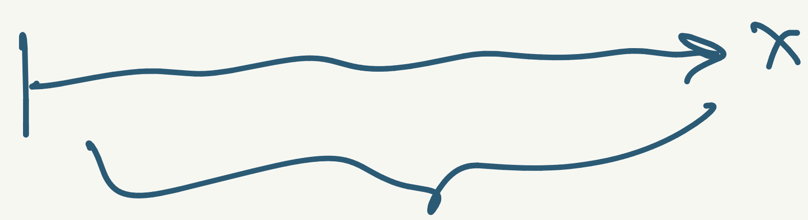
1) Number of reproductive bouts

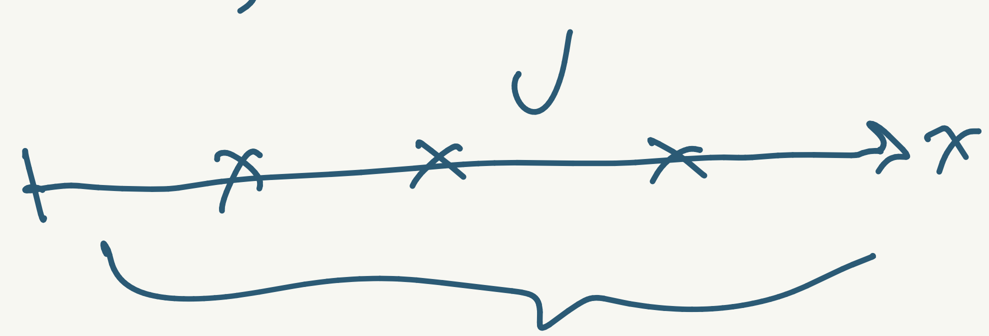
Semelparous: spp. reproduces 1x
- annual plants
- Some Pacific Salmon
- rare in vertebrates other than boney fish

Iteroparous: spp. reproduce multiple times
- birds, reptiles, mammals (most)

- Grandmother hypothesis

Tradeoffs btw. fecundity, growth, survival





2) r-selection vs. K selection

r: intrinsic rate of growth in a population

- selected for high population growth rates

"Quantity" over "Quality"

- Shorter lifespans
- rapid development
- early maturation
- low parental investment

(insects, weedy plants, small vertebrates)

K: Carrying Capacity of a population

"Quality" over "Quantity"

- Long-lived
- Develop slowly
- ~~Delqan~~ Delayed Maturation
- Invest heavily in offspring
- low rates of reproduction

(large mammals, turtles, crocodiles, long-lived trees)

Tradeoffs: Energy is limited and allocated to one structure ~~[illegible]~~ or function against another /

- Time
- Resources
- Behaviors

Φ = Reproductive value ~ mean amount of future reproductive success

- Maximized under mass selection

ϕ ~ part of Φ that is at stake

a ~ proportionate increase in ϕ that results for a (+) (YES) response

c ~ cost of a

b ~ loss factor from a (−) (NO) response

(+) $\Phi' = (1+a)\phi + (1-c)(\Phi - \phi)$

(−) $\Phi'' = (1-b)\phi + (\Phi - \phi)$

if $c=0$: $\Phi' = (1+a)\phi + (\Phi - \phi)$

$a=1$: $\Phi' = 2\phi + \Phi - \phi = \Phi + \phi$

if $b=0$: $\Phi'' = \phi + \Phi - \phi = \Phi$

if $b=1$: $\Phi'' = \Phi - \phi$

if $\Phi' > \Phi''$ (+) decision is chosen

if $\Phi'' > \Phi'$ (−) decision is chosen

$$\Phi' = \Phi'' \rightarrow \underbrace{(1+a)\phi + (1-c)(\Phi-\phi)}_{\Phi'} = \underbrace{(1-b)\phi + (\Phi-\phi)}_{\Phi''}$$

(solve for c^*)

Behaviors: finding food, finding mates, avoiding predators

- Max (Survival, reproduction)
- Cost & Benefits (tradeoffs)

- infanticide among lions
- Siblicide (Nazca booby)

