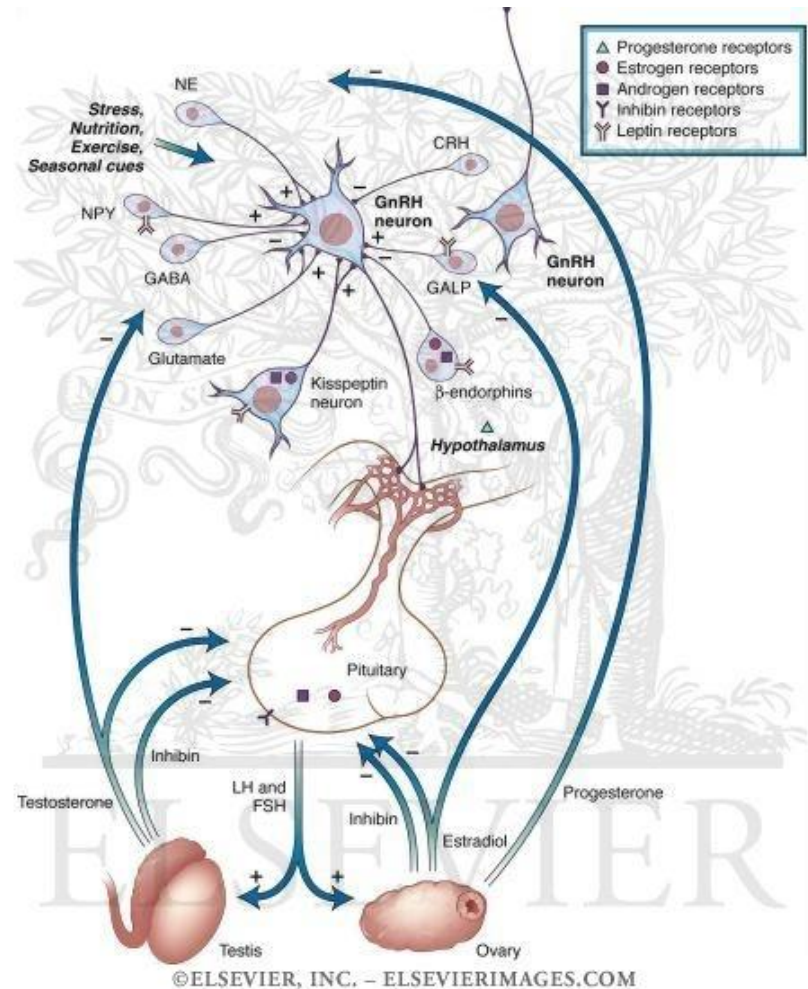
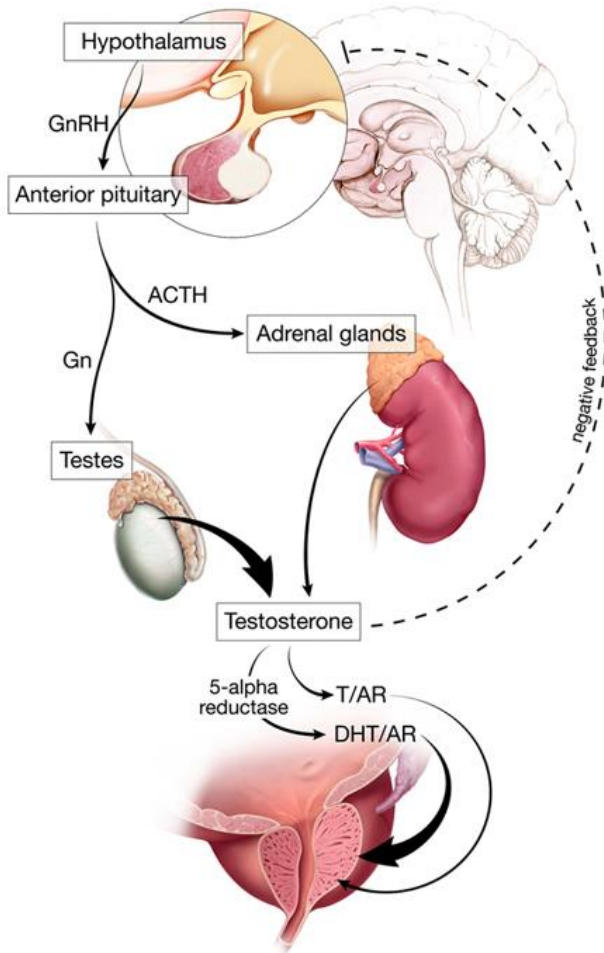


