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POLICY PERSPECTIVE

Coordinating Domestic Legislation and International Agreements to Conserve Migratory Species: A Case Study from Australia

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Abstract

Migratory movements of animals frequently span political borders and the need for international collaboration in the conservation of migratory species is well recognized. There is, however, less appreciation of the need for coordinated protection within nations. We explore consequences of multilevel governance for top-down implementation of international agreements, drawing on examples from Australia and with reference to the United States and European Union. Coherent implementation of legislation and policy for migratory species can be challenging in federal jurisdictions where environmental law making can be split across multiple levels of governance and local and federal priorities may not necessarily be aligned. As a result of these challenges, for example, two-thirds of Australian migratory birds remain unprotected under national legislation. In Australia and elsewhere, coordinated protection of migratory species can be implemented within the current framework of conservation law and policy by actions such as designating national migration areas, negotiating nationally coordinated agreements or listings of migratory species and pursuing new bilateral agreements with key countries along migratory routes.

Introduction

Environmental management actions resulting from legislation can have a positive effect on species conservation (Donald *et al.* 2007; Sanderson *et al.* 2016). Legislation can help to prioritize conservation actions and deliver funding, including for research and monitoring, and create statutory obligations to prepare and implement threat abatement and threatened species recovery plans (Meretsky *et al.* 2011). Over the past century, a suite of legal instruments has emerged for the protection of migratory species. Legally binding international agreements

have been completed around the world with explicit relevance to migratory birds (Jones & Mundkur 2010) with various geographic scopes (e.g., global agreements such as the Convention on the Conservation of Migratory Species of Wild Animals [CMS], or regional agreements across Africa-Eurasia, Europe, North America, and Asia-Pacific). Some focus on specific taxa, such as waterbirds (Agreement on the Conservation of African-Eurasian Migratory Waterbirds) or seabirds (Agreement on the Conservation of Albatrosses and Petrels), while others include all bird species known to migrate between their signatory countries (e.g., US-Russia Migratory Bird Convention).

