THE CONVENTION ON WETLANDS
64th meeting of the Standing Committee
Gland, Switzerland, 20-24 January 2025

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Proposed draft resolution on assessing wetland vulnerability

Submitted by the Republic of Korea

Action requested:

The Standing Committee is invited to review and approve the attached draft resolution for consideration by the 15th meeting of the Conference of the Contracting Parties.

Secretariat cover note

The draft resolution presents an overview of the Wetland Vulnerability Assessment Tool (WETVAT) developed by the Ramsar Regional Center – East Asia in collaboration with experts and the Government of the Republic of Korea and the Government of the Philippines. It invites Contracting Parties and other stakeholders to utilize the approach in the assessment and management of wetlands.

The STRP has been invited to review the draft resolution.

Introduction

This draft resolution responds to the need to ensure the wise use of wetlands and to recognize, assess and understand the vulnerability of wetlands to a multitude of threats.

The draft resolution presents an overview of the Wetland Vulnerability Assessment Tool (WETVAT) developed by the Ramsar Regional Center – East Asia in collaboration with experts and the Government of the Republic of Korea and the Government of the Philippines.

The draft resolution requests the Contracting Parties to take note of the WETVAT described in the Annex and invites Contracting Parties and other stakeholders, in a voluntary capacity, to utilize the approach in the assessment and management of wetlands.

The technical elements of the WETVAT have been subjected to consultation and evaluation with wetland managers from East Asia and beyond.

The figures in Annex 1 includes screenshots of the WETVAT worksheets for the purpose of illustrating how the tool appears, rather than for discussion. The initial version of the tool is available in English at the moment, and French and Spanish versions will be available for COP15 through a link to be included in a separate guide book on how to use the tool that will be submitted as an information document. The details of the tool could improve over time through feedback from its users.

There are no financial implications of this draft resolution on the Secretariat.

Paragraph	Action	Cost (CHF)
All	None	None

Draft Resolution XV.x on Assessing wetland vulnerability

1. ACKNOWLEDGING that the concept of the wise use of wetlands, as described in Annex A to Resolution IX.1, *Additional scientific and technical guidance for implementing the Ramsar wise use concept*, is at the centre of the Convention's efforts to halt and reverse wetland loss;

2. RECOGNIZING that the wise use of wetlands requires a thorough understanding of the drivers of change so that the root causes of wetland loss and degradation can be addressed (*Global Wetland Outlook,* 2018);

3. ALERT to the fact that, globally, wetlands have declined by 35% since 1970 and that deterioration of wetlands continues to be widespread (*Global Wetland Outlook: Special Edition*, 2021), and CONCERNED that this trend, if not addressed adequately, will affect the achievement of the United Nations 2030 Sustainable Development Goals (SDGs), mitigation and adaptation to climate change under the Paris Agreement and the UN Framework Convention on Climate Change, and the Kunming-Montreal Global Biodiversity Framework adopted by the Convention on Biological Diversity;

4. AWARE of the need to assess the status, trends and threats to wetlands as set out in Annex E of Resolution IX.1, *Additional scientific and technical guidance for implementing the Ramsar wise use concept* and in the mandate to the Scientific and Technical Review Panel in Annex 2 of Resolution XIII.8, on *Future implementation of scientific and technical aspects of the Convention 2019-2021*, that explicitly highlights the need for best practice methodologies and/or tools to monitor Wetlands of International Importance;

5. NOTING that effective wetland management, as described in Resolution XII.15, *Evaluation of the management effectiveness of Ramsar Sites*, requires an understanding and evaluation of the threats to the ecological character of a site;

6. FURTHER NOTING the requirement under Resolution XI.8, on *Streamlining procedures for describing Ramsar Sites at the time of designation and subsequent updates,* to ensure that a comprehensive description of factors (actual and likely) adversely affecting a site's ecological character is provided in the Ramsar Information Sheet (RIS) of a Wetland of International Importance; and

7. CONCERNED that, without adequate assessment of the drivers of negative change, the vulnerability of wetlands, including Wetlands of International Importance, to a diversity of threats, will continue;

THE CONFERENCE OF THE CONTRACTING PARTIES

8. RECOGNIZES the need to assess the vulnerability of wetlands to a variety of threats and drivers of negative change in ecological character;

9. REAFFIRMS the long-term value of taking a participatory approach when evaluating threats to wetlands, including to Wetlands of International Importance;

10. CALLS ON Contracting Parties when monitoring the condition of Wetlands of International Importance, and other wetlands, to ensure that such assessments not only include biological and hydrological components but also consider the vulnerability of the ecological character of the wetlands to a variety of threats;

11. TAKES NOTE of the Wetland Vulnerability Assessment Tool (WETVAT) described in Annex 1 of this Resolution; and ENCOURAGES Contracting Parties to consider, as appropriate, using the approach to assess the vulnerability of wetlands, especially those related to Article 3.2 of the Convention;

