Exploring Methods for Multi-Species Planning

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Aim

The aim of this Working Group session is to discuss existing methodologies for developing conservation plans for groups of taxa, and to use this information to advance our thinking on designing and implementing an effective planning process in response to this growing need.

Background

As the renamed Conservation Planning Specialist Group (CPSG), we have been tasked with providing leadership in scaling up species conservation planning across the breadth of taxonomic Specialist Groups that make up the IUCN's Species Survival Commission (SSC). This means not only expanding our collaborative efforts across a larger number of Specialist Groups, but also increasing the number of taxa that are covered by a given conservation planning process. Our intensive Population and Habitat Viability Assessment (PHVA) process, typically focused on planning for a single species or population, is not designed to accommodate this expanded need. At the same time that we continue to apply the proven PHVA process to appropriate situations, we must begin designing and implementing a new process for addressing the growing conservation needs of multiple species simultaneously.

A variety of different approaches to multi-species planning are discussed in the conservation biology literature. To highlight just a few examples, planning can address a taxonomic group (e.g., all lemurs), a geographic area (e.g., the mammals of South Africa's Kruger National Park), a defined threat to species persistence (e.g., poaching rhinos for international horn trade), or it can be based on more complex theories of optimal resource allocation for the maximum return on investment for biodiversity protection (e.g., development of Protected Areas). CBSG used to conduct a type of multi-species planning process called a Conservation Assessment and Management Plan, or CAMP that combined many of the approaches listed above in response to a particular planning need. While we no longer use this process, the basic workshop structure remains attractive and could perhaps be used as a basis for an evolved process that more effectively addresses the multi-species planning needs of the SSC.

The IUCN's World Commission on Protected Areas (WCPA) is collaborating with the SSC through the IUCN WCPA/SSC Joint Task Force on biodiversity and protected areas. This Task Force is working to identify a global standard for identifying sites – known as "key biodiversity areas" – whose active management could contribute significantly to the global persistence of species. In addition, they are determining how to best evaluate the long-term success for protected areas in conserving biodiversity.

There may perhaps be some areas of fruitful discussion and collaboration with the Task Force as we and the SSC expand species conservation planning across the breadth of Specialist Groups and IUCN members seeking to conserve biodiversity.

How do we determine the effectiveness of these various approaches – are some methods "better" than others? Should we consider each approach as a separate basis for planning workshop design? How might alternative workshop designs differ in their structure and the tools that would be used in the planning process? What kinds of intellectual and technical resources may be needed to facilitate this expanded capacity within CPSG?

Notes

Working group convenors acknowledged that there is confusion within the wildlife conservation community on the specific definitions of a number of terms related to species conservation planning. Consequently, the working group began their deliberations by discussing these terms, with the goal of achieving at least some consensus on their operational definitions in the context of CPSG activities. The discussions were focused around a draft document created by the workshop conveners, which was revised during the course of the CPSG Annual Meeting. The most current version of this document is included here as Appendix 1. This version was improved significantly as a result of the discussions in this working group.

Following the discussion of conservation planning terms, the group discussed the different types of contexts that CPSG might encounter as they move forward with multispecies conservation planning. These contexts may include:

- A specific taxonomic group, such as primates
- A specific taxonomic group in a defined area, such as:
    - Primates in a Protected Area
    - Primates in a country
    - Primates in a region, i.e, across national boundaries
- A group of taxa impacted by a specific threat, such as illegal trade or invasive species

Initially, the discussion centered on "thematic" and "geographic" scenarios that would define the scope of any given multi-species conservation planning initiative. Over the course of the discussion, there was an argument that all scenarios would be geographic, with a more specific scope defined by the purpose of the proposed planning initiative.

Additionally, would the scope of the planning initiative be at least in part defined by who is requesting the planning activity? Potential customers for multi-species planning include SSCC Specialist Groups, national governments, regional governments NGOs, etc. It is likely that the customer would in fact be important in framing the scope of a planning initiative, both geographically and thematically. Other issues that might determine the scope of a multi-species planning process include:

- Overall planning objective
- Availability of data on the taxa and the known threats to persistence
- Breadth of taxonomic diversity
- Capacity to implement conservation actions
- Legislative context and capacity to coordinate action

Understanding the geographic and thematic scope of a proposed planning initiative is considered important for many reasons, not the least of which would be choice of the appropriate deliberative process for productive discussion among stakeholders and the analytical tools for robust scientific evaluation of available information to support decision-making.

