



Darwin Initiative Main Project Annual 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)

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Darwin Project Information

Project reference	3801
Project title	Controlling an invasive aquatic plant for improved biodiversity and livelihoods
Host country/ies	Zambia
Contract holder institution	BirdLife International
Partner institution(s)	BirdWatch Zambia (BWZ); Centre of Agriculture and Bioscience Information (CABI); Zambia Environmental Management Agency (ZEMA)
Darwin grant value	£299,016
Start/end dates of project	1 July 2017 to 31 March 2021
Reporting period (e.g., Apr 2017 – Mar 2018) and number (e.g., Annual Report 1, 2, 3)	July 2017 to March 2018 (Annual Report 1)
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1. Project rationale

The Lukanga Swamp is located approximately 50 km west of the city of Kabwe, in the Central Province of Zambia. It is recognised as an Important Bird and Biodiversity Area (IBA) covering approximately 330,000 hectares and hosting in its small islands and surrounding mainland approximately 25000 fishing community members, as per the 2012 records. The swamp is highly important for the local communities living around the Swamp, as it provides fish for food and trade. It also has an abundance of fauna and flora.

Unfortunately, since 2009 the swamp has been infested by the invasive Kariba weed (*Salvinia molesta*, an invasive weed from south eastern Brazil) which currently covers about 200,000 hectares (>60% surface area) of the swamp. Because this weed forms a thick mat on water, it has led to reduced fish catch as most of the fish have moved further into the swamps, into areas not yet infested by the Kariba weed. This has led local fishermen to use more gear and in some cases, use incorrect fishing gear such as mosquito nets and poisons to catch fish. This weed has also led to a reduction of both sunlight and oxygen which ultimately can lead to the death of fish.

BirdWatch Zambia (BWZ), the official Zambian BirdLife Partner, has actively worked at the Lukanga Swamps IBA for over 10 years, conducting IBA monitoring activities on site, training bird guides, conducting educational talks in schools and villages and providing an entrepreneurship start-up funds for a local community group/Site Support Group (SSG). During the IBA monitoring activities over the last 5 years, proliferation of Kariba weed has been observed and mechanical control of the weed has been attempted but to no avail.

This project seeks to biologically control the Kariba weed (*Salvinia molesta*) by introducing *Cyrtobagous salviniae*, a weevil, thereby improving conditions for waterbirds, other biodiversity and the livelihoods of >2,500 fishermen's households.

This method has been used to control the Kariba weed on Lake Kariba by the Zambia Electricity Supply Corporation (ZESCO), Kafue Fisheries and at a privately-owned lodge in Chilanga – 30km from Lusaka. The privately-owned lodge is one of the few places at which total control has been achieved as neither the weed nor the weevil is now present.

2. Project partnerships

BirdLife International, the lead organisation, is working on this biocontrol project in collaboration with BirdWatch Zambia (BWZ, the BirdLife Partner in Zambia), the Centre for Agriculture and Biosciences International (CABI) through their partnership with the Zambia Agriculture and Research Institute (ZARI), Zambia Environmental Management Agency (ZEMA), and the Ministry of Fisheries and Livestock.

BirdLife International, through its Africa Partnership Secretariat, has been overseeing the overall management of this project, providing technical guidance and monitoring the impacts of project activities from project inception.

BWZ is the implementing organisation whose role is to work closely with the Meembe local Site Support and farmers Group (SSG), CABI, ZEMA, ZARI, BirdLife and other relevant stakeholders on the proposed activities at the site. BWZ is responsible for all planning and implementation activities.

CABI, one of the project partners recently established an office in Zambia. However, prior to the establishment of an office in Zambia, they have been implementing invasive species management strategies in Zambia through ZARI. Although ZARI is not listed as a formal partner, this institution is the local authority providing technical guidance to our project.

It is ZARI that provided *Cyrtobagous Salviniae* import permits as well as the Pest Risk Assessment that were used during negotiations with ZEMA to downscale the full Environmental Impact Assessment (EIA) to an Environmental Project Brief (EPB). Additionally, ZARI has granted official consent to BWZ, permitting one of ZARI's staff experienced with the *Salvinia molesta* biocontrol process to be part of this project. Presently the project has two collaborators (CABI and ZARI) with relevant experience on biocontrol. This collaboration is ensuring that national requirements for biocontrol as set by ZEMA, are met during this preparatory stage of the project.

All of the project partners have been instrumental in providing information for the compilation of Environmental Project Brief (EPB), offering guidance from their experiences with biocontrol processes, project planning and involvement with project activities.

All project partners, except BirdLife represented nationally by BWZ its partner, are based in the host country and this has greatly enhanced inter-organisational relationships and the building of country capacity.

3. Project progress

3.1 Progress in carrying out project Activities

Below is the progress against activities under the respective outputs:

Output 1: Environmental Impact and Risk Assessment guiding mitigation measures for biologically controlling *Salvinia molesta*.

Following consultations with ZEMA, through meetings and writing formal letters, the initially proposed full Environmental Impact Assessment (EIA) was downscaled to a smaller form of an EIA known as an Environmental Project Brief (EPB), which does not involve a public hearing and whose review is at a lower scale. With support from ZARI, the project provided evidence that the biocontrol process had previously been successfully conducted at other sites in Zambia and the weevil was already in Zambia and hence no further importation would be required. Unlike an EPB, conducting a full EIA includes processes such as public hearing which takes longer to review. Downscaling from EIA to EPB has therefore saved the project some time. Approval of the EPB based on the revised EPB is expected by end of April 2018.

