

Vyšší rostliny v Arktidě Špicberky / *Svalbard*

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OFAR ÚEB PŘF MU

Sources

<http://cruise-handbook.npolar.no/en/svalbard/vegetation.html>

<http://www.arcticsystem.no/en/arctic-inc/vegetation.html>

<http://svalbardflora.no/index.php?id=312>

<http://www.severskelisty.cz/cesty/cest0217.php>

<https://www.spitzbergen.de/landeskunde-und-tipps/flora-gruenzeug.html>

<http://collections.dartmouth.edu/arctica-beta/html/EA06-09.html>



Špicberky/Svalbard

Encyklopedie Diderot definuje rozdíl takto:

Svalbard – norské autonomní území v Severním ledovém oceánu, správní středisko Longyearbyen. Zahrnuje souostroví Špicberky a Medvědí ostrov.

Špicberky, norský *Spitsbergen* – norské souostroví v Severním ledovém, součást norského autonomního území Svalbard.

Špicberky jsou ostrovy v Severním ledovém oceánu severně od evropské pevniny. Je to skupina ostrovů roztroušených mezi 74° a 81° severní šířky a mezi 10° a 34° východní délky. Zároveň je to nejsevernější část Norského království.

Vikingové, původní objevitelé ostrovů, jim dali název *Svalbard – Země studených břehů*.

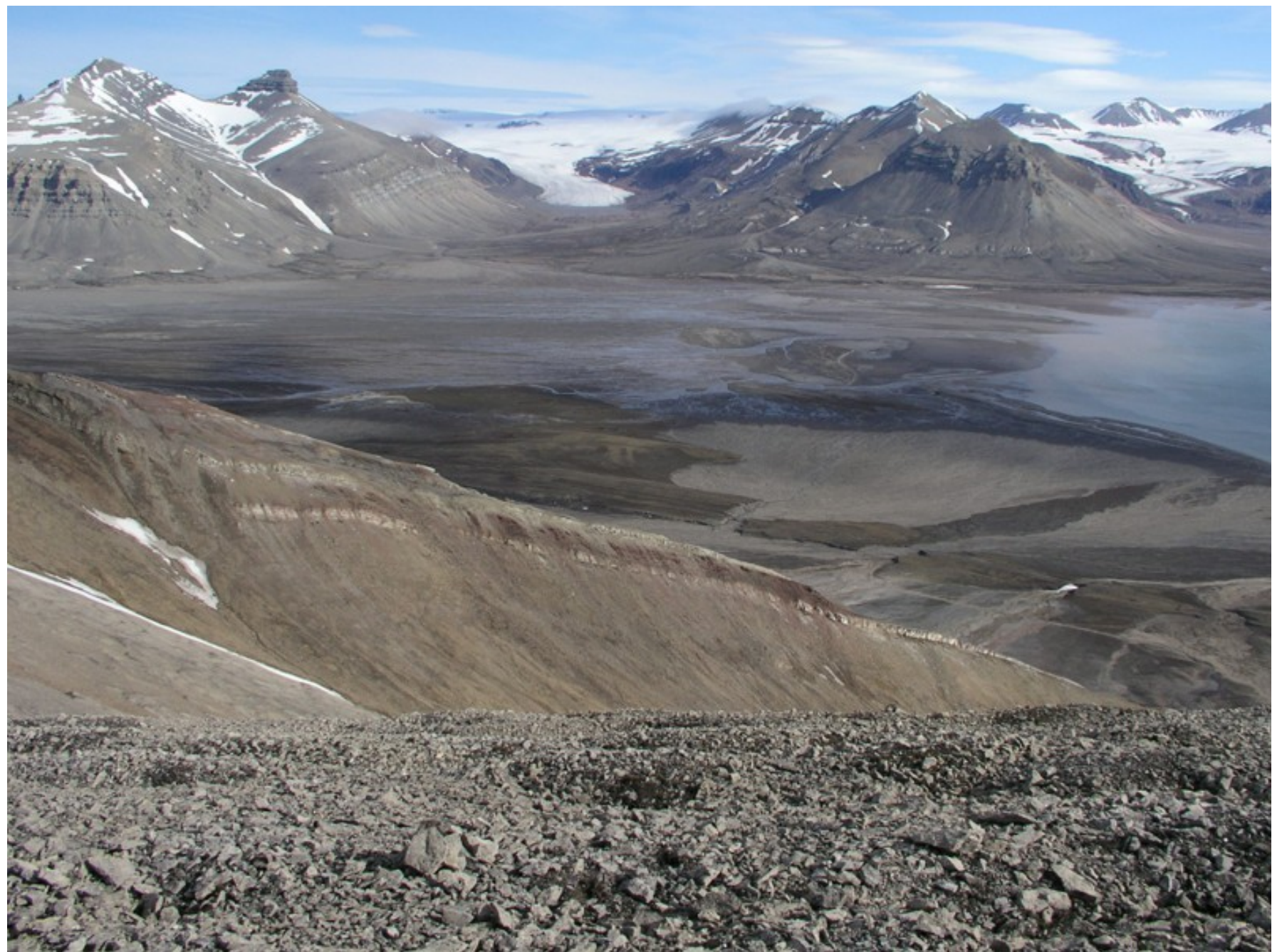
Norsko používalo a používá důsledně označení *Svalbard*, zatímco ostatní svět převzal spíše Barentsův název *Spitzbergen*, tedy Špicberky. Nesmí nás mýlit, že i Norové říkají jedné části souostroví Západní Špicberky (Spitsbergen).



