List three real-world systems that you think might contain feedback:

1) A predation hierarchy

2) Riding a bicycle

3) The open access problem

Why do you think they contain feedback? Describe what the feedback consists of:

1. A predation hierarchy – The feedback is found within the ebb and flow of available resources, available mates, and available safety.
   1. Producers create sugars via photosynthesis, store ground water, stabilize topsoil, offer forage for consumers, convert CO2 into O2, provide population control for consumers and predators by way of availability, compete with other producers for resources, and offer safety for family units of Consumers and Predators.
   2. Consumers convert sugars into proteins and breakdown other material into constituent components, provide population control for producers, pass nutrient stores and caloric availability to both Predators and Producers, convert O2 into CO2, compete for resources, aerate/compact soil, breed and die.
   3. Predators provide population control for consumers, provide nutrient loads for Consumers and Producers, convert O2 into CO2, compact and aerate soil, compete for resources, breed and die.

As producers flourish, consumer populations can flourish, but then they destroy habitat and overgraze, thus limiting the carrying capacity of the producers. As they die off, the producers can again flourish, and the cycle begins again. We find a similar event cycle relating the consumers to the predators. The distinguishing factor being the imperfection of the transition of energy between biomasses. Since some caloric availability is lost in digestion, the carrying capacity of the consumers is always smaller than that of the producers.

1. Riding a bicycle –
   1. Balance
   2. Vector
   3. Inertia

When riding a bicycle, one is feedback a large set of information related to speed, direction, and relative positions. All factors, in this case, are fed to a single agent, evaluated, and unrelated actions are set as the corrective response sets. The information set is open, and the feedback is then found within the agent themselves. For example, the agent is falling over due to insufficient speed for the incline. The agent runs a corrective action and performs verification checks simultaneously until the desired criteria are met, (no longer falling over), or are no longer possible (fell over). The agent may have gotten off of the bicycle, pedaled harder, began a tack-and-jibe sequence to diminish the incline, leaned to the opposite direction, or began steering erratically. The feedback is a moment-by-moment capturing of the effects of each successive attempt to correct.

1. The open access problem –
   1. Shepherd A
   2. Shepherd B
   3. Shepherd C
   4. Sheep

When sharing a common parcel of land, it behooves any one of the shepherds to place more sheep onto the common area. The problem is that any grazing area will have a maximum carrying capacity which it may endure before the system finds an equilibrium of 0.