CEPF Final Completion and Impact Report

Organization's Legal Name:	NatureMetrics
Project Title:	Improving Freshwater Biodiversity Conservation in Côte d'Ivoire Using DNA-based Monitoring
Grant Number:	CEPF-110627
Hotspot:	Guinean Forests of West Africa
Strategic Direction:	2 Mainstream biodiversity conservation into public policy and private sector practice in the nine conservation corridors, at local, sub-national and national levels
Grant Amount:	$148,500.00
Project Dates:	February 01, 2021 - July 31, 2022
Date of Report:	January 25, 2023

IMPLEMENTATION PARTNERS

☐ University :

UNA staff : Capacity building of the staff from the University of Nangui Abrogoua (Researchers, technicians and students). They received a biological molecular training during which they have praticted extraction, amplification and extraction. They benefit from a better understanding for eDNA approach. They also organized three workshops (project launch, training session, project ending) and arranged all sample collection and training events with support from NatureMetrics on the ground and remotely.

☐ Ministries :

- Ministry of Environment :
- Department of fauna conservation : deliver the licence permit for DNA sample exportation
- OIPR : OIPR staff participated in workshops and was trained to use eDNA kits in the field (take water samples in four National Parks (Comoe, Tai, Banco, Azagny) and one reserve (Lamto). 3 persons (2 men and a woman)
- OIPR staff participated in data collection with scientists, where they were trained to use eDNA kits in the field for DNA samples.

- Minsitry of Fishery :
- Department of fisheries : deliver the permission for fishing in Bandama river

☐ Civil society

- NGO : The NGO SOS-Foret : participated in the workshops and training in the field.

- Local community :

- Local chief of villages : permission to fish around village
- Local Fishermen helped in fish DNA data collection : Scientists have utilized fishermen's knowledge of the Bandama environment to record fish DNA

☐ Private sector

- Hydroelectric company :IHE : They gave to scientist the permission to access to the dam sites to collect data. IHE staff collaborated with scientists during the project.
- Consulting companies : two consulting companies (ENVAL and TERRABO) participate in the training.

☐ International Stakeholders

- The Institut de Recherche pour le Développement, IRD, barcoding in country

CONSERVATION IMPACTS

Planned Long-Term Impacts: 3+ years (as stated in the approved proposal)

Impact Description	Impact Summary
By the end of 2023 use project findings to support and advocate for the addition of of environmental laws and standards for the protection of freshwater biodiversity at a national level within the upcoming revisions of Law n ° 96-766 (October 3, 1996 on the environmental code) and Law n ° 65-255 (August 4, 1965 relating to the protection of fauna and the practice of hunting)	The team at UNA will remain involved as key influencers in the national debate for freshwater protection. The new lab will reinforce the validity of the claims with new data and research in country and results from this work will be published and made publicly available to continue influcneing ministries and decision makers in country. NatureMetrics will continue working closely with lenders and project developers to ensure best practice biodiversity monitoring is applied in country as the laws are strengthened through future polciy actions.
The project has demonstrated best practice approaches to effectively monitoring freshwater biodiversity and by 3 years from the start of project these will have fed into national and international best practices for ESIAs and biodiversity monitoring in the country and wider region by key lending institutions.	NatureMetrics already operates across West Africa engaging private sector in improving biodiversity monitoring activities. The IFC and the World Bank have recently began to ask for eDNA methods to be included in RfP and project terms for new developments as they understand the effectiveness of suhc methods being used. This project will support the uptake of such monitoring tools in Ivory Coast where development from extraction, hydro and energy is very high and poses large threats to biodiversity and ecosystems. The results will be used as a case study to promote the tools across projects in the region with aknowledgement of CEPF support.

Impact Description	Impact Summary
Environmental DNA methods are validated by the IUCN as an effective tool for identifying and monitoring existing and potential Freshwater KBAs in the West African region. Red list species updated accordingly.	The IUCN team already included eDNA methods as a suggested approach to clarify presence of key species for freshwter KBA identification in their report "Identification and validation of Western African freshwater Key Biodiversity Areas", the team has been supportive of this project from the start and will be identifying key data to include in a first joint case study to support the use of eDNA as a rapids mean to identify or verify a freshwater KBA site based on species occurence data. This will support the more rapid implementation of freshwtaer KBAs in the region and more widely across Africa in an effort to improve the conservation of freshwater ecosystems across the continent.

