

PLAN OF ACTION FOR THE CONSERVATION OF THE PARROTS OF SANTA MARTA (*Pyrrhura viridicata*), IN COLOMBIA 2015-2025: PROGRESS, ACHIEVEMENTS AND PERSPECTIVES

By: Esteban Botero–Delgadillo¹ & Carlos Andrés Páez²

SUMMARY

The "PLAN OF ACTION FOR THE CONSERVATION OF THE PARROTS OF SANTA MARTA (*Pyrrhura viridicata*), IN COLOMBIA 2015-2025" is constituted as a successful model to direct the strategies in search of mitigating the main threats to the parrot species

of the Sierra Nevada de Santa Marta (*Pyrrhura viridicata*), in Colombia. This plan is based on all available information on these species until 2015. The execution of research and actions framed within it allows to obtain enormous advances in the knowledge and conservation of the target species. Taking into account the data collected after the publication of the final document, the Fundesabanas Foundation together with other stakeholders propose to collect all the new information available until 2019 and reevaluate the situation of each threatened parrot. We present in this article the "Plan Of Action For The Conservation Of The Parrots Of Santa Marta (*Pyrrhura Viridicata*), In Colombia 2015-2025". This plan integrates the research results of the Threatened Parrots Program of the University of Sucre and CARSUCRE; and results from other institutions and individuals, and exposes the main threats and requirements of this group and future needs in terms of research and conservation. Although the individual threats by species are disparate, the general framework of the plan covers all the needs that must obviously be met. After being socialized and discussed during the "Workshop on Socialization and Discussion of the 2015-2025 Plan", this document was chosen as the guideline at the regional level to direct future efforts in favor of the conservation of this species of parrot, threatened by Colombia.

Keywords: Colombia, conservation, threatened parrots, action plan.

1. INTRODUCTION

Undoubtedly, the Psittacidae family is one of the most threatened bird families, due to the loss and degradation of their habitat, and the hunting and looting of nests for various purposes (Rodríguez-Mahecha & Hernández-Camacho 2002, Juniper & Parr 1998). In total, 11 of the 53 species present in Colombia are under some threat category by the IUCN (Rodríguez-Mahecha & Hernández-Camacho 2002), which has attracted the attention of many researchers and conservationists for more than 30 years.

This widespread interest in protecting the psittacines has led to the achievement of international agreements and local conservation programs. In addition to the action plan for psitaciformes prepared by IUCN (Rodríguez & Hernández 2002), in Colombia the "Plan Of Action For The

¹ Fundesabanas foundation, Santa Marta, Colombia. E-mail: admin@fundesabanas.org

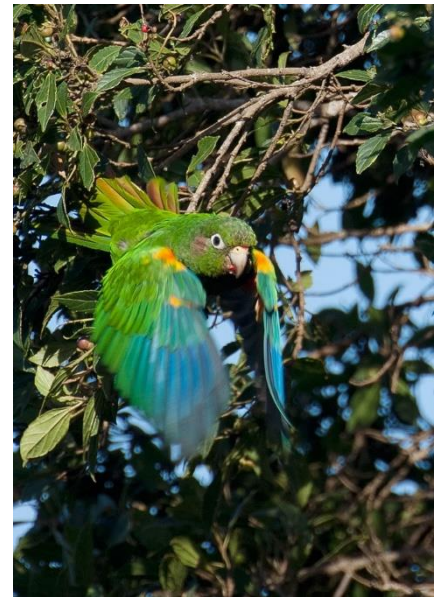
² Fuverde Foundation, Sincelejo, Colombia. E-mail: manager@fuverde.org

Conservation Of The Parrots Of Santa Marta (*Pyrrhura Viridicata*), In Colombia 2015-2025" was designed. which established four priorities:

- 1) identify the ecological requirements of the species
- 2) identify the priority areas for its conservation.
- 3) ensure the protection of the habitat necessary to sustain viable populations.
- 4) promote environmental awareness (Quevedo-Gil 2006).

Within the framework of this plan, about 22 threats affecting the parrot of Santa Marta were identified, grouped into four classes: direct, indirect, biological and scientific (Quevedo-Gil 2006). In the same way, the actions that should be aimed to reduce the effect of them were proposed.

