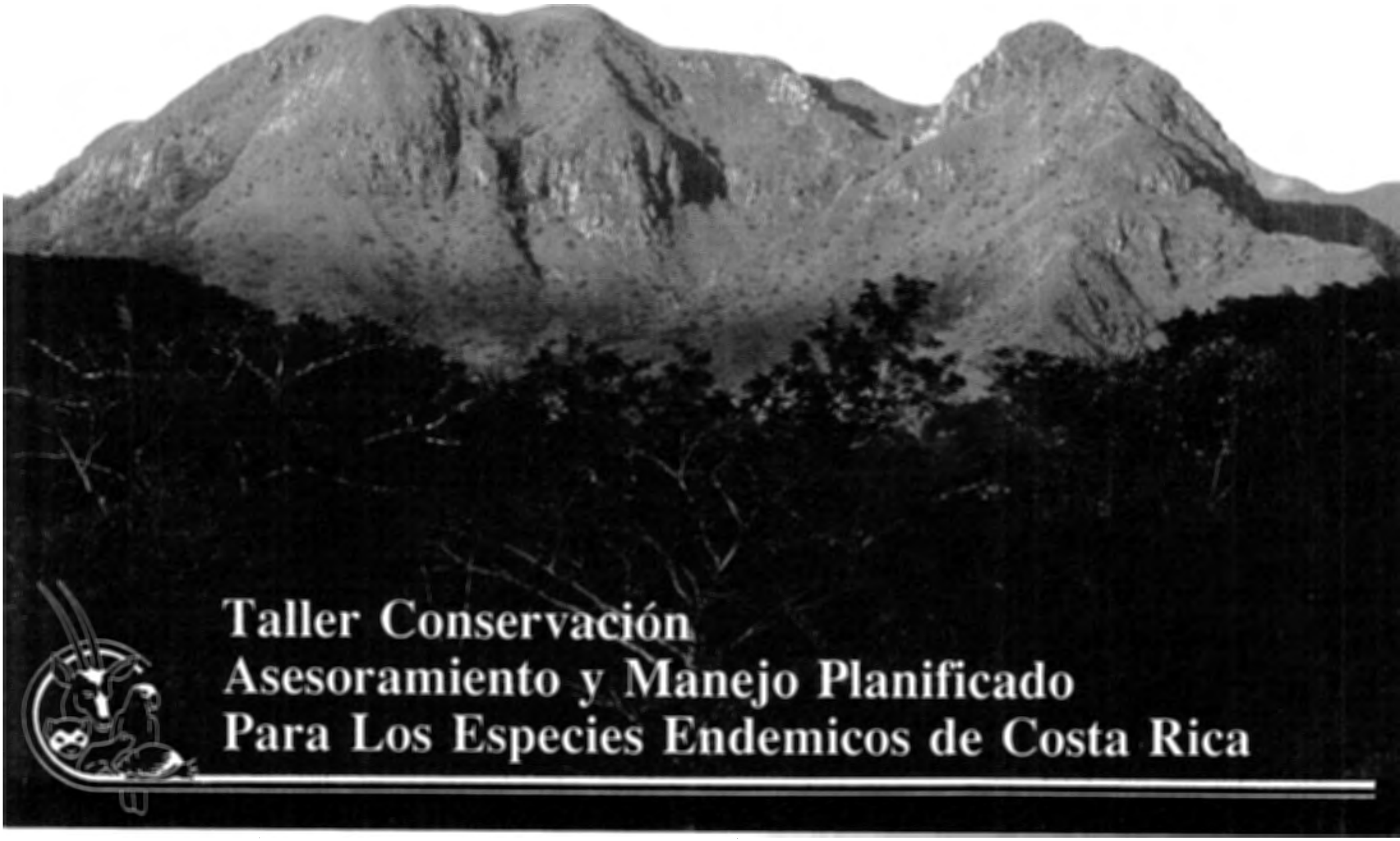

Taller Conservación Asesoramiento y Manejo Planificado Para Los Especies Endemicos de Costa Rica

TALLER DE EVALUACION DE CONSERVACION Y PLAN DE MANEJO PARA LAS ESPECIES ENDEMICAS DE COSTA RICA

CONSERVATION ASSESSMENT AND MANAGMENT PLAN (CAMP) WORKSHOP FOR COSTA RICAN ENDEMICS

REPORT

Simon Bolivar Zoo
San Jose, Costa Rica

31 Mayo - 2 June 1994

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RESUMEN EJECUTIVO

Objetivos

El objetivo del ejercicio fue revisar la aplicabilidad de los procedimientos del CAMP y del PHVA para la conservación de especies y subespecies endémicas de Costa Rica y para el planeamiento y conservación de biotas. El taller perseguía lo siguiente:

1. La introducción de los procedimientos del CAMP y del PHVA a las comunidades conservacionistas y que manejan recursos naturales en Costa Rica.

2 Realizar el primer taller del CAMP para los vertebrados y mariposas endémicas de Costa Rica y un taller de PHVA para el ***Saimiri oesterdii citrinellus***.

Los resultados de estos talleres se utilizarán para apoyar la conservación en las especies estudiadas y para establecer una estrategia de uso sostenido y desarrollo del ambiente para Costa Rica. Este programa reconoce la necesidad de un balance entre la parte económica, ecológica y social para alcanzar la meta del desarrollo sostenible. La experiencia internacional ha demostrado que las estrategias que se enfocan hacia uno o dos de estos sistemas solamente, no son exitosas. El planeamiento sectorial y la participación del gobierno, ONG's y el público, son puntos importantes para el éxito de esa estrategia.

Resultados del CAMP

Mariposas: La lista de especies (sección 3) incluye 14 mariposas, las cuales fueron evaluadas en su totalidad. No se tiene certeza de su situación, pero considerando la fragilidad del hábitat y la incertidumbre de su distribución se determina la existencia de 3 especies en peligro de extinción (*Memphis lankesteri*, *Cissia joycae* y *Cissia gomezi*) y 11 especies de baja abundancia. Fueron recomendados PHVAs para 3 especies. Se recomienda hacer investigaciones de la historia natural, distribución, abundancia y manejo en cautiverio de todas las especies. Bajo la luz de nueva información se recomienda hacer una re-evaluación del estatus poblacional de las especies evaluadas.

Vertebrados: La lista de especies (Sección 3) incluye 13 mamíferos, 7 aves, 20 reptiles, 29 anfibios, y 23 peces para un total de 92 especies de vertebrados evaluados; la mayoría fueron clasificados como Datos Deficientes, con 1 extinto y 1 clasificado como amenazado. Ninguna especie se clasificó en estado "Crítico". PHVA fueron recomendados para 31 especies (todas las aves y peces y el mono tití), se identificaron 344 especies que necesitan investigación para

su manejo, no fueron recomendadas poblaciones en cautiverio para ninguna especie, sin embargo la falta de información sobre el estado de la mayoría de las especies impidió la identificación de necesidades. Un resumen de la información que justificó la clasificación del grado de amenaza se presenta en las hojas de datos para cada especie que de encuentran en la sección 4.

Peces: Se revisó la información existente sobre los peces de las aguas continentales de Costa Rica, observándose que no existen datos de tipo biológico y ecológico que permiten establecer un plan de manejo para la conservación de las especies endémicas. Se analizaron 30 especies encontrándose que 4 eran sinonimias según los trabajos de Bussing (1985) y Zúñiga (1980), y una especie que no es endémica ya que se encuentra distribuida en Nicaragua y Panamá. Se recomendaron PHVA e investigación para todas las especies, ya que con la información existente no se puede evaluar el estado de las poblaciones.

Anfibios: La lista de anfibios (Sección 3) analizada incluye 33 especies las cuales se evaluaron en su totalidad. Se determinó que una de ellas se encuentra desaparecida (*Bufo periglenes*) y para el resto es imposible determinar su estatus, sin embargo, se puede aventurar a decir que cualquier especie de estas, puede estar sujeta a declinación de sus poblaciones por pérdida de hábitat, problemas genéticos, alteraciones del medio por el hombre y por tráfico para venta de mascotas.

Reptiles: La lista de reptiles (Sección 3) analizada incluye 20 especies, las cuales se evaluaron en su totalidad, presentando un alto grado de dificultad para determinar su estatus, sin embargo es posible aventurar a decir que todas ellas pueden estar sujetas a la declinación de sus poblaciones por pérdida de hábitat, problemas genéticos, alteraciones del medio por el hombre y otros.

Nota: En la actualidad se está realizando un monitoreo de poblaciones de anfibios y reptiles a largo plazo dirigido por el PhD. Federico Bolaños de la Universidad de Costa Rica, en Tapantí, Cerro de la Muerte, Reserva de San Ramón, Palmar Norte, Rincón de Osa, Cerro Chompipe, Río Las Vueltas en Heredia, Reserva Biológica La Selva, Sarapiquí y otros.

Aves: En Costa Rica existen 7 especies de aves endémicas y solamente en el área del Parque La Amistad hay 37 especies de distribución restringida, de las que no existe información suficiente para establecer la condición actual de sus poblaciones silvestres. En la medida de lo posible sería recomendable realizar los PHVAS correspondientes. En general es urgente llevar a cabo trabajos de campo para evaluar la condición actual de sus poblaciones y del habitat para elaborar posteriomente las estrategias de conservación.

Mamíferos: Se agregaron 7 especies a la lista que originalmente se nos presentó para este CAMP, para un total de 13 especies. Ocho especies fueron consideradas "no evaluables" (NE) de acuerdo al nuevo criterio de la UICN. Una subespecie se consideró en peligro (*Saimiri oerstedii citrinellus*). Tres especies se consideraron de "bajo riesgo" (LR) y finalmente una subespecie se consideró "dependiente de programas de conservación" (CD). De las 13 especies, 5 especies y una subespecie se consideraron endémicas de Costa Rica, 6 como especies endémicas regionales Costa Rica - Panamá y 1 como especie endémica regional Costa Rica - Nicaragua.

Tabulaciones:

El Plan de Asesoría y Manejo para la Conservación de Vertebrados y Mariposas de Costa Rica consideró ciento siete especies endémicas diferentes para el país (especies o subespecies). De las 107 especies, (3.7%) fueron asignadas a una de las tres categorias de amenaza, basadas en los criterios de las Categorias de Amenaza de la UICN (Versión 2.2):

Extintos	0 especies
Crítico	0 especies
Amenazada	4 especies
Vulnerable	0 especies
Bajo Riesgo	13 especies
Datos Insuficientes	86 especies

Se recomendaron Talleres de estudio poblacional y de hábitat (PHVA) para 34 de las 107 especies (32%). La mayoría de estas recomendaciones las dieron los grupos que trabajaron con peces (23), aves (7), y mariposas (3).

Se hicieron 407 recomendaciones para realizar investigaciones para el manejo de 107 especies, con más de un tipo para varios taxones en las siguientes categorías:

Censar	93 especies
Monitoreo	94 especies
Investigación de la historia natural	56 especies
Factores limitantes de manejo	64 especies
Manejo de hábitat	14 especies
Investigación taxonómica	61 especies
Investigación sobre factores limitantes	23 especies

En cautiverio se encuentran dos de las 107 especies según el reporte de ISIS de Diciembre de 1993 (1.9%). Se recomendaron para programas de manejo en cautiverio en alguno de los tres niveles (basados en parte en los criterios de la UICN) 15 de las 107 especies endémicas de Costa Rica:

Nivel 1	3 especies
Nivel 2	12 especies
Nivel 3	0 especies
No poblaciones en cautiverio	6 especies

Fueron listados como pedientes para programas en cautiverio 83 especies, hasta tanto haya más información disponible.

Recomendaciones Generales:

1. La urgente necesidad de iniciar programas de conservación inmediatos para 107 especies endémicas, con el propósito de impedir la pérdida tanto del hábitat como de las poblaciones endémicas y amenazadas.

2. Establecimiento de programas de propagación en cautiverio para las especies recomendadas como prioritarias si esta es la única intervención de manejo que puede garantizar la sobrevivencia de la especie. Esto con el propósito de mantener más del 90% de la diversidad genética de la población para los próximos 100 años. Deberá ser parte de un programa de conservación coordinado con el manejo y la recuperación de las poblaciones silvestres.

3. Incorporar la biota única de Costa Rica en los programas de educación.

4. Acciones recomendadas como prioritarias para las especies recomendadas como amenazadas:

    a. Conducir urgentemente un extenso inventario, asociado con investigación sobre la ecología para toda la fauna de vertebrados y mariposas endémicas de Costa Rica.

    b. Realizar un estudio sobre la posibilidad de proteger legalmente los sitios donde habitan vertebrados y mariposas claves que hasta el momento no se han protegido.

    c. Inventariar y conducir investigación ecológica sobre las especies de agua dulce endémicas para determinar su localización, estatus, ecología y necesidades de conservación.

    d. Desarrollo de un programa coordinado y administrado para obtener apoyo a las actividades de conservación del zoológico y jardín botánico. Este apoyo podrá ser a través de ayuda técnica, entrenamiento, cultivo *ex situ*, educación pública y levantamiento de fondos.

    e. El procedimiento del CAMP y del PHVA, podrá ser posteriormente refinado (en colaboración del CBSG si desean) para preparar talleres posteriores en Costa Rica como una parte integral de programas colaborativos de conservación.

    f. Obtener representaciones de cada población fundadora sobreviviente si es necesario.

    g. Mantener bancos genéticos en Costa Rica con el propósito de producir material de propagación para reintroducciones.

    h. Una revisión crítica de la política y manejo de introducciones de animales debido a que la evidencia sugiere que un gran número de reintroducciones no son exitosas a largo plazo.

Recomendaciones Especificas De Los Grupos De Trabajo

Mariposas:

1- Proteger las áreas de Patarrá, Cerros de Escazú y Cerros de La Carpintera para mantener y ampliar el hábitat de la Memphis lankesteri, de acuerdo con los datos existentes.

2- Desarrollar investigación para conocer las plantas hospederas de todas las mariposas endémicas y determinar los ciclos de vida, considerando su ecología (depredadores, parásitos, etc).

3- Desarrollar programas de reproducción en cautiverio tendientes al manejo y recuperación de las poblaciones silvestres, en caso de que estudios previos de monitoreo lo recomienden.

4- Incentivar el desarrollo de viveros para plantas hospederas.

5- Dar a conocer mediante programas de educación ambiental la importancia y el estado actual de las especies endémicas.

Peces:

1- Es necesario realizar investigaciones de tipo biológico y ecológico de las especies de peces endémicas.

2- Analizar el estado actual de las poblaciones de peces endémicos y determinar que factores bióticos o abióticos influyen sobre la distribución y abundancia de los mismos.

3- Llevar a cabo programas de conservación de las especies que se determinen en estado crítico e iniciar programas de reproducción en cautiverio para las especies recomendads como prioritarias.

4- Establecer un plan de educación ambiental donde se den a conocer las especies de peces endémicos y la importancia de su conservación.

5- Controlar la extracción de peces endémicos con interés comercial y ornamental.

Anfibios y Reptiles:

1- Iniciar un programa de conservación de las especies endémicas y no endémicas, con el próposito de impedir la pérdida del hábitat y con ello de las poblaciones de anfibios y reptiles.

2- Establecer un programa de monitoreo de la herpetofauna con investigaciones sobre la biología y ecología de las especies, tanto en los habitats naturales como en los alterados.

3- Realizar un estudio sobre la protección legal de áreas que permitan la conservación de la diversidad genética de anfibios y reptiles.

4- Establecer un programa de manejo y recuperación de las poblaciones de anfibios y reptiles que involucre reproducción en cautiverio de la especies amenazadas o desaparecidas para su posterior reintroducción.

5- Realizar en todas las especies de anfibios y reptiles analizadas, estudios genéticos, monitoreos, estudios de población, ecología y otros.

Aves:

1- Señalar la urgente necesidad y la importancia de iniciar programas nacionales de investigación sobre la evaluación del hábitat y el estado actual de las poblaciones de vida la silvestre que sirvan como punto de partida para el establecimiento de las políticas y estrategias de conservación.

2- Realizar a corto plazo la evaluación de las poblaciones en los habitats potenciales y verificar la distribución actual.

3- Revisar y estandarizar los criterios para establecer la condición de las especies, considerando las características propias de las poblaciones de cada una.

4- Propiciar en el futuro, espacios para la discusión sobre este tema entre especialistas nacionales o extranjeros que tengan experiencia sobre la condición actual de las diferentes especies y la correspondiente revisión de este informe.

5- Realizar trabajos de investigación para las 37 especies y 75 subespecies de distribución restringida que se encuentran en la Biosfera de La Amistad.

Mamíferos:

Para todas las especies condideradas es urgente iniciar trabajos de campo para conocer sobre aspectos taxonómicos, genéticos, de historia natural, monitoreos, ciclos de vida, etc. especificados para cada especies o subespecie, para lo que se necesitan programas de financiamiento, accesibles a investigadores e instituciones nacionales, para logra llevar a cabo estos estudios. A pesar de que en muchos casos la información disponible es escasa o nula, es recomendable que todas las especies de mamíferos incluidas en este trabajo, sean incluidas en los apéndices I o II de CITES, dadas las condiciones de hábitat y de su distribución particular. Excepción a esto sería las especies consideradas plaga (*Orthogeomys* sp).

En Costa Rica existe una importante representación de mamíferos con alrededor de 240 especies, incluyendo las especies marinas. De estas, 6 especies son endémicas al país y 8 endémicas regionales. Este tipo de fauna se ve amenazada por factores como pérdida de hábitat por desforestación, presión por cacería y contaminación entre otros.

Aún cuando existe alguna información básica sobre las distintas especies de mamíferos en Costa Rica, es indispensable mayor conocimiento y concientización sobre la biología de estos vertebrados.

Se hace necesario mayor apoyo y financiamiento a todo aquel proyecto que implique aportes en la ecología, reproducción e historia natural de las especies de mamíferos del país. En particular el estado actual de las poblaciones se desconocen casi todos los casos, aún cuando en muchos de ellos es posible que sea crítico.

CONSERVATION ASSESSMENT AND MANAGEMENT PLAN FOR ENDEMIC SPECIES OF COSTA RICA

EXECUTIVE SUMMARY

Objectives

The objectives of the workshops were to review the applicability of CAMP and PHVA procedures to endemic species and subspecies conservation in Costa Rica and to conservation planning for the biotas. The workshop aims were as follows:

1. The introduction of CAMP and PHVA procedures to the Costa Rica conservation and management community.

2. To hold a first CAMP workshop for the endemic vertebrates and butterflies of Costa Rica and a PHVA workshop for *Saimiri oerstedi citrinellus*.

The results of the workshop will be used to assist the conservation of these species and a sustainable environment and development strategy for Costa Rica. This program may recognize the need to balance economic, social and ecological systems to reach the goal of sustainable development. International experience has shown that strategies focusing on any one or two of these systems alone will not succeed. Cross-sectoral planning arrangements and the involvement of government, NGO's and the public are central to the success of such a strategy.

Results of CAMP

Butterflies: The species list (Section 3) includes 14 butterflies, all of them were evaluated. There is no certainty on their situation, but considering the fragility of their habitat and the uncertainty of their distribution, three species are considered endangered, (*Memphis lankesteri*, *Cissia joycas* and *Cissia gomezi*) and 11 species are considered of low abundance. PHVA were recommended for 3 species. Research on natural history, distribution, abundance and captive management is recommended for all species. Once this new information is acquired, a reevaluation of the status of the studied species is recommended.

Vertebrates: The species list (Section 3) includes 13 mammal, 7 bird, 20 reptile, 29 amphibian, and 23 fish for a total of 92 vertebrate taxa which were evaluated and most were classified as Data Deficient, with 0 extinct and 1 classified as threatened. No species were classified as 'Critical'. PHVAs were recommended for 31 species (all of the birds and fishes and the squirrel monkey), 344 research management needs were identified, and captive populations were not recommended for any species, but the lack of information on the status of most species led to a designation of unknown need. A summary of the information that led to the degree of threat classification is presented on the individual Taxon Data Sheets in Section 4.

Fishes: A review of the existing information on fishes of the continental waters of Costa Rica was done, finding that there are not enough data about the biology and ecology that permit establishment of a management plan for the conservation of the endemic species. Thirty species were analyzed, 4 of them were synonymous according to the works of Bussing (1985) and Zuñiga (1980). One of the species on the list is not endemic as it is also distributed in Nicaragua and Panama. PHVAs and research are recommended for all species because with the existing information it is impossible to evaluate their population status.

Amphibia: The list of amphibia (Section 3) analyzed includes 33 species, all of them were evaluated. *Bufo periglenes* has been declared as disappeared (extinct), and it was impossible to determine the status of the other. The population of any of these species might be declining because of habitat loss or alteration, genetic problems, and others.

Reptilia: The analyzed list of reptiles (Section 3) includes 20 species, all of them were evaluated. It was difficult to determine their status, although it is possible to establish that their populations can be declining due to habitat loss, genetic problems, environment alteration by man.

Note: Population monitoring on a long term basis for amphibians and reptiles is being held by Federico Bolaños of the University of Costa Rica. The places in which he is working are: Tapanti, Cerro de la Muerte, Reserva de San Ramon, Palmar Norte, Rincon de Osa, Cerro Chompipe, Rio Las Vueltas, Heredia, La Seva Biological Reserve, Sarapiqui and others.

Birds: Costa Rica has 7 endemic bird species, and in La Amistad National Park (in the border between Costa Rica and Panama) there are 37 species of restricted distribution. There is not enough information about them to establish the actual condition of their wild populations. It would be excellent to do the correspondent PHVA. It is urgent to do field work to evaluate the actual populations and habitat conditions, after that the elaboration of conservation strategies is recommended.

Mammals: Seven species were added to the original list, having a total of 13 species. Eight species were considered as not evaluated (NE) according to the new criteria of IUCN. One subspecies was considered endangered (*Saimiri oersterdi citrinellus*). Three species were considered in low risk (LR), one subspecies was considered conservation dependent programs (CD). From the 13 species studied, 5 species and 1 subspecies were considered as endemics, 6 were considered as regional endemics of Costa Rica - Panama, and one as regional endemic Costa Rica - Nicaragua.

Tabulations:

One hundred and seven distinct endemic Costa Rican taxa (subspecies or species if no subspecies are contained therein) were considered in the Conservation Assessment and Management Plan Workshop. Of the 107 taxa, 4 (3.7%) were assigned to one of three threatened categories of threat, based on the draft IUCN Red List Categories (Version 2.2) criteria:

Extinct	0 taxa
Critical	0 taxa
Endangered	4 taxa
Vulnerable	0 taxa
Low Risk	13 taxa
Data Deficient	86 taxa

34 of the 107 taxa (32%) were recommended for Population and Habitat Viability Assessment (PHVA) workshops. There was a working group bias in these recommendations with all coming from the fish (23), bird (7) and butterfly (3) working groups.

407 recommendations for Research Management were made for the 107 taxa, with more than one type for many taxa, in the following categories:

Survey	93 taxa
Monitoring	94 taxa
Life history research	56 taxon
Limiting factors management	64 taxa
Habitat management	14 taxa
Husbandry research	16 taxa
Taxonomic research	61 taxa
Limiting factors research	23 taxa

Two of the 107 taxa are present in captivity according to ISIS December 1993 (1.9%). 15 of the 107 Costa Rican taxa (14%) were recommended for one of three levels of captive programs (based in part on IUCN criteria):

Level 1	3 taxa	Level 2	12 taxa
Level 3	0 taxa	No Captive Population	6 taxa

Captive programs for 83 taxa were listed as "?", meaning that recommendations for such would be postponed until further information was available.

Recommendations

1. The urgent need to initiate immediate conservation programs for the ?? endemic species, with the aim of attaining no net loss of both relictual habitat and populations of endemic and threatened taxa.

2. Establish captive propagation programs for the recommended priority species, if this is the only management intervention that can assure survival for the species.. This should aim to retain 90%+ of the surviving founder's genetic diversity for the next 100 years. It should be a part of a conservation program coordinated with the management and recovery of the wild populations.

3. Further incorporate Costa Rica's unique biota into Costa Rica's educational programs.

4. Recommended actions for Priority threatened animal species:

    a. Conduct urgent and comprehensive survey work, and associated ecological research, for all of Costa Rica's endemic vertebrate and butterfly fauna.

    b. Examine the case for legal protection of key vertebrate and butterfly sites not presently covered.

    c. Survey and conduct ecological research on the fresh water and marine endemics to determine species locations, status, ecology and conservation needs.

    d. A coordinated and managed program be developed to encourage Zoological and Botanic Garden support for conservation activities in Costa Rica. This support to be expressed through technical aid, training, *ex situ* cultivation, public education and fund raising.

    e. The PHVA and CAMP procedure be further refined (in collaboration with CBSG if wished) to prepare for a further workshops in Costa Rica as an integral part of collaborative conservation programs.

    f. Obtain representation from each surviving founder population, if needed.

    g. Maintain gene banks on Costa Rica with aim of producing propagation material for re-introduction.

    h. Critically review policy and management for animal introductions as evidence suggests a number of re-introductions are not proving successful in the long term.

Specific Recommendations of the Working Groups:

Butterflies:

1-Protect the areas of Patarra, Cerros de Escazú and Cerros de la Carpintera to maintain and increase the habitat of *Memphis lankesteri*, according with existing data.

2- Initiate research to know the hostage plants of the endemic butterflies and to establish the life cycles considering their ecology (predators, parasites, etc.)

3- Establish captive breeding programs to manage and recover wild populations, in case the monitoring studies make this recommendation.

4- Encourage the establishment of hostage plants nurseries.

5- Develop educational programs to inform about the status of the endemic species.

Fishes:

1- Realize biological and ecological research about endemic fishes species.

2- Analyze the actual status of fishes populations and determine the biotic and abiotic factors that influence its distribution and abundance.

3- Establish conservation programs for the species considered as "Critical", initiate captive breeding programs for the species recommended as priorities.

4- Establish an environmental education plan to give information about endemic fishes and the importance of their conservation.

5- Control the extraction of endemic fishes with commercial and ornamental interest.

Amphibians and reptiles:

1- Initiate a conservation program of endemic and non-endemic species, with the purpose of prevent habitat and population loss.

2- Establish an herpetofauna population monitoring program with biology and ecology research, in natural and altered habitats.

3- Realize an study on the legal protection of areas that permit the conservation of genetic diversity of Amphibia and Reptilia.

4- Develop a recuperation and management program of Amphibia and reptile populations, that includes captive breeding of endangered species, thinking in a posterior reintroduction.

5- Study the ecology, genetics, populations of the endemics reptilia and Amphibia.

Birds:

1- Habitat evaluation and studies on the status of the populations are urgently needed, to establish political and conservation strategies.

2- Realize in the short term an evaluation of the populations in potential habitats, and verify the actual distribution.

3- Review and standardize the criteria to establish the condition of the species, considering the characteristics of each population.

4- Stimulate discussions between national and foreign specialist that have experience on the actual conditions of the different species and the review of this inform.

5- Realize research work on the 37 species and 75 subspecies of restricted distribution that are found in La Amistad Biosphere.

Mammals:

It is urgent to start field works for all the species considered to know their taxonomy, genetics, natural history, monitor, life cycles, etc. To do this work financial programs are needed accessible to researches and national institutions. Although there is a lack of information, it is recommended to include the endemic mammal species in CITES appendix I or II, due to the particular habitat and distribution conditions. The only exception are the species considered as pest.

There are 240 mammal species in Costa Rica, including marine species. Six of this species are endemic, eight are regional endemics. This type of fauna are endangered by factors as habitat loss, deforestation, hunting pressure and pollution, between others. Although there is some basic information on mammalian species in Costa Rica, more knowledge is needed on the biology of this vertebrates. More support and finances are needed to all the projects that mean information about the ecology, reproduction and natural history of native mammalian species. The actual population status is unknown in all cases, although it might be critical for most of them.

TALLER DE EVALUACION DE CONSERVACION Y PLAN DE MANEJO PARA LAS ESPECIES ENDEMICAS DE COSTA RICA

CONSERVATION ASSESSMENT AND MANAGMENT PLAN (CAMP) WORKSHOP FOR COSTA RICAN ENDEMICS

REPORT

Sección 2

CAMP Report y Recomendaciones

CAMP Report and Recommendations

PLAN DE ASESORIA Y MANEJO PARA LA CONSERVACION DE VERTEBRADOS Y MARIPOSAS COSTARRICENSES.

Introducción

La reducción y fragmentación del hábitat de las poblaciones silvestres está ocurriendo en una forma muy acelerada. Para un número cada vez mayor de especies los resultados son poblaciones pequeñas y aisladas, aumentando el riesgo de extinción. Existe un rápido aumento de la población humana, estimada actualmente en 5.25 billones de personas, esperándose para el año 2025, alcanzar los 8 billones de personas. Esta expansión y la concomitante utilización de los recursos no puede ser detenida, el resultado será una disminución de las otras especies que co-habitan el planeta.

Conforme las poblaciones silvestres disminuyen, los manejadores de vida silvestre deberán adoptar medidas que reduzcan el riesgo de extinción. Estas estrategias deberán ser globales en la naturaleza y deberán incluir la preservación del hábitat, intensificar la búsqueda de información y en algunos casos, manejar científicamente poblaciones en cautiverio que puedan interactuar demográfica y genéticamente con poblaciones silvestres.