Planned Short-Term Impacts: 1 to 3 years (as stated in the approved proposal)

Impact Description	Impact Summary
By end of June 2022 new lab capacity, barcoding efforts and data from environmental DNA will have stimulated the Ivoirien academic and conservation sector leading to at least 1 new collaboration in country, 2 collaborative publications, and 1 PhD project.	A first of its kind barcoding laboratory has been setup within the Freshwater Ecosystem Lab of the Université Nangui Abrogua. Training in-country and all materials were provided for the setup as well as support for sustainability of the facility. This has resulted in two additional collaborations with the IRD lead MARBEC platform for barcoding of marine coastal specis across West Africa (NatureMetrics will be supporting a workshop in Abidjan in September of 2022 with the UNA barcoding lab being used as a model for students across West Africa) and with Oxford Nanopore as part of the https://org.one/oo initiative that will support materials for barcoding of IUCN endangered species. A publication resulting from a comparative analysis of the eDNA and traditional monitoring data from the Bandama river (« Diversité des poissons du fleuve Bandama avant la mise en eau du barrage hydroélectrique de Singrobo-Ahouaty (Côte d'Ivoire) : Apports de ADN environnemental ») has been accepted at the JILO (presentation available in attachments "Présentation Allassane- Corte 12 Octobre VF". A further publication is being prepared from the barcoding of fish in the Bandama. A PhD student will commence in September 2022 to analyse all the data from the project as a component of their studies.
By the end of June 2022 at least one private sector company has adopted improved management practices for biodiversity in a minimum area of 200 hectares (based on project recommendations, monitoring data and policy briefs)	The biodiversity specialist of IHE Singrobo hydro development was present at the final workshop and presented about the importance of this kind of work to support the monitoring activities and BAP at the singrobo development site. The commitment is to continue supporting eDNA sampling at key sentinel

Impact Description	Impact Summary
	sites for the long term and identify key changes and impact on freshwater communities.
By end of June 2022 a comprehensive freshwater biodiversity baseline generated for the Bandama river watershed and 3 neighbouring KBAs along the watercourse (Lamto, Mopri forest reserve and Azagny National Park) has been instrumental in garnering support for freshwater conservation in Cote d'Ivoire with commitments made by at least one government entity.	The project completed enviornmental DNA baselines studies at multiple sites. Three seasons of sampling were conducted at the Bandama freshwater KBA and hydro development impact site. Baselines were also completed for the Tai National Park and at sites along the Comoe River and in Banco National Park. Stakeholder support was garnered by the Protected Area Agency (OIPR) and the private sector company (IHE) to continue monitoring and evaluate the status of biodiversity in key sites.
By end of June 2022 data from the project will have been presented and fed into the National IPBES Platform Action Plan with support from the National Focal Point.	An end of project stakeholder workshop allowed dissemination of key data with additional full outputs being shared across government, private sector, NGO and academic stakeholders. A representative for IPBES from the Ministry was present and supported the use of the data as part of national database activities and UNA stakeholders including professor Allassane Ouattara will take the lead to ensure the data is disseminated and used as part of the next IPBES Platform Action Plan meetings in country.

Unexpected impacts (positive or negative)?
Both positive and negative unexpected impacts came out of this project. We learned that some of the species of interest for the Bandama river were more widespread than we expected and the data will be hared with the IUCN to explore the status of some of these species and their current range.

A second postive impact was the reassessment of a Data Deficient IUCN species of freshwater shrimp byt the team at UNA. The species is called Macrobrachium Thysi https://www.iucnredlist.org/species/197913/2504953 and is found in the Banco National Park just outisde the University area and a key research site of rthe staff at UNA. We connected the team with the IUCN Red List curator for freshwater shrimp (Dr. Catherine Sayer) and successfuly updated the status and range maps for the species with this local knowledge. We are hoping to do thr same with some of the new fish occurence and sitribution data coming out of this project but the timeframes for validation of the data will be a little longer.