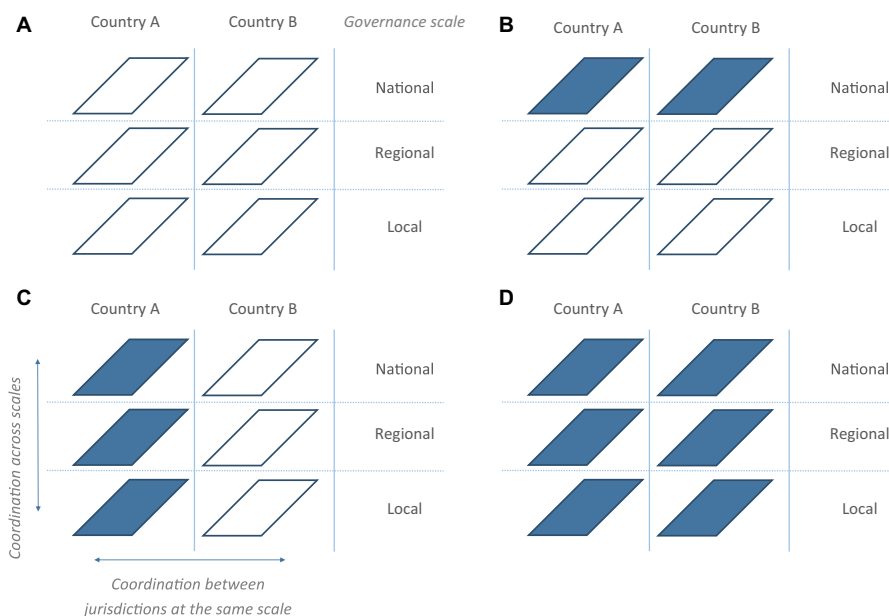


Figure 1 Typology of multilevel governance for conserving migratory species (blank parallelograms: lack of explicit policy for conserving migratory species; solid parallelograms: explicit policy for conserving migratory species in place). Coordination occurs in two dimensions, vertical and horizontal: (A) vertical and horizontal noncoordination, i.e., no institutional arrangements at any scale across entire migratory ranges, (B) horizontal coordination but lack of vertical coordination, i.e., arrangements are coordinated between nations but lack lower-level implementation, (C) lack of horizontal coordination but vertical coordination, i.e., institutional arrangements are coordinated across governance scales within particular jurisdictions of migratory ranges but missing from others, and (D) horizontal and vertical coordination. In reality, a combination of types may apply depending upon the species considered and the spatial scale of analysis.

These arrangements acknowledge that migratory species are intrinsically vulnerable to overexploitation and habitat loss along the chain of sites used during a full migratory cycle (Dorsey 1998; Runge *et al.* 2014), and that access to the common pool resource they represent needs regulation (De Klemm 1989; Lyster 1989; Giordano 2003).

The spatial dynamics of migratory species make it important to coordinate conservation across political jurisdictions (Behrens *et al.* 2008; Boere & Piersma 2012) and much effort has focused on developing agreements between nations (i.e., horizontal coordination; Figure 1). In contrast, migratory species conservation “on the ground” can be delivered through a combination of legislative mandates, local, voluntary, and private conservation initiatives, government funding programs, and local government land-use decision making, requiring coordination between these levels (i.e., vertical coordination; Figure 1).

Centralized powers at the national level can facilitate efforts for coordination. In federal systems, such as Australia, the European Union, and the United States, where environmental law and policy making powers are distributed across multiple levels of government, coordinating rule- and decision-making can be challenging

(Young *et al.* 2015). Translation of national or supranational policy into on-the-ground conservation outcomes can be hampered by local development priorities, resistance to top-down governance, inadequate enforcement across jurisdictions (Dongol & Heinen 2012), or lack of experience with governmental processes (Blicharska *et al.* 2016). For instance, the European Union Birds Directive (79/409/EEC) lists threatened and migratory bird species with the aim of coordinating protection across EU member states. Implementation requires translation into national legislation but levels of support and compliance in some countries is low (Blicharska *et al.* 2016). In response, the European Commission has begun to seek greater involvement by local stakeholders in designing and implementing conservation measures to improve bird conservation across Europe (Kati *et al.* 2015).

Here, we identify progress, challenges, and potential solutions toward achieving coordinated and comprehensive protection of migratory species within a federal system of governance. We outline a typology of multilevel governance for conserving migratory species, with coordination across vertical and horizontal dimensions (Figure 1), which can be used to identify and address multidimensional law and policy gaps for migratory species. We apply this typology to identify legislative gaps

Table 1 Numbers and connectivity of migratory bird species in Australia and their status under the EPBC Act

	Number of migratory bird species	Listed in EPBC as migratory	Listed in EPBC as threatened (CR, EN, VU)	Neither listed as migratory or threatened
Overall number of migratory bird species in Australia	349 (48%)	102 (29%)	34 (9.7%)	235 (67%)
Migrate solely within Australia (within-country)	140 (40%)	1 (0.7%)	8 (5.7%)	131 (94%)
International migrants	209 (60%)	101 (44%)	26 (12.4%)	104 (50%)
Connectivity with Papua New Guinea	135 (39%)	77 (57%)	6 (4.4%)	58 (43%)
Connectivity with Indonesia	135 (39%)	76 (56%)	8 (5.9%)	58 (43%)
Connectivity with New Zealand	88 (25%)	53 (60%)	22 (25%)	33 (38%)
Connectivity with Palearctic	74 (21%)	74 (100%)	7 (9.5%)	0 (0%)
Oceanic (seabirds)	99 (28%)	49 (49%)	20 (20%)	46 (47%)

for conserving migratory bird species, using Australia as a case study, but with relevance to other countries. Australia harbors species that migrate at various spatial scales, has a two-tiered system of environmental powers, and has national legislation intended specifically to conserve migratory species. Drawing on lessons from the United States and the European Union, we discuss how legislative gaps might be remedied.

