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Innovation of Bait Fisheries for Live-bait Conservation

Pole-and-line fishers are highly dependent on live-bait to attract schools of tuna. Livebait resources are becoming increasingly scarce from over- exploitation, climate change, and other anthropogenic impacts to coral reefs, which can lead to the collapse of the tuna fishery. We will experiment with alternative stimuli to livebait (e.g. programmable LED lights, bait pods and lures) to induce skipjack into a feeding frenzy. If successful, those techniques can be applied in low-income countries to reduce dependency on livebait .

Section 1 - Contact Details

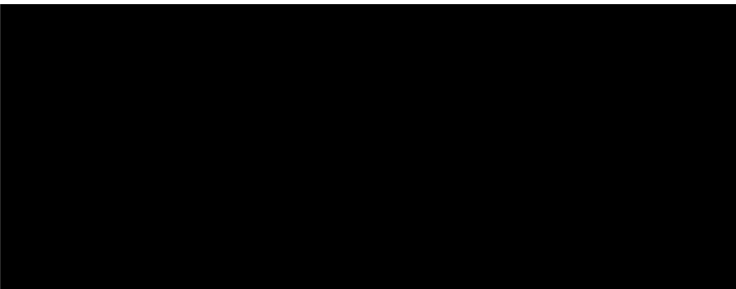
PRIMARY APPLICANT DETAILS

Title Mr
Name Craig
Surname Turley



GMS ORGANISATION

Type	Charity/ trusts
Name	The International Pole & Line Foundation (IPNLF)



Section 2 - Project Summary, Ecosystems, Approaches and Threats

Q3. Project Title

Innovation of Bait Fisheries for Live-bait Conservation

Q4. Key Ecosystems, Approaches and Threats

Please select up to 3 biomes that are of focus, up to 3 conservation actions that characterise your approach, and up to 3 threats to biodiversity you intend to address, from dropdown lists.

Biome 1

Marine shelves (seagrass, reefs, subtidal)

Biome 2

Marine - Pelagic ocean waters, deep sea floors

Biome 3

Shoreline or Supralittoral coastal systems

Conservation Action 1

Species management (harvest, recovery, re-introduction, ex-situ)

Conservation Action 2

Livelihood, economic & other incentives (incl. conservation payments)

Conservation Action 3

No Response

Threat 1

Biological resource use (hunting, gathering, logging, fishing)

Threat 2

Climate change & severe weather

Threat 3

No Response

Q5. Summary of project

Please provide a brief summary of your project, its aims, and the key activities you plan to undertake. Please note that if you are successful, this wording may be used by Defra in communications e.g. as a short description of the project on the website.

Please write this summary for a non-technical audience.

Pole-and-line fishers are highly dependent on live-bait to attract schools of tuna. Livebait resources are becoming increasingly scarce from over- exploitation, climate change, and other anthropogenic impacts to coral reefs, which can lead to the collapse of the tuna fishery. We will experiment with alternative stimuli to livebait (e.g. programmable LED lights, bait pods and lures) to induce skipjack into a feeding frenzy. If successful, those techniques can be applied in low-income countries to reduce dependency on livebait .

Section 3 - Dates & Budget Summary

Q6. Project Country(ies)

Which eligible host country(ies) will your project be working in?

Country 1 Maldives

Country 2 *No Response*

Country 3 *No Response*

Country 4 *No Response*

Do you require more fields?

No

Q7. Project dates

Start date:
01 April 2022

End date:
31 March 2024

Duration (e.g. 1 year, 8 months):
2 Years

Q8. Budget Summary

Darwin Funding Request	2022/23	2023/24	Total request
(Apr - Mar) £	£98,757.00	£79,035.00	177,792.00

Q9. Proportion of Darwin Initiative budget expected to be expended in eligible countries: % [REDACTED]

Q10a. Do you have proposed matched funding arrangements?

Yes

What matched funding arrangements are proposed?

The Following matched funding arrangements are proposed

Confirmed:

IPNLF Member contributions: [REDACTED]

Maldives National University Research Grant: [REDACTED] - Study on Livebait Fisheries in the Maldives

In-kind support for IPNLF Maldives and Science Director [REDACTED]

In-kind support of IPNLF's Managing Director [REDACTED]

Unconfirmed:

IPNLF member contributions unconfirmed: [REDACTED]

In-kind support from IPNLF will be in the form of senior staff oversight, financial management, logistical planning, technical expertise & consultancy, communication outputs and the development of marketing materials.

IPNLF will also continue to provide technical support Maldives delegations so they can protect the rights and needs of small-scale one-by-one tuna fisheries through the Indian Ocean Tuna Commission (IOTC) and G16 group of Indian Ocean coastal states.

Q10b. Total confirmed & unconfirmed matched funding (£) [REDACTED]

Q10c. If you have a significant amount of unconfirmed matched funding, please clarify how you fund the project if you don't manage to secure this?

All project activities proposed will be completed within Darwin Initiative grant funds and supported by the confirmed matched funding.

If unconfirmed matched funding is awarded, this will allow for extension of the proposed activities to support the project outcomes.

Section 4 - Darwin Objectives and Conventions

Q11. Problem the project is trying to address

Please describe the evidence of the problem your project is trying to address in terms of biodiversity and its relationship with poverty. What is the need, challenge or opportunity? For example, what are the drivers of loss of biodiversity that the project will attempt to address? Why are they relevant, for whom? How did you identify these problems?

Please cite the evidence you are using to support your assessment of the problem (references can be listed in a separate attached PDF document).

Low impact pole and line fishing techniques, which use one hook and one line to catch one fish at a time are widely accepted as one of the most sustainable commercial fishing techniques (1). This is because pole and line fishing is highly selective, and targets fish in less-sensitive pelagic waters whilst having minimal bycatch or interaction with sensitive marine habitats when compared to any other commercial tuna fishing technique(2). However, the Achilles heel of this sustainable fishing technique is its reliance on small pelagic or demersal fish species as a source of live-baitfish (3). These forage fish species, referred to as baitfish, are a critical component of the marine food webs(4). Globally, they are currently targeted in huge quantities by several different fisheries, including for human consumption, as well as for fish meal and fish oil processing. This has meant that baitfish stocks in many geographies are subject to overfishing and have become depleted. In the short term this has the potential to undermine the livelihoods of one-by-one fishing communities who are reliant on baitfish, whilst continued harvesting despite being overfished has the potential to undermine the sustainability credentials of one-by-one fisheries. In the longer term, unchecked overharvesting of baitfish could result in a trophic cascade leading to ecosystem collapse. In many places these issues have already materialised, resulting in dangerous and ever riskier bait-fishing practices with diminishing returns; or even closure of once thriving pole and line fisheries such as in Cabo Verde or Senegal. In other geographies issues regarding baitfish are foreseeable in the future where the effects of climate change and species range shifts are likely to impact the sensitive baitfish species.

Unfortunately, the livebait issue in the Maldives is complicated and multifaceted. Livebait resources inhabit coral reefs and associated environments which are becoming increasingly impacted by climate change (e.g. periodic episodes of coral bleaching, resource depletion, anthropogenic activities and competing human factors on resource allocation (between tourism and fisheries) (5). Fishermen are having to spend more time and use more fuel in search of live-bait, increasing their overheads and carbon footprint (IPNLF, unpublished data). Due to depleting resources of live-bait, fishers are increasingly resorting to using unconventional, and often disruptive methods of harvest such as SCUBA diving. A lack of adequate SCUBA training and poor maintenance of diving equipment can also become a health and safety concern on particular vessels if left unmanaged.

The international Pole and Line Foundation and IPNLF Maldives seeks to proactively address these issues with the ultimate intention to reduce pole and line fisheries' reliance on live-baitfish. This would mean that pole and line fishing operations would become more sustainable, profitable and safer, whilst more baitfish species are left in the ocean to recover stocks and support a healthier and more resilient marine food web.

Q12. Biodiversity Conventions, Treaties and Agreements

Q12a. Your project must support the commitments of one or more of the agreements listed below.

Please indicate which agreement(s) will be supported.

- Convention on Biological Diversity (CBD)
- Convention on International Trade in Endangered Species (CITES)
- Convention on the Conservation of Migratory Species of Wild Animals (CMS)
- United Nations Framework Convention on Climate Change (UNFCCC)
- Global Goals for Sustainable Development (SDGs)

Q12b. National and International Policy Alignment

Please detail how your project will contribute to national policy (including NBSAPs, NDCs, NAP etc.) and in turn international biodiversity and development conventions, treaties and agreements that the country is a signatory of.

This project is aligned with Strategy 4 and 5 of the National Biodiversity Strategy and Action Plan (NBSAP).

