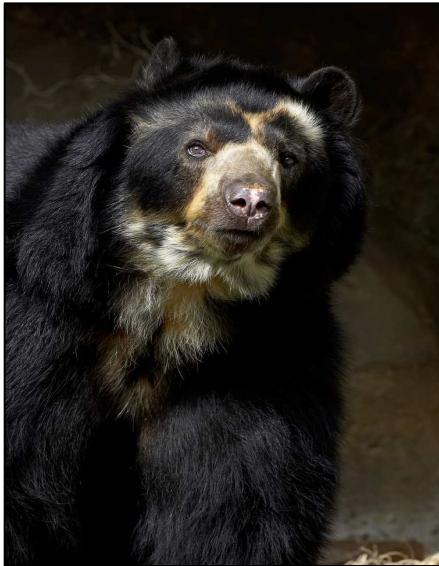
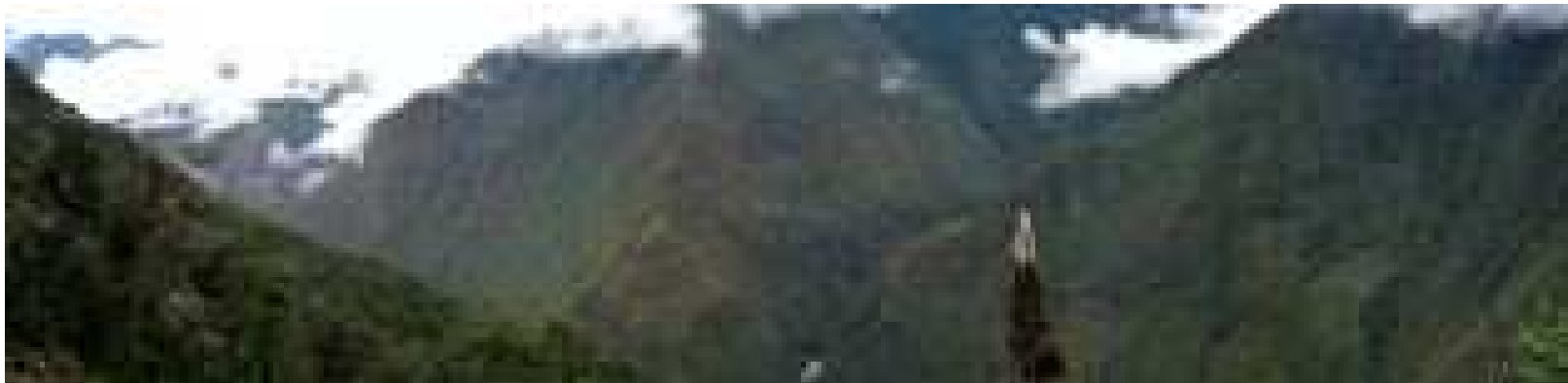


Reintroduction for Andean bears?

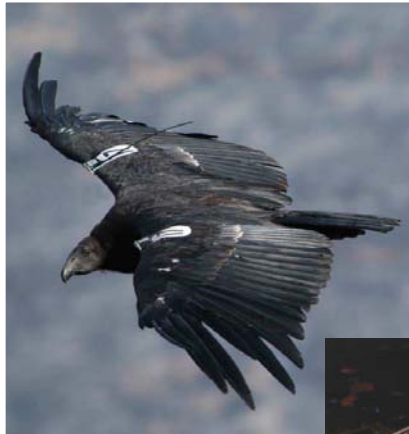
Welfare, conservation and ecological relevance of release strategies



Ron Swaisgood
San Diego Zoo
Conservation & Research
for Endangered Species



Why am I talking about Andean bear reintroduction?



