Young, Juliette Claire; Thompson, Des B.A.; Moore, Peter; MacGugan, Alastair; Watt, Allan; Redpath, Stephen Mark. 2016. **A conflict management tool for conservation agencies**. *Journal of Applied Ecology*, 53 (3). 705-711. 10.1111/1365-2664.12612

A conflict management tool for conservation agencies

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Running head: A conflict management tool

Summary

1. Growing pressure on natural resources is leading to more conservation conflicts. Governments and their statutory agencies devote increasing financial and human resources to this subject, but tend to adopt reactive, ad hoc approaches to management.
2. We combined theory and empirical data about five conservation conflicts in a transdisciplinary collaboration to co-develop a novel decision-making tool.
3. This tool uses a systematic step-wise approach with six distinct decision stages: i) establishing whether there is a conflict or an impact; ii) understanding the context of the conflict, including the stakeholders affected; iii) developing shared understanding of the conflict and goals; iv) building a consensus on how to reach the goals; v) implementing measures and vi) monitoring the outcomes.
4. Policy implications: We argue this new tool has wide applicability and democratic legitimacy and offers an exciting and practical approach to improve the management of conservation conflicts.

Key-words: Capercaillie, Conflict resolution, Framing, Mountain hare, Participation, Pine marten, Trust, Sawbill duck, Sea eagle, Urban gull.

Introduction

There are no systematic and widely applicable strategies to help government agencies deal with the range of damaging conservation conflicts that are emerging over diminishing resources (UN 2012). Such conflicts are often a strong indicator of democratic legitimacy, but the failure to deal with them has negative repercussions for conservation and can lead to resentment and distrust (Young 2010). Governments and statutory agencies responsible for conservation are coming under increasing pressure to find solutions to these challenging problems. The policy challenge is either to recognize and prevent disagreements over conservation from developing into damaging conflicts, or to proactively manage conflicts as they emerge. Successful management can be beneficial in terms of increasing public trust in politics and decision-making (Young *et al.* 2012).

Few studies offer frameworks for managing biodiversity conflicts (see White *et al.* 2009 and Redpath *et al.* 2013), and these are aimed at academic understanding, not at conservation agencies. A practical guide to help decision-makers deal with these challenging issues is required. Here we worked with a conservation agency to develop a tool for decision-makers to use when dealing with conflicts. We did this by first analysing a range of conflict issues that the agency were involved with, analysing the utility of the theoretical framework developed by Redpath *et al.* (2013) and then adapting it accordingly to develop a decision tool.

We analysed the perceptions of conflicts and their management by working with key stakeholders within and outside the Scottish Government's statutory nature conservation agency, Scottish Natural Heritage (SNH). We looked at five situations identified as priority areas by SNH, all involving species protected internationally: white-tailed sea eagle *Haliaeetus albicilla*; pine marten *Martes martes* and capercaillie *Tetrao urogallus*; sawbill ducks, such as Goosander *Mergus merganser* and Red-breasted Merganser *Mergus serrator*; herring gull *Larus argentatus* and lesser black-backed gull *Larus fuscus* ('urban gulls'); and mountain hare *Lepus timidus*.

An 'in-conflict assessment' was used to provide a snapshot of the state, drivers and impact of each situation (UN 2012) based on stakeholder perceptions. To analyse the existing evidence base for each situation, we analysed official public documents, scientific literature, grey literature, and gathered qualitative data from two workshops with a total of 43 participants, and 18 semi-structured interviews.

Initial generic conflict mapping and resolution principles based on Redpath *et al.* (2013) were discussed and refined in a first workshop (December 2013) with fourteen SNH staff with extensive experience of conservation conflicts. Interviews were then carried out from January to May 2014 with eleven SNH staff involved in managing the five priority issues and seven non-SNH interviewees (see Table 1), using a semi-structured interview guide (see Appendix S1 in Supporting Information). These interviewees provided detailed and knowledgeable input on the role of SNH in these priority areas. All interviews were transcribed verbatim and coded using NVivo qualitative data analysis software (QSR International 2010). Results from these interviews were communicated to 29 SNH staff at the second workshop in May 2014, where participants discussed the conflict management implications for SNH, from which we developed a systematic, step-wise conflict management tool.

A snapshot of five priority conservation issues: from sea eagles to mountain hares

The background, current management and research, and stakeholder perception for each of the five priority issues is summarized in Table 2.

