Department for Environment Food & Rural Affairs

DARWIN INITIATIVE

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Darwin Initiative: Final Report

*To be completed with reference to the "Writing a Darwin Report" guidance: (http://www.darwininitiative.org.uk/resources-for-projects/reporting-forms). It is expected that this report will be a **maximum** of 20 pages in length, excluding annexes)*

Darwin Project Information

Project reference	22-007
Project title	Establishing Sustainable Management of the Lake Sofia Catchment, Madagascar
Host country(ies)	Madagascar
Contract holder institution	Wildfowl & Wetlands Trust (WWT)
Partner institution(s)	Durrell Wildlife Conservation Trust (DWCT), Organisation de Soutien pour le Développement Rural à Madagascar (OSDRM), Asity Madagascar, Sofia Regional Department of Rural Development and Agriculture, Sofia Regional Department of Ecology, Environment, Marine and Forests, and Villages of the Lake Sofia catchment, Marotolana commune.
Darwin grant value	£276,527
Start/end dates of project	01/04/2015 – 31/03/2018
Project leader's name	Rob Shore
Project website/blog/Twitter	http://www.wwt.org.uk/support/our-appeals/missionmadagascar/ http://www.wwt.org.uk/conservation/wwt-projects/saving-themadgascar-pochard/
Report author(s) and date	Tomos Avent and Andrew Bamford – 29/06/18

1 Project Rationale

Most of Madagascar's wetlands have either been lost (+60%) or severely degraded due to conversion, sedimentation, invasive species and over-harvesting. Wetland species have declined dramatically as their habitats disappeared. The human communities, of which 80% are rural and 90% have jobs reliant on natural resources, have suffered as a result from loss of ecosystem services. Finding a sustainable solution to avoid the complete loss of native wetlands while improving conditions for local communities requires an integrated approach.

Lake Sofia, the most intact remnant of the once vast Bealanana Wetlands Complex and home to some of the world's most threatened endemic waterbirds, represents one of the last opportunities to implement this approach. 10,000 people (at least 62% of which are highly impoverished) rely on this wetland for their water, food and marsh plants. Extensive community interviews conducted prior to the project show that the main problems are threats from external pressures such as mining, agri-business and fishers from other regions, as well as increasing malnutrition and livestock disease. By securing community-based management of the Lake Sofia catchment, developing, training and supporting sustainable farming partnerships, empowering fishing groups, and applying lessons into national wise-use guidelines, this project

aims to protect and improve local people and secure a healthy wetland ecosystem that enables them to move beyond a subsistence only economy.

Lake Sofia is situated approximately 115 km east of the town of Antsohihy, in the Sofia region of Northern Madagascar.

2 Project Partnerships

This project brought together partners from a global wetland conservation organisation, nationally registered community-based conservation and education and awareness specialists, and a local entity of an international development and poverty alleviation network. Each partner has delivered succinct elements of the project through sub-grants from the lead organisation, WWT. A Project Steering Group (PSG), made up of senior managers, meets twice per year to review progress and reporting from the Project Management Group (PMG). The PMG comprises field teams, project coordinators, community group representatives and local government, and has met in area's largest town, Antsohihi, every three months throughout the project. During these meetings the PMG reviews each partner's progress (see Annex 7 for example of partner quarterly report) and agree action plans for the coming quarter. All stakeholders are invited to provide comments and input into future planning. All field staff share an office in Maratolana and schedule work together so that they can join other partner activities when relevant.

Although the Darwin project is now complete, the partnership has developed well during the three year period, and long-term plans are in place for continuing collaborative work at the site. Additionally, some partners have also started to develop new concepts for additional projects in Madagascar.

The exchange of knowledge between the conservation and international development sectors has been invaluable to the success of our work at Lake Sofia. An example being the development of sustainable financing mechanisms for the community associations (VOIs). During an early project review of management transfer agreements in Madagascar it became clear that many had eventually failed due to the lack of resilient funding streams. Reliance on fines and membership fees had proven precarious in many places. Attempting to avoid a similar fate for Sofia, project partners designed an extension to the Darwin-funded Sofia project that investigated turning the VOI's into businesses, able to generate profits from selling environmentally sustainable agricultural inputs. OSDRM was able to tap into business networks and hire appropriate consultants whilst Durrell and Asity have drawn upon previous experiences and consulted other conservation groups in Madagascar. WWT had recently developed similar business models for community fishery groups in SE Asia.

Reporting and providing means of verification was at times challenging, with each organisation having geographically separated HQs in the UK and within Madagascar. The situation has improved during the final year of the project, partially a result of WWT recruiting a full-time staff member in Madagascar for the first time. This position is funded externally to this Darwin grant.

All partners contributed to the final PMG report, attended final Project Steering Group meeting, and provided information for this Final Report.

3 Project Achievements

3.1 Outputs

Output 1 – Fully representative community management structures surrounding Lake Sofia re-established and strengthened, with new community management structures established for wider catchment of lake.

Nine community structures are now in place in the Lake Sofia catchment. The three lake-side community associations (VOIs) of Sofia Mandroso, Fikambana Fitantanana Matsabory Sofia, and Sandatra Sofia, have entered into a contractual agreement with the government to manage the natural resources (Gelose) of Lake Sofia (see Annex 8 for an example Gelose document). The other six community management structures are regulated through Dina, a voluntary agreement to abide by self-determined rules and regulations for the management and use of intact forest remnants and newly proposed reforestation plots. All nine community structures are working together in a Watershed Management Group, the first meeting of which was held in March 2018 (Annex 9). Community fora and workplan development and review meetings take place at least twice per year and have continued beyond the end of this Darwin-funded project in March 2018.

All community agreements were developed through a participatory process. Project partners have facilitated and funded the activities to ensure that they meet government requirements, but the Commune Mayor and Heads of the lakeside villages have coordinated independent VOI elections, gathered wider baseline community inputs and promoted the benefits of devolved management. Once the VOIs were provisionally established, they agreed rules and developed regulatory frameworks. Project partners developed protocols for collaboration with the Regional Direction of Environment, Ecology & Forests (DREEF), who oversaw consultation with other local and national government departments (e.g. Agriculture and Livestock, Fisheries, Chief of the District of Bealanana etc). Specialist consultants were contracted to deliver training in legal, financial, administrative and operational management (see Annex 10 for example of training on legal frameworks). Management Plans with associated Workplans, were finalised for the three lakeside VOIs in Oct 2017 (Annex 11). Three-year action plans are still in development for the six upstream community structures, a delay partly cause by increasing the scope of the project from three to six upstream structures after consultation with community groups in 2017. The six action plans will be finalised in Oct 2018.

Membership of the community associations is representative of the wider community, with multidimensional poverty index scores similar between members and non-members in villages surrounding the lake (with mean scores of 0.34 and 0.35 respectively – Annex 12). Membership of community associations has strong female representation, with 65% of members of all associations being women. Entrenched gender biases within management committees were more difficult to overcome, with only 37% female representation these groups

Lake Sofia was designated as a Ramsar Site on 22nd May 2017, recognising the site as a wetland of international importance under the Ramsar Convention (Annex 13).

Output 2 – Approaches to enhance existing local livelihoods and establish additional livelihood options developed, demonstrated at key sites and being implemented across the wider catchment

During the first year of the project 42 farmers participated in a pilot scheme to transition to systems of sustainable rice production. This pilot proved successful and popular, with rice harvesting in July 2016 producing yields between 4.2 T/ha and 7.8 T/Ha compared to yields between 1.5 T/ha and 2T/ha at control sites. An assessment of pesticides (Cypermethrin) in the sediment of Lake Sofia showed average concentrations of 0.23 mg/kg, up to 20x the concentrations that can potentially be lethal for many amphipods species. This project was therefore up-scaled, culminating in 468 farmers being involved in sustainable rice schemes by the end of the project. The sustainable rice cropping system called Zanatany is used, alongside improved seeds, vermicomposting, biochar production to improve and reduce nutrient loss from soil, ash use to restore crop residues and cover crops, and application of targeted natural pesticides. In August 2017 (the most recent harvesting data available at time of writing – see Annex 7) farmers produced an average of 4.7 T/ha compared to control sites producing 1.5 T/ha. Seedling demand decreased from 45 kilo/ha to 15 kilo/ha through removing the need to transplant seedlings and adopting principles of integrated pest management. Chemical pesticide usage decreased from a baseline of 83% to an average of 12.5% (Annex 7). A further 1459 farmers received training on environmentally sensitive fertilizers and pesticides, methods of growing without the need for transplantation, and integrated pest management. Of the

recipients of training (who were not also part of the full farming project), pesticide use decreased from 76% at start of project to 55% in 2017.

A farmer extension programme trained and provided equipment for 16 Community Development Workers. These farmers were selected from the initial farming pilot scheme, and have joined OSDRM specialist field staff to expand the scheme in 2017. They have received additional training and equipment and continue to be supported by the project to support the farmers newly adopting the scheme.

A feasibility study for alternative livelihood options (see Annex 23) suggested that neither coffee nor vanilla would deliver high enough benefits to provide farmers with high enough incentives to become a genuine long-term alternative livelihood. Based on this, Artemisia and Clove production was preferred. A total of 208 farmers cultivated Artemisia, totalling of 9.19 ha in 2017/18 and producing 1.242 tons of dried leaf powder. Clove bushes were distributed to farmers during 2016 but these take 5 years to mature so no production will occur before 2021. Some farmers in the region were already producing vanilla in small forest patches, so training to enhance production was provided to a total of 78 farmers in Andranovaky, Ambondrona, Antilongo, Lohan'i sofia and Antsiradavahely.

All fisherfolk known to use the lake (a total of 76 people) have been given legally meshed nets in exchange for previously used illegal equipment. The old nets were destroyed. A fish landing platform was built by the project in January 2017 to provide a safe area and avoid damage to fringe aquatic vegetation.

A no-take zone was incorporated into the Gelose zonation scheme in 2016 (see Annex 8). This extent was reduced in 2017 at the request of two villages who felt that access to fishing areas had become impractical for them. The no-take zone currently covers approximately one third of the lake. The mean length of fish caught has increased from 110mm in 2015 to 205mm in 2017 (Annex 14).

During the first year of the project, 25% of domesticated bird owners participated in a vaccination programme. An external review of this 2015/16 vaccination programme stated that high diversity and number of diseases in the area mean that an expensive quarterly vaccination programme would be necessary to achieve a significant impact. The project decided that this would not be good value for money for Darwin and submitted a Change Request to put greater emphasis on improved animal husbandry techniques. Staff from the Ministry of Livestock in Antsohihy carried out husbandry training for 238 community members in December 2016 and a total of 431 livestock owners in 2018. 24 farmers (six from each of the four target villages) were trained to deliver husbandry demonstrations for wider community. These demonstration farmers continue to be supported by the project partnership at Lake Sofia. The reporting of diseases as major problems has not decreased as much as we had targeted. This is not a major surprise given the changes made and the delays that came as a consequence. The reporting of diseases as major problems for chickens and ducks did decrease from 91% - 81 % and 55 % - 10 % respectively, but the reporting rate for geese remained the same (Annex 12). M&E will continue in this area to improve the focus of our training and support.

