ASSOCIATION of FISH & WILDLIFE AGENCIES

Pollinator & Invertebrate Conservation Working Group

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Toward a Standardized Monitoring Framework & Improved Data Infrastructures for U.S. Native Bees

There is an urgent need for a coordinated, standardized national framework and data infrastructure to address widespread data gaps and effectively monitor, assess, and conserve declining U.S. native bee populations through collaborative, science-based approaches.

Introduction

Declines have been well documented for many bee species in the United States. Based on standardized status assessment results for a subset of U.S. bee species, bees are currently one of the most imperiled groups of wildlife in the country, with 35% of the assessed species identified as being at-risk (Cornelisse et al 2025). While assessments of all 4,000 U.S. native bee species are currently underway, the known trends are concerning, as are their impacts on the stability of our ecosystems, especially in the context of One Health and national food security (NRC 2007, Potts et al 2010). Most states have identified bee Species of Greatest Conservation Need (SGCN) in their State Wildlife Action Plans (SWAP), including many bumble bee species currently listed or under review for listing under the Endangered Species Act (ESA). Native bees and other important pollinators are consistently identified as priorities by states and national partners (Mawdsley & Humpert 2016, deMaynadier et al. 2024). Thirty-three states and territories identified bee species as SGCN in their 2015 SWAPs and examples of recent draft and approved SWAP revisions in 2025 indicate that this number is increasing, as is the breadth of species identified.

It has been widely acknowledged that one of the most significant barriers to our understanding of native bee species is data deficiency. In particular, we need a robust framework for how we collect data so its analytical utility can be maximized to fill information needs (Woodard

Rusty patched bumble bee (*Bombus affinis*), the first native bee to have a focal species module for nationally standardized monitoring data collection. Photo by Skye Bruce.

et al. 2020; Cheshire 2023; Rousseau 2024; Levenson et al. 2025a). National efforts to better coordinate experts around the topic of native bee data and species statuses began in 2020 with the launching of the U.S. National Native Bee Monitoring Research Coordination Network (RCN). The RCN supports national efforts to better monitor species with the goal of uniting academics, government agencies, non-profit organizations, and the public to research, monitor and ultimately conserve native bees. More than 800 native bee experts and conservationists participate in this effort.

Given the overall lack of data and the need to improve the quality of data generated, the RCN developed standardized sampling methods for collecting and managing occurrence, pathogen/parasite, and genomic data (Cariveau et al. 2025, Levenson et al. 2025b, Lopez-Uribe et al. 2025, Strange et al. 2025), and a workflow for designing effective monitoring programs around the information needs of specific species, focused on occupancy as the state variable of interest (Otto 2025b). Summaries of these standardized methods were published in a special issue of the Journal of Melittology and promote a standardized approach to the collection of data and the monitoring of species (Woodard & Levenson 2025).

A next phase of this work is the development of a national native bee monitoring program. Long-term monitoring is needed to estimate status and trends, identify environmental drivers of population change, and understand the effects of management. These information needs can only be systematically met at a national scale with a coordinated data collection scheme that addresses spatial variability in sampling effort and detection/sampling error. Thus, a national program needs to include probabilistic selection of sampling units and account for imperfect species detection. A native bee monitoring program can embed the aforementioned method and data standards developed by the RCN within a broader, statistically robust sampling framework designed around to fill information needs for species of interest.

The national bee monitoring framework is being developed following design principles of established vertebrate monitoring programs (e.g., the North American Bat Monitoring Program, NABat, and the Amphibian Research and Monitoring Initiative, ARMI), with modifications to best fit the life history of and collection methods for native bees. Features of the native bee monitoring framework include a shared sample frame (10 × 10 km grid cells following the Master Sample design of NABat) and probabilistic selection of sampling units to

support inferences to non-surveyed cells. The framework also has an initial focus on occupancy (Otto 2025b), which is also the foundation of data collection for NABat and ARMI, and a modular sampling design structure to account for the fact that scientific and management information needs are highly varied across bee species and regions. Stakeholders across the US, with state wildlife agencies playing a fundamental role, will select focal species and make decisions about corresponding monitoring objectives, with decision-making and sampling design support provided by the framework.

Without data standards and a shared national framework for bee monitoring, successful management of native bee species across their ranges will continue to be limited and incredibly difficult. Experts across the country have been collecting native bee data for many years and it is the hope of the native bee conservation community, including those working for state and federal wildlife agencies, that a new era of coordination and national standardization is at hand. The broad coalition of native bee specialists recognizes the important role of state and federal wildlife agencies in the management of these species and seeks to collaborate in the establishment of a national system for effective monitoring design, standardized monitoring protocols, and centralized data repositories, to support the conservation of native bee SGCN and many other species.

