

# World Scientists' Warning to Humanity: A Second Notice

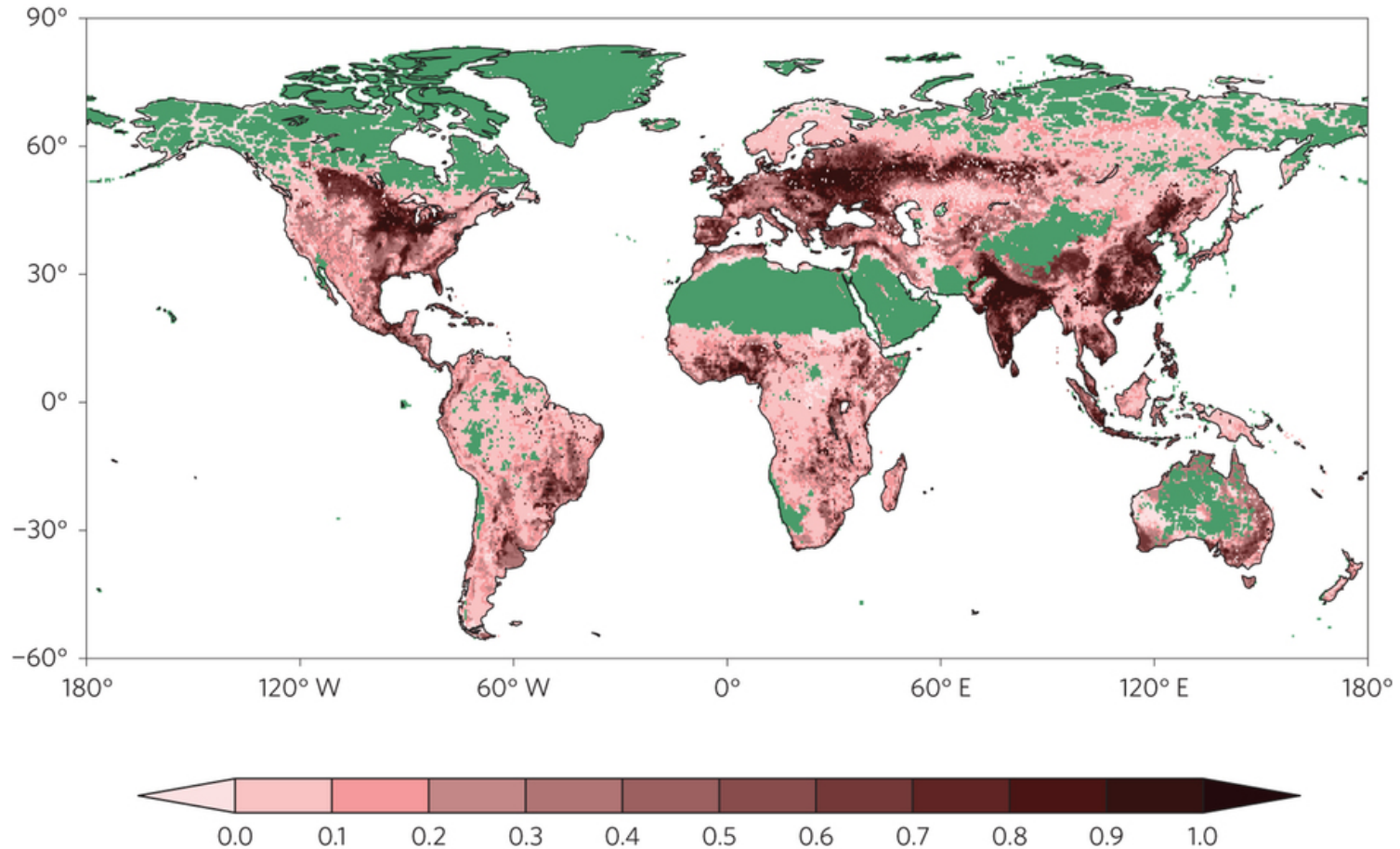
WILLIAM J. RIPPLE, CHRISTOPHER WOLF, THOMAS M. NEWSOME, MAURO GALETTI, MOHAMMED ALAMGIR, EILEEN CRIST, MAHMOUD I. MAHMOUD, WILLIAM F. LAURANCE, and 15,364 scientist signatories from 184 countries

C'est une alerte solennelle que publient, lundi 13 novembre 2017 dans la revue BioScience, plus de 15 000 scientifiques de 184 pays.

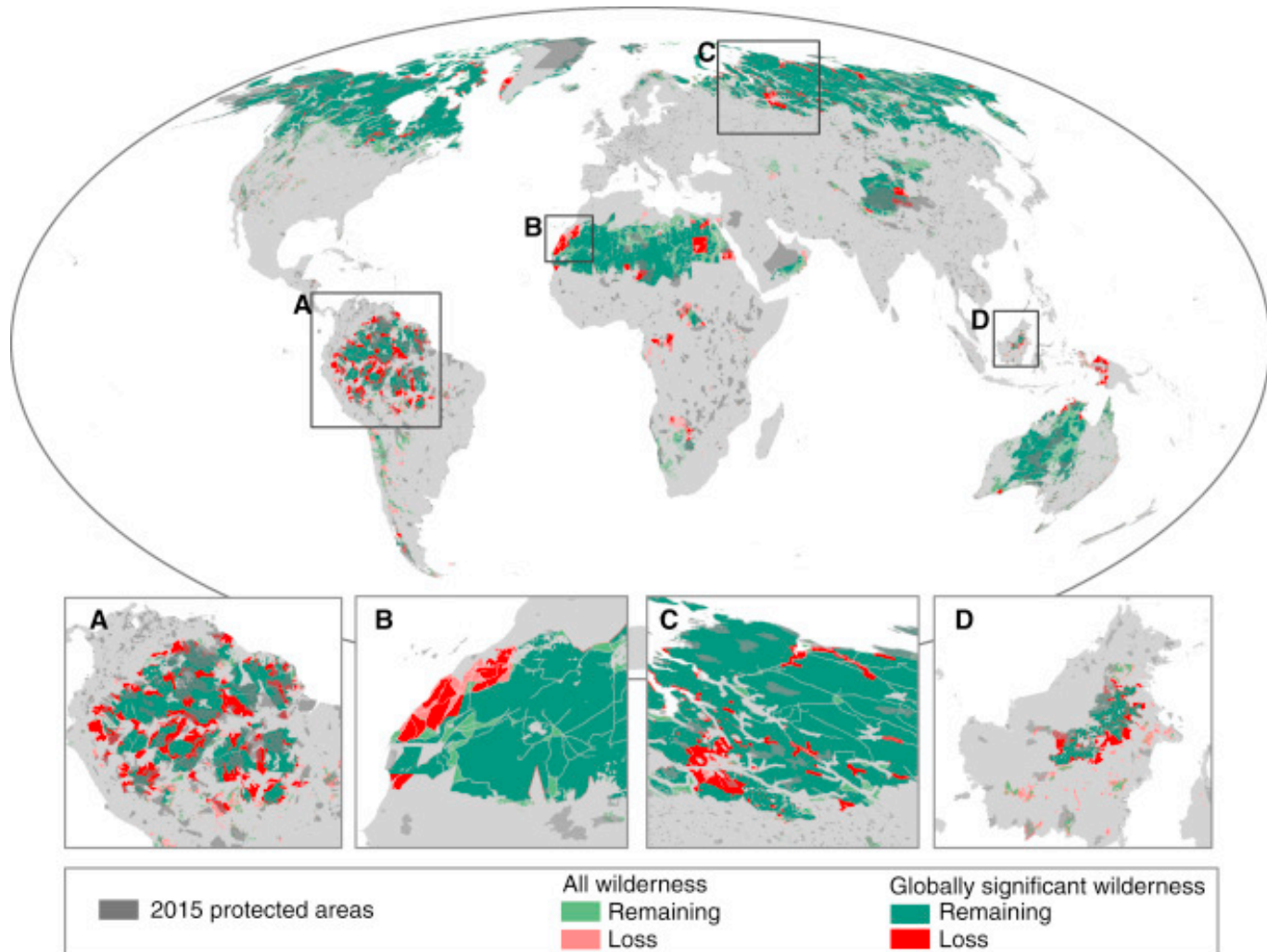
Biologistes, physiciens, astronomes, chimistes ou -encore agronomes, spécialistes du climat ou des océans, de zoologie ou d'halieutique, les auteurs mettent en garde contre la destruction rapide du monde naturel et le danger de voir l'humanité pousser « *les écosystèmes au-delà de leurs capacités à entretenir le tissu de la vie* ».

