Enhancing the Resilience of Protected Areas to Climate Change in The Gambia

PARCC Policy Brief

UNEP WCMC

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The United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) is the specialist biodiversity assessment centre of the United Nations Environment Programme (UNEP), the world's foremost intergovernmental environmental organisation. The Centre has been in operation for over 30 years, combining scientific research with practical policy advice.

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Cover picture: Baobolong Wetland Reserve, The Gambia. © Elise Belle

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Introduction to the project and its relevance to The Gambia

PARCC West Africa, officially known as 'Evolution of protected area systems with regard to climate change in the West Africa region' was a full-size GEF project focusing on the impacts of climate change on protected areas (PAs) implemented from 2010 to 2016. The main objective of the project was to develop strategies and tools to increase the resilience of PAs to climate change, and build capacity to implement these new approaches. In the project, we defined resilience of PAs as their ability to cope with climate change impacts in ways that maintain their essential functions and capacity for adaptation.

The United Nations Environment Programme (UNEP) was the implementing agency and UNEP World Conservation Monitoring Centre (UNEP-WCMC) was the executing agency, working in collaboration with IUCN West and Central Africa Programme (IUCN PACO). The project focused on five core countries in West Africa: Chad, Gambia, Mali, Sierra Leone, and Togo, with three additional countries involved in regional training workshops and some of the activities at the transboundary pilot sites. However, all scientific elements of the project, such as the climate projections, vulnerability assessments and conservation planning systems, were completed at the regional scale, covering the entire West African region.

After developing new regional climate projections for West Africa, the vulnerability of species and PAs to climate change was assessed through two complementary methodologies which were later integrated: species distribution models and vulnerability assessments based on the biological traits of species. An analysis of the connectivity of the West African PA network also highlighted the importance of specific PAs and links between PAs. Based on these findings, systematic conservation planning systems were developed for each country to help inform conservation priorities in the design of new PAs. Studies on the links between PAs, communities and climate change, and of available options for managing and financing PAs to adapt to climate change were also carried out.

Based on the scientific outputs mentioned above, five transboundary pilot sites were selected and activities on the ground implemented. For The Gambia, the Niumi-Delta du Saloum transboundary area between The Gambia and Senegal was chosen. The project also updated the Management Effectiveness Tracking Tool (METT) with the integration of climate change questions. Importantly, capacity building took place at multiple levels throughout the project lifespan, primarily through national and regional training workshops. Adaptation strategies and policy recommendations were also developed for climate adaptation and management in The Gambia (and at the regional level), as well as guidelines for managers of individual PAs in the face of climate change.

Finally, the results of the PARCC project have been integrated into the Protected Planet website, the web interface of the World Database on Protected Areas (WDPA), allowing access to all project outputs and to the results of the vulnerability assessments for each individual PA in The Gambia and in the rest of West Africa.

The project thus generated improved information on the effects of climate change on biodiversity and PAs, thereby allowing a better understanding of how to better manage PA, especially transboundary PAs, in the face of climate change.

Link to the PARCC project website: *http://parcc.protectedplanet.net*

Belle E.M.S., Burgess N.D., Misrachi M., et al. 2016. Climate Change Impacts on Biodiversity and Protected Areas in West Africa, Summary of the main outputs of the PARCC project, Protected Areas Resilient to Climate Change in West Africa. UNEP-WCMC, Cambridge, UK.

Summary of scientific results of the project for The Gambia

CLIMATE CHANGE PROJECTIONS AND IMPACTS ON ECOSYSTEM SERVICES

Regional climate projections

The UK Met Office Hadley Centre (MOHC) produced a range of plausible climate projections for the West Africa region by using a spatially detailed regional climate model to downscale five global climate model projections. In The Gambia, it is projected with high confidence that mean annual temperatures will increase (by an estimated 3-4.5˚C according to regional climate projections) by the end of the 21st century. The highest temperature increases are expected to occur furthest inland in the eastern region, which is less influenced by the regulating influence of the ocean. There is low confidence in projections of a decrease in precipitations (-40% to nearly -60% according to regional climate projections). It should also be noted that being a small country, The Gambia was captured only by a small number of grid points within the regional projections, these results should therefore be interpreted with a lot of caution.

Impacts on ecosystem services

The MOHC also assessed the projected impacts of climate change on ecosystem services, considering three scenarios of future human disturbance and the range of plausible climate projections. It is projected that the bare soil fraction might increasingly replace grass cover in The Gambia, and that vegetation productivity might be slightly reduced. Although there is limited confidence in these projections, which are related to changes in western Sahelian precipitation that are considered plausible rather than robust future projection, planning should take into account the possibility that precipitation might decrease in the far future.

