



**RESEARCH
FELLOWSHIP
PROGRAM**

WCS Institute
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GRANTEE INFORMATION	
PROJECT NAME: Conserving the last of the wild: pumas and wild camelids in the semiarid landscapes of the Argentinean Andes	
PRIME CONTACT/JOB TITLE: Emiliano Donadio – PhD student	
ORGANIZATION/INSTITUTION: University of Wyoming	
EMAIL: emiliano@uwyo.edu	REPORT DATE: June 20 th 2011
ADVISOR: Steven W. Buskirk, marten@uwyo.edu	

TYPE OF REPORT: Final

SECTION 1: EXECUTIVE SUMMARY

Executive Summary:

The loss of species interactions may result in negative impacts that affect both interacting species and the biological communities and ecosystems they inhabit. Unlike North America, southern South American predator-prey systems have been disrupted mainly through the elimination of large native prey (i.e. wild South American camelids: guanacos and vicuñas). Consequently, over vast areas of southern South America, the interaction between South American camelids and their main predator, the puma, has been disrupted with unknown consequences for biological communities. This project aimed to evaluate the community level importance of the predator-prey interaction between wild South American camelids (particularly vicuñas) and pumas in one of the last wild areas, San Guillermo National Park, where such interaction still occurs.

The main goals of this research were (1) to analyze the spatial distribution of puma predation on vicuñas; specifically, we investigated if some habitats were more or less risky for vicuñas and (2) to evaluate whether different levels of risk perceived by vicuñas resulted in a mosaic of habitats that differ in several community variables; specifically we investigated, in safe and risky habitats, vicuña foraging and vigilant behavior, and experimentally analyzed vicuña grazing impact on vegetation and small fauna.

We found that the distribution of vicuña carcasses was not random. Vicuñas were killed by pumas in canyons and meadows more than expected; conversely vicuñas were killed in flat plains less than expected. Canyons (due to rocky outcrops) and meadows (due to tall grasses) present features that facilitate the ambushing strategy of pumas. In fact, puma relative activity was higher in canyons and meadows than in flat plains. Vicuñas responded accordingly investing more time in vigilance and less in foraging in canyons and meadows than in flat plains; additionally, vicuñas tended to use areas farther away from rocky outcrops. Such behavioral responses had a clear effect on vegetation structure. When vicuñas were excluded from experimental plots (400m²-fenced areas), plant height, plant cover and plant reproductive success (measured as the presence of seed-heads in grasses) increased in flat plains while remained unchanged in canyons and meadows suggesting that in these risky habitats pumas rather than fences were protecting plants.

Results from this research highlight the importance of conserving large predators as well as their large herbivore prey from an ecological perspective. They are also valuable to quantitatively evaluate the success of conservation actions such as the restoration of top predators, large prey species or both, currently ongoing at least for camelids in Argentina. Furthermore, we have already submitted preliminary reports to the head of the park; we suggested keeping future tourist trails to a minimum in canyons as well as avoid roads nearby meadows. Otherwise, tourists may scare pumas away allowing vicuñas to graze in risky habitats and therefore homogenizing plant structural diversity across habitats.

Finally, WCS funds have also supported the training of future generations of conservation biologists in Argentina. Twenty seven undergraduate and graduate students from seven different Argentinean universities participated as lab or field technicians in this project.

