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Review

Impact and Lessons Learned from A Half-Century of Primate Conservation Action Planning

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Abstract: Over the last half-century, the world's human population has doubled, impacting almost all ocean and land areas. The threats facing primates in the wild have never been greater or more complex. Primatologists have long been aware of these threats and, since the 1970s, have coordinated efforts to safeguard these threatened species, through the International Union for Conservation of Nature Species Survival Commission (IUCN SSC) Primate Specialist Group (PSG). In an effort to stem the threat of extinction to primates, this group of now 700 experts+ has published 17 conservation action plans since 1977. As we look toward the next half-century, we take stock of the history of primate action planning to better understand the costs and benefits of these plans as a conservation tool. Here, we reviewed all plans published by the IUCN SSC PSG. In total, they described USD 246 million in planned primate conservation programming and were cited 1657 times by others. We found that half of the plans had been assessed in regard to their implementation, although these assessments were not standardized. Those that had been assessed, showed evidence of positive impacts on awareness raising, collaboration, fundraising, project implementation and policy, although the impact varied by plan. For example, three of the plans directly resulted in USD 15.92 million in funds raised; four plans quantified implementation rates, which ranged from 38% to 74% of actions partially or completely achieved 5 years after plan publication; and four plans attributed the gazettement of 19 protected areas across 11 countries as indirect successes following the publication of plans. Considered together, we reflect on the 'return-on-investment' for developing these plans and consider a range of 'lessons learned' for future primate action planning efforts.

Keywords: conservation action planning; biodiversity; primates; threatened species; IUCN specialist groups

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1. Introduction

Over the last half-century, the world's human population has doubled [1], impacting almost all ocean and land areas [2]. For example, between 2001 and 2018, 180 million hectares of tropical forest were lost [3]. Given that 90% of primate species worldwide are dependent on forest habitats [4] and combined with the impacts of climate change [5], the threats facing primates in the wild have never been greater or more complex [6].

Primatologists have long been aware of these threats and, since the 1970s, have coordinated efforts to safeguard these threatened species. Initially organized as a joint committee, the International Primatological Society and the International Union for Conservation of Nature's Species Survival Commission in the early 1960s, the modern-day Primate Specialist Group (PSG) was launched in 1977 under the International Union for Conservation of Nature Species Survival Commission (IUCN SSC) with the formalization of a Chair, Vice-Chairs, and several dozen members. At the time, 88 primate taxa were recognized by science, of which 38 were considered Endangered, 26 Vulnerable, 11 Rare, and 13 Indeterminate [7]. Moreover, 45 years later, the PSG is the largest of more than 160 specialist groups under the IUCN SSC with a membership of more than 700 scientists and conservationists who 'stand against the tide of extinction which threatens humanity's closest kin' [8]. These experts recognize 717 primate species and subspecies, of which 63% are now threatened with extinction. Members of the PSG share their views and expertise through conferences and PSG-sponsored publications, including *Primate Conservation* (launched in 1981), *Asian Primates Journal* (launched in 1991), *Neotropical Primates* and *Lemur News* (both launched in 1993), and *African Primates* (launched in 1995), in addition to the bi-annual report, *Primates in Peril: The 25 Most Endangered Primates* (launched in 2000 [9]). Moreover, PSG is the entity that coordinates and leads the mammoth tasks of maintaining an updated taxonomic list of all primates and regularly updating all the extant taxa profiles on the IUCN Red List of Threatened Species, which is the foundation upon which all primate action planning is built.

Primates play a high-profile role in global biodiversity conservation efforts, both as flagship species and as mankind's closest relatives [10,11]. It is perhaps no surprise then that in 1977 the newly-formed Primate Specialist Group of IUCN's Species Survival Commission, led by one of the authors of this paper—Russell Mittermeier—published *A Global Strategy for Primate Conservation* [12] as a first effort to take a worldwide view of primate conservation problems and only the second global strategy ever published (the first having been published on crocodilians in the same year).

The purpose of the plan was to make the PSG's goal of maintaining the known diversity of the Order Primates—with a target of zero extinctions—a reality. This was followed, 9 years later, by the *African Primate Action Plan* [13] as the first modern IUCN SSC specialist group plan. It was aimed at stimulating high-priority species conservation projects across the African continent (but excluding Madagascar, which the PSG has always considered a separate major primate region in its own right). In the years that followed, this document served as a blueprint for dozens of species conservation action plans for the other groups of organisms, including other primates (Table 1). Indeed, only 1 year later, the PSG also published the *Action Plan for Asian Primate Conservation* [14] and 6 years later, the first Action Plan for Lemur Conservation [15]. Since 1986, many plans have been published by IUCN SSC specialist groups, with each generation of plans evolving as our knowledge of threatened species and ecosystems expands and as the context in which we work changes.

Developing a primate action plan—and indeed any kind of species action plan—is no minor feat. It requires time and significant resources—typically years of consultation through in-person meetings, extensive data sharing and analysis, and several rounds of collaborative editing before a final document is published. For example, the production of the Action Plan for Chimpanzees in West Africa [16] cost USD 109,328 (including a consultation workshop and publication and dissemination of the action plan, but excluding the cost of participants' time and individual travel costs [17]). As another example of the time investment that action plans sometimes require, the recently published Red Colobus Action Plan [18] that had its roots in the 1986 African Primate Action Plan, was highlighted as a priority in a Red-Listing Workshop in 2005 and began in earnest in 2016, but was not completed until 5 years later. In a landscape of limited conservation funding, investment in the production of action plans is justified by arguments that they coordinate work, stimulate interest, facilitate fundraising, promote cooperative efforts, and focus

government and multi-institutional attention on key or high-priority species and areas of action. Nevertheless, there have been few studies examining the impact of species action plans on research, conservation, and policy (see below), although almost none in the context of primate action planning (however, see [19]).

Table 1. List of IUCN SSC PSG primate conservation action plans. In addition to these listed below, there are many other primate action plans which have been published, often with support from IUCN SSC PSG members; a representative selection is listed in Table S2.

No.	Year Published	Title	Taxa	Citation
		Global		
1	1977	A Global Strategy for Primate Conservation	All primates	Mittermeier [12]
		Sub-global (Continental or Regional)		
2	1986	Action Plan for African Primate Conservation 1986–1990	63 taxa: African primates, excluding lemurs	Oates [13]
3	1987	Action Plan for Asian Primate Conservation 1987–1991	37 high priority taxa out of 63 taxa: Asian primates	Eudey [14]
4	1992	Lemurs of Madagascar: An Action Plan for Their Conservation 1993–1999	30 taxa: All lemurs	Mittermeier et al. [15]
5	1996	African Primates. Status Survey and Conservation Action Plan	64 taxa: African primates, excluding lemurs	Oates [20]
6	2013	Lemurs of Madagascar: A Strategy for Their Conservation 2013–2016	103 taxa: All lemur taxa	Schwitzer et al. [21]
		Africa (excluding Madagascar)		
7	2003	Regional Action Plan for the Conservation of Chimpanzees in West Africa/West African Chimpanzees. Status Survey and Conservation Action Plan	2 taxa: *Pan t. verus*, *Pan t. ellioti* (formerly *Pan t. vellerosus*)	Kormos and Boesch [22]; Kormos et al. [16] (English and French)
8	2005	Regional Action Plan for the Conservation of Chimpanzees and Gorillas in Western Equatorial Africa	2 taxa: *Pan t. troglodytes* *Gorilla g. gorilla*	Tutin et al. [23] (English and French)
9	2007	Regional Action Plan for the Conservation of the Cross River Gorilla (*Gorilla gorilla diehli*)	1 taxon: *Gorilla g. diehli*	Oates et al. [24]
10	2010	Eastern Chimpanzee (*Pan troglodytes schweinfurthii*): Status Survey and Conservation Action Plan 2010–2020	1 taxon: *Pan t. schweinfurthii*	Plumptre et al. [25] (English and French)
11	2011	Regional Action Plan for the Conservation of the Nigeria-Cameroon chimpanzee (*Pan troglodytes ellioti*)	1 taxon: *Pan t. ellioti*	Morgan et al. [26] (English and French)
12	2012	Bonobo (*Pan paniscus*): Conservation Strategy 2012–2022	1 taxon: *Pan paniscus*	IUCN and ICCN [27] (English and French)
13	2012	Grauer's Gorillas and Chimpanzees in Eastern Democratic Republic of Congo (Kahuzi-Biega, Maiko, Tayna and Itombwe Landscape): Conservation Action Plan 2012–2022	2 taxa: *Pan t. schweinfurthii*, *Gorilla beringei graueri*	Maldonado et al. [28] (English and French)
14	2014	Revised Regional Action Plan for the Conservation of the Cross River Gorilla (*Gorilla gorilla diehli*) 2014–2019	1 taxon: *Gorilla g. diehli*	Dunn et al. [29]
15	2015	Regional Action Plan for the Conservation of Western Lowland Gorillas and Central Chimpanzees 2015–2025	2 taxa: *Pan t. troglodytes*, *Gorilla g. gorilla*	IUCN [30] (English and French)
16	2020	Regional Action Plan for the Conservation of Western Chimpanzees (*Pan troglodytes verus*) 2020–2030	1 taxon: *Pan t. verus*	IUCN SSC PSG [31] (English and French)
17	2021	Red Colobus (*Piliocolobus*) Conservation Action Plan 2021–2026	18 taxa: *Piliocolobus* spp.	Linder et al. [18]

Here, we review a half-century of primate action planning by the IUCN SSC PSG and attempt to draw out lessons learned and reflect on the ways in which these plans have mobilized support for primate conservation. First, we provide a historical account of primate action planning informed in part by our direct roles in developing the action plans and as experts in conservation who have seen action plans developed from afar. In

addition, we review all 17 IUCN SSC PSG plans (Tables 1 and S1), using this to discuss the costs and benefits of primate action planning as a conservation tool, and reflecting on lessons learned for future planning efforts.

