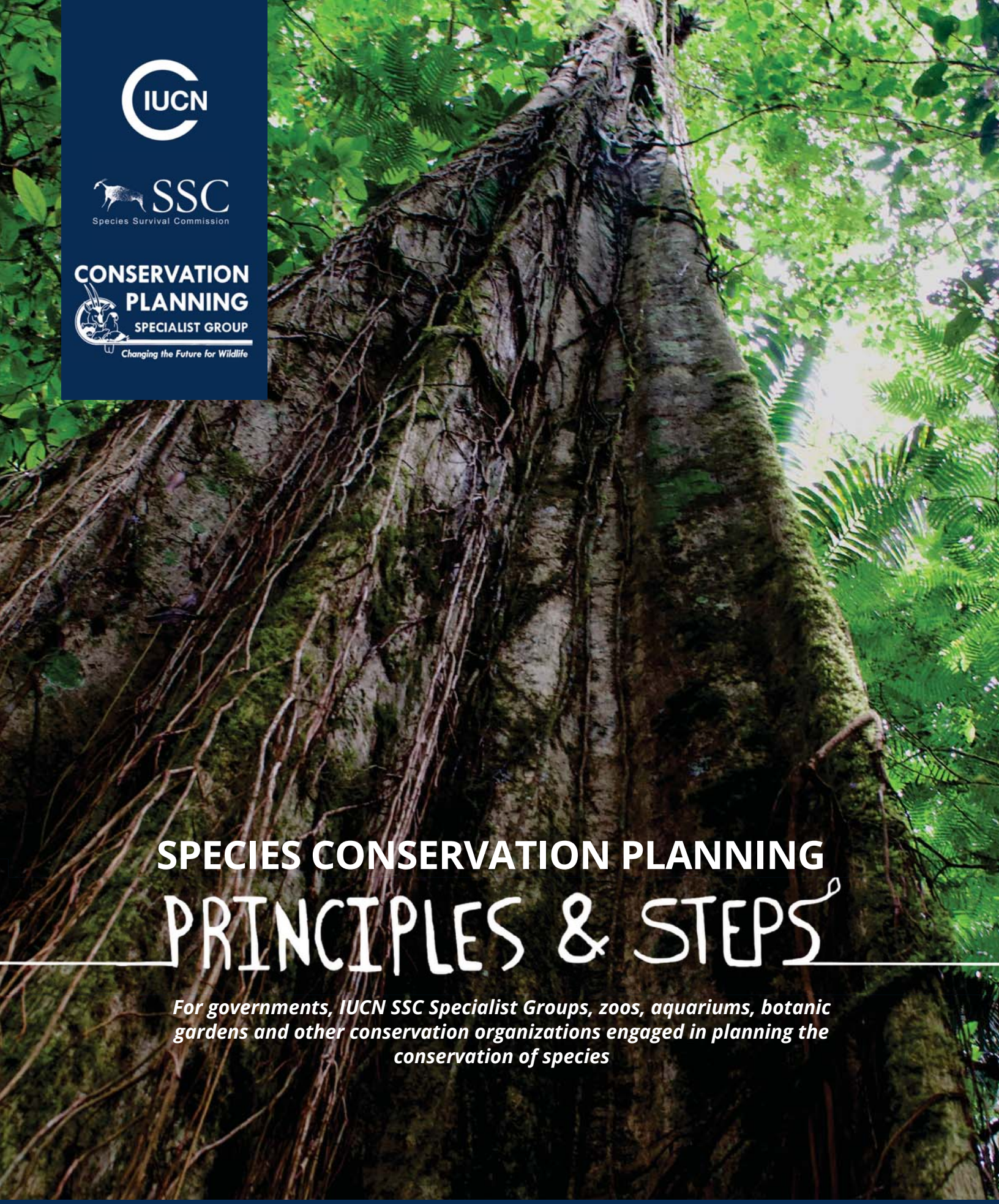

IUCN

SSC
Species Survival Commission

CONSERVATION PLANNING SPECIALIST GROUP
Changing the Future for Wildlife

SPECIES CONSERVATION PLANNING
PRINCIPLES & STEPS

For governments, IUCN SSC Specialist Groups, zoos, aquariums, botanic gardens and other conservation organizations engaged in planning the conservation of species

CPSG.ORG

A contribution of the IUCN SSC Conservation Planning Specialist Group

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CPSG. 2020. *Species Conservation Planning Principles & Steps*, Ver. 1.0. IUCN SSC Conservation Planning Specialist Group: Apple Valley, MN.

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In addition, the draft Principles and Steps were presented, both in plenary session and as a poster, at the SSC Leaders' Meeting in 2019. The valuable feedback received there has been incorporated into this document which is much improved as a result.

INTRODUCTION

THE PERCENTAGE OF SPECIES THREATENED WITH EXTINCTION IS REDUCED BY X% AND THE ABUNDANCE OF SPECIES HAS INCREASED ON AVERAGE BY X% BY 2030 AND BY X% BY 2050.

—PROPOSED SPECIES GOAL, ZERO DRAFT POST-2020 BIODIVERSITY FRAMEWORK

Today, people share the Earth with an estimated 8.7 million species. Of the 1.3 million that have been identified and described, 116,000 have so far been assessed for the IUCN Red List of Threatened Species, the world's leading authority on the conservation status of species. Of these, 31,000 species are considered Critically Endangered, Endangered, or Vulnerable, meaning they are threatened with extinction[1]. Despite committed action by many in past decades, recent reviews show little progress on slowing declines, and future waves of extinction are predicted [2]. Not only do such declines signal a failure to meet international commitments to stem biodiversity loss [2], but they also jeopardize our ability to achieve 2030 Sustainable Development Goals, many of which rely on the resources provided by species and the ecosystems they support.

A substantial change in approach and ambition is needed to create swift and lasting change for species. Well-resourced, effectively implemented species conservation plans will play a key role in this.

The purpose of species conservation planning is to increase the effectiveness of action by ensuring that it is based on thorough analysis of good information, well-defined and achievable goals, the incorporation of multiple perspectives, and agreement among those involved about what should be done. This is recognized by the IUCN Species Survival Commission (SSC), which describes the essential elements of species conservation as a cycle: Assess, Plan, Act.

Within the IUCN SSC, species conservation planning is led and supported through the Conservation Planning Specialist Group (CPSG). For 40 years, CPSG has been assisting diverse groups to plan for the conservation of species. Its approach to planning is deeply rooted in a set of principles that emphasize sound science and the meaningful participation of key stakeholders. These principles are used to guide a series of planning steps that continue to evolve in response to the increasing complexity of today's wildlife conservation challenges. Taken together, these principles and steps are important elements in the development and implementation of effective species conservation plans.

This style of planning has been shown to provide a turning point for those involved in conserving species, helping them transition to more effective ways of collaborating [3]. Over time, this leads to clear and measurable improvements in species' conservation status as shown in a new study [4] comparing the extinction trends of species before and after a planning intervention. For the 35 projects in the study, which spanned 23 countries and 12 years of planning, overall species declines slowed after the initial workshop and were reversed within 15 years. These studies illustrate the powerful role of CPSG's planning approach in rapidly increasing the effectiveness of conservation efforts.

To date, the planning work of CPSG and of the wider SSC has impacted hundreds of species, and other agencies around the world are planning for the conservation of thousands more.

For the 35 projects in the study, which spanned 23 countries and 12 years of planning, overall species declines slowed after the initial workshop and were reversed within 15 years. LEES, ET AL.

Unfortunately, the number still in need of plans is huge and expected to grow. In recognition of this, the SSC has set itself the challenge of ensuring that every species that needs a plan is covered by an effective plan.

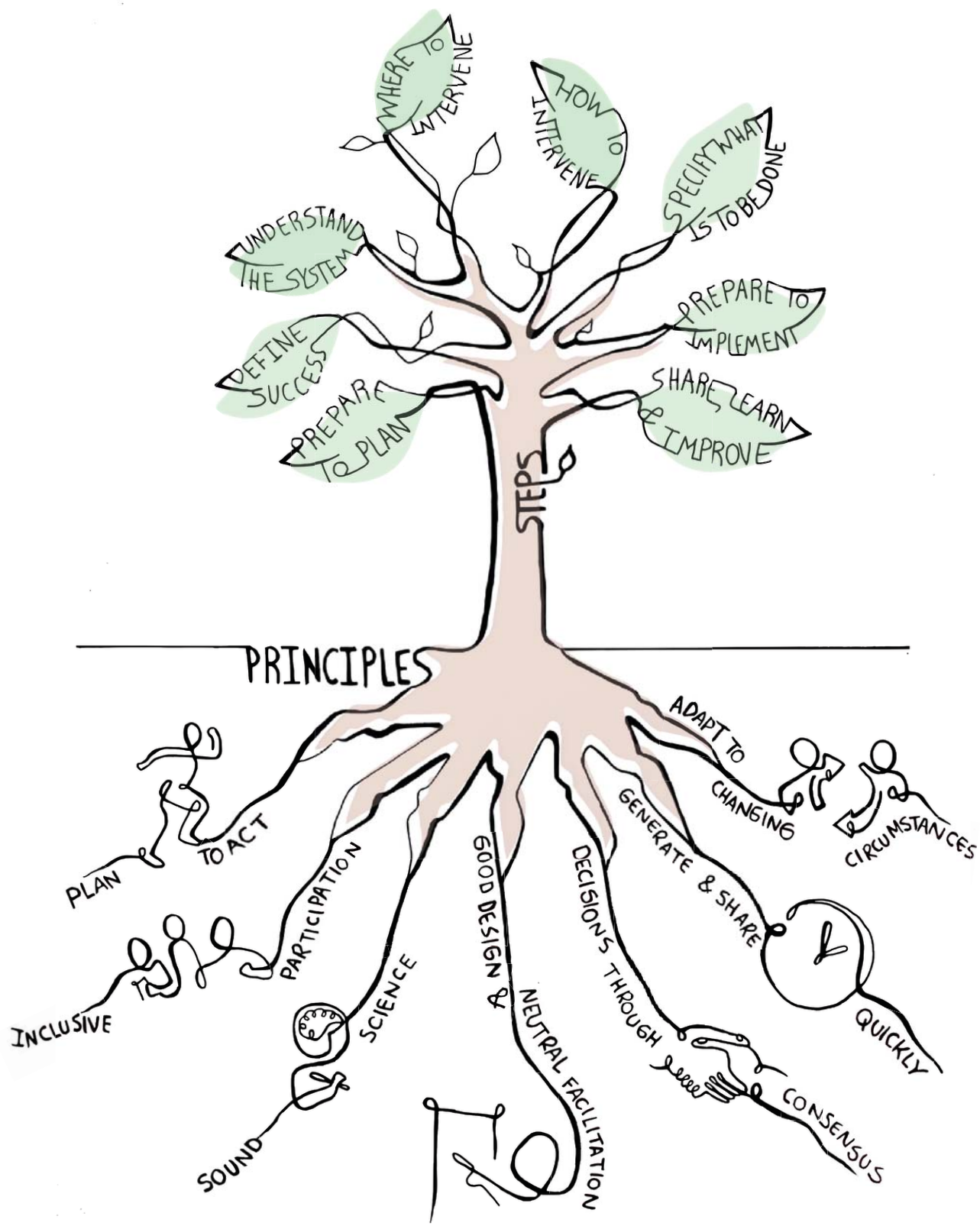
In addition to a significant increase in investment of resources for coordinated implementation of plans, this will require: rapid identification of threatened species that are not adequately covered by plans; the scaling up of processes that more rapidly advance larger numbers of species from status assessment into conservation action, through effective planning; and a massive expansion of the capacity to build effective plans, so that good planning can be delivered wherever it is needed.

Developing this capacity globally will require extensive training, mentoring, coaching and support, but it is eminently achievable. If each IUCN SSC Specialist Group, national government, interested non-government organization, zoo, aquarium, botanic garden, and civil society group with a concern for species had within it a cadre of competent planners able to respond as required, there would be more than sufficient capacity to meet the planning need.

To build such coordinated global capacity for saving biodiversity demands a shared understanding of what effective species conservation planning looks like. CPSG has developed the following document with this in mind. It presents a succinct philosophy and framework for good planning based on four decades of evolving practice that have converged on seven fundamental principles and eight practical steps. They build on valuable contributions from the SSC's Species Conservation Planning Task Force (2007 – 2008) and the Species Conservation Planning Subcommittee (2011 – 2017), the experience of individual Specialist Groups, and on insights from the global conservation community. We recognize that the approach described here is not the only way to develop effective species conservation plans. We also acknowledge that recovering threatened species requires more than what is discussed in these pages.

The target audiences for these guidelines are all those asking the question: What do we need to consider when determining how to plan for the conservation of species threatened with extinction? The aim of this document is to respond to that need by providing an accessible and practical overview of the species conservation planning process, and on where to look for resources that explain how to put these principles and steps into practice.

Today, CPSG encompasses a growing network of planning practitioners from across the SSC, and within national governments and non-governmental organizations. It includes not only those with skills, experience and key roles in planning the conservation of species, but also end-users of these resources and those who support and contribute to their development. Through good planning, this network is doing everything it can to catalyze a species conservation revolution. We hope you'll join us.



The drafting of this document gives us the opportunity to articulate and share the unwavering philosophy behind what CPSG has been doing and teaching for 40 years. The principles outlined here are represented in the graphic above as stable roots from which all we do grows. The leaves represent the planning steps that continue to evolve in response to the increasing complexity of today's wildlife conservation challenges. Taken together, these principles and steps are essential elements in the development and implementation of effective species conservation plans.

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CPSG'S

GUIDING PRINCIPLES

Well-designed and executed species conservation planning that adheres to the following set of seven core principles can improve existing efforts and stimulate greater ambition, collaboration and resourcing.

