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Best Available Science and Imperiled Species Conservation: Challenges, Opportunities, and Partnerships

US Fish and Wildlife Service Region 4 Workshop Summary: A Business, Government, and NGO Dialogue

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RESOURCES FOR THE FUTURE

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Abstract

This document reports on a March 2015 dialogue among businesses, NGOs, and federal and state conservation agencies focused on Endangered Species Act listing decisions and programs in the southeastern United States. Over the next decade, a large fraction of the nation's species listing decisions will be made in the Southeast, where a large number of aquatic species may be at risk. Also, private sector land and water use plays a particularly important role in both potential threats to species and opportunities for conservation and recovery in the region. Participants described the volume and timing of Region 4 listing decisions, identified science gaps pertinent to those decisions, identified ways to maximize the decision relevance and benefits of science investment given limited financial resources and tight time frames, and assessed the possibility and virtues of science collaboration within the private sector and between the private sector and the US Fish and Wildlife Service.

Key Words: Endangered Species Act, endangered species, species listing, species recovery, landscape-scale conservation

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US Fish and Wildlife Service Region 4 Workshop Summary: A Business, Government, and NGO Dialogue

James Boyd and Rebecca Epanchin-Niell*

1. Introduction

This document reports on a dialogue convened to address science challenges associated with Endangered Species Act (ESA) listing and recovery decisions and to explore scientific collaboration between government agencies and the private sector in the southeastern United States.[1] This dialogue, held in Atlanta in March 2015, focused on ESA issues and programs in US Fish and Wildlife Service (FWS) Region 4, which encompasses 10 states stretching from the Appalachian Mountains south to the Caribbean islands and west to the Ozarks, including the southern half of the Mississippi River basin. Participants were drawn from businesses and federal and state practitioners active in the region.

As the primary agency charged with implementing the ESA for terrestrial species, FWS is confronting workload challenges resulting from impending deadlines for candidate species listing actions in response to a multidistrict litigation settlement (MDLS) reached in 2011. Under the MDLS, the agency agreed that by the end of fiscal year 2016 it would make final listing determinations for 251 candidate species and, to the extent practicable, make critical habitat designations for those proposals. Beyond 2016, FWS will face hundreds of additional "petitioned" listing determinations. In fact, more than 600 post-2016 listing determinations have already been identified. These timetables, for both candidate and petitioned species, present a significant scientific and practical challenge for FWS, given its limited staff and financial resources.[2] They also present challenges and opportunities for the regulated community,

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[1] The Electric Power Research Institute (EPRI) and the National Council for Air and Stream Improvement (NCASI) provided financial support for the dialogue.

[2] Nationally, the FWS budget for listing decision analysis is approximately $25 million per year.

including land and natural resource owners and managers whose own data and analysis could and should be brought to bear on conservation, listing, and recovery plans. As part of its strategy for conserving the many petitioned species, FWS is reaching out to concerned parties and seeking their help. If species are being conserved to the point where they are not endangered or threatened with becoming endangered, they will likely not warrant listing under the ESA.

At a meeting hosted by Resources for the Future (RFF) in 2014, particular attention was drawn to ESA implementation in FWS Region 4, for several reasons.[3] First, Region 4 accounts for approximately 24 percent of the national listing determinations required under the MDLS (through 2016). Even more significantly, after 2016, Region 4 will be required to make listing determinations for 343 additional species, representing 60 percent of the nationwide post-MDLS total. This has implications both for FWS staff and for the private sector. Second, the region's tremendous aquatic biodiversity[4] accounts for a correspondingly large number of aquatic species at risk from a variety of anthropomorphic influences. A large proportion of Region 4's future determinations will be for aquatic species. Third, private sector land and water use in the Southeast plays a particularly important role in both potential threats to species and opportunities for conservation and recovery. Fourth, Region 4 has a notable track record of working with private sector partners on natural resource conservation and restoration.

Given the challenges facing Region 4 and its interest in innovative collaboration opportunities, RFF, the Electric Power Research Institute (EPRI), and the National Council for Air and Stream Improvement (NCASI) engaged regional experts and practitioners to address the following goals:

- describe the volume and timing of Region 4 listing and recovery decisions;
- identify science gaps pertinent to candidate and petitioned species protection, listing, and recovery;
- explore the role of multiple-species protections and landscape-scale conservation science in ESA implementation;

[3] See www.rff.org/Publications/Pages/PublicationDetails.aspx?PublicationID=22474.

[4] As an example of the region's aquatic biodiversity, 76 fish species are found in a relatively small watershed in Georgia (the Conasauga), whereas only 25 fish species are found in the entire Colorado River watershed.

- identify ways to maximize the decision relevance and benefits of science investment, given limited financial resources and tight time frames; and
- assess the possibility and virtues of science collaboration within the private sector and between the private sector and FWS.

The dialogue included 50 participants identified and recruited by the organizers, with representation weighted toward FWS and business sector practitioners. Participants and their affiliations are listed in Appendix A.

Participants were reminded that the meeting's purpose was not policy, legal, or political discussion of the ESA, but rather identification of practical, science-based conservation strategies to inform and improve ESA listing decisions. The agenda featured several presentations from FWS Region 4 staff about court-ordered deadlines, existing case workloads, and associated FWS science priorities and plans, including the listing work plan. The agenda also featured presentations from business leaders on their approach to ESA-related science and examples of successful science-based species conservation. The workshop agenda appears in Appendix B.