Strategy 4 "Ensure sustainable use of biological resources" clearly states that threats to biodiversity such as overexploitation, habitat loss and unsustainable use of resources, must be addressed, whereby in Target 1 of this Strategy, all major fisheries must be managed and harvested sustainably by 2020.

Strategy 5 addresses threats to biodiversity calls for minimizing pressure on coral reefs and other vulnerable ecosystems due to anthropogenic activities and climate change by 2025.

Target 3 under this strategy states that by 2025, impacted ecosystems that provide essential services related to water, human health, wellbeing and livelihoods will be restored significantly.

This project is also aligned with two major themes of the Nationally Determined Contribution (NDC) of Maldives: safeguarding coral reefs and its biodiversity, as well as Fisheries, where it specifically states the need for research development initiatives that will build resilience of the fisheries sector, and will contribute towards the management of fish stocks, by adapting to efficient technologies, and investing on national capacity needs. In addition, the National Adaptation Programme of Action states in 6.14, the need to experiment new and alternative species and breeding methods for live-bait

The Maldives is behind in fulfilling the calls for action in the NBSAP, NDC and NAPA, to sustainably manage and harvest all major fisheries by 2020, and experiment with alternatives to live-bait. Therefore, this project is justified on the grounds that an urgent intervention is required to minimize the exploitation of live-bait in the tuna fishery. LED lights, artificial lures and 'bait pods' have potential to be upscaled as alternatives to live-bait, and testing their effectiveness through this project may determine the future of the live-bait stocks in the wild.

Section 5 - Method, Innovation, Capability & Capacity

Q13. Methodology

Describe the methods and approach you will use to achieve your intended Outcome and contribute towards your Impact. Provide information on:

- How have you reflected on and incorporated evidence and lessons learnt from past and present similar activities and projects in the design of this project?
- The need for this work and a justification of your proposed approach.
- How you will undertake the work (materials and methods).
- What will be the main activities and where will these take place?
- How you will manage the work (roles and responsibilities, project management tools, risks etc.).

Please make sure you read the guidance documents, before answering this question.

The project will take place in the Maldives where access to the existing pole and line fishery will provide the most cost-effective way to test the proposed innovations in a real-world fisheries setting.

We propose to investigate the efficacy of a series of experimental alternatives to baitfish to elicit a feeding response in schools of skipjack tuna, comparable to that of livebait, with the aim to reduce or eliminate the use of live-bait in pole and line fishing operations.

The project will have the following outputs:

Output 1: Observe and document the existing tuna feeding response to live-bait as a control treatment to advance scientific knowledge.

Tuna feeding response will be measured using innovative Artificial Intelligence (AI) integrated underwater cameras (Helios) produced by project partner, SNTech and deployed from a Maldivian pole and line fishing vessel. We will attempt to isolate skipjack feeding response by testing against a range of confounding variables (e.g., time of the day, geographic locality, weather condition, school size, and stomach fullness).

Output 2: Develop experimental treatments to test as an alternative to live-bait including innovative use of alternative technologies.

These proposed treatments include combinations of:

- 1) Programmable LED lights (Pisces) produced by SNTech to test different wavelengths and frequencies of light in order to elicit a response in skipjack tuna.
- 2) Circular economy use of byproducts from fish processors (fish skin, scales or blood) to create chum or bait pods that release upon contact with water
- 3) Artificial lures

Output 3: Establish standard protocols for testing feeding response in tuna to a range of alternative stimuli that is replicable in commercial tuna fisheries to contribute to scientific methodology.

Finally, we will test the effectiveness of experimental treatments to elicit a feeding response in tuna in a real-world fisheries setting. The Helios system will record the skipjack's response to the novel stimuli. Results will be published in open access scientific report to advance global knowledge into baitfish alternatives.

Project partners are uniquely positioned to carry out the proposed project for the following reasons:

- 1) IPNLF's global involvement in pole and line fisheries that spans direct improvements at the fishery level, scientific research and market and policy engagement giving IPNLF an overview of one-by-one fisheries that exceeds the capabilities of any one fishery, company or government institution.
- 2) IPNLF's long standing relationships in the Maldives across the spectrum of fisheries stakeholders from fishers, processors and exporters to scientists and politicians.
- 3) IPNLF Maldives existing observer program allowing the data collection activities of this project to be a natural extension of our work
- 4) SNTech's innovative products and their willingness to provide in-kind support to analyse the results and develop the hardware and software to provide value to fishers and contribute to novel scientific knowledge for the global public good.

The fishing vessels upon which the experiments will be conducted will participate on a voluntary basis (see letters of support from Maldivian vessel owners), but vessel crew will be fairly remunerated for any lost income as a result of participating in the trials.

Q14. Innovation

Please specifically outline how your approach or project is innovative, noting the opportunity to describe the methodology is next.

Is it the application of existing evidence/technology/approach in a distinctly different sector, the development of new technologies/approach in an existing area, or is it a totally disruptive approach?

Programmable LED lights and Artificial Intelligence integrated cameras are cutting-edge technologies and their application as proposed in this project are entirely novel.

Exploring alternatives to livebait fish is also relatively unexplored with few published studies with limited success (See below)

- Chemical attractants in the water (Hester 1974(6); Sharma & Adams 1990(7))

- Shiny metals, calcium carbide and small brass cylinders (Baldwin 1977 (8); Shomura 1974(9))
- Latex sponge and vinyl chloride baits in the tuna longline industry (Hester 1974(6))
- Brine shrimp and liver of Japanese common squid as alternative bait (Hester 1974(6))

Underwater lights have been used to attract tuna as early as 1920's (Sokimi and Beverly, 2010(10)), and to harvest the baitfish species (Hazin et al.,2005(11); Sokimi and Beverly, 2010), but have not been used to try and elicit a feeding response in skipjack.

As such the proposed experiments are innovative and will contribute to novel scientific knowledge.

If successful the innovations have potential to positively disrupt traditional pole and line fishing methods by reducing the dependency on livebait which could have poverty reduction and biodiversity protection benefits across one-by-one tuna fisheries globally.

Q15. Capability and Capacity

How will you support the strengthening of capability and capacity in the project countries at organisational or individual levels, please provide details of what form this will take and the post-project value to the country.

Stakeholders from across the pole and line fishing sector, fisheries management and related value chains will be engaged and consulted throughout this project, enhancing their awareness of baitfish issues and the potential for alternatives. By Proactively addressing baitfish issues and taking a lead in this innovative research field of baitfish alternatives, the Maldives will establish themselves as a thought-leader in the research, potentially attracting more research and consultancy opportunities for Maldivians.

If successful, the research from this project will strengthen the capability of low impact one-by-one tuna fishers to sustainably harvest their marine resources and further minimize their ecosystem impacts, by removing the need for baitfish. This in turn enhances the capacity of coastal fishers in low and middle income developing countries to participate in sustainable fisheries which have a low barrier to entry and can offer dignified, sustainable and potentially lucrative employment and livelihoods.

By openly publishing the data and scientific reports and widely disseminating the outputs via digital communications outputs, the research conducted in the Maldives can help lower barriers to experimentation in other one-by-one fisheries and research institutions, catalysing a new frontier of research in one-by-one fisheries. The research will also provide insight for fisheries management authorities into potential ways to proactively address baitfish issues.

Section 6 - Gender, Awareness, Change Expected & Exit Strategy

Q16. Gender equality

All applicants must consider whether and how their project will contribute to reducing inequality between persons of different gender. Explain how your project will collect gender disaggregated data and what impact your project will have in promoting gender equality.

There is a common phrase in the Dhivehi (Maldivian local language) that "women are the ones that turn the fish into money".

Women are inextricably linked to the fisheries sector in the Maldives. Traditionally every single household has a fisherman, who would bring the daily catch, and the processing would be done by the women, who then turn the fish into salable products, making the fishing activity into tangible income.

If the tuna fishery were to collapse due to the scarcity and unavailability of live bait, it would affect the women who depend on the fishery for their livelihoods as well. IPNLF conducted a study in 2018, in Gdh. Gemanafushi (one of the largest fishing islands in the Maldives). Over 85 percent of women in Gemanafushi were engaged in fish processing, which directly contributed to household income. This is also the reality in many in low and middle income countries, where women play a pivotal role in the fisheries sector.

