How Decision Makers View Wildlife Conservation Challenges in the Southeast United States

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Abstract: Effective wildlife management requires understanding conservation challenges as defined by stakeholders and developing strategic responses to them. Outlining these challenges is the first step in wildlife management decision making. Research has documented how wildlife conservation practitioners and the public prioritize conservation issues, but little is known about the perspectives of people making conservation decisions, exposing a critical blind spot in efforts to effectively manage wildlife. In this case study, we interviewed 19 directors and 29 board members of state wildlife agencies (hereinafter, decision makers) in the southeastern United States to gauge their perspectives on past and current wildlife conservation challenges, and how to respond to them. We used a naturalistic qualitative approach. Results suggest that insufficient funding was viewed as the primary conservation challenge across the southeast, historically and currently. Declining agency relevancy and wildlife disease were also mentioned as important challenges that are more important now than they were in the last 30 years. Decision makers described their responses to these challenges as improving agency relevancy, acquiring land, and creating new partnerships. These results may reflect the unique responsibilities of directors and supervisory board members. However, perspectives of decision makers and stakeholders were aligned on topics such as imperiled and invasive species.

Key words: wildlife agencies, conservation leadership, commissioners, management, planning

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Effective wildlife management requires understanding conservation challenges and developing strategic responses to tackle them. Most conservation planning approaches label efforts to understand conservation challenges as 'defining the problem' (Sarkar et al. 2006). In the field of decision science, this problem framing step is viewed as the cornerstone of effective planning (Lauber et al. 2011, Gregory et al. 2012). Once a problem is clearly defined, planners can articulate more precise objectives, create links from their assessments to different stakeholder groups for implementation (Knight et al. 2006), and develop portfolios of actions (i.e., strategies) that are more likely to lead to a successful solution to the problem (Pressey et al. 2007, Gregory et al. 2012). Trying to solve ill-defined or undefined problems increases the likelihood of failure (Gregory et al. 2012, Game et al. 2013). However, a lack of problem definition or framing is a common occurrence in conservation planning, resulting in cascading effects into other facets of the planning cycle (Game et al. 2013). Conceptualization of conservation challenges should consider the unique perspectives of decision makers, wildlife practitioners, and impacted stakeholders.

Although there are diverse groups of stakeholders in conservation, they are largely in agreement with what they believe are major challenges. For instance, conservation-focused non-governmental organizations (NGOs) and wildlife practitioners share core perspectives of conservation challenges, specifically Diamond's (1989) 'evil quartet' of extinction drivers (habitat destruction, over-exploitation, invasive species, and extinction chains) combined with the effects of anthropogenic climate change (Brook et al. 2008). Members of the Australasian Wildlife Management Society viewed threatened species, threatened communities and habitats, and introduced species as the most important wildlife management chal-

lenges (Miller and Jones 2005). These results reflected outcomes from a similar study of The Wildlife Society members from the United States in which threatened species management and threatened biological communities and habitats were listed as the two most important wildlife management challenges (Brown et al. 1992, Miller and Jones 2005).

Although views of conservation challenges are diverse among the general public, the risk of species extinction tends to be viewed as the most significant wildlife conservation challenge, as is demonstrated in multiple survey-based studies (Meuser et al. 2009, Morse-Jones et al. 2012, Takahashi et al. 2012, Veríssimo et al. 2014). Further, the public typically prioritizes addressing conservation challenges linked to wildlife species that are perceived to be "aesthetic" (Roque de Pinho et al. 2014). Children also tend to favor conservation of ecologically important wildlife species and species with declining populations (Frew et al. 2017). In contrast, farmers tend to be concerned about nuisance wildlife (Wang et al. 2006, Stronen et al. 2007, Gusset et al. 2008), particularly those responsible for crop and livestock damage (Hegel et al. 2009, Sifuna 2010, McNutt et al. 2017). Recreational boaters view aquatic invasive species as a conservation challenge (Sharp et al. 2017).