PROJECT RESULTS/DELIVERABLES

Overall results of the project:
The project has been a success and a great learning experience for all those involved. The first miniature barcoding lab was setup in Ivory Coast and fish species were barcoded in country thanks to this setup. The lab is now fully managed by the Evosystems and Freshwater Team at the Université Nanguoi Abrogua and will continue to receive technical support from the NatureMetrics team as well as developing external collaboration to ensure long term sustainability of the lab. The environmental DNA work at this scale was a first for the country and thanks to a network of partners and collaborators we were able to expand

the scope of the survey beyond the Bandama and into other important biodiversity hotspots and KBAs in country. As part of the CEPF funded project the teams collected:
- 132 aquatic eDNA samples in Cote d'Ivoire across the Bandama River catchment, Comoe River, Banco National Park and Tai National Park. From these sample the analysis detected 269 taxa and species of note include: 19 with IUCN Red List conservation designations, including 5 Vulnerable - Mormyrus subundulatus, hippopotamus (Hippopotamus amphibius), leopard (Panthera pardus), African manatee (Trichechus senegalensis), African softshell turtle (Trionyx triunguis), 5 Endangered - Nimbapanchax petersi, Tai toad (Sclerophrys taiensis), pygmy hippopotamus (Hexaprotodon liberiensis), Diana monkey (Cercopithecus diana), western red colobus (Piliocolobus badius), and 2 Critically Endangered - Scriptaphyosemion schmitti, West African slender-snouted crocodile (Mecistops cataphractus).
- 41 aquatic eDNA samples in Liberia across a variety of key sites included by the IUCN freshwater KBA working group of Liberia. The work was done in conjucntion with the Society for the Conservation of Nature of Liberia and with a fish expert and taxonomist from the NatureMetrics team. Focus was on Critically Endangered fish species known from these aquatic ecosystems. A total of 132 taxa were detected in these surveys, most of these fish species. Two Critically Endangered Enteromius species were detected, both are range restricted species know only from a tributary of the St. Paul river. The data will used in conjunction with the IUCN freshwater team to prepare a report on a freshwater KBA identification using eDNA (CEPF will be referenced as the main donor and acknowledged) in Liberia and to increase protection status of the site.
- A total of 36 aquatic eDNA samples were collected in Sierra Leone with support from national fish experts from Njala University and Fourah Bay College. Sights know for the presence of Alliance for Zero Extinction (AZE) sites were targeted and specimen barcoded with identification done by local experts. A total of 157 taxa were detected and although we were not able to pick up the target species the research supported the need to conserve some of the last freshwater brooks in the savannah areas around Port Loko and Moyamba Junction. Further work with IUCN and museum collections will help make better use of the data in the future.
Results were shared back in a country wide workshop and future work is being planned with private and public sector partners to continue monitoring at some of the sites and understand impacts to biodiversity (reports attached in Annexe "Final Cote dIvoire Report, Final Sierra Leone Report, Final Liberia Report"). New surveys planned in Liberia and Sierra Leone allowed us to continue the work across boundaries and to provide valuable data about critically endangered fish species shared with civil society groups in country working alongside the KBA secretariat and the IUCN to improve the understanding of freshwater KBAs in their countries. All reports and data will be made freely available and will be used by the network of partners and collaborators to better inform management and conservation actions in the landscapes. The private sector stakeholders wee thoroughly impressed by the work and Ivoire Hydro Energy will pursue a continued eDNA monitoring approach at their sites in collaboration with UNA and NatureMetrics, the data will be used to inform Biodiversity Action Plans and further conservation work going forward (release of fish, offsetting etc.).

Results for each deliverable:

Component		Deliverable		
#	**Description**	**#**	**Description**	**Results for Deliverable**
1.0	Establish a barcode database	1.1	DNA barcode database for freshwater fish of the Bandama river freely accessible on GenBank	There is a validation and verification process of the data that will take longer than the project timeline for us to be able to upload all sequences into the Genbank database. However we will be doing this as soon as this process is completed and are happy to share the outputs with the CEPF team. Further barcoding will be implemented as part of the MARBEC project with IRD and increased collaborations will streamline efforts to improve reference libraries for key species regionally. For more info see https://umr-marbec.fr/en/thematic-school-on-dna-barcoding-and-edna-metabarcoding-from-12-to-16-09-2022-at-the-nangui-abrogoua-university-in-abidjan-cote-divoire/
1.0	Establish a barcode database	1.2	Barcoding key fish species from the region in collaboration with external institutions	The species barcoding has already commenced with species from Cote d'Ivoire, Sierra Leone and Liberia all being added to genetic reference databases. A collaboration with IRD and the MARBEC prohject have been consolidated with the long term objective of barcoding hundreds of species across West Africa as part of an international project. The Oxford Nanopore team have also been involved with the opportunity of being part of barcoding efforts for key threatened species in the landscape and will be able to provide

