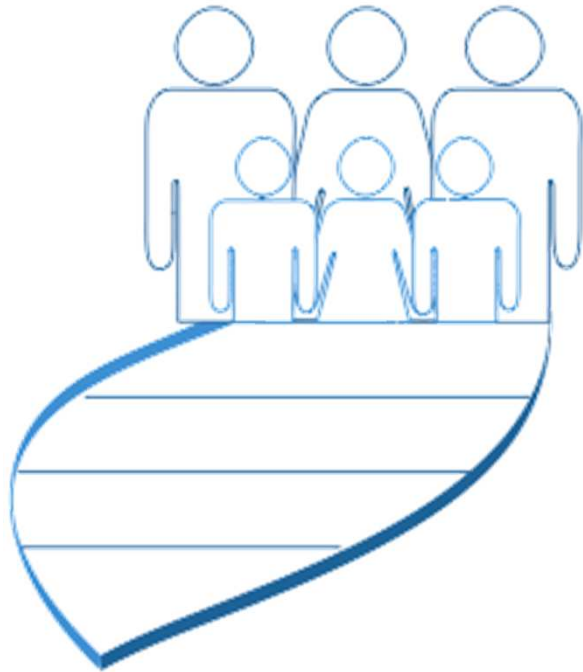


Life Sciences/HHMI
OutReach
PROGRAM



Summer 2010 Workshop
in Biology and Multimedia
for High School Teachers

Catherine Erickson
Chelsea High School
Chelsea, MA

Our World

- Mother Earth
- Spaceship Earth
- The Blue Marble

- Filled with Life?
 - Losing life?
- Losing biodiversity.....



<http://en.wikipedia.org/wiki/File:Globespun.gif>

Harvard University Life Sciences - HHMI
Outreach Summer 2010 Workshop for
Biology Teachers

Biodiversity

Who Cares?

What does it mean to me?

Definition of Biodiversity

- **Biodiversity** is the variation of life forms
- within a given ecosystem,
biome,
or on the entire Earth.
- From Wikipedia: <http://en.wikipedia.org/wiki/Biodiversity>

Why does Biodiversity Matter?

- Biodiversity is often used as a measure of the health of biological systems.
- The biodiversity found on Earth today consists of many millions of distinct biological species.

Each living thing has a role to play in its ecosystem

- Producer
 - Autotroph
- Consumer
 - Herbivore
 - Carnivore
- Decomposer
 - Nitrogen fixator



