

Darwin Initiative for the Survival of Species Final Report

1. Darwin Project Information

<i>Project Ref. Number</i>	162/13/016
<i>Project Title</i>	Endangered otter and invasive mink in Patagonia
<i>Country(ies)</i>	UK, Argentina
<i>UK Contractor</i>	Wildlife Conservation Research Unit (WildCRU), Oxford University
<i>Partner Organisation(s)</i>	PROFAUNA Organisation, University of Buenos Aires (UBA), Administracion de parques Nacionales (APN)
<i>Darwin Grant Value</i>	£ 89,664
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<i>Reporting period (1 Apr 2006 to 31 Mar 2007) Final Report</i>	1 Apr 2006 to 31 Mar 2007 Final Report
<i>Project website</i>	www.WildCRU.org/research/darwininitiative.htm www.profauna.org.ar
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2. Project Background/Rationale

The southern river otter (*Lontra provocax*), or huillín, is one of the most endangered mammals of the Southern Cone of South America and according to the IUCN it is in danger of complete extinction. The huillín is found in just two areas of the Andean-Patagonian region of Argentina. The isolation of their populations and their apparent inability to expand their distribution are of particular conservation concern. Our pilot studies for this project (Aued et al. 2003) suggested that the geographic distribution of otters is positively related to prey abundance and negatively related to the presence of a potential competitor, the invasive American mink (*Mustela vison*). Human barriers could also affect dispersal.

By the 1970s, the native otter was already close to extinction. Feral populations of American mink (originally introduced in the 1950s) were spreading rapidly through the valleys of the Andean-Patagonian region. Where mink became established they appear to be responsible for the near eradication of several species of riparian birds and mammals through predation of adults, nests and nestlings. Our study of the food and habitat requirements of mink in Argentina demonstrated that they overlap closely with those of otters, suggesting great potential for competition between the two species (see Previtalli et al. 1998).

3. Project Summary

The purpose of this project was to protect vertebrate biodiversity in the Andean-Patagonian region of Argentina by reducing the impact of invasive American mink and by facilitating the range expansion of endangered native otters in National Parks (see Appendix 0).

The planned outputs are as follows:

1) Academic outputs – theses, scientific papers and technical reports (See Appendices V, VI, VII, VIII, IX, X, XI). These will contribute towards the generation of new knowledge regarding which factors limit otter population expansion and how mink impact on vertebrate diversity - the first indicator that the purpose of the project has been achieved. This knowledge is required to underpin the otter's recovery.

2) (a) Practical management tools including management plans and training/implementation guides, computer databases, field reports, workshop records and agreements with the NPA. These will build Patagonia's capacity for otter reintroductions and mink removal - the second indicator of Purpose achievement (See Appendices XII, XIII, XIV, XV, XXI).

2(b) Training and education - training future Argentinean biologists, managers and wardens, educating stakeholders and policymakers, dissemination of results by a variety of methods and organisation of a permanent monitoring scheme. Trained personnel will be available to implement plans based on the aforementioned new knowledge. These will also build Patagonia's capacity for otter reintroductions and mink removal - the second indicator of Purpose achievement (See Appendices XVI, XVII, XVIII, XXII, XXIII, XXIV).

The major outputs of this project will be scientifically based plans designed for the national authorities, e.g. National Parks. For the parks to adopt our plans will itself be a measure of our success, and when they do so it will be possible to measure the success of each milestone they reach against our predictions (See Appendices XIX, XX).

Neither the outputs, nor the proposed operational plan, have been modified over the three years. The project met all its objectives.

The Articles under the Convention on Biological Diversity (CBD) that best describe the project are:

Article 7: Identification and monitoring

Article 8: In situ conservation

Article 12: Research and training

Article 17: Exchange of information

4. Scientific, Training, and Technical Assessment

Scientific assessment

All research objectives were achieved and represent one of the major project successes.

An outline of our results follows.

1. We found a significantly larger distribution of Southern river otters than was described 20 years ago when this species was declared in risk of extinction. In the 1970s, the distribution was reduced dramatically, mainly as a result of intense hunting pressure. Following this period, Aued et al. (2003) provided evidence of a population increase in Nahuel Huapi National Park. We were able to survey almost the entire Andean-Patagonic area and this work revealed a more optimistic situation for the otter population. We found a significant population increase with values for 'area of occupancy' and 'extent of occurrence' exceeding those for endangered species in accordance to IUCN criteria.

2. The distribution of otters closely matches the distribution of macro-crustaceans, following its heterogeneity at four ecological scales, showing the strong dependency of otters on this type of prey.
3. Unfortunately the main population of otters, which is located in the Nahuel Huapi National Park, showed a slight but significant decrease in total abundance. The underlying mechanism for this decline should be investigated in relation to the recent loss of coastal habitat arising from a new law permitting private owners to 'clear' the vegetation near the coast.
4. Our diet analyses revealed that otter diet composition - in terms of large prey types ('crustaceans', 'fish', and 'other' categories) - has not changed significantly over the last few years in freshwater and marine environments, suggesting that otters preferred relatively stable conditions.
5. Main prey of otters were macro-crustaceans in freshwater and benthonic fish in the sea, indicating that this endangered carnivores depends on slow prey that live on the bottom and cannot use pelagic and terrestrial prey.
6. Mink showed an enormous increase in distribution. In only 30 years, released mink have expanded their distribution to 23,400km² (an area 7.7km² larger than that of the otters).
7. Our results raise concern over the impact of mink on native bird species. We found that bird consumption occurred mainly in watercourses where crustaceans were absent. In those basins with crustaceans, mink predation on birds occurred mainly in winter, probably as a result of reduced availability of macro-crustaceans at that time of year. This result suggests that mink control should be concentrated in areas and periods of the year with low crustacean densities.
8. However, we discovered an unexpected type of seriously negative potential impact of mink. Mink have invaded marine areas inhabited by otters, and have started to occupy the same burrows that otters use. Future studies should evaluate the consequence of this newfound means of direct competition between these two species.
9. We developed a method that allowed DNA extraction from dry faeces, even from samples collected 10 years ago.
10. We published the cytochrome b and mitochondrial DNA control region sequences of *L. provocax* with GENBANK.
11. We used mitochondrial markers to confirm the expansion of otters to the limits of their distribution. This included the analysis of faeces collected from De los Estados Island, which supports what is probably the last relict population in Argentina of another otter species *L. felina*. Until now it has not been possible to discriminate between signs of the two species. However, the genetic technique that we have developed allowed us to reanalyse samples collected previously on the island. All of the faeces from which DNA could be extracted corresponded to *L. provocax*. This implies that the areas sampled were inhabited by this species and that new surveys are necessary to establish the size of the remaining population of *L. felina* in the island.
12. We conducted an AMOVA analysis to determine whether northern and southern *L. provocax* populations separated by more than 1,000km, could be distinguished genetically. We identified significant differences, suggesting that the two populations correspond to different genetic stocks.
13. We conducted the first macro-crustacean survey in Tierra del Fuego, which involved visiting 30 lakes and rivers on the island and sampling approximately 150 sites. We found no macro-crustaceans on Tierra del Fuego, which means that the freshwater bodies of this island do not provide the main type of prey available to otters in northern Patagonia.