Underpinning this philosophy is a commitment to the *One Plan approach*: the collaborative development of management strategies and conservation actions by all responsible parties to produce one comprehensive conservation plan for the species whether inside or outside its natural range. The result is an integrated conservation plan that mobilizes the full suite of skills and resources available to species in trouble, giving them a better chance at a future in the wild.

Plan to act

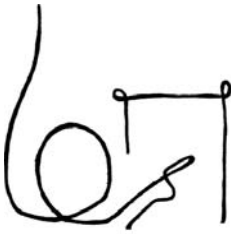
The intent of planning is to promote and guide effective action to save species. This principle underpins everything we do.

Promote inclusive participation

People with relevant knowledge, those who direct conservation action, and those who are affected by that action are all key to defining conservation challenges and deciding how those challenges will be addressed. Inclusivity refers not only to who is included in the planning process, but also to how their voices are valued and incorporated.

Use sound science

Working from the best available information—whether that be established facts, well-supported assumptions or informed judgments—is crucial to good conservation planning. Using science-based approaches to integrate, analyze and evaluate this information supports effective decision-making.

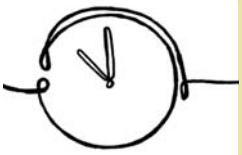


Ensure good design and neutral facilitation

Good species planning is designed to move diverse groups of people through a structured conversation in a way that supports them to coalesce around a common vision for the species and to transform this into an achievable, effective plan. Facilitators skilled in planning are essential in guiding these processes. Critically, neutral facilitation eliminates potential or perceived bias in the planning process, helping participants to contribute their ideas and perspectives freely and equally.

Reach decisions through consensus

Effective species conservation planning results in decisions that all participants can support or accept. Recognizing shared goals, seeing the perspective of others, and proceeding by consensus helps galvanize participants behind a single plan of action that is more likely to be implemented.



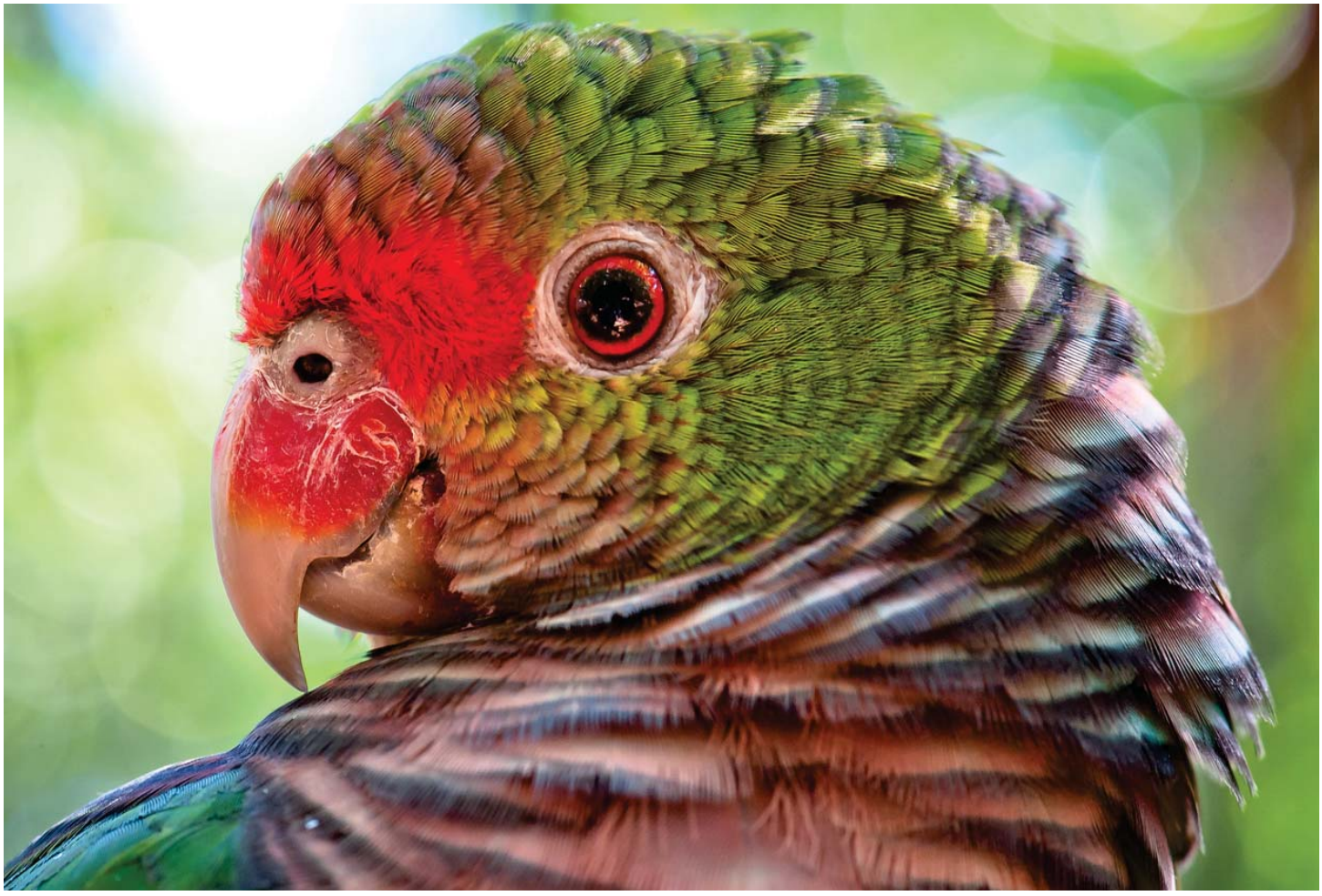
Generate and share products quickly

Producing and sharing the products of a conservation planning process quickly, freely and widely are important factors in its success. Delays carry a cost in terms of lost momentum, duplicated or conflicting effort or missed opportunities for action.

Adapt to changing circumstances

Effective plans are those that evolve in response to new information and to changing circumstances—biological, political, socio-economic, and cultural—that influence conservation efforts. Plans are considered living documents that are reviewed, updated and improved over time.

WE BELIEVE THESE TO BE THE ESSENTIAL CONDITIONS FOR SUCCESS.



CPSG'S

SPECIES CONSERVATION PLANNING STEPS

Here we summarize the eight steps to effective planning. Individual planners or planning methods may use different terminology, merge certain steps, or alter the order. As long as all steps are completed, and the process adheres to the planning principles outlined above, the result will be an effective, implementable plan with robust support and a high likelihood of improving the future status of the species.

1 Prepare to plan

Agree on the scope, rationale and required product of planning. Design and prepare a planning process that will meet these requirements.

2 Define success

Define the core elements of a future state for the species that represents the desired outcome both for conservation and for other relevant stakeholder needs or values.

3 Understand the system

Assemble the best available information on the biology, history, management, status and threats to the species, the obstacles to addressing those threats, and the opportunities or options for successful intervention.

4 Decide where to intervene

Determine where in the system to intervene and recommend and prioritize the changes needed to achieve the desired future state.

5 Agree on how to intervene

Identify alternative approaches to achieving the recommended changes, compare their relative costs, benefits and feasibility, and choose which one(s) to pursue.

6 Specify what is to be done

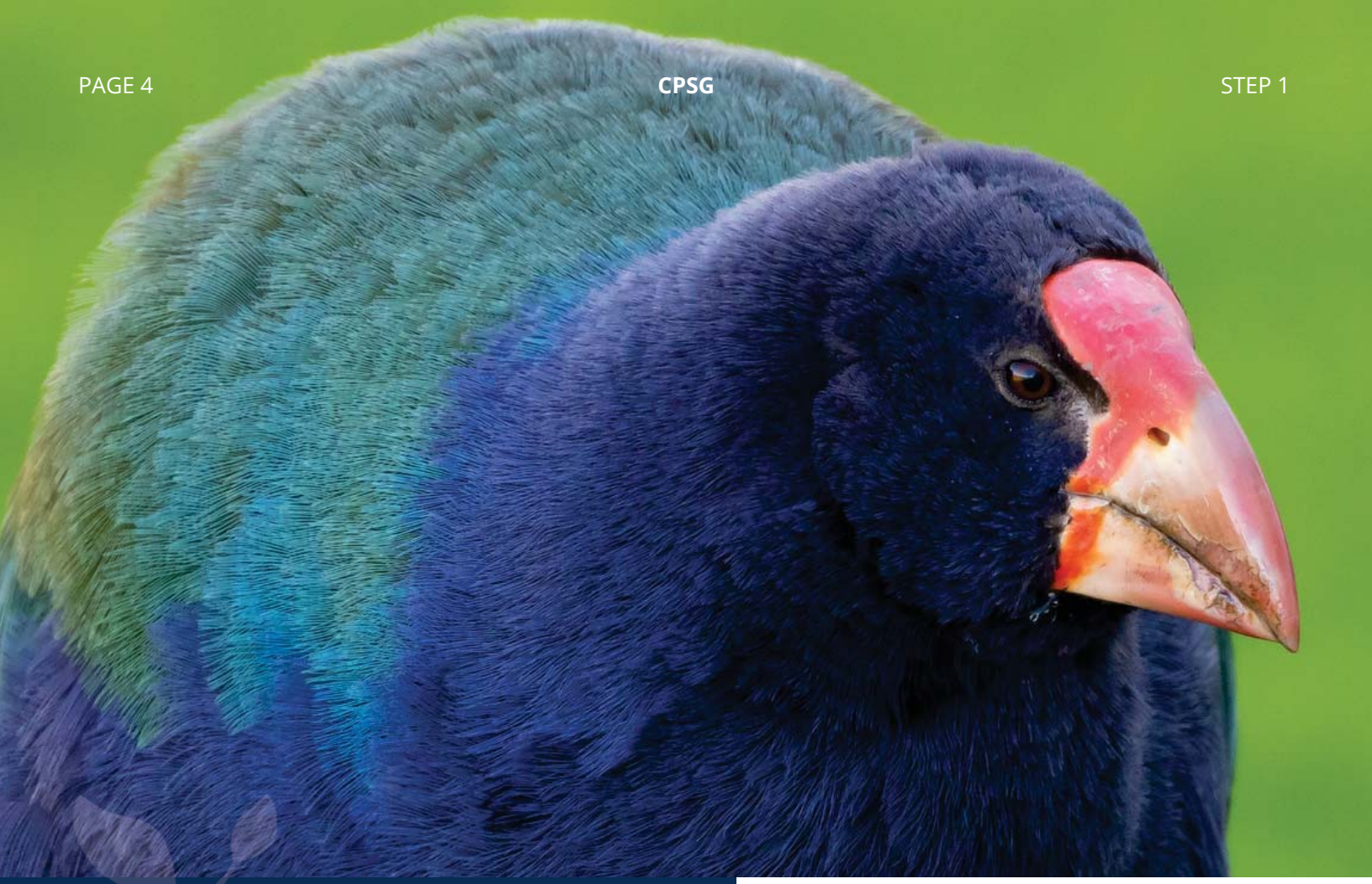
Agree on what will be done, when and by whom, to implement the chosen approach, and which measures will be used to indicate progress or completion of specific tasks.

7 Prepare to implement

Agree on how key individuals and organizations will communicate, coordinate, make decisions, and track and report on progress as they move forward together to implement the plan.

8 Share, learn and improve

Produce the plan swiftly, share it widely and strategically to maximize conservation impact, and capture lessons learned in order to develop more effective conservation planning processes.



STEP 1

PREPARE TO PLAN

Agree on the scope, rationale and required product of planning. Design a planning process that will meet these requirements.

In this preparatory planning step, an organizing team is assembled and takes the lead in agreeing on the purpose of the planning process and the required product (e.g. an action plan). It is at this stage that stakeholders are identified and engaged, relevant information on the species is assembled and an appropriate planning process is designed.

Assemble the organizing team

Sometimes it is a single person or organization that takes the initiative to develop a plan. Those initiating should consider who else should be in the 'organizing team' to assemble the relevant information and inform the design of the planning process. The team should be broad enough to reflect the most important stakeholders. Stakeholders are those people who have an interest in the species, expertise to share on the species (or the threats, possible conservation interventions, or interactions with human lives and livelihoods), or power to influence the implementation of the plan. Where the initiator is not a government agency, organizers should connect with the relevant government agency or agencies, to engage them as partners in the planning process and to secure a formal invitation to carry out the planning work envisaged.

Agree on the scope, rationale and required product

It is critical that the organizing team first clarify the rationale for planning and agree on the scope of the plan, including its intended taxonomic and geographic coverage and management focus. Is the purpose to develop a detailed action plan to recover a single species or population, or a high-level plan to provide more general direction for the conservation of multiple species over large areas? Is the focus on a plan for specific interventions, such as reintroduction or *ex situ* management? Over how many years should the plan be designed to last?

Clarifying why the plan is being developed now also provides important context. Is it because an existing plan has come to an end, because there is a funding opportunity, because new evidence suggests that a particular species group requires immediate conservation action, or an existing plan is not working and needs to be modified?

The core organizing team should be clear about the products that a successful planning process would provide. Does the written plan need to conform to the format of a particular government or funder? Is the plan intended to inform a particular audience, such as policy makers, or a group of field staff, and if so, what information do they need and in what format? The route through which planning is expected to influence on-the-ground change for species, and the practicalities associated with plan implementation, such as resource availability, can also inform the scope, rationale and desired outcomes.

Engage stakeholders

Depending on the project, the organizing team will include only some of the stakeholders needed to develop a well-supported plan. The team will be responsible for identifying the broader group who should be involved. All those potentially responsible for directing or preventing action, those likely to be impacted by it, and those with important information and insights, should be considered.