SECTION 2: RESEARCH PROGRESS

<p>Goal 1: Analyze the spatial distribution of puma predation on SAC in the semiarid landscapes of the Argentinean Andes</p>	<p>Specific Aims/Activities to Meet This Goal (one cell per individual aim/activity) Activity 1A: Compare topographic and vegetation features associated with camelid carcasses (puma kills – non puma kills) that may define risky habitats for SAC.</p>	<p>Progress on methods/data analysis (Please include all achievements and progress, highlight milestones, and explain any problems encountered.)</p> <p>1) The spatial distribution of puma predation on vicuñas was successfully analyzed based on 79 vicuña carcasses showing signs of puma predation. Puma kills were not distributed at random in the landscape. Although vicuñas were killed in all 3 habitats (canyons, meadows and flat open plain) they were killed by pumas more than expected (based on habitat area) in habitats a priori defined as risky, canyons and meadows, and less than expected in the habitat a priori defined as safe, open plains. Overall, canyons and meadows had higher vegetation cover and higher vegetation height than open flat plains. Also, canyons had more pronounced slopes and shorter distances to rocky outcrops than the other 2 habitats. Our results suggest that complex vegetation and topographical features benefit the hunting strategy (ambushing) of pumas; therefore increasing the risk of predation for vicuñas in habitats such as canyons and meadows. Status: Fully accomplished</p>
<p>Goal 2: Investigate whether a behaviorally mediated trophic cascade triggered by pumas, and mediated by the risk of predation perceived by SAC, creates a mosaic of habitats that differ in the structure of vegetation, and abundance and diversity of plants, small vertebrates and invertebrates</p>	<p>Activity 2A: To assess behavioral responses of camelids to puma predation using behavioral observations and giving up densities of food experiments</p>	<p>1) Behavioral observations: Vicuñas responded to the different levels of predation pressure suggested by vicuña carcass distribution. Such responses followed two different strategies. First, vicuñas tended to avoid areas close to canyons with rocky outcrops where puma activity and likely puma hunting success appear to be higher. They also used flat open plains more than canyons as shown by counts of vicuña latrines in line transects. Meadows, despite being a risky habitat, were highly used probably because meadows have high availability of food resources particularly during winter months when food resources are almost nil in the plains. Second, vicuñas increased vigilant and decreased foraging times in areas with tall vegetation and high plant cover (i.e., meadows) or complex topographical structures (i.e., canyons with rocky outcrops where pumas could hide). Indeed, in meadows and canyons individual and group vigilant budgets were higher than in flat open plains. Individual vicuñas in meadows tripled the amount of time spent vigilant when compared to vicuñas in the open plains. Likewise, in meadows and canyons the percentage of vicuñas vigilant within groups at any given time was 3.5 to 4 times higher than that of vicuñas groups grazing in the flat open plains. Status: Fully accomplished</p> <p>2) Giving-up densities of food: The only unforeseen problem that I could not solve was the lack of response of vicuñas to our feeding trials. We tried with different food substrates but vicuñas still ignored the buckets with food. Therefore I was unable to successfully complete this part of the project. Status: Not accomplished</p>

	<p>Activity 2B: To analyze the impact of camelids on vegetation and fauna</p>	<p>1) <i>Effects on vegetation</i> – Behavioral responses of vicuñas to varying levels of puma predation appeared to have an impact on vegetation; the size of the impact was habitat-driven. In the flat open plains, where vicuñas spend most of the time feeding, our experimental exclosures had a large impact on grasses. In fact, in this habitat grasses were 3.0 times taller inside than outside exclosures. Likewise, grass seed-heads were 28.0 times more abundant inside than outside exclosures. Also, green plant biomass was 6.5 times higher inside exclosures. Conversely, no effect of the exclosures was observed on vegetation cover. In canyons and meadows, where vicuñas spent more time vigilant, our experimental exclosures had a small impact on grasses. Here, grasses were only 1.2 to 1.3 times taller inside than outside exclosures; grass seed-heads were only 1.8 times more abundant inside than outside exclosures (only canyons) and; green plant biomass was just 1.3 to 1.6 times higher inside exclosures. In these two habitats no effect of exclosures was observed on vegetation cover. <i>Effects on fauna</i> – Changes in vicuñas behavior depending on the level of predation risk and concomitant changes in vegetation affect neither invertebrate abundance nor biomass. Similarly, no change in lizard abundance was observed. Status: Fully accomplished</p>
	<p>Activity 2C: To analyze camelid use of risky and safe habitats</p>	<p>1) See progress on activity 2A Status: Fully accomplished</p>

SECTION 3: PROJECT PROGRESS & ACCOMPLISHMENTS

3-1: Training and educational accomplishments:

During the duration of the project we hosted 30 undergraduate and graduate students including 26 Argentinean students from 7 different universities from all regions of Argentina, and 4 international students from Mexico, Spain and France. Also, 7 park rangers, and 3 provincial conservation agents collaborated with this project. All of them received intensive training in different field (transect sampling, behavioral observations, vegetation sampling, scat collection and identification, track identification, and field necropsies, small vertebrate and invertebrate trapping, marking and handling) and lab techniques (transect and behavioral data analysis, sample extraction and storage).

