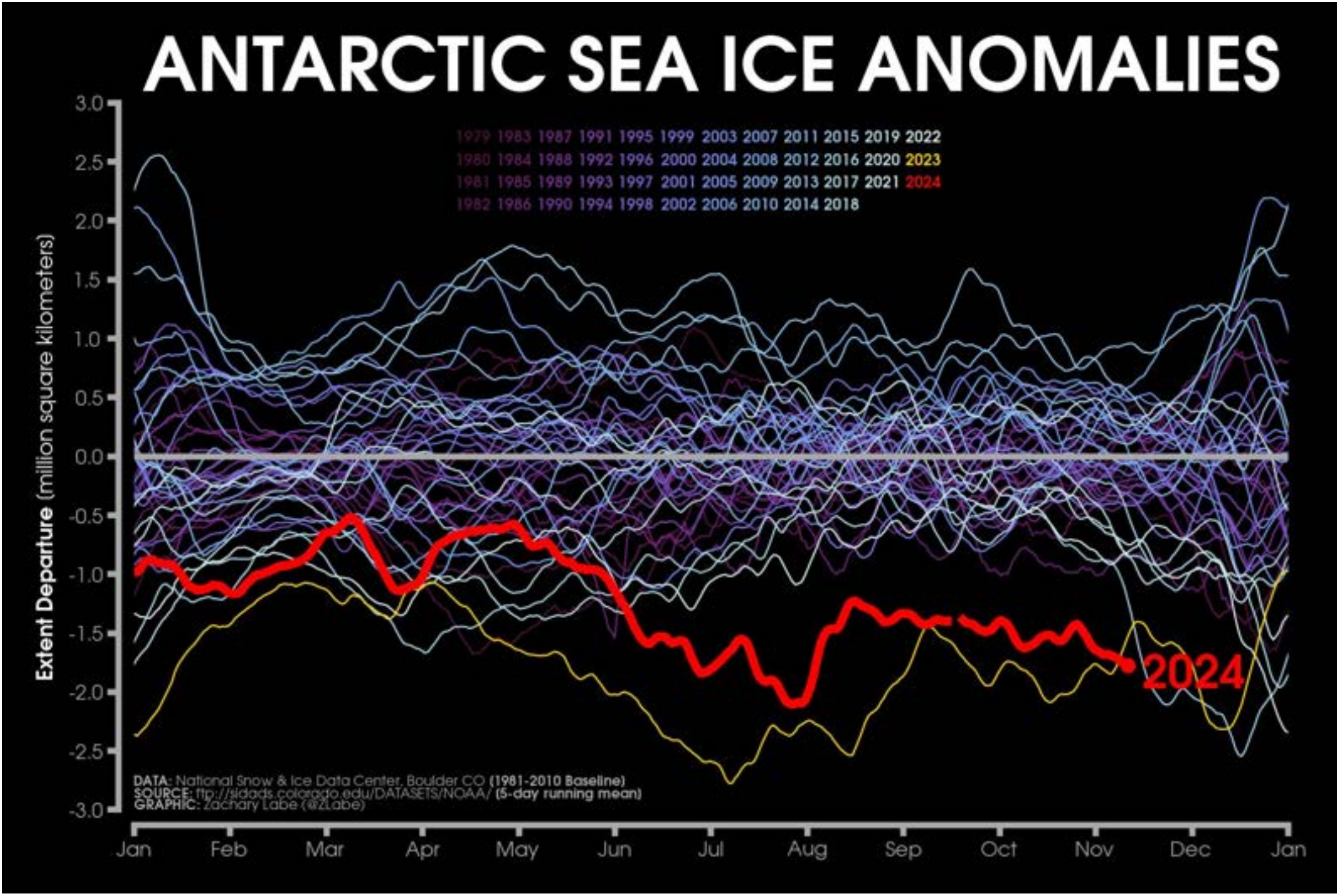
ETS Ingeniería de Montes, Forestal y del Medio Natural

