TAMBOPATA RESEARCH CENTER CONSERVATION IMPACT

The Macaw Project

The Tambopata Macaw Project is a long-term multidisciplinary study of the natural history, conservation and management of large macaws and parrots. The main topics of study include monitoring and observation of macaw nests, increasing survival rates of younger scarlet macaw chicks, documenting patterns of clay lick use by large macaws and other parrots, and documenting and understanding the impact of tourism on macaw clay licks. Since Dr. Donald Brighsmith's incorporation to the project in 1998, the project has become one of the world's foremost studies on wild macaws.

Clay licks and macaw conservation.

The Tambopata Macaw project has been working hard to understand the links between the clay lick, nesting, tree phenology (flowering and fruiting) and the movements of parrots in and out of the area. Over a thousand mornings of clay lick observation and literally hundreds of thousands of registrations may be the largest set of parrot data ever assembled. We have come a long way in understanding these interactions and now have a much better idea of what drives the annual life cycles of the macaws and parrots in Tambopata. A summary of our new findings is presented in this paper.

The following relationships have been discovered:

- The daily weather has a strong influence on the number of parrots that use the lick: least on rainy days and the most on clear sunny days.
- The seasonal climate changes drive the fluctuations in the annual food supply for parrots and macaws (flowers, unripe fruits and ripe fruits). Food availability is apparently lowest at the end of the wet season and early dry season (March - July) and highest in the early to mid wet season December and January.
- The annual fluctuations in food supply drive two things: the annual movements of parrots to and from the area around Tambopata Research Center and the time they breed.
- During the seasons of lowest food availability the birds apparently leave the area around TRC as the number of birds in the forest drops dramatically from April – July.
- The timing of breeding is apparently driven by the food supply: the number of parrot species breeding is closely correlated with the number of trees in fruit or flower. However, not all species breed simultaneously. Smaller species apparently breed earlier than larger ones.
- The movements of parrots out of the area during periods of low food abundance reduce the number of birds using the clay lick. In addition when food supplies are high, the birds apparently congregate in the vicinity of the lick.
- The timing of breeding also influences the number of birds at the clay lick, because for most parrot species, clay lick use peaks during the breeding season, specifically when the birds have young chicks in the nest. We have found that Scarlet macaws feed their chicks large amounts of clay, especially when the chicks are young. As the chicks age, the amount of clay they receive drops and the total use of the lick by the species drops as well.
- The number of birds at the clay lick is the result of the daily weather, seasonal climate, seasonal fluctuations of food supply (driven by seasonal climate), nomadic wanderings of the parrots (driven by changes in food supply), and the timing of the breeding season (also driven by changes in food supply).

We are also continually finding evidence that clay lick use is driven by the bird's need for sodium.

- Using soil samples analyzed by researchers at Texas A&M University we have found that birds apparently prefer soils with higher sodium content over soils that are best at neutralizing toxins.
- We have seen parrots engaging in behavior similar to that seen at clay licks while visiting the sodium rich mineral springs in Contamana (central Peru)
- We have documented parrots behaving as though they were at clay licks, but eating palm trees in other sections of the Tambopata National Reserve. We suspect that the palms are rich in sodium and for this reason the birds are eating them.

These new results give us a much more complete understanding of the forces that drive annual changes in clay lick use and give us insight in to the forces driving the annual cycle of the macaws and parrots. The conservation implications of this research are many:

- It suggests that conserving the areas near clay licks is very important because these areas:
  - harbor very large concentrations of parrots
  - should have high densities of breeding birds that may serve as a source for individuals that then disperse throughout the wider landscape
- It also shows that many, if not all, species of parrots in Tambopata move throughout the landscape, so just protecting small areas around clay licks is not enough to support healthy populations of parrots over the long term.
- As a result, large scale destruction of the forests adjacent to the Tambopata National Reserve and an increase in pet trade resulting from the Transoceanic Highway could significantly impact the populations of parrots that use the clay licks around Tambopata Research Center and other licks located deep within the reserve.

Macaw nests and reproductive rates

Data from monitoring hundreds of nests from blue & gold, red & green, and scarlet macaw nests show that:

- Natural, PVC, and wooden nest boxes all have vastly different hatching success rates. Natural nests have a hatching success rate of 65% while the PVC nest boxes commonly used around TRC have hatching rates of only 41%. The hatching rates in wooden boxes may be higher (80%) but the sample sizes are too small to draw any conclusions.
- Twenty four percent of all Scarlet Macaw chicks monitored (9 of 37) died of starvation or would have if the researchers had not intervened. Our findings suggest that sibling competition and not the overall food supply may be the determining factor in chick survival, but larger sample sizes are needed to confirm these preliminary findings.
- *Dipteryx micrantha* and *Mauritia flexuosa* are keystone tree species for parrot nesting in southeastern Peru. Clearing for agriculture, targeted destruction of parrot nests by collectors and selective felling of key species will reduce the density of suitable nest cavities.

- Across three studies (two in Costa Rica and the one in Peru) a total of 71 Scarlet Macaws have been released. The combined first-year survival post release was 74% and the post first-year survival was 96%. Breeding attempts have been recorded at all three sites and hand-raised birds with wild mates have successfully fledged young in Peru. Supplemental feeding post release played an important role in establishing a core flock at all three release sites.

Tourism Impacts on the Macaw Clay Lick

- The number of birds at the lick is not correlated with the number of people observing the lick. This means that approximately the same number of birds go to the clay lick regardless of the number of people watching the birds. The tourists are kept together and relatively quiet at a distance of 50m or more from the lick. These results suggest that the protocol in use by Rainforest Expeditions is not causing major reductions in the number of birds using the lick, but additional analyses are needed to determine if there are more subtle impacts on the birds.

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