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TITLE: BUILDING FROM BIODIVERSITY ASSESSMENT TO PLACE-BASED CONSERVATION ACTION ACROSS SCALES OF INFORMATION AND GOVERNANCE.

Authors: Carlos Carroll[1], Asena Goren[2], Thomas S. Hoctor[2], Reed F. Noss[2],

Lindsay M. Dreiss[3], Daniel J. Rohlf[4].

1 Klamath Center for Conservation Research, Orleans, CA USA

2 University of Florida Center for Landscape Conservation Planning, Gainesville, FL USA

3 Department of Environmental Science and Policy, George Mason University, Fairfax, VA, USA

4 Earthrise Law Center, Lewis and Clark Law School, Portland, OR USA

Corresponding author: Carlos Carroll, carlos@klamathconservation.org, PO Box 104, Orleans, CA 95556

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ABSTRACT

Scientific assessments of biodiversity and ecosystem services are challenged by the need to examine systemic drivers of change while maintaining support in a polarized political climate. Recent US national policy shifts that reduce federal support for scientific assessments underscore the necessity of a broad-based, resilient, and scalable assessment framework with sustained engagement of conservation practitioners from academia, non-governmental organizations, and subnational governments. Such an information ecosystem would integrate spatial data relevant to practitioners from national to regional extents with case studies of place-based strategies and mechanisms for framing local successes within national objectives. Subnational initiatives such as the Florida Wildlife Corridor and Southeast Conservation Adaptation Strategy provide examples of ambitious, science-informed conservation assessments developed and implemented with both governmental and public support. Engaging a diversity of participants and ensuring greater salience across scales are complementary approaches to strengthening the effectiveness of assessments. Sustaining non-governmental capacity for engagement with the assessment process requires improved models of collaboration, altered academic reward structures, and diverse sources of funding. Improved integration of national-scale data in subnational assessments can strengthen existing models, including state and provincial biodiversity strategies, and support the synthesis of currently fragmented spatial data on biodiversity distribution, threats, and conservation priorities. Stronger linkages between narrative assessments and spatial data, between spatial data and

place-based action, and between public engagement with the assessment process and local conservation initiatives can ensure a diverse, resilient support system for biodiversity data development, synthesis, and application that produces actionable knowledge to support place-based conservation.

INTRODUCTION

One of the greatest challenges facing humanity is the urgent need to halt and reverse biodiversity loss (IPBES, 2019; Díaz & Malhi, 2022). The magnitude of this challenge in the face of countervailing socioeconomic pressures has led to calls for transformative societal change to restore the relationship between humans and nature (IPBES, 2024). Effectively addressing such complex environmental challenges requires addressing systemic drivers of biodiversity loss across economic, political, social, and cultural dimensions (Lemos & Agrawal, 2006; Larigauderie et al., 2025).

Recent developments in the United States have forced a reevaluation of how scientific assessments can inform conservation policy and practice. In 2022, the US federal government initiated two groundbreaking initiatives: the National Nature Assessment (NNA; White House, 2022; Tallis et al., 2023, 2024) and the Biodiversity and Climate Change Assessment (USGS, 2024; NASEM, 2025). Both assessment processes were terminated in 2025 by the new federal administration (Nature, 2025). In response, non-governmental organizations and scientists organized to complete the national assessment (Levin, 2025).

The challenges presented by loss of federal support provide an opportunity to reimagine our model for assessments and strengthen their utility to practitioners and policymakers. Assessments historically have not been well translated to conservation outcomes; actionable recommendations are needed to address this shortfall. Recognizing that limited resources and timelines constrain individual initiatives, we nonetheless see value in proposing actions to build on existing groundbreaking efforts. Our focus here is strengthening place-based conservation; we acknowledge we do not comprehensively treat other essential elements of the assessment process (e.g., knowledge co-production; Beier et al., 2016).

Conserving places of value to nature and people is a central strategy for addressing the biodiversity crisis (IPBES, 2024). Many place-based conservation efforts are carried out by state, provincial, and Indigenous (Tribal [US] or First Nation [Canada]) governments (ICLEI, 2024). Assessments – comprehensive scientific evaluations of status, trends, and drivers of change in biodiversity and ecosystem services – can form a key element of the evidence base supporting place-based initiatives if they provide information that responds to the needs of conservation practitioners and policymakers at a range of spatial scales (IPBES, 2019, 2024).

We focus here on three facets of this complex challenge: enhancing linkages between narrative assessments and spatial data, between spatial data and place-based action, and between public engagement with the assessment process and local place-based conservation initiatives (Figure 1). We propose that comprehensive biodiversity assessments should adopt a sustained assessment model (Moss et al., 2019) that includes both periodic narrative syntheses and scalable geospatial data. Linking assessments and associated data more effectively to place-based actions requires scaling information over a range of spatial extents, and making this information relevant to a wide range of policymakers. Engaging a diversity of participants and ensuring that assessments clearly communicate the value and status of biodiversity are complementary approaches for broadening and sustaining public support for conservation science and action in the face of shifting political winds.

ROLE OF ASSESSMENTS IN SUBNATIONAL PLACE-BASED CONSERVATION: THE FLORIDA WILDLIFE CORRIDOR.

To better evaluate opportunities for linking assessments to place-based strategies, we explore one of the most successful (in terms of resources committed and area conserved) US examples of science-informed placed-based conservation. Since 1990, the State of Florida has spent >$6.6 billion USD to protect over one million hectares of land for biodiversity and ecosystem services in concert with local and county-level programs (Figure 2; Bohnett et al., 2024). Since 1997 The Florida Ecological Greenways Network (FEGN) and the associated Florida Wildlife Corridor (FWC) initiative have guided or inspired much of this land protection investment (Noss & Hoctor, 2026).