Foraging Ecology ~ obtaining the energy to
- grow
- reproduce
- not die

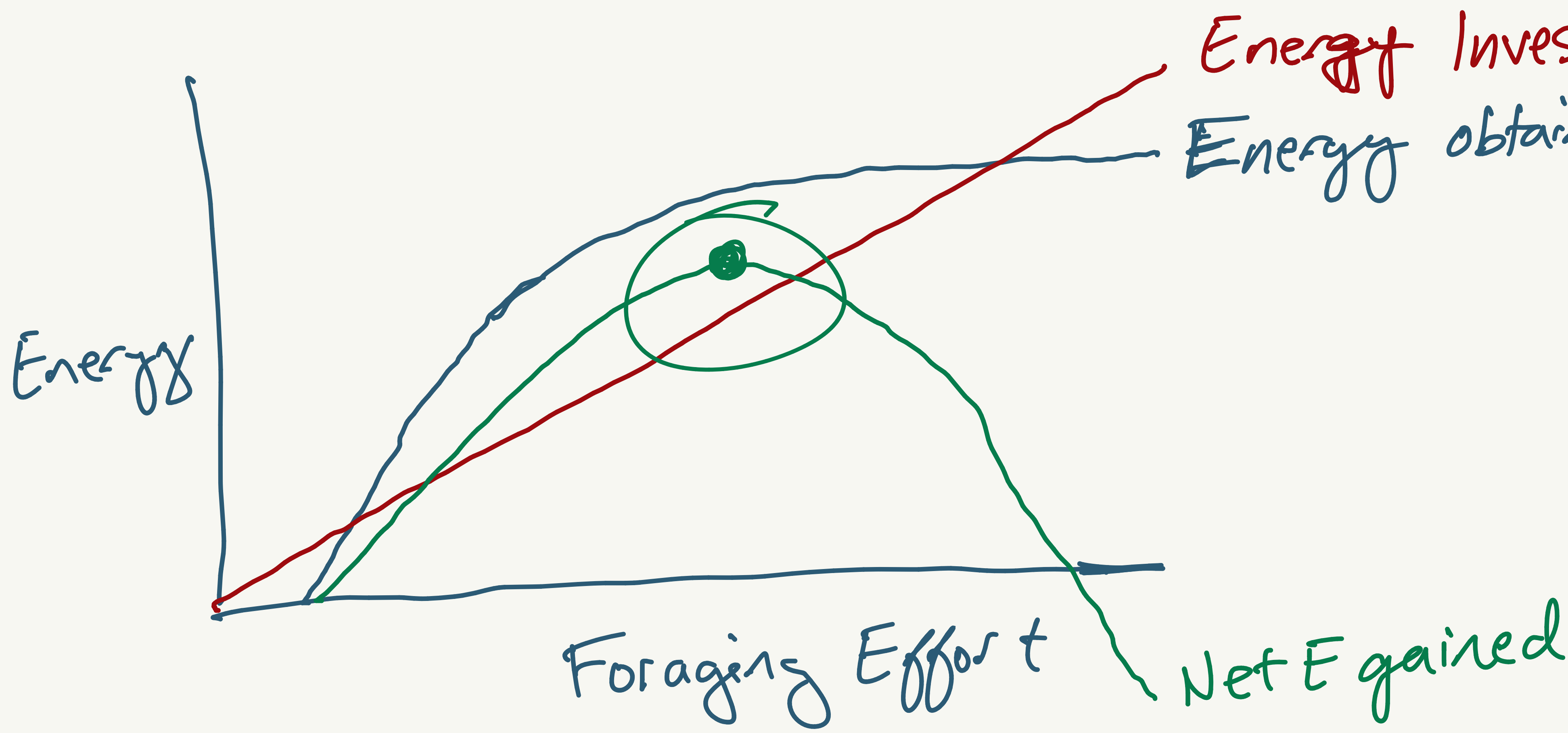
Optimal Foraging Theory:
- maximize energy gain
- minimize energy loss

- food varies over space and time
- " " in nutrional content

- grass
- figs (masting)
- lions eating herbivores

- Energetic costs: Finding, Capturing, Handling

Profitability $P = \frac{E_{gain} - E_{loss}}{t}$



foraging

Manipulation Experiment
- handling costs were altered to examine the effects this had on the time invested in foraging by Greats Tits