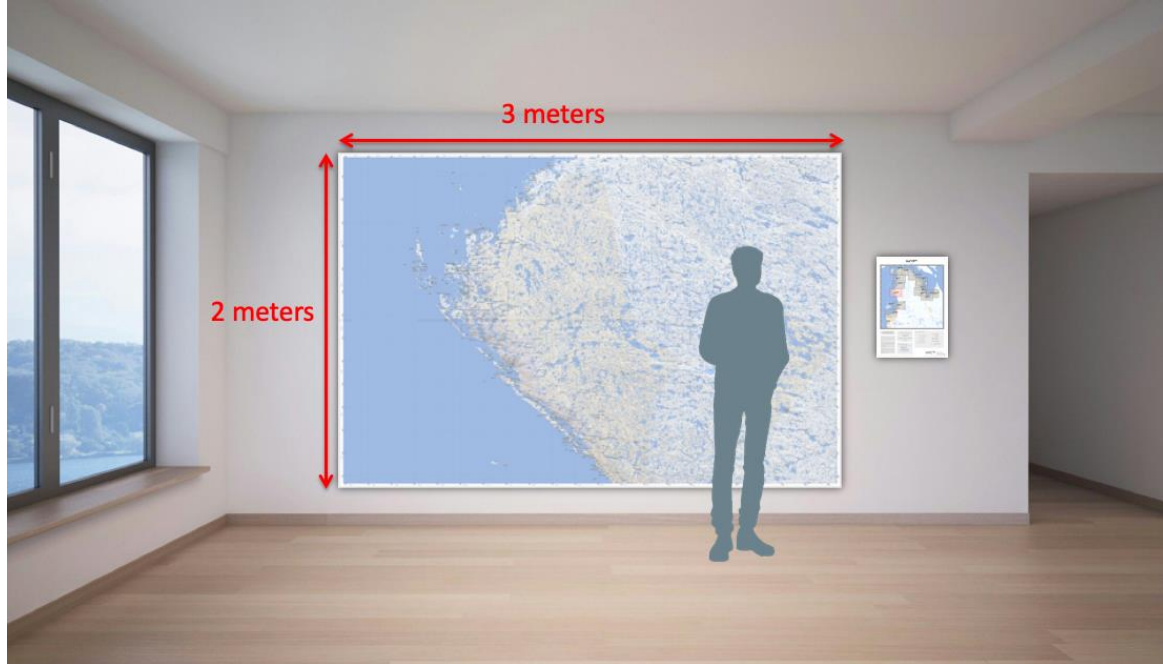
Special Maps

The Nunavik Map & Mural

We have created a special map of all the Nunavik region, showing a selection of the most important place-names (around 550). It also shows:

- Land categories,

- Protected areas,

- Bathymetry and

- Colored elevation.

The paper size is 36" x 36" (91 cm x 91 cm) and has two versions, one with labels in syllabic alphabet and the other with labels in roman alphabet. The Scale is 1 : 1 380 000.

There is also a big format version: a mural with both labels included. The size is 88" x 88" (220 cm x 220 cm) and the scale is 1 : 600 000.

The Place-Names Ranking

To create the previous map that shows only a selection of the place-names, it was necessary to rank all of them in order of importance, in three categories: 1, 2 or 3, (1 for the most relevant).

To do so, we created a web map in ArcGIS Online to be able to edit and assign the category to each record without having installed ArcGIS Desktop on the computer.

This tool allows the rest of the team to interact with the database on a shared controlled environment. This task was performed by Nicolas Pirti-Duplessis.

Software Used and File Formats

The maps have been generated using advanced cartographic software: a Geographical Information System (GIS) called **ArcGIS Desktop 10.5** developed by ESRI.

To prepare the digital data, it was necessary to use other complementary software like **ENVI** to generate the Hill-Shades and **Global Mapper** to regenerate the contour lines.

RNCanNRCanStyles.esriAddIn was used to apply the official symbology to the topographic layers and the **Maplex Label Engine** along with *import_labels_from_layer.esriaddin* to create the labels.

The native format of this software for the maps is the extension **MXD.**

Subsequently all the maps have been exported **to PDF (150 dpi).** To do this it was very helpful to use and application developed by an individual called: **Multiple MXD Exporter.tbx.** This script allows us to batch export many MXD files to PDF, PNG or JPG and set the resolution of the output. Each map takes an average of 20 minutes to export, totalling roughly **230 hours**. All of the exportation took place overnight using two computers.