1.1. The History of IUCN SSC PSG Primate Action Planning

In 1977, Sir Peter Scott, then Chair of the IUCN Species Survival Commission, asked all Specialist Group Chairs to prepare Global Conservation Strategies for the animal groups for which they were responsible. In response, the PSG prepared a 325-page document that included 69 projects with a total cost of USD 3,101,250 (or USD 14,795,367 in 2022 when adjusted for inflation). Although never published or widely circulated, the *Global Strategy for Primate Conservation* [12] represented the first attempt to approach primate conservation problems on a global rather than merely local basis and was the first attempt to establish international priorities for primate conservation. The strategy achieved this by placing a dual emphasis on ensuring the survival of endangered species wherever they occur and on providing effective protection for large numbers of primates in areas of high primate diversity or abundance.

At the time, the Global Strategy was sent to a number of conservation organizations and attracted the attention of two in particular, World Wildlife Fund-US (WWF-US) and the New York Zoological Society (now the Wildlife Conservation Society, WCS), which quickly began funding projects identified in the plan. Less than 2 years later, in 1979, WWF-US established its own Primate Program and the first-ever Primate Action Fund to address international primate conservation problems. This program supported not only the Director of the Primate Program, but also the work of the Primate Specialist Group itself and continued to do so for the next decade (1979–1989). This investment, which clearly grew out of the first action plan, propelled global primate conservation forward at a crucial point in its history. By 1987, this program had funded more than 150 projects in 31 countries and had begun producing *Primate Conservation*, the Journal and Newsletter of the IUCN SSC PSG, which also became an important means of communication among the world's primate conservationists. In the years that followed the publication of the Global Strategy, both WWF and WCS continued to have a major involvement in primate conservation. Moreover, additional support came from the Wildlife Preservation Trust International, the Brookfield Zoo, the African Wildlife Foundation, the National Geographic Society, the Fauna and Flora Preservation Society (now Flora and Fauna International), and the Frankfurt Zoological Society, among other organizations. Much of their interest in primate conservation was attributed at the time to the work of the PSG and to the concern generated by the original Global Strategy for Primate Conservation [13,14].

As the mid-1980s passed, it became clear that more needed to be done to ensure that all the world's then 200 recognized primate species continued to be conserved. By now, the number of primate taxa and the conservation projects focused on them had grown to the point where it was no longer practical to prepare a single global plan. Instead, the IUCN SSC PSG initiated a series of new regional primate action plans—first for Africa [13], then Asia [14], with the aim of guiding primate conservation activities through the 1980s (Figure 1). These were followed by an action plan for Madagascar's lemurs in the early 1990s [15], and eventually action plans for specific taxa and countries (Figure 2). In Africa, and with the support from key donors such as the Arcus Foundation and the US Fish and Wildlife Service, 11 regional action plans for 8 African ape taxa have been published by the IUCN SSC PSG's Section on Great Apes (SGA) (see http://www.primate-sg.org/action_plans/, accessed on 24 August 2022).

Figure 1. Covers of some IUCN SSC PSG primate conservation action plans. Plans pictured (top row then the bottom row, left to right): Oates [13], Eudey [14], Mittermeier et al. [15], Oates [20], Kormos et al. [16], and Schwitzer et al. [21].

It is important to note that over the last 50 years, many important and valuable primate action planning efforts have taken place outside of the direct remit of the IUCN SSC PSG (some examples are reviewed in [17]). For example, *Saving the Lion Marmosets* [32], was perhaps the first publication looking to establish a conservation plan for a single primate genus (*Leontopithecus*). As another example, and over the last few decades, the IUCN SSC Conservation Planning Specialist Group (CPSG; formerly Captive Breeding, later Conservation Breeding Specialist Group)—in partnership with several institutions and with varied government engagements—have used two different approaches, Population and Habitat Viability Analysis (PHVA) and Conservation Assessment and Management Plans (CAMP), to inform conservation action planning for primates. These approaches were particularly important for conservation planning of Neotropical and Asian primates, resulting in 25 reports, most of those produced during the 1990s and 2000s (many of which are listed on the Conservation Specialist Planning Group website, www.cpsg.org (accessed

on 24 August 2022); see Table S2). Moreover, these efforts have sometimes been carried out jointly with the PSG (e.g., PHVA for *Brachyteles* [33]) or else have always involved at least some members of the PSG, (e.g., [34]). In many cases, the results of these efforts have informed both IUCN SSC PSG and non-PSG primate conservation action plans.

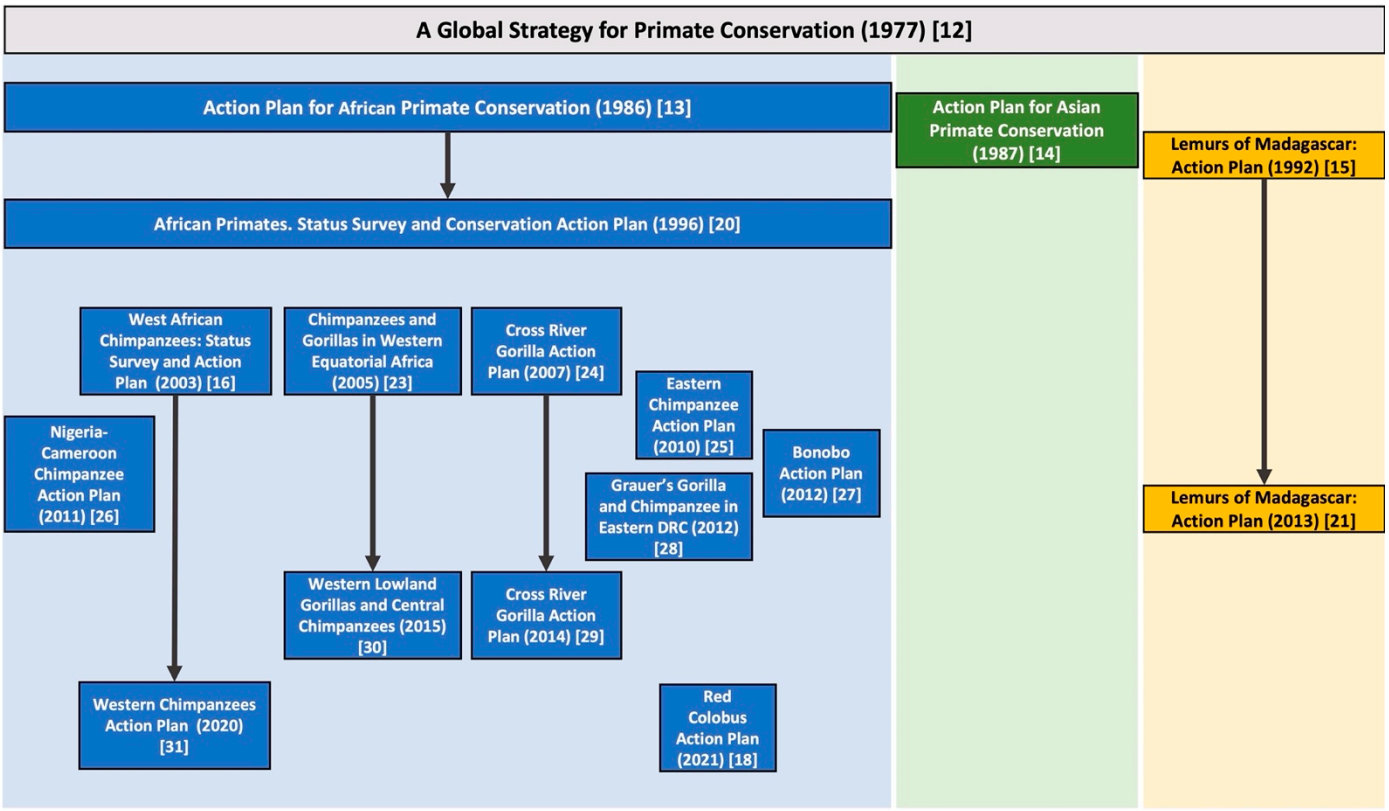

Figure 2. Visualizing the history of IUCN SSC PSG primate conservation action planning from the first global strategy (published in 1977) to the most recently published plan for red colobus. See refs [12–16,18,20,21,23–31].