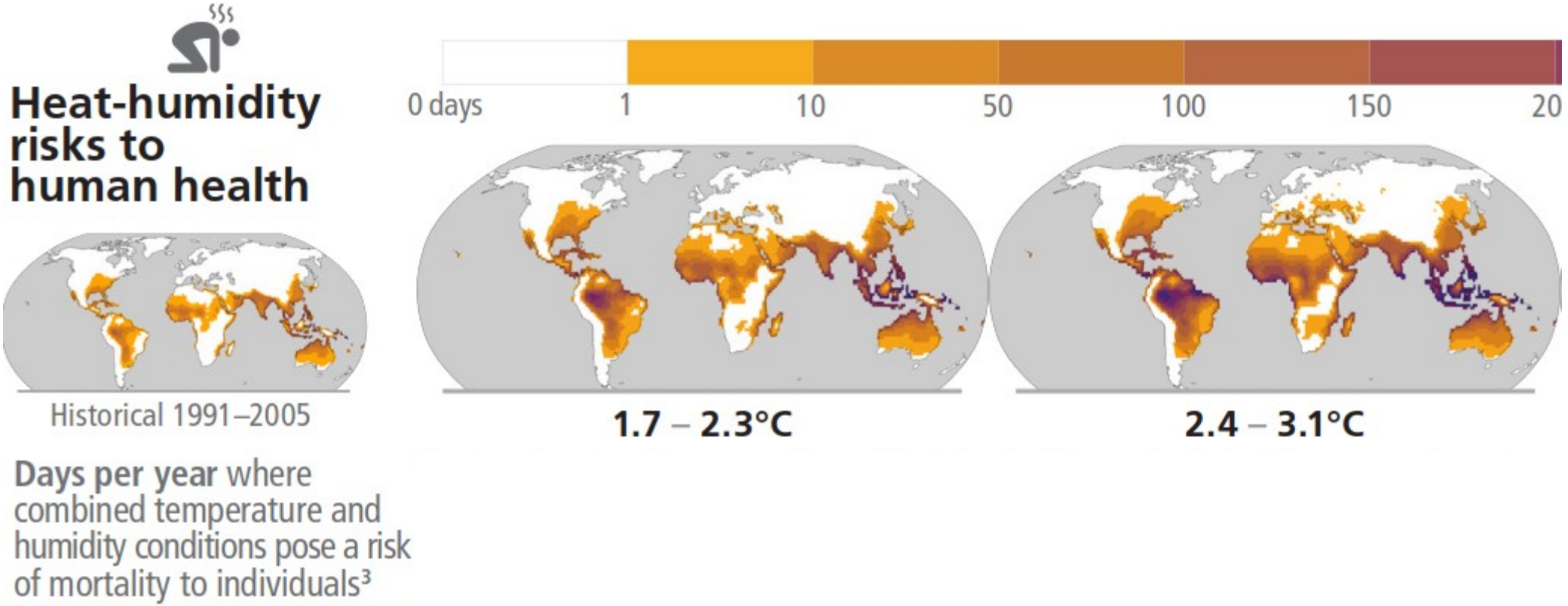
(School of Forest Engineering and Natural Resources)

Universidad Politécnica de Madrid


ANTARCTIC SEA ICE ANOMALIES
1979 1983 1987 1991 1995 1999 2003 2007 2011 2015 2019 2022
1980 1984 1988 1992 1996 2000 2004 2008 2012 2016 2020 2023
1981 1985 1989 1993 1997 2001 2005 2009 2013 2017 2021 2024
1982 1986 1990 1994 1998 2002 2006 2010 2014 2018
Extent Departure (million square kilometers)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
-1.5
-2.0
-2.5
-3.0
2024
DATA: National Snow & Ice Data Center, Boulder CO (1981-2010 Baseline)
SOURCE: ftp://sidads.colorado.edu/DATASETS/NOAA/ (5-day running mean)
GRAPHIC: Zachary Labe (@ZLabe)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Jan

Future climate change is projected to increase the severity of impacts across natural and human systems and will increase regional differences

Examples of impacts without additional adaptation



IPCC, 2023: Summary for Policymakers. In: Climate Change 2023: Synthesis Report. [Core Writing Team, H. Lee and J. Romero (eds.)]. IPCC, Geneva, Switzerland, 36 pages. (in press).

