

SERIES

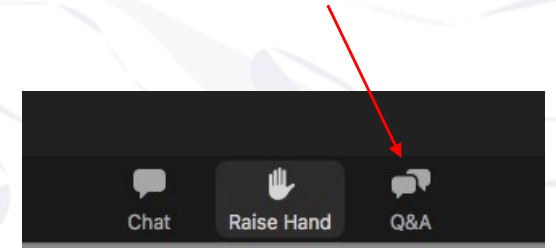


# How to manage **CATS** on **SMALL** **ISLANDS?**

# How to use the platform

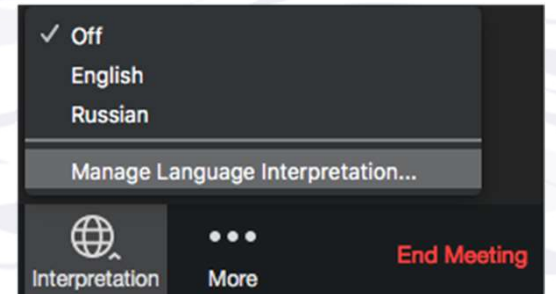
## ❖ PARTICIPANTS

You can ask questions through the « question box ». The moderators see them and relay them to the speakers who will answer them in the "question and answer" sessions provided. You can speak after each intervention.



## ❖ TRANSLATION

If you need interpretation please choose the channel below...



## ❖ SPEAKERS

Think that everyone can see and hear you...and that you are being recorded for future broadcasts! Please turn off your microphones when you are not speaking.

# Context & objectives

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## ❖ ICO SOLUTIONS

Islands, Coasts, Oceans Solutions : Identify and share good initiatives and practices all around the world with our partners



French public institution : acquire parcels of coastline threatened by urbanisation or degraded in order to turn them into restored, developed and welcoming sites respecting the natural balance.



International NGO : promotion and assistance in the management of Mediterranean island areas by the implementation of concrete actions in the field.



Small Islands Organization, international NGO : supports small islands of less than 150 km<sup>2</sup> towards their sustainable development and the sustainable management of their resources (water & sanitation, waste, energy, biodiversity, landscape and cultural heritage).

# Context & objectives

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## ❖ **SERIES « CAT MANAGEMENT ON SMALL ISLANDS »**

Share concrete practices to support their replication with experiences from project/program managers and experts in the field.

How to implement them? What are the difficulties and how to prevent and overcome them ? What are the keys to success?





# How to manage **CATS** on **SMALL ISLANDS?**

- **Last week** >> 1st Episode : Preventing the introduction and spread of cats on small islands (*replay on ICO website*)
- **Today** >> 2<sup>nd</sup> Episode : Soft technics to limit and control cats populations
- **April 25th (4:00 PM – UTC+2)** >> 3<sup>rd</sup> Episode : Eradication as last resort and the questions around it

# Organizing team



**Fabrice Bernard**  
*Moderator*

Europe & International head-Officer  
Conservatoire du littoral



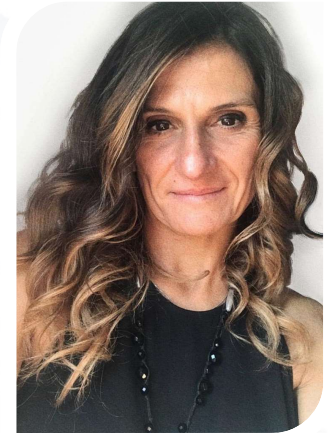
**Cyrielle Grouard**  
*Organization /  
Question Box*

Project Manager  
PIM Initiative



**Enora Tregouët**  
*Organization /  
Back Office*

Europe & International Project  
officer Conservatoire du littoral



**Isabella Ranieri**  
*Intepreter*

# Program – Episode 2

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## Soft technics to limit and control cats on islands

- ❖ **Introduction** – Biz Bell 5’
- ❖ **First part** – Vicente Piorno Gonzalez 10’
  - **The case of the Islas Atlánticas de Galicia (Spain)**
  - **Q&A**
- ❖ **Second part** – Elsa Bonnaud 10’
  - **The case of Port-Cros (France)**
  - **Q&A**
- ❖ **Expert’s summary** – Biz Bell 7’
- ❖ **Closing**



# Speakers



**Elsa Bonnaud**

Lecturer

Board member of PIM  
Initiative



INTERNATIONAL NGO FOR  
**MEDITERRANEAN  
SMALL ISLANDS**

France



**Elizabeth (Biz) Bell**

Managing director



**WMIL** | Wildlife  
Management  
International

New Zealand



**Vicente Piorno González**

Senior conservation officer



Spain

How to manage **CATS** on **SMALL ISLANDS?** | 2nd Episode – April 18th, 2023 | Organized by :