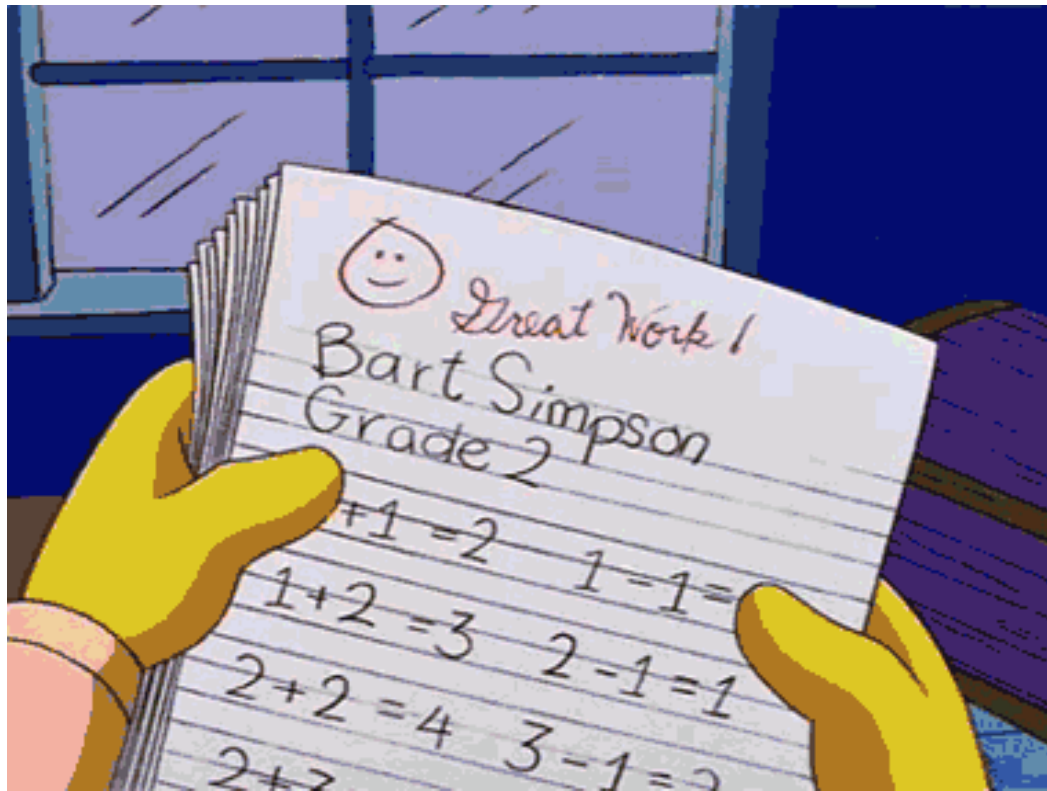
## LECTURE QUESTIONS



Can you explain in further detail the function of the hypothalamus-pituitary-gonadal (adrenal?) axis? In particular, can you go over the feedback loops? Are both negative and positive feedback loops present or only negative? Is the feedback loop only present in males? The book only talks about a negative feedback loop present in males



**IF YOU DON'T HAVE MORE QUESTIONS, I HAVE SOMETHING FOR YOU!**



**YOU MIGHT HAVE QUESTIONS AFTER THIS! RIGHT?**



Google Search

I'm Feeling Lucky

# Tracking the ecological overshoot of the human economy

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*CENTER FOR SUSTAINABLE ECONOMY*

<http://myfootprint.org>

## Which are the six assumptions to assess the “ecological footprint”?



1. It is possible to keep track of most of the resources humanity consumes and the wastes humanity generates.
2. Most of these resource and waste flows can be measured.
3. By weighting each area in proportion to its usable biomass productivity, the different areas can be expressed in standardized hectares.
4. Because these areas stand for mutually exclusive uses, and each global hectare represents the same amount of usable biomass production for a given year, they can be **added up** to a total representing the aggregate human demand.
5. Nature’s supply of ecological services can also be expressed in global hectares of biologically productive space.
6. Area demand can exceed area supply. For example, a forest harvested at twice its regeneration rate appears in our accounts at twice its area. This phenomenon is called “ecological overshoot”.

## Which are the Impact Components?

- (i) growing crops for food, animal feed, fiber, oil, and rubber.
- (ii) grazing animals for meat, hides, wool, and milk.
- (iii) harvesting timber for wood, fiber, and fuel.
- (iv) marine and freshwater fishing.
- (v) accommodating infrastructure for housing, transportation, industrial production, and hydro-electric power.
- (vi) burning fossil fuel.