Redpath *et al.* (2013) defined conflict as situations where "two or more parties with strongly held opinions clash over conservation objectives and when one party is perceived to assert its interests at the expense of another". By this definition, interviewees did not currently identify urban gull, sawbill duck and mountain hare issues as conflicts. For example the mountain hare issue was perceived as a situation where gamekeepers had an impact on hares, rather than a conflict between two or more

groups over hare conservation. This was compounded by a "*lack of availability or important data to SNH to make informed discussions*" (NCA2) and "*different views amongst the main hare specialists in Scotland as to how it should be done* [...] *you have to try and reconcile these differences and that's part of the challenge*" (CA7). One way forward was "*the definition of what sustainable management* [of mountain hares] *looks like*" (NCA2). The priority for urban gulls was developing "*a document which sets out legal situations, sets out the science, the biology and the management solutions that are available possibly with* […] *a few case histories*" (CA4). For sawbill ducks in rivers, the issue needed a "*proper discussion about the whole licensing issue around these species*" (NCA2). Whilst these three issues were currently identified as impacts, this was a snapshot of current perceptions and one could argue that the three issues have oscillated from impacts to conflicts over the years, depending on the wider socio-political context. In the case of the mountain hares, for example, one interviewee cautioned that it was likely to become a conflict as concerns grew from conservationists, pressure groups and the wider public over the management of the mountain hares, leading to potentially increased media attention and political pressure. This led one interviewee to conclude that "*in an ideal world we would have the resources to at least be thinking more proactively in dealing with these things before they become...high profile issues*" (CA7).

Only two issues were identified as conflicts by interviewees: the conflict between bird conservationists, farmers and crofters over the conservation of re-introduced sea eagles, and the conflict between conservationists and land managers around the perceived increased impact of pine marten on capercaillie. In the case of the sea eagle, there was a lack of shared understanding of what the conflict was about, with deep-seated conflicts over beliefs and values. This resulted in "*a kind of an emotive nightmare* […] *a very highly charged, emotional view, but it is…it's a view and it's a perception - they've very, very limited amount of fact with highly charged emotional views*" (NCA3), many of which revolved around the deep-held belief by some parties that sea eagles should never have been re-introduced to Scotland in the first place. One interviewee described the situation as one where "*re-introductions were done in a great spirit of enthusiasm and actually a lot of people*

112 *who did the re-introductions never really thought what impacts they were going to have*" (NCA1).
113 There were also conflicts over the information or knowledge different parties supported. The
114 situation was now seen by interviewees as one in which "*from a conservation point of view we are*
115 *emphasizing polarity*" (NCA3) between differing views towards sea eagle management and the
116 evidence underlying such management. In the case of the sea eagles conflict, interviewees felt that
117 going beyond the current stalemate required the conflict definition to be broadened out and placed
118 within a wider context of rural development.

119 The pine marten conflict was the most advanced of all issues explored in terms of conflict
120 management. Stakeholders in the conflict had a shared goal for capercaillie to recover, and were
121 willing to seek shared solutions. Whilst an interviewee acknowledged that "*it would be useful to*
122 *have a clear and unequivocal statement that that is not what this is about – it is capercaillie*
123 *conservation not about wider agendas*" (NCA2), a number of alternative solutions were being
124 discussed, including specific research and pilot schemes. This led another interviewee to support the
125 need to "*keep the momentum going* [...] *as long as we can see some progress on these various issues*
126 *undoubtedly there are going to be some challenges* […] *I think we can keep everybody on board*"
127 (NCA4). Transparency over why and how particular processes were applied was seen by
128 interviewees as beneficial.

129

130 **A novel systematic conflict management tool**

131 Based on the interviews with conservation agency staff and other stakeholders involved in
132 conservation conflicts and discussions in workshops, we suggest a systematic and proactive
133 approach for government, its agencies, and other stakeholders with six decision stages (Figure 1).

134 ***Stage 1****: Is there a conflict?*

The scientific literature often misuses the term wildlife conflict or conservation conflict to describe human–wildlife impacts (Young *et al.* 2010; Redpath *et al.* 2015). For the latter, technical solutions may work well. However, in conflicts between people over conservation, more complex and interdisciplinary approaches will be needed (Marshall *et al.* 2007; Madden & McQuinn, 2014). So, taking time to clarify whether an issue is a conflict or a human–wildlife impact, based on the perceptions of those involved, is essential to then identify the best management approaches. Such early and agreed clarification should help limit the likelihood that impacts develop into conflicts and also avoid the waste of limited financial resources. Conservation agencies and other stakeholders may need to prioritize conflicts to be managed according to their current intensity and impacts (Stage 2), and allocate resources accordingly.