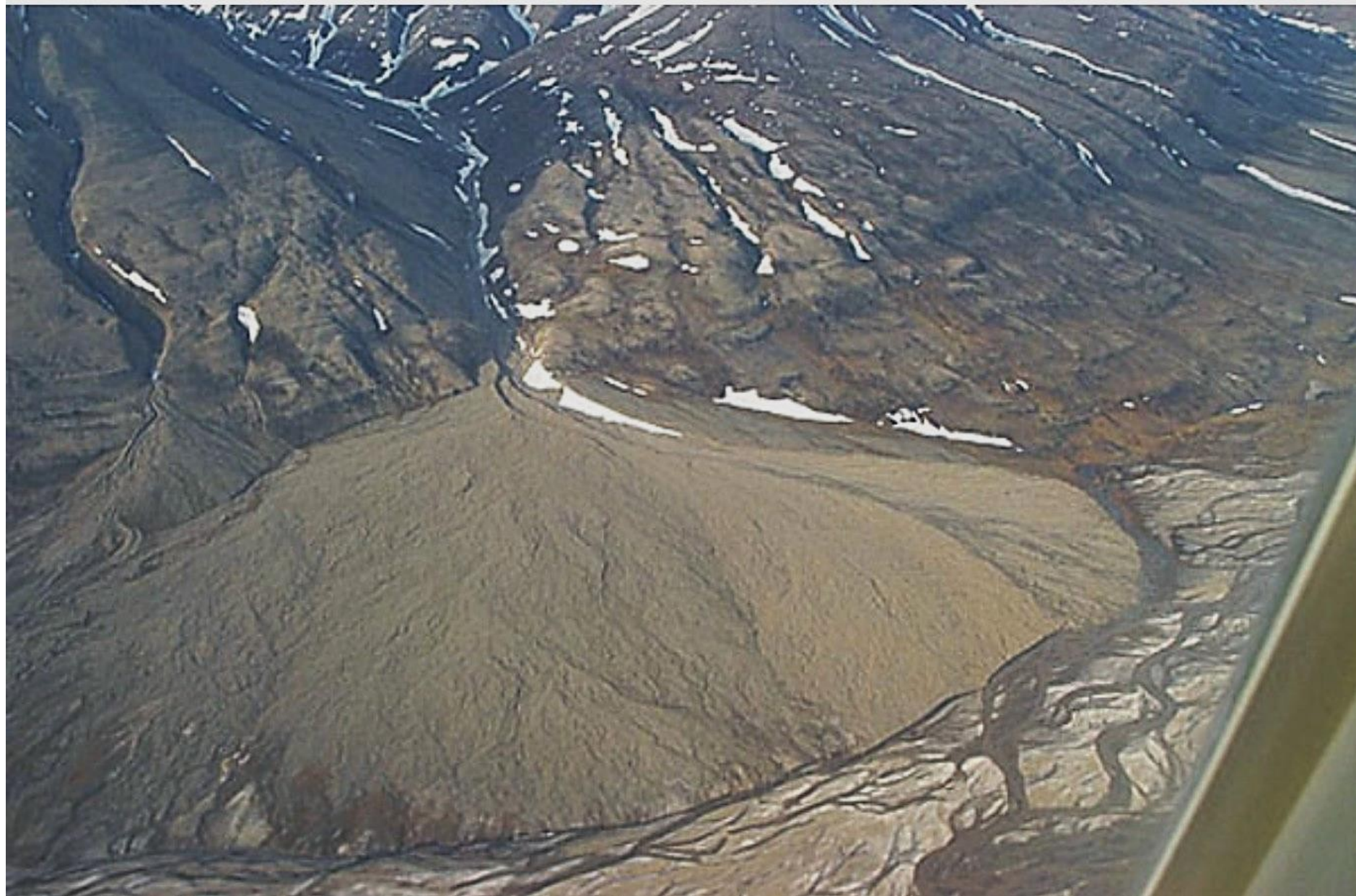




0 50 km



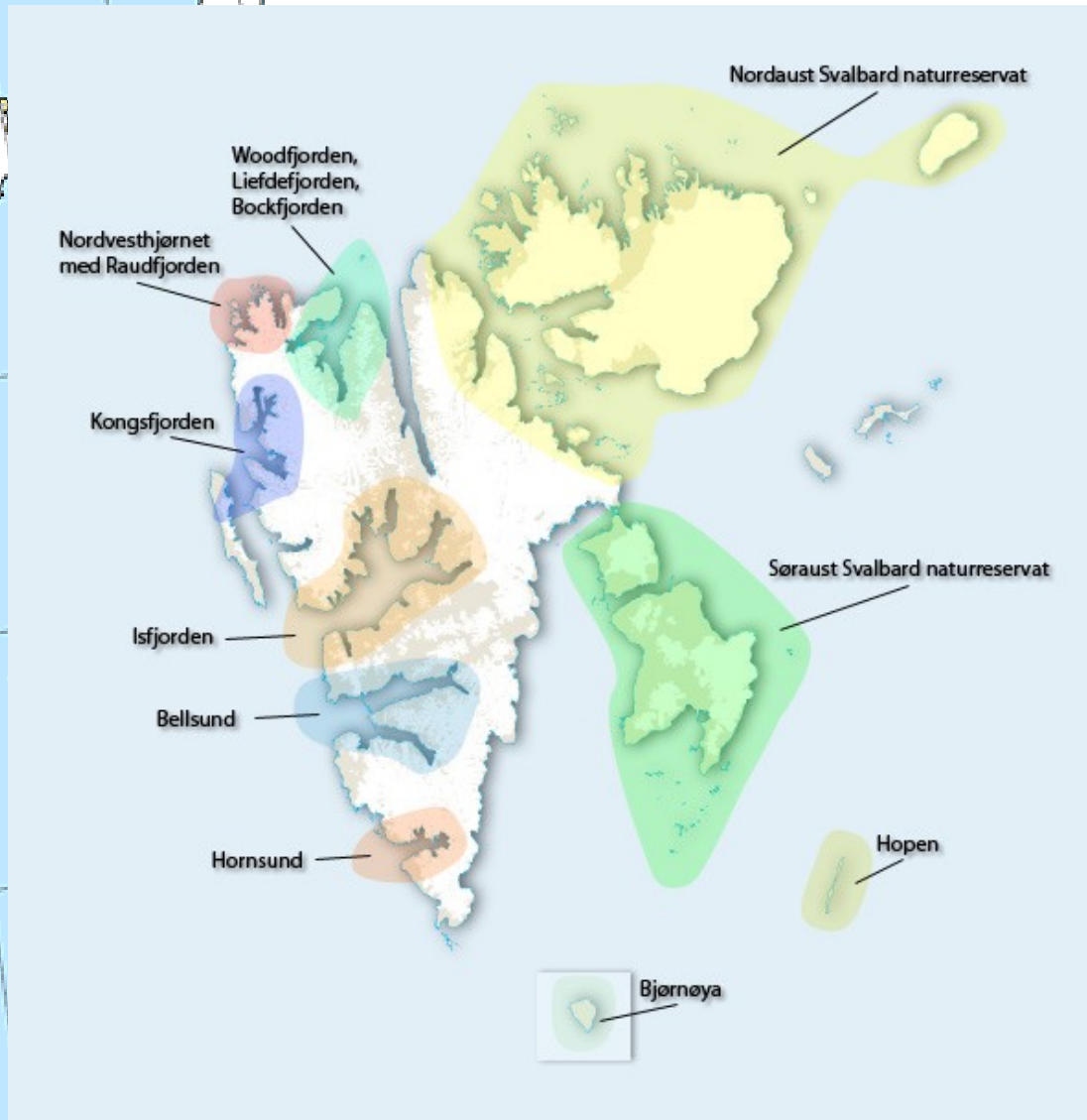
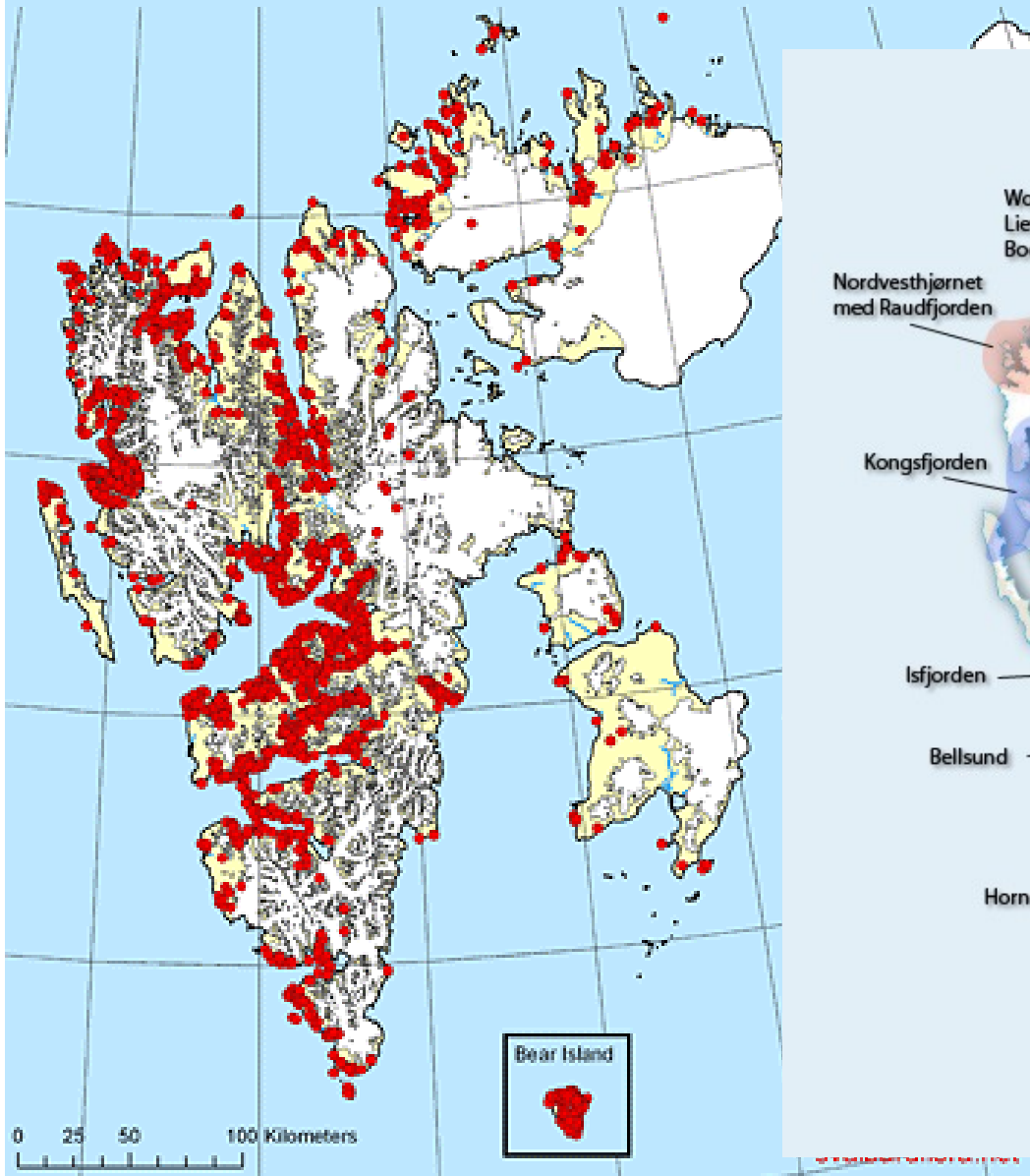
Obr. 8.2.2.5 Náplavový kužel, Svalbard, Norsko (Mount Holyoke College, 2004)



