WFB 074 – Lecture 4

Readings for Lectures 3 & 4 (Week 2)

Curry -Lindahl, K. 1974. The conservation story in Africa during the 1960s. Biological Conservation 6:170-178.

Wilcove, D. S. 1999. *The Condor's Shadow: the Loss and Recovery of Wildlife in America.* Introduction*: The Arrival* pp. 1-13. New York: W. H. Freeman and Co.

Fraser, C. 2009. *Rewilding the World.* Introduction: *The Predicta Moth*

Soulé, M. E. 1985. What is conservation biology? BioScience 35:727-734.

Orr, D. W. 1995. Conservation and conservatism. Conservation Biology **9**:242-245.

Grzimek, M. and B. Grzimek. 1960. Census of plains animals in the Serengeti National Park. Journal of Wildlife Management **24**: 27-37.

Next Reading Quiz: Tuesday, Jan 31

Field Trip

Total Responses: 49/77

Biodôme Montreal:	26 – YES	19 - NO
Roger Williams Park Zoo, RI:	23 – YES	21 - NO

(End of Lecture 3:)

Society for Conservation Biology

1. What is Conservation Biology?

2. Importance of Biodiversity

3. A Classic Example of "Fortress Conservation": *Serengeti shall not die*

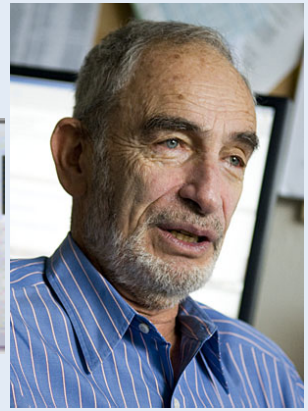


The Society for Conservation Biology

1978 - Stanford biologist Michael Soulé
And biologist-activist Paul Ehrlich organize
1st International Conference on Conservation Biology

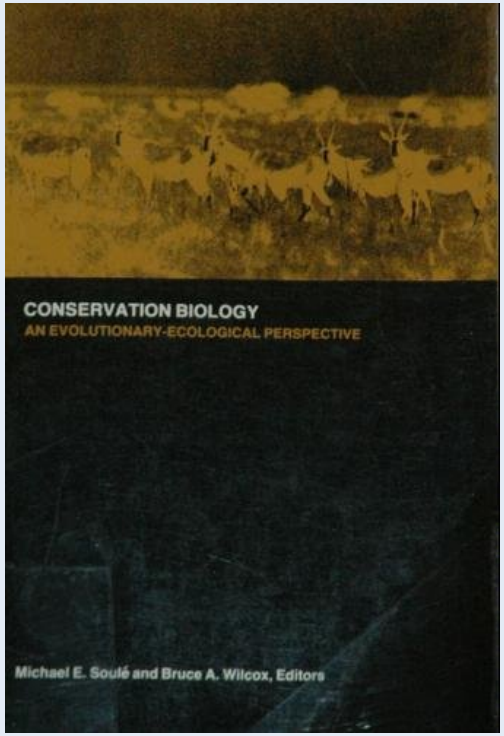


Michael Soulé



Paul Ehrlich

1980 – M. Soulé and Bruce Wilcox publish *Conservation Biology: An Evolutionary-Ecological Perspective*



1985 - Second International Conference on Conservation Biology votes to formally organize the **Society for Conservation Biology (SCB).**

The Society for Conservation Biology (SCB) http://www.conbio.org/

Annual Meetings
2012: North America Congress for Conservation Biology (NACCB 2012), July 15-18, 2012 in Oakland, California
---Very strong student membership.---

1987 – Conservation Biology Journal launched.

1st Cover (Vol. 1, Issue 1, 1987)
Caerulean Paradise Flycatcher
(*Euthrychomias rowleyi*)
From Sanguhe Island, Sulawesi Indonesia,
Thought to be extinct.

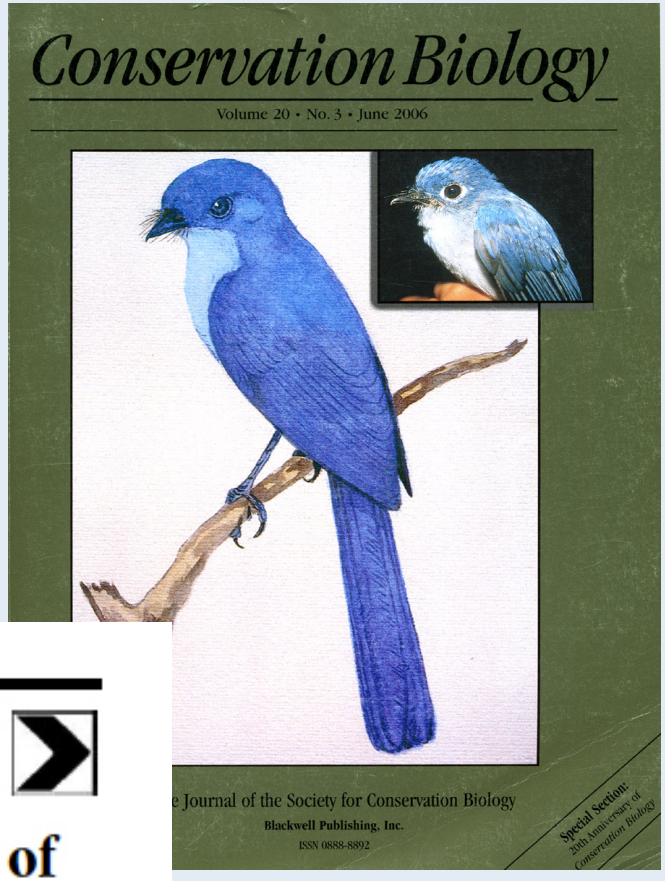


"The reporting of extinctions is done with the knowledge that one may be proved wrong; however, we believe that the Caerulean paradise-flycatcher is extinct and that some of the endemic fish and mollusks on Sulawesi may be endangered if not already extinct." (Whitten et al. 1987)

Society for Conservation Biology

2006 – 20th Anniversary Issue of Conservation Biology…

…celebrates good news that the Caerulean Paradise-Flycatcher is in fact extant !



