Session I

CAPTIVE BREEDING AND EXPLOITATION
Shown

• Phenotypic and Genetic Effects in Aquatic and terrestrial organisms
  – Exploitation (Hutchings, Coltman, Roy, Baker)
  – Rescue of small populations by captive breeding (Frankham, Hutchings, Leberg, Randi, Hedrick, Wayne, Bernachez)
  – Rescue of domesticated populations (Taberlet)
  – Evolutionary consequences of altered ecosystems (Waples)
Implications for management

• Exploitation can lead to genetic bottlenecks, changes in life history characteristics (phenotypic and genetic), and reduced productivity (recovery)
• Strong adverse effects of genetic adaptation to captivity reduces survival and reproductive success of animals returned to the wild
• Loss of genetic diversity from husbandry practices
• Adaptations to altered environments will have unknown impacts on restoration and conservation measures
Recommendations

• Exploitation
  – Tighter controls on size/age selective fishing/hunting mortality
  – Maintenance of large, complex populations
  – Anthropogenic mortality (e.g. 4Hs) is managed as exploitation?
Captive Breeding

- Controls on the containment capabilities of domesticated animals (incl. feral mammals/birds)
- Avoidance of introduction of non-native individuals
- Minimize use of captive animals in recovery programs
- Minimize number of generations in captivity
- Use strict breeding population protocols to minimize inbreeding, loss of diversity and adaptations, drift, unwanted hybridization, etc.
Discussion Notes

• Evolutionary consequences need to be more explicitly considered in policy decisions.
  – Policy managers/public need to understand evolutionary concepts more clearly

• Recommended evolutionary conservation goals need to be integrated into evolutionary management strategies
  – How to formulate clear evolutionary goals?
  – Focus on ecosystems not museum pieces
Points of contention

- Reversibility of evolution caused by human activity
- Does all diversity need to be conserved?
  - Diversity of interest (practical considerations)
  - Maintain lines showing human-induced evolution (polluted sites)
- Can we conserve evolutionary opportunities by conserving ecological functions and services, or is intervention necessary?
- Are economic and evolutionary conservation values compatible? Industry tradeoffs must be understood
- What is it we need to conserve: animal abundance, hotspots of diversity...
- Is the public ready to accept evolutionary concepts
What is at risk?

• Species-level variability
  – variability should be maintained as general principle
  – variability is the fundamental element of evolutionary potential
  – Long-term sustainability
• Possible loss of evolutionary options
• Risk of collapse
• Losing resilience
• Eroding the genetic diversity of wild populations
Policy Considerations

• Keeping evolutionary options in light of CC, etc.
• Tractable policy goals must incorporate elements of evolutionary conservation
• To achieve this, clear and simple evolutionary concepts are necessary
  – Build a communication strategy to help the public and the management to understand evolutionary conservation principles (i.e. climate change example).
  – Demonstrate with key examples and disseminate at places like “shiftingbaseline.org”
  – How do we keep the mandate alive? DOCUMENT?
Policy Considerations (cont’d)

• Burden of Proof - The burden of proof on environmental and evolutionary impact must be shifted in favor of a precautionary approach akin to Bayesian inference

• Evolutionary concepts must be integrated in decision-making economic structures (i.e. evaluations of economic options must meet evolutionary criteria)
  – Abundance, productivity, spatial structure and genetic variability