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**Marine Wildlife Health Surveillance in the
Galápagos Islands**


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*Puerto Ayora,
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Galápagos

INDEX

1. Introduction
2. Definitions
3. Background
4. Objectives
5. Methods
 - RRR operating system
 - Protocols
 - Training
 - Outreach
6. Advances and preliminary data
7. Ongoing specific studies
8. Next steps

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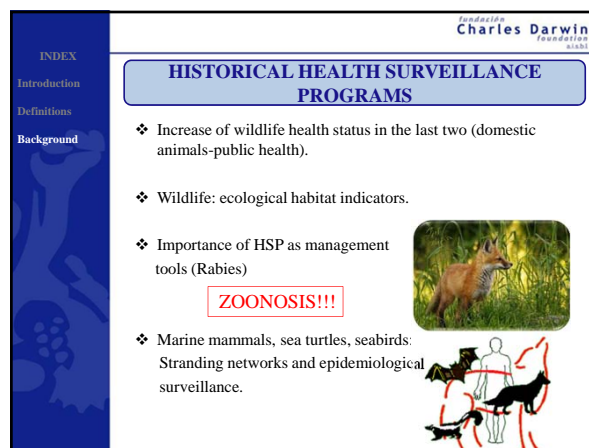
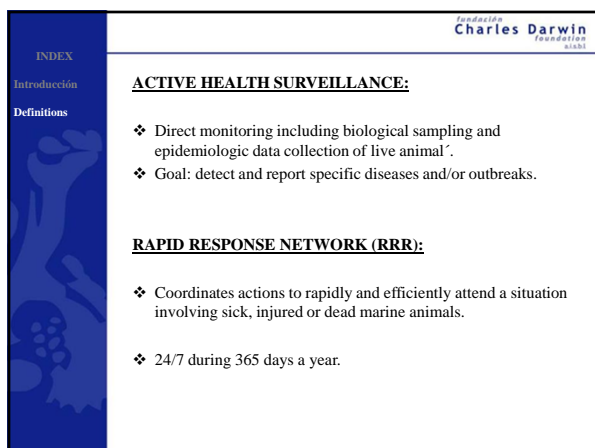
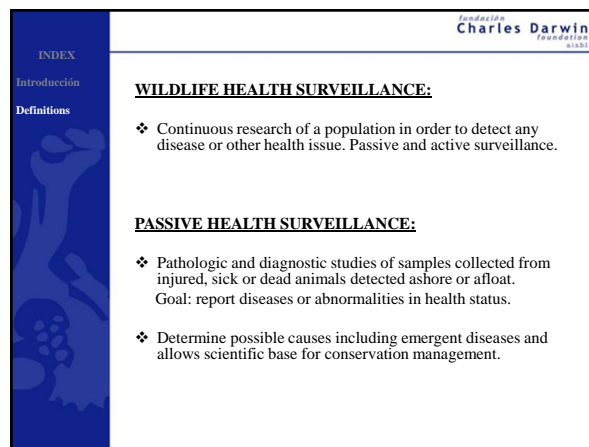
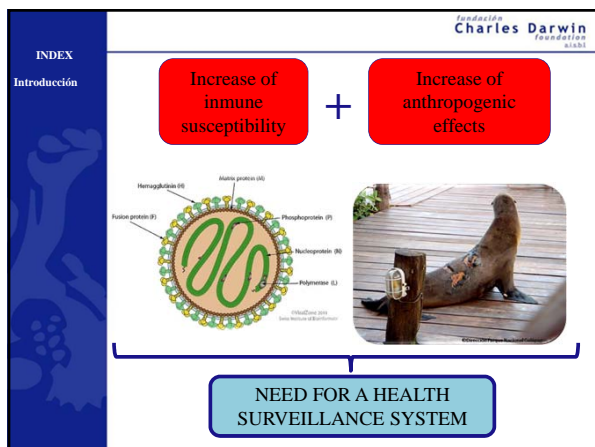
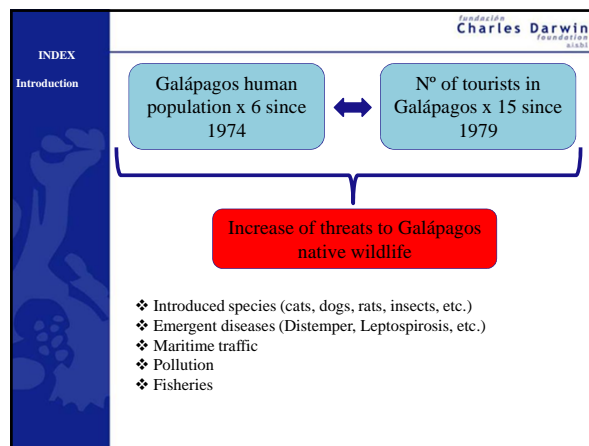
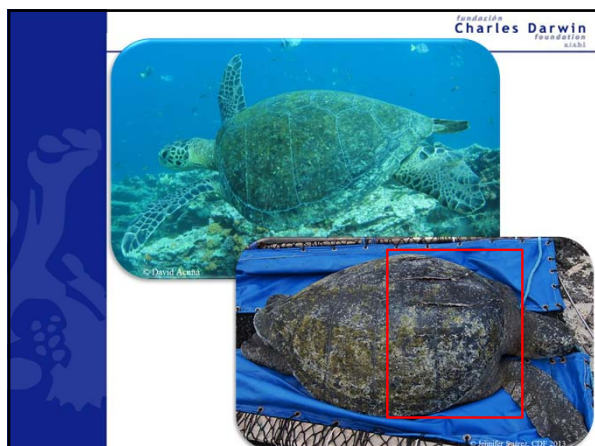
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INDEX
Introduction
Definitions
Background
Objectives

