LAYMAN'S REPORT

CONTROL OF THE INVASIVE SPECIES LAMPROPELTIS GETULA CALIFORNIAE ON THE ISLAND OF GRAN CANARIA

Life LAMPROPELTIS

LIFE10 NAT/ES/565

gesplan

Cabildo de Gran Canaria

Gobierno de Canarias

Life

NATURA 2000

PROJECT FACT SHEET

Name
LIFE 10 NAT/ES/000565 "Control of the invasive species *Lampropeltis getula californiae* on the island of Gran Canaria". LIFE+LAMPROPELTIS

Coordinating Beneficiary

gesplan

Associated Beneficiaries
General Directorate for Protection of Nature at the Government of the Canary Islands and Council of Gran Canaria.

Gobierno de Canarias

Cabildo de Gran Canaria

Budget allocated
1.025.863 €

Financing

Life	Gobierno de Canarias	Cabildo de Gran Canaria	gesplan
50 %	27,29 %	20,76 %	1,95 %

Duration
September 2011 – August 2015

Working team
Technical Project Director, 4 field technicians, legal and administrative support team and more than 20 outsourced external companies.

Web page
www.lifelampropeltis.com

Facebook
facebook.com/LifeLampropeltis

App
LAMPROPELTIS (Google Play y Appstore)

Photo Ramón Gallo

PROJECT AIMS

The main aim is to **reduce the density and abundance of the Californian King-Snake, Lampropeltis californiae, on the island of Gran Canaria** with the purpose of minimizing its impact on the biodiversity of this island, and specifically that of its main prey, the Gran Canaria giant lizard, *Gallotia stehlini* and the Gran Canaria mullet, *Chalcides sexlineatus*. For this reason, it has become necessary to achieve the following specific goals:

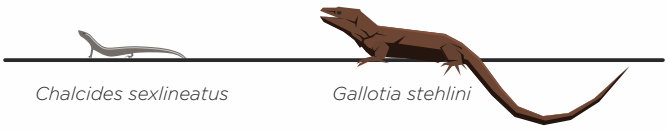
- The development and implementation of proven techniques for its detection and capture.

- Increase awareness about the species and its behaviour on Gran Canaria as an invasive species

- Promote the participation and awareness of the population in the struggle against the invasion, convincing them of the magnitude of the problem that we face.

- Share the knowledge acquired for the fight against invasions of exotic species of vertebrates on the islands.

- Provide the public sector administration with the tools to handle and prevent invasions of exotic species of vertebrates.



CALIFORNIA KING-SNAKE FACT FILE

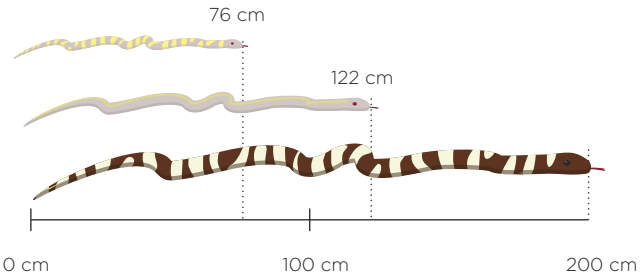
Name
Lampropeltis californiae (Blainville 1835)

Photo Jorge Saavedra

Photo Cristian Rodríguez

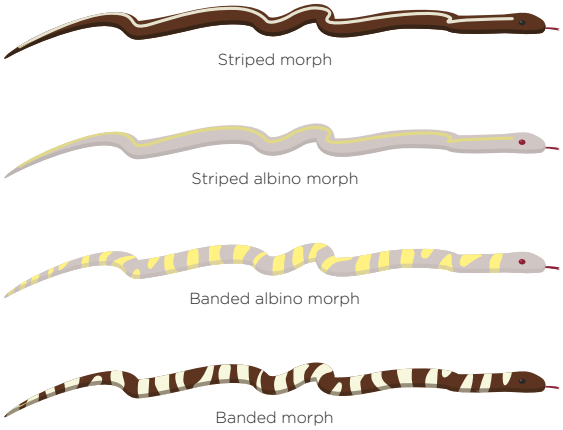
Family
Colubridae

Size
76 - 122 cm, up to a maximum size of 200 cm (Stebbins 2003)



Distribution
Extended along the western strip of North America, from Lower California to Oregon, from the south of Utah as far as western Arizona.