# Speaker

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## Vicente Piorno González

Senior conservation officer



PARQUE NACIONAL MARÍTIMO TERRESTRE  
DAS ILLAS ATLÁNTICAS  
DE GALICIA

Spain

# Speaker

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**Elsa Bonnaud**

Lecturer

**université**  
**PARIS-SACLAY**

Board member of  
PIM Initiative



INTERNATIONAL NGO FOR  
**MEDITERRANEAN  
SMALL ISLANDS**

France

# Introduction

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**Elizabeth (Biz) Bell**

Managing Director



**WMIL** | Wildlife  
Management  
International



New Zealand

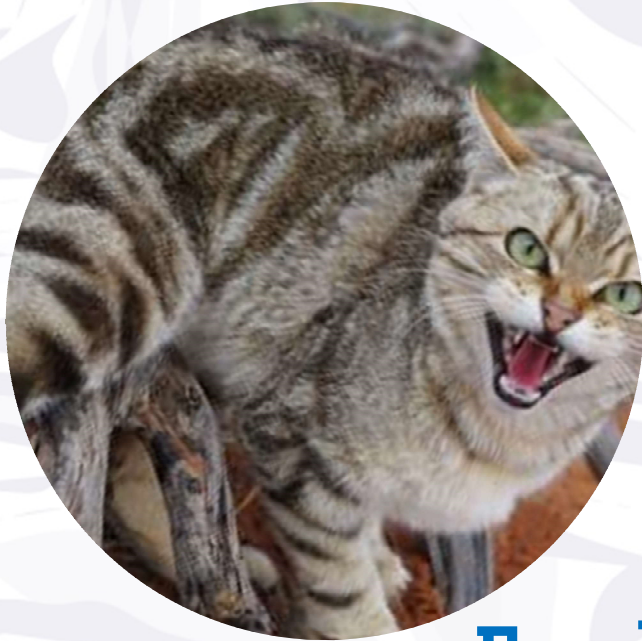
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# *CATegories*

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**Feral Cat**



**Stray Cat**



**Pet Cat**



# *What are soft methods of cat control?*

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## **SOFT METHODS:**

- **Generally non-lethal options**
- **Often followed by approved euthanasia options**
- **Including habitat alteration**



## **WHY USED SOFT METHODS:**

- **Following community consultation**
- **Location constraints**
- **Island characteristics**
- **Legal restrictions**

# *What are soft methods of cat control?*

---

## **HABITAT ALTERATION:**

- **Removal of food and shelter**
- **Can include non-toxic deterrents**
- **Locally effective**
- **Expensive**
- **Require regular maintenance**
- **Useful for small areas**



# *What are soft methods of cat control?*

---



## **EXCLUSION FENCING:**

- **Effective, but expensive and require regular maintenance**
- **Useful for small areas**



## **DETERRENTS:**

- **Sonic, scent, etc.**
- **Useful for small areas only**
- **Require constant reapplication**

# *What are soft methods of cat control?*

---

## TRAP NEUTER RELEASE (OR REHOME)

- Rehoming difficult (generally kittens only)
- Ecological implications
- Welfare implications
- Disease implications (transmission to pets)
- Property destruction implications





# *What are soft methods of cat control?*

---



## **LIVE TRAPS:**

- **Cage traps, Leghold traps, Soft net traps, etc.**
  - **Econode options (i.e., auto-reporting of captures)**
  - **Euthanasia method needed**
  - **Labour intensive**
  - **Legal implications**
  - **Welfare implications**
  - **Can release non-target species unharmed**
  - **Can release pet cats unharmed**



# *What are soft methods of cat control?*

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- **Hunting >> Targeted approach option**

**Can be considered as a soft or a hard method  
depending on the context...**

**We'll see that on the 3<sup>rd</sup> episode next week!**



# Control of feral cats in the Atlantic Islands National Park



PARQUE NACIONAL MARÍTIMO TERRESTRE  
DAS ILLAS ATLÁNTICAS  
DE GALICIA

Vicente Piorno  
Senior conservation officer  
Atlantic Islands National Park

SPAIN



# The islands of the National Park



6 islands  
90 – 350 ha, many small  
islets

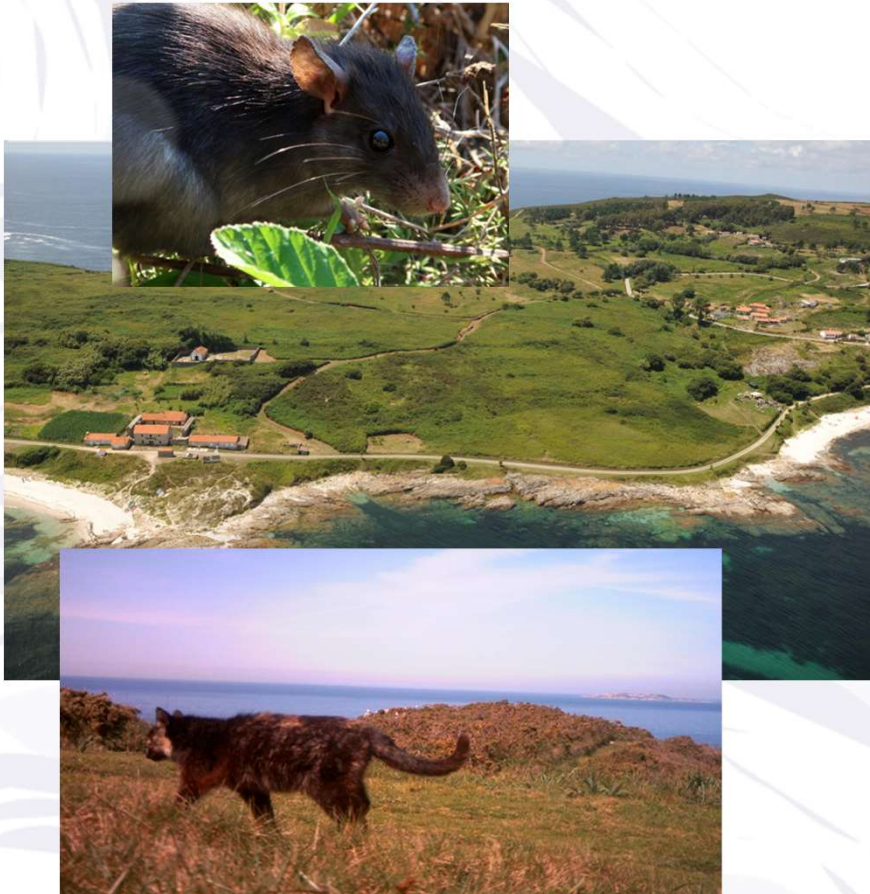
0.5 – 2 km  
from mainland

~5000 daily visitors  
in summer, <10 residents in  
winter





# The situation regarding cats



feralization  
of domestic cats before park  
declaration

impact on seabird  
colonies and small  
endemic vertebrates

program for eradication  
of invasive carnivores

# Cat surveying and monitoring



Indivíduo nº  Nome

Idade Adulto  Subadulto  Cria do ano

Sexo Macho  Fêmea  Indeterminado

Identificação Segura  Dúvida

Descrição breve  
Correr: efeito pesse (cabeça, corpo, patas, cauda)  
Negro e laranja em grandes manchas  
Fuziño, peito e patas dianteiras brancas