2. Overview of the Listing Process

There are two listing processes, the petition process and the candidate assessment process. Under the *petition process*, nonfederal organizations and individuals may petition FWS to list a species. FWS then has 90 days to decide whether the petition presents "substantial" information supporting the petitioned action. In terms of science collaborations and data sharing, it is important to note that during this 90-day review, FWS considers only data and analysis included in the petition or already on file with the agency.

Whether a petition presents substantial information depends on the amount and quality of information (either included in the petition or already available to FWS) pertaining to the following five "threat factors:" (1) the present or threatened destruction, modification, or curtailment of the species' habitat or range; (2) overutilization of the species for commercial, recreational, scientific, or educational purposes; (3) disease or predation; (4) the inadequacy of existing regulatory mechanisms; and (5) other natural or manmade factors affecting the species' survival.

If a petition is found to be substantial, FWS initiates a status review and publishes a "12-month finding" within 12 months of when the petition was filed. During this period FWS can consider a wider range of information provided by experts and stakeholders. Information needed

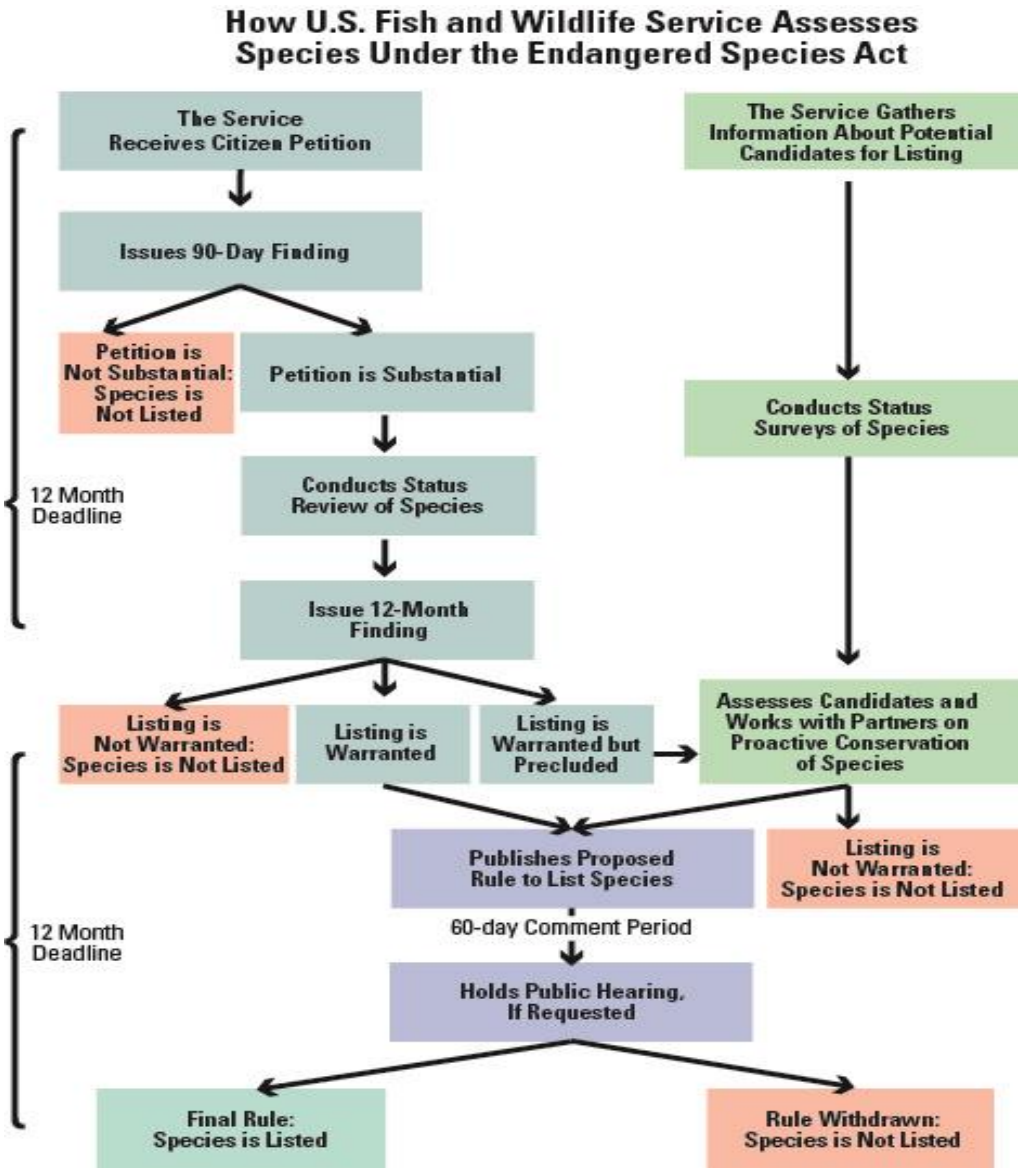
to make a listing decision includes data on the species' biology (such as its life cycle, genetics, current vs. historical range, and habitat requirements for breeding, food, and shelter), existing conservation efforts and agreements, and an assessment of the threats to the species. These threats are broadly categorized according to the five threat factors noted above. Species cannot be listed under ESA just because they are rare. A 12-month finding comes to one of three conclusions:

- Listing is not warranted.
- Listing is warranted. FWS publishes a proposed rule with a 60-day comment period and a final rule within 12 months of the "warranted" finding. The final rule may result in listing or not listing. Often, the 12-month warranted finding and proposed listing rule are published simultaneously.
- Listing is warranted but precluded. FWS may lack the time or resources to move to a proposed rule, comment, and final determination for certain species if, for example, other species are considered higher priority for a determination. In this case, FWS can "preclude" the finding. Species whose petitions are warranted but precluded are referred to as "candidate species."

