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Conservation of Migratory
Species of Wild Animals

EXAMINING RESOLUTIONS AND ARTICLES FROM THE CONVENTION ON MIGRATORY SPECIES (CMS) TO FIND STRATEGIC OPPORTUNITIES FOR THE WORKING GROUP ON MIGRATORY SPECIES AND HEALTH

Examining Resolutions and Articles from the Convention on Migratory Species (CMS) to find strategic opportunities for the Working Group on Migratory Species and Health

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COVER IMAGE

Common crane (*Grus grus*) at sunrise © Piotr Krzeslak/Adobe Stock Images

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Executive Summary

The recent international calls for co-management of conservation and health are innovative in how we conceive and manage wildlife health. The creation of a CMS Working Group on Migratory Species and Health provides an opportunity to implement these innovations.

A bridge between wildlife conservation and health can be built upon the shared determinants affecting the health and resilience of people and wildlife populations and the shared drivers endangering wildlife health and conservation status. The determinants and drivers interact to create the threats, vulnerabilities and capacities affecting how wildlife accesses their needs for daily living, copes with their environments and fulfills their social and ecological roles. Modern wildlife health management acts throughout a continuum of possible interventions uniquely tailored to the population's health needs and status. A continuum of care needs collaboration across disciplines, jurisdictions and species to promote recovery, reduce impacts, prevent harms and promote health and resilience.

This project explored how resolutions of CMS aligned with a continuum of care approach to wildlife health. The objective was to explore how resolutions are addressing wildlife health determinants and drivers to reveal possible areas of focus to help the Working Group address its remit. We analyzed the 43 resolutions adopted at COP14. Resolutions and other CMS instruments addressed multiple determinants of health across the continuum of care in multifaceted ways. Many resolutions aimed to sustain root causes of good health, maintain adaptive capacity, respond to known impacts and/or reduce vulnerability to harms. There is an opportunity to expand actions against known risky circumstances in advance of serious harm. The Working Group should explicitly define wildlife health, the CMS wildlife health scope of practice and the meaning of "ill-health". Establishing these definitions will help clarify the CMS' wildlife health priorities, strengthen arguments to seek opportunities for synergies with other health or conservation programs, and reveal pathways to cross domains and connect resolutions and programs.

Areas where the Working Group can help promote innovative wildlife health interventions include; (1) enhancing situational awareness to inform strategic actions throughout the continuum of care (2) closing the gap between resolution intentions and action by brokering knowledge, promoting evidence-based decision making and identifying pragmatic and adaptable solutions, (3) promoting multi-solving interventions that benefit multiple interests by addressing root causes of health and risk through collaborations with other experts and agencies and (4) supporting opportunities to promote and protect health throughout resolutions of CMS.

Key Lessons

1. Align existing resolutions with contemporary definitions of wildlife health

- The drivers of population declines and extinction overlap with the drivers of sub-optimal health and disease. Bridging wildlife conservation and health can provide strategies to concurrently address determinants of population health and resilience and drivers endangering wildlife health and sustainability.
- Many CMS resolutions provide mandates to sustain root causes of good health, maintain adaptive capacity, respond to known impacts and/or reduce vulnerability to harms, thus being able to bridge wildlife health and conservation.
- The current CMS resolutions address several root causes of wildlife health. Future resolutions should expand actions against known risky circumstances in advance of serious harm and support integrated responses to known health threats to more comprehensively address health threats and other determinants of wildlife health.

2. Areas where the CMS Working Group on Migratory Species and Health can support health- enabling actions

- Refine an operational definition of wildlife health to establish the CMS wildlife health scope of practice. Clarifying the CMS' health priorities, will help find opportunities to bridge health and conservation programmes, and reveal pathways to connect resolutions and programmes.
- Use evidence-based advocacy for advancements in health intelligence for better situational awareness that informs strategic actions. Health intelligence identifies actionable signals of change, provides insight into future risk trajectories, and characterizes possible opportunities for intervention in advance of harm.
- Develop a network of partnerships that brings together different information and perspectives to make better use of what is already being done by consistently integrating and communicating emerging knowledge.
- Close the gap between CMS mandates and action by brokering knowledge, promoting evidence-based decision making and identifying pragmatic and adaptable solutions. Increased attention must be directed to evidence synthesis for actions that address exposure to hazards and threats as well as sensitivity and adaptability to those hazard and threats before intolerable harms occur. Parties should be encouraged to share experience and knowledge on effective means to realize health and conservation co-benefits and to create the human resources capable of identifying and acting on opportunities for co-benefits advanced by CMS resolutions.

3. **Promote interventions that benefit multiple interests by addressing root causes of health and risk through collaborations with other experts and agencies.**

- The Working Group can champion wildlife-centred One Health through advocacy and evidence such that conservation commitments are honoured and addressed in One Health actions.
- The Working Group can contribute to CMS instruments and initiatives that encourage collaborations that concurrently contribute to conservation, sustainable development and health security for people, domestic animals and wildlife.
- Other parties, including WHO, WOAH and FAO, should be supported to ensure the wildlife health implications of One Health interventions and policies address conservation goals for migratory species.

4. **Increase capacity to contribute to opportunities to promote and protect health throughout resolutions of CMS.**

- Support Parties to realize the efficiency and impacts that can be gained through integrated approaches to concurrently protecting the root sources of health and conservation.
- Increased attention to actions that reduce vulnerability would bolster CMS activities against a wider suite of drivers of harm and determinants of health before significant harms occur, thus increasing its preventive actions.
- Focusing on the root causes of health and vulnerability would promote actions that build resilience and reduce risk for other sectors, including public health and agriculture.

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Part 1 – Background

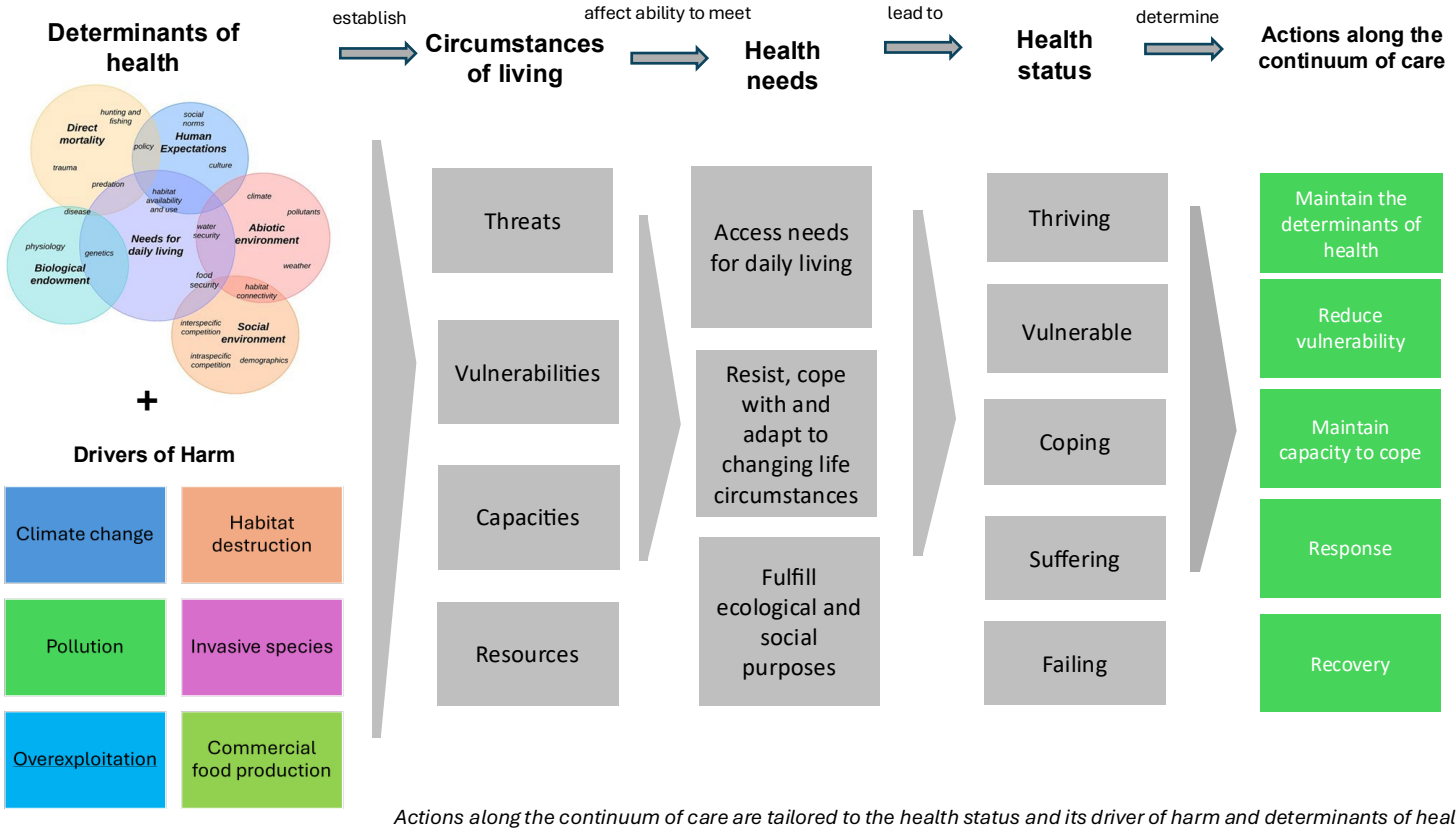
The rationale

The interconnected crises of climate change, biodiversity loss, inequities, pollution, habitat loss and overexploitation are fuelling multiple interacting pressures on wildlife. The experiences of SARS-CoV2, highly pathogenic avian influenza and the escalating biodiversity crisis have given wildlife health unprecedented prominence. The historical separation of wildlife health and conservation created a discontinuity between actions that can promote wildlife recovery from harms, reduce risky situations and protect the assets wildlife need to sustain resilient populations. There is a growing chorus of governments, international fora, multilateral agreements and civil society members calling for improved conservation and health co-management for better pandemic preparedness, climate change adaptation and for combating the biodiversity loss. The aftermath of the COVID-19 pandemic is shaping commitments and multilateral agreement buy-in to promote holistic, integrated and transformational change. The inclusion of the United Nations Environment Programme in the Quadripartite, a collaborative effort between the Food and Agriculture Organization of the United Nations (FAO), the UN Environment Programme (UNEP), the World Health Organization (WHO), and the World Organisation for Animal Health (WOAH), to advance a coordinated One Health approach is the sign of buy-in for changed approaches. The unprecedented level of political and public awareness of wildlife health and conservation has opened a window of opportunity to innovate how we collectively and concurrently promote wildlife health and conservation to sustain planetary health.

What is wildlife health?

The conservation status of ecosystems is dependent on the health of their parts (Lebel, 2003). Health provides the capacity to mitigate, adapt to and recover from shocks and stresses and continue to fulfill social and ecological roles (Goulet et al. 2024). An individual or population is healthy when it has sustained (1) access to the needs for daily living, (2) capacity to cope with stressors and threats and (3) can meet socially or ecologically defined goals for wildlife (Kipperman et al. 2024, Stephen 2014). Health, therefore, is the cumulative effect of interacting determinants of health and circumstances of living (Figure 1). This definition coincides with socio-ecological concepts of conservation which recognize that conservation outcomes are influenced not just by ecological factors, but also by abiotic and socio-economic dynamics which interact to help populations meet socially and scientifically defined goals (Taylor et al. 2024). By considering a suite of activities and determinants influencing health or conservation, a management focus on resilience becomes more achievable (Krausman & Harris 2011).

Figure 1. The relationship between determinants of health, drivers of harm, health status and health actions along the continuum of care. Health and resilience have a strong, mutually reinforcing relationship: resilient populations can access the resources, assets, and adaptive strategies needed to support health outcomes; good health provides the foundations to resist and recovery from adversity and meet the needs and expectations of daily living.



Actions along the continuum of care are tailored to the health status and its driver of harm and determinants of health

Determinants of health

To be healthy, an individual or population needs to have a set of resources and capabilities that enables them to cope with challenges and to fulfill their ecological and social roles. Health resources and capacities arise from interacting biological, social and environmental determinants of health. It is well recognized that ecosystems and social systems are no longer separate entities but rather interdependent parts of a whole. While much of the work on wildlife health has focused on biomedical aspects of health, social factors such as policy, cultural values and economics establish circumstances of living that have tremendous effects on health. There is an overlap between the determinants of health and resilience including the; (i) biological traits of the individuals; (ii) the animal's social environment; (iii) quality and accessibility of resources that provide the animal's needs for daily living; (iv) quality of the abiotic environment that provides foundational daily needs, such as a suitable climate and water security; (v) sources of mortality and morbidity ; and (vi) human decisions and expectations (Wittrock et al. 2019). Each of these six is comprised of a sub-set of factors, circumstances, or conditions unique for each species (Table 1).

Table 1. Illustrative examples of factors influencing wild ungulate determinants of health (adapted from Stephen et al. 2023)

Health determinant	Examples of factors contributing to the determinant
Needs for daily living	Habitat quality, forage availability and quality, habitat use, migration paths
Abiotic environment interactions	Contaminants, climate change, winter conditions, forest fire, flooding
Social environment of the animals	Demographics and population dynamics, abundance, herd structure, competition
Biologic endowment	Age, pathogens, parasites, disease, body condition, physiological stress, genetic diversity, microbiota
Mortality pressures	Hunting, predation, extreme weather, motor vehicle collisions
Human expectations and uses	Consumption, conservation management policy, Indigenous rights

Drivers of harm

Harm, as used in this report, refers to a range of adverse ecological, social, health or welfare impacts. Factors driving wildlife health harms also drive biodiversity loss, emerging disease vulnerability, climate change adaptation, and ecosystem loss and degradation — and vice versa. The drivers of wildlife health risks are the same forces underlying the broader biodiversity loss crisis. These drivers, such as habitat destruction, land-use change, overexploitation, climate change and pollution erode ecosystem integrity and resilience and both lead directly to ill-health as well as heightening vulnerability to emerging diseases. In a world of concurrent and interdependent problems, unique solutions for each problem are neither feasible nor effective (Fried et al., 2012). Wildlife do not experience these drivers one at a time nor must they only contend with the impacts of one driver in isolation from others. Wildlife health programs must evolve from an interdisciplinary approach to single problems to transdisciplinary approaches that manage the interactions and implications of multiple interdependent problems occurring simultaneously in a place or population. Managing the increasing number of interconnected problems involving interacting determinants of health and drivers of harm needs more than discrete and reductionist risk management. It needs multi-solving solutions.

Multi-solving

Multi-solving is a systems-thinking approach that addresses shared root drivers of challenges such as climate change, biodiversity loss, and public health threats by implementing solutions that create co-benefits across sectors, achieving greater impact and efficiency than tackling each issue on their own. Actions to protect and promote health provide multi-solving solutions. By creating the circumstances that protect the determinants of health and reduce or eliminate the drivers of harm for wildlife, not only are wildlife healthier, but so too are the ecosystems they inhabit and the people they affect (Hoyer et al. 2023, McMullen et al. 2023, Stephen 2024). Steps taken to protect the health of one species today can also protect the ability of other species and future generations of animals or people to meet their health needs (Stephen and Walzer 2023).

Whereas health investments targeting responses to diseases are increasingly needed, they alone are insufficient to cultivate and sustain healthy populations. Efforts to counteract the root causes of health problems that converge across species, sectors and generations are outpaced by the continued emergence of new problems. Coordinated interventions across the continuum of care are needed to address the natural and social capitals that shape access to resources and health capacities. These factors determine the conditions in which animals live, which can then be improved to reduce both the likelihood and impact of harm (Figure 1).

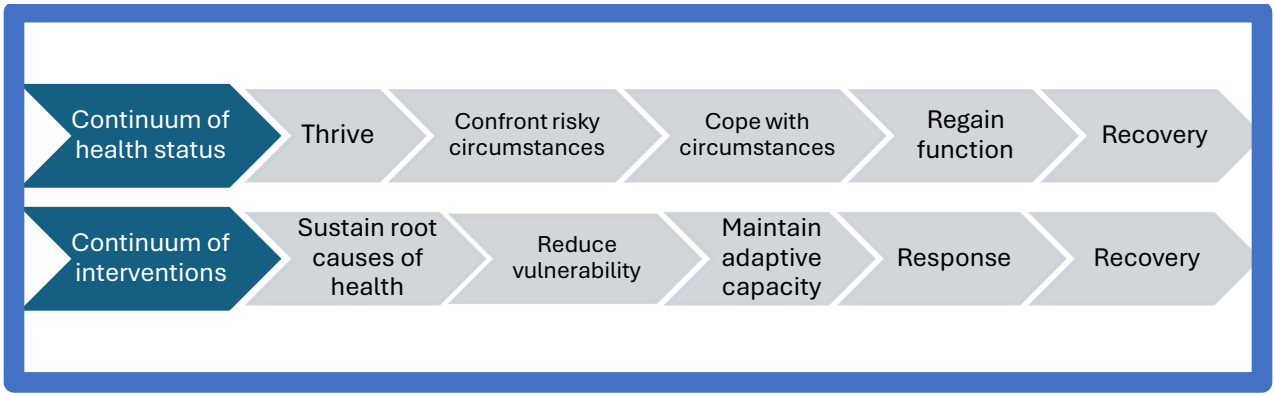
Multi-solving programs need people to work together across disciplines, sectors, jurisdictions and issues to address interdependent health and conservation problems. In times of limited budgets and increasing urgency to act, solutions that simultaneously lead to gains in human, wildlife and domestic animal health while promoting conservation goals offer compelling opportunities. Frameworks that encourage cross-sectoral collaboration, cross-interest communications, relationship building and engagement are needed (Jacobson and Robertson 2012). The continuum of care might offer a conceptual framework to bridge conservation and health.

Figure 2. The health of populations of wild animals is important for maintaining conservation status and resilience of ecosystems. Credit: Claudio Tellaeche Rullan / Ocean Image Bank / Mangrove Photography Awards

The Continuum of Care

Health, whether for individuals, populations, communities or species, exists along a continuum over time (Figure 2 and Table 2).

Figure 3. The interconnected range of different themes of interventions aligned with different stages of wildlife health status (see Figure 1)



Wildlife health care needs to tailor actions that "meet populations where they are" along this continuum (Table 2). For thriving populations, efforts emphasize creating circumstances where risks cannot arise, and populations have all they need to stay healthy. For populations living in conditions where new risks are occurring, interventions need to reduce exposure to risk factors, enhance capacity to cope with the risks and decrease the likelihood that harms will occur. For animals coping with the interacting drivers of harm they encounter, efforts need to not only reduce the risk drivers but also maintain adaptive and coping capacity by protecting the existing determinants of health. Populations failing to thrive need to be offered appropriate care and capacity to regain their social and ecological functions impaired by harms that have occurred. The necessary care offered can range from highly localised interventions to global actions, and from acute responses to emergencies to sustained actions against persistent threats.

Table 2. Matching health actions with wildlife population health status.

Health status	Characteristics of the stage	Actions in the continuum of care
Thriving	Optimal access to the resources and capacities is maintained to meet evolved needs, and ecologically and socially defined roles and expectations are fulfilled.	Protect and sustain critical biological, social and environmental factors needed for wildlife to fulfill their ecological and social roles and able to access their determinants of health *Examples: habitat corridors, protecting prey species and marine protected areas*
Vulnerable	There is sufficient exposure to hazards or risk factors that are likely to cause harm and/or changes in capacity to cope when those harms exist, but significant adverse impacts have not yet manifested.	Modify the circumstances to reduce exposure to hazards, risk factors, decrease sensitivity to harms and increase protective factors. *Examples: wildlife overpasses, regulate immunocompromising contaminants and invasive species control*
Coping	Early onset of harmful impacts that are being accommodated without significant or sustained change in physiological, ecological or social functions.	Promote early actions on the impacts of risks and hazards before significant impacts occur. *Examples: wildlife surveillance systems, habitat restoration and manage interfaces with agriculture*
Suffering	Harms of sufficient magnitude or duration such that needs for daily living and functions cannot be met or sustained.	Interventions that eliminate or minimize the impacts of harms. *Examples: disease outbreak response, changing transportation corridors to reduce collisions with wildlife and wildlife trade controls*
Failing	Excessive, unsustainable, or unacceptable loss of life, physiological or ecological or social functions.	Actions intended to support the recovery of a severely harmed population. *Examples: wildlife translocation and reducing overexploitation and habitat restoration*

The CMS is concerned with species that transit through different regions, facing different challenges and having varying access to the determinants of health as they move along their migration route. It is, therefore, likely that the health status of individuals within populations will change throughout their life course. Health interventions need to be adapted and evolve with population health status as they change over time and space. The continuum of care describes bundled options that draw on knowledge from multiple sectors, disciplines, and perspectives to guide systems-based interventions over time. It encompasses a comprehensive range of services that adapt to changing needs across all levels of care. By applying systems thinking, continuum of care approaches foster a culture of multi-solving, integrating solutions that simultaneously address interconnected drivers of risk, prevention and management.

The continuum of care framework is designed to strengthen systems-based risk prevention and management by:

1. Integrating and sharing knowledge dynamically across sectors, disciplines and geographies, making better use of existing actions and emerging information throughout the continuum.
2. Providing a structured platform for coordinated, multi-solving interventions, enabling more efficient responses and fostering "win-win" outcomes by linking and aligning ongoing efforts.
3. Supporting strategic resource allocation by scanning across the continuum of needs to identify leverage points where interventions can have the greatest systemic impact.
4. Promoting equitable wildlife health outcomes across countries by enabling consistent approaches to risk assessment, resilience building and conservation action.
5. Establishing a shared framework to assess, communicate and enhance collective efforts in health and conservation risk management.
6. Leveraging existing mechanisms under the CMS to embed wildlife health more fully into cross-border conservation strategies.
7. Aligning with and reinforcing international agreements and frameworks, including the CBD, Paris Agreement, and other One Health-relevant treaties ensuring that wildlife health actions contribute to global biodiversity targets, Sustainable Development Goals, climate goals and pandemic prevention commitments.

Ensuring consistent and effective management of the determinants of health requires coordinated action amongst a suite of professionals from landscape ecologists to conservation biologists, veterinarians, policy makers and others, each understanding their role in health and deploying their skills and capacity throughout the continuum of care within a common setting. Deploying CMS Resolutions, Articles and programs within a continuum of

care framework could facilitate a coordinated course of multi-faceted actions by orienting programs away from more isolated and categorical approaches to more integrated ones.

Figure 4. Health, whether for individuals, populations, communities or species, exists along a continuum over time. The continuum of care framework helps meet health needs 'where they are' on this spectrum. Credit: Balazs Simon / Pexels.com

Background on the CMS Scientific Council Working Group on Migratory Species and Health

The CMS Scientific Council established terms of reference for a Working Group on Migratory Species and Health in 2021. This was formalised in 2024 with operationalisation of the Group thereafter.[1] The Group will provide a mechanism to increase attention to wildlife health issues, define a key role for CMS, and advise Parties on how to tackle wildlife health risks affecting migratory species, while supporting Parties in delivering obligations of Resolution 12.6 (RevCOP14) on Wildlife Health and Migratory Species.[2]

Figure 5. With renewed attention on health and the environment, the CMS Working Group on Migratory Species and Health provides a clear wildlife health input to One Health initiatives. Credit: Kim Cuong Nguyen Trang / Ocean Image Bank / Mangrove Photography Awards

1 https://www.cms.int/sites/default/files/document/cms_scc-sc7_outcome2_working-groups_e_0.pdf

2 https://www.cms.int/sites/default/files/document/cms_cop14_res.12.6_rev.cop14_wildlife-health-and-migratory-species_e.pdf

Part 2 – Alignment of CMS Resolutions with wildlife health management themes

Project objective

CMS Resolution 12.6(RevCOP14) and the CMS Review on Migratory Species and Health (Kipperman et al. 2024) stress the need to address drivers of ill-health, many of which are the subject of other CMS Resolutions. The objective of this analysis was to identify key opportunities for the CMS Working Group on Migratory Species and Health to help advance and protect the health of migratory wildlife in a manner that enhances use of existing CMS work and without replicating efforts undertaken by other multi-national health-focused groups. This was accomplished by scoping recent CMS Resolutions from COP14 to firstly, assess their alignment with the vision for wildlife health described above and in the CMS Review (Kipperman et al. 2024) and secondly, inventory if or how they addressed determinants and drivers of health along the continuum of care.

Overview of the methods

To understand the scope of wildlife health encompassed by the recent focus of the Convention, we analyzed if the 43 Resolutions adopted at COP14 considered (i)determinants of wildlife health (Table 1), (ii) drivers of disease, and (iii) continuum of care. The continuum of care used was adapted from Figure 2 to include resolutions addressing impact assessment along the continuum. The six drivers of disease themes were extracted from the IUCN threat classification as factors deemed most important for migratory species (Kipperman et al. 2024). Eighteen descriptive wildlife health management themes were created as sub-themes of determinants, drivers and continuum of care (Table 3). A subjective inventory of themes within the Resolutions and relevant associated annexes was undertaken by one author (C K-A), with grounding truthing by author RC.

When a theme was identified, the Resolution was designated as positive for the theme. A Resolution could be positive for multiple themes. Once all resolutions were analyzed, the proportion of themes addressed in all 43 Resolution was determined. To account for multi-solving resolutions, the number of themes addressed across drivers, determinants and continuum of care actions was calculated for each resolution. We also looked to see how any definitions of wildlife health provided in the Resolutions aligned with the following definition from Meredith et al. (2022) used in the CMS Review (Kipperman et al. 2024):

"The physical, physiological, behavioural, and social wellbeing of wild-living animals measured at an individual, population and wider ecosystem level, and their resilience to change"

Findings

None of the 43 Resolutions adopted at COP14 explicitly defined wildlife health, although Resolution 12.6(RevCOP14) points to the above definition. However, many wildlife health management themes could be found within the Resolutions (Table 3).

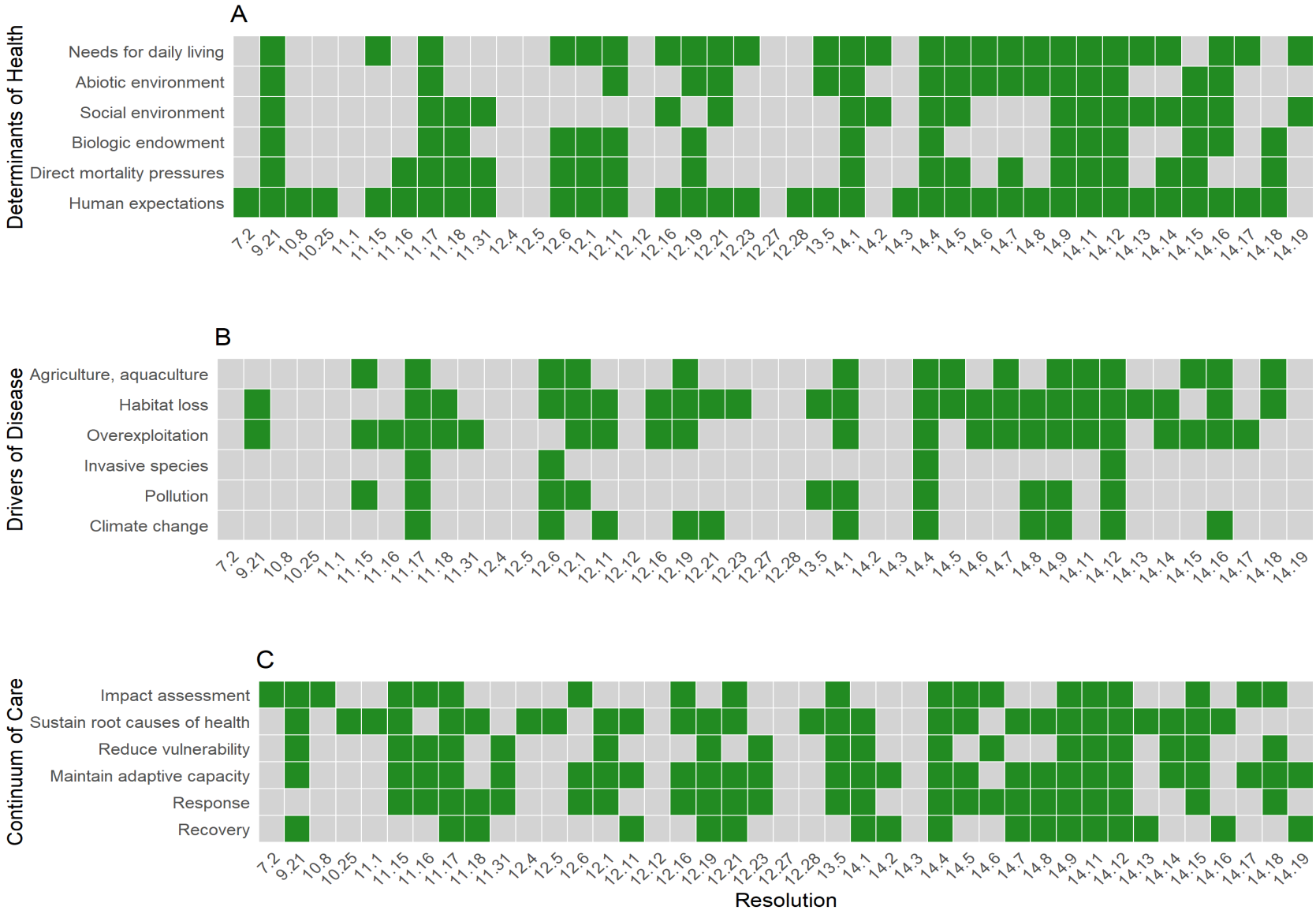
Figure 6. Even without explicit mention of wildlife health, many of the CMS mandates, already address the components of health by supporting the determinants of health of migratory species and addressing drivers of disease. Credit: Emilie Ledwidge / Ocean Image Bank

Table 3. Wildlife health themes used to inventory CMS Resolutions from COP14 for their alignment with determinants and drivers and proposed continuum of care actions.

	Wildlife health management theme	Percentage of resolutions with related components
Health Determinants	Needs for daily living	62.8
	Abiotic environment	41.9
	Social environment	44.2
	Biologic endowment	32.7
	Direct mortality pressures	46.5
	Human expectations	81.4
Drivers of Disease	Agriculture/aquaculture	32.6
	Habitat loss/degradation/disturbance	58.1
	Overexploitation	53.5
	Invasive species	11.6
	Pollution	25.6
	Climate change	27.9
Continuum of Care	Impact assessment	46.5
	Response	53.5
	Maintain adaptive capacity	67.4
	Reduce vulnerability	44.2
	Recovery	41.9
	Sustain root causes of health	67.4

Looking across all resolutions, all themes were addressed (Figure 3). Many resolutions were multi-solving: sixty percent of resolutions referenced three or more determinants of health, thirty percent referenced three or more drivers of disease, and fifty percent referenced three or more objectives along the continuum of care. Cross-referencing between resolutions was noted on multiple occasions.

Figure 7. Distribution of references to determinants (A) or drivers (B) of wildlife health and actions across the continuum of care (C) found in 43 CMS Resolutions from COP14. Green cells indicate presence of reference. Gray cells represent absence.



Actions addressing health determinants and drivers of disease were distributed throughout the continuum of care. Resolutions focused primarily on needs for daily living, human expectations, overexploitation or habitat loss. Within the continuum of care, the resolutions more commonly addressed health promotion and response than risk management and recovery. Across all resolutions, more aspects of resolutions addressed macro-level strategies that look at root cause (upstream actions) and risk reduction to address immediate health needs (downstream actions) than looking at mid-stream actions to reduce vulnerability and risk reduction.

Interpretation of the findings

As the CMS Review (Kipperman et al. 2024) highlights, there are a range of resolutions and other CMS instruments which address wildlife health themes across the continuum of care model. The findings of this study additionally reveal the diversity of ways that the resolutions of CMS are addressing wildlife health determinants and risk drivers and indicate that resolutions skew towards actions that will secure root-cause sources of determinants of health and resilience. The breadth of wildlife health management themes addressed in the resolutions suggests their compatibility with modern definitions of wildlife health. As seen in the examined resolutions, the Convention is integrating diverse health themes across resolutions and supporting synergic actions throughout a continuum of care via its resolutions.

The resolutions focus on upstream health promoting and health protecting interventions, (resolutions addressing sustaining root causes of health and maintaining adaptive capacity) and downstream response and risk reduction (resolutions addressing response and reducing vulnerability to known risks). There is an opportunity to expand the "mid-stream" where actions address known risky circumstances in advance of serious harm by managing specific vulnerabilities for species and/or ecosystems. Vulnerability is the combined effect of exposure to a threat, sensitivity to a threat and capacity to adapt to a threat. While existing CMS upstream activities can build adaptive capacity, such as with habitat protection, or address threat exposure, such as with pollution control, they have less emphasis on managing sensitivities. Sensitivity reflects the degree to which something can be harmed. Despite the strengths of the resolutions in building capacity upstream and responding to exposure downstream, there were fewer focused on managing biological, ecological, or social drivers of sensitivity to known, emerging or yet unknown threats.

Actions targeting vulnerability are launched before unacceptable harms occur. Increasing attention to vulnerability could help to identify a group or population with the aim of protecting it from one or more dangers. Bolstering vulnerability management could improve the completeness of the continuum of care. Encouraging midstream risk management actions would supplement and bridge currently supported upstream and downstream Resolutions.

A core purpose of wildlife health management systems is to find synergies and efficiencies across the continuum of health needs that lead to health protection actions. The Convention seems well-positioned to create synergies. The resolutions' potential to multi-solve creates a bridge between conservation and health that synergises across a continuum of care. The creation of cross-connections can create new pathways to action for migratory species health. By attending to multiple wildlife health themes within a continuum of care model, theories of change that link conservation and health can be made more explicit.

The resolutions demonstrate an implicit understanding and commitment to the prevailing definitions of wildlife health such as in Kipperman et al. (2024). It is recommended that the CMS Working Group on Migratory Species and Health explicitly defines wildlife health, the CMS wildlife health scope of practice and the meaning of "ill-health". Establishing these definitions will help understanding and consistency, clarify the CMS' wildlife health priorities, strengthen arguments to seek opportunities for synergies with other health or conservation programs, and reveal pathways to cross domains and connect resolutions and programs.

Part 3 – Insights for the Working Group on Migratory Species and Health

How the findings can inform efforts to fulfill the Working Group's terms of reference

The insights offered above plus the following commentary are intended to inform perspectives, principles and activities to enhance the Convention's leadership role in wildlife health through the implementation of the Working Group's terms of reference.

Engaging in One Health

One Health's aim to reduce vulnerability to emerging diseases and conserve livelihoods and ecosystems depends on healthy wildlife. One Health, however, has largely been driven by human interests, marginalizing animals and non-built environments (Lindenmeyer et al. 2022). Protection and sustenance of biodiversity and non-built environments are not negotiable for the continued survival of humanity yet, rarely do we see One Health interventions that equitably and concurrently promote animal, human and environmental health. Inadequate integration of wildlife health into One Health is a critical obstacle to promoting resilience for multiple species sharing the same place (WOAH 2021). One Health requires greater attention on protecting and promoting the health of wildlife and the wider environment (Uhart and Sleeman 2024). The Working Group can be a tangible mechanism to redress this imbalance.

By enhancing attention to the "mid-stream" actions to reduce vulnerability, the Working Group could not only bolster the CMS activities to more completely address the continuum of care against a wide suite of drivers and determinants, but it could also encourage more preventive actions enacted before significant harms occur. Focusing on the upstream drivers and determinants of wildlife health would promote multi-solving actions that build resilience and reduce risk for other sectors, including public health and agriculture.

Identifying priorities through future readiness

Unprecedented rates of social and ecological change are causing an unprecedented acceleration and emergence of wildlife health threats. It is also becoming an increasingly uncertain and volatile world. Being ready for an accelerating and uncertain future requires four key attributes (Bali and Taaffe 2017; Berkes 2017):

1. First is the recognition of interdependence, which involves understanding that human and non-human systems—such as health, ecosystems, and sustainable development—are deeply interconnected and cannot be managed in isolation.
2. Second, it is essential to adopt multifaceted approaches that tackle problems concurrently from multiple perspectives, enabling faster, more effective and sustainable outcomes.

3. Third, cross-sectoral learning plays a crucial role by facilitating the sharing of knowledge, innovations, resources and expertise across disciplines and sectors to address threats that affect multiple species and systems.
4. Finally, there is a need for system-level solutions, which move beyond narrow, problem-specific, or disease-specific interventions toward holistic, systems-based strategies that address root causes.

As shown above, COP14 resolutions of CMS contain aspects of these future-ready attributes. Having a consistent strategic health planning framework based on Figure 1 could provide a structured approach to develop health strategies that considers the full spectrum of health and conservation drivers and determinants, identifying opportunities for adaptive and collaborative interventions in advance of and in response to harms and threats.

Adopting a continuum of care approach and systems thinking could provide a planning framework to help identify opportunities to:

1. make better use of what is already being done by consistently integrating and communicating emerging information
2. result in more efficient responses through coordinated and integrated efforts and facilitate win-win situations by identifying opportunities to link and coordinate information and efforts across CMS activities or with other stakeholders and sectors
3. support strategic use of resources by scanning efforts and information throughout the continuum of care and determinants of health to find opportunities to effect change
4. facilitate equivalent approaches to wildlife health across range states through use of a common planning framework

Knowing where to focus to create lasting change can be overwhelming for complex issues like the interplay of wildlife health and conservation. Continuum of care thinking, based on the concepts of determinants of health and drivers of harm, can provide a shared framework to organize different views and perspectives, make sense of complexities and identify collaborative pathways for actions with greatest potential for impact.

The continuum of care concept can provide a framework to connect CMS programs with each other and with other programs and partners by helping to find potential overlaps, synergies, and areas of conflict, thus improving coordination and increasing impacts. Activities throughout the continuum of care on multiple determinants of health exist in CMS resolutions but not necessarily in coordinated and explicitly connected ways that are equitably distributed across places or species. Embedding a continuum of care approach across CMS activities will need a cross-sectoral communication and engagement plan, to reduce risks that the various actors along the continuum will work in isolation, inefficiently

and, in some cases, at cross-purposes. The current global situation makes enhancing win-win outcomes of paramount importance.

Identifying priorities through health intelligence

Intelligence helps identify actionable signals of change, provides insight into future risk trajectories, and characterizes possible opportunities for intervention throughout the continuum of care.

Wildlife health intelligence is a new concept intended to help (i) prioritize problems and needs, (ii) track progress to evaluate the impact of interventions, and (iii) make evidence-based decisions on policy, program design and resource allocation. Intelligence helps strategically target interventions at the appropriate places along the continuum. Whereas the usual wildlife health surveillance goal is early detection of harms to quickly minimize their effects, the goal of intelligence is to protect health by early actions in advance of harm. This is achieved through a network of partnerships that bring together different information and perspectives to characterize the nature of hazards and risks to which a population is sensitive and exposed, its capacity to cope with those threats, and the state of its health protecting environments. This requires more than accumulated data and knowledge. It also needs judgement, experience, insight and being aware of the socio-ecological consequences of actions.

Implications of the findings for informing the orientation of the Working Group

Being evidence-based in collating information

Decisions to act or to not act are driven by more than scientific evidence. Given that there are many outcomes, threats and expectations that influence the design, application and evaluation of wildlife health programs, the types of evidence considered in their implementation and evaluation must be equally diverse. Evidence-based decisions need: (i) evidence specific to the decision-making social and ecological context; (ii) evidence extracted from other settings or situations and (iii) evidence pertaining to the values and expectations of the decision makers and those affected by the decision (Bowen et al. 2009). Efforts to use evidence-informed approaches must, therefore, acknowledge the importance of context and culture.

Evidence-based approaches need to distill the best available knowledge from research with information on social and ecological context, costs, laws, lived experiences and values, to inform and improve health risk management practices and policies. Different types of evidence will be more relevant to different questions. While the Working Group has been created by the CMS Scientific Council, the group will need to be attentive to not only biological, ecological and medical scientific information on what it should do but also on social evidence to understand how to make it happen.

The Working Group should encourage a rigorous and systematic use of evidence-based approaches, but it should not support inaction in the absence of complete or perfect knowledge. It should only advocate for actions that are informed by some forms of evidence, regardless of the urgency to act. All actions should be accompanied by monitoring to support adaptive management that ensures that actions are meeting expected goals and are not causing adverse, unintended consequences. The larger the evidence gaps, the greater the need for adaptive management.

Aiding in implementation by closing the 'intention-to-doing' gap

This review only assessed the intentions of the resolutions agreed to by the Parties at COP14 in 2024. The Working Group should support Parties in implementing Resolution 12.6 (Rev.COP14) by making action plans that can be feasibly and sustainably implemented to create demonstrable success at different scales. Four main elements can guide the process of enabling action: (i) envisioning the future state, (ii) engaging key stakeholders and coalition building, (iii) identifying barriers and breaking down resistance to change, by finding opportunities to proactively promote and protect wildlife health and (iv) institutionalizing change. Wildlife health professionals often find there is no clear path to advocate for the authorities, resources and awareness required to institutionalize actions. The Working Group can, however, help decision makers understand the vision of change to protect wildlife health, build coalitions for action and develop strategies to overcome barriers.

A primary difficulty in implementing systems-based wildlife health initiatives is the fragmented efforts that influence population health outcomes. The findings in this report suggests that 'multi-solving' may be a key niche the Working Group can occupy to protect wildlife health by supporting the conditions, identifying opportunities and finding pathways to implementation of CMS resolutions throughout the continuum of care. By paying attention to and harnessing a diversity of different sectors and perspectives, sector-specific "blind spots", opportunities and assumptions can be made visible. By maximizing the synergistic benefits of species and habitat protection and health, countries (especially those with low resources) can optimize the use of their capacity to address multiple concurrent and connected problems.

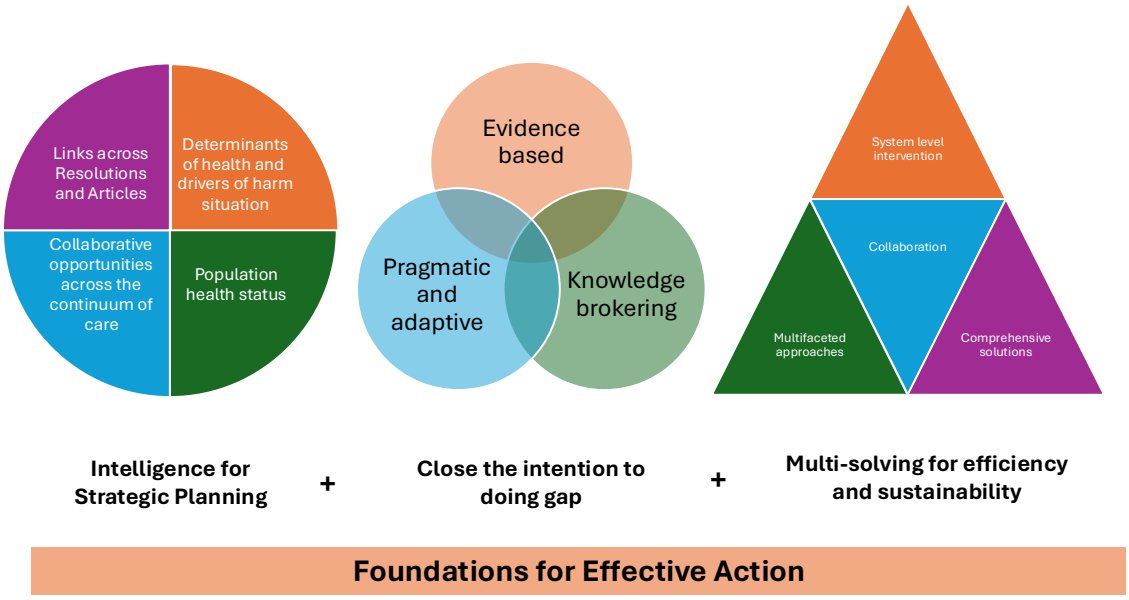
The CMS Working Group can help identify and bolster strategies and personnel to institutionalize actions. Successful multi-solving requires committed individuals, organizations and leaders who are willing to mobilize their personal networks and connections to encourage collective action. Supporting action-oriented human capacity development could be an important niche for the Working Group. Bridging the intention-to-doing gap using collaborative approaches between knowledge producers and knowledge users can help identify the right questions to ask that will produce credible and trustworthy evidence that can be translated into practical, feasible, acceptable and sustainable solutions.

The need to be pragmatic

Existing studies and experiences make it clear that action is required to reduce wildlife health risks but are less clear on how to get it done. Evidence that an intervention could change an outcome is not the same as evidence to show that the process for implementing the intervention is timely, feasible, acceptable, efficient, effective, ethical, affordable and or sustainable. Knowledge about threats and risk factors alone will not lead to risk reduction without understanding the factors changing the trajectory of a socio-ecological system to a safer state. Even when evidence exists, there can be barriers to its acceptance or implementation by decision-makers (Arais et al., 2021).

The path to translating wildlife health evidence into policy into action is context-laden, time-consuming and not linear. A pragmatic goal of the Working Group could be to identify effective interventions in 'real world' settings rather than discover mechanisms of causation or propose ideal interventions that cannot be feasibly or equitably implemented. Through a bridging role, the Working Group can identify ways to leverage existing CMS tools toward achievable, impactful health goals. This would involve integrating experts, capacities and strategies from diverse fields to broaden the scope of CMS initiatives toward multi-solving without attempting to address all aspects of migratory species health and conservation simultaneously.

Figure 8. Synthesis of candidate guiding principles and themes of Working Group activities needed to fulfill its term of reference in line with modern definitions of wildlife health



Next steps

1. The Working Group develops and supports Parties on a future-ready vision of wildlife health that exploits the CMS strengths and opportunities identified in this analysis and creates a niche for the CMS health programs as a multi-solving, bridging instrument intended to promote implementation of activities to protect and promote wildlife health and conservation.
2. Develop a cross-sectoral communication and engagement plan as a foundation for situational awareness throughout the continuum of care.
3. Develop a value proposition for resources to support intelligence functions overseen by the Working Group.
4. Design a framework and tool to describe the migratory wildlife health situation that can be used to identify and prioritize action and find interventions that could provide co-benefits across health and conservation concerns.

Figure 9. The CMS Working Group on Migratory Species and Health supports Parties in being able to exploit the strengths and opportunities provided by the Convention for delivering improved wildlife health for the benefits for all. Credit: Jordan Robins / Ocean Image Bank

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The Convention on the Conservation of Migratory Species of Wild Animals (CMS)

is an environmental treaty of the United Nations that provides a global platform for the conservation and sustainable use of migratory animals and their habitats. This unique treaty brings governments and wildlife experts together to address the conservation needs of terrestrial, aquatic, and avian migratory species and their habitats around the world.

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