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# Occupation des terres

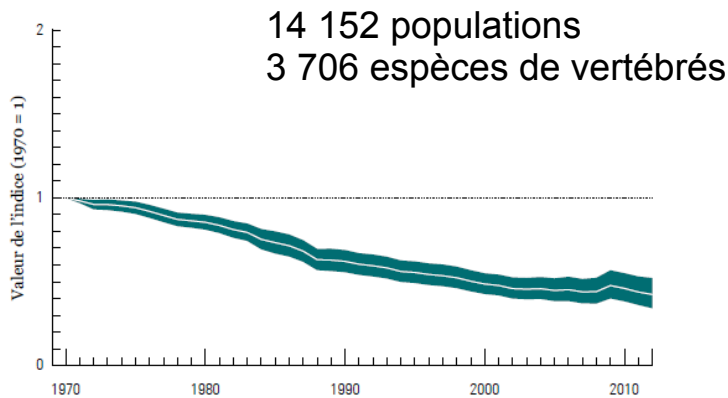


# En vingt ans, la Terre a perdu un dixième de ses espaces sauvages

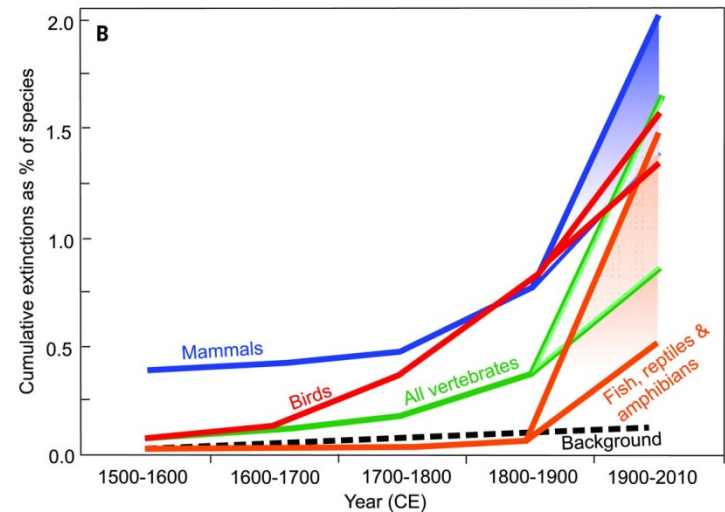


# Impact anthropique sur le vivant

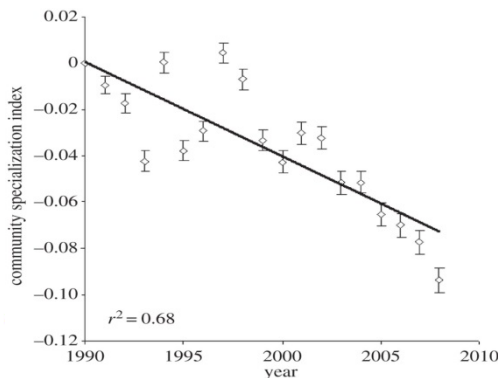
## Effondrement des abondances



## Accélération des extinctions



## Homogénéisation biotique



Le Viol *et al.*  
*Biology letters*, 2012

Waters *et al.* *Science*, 2016



# Impact anthropique sur le vivant

## Biological annihilation via the ongoing sixth mass extinction signaled by vertebrate population losses and declines

Gerardo Ceballos<sup>a,1</sup>, Paul R. Ehrlich<sup>b,1</sup>, and Rodolfo Dirzo<sup>b</sup>

<sup>a</sup>Instituto de Ecología, Universidad Nacional Autónoma de México, Mexico City 04510, Mexico; and <sup>b</sup>Department of Biology, Stanford University, Stanford, CA 94305

Contributed by Paul R. Ehrlich, May 23, 2017 (sent for review March 28, 2017; reviewed by Thomas E. Lovejoy and Peter H. Raven)

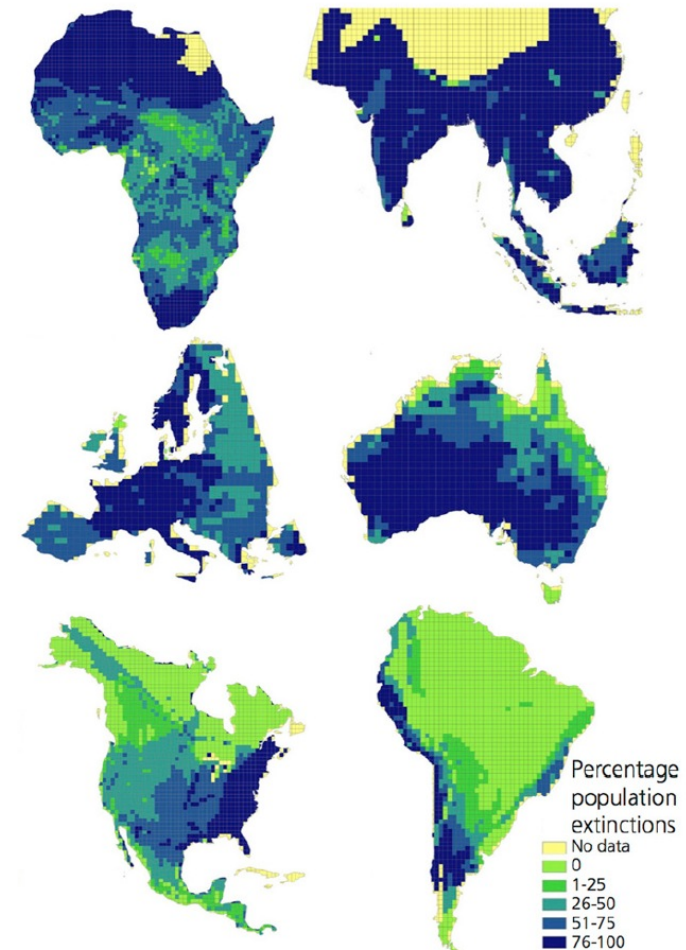
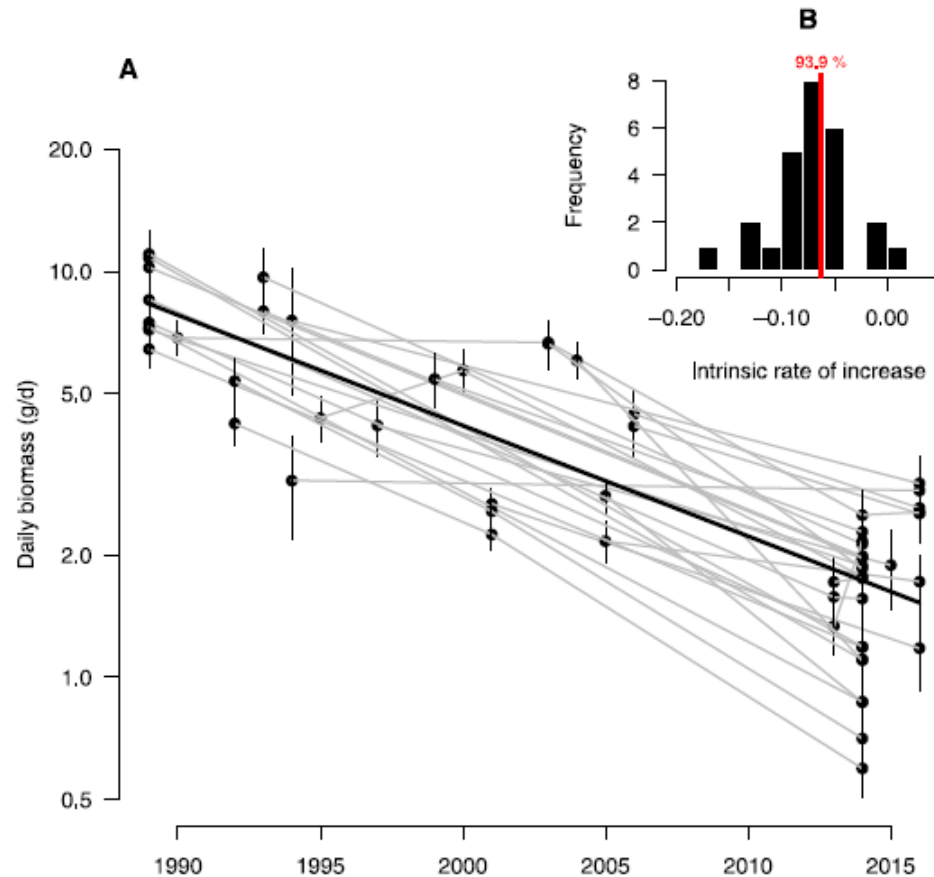


Fig. 6. Percentage of local population extinction in 177 species of mammals in  $1^\circ \times 1^\circ$  quadrats, as an indication of the severity of the mass extinction crises. The maps were generated by comparing historic and current geographic ranges (49) (*SI Appendix, SI Methods*). Note that large regions in all continents have lost 50% or more of the populations of the evaluated mammals. Because of the small sample size, biased to large mammal species, this figure can only be used to visualize likely trends in population losses.

# Impact anthropique sur le vivant



Hallmann, et al. (2017) PLoS ONE 12 (10): e0185809



**Fig 4. Temporal distribution of insect biomass at selected locations.** (A) Daily biomass (mean  $\pm 1$  se) across 26 locations sampled in multiple years (see [S4 Fig](#) for seasonal distributions). (B) Distribution of mean annual rate of decline as estimated based on plot specific log-linear models (annual trend coefficient =  $-0.053$ ,  $sd = 0.002$ , i.e. 5.2% annual decline).

# Impact anthropique sur le vivant

Impacts humains croissants

$$I = P \times A \times T$$

Ehrlich P.R., *TREE*, 2009

- Perte et fragmentation d'habitats (45%)
- Surexploitation (37%)
- Introduction d'espèces invasives (5%)
- Pollutions (4%)
- Changements climatiques (7%)



# BIG KILLERS

Overexploitation and agriculture are the most prevalent threats facing the 8,688 threatened or near-threatened species from comprehensively assessed species groups on the IUCN Red List.

## OVER-EXPLOITATION

6,241  
SPECIES  
AFFECTED

More than 80% of species analysed are harmed by more than one sub-class threat.

4,049  
SPECIES  
AFFECTED

LOGGING

1,680

HUNTING

1,118

FISHING

557

GATHERING  
PLANTS

## AGRICULTURAL ACTIVITY

5,407

4,692

CROP FARMING

2,267

LIVESTOCK  
FARMING

730

TIMBER  
PLANTATIONS

112

AQUACULTURE

## URBAN DEVELOPMENT

3,014

2,616

HOUSING

950

TOURISM AND  
RECREATION

907

INDUSTRIAL

## INVASION AND DISEASE

2,298

2,084

INVASIVE  
SPECIES

264

PROBLEMATIC  
NATIVE SPECIES

14

INTRODUCED  
GENETIC  
MATERIAL

## POLLUTION

1,901

1,523

AGRICULTURE

879

DOMESTIC  
WASTE

807

INDUSTRIAL

454

AIRBORNE

## SYSTEM MODIFICATION

1,865

1,269

FIRE

562

DAMS

167

OTHER

## CLIMATE CHANGE

1,688

716

STORMS AND  
FLOODING

685

HABITAT  
MODIFICATION

578

EXTREME  
TEMPERATURES

347

DROUGHT

The **Sumatran rhinoceros** (*Dicerorhinus sumatrensis*) and **Western gorilla** (*Gorilla gorilla*) are being harmed by overexploitation; Africa's **cheetah** (*Acinonyx jubatus*) and Asia's **hairy-nosed otter** (*Lutra sumatrana*) are being imperilled by agricultural activity.