Although the "Plan Of Action For The Conservation Of The Parrots Of Santa Marta (*Pyrrhura Viridicata*), In Colombia 2015-2025" was established as an important tool to direct research and conservation efforts for each species, this required a restructuring. All the information obtained from 2015 to 2019 had to be compiled and analyzed to evaluate the current situation of the species, and to identify the effects that conservation actions have had on their threats. In addition, all the growing information in these species treated in this document made evident the need to consider the parrot of Santa Marta (*Pyrrhura Viridicata*) as an endangered species, which had not been treated before.



With this in mind, the Fundesabanas Foundation considered it pertinent to identify the achievements obtained in the framework of the plan since 2015, determine the current conservation status of the Santa Marta parrot, the threats, reevaluate the conservation needs of the species, and extend or redesign the guidelines to direct the research and conservation efforts in the region. Within this context, we present in this article the "Plan Of Action For The Conservation Of The Parrots Of Santa Marta (*Pyrrhura Viridicata*), In Colombia 2015-2025", where we summarize the results of our analyzes for 15 threats of the parrot of Santa Marta (*Pyrrhura Viridicata*).

2. METHODS

2.1. Framework of the plan

Based on the considerations and goals set for the "Plan Of Action For The Conservation Of The Parrots Of Santa Marta (*Pyrrhura Viridicata*), In Colombia 2015-2025", we find it pertinent to give continuity to the objectives set forth in said document. In order to make this work a tool to evaluate the achievements obtained within the framework of this plan, this means that the general objective,

the specific objectives, the expected results and the activities proposed in the 2015-2020 plan continue being the guidelines for efforts to conserve parrot populations, however, an additional objective has been included and some results have been added that reflect the new information generated on the ecology of some of these species, in addition, following the recommendations of Quevedo-Gil (2006), the threat group has been extended from nine to 15 and the threat evaluation matrix has been modified according to the progress in the knowledge of each of these.



The objectives of the 2015-2025 plan will be the guideline for the design of research and conservation strategies of the target species. However, threat assessment should be the reference framework for decision making regarding this particular bird.

2.2. Consideration of the species

The species included in the 2015-2025 plan (Quevedo-Gil 2006) is still taken into account for this new version: the parrot of Santa Marta (*Pyrrhura Viridicata*).

2.3. Evaluation of the species

The data recorded for the species in the assessment of the state of knowledge and conservation of parrots (this volume) were used as guidelines for adjusting the objectives of the action plan and the threat matrix that prioritizes each of the pressures of agreement to the species. The matrix was initially based on the same 22 threats identified and the categories proposed in the 2015 work table. However, on this occasion we reduced the threats to 20 and transformed the qualifiers of each one (A: high; M: medium; B: low; N: not a threat; -: not evaluated) on a scale of arbitrary values that allows easy comparison of the situation of one species with respect to the others (0: not a threat; 1: low; 2: average ; 3: high; NE: not evaluated).

2.4. Work table

Similar to the 2012-2017 plan, all the information reported here and the results and conclusions derived from it should be extended to the ornithological community, specifically to all the actors external to the foundation involved in the conservation of the threatened parrot. In this way, the workshop "Working Table - Plan Of Action For The Conservation Of The Parrots Of Santa Marta (*Pyrrhura Viridicata*), In Colombia 2015-2025" was developed. To this were invited governmental and non-governmental organizations that have collaborated with the program Amenazados parrots of ProAves, ornithologists, conservationists and people from local communities and other entities that have developed actions framed within the 2002-2007 plan or that are independently involved in the



investigation and conservation of the Psitácidos of the country. In total, there were 23 people representing 6 institutions.

The objectives of the workshop were to evaluate the scope of the results proposed during the first plan.

2.4.1. General objective of the table

Evaluate the relevance of the current framework of the plan and formulate new guidelines to ensure the permanence of the populations of threatened parrots, based on the progress of the state of conservation of the species.