Full descriptions of methods and findings can be seen in the following seven manuscripts, these are subjected to peer review at international journals.

1. *Centrón D, Ramirez B, Fasola L, Macdonald D, Schiavini A, Cassini MH. Genetic diversity in South American river otter (Lontra provocax) in Argentina. Submitted to Journal of Heredity. (Appendix V).*
2. *Fasola L, Chéhebar C, Macdonald D, Centrón D, Porro G, Cassini MH. Distribution of Southern River otters (Lontra provocax) in Argentinean Patagonia. To be submitted to Biological Conservation (Appendix VI).*
3. *Fasola L, Chéhebar C, Muzio J, Macdonald D, Porro G, Cassini MH Invasion of North American minks in Argentinean Patagonia: degree of expansion and impact on native prey. Submitted to Journal of Applied Ecology. (Appendix VII).*
4. *Cassini MH, Fasola L, Aued B, Chéhebar C, Macdonald D The distribution of macrocrustaceans in Argentinean Patagonia: multiple scale analysis of the role of resource availability in wildlife distribution. Submitted to Oecologia. (Appendix VIII).*
5. *Fasola L, Chéhebar C, Macdonald D, Porro G, Cassini MH Coexistence of North American mink and South American river otter in Patagonia. Submitted to Oikos. (Appendix IX).*
6. *Fasola L, Gozzi AC, Malmierca L, Chéhebar C, Macdonald D, Cassini MH Diet of the Southern river otter in Argentinean Patagonia. Submitted to Oryx. (Appendix X).*
7. *Fasola L, Cassini MH, Cassini GH, Sage R. El monito de monte (Dromiciops gliroides) en el Parque Nacional Los Alerces, Provincia de Chubut, Argentina. Submitted to Mastozoología Neotropical (an Argentinean Journal). (Appendix XI).*

Training assessment

The project was successful in training Argentinean students, biologists and guards. The following lists account of people directly involved in the project.

1. *Juan Ignacio Túnez (biologist). He isolated the first samples of mitochondrial DNA of otters, under the supervision of Dr. Centrón (24 weeks). He will be in charge of genetic work for the post-project in Tierra del Fuego.*
2. *Juan Muzio (student). He conducted a one year project following the population of minks of the Moreno Lake, Nahuel Huapi National Park and produced an undergraduate thesis (48 weeks).*
3. *Leonardo A. Di Franco (student). He conducted a one year project in the Geographic Information System processing of the data and produced an undergraduate thesis (48 weeks).*
4. *Cecilia Gozzi (student). She conducted a one year study on otter diet in Tierra del Fuego based on scat analysis, and produced an undergraduate thesis (48 weeks).*
5. *Laura Fasola (biologist). She worked on all aspects of the study on the regional and local distribution and diet of both species, and on the conservation of otters and impact of mink and she is finishing a Ph D thesis. She has received daily supervision provided by Dr. Cassini and this training will be supplemented in Oxford (128 weeks).*
6. *Marcelo Bello (student). He collaborated with the field campaigns and in the first steps of data processing (32 weeks).*
7. *Verónica Benítez (student). She collaborated in data processing and project organisation (24 weeks)*
8. *Leonardo Leggieri (student). He collaborated in the field campaigns (24 weeks).*
9. *Benjamín Ramirez (student). He worked with us since the beginning of the molecular work acquiring important skills in the use of different techniques (72 weeks).*
10. *María Victoria Cáseres (student). She received training in diet analyses (4 weeks).*
11. *Carolina Blügermann (student). She received training in molecular techniques (4 weeks).*
12. *Nancy C. Castaneda (biologist). She collaborated in the development of the molecular techniques (48 weeks).*

13. *Maximiliano Nardelli (student). He was recently incorporated into the molecular ecology team to collaborate with Biologist Túnez (2 weeks).*
14. *Emilce Gallo (National Park employee). She collaborated in the organisation of the stakeholder workshop in Tierra del Fuego (2 weeks).*
15. *Mariano Calvi (guard from Tierra del Fuego National Park). He collaborated in field work and data collection in Tierra del Fuego (2 weeks).*
16. *Nicolás Ferrari (guard from Tierra del Fuego National Park). He collaborated in field work and data collection Tierra del Fuego (2 weeks).*
17. *Gerardo Porro (guard from Nahuel Huapi National Park). He collaborated in field work and data collection in Nahuel Huapi National Park (20 weeks).*
18. *Sebastián Farcciola (guard from Currué Lake). He collaborated in field work (1 week).*
19. *Pablo Perez (guard from Quillén Lake). He collaborated in field work (1 week).*
20. *María Laura Fenoglio (guard from Menéndez Lake). He collaborated in field work (1 week).*

Because we worked in an enormous area that includes 8 National Parks with hundreds of guards working for them, the best strategy for training as many guards as possible was to prepare written outputs that can be read from a web page. We produced the following key products:

1. *An edited book with a synopsis of all present knowledge on the endangered otter. Chapters were written by 34 authors from Chile and Argentina (Appendix XII)*
2. *A complete training guide for field work and research and monitoring design (Appendix XIII).*
3. *A complete technical report with the outcomes of this project (Appendix XVI)*
4. *An Spanish version of the action plan for Patagonian otter and the recommendations for mink control (Appendix XV)*
5. *An illustrated summary of the main results in a web page format (www.profauna.org.ar).*

Four theses were produced, three undergraduate and one PhD thesis, from three different Argentinean universities. Of the undergraduate thesis, two are already defended successfully and the final one will be defended in July 2007. The PhD thesis will be defended at the beginning of 2008 as the Argentinean student will spend one year at the WildCRU from April 2007 preparing the manuscript and receiving training there. The theses are:

1. *Juan Muzio, Universidad Nacional del Comahue, undergraduate thesis defended May 2006 'Alimentación del visón (Mustela vison) en relación a la fauna de los lagos andino-patagónicos' (Appendix XVI).*
2. *Leonardo A. Di Franco, Universidad Nacional de Luján, undergraduate thesis defended November 2006 (modalidad: Informe de Investigación). 'El aporte de los sensores remotos y de los sistemas de información geográfica al estudio de la ecología espacial y la conservación de mamíferos' (Appendix XVII).*
3. *Ana Cecilia Gozzi, Universidad Nacional de Luján, undergraduate thesis to be defended July 2007. 'Ecología alimentaria del huillín Lontra provocax en la Bahía Lapataia, Tierra del Fuego' (Appendix XVIII)*
4. *Laura Fasola, Universidad de Buenos Aires, PhD thesis to be defended in April 2008, 'Ecología espacial y dieta del huillín Lontra provocax y el visón Mustela vison en la Patagonia Andina: conservación de una nutria en peligro de extinción y control de una especie exótica invasora'.*

Technical assessment

The most important technical products are two action plans, written in Spanish, but with an English translation for evaluation and international publication purposes. Additionally, we also produced two databases on otters and minks.