Component		Deliverable		
#	Description	#	Description	Results for Deliverable
				additional trainings and materials to support this See www.org.one
2.0	Bio-physical survey	2.1	Environmental DNA survey completed and data analysed, final report and presentation delivered.	A total of 8 eDNA surveys have been completed during the course of this project. Six of these in Cote d'Ivoire (3 seasons along the Bandama, Tai National Park, Comoe River and Banco National park), one week of sampling in Sierra Leone at 2 key sites and one week of sampling in Liberia at multiple key sites know to harbour endangered and critically endangered fish species. Presentations delivered with key stakeholders and full reports being shared widely (see attachments for full reports ""Final Cote dIvoire Report, Final Sierra Leone Report, Final Liberia Report"). In total more than 200 environmental DNA samples were collected and species data was collected for nearly 500 species.
2.0	Bio-physical survey	2.2	Complete case study for KBA validation using eco-region restricted species	A case study is currently being developed and will focus on the assessment of 2 critically endangered Enteromius species in Liberia that could be potential Alliance for Zero Extinction site triggers having very restricted ranges currently known. The case study will be in conjunction with the IUCN and KBA teams and will be made available after the completion of the project due to data timeframes being too close for full development before July of 2022.

Component		Deliverable		
#	Description	#	Description	Results for Deliverable
3.0	Government and Private Sector Liaison	3.1	A report on training and outreach to DAP, PAGDRH, MEDD	This has been completed by the sub-grantee team at UNA who lead the in country workshops together with other key stakeholders. All in all the contribution of the NGO sector was less important than that from the Universities, porivate Sector and local communities. See attached report titled "UNA Report on partner involvement".
3.0	Government and Private Sector Liaison	3.2	Policy brief with key recommendations elaborated with IHE for long term freshwater biodiversity monitoring using DNA based methods	In development with UNA and IHE, will be released in September as part of the updated Biodiversity Action Plan for the hydropower site.
4.0	Strengthen capacity of Université Nangui Abrogua and National NGOs	4.1	A publication on environmental DNA surveys in Cote d'Ivoire lead by UNA staff with support from NatureMetrics is completed and submitted by June 2022	A comparison of enviornmental DNA and traditional fish monitoring surveys has been submitted by Dr. Allassane Ouattara and Benjamin Barca and accepted as part of the JILO conference in France later this year. résumé « Diversité des poissons du fleuve Bandama avant la mise en eau du barrage hydroélectrique de Singrobo-Ahouaty (Côte d'Ivoire) : Apports de ADN environnemental » See https://pole-lagunes.org/wp-content/uploads/sites/4/2022/05/Plaquette_infos_5jilo_en.pdf for info on the conference.
4.0	Strengthen capacity of Université Nangui Abrogua and National NGOs	4.2	A budget and training report detailing key steps for setup and training for a DNA extraction lab at Université Nangui Abrogua	A report, detailed instructions and a video all part of the material left with UNA and lab coordination team for future use. See attachments "Lab Training" presentations and video sent.

Component		Deliverable		
#	Description	#	Description	Results for Deliverable
4.0	Strengthen capacity of Université Nangui Abrogua and National NGOs	4.3	A Road Map for protection of rivers and freshwater biodiversity in Cote d'Ivoire is completed with National NGOs for presentation to government by June 2022	A stakeholder meeting in conjucntion with the end of the project was completed and key outputs presented. A suggested road map was presented by Dr. Allassane Ouattara and well received by key stakeholders and the policy brief to follow will outline key steps to be taken.
5.0	CEPF project management and monitoring for compliance	5.1	Understanding of gender issues within NatureMetrics, effectively monitored as evidenced by the submission of Gender Tracking Tools' at project start and end	Completed.
5.0	CEPF project management and monitoring for compliance	5.2	Project impacts monitored and reported online at project end as evidenced by the Final Completion and Impact Reports	Completed
5.0	CEPF project management and monitoring for compliance	5.3	Communication materials are shared with the RIT per email or other online data transfer software	Completed
5.0	CEPF project management and monitoring for compliance	5.4	Development, monitoring and reporting of the complaint mechanism	Developed, nothing to report at the end of project.

Tools, products or methodologies that resulted from the project or contributed to the results:
See attachements.

As part of the barcoding lab setup we developed an implementation and training module as well as vieo resources to be used by the lab and for future student trainings. These will also be shared more widely as part of the regional barcoding effort described woth IRD (MARBEC) to support scientists from across West Africa to learn how to use barocding tools and bioinformatics.