FWS can identify candidate species on its own, without an external petition. Under this *candidate assessment process*, FWS decisions are in practice less tightly linked to the deadlines imposed by the petition process. However, candidate species are subject to their own findings and rule development deadlines. Figure 1 depicts these listing and assessment processes and their statutory deadlines. Despite the statutory requirements, the deadlines often are missed because of lack of resources and large numbers of petitions. Failure to meet deadlines has been a focus of ESA litigation, and the MDLS in particular.

Critical habitat designation is required as part of the listing process, so long as it is prudent and critical habitat is identifiable, or "determinable" in the ESA's statutory language. If critical habitat is not identifiable, FWS has 12 months to identify it. Areas can be excluded from critical habitat provided the benefits of exclusion outweigh the costs and the exclusion would not result in the extinction of the species, but the bar for such exclusions is high and they are relatively rare. Without a "federal nexus"—which arises when private sector actors receive federal funding or require federal authorization, such as permits or licenses for water use or land alterations—critical habitat designation does not directly affect businesses or private landowners.

Figure 1. FWS Listing Process



Collaboration Implications

The business sector can bring its expertise and science to bear throughout this process, though several things are worth noting. In the 90-day petition review, FWS can use only science already available in FWS. Thus, to have input on species that may be petitioned, the business community must be anticipatory and proactive, developing and providing information to FWS before petitions are filed. Furthermore, information provided by the business sector must be shared directly with *all* FWS field offices because the office that will handle a species' listing

process is not known in advance. Because of the difficulty of predicting the species likely to be petitioned, a more efficient use of resources may be to provide analysis in support of 12-month findings. FWS is willing and able to receive new analysis during that period, and determinations are now being scheduled for 343 species in Region 4 through fiscal year 2027. The 12-month finding process represents another opportunity for engagement and cooperation, with longer lead times.

3. Priority Setting

Given the large number of species (343) needing listing determinations in Region 4 post-MDLS, the biological and economic importance of these determinations, and the relatively scarce funding for analysis, FWS must set priorities for analysis and find efficiencies in the analysis process. The dialogue highlighted three pertinent mechanisms: species categorization for status reviews, species batching, and spatial targeting. All three priority-setting mechanisms present opportunities for collaboration between FWS and the business sector.

3.1 Categorization of Species

To manage its significant post-MDLS workload, Region 4 has partnered with states to categorize at-risk species. The categorization is designed to inform the region's work plan priorities through fiscal year 2027. Another motivation is to identify species amenable to conservation actions that may avoid the need to list a species. This review places species in one of the following four categories, based in part on the status of the science available to make a listing determination:

- *Category G (Good to Go):* species ready for "immediate" conservation action, with biology and habitat needs that are well understood, where threats can be abated, perhaps through for proactive conservation, and where listing may be avoided.
- *Category N (Not Ready Yet):* species for which population and/or other important biological or threat data are lacking but whose status could be determined through surveys or other research and for which listing may not be warranted.
- *Category U (Unknown):* species with major information gaps on their distribution, populations, habitat needs, threats, and overall status.
- *Category (List):* species for which even immediate conservation actions are unlikely to prevent the need for listing, and species for which ESA listing has already been found warranted and scheduled for rule development.

Currently, Region 4 considers 37 percent of its at-risk species to fall in categories G and N, 35 percent in category U, and 13 percent in category L. An additional 15 percent of species are not currently categorized.

This assessment helps identify analytical needs on a species-by-species basis, and also helps identify species for which more analysis and/or conservation actions could prevent federal listing. This is of clear relevance to the business community. The potential of this approach has been demonstrated by the withdrawal of petitions for seven species, based on information showing these species to be secure.[5]

Collaboration Implications

The species categorization for status review is important to FWS's own planning and can help stakeholders (including the business community) identify and target their own analysis and conservation investments. Region 4 is willing to make the categorization available to stakeholders and considers it subject to modification as new analysis becomes available. Categories are fluid and change as species distribution, population, and threats are documented. In other words, the business community is both an audience for the review and, via its own science input, a potential contributor to changes in species' categorizations.

FWS also invites its partners to review the list of at-risk species and identify where collaboration with the agency could lead to conservation efforts that reduce the risk of these species' becoming threatened, endangered, or extinct.

3.2 Species Batching

Region 4 is also developing ways to "batch" species analyses. Batching organizes species into portfolios based on similarity in habitat needs, biological traits, geography, and threats. The rationale is that certain kinds of analysis (e.g., analysis of threats in a given geography) could be simultaneously applied to a portfolio of species to streamline assessment. There is currently no formal batching guidance or method; rather, it is "what you make of it," given the relevance of certain kinds of data to different species.

[5] For example, for five crayfish species, an investment of only $62,000 in population surveys produced information that resulted in withdrawal of the petitions for those species.