1. *Propuestas de acción para la conservación del huillín y el control del visón. Marcelo H. Cassini, Laura Fasola and David W. Macdonald. Technical report published by PROFAUNA organisation and submitted to National Park Administration (Appendix XV).*
2. *Draft of action plan for Patagonian otters in Argentina. Marcelo H. Cassini, Laura Fasola and David W. Macdonald. Manuscript to be published at the Proceedings of the Xth International Otter Colloquium to be held in South Korea. (Appendix XIX).*
3. *Recommendations for American mink control in Patagonia. Marcelo H. Cassini, Laura Fasola and David W. Macdonald. Darwin Initiative Technical Report (Appendix XX).*
4. *Computer database for *Lontra provocax* in Argentinean Patagonia*
5. *Computer database for *Mustela vison* in Argentinean Patagonia)*
6. *Computer database for macro-crustaceans in Argentinean Patagonia*

5. Project Impacts

New knowledge and new tools for conservation of Patagonian biodiversity

This project dramatically changed the perception of conservation associated with semi-aquatic mustelids of Argentina. Prior to our project, it was believed that:

1. Southern river otters (*Lontra provocax*) were in danger of extinction and translocation was required.
2. Mink were a problem, however the extent of this problem was ignored.
3. Marine otters (*Lontra marina*) inhabited the southern tip of Argentina.

1. Conservation status and translocation of Southern river otters.

The IUCN considers a species to be endangered (Criterion B; IUCN, 2001) when its estimated extent of occurrence is < 5,000 km², or its area of occupancy is < 500 km². Our extensive survey produced estimates of these variables for the first time in Argentina. Our most conservative estimate of the extent of occurrence for *L. provocax* in Argentina was 7,395 km², and our less stringent estimate 15,588 km². We estimated the area of occupancy at 792 km², using a conservative estimate of home range size. Additional criteria for endangered status are that the population is severely fragmented, known to exist in no more than five locations and continuing to decline or exhibiting extreme fluctuations in distribution or abundance. We found no evidence to support these criteria. Our evidence suggests, therefore, that *L. provocax* can most appropriately be considered as vulnerable in Argentina, rather than in danger of extinction. During the workshop that we co-organised with Chilean researchers (Southern river otters inhabit the south of Argentina and Chile), we reinforced this point of view because we could confirm that Chile has a relatively large population of this species in the south of the country. Final decisions about status changes depend upon future assessments of the marine population that inhabits the southeast coast of Argentina, and on an evaluation of the population abundance trend in the Nahuel Huapi National Park.

We found an optimal place for otter translocation: the basin of the Hua Hum river, at the northern limit of the present distribution of the species. The area possesses high quality coasts and high availability of the, almost exclusive, prey of otters, the macro-crustaceans. However, currently, translocation may not be necessary because the species was found in significantly more sites than was expected including new places close to this basin.

Another critical result of our study of native otters is the discovery of two separate genetic stocks of *L. provocax*, which require different conservation policies.

2. Mink status in western Patagonia.

We conducted the first large-scale survey of minks in Argentina, and we discovered an impressive expansion of the distribution of this exotic species. In only 30 years, they have invaded an area that, from north to south, is equivalent to the distance between London and Rome (1,500km). With such a degree of expansion it is unrealistic to think in terms of complete eradication.

We conducted the first studies on mink diet in Argentina. In areas with limited prey availability, waterfowl may constitute a large proportion of mink prey. We propose that mink control is feasible but only to protect breeding areas for endangered waterfowl.

After an exhaustive study on the ecological relationships between mink and otters we did not find evidence that mink cause a decline in otters, even when they demonstrate show a degree of spatial segregation between both species. However, in marine environments we discovered mink used burrows previously occupied by otters, potentially creating a source of resource competition.

3. Marine otter status in Argentina.

Marine otters (*Lontra felina*) are the second Patagonian otters, also classified as at risk of extinction by the IUCN. Thanks to our development of a technique for species identification, based on genetic analysis of faecal samples, we were able to show that otter faeces collected in the geographic range previously ascribed to *Lontra felina* were actually from *Lontra provocax*. This unexpected result indicates the need for urgent assessment of the conservation status of marine otters in Argentina. This country used to have the largest biodiversity of otters of the world with four species: *Lontra provocax*, *L. longicaudis*, *L. felina* and *Ptenomura brasiliensis*. However, at present *Ptenomura brasiliensis* is considered extinct in Argentina. If the disappearance of *L. felina* is confirmed, it will probably imply the largest biodiversity loss within a mammalian taxon in the region.

Help to the host country to meet CBS

We have produced two action plans, one for the otter and the other for the mink, with practical proposals that will help Argentina to improve conservation of vertebrate biodiversity within the National Parks of Patagonia. Biologist Claudio Chehébar is a member of this team and is also the Director of the Technical Office of the Patagonian Section of the Argentinean National Park Administration. He is therefore a key player with the authority to transform the recommendations into in action.

Future monitoring and project permanence will be achieved through two strategies focusing on the two stocks of *L. provocax* in Argentina. In the north, the team of guards coordinated by Claudio Chehébar will continue with the five-year surveys which were initiated in the 1980s, aided by the knowledge gained from this project. In the south continuity is guaranteed by a post-project fund provided by the Darwin Initiative. This will allow us to increase our knowledge of the southern stock and to coordinate a monitoring program with local authorities (SubDirección de Programación, Ministerio de Producción, Gobierno de Tierra del Fuego).

Improve collaboration between UK and local partner

The interaction between WildCRU (Oxford University) and GEMA group (Organization PROFAUNA) has been strengthened through this project. We worked efficiently together and we found fluid mechanisms of collaboration. Dr. Macdonald travelled to Argentina and visited the study areas, and Dr. Cassini and Dr. Centrón visited WildCRU twice to discuss the progress and development of the project in person.

Biologist Laura Fasola, who started as a project field assistant became a PhD. student and started a one-year visit to the WildCRU in April 2007 to complete her thesis.