In addition, the recognition of biodiversity conservation as a global priority—such as in the Convention of Biological Diversity and the United Nations Sustainable Development Goals—has resulted in a number of government and non-government primate plans. In Latin America, for example, the government implementation of their international biodiversity commitments has been a 'turning point' for primate conservation planning, as countries—including, for example, Brazil (see below and Table S2), Mexico [35], Peru [36], Ecuador [37], and Argentina [38]—have directly organized national action planning efforts for the conservation of threatened primates or officially recognized plans developed by national primatological societies. This has pushed forward primate conservation as these efforts are stated and implemented as a matter of public policy, which brings with it avenues for funding, inclusion of standardized protocols in environmental licensing processes, established official population management programs, and defined priority areas for species conservation (L. Jerusalinsky, pers. obs.). In other instances, organizations author action plans for species across their geographic portfolios. For example, WCS has produced a status survey for chimpanzees in Uganda [39], which includes a discussion of threats and recommended activities, while WWF has published a Great Ape Action Plan to guide their conservation work [40].

It is worth noting that while IUCN SSC PSG primate conservation action plans have historically focused on African primates, non-PSG primate conservation action planning efforts have flourished in Latin America and in Asia (see Table S2 for example primate action plans from these regions). These primate conservation action planning efforts often use

methods or documents which have been developed by the IUCN SSC PSG (e.g., IUCN Red List primate species profiles), and are almost always informed by the expertise of individual PSG members. Therefore, they function to strengthen the environmental governance landscape in primate range countries even if they are not part of the direct IUCN SSC PSG remit (and, therefore, outside the scope of this review).

The best example is certainly that of Brazil, which has produced seven action plans focused partly or entirely on primates since 2010 (e.g., [41–43], Figure 3), currently covering all the 35 primate taxa that are in the national official list of threatened species (see Table S2). These have been carried out under the auspices of the Brazilian government, specifically by the Chico Mendes Institute for Biodiversity Conservation (ICMBio—the national agency dedicated to the management of protected areas and conservation of threatened species of the fauna). Each plan is developed using methodological guidelines for elaboration and coordination of the plan and is monitored annually and through mid-term and final evaluations, with the support of a multi-institutional technical advisory group (TAG) [44]. Every plan is formally approved by an ICMBio ordinance, thus becoming an official public policy, helping to mobilize resources (funding, institutional capacities, personnel, etc.) for its effective implementation. Moreover, the permanent coordination and periodical follow-up of each plan, led by the ICMBio's National Center for Research and Conservation of Brazilian Primates (ICMBio/CPB) in close collaboration with the respective TAGs, has been crucial in promoting cooperative efforts and integrative analysis. An example is the 2010 National Action Plan for the Conservation of Muriquis—*Brachyteles arachnoides* and *Brachyteles hypoxanthus* [41], which promoted the development of scientific knowledge, public policies, and management for conserving these species [45], including the integrative genetic background to support the taxonomic validity of both species [46], the definition of methods and priority areas for demographic monitoring [47], and the protocols for population management [48].

Figure 3. Covers from some national conservation action plans focusing on primates published by the Brazilian federal environmental agency, ICMBio. Plans pictured (left to right): Jerusalinksy et al. [41], Jerusalinsky et al. [42], and Escarlate-Tavares et al. [43].

1.2. IUCN SSC PSG Action Plan Development Process

The primary aim of the IUCN SSC PSG primate action plans is to improve species conservation efforts or—as described by Oates [13], to articulate a "minimum objective to secure a limited number of high-priority protected areas". Plans—which differ in their scale

and scope—typically assess the conservation status of species and their habitats, outline conservation priorities, and then generate actionable recommendations by identifying specific conservation measures and projects that can be implemented across different parts of a wider landscape. Action plans necessarily bring together a wide range of stakeholders, and therefore, are useful tools for coordinating conservation activities, including across national borders or ecosystem boundaries, and for building consensus and inclusive dialogue. When done well, action plans can help guide conservation activities and donor funding toward priority areas that will yield the greatest conservation impact, and they can help individual initiatives 'see the forest for the trees'—where individual (small or local) actions alone may not be sufficient to prevent the extinction of species and where collaborative efforts across the range of the species may be necessary [17].

IUCN SSC PSG action plans are often developed using third-party conservation planning frameworks (such as the *Open Standards for the Practice of Conservation* [49]; reviewed by [50]), within the context of a joint ambition among stakeholders to develop a concerted and cohesive plan for species conservation. The plans aim to bring together usually extensive, but often siloed work. Target audiences vary by plan, but are generally aimed at conservation managers (including those working in protected areas and zoos), government policy-makers, and donors that require up-to-date information about a species [17]. Action planning typically includes the following participatory, multi-step approach (e.g., [25,30,31]):

1. **Virtual/written consultation** with experts who have experience with a species or group of species. These experts consult on an initial draft of conservation actions and priorities and this phase of action planning can also include data analysis and data modelling to cover known data gaps (using approaches, such as those developed by the CPSG, described above).
2. **In-person consultation:** Experts are brought together for an in-person workshop to identify priority areas and activities that will support the conservation of the species of interest. These workshops focus on conservation action planning, where broad visions, goals, and objectives (and often specific activities) are articulated. Participants may be asked to group and consult on pre-identified conservation targets or work together to create conceptual models that can then inform a conservation strategy. These workshops typically bring together 30–80 people from academia, government, and non-governmental organizations. Effort is made to ensure an equal representation of experts from across a species' range and from different stakeholder groups.
3. **Publishing and communicating the action plan:** The action plan is drafted and circulated to attendees of the workshop and to other experts for their input and feedback, prior to publication.

The methods used to create action plans differ according to each action plan's needs [17], but through the three-step process described above, primate action plans tend to include: (1) Current status of species or subspecies in the wild; (2) identification of priority conservation sites for the taxon; (3) an analysis of threats to species survival; and (4) recommendations on priority actions needed to ensure the species' future survival. Moreover, they often include budgets for specific implementation activities. These budgets can be powerful communication tools to convey the investment needed to 'save' or 'protect' primates in a specific area of the world. Therefore, they often provide baseline information for range-state national governments, non-governmental organizations, scientists, as well as for international treaties, and they aim to redirect conservation efforts from low priority areas to higher priority areas and activities [17]. Furthermore, they aim to galvanize financial support for conservation projects and serve as a communication tool for the target species, while also attempting to provide an objective assessment of priority actions for consideration by prospective donors [17].

Although not all PSG action plans have included budgets, we believe that budgets are essential components of these plans. What is more, they should be realistic and focus on the specific needs of the primates in question and in reversing the main threats identified

for the species, rather than trying to solve all the social problems of a particular country or region.

1.3. The Effectiveness of IUCN SSC Action Plans

Action plans as a whole (including, but not limited to, primate action plans) are rarely assessed for their effectiveness; only a few studies have attempted to look at their impact. Gimenez-Dixon and Stuart [51] assessed 18 action plans and found that: (1) Plans were regarded as important documents by experts within the specialist groups, as the plans often consolidated up-to-date information not readily available from other sources; (2) action plan recommendations were more often taken up by stakeholders if specialist group members were driving progress forward; and (3) a main constraint to implementation was a lack of adequate resources [51]. Ten years later, in 2002, the Species Survival Commission commissioned an evaluation of some aspects of its Action Plan Program [52] with a focus on four action plans (equids, lagomorphs, otters, and crocodiles), which included a total of 284 recommended activities/actions. A total of 18% of the activities/actions were considered to be completed, 50% ongoing, and 32% not started. Similar to the findings of Gimenez-Dixon and Stuart [51], failure to progress was due to a lack of resources and political sensitivity [52]. Nearly 70% of implemented actions were classified as research or ecological management. Finally, in 2003, Fuller et al. [53] evaluated three IUCN SSC Action Plans and found that of the 54 projects suggested in the plans, 33 had been initiated in the 5 years since the publication, and 35 specific conservation actions were undertaken. They suggested that a substantial amount of conservation activity within the scope of their study was directly attributable to the action planning process. Of course, action plans have also been the subject of criticism. Even among those that believe action plans are a useful tool for conservation (e.g., [54]), they have been criticized for:

1. Rarely being used or implemented [17];
2. being inconsistent in the way that information is presented [52];
3. failing to bridge the gap between general recommendations and specific actions [52];
4. focusing too often on charismatic mammalian megafauna (with a secondary question about whether these are species that already would have benefitted from conservation attention even in the absence of the action plan [54]);
5. focusing too much on individual threatened taxa at the expense of addressing regional conservation priorities [54];
6. being too focused on research activities, as a proportion of the recommendations that they recommend [52];
7. needing to better identify and collaborate with target audiences [52] or else succeeding only at motivating 'the converted' (e.g., the people who are already interested in the species in question, [54]);
8. having an optimism bias about the power of the plans to catalyze action (which could pragmatically be resolved by simply being more realistic about what plans can achieve, [53]); and
9. weak engagement with non-environmental sectors or stakeholders, leading to a lower implementation rate.