Migratory birds in Australia

The Australian continent provides nonbreeding habitat for migratory birds that breed in the Palearctic and New Zealand, and both breeding and nonbreeding habitat for seabirds and for species that cross the Torres Strait to New Guinea and Southeast Asia (international migrants). In addition, many migratory bird species complete their life cycle entirely within Australia (within-country migrants), with seasonal movements across Bass Strait and along altitudinal gradients, and opportunistic movements in inland regions. Some international (e.g., Far Eastern Curlew *Numenius madagascariensis*) and within-country (e.g., Orange-bellied Parrot *Neophema chrysogaster*) migrants are globally threatened. We analyze the gaps in Australian conservation legislation relevant to both international and within-country migrants (Table 1; for methods, and CMS definition of migration adopted here, see Appendices S1 and S2).

Migratory species legislation in Australia

Australia is a democratic federation of six states and two self-governing territories, with powers to enact laws allocated to different levels of government by the *Australian Constitution*. The national government's power to make environmental laws is restricted to implementing international legally-binding environmental agreements (for more information, see Appendix S3). The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC

Act) is the primary environmental legislation at the national level. The EPBC Act prohibits actions that have, will have, or are likely to have, a significant impact on any "matter of national environmental significance" (MNES), which includes both threatened species, and migratory species listed under an international agreement to which Australia is signatory. States and territories have responsibility for making environmental laws for any other matter, including other migratory species and their habitat, with some land-use decisions being devolved to local government. The existing state and territory laws regulate developments that affect threatened species, though most lack specific protection for migratory species. They also regulate "take," including killing or harming wildlife, but provide limited protection for wildlife habitat (<http://apeel.org.au>; Figure 2).

Australia is signatory to five legally binding international agreements specifically relevant to conserving migratory bird species, namely three bilateral migratory bird agreements (Australia-China, Australia-Japan, and Australia-Republic of Korea) and two multilateral agreements (the CMS and its subsidiary Agreement on the Conservation of Albatrosses and Petrels). These agreements include appendices listing the species to which their provisions apply—generally those for which there is evidence of migration between countries, regardless of conservation status. Section 209 of the EPBC Act adopts all species listed under these ratified agreements as MNES and has enabled the development of statutory plans for threat abatement (e.g., Threat Abatement Plan for the Incidental Catch of Seabirds during Oceanic Longline Fishing Operations) and conservation plans (e.g., Wildlife Conservation Plan for Migratory Shorebirds). Crucially, Australian legislative protection for migratory species is not limited to those species assessed as threatened, consistent with the principles of equity in use of common-pool resources and intrinsic vulnerability of migratory species which underpin international agreements for migratory species protection such as the CMS.

	Cross-national migrants	Within-country (interstate) migrants	Comment
National			The EPBC Act prohibits actions that have, will have, or are likely to have, on nationally listed threatened species and the migratory species protected under international agreements to which Australia is signatory.
ACT			The <i>Nature Conservation Act 2014</i> protects migratory species listed under the EPBC Act that regularly occur in the ACT, native species indigenous to Australia, and international migrants not listed under the EPBC Act.
NSW			Legal protection for migratory birds in NSW under the <i>Threatened Species Conservation Act 1995</i> (NSW) and <i>National Parks and Wildlife Act 1974</i> (NSW) is limited to regulating the 'use' etc of native species, with greater protection for listed threatened species
NT			Legal protection under the <i>Territory Parks and Wildlife Conservation Act</i> (n.d.) is limited to regulating the 'use' etc of wildlife, with greater protection for listed threatened wildlife, defined to include cross-national migratory species and, implicitly, within-country migrants
QLD			Legal protection under the <i>Nature Conservation Act 1992</i> (Qld) is limited to regulating the 'use' etc of wildlife, with greater protection for protected (threatened) 'native wildlife', defined to include cross-national migratory species and, implicitly, within-country migrants.
SA			Legal protection under the <i>National Parks and Wildlife Act 1972</i> (SA) is limited to regulating the 'use' etc of 'protected animals', defined to include cross-national migrants and, implicitly, within-country migratory species, with greater protection for listed threatened species.
TAS			Legal protection for migratory birds in Tas is limited to regulating the 'use' etc of native species under the <i>Nature Conservation Act 2002</i> (Tas), with greater protection for listed threatened, native species under the <i>Threatened Species Protection Act 1995</i> (Tas).
VIC			There is no explicit mention of migratory species in Victorian legislation. There is implicit provision for migrants in the <i>Wildlife Act 1975</i> (regulating species 'use') which defines 'wildlife' to include any vertebrate that is 'indigenous to the whole or part or parts of Australia.
WA			The <i>Wildlife Conservation Act 1950</i> provides for the conservation of all 'fauna', which is defined to include migratory species, whether they migrate in and out of the State, or into or out of any other State or Territory in Australia.