La preservación exitosa de las especies silvestres y los ecosistemas necesita el desarrollo y la implementación de programas de manejo realizados por las personas y los gobiernos que viven en el ámbito de distribución de la especie. Las recomendaciones contenidas en este documento están basadas únicamente en las necesidades de conservación; las políticas y las medidas a tomar son responsabilidad de las agencias gubernamentales a cargo de la conservación de la flora y fauna.

Plan de Asesoria y Manejo para la Conservación

Dentro de la Comisión de Sobrevivencia de Especios de la Unión Mundial para la Conservación de la Naturaleza, la meta primaria del Grupo de Especialistas de Reproducción en Cautiverio CBSG, es contribuir al desarrollo de estrategias de conservación y planes de manejo, holísticos y viables. Para alcanzar esta meta, el CBSG está colaborando con agencias y otros Grupos de Especialistas a nivel mundial en el desarrollo de procesos científicamente basados, tanto a nivel global como regional, con el fin de facilitar un acercamiento integrado en el manejo de especies, para su conservación. Una de estas herramientas es llamada Plan de Asesoria y Manejo para la Conservación (CAMP).

Los CAMP proveen una guía estratégica para la aplicación de técnicas de manejo intensivo que son requeridas cada vez con mayor fuerza para la recuperación o sobrevivencia de especies amenazadas. Los CAMP sirven para probar la aplicabilidad de los criterios de amenaza de la UICN así como también el ámbito de dicha aplicabilidad.

Adicionalmente, los CAMP son un intento de producir resúmenes progresivos de información actual para los grupos taxónomicos, proveíendose un mecanismo para registrar y rastrear el

estatus de la especie.

Además del manejo en su hábitat natural, se requiere, algunas veces, del manejo en cautiverio como complemento a programas de conservación que pretenden poblaciones viables de especies amenazadas. En general los animales en cautiverio y los programas de reproducción en cautiverio pueden jugar diversos roles en la conservación:

1- como reservorios genéticos y demográficos que pueden ser usados para reforzar las poblaciones silvestres ya sea revitalizando las poblaciones que están desapareciendo en su hábitat natural o restableciendo poblaciones por medio de la traslocación, donde se han extinguido o desaparecido.

2- provee endo recursos científicos como información y tecnología que pueden ser utilizados para proteger y manejar las poblaciones silvestres.

3- como embajadores que pueden educar al público y promover de financiamiento para la conservación *in situ*.

Se ha propuesto que, cuando las poblaciones en cautiverio puedan apoyar la conservación de especies, las poblaciones silvestres y en cautiverio deberán, y podrán ser, manejadas intensiva e interactivamente con intercambio de animales cuando sea necesario y posible. Las poblaciones en cautiverio deben ser un apoyo y no un sustituto de las poblaciones silvestres. Pueden existir problemas con el intercambio de poblaciones silvestres y en cautiverio si se toman en cuenta limitaciones logísticas, de financiamiento y de enfermedad. Las observaciones anteriormente mencionadas deben ser tomadas y resueltas inmediatamente debido a que muchas especies están pasando por una grave crisis poblacional que puede resultar en su extinción.

Resumen de las especies endémicas revisadas

Mariposas: La lista de especies (Sección 3) incluye 14 mariposas de las cuales 14 fueron evaluadas, con 0 extinguidas y 3 clasificadas como amenazadas. Ninguna especie se clasificó como "Crítica". PHVA fueron reccomendados para 3 especies, 63 especies con necesidades de manejo fueron identificadas, y se recomendó tener poblaciones en cautiverio para 3 especies, de las cuales 3 fueron clasificadas como Amenazadas. Ninguna de estas especies se encuentra en cautiverio o en programas de reproducción en este momento. Un resumen de la informaación que justificó el grado de amenaza en que se clasificaron se encuentra en las hojas de datos para cada especie que se encuentran en la Sección 4.

Vertebrados: La lista de especies (Sección 3) incluye 13 mamíferos, 7 aves, 20 reptiles, 29 anfibios, y 23 peces para un total de 92 especies de vertebrados evaluados; la mayoría fueron clasificados como Datos Deficientes, con 1 extinto y 1 clasificado como amenazado. Ninguna especie se clasificó en estado "Crítico". PHVA fueron recomendados para 31 especies (todas las aves y peces y el mono titi), se identificaron 344 especies que necesitan investigación para

su manejo, no fueron recomendadas poblaciones en cautiverio para ninguna especie, sin embargo la falta de información sobre el estado de la mayoría de las especies impidió la identificación de necesidades. Un resumen de la información que justificó la clasificación del grado de amenaza se presenta en las hojas de datos para cada especie que de encuentran en la sección 4.

Amenazas para la fauna endémica de Costa Rica.

La pérdida de hábitat ha resultado en una dramática disminución del ámbito histórico de la mayoría de estas especies. La pérdida directa por prácticas agrícolas constituye la mayor amenaza para las especies y las subespecies.

Algunas las poblaciones son lo suficientemente pequeñas como para ser vulnerables a eventos estocásticos tales como las sequías, enfermedades, depresión por entre-cruzamiento y además a las perturbaciones catástroficas.

Amenazas específicas a las especies endémicas.

Mariposas:

1- Interferencia Humana: Contaminación, deforestación sobre todo en la Meseta Central y las cercanías del Parque Nacional Braulio Carrillo.

2- Fragmentación del Hábitat: Por deforestación en la zona de la Meseta Central y la Península de Osa.

3- Incendios Forestales: Afecta a una especie (*Anthanasa dora*) pues son comunes los incendios arriba de los 2800 msnm, aún en áreas protegidas.

4- Efecto de gases volcánicos (Lluvia ácida): Las especies de la Cordillera Volcánica Central están siendo afectadas.

Peces:

Aunque no existen trabajos realizados sobre los factores biótico o abióticos que pueden amenazar la fauna ictiológica endémica, podemos hacer alusión a aquellos factores conocidos que pueden estar afectando la distribución y abundancia de los peces endémicos; en otros términos:

1- Las variaciones climáticas

2- Plaguicidas

3- Contaminación

4- Introducción de especies exóticas

5- Extracción incontrolada con fines comerciales y ornamentales.

Anfibios y Reptiles:

1- Fragmentación de hábitat

2- Alteraciones del medio por el hombre

3- Contaminación (pesticidas, herbicidas, otras)

4- Introducción de especies exóticas.

5- Comercio de especies.

Aves:

Actualmente la estabilidad de las poblaciones silvestres de las aves endémicas y las otras especies en general se encuentran potencialmente amenazadas por:

Enfermedades, deterioro genético, disturbio humano, competencia inter e intra específica, comercio ilegal, perdida de hábitat, depredación, introducción de especies exóticas y contaminación.

***Mamíferos*:**

1- Cacería deportiva y comercial

2- Contaminación de aguas fluviales

3- Fuegos-bosques primarios, espacios alterados, charrales

4- Tendidos eléctricos, carreteras que atraviesan zonas silvestres

5- Permisos de investigación para ratones y murciélagos sin restricciones de recolecta

Genética y Taxonomía

La taxonomía sirve para identificar las poblaciones de animales, se basa en sus similitudes y

diferencias. Así, la correcta clasificación de una especie es un instrumento importante para la conservación. La sistemática de muchas de las merece atención, para diferentes extensiones.

Muchas de las subespecies son designadas por una combinación de caracteres morfológicos y de distribución geográfica. Los participantes de este taller estuvieron de acuerdo en que muchas de esas clasificasiones mecesitan ser revisadas y basadas en análisis genéticos. Los problemas específicos se describen a continuación.

El Proceso del CAMP

El proceso del CAMP reune expertos en manejo de poblaciones silvestres y en cautiverio de las especies bajo revisión en un taller intenso e interactivo. El propósito del CAMP en Costa Rica es ayudar al pleno desarrollo de estrategias de conservación para las especies y subespecies endémicas amenazadas y evaluar la aplicabilidad de la versión 2.2 de los criterios de amenaza de UICN. Del 31 de mayo al 2 de junio de 1994, 30 personas se reunieron en San José, Costa Rica en el Zoológico Nacional Simón Bolívar para revisar, refinar y desarrollar futuras estrategias de conservación para las especies y subespecies de vertebrados y mariposas del país.

Los participantes trabajaron juntos para: 1- determinar lo mejor posible, la situación de las especies, 2- asignar a cada especie una categoría de amenaza según la versión 2.2 de los criterios de amenaza de la UICN y 3- identificar áreas de acción y necesidades de información para los propósitos de conservación y manejo.

Se circularon al grupo entero las apreciaciones y recomendaciones de los subgrupos de trabajo previo al consenso final, tal como está representado en este documento. Los participantes del taller apoyaron las recomendaciones concernientes al manejo investigativo, asignación de todas las especies a un estatus de amenaza y la cría en cautiverio.

Metas del Taller CAMP

Las metas del Taller CAMP en Costa Rica fueron:

1- Revisar la situación poblacional y las tendencias demográficas de los vertebrados y mariposas endémicas, probar la aplicabilidad de los criterios de amenaza de la UICN, y discutir las opciones de manejo para estas especies.

2- Dar recomendaciones para el manejo in situ y ex situ, la investigación, la obtención de información para las especies revisadas, incluyendo: recomendacion para talleres PHVA, manejo más intensivo, investigación taxonómica, censos, monitoreo, investigación de factores limitantes o cualquier otra investigación específica.

3- Producir un documento borrador con los resultados y recomendaciones del CAMP, para

distribuirlo entre los participantes y todas las partes interesadas en la conservación de las especies endémicas de Costa Rica.

Asignación de las categorías de amenaza de la UICN

Todas las especies fueron evaluadas, una por una, en términos de su estatus actual y proyectado su estado silvestre para asignar prioridades de conservación o de obtención de información. Los participantes del Taller aplicaron los criterios propuestos por la redefinición de las Categorías de la UICN basadas en el trabajo de Mace y Lande (Mace & Lande, 1991). El esquema de la UICN asigna categorías de amenaza en términos de los criterios estimados de probabilidad de extinción durante un período específico de tiempo. El sistema define tres categorías de amenaza para las especies:

Crítico 50% de probabilidad de extinción en los próximos 5 años o en dos generaciones, lo que tarde más.

En Peligro 20% de probabilidad de extinción en los próximos 20 años o en 5 generaciones, lo que tarde más.

Vulnerable 10% de probabilidad de extinción en los próximos 100 años.

Las definiciones de estos criterios se basan en la teoría de viabilidad de poblaciones. Para ayuda a hacer recomendaciones, los participantes del taller fueron motivados a aplicar los 5 items de criterios operacionalmente definidos y ser tan cuantitativos como fuera posible por dos razones:

1) los CAMP deben de establecer al final objetivos numéricos para tamaños poblacionales y distribuciones viables;

2) los números proveen mayor objetividad, menos ambigüedad, mayor comparación mejor comunicación y por lo tanto cooperación. Durante el taller, hubo muchos intentos de estimar si la población total de cada especie era mayor o menor que los umbrales de las categorías de amenaza, en borrador, de la UICN.

En muchos casos no existían estimados de población para las especies o exitían para especies - subespecies en una parte limitada de su distribución. En todos los casos se utilizaron estimados numéricos conservadores. **Las estimaciones poblacionales hechas representan un primer intento, que podrían usarse para el establecimiento de hipótesis falsas. Por lo tanto,los participantes del taller enfatizaron que estas estimaciones no son válidas para ningún otro propósito que no sea el que se intentó en este proceso.**

Para asignar las categorías de la UICN, los participantes del taller también utilizaron información sobre el estatus e interacción del hábitat y otras características (cuadro 1). Se consideró información sobre tendencias poblacionales, fragmentación, ámbito, eventos ambientales

estocásticos, reales y potenciales.

La información númerica sola no fue suficiente para asignar una de las categorías de amenaza de Mace y Lande. Por ejemplo, basándose únicamente en números, una especie puede ser asignada a las categorías de Vulnerable o Segura. El conocimiento de amenazas actuales o futuras o la fragmentación del hábitat natural remanente, sin embargo, pueden conducir a asignar una categoria más alta de amenaza.

Las categorías de amenaza de la UICN para los 107 especies estudiadas durante este ejercicio de CAMP se presentan en el cuadro 1.

Cuadro 1: Especies amenazadas de Costa Rica según las categorías de amenaza de la UICN.

CATEGORIAS UICN	NUMERO DE ESPECIES	PORCENT DEL TOTAL
Critica	0	0
En Peligro	4	3.8
Vulnerable	0	0
Bajo Riesgo	13	12.5
Dependiente de Conservacion	1	1
Datos Insuficientes	86	82.7
TOTAL	104	100

Una de la especies costarricenses designada a una categoría de amenaza de la versión revisada de UICN, se encuentra clasificada como amenazada en la clasificación corriente de la UICN, 102 especies designadas en la versión revisada --------- de la UICN no se encuentran en la lista roja de animales amenazados, 1990.

Una de las metas del CAMP fue evaluar la aplicabilidad de los nuevos criterios de amenaza de la UICN (versión 2.2), los cuales fueron diseñadas en un intento de redefinir las categorías de amenaza actuales de la UICN.

Borrador de las categorías de amenaza de la UICN (versión 2.2)

Las categorías de amenaza de especies utilizadas actualmente en los **Libros Rojos de la UICN** y en las Listas Rojas han sido utilizadas con algunas modificaciones, por alrededor de 30 años (Mace et al., 1994). Los criterios revisados de la UICN han sido un paso adelante en el intento

de hacer esas categorías más explicitas. Estos criterios subsecuentemente han sido revisados y formulados en un nuevo Borrador de Categorías de UICN, que han sido probadas en el proceso del CAMP.

El Borrador de Categorías de Listas Rojas de UICN provee de un sistema que facilita la comparación entre especies grandemente diferentes, y está basada tanto en criterios de población como de distribución (ver cuadro 4). Como los criterios de Mace y Lande, los nuevos criterios se pueden aplicar a cualquier unidad taxonómica a nivel de especie o subespecie, con un ámbito suficiente entre los diferentes criterios que permiten el apropiado listado de especies del espectro completo de especies, con las excepción de los microrganismos (Mace et al., 1994).

Las categorías de Crítico, Amenazado y Vulnerable están entrelazados (por ejemplo: si una especie califica como crítica, califica también para amenazado y vulnerable). Las categorías en borrador de las Listas Rojas de la UICN son:

EXTINTO (EX)

Una especie está **Extinta** cuando no hay la mayor duda de que el último individuo ha muerto.

EXTINTA EN ESTADO SILVESTRE (ES)

Una especie está **Extinta en estado silvestre** cuando se sabe que solamente sobrevive en cultivos, en cautiverio o como una población naturalizada (o población) fuera de su ámbito de distribución pasado.

CRITICO (CR)

Una especie se encuentra en estado **Crítico** cuando enfrenta un riesgo extramadamente alto de extinción en estado silvestre en un futuro inmediato, como lo define el criterio enlistado en el cuadro 4.

AMENAZADO (AM)

Una especie es **Amenazada** cuando no está en estado crítico pero esta enfrentando un alto riesgo de extinción en estado silvestre, en el futuro inmediato, tal como se define en el Cuadro 4.

VULNERABLE (VU)

Una especie es **Vulnerable** cuando no es crítica o amenazada, pero enfrenta un alto riesgo de extinción en estado silvestre en un mediano plazo, tal como se define en el cuadro 4.

DEPENDIENTE DE CONSERVACION (DC)

Las especies que no clasifican en alguna de las categorías mencionadas anteriorment, se pueden clasificar como **Dependientes de Conservación**. Para ser consideradas en esta categoria, una especie debe de ser el punto de interés de un programa de conservación continuo que puede ser especie - específico o hábitat - específico, que afecte directamene la especie en cuestión. La finalización de este programa traerá como resultado que la especie califique para algunas de las categorías de amenaza anteriormente mencionadas.

BAJO RIESGO (BR)

Una especie está en **Bajo Riesgo** cuando ha sido evaluada y no califica para ninguna de las categorías Crítica, Amenazada, Vulnerable, Suceptible, Dependiente de Conservación o Datos Insuficientes.

DATOS INSUFICIENTES (DI)

Una especie se clasifica como **Datos Insuficientes** cuando la información existente es inadecuada para tomar una desición directa o indirecta sobre su riesgo de extinción, basándose en su distribución y/o en su estado poblacional.

NO EVALUADA (NE)

Una especie cataloga como **No Evaluada** cuando no se ha evaluado de acuerdo a sus criterios.

En el cuadro 5 se presentan las nuevs categorias de la Lista Roja de la UICN para las 18 especies revisadas durante este CAMP, más las dos especies extintas.

Tabla 2. BORRADOR DE LAS CATEGORIAS DE LA UICN - FEBRERO 1994

CUALQUIERA de los siguientes criterios pueden ser usados para asignar las categorias:	**CRITICO**	**EN PELIGRO**	**VULNERABLE**
Reducción (de la población)	Dism. $\geq$ 80% en los últimos 10 años basado en:	Dism $\geq$ 50% en los últimos 10 años o 2 generaciones basados en:	Dism. $\geq$ 50% en los últimos 20 años o 5 generaciones basados en:
	a) observación directa O b) declinación en el área de ocupación y/o calidad del habitat O c) niveles actuales o potenciales de explotación O d) intro. de espec., hibridiz., patógenos, contaminantes, competidores o parasitos		
	O	O	O
	Predicción en un futuro cercano de un decline > 80%/10 años	Predicción en un futuro cercano de un decline >50%/10 años o 2 generaciones	Predicción en un futuro cercano de un decline >50%/20 años o 5 generaciones
Área de ocurrencia	Est. <100 km^2 o est. del área de ocupación <10 km^2 Y DOS de los siguiente:	Est. <5,000 km^2 o est. del área de ocup. <500 km^2, Y DOS de lo siguiente:	Est. <20,000 km^2 o est. del área de ocup. <2,000 km^2, Y DOS de lo siguitente:
	Severamente fragmentado o localizacion única	Severamente fragmentado o < 5 localidades	Severamente fragmentado o < 10 localidades
	Dism. de cualquiera de lo siguiente: a) área de ocurrencia b) área de ocupación c) área, extension y/o calidad del habitat d) # de localidades o subpoblaciones e) # de individuos maduros		
	Fluctuaciones extremas en CUALQUIERA de lo siguiente: a) área de ocurrencia b) área de ocupación c) # de localidades o subpoblaciones		
Estimación (de la población)	Est. de individuos maduros < 250 Y:	Est. de individuos maduros <2,000 Y:	Est. de individuos maduros <10,000 Y:
	Dism. $\geq$25% en un período de 3 años o 1 gener., cualquiera que se mayor	Dism. $\geq$15% en un período de 5 años o 2 generaciones cualquiera que sea mayor	Dism. $\geq$20% en un período de 10 años o 3 generaciones cualquiera que sea mayor
	O	O	O
	Dism. en individuos maduros Y en la estruct. de la poblacion puede ser que: a) en la pobl. no hayan mas de 50 individuos maduros O b) todos los individuos se encuentran en una única subpoblación	Dism. en individuos maduros Y en la estruct. de la poblacion puede ser que: a) en la pobl. no hayan mas de 250 individuos maduros O b) todos los individuos se encuentran en una única subpoblación	Dism. en indiviuos maduros Y en la estruct. de la poblacion puede ser que: a) en la pobl. no hayan mas de 1,000 individuos maduros O b) todos los individuos se encuentran en una única subpoblación
# de individuos maduros	Est. < 50 indiv. maduros	Est. < 250 indiv. maduros	Est. < 1,000 indiv. maduros
Probabilidad de extinción	$\geq$ 50% en los próximos 5 años o 2 generaciones, el que sea mayorà	$\geq$ 20% en los próximos 20 años o 5 generaciones, el que sea mayor	$\geq$ 10% en los próximos 100 años

Recomendaciones para manejo intensivo y acciones de investigación.

Para todas las especies, se generaron las recomendaciones de acción intensiva necesarias, en términos de manejo e investigación, que se creyó necesarias para su conservación. Estas recomendaciones, resumidas en el Cuadro 7, son: talleres de Asesoria de viabilidad de poblaciones y habitat (PHVA); investigación para el manejo de las poblaciones silvestres y programas de reproducción en cautiverio. Los talleres PHVA proveen mediante una asamblea la información biológica detallada disponible sobre cada taxón, evaluando las amenazas para su hábitat, desarrollando escenarios de manejo inmediato y escalas de tiempo de 100 años, y formulando un plan de manejo específico con la ayuda de modelos simulados. En muchos casos, los participantes del taller determinan que el nivel de información existente no es el adecuado para la conducción del PHVA; en tales casos, las recomendaciones se enlistan en "PHVA Pendiente".

Los participantes del taller intentan desarrollar un plan integrado de las acciones para el manejo e investigaciones necesarias para la conservación de las especies costarricenses. En todos los casos, se hizo un intento de hacer recomendaciones de manejo e investigación basadas en los varios niveles de amenaza que están incidiendo sobre las especies.

Para efecto del proceso del CAMP, amenaza se definió como " eventos inmediatos o a futuro que causan o pueden causar una disminución en las poblaciones"

Con tan sólo un conocimiento parcial de causas señaladas para la declinación de poblaciones de una especie, a veces resulta difícil definir claramente las acciones de manejo específicas para la conservación. Por lo tanto, el "Manejo investigativo" debe ser un componente de las actividades de recuperación y conservación. El manejo investigativo puede definirse como los programas de manejo los cuales incluyen una fuerte retroalimentación entre las actividades de manejo y la evaluación de la eficiencia del manejo, así como de la respuesta de la especie amenazada a tales actividades. Se han definido 7 categorías de manejo investigativo: reconocimiento (ej. búsqueda y localización); monitoreo; translocación; investigación o clarificación taxónomica; manejo de factores limitantes; investigación de factores limitantes e investigación de la historia natural. Se necesita frecuentemente información de censos para evaluar el estado de la población, especialmente para aquellas especies que se encuentran enlistadas como críticas, enfatizando la necesidad de implementar rápidamente metodologías intensivas de censos. Se resumen en el cuadro 3 las recomendaciones de manejo investigativo.

Cuadro 3. Recomendaciones para el manejo investigativo para las especies de vertebrados endémicos de Costa Rica.

Categorias UICN	PHVA	Censo	Monit	Inves. Histo Natural	Inves. Fact. Limt.	Maneo Fact. Limt.	reprod.	Inves. Sobre La Sp.
Amenzado	1							
Dependiente de Conservacio		1	1	1				1
Bajo Riesgo			1					
Datos Insuficientes	30	78	79	42	54	23	2	61
TOTAL	31	79	81	43	54	23	2	62

Cuadro 4. Recomendaciones para el manejo investigativo para las especies de mariposas endémicas de Costa Rica.

Categorias UICN	PHVA	Censo	Monit.	Reproduc.	Historia de Vida	Maneo de Habitat
Amenzado	3	3	3	3	3	3
Dependiente de Conservacio						
Bajo Riesgo	11	11	11	11	11	11
Datos Insuficientes						
TOTAL	14	14	14	14	14	14

Recomendaciones para programas en cautiverio.

Para pocas de las especies costarricenses se determinó que un programa en cautiverio sería necesario para contribuir al mantenimiento a largo plazo de poblaciones viables. Se propone que, cuando se crea necesario mantener poblaciones en cautiverio para ayudar a la conservación de la especie, tanto las especies en cautiverio como las que se encuentran en estado libre, deben ser manejadas en forma intensiva e interactiva con intercambio de animales cuando sea necesario y posible. Se pueden presentar problemas con el intercambio de poblaciones en vida libre y en cautiverio, si se consideran las limitaciones financieras, logísticas y de enfermedades.

Actualmente los zoológicos y el sector privado, pueden proveer una gran alternativa para la sobrevivencia de especies a través de programas cooperativos, ya que día a día, más y más especies se ven amenazadas con una disminución de su población.

Cuando se recomendó el manejo **ex situ**, también se sugirió el "nivel" del programa en cautiverio, el estado reflejado, prospectos en las áreas silvestre y diferencias taxonómicas. Los niveles de cautiverio utilizados en el CAMP son definidos a continuación.

Nivel 1 (1) - Se recomienda una población en cautiverio como un componente de un programa de conservación. Este programa tiene la meta tentativa de desarrollar y manejar una población suficiente para preservar por 100 años, el 90% de la diversidad genética de una población. El programa debe ser posteriormente definido con un plan de manejo de especies, abarcando poblaciones silvestres y en cautiverio e inmediatamente implementadocon las reservas existentes en cautiverio. Si las reservas existentes son insuficientes para lograr las metas del programa, se debería desarrollar un plan para el manejo de especies que especifique la necesidad para adicionar fundadores a las reservas. Si no existen reservas en cautiverio, entonces el programa se debería desarrollar en colaboración con agencias de vida silvestre, con los Grupos de Especialistas de la SSC e instituciones colaboradoras.

Nivel 2 (2) - Es similar al anterior, solo que el plan de manejo de especies y subespecies, debería incluir un refuerzo periódico de la población en cautiverio, con nuevo material genético traído de las poblaciones silvestres. El nivel o la cantidad necesaria de intercambio genético, debería ser definida en términos de las metas del programa, un modelo de población y un plan de manejo de especies. Se anticipa que suplementaciones periódicas con nuevo material genético permitirán el manejo de una población en cautiverio más pequeña. El período de tiempo para la implemetación de un nivel 2, dependerá de las recomendaciones hechas en el taller del CAMP.

Nivel 3 (3) - El programam en cautiverio no se recomienda como una contribución genética o demográfica para la conservación de la especie/subespecie pero es recomendada para educación, investigación o manejo en cautiverio.

Otras recomendaciones para cautiverio incluye:

No (N) - El programam en cautiverio no se recomienda como una contribución genética o demográfica para la conservación de la especie/subespecie. En esta categoría se pueden incluir las especies que se encuentran en cautiverio. En este caso, las especies/subespecies deberían ser evaluadas, ya sea para un manejo teniente a disminuir el número o para la eliminación completa de los programas en cautiverio como parte de una estrategia para acomodar tantas especies/subespecies como sea posible, identificado en el CAMP o en los planes de acción de la SSC como de alta prioridad de conservación.

Pendiente (P) - La decisión de un programa en cautiverio dependerá de la consecución de mayor información, ya sea, a través de un PHVA, un censo o la existencia de fuentes de información identificadas que deben ser solicitadas.

Durante el taller del CAMP, todas las especies fueron evaluadas con relación a su necesidad actual para propagación en cautiverio. Las recomendaciones se basaron en una serie de recomendaciones numéricas, incluyendo: necesidad inmediata para la conservación (tamaño de la población, borrador del estado en la Lista Roja de la UICN, tendencia de la población, tipo de programa de propagación en cautiverio), necesidad de o conveniencia como una especie sustituta, poblaciones actuales en cautiverio y determinación de la dificultad como se mencionó anteriormente. Basado en las consideraciones anteriormente expuestas, se hicieron las recomendaciones para programas en cautiverio. Estas recomendaciones, de acuerdo a las categorías de amenaza de la UICN, se presentan en el cuadro 5.

Cuadro 5. Recomendaciones de programas en cautiverio para especies en cautiverio de acuerdo a la categoría de amenaza de la UICN

Categorias UICN	Nivel 1	Nivel 2	Nivel 3	Pendiente	No
Amenzado	3				
Dependiente de Conservacio					
Bajo Riesgo		12			6
Datos Insuficientes				83	
TOTAL	3	12		83	6

La Revision Del Proceso Del CAMP

Los resultados de los talleres iniciales del CAMP son revisados: 1) por distribución de un borrador preliminar a los participantes del taller; 2) por distribución de un borrador subsecuente para comentarios por parte de 100 a 200 biólogos de campo, manejadores de vida silvestre y programas regionales de manejo en cautiverio alrededor del mundo; 3) en sesiones de revisión regionales en varias reuniones y talleres de la CBSG, utilizando expertos regionales del grupo taxonómico en cuestión. Así que los talleres del CAMP no son eventos aislados, a pesar de que a veces son eventos singulares. En vez de esto, son parte de un proceso continuo y en evolución del desarrollo de planes de conservación para las especies involucradas. El proceso de revisión del CAMP, permite la extración de información de expertos alrededor del mundo. Los CAMP

continuamente están evolucionando cuando se hace accesible nueva información y cuando cambian las situaciones globales o regionales y las prioridades. En casi todos los casos, los talleres de seguimiento van a requerir la consideración o estudio a profundidad de puntos en particular o sobre las bases regionales. Además, siempre será necesario monitorear la implementación y la efectividad de las recomendaciones resultantes de un taller. En muchos casos una cadena de talleres PHVA, resultarán de los talleres del CAMP. Los CAMP generalmente sirven como el primer paso en el desarrollo de planes de acción de la SSC.