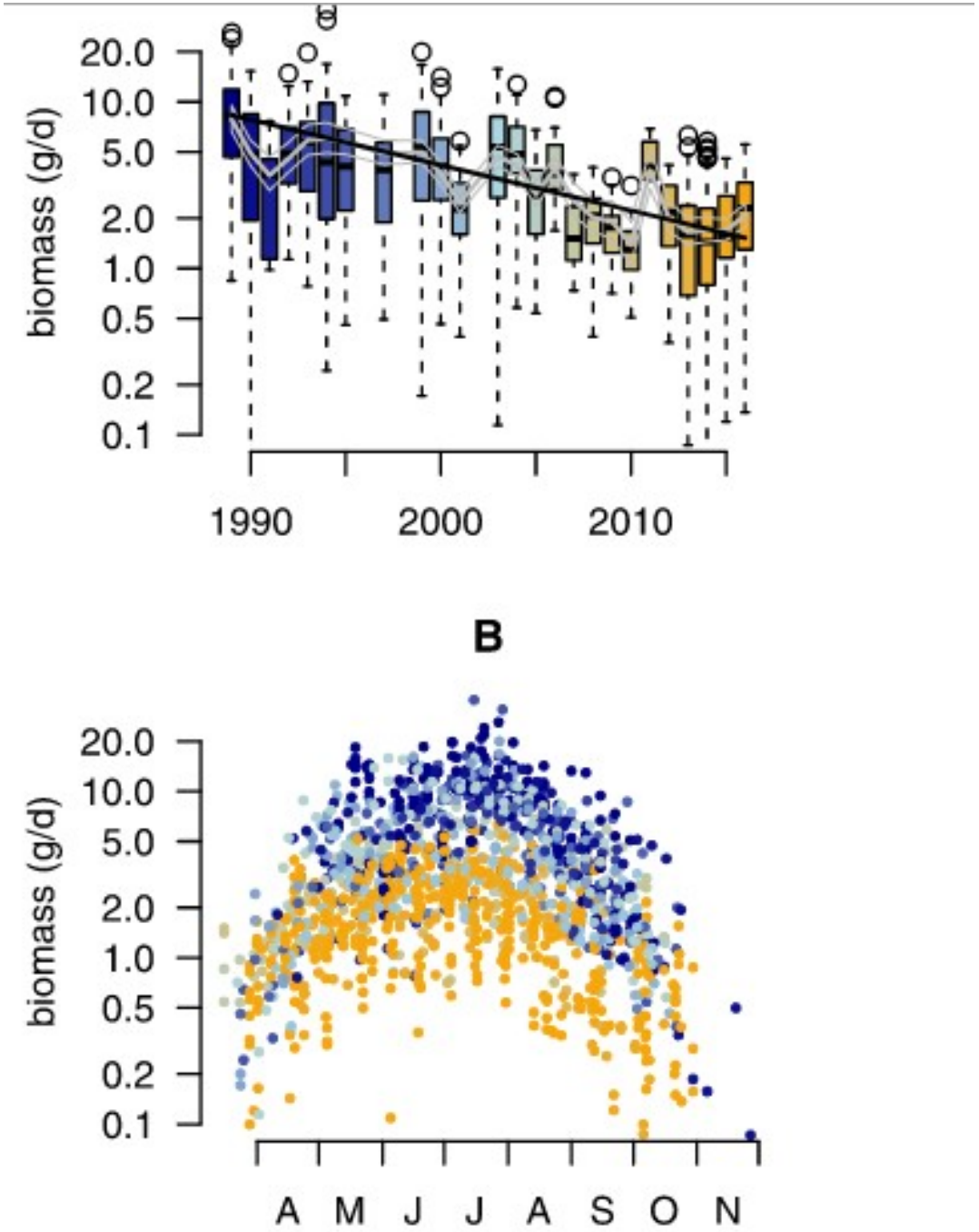


Fig 2. Temporal distribution of insect biomass. (A) Boxplots depict the distribution of insect biomass (gram per day) pooled over all traps and catches in each year (n = 1503). Based on our final model, the grey line depicts the fitted mean (+95% posterior credible intervals) taking into account weather, landscape and habitat effects. The black line depicts the mean estimated trend as estimated with our basic model. (B) Seasonal distribution of insect biomass showing that highest insect biomass catches in mid summer show most severe declines. Color gradient in both panels range from 1989 (blue) to 2016 (orange).