Improve local capacity and social impact

Globally the project will provide park wardens with more tools assessment of otter and mink status. Specifically we have already mentioned the benefits provided to the Director of the Technical Office of National Park Administration, Biologist Claudio Chehébar, and to Biologist Laura Fasola, who is at present in a training visit to the WildCRU. Biologist Juan Muzio is has applied for a position in a local environmental office. Biologist Leonardo Di Franco will soon travel to Italy for a six month course on GIS techniques. Biologist Cecilia Gozzi, after finishing her undergraduate thesis, will apply for a PhD position to conduct a study on otter foraging ecology in Tierra del Fuego. The three members of National Park of Tierra del Fuego (Emilce Gallo, Mariano Calvi and Nicolás Ferrari) will continue working with us in the post-project.

The project was not socially oriented; therefore there were no expectations of positive or negative immediate effect on the social environment of the project.

6. Project Outputs

Most of the intended outputs were achieved. Some outputs were replaced by others due to particular contexts, but there were more results than originally planned in most areas. Outputs were achieved in the following way:

Intended outputs	Achieved outputs	Replacement
5 undergraduate theses	3 undergraduate theses and 1 PhD thesis	2 undergraduate were replaced by 1 PhD thesis
28 people receiving 52 training weeks	20 people receiving 539 training weeks	We increased training time in a slightly reduced number of people
4 local workshops	1 think-tank meeting 1 bi-national workshop 1 bi-national workshop to be held in November 2007	3 local workshops were replaced by 2 bi-national meetings
2 action plans on otter conservation & mink control	2 action plans	No changes
1 field guide on monitoring	1 field guide and research and monitor design	The content of the guide was improved
3 computer based databases on mink, otter and prey distribution.	3 computer based database on mink, otter and prey distribution.	No changes
7 papers on peer reviewed journal	8 papers	1 additional paper
7 presentations in conferences	6 already presented 4 to be presented in Sept/Oct 2007	3 additional meeting presentations
1 newsletter	4 newsletters in webpages	Replaced 1 printed newsletter by 4 webpage's newsletter
3 press releases (local, national and UK)	2 local, 1 provincial press releases in schedule	UK press release replaced by local release
3 TV or radio programs	1 book 2 technical reports 2 printed calendars with DI logo	Programs were replaced by written dissemination outputs.
1 permanent monitoring scheme	1 permanent monitoring scheme	No change

Information relating to project outputs and outcomes has been disseminated in six different forms:

Presentation of 10 Conference talks and posters

These conference presentations served to present our results to our colleagues at local and international level. The meetings were held in Argentina, Chile, UK and South Korea (the latter in October 2007). Appendix XXI.

Release of 4 website newsletters

Two newsletters were released at the beginning of the project in the webpages of WildCRU and of PROFAUNA organisation, explaining the purposes and objectives of the project. A third newsletter was released to advertise the results of the Binational Meeting held in Valdivia in August 2005. The last newsletter summarised the results of the research in the webpage of PROFAUNA organisation (www.profauna.org.ar).

Release of 2 articles in newspapers

We have collaborated with the Patagonian National Parks authorities to disseminate our results via items in local newspapers.

1. Item in the newspaper 'Noticias de Bariloche', Thursday 12th July 2005, <http://www.bariloche2000.com>.
2. Item in the newspaper 'El Ciudadano de Bariloche', 4 July 2005, <http://www.elciudadanobche.com.ar/>

Distribution of 2 calendars with information on the project

Also in collaboration with National Park Administration, we published and distributed 1000 calendars in two formats, with the DI logo (Appendix XXII)

Publication of 1 book, 1 manual and 2 technical reports for park guards

1. M. H. Cassini, M. Sepúlveda, eds (2006). El Huillín *Lontra provocax*: Investigaciones sobre una nutria patagónica en peligro de extinción. Serie Fauna Neotropical 1, Publicación de la Organización PROFAUNA, Buenos Aires, pp. 162. Appendix XII
2. Cassini MH, Fasola L (2007). Uso del método de transecta-signo para monitorear y estudiar la ecología espacial de mamíferos, con especial referencia a las nutrias. Serie Fauna Neotropical 2, Publicación de la Organización PROFAUNA, Buenos Aires. Appendix XIII
3. Cassini MH, Fasola L, Macdonald DW. Informe técnico. Investigaciones sobre el huillín *Lontra provocax* y el visón americano *Mustela vison* en los bosques patagónicos. Appendix XIV
4. Fasola L, Macdonald DW, Cassini MH. Informe técnico. Propuestas de acción para la conservación del huillín *Lontra provocax* y el control del visón *Mustela vison*. Appendix XV

Organisation of two bi-national meetings

A bi-national workshop was held in Valdivia, Chile from 30 to 31 August 2005. The workshop was called 'Primera Reunión Binacional sobre Conservación del Huillín' (First Binational Meeting on Southern River Otter Conservation) and was sponsored by the Darwin Initiative and the Frankfurt Zoological Society. The aim of the workshop was to bring together all scientists and technicians working with these otters in both countries (the next meeting will incorporate all stakeholders). There were 28 presentations covering all aspects of otter biology (e.g. diet, distribution, interactions with people, veterinary, genetics, conservation history and environmental education: program in Appendix XXIII).

We are organising the second bi-national workshop, now expanding its aim to include also the marine otter *Lontra felina* and the mink *Mustela vison*. It will be held in Ushuaia, Tierra del Fuego in December 2007, and will be co-organised with local institutions.

7. Project Expenditure

Item	Budget (£)	Spending (£)	Difference from Budget (£)	% Difference

8. Project Operation and Partnerships

Together with research outputs relevant to conservation, project partnerships and collaborations achieved in Argentina and Chile were the most successful result of this project. We were able to create a collaborative net that will transcend this project and will allow future research and actions in the region.

1. *Interaction with most researchers working with Patagonian otters in South-America during the bi-national workshop, co-organised by us in Valdivia, Chile, in August 2005.*
2. *Dra. Daniela Centrón (Department of Microbiology, Faculty of Medicine, University of Buenos Aires) provided expertise and a whole laboratory prepared for genetic analysis.*
3. *Biologist Claudio Chéhebar (National Parks Administration, Bariloche) is an expert in Patagonian otters and is the main technical advisor in the Patagonian National Parks. He coordinated the survey in Nahuel huapi National Park. He has also provided faecal samples collected in northern Patagonia during the 1980s, over different seasons. These samples allowed us to compare the present diet with the prey consumed by otters more than 20 years ago.*
4. *Biologist Laura Malmierca (National Parks Administration, Ushuaia) provided assistance for the survey in Southern Patagonia. She also provided training and interaction with guards of the Tierra del Fuego National Park, and she is co-supervisor of a thesis. She also provided faeces collected in southern Patagonia on a seasonal basis between 1999 and 2004. Again, this allowed annual and seasonal comparisons of the diet.*