These discussions led to a conversation of the role that endangered species conservation planning plays within the larger context of species conservation. This is presented graphically in Figure 1 of Appendix 1. The overall process of species identification and broader risk assessment feeds into the more detailed treatment of species conservation planning as envisioned by CPSG, which is an inclusive set of steps for providing species with the conservation attention that they require for long-term persistence. While there is some overlap and redundancy in the individual steps needed for the "macro" and "micro" approaches to species conservation as laid out in the figure, the structure is meant to identify the larger process of prioritizing species for conservation assessment, which is then followed by the more detailed process of conservation action planning for those species deemed appropriate for that planning. This discussion ultimately generated some confusion among participants about the differences between these two organizational levels of planning, and the appropriate tools and processes to bring to bear on the planning elements that define them. Our ultimate challenge in this group is to understand the needs for species conservation planning across an extremely broad taxonomic range – with more than 25,000 species identified by the most current Red List assessment process as threatened – and to begin discussing how CPSG can provide leadership in conservation planning across the SSC. How can we increase our effectiveness in addressing the conservation planning needs for so many taxa?

With this goal in mind, the working group listed to a set of presentations featuring examples of various planning processes that are applicable to the multi-species planning context.

<u>Amphibian Ark Conservation Needs Assessment (Anne Baker, CPSG North America / Amphibian Ark)</u>

A logical, transparent, repeatable process for guiding amphibian conservation activities within a country or region.

- Evaluates and prioritises species
- Recommends a range of conservation activities for each species

The CNA process started as a way to identify those populations needed for rescue, and then broadened to include *in situ* conservation efforts. It began as a decision tree tool, then expanded to a workshop approach, and is now an online process. The process can recommend any of a series of potential conservation management activities, including:

- Ark
- Rescue
- *In situ* conservation
- In site research
- *Ex situ* research
- Mass production in captivity
- Supplementation

The process also uses numeric scores to evaluate and prioritize taxa for different types of conservation action:

- Red list assessment

- EDGE score
- Over collection from wild
- Threat mitigation
- Biological distinctiveness
- Scientific importance
- Cultural/socio-economic importance
- Habitat available for reintroduction

The online survey tool includes a series of questions that ultimately trigger recommendations for the various types of conservation actions, in a type of decision-tree approach.

Discussion points that emerged from this presentation:

- The problem with this type of evaluation tools is that it requires data. Scientists are not conservationists!
- Go to people who know the species – much quicker to do than someone trawling through all the literature. But people are often reluctant to do it. Also can be interpreted differently by different people – get different sorts of answers.
- Works quite well when you have very little data – easy to pass through the decision tree. Not so easy when you have a lot of information. Process seems inadequate because not giving you enough depth. Useful for invertebrates to determine whether they need something or nothing.
- Does the conservation needs assessment prioritize among actions? No – not really – does within the category – this is a high priority. But doesn't evaluate one action against another.
- The optimal method for implementing this tool is a bit unclear – whether it should be done in an interactive workshop setting, or perhaps entirely online, or some other method.
- Could you get 'robots' to generate the initial assessment and then people to sense check/refine?
- Basic information we need is often not the subject of scientific investigation – e.g. basic population density surveys. Scientists may be studying an aspect of a species' biology intensely but they will avoid the basic surveys which are time consuming and do not lead to fancy publications!

<u>Integrated Collection Assessment and Planning (Kristin Leus, CPSG Europe)</u>

The ICAP workshop process is designed to help zoos with their collection planning activities, explicitly applying CPSG's One Plan Approach to integrated species conservation. Consequently, it is important to include in situ researchers and managers in the planning process so that the needs of the wild population and its management are taken into account during the planning process.

Pre-workshop activities: Lots of work to be done before the workshop begins, including developing a description of *ex situ* status for each taxon which is then shared with the appropriate *in situ* people. It is important to survey a wide range of *in situ* people to ask them if there are roles for *ex situ* populations – BUT not just about breeding programs. The process is designed to open their minds to other types of *ex situ* activities, e.g. education and awareness raising roles, research roles etc. This work leads to the creation of a species sheet to summarize the information.