A consultant was hired to conduct the EPB which included an assessment of fauna and flora, hydro-geological features, socio-economic aspects as well as cultural/belief analysis of the area. A consolidated report was submitted to ZEMA who provided their feedback. A revised final draft has now been submitted to ZEMA for approval. Once feedback is received from ZEMA, the project team will formally launch the biocontrol activity at the provincial level.

The targeted launch date is 5th June 2018, on World Environment Day. By the launch day, breeding ponds and weevils will be present at one site and invited guests will have an opportunity to make the first release of the biocontrol agent into the Swamp.

Output 2: Fishing community members have increased the capacity and interest to participate in *Salvinia* control.

Awareness talks on site with the Meembe SSG and traditional leaders has been done, though at a small scale. These have only been informative talks taking into account the fact that permission to introduce the weevils into Lukanga swamp has not yet been granted by ZEMA. A total of 6 meetings have been held with 3 communities around the project area; the first was an introductory meeting at which BirdLife Africa Partnership Secretariat staff members were present including the project leader. This was an introductory meeting with Meembe SSG at which 17 members were present (7 male, 10 female) in addition to three fisheries officers from Meembe. An additional three meetings have been held with the SSG at Meembe: pond site selection meeting (5 women and 7 men), introduction of the Ramsar focal point personnel in Zambia (7 women, 8 men and 4 male fisheries officers) and endorsement meeting with 2 traditional leaders (1 male, 1 female) and 3 male SSG executive members.

One meeting was held with 4 traditional leaders and fisheries officer (all male) in Chilwa (another entry point into the Lukanga swamp) and one at Chiyuni (an additional entry point into the Lukanga) with 38 fishermen and their fisheries management committee which will during project be integrated into an SSG taking into account gender balance and youth representation.

Output 3: *Salvinia molesta* control in Lukanga Swamp improves habitat for wetland biodiversity including increased fish stock leading to increased food security for fishing community households.

The biocontrol process has not yet started, as authorisation from the Environment agency is pending; documents have been submitted and are awaiting final clearance. However, preparatory activities have been undertaken, including identification of a source for weevil collection, mapping the extent of coverage of the *Salvinia* weed on the entire swamp by a GIS expert, and identifying the location of weevil breeding ponds on the swamp banks at 4 entry points. Baseline fauna and flora data has been collected including a comparative analysis of biodiversity in infested areas versus uninfested areas. A need was identified for purchasing a weighing balance for the purpose of recording the Catch Per Unit of Effort (CPUE).

The project had planned to use a weighing balance owned by the fisheries department however, it was learnt that this scale is used by the rest of the province, hence the project cannot access it as required, hence the project has purchased its own scale under the M&E budget which will be used to measure and record CPUE before the first weevil introduction is undertaken in June 2018.

Output 4: Project partners maintain and build on the outcome of the project and promote biological control of alien invasive species in areas under aquaculture across Zambia for livelihood improvements and biodiversity conservation.

Getting a support from ZARI has been the highlight of this output to date, as having assured government institute participation with an employee dedicated to the project is a real commitment (rather than having a different person sent to represent ZARI each time). Contact has been made with the National Convention of Biological Diversity (CBD) focal point who has also indicated his intention to dedicate an official from his department to the project; an official letter is yet to be received. The fisheries department has already dedicated an official to the project from the national headquarters and will send official letters to the provincial office once permission from ZEMA is granted. Lastly the national Ramsar focal point has also offered his full support to the project; BWZ senior ecologist and co-leader of the project is now one of Zambia's 3 Ramsar Site Information Sheet updaters. In addition, with recommendations from Ramsar, a member from the project team will be present at the forthcoming Invasive species symposium organised by the Ramsar Convention. This kind of exposure will help with replicability of activities under this project in other Ramsar sites facing similar threats in Zambia.

News articles have been focused on highlighting the problem faced at Lukanga Swamp and its impact on both biodiversity and human wellbeing, e.g.

<https://www.birdlife.org/africa/news/leading-fight-against-invasive-plants-zambia>

The project is waiting for official permission be granted by ZEMA for the actual biocontrol, this is expected by the end of April 2018.

3.2 Progress towards project Outputs

Output 1: Environmental Impact and Risk Assessment guiding mitigation measures for biologically controlling *Salvinia molesta*:

In place of a full Environmental Impact Assessment (EIA), in consultation with and approval of ZEMA, a scaled down form of an EIA, referred to as an Environmental Project Brief (EPB) has been found more appropriate for this project. An EPB is still classified as an EIA since data collection procedure is the same, but is reduced in scale compared to a full EIA, due to lack of the public hearing and the fact that it is reviewed at a much lower rank.

The EPB has successfully been conducted to guide mitigation measures for biologically controlling *Salvinia molesta*. Following a review by ZEMA of the first draft of the EPB report, a revised EPB has been submitted to ZEMA for review and approval is expected by end of April 2018.

Output 2: Fishing community members have increased the capacity and interest to participate in *Salvinia* control.