Output 3 – Conditions (policy, practice and awareness) in place to reduce key threats to wildlife and the environment of Lake Sofia and its catchment, including burning/clearance of marsh, hunting/trapping of threatened wildlife, and draining of wetlands.

Social surveys indicated that 41% of households have an improved understanding of wetland management and conservation value – based on 59 households in the catchment surveyed at the start and end of the project (see Annex 12). In comparison, 61 control households, located away from the direct project work in Marotolana commune, reported an improved understanding of wetland management and conservation value of 16%. Although originally designed as a 'control group', the conservation project at Sofia has become well known in the wider area, with the Chef de Region visiting the project for the launch event in 2015 and promoting the initiative, so small increases in the surrounding communes could be expected. The 41% figure fell short of our ambitious target of 65% of households, but shows that good progress has been made over the three year period.

The Directions Régionales de l'Education Nationale (DREN) and the Circonscription Scolaire (CISCO) approved the project's Environmental Education programme and requested a wider regional roll-out. Therefore, by the end of this project, environmental education had been delivered in nine of the catchment's primary schools (Annexes 15 and 16). This included all of the government-supported primary schools in the catchment. The course comprised theoretical and practical sessions, also including field trips to the lakes and the development of nurseries for reforestation (see Annex 16 for pictures). As strong support had been received for this scheme, Asity and the local authorities decided that expanding the primary school scheme should take priority over the proposed pilot secondary school course. Training of teachers and nine local Education Officers was a major emphasis of this initiative, and materials have been left with schools to continue the work. The project has also continued the employment of the education specialist to support existing schools and continued expansion. Adult community awareness has been a feature of all programme initiatives, with the community education and awareness officer joining OSDRM when delivering sustainable development elements of the project. A project launch event and regular community for a have also spread awareness about the linked between healthy wetlands and healthy people, with community information panels (see Annex 16) sharing information on lake management rules and regulations, environmental awareness, and updates on project activities.

Detailed mapping of lake vegetation started in 2015 and has advised the management transfer agreement, habitat restoration and provided a baseline and updated data for monitoring (Annex 17). Within the Sofia Gelose agreement, community-owned lakeside areas have been allocated for reforestation (see Annex 8). Reforestation has been behind schedule throughout this project due to the delays to the initial management transfer agreements, and challenges finding examples of successful examples of reforestation in a local context. Project partners conducted study tours to visit the sites of Ankasabe, EcoFormation, and Hidden Forest, all organisations with a primary focus on forest restoration in Madagascar. A consultant was recommended and recruited to advise on soil improvement processes, production of seedlings, planting schemes and community ownership schemes (Annex 18). Six and a half hectares bare headlands (5.5 ha in east of the lake and 1 ha in the west) have been planted with nitrogen-fixing legumes (spp Tephrosia, Acacia, Mucuna and Stylosantes) to improve soil condition to a point where it is suitable for the planting of native species (Annex 18). This was an unanticipated, but necessary, activity. Plans to plant saplings are now in place for November 2018 and an additional external funding has been secured.

The six Community Dina Committees have each identified one hectare of land around existing forest fragments for the creation of mixed-use forest restoration. Here, native species will be planted alongside fast growing tree species (for firewood and timber) and fruit trees. A further 14ha has been identified for similar mixed-use forest creation within the VOI Gelose area, although all lakeside restoration will be reserved entirely for native species. A community managed nursery is germinating seeds and supporting saplings for the initial reforestation phase. This is being supplemented by externally purchased native seedlings. The project aims to plant 68,000 trees by the end of 2018.

As part of the school environmental education programme, four schools have allocated a total area of approximately 1.5ha for reforestation. The students are growing their own saplings and will each be responsible for planting and looking after their section of land. The schools nurseries were established in 2017 (Annex 16).

Six hectares of water lily and a further 2.75 hectares of cyperus marsh have been restored, exceeding our target of 1.5 hectares of aquatic and marginal habitat restoration. Replanting was done alongside community groups and post-restoration monitoring was added into the community ecological and biodiversity monitoring programme (see Annex 19 for initial programme and data collection methods). This programme was linked to the VOI (also called COBA) community associations set up as part of the lake resources management transfer agreement, and is also charged with monitoring illegal resource use. Community-based ecological monitoring has been carried out twice per month, starting in July 2017.

The condition and extent of marsh habitat has remained stable throughout the project period, with 2017 population densities of marsh specialist birds (Madagascar rail, swamp warbler and Madagascar kingfisher) all higher than the 2015 baselines (Annex 14). The most significant

increases of 250%, 180% and 310% were in the Northern marsh, which is the area prioritised for conservation action due to its water treatment function at the inflow of the lake.

Illegal activities are rarely recorded, but do still occur. The most worrying is the hunting of ducks by local children. This was identified in 2017 and resulted in a targeted education campaign. During the Oct 2017 survey, 33 traps for waterbirds were discovered. Some small-scale marsh burning was recorded early in the project, but has not been recorded on a significant scale since the inception of the Gelose agreement. Several fishermen have been fined by the VOI for using illegal equipment, so although illegal use still exists, the VOI are monitoring and controlling this.

Output 4 – National-level sustainable wetland management guidance (informed by the model developed at Lake Sofia) adopted by the Government of Madagascar and being used at wetlands across the country.

On 1st February 2018, the 'Guide National pour la Gestion Durable des Zones Humides, Madagascar' was launched, with an endorsement and foreword from the Minister of Environment (Annex 20), and presented at a National Conference organised by the project partnership (Annex 21). The guidance had been developed through a participatory process, started in Nov 2015 when the National Ramsar Committee (CONARAMS) endorsed the process and creation of a multi-stakeholder working group. The first National Wetland Guidance (NWG) development meeting in April 2016 drafted the Terms of Reference and work plan for the working group. The working group was overseen by the Ramsar National Focal Point, Volatiana Rahanitriniaina, and had representatives from OSDRM, WWT, Asity, Durrell, Direction du Système des Aires Protégées, Ministry of Fish Resources and Fisheries, Ministry of Agriculture and Livestock, Madagascar National Parks, Ministry of Water, WWF, Aquaterre Environmental Consultants (representing industry), Conservation International, The Peregrine Fund, and the National Programme for Watersheds & Irrigation (BVPI).

Study tours to Lake Kinkony, Torotorofotsy and Lake Aloatra were held in September and October 2016 for members of the Working Group to develop a shared understanding amongst key stakeholders of the values/importance of wetlands and the specific issues and challenges faced by Madagascar's wetlands (Annex 22 for study tour report). Findings from these study tours were written up as case studies in the final Guidance document (Annex 20).

The National Wetland Guidance launch conference was held on the 1st and 2nd of February 2018 and was attended by; 17 of the 20 Madagascar Ramsar Site Managers, members of the Working Group, the Africa Regional Capacity Building Officer of the Ramsar Secretariat, the Minister of Environment and the British Ambassador to Madagascar. The guidance document was presented by co-author Tomos Avent (WWT), with the conservation of Lake Sofia used as a case study throughout the presentation. Electronic copies were given to all attendees. The Guidance is available in English and French, with a Malagasy version in translation to be available in July 2018. The Guidance can be downloaded on the WWT website and the website of the Ministère de l'Environnement, de l'Écologie et des Forêts (http://www.ecologie.gov.mg/telecharger/).

Additional training on wetland management was provided by Bena Smith (WWT Consulting) and a panel of local wetland specialists, including Luciano Andriamaro (Conservation International), Rivo Rabarisoa (Asity Madagascar), and Tsilavina Ravelomanana (Department of Animal Biology, University of Antananarivo). Rasamoelina Rakotomamonjy of the Ramsar Secretariat provided training on the Ramsar Management Effectiveness Tracking Tool (R-METT), the implementation of which WWT will be supporting alongside the Ramsar National Focal Point over the next two years – this was an area identified for additional support during the end of conference participant survey.

Guidance is being applied by project partners at the sites of the original study tours, with wider commitment from Ramsar Site Managers identified during the end of conference survey. Plans are now in place to promote the National Wetland Guidance process and R-METT implementation at the Side-Event for Ramsar CoP in Dubai (Oct 2018).

3.2 Outcome

Outcome – Over 10,000 wetland-dependent people have secure access to natural resources and are part of a community-based management regime which improves food security/wellbeing/livelihoods and ecological conditions.

This project has led to the creation of nine catchment natural resource community management associations, each with open membership for all local people in the communes of the Lake Sofia catchment (Section 3.1, Output 1). Towards the end of this project these associations developed an overarching Watershed Management Group, which aids communication and collaborative working between associations (see Section 3.1, Output 1). Total membership currently exceeds 1,000 local people. Support and training has been given in natural resource management, and financial, operational and administrative management. Community Association Management Committees are freely elected and self-determine rules and regulations for the sustainable management of lake resources.

The overall score for perceptions of community satisfaction and social cohesion increased by 12.5% between 2014 and 2018 (Annex 12). The biggest improvement was seen in general life satisfaction, with the score increasing from 1.80 out of 4 in 2014 to 2.62 out of 4 in 2018, an increase of 31% (Annex 12). Gains were more difficult to make in areas that scored higher in the 2014 survey, which brought the overall average to below our target of 20%. There was an overall improvement in mean Multidimensional Poverty Index score, with the percentage of households classified as 'Poor' decreasing from 62% to 55% by the end of the project (Annex 12).

Household surreys measuring the Lean Season (the period of time during which households report to struggle to support their families) suggested that the mean duration of Lean Season was 24.6% lower in project villages (41.4 days) than control villages (54.9 days) (Annex 12). This exceeded our target and is a likely to be a result of improved rice yields (reported in Section 3.1, Output 2), aided also by a more productive fishery (see Section 3.1, Output 2). Farming groups were also supported by 12 CBSGs, comprising 237 members (57% of women) with accumulated assets of MGA 4,673,200 (approximately £1,100) by the end of the second year of this project. These groups continue.

Since the Gelose management transfer agreement was signed in Oct 2016, a total of 8.7 hectares of aquatic and plant restoration has been completed. The total extent of marsh in 2015 was 322.1 ha. By the end of the project, the total extent of marsh was largely unchanged, at 319.7 ha (Annex 17). Overall populations of marsh nesting bird species have increased (see Section 3.1, Output 3) but the Maximum counts of Endangered Meller's Duck of 70 in 2015 decreased to 29 in 2017. This corresponded with a decrease in maximum benthic invertebrate densities from 378 individuals per m^{-2} to 135 individuals per m^{-2} during the same time period. Invertebrate densities have shown encouraging signs of recovery in the first quarter of 2018 (Annex 14), so this result is likely the consequence of the stagnant state of the lake after the drought in 2016/17. The monitoring programme continues beyond this project period. Due to the poor state of other lakes in the region we have not managed to identify a reliable control site to measure our ecological indicators against.

