

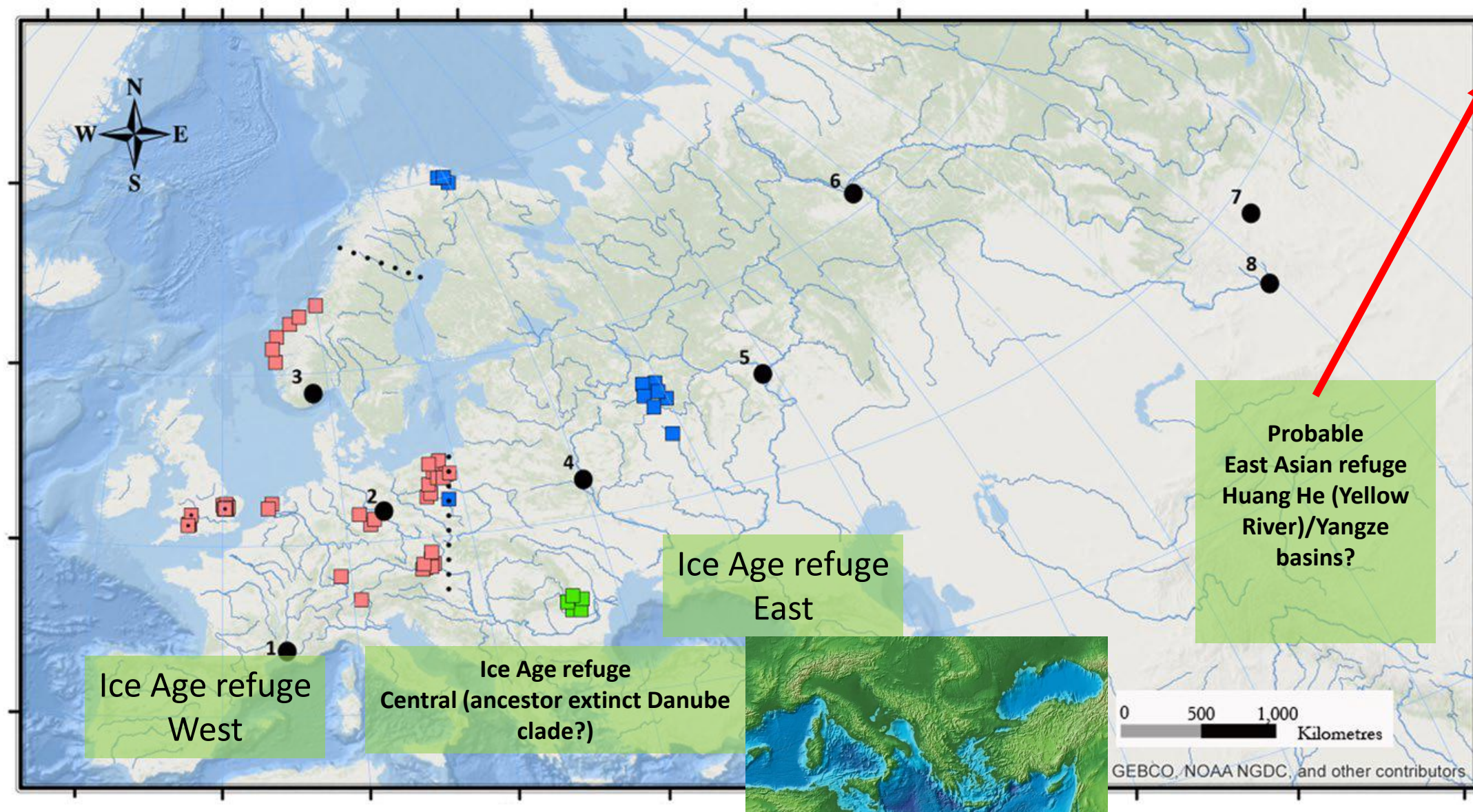
# Eurasian beaver population and distribution



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Ice Age:  
mutually  
isolated  
refugia in  
southern  
Eurasia  
(inferred  
from  
fossil  
DNA)

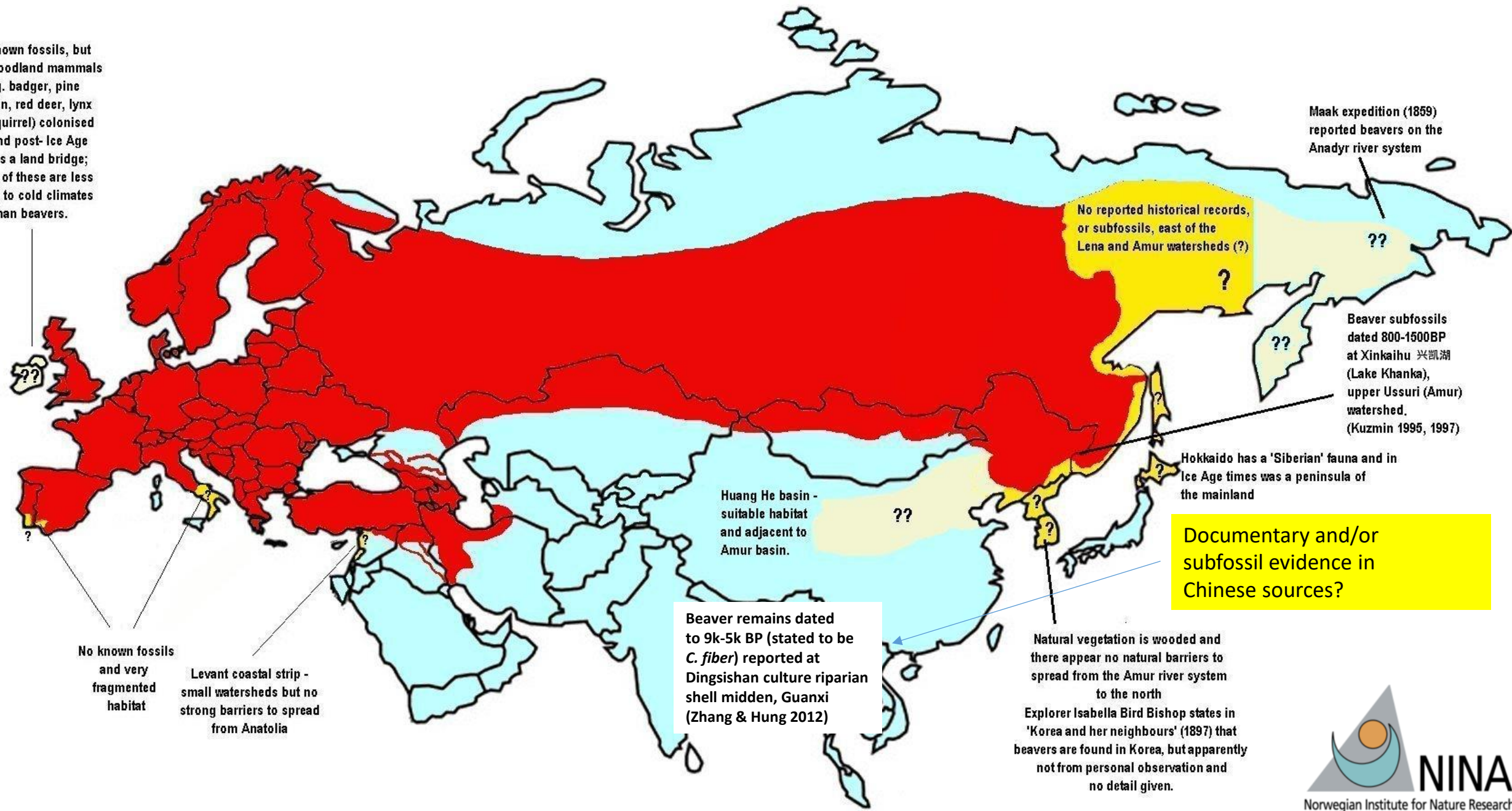


**Fig. 1 in Marr et al 2018.** Map of sampling localities for ancient *Castor fiber* individuals. The Western clade (pink) and Eastern clade (blue) had two post Ice-Age contact zones. A now extinct clade existed in the Danube Basin (green). Approximate locations of extant relict populations (1 to 8) from where modern *C. fiber* haplotypes derive are shown in black. (NB that no data for ancient DNA east of European Russia is as yet available; the furthest east living relict populations, 7&8, in the headwaters of the Yenesei and in western Mongolia/north Xinjiang, are in the 'Ice Age refuge East' clade)



# Probable post-Ice Age distribution of beavers in Eurasia

No known fossils, but many woodland mammals (e.g. badger, pine marten, red deer, lynx, red squirrel) colonised Ireland post-Ice Age across a land bridge; some of these are less robust to cold climates than beavers.







Chapter on beavers, Bestiary, Iran, Maragheh, 1297-1298 or 1299-1300. The Morgan Library & Museum.



Woodcut from Hortus Sanitatis, (Garden of Health), printed by Johann Pruss in Strasbourg in 1497.



"In the continent of Europe, in the country of Italy, there is a river called 'Ba-duo' (Padus or Po). At the river's mouth where it enters the sea lives the 'ban-di dog' (the beaver). By day it hides in the water, at night it lies on dry land. Its fur varies in color, black being most valued. It can gnaw trees, its bite as sharp as a knife."