While still awaiting the official permission from ZEMA to undertake the biocontrol, the first year of the project has been focused on awareness raising as well as seeking community approval and involvement. Training has been done with 6 fisheries officers and 2 community bird guides on bird identification, habitat monitoring as well as the nature of the proposed biocontrol process. In addition to that, awareness has been raised in a total of 72 community members and traditional leaders (50 male and 22 female).

Output 3: *Salvinia molesta* control in Lukanga Swamp improves habitat for wetland biodiversity including increased fish stock leading to increased food security for fishing community households.

Salvinia molesta control has not yet been undertaken as permission is pending. However, the baseline data collection has been done to ascertain the extent of the weed. So far, by just looking at only the 55,000 ha open water section of the swamp (which are used as fishing grounds), satellite map shows that over 30,000 ha of the open water is covered with the weed, implying that the weed is covering about 54.5% of these fishing grounds. The satellite imaging is yet to be delineated further to determine the invasive plants occurring away from the open water. In addition, comparative analysis of species diversity in infested versus uninfested areas showed a low bird species diversity in infested areas.

Output 4: Project partners maintain and build on the outcome of the project and promote biological control of alien invasive species in areas under aquaculture across Zambia for livelihood improvement and biodiversity conservation.

Project partners including CABI, ZARI, fisheries, the CBD and Ramsar national focal points have massively contributed to the progress attained so far by providing data and technical support and backstopping. These partners have been identified as the core members of the project steering committee and are scheduled to have quarterly meetings to ensure effective M&E of the project.

Both financial and technical interim reports have been completed. These have ensured that progress is monitored with reference to the projects logical framework and timelines.

3.3 Progress towards the project Outcome

Outcome: Biological control of *Salvinia molesta* in Lukanga Swamp enhances livelihoods and food security for 2,500 fishing households, and restores 2,000 km² (200,000 ha) of suitable habitat for biodiversity and the provision of ecosystems services

All the indicators proposed to measure the outcome still remain sufficient as they will show the effect of the biocontrol activities on fish Catch Per Unit of Effort, habitat restoration and increase in biodiversity, including the number of the globally threatened Wattled crane (*Bugeranus carunculatus*). Current baseline data recorded only 11 Wattled Cranes in a flooded area with no record of *Salvinia* infestation. Other water birds indicated a low species diversity in *Salvinia* infested areas particularly typical open water species such as ducks and geese. A satellite map is attached in Annex 4.9. Unfortunately, the Zambian National Remote Sensing from whom the satellite imagery was procured have their own system of collecting image data as such the team could not get images for the same month for comparison. One key highlight from the data across varying months is the different densities and locations of large masses of the invasive weed – it appears to be affected by mostly flooding during the rainy season as it floats over greater distances and relocates. This makes our biocontrol approach is the more approach as the biocontrol agents move with the weed.

The capacity of 6 fisheries officers and 2 community bird guides has already been increased through training on bird identification, habitat monitoring and the proposed biocontrol process.

Going forward the plan is to train an additional 50 people as indicated in the original project proposal.

3.4 Monitoring of assumptions

Assumption 1: *Salvinia molesta* control in Lukanga Swamp improves habitat for wetland biodiversity including increased fish stock leading to increased food security for fishing community households

Comments: the *Salvinia* control process has not yet started. However, the proposed method for the biocontrol activities remain as planned. The 72 community members with whom the project has been discussed so far are in full support, as they have tried several control methods, none of which have worked to control the weed. Experts including CABI and ZARI are confident that the proposed biocontrol agent will lead to an improved biodiversity composition of the swamp.

Assumption 2: No major risks that may hinder control programme; ZEMA approves the EIA report in a timely manner.

Comments: Assessments have been done and the report has been submitted. Though the process has taken longer than anticipated, it is expected that ZEMA will approve the biocontrol activities during their board meeting late in April 2018. Although the EPB has not found any potential risk arising from the biocontrol, Zambia has in the past had some bad experiences with biocontrol resulting in an infestation of the shrub *Lantana camara*. Therefore, the EPB outlines what will be done differently to avoid similar problems.

Assumption 3: Traditional leaders give their full support and endorsement of the initiative; Community members appreciate the initiative as a solution.

Comments: Traditional leaders are fully supportive of the project and have written consent letters for the use of their land for pond construction. (Letters in Annex 4). The local SSG is looking forward to the biocontrol activities once ZEMA has provided full permission.

Assumption 4: Successful collection of biocontrol agent from Kafue Fisheries (in Zambia) Project site conditions favourable for biocontrol agent multiplication; Biocontrol agent spreads and mixes well in-situ.

Comments: Conditions have been assessed. However, pond construction will be undertaken as soon as ZEMA has granted permission. This will be followed by the collection and rearing of the biocontrol weevil in the ponds.

Assumption 5: Biocontrol agent spreads and mixes well in-situ

Comments: The agent has not yet been introduced into Lukanga Swamp.

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

The project's main target is habitat restoration and improving the livelihoods of the local community by improving their income, increasing fish stock and creating a habitat that supports biodiversity and ecosystem services.

4. Contribution to the Global Goals for Sustainable Development (SDGs)

The SDGs below have been achieved during the first year of this project with regards to the activities that have taken place. These will continue to be achieved throughout the lifetime of the project.

5-Gender equality- both males and females have been involved with project activities from the start of the project.

17-Partnership for the goals- these have been enhanced through partnerships with project stakeholders during the first year of the project.