Panel Discussion on Reintroduction



- Armando Castellanos
- Daniel Rodriguez
- Tomorrow: 4-6 PM

Resources



- IUCN Reintroduction Guidelines (1998)
- Kolter & van Dijk, (2005). Rehabilitation and release of bears
- Swaisgood (In review). The conservation-welfare nexus in reintroduction programs: a role for sensory ecology.
Animal Welfare

Reintroduction as A Conservation Strategy

- Reintroduction 1 (IUCN):
 - Animals released into area where species has been extirpated
- Reintroduction 2 (Zoos, common usage):
 - Animals reared in captivity released into wild
- Supplementation (IUCN)
 - Animals released into existing resident population
- Translocation (IUCN):
 - Wild-to-wild (no criteria re: presence of residents pre-release)
- Goal: species recovery
- Focus: viable populations

IUCN (1998)

Reintroduction: Success and Failure

- Low success for captive releases (11-40%)
- Moderate "success" for translocation (40-75%)
- High mortality (>50%)
- No improvement in last 20 years

Griffith et al. (1989) Science; Wolf et al. (1998) Biol Cons;
Beck (1994) In: Olney; Fischer & Lindenmeyer (2000) Biol Cons

Reintroduction as a welfare strategy

- Rehabilitations & nuisance animal relocations
- Goals: better welfare living "free"
- Focus: individual welfare
- Effects on conservation: sometimes negative
 - Disease transmission
 - Genetics
 - Problem animals

Welfare goals "naïve"

"In view of of the considerable mortality inherent in even the best planned and managed reintroduction programs, the reintroduction of orphans should not be represented as "humanitarian."" (AZA, 1992)

Welfare goals can compromise conservation goals (& sometimes welfare goals)



Problem animals, cultural transmission
(Kolter & Dijk, 2005)



Social disruption (Goosens, 2005)



97% mortality
(Adams, 2004)



Nuisance animals still a nuisance
(Mosello et al., 1999)

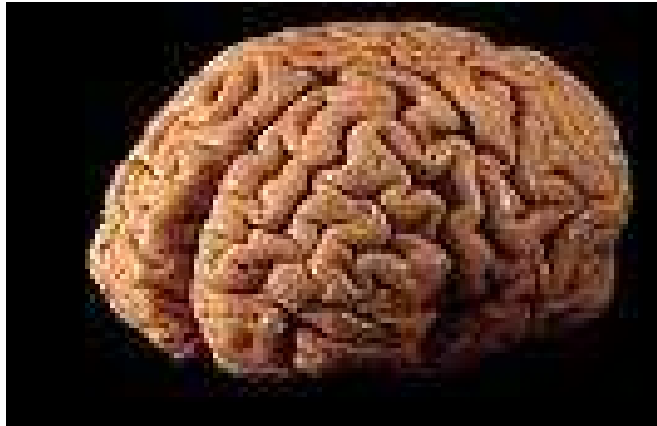
Captive environments that increase welfare and conservation goals



Golden-lion tamarins

- "Tough love" (Beck, 1995)
 - Preparation for predation, pathogens, inclement weather

A role for enrichment



- To counteract brain damage
 - Learning
 - Response to novelty
 - Emotional reactivity
- To teach specific survival skills
 - Climbing, foraging, antipredator behavior



Enrichment for black-footed ferrets



- Manipulated pen size, substrate for digging burrows, live prey, antipredator training
- Effects on post-release behavior, settlement, survival, reproduction

Biggins et al. (1999) Biol Cons

Soft vs. hard release



Golden lion tamarin

- Hard: drop and run
- Soft
 - Acclimation pen
 - Food, water
 - Intervention
 - But does it work?
(Wolf et al, 1998)

How soft is soft?



- Less emphasis on post-release management
- Standard wildlife management approach
- Little attention to more ecologically relevant & psychological needs

Getting by with a little help from friends: role of social support



- B-t prairie dogs captured and released in unfamiliar vs. familiar family groups:
 - 500% increase in survival

Shier (2007) Cons Biol

Three's a crowd: unfamiliar conspecifics may need more space



Linklater & Swaisgood (2008)
J Wildlife Management

- Translocated rhinos fight more in low densities after translocation than before translocation
 - Attack unfamiliar conspecifics
- Need to release fewer rhinos in larger reserves