Thereby, the project and its outcome contributes to women's economic empowerment, because it is also about sustaining and maintaining their livelihoods, and their involvement in the Maldivian fisheries' value chain. Conserving and sustaining the live-bait resources by experimenting and documenting alternatives to live-bait is also about sustaining livelihoods of women fisherfolk, because if the tuna fishery collapses due to the over-exploitation of live bait, there will also be a drastic reduction to women's income and their livelihoods. Moreover, in the long term, sustaining primary sources of income (such as from fisheries) also contribute to educating women and youth in fishing communities, as more families can afford to send their children to school, thereby increasing social mobility and employment opportunities for people including women. Thereby, conserving live-bait is directly linked to the empowerment of women, and communities.

Q17. Awareness and understanding

How will you raise awareness and understanding of biodiversity-poverty issues in your stakeholders, including who are your stakeholders, what approaches/formats/products will you use, how you will ensure open and free access to all data, and how will you know that the messages are understood?

Stakeholders from across the pole and line fishing sector, fisheries management and related value chains will be engaged and consulted throughout this project, enhancing their awareness of baitfish issues and the potential for alternatives.

Broader stakeholders include fishers and value chain actors (processors, exporters) in one-by-one fisheries globally as well as fisheries management authorities and research institutions with an interest in the sustainability of marine living resources.

Output 4 "Produce video, photographic and written communication outputs to promote project activities and outputs through social media websites and relevant public fora"; is specifically included to ensure that results of the project reach as wide an audience as possible and high-quality digital films will be produced to make the content and messages as widely digestible as possible.

Q18. Change expected

Detail the nature of the outputs you expect from the project (for example report, practical demonstration, know-how, new process, product or service design) and how these will help you to target the identified need, challenge or opportunity in terms of biodiversity and poverty reduction, and links between them.

You should identify what will change and who will benefit a) in the short-term (i.e. during the life of the project) and b) in the long-term (after the project has ended).

When talking about how people will benefit, please remember to give details of who will benefit, differences in benefits by gender or other layers of diversity within stakeholders, and the number of beneficiaries expected. The number of communities is insufficient detail - number of households should be the largest unit used.

Output 1 Observe and Document the existing Tuna Feeding Response to Live-bait as a control treatment to advance scientific knowledge .

Under this output, we will document the new knowledge on what induces feeding response in tuna, using AI integrated underwater cameras.

Output 2: Develop experimental treatments to test as an alternative to live-bait including innovative use of technologies.

Under this output, we will compile case studies of new technology and previously tested alternatives to live-bait documented in other countries, which will contribute to the report in Output 3 and we will also experiment with LED lights such as Pisces programmable LEDs , and develop novel products using byproducts from fish processing (fish skin, scales, blood etc) and mechanism for their delivery which reduce the need to use live-bait in fishing operations. We will trial the experiments with one fishing vessel and document their challenges and successes using alternative stimuli, and by

observing the tuna responses we will develop an experimental protocol.

Output 3: Establish standard protocols for testing feeding response in tuna to a range of alternative stimuli that is replicable in commercial tuna fisheries to contribute to scientific methodology.

Under this output, we will publish a report about the standard protocols for using alternative stimuli in tuna fisheries and document the experiments in Maldives. We will also conduct workshops to create awareness about the experiments and the results to stakeholders in Maldives, and will further engage in communications on social media and IPNLF website to reach international stakeholders and the wider fishing community.

Output 4: Produce video, photographic and written communication outputs to promote project activities and outputs through social media websites and relevant public fora.

This output will ensure the outputs of the project reach as wider audience as possible

The project contributes to novel scientific knowledge and methodologies and can act as a catalyst for further research into baitfish alternatives in tuna fisheries in the short term.

If experimental treatments are successful in eliciting a tuna feeding response comparable to livebait, they could reduce or remove the need for livebait in one-by-one fisheries. The reduced need for use of live-bait can have transformative longer term benefits for both biodiversity and poverty reduction in many low and middle income developing coastal states, in which development of low impact, sustainable fisheries could provide dignified and even lucrative livelihoods in a sustainable blue economy.

Furthermore, reduced reliance on baitfish would increase the operational efficiency and reduce the carbon footprint of pole and line fisheries by reducing the time and fuel spent searching for baitfish resources. Lastly, Reducing or removing dependency on live-bait in one-by-one tuna fisheries means that those forage fish can remain in the ocean to reproduce, fulfilling their ecosystem function as the prey fish that underpin the marine food web. Healthier more abundant stocks of forage fish contributes to better overall ecosystem health and resilience in the face of climate change and the biodiversity crisis.

Q19. Pathway to change

Please outline your project's expected pathway to change, including how your outcome can be scaled. This should be an overview of the overall project logic and outline why and how you expect your Outputs to contribute towards your overall Outcome and, longer term, your expected Impact.

This should directly relate to your overall project's Theory of Change which must be uploaded alongside your logframe at Q24. See the separate [Theory of Change Guidance](#) and [Section 2.3.2 of the Darwin Initiative Innovation Supplementary Guidance](#) for further information on your Theory of Change.

The ISSUE is dwindling live-bait populations from overexploitation, and anthropogenic impacts. Our GOAL is to reduce dependency on live-bait, to achieve our NEEDS and IMPACTS we want to see i.e. reduce or remove live-bait utilization in the tuna fishery, conserve live bait, and sustain the tuna fishery.

To achieve the goal, we introduce an INTERVENTION i.e. experiment with alternative stimuli

These interventions are part of our outputs, as identified in the logframe. These outputs lead to OUTCOMES, where the long-term Outcome is aligned to the GOAL.

Short Term outcome: Increased understanding of tuna response to live-bait feeding in pole-and-line fisheries and identify variables for experimentation

Intermediate Outcome: Increased knowledge of alternatives to live-bait, by experimentation and use of technology

Long term Outcome: Reduce Dependency of one-by-one fisheries on livebait by presenting alternatives to reduce or remove live-bait utilisation.

The results will lead to IMPACTS or systemic change in the long-term:

- 1) Traditional ways of using live-bait for tuna fishery is minimized or stopped
- 2) Live-bait populations are conserved and used sustainably
- 3) Tuna fishery is sustained including livelihoods
- 4) Carbon footprint of fishery is minimized as time and fuel spent on searching for live-bait is reduced

Q20. Exit strategy

How will the benefits or outcome be sustained post-funding? Will the innovation be mainstreamed into “business as usual” to continue to deliver the benefits? How will the required capability and capacity remain available to sustain the benefits? How will your approach, if proven, be scaled? Are there any barriers to scaling and if so, how will these be addressed?

The outcomes of the experimental research conducted through this project will be presented in an open access scientific report and will contribute to novel scientific research. The methodologies and results for outputs 1, 2 and 3 all aim to be replicable by other scientists and fisheries and will allow others to advance the research into livebait alternatives.

Should an experimental treatment trialled through this project be successful in cost-effectively eliciting a feeding response in tuna, whilst reducing or eliminating need for baitfish, IPNLF will widely promote the results through our global network, and seek funding to replicate the project results in other fisheries and countries that can benefit from the innovation.

If the result is linked to technology provided by SNTech (e.g. Pisces programmable LED system), SNTech may explore commercialising the solution and explore making the technology more affordable as a cost-effective solution for fishers in low and middle income countries. However the theory behind the LED light frequencies will be openly published and will therefore be replicable by market competitors.

IPNLF Maldives seek to lead the research into baitfish alternatives and share results with fisheries stakeholders in low and middle income countries where successful outputs could achieve the biggest poverty reduction and biodiversity benefits. Those fisheries may face barriers to pioneering similar research due to the seed money required or the ability to take risks with experimentation, as their basic survival and dietary needs may be directly linked to their daily fishing activities.

Output 4 aims to widely disseminate the project outputs and activities through written and digital media addressing another key barrier: awareness and acceptance among fisheries stakeholders.

Section 7 - Risk Management

Q21. Risk Management

Please outline the 6 key risks to achievement of your Project Outcome and how these risks will be managed and mitigated, referring to the [Risk Guidance](#). This should include at least one Fiduciary, one Safeguarding Risk, and one Delivery Chain Risk.

Projects should also draft their initial risk register, using the [Risk Assessment template](#), and be prepared to submit this when requested if they are recommended for funding. Do not attach this to your application.