HISTORICAL STUDIES IN GALÁPAGOS

- ❖ **Parker P, Deem S et al, 2001-2009:** Established Galápagos avifauna health status, transmission dynamic of existent diseases and main threats.
- ❖ **Salazar S, Alava JJ, 2005-2008:** Established population status of Galápagos pinnipeds.
- ❖ **Zárate P, Parra M, Denkinger J, 2009-2011:** Anthropogenic effects in Galápagos sea turtles.
- ❖ **Salazar S, Jiménez G, Denkinger J, 2006-2011:** Anthropogenic effects in Galápagos pinnipeds.
- ❖ **Brock P, 2012:** Immunity, life history and conservation of Galápagos sea lion. (PhD thesis)

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INDEX
Introduction
Definitions
Background
Objectives

- ❖ Establish a Rapid Response Network (RRN)
- ❖ Develop a guideline manual with standardized protocols regarding handling, first aids, data and sample collection.
- ❖ Train Galápagos National Park (GPND) rangers
- ❖ Purchase equipment for the RRN
- ❖ Create a Local Volunteer Network as part of RRN

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INDEX
Introduction
Definitions
Background
Objectives

- ❖ Develop an outreach campaign about RRN
- ❖ Establish anthropogenic effects incidence in marine wildlife
- ❖ Establish a disease baseline for marine wildlife
- ❖ Provide continuous technical assessment to the GNPD

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INDEX
Introduction
Definitions
Background
Objectives
Methods

MARINE WILDLIFE HEALTH SURVEILLANCE PROGRAM

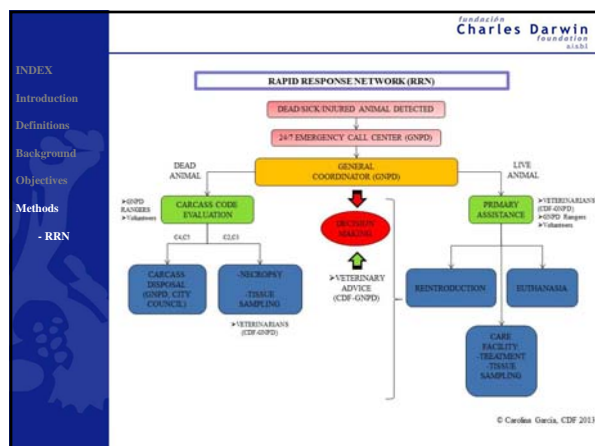
- Aims to establish a long-term health surveillance and monitoring of the iconic Galapagos marine species
- Aims to increase veterinary knowledge through scientific research
- Aims to provide technical advice on marine wildlife health status to the Galapagos National Park Directorate

STAGE 1:

Passive Health Surveillance through creation of the Rapid Response Network (ongoing)

STAGE 2:

Active Health Surveillance through targeted monitoring (future research)