Identifying the organizing team for the shrill carder bee, United Kingdom

The shrill carder bee (*Bombus sylvarum)* is a species that, within the United Kingdom, has declined sharply in its distribution. In 2019, CPSG was asked to facilitate the development of a 10-year conservation plan for the species. Following a discussion over the composition of the 'organizing team' the two original proponents of the plan (from one organization) were joined by three members of other organizations working on the species. This expanded group had a comprehensive understanding of the species and of the other stakeholders that might need to be involved. The organizing team identified over 130 people who could be impacted by or could impact on the plan, or had expertise on the species. This list was then refined down to approximately 70 people, of whom around 40 were able to attend the workshop. Following the workshop, the original organizing team formed a central component of a broader 'governance structure' for the project to oversee plan implementation.

The final group may include representatives from: government agencies, IUCN Specialist Groups, conservation NGOs, zoos, aquaria, botanic gardens, universities, local communities, or relevant businesses. The organizing team can also help to identify existing interpersonal or interorganizational conflicts that are likely to arise, so the planning process can be designed to accommodate or resolve these differences.

Assemble the information

Current knowledge about species biology, ecology, threats, interactions with human lives and livelihoods, and challenges to conservation should be assembled. Relevant information on the species both *in situ* and *ex situ* might be in the published literature, but is also likely to reside in unpublished reports, internal documents or databases, and in people's heads! If available, previous plans for the species or the areas where it lives should be reviewed for learning opportunities. Quantitative tools, such as Population Viability Analysis (see Step 3: Understanding the System), can help examine and illustrate likely future species trajectories under current and alternative conditions. Where such analytical tools are likely to add value, required information should be collected and initial models built and tested.

Design and prepare for the planning process

Designing a planning process involves thinking carefully about what topics need to be discussed, by whom, in what order, at what pace, and towards what specific end-points, as well as how participants in the discussion will be supported to make their best contributions. Where specific decisions need to be made or divergences of opinion resolved, the ground will need to be prepared for this. Provisions for translation, facilitation and the well-targeted application of analytical tools are all discussed in this step.

Equipped with an understanding of the purpose and scope of the plan, the people involved, and some initial knowledge of species-specific challenges and opportunities for conservation, the team can move on to designing an appropriate planning process. Resource availability, both time and funds, will also inform process design, and there may be trade-offs between what is ideal and what is possible. For example, while the ideal might be to bring stakeholders together for a series of in-person, multi-day workshops, resources may dictate an alternative that combines in-person and virtual workshops, or engagement through emails or phone calls.

At this stage, the organizing team should begin to consider what sort of governance structure might be required to oversee the implementation of the plan. This involves determining which individuals or organizations will be involved in decision making, coordinating actions and communicating among stakeholders during the implementation phase. If the governance structure is not predetermined, discussions begun at this stage may continue through the planning process and be completed during Step 7: Prepare to Implement.

This is also a good time to discuss how best to ensure the uptake of planning outcomes by key stakeholders and how planning outputs should be launched or communicated. Though including stakeholders in the planning process helps to promote ownership of the plan, it is often the case that planning participants will need to go back to their organizations to report on planning outcomes and to secure final approval for involvement or resourcing. By anticipating this early on, it can be planned for as part of the project. For example, should planning outcomes be presented to key stakeholders in a dedicated forum? Is there an additional layer of review or endorsement that will be needed before government approval of the plan can be completed and if so, how should this be achieved? Are there opportunities to promote the plan to key public figures? Should there be a press conference or release associated with the planning event, or should this wait until the plan is published? Should promotion of the planning process begin well before the workshop, to maximize impact? Thinking about these things early on helps us take full advantage of all opportunities for success.

CASE STUDY: BELLINGER RIVER SNAPPING TURTLE

Defining taxonomic and geographic scope

The focus of this project was the Bellinger River snapping turtle (BRST) (*Myuchelys georgesi*), a freshwater turtle endemic to a 60-km stretch of the Bellinger River, and possibly a portion of the nearby Kalang River, in New South Wales, Australia. In 2015, a significant mortality event was observed in BRSTs. Most affected turtles died shortly after being found, and those brought into *ex situ* care did not survive. Prior to this event, the BRST was described as locally abundant, with a population estimate of between 1,600 and 4,500 individuals. Afterwards, the population was estimated at 200 – 300 individuals, predominantly juveniles. A disease investigation identified a virus (Bellinger River Virus or BRV), new to science, as the agent most likely to be responsible for the observed mortalities. In addition to the disease investigation, a captive population was founded to provide immediate insurance against extinction and to generate turtles for release to aid recovery. However, before the disease event, BRSTs were also under pressure from a range of other factors, including limited distribution, habitat requirements, predation, water quality, and hybridization and competition with Murray River Turtles (*Emydura macquarii*). Some or all of these threats may have played a role in increasing the susceptibility of the species to the disease or could prejudice recovery. However, expert opinion was divided on the role and impact of these factors, and there was uncertainty about the source, nature, and prevalence of the virus, making it difficult to chart a clear path to recovery. This in turn made it difficult to respond clearly and consistently to community needs and concerns with respect to the Bellinger River and its management.

Defining the problem
A workshop was hosted by the New South Wales Office of Environment and Heritage in November 2016, at Taronga Zoo in Sydney. The aims of the workshop were:

- To agree, using the expertise available, on the current state of knowledge regarding BRSTs, the Bellinger virus and other disease and non-disease issues relevant to the conservation of the BRST; and
- To use this information to draft a plan of action for the sustained recovery of BRSTs.

Identifying the stakeholders
Key stakeholders in this project were identified as: the Australian Registry of Wildlife Health, Bellinger Shire Council, Biosecurity (Dept. Primary Industries), BRST Local Stakeholders Group, NSW Office of Environment and Heritage, Taronga Conservation Society Australia, Western Sydney University, University of Canberra, New South Wales Department of Parks and Wildlife, Wildlife Health Australia.

SUMMARY

- Establish the organizing team.
- Agree on the plan's scope, rationale and required product.
- Identify and engage relevant stakeholders.
- Secure the support of the appropriate government authority.
- Begin to identify and assess the available information on the species (including existing plans, if available).
- Consult relevant IUCN guidelines to inform the planning process.
- Design an appropriate planning process (considering tools, logistics, translation, facilitation etc.).
- Initiate discussion on the needs related to implementation.

STEP 2

DEFINE SUCCESS

Define the core elements of a future state for the species that represents the desired outcomes both for conservation and for other relevant stakeholder needs or values.

This step usually occurs when all stakeholders meet for the first time. At this early stage stakeholders need to build trust in each other and the process. They can do this in part through defining what the desired outcome would look like, both for conservation and for other relevant and compatible stakeholder needs or values. They should also clarify how progress toward achieving the desired outcomes might be measured.

Defining desired outcomes

When all stakeholders are brought together for the first time—either in person or virtually—it is important to give them the opportunity to contribute their own values, needs and concerns to the definition of what future success might look like. This can broaden the focus of the plan beyond the species, to include aspects of human lives, livelihoods and other cultural, socio-economic or political factors. This step provides a space in which people can discuss and reach agreement on what changes they most want to achieve for effective species conservation, without being restricted by today's realities. Building trust, mutual respect and clarity around why everyone is gathered together begins here.

The development of a shared vision—or a desired future state—is a common approach to defining what success will look like to stakeholders. Another way to think about a vision is to imagine it as a 'guiding star'; sailors use the guiding star to check that they are moving in the right direction, but do not expect to reach the star! Common components to consider integrating into a vision include the desired future geographic representation of the species, how dependent it is on human intervention, and how it interacts with and is valued by people.

Clarifying key elements of a vision

The vision statement should be accompanied by clear definitions of its important words or phrases. For example, a vision statement might identify a "viable population" as part of the desired future state for the species. However, the term "viable" requires an explicit definition, such as minimizing the risk of extinction to below a given threshold or maximizing the retention of population genetic diversity above a specific threshold. Similarly, a "self-sustaining population" might be defined as a population that is able to maintain at least a constant abundance without the need for human intervention through supplementation of individuals or through providing additional food.

In some situations, the development of a vision statement may not be considered helpful by the planning team. In these cases, moving straight to defining measurable long-term goals may be sufficient.

CASE STUDY: BELLINGER RIVER SNAPPING TURTLE

Participants were given a hypothetical future scenario in which the BRST recovery project had been entirely successful and was being reflected upon by others. They each took five minutes to think about themes they would like to hear described in those reflections. Thoughts were shared and discussed with the group. A smaller group synthesised these into a vision, with operational definitions and measures that could be used to track progress.

Defining success for the Tamaraw, Philippines

"By 2050, Tamaraw are a source of national pride and a flagship for Mindoro's natural and cultural heritage. They thrive in well-managed habitats, in populations that co-exist with Indigenous Peoples, and are valued by local communities across Mindoro."

The statement was translated into the Tagalog language and checked to ensure its meaning was retained. A small, representative group of participants worked to interpret the vision's elements operationally. This included: the use of Population Viability Analysis models to set Tamaraw population size thresholds that could be described as "thriving"; the interpretation of "well-managed habitat" as Tamaraw areas where unregulated activities have ceased; and "co-existence with Indigenous Peoples" as the achievement of space, protection and food security for both Tamaraw and Indigenous Peoples.

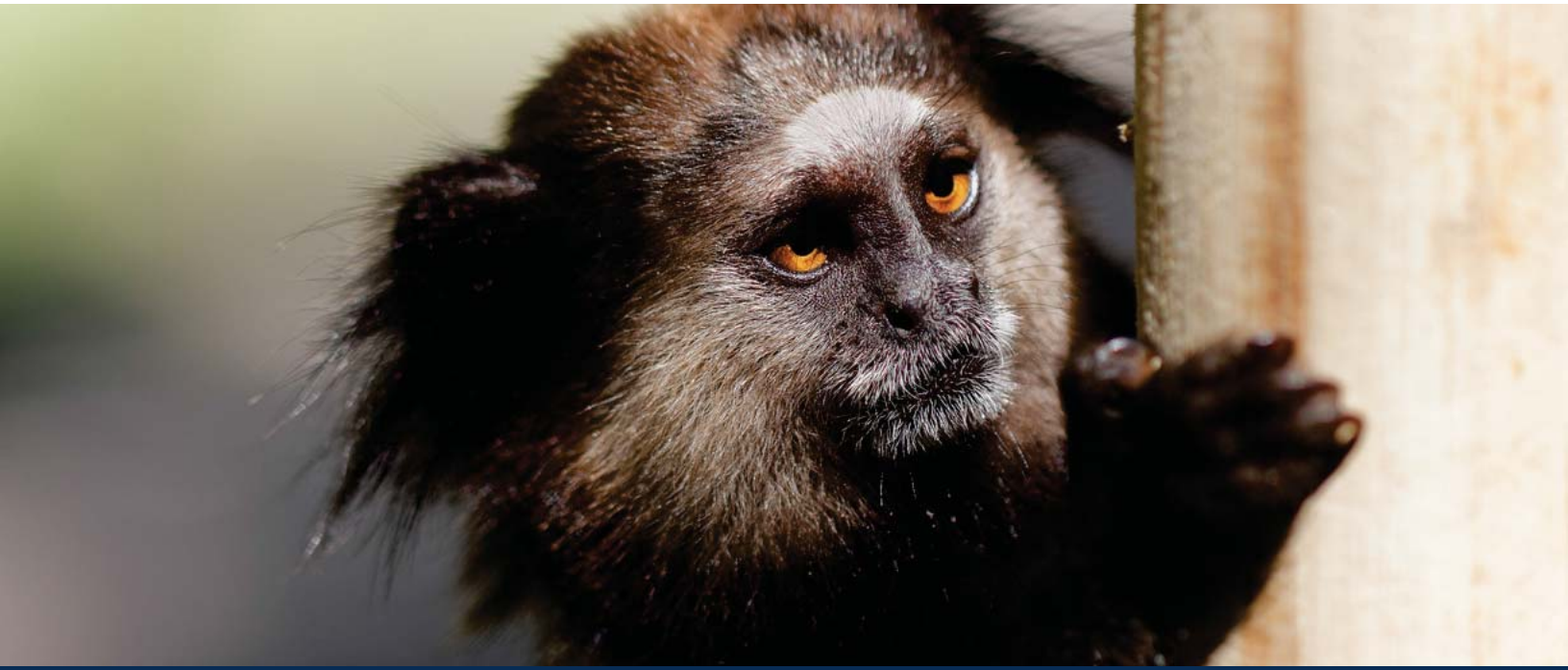
Aspirational vision of success
It is 2025. The Bellinger River Snapping Turtle project led to river health restoration and a sustainable turtle population that is disease free. It is a model conservation program for supporting critically endangered native fauna, facilitated by multi-agency collaboration and strong community engagement.

Operational definition of success

1. **Bellinger River Virus does not pose a threat to species in the wild.** Measures: The virus is not detectable via testing or immunity or protection provided to the species by vaccine or otherwise.
2. ***Emydura macquarii* does not pose a threat to species in the wild.** Measures: Control methods have ensured elimination of the hybridization threat [more precise measures to be determined once acceptable control methods have been studied and evaluated].
3. **The species is abundant in the Bellinger River.** Measures: Achieve an adult population of at least 1,500 turtles by 2030.
4. **Restoration of the species and its ecosystem are sufficient for ongoing resistance to known threats.** Measures: Restored population size is stable over time and recovers swiftly from occasional declines.
5. **The community supports the recovery program and is actively engaged in the long-term health of the Bellinger River system.** Measures: Landholders are involved in rehabilitation of at least 15-km of riparian zone by Year 5, and there is significant community participation (more than 70 people) in citizen science projects on river health.
6. **Multi-agency collaboration is in place and working positively for the program.** Measures: Key institutions have continued active involvement.

SUMMARY

- Agree on a definition of project success (e.g. a desired future state/vision).
- Establish and sufficiently define appropriate metrics to measure progress towards success.



STEP 3

UNDERSTAND THE SYSTEM

Assemble the best available information on the biology, history, management, status and threats to the species, the obstacles to addressing those threats, and the opportunities or options for successful intervention.