Diversity

Cerulean Paradise-Flycatcher Not Extinct: Subject of the First Cover Lives

TONY WHITTEN

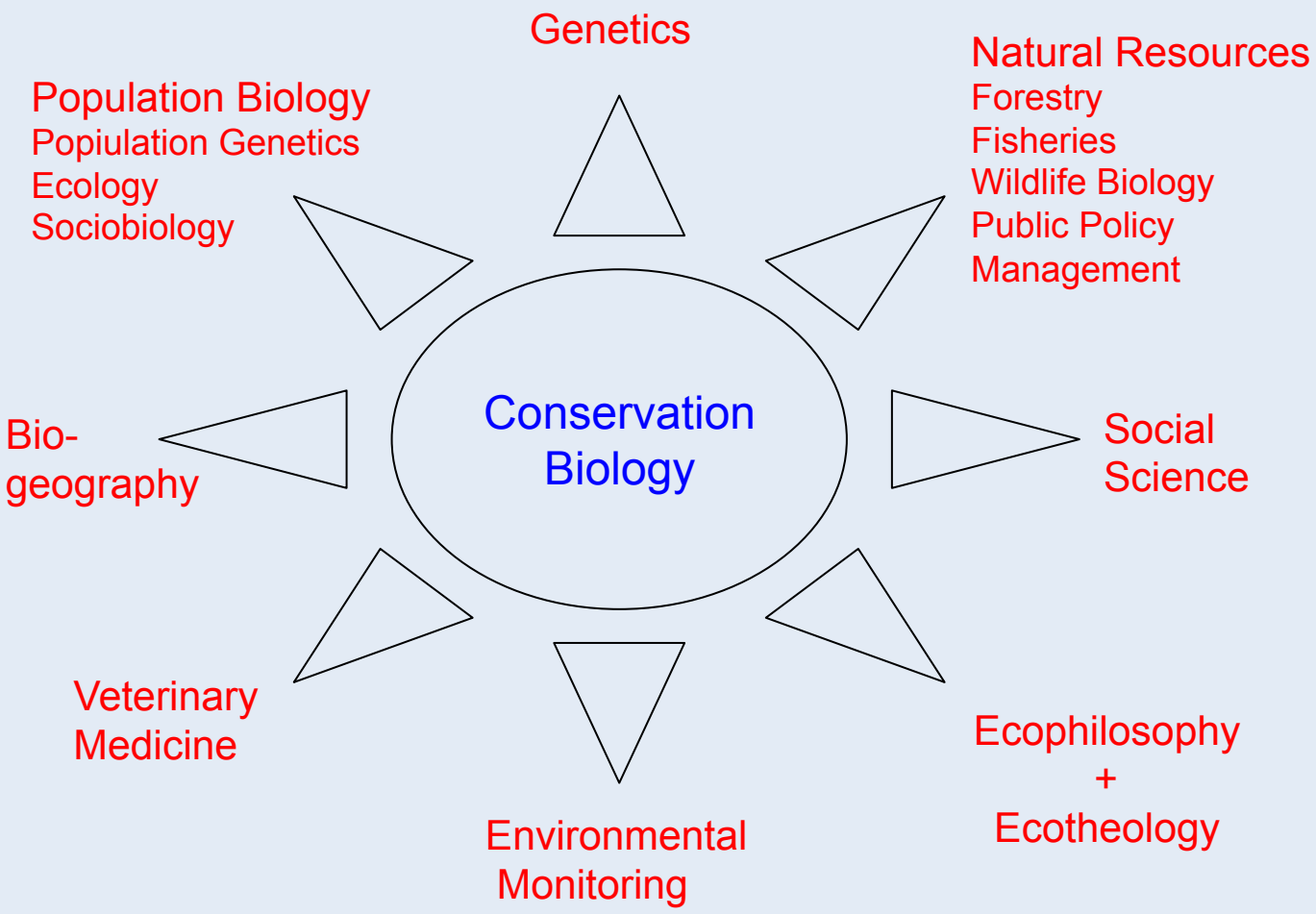
The World Bank, 1818 H Street NW, Washington, D.C. 20433, U.S.A., and Conservation Science Group, Department of Zoology, University of Cambridge, Downing Street, Cambridge CB2 3EJ, United Kingdom, email twhitten@worldbank.org

"I am pleased to report that, 20 years (and 100 journal issues) later, this possibly extinct species is in fact extant and being actively conserved" (Whitten 2006)

1. What is Conservation Biology? (Soulé 1985)

A new synthetic, multidisciplinary discipline
– "holistic" in nature -

Conservation Biology draws from many different Disciplines:



A "Crisis Discipline" …
(Soulé 1985)

- must act before knowing all the facts.
- a mixture of science and art
- requires Intuition + Information.

Functional (or Mechanistic) Postulates:

1. Evolutionary: Species = products of co-evolutionary processes

Species are interdependent (predator-prey; mutualistic relationships etc.)
=> A. Leopold: *"The first rule of intelligent tinkering is to save all the parts."*

- specialization of species



Variable Sunbird
(*Cinnyris venustus*)

- keystone species



Wildebeest
(*Connochaetes taurinus*)

- introduced generalists



European Starling
(*Sturnus vulgaris*)

Functional Postulates contd.

2. Importance of the Scale of Ecological Processes

Thresholds of survival:

• Many reserves are too small to contain viable populations → Insularization
(see also Island Biogeography Theory later in the course)



• (Single) species outbursts can reduce diversity

Example: unsustainable No. of elephants in NP

=> Survival rates are proportional to reserve size.

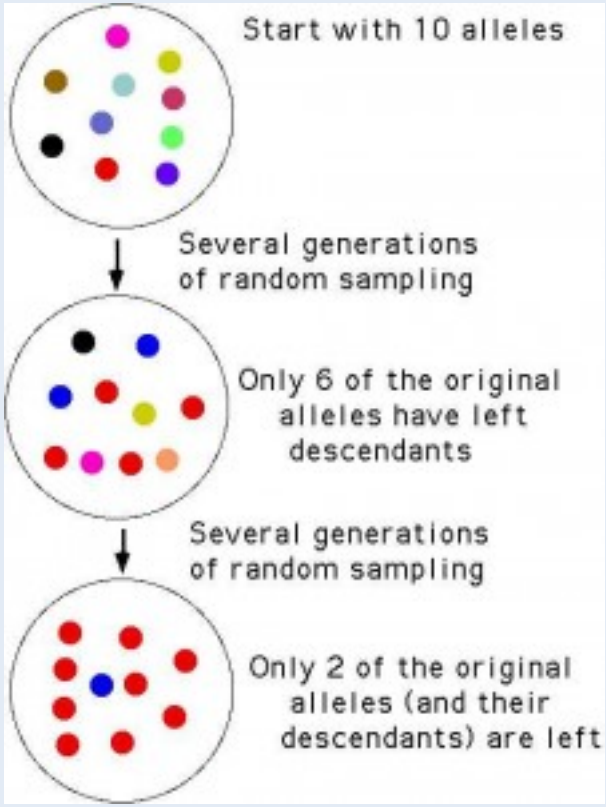
Functional Postulates contd.

3. Importance of Genetics

• Small population size can lead to inbreeding.
Population Size of 50-100 → Inbreeding Depression

• Genetic drift – impact of random changes in populations is greater in small populations than large populations

• Loss of adaptive variation
(i.e.: for natural selection "to choose from").



Genetic drift occurs in small populations to the smaller gene pool compared to large populations. After many generations, genetic drift may cause an allele (= alternate form of a gene) to be lost or fixed - the allele will reach either 0% frequency or 100% frequency.

Functional Postulates contd.

4. Nature reserves are “disequilibrial” for large, rare organisms.

1) Extinctions are inevitable in “habitat islands” the size of nature reserves.

=> Species diversity must be artificially maintained.

2) Natural Speciation will not work for large & rare organisms in reserves of limited size.

Reserves are nearly always too small.



Photographed by Andrew Laurie. ***Great Indian Rhinoceros:*** ***Genus:*** *Rhinoceros* ***Species:*** *unicornis*
Adult size: *Average 168cm tall at the shoulder* ***Adult weight:*** *Average 2-1 .2 tons*
Habitat: *Grasslands, swamps and forests in Nepal and northern India*
Surviving number: *Estimated 1,000—1,500*

Normative or Ethical Postulates of Conservation Biology:

1. Diversity of Organisms is Good.* => Non-natural Extinction is bad.

2. Ecological Complexity (Habitat Diversity) is Good*.

3. Evolution is Good* - "Evolution is the machine and Life is its product."

4. Biotic diversity has intrinsic value* – "irrespective of its instrumental or utilitarian value. Species have value in themselves."