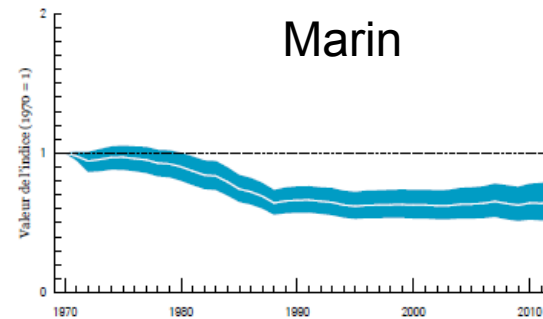
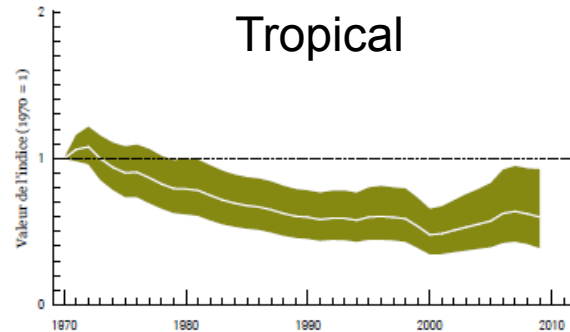
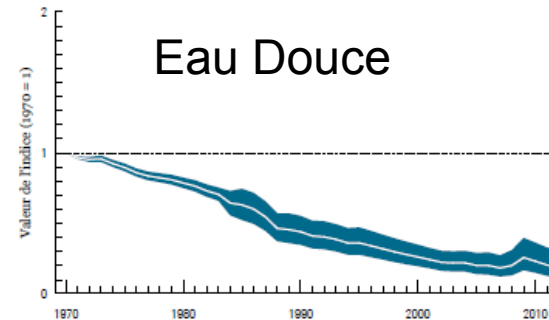
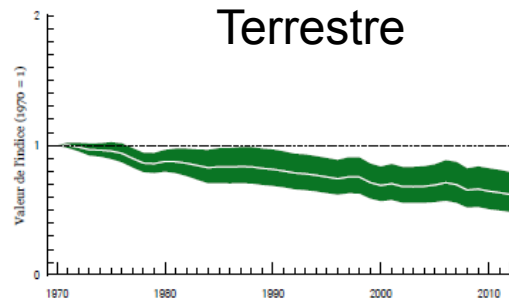
The **common hippopotamus** (*Hippopotamus amphibius*) and **leatherback turtle** (*Dermochelys coriacea*) are being affected by droughts and high temperatures.





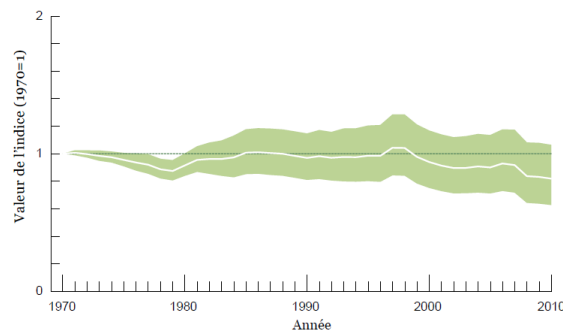
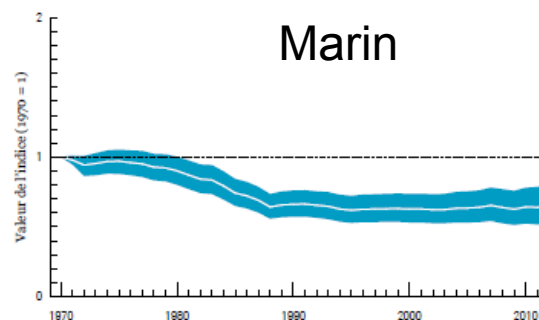
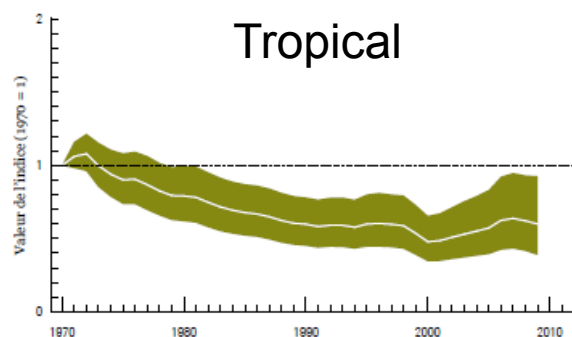
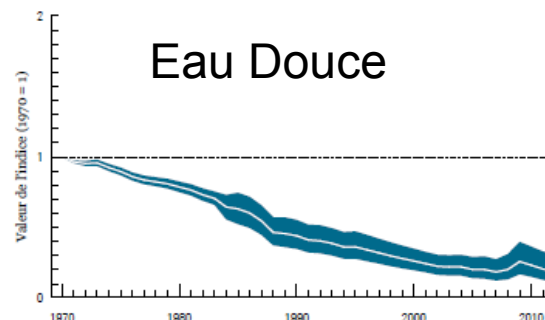
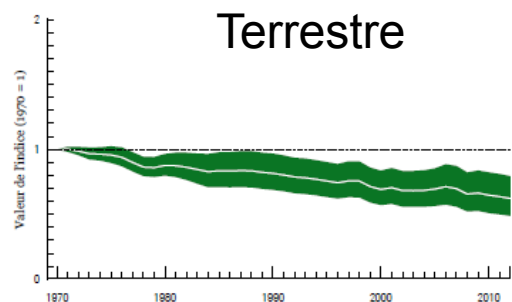
|                               | Estimated<br>Number of<br>described<br>species <sup>1</sup> | Number of<br>species<br>evaluated by<br>2017 (IUCN<br>Red List<br>version 2017-2) | Number of<br>threatened<br>species <sup>2</sup> in<br>2017 (IUCN Red<br>List version<br>2017-2) | Species<br>evaluated in<br>2017, as % of<br>species<br>described <sup>2,3</sup> | Lower estimate of %<br>threatened species<br>in 2017<br>(number threatened as<br>% of extant evaluated<br>species) <sup>2,3,4</sup> | Best estimate of %<br>threatened species<br>in 2017<br>(number threatened as<br>% of extant data<br>sufficient evaluated<br>species) <sup>2,3,4</sup> | Upper estimate of %<br>threatened species<br>in 2017<br>(number threatened +<br>DD as % of extant<br>evaluated species) <sup>2,3,4</sup> |
|-------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| <b>VERTEBRATES</b>            |                                                             |                                                                                   |                                                                                                 |                                                                                 |                                                                                                                                     |                                                                                                                                                       |                                                                                                                                          |
| Mammals <sup>5</sup>          | 5,644                                                       | 5,644                                                                             | 1,196                                                                                           | 100%                                                                            | 21%                                                                                                                                 | 25%                                                                                                                                                   | 36%                                                                                                                                      |
| Birds                         | 11,121                                                      | 11,121                                                                            | 1,480                                                                                           | 100%                                                                            | 13%                                                                                                                                 | 13%                                                                                                                                                   | 14%                                                                                                                                      |
| Reptiles                      | 10,450                                                      | 5,847                                                                             | 1,185                                                                                           | 56%                                                                             |                                                                                                                                     | Insufficient coverage                                                                                                                                 |                                                                                                                                          |
| Amphibians                    | 7,696                                                       | 6,582                                                                             | 2,100                                                                                           | 86%                                                                             | 32%                                                                                                                                 | 42%                                                                                                                                                   | 55%                                                                                                                                      |
| Fishes                        | 33,600                                                      | 16,197                                                                            | 2,371                                                                                           | 48%                                                                             |                                                                                                                                     | Insufficient coverage                                                                                                                                 |                                                                                                                                          |
| <b>Subtotal</b>               | <b>68,511</b>                                               | <b>45,391</b>                                                                     | <b>8,312</b>                                                                                    | <b>66%</b>                                                                      |                                                                                                                                     |                                                                                                                                                       |                                                                                                                                          |
| <b>INVERTEBRATES</b>          |                                                             |                                                                                   |                                                                                                 |                                                                                 |                                                                                                                                     |                                                                                                                                                       |                                                                                                                                          |
| Insects                       | 1,000,000                                                   | 7,100                                                                             | 1,338                                                                                           | 0.7%                                                                            |                                                                                                                                     | Insufficient coverage                                                                                                                                 |                                                                                                                                          |
| Molluscs                      | 85,000                                                      | 7,276                                                                             | 1,984                                                                                           | 9%                                                                              |                                                                                                                                     | Insufficient coverage                                                                                                                                 |                                                                                                                                          |
| Crustaceans <sup>5</sup>      | 47,000                                                      | 3,177                                                                             | 732                                                                                             | 7%                                                                              |                                                                                                                                     | Insufficient coverage                                                                                                                                 |                                                                                                                                          |
| Corals                        | 2,175                                                       | 864                                                                               | 237                                                                                             | 40%                                                                             |                                                                                                                                     | Insufficient coverage                                                                                                                                 |                                                                                                                                          |
| Arachnids                     | 102,248                                                     | 249                                                                               | 170                                                                                             | 0.24%                                                                           |                                                                                                                                     | Insufficient coverage                                                                                                                                 |                                                                                                                                          |
| Velvet Worms                  | 165                                                         | 11                                                                                | 9                                                                                               | 7%                                                                              |                                                                                                                                     | Insufficient coverage                                                                                                                                 |                                                                                                                                          |
| Horseshoe Crabs               | 4                                                           | 4                                                                                 | 1                                                                                               | 100%                                                                            | 25%                                                                                                                                 | 100%                                                                                                                                                  | 100%                                                                                                                                     |
| Others                        | 68,658                                                      | 773                                                                               | 143                                                                                             | 1.13%                                                                           |                                                                                                                                     | Insufficient coverage                                                                                                                                 |                                                                                                                                          |
| <b>Subtotal</b>               | <b>1,305,250</b>                                            | <b>19,454</b>                                                                     | <b>4,614</b>                                                                                    | <b>1%</b>                                                                       |                                                                                                                                     |                                                                                                                                                       |                                                                                                                                          |
| <b>PLANTS <sup>7</sup></b>    |                                                             |                                                                                   |                                                                                                 |                                                                                 |                                                                                                                                     |                                                                                                                                                       |                                                                                                                                          |
| Mosses <sup>8</sup>           | 16,236                                                      | 102                                                                               | 76                                                                                              | 0.6%                                                                            |                                                                                                                                     | Insufficient coverage                                                                                                                                 |                                                                                                                                          |
| Ferns and Allies <sup>9</sup> | 12,000                                                      | 478                                                                               | 246                                                                                             | 4%                                                                              |                                                                                                                                     | Insufficient coverage                                                                                                                                 |                                                                                                                                          |
| Gymnosperms                   | 1,052                                                       | 1,012                                                                             | 401                                                                                             | 96%                                                                             | 40%                                                                                                                                 | 40%                                                                                                                                                   | 42%                                                                                                                                      |
| Flowering Plants              | 268,000                                                     | 21,411                                                                            | 11,370                                                                                          | 8%                                                                              |                                                                                                                                     | Insufficient coverage                                                                                                                                 |                                                                                                                                          |
| Green Algae <sup>10</sup>     | 6,050                                                       | 13                                                                                | 0                                                                                               | 0.2%                                                                            |                                                                                                                                     | Insufficient coverage                                                                                                                                 |                                                                                                                                          |
| Red Algae <sup>10</sup>       | 7,104                                                       | 58                                                                                | 9                                                                                               | 0.8%                                                                            |                                                                                                                                     | Insufficient coverage                                                                                                                                 |                                                                                                                                          |
| <b>Subtotal</b>               | <b>310,442</b>                                              | <b>23,074</b>                                                                     | <b>12,102</b>                                                                                   | <b>7%</b>                                                                       |                                                                                                                                     |                                                                                                                                                       |                                                                                                                                          |
| <b>FUNGI &amp; PROTISTS</b>   |                                                             |                                                                                   |                                                                                                 |                                                                                 |                                                                                                                                     |                                                                                                                                                       |                                                                                                                                          |
| Lichens                       | 17,000                                                      | 8                                                                                 | 7                                                                                               | 0.05%                                                                           |                                                                                                                                     | Insufficient coverage                                                                                                                                 |                                                                                                                                          |
| Mushrooms                     | 31,496                                                      | 25                                                                                | 21                                                                                              | 0.079%                                                                          |                                                                                                                                     | Insufficient coverage                                                                                                                                 |                                                                                                                                          |
| Brown Algae <sup>10</sup>     | 3,784                                                       | 15                                                                                | 6                                                                                               | 0.4%                                                                            |                                                                                                                                     | Insufficient coverage                                                                                                                                 |                                                                                                                                          |
| <b>Subtotal</b>               | <b>52,280</b>                                               | <b>48</b>                                                                         | <b>34</b>                                                                                       | <b>0.09%</b>                                                                    |                                                                                                                                     |                                                                                                                                                       |                                                                                                                                          |
| <b>TOTAL</b>                  | <b>1,736,483</b>                                            | <b>87,967</b>                                                                     | <b>25,062</b>                                                                                   | <b>5%</b>                                                                       |                                                                                                                                     |                                                                                                                                                       |                                                                                                                                          |