Hartley, A.J., Jones, R. and Janes, T. 2015. Projections of change in ecosystem services under climate change. UNEP-WCMC technical report.
Hartley, A.J., Jones, R. and Janes, T. 2015. Climate Change and Ecosystem Services Fact Sheet: The Gambia. UNEP-WCMC technical report.

CLIMATE CHANGE IMPACTS ON SPECIES

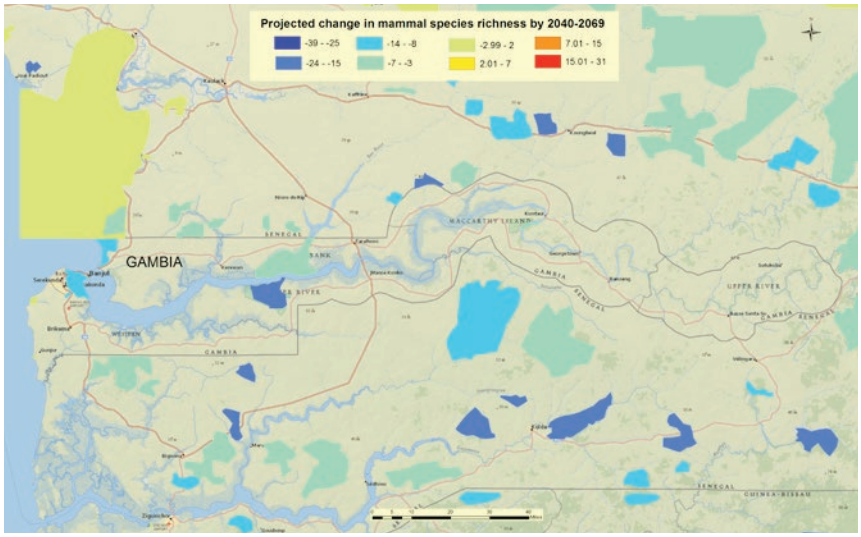
Projections of future species distributions

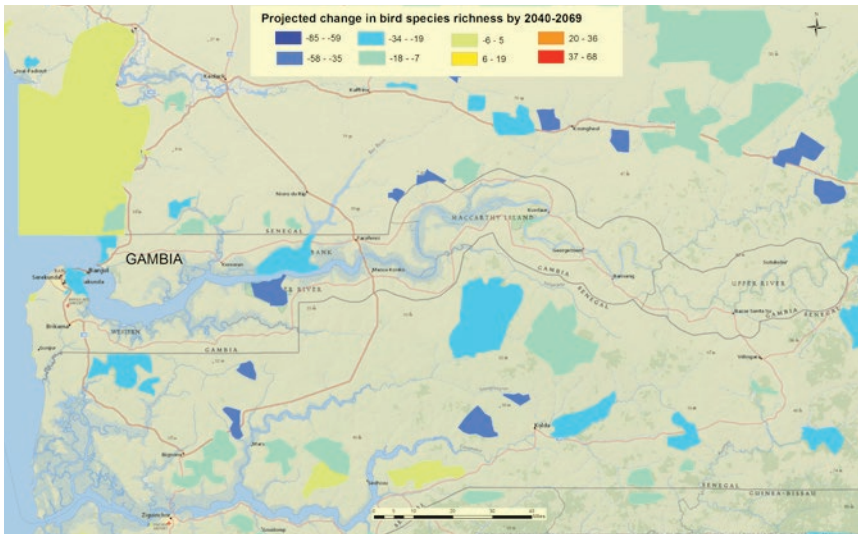
The static and fixed-boundary nature of current PAs compromises their effectiveness in the face of expected species range shifts caused by changing climatic conditions. The PARCC project used models that link species' distributions to biologically important climatic variables that are likely to define species' distributions in order to project future species (birds, mammals and amphibians) distributions across the West African PA network. The project found that by the end of the 21st century, 91% of amphibian, 40% of bird, and 50% of mammal species are projected to have reduced climate suitability across the network, and that individual PAs are likely to both lose and gain species, with species turnover within PAs expected to reach 45.7% for amphibians, 32.4% for birds and 34.9% for mammals by the end of the century.

