



REFER

RAILWAY AND BIODIVERSITY:

Turning a short-term problem into a long-term strategy

ALCUE – NET Session 5



DAS - Environmental and Sustainability Department

REFER

THE PORTUGUESE RAILWAY
NETWORK MANAGER

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- **REFER BUSINESS CONTEXT**
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- **REFER RESEARCH & DEVELOPMENT**
- **CHAIR REFER - BIODIVERSITY**



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THE PORTUGUESE RAILWAY
NETWORK MANAGER

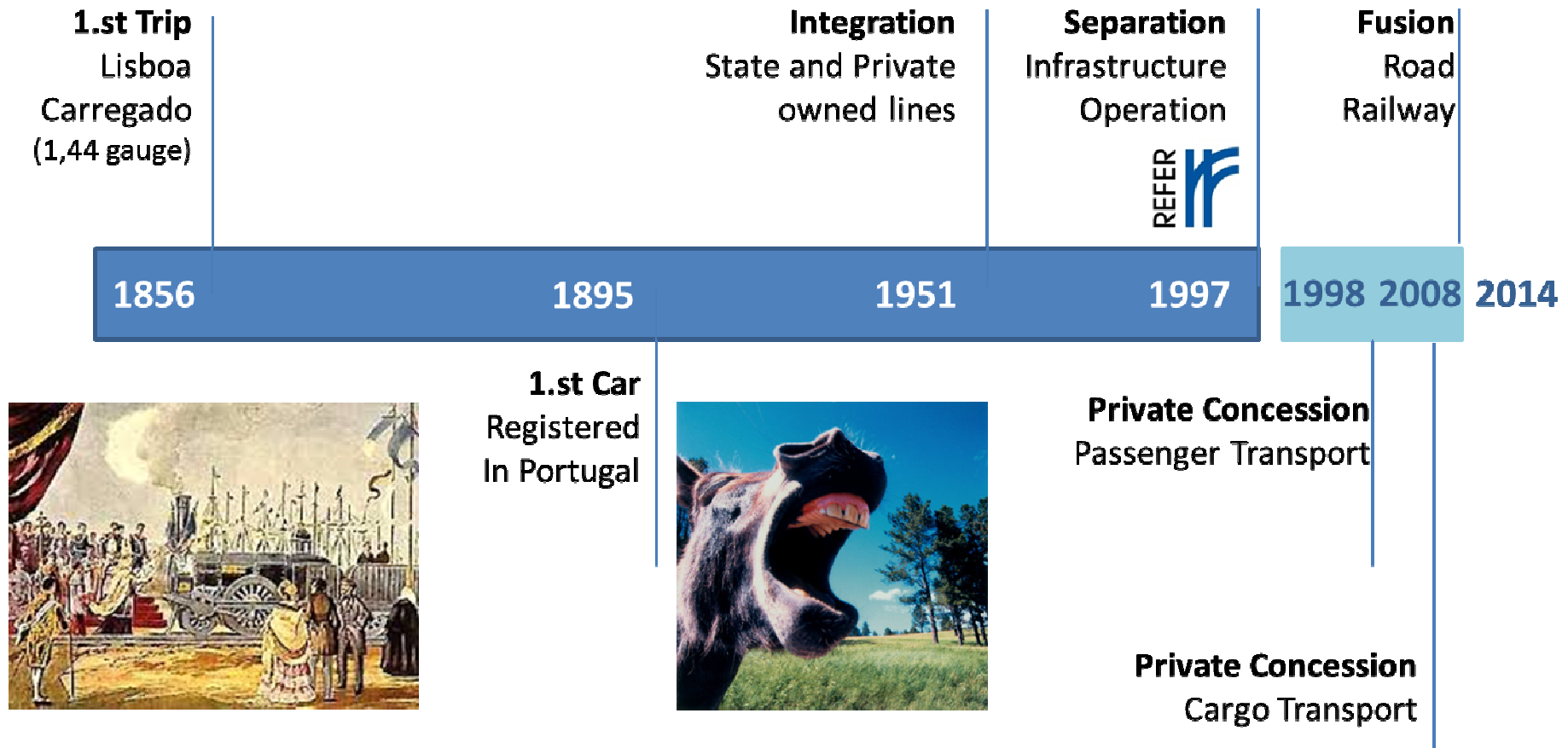
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REFER BUSINESS CONTEXT