Need for stress mediation



- Negative impacts on reproduction and immune system
- Cognitive effects (Teixeira et al. 2007)
 - Learning, memory, attention, decision-making
 - Demands on cognition post-release:
 - Foraging, distribution of resources
 - Find & use cover
 - Antipredator vigilance, decision-making
 - Avoid conspecific conflict
 - Most mortality first few days post-release

Reintroductions and Dispersal

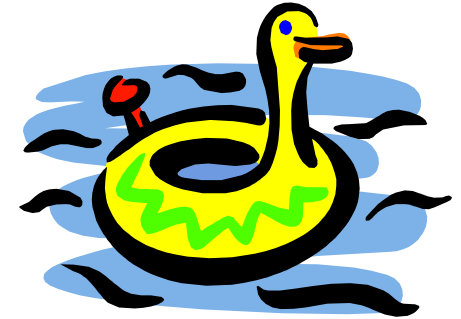
- "Forced dispersal"
- Post-release movements can greatly exceed species-typical dispersal distances
- High-risk period, high mortality
- Why hasn't the behavioral ecology of dispersal mechanisms been considered in reintroductions???

Why don't they settle down?

- Conspecific cueing (conspecific attraction)
- Looking for someplace like home--NHPI



Conspecific cueing and habitat settlement



Duck decoys

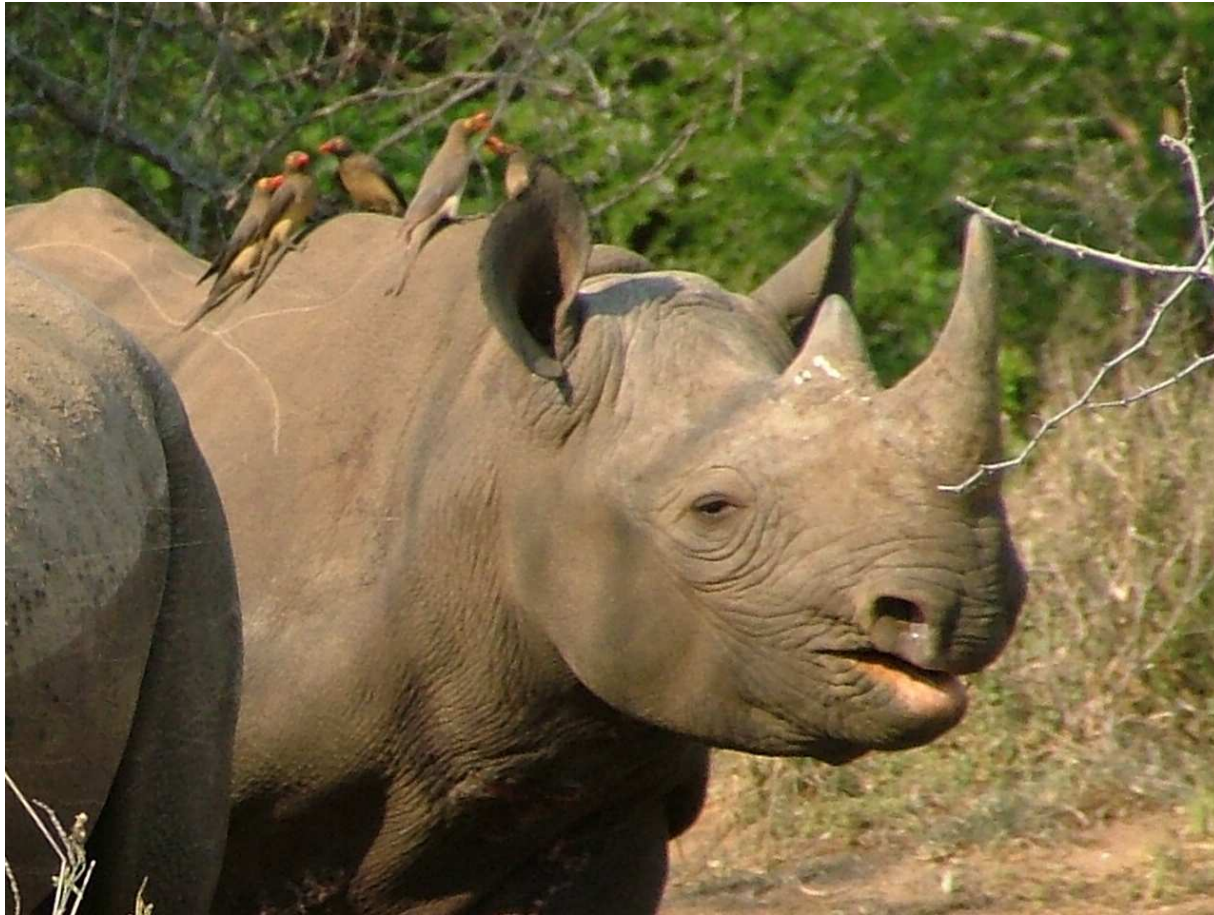
- Animals use presence or abundance of conspecifics to assess habitat quality (Stamps 1987, 1988)
 - Indirect cues
 - Cost saving, risk avoidance
- Not just social species
 - territorial birds
 - Prediction: attracted to settle near "occupied" territory