Stage 2*: Is the context of the conflict understood?*

Conflicts are embedded in wider environmental, economic, social, political and legislative contexts, which need to be understood before deciding whether and how to proceed with future management (Ban *et al.* 2013; Pecurul-Botines *et al.* 2014; White *et al.* 2009). Ignoring these societal dimensions of conflict can, especially in very contentious situations, increase risk of harm to the species of concern and relationships between stakeholders (Marshal *et al.* 2007). This stage requires the early identification of relevant groups, including an analysis and communication of the role of the conservation agencies, and acknowledgement from stakeholders of their position in a shared conflict. Stakeholders in this context are defined as all groups or individuals affected by and influencing the escalation or resolution of the conflict (e.g. government agencies, NGOs, landowners and land managers, civil society groups). Identification of possible gaps in understanding of the conflict, or components of it, and its wider societal context may also be required.

Stage 3*: Is a multi-stakeholder process for conflict management required and/or suitable?*

158 In some cases, such as where there are pronounced power imbalances between stakeholder groups,
159 or when a conflict is so acute there is no willingness to engage constructively, the development of a
160 multi-stakeholder process (Stages 4–6) may be premature (Hemmati 2002). Other solutions may be
161 more suitable, including top–down (e.g. imposing solutions, enforcing laws) or bottom–up options
162 (e.g. working with individual stakeholder groups). Regardless of the decision at this stage, time
163 should be taken by decision-makers at this stage to communicate what course of action will be taken
164 and why, thereby increasing transparency and ultimately trust with other stakeholders.

165 ***Stage 4****: Is there a joint understanding of the conflict and its evidence base?*

166 Before any steps towards conflict management can be taken, there needs to be consensus on what
167 the conflict is about and on the evidence base. This was one of the biggest current challenges in the
168 issues explored in this study, and one in which conservation agencies have a key role to play in
169 acknowledging and bringing together a broad range of knowledge.

170 ***Stage 5:*** *Is there a shared goal and agreed process towards reaching this goal?*

171 There is also a need for agreement among stakeholders on what would constitute a "managed"
172 conflict. This could potentially lead stakeholders to re-visit their values, attitudes, goals and
173 positions, and sharing such perspectives with others to break-down possible preconceptions. Once
174 agreement has been reached on a shared goal, stakeholders can then start discussing the processes
175 needed to reach it.

176 ***Stage 6:*** *Is monitoring in place?*

177 Conflicts are dynamic and require long-term monitoring and adaptation as appropriate. This requires
178 deciding jointly on what monitoring is required and how it should be implemented, including clear
179 allocation of roles among stakeholders (e.g. Niemela *et al.* 2005). Such monitoring could help
180 anticipate any potential future conflicts (Stage 1), but requires flexibility to take account of any

changes in management or in the wider context. Long-term adaptive approaches, whilst costly, may be essential to ensure continued collaboration between stakeholders.

Practical implications for policy and practice

Our new systematic conflict management tool is a product of a transdisciplinary approach focussed on decision-makers, rather than academics. While it builds on elements from existing frameworks, such as proposed by Redpath *et al.* 2013, there are four key differences.

First, our tool is a *step-wise* process thereby enabling practitioners and decision-makers to approach conflicts in a sequential manner planning their resource use accordingly. As the framework is specifically geared towards decision-makers, some elements will be specific to this group, for example the need to define the role of the conservation agency (Stage 2, Figure 1) and the need to communicate their roles and chosen course of action effectively and transparently (Stage 3, Figure 1). Second, much of the emphasis is on devoting effort *prior* to managing (or even mapping) conflicts to establish consensually whether an issue is either a conflict or an impact (Stage 1, Figure 1). While providing quick solutions may be politically tempting in terms of demonstrating action, if not agreed by all stakeholders these 'solutions' may be perceived as an imposition, potentially leading to win–lose outcomes, as in the case of sea eagles (see Table 2, also O'Rourke 2014). Third, we highlight the need for self-reflection and acknowledgement of how interpersonal relationships can help or hinder resolution of conservation conflicts. This step requires understanding of who the key stakeholders are, including the decision-makers (Stage 2, Figure 1), how they perceive each other, and how trust can be maintained or rebuilt as appropriate. Finally, the evidence underpinning a conflict needs to be agreed. In most issues explored in this study, information was either lacking, ignored or dismissed, or evidence was contradictory. Increasing transparency of decision-making processes would help all stakeholders understand the available evidence, the knowledge gaps and the

obstacles ahead. This could form the basis of a more proactive approach, enabling future planning and identifying resources should further research, including co-production of knowledge, be needed.

