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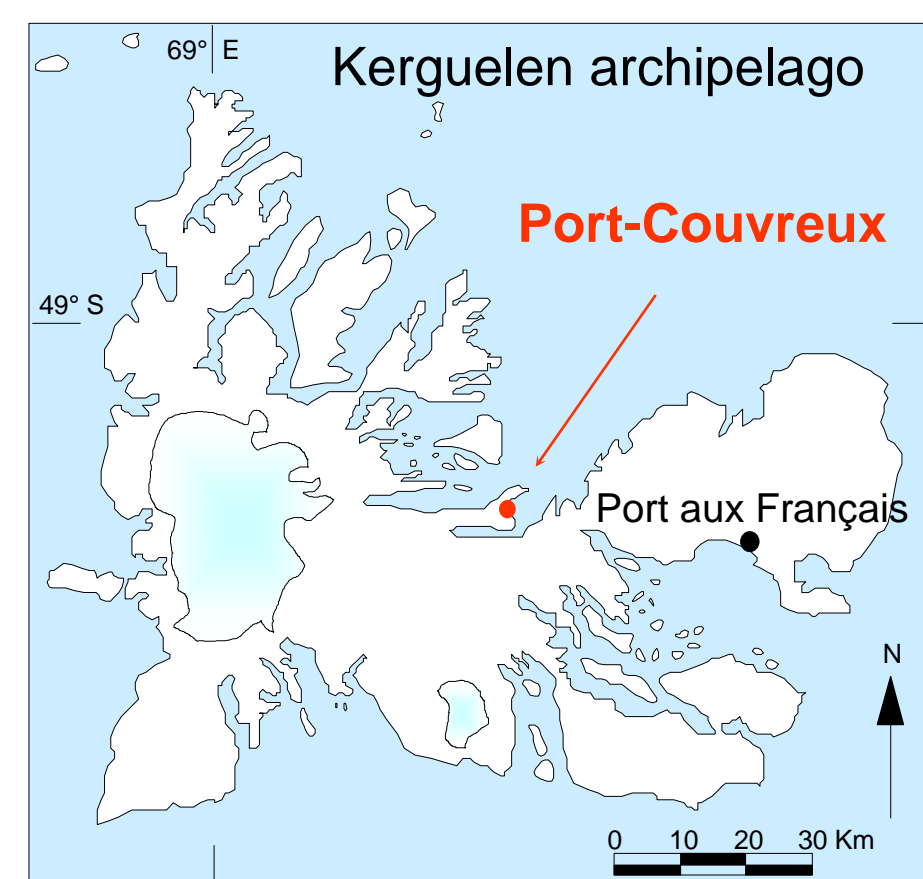
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IMPACT OF A PAST SHEEP FARMING ACTIVITY (1913-1931) ON THE VEGETATION AT PORT-COUVREUX, KERGUELEN ISLANDS

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Introduction

The Port-Couvreux station was built at Kerguelen Islands in 1911 for sealing and farming activities. In 1913, sheep were imported from the Falklands Islands. During World War I, sheep were abandoned and all individuals had died by the end of the war. In 1922, sheep were then imported from Capetown and shepherds lived at Port-Couvreux until 1931, when the farming activity ended and the sheep quickly died. The only sowing known was some vegetables such as radishes, potatoes, and watercress, completely gone today. However, 80 years after the the farm was abandoned, the present vegetation of Port-Couvreux is obviously an heritage of its past human activity.