Conspecific cueing in conservation action



- Decoys draw fairy terns to breeding territories (Jeffries 2001, Biol Cons)
- Playbacks facilitate territory settlement in black-capped vireos (Ward & Schlossberg, 2004, Cons Biol)

Manipulating conspecific cues for reintroduction



Linklater & Swaisgood (2007) Reintroduction News

How to translocate a rhino



Black rhinos on the run



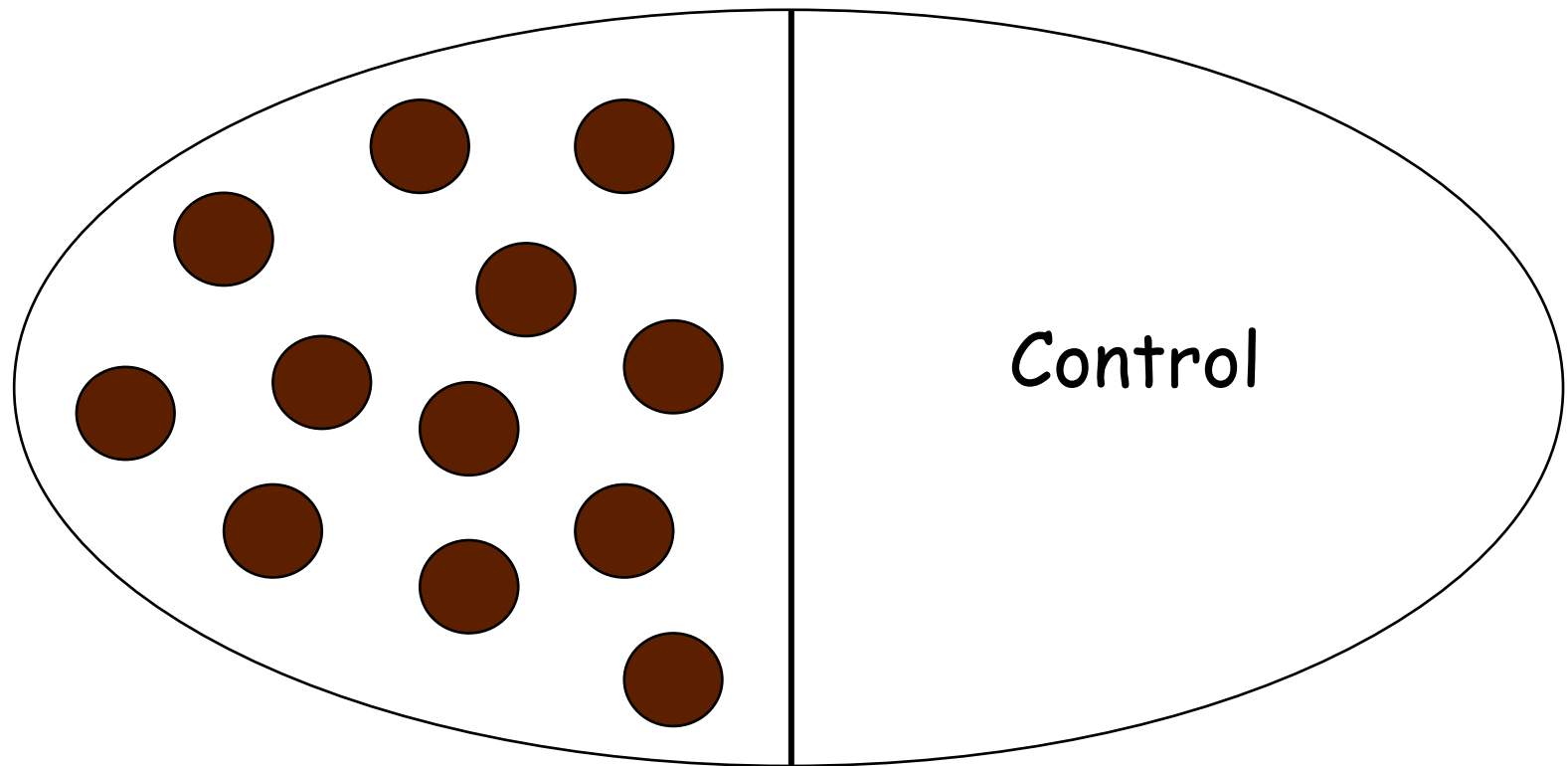
Failure to settle, crashing through fences, fighting