Finally, one of the undergraduate students conducted research for her honor thesis under my direction within the framework of my project. She expects to defend her thesis (and graduate) in middle September 2011.

List of undergraduate students involved (n = 22): Silvia Carta Gadea, Ramiro Crego, Paula Perrig, Pablo Gáspero, Norali Pagnutti, Natalia Di Clemente, Micaela Medina, Martin Filleni, Mariel Ruiz Blanco, Maria Laura Vinassa, Luciana Castillo, Leticia Forte, Juan Kantor, Jualiana Benitez, Ivana Macri, Gabriel Gomez, Fernando Merwaiss, Evangelina Vertua, Estefania Paz, Emiliano Depino, Daniela Mones de Oca and Carolina Baldini.

List of graduate students involved (n = 4): Silvina Bisceglia, Laura Sacchi, Claudina Solaro, Carolina Paez

List of international students involved (n = 4): Maud Oberlin (France), Ignacio Ruiz (Spain), Marco Escudero (Spain) and Emiliano Mendez (Mexico).

Home universities of Argentine students involved (n = 7): Universidad Nacional de Buenos Aires, Universidad Nacional de San Juan, Universidad Nacional de La Plata, Universidad Nacional de Río Cuarto, Universidad Nacional de San Luís, Universidad Nacional de La Pampa and Universidad Autónoma de Entre Ríos.

Home universities of international students involved (n = 3): Agrocampus-Ouest (France), Universidad de Monterrey (Mexico) and Universidad de Zaragoza (Spain).

List of federal (n = 7) and provincial (n = 3) agents involved: Yanina Ripoll (Biologist, Department of Conservation, San Juan province), Raul Col (Technician, Department of Conservation, San Juan province), Dardo Recabarren (Technician, Department of Conservation, San Juan province), Alvaro Montañez (Superintendent, San Guillermo National Park), Jose Gallo (Park ranger, San Guillermo National Park), Felipe Marinero (Park ranger, San Guillermo National Park), Jose Esquivel (Park ranger, San Guillermo National Park), Italo Esquivel (Park ranger, San Guillermo National Park), Jose Cavallero (Park ranger, San Guillermo National Park) and, Danilo Tapia (Park ranger, El Leoncito National Park).

3-2: Conservation accomplishments: If this was not a specific goal covered in section 2 above, describe conservation results (e.g., progress on species or habitat protection, legislation, management plans, publicity, fund-raising, local benefits, government actions, involvement of local and international agencies, improved prospects for future action, etc.). Please forward copies of brochures, posters, etc. that you create with funds from your RFP award.

Our research would make available the first experimental evidence supporting the idea that large mammalian predators influence prey behavior and consequently impact on plant communities. Such information would be used to influence management policies at San Guillermo National Park and surrounding provincial

Reserve. Specifically, our results would be used to inform the authorities of both protected areas about the convenience of keeping future tourist trails to a minimum in canyons as well as avoid roads nearby meadows. Also, we expect our findings would influence existing conservation priorities in Argentina. Specifically, we expect conservation priorities moving from being species-focused to a more holistic community-focused approach. This may take a long time to be accomplished though.

Our results would also be valuable to quantitatively evaluate the success of conservation actions such as the restoration of top predators, large prey species or both, currently ongoing at least for camelids in Argentina.