Introduced plant species	Native plant species
Dicotyledons	
<i>Cerastium fontanum</i> Baumg.	<i>Acaena magellanica</i> (Lam.) Vahl
<i>Cerastium glomeratum</i> Thuillard	<i>Galium antarcticum</i> Hooker f.
<i>Rumex acetosella</i> L.	<i>Montia fontana</i> L.
<i>Sagina procumbens</i> L.	<i>Ranunculus bitematus</i> Sm.
<i>Stellaria alsine</i> Grimm	
<i>Stellaria media</i> (L.) Vill.	
<i>Taraxacum erythrospermum</i> group	
Monocotyledons	
<i>Agrostis canina</i> L.	<i>Agrostis magellanica</i> Lam.
<i>Agrostis capillaris</i> L.	<i>Deschampsia antarctica</i> E. Desv.
<i>Agrostis stolonifera</i> L.	<i>Festuca contracta</i> T. Kirk
<i>Aira praecox</i> L.	<i>Juncus scheuchzerioides</i> Gaud.
<i>Anthoxanthum odoratum</i> L.	
<i>Dactylis glomerata</i> L.	
<i>Festuca arundinacea</i> Schreb.	
<i>Festuca rubra</i> subsp. <i>cf. commutata</i> Gaud.	
<i>Festuca rubra</i> subsp. <i>Rubra</i> L.	
<i>Gaudinia fragilis</i> (L.) Beauv.	
<i>Holcus lanatus</i> L.	
<i>Holcus mollis</i> L.	
<i>Juncus acutiflorus</i> E. Hth. Ex Hoffm.	
<i>Luzula campestris</i> L.	
<i>Poa annua</i> L.	
<i>Poa cf. palustris</i> L.	
<i>Poa pratensis</i> L.	
<i>Poa trivialis</i> L.	
<i>Trisetum spicatum</i> (L.) Rich.	
Pteridophytes	
	<i>Blechnum penna-marina</i> (Poir.) Kuhn
	<i>Lycopodium magellanicum</i> (Beauv.) Swartz

Alien introduced species

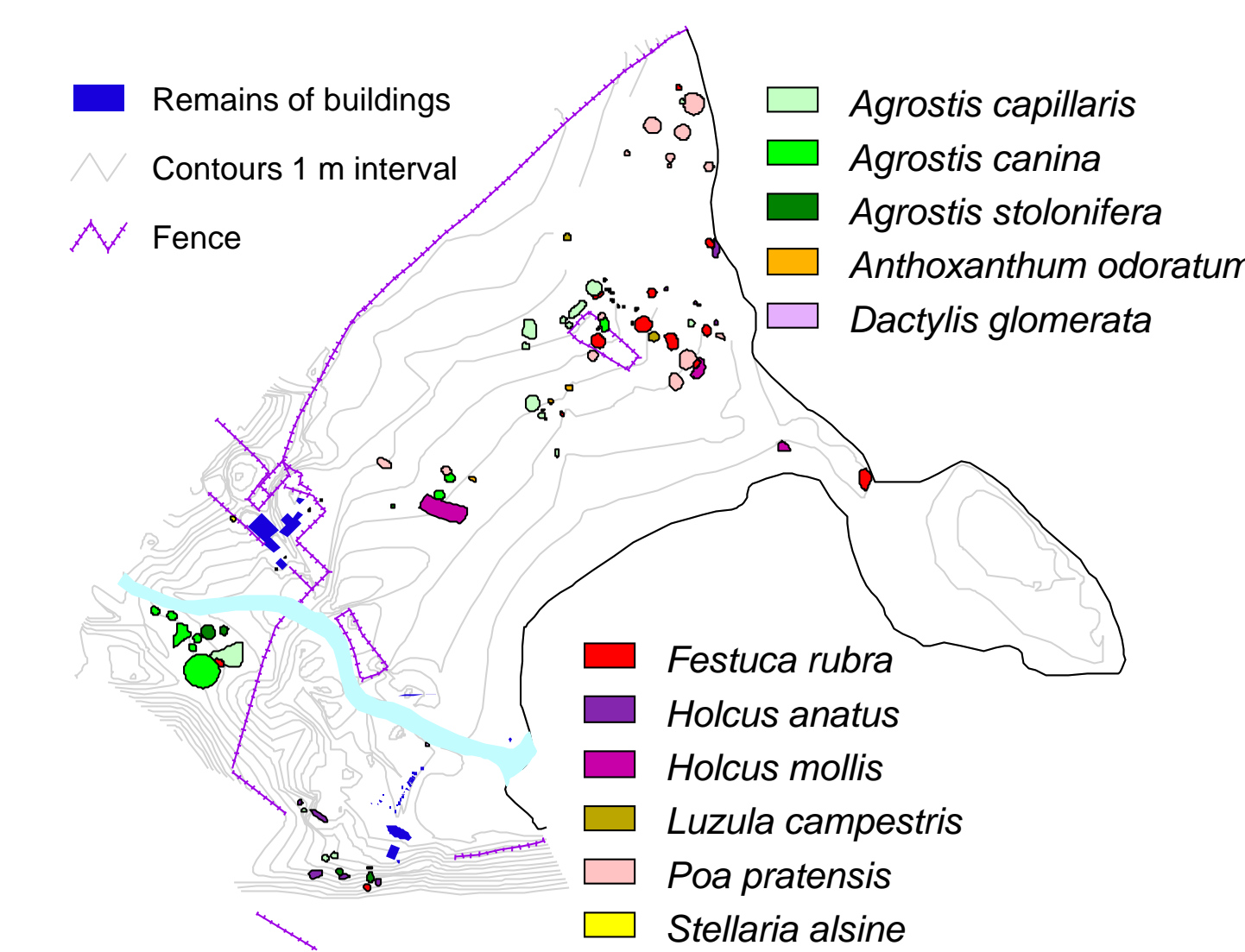
Among the 68 alien plant species currently present at Kerguelen Islands (Frenot et al. 2001), 26 grow at Port-Couvreux, in the vicinity of the old farm buildings. Seven species (in blue in the table) are exclusively limited to this region of Kerguelen. These species were probably introduced with forage brought from the Falklands Islands with sheep in 1913. This hypothesis is supported by two facts:
- the presence of *Trisetum spicatum*; this species grows in the cold regions of both hemispheres, and is present on the Falklands Islands,
- the presence of the small Coleoptera Carabidae *Ooapterus soledadinus* (Chevrier et al. 1997), originating from the Falklands Islands.