Colour patterns
Possessing an enormous chromatic variability ranging between standard Striped morph and Banded morph, with background colours going from brown to pure black, with white and yellowish stripes. This chromatic variability has been the main reason for its spreading throughout the world as terrarium pets.



The following characteristics show the capacity it has to become an invasive species on the Canary Islands

- It is somewhat standard in terms of its use of habitat, it can inhabit meadows or fields, woods or forested areas, semi-desert areas, dry and arid places and even peri-urban areas.
- It consumes both cold-blooded as well as warm-blooded prey, including amphibians, reptiles and their eggs, rodents, small birdlife and their eggs (Werler and Dixon, 2000).
- It is found in altitude range oscillating between 0 and 1.800 m above sea level.
- The optimum temperature for its activity ranges between 15 ºC and 31 ºC (Brattstrom, 1965).
- The female lays an average of 8-10 eggs which she abandons after laying.

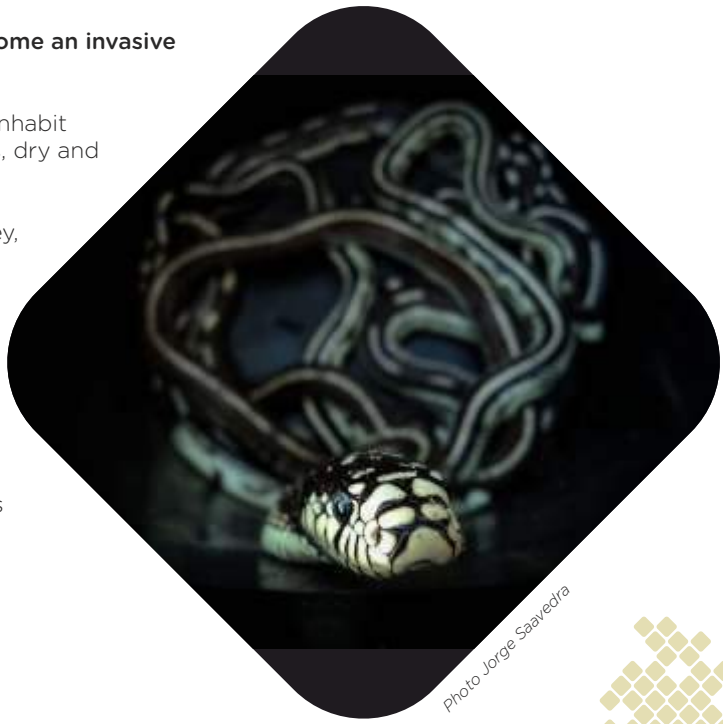


Photo Jorge Saavedra

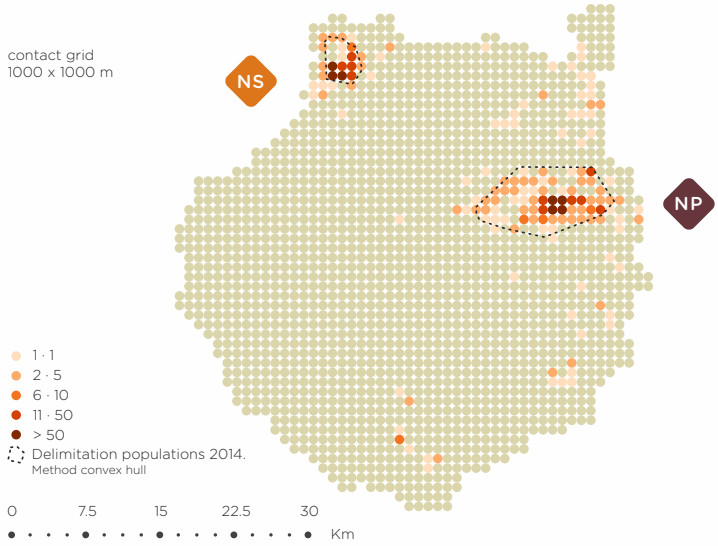
CALIFORNIAN KING-SNAKE POPULATIONS IN GRAN CANARIA

The King-Snake is distributed into two focus:

The **main one**, located in the north east of the island, in the municipalities of Telde, Santa Brígida, Valsequillo, San Mateo and Las Palmas, whose source is located in the neighbourhoods of La Solana in Telde and San Roque in Valsequillo, and the **secondary area** located in the north west, at the Natural Mountain Reserve at Amagro and its surrounding areas in the municipality of Gáldar.

