Project Update: May 2021

Abstract

Domestic dog (*Canis lupus familiaris*) is the most common carnivore globally. It can interact with wildlife in diverse ways; through predation, competition, disease transmission and hybridisation. The closer to protected areas, the more harmful its impacts could be. Nowadays, this species is considered one of the causes of more than half of bird, mammal and reptile extinctions globally. In this work, we want to quantify dog-wildlife interactions and understand how much does society knows and worry about the conflict at national scale (Argentina) and at local scale (northern Patagonia).

Aims and activities proposed to achieve each aim

Aims	Activities proposed
1) Assess the state of the problem of dog- wildlife interaction in urban and rural areas near protected areas	– Online surveys at national level – Personal Interviews – Camera trapping on the largest protected area in North- western Patagonia (Nahuel Huapi National Park)
2) Determine the social perception about protected areas, the presence of dogs in protected areas, and dog–wildlife interactions by all the stakeholders involved	– Online surveys at national level – Personal Interviews
3) Obtain concrete records of dog-wildlife interaction	– Online surveys at national level – Personal Interviews – Camera trapping on the largest protected area in North- western Patagonia (Nahuel Huapi National Park)
4) Estimate dogs presence and abundance in protected areas near human settlements	– Camera trapping on the largest protected area in North- western Patagonia (Nahuel Huapi National Park)
5) Assess the main drivers that increase the negative impact of dogs on wildlife in the sampled areas	– We will elaborate a map risk of dog to wildlife with the data obtained in the surveys, interviews and camera trap survey

Performed activities

Follow the planned schedule and perform the activities at the proposed time was difficult due to the sanitary situation the last 14 month due COVID-19 pandemic. All field activities was prohibited several months, and when we were allowed to carry out field activities, personal interviews and trips to other locations were not among the activities allowed by CONICET institution (National Council for Scientific and

Technical Research) or by local governments. However, we reorganize the schedule and activities seeking to comply with both the sanitary measures and the proposed objectives.

November 2019 – January 2020

- I performed the online survey and tested it. I made corrections three times before to spread it publicly. Once ready, I publish it and carry out permanent active dissemination through socials medias, e-mails, institutional channels, etc. to reach diverse and numerous sectors of society. When closing the survey, I obtained 1026 responses widely distributed at country level (figure 1).
- At the same time, at the beginning of the work I sought permits from the institutions involved, National Parks of Argentina and INIBIOMA – CONICET, to perform the study. Also I introduced the project to different stakeholders on the subject, including an important local association of domestic animals protection (*Mi granito de arena*). I request permission from neighbours and landowners to work in their territories, two indigenous communities (Lof Buenuleo and Lof Maliqueo, Mapuches communities) and privates organizations (*Challhuaco Aventuras*). Also I contacted residents of the Program of Veterinary Public Health of URESA Andina (Regional Unit of Epidemiology and Environmental Health Andean Zone, http://www.uresaandina.com.ar/residencia/) and the department of Parasitology of the Comahue National University to collaborate with the project in zoonosis aspects.

February 2020 - December 2021

Due to the COVID-19 pandemic and the strict lockdown, field samplings were not allowed during this period.

- During this time, I processed and analysed the large quantity of data obtained from online surveys. Also, I wrote and published a paper with a first set of data (Zamora-Nasca et al., 2021). This paper reports the first list of species persecuted by domestic dogs in Argentina. My co-authors and I observed that: 1) the 68.4% of respondents had witnessed a dog persecuting wildlife at least once (figure 1); 2) the problem is widely present along all the ecoregion of the country; 3) at least 80 species are persecuted by domestic dogs in Argentina (figure 2); 4) at least 6.5% of the affected species are categorized as EN or VU in National Red Lists (figure 3).