While there is agreement across some stakeholder groups, it is currently unknown if the directors and supervisory board members (hereinafter, decision makers) also agree that imperiled species are the major problems facing conservation and wildlife management. Although wildlife management agencies around the world are nominally responsive to public interests, most decisions are made in a top-down fashion (Wildlife Management Institute 1987). In the United States, each state has a wildlife agency, or wildlife division within a larger environmental department which is led by a director and supervisory board (members are typically appointed by elected officials). Board members, often called commissioners, set the overall direction of the agency, typically have power to remove directors, and can approve or veto most management decisions including those related to land acquisition, hunting regulation changes, research projects, and finances (Wildlife Management Institute 1987). Although conservation science has outlined the five aforementioned primary conservation challenges, and many survey studies have outlined public views of conservation problems, little is known about the perceptions of decision makers. This potential disconnect obscures the degree to which decision making aligns with understanding gained through scientific research or public preferences. We addressed this need with a qualitative case study that assessed how southeastern state wildlife agency leaders define wildlife conservation challenges and strategic responses to them.

Methods

We employed a naturalistic approach of qualitative research (Lincoln and Guba 1985) to explore perceptions of conservation challenges by wildlife agency decision makers in the 15 states and 1 territory (Puerto Rico) with membership in the Southeastern Association of Fish and Wildlife Agencies (SEAFWA). We used snowball sampling (Noy 2008) where one state wildlife agency director provided contacts for other key decision makers in the region who in turn were asked to provide additional contacts. We determined a stopping rule for interviews at the point where snowball sampling became cyclical (no new names were suggested), and theoretical saturation (i.e., the point where novel themes ceased to emerge) was reached (Shellabarger et al. 2012).

Interviews were informal conversations loosely relying on a four-question interview guide (Table 1) and data took the form of quotations nested in their conversational context. We conducted interviews from July 2019 to January 2020. Transcripts were written at the time of the interviews. To categorize transcripts, we assigned each individual interview a unique identification number and a pseudonym to maintain confidentiality.

Interviews were coded using QSR International's NVivo 10 qualitative data analysis software (NVivo 2014) and by choosing phrases that showed a specific conservation challenge or response to a challenge. We identified themes (Table 1) related to the specific prompts by using recurring motifs in the interview transcripts. We assessed intercoder reliability by having two interviewers code ten randomly selected interviews (Krippendorff 2019); five of the

Table 1. Themes emerging from responses to interview prompts for directors and supervisory board members of wildlife agencies in the southeastern United States from May 2019 to January 2020.

Prompt	Emergent themes
What are the most important wildlife management and conservation issues your agency has faced in the last three decades?	Lack of funding Agency becoming irrelevant Low game population numbers Wildlife disease Introduction and spread of invasive species Changing landscapes Concern around imperiled species Urbanization
How did your agency face these challenges in the past?	Improve relevance Acquire land Create new partnerships Improve legislation Species restoration Improve regulations
Tell me about the current challenges for your agency.	Lack of funding Agency becoming irrelevant Wildlife disease Introduction and spread of invasive species Changing landscape
What steps are being taken to address them?	Improve relevance Create new partnerships Acquire land Improve legislation

ten interviews were supervisory board members and five were directors or administrators. We evaluated intercoder reliability using Cohen's kappa (Lombard et al. 2002). We used chi-square (χ^2) tests to test for differences in the frequency of themes between directors and supervisory board members, using a significance level of $P < 0.05$. We report themes identified in ≥20% of interviews.

Results

The final sample includes 19 directors and administrators representing 16 state agencies and 29 supervisory board members representing 13 states (Table 2). We were not able to conduct interviews with board members from West Virginia and Mississippi. Puerto Rico did not have an active supervisory board at the time of the study. In some cases, more than one person was interviewed from each category in each state depending on the structure of the agency and willingness to participate. Analysis of intercoder reliability led to Cohen's kappa values of >0.75 for all themes.