This step concerns the assembly and critical analysis of what is known, or thought to be known, about the species. Additional information is elicited from stakeholders to build on what was collated at the start of the planning process. Once analyzed, stakeholders then identify what opportunities or options exist to intervene in the system and improve the status of the species.

Assembling and analyzing information

While some quantitative data are published in scientific journals, other equally valuable information exists in less accessible internal reports or as unpublished data. Additional critical sources of information are the knowledge, experiences and perspectives of the many stakeholders that interact with the species and its habitat, including those stakeholders that may be involved in managing *ex situ* populations of the species. To promote successful conservation planning, all of this information needs to be identified and analyzed for its relevance to the conservation problem.

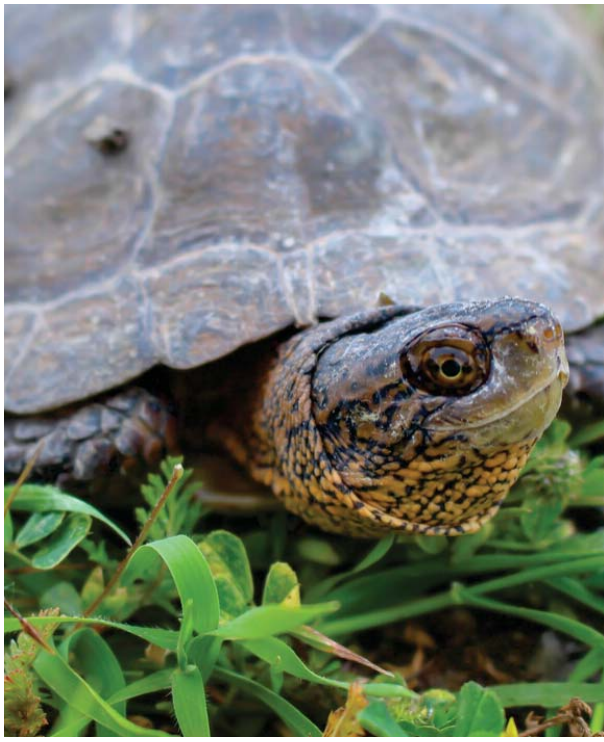
Each stakeholder needs to feel comfortable sharing their information and allowing it to be scrutinized by their peers. This sense of trust and common purpose is crucial to the success of the planning process, and is typically initiated during the previous step, Define Success. In some instances, it may be necessary to agree to restrictions on the use or distribution of unpublished or sensitive information.

In this step, the many social, political, and economic challenges to effective conservation action for the species are deconstructed by stakeholders. Root causes and direct and indirect impacts on species viability are described and, where possible, quantified. Incorporating a wealth of diverse information from a broad range of experts leads, through interactive discussion, to a richer understanding of the system among all stakeholders and greater confidence in the findings among all those involved.

Understanding the system begins during Step 1: Preparing to Plan, when the best available information is gathered. This information is circulated as briefing notes and a synthesis is often presented when stakeholders meet for the first time (virtually or in person), bringing everyone involved to a common level of basic understanding of the system.

A threat analysis is often best performed using a graphical tool such as a mind map [6] or a causal flow diagram [6,7], which helps stakeholders visualize threats to the species, how they impact the species, what causes the threats, and barriers to change (e.g. lack of legislation or enforcement). The visual model of the system can be sufficient for stakeholders to identify and discuss possible intervention points where it would be possible and practical to improve species status.

The data and information assembled in this step should also be used to assess the likely fate of the species or population of concern if current management activities do not change in the future. This provides a valuable baseline condition, against which proposed alternative management scenarios can be compared for their efficacy in reducing risk of extinction.



Understanding threats and challenges of conserving Western pond turtles, North America

In 2012, The Woodland Park Zoo in Seattle invited CPSG to conduct a Population and Habitat Viability Assessment (PHVA) workshop for the Western pond turtle (WPT) (*Actinemys marmorata*). The goal was to help the state's WPT Recovery Team to evaluate their current conservation plan and update it using improved analytical tools. A stakeholder-inclusive workshop on WPT viability identified the immediate threats to the turtles themselves (e.g., very low juvenile survival), and the processes generating the threats (e.g. high rates of predation on turtle nests and hatchlings by invasive bullfrogs). Participants also identified a group of challenges to effective conservation of the WPT, such as poor agreement among stakeholders on long-term management goals, resulting in lost opportunities for successful communication of the value of WPT conservation among local communities. This analysis provided the critical foundation for the development of an effective population viability model that identified key strategies for mitigating biological threats.

Population Viability Analysis (PVA) can be a useful tool in this regard [8]. This detailed risk assessment process, typically using simulation modelling methods, uses information on the biology of the species and the impacts of threats to generate projections of future abundance and extinction risk over a specific time frame. Sensitivity analysis is another application of PVA tools that highlights the specific demographic factors that drive population growth, and can also evaluate the impact of our uncertainty (gaps in knowledge) around birth and/or survival rates for the species of interest. Other quantitative tools can also contribute to understanding the system, including those for spatial analysis (e.g., habitat suitability and species distribution modelling) and for disease epidemiological analysis (e.g. the disease transmission model Outbreak [9]).

In situations where PVA or other quantitative tools and expertise are not available, qualitative analysis of threats and obstacles that stakeholders perceive as priorities for intervention can be sufficient.

CASE STUDY: BELLINGER RIVER SNAPPING TURTLE

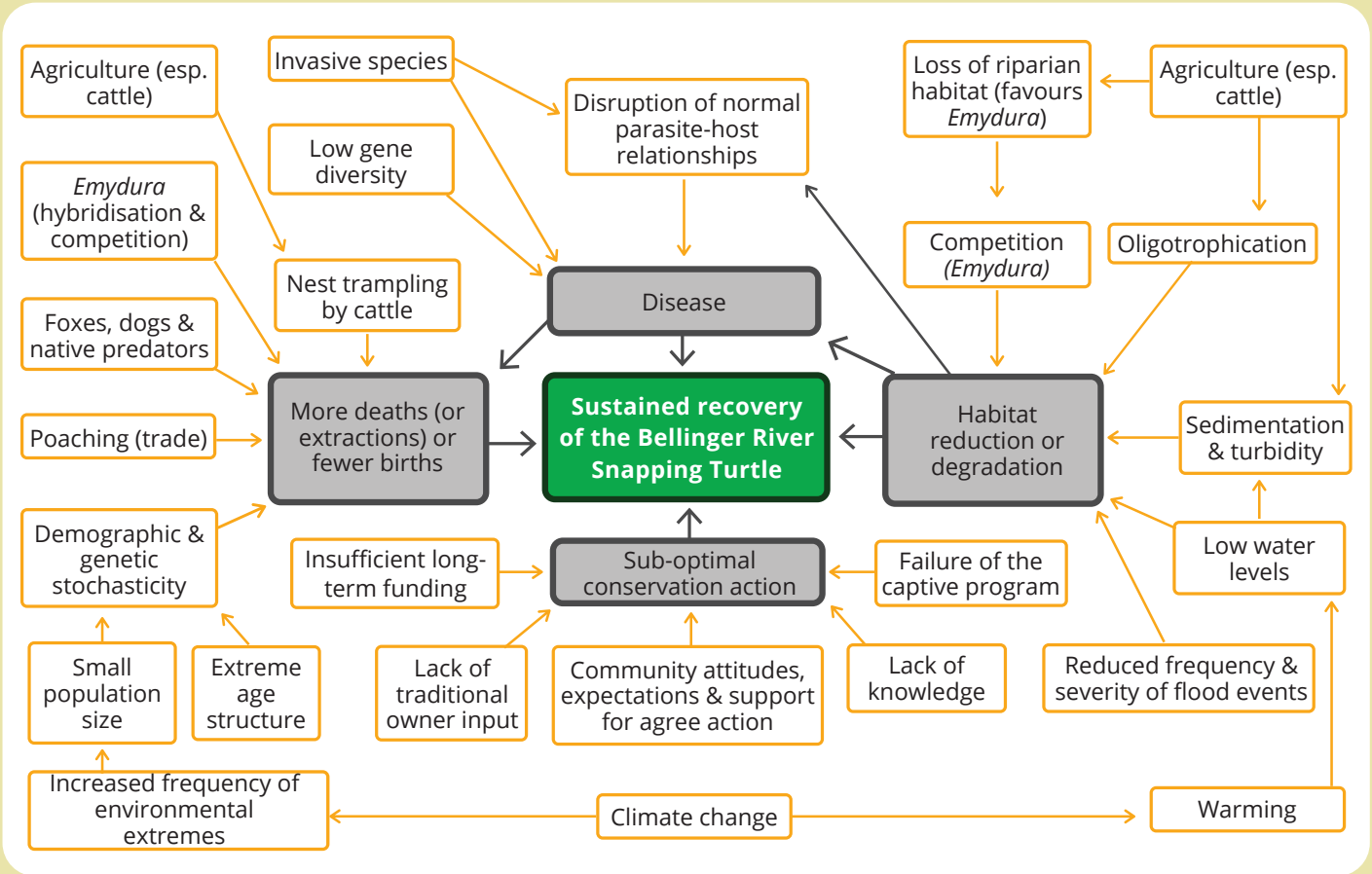


Figure 1. Diagram of brainstormed issues potentially affecting the sustained recovery of the Bellinger River Snapping Turtle with their causes, impacts and inter-connections. In addition, one example of output from subsequent discussion of these issues.

One example of output from subsequent discussion of these issues:

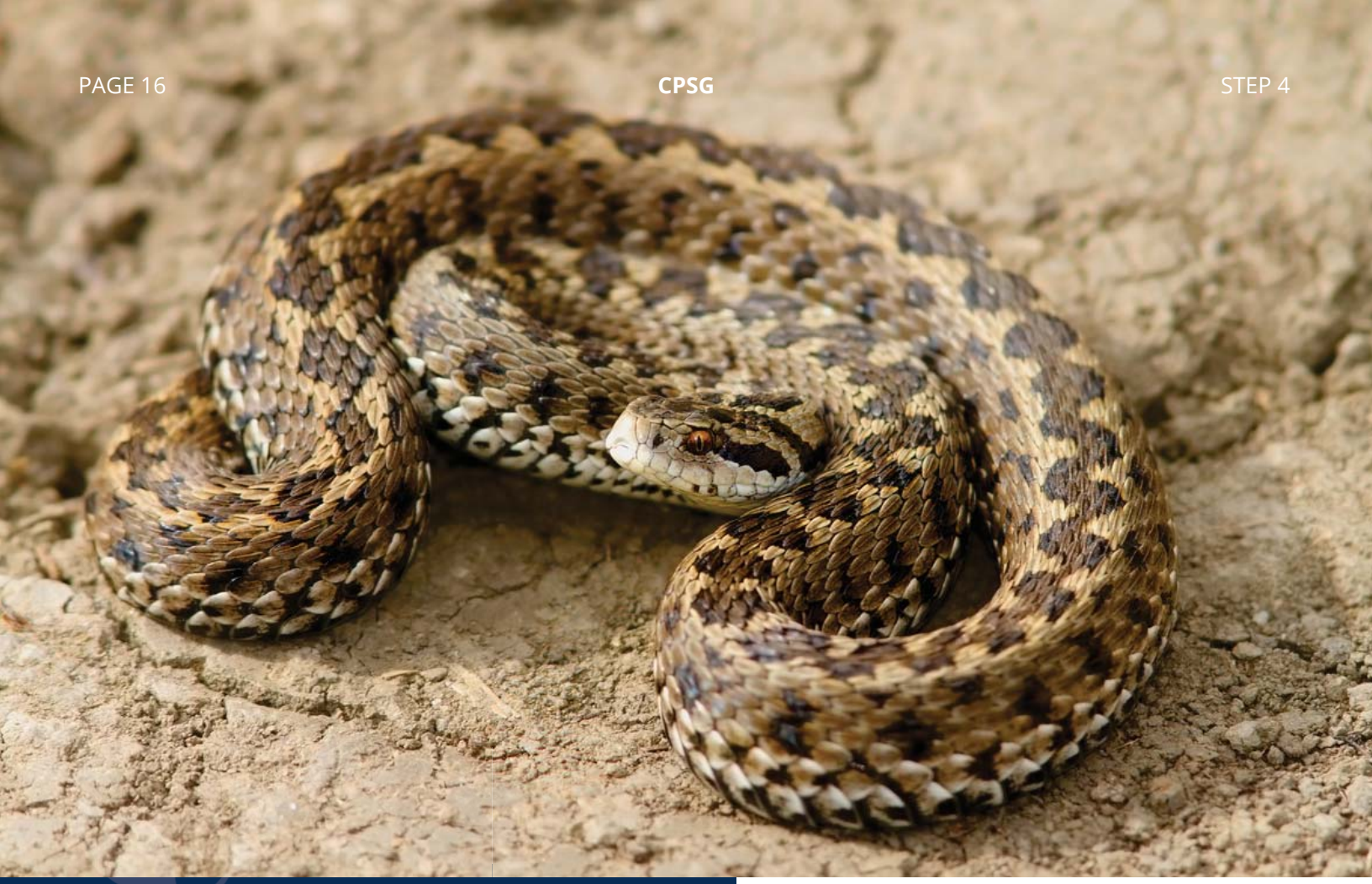
Fox predation
Foxes are an introduced predator and a permanent presence in the area. Standard controls are in place (shooting, baiting, trapping) but additional measures could be applied.

- **Impact**
  Foxes are known to prey on nesting female turtles and their eggs, causing direct mortality of both. In *E. macquarii*, fox predation may result in 90% egg mortality (Thompson 1983). A similar impact is assumed for BRSTs.

- **Key information gaps**
  Where do BRSTs nest? There are significant gaps in our knowledge of BRST nesting ecology that will make it difficult to protect nests or to encourage the restoration of the riparian zone in ways that will support successful BRST nesting.