Over the years, especially going back to the early days of action planning in the 1980s and 1990s, specialist groups preparing the plans—many of which were excellent and quite impressive—were under the mistaken impression that, once completed, they could be handed over to IUCN to be funded (R.A. Mittermeier, pers. obs.). In fact, IUCN never had the resources available to carry this out, and this often led to disappointment.

Having reviewed the history of primate action planning as mentioned above, and in the context of information about the effectiveness of action planning more broadly, we now review the conservation action plans published by the IUCN SSC PSG (Table S1) to inform a discussion on the use of primate action planning as a conservation tool, and reflect on lessons learned for future planning efforts.

2. Materials and Methods

All of the 17 action plans published by the IUCN SSC PSG (Table 1) were reviewed (Table S1). These were published from 1977 to 2021 and are conservation action plans authored or co-authored directly by the IUCN SSC PSG. The review of these plans—some of which follow on from each other (Figure 2)—allows for a qualitative examination of IUCN SSC PSG primate action planning over time. Of course, these publications represent only a fraction of the wider primate conservation planning landscape (Table S2). Moreover, the review does not include a number of important analyses, which have been published—sometimes as inputs to primate action plans—including Population and Habitat Viability Assessments (e.g., [34,55]) or action planning workshop reports that did not represent the final action plan document (e.g., [56]).

We obtained information from the 17 action plans (Table S1) to provide background on their context and original aims, focusing particularly on key indicators which were present in the majority of plans—despite action plans differing in their content, formatting, and framing (e.g., timeline of implementation; total estimated budget for implementation; focal taxa). Moreover, we noted the number of times that action plans had been cited by others, using a Google Scholar search (Table S1). Following this, publicly-available information on the implementation of these plans was compiled and summarized (Table S3), noting that primate action plans—and action plans more broadly—are rarely assessed formally for their effectiveness (see Introduction). There was notable variability in the quality and availability of publicly-available information about the implementation of these plans (see Discussion), and this limited our review. Nevertheless, this compilation of information provided a snapshot of qualitative and quantitative implementation and impact data (Table S3), which we have summarized by 'impact area' (see [17]). It should be noted that, collectively, the authors of this paper have been involved in the development of all the 17 plans—usually in their capacity as members of the IUCN SSC PSG Executive Committee, and these experiences are occasionally used to supplement the discussion as shown below.

3. Results

3.1. Regarding the Reviewed Action Plans

Of the 17 action plans reviewed, 1 was global in scope, 5 were continental or regional in scope (2 focused on Africa, 1 focused on Asia, and 2 focused on Madagascar), and 11 focused on sub-regional or taxon-specific issues relevant to African primates (Table S1). Fourteen of the 17 plans (82%) included an estimate of cost/budget (ranging from USD 6 to 66 million, adjusted for inflation), for a total sum of USD 246 million (adjusted for inflation) in planned primate conservation programming. Half (53%) of the 17 plans were developed as 4–6-year action plans and another quarter (24%) were developed as 10-year plans. One plan was described as an emergency 3-year plan, while others did not have a specific implementation timeline. As noted above (Section 1.2), these plans were all developed through consultative processes, with at least some of the development process taking place in situ (e.g., in-country consultation workshops). As one example, in the development of the second lemur action plan [21], more than two-thirds of the participants involved were Malagasy and care was taken to ensure good gender representation.

3.2. Implementation of the Action Plans

Of the 17 plans, 5 were still within their implementation windows (and, of these, only 1 plan had information publicly available about early progress toward implementation; Table S3). Of the remaining 12 plans, half (50%, n = 6) had been assessed in a publicly available document in regard to their implementation (Table S3).

The quality and depth of assessments varied widely by plan, and there was no uniformity in how this information was recorded or reported. For example, it was not possible to ascertain whether and how local communities were usually involved in plan implementation, beyond occasional reporting on capacity-building activities or local community engagement targets. Nevertheless, some trends emerged, and the information was useful

in providing a snapshot of the key outputs attributable partially or completely to the plans (or in some cases, the lack of expected outputs; Table 2).

Table 2. Summary of outcomes attributed to IUCN SSC PSG primate action plans for which information about post-publication implementation was available (see Table S3 for further information). Framework adapted from [17].

Impact Area	Outcomes Noted (See Detail in Table S3)
Awareness: Change in the awareness about primate conservation issues among key stakeholders	• The 17 action plans have been cited in other papers 1657 times between 1977 and 2021 (Table S1). • Following the publication of Kormos et al. [16], the majority of grantees found the action plan useful for writing proposals and the majority of donors indicated that decisions about their awards were influenced by the action plans. This included large donors, such as the Critical Ecosystems Partnership Fund (CEPF). However, awareness of the plan among other stakeholders was low. • Oates et al. [24] resulted in greater donor awareness and involvement in joint implementation of conservation programs from the United States Fish and Wildlife Service (USFWS), the German Development Bank (KfW), and the Arcus Foundation.
Collaborations: Collaboration and information sharing between stakeholders	• No new collaborations were launched as a result of Kormos et al. [16]. • The Lemur Conservation Network (LCN) was launched in response to the Lemur Action Plan [21] in 2015. To date, the LCN has more than 60 organizations and showcases their work to attract funding, volunteers, and other opportunities. • In response to Tutin et al. [23], extensive collaboration was initiated in the scientific community with data sharing from 82 surveys across 58 sites, including 7000 chimpanzee nests and 12,100 gorilla nests as a response to the paucity of data noted in the development of the plan. • The Ushiriki consortium was founded, with support from the Arcus Foundation, to support the implementation of the 2012–2022 action plan for *Grauer's Gorillas and Chimpanzees in Eastern Democratic Republic of Congo* [28]. • To support the *Regional Action Plan for the Conservation of Western Chimpanzees (2020–2030)*, a 37-member implementation group was created, including representatives of all eight range states [31]. • The Red Colobus Conservation Network and Red Colobus Working Group were launched to support the development and implementation of Linder et al. [18].
Funding: Amount of new funding available for primate conservation	• Mittermeier [12] resulted in the launch of a WWF Primate Program and the creation of the first-ever primate action fund, which supported 125 projects in 30 countries from 1979–1987. • There was an 8.5% increase in funding for West African chimpanzee conservation from 2002 to 2003 and an overall increase from 2002 to 2006 after the work by Kormos et al. [16] was published. From 2003–2007, USD 3,567,289 of funding was mobilized which was directly attributed to the plan (out of the target budget of USD 9 million), although this underestimates the amount of funding that was mobilized (as 50% of the people who were contacted to report back did not respond). • Following the publication of Oates et al. [24], the Convention on Migratory Species (CMS) and the Great Ape Survival Partnership (GRASP) provided new and significant funding for several initiatives in the landscape. • SOS Lemurs mobilized CHF 8.91 of which CHF 7.24 million was spent on programming from 2017 to 2019 to fund the Schwitzer et al. [21] Lemur Action Plan, and an additional USD 2.5 million in funds were raised in 2020 to be spent on programming until 2025. • The development of the Red Colobus Action Plan [18] was useful in raising funds, with USD 866,000 raised between 2018 and 2021 for conservation activities, prior to its launch. This figure surpassed USD 1 million by the time the plan was published (R.A. Mittermeier, unpubl. data).