Observacións

Foto (s)

Cámara 13

Localización do individuo  
(Indicar un punto e un número correlativo as localizacións do exemplar)

Data	nº cámara	Observacións
22.ene-11	13	
11.ago-10	17	
14.nov-10	17	
07.11.2010	18	
09.11.2010	18	
11.11.2010	18	
18.11.2010	18	
19.11.2010	18	

(utilizar outra folia para mais localizacións)

tracks and scats transect counts

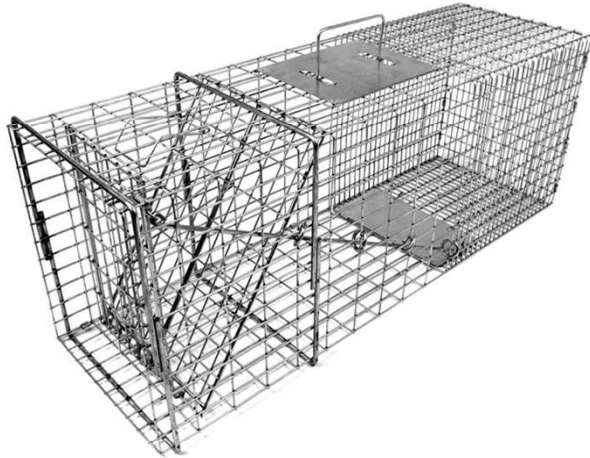
camera trapping

individual identification

territory mapping



# Cat trapping



tomahawk traps  
40 - 60 traps deployed

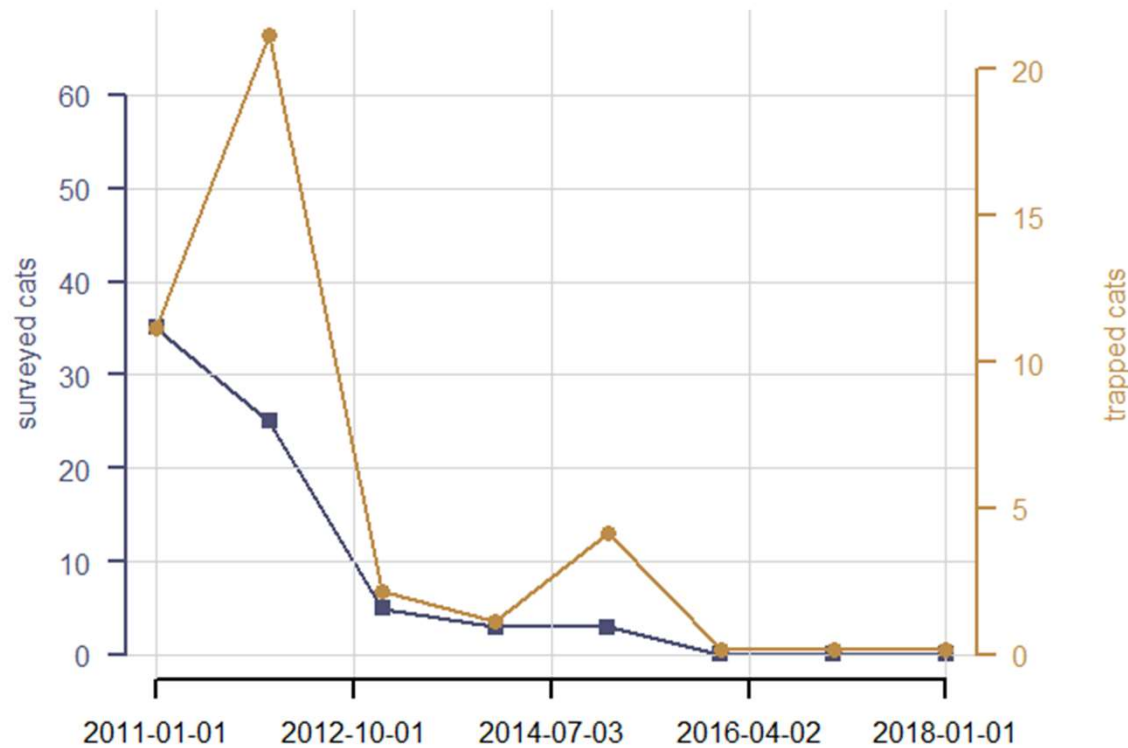
canned fish  
as bait

trap shyness

Wisconsin snares  
to trap the last cats



# Trapping results

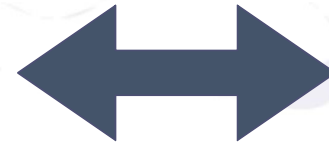


~ 60 cats removed  
in 5 years

rapid initial decline

difficult removal of last  
cats

# Effects on biodiversity



limitations  
of monitoring

apparent positive effect  
on:

- European shag
- Ocellated lizard

no effect on:

- Black rats

# Social issues

dealing  
with the  
cats



dealing  
with  
people



strong social opposition  
to  
cat euthanasia

agreements with cat  
welfare associations

promotion of social  
awareness

progressive banning of  
cats



# Conclusions



importance of:

- **surveying and monitoring**
- **planning**

**avoid conservation pessimism**

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# Intro / Part I

## Question & Answers

# Part II

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**Elsa Bonnaud**

Lecturer

**université**  
**PARIS-SACLAY**

Board member  
of PIM Initiative



INTERNATIONAL NGO FOR  
**MEDITERRANEAN  
SMALL ISLANDS**



# Introduced mammals : cats as a “severe and highly spread” species

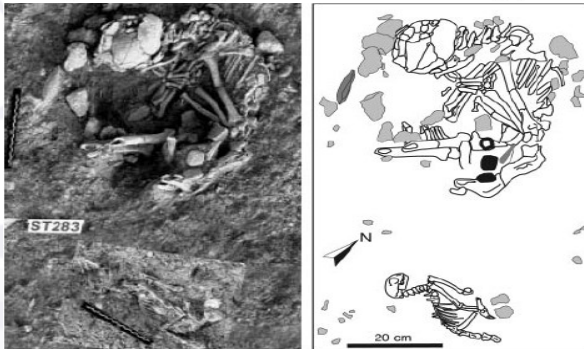
Domestic cat  
(*Felis silvestris catus*):



one of the predator the most spread on islands worldwide

➡ Domesticated very early

## Early Taming of the Cat in Cyprus



J.-D. Vigne,<sup>1\*</sup> J. Guilaine,<sup>2,3</sup> K. Debué,<sup>1</sup> L. Haye,<sup>2</sup> P. Gérard<sup>2,3</sup> Science, 2004

Most ancient evidence of domestication and insular introduction :  
9500-9200 years B.P.

➡ Great ability to catch rodents



# Introduced mammals : cats as a “severe and highly spread” species

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## Black rat

(*Rattus rattus*) :

- Have invaded more than 80 % of the world’s islands (Atkinson 1985)
- One of the most **damaging** species on islands
- A **leading** cause of seabird **extinction** risk (shearwaters & petrels; Birdlife International)



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*Review*

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## Severity of the Effects of Invasive Rats on Seabirds: A Global Review

HOLLY P. JONES,\* BERNIE R. TERSHY,† ERIKA S. ZAVALETA,‡ DONALD A. CROLL,†§  
BRADFORD S. KEITT,† MYRA E. FINKELSTEIN,‡ AND GREGG R. HOWALD\*\*



# Mediterranean endemic species: the yelkouan shearwater

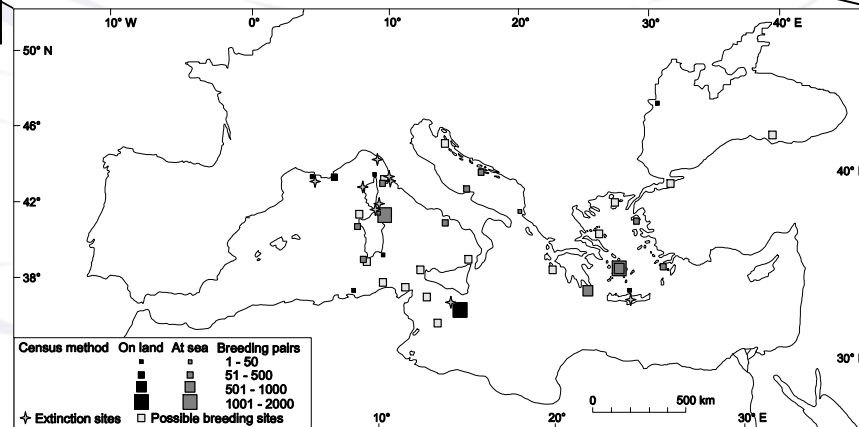


- Long-lived seabird
- Ground-nesting (deep natural rock cavity)
- Breeding cycle covering 9 months (on islands)
- One egg per year



## • Breeding sites:

South of France      Black-sea.  
 In several sites: breeding is not confirmed.



(Bourgeois & Vidal, 2008).

## • Worldwide population:

Probably less than 20 000 pairs



F. Dhermain



# The yelkouan shearwater populations of the study sites



Port-Cros

- Small Island (640ha)
- 80% forest vegetation
- 40 inhabitants
- 360 breeding shearwaters



Le Levant

- Small Island (1200 ha)
- Typical shrubs of “maquis” vegetation
- 150 Militaries and civils
- 2600 breeding shearwaters

Cats, rabbits, ship rats and wood mice

# Shearwater monitoring

## Cavities monitored:

- 100 on Port-Cros
- 76 on Le Levant

mainly by Karen Bourgeois & Jérôme Legrand



Shearwater monitoring	Port-Cros Island (360 breeding birds)								Le Levant Island (2600 breeding birds)			
Year survey	2003	2004	2005	2006	2007	2008	2009	mean ± SD	2007	2008	2009	mean ± SD
Breeding pairs	28	32	41	42	39	40	37		33	32	30	
Percent of occupied nests	0.277	0.311	0.398	0.396	0.375	0.388	0.366	0.359 ± 0.047	0.465	0.421	0.417	0.434 ± 0.027
Hatching success	0.700	0.857	0.974	0.895	0.737	0.947	0.917	0.861 ± 0.105	0.938	0.871	0.933	0.914 ± 0.037
Fledging success	0.929	0.958	0.838	0.853	0.929	0.917	1.000	0.918 ± 0.057	0.767	0.889	0.893	0.849 ± 0.072
Breeding success	0.650	0.821	0.816	0.763	0.684	0.868	0.917	0.789 ± 0.096	0.719	0.774	0.833	0.775 ± 0.057

## On both islands:

✓ Many suitable cavities are unoccupied  
: habitat available!