SUMMARY

- Visually organize available information (known, assumed and hypothesized) to develop a model that describes how stakeholders perceive threats to be impacting the species/ species group.
- Incorporate information on perceived obstacles to effective conservation into the model (e.g. legislation, interorganizational relationships, resources) to explain the current status of the species.
- Discuss points within the system where intervention could be directed.



STEP 4

DECIDE WHERE TO INTERVENE

Decide where in the system to intervene and recommend changes needed to achieve the desired future state.

At this step, the focus is on prioritizing where in the system it is both feasible and important to intervene, and on developing goals for these interventions. Where relevant, stakeholders should also consider how much change is needed to achieve the desired future state.

Prioritizing where to intervene

The goals clarify the broad changes that will be aimed for through plan implementation. Goals help focus stakeholders toward the specific areas of activity required to reduce or eliminate threats to species persistence, or to accelerate recovery. These are the areas of activity to which individuals and organizations will need to commit resources over the life of the plan. It is critical that stakeholders involved in developing the plan agree on the goals, the required, measurable and attainable changes in the system that will be pursued.

Things to consider here include the magnitude of positive change expected by focusing on one area instead of another, or the urgency of mitigating particular threats. Timing might be a consideration. The ideal future for the species might include expanding its distribution into currently unoccupied areas. For some species, this may be highly controversial. To avoid derailing conservation progress, it may be prudent to focus on threat abatement and recovery at existing sites for the 5 to 10-year time frame of the plan, and leaving range expansion to later revisions. Alternatively, participants might focus more on areas of activity that are most feasible given available resources and skills, or that most positively impact human lives and livelihoods while also improving species status. It may be important to consider short-term measures necessary to prevent imminent decline or extinction in addition to long-term actions targeting the reduction or removal of threats necessary for achieving the vision.

Determining degree of change

In Step 3: Understanding the System, stakeholders are encouraged to analyze what is known about the species and the reasons for its decline and begin to prioritize the threats to target for action. It is common for stakeholders to develop goals around these priority threats. Helpful goal statements usually consist of two component parts: the first describes the desired change (e.g. Reduce the abundance of invasive plant species X…); and the second consists of the predicted positive impact that will result from this change (e.g. In order to increase the availability of native habitat for the species…). The second part of the statement often begins with “In order to,” or, “So that” or words to that effect.

It can be helpful to include numerical targets within goal statements, if the numbers relate to both an understanding of what is possible and what is necessary to achieve the desired positive change in the system. A goal statement could be: “Reduce the abundance of invasive plant X by 25% over three years, in order to double the availability of native habitat for the species.” This is helpful if there is some understanding of why a 25% reduction of invasive plant X would likely lead to a doubling of native habitat for the species, and if such a reduction is feasible. Including specific measures facilitates monitoring of the plan and learning during the implementation phase.

***Ex situ* assessment for Brazilian birds, Brazil**

The Brazilian National Action Plans for Conservation of Atlantic Forest Birds and for Birds of Amazonia recommend the evaluation of how, and if, *ex situ* programs might contribute to conservation of these taxa. The first *ex situ* assessment workshop for these birds was held in February 2020 at Parque das Aves. Applying the IUCN *Guidelines for the Use of Ex Situ Management for Species Conservation*, 22 *in situ* and *ex situ* specialists reviewed the conservation needs of 10 galliformes and tinamiformes birds and identified potential *ex situ* conservation roles. The relative value, risks and feasibility of each option was considered. *Ex situ* roles, i.e. goals, were recommended for seven of the 10 taxa, with priority given to four species. Goals varied across these taxa, with each having 3-5 recommended and compatible goals, such as developing a source population for reintroduction, establishing an insurance population, and/or addressing research questions. These goals were integrated into the National Action Plans for further planning and implementation.

It is not helpful to set unrealistic goals, or unrealistic numbers of goals to be achieved. If needed, appropriate criteria, such as the conservation gains to be made by achieving the goal or the urgency with which it needs to be accomplished, can be applied to the list of goals to see which ones best fit the criteria.

CASE STUDY: BELLINGER RIVER SNAPPING TURTLE

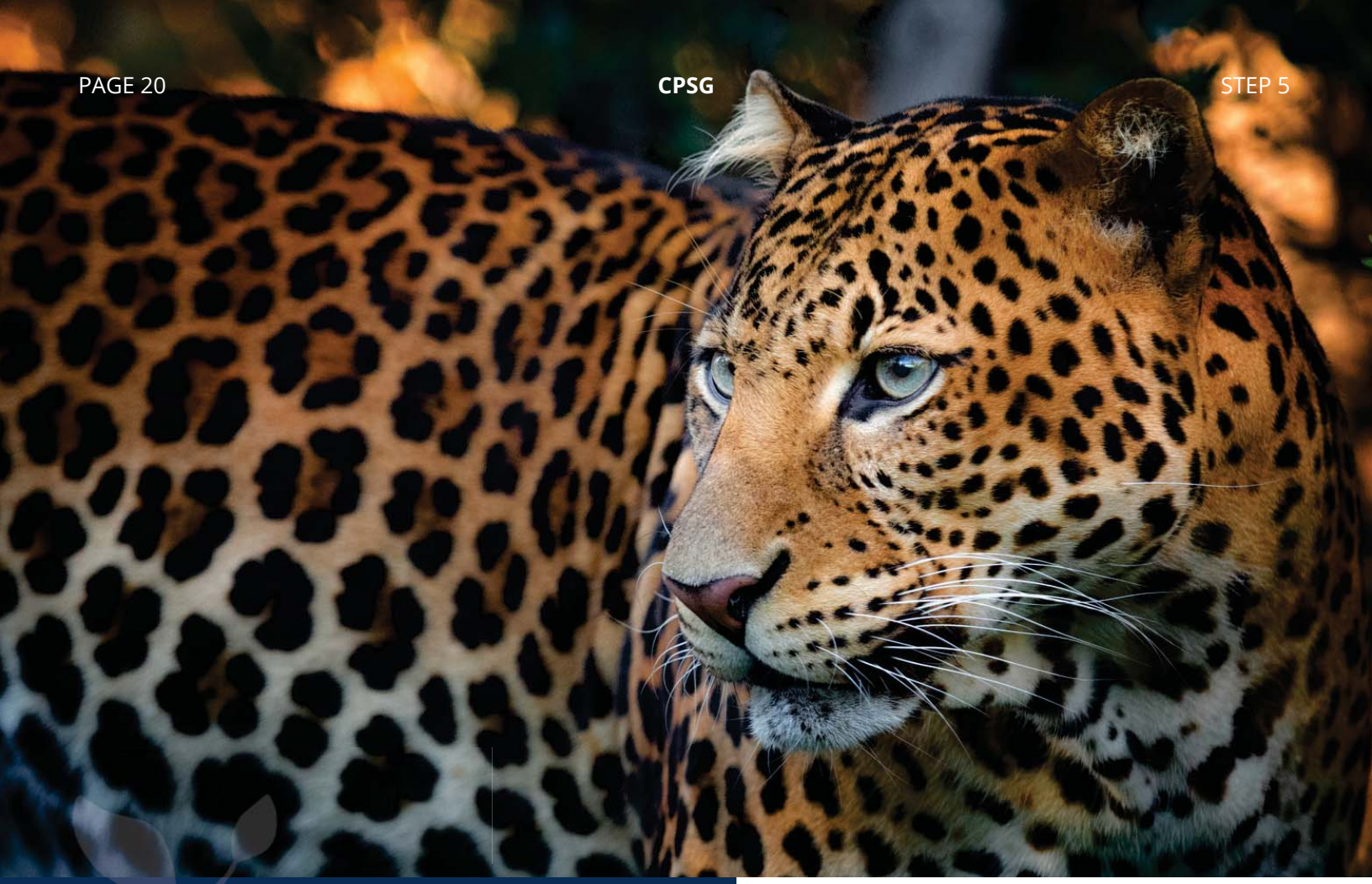
In this project, priorities for intervention are expected to change over time. For example, because the sudden disease event left few adults in the river, intervening to protect wild nests from predation will not be relevant for the first few years, but will become so as juveniles in the river mature to adulthood. Potential intervention points (re-framed as goals) were therefore prioritized by stakeholders for years 1–5 and separately for years 6–20.

Table 1. Proposed intervention points (framed as goals) where action could usefully be taken to promote the sustained recovery of BRSTs over periods of 1–5 years and 6–20 years. Shading indicates bands of priorities: high (red), medium (yellow) and low (green).

No.	INTERVENTION GOALS	1 - 5 year priority score (RANK)	6 - 20 year priority score (RANK)	Overall score (RANK)
1	To address competition with *E. macquiarii*	8 (1)	4 (4)	12 (1)
2	To restore the riparian zone	6 (2)	6 (2)	12 (1)
3	To mitigate risk from disease outbreak (especially Bellinger virus)	8 (1)	3 (5)	11 (2)
4	To mitigate risk of hybridization	6 (2)	5 (3)	11 (2)
5	To insure against captive program failure	6 (2)	3 (5)	9 (3)
6	To manage predation by foxes	0 (6)	8 (1)	8 (4)
7	To address community concerns	3 (3)	4 (4)	7 (5)
8	To improve water quality	3 (3)	3 (5)	6 (6)
9	To buffer against climate change	0 (6)	2 (6)	2 (8)
10	To reduce stochasticity	0 (6)	1 (7)	1 (9)
11	To reduce poaching	1 (5)	0 (8)	1 (9)
12	To reduce predation (dogs)	0 (6)	0 (8)	0
13	To reduce predation by native species	0 (6)	0 (8)	0

SUMMARY

- Clarify the broad changes that will be pursued through plan implementation.
- Where useful to do so, agree on how much change may be required to achieve the desired impact on the species.
- Develop clear goal statements for the interventions selected, including the desired change and how the change is predicted to positively impact the system and the species.



STEP 5

AGREE ON HOW TO INTERVENE

Identify alternative approaches to achieving the recommended changes, compare their relative costs, benefits, risks and feasibility, and choose which approach(es) to pursue.

At this step, stakeholders consider the different ways in which the goals agreed upon in the previous step could be achieved. The relative strengths and weaknesses of different approaches are compared, and consensus is built on which to recommend for implementation.

Identifying alternative approaches

There may be multiple approaches that can be taken—independently or concurrently—to achieve any single goal. Each approach considered should be distinct enough to be directly compared with other approaches in its ability to address a specific conservation goal.

Stakeholders should be actively engaged in brainstorming potential approaches. The emphasis on a participatory process is yet another reinforcement of stakeholder engagement and its benefits around improving conservation outcomes.

Deriving meaningful alternative approaches to achieve each goal often begins by forming a list of potential approaches that could be taken. Related or complementary actions can then be combined. For example, an approach to habitat improvement for a particular area might include a combination of improving fire regimes, removing invasive plants, and re-establishing native prairie vegetation at the desired density.

Evaluating alternative approaches

As with most steps in the conservation planning process, methods for evaluating alternative approaches range from the simple to the complex [6]**.** Each alternative can be evaluated on the basis of its broad strengths (including relative conservation benefits) and weaknesses (costs and risks), with specific "fixes" that could be put in place to overcome the potential costs and risks. Common criteria used to evaluate alternatives include feasibility (likelihood of being successfully implemented) and other relevant factors, such as technical expertise, socio-cultural impact or resource availability.

Population Viability Analysis (PVA) tools are particularly well-suited to facilitate direct quantitative comparisons of projected outcomes (extinction risk, population growth rate, etc.) for some alternatives. PVA can assess the likely interactions among management activities that might elevate or compromise their effectiveness or efficiency. These tools can also be used to evaluate the impact of uncertainty (i.e. our incomplete knowledge of biological parameters used in predictive models), as well as temporal variability in the system (i.e. natural fluctuations in survival and/or reproduction over time) that is common in natural environments.

Effective use of such tools requires the availability of substantial data, and requires considerable expertise to implement responsibly. However, they can provide valuable evidence to justify decision making across a range of complex management alternatives.

Evaluating approaches to conserve the Colorado pikeminnow, North America

CPSG was invited to conduct a detailed population viability analysis (PVA) for the Colorado pikeminnow (*Ptychocheilus lucius*) throughout its range within the Colorado River basin. The aim was to evaluate current species recovery criteria and alternative approaches for their potential efficacy in reversing current trends. Following a detailed threat analysis, a group of pikeminnow experts identified actions that were combined to form alternative approaches to achieving an increase in the abundance of the species. These stakeholders had collected valuable demographic field data that allowed them to develop proposed relationships between the magnitude of a given threat and the extent of its demographic impact on one or more age-classes of fish. With this information, a set of scenarios was developed in the PVA modelling platform projecting the likely future of the simulated pikeminnow population under the alternative approaches. The preferred approach was chosen in part on the basis of its effectiveness in helping the population to grow above the existing threshold for population viability.

CASE STUDY: BELLINGER RIVER SNAPPING TURTLE

In this case, some of the approaches identified could contribute to the achievement of multiple intervention goals, others to only one. Given the uncertainty about how the system and the target species would respond to these interventions, it was agreed that, initially, more than one strategy would be pursued for each priority issue. Approaches that targeted only lower priority intervention goals (control domestic dog behaviors and control poaching risk) were not prioritized for further work.

