

CEPF Final Completion and Impact Report

Organization's Legal Name:	"Dzermal Bijedic" University of Mostar
Project Title:	Enhancing Knowledge on Biodiversity and Assessing Ecological Status of the Lower Catchments of Neretva River, Bosnia and Herzegovina
Grant Number:	CEPF-109212
Hotspot:	Mediterranean Basin II
Strategic Direction:	2 Support the sustainable management of water catchments through integrated approaches for the conservation of threatened freshwater biodiversity
Grant Amount:	\$61,416.45
Project Dates:	November 01, 2019 - May 31, 2022
Date of Report:	October 26, 2022

IMPLEMENTATION PARTNERS

The principal partner in this project was Agency for Sustainable Development. The partnership has been established through the large grant, 109212, with Altus being a subgrantee. Established cooperation has continued through the small grant. The project activities were coordinated by Altus who also provided all travel and transportation services for duration of the project. Altus assisted in field research, data analysis, transportation of samples, staff and equipment, coordinate and organise all 'hands-on' project activities, including educational and training workshops for hunters and naturalists. All fieldwork was organised and coordinated through Altus, as well as transportation and storage of boat used for ichthyological research. This partnership proved very valuable for project team members during pandemics and outreach activities. Fish farm "Laks" proved to be another important partner in realization of project activities. They provided electroaggregate and technical support for fieldwork. Additionally they incorporated research finding into their breeding programs to focus on providing endemic fry for restocking. As the largest fish farm in the area, and commercial stakeholders, their support to the project was large. Local fishing societies were important stakeholders, although not directly involved in project activities they provided an important platform for dissemination of project findings and implementation of sustainable fishing practices. Data will be included in future water management and fish stock development plans (ribarska osnova). Members of the hunters' society have been educated on current issues and have adopted even more responsible approach to nature. Education of university students contributed to institutional capacity building. We also developed cooperation with the Institute for Schooling beyond their anticipated stakeholder capacity. They disseminated information to high schools and enticed greater interest in conservation.

CONSERVATION IMPACTS

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

Impact Description	Impact Summary
<p>Natural conditions of the project area are improved through inclusion of conservation outcomes into decision making process and increase of awareness.</p>	<p>All preconditions for full achievement of this impact have been met within the framework of the project. The knowledge database has been enhanced on ichthyofauna in all tested waterways. Current state of fish communities and population structure is now known, data is available on species abundance and numerousness, which could serve as a base for devising restocking plans in the future, by fishing societies and development of strategies for management of waters. Critical habitats for fish spawning have been identified and have been marked as areas that require special attention by NGOs and fishermen. Educational activities enabled members of hunting societies, sports fishermen, naturalists and students to devise their own approaches and contribution to sustainability. We have already witnessed increased awareness and more frequent actions of litter removal from the rivers and their shores and increased public demands for better communal services. Local conservation NGOs have been very enthusiastic about continuing conservation work. Several project proposals based on our research findings are currently being prepared by NGO "Novi val" and "Majski cvijet".</p>
<p>An effective and comprehensive long-term monitoring programme with a view of indigenous and endemic fish population conservation is produced and used in river management by local authorities.</p>	<p>We obtained data on current state of ichthyopopulations in Neretva and its tributaries including data on abundance distribution, numerousness and gender ratios for endemic and indigenous species. It was determined that population of most species is predominantly decreasing, due to various factors such as presence of introduced invasive species, speciation caused by built HPPs, loss of habitats and deteriorating ecosystem health. National and global conservation statuses have been compared. Most fish species found on the national Red list have been awarded an appropriate conservation status, many of them being listed as endangered or critically endangered which is in agreement with project findings. However despite this, little to no action is currently taken to conserve these species, which leads to continual decline in their population numbers. We established cooperation with relevant federal ministry which has issued us a permit to conduct this research and with fishing societies that manage</p>