Hallmann et al. (2017) PLoS ONE, 12

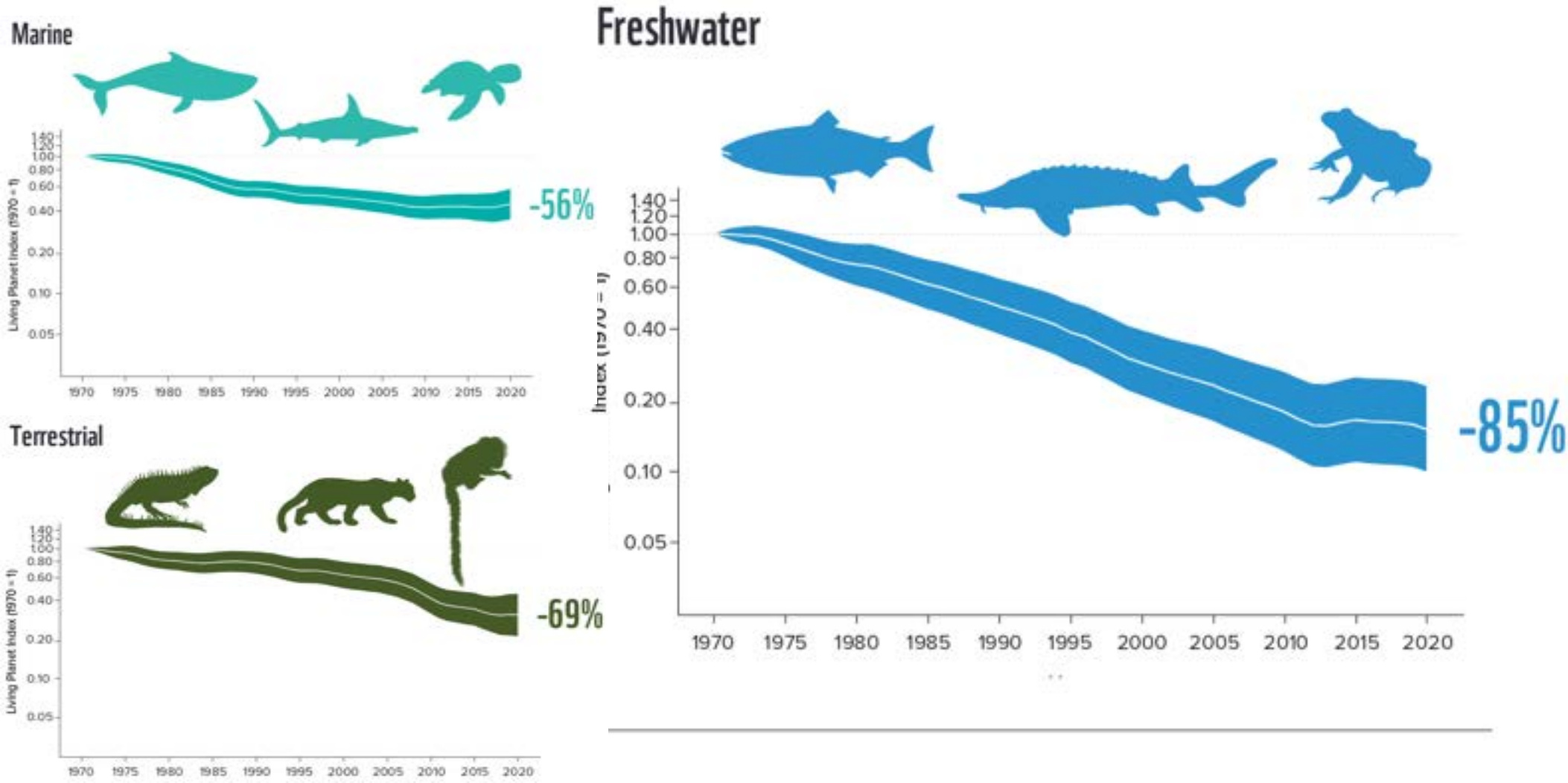