# Impact anthropique sur le vivant





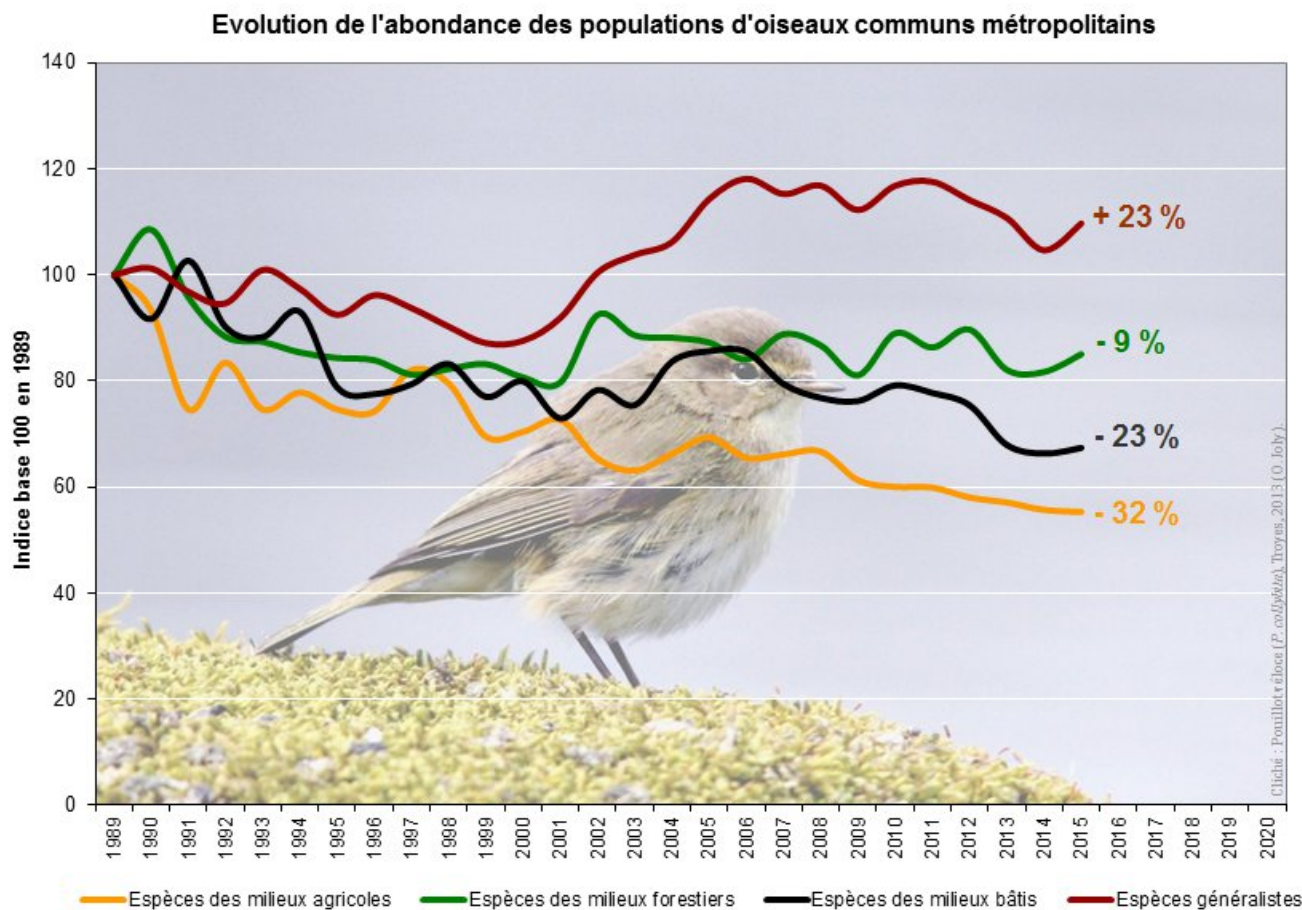
# Impact anthropique sur le vivant



**Figure 16 : Indice Planète Vivante<sup>®</sup> terrestre des populations localisées dans les aires protégées** enregistrent un déclin de 18 % entre 1970 et 2010. Ce déclin reflète les tendances de 1 956 populations de 773 espèces de mammifères, d'oiseaux, de reptiles, et d'amphibiens (WWF, ZSL, 2014).

— Indice Planète Vivante<sup>®</sup> terrestre dans les zones protégées  
— Intervalle de confiance

# Indicateur oiseaux communs (cas de la France)



Source : MNHN (CESCO), 2016.

Cet indicateur correspond à la moyenne des taux de variations des populations de 60 espèces communes échantillonnées annuellement de manière standardisée. Ces inventaires visent des oiseaux nicheurs généralistes et spécialistes des milieux agricoles, forestiers et bâtis en métropole.

# Empreinte évolutive

nature  
ecology & evolution

REVIEW ARTICLE

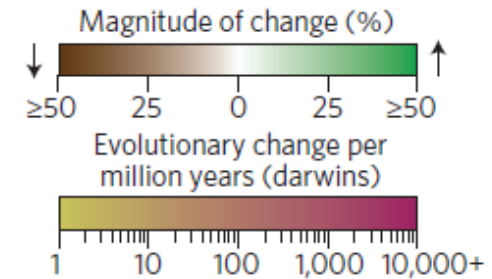
PUBLISHED: 21 FEBRUARY 2017 | VOLUME: 1 | ARTICLE NUMBER: 0065

## Human behaviour as a long-term ecological driver of non-human evolution

Alexis P. Sullivan<sup>1</sup>, Douglas W. Bird<sup>2</sup> and George H. Perry<sup>1,2,3\*</sup>



Domestication



| Species                                                                                                          | Human activity                                                                    | Timeframe         | Affected phenotype | Magnitude of change | Evol. rate (darwins) |
|------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------|--------------------|---------------------|----------------------|
|  Barley<br><i>Hordeum vulgare</i> |  | ~4 kyr BP–Present | Grain weight       | +256%               | 238                  |

