Ski touring and fauna: which interactions?

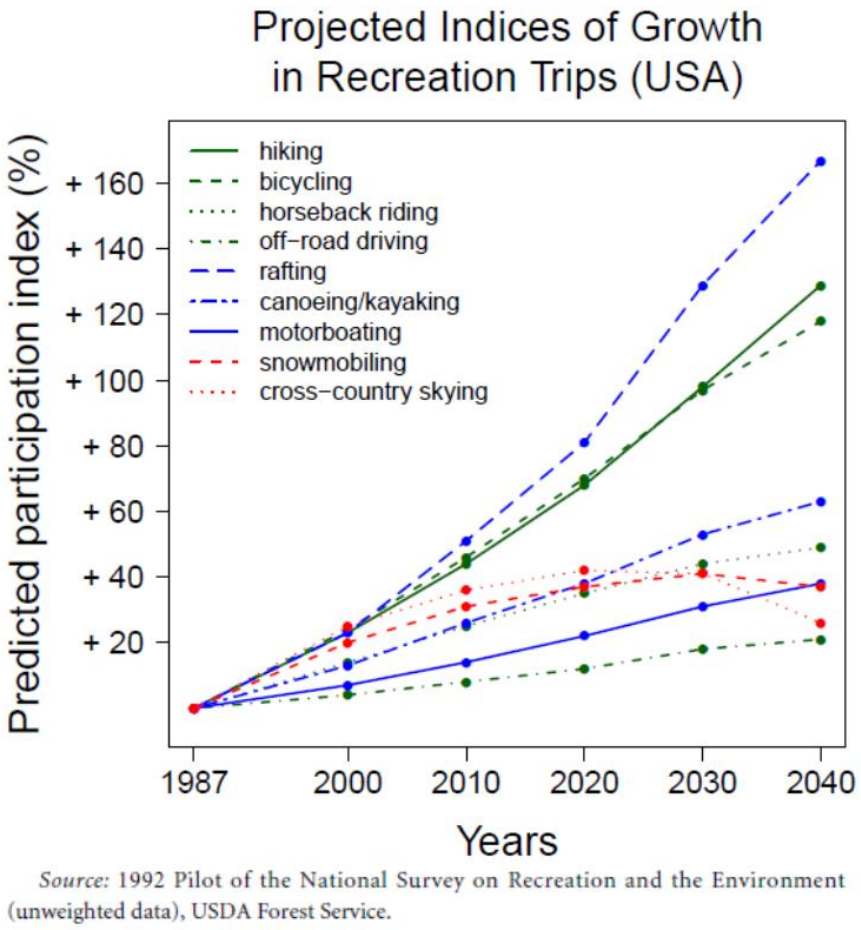
Antoine DUPARC

Workshop
"Wildlife and winter sport activities"

Lescheraines
March 4th 2016

Increase of interaction human/fauna

Increase of human activities all over the world



Source: 1992 Pilot of the National Survey on Recreation and the Environment (unweighted data), USDA Forest Service.

Disturbance increasing

What is disturbance?

- Definition of disturbance :

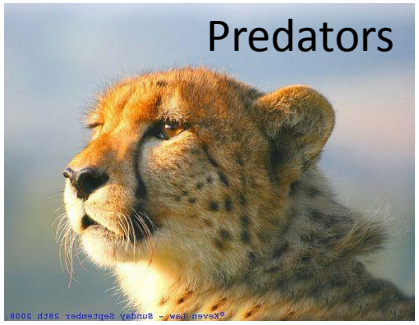
"A Deviation of animal behavior from pattern occurring without human influence".

Disturbance stimulus is a "human-related presence, object or sound that creates a disturbance".