12. FURTHER ENCOURAGES Contracting Parties, in the use of the approach described in Annex 1 or other similar approaches, to adopt adaptive management principles that allow for continuous data collection, periodic review, and iterative assessment as new information becomes available, thereby enhancing the effectiveness in responding to emerging threats and knowledge gaps;

13. ALSO ENCOURAGES Contracting Parties, as appropriate, to utilize the approach described in Annex 1, or other relevant approaches to assess wetland vulnerability, when describing the status of Sites on the List of Wetlands of International Importance in their National Reports and Ramsar Information Sheets;

14. INVITES Contracting Parties to allocate resources, where available, or seek partnerships with Ramsar Regional Initiatives and relevant international organizations to facilitate training, workshops, and resource sharing aimed at strengthening technical capacities for assessing and addressing wetland vulnerabilities;

15. CONFIRMS that this Resolution does not create additional reporting obligations for Parties, or financial implications on the Secretariat; and

16. THANKS the Ramsar Regional Center – East Asia for their sponsorship and organization that laid the foundation for the WETVAT.

Annex 1
Overview of the Wetland Vulnerability Assessment Tool (WETVAT)

Introduction

1. Throughout the world, wetlands are vulnerable as they are exposed to a range of pressures. In some locations, these pressures and potential impacts are well-documented and are being successfully addressed. However, at other locations, lack of data, resources and methods are hindering thorough vulnerability assessments. This is particularly the case in remote wetlands or those with limited management resources.

2. Assessment of threats to wetlands are often carried out as part of environmental impact analysis for development projects or as an element site management planning, particularly for Wetlands of International Importance. But in many cases assessment methods have been established in industrialized countries and are ill-adapted to conditions in less developed countries, where knowledge of wetlands is often less complete and resources more limited. The data required to carry out detailed assessment of many wetlands often does not exist and, as a result, few vulnerability assessments have been carried out. Furthermore, the communities that depend most heavily on a wetland are often those without the resources to carry out a formal assessment.

3. A joint Ramsar Convention-WWF-led initiative designed to foster the regional cooperation for long-term wetland conservation recommended development of tools to facilitate monitoring and evaluation of climate change and other impacts on Wetlands of International Importance and other wetland sites[1]. As a result, the EU Asia Pro-Eco programme funded the development of a set of inventory and assessment methods for Greater Himalayan wetlands[2]. An initial vulnerability assessment method was developed for high-altitude wetlands in the Himalayan region and was tested on both remote and non-remote sites[3]. The method was based on an earlier assessment of the ecosystem services provided by a wetland and the pressures that wetlands face[4].

Recent development of the Wetland Vulnerability Assessment Tool

4. The method developed through the work on Greater Himalayan wetlands has subsequently been enhanced for application across the domain of the Ramsar Regional Center - East Asia (RRC-EA), and beyond, and tested on a wider range of sites in the region. The resulting Wetland Vulnerability Assessment Tool (WETVAT) is directly complementary to other tools and voluntary approaches available to wetland managers, such as the Rapid Assessment of Wetland Ecosystem Services (RAWES)[5] and Ramsar Site Management Effectiveness Tracking Tool (R-METT)[6]. Furthermore, it contributes to ensuring that robust environmental impact assessments are undertaken and measures identified to minimize the impacts of projects on wetland

[1] WWF, 2006. Conservation of high-altitude wetlands in the Himalayas. Report of the Fourth Regional Workshop. Capacity building for high altitude wetlands conservation and management. New Delhi, India, 27–29 June 2006.
[2] ICIMOD, 2009. *A manual for an inventory of Greater Himalayan wetlands*. Kathmandu, Nepal: International Centre for Integrated Mountain Development (ICIMOD).
[3] Stratford, C. J., Acreman, M. C., & Rees, H. G. 2011. A simple method for assessing the vulnerability of wetland ecosystem services. *Hydrological Sciences Journal*, *56*(8), 1485-1500.
[4] Stratford, C.J., Acreman, M.C., Rees, H.G. and Shilpakar, R., 2008. A vulnerability assessment method for wetlands in the Himalayan region. Report to the Asia Pro-Eco Programme of the European Commission.
[5] Resolution XIII.17: Rapidly assessing wetland ecosystem services.
[6] Resolution XII.15: Evaluation of the management and conservation effectiveness of Ramsar Sites.

ecosystems, and consequently to protect and maintain the ecological character of wetlands as encouraged through Resolution XIV.16[7].