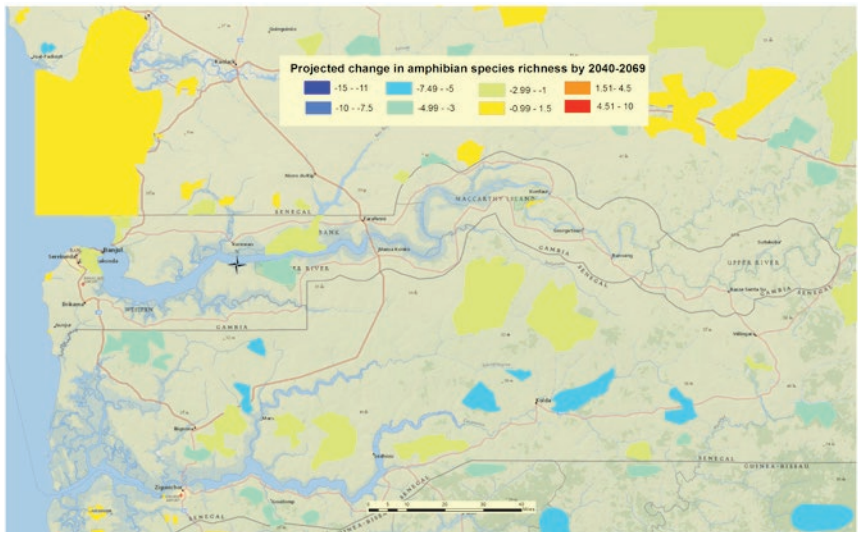
In The Gambia, important losses of mammals are expected to occur across many of the country' PAs, with losses projected to exceed 10 mammal species at some sites, such as Kiang West and coastal areas like Niumi National Park and Tanbi Nature Reserve. Similarly, the number of bird species is projected to be substantially reduced in PAs by the 2040-2069 time period, often in excess of 30 species at many sites, and only at a few coastal sites is bird species richness not expected to be reduced. The greatest loss in bird species numbers is expected to occur in Kiang West National Park. Projected changes in future amphibian richness are relatively small for The Gambia, with expected losses within PAs expected to concern only few species.

All the results showing the expected species turnover within each PA as well as the list of species for which a change in climate suitability is expected can be found at ***http://parcc.protectedplanet.net/sites/***.

Baker D.J. and Willis S.G. 2015. Projected Impacts of Climate Change on Biodiversity in West African Protected Areas. UNEP-WCMC technical report.
Durham University. 2015. Integrating species distribution models and trait data to inform conservation planning. UNEP-WCMC technical report.







Median projected change in mammal, bird and amphibian species richness in individual PAs of The Gambia between the present and the 2040-2069 future time period

Species vulnerability to climate change

A climate change vulnerability assessment of West African species was carried out by considering the combination of exposure (extent to which a species' physical environment will change due to climate change), sensitivity (lack of potential for a species to persist *in situ*) and low adaptability (species' inability to avoid the negative impacts of climate change through dispersal and/or micro-evolutionary change). The assessment included all the terrestrial and freshwater vertebrates of West Africa (183 amphibians, 1,172 birds, 517 freshwater fish, 405 mammals and 307 reptiles). Species that were identified as both sensitive and poorly able to adapt to climate change, and that were among the most severely exposed to climatic changes were described as 'climate change vulnerable'. Although the methodology does not provide a definitive indication of vulnerability, but a relative measure that may be compared between species within a group, these results can help prioritize among species and locations to ensure the most efficient and effective use of resources when securing species survival in the face of climate change.

Furthermore, it is recommended that when planning for future conservation and determining geographic priorities, planners should focus more on locations that contain comparatively high numbers of climate change vulnerable and/or threatened species. Such a strategy is likely to have the greatest positive impact per unit effort, and should address the conservation of the greatest number of species. However, areas with relatively low species richness and low numbers of vulnerable species should not be neglected.

For The Gambia, the assessment showed that the country has one of the highest bird density after the Guinean forests. It has been estimated that, depending on the PA considered, between 10% and 12% of bird, amphibian, and mammal species assessed are considered vulnerable to climate change. The Gambia is also a hotspot for threatened bird species, with again some of the highest densities recorded in West Africa.

All the results showing the percentage and the list of species considered vulnerable to climate change for each PA can be found at ***http://parcc.protectedplanet.net/sites/***.