Distributing chemical signals...





Planting conspecific cues



● = virtual scent territories

Natal Habitat Preference Induction (NHPI)

- Dispersers prefer to settle in habitat similar to natal habitat (imprinting)
- Two mechanisms:
 - Conspicuous cues to habitat quality
 - Performance-based preference
 - Experience in habitat A enhances performance in A

Habitat selection is an individual's, not a species', decision!



Looks good to you? Not me!

- What IS suitable for one animal may not be suitable for another
- What individuals PERCEIVE as suitable may differ
- Individuals may traverse "perfectly suitable habitat" searching for someplace like home

NHPI and Reintroductions

Do animals just keep
dispersing, looking for
someplace like home?

NHPI in caribou affects habitat choice & performance



- Translocated two ecotypes: grassland and mountain
- Translocated to mountain habitat
- Mountain ecotypes used same foraging strategy as residents
- Grassland ecotypes preferred more open south-facing slopes
 - Mortality twice as high

Warren et al. (1996). Cons Biol

Solutions to *your* NHPI problems



- Acclimation at site (but only if truly exposed to local cues)
- Select release habitat similar to natal habitat
- Avoid creating preferences for artificial habitats in captive breeding programs
 - Plant cues from release habitat in natal habitat during development
- Alter release site by planting specific cues from natal habitat

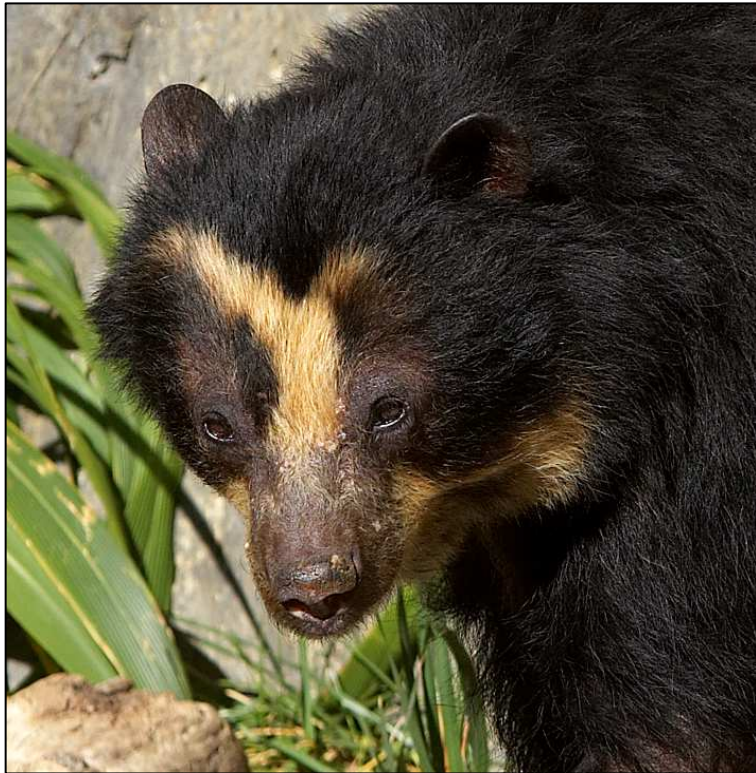
Reintroduction: NHPI argues for reducing disparities between captive and wild environments