5. WETVAT integrates the fundamental importance of wetlands for conserving biodiversity and their role in delivering ecosystem services founded on that biodiversity. The method described in this Annex identifies biodiversity separately as a fundamental component of the ecological character of a wetland but integrates the importance of wetlands both for conserving biodiversity and their role in delivering ecosystem services. The term "value" is used to cover both these elements, since the Convention uses the term to indicate both the intrinsic importance of wetlands for biodiversity and the significance of ecosystem services to people.

Aim of the tool

6. Wetlands are vulnerable to a wide range of human threats and environmental change including overgrazing by livestock, dam construction, pollution, drainage and climate change. Therefore, if the intrinsic characteristics and values that these wetlands possess are to be conserved, identification, assessment and management of threats must be undertaken. WETVAT does not address natural dynamics of wetlands that may alter their characteristics over time, rather it assesses the vulnerability of the system to a range of threats.

7. The aim of this tool is to equip governments, conservation agencies and wetland managers throughout the world with the ability to assess the vulnerability of their wetlands and to combine information with other wetland assessments to assess vulnerability at multiple scales. The tool has been specifically developed based on the knowledge that many organizations do not have the information or expertise required to carry out a full, detailed assessment. However, it recognizes that local and Indigenous knowledge of a site is often extremely comprehensive and just needs to be collated and structured in a way that facilitates vulnerability assessment.

Method overview

8. WETVAT is an interactive spreadsheet-based tool (in Microsoft Excel). It is complementary to the Convention's published framework for assessing the vulnerability of wetlands to climate change[8]. Both assess the likely response of the values associated with the wetland system to the range of identified threats. However, WETVAT assesses a much wider set of threats including, but beyond, climate change. WETVAT is deliberately set up to assess the values and threats from a local stakeholder perspective and in its analysis is likely to include both quantitative and qualitative data.

9. WETVAT uses a risk-based approach to assess vulnerability of wetlands to threats. Vulnerability is based on the likelihood of occurrence of negative impacts and the severity of any impact on biodiversity and ecosystem services. The risk score (High, Medium, Low) enables wetland managers to prioritize conservation activities, and their required resources, and identifies wetlands in need of further consideration and more detailed impact assessment.

[7] Resolution XIV.16 Integrating wetland protection, conservation, restoration, sustainable use and management into national sustainable development strategies.

[8] Gitay, H., Finlayson, C.M. and Davidson, N.C., 2011. A framework for assessing the vulnerability of wetlands to climate change. Gland, Switzerland: Ramsar Convention Secretariat, and Montreal, Canada: Secretariat of the Convention on Biological Diversity, Ramsar Technical Report no. 5 / CBD Technical Series no. 57. ISBN 92-9225-361-1 (print); 92-9225-362-X (web).

10. The WETVAT spreadsheet tool consists of six linked worksheets within one Microsoft Excel file:

    - Worksheet 1: Start page
    - Worksheet 2: Ecosystem components
    - Worksheet 3: Ecosystem services
    - Worksheet 4: Threats
    - Worksheet 5: Assessment
    - Worksheet 6: Summary

11. *Worksheet 1: Start page*. General information, for instance on the name of the site, the date of the assessment and the assessor(s), is entered into Worksheet 1. The worksheet also highlights, through a simple traffic light system, the status of the subsequent worksheets with regards to their state of completion (Fig. 1).

12. *Worksheet 2: Ecosystem components.* The ecosystem components record the biodiversity interest of the site (at genetic, species and ecosystem levels). Information is recorded under five categories: (i) wetland-dependent fauna; (ii) wetland-dependent flora; (iii) habitat diversity; (iv) genetic diversity; and (v) other ecological values (Fig. 2).

13. For each of the categories, an evaluation is made of the importance of the component using a four-point scale: (i) ++ highly significant component; (ii) + significant component; (iii) 0 negligible component; (iv) ? gaps in evidence. These scores represent the relative magnitude of the value of the component at the site. The assessor also has to enter a second score for each of the five ecosystem components. This second score relates to the certainty of the value. These two scores are combined in a simple matrix to give a single score that reflects both the magnitude and certainty of the value of each of the five ecosystem component categories.

14. To complete Worksheet 2 requires the assessor to identify survey data in local and national inventories and datasets held in government departments and universities, by non-governmental organisations, such as wildlife groups and knowledge held by local and Indigenous people. It can also include data from international databases, such as the Ramsar Sites Information Service and IUCN Red Lists.

15. *Worksheet 3: Ecosystem services*. The ecosystem services record the multiple benefits that the site is providing to human society. Information is recorded for different ecosystem services under four main categories (with the total number of services in each category given in parenthesis): provisioning (10), regulatory (16), cultural (8) and supporting services (6) (Fig. 3).