The development of National Wetland Guidance has received strong buy-in from government and non-governmental stakeholders. The publication of the guidance, endorsed with a foreword from the Minister of Environment, and broad attendance at the National Wetland Guidance launch conference and training event have provided a strong foundation for take-up on a national scale (see Section 3.1, Output 4). 100% of all attendees (including NGOs, VOIs, government and businesses) stated that are 'quite likely' (24%), 'likely' (29%) or 'very likely' (47%) to use the guidance where they work. Project partners are already using the guidance at the three Ramsar sites of Torotorofotsy, Lac Alaotra, and Lac Kinkony, in addition to Lake Sofia. One of the recommendations, to gather baseline information for wetlands, is being supported by WWT and Ministry of Environment through Ramsar Management Effectiveness Tracking Tools (R-METT) workshops, training on which was delivered by the Africa Regional Capacity Building Officer of the Ramsar Secretariat during the Wetland conference.

3.3 Impact: achievement of positive impact on biodiversity and poverty alleviation

Impact – The Bealanana Wetlands Complex is managed sustainably for people and wildlife, acting as a national model for wetland and catchment management that helps Madagascar deliver international development commitments (MDGs/SDGs).

The natural resources of Lake Sofia and the upstream forest catchment are under the management of independently functioning community associations, with self-determined rules and regulations being enforced. Over 2,700 have been engaged in sustainable livelihood initiatives; 468 directly involved in sustainable rice associations, 1459 receiving training on efficient farming mthods, 208 cultivating artemisia and cloves, 78 recipients of vanilla training, 76 fishers using improved fishery, and 431 people receiving training on livestock husbandry (see Section 3.1, Output 2). Lake Sofia is recognised internationally as a Ramsar Site and the integrated conservation and development work at the site has fed into published government endorsed guidance for the sustainable use of Malagasy wetlands, providing Ramsar Site Managers and other stakeholders with increased understanding of wetland conservation resources and approaches. Multidimensional Poverty Index scores and perceptions of community satisfaction and social cohesion have increased (see Section 3.2).

Lake habitat protection schemes have been integrated into VOI Gelose agreements and management plans, and aquatic plant restoration is being trialled over 8.7 hectares. There has been no net loss in the extent or condition of wetland habitat (see Section 3.1, Output 3). The area's first reforestation project has learned lessons from other initiatives in Madagascar and soil is being prepared to plant local seedlings growing in new school and community nurseries (see Section 3.1, Output 3). Lessons learnt from these habitat restoration trials will feed back to the Sofia Regional Direction of Environment, Ecology & Forests (DREEF), who has been a member of the Lake Sofia Project Steering Group.

The Lake Sofia case study was presented during the Madagascar National Wetland Conference in Antananarivo (Feb 2018) and has informed the development of the National Wetland Guidance, as have visits to three other project partner sites. Visits by HRH Princess Anne and the President of Madagascar to the Madagascar Pochard Breeding Centre (also run by project partners) in Antsohihi have generate local and national publicity for Lake Sofia, which is proposed to be the site for a reintroduction project in 2018.

The newly published National Wetland Guidance (Guide National pour la Gestion Durable des Zones Humides, Madagascar) is proposed to be the subject of a Side-Event at the Ramsar Conference of Parties in October 2018, alongside a project that has been developed as a consequence of this Darwin-funded work – the collection of Ramsar Management Effectiveness Tracking baseline data.

4 Contribution to Darwin Initiative Programme Objectives

4.1 Contribution to Global Goals for Sustainable Development (SDGs)

The project has made direct contributions SDG1 (to end poverty in all its forms everywhere) and SDG 2 (to end hunger, achieve food security and improved nutrition and promote sustainable agriculture) through sustainable rice farming, alternative crops, community-based savings groups and fisheries (see Section 3.1, Output 2 for numbers).

As reported in Section 3.1, Output 1, community association groups have a strong inclusion of women (SDG 5), who are able to influence major decision-making around natural resource management. Transparent electoral systems, open membership criteria, and training on administration and management of VOIs and other community groups (see Section 3.1, Output 1) work towards elements of SDG 16 – inclusive societies for sustainable development, and the building of effective, accountable institutions at all levels. Major decreases in agricultural chemical inputs, and preservation and restoration of marsh habitat (see Section 3.1, Outputs 2 and 3) works towards improved access to clean water for all (an element of SDG 6).

Increased national and global recognition of Lake Sofia through Ramsar designation (see Section 3.1, Output 4), ecological restoration of lakeside forests and aquatic vegetation (see Section 3.1, Output 3), enhanced and legally recognised lake management systems (see Section 3.1, Output 1), and transitions away from the use of illegal fishing equipment (see Section 3.1, Output 2) and agricultural chemicals (see Section 3.1, Output 2), have contributed towards SDG 15 – promoting, restoring and promoting sustainable use of the Lake Sofia terrestrial ecosystem, sustainably managing forests and halting biodiversity loss, and promoting inclusive societies for sustainable development. At a national level, bringing together multi-stakeholder groups for conferences and workshops to develop, and eventually be recipients of, National Wetland Guidance (see Section 3.1, Output 4) has achieved a wider contribution to SDG 15.

4.2 Project support to the Conventions or Treaties (CBD, CITES, Nagoya Protocol, ITPGRFA)

During this project, the partnership has developed strong links with the Ramsar Focal Point, Ms Volatiana Rahanitriniaina, who officially facilitated the Guidance development process and with whom we are now running Ramsar Management Effectiveness Tracking Tools at some of the new Ramsar sites in the country. Ramsar is recognised a lead partner in implementing CBD wetland-related activities. The CPD National Focal Point, Ms Rantonirina Rakotoaridera, has supported the project throughout and attended the National Wetland Guidance launch event alongside the Minister of Environment in early 2018.

Lake Sofia was designated a Ramsar site in 2017 (see Section 3.1, Output 1), with project partners eventually receiving the certificate from the Regional Capacity Building Officer of the Ramsar Secretariat during the project's World Wetland Day awareness event and conference in 2018. This contributes to **Goal 1.2** of the **Inland Waters Biodiversity thematic programme**, as does the establishment and legal recognition of community-based management of Lake Sofia.

The publication and government endorsement of National Wetland Guidance (see Section 3.1, Output 4) contributed to **Goal 2.1** of the **Inland Waters Biodiversity thematic programme**. The guidance was developed with representatives of industry, international development, agriculture, fisheries and environmental conservation. The contents of the guidance provides information to promote integration of conservation and sustainable use into relevant sectoral and cross-sectoral plans.

Environmental education and awareness programmes, through courses, information points, and public events for schools and communities at Lake Sofia (see Section 3.1, Output 3) have promoted and enabled the conservation and sustainable use of the biological diversity of inland water ecosystems, contributing to **Goals 2.4 and 3.1 of Inland Waters Biodiversity** and **CBD Aichi Target 1**.

CBD Aichi Target 6 has been supported through enhanced fisheries management at Lake Sofia and sustainable harvesting of marsh vegetation, which is an integral part of the community-selected regulation of lake resources (see Section 3.1, Outputs 1 and 3).

468 farmers participated in sustainable farming schemes, with an additional 1459 receiving training in environmentally sustainable techniques (see Section 3.1, Output 2). This contributed to **CBD Aichi Target 7**, transitioning areas under agriculture to become managed sustainably, ensuring conservation of biodiversity.

Reductions in agricultural chemical inputs (see Section 3.1, Output 2) and restoration of marsh habitat (see Section 3.1, Output 3) also contribute to **CBD Aichi Target 8**, bringing pollution, including from excess nutrients, down to levels that are not detrimental to ecosystem function and biodiversity.

4.3 Project support to poverty alleviation

Many of the biodiversity benefits of this project have been achieved by incentivising local people to choose to transition to more sustainable livelihoods. This project has supported

poverty alleviation through improving farmer yields through the transition to more profitable sustainable rice production (see Section 3.1, Output 2), securing access to natural resources through Gelose agreements (see Section 3.1, Output 1), improving the productivity of fisheries (see Section 3.1, Output 2), supporting crop diversification to artemisia and cloves (see Section 3.1, Output 2) and linking community-based savings groups to farmer associations (see Section 3.2). In total, livelihood support has been given to over 2,700 people (see Section 3.3 for breakdown of numbers). Improvements have been made to Multidimensional Poverty Index scores and perceptions of community satisfaction and social cohesion (see Section 3.2).

Members of farming associations have seen average yields rise by 300 % (see Section 3.1, Output 2), and the average size of fish caught in Lake Sofia has increased by 86 % (see Section 3.1, Output 2).

Access to natural resources is more secure due to the management transfer agreements and rules-based Dina agreements reported in Section 3.1, Output 1.

The inputs from local people during study tours for the development of National Wetland Guidance (see Section 3.1, Output 4) enabled stakeholders to have wider debates around wise use of resources and implications of regional development plans on local people. The needs of local people are embedded into this national-level guidance.

4.4 Gender equality

At all stages, the project has endeavoured for full inclusion of all sectors of the community to engage through meetings, training, livelihood support management transfer consultations and awareness raising. Women represent 66 % of all members in VOIs (natural resource management associations). As women are more likely to have greater proportion of their livelihoods reliant on natural resource collection, the management transfer agreements provide important security to local women. The percentage of women in VOI management committees is lower at 40%. Efforts were made to promote the importance of equal gender representation, but project partners did not interfere with the free and open process to elect representatives. 40 % is still a high proportion compared to other local management structures (e.g. commune committee and majors office). 25% of all farmers in the initial project farming associations were women, proportional to gender ratios of farmers in the local area. 12 Community-based Savings and loans Groups (CBSGs) have now been established with a total of 237 members of whom 57% are women. Thirteen of the 21 participants National Wetland Guidance draft review workshop in April 2017 were women, including representatives from industry, government and civil society.

4.5 Programme indicators

- **Did the project lead to greater representation of local poor people in management structures of biodiversity?**

Yes, nine management transfer agreements, with combined membership of over 1,020 people, have provided local people with a greater say in the management of natural resources. These agreements are endorsed by government.

- **Were any management plans for biodiversity developed?**

Yes, management plans are integrated into the three VOI agreements.

- **Were these formally accepted?**

Yes, these have been formally accepted by the Sofia Regional Direction of Environment, Ecology & Forests (DREEF).