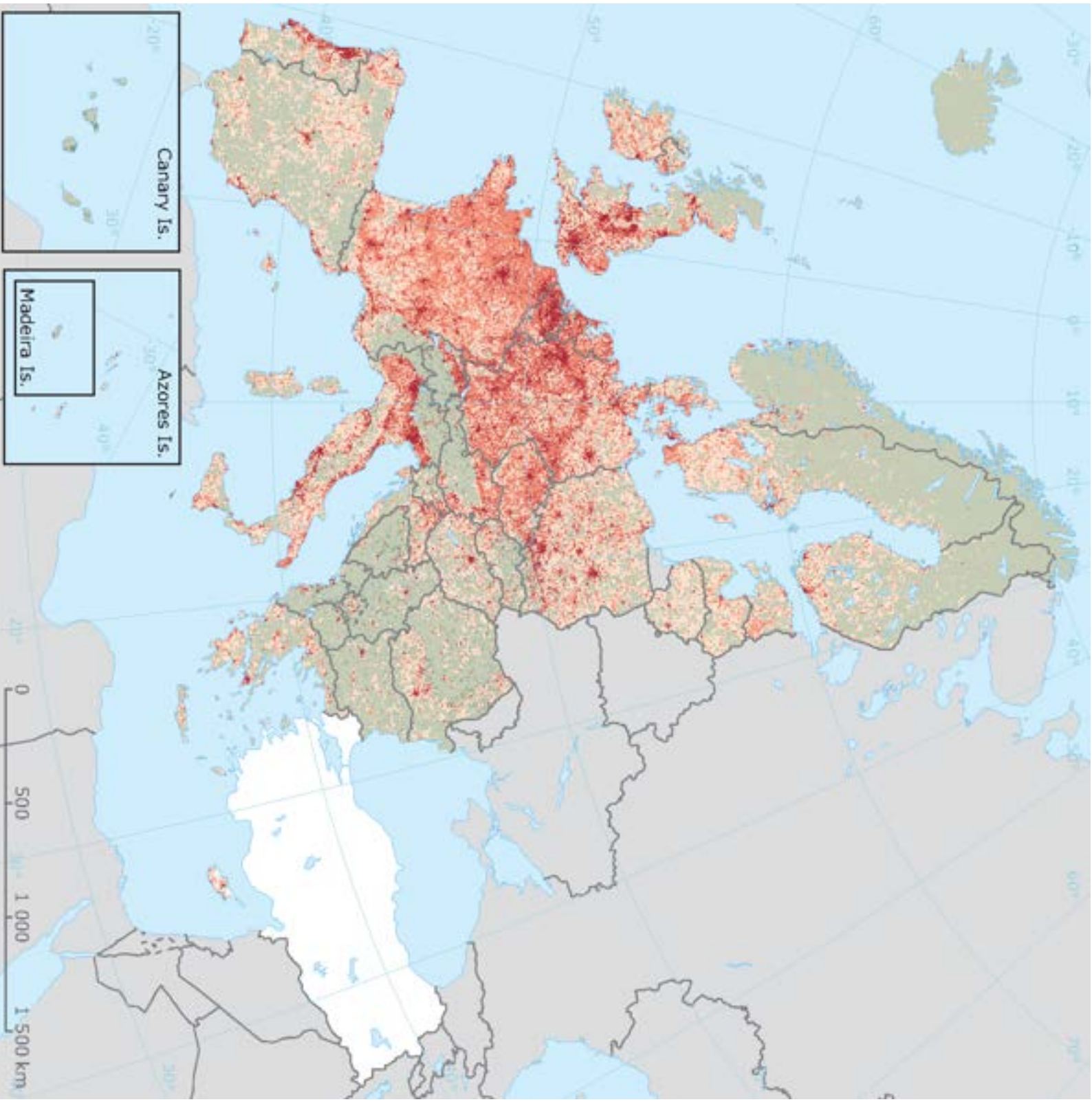