The FWC provides a compelling illustration of how assessments based on detailed spatial data and resulting priorities can inform subnational conservation action. Conservation science underpinned the FWC from the start. Initial proposals in the 1980s for a statewide network of connected conservation areas were based on hand-drawn maps informed by habitat and connectivity needs of wide-ranging species, especially the Florida panther (*Puma concolor couguar*) and black bear (*Ursus americanus floridanus*)(Noss, 1987). The integrated data, and consequently FWC's design, evolved over several decades to encompass a broader suite of species and ecosystem components (Figure 2a).

Initially thought to be too ambitious, the effort eventually received strong bipartisan political support due to a general consensus among policymakers and the public that Florida must lead on science-based land conservation programs to effectively respond to negative impacts of human population growth and development pressure, the highest in the nation (Noss & Hoctor, 2026). Support for the effort was further ensured through a collaborative implementation approach across diverse land ownerships and scales (Noss & Hoctor, 2026).

Ecological data are maintained, curated, updated, and analyzed by academic-governmental partnerships (Center for Landscape Conservation Planning [CLCP] and the Florida Natural Areas Inventory [FNAI])(Noss & Hoctor, 2026). The FEGN model is continuously updated by a team of conservation scientists using the best available data and conservation planning methods, with engagement by a Technical Advisory Group drawn from a diversity of domains (Hoctor et al., 2025). These data are used to prioritize land conservation projects through county, state, and federal programs guided by a multi-stakeholder council (Hoctor et al., 2000). State-level priorities are scaled down to inform local land-use planning decisions in cooperation with county-level conservation programs and Florida's many land trusts (Carr et al., 2026).

FWC proponents pursued an approach that combined both government-led and grassroots public engagement elements. The Florida Fish & Wildlife Commission Cooperative Conservation Blueprint project convened regional task forces to collaboratively develop data and priorities that were seen as credible and authoritative by state and local agencies. Simultaneously, public support was developed through innovative media, storytelling, and outreach campaigns and field expeditions focused on charismatic flagship species and unprotected priority natural areas. These campaigns were essential to building broad-based support for the FWC's ambitious place-based conservation strategy. The resulting substantial investment for conservation easements and land acquisition from willing sellers increased support from rural landowners (Noss & Hoctor, 2026).

Biodiversity assessments across broader spatial extents have also informed FWC priorities. The North American Coastal Plain was identified as a biodiversity hotspot (with Florida as the most biodiverse part of the region) via a global-scale analysis (Noss et al., 2015). Similarly, identification of climate refugia and critical areas for conservation of migratory species have involved analyses at a broad extent (Reece et al., 2013; Noss & Hoctor, 2026)(Table 2). FWC collaborators successfully petitioned for designation of the Okefenokee Swamp (a FWC core area on the Florida/Georgia border) as a globally significant UNESCO World Heritage site (Aicher et al., 2025).

As the FWC evolved, it has served as a catalyst for multi-state regional planning initiatives that adapted both the scientific methodology and the collaborative planning approach that has had demonstrated success in Florida (Johnson et al., 2021). Regional collaboration in connectivity planning involves partnerships between state natural heritage programs, state and federal agencies, Tribal Nations, NGOs, and other groups. The Southeast Conservation Adaptation Strategy (SECAS; https://secassoutheast.org; Figure 2b) was initiated in 2001 to coordinate connectivity planning via an assessment component (the SECAS Atlas and Conservation Blueprint) and associated spatial data (Johnson et al., 2021)(Figure 2b).

Regional assessment and planning can be especially challenging when it spans national boundaries. However, recent North American examples show progress on this front. The Cascadia Blueprint initiative in the northwestern US and southwestern Canada has developed a digital transboundary assessment and associated spatial data, with the goals of strengthening transboundary coordination, supporting Indigenous conservation leadership, and integrating connectivity conservation and climate adaptation priorities in planning (Krosby et al., 2023). The Yellowstone-to-Yukon initiative is another US/Canada transboundary partnership involving non-governmental organizations working to conserve connectivity for wide-ranging carnivores and other species of concern (Hebblewhite et al., 2022; Naidoo et al., 2025).

Regional initiatives leverage key advantages of scale: they capture ecological processes and contexts that extend beyond the boundaries of any single jurisdiction but retain a more coherent bioregional focus than could a national assessment (Table 2). Because they are typically initiated by subnational groups, these "communities of practice" may have greater legitimacy to stakeholders than do purely national efforts (Kalafatis et al., 2015).

However, work at the bioregional scale is challenged by the *ad hoc* nature of these cooperative efforts, and the lack of any formal governance structure to provide institutional continuity. Given their potential benefits, regional initiatives merit increased support from national governments directly via funding and indirectly via development of scalable datasets and assessments (Table 2). Future efforts can build on the example of the Landscape Conservation Cooperative (LCC) program, a US federal initiative lasting from 2011-2017 to support 22 regional conservation partnerships with state and Tribal governments (Mankowski et al., 2021).

ENSURING ASSESSMENTS CAN SUPPORT PLACE-BASED CONSERVATION.

The FWC initiative has clearly led to positive conservation outcomes. But what lessons does this example hold for crafting effective assessments? Although the Florida initiatives produce periodic reports and peer-reviewed scientific publications (Noss & Harris, 1986; Noss, 1987; Hoctor et al., 2000; Bohnett et al., 2024, 2026; Noss & Hoctor, 2026), their primary focus is on developing spatial data resources to inform place-based conservation actions (UF Center for Landscape Conservation Planning Hub, 2026).

Conversely, global and national scientific assessments have historically treated spatial information as a supporting element, secondary to general conclusions that hold across varied geographies (Carroll et al, 2022 a,b; Plumptre et al., 2024). This may be a legacy from older models of scientific assessments as periodic stand-alone documents. In the climate science field, recent proposals for a "sustained" assessment model involve creation of a comprehensive national geospatial information system and establishment of an assessment consortium with broad participation from non-governmental scientists and practitioners (Moss et al., 2019).