Table 2. *Cont.*

Impact Area	Outcomes Noted (See Detail in Table S3)
Project implementation: Conservation projects achieved (including the percent of the projects in the action plan implemented)	See Figure 4. Other example outcomes included: • Of the 42 projects detailed in Oates [13], 91% were at least partially implemented between 1986 and 1996, with an average rating of 2.1 of progress (scale: 1–5, 1 being the best rating). This included the construction of national park headquarters in three parks in two countries and the establishment of research stations in six countries. One quarter of the projects were disrupted by civil war or conflict [13]. • In the case of Kormos et al. [16], only 38% of projects were being implemented 5 years after the plan was published, but it was noted that civil war and conflict were the main external factors for low project implementation.
Policy: Policy decisions influenced	See Figure 5. Other examples include: • Thirteen national parks and reserves in nine countries and a World Heritage Site and Biosphere Reserve were designated following the publication of Oates [13]. • Kormos et al. [16] positively influenced policy, but tended to be more impactful in countries that already had good baseline knowledge of chimpanzees or where countries had the capacity and infrastructure to receive funding. • Four protected areas in three countries were gazetted (and another protected area was increased in size) following the publication of Tutin et al. [23]. In addition, two priority areas for great areas were included on the list of World Heritage Sites. • Two protected areas were established in Cameroon and a forestry and wildlife law was passed in Nigeria after the publication of Oates et al. [24]. In addition, a Cooperative Agreement was drafted by the governments of Nigeria and Cameroon to allow for joint patrols along the border.
Mitigation: Mitigated activities that would have been destructive to primates	• A gorilla orphanage in the Republic of the Congo was established following the publication of Oates [13]. • The publication of Kormos et al. [16] did not prevent threats facing chimpanzees in West Africa, but it did mitigate them. For example, the plan did not stop mining activities from taking place, but it did provide impetus for risk-mitigation activities. • A Gorilla Guardian program was established following the publication of Oates et al. [24] to improve protection and monitoring of gorilla populations outside of formally-protected areas.

In regard to awareness raising, the plans appeared to differ widely in the types of audiences they were trying to reach (Table 2). This is reflected in the fact that although the 17 plans have been cited 1657 times (Table S1), only 3 have been cited more than 200 times [16,20,21] and 4 had been cited less than 20 times (see Table S1). On one end of the spectrum, Mittermeier [12] was never formally published but succeeded in using the authority of the report's message to target key donors to fund primate conservation work across the world. On the other end of the spectrum, Kormos et al. [16] published their plan across four different documents—in both English and French—in an attempt to reach both practitioners and donors; this seemed to work in as much as the plan has been cited 279 times and was used by most key conservation donors to influence how they awarded funding [17].

In regard to the impact that plans had on collaboration (Table 2), networking platforms or coordination bodies were launched after some of the plans were published (e.g., Lemur Conservation Network after [21]; Red Colobus Conservation Network and Red Colobus Working Group as part of [18]; Table S3). In other cases, no formal bodies were launched, but informal networking across scientific communities to share data appreciably increased (e.g., in response to data gaps noted in [23], Table S3), feeding into the IUCN Red List assessment process (e.g., [57]), and leading directly to significant range-wide population estimates for some taxa [58,59].

In regard to mobilizing funding for primate conservation (Table 2), only one study has attempted to quantify the amount of funding mobilized as a direct result of a primate action plan, although it was clear that several other plans raised significant funding for conservation programming. On the one hand, action plans were used by networks of experts

and organizations to fundraise for their work. For example, following the publication of Kormos et al. [16], USD 3.57 million (or USD 4.8 million adjusted for inflation in 2022) was mobilized by stakeholders as a direct result of the plan in 5 years after it was published (toward an original goal of USD 9 million or USD 14.5 million adjusted for inflation in 2022), with an increase in 8.5% in funding in the year after the plan was published [17]. On the other hand, other action plans were used to establish new funding streams (e.g., the WWF Primate Program which funded 150 projects in 31 countries following [12]) or to establish funds specifically to fund the plans (e.g., the SOS Lemur initiative following [21]).

In regard to promoting project implementation (Table 2), quantified information about the implementation progress was available for four plans (Figure 4). Across these four plans, 38% to 74% of the actions described within the plans had been partially or completely achieved 5 years after plan publication and 91% of the activities had been partially or completely achieved 10 years after publication (Figure 4, Table S3). The quality of these estimates varied widely (Table S3), but as a more robust example, the 42 projects described by Oates [13] were later assessed to have a mean implementation rating of 2.4 out of 5 (1 being the best; 5 being the worst) 10 years after plan publication (Table S3). For two plans [13,16], it was noted that the biggest external factor for a lack of implementation was civil war or political instability, which evidences the complex landscapes in which these plans are implemented. In assessing Kormos et al. [16], it was not clear how the plan "actually translated into conservation on the ground" [17]. Meanwhile, the implementation of Oates et al. [24] was limited by funding constraints or "different government priorities" and was noted that non-site-based activities were implemented the best (e.g., education, awareness, outreach, research, community-based conservation activities), while the implementation of site-based actions was less successful. We could not find quantified information for any of the plans about attributable impact on primate populations, which is perhaps not surprising given that this would be difficult to analyze.

In regard to influencing policy decisions, there were good examples of how plans had directly or indirectly influenced policy decisions (Table 2). Four different plans mentioned specific protected areas that had been gazetted or expanded following the publication of plans (Figure 5, Tables 2 and S3), and, in one case, a cross-border Cooperative Agreement between two governments was signed, which was considered a significant achievement given the region's historical context (Table 2). Similarly, there were some—albeit fewer—plans that mentioned significant outputs related to the mitigation of threats to primates. In most cases, threat mitigation seemed to focus on relatively localized issues as opposed to directly influencing threat mitigation more broadly (Table 2).

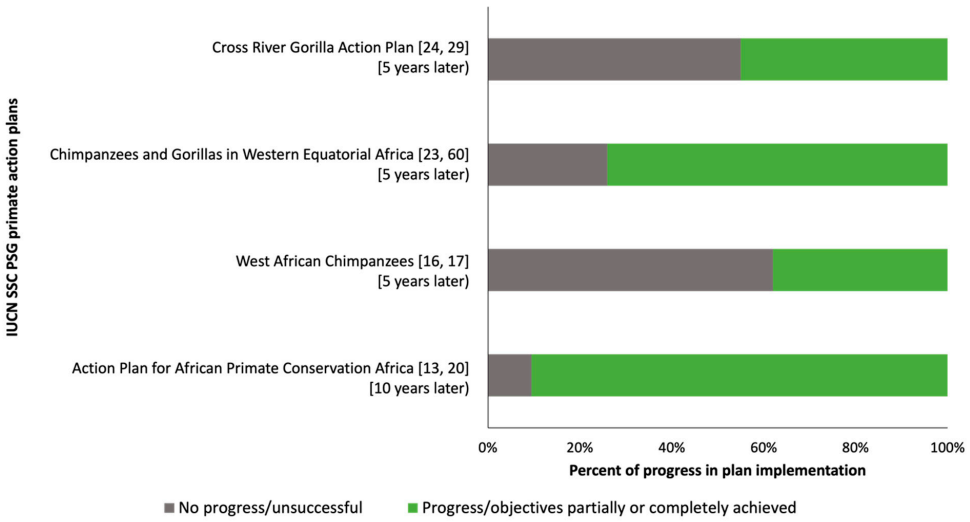

Figure 4. Estimated implementation progress in the years following primate action plan publication, for four primate action plans (see Table S1 for citations). See refs [13,16,17,20,23,24,29,60].