In this document, the Association of Fish and Wildlife Agencies (AFWA) Invertebrate and Pollinator Conservation Working Group, serving under the Wildlife Diversity and unding Committee, provides an introduction to the topics of native bee declines, current challenges, and identified next steps to foster coordinated data collection and species management. We also provide context for AFWA and its member organizations as wildlife management leaders in the U.S. There are many actively engaged on these subjects within the states and regional associations and we hope this document broadens the dialogue to a national level and outlines actions requiring support from the coalition of AFWA members to ensure effective engagement among state and federal wildlife agencies and our many partners.

Current Challenges

Native bees and other invertebrates face unique challenges relative to other wildlife taxa. Sampling effort across the U.S. is very inconsistent or entirely absent, and as a result, foundational data are missing for many species and areas (Cheshire et al. 2023, Rousseau 2024, du Clos 2025). Moreover, most native bees are small in size and difficult to identify without specialized training and expertise, and the number of experts capable of supporting survey and inventory projects has waned in recent decades (Engel 2021). Some states have invested heavily in the inventory and survey of native bees and other pollinators, but efforts remain fragmented and there is currently insufficient coordination among federal, state, academic, and NGO partners. Datasets that do exist are often inaccessible or fragmented across jurisdictions and organizations, making utilization and use in species status assessments incredibly difficult. Additionally, due to a lack of standardization, these data are inconsistent in how and where they are collected and reported, making comparisons across species ranges and between localized sampling efforts a significant additional barrier to utilization by management agencies and conservation partners (Montgomery et al. 2020, Woodard et al. 2020, Montgomery et al. 2021). Foundational baseline data on bee species distribution, abundance, and population trends are lacking for both state endemic and broader ranging species. Moreover, data are not often being collected in such a way that they can be used to support specific management decisions. While many challenges exist, the actions identified in this report present both an opportunity and a path forward to successfully conserve native bees in the U.S.

Action Area 1: Expand Capacity for Inventory, Monitoring, and Research

Taxonomic Infrastructure

There is a growing interest among wildlife

agencies to further their understanding of native bees and other pollinators as population declines are documented. Yet, many of these agencies lack the in-house expertise needed to outline paths forward for systematically identifying insect SGCN, effectively delivering conservation actions to perpetuate their populations, describing new species, and creating better species-level keys, which remain unavailable for many bee genera. An expansion of state and federal staffing has slowly begun, but capacity is still limited given the incredible diversity of native bee species. Many state and federal agencies rely on a dwindling pool of expertise housed within universities and specialized research facilities as they seek to grow insect assessment, survey, and monitoring programs. An expansion in capacity and in-house expertise will be required as interest and implementation continue to grow.

Taxonomy—the science of discovering, delimiting, describing, naming, and classifying species—remains the foundation for the study and conservation of living things. It provides the framework for determining what species exist, how they differ, where they occur, and how observations made across studies and institutions can be compared consistently. In contrast to most vertebrate groups in the U.S., where the fauna is comparatively well known and the need to describe new species is relatively rare in management contexts, bee taxonomists still regularly contend with undescribed species (Wilson et al. 2025, Dorey et al. 2026). In order to support expanded work in the arena of native bee conservation in the U.S., we must first have an understanding of the species present in the country. Some checklists have been maintained, but given the great diversity, a centralized, dynamically updated catalog including known distributions does not currently exist. Many state catalogs and checklists have been updated and completed in recent years, yet many gaps still exist. Taxonomists provide the majority of the identification support for survey, inventory, and monitoring projects across the country, yet the number of trained specialists has dwindled in recent years due to a lack of support (Woodard 2020, Engel 2021).

Insects, unlike many other animal groups, require expertise to identify to the species or subspecies level. Many programs, like the Master Melittologist programs launched in some states, have made great strides in training up identifiers from the public to grow the ranks of individuals who can support species identification activities in species inventory projects. A few institutions also currently exist to provide these services through federal positions at labs across the country. These labs include the U.S. Department of Agriculture's Agricultural Research Service (USDA ARS) Bee Biology and Systematics Lab in Logan, UT and the Wild Bee Lab at the United States Geological Survey (USGS) Ecological Science Center in Patuxent, MD. These labs provide support nationally and are located in two faunistically distinct regions of the country. As work and interest in bee conservation has grown, the demand for these identification services has increased and existing taxonomists and specialists lack the capacity to keep up with the volume and demand. In order to support this growing area of wildlife conservation, investments are needed to increase the capacity for state and federal agency taxonomic, identification, and biological support services. These support staff are often experts in the life history, collection methods, and conservation needs of many of these species, and this expertise will be needed as wildlife agencies identify species warranting conservation attention and as we grow in our understanding of how best to deliver conservation actions.