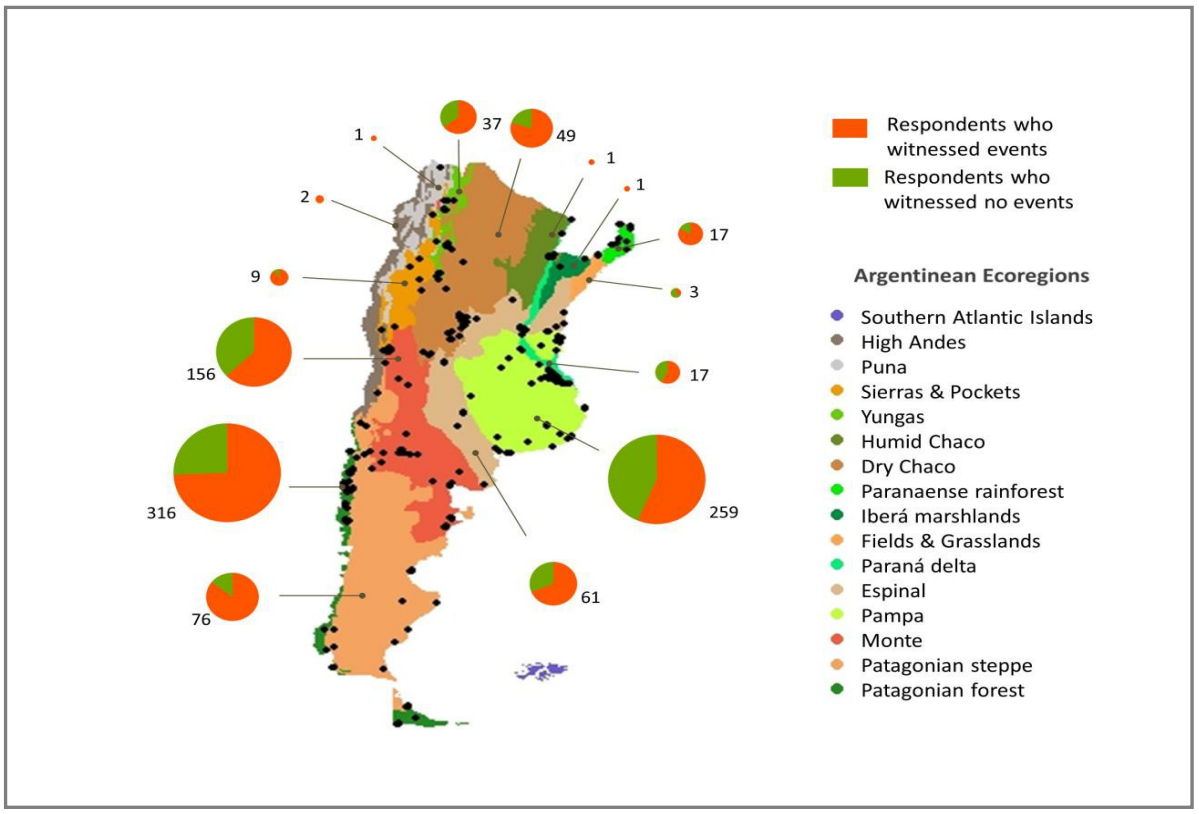

Figure 1. Map of Argentina including the locations, by ecoregion, from which we obtained responses reporting dogs chasing or preying on wildlife (black dots). The numbers beside each pie chart correspond to the total number of respondents from each ecoregion. Respondents who witnessed persecution events (red in pie chart) are distinguished from those who witnessed no events (green).