- **Were they participatory in nature or were they 'top-down'? How well represented are the local poor including women, in any proposed management structures?**

The Management Plans were developed through a full participatory process. Meetings and consultations were facilitated by local community representatives, with technical support provided by project partners and the Regional Direction of Environment, Ecology & Forests (DREEF). The community were free to select rule and regulations that were suitable for their

needs, and these rules were adapted after a trial stage in Year 1. For example, the area and extent of the no-take fishing zone was changed after one village found that the initial rules made access to the lake too difficult.

- **Were there any positive gains in household (HH) income as a result of this project?**

Estimating household income in a subsistence economy is challenging, but increases in rice yields and fish catch sizes (see Section 3.1, Output 2 for figures) suggest that HH income will have increased in the project area.

- **How many HHs saw an increase in their HH income?**

Over 2,700 people benefited from some level of livelihood support; 468 in sustainable rice programmes, 1459 receiving training on efficient farming, 208 cultivating Artemisia and cloves, 78 recipients of vanilla training, 76 fishers, and 431 people receiving training on livestock husbandry. Some of these individuals may be from the same household.

- **How much did their HH income increase (e.g. x% above baseline, x% above national average)? How was this measured?**

465 farmers had an average rice yield increase of 300%. 76 fishers reported fish sizes increase by 86%. The regional proportion of households saying they don't grow enough rice for their own needs has declined from 63% to 36%.

4.6 Transfer of knowledge

The purpose of the National Wetland Guidance project was to bring together national and international expertise to advise wetland managers, communities, businesses, wider civil society and government staff on best-practices for wetland sustainable use and management. Further expertise was brought in to deliver training for wetland stakeholders at the project's National Wetland Conference in Antananarivo in 2018, where 17 of the country's 20 Ramsar Site managers were joined by other wetland stakeholders, the Minister of Environment and the British Ambassador to understand potential applications of the guidance. Attendees also received training on wetland management planning, support available from the Ramsar Secretariat, and the implementation of the Ramsar Management Effectiveness Tracking Tool which will enable the collection of a baseline of the current state and needs of conservation management at key wetlands in the country.

The National Wetland Conference was followed by a project-support wetland public engagement event for World Wetlands Day 2018. This was held in the Jardin d'Antaninarenina, Antananarivo and was an opportunity for the general public to learn about the importance of wetlands for people and biodiversity. This event also provided a space for project partners to promote their wider work in Madagascar. The event, with the associated key messages, was featured on national television and radio.

Key to successful and long-lasting community based natural resource management is the transfer of knowledge to local community groups on sustainable management, financial and operational administration, and the setting and implementation of rules and regulations. Training was supplied throughout the project (as reported in Section 3.1, Output 1).

Environmental education and awareness was embedded into the project, promoting healthy wetlands for healthy people and creating a stronger culture of natural resource protection (Section 3.1, Output 3).

4.7 Capacity building

Malagasy project staff from Asity contributed to the National wetlands expert panel during the National Wetland Conference in Antananarivo in February 2018. The process of developing National Wetland Guidance has helped to create a more functional network of wetland stakeholders. Strengthening CONARAMS (Comité National Ramsar) has led to a new project to collect baseline information on the country's 20 Ramsar sites, which starts in July 2018.

Felix Razafindrajao, DWCT's Project Coordinator is in the process of completing his PhD, some data of which has been collected at Lake Sofia.

The interaction between a development/poverty alleviation partner and conservation groups has been an important element of capacity building for all parties involved in this project. OSDRM have reported greater confidence embedding wetland conservation principles at other projects in Madagascar, and the adoption of business-minded approaches for VOIs at Sofia have aided work at other DWCT and Asity wetland conservation sites.

5 Sustainability and Legacy

This Darwin project has created the foundation for a long-term project partnership at Lake Sofia. As mentioned in the Project Partnership section (Section 2), an extension project to develop sustainable financing mechanisms for the VOIs is now underway. This aims to decrease financial reliance on fines and membership fees, allowing the groups to become more resilient and generate financial reserves. The VOIs will have completed their initial three year phase in 2019, at which time the project partnership will support a full community review and adaptation of the scheme and submit an application for government approval to extend the agreement for a further ten years.

A farmer extension programme trained and provided equipment for 16 Community Development Workers. These farmers were selected from the initial farming pilot scheme, and have joined OSDRM specialist field staff to expand the scheme in 2017. They have received additional training and equipment and continue to be supported by the project to support the farmers newly adopting the scheme.

As project partners are still on-site, we continue to support farmers to manage project-bought equipment, and to maintain newly acquired skills. All project field staff have been retained.

Project partners plan to reintroduce the Critically Endangered Madagascar pochard to the Lake in September 2018, reaffirming our long-term commitment to this site. To ensure the greatest possible community participation, local people have been offered an opportunity to grow supplementary food for the Madagascar pochard. This supplementary food will be required for at least the first three years of the reintroduction project, so medium/long-term contracts have been signed with farmers.

The National Wetland Conference was the first opportunity for all Ramsar Site Managers to come together in one place. Ten of Madagascar's twenty Ramsar Sites were designated in 2017, so the conference was an important first step in bringing together all Site Managers, and supporting NGO partners, to form a network of Ramsar wetland conservationists. A 'Dropbox' was created for Ramsar stakeholders to share materials, including all presentations and documents that were featured during the National Wetland Guidance conference.

6 Lessons learned

The structure of the project partnerships, with separate elements of the project managed through sub-grants, worked well thanks to strong project management systems and good coordination of the partnership. I recommend that other complex multi-stakeholder partnerships agree clear M&E and reporting systems at the start of a project and remain flexible and adaptive with these systems throughout the evolution of the project.

The creation of the first three management transfer agreements took longer than planned, which in-turn led to delays with other project activities. Although I would continue to encourage ambitious Darwin projects, it is also important to recognise that relationships with communities in Madagascar can take a long time to develop. Representatives of Sofia's local communities often cite examples of other areas where the trust of local people has been exploited. As our project at Lake Sofia has always been linked to a potential reintroduction of the Madagascar pochard, some individuals had been concerned about potential conflicts of interest between conservation and people's livelihoods. Strong and honest environmental education and awareness, and the delivery of early tangible livelihood benefits, were important to alleviate

some of these concerns. The participation of a specialist poverty alleviation partner helped greatly to this end. Some short-term success through CBSGs and increased fish catch revenues have helped secure our credibility and build trust in technical advice.

The vaccination programme was much more complex than the project had originally anticipated, with the range of diseases, and necessity of quarterly vaccinations proving prohibitively expensive.

6.1 Monitoring and evaluation

A strong initial M&E plan has proven very important in this project. Project partners are responsible for collecting and reporting on their own M&E, with the wider M&E plan reviewed during Project Steering Group Meetings and adapted if necessary. Community monitoring data is included when possible, but the majority of data is collected by technical project specialists and external consultants. Consultants delivered independent external reporting on aquatic vegetation condition and extent, and many of the social survey results came from a PhD being conducted at the University of Bangor.

The biggest M&E challenges faced by the project have been the ecological indicators. Identifying the cause of changes over a short three year period has been made more difficult by the lack of reliable comparison sites. Originally Bemanevika wetland complex (now also a Ramsar Site) was going to be used as a control site, but the eco-hydrological conditions were found to be too different to offer a useful comparison. Big annual variations in species densities at both sites created too much noise in the data to infer useful conclusions, and results of decreases in max Meller's duck numbers and invertebrate densities at Lake Sofia are likely to be a result of the drought, which caused a relatively stagnant system in 2016. This issue was reported in the last annual report and we now believe that monitoring for a longer period is the only way that we will become more confident to make inferences form the data.

Within the rice growing systems at Lake Sofia we weren't able to identify a way to measure water usage, so this element of the monitoring and evaluation was removed through a Change Request accepted by Darwin.

6.2 Actions taken in response to annual report reviews

A greater number of Annexes have been added to this report to provide wider evidence of project progress and achievement. An attendance list has been included in the Watershed Management Group minutes to show an example of the breadth of representation at project/community group meetings (Annex 9). An example fish catch monitoring data set is attached (Annex 24) to show the information that is being captured. All field data collection is done through printed excel sheets, which are directly entered into the project computer in the project office in Marotolana.

The fish net exchange programme destroyed old fine-meshed nets so that they couldn't be re-used at the lake. They were generally in too poor condition to use for any other function. A lot of training has been completed during this project so it is difficult to provide detailed information on everything without making the report Annexes too long. Four pages of a legal training manual has been included as Annex 10 to give an indication of detail. Annexes have been added in English, Malagasy and French.

7 Darwin identity

The Darwin logo features on project outputs, consultancies, media, and invitations to meetings and government workshops, presentations, and publications (examples in Annexes 10, 15, 16 – including community information panels, 17, 19, 20, 21, 22). Darwin is also credited on the WWT project website. The government-endorsed National Wetland Guidance included a full acknowledgement of the UK Government's contribution to this work.

The British Ambassador to Madagascar attended the project's National Wetland Conference, and the Darwin project and UK Government's contribution to conservation and sustainable development was promoted to the President of Madagascar, during his joint visit with Princess Anne to the Madagascar Pochard captive breeding centre in 2017 (see https://www.thecrownchronicles.co.uk/royal-news/princess-annes-mission-save-endangered-birds-4-day-visit-madagascar/)

8 Finance and administration

8.1 Project expenditure

Project spend (indicative) since last annual report	2017/18 Grant (£)	2017/18 Total actual Darwin Costs (£)	Variance %	Comments (please explain significant variances)
Staff costs (see below)				
Consultancy costs				
Overhead Costs				
Travel and subsistence				
Operating Costs				
Capital items (see below)				
Others (see below)				
Audit costs				

Staff employed (Name and position)	Cost (£)
Andy Bamford – WWT Field Manager	
Felix Razafindrajao – DWCT Project coordinator	
Hanitra Rakotojoana – DWCT Project Manager	
Tina Fanjanirina – Asity Communicator	
Randrianarisoa Christiane Verosehen - OSDRM Project Management/technical officer*	
Mede Rabenosy – DWCT Field technician	
Paulette Rasoamihety – DWCT Field technician	
Rivo Rabarisoa – Asity Wetland Coordinator	
Vony Raminoarisoa – Asity National Coordinator	
Feno Razafinjatovo – Asity Finance/Admin Officer	
Razafindrakoto Mamonjisoa – Asity Comms Officer	
Solofondraibe Tolojanahary Serge Angelo, OSDRM Project Management/technical officer*	
Tahinjara Adele Etienne – OSDRM Field staff member	
Said Ali Ahmed – OSDRM Field Technician	
Razanaka Théodin – OSDRM Field staff manager	
Erneste Ramanantsoa – OSDRM Field staff manager	
Rasoamalala Eloise – OSDRM - Field staff member	
TOTAL	

Capital items – description	Capital items – cost (£)
100 watering systems for local farmers Large mesh fishing nets for local fisherfolk	
TOTAL	

Other items – description	Other items – cost (£)
Seeds for reforestation Seeds for reforestation Seedlings for reforestation Seeds for reforestation Netting to protect seedlings for reforestation Printing of materials for community meetings	
TOTAL	

8.2 Additional funds or in-kind contributions secured

Source of funding for project lifetime	Total (£)
HSBC	
Synchronicity Earth	
WWT Appeal	
TOTAL	

Source of funding for additional work after project lifetime	Total (£)
HSBC	
Synchronicity Earth	
WWT Appeal	
Legacy Donation	
WWT/Durrell in kind staff time	
TOTAL	

8.3 Value for Money

This project has supported a large number of community-based projects, bringing livelihood benefits to local people, and has helped secure the conservation of habitats and natural resources at a newly declared Ramsar Site. Many project costs have been the catalyst for greater action, and have been an investment into the long-term sustainability of the programme. Investments in VOIs for example have laid a strong foundations for building financial resilience and working towards independence in the future. Farming partnerships have inbuilt extension teams who are tasked with transferring knowledge and expanding the programme.