HISTORICAL RELEVANT DATES



The Regulator



GISAF
Gabinete de Investigação de Segurança
e de Acidentes Ferroviários

**CABINET FOR THE INVESTIGATION OF
SECURITY AND RAILWAY ACCIDENTS**



INFRASTRUCTURE MANAGER



RAILWAY OPERATOR



CLIENTS/MARKET



Passengers



Freight



REFER BUSINESS CONTEXT

MISSION



**INFRASTRUCTURE
MANAGEMENT
(IM)**

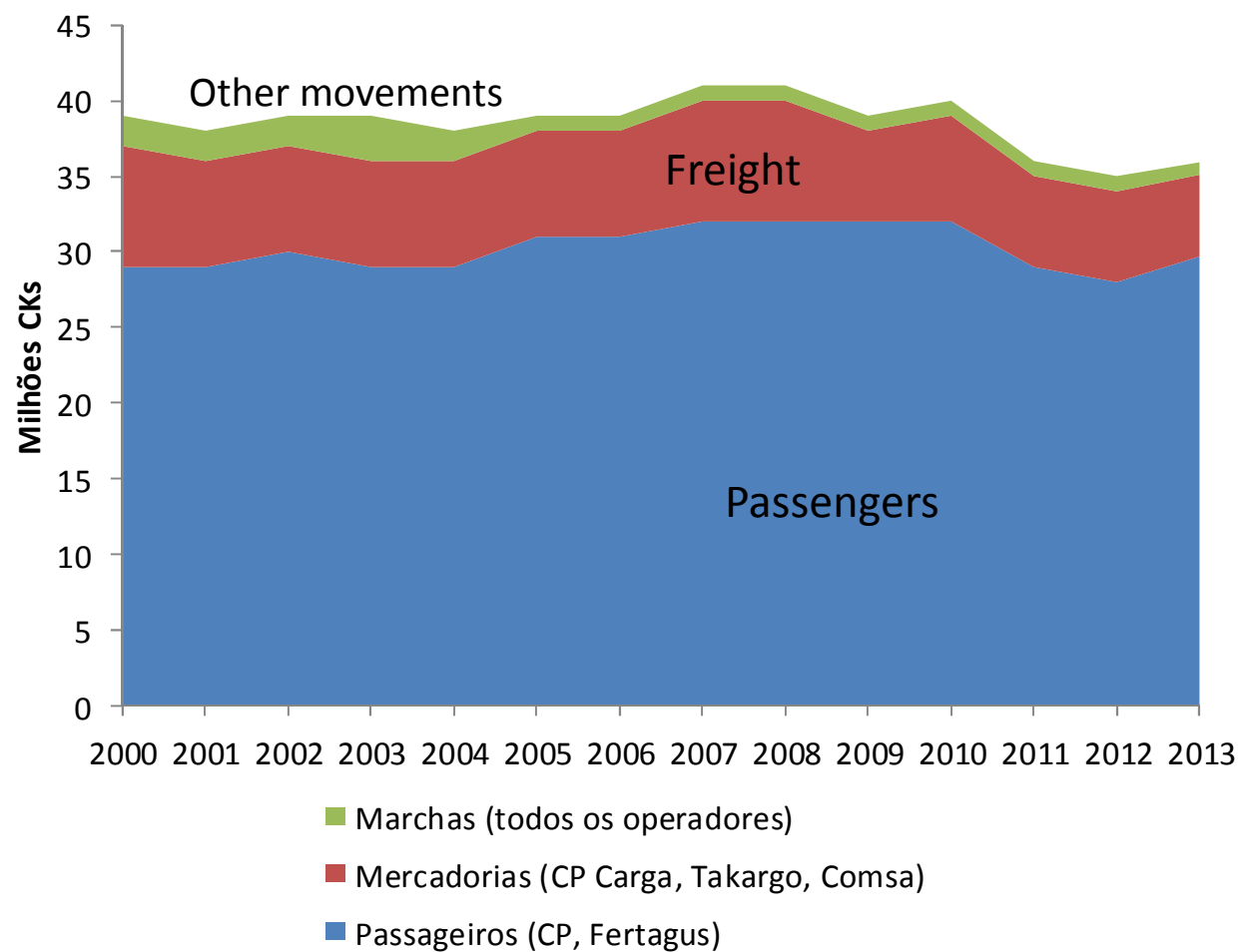
- Capacity Management
- Circulation Command and Control
- Maintenance