Frid and Dill 2002

Disturbance stimulus as a form of predation risk

=



Antipredator responses

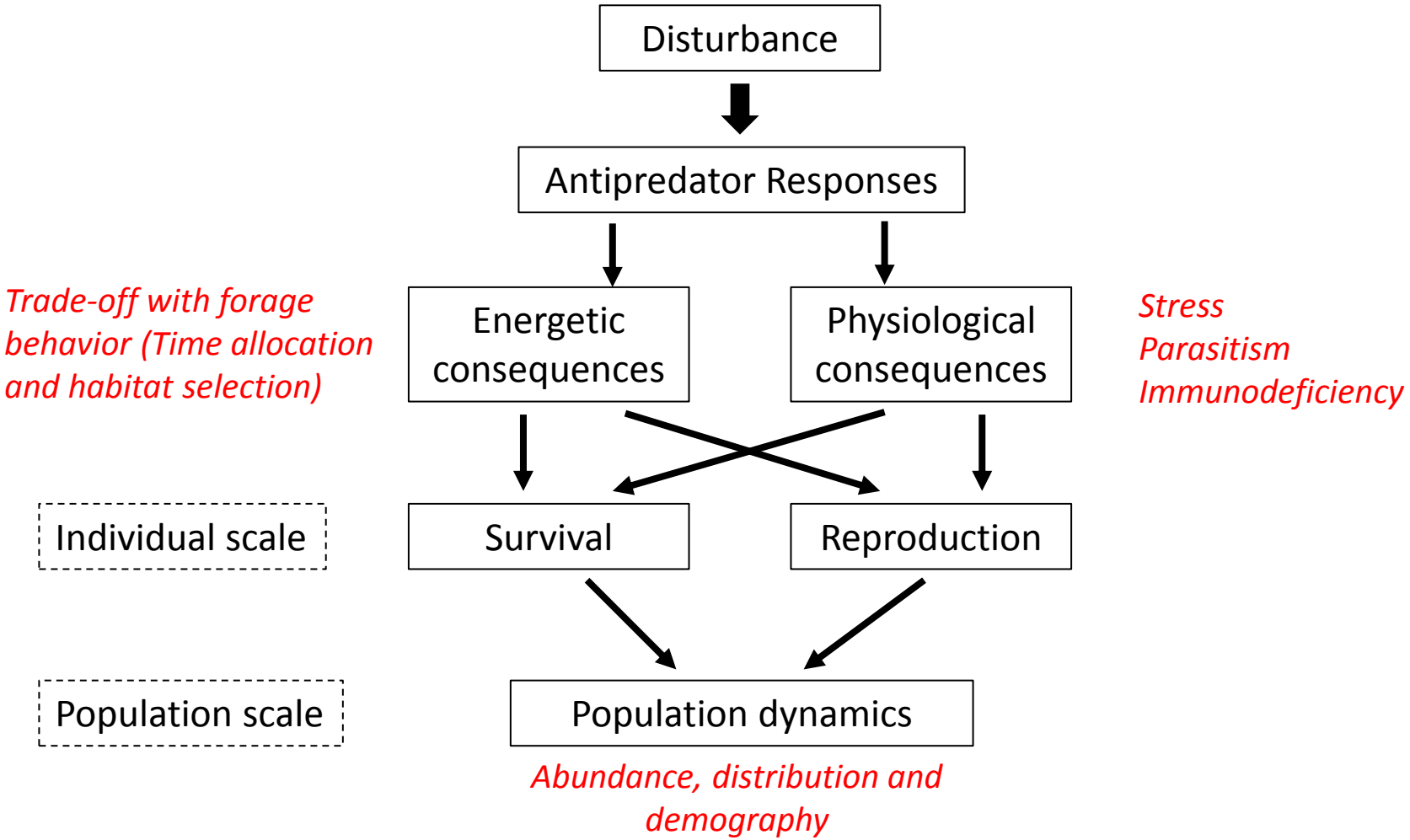
Vigilance
(Detection)

Flight
(Escape)

Habitat selection
(Avoidance)

Creel and Christianson 2008; Frid and Dill 2002

The consequences for the fauna



Impact on global wildlife

Taxa	Antipredator response	Survival	Reproduction	Demography
Birds	✓	✓	✓	✓
Reptiles	✓	✓	?	?
Marine mammals	?	✓	✓	✓
Large herbivores	✓	✓	✓	✓
Carnivores	✓	✓	?	?
Arthropods	?	?	?	✓