*This is what David Orr (Reading: "Conservatism and Conservation") calls: "Believe in a transcendent moral order"

2. Biodiversity

Short for "Biological Diversity"

- Genetic diversity - Genetic variation contained in all individual plants, animals, fungi, and microorganisms. Also occurs within a species.

- Species diversity - All the differences within and between populations of species, and between different species.

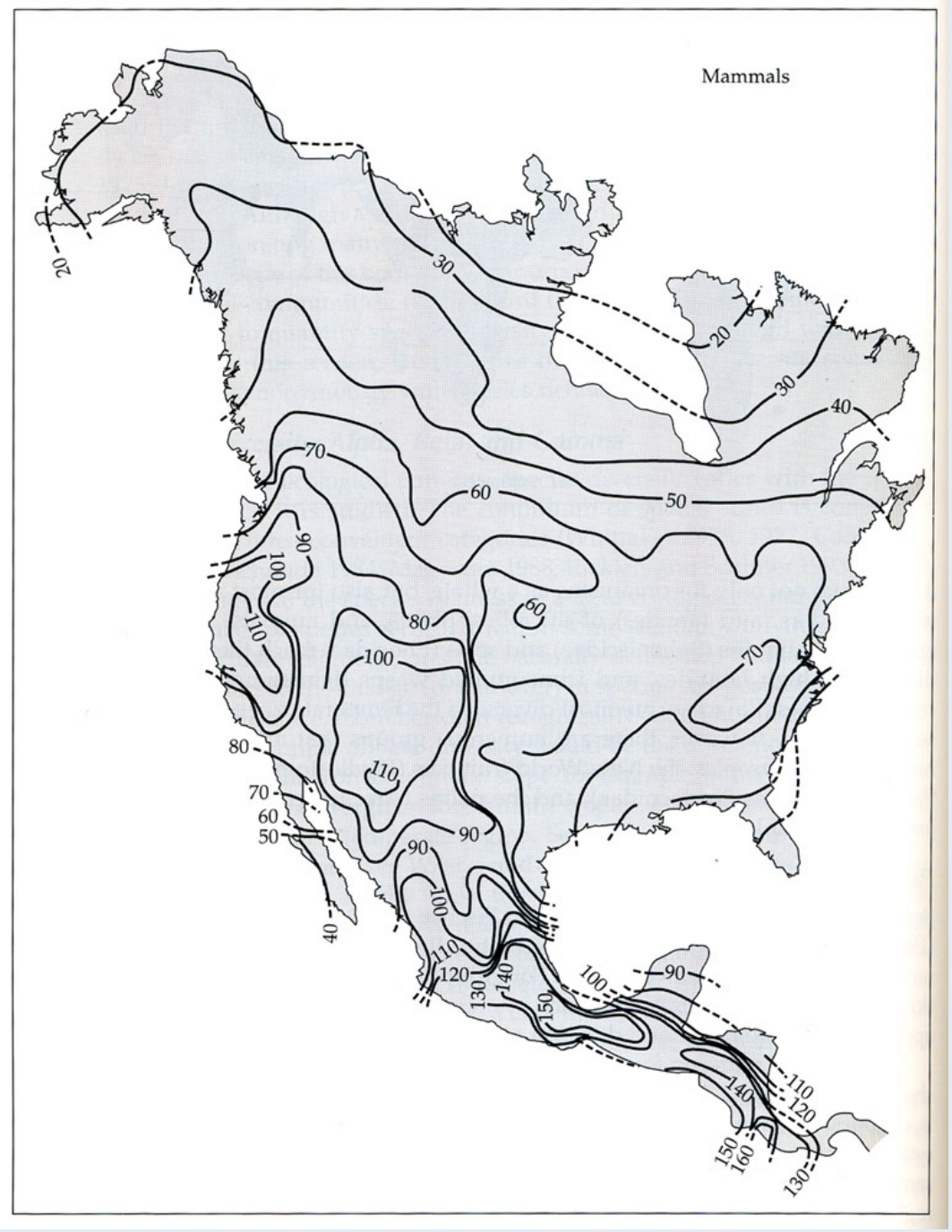
- Ecosystem diversity - All the different habitats, biological communities, and ecological processes, as well as variation within individual ecosystems.



