



Holistic Sustainability

A Niche for Humans

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CACOR Presentation

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The Main Conclusion:

**The conscious purpose of being
normal changes everything.**

**In this presentation, I emphasize two
main points.**

The bad news is you've got advanced-stage humans. The good news is they've just about run their course and you should be on the mend soon.



First Main Point:

We humans, as a species, are a pathogen, or malignancy, in the reality of which we are a part. Many of the ways we participate in reality are pathological.

I am not alone in making this point:

1. Steven J. Bartlett: **The Ecological Pathology of Man.**
2. Thomas Berry: “...**pathological** plundering...”
3. Warren Hern “The human species is... **ecocidal**...”
4. Thomas Berry: “...the supreme **pathology** of all history.”

1. Bartlett, S.J. , 2006, *Mentalities/Mentalités: An Interdisciplinary Journal*, Vol. 20, No. 2, pp. 1-18
2. Thomas Berry, 2009, *The Christian Future and the Fate of the Earth*, p93.
3. Hern, W.M. Has the human species become a cancer on the planet?: A theoretical view of population growth as a sign of pathology. *Curr World Lead* 36(6):1,089-124. p1109.
4. Thomas Berry. 1988. *The Dream of the Earth*, p 204.

The bad news is you've got advanced-stage humans. The good news is they've just about run their course and you should be on the mend soon.



Second Main Point:

The healing that must take place requires that the laws of nature be allowed to do their work. Diseases are part of the biosphere's "immune system". Can we accept their work as "good news"?

A silhouette of a mountain range against a golden sunset sky. The mountains are dark and jagged, with the highest peak in the center. The sky is a gradient of yellow and orange, with the sun setting behind the mountains on the right side.

This webinar is based on four primary
cornerstones



Cornerstone #1 - A definition of reality:

That from which nothing is excluded!



Cornerstone #2 - A general principle:

All things are interconnected!

Cornerstone #3 – Another general principle:

What is good for the part can be detrimental to the whole and vice versa.



A corollary to Cornerstone #3:



Issues of systemic abnormality are best addressed by emulating (if not simply employing) natural normative forces.

A sunset over a rocky coastline. The sky is a mix of orange, yellow, and dark grey. In the center, a large, dark rock formation stands prominently. To the right, a dark, forested hill rises. The foreground shows the ocean with gentle waves and a sandy beach. The overall mood is serene and dramatic.

Cornerstone #4 – One more general principle:

Everything reflects everything else.

These four postulates constitute systemic thinking. However...

Bill Rees: "...we don't think systemically."¹

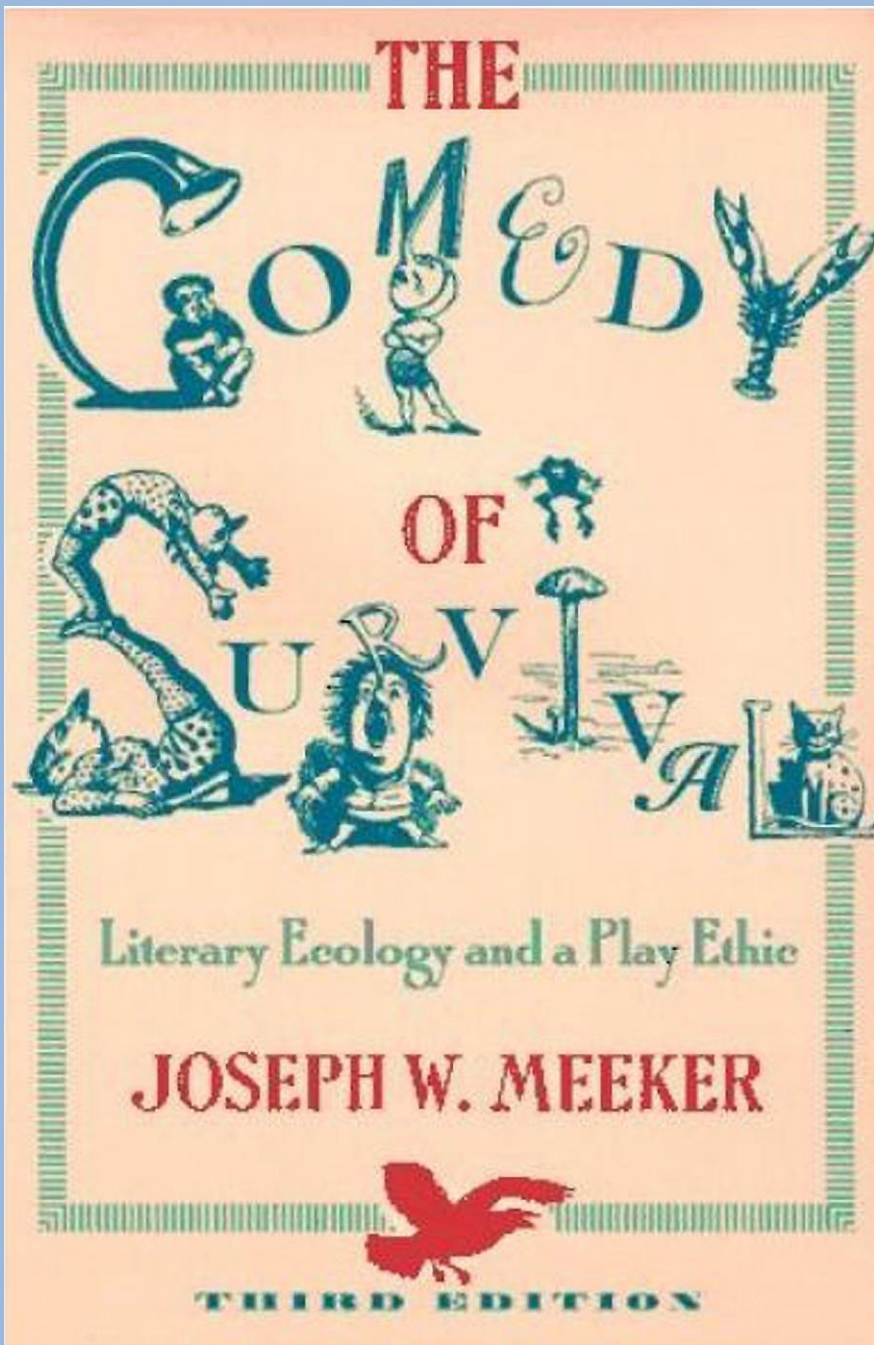
Philip Garnett: "Our thinking is not systemic."²

Albert Einstein: "A new type of thinking is essential if mankind is to survive . . ."³

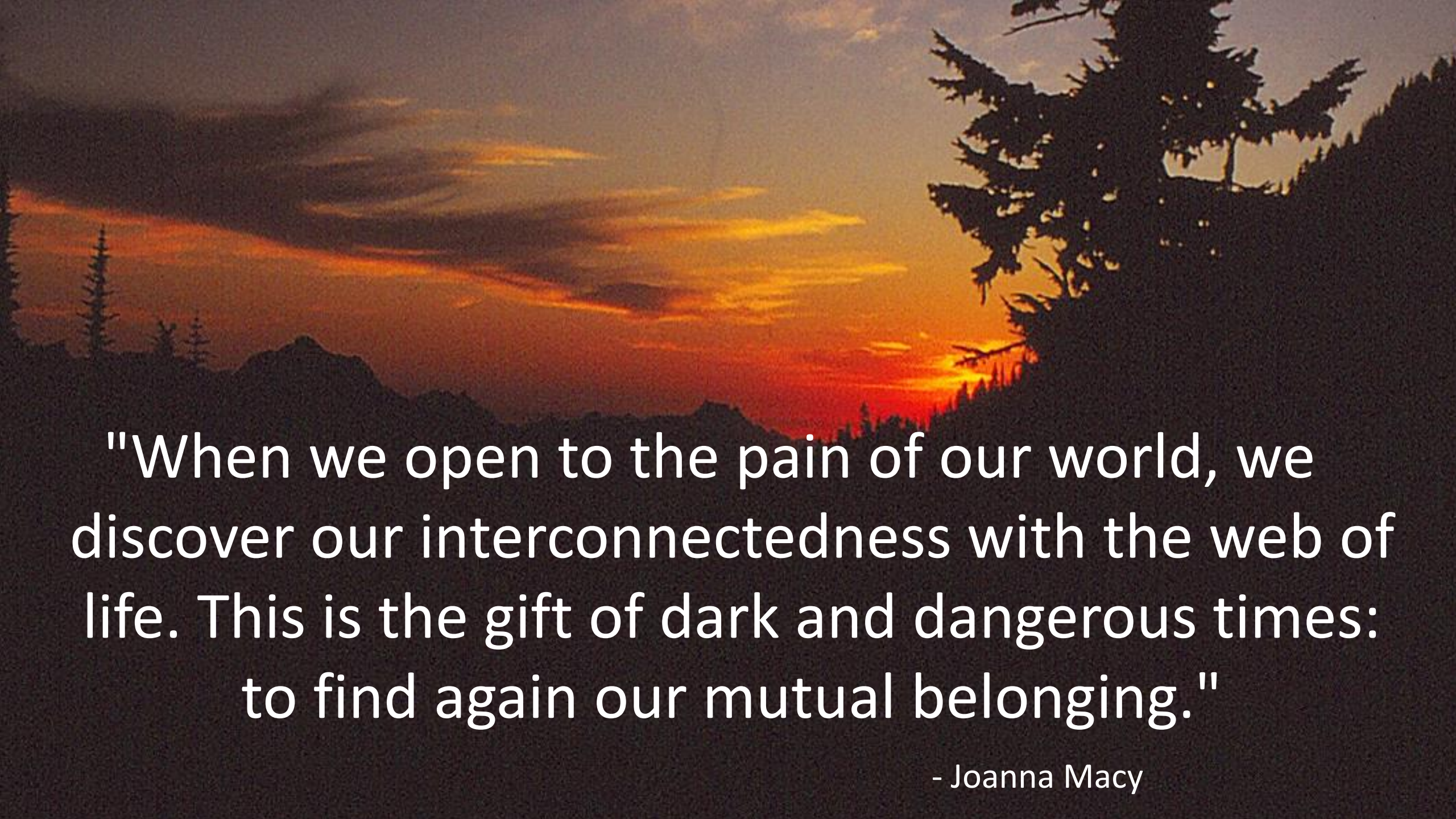
1. IRAS webinar, August 13, 2024

2. 2018, Science of the Total Environment 626:684-688.

3. New York Times Magazine, May 25, 1946.

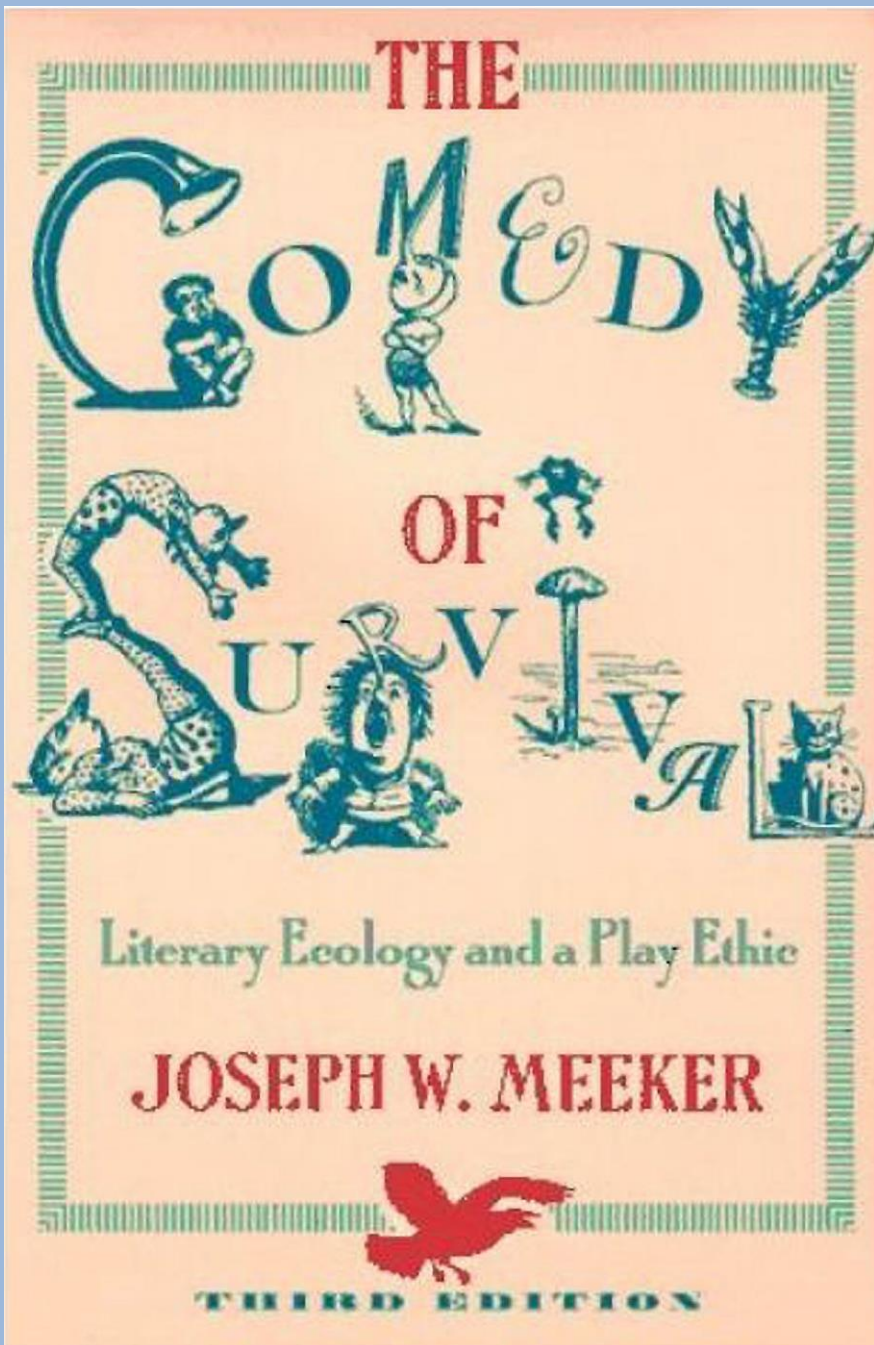


The fractal nature of reality means that we can learn from our mistakes as a species.

A photograph of a sunset over a mountain range. The sky is filled with warm, orange and yellow light, with some clouds catching the low sun. In the foreground, the dark silhouettes of evergreen trees are visible against the bright sky. The overall mood is serene and contemplative.

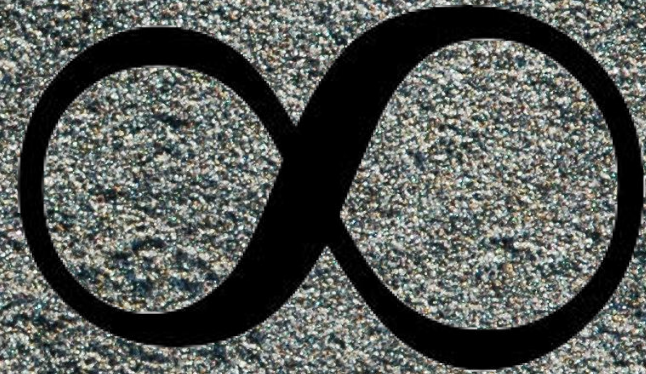
"When we open to the pain of our world, we discover our interconnectedness with the web of life. This is the gift of dark and dangerous times: to find again our mutual belonging."

- Joanna Macy



“Misery arises from simplified and narrow vision; felicity lies in participation in systemic complexity.”

In this Webinar, I present examples of systemic thinking based on normative information.



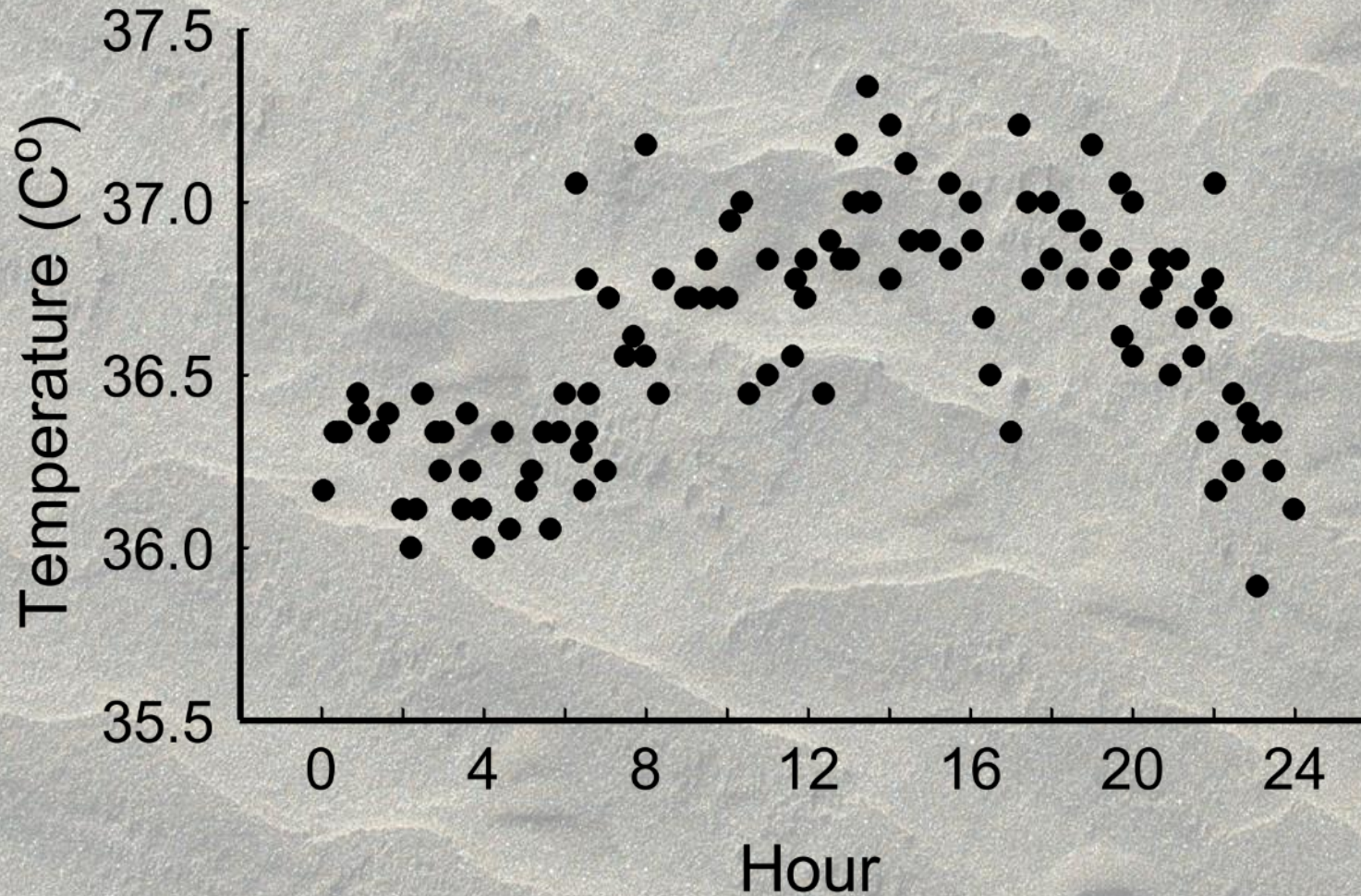
This way of thinking achieves universal holism.



What is
***Normative* Information?**

Example:

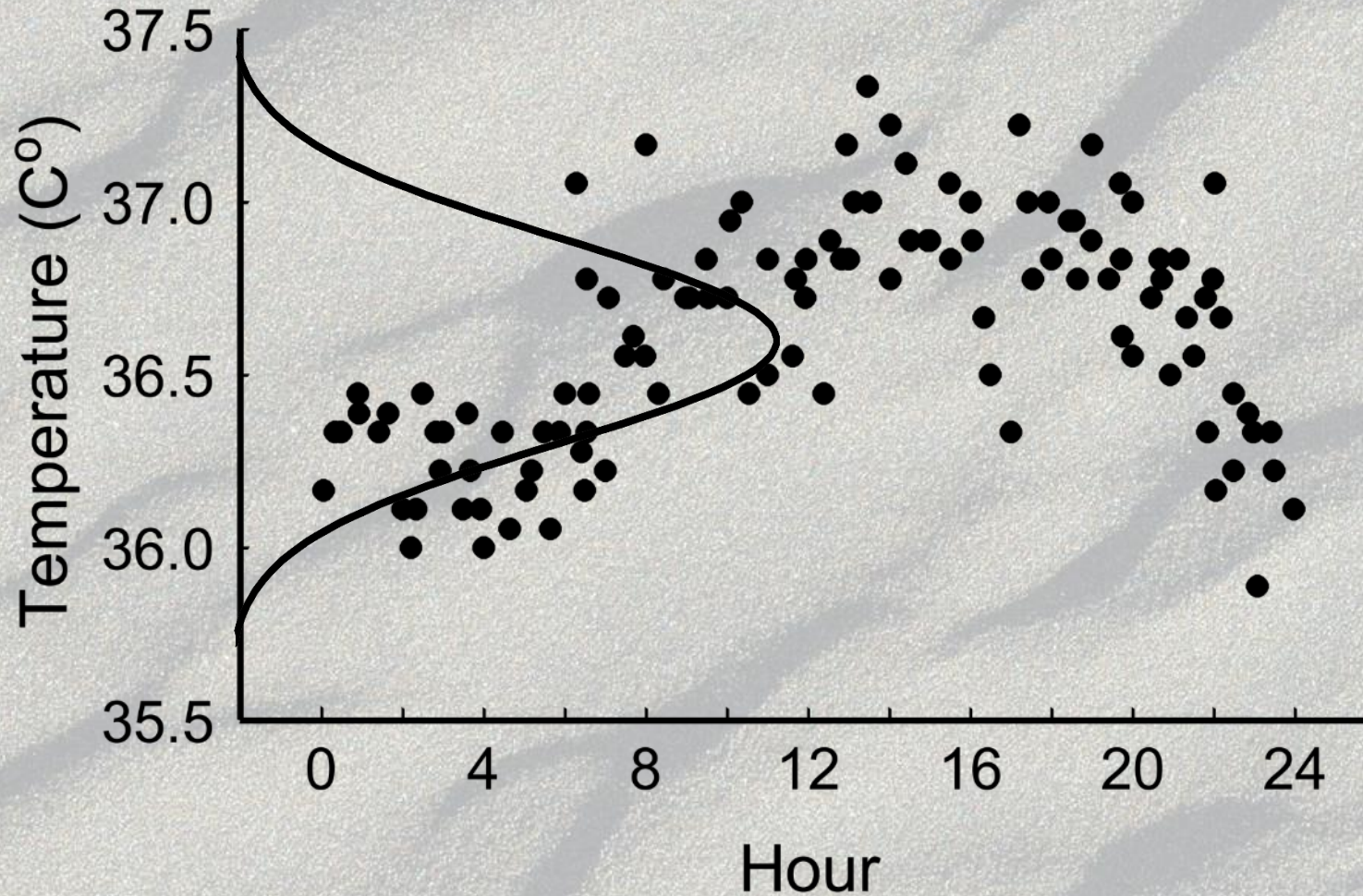
Body Temperature as used in medicine



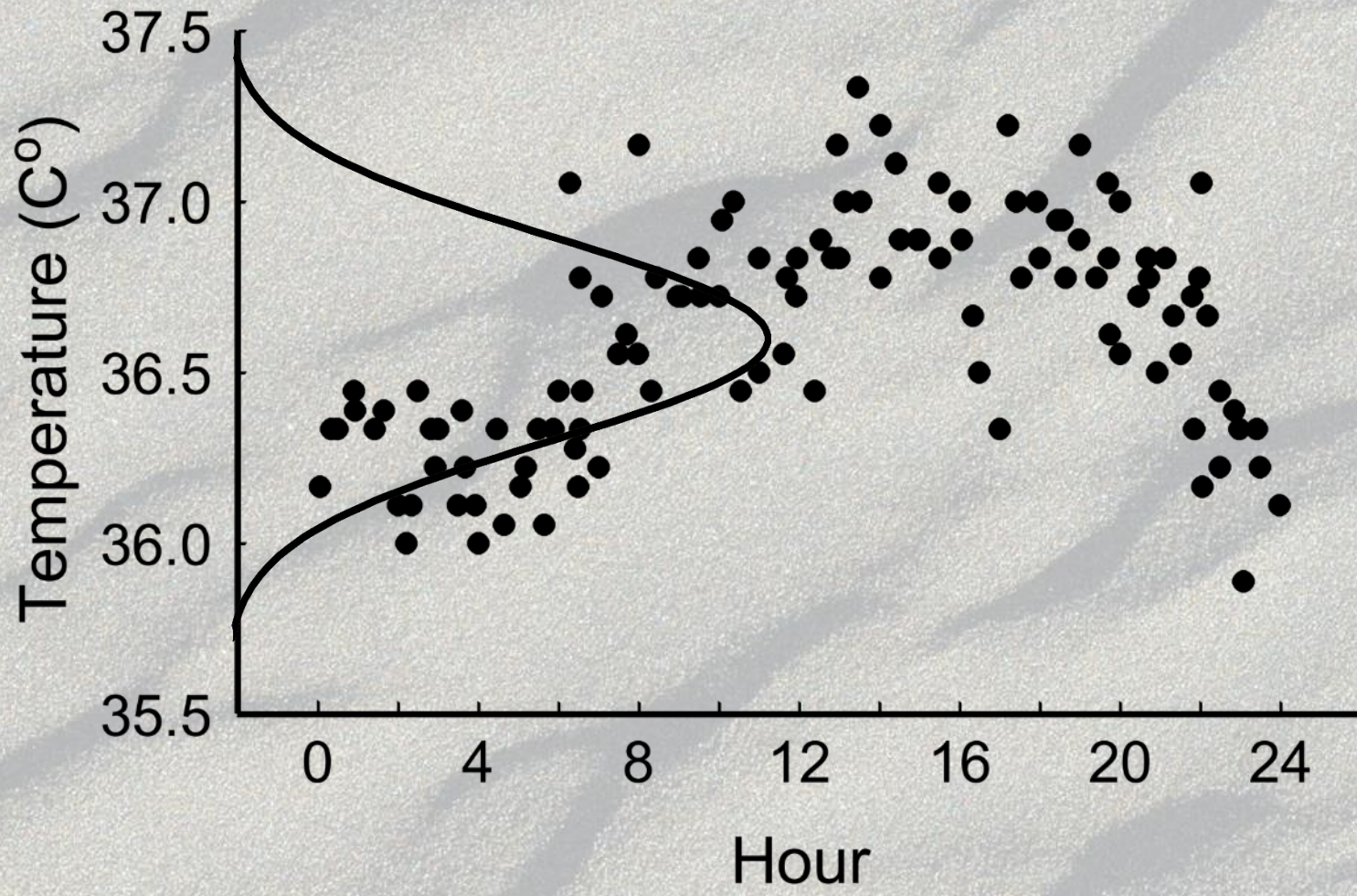
Human body temperature has a pattern related to time of day.