Risk Description	Impact	Prob.	Gross Risk	Mitigation	Residual Risk
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Fiduciary	Minor	Rare	Minor	The project activities are proposed in the Maldives as this is where IPNLF can get best value for money and conduct the most experimental trials.	Minor
The innovative and experimental nature of the proposed projects means that outcomes are not guaranteed, and thus nor is value for money.					
Safeguarding	Minor	Rare	Minor	At-sea observation work will be carried out experienced IPNLF fisheries observers who are trained in at-sea survival techniques and are familiar with operations onboard fishing vessels.	Minor
At-sea work on fishing vessels carries inherent safety risks including risk of injury, accidents and drowning.					
Delivery Chain	Minor	Rare	Minor	SNTech owns the intellectual property to their products, but there is an agreement in place between IPNLF and SNTech that the data and results of research from this project will be made openly available to allow third parties to replicate and further develop products that produce the intended outcome.	Minor
Intellectual property resulting from the development of new innovative technology could be made exclusive, preventing replication for the benefit of low-middle income fishers.					
Risk 4	Minor	Possible	Moderate	All IPNLF project staff are double vaccinated against COVID-19 and will follow all in-country rules regarding the on-going COVID-19 pandemic including use of facemasks, social, distancing and quarantine periods as required.	Minor
The ongoing COVID -19 pandemic poses a risk of spreading infection among project staff and participating fishing vessel crews.					
Risk 5	Minor	Possible	Moderate	IPNLF will continue to monitor and comply with international and national restrictions as a result of COVID-19 and will consult with Darwin Initiative counterparts as and when disruption occur/ are anticipated and upon agreement, will adjust activity timelines as appropriate.	Minor
The ongoing COVID-19 pandemic and associated restrictions may prevent UK project staff/consultants from entering Maldives and Maldivian Observers from conducting at-sea work (as it did for much of 2020/21)					
Risk 6	Insignificant	Possible	Minor	Non-significant results are an important aspect of scientific research and contribute to novel knowledge. All results, whether significant or non-significant will be written up as academic research and made publicly available. Methodologies developed as a result of this project will be a valuable contribution to science in their own right.	Minor
Due to the unknown/ innovative nature of this project, there is a risk that none of the experimental treatments result in a significant feeding response in skipjack that is comparable to live-bait					

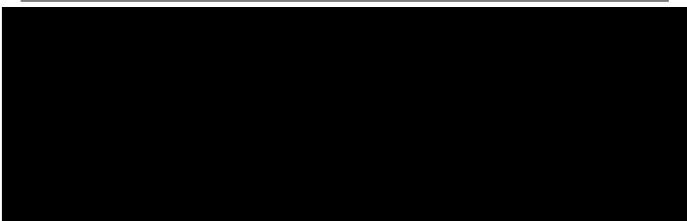
Section 8 - Implementation Timetable

Q22. Provide a project implementation timetable that shows the key milestones in project activities

Provide a project implementation timetable that shows the key milestones in project activities. Complete the Word template as appropriate to describe the intended workplan for your project and upload this below as a PDF.

[Implementation Timetable Template](#)

Please add/remove columns to reflect the length of your project. For each activity (add/remove rows as appropriate) indicate the number of months it will last, and fill/shade only the quarters in which an activity will be carried out.



Section 9 - Monitoring and Evaluation

Q23. Monitoring and evaluation (M&E)

Describe how the progress of the project will be monitored and evaluated, making reference to who is responsible for the project's M&E.

Darwin Initiative projects are expected to be adaptive and you should detail how the monitoring and evaluation will feed into the delivery of the project including its management. M&E is expected to be built into the project and not an 'add' on. It is as important to measure for negative impacts as it is for positive impact. Additionally, please indicate an approximate budget and level of effort (person days) to be spent on M&E (see [Financial Guidance](#)).

IPNLF will have a monitoring and evaluation (M&E) staff dedicated to this project, who will conduct M&E on the following aspects:

Results Monitoring

Results monitoring will be based on delivery and achievement of outputs, outcomes and impacts, and whether the project is on track against intended milestones and targets including any unintended consequences (positive or negative).

The smart indicators and means of verification on the log frame will be used to monitor the progress and achievement of results.

Activities Monitoring

IPNLF will monitor the progress and achievement of activities listed under the outputs, according to the project implementation table. We will monitor both the timeline, as well as track how the funds are utilised per activity, and whether they have been delivered according to the Project Implementation timetable.

Financial Monitoring

Finances will be monitored by the IPNLF Financial Manager and summarised in quarterly reports. Under this activity, we will track the use of funds, whether they are utilised according to the Project Implementation Table and Budget.

Situational/Context Monitoring Situation/context monitoring examines the project's operating environment, monitoring risks and assumptions, as well as political and institutional factors that may influence project progress.

Compliance monitoring-We will ensure that project delivery is in accordance with local, national government laws, within donor requirements and to ethical standards.

Organisational monitoring: This will be ensured by IPNLF internal and external audits.

Total project budget for M&E (this may include Staff and Travel and Subsistence Costs)



Percentage of total project budget set aside for M&E



Number of days planned for M&E

200

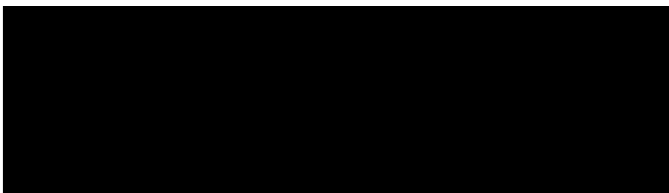
Section 10 - Logical Framework

Q24. Logical Framework

Darwin Initiative projects will be required to monitor (and report against) their progress towards their expected Outputs and Outcome. This section sets out the expected Outputs and Outcome of your project, how you expect to measure progress against these and how we can verify this.

[Logframe Template](#)

Please complete your full logframe in the separate Word template and upload as a PDF using the file upload below. Copy your Impact, Outcome and Output statements and your activities below - these should be the same as in your uploaded logframe.



Impact:

Reduce reliance on livebait in pole-and-line tuna fisheries through the use of innovative alternatives, thereby enhancing fisheries sustainability, operational efficiency, reduction of carbon footprint and conservation of vulnerable baitfish resources.

Outcome:

Dependency of pole-and-line fisheries in the Maldives on livebait is reduced by developing innovative technologies as an alternative to live bait resources

Project Outputs

Output 1:

Observe and document the existing tuna feeding response to live-bait as a control treatment to advance scientific knowledge

Output 2:

Develop experimental treatments to test as an alternative to live-bait including innovative use of alternative technologies.

Output 3:

Establish standard protocols for testing feeding response in tuna to a range of alternative stimuli that is replicable in commercial tuna fisheries to contribute to scientific methodology.

Output 4:

Produce video, photographic and written communication outputs to promote project activities and outputs through social media websites and relevant public fora.

Output 5:

No Response

Do you require more Output fields?

It is advised to have less than 6 Outputs since this level of detail can be provided at the activity level.

No

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

Activity 1.1. Observe fishing conditions, and baitfish utilization on commercial Maldivian pole-and-line fishing vessels AI integrated using underwater cameras to capture control conditions.

Activity 1.2 Assess different behaviours of skipjack from underwater footage to determine measures of voracity of feeding response

Activity 1.3 Experiment with different variables in eliciting feeding responses in order to isolate effects of the experiments, record and standardize them

Examples of the variables include: type of fishing event, sea state, visibility, time of day, locality, size of school, stomach fullness at start of event, school interactions and depredation events. The standard methodology will be developed during the experimental design phase.

Activity 2.1 Conduct desk study to compile case studies of new technology and alternative techniques to live-bait in other countries/fisheries

Activity 2.2 In consultation with fisheries stakeholders, codevelop alternative stimuli to livebait which have potential to elicit a feeding frenzy response in skipjack tuna..

Activity 2.3 Test novel alternative external stimuli such as programmable LED lights, byproducts from fish processing/ artificial bait pods and artificial lures to elicit and maintain a feeding frenzy in skipjack schools.

Activity 3.1 Create a report documenting the trials and standard protocols developed in Maldives, and analysing the potential for scalability and impact in low and middle income countries

Activity 3.2 Increase stakeholder buy-in and replication using awareness and communications

Activity 4.1 Throughout project, project staff will capture high resolution pictures and footage of project activities, stakeholder engagement and experimental trials for promotional film

Activity 4.2 Publish a 2-3 minute video experimental methodology and variables required for analysis, which can be used for further scientific study

Activity 4.3 Promotional film edited and produced using footage captured during the project period.

Activity 4.4. 4 Blogposts/articles written bi-quarterly

Section 11 - Budget and Funding

Q25. Budget

Please complete the appropriate Excel spreadsheet, which provides the Budget for this application. Some of the questions earlier and below refer to the information in this spreadsheet.

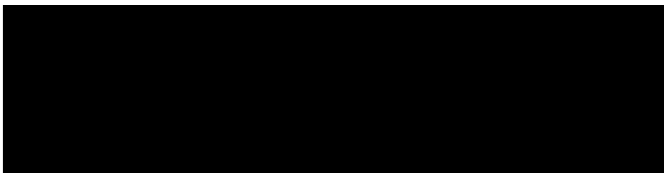
Note that there are different templates for projects requesting under £100,000 and over £100,000. Please refer to the Finance Guidance for more information.