New tools such as DNA barcoding and Artificial Intelligence (AI)-assisted identifications are growing in their utility, but the results of these modern methods are only as good as the taxonomic libraries, either image- or DNA sequence-based, on which they rely. For example, environmental DNA (eDNA) is only a useful tool once a creditably identified individual of a species has been sequenced and the sequence made publically available in shared DNA repositories (i.e., NCBI), and outside a few genera of bees, this remains a significant gap. Images used to train AI tools provide a similar example, where machine learning systems require a large number of verifiably identified species images to build systems that can effectively identify species. These

tools also require a high degree of species coverage in an area to obtain correct identifications.

Many state and federal wildlife agencies have repeatedly communicated that their biggest barrier to insect conservation, including of bees, is a lack of expertise to both assess the conservation status of species and to identify the specific species of interest once survey, inventory, and monitoring begins. An expansion of the current capacity of native bee specialists will be vital for conservation efforts to move forward at both the state and national levels.

Specimen and Data Infrastructure

There is also a major need for increased support for the appropriate stewardship of bee specimens and data across the U.S. Specimens are preserved, verifiable records of species occurrence and identity that provide the physical basis for documenting distributions, confirming identifications, studying morphology, genomics, and life history, and generating the reliable biodiversity data needed for conservation planning. Many specimens of native bees collected across the country going back centuries, and housed in natural history collections, remain undetermined to species and the data are not digitized and in a condition for use by the broader wildlife conservation community (Chesshire et al. 2023; Cobb et al. 2019). A great deal of the knowledge we currently possess on the distributions and life histories of bees is found in the collection labels associated with these specimens. Already, significant investment has been put towards the digitization of museum and collection specimens in recent decades, however, many important regional institutions continue to lack fully digitized data regarding their collection holdings, leaving significant gaps nationally.

In parallel with this remaining lag in efforts to digitize collected bees, there has also been, historically, a lack of use of data standards for wild bee data. Due to this, most publicly available bee data generated to-date do not have the full suite of associated data fields that are important for basic analyses (Rousseau et al. 2024). In recent years, however, data standards have become more widely used as digitization efforts have increased. This standardization has allowed for the data to be interoperable for, accessible, and more useful to a broadening user base. Most biological collections and biodiversity data systems utilize Darwin Core data standards (Wieczorek et al. 2012) and most state and federal agencies in the natural resource field recognize these data standards and collect information in a similar, yet inconsistent, fashion. A data standard tailored to bees (the Wild Bee Data Standard, Du Clos et al. 2025) has also been recently released. Additional support for the digitization of existing museum specimens, accessioning new specimens, and using accepted data standards for new specimens collected will streamline the collective growth in our understanding and fill knowledge gaps for conservation priority species and a breadth of other wildlife taxa that agencies are tasked with managing.

Action Area 2: Coordinate National Inventory and Monitoring Efforts

National Native Bee Inventory

A lack of baseline species distribution data remains a significant barrier to the advancement of bee conservation in the U.S. In addition to the absence of a national species catalog, a coordinated national inventory of native bees collected in a systematic and consistent fashion has never been completed. A great many local, state, and sometimes regional, efforts have been initiated, often with varying methods and intended uses. Much like the impetus for national inventories for other wildlife taxa, such as birds, bats, or reptiles and amphibians, native bees and other insects lack consistent range-wide inventories. As a result, state and federal wildlife agencies lack sufficient information to accurately determine the presence or likely absence of target species within their jurisdictions. Bumble bee species have seen a rapid rise in state atlas programs designed to inventory and assess the distribution and status of the species in this specific bee group. These projects have been highly effective in developing complete species lists for states, wildlife areas, and refuges, and

have contributed to the conservation assessment of most species in the country. Additionally, the partnership with community scientists in the gathering of these data has broadened the public's understanding of the role these species play in both native habitats and food security. Ten years ago, bumble bees had many data-deficient species and species for which, if there were data, they were often limited or narrow in scope and scale (Williams & Osborne 2009). Other native bee genera are currently in a similar state, in that we know very little about most of the species found in the U.S. across their ranges. Similar to how a standardized method of data collection and reporting was developed for birds through Breeding Bird Surveys and Christmas Bird Counts, and for bats under NABat, a standardized and coordinated approach for native bee inventory is needed. The focus of these inventory efforts could be directed at regions or groups with poorly represented data or at a foundational level could be implemented nationally for full, range-wide context.