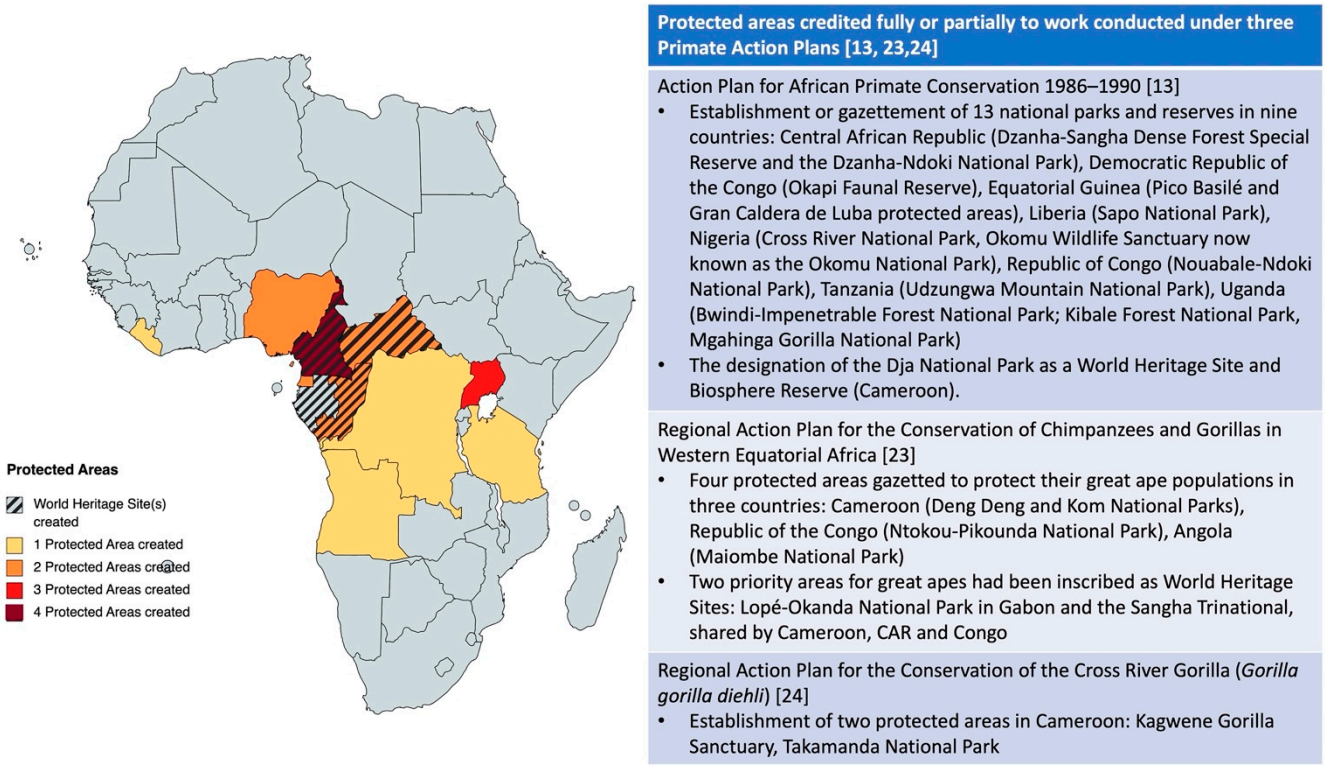

Figure 5. Geographic spread of protected areas established which have been credited partially to three Primate Action Plans [13,23,24].

4. Discussion

In this paper, we reviewed 17 conservation action plans published by the IUCN SSC PSG from 1977 to 2021. These plans detailed conservation action strategies aimed at protecting wild primates with a total cost of USD 246 million (adjusted for inflation). We consider below the 'return-on-investment' for developing these plans and consider a range of 'lessons learned' for future primate action planning efforts.

4.1. The 'Return-On-Investment' for Primate Action Plans

The costs and benefits of developing species conservation plans, including primate action plans, have been debated (e.g., [61]). For example, the benefits of an action plan can include data consolidation, improved networking, and improved implementation (both through more implementation and more evidence-based implementation) [50]. In some cases (e.g., the recent Red Colobus Action Plan [18]), the preparation process of the plan in and of itself, generated well over a million dollars in project funding even before the plan was published (R.A. Mittermeier, unpubl. data.). On the other hand, the costs of an action plan can include high resource costs for their development and publication, contributing "towards a culture of feigned action", and de-motivating stakeholders who may feel ill-equipped to tackle a problem of this scale/size (e.g., [61]).

Quantifying the costs and benefits of primate action plans is not easy, particularly as there are no peer-reviewed assessments of their impact (but see [19]), but the information we have summarized in this paper provides some broad indications. First, in regard to costs, from our direct experience in developing action plans, we broadly estimate that developing each individual plan costs USD 200,000 per plan, for a total resource investment of USD 3.4 million to develop all 17 plans. We could find data estimating the direct financial benefit from only 3 of these 17 plans (e.g., a quantified amount of funding mobilized as a direct result of the plan); however, for these three plans, the direct monetary benefit had a sum of USD 15.92 million (adjusted for inflation, Table S3). In other words, we found that these three plans mobilized 4.6 times as much money as we estimate was used to develop

all 17 plans. Granted, this quick analysis does not account for the hundreds of hours—and thousands of emails—that underpin the development of action plans (and therefore, likely underestimates the actual costs of development). However, it also similarly greatly underestimates the benefits of these plans since it does not include an indirect or wider benefit—such as the 19 protected areas that were established following the publication of four of the plans and partially attributed to them (Table S3), educational or social benefits or the intangible benefit of increased political and scientific attention for the world's most threatened primates. More research is needed to quantify the direct and indirect benefits of primate conservation action plans and, in those analyses, tackle the issue of attribution (e.g., whether the benefits attributed to the primate action plans would have happened in a counter-factual scenario in which no plan existed [50]). This research would be a very welcome next step in the history of primate action planning.

Looking broadly across the seven plans for which implementation progress had been assessed, and echoing points noted by other colleagues (e.g., [50,61]), plans were generally successful in: (1) Raising awareness among key stakeholders; (2) increasing collaboration across these stakeholders; (3) mobilizing new funding that resulted in (4) at least a third of plan activities were implemented within 5 years of plan publication (Figure 4); (5) policy influencing most notably through the gazettement of new protected areas (Figure 5); and (6) oft-localized activities to mitigate threats against primates. There were also cases in which the plans had less-than-desired impact. Lessons learned from these efforts are examined below.

4.2. Lessons Learned

Our collective experiences, and the results of our qualitative review of 17 plans, highlight a core number of 'truths' that are crucial for primate action planning to be carried out in a way that achieves maximum impact [7,50]. These include:

1. **The planning process:** Action planning needs to be transparent, inclusive, and a consensus-based team effort, in which there is high quality stakeholder engagement and moderation across different sectors and siloes, and where primate action plan publication is just one stage in a long-term process;
2. **Using the best evidence and incorporating flexibility:** Action plans need to be tightly integrated with the Red Listing process—not only to inform the IUCN Red List of Threatened Species updates, but also in responding to the Red List (e.g., [18,30]), while also considering the best science and responding flexibly to new data. Indeed, action plans need to be based first and foremost on information generated by the Red List;
3. **Being intentional about scale:** Action plans must be intentional about the scale at which they are developed, including geographic, taxonomic, and institutional scales, while also working intentionally where they overlap with complementary planning exercises. In some cases, for example, a multi-country approach is preferable for taxa that range across several countries. In other cases, such as for Madagascar, a national approach is preferable. In any case, large-scale implementation (over time and space) cannot be achieved without the full inclusion of local communities in the leadership, development, and implementation of plans;
4. **Empowered fundraising:** Action plans with the greatest impact are those where PSG members are empowered as fundraisers, with the plan targeting donors and using 'donor language', which includes clear budget allocations against time-bound and specific activities. Good plans function as a 'bridge' between scientists, government decision-makers, and donors. Good plans also enhance funding efforts by key donors, by collaborating with them to inform (and improve) the trajectory of their funding streams; and
5. **Elevating the visibility of poorly known but seriously threatened groups of primates:** Action plans can often highlight the importance of genera of primates that

have received very little attention or those of endangered status that are not sufficiently recognized by the international community.

4.2.1. The Planning Process

To ensure strong planning processes, there are a number of best practices that future primate action planning efforts can put into place. First, our review suggests that plans which are coordinated by a single entity may have higher impact, perhaps because a coordinator can be a persistent advocate to drive the planning process forward. For example, the success of the Lemur Conservation Network in supporting the Lemur Action Plan [21] was cited as the impetus behind the launching of the Red Colobus Conservation Network to support implementation of the Red Colobus Action Plan [18] (Figure 6). Effective coordinators—especially where action planning takes years to conclude (see below)—can shepherd stakeholders through the process and push for greater cross-sectoral collaboration. These coordinators can also play a role in improving stakeholder inclusion and diversity (see below), for example, by tracking and increasing engagement by local communities. Ideally, primate action planning processes need to be more than only one or two stand-alone workshops; they must incorporate continuous engagement with government partners and other stakeholders, using a method of engagement that is understood and accepted by all participants (L. Jerusalinsky, J. Refisch, pers. obs.). The idea of central coordination to improve primate action plan development (and implementation) is not new (e.g., [17,61]), and it appears to be catching on. Although only one of the 17 plans reviewed here mentioned having a coordinator [18], the recently-published western chimpanzee plan also has a coordinator (Table 2). O'Neill and O'Connor [50] note that stakeholders perceive centrally-coordinated plans as making more progress than plans that do not have this coordination function.