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INDEX
Introduction
Definitions
Background
Objectives
Methods
- RRN

RRN Team:

- Rapid and efficient response
- Local authority contact
- Evaluation of situation
- First aids
- Decision makers
- Inform public and media
- Care for public health
- Care for personal security

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DUTIES

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INDEX

Introduction

Definitions

Background

Objectives

Methods

- RRN

Coordinators (GNPD)

- Direction
- Decisions
- Team Coordinación
- Coordination with other institutions
- Inform media

Veterinarians (CDF-GNPD)

- Responsible for animal care
- Technical advisors
- Specific knowledge in marine wildlife medicine
- Capacity building

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INDEX

Introduction

Definitions

Background

Objectives

Methods

- RRN

GNPD Rangers

- Assist coordinators and veterinary team
- Represent environmental authority
- Follow coordinators guidelines
- Specific training requested

Local Volunteer Network

- Naturalist guides, surfers, fishermen
- Assist RRN team groups
- Follow coordinator guidelines
- >18 years old
- Resident in Galápagos
- Specific training requested

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INDEX

Introduction

Definitions

Background

Objectives



Methods

- RRN

- Manual

Manual created by CDF includes:

- ❖ RRN criteria (*No interference with Nature*)
- ❖ RRN operating system
- ❖ RRN elements
- ❖ Protocols for live animals
- ❖ Protocols for dead animals
- ❖ Standardized data collection forms
- ❖ Necropsy protocols
- ❖ Carcass disposal protocols
- ❖ Necessary equipment

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INDEX

Introduction

Definitions

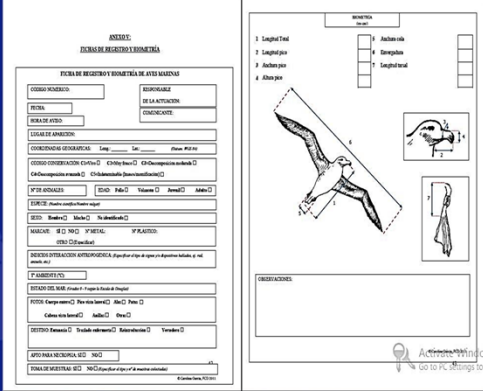
Background

Objectives

Methods

- RRN

- Manual



Foundation Charles Darwin foundation GALAPAGOS

INDEX

Introduction

Definitions

Background

Objectives

Methods

- RRN

- Manual

- Training

GNPD RANGERS TRAINING WORKSHOPS

- ❖ 1 Training Workshop about Marine Wildlife Rapid Response Network, 22-23 y 25-26 July 2013
- ❖ Theoretic lectures and stranding simulations at Playa Brava, Tortuga Bay
- ❖ 75 trained rangers




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INDEX

Introduction

Definitions

Background

Objectives

Methods

- RRN

- Manual

- Training

- Outreach

OUTREACH CAMPAIGN

- ❖ Coordinated by CDF and GNPD (CEPA)
- ❖ RRN introduction to main Galápagos Marine Reserve (RMG) users
- ❖ Naturalist guides, surfers, fishermen
- ❖ Talks, poster display, TV and radio spots, community activities
- ❖ Schools visits
- ❖ Volunteer recruitment



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Charles Darwin
Foundation
Galapagos

INDEX

Introduction

Definitions

Background

Objectives

Methods

- RRN
- Manual
- Training
- Outreach

Advances and Preliminary data

ADVANCES

- ❖ 24/7 emergency hotline identified
- ❖ 75 trained GNPDR rangers
- ❖ RRN Manual drafted and ready for publishing
- ❖ Veterinary care ongoing
- ❖ Necropsy performing ongoing
- ❖ First aids facility identified

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Charles Darwin
Foundation
Galapagos

INDEX

Introduction

Definitions

Background

Objectives

Methods

- RRN
- Manual
- Training
- Outreach

Advances and Preliminary data

PRELIMINARY RESULTS

(May 2011- September 2013)

- ❖ 68 RRN actions
- ❖ 43 dead animals / 22 live animals
- ❖ 26 sea lions; 10 marine iguanas; 3 green sea turtles; 13 seabirds; 2 cetacean; 9 terrestrial birds; 3 giant tortoises

Recorded RRN actions in the Galápagos Islands (May 2011-September 2013) (n=68)