**How do these Impacts aggregate?**

$$\sum P_i \cdot E_i = A$$

**How are these Impacts buffered?**

RESILIENCE

Which are the factors that lead to ecosystem stability?

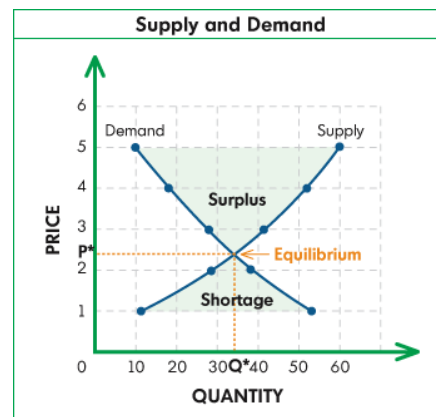
## How do we measure the “overshoot”?

The extent to which human area exceeds nature’s supply. It’s a percentage.

**Table 1. Summary of equivalence factors, humanity’s area demands, and earth’s biological capacity in 1999 (per capita)**

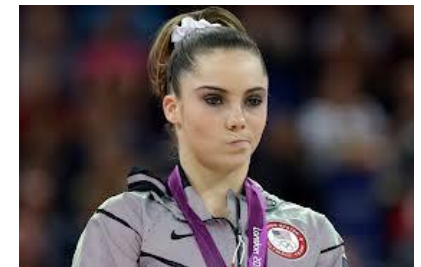
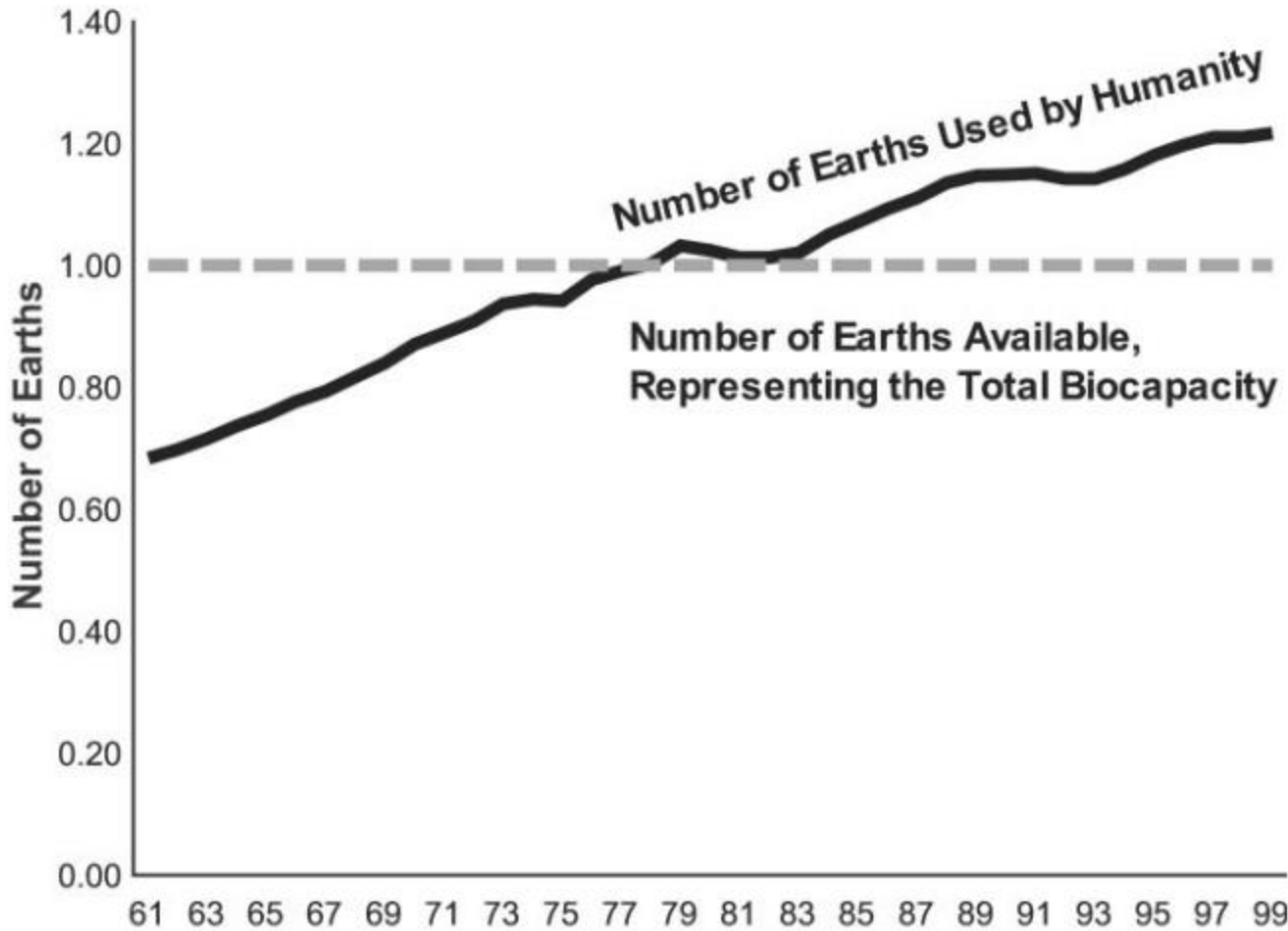
Area	Equivalence factor, gha/ha	Average global area demand (per capita)		Existing global biocapacity (per capita)	
		Total demand, ha (per capita)	Equivalent total, gha (per capita)	World area, ha (per capita)	Equivalent total, gha (per capita)
Growing crops	2.1	0.25	0.53	0.25	0.53
Grazing animals	0.5	0.21	0.10	0.58	0.27
Harvesting timber	1.3	0.22	0.29	0.65	0.87
Fishing	0.4	0.40	0.14	0.39	0.14
Accommodating infrastructure	2.2	0.05	0.10	0.05	0.10
Fossil fuel and nuclear energy	1.3	0.86	1.16	0.00	0.00
<b>Total</b>			<b>2.33</b>	<b>1.91</b>	<b>1.91</b>

