Ecologia Animale e Biologia della Conservazione

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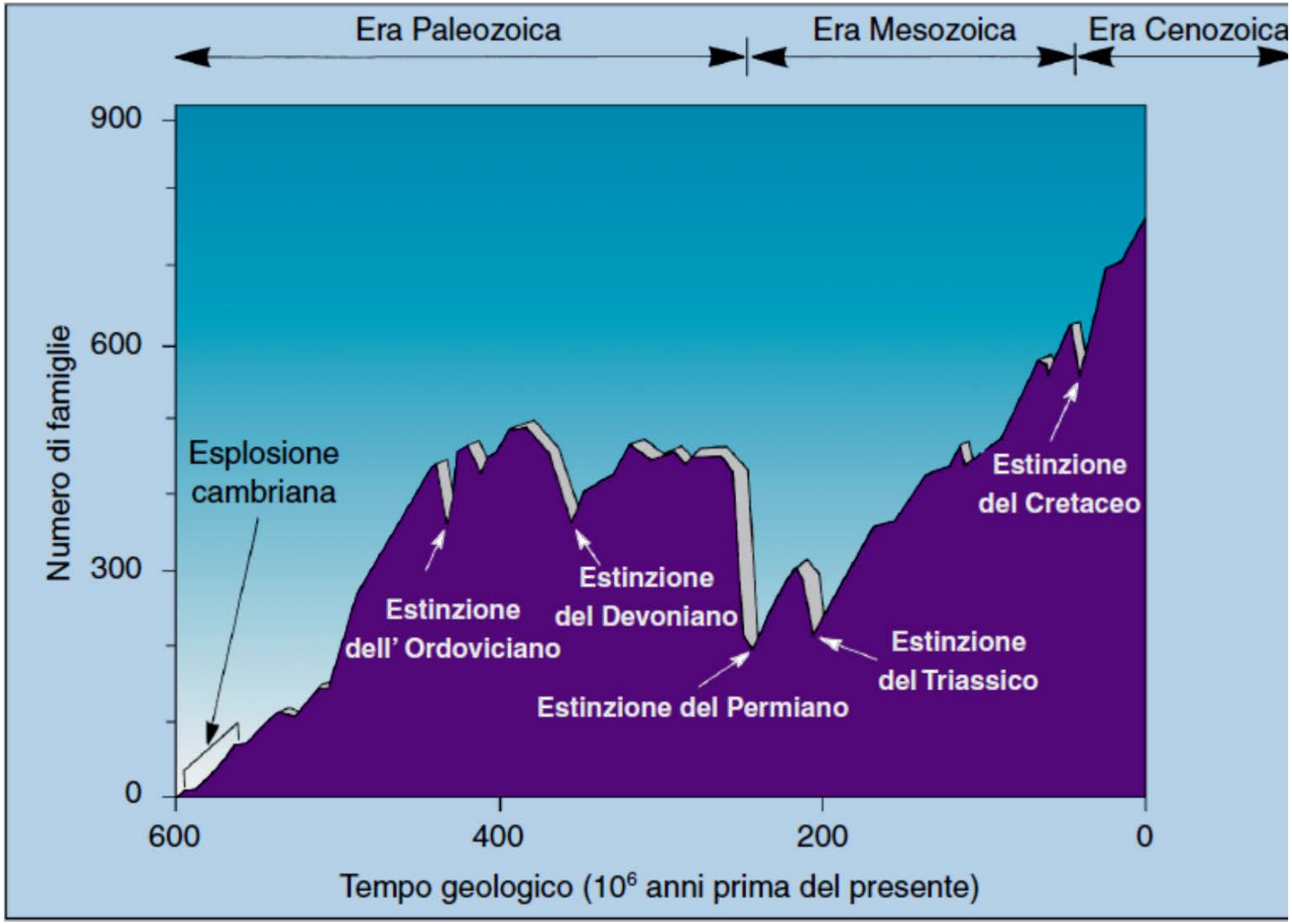
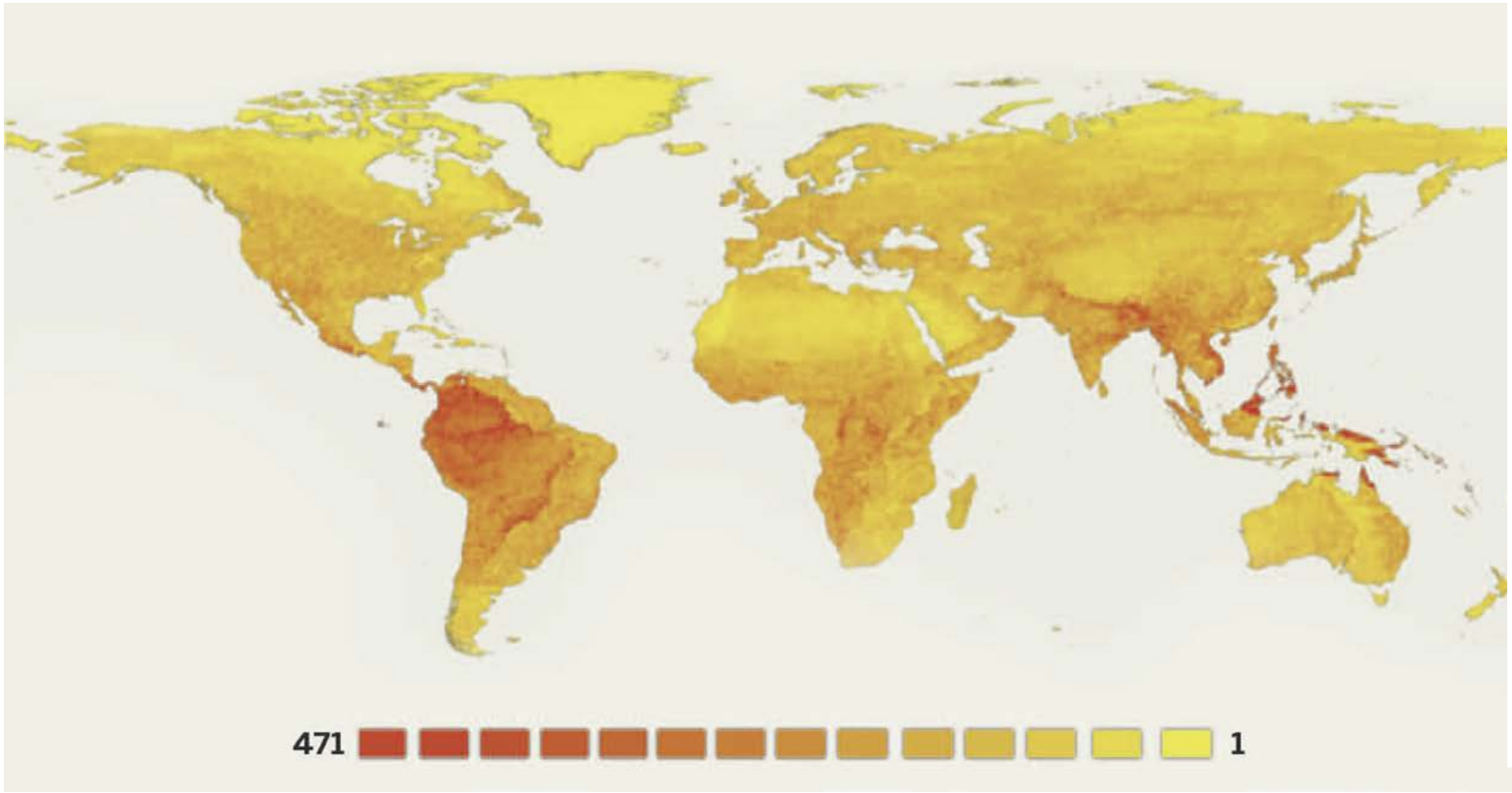
Extinction is a natural process!



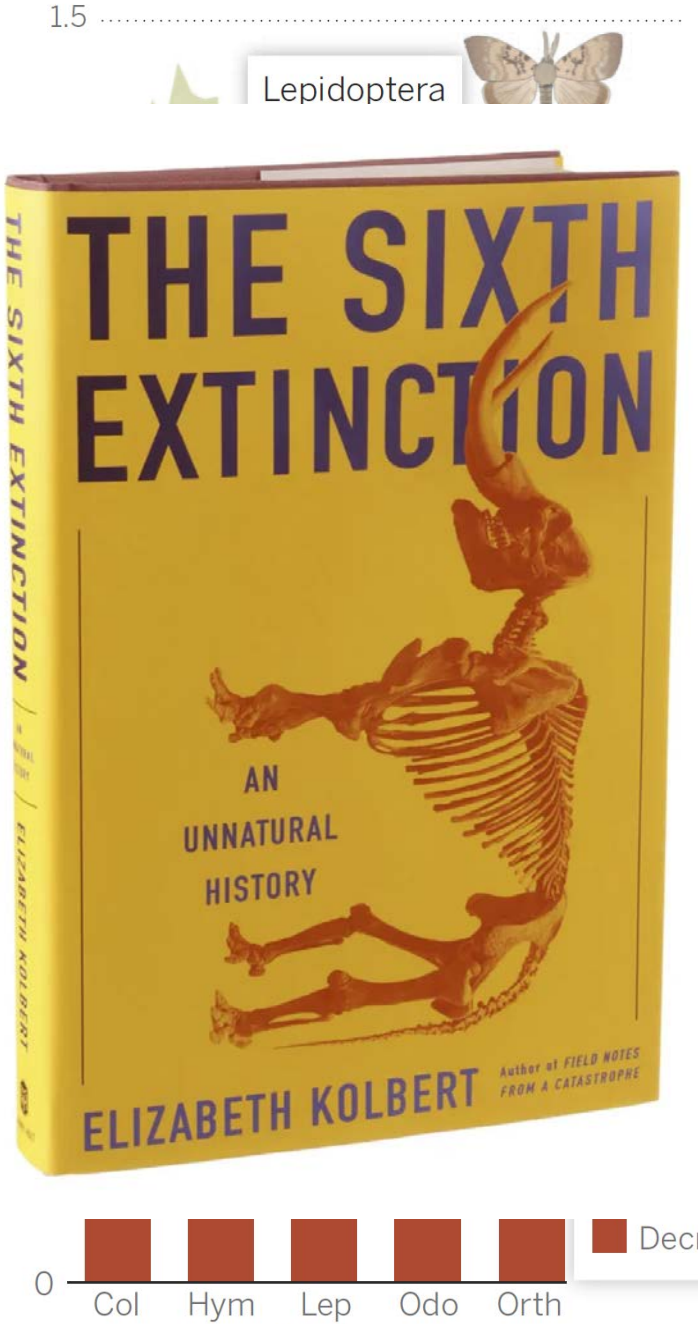
REVIEW

Defaunation in the Anthropocene

Rodolfo Dirzo,[1*] Hillary S. Young,[2] Mauro Galetti,[3] Gerardo Ceballos,[4]
Nick J. B. Isaac,[5] Ben Collen[6]