La CBSG está profundamente conciente de las limitaciones de desarrollar un documento CAMP con la limitada información de los biólogos alrededor del mundo. Debido a su diseño, el proceso del CAMP no se puede realizar con una gran cantidad de personas. Los procesos del CAMP pretenden que los documentos resultantes definan preliminarmente el ámbito de los problemas que está enfrentando la especie o la región. No es probable que exista toda la información para una especie o región en particular a menos que ya se haya definido o preparado un plan de acción. Una de las importancias de los CAMP es que permite determinar la existencia parcial, incierta o nula de información. Por tanto, este proceso provee un documento base que va a hacer editado, alterado y mejorado, a través de la distribución para su revisión, entre una amplia comunidad además de los participantes del taller.

El proceso de revisión para el CAMP de Costa Rica está apenas empezando; todos los miembros del grupo de especialistas pertinentes de la SSC recibirán, en un futuro cercano, copias de un borrador para ser revisado y comentado, después los participantes en el taller tendrán la oportunidad de realizar una revisión más detallada del primer borrador. Los comentarios hechos por el resto de los grupos de especialistas se incluirán en versiones subsecuentes.

Los documentos del CAMP son objetos vivos que serán continuamente revisados y actualizados basándose en información nueva o en los cambios de necesidades. El actual proceso del CAMP continuará ya sea en la aplicación del mismo para nuevos grupos taxónomicos y\o para el refinamiento de los existentes. En los próximos 5 años se pretende iniciar el proceso del CAMP para todos los grupos de vertebrados terrestre (también llamados tetrápodos) y para un selecto grupo de peces. Más de 25 CAMP se han llevado a cabo para una ampli variedad de vertebrados: boas y pitones, varanidos e iguanidos, lagartijas, pinguinos, aves acuáticas, megápodos, codornices, faisanes, palomas, grullas, loras, "hornbill", marsupiales, primates, cánidos e hienas, prociónidos, mustélidos, vivérridos, félidos, cérvidos, antílopes y caprinos. También se han realizado CAMP regionales: aves del bosque hawaianas, especies endémicas de Guatemala y especies endémicas de la Isla Santa Elena. Los reportes de estos CAMP se pueden encontrar en las oficinas de la CBSG.

El proceso del CAMP es el punto central para el establecimiento de las prioridades globales para una campaña intensiva de conservación. Los CAMP proveen un marco de trabajo para el manejo intensivo de especies silvestres en cautiverio. Las agencias de vida silvestre y los programas regionales de reproducción en cautiverio pueden usar los CAMP como guías para el desarrollo de sus propios planes de acción. Lo que pretende este proceso así como también otros programas de la CBSG es contribuir al uso racional, a nivel mundial, de los limitados recursos para la

conservación de especies.

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COSTA RICA ENDEMIC SPECIES CONSERVATION ASSESSMENT AND MANAGEMENT PLAN WORKSHOP

Introduction

Reduction and fragmentation of wildlife populations and habitat are occurring at a rapid and accelerating rate. For an increasing number of taxa, the results are small and isolated populations at risk of extinction. A rapidly expanding human population, now estimated at 5.25 billion, is expected to increase to 8 billion by the year 2025. This expansion and concomitant utilization of resources has momentum that cannot be stopped, the result being a decreased capacity for all other species to simultaneously exist on the planet.

As wildlife populations diminish in their natural habitat, wildlife managers realize that management strategies must be adopted that will reduce the risk of extinction. These strategies will be global in nature and will include habitat preservation, intensified information gathering, and in some cases, scientifically managed captive populations that can interact genetically and demographically with wild populations.

The successful preservation of wild species and ecosystems necessitates development and implementation of active management programs by people and governments living within the range area of the species in question. The recommendations contained within this document are based on conservation need only; adjustments for political and other constraints are the responsibility of regional governmental agencies charged with the preservation of flora and fauna within their respective countries.

Conservation Assessment and Management Plans (CAMPs)

Within the Species Survival Commission (SSC) of IUCN-The World Conservation Union, the primary goal of the Conservation (formerly Captive) Breeding Specialist Group (CBSG) is to contribute to the development of holistic and viable conservation strategies and management action plans. Toward this goal, CBSG is collaborating with agencies and other Specialist Groups worldwide in the development of scientifically-based processes, on both a global and regional basis, with the goal of facilitating an integrated approach to species management for conservation. One of these tools is called Conservation Assessment and Management Plan (CAMP).

CAMPs provide strategic guidance for the application of intensive management techniques that are increasingly required for survival and recovery of threatened taxa. CAMPs are also one means of testing the applicability of the IUCN criteria for threat as well as the scope of its applicability. Additionally, CAMPs are an attempt to produce ongoing summaries of current data for groups of taxa, providing a mechanism for recording and tracking of species status.

In addition to management in the natural habitat, conservation programs leading to viable populations of threatened species may sometimes need a captive component. In general, captive populations and programs can serve several roles in conservation:

1) as genetic and demographic reservoirs that can be used to reinforce wild populations either by revitalizing populations that are languishing in natural habitats or by re-establishing by translocation populations that have become depleted or extinct;
2) by providing scientific resources for information and technology that can be used to protect and manage wild populations; and
3) as living ambassadors that can educate the public as well as generate funds for *in situ* conservation.

It is proposed that, when captive populations can assist species conservation, captive and wild populations should, and can be, intensively and interactively managed with interchanges of animals occurring as needed and as feasible. Captive populations should be a support, however, not a substitute for wild populations. There may be problems with interchange between captive and wild populations with regard to disease, logistics, and financial limitations. In the face of the immense extinction crisis facing many taxa, these issues must be addressed and resolved immediately.

An Overview of the Endemic Costa Rican Species Reviewed

Results of CAMP

Butterflies: The species list (Section 3) includes 14 butterflies, all of them were evaluated. There is no certainty on their situation, but considering the fragility of their habitat and the uncertainty of their distribution, three species are considered endangered, (*Memphis lankesteri*, *Cissia joycas* and *Cissia gomezi*) and 11 species are considered of low abundance. PHVA were recommended for 3 species. Research on natural history, distribution, abundance and captive management is recommended for all species. Once this new information is acquired, a reevaluation of the status of the studied species is recommended.

Vertebrates: The species list (Section 3) includes 13 mammal, 7 bird, 20 reptile, 29 amphibian, and 23 fish for a total of 92 vertebrate taxa which were evaluated and most were classified as Data Deficient, with 0 extinct and 1 classified as threatened. No species were classified as 'Critical'. PHVAs were recommended for 31 species (all of the birds and fishes and the squirrel monkey), 344 research management needs were identified, and captive populations were not recommended for any species, but the lack of information on the status of most species led to a designation of unknown need. A summary of the information that led to the degree of threat classification is presented on the individual Taxon Data Sheets in Section 4.

Fishes: A review of the existing information on fishes of the continental waters of Costa Rica was done, finding that there are not enough data about the biology and ecology that permit establishment of a management plan for the conservation of the endemic species. Thirty species were analyzed, 4 of them were synonymous according to the works of Bussing (1985) and Zuñiga (1980). One of the species on the list is not endemic as it is also distributed in Nicaragua and Panama. PHVAs and research are recommended for all species because with the existing information it is impossible to evaluate their population status.

Amphibia: The list of Amphibia (Section 3) analyzed includes 33 species, all of them were evaluated. *Bufo periglenes* has been declared as disappeared, and it was impossible to determine the status of the others. The population of any of these species might be declining because of habitat loss or alteration, genetic problems, and other reasons.

Reptilia: The analyzed list of reptiles (Section 3) includes 20 species, all of them were evaluated. It was difficult to determine their status, although it is possible to establish that their populations can be declining due to habitat loss, genetic problems, environment alteration by man.

Population monitoring on a long term basis for amphibians and reptiles is being held by Federico Bolaños of the University of Costa Rica. The places in which he is working are: Tapanti, Cerro de la Muerte, Reserva de San Ramon, Palmar Norte, Rincon de Osa, Cerro Chompipe, Rio Las Vueltas, Heredia, La Seva Biological Reserve, Sarapiqui and others.

Birds: Costa Rica has 7 endemic bird species, and in La Amistad National Park (in the border between Costa Rica and Panama) there are 33 species of restricted distribution. There is not enough information about them to establish the actual condition of their wild populations. It would be excellent to do the correspondent PHVA. It is urgent to do field work to evaluate the actual populations and habitat conditions, after that the elaboration of conservation strategies is recommended.

Mammals: Seven species were added to the original list, having a total of 13 species. Eight species were considered as not evaluable (NE) according to the new criteria of IUCN. One subspecies was considered endangered (*Saimiri oersterdii citrinellus*). Three species were considered in low risk (LR), one subspecies was considered conservation dependent programs (CD). From the 13 species studied, 5 species and 1 subspecies were considered as endemics, 6 were considered as regional endemics of Costa Rica - Panama, and one as regional endemic Costa Rica - Nicaragua.

Threats to Costa Rican Endemics

Loss of habitat has resulted in a dramatic decline in the historical range of almost all of these species. Direct loss by agricultural practices constitutes a major threat to all of the species and subspecies. Many of the populations are small enough to be vulnerable to stochastic events such as drought, disease, inbreeding depression, and additional catastrophic perturbations.

Principal Threats to Endemic Species

Butterflies:

1- Human interference, pollution, deforestation.
2- Habitat fragmentation
3- Forest fires
4- Volcanic gases, acid rain produced by volcanic contamination

Fishes:

Although there are no works on the biotic and abiotic factors that affect the endemic icthyofauna, there are know factors that can affect the distribution and abundance of the endemic fishes:

1- Climatic variations
2- Pesticides
3- Pollution
4- Introduction of exotic species
5- Uncontrolled extraction for commerce

Amphibians and reptiles:

1- Pollution- pesticides, herbicides
2- Introduction of exotic species
3- Habitat fragmentation
4- Commerce

Birds:

1- The stability of wild endemic bird populations and other species are threatened by: Sicknesses, human disturbance, inter or intra-specific competence, illegal commerce, habitat loss, predation, exotic species introduction, Pollution, genetic damage

Mammals:

1- Commercial and sport hunting
2- Pollution of fluvial waters
3- Fire
4- Electric lines and roads that cross wild areas
5- Research programs without collection restrictions

Taxonomy and Genetics

Taxonomy serves to identify populations of animals on the basis of their similarities and differences. Thus, a correct classification of taxa is an important instrument for conservation. The systematics of many of the species deserve attention.

Many of the species are designated by a combination of morphological characters and geographic distribution. This workshop participants were in agreement that many of these classifications need to be reviewed and supported by genetic analyses. The specific problems are described below.

The CAMP Process

The CAMP process assembles expertise on wild and captive management for the taxonomic group under review in an intensive and interactive workshop format. The purpose of the Costa Rican Conservation Assessment and Management Plan (CAMP) workshop was to assist in the further development of a conservation strategy for Costa Rican endemic threatened species and subspecies, and to test the applicability of the IUCN version 2.2 criteria for category of threat. On 31 May - 2 June, 1994, thirty individuals met in San Jose, Costa Rica at the Simon Bolivar Zoo to review, refine, and develop further conservation strategies for Costa Rican endemic species and subspecies of vertebrates and butterflies.

Participants worked together to: 1) determine best estimates of the status of all the taxa; 2) assign each taxon to a IUCN version 2.2 category of threat; and 3) identify areas of action and information needed for conservation and management purposes.

The assessments and recommendations of the working group were circulated to the entire group prior to final consensus, as represented in this document. Summary recommendations concerning research management, assignment of all taxa to threatened status, and captive breeding were supported by the workshop participants.

CAMP Workshop Goals.

The goals of the Costa Rica CAMP workshop were:

1) To review the population status and demographic trends for endemic vertebrates and butterflies, to test the applicability of the IUCN criteria for threat, and to discuss management options for these taxa.

2) To provide recommendations for *in situ* and *ex situ* management, research and information-gathering for all taxa reviewed, including: recommendations for PHVA workshops; more intensive management in the wild; taxonomic research, survey, monitoring, investigation of limiting factors, taxonomy, or other specific research.

3) Produce a discussion draft Conservation Assessment and Management Plan for endemic Costa Rican endemic taxa, presenting the recommendations from the workshop, for distribution to and review by workshop participants and all parties interested in conservation of endemic Costa Rican taxa.

Assignment to IUCN Categories of Threat.

All the taxa were evaluated on a taxon-by-taxon basis in terms of their current and projected status in the wild to assign priorities for conservation action or information-gathering activities.

The workshop participants applied the criteria proposed for the redefinition of the IUCN Categories based upon work by Mace and Lande in their 1991 paper (Mace & Lande, 1991). The IUCN scheme assesses threat in terms of criteria providing an estimate of likelihood of extinction within a specified period of time. The system defines three categories for threatened taxa:

Critical 50% probability of extinction within 5 years or two generations, whichever is longer.

Endangered 20% probability of extinction within 20 years or five generations, whichever is longer.

Vulnerable 10% probability of extinction within 100 years.

Definitions of these criteria are based on population viability theory. To assist in making recommendations, participants in the workshop were encouraged to apply the 5 sets of operationally defined criteria and to be as quantitative or numerate as possible for two reasons: 1) CAMPs ultimately must establish numerical objectives for viable population sizes and distributions; 2) numbers provide for more objectivity, less ambiguity, more comparability, better communication, and, hence, cooperation. During the workshop, there were many attempts to estimate if the total population of each taxon was greater or less than the numerical thresholds for the draft IUCN Categories of Threat. In many cases, current population estimates for the taxa were unavailable or available for species/subspecies within a limited part of their distribution. In all cases, conservative numerical estimates were used. **When population numbers were estimated, these estimates represented first-attempt, order-of-magnitude educated guesses that were hypotheses for falsification. As such, the workshop participants emphasized that these estimates should not be authoritative for any other purpose than was intended by this process.**

In assessing threat according to the IUCN criteria, workshop participants also used information on the status and interaction of habitat and other characteristics (Table 1). Information about population trends, fragmentation, range, and stochastic environmental events, real and potential, were considered.

Numerical information alone was not sufficient for assignment to one of the Mace-Lande categories of threat. For example, based solely on numbers, a taxon might be assigned to the Vulnerable or Secure category. Knowledge of the current and predicted threats or fragmentation of remaining natural habitat, however, may lead to assignment to a higher category of threat.

IUCN categories of threat for the 103 taxa examined during this CAMP exercise are presented in Table 1.

Table 1. Threatened Costa Rican Endemic Taxa - Draft IUCN Categories of Threat.

IUCN CATEGORY	NUMBER OF TAXA	PERCENT OF TOTAL
Critical	0	0
Endangered	4	3.8
Vulnerable	0	0
Low Risk	13	12.5
Conservation Depend.	1	1
Data Deficient	86	82.7
TOTAL	104	100

One of the goals of the CAMP workshop was to test the applicability of the revised IUCN criteria for threat (version 2.2), which were designed in an attempt to redefine the current IUCN categories of threat. One of the Costa Rican taxa assigned to a revised IUCN category of threat is listed as threatened under the current IUCN classification; 102 taxa assigned to revised IUCN categories of threat are not listed in the *1990 IUCN Red List of Threatened Animals*.

Draft IUCN Categories (version 2.2).

The threatened species categories now used in IUCN Red Data Books and Red Lists have been in place, with some modification, for almost 30 years (Mace et al., 1994). The revised IUCN criteria were one developmental step in an attempt to make those categories more explicit. These criteria subsequently have been revised and formulated into new Draft IUCN Categories, which also are being tested in the CAMP process.

The Draft IUCN Red List Categories provide a system which facilitates comparisons across widely different taxa, and is based both on population and distribution criteria (see Table 4). Like the Mace-Lande criteria, the new criteria can be applied to any taxonomic unit at or below the species level, with sufficient range among the different criteria to enable the appropriate listing of taxa from the complete spectrum of taxa, with the exception of micro-organisms (Mace *et al.*, 1994).

The categories of Critical, Endangered, and Vulnerable are all nested (i.e., if a taxa qualifies for Critical, it also qualifies for Endangered and Vulnerable). The Draft IUCN Red List Categories are:

EXTINCT (EX)
A taxon is **Extinct** when there is no reasonable doubt that its last individual has died.

EXTINCT IN THE WILD (EW)
A taxon is **Extinct in the Wild** when it is known only to survive in cultivation, in captivity, or as a naturalized population (or population) well outside the past range.

CRITICAL (CR)
A taxon is **Critical** when it is facing an extremely high risk of extinction in the wild in the immediate future as defined by the criteria listed in Table 4.

ENDANGERED (EN)
A taxon is **Endangered** when it is not Critical but is facing a very high risk of extinction in the wild in the near future, as defined by the criteria listed in Table 4.

VULNERABLE (VU)
A taxon is **Vulnerable** when it is not Critical or Endangered but is facing a high risk of extinction in the wild in the medium-term future, as defined by the criteria listed in Table 4.

CONSERVATION DEPENDENT (CD)
Taxa which do not currently qualify under any of the categories above may be classified as **Conservation Dependent**. To be considered **Conservation Dependent**, a taxon must be the focus of a continuing taxon-specific or habitat-specific conservation program which directly affects the taxon in question. The cessation of this program would result in the taxon qualifying for one of the threatened categories above.

LOW RISK (LR)
A taxon is **Low Risk** when it has been evaluated and does not qualify for any of the categories Critical, Endangered, Vulnerable, Susceptible, Conservation Dependent, or Data Deficient.

DATA DEFICIENT (DD)
A taxon is **Data Deficient** when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status.

NOT EVALUATED (NE)
A taxon is **Not Evaluated** when it has not yet been assessed against the criteria.

Table 2. DRAFT IUCN RED LIST CATEGORIES - FEBRUARY 1994

ANY of the following criteria may be used to assign categories:	**CRITICAL**	**ENDANGERED**	**VULNERABLE**
Population reduction	≥ 80% decline in last 10 yrs based on:	≥ 50% decline in last 10 yrs or 2 generations based on:	≥ 50% decline in last 20 yrs or 5 generations based on:
	a) direct observation OR b) decline in area of occupancy, occurrence and/or habitat quality OR c) actual or potential levels of exploitation OR d) introd. taxa, hybridization, pathogens, pollutants, competitors or parasites		
	OR	OR	OR
	≥ 80% decline/10yrs predicted in near future	≥ 50% decline/10 yrs or 2 generations predicted in near future	≥ 50% decline/20 yrs or 5 generations predicted in near future
Extent of occurrence	Est. < 100 km² or area of occupancy est. < 10 km², AND TWO of the following:	Est. < 5,000 km² or area of occupancy est. < 500 km², AND TWO of the following:	Est. < 20,000 km² or area of occupancy est. < 2,000 km², AND TWO of the following:
	Severely fragmented OR single location.	Severely fragmented OR ≤ 5 locations	Severely fragmented OR ≤ 10 locations
	Decline in ANY of the following: a) extent of occurrence b) area of occupancy c) area, extent, and/or quality of habitat d) # of locations or subpopulations e) # of mature individuals		
	Extreme fluctuations in ANY of the following: a) extent of occurrence b) area of occupancy c) # of locations or subpopulations		
Population estimates	Est. < 250 mature indivs. AND:	Est. < 2,500 mature indivs. AND:	Est. < 10,000 mature indivs. AND:
	Decline ≥ 25% within 3 yrs or one generation, whichever is longer	Decline ≥ 15% within 5 yrs or 2 generations, whichever is longer	Decline ≥ 20% within 10 yrs or 3 generations, whichever is longer
	OR	OR	OR
	Decline in mature individuals AND population structure EITHER a) no pop. w/ > 50 mature indivs. OR b) all indivs. in single subpop.	Decline in mature individuals AND population structure EITHER a) no pop. w/ > 250 mature indivs. OR b) all indivs. in single subpop.	Decline in mature individuals AND population structure EITHER a) no pop. w/ > 1,000 mature indivs. OR b) all indivs. in single subpop.
# of mature individuals	Est. < 50 mature individuals	Est. < 250 mature individuals	Est. < 1,000 mature individuals
Probability of extinction	≥ 50% within in 5 yrs or 2 generations, whichever is longer	≥ 20% within 20 yrs or 5 generations, whichever is longer.	≥ 10% within 100 yrs

Recommendations for Intensive Management and Research Actions.

For all taxa, recommendations were generated for the kinds of intensive action necessary, both in terms of management and research, that were felt to be necessary for conservation. These recommendations, summarized in Table 7, were: Population and Habitat Viability Assessment (PHVA) workshops; wild management and research; and captive programs. PHVA workshops provide a means of assembling available detailed biological information on the respective taxa, evaluating the threats to their habitat, development of management scenarios with immediate and 100-year time-scales, and the formulation of specific adaptive management plans with the aid of simulation models. In many cases, workshop participants determined that the current level of information for a taxa was not adequate for conduction of a PHVA; in those cases, recommendations are listed as "PHVA Pending."

Workshop participants attempted to develop an integrated approach to management and research actions needed for the conservation of Costa Rican taxa. In all cases, an attempt was made to make management and research recommendations based on the various levels of threat impinging on the taxa. For the purposes of the CAMP process, threats were defined as "immediate or predicted events that are or may cause significant population declines."

With only partial understanding of underlying causes for decline in some taxa, it was sometimes difficult to clearly define specific management actions needed for the conservation. Therefore, "research management" must become a component of conservation and recovery activities. Research management can be defined as a management program which includes a strong feedback between management activities and an evaluation of the efficacy of the management, as well as response of the threatened taxa to that activity. Seven basic categories of research management activities were identified: survey (e.g., search and find); monitoring; translocation; taxonomic research or clarification; management of limiting factors; limiting factors research; and life history research. The frequent need for survey information to evaluate population status, especially for those taxa listed as Critical, emphasizes the need to quickly implement intensive survey methodologies. Research management recommendations are summarized in Table 3.

Table 3. Research management recommendations for Costa Rican endemic vertebrate taxa.

IUCN Category	PHVA		SURVEY	MONITR	LIFE HIST. RESRCH	LIMITING FACTORS RESRCH	LIMITING FACTORS MGMT	Husbandry	TAXON RESRCH
Endangered	1								
Con Depend			1	1	1				1
Low Risk				1					
Data Defic.	30		78	79	42	54	23	2	61
TOTAL									

Table 4. Research management recommendations for Costa Rican endemic Butterfly taxa.

IUCN Category	PHVA	Survey	Monitor	Husband	Life History	Habitat Managemt
Endangered	3	3	3	3	3	3
Vulnerable						
Low Risk	11	11	11	11	11	11
Data Defic.						
TOTAL	14	14	14	14	14	14

Captive Program Recommendations.

For a few of the Costa Rican taxa, it was determined that a captive component would be necessary to contribute to the maintenance of long-term viable populations. It is proposed that, when captive populations can assist species conservation, captive and wild populations should be intensively and interactively managed with interchanges of animals occurring as needed and as feasible. There may be problems with interchange between captive and wild populations with regard to disease, logistics, and financial limitations.

Today, as more and more species are threatened with population declines, cooperative recovery programs, including both zoos and the private sector, may provide a major avenue for survival. This cooperation must include support for field research, habitat conservation, as well as public education.

When *ex situ* management was recommended, the "level" of captive program was also suggested, reflecting status, prospects in the wild, and taxonomic distinctiveness. The captive levels used during the CAMP are defined below.

> **Level 1 (1)** - A captive population is recommended as a component of a conservation program. This program has a tentative goal of developing and managing a population sufficient to preserve 90% of the genetic diversity of a population for 100 years (90%/100). The program should be further defined with a species management plan encompassing the wild and captive populations and implemented immediately with available stock in captivity. If the current stock is insufficient to meet program goals, a species management plan should be developed to specify the need for additional founder stock. If no stock is present in captivity then the program should be developed in collaboration with appropriate wildlife agencies, SSC Specialist Groups, and cooperating institutions.

Level 2 (2) - Similar to the above except a species/subspecies management plan would include periodic reinforcement of captive population with new genetic material from the wild. The levels and amount of genetic exchange needed should be defined in terms of the program goals, a population model, and species management plan. It is anticipated that periodic supplementation with new genetic material will allow management of a smaller captive population. The time period for implementation of a Level 2 program will depend on recommendations made at the CAMP workshop.

Level 3 (3) - A captive program is not currently recommended as a demographic or genetic contribution to the conservation of the species/subspecies but is recommended for education, research, or husbandry.

Other captive recommendations include:

No (N) - A captive program is not currently recommended as a demographic or genetic contribution to the conservation of the species/subspecies. Taxa already held in captivity may be included in this category. In this case species/subspecies shod be evaluated either for management toward a decrease in numbers or for complete elimination from captive programs as part of a strategy to accommodate as many species/subspecies as possible of higher conservation priority as identified in the CAMP or in SSC Action Plans.

Pending (P) - A decision on a captive program will depend upon further data either from a PHVA, a survey, or existing identified sources to be queried.

During the CAMP workshop, all taxa were evaluated relative to their current need for captive propagation. Recommendations were based upon a number of variables, including: immediate need for conservation (population size, draft IUCN Red List status, population trend, type of captive propagation program), need for or suitability as a surrogate species, current captive populations, and determination of difficulty as mentioned above. Based on all of the above considerations, recommendations for captive programs were made. These recommendations, by IUCN category of threat, are presented in Table 8.

Table 5. Captive program recommendations for Costa Rican Taxa by IUCN threat category.

IUCN Category	Level 1	Level 2	Level 3	Pending	No
Endangered	3				
Vulnerable					
Low Risk		12			6
Data Deficient				83	
TOTAL	3	12		83	6

The Review Process For CAMPS

The results of the initial CAMP workshops are reviewed: 1) by distribution of a preliminary draft to workshop participants; 2) by distribution of a subsequent draft for comment by 100-200 field biologists and wildlife managers and to regional captive programs worldwide; 3) at regional review sessions at various CBSG meetings and workshops, utilizing local expertise with the taxonomic group in question. Thus CAMP workshops are not single events although sometimes they are singular events. Instead, they are part of a continuing and evolving process of developing conservation and recovery plans for the taxa involved. The CAMP review process allows extraction of information from experts worldwide. CAMPs are continuously evolving as new information becomes available and as global and regional situations and priorities shift. In nearly all cases, follow-up workshops will be required to consider particular issues in greater depth or on a regional basis. Moreover, some form of follow-up always will be necessary to monitor the implementation and effectiveness of the recommendation resulting from the workshop. In many cases a range of PHVA workshops will result from the CAMP workshops. CAMPs have often served as the first step in the development of SSC Action Plans.

The CBSG is keenly aware of the limitations of developing a CAMP document with limited input from biologists worldwide. Because of its design, the CAMP process is one that cannot be achieved with a large delegation. CAMP processes are begun with the intent that the resulting documents will be a first cut at defining the scope of the problem facing a taxon or region. It is unlikely that all the information for a particular taxon or region will be available unless an Action Plan has already been prepared. One value of the CAMP process is that it allows definition of where there are uncertainties or a total lack of data. As such, this process provides a baseline document which will be edited, altered, and improved by distribution for review to a broader community than the workshop participants.

The review process for the Costa Rica CAMP is just beginning; all members of the appropriate SSC Specialist Groups will receive copies of the draft document for their review and comment in the near future, after the participants in the workshop have had an opportunity to more closely review the first draft document. Comments by the rest of the Specialist Groups on the draft will be incorporated into subsequent versions.

CAMPs are "living" documents that will be continually reassessed and revised based upon new information and shifting needs. The current CAMP process will continue both by its application to new groups of taxa and the refinement of the ones already under way. Over the next five years it is intended to initiate the CAMP process for all terrestrial vertebrate groups (the so-called tetrapods) and for selected fish groups. More than 25 CAMPs have already been carried out for a wide spectrum of the vertebrates: boid and pythonid snakes; varanid and iguanid lizards; penguins; waterfowl; megapodes; quail, partridges and francolins; pheasants; pigeons and doves; cranes; parrots; hornbills; marsupials; primates; canids and hyenas; procyonids; mustelids; viverrids; felids; cervids; antelope; and Caprinae. Several regional CAMPs have also been conducted: Hawaiian forest birds; Guatemalan endemics; and St. Helena Island endemics. These CAMP reports are available from the CBSG Office.

The CAMP process is central to establishment of global priorities for intensive conservation action. CAMPs provide a global framework for intensive management in the wild for captivity. Wildlife agencies and regional captive breeding programs can use the CAMPs as guides as they develop their own action plans. It is the intent that this process, as well as CBSG's other programs, will ultimately contribute to the wise worldwide use of limited resources for species conservation.