To make aggregation reflect differences in bioproductivity, areas are expressed in standardized global hectares (gha), which correspond to hectares with world average bioproductivity.



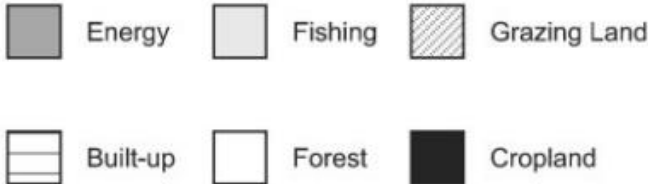
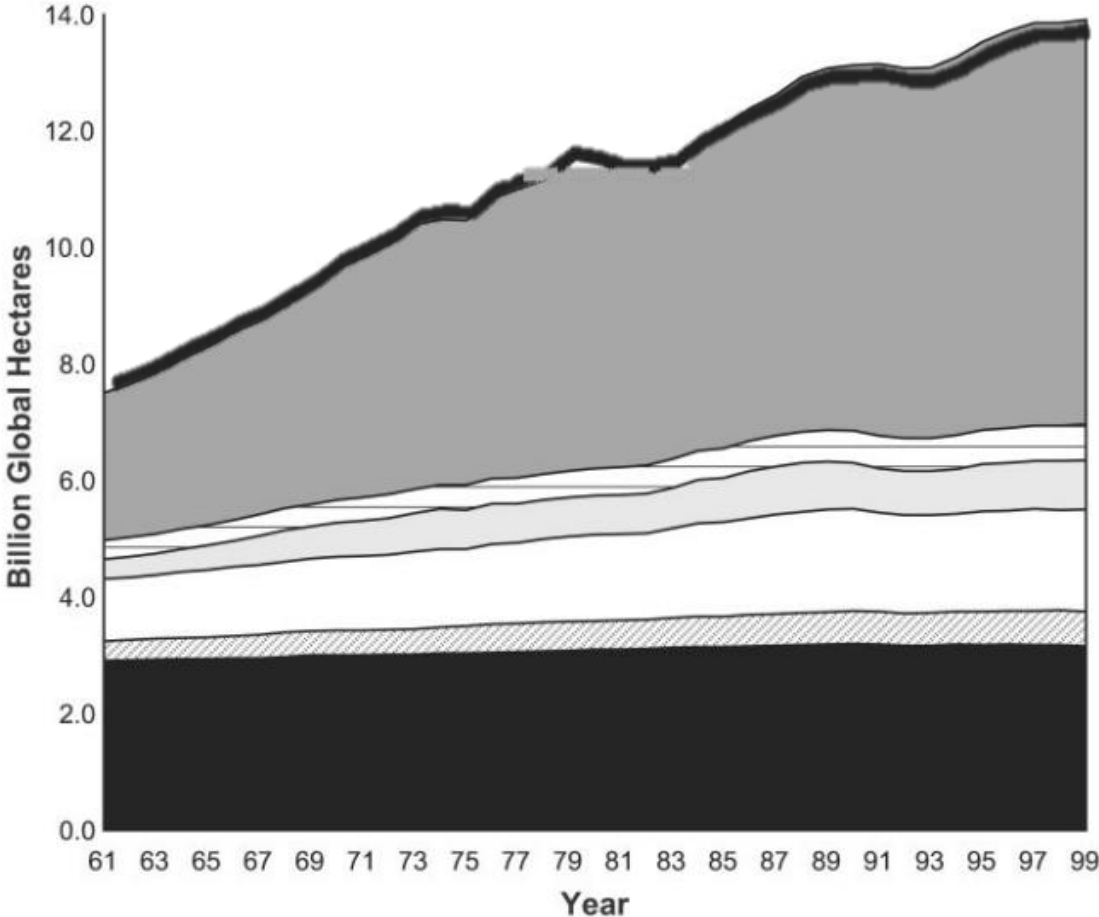