Example:

Body Temperature as used in medicine



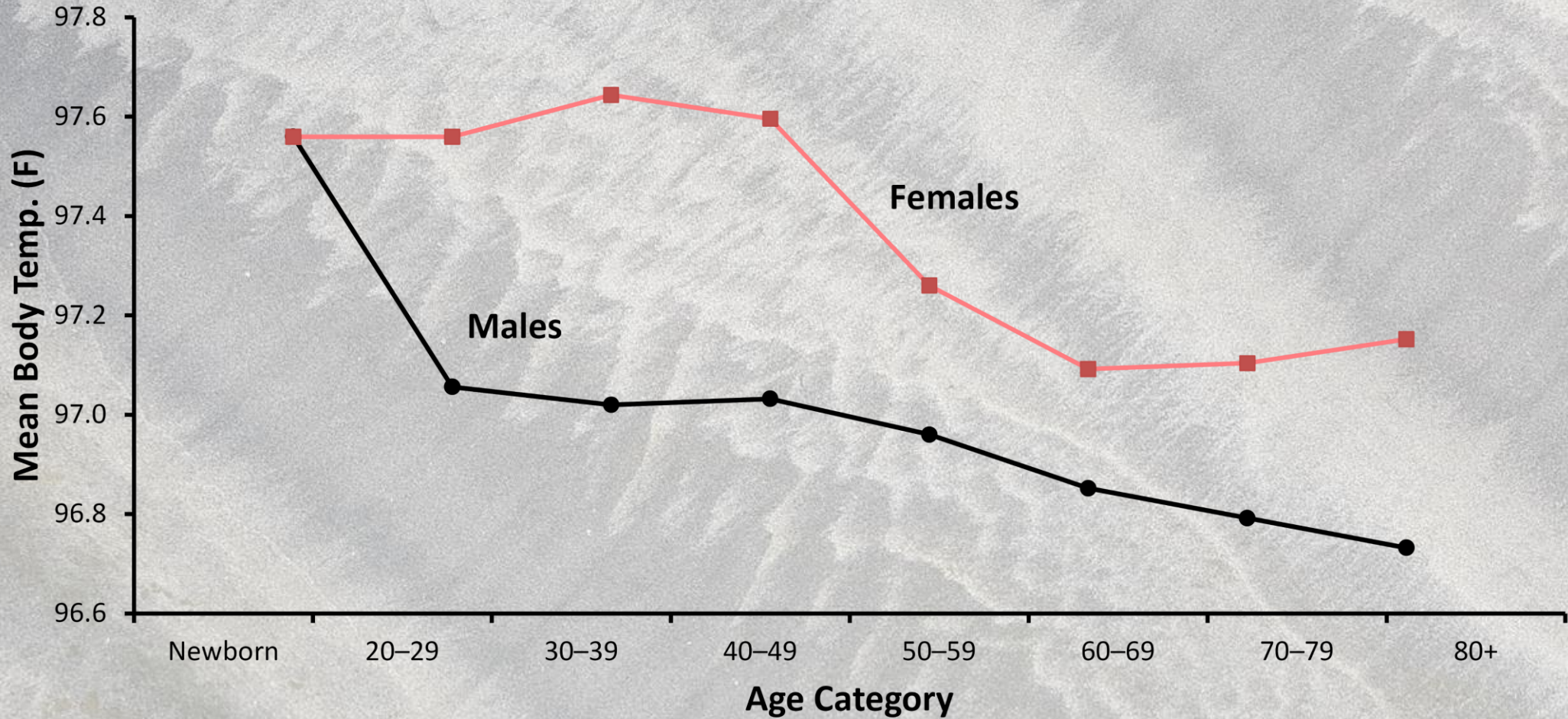
Human body temperature shows a pattern; there are limits to variation.



A body temperature of 101.3° F would be considered a fever – abnormal or outside the normal range of natural variation..

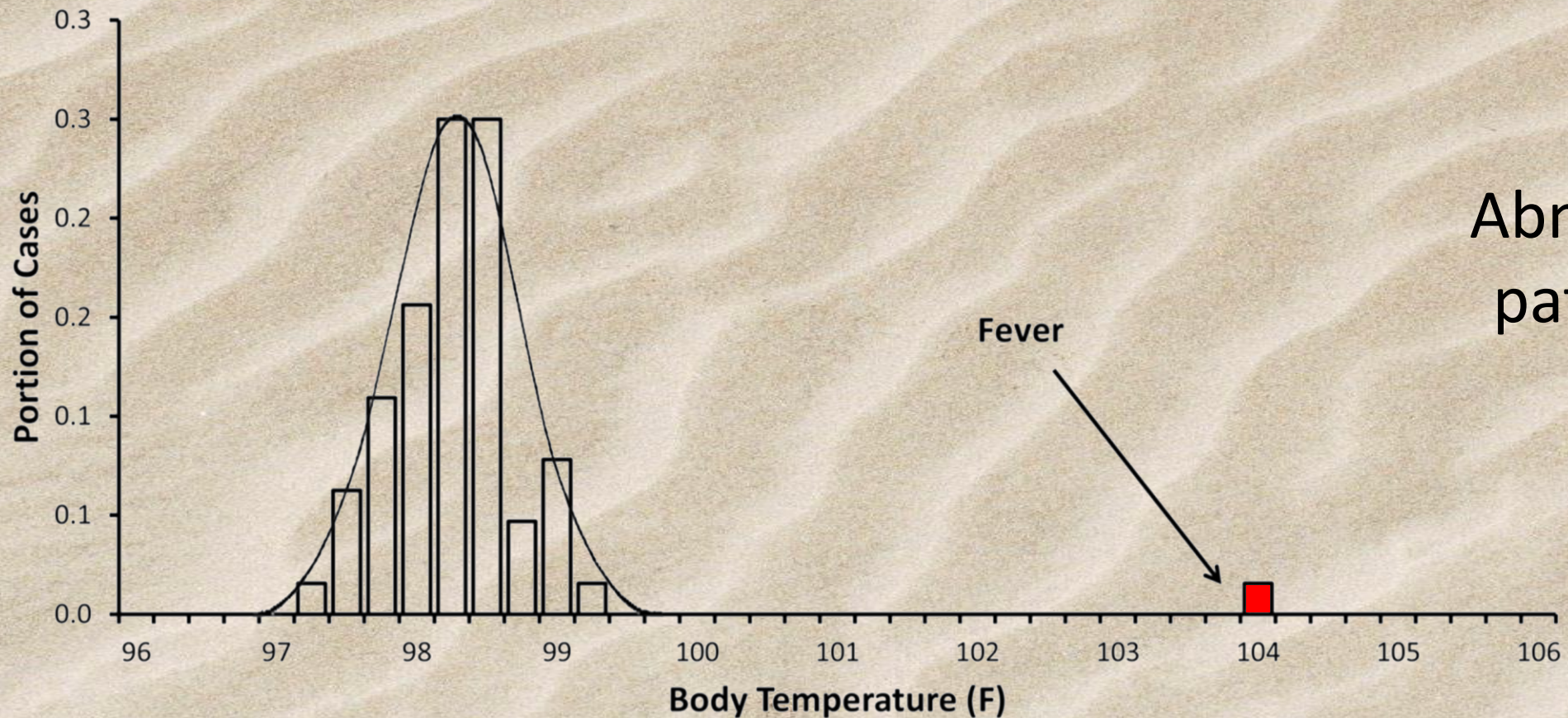
What is the normal noon-time body temperature of an 85 year-old male human who weighs 185 lbs.?

Human Body Temperature - Related to Age and Sex




Sources: <https://pubmed.ncbi.nlm.nih.gov/11005363/> and, <https://doi.org/10.1093/gerona/blr001>

Body Temperature



Abnormality is pathological.



**How do naturally observed patterns
achieve holism?**



“... every being in the universe is universe-referent for its origin and destiny and its proper role in the great community of existence.”

Thomas Berry



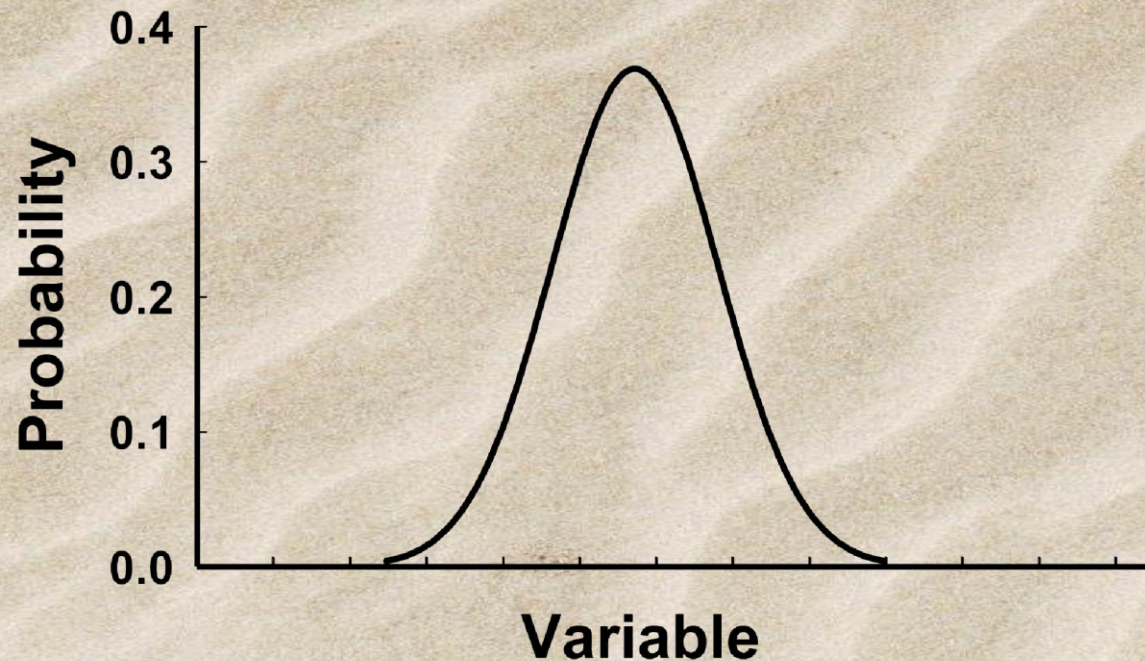
“The wonderful thing about the universe is that it constitutes an absolute unity in which each component is universe-referent and all the components are inter-referent among themselves.”

Thomas Berry

In other words:

Every pattern, every part of reality, is the result of everything that contributed to it's being what it is and does.

Probability distribution



$$= \sum_{i=0}^{\infty} f(e_i)$$

A red arrow points to the infinity symbol (∞) in the equation.



**Everything in the universe has a story that
excludes nothing!**



The Signature of All Things

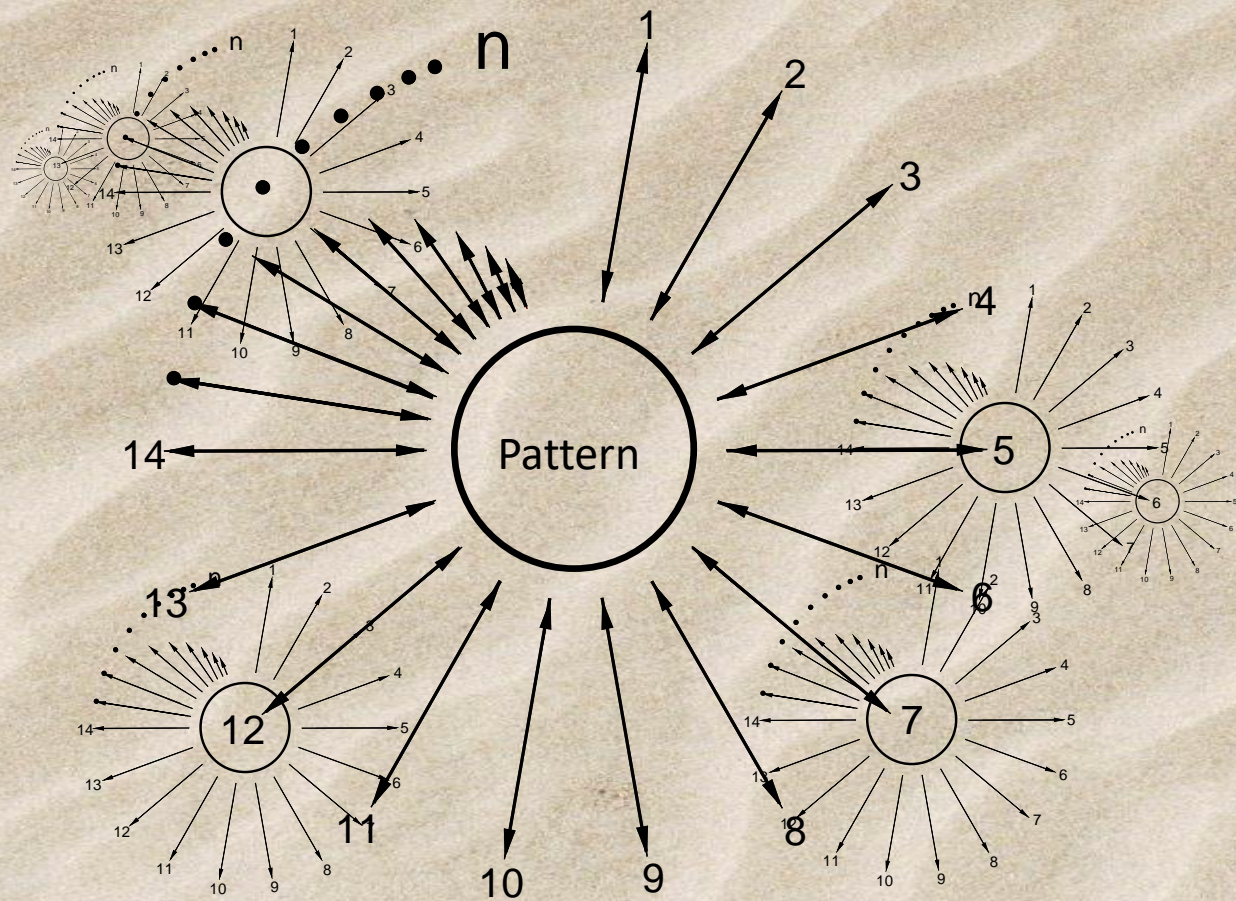
- Elizabeth Gilbert



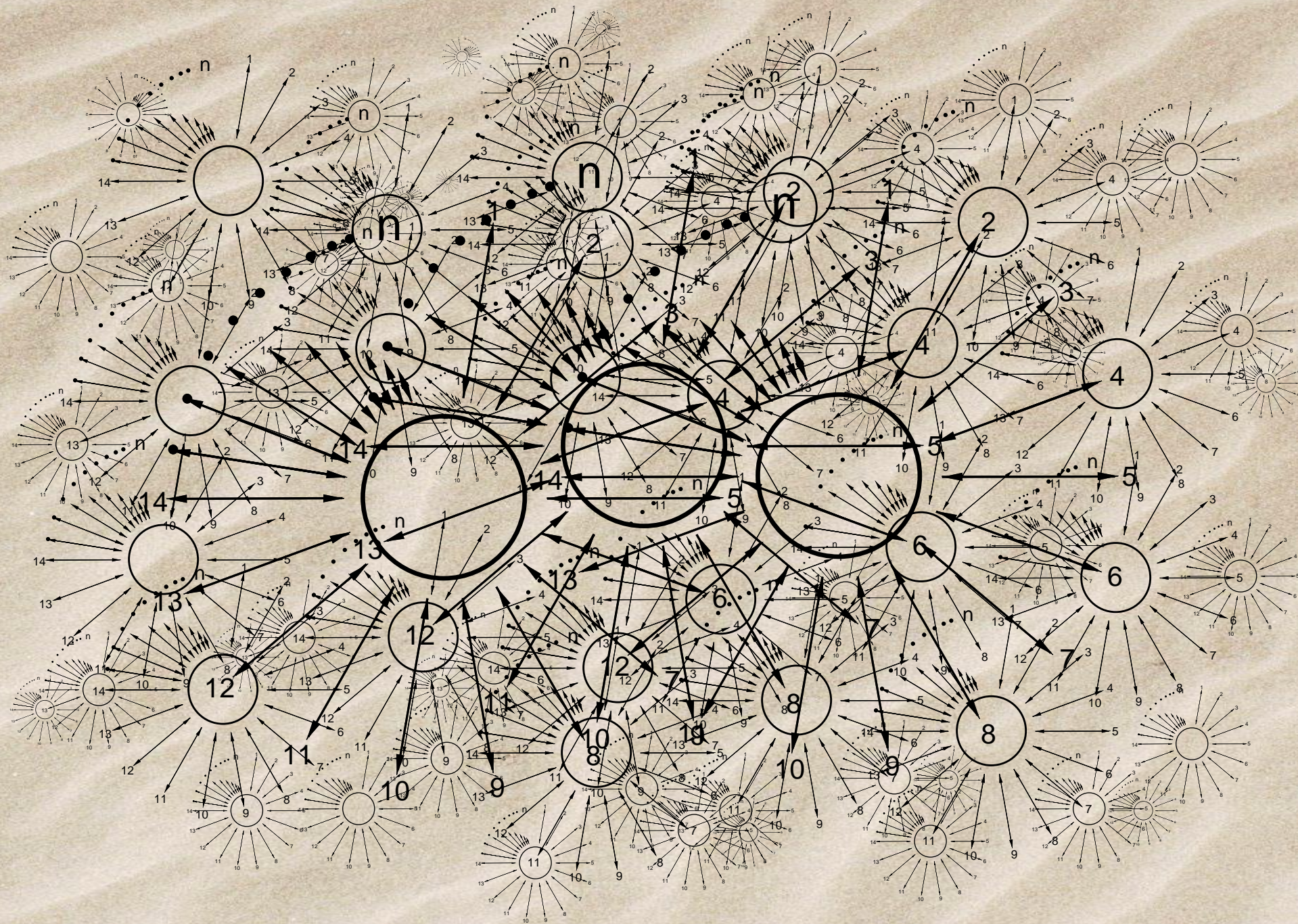
(Photo courtesy of NASA/GSFC/NOAA/USGS)

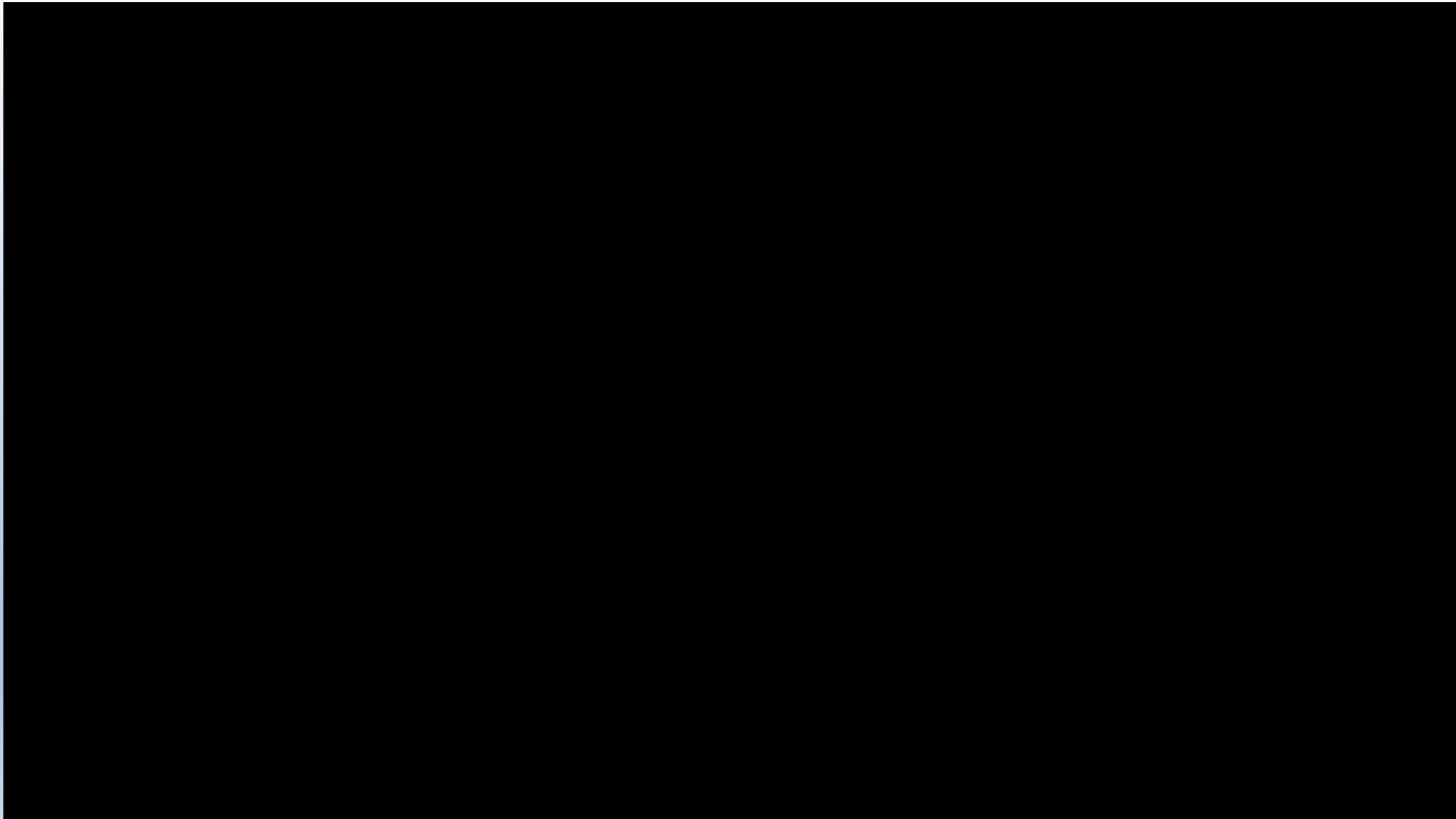
Albert Einstein:
“God does not care
about our
mathematical
difficulties. He
integrates
empirically.”

Infeld, L. 2006. Quest: An autobiography. American
Mathematical Society, Providence, RI. 361p.



$n \rightarrow \infty$







(Photo courtesy of NASA, ESA, CSA, STScI; J. DePasquale, A. Koekemoer, A. Pagan (STScI)).







Fritjof Capra and David Steindl-Rast:
“The one reality to which we ultimately
belong ... can be called God.”

Capra, Fritjof and David Steindl-Rast with Thomas Matus, *Belonging to the Universe* (New York: Harper and Row, 1991), 16.

A close-up photograph of a sandy path lined with small, light purple flowers and green foliage. The path is made of light-colored sand and runs diagonally from the bottom left towards the top right. On either side of the path, there are numerous small, five-petaled purple flowers with yellow centers, interspersed with green, succulent-like plants. The lighting is soft, creating a gentle, natural atmosphere.