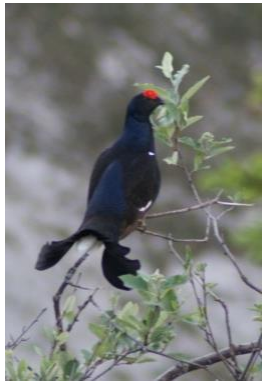





Mountain fauna

Alpine ibex

Rock partridge



Black grouse

Rock ptarmigan

Isard

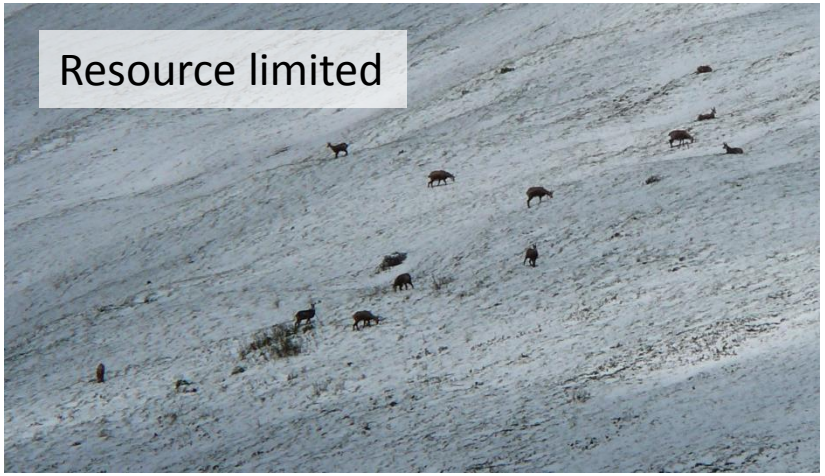
Mountain hare

Chamois

Eurasian wolf

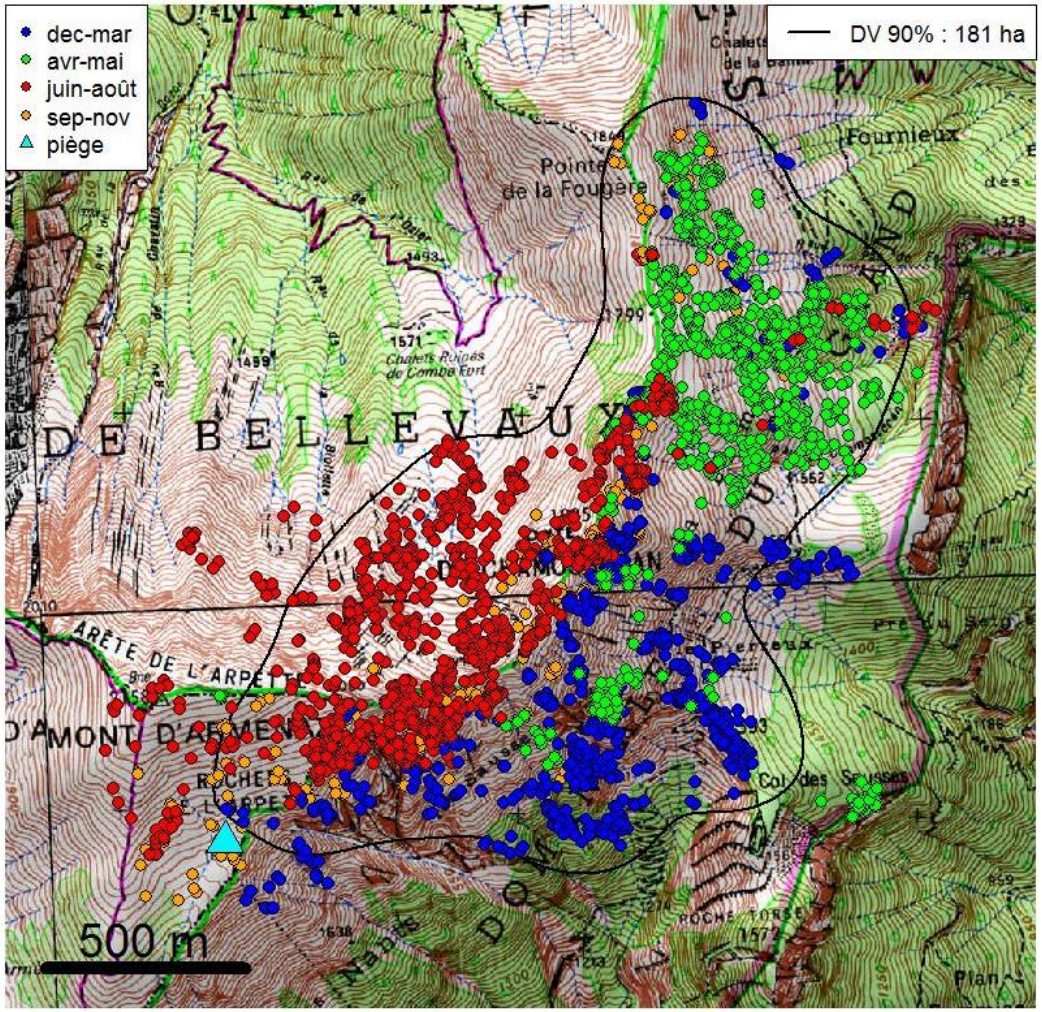
Does every species have the same sensitivity to winter disturbance?