At the workshop itself, the participants prioritize which taxa are to be addressed first based on their needs. They then consider direct and indirect *ex situ* roles and for each role evaluate their applicability using these criteria:

- Benefit
- Feasibility
- Risk
- Characteristics

Each of these characteristics are rated as high, moderate, or low. Based on this evaluation, participants are asked whether or not to recommend an *ex situ* role for the taxon. This is not an automated decision, but is instead a human decision. The decision is based on a qualitative assessment at present, could the information could lead to a quantitative scoring or scaling in a way that provided a more defensible result.
This process is used to develop a long term management plan (LTMP) for prioritized species At the end, for all taxa in the group, the following recommendations can be made:

- Continue or modify existing programmes
- Reduce or phase out *ex situ* population
- Establish new *ex situ* populations
- Do not establish an *ex situ* population

It is used to provide guidance to regional zoo associations for collection planning and species conservation management programs. So far, the process has been tested on the Canid/Hyaenid Specialist Group.

Discussion points that emerged from this presentation:

- This sounds like it more focused on zoo planning than wild population conservation planning – non-conservation roles also important. The ICAP process is definitely more focused on one particular area of conservation activity – *ex situ* contributions to wild population conservation.
- There might be elements of the evaluation mechanism that could be used in broader conservation planning. Could 'hybridize' this process with CPSG's older "CAMP" process which didn't deal with the *ex situ* role very thoroughly.
- The CNA process doesn't ask questions about cost, which is taken into account in the ICAP process. Another level below that for the captive component.
- There are some concerns about no quantification of cost, feasibility, benefit – without this, you can't get to a point where one can make specific decisions against multiple species.
- This process seems to be information intensive – does all the information contribute importantly to your decision? It depends on who the client is for the particular planning context.
- How to deal with increased uncertainty in data – it is possible to put boundaries around it – what's the worst/best case scenario, etc.

<u>Open Standards for the Practice of Conservation (Nico Boenisch, Conservation Measures Partnership)</u>

The Open Standards began with a "Rosetta Stone" type of analysis that compared the planning terms that were being used across a host of planning approaches in order to create a common vocabulary. The Conservation Measures Partnership is an assemblage of public and private donors within the conservation sector that assesses emerging tools for incorporation as best practice into the Open Standards, adopting ideas from other disciplines and organizations as required. The philosophy is based on a useful quote by Dan Martin:

"*A plan is truly strategic when it specifies not only what you will do but what you will not do and why*."

The general framework for applying the Open Standards involves the following steps:

- Identify the scope of your planning activity
- Identify the appropriate stakeholders
- Identify a manageable number of "targets" – these may be species, habitats, or other elements that comprise the system under consideration
- Define the biological viability targets for each target
- Identify direct and indirect threats affecting each target
- Construct a conceptual model of the factors affecting viability of each target
- Identify strategies for effective conservation of each target, and where/how those strategies will be applied
- Using the concept of results chains, assess the predicted effectiveness of each strategy when applied to each target
- Identify the system characteristics that will be subject of monitoring to evaluate effectives of each management strategy

The OS approach uses an accompanying software tool known as Miradi to organize information, to generate graphical concept models, threat analyses and results chains, and to coordinate monitoring and evaluation activities after the main planning element has been completed.

Key concepts to remember when using the Open Standards approach:

- Plan at the appropriate scale
- Engage key stakeholders
- Start with the best information
- Work iteratively
- Don't let "perfect" get in the way of "good"

For more information, check out:

- FOSonline.org
- cmp-openstandards.org
- ccnetglobal
- miradi.org
- miradiShare.org

Discussion points that emerged from this presentation:

- The Crane Specialist Group has been using the OS approach, as well as CPSG's Population and Habitat Viability Assessment (PHVA) process – to develop their Crane Action Plan. The approach is multi-species and threat-based but has not used Miradi as the primary software platform. They have also followed Government plans – multi-lateral agreements require a specific format and process. The population viability analysis software *Vortex* has been incorporated into the OS process to guide the development of strategies and actions that will be taken. Government processes need to be followed where they exist but it can be possible to include additional tools.

  PHVA workshops and OS processes can talk to each other. OS can take a lot of time – it is a steep learning curve when applying Miradi to the planning framework. The PHVA workshop brings stakeholders together to develop a framework – this can subsequently be put into a Miradi framework. So they can talk to each other on a lot of fronts.

Poisoning is currently affecting a lot of crane species in Luanga, and an OS process is being used there, in a multi-species approach, to look at threat-directed strategies.

The International Crane Foundation has used OS in a range of situations. It is useful in drilling down into the assumptions underpinning ideas about how change will be driven, through the construction of results chains. Outlining these expectations and measuring against them really helps to test underlying assumptions and adapt them where needed.