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TALLER DE EVALUACION DE CONSERVACION Y PLAN DE MANEJO PARA LAS ESPECIES ENDEMICAS DE COSTA RICA

CONSERVATION ASSESSMENT AND MANAGMENT PLAN (CAMP) WORKSHOP FOR COSTA RICAN ENDEMICS

REPORT

Sección 3

Spreadsheets Para Las Endemicas de Costa Rica

Endemic Vertebrate and Butterfly CAMP Spreadsheets

ENDEMIC VERTEBRATES AND BUTTERFLIES OF COSTA RICA
CAMP SPREADSHEETS

	TAXON		WILD POPULATION									CAPTIVE POP		
	SCIENTIFIC NAME		RANGE	EST#	DQ	SUB POP	TRND	AREA	NEW IUCN	THRTS	PHVA	RSCH MGT	REC	DIF	NUM
	MAMMALIA														
	Insectivora														
	Soricidae														
1	Cryptotis	jacksoni	Macizo, Irazú	<500	2/3	?	?	A	DD	I, L, Ps, Sv	N	T, S, M, H	N	3	0
	Chiroptera														
	Phyllostomidae														
2	Sturnira	mordax	Costa Rica, Panama	?	2/3	?	?	C	DD	L, Ps	N	S,M,H	N	3	0
	Primates														
	Cebidae														
3	Saimiri	oerstedi citrinellus	Pacific Central	<500	1		D	AA	En	G,Ht,I,L, Pl,Ps,T	Yes			2	3
	Carnivora														
	Procyonidae														
4	Bassaricyon	lasius	Estrella de Cartago (known only from type locality)	?	?	?	?	?	DD	Ht,I	N	T,Lh	N	3	0
	Rodentia														
	Geomyidae														
5	Orthogeomys	cherriei	Noreste y sureste y Nicaragua	>1000	2/4	F	I	B	LR	I	N	M	N		0
6	Orthogeomys	heterodus	C Costa Rica	?	4/2	F	?	A	LR	I	N				0
7	Orthogeomys	underwoodi	C Pacific coast												
8	Oryzomys	zphrastus	N. Cord. Talamanca	?	3	?	?	A	DD	Sf	N	S,M,Lh	?	?	0
9	Scotinomys	xerampelinus	Cords. Volc. Central y Talamanca	?	2	F	?	A	DD	Sf	N	S,M,Lh	?	?	0

	TAXON		WILD POPULATION										CAPTIVE POP		
	SCIENTIFIC NAME		RANGE	EST#	DQ	SUB POP	TRND	AREA	NEW IUCN	THRTS	PHVA	RSCH MGT	REC	DIF	NUM
	Heteromyidae														
10	Heteromys	oresterus	Talamanca Range												
	Muridae														
11	Reithrodontomys	rodriguezi	Volcan de Irazu, Cartago Prov.												
12	Syntheosciurus	brochus porsensis	Cordillera Volc Central y Talamanca y Cerro Pando	>1000 <10,000	1/2	F	?	A	CD	I,Sf	N	T,S,M, Lh	N	2	0
	Lagomorpha														
	Leporidae														
13	Sylvilagus	dicei	Costa Rica, Panama	?	2	?	?	A	DD	Hf,Sf	N	T,S, M,Lh	N	3	0
	AVES														
	Cuculiformes														
	Cuculidae														
14* See foot note	Coccyzus	ferrugineus	Cocos Is.	C Pe - Ex		?	?	24 km	DD	C,D,G,IIc ,Ice,IILt,P ,PePs,Pu	Yes	Lh,M, T,M	-	-	0
	Apodiformes														
	Trochilidae														
15*	Amazilia	boucardi	Pacific coast from Golfo de Nicoya S to Golfo Dulce	C Pr Ex Ex		F	D	?	DD	C,D,G,IIc ,Ice,IILt,P ,PePs,Pu	Yes	Lh,M, T, Lm	-	-	0
16*	Elvira	cupreiceps	Cordillera de Guanacaste to N Reventazon valley	C Pe - A		F	D	?	DD	C,D,G,IIc ,Ice,IILt,P ,PePs,Pu	Yes	Lh,M, T, Lm	-	-	0
17*	Lampornis	cinereicauda	Cordillera de Talamanca S about to border with Panama	C Pe - -		?	?	?	DD	C,D,G,IIc ,Ice,IILt,P ,PePs,Pu	Yes	Lh,M, T, Lm	-	-	0

	TAXON		WILD POPULATION										CAPTIVE POP		
	SCIENTIFIC NAME		RANGE	EST#	DQ	SUB POP	TRND	AREA	NEW IUCN	THRTS	PHVA	RSCH MGT	REC	DIF	NUM
	Passeriformes														
	Tyrannidae														
18*	Nesotriccus	ridgwayi	Cocos Is.	C Pr - Ex		?	?	24 km	DD	C,D,G,IIc ,Ice,IILt,P ,PePs,Pu	Yes	Lh,M, T, Lm	-	-	0
	Thraupidae														
19*	Habia	atrimaxillaris	Golfo Dulce lowlands	C/E Ex Ex Ex		F	D	?	DD	C,D,G,IIc ,Ice,IILt,P ,PePs,Pu	Yes	Lh,M, T, Lm	-	-	0
	Emberizidae														
20*	Pinaroloxias	inornata	Cocos Is.	A Pr - Ex		?	?	24 km	DD	C,D,G,IIc ,Ice,IILt,P ,PePs,Pu	Yes	Lh,M, T, Lm	-	-	0
	REPTILIA														
	Squamata Lacertilia														
	Anguidae														
21	Celestus	cyanochloris	C, NE, & T	?	?	?	?	?	DD	L	No	T, S, M, Lm	?	?	0
	Gekkonidae														
22	Sphaerodactylus	pacificus	Cocos Is.	?	?	?	?	?	DD	L	No	T, S, M, Lm	?	?	0
	Iguanidae														
23	Norops	altae	C, SW, & T	?	?	?	?	?	DD	L	No	T, S, M, Lm	?	?	0
24	Norops	pachypus	C & T	?	?	?	?	?	DD	L	No	T, S, M, Lm	?	?	0
25	Norops	polylepis	SW	?	?	?	?	?	DD	L	No	T, S, M, Lm	?	?	0
26	Norops	townsendi	Cocos Is.	?	?	?	?	?	DD	L	No	T, S, M, Lm	?	?	0

	TAXON		WILD POPULATION										CAPTIVE POP		
	SCIENTIFIC NAME		RANGE	EST#	DQ	SUB POP	TRND	AREA	NEW IUCN	THRTS	PHVA	RSCH MGT	REC	DIF	NUM
27	Norops	tropidolepis	C & T	?	?	?	?	?	DD	L	No	T, S, M, Lm	?	?	0
	Teiidae														
28	Neusticurus	apodemus	SW: San Isidro del General, San Jose	?	?	?	?	?	DD	L	No	T, S, M, Lm	?	?	0
29	Ptychoglossus	plicatus	NE, SE, & SW	?	?	?	?	?	DD	L	No	T, S, M, Lm	?	?	0
	Squamata Serpentes														
	Colubridae														
30	Geophis	downsi	SW: Cordillera Costena	?	?	?	?	?	DD	L	No	T, S, M, Lm	?	?	0
31	Geophis	ruthveni	NE	?	?	?	?	?	DD	L	No	T, S, M, Lm	?	?	0
32	Geophis	zeledoni	C: Volcan Poas	?	?	?	?	?	DD	L	No	T, S, M, Lm	?	?	0
33	Leptodeira	rubricata	SW	?	?	?	?	?	DD	L	No	T, S, M, Lm	?	?	0
34	Rhadinaea	serperaster	C & NE	?	?	?	?	?	DD	L	No	T, S, M, Lm	?	?	0
35	Sibon	argus	NW & SW	?	?	?	?	?	DD	L	No	T, S, M, Lm	?	?	0
36	Trimetopon	gracile	C, NE, & T	?	?	?	?	?	DD	L	No	T, S, M, Lm	?	?	0
37	Trimetopon	pliolepis	NE, NW, & SW	?	?	?	?	?	DD	L	No	T, S, M, Lm	?	?	0
38	Trimetopon	simile	NE: Siquirres	?	?	?	?	?	DD	L	No	T, S, M, Lm	?	?	0
39	Trimetopon	viquezi	NE: Siquirres	?	?	?	?	?	DD	L	No	T, S, M, Lm	?	?	0
40	Urotheca	myersi	Canton Perez-Zeledon, San Jose Prov. (Cordillera de Talamanca)	?	?	?	?	?	DD	L	No	S,T, M, Lh	?	?	0

	TAXON		WILD POPULATION										CAPTIVE POP		
	SCIENTIFIC NAME		RANGE	EST#	DQ	SUB POP	TRND	AREA	NEW IUCN	THRTS	PHVA	RSCH MGT	REC	DIF	NUM
	AMPHIBIA														
	Anura														
	Bufonidae														
41	Atelopus	senex	C & T: Volcanica & Cordillera de Talamanca	?	?	?	?	?	DD	L	No	S,T, M,Lh	?	?	0
42	Bufo	holdridgei	C: Cordillera Central (Cerro Chompipe)	?	?	?	?	?	DD	L	No	S,T, M,Lh	?	?	0
43	Bufo	melanochloris	NE, SE, & SW, M.V	?	?	?	?	?	DD	L	No	S,T, M,Lh	?	?	0
44	Bufo	periglenes	C: Cordillera de Tilaran, M.V.	?	1	?	D	A-	DD	L	No	S,T, M,Lh	?	?	0
	Centrolenidae														
45	Centrolenella	talamancae	NE: Cartago Prov.	?	?	?	?	?	DD	L	No	S,T, M,Lh	?	?	0
	Dendrobatidae														
46	Dendrobates	granuliferus	SW: Golfo Dulce region	?	4	?	S	A	DD	L	No	S,T, M,Lh	?	?	0
47	Phyllobates	vitattus	SW: Golfo Dulce region	?	?	?	?	?	DD	L	No	S,T, M,Lh	?	?	0
	Hylidae														
48	Hyla	pictipes	C & T	?	?	?	?	?	DD	L	No	S,T, M,Lh	?	?	0
49	Hyla	rufioculus	C, NE, SW, & T	?	?	?	?	?	DD	L	No	S,T, M,Lh	?	?	0
50	Hyla	xanthosticta	C: Volcan Barba, Heredia	?	?	?	?	?	DD	L	No	S,T, M,Lh	?	?	0
51	Agalychnis	annae	C, NE, NW, SE, & T	?	?	?	?	?	DD	L	No	S,T, M,Lh	?	?	0
	Leptodactylidae														

	TAXON		WILD POPULATION										CAPTIVE POP		
	SCIENTIFIC NAME		RANGE	EST#	DQ	SUB POP	TRND	AREA	NEW IUCN	THRTS	PHVA	RSCH MGT	REC	DIF	NUM
52	Eleutherodactylus	altae	C: M. Vede	?	?	?	?	?	DD	L	No	S,T, M,Lh	?	?	0
53	Eleutherodactylus	angelicus	C: Cordillera de Tilaran & Volcan Poas, M.V.	?	?	?	?	?	DD	L	No	S,T, M,Lh	?	?	0
54	Eleutherodactylus	cuaquero	C: Cordillera de Tilaran, Puntarenas	?	?	?	?	?	DD	L	No	S,T, M,Lh	?	?	0
55	Eleutherodactylus	escoces	C: Barba, Irazu, & Turrialba	?	?	?	?	?	DD	L	No	S,T, M,Lh	?	?	0
56	Eleutherodactylus	hylaeformis	C & T: mountains, M.V.	?	?	?	S	?	DD	L	No	S,T, M,Lh	?	?	0
	Caudata														
	Plethodontidae														
57	Bolitoglossa	alvaradoi	NE: Limon, Cartago, & Alajuela	?	?	?	?	?	DD	L	No	S,T, M,Lh	?	?	0
58	Bolitoglossa	arborescandens	C & NE	?	?	?	?	?	DD	L	No	S,T, M,Lh	?	?	0
59	Bolitoglossa	cerroensis	T: Cartago & San Jose	?	?	?	?	?	DD	L	No	S,T, M,Lh	?	?	0
60	Bolitoglossa	diminuta	NE: near Tapanti, Cartago	?	?	?	?	?	DD	L	No	S,T, M,Lh	?	?	0
61	Bolitoglossa	epimela	NE: Cartago	?	?	?	?	?	DD	L	No	S,T, M,Lh	?	?	0
62	Bolitoglossa	gracilis	NE: near Tapanti, Cartago	?	?	?	?	?	DD	L	No	S,T, M,Lh	?	?	0
63	Bolitoglossa	sooyorum	T: near El Empalme, Cartago	?	?	?	?	?	DD	L	No	S,T, M,Lh	?	?	0
64	Nototriton	picadoi	C & T	?	?	?	?	?	DD	L	No	S,T, M,Lh	?	?	0
65	Nototriton	richardi	C: Volcan Poas & San Jose Prov.	?	?	?	?	?	DD	L	No	S,T, M,Lh	?	?	0
66	Oedipina	altura	T: Cordillera de Talamanca, Cartago	?	?	?	?	?	DD	L	No	S,T, M,Lh	?	?	0

	TAXON		WILD POPULATION										CAPTIVE POP		
	SCIENTIFIC NAME		RANGE	EST#	DQ	SUB POP	TRND	AREA	NEW IUCN	THRTS	PHVA	RSCH MGT	REC	DIF	NUM
67	Oedipina	carablanca	NE: Los Diamontes, Limon	?	?	?	?	?	DD	L	No	S,T, M,Lh	?	?	0
68	Oedipina	paucidentata	T: Cordillera de Talamanca, Cartago	?	?	?	?	?	DD	L	No	S,T, M,Lh	?	?	0
69	Oedipina	poelzi	C & SE	?	?	?	?	?	DD	L	No	S,T, M,Lh	?	?	0
	Gymnophiona														
	Caeciliidae														
70	Oscaecilia	osae	Peninsula de Osa	?	?	?	?	?	DD	L	No	S,T, M,Lh	?	?	0
	OSTEICHTHYES														
	Atheriniformes														
	Cyprinodontidae														
71	Rivulus	fuscolineatus	CR	?	2/4	F	?	?	DD	C, Pu, Ps, Ice	Y	S, M, Lm, Lr	?	?	?
72	Rivulus	glaucus	CR, Pacifico Sur	?	2/4	F	?	?	DD	C, Pu, Ps, Ice	Y	S, M, Lm, Lr	?	?	?
73	Rivulus	uroflammeus	CR, Pacifico	?	2/4	F	?	?	DD	C, Pu, Ps, Ice	Y	S, M, Lm, Lr	?	?	?
	Poeciliidae														
74	Brachyrhaphis	holdridgei	Atlantic slope	?	2/4	F	?	?	DD	C, Pu, Ps, Ice	Y	S, M, Lm, Lr	?	?	?
75	Brachyrhaphis	rhabdophora	Atlantic & Pacific slopes	?	2/4	F	?	?	DD	C, Pu, Ps, Ice	Y	S, M, Lm, Lr	?	?	?
76	Brachyrhaphis	parismina	Atlantic slope	?	2/4	F	?	?	DD	C, Pu, Ps, Ice	Y	S, M, Lm, Lr	?	?	?
77	Priapichthys	annectens	Atlantic & Pacific slopes	?	2/4	F	?	?	DD	C, Pu, Ps, Ice	Y	S, M, Lm, Lr	?	?	?
78	Poeciliopsis	paucimaculata	Pacific slope, Sur	?	2/4	F	?	?	DD	C, Pu, Ps, Ice	Y	S, M, Lm, Lr	?	?	?

	TAXON		WILD POPULATION										CAPTIVE POP		
	SCIENTIFIC NAME		RANGE	EST#	DQ	SUB POP	TRND	AREA	NEW IUCN	THRTS	PHVA	RSCH MGT	REC	DIF	NUM
79	Phallichthys	quadripunctatus	Sixaola River, Limon Province	?	2/4	F	?	?	DD	C, Pu, Ps, Ice	Y	S, M, Lm, Lr	?	?	?
80	Phallichthys	tico	Atlantic slope: Rio San Juan basin	?	2/4	F	?	?	DD	C, Pu, Ps, Ice	Y	S, M, Lm, Lr	?	?	?
	Cypriniformes														
	Characidae														
81	Cheirodon	terrabae	Pacific slope: Rio Grande de Terraba basin	?	2/4	F	?	?	DD	C, Pu, Ps, Ice	Y	S, M, Lm, Lr	?	?	?
82	Hyphessobrycon	savagei	Pacific slope: Rio Grande de Terraba basin	?	2/4	F	?	?	DD	C, Pu, Ps, Ice	Y	S, M, Lm, Lr	?	?	?
83	Pterobrycon	myrnae	S Pacific slope	?	2/4	F	?	?	DD	C, Pu, Ps, Ice	Y	S, M, Lm, Lr	?	?	?
84	Roeboides	ilseae	SE: Pacific slope	?	2/4	F	?	?	DD	C, Pu, Ps, Ice	Y	S, M, Lm, Lr	?	?	?
85	Bryconomenicus	tenabensis	Rio terraba	?	2/4	F	?	?	DD	C, Pu, Ps, Ice	Y	S, M, Lm, Lr	?	?	?
	Lebiasinidae														
86	Piabucina	boruca	Pacific slope: Rio Grande de Terraba & Rio Coto basins	?	2/4	F	?	?	DD	C, Pu, Ps, Ice	Y	S, M, Lm, Lr	?	?	?
	Gobiesociformes														
	Gobiesocidae														
87	Gobiesox	potamius	Pacific slope rivers	?	2/4	F	?	?	DD	C, Pu, Ps, Ice	Y	S, M, Lm, Lr	?	?	?
	Perciformes														
	Cichlidae														
88	Cichlosoma	diquis	S Pacific slope: Punta Mala to Rio Coto drainage	?	2/4	F	?	?	DD	C, Pu, Ps, Ice	Y	S, M, Lm, Lr	?	?	?

	TAXON		WILD POPULATION										CAPTIVE POP		
	SCIENTIFIC NAME		RANGE	EST#	DQ	SUB POP	TRND	AREA	NEW IUCN	THRTS	PHVA	RSCH MGT	REC	DIF	NUM
89	Cichlosoma	lyonsi	Pacific slope: tributary to Rio Coto (Puntarenas prov.)	?	2/4	F	?	?	DD	C, Pu, Ps, Ice	Y	S, M, Lm, Lr	?	?	?
90	Cichlasoma	rhytisma	Rio Sixaola drainage	?	2/4	F	?	?	DD	C, Pu, Ps, Ice	Y	S, M, Lm, Lr	?	?	?
91	Cichlosoma	sajica	S Pacific slope: Punta Mala to Rio Esquinas basin	?	2/4	F	?	?	DD	C, Pu, Ps, Ice	Y	S, M, Lm, Lr	?	?	?
	Gobiidae														
92	Sicydium	altum	Atlantic slope	?	2/4	F	?	?	DD	C, Pu, Ps, Ice	Y	S, M, Lm, Lr	?	?	?
	Siluriformes														
	Pimelodidae														
93	Nannorhamdia	lineata	Pacific slope: Puntarenas prov.	?	2/4	F	?	?	DD	C, Pu, Ps, Ice	Y	S, M, Lm, Lr	?	?	?
	INSECTA														
	Lepidoptera														
	Nymphalidae														
94	Memphis	lankesteri	Cartago, SW Meseta Central (1000-1500 m)	Escasa	2	F	D?	AA-3	Vu En?	I, Lf, L, Pu	Y	M, Hm, S, Lh, H	1	1	0
95	Dynamine	hecuba	Atlantic slope (200-900 m) Carrillo	Poco común	2	NF	S?	AA-2	LR	Pu, I	N	M, S, Lh, H	2	1	0
96	Perisama	barnesi	Atlantic slope (300-1000 m) Carrillo	Rara	2	NF	S?	AA-2	LR	Pu, I	N	M, Hm, S, Lh, H	2	1	0
97	Adelpha	stilesiana	Atlantic slope (800-1100 m) Carrillo	Rara	2	NF	S?	AA-2	LR	Pu, I	N	M, Hm, S, Lh, H	2	1	0

	TAXON		WILD POPULATION										CAPTIVE POP		
	SCIENTIFIC NAME		RANGE	EST#	DQ	SUB POP	TRND	AREA	NEW IUCN	THRTS	PHVA	RSCH MGT	REC	DIF	NUM
98	Anthanassa	dora	Volcan Poas, Volcan Irazu, & Cordillera de Talamanca (> 2800 m)	Rara	2	NF	S?	AA-3	LR	Sv, Sf	N	M, Hm, S, Lh, H	2	1	0
99	Eresia	sticta	Atlantic slope in association with Carrillo Belt (100-800 m)	Rara	2	NF	S?	AA-2	LR	Pu, I	N	M, Hm, S, Lh, H	2	1	0
100	Eresia	nigripennis	Atlantic slope of Cordillera Central (500-1000 m) & possibly Panama	Poco común	2	NF	S?	AA-2	LR	Pu, I	N	M, Hm, S, Lh, H	2	1	0
101	Castilia	fulgora	Atlantic slope of Cordillera Central (700-1600 m)	Rara	2	NF	S?	AA-2	LR	Pu, I	N	M, Hm, S, Lh, H	2	1	0
102	Cyllopsis	rogersi	Atlantic & Pacific slopes (1000-2300 m) & perhaps Panama	Poco común	2	NF-A F-Pa	S?	AA-2	NE LR	L, Lf, I	N	M, H	2	1	0
103	Cissia	joycae	known from two specimens, one from Finca La Selva	Rara	3	?	?	?	En?	?	Y	M, Hm, S, Lh, H	1	3	0
104	Cissia	drymo	Atlantic slope: Guapiles (known from two specimens)	Rara	2	NF	S?	AA-2	LR	Pu, I	N	M, Hm, S, Lh, H	2	2	0
105	Cissia	agnata	Atlantic slope (100-400 m)	Rara	2	NF	S?	AA-2	LR	Pu, I	N	M, Hm, S, Lh, H	2	2	0
106	Cissia	gomezi	known from four specimens including one from Osa Peninsula	Rara	3	?	?	?	En?	?	Y	M, Hm, S, Lh, H	1	3	0
107	Lymanopoda	euopis	Atlantic & Pacific slopes (2000-3000 m)	Poco común	2	NF-A F-Pa	S?	AA-2	NE LR	L, Lf, I	N	M, H	2	1	0

* Footnote for Aves species entries (8 - 13) in Est# column. Four references were used as sources in the order given for the entries in the cells: 1) Stiles, et al. 1989; 2) Reglamento de la Ley de Vida Silvestre. Art. 63 1993; 3) Estudio de Biodiversidad, San Jose, Costa Rica 208 pages, 1992; 4) INBIO, Base de datos 1994. The abbreviations used are: PR = Población reducida o amenahada; A = Abundante; PE = Población Estable; E = Escasa; C = Comun; Ex = Especie en peligro de extinción; - = No aplica.

Synonyms and Non-endemic Species Removed From Original List

TAXON		WILD POPULATION										CAPTIVE PROGRAM		
SCIENTIFIC NAME		RANGE	EST#	DQ	SUB POP	TRND	AREA	NEW IUCN	THRTS	PHVA	RSCH MGMT	REC	DIFF	NUM
Norops	curtus= invalid	Costa Rica (a synonym of Norops tropidolepis)												
Norops	godmani= invalid	Mountains (a synonym of Norops limifrons)												
Astyanax	regani= fasciatus Bussing-1985	Pacific slope												
Cichlosoma= No report	loisellei	Atlantic slope: San Miguel River, Limon prov.	?	?	?	?	?	?	Y	?	?	?	?	
Cichlosoma= No report	spilotum	Atlantic slope	?	?	?	?	?	??	Y	?	?	?	?	
Cichlosoma= Not endemic	tuba	Atlantic slope, Nicaragua, Panama												
Rhamdia	alfaroi= nicaraguansi	Pacific slope: Escobal												
Rhamdia	heteracantha= guatemalensi	Atlantic & Pacific slopes												
Rhamdia	nasuta= guatamalensi	Atlantic & Pacific slopes												

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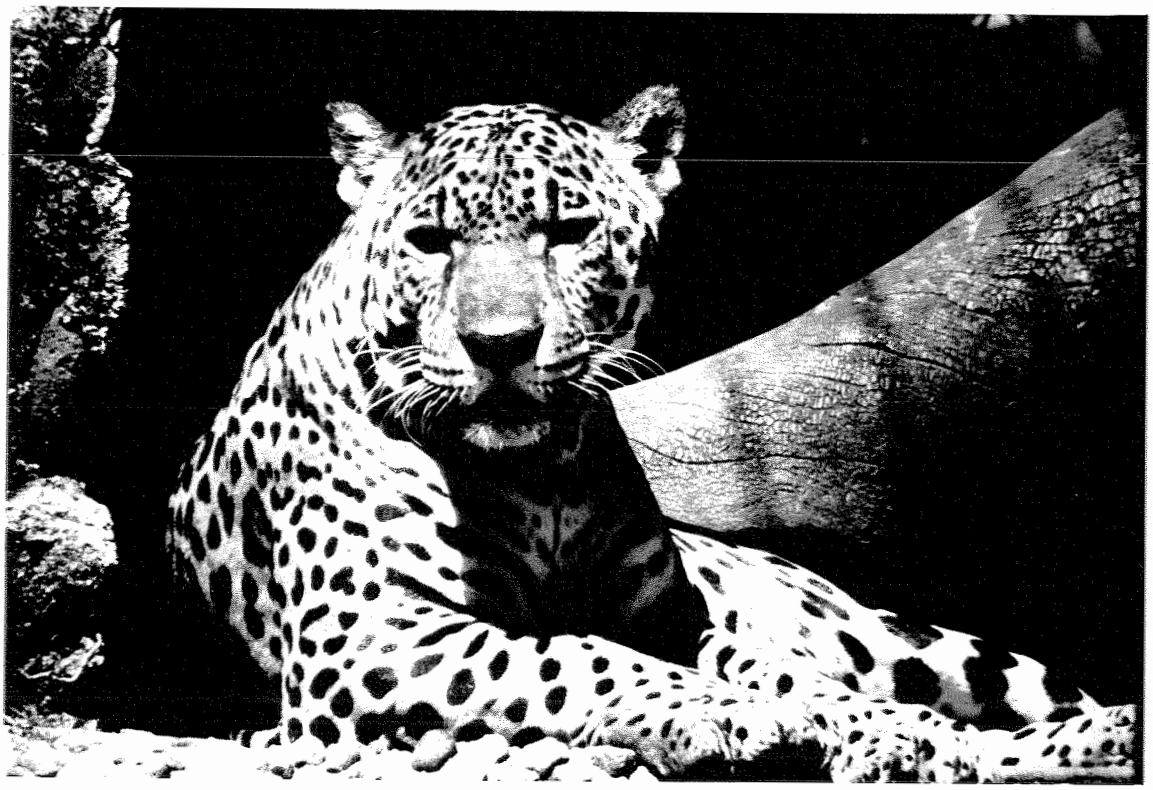

Sección 4

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Sección 5

IUCN Documents

Note by the Director General on Guidelines for the Ecological Sustainability of Nonconsumptive and Consumptive Uses of Wild Species

1. Recommendation 18.24 adopted unanimously by the General Assembly of IUCN at its 18th Session (Perth, Australia, December 1990) recognized that uses of wild species may be nonconsumptive or consumptive. It noted that some countries successfully conserve many wild species without using them consumptively, and that in many other countries the use of wild species is necessary for the well-being of their people. It requested the Director General:

"...to coordinate IUCN programme activities, in consultation with the Species Survival Commission and in collaboration with IUCN members, to:

"a. Develop guidelines [for sustainable use] based on scientific, socio-economic, and traditional knowledge, the principle of equitable allocation of resources and distribution of benefits, and on other criteria recommended by the Workshop on Sustainable Utilization of Wildlife, for consideration by the Council;

"b. work to achieve the agreement of IUCN members to endorse and implement those guidelines;

"c. undertake or sponsor field projects to research and test factors needed to ensure successful sustainable use of wildlife;

"d. review as appropriate existing programmes and practices involving the use of wildlife and recommend modifications necessary in order to conform with the IUCN guidelines".

2. The guidelines at Annex 1 have been prepared in response to that mandate and the target set by ***Caring for the Earth***[1] for all countries to adopt guidelines for sustainable use of wild species by the year 2000.

3. Drafts of the guidelines were prepared by the IUCN/SSC Specialist Group on Sustainable Use of Wild Species (Co-Chairs, Christine and Robert Prescott-Allen) and the IUCN Sustainable Use of Wildlife Programme (Director, Stephen Edwards). Drafts were reviewed by a workshop, held, 17-20 February 1992, in conjunction with the IVth World Parks Congress (Caracas, Venezuela, 10-21 February 1992), by several hundred reviewers throughout the IUCN network, and by the Steering Committee of the Species Survival Commission. The final draft of the Guidelines was revised and agreed by the IUCN Council on 28 May 1993 for submission by the Director General to the 19th Session of the General Assembly. It will be considered by the General Assembly Workshop on Sustainable Use of Living Natural Resources, and then laid before the plenary for adoption. A draft Resolution of the General Assembly is attached at Annex 2 as a basis for the latter's decision.

[1] IUCN/UNEP/WWF. 1991. *Caring for the Earth: A Strategy for Sustainable Living*, p.179, Gland Switzerland

Introduction

1. People throughout the world use a great number of wild species, both consumptively and nonconsumptively, for food, medicine, clothing, shelter, fuel, fibre and income. Wild species also have cultural, religious, ritual, ceremonial, recreational, intellectual and aesthetic importance. They are economically significant in all countries and vital to the economic and cultural survival of many communities.

2. A fundamental aim of ***Caring for the Earth*** is to ensure the conservation of species and ecosystems for their intrinsic value and as a foundation for human development.

3. Protection of species, ecosystems and areas provides an important means by which wild species and biodiversity can be maintained.