Throughout the project there have been repeated captures in the different areas of the aforesaid locations, that might indicate the formation of new population nuclei in the municipalities of San Bartolomé de Tirajana and Ingenio.

Grid network of 1 Km x 1 Km with sightings of the presence of the Californian King-Snake (captures, observed, shedding skin and excrement) between 2009 and 2015 (n=3.180). Source: in-house project data: LIFE+LAMPROPELTIS.



The major environmental adaptability of the king-snake is clearly seen in the two existing nuclei in Gran Canaria.

The main one is in an area characterized by crops containing fruit trees and watercress *(Nasturtium officinalis)* with considerable urban spread.

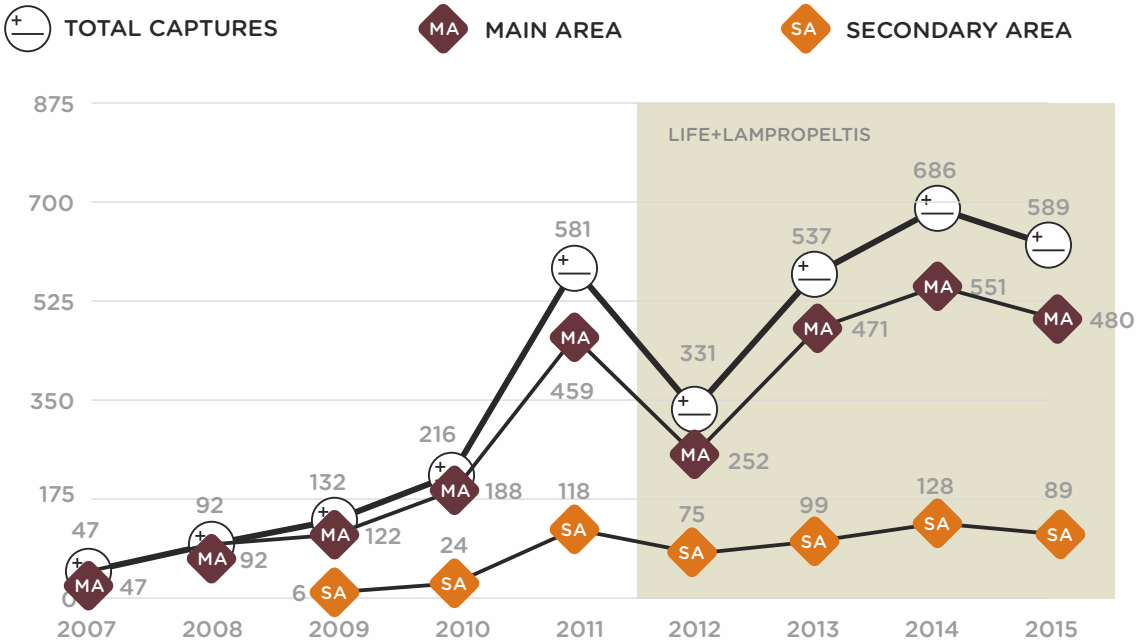
The secondary area is in the **Natural Mountain Reserve at Amagro**, with the presence of natural vegetation on the ground characterized by *tabaiba dulce (Euphorbia balsamífera)* and the *cardón (Euphorbia canariensis)*.

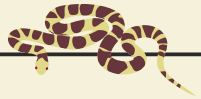
MA

Main Area, in the neighborhoods of La Solana (Telde) and San Roque (Valsequillo).

SA

Secondary Area, Natural Monument Mountain of Amagro (Gáldar).