The approach suggested here may depart from current government approaches to conflict management. In developing this tool, however, we recognize important considerations. Legal interpretations may impact stages 5 and 6, limiting achievement of agreed goals, regardless of consensus on their desirability. In addition, the evidence supporting decisions needs to be robust, as decisions could be challenged successfully on the grounds that the evidence base is not firm or is contestable. Furthermore, political will to manage a conflict may be essential to maintain the momentum of the process. We also need to reiterate that this systematic tool was developed in the Scottish policy and stakeholder context. When applying it to other policy contexts, appropriate and early care (e.g. Stage 2–3, Figure 1) should be taken to revisit the process with key stakeholders, for example NGOs and other non-state or state actors, especially where state capacity is absent or weak, or where government agencies are perceived as the major cause of conflict.

To conclude, we propose that this systematic approach be implemented more widely for three key reasons. The first is political. Governments are expected under the Aichi targets to reduce the direct pressures on biodiversity and promote sustainable use (Strategic Goal B). Conservation conflicts can hinder the implementation of actions on the ground to reach this target and should be addressed in a systematic manner. The second reason is related to cost. Ignoring conflicts or reaching stalemates in intransigent ones are both costly strategies in terms of resources spent and stakeholder relationships (UN 2012). We believe a systematic approach such as the conflict management tool proposed here could be cost-effective by differentiating between impacts and conflicts, prioritizing conflicts in need of management (to reduce future costs), and applying the most relevant responses appropriately and effectively. The third reason is linked to improved governance. By applying such a systematic approach, government agencies and other stakeholders could develop more robust,

transparent and trusting relationships, based on sharing information and values, leading to more sustainable social and environmental outcomes (UN 2012).

Acknowledgements

This research was funded by Scottish Natural Heritage, contract RGC2384. We thank all interviewees and workshop participants who gave us their time and input. We also thank Adam Vanbergen, Dave Carss and anonymous reviewers for helpful comments on an earlier draft.

Data accessibility

The data will be archived in the NERC Environmental Information Data Centre (EIDC).

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320 3990.

321 **Table 1.** Distribution of interviewees according to background and issue covered. The non-
322 conservation agency staff worked for the Royal Society for the Protection of Birds Scotland, Science
323 and Advice for Scottish Agriculture, the Game and Wildlife Conservation Trust, Forestry Commission
324 Scotland and Scottish Land and Estates

Interviewee background	Sea eagles	Pine marten	Mountain hares	Urban gulls	Sawbill ducks	General
Conservation agency staff	CA1–CA5	CA6	CA7–CA8	CA4	CA9	CA10–CA11
Non-conservation agency staff	NCA1–NCA3	NCA1–NCA4	NCA1–NCA2, NCA5	NCA6–NCA7	NCA2–NCA3	

325

326 **Table 2.** Background, current management and research and stakeholder perception of five species
327 issues identified by Scottish Natural Heritage (SNH)