Past Challenges

Decision makers identified lack of funding ($n = 19$) and agency relevance ($n = 19$) as the two most prevalent challenges in the last 30 years (Table 2). Decision makers highlighted expanding re-

Table 2. Themes and subthemes emerging through participant quotes in thematic analysis of interviews. * Indicates significance at the P < 0.05. Intercoder reliability is assessed through Cohen's kappa.

Themes and subthemes	*Directors (n = 19) with relevant quotes*	*Supervisory board members (n = 29) with relevant quotes*	*Number of participants with relevant quotes*	*Chi-square*	*Cohen's kappa*
Past challenges					
Lack of funding	11	8	19	4.41*	0.89
Agency is becoming irrelevant	11	8	19	4.41*	0.86
Changing values	6	3	9	3.40	0.84
Declining numbers of sportspersons	6	3	9	3.40	0.76
Low game population numbers	7	9	16	0.17	0.80
Wildlife disease	5	10	15	0.36	0.96
Chronic wasting disease	4	9	13	0.58	1.00
Introduction and spread of invasive species	7	8	15	0.46	0.98
Changing landscapes	7	5	12	2.35	0.78
Conversion of natural landscapes	5	4	9	1.18	0.78
Concern around imperiled species	6	4	10	2.20	1.00
Urbanization	6	4	10	2.20	0.89
Past solutions					
Improving relevance	13	9	22	6.46*	0.87
Acquire land	4	11	15	1.52	0.94
Create new partnerships	8	5	13	3.59	0.85
Improve legislation	7	5	12	2.35	1.00
Improve state legislation	6	5	11	1.34	0.90
Species restoration	5	4	9	1.18	0.94
Improve regulations	4	5	9	0.11	1.00
Present challenges					
Lack of funding	10	13	23	0.28	0.91
Agency is becoming irrelevant	11	5	16	8.54*	0.84
Wildlife disease	5	11	16	0.70	1.00
Chronic wasting disease	3	10	13	2.03	1.00
Introduction and spread of invasive species	2	7	9	1.40	0.99
Changing landscape	4	5	9	0.11	0.80
Present solutions					
Improve relevance	14	14	28	3.05	0.94
Marketing	10	6	16	5.27*	0.93
Outreach	5	4	9	1.18	0.99
Recruit new staff	6	5	11	1.34	0.94
Create new partnerships	4	6	10	0.00	0.90
Acquire land	2	7	9	1.40	1.00
Improve legislation	5	4	9	1.18	0.80

sponsibilities of the agencies with no increased funding, as well as a decline in hunting and fishing license sales. Liam's statement is representative of funding concerns: "One that is constant that has probably been since the beginning of time is the funding issue." Similarly, Justin said, "The funding model of (state) needs some adjustment. We are funded by license dollars and (Pittman-Robertson funds) and things like that, but with a decreasing (number) of hunters and increase cost in upkeep, it does not work." Directors cited lack of funding as a challenge more often than did supervisory board members (Table 2). More than half of the directors (57%) mentioned funding as a challenge, while only 8 of the 29 supervisory board members did (28%; Table 2).

Decision makers' beliefs about agencies becoming irrelevant in recent decades often focused on subthemes of changing stakeholder values ($n = 9$) and a declining number of sportspersons ($n = 9$; Table 2). Decision makers described that a change in values was coming from an increased diversity in state residents, with Hunter saying, "With a growing, diverse population with (people) coming in from out of state with different views and ideas." Decision makers also believe wildlife values in the increasingly diverse citizenry are shifting from utilitarian to more mutualistic values. Adam said, "Now their values about how wildlife should be managed have changed dramatically, and that's what we're dealing with now." In addition, the number of hunters and anglers in the United States is perceived to be declining. Tristan summarized by saying, "There's a general decline in (the) hunting population." Further, there was a connection of the declining hunting and angling population to the decline in available funding. Wyatt said, "The long-term concern is hunter and angler recruitment for the funding model of the North American Model (for Wildlife Conservation)." This leads to the issues of maintaining relevancy in the changing world. Directors mentioned the issue of relevancy (58%) more often than supervisory board members did (28%; Table 2).