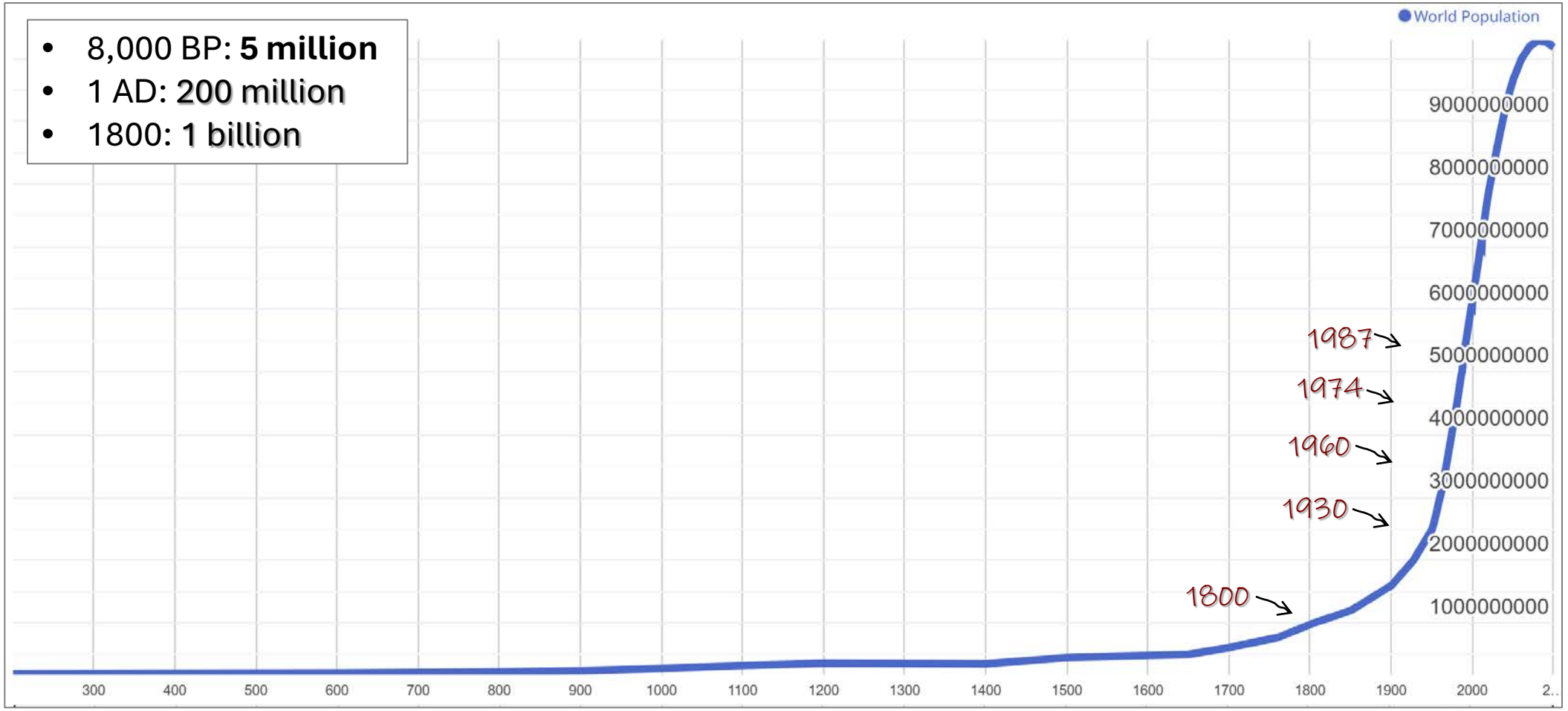


Global population decline in **birds** and **mammals**



% **Insect** species declining

Human population growth



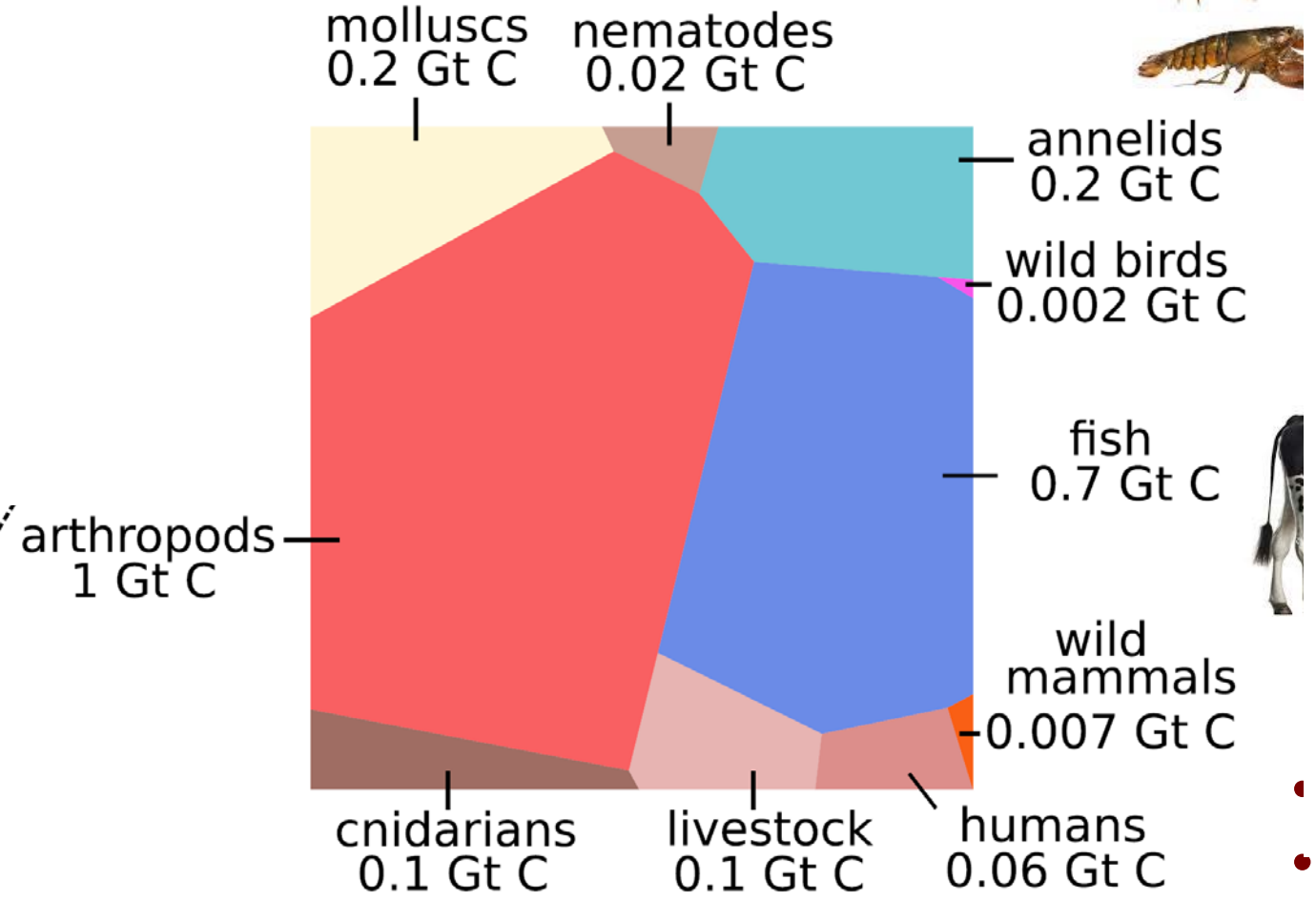
https://www.worldometers.info/world-population/

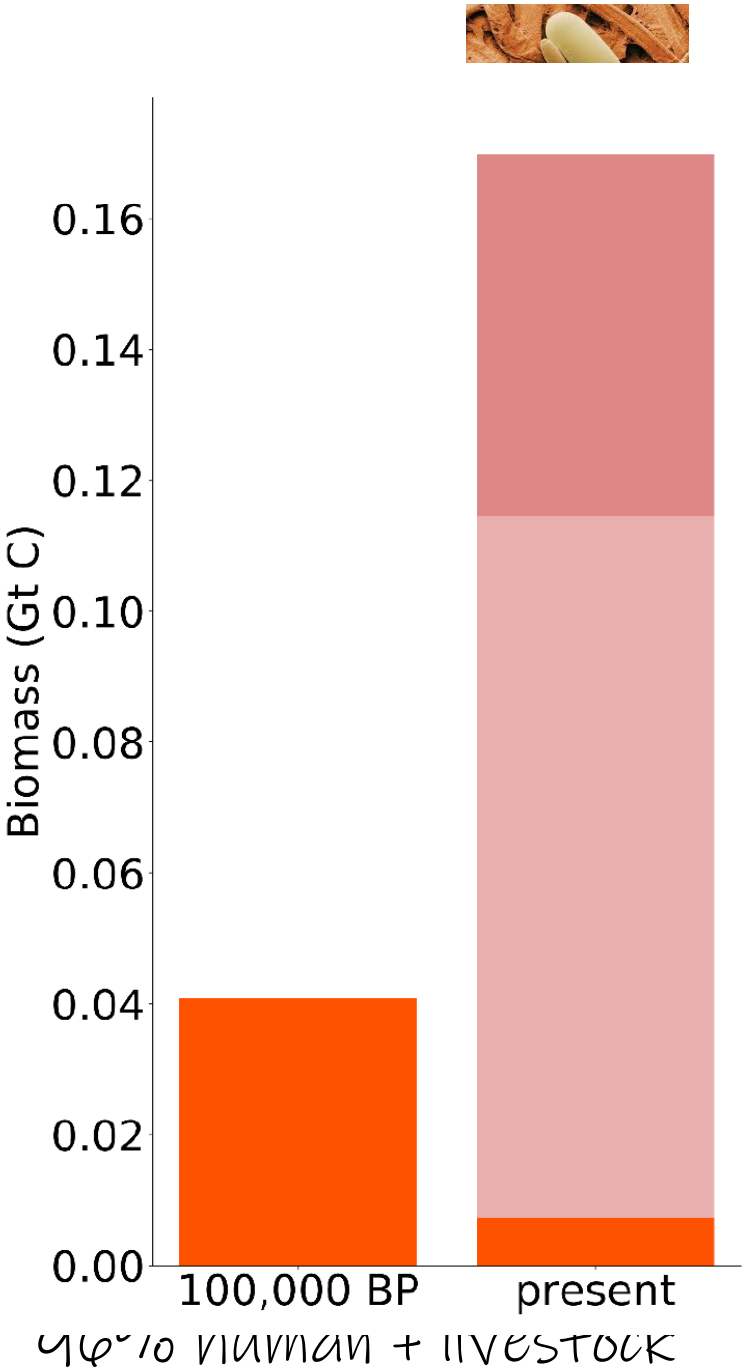
Human biomass on earth

PNAS

The biomass distribution on Earth

Yinon M. Bar-On[a], Rob Phillips[b,c], and Ron Milo[a,1]