*Qing Encyclopedia, 1726, citing Jesuit informants*



**C**ASTOR animal quadrupes est amphibium: Latini fibrum, & ut Servius placet canem Ponticum vocant; Græcis nominatur castor, & *καστορέμιον*, id est, canis fluvialis, ut apud Sylviaticum legimus. Italis, biutaro: uel beuero: Gallis, bieuere, quoniam Brauola Gallos Castoris nomine retinere scribit; id quod Hispanos fecisse puto: fieri tamen potest ut Galli etiam in regionibus quibusdam retinuerint. In Mattheoli Italica Dioscoridis translatione fibrus ipse il castoreo uocatur. Germanis biber: Anglis beuer: Illis biber: quæ omnia a fibro uoce Latina deducta esse prima fronte statim apparet. Sylviaticum plurima passim castoris & castorei in Arabum libris nomina recenset, quorum multa scriptura solum & orthographia differunt, ego omnia utcumque corrupta adnumerabo. Albedustier, castoreum: ego ipsum castorem potius intelligo, nam pro testiculis uel iune uel similem uocem addere solent: Ium de bedust, luna da badustier: Angul de beldustor: Guidelarus: Quibar: In de bidistier: Zun de bedustier: luna da bauaster: Iune de bufor: Gen de bedustier. Auicenna habet Giēdedestiar, aliās Giēdibidestiar. Reperio & alia quædam uocabula apud Sylviaticum & alios, quæ inter se tum a superioribus non parum differunt: ut, Calcubas, Amphima, uoce corrupta forsitan ab amphibio: & Anfinia similiter, nam cetera Græcam Sylviaticus exponit: item Achiam, Anchian, Anchiani, Antin algil, Afuschelhar, Albertus lamyekyz barbaram uocem, ex Auicenna puto, castorem interpretatur: quæ uox fortassis Illyrica est. Nam Polonis dama lanij dicitur, cuius diminutivum lanijska. Castoreum testiculus est animalis, quod castor appellatur uel deſt, Platearius. Ex his tot scribendi modis quin maior pars corrupta sit, dubium non est: ego quos quibus præferam incertus sum. Kipod Hebraicæ uocem Eſaia 34. & alibi in Sacris literis non castorem, ut cuidam uidetur, sed echinum terrestrem significare in eius historia demonstrabo. *אנאקאח* Leuitici cap. 11. aliqui ericium, alij hircum interpretantur, aut thor concordantiarum reptile uolans. R. Salomon alibi hericium, alibi בריה exponit, id est fibrum, Gallica lingua (qua is uti solet) bieuere dictum: sic etiam Munſerus legit. Non placet legi uicere, quod id uocabulum lingua Gallica R. Salomoni familiari, aliter efferatur.

Differunt a lutra fibræ cauda solum: cetero pilus utriusque pluma mollior: utriusque aquaticum, Plinius. Sunt qui fibrum meli comparent: sed corpus ei longius tribuunt, & pilum subtiliorem. Pilos habet pulchros.



back the florid leaping on the Bear, which pulch at his guts with her fore-feet-nails, and is by the heels of the Horse upon his head. Also Bears fear a Sea-calf, and will not fight with them if they can be avoided, for they know they shall be overcome.

Great is the fierceness of a Bear, as appeareth by holy Scripture. *Hof. 13. I will meet them as a Bear robbed of her whelps* (saith the Lord) and will tear in pieces their forward bears: And *Chulal tellech Abſalon*, 2 Sam. 17. *Thou knowest that thy Father and the men that be with him be most valiant and fierce, like a full Bear robbed of her Whelps*: for a full Bear is more courageous than a male.

There is a filthy Nation of men called *Taisels*, who are given unto a Sodomitical buggery, to commit uncleanness with man, and especially with young boys; but if any of them take a wilde Bore, or kill a Bear, he shall be exempted from this kind of beastly impudency. *Helioſabab* was wont to shut up his drunken friends together, and suddenly in the night would put in among them Bears, Wolves, Lyons, and Leopards, muzzled and disarmed, so that when they did awake, they should finde such chamber-fellows, as they could not behold (if darkness did not blind them) without singular terror; whereby many of them fell into swoonings, fittickes, extasie and madnes.

*Ænem Sil.*

*Sacres obser-  
uatio de Beas,  
Columella.*

*Armedul.  
Vires medi-  
cinal.*

There are many natural operations in Bears. *Piny* reporteth, that if a woman be in fore travail of child-birth, let a stone or arrow which hath killed a Man, a Bear or a Bore, be thrown over the house wherein the woman is, and she shall be eased of her pain. There is a small worm called *Folsee*, which eateth the Vine-branches when they are young, but if the Vine-fickles be anoynted with Bears blood, that worm will never hurt them. If the blood or grease of a Bear be set under a bed, it will draw unto it all the fleas, and so kill them by cleaving thereunto. But the vertues medicinal are very many: and the first of all, the blood cureth all manner of Bunches and Apoplems in the flesh, and bringeth hair upon the eye-lids: the bare place be anoynted therewith.

The fat of a Lyon is moist hot and dry, and next to a Lyons, a Leopards; next to a Leopards, a Bears; and next to a Bears, a Bulls. The later Physicians use to cure convulsed and distracted parts, spots, and tumors in the body. It also helpeth the pain in the loyns, if the sick part be anoynted therewith, and all Ulcers in the legs or thins, when a Plaster is made thereof with Bole-Armorica. Also the Ulcers of the feet, mingled with Allom. It is soveraign against the falling of the hair, compounded with wilde roses. The *Spaniards* burn the brain of Bears when they die in any publick sports, holding them venomous, because being drunk, they drive a man to be as mad as a Bear; and the like is reported of the heart of a Lyon, and the brain of a Cat. The right eye of a Bear dried to powder, and hung about childrens necks in a little bag, driveth away the terror of dreams, and both the eyes whole, bound to a mans left arm, causeth a quartan Ague.

The Liver of a Sow, a Lamb, and a Bear put together, and trod to powder under ones shoes causeth and defendeth Cripples from inflammation: the gall being preserved and warmed in water, delivereth the body from cold, when all other medicine faileth. Some give it mixt with water, to them that are bitten with a mad Dog, holding it for a singular remedy, if the party can fast three days before.

It is also given against the Pallie, the Kings Evil, the Falling-sickness, an old Cough, the Inflammation of the Eyes, the running of the Ears, the difficulty of Urine, and delivery in Child-birth, the Hemorrhoids of the Back. The bones in a Perenne are good against the Falling-euill, and the Pallie; and that women may go their full time, they make Amulets of Bears nails, and cause them to wear them all the time they are with child.

#### Of the BEAVER Male and Female.

*Of the words.  
Sylviaticum.*

*The notation  
of fibrum from  
the Latine.  
The notation  
of the Greek  
word Castor.  
What men-  
tion of Beas a  
Beaver is.*

A Beaver is called in *Greek*, *Castor*; in *Latine*, *Fiber*; in *Italian*, *Bicarro*, or *Biverno*, and *Castoreo*; in *Spanish*, *Castor*; in *French*, *Bicars*, and sometime *Castor*; in *Ungrian*, *Bols*; in *German*, *Biber*; all which words at the first sight seem to be derived from the *Latine*: There is no certain word for it in *Hebrew*: in *Arabia* it is called *Bedustier*: it is also called in *Latine*, *Canis Ponticus*, but *Canis Fluvialis*, is another Beas, as we shall manifest in the succeeding discourse of an Otter: and the reason why in *Latine* it is called *Fiber*, because (as *Varrus* saith) it covereth the sides, banks, or extremities of the river, as the extremities or lips of the ear and liver are called *labia*, and the skirts or garments *fimbria*: but the reason why the *Grecians* call it *Castor*, is not as the *Latines* have supposed, because it biteth off his own toes, *quasi castro* (saith *Plinius*), as shall be manifested soon after, but of *Castro*, because for the toes thereof it is hunted and killed; or rather of *Gaster*, signifying a belly, for that the body is long and almost all belly: or rather because of the colour & ill favour thereof. This Beaver is no other then that which *Aristotle* calleth *Lutes*, and it differeth from an Otter only



colour yellowish red, wherewith they defend themselves against beasts, take fishes as it were upon hooks, and will gnaw in funder trees as big as a mans thigh: they have also grinding teeth very sharp, wherein are certain wrinkles or folds, so that they seem to be made for gnawing some hard substance, for with them they eat the rindes or barks of trees; wherefore the biting of this beaver very deep, being able to crush slender the hardest bones, and commonly he never loseth his hold, until he feeleth his teeth gnaw one against another. *Piny* and *Salmasius* affirm, that the person so bitten cannot be cured, except he hear the crafching of the teeth; which I take to be an opinion without truth.

inghe tayl. Some compare a Beaver with a Badger, but they attribute to him a longer body and smoother hair, but shorter and softer then a Badger: their colour is somewhat yellow and white, speckled with ash-colour, which stand out beyond the shorter hairs, double their length: they are neat and soft like unto an Otters, and the hairs length of the one and others colour, is not equal. Some have seen them brown declining to black, which *Athanasius* preferreth, and *Salmasius* affirmeth, that his long hairs are like a Dogs, and the short ones like an Otter. They are most plentiful in *Pontus*, for which cause it is called *Canis Ponticus*; they are also bred in the Rivers of *Spain*, and in the River *Marne* in *France*; *Valais*, in *Italy*; in *Savoy*, in the Rivers *Isere* and *Rhône*, and in the Island called *Camargue*, and in *Helvetia*, near *Amis*, *Epis* and *Lanaque*: Likewise throughout all *Germany*, *Polonia*, *Sclavonia*, *Russia* and *Prussia*: and there are Beavers in the woods of *Muscovy* and *Lithuania*, of excellent perfection and stature above others, having longer white hairs which glister above others. Their beas live both in the water and on the land, for in the day time they keep the water, and in the night they keep the land, and yet without water they cannot live, for they do participate much of the nature of fishes, as may be well considered by their hinder legs and tail.