- [Budget template for projects under £100k](#)
- [Budget template for projects over £100k](#)

Please ensure you include any co-financing figures in the Budget spreadsheet to clarify the full budget required to deliver this project.

NB: Please state all costs by financial year (1 April to 31 March) and in GBP. The Darwin Initiative cannot agree any increase in grants once awarded.

Please note the next section is about the financial aspects of your project, rather than technical elements.



Q26. Funding

Q26a. Is this a new initiative or does it build on existing work (delivered by anyone and funded through any source)? Please give details.

New Initiative

Please give details.

The proposed project is a logical extension of investigations into baitfish use that IPNLF have led over the past 9 years. IPNLF have produced several technical reports relating to sustainable use of livebait in pole and line fisheries including:

- Skippers guidebook to pole and line fishing best practices
- Bait Fishery Management Arrangements for the Indonesian Pole and Line Fishery
- Pole and Line and Baitfish Fisheries Project Indonesia
- Ensuring Sustainability of Livebait Fish
- Farmed Milkfish as Bait for the Tuna Pole-and-line Fishing Industry in Eastern Indonesia: A Feasibility Study
- Improving the Management of Baitfisheries Associated with Pole-and-Line Tuna Fishing in Indonesia
- Maldives Livebait Management Plan 2013

Q26b. Are you aware of any current or future plans for similar work to the proposed project?

Yes

Please give details explaining similarities and differences, and explaining how your work will be additional and what attempts have been/will be made to co-operate with and learn lessons from such work for mutual benefits:

To our knowledge, the investigation of technological alternatives to baitfish that reduce or remove the need for livebait in one-by-one tuna fisheries is novel and innovative.

There are several projects globally that are investigating land and sea-based aquaculture production as an alternative to wild capture of livebait. These include the cultivation of milkfish (*Chanos chanos*), bigeye scad (*Selar crumenophthalmus*) and freshwater tilapia (*Oreochromis Sp.*). IPNLF have/continue to consult on such projects in Maldives, Indonesia and Cabo Verde.

Q27. Capital items

If you plan to purchase capital items with Darwin funding, please indicate what you anticipate will happen to the items following project end. If you are requesting more than 10% capital costs, please provide your justification here.

Capital items include the following:

- 1) Rental of the Pisces LED light system from SNTech at [REDACTED] for two years. At the end of the project period the Pisces system will be returned to SNTech
- 2) Purchase of two Helios AI integrated cameras from SNTech at [REDACTED]. At the end of this project the Helios cameras will remain with IPNLF Maldives to enable further experimental trials in the future.
- 3) Construction of two custom camera and lighting rigs for the pole and line vessel experiments, constructed in the Maldives. Following the end of the project, the rigs will stay with IPNLF Maldives to enable further experimental trials in the future.

Capital costs are not more than 10%.

Q28. Value for Money

Please describe why you consider your application to be good value for money including justification of why the measures you will adopt will secure value for money.

The Maldives is selected as the location to trial baitfish alternatives for its well established pole and line fishery and IPNLF's strong history of engagement at the fishery level directly with vessel owners and captains in experimental trialling of new technologies. Through these relationships and IPNLF Maldives' existing observer program on pole and line vessels in the Maldives, the experimental trials are able to be conducted more cost-effectively than in any other pole and line fishery. For these reasons we believe IPNLF is uniquely positioned to deliver the work plan.

If successful, the outputs of this project could be efficiently scaled through IPNLF's global network to other geographies and fisheries, including low and middle income countries where reduction of removal of livebait could have significant poverty-reduction and biodiversity protection benefits through the sustainable development of one-by-one tuna fisheries and their value chains.

The Pisces programmable lights and Helios AI integrated camera provided by SNTech are unique and innovative within the marketplace and are provided at reduced 'research and development' rates.

The rates of IPNLF Maldives, IPNLF and SNTech staff are commensurate with experience and aligned with fair remuneration rates for each geography and sector. All travel and subsistence is based on economy rates and basic accommodation.

Section 12 - Outputs, Open Access, Ethics & Safeguarding

Q29. Safeguarding

Projects funded through the Darwin Initiative must fully protect vulnerable people all of the time, wherever they work. In order to provide assurance of this, projects are required to have appropriate safeguarding policies in place.

Please confirm the Lead Partner has the following policies in place and that these can be available on request:

We have a safeguarding policy, which includes a statement of our commitment to safeguarding and a zero tolerance statement on bullying, harassment and sexual exploitation and abuse

Checked

We have attached a copy of our safeguarding policy to this application	Checked
We keep a detailed register of safeguarding issues raised and how they were dealt with	Checked
We have clear investigation and disciplinary procedures to use when allegations and complaints are made, and have clear processes in place for when a disclosure is made	Checked
We share our safeguarding policy with downstream partners	Checked
We have a whistle-blowing policy which protects whistle blowers from reprisals and includes clear processes for dealing with concerns raised	Checked
We have a Code of Conduct in place for staff and volunteers that sets out clear expectations of behaviours -- inside and outside the work place - and make clear what will happen in the event of non-compliance or breach of these standards	Checked

Please outline how you will implement your policies in practice and ensure that downstream partners apply the same standards as the Lead Partner.

IPNLF shares our safeguarding policies with all staff during the onboarding process to ensure that everyone involved with the charity knows how to recognise, report, and record safeguarding concerns.

MoUs will be signed upon awarding of the grant to set expectations that all project partners apply the same level of due diligence regarding safeguarding issues.

IPNLF annually review and update the policies and procedures to ensure they remain fit for purpose.

Throughout the project, IPNLF and in-country partners will monitor and identify possible/emerging safeguarding risks, to project beneficiaries, staff or anyone else who may come into contact with our organisations.

Q30. Ethics

Outline your approach to meeting the key ethical principles, as outlined in the guidance.

IPNLF is committed to Darwin's key ethical principles. Strong ethical principles are central to our charitable objectives and outlined in our employee handbook. We are compelled to uphold the integrity of our findings and openly share them with stakeholders and potential beneficiaries for the global public good. Throughout the project we will uphold the laws of both the UK and Maldives.

Pole and line vessels participating in the project are participating on a voluntary basis (see the translated letters of support from pole and line vessel owners). Any opportunity cost incurred, resulting from participation in experimental trials will be reimbursed to fishers/vessels at a fair rate in order to prevent any income loss as a result of participating in the project.

Local and indigenous knowledge from Maldivian pole and line fishermen is critical to the success of the project and will be shared on a voluntary basis.

The final outputs of the project will be made open access with the intention to widely disseminate findings across pole and line fisheries globally, particularly in low and middle income developing countries where access to live bait may be a limiting factor in the development of sustainable tuna fisheries.

Section 13 - FCDO Notifications

Q31. FCDO notifications

Please whether there are sensitivities that the Foreign, Commonwealth and Development Office will need to be aware of should they want to publicise the project's success in the Darwin competition in the host country.

Yes

Please indicate whether you have contacted your Foreign Ministry or the local embassy or High Commission (or equivalent) directly to discuss security issues (see Guidance Notes) and attach details of any advice you have received from them. If you have not, please say why not.

Yes (no written advice)

Section 14 - Project Staff

Q32. Project staff

Please identify the core staff on this project, their role and what % of their time they will be working on the project.

Please provide 1-page CVs or a 1 page job description, further information on who should be classified as core staff can be found in the Finance Guidance.

Name (First name, surname)	Role	% time on project	1 Page CV or job description attached?
Shiham Adam	Project Leader	30	Checked
Martin Purves	Project Oversight	10	Checked
Craig Turley	Project Design, Monitoring and Evaluation	10	Checked
TBC	Scientific Advisor	10	Checked

Do you require more fields?

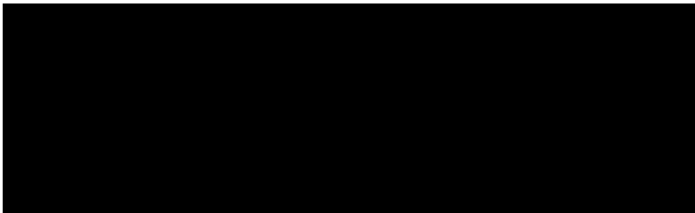
Yes

Name (First name, surname)	Role	% time on project	1 Page CV or job description attached?
Hawwa Nashfa	Monitoring and Evaluation	30	Checked
Ibrahim Saneeh	Field Technician/Observer	50	Checked
Ibrahim Nadheeh	Field Technician/Observer	50	Checked
Elsabe Crockart	Project Administrator	10	Checked
Philippine Wouters	Communications Manager	7	Checked

Helena Gey van Pittius	Financial Manager	10	Checked
<i>No Response</i>	<i>No Response</i>	0	Unchecked
<i>No Response</i>	<i>No Response</i>	0	Unchecked

Please provide 1 page CVs (or job description if yet to be recruited) for the project staff listed above as a combined PDF.