5. *Dr. Victor Cussac (Comahue University, Bariloche) is an expert in fish ecology. He provided fish samples for diet composition analyses and also data on the distribution and abundance of fish among Patagonian lakes. He is also a Co-supervisor of one of Muzio's thesis.*
 6. *Biologist Maximiliano Sepúlveda (CODEFF, Chile) organised the bi-national meeting in Chile and is Co-editor, with Dr. Cassini, of a book on huillines.*
 7. *Dr. Adrián Schiavini (CADIC, CONICET, Ushuaia). We have formed a new key collaboration this year with Dr. Schiavini. He has conducted a number of marine vertebrate studies in southern Patagonia. He provided faecal samples that were collected in De los Estados Islands. This material is of fundamental importance due to the extreme logistical difficulties surrounding travel to this remote island. Dr. Schiavini and collaborators conducted two expeditions and, for the first time, they were able to collect samples from all over the islands. He has agreed that we may use all of these samples in our genetic analyses and he also provided us with a taxonomic key for fish bone identification - a valuable resource for dietary analysis.*
 8. *PRODITEL group. This group is specialised in GIS analysis and have a team of experts and the required equipment. One of our undergraduate students (Leonardo Di Franco) worked in close collaboration with this group.*
 9. *Biologist Nora Loekemeyer, a senior member of Dirección de Áreas Protegidas, Subsecretaría de Planeamiento, Ministerio de la Producción (Protected Area Department, Planning Secretary, Ministry of Production of Tierra del Fuego Province. The Protected Areas Department is the authority responsible of the development of action plans for wildlife and management of the protected areas in the Province of Tierra del Fuego. Biologist Loekemeyer gave local official support to our project and she will be directly involved in the post-project there.*
 10. *Biologist Miguel Isla, Director, Dirección de Pesca (Fishery Agency of Tierra del Fuego), provided with the information available on fish abundance and distribution in the Beagle Channel.*
 11. *Biologist Clotilde Susana Lizarralde, Directora, Dirección de Ciencia y Tecnología (Science and Technology Agency of Tierra del Fuego). She gave the official permission for working in Tierra del Fuego.*
 12. *Dr. Federico Tapella, expert on crustaceans, and Biologist Claudia Boy, expert in fish ecology and physiology, from the Centro Austral de Investigaciones Científicas (Austral Centre of Scientific Research, CADIC). They provided us with information on the main prey of otters in marine environments and with the Guide for fish bone identification that we used for fragment identification from otter faeces.*
 13. *Dr. Martín Funez and Dr. Pablo Carmanchahi, from the Centro de Ecología Aplicada (Centre of Applied Ecology) from Neuquén province, provided information on the population of otters discovered by them in the Limay River.*
 14. *Mr H. Matarasso provided with highly valuable information on the presence of this endanger species in the river Collón Cura.*
 15. *Biologist Amalia Testa, from the Natural Science Museum 'Bernardino Rivadavia', collaborated in diet analysis, especially in techniques of bone fragment recognition and otholites.*
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9. Monitoring and Evaluation, Lesson learning

To determine whether the project and its components were conducted as planned both WildCRU and PROFAUNA carried out an internal project evaluation throughout the course of the project. This progress evaluation determined whether the project was meeting its stated purpose, objectives, outputs and milestones according to the proposed timetable. Towards the end of each project year, a major evaluation took place to assess strengths, weaknesses and implement corrective measures. We also assessed the cost-effectiveness of what had been accomplished, benefits to trainees and the effectiveness of components. International specialists with expertise in the field of this project were recruited to act as evaluators. The evaluators determined how dissemination activities and outputs were providing feedback to inform decision-making. Success was estimated based on academic outputs (theses, papers and technical reports), training and education outputs (number of people trained and training weeks), cooperation activities with local institutions, etc.. They have also examined how research and training had contributed to understanding of the key factors involved in the long-term conservation of otters and general biodiversity. Outcome indicators have served as a baseline for measuring success. At the end of the project we evaluated whether the project was replicable, transportable and applicable to other parts of Argentina and beyond. We have also evaluated the realised potential of the Beagle Channel to become a flagship for Darwin's legacy and biodiversity conservation, so we propose a post-project with that purpose.

The main project activities, timetables and the staff responsible for the execution of the project were included in the annual operational plans of PROFAUNA. These were evaluated annually using standardised internal procedures already in place. We applied the participatory principle by promoting the participation of all partners in the evaluation of the project. The Argentine universities involved evaluated the proposed plans for the four theses conducted during the project.

The main difficulty of the project was the enormous geographic extent of the survey. We solved it by coordinating the work of three separate teams that simultaneously surveyed different parts of Argentinean Patagonia.

10. Actions taken in response to annual report reviews (if applicable)

The reviewers were very positive regarding our first annual report. We have acknowledged their useful point that mink might predate on neonate otters. The main query raised by the reviewers related to our internal monitoring arrangements. The various members of the team maintained regular, fluent communication via email, e.g. between Prof. Macdonald (the Principal Investigator) and Dr. Cassini (the project leader in Argentina), between Dr. Cassini and the diverse collaborators that have joined the project over the last two years in both Argentina and Chile, and between Argentinean partners that work in separate teams. Internal monitoring was reinforced efficiently during a visit to the UK by the two senior scientists from Argentina, Dr. Cassini and Dr. Centrón. During this trip, Prof. Macdonald and other members of the Wildlife Conservation Research Unit had fruitful meetings, as well as informal discussions, with Dr. Cassini and Dr. Centrón. The efficiency of internal monitoring is implicit in the large quantity of results achieved in the first two years of this project.

11. Darwin Identity

In order to publicise the Darwin Initiative the Darwin Logo was featured in project outputs, on field equipment and on information advertising the project (see Appendices). The Darwin Initiative has been acknowledged in seminars, newsletters, theses, reports and peer-reviewed publications.

The Darwin Initiative is well recognized in Argentina because of its support for other important projects in the region. We sought to further this positive recognition throughout this project. During the life of this project, the Darwin Initiative was linked to the main project outcomes that were disseminated by newspapers, the websites and the printed information. Staff and students involved in this project made every effort to ensure that the Argentinean people were aware of the aims and objectives of the Darwin Initiative. It was seen as important to advertise its role in facilitating conservation action in countries rich in biodiversity, but poor in economic resources, in order to implement the convention of biodiversity (CBD).

This project showed a clear identity for its holistic nature integrating training of local people with rigorous research for the conservation of endangered species and control of invasive ones. We found useful to maintain a link with the monitoring program initiated by Biologist Claudio Chehébar in Nahuel Huapi National Park in the 1980's and with previous efforts conducted in Tierra del Fuego National Park. We also promoted collaboration with many different local researchers and institutions. Nevertheless, the identity of the project remained intact due to the forcefulness of our results and their significance for the originally intended purpose.