Country of  
beas.

*Alberius.*

There are land  
and water Beas.

Their several  
parts: *mouth*, *teeth*, *tail*, *bellum*.

*mouth*, *teeth*, *tail*, *bellum*.

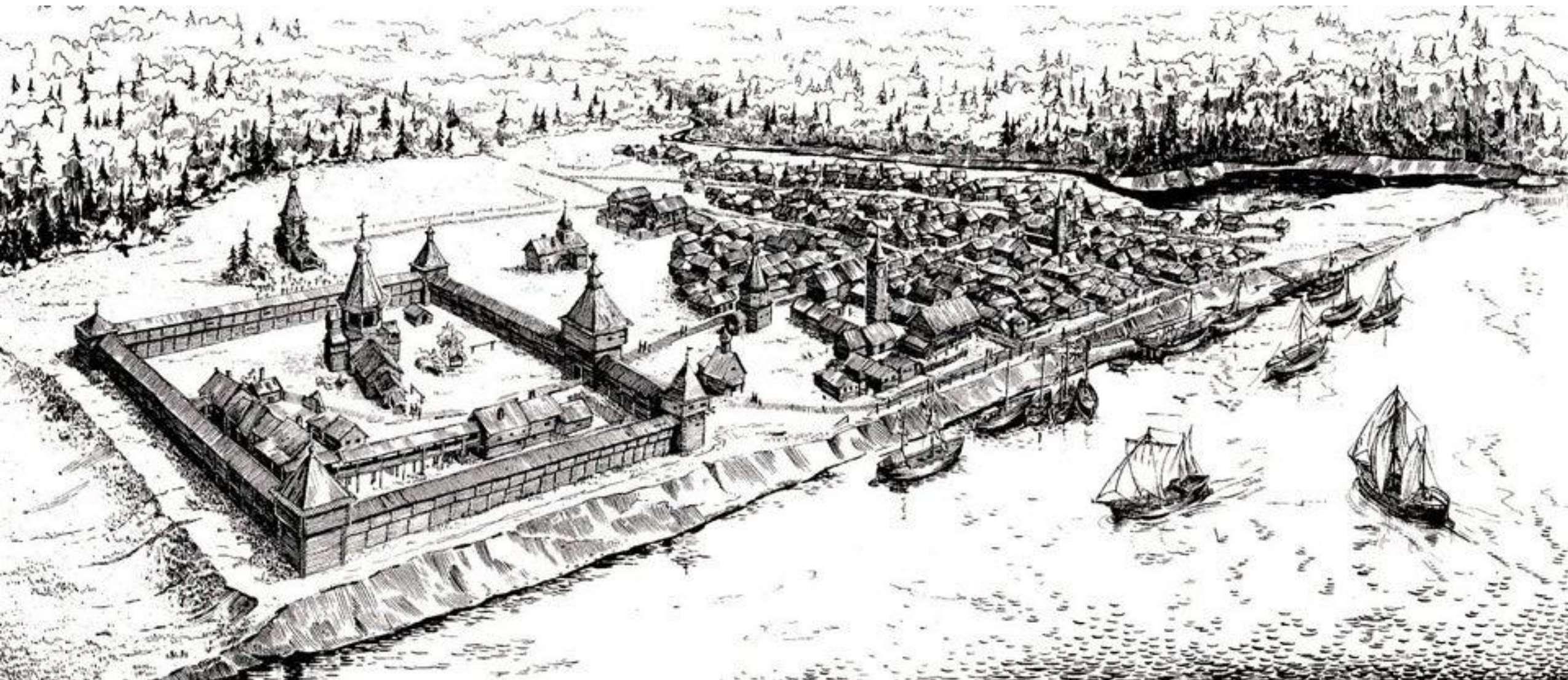
*mouth*, *teeth*, *tail*, *bellum*.

*mouth*, *teeth*, *tail*, *bellum*.

*mouth*, *teeth*, *tail*, *bellum*.

"They are most plentiful in Pontus (the Black Sea region, especially the S & E coasts)... they are also bred in the Rivers of Spain, and in the River Marne in France; the Po in Italy; in Savoy (SE France & NW Italy), in the Rivers Isere and Rhône, and in the Island called Camargue, and in Switzerland, near Arrau, Reuss and Lemman (Lake Geneva): likewise throughout all Germany, Poland, Sclavonia (~ modern Belarus), Russia and Prussia: and there are Beavers in the woods of Muscovy and Lithuania (which then included most of modern Ukraine), of excellent perfection and stature above others, having longer white hairs which glister above others... they (beavers) are taken for their skins, tails, and cods (testicles, meaning their castoreum glands)" (Topsell 1607, with modern spellings and placenames)



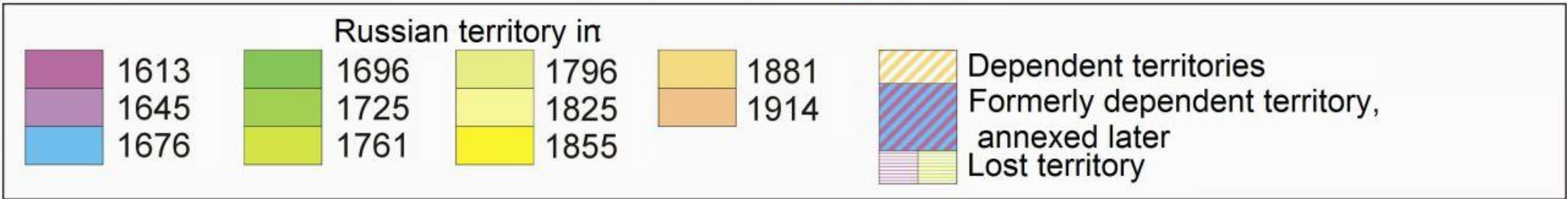
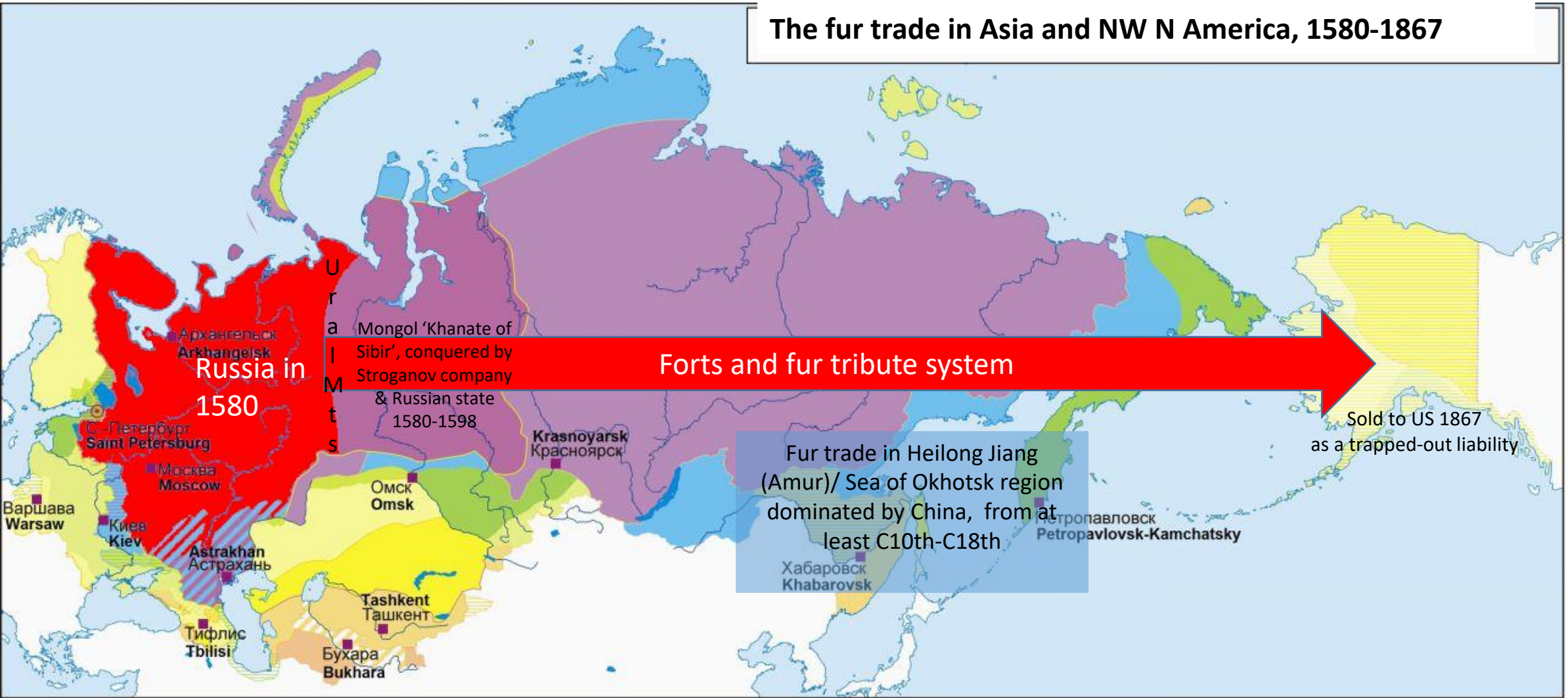