PORTFOLIO INDICATORS

Portfolio Indicator Number	Portfolio Indicator Description	Expected Numerical Contribution	Expected Contribution Description	Actual Numerical Contribution	Actual Contribution Description
2a	Number of hectares within production landscapes are managed for biodiversity conservation or sustainable use (target: At least 100,000).	200	Based on project recommendations, bio-monitoring data and policy briefs one private company will improve conservation measures for a stretch of the Bandama river impacted by the construction of a new hydro development.	0	It is hard to define the area at the moment but there is a commitment to improve conservation measures as part of the BAP and relocation efforts IHE has already started. Additional sites outside of the core project area might also benefit from completed baselines and data sharing with IUCN/GBIF/GenBank and national stakeholders.
2b	Number of conservation corridors with public policies and/or private sector business practices incorporating provisions for biodiversity conservation (target: at least 6).	1	The Lower Bandama River catchment corridor is better protected thanks to improved conservation business practices of the hydro sector.	1	Stopping the construction of the dam is impossible but with renewed efforts to improve the monitoring and the outcomes with IHE and UNA we believe the project has contributed positively to the future of conservatiuon in the area. UNA will remain a key player and will provide a lead scientific advisory role to support best practices and long

Portfolio Indicator Number	Portfolio Indicator Description	Expected Numerical Contribution	Expected Contribution Description	Actual Numerical Contribution	Actual Contribution Description
					term monitoring of impact at the sites.
2.2	Number of key biodiversity areas with locally-relevant information on natural ecosystems generated and used to influence political and economic decision-making in favor of their conservation (target: for at least 20).	1	New freshwater baseline data and knowledge sharing with government and private sector will influence political and economic decision making for conservation of the Lower Bandama Freshwater KBA	2	Enviornmental DNA data and results have been shared widely with stakeholders and monitoring activities have been conducted across many sites in the three countries with a focus on the lower Bandama River (KBA) and additional sites across three countries (Cote d'Ivoire, Liberia and Sierra Leone). Since the offsetting from IHE in Cote d'Ivoire will also cover the old reserve of the Station de recherche écologique de Lamto (KBA), we hope this data will improve management as part of the new BAP. The timeframes were not long enough to fully understand how this work can influence political and economic decisions but our hope is it will create a strong foundation and baseline to track future impact and be used as a tool by lenders for example to understand potential

Portfolio Indicator Number	Portfolio Indicator Description	Expected Numerical Contribution	Expected Contribution Description	Actual Numerical Contribution	Actual Contribution Description
					impact of new infrastructure or energy projects close to existing KBA sites. We also expecte data to feed back through the IUCN Red List into KBA delineation and in future the creation of additional freshwater KBAs in the three countries. It is likley an additional site in Liberia will also be studies for inclusion as a Freshwater KBA based on the data from this survey. The work will be continued in collaboration with IUCN and SCNL.
2.4	Number of private companies adopt new management practices consistent with biodiversity conservation at operations in the conservation corridors (target: At least 5).	1	Working closely with Ivoire Hydro Energy we aim to improve conservation management practices at the site including improved long term monitoring of sentinel sites to understand impacts on freshwater biodiversity and regulation of water flows.	1	Ivoire Hydro Energy (IHE) is committed to using he data collected and contonuing monitorjg as part of their BAP at key sentinel sites that will be decided together with the sub-grantee (UNA) already involved with the freshwater monitoring component of the ESIA. In addition the offset and release site of M'brimbo village will be protected with support of local fihserfolk and continued monitoring by the UNA

Portfolio Indicator Number	Portfolio Indicator Description	Expected Numerical Contribution	Expected Contribution Description	Actual Numerical Contribution	Actual Contribution Description
					team with support from NatureMetrics.
5a	Number of networks are formed among civil society, government and private sector actors to facilitate capacity building, avoid duplication of effort and maximize impact (target: At least 15).	1	As a result of the project, an existing working relationship between local scientists and the private sector is formally established through an MoU	2	The project helped to formalise an existing relationship between local scientists and the private sector as well as national consultancies. IHE and UNA scientists are now working together better than ever before on more effective biodiversity management strategies. An MoU has been signed between Scientists from UNA and IHE company for biodiversity monitoring. The consulting companies (ENVAL and TERRABO) have followed all the training. They want to be trained more in using eDNA for a better inventory of biodiversity and be part of the wider partnership for monitoring of the Bandama River. A collaboration was also established with MARBEC and the IRD to support training school activities in Abidjan undertaken in September 2022 with stakeholders from all over West Africa to benefit from the training