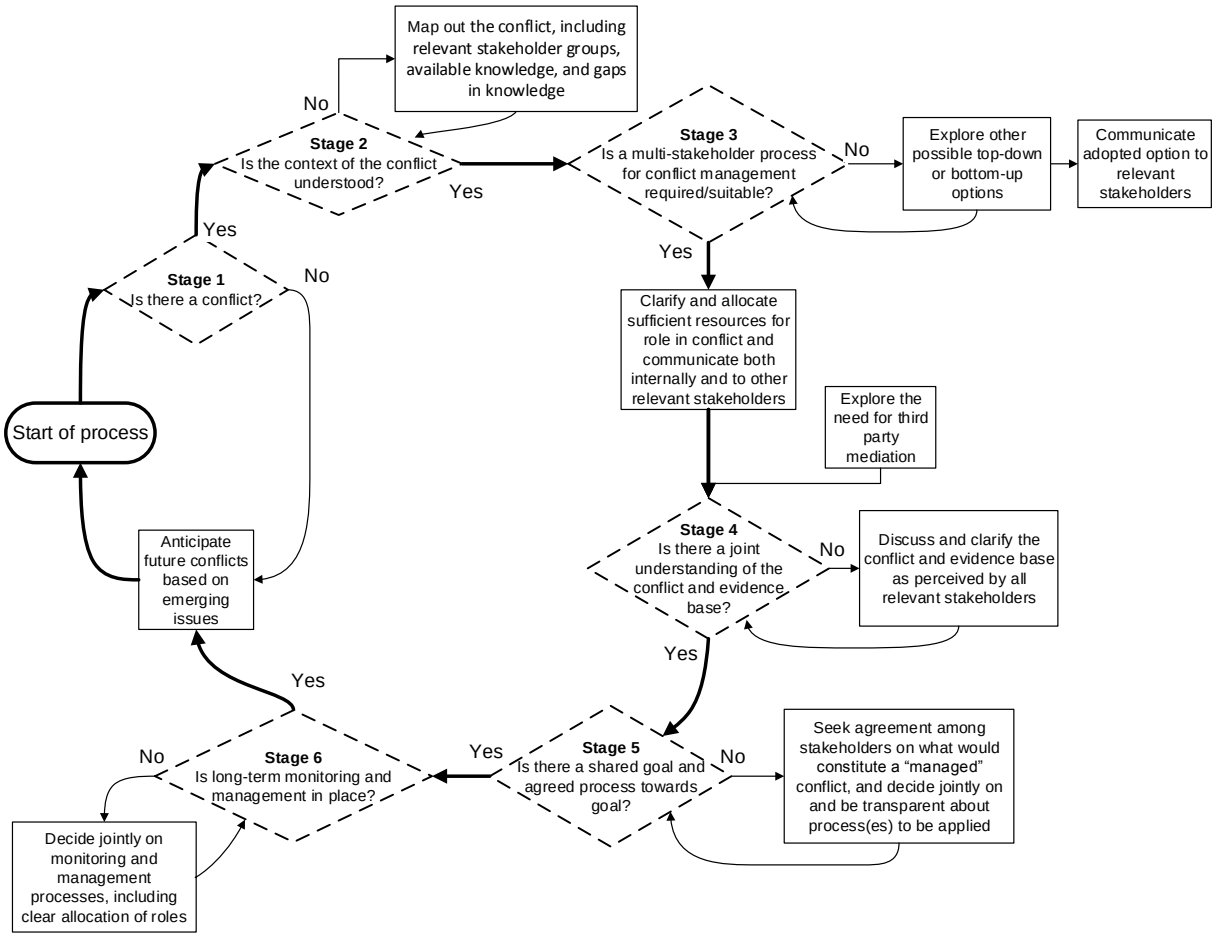
	Background	Current management and research	Stakeholder perception of conflict
Sea eagles	Habitat destruction and direct persecution led to the extinction of white-tailed sea eagles *Haliaeetus albicilla* in Scotland in early 20th Century. Sea eagles were re-introduced from 1975 onwards. By 2010, over 50 breeding pairs were present in Scotland. Sea eagles have a varied diet that can include lambs.	Localized and then national sea eagle management schemes. Research on impacts of sea eagles on lambs (e.g. Marquiss *et al.* 1999; Simms *et al.* 2010), and economic benefits of sea eagles (Molloy 2011).	According to interviewees, the conflict revolves around the fact that sea eagles were re-introduced in 1975 without sufficient consultation and the extent to which sea eagles impact on agricultural productivity, contested amongst the main protagonists.
Pine marten	Both the pine marten *Martes martes* and the capercaillie *Tetrao urogallus* are protected species. Capercaillie have been declining in numbers and range in Scotland since the mid-1970s due to climate change, habitat destruction, mortality from striking forest fences, and predation. Pine marten range and abundance are considered to have increased since the 1970s. The pine marten is known as a	Much of the research has focussed on capercaillie population trends and the factors affecting breeding success (e.g. Baines *et al.* 2011) including predation by crows *Corvus corone*, red foxes *Vulpes vulpes* (e.g. Summers *et al.* 2004) and pine marten (e.g. Baines *et al.* 2004; Summers *et al.* 2009). Management efforts in relation to capercaillie have focussed on improving and increasing woodland habitat, removing or modifying deer fences, and the control of	Interviewees highlighted that all stakeholders in this conflict had a shared goal, namely for capercaillie to recover. Although all interviewees acknowledged that a range of factors were contributing to the decline of capercaillie, the conflict was perceived as being over how to tackle those factors, including predation. Concerns revolved specifically around the perceived increased impact of pine marten on capercaillie, and what could be done in the current legislative context.