# Modernity, globalisation, and extinction: 1580-1920

Mangazeya-on-Taz, northern Siberia, in c. 1600



The fur trade in Asia and NW N America, 1580-1867



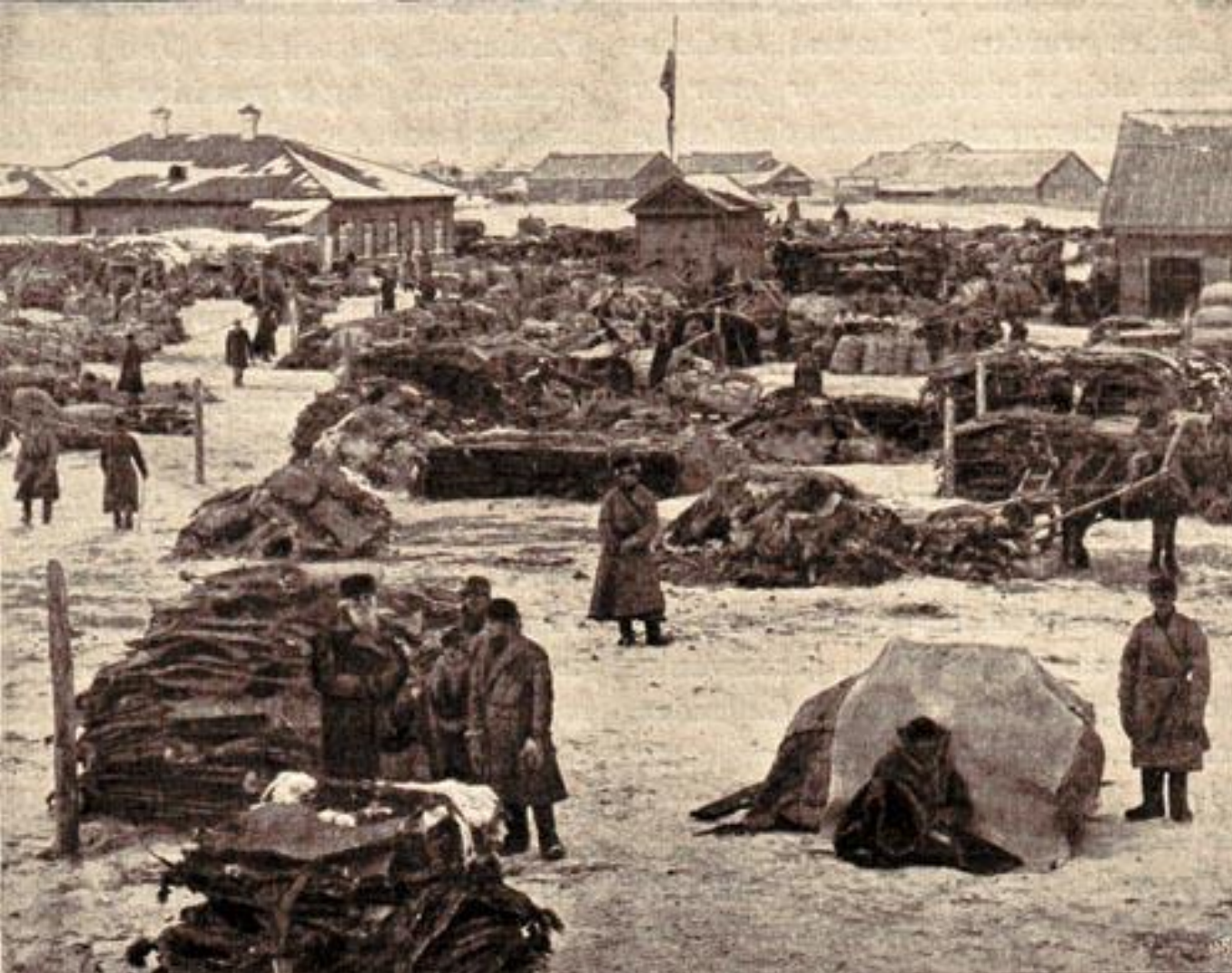


# Siberian fur trade river routes (with modern borders indicated) [Source](#)

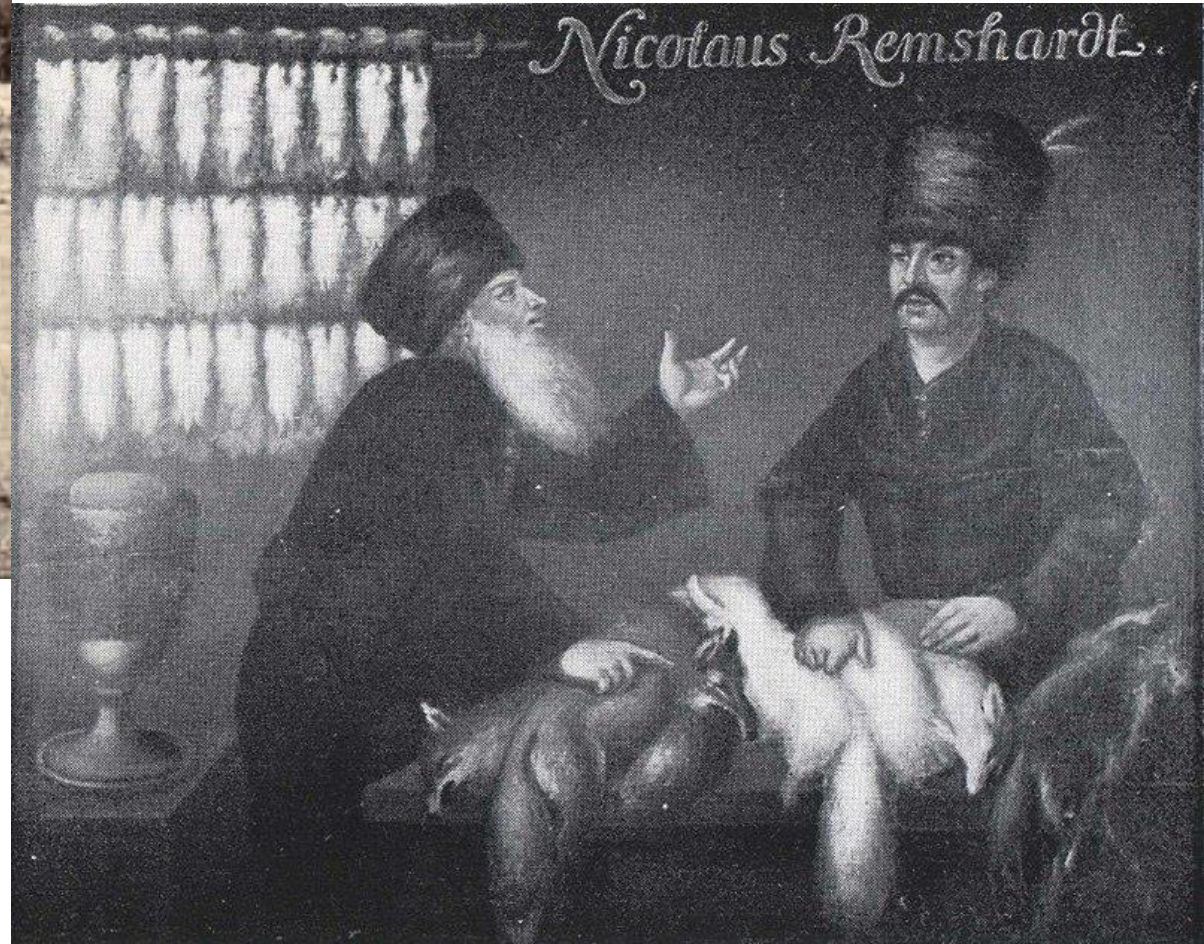
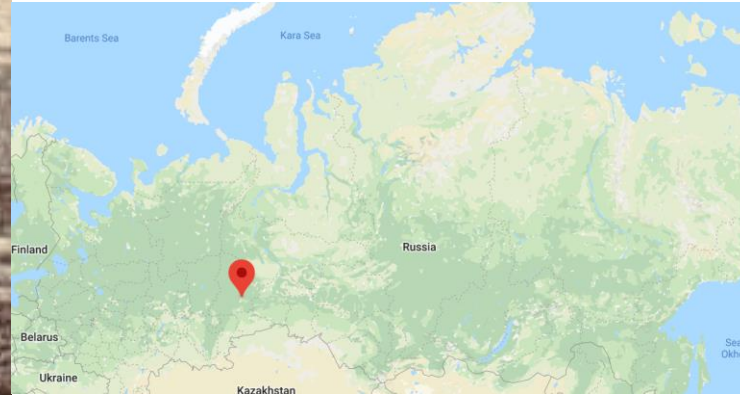


Area of Russia east of Urals: 13.2 million km<sup>2</sup> (China: 9.6 million km<sup>2</sup>; Europe excluding Russia: 6.2 million km<sup>2</sup>)