Five of the field staff working on this project have been recruited from the local community, helping to forge close links with villagers and also investing in local capacity development. In addition, the project has supported local community monitoring groups, helping community associations to experience first-hand the results of improved wetland management and providing funding for direct employment.

Darwin funding towards the project helped us to leverage in excess of additional funding. This created cost-savings and efficiencies and enabling a more comprehensive programme of activities to take place in parallel with Darwin-funded work. This was especially the case for the expanded sustainable rice programme.

The project has invested in the creation of national wetland stakeholder networks and delivered guidance to support wiser-use of wetland systems. Learning at Lake Sofia has informed the development of this guidance throughout.

Annex 1 Project's original (or most recently approved) logframe, including indicators, means of verification and assumptions.

Note: Insert your full logframe. If your logframe was changed since your Stage 2 application and was approved by a Change Request the newest approved version should be inserted here, otherwise insert the Stage 2 logframe.

Project summary	Measurable Indicators	Means of verification	Important Assumptions
Impact: Effective contribution in support of the implementation of the objectives of the Convention on Biological Diversity (CBD), the Convention on Trade in Endangered Species (CITES), and the Convention on the Conservation of Migratory Species (CMS), as well as related targets set by countries rich in biodiversity but constrained in resources.			
Outcome: Over 10,000 wetland-dependent people have secure access to natural resources and are part of a community-based management regime which improves food security/wellbeing/livelihoods and ecological conditions.	1. Six community associations are active across the entire catchment and are working together to address catchment-scale issues by year 3. 2. By year 3, average community satisfaction and social cohesion perception scores improve by 20% against 2014 baseline (gender and poverty disaggregated data is available, however to give an indication of change, overall scores would move from a current average of 2.16 to 2.60 out of 4).	1. Public record (statutes and official signed documentation), project documents, association meeting minutes and participants lists, community forum meetings/feedback, participatory learning reports for target stakeholder/beneficiary groups (resource user groups, marginalised groups, women), social survey/attitudes assessment report, minutes of meetings with commune chief and district/provincial level representatives. 2. Household survey data and reports. 3. Household survey data and	That, following the recent elections (establishing the first democratically elected government since 2009), the newly established political environment remains relatively stable and conducive to conservation and development work delivered in partnership with external agencies. *[National-level work, particularly activities under output 4 will be used to maintain close working relationships with the government and keep a close eye on the situation and the steering group will be tasked with developing strategies to address any changes]* That powerful individuals and outside influences, which have encroached into many other similar wetland areas (e.g. Lake Antafiandakana), do not seek to or succeed in destabilising the project's progress for their own interests. *[Work to establish the legal basis for the association's work will significantly address this issue during the lifetime of the project and national level work with government ministries will help ensure political support is in place to react to any threats]*

	3. Average duration of the 'lean season' (a widely recognised measure in development work, broadly defined as the difficult period between harvests when resources become scarce and food is more expensive) is reduced by 20% in target villages by year 3 in comparison to identified reference villages for the same period. 4. Populations of ecological indicator species at Lake Sofia stabilized at current levels and no net loss of wetland habitat or deterioration in condition in year 3 in comparison to year 1. 5. Guidance on the sustainable management of wetlands in Madagascar is supported by government and being used at (or agreed plans in place to use at) wetlands across the country.	participatory learning reports, minutes of community meetings. Comparable data from reference villages (to capture real change rather than the influence of external factors such as climate) 4. Biodiversity survey and monitoring data (including benthic invertebrate counts, fish catch records and waterbird population counts), satellite imagery and aerial photography 5. National level CBD and Ramsar reporting, guidance referenced in additional	That the management bodies established are endorsed and empowered by government to control/coordinate the sustainable management of Lake Sofia and its catchment. *[Although using existing frameworks and recognised techniques this is a relatively new approach/model in Madagascar. The involvement of local government (DREEF and DRDR) as project partners will help to ensure this, supported by national level policy work]*
Outputs: **1**. **Fully representative community management structures surrounding Lake Sofia re-established and strengthened, with new community management structures established for**	1. Management transfer agreements in place for the three local associations surrounding Lake Sofia (Sofia Mandroso, Fikambana Fitantanana Matsabory Sofia, and Sandatra Sofia) by November 2015 and for a further three upstream communities (Antilongo,	1. Public record (official declaration), documents supporting submission, press releases and articles	

the wider catchment of the lake	Lohanisofia, and Andranovaky) by 2018. 2. Annual workplans and 3-year action plans (covering institutional development activities as well as conservation and community development work) are in place (agreed by general assembly) and being implemented in 3 communities by 2016 and 6 communities by 2018. 3. The membership of local association management structures (executive committee, advisory board, and general assembly) are fully representative of the local community, including at least 50% women and with representative social stratification, by 2017. 4. Watershed management group established and holds inaugural meeting by 2018.	 2. Articles of local associations (annual workplans and 3 year activity plans), reports of annual workplan development/review and semi-annual workplan progress update meetings. Supplemented by feedback/minutes from community meetings and participatory learning reports. 3. Public record (official documents), TORs, management committee membership/participant lists and minutes of meetings, minutes/feedback from community meetings, project documents, household survey data (disaggregated by village, Multi-dimensional Poverty Index score, and gender). 4. Public record, press releases and articles, watershed management group meeting minutes and project reports/photographs.	
2. **Approaches to enhance existing local livelihoods and establish additional livelihood options developed, demonstrated at key sites and being implemented across the**	**5. 650 farmers around the lake receiving training on good husbandry practices and 25 farmers participating in husbandry demonstration sites'** **6. Reporting of disease as**	**5. Training and demonstration site reports.** 6. Household survey data and	That the evidence gathered and demonstrated through pilot project work will be sufficient to change attitudes and enable training to improve wider uptake (as cultural/spiritual beliefs can create scepticism towards technical solutions). *[This is an assumption based on successful work elsewhere in Sofia region,*

wider catchment	**a major problem with chickens/ducks/geese, reduced to 50%/30%/30% by 2018 (against 2014 baseline of 90%/55%/55%).** 7. At least 90% of fisherfolk are using recommended fishing equipment and respecting local fishing regulations by 2016 8. 15 farmers (from three communities) signed up to and have started working on the rice farming pilot projects by 2016. **9. Rice yields increased by an average of at least 150% and chemical inputs reduced by 90% on pilot rice fields by 2017 (in comparison with 2015 baseline of pilot sites and control sites).** 10. At least 30 additional rice farmers (beyond pilot sites) applying the new techniques to their rice fields by 2017 11. Lake Sofia wet Arabica coffee and sustainable vanilla production business plans developed by 2016 with local infrastructure (nurseries, storage and collection	reports 7.Records/receipts of gear exchange, reports of local associations on infringements of regulations, fisheries monitoring reports 8. Signed agreements with local associations/village leadership and individual farmers, project reports **9. Rice yield data from pilot and control sites, community feedback (meeting minutes, attitudes/awareness surveys), press releases/articles, journal papers** 10. Agreements with local associations, participants lists and reports from training and follow-up events, community feedback (meeting minutes, attitudes/awareness surveys) 11. Feasibility study final report, minutes of community meetings, Lake Sofia community development plans, Strategies/Plans of OSDRM, Project proposals, Project	*however in Madagascar cultural issues can be very localised (e.g. local 'fadys' which prevent certain activities in certain locations based on spiritual/ancestral beliefs). Staff of the project have the skills to adapt work to this very local context and additional staff recruited from the local community will help with this]*

	networks) in place by 2017 and pilot phase production underway in 2018.	registers of donors.	
3. **Conditions (policy, practice and awareness) in place to reduce key threats to wildlife and the environment of Lake Sofia and its catchment, including burning/clearance of marsh, hunting/trapping of threatened wildlife, and draining of wetlands.**	12. 65% of households in the Lake Sofia catchment have an increased understanding of the social, environmental and economic importance of sustainable wetland/watershed management by 2017 in comparison to 2015 baseline 13. Environmental education programs developed by the project are integrated into the curriculum of at least two primary schools and one secondary school in the catchment by 2016 and being adopted commune-wide by 2018 14. At least 1.5ha of marginal/aquatic vegetation restored and 5ha of currently bare headland around Lake Sofia reforested (under cover of saplings of diverse native provenance and demonstrating annual survival rates of at least 70%) by 2018 **15. Population density of marsh specialist birds showing no decline from 2015 levels.** 16. Instances of deliberate burning/drainage of marsh,	12. Attitudes/awareness survey at beginning and end of project 13. School curricula/syllabus and lesson plans, evaluation report interviews with students and teachers, project reports, minutes of meetings with education departments, commune and district level education department plans 14. Satellite imagery (Landsat images - 30m resolution), photographic evidence, minutes of community meetings, project reports, press/media articles, inventories and receipts of plug plants and saplings. **15. Project reports and monitoring data, biodiversity reports.** 16. Satellite imagery (Landsat images - 30m resolution),	That there is not a fundamental ecological reason for the relative lack of productivity in Lake Sofia (of benthic invertebrates and fish) and that this is a consequence of poor environmental practices surrounding and upstream of the lake. *[This issue has been explored and fairly detailed investigations conducted to date suggest that this is unlikely to be the case, however it must always be considered and any indications/evidence during the project that this may be the case need to be reported to and considered by project management]*

	use of illegal fishing gear, illegal hunting by residents of local communities reduced to zero by year 3, and any instances of such activities by outsiders are effectively prosecuted/redressed in accordance with the rules of the local association.	photographic evidence, incidences of burning and clearance reported in minutes of community/association meetings, District and provincial DREEF/DRADR records.	
4. **National-level sustainable wetland management guidance (informed by the model developed at Lake Sofia) adopted by the Government of Madagascar and being used at wetlands across the country.**	17. National-level working group established in 2015 18. Draft guidance developed for consultation by 2016 19. Final guidance (including a case study on Lake Sofia) produced and endorsed by government by the end of 2017 20. Guidance is being applied to at least 3 additional wetland sites in Madagascar by 2018.	17. Working group ToR and commitment of members (MoU/charter), minutes of meetings, project reports. 18. Draft guidance document, minutes of meetings 19. Final guidance document, minutes of meetings, project reports 20. Project reports from other sites (organisations both within and beyond the Lake Sofia project partnership), minutes of meetings and reports of government.	That the increasing political stability of Madagascar attracts additional donors and partners to work/collaborate in the region and build on the foundations established by the project. *[If this assumption does not hold, the project will focus even more effort on developing close relations with specific donors to ensure support continues during political instability. This has been a proven strategy during the past political turmoil. Work to ensure management structures are community-led and maintainable/sustainable without significant external intervention will also help mitigate the impact]*