**LONG TERM INVESTMENT IN
INFRASTRUCTURES
(LTI)**

- Construction, installation and renovation of the railway infrastructure

REFER BUSINESS CONTEXT

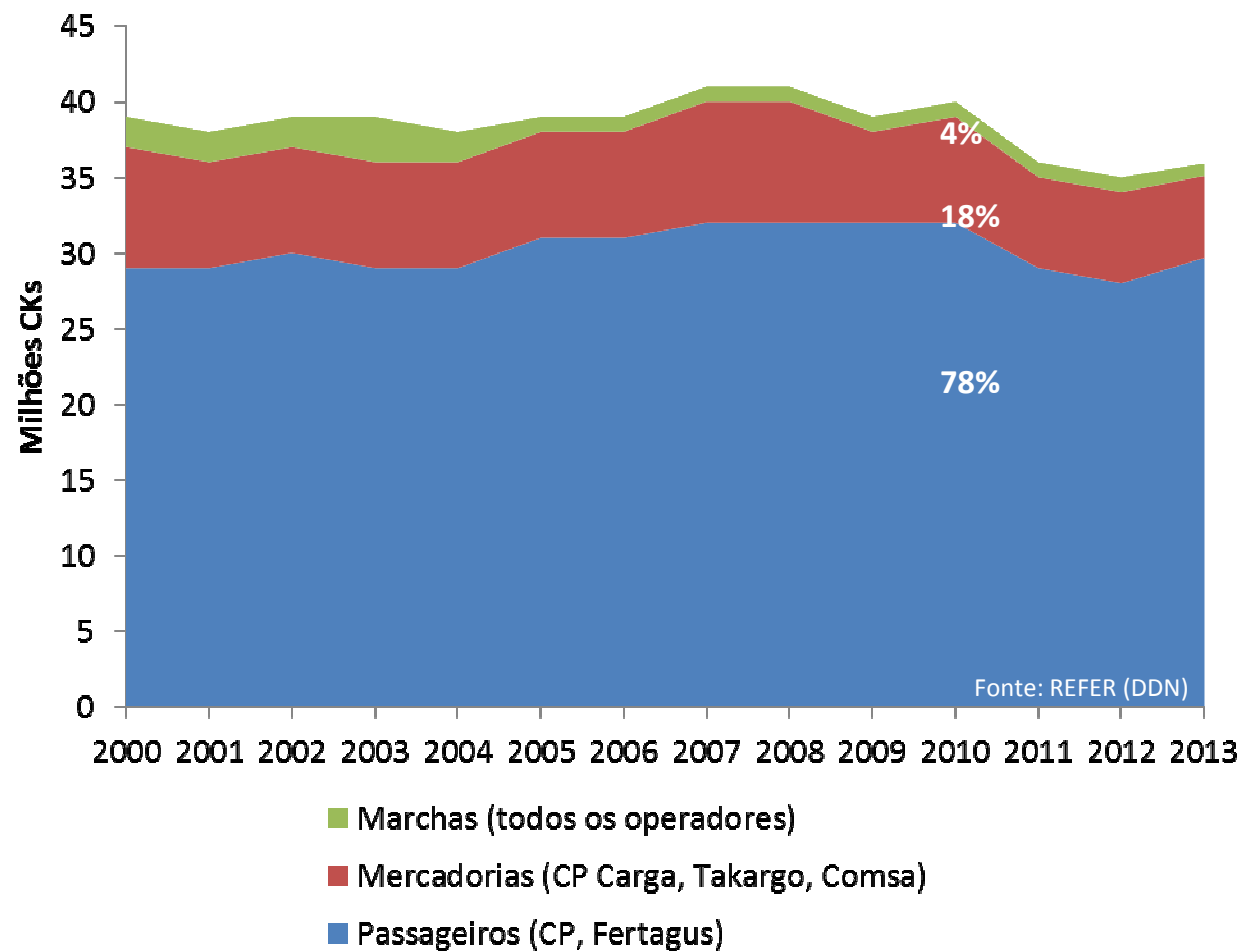
TRAFIC EVOLUTION BY TYPE OF SERVICE



CK – Train Quilometres

REFER BUSINESS CONTEXT

TRAFIC EVOLUTION BY TYPE OF SERVICE



CK – Train Quilometres

REFER BUSINESS CONTEXT

THE PORTUGUESE RAILWAY NETWORK



PRIMARY
1.176 km

- Axis with biggest demand
- Main access to logistic platforms, sea ports, airports and land boundaries.
- 46% of the network

COMPLEMENTARY
888 km

- Net closing lines in connection with the primary network
- 35% of the network

SECUNDARY
477 km

- Low demand service
- 19% of the network



EVOLUTION OF THE RAILWAY NETWORK MAIN CHARACTERISTICS



	2000	2013	Evolution
--	------	------	-----------

General Data [Km]

Total Extension in Operation	3.067	2.541	-17%
Double or multiple lines	507	610	+20%
Electrified lines	907	1.630	+80%

Signalling and Telecommunication Systems [Km]

Lines with Velocity Control	760	1.639	+116%
Lines with Radio Telecom	815	1.506	+85%
Lines with electronic/electric Syst.	917	1.740	+90%

Level Crossings (PN)

PN/km	0,78	0,35	-55%
% of PN with active protection	26	50	+24 p.p.