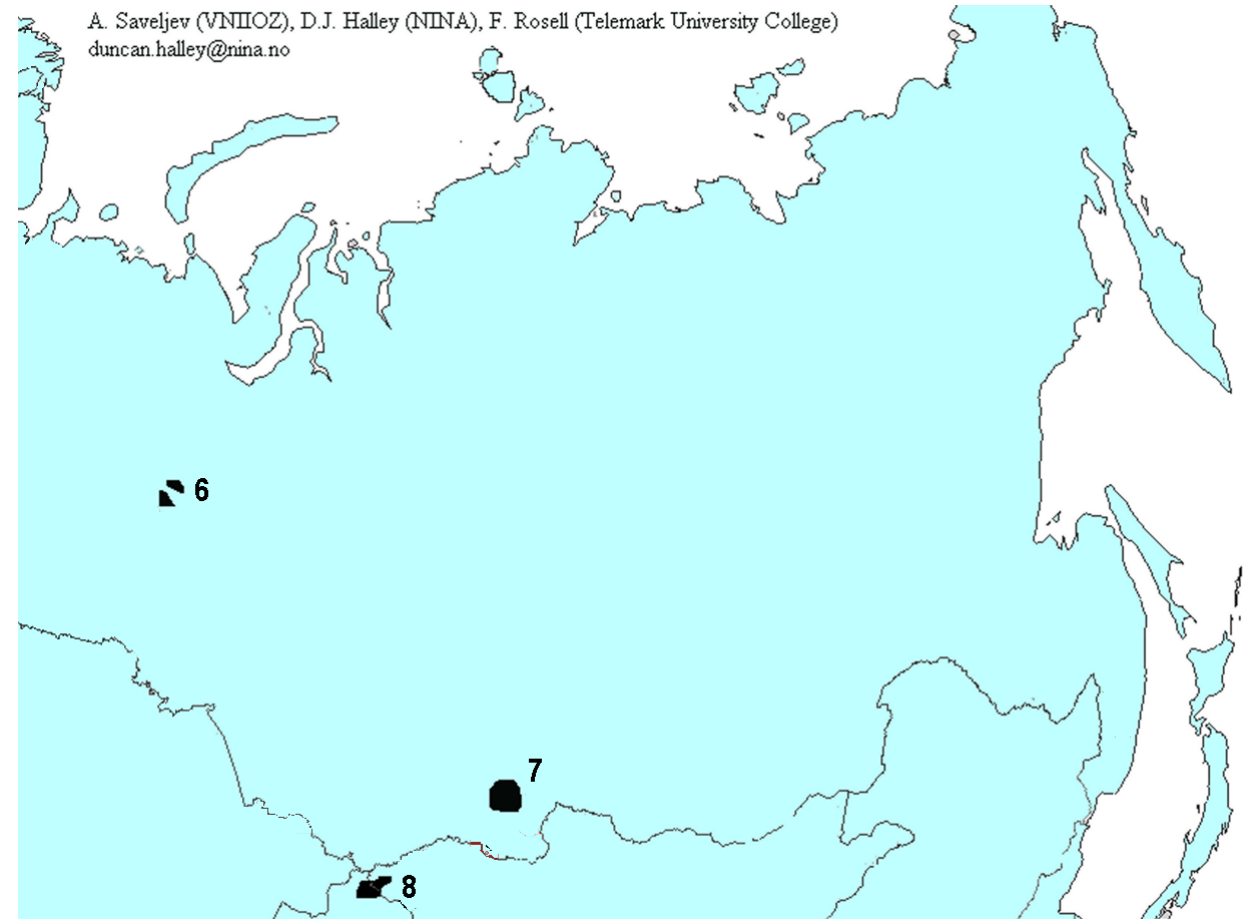
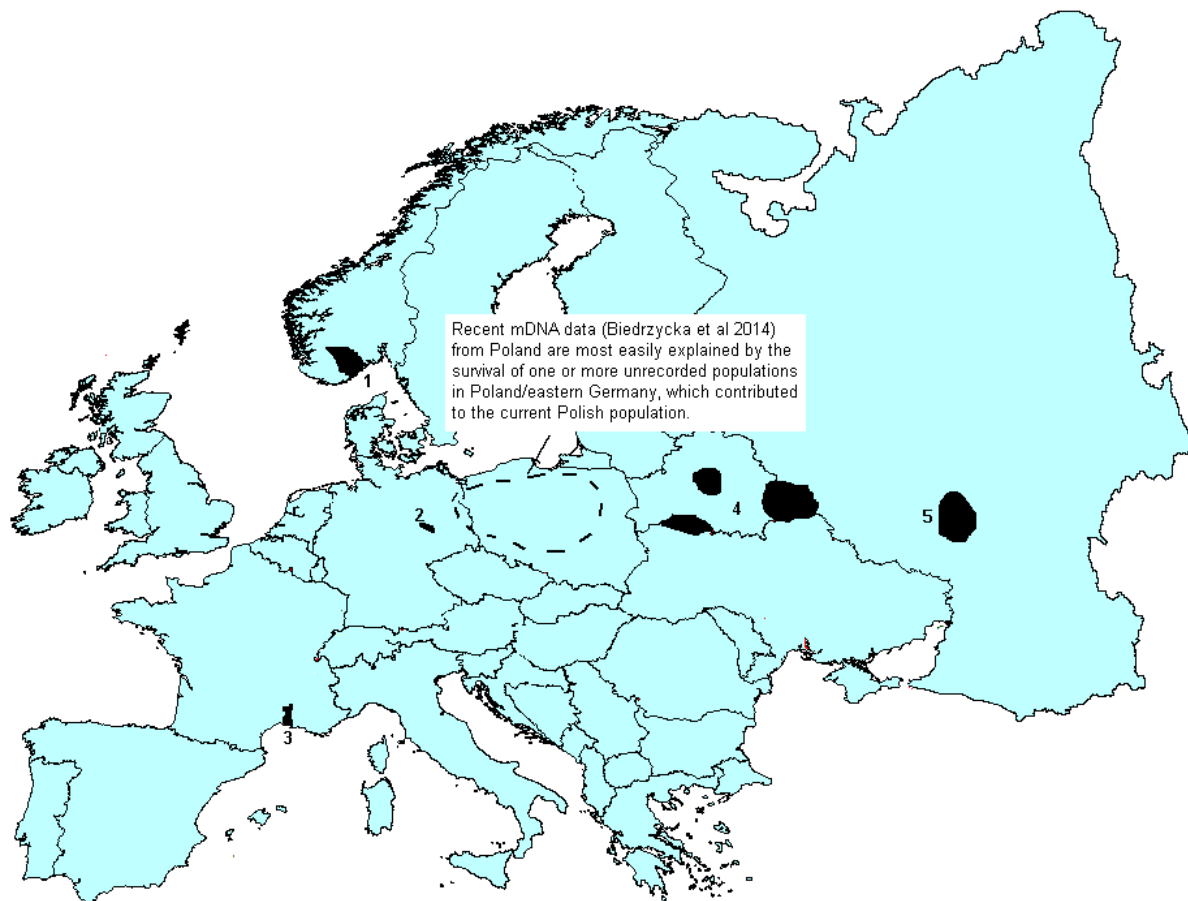