Winter mountain constraints



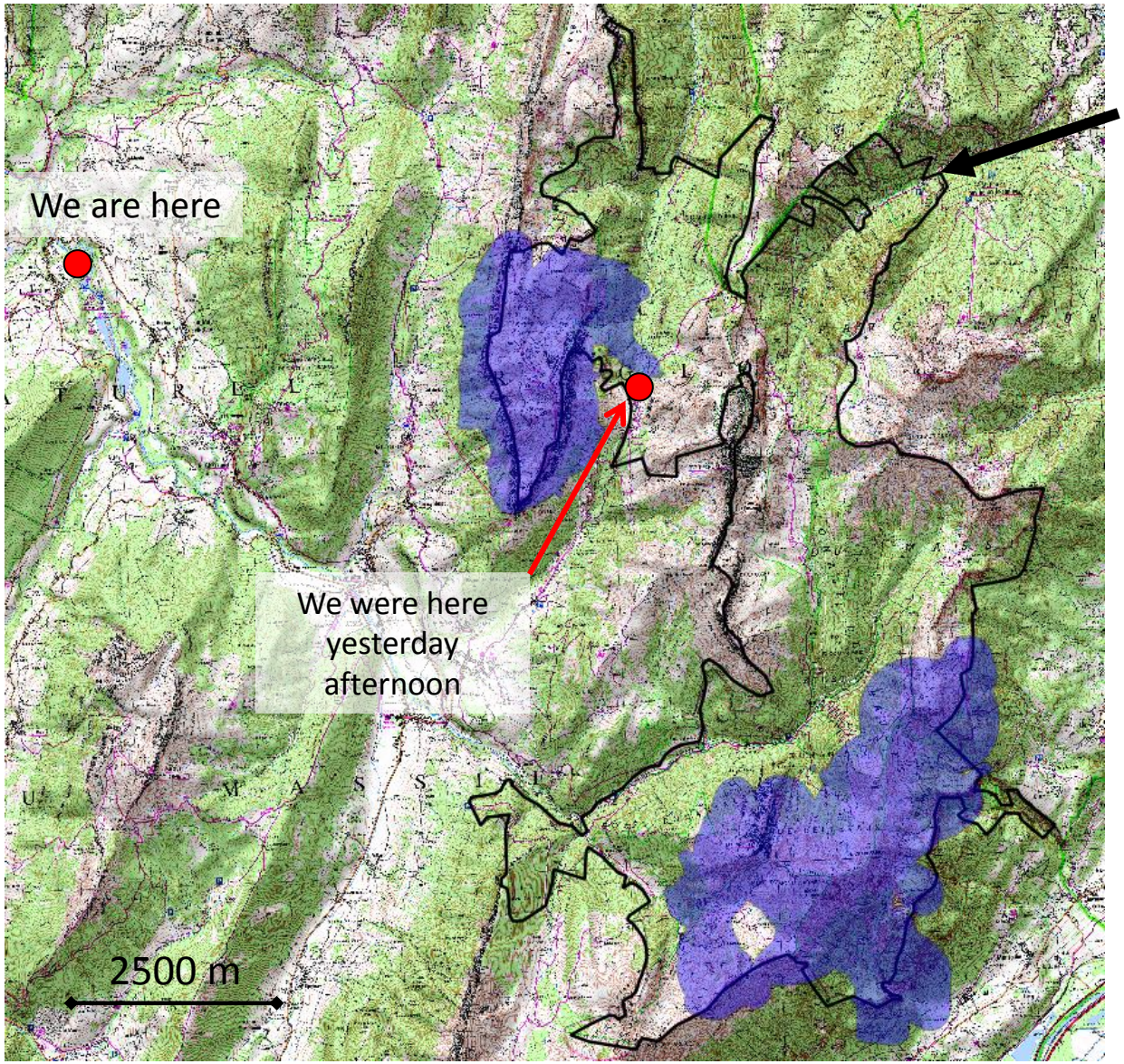
Recreational activities limit availability of areas undisturbed for fauna

Biological model : the Alpine chamois



Body mass (kg)	♀ : 26 ♂:39
Typical habitat	Mountain grasslands
Flight tactic	Use of refuge area
Should avoid	Closed and flat areas
Diet	Intermediate feeders
Sociability	Social (low stability)

Interaction chamois / ski touring



National game and hunting reserve (5200 ha)