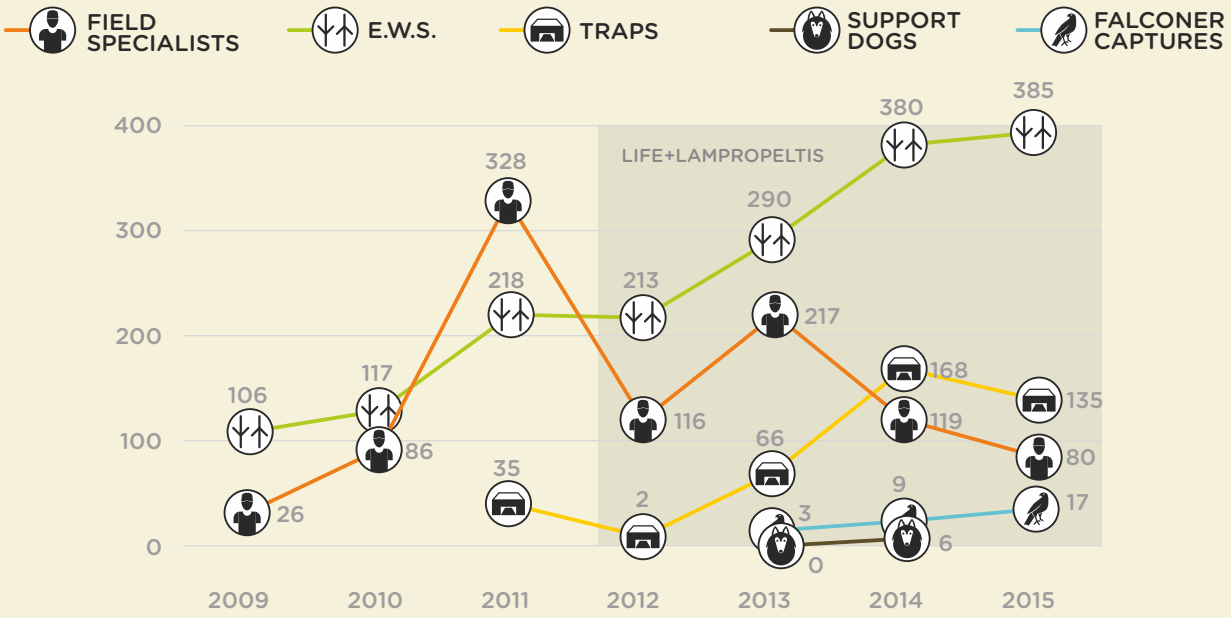
CONTROL OF CALIFORNIAN KING-SNAKE POPULATIONS

The main actions geared towards the control of the proliferation are the following:

PROTOCOLS FOR CAPTURING ACTION A1
This document contains all the procedures necessary for the diverse methods of capture of the Californian King-Snake as well as the handling of the captured animals (location, transport, handling, monitoring, data gathering, Early Warning System, etc.).

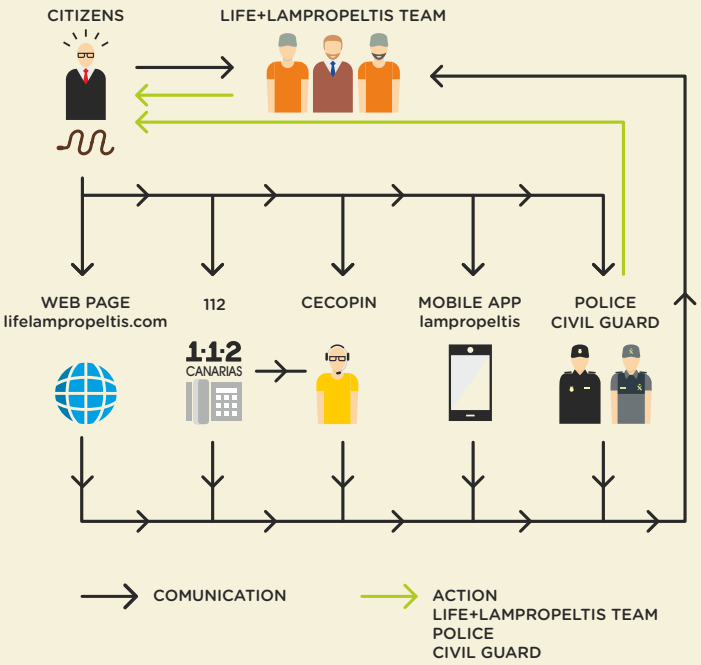
Available in the download section of the web:
www.lifelampropeltis.es/images/pdf/A1_2013.pdf