Fur market in Irbit, 1913



Russian trader in Siberian furs at the market in →  
Leipzig, Germany c. 1800

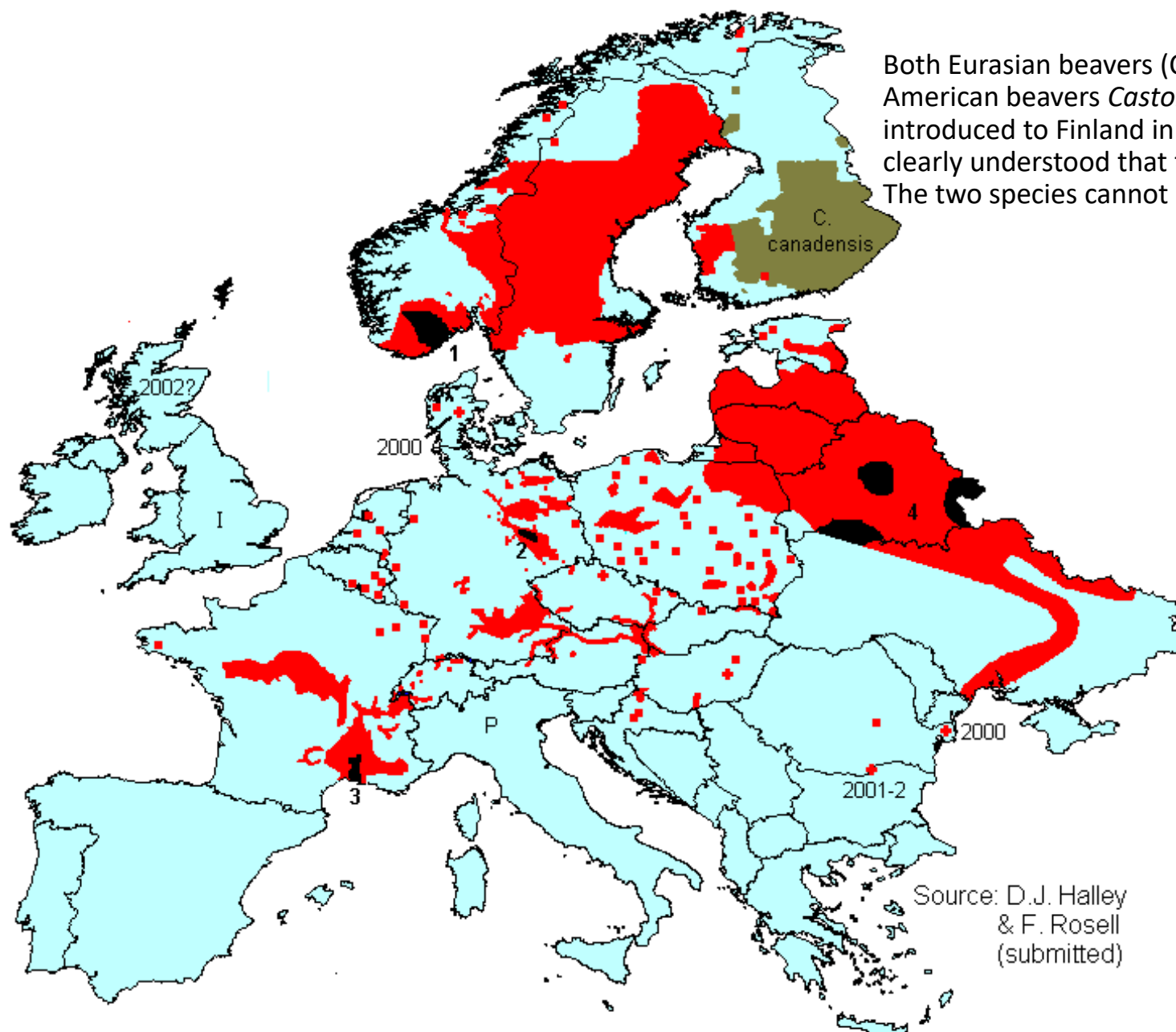




Beaver distribution in Europe (left) and Asia (right) in early 20th century

World population estimate c 1200 individuals in 8 scattered refuges

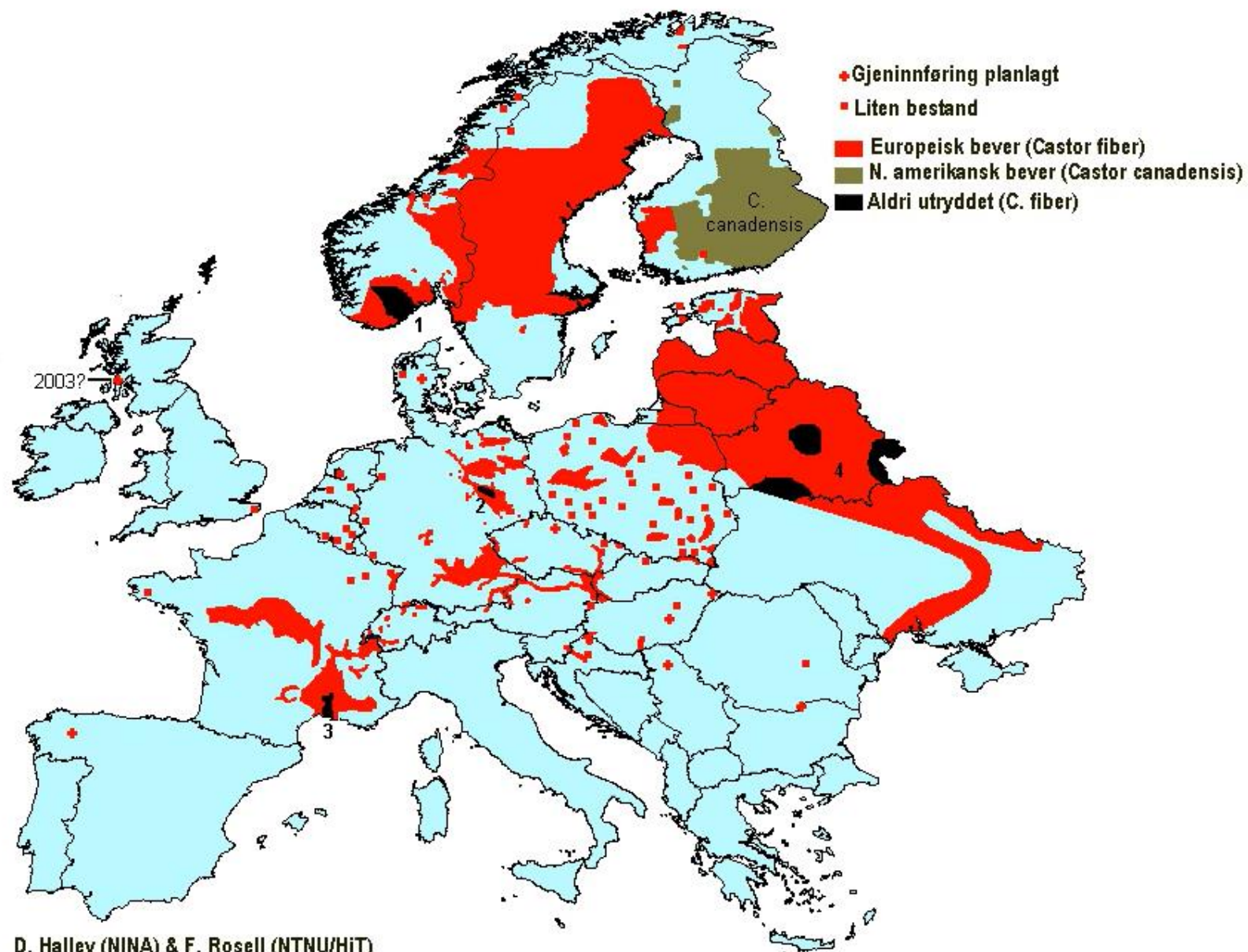




Both Eurasian beavers (*Castor fiber*) and North American beavers *Castor canadensis* were introduced to Finland in 1935-37 (it was not then clearly understood that they were distinct species. The two species cannot hybridise).

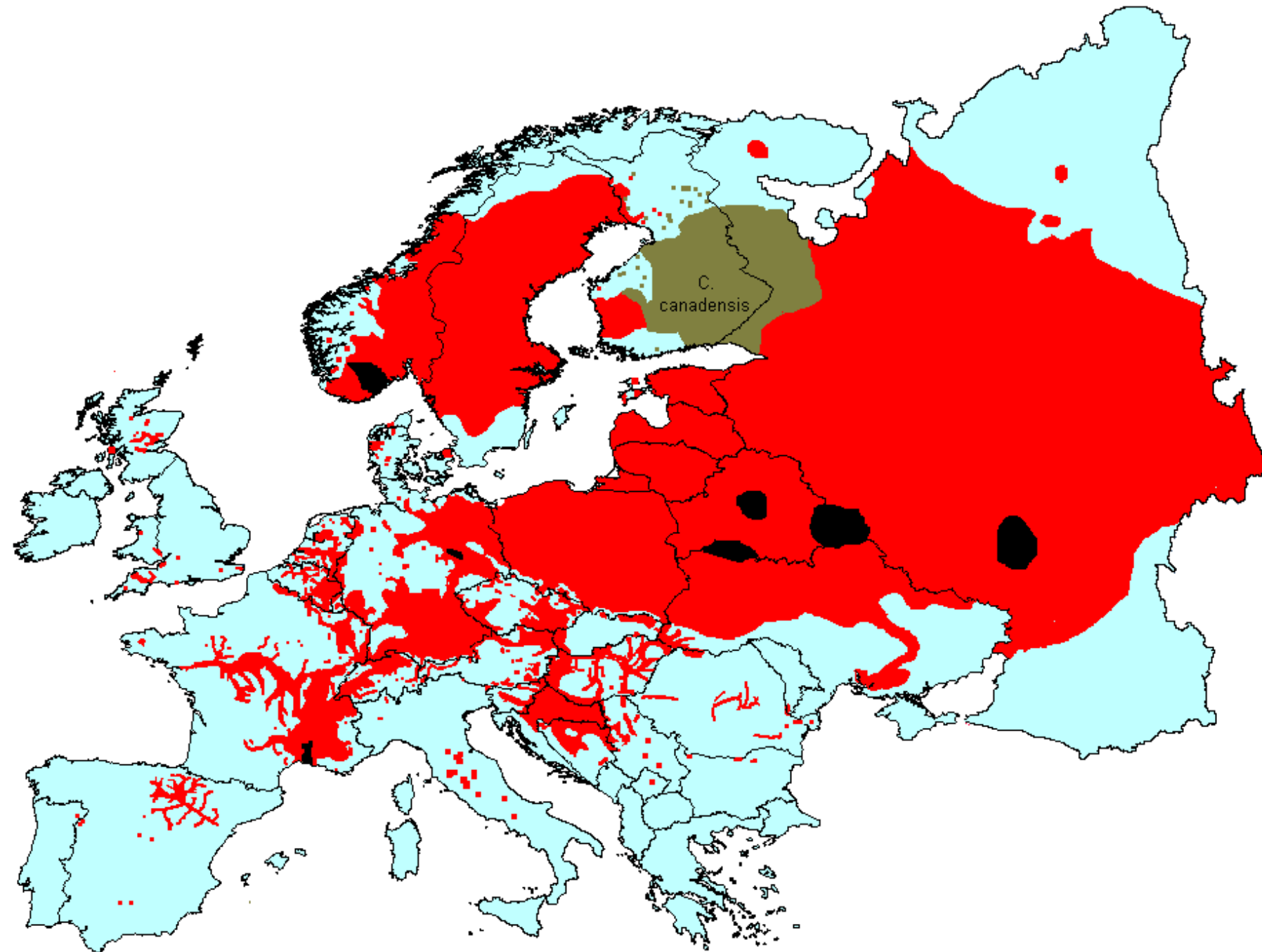
Source: D.J. Halley  
& F. Rosell  
(submitted)