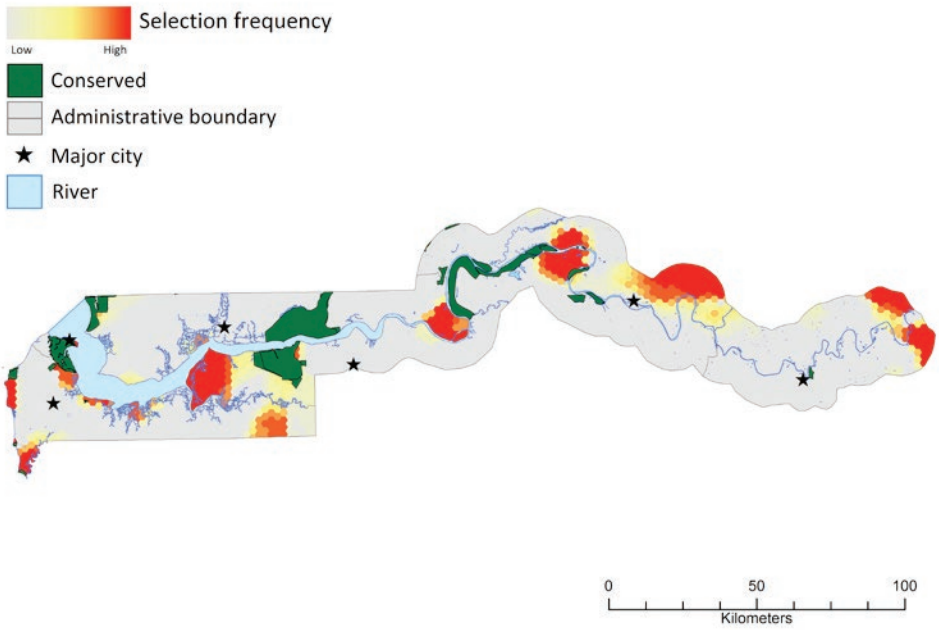
Carr, J.A., Hughes, A.F. and Foden, W.B. 2014. A Climate Change Vulnerability Assessment of West African Species. UNEP-WCMC technical report.

IDENTIFICATION OF PRIORITY AREAS FOR CONSERVATION

Systematic conservation planning is the most widely used approach for designing PA networks. Based on a list of important conservation features to protect (such as species, habitats and ecological processes), their distributions are mapped and targets are set for how much of each feature should be protected. A gap analysis is then carried out to measure the extent to which the existing PA system meets the targets, and priority areas for conservation are identified.

In The Gambia, only 4% of the territory is included in PAs and 2% is included in currently unprotected Important Bird and Biodiversity Areas (IBAs) according to the data currently included in the World Database on Protected Areas (WDPA). The conservation features considered included all ecoregions and vegetation types, as well as the present distribution of all amphibian, bird and mammal species and future projected distribution of threatened species found in The Gambia. The gap analysis showed that the existing national PA system meets targets for only 1.1% of conservation features. It is failing to meet targets for almost all species considered, especially mammal species for which none of the targets are met, and 18.2% of threatened species are currently unprotected. The current national PA network also fails to sufficiently conserve any ecoregion and a number of vegetation types. Priority areas for protection were identified throughout the country, in some cases around existing PAs.

Therefore, given the very important gaps identified, it is recommended that The Gambia expands its national PA system, which would need to cover 23.3% of the territory in order to achieve all conservation targets.



Conservation priority areas identified in The Gambia for meeting conservation targets, whilst avoiding areas with high human population density where possible

Smith R.J. 2015. Gap Analysis and Spatial Conservation Prioritisation in The Gambia. UNEP-WCMC technical report.

Pilot activities implemented in The Gambia

In The Gambia, the site selected for pilot activities was the transboundary area between Niumi National Park in The Gambia and the Delta du Saloum Park in Senegal. The activities carried out, as defined by the representatives from Sierra Leone, were all geared towards contributing to enhancing the resilience of the transboundary area to the negative impacts of climate change. They included:

1. **An updated transboundary management plan integrating climate change aspects**. Although a common management plan already existed, it did not take climate change into account, and some objectives and outcomes had to be revised. With the help of a consultant and in collaboration with Wetlands International, a new transboundary management plan was developed.
2. **Networking meeting between PA staff and the local communities**. A visit in Senegal was organised for representatives of local communities and members of park management staff in The Gambia to share experience with their counterparts in Senegal. This included sharing experiences on monitoring programmes, climate change adaptation initiatives, and local community involvement in PA management.
3. **Social vulnerability assessment of a community in the Delta du Saloum**. The assessment of the social vulnerability to climate change of natural resource dependent communities living in a community of the Delta du Saloum was conducted by ENDA and a team of facilitators that participated in a similar assessment under the framework of another project.
5. **Review and update the Niumi Biosphere Reserve management plan**. A task force was selected to review and validate the Niumi Biosphere Reserve management plan. If the site is accepted by UNESCO, Niumi and Saloum will constitute a Transboundary Biosphere reserve.

