Welcome to the online Earthwatch Research Proposal.

Earthwatch's proposal review processes are guided by our mission to engage people worldwide in scientific field research and education to promote the understanding and action necessary for a sustainable environment. Proposals are reviewed based on scientific merit, appropriateness of volunteer activities, safety and logistical viability, expected project outcomes and impacts, and Earthwatch's available support for the project. Proposals also undergo peer review by reviewers of your recommendation and reviewers elected by Earthwatch independently. Earthwatch Research Proposals are valid for 3 years. For more information see www.earthwatch.org/research.

The Proposal is broken down in six sections:

- Section 1: Project design
- Section 2: Impacts
- Section 3: Project overview for a lay audience
- Section 4: Field Logistics
- Section 5: PI and Staff Information
- Section 6: Acknowledgements, appendices, and anything else

You must be online to complete and move through this form. A word template is available on request if you wish to work on your report offline and copy your information onto the form when it is ready to submit. Send requests to Sarah Ryan at research@earthwatch.org.

Your final Proposal MUST be submitted to Earthwatch through this online form, however.

* Indicates Response Required

Background Information

* Lead PI

Dr. Donald Brightsmith

* Proposal Completed By

Dr. Donald Brightsmith

* Scientific project title

Macaw Conservation in the Tambopata-Candamo Reserve Zone, Peru: Evaluation of tourism impact

* **Research site location(s):** Be as specific as possible: include the city, town, national park, state, etc.

Tambopata Research Center, Madre de Díos, Peru

* Research site country(ies)

Peru

* Research site region

South America

Research site(s) latitude

Latitude: 12° 38’ S

Research site(s) longitude

Longitude: 69° 12’ W

Project web address (if applicable)

http://macaw project.org/

Section One: Project Design

Provide as much detail as reviewers will need to properly assess your research proposal and cite references. We encourage you to re-use text from previous research proposals if the answers fit the question.

* Goal

Describe the desired result that this project seeks to achieve and the problem that will be addressed as a result. How is your project innovative or distinct from other work in your field?

Due to their large size and great beauty, macaws make excellent flagship species and serve as charismatic focal points for the conservation of the ecosystems where they occur. Unfortunately throughout most of tropical America large macaws have suffered major population declines (Beissinger and Snyder 1992, Juniper and Parr 1998). Earthwatch volunteers will have the ability not just to work with a single project, but join a developed research program focused on different aspects of macaw conservation. This work will develop and evaluate techniques for increasing reproductive output of wild macaws, expand our knowledge of macaw nesting behavior, increase our understanding of the complexities of clay lick use and evaluate tourism as a method of protecting macaws and their habitat. This scientific information will then be dispersed through a variety of channels to local native communities, to school children in Lima, to the Peruvian government and via the Internet to classrooms and conservationists world-wide.

The reasons for macaw decline are many and include habitat loss and collection for the pet trade (Forshaw 1989, Beissinger and Snyder 1992). Habitat loss may take many forms including clearing for agriculture and selective logging. Selective logging usually leaves much native vegetation standing including many important macaw food species, but can severely impact macaws because the harvest often targets the old, large trees that the macaws depend upon for nesting. These slow growing trees may take a century to attain sufficient size to harbor cavities. The deep, dry nest cavities that the macaws prefer may take an additional 10 - 20 years to form but then last for many decades. Even in virgin forest these large tree cavities are usually in short supply (Beissinger and Snyder 1992, Munn et al 1991). As a result, each nest site cut represents not just the loss of a single nest, but also the loss of dozens of future chicks that could have been raised in this cavity. Collection for the pet trade further exacerbates this shortage of nest sites because in many areas collectors cut the nest trees in order to remove the macaw chicks (González 1998, 1999).

The threats faced by large macaws are compounded by the fact that these species have naturally low reproductive rates. Previous work by the researchers in Tambopata have shown that the low reproductive rates are due to three main factors: 1) there are not enough suitable nest sites even in pristine old-growth forest hundreds of years old, 2) only about 60% of nests fledge young as predators and parasites combine to kill many chicks, 3) many natural nest sites suffer higher failure rates because they are either too shallow or wet and 4) successful nests usually fledge only one young even when 3 or 4 eggs are laid because one chick monopolizes

the food deliveries and the others die of malnutrition (Nycander et al. 1995, Beissinger and Snyder 1992, Munn et al 1991). As a result, a population of 200 macaws may produce as few as 8 young per year.

Given the threats that face many macaw populations today, it is obvious that protecting large tracts of habitat is vital to the survival of macaws and the thousands of species that share their habitat. Some of the most important areas to protect are clay licks. Here hundreds of individuals of up to 17 species congregate daily to descend to the river and stream banks to eat clay. This clay apparently neutralizes the toxins in the seeds that the birds eat and fortifies the natural mucus coating in the stomach providing additional protection from toxins (Gilardi et al. 1999). The fact that macaws return daily makes the birds particularly vulnerable to hunters in these locations. For example groups of up to 200 or more may frequent large clay licks such as those along the Tambopata and Madre de Díos Rivers in southeastern Peru (pers. obs.). The same predictability that makes clay licks good sites for hunters also makes these locations ideal sites for tourism (Munn et al. 1991). As a result, a string of ecotourism projects have sprung up in the last decade that offer macaw viewing at clay licks as a central part of their itineraries. Significant areas are currently being protected from hunting and logging by these ecotourism companies because these tourism projects have a vested interest in protecting the nests and clay licks near their lodges.

Despite the fact that western scientists have known about clay lick use for over twenty years, our knowledge of clay lick use is still in its infancy (Emmons and Stark 1979). To date there is no well-documented information on how often macaws and parrots return to clay licks, how far the birds range to visit licks, if they shift between licks on a daily basis, or if there are seasonal differences in lick use (but see Beissinger and Snyder 1992 and Munn et al. 1991 for rough estimates of some of these parameters). Similarly no one has begun to unravel the complex intra and interspecific interactions among the species at the clay licks. This sort of basic information is vital to our understanding of clay lick use and must be obtained if we want to effectively protect clay licks and understand the impacts of tourism.

While there is little doubt that ecotourism is less damaging to macaw populations than hunting and logging, studies documenting the impact of tourism on macaws and parrots at clay licks are lacking. Tourism impacts may be manifested in a variety of ways. Macaws are a favorite of tourists throughout the areas where they occur. Particularly valued by tourists are close range sightings that allow good photo opportunities (Munn et al. 1991). Tourist groups frequently observe the clay licks from boats as they pass by or from blinds and trails adjacent to the licks. Groups also approach groups of macaws perched in the trees waiting to descend to the licks (pers. obs.). Using as a starting point the basic information on the behavior of parrots and macaws at clay licks, the effects of these sorts of tourism visits must be evaluated so that recommendations can be made on how to reduce the disturbance to the birds.