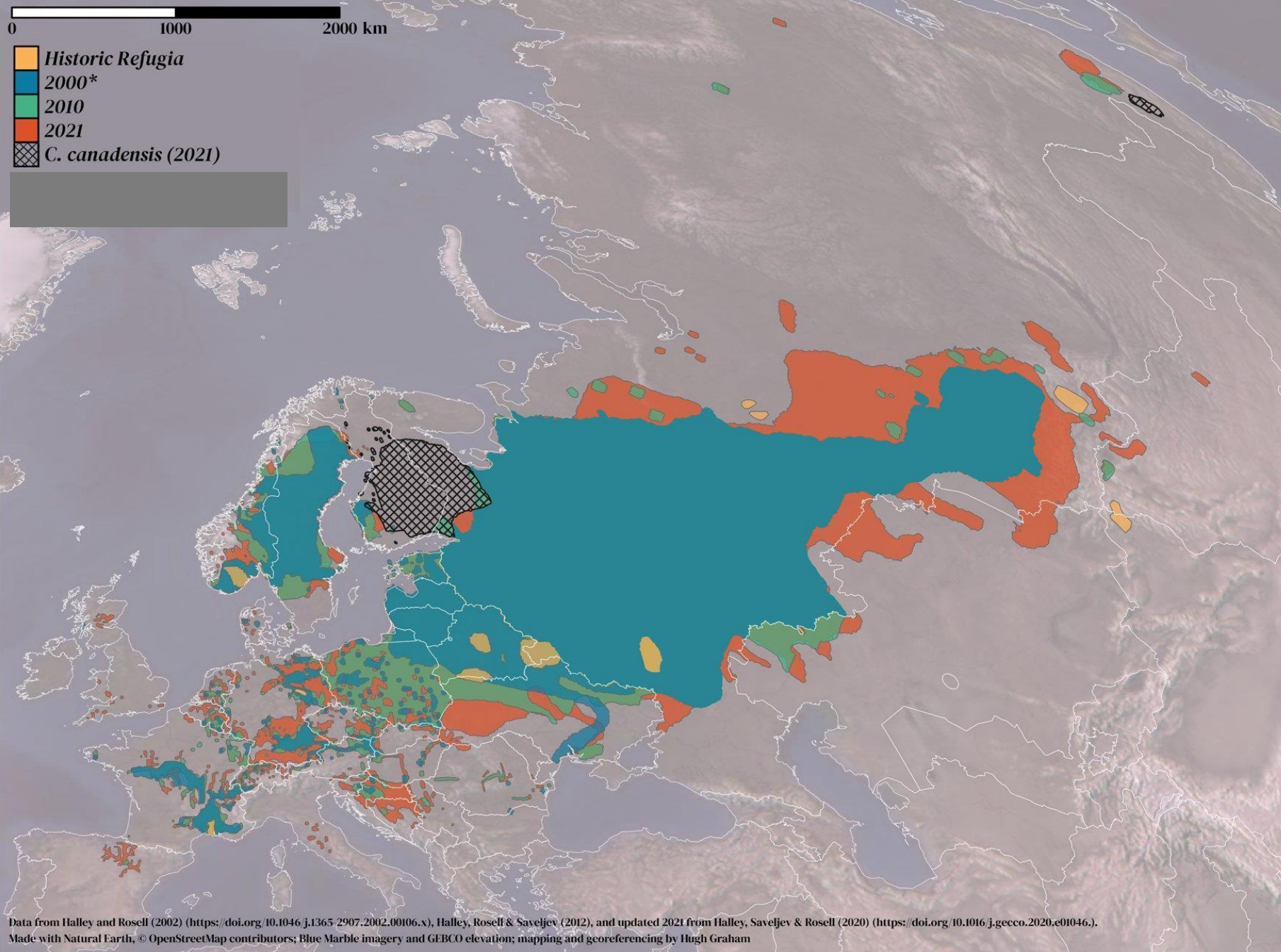
D. Halley (NINA) & F. Rosell (NTNU/HiT)





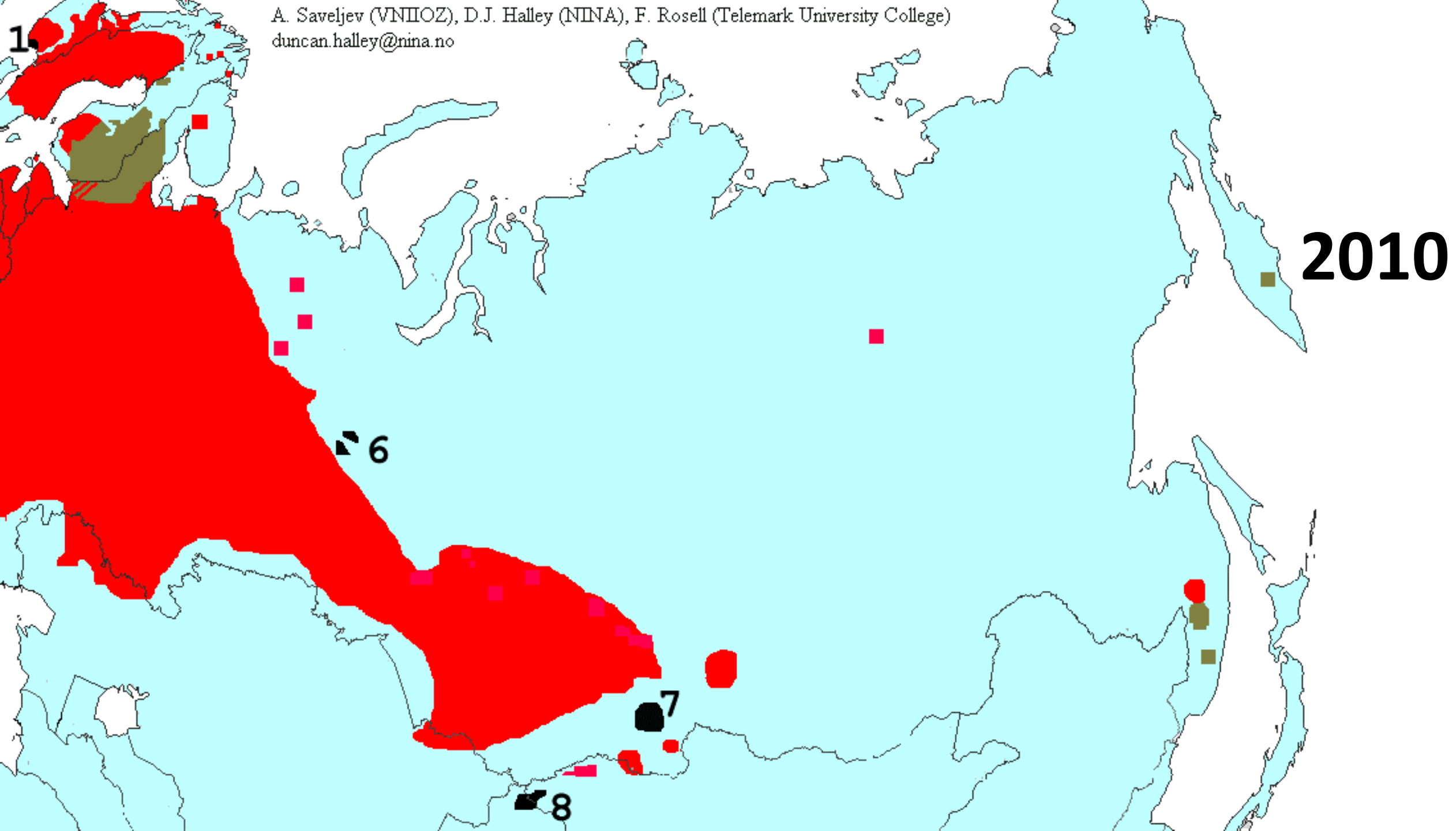


# Eurasian Beaver (*C. fiber*) Distribution Change

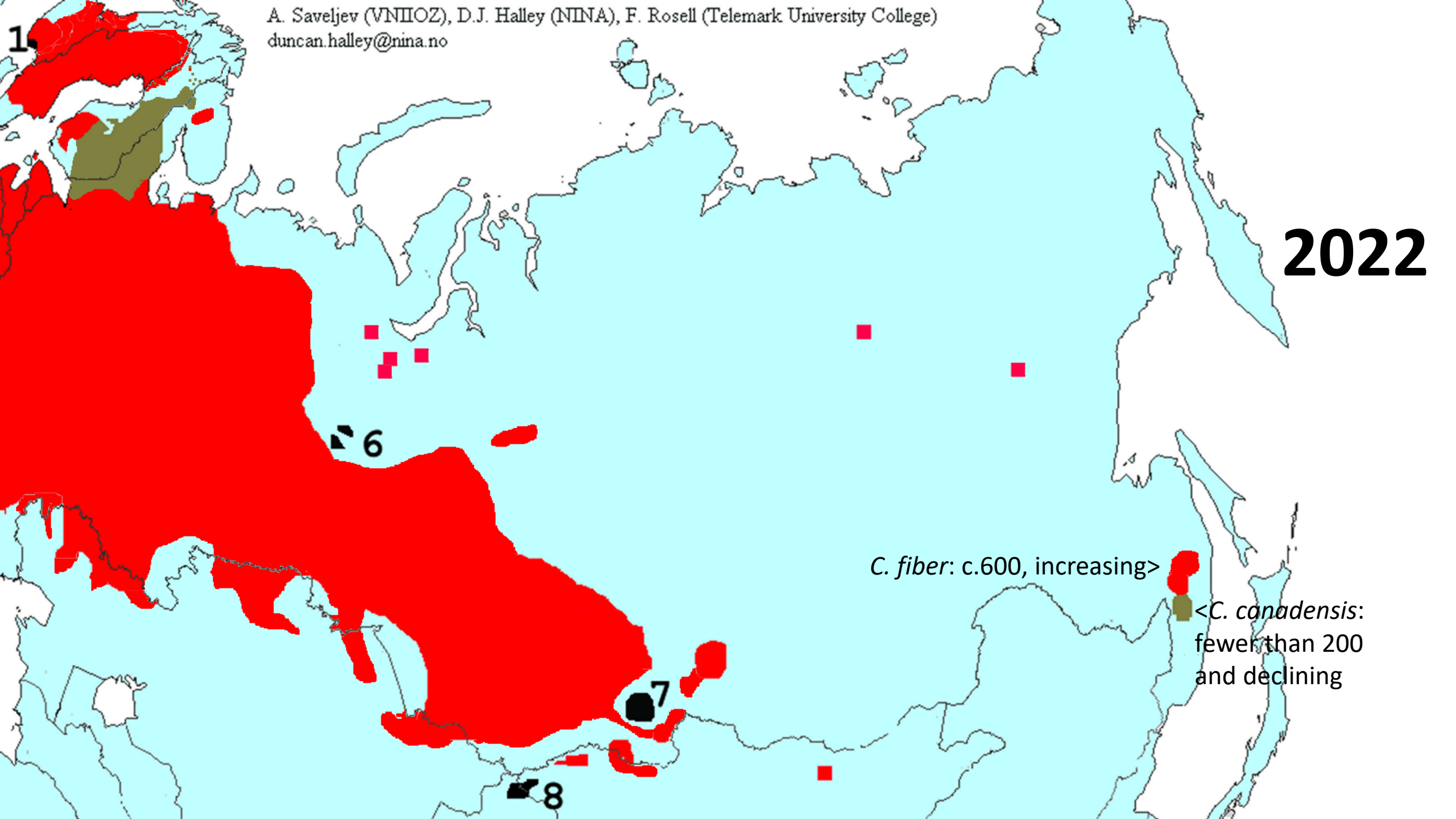


Source: adapted from Graham, H.A. (2022) Quantifying the impact and expansion of Eurasian beaver in Great Britain. PhD Thesis, University of Exeter.