Standardized Monitoring Protocol

As mentioned above, a shared, coordinated national framework for native bee monitoring is a path forward to acquiring the information most needed to effectively manage native bees. Monitoring is defined as "the process of gathering information about some system state variable(s) at different points in time for the purpose of assessing system state and drawing inferences about changes in state over time" (Yoccoz et al. 2001). In other words, it is a process of gathering information (not just data) about variables, such as species occupancy, abundance, or richness, to draw broader conclusions about temporal changes in biological patterns, such as why species are declining, and identify management actions that can lead to desired population outcomes. This is entirely distinct from species inventory and atlases, where the goal is most often to identify the species in an area (i.e., generate checklists) or map species distributions during a snapshot in time.

Biological monitoring projects and programs are most effective when they possess a sampling structure that is designed around specific monitoring objectives (Yoccoz et al. 2001; Nichols & Williams 2006). Decisions about monitoring objectives, sampling design, and the specific details of data collection are best made by groups that include land and species managers, researchers, coordinators, and data collectors. Collectively, these groups include participants that have the insight as to why they are monitoring, what variable(s) to monitor, and how to carry out successful data collection for their focal species and region. Participants who will use data to inform conservation actions and decisions, such as state wildlife agencies, play a central role in making decisions about monitoring objectives. Coordinated programs can provide support for making these decisions. Central coordination is also important for creating alignment across monitoring efforts so that data are interoperable and can be used for shared data products, such as range-wide occupancy models, that have broad benefits for species management and conservation.

Virtually all biological monitoring programs are challenged by two forms of sampling bias: spatial variability in sampling effort and detection/sampling error, two issues that are well known to affect data collection for bees (Jamieson 2019, Rousseau 2024). With a hierarchical sampling design, data can be collected to best answer more targeted, local scientific and management objectives while simultaneously contributing to a larger interoperable dataset that can be leveraged to evaluate national status and trends. With coordinated monitoring, benefits can be reaped such as distributing the logistical and financial burden of data collection and creating shared infrastructures that support issues like site selection, and data management and sharing, in ways that address stakeholder needs.

Learning from Other Wildlife Models

Bee conservation, and insect conservation more broadly, stands on foundational science developed over the last century of applied wildlife management. While there are many unique aspects of bee biology, such as greater species diversity and complex data challenges, there is not a need to develop a successful model for bee conservation that is independent of the excellent

methods developed for other taxanomic groups. A great many taxa-specific coalitions have been organized to tackle the challenge of developing broadscale inventory and monitoring programs. These include, but are not limited to, the North American Breeding Bird Survey (BBS, USGS 2020) and the associated Partners in Flight (PIF) databases, the Amphibian Research and Monitoring Initiative (ARMI, Corn 2005), and the North American Bat Monitoring Program (NABat, Loeb 2015). Each of these monitoring-focused efforts were driven by the shared need for taxa-specific data on the population status of species of concern after documented declines or recent disease invasions. Networks of taxa specialists, state and federal wildlife agencies, and partner organizations rallied to develop inventory and monitoring strategies to confirm the extent of documented population declines. These efforts then led to the development of strategies to mitigate significant documented threats and collaborative delivery of conservation actions. The models have been developed for establishing effective partnership networks, monitoring methods, and successful implementation of national coordinated programs. The body of native bee specialists made up of academic, agency, and NGO partners has grown following the development of the native bee research coordination network (Woodard 2020), and has identified standardized monitoring methods (Woodard and Levenson 2025). The current next step is to develop a coordinated program that will successfully facilitate, launch, and manage inventory and monitoring efforts for for native bees.

Action Area 3: Centralized Data Repository with User Support

Much like the framework of monitoring networks developed for vertebrate species, a native bee occurrence and monitoring data repository is needed at the national level. At present, native bee occurrence and monitoring data are dispersed across agencies, museums, research groups, and community science platforms, limiting their coordinated use. A U.S. data repository and data system would provide a hub for accessible vetted data collected across the breadth of native bee species. With the use of consistent data standards, these systems would integrate well with existing biodiversity data aggregators of both specimen and community science observation records (e.g., GBIF, iNaturalist, Catalog of Life and Symbiota, NCBI). Thus, this system can be built upon to complement and inform existing community-driven input and data curation features or platforms while protecting more sensitive data. As more monitoring data are compiled, these systems would also provide analytical tools that can inform status assessments, priority-setting, and the evaluation of management actions. A centralized data repository would also create important opportunities for the integration of bee trait and life history data. Traits such as body size, nesting habit, diet breadth, phenology, and sociality are critical for understanding species' ecology, vulnerability, and likely responses to environmental change (Ostwald et al. 2024). These bee trait data help inform species and habitat managers approaches to recovery and restoration as they develop management plans and deliver conservation actions.

