A Web-Based Approach to Stakeholder Analysis for Identifying and Understanding Broader Constituencies in Wildlife Conservation

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ABSTRACT

Shifting social and ecological contexts for conservation in North America have highlighted that wildlife agencies must engage with broad constituencies to achieve their missions. Responding to limitations in practitioner capacity to find, understand, and plan for engagement with a broader array of stakeholders, we developed a web-based method for stakeholder analysis and used it to identify and describe the activities of 214 organizations, including businesses, nongovernmental organizations, and local, state, and federal entities, that promote wildlife viewing in Virginia. We found that the majority of these stakeholders provide social opportunities and informational resources related to wildlife viewing. We also identified geographic and programmatic gaps that informed strategic planning within the state wildlife agency for meaningful engagement with wildlife viewers as a growing constituency. This project demonstrates the ability of web-based stakeholder analysis to generate inclusive and actionable insights about relatively new and unfamiliar stakeholders for natural resource management.

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Introduction

The social and ecological context for wildlife management and conservation are shifting across the United States and Canada. Ongoing urbanization has contributed to changes in human values and experiences related to wildlife, with direct consequences for relationships between segments of the public and wildlife agencies (Manfredo et al. 2017). Meanwhile, declining hunting license sales and increasing rates of participation in other forms of outdoor recreation (USDOI 2018) has prompted exploration of new avenues for funding agency conservation efforts in the future (Dunfee et al. 2019). These changes have drawn increased attention to the role of nontraditional constituencies in the success of wildlife agencies, and resulted in calls for consideration and inclusion of more diverse beneficiaries in agency planning and governance (Decker et al. 2016; Dunfee et al. 2019). Broader engagement is consistent with the notion that natural resources are a public trust (Decker et al. 2016) and essential if public agencies are to...
continue to fulfill their mandates and missions (Bryson 2004). However, substantial barriers constrain engagement between wildlife agencies and the diverse beneficiaries of wildlife management, including limited agency “capacity to identify, understand, engage with, and serve” groups beyond traditional hunting and angling constituencies (Dunfee et al. 2019, p. 40). In this paper, we report on our use of a web-based social science method to find and explore the interests and activities of organizations that support wildlife viewing (hereafter, wildlife viewing organizations), to inform state agency efforts to plan for meaningful engagement with this growing constituency. We provide an overview of the method we used and demonstrate the value of this approach for other natural resource agencies and organizations seeking to understand and engage with new stakeholders.

**Stakeholder Analysis**

A wide variety of tools have been developed for systematically identifying, describing, categorizing, and studying the relationships between stakeholders – individuals or groups that are likely to impact or be impacted by a particular action or decision (Schmeer 1999). Approaches to stakeholder analysis begin, often implicitly, with defining the boundaries of the issue so that actors with a stake in that issue can be identified and their particular positions described (Reed et al. 2009). Information about stakeholder interests in, perceptions of, and power to shape the issue is then organized to inform strategic stakeholder engagement (Bryson 2004). Stakeholder identification and description can be participatory, involving direct interaction with stakeholders through interviews, surveys, or focus groups, or non-participatory, conducted using secondary information (Reed et al. 2009). While participatory analysis can yield rich insight into the social context of natural resource management decisions (e.g., Rastogi et al. 2010), many practitioners lack time and resources to collect in-depth, primary social science data (Reed et al. 2009). Non-participatory approaches, which rely on brainstorming, written records, or expert solicitation (Chevalier and Buckles 2008), offer an alternative, but existing methods are most appropriate when those conducting the analysis have extensive knowledge of the array of possible stakeholders (Reed et al. 2009). Even then, stakeholder identification methods that rely heavily on the experience or intuition of natural resource managers may result in cognitive or institutional “blind spots” that prevent the inclusion of unexpected stakeholders (Colvin et al. 2016).