2.4.2. Specific objectives

In this version an objective has been included (objective iii) and small modifications have been made to two others with respect to the table held in 2012 (objectives ii and iv).



i. Present the current state of knowledge about the natural history of the threatened parrot species in Colombia.

ii. Identify and reevaluate threats to the parrot species of interest at the regional and local levels.

iii. Identify the current state of conservation of threatened parrot species in Colombia, the proposed and

implemented actions, and the conservation needs of each of the species of interest.

iv. Evaluate the relevance of the guidelines established in the 2012-2017 plan and again recommended in the 2015-2025 plan, and propose other alternatives consistent with the current state of conservation of the species of interest.

Once the workshop was completed, the impressions and suggestions to complement the information provided for the species and the general framework of the plan were taken into account. The results presented below are derived from the discussion with the participants of the first version of the plan during the table in 2015.

3. RESULTS

3.1. "Plan Of Action For The Conservation Of The Parrots Of Santa Marta (Pyrrhura Viridicata), In Colombia 2015-2025"

The specific objectives derived from the general objective frame a series of expected results, which in turn are the guidelines for the activities necessary to reduce or eliminate the impact of the threats identified for all species in general.

3.1.1. Overall objective

Ensure the permanence of viable populations of threatened species of parrots in the Colombian Andes.

3.1.2. Specific objectives

I. OBJECTIVE 1. DETERMINE THE POPULATION STATUS OF THE ENDANGERED PARROT SPECIES

Expected results

- Abundance and population density estimated in the core areas of its geographical distribution.
- Estimated local and national population sizes.
- Spatio-temporal variations in the abundances and their relationship with the supply of resources and the beginning of the reproductive season evaluated.



Activities

- Development of a reliable methodology for monitoring parrot populations and rigorous estimation of their density and population size.
- Monitoring of populations.
- Linking students and interns in the development of monitoring plans and population investigations.
- Linking researchers with experience in the design and execution of research and demographic analysis.
- Experimentation in the use of artificial nests by the species of interest and annual monitoring of them.
- Recognition and monitoring of potential competitors and predators.

- Population monitoring using telemetry techniques with representative samples of parrot populations.

- Capture and marking of individuals for the development of studies that reveal the population structure and demographic trends in each species.



- Design and implementation of genetic studies to estimate genetic variability, intra- and interpopulation, and infer the possible consequences based on the results obtained.
- Design and implementation of ecological and genetic studies to confirm the status of species for isolated populations of taxa considered as species in this plan.

II. OBJECTIVE 2. IDENTIFY THE ECOLOGICAL REQUIREMENTS OF ENDANGERED PARROT SPECIES

Expected results

- Specific requirements identified (diet, reproduction, nesting, travel distances, etc.).
- Habitat in use characterized for each species.
- Preferences of habitat and relationship between abundance of resources and changes in the trophic niche and use of the available habitat units for the evaluated species.
- Structure of the reproductive groups in cooperative reproducers, the degree of kinship between individuals and the role played according to the age evaluated.
- Potential spatial distribution of the 15 threatened species modeled.
- Identification of biogeographic patterns and evaluation of the main threats and conservation gaps throughout their distribution. Assessment of the possible consequences of climate change on the geographical distribution of threatened parrot species.

Activities

- Characterization of the habitat (floristic surveys, identification of herbarium specimens).

- Determination of habitat preferences and spatio-temporal variations in the use of landscape units.
- Quantification of fruit production of plant species of importance to parrots and other possible resources used by them.
- Relationship between phenological events and spatio-temporal variations in diet and the amplitude of the trophic niche.
- Production of vegetation coverage maps.
- Evaluation of the population status of the important plant species for parrots from their age structure.
- Predictions of the spatial distribution of threatened parrots based on biotic and abiotic characteristics.
- Verification in the field of predicted spatial distributions.
- Predictions of the spatial distribution of threatened parrots under different climate change scenarios.
- Linking students and interns in the development of monitoring plans and ecological research.
- Construction of canopy stations to perform detailed ecological observations.
- Experimentation in the use of artificial nests by the species of interest and annual monitoring of them.