While many agencies and organizations have varying data-use and data-sharing policies and agreements, a pre-implementation, coordinated design and shared governance would allow for the development of a system that gives the data providers control over how their data are used and ensures a sustainable approach built on trust and united vision. A foundational data structure has been developed for many vertebrate groups by the USGS Ecosystems Mission Area (EMA) Species Management Research Program. The North American Bat Monitoring Program serves as a key example of how a coordinated monitoring framework and data and information systems can be integrated into one cohesive, coordinated system that delivers broad benefits to stakeholders at local, regional, and national scales (Loeb et al. 2005; Reichert et al. 2021). This system also supports data privacy by allowing users of the system to set their own limitations on data access and use. There are also other excellent examples of data systems that prioritize sensitive-species protections and have varied administrative layers for data protection, quality

control checks, and data provenance tracking (USDA-ARS Biocollections Portal, Motus Database). Thus, developers of a system for bee monitoring have many successful examples they can draw from and adopt to rapidly build this framework.

As with other taxa-specific monitoring programs, a successful national native bee data repository would require dedicated user support. This user support will ensure that agencies, researchers, collections staff, and community partners can effectively contribute to and use the system. User support should also include training in data standards and submission workflows, clear documentation, technical assistance, and responsive help for troubleshooting data access, upload, and quality-control issues. Providing this support will improve data consistency, increase participation, and help ensure that the system is broadly usable across institutions with varying levels of technical capacity. As data volumes increase and uses expand, this support will also allow for the repository to adaptively manage and expand the systems, analytical tools and user interfaces to meet the associated growing needs. The NABat system started as a repository of national bat data and has grown into a team supporting users in the analysis of species trend data and expanded population modelling. These system data managers provide a foundation of support for wildlife agencies and the wildlife research community and will be necessary for the future success of a national bee monitoring program.

Prioritization Framework

There are approximately 4,000 species of bees native to the U.S., making it impossible to rigorously monitor all of them. Therefore, a prioritization framework needs to be implemented to best allocate the limited resources available for bee conservation (Redding and Mooers 2006, Arponen 2012, Buxton et al. 2021). One of the criteria that could be used for this prioritization scheme is the inclusion of the species on state and national lists such as the ESA and SGCN lists within SWAPs (Mawdsley and Humpert 2016, deMaynadier et al. 2024). Few bee species are currently included within the ESA, so state SGCN lists can be a helpful resource for selecting species to prioritize, especially if species are identified on multiple states' lists. Prioritization for survey and monitoring efforts can also be based on geographic areas rather than specific species. This could include Conservation Opportunity Areas (COAs), identified in many SWAPs. Additionally, good candidate species for monitoring should have characteristics that make them more amenable to monitoring, such as having higher detectability and identifiability, or particularly desirable candidates for monitoring, such as when monitoring of these species provides valuable outcomes or information relative to the resources required.

National priority areas have been established in the U.S. for vertebrates and could be similarly established for bee conservation. Criteria for selecting these areas could include high species richness, declining endemic or phylogenetically distinct species, environmental indicators of diversity (Fleishman et al. 2005; Rousseau et al. 2025), areas with bees associated with populations of rare or at-risk plant species, and areas where bees provide pollination services that benefit vertebrates, native habitats, or important crops (Kremen 2002, Koh et al. 2016). Following a foundation established on these priority species and areas, and as technology for surveying and monitoring improves, more species and areas can be prioritized (van Klink et al. 2022).

Implementation & Governance

There is heightened interest in cooperative and coordinated efforts regarding managing and conserving native bees and other pollinators, as demonstrated by recently published U.S. federal agency-wide pollinator initiatives, including those within the Bureau of Land Management (BLM 2022), the U.S. Department of Agriculture (USDA 2022), the U.S. Geological Survey (USGS, Otto 2025a), and the U.S. Fish and Wildlife Service (USFWS 2025). There are inter-agency pollinator working groups within the following organizations: AFWA; Western Association of Fish and Wildlife Agencies (WAFWA); Midwest Association of Fish and Wildlife Agencies

(MAFWA); Northeast Association of Fish and Wildlife Agencies (NEAFWA); and The National Military Fish and Wildlife Association, in addition to many other local and regional coalitions. There are also international collaborations, including the Commission on Environmental Cooperation Advancing Pollinator Conservation throughout North America project (CEC 2024) as well as research coordination projects, such as the USDA-funded U.S. National Native Bee Monitoring Research Coordination Network.