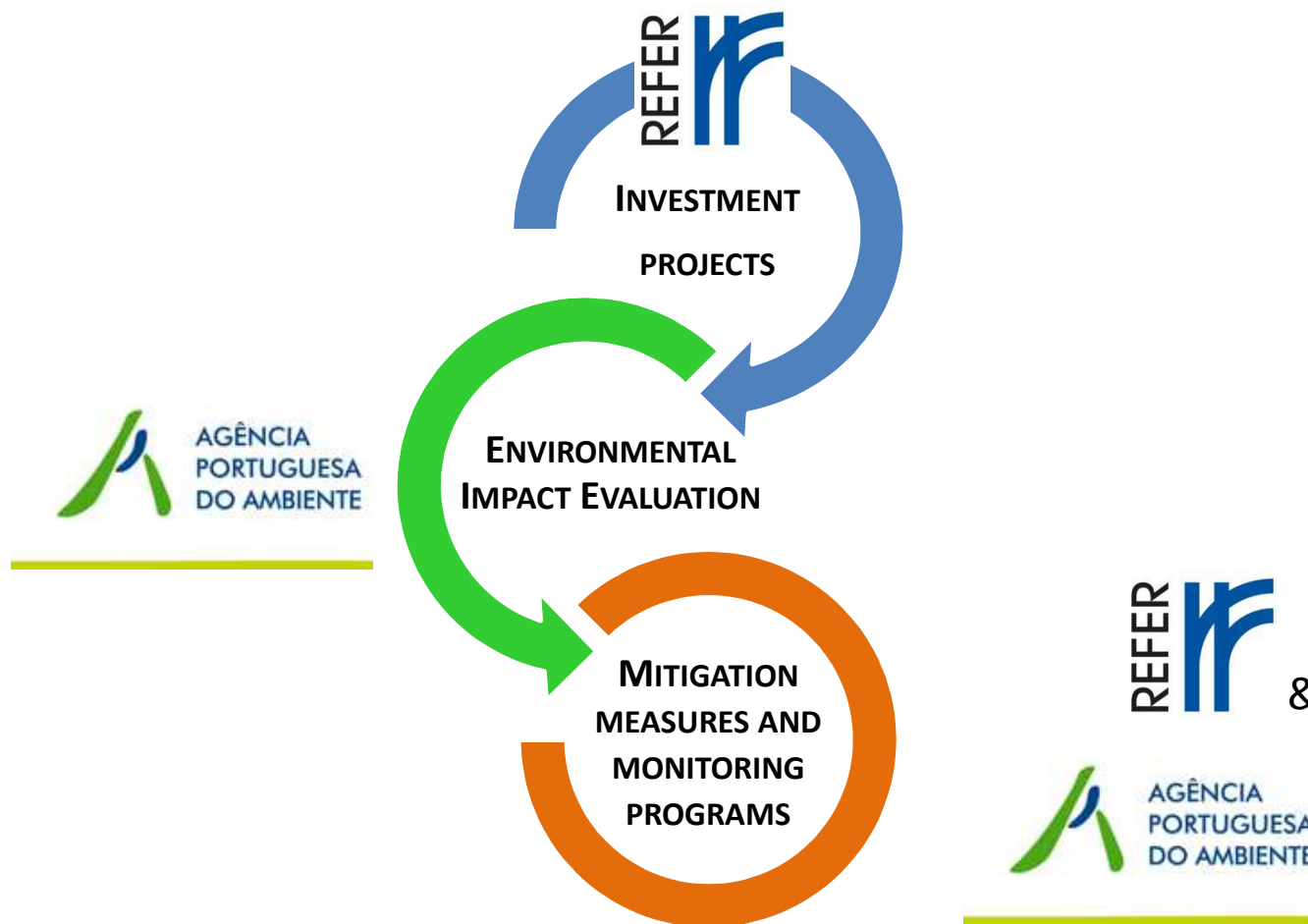
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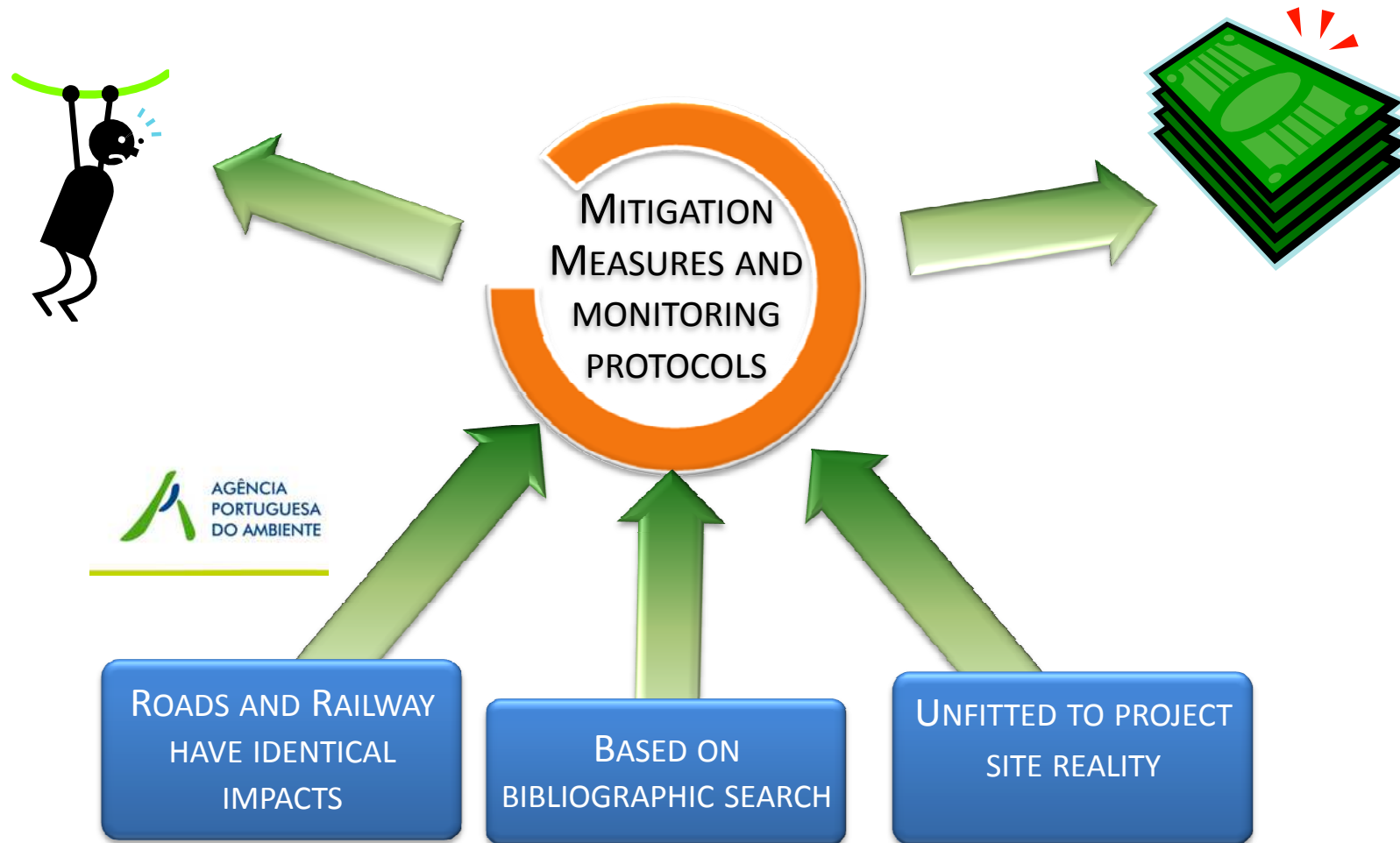
THE PORTUGUESE RAILWAY
NETWORK MANAGER

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REFER BUSINESS & BIODIVERSITY

