Week 2: Class 3
1:30-2:10:
- KCES Treasure Hunt Q & A
- How to select appropriate sources for research
- Activity: Cheeseman ESA (Contd. from Class 2)

2:10 – 3:20
- Activity  (Check out Wright and Boorse, 12th Ed, from the SRC)
  - Three Unifying Themes of Environmental Science
  - 9 concepts of Sustainability
- Share with class
Sources for Online Research

Types of appropriate sources for content research:

- **Science magazines and journals:** E.g., *Science, Nature, Scientific American, Conservation Biology*
- **Government agency reports and websites:** US Fish and Wildlife Service, California Department of Fish and Wildlife
- **Science-based organizations:** Center for Biological Diversity, International Union for the Conservation of Nature
- **Some Non-profits:** Rainforest Alliance (does conservation work in rainforest ecosystems)
- **News organizations that have investigative reporting:** E.g., Environmental News section of New York Times, LA Times, SJ Mercury News, Living on Earth, KQED Science
- **Universities:** E.g., Safe Passage for Coyote Valley, Yale University reports on Environmental Science, UC Berkeley’s Evolution 101
- **Museums:** E.g., American Museum of Natural History
**Sources for Online Research**

- HINT: Check the “About” section of the website for the purpose of the website.
- When in doubt, “dig deeper”
- Keep each other honest

Types of inappropriate sources for content research:
- Personal websites
- Class websites
- Commercial websites, e.g., travel websites

Examples of inappropriate sources (from past classes):
- Earth Eclipse (personal website)
- Blueplanet Biomes (class website)
- Conserve-energy-future.com (personal website)
- Bioexpedition.com
- w3.marietta.edu/... (student website)
1. What are the **three unifying themes of Environmental Science** (Fig. 1-8)?

2. Who are **Stewards** (Pg 17)? Go to the website of the Goldman Environmental Prize. Pick one winner and briefly explain when and why they were awarded the prize. **Prepare to share with class.**

3. What is **environmental racism** (pg 18)? Work with your team to show a local example. **Prepare to share with class.**

4. See Exploring a Stewardship Ethic (Pg 19). What does “anthropocentric” stewardship ethic mean? Do you agree that this is sufficient? Give at least one example to justify your answer. **Prepare to share with class.**
Wright and Boorse, 12th Ed. Use pages 12-13 to answer the following in your journal:

1. Define development, sustainable yields, sustainable ecosystem, sustainable society

2. What are the dimensions of sustainable development (Fig 1-9)

3. Is it possible to apply sustainability to human systems? Explain with an example. Prepare to share with class.

4. What is a sustainable development ideal?

5. What is Yale University’s Environmental Sustainability Index

6. What will it take to transition to a sustainable future?
Week 2: Class 4
1:30-2:15:
1. Lecture: Science, Scientific Method, and Environmental Science
2. Video: Rachel Carson and the Modern Environmental Movement

2:15 – 3:20
1. E-mail team name with list of team members
2. Activity: Local Case Study in Conservation Biology
Science, Scientific Method & Environmental Science

- What is Science?
- What is Environmental Science?
- What is the Scientific Method?
What is Science?

A Framework to acquire FACTUAL knowledge
Traditional Knowledge - Informal
Formal Frameworks of Knowledge

- Dogma
  - Hierarchical
  - Authority
  - Obedience
  - Faith
  - Questioning
  - Proof

Mid 15th Century

- Science
- Questioning
- Proof-based (data)
- Transparent
- Less Biased
- Collaborative
- Universal
**Framework of Science**

- **Data**
  - Systematic collection
  - By Observation or Experimentation
  - Measurements

- **Facts**
  - Statement
  - By *Interpreting data*

- **Scientists**
  - Seek facts using the *Scientific Method*
A Scientific Theory ≠ A Hypothesis
# Bias in Science

## Avoidable
- **$$$ Funding**
  - Industry vs Independent
- **$$$ Communication**
  - Sensational vs Negative
- **Cultural**
  - Gender
  - Current Paradigm
    - Religious beliefs (Evolution)
    - Economics/Environment (Global warming and Climate Change)

## Unavoidable
- **Accessibility**
  - E.g., Cognitive abilities in animals
- **Instrumentation**
  - E.g., Germ theory of disease
- **Survey-based data**
  - E.g., Dietary guidelines
- **Reductionist vs Holistic**
  - E.g., Ecosystems
- **Ethical Considerations**
## Bias in Science

### Avoidable

- $$$ Funding
  - Industry vs Independent

- $$$ Communication
  - Sensational vs Negative

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  - Gender
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### Unavoidable

- Accessibility
  - E.g., Cognitive abilities in animals

- Instrumentation
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- Survey-based data
  - E.g., Dietary guidelines

- Reductionism vs Holistic
  - E.g., Ecosystems

- Ethical Considerations
Environmental Science

• Scientific study of life *in the context of the living and nonliving environment*, E.g.,
  – Environmental Pollution and Prevention
  – Conservation Biology
  – Renewable Energy
  – Ecosystem Management & Sustainability Studies

• Complex and Less amenable to reductionism
  – Large spatial and time scales
  – “When we try to pick out anything by itself, we find it hitched to everything else in this universe.” - John Muir
Environmental Science

• Part science, part social science
  – Our actions impact the environment
  – Our actions governed by consensus-based policy
  – Ethics: Who will represent those that cannot be at the table?

• Science of hope
  – How to address current global challenges
  – Knowledge is power, the power to restore

Follows the 5 steps of the Scientific method
Environmental Stewardship

Environmental Science has a sixth step!

6. Stewardship
   - Make Informed policy
   - Educate Stakeholders
     - Policy Makers
     - Citizens
   - Advocacy
     - Represent those that are not at the table!
Environmental Scientist’s Challenge

Study complex interactions, slow processes, long-term impacts, large-scale impacts, ...

Find solutions while not creating new problems...

Need a Holistic approach

Needs everyone’s participation

Citizen scientists - The world needs you!
CONCLUSION

- Knowledge about how the natural world works is *absolutely crucial* to humans living on Earth!
- The scientific method has a track record for being the *least biased*

It is our *collective responsibility* to seek this knowledge and *act in accordance*.
Rachel Carson
Author, “Silent Spring”

Rachel Carson and The Modern Environmental Movement
Class 4 Activity
Environmental Science: Local Case Study

Sources: [http://wildlife.ucsc.edu/](http://wildlife.ucsc.edu/) and [http://santacruzpumas.org](http://santacruzpumas.org)

Answer the following:
1. Who are the scientists?
2. What is their research interest?
3. Where do they work (i.e., what is the study site)?
4. How do they study their research subject?
5. What tools/instruments do they use?
6. What are some of the results of their study?
7. What are they trying to sustain?
8. Are they following the scientific method? Explain.
9. Would you consider them as Environmental Scientists? Why?
10. Be prepared to share 2 highlights from your summary.
Extra Credit (Individual)

- Based on your research, what one question do you have about the Santa Cruz Puma and its environment?
- This is not a team question. It is for you as an individual.
- Extra credit: 5 pts