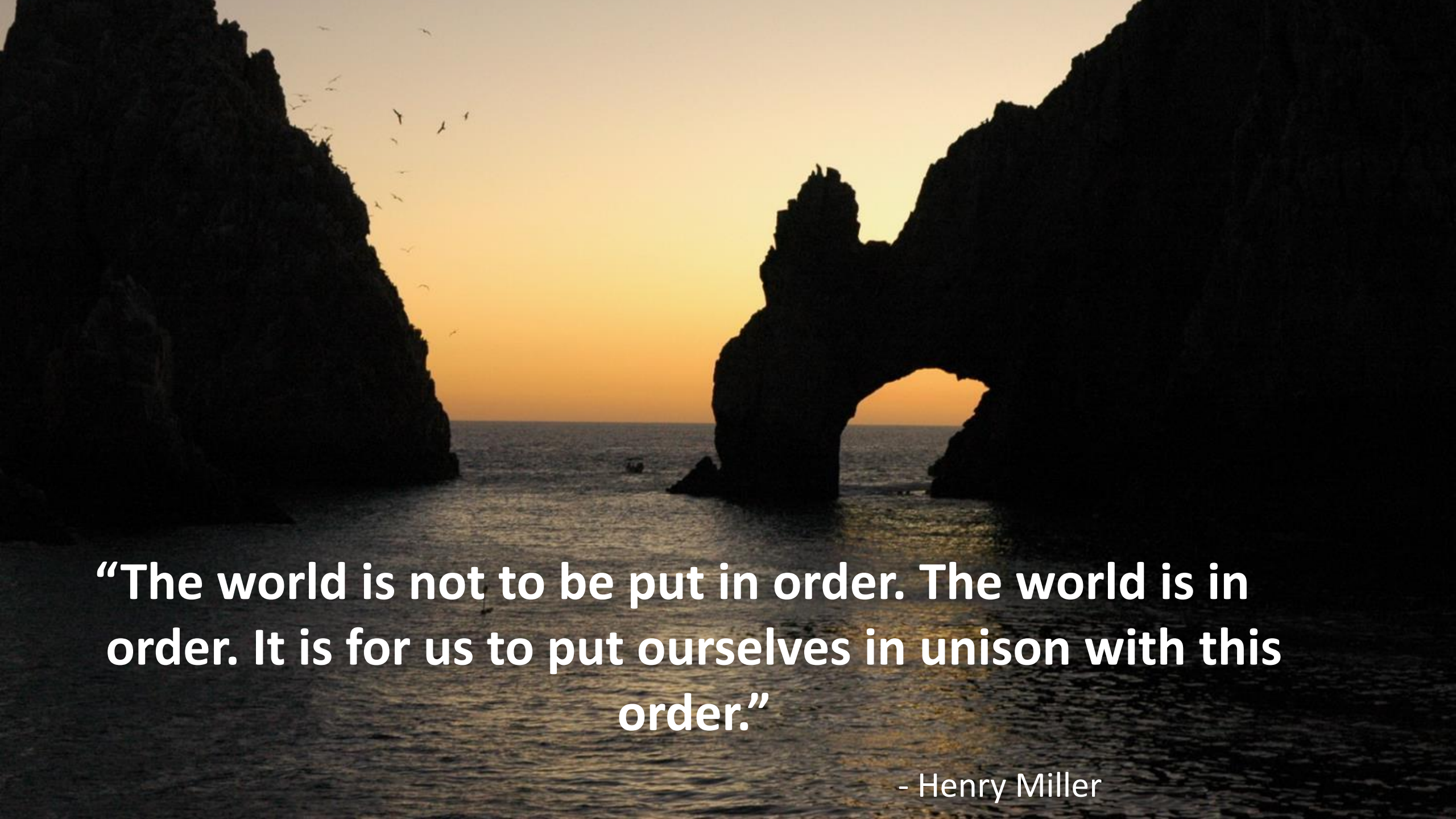
“Let nature be your guide.”

- Michael Maier



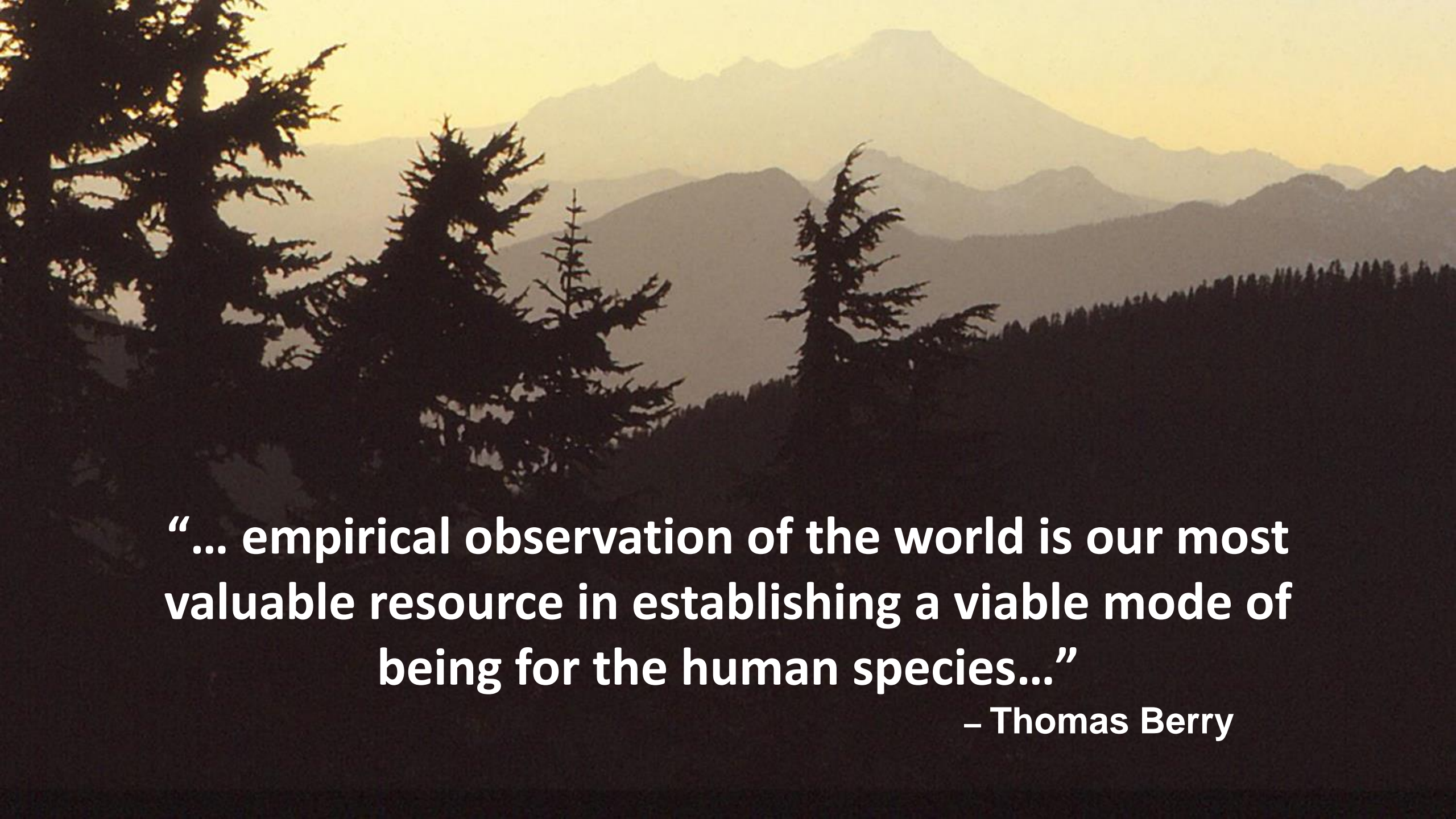
“The goal of life is living in agreement with nature.”

- Zeno



“The world is not to be put in order. The world is in order. It is for us to put ourselves in unison with this order.”

- Henry Miller



“... empirical observation of the world is our most valuable resource in establishing a viable mode of being for the human species...”

– Thomas Berry



“... in talking about living things or self-corrective circuits, we should follow the example of the entities about which we are talking.”

– Gregory Bateson



“Nature is an incomparable guide if you know how to follow her.”

- C.G. Jung

“Come forth into the light of things, let nature
be your teacher.”

- William Wordsworth



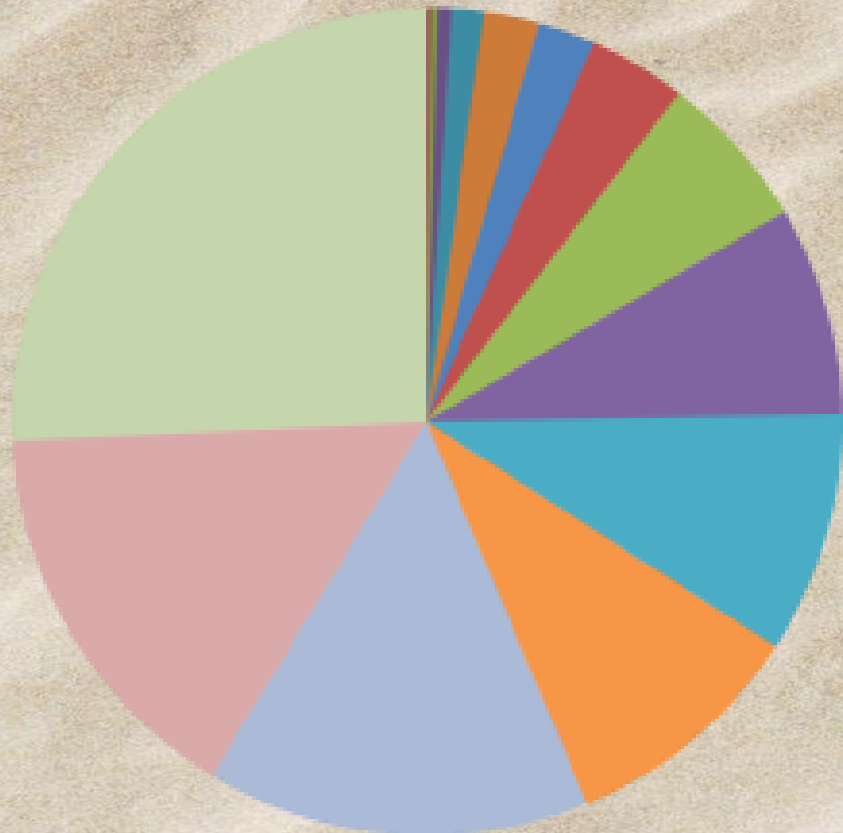


We have the option of seeing other species of mammals of our body size as ecological role models.

First example: Harvesting Biomass in the Marine Environment

If we were to participate in reality as a normal species of mammal of our body size, how much biomass would we harvest from the marine environment each year?

Total Marine Biomass Consumed by 15 Species (1,000 metric tons per year)



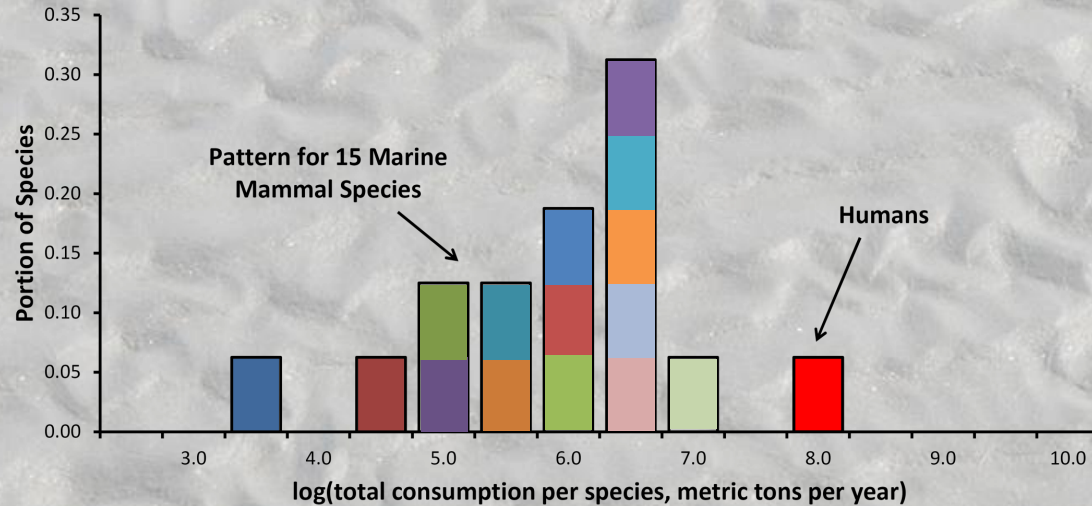
- Finless porpoise (5.61)
- Harbour porpoise (43.50)
- White beaked dophin (57.66)
- White sided dolphin (143.21)
- Hourglass dolphin (324.63)
- Risso's dolphin (553.30)
- Northern right whale dolphin (570.01)
- Fraser's dolphin (982.40)
- Dall's porpoise (1,572.61)
- Bottlenose dolphin (2,103.62)
- Spinner dolphin (2,424.07)
- Pacific white-sided dolphin (2,464.15)
- Striped dolphin (3,854.18)
- Spotted dolphin (4,017.30)
- Common dolphin (6,610.59)

Total Marine Biomass Consumed by 16 Species - Including Humans (1,000 metric tons per year)



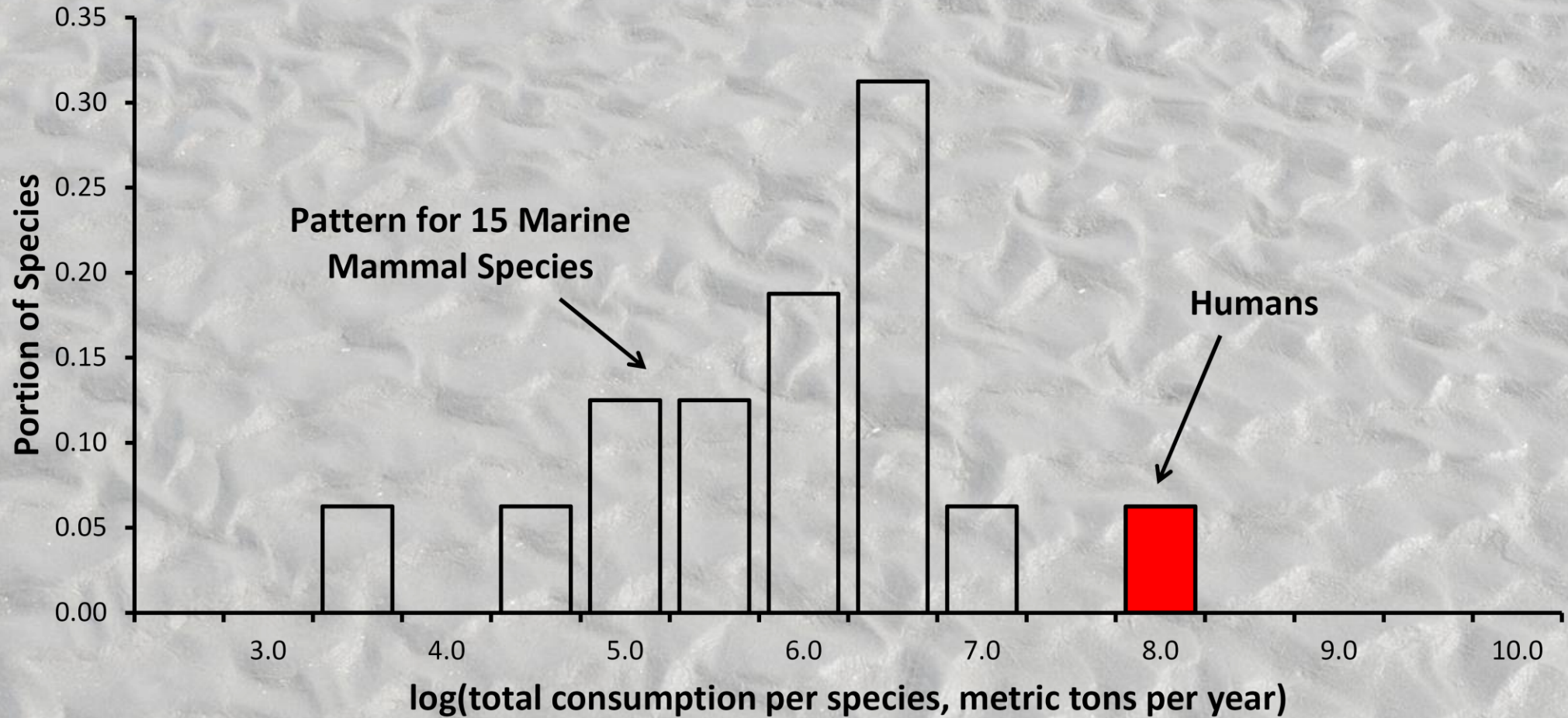
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- Common dolphin (6,610.59)
- Humans (105,302.00)

