**Course goals:**

Develop a comprehensive understanding of the different ways in which humans are altering the earthâ€™s land and ocean ecosystems and the implications of these ongoing changes for their future ecological functioning.

**Course format:**

Lectures on Monday and Wednesdays (10.30-11.45am) plus required discussion section (date and time TBD).

Paul Moorcroft's Office hours: Wednesday 3pm-4pm, or by appointment. Please find me in MCZ 4th floor Suite 43.

Section Date/Time: TBD

## Lecture Schedule

**Introduction**

**I. Components of the Earth System**

The Earth's climate

Vegetation, climate and the global energy budget

Climate and distribution of terrestrial ecosystems

The physical environment of the oceans

Ocean ecosystems and productivity

Global patterns of productivity

**II. Earth System History**

The past twenty thousand years (since last glacial maximum)

The last few hundred years (including human population growth)

**III. Human Perturbations to the Earth System**

**3.1 Fossil Fuel Emissions**

The ocean carbon cycle

Response of marine ecosystems to warming

Response of marine ecosystems to $CO_2$-induced climate change

Response of terrestrial ecosystems to increasing atmospheric $CO_2$

Global Carbon Cycle/Industrialization and the effects of $CO_2$ and other greenhouse gases on the atmosphere

**3.2 Changing Water and Atmosphere Chemistry**

Eutrophication in lakes, rivers and estuaries

Tropospheric ozone and the pH of precipitation and its impact on the terrestrial and aquatic ecosystems

Ocean Acidification

**3.3 Land Transformation**
The impacts of deforestation and agriculture on terrestrial biogeochemical cycles

Human transformation of the land-surface and its impact on near surface climate and water cycling

**3.4 Species Extinction and Invasions**

Terrestrial & Marine Species Extinctions
Terrestrial & Marine Species Invasions

**3.5 Human Exploitation of Natural Resources**

Agriculture and the world's food supply

Fisheries and harvesting

Fisheries and harvesting cont.d

## Field Trips

Students are expected to attend a forest ecosystem ecology field trip in October (exact date: TBD)

**Assignments and grading:**

Mid-term (in-class) 30%

Section Participation 20%

Final Exam (3 hour) 50%