✓ Reproductive success is high

# Study of cat

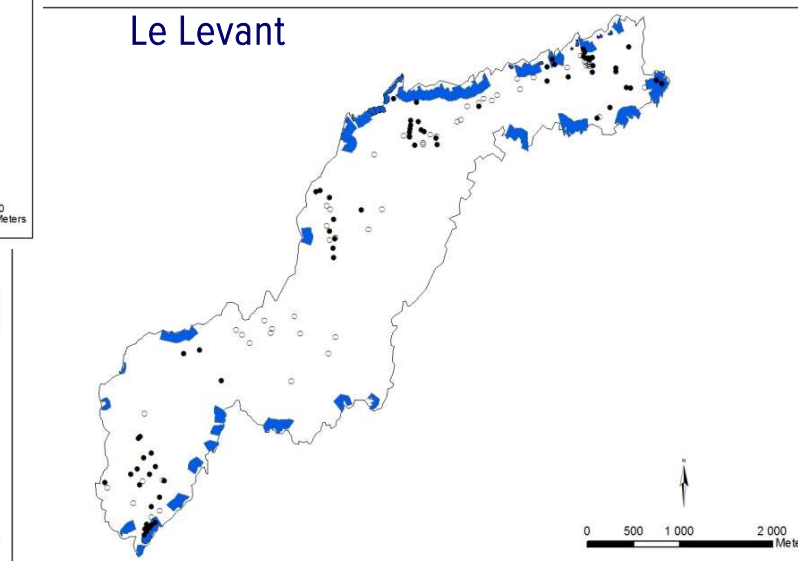
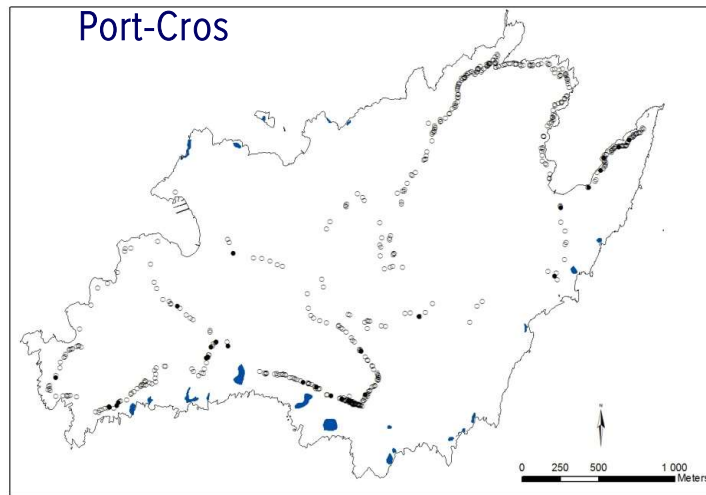
➤ Scats collected on the field according to shearwater breeding cycle



Rodent remains



Shearwater remains



Yelkouan shearwater colonies



# Study of cat diet

Food categories	Port-Cros Island (August 2002 - August 2004)	Le Levant Island (August 2006 - August 2008)
	Frequency of occurrence	
<b>MAMMALS</b>	<b>91.87</b>	<b>74.50</b>
<i>Rattus rattus</i>	77.94	43.00
<i>Apodemus sylvaticus</i>	34.69	2.50
<i>Oryctolagus cuniculus</i>	6.68	27.00
<b>BIRDS</b>	<b>16.69</b>	<b>51.00</b>
<i>Puffinus yelkouan</i>	5.81	43.50
other-birds	10.89	7.50
<b>REPTILES</b>	<b>7.84</b>	<b>11.50</b>
<b>INSECTS</b>	<b>11.03</b>	<b>8.50</b>

Cat preyed mainly upon

- introduced mammals
- and birds

## On Port-Cros Island:

- Mainly rats and wood mice
- Shearwater the most frequent bird found in cat' scats

## On Le Levant Island:

- Mainly rats and rabbits
- Shearwater found in nearly half of scat collected!

# Cat impact on shearwater populations

- Population dynamics model run with Unified Life Model Software (Legendre & Clobert 1995, last updated version in 2017)
- Cat predation rates (calculate according to cat diet studies, cat population and shearwater behavior)
- Assumption: shearwater populations are closed populations!

	Port-Cros			Le Levant		
Shearwater <sub>Pop</sub>	360			2600		
Cat <sub>Pop</sub>	0	20	0	5	10	20
N <sub>shear. killed</sub>	0	431 ± 72	0	810 ± 230	1621 ± 460	3241 ± 920
Preda.Breeders	0	0.386 ± 0.065	0	0.101 ± 0.029	0.202 ± 0.057	0.403 ± 0.115
Predat.Prospect.	0	1.544 ± 0.260	0	0.404 ± 0.116	0.808 ± 0.228	1.612 ± 0.460
$\lambda$	<b>1.0102</b> ± 0.0000	<b>0.7054</b> ± 0.0064	<b>1.0101</b> ± 0.0000	<b>0.8586</b> ± 0.0001	<b>0.6805</b> ± 0.0021	<b>0.7331</b> ± 0.0058
<b>T<sub>ext</sub> (year)</b>	-	<b>~ 6</b>	-	<b>~ 53</b>	<b>~ 21</b>	<b>~ 7</b>

- ✓  $\lambda > 1$  only if no cat predation
- ✓ Even a small cat population leads to shearwater population extinction
- ✓ Hypothesis to explain shearwater population persistence on Port-Cros: Immigrant prospectors!