http://commons.wikimedia.org/wiki/File:Oak_tree_-_geograph.org.uk_-_609575.jpg



http://en.wikipedia.org/wiki/File:Gryllus_calcaratus_sporobolus.jpg

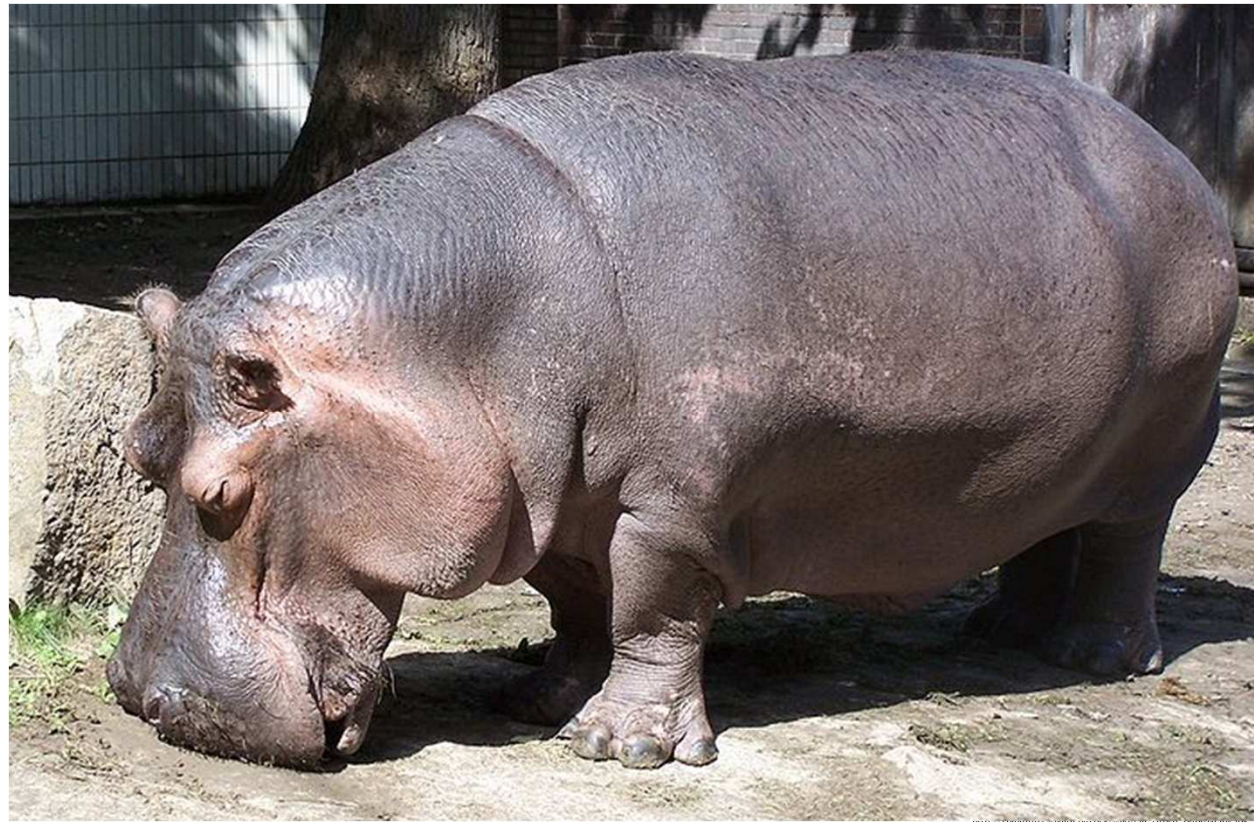


http://en.wikipedia.org/wiki/File:Red-tailed_Hawk_Buteo_jamaicensis_Full_Body_1880px.jpg



Why is Biodiversity Declining?

- Think HIPPO!



Harvard University Life Sciences - HHMI
Outreach Summer 2010 Workshop for
Biology Teachers

H I P P O + C

- H-Habitat Loss-destruction, degradation and fragmentation (mostly due to humans)
- I-Invasive Species (ooops! I didn't mean to do that!)
- P-Population of humans increasing
- P-Pollution (mostly from us homo sapiens)
- O-Overharvesting—Taking too much at a time!
- + C- Climate Change

HIPPO



Harvard University Life Sciences - HHMI
Outreach Summer 2010 Workshop for
Biology Teachers

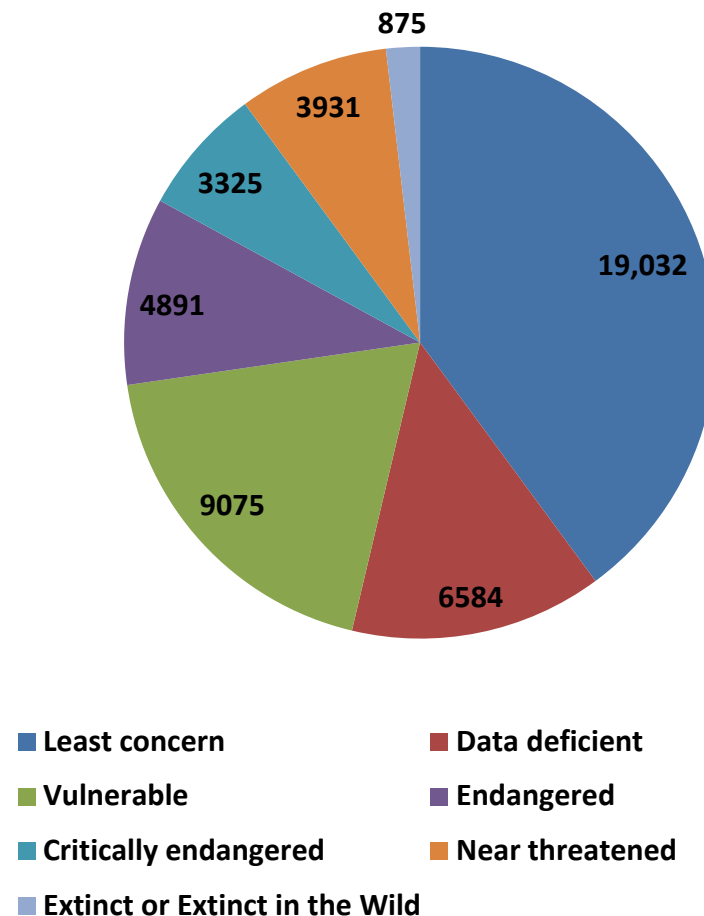
What is happening to Biodiversity?