Inclusive techniques are needed that generate accurate and actionable insights about unknown stakeholders through methods that are low-cost, easy-to-use, broadly accessible (Reed et al. 2009), and scientifically robust (Colvin et al. 2016). Historically, direct methods of collecting information about stakeholders were essential because so little secondary information was available (Schmeer 1999). However, with the dramatic rise in internet use, material published on websites provides a valuable source of secondary information about stakeholders, particularly organizations (Kim and Kuljis 2010). Systematic analysis of web content has the potential to address some of the limitations of typical approaches to stakeholder analysis by allowing natural resource agencies and organizations to identify and explore the interests of new stakeholders using information readily available online.
Case Study

Consistent with social trends across the United States, a substantial and growing portion of Virginia residents participate in birdwatching and other forms of wildlife viewing, including feeding, observing, or photographing wildlife (USDOI 2018). In response to these trends, and in support of its initiative to recruit, retain, and reactivate participants in outdoor recreation and wildlife conservation, the Virginia Department of Wildlife Resources (DWR), in collaboration with researchers at [university redacted], initiated a social science study and participatory planning process in 2018 designed to help the agency better serve wildlife viewers in the state. A Stakeholder Advisory Committee representing 20 wildlife viewing groups and a Technical Advisory Committee of 18 DWR staff (hereafter, advisory committees) collaboratively developed a Wildlife Viewing Plan to guide the activities of the DWR related to wildlife viewing for the next 10 years. This process was supported by data collected on wildlife recreationists in the state from qualitative focus groups (citation redacted), quantitative surveys (citation redacted), and the web-based stakeholder analysis presented here. Focus groups and surveys explored the interests and experiences of individual wildlife viewers, while this stakeholder analysis focused on activities occurring at the organizational level and generated insight into the priorities of the many wildlife viewing organizations that were not represented on the Stakeholder Advisory Committee. Specifically, we explored (1) the characteristics of wildlife viewing organizations in Virginia; (2) how these stakeholders engage with wildlife; and (3) their involvement in conservation activities.

Methods

We conducted a web-based stakeholder analysis to identify and describe the interests and activities of organizations that participate in or support wildlife viewing in Virginia using the following five steps (Figure 1).

Step 1: Establish a Sampling Frame

Consistent with the first step of stakeholder analysis (Reed et al. 2009), we first established a sampling frame by determining criteria that must be met for organizations to be included in analysis. We limited our analysis to organizations and groups that actively participate in and/or promote wildlife viewing in Virginia, for at least part of their activities. We defined wildlife viewing as intentionally observing, photographing, interacting with, or collecting data on wildlife and plants and visiting parks and natural areas because of wildlife. This definition expands upon the definition of “wildlife watching” used in the National Survey of Fishing, Hunting, and Wildlife-Associated Recreation (USDOI 2018) to explicitly include wildlife-related data collection, such as participatory and citizen science (hereafter, citizen science). We further limited our sample to organizations that (1) have a physical location or mailing address in Virginia; (2) host or promote activities related to wildlife viewing in Virginia at least monthly; and (3) possess a website that had been updated within the past year at the time of the study (as of June 2019). We included organization chapters and individual state and federal forests, parks, refuges, and management areas as separate entities because of the
variability in their capacity and level of activity related to wildlife viewing. We included citizen science projects under their parent organizations.

**Step 2: Systematically Search for Stakeholders**

We began identifying wildlife viewing organizations through brainstorming by individuals involved in the planning process for the DWR’s Wildlife Viewing Plan. Our list initially included the organizations represented by members of the Stakeholder Advisory Committee and additional organizations identified as wildlife viewing stakeholders by the advisory committees. We subsequently completed a systematic Google search in an effort to generate a list of all organizations that support wildlife viewing in Virginia. We developed sets of search terms to identify local (county or independent city) government agencies, non-governmental organizations (NGOs), and businesses with a connection to wildlife viewing (Table 1). Additionally, to ensure the inclusion of state and federal government agencies that promote wildlife viewing, we searched the websites for...
all federally- and state-designated public lands in Virginia. Organizations that met the three inclusion criteria defined in Step 1 were included in the analysis.