Figure 2 Migratory patterns of birds explicitly referenced in Australian conservation legislation. Light blue shading signifies where protections for migratory species are implicit rather than explicit, or restricted to limiting "use" of a species. Further detail on the coverage of relevant state legislation is included in Appendix S3.

Legislative gaps to conserving migratory birds in Australia

Governance arrangements where legislative powers over the environment are held at multiple levels may result in gaps in the protection of migratory species. For instance, international and within-country migratory birds that are

not listed under any of the international agreements to which Australia is signatory will only be protected under the provisions of the EPBC Act if they qualify for listing as a nationally threatened species. Consequently, two-thirds of the migratory bird species occurring in Australia are not listed under the EPBC Act (Table 1). We identified three gaps in Australian legal instruments for

conserving migratory species: (1) gaps in statutory listing of international migrants, (2) gaps in statutory listing of within-country migrants, and (3) gaps in subnational legal instruments and coordinated conservation of international and within-country migrants. In the following section, we describe and analyze these gaps. We suspect such gaps are typical of many federal systems.

Gaps in statutory listing of international migrants

Where domestic legislation adopts species lists from international agreements, their taxonomic coverage depends on the geographic scope of the international agreement. For example, Australia has not signed bilateral agreements with either Indonesia or Papua New Guinea, leaving bird species moving only between these three countries with no protection as listed migratory species under the EPBC Act (for list of species, see Appendix S4). This not only impedes their management domestically, but also hampers coordinated conservation across their entire migratory range. Even where species are covered by international agreements and listed under the EPBC Act as migratory, conservation may be ineffective because some range states are not signatories to international agreements. For instance, only 10 of the 22 countries visited by shorebirds during migration along the East Asian-Australasian Flyway are party to at least one legally binding international agreement specifically relevant to conserving these species (Gallo-Cajiao 2014).

Gaps in statutory listing of within-country migrants

No national legislation coordinates the conservation of within-country migrants in Australia, leaving gaps across both vertical and horizontal dimensions. The national government has no jurisdiction to protect such species as migrants under the EPBC Act because by definition they are not listed under any international agreement. Most species that migrate north after breeding in the southern states stop short of international borders into Papua New Guinea and Indonesia and stay within Australia (Table 1: 40% of all Australian migratory birds, 140 species, see Appendix S5). Unless such species are listed as threatened under the EPBC Act, there is no legal mechanism at the national level to enable coordinated conservation across their full annual cycle.