Listings per se cannot be batched, however, because the ESA requires species-specific information on threats and status and listing determinations. Data on a "surrogate" species cannot be used to make decisions on other species. However, if the same threat (e.g., sedimentation in a particular watershed, or land-cover change in a particular area) affects multiple species, analysis of that threat can be applied to multiple species. Batching can also be applied to analysis of habitat conservation plans (as opposed to listing decisions). Batching based on habitat features, threats, and conservation at the six-unit hydrologic unit code (HUC) level was mentioned as "likely to be a fruitful approach."

Collaboration Implications

FWS staff suggested that productive foci for the business sector were habitat conservation plans, safe harbor agreements, and candidate conservation agreements with assurances, for which analysis of threats and conservation actions could be batched across multiple species. These mechanisms are discussed in Section 5.

3.3 Spatial Targeting

Spatial targeting involves a landscape-scale analysis of threats, conservation needs, and natural resource management effectiveness. By mapping and visualizing species' threats, habitats, existing conservation projects, and protected lands, spatial analysis can help FWS and the regulated community geographically "target" opportunities for cost-effective habitat protection and restoration projects and developed land uses that minimize species threats.

As an example, Region 4 has developed maps to help guide wind development projects in coastal North Carolina and Puerto Rico. The maps depict areas of greater and lesser species-related concern and in principle provide potential developers with information that can save time, reduce future land-use conflicts or permitting constraints, and identify potential mitigation projects. The maps use a green-yellow-red scheme, whereby green and yellow indicate lands relatively less likely to trigger ESA-related assessment or compliance issues for developers. The map does not carry any regulatory weight; rather, it is meant to provide some rough guidance to project developers.

The example is limited in a variety of ways, including its geographic scope, focus on wind energy projects, and inclusion of only migratory birds' and listed species' habitats and threats (petitioned and candidate species are not featured). However, it is illustrative of how spatial analysis can foster communication between FWS and the business community, help identify knowledge gaps, and potentially reduce costs of regulatory compliance. In principle, for

example, analogous maps could be developed for projects affecting aquatic and terrestrial and habitat.

Spatial targeting analysis is also being conducted by the private sector. One recommendation that emerged from the 2014 RFF meeting was "early identification by the regulated community (from the post-2016 work plan) of species whose listing would (1) be most economically significant and (2) affect groups of regulated businesses (due to similar kinds of operations, land holdings, or geographic location)." Building on this recommendation, EPRI has begun to explore how different industries are prioritizing species for attention, and with input from 11 companies in the energy sector, it is developing a method to identify "overlapping priorities" for those companies. A goal of the effort is to identify the most important, immediate science investments for the sector.

Some energy companies are already doing spatial mapping to identify potential avian mortality from electrocutions as input to electricity transmission expansions and other infrastructure siting.

Collaboration Implications

Spatial targeting is underexplored but potentially valuable to both FWS and the business sector. Particularly when married to categorization of species for reviews and work plans being developed by FWS, geographic analysis that brings together species habitat, threat, and conservation information with information on business sector land and water use (current and future) can help identify science priorities and collaborative opportunities within the business sector.

4. Data Sharing

The ways in which species data and analysis are collected, shared, and integrated into the listing process bear directly on the effectiveness and efficiency of ESA decisionmaking.

4.1 Federal Information Sources

FWS Region 4 provides several information resources of potential interest to the regulated community:

- the Candidate Conservation website, which has background on petitions and related conservation efforts (www.fws.gov/southeast/candidateconservation/examples.html);

- the At-Risk Finder, a database that allows users to sort hundreds of at-risk species in the Southeast by, for example, state, species range, and habitat type (www.fws.gov/southeast/candidateconservation/finder.html); and
- the Listing Workplan through 2015 (www.fws.gov/southeast/candidateconservation/PDF/SEListing2014.pdf).

Limitations to some of these resources were noted. For example, there is no national listing of petitioned species (though Region 4 posts lists of petitioned species on the Candidate Conservation website). Also, the species-specific data and analysis follow no standard format, and as yet most files are not digitized or available online. Another challenge is a lack of access to state species data.[6] Finally, although no internal "firewalls" prevent data sharing between FWS and the states and other stakeholders, FWS currently lacks a system to facilitate data sharing.

In response to the data sharing challenge, Region 4 is developing plans to use Griffin Groups, a web-based social network for data and information sharing developed and administered by Connecting Conservation, a nonprofit conservation NGO (griffingroups.com). Users can join species-specific collaboration groups and employ the tool to share data, files, and other information through the website.

4.2 Business Sector Analysis

FWS emphasized its desire that the business sector provide as much information as possible on target species (e.g., status, distribution, biology, threats) and conservation actions affecting them. More specifically, FWS encourages businesses to conduct and share science literature reviews. The agency also encourages establishment of standardized protocols and formats for data collection and reporting. When businesses fund research or graduate students, FWS recommends making a data management plan and data sharing policy part of the agreement so that FWS, as well as the funder, can have easier access to any data generated. Also noted was the opportunity for greater business participation in academic and professional meetings—important forums for sharing analyses of imperiled species.[7]

[6] FWS and the states have signed an agreement giving FWS access to all pertinent state data during the 90-day finding period.

[7] Examples include the American Fisheries Society, Southeastern Fishes Council, American Society of Ichthyologists and Herpetologists, Wildlife Society, and Association of Fish and Wildlife Agency meetings.