The following will be achieved once the bio-control activities are under way and the results will be documented in future reports.

1-No poverty-

2-Zero hunger

3-Good health and wellbeing

15-Life on land

5. Project support to the Conventions, Treaties or Agreements

The project will make a contribution towards the achievement of Zambia's latest National Biodiversity Strategy and Action Plan (NBSAP - 2015) strategic goals B, C and D. Furthermore, the project is contributing to achievement of Aichi Targets 1, 5, 6, 9, 11, 12, 14, 17 and 18 of biodiversity. In addition to that, the project will also contribute to the Ramsar reporting system and to site updates.

6. Project support to poverty alleviation

The main aim of the project is to control *Salvinia molesta* by introducing *Cyrtobagous salviniae*, a weevil, thereby improving conditions for waterbirds, other biodiversity and the livelihoods of >2,500 fishermen households.

The Swamp is important for the fishing local community, and it contributes about 20% to Zambia's fish. It is one of Zambia's major fisheries supplying protein to at least four large cities in the country. Because most of the local fishermen supply fish to traders, fish from Lukanga Swamp provide a valuable income to many communities living beside Lukanga Swamp. Hence, as the *Salvinia molesta* weed is controlled, the expectation is for fish stocks to increase, and poverty levels for those living beside Lukanga Swamp, are expected to decrease.

The expected direct impacts will be an increase in the Catch per unit of Effort, as a result of increased sunlight and oxygen levels for the fish, which are expected as the biocontrol weevil, starts controlling the *Salvinia*, which is currently choking the swamp and impacting fish stocks and community livelihoods.

7. Project support to gender equality issues

The project has been working with both males and females from the local Site Support Group (SSG). Moving forward, the construction of ponds, release of weevils onto ponds, rearing in ponds and introduction of weevils into the swamps will be done by 50% women and 50% men. Additionally, pond management is scheduled to be undertaken by 2 youths; one male, one female. Currently gender representation has been 30% women and 70% men and only 20% of the total are youths. The project will however seek to ensure equal representation in its activities by recruiting additional members from the under-represented categories.

8. Monitoring and evaluation

Biodiversity and Socio-economic baseline studies were conducted by BirdWatch Zambia and the EIA consultant between November and December 2017. In addition, a baseline map indicating coverage of the invasive weed on the swamp was also developed by a GIS consultant engaged by the project. During baseline, water samples were collected and tested in the lab to determine the current amount of Dissolved Oxygen (DO) before the biocontrol activities. Furthermore, a weighing balance has now been procured for measuring the CPUE. CPUE records indicated in the project proposal had been obtained from the Department of Fisheries, but the project team will in partnership with Fisheries officers on site measure and record this indicator prior to weevil introduction to ensure an up to date base line of CPUE to allow the project to monitor the increase in fish stocks at the swamp, post release of the biocontrol agent.

A Project Steering Group has been formed and they will be responsible for facilitating and guiding the effective monitoring and evaluation of the project. This committee will have quarterly meetings to review project progress. The project M&E framework has already been developed and is attached as an annex of this report.

9. Lessons learnt

During the baseline survey, spatial analysis was undertaken using satellite imagery to ascertain the extent of coverage of the Kariba weed (*Salvinia molesta*) on Lukanga swamp. The results stimulated decisions to access the swamp from various entry points as a larger area than anticipated is infested by the weed. Therefore it is recommended that similar projects should always consider satellite imagery during the first 3 months of their project to ensure effective ground-truthing and ensuring that planned activities cover all affected areas.

Through interactions with experts at ZARI, the project team learnt that a pest risk assessment has previously been conducted indicating that *Cyrtobagous salviniae* is the best bio-control agent for *Salvinia molesta* control, and thus for use at Lukanga Swamp. This has highlighted the importance of continuous partner engagement during and beyond the project lifetime. Regarding future plans, the projects will develop a project manual for biocontrol of invasive species in Zambia – this will be done in partnership with ZEMA, the national CBD Focal point within the Ministry of Natural Resources and Environmental Protection as well as the Department of National Parks and Wildlife who have the mandate to manage habitats of wildlife and the environment. Our hope is that this manual will be adopted at a national scale and will become a major tool that guides invasive species management in Zambia. This manual will be used by individuals, institutions or organisations intending to control *Salvinia molesta* and other invasive species, as well as for research purposes.

10. Actions taken in response to previous reviews (if applicable)

The only report that has previously submitted is the first interim half year report. We did not receive any reviews from this report. This is the first annual report from the project, and therefore there has been no previous feedback on any annual report.

11. Other comments on progress not covered elsewhere

Capacity has been built by BWZ staff working with 6 Fisheries officers (belonging to the Department of Fisheries) and 2 community bird guides on bird identification, habitat monitoring as well as the nature of the proposed bio-control process. This was done during the biodiversity assessment for 7 days and an additional 4 days during which the project team visited the swamp using a different entry point. This makes it easier to work with the officers throughout the lifetime of the project and increases participation from local authorities and increases collaborations with other institutions. As the Darwin Initiative funds were received during the second quarter of the project, this meant that some of the activities planned for the first quarter were moved into the second quarter.

