Preserve & Protect

Managing Wildlife for a Changing Ecosystem

Most wildlife – like loggerhead turtles and piping plovers – have to handle their own population to adapt to changing habitats. But the horses on Shackleford Banks have some help.

Because the population is on a limited space - 2990 acres – and can't roam like turtles or birds, it needs some help keeping the numbers at a sustainable level. The herd is kept between 110 and 130 animals. Selected mares (adult females) are contracepted (given a birth control injection by dart which falls out after injecting the contents) each year. Selected young horses are sedated, also by darting, and removed each year to go to adoptive homes on the mainland.

If the horses weren't managed, natural selection would determine which animals reproduced. Females who were fertile and who were good mothers would have offspring.

Management strategy allows mares of under-represented lines the chance to reproduce.

Strong offspring would survive. Males who were good strong fighters would become alpha stallions and hold large harems of mares.
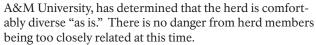
Since the horses need to be managed for population size, the managers (the park and the Foundation for Shackleford Horses, Inc.) have to make choices. Which mares to contracept? Which youngsters to remove?

One model is the "random" system. Females whose numbers were chosen out of a hat would receive birth control that year and youngsters who were similarly chosen would be removed.

But herd managers have information about the herd that

suggests we should manage differently. We have up to four generations of records on these horses. The Shackleford herd members trace their ancestry back to 47 "founders." A founder is an individual whose parents are not known, and he or she is treated as the originator of that line.

Our primary genetics advisor, Dr. Gus Cothran of Texas A&M University, has determined that the herd is comfortably diverse "as is." There is no danger from herd members being too closely related at this time.

Of the founders, one mare "#36 Daphne" has 28 living representatives – daughters, sons, granddaughters, etc. – on the island. This is far and away the largest line. Seven lines have only one representative on the island, five have only two, and nine have three representatives.

Since we don't know the relationship of the lines any further back than 4 generations, we treat the lines as if they are unrelated. Though, of course, all the horses on the island are likely to be somehow related to each other. They are related enough to be given a breed name: Banker Horses.

If you were managing a barrier island population for the future, and wanted to be sure it had the best chance to adapt to changing conditions, what attributes would you choose? Perhaps the ability to make do with less water? Or the instinct to avoid hurricane force winds and rising water? Or the ability to survive in temperature extremes? All of these are assets. The problem is that we don't know what lines have these abilities to a greater or lesser degree.

The best way to manage a population like this is to preserve its diverse gene pool. That way, whatever adaptive abilities are needed in the population, some animals should have them.

Management decisions of contraception and removal are made on the basis of number of representatives, mean kinship, and some individual factors. For example, a mare with one "uncle" and no offspring would not be contracepted so she has the chance to produce offspring for her line. A stallion with no offspring and no known relatives would – if he could win and keep a mare – have the chance to increase his line by having any foals stay on the island – even if their

Strength and agility are required of a successful harem stallion.

mother was from a very well represented line.

Mean kinship is a number derived from a complex formula that shows the relative relatedness of all members of the herd. An offspring from two well represented parents would have a higher mean kinship number than one with two less well represented parents. Mean kinship is valuable when a decision needs to be made between two individuals and the relationship is more complicated than can be determined by just comparing the number of representatives.

Individual factors include situations like the reproductive capacity of the members. A line with three representatives where all three are breeding age females is not so "thin" as one with one aging mare and two young unproven stallions.

By making the best possible decisions, this wild but remotely managed population will have the genetic diversity to adapt to its changing barrier island ecosystem

Young horses need thick winter coats and enough grasses left over from the growing season to survive the cold months.