- In general, the OS approach works best when a maximum of eight targets is identified. So if a larger number of species is being considered, the first process step would be to collapse this list into higher/broader targets e.g. threats or ecosystems. This is referred to lumping and splitting targets. This is useful for taking larger, strategic decisions. This might be done at a very high level with project partners to get some initial cuts on which partner might take which portion of work. This lumping process involves asking a series of questions about the similarity of threats among co-existing species – if they are similar, they can be lumped.

Priority Threat Management (Tara Martin, University of British Columbia)

This approach was developed in part to complement the Open Standards approach by filling some important conceptual gaps:

- How much will it cost to save a given number of species?
- Which actions are the most cost-effective?

Discussions are currently underway to consider how to merge the PTM and OS approaches for more effective conservation planning across multiple species.

Priority Threat Management identifies candidate management actions that could be applied to groups of species that are lumped according to specified criteria (e.g., threat, life history, etc.). For each candidate action, the cost effectiveness (CE) is estimated in part as a function of the benefit (*B*) of that action, which is defined as the change in persistence probability for the species group once the management action is applied. Furthermore, the CE score is a function of the feasibility (*F*) of that candidate action, which is itself a function of the action's likelihood of success and the likelihood of its uptake (implementation) by the appropriate actors. Finally, the CE score is impacted by the estimated cost (*C*) of each candidate action. CE for each candidate action is then calculated simply as (BxF)/C.

The information used to generate estimates of benefit, likelihood of success, likelihood of uptake, and cost are all developed through formal expert elicitation techniques.

Fundamentally, this process is recognized as a cost-effectiveness decision-making tool. The candidate actions are decided upon early in the process, so the more basic process of determining threats and the actions necessary to address them has already been completed.

Discussion points that emerged from this presentation:

- The issue was raised about how long each of these process may take to generate a final plan. A PHVA-type process through CPSG would likely a total of 8-12 months from initiation to completion, with one or two 2 – 4 day workshops during that timeline. Similarly, a Priority Threat Management process would typically require 6 months – 2 years, depending on the

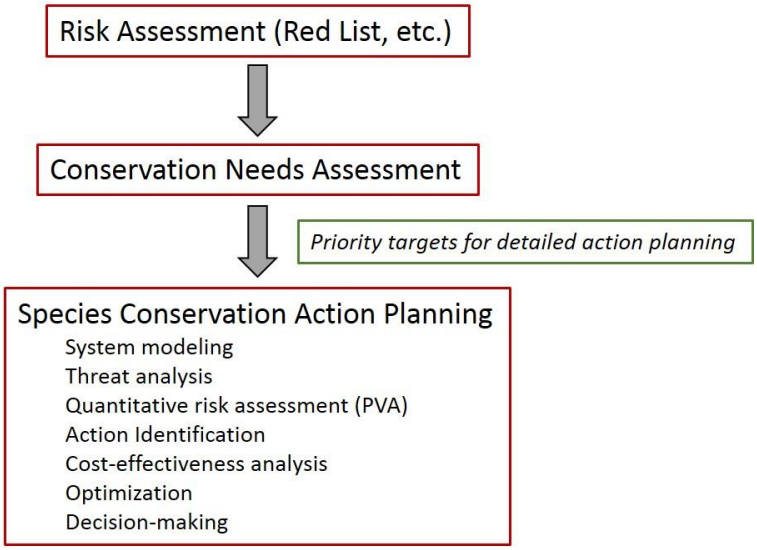
geographic scope and overall complexity. An Open Standards-based approach could be quite flexible, depending on the desired depth of analysis.

- Eliciting expert advice is clearly a key to all of these processes but there can be discomfort in basing decisions on it. A large disciplinary field on expert elicitation exists today, but it remains a challenge to ensure that this advice is elicited in a way that is transparent, repeatable, robust and faithful to the recognition of uncertainty around the reported estimates.

Conclusions

As a final wrap-up for this working group discussion, there was a recommendation to put together a dedicated group of participants to take these discussions further – to better understand each of the approaches discussed in the working group, to identify strengths and weaknesses therein, and to perhaps make some recommendations on which approaches are best for specific situations.

The participants confirmed once again that there is real value in thinking systematically and hierarchically about this broad planning process, from the most strategic assessment of species risk (i.e., Red List assessment) to the most tactical specification of detailed on-the-ground actions required to minimize long-term extinction for specific taxa.