Successful implementation of a national native bee monitoring and inventory program requires a broad coalition of support. A broad network of stakeholders and key partners have provided guidance regarding the development of the overarching framework and these partners will be critical in supporting next steps as the foundational systems are designed and created to receive and support a wide variety of data. The core leadership of the system referred to as USBee will assist in the coordination with partners, background data management, and data analysis, as well as providing technical and administrative support. The pilot framework of USBee, currently in its initial stages (Figure 1), is being developed in partnership with USGS EMA staff in partnership with USFWS and national RCN leaders. The current version is intended to support the development of modules that allow for partners to develop a monitoring framework for focal species at desired scopes and scales with input and support from central coordinators. Modules will be developed by teams of stakeholders with an interest in monitoring a focal bee species in their area, with state wildlife agencies playing a key role in identifying focal species and their information needs. Module development will follow a standardized workflow (Figure 2) that has been developed for USBee, with support from a module-reviewer team. A monitoring program for a focal bee species developed in USBee would then support the input of data from the partners involved in the project and those data will be contained in the larger

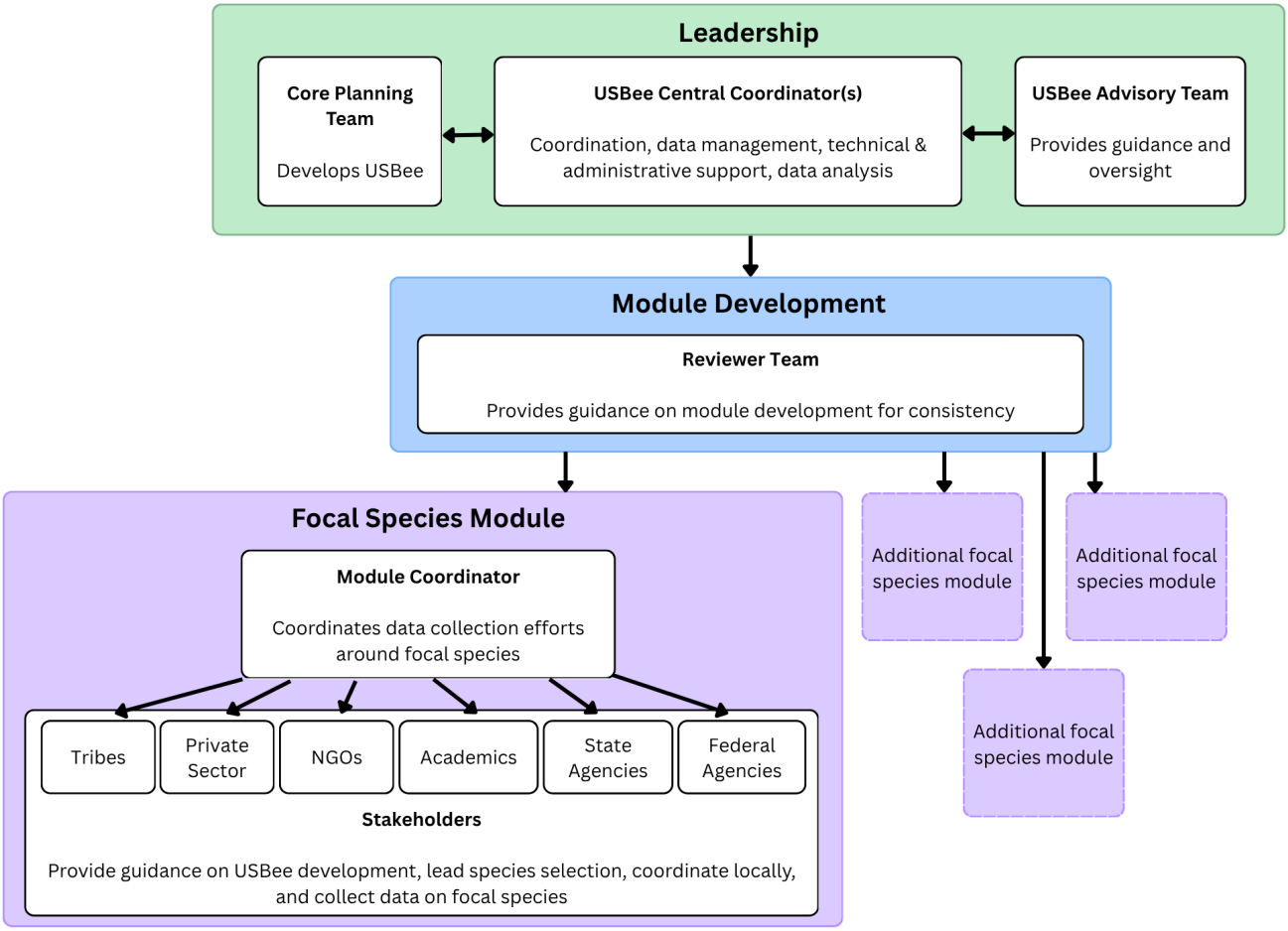

Figure 1. Conceptual framework of the USBee Monitoring Program and focal species module development. Figure by S. H. Woodard and used with permission.

database and available for analysis by module members. Multiple modules could be developed for focal taxa or geographic regions. In addition to the foundational monitoring framework, data collected as a part of inventory work would also be supported by USBee so that a central repository of national bee data would be maintained and available to wildlife agencies, researchers, and conservation partners.