- On the Planet:
- The rate of extinction of species is now 100 times greater than the natural rate because of humans.
- Our modern period is often called “The Sixth Mass Extinction” due to biodiversity loss.

Last year—2009 summary

- As of 2009, with 47, 677 species assessed; 36% are considered threatened with extinction, of
- Of 25,485 species in completely assessed groups mammals, birds, amphibians, corals, freshwater crabs, cycads and conifers,
- 21% are considered threatened.
- (Secretariat of the Convention on Biological Diversity (2010) Global Diversity Outlook 3. Montreal, 94 pages.)

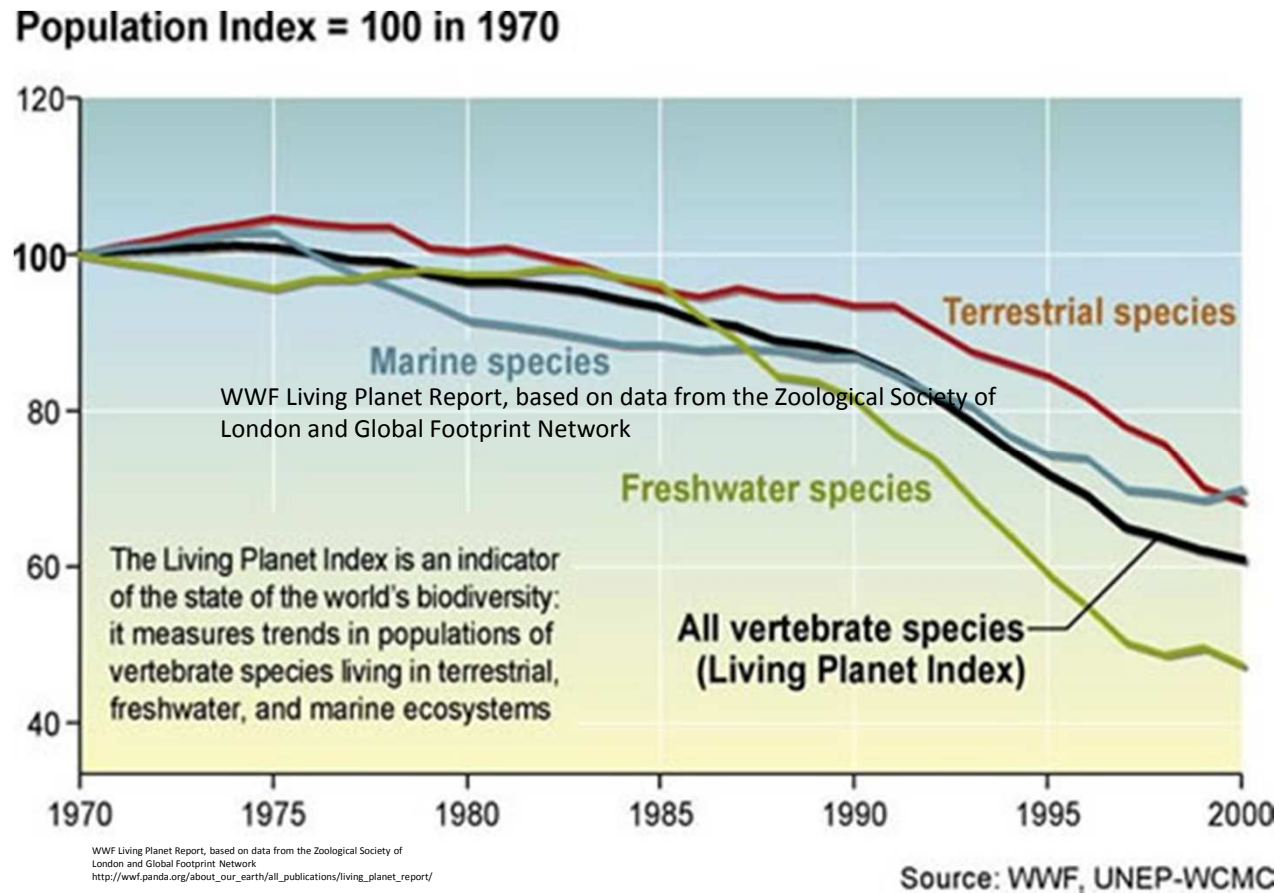
Graphical Representation



Proportion of all assessed species in different threat categories of extinction risk on the IUCN Red List, based on data from 47,677 species. Source: IUCN, pie chart compiled by [Secretariat of the Convention on Biological Diversity \(2010\) Global Biodiversity Outlook 3, May 2010](#)

<http://www.globalissues.org/article/171/loss-of-biodiversity-and-extinctions> chart redrawn by Christine Rodriguez

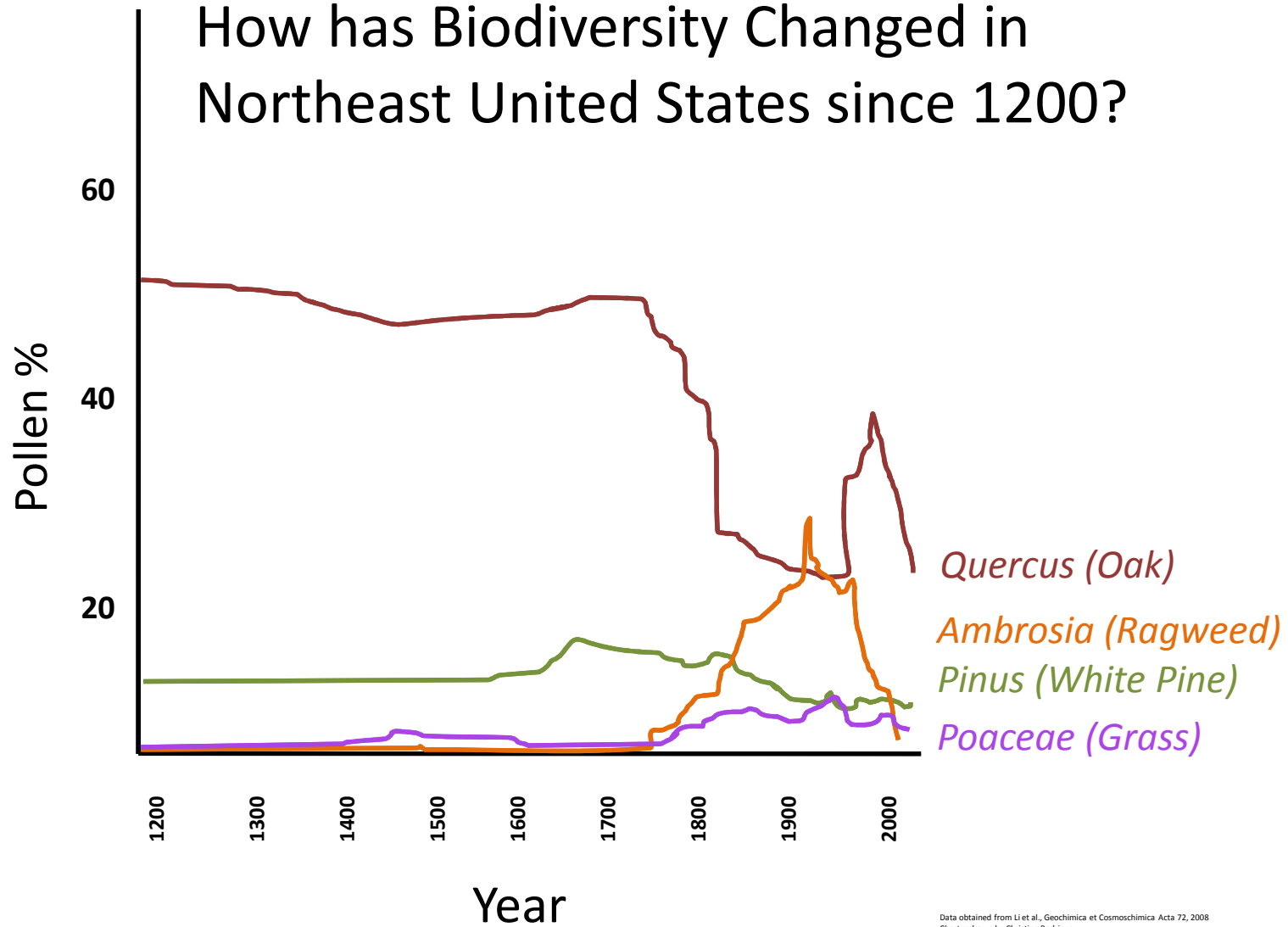
Biodiversity is fading away.....