12. Sustainability and legacy

The project believes that the proposed exit strategy will be effective, as it leaves capacity with the local community members as well as the fisheries officers. Developing the capacity of fisheries officers who are stationed at the project site and are frequently monitoring and patrolling the project area will ensure sustained monitoring of *Salvinia molesta* once the project finishes. Furthermore, further training and participation during the weevil introduction will enable fisheries officers to continue such activities in newly infested area discovered during their routine patrols. Local community, especially Site Support Group (SSG) members will also join in in the training. Fisheries officers will only be lost if the government transfers them to a different fisheries but they always get replaced and the project will simply train and incorporate the new officers onto the project/initiative.

Before we can train the SSG we would like to engage some young people – currently it will be double work for us because most of them can't speak English so monitoring training and reporting will be in the local language but we also plan to have some school leavers join us and these will all be trained.

13. Darwin identity

The Darwin Initiative logo was used on the reports developed from the baseline survey. The Darwin Initiative has very well been recognised as a distinct project donor with a clear identity.

BWZ has also started populating information on the project into a webpage that reports/publicizes activities resulting from the Darwin funding. This page is contained within the current BWZ organisational website. The intention is to show progress on the work and disseminate information on the bio-control of *Salvinia molesta*.

14. Project expenditure

Table 1: Project expenditure during the reporting period (1 July 2017 – 31 March 2018)

Project spend (indicative) since last annual report	2017/2018 Grant (£)	2017/2018 Total Darwin Costs (£)	Variance (£)	Variance %	Comments (please explain significant variances)
Staff costs					
Consultancy costs					
Overhead Costs					
Travel and subsistence					
Operating Costs					
Capital items (see below)					
Others (see below)					
TOTAL					

To date, no changes to the overall budget have been required. However, there has been some variation in expenditure for some of the budget lines during the first year of the project. These have mainly been as a result of the delay in approval of the biocontrol activities by the national agency. Delayed approval has meant that these activities will now start in the next reporting period. We would like to discuss these variations with the Darwin Initiative and would like to kindly request unspent budget to be carried forward to the next period in order to ensure efficient delivery of biocontrol activities.

Annex 1: Report of progress and achievements against Logical Framework for Financial Year 2017-2018

Project summary	Measurable Indicators	Progress and Achievements April 2017- March 2018	Actions required/planned for next period
<p>Outcome</p> <p>Biological control of <i>Salvinia molesta</i> in Lukanga Swamp enhances livelihoods and food security for 2500 fishing households, and restores 2000km² of suitable habitat for biodiversity and provision of ecosystems services</p>	<p>0.1 From a baseline of >20kg/hr at the start of the project, fish catch effort increased to >30kg/hr</p> <p>0.2 By the end of project <i>Salvinia molesta</i> cover reduced by 200,000 ha with increased (from baseline) numbers of Wattled Crane and other water birds</p> <p>0.3 Capacity building in project management for the Site Support Group-SSG (a farmer's group with whom BWZ has worked doing IBA monitoring for 8 years)</p>	<p>Modalities for measuring fish catch per unit effort (CPUE) baselines have been set, including procuring a weighing balance.</p> <p>Baseline data for coverage of weed and numbers of Wattled Cranes and other waterbirds, have been collected; 54% of the swamp found to be infested by the weed based on satellite imagery and mapping</p> <p>Awareness meetings with SSG members, fisheries officers and traditional leaders held. Areas for more capacity development identified, which. Includes livelihood programmes that will reduce pressure on fishing which is the main source of income.</p> <p>Consent letters obtained from traditional leaders.</p>	<p>Measure CPUE baselines before start of biocontrol on site.</p> <p>Once ZEMA has approved the biocontrol process, then pond construction activities will begin and rearing of the <i>Cyrtobagous salviniae</i> will be done prior to its introduction into the Lukanga swamp.</p> <p>Training sessions for the local community in biocontrol as well as habitat and species monitoring activities.</p>
<p>Output 1.</p> <p>Environmental Impact and Risk Assessment guiding mitigation measures for biologically controlling <i>Salvinia molesta</i>.</p>	<p>Approval by Zambia Environment Management Authority (ZEMA) for <i>Salvinia</i> control work to start by mid of year 1</p>	<p>An Environmental Project Brief (EPB) was undertaken in place of an EIA and the first draft of the EPB report was submitted to ZEMA mid-January 2018. Comments were received in mid-February demanding a second draft which has since been submitted to ZEMA. In this regard, we await their response/approval before moving on with activities related to the introduction of the <i>Cyrtobagous salviniae</i>.</p> <p>Evidence provided (submission letter stamped to show receipt by ZEMA) in Annex 4</p>	
<p>Activity 1.1</p> <p>Hire a consult to conduct EIA</p>		<p>A consultant was hired (Masterteck Enterprises) who undertook assessments leading the EPB. This activity is completed and there will be no other consultant activities once ZEMA has approved the EPB.</p>	
<p>Activity 1.2,</p> <p>Conduct EIA</p>		<p>The EIA was downscaled to an EPB and this has since been completed.</p>	