Total Biomss Consumption - Marine Environment

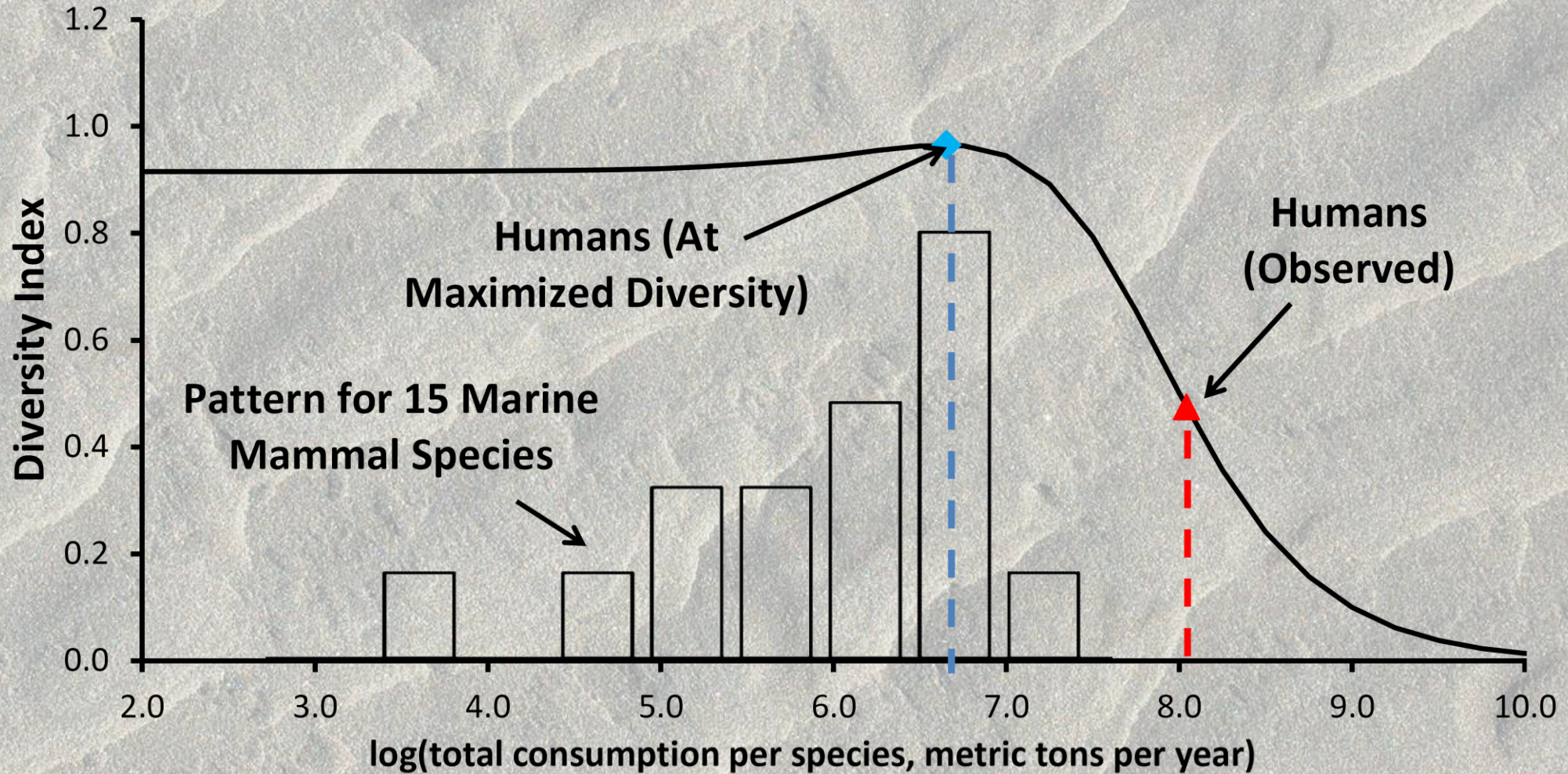


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- **Humans (105,302.00)**

Total Biomss Consumption - Marine Environment

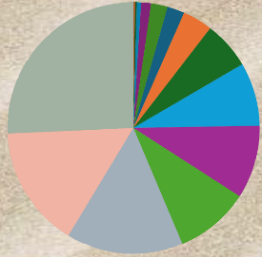


Diversity as Function of Consumption by Humans in the Marine Environment

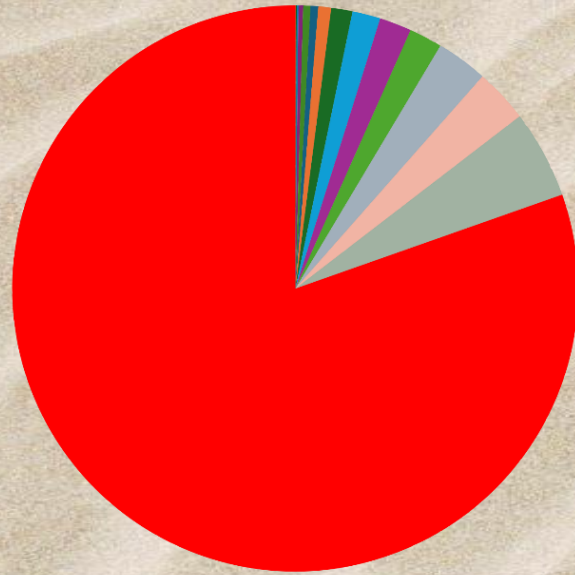


Total Marine Biomass Consumed

A



B



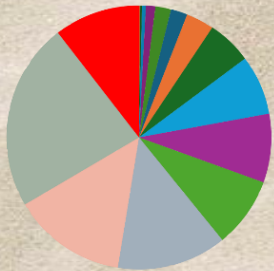
A. Nonhuman Species

B. Including Humans

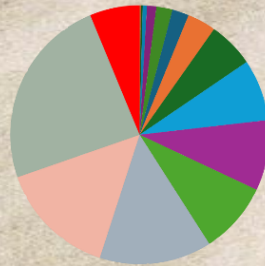
C. Humans at Maximum Diversity

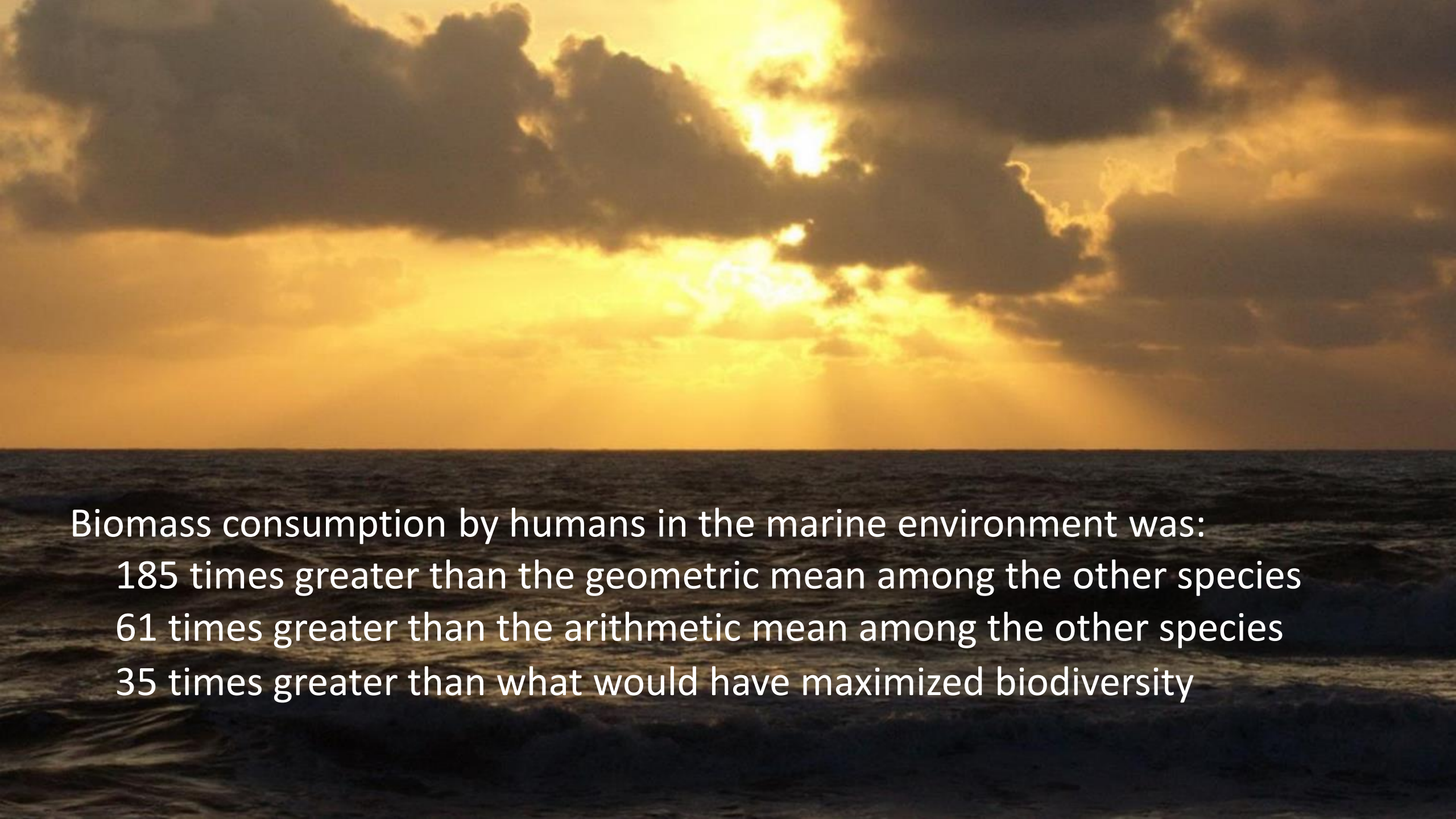
D. Humans at Average Among Nonhumans

C



D



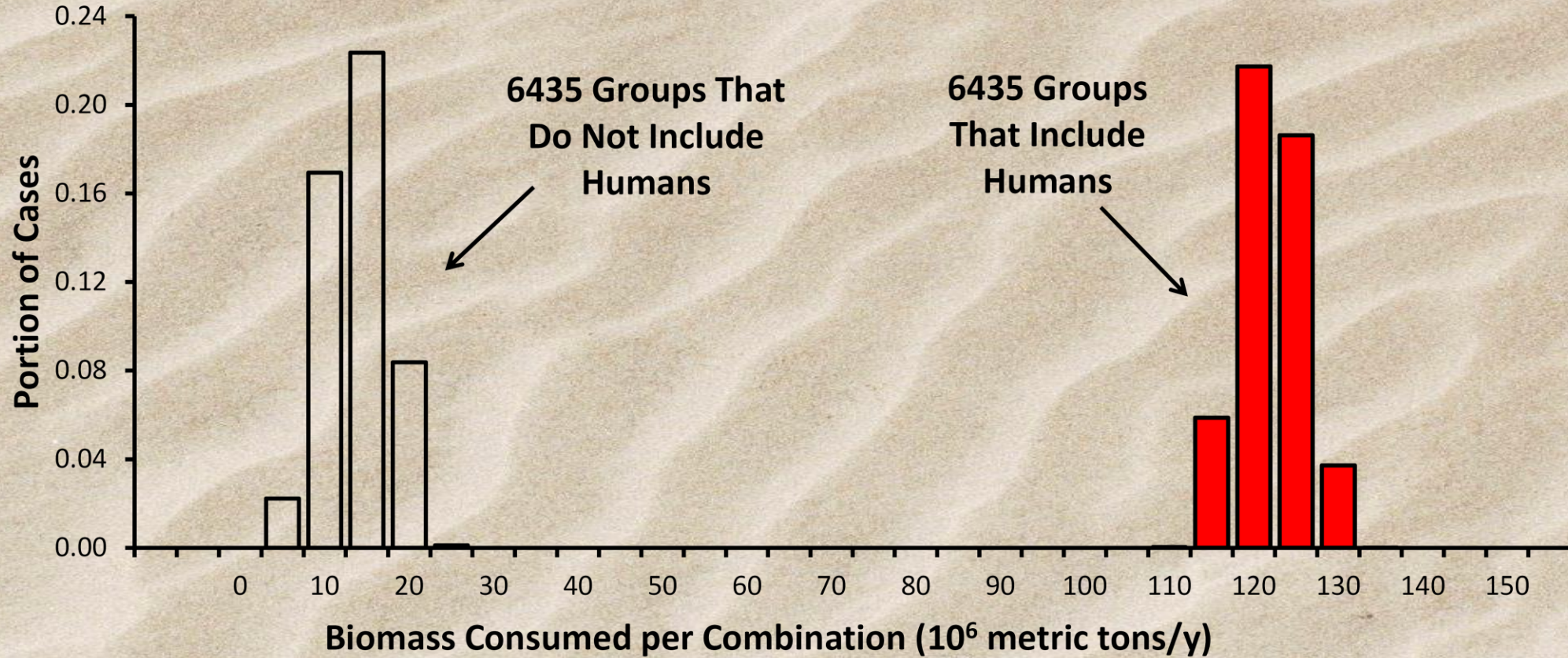


Biomass consumption by humans in the marine environment was:
185 times greater than the geometric mean among the other species
61 times greater than the arithmetic mean among the other species
35 times greater than what would have maximized biodiversity

- ■ Finless porpoise (5.61)
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- ■ Humans (105,302.00)

These 16 species can be sampled 8 at a time to get 12,870 distinct combinations half of which include humans.

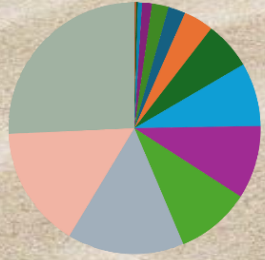
Biomass Taken in the Marine Environment by Groups of Eight Species



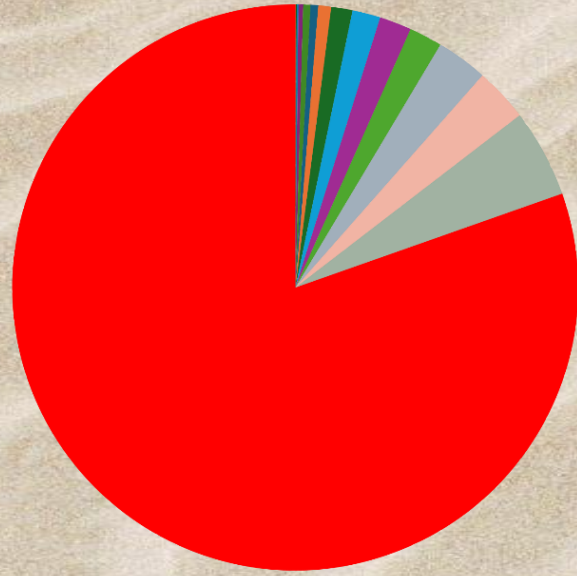
The harvest by humans was 64 times larger than what would make the two groups of groups have the same average.



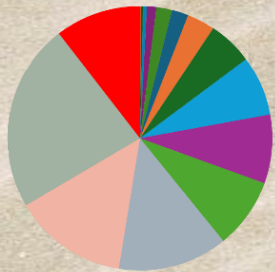
A



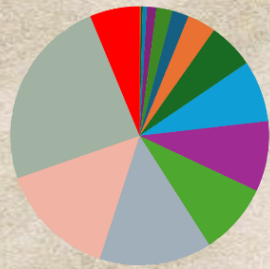
B



C



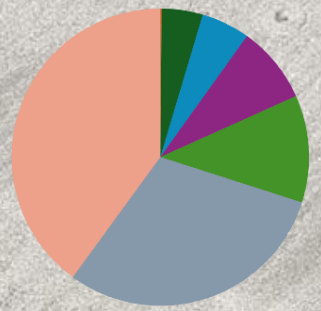
D



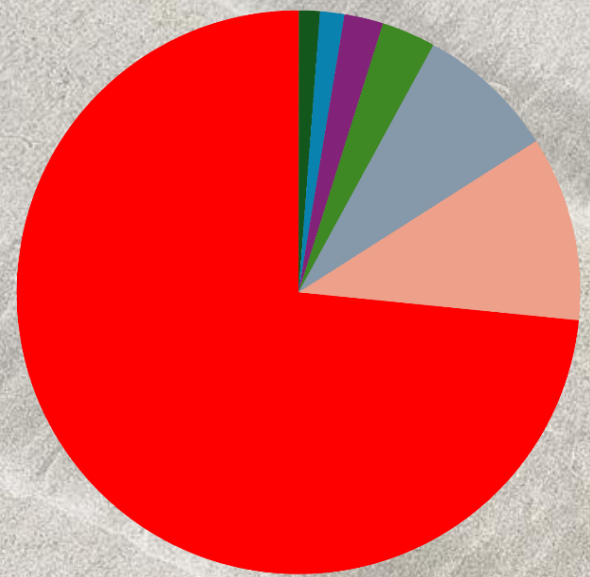
The Full Marine Environment

The Marine Part of the Biosphere

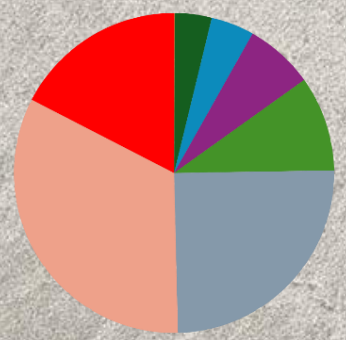
A



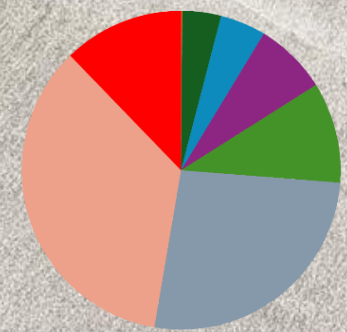
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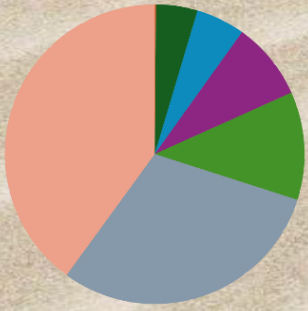
An Ecosystem

The Eastern Bering Sea

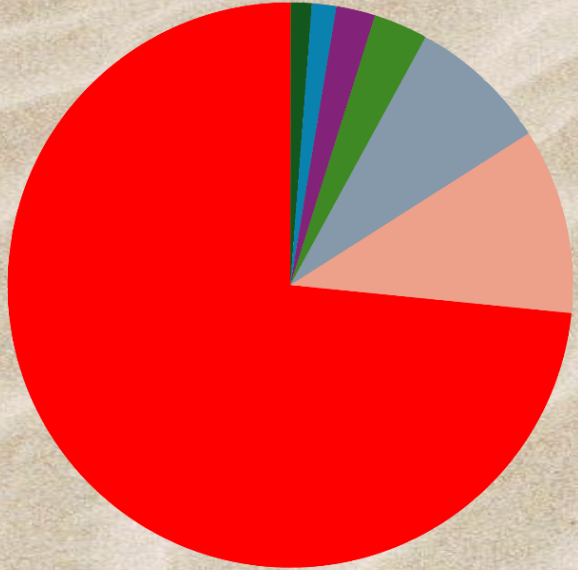
A group of species

The finfish of the Eastern Bering Sea

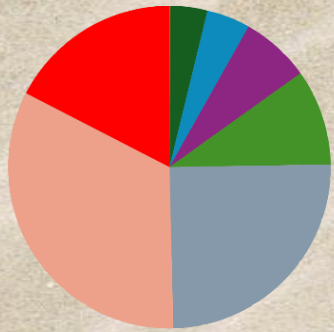
A



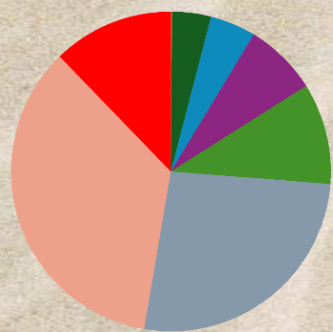
B



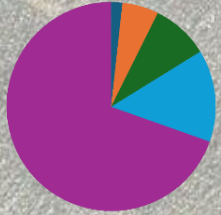
C



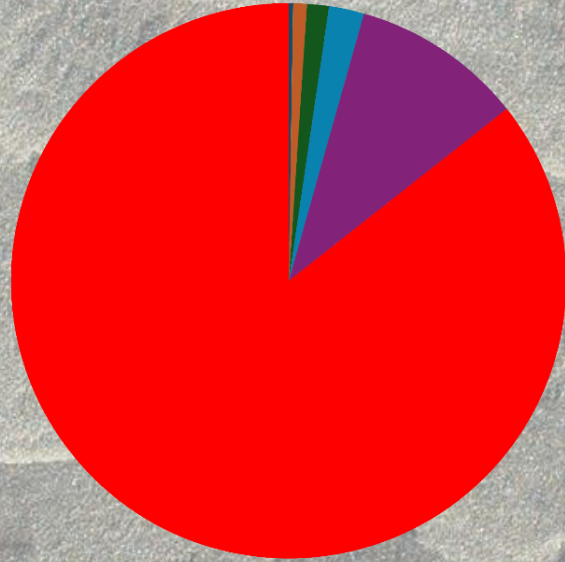
D



A



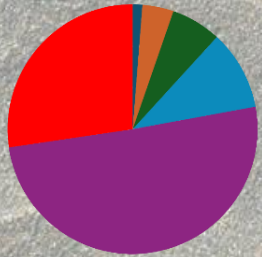
B



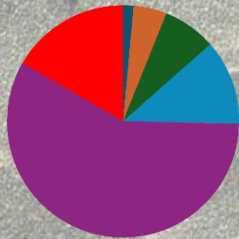
A single species

*Pollock in the
Eastern Bering Sea*

C



D

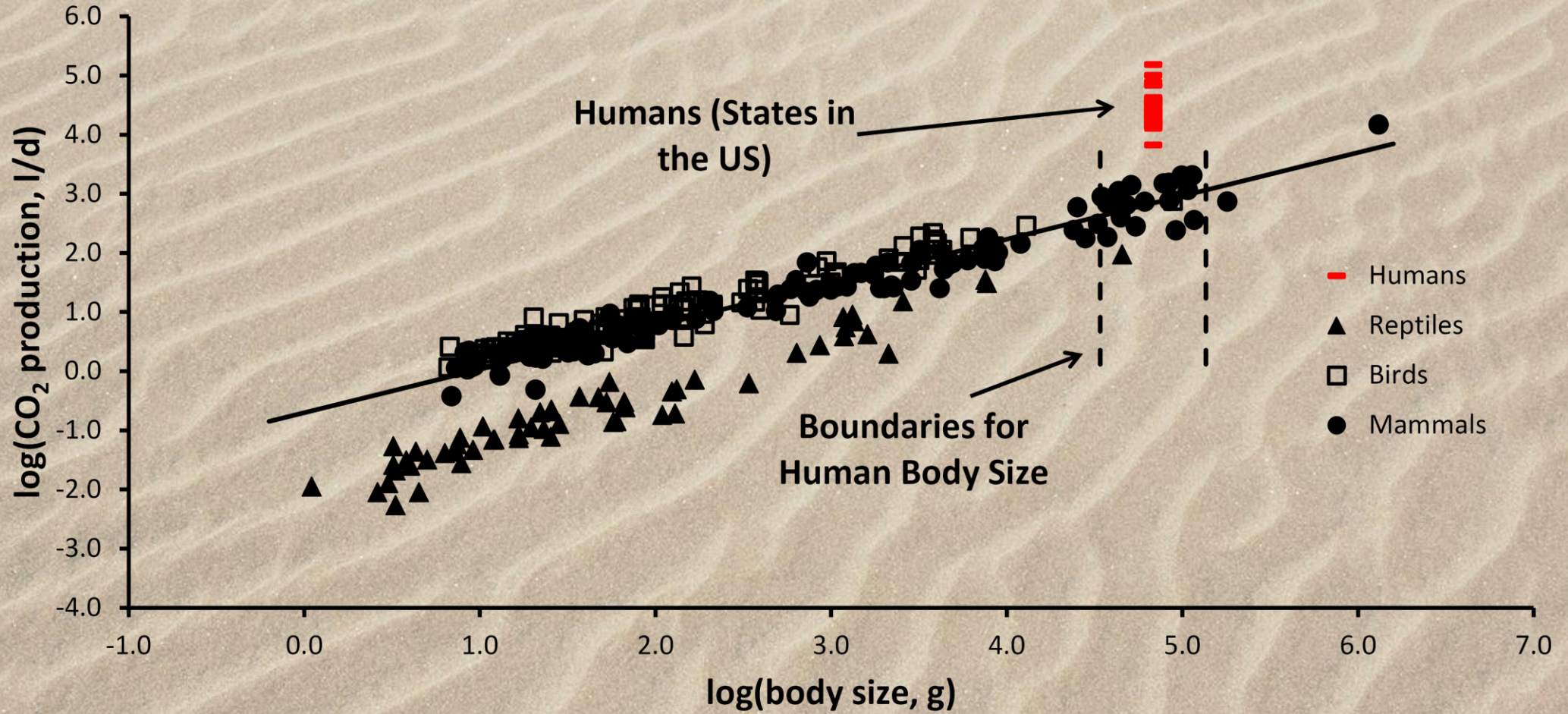


**Biomass consumption is not the only
metric that applies to species!**

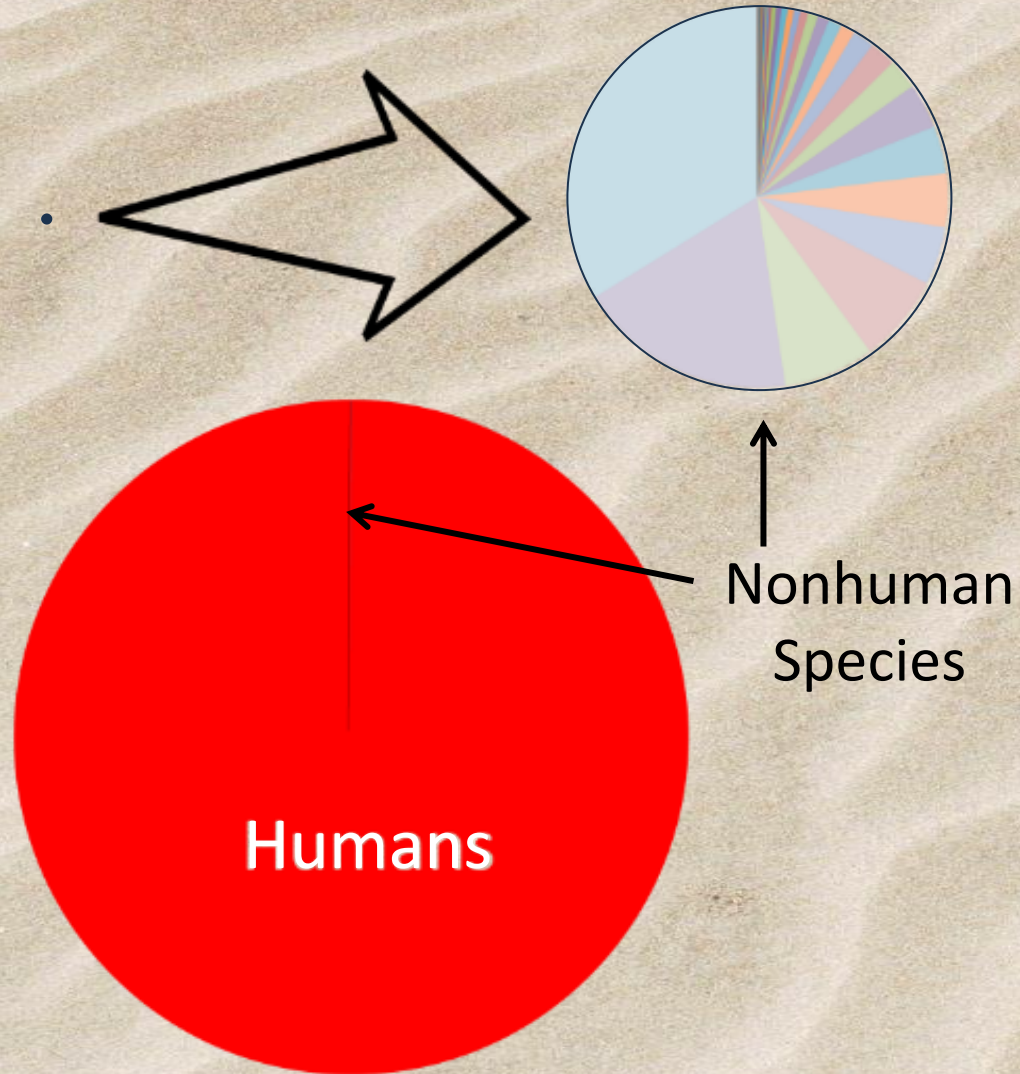
If we were to participate in reality as a
normal species of mammal of our body size,
how much CO₂ would we produce each
year?



Per Capita CO₂ Production

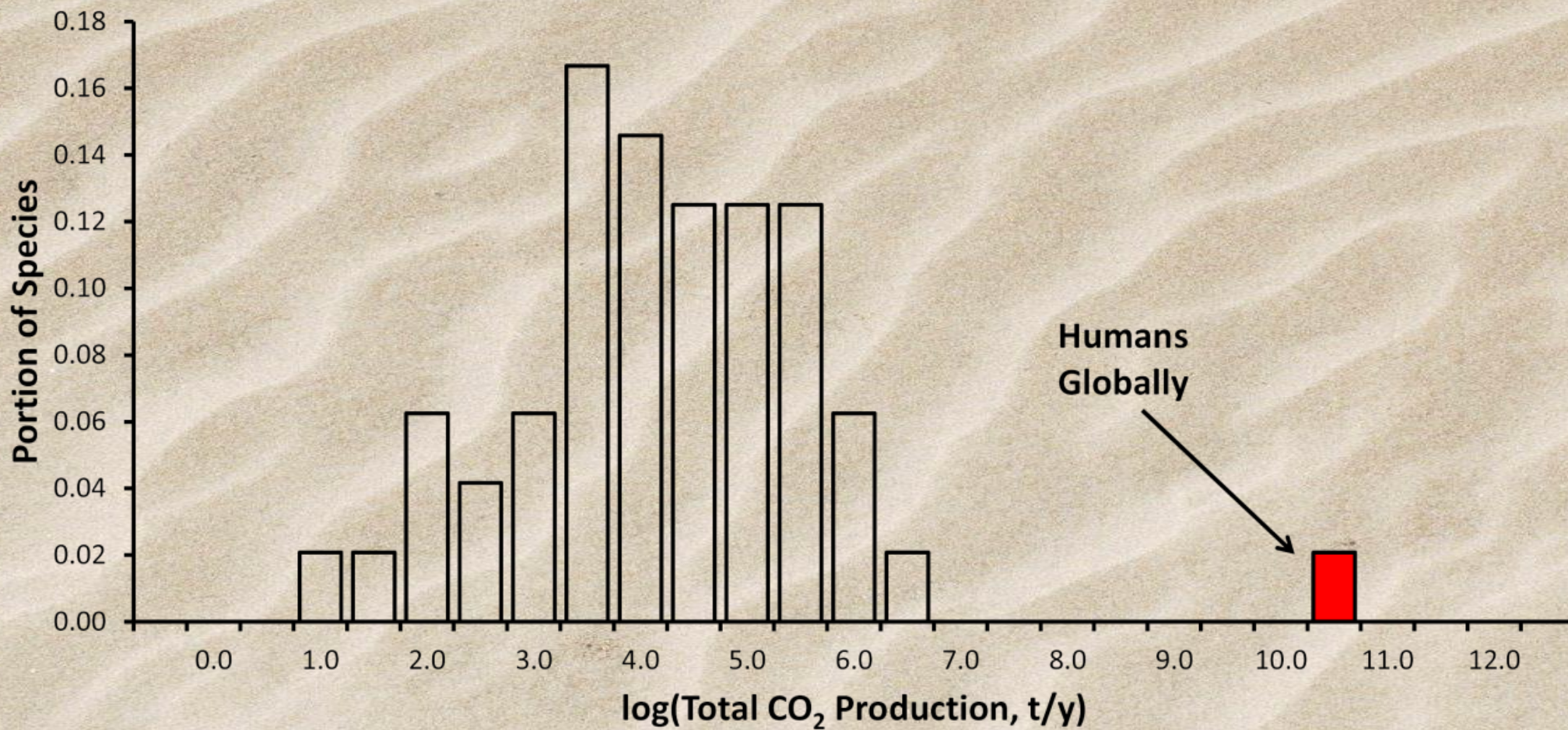


Global CO₂ Production



CO₂ production by humans is about 3,000,000 times greater than the average among the nonhuman species!