# Empreinte évolutive

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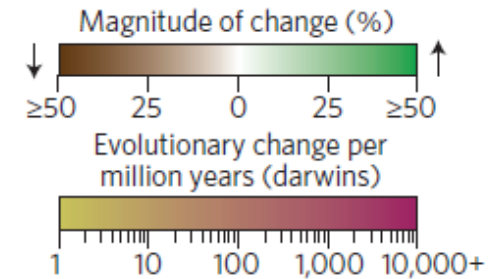
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|----------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|----------------------|
|  Barley<br><i>Hordeum vulgare</i>            |                                                                                                                                                                                                                                                 | ~4 kyr BP–Present                                                                                                                                                                                                                                                                            | Grain weight                                                                                                                                                                                                                                                                                                              | +256%               | 238                  |
|                                                                                                                            |  Trophy hunting<br> Net/trap fishing<br> Habitat modification/urbanization |  Hunting<br> Angling<br> Translocation |  Plant harvesting<br> Invertebrate harvesting<br> Defaunation |                     |                      |
|  Bighorn sheep<br><i>Ovis canadensis</i>   |                                                                                                                                                                                                                                               | 1972–2002 (30 years)                                                                                                                                                                                                                                                                         | Male horn length<br>Male body mass                                                                                                                                                                                                                                                                                        | –31%                | 12,126               |
|  Sheephead<br><i>Semicossyphus pulcher</i> |                                                                                                                                                                                                                                               | 1969–1998 (29 years)                                                                                                                                                                                                                                                                         | Body mass                                                                                                                                                                                                                                                                                                                 | –41%                | 18,018               |
|  Palm seeds<br><i>Euterpe edulis</i>       |                                                                                                                                                                                                                                               | Present day (large fauna vs not)                                                                                                                                                                                                                                                             | Seed size                                                                                                                                                                                                                                                                                                                 | –16%                | N/A                  |

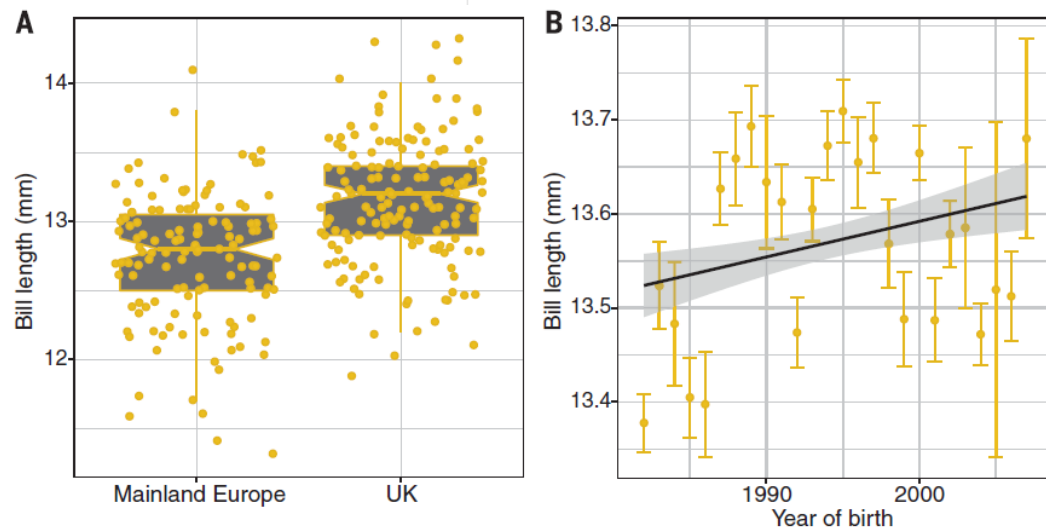
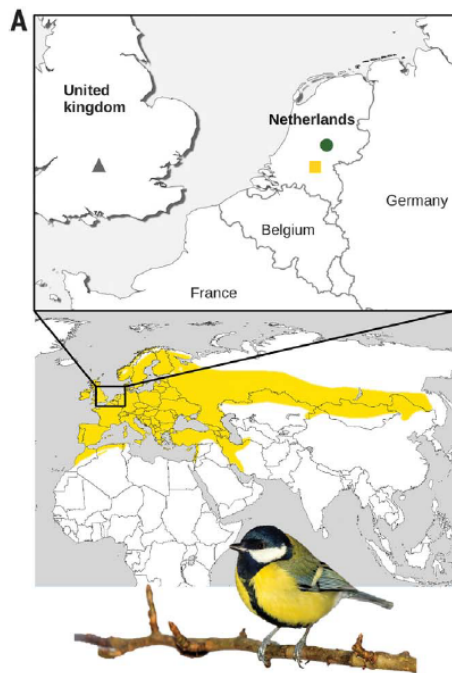
# Empreinte évolutive

## Recent natural selection causes adaptive evolution of an avian polygenic trait

Mirte Bosse<sup>1,2,\*</sup>, Lewis G. Spurgin<sup>3,4,\*</sup>, Veronika N. Laine<sup>1</sup>, Ella F. Cole<sup>3</sup>, Josh A. Firth<sup>3</sup>, Phillip Gienapp<sup>1</sup>, Andrew G. Gosler<sup>3</sup>, ...

\* See all authors and affiliations

Science 20 Oct 2017:  
Vol. 358, Issue 6361, pp. 365-368  
DOI: 10.1126/science.aal3298



**Fig. 4. Spatiotemporal variation in bill length.** (A) Bill lengths of museum samples from the United Kingdom and mainland Europe. (B) Temporal variation in bill length in the Wytham population plotting annual means with standard error from 1982–2007. Line and (narrow) shaded area in (B) are fitted values and 95% confidence limits from a linear regression ( $R^2 = 0.004$ ); there are different scales on axes in (A) and (B).



# Empreinte évolutive

nature  
ecology & evolution

REVIEW ARTICLE

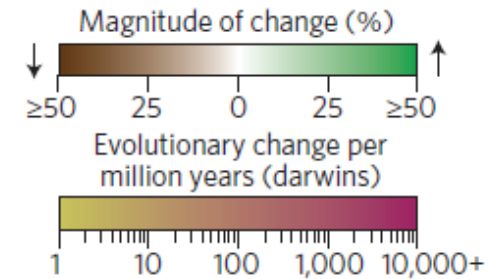
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Domestication



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|-----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------|--------------------|---------------------|----------------------|
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Trophy hunting



Net/trap fishing



Habitat modification/  
urbanization



Hunting



Angling



Translocation



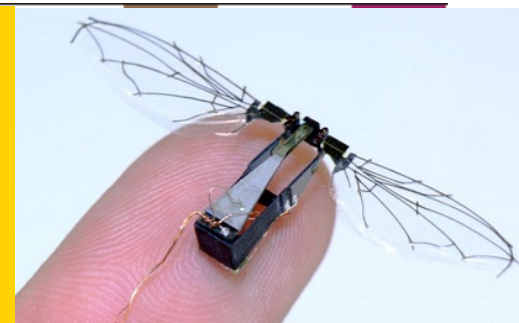
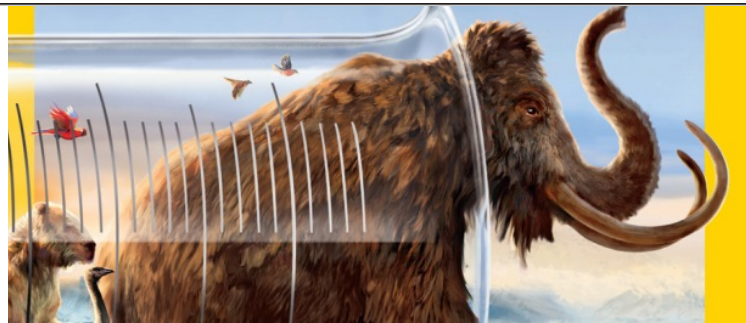
Plant harvesting