# Time trend of humanity's ecological demand.



It doesn't say anything about how rapidly the natural capital stock is becoming depleted or for how long.

# Global ecological demand over time, in global hectares

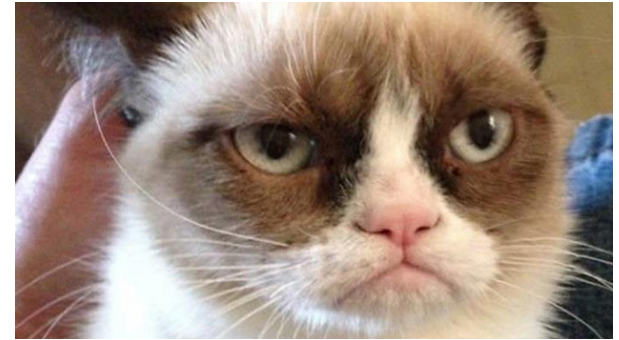


# My Ecological Footprint - Quiz Results

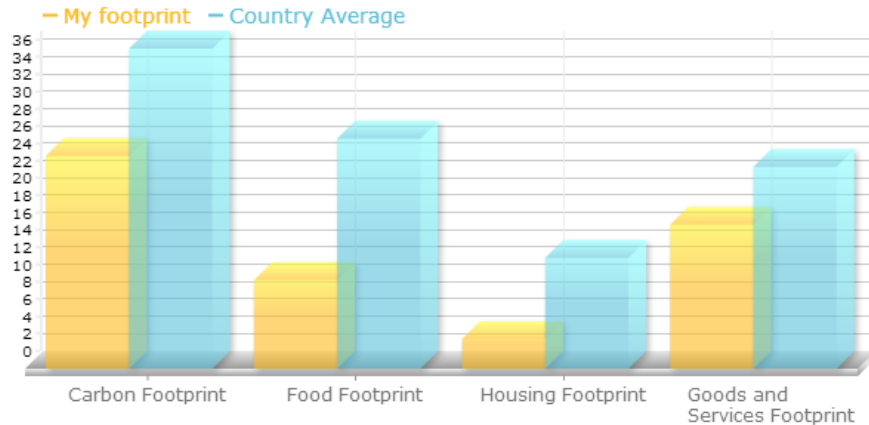
If everyone on the planet lived my lifestyle, we would need:



= 3.50 Earths

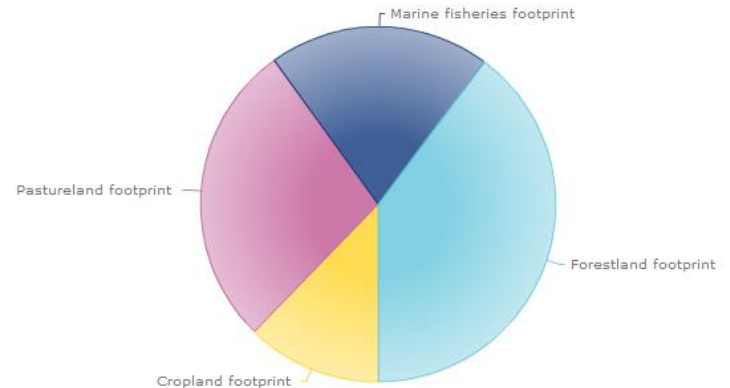


MY FOOTPRINT IN GLOBAL HECTARES BY CONSUMPTION CATEGORY



Total: 54.92

MY FOOTPRINT SHARE BY BIOME



**Please, beat me up!**

# Climate and species' range



# IPCC

INTERGOVERNMENTAL  
PANEL ON  
CLIMATE CHANGE



WMO



UNEP

# What's the hypothesis?

Global warming is happening

# What's the prediction?

If that hypothesis is true, species ranges should move both polewards in latitude and upwards in altitude.

# How did Dr Parmesan test this prediction?