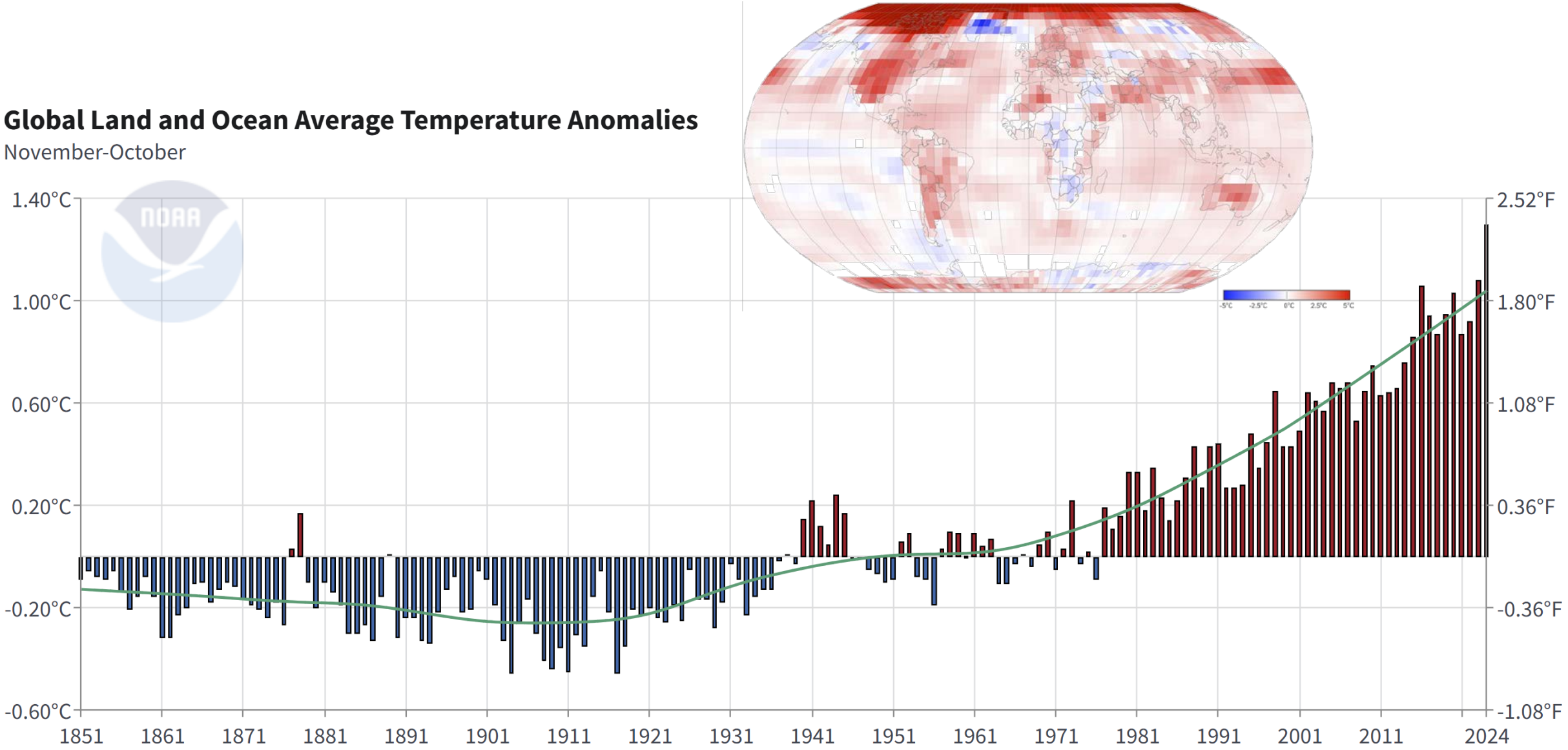




- 96% human + livestock

Global Land and Ocean Average Temperature Anomalies

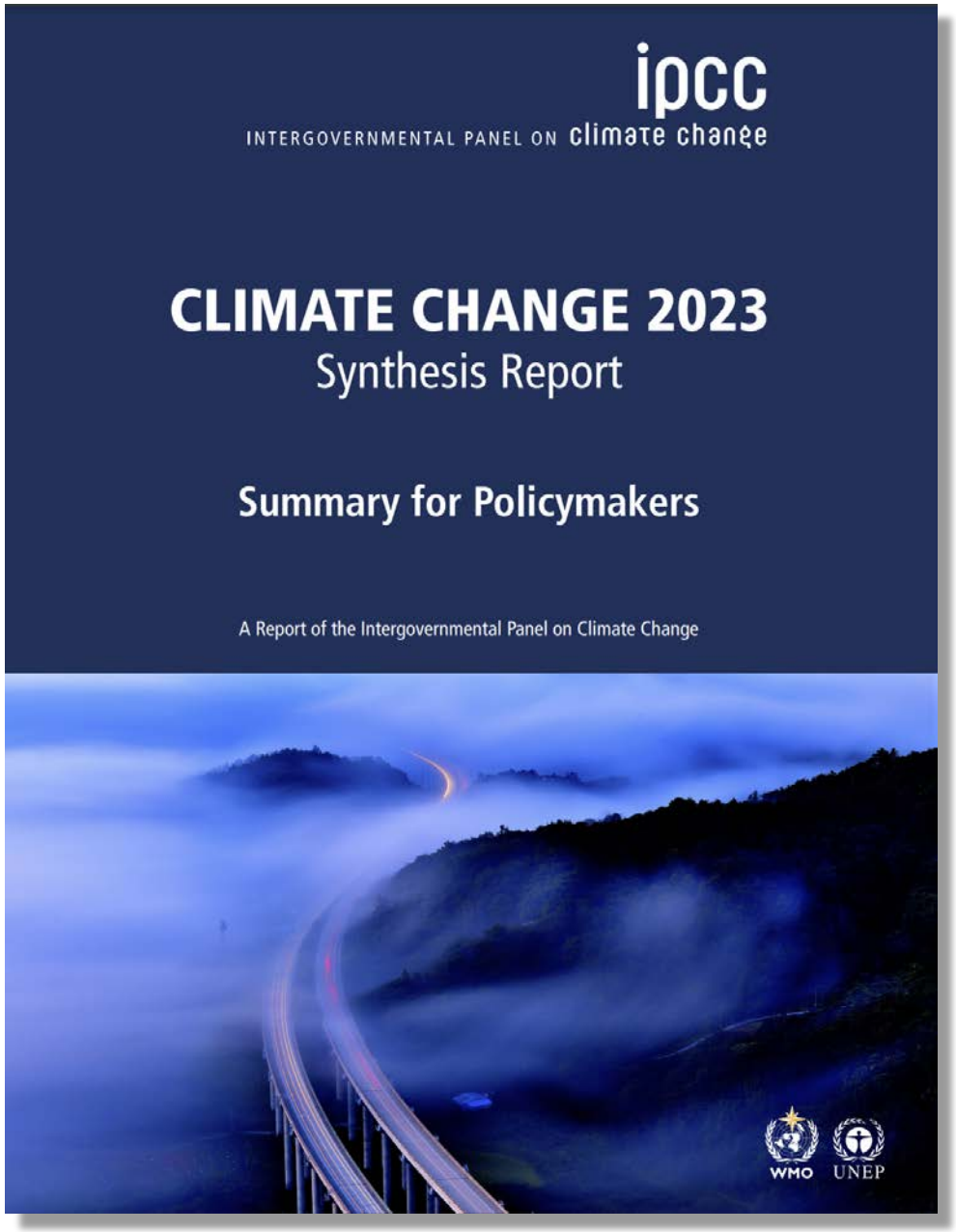
November-October



https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/global/time-series

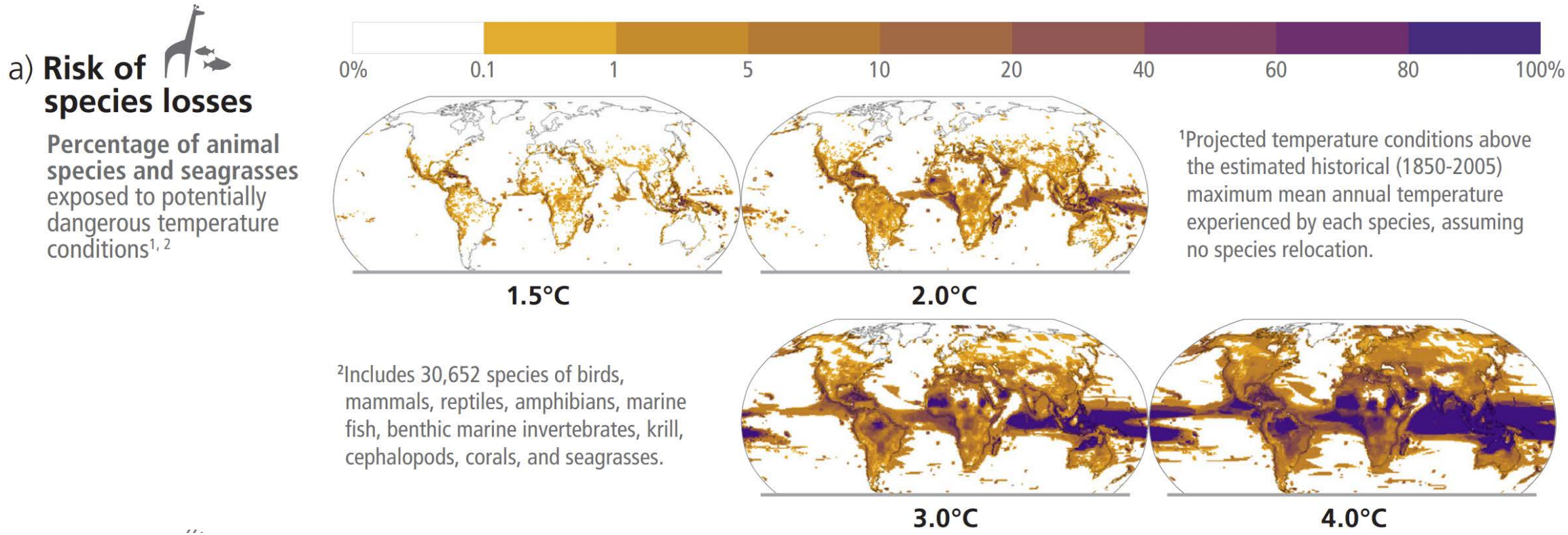
https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/global/time-series

- **Human activities**, principally through emissions of greenhouse gases, **have unequivocally caused global warming**, with global surface temperature reaching 1.1°C above 1850-1900 in 2011-2020.
- Global greenhouse gas emissions have continued to increase, with unequal historical and ongoing contributions arising from **unsustainable energy use**, land use and **land-use change**, **lifestyles** and **patterns of consumption and production**



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

Examples of impacts without additional adaptation



https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_SPM.pdf

Habitat loss and fragmentation

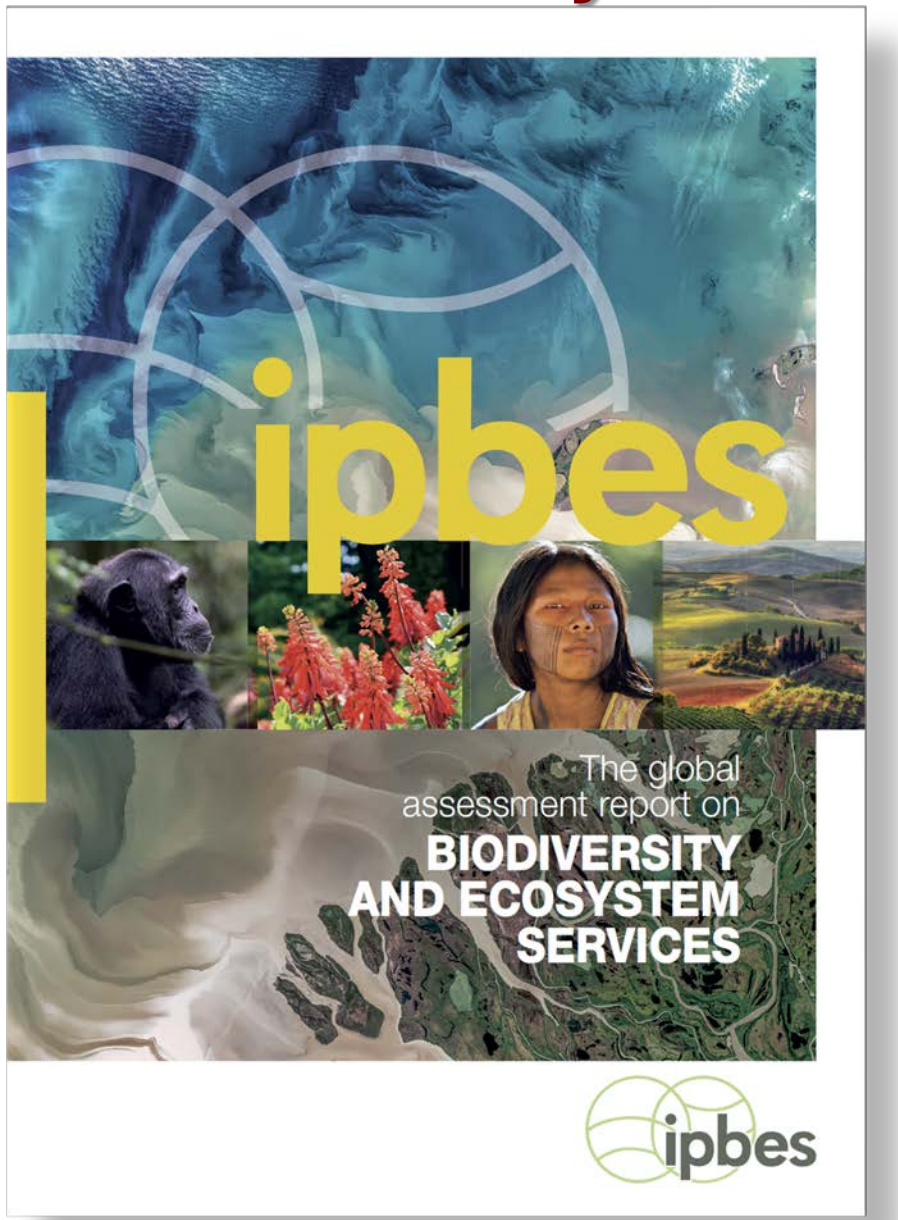
Species overexploitation

https://www.hindustantimes.com/

Invasive species

Pollution and contamination

Biodiversity crisis – a planetary emergency



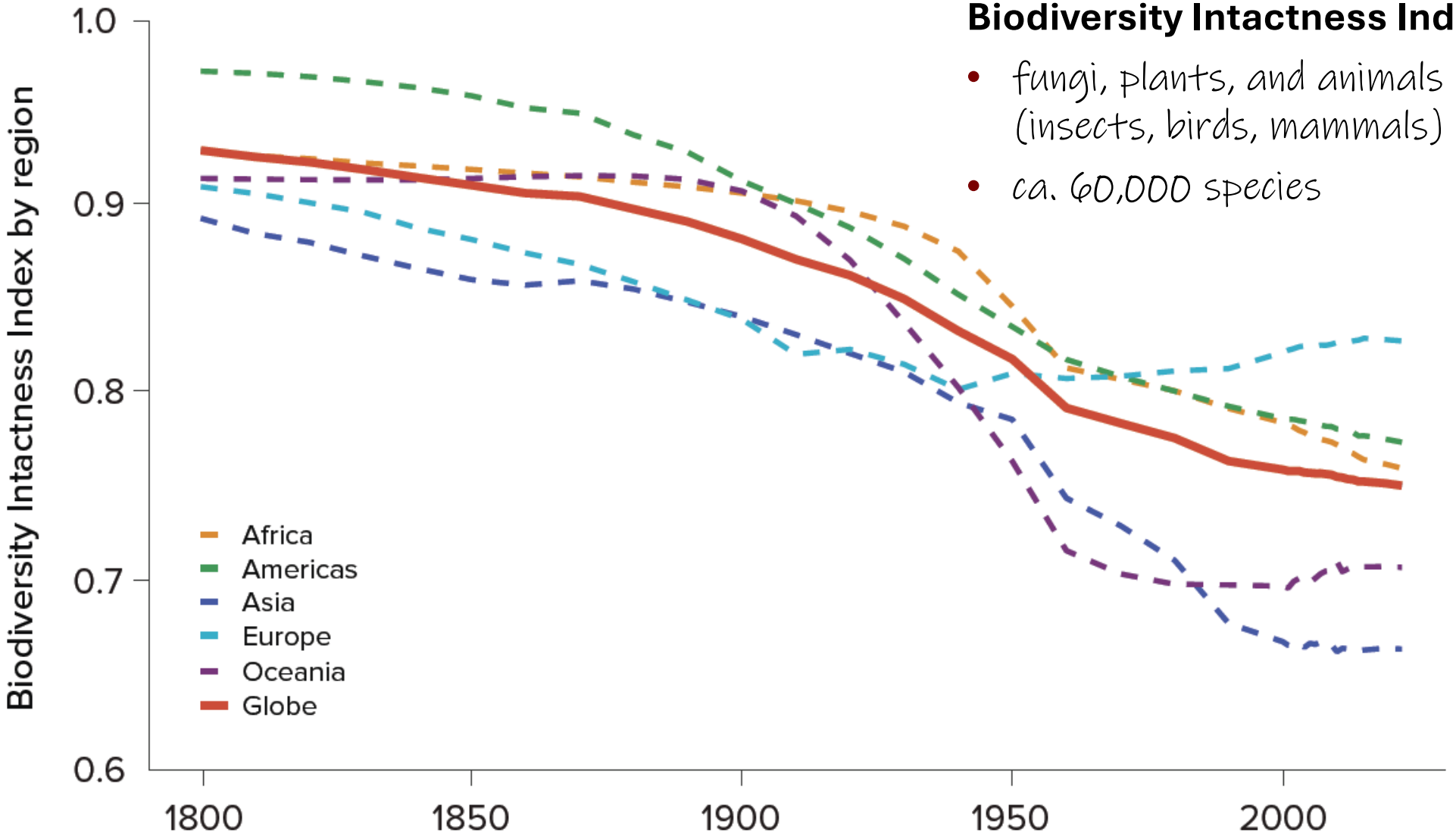
- ~ 1 million plants and animals at risk of extinction due to human activity
- Since 1900, native species have decreased by at least 20%
- Since 1970 species loss is accelerating and unequally distributed across countries
- Since 1970, invasive alien species per country have increased by 70%