4. Many species and their supporting ecosystems are under increasing human pressure. Unsustainable use depletes these resources, eventually resulting in loss of the species or populations, degradation of associated ecosystems, or both.

5. By contrast, sustainable use of wild species has the potential to provide both:

(a) Development benefits — assuring the long term supply of valuable resources to people, and enabling species and populations depleted by overuse to recover; and

(b) Conservation benefits — conserving not only the species concerned but also associated ecosystems and species.

6. If there is use of species and ecosystems, ensuring that it is sustainable is a basic principle of conservation and sustainable development, enunciated in many international and national policy documents.

7. However, understanding of sustainability has changed over the past 30 years; and "sustainable use" has been interpreted in a number of ways. In these guidelines, "sustainable use" means use that does not reduce the future use potential, or impair the long-term viability, of either the species being used or other species; and is compatible with maintenance of the long-term viability of supporting and dependent ecosystems. "Sustainability" may involve ecological, economic, and social factors, but in this document refers only to ecological sustainability.

8. The purpose of these guidelines is to provide a working definition of sustainable use, and guidance on how to increase the probability that a particular use is sustainable. The matter of probability must be stressed. It is much more difficult to demonstrate that a use is sustainable than it is to show that it does not endanger the species' survival. The intention is neither to condemn nor encourage uses of wild species, but to help ensure that any uses are likely to be sustainable. If wild species are used, then these guidelines should apply.

9. Respect for nature is fundamental to the concepts of sustainable use. It is recognized that ethical perceptions of uses and types of use vary among countries and cultures. Therefore, in certain cases ecologically sustainable uses may be precluded on ethical and other grounds.

10. It is recognized that nature does not exist exclusively for human use but that it has its own intrinsic value. Also, not all species should be regarded as being available for human use. Therefore, these guidelines are based on the ethical context outlined below:

(a) People should conduct their activities with respect for the viability of wild species and the integrity of natural systems.

(b) There should be recognition of individual and collective responsibility for the commons of nature.

(c) People should seek an equity of benefits among the present generation and between the present and future generations.

(d) People have a right to the resources needed for a decent standard of living, which may include deriving economic, scientific, aesthetic or other benefits from some wild species, provided they do so sustainably.

(e) People have the responsibility to ensure that their uses of wild species are sustainable and non-wasteful.

(f) People should protect wild animals from cruelty and avoidable suffering.

11. The guidelines cover any wild and semi-wild species that are used for human benefit; and all nonconsumptive and consumptive uses, including logging, fishing, hunting, capturing, trapping, gathering, and viewing. They do not address exotic populations,

feral populations, semi-domesticated populations or domesticated populations. (All these terms are defined in the Glossary.)

12. The guidelines provide Criteria and Requirements. The Criteria define conditions to be met if a use of a wild species is to be ecologically sustainable. A use that does not meet the Criteria is unlikely to be sustainable over the long term. The Requirements set out basic operational conditions necessary to fulfill the Criteria.

13. Together, the Criteria and Requirements are intended to guide policies, laws and administrative procedures aimed at ensuring that any uses of wild species are sustainable and that the affected species and their supporting ecosystems are conserved. They are intended to be used by governments, resource users, communities, businesses, conservation organizations, research institutions, development banks, aid agencies and others that share this aim.

14. Countries may have difficulty applying the guidelines. They may have to choose where first to apply the guidelines and do so progressively. Countries and organizations in a position to assist others to build the necessary management capacity should endeavour to do so, if requested.

15. More detailed provisions will be needed to guide the sustainable use of particular species and ecosystems under specific local conditions. The present Criteria and Requirements are designed as a framework within which such provisions may be developed.

16. IUCN will attempt to support these guidelines with more specific guides backed by case studies. These guides will apply to major categories of use such as hunting and trapping, logging, fishing, and nonconsumptive uses. The case studies will test the Criteria and Requirements and examine ways of implementing them. IUCN will also attempt to clarify the complex ethical issues arising from nonconsumptive and consumptive uses of wild species. IUCN will also supplement the suggestions given here for a legal framework for sustainable use.

17. These guidelines will be reviewed and revised periodically, as efforts to use wild species sustainably are evaluated and understanding of the subject improves. The first review will be within three years of adoption of the guidelines as IUCN policy by the IUCN General Assembly.

18. To promote the sustainability of uses of wild species, States and conservation organizations should disseminate these guidelines widely.

Criteria for Sustainable Use

19. A use of a wild species is likely to be sustainable if:

(a) It does not reduce the future use potential of the target population or impair its long-term viability;

(b) it is compatible with maintenance of the long-term viability of supporting and dependent ecosystems;

(c) it does not reduce the future use potential or impair the long-term viability of other species.

Interpretation of the Criteria

20. Long-term viability can be impaired by impacts on the target population's size, productivity, sex ratio, age structure, social behaviour, genetic diversity, or on components of its ecosystem. In many cases, some of these factors may vary from year to year. Use often affects such variation. This is acceptable as long as it is within the normal range of variation of the target population and ecosystem components concerned.

21. The use should be managed to ensure:

(a) No reduction of the future use potential of the target population. In the case of consumptive uses, both short-term and long-term harvest levels of the target population should be set with full regard for the precautionary principle (see paragraphs 50-52).

(b) Low risk. Risk of seriously depleting the target population should be negligible.

(c) Restoration. Uses of target populations that have been overused in the past should allow recovery of the population to a level consistent with the expected long-term capacity of the ecosystem (not necessarily its historical capacity). Where necessary, the ecosystem should be rehabilitated or restored to promote recovery of the population.

The relative importance of the above three elements will vary from case to case.

22. Loss of genetic diversity should be avoided by carefully monitoring and limiting harvests where the risk is greatest — in particular where harvesting:

(a) Concentrates on particular sex, age or size classes;

(b) includes geographically distinct or genetically well differentiated or rare populations;

(c) includes populations at the geographical, elevational (including depth in the case of marine species) or other locational extremes of a species' range; or

(d) includes endemic populations restricted to a small area.

23. The ecosystem components necessary for the survival of the target population may include habitats, predators, prey, pollinators, seed dispersers, and the structure and fertility of the soil. Natural events can change these components, as can human activities. It is important to be aware of such changes, including likely but unpredictable events such as hurricanes and drought, and to alter use levels in response to them. It is also important that use of the target population does not reduce the capacity of the habitat to support the species or other species within that habitat. It is recognized that the populations of non-target species may fluctuate in relation to use of the target species.

24. Impacts on associated ecosystems and other species are likely to be of most concern when:

(a) The use is not species-specific and incidental impacts are high;

(b) many other species depend on the target species; or

(c) the associated ecosystems or non-target species are rare, threatened, or economically or culturally important.

25. In the first case, impacts on the most sensitive species need to be specially considered. In the second case, the ecological role of the target species needs to be assessed and use levels adjusted to accommodate and maintain the integrity of the ecosystem and the viability of other species. In the third case, the main uses requiring careful assessment are: consumptive uses that involve high levels of incidental take or habitat alteration (such as logging, fishing, grazing of livestock on wild vegetation); and nonconsumptive use of wild species and ecosystems where visitor pressure is high.

Application of the Criteria

26. The Criteria are challenging and are not likely to be met immediately in many situations. There are large numbers of species used consumptively and nonconsumptively and considerable information may be needed to show that the Criteria have been met. It may take years to obtain this information in particular cases, and given limited personnel and financial resources, countries should follow the precautionary principle in controlling uses of wild species. However, where uses are clearly likely to have little impact, it is unreasonable to insist that they must demonstrate compliance with the Criteria or be stopped.

27. Accordingly, it is recommended that priority attention be paid to situations where the scale of use or the condition of the target population or its supporting ecosystems engenders concern about ecological sustainability. Uses should be made to conform with the Criteria before the use causes significant damage to the target population, associated ecosystems or other species. Adopting the precautionary principle, lack of information must not be used to justify continuing a potentially unsustainable use without efforts to gather the necessary information in a timely manner.

28. The sustainable use of migratory species often depends on adequate habitat maintenance in places far from the area of use. Making sure that the Criteria are met is especially difficult under these circumstances, and will require cooperation by managers and users in many jurisdictions (see also paragraph 46).

Requirements for Fulfilling the Criteria

29. These Requirements do not apply to uses whose impacts are obviously inconsequential.

30. The Requirements for making uses sustainable are:

(a) **Information** on the target population and its associated ecosystems, on current and proposed uses, and on social and economic factors affecting them.

(b) A **management system** that can respond rapidly to changing conditions or better information.

(c) A supportive and effective **legal framework**.

(d) **Social or economic incentives** for the people living with the target population or its supporting ecosystems to conserve them.

(e) Acceptance of the **precautionary principle** and **safeguards** to ensure the survival of wild species, populations and supporting ecosystems.

INFORMATION

Interpretation

31. Reliable information is needed to determine the long-term viability of the target population and its associated ecosystems under current and proposed conditions of use. Depending on the species, and on the type and level of use, such information may include:

(a) The size, structure and dynamics of the target population. This may include such factors as recruitment and natural mortality rates, age structure, size distribution, sex ratio, density, growth rates, age to maturity, dispersal and ranging behaviour, social behaviour, and genetic composition.

(b) Habitats or other ecosystem components necessary for the survival of the target population.

(c) The relationships between the target population and associated species and communities (such as predators, parasites, prey, seed dispersers, pollinators, epiphytes, competitors, disease organisms).

(d) Abiotic factors (such as climate and weather, fire, soil conditions, water quality) that might influence the status of the target population or its supporting ecosystems.

(e) Types of use (e.g., viewing, hunting, logging), levels of use (e.g., size of harvest, numbers of visitors, catch per unit of effort), manner of use (e.g., life stages used, locations and seasons of use), alternative uses that may be more sustainable.

(f) Social, cultural and economic factors affecting use, such as changes in markets or technology, elasticity of demand and supply, the degree to which markets can be manipulated, economic and property relations, power and authority relationships, and values and perceptions.

Application

32. Judgement is needed as to what constitutes adequate data. It would be impracticable to insist on comprehensive scientific information before any use can be sanctioned. However, the less information available, the lower the safe level of use. Sometimes, particular indicators of population or ecosystem health may be available. Monitoring systems, local or traditional knowledge, and scientific research are sources of information. In all cases, those managing use ought to be satisfied that they have enough knowledge to provide early warning of unsustainable trends.

33. For new uses, the minimum requirement is an estimate of the size and structure of the target population. In the case of a new consumptive use, a limited harvest programme using a range of harvest levels may be a suitable means of acquiring the information needed, if accompanied by a monitoring and evaluation programme.

34. For continuing uses it is essential to have a programme to monitor and evaluate appropriate indicators of use levels and the status of the target population. It is also necessary to monitor the status of habitats and the impact of the use on supporting ecosystems. In addition, it is important to identify any other information required to enable the use to meet the Criteria, and to implement a cost-effective system to obtain the information as quickly as possible.

35. Information required to determine the long-term viability of a population or ecosystem requires many years to assemble and verify, since several key variables (such as recruitment) can change naturally from year to year. Survey methods should be employed consistently to ensure that data are comparable from year to year.

MANAGEMENT SYSTEM

Interpretation

36. A management system is needed that is able to adapt and adjust uses in response to changes in the target population, its supporting ecosystems, and other affected species. Such a system recognizes that all the information needed to ensure sustainable use may not be available. It therefore sets use levels cautiously and adjusts them in response to monitoring and other sources of information.

37. In addition, management should take account of changes in demand for the target population as a result of changes in human population numbers, per capita resource consumption, or technologies. It should also take account of impacts of other human activities on the target population or its supporting ecosystems (such as pollution and habitat destruction).

Application

38. Management involves a partnership between managers and users or other beneficiaries of the use. Common arrangements include:

(a) Government (manager) for the people (users/beneficiaries).

(b) Community (manager) for community members (users/beneficiaries).

(c) Private landholder (manager) for him/herself and dependants (users/beneficiaries).

39. Effective management requires:

(a) Clear definition of rights and responsibilities with respect to the target population and its supporting ecosystems. This includes providing the users of the target population with legally established long-term rights and responsibilities in its management. The exclusivity, duration and other characteristics of the rights and responsibilities will vary with the nature of the target population and the resource ownership system. The closest possible linkage should be made between the benefits that users derive from wild species and their accountability for using them sustainably.

(b) Fair sharing of the costs and benefits of using wild species among the different managers and users. The benefits should be sufficient to cover the costs of management and provide an incentive for conservation of the species used and their supporting ecosystems.

(c) Exchanges of information on the status and trends of the target population and its supporting ecosystems, and on sustainable use practices and benefits, among all those involved in the use. This can be achieved through consultation, training (including on-site demonstration projects), formal and informal educational programmes, and extension services.

40. A resource management plan should help the manager make scientifically and economically sound decisions. It is especially important in any of the following cases:

(a) Target populations are declining.

(b) Consumptive uses are on a large or increasing scale, relative to the target population or its supporting ecosystem.

(c) Consumptive uses have a significant impact on supporting ecosystems or other species.

(d) Nonconsumptive uses have a significant impact on the target population, other species or supporting ecosystems. Significant impacts include, for example, frequent disturbance of animals, trampling of coral reefs, and erosion.

(e) Potential changes in land use or other conditions could have a significant impact on supporting ecosystems or the target or non-target species.

(f) Management requires coordination of a number of managers or users, because the species being used comes under more than one jurisdiction.

41. The resource management plan may cover one or more species or a particular area. Area coverage is often preferable, to encourage both an ecosystem approach to management and local participation in the plan. The plan should show how the Criteria will be met with respect to the species and area concerned. It should summarize the information on which management is based, identify the priority information gaps, and set out a programme to fill the gaps. The plan should address how a target population, its supporting ecosystem, and use levels will be monitored, and procedures for adjusting use levels on the basis of monitoring. It should describe how uses will be regulated and how the manager will ensure compliance with regulations.

42. The plan should be prepared by the party responsible for management, in cooperation with users, local communities, and other relevant interest groups. Depending on the management system, the responsible party may be a government agency, a community group, an association of resource users, or a landholder. An area plan may involve more than one management agency, in which case a single party should be designated as having principal responsibility for use of particular resources. The plan should be periodically evaluated by an independent, informed and impartial body from the country concerned. Both the plan and the evaluation should be open to public input and available for public review.

LEGAL FRAMEWORK

Interpretation

43. States, including their competent local authorities, should ensure that populations of wild species found within their jurisdictions are conserved and, if used, are used sustainably. Government agencies should be legally authorized to advise and assist resource managers to ensure that uses are sustainable. The responsibility and participation of local communities, including indigenous peoples, should be recognized in

national legislation for the sustainable use of wild species.

44. These Criteria for the sustainable use of wild species should be incorporated clearly into the legislative and administrative framework of each State, incorporating the precautionary principle as a fundamental element of such laws.

Application

45. Governments' policies, laws and institutions should ensure that any use of wild species is ecologically sustainable. However, States' systems of governance and laws vary. Nevertheless, to provide effective management of wild species, States ought to adopt a legal framework that takes into account the following:

(a) Adopting, or amending when necessary, legislation governing the sustainable use of wild species, publishing and disseminating it to all levels of government and making it readily available to the public;

(b) identifying habitats necessary to maintain viable populations of species and reserving where required these areas by legislation to prevent inconsistent uses;

(c) designating through law the corridors, transition zones and buffers to safeguard effectively threatened wild species whose habitat or range includes unprotected as well as protected areas;

(d) establishing norms for the management of wild species as an integral part of land use regulations, such as town and country planning or zoning or coastal zone management regimes;

(e) enabling local communities and/or individuals to manage, or participate in the management of wild species, and to derive legitimate benefits from their sustainable use;

(f) requiring that environmental impact assessment procedures evaluate adverse effects of development on wild species, including analysis of base-line data about possibly affected wild species and identification of alternatives or mitigation measures essential to ensure the viability of wild species;

(g) establishing legally the seasons during which the taking of species is allowed or prohibited, and other such limitations as necessary to ensure that use does not result in the impairment of viability through impact on species' functions such as breeding, migration, and resting;

(h) establishing and enforcing administrative and criminal sanctions to deter and, where necessary, to punish illegal uses such as poaching or smuggling;

(i) establishing, training and equipping State and local conservation and other agencies to administer and enforce applicable statutes and regulations for the conservation and sustainable use of wild species, and providing for administrative and judicial review to facilitate their consistent and lawful function;

(j) providing for routine budgetary allotments to underwrite these legal measures, and enact laws establishing appropriate user fees and management payments and enabling establishment of trust funds or other mechanisms for channeling financial contributions to enhance the viability of wild species;

(k) ensuring by law that contracts or permits for tourism operations and other commercial interests, such as parks concessionaires, require adherence to these Criteria.

46. A target population whose range crosses or straddles international boundaries should be the subject of a management agreement between the countries concerned, unless its long-term viability is already assured. The agreement should be designed to meet the Criteria. Where a target population occurs outside the jurisdiction of any government, it should be used only under an agreement that upholds the Criteria and includes mechanisms for enforcement of the agreement. In the case of marine populations that are in the high seas, or cross or are shared by two or more Exclusive Economic Zones (EEZs) or an EEZ and the high seas, governments should cooperate with the appropriate international management agency. New uses should not reach substantial levels before the appropriate management agency has been identified or established. In addition, States should both:

(a) Adhere to and implement international agreements designed to enhance wild species' viability, and further ensure as required by international law that all activities within a State's jurisdiction or control shall not impair the viability of wild species in another State or in areas of international jurisdiction; and

(b) establish emergency response capabilities to protect wild species from avoidable negative impacts of military activities during times of armed conflict, as required by international law.

SOCIAL AND ECONOMIC INCENTIVES

Interpretation

47. The social and economic benefits from sustainable use could provide powerful incentives to conserve wild species and their supporting ecosystems, provided:

(a) The people most likely to have a direct impact on the species and ecosystems concerned receive a fair share of the benefits from the use. Resource users are more likely to conserve and use wild species sustainably if it is in their interests to do so.

(b) There is a clear connection between the benefits and conservation. Fulfillment of the Criteria yields immediate and sustained net benefits for people, and a portion of these benefits should be reinvested in maintaining target populations and their supporting ecosystems.

Application

48. Governments, development banks, aid agencies, conservation organizations, and businesses may be able to establish or enhance incentives for conservation of wild species and their supporting ecosystems and assist in the implementation of resource management plans by:

(a) Respecting and encouraging rights and traditions of local communities that are compatible with conservation of wild species.

(b) Supporting traditional customs that are ecologically sound.

(c) Providing fiscal incentives to encourage the sustainability of uses of wild species.

(d) Providing economic, institutional, biological and other technical assistance on request.

(e) Developing community-level education programmes on the uniqueness and importance of local wild species.

(f) Cooperating with rural communities to develop sustainable use projects that demonstrate the value of maintaining those populations used and their supporting ecosystems.

(g) Cooperating in the creation of effective management systems for use by the local people living near or in a target population or ecosystem.

(h) Determining the values of wild species and populations, assessing the size and characteristics of markets, building up expertise in reaching and developing markets, and improving terms of trade in the products of wild species.

(i) Investing in the creation of producers' organizations to assist in the efficient production, distribution and marketing of the resources concerned.

(j) Improving the price and profitability to local people of nonconsumptive and consumptive uses of wild species, and by helping local people to add value to sustainable uses and retain the added value.

(k) Developing and publicly identifying, through labels or otherwise, sustainable uses of wild species to replace unsustainable uses.

49. It is recognized that attempts to increase economic benefits from uses of wild species run the risk of promoting unsustainable levels and types of use. The impacts of such attempts will need to be monitored very closely. It is also recognized that making uses sustainable may cost more than some forms of unsustainable use. Hence products from sustainable use may not be able to compete with similar products from unsustainable use, unless specific trade or fiscal measures are taken to favour the products from sustainable use.

The Precautionary Principle and Other Safeguards

Interpretation

50. The precautionary principle requires approaching questions of sustainability of use with the commitment to act in the way least likely to impair the viability of the species or ecosystem. This may result in decisions not to use. This precautionary principle is especially important when estimating sustainable use levels. Use levels should always be cautious and well within the calculated capacity of the target population and its supporting ecosystems. Target populations and supporting ecosystems may need to be safeguarded by management regimes that include the designation of protected areas.

Application

51. In applying the precautionary principle, it is important to consider those elements of the ecosystem affected by the use that are most vulnerable to long-term

or irreversible damage. In some instances, it may be the target population. In others — for example, the harvesting of animals in drought prone areas — it may be the animals' habitat. In the former case, the precautionary principle may be satisfied by a low rate of harvest. In the latter case, it may be satisfied by a higher rate of harvest that protects the habitat from being degraded (for example, by overgrazing).

52. Methods of estimating sustainable use levels, and their likely range of error, should be thoroughly investigated and documented in the management plan. Use levels should be set with sufficient room to:

(a) Accommodate potential negative effects of miscalculation, unforeseen factors or unpredictable events (such as disease, natural disasters, drought).

(b) Allow for uncertainty and lack of information about the target population and its supporting ecosystems, and the impact of the use on associated species and ecosystems.

For example, in the case of consumptive uses, a recommended general rule is that the harvest rate should usually be half or less than half of the intrinsic rate of increase of the population.

53. A system of protected areas that includes a country's major ecosystem types, as well as rare and unique ecosystems, can provide valuable comparative baseline data for monitoring the status of populations and ecosystems that are being used.

54. National protected area systems can also be a reservoir of genetic diversity, protecting populations of many target species. However, they are usually unable to protect migratory species or species with widely dispersed populations (such as large carnivores, marine turtles, and tunas). Such species will depend largely on management outside protected areas, supplemented by protection of parts of their populations during crucial stages in their life history (for example, protection of breeding and staging areas). International cooperation, through bilateral, regional and global conservation agreements, will often be needed.

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GLOSSARY

Biodiversity: The variety among living organisms including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.

Conservation: Protection, maintenance, rehabilitation, restoration, and enhancement of populations and ecosystems, including the management of human use of organisms or ecosystems to ensure such use is sustainable.

Consumptive use: An activity by which human beings derive benefit from a population or ecosystem by **permanently removing** organisms or their products from the population or ecosystem concerned. Hunting, egg collecting, trapping, live capturing, fishing, shellfish gathering, logging, plant gathering, and mushroom collecting are examples of uses that permanently remove whole organisms. Tapping wild trees for exudates and similar activities involving animals (for example, milking wild snakes for venom), gathering fruits, collecting honey from wild bees, cutting plants for thatch or fodder, and putting livestock to graze on wild vegetation are examples of uses that permanently remove only certain products and not the producing organism.

Domesticated population: A population that is adapted to life in close association with and to the advantage of humans, and whose entire life cycle is carried out under human management.

Ecosystem: A dynamic system of plants, animals and other organisms interacting together and with the non-living components of their environment in a defined area.

Endemic population: A population native to, and restricted to, a particular geographic area, often within a State.

Exotic population: A population that exists in a free state in an area outside its historically known range as a result of intentional or accidental introduction by human activities.

Feral population: A population that has escaped or been released from cultivation or domestication and maintains itself in the wild state.

Gene: The part of the DNA molecule that encodes a single enzyme or structural protein unit and transmits unique hereditary information from one generation to another.

Genetic diversity: The variety of kinds, forms (alleles), frequencies, and structural arrangements of genes in a population or species, or among populations or species of higher taxa. Sometimes used to refer to the total genetic variety of all species in a defined area.

Habitat: A place or ecological community where a particular species occurs and that provides conditions for its survival (such as food and shelter).

Integrity of ecosystems: The intactness of the natural array of biotic and abiotic components in an ecosystem, along with the functional balances and interdependencies among them. Large-scale environmental phenomena (such as natural fires, rainfall, cloud cover) are also involved in regard to management of landscapes or biomes. See also "viability" of ecosystems.

Intrinsic rate of increase: The maximal growth rate of a population under prevailing ecological conditions but without the effects of competition from members of the same species. This rate is specific to a species, and often to a population, but the actual rate of growth depends on the population's density and structure and its environmental situation at the time.

Nonconsumptive use: An activity by which human beings derive benefit from a population or ecosystem **without permanently removing** organisms or their products from the population or ecosystem concerned. Examples include wildlife viewing, visiting sacred groves and other culturally important ecosystems, and managing wild insects for crop pollination.

Organism: A living being or form of life that is a cell or is composed of cells. Any member of the kingdoms Monera (prokaryotes or bacteria and blue-green algae), Protoctista (other algae, protozoa and single-celled organisms that are not prokaryotes or fungi), Fungi (mushrooms, yeasts, lichens, etc.), Animalia (invertebrates, fishes, amphibians, reptiles, birds, mammals), or Plantae (mosses, ferns, conifers, flowering plants, etc.).

Population: A group of individuals of the same species separated geographically, or sometimes temporally, from other such groups. Populations often are distinctive entities within a species, showing substantial genetic differences as groups across the geographic range of a species.

Protected area: An area managed through legal or customary regimes so as to protect and maintain biodiversity and natural and cultural resources.

Resource: A population or ecosystem that is the subject of nonconsumptive or consumptive use.

Semi-domesticated population: A population that reproduces with human assistance but otherwise lives freely in naturally-regenerating habitats to which it is not native. For example, trees from non-local seed that are planted on forest land that is not otherwise tended. Note: the definitions of semi-domesticated and semi-wild populations represent somewhat arbitrary points on the continuum from wild to domesticated.

Semi-wild population: A population that reproduces with human assistance but otherwise lives freely in naturally-regenerating habitats to which it is native; or that reproduces without human assistance but requires supplementary feeding to ensure survival because its habitat cannot support it throughout the year. For example, fish fry produced in hatcheries from eggs collected from wild or semi-wild fish and returned to the stream from which the eggs were collected; winter-fed deer in Europe and North America. Note: the definitions of semi-domesticated and semi-wild populations represent somewhat arbitrary points on the continuum from wild to domesticated.

Species: For sexually reproducing organisms, a species is a distinct population or group of populations that actually or potentially interbreeds, and which is innately isolated reproductively from any other population or group of populations; for asexual or unisexual organisms, a species is a distinct population or group of populations in which all individuals are ecologically interchangeable and/or genetically identical, and which share a common ancestry and descent potential unique to the population or group of populations.

Sustainability: Throughout this document, sustainability refers to the Sustainability of use, as defined under "sustainable use" below.

Sustainable use: Use that does not reduce the future use potential, or impair the long-term viability, of either the species being used or other species; and is compatible with maintenance of the long-term viability of supporting and dependent ecosystems.

Target population/Species/Ecosystem: The population, group of populations, species, group of species, or ecosystem that is the object of use.

Use: An activity by which human beings derive benefit from a population, species or ecosystem. Uses are either consumptive or nonconsumptive. They may be personal or domestic (subsistence), for income from trade in local, national or international markets, for food, medicine, clothing, shelter, fuel, fibre, and cultural needs (including religious, ritual, ceremonial, recreational, intellectual and aesthetic). "Use" does not include control of a species that may be considered harmful to people.

Viability: When applied to a **species or population**, viability refers to the capacity of the target species or population to: (a) maintain genetic diversity; (b) maintain its potential for evolutionary adaptation; and (c) be at minimal risk of extinction (in the case of a species) or extirpation (in the case of a population of a widespread species) from demographic fluctuations, environmental variation and potential catastrophe (including over-use). When applied to an **ecosystem**, viability refers to the capacity of the ecosystem to: (a) maintain the diversity of its components (habitats, species, genes); (b) maintain its capacity for continuity and renewal; and (c) maintain its productivity.

Viable: Used in relation to populations, species and ecosystems as possessing the quality of "viability", as defined above.

Wild population: A population that reproduces without human assistance in naturally-regenerating habitats to which it is native.

Draft Motion

Guidelines for the Ecological Sustainability of Nonconsumptive and Consumptive Uses of Wild Species

ACKNOWLEDGING the great interest in the sustainable use of wild species as conservation tool;

RECALLING that both the *World Conservation Strategy* and *Caring for the Earth* emphasize that wild species should be conserved for their intrinsic value and for the benefit of mankind;

NOTING that uses of wild species involve plants as well as animals, and that uses may be consumptive and nonconsumptive;

REAFFIRMING General Assembly Recommendation 18.24 as IUCN's basic policy on the sustainable use of wild species;

RECOGNIZING the work carried out by the IUCN/SSC Specialist Group on the Sustainable Use of Wild Species and the IUCN Sustainable Use of Wildlife Programme to prepare draft Guidelines for the Sustainable Use of Wild Species, as called for in Recommendation 18.24;

AWARE of the broad and extensive consultation process that has been carried out among IUCN members and Commission members to prepare successive drafts of the Guidelines;

The General Assembly of IUCN — The World Conservation Union, at its 19th Session in Buenos Aires, Argentina, 17-26 January 1994:

1. ADOPTS and ENDORSES the Guidelines for the Ecological Sustainability of Nonconsumptive and Consumptive Uses of Wild Species, as agreed by the Workshop on Sustainable Use of Living Natural Resources;

2. URGES all countries to promote and implement the Guidelines, and to ensure that where there is use, it is sustainable;

3. REQUESTS the Director General, within available resources, to review the Guidelines and to provide a report for the 20th Session of the General Assembly; and

4. FURTHER REQUESTS the Director General, within available resources, to support the guidelines with more specific guides backed by case studies of major categories of use.