Spatial data are key to assessing habitat loss or degradation, the leading driver of biodiversity loss; they are also useful for designing strategies to address other threats such as invasive species and overexploitation (Hogue & Breon, 2022). Recent global assessments by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) recognize the need to integrate place-based measures (spatial planning, protected areas, connectivity conservation) with less-place-specific policy changes such as subsidy reform (CBD, 2022; IPBES, 2024).

Spatial analysis and systematic conservation planning are essential to achieving many of the targets of the Convention on Biological Diversity (CBD) Kunming-Montreal Global Biodiversity Framework (KMGBF)(Giakoumi et al., 2025). For example, KMGBF Target 3 commits nations to conserve 30% of their territory (the "30x30" ambition) by identifying ecologically representative, well-connected areas of particular importance for biodiversity (CBD, 2022).

BENEFITS OF LINKING ASSESSMENTS AND DATA ACROSS SCALES

Our thesis that comprehensive biodiversity assessments should include both narrative syntheses and scalable spatial data may seem overambitious given that narrative assessments potentially divert scarce resources from place-based conservation. However, narrative assessments can complement on-the-ground initiatives by synthesizing existing literature, traditional knowledge, and other data, and communicating actionable findings to a broad audience (IPBES, 2019). This can both increase public support for place-based action and help coordinate local actions within a coherent policy framework (Figure 1). (By policy, we refer to both programs that direct resources to conservation priority areas and non-place-specific regulations).

Even acknowledging the value of linking assessments and spatial data at the subnational scale, one may question the effort necessary to connect and coordinate such efforts with national assessments and data. Place-based approaches to conservation are successful in part due to the power of local context in motivating human connections with nature (IPBES, 2024; Raudsepp-Hearne et al., 2026). Under federalism structures such as govern the US and Canada, subnational governments assume major responsibility for biodiversity and wildlife conservation, especially on private land.

Subnational initiatives such as the FWC nonetheless benefit from linkages to national efforts. Assessments can support place-based conservation by both scaling down and scaling up information (Figure 3, Table 2). Scaling down national assessments can provide subnational initiatives with information on biodiversity features and ecological processes that extend beyond their boundaries. Examples include the status of migratory and wide-ranging species, and ecosystems that span states, provinces, and countries (Table 2).

The US federal government has a major responsibility for land management; nearly one-third of the US is managed by a federal agency (Hanson & Vincent, 2020). This provides a direct pathway for national and subnational assessments to inform federal land management planning, especially by fostering analyses that extend beyond the boundaries of individual administrative units (Schultz et al., 2015; Carroll et al., 2025). Effectively implementing global and national commitments to place-based conservation targets (e.g., KMGBF Target 3 ("30x30"), Canada's Target 1, and the US "America The Beautiful" initiative) requires comprehensive spatial information on biodiversity features (Baker et al., 2025; Coristine et al., 2018; Carroll & Noss, 2022; Carroll & Ray, 2021; Schloss et al., 2024; Watson et al., 2023).

While Federal agencies directly manage only 13% of Florida lands, they are key partners in FWC implementation, in large part through funding such programs as Land and Water Conservation Fund, North American Wetlands Conservation Act, Agricultural Conservation Easement Program, Regional Conservation Partnership Program, and Forest Legacy Program (Noss & Hoctor, 2026). The Department of Defense Sentinel Landscapes Partnership involves assessment and planning in collaboration with state, local, and private partners across large landscapes surrounding military installations (Cranston, 2019).

Scaling up data from subnational initiatives to understand national trends and draw lessons from conservation success stories is also a key role of national biodiversity assessments (Table 2). This effort can use subnational assessments and biodiversity strategies developed by state, provincial, and Indigenous governments (Lachler & Wilkerson, 2014; Hébert et al., 2025).

The challenge is for national assessments to contextualize and inform without usurping local initiatives. Both the US and Canadian federal governments have sought to navigate the tension between top-down prioritization and local control by opportunistically supporting initiatives that already garnered strong local support (Carroll et al., 2022a). The downside of this approach is that areas important for biodiversity may not be targeted for conservation actions if no local champions exist for their protection (OAG, 2024).

One major global effort, the Key Biodiversity Area (KBA) database, although still poorly developed in some regions including the US, provides a widely applicable model in part because it combines bottom-up and top-down elements. Local practitioners may nominate areas for inclusion in the database, but nominations are evaluated based on a consistent standard (Lansley et al., 2025; Raudsepp-Hearne et al., 2026). Comprehensive national KBA assessments are key tools in identifying previously unrecognized sites (Plumptre et al., 2025). Networks such as GEOBON and the proposed World Biodiversity Research Program are additional efforts to develop scalable biodiversity data systems analogous to existing climate data networks (Gonzalez et al., 2025; Zurell et al., 2025).

The Florida initiatives exemplify several broadly relevant principles of data development. FWC and FEGN develop data on biodiversity features and land conservation priorities based on principles of transparency and open access; both the methods and spatial data are freely available for review and application (UF Center for Landscape Conservation Planning Hub, 2026).

BARRIERS TO LINKING ASSESSMENTS AND DATA ACROSS SCALES

Despite the evident benefits of cross-scale data development and coordination, progress has been challenging due to barriers related to politics, governance, and data. Regulations and planning efforts that affect biodiversity are poorly coordinated across scales of governance, especially in nations with federalism structures such as the US and Canada (Ray et al., 2021). Biodiversity-related data are often created and curated separately by level of governance with consequent compatibility challenges and concerns about information ownership (Hardisty et al., 2019).

Although national-extent assessments and data can ideally strengthen state and local conservation planning, the scale of analysis inevitably raises issues concerning the respective power of national versus subnational and local governments. Within the US, the proposals to assess and map biodiversity at a national extent, including to the National Biological Survey in the 1990s as well as the recent NNA, has been attacked as a threat to private property rights and local control (Pulliam 1998a, 1998b: Carroll et al., 2023). Early versions of the FWC were opposed by some land development interests for similar reasons (Noss & Hoctor, 2026).