Biodiversity Gradients

Latitudinal Gradient

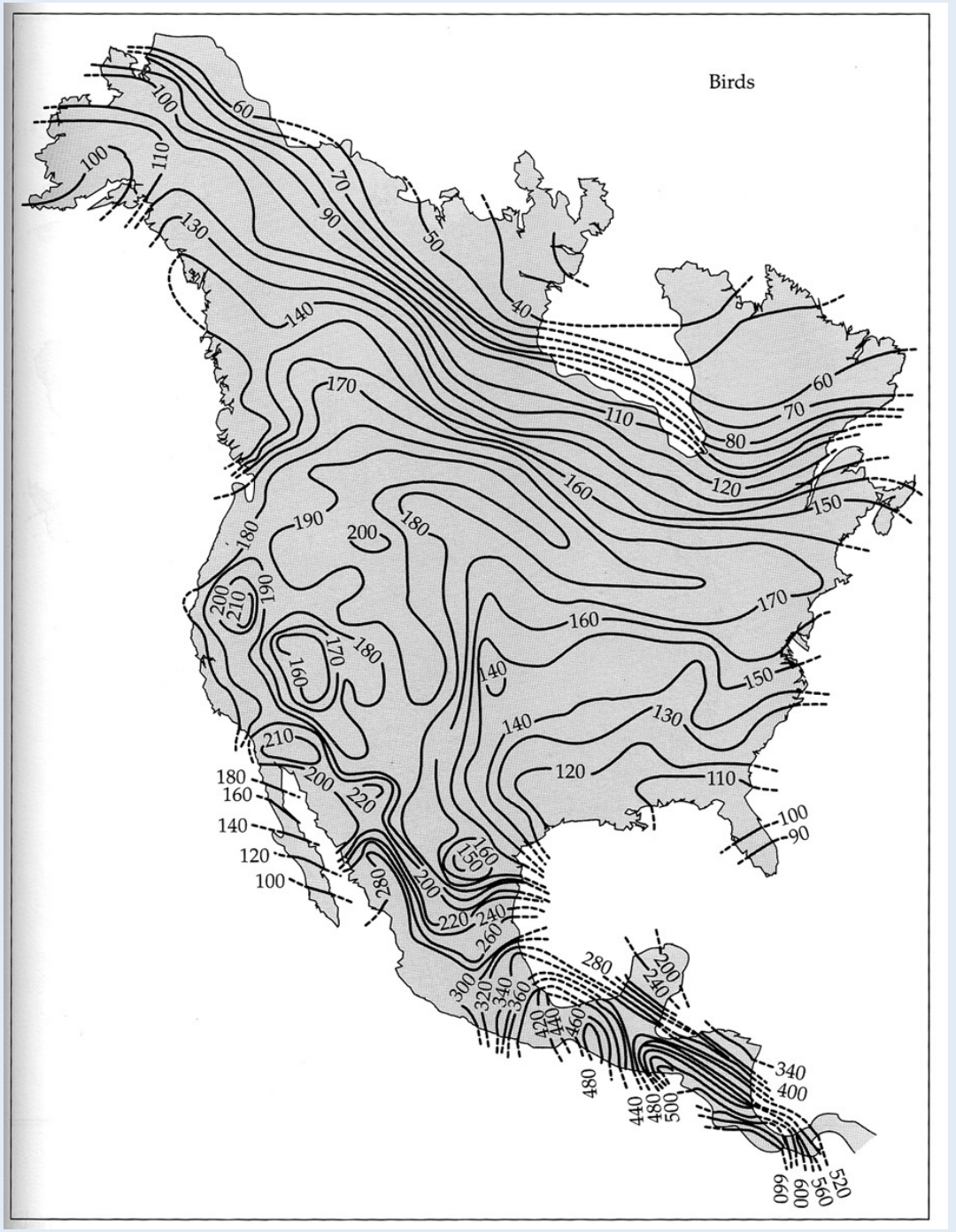
North American Terrestrial Mammals



Biodiversity Gradients

Latitudinal Gradient

North American Breeding Land Birds



Biodiversity Gradients

Peninsula Gradient - Baja California

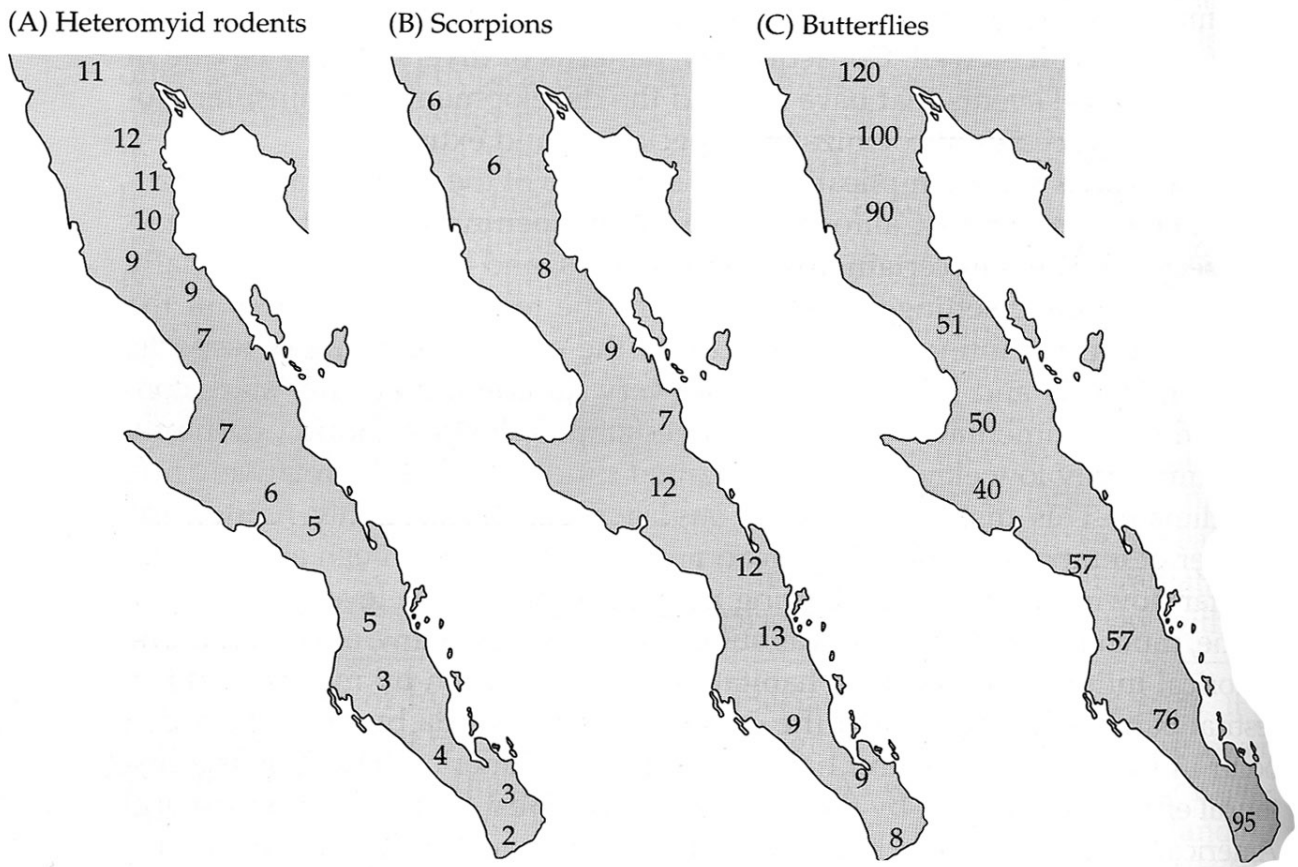


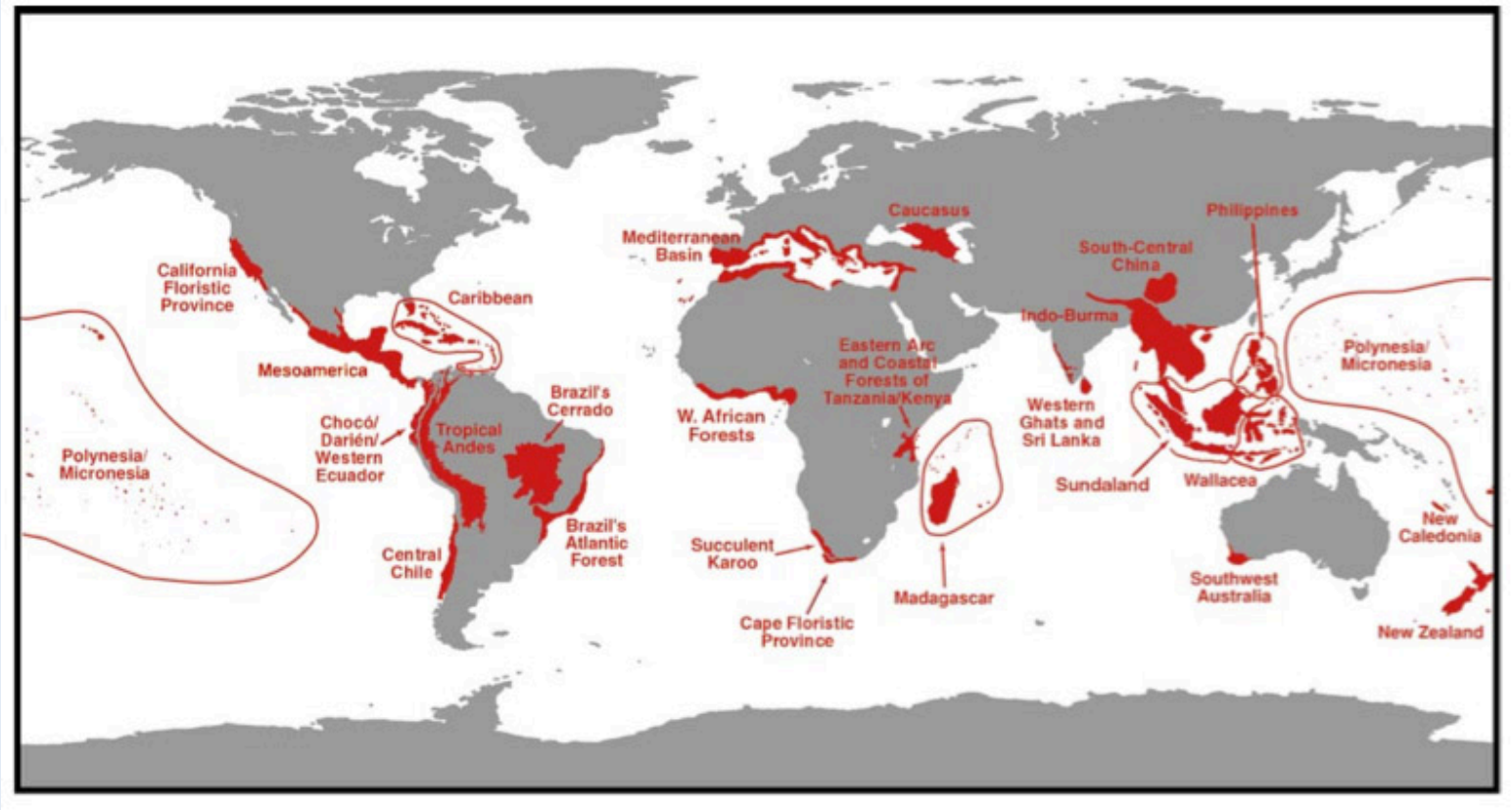
Figure 15.7 Variation in the species richness of three different groups of organisms in Baja California, showing the variety of patterns observed on this peninsula. The diversity of heteromyid rodents (kangaroo rats and pocket mice, A) decreases down the peninsula from base to tip; that of scorpions (B) does not show a clear pattern, but may peak near the center of the peninsula; and that of butterflies (C) is distinctly bimodal, with peaks near the base and tip and the lowest diversity in the center. (Data from Taylor and Regal 1978; Due and Polis 1986; Brown 1987.)