- Recognition and monitoring of potential competitors and predators.
- Design and implementation of genetic and behavioral studies to determine the structure of reproductive groups in cooperative reproducers, as well as the degree of kinship between adults and helpers.
- Capture and marking of individuals to identify the age of helpers in species with cooperative reproduction; as well as to determine the age at which individuals perform as reproductive adults.
- Monitoring of populations using telemetry techniques with representative samples of the populations to identify the displacements and routes on a local scale and their relationship with the abundance of resources.

III. OBJECTIVE 3. IDENTIFY PRIORITY AREAS FOR THE CONSERVATION OF ENDANGERED PARROT SPECIES

Expected results

- Current and potential spatial distribution for each of the 15 parrot species modeled.
- Priority areas for conservation identified.

Activities

- Collection and assessment of presence records for each of the threatened parrot species.
- Preparation of current and potential distribution range maps for each of the threatened parrot species.



- Estimation of the percentage of vegetation remaining in the range of distribution and determination of habitat loss for each species.
- Estimation of the percentage of representation that the SINAP areas make of the current distribution area of each species.
- Field evaluation of predictive models of geographical distribution.

IV. OBJECTIVE 4. ENSURE THE PROTECTION OF THE HABITAT NECESSARY TO SUSTAIN VIABLE POPULATIONS OF THREATENED PARROT SPECIES

Expected results

- Effectiveness in secured protection.
- Increased protected area coverage.
- Administrative management supported by other governmental and non-governmental organizations.
- Communities trained to search for sustainable production alternatives.

Activities

- Acquisition of priority areas adjacent to existing reserves.
- Procurement and processing of stimuli for conservation.
- Project planning and management courses.
- Advising in planning and project management.
- Support for the establishment of nurseries for ecological restoration.
- Achievement of a new model of areas for the common use of wood and wood energy forests.
- Protection of forest fragments using fences, in order to avoid the incursion of domestic species such as cattle to existing fragments.
- Advice to the municipalities in the elaboration and updating of the environmental component of territorial planning plans.
- Theoretical-practical workshops on training in sustainable production alternatives.
- Pilot projects in sustainable production practices.
- Socio-economic participatory diagnosis through the analysis of community surveys.



V. OBJECTIVE 5. PROMOTE ENVIRONMENTAL AWARENESS

Expected results

- Local community trained to monitor parrot populations.

- Teachers trained for the implementation of environmental curricula.
- Massive campaigns to generate environmental awareness (e.g. Loro Bús) executed.
- Advertising campaigns about the activities developed by ProAves published.

Activities

- Creation and training of local groups of bird watchers.
- Donation of bird guides and binoculars.
- Design of environmental curricula.
- Training talks for teachers in environmental education.



- Donation of educational material.
- Establishment of the social service of students in protected areas.

3.2. Threat matrix and evaluation of priorities

Although the particular conservation needs of

each species are detailed in another paper (see Botero-Delgadillo & Páez, pp. 86-151 of this issue), the idea of this document is to issue recommendations and set objectives based on the general requirements of the Psittacidae family. The threat matrix presented below is a weighted summary of the pressures and threats identified in the development of information for each of the threatened parrot species (Table 1). This reference should be worked in conjunction with the plan described above when trying to design strategies or perform actions for a specific species. As noted, the main threats to all species are: slash and burn; the cattle ranch; the Agriculture; the low efficiency of the protected areas where they find; trade or hunting; and the poor knowledge about its biology and ecology. In addition, there are some intrinsic threats to its biology that are common for the 15 species, such as low population size, gregarious behavior (which facilitates looting), high ecological specificity and broad population movements.

4. DISCUSSION AND CONCLUSIONS

Below we summarize the general impressions of the discussion of the plan corresponding to each species during the work table. In addition, we contextualize in a broad sense the main advances in the knowledge of threatened parrot species in Colombia, the main conservation actions and future needs to achieve the effective protection of all members of the Psittacidae family.