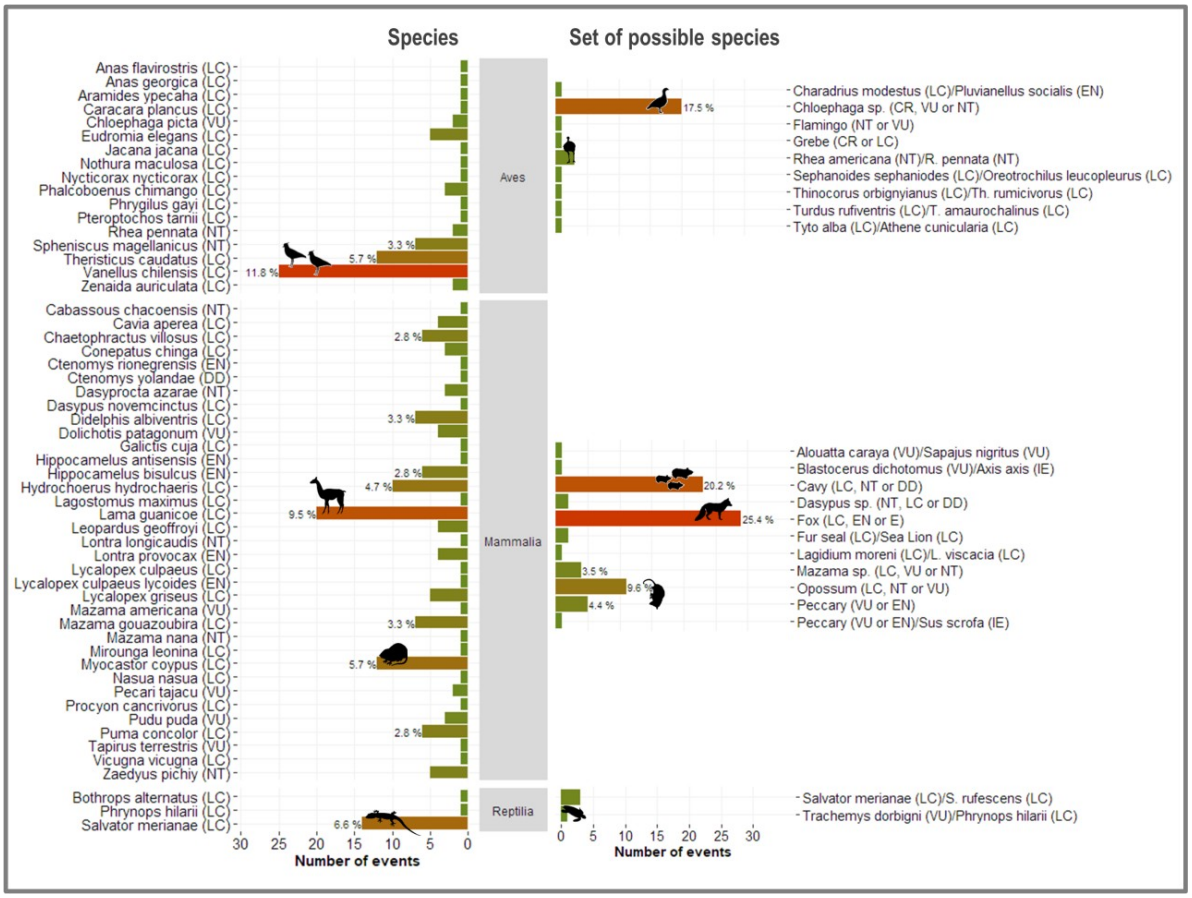

Figure 2. Number of dog chases or predation events on wildlife reported (and percentages of total events in cases where the species were mentioned in more than five events) that could be identified taxonomically to native species level (left side), and sets of up to four possible species (which may also include some exotic species) (right side) according to the location of the event and the description of respondents (for more details, please see methods section of Zamora-Nasca et al., (2021)). Events including an exotic species with certainty were excluded. The color gradient of the bars represents the number of events, from the lowest (green) to the highest (red). IE: Invasive Exotic; E: Exotic; DD: Data Deficient; LC: Least Concern; NT: Near Threatened; VU: Vulnerable; EN: Endangered; CR: Critically Endangered. See Table A2 in online Appendix of Zamora-Nasca et al., (2021) for the complete taxonomic names and the correspondence of the common names with the scientific names.

