

## Treating declining numbers.

Hopefully it's obvious that this depends a good deal on having some kind of accurate diagnosis of the problem.

But then, what next?

### **I. If at all possible, then any treatment should be evaluated.**

- Often several treatments are tried at once - some method should be found for evaluating the different treatments and deciphering which is actually working (if not both).

- The text mentions two main objections to treatment evaluations:

- 1) Lack of time - sometimes, it is argued, a species is in so much trouble that there isn't time for an experimental design. Quite rightly, the response is "if there's time for a treatment, there's time for some kind of experimental design".

- 2) Lack of numbers - sometimes the numbers are so low that statistics may not help much. The response here is silly:

- "statistics is the mathematics of low numbers ??????" No, statistics work on even very large numbers (and most tests gain power with larger samples).

- A better response might be that statistics still work on surprisingly low numbers. Sometimes even a sample size of 6 or 7 can yield statistically significant results. True, you gain power the higher your sample size, but this shouldn't stop you from trying.

- Further, if you have statistical evidence that your treatment is working you are on much firmer scientific ground than otherwise.

But if (1) and (2) are both a problem, then one might be justified in doing everything one can in the near term to try and save the species and then worrying about treatment designs etc. at a later date. Still, the step of evaluating treatments should not be ignored, just postponed.

Also, by setting up an elaborate analysis to test treatments, it should be kept in mind that some "treatments" may not work very well (quite obviously so in many cases), and there's a strong argument that with endangered species one shouldn't be "throwing away" individuals by subjecting them to obviously less effective treatments just so these

treatments can be evaluated. Again, this is less of a problem if numbers are a little higher and things aren't so urgent.

It is important to evaluate treatments, just use a little common sense when doing so.

An example of what is meant by evaluating treatments (hypothetical):

#### Box 9.1

In this hypothetical populations, two factors are thought to contribute to the decline of the imaginary parrot:

- introduction of rats
- removal of nesting possibilities by logging

So there are two "obvious" treatments available:

- rat exclusion devices
- supplemental nest boxes

So provide four test sites to test all possible outcomes (rearranged from your text):

		Rat exclusion devices present	
		yes	no
Supplemental nests available	yes	(two sites for each combination)	
	no		

Measure the number of fledglings per treatment, then evaluate to see if it's rat exclusion devices or supplemental nesting (or both) that help the most. The book is not quite right when it says that if the factors interact that the answer is ambiguous - it's just a little more difficult to deal with.

- It might, for example, indicate that rats or loss of nesting are not important on their own, just that if the parrots are subjected to both do they become important. In that case one might decide to exclude rats or provide supplemental nesting boxes, but that both aren't needed.

This is a nice hypothetical example since it clearly illustrates some of the points

made above:

If the parrot is in serious trouble should we really leave any in totally exposed conditions simply to test our design?

If numbers and time are both critically low, does it make sense to go through all this?

On the other hand, we've gained very valuable information, and we can't really expect our species to recover until we've identified the best treatment.

- If we decide the population is so critical that we need to resort to captive breeding, we will most likely not be successful in re-introductions until we've made sure we've eliminated the cause.

Note also the overlap between treatments and determining the cause of the decline as discussed previously.

## **II. Supplementing resources**

Here we're concerned with preserving or supplementing some limiting resource (and then evaluate the effect it has on the population).

There are two categories of resource use:

- 1) Pre-emptive: use of this resource prevents other animals from using it (e.g., woodpeckers and nesting holes)
- 2) Consumptive: reduces the use of a resource for other animals (e.g., feeding stations for vultures).

A) Management of breeding sites:

This covers lots of ground, for example:

- managing breeding ponds for amphibians
- making sure enough trees are around for cavity nesters
- making sure enough beaches are around for sea turtles
- making sure access to breeding sites is still open (e.g., fish ladders).

Many of these could be supplemented or protected fairly easily by providing artificial ponds, nest boxes, staking off nesting beaches, etc.

#### B) Management to supplement food:

This is a little obvious - if food is thought to be limiting the population, then supplement food.

One needs to be careful to provide the correct diet. Nice example of Cape griffon vultures - they needed bone as well as meat, and initially all they were offered was meat.