EXEMPLARY METHODS FOR CAPTURE OF SNAKE
Since 2007, when the naturalisation of the king-snake in Gran Canaria was confirmed, 3.264 specimens have been captured, of which 2.243, have been captured under the protection of the LIFE+LAMPROPELTIS project. Distributed by nuclei; 2.661 have been caught in the main nucleus and 559 in the secondary nucleus. 44 specimens have been captured outside of the established population nuclei, the result of fortuitous or intended releases.



Early Warning Systems E.W.S. ACTION C6 The establishment of Early Warning Systems has as aim bringing together the citizens and the LIFE+LAMPROPELTIS working team, and at the same time, having on-going information on the evolution of the population wherever the working team cannot be present or cannot reach. Taking as a reference point the citizens, we have established five means of direct contact: the technical field team providing immediate response, CECOPIN (Centre for the Prevention of Fires), el 1-1-2, the police corps and SEPRONA, the web page and application for Smartphones LAMPROPELTIS. Of all of these, the most commonly used is the direct calling to the working team (74 %), followed by warnings to CECOPIN (13 %) and the police and SEPRONA (11 %).

The use of E.W.S. by citizens has been growing very significantly, being 2015 the year record in cooperation of citizens, despite having data just until August (385 collected thanks to E.W.S.).



CONTROL OF CALIFORNIAN KING-SNAKE POPULATIONS

Direct captures through active searches undertaken by field specialists ACTION C1
Captures made by field specialists have been the only ones that have seen a decline throughout the life of the project, a clear consequence of the success of citizen participation and the improvement of the trapping systems (if a lot of time is spent collecting snakes handed in by residents, or captured in traps, not much time can be devoted to manual searches).

Captures made using traps ACTION C2
Three different types of traps have been used: deck traps, double funnelled traps and box traps. The use of traps has provided 406 capture, of which, 303 have been in the last two years of the LIFE+ project.

The most efficient method has been the use of box traps requiring the efforts of 1,3 hours of field specialist for each specimen captured.

Box trap with snake captured inside

*Data up to August 2015

Distribution area of the species ACTION A2
With the aim of evaluating the evolution of the populations, each year the area occupied by the species has been estimated ACTION A2, the results indicate that in both populations the surface area has increased slowly, yet continuously.

SURFACE AREA	2011	2012	2013	2014
MAIN AREA (NP)	64,74 km²	65,97 km²	66,38 km²	69,67 km²
SECONDARY AREA (NS)	11,65 km²	12,10 km²	12,59 km²	13,57 km²
TOTAL km²	76,39 km²	78,07 km²	78,97 km²	83,24 km²

Trained animals ACTION C3
Tests have been performed to verify the effectiveness of the use of trained dogs and Harris's hawk (Parabuteo unicinctus) in the capture of king-snakes. The results have been lower than those forecast with both methods. Trained dogs have only managed to capture six specimens in two years. Thanks to the Harris eagles we have been able to capture 29 king-snakes, a low number compared to other methods, yet is interesting to take into account in order to implement in the future strategies of collaboration between the falconers and the project.

The results of these actions are included in the monitoring report contained in the download section of the web:
www.lifelampropeltis.com/index.php/homepage1/informes

Harris's hawk (Parabuteo unicinctus)

IMPROVEMENT OF THE GENERAL PUBLIC'S AWARENESS OF THE INVASIVE SPECIES IN GRAN CANARIA

Several actions have been undertaken as part of the project that are geared towards improving awareness of the true biology and behaviour of the California king-snake in Gran Canaria.

With each one of the captures made, a database has been created with more than 90 fields, amongst which meteorological and morphological data, location, observations, etc have been included. This information has provided a better understanding of the environmental conditions (temperature, atmospheric pressure, wind, relative humidity, etc.) in which the Californian king-snake increases its activity and surface area, when is the beginning of the mating season, in which climatic situations the king-snakeuses artificial decks as shelters, etc. ACTION A3.