### Step 3: Determine Stakeholder Attributes of Interest and Develop Codes

We determined a set of organizational attributes to analyze based on needs for the DWR’s Wildlife Viewing Plan. For each of these attributes, we developed codes that would allow us to consistently collect this information for each wildlife viewing organization in Virginia and to later analyze that information quantitatively. We created an Excel spreadsheet with rows for each organization identified in Step 2 and columns for (1) the location of the organization’s headquarters; (2) regions of the state in which the organization is active, based on the areas served by the DWR’s four regional offices; and (3) the taxa of interest to the organization (e.g., birds, marine mammals, or wildlife in general). Reflecting the search terms described in Step 2, we defined codes (and spreadsheet columns) for organization type, including federal, state, or local agency, business, and NGO. We also defined codes for the types of wildlife interactions promoted by organizations, including handling or feeding, photographing, and observing or collecting data on wildlife. Because some individual birders and other wildlife viewers also hunt or fish (Cooper et al. 2015), we added a code for whether wildlife viewing organizations also promote hunting or angling, to explore whether this recreational overlap is reflected at an organization level.

Finally, we developed codes for organizations’ conservation activities using three of the domains of pro-environmental behavior described by Larson et al. (2015): environmental citizenship, which refers to contributing to wildlife conservation financially or politically; land stewardship, which primarily entails enhancing wildlife habitat; and social engagement, which includes interacting with, informing, or inspiring others related to wildlife conservation. Focus groups with wildlife viewers in Virginia (citation redacted) and a planning meeting for the DWR’s Wildlife Viewing Plan highlighted the importance of citizen science and other monitoring efforts as a distinct arena of conservation activity within the wildlife viewing community, so we added a code for data collection. Additionally, preliminary analysis of websites indicated that many organizations distribute material resources in support of wildlife viewing and conservation, so we created a resource allocation code as well.

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**Table 1. Search strategies used for each type of organization during stakeholder identification.**

<table>
<thead>
<tr>
<th>Organization Type</th>
<th>Online Search Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Federal agencies</td>
<td>Searched websites for all federally-designated lands in Virginia, including national parks, wildlife refuges, and national forests</td>
</tr>
<tr>
<td>State agencies</td>
<td>Searched websites for all state-designated public lands in Virginia, including state parks, wildlife management areas, and state forests</td>
</tr>
<tr>
<td>Local (county or independent city) agencies</td>
<td>Searched the name of each individual county or independent city in Virginia AND: wildlife viewing OR wildlife</td>
</tr>
<tr>
<td>Non-governmental organizations (NGOs)</td>
<td>Searched Virginia AND: wildlife, organizations, nonprofit, viewing, outdoor, nature, club, minority, wildlife, watching, viewing, birding, photography, high school, AND/OR youth</td>
</tr>
<tr>
<td>Businesses</td>
<td>Searched Virginia AND: store, bird, supplies, binocular, camera, wildlife, guide, tour, ecotour, viewing, southwest, photography, AND/OR nature</td>
</tr>
</tbody>
</table>
**Step 4: Collect Stakeholder Information from Websites**

Data collection was conducted by a researcher who searched each organizational website identified in Step 2 for the categories of data defined in Step 3. Information about organization characteristics and recreation activities were recorded directly into our spreadsheet. Website pages that contained information about an organization’s conservation activities, such as the organization’s projects, calendar, list of events, or donations page, as well as pages titled, for example, “What We Do” or “About Us,” were downloaded as PDFs for more detailed coding. In cases where a second website page contained only information already completely captured in other pages, only one page was downloaded.