https://www.ipbes.net/global-assessment

Biodiversity crisis – a planetary emergency

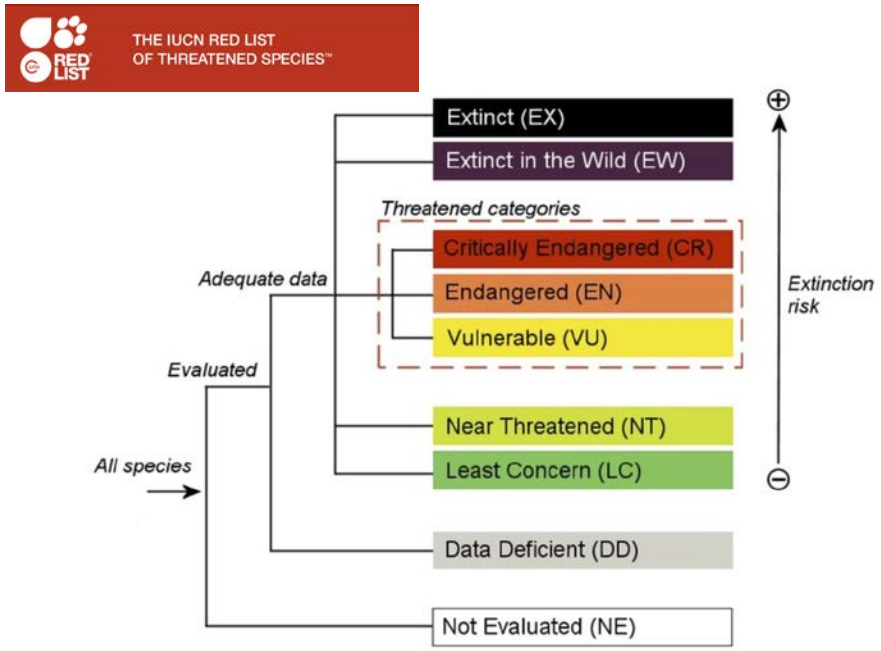
Biodiversity Intactness Index (BII):

- fungi, plants, and animals (insects, birds, mammals)
- ca. 60,000 species

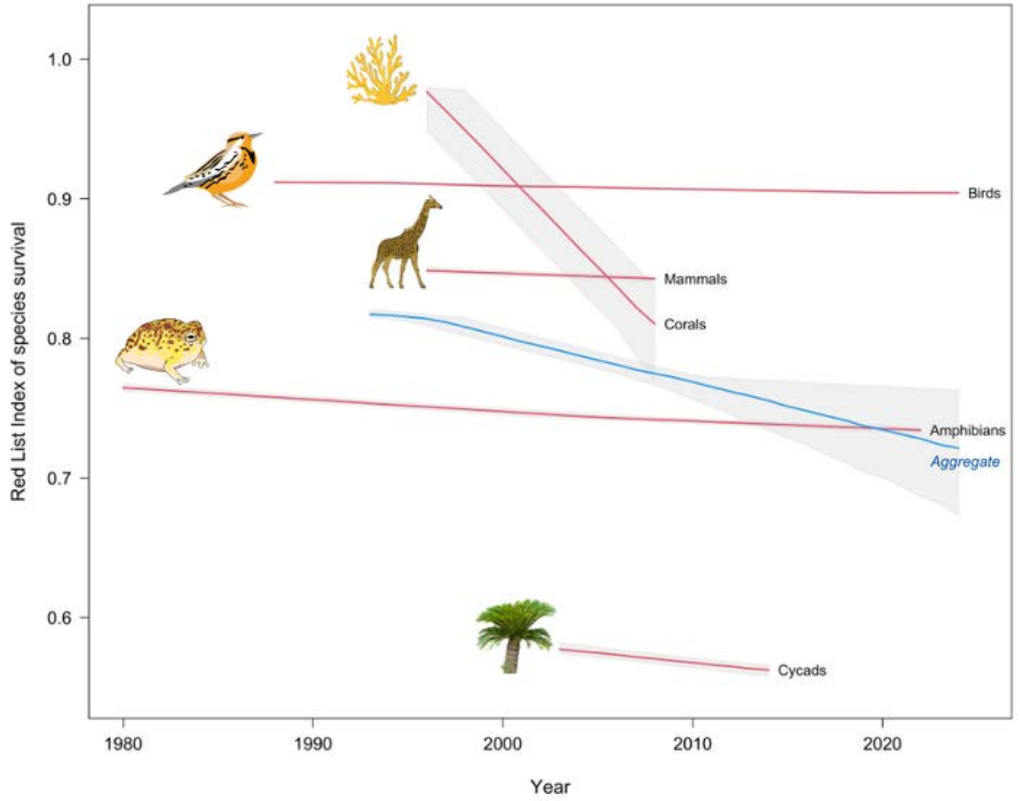


https://www.nhm.ac.uk/our-science/services/data/biodiversity-intactness-index.html

Biodiversity crisis – rate of extinction



Red List Index (RLI)



The Red List Index shows trends in overall extinction risk for species, and is used to track progress towards target for reducing biodiversity loss

https://www.iucnredlist.org/assessment/red-list-index

Biodiversity crisis – Species' rates of extinction

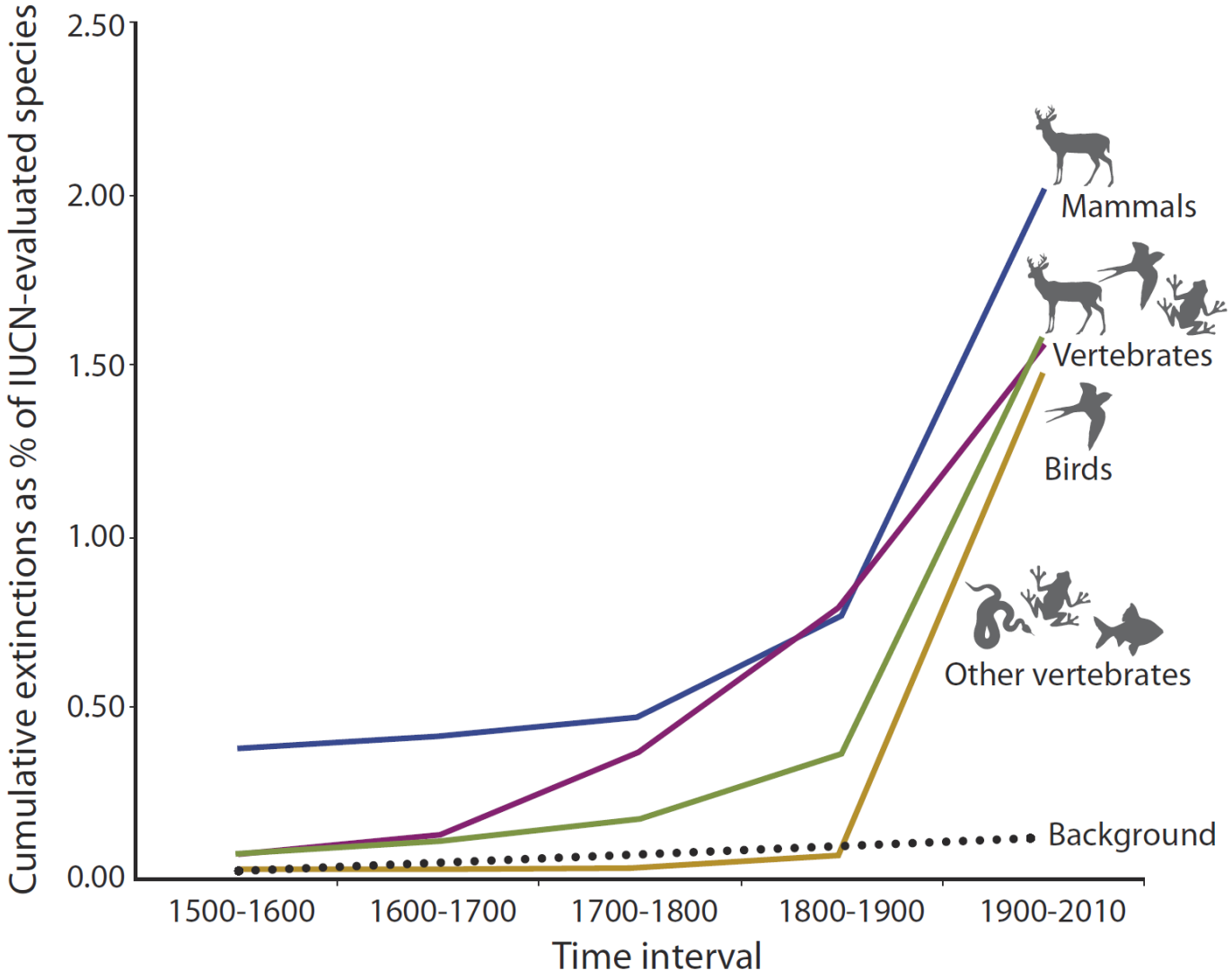
RESEARCH ARTICLE

ENVIRONMENTAL SCIENCES

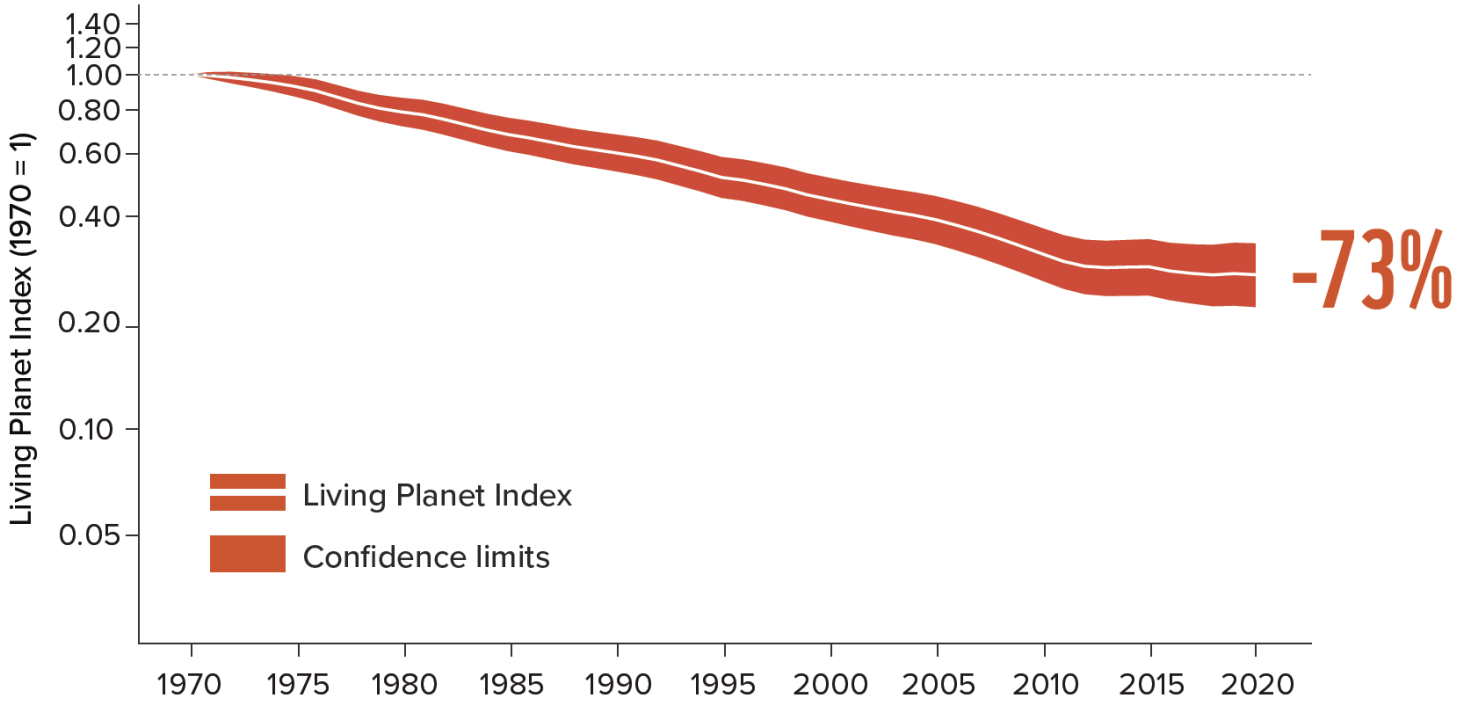
Accelerated modern human–induced species losses: Entering the sixth mass extinction

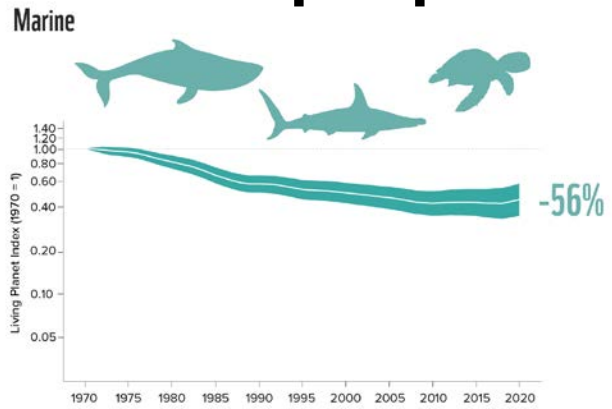
Gerardo Ceballos,[1]* Paul R. Ehrlich,[2] Anthony D. Barnosky,[3] Andrés García,[4] Robert M. Pringle,[5] Todd M. Palmer[6]