Unfortunately, due to the naturally low reproductive rates of macaws, just protecting habitat may not be enough to allow them to recover from the decades of collection and tree cutting (Abramson et al. 1995). For this reason, a major objective of this project is to develop and evaluate different methods to increase the reproductive success of large macaws. We will design new nest boxes for macaw species that have never nested in artificial nest substrates and conduct experiments aimed at understanding why some macaw chicks die of starvation and how to enhance their survival. The findings will be shared with conservation scientists worldwide and the personnel of INRENA (the branch of the Peruvian Ministry of Agriculture in charge on natural resource management). This will ensure that the basic set of tested macaw management techniques developed here arrives in the hands of the people most able to use the information to help the recovery and maintenance of macaw populations throughout the tropics.

* Objectives

State and describe the scientific objectives that will contribute to achieving the project goal.

1. Develop and test techniques for increasing reproductive output of wild macaws

Nest monitoring: Earlier research in Tambopata Research Center found that starvation among macaw chicks was common, resulting in the deaths of 16 of 30 chicks monitored (Nycander et al. 1995). This work also mentions anecdotally that the only nests that could fledge more than one chick had chicks that were hatched within a day of each other. In much smaller Green-rumped Parrotlets, the space between hatching (or hatching synchrony) has little effect on the number of young fledged in small broods <4 but a significant effect in large broods suggesting that the interactions among hatching synchrony and fledging may be rather complex especially if more than 2 nestlings are involved (Stoleson and Beissinger 1997). It has also been suggested that the younger chick begins to starve when its older sibling opens its eyes around day 15 (Nycander pers. com.). Preliminary data from the 1999 – 2000 season suggests that weather may also play a major role in weight loss and starvation by young chicks (DB unpublished data). The current study will test the relative importance of these factors by comparing the fates of nests with 1, 2, and 3 chicks. Understanding why the macaw chicks starve and how to avoid this starvation will be vital to the long term central goal of this project which is to develop techniques useful in increasing the reproductive output of wild macaws in areas where they are highly endangered.

Central questions

- ☐ Can supplemental feeding in the nest be used to reduce the rate of macaw chick starvation?
- ☐ Why do some chicks die of starvation: what are the relative roles of competition with nest mates, weather and total food availability in this starvation?
    - ☐ If competition with nest mates is an important factor in chick starvation, the probability of starvation and the need for supplemental feeding should be positively correlated with the difference in chick age.
    - ☐ If weather is an important factor in chick starvation, daily chick weight gain should be inversely related to the number of hours of rainfall and the quantity of rain and directly related to temperature.
    - ☐ If total food availability for the parents is an important cause of chick starvation, chicks should show signs of starvation late in the season when their energy demands are the greatest and chicks with nest mates should gain weight slower than chicks that are raised alone.

Nest boxes: Develop and test PVC nest boxes usable by Red-and-green Macaws and Blue-and-yellow Macaws. In the long term, development of these new nest boxes will facilitate intensive study of these two species as nest boxes provide much easier access to larger numbers of nests. These additional nest box designs will also be useable by managers working with populations in other areas where the macaws are more endangered. Similarly we will have nest box designs that are usable by different sized macaws: Red-and-green Macaw 1,300 - 1,500 g, Scarlet Macaw 950 - 1,150 g and Blue-and-yellow Macaw 900-1200 g (Abramson and Thomsen 1995). Having these different options will increase the chances that managers in other areas will find a design usable by the species they are working with.

2. Document the behavior of macaws at the nest

Data from nest observations will provide vital background information for interpreting the patterns of nesting success and chick growth. Data from rainy day observations will show whether the rate of feeding by adults decreases, giving an idea about the causative relationship between rain and chick weight gain. Differences in nest attendance and nest feeding should also provide other useful insight into causes of starvation. Visitation frequency of adults at nests with different numbers of chicks should give an idea if the adults are capable of compensating for the increased brood size by increasing their foraging rates, or if they are limited in their ability

provide food (Stoleson and Beissinger 1997). These observations may also provide insight into the causes and prevention of nest predation, the intensity of nest site competition and other factors as well.

These data will facilitate comparisons not only among the macaw species that occur in southeastern Peru, but also with macaws in other areas. Major discrepancies in nest attendance behavior may indicate important underlying differences in the ecology of the macaw species and suggest new avenues of research. Researchers in Guayaquil, Ecuador have conducted extensive observations on a single nest of Great Green Macaw (A. ambigua) and the information from this nest is being made available to us (Eric von Horst pers. com.) to facilitate comparisons with the macaws in Tambopata. In addition I (DB) will continue contacting other researchers to see if any have detailed nest observations that could be used to compare to our Tambopata birds.

Central questions:

- ☐ Are there major differences in the time spent incubating and brooding among different species of macaws? Do macaw species differ in the rates at which they feed their young?
- ☐ Do these differences relate to nest success and probability of chick starvation?
- ☐ What is the effect of rain on the time budgets of the adult macaws? Can this be used to explain the effects of weight gain on the chicks?

- ☐ Do adults at nests with 2 or more chicks spend significantly less time in the nests or have to make more feeding visits to the nest than those with only one?

3. Document clay lick use and impact of ecotourism

The clay lick monitoring data collected by the EARTHWATCH Volunteers in November 2000 – February 2001 will be combined with similar data from June – October 1999, February – March 2000 and June – August 2000 to provide a broad view of how clay lick use changes between the wet and dry seasons and between years. It is also hoped that the partnership with Earthwatch will continue, providing additional data in future years. Having data over a number of seasons across years is invaluable, as it will allow us to quantify patterns and changes in clay lick use. Knowing the exact patterns of lick use will suggest what species of parrots or other clay lick users have drastic seasonal or annual variation and suggest which species warrant more detailed studies of diets and behavior in an effort to better understand the changes in lick use. The additional data on social interactions and behavioral roles will supplement studies on chemical analyses and help us better understand the forces that drive the patterns of clay lick use we observe (Emmons and Stark 1979, Gilardi et al. 1999, Van Houtan et al. unpublished data).

Central questions

- ☐ Document spatial and temporal patterns of parrot and macaw clay lick use and determine what forces drive these patterns.

    - ☐ How many individuals of each species visit the lick on a daily basis?

    - ☐ Do species differ in their temporal use of clay licks throughout the day?

    - ☐ How do the patterns of clay lick use change with the seasons?

    - ☐ Are these patterns stable from year to year?

    - ☐ Do some species act as sentinels while ‘pioneers’ are the first to descend to the lick?

    - ☐ How many different behavioral roles are there and are their multiple species that fill each role?

    - ☐ How do dominance interactions among species influence the spatial and temporal use of clay licks?