Several partnerships and collaborations have been created during this project (1) we developed a strong liaison with San Guillermo National Park staff; this resulted in the park strongly supporting our work and also accepting and implementing some of our management suggestions; (2) similarly, we developed a strong relationship with provincial agents in charge of managing the reserve that surrounds the park; this resulted in the province providing some logistical support and asking for our advise in management issues related to the provincial reserve; (3) we collaborated with two federal research institutes; basically we submitted invertebrate samples for identification; at least 3 new species of invertebrates were found; (4) we are developing a research group that includes researchers from Argentina, USA and maybe England; ideally, this group will develop several research projects at San Guillermo National Park; strong national and international research programs will surely enhance the conservation status of the park impeding encroachment by mining companies.

3-3: Other accomplishments: If not covered in a specific goal in section 2 above, please describe other achievements of the project (e.g., media involvement, papers presented at meetings, participation in committees, workshops, etc.).

Presentations in professional meetings: Together with several of my volunteers (all undergraduate students), I presented 2 posters at the XII Argentinean Mammalogy Meeting (early November 2008), 2 posters at the XIII Argentinean Meeting of Ecology (late November 2008), 1 poster at the 10th International Theriological Meeting, 1 poster at the 90th ASM annual meeting, and 3 posters at the XXIII Argentinean Mammalogy Meeting (early November 2010) [Total presentations: 9; see below for a list of presentations].¹ Undergraduate student.

- ✓ **Donadio E.**, C.M. Ruiz Blanco, R.D. Crego, S.W. Buskirk. & A.J. Novaro. 2010. Survival rates and mortality factors of juvenile vicuñas *Vicugna vicugna* in the high Andes of northwestern Argentina. In Spanish. XXIII Argentine Meeting of the Theriological Society, Bahía Blanca, Argentina. **NUM 9**
- ✓ Perrig P.L., **E. Donadio**, J.A Pereira & D. Gómez. 2010. Use of meadows by wild South American camelids and pumas *Puma concolor* in the mountain range of San Juan province, Argentina. In Spanish. XXIII Argentine Meeting of the Theriological Society, Bahía Blanca, Argentina. **NUM 8**
- ✓ Ruiz Blanco C.M, **E. Donadio**, R.D. Crego, S.W. Buskirk & A.J. Novaro. 2010. Puma *Puma concolor* predation on vicuñas *Vicugna vicugna*: evidence for a behaviorally mediated trophic cascade. In Spanish. XXIII Argentine Meeting of the Theriological Society, Bahía Blanca, Argentina. **NUM 7**
- ✓ **Donadio E.**, M. Ruiz Blanco¹, R. Crego¹, S.W. Buskirk & A.J. Novaro. 2010. Birth weight and sex as factors affecting juvenile vicuña survival. Proceedings of the 90th Annual Meetings of the American Society of Mammalogists to be held in Laramie, WY, June 2010. **NUM 6**
- ✓ Ruiz Blanco M. ¹, **E. Donadio**, R. Crego¹, S. Buskirk & A. Novaro. 2009. Foraging and vigilant budgets in vicuñas *Vicugna vicugna*: habitat type overrides group size. 10th International Mammal Congress, Mendoza, Argentina. **NUM 5**
- ✓ **Donadio E.**, D.B. McDonald, A.J. Novaro, J.N. Pauli & S.W. Buskirk. 2008. Effects of introduced prey species on native predator communities: a comparative study in semi-arid habitats of Argentina (in Spanish). Proceedings of the XXIII Argentinean Meeting of Ecology, San Luis, Argentina. **NUM 4**
- ✓ Crego R.D.¹, C.M. Ruiz Blanco¹, **E. Donadio**, S.W. Buskirk & A.J. Novaro. 2008. Vigilance and foraging budgets in vicuñas *Vicugna vicugna* and its relationship with habitat structure (in Spanish). Proceedings of the XXIII Argentinean Meeting of Ecology, San Luis, Argentina. **NUM 3**
- ✓ **Donadio E.**, M. Vitali¹, A. Wursten¹, V. Salvador¹, J. Zanon¹, M.J. Veinticinco¹, M. Monteverde, A.J. Novaro & S.W. Buskirk. 2008. Wild South American camelids and their importance in the diet of pumas *Puma concolor*: a regional evaluation at seven protected areas of northwestern Argentina (in Spanish). Proceedings of the XXII Argentine Meeting of the Theriological Society, Villa Giardino, Argentina. **NUM 2**