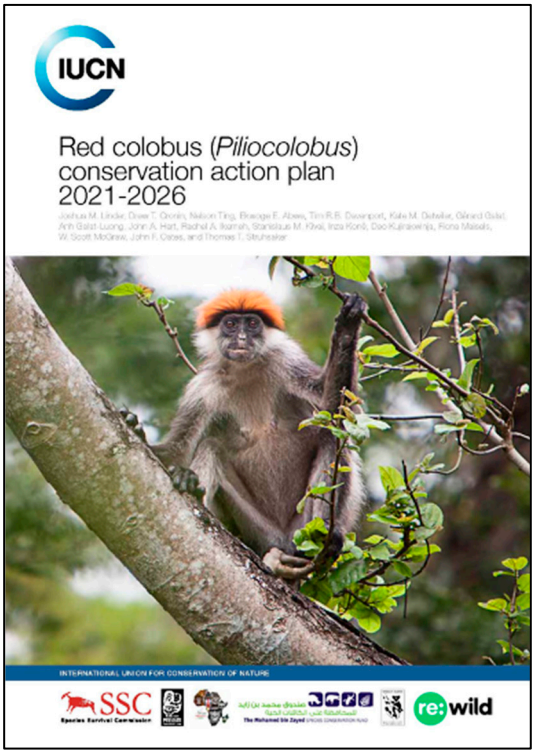

Figure 6. The cover of the Red Colobus action plan [18].

Second, there is an optimal speed with which plans should be developed [50]. Past IUCN SSC PSG plans varied widely in how quickly they were published; some were developed at a pace [21], but others took 4 years [26] or even a decade to reach publication [18]. While the process of plan development is beneficial in itself [50], the journey can only

progress to a certain point until a plan is actually published. In other words, there is a trade-off between ensuring high legitimacy when developing a multi-stakeholder plan/initiative and ensuring good speed of development [62]. This is especially true where the primate taxa in question are threatened with extinction; in these instances, a slow production cycle could inadvertently undermine the sense of urgency that plans try to convey [9]. Based on the plans reviewed here, a 1–2-year consultation and development period prior to publication seems to be an optimal window of time to allow for both good consultation and good momentum building, but only if stakeholders are continuously engaged throughout the process. Where there is sufficient momentum and resources, good plans can be produced in as little as 6 months, as was the case with Tutin et al. [23]. All of that said, we have found in many cases that the simple fact that a plan is underway can have a significant fundraising impact.

Third, inclusive stakeholder engagement in the planning process is crucial. Over the last 50 years, the extent of stakeholder inclusion in primate action plan development has changed and progressed. This is due to improvements in remote-connectivity (e.g., reliable internet), increased in-country capacity within primate range countries, and due to standardization of the primate action planning process [50]. Continued progress on inclusion and diversity will benefit future primate actions, not least since relatively minor changes in inclusion strategies can result in real (or perceived) improvements in the legitimacy of the plans and also because the discussion about de-colonizing primatology has progressed in recent years. There are many tangible examples of how to increase the diversity of voices and inputs in primate action planning. For example, action plan coordinators can track the proportion of women and minorities who engage in different meetings and consultations (an approach often used by multilaterals, including the World Bank and United Nations organizations as well as by the Convention on Biological Diversity; K.E. Reuter, J. Refisch, pers. obs.). In other cases, capacity in some groups may be so low that they cannot effectively engage in the process. Here, action plans can include activities or targets to increase stakeholder capacity. Activities implemented under the Lemur Action Plan [21] with funding from the SOS Lemurs initiative are a particularly good case study, whereby Lemur Love—a small non-profit organization—launched a writing fellowship program for Malagasy students and early-career researchers working in conservation. These people, the majority of them Malagasy women, are mentored to publish their first peer-reviewed manuscripts, with the aim of increasing the capacity of Malagasy conservationists to implement evidence-based lemur conservation programming in the future. Moreover, the Primate Action Fund managed by the PSG and supporting organizations, the most recent being Re:wild, have placed major emphasis on supporting emerging conservationists from countries, such as Madagascar and other habitat countries for more than 40 years. Also relevant to this point are key lessons and recommendations summarized by O'Neill and O'Connor [50] in their review of great ape action plans, and there is extensive literature on the types of spaces (whether virtual or in-person) needed for inclusive decision-making (e.g., [63,64]). The efforts described above are, of course, only a start. Much more work is needed on skills transfer, bringing local experts into leadership roles in primate research and conservation efforts, and ensuring that authors of primate action plans reflect the whole stakeholder landscape.

Fourth, it is desirable that the action planning process includes the expected products for each action and well-defined goals for each specific objective, as well as a follow-up procedure to be performed by a coordinating committee. By monitoring the effort in the implementation of actions and evaluating the achievements for each specific objective, it is possible to periodically and objectively assess implementation success. In addition, the results of this follow-up may provide useful feedback to the group of stakeholders involved in plan implementation on aspects that are progressing well and those that need more attention to be effectively achieved. Finally, this periodic follow-up offers the possibility of strategically adjusting the plans —e.g., including or excluding actions, adjusting values for funding—in an adaptive management approach (see below).

4.2.2. Using the Best Evidence and Incorporating Flexibility

We found that the quality of evidence and application of logical approaches within existing primate action plans were generally high [50]. Most plans referenced well-known planning frameworks and many, including the very first plans published in the 1970s and 1980s, included great detail about the evidence base underpinning their recommendations. However, despite these strengths, there are improvements that could be made to future action plans from a technical perspective. First, and in regard to monitoring and evaluation, only half of the primate action plans that were outside of their implementation period, had been assessed for their impact (and the quality of these assessments varied greatly; Table S3). In the areas where they had been assessed, the authors of the plans were almost always assessing themselves and only some acknowledged the bias this could introduce (e.g., [17]). Better post-publication monitoring is crucial to maintain high momentum and show the value of these plans as conservation tools (see below). Second, in most cases, it seemed apparent that the drafting of the initial monitoring framework and subsequent impact assessments were not carried out by experts in monitoring and evaluation. Bringing this expertise into future planning efforts could be very beneficial, especially if there is a central coordinating entity that supports the monitoring (see above). Better monitoring frameworks could, for example, make it easier to understand a plan's impact within the context of declining baselines, i.e., in contexts where there is an increase in habitat degradation or increase in threats facing primates that are outside of the 'sphere of influence' of any individual action plan. Although primate action plans are not designed to address these external factors, these contexts underscore the value of effective monitoring not only for stakeholders to communicate 'wins' to different audiences (see below), but also to feed into plan adaptation.

Third, there are a number of other strategies that primate action plans can use to address—and accommodate—the complex environments in which they work. For example, the declaration of 'no-go' zones [61] or more clearly acknowledging evidence gaps up front and using these gaps to provide space for plans to change or adapt as the evidence base changes. The coordinators of future primate action plans should be intentional about being flexible with their plans—through building in components that can change as new circumstances arise or, for example, by building in mid-plan checkpoints. There were several instances in which unexpected conflict disrupted the implementation of primate action plans (e.g., [13,16]). In these cases, the action plan should be updated or modified. In other cases, it was noted that action plans were taken too literally and did not allow for incorporation of new ideas (e.g., [17]).

4.2.3. Being Intentional in Regard to Scale

Intentionality is important when designing the scale at which a primate action plan will work. The evolution of IUCN PSG SSC action planning has seen a move to more localized scales of planning (Figure 1), focusing on fewer taxa, and with longer implementation timeframes (Table S1). This pragmatic approach does seem to be improving the impact of primate action planning efforts, and in the future, could allow plans to work better across different sectors using, for example, a system dynamics approach [65]. System dynamics are a powerful modelling tool for understanding complex adaptive systems, including socio-ecological systems. This approach has been applied recently in the Hwange Kazuma Chobe Wildlife dispersal area of the Kavango Zambezi Transfrontier Conservation area (J. Refisch, pers. obs.). The approach allowed different sectors to develop their own model and it is an elegant way of engaging sectors which traditionally collaborate little with the environmental sector. The decision about what scale a primate action plan should focus on is important as it impacts all aspects of development and implementation. For example, larger-scale plans can make coordinating stakeholders more difficult, including maintaining their interest over the duration of the plan, especially where they may not interact with the activities listed within the plan on a regular basis. In addition, when considering the plan's 'scale', administrative boundaries should be taken into account

as they can provide an opportunity to link directly to government agency priorities. For example, national-level action plans (as opposed to transnational plans) may allow for easier engagement with relevant national government authorities. There are, of course, situations where larger-scale planning could be more appropriate—such as for species with large ranges or large cross-boundary ecosystems where the impacts of climate change are already apparent.

Where larger-scale planning may be relevant, it could be beneficial for future plans to consider working toward different 'scenarios of success' (e.g., low, medium, and high-success scenarios) in order that progress can be more fairly assessed. For example, in West Africa, USD 3.5 million of a USD 9 million target had been fundraised in the 5 years following the publication of Kormos et al. [16,17]. While it was informative to acknowledge the gap between the funding that authors had wanted to mobilize against the eventual reality, this 'gap' looks much less like a failure when readers are reminded that the geographic scale of the plan was quite significant and that the region in which Kormos et al. [16] was attempting to carry out primate conservation work was experiencing ongoing civil war and conflict. If the plan had been organized around different 'scenarios of success', it may have allowed plan organizers to acknowledge that fundraising USD 3.5 million in this context was indeed a 'win' to celebrate, particularly as there may have been significantly lower (or virtually no) investment in primate research and conservation without the plan. Finally, and relevant to this 'lesson learned', one critique of biodiversity action planning has been that the proliferation of plans has resulted in a busy conservation planning landscape that is increasingly harder for stakeholders to navigate, including donors with finite time and attention to spend on increasingly disparate initiatives. As a result, we recommend that future efforts should be more intentional about how they work together with, and benefit from, complementary planning exercises that they overlap with geographically or thematically.