**Step 5: Analyze and Summarize Data**

We imported all PDFs downloaded from organization websites into Dedoose (Version 8.2.14. 2019), a relatively low-cost and easy-to-use web application for qualitative analysis. A researcher scanned the PDFs for evidence of the five domains of conservation activities defined in Step 3. This deductive coding, in which categories are predetermined, was combined with inductive coding, in which codes are determined and iteratively adjusted while exploring the data (Rivas 2012), in order to capture more detail about specific conservation activities conducted or promoted by wildlife viewing organizations. Two subcategories of social engagement – engaging youth and engaging Black, Indigenous, and other people of color (BIPOC) – were defined in advance because they were identified as priorities for the DWR’s Wildlife Viewing Plan. These codes and data on their presence or absence on each organization’s website were added to our existing Excel spreadsheet for analysis. We then quantified and summarized the distribution, recreation activities, and conservation activities of wildlife viewing organizations in Virginia.

**Results**

**Stakeholder Identification**

We initially identified 290 organizations as possible stakeholders for Virginia’s Wildlife Viewing Plan. We excluded 76 organizations from further analysis because they did not meet our inclusion criteria related to their physical location, recent activity, or website status. Of the remaining 214 organizations, 20 were the organizational affiliations of Stakeholder Advisory Committee members; 35 were identified through brainstorming by members of the advisory committees; and 159 additional organizations were identified through our systematic Google search.

**Organization Characteristics**

We identified 35 county and independent city government bodies (16% of organizations), 17 federal government agencies (8%), 15 state government agencies (7%), 36 businesses (17%) and 111 NGOs (52%), including clubs, nature centers, museums,
foundations, and conservancies, that met our criteria. Over twice as many organizations were headquartered or active in the coastal and northeastern metropolitan areas of Virginia than in the inland and more rural central and southwestern regions. The majority of organizations \((n = 153; 71\%)\) indicated a general interest in wildlife on their websites, and over five times as many organizations showed a specific interest in birds \((n = 69; 32\%)\) than in land mammals \((n = 12, 6\%)\), the second-highest category. Few organizations specifically mentioned a focus on or activities directed toward amphibians and reptiles \((n = 3; 1\%)\), fish \((n = 6; 3\%)\), or insects \((n = 6; 3\%)\).

**Recreation Activities**

Among the organizations we analyzed, 149 (70%) were involved in wildlife observation or data collection, 42 (20%) engaged in or promoted handling or feeding wildlife, and 37 (17%) participated in or supported wildlife photography. Handling wildlife was done almost entirely within the context of herping, which refers to searching for reptiles and amphibians, or by agencies that handle wildlife for research or management purposes. Feeding wildlife primarily applied to organizations that support feeding birds. Hunting and/or angling activities were promoted by 66 (31%) of the Virginia wildlife viewing organizations included in our study; the majority of these organizations (94%) were government agencies at the local, state, or federal level.

**Conservation Activities**

Our analysis of organizations’ conservation activities showed that wildlife viewing organizations in Virginia most commonly participated in some form of resource allocation \((n = 180, 85\%)\) (Figure 2). This principally included providing online information about wildlife and wildlife viewing, but also included offering products or services and grants and scholarships. The majority of organizations were also involved in forms of social engagement \((n = 167, 79\%)\). For 40% \((n = 86)\) of organizations, social engagement included a specific focus on programming for youth. Only 3 organizations (1%) described any specific engagement with BIPOC. Land stewardship activities were conducted or promoted by 47% \((n = 100)\) of organizations; ten times as many organizations managed wildlife habitat on public lands \((n = 72, 34\%)\) compared to private lands \((n = 6, 3\%)\). Over a third of organizations in our analysis \((n = 80, 38\%)\) participated in data collection, with most focused on collecting data on wildlife, rather than habitats or environmental conditions. Wildlife viewing organizations demonstrated the least involvement in environmental citizenship, with only 45 (21%) directly engaged in advocating or fundraising for conservation causes.