12. Leverage

Throughout the duration of the project additional financial assistance was gained from three sources. In 2005 the National Park Administration contributed £200 to survey conducted by Est. Juan Muzio in the Moreno Lake as part of his undergraduate thesis. Every year, the University of Luján made available approximately £1,000 in average for maintenance and office consumables. The Agencia Nacional de Promoción Científica y Tecnológica of Argentina contributed £20,000 mainly for buying equipment and consumables required for a molecular ecology laboratory

The UK team has worked very hard to develop further funding opportunities for the host country part of the team. This has involved a professional fund-raiser in the UK, Mrs D. Roberts, devoting time to developing appeals for the project, and Professor Macdonald making presentations to potential donors in the UK and USA. This process is on-going (considering that the project now has post project funding).

13. Sustainability and Legacy

The region of incumbency of the project is divided in two parts: northern Patagonia, and southern Patagonia, each one with a different stock of native otters and also with different local administrations. As was mentioned, in northern Patagonia there is an expert on otters from the National Park Administration, Biologist Claudio Chehébar, who is part of our team and who will continue to conduct a permanent monitoring program in that area. The conclusions and outputs of this project will be applied in his future work to improve objectives and approaches. His work we will support by National Park Administration and probably by small grants provided by international sources, such as the International Otter Fund. GEMA group of PROFAUNA organisation we will continue working in collaboration, with National Park Administration, specially in analysing data which will estimate changes in distribution and abundance of otters and mink, and in processing faeces samples for diet and genetic analyses.

In southern Patagonia, i.e. in the marine coast of Tierra del Fuego, we will continue working with a Darwin Initiative Post-project funding 2007 grant called: Implementing an otter action plan for marine environments of Tierra del Fuego, Patagonia. This project includes assessment of the factors regulating otter distribution in this area, and the development of a plan for integral management of the coastal habitats of Beagle Channel and De los Estados Island.

In summary the legacy of this project is guaranteed by the trained staff remaining in the area, organisational partnerships well established, scientific results and management recommendations of the project incorporated into management plans of the National Park Administration and the Sub-dirección de Planeamiento of Tierra del Fuego and new funds having been secured.

14. Value for money

Comparing the results obtained to the financial resources invested, we rate this project as very economical. This conclusion is supported by the following evidence: (1) Most of the work was conducted by Argentinean students and park rangers, saving substantial sums of funding because we did not need to hire full time researchers, technicians and communicators; (2) PROFAUNA organisation provided the van transportation to carry out the monitoring in Patagonia; (3) University of Buenos Aires provided the molecular ecology laboratory and a small lab was set up thanks to Argentinean funds (4) University of Luján provided the laboratory for diet analysis, and (5) PROFAUNA organisation provided additional minor equipment for field work. Over the three years that the project was operational, we raised matching funds to support the Darwin Initiative funding and activities, thus greatly enhancing the original investment.

15. Appendix I: Project Contribution to Articles under the Convention on Biological Diversity (CBD)

Please complete the table below to show the extent of project contribution to the different measures for biodiversity conservation defined in the CBD Articles. This will enable us to tie Darwin projects more directly into CBD areas and to see if the underlying objective of the Darwin Initiative has been met. We have focused on CBD Articles that are most relevant to biodiversity conservation initiatives by small projects in developing countries. However, certain Articles have been omitted where they apply across the board. Where there is overlap between measures described by two different Articles, allocate the % to the most appropriate one.

Project Contribution to Articles under the Convention on Biological Diversity		
Article No./Title	Project %	Article Description
6. General Measures for Conservation & Sustainable Use	0	Develop national strategies that integrate conservation and sustainable use.
7. Identification and Monitoring	50	Identify and monitor components of biological diversity, particularly those requiring urgent conservation; identify processes and activities that have adverse effects; maintain and organise relevant data.
8. In-situ Conservation	20	Establish systems of protected areas with guidelines for selection and management; regulate biological resources, promote protection of habitats; manage areas adjacent to protected areas; restore degraded ecosystems and recovery of threatened species; control risks associated with organisms modified by biotechnology; control spread of alien species; ensure compatibility between sustainable use of resources and their conservation; protect traditional lifestyles and knowledge on biological resources.
9. Ex-situ Conservation	0	Adopt ex-situ measures to conserve and research components of biological diversity, preferably in country of origin; facilitate recovery of threatened species; regulate and manage collection of biological resources.
10. Sustainable Use of Components of Biological Diversity	0	Integrate conservation and sustainable use in national decisions; protect sustainable customary uses; support local populations to implement remedial actions; encourage co-operation between governments and the private sector.
11. Incentive Measures	0	Establish economically and socially sound incentives to conserve and promote sustainable use of biological diversity.
12. Research and Training	10	Establish programmes for scientific and technical education in identification, conservation and sustainable use of biodiversity components; promote research contributing to the conservation and sustainable use of biological diversity, particularly in developing countries (in accordance with SBSTTA recommendations).

13. Public Education and Awareness	10	Promote understanding of the importance of measures to conserve biological diversity and propagate these measures through the media; cooperate with other states and organisations in developing awareness programmes.
14. Impact Assessment and Minimizing Adverse Impacts	0	Introduce EIAs of appropriate projects and allow public participation; take into account environmental consequences of policies; exchange information on impacts beyond State boundaries and work to reduce hazards; promote emergency responses to hazards; examine mechanisms for re-dress of international damage.
15. Access to Genetic Resources	0	Whilst governments control access to their genetic resources they should also facilitate access of environmentally sound uses on mutually agreed terms; scientific research based on a country's genetic resources should ensure sharing in a fair and equitable way of results and benefits.
16. Access to and Transfer of Technology	0	Countries shall ensure access to technologies relevant to conservation and sustainable use of biodiversity under fair and most favourable terms to the source countries (subject to patents and intellectual property rights) and ensure the private sector facilitates such assess and joint development of technologies.
17. Exchange of Information	10	Countries shall facilitate information exchange and repatriation including technical scientific and socio-economic research, information on training and surveying programmes and local knowledge
19. Bio-safety Protocol	0	Countries shall take legislative, administrative or policy measures to provide for the effective participation in biotechnological research activities and to ensure all practicable measures to promote and advance priority access on a fair and equitable basis, especially where they provide the genetic resources for such research.
Total %	100%	Check % = total 100

16. Appendix II Outputs

Please quantify and briefly describe all project outputs using the coding and format of the Darwin Initiative Standard Output Measures.

