



COLLABORATION FOR ENVIRONMENTAL EVIDENCE

SYSTEMATIC REVIEW NO. 61

**WORKING TITLE: EFFECTIVENESS OF PROTECTED AREAS FOR THE
CONSERVATION OF THREATENED SPECIES OF THE GENUS *Amazona***

REVIEW PROTOCOL

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COVER SHEET

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1. BACKGROUND

Some avian families contain significantly more threatened species than predicted by chance alone (Bennett and Owens 2002). The Psittacidae is one of these bird families with a high proportion of threatened species (28% of all species) (Snyder et al. 2000; Bennett and Owens 2002). Extrinsic causes that threaten the survival of the Psittacidae are well known, the most important being habitat destruction and illegal trade (Juniper and Parr 1998; Snyder et al. 2000).

Within the Psittacidae, the genus *Amazona* includes 33 species that are distributed exclusively within the Neotropics, including the Greater and Lesser Antilles, where they live in different habitat types from arid areas to tropical rainforests (Forshaw 1989; Juniper and Parr 1998). Parrots within this genus are medium (23-35 cm) to large (37-45 cm) in size, and most of them have a green colouration (Forshaw 1989; Juniper and Parr 1998). Of the recognised species that encompass the genus *Amazona*, 16 (48%) have been classified within some IUCN threat category (Critically endangered, Endangered or Vulnerable) (Snyder et al. 2000; IUCN 2007). Population numbers of nine of these species are still declining, are stable for five species, and have increased slightly for two species in recent years (BirdLife International 2000). When considering the factors threatening *Amazona* parrots, poaching is the main one affecting eight species, followed by deforestation or habitat modification in historical or recent times which affects four of them; whereas the other four species are threatened by a combination of these two factors (Snyder et al. 2000).

In recent decades the establishment of protected areas and reserves has been considered to be one of the most efficient strategies to conserve threatened ecosystems and species (Caughley 1994). As habitat destruction is a key factor leading to parrot population declines conservationist and government entities in the Neotropics have widely promoted the establishment of protected areas to preserve critical habitats (feeding and breeding areas) for *Amazona* species (Snyder et al. 2000). Protected areas are also important to conserve *Amazona* parrots because the protection of nesting sites can reduce poaching levels, which is one of the main causes of nest failure in Neotropical psittacines (Wright et al. 2001).

Although it is considered that 11.5% of the earth's surface is currently protected (Chape et al. 2003), recent studies have shown that the global network of protected areas is insufficient (Brooks et al. 2004; Rodrigues et al. 2004) and inefficient (Bruner et al. 2001) in conserving terrestrial biodiversity. In the Neotropics, however, there is little information on the effectiveness of protected areas to preserve threatened species, such as parrots of genus *Amazona*. Due to the degree of threat faced by *Amazona* species it is essential to assess the role played by protected areas in their conservation.

2. OBJECTIVE OF THE REVIEW

Evaluate the effectiveness of protected areas as a strategy to conserve globally threatened parrots of the genus *Amazona*.

Primary question

What is the effectiveness of protected areas in achieving the conservation of globally threatened species of the genus *Amazona*?

Secondary questions

What is the effect of the (1) type, (2) size, (3) habitat type, and (4) proximity to human populations, on the effectiveness of protected areas in protecting the species of the genus *Amazona*?

Do deforestation levels related to parrot habitat vary between protected and unprotected sites?

Are there specific programs to control illegal poaching of parrot chicks within protected areas?

Are there differences in the extent of illegal poaching of parrots of the genus *Amazona* within and outside protected areas?

3. METHODS

3.1 Search strategy

In order to compile information on the review, the following steps will be carried out:

3.1.1 General database search

The following databases and web engines will be used to conduct searches:

- Google
- Google Scholar
- ISI Web of Knowledge
- Jstor
- BioOne
- Biological Abstracts (1980-present)
- ScienceDirect

The following keywords and combination of the latter will be used in the above mentioned searches:

English keywords	Spanish keywords
Parrot	Loro
<i>Amazona</i>	<i>Amazona</i>
Protected areas	Áreas protegidas
National park	Parque Nacional
Habitat destruction	Destrucción de hábitat
Poaching	Captura ilegal
Trade	Comercio
Conservation	Conservación
Management	Manejo

For the web searches the first 100 results of each of the searches will be considered and those results in Word (.doc or .docx) or pdf format will be included in the review.

3.1.2 Specialist searches

Specific databases:

- Searchable Ornithological Research Archive (SORA)

Libraries of the following institutions in Venezuela will be consulted for internal reports, theses and unpublished manuscripts (grey literature), as well as book chapters on the relevant subject of the review:

- Ministerio del Poder Popular para el Ambiente
- Instituto Nacional de Parques
- Universidad Simón Bolívar
- Instituto de Zoología Tropical, Universidad Central de Venezuela
- Biblioteca Marcel Roche, IVIC
- Biblioteca Colección Ornitológica Phelps

In order to find grey literature from other countries, ornithologists from the Neotropical region will be consulted through the following electronic discussion groups:

- NEOORN
- NOS
- Amazona Research Forum
- OVUM

3.1.3 Web Searches

The web pages of the following institutions and organisations will be consulted:

- BirdLife International
- UICN – World Commission on Protected Areas.
- World Parrot Trust
- Rare Species Conservatory Foundation
- ParksWatch

- The Nature Conservancy
- Loro Parque Fundación

3.2 Study inclusion and exclusion criteria

I will assess studies for inclusion in the review based on a hierarchical assessment of relevance by first scanning article titles, followed by reading the abstract of articles with relevant titles, followed by reading the full-text of articles with relevant titles and abstracts. Studies will be deemed relevant based on the presence of the desired subject, intervention and outcome elements as listed below. Repeatability of the article selection process will be determined through sampling the literature database (or subset thereof) by two investigators working independently. The congruence of study selection by the investigators will be assessed by kappa analysis.