4. Ecotourism impacts on clay lick use

Information on the impacts of tourism on clay licks will allow us to take steps to minimize these impacts at Tambopata Research Center ensuring the sustainability of the ecotourism activities at this site. It will also provide us the basic information needed to make recommendations to the local government and other ecotourism companies about how they can reduce their impact parrots and macaws that use clay licks. Discovering ways to minimize tourism impact at clay licks is an important long-term goal of the project as it will allow large numbers of birds to use the licks. It will also provide the commercial companies that have vested interest in the licks, the information needed to wisely manage their own activities and conserve this important resource long after the current project has ended.

- ☐ How do passing boats affect macaws and parrots that are on the clay lick or in the trees waiting to descend?
- ☐ How does the number of tourists and their distance from the lick affect the number of birds using the clay lick?
- ☐ Work with government agencies and ecotourism operators to reduce tourism's impacts on large macaws

* Methods and Activities

For each of your project objectives describe in detail the methodology you plan to use, the sampling scheme, and plans for data analysis.

Increase reproductive success of macaws:

Previous research in southeastern Peru has developed a variety of techniques useful in increasing the reproductive success of large macaws (Munn et al. 1991, Nycander et al. 1995). During this work they found that for every 2 chicks that fledge, 1 dies as a result of malnutrition. As a result, these workers developed hand-feeding techniques that successfully saved 32 chicks that were doomed to die from starvation. This year we confirmed the first successful breeding by a hand raised bird and its wild mate, indicating that these birds have fully integrated into the wild population. The only drawback of this method is that the chicks ended up with no fear of humans. In fact they regularly approached people looking for food. The lack of fear of humans means that this technique will not be useful in areas close to human populations. The brood manipulation experiment described below will help us understand the causes of this starvation and test a technique to save these doomed nestlings that will be useful for conservation projects in inhabited areas.

Brood manipulation experiment and nest monitoring: In order to discover why chicks die from malnutrition and how to save the chicks without producing tame macaws, the following experiment will be conducted. Nests will be climbed every 2-4 days during the pre-egg laying stage so that the approximate laying dates are known for all eggs. The eggs will be removed as laid and replaced with porcelain eggs of the same size and weight. The eggs will be incubated in electric incubators. As the chicks hatch, they will be assigned to different nests in order to produce pairs of nests that have 1, 2 or 3 chicks with similar relative ages. Experimentally designating chicks to nests is important as is eliminates many confounding factors that can result from just observing natural nests. For each pair of similar nests, one will be designated a control and the other an experimental.

Both control and experimental nests will be climbed daily during the first 30 days after placing the chicks and then every two days from day 31 through the fledging of the last chick. Each time the nest is climbed, the chicks will be weighed and their culmen, tarsus, wing and tail measured. The weight data will be used to monitor the growth of the chick. If a chick in an experimental nest shows signs of malnutrition, we will begin supplemental

feedings, while chicks in control nests will just be observed and not fed. Supplemental feeding will be done twice a day, once in the morning (between 05:30-9:30) and once in the afternoon (15:30-18:00). The underweight chicks from control nests will be removed from their nests, lowered to the ground, fed and immediately returned to the nest. Birds will be fed a commercially produced macaw hand feeding formula (Harrison's Juvenile formula) using a syringe.

The eggs will be incubated in captivity because over half of the eggs laid are either predated or fail to hatch for some reason (Nycander et al. 1995, unpublished data). As a result incubating the eggs will eliminate this source of egg loss and provide a larger sample of nests with chicks.

Design and construction of macaw nest boxes: The early macaw research also developed techniques to cut live Mauritia palms to create nests for Blue-and-yellow Macaws and designed nest boxes that are being used by Scarlet Macaws (Munn et al. 1991, Nycander et al. 1995). Now new artificial nests will be designed for Red-and-green Macaws and Blue-and-yellow Macaws. These new nest box designs will be useful to managers in areas of Peru and other countries that are trying to help macaw species recover from decades of exploitation. For instance boxes that work for Red-and-green Macaws may be usable by Ecuador's highly endangered Great-green Macaw (Horstmann 1996).

Nest boxes for Red-and-green Macaws: Ten boxes for Red-and-green Macaws will be erected. These artificial nests will follow the basic design used successfully by Scarlet Macaws, except they will be made from 16-inch diameter PVC pipes instead of the 14-inch PVC preferred by Scarlets. Five of these boxes will be hung vertically, like the nest boxes used by Scarlet Macaws while the other five will be hung horizontally because many of the natural Red-and-green Macaw nests are in horizontal tree cavities. Hanging the boxes in two different orientations will allow us to determine which orientation the birds prefer.

Nest boxes for Blue-and-yellow Macaws: The early work on macaws at Tambopata showed that Blue-and-yellow Macaws nest successfully in Mauritia palms that have had the tops cut off. This technique, while successful, requires the destruction of mature palms, and these palms last on average only about 4-5 years before completely rotting away and falling over (unpublished data). In order to find a more durable and less destructive method to increase the reproductive output of Blue-and-yellow Macaws, the current project will develop nest boxes useable by this species. The boxes will be made from 14-inch PVC pipe similar to those used by Scarlet Macaws. The boxes will have one 15 cm diameter entrance hole about 20 cm from the top and will be open on top. This will simulate the palm nest sites that the birds are currently using. Each box will have extensive drainage holes and sand in the bottom so that the box does not fill with rainwater during the breeding season. These nest boxes will be hung on tall isolated Mauritia palms near the 12 remaining palms that have been cut during the past 10 years.

Nest boxes at Park Guard Stations: Nest boxes will also be constructed at control points at the entrances to the Tambopata-Candamo Reserve and the Bahuaja Sonene National Park. These stations are operated by the Peruvian government agency Instituto Nacional de Recursos Naturales or INRENA. Here the boxes will serve as a focal point highlighting the global plight of macaws. Park guards will be given extensive information on macaws and macaw management that they will then be able to share with the hundreds of tourists that pass through the guard posts annually.

Nest observations

In order to determine the incubation, brooding, and feeding time schedules of adult macaws, nest observations will be conducted at a subset of the active Scarlet and Blue-and-yellow Macaw nests. Observations will be conducted from 05:00 – 18:00 in four shifts 05:00 – 08:00, 08:00 – 11:30, 11:30 – 15:00, and 15:00 – 18:00. During these observations the following will be recorded: arrivals and departures of nesting adults from the nest tree, arrivals and departures of nesting adults from the nest cavity, arrivals and departures of potential competitors and predators, reactions of nesting adults to potential competitors and predators, alarm calls by

adults and their apparent causes, and intrapair social activities (allopreening, allofeeding etc.). Weather data including sun, rain, fog and wind will also be noted.