Activities (each activity is numbered according to the output that it will contribute towards, for example 1.1, 1.2 and 1.3 are contributing to Output 1)

1.1 Develop and agree initial 3-year management transfer agreements for Sofia Mandroso, Fikambana Fitantanana Matsabory Sofia, and Sandatra Sofia.
1.2 Develop agreements to transfer the management of natural resources to local-constituted community associations across the upstream catchment of Lake Sofia.
1.3 Revise and update the management transfer agreements for Sofia Mandroso, Fikambana Fitantanana Matsabory Sofia, and Sandatra Sofia based on information gathered by the project.
1.4 Constitute membership of executive committees, advisory boards, and general assemblies of local associations
1.5 Hold annual workplan development and review meetings with general assemblies

1.6	Hold community fora 3 times per year in each community to ensure wider accountability
1.7	Produce semi-annual and annual progress reports on each local association
1.8	Provide technical support to the local community to understand and support delivery of the management transfer agreements
1.9	Deliver training on laws and rights for members of the local associations
1.10	Establish watershed management group for Lake Sofia Catchment, bringing together local associations across the catchment, local government and other stakeholders.
1.11	Hold annual watershed management group meeting
1.12	Seek to support/reinforce catchment-level work through national/international site/landscape designation compatible with community management objectives (e.g. Protected Harmonious Landscape, Ramsar Site).
2.1	Vaccinate domestic birds against disease in the villages surrounding Lake Sofia
2.2	Train members of local communities in vaccination techniques
2.3	Produce vaccination guidance manual
2.4	Deliver animal husbandry practices training to all villages in the Lake Sofia catchment
2.5	Produce information factsheets on common diseases, focussed on prevention and management techniques
2.6	Construct fishing and fish landing platforms at Lake Sofia to improve lake access and safety, enable easier processing and monitoring of fish catches, and reduce disturbance to marsh habitats
2.7	Provide replacement fishing equipment in exchange for any fishing gear not permitted for use on Lake Sofia under existing or any revised regulations.
2.8	Design and implement fisheries/fish catch monitoring programme
2.9	Identify locations for pilot rice farming projects and sign agreements with participants (through local associations where already in place)
2.10	Conduct pilot projects in three villages to demonstrate the application of more environmentally sensitive rice cultivation practices
2.11	Develop and implement monitoring programme (focussed on yield, water quality and external inputs) for pilot rice farming projects
2.12	Report on findings of pilot projects
2.13	Train agricultural extension training team
2.14	Deliver environmentally sensitive rice cultivation (including soil management techniques) training to all villages in the Lake Sofia catchment
2.15	Develop and agree a roll-out programme of rice farming work with local association and village leadership
2.16	Conduct feasibility study for alternative livelihood options (wet-processed Arabica coffee/sustainable vanilla)
2.17	Establish local nursery to supply high-quality cuttings to local farmers
2.18	Identify locations for development of pilot value-added coffee and vanilla projects and sign agreements with participants
2.19	Provide training and materials on sustainable coffee/vanilla farming practices
2.20	Produce quarterly updates and annual progress report on all activities
3.1	Develop environmental education programme and supporting materials (lesson plans, ID guides, basic sampling equipment, teaching guides) for use in schools
3.2	Run initial demonstration sessions in schools
3.3	Conduct teacher training events
3.4	Develop magnification/roll-out plan with local and regional education departments
3.5	Establish catchment-wide network of community information dissemination points

3.6	Develop simple ecological monitoring framework, linking improvements in ecological health to human health/wellbeing
3.7	Identify network of local community monitoring focal points and sign agreements with participants
3.8	Run training events and provide simple monitoring materials to focal points to enable them to act as local coordinators of monitoring effort
3.9	Produce semi-annual community monitoring reports
3.10	Identify and agree locations and plans for reforestation work on bare headlands surrounding lake with local associations
3.11	Procure supply of suitable seedlings for reforestation work and establish local holding station/nursery
3.12	Conduct reforestation events with villages surrounding Lake Sofia
3.13	Assess extent and quality of aquatic/marginal habitat and identify priority locations for restoration work
3.14	Undertake restoration of aquatic and marginal vegetation with local community, using cuttings and transplants from healthier areas of the lake/catchment
3.15	Undertake habitat extent and condition monitoring using combination of remote sensing and groundtruthing techniques
3.16	Produce quarterly updates and annual progress report on habitat restoration work
4.1	Constitute national working group to develop the guidance
4.2	Run study tours to four wetlands (Lake Alaotra, Lake Kinkony, Torotorofotsy and Lake Sofia)
4.3	Hold guidance development workshop
4.4	Write up Lake Sofia case study
4.5	Produce draft guidance and consult with broad range of stakeholders
4.6	Workshops to finalise guidance, chaired by national CBD and Ramsar focal points.
4.7	Design and publish guidance document in three languages (Malagasy, French and English)
4.8	Organise national conference for wetland managers and policy makers and use as platform to launch guidance
4.9	Project partners involved in managing wetlands elsewhere in Madagascar (particularly DWCT and Asity) test the guidance against those sites and apply recommendations.
4.10	Promote guidelines at national and international conferences and conventions
4.11	Produce quarterly updates and annual progress reports

Annex 2 Report of progress and achievements against final project logframe for the life of the project

Project summary	Measurable Indicators	Progress and Achievements
Impact: The Bealanana Wetlands Complex is managed sustainably for people and wildlife, acting as a national model for wetland and catchment management that helps Madagascar deliver international development commitments (MDGs/SDGs).		The natural resources of Lake Sofia and the upstream forest catchment are under the management of independently functioning community associations, with self-determined rules and regulations being enforced. Over 2,700 people choose to remain engaged in sustainable livelihood initiatives. Lake Sofia is recognised internationally as a Ramsar Site and the integrated conservation and development work has fed into newly published government endorsed guidance for the sustainable use of Malagasy wetlands, providing Ramsar Site Managers and other stakeholders with increased understanding of wetland conservation resources and approaches.
Outcome Over 10,000 wetland-dependent people have secure access to natural resources and are part of a community-based management regime which improves food security/wellbeing/livelihoods and ecological conditions.	1. Six community associations are active across the entire catchment and are working together to address catchment-scale issues by year 3. 2. By year 3, average community satisfaction and social cohesion perception scores improve by 20% against 2014 baseline (gender and poverty disaggregated data is available, however to give an indication of change, overall scores would move from a current average of 2.16 to 2.60 out of 4). 3. Average duration of the 'lean season' (a widely recognised measure in development work, broadly defined as the difficult period between harvests when resources become scarce and food is more expensive) is reduced by 20% in target villages by year 3 in comparison to identified reference villages for the same period.	1. Nine associations now exist: three VOIs and six Dina Committees (Annex 8 for example of VOI agreement). They are currently working together as a watershed management group call the 'Groupe de Gestion du Lac Sofia' to establish forest management rules for the catchment (Annex 9 for minutes of first Groupe de Gestion du Lac Sofia meeting). 2. Overall community satisfaction and social cohesion perception score increased by 12.5% between 2014 and 2018 (Annex 12). The biggest improvement was seen in general life satisfaction, with the score increasing from 1.80 out of 4 in 2014 to 2.62 out of 4 in 2018, an increase of 31% (Annex 12). 3. Period of lean season was reported to be 54.9 days in control villages and 41.4 days in the target villages (based on a comparison between 28 target village and 33 non-target village households – Annex 12). This reduction of 24.6 %.

	4. Populations of ecological indicator species at Lake Sofia stabilized at current levels and no net loss of wetland habitat or deterioration in condition in year 3 in comparison to year 1.	4. The extent and composition of marsh habitat remained similar between the start and end of project, with 322.1 ha recorded at the start of the project and 319.7 ha recorded at the end (Annex 17). Since the VOI has been established, 6 ha of water lily and 2.7 ha of cyperus marsh have been restored. General condition remains the same (Annex 17). The estimated population size of marsh birds (Madagascar rail, swamp warbler and Madagascar kingfisher) were stable in the southern marsh between 2015 and 2017 and increased by 250%, 180% and 310% respectively in the northern marsh during the same period (Annex 14). Maximum counts of Endangered Meller's Duck were 70 in 2015, but decreased to 29 in 2017. This corresponded with a decrease in maximum benthic invertebrate densities from 378 per m^{-2} to 135 per m^{-2} during the same time period (Annex 14). Densities are now showing an increase, so this result is likely the consequence of the drought in 2016.
	5. Guidance on the sustainable management of wetlands in Madagascar is supported by government and being used at (or agreed plans in place to use at) wetlands across the country.	5. Guidance has been endorsed by the government (with foreword from the Ministry of Environment), published and shared with 17 of the 20 Ramsar site managers during a National Wetland Guidance Conference in Feb 2018 (Annexes 21 and 21). At the conference, 100% of all attendees (including NGOs, VOIs, government and businesses) stated that are 'quite likely' (24%), 'likely' (29%) or 'very likely' (47%) to use the guidance where they work. Implementation of the guidance being directly supported by project partners at three Ramsar sites after the sites featured as case studies; Torotorofotsy, Lac Alaotra, and Lac Kinkony.
Output 1. Fully representative community management structures surrounding Lake Sofia re-established and strengthened, with new community management structures established for the wider catchment of the lake	1. Management transfer agreements in place for the three local associations surrounding Lake Sofia (Sofia Mandroso, Fikambana Fitantanana Matsabory Sofia, and Sandatra Sofia) by November 2015 and for a further three upstream communities (Antilongo, Lohanisofia, and Andranovaky) by 2018.	1. Lake system Gelose management transfer agreements for the three community associations (VOIs) were agreed in 2016. Six further agreements signed for six upstream communities to establish forest management regulatory systems (*Dina*).
	2. Annual workplans and 3-year action plans (covering institutional development activities as well as	2. Workplans for 2018 are in place for the 3 VOIs (Annex 11 for example). Institutional development has been planned in detail, including a follow-on