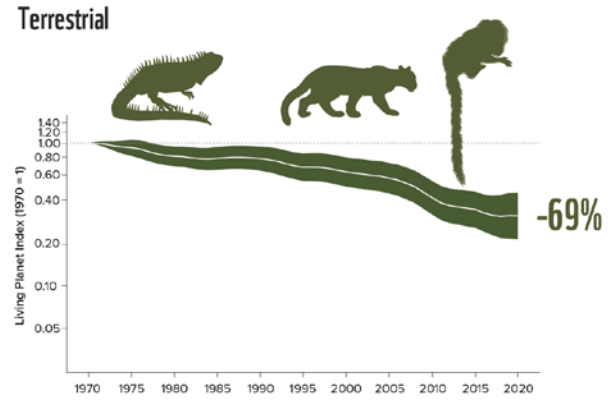
- 617 vertebrate species extinct since 1500 (most since 1900)
- Modern extinction rates are 8-100 times higher than background rates
- Number of extinctions in the last century would have taken 800 – 10,000 years at the background rate

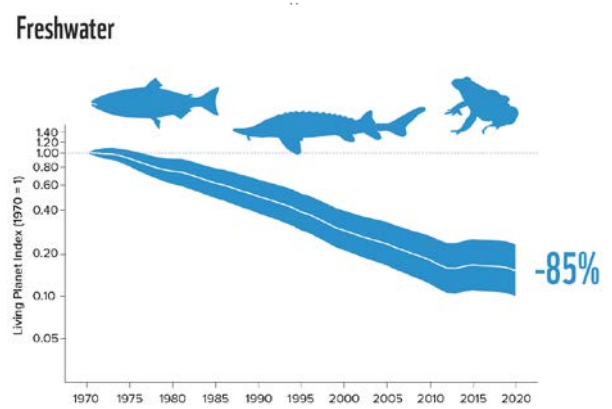


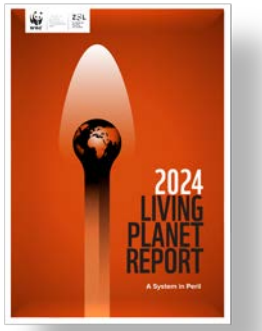
Biodiversity crisis – Decline in vertebrate pops.







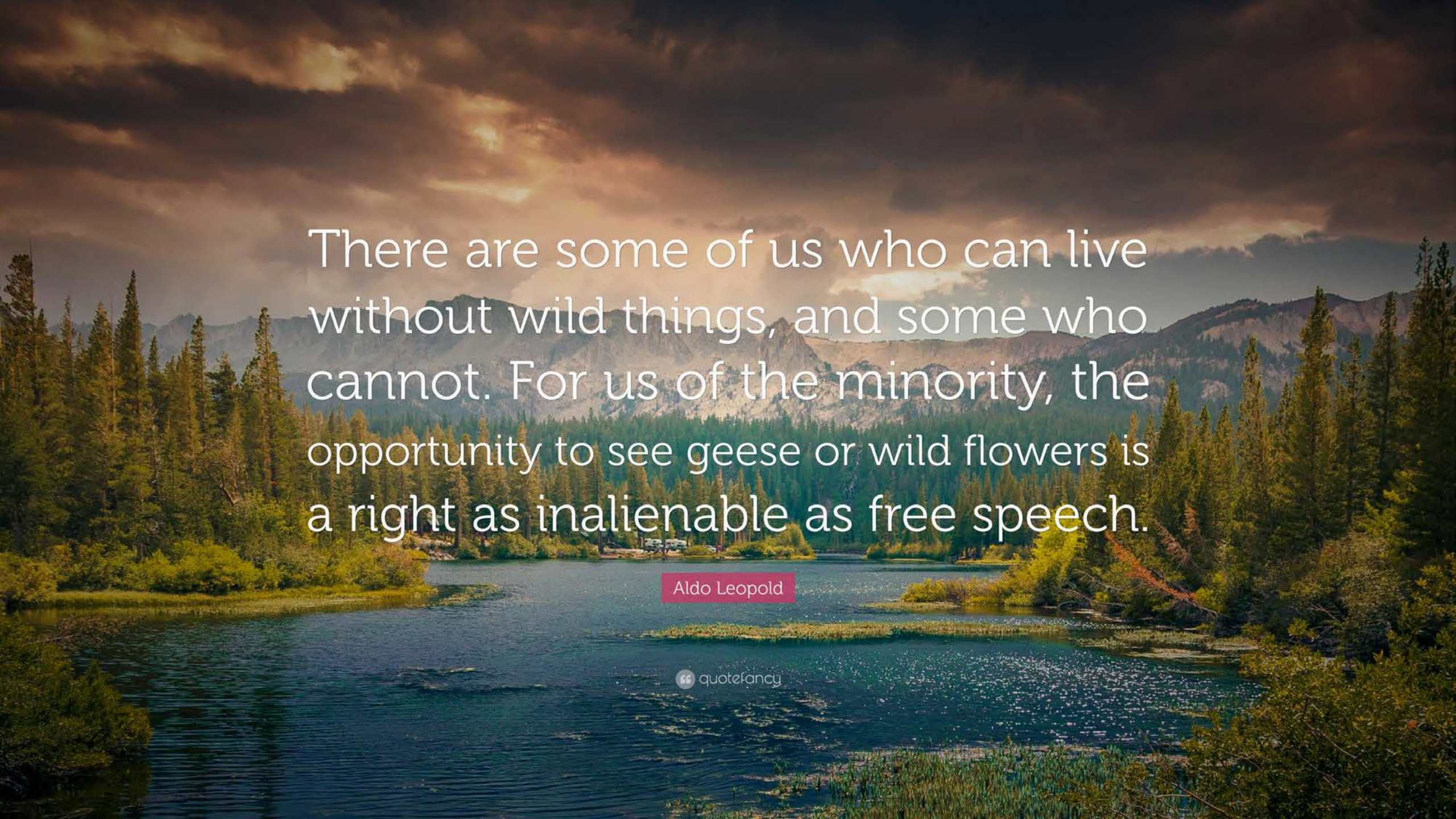




- since 1970, the LPI monitors changes in the size of vertebrate populations globally
- 5,495 species
- Ca. 35,000 populations

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

Saving the Ark


There are some of us who can live without wild things, and some who cannot. For us of the minority, the opportunity to see geese or wild flowers is a right as inalienable as free speech.
Aldo Leopold
quotefancy

Ecologia Animale e Biologia della Conservazione

- Ecobiologia (LM)
- I anno, II semestre (9 CFU)
- Paolo Ciucci (paolo.ciucci@uniroma1.it)
  - https://corsidilaurea.uniroma1.it/it/users/paolociucciuniroma1it
  - https://www.researchgate.net/profile/Paolo-Ciucci
  - https://scholar.google.com/citations?user=EmcqzmIAAAAJ&hl=en
- info e materiale didattico su: https://elearning.uniroma1.it/

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Ecologia Animale e Biologia della Conservazione

Propedeuticità didattiche:

- Zoologia
- Ecologia
- Genetica
- Statistica
- Fauna d'Italia…

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Ecologia Animale e Biologia della Conservazione

- 9 crediti
  - lezioni (8 ore/CFU)* → 24 lezioni (48 ore)
  - Escursione di campo → In alternativa: Monografia TWS

*1 ora lezione frontale ≅ 2 ore studio personale

- materiale didattico
  - diapositive (pdf su *e-learning*)
  - libri di testo (pdf su e-learning)
  - 'suggested readings'

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Ecologia Animale e Biologia della Conservazione

- lezioni
  - martedì 14:00 – 16:00
  - mercoledì 14:00 – 16:00
  - giovedì 14:00 – 16:00
- valutazione
  - esame finale 60%
  - partecipazione in aula 40%

- durata lezioni: 4 marzo – 24 aprile
- escursione didattica: 11–13 giugno (PNATE)??

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arta d'identità del Parco
a storia
nalità
rgani dell'Ente +
ruttura organizzativa +
atuto e Regolamenti
chiesta indennizzo per danni da una
rumenti di Pianificazione +
ssociazioni, Fondazioni e società artecipate
per mille
rvizio Civile

L'Università incontra il Parco!

Conclusosi la settimana scorsa il seminario universitario del Professor Paolo Ciucci

(Pescasseroli, 17 Gennaio 2022)

Nelle giornate dal 10 al 12 gennaio, il Parco è stato sede di un'escursione didattica di 30 studenti e studentesse della Laurea Magistrale in Ecobiologia dell'**Università di Roma La Sapienza**. In collaborazione con l'Ente, l'escursione è stata organizzata dal Prof. Paolo Ciucci nell'ambito del suo corso di Ecologia Animale e Biologia della Conservazione, per il quale sono previsti crediti formativi dedicati ad attività di campo.

L'Università incontra il Parco!

Nonostante condizioni meteorologiche non proprio ottimali, la presenza di neve ha permesso agli studenti e alle studentesse muniti di ciaspole di perlustrare ampie zone del Parco lungo i sentieri prestabiliti e riconoscere tracce e segni di presenza della fauna attiva in questo periodo dell'anno. Gli studenti e le studentesse sono stati esposti a tecniche di rilevamento quali lo snowtracking e il pellet-count e hanno imparato a individuare i segni di alimentazione, in

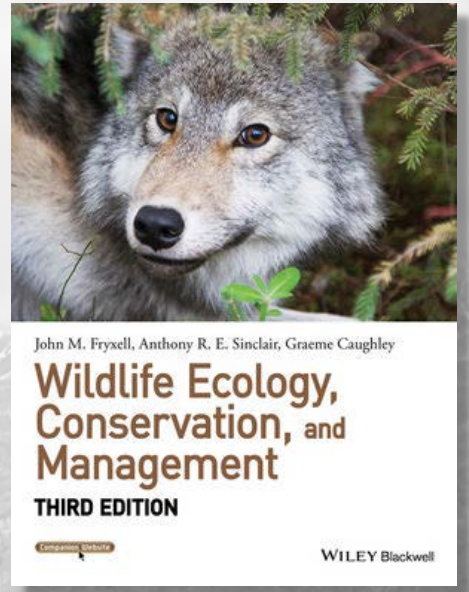

?
Parco Nazionale
APPENNINO
TOSCO-EMILIANO

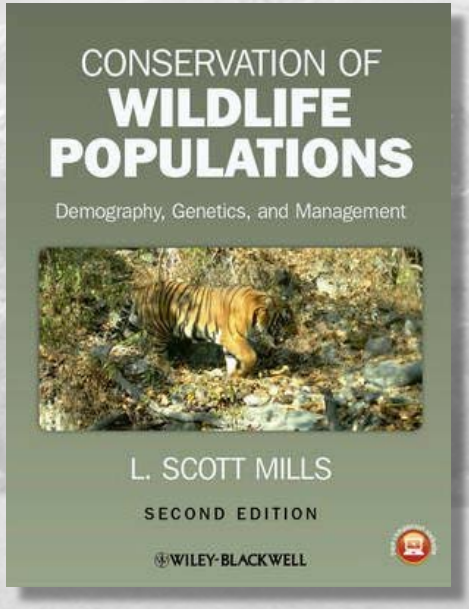
Ecologia Animale e Biologia della Conservazione

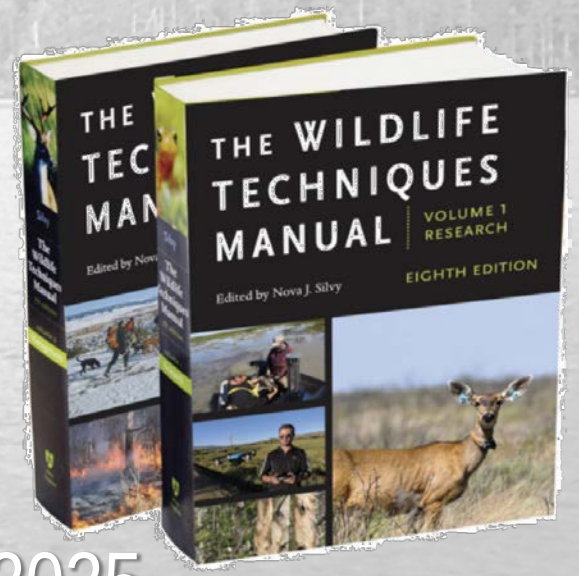
www.nhbs.com

Principali testi di riferimento

- Fryxell J.M., A.R.E Sinclair, G. Caughley. 2014. Wildlife Ecology, Conservation, and Management. III Edition, Wiley-Blackwell. Oxford.
- Mills, L.S. 2013. Conservation of Wildlife Populations. II Edition, Wiley-Blackwell, Oxford
- Silvy N. J. (ed). 2012. The Wildlife Techniques Manual. Voll. 1 and 2. 8° edition. Johns Hopkins Univ. Press.