MITIGATION STRATEGIES

**Feasibility of mitigation strategy not yet known. Key questions need to be answered before this can be determined.*

***Community-led activities run independently of the BRST recovery project though potentially informed and influenced by it.*

? Not known until results of studies indicate whether E. macquarii is a BV reservoir

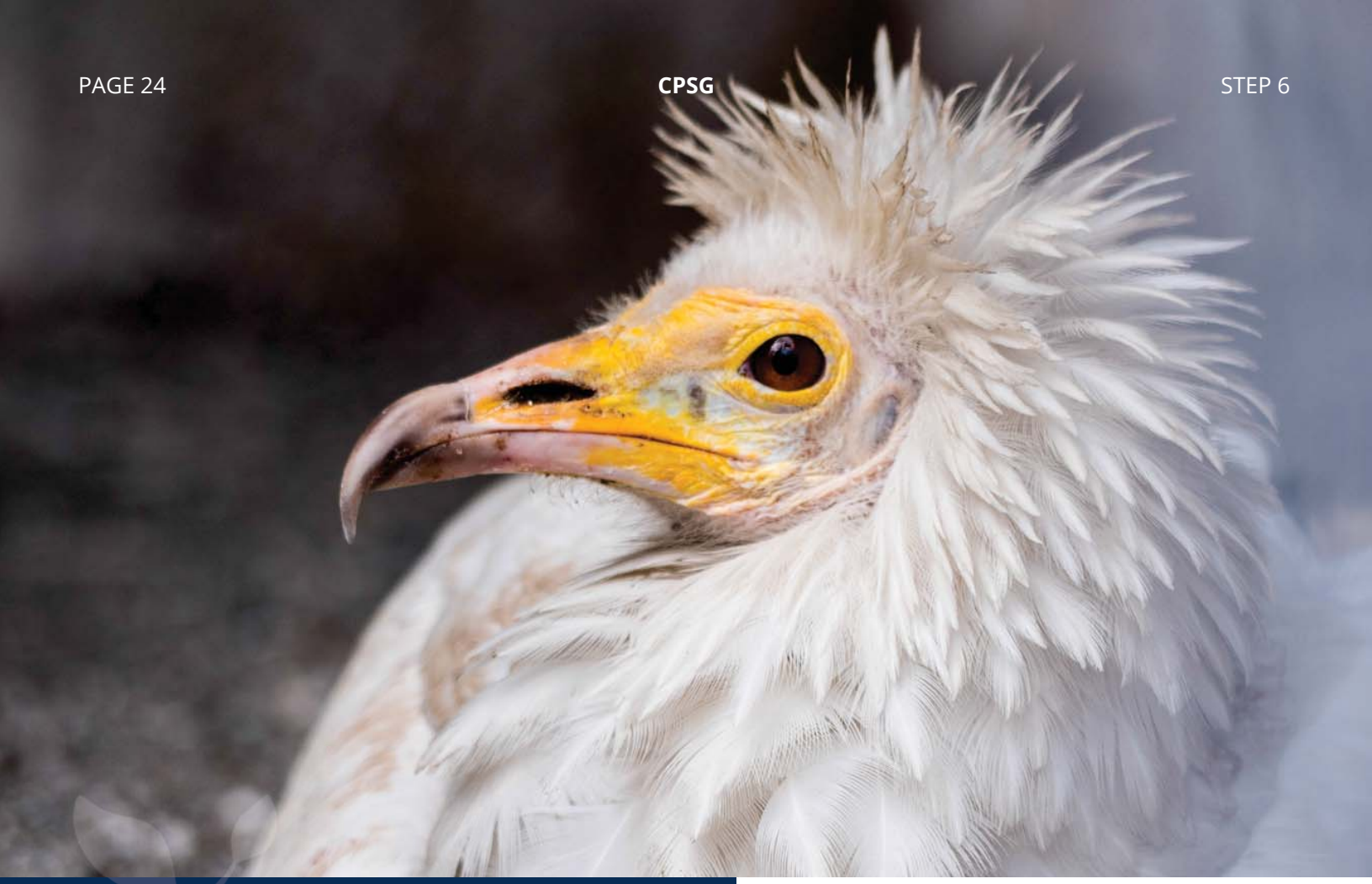
1 (lighter shading): *lower impact on issue is expected*
2 (darker shading): *higher impact on issue is expected*

	Address competition with *E. macquarii*	Restore riparian zone	Mitigate disease outbreaks (esp. BV)	Mitigate hybridisation	Insure against captive program failure	Manage predation (foxes)	Address community concerns	Improve water quality	Buffer against climate change	Reduce stochasticity	Reduce poaching	Reduce predation (dogs)	Predation by native species
***Control *E. macquarii*:** Answer key questions about the threat and evaluate control options using trials. Use results to design and deliver appropriate control.	2		?	2									
****Active restoration of riparian zone:** community-led projects (underway)	1	2		1		1		1	1	1		1	
***Manage Bellinger River Virus:** Investigate BRV, answer key questions and use this information to design and deliver appropriate management measures			2										
Engage community (underway): Revise and implement communication strategy, manage local stakeholder group, involve community in multi-faceted on-ground action.		1	1			1	2	1			1	1	1
Pursue best practice captive breeding for insurance & release: maintain best practice management of husbandry, disease risk, genetics and demography, spread program across multiple sites, rapidly generate large numbers for release	1			1	2					2			
Control foxes: targeted fox control and some fencing						2						2	2
Control domestic dog behaviors: Install signage to deter uncontrolled dogs during the turtle breeding season.												2	
Control poaching risk: Continue tagging and not publicizing turtle sites.											2		
	Yr 1-5 priorities				**Yr 6-20 priorities**				**Lower priorities**				

Table 2. Summary of priority approaches for mitigation of the main issues constraining Bellinger River snapping turtle recovery. Depth of shading corresponds to expected effectiveness of mitigation for each threat.

SUMMARY

- Identify alternative approaches to achieving each goal and assess their relative costs and benefits.
- Identify both biological and human-related (political, social, economic) risks of each alternative approach, as well as potential ways to mitigate those risks.
- Clarify potential interactions between selected approaches (positive or negative).
- Achieve agreement among stakeholders upon the approaches recommended for implementation.



STEP 6

SPECIFY WHAT IS TO BE DONE

Agree on what will be done, when and by whom, to implement the chosen approach and determine the measures to be used to indicate progress or completion of specific tasks.

At this step, stakeholders move towards defining the actions that they and others will take in order to implement the selected approaches and achieve the goals. Clarity around who is committing to do what and by when encourages accountability. Determining measures that will be used to indicate progress or completion of specific actions provides transparency and opportunities for learning and improvement.

Determining what will be done, by whom and when

By undertaking the preceding steps to build agreement around what and how the system needs to change, stakeholders articulate a commitment to take specific actions. Without such commitment the plan is less likely to be implemented, or implemented effectively.

Specific actions often also require the involvement of individuals or organizations that are not represented at the workshop. They may not have been identified in the stakeholder analysis, or they may not have been available to participate. If this is the case, then those involved in the planning process should consider what steps they could take to ensure the actions are communicated to the relevant people and a positive response secured. In this way, those most closely involved in the planning process can influence the extent to which resources are in place to ensure the plan is fully implemented.

Actions that help reduce uncertainty are valuable to identify at this stage. These actions may, for example, involve undertaking specific research to fill priority knowledge gaps. Alternatively, monitoring the implementation of other actions may generate new understanding and so inform future decisions made.

Determining indicators to measure progress

Specifying actions requires those involved to clearly state what is going to be done, by whom, when, and, importantly, how everyone will know if the action has been completed. When particular actions are ongoing (i.e. no clear end point, such as monitoring the population of a given species), it is helpful to include some means of verification that the actions are being undertaken, and how progress updates will be made available to stakeholders (e.g. end of year report).

Indicators, or means of verification that actions have been completed (or not!) and why, will facilitate monitoring of plan implementation and, importantly, provide valuable learning for future planning. For example, it might be that certain actions were not undertaken because they were not thought to be important, or because certain stakeholders were unable to invest the necessary resources. Either reason can inform the nature of discussions that are built into the plan renewal process.

Specifying actions for crop-wild relative conservation, Zambia

Amongst the 3,600 species of vascular plants of Zambia are several hundred species of importance to ensure the future food and economic security of the country, and the wider region. A government-endorsed National Strategic Action Plan for these species was produced in 2017, through a multi-stakeholder inclusive workshop process. Eighteen actions were identified within the plan, each of which included baseline information on the current situation, clear statements of what completing each action would look like, when each would be completed and which organization was responsible for this work. In addition, "indicators of success" were identified to aid monitoring of action progress.

CASE STUDY: BELLINGER RIVER SNAPPING TURTLE

Actions were developed for all high priority strategies:

1. **Control *E. macquarii*.**
2. **Active restoration of riparian zone.**
3. **Manage Bellinger River Virus.**
4. **Pursue best practice captive breeding for insurance and release.**
5. **Engage the community.**
6. **Control foxes (post five years).**

The following action examples relate to **Strategy 3. Manage Bellinger River Virus**.

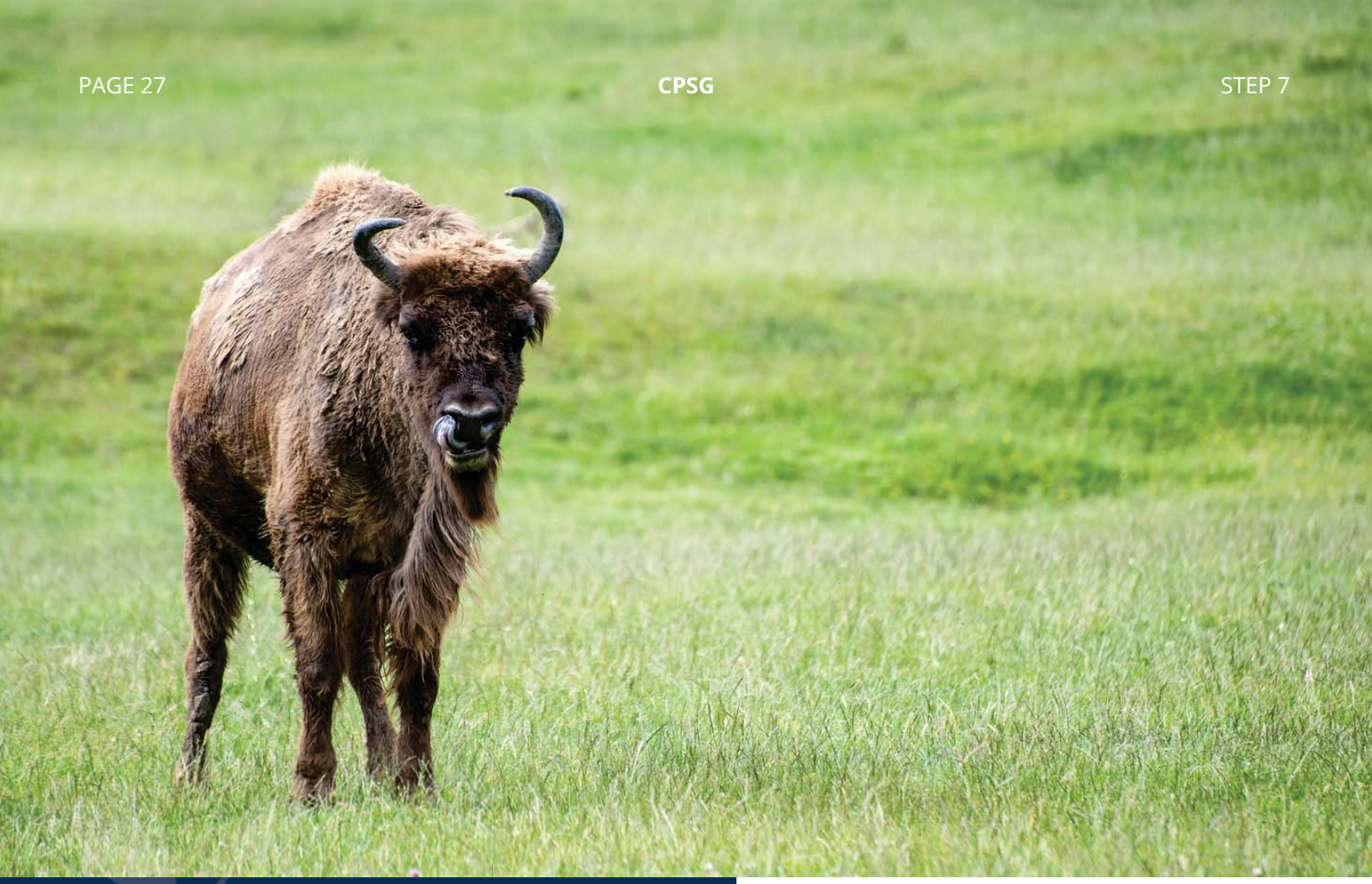
Action 3.1. Investigate modes of BRV transmission.
Detail: Carry out experimental BRV infection trials to study transmission, incubation, shedding, age/sex susceptibility and pathogenesis. This will involve, initially, development and approval of a grant proposal, work on which should start immediately.
Lead agency: Australian Registry of Wildlife Health
Potential collaborators: Office of Environment & Heritage, Dept. Primary Industries, James Cook University
Timeline/frequency: Commence Year 1 (June 2016-2017).
Success measure(s): Heightened understanding of this disease enables the likely effectiveness and feasibility of mitigation strategies to be assessed and informed decisions to be taken on issues such as E. macquarii control, vector control etc.
Related intervention goal(s): 1, 3, 4, & 5

Action 3.2. To establish a serological test for BRV with a high sensitivity and specificity.
Detail: Establish and deploy the test as part of the epidemiological investigation of BRV disease. Establishing a serological testing method will help identify the virus recognized as a primary pathogen. We would expect that during the outbreak, affected animals died so quickly that they did not have time to produce antibodies. Therefore, if antibodies are identified in those animals it is likely that the virus was present prior to the disease event. We are also currently uncertain whether the juvenile animals currently alive in the river are resistant to the virus or have not been exposed to it. The serological test can provide answers to this.
Lead agency: Australian Registry of Wildlife Health
Potential collaborators: Dept. Primary Industries, Office of Environment & Heritage
Timeline/frequency: Commence Year 1 (June 2016-2017).
Success measure(s): Serological test with high sensitivity and specificity is developed and enables the detection of animals that have been exposed to BRV.
Related goal(s): 1, 3, 4 & 5

Action 3.3. Explore possible antiviral treatment options for reptiles and associated biosecurity methods.
Detail: Desktop study of possible treatment options explored.
Lead agency: Australian Registry of Wildlife Health
Potential collaborators: Dept. Primary Industries, Bellingen Veterinary Hospital
Timeline/frequency: Commence Year 2 (June 2017-2018).
Success measure(s): Treatment options are understood and enable informed management of BRV-affected animals.
Related goal(s): 1, 3, 4 & 5

SUMMARY

- Dedicate sufficient time within the planning process for stakeholders to discuss and specify the actions that need to be taken to achieve the goals.
- Clarify who will do what and by when, or agree on a process by which this critical detail will be added.
- Involve those people who need to implement actions to ensure that they agree to the actions identified.
- Identify indicators to ensure that all stakeholders will clearly know if and when each action has been completed.