The Conservation Needs Assessment can identify broad strategies and actions for conservation management among a large group of selected taxa, and can also recommend more detailed systematic conservation action planning for some subset of those taxa originally evaluated. The action planning can be focused on a single species or a subset of the taxonomic group evaluate in the CNA, as determined by the results of the higher-level analysis.

The group will include the following participants (with others added as requested):

- Anne Baker
- Nico Boenisch
- Andre Botha
- Nicole Duplaix
- Mike Jordan
- Caroline Lees
- Tara Martin
- Phil Miller
- Kerryn Morrison

For this group's discussions, a recommendation was made to refer to a 2017 paper by M.W. Schwartz et al. in *Conservation Letters* that discusses the important features of a set of conservation decision-support frameworks.

Appendix 1.

Species Conservation Planning: Standardizing Terms

As discussed at the CPSG Regional Resource Centers meeting, the term "conservation planning" is currently used to cover a wide variety of activities that are very different from each other in terms of context, purpose and outputs. Separating out these different activities by assigning them specific terms and associated definitions, may reduce confusion among colleagues and collaborators and improve the quality of discussions both within and outside CPSG.

In this light the following terms and definitions are suggested for use within and by CPSG.

Conservation Planning

A structured, evidence-based, social process that provides guidance on management activities for the long-term maintenance of biodiversity. Planning processes may align themselves along one or more axes based on taxonomy, geographic area or threat to persistence. The general process follows the typical planning cycle (Figure 1) that includes implementation planning, monitoring / evaluation of the plan's impacts, and iterative plan revision as appropriate.

Species Conservation (Strategic) Planning

The process of conservation planning where the central focus is one or more species. This process may include species conservation needs assessments and/or species conservation action planning (see below). Planning can be strategic based on the scope, depth, and duration of the planning product.

Tool examples

- *Strategic Planning for Species Conservation (IUCN/SSC 2008)*

Species Risk Assessment

A systematic evaluation of the viability of a species, where viability can be defined as local/global extinction, quasi-extinction (population decline below a specified threshold), or loss of ecosystem functionality. When conducted for invasive species, the risk can be defined in terms of the probability of population increase above an accepted threshold abundance.

Risk category may be used either on its own or in conjunction with other factors (e.g. evolutionary distinctness) in a process to prioritize species for further conservation attention (e.g., Red List). Additionally, the assessment can be incorporated into a conservation action planning process (see below) that identifies specific actions to improve species viability. Analysis of the extent of uncertainty in species knowledge and its impact on the result of an assessment is an important part of the process.

Tool examples

- *Red List (IUCN 2012)*
- *Population Viability Analysis (e.g., Morris and Doak 2002)*

Species Conservation Needs Assessment (CNA)

A systematic identification of the main strategies or types of activities required to conserve or recover a threatened species or a group of focal taxa, based on an understanding of current and potential threats and of possible management interventions with an evaluation of their likelihood of implementation.

This process might be included within a single species planning initiative as a precursor to identifying, evaluating, deciding and assigning, more specific or spatially-explicit actions. Alternatively it may be carried out across multiple taxa, with an explicit component devoted to prioritizing those taxa that would benefit from more intensive conservation action planning (which generally requires a different subset of knowledge and expertise) in a separate process.

Tool examples

- *Amphibian Ark CNA (Amphibian Ark 2012)*
- *CBSG CAMP (Ellis and Seal 1996)*
- *SSC Action Plans (Fuller et al. 2003)*

Species Conservation Action Planning

A process through which actions needed to implement the conservation needs of a species are identified, described, and organized according to priority. Key features of this planning include a detailed specification of what needs to be done, the geographic location of the action and its timeline to completion, and a designated actor that is committed to taking responsibility for completing the action.

Tool examples

- *PHVA (CBSG 2010)*
- *Open Standards for the Practice of Conservation (CMP 2013)*
- *Conservation Action Planning (TNC 2007)*

Conservation Resource Optimization

Determining the optimal allocation of a finite pool of resources to actions or projects, to maximize benefits to both conservation of one or many species as well as to other identified stakeholder values.

This may operate in support of a broader conservation action planning initiative (within the action/strategies step) or may be done hypothetically as a general priority setting exercise.

Tool examples

- *Multi-attribute Utility Analysis (e.g., Gregory et al. 2012)*
- *Systematic Conservation Planning (Margules and Pressey 2000)*
- *Priority Threat Management (Carwardine et al. 2012)*

Systematic Conservation Planning

Identification of the optimal application of spatially-explicit conservation management actions in order to promote the persistence of species (Tara Martin, pers. Comm.).