Species	Percentage
Sea lions	39%
Marine iguanas	15%
Sea turtles	4%
Seabirds	20%
Cetaceans	3%
Giant tortoises	14%
Terrestrial birds	5%

Foundation
Charles Darwin
Foundation
Galapagos

INDEX

Introduction

Definitions

Background

Objectives

Methods

- RRN
- Manual
- Training
- Outreach

Advances and Preliminary data

PRELIMINARY RESULTS

(May 2011- September 2013)

Macroscopic results :

- 25 natural causes
- 24 anthropogenic causes
- 19 unknown causes

Causes of dead in Galápagos wildlife detected by the RRN (May 2011-September 2013) (n=68)

Cause	Percentage
Anthropogenic	35%
Natural	37%
Unknown	28%

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Charles Darwin
Foundation
Galapagos

INDEX

Introduction

Definitions

Background

Objectives

Methods

- RRN
- Manual
- Training
- Outreach

Advances and Preliminary data

Ongoing specific Studies

NEXT STEPS

- ❖ Outreach campaign
- ❖ Additional RRN equipment purchase
- ❖ Care facility restoration
- ❖ Local active volunteer recruitment and training
- ❖ Active Health Surveillance

Foundation
Charles Darwin
Foundation
Galapagos

INDEX

Introduction

Definitions

Background

Objectives

Methods

- RRN
- Manual
- Training
- Outreach

Advances and Preliminary data

Ongoing specific Studies

False killer whale: BOAT STRIKE?

Foundation
Charles Darwin
foundation
GLAD

INDEX

Introduction

Definitions

Background

Objectives

Methods

- RRN
- Manual
- Training
- Outreach


Advances and Preliminary data

Ongoing specific Studies

Next steps

Clinical cases

Red-billed Tropicbird: COLLISION



Foundation
Charles Darwin
foundation
GLAD

INDEX

Introduction

Definitions

Background

Objectives

Methods

- RRN
- Manual
- Training
- Outreach

Advances and Preliminary data

Ongoing specific Studies

Next steps

Clinical cases

Marine Iguana: DOG ATTACK



Foundation
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foundation
GLAD

INDEX

Introduction

Definitions

Background

Objectives

Methods

- RRN
- Manual
- Training
- Outreach

Advances and Preliminary data

Ongoing specific Studies

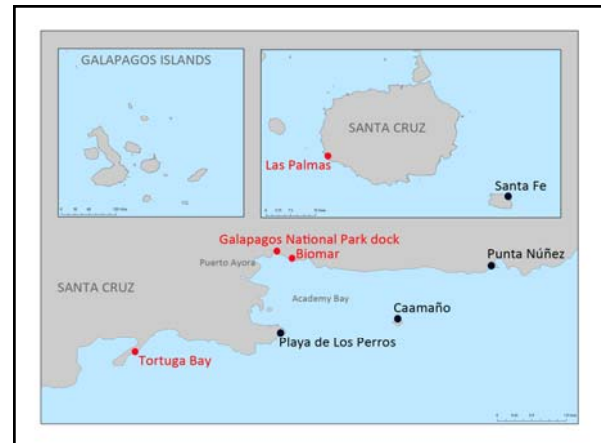
Next steps

Clinical cases

Ongoing specific studies

ONGOING SPECIFIC STUDIES

- ❖ September 2013: Marine iguana outbreak in Las Palmas, Santa Cruz Island.
- ❖ Vomiting and deaths. Good body condition. Macroalgae.
- ❖ October 2013: spread to other locations
- ❖ Around 150 deaths in less than two months
- ❖ Intensive monitoring, biological sampling and necropsy performance
- ❖ Diagnostics in USA laboratories (ZooPath, UF)
- ❖ Ongoing histopathology, virology and toxicology analyses
- ❖ Main cause remains unknown until date



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INDEX

Introduction

Definitions

Background

Objectives

Methods

- RRN
- Manual
- Training
- Outreach

Advances and Preliminary data

Ongoing specific Studies

Next steps

Clinical cases

Ongoing specific studies



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INDEX

Introduction

Definitions

Background

Objectives

Methods

- RRN
- Manual
- Training
- Outreach

Advances and Preliminary data


Ongoing specific Studies

Next steps

Clinical cases

Ongoing specific studies

NECROPSY FINDINGS



Good body condition

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