Ensure the file is named clearly, consistent with the named individual and role above.



Have you attached all project staff CVs?

Yes

Section 15 - Project Partners

Q33. Project partners

Please list all the Project Partners (including the Lead Partner), clearly setting out their roles and responsibilities in the project including the extent of their engagement so far and planned.

This section should demonstrate the capability and capacity of the Project Partners to successfully deliver the project. Please provide Letters of Support for all project partners or explain why this has not been included.

The partners listed here should correspond to the Delivery Chain Risk Map (within the Risk Register template) which you will be asked to submit if your project is recommended for funding.

Lead Partner name: The International Pole and Line Foundation

Website address: ipnlf.org

Why is this organisation the Lead Partner, and what value to they bring to the project?

IPNLF Maldives is the Maldivian registered entity for the International Pole and Line Foundation (IPNLF).

Whilst IPNLF Maldives will take the lead on all project activities, monitoring and evaluation and reporting , IPNLF will provide project oversight and assistance where required. IPNLF will be responsible for the project financial management, monitoring and evaluation.

(including roles, responsibilities and capabilities and capacity):

IPNLF is named as the lead partner because we are able to provide the two years of audited accounts required by Darwin Initiative.

IPNLF has been operating in the Maldives since our inception in 2012. . We have been working in close collaboration with local fishing communities, NGOs, government and scientists from our inception to ensure the country's traditional one-by-one fisheries continue to be managed as responsibly as possible, while providing sustainable employment for the Maldivian fishing community.

IPNLF has members from throughout the Maldivian tuna supply chains including Maldives Seafood Processors and Exporters Association (MSPEA), Dhivehi Masverin, Ensis Fisheries PVT. LTD., Horizon Fisheries, Maldives Fishermen's Association (MFA) and Maldives Industrial Fisheries Company Limited (MIFCO)

Allocated budget: 0

International/In-country Partner International

Represented on the Project Board Yes

Have you included a Letter of Support from the organisation? Yes

Have you provided a cover letter? Yes

Do you have partners involved in the project?

Yes

1. Partner Name: IPNLF Maldives

Website address: ipnlf.org

What value does this Partner bring to the project?

IPNLF Maldives is the Maldivian registered entity for the International Pole and Line Foundation (IPNLF). Between 2012 and 2020 the Maldivian entity operated as a subsidiary of IPNLF. In 2020, IPNLF Maldives was registered under the Associations Act 2003, and an independent board was appointed. IPNLF does however still retain a level of oversight over IPNLF Maldives.

(including roles, responsibilities and capabilities and capacity):

IPNLF Maldives, with oversight from IPNLF, will be responsible for general project management and coordination, experimental design, implementation of project activities, data collection activities, stakeholder engagement and relationship management, monitoring and evaluation of experimental protocols, reporting to donors and scientific report writing.

IPNLF Maldives is uniquely positioned to carry out the work as we have a longstanding relationship across the entire value chain for Maldivian tuna and have fisheries expertise and insight that go beyond the Maldives to give a more holistic global fisheries perspective.

The at-sea work required for the project is a natural extension of our existing observer program and our field technician/observer team have the skills and competencies required to conduct the experimental trials.

Allocated budget:

0

International/In-country Partner

In-country

Represented on the Project Board

Yes

Have you included a Letter of Support from this partner?

Yes

2. Partner Name:

Safety Net Technologies (SNTech)

Website address:

<https://sntech.co.uk/>

What value does this Partner bring to the project?

SNTech is a technological innovation start-up with the primary goal to design and build devices to increase the selectivity of commercial fishing practices, making the industry more sustainable.

(including roles, responsibilities and capabilities and capacity):

SNTech are a team of engineers and business planners, collaborating with scientists to turn their theories into usable devices that aim to make fishermen's lives easier, and commercial fishing more sustainable.

SNTech will provide their innovative devices to be trialled in the project including: Pisces, our programmable LED light system and Helios, our AI integrated underwater camera.

SNTech will be responsible for the fit-for-purpose programming and installation of Pisces and Helios, ongoing tech support, assisting in experimental design, and the reviewing of experimental data and footage in order to train the AI.

Allocated budget: [REDACTED]

International/In-country Partner International

Represented on the Project Board Yes

Have you included a Letter of Support from this partner? Yes

If no, please provide details *No Response*

3. Partner Name: *No Response*

Website address: *No Response*

What value does this Partner bring to the project? *No Response*

(including roles, responsibilities and capabilities and capacity):

Allocated budget: 0

International/In-country Partner International
 In-country

Represented on the Project Board Yes
 No

Have you included a Letter of Support from this partner? Yes
 No

If no, please provide details *No Response*

4. Partner Name: *No Response*

Website address: *No Response*

What value does this Partner bring to the project? *No Response*

(including roles, responsibilities and capabilities and capacity):

Allocated budget: 0

International/In-country Partner International
 In-country

Represented on the Project Board Yes
 No

Have you included a Letter of Support from this partner? Yes
 No

If no, please provide details *No Response*

5. Partner Name: *No Response*

Website address: *No Response*

What value does this Partner bring to the project? *No Response*

(including roles, responsibilities and capabilities and capacity):

Allocated budget: 0

International/In-country Partner International
 In-country

Represented on the Project Board Yes
 No

Have you included a Letter of Support from this partner? Yes No

If no, please provide details *No Response*

6. Partner Name: *No Response*

Website address: *No Response*

What value does this Partner bring to the project? *No Response*

(including roles, responsibilities and capabilities and capacity):

Allocated budget: 0

International/In-country Partner International In-country

Represented on the Project Board Yes No

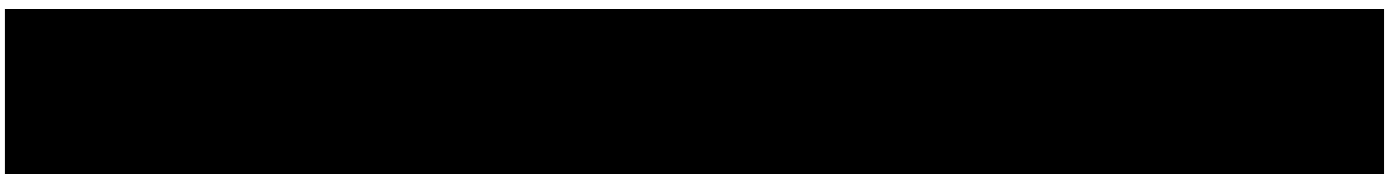
Have you included a Letter of Support from this partner? Yes No

If no, please provide details *No Response*

If you require more space to enter details regarding Partners involved in the project, please use the text field below.

No Response

Please provide a cover letter responding to feedback received at Stage 1 if applicable and a combined PDF of all letters of support.



Section 16 - Lead Partner Track Record

Q34. Lead Partner Capability and Capacity

Has your organisation been awarded Darwin Initiative funding before (for the purposes of this question, being a partner does not count)?

No

Please provide the below information on the lead organisation.

What year was your organisation established/ incorporated/ registered? 01 January 2012

What is the legal status of your organisation? NGO

Other explained *No Response*

How is your organisation currently funded? IPNLF is funded via 4 key fundings sources (which as of 2019 were in the following proportions)
Philanthropic Foundation Funding 52%
Commercial Membership Fees 28
Member Project Sponsorship 5%
Corporate sponsorship 15%

Describe briefly the aims, activities and achievements of your organisation. Large organisations please note that this should describe your unit or department.

Aims IPNLF mission: To empower responsible fisheries, which give back to the seas and the people that depend on them.
IPNLF Vision: A world with thriving fisheries that work in balance with nature by catching one fish at a time.

Activities -National/RFMO policy support, advocacy and capacity building
-Capacity building in sustainable fishing techniques, harvest-handling, cold storage
-Implement traceability and innovative technologies in artisanal tuna fisheries
-Coordinate fisheries observer programs
-Plastic pollution reduction and circular economy initiatives
-Engage Market-partners (67 members) to promote market access for responsible one-by-one tuna fisheries.

Achievements -Working with 50+ supply chain companies on social and environmental improvements in tuna fisheries
-Raised the profile of one-by-one fisheries globally
-IPNLF honoured with Seafood Champion Award in 2017
-Participated as UN Food Systems Champion in 2022
-On Advisory Group for High Level Panel for a Sustainable Ocean Economy

Provide detail of 3 contracts/projects held by the Lead Partner that demonstrate your credibility as an organisation and provide track record relevant to the project proposed. These contracts/awards should have been

held in the last 5 years and be of a similar size to the grant requested in your Darwin application.