- the young did not develop normally due to lack of calcium.
- once bone splinters were added to supplemental feeding carcasses, this problem went away.

It's often better (for both the habitat and cost) to try to re-establish the environment to provide the missing food.

Supplementing food requires an on-going effort (more so than with managing breeding sites, since food often will need to be provided daily).

#### C) Management to supplement shelter:

Again, this is a broad area. Anything from refuges to sleeping places or refuges to evade predators can be included here.

- Black footed ferret needs the prairie dog for shelter (and food!)
- The numbat declined partially because there was no place for it to escape from predators
- Deforestation is kind of obvious - lots of animals loose shelter.
- A neat example of bats:
  - Some bats require undisturbed caves in which to hibernate
  - Human activities in caves can cause them to come out of hibernation prematurely; they may not have enough energy to go back into hibernation and wake up at the end of spring (not enough fat reserves).
  - closing off the caves initially made the situation worse.

- prevented cool air from getting into the cave, so hibernating bats were more active (too warm - the same reason they wake up when humans disturb the cave).

- replacing seals to the cave with bars solved the problem (this isn't specifically mentioned in the text).

Note that many of these “supplementation” methods are labor intensive and will require on ongoing commitment (even the bars on caves are generally opened during the spring - fall so that spelunkers have access).

### **III. Controlling population loss directly**

#### A) Legislation.

Obviously, if overharvesting is a problem, then one of two things can be tried:

- 1) legislating the level of the harvest
- 2) prohibiting the harvest all together

But legislating this is only the first step. It will also require some kind of enforcement and more importantly, education, to be effective.

Particularly when harvesting is prohibited, steps should be taken to reduce its desirability by:

- lowering it's value
- ensure penalties outweigh benefits.

Enforcement has in some cases required extreme intervention:

- guarding the animal 24 hours a day (rhino)
- guarding nests during nesting season
- employing helicopter gunships

The extreme high price of something (e.g. rhino horn) can cause legislation and even enforcement to be less effective. Other things sometimes are tried, for example in the case of the rhino:

- removing horns to reduce their desirability to poachers (mixed success - some poachers will shoot them anyway, and horns re-grow quickly). This may also adversely affect the rhino.

- providing substitute products made from water buffalo horn instead of rhino horn

- incidentally, the number one reason for getting rhino horns is not for its use as an aphrodisiac, but rather as its use in “dagger” handles in oil rich gulf states (it doesn’t seem like water buffalo will do the trick here).

Legislating for sustainable yield is difficult:

- What is sustainable yield? Sometimes there’s little data, and the best one can do is “guess”.

- Nevertheless, an approach used by some countries to limit exports by past “average” export levels is silly.

Often, the only way to really help with legislation is to educate the local people. Some examples:

- Parrots in the Eastern Caribbean started to recover once folks understood that what was happening to the parrots (too many were being exported for the pet trade).

- Banded iguana in Fiji - for reasons not explained in the text, the local population had many misconceptions about the banded iguana and were killing them. After introducing the iguana to school children, killings let off.

But still, what does one do about the tiger?

- Highly endangered, and yet the local people justifiably are afraid of tigers (there have been numerous man-eating tigers in India’s history, and even today the trend continues).

Supplementing wild populations with captive raised populations for the purposes of reducing trade in wild populations also works.

- Often products from captive raised individuals help to offset the pressure on wild populations.

- Sometimes obstinacy still gets in the way:

- products made from the musk deer are considered superior if they come from wild populations (book doesn't say, but these are probably medicinal products used in traditional medicine).

- Traditional medicine, particularly in China, has had a large negative impact on many wild populations.

- incidentally, this can even be a disincentive for conservation, since there are now captive populations leading many to ask "why bother conserving the wild populations".

Finally, a word on reserves (more later).

These are only as successful as enforcement and attitudes of people living around the reserves permit.

Without both, the reserves can be less than effective.

Even in the U.S., we sometimes have problems:

- Poaching takes place all the time.

- The attitudes of people living around Yellowstone are not always good - with the re-introduction of wolves to Yellowstone a lot of folks were complaining.

B) Controlling predators

[continued]