# Feral cat eradication on Port-Cros Island

- Using only live-traps

(due to a small population of domestic cat on this island)



- Eradication program conducted

- First, on shearwater colonies
- Then, spread over all island parts



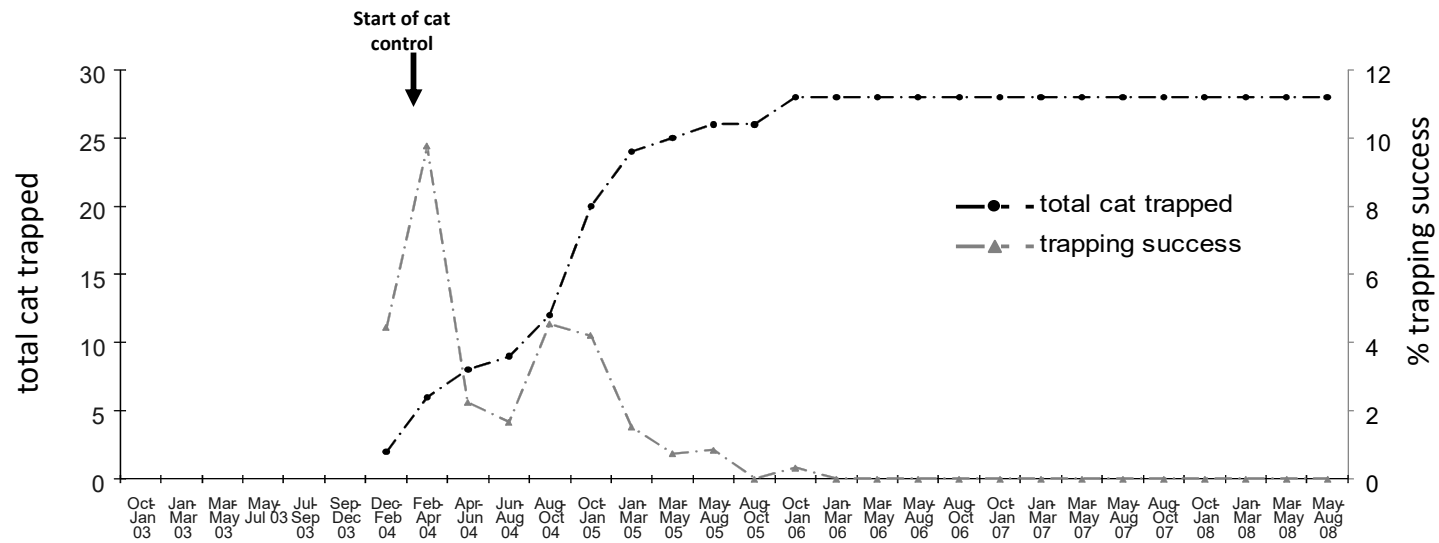
28 feral cats trapped over two full years