Code	Total to date (reduce box)	Detail (←expand box)
Training Outputs		
1a	Number of people to submit PhD thesis	1
1b	Number of PhD qualifications obtained	0
2	Number of Masters qualifications obtained	0
3	Number of other qualifications obtained	3 (undergraduate theses)
4a	Number of undergraduate students receiving training	10
4b	Number of training weeks provided to undergraduate students	332
4c	Number of postgraduate students receiving training (not 1-3 above)	0
4d	Number of training weeks for postgraduate students	0
5	Number of people receiving other forms of long-term (>1yr) training not leading to formal qualification(i.e. not categories 1-4 above)	0
6a	Number of people receiving other forms of short-term education/training (i.e. not categories 1-5 above)	10
6b	Number of training weeks not leading to formal qualification	207
7	Number of types of training materials produced for use by host country(s)	2 (webpage and book)
Research Outputs		
8	Number of weeks spent by UK project staff on project work in host country(s)	1
9	Number of species/habitat management plans (or action plans) produced for Governments, public authorities or other implementing agencies in the host country (s)	2
10	Number of formal documents produced to assist work related to species identification, classification and recording.	1
11a	Number of papers published or accepted for publication in peer reviewed journals	0 (7 submitted)
11b	Number of papers published or accepted for publication elsewhere	0
12a	Number of computer-based databases established (containing species/generic information) and handed over to host country	3
12b	Number of computer-based databases enhanced (containing species/genetic information) and handed over to host country	0
13a	Number of species reference collections established and handed over to host country(s)	0
13b	Number of species reference collections enhanced and handed over to host country(s)	0

Dissemination Outputs		
14a	Number of conferences/seminars/workshops organised to present/disseminate findings from Darwin project work	2 bi-national
14b	Number of conferences/seminars/ workshops attended at which findings from Darwin project work will be presented/ disseminated.	4 (7 presentations)
15a	Number of national press releases or publicity articles in host country(s)	0
15b	Number of local press releases or publicity articles in host country(s)	3
15c	Number of national press releases or publicity articles in UK	0
15d	Number of local press releases or publicity articles in UK	0
16a	Number of issues of newsletters produced in the host country(s)	0
16b	Estimated circulation of each newsletter in the host country(s)	0
16c	Estimated circulation of each newsletter in the UK	0
17a	Number of dissemination networks established	0
17b	Number of dissemination networks enhanced or extended	0
18a	Number of national TV programmes/features in host country(s)	0
18b	Number of national TV programme/features in the UK	0
18c	Number of local TV programme/features in host country	0
18d	Number of local TV programme features in the UK	0
19a	Number of national radio interviews/features in host country(s)	0
19b	Number of national radio interviews/features in the UK	0
19c	Number of local radio interviews/features in host country (s)	0
19d	Number of local radio interviews/features in the UK	0
Physical Outputs		
20	Estimated value (£s) of physical assets handed over to host country(s)	£49400
21	Number of permanent educational/training/research facilities or organisation established	0
22	Number of permanent field plots established	1
23	Value of additional resources raised for project	£21200

17. Appendix III: Publications

Provide full details of all publications and material that can be publicly accessed, e.g. title, name of publisher, contact details, cost. Details will be recorded on the Darwin Monitoring Website Publications Database that is currently being compiled.

Mark (*) all publications and other material that you have included with this report

Type * (e.g. journals, manual, CDs)	Detail (title, author, year)	Publishers (name, city)	Available from (e.g. contact address, website)	Cost £
Book*	<i>El Huillín Lontra provocax: Investigaciones sobre una nutria patagónica en peligro de extinción, M. H. Cassini, M. Sepúlveda, eds, 2006</i>	PROFAUNA Organisation, Buenos Aires	Corrientes 1145, 4° 47, (1043) Buenos Aires, Argentina	10
Technical * Report	<i>Propuestas de acción para la conservación del huillín y el control del visón. M. H. Cassini, L. Fasola and D. W. Macdonald, 2007</i>	PROFAUNA Organisation, Buenos Aires	Corrientes 1145, 4° 47, (1043) Buenos Aires, Argentina	Free in .pdf format
Technical Report*	<i>Investigaciones sobre el huillín Lontra provocax y el visón americano Mustela vison en los bosques patagónicos, Cassini MH, Fasola L, Macdonald DW, 2007</i>	PROFAUNA Organisation, Buenos Aires	Corrientes 1145, 4° 47, (1043) Buenos Aires, Argentina	Free in .pdf format
Technical Report*	<i>Propuestas de acción para la conservación del huillín Lontra provocax y el control del visón Mustela vison, Fasola L, MacDonald DW, Cassini MH, 2007</i>	PROFAUNA Organisation, Buenos Aires	Corrientes 1145, 4° 47, (1043) Buenos Aires, Argentina	Free in .pdf format
Manual*	<i>Uso del método de transecta-signo para monitorear y estudiar la ecología espacial de mamíferos, con especial referencia a las nutrias. Cassini MH, Fasola L, 2007.</i>	PROFAUNA Organisation, Buenos Aires	Corrientes 1145, 4° 47, (1043) Buenos Aires, Argentina	Free in .pdf format

18. Appendix IV: Darwin Contacts

To assist us with future evaluation work and feedback on your report, please provide contact details below.

Project Title	Endangered otter and invasive mink in Patagonia
Ref. No.	162/13/016
UK Leader Details	
Name	Macdonald, David W.
Role within Darwin Project	General coordinator
Address	Wildlife Conservation Research Unit, Department of Zoology, University of Oxford, Tubney House, Abingdon Road, Tubney, Abingdon, Oxfordshire OX13 5QL
Phone	
Fax	
Email	
Other UK Contact (if relevant)	
Name	
Role within Darwin Project	
Address	
Phone	
Fax	
Email	
Partner 1	
Name	Cassini Marcelo H.
Organisation	PROFAUNA
Role within Darwin Project	Local coordinator
Address	Corrientes 1145, 4° 47 (1043) Buenos Aires Argentina
Fax	
Email	