Impact Description	Impact Summary
	waterways and fishstock. Based on the findings of this study and future research and direct conservation actions, we will contribute to establishing an effective long-term monitoring in order to conserve the species. Fish farm Laks will use data to devise breeding and restocking plans.
Local Communities in the municipalities of Mostar, Buna, Blagaj and Stolac are sensitized on freshwater biodiversity, threats to freshwater biodiversity and water quality, and some groups get organized to take actions to reduce threats.	Long term education of school children has been established through collaboration with the Insitute for Schooling and distribution of educational materials to schools, in the municipalities of Mostar, Buna, Blagaj and Stolac. Significant findings on biodiversity in the area have been shared with Biology teachers in the area. Fishing society from Mostar and university students have received relevant information, students in particular have been motivated to tackle conservation issues. In Blagaj NGO "Novi val" has received copies of the Good fishing guide which will be distributed to local community. They have also organised several actions of waste collection on Buna, Bregava and Trebizat. In Buna NGO "Majski cvijet" has organised conservation actions to fight construction on mHHP on Buna chanel. High school students in Stolac have received fieldwork education and water quality testing. Members of the hunters society from Mostar has received structured training on threats to freshwater biodiversity and water quality and have organised themseleves to take actions to reduce threats to nature.

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

Impact Description	Impact Summary
The database on freshwater biodiversity with free access created and used by at least three local stakeholders of Neretva river (BIH07) and Trebižat (BIH09) KBAs: NGO, experts, and authorities in strategic decisions.	This impact has been fully achieved. We aggregated a large amount of data and devised inventory of species inhabiting this area, including their current conservation status. Database has been a little expanded from the one originally planned, which endeavoured to list fish and plant species. We included macrozoobenthos and other water-dependent animal species that commonly habitate this area. Database can be further processed in electronic format and updated as needed. It is freely available for use by experts, students, NGOs and authorities. It is advisable to refer to this database when planning future research and conservation work, and for any strategic development by authorities or other investors. The use of database has been recommended as a supplemental and useful tool for use by undergraduate and graduate students at the Department of Biology Dzemaal

Impact Description	Impact Summary
	Bijedic University of Mostar. Database will be submitted to CEPF in this form and upon approval by CEPF on Altus' and UNMO's websites. The list is not exhaustive and is a base for future updates. The list contains common species name, latin name, family, distribution range in Neretva basin and conservation status on national/global IUCN Red list, if any.
Awareness of at least 100 local fishermen about the importance of long-term conservation of endemic fish and their habitats increased and their fishing techniques made more sustainable.	We reached more than 100 local fishermen with targeted education, not limited to organised activities and events. Seminar was organized for stakeholders, 16 representatives of fishing societies who were invited to attend the presentation on the current state of ichthyofauna. The presentation was held at the university. Seminar and a dialogue session were organized for six members of local hunting societies, who found them very valuable and informative. We kept record of the willing participants on sign-off sheet, with over 100 signatures. One of the most interesting and important aspect of fieldwork was direct contact with sports fishermen who were highly interested in our work and happy to share their concerns and ideas with us. All educational materials shared with stakeholders were very welcomed. Good fishing guide was developed and shared with relevant stakeholders. Due to Covid-19 pandemics and strict epidemiological restrictions, educational activities, seminars and workshops could not be organised far in advance, and had to be in line with restrictions. Implementation of all our activities was planned with high degree of responsibility for our own health and the health of the participants. High numbers achieved reflect a continuous effort throughout fieldwork and outreach.
Expert evaluations for the assignment of IUCN conservation status prepared for least 20 aquatic species and communicated with local stakeholders.	This impact has not been achieved during the project. However all preconditions necessary for completion of IUCN assessment have been reached. We have completed further training that enables us to complete assessment and have all data needed for assessment. Unfortunately we are out of time to fully complete assessments for this project.
At least five local students/biologist have their knowledge on aquatic biodiversity increased.	Biology students Edis Hodzic, Ana Knezevic, Amina Krhan, Anida Zlomuzica and Emina Lulic have made contribution to the project and have been educated in fieldwork, data analysis, conservation priorities and report writing.
Cooperation of ecologists and biologists from two autonomous entities, Federation of Bosna and Hercegovina and Republika Srpska, strengthened.	This impact has not been achieved. Initially, we planned to further our cooperation with Centar za životnu sredinu from Banja Luka that was initiated at the CEPF meeting in Tomislavgrad. We suggested that memorandum of understanding should be signed between institutions, joint fieldwork should

Impact Description	Impact Summary
	be organised resulting in production of a short video clip. However, due to covid-19 pandemics during our first year of research, were we limited in activities that we could organise. Due to distance between Mostar and Banja Luka we were unable to establish joint fieldwork. Colleagues from Banja Luka suggested that we include our data in their publication, but our results could not be available for publishing in time for their planned publication, because our reaseach required two seasons to be considered complete. We hope to have a more productive cooperation in future.
Information on plants from Buna river area improved, included in database and accessible to stakeholders.	This impact has been fully achieved, data included in gallery, database and botanical reports.