<p>Activity 1.3, Consultant submits draft EIA report to BWZ for review</p>	<p>At completion of EPB activities, the consultant submitted the first draft report for review to BWZ for review before it was submitted to ZEMA. Currently the second draft has been submitted to ZEMA after a review by BWZ.</p> <p>We await for the ZEMA comments before the start of any biocontrol activities.</p>
<p>Activity 1.4, Final revised EIA report submitted to ZEMA</p>	<p>This is anticipated to be done once second draft review comments are received from ZEMA. We are expecting a formal decision from ZEMA by the end of April 2018.</p>
<p>Output 2. Fishing community members have increased the capacity and interest to participate in <i>Salvinia</i> control.</p>	<p>2.1 By end of Year 1 >100 community members sensitised and trained in the biocontrol process.</p> <p>2.2 By end of Year 3 at least 50% of sensitized fishing community members voluntarily participating in monitoring of <i>Salvinia molesta</i>, fish stocks and birds.</p> <p>72 (22 female, 50 male) local Site Support group and traditional leaders have been spoken to and they appreciate the initiative and they have shown interest and willingness to participate in the <i>Salvinia</i> control. More sensitisation and training sessions will begin soon after ZEMA response is received.</p> <p>Community involvement is always key as it increases capacity and ensures sustainability of the water systems even after the life of the project. This also creates a good exit strategy for the project.</p>
<p>Activity 2.1. Conduct awareness talks on site, discussing the control program and methods</p>	<p>5 talks have been undertaken on a small scale by BWZ staff. These have involved community members, traditional leaders, bird guides, fishery officers as well as the SSG – a total of 72 (22 female and 50 male).</p> <p>This indicator is important because it keeps the community aware and involved with activities conducted on their daily use and valuable swamp.</p>
<p>Activity 2.2. Community mobilisation of participants, time table development, etc</p>	<p>This has not been done as yet, as community activities have not started because ZEMA permission is pending. However, once permission is granted this will be discussed with all involved parties to discuss and agree responsibilities of each party, a timeline and targets are set, and monitoring programme agreed and established.</p>
<p>Output 3. <i>Salvinia molesta</i> control in Lukanga Swamp improves habitat for wetland biodiversity including increased fish stock leading to increased food security for fishing community households.</p>	<p>3.1 From a baseline of >20kg/hr at the start of the project, fish catch effort increased to <25kg/hr and <30kg/hr by project mid-term and project end respectively thereby benefiting 2500 fishing households.</p> <p>3.2 By the end of project 200, 000 ha of currently invaded area under biological control of <i>Salvinia molesta</i> and with increased species richness of waterbirds</p> <p>A Scale has been procured for measuring the Catch per Unit of Effort (CPUE) before the start of biocontrol activities, at mid-term and end of project. This decision was made after having a meeting with the fisheries officers regards biodiversity baselines. This scale will be stationed at Waya fisheries office because it is the biggest as well as the busiest harbour. It will however be moved around all the entry points at different periods during the project so as to obtain a CPUE that is well representative of the whole swamp.</p> <p>Following a satellite data survey it has been found that 54% of the swamp's open water has been found to be infested by the Kariba weed, which is higher than expected.</p> <p>Despite 3-month delay in approval of biocontrol activities, it is expected that projected biocontrol will be realistic, and based on preliminary surveys and</p>

		consultations BWZ has modified biocontrol plans to use at least 3 points/locations of beetle introductions instead of one, to improve the rate of spread.
Activity 3.2 Establishment of on-site weevil breeding ponds		<p>The materials for constructing of the ponds have been procured.</p> <p>Written consent letters for pond construction have successfully been obtained from the local traditional leaders. (evidence in Annex 4)</p> <p>The actual establishment of the ponds will begin once ZEMA has approved the biocontrol process.</p>
Activity 3.9 Documentation, including video footage of weevil and no weevil released sites		<p>A baseline survey was undertaken by BirdWatch Zambia in November 2018; and a flora and fauna report and a comparative analysis report (bird diversity in <i>Salvinia</i> areas versus non-<i>Salvinia</i> areas) were made.</p> <p>The fauna and flora report provides an overall status of the biodiversity of the swamp with regards vegetation, large mammals and birds. All these are recorded to show number of species present/ observed at baseline and it provides further details of the number of birds per species. This report indicates the presence of 10 plant species, 95 bird species with an estimated 17,555 birds counted and 6 species of other large mammals.</p> <p>The comparative report compares biodiversity in infested and non-<i>Salvinia</i> infested area. <i>Salvinia</i> infested areas/transects indicate a low count of birds compared to those non-<i>Salvinia</i> infested areas.</p> <p>Both reports set a baseline that can be used to compare against throughout the project. However, previously un-accessed areas that have been newly discovered to have <i>Salvinia</i> due to the mapping surveys will now be undertaken, and further community information will be assessed, surveyed and analysed.</p>
Output 4 Project partners maintain and build on the outcome of the project and promote biological control of alien invasive species in areas under aquaculture across Zambia for livelihood improvement and biodiversity conservation.	4.1 Experience on biocontrol of invasive weed shared with at least 2 national institutions in 2 sites where it is a threat to biodiversity and fishing at project mid-term and project end	<p>A series of meetings have been held with ZARI and CABI for the purpose of providing additional guidance regarding approaches to biocontrol of Kariba weed.</p> <p>To date, BWZ has not visited any national institutions because it has not yet undertaken the biocontrol process.</p>
Activity 4.1 Meeting with key stakeholders to share progress, successes, failures and lessons		The first meeting with partners was the project inception meeting that involved all project partners. This meeting was in the first week of October 2017 and was attended by the project leader and finance coordinator from BirdLife, BWZ staff listed on the Darwin project, representatives from the Fisheries Department, CABI,