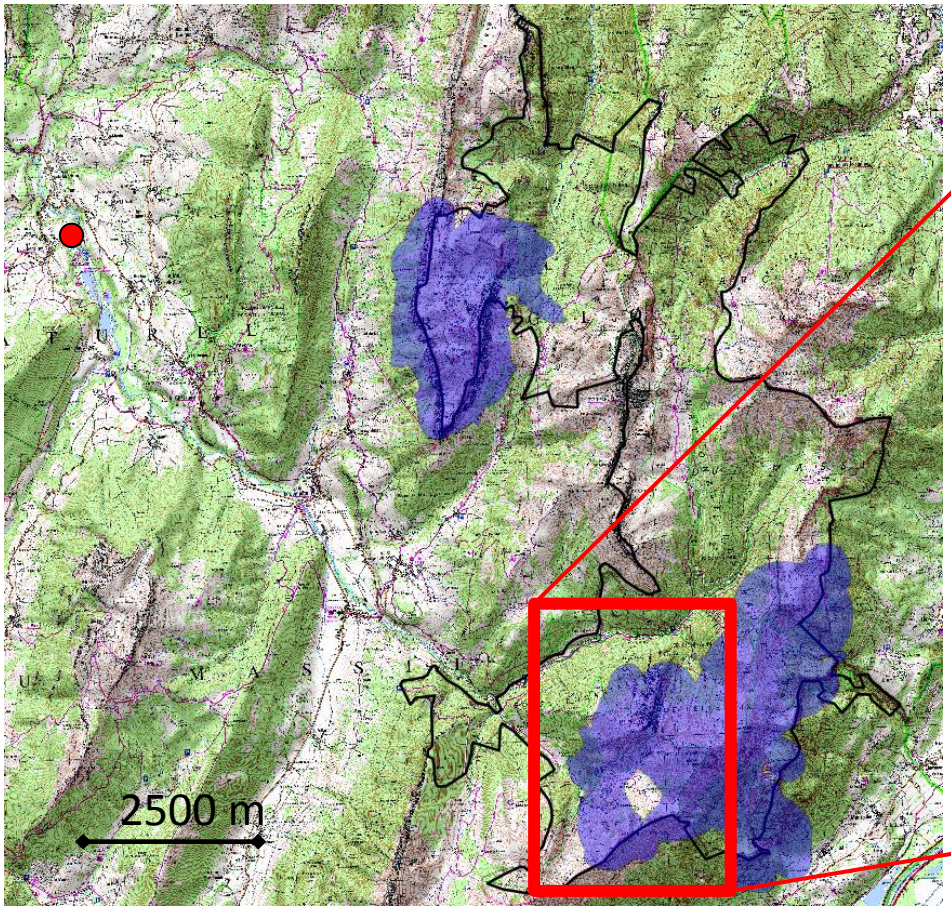
Area use by chamois all the year

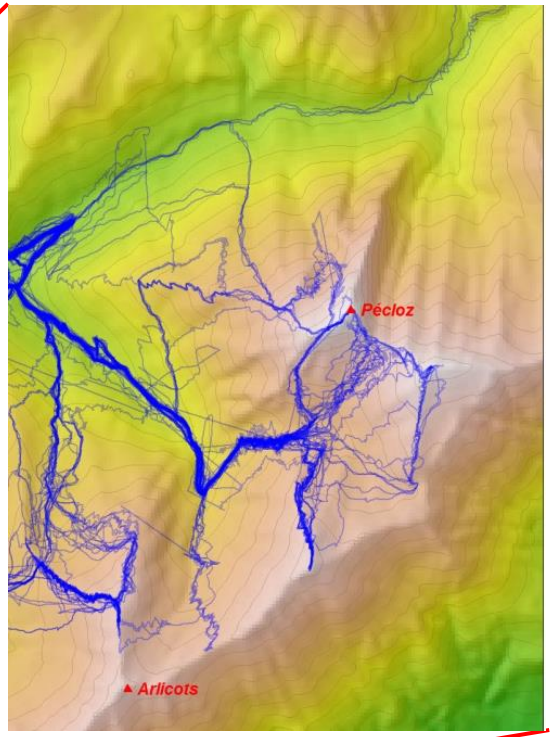
Chamois survey since 1985

Interaction chamois / ski touring

GPS tracker

Only Ski touring in the reserve
84 gps tracks recorded





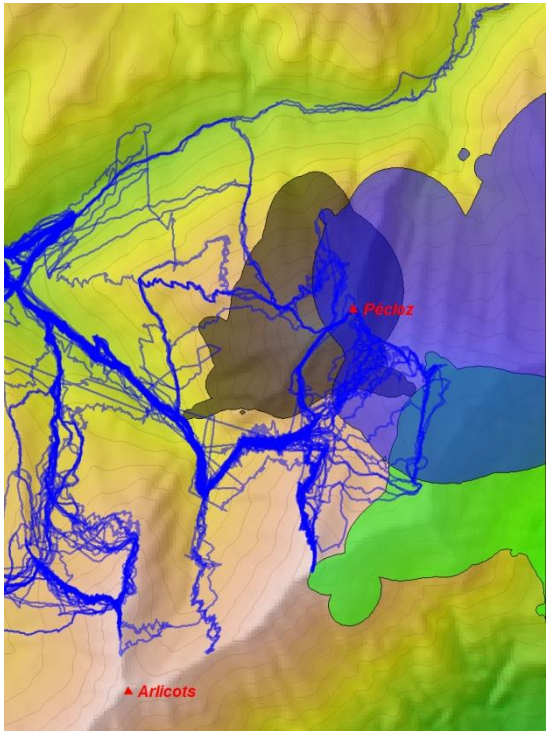
Area use by chamois all the year

Interaction chamois / ski touring

Large overlap between ski tracks and distribution of chamois

Potentially strong interaction at large scale

Do chamois respond to skiers presence?