STEP 7

PREPARE TO IMPLEMENT

Agree upon how key individuals and organizations will communicate, coordinate, make decisions, and track and report on progress as they move forward together to implement the plan.

This step is the culmination of the planning process, in which the draft plan is outlined, progress made is celebrated, and next steps decided. At this step, stakeholders agree upon how key individuals and organizations will communicate, coordinate, make decisions, and track and report on progress as they move forward together to implement the plan effectively and synergistically.

Celebrating progress and closure
The collaborative planning process can be exhausting as well as fulfilling. Stakeholders get to know each other, challenge each other, and feel a mix of frustration, elation and often high emotion. Some form of formal closure process can allow for a celebration of the progress made in developing the plan, as well as to highlight the implementation work to follow.

At the end of a collaborative planning process there may be a public press conference or the presentation of a summary of planning outcomes to certain authorities, public figures or key stakeholders. For maximum benefit and wherever possible, this should be organized well in advance (see Step 1: Prepare to Plan).

Clarifying communication, coordination and decision making
Successful plan implementation relies on some form of oversight, or governance, by key stakeholders or their organizations. Good governance involves clarifying who will be involved in and responsible for decision making, communication and coordination, and how. The aim is to be transparent about how stakeholders will organize themselves so they can keep track of implementation and make timely decisions about changes as new information arises.

The most appropriate governance structure for the implementation of any single plan will vary depending on the situation. The structure decided upon should also be communicated to all stakeholders so they know how coordination will be achieved. Some plans might benefit from a technical advisory group that may lack decision-making powers but has a role in providing scientific advice to the governing group, or to implementation teams, to guide their actions. Other individuals or organizations may be involved to provide additional skills and necessary financial resources to ensure those implementing the plan have the capacity to do so. What many successful plans share is the presence of a point person or coordinator (sometimes in a paid position) who keeps track of actions implemented, maintains information exchange and encourages stakeholders to do the necessary work through maintaining personal contact.

In reality, preparing to implement begins at Step 1: Preparing to Plan. Asking at this early stage about which individuals and/or organizations are likely to be involved in overseeing the implementation of the plan once developed can help to identify additional stakeholders who should be included within the planning process.

There are situations in which it is not possible to determine this type of involvement in advance. Whatever the situation, during “Prepare to Implement” relevant stakeholders should be given time to decide how they will organize themselves, so this can then be communicated to all stakeholders.

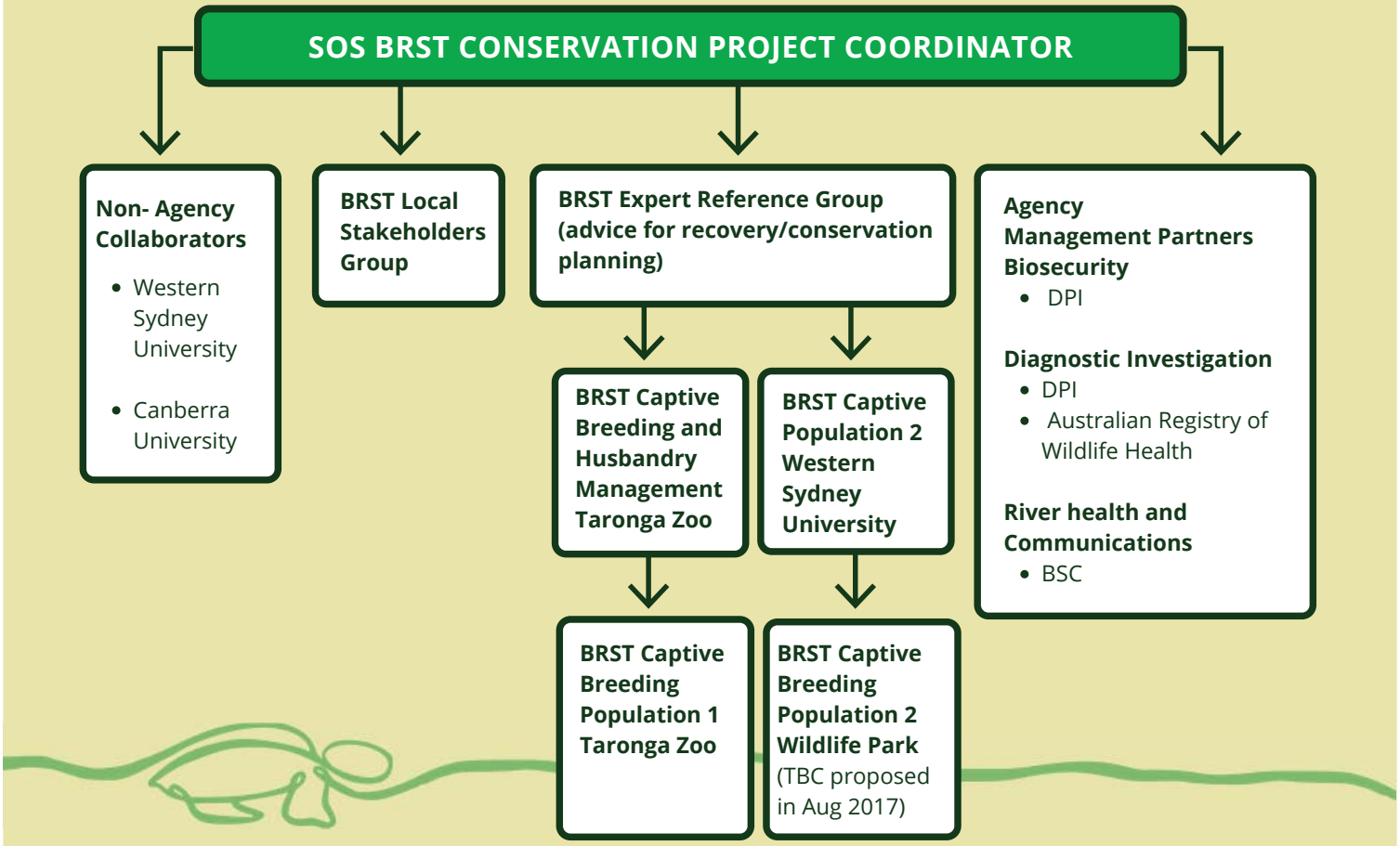
Formosan pangolin Population and Habitat Viability Assessment, Taiwan

In 2017 CPSG facilitated the second Population and Habitat Assessment (PHVA) workshop for the Formosan pangolin in Taiwan, building upon progress made since the first PHVA in 2003. This planning process involved more than 70 stakeholders from 13 countries. A National Conservation Strategy Planning Meeting was held immediately following the 2017 PHVA to discuss implementation of the resulting National Conservation Strategy and Action Plan. A Formosan Pangolin Core Group (FPCG) was created to coordinate information sharing and implementation of this conservation strategy. Four sub-groups were also established to drive activities, each with a lead stakeholder organization: Research Group (led by ESRI); Conservation Strategy Group (led by the Forest Bureau); Conservation Education Group (led by Taipei Zoo); and Integrated Conservation/ Rescue Group (led by Taipei Zoo). The entire Strategy and Action Plan will be reviewed every five years.

The plan may need to change during the implementation phase as new information arises or as actions do not have the predicted impact. The plan should include a review schedule, in which agreed actions can be monitored, success measured, and a timeframe set for plan review and potential modification.

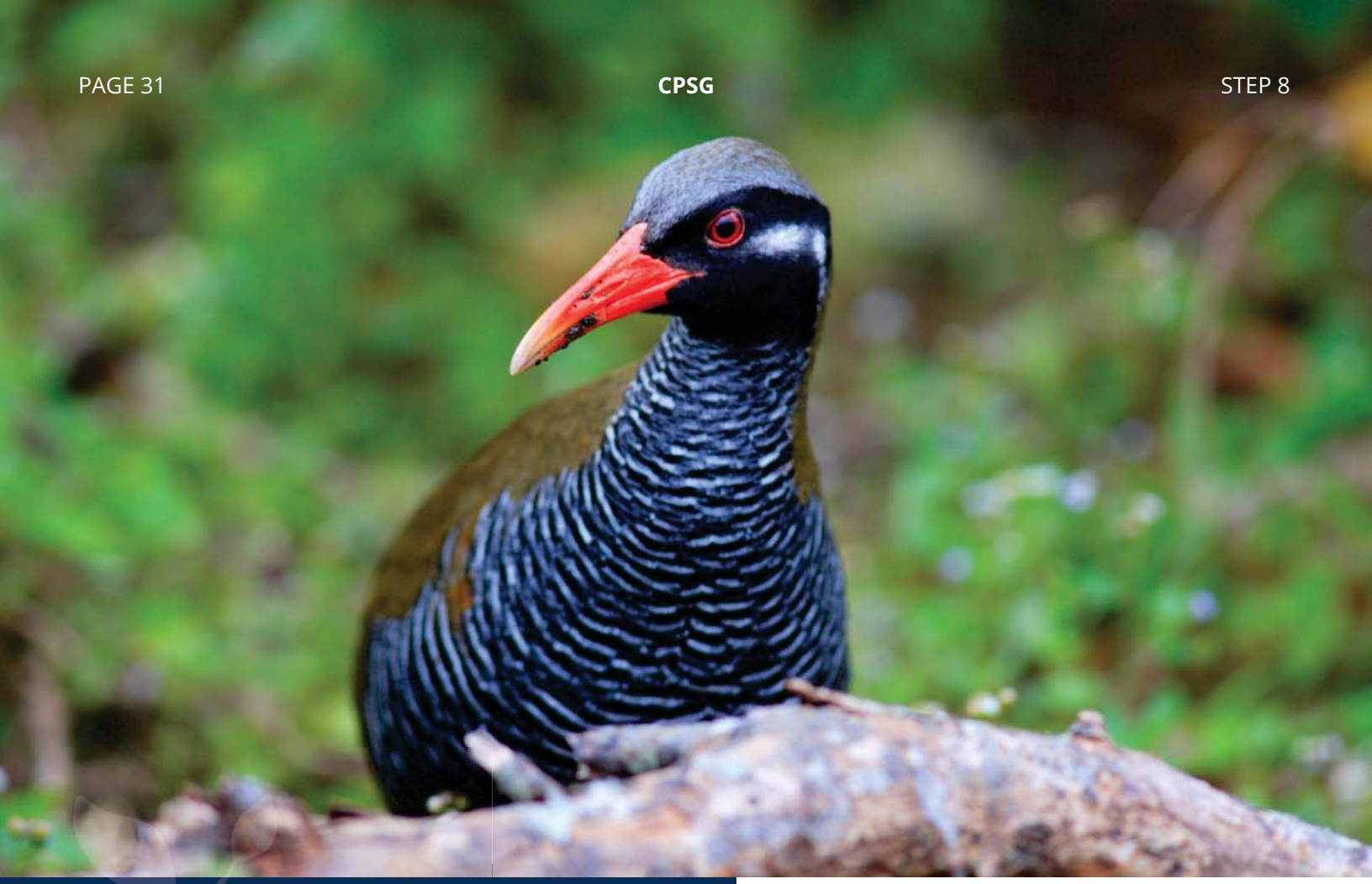
CASE STUDY: BELLINGER RIVER SNAPPING TURTLE

The proposed action plan for recovery of the Bellinger River Snapping Turtle (BRST) will operate through the following organizational framework.



SUMMARY

- Include time at the end of the planning phase to celebrate the progress made in plan development and to recognize that the implementation phase now begins.
- Agree on a governance structure for plan implementation, including identification of necessary resources.
- Decide how actions will be monitored and relevant stakeholders contacted to ensure that actions they are responsible for have been implemented.



STEP 8

SHARE, LEARN AND IMPROVE

Produce and share the plan as soon as possible after completion of the planning process to maximize its conservation impact. Capture lessons learned in order to develop more effective conservation planning approaches.

At this step, it is critical that the draft plan arising from the planning process is finalized swiftly and shared widely with all those who could influence implementation, in order to maximize conservation impact. This step also provides an opportunity for capturing lessons learned about the planning process itself, and using that insight to improve future conservation planning.

Finalize and share the plan

Following the intense planning process, particularly if it involved a face-to-face workshop, it can be easy for everyone to feel the work is complete. It is not. Someone, often the lead facilitator of the planning process, must take responsibility for finalizing the workshop report. This includes ensuring all participating stakeholders have the opportunity to comment on the report before it is finalized. It is important to stress at this stage that participants should not make substantive changes in the plan without further discussion with all stakeholders.

Sometimes the workshop report provides everything that is needed in a written implementation plan, and sometimes it needs to be reformatted or reshaped to become the species conservation plan. The ultimate use of the plan (outlined in Step 1: Prepare to Plan) will influence the final structure of the written document. For example, the plan may be intended as a funding proposal to secure the resources needed to implement actions. This might require further editing before it can serve this purpose. Whatever the desired format of the final plan, a process should be agreed upon, with named individuals taking specific roles in completing it and in distributing it.