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- ✓ **Donadio E.**, C.M. Ruiz Blanco¹, R.D. Crego¹, A.J. Novaro & S.W. Buskirk. 2008. Capturing and marking with ear-tag transmitters newborn vicuñas (*Vicugna vicugna*) at San Guillermo National Park, Argentina (in Spanish). Proceedings of the XXII Argentine Meeting of the Theriological Society, Villa Giardino, Argentina. **NUM 1**

Highlighted in yellow are the references to match titles here and attached posters and abstracts

Public talks, seminars and articles: During 2008, based on previously gathered data and preliminary data collected during this project, I presented a public talk titled: *The ecological importance of the protected areas of northwestern Argentina*. I presented this talk before a diversity of audiences at the Argentinean Institute for Research in Arid Zones (Mendoza, May 2008), National University of Cuyo (Mendoza, June 2008), Argentinean National Park Service Northwestern Region (Salta, August 2008), Laguna Los Pozuelos National Monument (Jujuy, August 2008), and National University of San Luis (November 2008). This talk highlights the importance of conserving several protected areas of northwestern Argentina based on the persistence in those areas of ecologically important interactions. The presentation emphasizes the outstanding conservation status of San Guillermo National Park (my study site) and warns against the uncontrolled development of open-pit large-scale mining operations nearby the park.

Also, I developed the talk *An (im)perfect monitoring: thoughts on biologists, mining and conservation*. This talk deals with ethic challenges faced by biologists working for mining companies and also analyze and evaluate the Environmental Impact Assessments presented by mining companies working nearby San Guillermo National Park. This talk was presented at the Argentinean Meeting of Mammalogy (early November 2008), the National Park Administration Agency Central Branch, Cordoba (early November 2008), the Center for Applied Ecology, Neuquén province (early April 2009), National University of La Plata, Buenos Aires province (August 2009) and the Department of Zoology, University of Wyoming (October 2009). Overall I gave 11 oral presentations dealing with wildlife, ecology and conservation how large-scale open-pit mining operations could affect them.

I was invited by the house of representatives of Mendoza province (May 2011) to present a talk dealing with the quality of the Environmental Impact Assessment presented by a mining company that plans to operate in the Andes of Mendoza province. After the presentation I was interviewed by several media (see http://www.hcdmza.gov.ar//index.php?option=com_content&task=view&id=2348&Itemid=1)

We developed an interactive power-point, which includes movies, aimed to teach ecology in primary and secondary schools using our field data. In this power point, student become field ecologists and have to gather, analyze, present and interpret data from our own study site. The power point is being used by the University of Wyoming in one of its outreach programs.

We developed a documental of the park. This documentary has been given to the head of San Guillermo National Park. The documentary will be used by park rangers when giving talks in schools and other institutions.

We organized a scientific collection of vicuña, guanaco and puma skulls. The collection has around 400 specimens, each of them with an individual code that can be linked to a digital data base with ancillary information. The collection is housed at the headquarters of San Guillermo National Park and can be freely visited by researchers. We expect the collection will highlight the importance of the park as a source of scientific information.

Over the last 3 years, I published 3 papers in peer-reviewed journals dealing with wildlife ecology and conservation at San Guillermo National Park. In these papers I presented results of my studies in the area as well as discussing the involvement of scientists in the evaluation and control of mining operations in the Andes range. Also we designed and implemented a monitoring plan for biodiversity for San Guillermo Biosphere Reserve, which includes the park and the surrounding provincial reserve (list of articles and reports below). ¹ Undergraduate student.