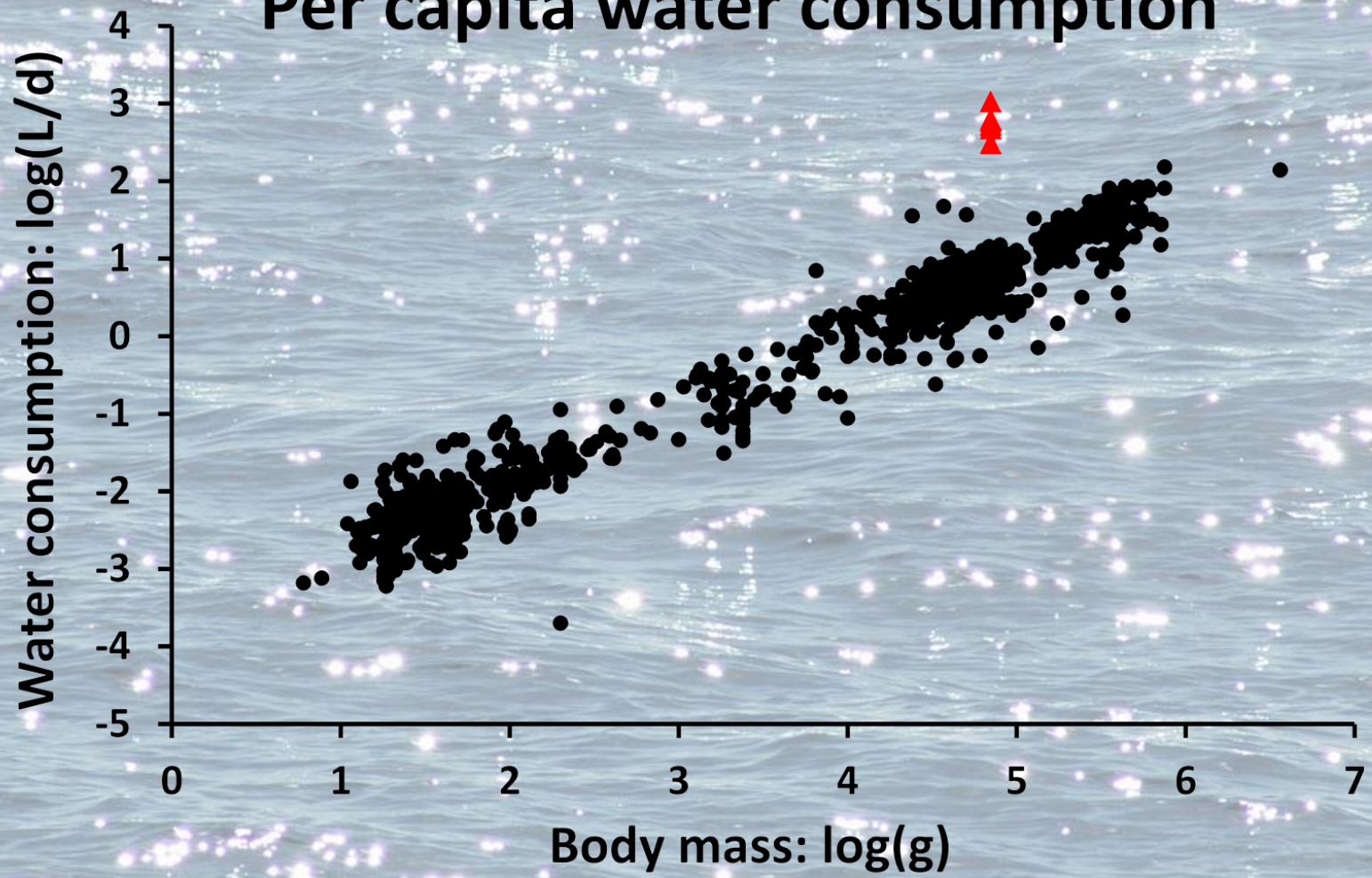
Total CO₂ Production



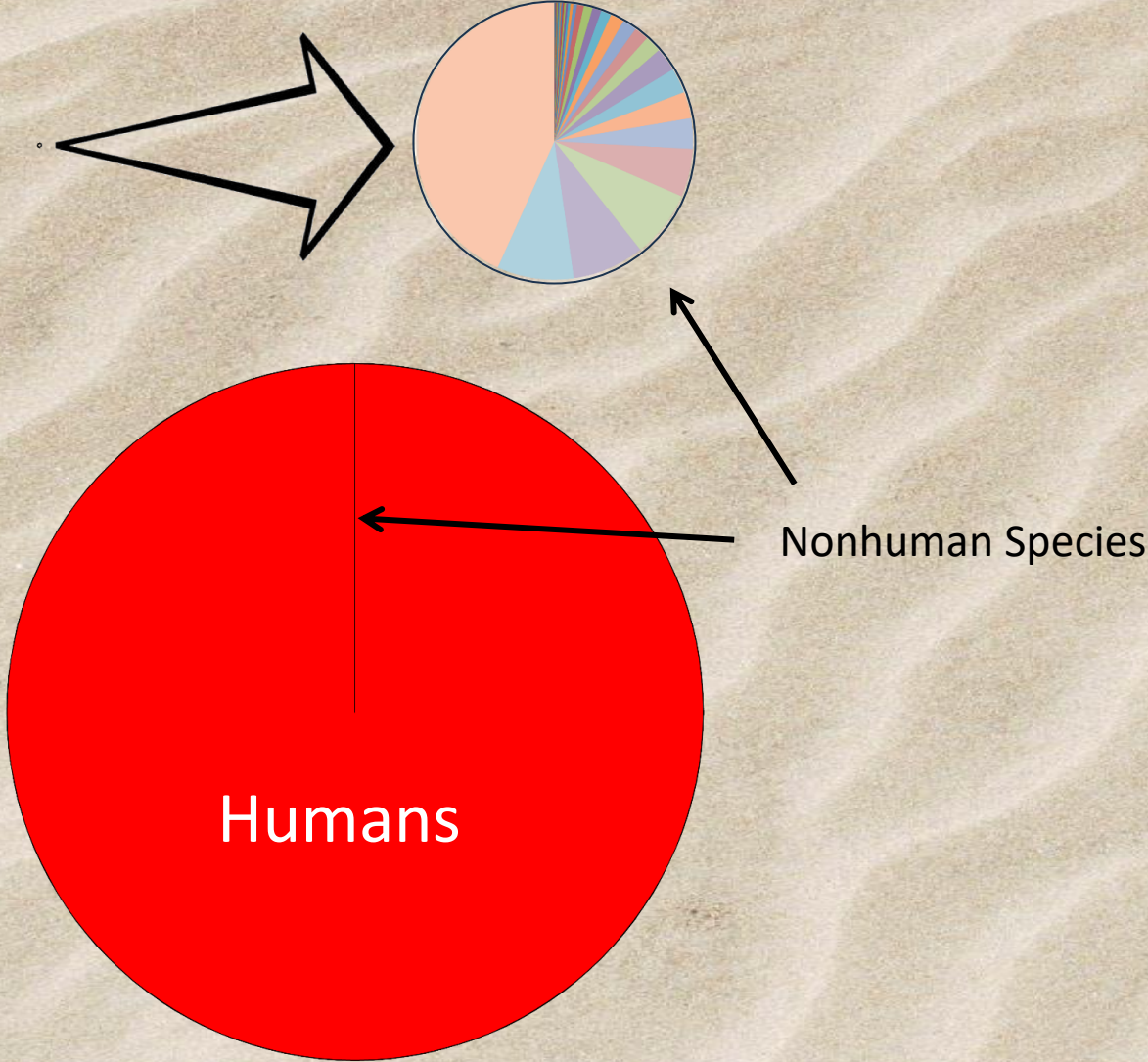
**Water consumption is another metric that
applies to species!**

If we were to participate in reality as a normal
species of mammal of our body size, how
much water would we consume each year?

Per capita water consumption

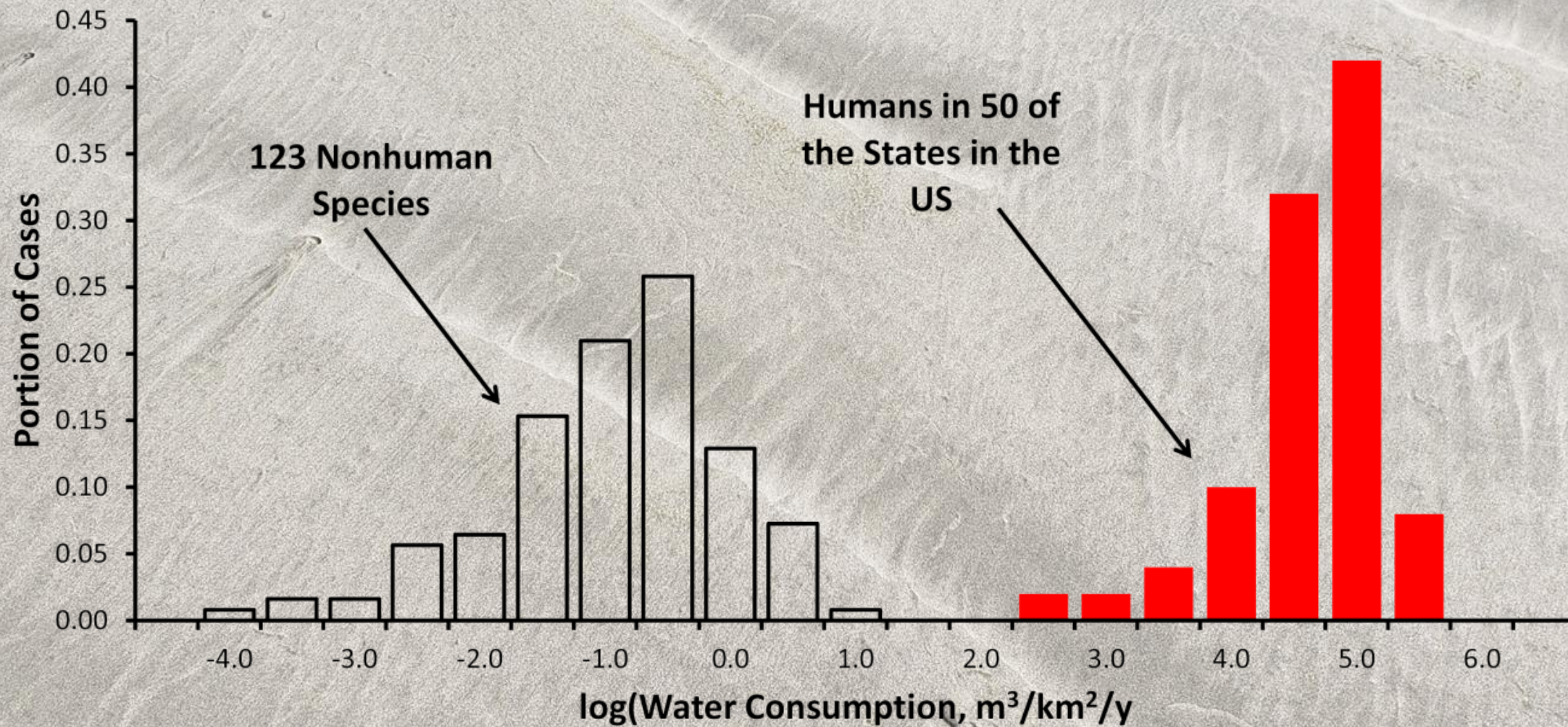


Global Water Consumption

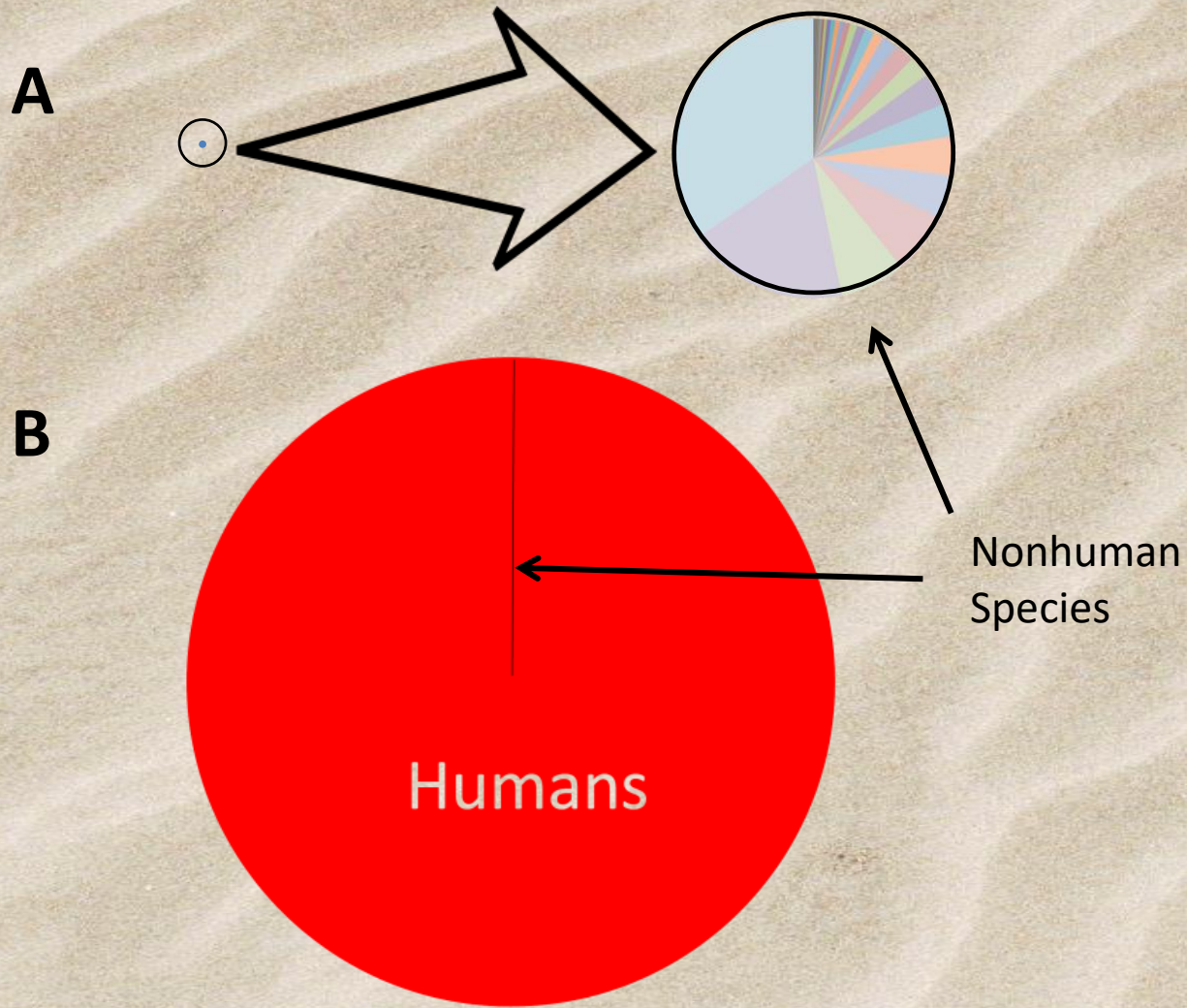


Global water consumption by humans is over 82,000 times more than the average for the nonhuman species!

Water Consumption per Unit Area

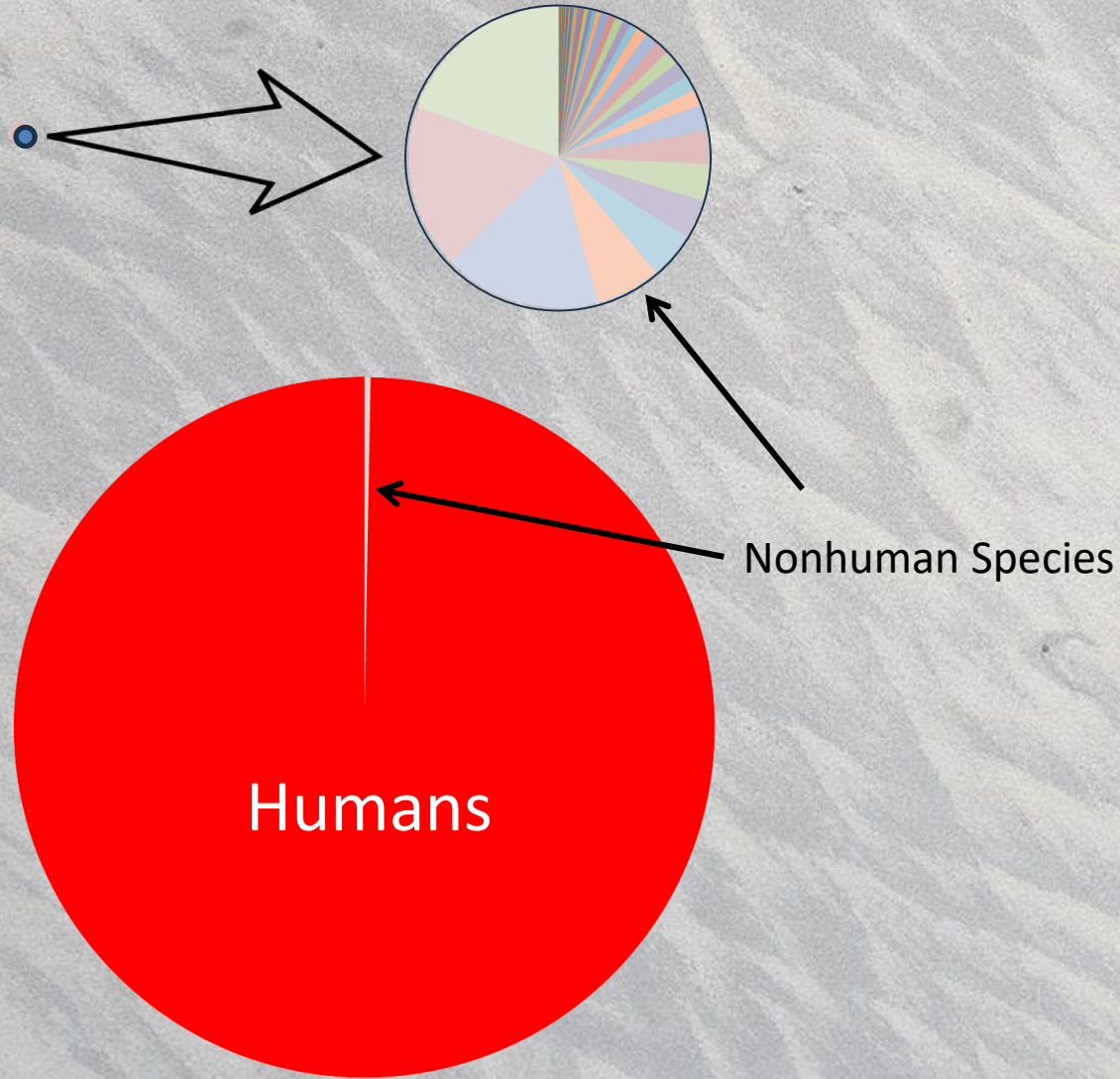


Global Oxygen Consumption



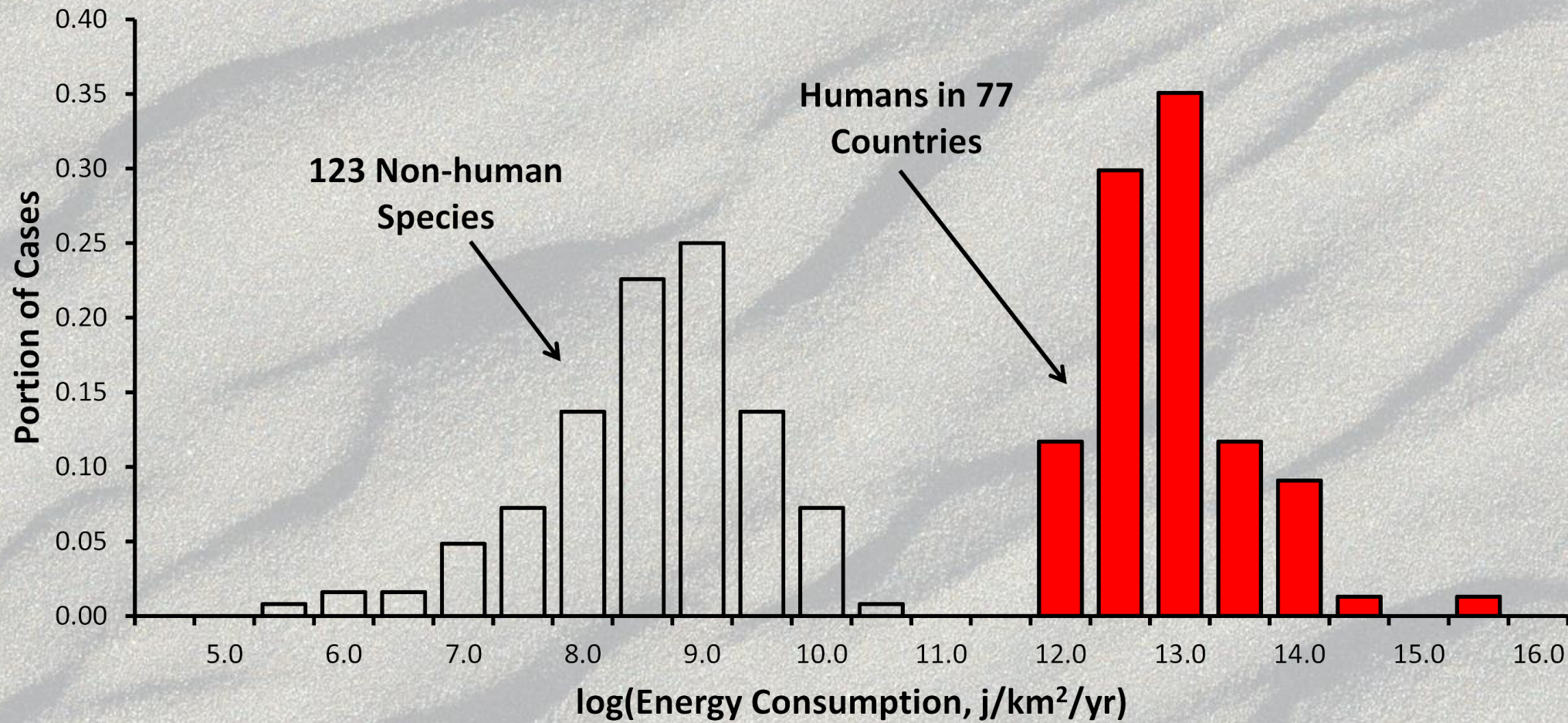
Humans consume almost 2,900 times as much O_2 as is consumed by the average among nonhumans.

Global Energy Consumption

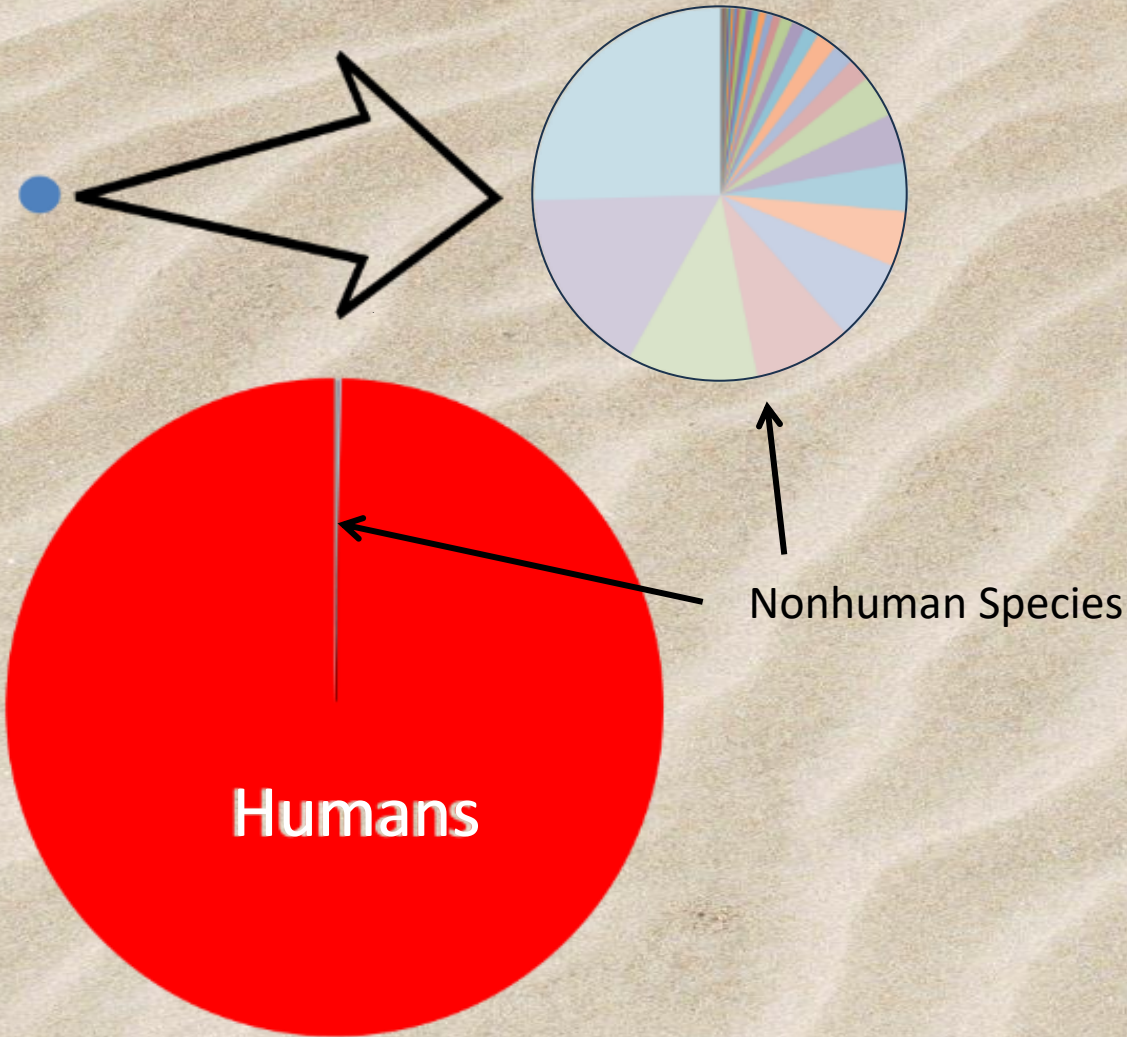


Humans
consume about
154,000 times as
much energy as
the average
nonhuman
species of
mammal of
human body size!