INVESTMENTS ENVIRONMENTAL APPROVAL



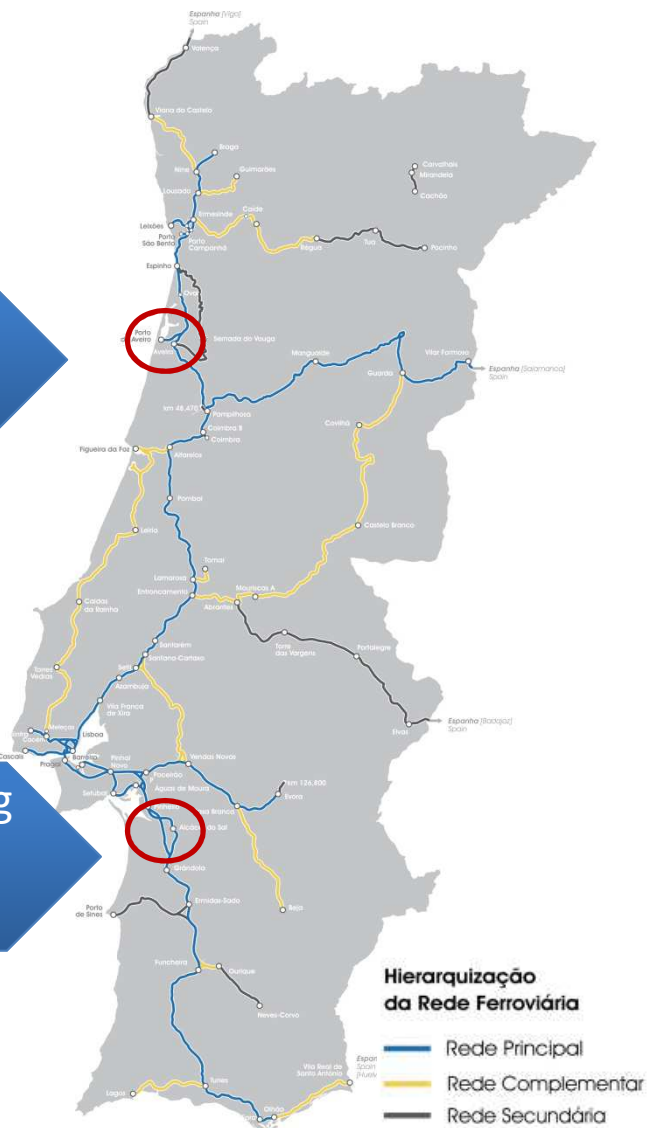
REFER EXPERIENCE ON PROJECTS CROSSING *REDE NATURA 2000* AREAS



Aveiro Port Rail
Connection crossing Ria
de Aveiro EPZ



Sado's Rail Bridge crossing
Natural Reserve of Sado
Estuary





HOW TO REDUCE COSTS AND SIMULTANEOUSLY IMPROVE THE RELATION BETWEEN RAIL AND BIODIVERSITY?



The use of Precautionary Principle



Tailored environmental solutions on
project design conception phase



Nature conservation and biodiversity
expert assessment

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2007



**NATURE CONSERVATION AND
BIODIVERSITY EXPERT ASSESSMENT**

**GLOBAL ENVIRONMENTAL STRATEGY TO
APPLIED IN REFER INVESTMENT AND
MAINTENANCE PROCEDURES**

**DEFINITION OF A SET OF HIGH-LEVEL
PRINCIPLES TO INCORPORATE IN PLANS,
PROGRAMS OR PROJECTS ELABORATION**

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2011

U.PORTO

CÁTEDRA
BIODIVERSIDADE
REFER



Associate Professor Dr. David Vieites at MNCN – CSIC.
REFER Biodiversity Chair ICETA – CIBIO.



CÁTEDRA BIODIVERSIDADE REFER

BENCHMARK ASSESSMENT OF THE POTENTIAL IMPACT OF LINEAL INFRASTRUCTURE ON ECOSYSTEM FRAGMENTATION AND CONNECTIVITY

PROPOSE AND ADAPT TO REFER NEEDS, AVAILABLE METHODOLOGICAL APPROACHES AND PROTOCOLS, WHICH CAN BE APPLIED TO MEASURE EFFECTIVE IMPACTS OF PORTUGUESE RAILWAY NETWORK ON CONNECTIVITY AND FRAGMENTATION

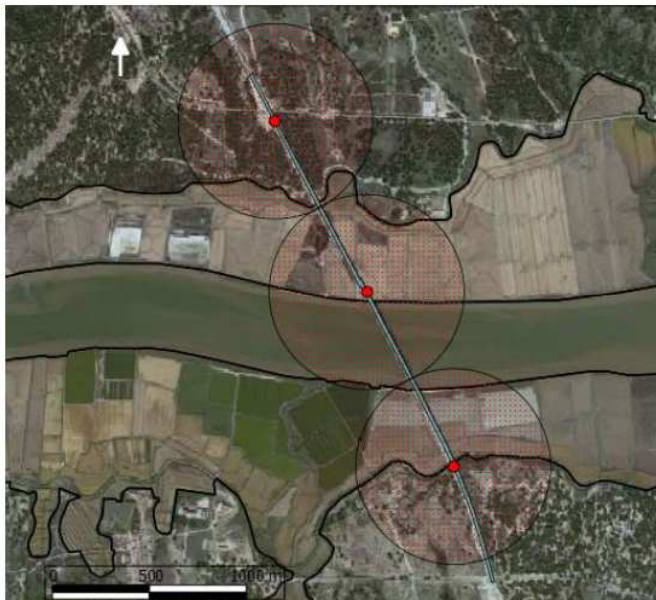
WORK WITH REFER ON HOW THE AVAILABLE METHODOLOGIES ON MONITORING PROTOCOLS CAN BE INCORPORATED ON THEIR WORKING PROCESSES IN AN EFFECTIVE FORM. TRAINING COURSE FOR REFER PERSONNEL WILL BE ORGANIZED.