This political dynamic is not unique to biodiversity assessments but has increasingly affected scientific assessments in fields such as climate science and public health. The US National Climate Assessment (NCA) is mandated to be issued at four-year intervals (Landry et al., 2025). However, the current US federal administration disbanded the team of experts tasked with producing the 6th NCA and restricted participation of federal scientists in the global Intergovernmental Panel on Climate Change (IPCC) assessment (Nature, 2025).

In response, non-governmental groups have sought to salvage the climate assessment process (Table 1). US scientific societies and universities have stepped in to support continued development of national science syntheses and participation of US scientists in forthcoming global assessments (Landry et al., 2025). A coalition of governments, academia, and non-profit groups have joined forces to continue federally initiated monitoring efforts and ensure public availability of climate data, including via the Climate.US website (Sheperd, 2025; Temple, 2025). Analogously, when the US government terminated the NNA effort in 2025, a non-governmental organization (The Nature Record) was organized to support completion of the assessment (Levin, 2025). Efforts are ongoing by non-governmental groups to support US scientists involved in development of IPBES reports (Bowser et al., 2025)(Table 1). Although these non-governmental efforts arose in response to a crisis, they offer an opportunity for creative evolution of the US assessment model.

HOW CAN ASSESSMENTS BEST NAVIGATE THE NEXUS BETWEEN SCIENCE AND POLICY?

Global biodiversity and climate change assessments are premised on an explicit or implicit theory of change regarding how scientific information can effectively inform policy (Hoppe et al., 2023; Pörtner et al., 2023; McElwee & Harrison, 2025). Cash et al. (2002) identified three qualities fundamental to the ability of assessments to inform action: credibility (is the information authoritative?), legitimacy (does the process consider diverse perspectives?), and salience (is the information relevant to decision making?). Scientific assessments completed by national governments and intergovernmental bodies have historically focused on credibility, sometimes to the detriment of legitimacy and salience (Cash et al., 2002). Scientists involved in recent US non-governmental climate and biodiversity assessments are navigating unfamiliar terrain to create a product that retains credibility while engaging a broader spectrum of scientists and practitioners.

Assessments focused on anthropogenic climate change can provide insights for how biodiversity assessments can simultaneously achieve credibility, legitimacy, and salience. Climate change assessments such as the US NCA typically present a policy-relevant portfolio of potential mitigation options and their projected consequences while striving to avoid being perceived as policy-prescriptive (IPCC, 2023; Avery et al., 2025). Although the complexity of ecological systems makes development of analogous scenarios challenging, biodiversity assessments also increasingly incorporate scenarios that project consequences of alternative policies (Periera et al., 2024; Kowarsch & Jabbour, 2025; Pérez-Granados et al., 2025; Zurell et al., 2025; Aschi et al., 2026).

For example, IPBES has developed a tool that enables scientists to make future biodiversity projections at multiple scales (Nature Futures Framework; Kim et al., 2023). Such scenarios can be a key resource for informing land and resource management planning, both at national (ECCC, 2024; Gerber et al. 2024; Cooke et al., 2026; Rigal et al., 2026) and subnational extents (Hébert et al., 2025; Pérez-Granados et al., 2025)(Figure 3). For example, the FWC employs models projecting alternative future scenarios for Florida's population growth and land use change to help prioritize acquisition of conservation lands (Farrah et al., 2025; Noss & Hoctor, 2026).

IPBES recently completed a transformative change assessment (TCA) describing strategies that could promote "a fundamental, system-wide reorganization across technological, economic and social factors…that matches the scope, scale, speed and depth necessary to maintain life on this planet" (IPBES, 2024). The TCA's strategies for transformative change include place-based conservation, structural changes in both economic systems and governance, and empowerment approaches that strengthen human connections with nature (IPBES, 2024).

In the context of climate change policy, nations and corporations economically dependent on fossil fuels have sought to dilute calls for such systemic interventions to address drivers of climate change (Morrison et al., 2022). The resulting conflicts have increasingly spilled over from climate and biodiversity policy fora (UNFCCC, CBD) to the scientific assessment process itself (Carroll et al., 2017; Tandon et al., 2025; Niiler, 2025). While IPBES's increased focus on transformative change promises opportunities to strengthen assessment impact, it also risks increasing opposition to future assessments from institutions that resist calls for departures from "business-as-usual" scenarios (Gustafsson & Hysing, 2023; Hughes & Grumbine, 2023).

Legitimacy (Cash et al., 2002) implies not only consideration of diverse perspectives but also substantive engagement with diverse stakeholders; increased legitimacy can enhance resilience of an assessment effort in the face of loss of support from any one source (e.g., national governments). Salience, the fit of assessment data to specific applications, can be strengthened by prioritizing relevance to planning and decision-making in gathering data, providing resources to support subnational governments and organizations in applying data, and fostering greater collaboration between local and national initiatives (Lemos et al., 2012; Moss et al., 2019)(Figure 3, Table 1). Recent efforts in developing regional climate assessments have led to progress on addressing legitimacy and salience (Kirchhoff et al., 2019; Crimmins et al., 2025; Frazier et al., 2025).

Examples of effective communication concerning climate science can provide insights on how to achieve both credibility and legitimacy in the face of organized opposition and misinformation campaigns (Oreskes & Conway, 2010). We do not minimize the challenge facing biodiversity assessment initiatives as they seek to maintain support in the current political context. However, we propose that to be effective, assessments must examine systemic drivers of biodiversity loss and associated policies in a transparent and inclusive manner.

PARALLELS AND CONTRASTS TO OTHER GEOGRAPHIES

The challenges we discuss above apply broadly, especially as the world's nations develop an evidence base to support progress towards the KMGBF targets (CBD, 2022). For example, as a party to the global CBD (unlike the US), Canada's federal government has formally committed to implementing the KMGBF, and issues periodic strategy updates and reports on progress towards achieving biodiversity targets (ECCC, 2024). Although the Canadian federal government directly manages only a small portion of the national land area, it plays a role in national coordination of land-use decisions such as development of critical mineral resources (Ray et al., 2021; Kerr, 2023).