Portfolio Indicator Number	Portfolio Indicator Description	Expected Numerical Contribution	Expected Contribution Description	Actual Numerical Contribution	Actual Contribution Description
					method NatureMetrics established with UNA.
3	Number of globally threatened species targeted by CEPF grants with populations stable or increasing (target: at least 30).	3	By end of June 2022 a comprehensive freshwater biodiversity baseline generated for the Bandama river watershed and 3 neighbouring KBAs along the watercourse has been instrumental in gathering data on freshwater species globally threatened	5	e-DNA confirmed the presence of 5 freshwater species globally threatened around key conservation sites confirming their presence and population trend.
3.1	Number of Critically Endangered and Endangered species with priority actions identified in Conservation Action Plans being implemented (target: for at least 15).	1	Through e-DNA methods, an effective tool for identifying and monitoring existing and potential Freshwater KBAs in the West African region, Pigmy Hippo data were updated accordingly on ICUN RedList (contributing to the species conservation action plan)	3	Successful results of this pilot project, support the use of eDNA as a rapids mean to identify or verify a freshwater KBA site based on species occurence data. This will support the more rapid implementation of freshwater KBAs in the region and more widely across Africa in an effort to improve the conservation of freshwater ecosystems across the continent. The project also supported data for other EN or CR species across the region, contributing to Red List data and possible KBA

Portfolio Indicator Number	Portfolio Indicator Description	Expected Numerical Contribution	Expected Contribution Description	Actual Numerical Contribution	Actual Contribution Description
					development and population size, distribution & trends for some lesser studies species. These include: 2 endangered species being Tai toad (Sclerophrys taiensis) and Pygmy hippopotamus (Hexaprotodon liberiensis), and 1 Critically Endangered species being West African slender-snouted crocodile (Mecistops cataphractus). The two primates listed as endangered and mentioned previously are not included here despite having conservation plans, because they are well studied already. The two critically endangered Enteromius species in Liberia, being assessed by experts, do not yet have conservation action plans and are therefore not counted here either.

GLOBAL INDICATORS

Protected Areas

Protected areas that have been created and/or expanded as a result of the project. Protected areas may include private or community reserves, municipal or provincial parks, or other designations where biodiversity conservation is an official management goal.

Name of Protected Area	WDPA ID*	Latitude	Longitude	Country	Original Total Size (Hectares) **	New Protected Hectares ***	Year of Legal Declaration or Expansion

*World Database of Protected Areas

**If this is a new protected area, 0 should appear in this column

*** This column excludes the original total size of the protected area.

Key Biodiversity Area Management

Key Biodiversity Areas (KBAs) under improved management—where tangible results have been achieved to support conservation—as a result of the project.

KBA Name	KBA Code	Size of KBA	Number of Hectares with Improved Management
Lower Bandama River	fw4		200
Station de recherche écologique de Lamto	CIV15		300

Production Landscapes

Production landscapes with strengthened management of biodiversity as a result of the project.

A production landscape is defined as a site outside a protected area where commercial agriculture, forestry or natural product exploitation occurs.

Name of Production Landscape	Latitude	Longitude	Hectares Strengthened	Intervention

Benefits to Individuals

- **Structured Training:**

Number of Men Trained	Number of Women Trained	Topics of Training
16	2	• Topic 1 : The DNA analyses in laboratory : how to extract, amplify and sequence DNA ? • Topic 2 : The DNA sampling approach in the field

- **Cash Benefits:**

Number of Men – Cash Benefits	Number of Women – Cash Benefits	Description of Benefits

Benefits to Communities

View the **characteristics** column below with the following corresponding codes:	View the **benefits** column below with the following corresponding codes:
1- Small Landowners	a. Increased Access to Clean Water
2- Subsistence Economy	b. Increased Food Security
3- Indigenous/ Ethnic Peoples	c. Increased Access to Energy
4- Pastoralists / Nomadic Peoples	d. Increased Access to Public Services
5- Recent Migrants	e. Increased Resilience to Climate Change
6- Urban Communities	f. Improved Land Tenure
7- Other	g. Improved Use of Traditional Knowledge
	h. Improved Decision-Making
	i. Improved Access to Ecosystem Services

Community Name	**Community Characteristics**							**Type of Benefit**								**Country**	**Number of Males Benefitting**	**Number of Females Benefitting**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**a**	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**			