Appendix 0: Logical framework

Project summary	Measurable indicators	Means of verification	Important assumptions
<p>Goal:</p> <p>To draw on expertise relevant to biodiversity conservation from within the United Kingdom and to work with local partners in countries rich in biodiversity but poor in the resources necessary to achieve its conservation</p> <ul style="list-style-type: none"> • conservation of biological diversity, • sustainable use of its components, and • fair and equitable sharing of the benefits arising from the utilisation of genetic resources 			
<p>Purpose</p> <p>To protect the vertebrate biodiversity of Argentina's Andean-Patagonian region by reducing the impact of invasive American mink and by facilitating the range expansion of endangered native otters in National Parks.</p>	<p>New knowledge regarding which factors limit otter population expansion and how mink impact on vertebrate diversity. Identification of key sites for otter reintroductions and mink removal by yr 2.</p> <p>Increased capacity for researchers, wildlife managers and Park wardens to implement effectively otter reintroductions and mink removal. Permanent monitoring of otter status and mink impact by yr 3.</p> <p>Ultimately, expansion of otter population numbers and distribution range and concomitant reduction of mink.</p>	<p>Publication of theses, papers accepted by peer-reviewed journals, technical reports produced by National Park and partner organisations.</p> <p>Management plans, training & implementation guides, computer databases, fieldwork reports, workshop records, and formal agreements with National Park Administration.</p> <p>Adoption by National Parks authorities of our recommendations, and subsequent successful implementation by them of each stage as outlined in our plans. Of course, stages to be adapted as conditional on unfolding developments.</p>	<p>National Park authorities maintain their present support for our research activities and continue to be prepared to incorporate our new management proposals.</p>
<p>Outputs</p> <p>Training of future Argentine biologists and managers and wardens of National Parks of Patagonia. Education of stakeholders, policy makers via workshops/Think Tanks.</p> <p>Action plans and other research products for the conservation of vertebrate biodiversity in Patagonia.</p> <p>Academic output.</p> <p>Several methods of result dissemination.</p> <p>Organisation of a permanent monitoring scheme.</p>	<p>5 (3, undergraduate theses), 8 (4a&c) receiving 32 (4b&d). 4 (7), workshops with 20 (6A) receiving 20 (6B).</p> <p>2 (9) on otter conservation & mink control, 1 (10) on monitoring, 3 (12) on mink, otter and prey distribution. 7 (11), 7 (14).</p> <p>3 (15), 1 (16), 1 (18), 2 (19). 1 (20) on mink impact and otter distribution.</p>	<p>5 undergraduate theses submitted/ defended, student performance reports, workshop and Think Tank participant records.</p> <p>Management plans, field implementation & training guides and computer databases sent to DI.</p> <p>Papers and conference abstracts sent to DI.</p> <p>Copies of all publications and records sent to DI.</p> <p>Agreement with Argentine National Park managers.</p>	<p>Students, National Park managers, stakeholders available and motivated for training and application of new skills.</p> <p>Field and laboratory techniques appropriate for data collection and processing</p> <p>Journal editors/ conference organisers accept papers.</p> <p>Newspaper, radio and TV producers interested.</p> <p>National Park Administration interested.</p>
<p>Activities</p>	<p>Activity Milestones (Summary of Project Implementation Timetable)</p>		

Apr-Sep 2004	Project organisation. Training workshops. Conservation agency Think Tank meeting. Preliminary campaign, testing techniques and landscape characterisation.
Oct-Dec 2004	Six month report and survey in two Parks.
Jan-Feb 2005	Survey in Tierra del Fuego Park.
Mar-Apr 2005	Data processing and annual report.
May 2005-Jan 2006	Diet, Genetic and GIS studies and six month report.
Feb-Apr 2006	Data processing, stakeholder workshop, additional training, annual report.
May-Jun 2006	Training students, organisation of wardens' workshop, dissemination.
Jul-Dec 2006	Wardens' workshops and dissemination of findings.
Jan-Apr 2007	Production of Action Plan, agreement with authorities, definition of management programme, annual report.

LIST OF APPENDICES

DI FORM

1. Appendix 0: Logical Framework
2. Appendix I: Project Contribution to Articles under the Convention on Biological Diversity (CBD)
3. Appendix II Outputs
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PUBLICATIONS ON PEER REVIEW JOURNALS

6. Appendix V: Centrón D, Ramirez B, Fasola L, Macdonald D, Schiavini A, Cassini MH. Genetic diversity in South American river otter in Argentina. Submitted Journal of Heredity.
7. Appendix VI: Fasola L, Chéhebar C, Macdonald D, Centrón D, Porro G, Cassini MH. Distribution of Southern River otters (*Lontra provocax*) in Argentinean Patagonia. To be submitted to Biological Conservation.
8. Appendix VII: Fasola L, Chéhebar C, Muzio J, Macdonald D, Porro G, Cassini MH Invasion of North American minks in Argentinean Patagonia: degree of expansion and impact on native prey. Submitted to Journal of Applied Ecology.
9. Appendix VIII: Cassini MH, Fasola L, Aued B, Chéhebar C, Macdonald D. The distribution of macro-crustaceans in Argentinean Patagonia: multiple scale analysis of the role of resource availability in wildlife distribution. Submitted to Oecologia.
10. Appendix IX: Fasola L, Chéhebar C, Macdonald D, Porro G, Cassini MH Coexistence of North American mink and South American river otter in Patagonia. Submitted to Oikos. (Appendix V).
11. Appendix X: Fasola L, Gozzi AC, Malmierca L, Chéhebar C, Macdonald D, Cassini MH Diet of the Southern river otter in Argentinean Patagonia. Submitted to Oryx.
12. Appendix XI: Fasola L, Cassini MH, Cassini GH, Sage R. El monito de monte (*Dromiciops gliroides*) en el Parque Nacional Los Alerces, Provincia de Chubut, Argentina. Submitted to Mastozoología Neotropical (an Argentinean Journal).

WRITTEN OUPUTS FOR WARDS AND FIELD BIOLOGISTS

13. Appendix XII: An edited book: M. H. Cassini, M. Sepúlveda, eds (2006). El Huillín *Lontra provocax*: Investigaciones sobre una nutria patagónica en peligro de extinción. Serie Fauna Neotropical 1, Publicación de la Organización PROFAUNA, Buenos Aires, pp. 162.
14. Appendix XIII: Training guide: Cassini MH, Fasola L (2007). Uso del método de transecta-signo para monitorear y estudiar la ecología espacial de mamíferos, con especial referencia a las nutrias. Serie Fauna Neotropical 2, Publicación de la Organización PROFAUNA, Buenos Aires
15. Appendix XIV: Technical report: Cassini MH, Fasola L, Macdonald DW. Investigaciones sobre el huillín *Lontra provocax* y el visón americano *Mustela vison* en los bosques patagónicos.
16. Appendix XV: Technical report: Fasola L, Macdonald DW, Cassini MH. Propuestas de acción para la conservación del huillín *Lontra provocax* y el control del visón *Mustela vison*.

THESIS

17. Appendix XVI: Juan Muzio, Universidad Nacional del Comahue, undergraduate thesis defended May 2006
18. Appendix XVII: Leonardo A. Di Franco, Universidad Nacional de Luján, undergraduate thesis defended November 2006.
19. Appendix XVIII: Ana Cecilia Gozzi, Universidad Nacional de Luján, undergraduate thesis to be defended July 2007.

TECHNICAL PRODUCTS IN ENGLISH

20. Appendix XIX: Draft of action plan for Patagonian otters in Argentina. Marcelo H. Cassini, Laura Fasola and David W. Macdonald. Manuscript to be published at the Proceedings of the Xth International Otter Colloquium to be held in South Korea.
21. Appendix XX: Recommendations for American mink control in Patagonia. Marcelo H. Cassini, Laura Fasola and David W. Macdonald. Darwin Initiative Technical Report.

DISSEMINATION OUTPUTS

22. Appendix XXI: Abstracts of ten conference presentations
23. Appendix XXII: Calendars
24. Appendix XXIII: Program meeting