Unexpected impacts (positive or negative)?

Altus established cooperation with National and University Library of Bosnia and Herzegovina, and registered as publishers. The library has recognised importance of our research results as an important addition to scientific literature in Bosnia and Herzegovina and approved publication of final project results.

NGO "Novi val" approached us to establish cooperation and present our project in their series of video clips produced as part of their project financed by Swedish embassy. We were of course very happy to collaborate.

Link: https://www.youtube.com/watch?v=H5N0uKBhOec&ab_channel=EkoHubBlagaj

Collaboration started with management of Nature park "Kravica" at Trebizat. They wish to use our data in their promotional materials.

Pandemics caused people to spend more time outdoors, engaging in various activities in the nature, hence we encountered a larger number of sports fishermen and nature lovers that we would have normally, and that increased our outreach and dissemination of information.

Representatives of the Swedish embassy were impressed with the project and results especially the fact that it was financed by CEPF, so they accompanied us on water quality monitoring fieldtrip. We discussed further funding possibilities with them and shared our knowledge and experience.

Management at Kravica was very welcoming to our team during our fieldwork, expressed their interest in furthering the cooperation and allowed us access to the park without having to pay the admission fee.

Pandemics disrupted our activity schedule and required certain adjustments to be made. Restrictions were imposed which limited a number of passengers in cars, at certain times travel to and from certain municipalities was restricted, but we managed to work around it as we were committed to achieving the best possible results.

PROJECT RESULTS/DELIVERABLES

Overall results of the project:

The research and fieldwork activities conducted through this project have shown current state of ichthyopopulation in lower catchments of Neretva and its tributaries. We collected

data on population structure, numerousness, distribution, recorded which species were observed. The condition of waterways has also been assessed, along with ecosystem quality. The immediate threats to long-term sustainability of ecosystems and habitats have been identified. The quality of water from chemical physical, and microbiological aspects has been analysed. In general, data provides a base for further development strategies of urban development, freshwater management plans, restocking of rivers and development of tourist offers. Plan of protection and conservation of rivers, provided sound scientific evidence and materials that will assist in reaching wider audience long after the project has been completed. Educational tools will serve future high schools and university students to expand their base of knowledge. Information provided through this project can also provide invaluable guidance for new conservation projects which would plan direct conservation actions with the aim of conserving specific species. The project contributed to enhancing general knowledge on biodiversity of the researched area and established updated database with relevant information readily available to interested stakeholders.

The project enabled us to narrow the knowledge gap and continue research in order to valorise conservation value of this natural resource and its diverse aquatic wildlife, allowed us to work with the local community and further raise public awareness through educational programs and dissemination of research findings. Despite its exceptional conservation value the waterways in the area are highly endangered along with their unique freshwater fauna. The

concern is that the majority of natural attributes that mark this area as significant will be permanently lost. Hence improved knowledge on aquatic fauna and its conservation value, with focus on education and collaboration with relevant authorities, high schools, NGOs, the local community and other stakeholders contributed to addressing key threats by highlighting the conservation of nature and its importance for further development of the region. This project compiled data on the current state of ecosystems whilst taking into account existing threats. The aim was to compile a comprehensive list of coastal flora and aquatic fauna, determine conservation status of the species, assess ecological status of diverse habitats and ecosystems. Detailed research provided data on current status of indigenous, endemic and allochthonous fish species, with a view of creating comprehensive inventory of ichthyofauna, determining degree of vulnerability and its causes. Good fishing guide was developed based on research data, literature search and discussions with stakeholders.

Water quality was assessed on all seven rivers and two lakes on a monthly basis over a twenty month period. This have us a cocprehensive understanding not only of the trends of the quality of water in these waterways, but also condition of ecosystems as habitats for fish and other aquatic organisms. Microbiological pollution trends were also assessed. Macroinvertebrate surveys have been completed which enabled us to calculate biodiversity indices and state of ecosystems using macrozoobenthos as biodindicators of ecosystem health.

Botanical surveys have been completed adding value to database of aquatic biodiversity and enhancing knowledge on plant species in the area.

Scientific articles have been published, increasing value of the project and making data available for wider range of stakeholders.