- A sterilization campaign was simultaneously conducted on the domestic cats



# Feral cat eradication on Port-Cros Island

## Cat trapping



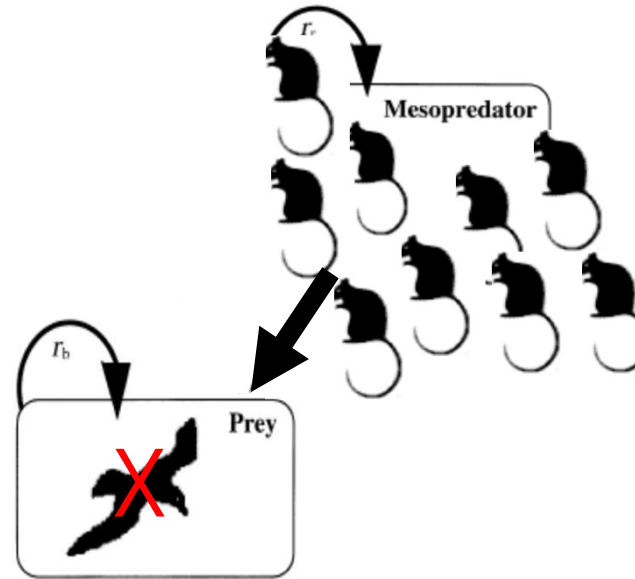
✓ No more cat trapped from October 2006

✓ No more sign of cat predation from May 2005

# Feral cat eradication on Port-Cros Island

➤ Multi-invaded island

→ Trophic links

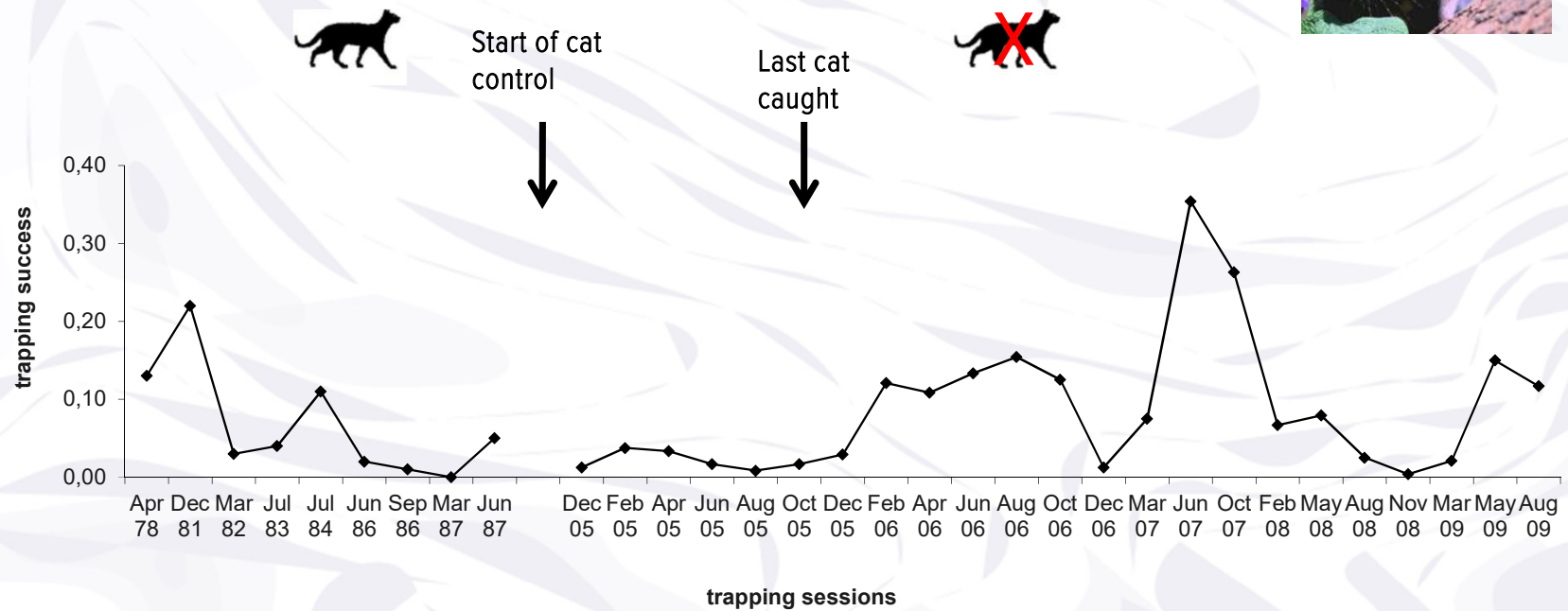


« Mesopredator Release Effect »:

- High increase of density of mesopredator population following top-predator removal
- Stronger impact of mesopredator on prey population (here seabirds)

# Feral cat eradication on Port-Cros Island

## Monitoring of rat population

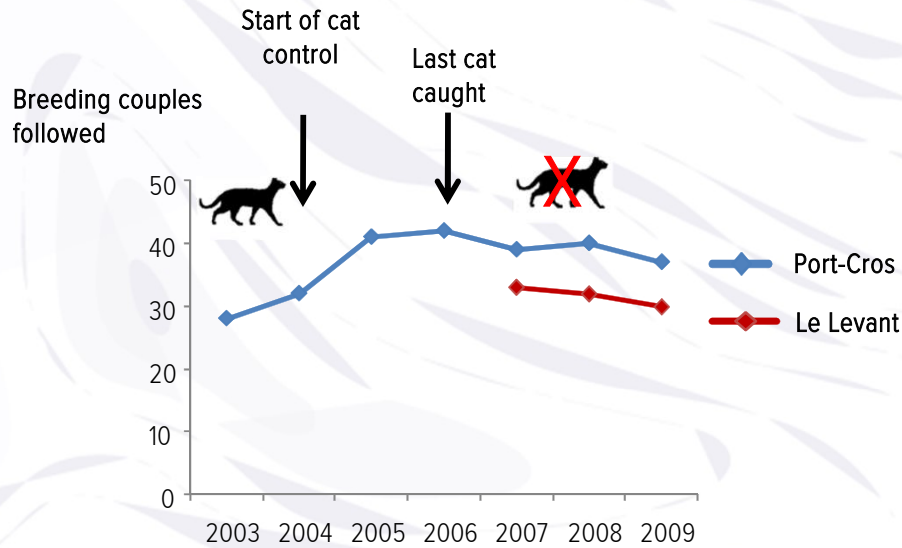


- ✓ High variations of rat trapping success
- ✓ BUT : variations similar to previous values already recorded on the island with cat presence

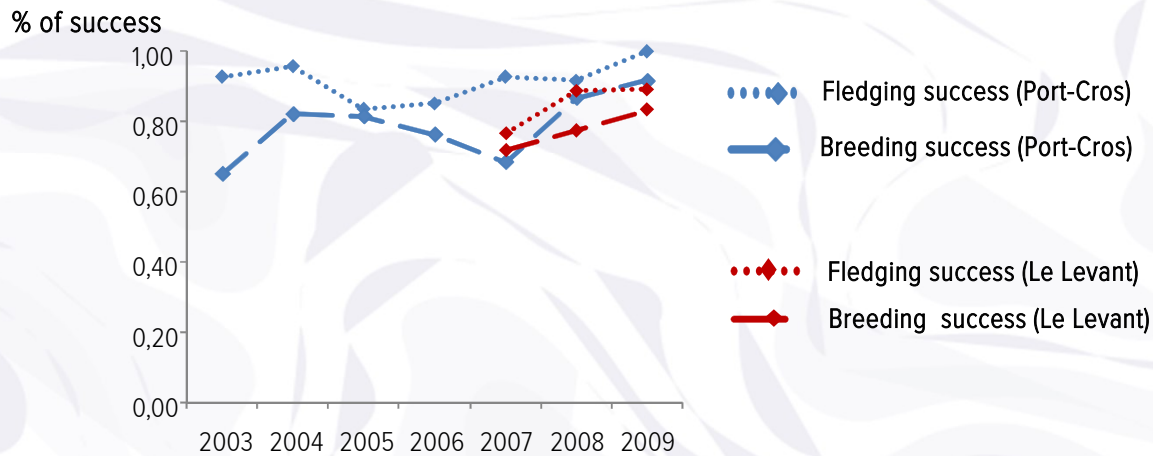


# Feral cat eradication on Port-Cros Island

Monitoring of yelkouan shearwater population (one colony!!!)