Upon completion, the plan is shared with all workshop participants, donors and partners. The organizing team, in consultation with stakeholders, should determine who else should receive the plan in order to maximize impact. Possible recipients include national authorities responsible for biodiversity conservation or natural resource management; Convention on Biological Diversity focal points; Convention on International Trade in Endangered Species of Wild Fauna and Flora representatives; regional, national or global zoos, botanic gardens and aquariums and their associations; and other government bodies, such as transportation departments and tourism agencies that may be developing plans that could be influenced by the needs of the species. The report is generally made widely available by uploading it to the CPSG, or another, website.

If not already connected to the planning process, SSC Specialist Groups and Red List Authorities should receive appropriate plans in order to support Red List updates and aid implementation. There may also be opportunities for the plan to contribute to National or Regional Red List efforts.

Learn from the process

The mechanics of conservation planning can always be improved through an objective evaluation of a particular process and its design. After the planning is completed and while the plan is being produced, stakeholders should provide detailed feedback on their perceptions of the planning process. Likewise, the facilitation team should reflect on what they see as the strengths and weaknesses of the design and its implementation. In this way, the method of species conservation planning is always evolving.

Learning and adapting the planning process: Rethinking the Population Viability Analysis process

To maximize the value of the Population Viability Analysis (PVA) to inform decision-making within a planning workshop, it is recommended that the process be designed in two distinct phases: a dedicated PVA model development process, culminating in a detailed report of the biological results of the risk assessment process; and a conservation planning process that now has the results of the PVA in hand to guide the many facets of complex decision-making. This allows for greater input from species experts in the preliminary development of the quantitative risk assessment, and ensures the results are readily available to all stakeholders in the second planning phase.

The product of a planning process reflects what is known at the time. Once plan implementation begins, and new knowledge and insight is collected, it is common to adjust one or more elements of the original plan. This iterative process of adaptive planning is a crucial component of sound, evidence-based species conservation.

CASE STUDY: BELLINGER RIVER SNAPPING TURTLE

Sharing
In addition to sharing the documented plan with those organizations represented within the implementation framework and beyond, the plan includes the explicit development of a communication strategy (Action 4.1) to ensure that relevant new information is made available to stakeholders throughout the program.

Learning
There are several experimental elements to this program and adapting to lessons learned will be key. Regular reviews are built into the project's timeline, with major reviews beginning after the first releases (see below).

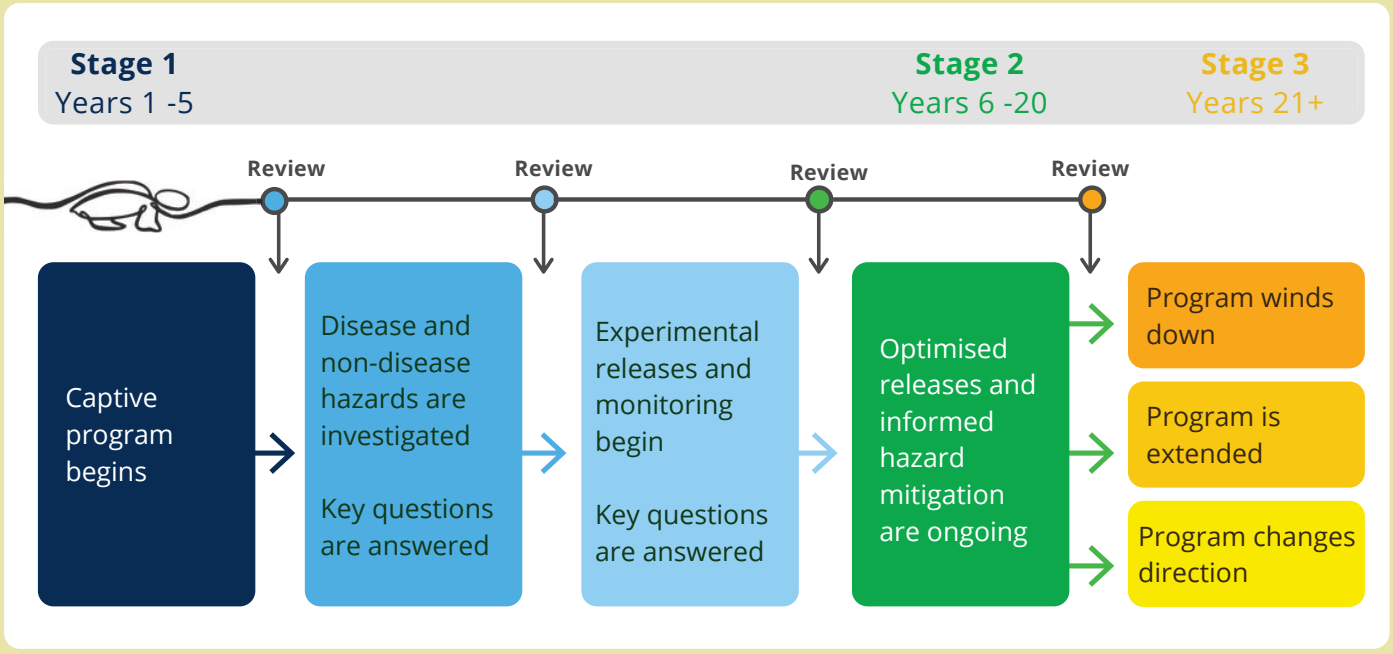


Figure 3. Three stages of the recovery program for Bellinger River snapping turtles. In the initial stage, the captive breeding program is developed and key information gaps are filled relating to the disease and to the situation in the river. The second stage involves pursuing recovery while continuing to gather information and test and hone strategies. The third stage involves evaluating program progress and either winding down the program or changing direction.

SUMMARY

- Agree on a process for preparing the final plan report, including opportunities for stakeholders to comment on the report and for edits to the report if required to convert it into a species conservation plan.
- Ensure stakeholders have had the opportunity to provide their feedback on the planning process so improvements can be made next time.
- Share the plan with relevant national authorities so they can facilitate implementation and include it within their reporting on national commitments to international conventions and agreements (e.g. the Convention on Biological Diversity).
- Share the plan with the relevant IUCN Red List Authority or IUCN SSC Specialist Group Chairs, so it can be linked to any Red List or Green Status assessment and support conservation action for the species or species group.
- Identify opportunities to share the plan more widely in order to build broad support for implementation.

CHECKLIST

SPECIES CONSERVATION PLANNING STEPS

Prepare to plan

- [ ] Establish the organizing team.
- [ ] Agree on the plan's scope, rationale and required product.
- [ ] Identify, contact and invite the relevant stakeholders.
- [ ] Secure the support of the appropriate government wildlife authority.
- [ ] Assemble and analyze the available information on the species (including existing plans).
- [ ] Consult relevant IUCN guidelines to inform the planning process.
- [ ] Develop an appropriate planning process (considering tools, logistics, translation, facilitators etc.).
- [ ] Initiate discussion on the needs related to implementation.

Define success

- [ ] Agree on a definition of project success (e.g. a desired future state/vision).
- [ ] Establish and sufficiently define appropriate metrics to measure progress towards success.

Understand the system

- [ ] Visually organize available information (known, assumed and hypothesized) to develop a model that describes how stakeholders perceive threats to be impacting the species or species group.
- [ ] Incorporate information on perceived obstacles to effective conservation into the model (e.g. legislation, interorganizational relationships, resources) to explain current status.
- [ ] Discuss points within the system where intervention could be directed.

Decide where to intervene

- [ ] Establish a process that helps stakeholders prioritize what is both feasible and important to change in the system.
- [ ] Achieve agreement on how much change may be required in order to achieve the desired impact on the species.
- [ ] Develop clear goal statements for the interventions selected, including the desired change and how the change is predicted to positively impact the system and the species.

Agree on how to intervene

- ☐ Identify alternative approaches to achieving each goal and assess their relative costs and benefits.
- ☐ Identify both biological and human-related (political, social, economic) risks of each alternative approach, as well as potential ways to mitigate those risks.
- ☐ Clarify potential interactions among selected approaches (positive or negative).
- ☐ Achieve agreement among stakeholders upon the approaches recommended for implementation.

Specify what is to be done

- ☐ Dedicate sufficient time within the planning process for stakeholders to discuss and specify the actions that need to be taken to achieve the goals.
- ☐ Clarify who will do what and by when, or agree on a process by which this critical detail will be added.
- ☐ Involve those people who need to implement actions in agreeing to actions identified.
- ☐ Identify indicators to ensure clarity for all stakeholders on when they will know if each action has been completed.

Prepare to implement

- ☐ Include time at the end of the planning phase to celebrate the progress made in plan development and to recognize that the implementation phase now begins.
- ☐ Agree on a governance structure for plan implementation, including identification of necessary resources.
- ☐ Decide how actions will be monitored and relevant stakeholders contacted to ensure that actions they are responsible for have been implemented.

Share, learn and improve

- ☐ Agree on a process for preparing the final plan report, including opportunities for stakeholders to comment on the report and for edits to the report if required to convert it into a species conservation plan.
- ☐ Ensure stakeholders have had the opportunity to provide their feedback on the planning process so improvements can be made next time.
- ☐ Share the plan with relevant national authorities so they can facilitate implementation and include it within their reporting on national commitments to international conventions and agreements (e.g. the Convention on Biological Diversity).
- ☐ Share the plan with the relevant IUCN Red List Authority or IUCN SSC Specialist Group Chairs, so it can be linked to any Red List or Green Status assessment and support conservation action for the species or species group.
- ☐ Identify opportunities to share the plan more widely in order to build broad support for implementation.

CONCLUSION

CPSG's Species Conservation Planning Steps are designed to serve as a guide to those looking to answer the question: What do we need to consider when determining how to plan for the conservation of species threatened with extinction? Woven throughout these steps are the core principles of planning to act, inclusivity, sound science, good process design and facilitation, consensus-based decision making, rapid production of a product, and adaptation. Such an approach, we know from experience, results in greater consensus and is a catalyst for collaborative conservation action.

The CPSG Principles and Steps describe what should be considered when developing species conservation plans. How you put them into practice will vary depending on the focus and scope of the plan required, how best to engage those that need to be involved in its development, and your experience in leading on the process. Most of the case-studies presented here are for single-species planning initiatives, though the same principles and steps can be applied to planning the conservation of multiple species concurrently. For those interested in developing the ability to put the CPSG Principles and Steps into practice, online and in-person training and additional resources are available through www.cpsg.org.

Through these guidelines, we hope to make a contribution to the development of more effective plans for more threatened species so that by 2030 we can see a measurable reduction in population declines worldwide. Through working in concert with the existing body of expertise across the SSC, and within governments and non-government organizations across the globe, we can move towards a future in which every species that needs a plan is covered by an effective, implemented plan.

REFERENCES AND RESOURCES

To find out more about how to design and facilitate participatory species conservation planning processes (including related training courses), please visit our website (www.cpsg.org) or contact office@cpsg.org.

References

[1] IUCN (2020). The IUCN Red List of Threatened Species. Version 2020-2. Accessed at: https://www.iucnredlist.org/ (25/05/2020).

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Additional IUCN SSC planning-related resources

The following texts help deepen understanding of species conservation planning. The list is not meant to be comprehensive, nor is it meant to suggest these materials are more valuable than other literature that exists that is relevant to species conservation planning.

IUCN SSC. (2013). Guidelines for Reintroductions and Other Conservation Translocations. Version 1.0. Gland, Switzerland: IUCN Species Survival Commission, viiii + 57 pp. Accessed at: https://portals.iucn.org/library/sites/library/files/documents/2013-009.pdf (20/05/2020).

World Organisation for Animal Health (OIE) & International Union for Conservation of Nature (IUCN). (2014). Guidelines for Wildlife Disease Risk Analysis. OIE, Paris, 24 pp. Published in association with the IUCN and the Species Survival Commission. Accessed at: https://portals.iucn.org/library/sites/library/files/documents/2014-006.pdf (20/05/2020).

IUCN SSC. (2014). Guidelines on the Use of Ex Situ Management for Species Conservation. Version 2.0. Gland, Switzerland: IUCN Species Survival Commission. Accessed at: https://portals.iucn.org/library/sites/library/files/documents/2014-064.pdf (20/05/2020).

Breitenmoser, U., Lanz, T., Vogt, K. & Breitenmoser-Würsten, Ch. (2015). How to save the cat - Cat Conservation Compendium, a practical guideline for strategic and project planning in cat conservation. Cat News Special Issue 9, 36 pp. Accessed at http://www.catsg.org/index.php?id=293 (20/05/2020).

Foden, W.B. and Young, B.E. (eds.) (2016). IUCN SSC Guidelines for Assessing Species' Vulnerability to Climate Change. Version 1.0. Occasional Paper of the IUCN Species Survival Commission No. 59. Cambridge, UK and Gland, Switzerland: IUCN Species Survival Commission. x+114pp. Accessed at: https://portals.iucn.org/library/sites/library/files/documents/ssc-op-059.pdf (20/05/2020).

IUCN SSC Species Conservation Planning Sub-Committee. (2017). Guidelines for Species Conservation Planning. Version 1.0. Gland, Switzerland: IUCN. xiv + 114 pp. Accessed at: https://portals.iucn.org/library/sites/library/files/documents/2017-065.pdf (20/5/2020).

Magos Brehm, J., Kell, S., Thormann I., Gaisberger H, Dulloo, M.E. and Maxted, N. (2017). Interactive Toolkit for Crop Wild Relative Conservation Planning version 1.0. University of Birmingham, Birmingham, UK and Bioversity International, Rome, Italy. Accessed at http://www.cropwildrelatives.org/conservation-toolkit/ (20/05/2020).

IUCN. (2018). Guidelines for invasive species planning and management on islands. Cambridge, UK and Gland, Switzerland: IUCN. viii + 40pp. Accessed at: https://portals.iucn.org/library/sites/library/files/documents/2018-030-En.pdf (20/05/2020).

Species Conservation Toolkit Initiative (https://scti.tools/) provides open access to a range of software tools they have developed that can be used to inform risk identification and management, including the use of the PVA tool, Vortex, disease modelling and population management.

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