Census macaw and parrot clay lick use

This section of the study will document the patterns of clay lick use and increase our understanding of how interspecific social interactions affect the spatial and temporal patterns of clay lick use. In order to document the spatial and temporal patterns of clay lick use, licks will be monitored throughout the day from shortly after dawn until late afternoon. Temporal patterns will be documented by making complete counts of all birds on the lick every five minutes. The total number of each species present on the lick at each sampling interval will be used to track the changes in lick use at different time scales: throughout the day, between days, between seasons and between years. Spatial patterns of lick use will be documented by scanning each group of birds with a video camera every five minutes. The entire lick will then be gridded and the use of each area by each species mapped. This will be used to produce maps showing the preferred sites for each species that visits the lick.

Whenever birds are on the lick, groups will be videotaped. These video tapes will then be used to determine the dominance hierarchy among lick-using species, what species are the first to land on the licks and what species sound the alarm calls that cause the flocks to fly from the lick and surrounding trees. The dominance hierarchy will be determined by observing agonistic interactions among species and recording the outcomes. This hierarchy information will be used to determine which species choose to perch in central or peripheral locations and which are forced by dominants to use sub-optimal locations. The data on which species are first to land on the lick and which sound the alarm will show if there are designated ‘leader’ and ‘sentinel’ species or if these roles are filled equally by all species. These data will help determine if the multiple species of birds that share the clay lick in the morning act as a coherent mixed species flock where each species fills a definitive and necessary role, if each species acts independently regardless of the presence of others or some combination of these two possibilities.

Ecotourism impacts at clay licks

Observers will record visits by tourists in boats, on the beaches across the river from the clay licks and on the trails in the vicinity of the lick. Data collected will include the arrival time, number in the group, distance from the lick, and the conduct of the tourists during the visit.

These data will be combined with the climate data and basic clay lick monitoring data to produce a model to determine if tourist activities are having any of the following effects: 1) causing birds to fly from the vicinity of the lick, 2) reducing the numbers of birds descending to the lick to eat clay, 3) preventing the birds from descending to the lick or 4) changing the timing of activity of the birds at the lick. Determining if ecotourism causes birds to fly from the lick and vicinity will be done by comparing the number of macaws and parrots on the lick before and after the passage of a boat. The number of birds descending to the lick will also be compared to the number of tourists observing the lick to look for any signs of a negative correlation. The behavior of birds in periods of high tourist activity will also be compared to periods of low tourist activity to see if the timing and behavior of clay lick use changes at a seasonal scale.

Work with tourism companies: As impacts of tourism are discovered, recommendations will be made to local tourism companies on how to change their practices to minimize these effects. These recommendations will likely include restricting access to areas near the clay licks, constructing or improving observation blinds, and reducing river traffic in the vicinity of the clay licks. As these measures are implemented by the companies the subsequent monitoring of macaw and parrot activity will be used to determine if the measures effectively reduce the disturbance to the birds.

Work with government agencies: Annual reports on the impact of tourism will be written and presented to the Peruvian Ministry of Industry Tourism and Integration (MITINSI) and the National Institute for Natural Resources (INRENA). The data and recommendations presented in these reports will provide these agencies with the

scientific basis needed to make intelligent decisions about how to manage tourism and minimize its impact on macaws and parrots.

* Are you, as researchers, required to acquire permits in order to work at the research site?

Yes

Please provide details of the permits that you will need to secure in order to work at the research site(s). You are required to provide copies of these permits to Earthwatch at least 90 days before volunteers enter the field with you. We prefer that you send a copy of each permit as soon as you receive it.

A copy of the 1999 –2000 permits is being faxed to your US office. The permit process for 2000 – 2001 will be started in April. The permitting process takes on average two months so the seven months from April to November will be more than sufficient.

* Need for Volunteer Participation

All Earthwatch projects must involve active participation by non-specialist volunteers in field research. Projects should include a range of research tasks that will be conducted by volunteers under your supervision. Setting clear expectations about volunteer involvement helps to make a successful expedition.

- Describe the tasks/activities that volunteers will participate in.
- How do you plan to ensure data collected by volunteers is scientifically sound?
- If tasks/activities vary across teams or seasons, please describe when different activities will occur.

Participants will be rotated through the following activities:

Palm Swamp observation. Half hour walk, a climb up a 45 ft ladder to the top of an observation tower, then a 3 – 3.5-hour observation of 2 – 5 active Blue-and-yellow Macaw nests. 15% of volunteer work time.

Clay lick observation morning and afternoon: a 10-minute boat ride or 45-minute walk, then a 3-hour observation. 25% of volunteer work time.

Scarlet Macaw nest observation morning and afternoon: a 10-30 minute walk then a 3 – 3.5-hour observation. 40% of volunteer work time.

Nest monitoring assistant (08:00 – 12:00): accompany and aid project assistants as they climb active Scarlet or Red and Green Macaw nests to record data on chick growth and nest status. 10% of volunteer work time. This task will occupy less time in February.

Field training will be done in a variety of methods. Collection of data at clay licks requires identification of some 15 species of parrots (including macaws, parrots, parakeets, and parrotlets) and special counting techniques. As a result, extra time will be invested in teaching these skills. Before the volunteers come, they will have a list of books in which they can find pictures of these species. During the afternoon and evening of Day 1, I will show slides of all the important species and discuss the best ways to distinguish them. In a formal lecture to all team members I will teach them how to use the data sheet and collect data. Following this I will show a video of parrots on a clay lick and ask for each volunteer to fill out a data sheet. I will go over these data sheets and help people correct their errors. On the morning of Day 3 the entire group will go to the main clay lick at TRC and each member will fill out their own data sheet.

Observations of macaw nesting activity are simpler as the key data are the arrival and departure times of the adults. The important data to collect will be outlined on a one-page sheet and given to each participant. I will go over this sheet on the night of Day 2.

* How would you rate the rigour of work in which the volunteers will participate?

1. Very Easy: Mostly lab work; must be able to walk up to 1 mile/day (1.6km) in flat terrain.

2. Easy: Some walking over uneven ground, small hills; must be able to walk up to 3 miles/day (5km).

3. Moderate: Walking, possibly in sand or uphill with a light pack, up to 5 miles/day (8km); stooping, bending or kneeling.

4. Very Active: Walking up to 10 miles/day (16km), possibly in sand or uphill, climbing over rocks or fences, possibly high altitude; carrying equipment weighing up to 10lbs (5kg).

5. Strenuous: Hiking up to 15 miles/day (25km), possibly backcountry and/or uphill; carrying equipment weighing up to 40lbs (18kg).

3

Literature Cited in the Proposal

Provide a list of references to literature cited in the proposal.

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Horstman, E. 1996. Update of the Guayaquil Macaw Conservation Project, Ecuador. Psittascene 5:11-12.

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Nycander, E., D. H. Blanco, K. M. Holle, A. del Campo, C. A. Munn, J. L. Moscoso, y D. G. Ricalde. 1995. Manu and Tambopata: Nesting success and techniques for increasing reproduction in wild macaws in Southeastern Peru. Pp. 423-443 en The large macaws: Their care, breeding and conservation (J. Abramson, B. L. Speer, y J. B. Thomsen, eds.). Raintree Publications, California.