16. For each ecosystem service, an evaluation is made of the importance of its contribution to beneficiaries of the service using a four-point scale: (i) ++ significant positive contribution; (ii) + positive contribution; (iii) 0 negligible contribution; (iv) ? gaps in evidence. These scores represent the relative magnitude of the value of the ecosystem service at the site. The assessor also has to enter a second score for each of the ecosystem services. This second score relates to the certainty of the value. These two scores are combined in a simple matrix to give a single score that reflects both the magnitude and certainty of the value of each of the ecosystem services.

17. The structure of Worksheet 3 is directly compatible with the RAWES worksheet. This allows for a direct transfer from one tool to another. Where a RAWES assessment has been undertaken it would be normal to assign a high degree of certainty to the inputs. However, in situations where RAWES has not been applied, the assessor will have to evaluate the ecosystem services

being provided by the site through other means such as conducting participatory workshops, utilizing other formal ecosystem service assessment methodologies or consulting with local stakeholders, knowledge holders and staff. Under these circumstances the certainty may be lower.

18. *Worksheet 4: Threats*. The threats are recorded under the 13 categories presented in Data Sheet 3 of RMETT, namely:

    - Residential and commercial development (within site)
    - Agriculture and aquaculture (within site)
    - Energy production and mining (inside the site)
    - Transportation and service corridors inside the site
    - Biological resource use and harm within the site
    - Human intrusions and disturbance within the site
    - Natural system modifications
    - Hydrological change
    - Invasive and other problematic species and genes
    - Pollution entering into, or generated from within, the site
    - Geological events
    - Climate change and severe weather
    - Specific cultural and social threats

19. Further, more detailed threats are listed under each of the 13 categories. A total of 48 threat categories are available for reporting. For each threat two scores, one for likelihood of the threat and one for the severity of threat, are recorded and a simple matrix is automatically generated to give a single score for each threat. The allocated score is based on: (H) high significance are those which are seriously degrading the site's values; (M) medium are those threats having some negative impact; (L) those characterized as low are threats which are present but not seriously impacting values; (N/A) where the threat is not present or not applicable to the site; and (U) where information on the threat is unknown.

20. *Worksheet 5: Assessment*. The assessment worksheet automatically links the wetland values (ecosystem components and ecosystem services) and the threats to the wetland. This worksheet determines how the threats are likely to impact on the components and services. This worksheet has pre-defined default values based on information derived from multiple publications and peer-reviewed literature.

21. Worksheet 5 combines all of the values in a single matrix and gives a single output for each value and threat intersection (based on equation (1)). The assessment worksheet presents a synthesis of all the values that the wetland provides, the threats that the wetland is under, and shows which threats impact on which values.
    Final Assessment Value = Value Score × Link × Threat Score (Equation 1)

22. Since the threat scores H, M, L and N can be assigned numerical values of 3, 2, 1 and 0, respectively, the final assessment score is a number between 0 and 27. Scores between 0 and 9 are colour coded green, considered to be relatively low threats, scores between 10 and 18 are colour coded amber and scores between 19 and 27 are colour coded red, to emphasize the components and services under significant threat.

23. The method is designed so that an assessment can still be conducted in situations where data are limited or missing and, in those cases, the finished assessment will highlight missing data. By

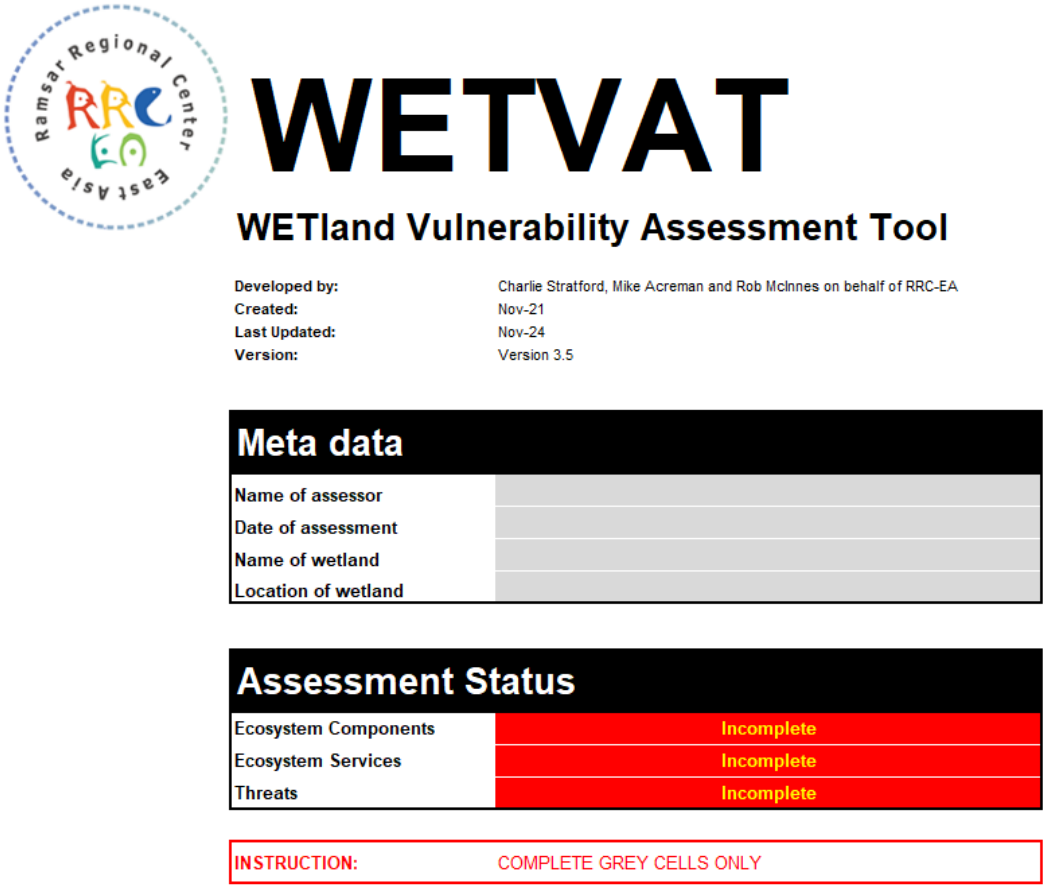
entering a U (Unknown) next to a value or threat, the spreadsheet looks to see whether there is the potential for a negative impact and, if so, highlights this in the assessment in Worksheet 5. Flexibility is incorporated into the method by providing space for "other values/threats", in which the user can write in their value or threat (or both), and these will appear in the subsequent worksheets. This facilitates input of any unanticipated values or threats present at the site.