WFB 074 – Lecture 4

Biodiversity Concepts: Hotspots

"The richest and most threatened reservoirs of plants and animals on earth."
Concept promoted by Conservation International.

Proposed by:
Mittermeier, R. A., N. Myers, and J. B. Thomsen. 1998. Biodiversity hotspots and major tropical wilderness areas: approaches to setting conservation priorities. Conservation Biology 12:516-520.



`biodiversity hotspots' where exceptional concentrations of endemic species are undergoing exceptional loss of habitat (from: Myers et al. 2000. Biodiversity hotspots from conservation priorities. Nature 403:853-858.

Biodiversity Hotspots

Example 1:

Guinean Forest of West Africa

Tropical Forest Biome



"Vital Signs"	
Hotspot Original Extent (km ^{2})	620,314
Hotspot Vegetation Remaining (km^2)	93,047
Endemic Plant Species	1,800
Endemic Threatened Birds	31
Endemic Threatened Mammals	35
Endemic Threatened Amphibians	49
Extinct Species†	0
Human Population Density (people/ km ^{2})	137
Area Protected (km ^{2})	108,104
Area Protected (km ^{2}) in Categories I-IV*	18,880

*=IUCN Protected Area Categories (see Lecture 3)

Biodiversity Hotspots

Example 2:
California Floristic Province

Mediterranean-type Biome



"Vital Signs"	
Hotspot Original Extent (km ^{2})	293.804
Hotspot Vegetation Remaining (km ^{2})	73.451
Endemic Plant Species	2.124
Endemic Threatened Birds	4
Endemic Threatened Mammals	5
Endemic Threatened Amphibians	8
Extinct Species	2
Human Population Density (people/km ^{2})	121
Area Protected (km ^{2})	108.715
Area Protected (km ^{2}) in Categories I-IV*	30.002

Recent news on Hotspots:
Hanson, T. et al. 2009. Warfare in biodiversity hotspots. Conservation Biology 23 578-587.

Over 90% of the major armed conflicts between 1950 and 2000 occurred within countries containing biodiversity hotspots, and more than 80% took place directly within hotspot areas.

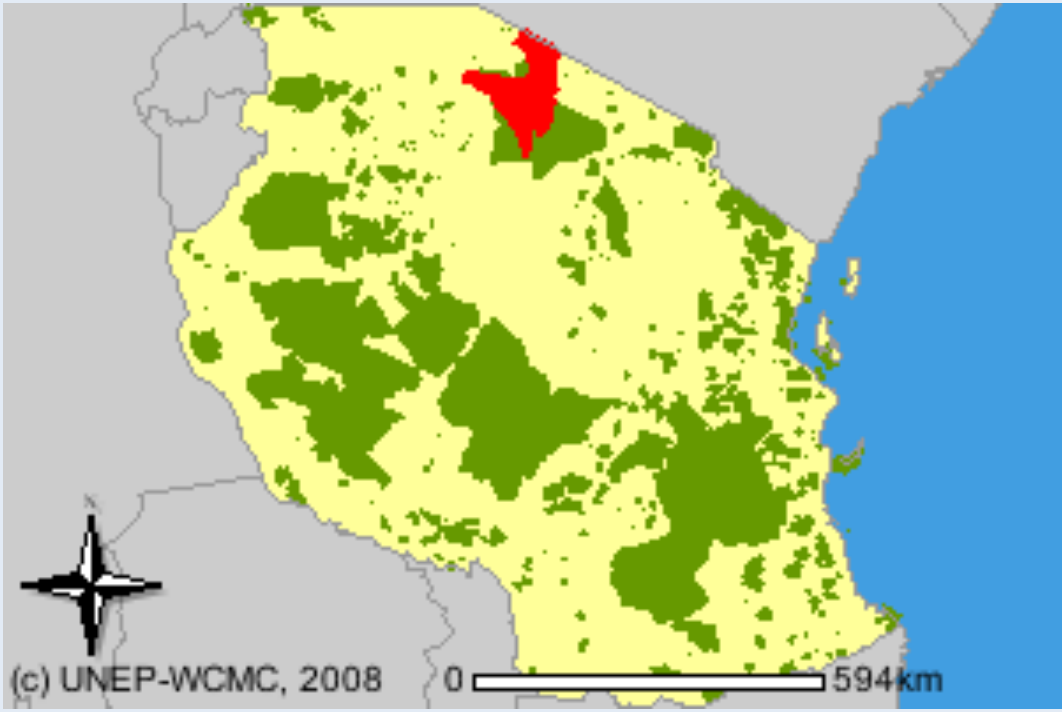
Explore the Hotspot Concept at:
http://www.biodiversityhotspots.org/

3. A Classic Example of "Fortress Conservation": *Serengeti shall not die*

1940 - Serengeti Plain upgraded from Reserve to National Park guarantees rights of resident Maasai to continue living in the park in perpetuity.

"*The existence of the Maasai in a National Park offers little difficulty since they neither hunt game nor cultivate the soil, and are thus better adapted than other native tribes to live amicably amongst the game*"

Major R. W. G. Hingston (1940):



red: Serengeti NP
green: Other Protected Areas in Tanzania
http://www.unep-wcmc.org.ezproxy.uvm.edu/wdpa/

1946 – *Society for the Preservation of the Wild Fauna of the Empire* (SPFE) deputation to colonial office in London complained that the Serengeti was not living up to the standards of the Convention for the Protection of the Fauna of the Empire.

Lee Talbot (later head of IUCN): *Maasai herding systems ecologically destructive*.