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DRAFT GUIDELINES FOR RE-INTRODUCTIONS

INTRODUCTION

These policy guidelines have been drafted by the Re-introduction Specialist Group of the IUCN's Species Survival Commission[1], in response to the increasing occurrence of re-introduction projects world-wide, and consequently, to the growing need for specific policy guidelines to help ensure that the re-introductions achieve their intended conservation benefit, and do not cause adverse side-effects of greater impact. Although the IUCN developed a Position Statement on the Translocation of Living Organisms in 1987, more detailed guidelines were felt to be essential in providing more comprehensive coverage of the various factors involved in re-introduction exercises.

These guidelines are intended to act as a guide for procedures useful to re-introduction programmes and do not represent an inflexible code of conduct. Many of the points are more relevant to re-introductions using captive-bred individuals than to translocations of wild species. Others are especially relevant to globally endangered species with limited numbers of founders. Each re-introduction proposal should be rigorously reviewed on its individual merits. On the whole, it should be noted that re-introduction is a very lengthy and complex process.

This document is very general, and worded so that it covers the full range of plant and animal taxa. It will be regularly revised. Handbooks for re-introducing individual groups of animals and plants will be developed in future.

1. DEFINITION OF TERMS

a. "Re-introduction": an attempt to establish a species[2] in an area which was once part of its historical range, but from which it has become extinct[3]. ("Re-establishment" is a synonym, but implies that the re-introduction has been successful).

b. "Translocation": deliberate and mediated movement of wild individuals or populations from one part of their range to another.

c. "Re-inforcement/Supplementation": addition of individuals to an existing population

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[1] Guidelines for determining procedures for disposal of species confiscated in trade are being developed separately by IUCN for CITES.

[2] The taxonomic unit referred to throughout the document is species: it may be a lower taxonomic unit (e.g. sub-species or race) as long as it can be unambiguously defined.

[3] CITES criterion of "extinct": species not definitely located in the wild during the past 50 years.

of conspecifics.

d. "Conservation/Benign Introductions": an attempt to establish a species, for the purpose of conservation, outside its recorded distribution but within an appropriate habitat and eco-geographical area.

2. AIMS AND OBJECTIVES OF THE RE-INTRODUCTION

a. Aims:

A re-introduction should aim to establish a viable, free-ranging population in the wild, of a species or subspecies which was formerly globally or locally extinct (extirpated). In some circumstances, a re-introduction may have to be made into an area which is fenced or otherwise delimited, but it should be within the species' former natural habitat and range, and require minimal long-term management.

b. Objectives:

The objectives of a re-introduction will include: to enhance the long-term survival of a species; to re-establish a keystone species (in the ecological or cultural sense) in an ecosystem; to maintain natural biodiversity; to provide long-term economic benefits to the local and/or national economy; to promote conservation awareness; or a combination of these.

Re-introductions or translocations of species for short-term, sporting or commercial purposes - where there is no intention to establish a viable population - are a different issue, beyond the scope of these guidelines. These include fishing and hunting activities.

3. MULTIDISCIPLINARY APPROACH

A re-introduction requires a multidisciplinary approach involving a team of persons drawn from a variety of backgrounds. They may include persons from: governmental natural resource management agencies; non-governmental organisations; funding bodies; universities; veterinary institutions; zoos (and private animal breeders) and/or botanic gardens, with a full range of suitable expertise. Team leaders should be responsible for coordination between the various bodies and provision should be made for publicity and public education about the project.

4. PRE-PROJECT ACTIVITIES

4a. BIOLOGICAL

(i) Feasibility study and background research

- An assessment should be made of the taxonomic status of individuals to be re-introduced. They must be of the same subspecies as those which were extirpated, unless adequate numbers are not available. An investigation of historical information about the loss and fate of individuals from the re-introduction area, as well as molecular genetic studies, should be undertaken in case of doubt. A study of genetic variation within and between populations of this and related taxa can also be helpful. Special care is needed when the population has long been extinct.

- Detailed studies should be made of the status and biology of wild populations (if they exist) to determine the species' critical needs; for animals, this would include descriptions of habitat preferences, intraspecific variation and adaptations to local ecological conditions, social behaviour, group composition, home range size, shelter and food requirements, foraging and feeding behaviour, predators and diseases. For plants it would include biotic and abiotic habitat requirements, dispersal mechanisms, reproductive biology, symbiotic relationships (e.g. with mycorrhizae, pollinators), insect pests and diseases. Overall, a firm knowledge of the natural history of the species in question is crucial to the entire re-introduction scheme.

- The build-up of the released population should be modelled under various sets of conditions, in order to specify the optimal number and composition of individuals to be released per year and the numbers of years necessary to promote establishment of a viable population.

- A Population and Habitat Viability Analysis will aid in identifying significant environmental and population variables and assessing their potential interactions, which would guide long-term population management.

(ii) **Previous Re-introductions**

- Thorough research into previous re-introductions of the same or similar species and wide-ranging contacts with persons having relevant expertise should be conducted prior to and while developing re-introduction protocol.

(iii) **Choice of release site**

- Site should be within the historic range of species and for an initial re-inforcement or re-introduction have very few, or no, remnant wild individuals (to prevent disease spread, social disruption and introduction of alien genes). A conservation/ benign introduction should be undertaken only as a last resort when no opportunities for re-introduction into the original site or range exist.

- The re-introduction area should have assured, long-term protection (whether formal or otherwise).

(iv) **Evaluation of re-introduction site**

- Availability of suitable habitat: re-introductions should only take place where the

habitat and landscape requirements of the species are satisfied, and likely to be sustained for the for-seeable future. The possibility of natural habitat change since extirpation must be considered. The area should have sufficient carrying capacity to sustain growth of the re-introduced population and support a viable (self-sustaining) population in the long run.

- Identification and elimination of previous causes of decline: could include disease; over-hunting; over-collection; pollution; poisoning; competition with or predation by introduced species; habitat loss; adverse effects of earlier research or management programmes; competition with domestic livestock, which may be seasonal.

- Where the release site has undergone substantial degradation caused by human activity, a habitat restoration programme should be initiated before the re-introduction is carried out.

(v) Availability of suitable release stock

- Release stock should be ideally closely-related genetically to the original native stock.

- If captive or artificially propagated stock is to be used, it must be from a population which has been soundly managed both demographically and genetically, according to the principles of contemporary conservation biology.

- Re-introductions should not be carried out merely because captive stocks exist, nor should they be a means of disposing of surplus stock.

- Removal of individuals for re-introduction must not endanger the captive stock population or the wild source population. Stock must be guaranteed available on a regular and predictable basis, meeting specifications of the project protocol.

- Prospective release stock must be subjected to a thorough veterinary screening process before shipment from original source. Any animals found to be infected or which test positive for selected pathogens must be removed from the consignment, and the uninfected, negative remainder must be placed in strict quarantine for a suitable period before retest. If clear after retesting, the animals may be placed for shipment.

- Since infection with serious disease can be acquired during shipment, especially if this is intercontinental, great care must be taken to minimize this risk.

- Stock must meet all health regulations prescribed by the veterinary authorities of the recipient country and adequate provisions must be made for quarantine if necessary.

- Individuals should only be removed from a wild population after the effects of translocation on the donor population have been assessed, and after it is guaranteed that these effects will not be negative.

4b. SOCIO-ECONOMIC AND LEGAL ACTIVITIES

- Re-introductions are generally long-term projects that require the commitment of long-term financial and political support.

- Socio-economic studies should be made to assess costs and benefits of the re-introduction programme to local human populations.

- A thorough assessment of attitudes of local people to the proposed project is necessary to ensure long term protection of the re-introduced population, especially if the cause of species' decline was due to human factors (e.g. over-hunting, over-collection, loss of habitat). The programme should be fully understood, accepted and supported by local communities.

- Where the security of the re-introduced population is at risk from human activities, measures should be taken to minimise these in the re-introduction area. If these measures are inadequate, the re-introduction should be abandoned or alternative release areas sought.

- The policy of the country to re-introductions and to the species concerned should be assessed. This might include checking existing national and international legislation and regulations, and provision of new measures as necessary. Re-introduction must take place with the full permission and involvement of all relevant government agencies of the recipient or host country. This is particularly important in re-introductions in border areas, or involving more than one state.

- If the species poses potential risk to life or property, these risks should be minimised and adequate provision made for compensation where necessary; where all other solutions fail, removal or destruction of the released individual should be considered. In the case of migratory/mobile species, provisions should be made for crossing of international/state boundaries.

5. PLANNING, PREPARATION AND RELEASE STAGES

- Construction of a multidisciplinary team with access to expert technical advice for all phases of the programme.

- Approval of all relevant government agencies and land owners, and coordination with national and international conservation organizations.

- Development of transport plans for delivery of stock to the country and site of re-introduction, with special emphasis on ways to minimize stress on the individuals during transport.

- Identification of short-and long-term success indicators and prediction of programme duration, in context of agreed aims and objectives.

- Securing adequate funding for all programme phases.

- Design of pre- and post- release monitoring programme so that each re-introduction is a carefully designed experiment, with the capability to test methodology with scientifically collected data.

- Appropriate health and genetic screening of release stock. Health screening of closely related species in re-introduction area.

- If release stock is wild-caught, care must be taken to ensure that: a) the stock is free from infectious or contagious pathogens and parasites before shipment and b) the stock will not be exposed to vectors of disease agents which may be present at the release site (and absent at the source site) and to which it may have no acquired immunity.

- If vaccination prior to release, against local endemic or epidemic diseases of wild stock or domestic livestock at the release site, is deemed appropriate, this must be carried out during the "Preparation Stage" so as to allow sufficient time for the development of the required immunity.

- Appropriate veterinary or horticultural measures to ensure health of released stock throughout programme. This is to include adequate quarantine arrangements, especially where founder stock travels far or crosses international boundaries to release site.

- Determination of release strategy (acclimatization of release stock to release area; behavioural training - including hunting and feeding; group composition, number, release patterns and techniques; timing).

- Establishment of policies on interventions (see below).

- Development of conservation education for long-term support; professional training of individuals involved in long-term programme; public relations through the mass media and in local community; involvement where possible of local people in the programme.

- The welfare of animals for release is of paramount concern through all these stages.

6. POST-RELEASE ACTIVITIES

- Post release monitoring of all (or sample of) individuals. This most vital aspect may be by direct (e.g. tagging, telemetry) or indirect (e.g. spoor, informants) methods as suitable.

- Demographic, ecological and behavioural studies of released stock.

- Study of processes of long-term adaptation by individuals and the population.
- Collection and investigation of mortalities.
- Interventions (e.g. supplemental feeding; veterinary aid; horticultural aid) when necessary.
- Decisions for revision, rescheduling, or discontinuation of programme where necessary.
- Habitat protection or restoration to continue where necessary.
- Continuing public relations activities, including education and mass media coverage.
- Evaluation of cost-effectiveness and success of re- introduction techniques.
- Regular publications in scientific and popular literature.

Research involving species at risk of extinction

La recherche en rapport avec des espèces menacées d'extinction

Investigaciones en que se usan especies en riesgo de extinción

IUCN POLICY STATEMENT
DECLARATION DE PRINCIPE DE L'UICN
POSICION DE LA UICN
14.6.89

Approved by the 27th Meeting
of IUCN Council

Adoptée durant la 27e Session
du Conseil de l'UICN

Aprobada durante la 27a. Reunión
del Consejo de la UICN

IUCN POLICY STATEMENT ON RESEARCH INVOLVING SPECIES AT RISK OF EXTINCTION

PROLOGUE

IUCN holds that all research on or affecting a threatened species carries a moral responsibility for the preservation or enhancement of the survival of that species. Conservation of the research resource is clearly in the interest of the researchers.

IUCN recognizes that the taking and trading of specimens of threatened species are covered by international agreements and are normally included in national legislation which provides authorized exemptions for the purpose of scientific research.

Basic and applied research is critically needed on many aspects of the biology of animal and plant species at risk of extinction (e.g. those listed by IUCN as Vulnerable, Rare, Endangered, or Indeterminate) to provide knowledge vital to their conservation.

Other scientific interests may involve the use of threatened species in a wide variety of studies. Taking into account the importance of many kinds of research, as well as potential threats such species could be subject to in such activities, IUCN, after careful consideration, adopts the following statements as policy.

POLICY

IUCN encourages basic and applied research on threatened species that contributes to the likelihood of survival of those species.

When a choice is available among captive-bred or propagated, wild-caught or taken, or free-living stock for research not detrimental to the survival of a threatened species, IUCN recommends the option contributing most positively to sustaining wild populations of the species.

IUCN recommends that research programmes on threatened species that do not directly contribute to conservation of the species should acknowledge an obligation to the species by devoting monetary or other substantial resources to their conservation, preferably to sustaining populations in the natural environment.

Whether animals involved are captive-bred, wild-caught, or free living, or whether plants involved are propagated, taken from the wild, or in their natural habitat, IUCN opposes research that directly or indirectly impairs the survival of threatened species and urges that such research not be undertaken.

PROTOCOLS

In this context IUCN urges researchers to accept a personal obligation to satisfy themselves that the processes by which research specimens are acquired (including transportation) conform scrupulously to procedures and regulations adopted under international legal agreements. Further, researchers should adopt applicable professional standards for humane treatment of animal specimens, including their capture and use in research.

IUCN urges that any research on threatened species be conducted in conformity with all applicable laws, regulations and veterinary professional standards governing animal acquisition, health and welfare, and with all applicable agricultural and genetic resource laws and regulations governing acquisition, transport, and management of plants.

DRAFT IUCN RED LIST CATEGORIES

Version 2.2

I) Introduction

1. The threatened species categories now used in Red Data Books and Red Lists have been in place, with some modification, for almost 30 years. Since their inception they have become widely recognised internationally, and they are now used in a whole range of publications and listings, produced by IUCN as well as by numerous governmental and non-governmental organisations. The Red Data Book categories provide an easily and widely understood method for highlighting those species under higher extinction risk, so as to focus attention on conservation measures designed to protect them. The system has worked well under the existing definitions, and underlies many valuable conservation assessments and management plans. However, with the increasing recognition that the resources available for conservation are very limited and need to be allocated rationally among many different demands, the categories have been used more frequently for setting priorities for conservation action. It is this change in emphasis that has provoked recent moves to revise the category definitions.

2. The need to revise the categories has been recognised for some time. In 1984, the SSC held a symposium, 'The Road to Extinction' (Fitter & Fitter 1987) which examined the issues in some detail, and at which a number of options were considered for the revised system. However, no single proposal resulted. The current phase of development began in 1987 with a request from the SSC Steering Committee develop a new approach that would provide the conservation community with useful information for action planning.

The revision has several aims: to provide an explicit system that can be applied consistently by different people; to improve the objectivity by providing those using the criteria clear guidance on how to evaluate different factors which affect risk of extinction; to provide a system which will facilitate comparisons across widely different taxa; and to give people using threatened species lists a better understanding of how individual species were classified. In this document, proposals for new definitions for Red List categories are presented. The general aim of the new system is to provide an objective framework for the classification of species according to their extinction risk. This is intended to be equally applicable across taxa, and to be useful in the planning of conservation actions.

3. The proposals presented in this document result from a continuing process of drafting, consultation and validation exercises, and re-drafting. It is clear that the production of a large number of draft proposals has led to some confusion, especially as each draft has been used for classifying some set of species for conservation purposes. To clarify matters, and to open the way for future modifications as and when they become necessary, a system for version numbering is now being introduced as follows:

Version 1.0: Mace & Lande (1991)
The first paper discussing a new basis for the categories, and presenting numerical criteria especially relevant for large vertebrates.

Version 2.0: Mace et al (1992)
A major revision of Version 1.0, including numerical criteria appropriate to all organisms and introducing the non-threatened categories.

Version 2.1: IUCN (1993)
Following an extensive consultation process within SSC, a number of changes were made to the details of the criteria, and fuller explanation of basic principles was included. A more explicit structure clarified the significance of the non-threatened categories.

Version 2.2: this paper
Following further comments received and additional validation exercises, some minor

changes to the criteria have been made. In addition, the Susceptible category present in Versions 2.0 and 2.1 has been subsumed into the Vulnerable category. A precautionary application of the system is emphasised.

In future any application of the criteria should include the appropriate version number as given above.

4. In the rest of this document the proposed system is outlined in several sections. The Preamble presents some basic information about the context and structure of the proposal, and the procedures that are to be followed in applying the definitions to species. This is followed by a section giving definitions for terms used in a specific fashion within the definitions. Finally the definitions are presented, followed by the quantitative criteria used for classification within the threatened categories. It is important for the effective functioning of the new system that all sections are read and understood, and the recommendations followed by people applying the system.

References:

Fitter, R., and M. Fitter, ed. (1987) The Road to Extinction. Gland, Switzerland: IUCN.

IUCN. (1993) Draft IUCN Red List Categories. IUCN, Gland, Switzerland.

Mace, G. M. et al. (1992) "The development of new criteria for listing species on the IUCN Red List." Species 19.Dec. (1992): 16-22.

Mace, G. M., and R. Lande. (1991) "Assessing extinction threats: toward a reevaluation of IUCN threatened species categories." Conserv. Biol. 5.2: 148-157.

Scott, P., J. A. Burton, and R. Fitter (1987) "Red Data Books: the historical background." The Road to Extinction. pp 1-6. Ed. R. Fitter and M. Fitter. Gland, Switzerland: IUCN.

II) Preamble

The following points present important information on the use and interpretation of the categories (= Critically Endangered, Endangered, etc.), criteria (= A to E), and sub-criteria (= a,b etc., i,ii etc.):

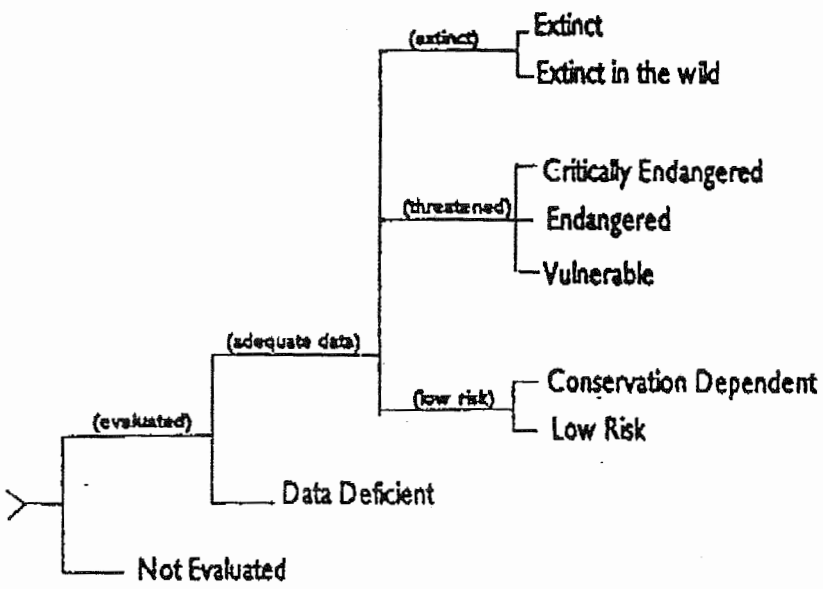
1. Taxonomic level and scope of the categorisation process

The criteria can be applied to any taxonomic unit at or below the species level. The term 'taxon' in the following notes, definitions and criteria is used for convenience, and may represent species or lower taxonomic levels, including forms that are not yet formally described. There is a sufficient range among the different criteria to enable the appropriate listing of taxa from the complete taxonomic spectrum, with the exception of micro-organisms. The criteria may also be applied within any specified geographical or political area althoughspecial notice should be taken of point 11 below. In presenting the results of applying the criteria, the unit and area under consideration should be made explicit. The categorisation process should only be applied to wild populations reproducing naturally inside their natural range, and to populations resulting from benign introductions (defined in the draft IUCN Guidelines for Reintroductions as "..an attempt to establish a species, for the purpose of conservation, outside its recorded distribution, but within an appropriate habitat and eco-geographical area") .

2. Nature of the categories

The categories of Critically Endangered, Endangered and Vulnerable are nested. Thus all taxa listed as Critically Endangered qualify for Vulnerable and Endangered, and all listed as Endangered qualify for Vulnerable. Together these categories are described as 'threatened' .The threatened species categories form a part of the overall scheme. It will be possible to place all taxa into at least one of the categories (see Figure 1).

Figure 1: Structure of the Categories



3. Role of the different criteria

For listing as Critically Endangered, Endangered or Vulnerable there are five quantitative criteria; meeting any one of these criteria qualifies a taxon for listing at that level of threat. The different criteria (A-E) are derived from a wide review aimed at detecting risk factors across the broad range of organisms and the diverse life histories they exhibit. Even though some criteria will be inappropriate for particular taxa and some taxa will never qualify under particular criteria however close to extinction

they come, there should be criteria appropriate for assessing threat levels for any taxon (other than micro-organisms). The relevant factor is whether any one criterion is met, not whether all are appropriate or all are met.

4. Derivation of quantitative criteria

The quantitative values presented in the various criteria associated with threatened categories were developed through wide consultation and they are set at what are generally judged to be appropriate levels, even if no formal justification for these values exists. The levels for different criteria within categories were set independently but against a common standard. Some broad consistency between them was sought. However, a given taxon should not be expected to meet all (A-E) criteria in a category; meeting any one criterion is sufficient.

5. Implications of listing

Listing in the categories of Not Evaluated and Data Deficient indicates that no assessment of extinction risk has been made, though for different reasons. Until such time as an assessment is made, species listed in these categories should not be treated as if they were non-threatened, and it will be appropriate (especially for Data Deficient forms) to give them the same degree of protection as threatened forms, at least until their status can be evaluated.

Extinction is seen as a probabilistic or chance process. Thus, a listing in a higher extinction risk category implies a higher expectation of extinction, and over the time-frames under consideration more taxa listed here are expected to go extinct (without effective conservation action) than taxa listed in the lower risk categories. However, the fact that some taxa listed at high risk persist, does not necessarily mean their initial assessment was inaccurate.

6. Data quality and the importance of inference and projection

The criteria are clearly quantitative in nature. However, the absence of high quality data should not deter attempts at applying the criteria, as methods involving estimation, inference and projection are emphasised to be sufficient throughout. Inference and projection may be based on extrapolation of current or potential threats into the future and their rate of change, or on extrapolation of factors related to population abundance or distribution (including dependence on other taxa), so long as these can reasonably be supported. Suspected or inferred patterns in either the recent past, present or near future can be based on any of a series of related factors, and these factors should be specified.

Taxa at risk from threats posed by future events of low probability but with severe consequences (catastrophes) should be identified by other criteria (e.g. small distributions, few locations). Many threats are most easily dealt with as soon as they are identified (pathogens, invasive organisms, hybridization) rather than waiting until they have caused damage which is irreversible, or nearly so.

7. Uncertainty

The criteria should be applied on the basis of the available evidence on taxon numbers, trend and distribution, making due allowance for statistical and other uncertainties. In cases where a wide variation in estimates is found, it is legitimate to apply the precautionary principle and use the lowest credible estimate.

Where data are insufficient to assign a category (including Low Risk), the category of 'Data Deficient' may be assigned. However, it is important to recognise that this category indicates that data are inadequate to determine the degree of threat faced by a taxon, not necessarily that the taxon is poorly known. In cases where there are evident threats to a taxon through, for example, deterioration of its only known habitat, it is important to attempt threatened listing, even though there may be little direct information on the biological status of the taxon itself. The category 'Data Deficient' is not a threatened category, although it indicates a need to obtain more information on such species to determine their appropriate listing.

8. Conservation actions in the listing process

The criteria for the threatened categories are to be applied to a taxon irrespective of whether conservation action is taking place. In cases where it is only conservation action that prevents the

taxon from meeting the threatened criteria, the designation of 'Conservation Dependent' is appropriate. It is important to emphasise here that a taxon may be deserving of conservation action even if it is not listed as threatened.

9. Documentation

All taxon lists including categorisation resulting from these criteria should state the version number of the category definitions as well as the criteria and sub-criteria that were met. No listing can be accepted as valid unless at least one criterion is given. If more than one criterion or sub-criterion was met, then each should be listed. However, failure to mention a criterion should not necessarily imply that it was not met. Therefore, if a re-evaluation indicates that the documented criterion is no longer met, this should not result in automatic down-listing. Instead, the taxon should be re-evaluated with respect to all criteria to indicate its status. The factors responsible for triggering the criteria, especially where inference and projection are used, should at least be logged by the evaluator, even if they cannot be included in published lists.

10. Threats and priorities

The category of threat is not necessarily sufficient to determine priorities for conservation action. The category of threat simply provides an assessment of the likelihood of extinction under current circumstances, whereas a system for assessing priorities for action will include numerous other factors concerning conservation action such as costs, logistics, chances of success, and even perhaps the taxonomic distinctiveness of the subject.

11. Use at regional level

The criteria are most appropriately applied to whole taxa at a global scale, rather than to those units defined by regional or national boundaries. Regionally or nationally based threat categories are best used with two key pieces of information: the global status category for the taxon, and the proportion of the global population or range that occurs within the region or nation. However, if applied at regional or national level it must be recognised that a global category of threat may not be the same as a regional or national category for a particular taxon. For example, taxa that were classified as Vulnerable on the basis of their global declines in numbers or range might be Low Risk within a particular region where the population was stable. Conversely, taxa classified as Low Risk globally might be Critically Endangered within a particular region where numbers were very small or declining, perhaps only because they were at the margins of their global range.

12. Re-evaluation

Evaluation of taxa against the criteria should not be seen as a single event. As circumstances change, re-evaluation will be necessary, and listings should indicate explicitly the taxa for which re-evaluation should occur within a short time-frame (typically within 5 years), or under some specified circumstance. This is especially important for taxa listed under Low Risk, but which are close to qualifying as Vulnerable or Conservation Dependent.

13. Transfer between categories

There are some rules to govern the movement of taxa between categories. These are as follows: (A) A taxon may be moved from a category of higher threat to a category of lower threat if none of the criteria of the higher category has applied for 5 years or more. (B) If the original classification is found to have been erroneous (based on reanalysis of the data or new information), the taxon may be transferred to the appropriate category or removed from the threatened categories altogether, without delay (but see Section 9). (C) Transfer from lower risk to higher risk categories of threat is immediate.

14. Problems of scale

Classification based on the sizes of geographic ranges or the patterns of habitat occupancy is complicated by problems of spatial scale. The finer the scale at which the distributions or habitats of taxa are mapped, the smaller will be the area that they are found to occupy. Mapping at finer scales reveals more areas in which the taxon is unrecorded. It is impossible to provide any strict rules for mapping taxa or habitats; the most appropriate scale will depend on the taxa in question, and the origin and comprehensiveness of the distributional data. However, the thresholds for some criteria (e.g. Critically Endangered) necessitate mapping at a fine scale (in units of one square kilometre).

III) Definitions

1. Population
Population is defined as the total number of individuals of the taxon. For functional reasons, primarily owing to differences between life-forms, population numbers are expressed as numbers of mature individuals only. In the case of taxa biologically dependent on other taxa for all or part of their life cycles, biologically appropriate values for the host taxon should be used.

2. Subpopulations
Subpopulations are defined as geographically or otherwise distinct groups in the population between which there is little exchange (typically one successful migrant individual or gamete per year or less).

3. Mature individuals
The number of mature individuals is defined as the number of individuals known, estimated or inferred to be capable of reproduction. Where the population is characterised by normal or extreme fluctuations the minimum number should be used. This measure is intended to count individuals capable of reproduction and should therefore exclude individuals that are environmentally, behaviourally or otherwise reproductively suppressed in the wild. In the case of populations with biased adult or breeding sex ratios it is appropriate to use lower estimates for the number of mature individuals which take this into account. Reproducing units within a clone should be counted as individuals, except where such units are unable to survive alone (e.g. corals). In the case of taxa that naturally lose all or a subset of mature individuals at some point in their life cycle, the estimate should be made at the appropriate time, when mature individuals are available for breeding.

4. Generation
Generation may be measured as the average age of parents in the population.

5. Continuing decline
A continuing decline is a recent, current or projected future decline whose causes are not known or not adequately controlled and so is liable to continue unless remedial measures are taken. Natural fluctuations will not normally count as a continuing decline, but an observed decline should not be considered to be part of a natural fluctuation unless there is evidence for this.

6. Severe decline
A severe decline (criterion A) is a reduction in the number of mature individuals of at least the amount (%) stated over the time period (years) specified, although the decline need not still be continuing. A severe decline should not be interpreted as part of a natural fluctuation unless there is good evidence for this. Downward trends that are part of natural fluctuations will not normally count as a severe decline.

7. Extreme fluctuations
Extreme fluctuations occur in a number of taxa where population size or distribution area varies widely, rapidly and frequently, with a variation greater than one order of magnitude.

8. Severely fragmented
Severely fragmented is defined as the case where increased extinction risks result from the fact that most individuals within a taxon are found in small and relatively isolated subpopulations. These small subpopulations may go extinct, with a reduced probability of recolonisation.