Less frequently, informants mentioned low game population numbers, wildlife disease, invasive species, landscape change, imperiled species, and urbanization as being other past challenges (Table 2). Decision makers mentioned the challenge of having low game population numbers in past decades ($N = 16$; Table 2), with specific reference given to white-tailed deer (*Odocoileus virginianus*), wild turkey (*Meleagris gallopavo*), and upland game birds. Luke said, "A lot of the Great Plains habitat species (had a low population) …" Similarly, Tripp said, "Species that had pretty much been wiped out … are back to healthy populations. Black bears (*Ursus americanus*) were very threatened in the 1980s in (the) mountains, and that has been totally reversed." Wildlife disease was also viewed as an important challenge among decision makers ($n = 15$; Table 2), and most of their references to disease focused on chronic wasting disease ($n = 13$; Table 2) in white-tailed deer and elk (*Cervus canadensis*) herds. For instance, Stephen said, "I'll start with the most obvious one, (chronic wasting disease), and we are vulnerable as far as a policy standpoint." Additionally, Jacob said that, "We not only have (chronic wasting disease) in our white-tailed deer herd, we have it in our elk herd. It's tough."

The introduction and spread of invasive species was another commonly mentioned challenge ($n = 15$), with participants most often listing feral hogs (*Sus scrofa*) and Asian carp (*Cyprinus carpio*; Table 2). Eleanor summed this up by stating, "Asian carp (have) been a huge challenge." Further, Margaret said, "As (long) as I've been involved, what I see is the biggest concern is the overpopulation of feral hogs. (They) affect so many things beyond our farmers' crop." Participants also mentioned landscape change as a historical challenge ($n = 12$), and conversion of natural landscapes in particular ($n = 9$; Table 2). Logan said, "I would say in general, habitat loss … by far has been the most significant. We continue to lose habitat at an alarming rate." Colby linked habitat loss to "urban growth development, sprawl" as did Douglass who voiced concerns about "habitat issues, (and) increased urbanization." Additionally, Oscar mentioned, "One (challenge) is habitat fragmentation, (going to) smaller and smaller tracts of land." Threatened and endangered species were also mentioned as a common challenge ($n = 10$; Table 2). Hunter spoke about threatened and endangered species, stating, "Threatened and endangered species are under constant threat of development (103)." Further, George said "Early to mid-eighties, (we had) lots of resources and staff focused on imperiled species and non-game species." Urbanization ($n = 10$) emerged as a conservation challenge linked to rapid population growth in the southeast, and urban sprawl (Table 2).

Responses to Past Challenges

Decision makers described improving relevance as the most common response to the challenges of the past ($n = 22$; Table 2). Directors and commissioners both noted that they have done several different things in order to improve the relevance of their agencies, from offering more wildlife education to engaging with private landowners. Mason said that for his state, "R^3 (Recruitment, Retention, Reactivation) is a big priority. (We have) an R^3 coordinator for game management and R^3 coordinator for fisheries management." Sawyer noted that his agency, "(Engages) core constituents—hunters and anglers." Agencies also engaged private landowners to improve relevancy. Ethan said, "Working with private landowners is bigger bang for your buck in terms of conservation." Directors were more likely to mention working to improve relevance ($n = 13$) than supervisory board members ($n = 9$; Table 2). Participants also described acquiring land to protect wildlife habi-

tat and provide more public hunting land. Franklin said, "(We have been) acquiring land and turn(ing) it into game lands to make sure they can never be developed." Similarly, Matthew said, "As far as access, (we are) continually adding land … look(ing) at new properties, (and) open(ing) up more land."