	predator of capercaillie eggs and chicks.	predators such as crows and red foxes (e.g. Kortland 2006).	
Mountain hares	The mountain hare *Lepus timidus* is found across most of Scotland, mainly on grouse moors in the north-east. Mountain hares are a human quarry and a prey species (e.g. prey of the golden eagle *Aquila chrysaetos*). Mountain hares have been linked to the transmission of louping ill virus to red grouse *Lagopus lagopus scoticus*.	Much of the recent research has focused on the distribution of the species in Scotland (e.g. Kinrade *et al.* 2008), including assessments and analysis of densities (Bisi *et al.* 2011; Newey *et al.* 2011), and factors potentially affecting densities (e.g. Newey *et al.* 2007; Townsend *et al.* 2011). A report commissioned by SNH identified a range of research priorities to better inform the sustainable management of mountain hares (Newey *et al.* 2008).	The conflict was defined by one interviewee as a concern amongst conservationists regarding the "*unsustainable management of mountain hares on grouse moors*", with the perception that too many mountain hares were currently being killed. Interviewees mentioned the lack of method of estimating mountain hare populations that could allow for the establishment of a population level representing the so-called "Favourable Conservation Status" and any subsequent informed discussion on mountain hare management.
Urban gulls	Herring gulls *Larus argentatus* and lesser black-backed gulls *Larus fuscus* are both protected under Annex II of the EC Birds Directive. Populations of both have decreased since monitoring began in 1969–70. There has, however, been an increase in urban-nesting gulls. Gulls can impact on humans through transmission of disease, noise, defecation and harassment of people. These impacts have led to urban gulls being perceived as pests by those affected.	In Scotland, herring and lesser black-backed gulls can be managed year-round under license GL 03/2013. The management of urban gulls has proved challenging, often resulting in expensive but ineffectual results (Soldatini *et al.* 2008). Initiatives have been set up to resolve the gull issue in specific areas. An extensive review of urban gulls and their management in Scotland was carried out (Calladine *et al*. 2006).	The main challenge was perceived as a lack of knowledge relating to the numbers, nesting and foraging habitats of urban gulls, and their interchange with non-urban gulls. Interviewees questioned current management approaches, including problems associated with allowing lethal control of a declining species of conservation interest. Whilst not currently a conflict, interviewees stressed this could change as concerns over disturbance and aggression increase from both members of the public and local authorities could lead to increased media attention and political pressure.
Avian predators in rivers and inland waters	Sawbill ducks, such as Goosander *Mergus merganser* and Red-breasted Merganser *Mergus serrator* are predators of Atlantic salmon, *Salmo salar L.* smolts, and their perceived impact is of concern to fishermen.	Research has focussed on the impact of sawbill ducks on salmonids (e.g. Marquiss *et al.* 1998), including priorities for future work (Marquiss *et al*. 1998). SNH have derogation authority under section 16(1)(k) of the Wildlife and Countryside Act 1981 to grant licences to permit the killing or taking of wild birds for the purpose of preventing serious damage to fisheries.	The main concerns were over ineffective dissemination of information, such as over monitoring of avian predators, and a perception that "*the licenses are being issued too freely with lack of terms and conditions and lack of enforcement*". The main issue according to interviewees was around the red-breasted merganser, which was seen by one interviewee as showing "*sharp declines in inland breeding populations and [...]*

			licensing may be a serious contributing factor here".

328

329 **Figure 1.** Systematic approach for conservation agencies and other stakeholders involved in conflict
330 to identify and manage conservation conflicts. The process starts in the middle left-hand
331 side of the figure. Diamond shapes indicate decision stages in conflict identification,
332 management and monitoring.



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335 **Supporting Information**

336 Additional Supporting Information may be found in the online version of this article:

337 Appendix S1. Interview guide.