Furthermore, the METT (Management Effectiveness Tracking Tool), revised within the framework of the PARCC project to include questions related to climate change, was applied to the two transboundary PAs.

Adaptation strategy and policy recommendations for The Gambia

The aim of the proposed strategy, which was developed in consultation with country representatives, is to increase the resilience of PAs in The Gambia to the effects of climate change. Its vision is in line with The Gambia's Vision 2020's objective for the environment and of the updated National Biodiversity Strategy and Action Plan (NBSAP), which is 'to conserve and promote the rational use of the nation's natural resources and environment for the benefit of present and future generations in a manner that is consistent with the overall goal of sustainable development'.

The national strategy for The Gambia comprises 3 Goals, 12 Objectives, and 39 specific actions.

Strategic Goal 1: Strengthen ongoing conservation plans and programs and their implementation by improving the performance of existing PAs and by finalise the designation and regulation of areas identified as requiring protection.

- **Objective 1.1:** Assess existing PAs and ensure their sustainable and effective management so as to improve the achievement of the conservation objectives for which they were created.
- **Objective 1.2:** Accelerate and complete the designation and integration of areas identified as requiring protection in the national PA system.
- **Objective 1.3:** Identify biodiversity components and related ecosystem services important for The Gambia and adopt measures for their protection as needed, bearing in mind the Sustainable Development Goals and the new perspectives in the conservation of biological diversity, adaptation to climate change and land degradation issues.
- **Objective 1.4:** Conduct a gap analysis using an updated list of conservation features, i.e., components of biodiversity that should be protected, and prioritize them bearing in mind the threats posed to them and their ecological/biological and socioeconomic importance in the country.

Strategic Goal 2: Anticipate and respond to ongoing and future environmental changes, focusing on changes caused by climate change.

- **Objective 2.1:** Increase knowledge on observed and projected impacts of climate change on biodiversity and associated ecosystem services in The Gambia.
- **Objective 2.2:** Identify and appropriately manage climate refugia, areas that are resilient to climate change, and areas that will include the future geographical distribution of species displaced by climate change.
- **Objective 2.3:** Bearing in mind the possible shifts in species ranges, develop, re-evaluate, restore and/or maintain ecological corridors and stepping stones between PAs, taking into account climate change impacts.
- **Objective 2.4:** Identify options for areas that are likely to include the future geographical distribution of species displaced by climate change.