Maasai herder (from: intercontinentalcry.org/)

"I wish at once to reassure you that all Maasai and other pastoralists who have been normally resident within the area of the Park will not be turned out."
1954 Governor of Tanganyika at Maasai Federal Council:

21 April 1958 - 12 Maasai elders sign "Agreement By the Maasai to vacate the Western Serengeti".

"*We were told to sign. It was never explained to us. None of the elders even knew how to read or write. You white people are very tough.*"
(Tendemo Ole Kisaka in interview with R. Bonner)

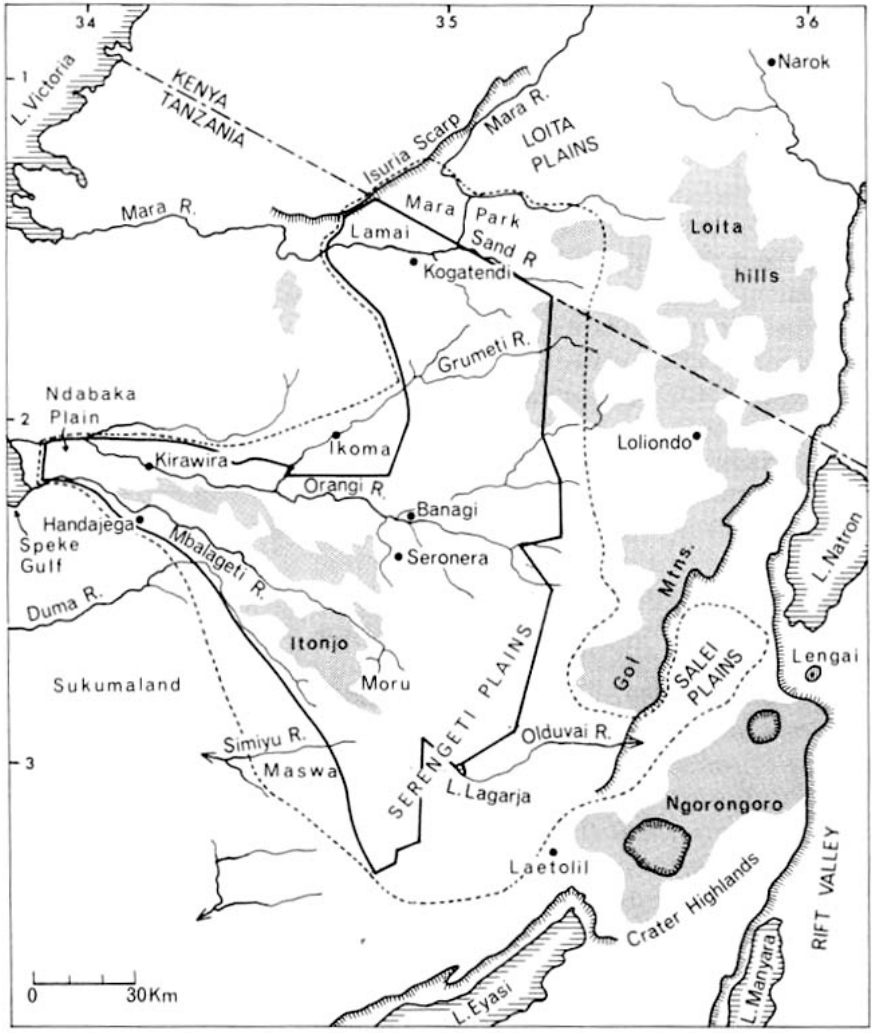
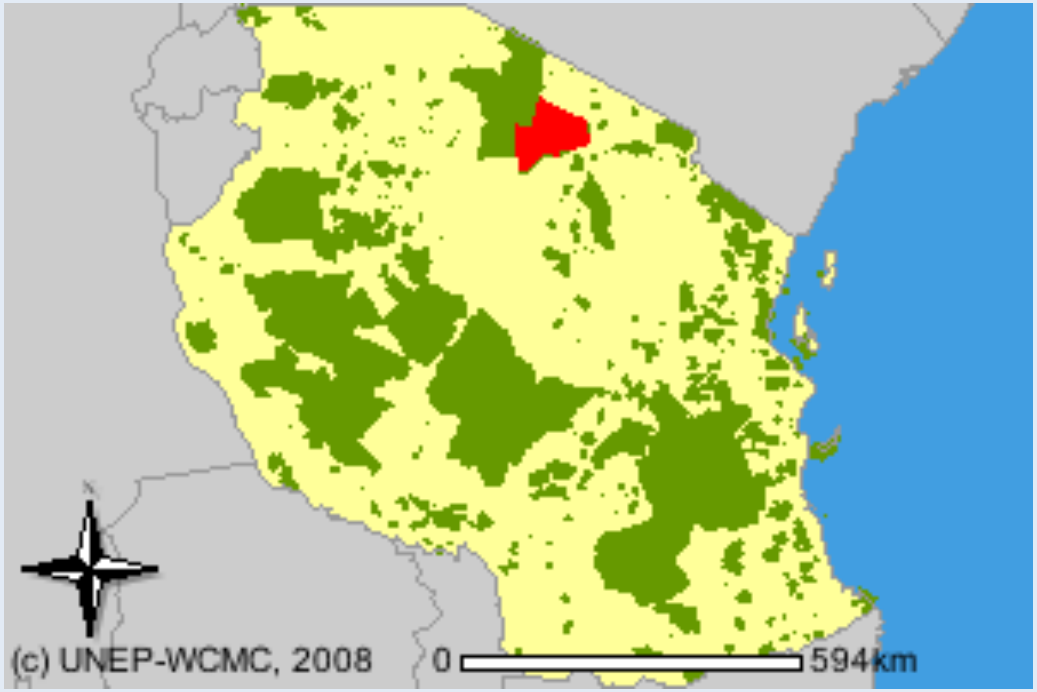


Figure 1.1 The Serengeti-Mara ecosystem is the area used by the wildebeest (*even broken line*). The Serengeti Park is shown by the heavy line. Hills are shaded.

Area split into Serengeti NP (no Maasais) and Ngorongoro Conservation Area (Maasai present)

31% of Tanzania land area is protected.



red: Ngorongoro Conservation Area
green: Other Protected Areas in Tanzania
http://www.unep-wcmc.org.ezproxy.uvm.edu/wdpa/

1974 - Eviction of the Maasai from the Ngorongoro Crater Floor.

"Very early in the morning, about five o'clock. three trucks full of field force soldiers stopped very close to the boma and told the people, 'Bring everything out, we are going to burn the houses', "

(Tate ole Rokonga, cited in Bonner 1993:180)



"My personal view is that it was a political move, because the Tanzanian government didn't want tourists to see undeveloped people in hide cloths."
(Henry Fosbrooke, Ngorongoro Conservation Area's 1st Conservator, cited in Bonner 1993:181)

1980's - "Fortress Conservation mentality" evidenced by: "Save the Elephant" campaign in US.

- Burning of stockpiled ivory under Kenyan president Daniel Arap Moi.

- Militarily armed anti-poaching units in Zimbabwe ("war on poachers").