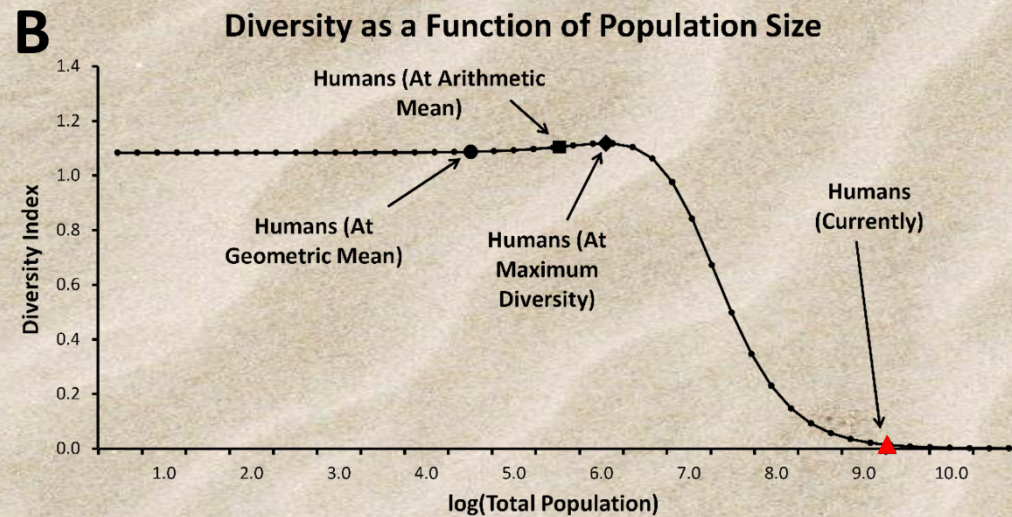
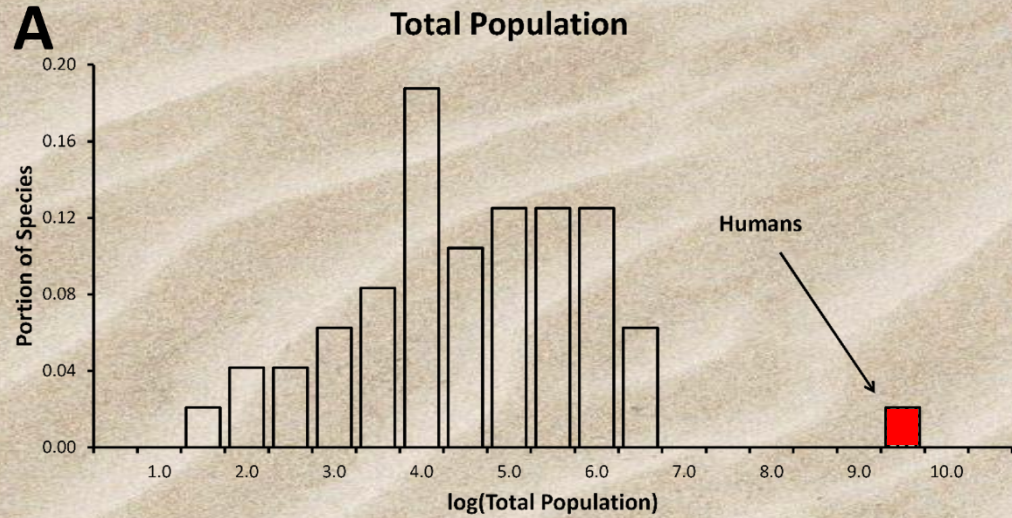
Energy Consumption per Unit Area



Total Global Population

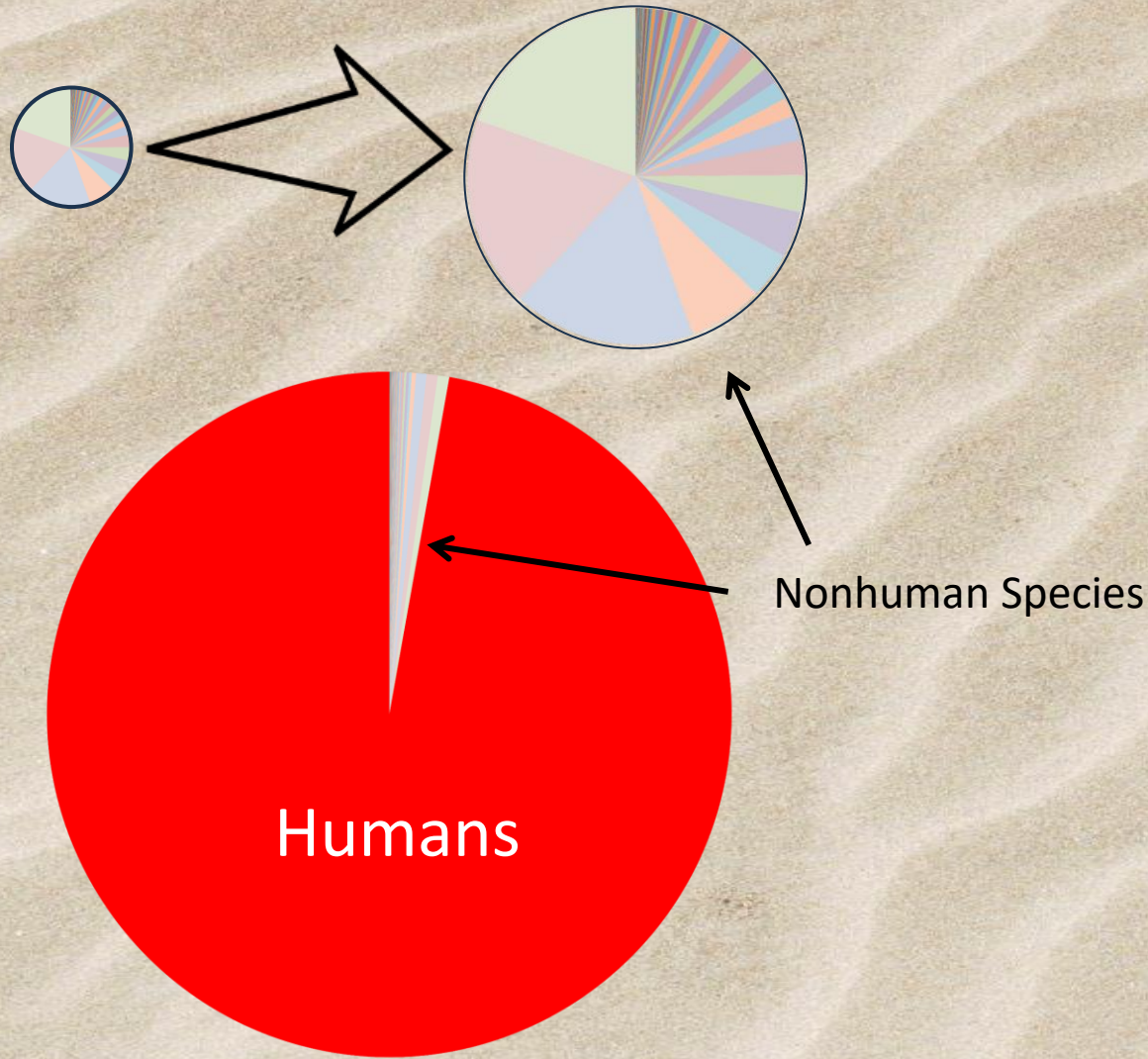


The current human population is over 21,000 times larger than the average for the other species!



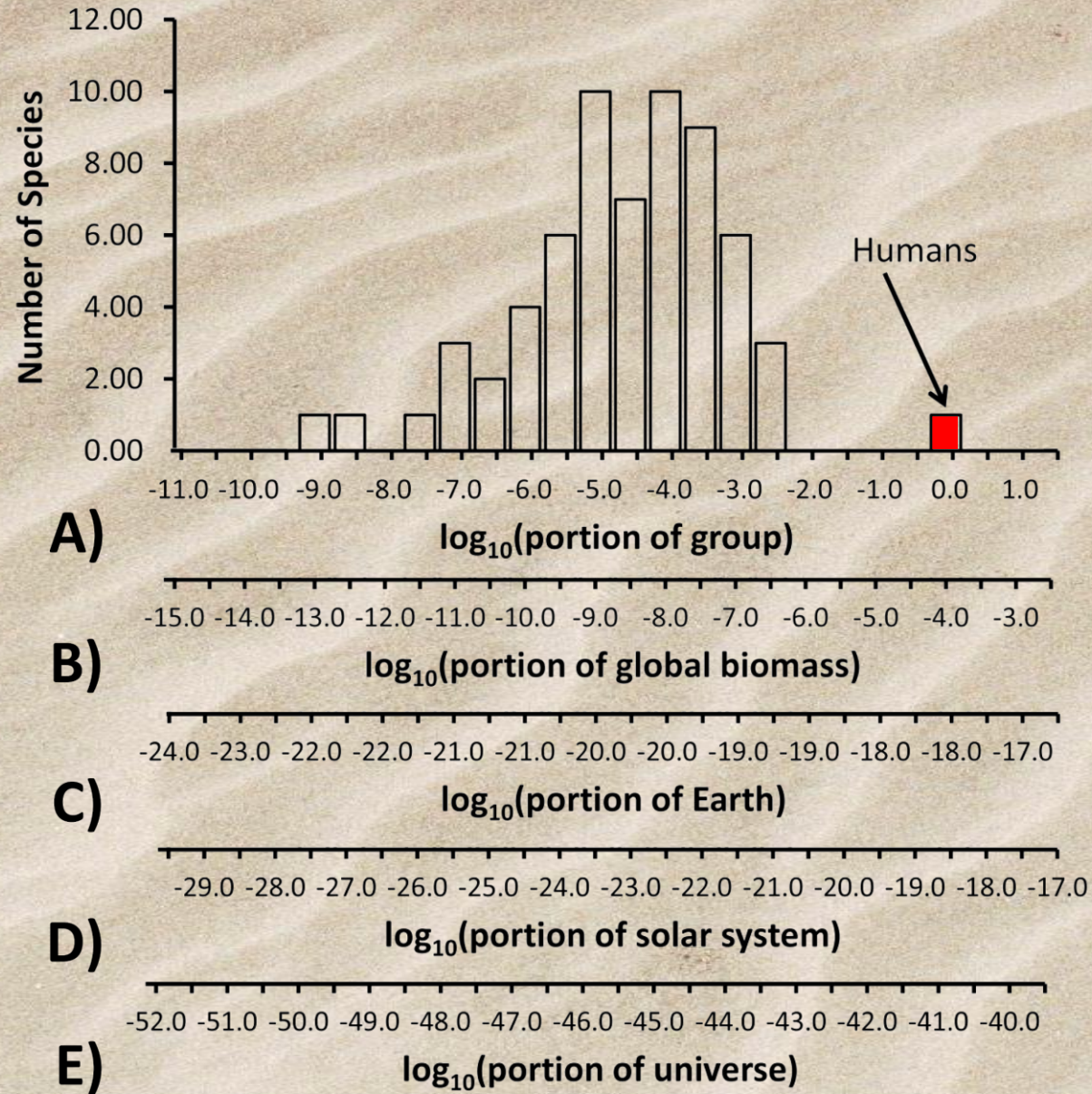
The current human population is about 3,600 times larger than what would maximize biodiversity!

Total Global Biomass



The current human biomass is about 2,180 times larger than the average for the other species!

Total Mass in Different Scales

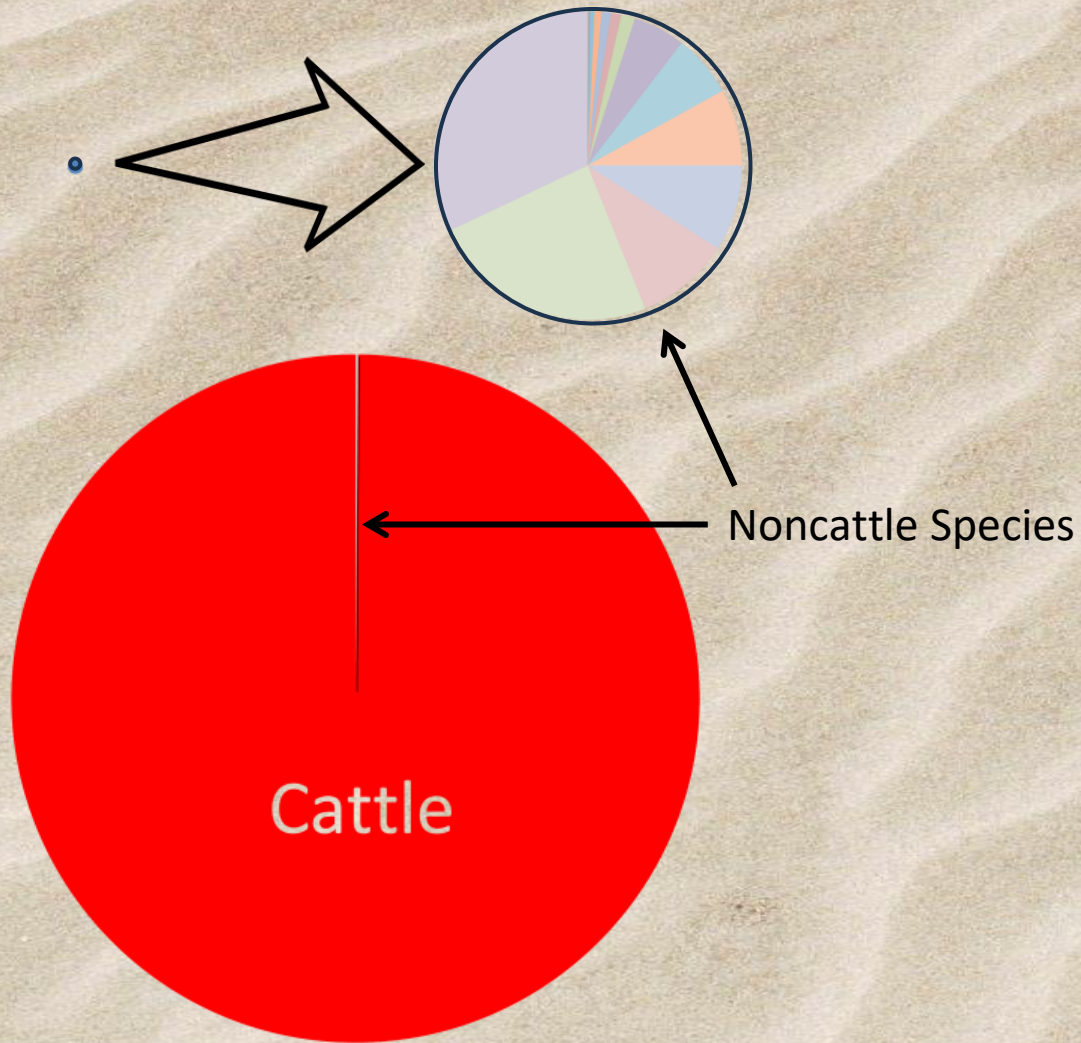


Consonance is essential in using normative information (it is imperative that we avoid logical typing errors).

**Normative information also applies to
domestic species!**

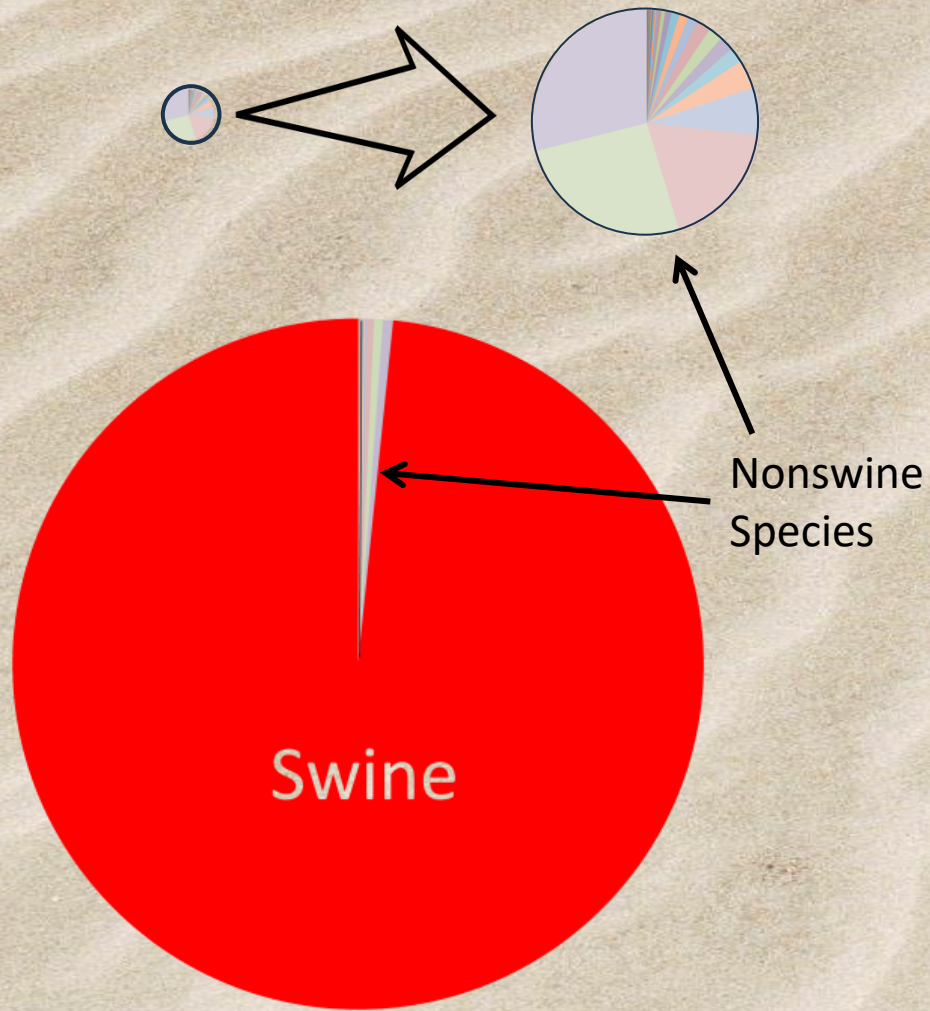
How large would the population of
domestic cattle be if it were normal for
species of mammals of its body size?

Global Population Size



Cattle, world-wide, have a population $\sim 13,000$ times as much as the average for the non-cattle species!

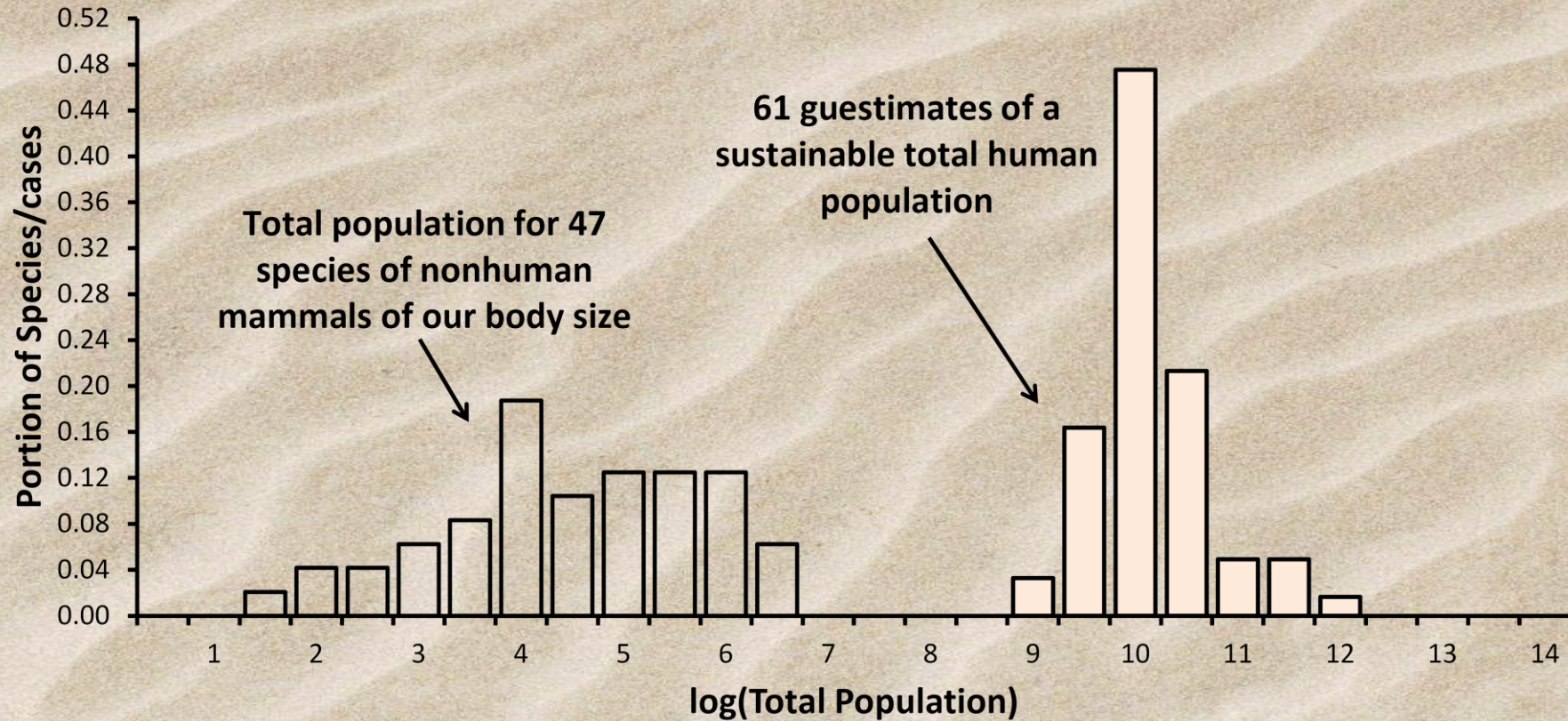
Global Population Size



Swine, world-wide, have a population $\sim 3,300$ times as much as the average for the non-swine species!

Note that, as with body temperature, we are not seeking professional opinion! We are observing normative information.