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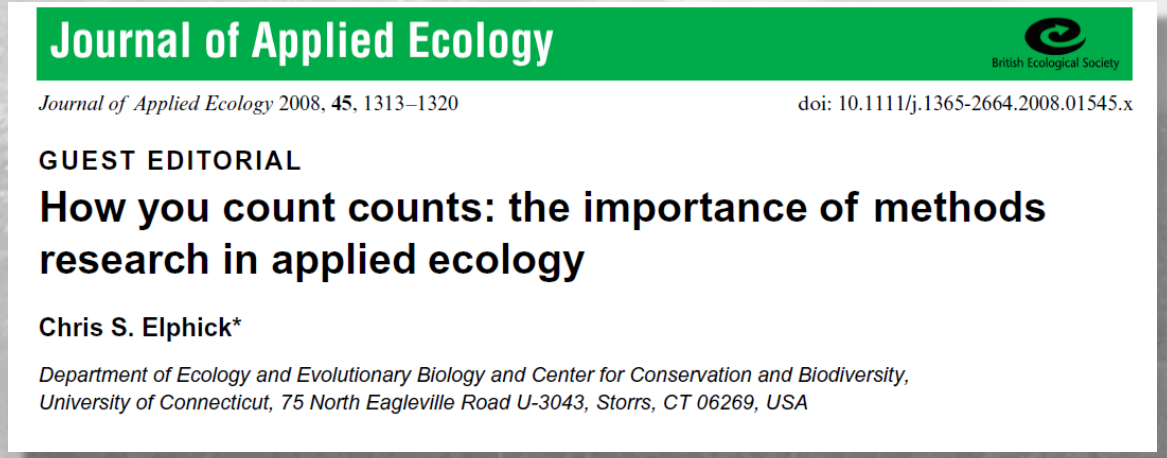
Altri testi, linee guida, articoli …



Journal of Applied Ecology

British Ecological Society

Journal of Applied Ecology 2008, **45**, 1313–1320 doi: 10.1111/j.1365-2664.2008.01545.x

GUEST EDITORIAL

How you count counts: the importance of methods research in applied ecology

Chris S. Elphick*

Department of Ecology and Evolutionary Biology and Center for Conservation and Biodiversity, University of Connecticut, 75 North Eagleville Road U-3043, Storrs, CT 06269, USA

ELSEVIER

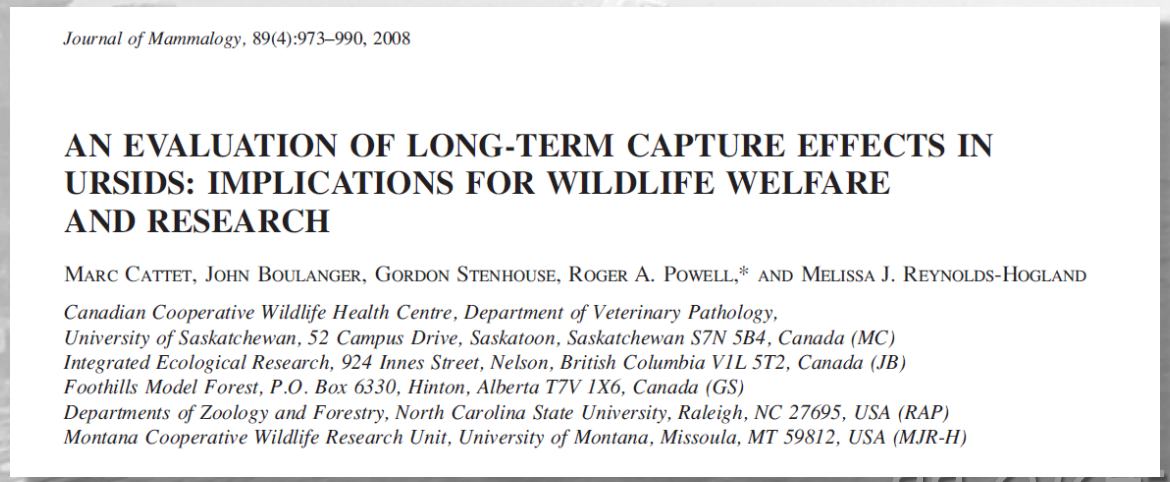
Opinion *TRENDS in Ecology and Evolution* Vol.21 No.12

Full text provided by www.sciencedirect.com ScienceDirect

Monitoring for conservation

James D. Nichols[a] and Byron K. Williams[b]

[a] USGS, Patuxent Wildlife Research Center, Laurel, MD 20708, USA
[b] USGS, Cooperative Research Units, Reston, VA 20192, USA

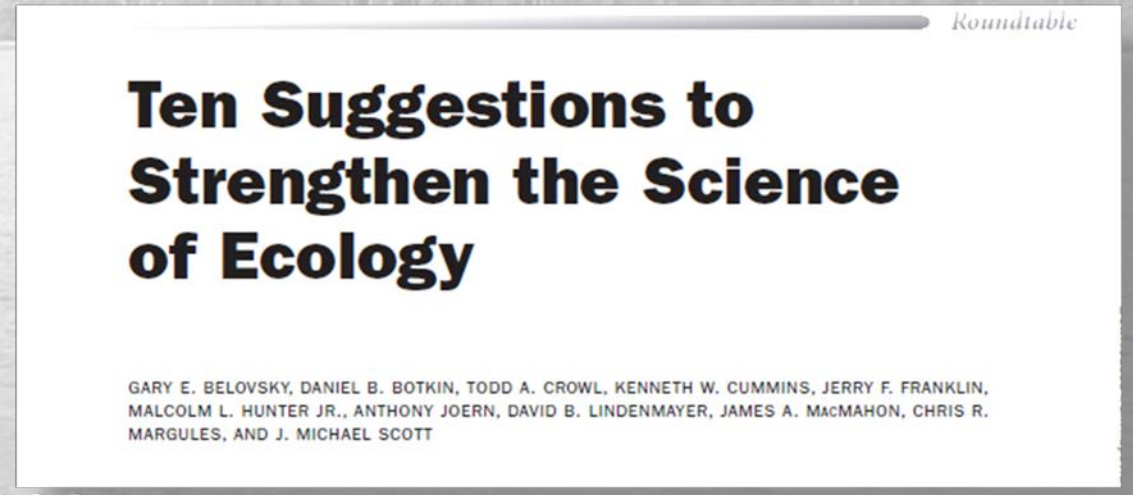


Journal of Mammalogy, 89(4):973–990, 2008

AN EVALUATION OF LONG-TERM CAPTURE EFFECTS IN URSIDS: IMPLICATIONS FOR WILDLIFE WELFARE AND RESEARCH

MARC CATTET, JOHN BOULANGER, GORDON STENHOUSE, ROGER A. POWELL,* AND MELISSA J. REYNOLDS-HOGLAND

Canadian Cooperative Wildlife Health Centre, Department of Veterinary Pathology, University of Saskatchewan, 52 Campus Drive, Saskatoon, Saskatchewan S7N 5B4, Canada (MC)
Integrated Ecological Research, 924 Innes Street, Nelson, British Columbia V1L 5T2, Canada (JB)
Foothills Model Forest, P.O. Box 6330, Hinton, Alberta T7V 1X6, Canada (GS)
Departments of Zoology and Forestry, North Carolina State University, Raleigh, NC 27695, USA (RAP)
Montana Cooperative Wildlife Research Unit, University of Montana, Missoula, MT 59812, USA (MJR-H)



Roundtable

Ten Suggestions to Strengthen the Science of Ecology

GARY E. BELOVSKY, DANIEL B. BOTKIN, TODD A. CROWL, KENNETH W. CUMMINS, JERRY F. FRANKLIN, MALCOLM L. HUNTER JR., ANTHONY JOERN, DAVID B. LINDENMAYER, JAMES A. MACMAHON, CHRIS R. MARGULES, AND J. MICHAEL SCOTT

a.a 2024-2025

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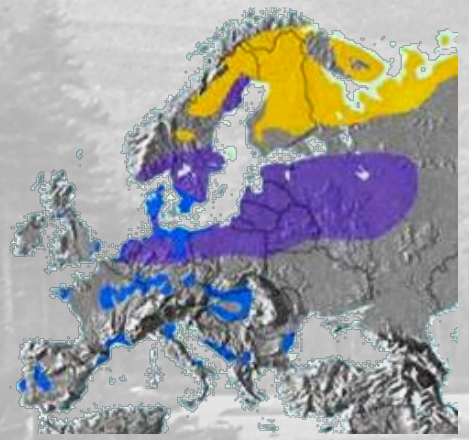
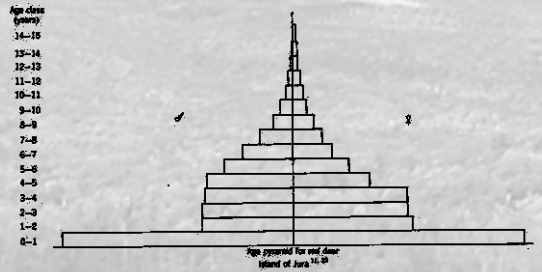
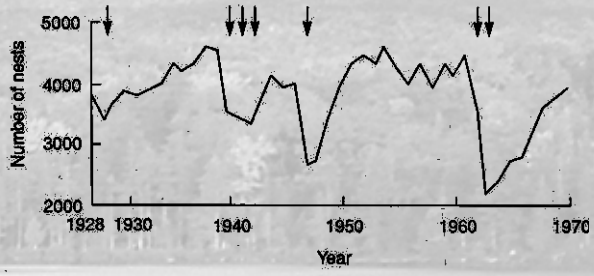
Primer on
Wildlife Ecology
(11 lezioni)







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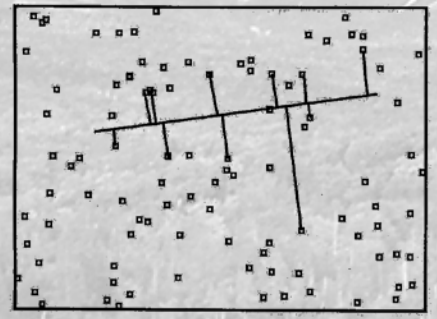
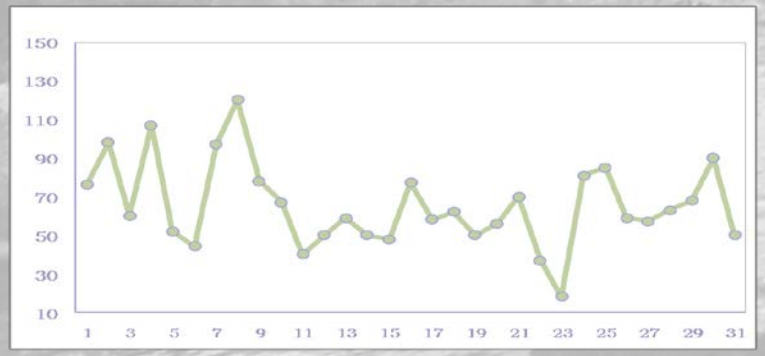
PRIMER ON WILDLIFE ECOLOGY				
Argomenti	**Libro di riferimento**	**Capitolo**	**Titolo capitolo**	**Pagg.**
Introduzione al Wildlife Management and Conservation	Fryxell et al. (2014)[1]	1	- *Introduction: goals and decisions*	1-8
	Mills (2013)[2]	1	- *The big picture: human population dynamics meet applied population biology*	3-13
	Smith (1996)[3]	1	- *Ecology: its meaning and scope*	3-13
Parametri spaziali	Fryxell et al. (2014)[1]	4-3	- *Dispersal, dispersion and distribution* - *Home range and habitat use*	53-67 35-51
Habitat e RSFs	Morrison (2002)[3]	2	- *Habitat*	41-70
	Fryxell et al. (2014)[1]	3	- *Home range and habitat use*	35-51
Cibo e Alimentazione	Fryxell et al. (2014)[1]	2	- *Food and nutrition*	11-33
Popolationi: struttura	Krebs (2001)[4]	10	- *Demographic techniques: vital statistics*	133-154
	Bolen & Robinson (2002)[5]	5	- *Population Ecology*	46-59
Popolazioni: dinamica e regolazione	Fryxell et al. (2014)[1]	5	- *Population growth and regulation*	69-93
	Bolen & Robinson (2002)[5]	5	- *Population Ecology*	49-59
Predazione	Fryxell et al. (2014)[1]	7	- *Predation*	123-138
	Mills (2013)[2]	8	- *Predation and Wildlife Populations*	142-153
Parassiti e agenti patogeni	Fryxell et al. (2014)[1]	8	- *Parasites and pathogens*	139-156

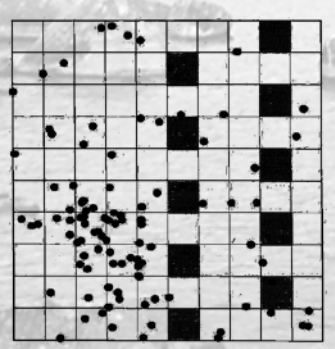
[1]: **Fyxell J.M., A.R.E. Sinclair, G. Caughley**. 2014. *Wildlife Ecology, Conservation and Management*. Third edition. Wiley-Blackwell, Oxford, U.K. 509 pagg.
[2]: **Mills, L.S.** 2013. *Conservation of Wildlife Populations. Demography, Genetics, and Management.* Second edition. Wiley-Blackwell, Oxford, U.K. 326 pagg.
[3]: **Smith, R.L.** 1996. *Ecology and Field Biology. Fifth Edition.* Harper Collins ollege Publishers, NY, U.S.A. 326 pagg.
[4]: **Morrison M.L.** 2002. *Wildlife Restoration. Techniques for Habitat Analysis and Animal Monitoring.* Island Press, Washington, U.S.A. 209 pagg.
[5]: **Krebs C.J.** 2001. *Ecology: the Experimental Analysis of Distribution and Abundance*. Benjamin Cummings, San Francisco, U.S.A. 608 pagg.
[6]: **Bolen E.G.**, **W.L. Robinson**. 2002. Wildlife Ecology and Management. Fifth Edition. Pearson, Cambridge, U.K. 634 pagg.