		ZARI, World Wide Fund (WWF) After which 2 other meetings were done with the fisheries management of Lukanga, ZARI and another with CABI to provide
<p>Output 5. Project management, impact monitoring and evaluation structures and processes ensure that the project objectives are achieved on schedule and within budget</p>	<p>5.1 Partners and staff with project contractual agreements and full understanding of project requirements, including reporting</p> <p>5.2 Biodiversity and socio-economic baselines, with follow-up monitoring & evaluation system in place</p> <p>5.3 Documentation of biocontrol agent activity and progress published annually in the State of the Wetlands annual report as well as IBA status and trends reports which are all publicly shared documents</p>	<p>BirdLife International sub-contracted BirdWatch Zambia for project implementation. BirdLife staff (Project Leader and Finance Coordinator) visited BirdWatch Zambia to undertake full project induction, including training on technical and financial reporting (including going through reporting templates and timelines), financial management, and M&E. Other project partners (ZARI, ZEMA) and other stakeholders were also met during a project inception meeting, and a site visit to Lukanga Swamp to meet local stakeholders was undertaken.</p> <p>A baseline survey has already been conducted and has resulted into two documents; a flora and fauna report as well as a comparative report. A Socio-economic baselines has also been established.</p>
<p>Activity 5.1 Contract project partners and staff</p>		<p>BirdLife International sub-contracted BirdWatch Zambia for project implementation. This was done before project inception meeting and all the project staff fully understand the project and its activities.</p>
<p>Activity 5.2 Undertake project induction/inception and quarterly meetings</p>		<p>Project inception/induction has been completed. A meeting was held with partners at the end of March 2018. This meeting lead to the development of a project steering committee which will meet quarterly to monitor the technical progress on the project.</p> <p>Quarterly meeting have been planned once ZEMA permission is given. However, all partners are updated with the current status of the project.</p>
<p>Activity 5.3 Set/confirm biodiversity and socio-economic baselines</p>		<p>These baselines were set and have been done.</p>
<p>Activity 5.4 Undertake project monitoring and reporting involving partners</p>		<p>A monitoring and evaluation steering committee has been formed and Terms of Reference were distributed to all members. Meetings have been scheduled to take place every quarter.</p>

Annex 2: Project's full current logframe as presented in the application form (unless changes have been agreed)

Project summary	Measurable Indicators	Means of verification	Important Assumptions
Impact: Control of invasive alien species from areas under aquaculture in Zambia increases the resilience of 2500 fishing households and conserve wetland biodiversity.			
<p>Outcome:</p> <p>Biological control of <i>Salvinia molesta</i> in Lukanga Swamp enhances livelihoods and food security for 2500 fishing households, and restores 200,000 ha of suitable habitat for biodiversity and provision of ecosystems services</p>	<p>0.1 From a baseline of >20kg/hr at the start of the project, fish catch effort increased to <30kg/hr by the end of the project, benefiting 2,500 fishing households (consisting of 21,000 people in total)</p> <p>0.2 By the end of project <i>Salvinia molesta</i> cover reduced by 200,000ha with increased (from baseline) numbers of <i>Wattled Crane</i> and other water birds</p> <p>0.3 Capacity building in project management for the Site Support Group-SSG (a farmer's group with whom BWZ has worked doing IBA monitoring for 8 years)</p>	<p>0.1 Reports from baseline and end of project participatory fishing community assessment surveys</p> <p>0.2 Reports based on baseline and end of project mapping and biological surveys</p> <p>0.3 Capacity surveys of CBO/SS</p>	<p>0.1 Successful introduction and activity progress of the biocontrol agent once present on site.</p>
<p>Output 1</p> <p>1. Environmental Impact and Risk Assessment guiding mitigation measures for biologically controlling <i>Salvinia molesta</i>.</p>	<p>1.1 Approval by Zambia Environment Management Authority (ZEMA) for <i>Salvinia</i> control work to start by mid of year 1</p>	<p>1.1 EIA report</p> <p>1.2 Approval letter from ZEMA.</p>	<p>1.1 No major risks observed that may hinder control program</p> <p>1.2 ZEMA approves the EIA report in a timely manner.</p>
<p>Output 2</p> <p>2. Fishing community members have increased the capacity and interest to participate in <i>Salvinia</i> control.</p>	<p>2.1 By end of Year 1 >100 community members sensitised and trained in the biocontrol process.</p> <p>2.2 By end of Year 3 at least 50% of sensitized fishing community members voluntarily participating in monitoring of <i>Salvinia molesta</i>, fish stocks and bird</p>	<p>2.1 Capacity assessment reports</p> <p>2.2 Monitoring datasheets and reports</p>	<p>2.1 Traditional leaders give their full support and endorsement of the initiative</p> <p>2.2 Community members appreciate the initiative as a solution</p>
<p>Output 3</p> <p><i>Salvinia molesta</i> control in Lukanga Swamp improves habitat for wetland</p>	<p>3.1 From a baseline of >20kg/hr at the start of the project, fish catch effort increased to <25kg/hr and <30kg/hr by project mid-term and project end</p>	<p>3.1 Reports from baseline and end of project participatory fishing community assessment surveys</p>	<p>3.1 Successful collection of biocontrol agent from Kafue Fisheries (here in Zambia) Project site conditions</p>