Procedurally, FWS reiterated that analysis provided by the business sector will not be used in 90-day findings unless the information is already in the possession of the relevant field office. Because future petitions are difficult to predict, businesses should instead focus on providing information relevant to species awaiting 12-month findings and for which listing decisions will be made over the next 10 or so years (those for which there has been a "substantial" 90-day finding). From the FWS perspective, business sector data on conservation actions in rare or at-risk habitat types will probably be most useful. Ideally, the business sector should submit this information regularly to FWS so that it is available for any findings (including 90-day findings) for petitioned species in that habitat type. A barrier to this recommendation is that FWS does not provide a centralized, "one-stop" point for submissions. Instead, businesses must provide data to any potentially involved FWS field office (some states have multiple field offices).[8]

New data can be contributed following a proposed listing. If new information comes to light during the 90-day comment period that affects the species status, the listing decision can change. However, it is relatively difficult to affect listing decisions during that part of the process.

FWS therefore recommends that the business sector focus on the 12-month review window.[9] During that review, FWS currently finds it a challenge to get all available, pertinent analysis. Therefore business sector engagement in 12-month review data sharing would be extremely helpful to FWS. At present, and lacking a centralized mechanism for data sharing, businesses need to create their own outreach lists and send research and data to the various government offices involved in the reviews, including FWS field offices and state agencies.

Business participants raised concerns about data sharing. For example, they noted that any data provided to FWS would be available to the public via a FOIA request. They also worry that data provided by businesses will be "used against them." FWS acknowledged that this is a potential disincentive to data sharing because future petitioners could in principle use such data themselves. Also, private sector participants were concerned that their data would get "lost" and

[8] Region 4 does identify for its partners the "lead offices" for most species.

[9] The recommendation may also apply to "warranted but precluded" candidate species beyond the 12-month review, where additional science could inform the development of a final listing and recovery rule.

not actually be considered—a concern that arises because of perceptions that file management by regulators (including data sharing within the regulatory agencies) is not transparent or consistent.

Collaboration Implications

FWS encourages the development and submission of as much business sector data as possible. Issues remain with the mechanisms used to share data, and collaboration to improve such mechanisms is desirable (including development of reporting protocols and transparent file-sharing tools). In principle, business data could alter listing decisions—for example, by demonstrating that existing conservation is adequate to avoid listing. From the business community's perspective, government assurances regarding the use of business data (and any regulatory risks generated from providing that data) are needed to remove disincentives for data sharing. Also, the business sector recommends development of a process to allow centralized sharing of business data among regional and field office staff.

4.3 Species Status Assessments

Species status assessments (SSAs) are a new process designed to generate and share analysis prior to or early in the listing process. Under such an assessment, FWS, relevant state agencies, and interested stakeholders convene collaborators to analyze a species' threats, population trajectories, and potential conservation actions. Listing decisions are then informed by the SSA. The assessments are meant to be public, living documents that can be updated as new knowledge comes to light. In part they respond to perceptions that (1) listing and recovery decisions are "analytically disconnected," thereby leading to duplication of effort and other inefficiencies; (2) recovery planning is not publicly transparent; and (3) recovery plans are often out of date by the time decisions are made. SSAs are meant to "follow" species through the listing and recovery process to streamline analysis and decisionmaking.

One motivation is to have threat and recovery analysis available throughout the listing process and ready for postlisting recovery planning and consultations. Another motivation is to identify data needs earlier in the administrative process. One possibility is that SSAs may reveal data needs, analysis opportunities, and prelisting conservation actions that alter FWS work plans, including the timing of listing decisions.

SSAs are not regulatory documents per se. Rather, they are geared toward anticipatory collection of analysis pertinent to listing decisions, permitting, and recovery planning. SSAs follow a standard format but differ in the amount and type of species information available. The business community is encouraged to participate in SSAs as active members and data providers.

The business sector recommends development of an updated and readily available list of completed and ongoing SSAs for use by stakeholders.

Collaboration Implications

Species status assessments provide a platform for collaboration on proactive species viability and conservation analysis. They may foster a more transparent, up-to-date, and efficient approach to analysis across all phases of ESA decisionmaking, from the listing process through recovery planning.

4.4 SEAFWA

The Southeastern Association of Fish and Wildlife Agencies (SEAFWA) is composed of state agencies with fish and wildlife management and protection responsibilities.[10] A goal of SEAFWA is to promote analysis and conservation actions to reduce the need for federal listing and thereby preserve state authority over species management and protection. SEAFWA's focus is therefore on at-risk (as opposed to already listed) species and the post-MDLS candidate list. SEAFWA, and in particular its Southeast At-Risk Species (SEARS) strategy, is categorizing species for status reviews and developing SSAs and other data-sharing initiatives for use by stakeholders. SEAFWA works in close conjunction with FWS, and Region 4 in particular. SEAFWA's Wildlife Diversity Committee is implementing the SEARS strategy with the support of agency directors and in partnership with FWS. SEARS is meant to help set priorities, find and fill data gaps to help determine whether listing is warranted, improve communication on species status, and identify conservation opportunities—all of which would improve conditions for a species and, SEAFWA hopes, reduce litigation. On several dimensions there is a close collaboration between SEARS state-led activities and federal-led activities, described above. For example, SEARS is undertaking the following actions:

- Categorizing species, with a goal of distinguishing species in immediate peril and requiring federal protection from species that are at risk but for which immediate conservation actions may avoid listing. The categorizing process described in Section 3.1 was developed and conducted by SEAFWA and shared with FWS.