Gaps in subnational legal instruments and coordinated conservation

Legislation enacted at the subnational level can be important for fostering vertical as well as horizontal coor-

dination. Most environmental laws in Australia relating to land use are subnational, so effective conservation usually requires simultaneous or complementary law for conserving migratory birds in each state or territory across their entire range. Analysis of explicit references to migrants in existing conservation law at the state and territory level (Figure 2) demonstrates key legislative gaps for migratory bird conservation for both international and within-country migrants. While general wildlife conservation legislation in most states and territories includes, largely implicit, references to migratory species through broad definitions of key terms, such as “indigenous,” “fauna,” and “wildlife,” there are no explicit, substantive provisions to protect species migrating across subnational borders. This legislative gap weakens the implementation of international agreements for conserving international migrants and provides no means for coordinating conservation of within-country migrants.

Addressing the gaps

The scope and operation of legal frameworks in Australia creates gaps in legislative protection for migratory species across scales. Here, we identify potential ways to fill these gaps.

New international agreements (fill horizontal gaps at international level)

The development of legally binding agreements between countries is influenced by interactions with other national interests (e.g., exploitation of other natural resources), feedback effects from other shared national interests (e.g., trade), financial and technical capacity, and interactions between geopolitical and biogeographical factors (e.g., Dorsey 1998). The negotiation of international agreements requires time and resources (Kark *et al.* 2015), so potential signatory countries could be prioritized according to the number and threat status of shared species, complementarity with existing international agreements, and political feasibility. For instance, while a timely legally binding multilateral agreement may not be feasible within the complex geopolitics of the Asia-Pacific region (Boardman 2006), a bilateral migratory bird agreement between Australia and Papua New Guinea would capture 56% (58) of the international migratory bird species in Australia that are not currently listed under the EPBC Act.

Such bilateral agreements may also increase the potential for resource mobilization between countries. Often, access to technical and financial capacity does not necessarily correspond with where conservation needs are imperative (McClanahan & Rankin 2016).

Cross-subsidization is already occurring along the American flyway (Kark *et al.* 2015) and payments by Europe have been identified as a means of improving the prospects of migratory birds in Africa (Sultanian & van Beukering 2008).

Domestic collaboration on environmental matters to include migratory species (fill horizontal and vertical gaps at national and subnational levels)

Growing recognition that environmental challenges do not stop at jurisdictional boundaries—which has led to international agreements on climate change, ozone depletion, and migratory species conservation—has permeated Australian subnational government approaches. For example, national and state and territory governments have recently negotiated a National Clean Air Agreement (Department of Environment 2015) to provide uniform air quality standards across all jurisdictions. There is also a nation-wide aspiration for uniform statutory threatened species lists across all jurisdictions (Australian Government 2015). Although national legislative powers are limited, a coordinated approach to migratory species conservation that fills both horizontal and vertical gaps in protection of international and within-country migratory species could be initiated by developing a national agreement on migratory species conservation. Such an agreement could stimulate the development of subnational conservation mechanisms for migratory species in a form that is consistent across all jurisdictions, and provide guidance for subnational conservation priorities.

Identify important areas for within-country migratory species and confer special protection

In addition to a national agreement on migratory species, spatial coordination of conservation across subnational jurisdictions can be encouraged through the identification of important areas for migratory species, and by directing funding to habitat conservation and environmental management activities within those areas. This approach has been enacted in the United States through Migratory Bird Habitat Joint Ventures (Anderson & Padding 2015), and internationally, including in Australia, through Birdlife International's Important Bird and Biodiversity Areas. Few Australian migratory passerines build up fat reserves, suggesting limited ability to migrate across discontinuous habitat (Chan 1995) and identifying and protecting key habitat along Australia's eastern states could help to conserve many of Australia's within-country migratory passerines. Within Australia,

the National Wildlife Corridors Plan (Department of the Environment 2012), launched in 2012 to address habitat fragmentation, provides an avenue to achieve effective key habitat conservation for within-country migratory species in the absence of direct legal protections. Under the Plan, and subject to the agreement of affected landholders, the federal Environment Minister may identify and declare an area that crosses tenures, landscapes, and state or territory borders to be a "National Wildlife Corridor" for targeted funding. Declaring within-country migratory species habitat in this manner has the potential to improve conservation outcomes for multiple species more efficiently than relying on administratively onerous statutory listing processes for individual species. It has the advantage of emphasizing collaboration, voluntary participation and community education, and greater flexibility for landholders across landscapes and jurisdictional borders. It also provides an opportunity for collaborative partnerships to conserve migratory species between national, state and territory, and local governments, helping to overcome some of the jurisdictional barriers and shortfalls described in this article.

Discussion and conclusions

Various proposals for addressing the gaps we have identified in migratory species legislation have been trialled overseas, though these come with their own challenges. For example, while the European Union's Birds and Habitat Directives provide the framework for managing hunting and conserving habitats across all member states, implementation and enforcement has been uneven (Ferranti *et al.* 2010), though nonetheless the Directive has had a net positive impact on conservation (Sanderson *et al.* 2016). International coordination will prove even harder for Australia to implement as it is not embedded in a region as politically integrated as Europe (Boardman 2006). At the domestic level, the United States has been advancing migratory bird conservation through legislative frameworks, and less formal arrangements, since at least the early 1900s (Dorsey 1998), often to manage wildfowl for hunting. The US Flyway Councils are primarily state-led and focus on hunting while Migratory Bird Habitat Joint Ventures include multiactor partnerships focusing primarily on habitat (Anderson & Padding 2015). However, not only are waterfowl in Australia less migratory than in the United States (Kingsford & Norman 2002) but they are also not hunted to the same extent (Burgin & Burgin 2015), limiting the degree of political and financial leverage wildfowl management can generate. There is thus a need for more research on the wide array of arrangements for conserving migratory birds and

how they might fit within different contexts. Shifts in distribution and intensity of threats from both climate change and human impacts will change future priorities for conservation. Policy that promotes adaptable management under uncertainty will be particularly important for migratory species (Moon *et al.* 2017).

Despite the potential of international agreements to achieve conservation outcomes, there remains large uncertainty about their representation and implementation in domestic legislation across scales and how well they cover migratory birds taxonomically. The framework used here to analyze Australian law and policy could be adopted in future comparative analyses across multiple countries and a wider range of political systems. This could help to identify general recommendations, to influence domestic policy through international fora, and to encourage the diffusion of stronger, more effective law and policy models for conserving migratory species.

Migratory species conservation relies on actions coordinated across national and subnational borders, for which legal instruments are paramount. The development and operation of environmental legislation and policy in Australia has resulted in gaps in the range of species covered and the scale of migratory species conservation. Creative solutions are needed to fill those gaps within the existing, albeit incomplete, legislative framework. Where powers to legislate for environmental matters are restricted, conservation of migratory species can be coordinated and encouraged at a national level through nonlegally binding arrangements such as national migratory species priority lists or the declaration of national migration habitat to direct funding for research and management. Alongside targeted development of new bilateral agreements between countries, such solutions can enable a more coordinated and comprehensive response to the ongoing crisis of migratory species declines. Nonbinding national guidance can also help to coordinate subnational, binding mechanisms such as conservation legislation and habitat conservation through the declaration of formal protected areas, and remedy the potential for vertical and horizontal gaps such as those identified in this article. The recommendations identified above can be used to inform the development of law and policy in other federal jurisdictions, and more broadly, wherever species migrate across subnational and international borders and require coordinated conservation.

Here, we have demonstrated the complexities of legislative frameworks for conserving migratory birds, and how they require both scholarly and practical attention. With increased vulnerability and ongoing population declines of migratory species across the globe (e.g., Kirby *et al.* 2008), remedying gaps in migratory species legislation to improve coordination across jurisdictions and

scales is essential to improve conservation outcomes for migratory species.

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Supplementary Material

Appendix S1. Methods.

Appendix S2. Definition of migration.

Appendix S3. Expanded introduction to migratory species legislation in Australia.

Appendix S4. List of species known or suspected to migrate between Australia and Papua New Guinea.

Appendix S5. List of species known or suspected to migrate solely within Australia.

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