Ivory Burning in Kenya
http://www.kws.org/nairobi.html

Post-war Fascination with the Serengeti in Germany

August 2006
German Edition of
National Geographic.
Cover:

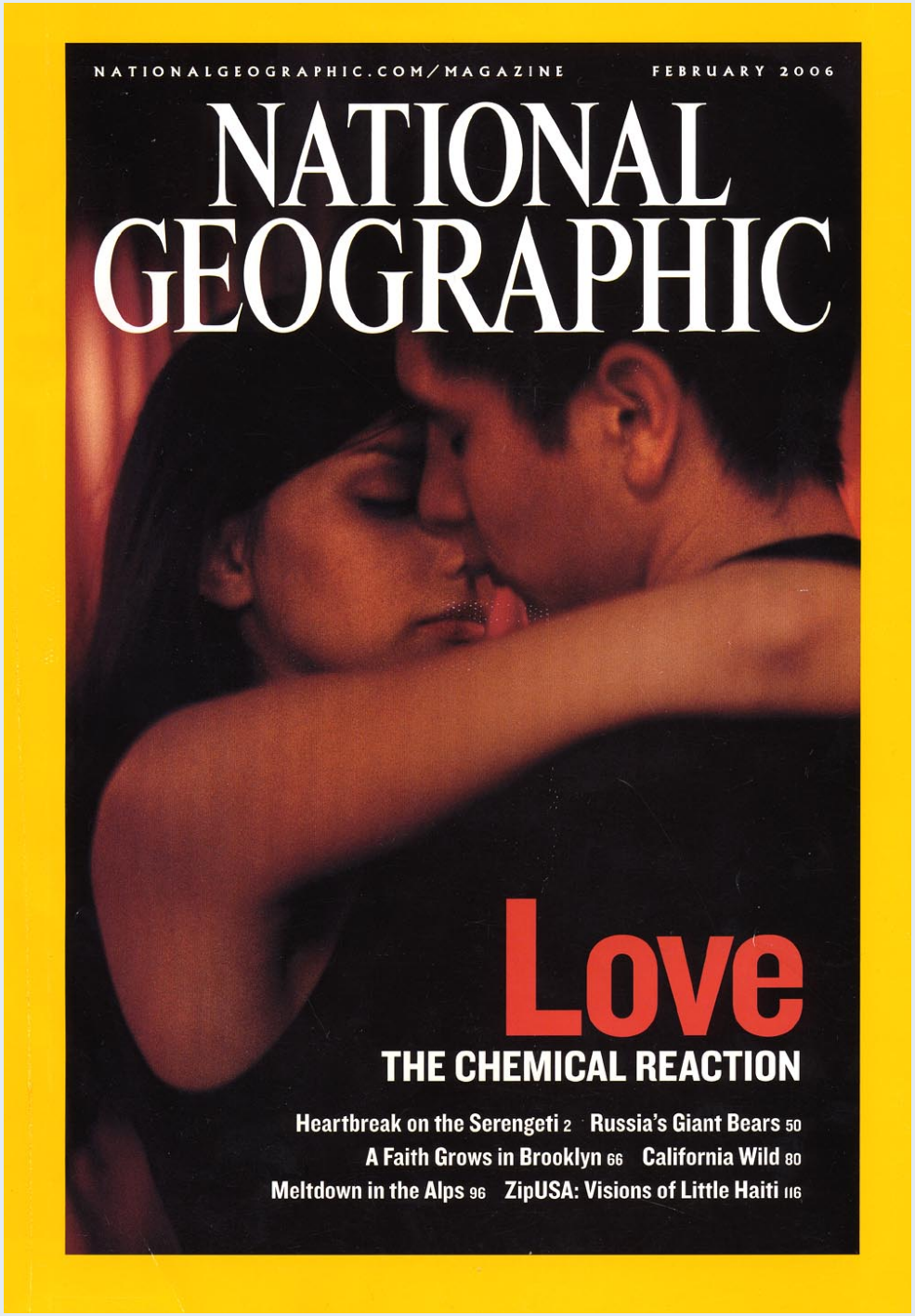
“Mythos Serengeti
What’s the future of Africa’s
Most beautiful Game Reserve?”



February 2006
American Edition of NG
with the same Serengeti Story,
but Cover Story is claimed by…

"Love – The chemical Reaction"

Serengeti Story appeared further down as:
"Heartbreak on the Serengeti"…[??]



Serengeti shall not die - Producers

Prof. Bernhard Grzimek (1909-1987)

Veterinarian, Zoologist, Ethologist.

Director of Frankfurt Zoo.

Author of numerous books.

Editor-in-Chief of 13-volume *Grzimek's Animal Life Encyclopedia* (1967) – available at B/H Library 1st floor Reference section.

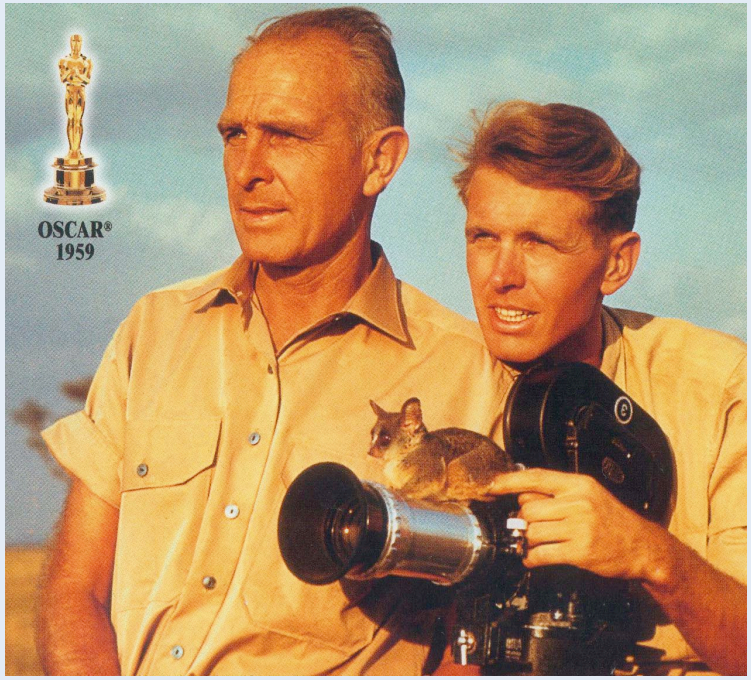


Serengeti shall not die - **Producers**

Wildlife Filmmaker, Conservationist

Films:
No Room for Wild Animals (1956)
Serengeti Shall Not Die (1959)

Michael Grzimek (1934-1959)



MICHAEL GRZIMEK
12.4.1934–10.1.1959
He gave all he possessed
including his life
for the wild animals of Africa

Inscription for M. Grzimek

Michael died in 1959, during the filming, after a plane collision with a vulture. He was buried on the rim of Ngorongoro Crater.

Bernhard Grzimek finished the Oscar-winning Documentary and continued to campaign for wildlife conservation until his death in 1987.

Wildlife as a cultural Heritage…

The German film assessment office (FBW) demanded to cut a text passage declaring *African wildlife as a cultural heritage of all humanity just like the Acropolis, the Louvre, or St. Peter's in Rome.* B. Grzimek stubbornly resisted this censorship responding in a letter:

> *"Human works of art can always be newly created, whereas an animal species can never rise again once it has been driven to extinction. The producers of this film view it as their moral and cultural mandate to commit themselves in the same way to the protection of the last magnificent remains of African nature, as to the preservation of European cultural edifices. This passage stands for the entire meaning and effort of this film."*

Today both Serengeti National Park and Ngorongoro Crater are UNESCO World Heritage Sites (Explore: http://whc.unesco.org/en/list)