USBee will initiate a small number of focused, time-bound task force groups aligned to priority needs (e.g., monitoring design, data standards), with additional groups (e.g., taxonomy, communications) developed as capacity and needs evolve. Groups will be composed of members from federal and state agencies, NGOs, and academia. The taxonomy group will standardize the identification and classification of bee species to ensure data accuracy and consistency. The data standards group will confirm that collected data are interoperable and sustainable for national-scale analyses, adhering to all federal data management principles as applicable. The monitoring design group will create scientifically sound, cost-effective monitoring protocols that can track bee population trends nationally. Lastly, the communications group will ensure effective exchange of information among stakeholders, promoting collaboration, partnership, and widespread engagement.

AFWA plays a critical role as a liaison among state, territorial, and federal agencies, facilitating partnership and collaboration on broad and relevant issues. AFWA has been important in emphasizing the significance of invertebrate inclusion in SWAP's and supports the need for standardized monitoring and a central data repository for bees. To support the implementation of recently revised SWAPs as well as federal agency pollinator plans, foundational infrastructure and coordination is needed nationally. AFWA and its member agencies and organizations are recognized leaders in the wildlife management and conservation field, and as growing levels of imperilment of native bees are documented nationally, the community of specialists will look to AFWA to assist in the prioritization and implementation of a national framework to document and advance conservation delivery for native bee species.