Port-Couvreux in 1924



Port-Couvreux in 2000



Patches

Some plant species usually grow as almost monospecific patches. These patches have grown rapidly since 1995, year of first measurements. For instance, increase in diameter of *P. pratensis*, *A. capillaris*, and *F. rubra* subsp. *commutata* patches varied from 0.25 to 0.45 cm yr⁻¹. This increase was probably caused by the recent changes in climatic conditions.



Poa pratensis patch in 1996

A preliminary study showed that the soil characteristics are affected by these alien plant species, which produce larger amounts of organic matter than the native communities. A thick organic layer usually develops under the alien grass patches as shown below on these photographs.

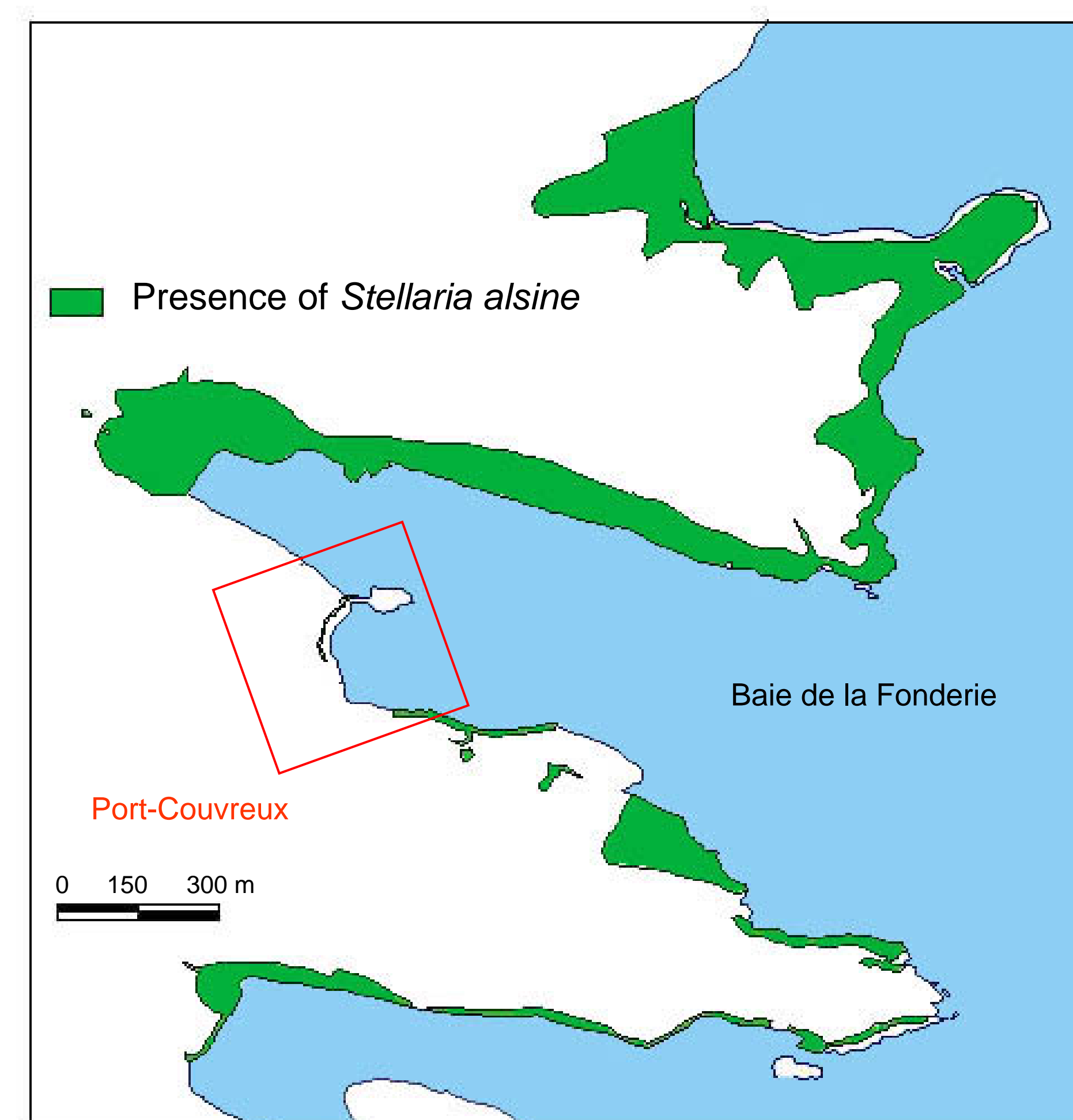
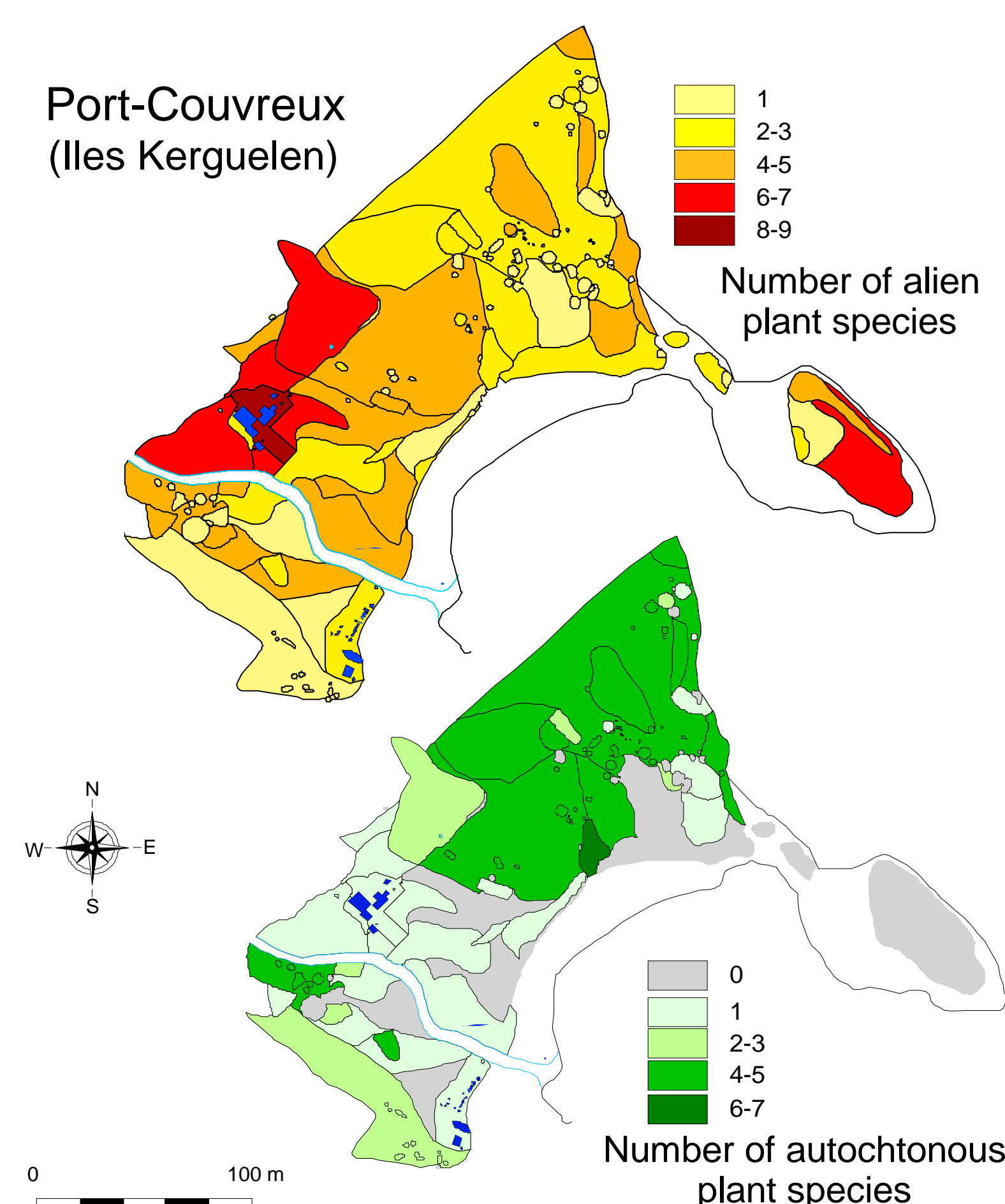
The blue arrow indicates the specific horizon developed under the introduced vegetation