3.2.1. Relevant subject:

All those species of the genus *Amazona* that are classified as globally threatened according to the IUCN (2007). These are:

Especie	Categoría
<i>Amazona vittata</i>	Critically endangered
<i>Amazona imperialis</i>	Endangered
<i>Amazona oratrix</i>	Endangered
<i>Amazona rhodocorytha</i>	Endangered
<i>Amazona viridigenalis</i>	Endangered
<i>Amazona agilis</i>	Vulnerable
<i>Amazona arausiaca</i>	Vulnerable
<i>Amazona barbadensis</i>	Vulnerable
<i>Amazona brasiliensis</i>	Vulnerable
<i>Amazona collaria</i>	Vulnerable
<i>Amazona finschi</i>	Vulnerable
<i>Amazona guildingii</i>	Vulnerable
<i>Amazona pretrei</i>	Vulnerable
<i>Amazona ventralis</i>	Vulnerable
<i>Amazona versicolor</i>	Vulnerable
<i>Amazona vinacea</i>	Vulnerable

3.2.2. Types of intervention:

- Management of populations of the genus *Amazona* within protected areas.
- Control of illegal capture and trade of *Amazona* parrots within and outside protected areas.
- Management and restoration of habitat for species of the genus *Amazona* within and outside protected areas.

3.2.3. Types of comparators:

It is expected to use any indicator of variation in the status of the species. If such data is available, information will also be included on the above mentioned variables before and after the establishment of protected areas, and comparisons between the variables within and outside protected areas.

3.2.4. Types of outcome:

The selected studies will be those that indicate some variation in the status of the target species as a result of being found within a protected area. Such variation can be related to population size or density, the number of available nesting cavities, the number of active nests, nest productivity, available feeding area, as well as the level of poaching and illegal trade.

3.2.5. Types of studies:

All studies that refer to the studied intervention will be included, and those can be articles in peer-reviewed journals, book chapters, theses, or internal reports from governmental and non-governmental organizations. Likewise, studies that present quantitative as well as qualitative results will also be included.

3.2.6. Potential reasons for heterogeneity:

As the systematic review will include several species from different countries, the following variables will be considered as possible sources of heterogeneity:

- Derived from the characteristics of the protected area:
 - Proportion of the protected area in relation to the size of species range
 - Type of protected area and permitted uses within the latter
 - Size and shape of the protected area and type of environmental matrix around it
 - Legal framework of each protected area
 - Protected areas managed governmentally and privately
 - Amount of funds invested in the conservation and management of protected areas
 - Presence of human populations within and/or in the outskirts of the protected area
- Derived from the characteristics of the species:
 - Habitat type
 - Presence of predators and/or cavity competitors
- Derived from the characteristics of human-related threats :
 - Amount of illegal poaching
 - Control measures for poaching and illegal trade

- Level of habitat destruction within the species' distribution range

3.3 Study quality assessment

Selected studies will be assessed to determine their quality, and will be classified according to six quality categories that range from I (maximum) to IV (minimum) using the following pre-established criteria as described by Pullin and Knight (2001, 2003).

<i>Category</i>	<i>Quality criteria</i>
I	Strong evidence from well designed experiments (controlled and randomized experiments) with an appropriate sample size.
II-1	Evidence from well designed controlled experiment but without randomization.
II-1	Evidence derived from a comparison of differences between different locations or situations that are or aren't influenced by the independent variable ("treatment" vs. "control").
II-3	Evidence derived from several time series or blunt results of uncontrolled experiment.
III	Opinions of experts, which are based on qualitative field results, descriptive studies and reports from expert committees.
IV	Inadequate evidence due to methodological problems (simple size, duration, etc.) or unexplained evidence.

3.4 Data extraction strategy

To extract information from selected studies, tables will be designed to compile quantitative and qualitative data from each of the studies. The following information will be included in the tables:

- Author
- Date
- Studied species
- Country and study area
- Intervention type
- Protected area type
- Protected area size
- Habitat of the species within the protected area
- Use of a control (YES/NO)
- Evaluation conducted before the intervention (YES/NO)
- Methods used
- Sample size
- Result type (Quantitative/Qualitative)
- Main results

3.5 Data synthesis

The synthesis of the data will include summary tables that will contain the characteristics, quality, and results of each study. Depending on the quality of the extracted data, quantitative analyses will be carried out on the latter. If enough studies are found that permit the comparison of data (with or without protected area, before and after the creation of the protected area), meta-analyses will be performed.

4 POTENTIAL CONFLICTS OF INTEREST AND SOURCES OF SUPPORT

None expected *a priori*.

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