Nevertheless, data and assessments to support such coordination are currently underdeveloped (OAG, 2024). For example, Canada's 2030 Nature Strategy (ECCC, 2024) highlights relevant actions across jurisdictions yet provides limited clarity on how to evaluate overall progress toward transformative outcomes. Comments submitted on the draft strategy highlighted the absence of a centralized national biodiversity data platform and warned that federal biodiversity assessment may provide little actionable information absent a monitoring and reporting infrastructure coordinated with local and provincial authorities (WCS Canada 2023, 2024).

The most ambitious recent place-based conservation initiatives in Canada involve spatial planning and associated funding to further reconciliation between First Nations and settler governments (No'kmaq et al., 2021; Mansuy et al., 2024). For example, First Nations are working to protect ~9 million hectares (about 19%) of the Yukon Territory via planning processes and self-declared Indigenous Protected and Conserved Areas (IPCA)(Mantyka-Pringle et al., 2025). Indigenous-led spatial planning can form a component of broader reconciliation efforts by supporting self-determination and more inclusive governance (No'kmaq et al., 2021; Mansuy et al., 2024), illustrating the intersection of equity and place-based conservation as a pathway to addressing biodiversity loss (IPBES, 2024).

Commitments to knowledge co-production with Indigenous rightsholders are widely recognized as fundamental to reconciliation between First Nations and settler governments. However, evidence from Indigenous-led planning processes suggests that while some national datasets can inform priority-setting, their use raises ongoing questions of legitimacy that must be addressed through approaches that explicitly bridge Western and Indigenous knowledge systems (e.g., "two-eyed seeing"; Mantyka-Pringle et al., 2025)(Table 1).

CONCLUSION

Scientific biodiversity assessments face the challenge of addressing root drivers of biodiversity loss while simultaneously maintaining credibility, legitimacy, and salience in a polarized political climate (Gustafson & Hysing, 2023). Recent shifts in US national policy have significantly reduced federal support for national scientific assessments. Despite the currently adverse political context, these challenges represent an opportunity to reimagine our model of assessments and strengthen their utility to practitioners and policymakers by drawing lessons from successful subnational conservation initiatives.

We can use the current opportunity to clarify objectives and accelerate progress towards a sustained, resilient, and scalable assessment framework with broad engagement from conservation practitioners and the public. Narrative biodiversity assessments should form a key element of a broader "information ecosystem" in which the narrative document is linked to scalable spatial data relevant to practitioners from national to regional extents, with a sustained role for non-governmental participants in co-production and independent review (Beier et al., 2016)(Figure 1).

The need for broader participation and greater salience across scales are not disparate issues but complementary components of an integrated approach to strengthening the effectiveness of assessments. Sustaining non-governmental capacity for engagement with the assessment process requires improved models of collaboration, altered academic reward structures, and more diverse sources of funding (Carroll et al., 2017). The recent response by US climate scientists defending scientific integrity in the face of political pressure provides a relevant model for enhancing involvement of national science academies, scientific societies, and expert groups (Landry et al., 2025).

A resilient assessment framework might involve a consortium including academia, non-governmental organizations, and subnational governments (Moss et al., 2019). The assessment would maintain elements relevant to national policy (e.g., subsidy reform and management of federal lands) but also include case studies of successful state and local initiatives where ambitious science-informed conservation priorities were developed and implemented with both governmental and public support (Noss & Hoctor, 2026).

Especially in nations such as the US where national governments directly manage a significant proportion of the landscape, national assessments can support more effective management for halting and reversing loss of biodiversity and ecosystem services (Carroll et al., 2022a,b). Federal land management agencies could revise relevant regulations and guidance documents to mandate use of national and regional biological assessments in land management planning, and to identify ways that individual administrative areas could coordinate with adjacent federal management areas as well as contribute to national biodiversity conservation goals and advance connectivity and ecosystem integrity (Carroll et al., 2022b). Federal grants (e.g., the Land and Water Conservation Fund) could be prioritized towards advancing broader conservation goals identified in national and regional assessments and supporting integration of assessment data into State Wildlife Action Plans and other subnational planning processes.

Both scaling up and scaling down between national to subnational contexts are necessary (Figure 3, Table 2). Whereas national data provide context for subnational efforts, national syntheses of subnational efforts are necessary to assess progress towards global and national biodiversity targets for ecological representation and connectivity (Lemieux et al., 2022). Improved integration of national-scale data can strengthen existing subnational assessment models, including state and provincial biodiversity strategies, State Wildlife Action Plans, and Habitat Connectivity Action Plans (Lacher & Wilkerson, 2014; NFWPCAN, 2021; Hébert et al., 2025). Although in a polarized political climate subnational efforts may opt to downplay coordination with national governments, the initiatives we describe here have successfully navigated this issue, using national data and resources to strengthen subnational place-based efforts.

Although the individual elements of our proposed assessment/data “ecosystem” (Figure 1) currently exist in some form, the interconnections between these elements need strengthening to build sustained support for assessment development and application. Currently, many national-extent biodiversity datasets in the US are curated by non-governmental organizations, affiliated state agency partners, and Natural Heritage Programs (NatureServe, 2025). Conservation priority maps have been produced by a variety of national organizations based on different aspects of biodiversity (Dreiss et al., 2024; Karimi et al., 2025). Citizen science initiatives such as iNaturalist and eBird are also key resources (Farwell et al., 2025).