Ecologia Animale e Biologia della Conservazione

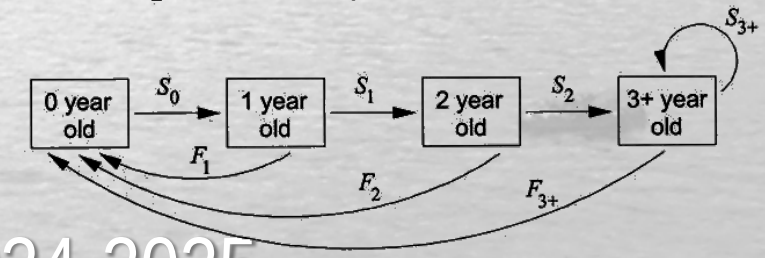
Advances in Wildlife Ecology
(8 lezioni)







$$L = \begin{bmatrix} 0 & F_1 & F_2 & F_{3+} \\ S_0 & 0 & 0 & 0 \\ 0 & S_1 & 0 & 0 \\ 0 & 0 & S_2 & S_{3+} \end{bmatrix}$$



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$$\binom{N}{n} = \frac{N!}{(N-n)!n!}$$

Ecologia Animale e Biologia della Conservazione

ADVANCES IN WILDLIFE ECOLOGY

Argomenti	Libro di riferimento	Capitolo	Titolo capitolo	Pagg.
The scientific method in Wildlife Ecology	Garton et al. (2012)[1]	1	- *Research and Experimental design*	1-40
	Mills (2013)[2]	2	- *Designining studies and interpreting populaiton biology data*	17-37
Trapping and Handling wildlife	Schemnitz et al. (2012)[3]	4-3	- *Capturing and Handling Wild Animals*	64-117
Estimating Abundance	Pierce et al. (2012)[4]	2	- *Estimating Population Abundance*	284-310
	Mills (2013)[2]	4	- *Estimating Population Vital Rates*	35-51
	Fryxell et al. (2014)[5]	12	- *Counting animals*	205-231
Population projections	Mills (2013)[2]	7	- *Accounting for age- and sex-specific differences*	132-158
	Fryxell et al. (2014)[5]	13	- *Age and stage structure*	233-250

[1]: **Garton E.O.** et al. (2012) Research and Experimental design. Pp. 1-40 in (Silvy NJ, ed.): *The Wildlife Techniques Manual - Research*. Seventh edition., Vol. 1. The John Hopking Univ. Press, Balatimore.
[2]: **Mills, L.S.** 2013. *Conservation of Wildlife Populations. Demography, Genetics, and Management*. Second edition. Wiley-Blackwell, Oxford, U.K. 326 pagg.
[3]: **Schemnitz S.D.** et al. (2012) Capturing and Handling Wild Animals. Pp. 64-117 in (Silvy NJ, ed.): *The Wildlife Techniques Manual - Research*. Seventh edition., Vol. 1. The John Hopking Univ. Press, Balatimore.
[4]: **Pierce B.L.** et al. (2012) Estimating Animal Abundance. Pp. 284-310 in (Silvy NJ, ed.): *The Wildlife Techniques Manual - Research*. Seventh edition., Vol. 1. The John Hopking Univ. Press, Balatimore.
[5]: **Fyxell J.M.** et al. (2014). *Wildlife Ecology, Conservation and Management*. Third edition. Wiley-Blackwell, Oxford, U.K. 509 pagg.

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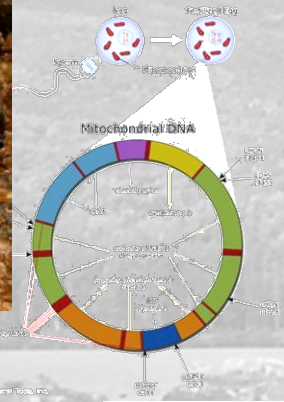
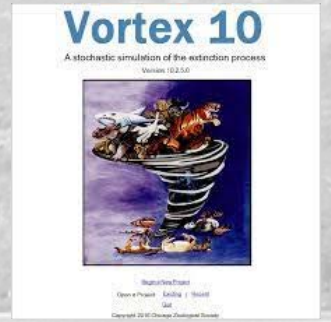
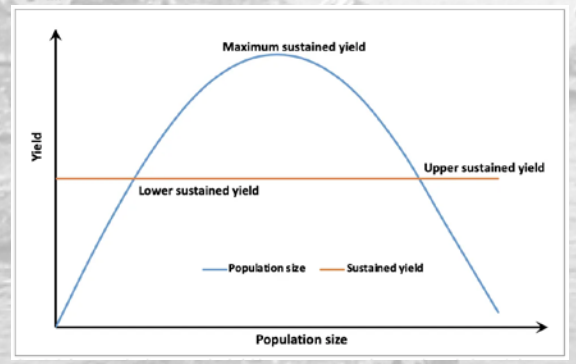
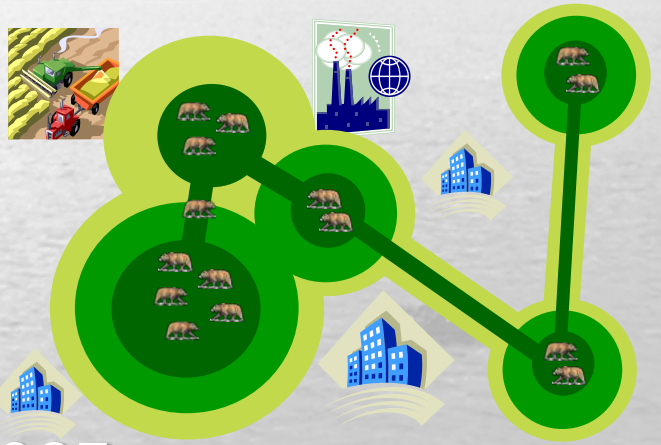
Applications in Wildlife Ecology

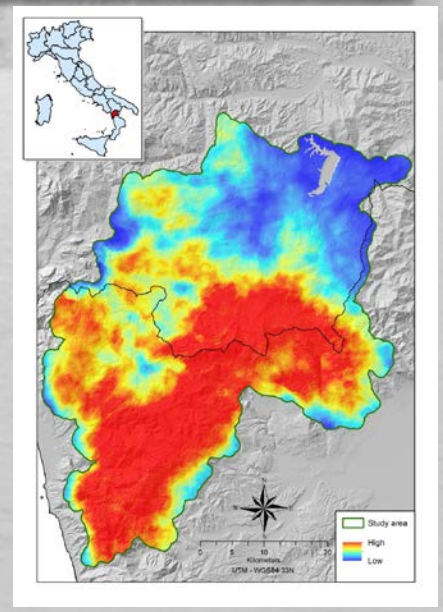
(5 lezioni)











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APPLICATIONS IN WILDLIFE ECOLOGY

Argomenti	Libro di riferimento	Capitolo	Titolo capitolo	Pagg.
Dynamics and management of small populations	Mills (2013)[1]	12	- *Predicting the dynamics of small and declining populations*	224-243
	Mills et al. (2012)[2]	35	- *Ecology and Management of Small populations*	270-292
Monitoring for conservation	Elzinga et al. (2001)[3]	1, 2, 7,	- *Introduction to Monitoring (Chpt. 1)*	1-10
		14, 15	- *Monitoring Overview (Chpt. 2)*	11-20
			- *Basic Principles of Sampling (Chpt. 7)*	75-100
			- *Objectives (Chpt. 14)*	247-270
			- *Communication and Monitoring Plans (Chpt. 15)*	271-281
Conservation Genetics and Wildlife Ecology	Oyler-McCance & Leberg (2012)[4]	22	- *Conservation Genetics and Molecular Ecology in Wildlife Management*	526-546
	Mills (2013)[1]	3	- *Genetic Concepts and Tools to support Wildlife Population Biology*	33-53
Use of dogs and remote cameras in wildlife research	Dahlgren et al. (2012)[5]	5	- *Use of Dogs in Wildlife Research and Management*	140-153
	Locke et al. (2012)[6]	12	- *Use of Reemote Cameras in Widlife Ecology*	311-318
Analysis of wildlife biology data	Collier & Schwertner (2012)[7]	2	- *Management and Analysis of Wildlife Biology Data*	41-63

[1]: **Mills, L.S. (**2013). *Conservation of Wildlife Populations. Demography, Genetics, and Management.* Second edition. Wiley-Blackwell, Oxford, U.K. 326 pagg.
[2]: **Mills, L.S**. (2012). Ecology and Management of Small Populations. Pp. 270-292 in (Silvy NJ, ed.): *The Wildlife Techniques Manual - Research*. Seventh edition., Vol. 2. The John Hopking Univ. Press, Balatimore.
[3]: **Elizinga C.L.** et al. (2001). Monitoring plant and Animal Populations. Blakwell Science, MS, U.S.A. 360 pp.
[4]: **Oyler-McCance S.J.** & **P.A Leberg**. (2012). Conservation Genetics and Molecular Ecology in Wildlife Management. Pp. 526-546 in (Silvy NJ, ed.): *The Wildlife Techniques Manual - Research*. Seventh edition., Vol. 2. The John Hopking Univ. Press, Balatimore.
[5]: **Dahlgren D.K.** et al. (2012) . Use of Dogs in Wildlife Research and Management. Pp. 140-153 in (Silvy NJ, ed.): *The Wildlife Techniques Manual - Research*. Seventh edition., Vol. 1. The John Hopking Univ. Press, Balatimore.
[6]: **Locke S.L.** et al. (2012). Use of Dogs in Wildlife Research and Management. Pp. 311-318 in (Silvy NJ, ed.): *The Wildlife Techniques Manual - Research*. Seventh edition., Vol. 1. The John Hopking Univ. Press, Balatimore.
[7]: **Collier B.A. & Schwertner T.W.** et al. (2012) Management and Analysis of Wildlife Biology Data. Pp. 64-117 in (Silvy NJ, ed.): *The Wildlife Techniques Manual - Research*. Seventh edition., Vol. 1. The John Hopking Univ. Press, Balatimore.

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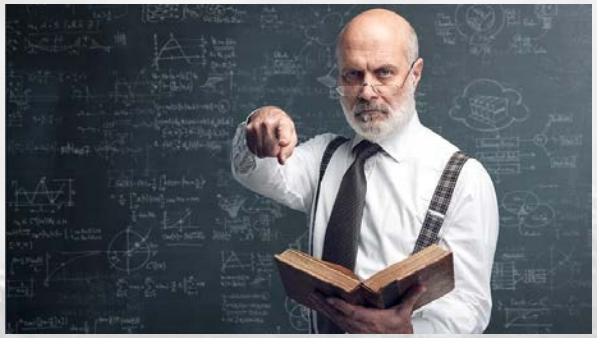
- Lezioni frontali
- Active learning:
  - *guided discussions*
  - *lectures*



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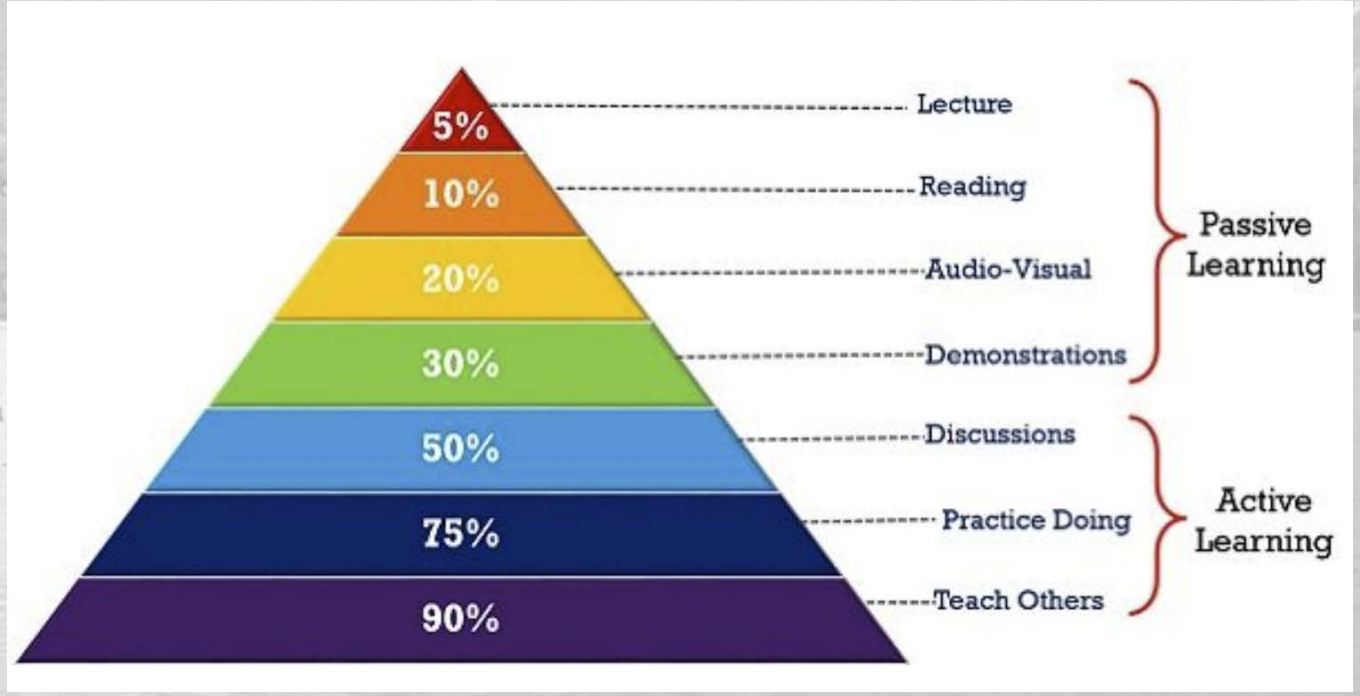
Active learning