CÁTEDRA
BIODIVERSIDADE
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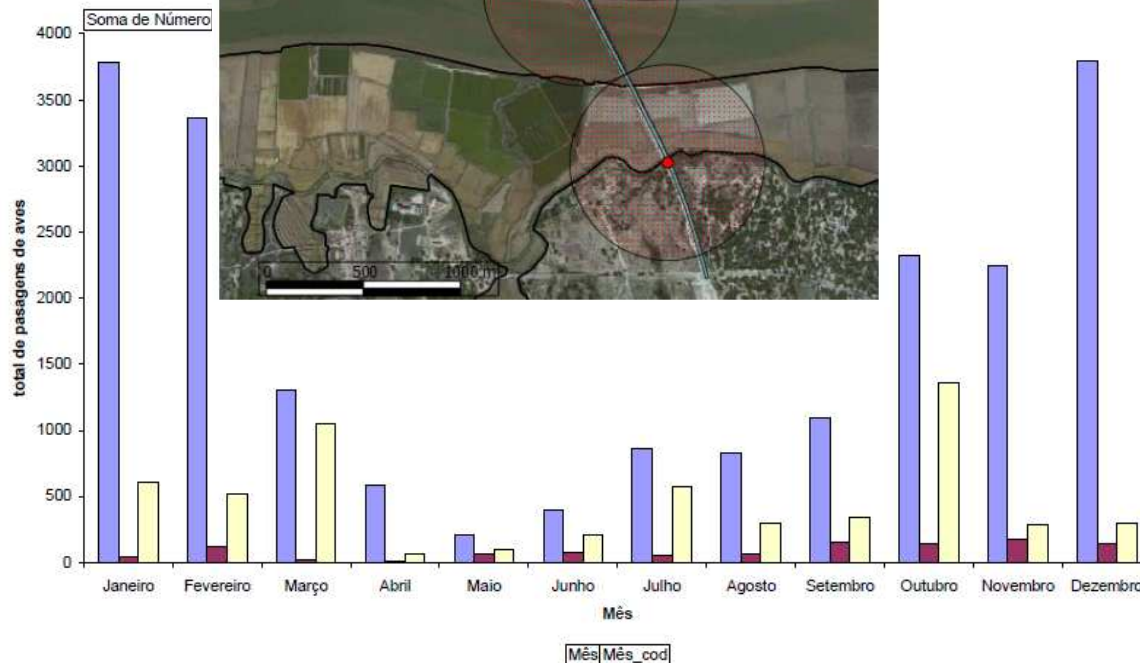
BOOK EDITION AS A RESULT OF BENCHMARK ASSESSMENT WORK. CONTENTS:

- GENERAL DESIGN
- GENERAL GUIDELINES
- USE OF THE INFRASTRUCTURE;
SCIENTIFIC EVIDENCE
- MITIGATION OF BARRIER EFFECT
- SUGGESTED DESIGN
- MAINTENANCE
- SPECIFIC SPECIES GUIDELINES

Question: In *Rede Natura* area is Sado's bridge responsible for significant mortality of aquatic flying birds?