Narrative assessments can help synthesize such spatial data on biodiversity distribution and threats, as well as help identify common conservation priorities and galvanize public support to carry them out (Levin, 2025). Initiatives that extend across state, provincial, and national boundaries present challenges in data compatibility, but recent efforts provide models for transboundary data development and application (Krosby et al., 2023). Stronger linkages between narrative assessments and spatial data, between spatial data and place-based action, and between public engagement with the assessment process and local conservation actions (Figure 1) can help ensure a diverse, resilient support system for biodiversity data development and synthesis that produces scalable knowledge to support national, subnational, and local actions advancing biodiversity conservation.

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FIGURE LEGENDS

Figure 1. Diagram of the proposed "Assessment to Action" cycle, highlighting elements of biodiversity assessment initiatives that can enhance their support and connections to place-based conservation. The diagram is intended to highlight the themes of this essay rather than

provide a comprehensive overview of the assessment process, which necessarily includes additional elements.

Figure 2. The Florida Wildlife Corridor (a) and Southeast Conservation Adaptation Strategy (b) represent examples of linking spatial assessments and place-based conservation action at subnational (a, state, b, regional) extents. Priority levels shown are derived from a suite of biodiversity and ecosystem services components described in text (see also Noss & Hoctor, 2026).

Figure 3. Relationship of the examples of biodiversity assessment and conservation action presented in this essay, in terms of spatial scale (Y axis) and along a spectrum from assessment-focused to implementation or action-oriented (X axis). Examples (e.g, National Biodiversity Strategies and Action Plans) shown as action- or implementation-oriented vary in the degree to which they have resulted in on-the-ground implementation to date.

Table 1. Strategies for enhancing resilience, legitimacy, credibility, and salience of national and subnational biodiversity assessments and strategies, along with examples described in this essay.

Strategy	Examples
Broaden concept of assessment to encompass information ecosystem	Florida Wildlife Corridor, SECAS, Cascadia Blueprint
Support knowledge co-production, transparent methods, and open access data	SECAS, Yellowstone-to-Yukon Conservation Initiative, Florida Wildlife Corridor
Integrate Western and Indigenous knowledge sources	Yukon Indigenous-led land planning processes, Cascadia Blueprint
Involve diverse groups, including national academies and scientific societies, in peer review and outreach	Levin (2025), Landry et al. (2025) , Florida Wildlife Corridor
Develop non-governmental support for involvement in assessments	Levin (2025), Landry et al. (2025), Bowser et al., (2025)
Develop scalable spatial data	NatureServe, Key Biodiversity Area program, FWC/SECAS, Cascadia Blueprint
Synthesize and publicize lessons from subnational initiatives	SECAS, Yellowstone-to-Yukon Conservation Initiative, Florida Wildlife Corridor
Support regional and transboundary communities of practice	SECAS, Cascadia Blueprint, Landscape Conservation Collectives
Develop public understanding of relevance of assessment to place-based values	Florida Wildlife Corridor, The Nature Record (former US National Nature Assessment)

Table 2. Examples of assessment elements that are relevant across spatial scales in supporting place-based conservation planning, prioritization, and implementation. A metric or attribute may have different implications when scaling from national to subnational planning or vice versa. For taxa that are locally abundant but globally threatened, information from national assessments could provide context for subnational efforts. Information on a wildlife corridor that spans multiple states suggests the need for coordination across subnational boundaries and also informs subnational efforts concerning ecological flows between adjacent areas. (KMGBF; Kunming-Montreal Global Biodiversity Framework).

Significance	***Priority, Context***	***Coordination, Flows***
Metric		
GENERAL		
Climatic refugia		*
Migratory species habitat		*
Population Connectivity		*
Endangered ecosystems	*	
Contextualize threat levels for broadly distributed species	*	
KEY BIODIVERSITY AREA CRITERIA (Raudseppe-Hearne et al., 2026)		
Threatened Biodiversity	*	
Geographically Restricted Biodiversity	*	
Ecological Integrity	*	*
Biological Processes		*
Irreplaceability Through Quantitative Analysis	*	
KMGBF CRITERIA (CBD, 2022)		
Areas of high biodiversity importance	*	
Ecosystems of high ecological integrity and intactness	*	*
Areas of importance for ecosystem functions and services	*	*
Areas representative of all ecosystem types	*	
Areas important for ecological connectivity, including for migratory species		*
Culturally important areas identified by Indigenous peoples and local communities	*	

Figure 1.