Later, all the maps were **exported to PNG or JPG** using either the script mentioned above or exporting directly from the PDF, using the batch converted tool included in the application **PDF Reader Pro for Mac.**

The next step was to prepare the images for the website. All the images were reduced in size **to 30%**, for use as a preview image on the website. This task was accomplished using the Batch Export tool of **SnagIt** via Windows Explorer.
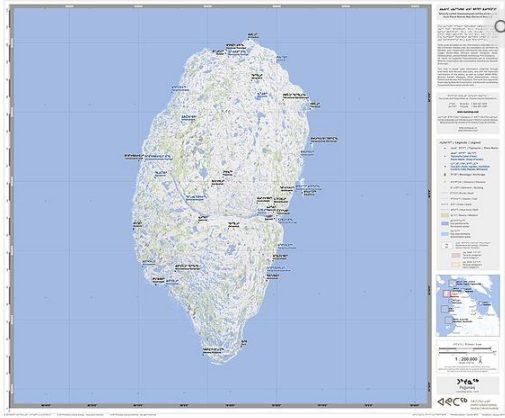
Finally, the *location maps* from all the maps was cropped as an image for the product page of each map on the website. This task was performed using **FastStone**, the semi-automatic tool: **Crop board.** (open source).

Regarding the murals collection: each mural is a **mosaic** of four pieces. These files are very heavy, so it was necessary to use a strong software for image processing. We used **GIMP** (open source): this also allowed us to **modify the RGB values** for the water bodies when printing on vinyl paper.

All of these apps and scripts, as well as the symbologies, can be found here C:...\AVATAQ_GIS\0_ADMIN\APPS

www.nunatop.com

In order to deliver the map collections to the different users, Avataq has released a separate Website as a showroom. There, the user can preview an image of every map, select a paper type and fill out an order form.

Each map can be previewed through the "product page" where you see a low-resolution image of the map and the location map.

IS04_Pujjunaq

Product Info   —

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Série de cartes toponymiques inuites du Nunavik

Inuit Place-Names Map Series of Nunavik

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Première édition | Janvier 2019

1st Edition | January 2019

IS04_Pujjunaq_200K
ᐊᖃᓯᓂᒐ / **Échelle / Scale:** 1:200.000
Alphabet: Roman + Syllabic
Dimensions: 24" tall x 29" wide (61 cm x 74 cm)
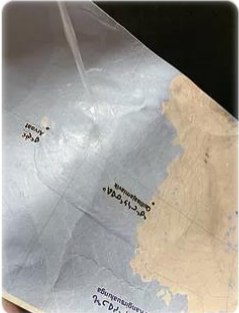
Use limitations   +

Copyright   +

ᐸᐅᑕᖅ ᓴᐅᒪᓯᕐᓇᓕᒃ
Institut culturel Avataq
Avataq Cultural Institute

ᓄᓇᕕᒻᒥ ᓄᓇᓐᖑᐊᕗ ᓄᓄᑦ ᐊᑎᖏᓐᑦ ᐃᓄᒃᑎᑐᑦ
Série de cartes toponymiques inuites du Nunavik
Inuit Place-Names Map Series of Nunavik

NUNATOP

All the maps you find on the Collections page can be printed and shipped to your address. There are three options of paper:

Thick Paper
This good quality paper is perfect to work indoor, offices, houses, libraries, etc...

Tyvek
Vey light waterproof material, very resistant, makes it ideal for outdoor activities.
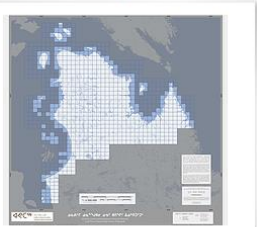
Adhesive Vinyl
This is and adhesive material to place the map on a wall, ideally indoor, also very resistant.
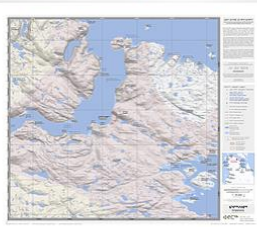
* Murals are only printed on vinyl.

You will need to fill a Form Orden to receive a quote for printing and shipping:

Catalog 50K   Villages   Islands   Murals

| Order Form | Order Form | Order Form | Order Form |

The Experience Gained

The main goal of this project is to preserve the cultural toponymy for Inuit and present it in a form that can be used in their daily lives. The effort to collect these place-names has spanned several decades.