**Discussion**

In response to shifting patterns in outdoor recreation, wildlife agencies are turning their attention to broader constituencies in order to increase their relevance, fulfill their public trust mandates, and advance conservation (Dunfee et al. 2019). In 2019, the Association of Fish and Wildlife Agencies (AFWA) and Wildlife Management Institute
released a guidance document entitled *Fish and Wildlife Relevancy Roadmap: Enhanced Conservation Through Broader Engagement*, which lays out a possible, but largely untested course for state and provincial agencies interested in engaging with new or less familiar demographic and recreation groups (Dunfee et al. 2019). Responding to the call for agencies to share their experiences implementing the Roadmap (Dunfee et al. 2019), we have described our use of a web-based approach to stakeholder analysis and its value in guiding the Virginia DWR as the agency seeks to deepen its engagement with wildlife viewers. Below, we elucidate how this analysis has informed planning within the DWR and suggest how a web-based approach might be used by other natural resource agencies and organizations to identify and serve relatively new and unknown stakeholder groups.

![Figure 2](image_url)

**Figure 2.** Participation of Virginia wildlife viewing stakeholders in 5 domains (on left) and sub-categories of conservation activities (on right), as determined by analysis of websites. Individual organizations participated in multiple domains and sub-categories, so totals do not sum to 100%.
Understanding and Engaging with Broader Constituencies

We found that a web-based approach to stakeholder analysis enabled the identification and description of over 200 stakeholders from a constituency with which the DWR had relatively limited experience. Reed et al. (2009) have cautioned that non-participatory methods for stakeholder analysis, which generally rely on the social networks and knowledge of analysts and participants, can be exclusionary and reinforce biases about which actors are most relevant to an issue. Common methods for stakeholder identification, in particular, can result in the persistent inclusion of only the “usual suspects” in stakeholder processes (Colvin et al. 2016; Reed 2008). However, through a systematic Google search, we identified 159 wildlife viewing organizations that were not previously identified through brainstorming by agency staff and stakeholder groups involved in drafting Virginia’s Wildlife Viewing Plan. This suggests that a web-based approach has the potential to be more inclusive than other non-participatory methods. Using only websites, we consistently found and collected data on organizations’ locations, taxa of interest, interactions with wildlife, and conservation activities. Resulting insight into the breadth of wildlife viewing organizations in Virginia and the resources and activities they provide has informed how DWR staff approach their role in supporting wildlife viewers and has been valuable in the development of the agency’s Wildlife Viewing Plan. Combined with data on individual wildlife viewers in the state, this web-based stakeholder analysis helped the advisory committees identify priorities that reflect the interests of the breadth of wildlife viewers and recommend engagement strategies that will complement, not duplicate, programs and services offered by other entities.

By generating information on the identity and stakes of the many actors connected to a given issue, stakeholder analysis allows agencies to plan strategically to provide public value (Bryson 2004). Given limitations in the resources available to most wildlife agencies, meeting the needs of a broader swath of the public will require capitalizing on the expertise and capacity of partner organizations that represent and serve target constituencies (Dunfee et al. 2019). Working collaboratively can allow agencies to pool their resources with other organizations; it can also contribute to conflict resolution between groups with competing interests; facilitate enduring and socially-supported solutions to conservation issues; and improve management decisions through knowledge sharing (McNeely 1995). For example, our analysis indicated that the majority of organizations that support wildlife viewing in Virginia are providing online resources about wildlife and wildlife viewing, and many are leading educational workshops and wildlife viewing trips. The advisory committees for the DWR’s Wildlife Viewing Plan thus recommended that the agency work with partners to expand distribution and promotion of the abundant resources already available and add value to existing activities. Partnerships can also help agencies connect to existing volunteer networks. The organization list generated through our analysis will be used by agency staff to recruit new groups for the DWR’s Adopt-a-Trail program, through which volunteers from partner organizations monitor and report on conditions at Virginia’s statewide Bird and Wildlife Trail sites.