Figure 1.4 (b) The Living Planet Index by ecosystem type from 1970 to 2020 based on 16,909 populations of 1,816 marine species, 11,318 populations of 2,519 terrestrial species, 6,609 populations of 1,472 freshwater species.

WWF (2024) Living Planet Report 2024 – A System in Peril. WWF, Gland, Switzerland.

Figure 10. Cumulative number of upstream dams on major European rivers. From Mulligan *et al.* 2009.

http://ec.europa.eu/environment/nature/conservation/species/redlist/downloads/European_freshwater_fishes.pdf



Fragmentation pressure and population density in EEA member countries

		Population density (Number of residents per 1km²)	
		< 100	> 100
Fragmentation pressure class	Very low	Low fragmentation over sparsely populated areas	Low fragmentation over densely populated areas
	Low		
	Medium	Average fragmentation over sparsely populated areas	Average fragmentation over densely populated areas
	High	High fragmentation over sparsely populated areas	High fragmentation over densely populated areas
	Very high		

No data

Outside coverage


Alto Tajo


2023/05/08 12:29


13278514634184
17481925757016


Timberjack
1070


90m
KOMATSU
931
9244312380730.25000
8984598021252.22000


INIA


MZ2
GOBIERNO DE ESPAÑA

Front Ecol Environ 2003; 1(9): 488–494

"Nature is not fragile . . . what is fragile are the ecosystems services on which humans depend". (Levin 1999)

Society demands technicians who understand a system (its structure and function) and who apply that knowledge to produce solutions.

These technicians should have a deep understanding of function and structure of social-ecological systems. And they have to be experts at identifying *symptoms*, diagnosing syndromes and prescribing *therapies*.

“Ecology is not rocket science – it is far more difficult”.