There are around 170 vascular plants, 370 mosses, 700 fungi, 600 lichens and 750 terrestrial and freshwater algae in Svalbard. The vegetation is well safeguarded by protected areas and because it is not permitted to pick any plants.

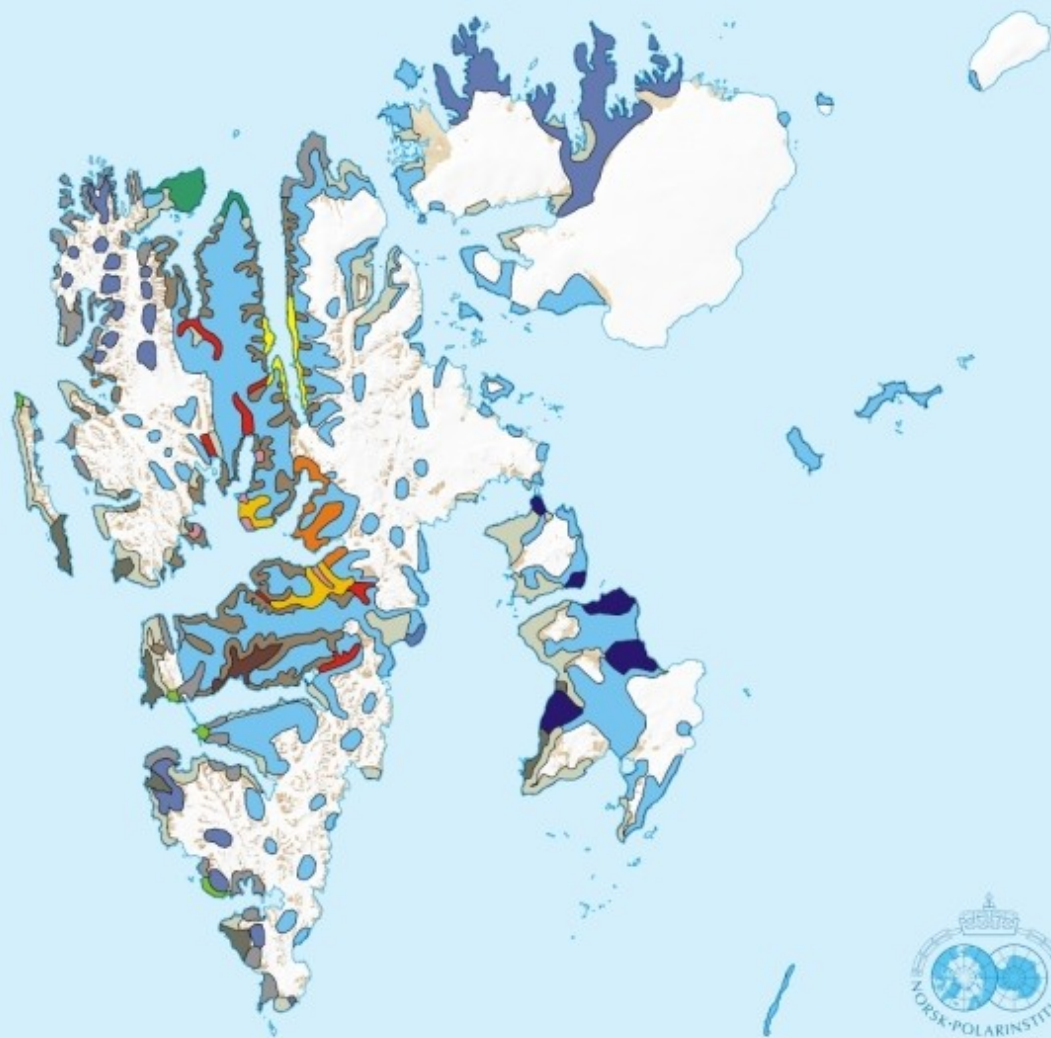
Nevertheless, 50 species were included on the Red List for Svalbard in 2010; 35 are endangered and 15 near threatened.

Total record of vascular plant species in Svalbard



SOME NUMBERS:

Total number of registred Vascular plants in Svalbard:	184
+ Introduced plants:	13.5
Pteridophyta - Ferns:	10
Magnoliophyta - Two embryonic leafs:	108
Liliopsida - One embryonic leaf:	54
Redlisted, total:	48
Redlisted, CR = Critically Endangered:	9
Redlisted, EN = Endangered:	11
Redlisted, NT = Near Threatened:	14
Redlisted, VU = Vulnerable:	14
Species with photo of seed:	9



100 km

Vegetation classes

- | | | | |
|--------------------------|--------------------|------------------------|---------------------------|
| 1) Pot. pulch. steppes | 5) Unstable sedim. | 9) Mesic Luz. conf. | 13) Pap. polar des. |
| 2) Dry dryas ridges | 6) Calc. fens | 10) Poa alp. snow beds | 14) Luz. conf. polar des. |
| 3) Mesic Dryas-Tom. nit. | 7) Acidic mires | 11) Desch. alp. mires | 15) Manured polar des. |
| 4) Cass. tetr. | 8) Mesic Luz. niv. | 12) Moss tundras | |