[10] Members come from 15 states plus Puerto Rico and the US Virgin Islands, which roughly correspond to FWS Region 4. State agencies have jurisdiction over all nonlisted species.

- Establishing information-sharing systems to help states and federal agencies communicate and coordinate activities and analysis (including use of Griffin Groups, as described in Section 4.1).
- Seeking data from and analytical collaborations with the business sector and academia (for reasons identical to those described in Section 4.2).
- Conducting species status reviews (as described in Section 4.3).

Funding for SEARS comes from a combination of federal grants, state wildlife grants, NGO partnerships, and public-private partnerships with the business community.

Collaboration Implications

In addition to federally oriented collaborations, FWS encourages the business community to develop parallel collaboration with states via SEAFWA, particularly in activities designed to reduce the need for federal listing.

5. Private Sector Programs and Tools

The ESA places certain responsibilities on private businesses and landowners. Specifically, "take" of listed wildlife species is prohibited without a permit, where take is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or any attempt to engage in such conduct" and can include significant habitat modification. These requirements can constrain private sector land and water uses. However, a variety of tools and programs developed by FWS increase flexibility for landowners, as well as contribute to the conservation of candidate and listed species.[11]

In situations where there is no federal nexus—that is, the private action does not involve federal funding, require a federal permit, or occur on federal land—the tools available to the private sector include habitat conservation plans (HCPs), safe harbor agreements (SHAs), and candidate conservation agreements with assurances (CCAAs).

An HCP is appropriate when businesses and landowners know their actions may cause incidental take of a listed species. In contrast, SHAs are appropriate for businesses and landowners who have a listed species on their property and are generally comfortable having the

[11] See www.fws.gov/southeast/candidateconservation/pdf/LandownerConservationChart.pdf.

species there, but who don't want the species to generate more obligations if its population increases. CCAAs are appropriate for businesses and landowners who would like to help avoid species listing and want regulatory certainty if the species is eventually listed. In addition to these tools, which are described in more detail below, prelisting policy also is being developed, which is expected to enable federal and nonfederal landowners to receive credits for conservation actions implemented prior to a species' listing, which could then be sold or used to mitigate take after the listing.

Habitat conservation plans. In the absence of a federal nexus, a business or landowner who plans to engage in an otherwise lawful activity that will result in take of a listed species must develop an HCP to obtain an incidental take permit. The plan requires minimization and mitigation of the harm to ensure that take will not appreciably reduce survival and recovery of the species, and adequate funding for implementation. Region 4 has 365 HCPs in place, most of which are for just two species (Alabama beach mouse and Florida scrub jay) and most affecting less than an acre of land. Only two HCPs in the region cover more than one species, and none cover freshwater aquatic species. HCPs can take a long time to develop and finalize (up to seven years for large plans). In contrast, when there is a federal nexus, private actions are covered under ESA Section 7, rather than an HCP. Under Section 7 the relevant federal agency (e.g., the Environmental Protection Agency or the Army Corps of Engineers), rather than the private business or landowner, must consult with FWS.

Safe harbor agreements. In contrast to HCPs, SHAs are voluntary agreements to proactively conduct conservation actions to provide net benefits for a listed species, in exchange for an incidental take permit. A baseline survey is conducted at the start of the agreement. The landowner is responsible only for the baseline number of listed species individuals on the property, and the agreement can be canceled at any time. Landowners may engage in an SHA because it increases management flexibility, clarifies their obligations, and may increase their access to conservation funding. Unoccupied habitat can be enrolled in an SHA with a zero baseline, which can benefit landowners near a reintroduction project. SHAs can take several years to put in place. Of the 12 SHAs in Region 4, nine are for the red-cockaded woodpecker. One SHA is for three species of mussels in Chewacla Creek in Alabama, and one is for the speckled pocketbook and yellowcheek darter in Arkansas. Some SHAs for the red-cockaded woodpecker are "programmatic" agreements: the landowners do not deal with FWS directly but instead sign individual agreements with the state department of natural resources.

Candidate conservation agreements with assurances. CCAAs are also voluntary agreements to implement proactive conservation for candidate, rather than listed, species. In

exchange for voluntary conservation actions, FWS provides formal assurances that no additional management will be required by the business or landowner if the species is listed. The CCAA conservation standard is higher than under an SHA. The standard for an individual participant is to engage in conservation actions that, if engaged in by all other pertinent landowners, would be enough to avoid the species' listing. The dual goals of CCAAs are to prevent listing of the species and to provide the landowner with regulatory certainty if the species is eventually listed (because the landowner already knows her obligations). These agreements can take several years to set up. Region 4 has in place three small-scale CCAAs (for Adams cave beetle in Kentucky; robust redhorse, a large fish, in the Ocmulgee River in Georgia; and spring pygmy sunfish in Alabama) and one larger agreement (for yellowcheek darter in the upper Little Red River watershed in Arkansas). Two CCAAs are pending.

FWS encourages greater use of these tools by the private sector. However, a variety of factors may be inhibiting their use, including the time and cost of developing and implementing agreements (e.g., more than $100,000 for an agreement). The complexity of the agreements (especially for multiple species), the practicability of conservation measures, the potential for minimizing risk of take, and the certainty of assurance (which might be threatened by third-party lawsuits)[12] are all factors that affect use of these tools. Business sector participants noted during this workshop, however, that Region 4 is particularly flexible and innovative in its approach.