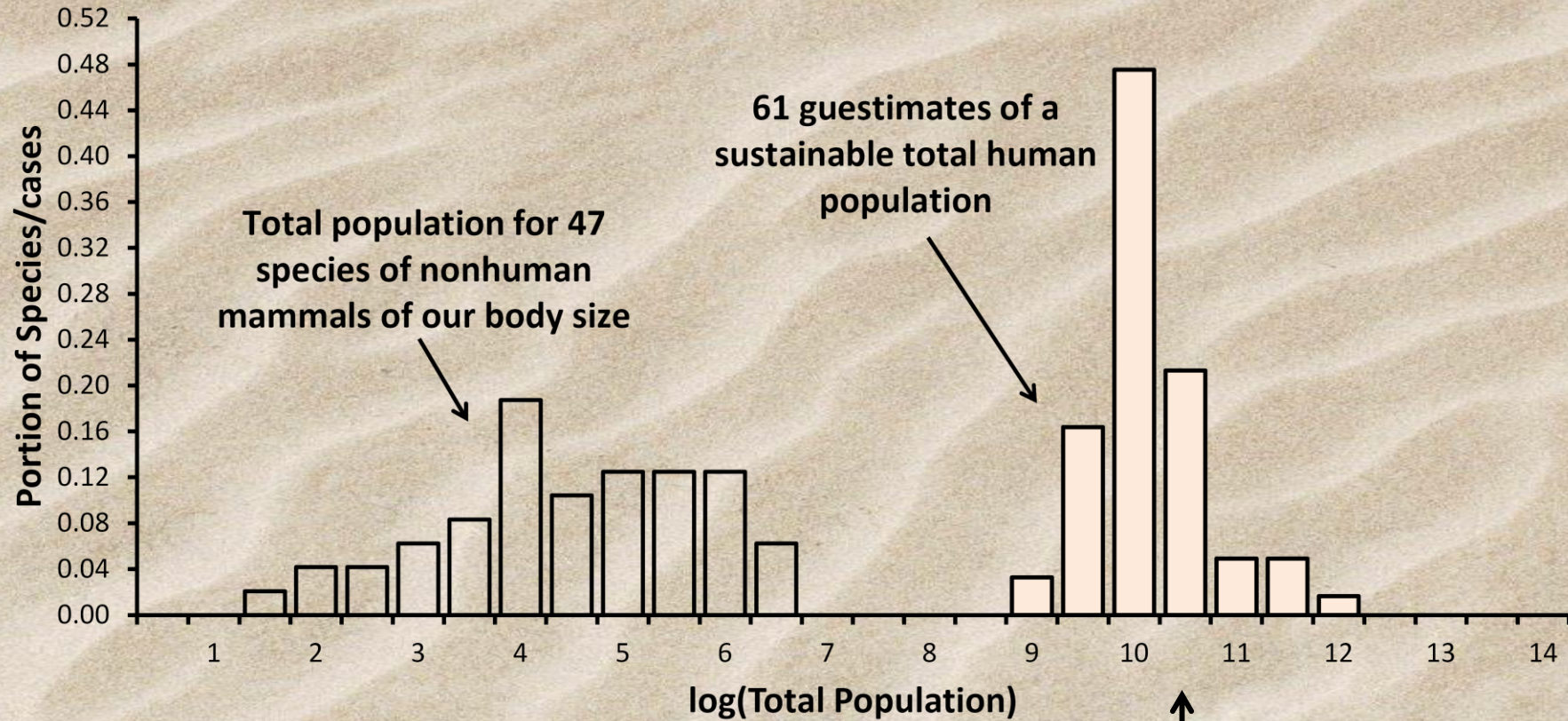
Total Population



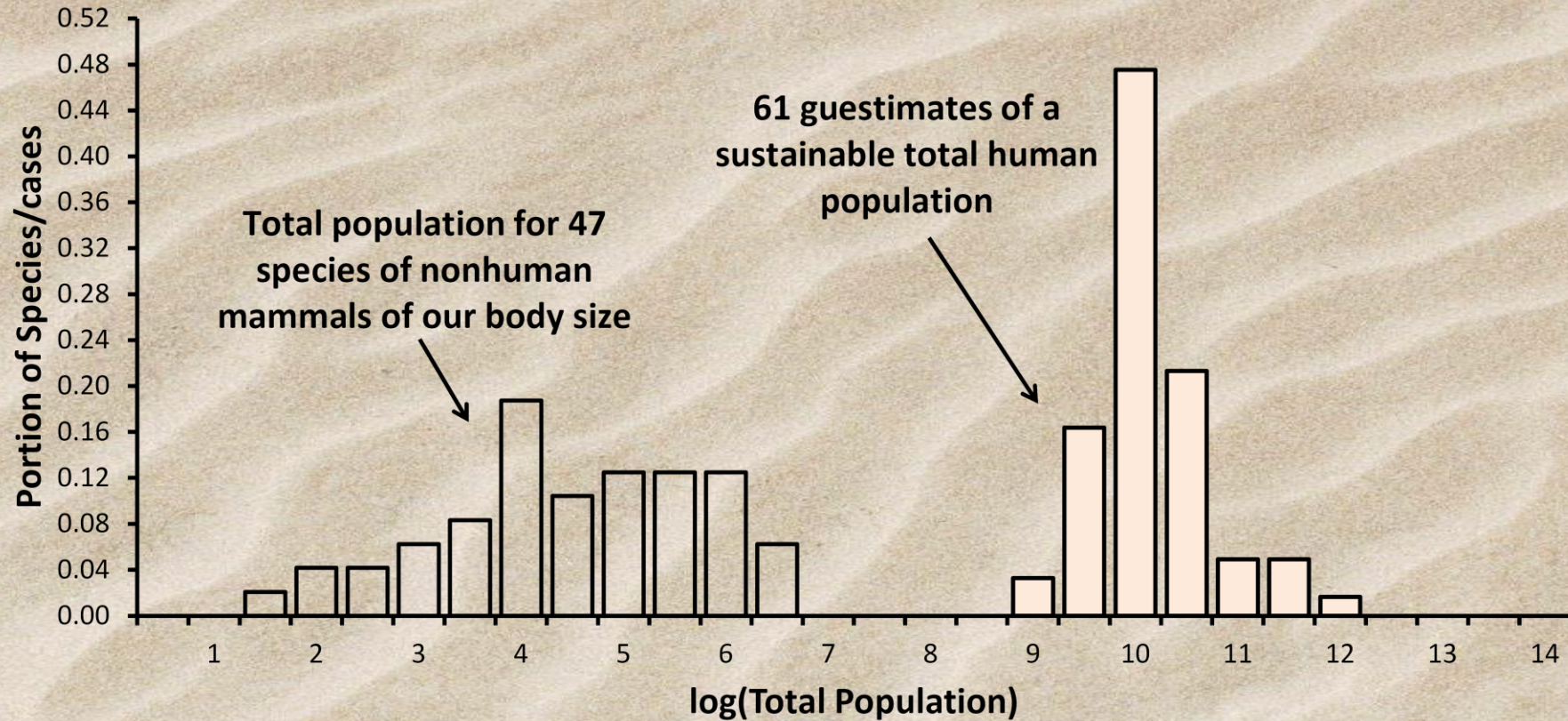
Expert opinions compared to normative data.

Expert opinions from: Cohen (1995) How many people can the earth support? Norton, New York, NY.

Total Population



Total Population



Don't ask an expert; Ask now the beasts and they shall teach thee.

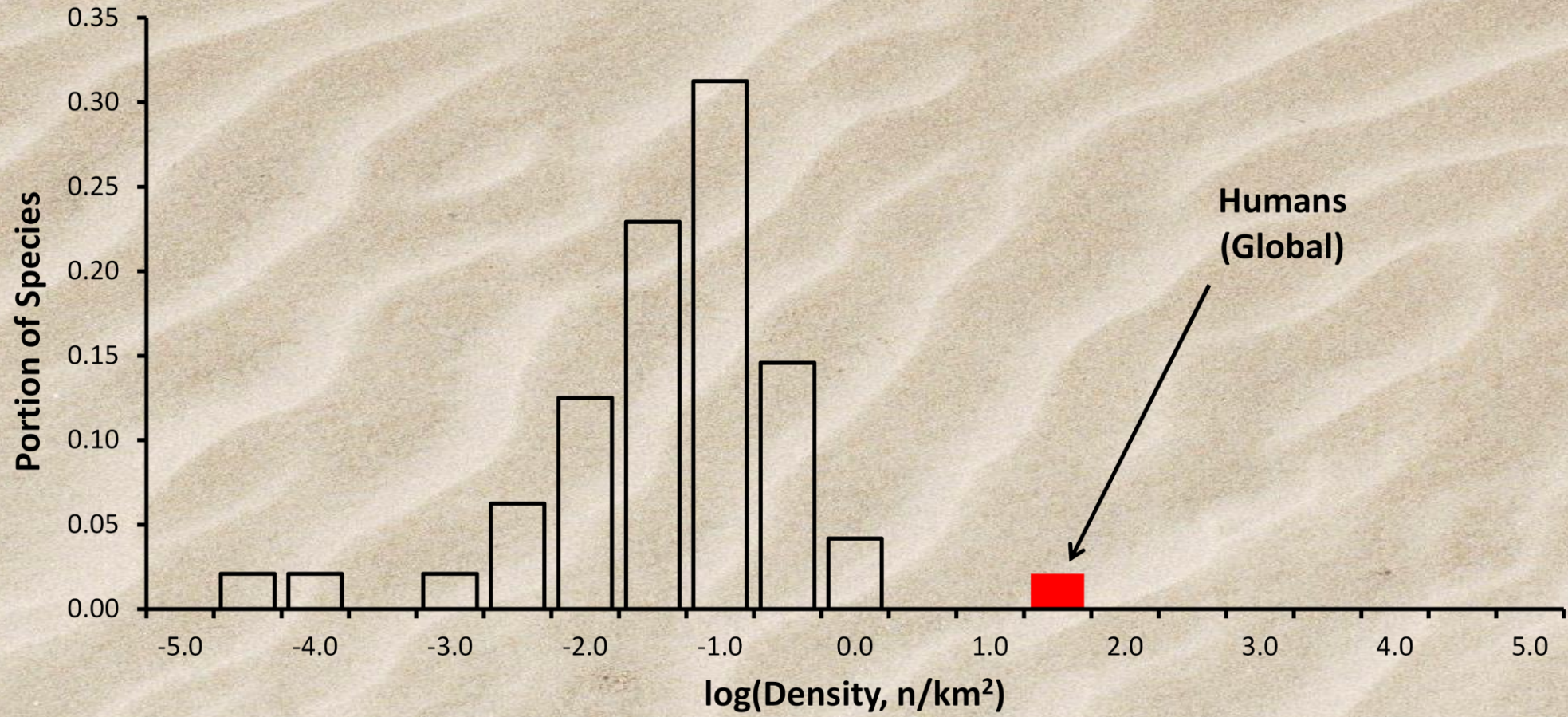


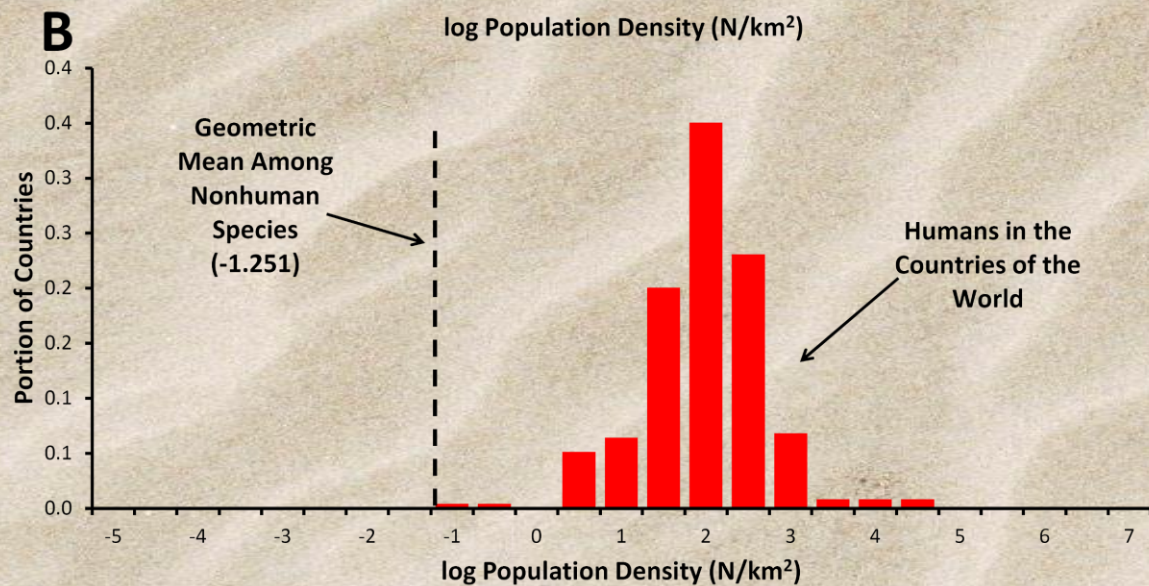
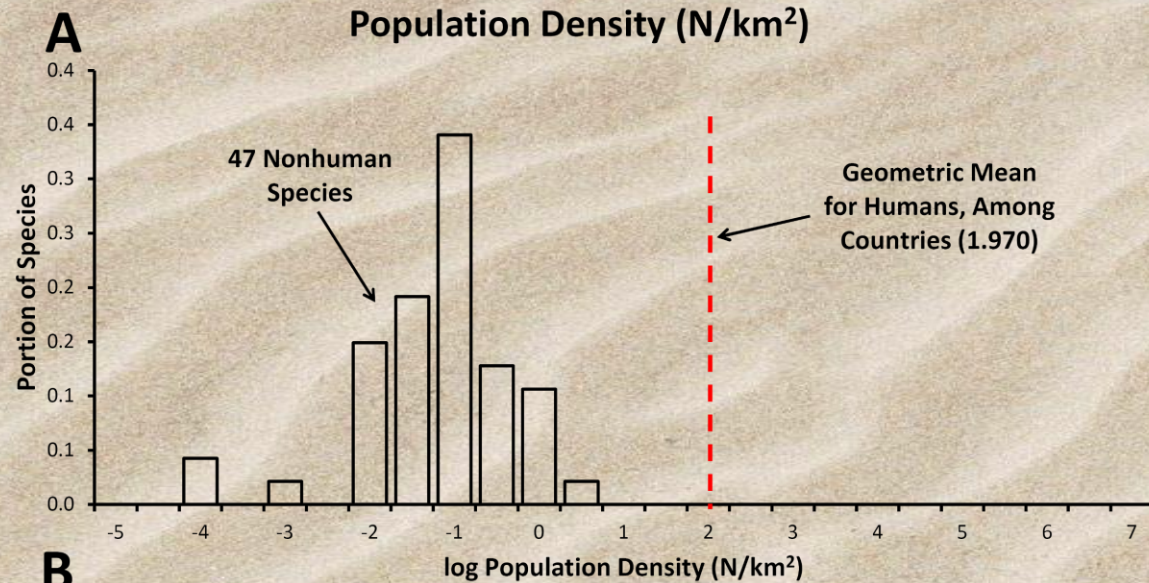
Total global population is not the only metric involving population.

-

There is also population density, or individuals per unit area.

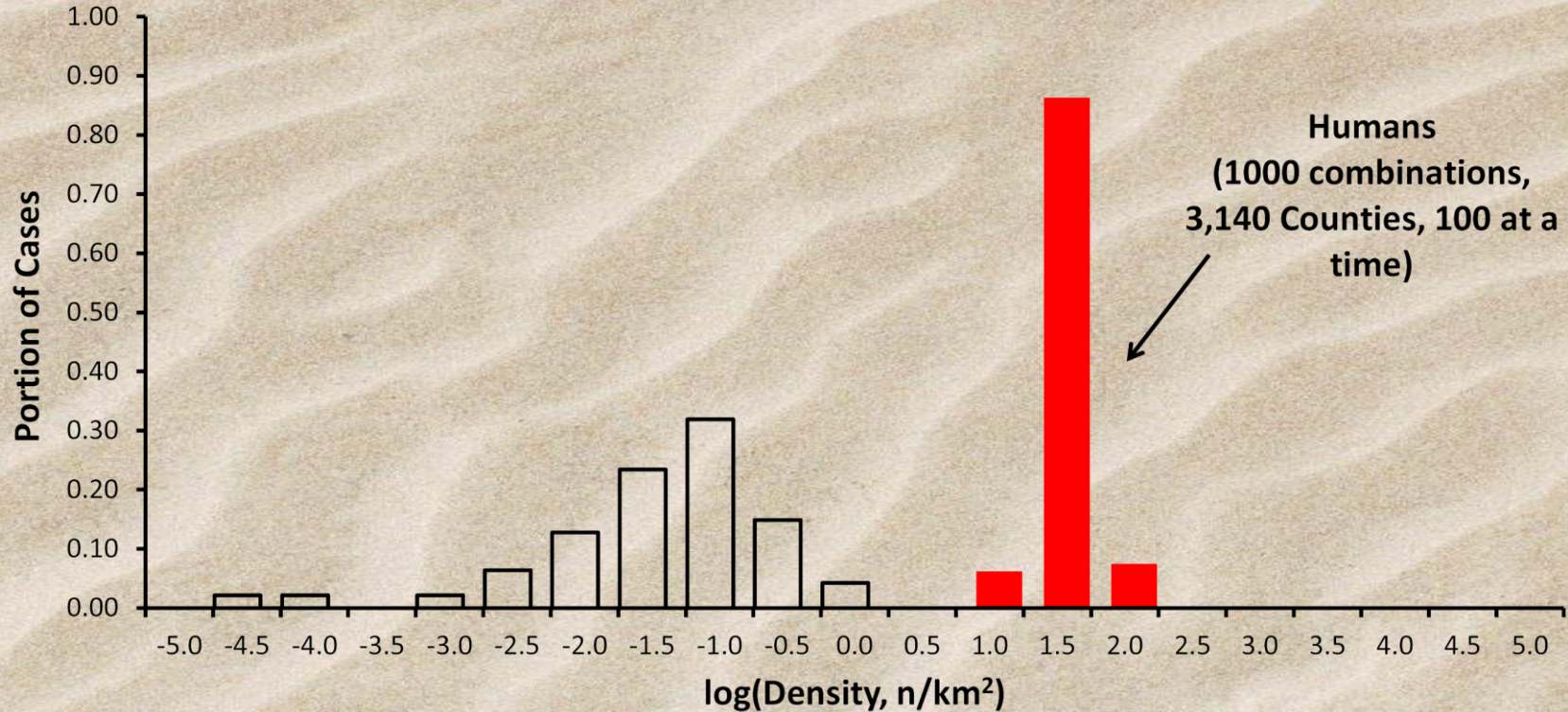
Population Density





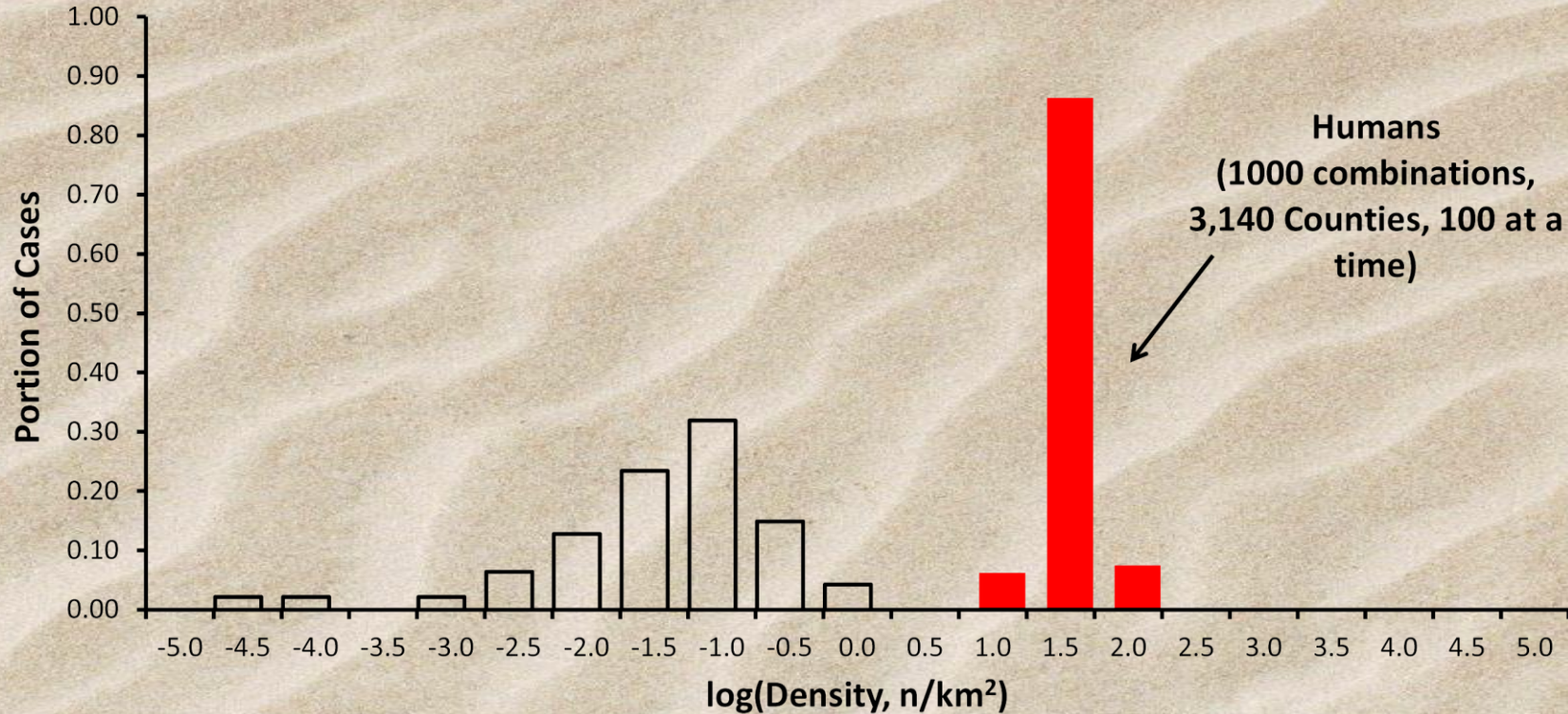
The average density of humans is over 1,600-fold larger than that for the nonhuman species.

Population Density



The density of humans in the United States is over 600-fold larger than the mean density of other species.

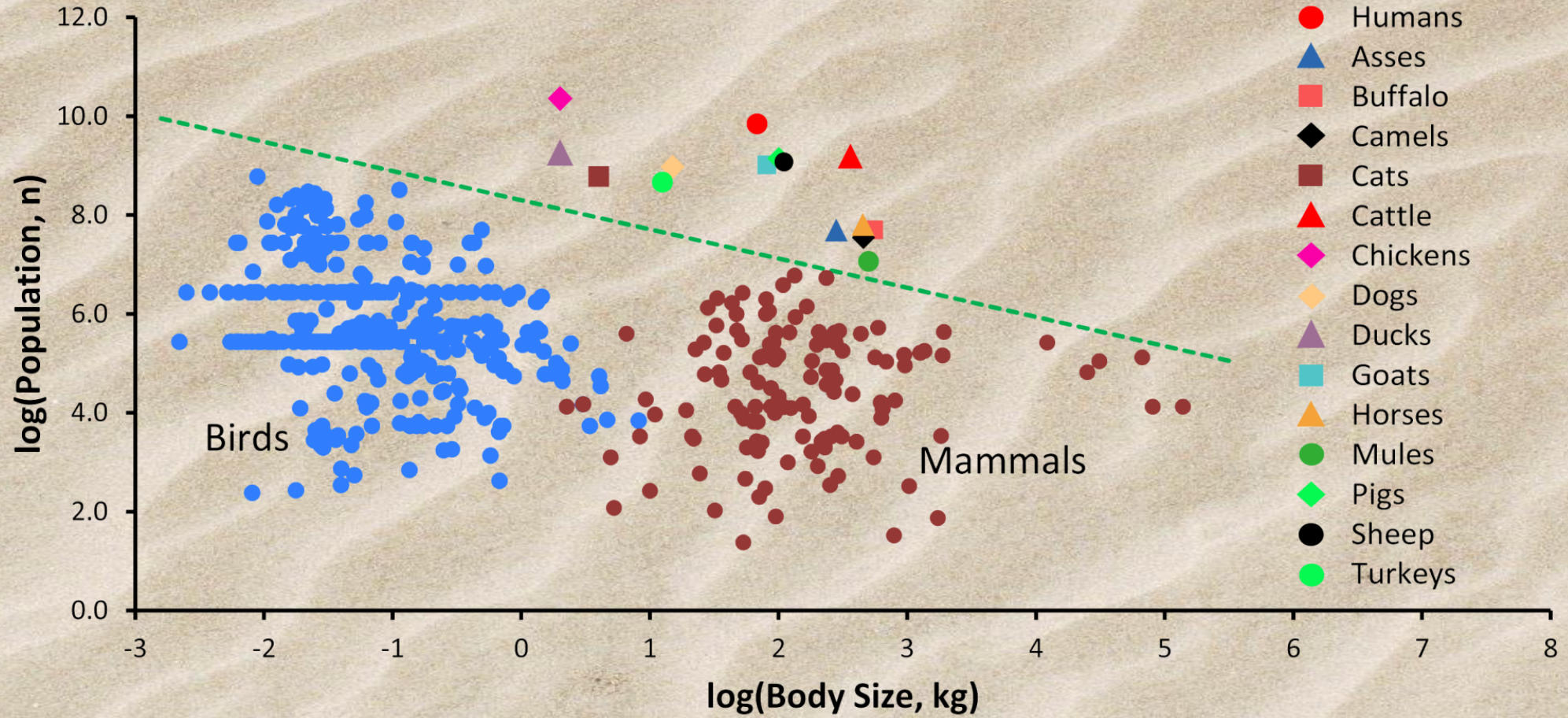
Population Density



With 3,140 counties in the US, there are over 2.4×10^{943} distinct combinations of 1,570.

Domestic species are not confined to mammals; other species (like birds) are included.

