* Everything was connected in the past
* Now only little is connected
* Captive breed because many species cannot survive harsh condition in the wild
* Almost 1000 are captive breed
* Few invertebrates
* Many threatened plants
* Captive breed – to save species from extinction and eventually returned to the wild
* Up to 200 years of expected captive before releasing to the wild
* Genetic adaptation to captivity – beneficial in captivity but harmful when returned to the wild
* Objective of captivity
  + Freeze evolution
* Targets for captive management – retain 90% GD for 100 years
  + 10% loss of GD, reduction in ability to evolve – and 10% increase in IBD, 10% reduction in fitness
* Wild pop is declining – captive pop has founding, growth, maintenance – reintroduce has founding, growth, and maintenance too
* Founding
  + Minimum 20 to 30 contributing individuals – plot between heterozygosity before and after captive vs number of founders
  + Not all of them are going to breed when bringing them to new environment
* Fewer founders – target number to reach 90% GD has to be increased
* Growth – need to increase number as early as possible – eliminate risk of environmental stochasity – avoid inbreeding
* Maintenance – close to target effective pop size – retain GD and minimise inbreeding – minimise mk
  + Maximum avoidance of inbreeding – 8 unrelated founders – take equal number of eight pairs – 1 male and 1 female from each pair – each pair and family contributes equally – mate the pair in each successful generation – in the end everyone is equally related
  + Unmanaged pop is about Ne = 0.1N
* Kinship invented to cope with the way to maximum avoidance
  + Kinship – how related 2 individuals are
  + Measure kinship of hypothetical offspring
  + Probability of 2 alleles that are identical by descent
  + Range from 0 to 1
  + We look for low kinship – small kinship is genetically more valuable
* Case study – California condor
  + Extinct in the wild
  + Minimising kinship based on pedigree – some founders might be related
  + Every founder genome sequence
  + Use both genome sequence and pedigree to calculate kinship
  + Dwarf – die at hatching time – lethal recessive disease – could not eliminate because half are potential carriers
  + Identify pairs that had dwarf and paired them up with individual that has no history of dwarf
  + Now use molecular technique
  + Number increased linearly
  + Reintroduction started very early
* Przewalski’s horse – Mongolian horse
  + 12 founders and 4 domestic
  + Started before kinship suggested
  + Strategy seems similar to kinship minimisation
  + Genome shows it is distinct from domestic horses – distinct is more appropriate than calling it as sub-species
* How successful
  + Many have been successful but not all can be
* Attempts to resurrect extinct species
  + Hasn’t been successful yet
  + Great development in stem cell technology
  + Mammoth could be the most potential – surrogate – close to Indian elephant
  + Should not use this as first choice of conservative strategy
* Reintroductions
* Genetic adaptation to captivity – evolution that occurs when bringing from wild to captivity – adaption can be large
  + Overwhelmingly when reintroduced to wild
  + Salmonids fish – exponential decay
  + EFS = equal family size