Regarding the 2002-2007 plan, progress in knowledge of the biology of threatened parrots has been considerable. Species such as Orejiamarillo Parrot, Blue-winged Parrot and Santa Marta Parrot are clear examples of birds whose basic biology has been explored in a broad spectrum, covering aspects of their reproductive biology, habitat use, diet, foraging behavior, population status and threats. This is undoubtedly a huge advance if we bear in mind that these three parrots are the most threatened according to the IUCN criteria. In addition, the continuous monitoring of the phenology of its main resources, the results of the research supported by the Artificial Nests Program of the ProAves Foundation and the constant training of personnel to monitor their populations, have allowed obtaining information base for the development of conservation plans and decision making



aimed at reducing the impact of their main pressures. The realization of the activities proposed in the 2002-2007 plan has been the main cause of the enormous progress made so far in the conservation of these species. In any case, such advances have resulted in the posing of new questions. In this sense, its resolution will allow us to approach a much more precise assessment of the current state of its populations and a deeper knowledge that will make it easier to assess its threat status and propose the most appropriate strategies for its protection. For two of these species, the Parrot Orejiamarillo and the Periquito de Santa Marta, it will be essential to start with demographic and genetic studies, because their populations could suffer the effects associated with a low genetic diversity or a potential effect founder. In the case of the Blue-winged Parrot, efforts should focus on continuing the restoration of native vegetation, since habitat loss and its limited geographical distribution continue to be its main threat.

The advances obtained with these species have not only been in the field of research, but in the field of conservation. Through projects such as the mobile environmental classroom -Loro Bús-

and several environmental campaigns, numerous municipalities have been reached in order to raise awareness among young people and children about the importance of these birds. It should be noted that these campaigns have had the important support of numerous institutions, achieving a great reach. In this way, advertising campaigns such as "reconcílate con la naturaleza" have reached more than 15,000 people through 27 television channels, with an impact on audience close to 20,000,000 people. Likewise, the workshops and other trainings have sought to support the initiatives of the communities that seek alternatives for sustainable development. In addition, the establishment of the natural reserves of the birds Loro Orejiamarillo (protection of the habitat of *O. icterotis*), Loro Aliazul (protection of the habitat of *H. fuertesii* and *L. branickii*), and El Dorado (protection of the habitat of *P. viridicata*), and the beginning of the Artificial Nest Program and the implementation of nurseries to propagate plants that are part of the diets of the species of interest have been part of a multi-pronged strategy that seeks to cushion the impact of threats of a different nature.

During the workshop there was another group of parrots with a different situation, although with



significant advances: the Parakeet Frentirrufo, the Cotorra Montañera, the Perico Paramuno, the Parakeet Aliamarillo and the Parakeet Cariamarilla. Its apparent state is not as critical as the three previous species, and therefore constitute a huge challenge in scientific and applied terms. Although the efforts of ProAves and all the entities involved in its conservation have supported and promoted studies and educational campaigns, the state of its knowledge is still far from adequate to formulate specific strategies for its protection. The study of some of these birds

has turned out to be a complex task (e.g. Periquito Frentirrufo, Perico Paramuno and Parrot Cariamarilla), and even their ecological requirements and their population status have not been determined in the desired way. Although the conservation actions have been significant,

As shown in a paper documenting the current state of knowledge and conservation of threatened parrots (see Botero-Delgadillo & Páez, pp. 86-151 of this issue), their success will depend to a large extent on the scientific support with which they can tell. It will be essential to deepen on their habitat requirements, their movements on a local scale, their abundances and basic aspects of their reproductive biology.

A third group of particular importance conformed it: the Guadelmaya Verdelimón, the Green Macaw and the Parakeet Alipunteado. Although these birds are considered threatened with extinction, it is highly probable that their state of conservation is more worrying than assumed. The conservation actions are null for the Parakeet Alipunteado and is perhaps the only threatened parrot whose state of knowledge has not advanced for 10 years or more. The two macaws (*Ara* genus)

present a similar situation, although the ProAves Foundation has started with some research in the Green Macaw and with the participation in the development of workshops for the conservation of the Guadelmaya Verdelimón. For these birds, the lack of commitment from governmental and non-governmental organizations and the poor knowledge about their biology remain serious threats. In this sense, the priority is to fill such information gaps in order to formulate a preliminary strategy supported by scientific arguments.