Biggens et al. (1999) Biol Cons

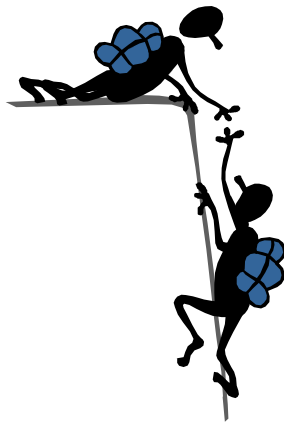
- Cage-reared ferrets traveled further & had higher mortality
 - Searching for cage-like environments post-release?
- Ferrets reared in enriched captive environment traveled less and had lower mortality

Application to bears?



- Our job to think this through

A new synthesis?



- Behavioral ecologists:
 - Theoretical framework
 - Adaptive value of animal behavior in natural habitat
 - Focus on individual (fitness)
 - Need increased focus on proximate mechanism
- Conservation biologists
 - Understanding of the most important threats to animal populations
 - Governmental regulations & policy
 - Focus on populations, habitat, ecosystems
- Animal welfarists:
 - Better understanding of psychological and perceptual processes (e.g., stress)
 - Reality check: individuals matter

Pros & Cons?

Come back tomorrow at 4



Reintroduction as a conservation strategy for Andean bears? Pros and cons



Zoological Society of San Diego

Ron Swaisgood
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Conservation & Research
for Endangered Species

First question: why release?

- Has a conservation goal been identified?
 - Part of a strategic species recovery plan
 - Suitable unoccupied habitat
 - Small population, below carrying capacity, needing augmentation
- Is the goal welfare of the individual?
 - If so, think this through carefully
 - Poor welfare, low survival common

Pros

- Establish new populations where species has been extirpated
 - Extend species range
 - Repopulate new protected areas
- Increase genetic diversity in small (inbred) populations
 - Part of meta-population management strategy
- Saves lives of individual bears that might be euthanized
- Engages public interest; use as conservation education tool
- An opportunity for research, insights into biology, ecology and behavior

Cons: For released animal



- Death is common outcome for reintroduced animals
- Stress, poor welfare during adjustment period
- May not integrate into wild society, reproduce

Cons: Impacts on wild population?

- Disease transmission
- Genetic "pollution"
 - Breaks up co-adapted gene complexes
- Social disruption
- Released animal becomes a nuisance
 - Bear crop raiding and cattle depredation
 - Cultural transmission of bad habits
 - Risk increasing human-animal conflict

Source of animals matters

- Captive-born have lowest success
- Wild-born, translocated have highest success
- Wild-born, with short period in captivity
 - May have higher success
 - Keep rehabilitation period short
 - Bears brought into captivity when older may make better release candidates

Reintroduction biology

- A scientific approach to reintroductions
- Consider species-specific ecological and psychological needs
- Test hypotheses, post-release monitoring
- Develop optimal reintroduction strategy
 - Can take years (decades)

A role for "experimental release"

- Small-scale releases
- Goal: Development of an optimal release strategy for future use, as needed.
 - feedback on potential problems facing reintroduced animals
- Method:
 - More trial-and-error acceptable
 - Detailed post-release monitoring essential
 - Learn from mistakes
 - Correct problems (recapture unhealthy or problem animals)