What is happening to Biodiversity?

- In North America:
- “If you visited North America 200 years ago, for example, you wouldn't even have recognized it as the same continent dominated by human beings today. A few hundred years ago, North America was teeming with life, with huge old-growth forests, pristine rivers and abundant plains. Today it is relatively dead, having been over-developed, over-paved and over-population to a point so extreme that our ancestors would largely consider it "dead".” (Mike Adams, the Health Ranger, Editor of NaturalNews.com)
- http://www.naturalnews.com/029056_environmental_protection_population_control.html

How has Biodiversity Changed in Northeast United States since 1200?



Data obtained from Li et al., *Geochimica et Cosmochimica Acta* 72, 2008
Chart redrawn by Christine Rodriguez

Is there biodiversity in Chelsea?

- Do you see living things (besides people?)
 - Plants
 - Trees, bushes, grasses
 - Animals
 - Squirrels, other rodents, insects, birds
 - Lichens, Fungus
 - Look closely on tree trunks, rocks, ground
 - Microscopic life
 - What's in water, soil, air?

Identify your “favorite” organism or species in your “backyard”.

FRQ:

Write 3 paragraphs about what would happen if your choice of organism or species no longer existed.

Make sure to:

1. Clearly identify the organism or species with genus and species name.
2. Include a picture of your organism or species.
3. In the first paragraph, summarize the characteristics of the organism or species that makes it special, define its role in the ecosystem and/or its role in your life.
4. In the second paragraph, describe the “world” without your organism or species. Be elaborate and imaginative.

- What if?
- Your favorite organism no longer existed?
- Have you seen
 - “Click”?
 - “Frequency”?
 - “Back to the Future”?
 - “It’s a Wonderful Life”?
 - “Christmas Carol”?

Conclusion

- Third paragraph
 - What can be done to make sure this organism or species stays around?
 - Actions to be taken by YOU
 - Actions that could be taken by others.
 - How could you show your appreciation for this organism or species?
 - On a daily basis
 - On a monthly or yearly basis

Works Cited

- <http://en.wikipedia.org/wiki/File:Globespin.gif>
- <http://en.wikipedia.org/wiki/Biodiversity>
- <http://en.wikipedia.org/wiki/Beetle>
- <http://en.wikipedia.org/wiki/Oak>
- [http://en.wikipedia.org/wiki/Red-tailed Hawk](http://en.wikipedia.org/wiki/Red-tailed_Hawk)
- [http://en.wikipedia.org/wiki/Nitrogen-fixing nodules](http://en.wikipedia.org/wiki/Nitrogen-fixing_nodules)
- <http://en.wikipedia.org/wiki/Hippopotamus>
- <http://www.globalissues.org/article/171/loss-of-biodiversity-and-extinctions>
- IUCN, pie chart compiled by [Secretariat of the Convention on Biological Diversity \(2010\) Global Biodiversity Outlook 3, May 2010](#)
- http://www.naturalnews.com/029056_environmental_protection_population_control.html
- Li, Long et al.,(2008) *Complex trajectories of aquatic and terrestrial ecosystem shifts caused by multiple human-induced environmental stress*. *Geochimica et Cosmochimica Acta* 72, 4338-4351
- Miller, G. Tyler and Scott E. Spoolman, Living in the Environment: Concepts, Connections and Solutions, 16e, Brooks/Cole, Cengage Learning 2009