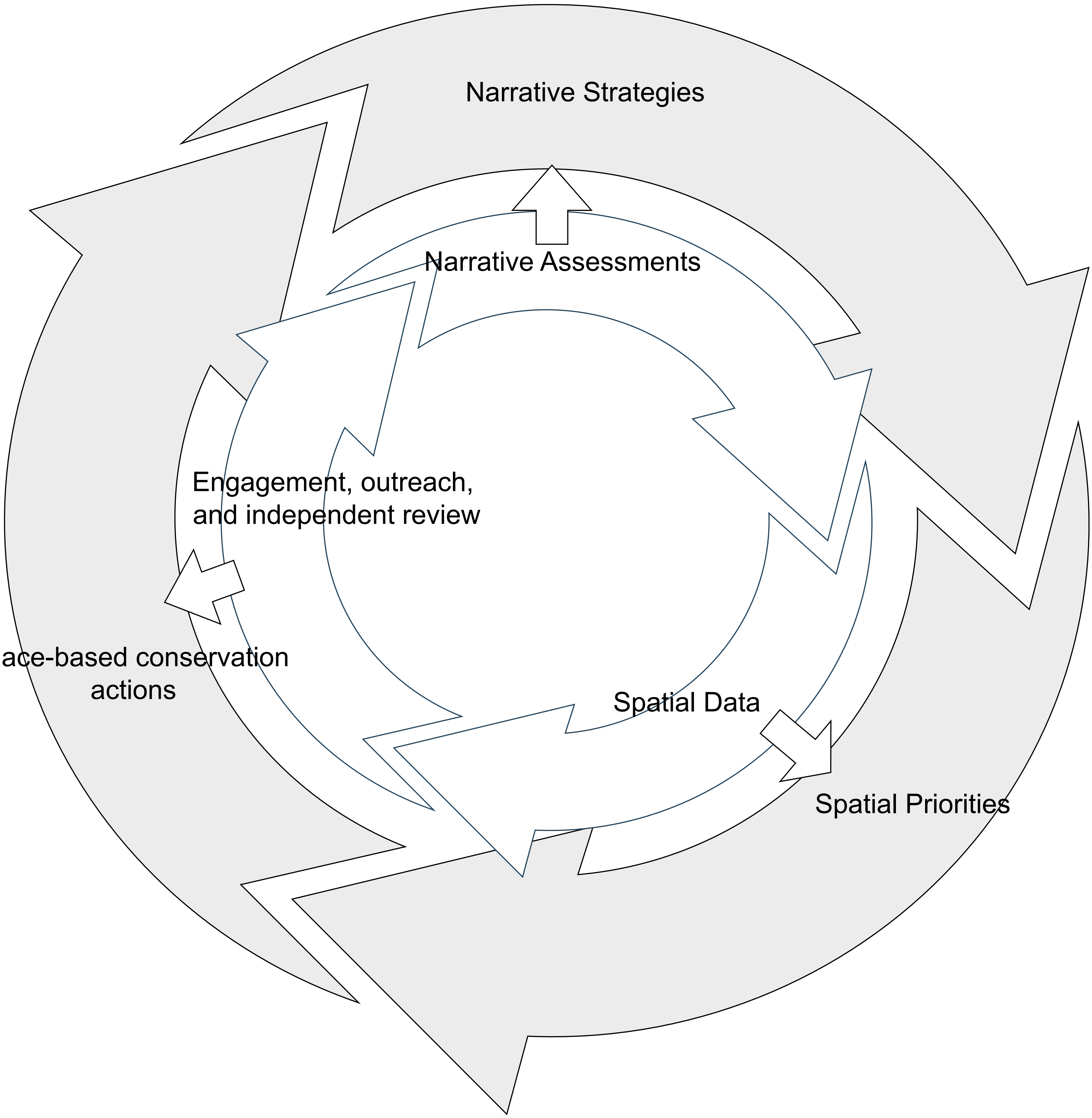
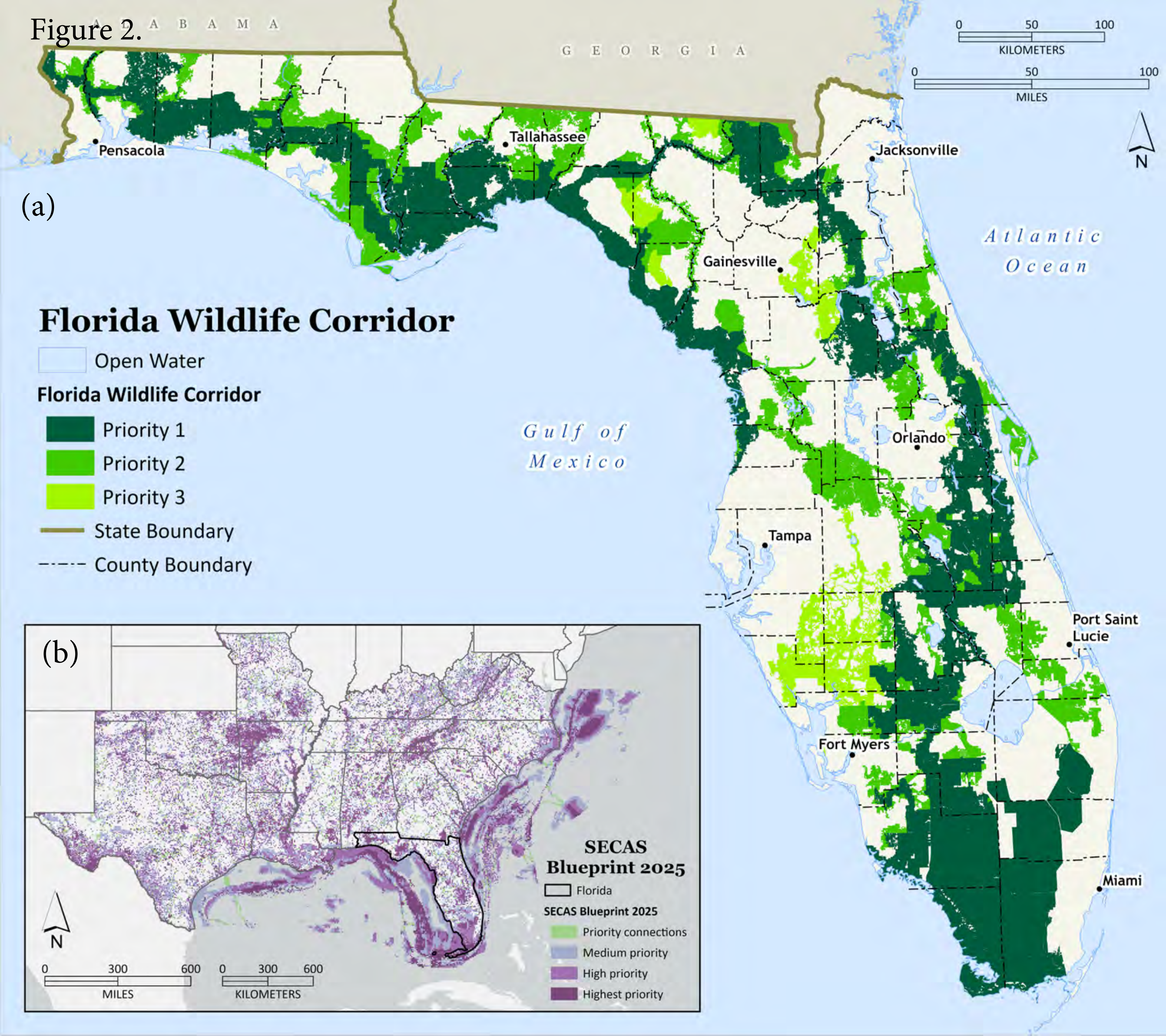
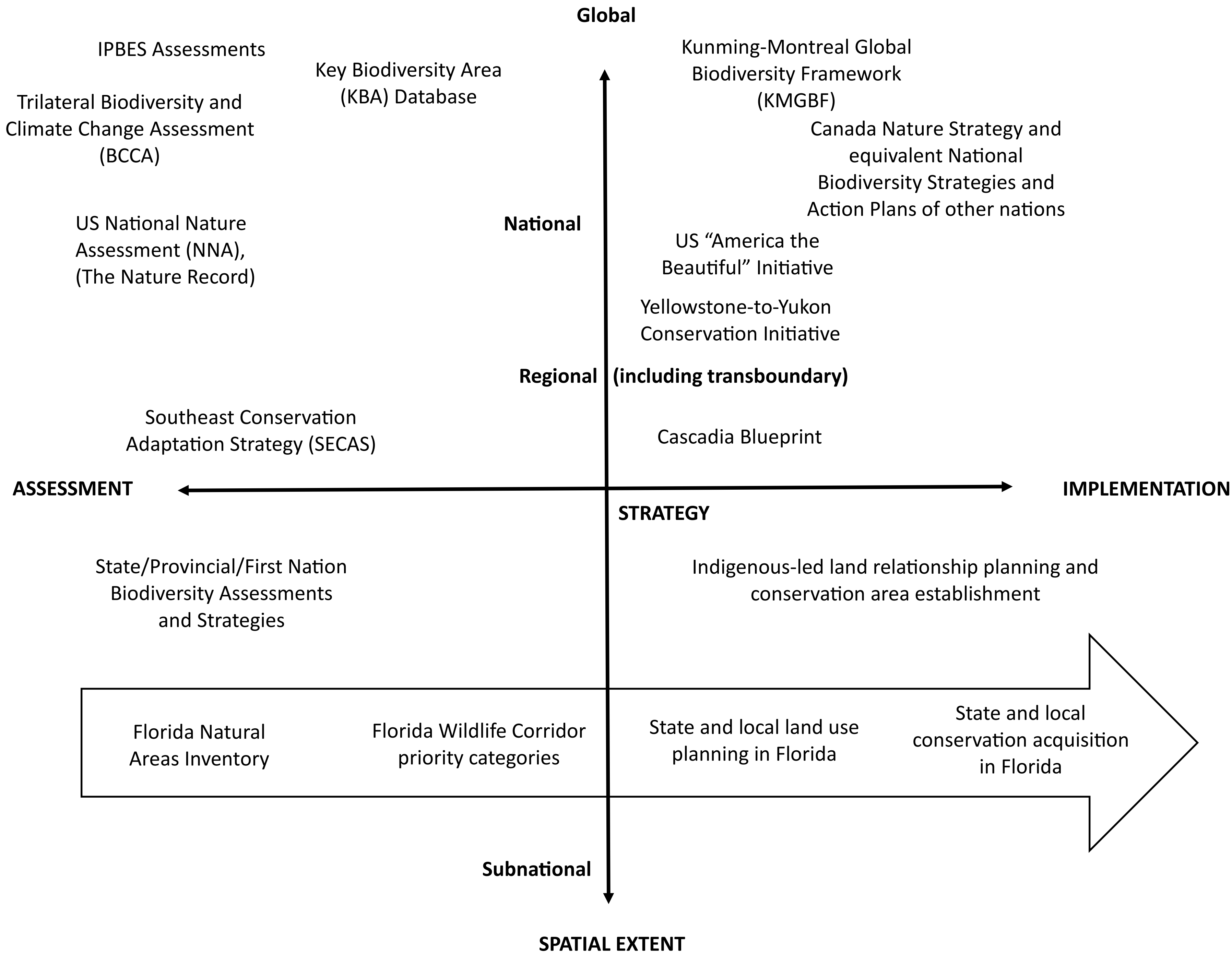