Stoleson, S. H. and S. R. Beissinger. 1997. Hatching asynchrony, brood reduction, and food limitation in a Neotropical parrot. Ecol. Monographs 76:131-154.

Section Two: Project Impacts

Earthwatch has identified 12 Measures of Success (MoS) to express achievements across the diverse portfolio of projects we support; details can be found here. Please set targets against each of these Measures of Success for the coming three years to the best of your ability. Your project may not address all MoS, but we are looking for reasonable progress against a significant number of them. You will be required to report out on these achievements in Field Reports that you will complete at the end of each field season.

Increasing Scientific Knowledge

What peer reviewed publications are you planning to produce?
Provide specific targets regarding the peer reviewed publications you are targeting.

Conservation Biology, Animal Behavior, Ecology, Auk

How do you plan to disseminate your project results through non-peer reviewed media?
Provide specific targets for sharing and disseminating your results to raise awareness of your research results through to local, regional, and international audiences (including printed materials, broadcast media coverage, community-accessible materials, academic, public, and private presentations, etc.).

Bird Talk Magazine (PI writes a regular column); International Wildlife, Natural History, or similar magazine

Developing Environmental Leaders

How will you engage people (local community, Earthwatch volunteers, and others) in transformational learning experiences? Include details about activities that aim to engage and educate people regarding the relevant scientific topics and local or global issues.

The information from this project will be integrated into the ongoing environmental education campaign run by Rainforest Expeditions that includes visits by staff to secondary schools in Lima, Peru and visits by these students to the company's rain forest lodges (Posada Amazonas and Tambopata Research Center). The majority of this information will also be integrated into the company web pages and made available via Internet to classrooms, students, and scientists worldwide.

Partnerships

Include any partnerships that will help you achieve your goals, objectives, and/or project outputs. Detail the nature of the partnership and the role each partnership plays in supporting the proposed project.

Enter text here

Contributions to conventions, agendas, policies, management plans

How will the project contribute to these at an international, regional, national, and/or local scale? Provide specific details about the nature of the contribution that will be made by your project (i.e. submission of data to conventions, contribution to committees and working groups, drafting management plans etc.).

The results of this work are being shared with the Instituto National de Recursos Naturales (INRENA), the Peruvian government ministry in charge of managing the nation's parks and wildlife. The lead researchers on this project both have a commitment to share information with INRENA and work with them as requested. Don will be giving a workshop on the macaw reproduction work in late 2000 to the INRENA personnel to teach them the theories and techniques of macaw management. It is hoped that this will lead to similar government sponsored projects in other areas of Peru, like Iquitos where macaws have been all but eliminated from large areas.

The results from the clay lick work are also being shared with INRENA. It is hoped that this will lead to the development of standardized regulations about tourism activities near clay licks if the impacts of tourism are deemed to be significant.

Actions or activities that enhance the local natural environment and/or human community

Do you plan to take action to help achieve impacts and improve natural and social benefits at the project site? Please provide details. Types of action can include waste clean up, invasive species removal, building restoration, tree planting, etc.

The ecotourism industry in Peru and elsewhere will benefit by learning what types of impacts it is having on clay licks, one of the area's main attractions. This work will also develop the techniques that will allow the recovery of macaw populations. These healthy macaw populations can then provide added attractions for ecotourism and boost the quality of the tourism experience. Macaw researchers working in other areas will benefit from the experience and new techniques developed during this research because we will be able to present a menu of options useable to increase the reproductive success of wild macaw populations. Ecotourism companies will benefit from the findings of the clay lick work especially if they use this information to help reduce the disturbance at the clay licks thereby preserving the lick.

The local people of the Native Community of Infierno will also benefit as these data and techniques will be shared with community members so they can manage the populations of large macaws on their lands including the areas surrounding their lodge Posada Amazonas. This lodge is a 60%, 40% partnership with Rainforest Expeditions with the native community controlling the greater portion. Posada Amazonas and the lands of the native community are located within 30 km of the city of Puerto Maldonado. This location is convenient for tourism, but the proximity has led to a notable reduction in macaw populations. Aiding the recovery of the macaw populations on the community lands will be a great benefit to the lodge by increasing the chance of visitors seeing large macaws. Since the majority of the profits from this lodge go to community projects, the success of the lodge will help the entire community.

Expected long-term impact of project

This section may not be applicable for your project during its early years. We appreciate that impacts are more likely to be achieved by longer-running projects and would like to get an understanding of your desired long-term impacts. Depending on the subject of your research only some of the categories below may be applicable.

Will this project contribute to enhancing, restoring, or maintaining taxa of conservation significance*? Please provide details.

*Conservation significance refers to taxa of biological and/or cultural significance.

Large macaws have suffered major population declines throughout most of tropical America. The reasons for these declines are many and include habitat loss, hunting, and collection for the pet trade. This project will develop and evaluate techniques for increasing reproductive output of wild macaws, expand our knowledge of macaw nesting behavior, increase our understanding of the complexities of clay lick use and evaluate tourism as a method of protecting macaws and their habitats.

Will this project contribute to enhancing, restoring, or maintaining natural habitats? Please provide details.

Enter text here

Will this project contribute to enhancing, restoring, or maintaining ecosystems services? Please provide details.

Enter text here

Will this project contribute to enhancing, restoring, or maintaining cultural heritage? Please provide details.

Enter text here

Will this project contribute to enhancing, restoring, or maintaining livelihoods*? Please provide details.
*Livelihood assets include persons benefitting from economically applicable training and community assets such as clean water, access to resources, development of a community trust, setting up a local museum, etc.

The local people of the Native Community of Infierno will also benefit as these data and techniques will be shared with community members so they can manage the populations of large macaws on their lands including the areas surrounding their lodge Posada Amazonas. This lodge is a 60%, 40% partnership with Rainforest Expeditions with the native community controlling the greater portion. Posada Amazonas and the lands of the native community are located within 30 km of the city of Puerto Maldonado. This location is convenient for tourism, but the proximity has led to a notable reduction in macaw populations. Aiding the recovery of the macaw populations on the community lands will be a great benefit to the lodge by increasing the chance of visitors seeing large macaws. Since the majority of the profits from this lodge go to community projects, the success of the lodge will help the entire community.

Section Three: Project Overview

* Provide an overview of the project for a lay audience, using clear accessible language where possible. Imagine you are explaining your project to a reporter or family member. This information will be used by Earthwatch in the project Briefing that will be given to all volunteers. Portions of this text may also be used on the Earthwatch website to provide an overview of the project for potential volunteers.

  The following items should be included in the overview:
  - The need for the project at local, national, and international levels setting the need in context.
  - Status/importance of focus of project (focal species, habitats, archaeological/paleontological/cutural features).
  - Previous/relevant work on the subject and at the research site.
  - Description of how the outputs of the project will be used over the next three years and plans for the legacy of the project upon its completion.