control soil below native community dominated by bryophytes and *Agrostis magellanica*

soil below the patch of *Poa pratensis*

The vegetation maps reveal that many introduced plant species occur near the ruined livestock buildings but do not spread very far. There is a clear balance between the native plant species, rare around the farm, and the alien plant species. The dominance of these introduced species declines gradually with the distance from the farm buildings.



Some species show a more extended distribution area:
• *Holcus lanatus*
• *Poa trivialis*
• *Stellaria alsine*

These species have spread several hundred meters from the farm, probably because of their high production of seeds. *H. lanatus* spreads mainly in a W-SW direction, in the lee of the dominant winds. We estimated that this species produced more than 1.5 million seeds m⁻² in March 2000. *P. trivialis* and *S. alsine*, show a clear coastal distribution and do not spread inland. *S. alsine* is a very successful species on Ile de la Possession (Crozet Islands), where it recently arrived (Frenot et al., 2001).

References

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Conclusion

Frenot et al. (2001) suggested that the colonizing abilities under the subantarctic environment could be more developed in long-lived species than in annual species. At Port-Couvreux, most of the alien plant species established are perennial, except *Aira praecox* (annual) and *Poa annua* (annual or biennial). From a conservation point of view, the native plant communities at Port-Couvreux have been greatly altered by the accidental introduction of alien plant species. However, these changes are still limited to a small area in the vicinity of the sheep farm, probably because the invasion potential of the alien species is low.