(Original definition: An area-based planning process that optimizes the allocation of conservation areas such that the total requirement of resources (typically, area or costs) under a given conservation target is minimized (Possingham et al. 2000).

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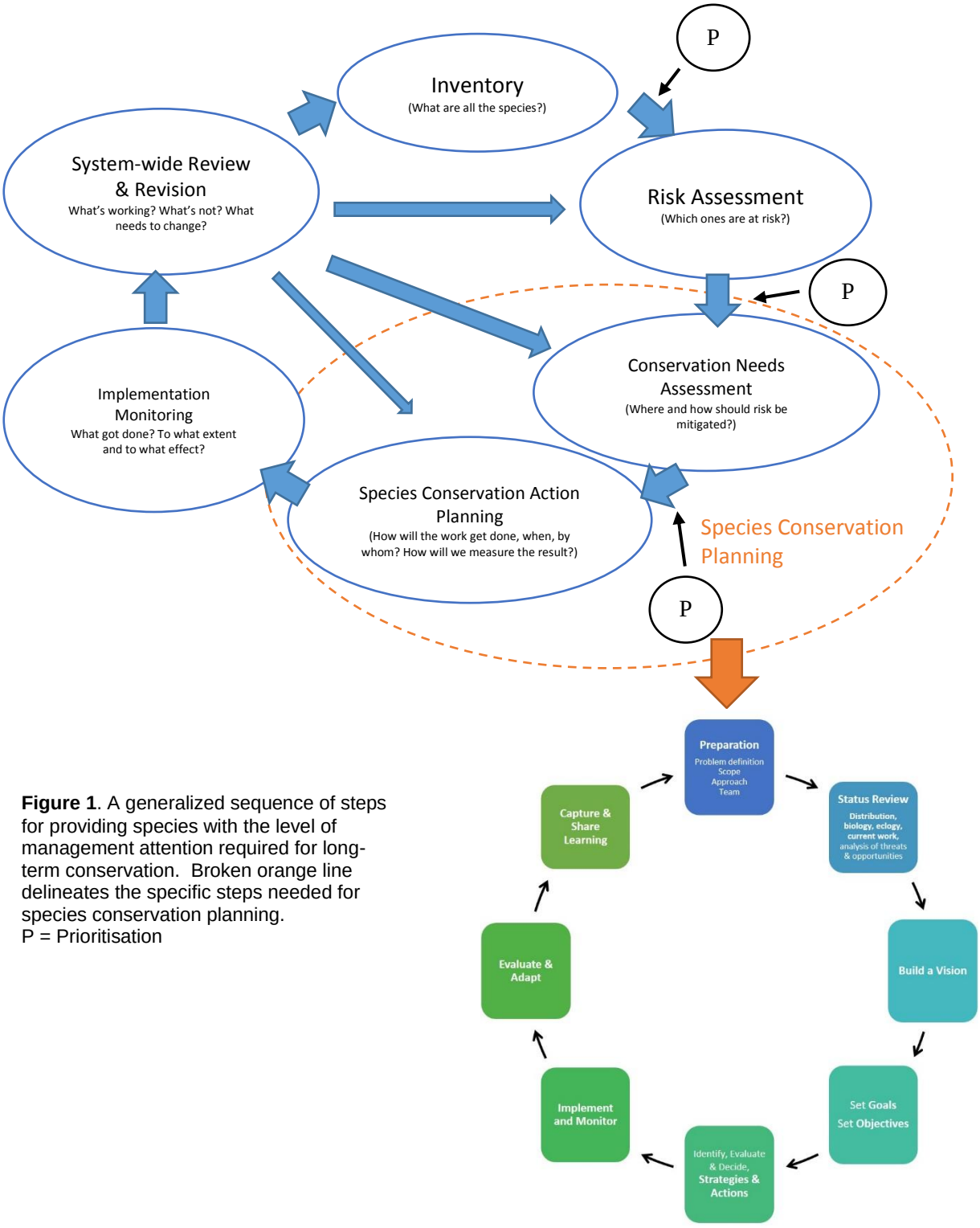

Figure 1. A generalized sequence of steps for providing species with the level of management attention required for long-term conservation. Broken orange line delineates the specific steps needed for species conservation planning.
P = Prioritisation

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