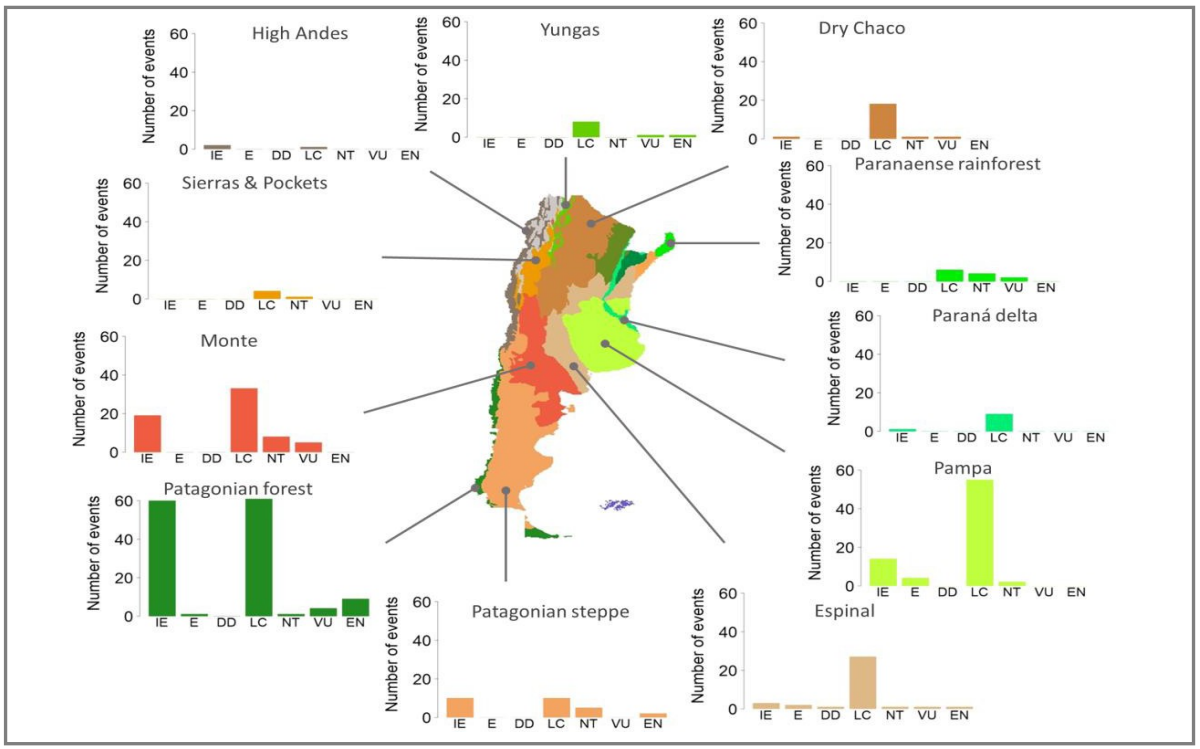

Figure 3. Number of dog chases or predation events on wildlife reported in each Argentine ecoregion, and the conservation status of the species at National level. IE: Invasive Exotic; E: Exotic; DD: Data Deficient; LC: Least Concern; NT: Near Threatened; VU: Vulnerable; EN: Endangered; CR: Critically Endangered. Data includes reports of single species and sets of possible species where all the species were in the same category. Sets of possible species with individuals in two or more categories were excluded (for more details, please see methods section of Zamora-Nasca et al., (2021)). Detailed information on the locations of the events reported, the taxonomic classification of the species involved and categories per ecoregion can be accessed via the following link: https://adivirgilio.shinyapps.io/dogs_attack_to_wildlife/.

- We performed a permanent accessible data base where we organized the obtained information by Argentinean ecoregion. We reported the location of each event of wildlife persecution reported, the species involved and their conservation status. This data base will be updated as new information becomes available. This database can be accessed through the following link: https://adivirgilio.shinyapps.io/dogs_attack_to_wildlife/. In first instance, it was publicized in English, in a short time, we will perform an online data base in Spanish, with all the information obtained to make this more accessible to the society.
- On the other hand, I start to work in collaboration with professional illustrators and animators with extensive experience in audio-visual media (see professional profile: Behance.net/anainesflores). The aim is to perform a short video and a set of posters to share the results with the society and use these materials as tools for campaigns awareness. We plan to continue working together as we obtain new data.

January – April 2021

The CONICET institution and local government allows us to return to field sampling follow COVID- 19 prevention protocol (only two persons, daily sampling without overnight, trips to other locations and overnight stays not allowed).