Decision makers talked about creating new partnerships as a related response to past challenges ($n = 13$; Table 2). Creating new partnerships was a broad category that included collaborations to save imperiled species, acquiring land and obtaining more funding. Decision makers also mentioned working with federal agencies and wildlife agencies from surrounding states. For example, Brenda said, "(With) Asian carp, it's the same way … (we've) done a splendid job in learning and trying to learn from other agencies…." Peter highlighted the federal partnerships, saying, "We manage an additional three million acres of land through partnerships with people like the (U.S. Forest Service)." Participants also described improving legislation to mitigate historical challenges ($n = 12$; Table 2). Liam said, "Legislatively we have increased fines and stopped the movement (of feral hogs)." Improving legislation was linked to addressing funding challenges as well. George said, "One thing we've done is been successful at getting legislature to fund broad programs."

Decision makers also commonly said that species restoration projects were solutions to restoring the state's game populations ($n = 9$; Table 2). Emma described numerous, "restoration projects (such as) otter (*Lontra canadensis*), elk, natural repopulation of black bears, grouse (*Bonasa umbellus*), prairie chickens (*Tympanuchus cupido*)." Similarly, Adam said, "We continued with elk restoration in the last 13–14 years." And finally, decision makers considered changing their agency's regulations ($n = 9$; e.g., bag limits, season dates) as one solution to past conservation challenges (Table 2). Eugene said, "We tried to make regulations for the reservoirs (based) on science." Further, Andrew said, "(We made) rule making changes, new rules but all of that has come from awareness of the population of (state) and evidence and data whether it's our agency or a third party."

Present Challenges

When asked about current challenges, informants indicated they were dealing with some of the same problems as they did in the past. Notably, decision makers described a lack of funding as the most common challenge they are facing today ($n = 23$; Table 2). Funding includes the decline in sale of hunting and fishing licenses, as well as concern with reducing budgets. Oliver said, "… funding—never enough money to do everything we need. Our jobs as public employees is to do the best job we can with the resources we have." Similarly, Harrison said, the "challenge is getting the proper funding from state legislature to do the things that I've described." Similarly, Nicholas said, "If you look at the objective data, it is clear that revenue provided by hunter and fishermen is the bulk of conservation dollars in North America, so we have fewer hunters and fishermen, fewer dollars for fish and wildlife conservation." Supervisory board members (45%) were just as likely to mention funding as a challenge as directors (53%; Table 2). Further, decision makers listed the agency becoming irrelevant as another current challenge ($n = 16$; Table 2). This theme suggested the growing role of technology and the growing diversity of constituents were making agencies less relevant. For example, Cole said, "Every state competes with technology … social media, what we have at our fingertips alter(s) social behavior, (and people) do not recreate outside like they used to." Oliver also said, "Some of the things we talk about … is how do we embrace the new constituents in a way that is relevant, and that people think they are getting value out of their agency." Directors were more likely to mention the agency becoming irrelevant (58%) than the supervisory board members (17%; Table 2).

Decision makers described wildlife disease as another current challenge ($n = 16$; Table 2). This theme was largely the same as the disease theme for past challenges as it focused largely on chronic wasting disease ($n = 13$; Table 2). Nicholas said, "Chief is chronic wasting disease, it is a serious threat to that natural resource and (state) should do everything in its power to contain and regulate and hopefully eliminate that disease from the wild herd." Noah captured the multifaceted aspect of this disease, saying "Wildlife threats in general, but in particular (chronic wasting disease). (It) can devastate the ability to deer hunt in (state). (We've) got to make sure we are addressing the human dimensions side of this disease." In addition, there are states that do not have a confirmed case yet but are still concerned about it. Samantha said they are working on "Understanding why we don't have (chronic wasting disease) in the state."

Participants also described the spread and introduction of invasive species as one of their current challenges ($n = 9$; Table 2). Feral hogs and Asian carp were two species that were mentioned specifically. Hunter said, "I'll give a success story first. If you talk to (wildlife managers in) the southeast, feral hogs are something you acquire and never get rid of. We've pretty much eradicated them." Elijah said, "But now also infested with the feral hog … some can be vicious to dogs and animals, now the coyotes as well." Finally, directors and supervisory board members described a changing landscape as a challenge ($n = 9$; Table 2). Within the landscape change theme, the conversion of natural landscapes and increased fragmentation were mentioned as specific challenges. Jackson said, "Habitat is another (issue), elk habitat, quail (*Colinus virginianus*) (habitat), grouse (*Bonasa umbellus*) habitat …" Further, Hudson said, "Habitats are going to continue to change and fragment."