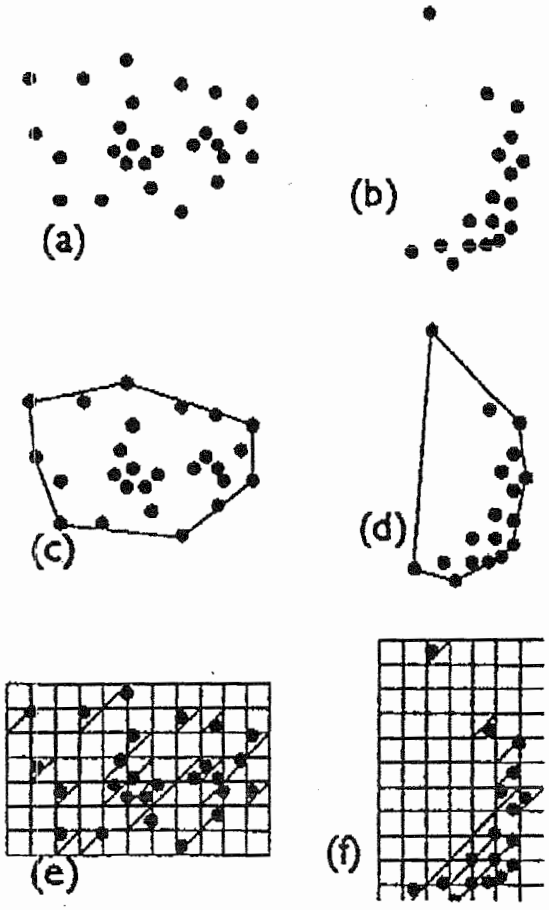
9. Extent of occurrence
Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of present occurrence of a taxon, excluding cases of vagrancy. This measure does not take account of discontinuities or disjunctions in the spatial distributions of taxa (but see 'Area of occupancy'). Extent of occurrence can often be measured by a minimum convex polygon (the smallest polygon in which no internal angle exceeds 180 degrees and which contains all the sites of occurrence).

10. **Area of occupancy**

Area of occupancy is defined as the area within its 'extent of occurrence' (see definition) which is occupied by a taxon, excluding cases of vagrancy. The measure reflects the fact that a taxon will not usually occur throughout the area of its extent of occurrence, which may, for example, contain unsuitable habitats. The area of occupancy is the smallest area essential at any stage to the survival of a taxon (e.g. colonial nesting sites, feeding sites for migratory taxa). The size of the area of occupancy will be a function of the scale at which it is measured, and should be at a scale appropriate to relevant biological aspects of the taxon. The criteria include values in km^2, and thus to avoid errors in classification, the area of occupancy should be measured on grid squares (or equivalents) which are sufficiently small (see Figure 2).

Figure 2:

Two examples of the distinction between extent of occurrence and area of occupancy. (a) and (b) are the spatial distribution of known, inferred or projected sites of occurrence. (c) and (d) show one possible boundary to the extent of occurrence, which is the measured area within this boundary. (e) and (f) show one measure of area of occupancy which can be measured by the sum of the occupie grid squares.



11. **Quantitative analysis**

A quantitative analysis is defined here as the technique of population viability analysis (PVA), or any other quantitative form of analysis, which estimates the extinction probability of a taxon or population based on the known life history and specified management or non-management options. In presenting the results of quantitative analyses the structural equations and the data should be explicit.

IV) The categories

EXTINCT (EX)
A taxon is Extinct when there is no reasonable doubt that its last individual has died.

EXTINCT IN THE WILD (EW)
A taxon is Extinct in the wild when it is known only to survive in cultivation, in captivity or as a naturalised population (or populations) well outside the past range. A taxon is presumed extinct in the wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.

CRITICALLY ENDANGERED (CR)
A taxon is Critically Endangered when it is facing an extremely high risk of extinction in the wild in the immediate future, as defined by any of the criteria (A to E) on page 10.

ENDANGERED (EN)
A taxon is Endangered when it is not Critically Endangered but is facing a very high risk of extinction in the wild in the near future, as defined by any of the criteria (A to E) on page 11.

VULNERABLE (VU)
A taxon is Vulnerable when it is not Critically Endangered or Endangered but is facing a high risk of extinction in the wild in the medium-term future, as defined by any of the criteria (A to E) on page 12.

CONSERVATION DEPENDENT (CD)
Taxa which do not currently qualify as Critically Endangered, Endangered or Vulnerable, may be classified as **Conservation Dependent**. To be considered **Conservation Dependent**, a taxon must be the focus of a continuing taxon-specific or habitat-specific conservation programme which directly affects the taxon in question. The cessation of this conservation programme would result in the taxon qualifying for one of the threatened categories above.

LOW RISK (LR)
A taxon is Low Risk when it has been evaluated and does not qualify for any of the categories Critically Endangered, Endangered, Vulnerable, Conservation Dependent or Data Deficient. It is clear that a range of forms will be included in this category including: (i) those that are close to qualifying for the threatened categories (i) those that are of less concern and (a) those that are presently abundant and unlikely to face extinction in the foreseeable future. It may be appropriate to indicate into which of these three classes taxa in Low Risk seem to fall. It is especially recommended to indicate an appropriate interval, or circumstance, before re-evaluation is necessary for taxa in the Low Risk class, especially for those indicated in (i) above.

DATA DEFICIENT (DD)
A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution is lacking. DD is therefore not a category of threat or Low Risk. Listing of taxa in this category indicates that more information is required. Listing a taxon as DD acknowledges the possibility that future research will show that threatened classification is appropriate. It is important to make positive use of whatever data are available. In many cases great care should be exercised in choosing between DD and threatened status. If the range of a taxon is suspected to be relatively circumscribed, if a considerable period of time has elapsed since the last record of the taxon, or if there are reasonable chances of unreported surveys in which the taxon has not been found, or that habitat loss has had an unfavourable impact, threatened status may well be justified.

NOT EVALUATED (NE)
A taxon is Not Evaluated when it is has not yet assessed against the criteria.

V) The Criteria for Critically Endangered, Endangered and Vulnerable

CRITICALLY ENDANGERED (CR)

A taxon is **Critically Endangered** when it is facing an extremely high risk of extinction in the wild in the immediate future, as defined by **any** of the following criteria (A to E):

A) Population reduction in the form of **either** of the following:

1) An observed , estimated, inferred or suspected severe decline of at least 80% during the last 10 years or 3 generations for which data are available, based on (and specifying) **any** of the following:

   a) direct observation
   b) a decline in area of occupancy, extent of occurrence and/or quality of habitat
   c) actual or potential levels of exploitation
   d) the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites.

2) A severe decline of at least the rate specified in A1 that is projected, observed, inferred or suspected to be likely to occur in the near future, based on (and specifying) any of (b), (c), or (d) above.

B) Extent of occurrence estimated to be less than 100 km² or area of occupancy estimated to be less than 10 km², **and** estimates indicating **any two** of the following:

1) Severely fragmented or found only at a single location.

2) Continuing decline, observed, inferred or projected, in **any** of the following:

   a) extent of occurrence
   b) area of occupancy
   c) area, extent and/or quality of habitat
   d) number of locations or subpopulations
   e) number of mature individuals .

3) Extreme fluctuations in **any** of the following:

   a) extent of occurrence
   b) area of occupancy
   c) number of locations or subpopulations

C) Population estimated to number less than 250 mature individuals **and either:**

1) An estimated continuing decline of at least 25% within 3 years or one generation, whichever is longer **or**

2) A continuing decline, observed, projected, or inferred, in numbers of mature individuals **and** population structure in the form of **either**

   a) severely fragmented (i.e. no population estimated to contain more than 50 mature individuals)
   b) all individuals are in a single sub-population.

D) Population estimated to number less than 50 mature individuals .

E) Quantitative analysis showing the probability of extinction in the wild is at least 50% within 5 years or 2 generations, whichever is the longer.

ENDANGERED (EN)

A taxon is **Endangered** when it is not Critically Endangered but is facing a very high risk of extinction in the wild in the near future, as defined by any of the following criteria (A to E):

A) Population reduction in the form of **either** of the following:

1) An observed , estimated, inferred or suspected severe decline of at least 50% during the last 10 years or three generations for which data are available, based on (and specifying) any of the following:

a) direct observation
b) a decline in area of occupancy, extent of occurrence and/or quality of habitat
c) actual or potential levels of exploitation
d) the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites.

2) A severe decline of at least the rate specified in A1 that is projected, observed, inferred or suspected to be likely to occur in the near future, based on (and specifying) any of (b), (c), or (d) above.

B) Extent of occurrence estimated to be less than 5000 km^2 or area of occupancy estimated to be less than 500 km^2, and estimates indicating any two of the following:

1) Severely fragmented or found only at no more than five locations.

2) Continuing decline, inferred, observed or projected, in any of the following:

a) extent of occurrence
b) area of occupancy
c) area, extent and/or quality of habitat
d) number of locations or subpopulations
e) number of mature individuals .

3) Extreme fluctuations in any of the following:

a) extent of occurrence
b) area of occupancy
c) number of locations or subpopulations

C) Population estimated to number less than 2500 mature individuals and either:

1) An estimated continuing decline of at least 20% within 5 years or 2 generations, whichever is longer, or

2) A continuing decline, observed, projected, or inferred, in numbers of mature individuals and population structure in the form of either

a) severely fragmented (i.e. no population estimated to contain more than 250 mature individuals)
b) all individuals are in a single sub-population.

D) Population estimated to number less than 250 mature individuals .

E) Quantitative analysis showing the probability of extinction in the wild is at least 20% within 20 years or 5 generations, whichever is the longer.

VULNERABLE (VU)

A taxon is **Vulnerable** when it is not Critically Endangered or Endangered but is facing a high risk of extinction in the wild in the medium-term future, as defined by **any** of the following criteria (A to E):

A) Population reduction in the form of **either** of the following:

1) An observed , estimated, inferred or suspected severe decline of at least 50% during the last 20 years or 5 generations for which data are available, based on (and specifying) **any of** the following:

a) direct observation
b) a decline in area of occupancy, extent of occurrence and/or quality of habitat
c) actual or potential levels of exploitation
d) the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites.

2) A severe decline of at least the rate specified in A1 that is projected, observed, inferred or suspected to be likely to occur in the near future, based on (and specifying) any of (b), (c), or (d) above.

B) Extent of occurrence estimated to be less than 20,000 km^2 or area of occupancy estimated to be less than 2000 km^2, and estimates indicating **any two of** the following:

1) Severely fragmented **or** found at no more than ten locations.

2) Continuing decline, inferred, observed or projected, in **any of** the following:

a) extent of occurrence
b) area of occupancy
c) area, extent and/or quality of habitat
d) number of locations or subpopulations
e) number of mature individuals .

3) Extreme fluctuations in **any of** the following:

a) extent of occurrence
b) area of occupancy
c) number of locations or subpopulations

C) Population estimated to number less than 10,000 mature individuals and **either**:

1) An estimated continuing decline of at least 20% within 10 years or 3 generations, whichever is longer, **or**

2) A continuing decline, observed, projected, or inferred, in numbers of mature individuals **and** population structure in the form of **either**

a) severely fragmented (i.e. no population estimated to contain more than 1000 mature individuals)
b) all individuals are in a single sub-population.

D) Population very small or restricted in the form of **either** of the following:

1) Population estimated to number less than 1000 mature individuals.

2) Population is characterised by an acute restriction in its area of occupancy (typically

less than 100 km^2) or in the number of locations (typically less than 5). Such a taxon would thus be prone to the effects of human activities (or stochastic events whose impact is increased by human activities) within a very short period of time in an unforeseeable future, and is thus capable of becoming Critically Endangered or even Extinct in a very short period.

E) Quantitative analysis showing the probability of extinction in the wild is at least 10% within 100 years.

11/5/94

Cría en cautividad

POSICIÓN DE LA UICN

(de Septiembre de 1987)

POSICION DE LA UICN SOBRE LA CRIA EN CAUTIVIDAD

Posición preparada por el
Grupo de Especialistas en Cría en Cautividad
de la Comisión de Supervivencia de Especies

Adoptada por la 22a. Reunión del Consejo de la
Unión Internacional para la Conservación de la Naturaleza
y de los Recursos Naturales (UICN)

Gland, Suiza, 4 de Setiembre de 1987

SUMARIO: la sola protección de los hábitat no es suficiente si el objetivo de la Estrategia Mundial para la Conservación en cuanto al mantenimiento de la diversidad biótica, quiere ser alcanzado.

El establecimiento de poblaciones cautivas autosuficientes y una intervención de apoyo serán necesarios para evitar la pérdida de muchas especies, especialmente aquellas en situación de gran riesgo por encontrarse en hábitat que se han visto muy reducidos, altamente fragmentados y alterados. Se necesitan establecer programas de cría en cautividad antes que las especies se vean reducidas a una cantidad de ejemplares críticamente baja, y también es preciso que dichos programas se coordinen internacionalmente según principios biológicos acertados, con miras a mantener o reintegrar poblaciones viables a su medio natural.

ENUNCIACION DEL PROBLEMA

Los datos de la UICN indican que cerca del 3% de la superficie terrestre está oficialmente protegida. Parte de esta área y mucho del restante 97% se está volviendo inhabitable para muchas especies, y las poblaciones que quedan están en gran medida siendo reducidas y fragmentadas. A partir de la moderna biología de la población se puede predecir que en esas condiciones muchas especies se perderán. En promedio, en cada año en este siglo se ha perdido más de una especie de mamífero, ave o reptil. El ritmo de desaparición para todas las especies es mucho más elevado, ya que no se registran las extinciones que ocurren en la mayoría de las taxas fuera de estos grupos.

Ciertos grupos de especies, especialmente aquellas con una distribución restringida, las de gran tamaño, las de gran valor económico, aquellas que están al principio de la cadena alimentaria, y las que solamente ocurren en hábitat clímax se hallan en una situación de riesgo particularmente alto.
Las especies de las mencionadas categorías son posiblemente las primeras en perderse, pero corren el riesgo una amplia

variedad de otros tipos. La conservación a largo plazo requerirá un manejo para reducir el riesgo, incluyendo poblaciones *ex situ* que podrían servir de apoyo e interactuar demográfica y genéticamente con, poblaciones silvestres.

FACTIBILIDAD

Más de 3000 especies de vertebrados están siendo criadas en zoológicos y otras instalaciones para animales en cautiverio. Cuando se hacen serios esfuerzos la mayoría de las especies se reproducen en cautiverio, y poblaciones viables pueden ser mantenidas por largos períodos. Una rica experiencia está disponible en esas instituciones en asuntos que incluyen reproducción animal, medicina veterinaria, biología reproductiva, comportamiento animal, y génetica. Ellas brindan un apoyo a las poblaciones de muchas taxas amenazadas, usando recursos que no compiten con aquellos de la conservación *in situ*. Las poblaciones en cautiverio han suministrado en el pasado un apoyo crítico a algunas poblaciones silvestres (por ejemplo el bisonte americano, *Bison bison*) y ha sido para otras la única manera de escapar de la extinción, al ser reintroducidas a su medio natural (por ejemplo el oryx arábigo, *Oryx leucoryx).*

RECOMENDACION

La UICN insta a todas aquellas organizaciones nacionales e internacionales e instituciones individuales interesadas en el mantenimiento de animales silvestres en cautiverio, a comprometerse, siempre que sea necesario, a desarrollar una política general de desarrollo demográfico autosostenido de poblaciones cautivas de especies en peligro de extinción.

PROTOCOLO SUGERIDO

QUE HACER Se deben tener en cuenta los problemas específicos de la especie en cuestión, y se deben explicitar claramente los objetivos del programa de cría en cautividad.

CUANDO Siempre se ha subestimado la vulnerabilidad de las poblaciones poco numerosas. Esto ha llevado a que las poblaciones en cautiverio se establezcan demasiado tarde, cuando la crisis es enorme y la extinción probable. Por tanto un reconocimiento temprano de tales situaciones es decisivo y depende de la información sobre el status de las poblaciones silvestres, particularmente la proporcionada por el Centro de Monitoreo de la Conservación de la UICN. El manejo para mejor reducir el riesgo de extinción requiere que se establezcan poblaciones en cautiverio sustentables con mucho más anticipación, preferiblemente cuando la población silvestre está aún en los millares. Los vertebrados con un censo actual por debajo de los mil individuos en su medio natural, requieren una estrecha y rápida colaboración entre los conservacionistas que trabajan en el terreno y aquellos especialistas en cría en cautividad, para hacer sus esfuerzos complementarios y minimizar la posible extinción de la taxa.

COMO Para asegurar el objetivo primario, que es la supervivencia de especies a través de poblaciones en cautiverio estables y autosustentadas, es necesario que dichas poblaciones en cautiverio sean establecidas y manejadas según principios científicos válidos. Las poblaciones en cautiverio que sean estables conservan las opciones para la reintroducción y/o el apoyo a las poblaciones silvestres.

El marco para una cooperación y coordinación internacional entre las instituciones de cría en cautividad que poseen especies en situación de riesgo, se debe establecer en un acuerdo para que cooperativamente se manejen dichas especies, a fin de lograr una seguridad demográfica y una

diversidad genética. El Grupo de Especialistas en Cría en Cautividad de la UICN/CSE es un grupo consultor apropiado en lo que concierne a la ciencia y recursos de la cría en cautividad.

Los programas de cría en cautividad destinados a especies en situación de riesgo deberán dirigirse en primer lugar a beneficiar a las mencionadas especies, sin que intervengan intereses comerciales. La adquisición de animales para dichos programas no deberá promover actividades comerciales. Cuando sea posible, los programas de cría en cautividad deberán ser llevados a cabo paralelamente con los estudios de campo y con los esfuerzos destinados a la conservación de las especies en su medio natural.

TALLER DE EVALUACION DE CONSERVACION Y PLAN DE MANEJO PARA LAS ESPECIES ENDEMICAS DE COSTA RICA

CONSERVATION ASSESSMENT AND MANAGMENT PLAN (CAMP) WORKSHOP FOR COSTA RICAN ENDEMICS

REPORT

Sección 6

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TALLER DE EVALUACION DE CONSERVACION Y PLAN DE MANEJO PARA LAS ESPECIES ENDEMICAS DE COSTA RICA

CONSERVATION ASSESSMENT AND MANAGMENT PLAN (CAMP) WORKSHOP FOR COSTA RICAN ENDEMICS

REPORT

Sección 7

Appendix
Taxon Data Sheets

CAMP. REPORTE POR TAXON

ESPECIE: Sturnira mordax - murciélago

CLASIFICACION:
IUCN:
USFWS:
CITES:
Otro:

Clasificación Taxonómica: Endémica regional (Costa Rica - Panama)

Distribución: 0-3200 m.s.n.m. En todo el país excepto Pacífico Norte. Parece más abundante en alturas medias y altas.

Población Silvestre: ?

Estudios de Campo:

Amenazas: 1) Destrucción de hábitat
2) Uso de pesticidas

Comments: Información básica sobre la especie. Colectado y reportado en el Parque Nacional Tortuguero y en el Parque Nacional Braulio Carrillo (sector Bajo de la Hondura)

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: X
PHVA: X
Otro:

Poblaciones en Cautiverio:

Recomendaciones de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Cryptotis jacksoni - musaraña

CLASIFICACION:
IUCN:
USFWS: No disponible
CITES: " "
Otro: " "

Clasificación Taxonómica: Endémica de Costa Rica

Distribución: Macizo Volcán Irazú - 2350-3180 m.s.n.m. (Woodman & Timm, 1993)

Población Silvestre: <500 posiblemente

Estudios de Campo:

Amenazas: 1) Destrucción de habitat para cultivos
2) Uso de plaguicidas
3) Depredación por animales domésticos (perros y gatos)

Comentarios: Hacen faltan más estudios taxonómicos (además de Woodman 1992) toda la información básica (biología, ecología e historia natural) de la especie y de su hábitat.

Presente Parque National Volcán Irazú

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: X
PHVA: X
Otro:

Poblaciones en Cautiverio:

Recomendaciones de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Bassaricyon lasius - olingo

CLASIFICACION:
IUCN:
USFWS:
CITES:
Otro:

Clasificación Taxonómica: Endémica de Costa Rica

Distribución: La Estrella, Cartago (1200 m.s.n.m.)

Población Silvestre:

Estudios de Campo:

Amenazas: 1) Alteración de hábitat
2) Cacería

Comentarios: Son indespensables todos los estudios básicos para cualquier especie.

No se ha colectado o informado en alguna Area Silvestre Protegida

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: X
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendaciones de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Saimiri oerstedii citrinellus - mono ardilla o titi

CLASIFICACION:
IUCN:
USFWS:
CITES: Apéndice II
Otro:

Clasificación Taxonómica: Subespecie endémica de Costa Rica

Distribución: Pacifico Central, especialmente Parque Nacional Manuel Antonio

Población Silvestre: <500

Estudios de Campo: Evaluaciones de población, monitoreos e historia natural (Boinski 86-93, Wong & Carrillo 91-94, Arauz 92-93)

Amenazas: Ver cuadro

Comentarios: Por los estudios realizados, se podría iniciar manejo de poblaciones.

Presente en el Parque Nacional Manuel Antonio

Recomendaciones:
Manejo en áreas naturales: X
Investigaciones:
PHVA:
Otro:

Poblaciones en Cautiverio: L. Muller (La Garita, Alajuela); D. Castelfranco (Jardín Gaia, Quepos)

Recomendaciones de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Syntheosciurus brochus poasensis - ardilla de altura

CLASIFICACION:
IUCN:
USFWS:
CITES: Apéndice II
Otro:

Clasificación Taxonómica: Subespecie endémica de Costa Rica

Distribución: Cordilleras Volcánica Central y Talamanca

Población Silvestre: >1000<10000

Estudios de Campo:

Amenazas: 1) Fuego
2) Deforestación

Comentarios: 1) Require de más información básica, así como de estudios taxonómicos en referencia a S. brochus brochus (Panamá). 2) Su grado de dificultad en cautiverio (2), Dificultad moderada fué estimado con base al comportamiento de otras ardillas costarricenses.

Colectado en Parque Nacional Volcán Poás y Parque Nacional Tapantí

Recomendaciones:
Manejo en áreas naturales:
Investigaciones:
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendaciones de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Sylvilagus decei - conejo de monte

CLASIFICACION:
IUCN:
USFWS:
CITES:
Otro:

Clasificación Taxonómica: Endémica regional Costa Rica - Panamá

Distribución: Cordillera de Talamanca, tierras altas (2500-3400 m.s.n.m.)

Población Silvestre: ?

Estudios de Campo:

Amenazas: Ver cuadro

Comentarios: Require de todos los estudios básicos de ecología e historia natural.

No ha sido communicada o colectada en alguna Area de Conservación (Area Silvestre Protegida).

Recomendaciones:
Manejo en áreas naturales:
Investigaciones:
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendaciones de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Orthogeomys cherriei - taltuza

CLASIFICACION:
IUCN:
USFWS:
CITES:
Otro:

Clasificación Taxonómica: Endémica regional Costa Rica - Nicaragua.

Distribución: Norteste del Valle Central y Zona Norte de Costa Rica. 50-1450 m.s.n.m.

Población Silvestre: >1000....? Fraccionadas

Estudios de Campo: Hábitos reproductivos y descripción de madrigueras

Amenazas: Ninguna en particular

Comentarios: Tiene categoría de plaga en cultivos agrícolas. Sin embargo no ha habido programas particulares ni planificación adecuada en su control. No ha sido colectada o informada en áreas silvestres protegidas.

Recomendaciones:
Manejo en áreas naturales:
Investigaciones:
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendaciones de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Orthogeomys heterodus - taltuza

CLASIFICACION:
IUCN:
USFWS:
CITES:
Otro:

Clasificación Taxonómica: Endémica de Costa Rica

Distribución: Elevaciones medias y altas del Sur del Valle Central y Cordilleras Volcánica Central y de Talamanca (300-3125 m.s.n.m.)

Población Silvestre:

Estudios de Campo: Se requiere de información básica sobre la especie

Amenazas: Ninguna en particular

Comentarios: Tiene categoría de plaga en cultivos agrícolas. Su control no ha sido planificado.

Colectada en el Parque Nacional Braulio Carrillo (Sector Zurquí)

Recomendaciones:
Manejo en áreas naturales:
Investigaciones:
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendaciones de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Orthogeomys underwoodi - taltuza

CLASIFICACION:
IUCN:
USFWS:
CITES:
Otro:

Clasificación Taxonómica: Endémica de Costa Rica

Distribución: Pacífico Central y Sur

Población Silvestre:

Estudios de Campo: Se requiere de información básica sobre la especie

Amenazas: Ninguna en particular

Comentarios: Ha sido colectada en los Parques Nacionales Manuel Antonio y Corcovado

Recomendaciones:
Manejo en áreas naturales:
Investigaciones:
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendaciones de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Scotinomys xerampelinus - ratón silvestre

CLASIFICACION:
IUCN:
USFWS:
CITES:
Otro:

Clasificación Taxonómica: Endémica regional de Costa Rica y Panamá

Distribución: Cordilleras Volcánica Central y de Talamanca. 2400-3450 m.s.n.m.

Población Silvestre:

Estudios de Campo: Se requiere de información básica sobre la especie

Amenazas: 1) Fuego

Comentarios: Colectado en los Parques Nacionales Volcán Irazú y Chirripó.

Recomendaciones:
Manejo en áreas naturales:
Investigaciones:
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendaciones de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Reithrodontomys rodriguezi - ratón silvestre

CLASIFICACION:
IUCN:
USFWS:
CITES:
Otro:

Clasificación Taxonómica: Endémica de Costa Rica

Distribución: Cordilleras Volcánica Central y de Talamanca. 2350-3400 m.s.n.m.

Población Silvestre:

Estudios de Campo: Se requiere de información básica de esta especie

Amenazas: 1) Fuego

Comentarios: Colectado en Parques Nacionales Braulio Carrillo (Sector Volcán Barba) y Volcán Irazú.

Recomendaciones:
Manejo en áreas naturales:
Investigaciones:
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendaciones de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Heteromys oresterus - ratón de bolsas mejillales

CLASIFICACION:
IUCN:
USFWS:
CITES:
Otro:

Clasificación Taxonómica:

Distribución: Tierras altas de Tilarán, Cordillera Volcánica Central y Cordillera de Talamanca (incluyendo sistemas montañosos conexos a Talamanca 1300-3300 m.s.n.m.

Población Silvestre: Endémica de Costa Rica

Estudios de Campo: Se requiere de toda información básica referente a esta especie

Amenazas: 1) Fuegos
2) Deforestación

Comentarios: Ha sido colectado en la Reserva Biológica Monteverde (privado) y Reserva Forestal Los Santos *

Recomendaciones:
Manejo en áreas naturales:
Investigaciones:
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendaciones de un Programa en Cautiverio:

* Las Reservas Forestales no poseen niveles estrictos de protección.

CAMP. REPORTE POR TAXON

ESPECIE: Oryzomys aphrastus - ratón silvestre

CLASIFICACION:
IUCN:
USFWS:
CITES:
Otro:

Clasificación Taxonómica: Endémica regional de Costa Rica y Panamá

Distribución: Sector Norte de la Cordillera de Talamanca (Dota) 1200 m.s.n.m.

Población Silvestre:

Estudios de Campo: Se requiere de toda información básica referente a esta especie

Amenazas: 1) Fuego

Comentarios: Colectada en Reserva Forestal Los Santos *

Recomendaciones:
Manejo en áreas naturales:
Investigaciones:
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendaciones de un Programa en Cautiverio:

* La Reserva Forestal no posee un nivel estricto de protección.

CAMP. REPORTE POR TAXON

ESPECIE: Stenella longirostris centroamericana. Murciélago.

CLASIFICACION:
IUCN:
USFWS:
CITES: Apendice I
Otro:

Clasificación Taxonómica: Endémica de las aguas costeras * del Pacífico de Centroamerica

Distribución: Aguas costeras del Pacífico de Centroamerica, desde el Sur de México hasta el Norte de Panamá

Población Silvestre: >1000 <10000

Estudios de Campo:

Amenazas: 1) Contaminación de aguas
2) Pesca

Comentarios: Se requiere de más información básica sobre esta especie

Recomendaciones:
Manejo en áreas naturales:
Investigaciones:
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendaciones de un Programa en Cautiverio:

* 50 km o menos de la costa

CAMP. REPORTE POR TAXON

ESPECIE: Trichechus manatus- manatí, vaca marina.
FamiliaÑ Trichechidae (=Manatidae)
CLASIFICACION:
IUCN:
USFWS:
CITES: Apéndice I
Otro:

Clasificación Taxonómica: No Endémica, rara.

Distribución: Norte de la Vertiente y Costa Atlánticas. En el Atlántico Sur y en la Vertiente Norte la situación es desconocida, posiblemente crítica o extinta.

Población Silvestre: 500

Estudios de Campo: Se ha realizado un conteo aéreo somero.

Amenazas: 1) Contaminación de cursos de agua y canales.
2) Tráfico acuático (fluvial, consistente de barcos, lanchas, etc.)
3) Desviación de cursos de agua y/o canales con lo cual se produce la desecación.
4) Cacería para alimentación.