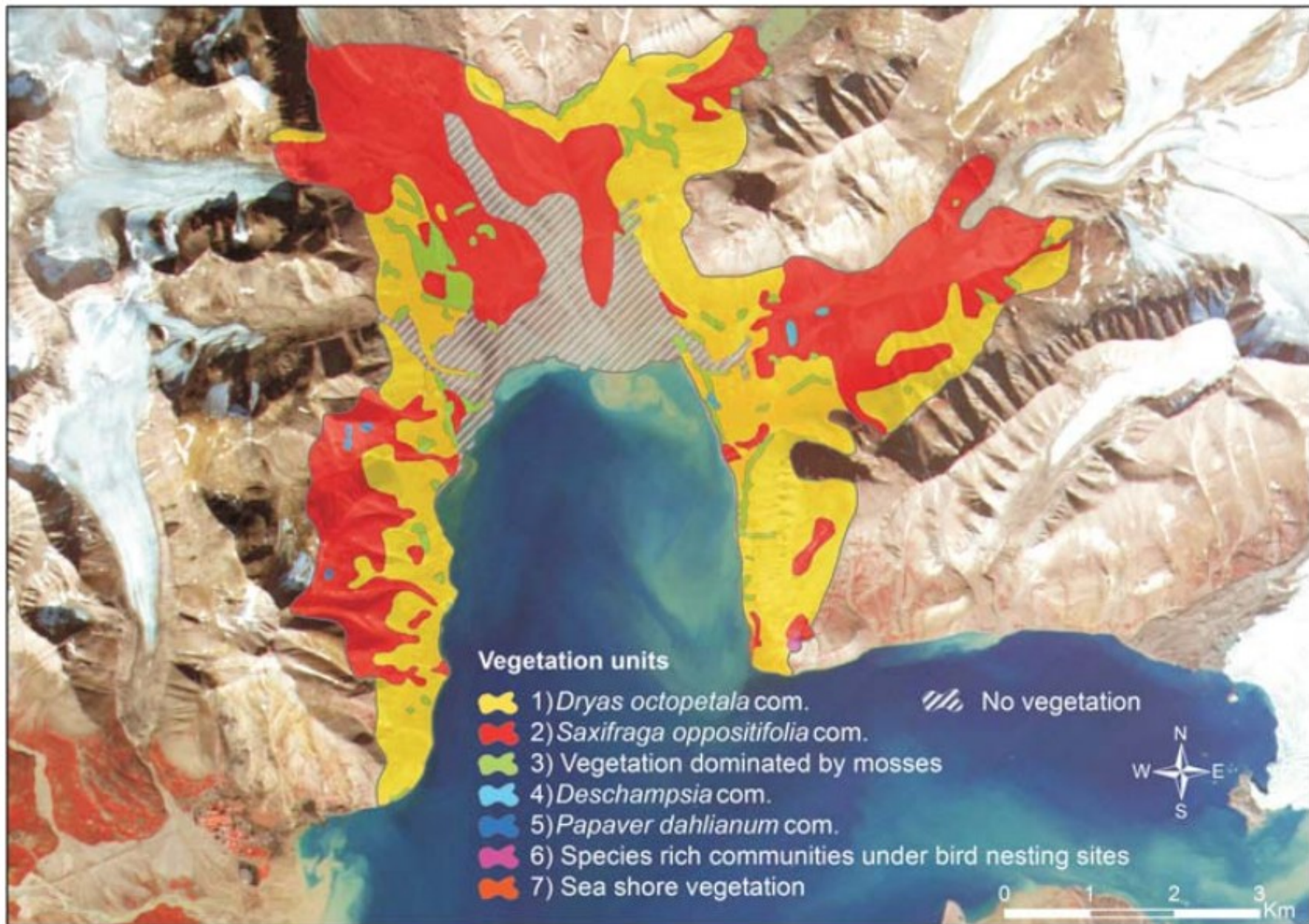
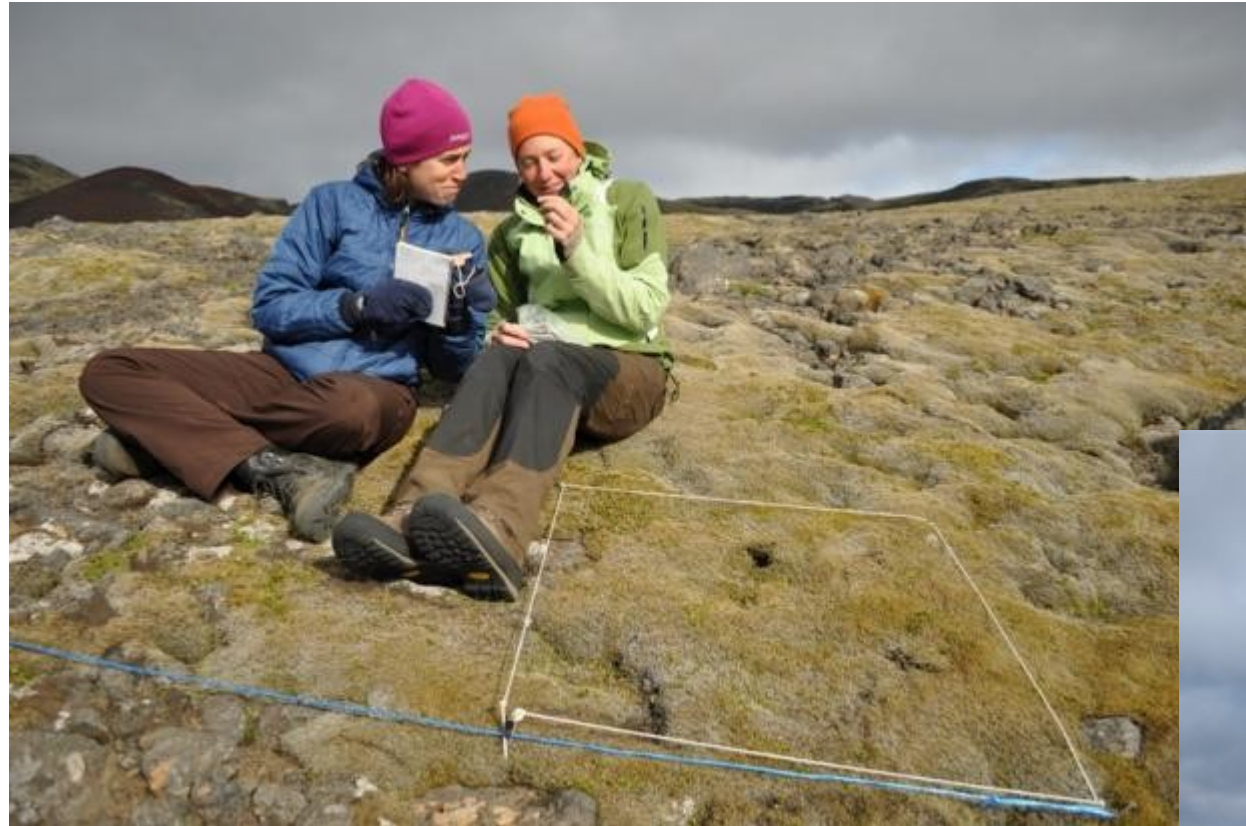


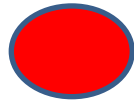
Fig. 1. A simplified vegetation map of the area around the Petuniabukta, central Svalbard, 2008.



UNIS
The University Centre in Svalbard



STUDY IN SVALBARD?
Application deadline: 15 April
www.unis.no



UNIS



Longyerbyen by night







Kurz polární ekologie 2016

21 Březen 2016

[Kurz polární ekologie 2016](#)

Geografický ústav PŘF MU ve spolupráci s Centrem polární ekologie PŘF JU pořádá

Kurz polární ekologie - Svalbard 2016

Podrobnější informace a podmínky pro zájemce o kurz jsou dostupné na adrese

<http://www.sci.muni.cz/geosciences/winter2016.html>

Realizace kurzu je podpořena projektem

EEA grants & Norway grants NF-CZ07-ICP-1-032-2014.