Due to their large size and great beauty, macaws make excellent flagship species and serve as charismatic focal points for the conservation of the ecosystems where they occur. Unfortunately throughout most of tropical America large macaws have suffered major population declines (Beissinger and Snyder 1992, Juniper and Parr

1998). Earthwatch volunteers will have the ability not just to work with a single project, but join a developed research program focused on different aspects of macaw conservation. This work will develop and evaluate techniques for increasing reproductive output of wild macaws, expand our knowledge of macaw nesting behavior, increase our understanding of the complexities of clay lick use and evaluate tourism as a method of protecting macaws and their habitat. This scientific information will then be dispersed through a variety of channels to local native communities, to school children in Lima, to the Peruvian government and via the Internet to classrooms and conservationists world-wide.

The reasons for macaw decline are many and include habitat loss and collection for the pet trade (Forshaw 1989, Beissinger and Snyder 1992). Habitat loss may take many forms including clearing for agriculture and selective logging. Selective logging usually leaves much native vegetation standing including many important macaw food species, but can severely impact macaws because the harvest often targets the old, large trees that the macaws depend upon for nesting. These slow growing trees may take a century to attain sufficient size to harbor cavities. The deep, dry nest cavities that the macaws prefer may take an additional 10 - 20 years to form but then last for many decades. Even in virgin forest these large tree cavities are usually in short supply (Beissinger and Snyder 1992, Munn et al 1991). As a result, each nest site cut represents not just the loss of a single nest, but also the loss of dozens of future chicks that could have been raised in this cavity. Collection for the pet trade further exacerbates this shortage of nest sites because in many areas collectors cut the nest trees in order to remove the macaw chicks (González 1998, 1999).

The threats faced by large macaws are compounded by the fact that these species have naturally low reproductive rates. Previous work by the researchers in Tambopata have shown that the low reproductive rates are due to three main factors: 1) there are not enough suitable nest sites even in pristine old-growth forest hundreds of years old, 2) only about 60% of nests fledge young as predators and parasites combine to kill many chicks, 3) many natural nest sites suffer higher failure rates because they are either too shallow or wet and 4) successful nests usually fledge only one young even when 3 or 4 eggs are laid because one chick monopolizes the food deliveries and the others die of malnutrition (Nycander et al. 1995, Beissinger and Snyder 1992, Munn et al 1991). As a result, a population of 200 macaws may produce as few as 8 young per year.

Given the threats that face many macaw populations today, it is obvious that protecting large tracts of habitat is vital to the survival of macaws and the thousands of species that share their habitat. Some of the most important areas to protect are clay licks. Here hundreds of individuals of up to 17 species congregate daily to descend to the river and stream banks to eat clay. This clay apparently neutralizes the toxins in the seeds that the birds eat and fortifies the natural mucus coating in the stomach providing additional protection from toxins (Gilardi et al. 1999). The fact that macaws return daily makes the birds particularly vulnerable to hunters in these locations. For example groups of up to 200 or more may frequent large clay licks such as those along the Tambopata and Madre de Díos Rivers in southeastern Peru (pers. obs.). The same predictability that makes clay licks good sites for hunters also makes these locations ideal sites for tourism (Munn et al. 1991). As a result, a string of ecotourism projects have sprung up in the last decade that offer macaw viewing at clay licks as a central part of their itineraries. Significant areas are currently being protected from hunting and logging by these ecotourism companies because these tourism projects have a vested interest in protecting the nests and clay licks near their lodges.

Despite the fact that western scientists have known about clay lick use for over twenty years, our knowledge of clay lick use is still in its infancy (Emmons and Stark 1979). To date there is no well-documented information on how often macaws and parrots return to clay licks, how far the birds range to visit licks, if they shift between licks on a daily basis, or if there are seasonal differences in lick use (but see Beissinger and Snyder 1992 and Munn et al. 1991 for rough estimates of some of these parameters). Similarly no one has begun to unravel the complex intra and interspecific interactions among the species at the clay licks. This sort of basic information is vital to our understanding of clay lick use and must be obtained if we want to effectively protect clay licks and understand the impacts of tourism.

While there is little doubt that ecotourism is less damaging to macaw populations than hunting and logging, studies documenting the impact of tourism on macaws and parrots at clay licks are lacking. Tourism impacts may be manifested in a variety of ways. Macaws are a favorite of tourists throughout the areas where they occur. Particularly valued by tourists are close range sightings that allow good photo opportunities (Munn et al. 1991). Tourist groups frequently observe the clay licks from boats as they pass by or from blinds and trails adjacent to the licks. Groups also approach groups of macaws perched in the trees waiting to descend to the licks (pers. obs.). Using as a starting point the basic information on the behavior of parrots and macaws at clay licks, the effects of these sorts of tourism visits must be evaluated so that recommendations can be made on how to reduce the disturbance to the birds.

Unfortunately, due to the naturally low reproductive rates of macaws, just protecting habitat may not be enough to allow them to recover from the decades of collection and tree cutting (Abramson et al. 1995). For this reason, a major objective of this project is to develop and evaluate different methods to increase the reproductive success of large macaws. We will design new nest boxes for macaw species that have never nested in artificial nest substrates and conduct experiments aimed at understanding why some macaw chicks die of starvation and how to enhance their survival. The findings will be shared with conservation scientists worldwide and the personnel of INRENA (the branch of the Peruvian Ministry of Agriculture in charge on natural resource management). This will ensure that the basic set of tested macaw management techniques developed here arrives in the hands of the people most able to use the information to help the recovery and maintenance of macaw populations throughout the tropics.

Section Four: Field Logistics

This section provides Earthwatch with an overview of the volunteer experience. We are looking for clear signs that this will be both an engaging and well-managed experience for volunteers. It is important to show that you are prepared to have a group of non-specialist participants in the field for an extended period of time. This includes having laid out a plan for all logistics including food, transport, and accommodation, having an awareness and preparedness for mitigating potential dangers/hazards on site, and ways to communicate with Earthwatch, or sources of aid from the field.

Need for Volunteer Participation

Participants assist the researchers in the field for set blocks of time in groups called teams. Earthwatch participants can be adults, teens, students, teachers, or corporate employees. Participants are NOT required to have any special skills before signing up to work on a project and will be trained to complete all field tasks upon arrival on site. High school students and college students are becoming an increasingly important type of volunteer, so your ability to work with these volunteers is advantageous.

* a. State minimum number of volunteers per team (to allow completion of tasks)

6

* b. State maximum number of volunteers per team (so that all team members are sufficiently occupied with useful tasks and so that all volunteers can be safely managed, including in vehicles, accommodations and during research tasks)

10

* c. Provide a date range (months) for the teams:

November - February

* d. Provide the total number of teams you would like to run

4

* Potential team length(s)

☐ 1 day ☐ 2-3 days ☑ approximately 1 week ☑ approximately 2 weeks

Accommodation

* a. **Type of Accommodation:** Please indicate the accommodation type(s) available.