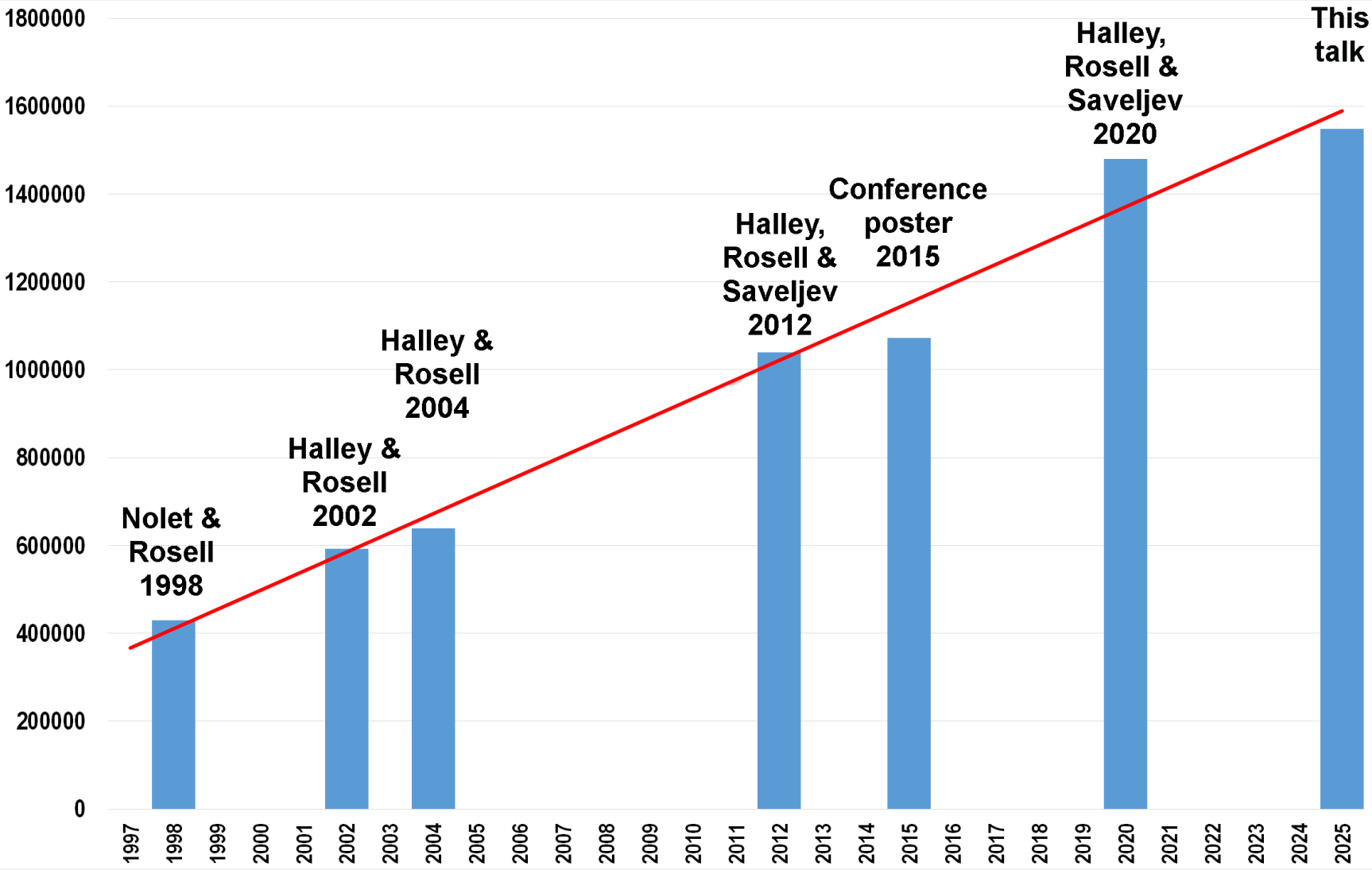
Country	Extirpation	Protection	Re-colonisation and/or translocations	Present population size
Austria	1869		1970-90	7600
Belarus	remnant	1922	1948	51 100
Belgium	1848		1998-99	2200-2400
Bosnia & Herzegovina	?		2006	c.180
Bulgaria	1750-1850		-	7+
China	remnant	1991	-	800
Croatia	1857?		1996-98	2500-3000
Czech Republic	Mid 18 <sup>th</sup> century; 1876		1800-1810 1991-92, 1996	14610
Denmark	c.500 BC2		1999; 2009-11	216 - 252
England	18th century?		2016	c.300 <sup>3</sup>
Estonia	1841		1957	18 000
Finland	1868	1868	1935-37, 1995	3300-4500 <sup>4</sup>
France	remnant	1909	1959-95	>14 000
Germany	remnant	1910	1936-40, 1966-89, 1999-2000	58 660
Greece	1876		proposed	0
Hungary	1865		1980-2006	14 600-18 300
Italy	1541		>2018	>47
Kazakhstan	1915		1963-1986	5 500
Latvia	1870s		1927-52, 1975-84	100 000
				-150 000
Kosovo	?		2025	1+
Liechtenstein	?			70
Lithuania	1938		1947-59	121 000

Luxembourg	?		-	c.75
Moldova	?		-	c. 10
Mongolia	remnant		1959-2002; 2012, 2018	800
Netherlands	1826		1988-2000	2300-3800
Norway	remnant	1845	1925-32, 1952-65	>80 000
Poland	1844	1923	1943-49, 1975-2000	154331
Portugal	c. 1450		2025	1+
Romania	1824?		1998-99	2145-2250
Russian Federation	remnant	1922	1927-33, 1934-41, 1946-2005	700000
Scotland	16th century		2009	c.2000
Serbia	1903?		2003-4	1000-1500
Slovenia	1750?		-	300-400
Slovakia	1858		1995	7700-9600
Spain	17 <sup>th</sup> century	1980s	2003	450-650 <sup>6</sup>
Sweden	1871	1873	1922-39	130,000
Switzerland	1820		1956-77	4900
Ukraine	remnant	1922		46000
Wales	16th century	2016		c15
Minimum Population Estimate				1 546 000

Updates/corrections?  
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# Estimated minimum world population of Eurasian beaver, 1998-2025





## REVIEW

### Population and distribution of beavers *Castor fiber* and *Castor canadensis* in Eurasia

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#### Keywords

beaver, *Castor fiber*, *Castor canadensis*, distribution, Eurasia, population, reintroduction

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#### ABSTRACT

1. A century ago, overhunting had reduced Eurasian beaver *Castor fiber* populations to c. 1200 animals in scattered refugia from France to Mongolia. Reintroductions and natural spread have since restored the species to large areas of its original range. Population has more than tripled since the first modern estimate in 1998; the minimum estimate is now c. 1.5 million.
2. Range expansion 2000–2020 has been rapid, with large extensions in western and south-central Europe, southern Russia, and west and central Siberia. Beavers are now re-established in all countries of their former European range except for Portugal, Italy, and the southern Balkans; they occur broadly across Siberia to Mongolia, with scattered populations farther east. About half of the world population lives in Russia. Populations appear to be mature in much of European Russia, Belarus, the Baltic States, and Poland.
3. There is a significant population of North American beaver *Castor canadensis* in Finland and north-west Russia. Most other 20th-Century introductions of this species have become extinct or been removed.
4. Recent DNA studies have improved understanding of *Castor fiber* population prehistory and history. Two clades, east and west, are extant; a third 'Danube' clade is extinct. Refugial populations were strongly bottlenecked, with loss of genetic diversity through genetic drift.
5. Future range extension, and large increases in populations and in impacts on freshwater systems, can be expected. Beavers are now recolonising densely populated, intensely modified, low-relief regions, such as England, the Netherlands, Belgium, and north-west Germany. They will become much more common and widespread there in coming decades. As beavers are ecosystem engineers with profound effects on riparian habitats, attention to integrating beaver management into these landscapes using experience gained in other areas – before the rapid increase in population densities and impacts occurs – is recommended.

#### INTRODUCTION

This paper is the third review – including short updates the fifth paper – intended to summarise Eurasian beaver *Castor fiber* distribution change and population development (Nolet & Rosell 1998, Halley & Rosell 2002, 2003,

Halley et al. 2012; a population estimate for Europe was also recently presented in a short communication, Wrobel 2020). The status of the North American beaver *Castor canadensis* in Eurasia is also reviewed. Information available is copious, but very widely scattered. Some is available in peer-reviewed papers, but most is in national- or



CONSERVATION HANDBOOKS



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## The Eurasian Beaver Handbook

### Ecology and Management of *Castor fiber*

Thank you!