Characteristics of "Other" Communities:

Policies, Laws and Regulations

View the **topics** column below with the following corresponding codes:			
A- Agriculture	E- Energy	I- Planning/Zoning	M- Tourism
B- Climate	F- Fisheries	J- Pollution	N- Transportation
C- Ecosystem Management	G- Forestry	K- Protected Areas	O- Wildlife Trade
D- Education	H- Mining and Quarrying	L- Species Protection	P- Other

No.	**Name of Law**	**Scope**	**Topics**														
			A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**M**	**N**	**O**	**P**

"Other" Topics Addressed by the Policy, Law or Regulation:

No.	Country/ Countries	Date Enacted/ Amended	Expected impact	Action Performed to Achieve the Enactment/ Amendment

Companies Adopting Biodiversity-friendly Practices

A company is defined as a for-profit business entity. A biodiversity-friendly practice is one that conserves or uses natural resources in a sustainable manner.

Name of Company	Description of Biodiversity-Friendly Practice	Country/Countries where Practice was Adopted
Ivoire Hydro Energy	IHE staff : They understood how the eDNA approach could help them in the future to monitoring aquatic biodiversity in their Biodiversity Action Plan. The company IHE want to integrate this practise within their biodivesity management plan.	Cote d'Ivoire

Networks and Partnerships

Networks/partnerships should have some lasting benefit beyond immediate project implementation. Informal networks/partnerships are acceptable.

Name of Network/Partnership	Year Established	Country/ Countries	Established by Project?	Purpose
Bandama Scientific Advisory	2021	Cote d'Ivoire	Yes	The project helped to formalise an existing relationship between local scientists and private sector as well as national consultancies. This project has opened up a line of communication that has spread to a lot of people. By establishing relations via this project, a collaboration between scientists and private sector is created. IHE and UNA scientists are now working together better than ever before in more effective biodiversity management strategies. A MOU has been signed between Scientists from UNA and IHE company for the biodiversity monitoring.The consulting companies (ENVAL and TERRABO) have followed all the training. They want to be trained more in using eDNA for better inventory of biodiversity and be part of the iwder partnership for monitoring of the Bandama River.
MARBEC	2021	Cote d'Ivoire;France;Ghana;Nigeria;Senegal;Serbia;United Kingdom	No	To improve our understanding of genetic information for key coastal fish species across West Africa. See more info https://www.ird.fr/irn-wamba-net-west-african-marine-fish-dna-barcoding-network

Sustainable Financing

Sustainable financing mechanisms generate funding for the long-term (generally five or more years). These include, but are not limited to, conservation trust funds, debt-for-nature swaps, payment for ecosystem services (PES) schemes, and other revenue, fee or tax schemes that generate long-term funding for conservation.

Name of Mechanism	Purpose	Date Established	Description	Country/ Countries	Project Intervention	Delivery of Funds?

Globally Threatened Species

Globally threatened species (CR, EN, VU) on the IUCN Red List of Threatened Species, benefitting from the project.

Genus	Species	Common Name (English)	Status	Intervention	Population Trend at Site
Enteromius	melanotaenia		CR	Monitoring to confirm presence at key sites and support protection with staleholders in Liberia, possibility to trigger a KBA with data.	Unknown
Enteromius	carcharhinoides		CR	Monitoring to confirm presence at key sites and support protection with staleholders in Liberia, possibility to trigger a KBA with data.	Unknown
Scriptaphyosemion	schmitti		CR	eDNA monitoring confirmed presence of species in Tai National Park, possible range increase and support for further freshwater conservation around the protected area.	Increasing
Mecistops	cataphractus	African Slender-snouted Crocodile	CR	eDNA confirmed presence at key sites around Tai National Park, confirming this is a stronghold for the species.	Stable
Nimbapanchax	petersi		VU	Monitoring with stakeholders at Banco National Park confirmed the presence of this important species in a very small protected area. Reinforced support for protection of the site.	Unknown
Trichechus	senegalensis	Seacow	VU	eDNA confiemed presence of the species in the lower Bandama river and the animals moving up to 30-40km up river for feeding and possibly breeding. Data will be very useful to understand the importance of	Unknown

Genus	Species	Common Name (English)	Status	Intervention	Population Trend at Site
				these sites for the local manatee population.	
Mormyrus	subundulatus	Elephant Nose	EN	Project found the population to be healthy and across a wider range than previously expected.	Increasing
Sclerophrys	taiensis	Tai Toad	EN	Common throughout Tai National Park. Important work needed to understand how eDNA can be used to improved amphibian monitoring at key sites.	Stable
Choeropsis	liberiensis	Pygmy Hippopotamus	EN	eDNA confirmed presence at key sites around Tai National Park, confirming this is a stronghold for the species.	Stable

LESSONS LEARNED

The eDNA approach could be further promoted on a larger scale, which will contribute to the conservation of biodiversity in Cote d'Ivoire.