☑ Field Station ☐ Hotel ☐ Hostel

☐ Camping ☐ Bed & Breakfast ☑ Other Lodge

* b. Describe the participants' accommodation.
- Is there access to electricity, refrigeration, or internet access?
- Indicate what type of beds and bedding will be provided, including mosquito nets.
- Include whether there will be showers, if there is hot water available, whether there is conventional sanitation or pit toilets.

The two places we will be staying are both very successful tourist lodges designed for international tourists. As a result, the accommodations are excellent. Posada Amazonas was recently listed by Audubon Magazine as one of the 10 best jungle lodges in the world. It has large rooms either with two twin beds or one double bed and a private bath with sink, toilet, and shower (cold water only).

Tambopata Research Center is somewhat simpler. The rooms are smaller but still comfortable and hold either two twin or one double bed. The bathrooms with flush toilets and cold showers are shared.

At both lodges, two people will share each room, but singles are available for an additional fee. There is no electricity in the rooms, but video camera batteries can be recharged using the lodge's generator. Sheets, towels, pillows, blankets and mattresses will all be provided.

* c. If volunteers will be sharing with others please specify how many per room. *(Please note: Single gender rooms are highly preferred)*.

At both lodges, two people will share each room, but singles are available for an additional fee.

* d. Can couples be accommodated?

Yes

Comments regarding couples accommodations:

none

* e. Can single room requests be accommodated?

Yes

Comments regarding single room requests:

Singles are available for an additional fee

Food

It is Earthwatch's experience that good food is essential for good morale! It is expected that research staff share meals with their teams.

* a. What are the cooking arrangements? If volunteers are expected to assist in meal preparation, shopping, or clean-up, please specify.

As with the accommodations, the food is excellent. Trained professional cooks prepare three buffet meals a day.

* b. Describe the typical food, and list specific food that is available and unavailable.

Dishes include a mixture of local, national and international foods, with fresh juice at each meal.

* c. Can you accommodate special diets such as vegetarians, vegans, lactose intolerance, gluten-free, etc.?

Yes

Comments regarding special diets:

The kitchen staff is accustomed to adjusting to the dietary needs of international tourists including vegetarians, vegans, and the lactose intolerant. As a result, special requests are not a problem.

Field Site

* a. Describe the area's attractions. List any attributes of the area that would attract potential volunteers including animals the volunteers will see but aren't necessarily studying or activities the volunteers may participate in during their free time (including museums, art galleries, guided nature walks, kayaking, hiking, bird watching, cultural traditions/dances, etc.).

Enter text here

* b. Describe the research area's climate, flora and fauna, geographic environment, and culture. Note temperature extremes, altitude, precipitation, humidity, insects, and other possible irritants. Earthwatch recruits volunteers from many different countries. Please describe the cultural atmosphere in which teams will be living and working (such as the predominant spoken language, if English is commonly understood, religion, special customs or unacceptable behaviors).

Enter text here

* c. Dangers/Hazards: Describe any potential safety risks associated with the research site, including health hazards which might be encountered. Describe any research activities or recreational activities in which the PIs/staff or volunteers may participate in during an Earthwatch team that are considered dangerous or carry

an unusual risk of accident. Also describe any hazards that are prevalent in the area that anyone in the field may be exposed to.

Volunteers that are allergic to bee stings must bring their epinephrine shots as stinging bees, wasps and ants are common. Vaccination against Yellow Fever is required by law for visitors to this area. Vaccination against typhoid, hepatitis A, tetanus, diphtheria, measles, mumps and rubella are recommended. Talk to your doctor about taking malarial prophylaxis.

Leishmaniasis is present in the area of the lodge. This fly born disease causes a small sore that does not heal for many months. There is no vaccination, but it is treatable and can cause complications if not treated. The best defense against this disease is to use long sleeved shirts, long pants and insect repellent. During long observations, mosquito headnets and a pair of light cotton gloves can also be used in place of insect repellent.

Both lodges keep a well-stocked first aid kit, but participants are encouraged to bring a small supply of personal medications including painkillers (ibuprofen etc.), anti-diarrhea medicine, and Cipro (a broad spectrum digestive system antibiotic). Talk to your doctor about other medicine that you should bring.

* d. Do volunteers require special visas or permissions to work at the research site? Earthwatch volunteers generally travel on tourist visas; please indicate if other visas or permissions are required to work at the site.

No

e. Please provide details of special visas or permissions volunteers would be required to get to work at the research site. Please indicate whether or not you would be able to assist with acquiring these.

n/a

Physical Conditioning/Medical Advice

* a. Describe the physical and psychological demands of the expedition. Be specific about the amount of weight to be carried, distance walked, etc. and recommend appropriate activities to help volunteers prepare in advance of the project.

Participants must be healthy and able to walk over the uneven terrain that is typical of forest trails. Daily hikes of up to 35 minutes through the dark to arrive or return from observation points are routine.

* b. Specify any limitation that would make participation by volunteers impossible or difficult (such as mobility restrictions, allergies, phobias, etc.)

Participants must be healthy and able to walk over the uneven terrain that is typical of forest trails.

Field Communications

* a. Does the research/accommodation area have access to 24 hour communication to allow contact to and from Earthwatch, if required?

No

* b. Specify how volunteers and PIs/staff can be reached in the field (e.g. mail, telephone, fax, cable/telegraph, e-mail), for emergencies, and casual communication.

Communications will be limited during the stay in the field. For emergency messages call the Rainforest Expeditions office in Puerto Maldonado 011 (51) 84 571056 the office is in direct radio communication with the lodges every day at 8 AM and 6 PM. lower priority communications can be sent by e-mail to amaforest@wayna.rcp.net.pe. Mail is not considered particularly reliable.

* c. List all project communication equipment (including satellite phones, mobile phones, walkie talkies, EPIRBs, VHF radios, etc.). Identify if there are legal restrictions on the use of certain types of communication devices and if correct permissions have been granted.

Rendezvous

* a. Where will volunteers be met on Day One by project staff? The rendezvous point is usually the commercial airport, railway station or town closest to the research site. It is helpful if you set the rendezvous time in accordance with local transportation schedules. For the proposal, answer this to the best of your ability. Earthwatch staff will work with you to lock in a final rendezvous after the project is approved.

Puerto Maldonado, Peru

* b. How far is the suggested rendezvous from the research site? Please give the distance in kilometers, the time it takes to reach the research site and by what means this travel will take place.

Approximately 25 km; 2 hours by boat and bus

Itinerary

* a. Briefly outline a typical research day from rising to retiring. Specify the approximate times for field work, meals, data inputting, and daily briefings/facilitated discussions.

Daily schedules will vary depending on what activities each volunteer is doing. Here are a few examples of typical schedules.