Narrative Strategies
Narrative Assessments
Engagement, outreach, and independent review
Place-based conservation actions
Spatial Data
Spatial Priorities

Figure 2.



(a)
Florida Wildlife Corridor
Open Water
Florida Wildlife Corridor
Priority 1
Priority 2
Priority 3
State Boundary
County Boundary
ALABAMA
GEORGIA
Pensacola
Tallahassee
Jacksonville
Gainesville
Orlando
Tampa
Port Saint Lucie
Fort Myers
Miami
Atlantic Ocean
Gulf of Mexico
0 50 100 KILOMETERS
0 50 100 MILES
N
(b)
SECAS Blueprint 2025
Florida
SECAS Blueprint 2025
Priority connections
Medium priority
High priority
Highest priority
0 300 600 MILES
0 300 600 KILOMETERS
N

Figure 3.


Global
IPBES Assessments
Key Biodiversity Area (KBA) Database
Kunming-Montreal Global Biodiversity Framework (KMGBF)
Trilateral Biodiversity and Climate Change Assessment (BCCA)
Canada Nature Strategy and equivalent National Biodiversity Strategies and Action Plans of other nations
US National Nature Assessment (NNA), (The Nature Record)
National
US "America the Beautiful" Initiative
Yellowstone-to-Yukon Conservation Initiative
Regional (including transboundary)
Southeast Conservation Adaptation Strategy (SECAS)
Cascadia Blueprint
ASSESSMENT
IMPLEMENTATION
STRATEGY
State/Provincial/First Nation Biodiversity Assessments and Strategies
Indigenous-led land relationship planning and conservation area establishment
Florida Natural Areas Inventory
Florida Wildlife Corridor priority categories
State and local land use planning in Florida
State and local conservation acquisition in Florida
Subnational
SPATIAL EXTENT