- From online surveys and talking to people I identify sites to install the camera traps. Several testimonies reports that exist a pack of 20 – 30 dogs, very aggressive in a zone of the Nahuel Huapi National Park. The zone where the pack was witnessed is near the landfill of the city and near a clandestine pig farm. Many people reported seeing these dogs feeding at these sites. The city of San Carlos de Bariloche is immerse inside the Nahuel Huapi National park, so the edges between city and park are diffuse. The area has a high intensity of use, either by local inhabitants, native communities (Mapuches) and tourists who circulate through trails enabled for walks.
- I decide to install the cameras near these sites in two valleys with pristine vegetation (Figure 4 and 5). The aim was know how much dog's frequent sites at different distances from de city. My team of work and I seek to identify the pack, estimates presence and abundance; and know the pattern of use of the protected area, roads, zones that frequents and overlaps with wildlife.
- We installed on each valley, 10 cameras separated 800 meters each one, covering an area of 405 ha (Figure 5). We leave the cameras during 30 days. At a first glance of the captures of the cameras, we observed high presence of dogs in the area, and also native fauna, and other invasive species. In the following section it can be seen some of the images captured by the cameras.
- During field work, I collected feces of dogs and wildlife which will be analysed to study zoonosis aspects. Also, I will use the feces samples and hair of dogs and wildlife also collected during field samplings to study dietary aspects through isotopes. These materials will be analysed in collaboration with URESA Andina and the department of Parasitology of the Comahue National University. The aim of the collaboration is to add information about health problems caused by dogs, either to people than to wildlife. Moreover, we want to study diets overlaps between domestic dogs and wildlife.