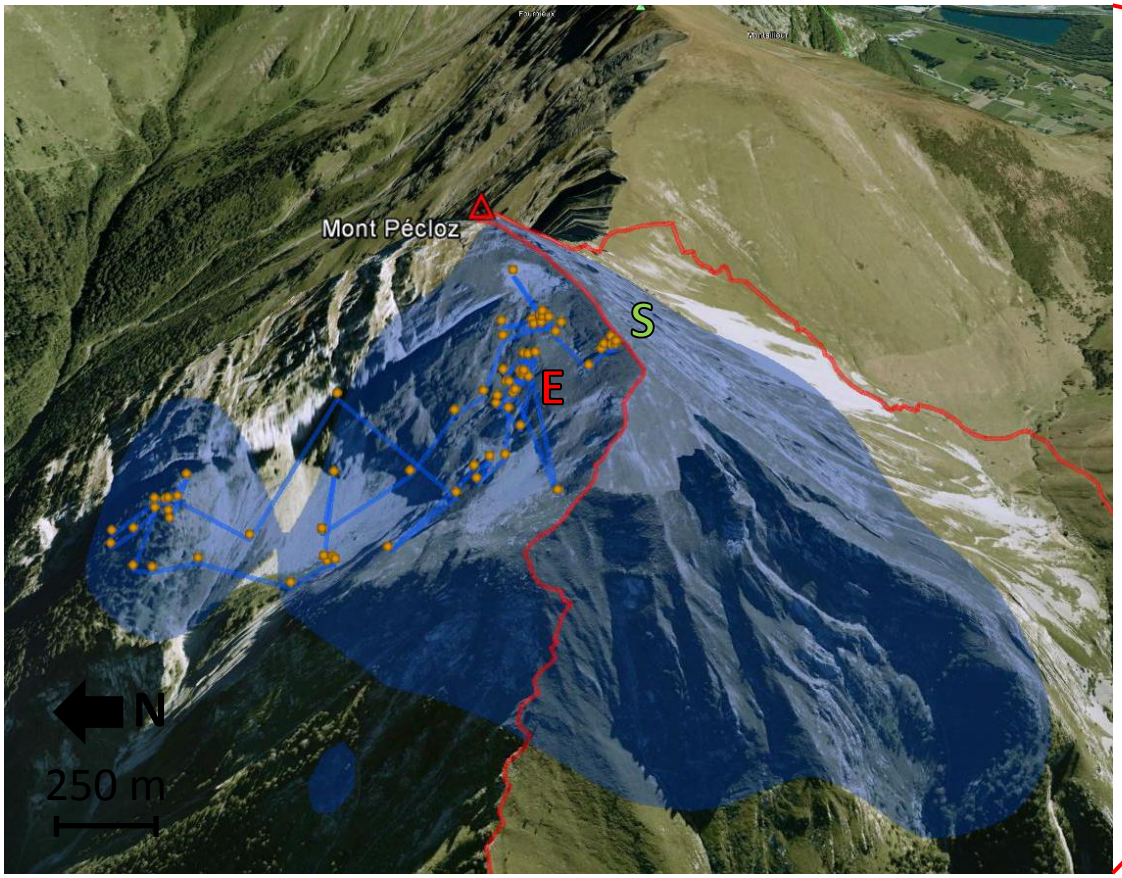


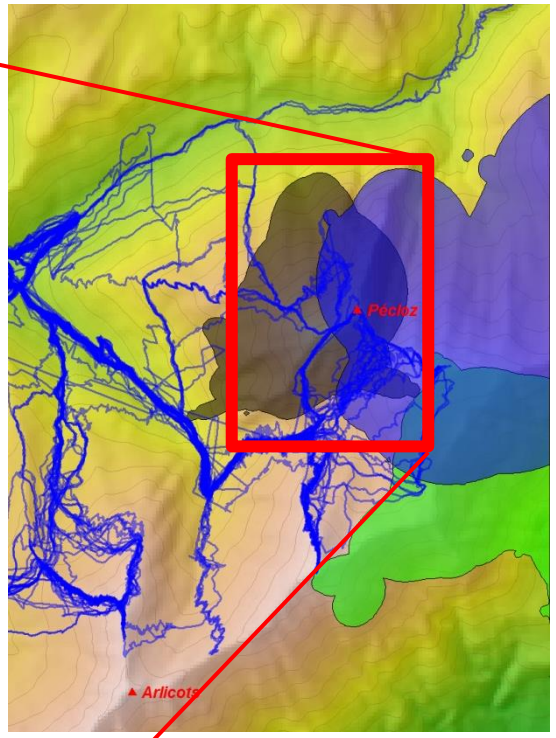
Polygons : Spatial groups of chamois

Interaction chamois / ski touring

79 females chamois equipped with **GPS** (2004 – 2014)
Location recorded every 20mn on :