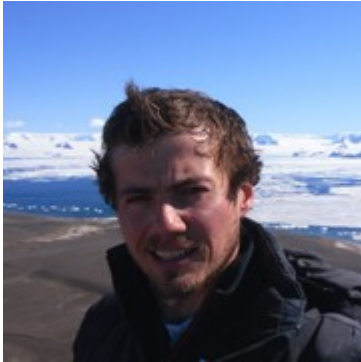




Luděk Sehnal

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Chemical Biology, Biochemistry, Analytical Chemistry
Master of Science

[**Cryoconite holes on frozen lakes as source of interesting extremophilic and extremotolerant organisms**](#), Article · Jan 2015

[Luděk Sehnal](#)

[**Diurnal changes in photosynthetic activity of the biological soil crust and lichen: Effects of abiotic factors \(Petuniabukta, Svalbard\)**](#)

Feb 2015 · Czech Polar Reports

[Luděk Sehnal](#) [Miloš Barták](#) [Peter Váczí](#)



Trnková, K., Barták, M. Desiccation-induced changes in photochemical processes of photosynthesis and spectral reflectance in *Nostoc commune* (Cyanobacteria, Nostocales) colonies from polar regions

[Phycological Research, 2017](#)



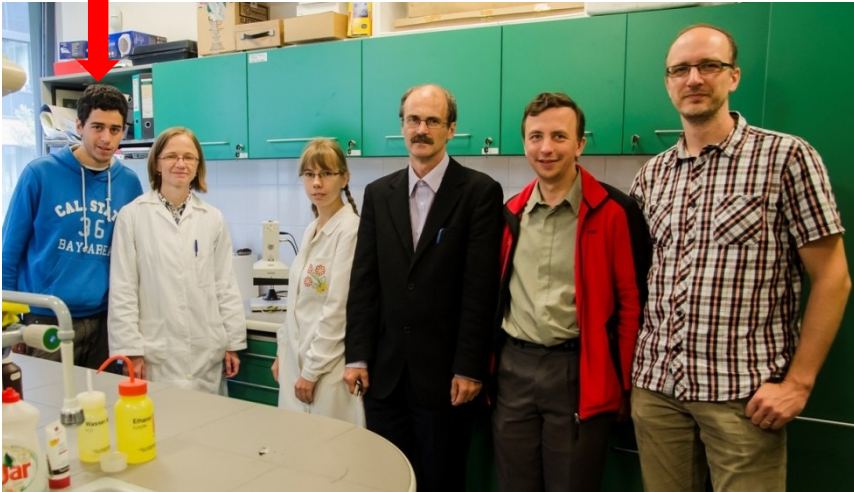
Jupa, R., Hájek, J., Hazdrová, J. Barták, M. (2012): Interspecific differences in photosynthetic efficiency and spectral reflectance in two *Umbilicaria* species from Svalbard during controlled desiccation

[Czech Polar Reports, 2012](#)



David Vilumbrales

Gema González Rubio
Projekt: Diversity of algal and cyanobacterial species forming microbial mats in Antarctic seepages







Dryas octopetala



Dryas octopetala



Dryas octopetala - Kapp Schultz
The flora of Svalbard - svalbardflora.net - Photo © 2006 Kjersti Wannebo Nilsen



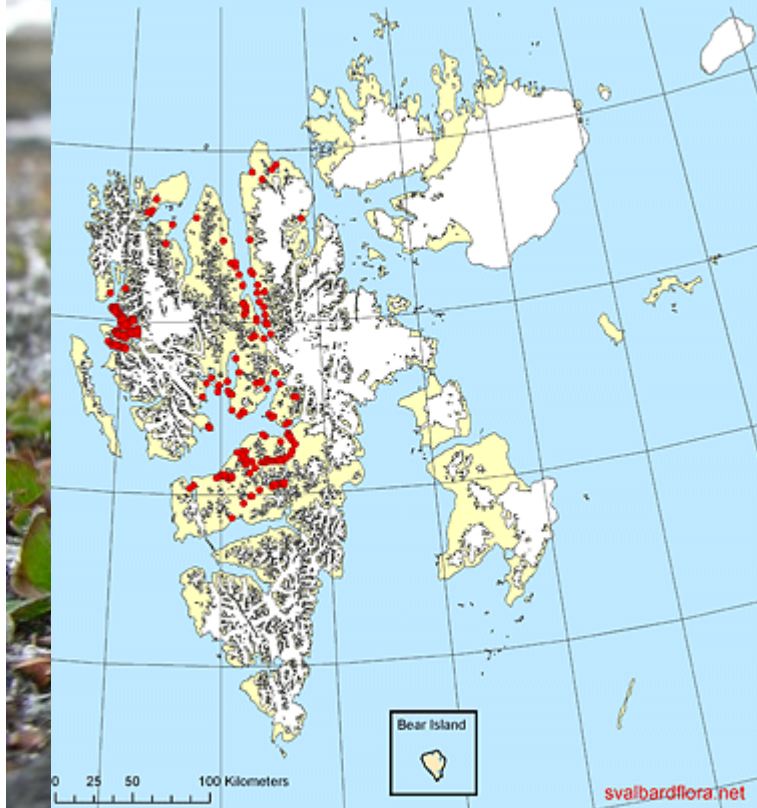


*Dryas
octopetala*



Silene uralensis

Cassiope tetragona (L.) D. Don spp. *tetragona*



Cassiope tertagona



Saxifraga oppositifolia



Silene acaulis



Fig. 5. Tufts of *Saxifraga aizoides* on alluvia in the Mimerelva river valley.





Pedicularis dasyantha



Colobanthus quitensis - Antarktida





Saxifraga hyperborea - Lady Franklinfjorden

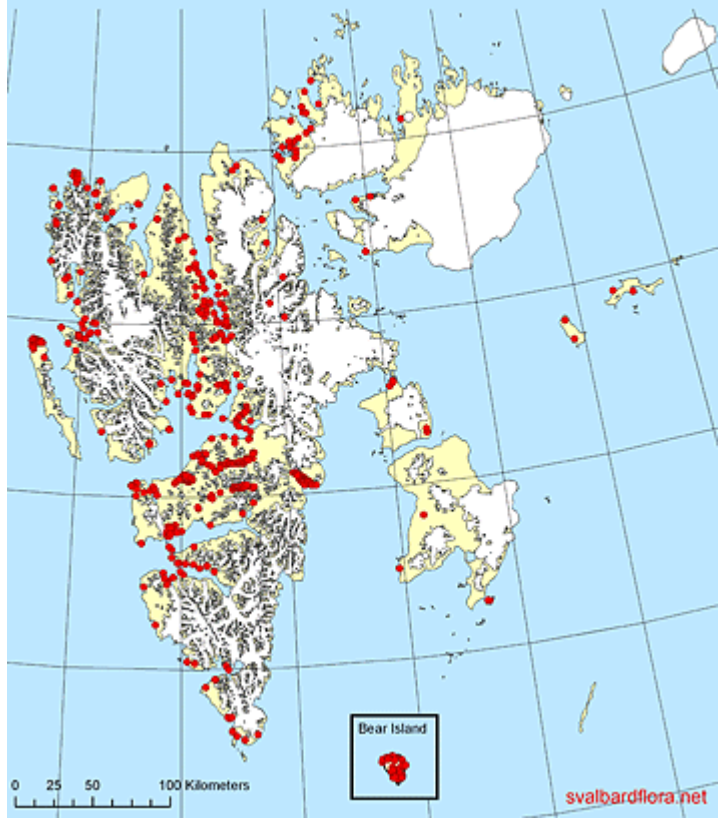
Salix herbacea L.



Salix herbacea - Rålstranda



Salix polaris Wahlenb.



Salix polaris - Ossian Sarsfjellet



Luzula wahlenbergii Rupr.