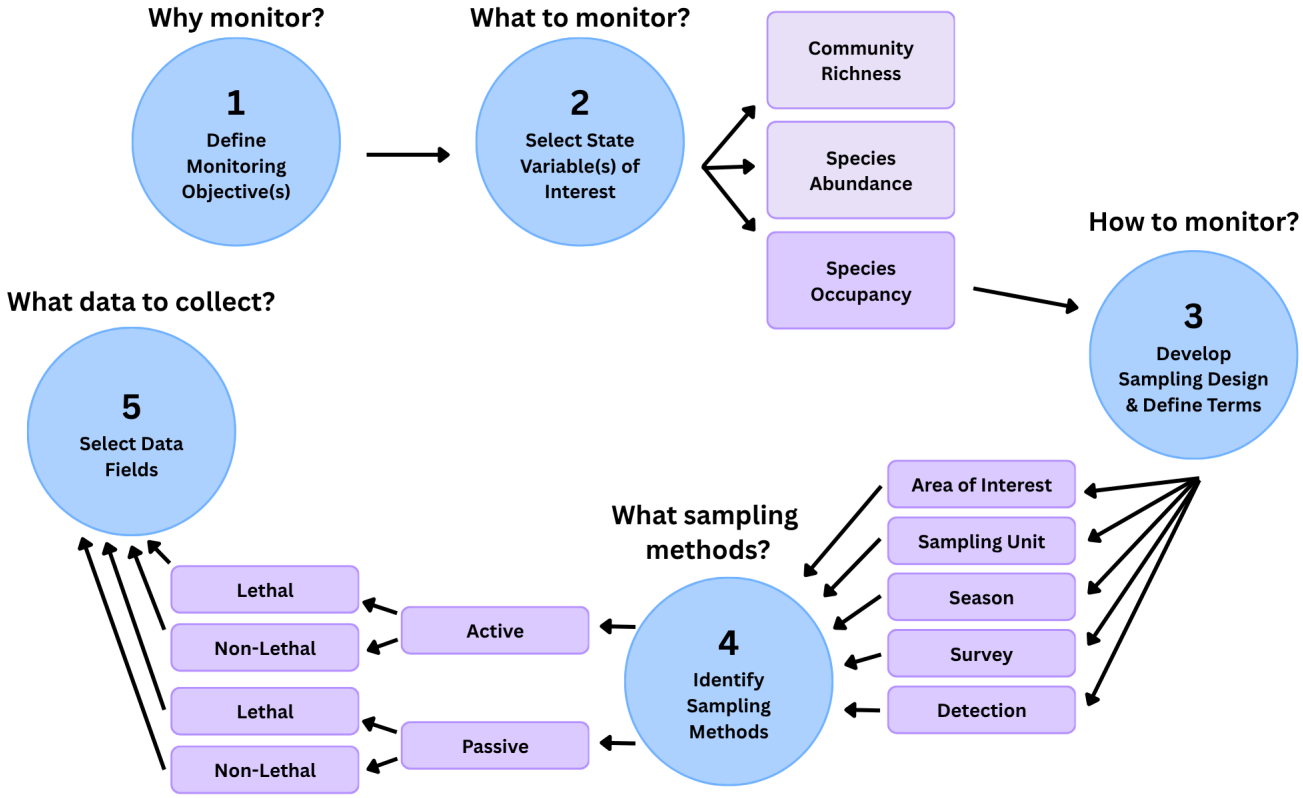

Figure 2. Workflow for developing a monitoring module in USBee. Occupancy will be the primary variable of interest at the start of the program. Figure modified from Otto et al. 2025 with permission.

Expected Outcomes and Metrics

Developing a standardized and coordinated approach for the collection and management of native bee data will substantially support native bee taxonomic assessment and inventory, monitoring, and data management at the national level. This expanded support, along with enhanced staff capacity, are essential for addressing identification bottlenecks and data gaps that currently limit native bee monitoring efforts and the subsequent development of effective conservation actions. Standardized data collection protocols and interoperable data infrastructure will allow for the consolidation of expert-vetted bee occurrence and monitoring data across projects, jurisdictions, and time, thus supporting robust analyses nationwide. These advances will allow for for the tracking of native bee status and trends across local, regional, and national scales using defensible state variables such as occupancy. Improved access to high-quality, transparent data and the development of decision-making tools will facilitate integration of native bee data into management decisions, species status assessments, and conservation investment prioritization. Collectively, these outcomes will justify the development of an efficient, collaborative, and transparent national native bee monitoring system that reduces redundant collecting efforts and strengthens the scientific foundation for conserving native bees and the ecosystem services they provide.

Call to Action

Population declines among native bees have been well documented across the country and require a rapid response from the wildlife agencies tasked with their management or with species or habitat priorities supported by the services provided by these taxa. Given the breadth of species diversity and ranges spanning state boundaries, a broader coordinated effort to collect data and assess status is required. With the implementation of many SWAPs and the launching of many federal pollinator conservation initiatives, the opportunities for unified collaboration have never been better and the wildlife conservation community is poised to make progress to support the management of priority species at a national scale. The USBee program in its pilot stage is poised to serve as a robust foundation for data-driven bee conservation and adaptive management. Moreover, public interest in native bees and other pollinators is a powerful factor driving local, state, and federal conservation and management policy. Recent successful policy efforts to establish regulatory, management, and conservation authority over native bees and other invertebrates in states such as Colorado and New Mexico highlight the demand for action from our constituents and underscore our responsibilities.

Recommendations for AFWA

1. Engage with the entomological & native bee communities as a leader in the fish and wildlife management sector. Continue to grow collaborations & implement actions that intersect with joint priorities, in particular matters of relevance to AFWA members & partners.

2. Increase the effectiveness of wildlife management advocacy efforts through collaboration with native bee conservation initiatives and increased engagement with policymakers.

3. Become more engaged with state, federal, and tribal officials, and work alongside NGO partners for the implementation of standardized inventory and monitoring actions for the benefit of SGCN native bees (Mawdsley & Humpert 2016).

4. Encourage AFWA members and regional fish & wildlife associations to develop inventory and monitoring implementation strategies. Coordinate & offer support to these efforts in order to achieve workable consistency and to help remove barriers to success.

5. Increase engagement with the AFWA One Health Committee to enhance in cross-discipline initiatives.

6. Reinforce existing relationships among scientists, pollinator ecologists, biologists, land managers, legislators, and other stakeholders to meet current and future challenges.

Citations

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