- **Sunday : more disturbance by skiers**
- Monday and Tuesday





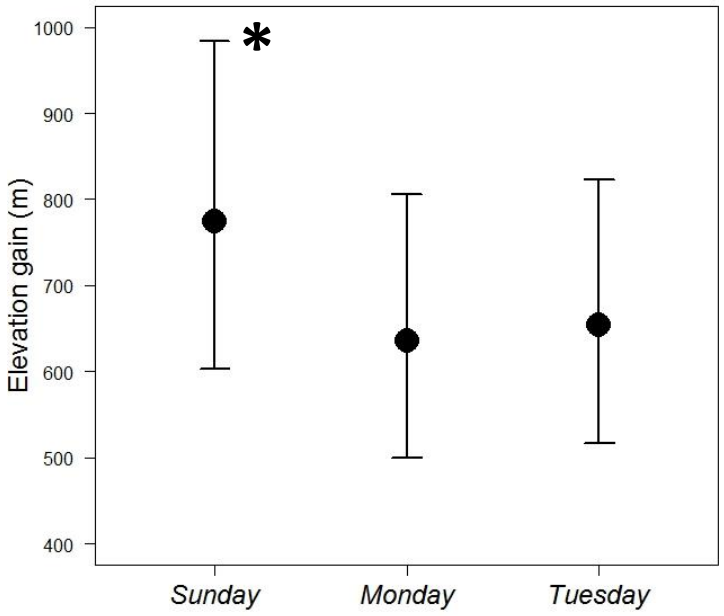
S Start

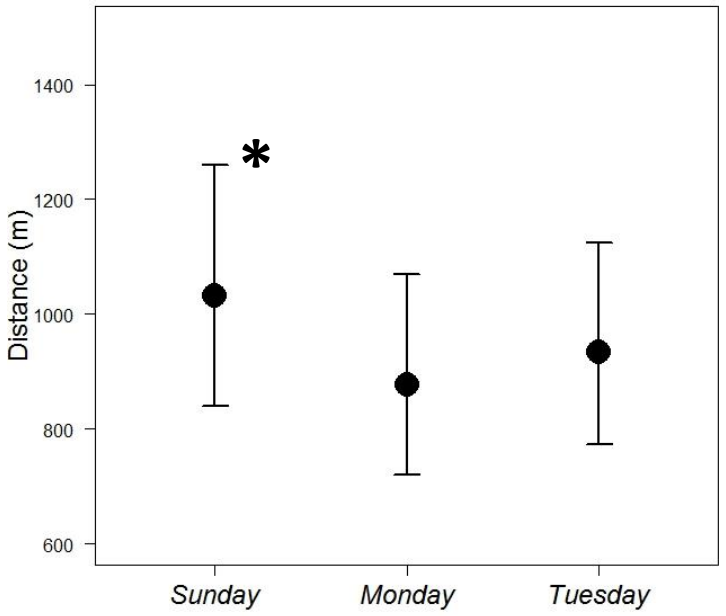
E End

90 % Home range

Interaction chamois / ski touring

- Estimation of difference in elevation gain and distance travelled by female chamois during disturbed hours (9h - 17h local)
- **Comparison between disturbed** (Sunday) **and undisturbed days** (Monday, Tuesday)



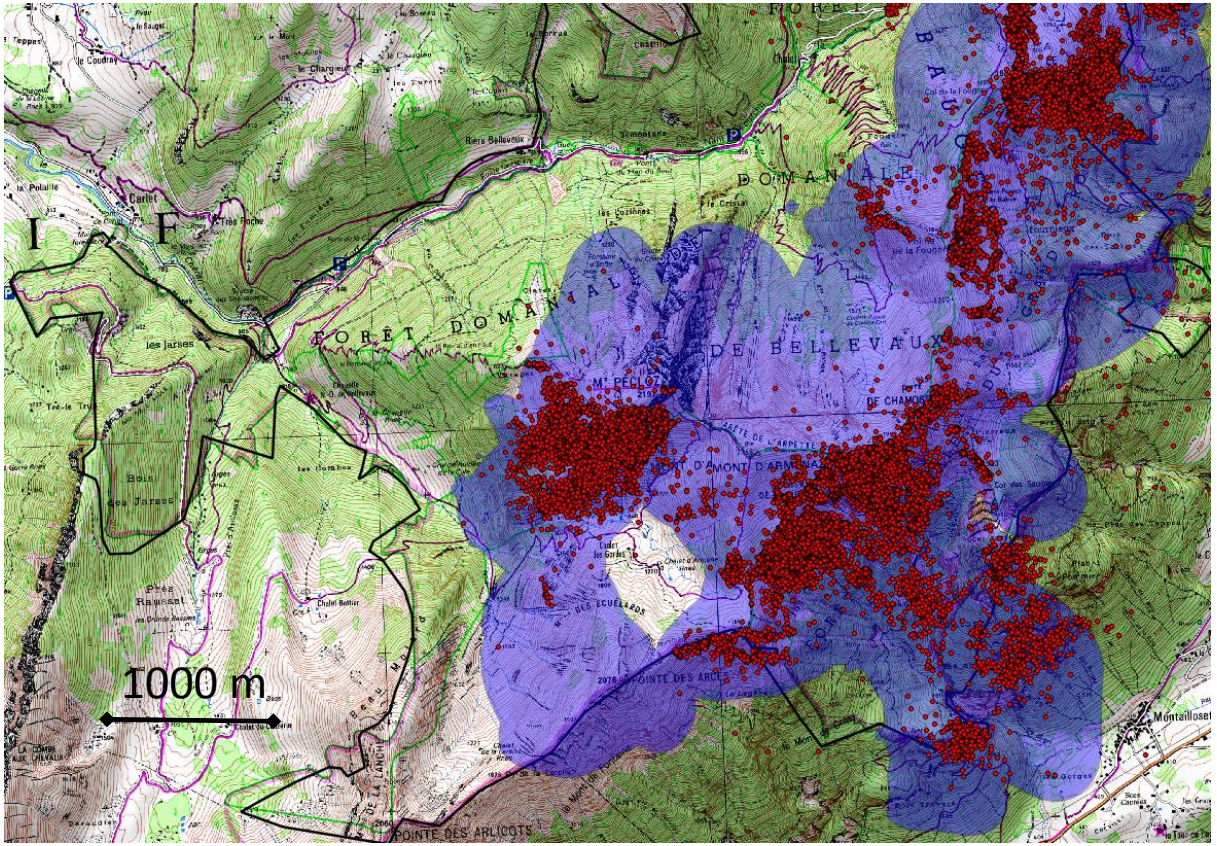


20% more in elevation gain (+ 129 m) and 14% more in distance (+ 127 m) on sunday