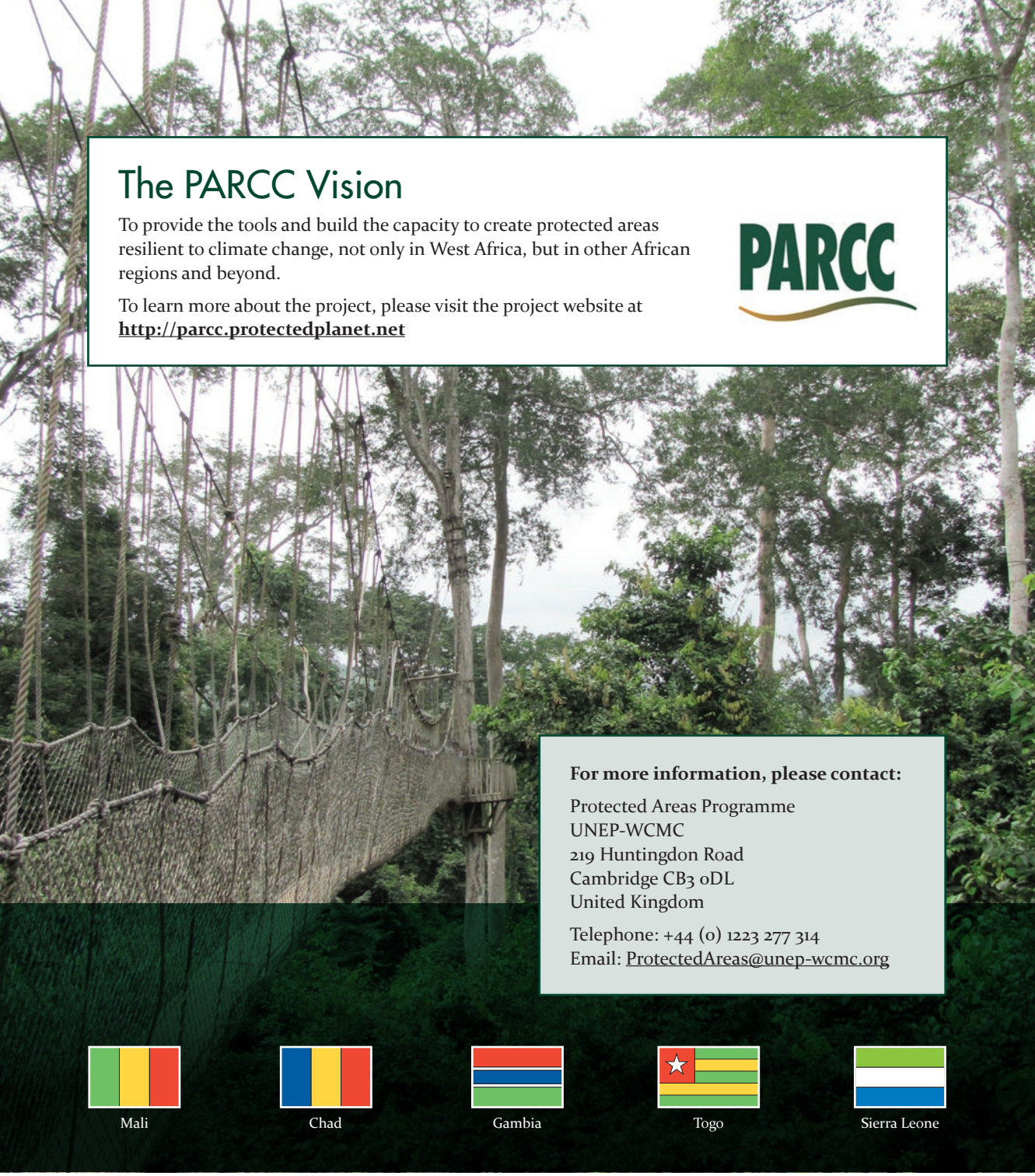
Strategic Goal 3: Create and/or strengthen the enabling environment for the successful implementation of the strategy.

- **Objective 3.1:** Integrate this strategy on PA system resilient to climate change in broader national strategies and plans.
- **Objective 3.2:** Strengthen human, financial, institutional, legislative and technological capacities.
- **Objective 3.3:** Strengthen communication, education, research and awareness on the issues of PAs, the impact of climate change and adaptation to climate change.
- **Objective 3.4:** Strengthen coordination and cooperation, including transboundary cooperation.

Mulongoy, J. 2015. National strategy and policy recommendations for the planning and management of protected areas in the face of climate change: The Gambia. UNEP-WCMC technical report.

Conclusions for The Gambia

- **The climate of The Gambia has been observed to be changing in recent decades, with some of these changes clearly attributable to climate change**. Regional climate projections have shown that there is a high level of confidence that temperatures will increase in the country, but there is little consensus on the direction and magnitude of potential changes in rainfall, with a high variability between projections. These changes could have significant impacts on ecosystem services such as carbon storage and vegetation productivity.
- **Biodiversity and PAs are being affected by climate change in The Gambia, and some PAs, such as Kiang West and coastal areas, appear to be more vulnerable than others to its impacts**. A large proportion of amphibian, bird and mammal species are expected to be found in areas of lower climate suitability by the end of the century, and a high species turnover is expected in most PAs. A significant number of species found in The Gambia (including amphibians, birds, freshwater fish, mammals and reptiles) have been identified as being vulnerable to climate change based on their specific biological traits. Of these species, those that have been assessed as globally threatened should be considered as priorities for conservation.
- **PA management should be improved in order to enhance the resilience of PAs to climate change in The Gambia, and the PA network should be extended.** PAs in The Gambia are facing a number of anthropogenic threats. It is therefore crucial to first improve the management effectiveness of existing PAs to give them a better chance to be able to cope with climate change impacts. For species identified as vulnerable to climate change, specific management options are to facilitate their dispersal and to identify sites of suitable climate persisting within their current ranges. In addition, in order to fully protect all essential conservation features in The Gambia, it is recommended that the existing PA network is significantly extended.



The PARCC Vision

To provide the tools and build the capacity to create protected areas resilient to climate change, not only in West Africa, but in other African regions and beyond.

To learn more about the project, please visit the project website at **http://parcc.protectedplanet.net**

PARCC

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