- 5 discussioni guidate (5 x 2 = 10 volontari)
- 5 lezioni frontali (5 x 4 = 20 volontari)
- partecipazione attiva di tutti a lezione (domande, commenti, discussione)



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Active learning: Guided discussions

- giovedì
- gestite da 2 *chairs* + 2 *facilitators*
- 30 min presentazione ppt (*chairs*)
- 50 min discussione (partecipazione attiva di tutti)
- 10 min conclusioni e *position statement* (*chairs* + *facilitators*)
- *2-4 articoli*

1. The Land Ethic
2. Wildlife supplemental feeding
3. Compassionate Conservation
4. Observational studies and the extinction of field experience
5. Biodiversity crisis and remedies

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Active learning: Lectures

- lavoro di gruppo (5 persone)
- capitoli/report tecnici
- 75 min presentazione (ppt)
- 15 min Q&A
- partecipazione attiva di tutti (domande, commenti, discussione)

1. Dynamics and management of small populations
2. Monitoring wildlife populations
3. Management and Analysis of Wildlife Biology Data
4. Use of dogs in research and management + Use of remote cameras in Wildlife ecology
5. Living Planet Report

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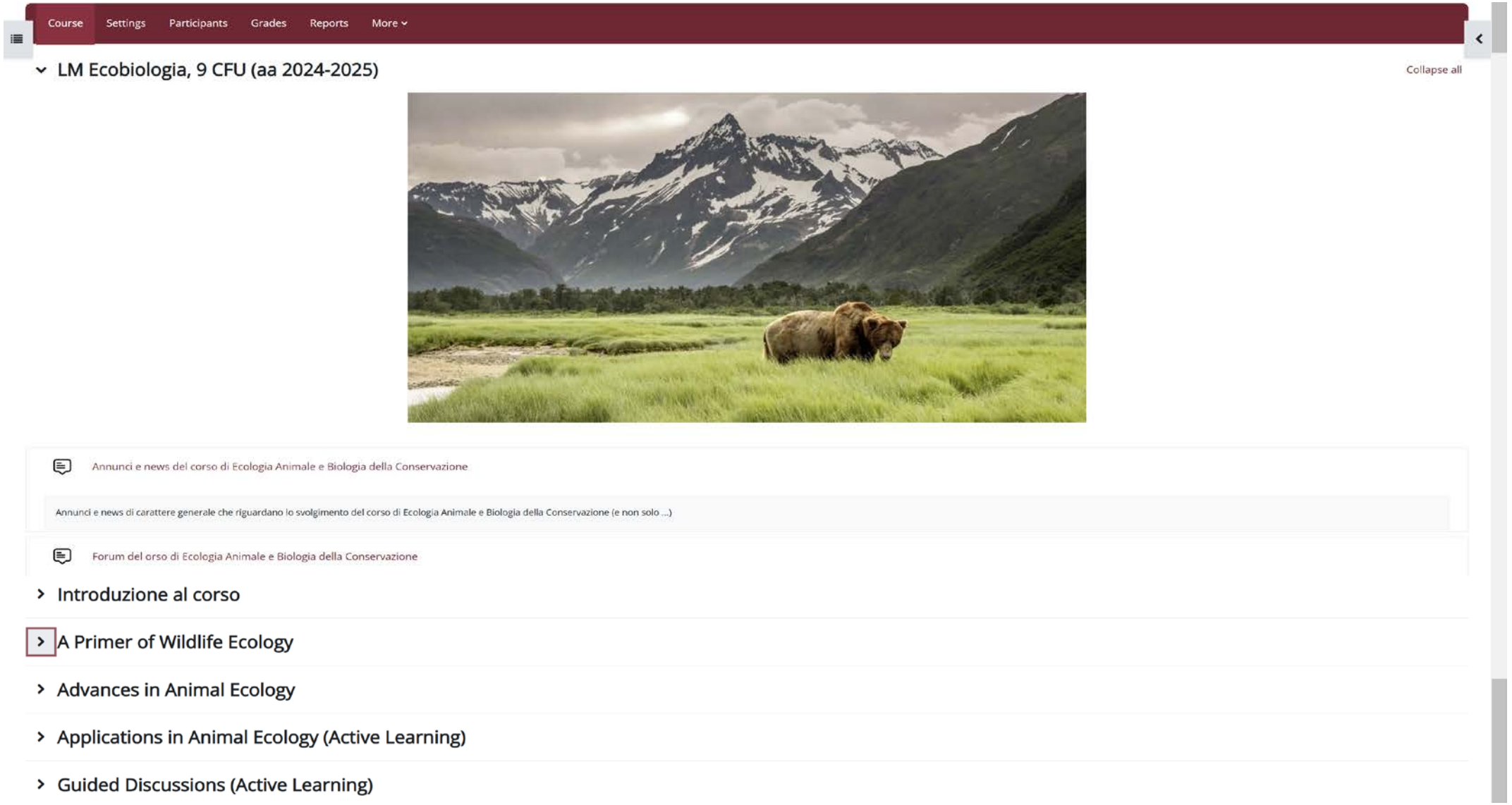

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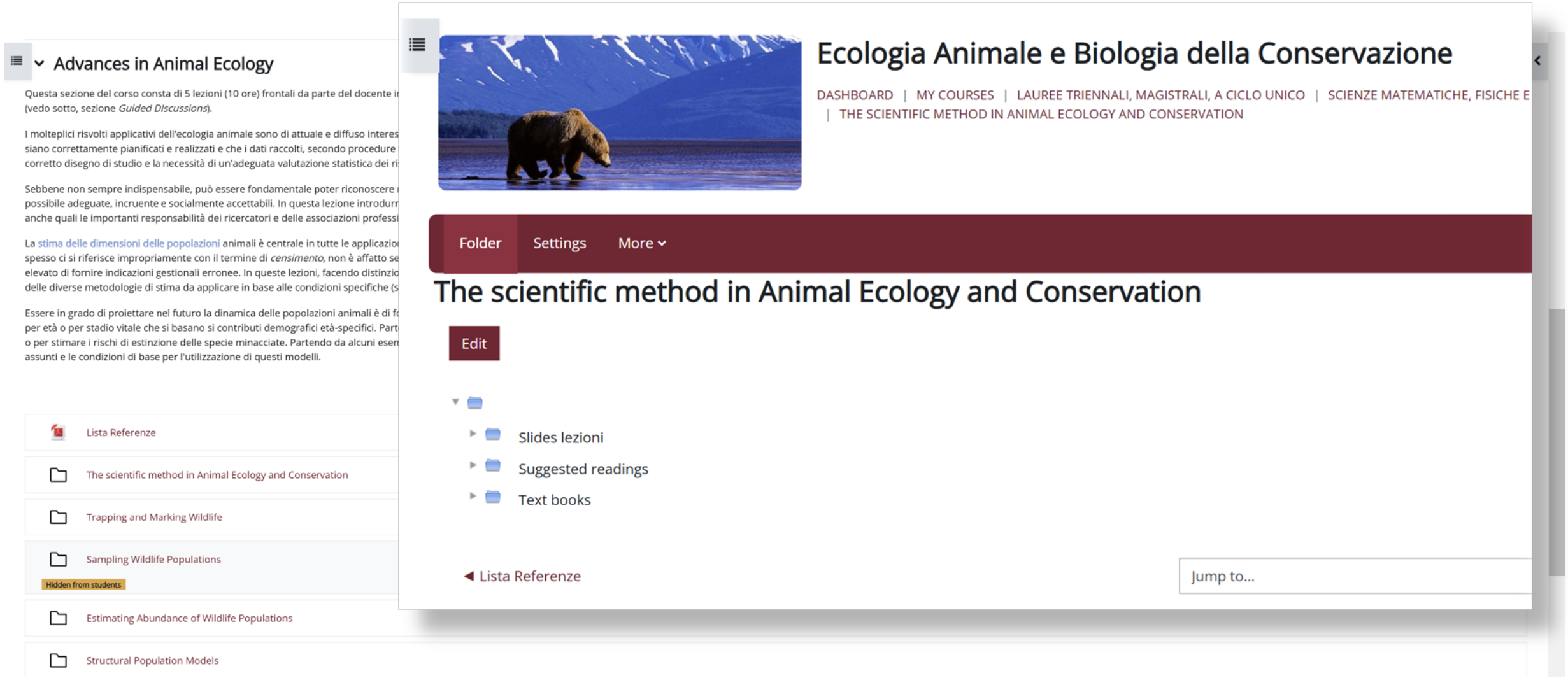

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Lezione n.	Data	Sezione del corso	Argomento lezione
1	04-Mar	**Introduzione al corso**	Struttura, orari, prove d'esame - Contestualizzazione, argomenti trattati e loro rilevanza
2	05-Mar	**Primer on Wildlife Ecology**	Setting the stage: Biodiversity crisis - Wildlife Ecology, Conservation and Management
3	06-Mar		Spatial Patterns and Movements
4	11-Mar		Habitat and Resource Use
5	12-Mar		Food and nutrition
6	13-Mar		Open Discussion 1: The Land ethic
7	18-Mar		Structure of wildlife populations
8	19-Mar		Wildlife population dynamics
9	20-Mar		Open Discussion 2: Artificial and Supplemental feeding
10	25-Mar		Predation Ecology
11	26-Mar		Wildlife Disease
12	27-Mar		Open Discussion 3: Compassionate conservation
13	01-Apr		The scientific method in Wildlife Ecology and Conservation (1)
14	02-Apr	**Advances in Wildlife Ecology**	The scientific method in Wildlife Ecology and Conservation (2)
15	03-Apr		Open Discussion 4: Observational studies and the extinction of field experience
16	08-Apr		Trapping and handling wildlife
17	09-Apr		Estimating population abundance
18	10-Apr		Open Discussion 5: Biodiversity crisis and remedies
19	15-Apr		Structural models for population projections
20	16-Apr	**Applications of Wlidlife Ecology**	Active learning: Dynamics and management of small populations
	17-Apr	vacanze Pasqua	
	22-Apr		
21	23-Apr		Active learning: Monitoring wildlife Populations
22	24-Apr		Active learning: Use of dogs and remote cameras in widlife research and management
23	29-Apr		Active learning: Conservation genetics and widlife ecology applications
24	30-Apr		Active learning: Management and analysis of wildlife biology data Living Planet Report
	11-13 Giu	**Field trip**	

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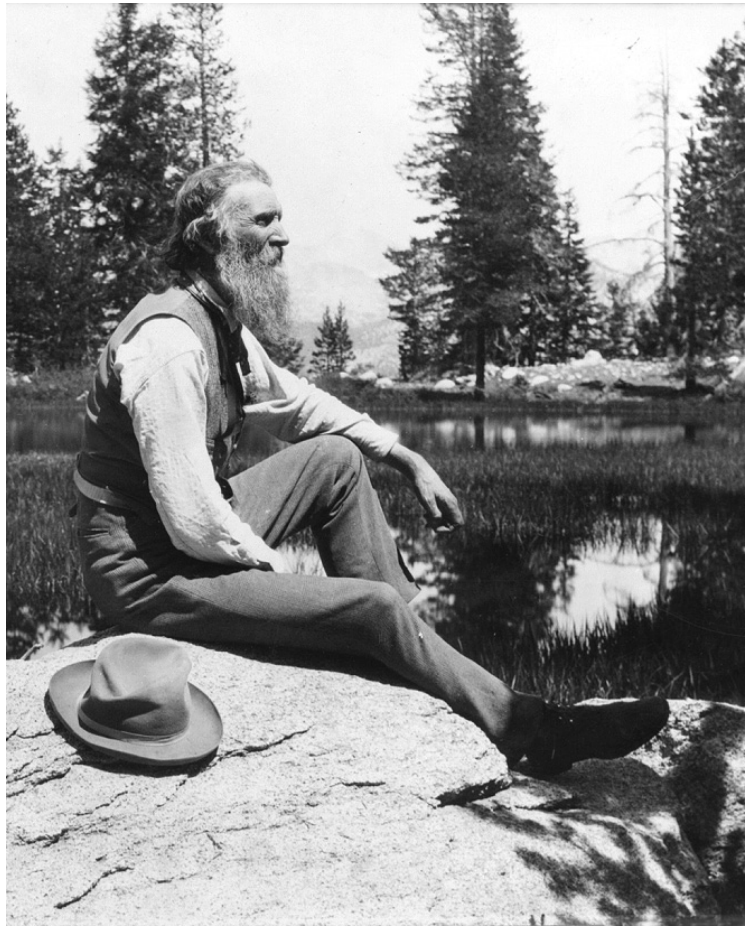

John Muir (1838-1914)

Enrollment key: **John_Muir**

Group enrollment key (Anno accademico 2024-2025): **JM2024-2025**

Aldo Leopold (1887-1948)

Slide password: **aldoleopold**

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