Contract/Project 1 Title	Developing a Fishery Information System (FIS) for the Maldives
Contract value/Project budget (include currency)	[REDACTED]
Duration (e.g. 2 years, 3 months)	4 year and still ongoing
Role of organisation in project	Project execution and assist in implementation of the project.
Brief summary of the aims, objectives and outcomes of the project	Fisheries Information System (FIS) is an online database for maintaining fishery records to support fishery management. FIS maintains and updates records of fishing vessels and issues annual fishing licenses in the Maldives. It is also a data capture system; it compiles data from paper log books submitted by fishers, as well as records of commercial fish purchases added remotely by the companies. FIS also doubles as a traceability tool and catch documentation software by tracking "fish purchase lots" from commercial buyers and linking them to final products during export to produce 'catch certificates' required as part of catch documentation.
Client/independent reference contact details (Name, e-mail)	[REDACTED]
Contract/Project 2 Title	Establishment of the Fishery Community Training Centre in Laamu Atoll - Maldives
Contract value/Project budget (include currency)	[REDACTED]
Duration (e.g. 2 years, 3 months)	3 years
Role of organisation in project	Develop and execute the project in the Maldives; provide technical support and issues communications; coordinate with relevant government agencies.
Brief summary of the aims, objectives and outcomes of the project	The project was aimed at establishing a Fishery Community Training Centre on the island of Laamu Gamu, in south central Maldives, with a view to provide fishery related training fishers, and also to establish information centre, where fishers can call, for example for best location of fish.
Client/independent reference contact details (Name, e-mail)	[REDACTED]

**Contract/Project 3
Title**

OAK Foundation: Advancing Position of Small-scale Tuna Fisheries through International Policy Reform

Contract value/Project budget (include currency)



Duration (e.g. 2 years, 3 months)

4 years

Role of organisation in project

Sole recipient/ Project Lead

Brief summary of the aims, objectives and outcomes of the project

Aim: deliver more equitable and sustainable international fisheries policies that protect ocean resources and reliant communities. Ensure smaller-scale, one-by-one tuna fisheries are represented and engaged in decision-making for international tuna resource management.

Objectives (2022)

- Form ICCAT coalition to adopt policies that address inequity in the representation of SSF and promote sustainable management of tuna resources
- IOTC adopts a system to equitably allocate tuna fishing opportunities with consideration for developing states
- Minimum two Western Pacific countries with one-by-one tuna fisheries adopt policies that promote sustainable management of tuna resources
- Increase SSF stakeholders capacity to promote equitable access and sustainable resource management.

Client/independent reference contact details (Name, e-mail)



Have you provided the requested signed audited/independently examined accounts?

If yes, please upload these on the certification page. Note that this is not required from Government Agencies.

Yes

Section 17 - Certification

Q35. Certification

On behalf of the

Company

of

International Pole and Line Foundation

I apply for a grant of

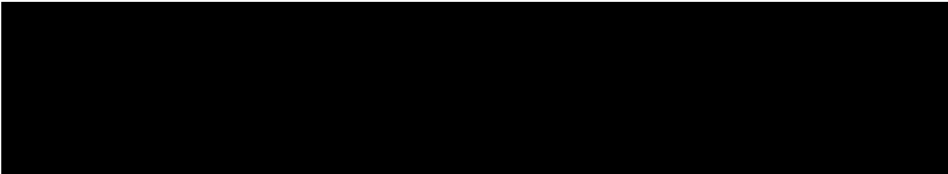
£177,792.00

I certify that, to the best of our knowledge and belief, the statements made by us in this application are true and the information provided is correct. I am aware that this application form will form the basis of the project schedule should this application be successful.

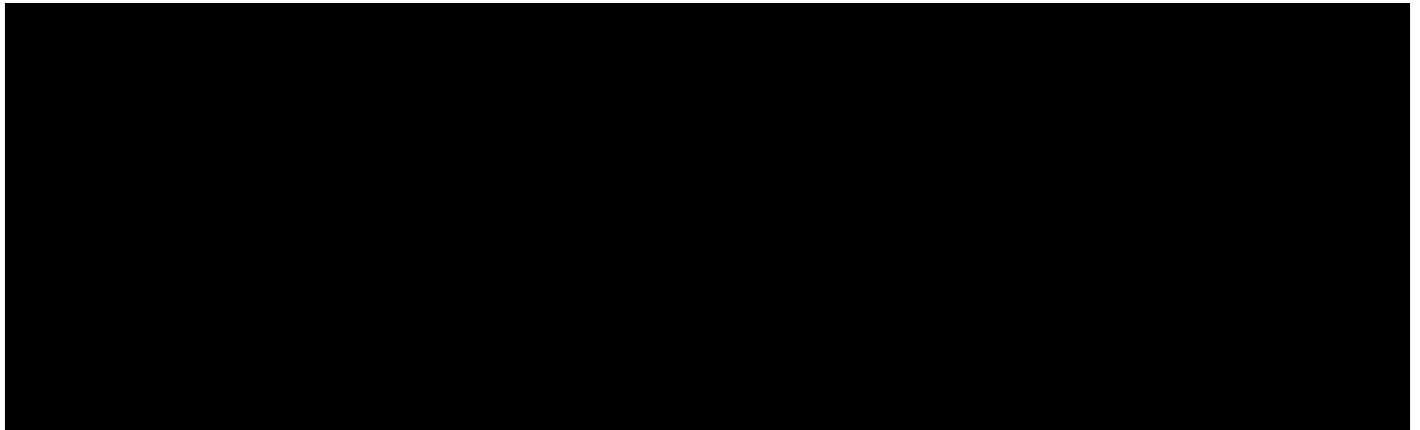
(This form should be signed by an individual authorised by the applicant institution to submit applications and sign contracts on their behalf.)

- I have enclosed CVs for project key project personnel, letters of support, budget, logframe, theory of change, safeguarding policy and project implementation timetable (uploaded at appropriate points in application)
- Our last two sets of signed audited/independently verified accounts and annual report (or other financial evidence - see Financial Guidance) are also enclosed.

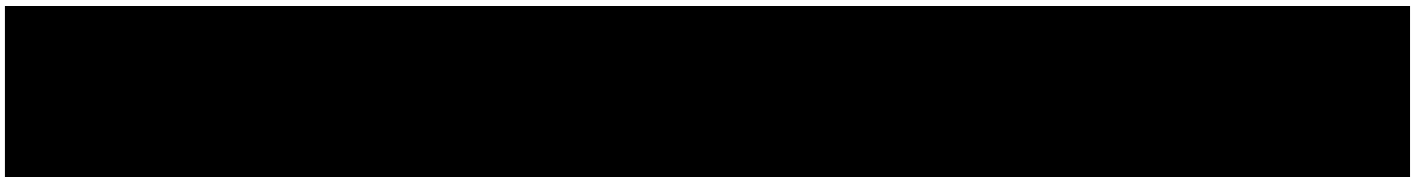
Checked

Name	Craig Turley
Position in the organisation	Fisheries Improvement Manager
Signature (please upload e-signature)	
Date	06 December 2021

Please attach the requested signed audited/independently examined accounts.



Please upload the Lead Partner's Safeguarding Policy as a PDF



Section 18 - Submission Checklist

Checklist for submission

I have read the Guidance, including the “Guidance Notes for Applicants”, “Supplementary Guidance for Darwin Initiative Innovation”, “Monitoring, Evaluation and Learning Guidance”, “Theory of Change Guidance”, “Risk Guidance” and “Financial Guidance”.	Checked
I have read, and can meet, the current Terms and Conditions for this fund.	Checked
I have provided actual start and end dates for my project.	Checked
I have provided my budget based on UK government financial years i.e. 1 April – 31 March and in GBP.	Checked
I have checked that the budget is complete, correctly adds up and I have included the correct final total at the start of the application.	Checked
The application has been signed by a suitably authorised individual (clear electronic or scanned signatures are acceptable).	Checked
I have attached the below documents to my application:	Checked
<ul style="list-style-type: none"> • my completed logframe as a PDF using the template provided 	
<ul style="list-style-type: none"> • my 1 page Theory of Change as a PDF which includes the key elements listed in the guidance 	Checked
<ul style="list-style-type: none"> • my budget (which meets the requirements above) 	Checked
<ul style="list-style-type: none"> • my completed implementation timetable as a PDF using the template provided 	Checked
<ul style="list-style-type: none"> • 1 page CV or job description for all the Project Staff identified at Question 32, including the Project Leader, or provided an explanation of why not. 	Checked
<ul style="list-style-type: none"> • a letter of support from the Lead Partner and partner(s) identified at Question 33, or an explanation of why not. 	Checked
<ul style="list-style-type: none"> • a cover letter from the Lead Partner, outlining how any feedback received at Stage 1 has been addressed where relevant. 	Checked
<ul style="list-style-type: none"> • a copy of the Lead Partner’s safeguarding policy, which covers the criteria listed in Question 29. 	Checked
<ul style="list-style-type: none"> • a signed copy of the last 2 annual report and accounts for the Lead Partner, or provided an explanation if not. 	Checked
(If copying and pasting into Flexi-Grant) I have checked that all my responses have been successfully copied into the online application form.	Checked

I have been in contact with the FCDO in the project country(ies) and have included any evidence of this. If not, I have provided an explanation of why not. Checked

I have checked the Darwin website immediately prior to submission to ensure there are no late updates. Checked

I have read and understood the Privacy Notice on the Darwin Initiative website. Checked

We would like to keep in touch!