Luzula wahlenbergii - Longyearbyen

The Flora of Svalbard - svalbardflora.net

Photo © 2007 Bjørn Erik Sandbakk



Carex ursina Dewey









Pyramiden, Svalbard







Fig. 8. Anthropogenic grasslands in center of Pyramien town.

Characteristics of alien plant species recorded in the Svalbard settlements of Barentsburg, Longyearbyen and Pyramiden in August 2011. The origin (Eu = Europe, As = Asia, NA = North America and Af = Africa) and the characteristics (taxon, family and life history) is based on the species description in Norsk flora (Lid et al. 2005). Abundance is described based on alien plant presence, amounts and distribution in field and ranged from low to high.

Taxon	Family	Locality	Life history	Origin	Abundance
<i>Achillea millefolium</i>	<i>Asteraceae</i>	Barentsburg	Perennial	Eu,As	High
<i>Agrostis canina</i>	<i>Poaceae</i>	Barentsburg	Perennial	Eu,As,NA	Low
<i>Anthriscus sylvestris</i>	<i>Apiaceae</i>	Barentsburg	Perennial	Eu,As,Af	High
<i>Barbarea vulgaris</i> var.					
<i>Arcuata</i>	<i>Brassicaceae</i>	Barentsburg/Pyramiden	Perennial	Eu,As	High
<i>Cerastium fontanum</i>	<i>Caryophyllaceae</i>	Longyearbyen	Perennial	Eu,As	Low
<i>Deschampsia cespitosa</i>	<i>Poaceae</i>	Barentsburg/Pyramiden	Perennial	Eu,As	Medium
<i>Epilobium montanum</i>	<i>Onagraceae</i>	Barentsburg	Perennial	Eu,As	High
<i>Festuca rubra</i>	<i>Poaceae</i>	Longyearbyen	Perennial	Eu,As	High
<i>Poa pratensis</i>	<i>Poaceae</i>	Barentsburg/Longyearbyen	Perennial	Eu,As,NA	Medium
<i>Polygonum aviculare</i> ssp.					
<i>Aviculare</i>	<i>Polygonaceae</i>	Longyearbyen	Annual	Eu,NA	Low
<i>Ranunculus acris</i>	<i>Ranunculaceae</i>	Barentsburg/Longyearbyen	Perennial	Eu,As	High
<i>Ranunculus repens</i>	<i>Ranunculaceae</i>	Barentsburg	Perennial	Eu,As	Medium
<i>Rumex longifolius</i>	<i>Polygonaceae</i>	Barentsburg	Perennial	Eu,As	Medium
<i>Taraxacum sect. ruderalia</i>	<i>Asteraceae</i>	Barentsburg/Pyramiden	Perennial	Eu,As	High
<i>Trifolium repens</i>	<i>Favaceae</i>	Longyearbyen	Perennial	Eu,As,Af	Low
<i>Urtica dioica</i>	<i>Urticaceae</i>	Barentsburg	Perennial	Eu,As,Af	High

Invazní druhy





Anthriscus sylvestris - Barentsburg








Cow parsley

=

Kerblík lesní



Bioclimate subzone

-  Glaciated
-  Subzone A
-  Subzone B
-  Subzone C
-  Subzone D
-  Subzone E
-  Non-Arctic
-  Study location

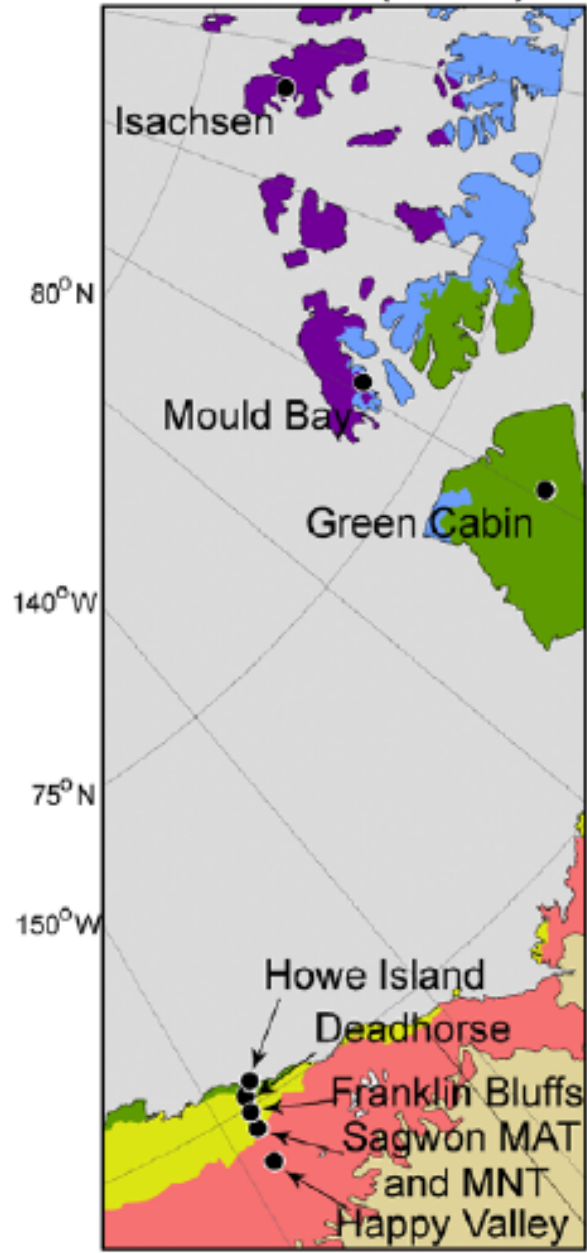
0 125 250 500 km

(a) Circumpolar Arctic



0 1250 2500 5000 km

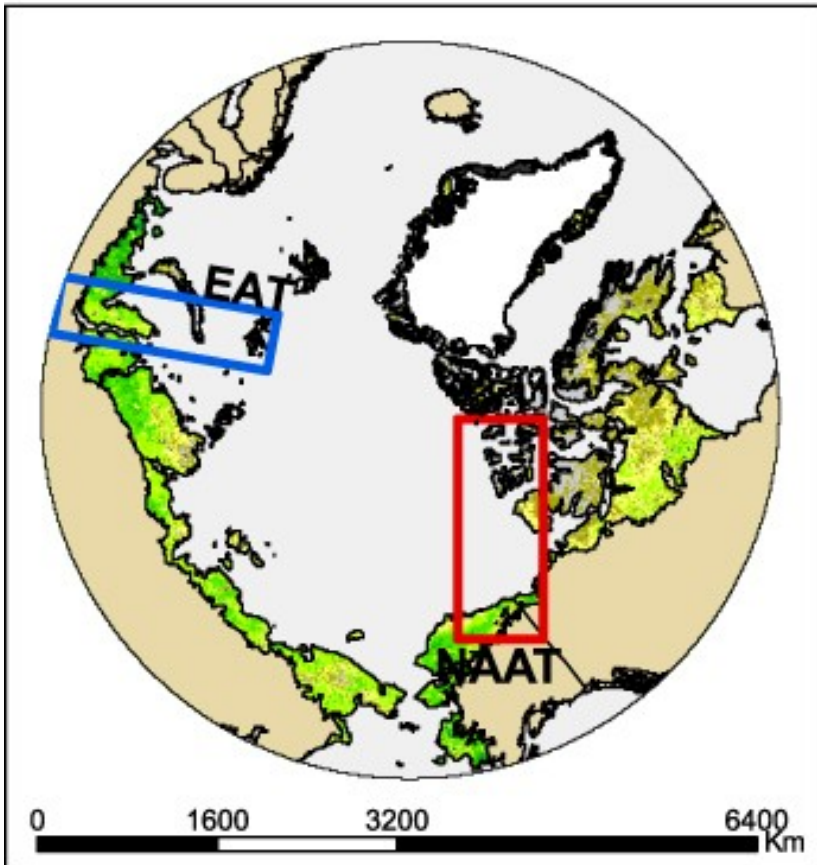
(b) North America Arctic Transect (NAAT)