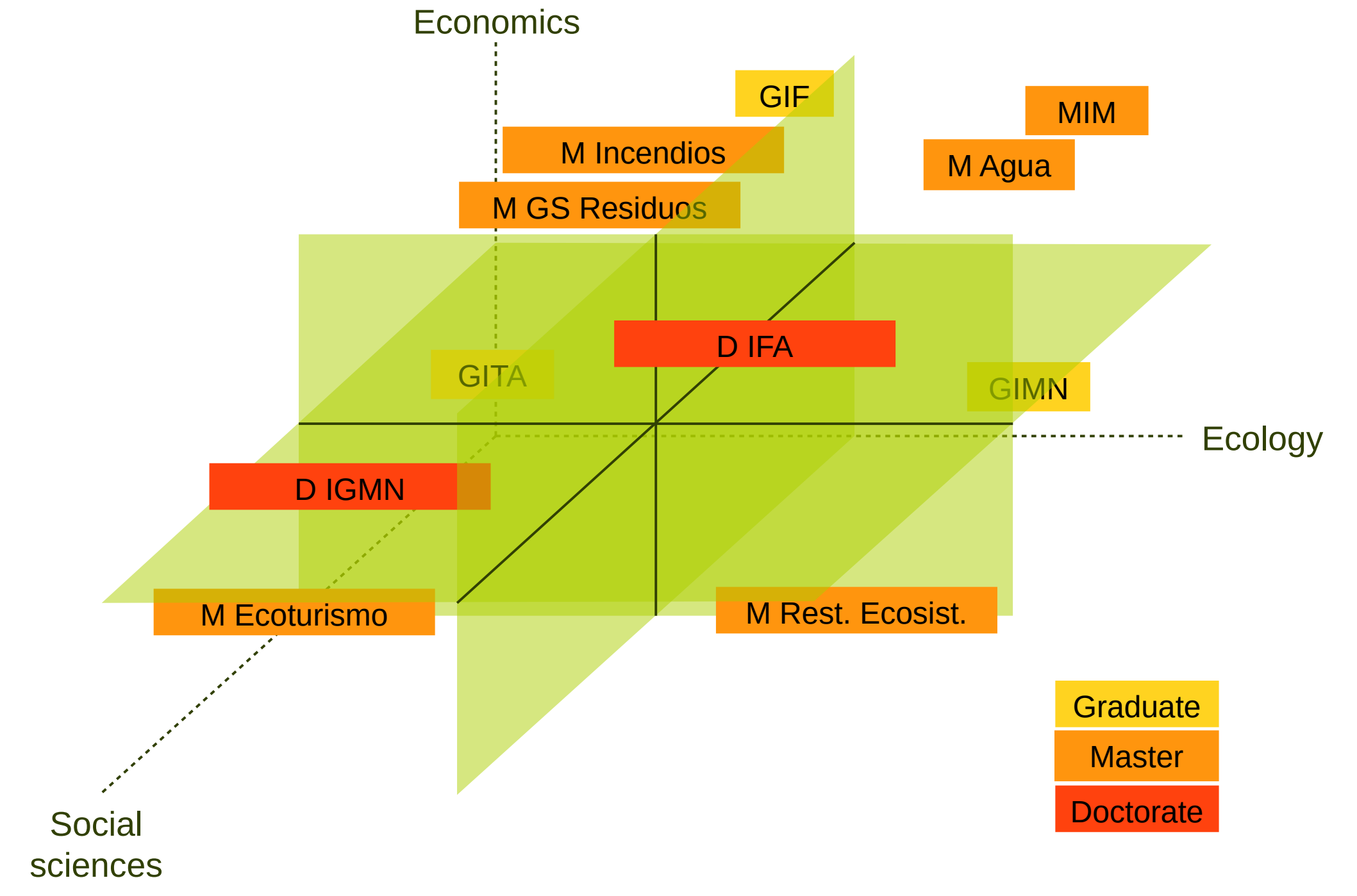
(Hilborn & Ludwig 1993)

(social)ecological systems engineering

Set of techniques that apply knowledge of the structure and functioning of ecological systems to achieve specific objectives, eg:

- diagnosing problems
- evaluating processes
- anticipating consequences
- planning and modulating actions
- generating and restoring processes and structures
- conservation biology
- environmental pollution
- biota and biotope management
- use of ecosystem services
- land and landscape use planning
- provision of water resources
- restoration ecology
- pest & invasion management
- pathologies
- natural disasters

School of Forest Engineering and Natural Resources



Study programs

Bachelor degree

Natural Environment Engineering
Forest Engineering
Environmental Technologies Engineering

Master degree

Ecosystem Restoration
Forest Engineering
Uses and Management of Water Resources in Natural Environment
Wild Fires
Management of Ecological and Sustainable Tourism
Circular Economy

Phd Programs

Advanced Forest Research
Engineerig and Management of the Natural Environment

Bachelor Degree in Forest Engineering

240 ECTS Credits

Objectives

- To train professionals in the fields of planning, industrial processing of forest products, and assessment and sustainable management of forest areas and the rural environment.
- To enable students to obtain multidisciplinary training aiming at their specialization in areas such as forest planning; forest industries; environmental assessment; project management; techniques for analysing and processing information; and sustainable management in the forest sector.
- To enable students to:
    - Direct or participate in forest management projects.
    - Draw up and implement forestry engineering projects.
    - Conduct projects in the field of forest industries.
- Specialisation: The degree includes two itineraries aimed at the specialisation in Forest Management and Forest Industry.