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- ✓ **Donadio E.**, A.J. Novaro, S.W. Buskirk, A. Wurstten¹, M. Vitali¹ & M. Monteverde. 2010. Evaluating a potentially strong trophic interaction: pumas and wild camelids in protected areas of Argentina. *Journal of Zoology* 280: 33-40.
- ✓ **Donadio E.** 2009. Ecologists and large-scale mining operations, thoughts about why and how become involved in the mining-environmental conflict [In Spanish] *Ecología Austral* 19 (3):247-254.
- ✓ **Donadio E.**, M.L. Merino & M.J. Bolgeri¹. 2009. Diets of two coexisting owls in the high Andes of northwestern Argentina. *Ornitología Neotropical* 20 (1):136-141.
- ✓ Di Martino S. & **E. Donadio**. 2009. Biodiversity monitoring plan for San Guillermo National Park. Administration de Parques Nacionales, Argentina.

3-4: List of publications during past six months: List any articles or books published and/or in press (popular and technical), as well as "grey literature" (e.g., management plans, field surveys, etc.) that relates to the RFP-funded project.

N/A

3-5: Additional support: Has your project been supported by other organizations? Please list these organizations and how they have assisted you in completing your RFP project.

The following organizations supported my project through either direct funding or donating field equipment: Rufford Foundation (Booster Grant), American Society of Mammalogists (Grant-in-Aid of Research), Program in Ecology (Summer Fellowships; UWYO), Cleveland Metropark Zoo (Scott Neotropical Fund Program), National Geographic (Committee for Research and Exploration Grant), Department of Zoology (Menkens Grant; UWYO), School of Natural Resources (Plummer Scholarship; UWYO), Posse Program (UWYO), CREO (Conservation, Research and Education Opportunities), Idea Wild.

SECTION 4: UPDATE TO TIMELINE AND BUDGET

4-1: Timeline: N/A

4-2: Budgetary changes:

We used less than expected to build exclosures and ran feeding experiments (budgeted = 4,000; used = 2,115); however road conditions had a high impact on trucks and therefore we spent more than expected in truck maintenance (budgeted = 1,450; used = 3,335).

4-3: Future Reporting: N/A

SECTION 5: IMPACT OF RFP SUPPORT

5-1: How has the RFP assisted your career as a conservationist?

RFP assisted me by providing funds to conduct research on ecological and conservation topics, which are part of my dissertation. Also, my presence in the national park, which is surrounded by heavy gold mining exploration and exploitation, has resulted in a profuse interaction with federal and provincial agencies, which have been requesting my opinion on issues dealing with the potential impact of mining on the national park and a neighboring provincial reserve. This interaction included the evaluation of Environmental Impact Assessments (EIA) presented by mining companies and the development of documents presented to the provincial government with recommendations to improve the quality of the EIAs. Conversely, my interaction

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with mining companies has not been fruitful as companies systematically denied any sort of errors (and there are many) in their EIAs. Moreover, mining companies assert that open pit gold mining operations represent no threat to the environment.

In conclusion, RFP has not only provided me with a unique opportunity to conduct conservation-related work for my dissertation but also allowed me become a biologist dealing with real world problems.

5-2: How has the RFP helped achieve “conservation” through your project?

Mostly through supporting field-based research, which allowed obtaining ecological information useful for the management of the park and surrounding provincial reserve (at a local scale) and also for the conservation management of large predators (at a regional scale)

5-3: Are there additional ways that the Research Fellowship Program and/or WCS can assist you in completing your funded RFP project?

N/A

SECTION 6: FINAL REPORT SECTION

6-1: Financial Report. Refer to Item 3 in your contract. If you need the format, please request the template from fellowship@wcs.org. **Attached**

6-2: Future Publications:

Estimated completion date for PhD dissertation: April 2012

Expected number of manuscripts to be submitted for publication: 4 (manuscripts will be submitted within the next 15 months)

Description of potential manuscripts

MS 1: it would report data on a behaviorally mediated trophic cascade triggered by pumas preying upon vicuñas. To be submitted to *Ecol Monographs*, *Oecologia* or *Oikos*.