Temporal antipredator responses of chamois to ski touring at large scale

Research perspectives

Interaction are more complex at finer scale



Habitat selection study

Location of chamois January - March

Area use by chamois all the year

Research perspectives

Understand the skiers and chamois landscape use

- Do they select for the same habitat criterion?

	Chamois	Skier
Snow depth	---	+++
Slope	+++ (cliff)	+
Exposure	Heat exposure	Variable with avalanche risk

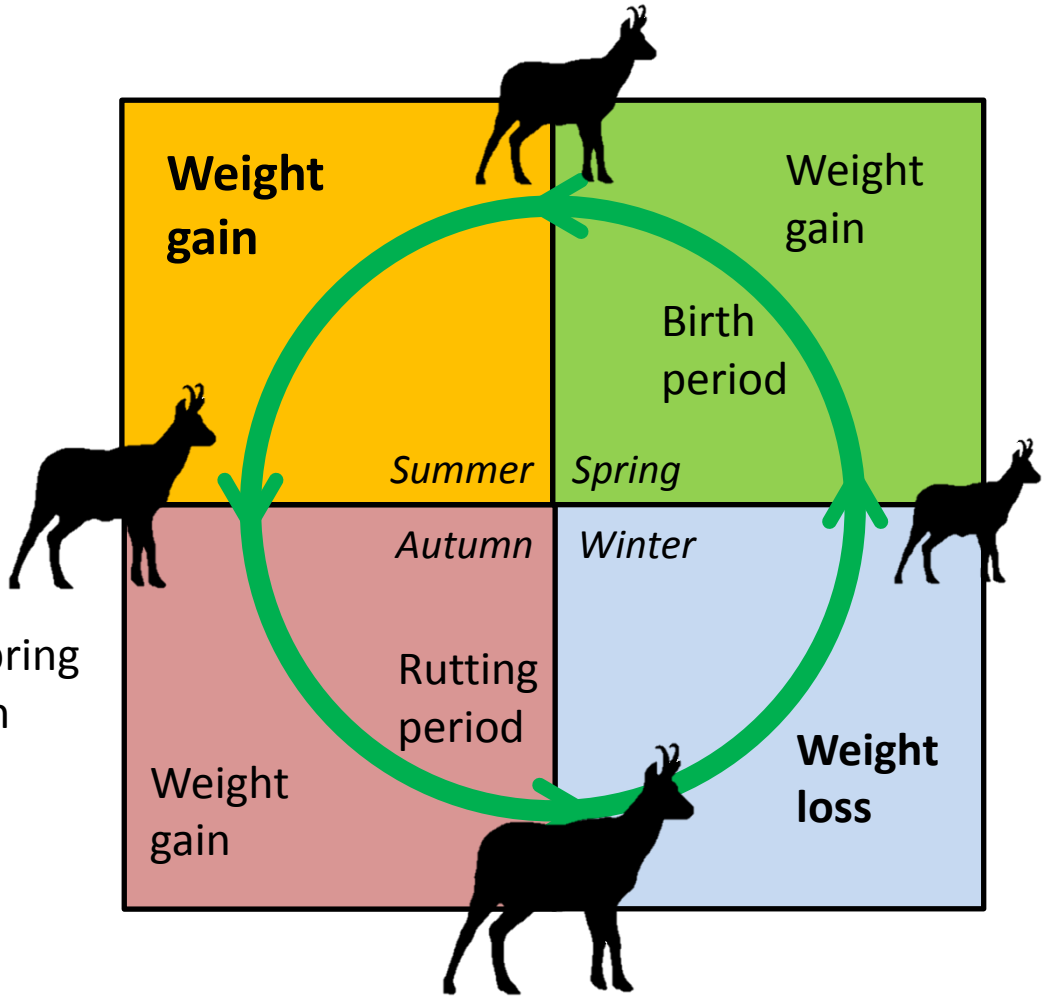
- What are the consequences of skiing on chamois in term of :
  - Activity (time allocation trade off between antipredator behaviors and forage acticity)
  - Energy budget
  - Survival, reproduction and demography consequences

Disturbance in global view

Winter disturbance is just a part of the annual disturbance endured by a species

For chamois, winter survival is mainly depend of **body condition** of the animal **before winter**

All disturbances, even small, from spring to autumn could play a higher role in survival.



Identify critical period for survival and reproduction of species is a key point to understand or predict impact of the annual disturbance cycle.

Thank your for your attention