1.200 deceased samples have been examined in order to obtain highly relevant details on such aspects as diet, gender, physiological state, pregnancy (females with eggs inside), number of eggs, age, morphological aspects, etc. ACTIÓN C4.

Up to a total of 25 specimens have been released into the wild with radio transmitters fitted, this has allowed us to know aspects of their behaviour such as philopatry (tendency to remain close to the birthplace), movement for nocturnal activity in summer months, differences between the mobility range between males and females, amongst other aspects ACTION C5.

It has been demonstrated that the king-snake is affecting endemic reptile populations in Gran Canaria, and particularly the populations of giant lizard of Gran Canaria (Gallotia stehlini) whose populations have decreased significantly, And the undertaking control tasks have not been able to allow their recovery ACTION A5.

On the other hand, two genetic studies have been performed on king-snake populations have allowed us to determine that the introduction of king-snakes in both regions, carried out by different people, showing that there is a high-level of inbreeding in each one of theme, that show reduced effective population sizes (number of individuals that leave offspring in the population) and that this size throughout the project and in the main area have been maintained or even increased, whilst the levels have fallen in the secondary nucleus ACTION A4.

The results of these actions are included in the download section of the web:
www.lifelampropeltis.com/index.php/homepage1/informes

Lizard after being regurgitated by snake

Photo José Miguel Sánchez

PREVENTION OF NEW INTRODUCTIONS OF INVASIVE EXOTIC SPECIES

Following the passing of Royal Decree 1628/2011, on the 14th of November (repealed by Royal Decree 630/2013, passed on the 2nd of August) through which the listing and cataloguing in Spain of invasive exotic species is regulated, Spanish law has specific legislation for the management and cataloguing of invasive exotic species. Furthermore, this royal decree has catalogued as invasive exotic species in the Canary Islands all of the species of snakes belonging to the Colubridae family, amongst which we can find the Californian king-snakeand therefore, its its possession, transport, traffic and trade is prohibited.

In the project, a **Manual for Risk Analysis in Exotic Vertebrate Trading** has been developed This is a document of relevant importance, that aims to serve as a useful tool for public sector administrations, through which the risk of settlement and infestation of marketable exotic vertebrate species. Using a series of analytical tools relating to aspects of climatic similitude between their original habitat and that of the Canary Islands, worldwide distribution, diet, behaviour, prior history of invasion, etc., for each individualised species, we can obtain a risk of invasion value, for health and infestation. ACTION C7.

This objective value will allow the technicians involved in the authorisation of the entry of examples of exotic species to make the necessary determinations relating to the suitability of this species being commercialised in the Canary Islands. Likewise, it can also represent a valuable tool for impact studies on those activities that lead to the entry of exotic species.

The application of this Manual has allowed for the creation of a list invasive exotic species in the Canary Islands , whose 27 new species of vertebrates included on the black list, will be proposed by the General Directorate for Protection of Nature at the Government of the Canary Islands to the Ministry of Agriculture, Foodstuffs and Environment, for their inclusion in the forthcoming review of the catalogue of invasive species ACTION D8.
Available in the download section of the web:

www.lifelampropeltis.es/images/pdf/C7%20Manual%20riesgos%20vertebrados%20exoticos.pdf

INCREASING AWARENESS AND THE PARTICIPATION OF SOCIETY IN THE STRUGGLE AGAINST INVASIVE EXOTIC SPECIES

A total of 261 of informative workshops have been carried out, with a total outreach of 6.794 people in the educational sphere (208 workshops and 5.242 students and teachers from Primary to High School, including the vocational training students), professional workshops (39 workshops and 1.072 people) and general public (16 workshops and 480 people).

In the last two years of the project, volunteer actions have been set up with a total of 12 field departures involving almost 300 volunteers, and in which social such as La Vinca, Ruta7, AVAFES and ASPERCAN (Asperger Association of the Canary Islands) have taken part rewarding experiences both for the volunteers as well as the staff for the LIFE+LAMPROPELTIS project **ACTION D1**.