✓ Beginning of settlement of new breeders on Port-Cros Island

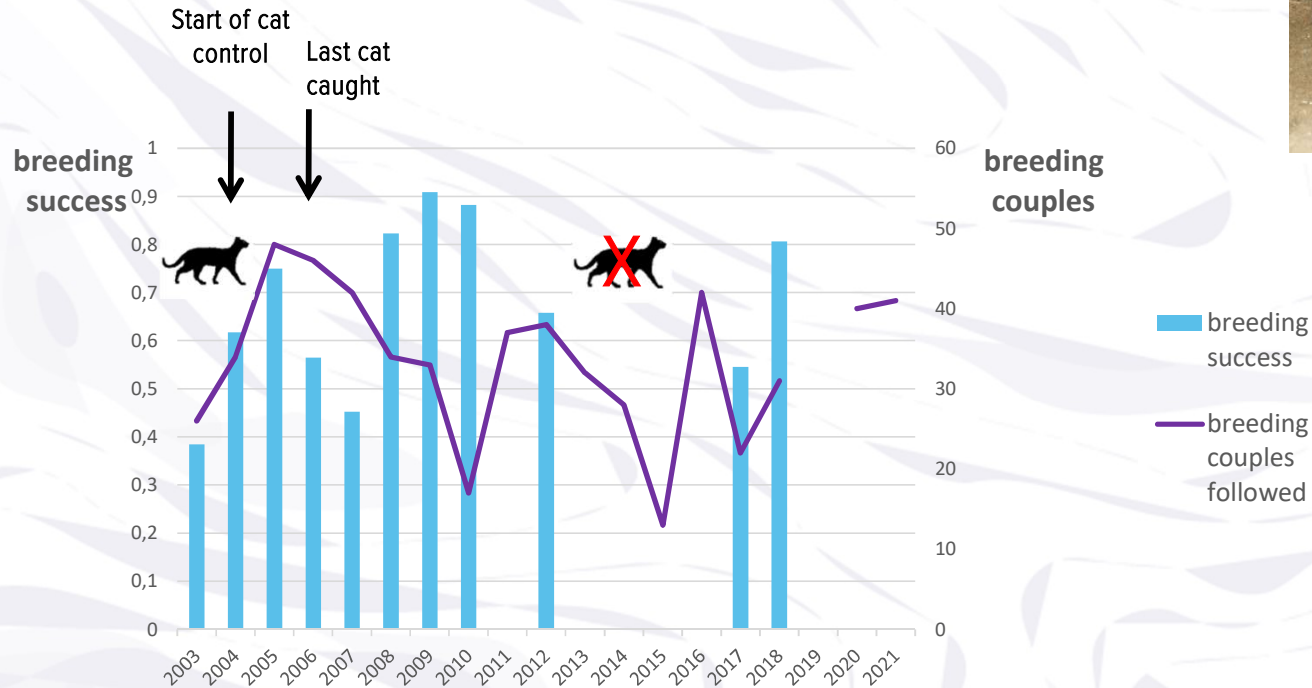


✓ High reproductive success

✓ No rat impact on shearwaters (or really low)

# Feral cat eradication on Port-Cros Island : 15 years later?

Monitoring of yelkouan shearwater population (one colony!!!)



- ✓ Difficulties of long term monitoring
- ✓ New threats as pigs appeared
- ✓ Threats at sea? : Climate change?  
Bycatch?  
Windturbine park?

# At this archipelago scale

## Monitoring of yelkouan shearwater population



Porquerolles: relictual population 36-79 couples  
[Scopoli's shearwater: 26-89 couples]

Le Levant: 918-3160 couples  
(distance sampling estimate)



Port-Cros: 225-734 couples (distance sampling estimate)



CENTRE D'ÉCOLOGIE  
FONCTIONNELLE  
& ÉVOLUTIVE



## Conclusive remarks

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- Cat predation is a strong threat for shearwater survival
- On these Mediterranean Islands (major breeding site for yellow shearwaters) shearwater populations seem at relic stage :
  - very few breeders (on Port-Cros)
  - lot of available habitat
- These populations can not support the amount of birds eaten if they are closed populations
- Feral cat eradication, while conserving a neutered domestic cat population, is efficient for native species conservation (valuable option for inhabited islands)
- What about Le Levant island? And Bagaud island?



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# Part II

## Question & Answers

# *Expert's summary*

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**Elizabeth (Biz) Bell**

Managing Director



**WMIL** | Wildlife  
Management  
International



New Zealand





# Summary

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- **Range of soft options available**
- **Varied level of community support, but often high support**
- **Different levels of effectiveness**
- **Expensive**
- **Labour intensive**
- **Legal implications**
- **Welfare implications**
- **Targeted and/or can release non-target species unharmed**

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# Very last Questions ?



**NEXT**

How to manage **CATS** on  
**SMALL ISLANDS?**

**WORKSHOPS**

- **April 25th** (4:00 PM – UTC+2) >> 3<sup>rd</sup> Episode : Eradication as last resort and the questions around it.
- Watch the **Replay from our first episode** : Preventing the introduction and spread of cats on small islands >>

<https://ico-solutions.eu/workshops/series-cats-management-on-small-islands/>



**Thank you for your attention!**  
**See you soon for the next episode**

Contact us : [icosolutions@conservatoire-du-littoral.fr](mailto:icosolutions@conservatoire-du-littoral.fr)

ICO Solutions Calendar : [www.ico-solutions.eu](http://www.ico-solutions.eu)