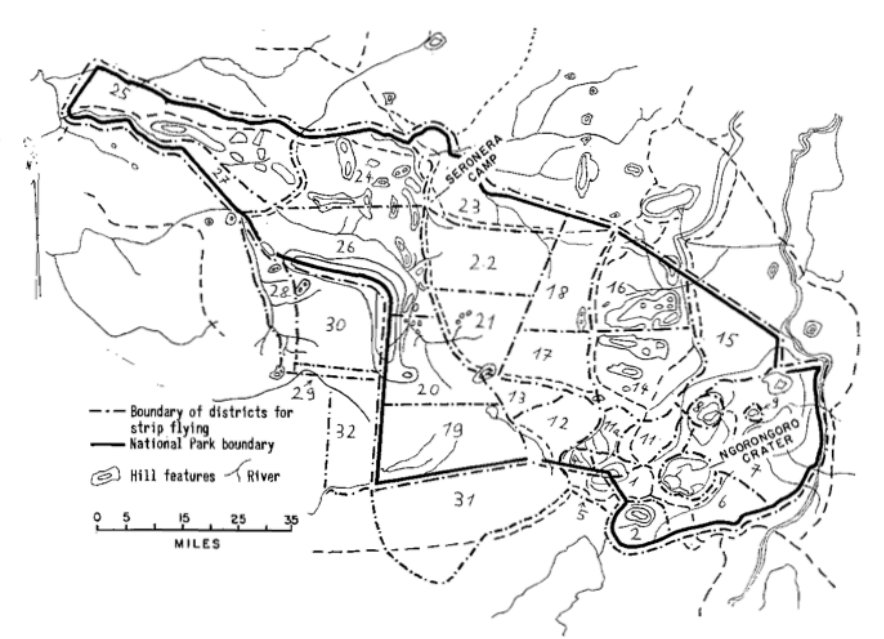
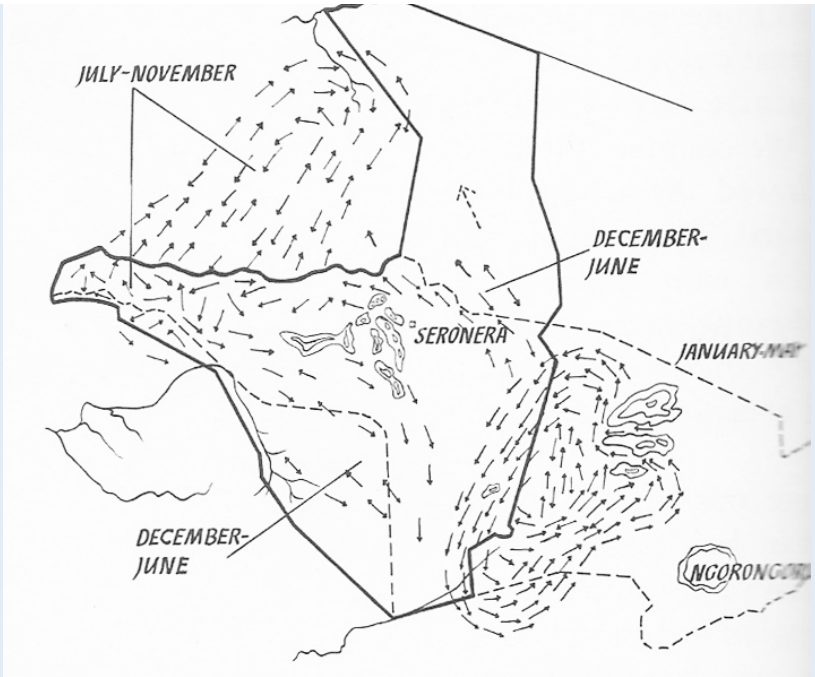
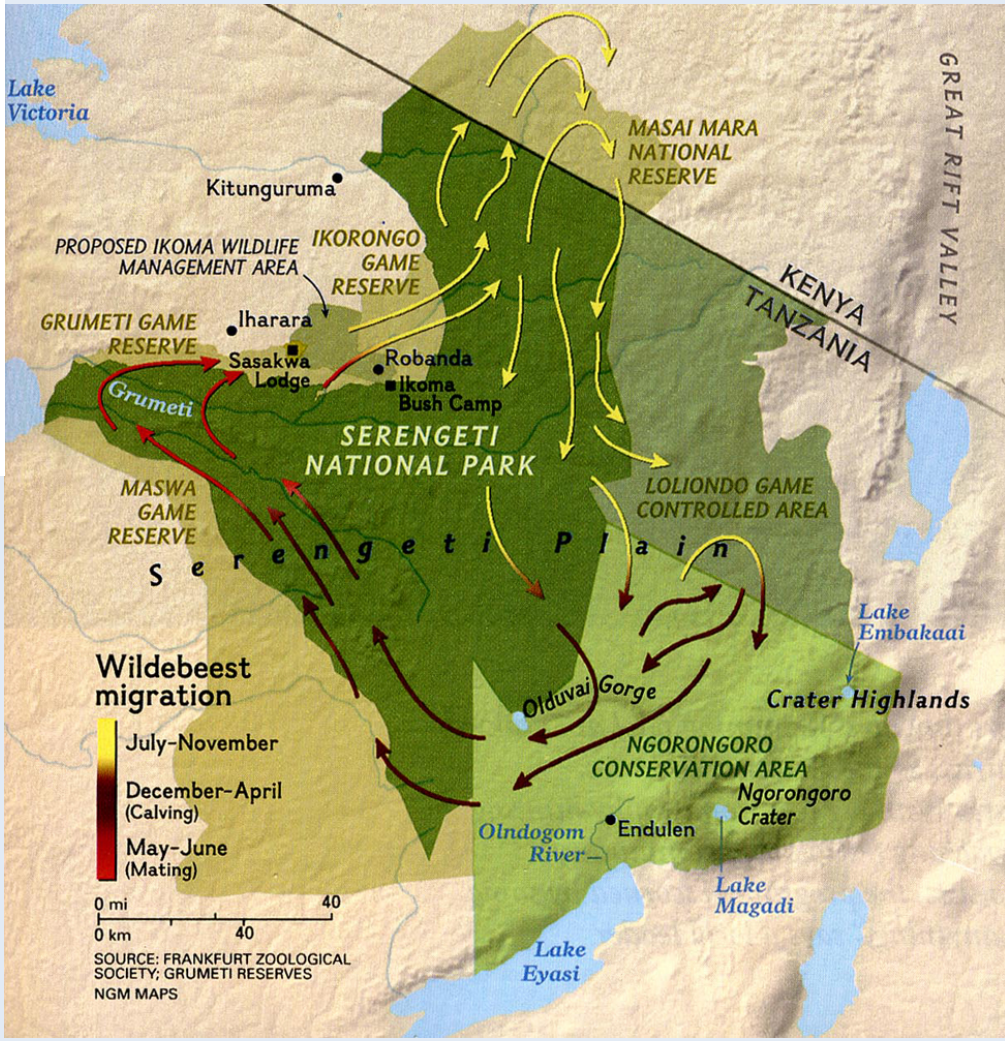


FIG. 2. The Serengeti Area, showing Park boundaries in 1958 and numbered districts for strip flying.



Grzimek's Research & Recommendations



Serengeti Today - Source: Nat. Geogr. Magazine

New Threats:

Proposed Serengeti Highway Project



January 2012 Update

A Chinese company has entered into an agreement with Tanzania and Uganda for the construction of a Tanga-Arusha-Musoma-Uganda railway. Most likely, it will be accompanied by a road as well. The most direct route for this transportation corridor would be through the Serengeti.



Read More: http://www.savetheserengeti.org/issues/stop-the-serengeti-highway/#ixzz1jeh3YrdU



Video: Serengeti Shall not Die

Questions to ponder during the film:

- How is conservation “sold” in the film?
- How are native people and their role in or near the park portrayed in the film?
- What is the assumed role of the expatriates?
- How much “conservation science” (methodology, data collection) does the film convey?