4.2.4. Empowered Fundraising

There are a number of best practices that we advocate for future primate action planning efforts. First, intentionality with regard to the format and framing of a primate action plan to maximize clear communication when the plan is launched (and in the years that follow), can be among the most important inputs into a plan's success. This is due to the fact that the launch of a plan opens a 'window of opportunity' to engage with stakeholders and to secure 'buy in'. Without the right communications package, this 'window of opportunity' can be missed. To be intentional about a plan's format and framing requires a clear understanding of which audiences the plan aims to target. The audiences for primate action plans can be categorized broadly into funders/donors, implementing partners, governments, and other stakeholders with the ability to mitigate threats against primates (e.g., mining companies, local communities). Communicating with stakeholders can take a lot of resources, with each type of stakeholder requiring additional resources to target. Deciding on which communication channel (or which stakeholder) will provide a good 'return-on-investment' is important [62] and requires forward planning. Without this forward planning, action plans could suffer from not having systematic distribution of plans to the right stakeholders, and therefore, reaching only the already-'converted' (e.g., [17]). When packaged right, action plans are good tools for engaging with individual donors and foundations that focus on species conservation.

There are good examples of IUCN SSC PSG plans that have been formatted and framed in a way to target the right audiences. For example, Kormos et al. [16] issued two versions of the same document—a detailed technical and scientific document and a succinct more donor-friendly overview. Although not all stakeholders found both types of documents useful, there was general consensus that they served different purposes and were complementary [17]. As another example, the colleagues leading on the Lemur Action Plan published not only the action plan [21], but detailed budgets for the plan, and a widely-cited policy forum paper in *Science* (see below). With these, and other plans, it has

been beneficial to publish documents in more than one language (Table S1). In addition, where possible, the existence of a new action should be published in the highest profile journal possible, and sometimes linked to other issues facing the species in question. This was part of the reason for the great success of the Lemur Action Plan, although it is not always possible to publish in journals as high profile as *Science*.

Second, and related to the point above about clear communication, over the history of IUCN SSC PSG action planning, there has been a shift in the communication tools available to primate conservation practitioners [9]. For example, when the global primate action plan was written in 1977 [12], it was communicated to partners by personally handing them copies of a typed document that had been xeroxed. Clearly, we have advanced far beyond this primitive method over the past 45 years. As the next generation of primate action plans were published—in 1986, 1987, and 1992 [13–15]—access to the internet continued to be virtually negligible with only 1% of the world's population using the internet in 1995 [66]. In the subsequent decades, however, the nature of the world's media has shifted drastically; by 2020, 60% of the world's population were using the internet [66] and all types of information—whether on social media or in scientific papers—had increased by orders of magnitude (e.g., [67]). While this may seem challenging, the busy information landscape can be an unexpected gift to primate action plans, if packaged properly.

One example of a well-packaged primate action plan can be seen from the most recent Lemur Action Plan [21]. In Madagascar, where there have been at least 3900 scientific papers on its biodiversity published from 1960 to 2015 [68], this plan has been an effective tool for helping donors make sense of how to target their funding. Framed as an 'emergency 3-year action plan' to implement conservation actions in 30 priority sites harboring endangered lemurs with a budget of USD 7.6 million, this plan was communicated as evidence-based, but pragmatic. For example, the budget was described bluntly—and effectively—as being a reasonable "amount in terms of international aid, for an incalculable return" [69]. This framing, alongside a strong communications strategy, built enough momentum and urgency that by the time the Lemur Conservation Network (LCN) was launched in late 2014 [70], organizations working in Madagascar, who often competed for funding, were willing to work together under one umbrella. The branding of the LCN—which was targeted at lemur enthusiasts of all backgrounds—further opened the door to anyone who wanted to support work under the Lemur Action Plan, and it now brings the conservation messages of organizations based in Madagascar (which would ordinarily have difficulty reaching English-speaking audiences) to the world. The success of the Lemur Action Plan was also due to another crucial element—namely, the ability of the PSG to rapidly take advantage of an opportunity presented to IUCN by an anonymous donor, which resulted in an immediate site visit to Madagascar by the PSG leadership and a major commitment to fund the entire plan only a month later. This resulted in the creation of the SOS Lemurs initiative, which provided CHF 7.24 million in grants over a 3-year period.

As a result, it is clear from the success of the Lemur Action Plan, that future action plans should endeavor to be more intentional about how and when funders are engaged [60], and how funding mechanisms are expected to work. Early donor participation in primate action planning has been described as a net benefit [50] and our review shows that plans can be improved in how explicitly they discuss funding mechanisms and models for delivering the work that they propose. In addition, there has been an evolution for more recently-published plans to have strong online footprints (e.g., [18,21]), but none have yet implemented online and real-time tracking of their progress, a recommendation made a decade ago [61]. This type of transparent and ongoing communication could help avoid a situation where stakeholders are not "convinced of the efficacy of the plan" [61]. Such doubt from stakeholders can render primate action plans as less effective than other options/conservation tools, and therefore, lead to a reduced return-on-investment from these efforts.

4.2.5. Elevating the Visibility of Poorly Known but Seriously Threatened Groups of Primates

Finally, and in relation to the last recommendation about elevating the visibility of poorly-known primate taxa, a prime example is the Red Colobus Action Plan (*Piliocolobus* spp.). This is the most endangered primate genus in Africa, but largely overlooked since they are never maintained in captivity (Figure 5; Linder et al. [18]). The drafting of the Red Colobus Action Plan [18] has elevated the profile of this genus and helped mobilize funding that previously would not have been available to colleagues working to protect and conserve these species. Another example is the effort to produce an action plan for the *Cercocebus* mangabeys and the genus *Mandrillus*, the latter including the mandrill and the drills. Although these primates are better known than the red colobus, they also have received relatively little attention from the international community. This new plan is nearing completion as we are writing this paper.

5. Conclusions

The five-decade journey of conservation action planning by the IUCN SSC PSG has played a pivotal role in primate conservation worldwide. Here, our review provides evidence that primate action plans—as flawed and variable in content and impact as they may sometimes be—have had an enormous impact in translating information from the IUCN Red List and a very wide range of research activities into concrete conservation action. Moreover, our review supports the notion that without these plans, the global conservation situation for primates could be much more severe and we quite possibly could already have lost a number of species. Furthermore, we have reflected on 'lessons learned' over the last 45 years, so that future efforts can be strengthened and improved. The key points that emerged from the present analysis of this history, and that can serve as inspiration for the future are: (1) Having a well-established and communicated planning process from the beginning, including post-planning steps, such as a follow-up procedure; (2) establishing a coordination mechanism to promote the effective implementation of the plans; (3) strong fundraising and communication strategies; (4) basing conservation plans on the best available scientific knowledge; (5) involving as many stakeholders as possible, and all of those directly involved with the conservation of the target taxa; (6) considering the political and cultural heterogeneity of the countries and regions involved; and (7) engaging directly with other conservation planning initiatives focusing on the same taxa or same region, such as those led by national governments. With these and other lessons learned, we recognize that conservation action plans increasingly function as mechanisms for establishing consensus-based strategies, and as a forum for strengthening inter-institutional cooperation in order to effectively implement these strategies. The findings summarized here will no doubt be useful, not only for the development of the PSG's future conservation action plans, but for non-primate conservation planning efforts, as well.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/d14090751/s1. Table S1: Primate Action Plans included in this review, with key information extracted from reports to inform the study. See Literature Cited in the main body of the paper for full citation information (citation number in brackets). Table S2: Examples of non-IUCN SSC PSG primate action plans not already cited in the main body of text. This is not a comprehensive list of plans but a representative sample of those not included in our review, to showcase the wide variety of plans in different parts of the world. Where papers are cited in the main text, brackets indicate the reference number in the Literature Cited. Though the plans in this table were not official IUCN SSC PSG plans, virtually all of them had significant–and sometimes major–involvement from individual PSG members. Table S3: Primate Action Plans included in this review alongside publicly available information published about their implementation, together with information about their impact or effectiveness. See Literature Cited in the main body of the paper for full citation information (citation number in brackets).

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