	conservation and community development work) are in place (agreed by general assembly) and being implemented in 3 communities by 2016 and 6 communities by 2018.	project for financial sustainability. Workplans for the six Community Dina are in development, linked to the reforestation initiative.
	3. The membership of local association management structures (executive committee, advisory board, and general assembly) are fully representative of the local community, including at least 50% women and with representative social stratification, by 2017.	3. Membership of VOIs is 65% female, although membership of management boards is only 40% female. Multidimensional poverty index (MPI) MPI values are similar for community association (VOI) members and non-members (with a median score of 0.33 in both cases – Annex 12) suggesting a representative social stratification.
	4. Watershed management group established and holds inaugural meeting by 2018.	4. The watershed management group held its first meeting in March 2018 (Annex 9).
Activity 1.1 Develop and agree initial 3-year management transfer agreements for Sofia Mandroso, Fikambana Fitantanana Matsabory Sofia, and Sandatra Sofia.		Completed in 2016.
Activity 1.2. Develop agreements to transfer the management of natural resources to local-constituted community associations across the upstream catchment of Lake Sofia.		Committees have been established in each of the six communities (fokontany) who have developed regulatory agreements (dina) for natural resource management of the forest systems in the upstream catchment.
Activity 1.3. Revise and update the management transfer agreements for Sofia Mandroso, Fikambana Fitantanana Matsabory Sofia, and Sandatra Sofia based on information gathered by the project.		As the initial agreements were signed slightly behind schedule, meaning that this activity can only be completed in 2019, once the initial three year trial is completed.
Activity 1.4. Constitute membership of executive committees, advisory boards, and general assemblies of local associations.		Completed in 2016.
Activity 1.5. Hold annual workplan development and review meetings with general assemblies.		The most recent meeting was held in January 2018, and annual work plans were approved for all three VOIs.
Activity 1.6. Hold community fora 3 times per year in each community to ensure wider accountability.		Forums have been held 2 or 3 times per year throughout the project, sometimes in each community and sometimes in Marotolana with representatives of all communities invited. The most recent was March 2018.

Activity 1.7. Produce semi-annual and annual progress reports on each local association.		One VOI has produced a report covering 2017 activities. The other two reports are in progress.
Activity 1.8. Provide technical support to the local community to understand and support delivery of the management transfer agreements.		One full-time member of staff based in Marotolana provides ongoing support to the VOIs, particularly in financial management.
Activity 1.9. Deliver training on laws and rights for members of the local associations.		Training was given in 2017.
Activity 1.10. Establish watershed management group for Lake Sofia Catchment, bringing together local associations across the catchment, local government and other stakeholders.		First Watershed Management Group met in March 2018. This group has evolved from the multi-stakeholder Project Management Group (PMG) established for this Darwin-funded project. The Project Management Group (established at the start of the project) already brought together nearly all the stakeholders required for the watershed management group, and so was expanded to bring in the extra stakeholders required – in particular the committees from the six upstream fokontany.
Activity 1.11. Hold annual watershed management group meeting.		This was held in March 2018.
Activity 1.12. Seek to support/reinforce catchment-level work through national/international site/landscape designation compatible with community management objectives (e.g. Protected Harmonious Landscape, Ramsar Site).		Lake Sofia and its surrounding marsh was declared a Ramsar site in June 2017 (see https://rsis.ramsar.org/ris/2301).
Output 2. Approaches to enhance existing local livelihoods and establish additional livelihood options developed, demonstrated at key sites and being implemented across the wider catchment.	5. 650 farmers around the lake receiving training on good husbandry practices and 25 farmers participating in husbandry demonstration sites. 6. Reporting of disease as a major problem with chickens/ducks/geese, reduced to 50%/30%/30% by 2018 (against 2014 baseline of 90%/55%/55%). 7. At least 90% of fisherfolk are using recommended fishing equipment and respecting local fishing regulations by 2016. 8. 15 farmers (from three	5. Staff from the Ministry of Livestock in Antsohihy carried out husbandry training for 238 community members in December 2016 and a total of 431 livestock owners in 2018. 24 farmers (six from each of the four target villages) trained to deliver husbandry demonstrations for wider community. 6. Disease reporting rates for chickens/ducks/geese in 2018 are 81%/10%/50% (Annex 12). This represents a slight reduction on the 2014 baseline, but not as substantial as we had targeted, partly due to an enforced change of domestic animal health programme after the vaccination scheme was deemed unworkable. 7. 76 fisherfolk have been supplied with nets meeting local regulations – this is 100% of known fisherfolk who use nets. All folk fishing with lines already meet the regulations. 8. 42 farmers had been signed up by 2016.

	communities) signed up to and have started working on the rice farming pilot projects by 2016. 9. Rice yields increased by an average of at least 150% and chemical inputs reduced by 90% on pilot rice fields by 2017 (in comparison with 2015 baseline of pilot sites and control sites). 10. At least 30 additional rice farmers (beyond pilot sites) applying the new techniques to their rice fields by 2017. 11. Lake Sofia wet Arabica coffee and sustainable vanilla production business plans developed by 2016 with local infrastructure (nurseries, storage and collection networks) in place by 2017 and pilot phase production underway in 2018.	9. Farmers engaged in the pilot project produced 4.7 tonnes per/ha in Aug 2017 compared to a baseline of 1.5 per/ha at the start of the project. This reflects an increase of over 300% (Annex 7). As open training was delivered widely throughout the project, less than 1% of households in the catchment would qualify as 'control' sites. Therefore the indicator could only be a temporal comparison. In 2017 chemical inputs declined from a baseline of 83% to 12.5% in pilot sites (Annex 7). 10. By the end of the project, 468 farmers had received intensive support to adopt new rice farming techniques, and 1459 additional farmers had received education on the techniques. Represents approximately 99% of households in the catchment. 11. Feasibility study (see Annex 23) suggested that neither coffee nor vanilla was a suitable crop for the area so project transitioned to support Artemisia and Clove production. A total of 208 farmers cultivated Artemisia, totalling of 9.19 ha in 2017/18 and producing 1.242 tons of dried leaf powder. Clove bushes were distributed to farmers during 2016 but these take 5 years to mature so no production will occur before 2021. No business plan was developed.
Activity 2.1. Vaccinate domestic birds against disease in the villages surrounding Lake Sofia.		Activities 2.1 to 2.3 were stopped in 2016 as inefficient, and the associated indicator changed through an approved Change Request.
Activity 2.2. Train members of local communities in vaccination techniques.		See above.
Activity 2.3. Produce vaccination guidance manual		See above.
Activity 2.4. Deliver animal husbandry practices training to all villages in the Lake Sofia catchment.		Training was delivered in December 2017 to 243 farmers and February 2018 to 188 farmers, a total of 431 farmers representing all nine of the fokontany. 24 farmers have been trained to demonstrate the techniques within their communities.
Activity 2.5. Produce information factsheets on common diseases, focussed on prevention and management techniques.		Not completed, as the farmers trained to disseminate information after it was decided that this was a more effective way of spreading information in the

	area.
Activity 2.6. Construct fishing and fish landing platforms at Lake Sofia to improve lake access and safety, enable easier processing and monitoring of fish catches, and reduce disturbance to marsh habitats.	Fish landing platform constructed in January 2017.
Activity 2.7. Provide replacement fishing equipment in exchange for any fishing gear not permitted for use on Lake Sofia under existing or any revised regulations.	During February 2018, an additional 23 fishermen were provided with legal fishing equipment, making a total of 76 fishermen supplied. This represents all the fishermen using nets on Lake Sofia.
Activity 2.8. Design and implement fisheries/fish catch monitoring programme.	Fish catch monitoring programme has been ongoing since 2015.
Activity 2.9. Identify locations for pilot rice farming projects and sign agreements with participants (through local associations where already in place).	Completed in 2015.
Activity 2.10. Conduct pilot projects in three villages to demonstrate the application of more environmentally sensitive rice cultivation practices.	Completed in the rice growing season of 2015/2016 and subsequently expanded.
Activity 2.11. Develop and implement monitoring programme (focussed on yield, water quality and external inputs) for pilot rice farming projects.	Completed for each of the three rice growing seasons within the duration of this project.
Activity 2.12. Report on findings of pilot projects.	Completed. Report available.
Activity 2.13. Train agricultural extension training team.	Completed. 16 Community Development workers (CDWs) have been trained and have taken over the regular support of farmer groups. These CDWs also promote the practices amongst other farmers in the catchment, and are currently engaged with 138 rice farmers as our work expands beyond the Darwin-funded project.
Activity 2.14. Deliver environmentally sensitive rice cultivation (including soil management techniques) training to all villages in the Lake Sofia catchment.	In addition to 468 farmers who received training and supervision, an additional 1459 farmers have been educated on the subject.
Activity 2.15. Develop and agree a roll-out programme of rice farming work with local association and village leadership.	Nearly all rice farmers within the catchment have been reached by the project during the past 3 years. An extension project is in place to deliver more active support to farmers through the VOIs, including a kiosk system where farmers can buy environmentally friendly inputs.
Activity 2.16. Conduct feasibility study for alternative livelihood options (wet-processed Arabica coffee/sustainable vanilla).	Completed in 2016. The report is available, but suggested that coffee and vanilla were not suitable for the area so attention shifted to artemisia and cloves.
Activity 2.17. Establish local nursery to supply high-quality cuttings to local farmers.	Clove saplings and artemisia seeds supplied directly to farmers.

