I. Managing populations that are in “decline”

A. Providing Resources
B. Controlling Threats
C. Direct Manipulation
D. Ex situ Conservation

A) Providing resources for populations

- Providing food, nutrients
Houbara bustard
Water holes created in Saudi Arabia to assist in restoring populations of the bustard & gazelle

Problems:
• Foster long-term dependence on people

They're a constantly killing coral-destruction machine.”—D. Nuckols, coordinator for Coastal America

Providing a physical environment

Providing species interactions

Arctic tern

Large Blue butterfly—dependant upon Myrmica sabuleti
B) Controlling threats

1) Preventing Overexploitation
2) Managing Indirect threats
3) Controlling Consumers & Competitors

- Preventing Overexploitation
  - Banning the trade of species products (CITES) - CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora) is an international agreement between governments. http://www.cites.org/eng/disc/species.shtml

- Controlling Competitors
  - Brown-headed cowbird
  - Sierra yellow-legged frog vs. Introduced trout

- Removing introduced predators
Removal of feral horses from sensitive areas

Dealing with indirect impacts

C) Direct Manipulations

1) Translocations & Assisted Migration
2) Artificial Breeding
3) Ex situ conservation
1) Translocation

the movement of an organism from one place with free release in another and refers collectively to: (1) introduction, (2) re-introduction and (3) re-stocking/augmenting.
Requires knowledge of species biology & suitable habitat!

a. Introducing organisms into new sites (movement into an area where they did not formerly exist, non-endemic)

b. Reintroducing organisms into sites which they have been extirpated

c. Augmenting or supplementing small populations

Assisted migration, on the horizon?

- Proposed method of transferring to a cooler place where the plants it depends on for food are shifting their growing seasons to
- Torreya taxifolia - recently planted in N.C.
  - Potential problems:

  • Recent commentary in Science: “Translocation should be attempted, according to the chart, only with species that have “a high risk of decline or extinction under climate change”, when the translocation is “technically possible”, and when “the benefits of translocation outweigh the biological and socioeconomic costs and constraints”.

2) Artificial Breeding

a. Double-clutching: removing one set of eggs to induce

b. Cross-fostering:

c. Head-starting: reduce mortality during the short time when young are vulnerable

d. Hatcheries: raise fish to a certain size then release them into the wild
d. Artificial Insemination and Embryo transfer

- Wolong Giant Panda Research Centre - Scientists carried out the artificial insemination in March, and You was found to be pregnant in June during an ultrasound.

Artificial breeding success stories:
3) Ex situ conservation

- Removal of individuals or groups from their natural habitat into captivity, either to breed or to maintain a genetic stock
- Studbooks: (history of each individual in a population)
  - Pedigrees, capture site, genetic & demographic identity
- Species Survival Program (coordinated effort)

Examples:

- The Wyoming Toad
- Black-footed ferrets

Disadvantages of captive breeding

1) Can endanger remaining small wild populations
2) Difficult to maintain large enough population size to prevent inbreeding depression
3) Captive populations may undergo selection, adapting them to captive conditions
Captive-bred reintroductions

For reintroduction to work:
- YOU NEED A SELF-SUSTAINING CAPTIVE POPULATION
- REQUIRE A SUITABLE AMOUNT OF ADEQUATE AND PROTECTED HABITAT
- EFFECTIVE TECHNIQUES TO PREPARE ANIMALS FOR REINTRODUCTION
- POST-RELEASE MONITORING AND EVALUATION
- SUFFICIENT LONG-TERM FUNDING POTENTIAL
- EDUCATE THE PUBLIC

Ex situ conservation:
Philosophical problem?
- Conservation can only have real meaning if species are kept in context with their habitat
- Conservation is about conserving the whole with its complex interactions, not isolated pieces