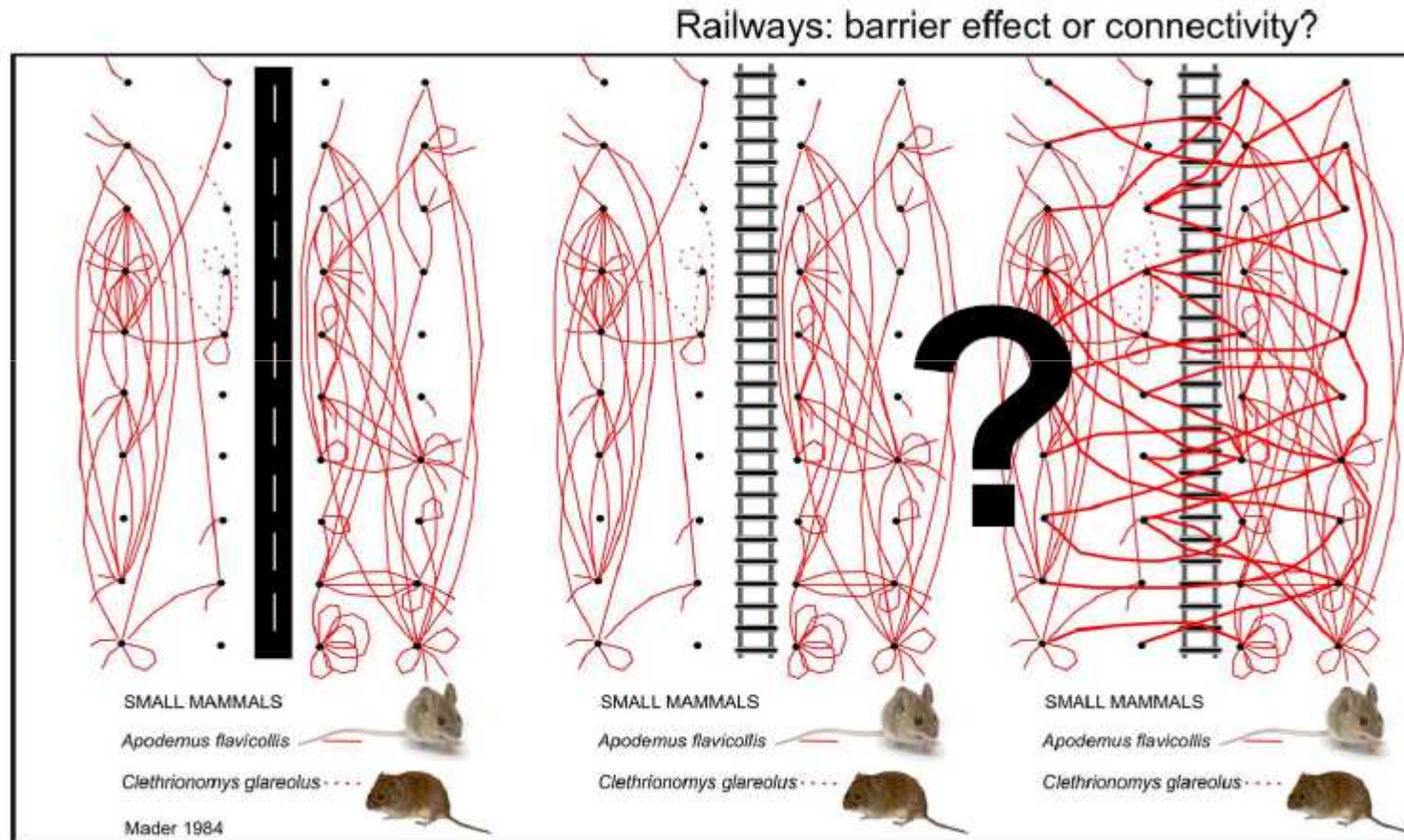


After 12 months of observations
there's been registered **32 359**
crossings over and under the bridge
Mortality: 95 birds (0,3%)



RESULT: MINIMIZATION
MEASURE DEFINED BY
ENVIRONMENTAL AUTHORITY
(SCREENS ALL ALONG THE
BRIDGE: 1,5 KM LONG) IT'S
NOT NECESSARY