The insights from our web-based stakeholder analysis identified geographic and programmatic gaps in services for target constituencies that the DWR could address. For example, we found that approximately twice as many wildlife viewing organizations are
active in the eastern portion of Virginia compared to southern and western regions. This trend mirrors the distribution of human population in the state, but indicates that additional programs for wildlife viewing or citizen science may be needed to engage people with the unique habitats and wildlife populations in southwestern Virginia. Cognizant of these geographic gaps, the DWR’s Wildlife Viewing Plan emphasizes the need for statewide implementation that engages wildlife viewers in both urban and rural areas across Virginia. Our analysis also revealed considerable gaps in the provision of programs that specifically support wildlife viewing among BIPOC. The first goal of Virginia’s Wildlife Viewing Plan focuses on engaging diverse Virginians with wildlife and wildlife viewing, including underrepresented ethno-racial groups. Strategies under this goal guide the agency to develop strategic partnerships with organizations that already connect BIPOC to the outdoors; enhance the accessibility of DWR lands, programs, and resources for underrepresented groups; and emphasize cultural competency and diversity and inclusion in agency hiring and training.

The need for strategic planning based on knowledge of stakeholder activities extends to agency conservation efforts, since conservation is achieved as a mosaic of organizations and efforts (Vance-Borland and Holley 2011). Our stakeholder analysis indicated low levels of engagement by Virginia’s wildlife viewing organizations in political support for conservation, data collection and monitoring efforts that directly inform the work of the DWR, and the management of private lands and wildlife populations. The advisory committees for the Wildlife Viewing Plan developed potential tactics the agency could employ to address each of these gaps, including simply communicating about the value of voting and advocacy as behaviors that support wildlife conservation; working with DWR biologists to develop citizen science projects that are aligned with agency data needs and mechanisms for incorporating data generated by citizen scientists in DWR decision-making processes; and expanding the agency’s habitat education program as a way to engage businesses, private landowners, and schools with wildlife viewing, wildlife conservation, and the DWR.

**Organizational-Level Insights**

This web-based stakeholder analysis was one component of a larger wildlife recreation study that also included focus groups and a mixed-mode online and mail survey with wildlife recreationists in Virginia. Use of multiple methods generated both organizational and individual-level insights, and allowed triangulating them for richer understanding of wildlife viewers. Specifically, our analysis adapted domains of conservation behavior that have typically been applied to individuals (Larson et al. 2015) to wildlife viewing organizations, in order to explore conservation activities undertaken at an organizational level. Although the level of analysis was different, like Larson et al. (2015), we found that social engagement and land stewardship activities were most common, while organizations were less often engaged in environmental citizenship activities. These patterns were likewise consistent with the findings of focus groups (citation redacted) and surveys (citation redacted) conducted with individuals as a component of the DWR’s planning process.
Building on studies that have shown that individual wildlife viewers also participate in hunting (Cooper et al. 2015), our web-based stakeholder analysis also confirmed overlap between wildlife viewing and hunting and angling activities at an organizational level. However, almost all of the organizations we identified in Virginia that promote hunting and angling as well as wildlife viewing were federal, state, or local agencies that focus on local tourism or operate public lands. Agencies thus appear to have unique experience providing programs and services that support multiple forms of wildlife-associated recreation. The advisory committees for the DWR’s Wildlife Viewing Plan recommended increased collaboration and information sharing across agencies to enhance collective understanding of how to best serve multiple recreation groups, which may have different values and interests related to wildlife.

**Strengths and Limitations of Web-Based Stakeholder Analysis**

A web-based approach to stakeholder analysis provides a relatively simple, low-cost method for systematically discovering, understanding, and planning for engagement with broader constituencies at the organizational level. This approach can likely be accomplished with existing technological and staff capacity as it requires minimal materials; with the exception of our analysis of organizational conservation activities, all data were analyzed using an Excel spreadsheet, without the need for an expensive or more complicated program. This technique allows researchers and managers to assess stakeholders’ interests from any distance using content created by the organizations themselves. We also found that, with mentoring, it is an appropriate project for an intern or technician.