The real challenge of this last phase of the project does not have to do with the use of advanced technology, because it has been done just a deep knowledge of GIS, a good suite of software and two powerful computers. It was not even necessary to collect the cartographic base, since Natural Resources Canada provides all these layers with excellent quality and level of detail, free of charge.

The challenge lies in making the right decisions initially, in terms of content and design, so that it is not necessary to correct and repeat tasks over and over again. Even more importantly: the overall coordination of the project carried out by Elsa Cencig has allowed each stage to progress quickly, efficiently and accurately.

Of course, there were inevitably corrections to make. This is expensive, since even small tasks such as correcting spelling errors in a village name require us to open the map, make the correction, be sure all the layers are on, save it, export it to PDF and to PNG, and finally replace the original version in several locations. Even if this task requires just a few minutes, if it must be done 700 times, that results in two full weeks of work.

All and all, now the project is over, we can say that it was carried out at an intense and sustained pace with very few mistakes made, ending with a highly satisfactory result. Most importantly, having a lot of fun along the process. Congratulations to the whole team.
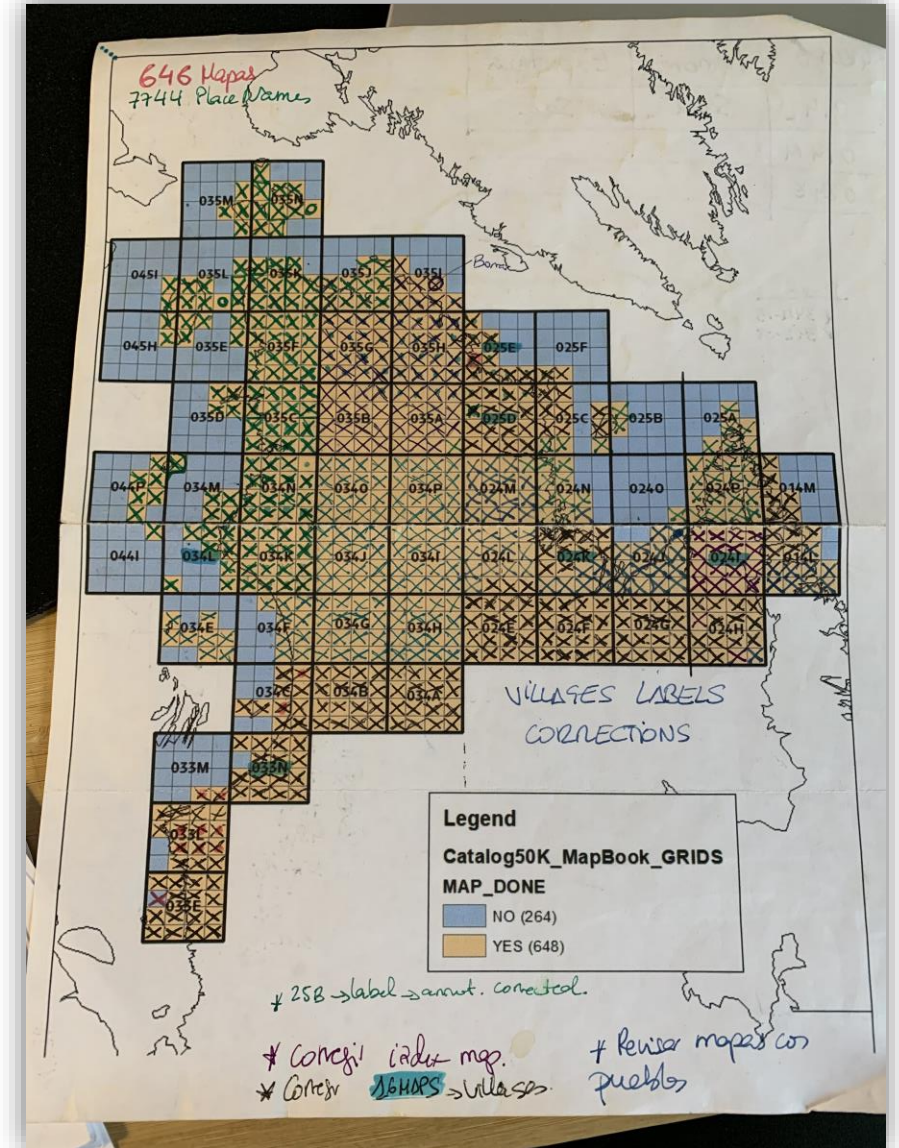
This last phase of the Nunatop project has been developed by an interdisciplinary group:
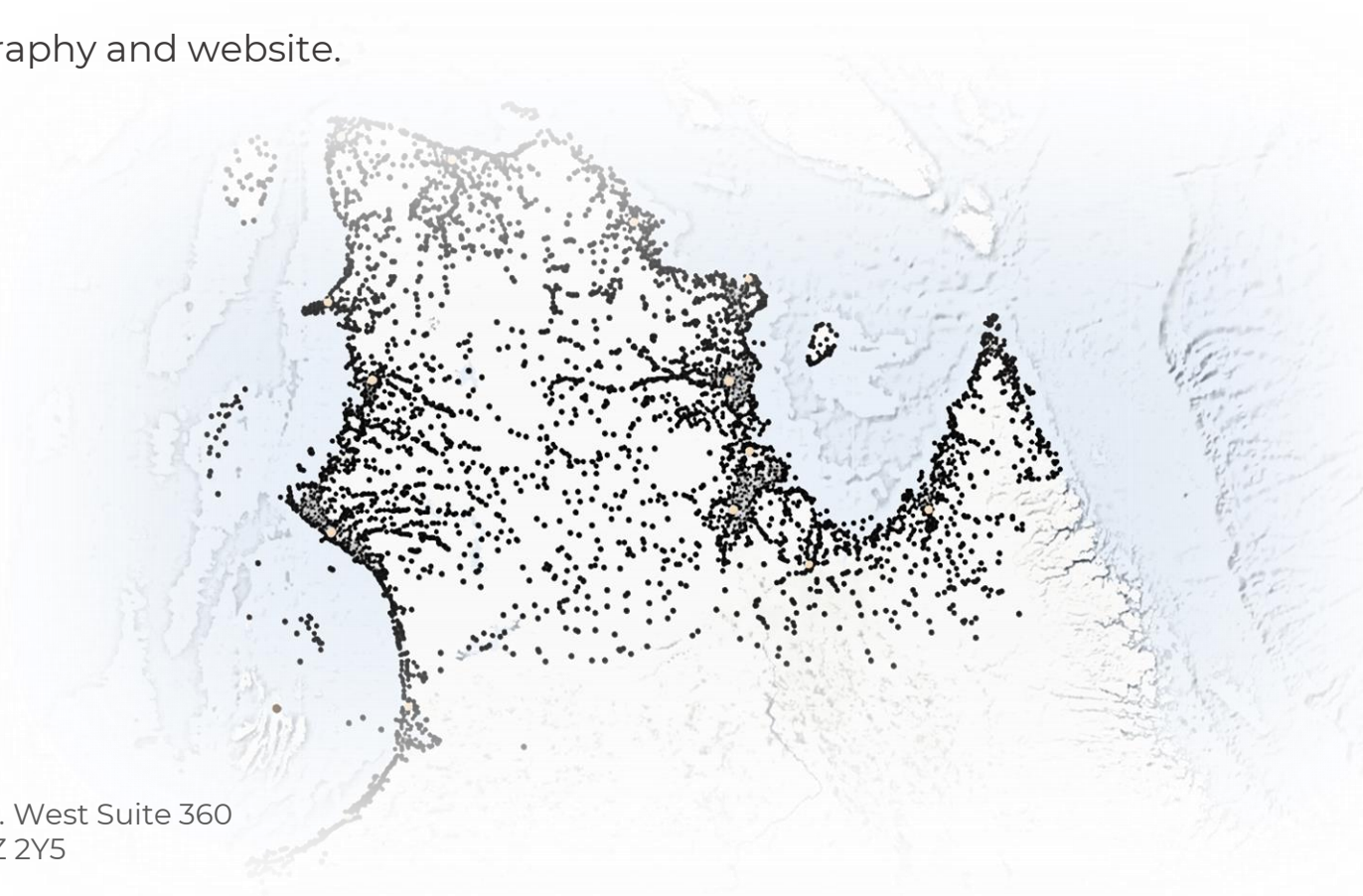
Robert Fréchette: general management.

Elsa Cencig: general coordination.

Nicolas Pirti-Duplessis: translation, place-names corrections and ranking.

Marta Benito: databases management, cartography and website.

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Avataq Cultural Institute

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