Several existing programs that engage landowners in proactive conservation were described during the workshop, including programs to conserve forest-dwelling bats, restore longleaf pine ecosystems, and facilitate conservation of aquatic species. For example, to conserve forest-dwelling bats, Region 4's Ecological Services Office is leading an effort to develop a regionwide, umbrella SHA-CCAA that focuses on forest conversion, management, and recreation and to complete a biological opinion and environmental assessment. Applicants can then choose to participate in the programmatic effort or seek ESA compliance through existing means (e.g., an individual HCP, SHA, or CCAA). In principle, this strategy will help the forest industry move through ESA legal pathways more quickly by changing its forest management practices to minimize harm to target species.

[12] There is limited case law about the robustness of assurances, but the New Mexico and Texas CCAA for the dune sagebrush Lizard recently withstood litigation charging that the species had not received enough conservation.

The longleaf pine ecosystem is the focus of several programs. This ecosystem, once a dominant forest type on the coastal plain from Virginia to Texas, provides important habitat for both plants and animals. It also provides valuable forest economic opportunities. The majority of SHAs in Region 4 have focused on the red-cockaded woodpecker, and habitat management under the agreements can include mechanical hardwood control, prescribed fire, provision of artificial nesting cavities, and longleaf restoration. In total, 402 SHAs agreements have been signed for this species with 2.5 million acres enrolled, covering 686 red-cockaded woodpecker baseline groups and providing 169 surplus groups. These agreements have improved conservation on enrolled properties, and populations have increased by 20 percent on enrolled lands.

Few private landowner agreements have focused on aquatic species, which face different threats and require different management and conservation approaches than terrestrial species. Major issues for aquatic species are altered flows (including municipal water withdrawals and dams), water quality and sedimentation, and loss of connectivity (due to road crossings, culverts, and dams). Region 4 has high aquatic diversity and large numbers of listed, petitioned, and imperiled aquatic species. One partnership addressing conservation of aquatic species is the Claude Harris National Aquatic Research Center, a hatchery facility used to conduct applied aquaculture research on at-risk species, including propagation and reintroduction of mussels. Conservation Fisheries Incorporated is a hatchery focused on understanding fish life history and breeding requirements and reintroducing species into their native habitats. The Alabama Rivers and Streams Network develops partnerships for conservation, framed in the context of clean water. Their efforts include dam removal, improving fish passage by changing culverts, sediment traps to improve water quality, and mollusk reintroductions. Alabama Power is another example. On the Coosa River in Alabama are 7 dams, 26 federally listed species, and 8 critical habitat units. As part of the Federal Energy Regulatory Commission relicensing process, Alabama Power and partners worked on a plan to restore flows below the dam, developed a drought plan, and reintroduced 42 species. Because of this effort, FWS was able to allow Alabama Power take on the reintroduced species.

The National Oceanic and Atmospheric Administration (NOAA) is the second federal agency charged with ESA implementation, largely for marine and anadromous species. In general, NOAA has dealt less with private businesses and landowners, though it has established with FWS a programmatic agreement with power companies under Section 316 of the Clean Water Act to deal with species around power plants. This workshop identified a potential need for increasing engagement with NOAA on future ESA issues.

Collaboration Implications

Proactive conservation can be used to avoid listing or enable downlisting of species under the ESA. Businesses' and private landowners' participation in HCPs, SHAs, and CCAAs may serve key roles in these efforts. Development of programmatic HCPs, SHAs, and CCAAs for species of particular relevance to the private sector is a potential focal area of collaboration. Although programmatic agreements can require substantial upfront effort, their advantage is that businesses and landowners simply need to get a certificate of inclusion to be covered under the agreement. For current candidate species, listing decisions will be made by 2017, so if the private sector wants CCAAs in place for these species, it needs to act soon. For species that were recently petitioned, the private sector may have 10 or 11 years to get agreements in place before a listing decision is made. Habitat restoration and species reintroductions will be major components of conservation efforts for certain aquatic species in river reaches where they are not currently found. These tools can be used in creative ways to manage reintroductions (e.g., setting the baseline population level in an SHA to zero) and thus represent a good collaborative opportunity, particularly for the power sector.

6. Conclusions and Implications beyond Region 4

This workshop identified opportunities for collaboration among the business sector, FWS, and state partners in sharing data and science, developing spatial assessments, and developing and engaging in conservation agreements and programs. Many of the findings in this workshop echo those identified in the 2014 meeting hosted by Resources for the Future in Washington, DC. However, a focus on regional issues enabled much more specificity in identifying and developing these opportunities.

In particular, the meeting identified substantial opportunity for the business sector to provide science input for post-MDLS decisionmaking, especially input to 12-month findings (including for the 343 species for which Region 4 will make decisions through fiscal year 2027). Furthermore, Region 4's predetermination review of species, which categorizes petitioned species based on their conservation and science needs, can help the business sector identify and target analysis, data collection, and conservation investments toward species whose listing outcomes have the greatest potential to be altered by those investments.

Development of programmatic agreements, such as HCPs, SHAs, and CCAAs, for species that are relevant to the business sector is another important area for collaboration. Proactive conservation will be needed to avoid listing or enable downlisting of species under the

ESA, and SHAs and CCAAs are critical tools for achieving this. Also, with large numbers of listed and petitioned aquatic species in Region 4, reintroductions will be a major component of conservation efforts, necessitating new ways of using existing tools and representing another important collaborative opportunity.