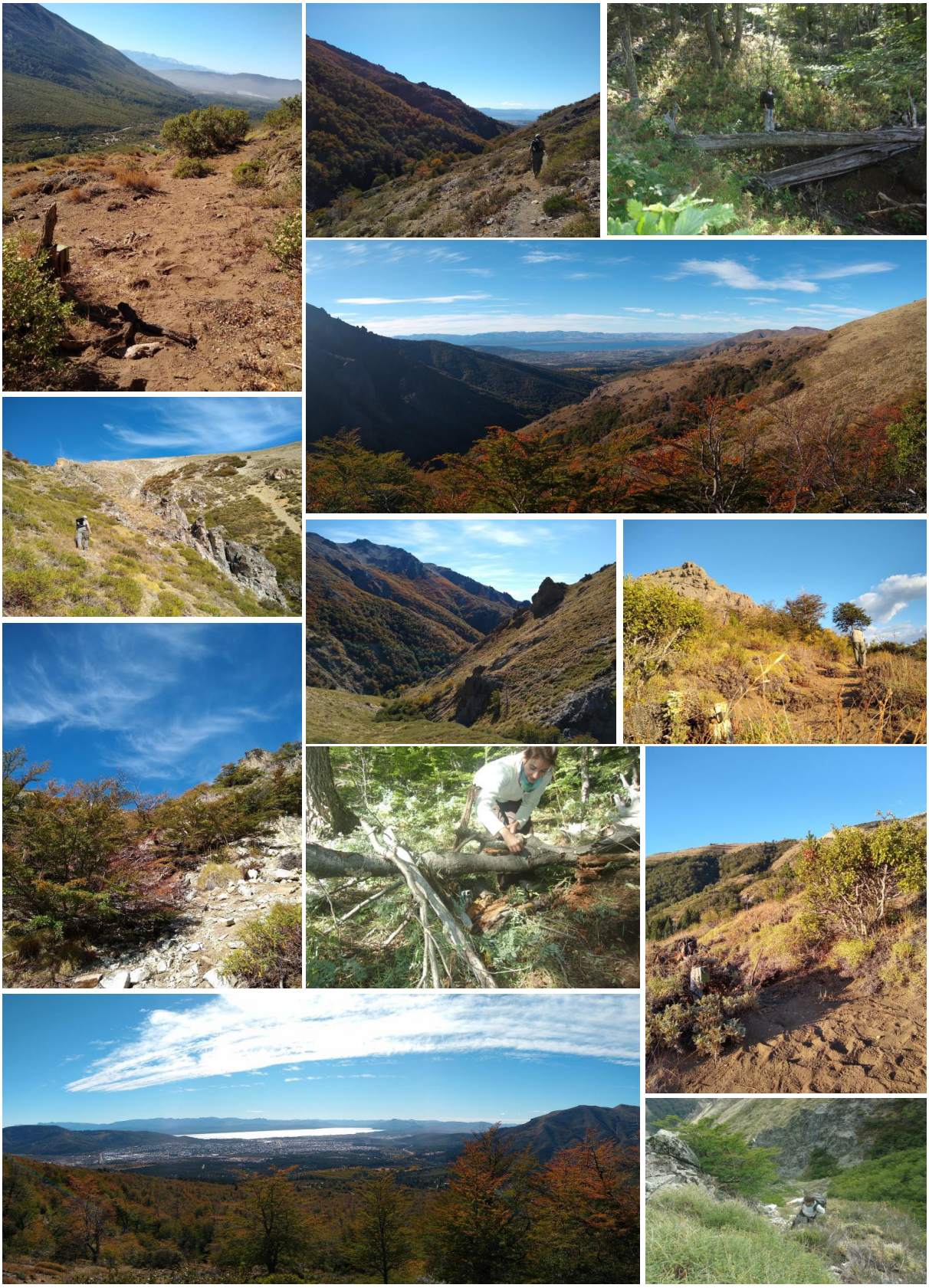

Figure 4. Photographs of the study area, camera stations and work team.