The inclusion in the plan of the Periquito del Sinú, the Periquito de Todd and the Periquito Coligranate del Pacífico attracted the attention of the assistants to the workshop, since the first two are currently recognized as sub-species of the Painted Parakeet (*Pyrrhura picta*), while the third is a geographical breed of the Parakeet Coligranate (*Pyrrhura melanura*). However, the compilation on all the biological and ecological information available about them suggests that their conservation status should be evaluated urgently, since they are isolated populations or independent evolutionary units (see Botero-Delgadillo & Páez, pgs. 86-151 of this number). This is undoubtedly a sufficient argument to propose them as priority species or sub-species, and taking into account



their potential distribution and threats, it is plausible that they are critically endangered parrots.

and his collaborators have already produced the first results for the Periquito de Todd and the Periquito Coligranate del Pacífico, and even seeks to replicate the effects that the project has had for the Periquito de Santa Marta and the Periquito Aliamarillo. In the case of the

Periquito del Sinú, the efforts should be directed to continue the explorations that allow to determine the presence of remaining populations in the core area of its geographic distribution.

A last species considered during the plan was the Parrot Carirrosada, a parrot that is not cataloged under any threat criteria, but whose situation is alarming. The Parrot Carirrosada is an endemic parrot of a biogeographic region with enormous gaps of knowledge and subject to capture and hunting. Only the start of awareness campaigns in the communities, the increase in the representation of protected areas in their range and the design of ecological and population studies, will lead to a precise determination of their state of conservation and the necessary measures to eliminate the negative effects of all the pressures.

The final impressions during the discussion table showed some concern about the absence of other actors that could be key in the conservation of some species. Undoubtedly, the common factor in the recommendations of the participants was the linking of private companies to support conservation and education actions. Also, as the participation of universities and government

organizations in research projects. The participants emphasized that the current knowledge in some species is far from ideal to propose a category of threat consistent with their status. Such was the case of the Cotorra Montañera, the Periquito Aliamarillo, the Periquito Alipunteado, the Periquito Frentirrufo and the Perico Paramuno; for the last three, it was argued that the national category of threat should reflect a more critical state. Similarly, it was suggested that the status of the Santa Marta Periquito, the Verdelimón Guacamaya and the Parrot Parrot may be more alarming.

Finally, during the workshop other alternatives were discussed that could be positive if they are applied properly. In addition, of the ecological restoration activities executed by the Special Administrative Unit of National Natural Parks (UAESPNN) and ProAves independently, the design of biological corridors, the implementation of easements ecological and the establishment of protected areas in perpetuity, efforts should focus on the implementation of sustainable development strategies. Clear examples of such strategies are the mechanisms for obtaining incentives in the communities, the inclusion of the figure of payments for environmental services in national policies and environmental certifications.

The final conclusion of the workshop, adopted to conclude this document, is that the active linkage of all the entities directly or indirectly related to the threatened parrots will be fundamental. Only the joint effort will advance the knowledge of the 15 species, in order to make effective and consistent decisions. The participation of the entities involved in the



workshop should transcend the contributions made to this work. It is expected that these will facilitate their application throughout the country and strengthen it as a national strategy. In this way, it will be expected to obtain results similar to the 2002-2007 plan, once the current document expires.

THANKS

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TABLE 1. MATRIX OF THREATS OF THREATED PARROT SPECIES CONSIDERED IN THE PLAN 2015-2025.

THREAT	The Parrots Of Santa Marta (<i>Pyrrhura Viridicata</i>)
Direct	
Deforestation (felling, burning, etc.)	3
Cattle raising	1
Video development	3
farming	2
Illicit crops / fumigation	2
Hunting	3
Religious activities	0
Low availability nesting sites	NE
Potential trade	2
Indirect	
Lack of commitment from GOs and NGOs	3
Lack of protected areas	1
Lack of efficiency of protected areas	2
Armed conflict	3
Lack of environmental education programs	2
Biological	
Broad population movements	NE
High ecological specificity	NE
Low population size	2
Gregarious behavior	1
Scientific	
Inappropriate monitoring methods	NE
Poor biological knowledge	3

Qualifiers: 0, it is not a threat; 1, low grade threat; 2, threat of medium degree; 3, high grade threat; NE, not evaluated.