Global Population vs Body Size

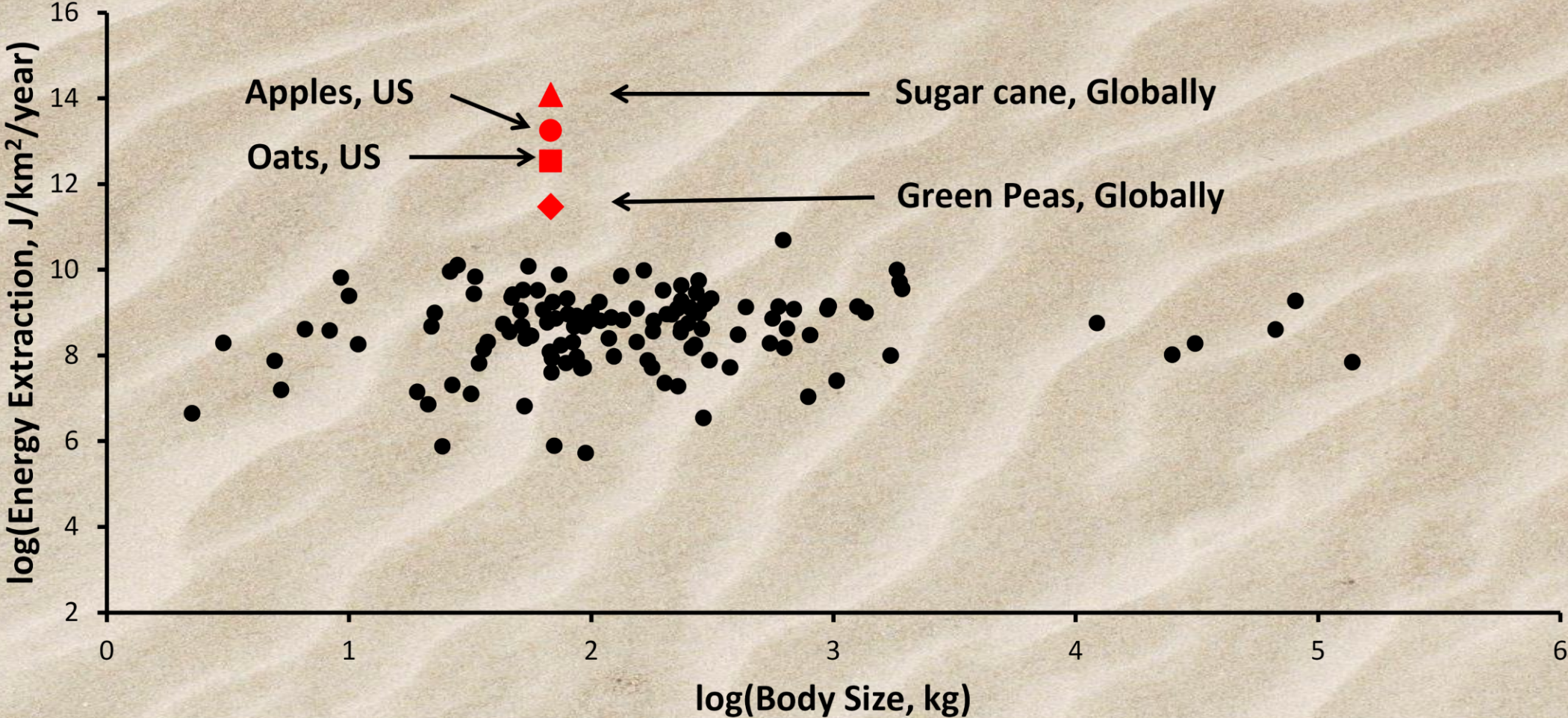


Data for birds from Birdlife International (<http://www.birdlife.org/>) 2012

The field of macroecology has yet to fully embrace the concept that it is revealing normative patterns.

A good example is the equivalence rule – a pattern of patterns.

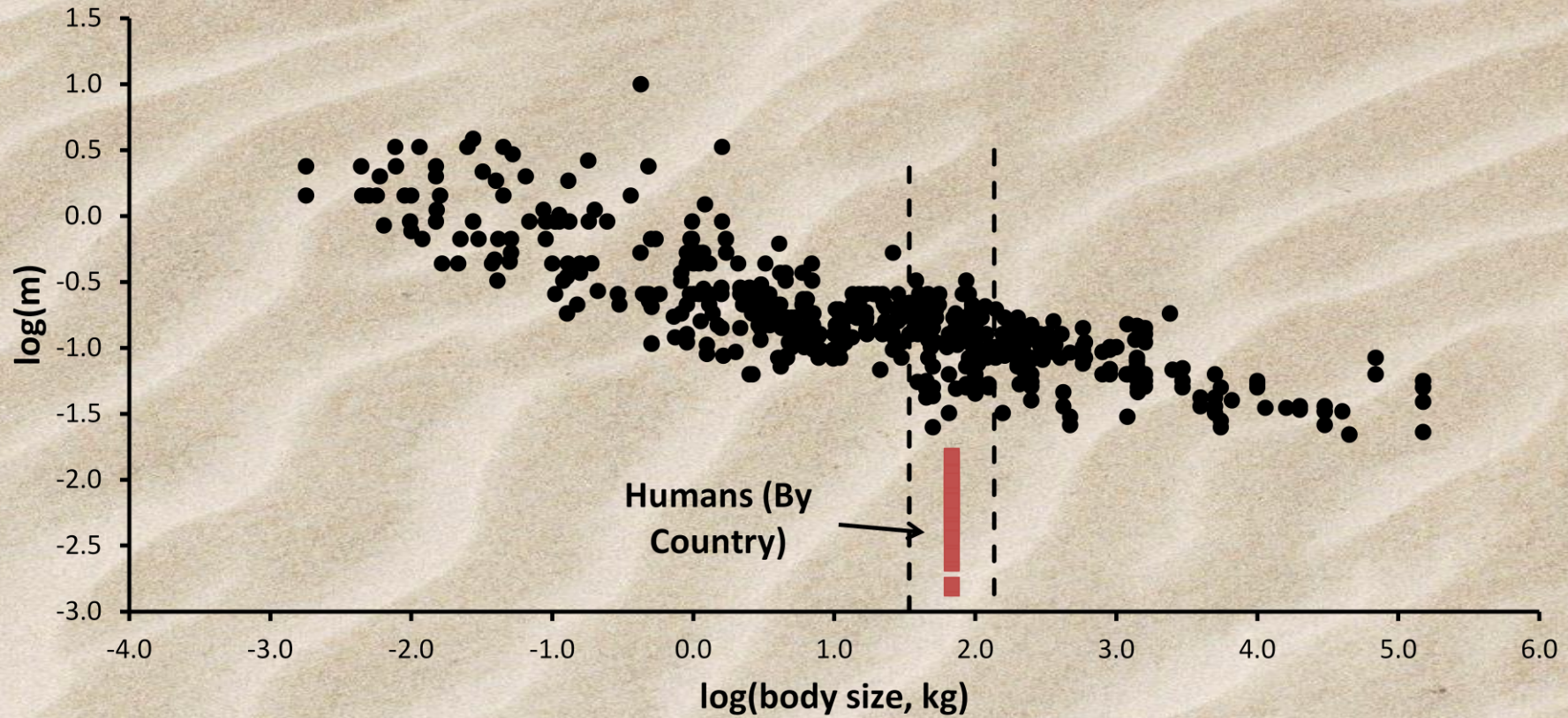
Energy Extraction per Unit Area



Agriculture, fisheries and energy production are not the only fields of human endeavor that have become pathological in nature.

Another example is the field of medicine.

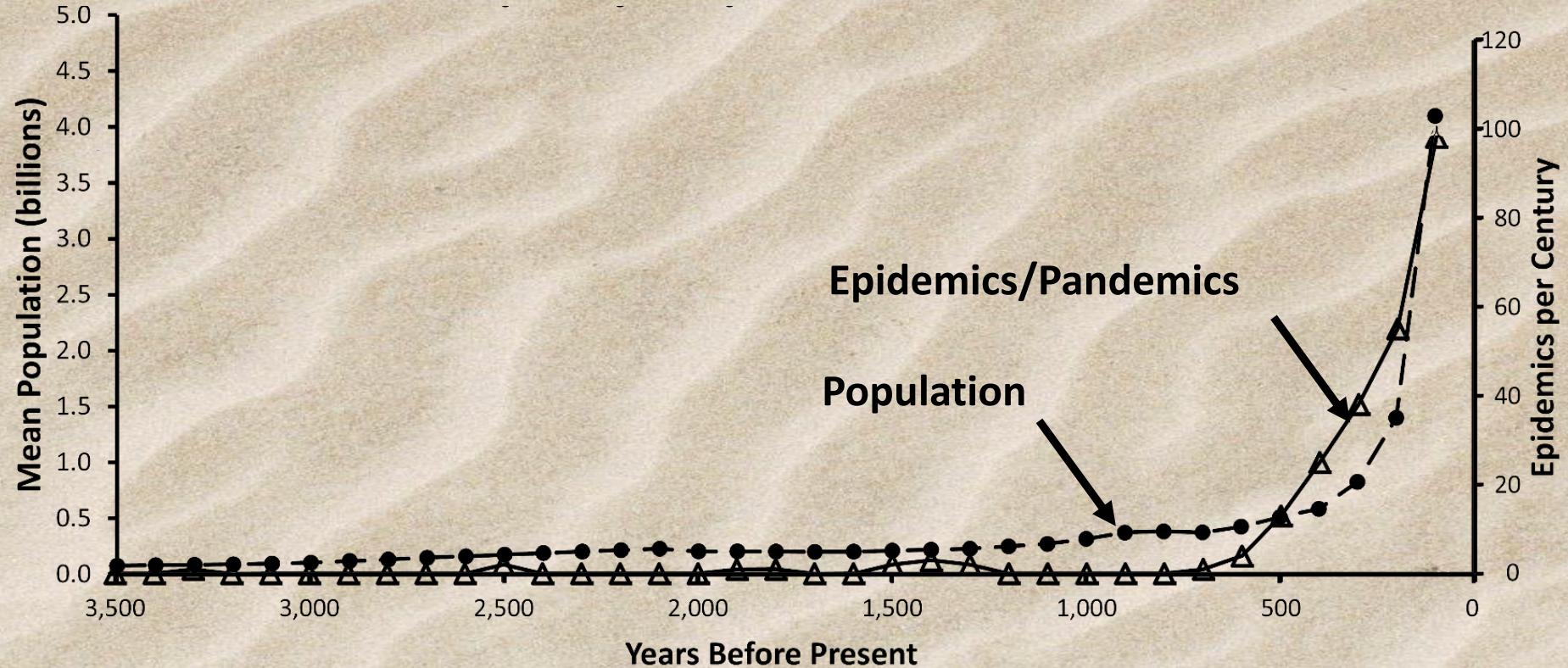
Natural Mortality Rate (m) vs Body Size (Mammals)



m for mammals: McCoy & Gillooly 2008 doi: 10.1111/j.1461-0248.2008.01190.x

m for humans from: <http://databank.worldbank.org/data/reports.aspx?source=2&series=SP.DYN.CDRT.IN&country=>

Frequency of epidemics and human population size over time.



https://en.m.wikipedia.org/wiki/List_of_epidemics and
<https://ourworldindata.org/world-population-growth>

**As a species, systemic thinking both avoids
and accounts for exceptionalism. Our
species is subject to all the laws of nature
as are all species.**

Exceptionalism is a part of reality that is accounted
for by every empirically observed pattern.

Another dimension of being a species is Geographic Range Size.

In mimicking other species, we have the option of occupying a certain portion of the Earth – and leaving the other portion unoccupied.

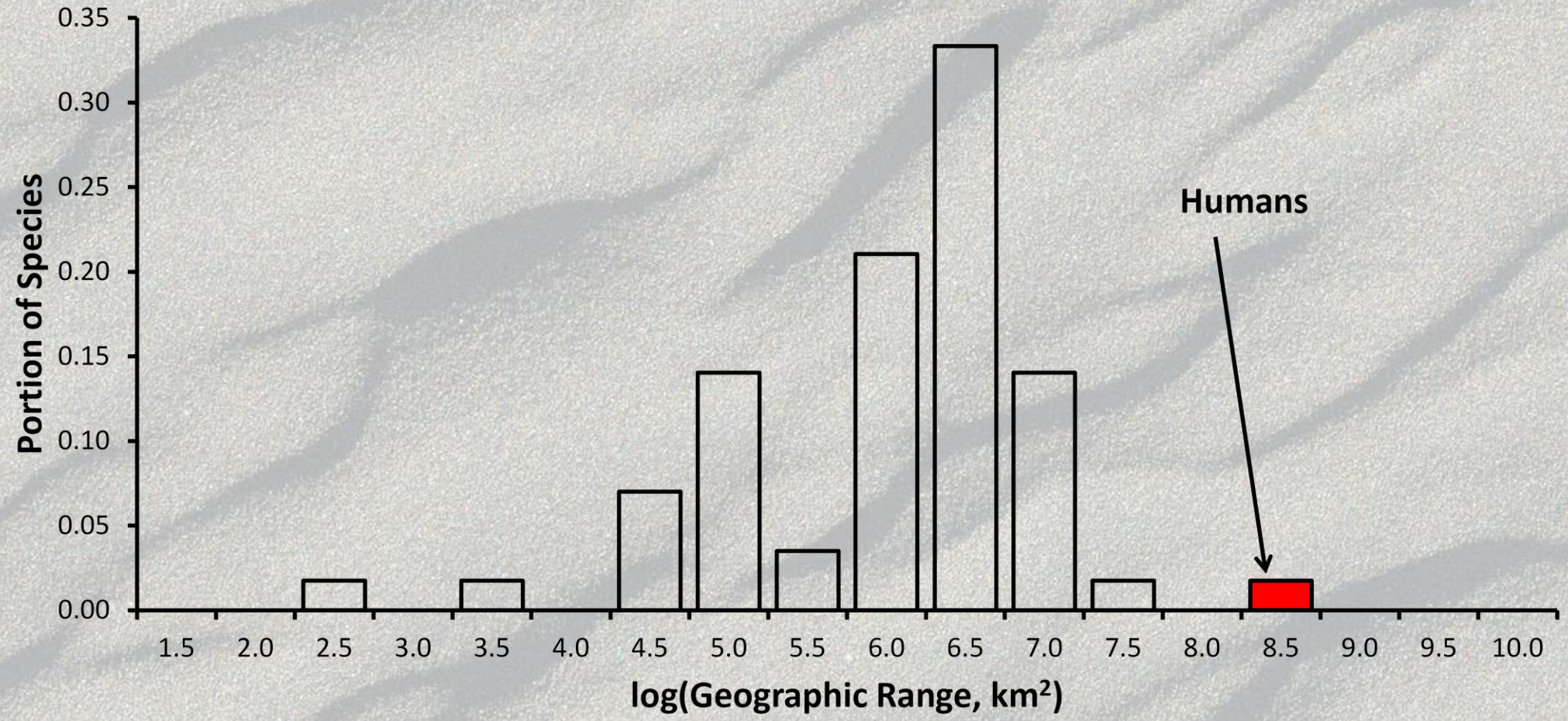




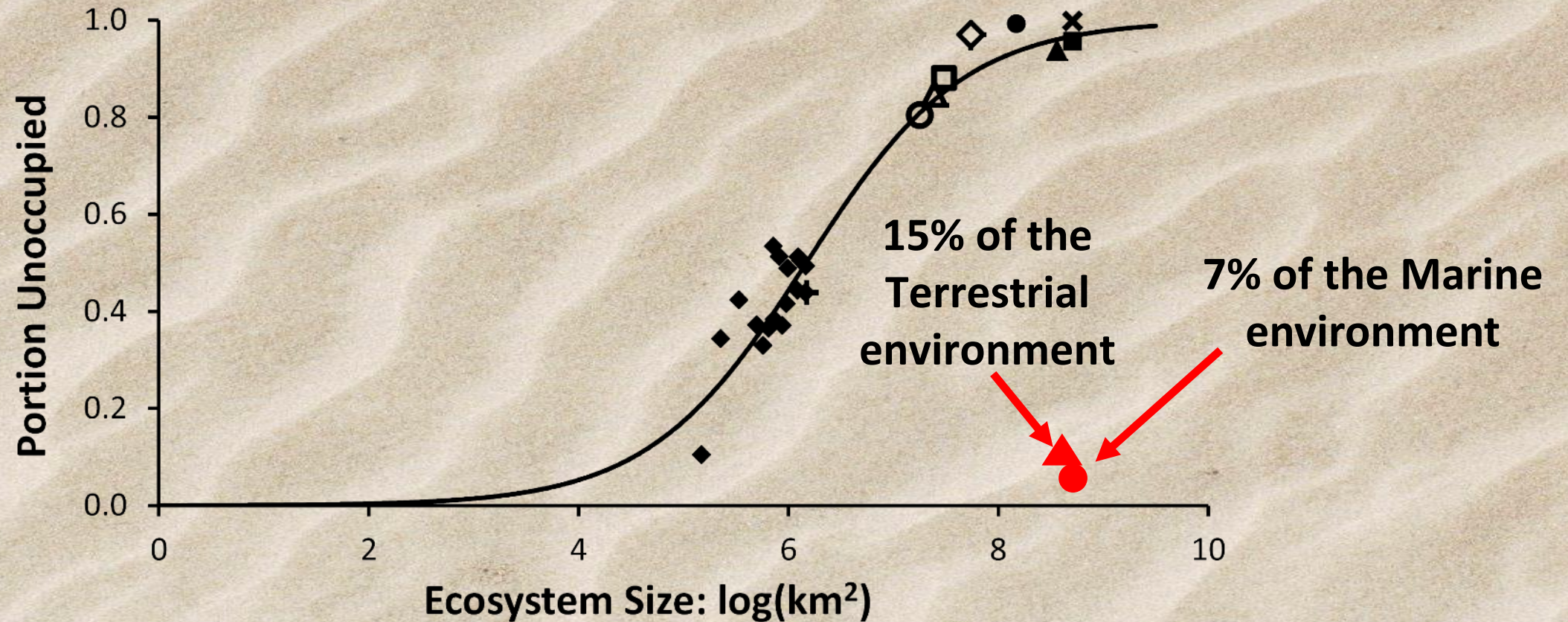




Geographic Range

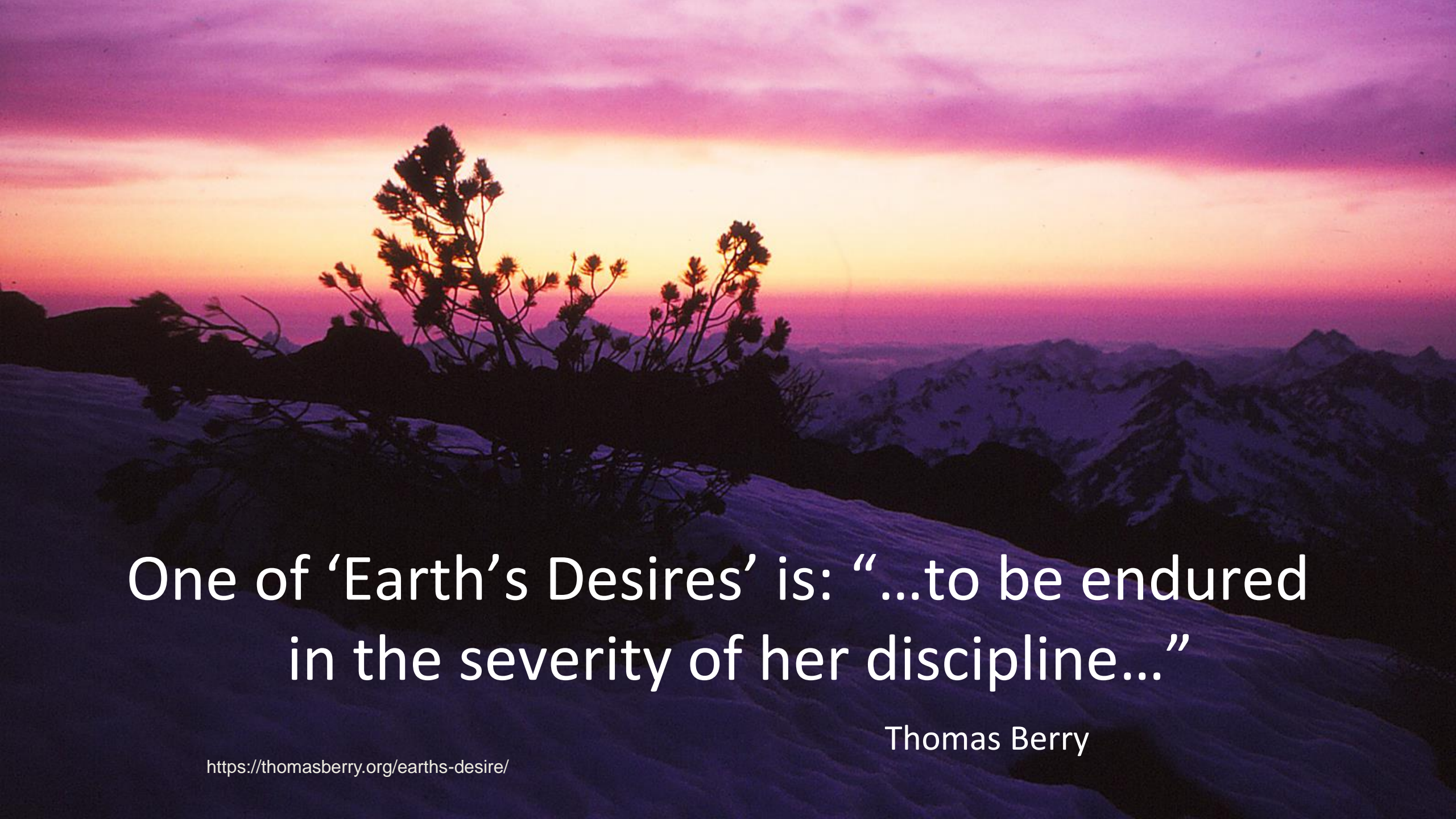


Portion of Ecosystem To Be Set Aside In Protected Status



Can we, as a species, achieve normalcy on our own?

In mimicking other species, we can depend on the self-organizing, autopoietic, self-perpetuating, homeostatic forces of nature to be of holistic help.



One of 'Earth's Desires' is: "...to be endured
in the severity of her discipline..."

Thomas Berry

<https://thomasberry.org/earths-desire/>



“That which does not kill us makes us stronger.”

- F. Nietzsche



" ...ultimately the human community has to accept
the governance of the planet.,."

- Thomas Berry

As a species, can we come to see **good
news in the self-organizing forces of nature
and their role in restoring humans to
normalcy?**

**My email address:
cwfernhaven@comcast.net**



“...we must be clear concerning the order of magnitude of the changes that are needed.”

- Thomas Berry

Revisiting Holism:

1. Normative information accounts for everything.



Systemic thinking is fully reflexive.

The image features a landscape of dark, jagged mountain peaks in silhouette against a vibrant, multi-colored sky. The sky transitions from a deep purple at the top to a bright pink and orange near the horizon, where the sun is setting or rising. The overall mood is serene and majestic.

Mind and Nature: A Necessary Unity

- Gregory Bateson



*Wholeness and
the Implicate
Order*

- D. Bohm



In thinking systemically we achieve complete integrity.

The subjects of all disciplines are taken into account.

This includes all disciplines yet to emerge.



**The unknown *and*
the unknowable are
taken into account.**



You have undoubtedly heard of Deep Ecology.

Systemic thinking involves the infinite extension of such depth to all disciplines:

- 1. Deep Ecology**
- 2. Deep Philosophy**
- 3. Deep Theology**
- 4. Deep Cybernetics**
- 5. Deep Physics**
- 6. Deep Evolution**
- 7. Deep Biomimicry**
- 8. Deep Astronomy**
- 9. Deep Astrology**
- 10. Deep Thermodynamics**

This infinite extension goes on forever:

11. Deep Cosmology

12. Deep Mathematics

13. Deep Chemistry

14. Deep Botany

15. Deep Geology

16. Deep Field Theory

17. Deep Psychology

18. Deep Entropy

19. Deep Epistemology

⋮



Systemic thinking involves Deep Mathematics; the universe has a fractal quality.

This fractal quality means that DEI can be extended from our perspective involving individuals to our perspective involving other species.

Diversity - maximized by being a normal species.

Equity - all species are emergent from reality.

Inclusion – all species are parts of reality.

**This fractal quality also means that democracy can
be extended to all things.**

Revisiting Holism:

1. Normative information accounts for everything.
2. Being normal means that all consequences are normal.

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3. The systemic paradigm can be universal.

Revisiting Holism:

1. Normative information accounts for everything.
2. Being normal means that all consequences are normal.
3. The systemic paradigm can be universal.
4. Applies to all dimensions of being.

(caveat)

The Main Conclusion:

**The conscious purpose of being
normal changes everything.**

Acknowledgement:

The work I have talked about would not have been possible without people like my dear friend Larry Hobbs who passed away last year.



Larry's role in my life
included bringing the
thinking of Gregory
Bateson into my
realm.



Fred Lanphear injected the work of Thomas Berry into my life. Following Fred's passing in 2010, a group of colleagues began a Thomas Berry study group which lasts to this day.



Thomas Berry's numerous publications included the influence of many respected philosophers and theologians – all now part of my life and thinking.



Christa

Laura Johnson

HRC
Chloe

Suzanne McCuskey

Kim Lee



People like Megan Rodden helped extract information from the published literature. She, I, and our colleagues are all very grateful to the thousands of scientists who produced the data used in our publications and in this webinar.

There are no words to adequately express my gratitude to my wife, **Jean**, for all of her endurance, help and support over the years of my working through the concept of systemic thinking!

I am very grateful to Ruben Nelson who invited me to make this presentation!

And thanks to **You**, for attending this presentation; I hope that my influence on your life has nudged the world toward the systemic paradigm!

Thank You!

A panoramic view of a mountain range under a clear blue sky. The mountains are layered, with the closest ones in dark blue and the farthest ones in a lighter, hazy blue. A prominent snow-capped peak is visible in the distance. The overall scene is serene and majestic.

In Wildness Is the Preservation of the World

- Henry D. Thoreau