Invertebrate harvesting



Defaunation



# Pourquoi sommes-nous concernés ?

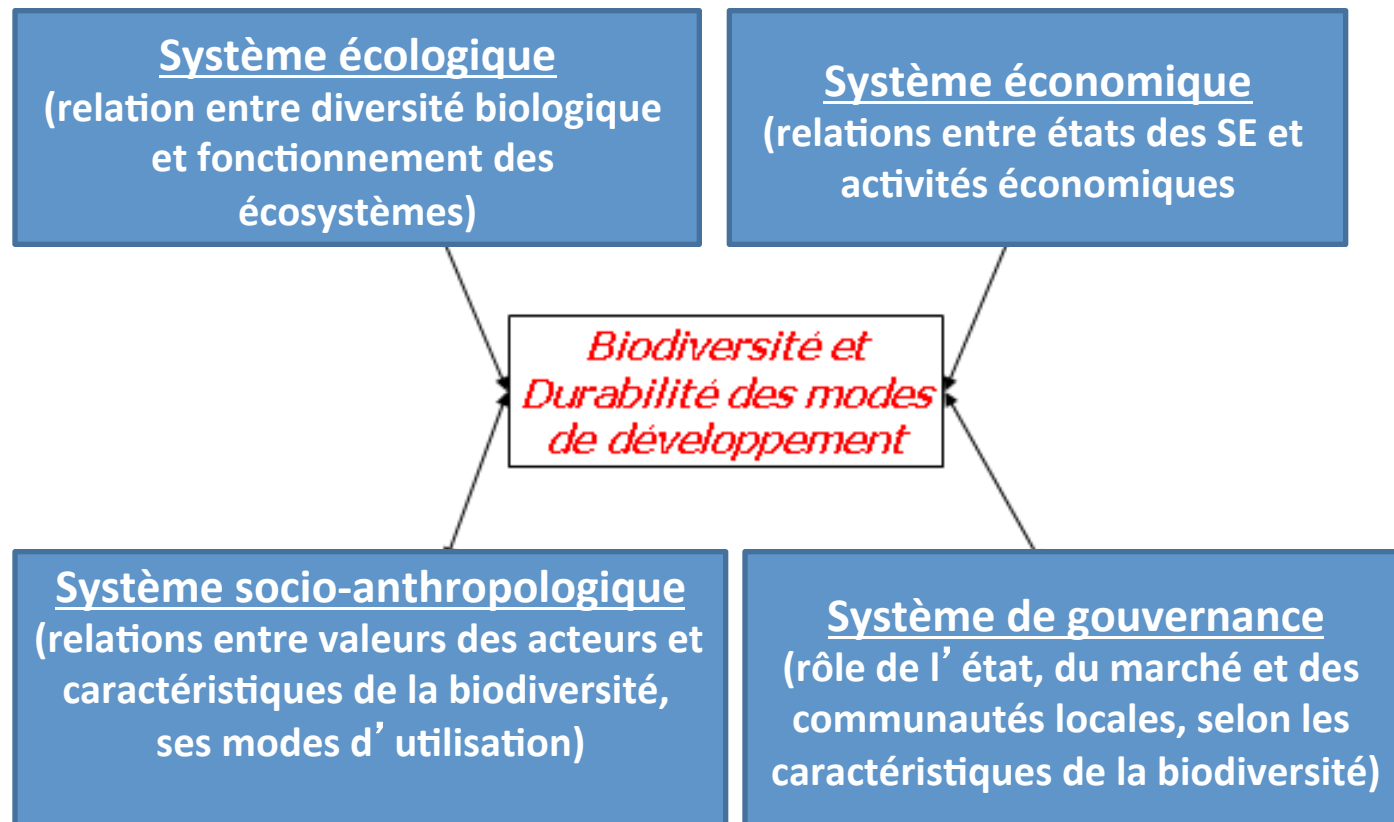


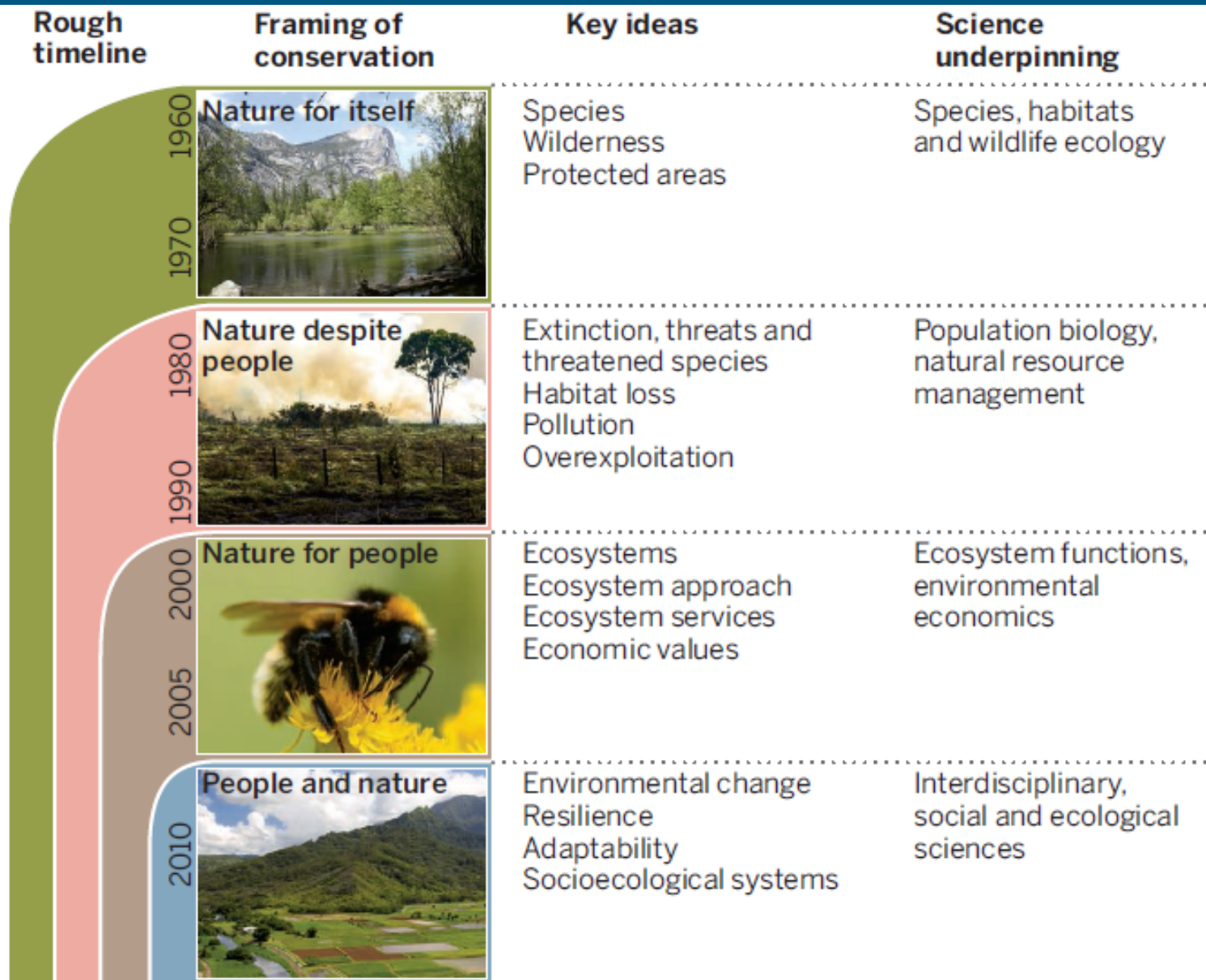
# Pourquoi sommes-nous concernés ?

Difficulté des arbitrages :

- Faut-il conserver la biodiversité ? Pourquoi ? Pour qui ?
  - Peut-on et doit-on conserver la biodiversité tout en nourrissant une population croissante d'individus qui ont une demande de bien être elle-même croissante ?
  - Faut-il conserver la biodiversité pour elle-même ou pour les services qu'elle nous rend ?
  - Faut-il conserver les individus, espèces, populations, communautés ou écosystèmes, la biodiversité remarquable ou ordinaire, commune ou rare ?
  - ....?
-

# Différentes visions, arguments, valeurs





**Changing views of nature and conservation.** Over the past 50 years, the prevailing view of conservation has changed several times, resulting, for example, in a shift in emphasis from species to ecosystems. None of the framings has been eclipsed as new ones have emerged, resulting in multiple framings in use today.

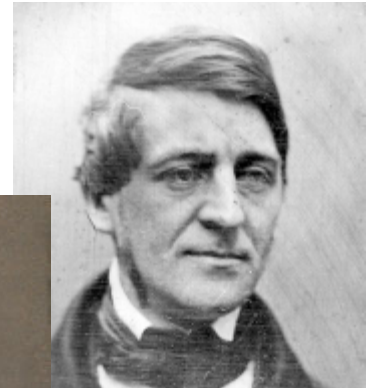


# Nature for itself

## **Ralph Waldo Emerson (1803-1882)**

Philosophe, essayiste, poète

Chef de file des transcendentalistes



## **Henry David Thoreau (1817-1862)**

Naturaliste, en retrait de la société



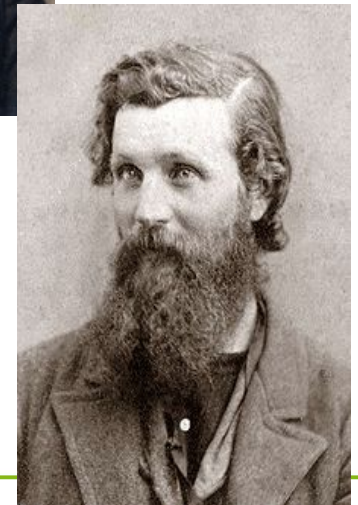
## **John Muir (1838-1914)**

Écrivain, premier naturaliste moderne

Fortes conviction religieuses

Fondateur du Sierra Club, du Parc National Yosemite

Inspirateur de nombreux mouvements de protection de la nature



# Attachement au « monde sauvage » *Wilderness* et *Wildnis* au XIX<sup>ème</sup> siècle



Hetch Hetchy Valley, Parc national de Yosemite  
*Albert Bierstad, 1875*  
Hudson River School



Gorge dans une forêt de sapins  
*Caspar David Friedrich, 1811*

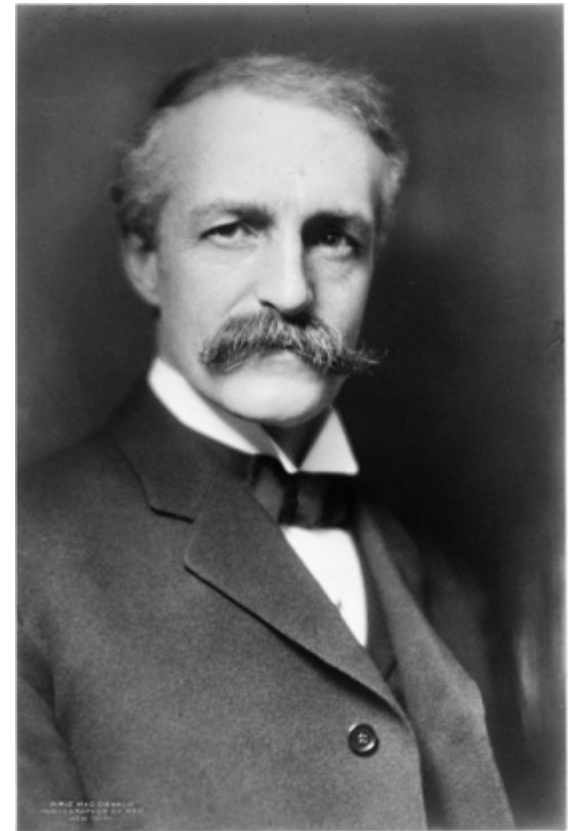
# Nature for people

Gifford Pinchot (1865-1946)