MS 2: it would report data on puma-vicuña direct interactions. To be submitted *J. of Animal Ecology* or *J. of Mammalogy*.

MS 3: it would use network analysis and correspondence analysis to evaluate the effects of exotic prey species on the trophic structure vertebrate predator communities. To be submitted to: *Ecological Applications* or *Biological Invasions*.

MS 4: it would report data on vicuña reproductive ecology. To be submitted to the *Journal of European Wildlife Research*.

6-3: Personal Future Conservation Plans: Will you continue with your current project, or do you have different plans?

Upon completion of my PhD program I am planning to return to my country to keep working on ecological projects with strong conservation applications. Indeed, I will be applying for a position at the Argentine Research Council (CONICET) and joining to Dr. A Novaro's group to become a member of his Patagonian and Steppe Conservation program. Most likely I will continue my work in the San Guillermo landscape (see 6-4) and start at least one new project in the Payunia-Ahuca Mahuida landscape.

6-4: Project Future Conservation Potential: We do not expect every RFP project to result in a major conservation “breakthrough.” What further data needs to be gathered? What future conservation policy/action would you recommend, to what local/national actors?

After studying the importance of the interaction puma-vicuñas over vegetation and small fauna we suspect puma predation on vicuñas also affects Andean condor and other bird scavenger populations. Starting in middle 2012 we expect to continue our work evaluating the use by condors of vicuña carcasses with signs of puma predation. Our preliminary observations are encouraging: most vicuñas in our study site are killed by pumas and condors used these carcasses almost always. If quantitative data confirms this speculation then we will be able to link pumas, vicuñas and condors, three highly charismatic species, to build our case for the conservation of the frequently ignored arid and semi-arid landscapes of South America.

Also, we are planning to continue gathering data on vicuña demographic parameters to inform projects dealing with the sustainable use of this species. In our study site, gathering such information would be relatively easy due to the abundance and docility of vicuñas. We expect to radio collar 50 adult females to estimate survival female survival rates and productivity. To date none study attempted to do this.

We are also planning to develop a monitoring plan for the biota inhabiting the streams of the area. This is fundamental for the conservation of this dry area because these streams are being used by large scale mining operations. Not such a plan is in place so far and streams are very important for the maintenance on meadows which in turn support vicuña populations.

Steps towards these goals have been already taken. Several funding sources have been identified. I have also created ties with several colleagues who accepted to collaborate with the research ideas mentioned above. We will meet in June to develop a sort of blueprint that would be use to achieve our conservation goals. Also, one scholarship is already available for one Argentinean student to conduct research at San Guillermo National Park. We are now interviewing potential candidates for this position.

6-5: Dispensation of RFP-Funded Permanent Equipment: Refer to Item 4 in your RFP contract. Please list all pieces of equipment purchased with WCS RFP funds, and indicate your plans for each.

N/A

SECTION 7: ATTACHMENT LIST

Please indicate which items you are attaching to this report:

Revised Timeline	<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/>	No	
Revised Budget	<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/>	No	
Revised Reporting Schedule	<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/>	No	
Sample Brochures, posters, etc.* ¹	<input checked="" type="checkbox"/>	Yes	<input type="checkbox"/>	No	Digital copies attached
Images and captions * ²	<input checked="" type="checkbox"/>	Yes	<input type="checkbox"/>	No	Digital copies attached
Release for use of images in publicity	<input checked="" type="checkbox"/>	Yes	<input type="checkbox"/>	No	
Financial Report (final report only)	<input checked="" type="checkbox"/>	Yes	<input type="checkbox"/>	No	

* Please indicate if these are being posted as hard copies, separately from this report.

¹ Posters and abstracts presented in professional meetings are attached separately

² As requested 6 images and their captions are attached; however please recall that some time ago I mailed a DVD with about 40 pictures and 4 movies.

All images and printed material submitted can be used by WCS to publicize its activities.

Emiliano Donadio, June 20th 2011