Example #1

04:00 Wake up

04:10 Eat Breakfast

04:45 Depart for 10 min boat ride to observation point

05:00 – 7:00 Observe main clay lick recording number of birds every five minutes.

08:00 Breakfast

9:00 – 11:00 Rest

11:00 Depart on 15 – 30 min walk to observation point

11:30 – 15:00 Observe macaw nest (box lunch provided).

15:30 – 19:00 Rest or bird walk with a professional guide.

19:00 Dinner

20:00 Talk by PI summarizing the day's activities and giving plans for the next day

Example #2

06:30 Breakfast

07:30 Depart on 15 – 30 min walk to observation point

08:00 – 11:30 Observe Blue-and-yellow macaw nests in the palm swamp

13:00 Lunch

14:30 Depart on 15 – 30 min walk to observation point

15:00 – 18:00 Observe Scarlet Macaw nest in forest

19:00 Dinner

20:00 Talk by PI summarizing the day's activities and giving plans for the next day

Section Five: Project Budget

This section details the project costs, what Earthwatch can and cannot cover with our field grants. As part of your proposal you are required to submit a project budget. Earthwatch uses a standard budget template which has been designed in line with the grant disbursement model. Earthwatch can support you in understanding and completing this template. Your final budget will be agreed and finalised once your project has been approved from a research perspective. You can find the budget template on our website along with other resources relating to project set up. Once your project has been approved from a research perspective the final stage of your project approval will include finalisation of project budget and team dates.

Earthwatch grants cover the expenses for the project whilst teams are in the field. There are restrictions to this funding and grants do not cover PI salaries, capital equipment or post-expedition data analysis. Full details of the Earthwatch funding model including what is, and is not covered can be found on the budget template.

*Please attach a document with your proposed project budget

Section Six: Principal Investigator (PI) and Staff Information

Please list the Lead PI, Co-PIs, and other staff on your project. For the lead PI and Co-PI(s) you are required to attach an updated CV.

Lead Principal Investigator (Lead PI) - The PI has ultimate project oversight and responsibility for the research objectives, operations, risk management, health, safety, and participant experience.

Co-PI - The Co-PI(s) collaborate with the lead PI for project oversight and responsibility. Projects may have Co-PIs that share responsibility equally, or they may provide support for the lead PI.

Field Team Leader - A Field Team Leader is a project staff member who is entrusted with leadership and responsibility for Earthwatch participants in the PI or Co-PI's absence.

Lead PI

* Title

Dr.

* First Name

Donald

* Last Name

Brightsmith

* Institutional affiliation/Employer

Schubot Center at Texas A&M University

* Position

Assistant Professor

* Street Address

Department of Veterinary Pathobiology, TAMU 4467

Address Line 2

Texas A&M University

* City

College Station

* State

Texas

* Postal Code

77843-446

* Country

USA

* Work Telephone

Other Telephone

* Email Address

Secondary Email Address

* Project role and responsibilities

* Date of birth

* Nationality

* Current First Aid qualification

* Previous experience at research site

* Previous experience working with volunteers

Staff 2

Title

First Name

Last Name

Institutional affiliation/Employer

Position

Street Address

Address Line 2

City

State

Postal Code

Country

Work Telephone

Other Telephone

Email Address

Secondary Email Address

Project role and responsibilities

Date of birth

Nationality

Current First Aid qualification

Previous experience at research site

Previous experience working with volunteers

Staff 3

Title

First Name

Last Name

Institutional affiliation/Employer

Position

Street Address

Address Line 2

City

State

Postal Code

Country

Work Telephone

Other Telephone

Email Address

Secondary Email Address

Project role and responsibilities

Date of birth

Nationality

Current First Aid qualification

Previous experience at research site

Previous experience working with volunteers

Staff 4

Title

First Name

Last Name

Institutional affiliation/Employer

Position

Street Address

Address Line 2

City

State

Postal Code

Country

Work Telephone

Other Telephone

Email Address

Secondary Email Address

Project role and responsibilities

Date of birth

Nationality

Current First Aid qualification

Previous experience at research site

Previous experience working with volunteers

Please attach a CV for the Lead PI and all Co-PIs.

Section Six: Exhibits, peer review, anything else

Referrals for Peer Review

All proposals will be peer reviewed by reviewers of your recommendation and reviewers elected by Earthwatch independently. You must submit two reviewers whom you have contacted about reviewing your proposal. Your reviewers should be experts in the same field as your proposal. Your reviewers should not be directly involved in this research project or be biased towards you and/or this research.

Reviewer 1

* First Name

* Last Name

* Title

* Institution

* Email Address

Reviewer 2

* First Name

* Last Name

* Title

* Institution

* Email Address

Complementary Project Funding

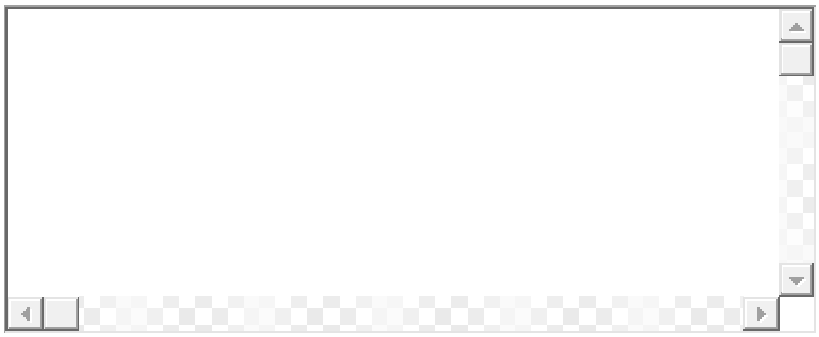
Earthwatch is working towards improving the long-term sustainability of its projects, and we have seen that sourcing funding from multiple sources is a key component towards achieving this. Provide a brief statement relating to other funding sources (or funding sources you anticipate receiving, or plan to apply to) and the relative (or anticipated) contribution of Earthwatch support towards the project's success. You will be able to provide updates on this component of your project as things change over time.

Rainforest Expeditions has agreed to provide approximately $22,800 in goods and services to this project in the 2000 – 2001 field season. See detailed budget sheets for a detailed summary of the contributions of Rainforest Expeditions.

Additional donations from individuals and avicultural societies will be solicited starting in April 2000. A total of $2,000 has already been pledged for the 2000 – 2001 season.

Additional Comments

Is there anything else you would like us to consider?



Exhibits

The following exhibits are required before your proposal is complete:

a) CV for the Lead PI and each Co-PI

b) Copy of research permits or letters of endorsement obtained from the appropriate authorities in order to conduct research at your proposed study site.

You may also want to include graphs, sample data sheets, maps, photos (of staff, the research, and the location), or other information supporting your proposal. This information may also be used in marketing materials to attract participants to your project.