Activity 2.18. Identify locations for development of pilot value-added coffee and vanilla projects and sign agreements with participants.		As stated in Activity 2.16, emphasis was shifted onto artemisia and clove production. Clove saplings supplied to 68 farmers, but will take 5 years to mature. 208 farmers cropped artemisia on a total of 9.19 ha of land.
Activity 2.19. Provide training and materials on sustainable coffee/vanilla farming practices.		Training given to 150 farmers who already grow vanilla. All farmers who grow artemisia have been given training and supervision as required. Training for cloves will happen when the plants mature.
Activity 2.20. Produce quarterly updates and annual progress report on all activities.		All reports completed and available.
Output 3. Conditions (policy, practice and awareness) in place to reduce key threats to wildlife and the environment of Lake Sofia and its catchment, including burning/clearance of marsh, hunting/trapping of threatened wildlife, and draining of wetlands.	12. 65% of households in the Lake Sofia catchment have an increased understanding of the social, environmental and economic importance of sustainable wetland/watershed management by 2017 in comparison to 2015 baseline.	12. Social surveys indicated that 41% of households have an improved understanding of wetland management and conservation value – based on a sample of 59 randomly selected individuals interviewed in 2015 and again in 2017 (Annex 12). These people are from different locations throughout the catchment. The figures for a nearby control site (Antafiandakana) report a 16% improvement in understanding.
	13. Environmental education programs developed by the project are integrated into the curriculum of at least two primary schools and one secondary school in the catchment by 2016 and being adopted commune-wide by 2018.	13. Environmental education programme has been approved by local education authorities (CISCO and DREN) and is being taught at nine primary schools (Annex 15). These include all public private schools in the project area. The regional education authorities have approved a wider regional roll-out of the project's primary school course to all schools in the catchment. Local authorities suggested that secondary schools shouldn't be targeted at this stage.
	14. At least 1.5ha of marginal/aquatic vegetation restored and 5ha of currently bare headland around Lake Sofia reforested (under cover of saplings of diverse native provenance and demonstrating annual survival rates of at least 70%) by 2018.	14. The project has now completed a total of 6 ha of water lily restoration and 2.7 ha of cyperus restoration. A community monitoring programme is in place to assess the effectiveness of this work. Nurseries constructed and 6.5ha of bare headlands planted with legumes to improve soil condition – a pre-requisite for reforestation due to the degradation of land at the site (Annex 18). Plan to plant saplings in Nov 2018.
	15. Population density of marsh specialist birds showing no decline from 2015 levels.	15. Population density of selected marsh birds (Madagascar rail, swamp warbler and Madagascar kingfisher) were stable in the southern marsh between 2015 and 2017. In the same period, the three species have

	16. Instances of deliberate burning/drainage of marsh, use of illegal fishing gear, illegal hunting by residents of local communities reduced to zero by year 3, and any instances of such activities by outsiders are effectively prosecuted/redressed in accordance with the rules of the local association.	increased by 250%, 180 and 310% in the northern marsh (Annex 14). 16. Some small-scale illegal activities still occur. Although some burning still occurs, it is too small scale to assess on satellite images, suggesting it is a minor problem. Several fishermen have been fined by the VOI for using illegal equipment, so although illegal use still exists, the VOI are monitoring and controlling this. During a survey in Oct 2017, 33 traps for waterbirds were discovered. As most of these traps are set by children, prosecution is not possible. VOIs investigating other methods to address the problem.
Activity 3.1. Develop environmental education programme and supporting materials (lesson plans, ID guides, basic sampling equipment, teaching guides) for use in schools.		Completed in 2017, and approved by regional education authorities.
Activity 3.2. Run initial demonstration sessions in schools.		First teaching started in 2016, in three primary schools.
Activity 3.3. Conduct teacher training events.		Teacher training events were run in 2016 and 2017.
Activity 3.4. Develop magnification/roll-out plan with local and regional education departments.		Regional authorities have agreed plan to expand uptake of the programme to all primary schools within the fokontany.
Activity 3.5. Establish catchment-wide network of community information dissemination points.		Seven information points were installed in 2016.
Activity 3.6. Develop simple ecological monitoring framework, linking improvements in ecological health to human health/wellbeing.		Community monitoring programme developed in 2017.
Activity 3.7. Identify network of local community monitoring focal points and sign agreements with participants.		Focal points identified and monitoring started in 2017.
Activity 3.8. Run training events and provide simple monitoring materials to focal points to enable them to act as local coordinators of monitoring effort.		Materials and training were provided at the first monitoring events.
Activity 3.9. Produce semi-annual community monitoring reports.		First report completed in October 2017.
Activity 3.10. Identify and agree locations and plans for reforestation work on bare headlands surrounding lake with local associations		Completed in 2016.
Activity 3.11. Procure supply of suitable seedlings for reforestation work and establish local holding station/nursery.		Main nursery established in January 2018 to supplement schools nursery started in 2017. Seeds purchased from supplier in Antananarivo and grown

		to seedlings in the nursery.
Activity 3.12. Conduct reforestation events with villages surrounding Lake Sofia.		Legumes were planted in the reforestation sites during January and February 2018 with the aim of improving soil quality. 6.5ha of legumes were planted. Tree planting events planned for later in the year.
Activity 3.13. Assess extent and quality of aquatic/marginal habitat and identify priority locations for restoration work.		Annual mapping of aquatic vegetation throughout project has identified locations (Annex 17 for sample annual report)
Activity 3.14. Undertake restoration of aquatic and marginal vegetation with local community, using cuttings and transplants from healthier areas of the lake/catchment.		Initial planting of papyrus and water-lilies took place in Oct 2017.
Activity 3.15. Undertake habitat extent and condition monitoring using combination of remote sensing and groundtruthing techniques.		Lakeside vegetation has been surveyed annually. Reports available.
Activity 3.16. Produce quarterly updates and annual progress report on habitat restoration work.		Contained within general progress reports.
Output 4. National-level sustainable wetland management guidance (informed by the model developed at Lake Sofia) adopted by the Government of Madagascar and being used at wetlands across the country.	17. National-level working group established in 2015. 18. Draft guidance developed for consultation by 2016. 19. Final guidance (including a case study on Lake Sofia) produced and endorsed by government by the end of 2017. 20. Guidance is being applied to at least 3 additional wetland sites in Madagascar by 2018.	17. Group was established in 2016. 18. Draft guidance completed and consultations with stakeholders completed in March 2017. 19. Final guidance was endorsed by government in January 2018 (Annex 20). 20. Guidance presented to 17 of the 20 Ramsar Site Managers in Madagascar at a National Wetland Conference (Annex 21). Workshop sessions allowed review and Q&A sessions, with commitments at end of workshop to apply guidance. Three partner sites featured as case studies and are now actively applying guidance.
Activity4.1. Constitute national working group to develop the guidance.		Completed in 2016.
Activity4.2. Run study tours to four wetlands (Lake Alaotra, Lake Kinkony, Torotorofotsy and Lake Sofia).		Completed in 2016.

Activity4.3. Hold guidance development workshop.	Completed in 2016.
Activity4.4. Write up Lake Sofia case study.	Three other sites used as case studies, with Lac Sofia used as a case study during the guidance launch event.
Activity4.5. Produce draft guidance and consult with broad range of stakeholders.	Completed in 2017.
Activity4.6. Workshops to finalise guidance, chaired by national CBD and Ramsar focal points.	Completed in 2017.
Activity4.7. Design and publish guidance document in three languages (Malagasy, French and English).	Completed in 2017.
Activity4.8. Organise national conference for wetland managers and policy makers and use as platform to launch guidance.	Held in February 2018.
Activity4.9. Project partners involved in managing wetlands elsewhere in Madagascar (particularly DWCT and Asity) test the guidance against those sites and apply recommendations.	Started in February 2018.
Activity4.10. Promote guidelines at national and international conferences and conventions.	Promoted at national conferences in 2016 and 2018. Plan being developed with Defra and Madagascar Ramsar National Focal Point to present work at a Side-Event for Ramsar CoP in Dubai (Oct 2018).
Activity4.11. Produce quarterly updates and annual progress reports.	Contained within overall progress reports.

Annex 3 Standard Measures

Code	Description	Total	Nationality	Gender	Title or Focus	Language	Comments
Training Measures							
1a	Number of people to submit PhD thesis	0					
1b	Number of PhD qualifications obtained	0					
2	Number of Masters qualifications obtained	0					
3	Number of other qualifications obtained	0					
4a	Number of undergraduate students receiving training	0					
4b	Number of training weeks provided to undergraduate students	0					
4c	Number of postgraduate students receiving training (not 1-3 above)	0					
4d	Number of training weeks for postgraduate students	0					
5	Number of people receiving other forms of long-term (>1yr) training not leading to formal qualification (e.g., not categories 1-4 above)	0					
6a	Number of people receiving other forms of short-term education/training (e.g., not categories 1-5 above)	>1500	Malagasy		Rice farming, animal husbandry, laws for management transfer, etc.	Malagasy	
6b	Number of training weeks not leading to formal qualification	>50					
7	Number of types of training materials produced for use by host country(s) (describe training materials)	1			National Wetland Management	English, French	

					Guidance		

Research Measures		Total	Nationality	Gender	Title	Language	Comments/ Weblink if available
9	Number of species/habitat management plans (or action plans) produced for Governments, public authorities or other implementing agencies in the host country (ies)	3			Management transfer agreements for Lake Sofia community associations	Malagasy	Arrived at through a participatory process.
10	Number of formal documents produced to assist work related to species identification, classification and recording.	0					
11a	Number of papers published or accepted for publication in peer reviewed journals	0					
11b	Number of papers published or accepted for publication elsewhere	0					
12a	Number of computer-based databases established (containing species/generic information) and handed over to host country	0					
12b	Number of computer-based databases enhanced (containing species/genetic information) and handed over to host country	0					
13a	Number of species reference collections established and handed over to host country(s)	0					
13b	Number of species reference collections enhanced and handed over to host country(s)	0					

Dissemination Measures	Total	Nationality	Gender	Theme	Language	Comments

Dissemination Measures		Total	Nationality	Gender	Theme	Language	Comments
14a	Number of conferences/seminars/workshops organised to present/disseminate findings from Darwin project work	1			Wetland management	French, English	World Wetlands Day 2018
14b	Number of conferences/seminars/ workshops attended at which findings from Darwin project work will be presented/ disseminated.	1			Wetland management	French, English	University of Antananarivo, October 2016.

Physical Measures		Total	Comments
20	Estimated value (£s) of physical assets handed over to host country(s)		
21	Number of permanent educational, training, research facilities or organisation established	0	
22	Number of permanent field plots established	0	

Financial Measures		Total	Nationality	Gender	Theme	Language	Comments
23	Value of additional resources raised from other sources (e.g., in addition to Darwin funding) for project work	£					

Annex 4 Aichi Targets

	Aichi Target	Tick if applicable to your project
1	People are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.	✓
2	Biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.	✓
3	Incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio economic conditions.	
4	Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.	
5	The rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.	
6	All fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.	✓
7	Areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.	✓
8	Pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.	✓
9	Invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.	
10	The multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.	
11	At least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.	✓
12	The extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.	
13	The genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.	

14	Ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.	✓
15	Ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.	
16	The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation.	
17	Each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.	✓
18	The traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.	
19	Knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.	
20	The mobilization of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization should increase substantially from the current levels. This target will be subject to changes contingent to resource needs assessments to be developed and reported by Parties.	

Annex 5 Publications

Type * (e.g. journals, manual, CDs)	Detail (title, author, year)	Nationality of lead author	Nationality of institution of lead author	Gender of lead author	Publishers (name, city)	Available from (e.g. web link, contact address etc)
Guide/Manual	Blackham, G.V. & Avent, T. (2018). Guide National pour la Gestion Durable des Zones Humides, Madagascar. Wildfowl & Wetlands Trust*	British	UK	Female	Wildfowl & Wetlands Trust	http://www.wwt.org.uk/uploads/documents/Guide_National_pour_la_Gestion_Durable%20des_Zones_Humides.pdf http://www.ecologie.gov.mg/download/guide-national-pour-la-gestion-durable-des-zones-humides-madagascar/

Annex 6 Darwin Contacts

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