<p>biodiversity including increased fish stock leading to increased food security for fishing community households.</p>	<p>respectively thereby benefiting 2500 fishing households</p> <p>3.2 By the end of project 200,000 ha of currently invaded area under biological control of <i>Salvinia molesta</i> and with increased species richness of waterbirds</p>	<p>3.2 Reports based on baseline, midterm and end of project mapping and biological survey</p>	<p>favourable for biocontrol agent multiplication</p> <p>3.2 Biocontrol agent spreads and mixes well in-situ</p>
<p>Output 4</p> <p>Project partners maintain and build on the outcome of the project and promote biological control of alien invasive species in areas under aquaculture across Zambia for livelihood improvement and biodiversity conservation.</p>	<p>4.1 Experience on biocontrol of invasive weed shared with at least 2 national institutions in 2 sites where it is a threat to biodiversity and fishing at project mid-term and project end</p>	<p>4.1 Lesson-sharing workshop reports</p> <p>4.2 Media report</p>	
<p>Output 5.</p> <p>Project management, impact monitoring and evaluation structures and processes ensure that the project objectives are achieved on schedule and within budget</p>	<p>5.1 Partners and staff with project contractual agreements and full understanding of project requirements, including reporting</p> <p>5.2 Biodiversity and socio-economic baselines, with follow-up monitoring & evaluation system in place</p> <p>5.3 Documentation of biocontrol agent activity and progress published annually in the State of the Wetlands annual report as well as IBA status and trends reports which are all publically shared documents</p>	<p>5.1 Site visits</p> <p>5.2 Reports and on site footage</p>	<p>5.1 Biocontrol agent spreads and mixes well in-situ</p>
<p>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)</p> <p>1.1 Hire a consult to conduct EIA</p> <p>1.2 Conduct EIA</p> <p>1.3 Consult submits draft EIA report to BWZ for review</p> <p>1.4 Final revised EIA report submitted to ZEMA</p> <p>2.2 Conduct awareness talks no site, discussing the control program and methods</p> <p>2.3 Community mobilisation of participants, time table development, etc</p> <p>3.1 Training of participants; first institutional partners then community members</p> <p>3.2 Establishment of on-site weevil breeding ponds</p>			

- 3.3 Weevil collection and release into on-site ponds
- 3.4 Rearing of weevils by community members supervised by BWZ staff
- 3.5 Releasing the weevil into trial sites within the swamps
- 3.6 Monitoring of released weevil
- 3.7 Release weevil into additional sites
- 3.8 Maintain on-site breeding ponds
- 3.9 Documentation, including video footage of weevil and no weevil released sites
- 4.1 Meeting with key stakeholders to share progress, successes, failures and lessons
- 4.2 Newspaper article on overall project activity
- 4.3 TV interview sharing on-site video footage
- 5.1 Contract project partners and staff
- 5.2 Undertake project induction/inception and quarterly meetings
- 5.3 Set/confirm biodiversity and socio-economic baselines
- 5.4 Undertake project monitoring and reporting involving partners

Annex 3: Standard Measures

Table 1 Project Standard Output Measures

Code No.	Description	Gender of people (if relevant)	Nationality of people (if relevant)	Year 1 Total	Year 2 Total	Year 3 Total	Total to date	Total planned during the project
12	GIS software installed on BWZ office computer.							
6A	Education and training on <i>Cyrtobagous salviniae</i> .	Male	Zambian					
20	Procured materials including computers and computer hardware							
23	1 Accounts officer and 1 Education officers staff time.	Both male	Zambians	2				

In Table 2, provide full details of all publications and material produced over the last year that can be publicly accessed, e.g. title, name of publisher, contact details, cost. Mark (*) all publications and other material that you have included with this report.

Table 2 Publications

Title	Type (e.g. journals, manual, CDs)	Detail (authors, year)	Gender of Lead Author	Nationality of Lead Author	Publishers (name, city)	Available from (e.g. weblink or publisher if not available online)
Leading the fight against invasive plants in Zambia	Newsletter article	Nick Langley and Chaona Phiri, 2017				https://www.birdlife.org/africa/news/leading-fight-against-invasive-plants-zambia
Lukanga swamps IBA biocontrol-Baseline survey	Newsletter article	Clara Nanja and Chaona Phiri	Female	Zambian	BirdWatch	
Assessing the abundance of Flora and Fauna in and around the Lukanga Swamps	Baseline report	Clara Nanja and Annie Musama	Female	Zambian		
Comparative analysis of biodiversity around the Lukanga swamps	Baseline report	Omali Phiri and Tina Chishiba	Male	Zambian		

Checklist for submission

	Check
Is the report less than 10MB? If so, please email to Darwin-Projects@ltsi.co.uk putting the project number in the Subject line.	Yes
Is your report more than 10MB? If so, please discuss with Darwin-Projects@ltsi.co.uk about the best way to deliver the report, putting the project number in the Subject line.	n.a.
Have you included means of verification? You need not submit every project document, but the main outputs and a selection of the others would strengthen the report.	Yes
Do you have hard copies of material you want to submit with the report? If so, please make this clear in the covering email and ensure all material is marked with the project number.	No
Have you involved your partners in preparation of the report and named the main contributors	Yes
Have you completed the Project Expenditure table fully?	Yes
Do not include claim forms or other communications with this report.	