☐ IHE Company

Sustainability is one of the most important challenges the company IHE which is actually building the Singrobo-Ahouaty is facing based upon their Biodiversity Actions Plan (BAP). This company is integrating sustainability in their BAP because the construction of the dam is supposed to impact the Bandama river and its biodiversity. Considering sustainability may lead to influence the success of BAP. There is great interest for the innovative approach used during the project because of ease of use and cost-effectiveness.

☐ Local community

Local people around our sampling sites and fishing community become more aware of the importance of sustainable practices. We noticed their commitment to sustainability because of the presence of species of interest for conservation and commercial use and they were keen to learn the use of the techniques with the teams in the field so in the future they can be involved or contracted out for conducting surveys.

☐ Sub-grantee (Université Nangui Abrogua)

One success is the implementation of the new lab of eDNA in UNA is essential for developing collaboration between scientists and biodiversity stakeholders such us OIPR, fishery department, and private sectors (consulting companies, IHE). This lab is one in country equiped for molecular biology analyses. People come to visit the eDNA lab and request a collaboration. The use of eDNA approach implied a series of benefits for adopting this molecular technology by scientists and consulting companies, and the value added in biodiversity inventory has been considerable (time and money saving).

☐ Adminsitration

One of the success is that the aquatic biodiversity in three National Park (Tai, Comoe, Banco) has been updated. OIPR want to insert the new approach into the strategies for assessing biodiversity.

☐ Grantee (NatureMetrics)

This project has been quite the ride for us and we have leanred a lot along the way. We appreciated the support from the RIT and CEPF teams throughout and would have benefitted from additional linking with other grantee teams during the project period, possibly a quarterly call with everyone to share updates and lessons learned. The new methods established and shared by the team have been greatly appreciated by all stakeholders involved and we believe eDNA has a role to play in future proofing and baselining key projects to understand impacts (both positive and negative). Relaying the information back to key stakeholders and making it relevant is always a difficult step and one we took very seriously as we developed the project. Unfortunately the project timeframes were limiting to an extent given the complicated outputs we had to work on and additional logistics complications due to covid, meaning a lot of the data was only available at the tail end of the project.

SUSTAINABILITY/REPLICATION

Working at the forefront of technological advances in molecular monitoring methods can be quite complex in the West African context. Logistics and customs can be a nightmare and collaborations in country are essential to obtain menaningful results. By building a strong sub-grantee and involving them from the start in all decision makers and leaders in country we were able to overcome most obstacles and create a long lasting relationship that will go beyond the tieframes of the CEPF workshop. The eDNA and barcoding work can replicated on a seasonal or yearly basis and gives the opportunity to teack biodiversity change (both positive and negative) in the landscape. With a number of new projects on the horizon and new collaborations we believe the project will have the sustainability needed to achieve some of the long term impacts.

ENVIRONMENTAL AND SOCIAL SAFEGUARDS/STANDARDS

No action required, none triggered.

ADDITIONAL COMMENTS/RECOMMENDATIONS

18 months is a very short timeframe to achieve some of the desired changes needed in these landscapes.

ADDITIONAL FUNDING

Total Amount of Additional Funding Actually Secured (USD)	$20,800.00
Breakdown of Additional Funding	The additional amount provided by NatureMetrics was higher than expected but was provided none the less to make sure a very complex series of analysis and trainings could be performed by the teams involved. The project manager, barcoding lab expert and the data and reporting team all worked more hours than expected and these were not added to total project budget. Additional funding will be provided to support travle of UNA lab coordinator the the UK in September/October as VISA issues did not allow for the visit to happen during the project period so the trip will have to funded in part by NatureMetrics.

INFORMATION SHARING AND CEPF POLICY

CEPF is committed to transparent operations and to helping civil society groups share experiences, lessons learned and results. For more information about this project, you may contact the organization and/or individual listed below.

NatureMetrics - edna-inbox@naturemetrics.co.uk