Available in the download section of the web:
www.lifelampropeltis.es/images/pdf/D1_2013.pdf

Specific teaching materials have been designed consisting of 7.000 triptychs, 1.000 posters distributed to each one of the workshops, and issued in the affected municipalities, along with 11 informative panels fitted. The media coverage relating to the project has resulted in more than 100 articles published in the written press, more than 15 radiophone and television interviews, with the highlight being the INTERNATIONAL SEMINAR ON THE MANAGEMENT OF INVASIVE EXOTIC REPTILES, held in May 2014, which led to the opening of important gateways to the exchange of information between the experts and resulted in more than 70 articles published in the worldwide press , along with almost 4.000 visits to the project web on the days before the event.

www.lifelampropeltis.com/images/pdf/D3_triptico_v2.pdf

The presentations and results from the International Seminar are available in the download section of the web:
www.lifelampropeltis.com/index.php/homepage1/informes

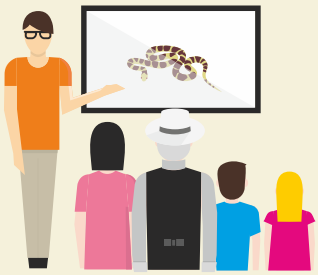
Documentary *The California king-snake in Gran Canaria. The silent invasion*.

Documentary lasting 23 minutes, with subtitles in English, French and German, showing the different actions undertaken through the project in a clear and precise manner in order to control the spread of the California king-snake. 1.000 copies have been pressed onto DVD format, and is currently housed on platforms such as YouTube or Vimeo.

www.youtube.com/watch?v=jA68IaIYSdM

With regards to the educational community, the documentary has been incorporated into the Educational Mediatheque of the Department of Education and Universities, as part of the online resources available for teachers and alumni.

www3.gobiernodecanarias.org/medusa/mediateca/publicaciones/?attachment_id=401



Good practices manual for trading in exotic species.

This manual delves deeper into the conditions for feeding, cleaning, handling and lighting needed, with the aim of optimising the animal's wellbeing, as well as making reference to the safety and maintenance conditions necessary in captivity, with the aim of avoiding escapes into the wild. Similarly, there is a specific chapter dedicated to the differentiation between the different exotic species and the invasive species, and each zoological group dealt with in the manual, a mention is made of the main invasive species whose trading is prohibited.

21.000 copies of this easily-readable and enjoyable manual have been printed, in pet shops and businesses dedicated to the sale of animals throughout the Canary Islands, clinics and veterinary surgeries, along with authorised zoological parks, with the intention of it being the actual trader and veterinary professional who distributes the document to their clients and informs these of the consequences of bad practices in this activity that can lead to damages to the islands' environmental balance.

Digital version available in the downloads section of the web:
www.lifelampropeltis.es/images/pdf/D9_MBP_comercio_exoticas.pdf

www.lifelampropeltis.es/images/pdf/D9_MBP_comercio_exoticas.epub

CONCLUSIONS

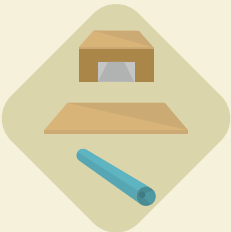
The LIFE+LAMPROPELTIS project has meant an example of technical and administrative coordination between the administrative partners involved in said project, the Government of the Canary Islands and the Council of Gran Canaria.

Photo Cristian Rodriguez

The control of invasive exotic species requires major efforts in the long-term to start to obtain indicators of whether a reduction is occurring in wild populations.

In both population nuclei, we have only been able to slow down the expansion of the species and its affectation on native fauna. The selection of effective capture methods, the considerable increase of citizens' implication, the establishment of a solid network of information exchange between experts, the implantation of Early Warning Systems, knowledge of the species' biology in Gran Canaria and the drive of volunteers have led to the building of solid foundations with the power to reverse this trend in the future.

EFFECTIVE CAPTURE METHODS



CITIZENS' IMPLICATION

NETWORKING

EARLY WARNING SYSTEMS E.W.S.

KNOWLEDGE OF THE SPECIES' BIOLOGY

VOLUNTEERS SUPPORT

Drafting and Coordination Gesplan
Photos Ramón Gallo, Jorge Saavedra, Cristian Rodríguez, José Miguel Sánchez
Design and Layout Javier Ruiz

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