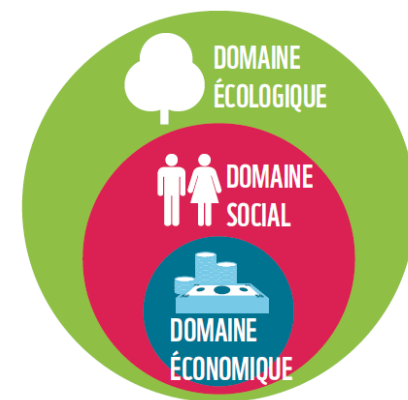
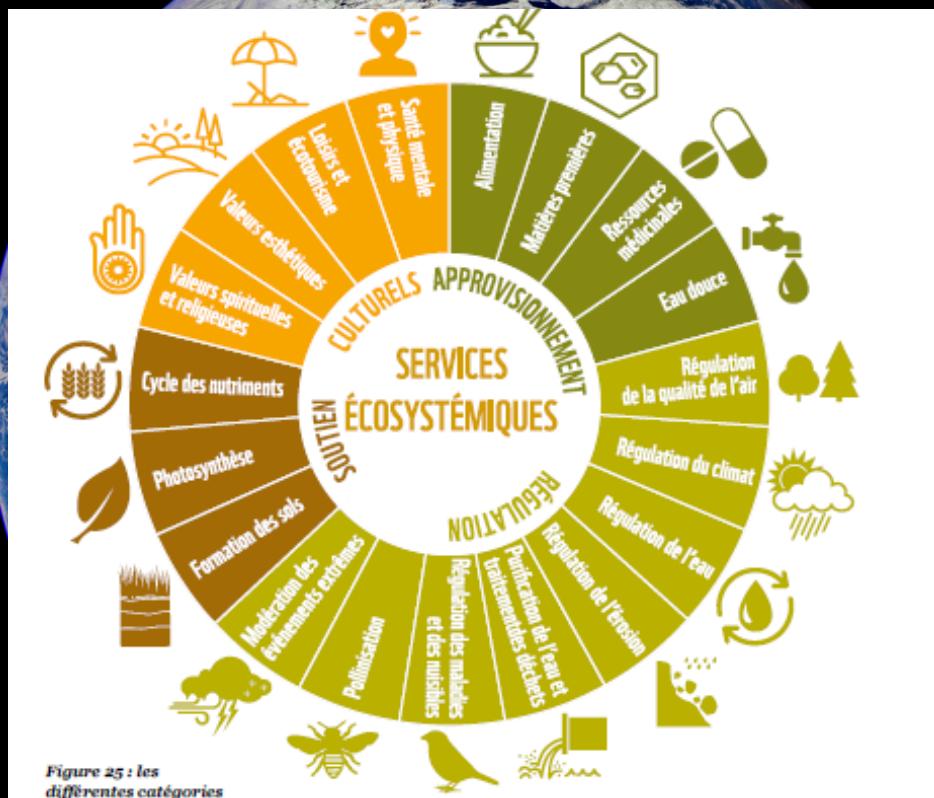
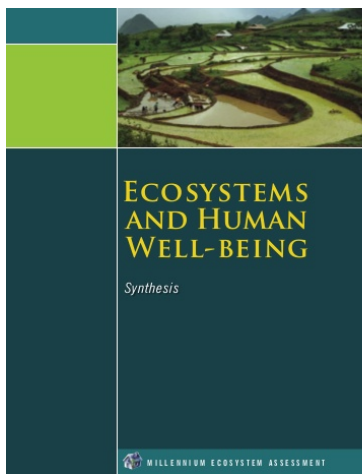
Premier Directeur de l' US Forest Service

"the art of producing from the forest whatever it can yield for the service of man."

Amitiés puis conflit avec Muir en 1897 sur la présence de pastoralisme dans les réserves forestières



# Nature for people



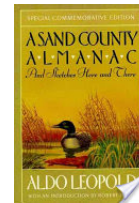
# Vers une éthique environnementale

## Aldo Leopold (1887-1949)

- Forestier, Ecologiste, Environnementaliste
- Approche holiste

### A Sand County Almanac, 1948

- “A thing is right when it tends to preserve the integrity, stability and beauty of the biotic community. It is wrong when it tends otherwise.”
- “It is inconceivable to me that an ethical relation to land can exist without love, respect and admiration, and a high regard for its value. By value, I of course mean something far broader than mere economic value; I mean value in the philosophical sense.”

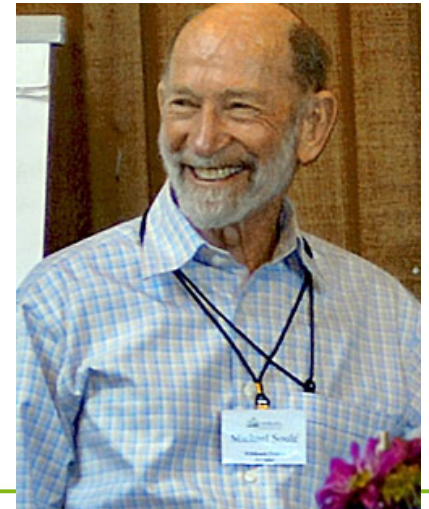




# Fondements éthiques de la conservation

## Michael Soule (1985)

- La diversité des espèces et des communautés biologiques devrait être préservées
- L'extinction précoce des populations et des espèces doit être évitée
- La complexité écologique doit être maintenue
- L'évolution doit se poursuivre
- La diversité biologique a une valeur intrinsèque





# Valeurs instrumentale/intrinsèque : une histoire de fins et de moyens

- Valeur instrumentale (ou extrinsèque)

- Valeur qu'a une entité en fonction du moyen qu'elle constitue pour les fins d'une autre entité
- Définie par l'utilisation réelle ou potentielle de l'entité considérée
- Biens, services, information, ressources psycho-spirituelles
- Mesures notamment économiques

*Justus et al. TREE 2009*

- Valeur intrinsèque (ou non instrumentale)

- Valeur de ce qui est une fin en soi
- Non divisible en catégories
- Valeur objective ou subjective ?
- Comment la mesurer ?

*Vucetich et al. Conserv. Biol. 2015*

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# A qui/quoi conférer de la valeur ?

- Anthropocentrisme
- Biocentrisme
- Ecocentrisme
- Pragmatisme



*Caspar David Friedrich*

# Anthropocentrisme

- Valeur intrinsèque attribuée aux seuls humains
- Valeur instrumentale attribuée au reste de la biodiversité et de la nature (SE)
- Approche centrée sur les « ressources naturelles »
- Justice environnementale : perçue comme une branche des approches anthropocentrées de l'éthique environnementale



© Paul de Barros

# Biocentrisme

Valeur intrinsèque attribuée aux humains et au vivant

Quelle entité a une valeur intrinsèque ?

Individus sensibles (Singer 1975, Regan 1983),

Toute forme de vie (Goodpaster 1978, Taylor 1986)

Gradation (Rolston 1994)

Individus sensibles, humains conscients

Espèces, écosystèmes,

Apport de l'évolution

---

# Ecocentrisme

Valeur intrinsèque à la communauté biotique incluant l'homme

Aldo Leopold (1949)

- “A thing is right when it tends to preserve the integrity, stability and beauty of the biotic community. It is wrong when it tends otherwise.”



John Baird Callicott (2006) « Ethique de la Terre »

- Prise en compte des flux écologiques
- « A thing is right when it tends to disturb the biotic community only at normal spatial and temporal scales. It is wrong when it tends otherwise. »





# Ecocentrisme

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- « A thing is right when it tends to disturb the biotic community only at normal spatial and temporal scales. It is wrong when it tends otherwise. »



**« An action is good when it contributes to maintain or even enhance the evolutionary potential of biological systems »**

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# Pragmatisme

Bryan Norton (1999)

*Pragmatism, adaptive management, and sustainability*

- La valeur intrinsèque n'est pas opérationnelle
- Plaide pour la convergence de la diversité des approches et argumentaires en conservation
- « Si la biodiversité est valorisée parce qu'elle fournit des services écosystémiques, des pools de ressources potentielles, des intérêts esthétique, des enjeux religieux etc, et mobilise des actions en sa faveur alors cela revient au même que de lui attribuer de la valeur intrinsèque. »



# Néanmoins...

- La valeur intrinsèque n'empêche pas l'action (*Fox, Journal of Ecosophy, 1993*)
- Attribuer une valeur intrinsèque au vivant renverse la charge de l'argumentaire en conservation
  - pourquoi conserver ?
  - pourquoi détruire ou laisser détruire ?



# “Old” versus “New conservation” ?

“Old”



M. Soulé

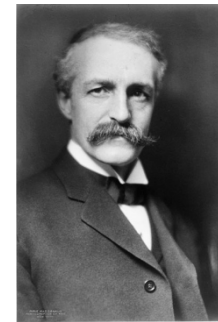


J. Muir

*For Nature*



*For both*



G. Pinchot

*For People*

“New”



P. Kareiva

Biocentrisme, ecocentrisme, anthropocentrisme, pragmatisme...

Quelles sont leurs racines et leurs conséquences à l'échelle de l'histoire du vivant ?

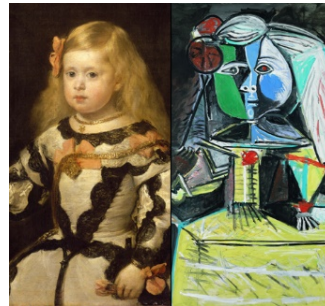
# Nécessité d'une approche évolutive

Mettre en perspective les débats à court terme

- Reconnecter les histoires évolutives des humains et non-humains
- Comprendre les conséquences évolutives des impacts humains
- Comprendre les inerties des trajectoires humaines
- Envisager les scénarios de transitions possibles

# Bien être humain au delà de la valeur adaptative

- Evolution des capacités cognitives, liens sociaux, construction de niche
- Résilients vis-à-vis des fluctuations environnementales
- Energie croissante pour les fonctions sensorielles et cognitives au-delà de gains en valeur adaptative
- Conscience individuelle et recherche de bien-être
- Emancipation phénotypique ?





# Bien être humain au delà de la valeur adaptative

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- Conscience individuelle et recherche de bien-être
- Emancipation phénotypique ?



# Quelles interactions humains / non-humains ?

# Quelles interactions humains / non-humains ?

## SHOULD WE ...

abandon attempts  
at biodiversity  
conservation?

# Quelles interactions humains / non-humains ?

## Roots

### SHOULD WE ...

INTRINSIC VALUE

CONSERVATION

WILDERNESS

abandon attempts  
at biodiversity  
conservation?