24. *Worksheet 6: Summary*. Because Worksheet 5 contains a significant range of information, the main threats and the components and services under threat are summarized in Worksheet 6 to assist wetland managers with prioritizing future management actions.

Utilizing the results

25. WETVAT has been designed to be used for both Wetlands of International Importance and other wetlands. The results can be utilized for a range of purposes including *inter alia* investigating actual or potential threat scenarios of projects or developments which may impact on a wetland site; for informing the prioritization of resource allocation for intervention to mitigate threats; to inform management planning activities within site management plans; or to highlight knowledge gaps and to prioritize resourcing towards understanding and addressing the most significant threats.

Figure 1. Worksheet 1: Start page



WETVAT

WETland Vulnerability Assessment Tool

Developed by:	Charlie Stratford, Mike Acreman and Rob McInnes on behalf of RRC-EA
Created:	Nov-21
Last Updated:	Nov-24
Version:	Version 3.5

Meta data

Name of assessor	
Date of assessment	
Name of wetland	
Location of wetland	

Assessment Status

Ecosystem Components	Incomplete
Ecosystem Services	Incomplete
Threats	Incomplete

INSTRUCTION:	COMPLETE GREY CELLS ONLY

Figure 2. Worksheet 2: Ecosystem components

Ecosystem Components

Ecosystem Components	Score	Comments
Wetland Dependent Fauna		
Wetland Dependent Flora		
Habitat Diversity		
Genetic Diversity		
Other ecological values		

INSTRUCTION:	ENTER INFORMATION IN ALL THE GREY CELLS (NOTE: THEY WILL CHANGE COLOUR FOLLOWING DATA ENTRY) USING THE DROP DOWN MENU, SELECT THE APPROPRIATE SCORE FOR EACH COMPONENT BASED ON THE VALUES BELOW

Scoring system	Score	Description
++	Significant Positive	Including all Red List species or nationally important species and habitats
+	Positive	Including sub-nationally important species and habitats
0	Negligible	Limited or no important ecological components
?	Gaps in Evidence	No relevant evidence or information currently available

Figure 3. Worksheet 3: Ecosystem services

Ecosystem Services

Provisioning Services	Score	Comments
Fresh water		
Food		
Fuel		
Fibre		
Genetic resources		
Natural medicines or pharmaceuticals		
Ornamental resources		
Clay, mineral, aggregate harvesting		
Energy harvesting from natural air and water flows		
Other provisioning services		
Regulatory Services		
Air quality regulation		
Local climate regulation		
Global climate regulation		
Water regulation		
Flood hazard regulation		
Storm hazard regulation		
Pest regulation		
Disease regulation - human		
Disease regulation - livestock		
Erosion regulation		
Water purification		
Pollination		
Salinity regulation		
Fire regulation		
Noise and visual buffering		
Other regulatory services		
Cultural Services		
Cultural heritage		
Recreation and tourism		
Aesthetic value		
Spiritual and religious value		
Inspiration value		
Social relation		
Educational and research		
Other cultural services		
Supporting Services		
Soil formation		
Primary production		
Nutrient cycling		
Water recycling		
Provision of habitat		
Other supporting services		