Spatial targeting, particularly when considered jointly with predetermination species reviews and work plans being developed by FWS, has the potential to promote strategic collaboration. In particular, geographic analysis of species habitat and threats, combined with information on the business sector's land and water use (current and future), could help identify science priorities and collaborative opportunities within the business sector, including priority species for scientific study and programmatic conservation agreements.

Data sharing between the private sector and the agency remains a challenge because incentives and protocols are lacking. Although better access to business data could in principle alter listing decisions, government assurances regarding the use of this information are needed. This meeting identified concrete ways for the business sector to share data and science to inform species listings and management.

Region 4 is considered particularly amenable to engaging with landowners and developing creative programs for conserving species. This was highlighted throughout the workshop. Because Region 4 faces the nation's largest proportion of post-MDL species listing decisions and the Southeast is dominated by private lands and large population centers, this region is particularly dependent on partnerships and strategic planning to handle the workload, while seeking to avoid federal listing of as many species as can be warranted.

Appendix A. Workshop Participants

Stan Cook	Alabama DCNR
Chris Hall	Arkansas Electric Cooperative Corporation
Curtis Warner	Arkansas Electric Cooperative Corporation
John Magalski	American Electric Power
Stephen Cain	Arkansas Electric
Scott Fletcher	Duke Energy
William Foris	Duke Energy
Tim Hayes	Duke Energy
Jim Meiers	Duke Energy
Bob Goldstein	Electric Power Research Institute
Becca Madsen	Electric Power Research Institute
Nalini Rao	Electric Power Research Institute
Jeanne Lennon	First Energy
Fred Starheim	First Energy
Bobby Maddrey	Georgia Pacific
Erik Heinen	Great River Energy
Matt Herman	Great River Energy
Mary Jo Roth	Great River Energy
John Humes	Hoosier Electric
Paul Ling	Kansas City Power and Light
Ben Wigley	National Council for Air and Stream Improvement
Pace Wilber	NOAA Fisheries
Stefania Bolden	NOAA Fisheries
Lindsey McCloy	New York Power Authority
Vincent Pezzullo	New York Power Authority
Dan Roach	Rayonier
James Boyd	Resources for the Future
Rebecca Epanchin-Niell	Resources for the Future
Ruth Valencia	Salt River Project
Mark Wicke	Salt River Project
John Biagi	SEAFWA
Robert Curry	SEAFWA
Ed Laurent	SEAFWA
Becky Gwynn	SEAFWA
Charles Rick Berry	Southern Co
Kristin Brodeur	Southern Co
Jim Candler	Southern Co
Jason Carlee	Southern Co
Patrick Chubb	Southern Co

Steve Krotzer	Southern Co
Joe Slaughter	Southern Co
Daniel Warren	Southern Co
Leslie Cox	Southern Co
Ken Darby	Southern Co
Jonathan Lowery	The Westervelt Company
Anne Aiken	Tennessee Valley Authority
John Baxter	Tennessee Valley Authority
Holly LeGrand	Tennessee Valley Authority
Leopoldo Miranda	USFWS
Allan Brown	USFWS
Mike Harris	USFWS
Robert Tawes	USFWS
Aaron Valenta	USFWS
Jeff Powell	USFWS
Mike Oetker	USFWS
Cindy Williams	USFWS
Bob Emory	Weyerhaeuser Company
Jonathan Gassett	Wildlife Management Institute

Appendix B. Workshop Agenda

Imperiled Species Conservation:
Challenges, Opportunities, and Partnerships
at the Regional Level
Southeast Region

March 2–3, 2015

Atlanta Marriott Century Center

2000 Century Boulevard NE, Atlanta

March 2

1:00 **Introductions**

1:30 **Welcome to Region 4 and conservation, southern style**

- Mike Oetker, Deputy Regional Director, FWS Region 4

1:45 **Meeting objectives and organization, participating organizations, related activities**

- Mike Harris, FWS Region 4
- Ben Wigley, NCASI
- Bob Goldstein, EPRI

2:00 **FWS Region 4 conservation partnerships, successful collaboration, shared interests, shared successes**

- Aaron Valenta, FWS

3:30 **FWS listing framework and data requirements**

- Rob Tawes, FWS

4:00–4:30 **Collaboration success story 1: Alabama Aquatic Biodiversity Center**

- Stan Cook, Alabama DCNR
- Jeff Powell, FWS

4:30–5:00 **Collaboration success story 2: Southeast At-Risk Species Strategy**

- Becky Gwynn, SEAFWA
- Jon Gassett, WMI

5:00–5:30 **Collaboration success story 3: Overview of existing tools for private landowners and perspective from forest industry**

- Mike Harris, FWS Region 4
- Ben Wigley, NCASI

March 3

8:00 **Review of previous day**

- James Boyd and Rebecca Epanchin-Niell, RFF

8:30 **Opportunities, desired outcomes, and next steps for collaboration**

Topic 1: Enhancing conservation of aquatic species

Topic 2: Enhancing information and data sharing through SEARS or other means

Topic 3: Enhancing tools for private landowners

- James Boyd and Rebecca Epanchin-Niell, RFF, moderators

11:00 **Summarize partnership potential, action items, and next steps**