(c) Eurasia Arctic Transect (EAT)

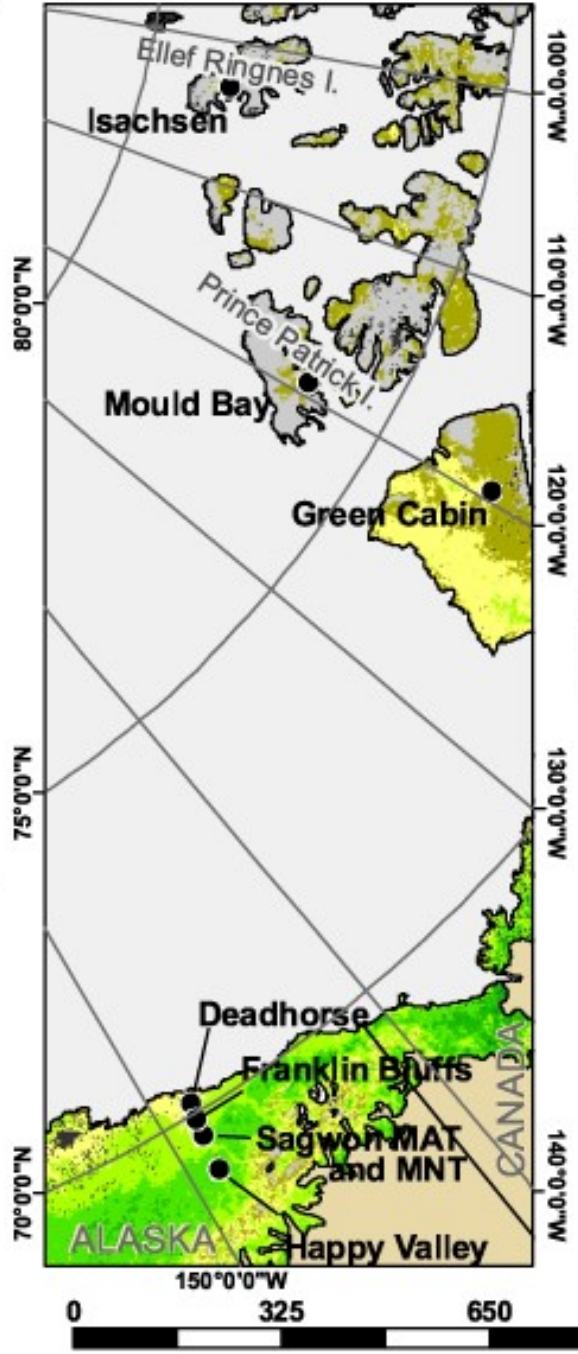


Circumpolar Arctic



NDVI	Above Ground Plant Biomass
<0.03	<50 g/m ²
0.03 - 1.14	50 - 100 g/m ²
0.15 - 0.26	101 - 250 g/m ²
0.27 - 0.38	251 - 500 g/m ²
0.39 - 0.50	501 - 1000 g/m ²
0.51 - 0.56	1001 - 1500 g/m ²
0.57 - 0.62	1501 - 2000 g/m ²
>0.62	>2000 g/m ²
	Glaciated

North America Arctic Transect

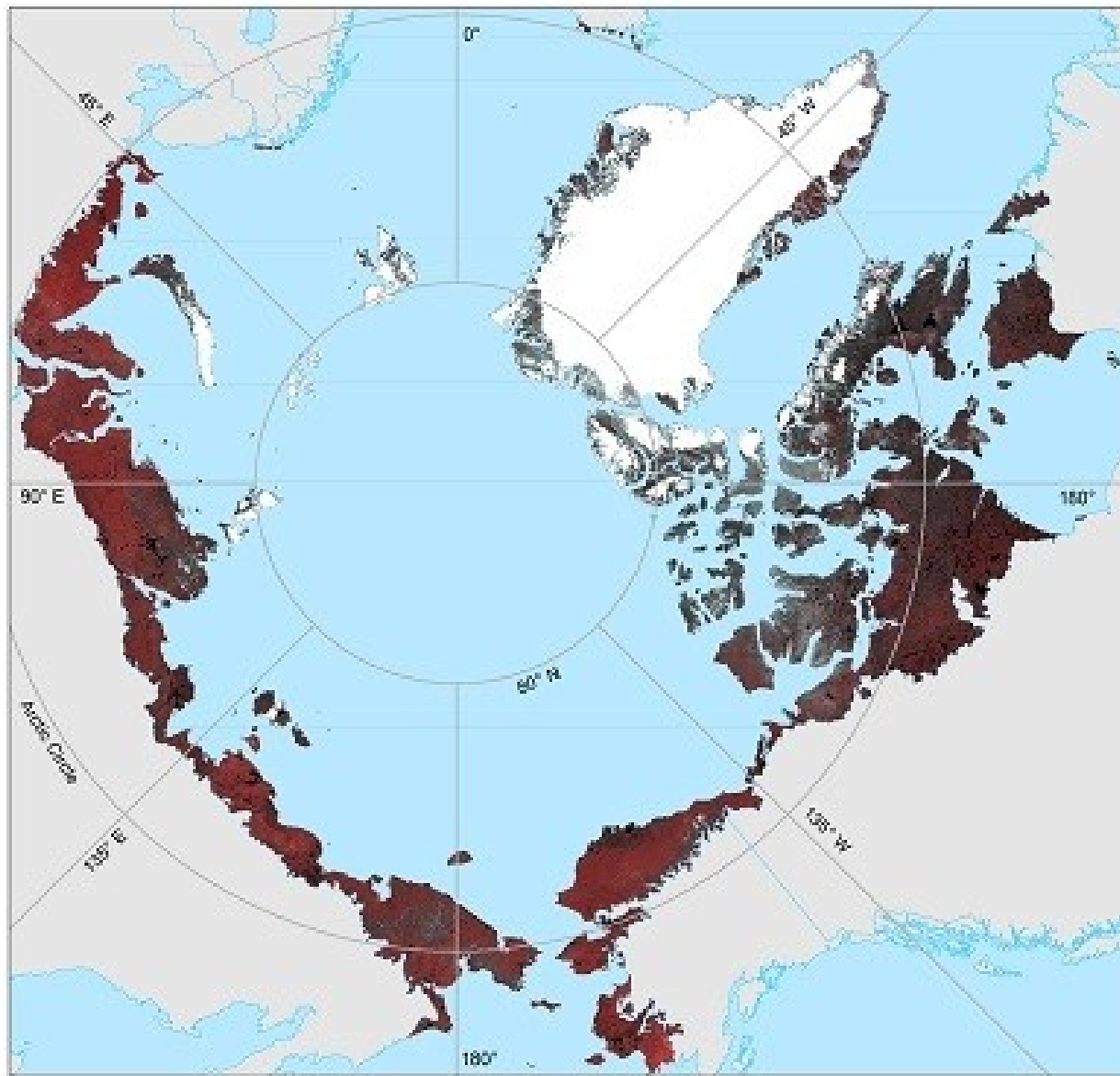


Eurasia Arctic Transect



Circumpolar Arctic Vegetation Map

AVHRR Derived False Color Infrared Image



AVHRR Derived False Color Infrared image

This is a false color infrared image of the Arctic region, north of 60°N, during maximum greenup. The image combines data from the summers of 1993 and 1995, which were relatively warm years with minimum snow and cloud cover. Red tones are areas of dense vegetation; blues and greys are sparsely vegetated; black areas are water and white areas are ice.