Scoring system	Score	Description
++	Significant Positive	Important service with many beneficiaries
+	Positive	Minor service with relatively few benficiaries
0	Negligible	Limited or no service with very few beneficiaries
?	Gaps in Evidence	No relevant evidence or information currently available

NOTE: SCORING IS BASED ON THE RAPID ASSESSMENT OF WETLAND ECOSYSTEM SERVICES (RAWES) APPROACH

INSTRUCTION:	ENTER INFORMATION IN ALL THE GREY CELLS (NOTE: THE SCORE CELLS WILL CHANGE COLOUR FOLLOWING DATA ENTRY) USING THE DROP DOWN MENU, SELECT THE APPROPRIATE SCORE FOR EACH SERVICE BASED ON THE VALUES ABOVE

Figure 4. Worksheet 4: Threats

Threats

Threat Categories	Overall Threat Score	Overall Confidence	Threat Severity	Severity Confidence	Threat Likelihood	Likelihood Confidence	Comments
1. Residential and commercial development (within site)							
Housing and settlement							
Commercial and industrial areas							
Tourism and recreation infrastructure							
2. Agriculture and aquaculture (within site)							
Annual and perennial non-timber crop production							
Drug cultivation							
Wood pulp and plantations							
Livestock farming and grazing							
Marine and freshwater aquaculture							
3. Energy production and mining (inside the site)							
Oil and gas drilling							
Mining and quarrying							
Energy generation, including from hydropower dams, wind farms and solar panels							
4. Transportation and service corridors inside the site							
Roads and railroads							
Utility and service lines							
Shipping lanes and canals							
Flight paths							
Ports with large scale loading and unloading of goods							
5. Biological resource use and harm within the site							
Hunting, killing and collecting of terrestrial animals							
Collecting terrestrial plants or plant products (non-timber)							
Logging and timber harvesting							
Fishing, killing and harvesting of aquatic resources							
6. Human intrusions and disturbance within the site							
Recreational activities and tourism							
War, civil unrest and military exercises							
Research, education and other work-related activities							
Activities of site managers							
Vandalism, destructive activities or threats to staff and visitors							
7. Natural system modifications							
Habitat clearing							
Fire and fire suppression							
Dams, hydrological modification and water management/use							
Increased fragmentation within the site							
Isolation from other natural habitats							
Other 'edge effects' that degrade the site values							
Loss of keystone species							
7a. Hydrological change							
Dams within or upstream of the site, which alter the hydrological regime							
Water extraction / diversion within the site or catchment							
Excess ponding of water onsite							
Loss of hydrological connectivity							
Drought conditions							
Desertification							
8. Invasive and other problematic species and genes							
Invasive plant species							
Invasive animal species							
Pathogens							
Introduced genetic material							
9. Pollution entering into, or generated from within the site							
Household sewage and urban waste water from outside the site							
Sewage and waste water from site facilities							
Industrial, mining and military effluents							
Agricultural and forestry effluents							
Garbage and solid waste							
Air-borne pollutants							
Excess energy							
10. Geological events							
Volcanoes							
Earthquakes / tsunamis							
Avalanches / landslides							
Erosion and siltation / deposition							
11. Climate change and severe weather							
Habitat shifting and alteration							
Droughts							
Temperature extremes							
Storm and flooding							
12. Specific cultural and social threats							
Loss of cultural links, traditional knowledge and / or management practices							
Natural deterioration of important cultural site values							
Destruction of cultural heritage buildings, gardens, sites, etc.							

Threat Score	Description
H	Threat is seriously degrading the site's values.
M	Threat has some negative impact on the site's values.
L	Threat is present but does not seriously impact the site's values.
N	N/A - the threat is not present or applicable to the site.
U	Unknown

Confidence Score	Description
H	Based on extensive field survey and research
M	Based on old/outdated evidence or from a proxy site
L	Based on anecdotal evidence. Not backed up by data.

NOTE: SCORING IS BASED ON THE R-METT APPROACH

INSTRUCTION: ENTER INFORMATION IN ALL THE GREY CELLS (NOTE: THE SCORE CELLS WILL CHANGE FOLLOWING DATA ENTRY). ENTER SUPPORTING DETAILS IN THE COMMENTS CELLS.