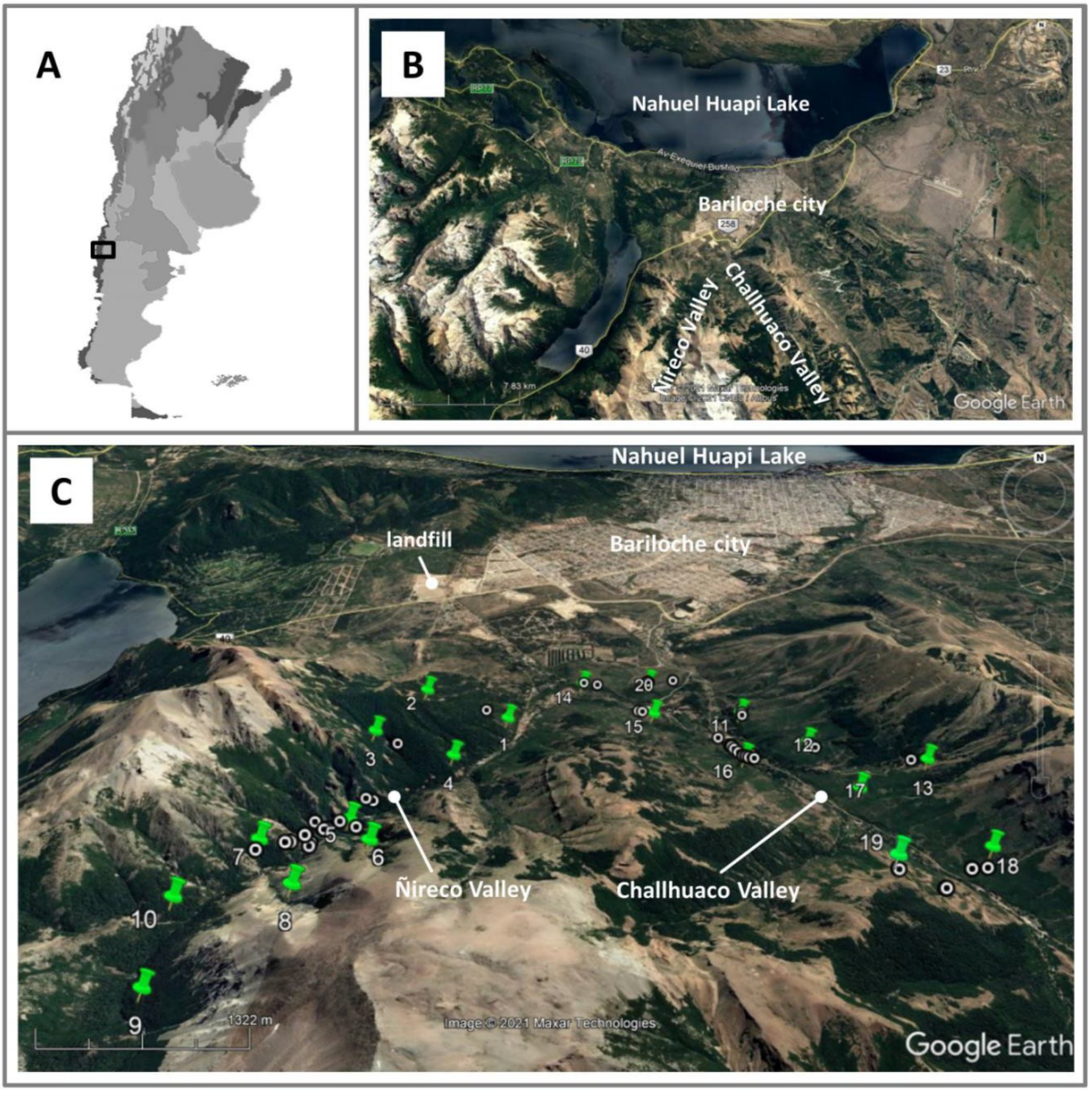

Figure 5. Study area located in North Patagonia of Argentina (A); in Bariloche City (B). The cameras were installed in the Nahuel Huapi National Park, in two valleys at difference distance of Bariloche city (C). Green marks corresponds to each camera station, white circles corresponds to carnivores feces collected.

Captures obtained from different camera stations

Camera station 1: Domestic dogs, domestic cat, native foxes and exotic European hare.

Camera station 2: Domestic dogs and exotic European hare.

Camera station 4: Native fox and domestic dogs.

Camera station 9: Domestic dog, exotic deer and native foxes.

Camera station 16: Pack of domestic dog; native foxes, exotic deer and exotic European hare.

Upcoming activities

- Currently we are analysing other set of data obtained from the online surveys to answer the questions about social perception of protected areas, the presence of dogs in protected areas, and dog–wildlife interactions by all the stakeholders involved. We are performing a map of Argentina with the protected areas visited by the respondents, the frequency of events of interaction of dogs and wildlife in these areas, the perception of the people regard management measures and the knowledge about the measures already implemented. The responses comprehend information about 894 different protected areas of the country that belongs to different categories of protection.
- We have installed the cameras again in an area adjacent to the one already sampled to cover a greater surface area. Also, I am processing the data already obtained by the cameras in order to achieve the following aims: obtain concrete records of dog-wildlife interaction and estimate dogs presence and abundance in protected areas near human settlements.
- The team of animators and I are working in the realization of the video to share with society the results obtained so far.
- In the near future I hope to carry out the personal interviews planned as the health situation regarding the COVID-19 pandemic allows me.
- I plan to analyse all the data together to assess the main drivers that increase the negative impact of dogs on wildlife in the sampled areas and perform the map risk of dogs to wildlife proposed.

References

Zamora-Nasca, L.B., di Virgilio, A., Lambertucci, S.A., 2021. Online survey suggests that dog attacks on wildlife affect many species and every ecoregion of Argentina. Biol. Conserv. 256. https://doi.org/10.1016/j.biocon.2021.109041

Online survey suggests that dog attacks on wildlife affect many species and every ecoregion of Argentina

Online Appendix A

Figure A1: Interactive map of Argentinean ecoregions that shows the localization of the events reported, the taxonomic classification of the species involved and their national categorization of threat. The information of this interactive figure will be updated as new data is obtained. Link to the figure:
https://adivirgilio.shinyapps.io/dogs_attack_to_wildlife/

Additional Results: Results of possible species involved in dogs chase or pray situations.

For the cases where the species of set of up to four possible species where categorized in different status in global and National red lists, there were 12 possible situations involving species categorized as Critically Endangered, Endangered, and Vulnerable at global level in the IUCN red list and 63 possible interactions involving species categorized in these statuses at National level (see detailed information of the possible species involved in Table 1 and in the Figure A1).