Please check this box if you would be happy for the lead applicant (Flexi-Grant Account Holder) and project leader (if different) to be added to our mailing list. Through our mailing list we share updates on upcoming and current application rounds under the Darwin Initiative and our sister grant scheme, the IWT Challenge Fund. We also provide occasional updates on other UK Government activities related to biodiversity conservation and share our quarterly project newsletter. You are free to unsubscribe at any time.

Checked

Data protection and use of personal data

Information supplied in this application form, including personal data, will be used by Defra as set out in the latest copy of the Privacy Notice for Darwin, Darwin Plus and the Illegal Wildlife Trade Challenge Fund available [here](#). This Privacy Notice must be provided to all individuals whose personal data is supplied in the application form. Some information may be used when publicising the Darwin Initiative including project details (usually title, lead organisation, location, and total grant value) on the GOV.UK and other websites.

Information relating to the project or its results may also be released on request, including under the 2004 Environmental Information Regulations and the Freedom of Information Act 2000. However, Defra will not permit any unwarranted breach of confidentiality nor will we act in contravention of our obligations under the General Data Protection Regulation (Regulation (EU) 2016/679).

Project Title: **Innovation of Bait Fisheries for Live-bait Conservation**

Project Summary	SMART Indicators	Means of Verification	Important Assumptions
Impact: Reduce reliance on livebait in pole-and-line tuna fisheries through the use of innovative alternatives, thereby enhancing fisheries sustainability, operational efficiency, reduction of carbon footprint and conservation of vulnerable baitfish resources. (Max 30 words)			
Outcome: Dependency of pole-and-line fisheries in the Maldives on livebait is reduced by developing innovative technologies as an alternative to live bait resources	0.1 By the end of the project at least three alternatives to livebait have been prototyped and trialled in the Maldivian pole and line tuna fishery. 0.2 By the end of the project at least one developed baitfish alternative is able to elicit a feeding response in tuna significant enough to justify reduced use of livebait. 0.3 By the end of the project, pole and line fishers on the trial vessels are using less livebait to catch similar quantities of tuna resulting from use of developed livebait alternatives.	0.1 Scientific reports and video and photographic evidence of livebait alternatives being trialled in Maldivian pole and line fisheries. 0.2 Significant tuna feeding response recorded and analysed using sophisticated AI-integrated underwater cameras (Helios) 0.3 At-sea observations verify significant reductions in use of live-bait, detailed in a scientific report and communications outputs.	0.1 All important variables are identified and observable. 0.2 stakeholders are willing trust IPNLF to experiment with alternatives, new research published and accessible, experimental inputs are readily available 0.3 live bait alternatives are successful to elicit a sufficient tuna feeding frenzy so that fishermen and stakeholders replicate it on fishing vessels
Outputs: 1. Observe and document the existing tuna feeding response to live-bait as a control treatment to advance scientific knowledge	1.1 In the first year, at least 20 successful fishing events in which livebait are utilised are recorded and observed us AI integrated underwater cameras to determine a baseline control treatment against which experimental treatments can be compared. 1.2 At least 3 key variables to determine the voracity of tuna feeding response determined in the first year.	1.1 Cameras are procured and installed on the fishing vessel 1.2 Trip reports from each fishing trip 1.3 Observer datasheets with variables and experiments recorded 1.4 AI integrated video is analysed 1.5 Results presented in scientific report.	1.1. Cameras are able to record every activity 1.2 All the variables are observable and recorded.

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<p>2. Develop experimental treatments to test as an alternative to live-bait including innovative use of alternative technologies.</p>	<p>2.1 minimum 3 case studies of existing and new research are identified during desk study 2.2 Experimental treatments using alternative stimuli including LED lights, byproducts of fish processing/artificial bait pods and artificial lures are co-developed with relevant stakeholders and LED lights are procured by end of second quarter. 2.3 At least 40 at-sea trials conducted on a pole and line vessel using a combination of programmable LED lights, byproducts of fish processing/artificial bait pods and artificial lures to elicit a feeding frenzy response in tuna over the project period.</p>	<p>2. desk reports 2.2. procurement reports 2.3 fishing trips, trip reports 2.4 Results presented in scientific report</p>	<p>2.1 new research is documented and published 2.2 experimental inputs are available for development or procurement 2.3 stakeholders are willing to trust IPNLF to experiment with alternatives on their vessels</p>
<p>3. Establish standard protocols for testing feeding response in tuna to a range of alternative stimuli that is replicable in commercial tuna fisheries to contribute to scientific methodology.</p>	<p>3.1 By the end of the project, experimental protocols are developed standardised, and recorded in a scientific report 3.2 By the end of the project experimental Protocols are widely shared with stakeholders both in Maldives through stakeholder workshops and abroad through communication outputs (output 4).</p>	<p>3.1 Report is published on IPNLF website and shared with stakeholders 3.2 Results presented in scientific report 3.3 Number of stakeholders validated and replicate the protocol on their vessels</p>	<p>3.2 Stakeholders are willing and interested to read new research on alternatives to livebait 3.3 Stakeholders are receptive to engage with the findings and the protocol</p>
<p>4. Produce video, photographic and written communication outputs to promote project activities and outputs through social media websites and relevant public fora.</p>	<p>4.1 By the end of the project produce at least 4 written articles/blog posts to promote project activities and outcomes. 4.2 By the end of the project an informational video is produced documenting the experimental protocol</p>	<p>4.1 Blog posts published 4.2 Informational video published on IPNLF Youtube and promoted 4.3 High quality promotional film published on IPNLF Youtube</p>	

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	<p>4.3 By the end of the project a high-quality promotional film is produced to promote project activities and outcomes. 4.4 Photos and captions regularly posted on IPNLF Maldives and IPNLF social media channels (instagram and facebook)</p>	<p>4.4 Social Media posts.</p>	
<p>Activities</p> <p>Activity 1.1. Observe fishing conditions, and baitfish utilization on commercial Maldivian pole-and-line fishing vessels AI integrated using underwater cameras to capture control conditions.</p> <p>Activity 1.2 Assess different behaviours of skipjack from underwater footage to determine measures of voracity of feeding response</p> <p>Activity 1.3 Experiment with different variables in eliciting feeding responses in order to isolate effects of the experiments, record and standardize them</p> <p>Examples of the variables include: type of fishing event, sea state, visibility, time of day, locality, size of school, stomach fullness at start of event, school interactions and depredation events. The standard methodology will be developed during the experimental design phase.</p> <p>Activity 2.1 Conduct desk study to compile case studies of new technology and alternative techniques to live-bait in other countries/fisheries</p> <p>Activity 2.2 In consultation with fisheries stakeholders, codevelop alternative stimuli to livebait which have potential to elicit a feeding frenzy response in skipjack tuna..</p> <p>Activity 2.3 Test novel alternative external stimuli such as programmable LED lights, byproducts from fish processing/ artificial bait pods and artificial lures to elicit and maintain a feeding frenzy in skipjack schools.</p> <p>Activity 3.1 Create a report documenting the trials and standard protocols developed in Maldives, and analysing the potential for scalability and impact in low and middle income countries</p> <p>Activity 3.2 Increase stakeholder buy-in and replication using awareness and communications</p> <p>Activity 4.1 Throughout project, project staff will capture high resolution pictures and footage of project activities, stakeholder engagement and experimental trials for promotional film</p>			

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Activity 4.2 Publish a 2-3 minute video experimental methodology and variables required for analysis, which can be used for further scientific study

Activity 4.3 Promotional film edited and produced using footage captured during the project period.

Activity 4.4. 4 Blogposts/articles written bi-quarterly