USING THE DROP DOWN MENU, SELECT THE APPROPRIATE SCORE FOR EACH THREAT THE VALUES ABOVE

Figure 5. Worksheet 5: Assessment

Wetland Vulnerability Assessment	Threats																																			
	1. Residential and commercial development (within site)	Housing and settlement	Commercial and industrial areas	Tourism and recreation infrastructure		2. Agriculture and aquaculture (within site)	Annual and perennial non-timber crop pro	Drug cultivation	Wood pulp and plantations	Livestock farming and grazing	Marine and freshwater aquaculture		3. Energy production and mining (inside the site)	Oil and gas drilling	Mining and quarrying	Energy generation, including from hydrop		4. Transportation and service corridors inside the site	Roads and railroads	Utility and service lines	Shipping lanes and canals	Flight paths	Ports with large scale loading and unload		5. Biological resource use and harm within the site	Hunting, killing and collecting of terrestria	Collecting terrestrial plants or plant produ	Logging and timber harvesting	Fishing, killing and harvesting of aquatic		6. Human intrusions and disturbance within the site	Recreational activities and tourism	War, civil unrest and military exercises	Research, education and other work-rela	Activities of site managers	Vandalism, destructive activities or threa
Ecosystem Components																																				
Loss of Wetland Dependent Fauna		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##
Loss of Wetland Dependent Flora		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##
Loss of Habitat Diversity		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##
Loss of Genetic Diversity		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##
Loss of Other ecological values		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##
Provisioning Impact																																				
Loss of Fresh water		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##
Loss of Food		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##
Loss of Fuel		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##
Loss of Fibre		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##
Loss of Genetic resources		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##
Loss of Natural medicines or pharmaceuticals		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##
Loss of Ornamental resources		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##
Loss of Clay, mineral, aggregate harvesting		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##
Loss of Energy harvesting from natural air and water f		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##
Loss of Other provisioning services		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##
Regulatory Impacts																																				
Loss of Air quality regulation		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##
Loss of Local climate regulation		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##
Loss of Global climate regulation		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##
Loss of Water regulation		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##
Loss of Flood hazard regulation		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##
Loss of Storm hazard regulation		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##
Loss of Pest regulation		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##
Loss of Disease regulation - human		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##
Loss of Disease regulation - livestock		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##
Loss of Erosion regulation		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##
Loss of Water purification		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##
Loss of Pollination		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##
Loss of Salinity regulation		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##
Loss of Fire regulation		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##
Loss of Noise and visual buffering		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##
Loss of Other regulatory services		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##
Cultural Impacts																																				
Loss of Cultural heritage		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##
Loss of Recreation and tourism		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##
Loss of Aesthetic value		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##
Loss of Spiritual and religious value		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##
Loss of Inspiration value		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##
Loss of Social relation		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##
Loss of Educational and research		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##
Loss of Other cultural services		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##
Supporting Impacts																																				
Loss of Soil formation		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##
Loss of Primary production		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##
Loss of Nutrient cycling		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##
Loss of Water recycling		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##
Loss of Provision of habitat		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##
Loss of Other supporting services		##	##	##			##	##	##	##	##			##	##	##			##	##	##	##	##			##	######	##	##			####	##	##	##	##

Figure 5. Worksheet 5: Assessment (continued)