Bachelor Degree in Natural Environment Engineering

240 ECTS Credits

PROGRAMME OBJECTIVES

Students graduated in Natural Environment Engineering achieve a series of multi-disciplinary subjects in specific areas such as earth science, territorial analysis, socioeconomics, infrastructures in the natural environment, species and site management, environmental impact detection and assessment, and management of engineering projects.

GENERAL SKILLS

- To apply insights and suitable techniques to the design, development and exploitation of technology addressed to the management, preservation and protection of the natural environment.
- To communicate effectively knowledge and ideas related to the environmental technologies.
- To carry out professional activities under social and ethical responsibilities.
- To identify and quantify the ecological requirements of the wild flora and fauna species.
- To evaluate the economic value of the ecosystems and resources of the natural environment, as well as the impact of human activities.
- To understand and implement land-use plans of the natural environment.
- To determine and evaluate the environmental and ecological factors involved in the planning of the construction of infrastructures in the natural environment
- To design preventive, corrective and compensatory actions for the ecological and environmental effects caused by the activities carried out in the natural environment.
- To design and implement actions for the restoration of degraded ecosystems
- To perform ecological and environmental consultancy works in the natural environment
- To control the bases of the renewable energetic uses in the natural environment
- To manage pollutants and waste disposed in the natural environment sector.
- To plan preventive strategies and actions against natural disasters.

Bachelor Degree in Environmental Technologies Engineering

240 ECTS Credits

Objectives

- To train professionals able to identify current environmental problems and, to know and apply the suitable tecnhologies for their resolution.
- Toprepare professionals for the improvement and management of the processes, systems and sustainable products involved.
- To train professionals able to lead multidisciplinary working teams and occupy positions of responsability in the companies and I+D+I departments in the sector of environmental management (e.g. residues treatment; environmental serivices; sustainable transportation and contruction; and, recovery of natural resources).
- Majors: The Degree offers three majors focused on the expertise in Environmental Management in Civil Engineering, Industrial Engineering, and Natural Resources Engineering, leading to provide the student with the skills required in these areas through practical methodology.

Postgraduate

Master Programs

Master in Ecosystem Restoration

Master in Forest Engineering

Master "Uses and Management of Water Resources in Natural Environment"

Master in Forest Firefighting Technology

Master of Science in Management of Ecological and Sustainable Tourism

Master's Degree in Circular Economy

Phd Programs

Phd in Advanced Forest Research

Phd in Engineerig and Management of the Natural Environment

Courses taught in English

Structure and Function of Woody Plants

Uses of medicinal and aromatic plants

Multiple use of natural products

English for professional and academic communication

Geomorphic restoration

Monitoring and control of pollution in soils, water and vegetation

Zoology

Forest Resilience

Scientific Research and Communication

Watersheds management in Mediterranean areas

Spring semester: 35 ECTS
Fall semester: 12 ECTS


Location

Research Groups

Wood Construction

Defense and Use of the Natural Environment

Ecology and Sustainable Forest Management

Economy and Sustainability of the Natural Environment

Genetics, Physiology and Forest History

Hydrobiology

History and Dynamics of the Plant Landscape

Inventory and Management of Natural Resources

SILVANET - Technologies and Methods for Sustainable Management

Wood and Cork Technology

GEO-QuBiDy: Group of Earth Observation for Quantitative Biosphere Dynamics

community

© European Union, 2019.

1. Mission

Where one or several social challenges are present and technological components are part of the solution.

5. Evaluation

Criteria to recognise student's engagement (attitude, implication) as much as effective results.

COMMUNITY

2. Challenges

Based on real-world needs and SDGs. Brought to the community by teachers, external partners or problem owners.

4. Activities

Courses linked to diploma and non-academic events involving staff, problem owners and students, etc.

3. People

Interdisciplinary and diverse working groups (teachers, students, NGOs, experts, public institutions, etc) chaired by an EELISA board.

Co-funded by the Erasmus+ Programme of the European Union

ETS Ingeniería de Montes, Forestal y del Medio Natural

(School of Forest Engineering and Natural Resources)

Universidad Politécnica de Madrid