None

None

None

# Quelles interactions humains / non-humains ?

|                                                | Roots           |              |            | Challenges                                                                                                                                                 |
|------------------------------------------------|-----------------|--------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SHOULD WE ...                                  | INTRINSIC VALUE | CONSERVATION | WILDERNESS | ECOSYSTEM SERVICES (ES)                                                                                                                                    |
| abandon attempts at biodiversity conservation? | None            | None         | None       | Runaway consumption of biodiversity resources<br><br>Blind Anthropocene |

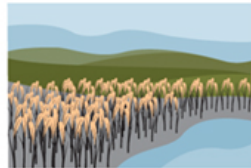
# Quelles conséquences sociales ?

- Anthropocene aveugle
  - Accroissement des inégalités
  - Dérégulations
  - Refus des justices environnementales
  - Scénarios malthusiens
  - Surcompensation

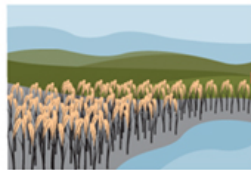




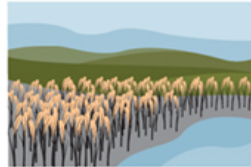
# Quelles interactions humains / non-humains ?

|                                                          | Roots           |              |            | Challenges                                    |                                                                                                               |
|----------------------------------------------------------|-----------------|--------------|------------|-----------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| SHOULD WE ...                                            | INTRINSIC VALUE | CONSERVATION | WILDERNESS | ECOSYSTEM SERVICES (ES)                       |                                                                                                               |
| abandon attempts at biodiversity conservation?           | None            | None         | None       | Runaway consumption of biodiversity resources |  <b>Blind Anthropocene</b> |
| conserve for the resilience of future human generations? | Human fitness   |              | None       | Long-term provisioning and regulating ES      |                            |

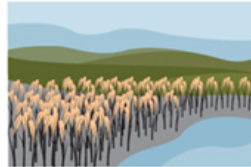
# Quelles interactions humains / non-humains ?

|                                                             | Roots            |              |                   | Challenges                                    |                                                                                                               |
|-------------------------------------------------------------|------------------|--------------|-------------------|-----------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| SHOULD WE ...                                               | INTRINSIC VALUE  | CONSERVATION | WILDERNESS        | ECOSYSTEM SERVICES (ES)                       |                                                                                                               |
| abandon attempts at biodiversity conservation?              | None             | None         | None              | Runaway consumption of biodiversity resources |  <b>Blind Anthropocene</b> |
| conserve for the resilience of future human generations?    | Human fitness    |              | None              | Long-term provisioning and regulating ES      |                            |
| conserve for the immediate well-being of human individuals? | Human well-being |              | Scenic wilderness | Short-term provisioning and cultural ES       |                            |

# Quelles interactions humains / non-humains ?

|                                                             | Roots                        |              |                   | Challenges                                          |                                                                                                        |
|-------------------------------------------------------------|------------------------------|--------------|-------------------|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| SHOULD WE ...                                               | INTRINSIC VALUE              | CONSERVATION | WILDERNESS        | ECOSYSTEM SERVICES (ES)                             |                                                                                                        |
| abandon attempts at biodiversity conservation?              | None                         | None         | None              | Runaway consumption of biodiversity resources       |  Blind Anthropocene |
| conserve for the resilience of future human generations?    | Human fitness                |              | None              | Long-term provisioning and regulating ES            |                     |
| conserve for the immediate well-being of human individuals? | Human well-being             |              | Scenic wilderness | Short-term provisioning and cultural ES             |                     |
| conserve for the well-being of future human generations?    | Human well-being and fitness |              | Scenic wilderness | Long-term provisioning, regulating, and cultural ES |                    |

# Quelles interactions humains / non-humains ?

|                                                             | Roots                        |                                                                                    |                   | Challenges                                          |                                                                                                             |
|-------------------------------------------------------------|------------------------------|------------------------------------------------------------------------------------|-------------------|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| SHOULD WE ...                                               | INTRINSIC VALUE              | CONSERVATION                                                                       | WILDERNESS        | ECOSYSTEM SERVICES (ES)                             |                                                                                                             |
| abandon attempts at biodiversity conservation?              | None                         | None                                                                               | None              | Runaway consumption of biodiversity resources       |  Blind Anthropocene      |
| conserve for the resilience of future human generations?    | Human fitness                |  | None              | Long-term provisioning and regulating ES            |                          |
| conserve for the immediate well-being of human individuals? | Human well-being             |                                                                                    | Scenic wilderness | Short-term provisioning and cultural ES             |  Deliberate Anthropocene |
| conserve for the well-being of future human generations?    | Human well-being and fitness |                                                                                    | Scenic wilderness | Long-term provisioning, regulating, and cultural ES |                         |

# Quelles conséquences sociales ?

- Anthropocène délibéré: valeur adaptative humaine
  - Focus sur la démographie et la génétique humaine
  - Minimisation des arguments de bien être
  - Régulations centrées sur la cellule familiale, le groupe ethnique
  - Mobilisations des valeurs sacralisant la reproduction
  - Transhumanisme reproductif (clonage, eugenisme...)
  - Travail, domestication et maîtrise de l'environnement au service des générations futures



# Quelles conséquences sociales ?

- Anthropocène délibéré: bien être humain
  - Accroissement des inégalités
  - Régulations centrées sur la recherche de plaisir
  - Transhumanisme du bien être (longévité, jeunesse)
  - Pas de justice environnementale entre générations
  - Echec à court ou moyen terme ?



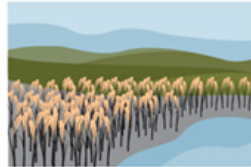


# Quelles conséquences sociales ?

- Anthropocène délibéré: bien être et valeur adaptative
  - Développement durable
  - Régulations centrées sur le devenir des groupes humains
  - Conservation et restauration du « capital naturel »
  - Justice environnementale y compris intergénérationnelle
  - Gestion de l'environnement au service du bien être des générations futures



# Quelles interactions humains / non-humains ?

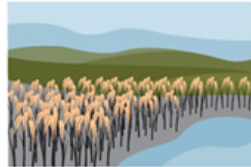
|                                                                     | Roots                                            |                                                                                    |                            | Challenges                                          |                                                                                                                                 |
|---------------------------------------------------------------------|--------------------------------------------------|------------------------------------------------------------------------------------|----------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| SHOULD WE ...                                                       | INTRINSIC VALUE                                  | CONSERVATION                                                                       | WILDERNESS                 | ECOSYSTEM SERVICES (ES)                             |                                                                                                                                 |
| abandon attempts at biodiversity conservation?                      | None                                             | None                                                                               | None                       | Runaway consumption of biodiversity resources       |  Blind Anthropocene                          |
| conserve for the resilience of future human generations?            | Human fitness                                    |  | None                       | Long-term provisioning and regulating ES            |                                              |
| conserve for the immediate well-being of human individuals?         | Human well-being                                 |                                                                                    | Scenic wilderness          | Short-term provisioning and cultural ES             |  Deliberate Anthropocene                     |
| conserve for the well-being of future human generations?            | Human well-being and fitness                     |                                                                                    | Scenic wilderness          | Long-term provisioning, regulating, and cultural ES |                                             |
| conserve for the well-being of future human generations and nature? | Human well-being and fitness<br>Nonhuman fitness | Evocentric                                                                         | Wildness beyond wilderness | Long-term evolutionary trajectories beyond ES       |  Deliberate overcoming of the Anthropocene |

# Quelles interactions humains / non-humains ?

- Dépassement de l'Anthropocène : approche évocentrée
  - Qui peut le plus peut le moins ?
  - Respect des processus darwiniens chez les non-humains
  - Respect des choix individuels et droits humains actuels et futurs
  - Régulations fortes pour réduire notre empreinte évolutive
  - Intenable hors de choix délibérés
  - Justice environnementale
  - Justice sociale



# Quelles interactions humains / non-humains ?

|                                                                     | Roots                                            |                 |                            | Challenges                                          |                                                                                                                                 | Consequences             |         |
|---------------------------------------------------------------------|--------------------------------------------------|-----------------|----------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|--------------------------|---------|
| SHOULD WE ...                                                       | INTRINSIC VALUE                                  | CONSERVATION    | WILDERNESS                 | ECOSYSTEM SERVICES (ES)                             |                                                                                                                                 | EVOLUTIONARY TRANSITIONS | IMPACTS |
| abandon attempts at biodiversity conservation?                      | None                                             | None            | None                       | Runaway consumption of biodiversity resources       |  Blind Anthropocene                          | Minor                    | Major   |
| conserve for the resilience of future human generations?            | Human fitness                                    |                 | None                       | Long-term provisioning and regulating ES            |                                              |                          |         |
| conserve for the immediate well-being of human individuals?         | Human well-being                                 | Anthropocentric | Scenic wilderness          | Short-term provisioning and cultural ES             |  Deliberate Anthropocene                     |                          |         |
| conserve for the well-being of future human generations?            | Human well-being and fitness                     |                 | Scenic wilderness          | Long-term provisioning, regulating, and cultural ES |                                             |                          |         |
| conserve for the well-being of future human generations and nature? | Human well-being and fitness<br>Nonhuman fitness | Evocentric      | Wildness beyond wilderness | Long-term evolutionary trajectories beyond ES       |  Deliberate overcoming of the Anthropocene | Major                    | Minor   |

# Quelles interactions humains / non-humains ?

- Eviter les pressions de sélection directionnelles des échelles locales aux échelles globales
  - Eviter les extinctions ciblées sur les espèces ou communautés pour réduire les impacts sur les trajectoires évolutives
  - Poser les questions relatives aux : socio-écosystèmes, espaces protégés, agro-écosystèmes, services-écosystémique, nature-based solutions, biotechnologies, à la biologie synthétique, etc... dans une perspective évolutive
  - Implications éthiques
    - Prise en compte des droits humains et capacités
    - Identification des convergences et conflits avec des considerations non-scientifiques
  - Implications pour la recherche
    - Approches transdisciplinaires sciences de l'Homme et des sociétés, écologie, évolution
-