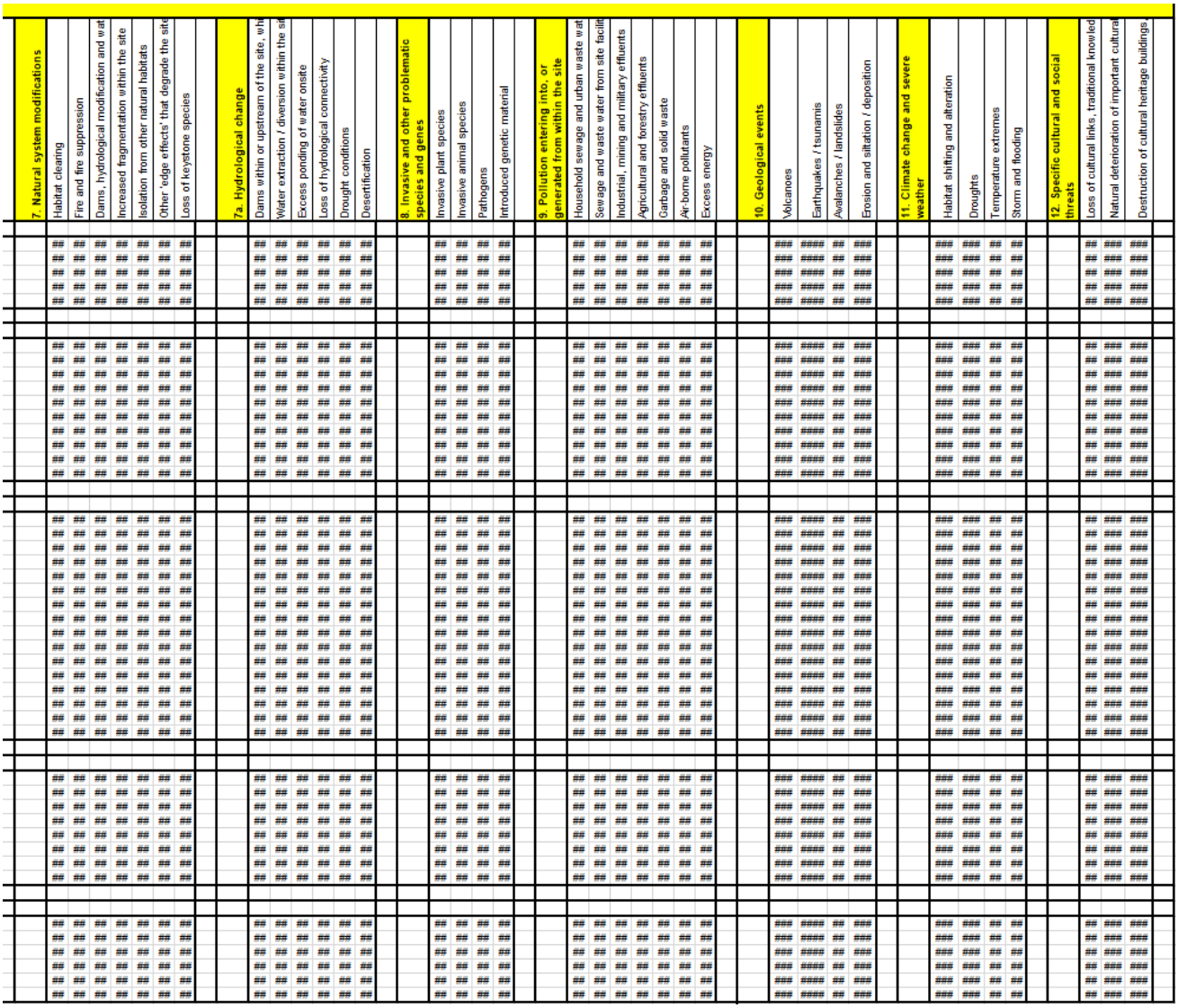


Figure 6. Worksheet 6: Summary

Threats Summary

	Overall Threat Impact Score	Overall Confidence
1. Residential and commercial development (within site)		
Housing and settlement		
Commercial and industrial areas		
Tourism and recreation infrastructure		
2. Agriculture and aquaculture (within site)		
Annual and perennial non-timber crop production		
Drug cultivation		
Wood pulp and plantations		
Livestock farming and grazing		
Marine and freshwater aquaculture		
3. Energy production and mining (inside the site)		
Oil and gas drilling		
Mining and quarrying		
Energy generation, including from hydropower dams, wind farms and solar panels		
4. Transportation and service corridors inside the site		
Roads and railroads		
Utility and service lines		
Shipping lanes and canals		
Flight paths		
Ports with large scale loading and unloading of goods		
5. Biological resource use and harm within the site		
Hunting, killing and collecting of terrestrial animals		
Collecting terrestrial plants or plant products (non-timber)		
Logging and timber harvesting		
Fishing, killing and harvesting of aquatic resources		
6. Human intrusions and disturbance within the site		
Recreational activities and tourism		
War, civil unrest and military exercises		
Research, education and other work-related activities		
Activities of site managers		
Vandalism, destructive activities or threats to staff and visitors		
7. Natural system modifications		
Habitat clearing		
Fire and fire suppression		
Dams, hydrological modification and water management/use		
Increased fragmentation within the site		
Isolation from other natural habitats		
Other 'edge effects' that degrade the site values		
Loss of keystone species		
7a. Hydrological change		
Dams within or upstream of the site, which alter the hydrological regime		
Water extraction / diversion within the site or catchment		
Excess ponding of water onsite		
Loss of hydrological connectivity		
Drought conditions		
Desertification		
8. Invasive and other problematic species and genes		
Invasive plant species		
Invasive animal species		
Pathogens		
Introduced genetic material		

Figure 6. Worksheet 6: Summary (continued)

9. Pollution entering into, or generated from within the site
Household sewage and urban waste water from outside the site
Sewage and waste water from site facilities
Industrial, mining and military effluents
Agricultural and forestry effluents
Garbage and solid waste
Air-borne pollutants
Excess energy

10. Geological events
Volcanoes
Earthquakes / tsunamis
Avalanches / landslides
Erosion and siltation / deposition

11. Climate change and severe weather
Habitat shifting and alteration
Droughts
Temperature extremes
Storm and flooding

12. Specific cultural and social threats
Loss of cultural links, traditional knowledge and / or management practices
Natural deterioration of important cultural site values
Destruction of cultural heritage buildings, gardens, sites, etc.

Score	Description
Overall Threat Score	
	Low threat
	Medium threat
	High threat
Overall Confidence	
	High confidence
	Medium confidence
	Low confidence
INSTRUCTION:	**VALUES ARE AUTOMATICALLY GENERATED**