Responses to Present Challenges

Decision makers described efforts to improve agency relevance most often when describing responses to today's challenges ($n = 28$; Table 2). Marketing ($n = 16$) and outreach ($n = 9$; Table 2) were the most common ways decision makers worked to improve agency relevancy. Samuel said, "(Hosting) outreach programs to ranchers and landowners to do something (on their land) that's geared towards wildlife or works for both." Further, Adam said that his state has, "Programs to get people back into the outdoors who have lost that connection and why being outdoors and associating with wildlife is important." Similarly, Oscar said, "We're very focused on our outreach and engagement programs, they are very targeted on how you create families of outdoor enthusiasts." Directors were more likely to mention marketing (53%) as a response than the supervisory board members (21%; Table 2).

Decision makers described recruiting staff to solve current challenges ($n = 11$; Table 2). Luke said, "Bringing on board R^3 coordinators, bringing on more human dimensions capabilities. Shift the focus, not completely shift it, but realize that we cannot focus 100% on wildlife science." Similarly, Liam said, "We are hiring communication and marketing people and again that costs money." Conversely, Logan said, "(We're) getting the highest quality people making the day to day decisions." Partnerships remained an important approach for solving current challenges ($n = 10$; Table 2). Noah said that, "Collaboration between agencies and the federal agencies as well and see if we can get ahead (of challenges) but also address the sociological part(s)." Raymond said, "Foundations are also helping us buy the land."

Directors and supervisory board members also described improving legislation as an important tool they are using today ($n = 9$; Table 2). This includes working with state and national legislatures. Noah said, "On the funding side, we are tracking the Recovering America's Wildlife Act (national legislation). That would be a game changer for us." Further, Franklin said, "We've got to continue lobbying for (wildlife) education." Finally, decision makers listed using land acquisition to address current challenges ($n = 9$; Table 2). Raymond said, "We have a land acquisition committee, and every meeting we are acquiring land and we do have executive sessions once a year about what we want to do for the year and how we are going to do it. We are not out there just buying land because it is available, (we are) making sure it works together in the ecosystem." Similarly, Hunter said, "It's not just (a) buy the land model but we have a conservation easement program where landowners give the development rights of their properties and that's habitat conservation."

Discussion

Decision makers' relatively high levels of concern about the lack of funding and the decrease in relevancy of wildlife agencies may reflect both their lengthy experience working in wildlife conservation and a pragmatic response to their professional imperative to ensure functional wildlife agencies persist. Decision makers by virtue of their positions, however, are focused on the means for achieving conservation objectives through well-funded and functional wildlife agencies. This perspective from decision makers may prove valuable for anyone involved with wildlife conservation. Indeed, understanding of how to reduce biodiversity loss gained through decades of scientific research has far outpaced the capacity to carry out the required actions (Holling and Meffe 1996, Vucetich et al. 2017). Based on the perspectives highlighted in this study, conservation planning may benefit more from a focus on the development of strategies to generate funding and public support for agencies than on the traditional emphasis on natural science aspects of wildlife conservation. In other studies, both the public and professionals identified fundamental objectives such as reducing invasive species populations and slowing extinction as the focal wildlife conservation challenges (Brown et al. 1992, Sharp et al. 2017). The public, however, has less long-term experience with wildlife conservation than decision makers, and is free from the responsibilities of running wildlife conservation agencies.