Comentarios: Se requiere no sólo de información básica para la especie en el país sino de intensificar y "oficializar" conteos aéreos. Informado en el Parque Nacional Tortuguero y Refugio Nacional de Vida Silvestre Barra del Colorado.

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Sí
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendaciones de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Nesotriccus ridgwayi

CLASIFICACION:
IUCN:
USFWS:
CITES:
Otro: Stiles et al 1989 (c); Reglamento de la ley de vida Silvestre. Art. 63 (pr); Evaluación de la Biodiversidad en Costa Rica (-); ImBio. Base de datos (ex)

Clasificación Taxonómica:

Distribución: Isla del Coco

Población Silvestre: No determinada

Estudios de Campo: Escasos

Amenazas: Clima, enfermedades, problemas geneticos, disturbio humano, competencia inter e intraspecifica, perdida de habitats, depredación, contaminación

Comentarios: Información deficiente

Recomendaciones:
Manejo en áreas naturales:
Investigaciones:
PHVA:
Otro: Trabajos de campo para evaluar el estado actual de las poblaciones silvestres el habitat y su distribución; asi como los factores que amenazan la estabilidad actual

Poblaciones en Cautiverio:

Recomendaciones de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Pinaroloxias inornata

CLASIFICACION:
IUCN:
USFWS:
CITES:
Otro: Stiles et al 1989 (a); Reglamento de la ley de vida Silvestre. Art. 63 (pr); Evaluación de la Biodiversidad en Costa Rica (-); ImBio. Base de datos (ex)

Clasificación Taxonómica:

Distribución: Isla del Coco

Población Silvestre: No determinada

Estudios de Campo: Escasos

Amenazas: Clima, enfermedades, problemas geneticos, disturbio humano, competencia inter e intraspecifica, perdida de habitats, depredación, contaminación

Comentarios: Información deficiente

Recomendaciones:
Manejo en áreas naturales:
Investigaciones:
PHVA:
Otro: Trabajos de campo para evaluar el estado actual de las poblaciones silvestres el habitat y su distribución; asi como los factores que amenazan la estabilidad actual

Poblaciones en Cautiverio:

Recomendaciones de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Coccyzus ferrugineus

CLASIFICACION:
IUCN:
USFWS:
CITES:
Otro: Stiles et al 1989 (c); Reglamento de la ley de vida Silvestre. Art. 63 (pe); Evaluación de la Biodiversidad en Costa Rica (-); ImBio. Base de datos (ex)

Clasificación Taxonómica:

Distribución: Isla del Coco

Población Silvestre: No determinada

Estudios de Campo: Escasos

Amenazas: Clima, enfermedades, problemas geneticos, disturbio humano, competencia inter e intraspecifica, perdida de habitats, depredación, contaminación

Comentarios: Información deficiente

Recomendaciones:
Manejo en áreas naturales:
Investigaciones:
PHVA:
Otro: Trabajos de campo para evaluar el estado actual de las poblaciones silvestres el habitat y su distribución; asi como los factores que amenazan la estabilidad actual

Poblaciones en Cautiverio:

Recomendaciones de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Lampornis cinereicauda

CLASIFICACION:
IUCN:
USFWS:
CITES:
Otro: Stiles et al 1989 (c); Reglamento de la ley de vida Silvestre. Art. 63 (pe); Evaluación de la Biodiversidad en Costa Rica (-); ImBio. Base de datos (-)

Clasificación Taxonómica:

Distribución: Desde las tierras altas al sur de la Cordillera de Talamanca y las tierras altas región n.e. de Panamá; desde los 1800-2700 m.s.n.m.

Población Silvestre: No determinada

Estudios de Campo: Escasos

Amenazas: Clima, enfermedades, problemas geneticos, disturbio humano, competencia inter e intraspecifica, perdida de habitats, depredación, contaminación

Comentarios: Información deficiente

Recomendaciones:
Manejo en áreas naturales:
Investigaciones:
PHVA:
Otro: Trabajos de campo para evaluar el estado actual de las poblaciones silvestres el habitat y su distribución; asi como los factores que amenazan la estabilidad actual

Poblaciones en Cautiverio:

Recomendaciones de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Amazilia boucardi

CLASIFICACION:
IUCN:
USFWS:
CITES:
Otro: Stiles et al 1989 (c); Reglamento de la ley de vida Silvestre. Art. 63 (pr); Evaluación de la Biodiversidad en Costa Rica (ex); ImBio. Base de datos (ex)

Clasificación Taxonómica:

Distribución: Desde las tierras bajas del Golfo de Nicoya hasta el Golfo Dulce

Población Silvestre: No determinada

Estudios de Campo: Escasos

Amenazas: Clima, enfermedades, problemas geneticos, disturbio humano, competencia inter e intraspecifica, perdida de habitats, depredación, contaminación

Comentarios: Información deficiente

Recomendaciones:
Manejo en áreas naturales:
Investigaciones:
PHVA:
Otro: Trabajos de campo para evaluar el estado actual de las poblaciones silvestres el habitat y su distribución; asi como los factores que amenazan la estabilidad actual

Poblaciones en Cautiverio:

Recomendaciones de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Habia atrimaxillaris

CLASIFICACION:
IUCN:
USFWS:
CITES:
Otro: Stiles et al 1989 (c/e); Reglamento de la ley de vida Silvestre. Art. 63 (ex); Evaluación de la Biodiversidad en Costa Rica (ex); ImBio. Base de datos (ex)

Clasificación Taxonómica:

Distribución: Tierras bajas del Golfo Dulce

Población Silvestre: No determinada

Estudios de Campo: Escasos

Amenazas: Clima, enfermedades, problemas geneticos, disturbio humano, competencia inter e intraspecifica, perdida de habitats, depredación, contaminación

Comentarios: Información deficiente

Recomendaciones:
Manejo en áreas naturales:
Investigaciones:
PHVA:
Otro: Trabajos de campo para evaluar el estado actual de las poblaciones silvestres el habitat y su distribución; asi como los factores que amenazan la estabilidad actual

Poblaciones en Cautiverio:

Recomendaciones de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Elvira cupreiceps

CLASIFICACION:
IUCN:
USFWS:
CITES:
Otro: Stiles et al 1989 (c); Reglamento de la ley de vida Silvestre. Art. 63 (pe); Evaluación de la Biodiversidad en Costa Rica (ex); ImBio. Base de datos (ex)

Clasificación Taxonómica:

Distribución: Cordillera de Guanacaste hasta el norte del Valle Reventazon, desde los 300-1500 m.s.n.m.

Población Silvestre: No determinada

Estudios de Campo: Escasos

Amenazas: Clima, enfermedades, problemas geneticos, disturbio humano, competencia inter e intraspecifica, perdida de habitats, depredación, contaminación

Comentarios: Información deficiente

Recomendaciones:
Manejo en áreas naturales:
Investigaciones:
PHVA:
Otro: Trabajos de campo para evaluar el estado actual de las poblaciones silvestres el habitat y su distribución; asi como los factores que amenazan la estabilidad actual

Poblaciones en Cautiverio:

Recomendaciones de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Metachirus nudicaudatus - zorro rojo o colorado
Familia Didelphidae
CLASIFICACION:
IUCN:
USFWS:
CITES:
Otro:

Clasificación Taxonómica: No endémica. Rara

Distribución: Zona Norte de Costa Rica. Región Atlántica de Costa Rica; 0-1000 m.s.n.m.

Población Silvestre:

Estudios de Campo: Se requiere información básica de a especie

Amenazas: 1) Deforestación

Comentarios: Ha sido colectado cerca de la Estación Biológica La Selva (privada)

Se recomienda Apendice I (CITES)

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Yes
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendaciones de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Vampyrum spectrum - falso vampiro
Familia Phyllostomidae
CLASIFICACION:
IUCN:
USFWS:
CITES:
Otro:

Clasificación Taxonómica: No endémica

Distribución: Tierras bajas de todo el país; 0-1000 m.s.n.m. Tanto en bosque seco como en bosque húmedo

Población Silvestre:

Estudios de Campo: Hábitos alimenticios

Amenazas: 1) Deforestación

Comentarios: Ha sido colectada en el Parque Nacional Manuel Antonio y en la Reserva Biológica Monteverde (privada). Requiere esta especie de más informacón básica.

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Yes
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendaciones de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Ateles geoffroyi - mono colorado o araña
Familia Cebidae
CLASIFICACION:
IUCN:
USFWS:
CITES: Apendice I
Otro:

Clasificación Taxonómica: No endémica. Amenazada.

Distribución: Tierras bajas, medias e incluso altas (ca 3000 m.s.n.m.) del país de Costa Rica

Población Silvestre: < 10000

Estudios de Campo: Algunos censos preliminares en Parque Nacional Santa Rosa y Manuel Antonio, así como en Reserva Natural Absoluta de Cabo Blanco. También sobre hábitos alimenticios

Amenazas: 1) Deforestación
2) Cacería (comestible)

Comentarios: Es necessario conocer más sobre sus habitos reproductivos, efectuar más censos e iniciar monitoreos.

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Yes
PHVA:
Otro:

Poblaciones en Cautiverio: En Zoológico Simón Bolívar

Recomendaciones de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Alouatta palliata - mono congo
Familia Cebidae
CLASIFICACION:
IUCN:
USFWS:
CITES: Apendice I
Otro:

Clasificación Taxonómica: No endémica. Común.

Distribución: Tierras bajas o de mediana altura del Atlantico, Pacifico y Zona Norte del país

Población Silvestre: <10000

Estudios de Campo: Hábitos alimenticios y reproductivos, censos de poblacion y algunos monitores preliminares; principalmente en Parques Nacionales Santa Rose y Manuel Antonio y Centro Ecológico La Pacífica

Amenazas: 1) Deforestación
2) Cacería

Comentarios: Hacen falta censos en el Atlántico y en el Pacífico sur, así como consolidar programas de monitoreo de poblaciones en todo el país

Recomendaciones:
Manejo en áreas naturales: Yes
Investigaciones: Yes
PHVA: Yes
Otro:

Poblaciones en Cautiverio:

Recomendaciones de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Myrmecophaga tridactyla - oso caballo, hormiguero real Familia Myrmecophagidae

CLASIFICACION:
IUCN:
USFWS:
CITES: Apendice I
Otro:

Clasificación Taxonómica: No endémica. Amenazada, posiblemente crítica.

Distribución: Tierras bajas del Pacífico, Atlantico y Zona Norte de Costa Rica. En el Pacifico seco quizá extinta

Población Silvestre: < 100

Estudios de Campo:

Amenazas: 1) Deforestation
2) Cacería. La gente en las zonas rurales le temen a este animal por las muchas historias que existen sobre ella

Comentarios: Se requiere de mucha información básica de esta especie. Ha sido observado en los ultimos años en el Parque Nacional Santa Rosa y en el Parque Nacional Tortuguero

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Yes
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendaciones de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Neusticurus apodemus
Familia: Taiidae.

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación Taxonómica: Conocida.

Distribución: Bajuras del Pacífico noroeste, colinas adyacentes y Meseta Central Occidental.

Población Silvestre:

Estudios de Campo: Taxonómicos.

Amenazas: Pérdida de habitat.

Comentarios:

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Taxonómicas, Exploración, Monitoreo y Estudios de Historia de Vida.
PHVA:
Otro:

Población en Cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE:Ptychoglossus plicatus

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida.

Distribución: Bajuras del Atlántico Noreste y colinas adyacentes.

Población Silvestre:

Estudios de Campo: Taxonómicos.

Amenazas: Pérdida de habitat.

Comentarios:

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Taxonómicas, Exploración, Monitoreo y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Geophis dowsi.

CLASIFICACION: Desconocida
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida

Distribución: Bajuras del Pacífico Suroeste y Colinas Adyacentes.

Población Silvestre:

Estudios de Campo: Taxonómicos.

Amenazas: Pérdida de Habitat.

Comentarios:

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Taxonómicas, Monitoreo, Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Geophis ruthveni.

CLASIFICACION: Desconocida
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida

Distribución: Bajuras del Atlántico noreste y colinas adyacentes.

Población Silvestre:

Estudios de Campo: Taxonómicos.

Amenazas: Pérdida de Habitat.

Comentarios:

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Taxonómicas, Monitoreo, Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Geophis zeledoni.

CLASIFICACION: Desconocida
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida

Distribución: Cordillera Central y de Tilarán: Volcán Poás.

Población Silvestre:

Estudios de Campo: Taxonómicos.

Amenazas: Pérdida de Habitat.

Comentarios:

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Taxonómicas, Monitoreo, Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Rhadinaea serperaster

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida.

Distribución: Cordillera Central y de Tilarán, Bajuras del Atlántico Noreste y colinas adyacentes.

Población Silvestre:

Estudios de Campo: Taxonómicos.

Amenazas: Pérdida de Habitat.

Comentarios:

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Monitoreo, Exploración, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Sibon argus

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida.

Distribución: Bajuras del Pacífico Noroeste, Colinas Adyacentes y Meseta Central Occidental.

Población Silvestre:

Estudios de Campo: Taxonómicos.

Amenazas: Pérdida de Habitat.

Comentarios:

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Monitoreo, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Leptodeira rubricata

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida.

Distribución: Bajuras del Pacífico Suroeste y colinas adyacentes.

Población Silvestre:

Estudios de Campo: Taxonómicos.

Amenazas: Pérdida de Habitat.

Comentarios:

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Monitoreo, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Trimetopon gracile

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida.

Distribución: Cordillera Central y de Tilarán, Bajuras del Atlántico Noreste y Colinas Adyacentes y Corillera de Talamanca, Reserva de Monteverde.

Población Silvestre:

Estudios de Campo: Taxonómicos.

Amenazas: Pérdida de Habitat.

Comentarios:

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Monitoreo, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Trimetopon pliolepis

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida.

Distribución: Bajuras del Atlántico Noreste y Colinas Adyacentes, Bajuras del Pacífico Noroeste, colinas adyacentes y Meseta Central Occidental, Bajuras del Pacífico Suroeste y colinas adyacentes, Reserva de Monteverde.

Población Silvestre:

Estudios de Campo: Taxonómicos.

Amenazas: Pérdida de Habitat.

Comentarios:

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Monitoreo, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Trimetopon simile

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida.

Distribución: Bajuras del Atlántico Noreste y Colinas Adyacentes, Siquirres y Reserva de Monteverde.

Población Silvestre:

Estudios de Campo: Taxonómicos.

Amenazas: Pérdida de Habitat.

Comentarios:

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Monitoreo, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Trimetopon viquezi

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida.

Distribución: Bajuras del Atlántico Noreste y Colinas Adyacentes, Siquirres.

Población Silvestre:

Estudios de Campo: Taxonómicos.

Amenazas: Pérdida de Habitat.

Comentarios:

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Monitoreo, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Oscaecilia osae

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida.

Distribución: Península de Osa.

Población Silvestre: Desconocida.

Estudios de Campo: Taxonómicos.

Amenazas: Pérdida de Habitat.

Comentarios:

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Monitoreo, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Oedipina altura

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida.

Distribución: Cordillera de Talamanca: Cartago.

Población Silvestre: Desconocida.

Estudios de Campo: Taxonómicos.

Amenazas: Pérdida de Habitat.

Comentarios:

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Monitoreo, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Oedipina carablanca

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida.

Distribución: Bajuras del Atlántico Noreste y colinas adyacentes: Los Diamantes, Limón.

Población Silvestre: Desconocida.

Estudios de Campo: Taxonómicos.

Amenazas: Pérdida de Habitat.

Comentarios:

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Monitoreo, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Oedipina paucidentata

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida.

Distribución: Cordillera de Talamanca, Cartago.

Población Silvestre: Desconocida.

Estudios de Campo: Taxonómicos.

Amenazas: Pérdida de Habitat.

Comentarios:

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Monitoreo, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Oedipina poelzi

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida.

Distribución: Cordillera Central y de Tilarán y Bajuras del Atlántico Sureste y Colinas Adyacentes.

Población Silvestre: Desconocida.

Estudios de Campo: Taxonómicos.

Amenazas: Pérdida de Habitat.

Comentarios:

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Monitoreo, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Phyllobates vitattus

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida.

Distribución: Bajuras del Pacífico suroeste y colinas adyacentes.

Población Silvestre: Desconocida.

Estudios de Campo: Taxonómicos.

Amenazas: Pérdida de Habitat.
Tráfico de Vida Silvetre.
Interferencia o disturbio Humano.

Comentarios:

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Monitoreo, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Norops altae

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida.

Distribución: Cordillera Central y de Tilarán, Bajuras del Pacífico suroeste y colinas adyacentes y Colina de Talamanca.

Población Silvestre: Desconocida.

Estudios de Campo: Taxonómicos.

Amenazas: Pérdida de Habitat.
Tráfico de Vida Silvetre.
Interferencia o disturbio Humano.

Comentarios:

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Monitoreo, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Norops pachypus

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida.

Distribución: Cordillera Central y de Tilarán y Cordillera de Talamanca.

Población Silvestre: Desconocida.

Estudios de Campo: Taxonómicos.

Amenazas: Pérdida de Habitat.
Tráfico de Vida Silvetre.
Interferencia o disturbio Humano.

Comentarios:

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Monitoreo, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Norops polylepis

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida.

Distribución: Bajuras del Pacífico suroeste y colinas adyacentes.

Población Silvestre: Desconocida.

Estudios de Campo: Taxonómicos.

Amenazas: Pérdida de Habitat.
Tráfico de Vida Silvetre.
Interferencia o disturbio Humano.

Comentarios:

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Monitoreo, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Norops towsendi

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida.

Distribución: Isla de Cocos.

Población Silvestre: Desconocida.

Estudios de Campo: Taxonómicos.

Amenazas: Pérdida de Habitat.
Tráfico de Vida Silvetre.
Interferencia o disturbio Humano.

Comentarios:

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Monitoreo, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Norops tropidolepis

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida.

Distribución: Corillera Central y de Tilarán y Corillera de Talamanca.

Población Silvestre: Desconocida.

Estudios de Campo: Taxonómicos.

Amenazas: Pérdida de Habitat.
Tráfico de Vida Silvetre.
Interferencia o disturbio Humano.

Comentarios:

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Monitoreo, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Celestus cyanochloris

CLASIFICACION: Desconocida a la fecha, en proceso de revisión.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: ?

Distribución: Corillera Central y de Tilarán, Bauras del Atlántico Noreste y colinas adyacentes y Corillera de Talamanca.

Población Silvestre: ?

Estudios de Campo: Taxonómicos.

Amenazas: Pérdida de Habitat.

Comentarios: La especie descrita está siendo estudiada para clasificarla en 5 especies distintas.

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Censos, dinámica poblacional, distribución actual, Exploración, Monitoreo, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Sphaerodactylus pacificus

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: ?

Distribución: Isla de Cocos.

Población Silvestre: ?

Estudios de Campo: Taxonómicos.

Amenazas: Pérdida de Habitat.

Comentarios:

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Monitoreo, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Urotheca myersi

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: ?

Distribución: Perez'Zeledon, Provincia de San José, Cordillera de Talamanca

Población Silvestre: ?

Estudios de Campo: Taxonómicos.

Amenazas: Pérdida de Habitat.

Comentarios: 1 o 2 ejemplares conocidos.

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Monitoreo, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Nototriton picadoi

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida

Distribución: N. picadoi en Tapantí.
N. mayor, en Morovia, Chirripó (sólo un ejemplar).
N. abscandens, meseta Central y Tilarán.

Población Silvestre:

Estudios de Campo:

Amenazas: Pérdida de Habitat.

Comentarios: Dividida actualmente en 4 especies.

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Monitoreo, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Nototriton richardi

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida

Distribución: N. guanacaste en Orosí (varios ejemplares).
N. tapantí, Tapantí (sólo un ejemplar).

Población Silvestre:

Estudios de Campo:

Amenazas: Pérdida de Habitat.

Comentarios: Dividida actualmente en 2 especies.

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Monitoreo, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Agallychnis annae

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida

Distribución: Corillera Central y de Tilarán, Bajuras del Atlántico noreste y colinas adyacentes, Bajuras del Pacífico noroeste, colinas adyacentes y Meseta Central Occidental, Bajuras del Atlántico sureste y colinas adyacentes, Corillera de Talamanca y Reserva de Monteverde.

Población Silvestre:

Estudios de Campo: Taxonómicos.

Amenazas: Pérdida de Habitat.
Interferencia o disturbio Humano.
Contaminación.

Comentarios:

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Monitoreo, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Hyla pictipes

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida

Distribución: Cordillera Central y de Tilarán y Corillera de Talamanca.

Población Silvestre:

Estudios de Campo: Taxonómicos.

Amenazas: Pérdida de Habitat.

Comentarios: Posiblemente datos obtenidos en monitoreo de poblaciones de anfibios en Costa Rica y Panamá por Federico Bolaños de la U.C.R.

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Monitoreo, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Hyla rufioculus

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida

Distribución: Cordillera Central y de Tilarán, Bajuras del Atlántico Noreste y colinas adyacentes, Bajuras del Pacíico Suroeste y colinas adyacentes, Corillera de Talamanca y Reserva de Monteverde.

Población Silvestre:

Estudios de Campo: Taxonómicos.

Amenazas: Pérdida de Habitat.

Comentarios: Posiblemente datos obtenidos en monitoreo de poblaciones de anfibios en Costa Rica y Panamá por Federico Bolaños de la U.C.R.

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Monitoreo, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Hyla xanthosticta

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida

Distribución: Cordillera Central y de Tilarán: Volcán Barba, Heredia.

Población Silvestre:

Estudios de Campo: Taxonómicos.

Amenazas: Pérdida de Habitat.

Comentarios: Posiblemente datos obtenidos en monitoreo de poblaciones de anfibios en Costa Rica y Panamá por Federico Bolaños de la U.C.R.

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Monitoreo, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Dendrobates granuliferus

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida

Distribución: Bajuras del Pacífico suroeste y colinas adyacentes. Región del Golfo Dulce.

Población Silvestre: Población estable en sitio conocido (Rincón de Osa, provincia de Puntarenas)

Estudios de Campo: Se han realizado estudios sobre la especie pero son de acceso restringido (tesis U.C.R.).

Amenazas: Pérdida de Habitat.
Tráfico de Vida Silvestre.
Interfenecia o disturbio humanos.

Comentarios: La persona que conoce mas sobre la especie es Federico Bolaños (U.C.R., tesis de maestría). Eberhard Meyer, Universitat de Ulm, Alemania.

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Monitoreo, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Centrolenella talamancae, ahora Hylinobatrachium talamancae.

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida

Distribución: Bajuras del Atlántico noreste y colinas adyacentes. Provincia de Cartago.

Población Silvestre:

Estudios de Campo: Taxonómicos.

Amenazas: Pérdida de Habitat.
Interfenecia o disturbio humanos.

Comentarios: Sólo un especímen conocido.

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Monitoreo, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Bufo holdridgei

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida

Distribución: Cordillera Central y de Tilarán.

Población Silvestre:

Estudios de Campo: Taxonómicos.

Amenazas: Pérdida de Habitat.

Comentarios:

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Monitoreo, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Bufo melanochloris

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida

Distribución: Bajuras del Atlántico Noreste y colinas adyacentes, bajuras del Atlántico sureste y colinas adyacentes, Bajuras del Pacífico suroeste y colinas adyacentes, Reserva de Monteverde.

Población Silvestre:

Estudios de Campo: Taxonómicos.

Amenazas: Pérdida de Habitat.

Comentarios:

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Monitoreo, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en Cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Bufo periglenes

CLASIFICACION:
IUCN: Crítico
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida

Distribución: Cordillera Central y de Tilarán. Reserva de Monteverde.

Población Silvestre:

Estudios de Campo: Taxonómicos y Poblacionales.

Amenazas: Pérdida de Habitat.
Clima.
Problemas con variabilidad genética.

Comentarios: Población desaparecida del área conocida desde 1989. Se requiere búsqueda intensiva de la especie y, de encontrarla, manejo en cauitiverio o en su rango de distribución.

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Monitoreo, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Atelopus senex

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida

Distribución: Cordillera Central y de Tilarán, Cordillera de Talamanca.

Población Silvestre:

Estudios de Campo: Taxonómicos.
Tesis de grado U.C.R.

Amenazas: Pérdida de Habitat.

Comentarios: Durante 5 meses de búsqueda en sitio conocido para la especie no se ha encontrado un sólo individuo. Sitio: Cerro Chumpipi, provincia de Heredia cerca de Río Las VUletas. Monitotreo de Poblaciones de Anfibios en Costa Rica y Panamá (1994, U.C.R.). Probablemente extinta en la zona.

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Monitoreo, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro: Es necearia la búsqueda intensiva de la especie.

Poblaciones en cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Bolitoglossa alvaradoi

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida

Distribución: Bajuras del Atlántico Noreste y colinas adyacentes, Limón, CArtago y Alajuela.

Población Silvestre:

Estudios de Campo:

Amenazas: Pérdida de Habitat.

Comentarios:

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Monitoreo, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Bolitoglossa arborescandens

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida

Distribución: Cordillera Central y de Tilarán, Bajuras del Atlántico Noreste y colinas adyacentes.

Población Silvestre:

Estudios de Campo:

Amenazas: Pérdida de Habitat.

Comentarios:

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Monitoreo, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Bolitoglossa cerroensis

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida

Distribución: Cordillera de Talamanca: Cartago y San José.

Población Silvestre:

Estudios de Campo:

Amenazas: Pérdida de Habitat.

Comentarios:

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Monitoreo, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Bolitoglossa diminuta

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida

Distribución: Bajuras del Atlántico noreste y colinas adyacentes: cerca de Tapantí, Cartago.

Población Silvestre:

Estudios de Campo:

Amenazas: Pérdida de Habitat.

Comentarios:

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Monitoreo, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Bolitoglossa epimela

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida

Distribución: Bajuras del Atlántico noreste y colinas adyacentes: Cartago.

Población Silvestre:

Estudios de Campo:

Amenazas: Pérdida de Habitat.

Comentarios:

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Monitoreo, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Bolitoglossa gracilis

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida

Distribución: Bajuras del Atlántico noreste y colinas adyacentes: cerca de Tapantí, Cartago.

Población Silvestre:

Estudios de Campo:

Amenazas: Pérdida de Habitat.

Comentarios:

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Monitoreo, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Bolitoglossa sooyoyum

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida

Distribución: Cordillera de Talamanca, cerca de El Empalme, Cartago.

Población Silvestre:

Estudios de Campo:

Amenazas: Pérdida de Habitat.

Comentarios:

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Monitoreo, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Eleutherodactylus altae

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida

Distribución: Cordillera Central y de Tilarán. Reserva de Monteverde.

Población Silvestre:

Estudios de Campo:

Amenazas: Pérdida de Habitat.

Comentarios:

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Monitoreo, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Eleutherodactylus angelicus

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida

Distribución: Cordillera Central y de Tilarán, volcán Poas y Reserva de Monteverde.

Población Silvestre:

Estudios de Campo:

Amenazas: Pérdida de Habitat.

Comentarios:

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Monitoreo, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Eleutherodactylus cuaquero

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida

Distribución: Cordillera Central y de Tilarán, Puntarenas y Reserva de Monteverde.

Población Silvestre:

Estudios de Campo:

Amenazas: Pérdida de Habitat.

Comentarios:

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Monitoreo, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Eleutherodactylus escoces

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida

Distribución: Cordillera Central y de Tilarán, Barba, Irazú y Turrialba.

Población Silvestre:

Estudios de Campo:

Amenazas: Pérdida de Habitat.

Comentarios:

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Monitoreo, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

ESPECIE: Eleutherodactylus hylaeformis

CLASIFICACION: Desconocida.
IUCN:
USFWS:
CITES:
Otro:

Clasificación taxonómica: Conocida

Distribución: Cordillera Central y de Tilarán, Cordillera de TalamancaBarba, Irazú y Turrialba. Reserva de Monteverde.

Población Silvestre:

Estudios de Campo:

Amenazas: Pérdida de Habitat.

Comentarios:

Recomendaciones:
Manejo en áreas naturales:
Investigaciones: Exploración, Monitoreo, Taxonómicos y Estudios de Historia de Vida.
PHVA:
Otro:

Poblaciones en cautiverio:

Recomendación de un Programa en Cautiverio:

CAMP. REPORTE POR TAXON

SPECIES: Sciurus brochus poasensis - high elevation squirrel

STATUS:
IUCN:
USFWS:
CITES: Appendix II
Other:

Taxonomic status: Endemic subspecies of Costa Rica

Distribution: Central Volcanic Mountainous System and Talamanca

Wild Population: >1000<10000

Field Studies:

Threats: 1) Fires
2) Deforestation

Comments: 1) More basic information is required and taxonomic studies to differentiate with S. brochus brochus of Panama.
2) Difficulty level (2) to maintain the species in captivity was estimated based on observations on other Costarican squirrels.

Collected at the Poas Volcano and Tapanti National Parks.

Recommendations:
Wild management:
Research:
PHVA:
Other:

Captive Population:

Captive Program Recommendation: