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Assessing Protected Area Management Effectiveness: the Need for a Wetland-Specific Evaluation Tool

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Abstract

The Ramsar Convention on Wetlands of International Importance Especially as Waterfowl Habitat was developed in 1971, and has established the world's largest network of protected areas. However, monitoring and reporting have been inadequate to fully achieve the goals of the Convention. We argue that current reporting mechanisms, including the Management Effectiveness Tracking Tool (METT), Rapid Assessment and Prioritization of Protected Area Management (RAPPAM), and the R-METT reporting framework adopted at the 12th Conference of the Parties, are not well adapted to wetland systems and the objectives of the Ramsar Convention. This paper outlines one possible structure for a new reporting mechanism, explicitly focused on the Convention's objectives of maintaining ecological character and promoting wise use within the context of sustainable development. Through these lenses, we developed a 15-question framework that would have site managers compile the most pertinent information relating to these two points quickly, including providing operational definitions, identifying allowable uses, quantifying economic benefits, reporting fundamental monitoring data, and assessing stakeholder engagement opportunities. We argue that, if we are to provide an informed outlook for the next half-century of wetland conservation under the Ramsar Convention, we must begin by refining its information-gathering protocols for its system of wetlands of international importance.

Keywords Ramsar Convention · Reporting mechanisms · Monitoring · Assessment · Wise use

Introduction

As concerns over declines in natural areas have grown, governments have sought to establish benchmarks such as Aichi Target 11 to curb the rapid loss of biodiversity (Convention on Biological Diversity 2010). Losses of wetlands in particular since 1970 have exceeded 35% where data are available on coverage trends (Ramsar Convention on Wetlands 2018), and rates of loss have increased in recent years despite the relatively widespread adoption of the Ramsar Convention over that time period, which ostensibly should curb this trend (Darrah et al. 2019). However, much as spatial extent alone cannot account for the ramifications of habitat loss for ecosystem function, coverage of protected areas does not suffice without proper management (Leverington et al. 2010; Gardner et al. 2015).

The Convention on Wetlands of International Importance especially as Waterfowl Habitat, otherwise known as the Ramsar Convention, was signed in 1971 in Ramsar, Iran (Ramsar Convention 1994) and it came into force in 1975. It is an international agreement promoting the conservation and wise use of wetlands and their resources in an effort to reverse the loss and degradation of wetlands globally while supporting internationally agreed upon development strategies (Finlayson et al. 2011; Kumar et al. 2011; Ramsar COP12 2015a). Sustainable uses of both freshwater and marine wetland resources are especially important for local livelihoods in many parts of the world (Shrivastava and Heinen 2007; Guzman et al. 2020), which was explicitly recognized in Ramsar's original documents (Bowman 1995; Heinen 1995a). Contracting parties must nominate one wetland within their national jurisdiction as a Wetland of International Importance prior to signing and develop an appropriate management plan for listed sites (Finlayson et al. 2011), as well as promote the wise use of wetlands throughout their territories "as far as possible" by

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establishing reserves and providing for the enforcement of conservation regulations (Ramsar Convention 1994). This wise use principle has also been interpreted by the parties to include adopting national wetland policies (Navid 1989), developing programs for studying, monitoring, and educating the public about wetlands (Finlayson et al. 2011), and establishing management plans for their designated Wetlands of International Importance (Finlayson and Gardner 2020), as well as policy instruments to conserve wetlands more broadly within their jurisdictions.

At the time of this writing, there are 171 contracting parties and 2421 listed wetlands covering over 254 million hectares (Ramsar Convention Secretariat 2021). Estimates indicate that 13% to 18% of the global area of wetlands is now designated as Wetlands of International Importance under Ramsar (Davidson and Finlayson 2018; Janse et al. 2019), otherwise known as Ramsar sites (Gardner and Davidson 2011). A site must meet at least one of nine criteria to be eligible for designation (Ramsar Convention 1971): (1) contain representative, rare, or unique wetland types, (2) support vulnerable, endangered, or critically endangered species or threatened ecological communities, (3) support populations of plant and/or animal species important for maintaining the biological diversity of a particular biogeographic region, (4) support plant and/or animal species at a critical stage in their life cycles, or provide refuge during adverse conditions, (5) regularly support 20,000 or more waterbirds, (6) regularly support 1% of the individuals in a population of one species or subspecies of waterbird, (7) support a significant proportion of indigenous fish subspecies, species or families, life-history stages, species interactions, and/or populations that are representative of wetland benefits and/or values, (8) serve as an important source of food for fishes, spawning ground, nursery, and/or migration path on which fish stocks, either within the wetland or elsewhere, depend, or (9) regularly support 1% of the individuals in a population of one species or subspecies of wetland-dependent nonavian animal species. The broader emphasis from a management perspective is on monitoring and reporting on the "ecological character" of the wetland, from Article 3 (Ramsar Convention 1994). Contracting parties implement the Convention through three primary pillars: promoting the wise use of all wetlands within their territory, designating and managing Ramsar sites, and international cooperation to share knowledge and information as well as manage shared resources, for example, through the designation of transboundary wetlands where appropriate (Gardner and Davidson 2011; Moomaw et al. 2018).

The Convention was considered ahead of its time at signing. The underlying commitment to managing wetlands for wise use—rather than simply for preservation—was aligned with goals of sustainable development as yet underdeveloped on the global policy stage (Heinen 1995b, 2012; Finlayson et al. 2011). It is, of course, not without its flaws. Prevalent among these is its relative lack of teeth in that it has little control or enforcement power over its contracting parties in actions impacting overall status of wetlands in their territory (Sah and Heinen 2001). Despite the stated commitments of the contracting parties to achieve better management of Ramsar sites as well as all wetlands within their national jurisdictions, insufficient action has been taken to this end as evidenced by the paucity of national wetland inventories (Finlayson 2012) deemed vital for effective wetland management (Finlayson et al. 2011) and unsuccessful or incomplete implementation in many countries (Ter-Ghazaryan and Heinen 2006; Gardner et al. 2015; Janse et al. 2019). Some have raised concerns about the reliability or validity of data submitted to the Secretariat through the triennial national reports (NRs), perhaps because the NRs do not require submission of supporting documentation at the subnational or site levels, calling into question the Convention's ability to track wetland trends accurately (McInnes et al. 2017). Strategic plans have also offered conflicting guidance, with some emphasizing the importance of stand-alone wetland policies, while others encourage embedding these into other national environmental policies (Pittock 2010). In addition, contrary to other international environmental agreements, the Ramsar Convention has not set explicit targets, instead remaining a process-oriented framework.

A critical first step in addressing these shortcomings was adopting a shared framework for protected areas management effectiveness (PAME) (Ramsar COP12 2015b). At the 12th Conference of the Parties (COP) in Uruguay, recognizing the shifts in the decade prior by various entities such as the World Heritage Convention and the Convention on Biological Diversity, the parties approved the Ramsar Site Management Effectiveness Tracking Tool (R-METT; Resolution XII.15; Ramsar COP12, 2015).

The World Commission on Protected Areas (WCPA) defines six key elements of effective management: context, planning, inputs, processes, outputs, and outcomes (Deguignet et al. 2017) (Fig. 1). Over the last two decades, the WCPA has supported the development of several tools to assess PAME (Stoll-Kleemann 2010), coinciding with increasing interest in standardized evaluation techniques among funders of environmental projects around the world (Worboys et al. 2015). Two tools in particular have been widely adopted: the Rapid Assessment and Prioritization of Protected Area Management (RAPPAM) and the Management Effectiveness Tracking Tool (METT). Both tools are grounded in the WCPA's six key elements as a framework for evaluation, grouping questions by subject area and focusing on specific elements.

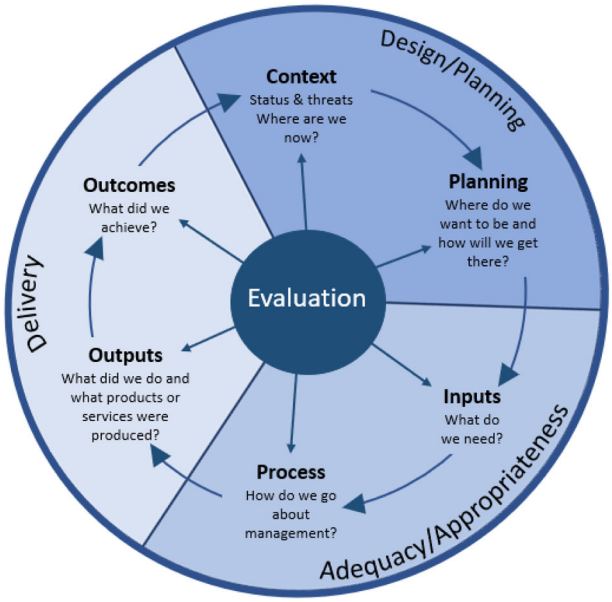

Fig. 1 The WCPA's six key elements for PAME, adapted from Hockings et al. (2006)

This paper reviews the application of these tools, specifically in the context of their usefulness in tracking management effectiveness of Ramsar sites. Continuous monitoring of wetlands is particularly important, as these systems are critical barometers of global change due to their vulnerability to changes in ecological and hydrological conditions (Erwin 2009; Lamsal et al. 2017). As wetland loss continues and outpaces the loss of forests threefold (Ramsar Convention on Wetlands 2018), we assess the potential and limitations of both RAPPAM and METT for evaluating PAME in wetlands. Finally, we propose a preliminary framework to address these limitations and improve reporting of management processes and outcomes for wetland ecosystems worldwide.

Methods

For this review, we compiled literature from three sources: the web-based archives of both the Ramsar Convention and the WCPA and a nontime limited Web of Science search. On Web of Science, we used the search terms "PAME," "RAPPAM," "METT" (and the fully spelled out names of each), "Ramsar," and "wetlands of international importance," as well as the combinations "PAME and Ramsar" and "PAME and wetlands." We then excluded any documents that were unrelated to the scope of this research, such as case study evaluations of PAME that used a tool other than RAPPAM and METT, literature on Ramsar not related to the convention (i.e., about non-wetlands-related topics in Ramsar, Iran), or research on Ramsar that did not evaluate management effectiveness. We used snowballing (Harrison et al. 2014; Van Wee and Banister 2015) to identify additional sources from the literature cited within the documents.

After compiling the relevant documents, we then grouped them into four categories based on three guiding research questions: (1) what does each entity seek to include in management evaluations, (2) what questions do they ask to assess management effectiveness, and (3) to what extent are the evaluation tools being implemented effectively? The first category includes sources such as the original texts downloaded from the web-based archives of Ramsar and WCPA, as well as the original handbooks for RAPPAM and METT which outlined their conceptualization and objectives. In the second category, we included the questionnaires developed for RAPPAM, METT, and the Ramsar-modified METT (R-METT). The third category was further subdivided into internal evaluation papers, such as those commissioned by the WCPA, and external evaluation papers, such as case studies published by unaffiliated groups including academic publications. Lastly, the final category included evaluation papers on R-METT, RAPPAM, and METT by external groups.

After answering these three guiding questions, we identified critical objectives outlined by the Ramsar Convention text which should be benchmarked and assessed by sites and contracting parties to ensure compliance with the Convention. Based on the respective strengths and weaknesses of the three existing evaluation frameworks, we propose a novel framework for assessing wetland management, specifically in the context of reporting on management processes and outcomes occurring on Ramsar sites.

Existing Evaluation Frameworks

METT

The METT was initially released by the World Wildlife Fund for Nature (WWF) in 2002 following a year of trials, with a second edition published 5 years later (Stern 2007). It is intended as a repeat evaluation tool to track management through time of a given protected area (Stolton and Dudley 2016). The tool was developed specifically to track forest management, as such projects were the focus of many World Bank conservation funds at the time, but it has been applied with some modifications to other systems. Notably, the Ramsar Secretariat has adopted a modified METT, known as the R-METT, for reporting on Ramsar sites (Ramsar COP12 2015b). Though WWF acknowledges that participatory evaluations would be better, the only recommendation as far as participation is that at minimum more than one member of management should be involved

(Stern 2007). This reduces bias and subjectivity in the responses (Carbutt and Goodman 2013), while also facilitating consistency across repeat evaluations by ensuring continuity across assessments.

The questionnaire itself is designed to be quite short, with only 33 questions in total, to encourage repeat evaluations and embedding monitoring and evaluation into adaptive management processes (Stolton and Dudley 2016). As a result, the METT is considered a relatively rapid assessment tool which can be completed in a couple of days. Each response is a subjective description of the condition of the question's subject, quantified with a score ranging from 0 to 3 (Carbutt and Goodman 2013). As descriptions can be quite lengthy and include subjective terms such as "sufficient" or "adequate," it is important to build consensus as to the meanings of these terms in the protected areas context (Stolton and Dudley 2016).

This subjectivity can result in radically disparate scores when the assessment is undertaken by different actors, and thus the numerical score must be taken with some caution (Carbutt and Goodman 2013). It is also partly the reason that METT scores are not considered comparable across sites and contexts. Contrary to its counterpart, RAPPAM, the METT questions imply a certain hierarchy of effectiveness, where each step closer to what might be considered "optimum management" is worth more points, which might serve as a perverse incentive for score padding. In addition, while each response should be accompanied by explanatory notes from the assessment team, these are often left incomplete (Zimsky et al. 2010; Stolton and Dudley 2016). This is particularly challenging when assessing outcomes, as the METT does include one question on management outcomes, but these are difficult to verify if assessors do not include evidence of these outcomes in the narrative accompanying the question (Zimsky et al. 2010).

RAPPAM

The RAPPAM method was published by the WWF in 2003 with the explicit aim of comparing management across protected area networks, typically within a country (Ervin 2003). Much like METT, the RAPPAM was developed specifically for assessing forest management, but has been modified and expanded to other systems (Ervin 2003), and remains one of the most commonly used PAME methods (applied over 2276 times to 1930 protected areas; Coad et al. 2015). It also strongly emphasizes a participatory process to PAME, as the questions are structured to determine the extent to which stakeholders agree with statements relating to the site features, functions, and management (Ervin 2003). However, the questionnaire does not explicitly address uses, so it is best suited for IUCN categories I–IV (Heinen 2010).

The questionnaire consists of a series of questions with answer choices for yes, mostly yes, mostly no, and no, avoiding the tendency of responses clustering at a midpoint (Hockings et al. 2015). They may also provide explanatory notes for each response, though they are only expected for the "mostly yes/no" responses (Ervin 2003). The assessment can be used to quantify the total pressures and threats faced by each protected area approximately (Carbutt and Goodman 2013), and thus provides a useful tool for comparing and prioritizing protected areas based on their relative threat levels in the broader network. Contrary to the METT, the RAPPAM assessment seems much more focused on what there is—focusing on yes/no type responses to a single prompt—than on what there should be, along with and the management team's progress toward meeting that goal (Ervin 2003).

However, completing a RAPPAM assessment is time intensive and logistically challenging, especially if utilizing participatory methods (Paleczny and Russell 2006). Unlike METT, it does not provide a list of common threats to protected areas, instead relying on compilers to select threats based on recall and the relative importance of them. However, it does ask for trends in these threats and pressures, which may allow for long-term indirect tracking of management outcomes. The questionnaire does not relate explicitly to management outcomes or outputs (Coad et al. 2015), instead focusing on the first four elements of the management cycle proposed by the WCPA. As with other assessments, additional questions have been developed to evaluate outcomes and outputs, as well as supplementary information on the policy environment, but these are not included or required in the main questionnaire (Ervin 2003). Thus, RAPPAM is ill suited to answer questions about the role of the policy environment in influencing management. This element is of particular importance in protected area networks established under a shared intergovernmental agreement like the Ramsar Convention.

R-METT

The R-METT was proposed as a voluntary mechanism for PAME evaluation of Ramsar sites to provide sites with no preexisting evaluation framework to assess their management effectiveness using a standardized framework (Ramsar COP12 2015b). The R-METT consists of five data sheets reflecting a combination of adapted METT questions as well as the IUCN Conservation Assessment for World Heritage Sites (Ramsar COP12 2015b). Like RAPPAM, the R-METT identifies key values of the site on its Data Sheet 1b, which is meant to reflect the criteria for designation of the site (Ramsar COP12 2015b). After that point, the R-METT is virtually identical (with few deviations) to the METT's Threat Categorization and Assessment Forms.

Current Ramsar site reporting through the R-METT categorizes all uses as "threats" (Ramsar COP12 2015b), which is in stark contrast with the spirit of the Convention as a tool for sustainable development.

There are, however, some notable modifications meant to make the R-METT more tailored to wetland management evaluation. Section 7a in the threat categorization on Hydrological Change is an extension of the METT's Section 7 on Natural System Modification (Stern 2007). In Section 8, they include the threat of "invasive native species," which is not mentioned in the METT form. In the assessment form, they omit the "Additional Points: Condition of Values," instead adding three more detailed questions about ecological character, cross-sectorial management entities, and communication with the Ramsar administrative authority to round out the 33 questions (Ramsar COP12 2015b). Finally, the R-METT asks managers to identify five questions from the assessment form which are major constraints to effective management and five which are the greatest strengths of the current management mechanisms and why. This is a reflective feature unique to the R-METT. The R-METT's Data Sheet 5 asks managers to define trends in ecological character, specifically in terms of features that were used to qualify the site as a wetland of international importance at designation, by assigning both an assessment of the condition of that feature, as well as trends in the condition.

Previous studies on the applicability of the standard METT tool to Ramsar sites had found that the tool served as an adequate and sufficiently simple method for application at sites with varying degrees of age, development, and management experience (Chatterjee and Pittock 2005). The authors compiled feedback from management teams asked to pilot the METT at each of their eight respective Ramsar sites, finding that scores generally reflected trends in best management practices (Chatterjee and Pittock 2005). However, they noted, additional questions on outcomes and stricter definitions of ecological character were needed, points which were (to some extent) addressed in the R-METT approved by the COP in 2015 (Ramsar COP12 2015b). Some have even called for a reframing of ecological character questions to better align with a dynamic social-ecological systems framework to be considered instead as "wetland character" (Kumar et al. 2020). The R-METT does not include targeted questions relevant to wetlands, such as areal extent, water budget, water level fluctuations, nutrient fluxes, and vegetation, five elements widely considered to determining wetland ecosystem functions (Janse et al. 2019), and by extension, its ecological character. It is important to note that the R-METT remains a process-based evaluation tool and that, while the Secretariat has taken steps to clarify "ecological character," developing a description of ecological character remains a task of the local management team which does not have to be completed prior to designation, as indicated by question 31 on the assessment form (Ramsar COP12 2015b).

Proposed Framework

We propose an alternative framework that addresses the goals of the Ramsar Convention more explicitly while simplifying the reporting process to ensure that reports are compiled and submitted regularly to the Secretariat. In addition, we sought to create a reporting framework that would facilitate system-wide, as well as internal year-to-year, site-based comparison, within a single evaluative tool. Increased frequency of reporting will enhance early warning systems such that changes in ecological character are detected before severe degradation occurs and to inform more responsive management (Worboys et al. 2015; Gell and Finlayson 2016; Marín et al. 2018). While earth observation technologies are likely to play an increasingly important role in Ramsar implementation monitoring (Mackay et al. 2009; Rebelo et al. 2018), in situ data collection and surveillance do and will remain necessary for tracking changes in wetland extent and function at medium and fine scales. Thus, on-the-ground teams require a rapid assessment tool to support such data collection without placing an excessive reporting mandate on understaffed and under-resourced sites (Finlayson 2003; Finlayson et al. 2017). Several of the questions are shared with the R-METT, but request additional supporting evidence that is not required in any of the existing evaluation tools. We should note that in this paper, we use the term "monitoring" to refer to both hypothesis- and nonhypothesis-driven wetland assessment, while the Convention's guidance refers only to the former as monitoring, and uses "surveillance" to refer to the latter (Finlayson 2003; Rebelo et al. 2018). As many Ramsar sites do not yet have management plans to support hypothesis-driven monitoring, this tool was developed to compile data irrespective of ongoing management interventions. In addition to compiling these data, the framework is intended to signal to site managers what data or emphases may be missing from their existing management plans and priorities. Here, we outline the four general sections and questions of this proposed framework, the Rapid Ramsar Management Effectiveness Evaluation Tool (Rapid R-MEET), which span social, economic, and environmental criteria as suggested for robust monitoring (Barbier et al. 1997; Finlayson et al. 2017) and the rationale for the inclusion of each.

Section 1: Site Context

The first section requests general site information in narrative format, including the name, year of designation, and

Table 1 The first section of the Rapid R-MEET covers site context

Site Context	1. Name of Ramsar site
	2. Date when Ramsar site listed
	3. Total area of Ramsar site (ha)
	4. Reasons for designation
	a. Identify the key values of the site that reflect the Ramsar criteria used for site designation
	b. Identify other key values (not from the Ramsar criteria) of the site

Table 2 The second section of the Rapid R-MEET covers national context

National Context	1. Is there a national wetland policy?
	a. Circle one: Yes/No
	b. If yes, what is it?
	2. Is there a designated national authority for Ramsar implementation?
	a. Circle one: Yes/No
	b. If yes, who is it?
	3. Is there a standardized national definition of a wetland? What is it?
	a. Circle one: Yes/No
	b. If yes, what is it?
	4. Is there designated funding for Ramsar site management?
	a. At the national level—circle one: Yes/No
	b. At the site level—circle one: Yes/No

area (Table 1). Although this information is typically included in a site's Ramsar Information Sheet (RIS), area can change over time as a reserve expands (or reduces) its spatial footprint (Gardner and Davidson 2011). Given that globally, 51.3% of RISs are overdue, it is unlikely that this change will be captured in current reporting mechanisms that have thus far proven insufficient in supporting timely updates and adequate recognition of indirect human threats to wetlands (Kafle and Savillo 2009; Finlayson 2012; Moomaw et al. 2018; Davidson et al. 2020). Improved PAME evaluation tools can encourage more frequent updates to RISs, thus supporting the broader goals of the Convention at the national level (Davidson 2016). In addition to providing a high-level overview of the site, these questions facilitate long-term system-wide assessment of the role of age and area in management effectiveness. In the context of marine reserves, some of which are Ramsar sites, conservation benefits have been found to increase with age and size (Cook and Heinen 2005; Edgar et al. 2014; Kroloff et al. 2019). However, an analysis of Ramsar sites found that deterioration of ecological character was more widespread in countries whose wetland sites had a larger average area (Davidson et al. 2019).

In addition, the site context section requests information on the site's key values. Reporters will first be asked to identify the criteria used to designate the site using a checklist of the nine Ramsar criteria (Gardner and Davidson 2011). Where applicable, they should identify which subcriteria were relevant. For example, Criterion 1 is "A wetland should be considered internationally important if it contains a representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region," and the reporter would identify whether the wetland is representative, rare, or unique, natural or near natural. They will also be asked to identify any key values of the site not captured in the nine criteria, which can extend the scope of values to socioeconomic characteristics of the site. While modeled after "key management objectives" questions in RAPPAM and METT, this question encourages reporters to consider key aspects of ecological character and stakeholder needs outside of the lens of current management, providing a potential roadmap for future management.

Section 2: National Context

When implementing a multilateral agreement, the national policy environment is critical. This is certainly the case for the Ramsar Convention, in which implementation is generally accomplished through existing national legislation, and with a special influence on individual sites (Navid 1989). However, only 73 of the contracting parties have adopted wetland-specific policies, which can hinder implementation of the convention and limit the scope of its protections to designated sites, rather than all wetlands within their territory (Finlayson and Gardner 2020). Legal planning indicators (including legal status of a site and broader policy context of the resource) have been found to be strongly correlated with values conservation (Leverington et al. 2010). Clarity on the designated authority alleviates obstacles to reporting by identifying a responsible party for enforcing monitoring and evaluation requirements and submitting reports to the Secretariat. Asking reporters to provide this information may encourage better communication between local implementing bodies and the designated authority, which has been called for by scholars to ensure the sustainability of wetlands worldwide (Finlayson et al. 2019).

Reporters will also be asked to provide the national wetland definitions, if they exist (Table 2). Standardized definitions are vital for setting priorities and knowledge of these definitions has been linked to support for wetland conservation (Johnson and Pflugh 2008). Lastly, this section asks whether there is designated funding for Ramsar site management, either at the national level (e.g., through

federal budget disbursements or nationally available grants) or at the site level (e.g., through local or regional planning agencies and partners). Adequacy of funding (as well as indirect indicators of this, such as adequacy of infrastructure and law enforcement) consistently correlates with overall management effectiveness (though not necessarily with outcomes; Heinen et al. 2017; Leverington et al. 2010), and sustainability of funding is assumed to ensure protected area longevity (Ervin 2003; Reid-Grant and Bhat 2009). Where funding is not available, the contracting party or Secretariat may be able to step in to provide additional resources or support the pursuit of additional funding.

Section 3: Site Management

As the contracting parties have placed particular emphasis on the implementation of the Convention through the designation of Ramsar sites (Gardner and Davidson 2011), it is evident that site management itself will be imperative to achieving the goal of wetland conservation. However, it is important to note that the goal of this evaluation framework is not to facilitate in management planning, but to identify critical gaps in monitoring of implementation in these sites. The questions in this section aim to elucidate the management team's interpretation of key facets of the convention, and the extent to which they are monitoring basic ecological character traits (Table 3). The first facet to this is determining whether an up-to-date management plan is being implemented at the site (Pritchard 2015), a requirement of the convention (Finlayson et al. 2011) yet less than half of Ramsar sites report doing so (Ramsar Convention on Wetlands 2018).

The second key component is the management team's operating definition of wise use. Over the years, the contracting parties have interpreted the wise use principle to refer to the maintenance of ecological character (Navid 1989), but ecological character itself has been an ambiguous term to quantify, translate, and report on (Davidson et al. 2019). Thus, the lack of an explicit and actionable definition of "wise use" has been criticized by scholars as being at odds with the feeling of the convention, and especially its emphasis on supporting ecological character (Farrier and Tucker 2000). The goal of this question is thus to gain a system-wide understanding of how management teams on the ground have interpreted this principle and how they have structured management to reflect it. In addition, reporters will be asked to identify the allowable use categories for their respective sites. Ramsar wetlands are often working wetlands, where some human activities (including some extractive processes) are allowed to continue under the guise of "wise use," insofar as it furthers the objectives of sustainable development under the Convention (Finlayson et al. 2011). However, there is not a standard definition of this, and thus no existing listing of what constitutes it, despite the Convention's publication of several wise use handbooks (Finlayson and Gardner 2020). Capturing the diversity of resource uses allowed in wetlands improves capacity to assess uses and potential threats.

Table 3 The third section of the Rapid R-MEET covers site management

Site Management	1. Is there an up-to-date management plan being implemented? a. Circle one: Yes/No b. If yes, upload the management plan here. 2. What is the definition of wise use used by the management team? 3. What are allowable uses for the site? a. Food crop cultivation b. Timber extraction c. Mineral extraction d. Aquaculture e. Fishing f. Hunting g. Water h. Foraging/harvesting of non-timber forest products i. Traditional cultural/religious uses j. Other 4. What ecological indicators are currently being monitored regularly on site? a. Hydrological Monitoring b. Vegetation Surveys c. Bird surveys d. Invasive species e. Land use change f. Other

R-METT currently asks managers to report on "trends in ecological character" supported by available evidence (Ramsar COP12 2015b), but managers are not mandated to collect any data in particular, despite the fact that such data are pivotal to support management decisions (Bhat and Stamatiades 2003; Mackay et al. 2009). In addition, this question can be ambiguously reported, as can its equivalent in the national triennial reporting form (Davidson et al. 2020), leading to an incomplete picture of ecological character monitoring at Ramsar sites. Given the Convention's origins in waterbird and wetland conservation (Navid 1989; Finlayson et al. 2011; Davidson 2016), we argue that bird surveys and hydrologic monitoring should be required at a minimum. Ramsar sites often provide critically important habitat, whether for migratory stopovers, overwintering sites, or as longer-term breeding grounds, for many species of waterbirds (Heinen 1990; Davidson and Stroud 1996). Bird surveys can often signal overall ecosystem health given their sensitivity to environmental

Table 4 The fourth and final section of the Rapid R-MEET covers the site's community relations

Community Relations	1. What are the direct economic benefits of the site? a. Employment on the site (management, maintenance) b. Revenues in entry fees c. Revenues in use permits d. Revenues from programming 2. What are the indirect economic benefits of the site? a. Employment in related sectors (tourism, education, hospitality, fisheries, agriculture, etc.) b. Revenues from associated markets (tourism, education, hospitality, fisheries, agriculture, handicrafts, etc.) 3. What is the role of stakeholders in informing management decisions?

conditions (Finlayson et al. 2017), and hydrology is crucial to maintaining wetland characteristics, as demonstrated by the impacts of altered hydrologic flows on wetlands in the Convention's Montreux register (Dudley et al. 2003). However, given that birds are not always reliable indicators of overall aquatic biodiversity (Gardner et al. 2015), these recommendations are a minimum starting point to consider, and would likely yield great insight on trends in bird populations that is sorely needed to support international conservation efforts (Davidson and Stroud 1996).

In accordance with the Convention's emphasis on community participation, documenting trends in bird populations may also be an opportunity for management teams to engage local ecological knowledge (Edwards and Roy 2017; Rehage et al. 2019). Such a knowledge base, whether existing or developed through a citizen science program, can be an important starting point in more data-limited sites or it can be used to support triangulation in reconstructing historical baselines (Worboys et al. 2015; Bavinck et al. 2017; Finlayson et al. 2017; Kroloff et al. 2019). As hydrologic monitoring can be broad and encompass topics from flow rate to pollution and salinity, management teams would be expected to determine the appropriate monitoring regime for the site. Given the intricate connections between water and human wellbeing, more robust hydrological monitoring would additionally support the Convention's framing of the interconnectedness between humans communities and wetlands (Davidson and Coates 2011). Ecological and hydrologic values would thus form the backbone of this wetland monitoring program (Stratford et al. 2011). In addition to identifying what wetland values they are currently monitoring, management teams will also be asked to provide their monitoring data, thus contributing to compiling a single repository on global wetland conditions.

Section 4: Community Relations

While at times they have been found lacking in some ways, and frequently do not meet their full expectations (e.g., Baral and Heinen 2020), participatory management structures of many types of natural resources are recognized as playing critical roles in improving management while empowering local people (Heinen 1995b; Reed et al. 2009; Nagabhatla et al. 2012; Pittman et al. 2014). This is reflected in the normative preferences for stakeholder engagement exhibited in both RAPPAM and METT (Ervin 2003; Stolton and Dudley 2016). Furthermore, the social context of wetland management has been an integral component of the Convention given its promotion of sustainable development, as evidenced by the inclusion of social and cultural values on the RISs compiled when nominating a wetland of international importance (IUCN for Panama 1993), its explicit recognition of the interdependence between humans and wetlands (Davidson 2016), and guidance from the Secretariat encouraging collaboration across sectors to communicate and recognize multiple wetland values (Kumar et al. 2017). There is a recognized need among protected area scholars and practitioners for a deeper understanding of the interconnections between socioeconomic conditions and resource management decision-making and outcomes, especially with respect to community knowledge and perceptions of these processes (Guzman et al. 2020) and to enhancing the adoption of a socioecological systems thinking approach to managing Ramsar sites to improve implementation (Kumar et al. 2011; Hettiarachchi et al. 2015). In addition, adequate economic valuation of wetland services and benefits is critical to achieving the wise use and conservation goals of the Convention (Barbier et al. 1997).

This section first considers the direct and indirect economic benefits of the Ramsar site (Table 4). Quantification of direct economic benefits, in the form of direct employment generated by the site, can be conducted relatively easily with the support of site managers with respect to salaries and benefits for employees and contractors dependent upon the Ramsar site. In cases of multi-internationally designated areas, these direct benefits should be broken down, where possible, based on the relative budgetary contributions associated with each designation.

Indirect benefits are often more difficult to quantify (Barbier et al. 1997), but can be assessed in conjunction with municipal governments or external researchers to quantify the economic impact of the wetland on the community, both through market and nonmarket goods and services. Note that here, we use the term "indirect benefit" to describe nonemployment economic benefits of the site, and it is distinct from "indirect use value." These indirect benefits may include direct use values, such as resource extraction and tourism revenue, or indirect use values associated with the regulatory and supporting services provided by wetlands in the form of flood protection or water regulation (Russi et al. 2013). Each of these categories of values may be quantified using different valuation techniques, such as contingent valuation, market analysis, preventive expenditures, and others, depending on the type of use and available data (Barbier et al. 1997). The Ramsar Secretariat has produced several handbooks on valuation techniques relevant to wetlands that provide a more robust description of how to plan and execute appropriate economic assessments for Ramsar sites (see Barbier et al. 1997; Russi et al. 2013). Providing estimates, especially of indirect benefits, is critical to compiling a global database of the value of wetlands to better communicate the need for their conservation to policymakers. As wetland values vary immensely from site to site depending on context and resource (Schaaf and Clamote Rodrigues 2016; Kumar et al. 2017), specific types of uses and benefits are not provided in the framework. Finally, the section asks reporters to describe (in narrative format) the role of local stakeholders in decision-making. Frequent participation is integral to achieve good conservation outcomes, particularly in sites with great variability in resource use and dependence among diverse or rapidly changing neighboring communities (Sah and Heinen 2001). Coupled with the allowable use categories from Section 3, these responses can help identify resource groups that are being particularly excluded or potentially driving conflict in the surrounding communities (Palacio et al. 2003).

Conclusions

Wetlands are among the planet's most biological productive ecosystems, and when their function is not compromised by degradation, they provide ecosystem services that far exceed those of most terrestrial ecosystem types (Ramsar Convention on Wetlands 2018). In recognition of their vital role in global processes, and their alarming rate of decline throughout the 20th century and ongoing, the Ramsar Convention on Wetlands of International Importance was developed in 1971 (Navid 1989). However, as we celebrate its 50th anniversary, there are many ample causes for alarm. Wetlands continue to be converted, drained, and degraded rapidly worldwide (Davidson and Finlayson 2018) and wetland-dependent species continue to decline toward extinction (Gardner et al. 2015), despite the Ramsar Convention providing the impetus to establish the world's largest network of protected areas (Gardner and Davidson 2011).

Monitoring, evaluation, and reporting are critical to delivering on the Ramsar Convention's objectives of conservation and wise use of wetlands (Ramsar Convention Secretariat 2010). However, monitoring and reporting, both on the national and site levels, have been inadequate to achieve the goal of the Convention's treatment of wetlands as important barometers of change (Erwin 2009; Davidson et al. 2020; Finlayson and Gardner 2020). We argue that this may be in part due to the time required to produce such reports, and the fact that current reporting mechanisms, including the R-METT reporting framework adopted at the 12th COP, are not well adapted to wetland systems and the objectives of the Ramsar Convention. Thus, a thorough reappraisal of the Ramsar Convention's efficacy should begin with the adoption of a novel framework that specifically targets the Convention's objectives.

This paper outlined one possible structure for a new reporting mechanism. In preparing it, we distilled the Ramsar Convention's objectives with respect to wetlands of international importance to their core: maintaining ecological character and promoting wise use within the context of sustainable development. Through these lenses, we developed a 15-question framework that would ask site managers to compile the most pertinent information relating to these two points, including providing operational definitions, identifying allowable uses, quantifying economic benefits, reporting fundamental monitoring data, and assessing stakeholder engagement opportunities. This is not meant to serve as a comprehensive tool for gathering the data needed to develop a thorough database of the many factors affecting the ecological character of these complex systems (Mackay et al. 2009), but rather to fill a critical gap in reporting on select components of particular relevance to the Convention and to the management of individual sites. As adequate site-level reporting is low among contracting parties, this short form would greatly enhance the Convention's ability to monitor global wetland trends in the context of these specially designated sites. Contracting parties also have an obligation to maintain ecological character of all wetlands in their jurisdiction through wise use based on Ramsar criteria (Finlayson et al. 2011; Davidson 2016), and meaningful progress toward achieving this may be contingent upon the availability of a brief yet robust monitoring and reporting tool as the one we outlined here. In addition, PAME reporting serves an important internal procedural role for management teams (Worboys

et al. 2015), as it can signal key national or international objectives, and encourage managers to think about how these objectives manifest at their sites and in their monitoring and management practices. This is critical to ensuring that implementation is more or less standard across sites and contracting parties, while still being sensitive to local conditions.

We are currently planning research in several countries across a variety of freshwater and marine Ramsar sites to test this mechanism in the field in order to determine its adaptability in different contexts and its usefulness to site managers. Explicit recommendations of monitoring regimes, mechanisms, and setting explicit baselines were beyond the scope of this analysis, but ample resources have been provided by the Convention and previous research to supplement this information (Ramsar Convention Secretariat 2010; Kopf et al. 2015). If we are to provide an informed outlook for the next half-century of wetland conservation under the Ramsar Convention, we must begin by refining its information-gathering protocols for its system of Wetlands of International Importance.

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