The funding and relevancy focal areas, however, present a challenge for decision makers because they only control funding streams from a small and decreasing public sector. Directors and supervisory board members typically have little influence over allocation of any tax revenue except that generated from sales of firearms, ammunition, fishing equipment and boat fuel (Echols et al. 2019). Given this context, decision makers recent efforts to reorganize agencies to focus on R3 for hunters, anglers, and shooting sports seems intuitive (Price Tack et al. 2018) but may also present challenges for the parallel goal of increasing agency relevancy among the general public. The diverse R^3 strategies being rolled out by state wildlife agencies include promoting women in the outdoors (Stange 1998, Bosteder and Appleby 2015), youth recruitment (Price Tack et al. 2018), and employing marketing strategies to nonresident hunters (Olson 2012). These actions all have merit, but do not focus on reaching out to growing segments of the populations including ethnic and racial minorities, bird watchers, and wildlife photographers (Parrado and Kandel 2010, Ma et al. 2013, Hanisch et al. 2019).

Directors and board members may value improving agency relevancy differently because directors are typically wildlife professionals, whereas supervisory board members are typically political

appointees representing well-established wildlife interest groups. This could be viewed as a rational organizational structure since supervisory boards were typically established during a client-focused era of wildlife management, with the assumption that board members would understand interests of hunters and anglers and ensure they were met by agency professionals (Leopold 1933, Decker et al. 1996, Peterson and Rodriguez 2012). Relevancy is clearly not an issue for the traditional clients represented by board members. Agency directors, however, must coordinate daily activities of agencies (Wildlife Management Institute 1987) with impacts on diverse stakeholders including hunters and anglers (Schroeder et al. 2017), bird watchers (Ma et al. 2013), and wildlife photographers (Hanisch et al. 2019).

Our study indicates that decision makers and the larger conservation community share concern for the increasing numbers of imperiled species and increasingly widespread invasive species (Miller and Jones 2005, Meuser et al. 2009, Morse-Jones et al. 2012, Takahashi et al. 2012, Veríssimo et al. 2014). Agency work focused on imperiled and invasive species may be fertile ground for solutions that include new partnerships and more diverse stakeholders. Some well-known partnerships including the Tushar Allotments Collaboration, La Sal Sustainability Collaboration, Three Forests Collaboration, and the Grazing Lands Conservation Initiative provide preliminary support for this approach (Goodwin and Moseley 2012, Straube 2017). Because invasive species create economic harm (Holmes et al. 2009), their management may be conducive to building bridges and partnerships between stakeholders who share the burden of invasive species damage (Harper et al. 2016). For example, feral hogs were mentioned by both directors and supervisory board members as a significant concern, a perspective that is aligned with that of the public (Adams et al. 2005, Grady et al. 2019), row crop producers (Harper et al. 2016), livestock producers (Adams et al. 2005), hunters (Grady et al. 2019), and both game and non-game focused wildlife NGOs (Brown et al. 1992, Miller and Jones 2005). Engagement in this arena may help promote partnerships and agency relevancy even if attempts to control the invasive species ultimately fail. However, this approach can be expanded to other species management plans, especially for multistate populations.

Decision maker perceptions of conservation challenges and solutions likely emerge from their obligations to address financial, political, and logistical aspects of agency operations. Explicitly acknowledging decision space constraints imposed by decision makers' obligations to operate an agency may reduce frustration among scientists and partitions who naturally focus more on science associated with wildlife populations and implementation issues.

Supervisory board members might report less concern about relevance and past funding needs than agency directors due to the nature of the different positions. Supervisory board members are intended to represent the public of their state, whereas directors face more responsibilities associated with keeping the agency running. Central challenges surrounding inadequate conservation funding and declining relevance of agencies can only be addressed by engagement with state legislatures and stakeholders, the purview of board members, yet board members were less concerned about these issues than directors. These findings suggest education and outreach with board members may be essential as state wildlife agencies work to address funding and relevancy challenges. Such training must be repeated as board members rotate based on appointments and have other careers. Finally, this study suggests invasive species and disease management initiative may be particularly amenable to consensus among decision makes and effective initiatives for building conservation partnerships.

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