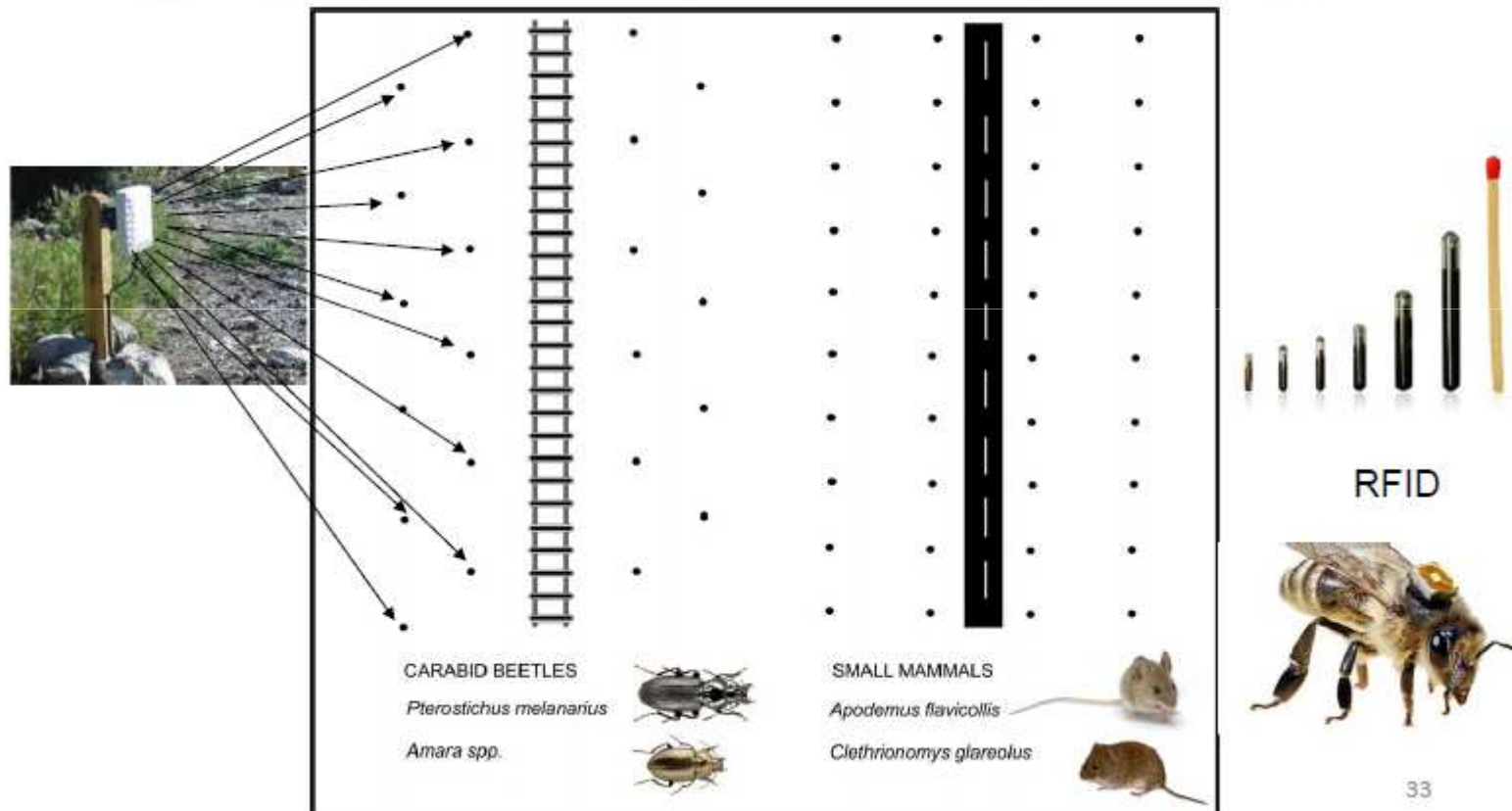
SCIENTIFIC APPROACH



Adapted from Vieites, D. 2014. Presentation to REFER

SCIENTIFIC APPROACH

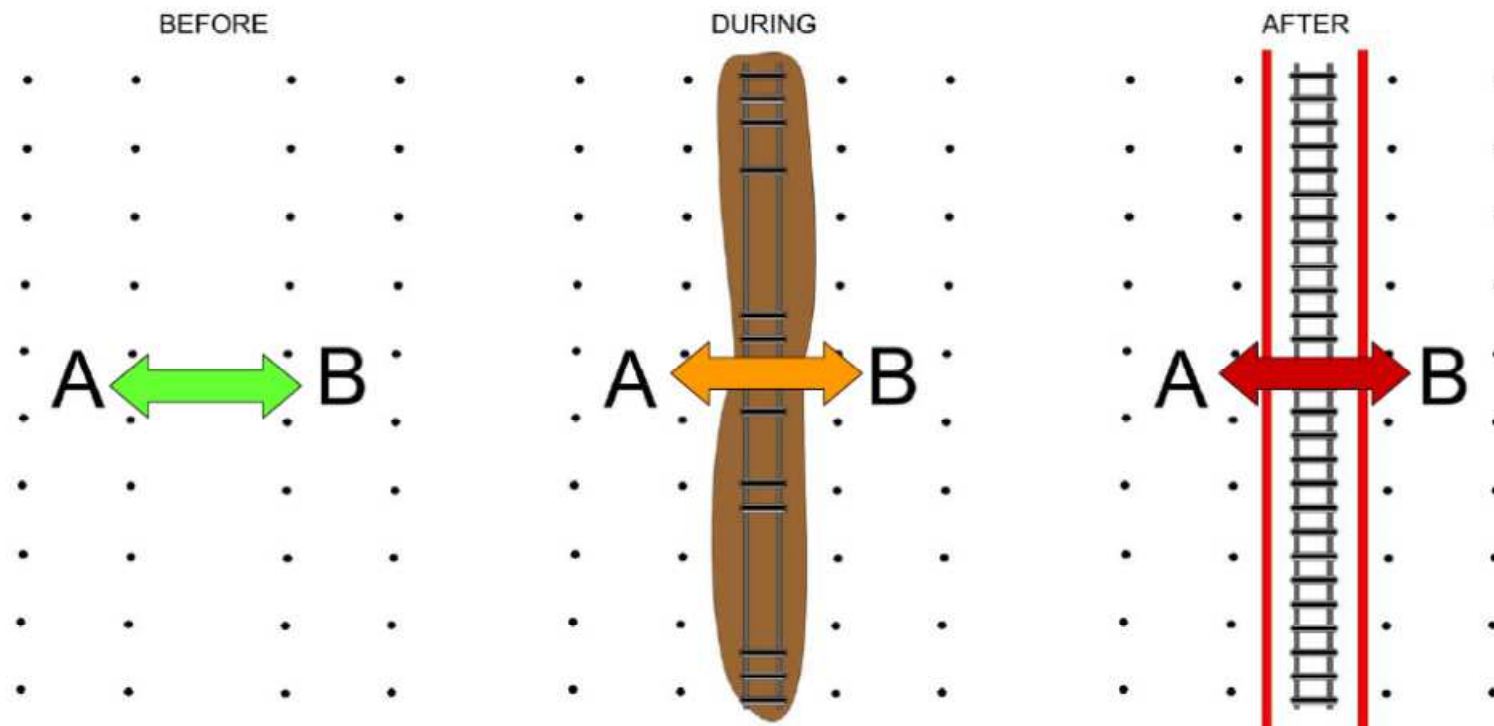
Improved design + novel technologies = better and more accurate data



Adapted from Vieites, D. 2014. Presentation to REFER

SPATIAL TEMPORAL IMPACT

Sampling design



Adapted from Vieites, D. 2014. Presentation to REFER

CONCLUSIONS



A REFER HAS CONSIDERED RELEVANT TO KNOW MORE, ON A SCIENTIFIC BASIS, ABOUT BIODIVERSITY, HABITATS FRAGMENTATION AND BIRD CATENARY COLLISION IMPACTS. TO CLOSE THOSE KNOWLEDGE GAPS REFER HAS CREATED A PARTNERSHIP WITH CIBIO AND UPORTO AND SUBSEQUENTLY THE CHAIR REFER- BIODIVERSITY

| CÁTEDRA
BIODIVERSIDADE
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PRELIMINARY RESULTS AND SUBSEQUENT ACTIVITIES PREVIEW ALLOW US TO CONCLUDE THAT A RELATION BETWEEN RAILWAY AND BIODIVERSITY IS POSSIBLE WITH A WIN-WIN CONTEXT

THIS IS THE RESULT OF A SUCCESSFUL PARTNERSHIP BETWEEN A PORTUGUESE PUBLIC COMPANY **REFER** AND A RESEARCH & DEVELOPMENT TEAM **CIBIO** WITH DIFFERENT POINTS OF VIEW BUT COMMON OBJECTIVES ON THE PROTECTION OF BIODIVERSITY



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A WAY towards the FUTURE

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