While our focus was on identifying organizations that currently support wildlife viewing, web-based stakeholder analysis could also be used to identify organizations who have interests that align with wildlife conservation, but are not currently engaged as conservation stakeholders. For example, our analysis found only three organizations that explicitly promote wildlife viewing among BIPOC. Different search terms could be used to identify organizations that serve BIPOC without a focus on wildlife, such as environmental justice groups and community groups in areas with a larger proportion of BIPOC, which could be important partners for achieving the goals and objectives of the DWR’s Wildlife Viewing Plan related to BIPOC. Web-based analysis thus promises to be a beneficial first step for natural resource agencies and organizations seeking to forge creative partnerships with entities outside of the “usual suspects” for conservation (NABCI 2021) and communicate the relevance of wildlife conservation to broader segments of the public (Dunfee et al. 2019).

Still, there are limitations to a web-based analysis for holistic understanding of stakeholders. First, our search strategy was unable to identify organizations without an active website, such as those that only had social media pages, because these pages are not easily found using Google search terms. Thus, like other non-participatory methods of stakeholder identification, the web-based approach we used likely excluded smaller organizations that are already at risk of being marginalized (Reed et al. 2009). Alternative search strategies could be developed to increase inclusion of these groups, for example, through targeted searches of Facebook or Twitter. Additionally, the quality
of the information gathered in a web-based analysis depends heavily on website quality, which is a factor of how up-to-date, accurate, and complete website information is (Hasan and Abuelrub 2011). Thus, while a web-based stakeholder analysis is a valuable starting place, the robustness of its conclusions can be increased by triangulating the analysis with other sources of information about new constituencies, as we did with focus groups and surveys. However, use of multiple methods requires additional cost and time, and, depending on the scope of the issue and the number of identified stakeholders, a stakeholder analysis alone can be time-consuming; our analysis was a full-time commitment for a summer intern.

Perhaps most importantly for engaging with broader constituencies, a web-based approach to stakeholder analysis does not build relationships between identified stakeholders and agencies, as can be achieved with participatory methods (Reed et al. 2009). Working with stakeholders identified through a web-based analysis may thus require additional investments of time and energy to establish the trust necessary for effective partnerships (Stern and Coleman, 2015). We conducted this analysis in an effort to represent the interests of groups that were not involved in an ongoing planning process with stakeholders. Alternatively, a web-based stakeholder analysis could be used before the engagement phase to identify groups or individuals for inclusion that are representative of the diversity of stakeholders or to determine the fundamental purpose of the process itself (Reed et al. 2009). Either way, in order to develop conservation and recreation plans that are relevant to the interests of diverse constituencies, web-based stakeholder analysis must be combined with meaningful stakeholder engagement that provides constituent groups with a voice in decision-making.

**Conclusion**

Both the scholarship and practice of stakeholder engagement have identified a need for economical and broadly accessible methods for stakeholder analysis that can generate robust and actionable insights about stakeholders, particularly those who are unfamiliar and unexpected in natural resource management. Working with the Virginia DWR, we developed a web-based approach to stakeholder analysis in order to find and understand organizations that serve wildlife viewers, a relatively new and growing constituency for the agency. Insights from this stakeholder analysis, triangulated with data from focus groups and surveys, helped the DWR set priorities, identify potential partners, and establish data-driven goals, objectives, and strategies for increasing participation in wildlife viewing in Virginia and enhancing engagement between viewers and the agency. As this practice-based experience demonstrates, web-based stakeholder analysis is a valuable starting point for natural resource agencies and organizations as they navigate shifting social and ecological conditions and work to connect more people to wildlife and the outdoors.

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Data availability statement

The dataset generated through this study is available from the corresponding author, JCB, upon request.

Note: The findings and conclusions in this article are those of the authors and do not necessarily represent the views of the U.S. Fish and Wildlife Service.

References