AVHRR data were obtained from the USGS, EROS Alaska Field Office as 5i-weekly composite images. The circumpolar map was produced by selecting the pixels that had the maximum reflectance during the period of 11 July through 31 August for the years of 1993 and 1995.

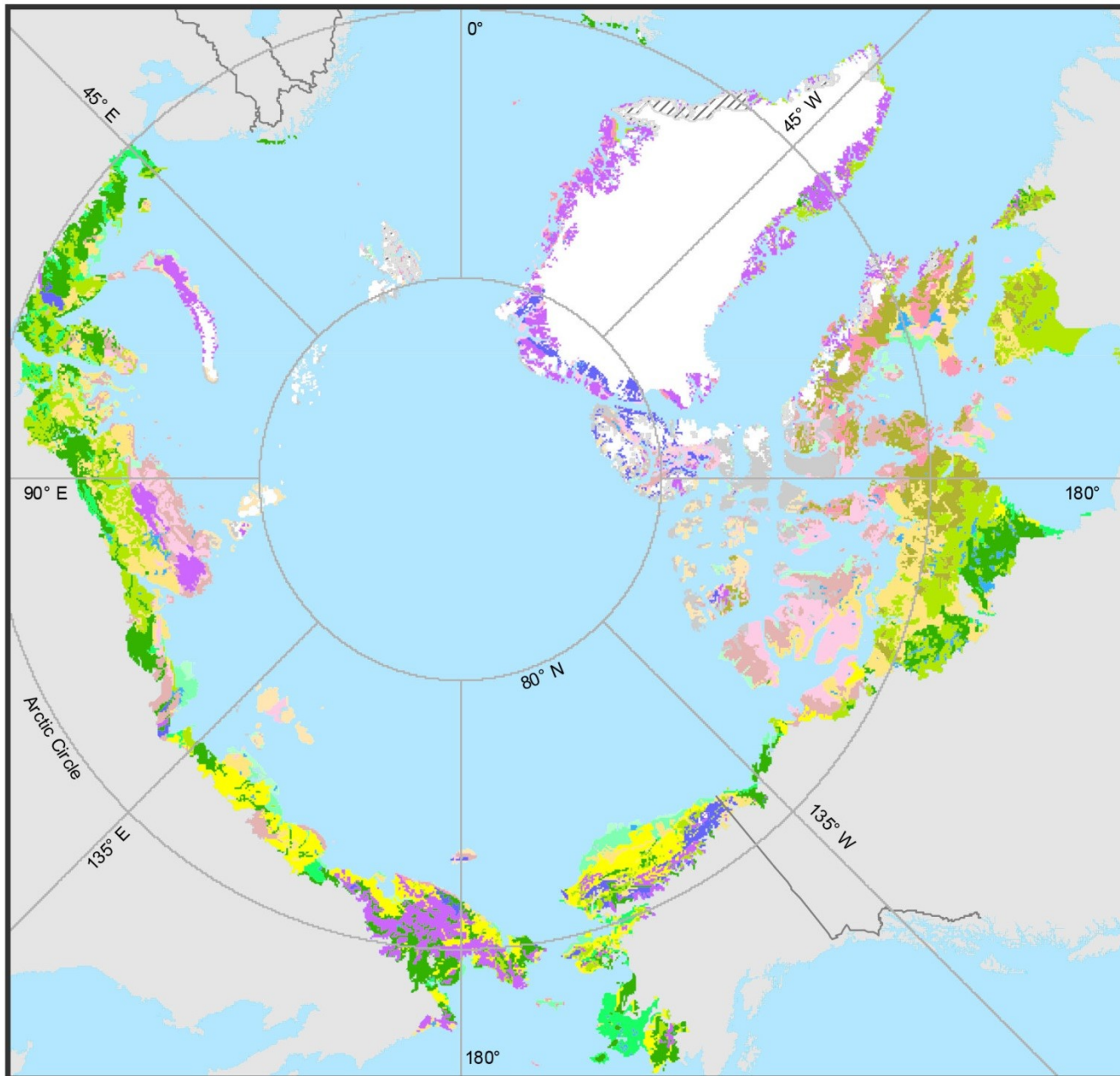


Lambert Azimuthal Equal Area Projection
Longitude of origin: -150°, Latitude of origin: 90°

Map is designed to print at full scale on both B (11 x 17") and A3 (297 x 420 mm) sized paper. The outer most text line measures 260 x 350 mm when the map is plotted at full size.

<http://www.arcticdata.org/>

Circumpolar Arctic Region Vegetation



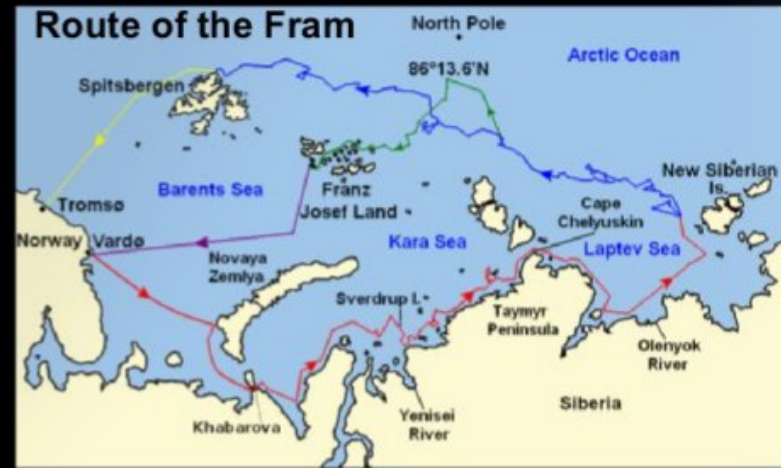
- Cryptogam, herb barren
- Cryptogam barren complex (bedrock)
- Noncarbonate mountain complex
- Carbonate mountain complex
- Prostrate dwarf-shrub, herb tundra
- Prostrate/Hemiprostrate dwarf-shrub
- Rush/grass, forb, cryptogam tundra
- Graminoid, prostrate dwarf-shrub
- Nontussock sedge, dwarf-shrub, moss
- Tussock sedge, dwarf-shrub, moss
- Erect dwarf-shrub tundra
- Low-shrub tundra
- Sedge/grass, moss wetland
- Sedge, moss, dwarf-shrub wetland
- Sedge, moss, low-shrub wetland
- ▨ Nunatak complex
- Glaciers
- Water
- Lagoon
- Non-Arctic Areas



Lambert Azimuthal Equal Area Projection
Longitude of origin: -180°, Latitude of origin: 90°N

Derived from: CAVM Team. 2003. Circumpolar Arctic Region Vegetation Map. (1:7,500,000 scale), Conservation Planning and Assessment (CPA) Report No. 1. U.S. Fish and Wildlife Service, Anchorage, Alaska.

Fridtjof Nansen and the Fram



- Fridtjof Nansen discovered the Transpolar drift by allowing his ship, the 'Fram', to freeze into the ice off Siberia (1893-1896). It escaped the sea ice north of Svalbard three years later.

Nansen leaving the Fram during epic attempt to reach the pole.



Images: Nansen, Courtesy of George Grantham Bain Collection (Library of Congress); Fram, Nansen's book *Farthest North: Voyage and Exploration of the Fram 1893-96*; map and lower right photo from http://en.wikipedia.org/wiki/File:Fridtjof_Nansen_LOC_03377u-3.jpg

Yurtsev's floristic division of the Arctic



- Divides the Arctic into 6 floristic provinces and 22 subprovinces
- Separates oceanic and continental areas of the Arctic.

Island of cushion forms: from glacier to plants to rocks