Results for each deliverable:

Component		Deliverable		
#	Description	#	Description	Results for Deliverable
1.0	RESEARCH: IMPROVING THE KNOWLEDGE ON FRESHWATER BIODIVERSITY	1.1	A comprehensive literature review on fish communities and ecological status of waterways in the area produced including historical and recent data.	The literature review has been written based on recent and historical published data on fish communities in the area. The report has been submitted as part of July 2020 Progress report. This review has set up the framework of the project and allowed comparative analysis to be performed. In any research it is essential to know in the start, which published data is at our disposal.
1.0	RESEARCH: IMPROVING THE KNOWLEDGE ON FRESHWATER BIODIVERSITY	1.2	Database on ichthyofauna created with a photo gallery of at least 20 freshwater species, and three reports on fields trips.	This deliverable has been fully achieved. Database on freshwater biodiversity has been created in word format in tabular form and is open to further content and design updates. Database will be submitted to CEPF in this form and upon approval by CEPF on Altus' and UNMO's websites. We included in the database, not only species observed during this project, but also other species confirmed to commonly populate this area. Database is organised as one document, divided into four parts. The first part lists fish species, followed by plants, macrozoobenthos and other animals. The list is not exhaustive and is a base for future updates. The list contains common species name, latin name, family, distribution range in Nerteva basin and conservation status on national/global IUCN Red list, if any.

Component		Deliverable		
#	Description	#	Description	Results for Deliverable
3.0	CAPACITY BUILDING AND PROJECT ADMINISTRATION	3.1	CSTT/GTT filled up and sent to CEPF at beginning and end of project.	Required forms have been completed and submitted at beginning and end of project.
3.0	CAPACITY BUILDING AND PROJECT ADMINISTRATION	3.2	Final Completion and Impacts Report filled up and submitted at the end of the project.	Final Completion and Impact Report is ongoing process.
3.0	CAPACITY BUILDING AND PROJECT ADMINISTRATION	3.3	Detailed plan of activities, financial and administrative documents.	All documents pertaining to project activities, finances and administration is archived at UNMO, as per standard protocols for all projects. Project activities were planned and adjusted in view of achieving the highest possible standard of deliverables under any given circumstances. Activities were summarised and included in timesheets on a monthly basis. All financial documents, detailed transaction reports, receipts, supporting documents, bank statements from dedicated bank account are archived. All administrative documents related to various project activities, procurement of equipment, health and safety protocols, etc are archived.
1.0	RESEARCH: IMPROVING THE KNOWLEDGE ON FRESHWATER BIODIVERSITY	1.3	A report on the most significant findings on aquatic biodiversity in the Neretva basin produced and shared with stakeholders.	Most significant findings have been included in Good fishing guide and shared with stakeholders.
2.0	EDUCATION, PROMOTION AND KNOWLEDGE SHARING	2.1	Good practice manual for sport fishing and educational brochures on freshwater biodiversity and	Good fishing guide has been created and printed, as an educational tool and a handy guide for all current and aspiring recreational fishermen, anglers and nature lovers as

Component		Deliverable		
#	Description	#	Description	Results for Deliverable
			conservation of waterways, produced.	stakeholders. It was developed after two seasons of fieldwork, where we met many local fishermen and naturalists, listened to their complaints, advice and wishes for clean rivers and environment. After collecting data from the field, and having had numerous conversations with them, we developed this guide taking into account their interests and level of knowledge, whilst paying special attention to usefulness and useability of this guide. The guide has been written in simple language to be useable by people of all ages and to allow for different levels of education and general knowledge.
2.0	EDUCATION, PROMOTION AND KNOWLEDGE SHARING	2.2	At least three scientific articles published/presented in reputable journals/international conferences.	Articles have been published.
2.0	EDUCATION, PROMOTION AND KNOWLEDGE SHARING	2.3	Report (poster or presentation) from participation to CEPF grantee meetings and exchanges.	Due to covid-19 pandemics, there were not many organised events. We participated in conference organised by ReReC in July 2021 and May 2022 and online workshop in April 2022 organised by WWF Mostar.
3.0	CAPACITY BUILDING AND PROJECT ADMINISTRATION	3.4	Minutes of workshops and meetings with administration on steps that could be taken to improve situation.	Minutes from the meetings have been compiled into one report.
3.0	CAPACITY BUILDING AND PROJECT ADMINISTRATION	3.5	METT form filled up and sent to CEPF at initial stages of the project.	METT form has been filled out and submitted both at the beginning and end of project.

Component		Deliverable		
#	Description	#	Description	Results for Deliverable
3.0	CAPACITY BUILDING AND PROJECT ADMINISTRATION	3.6	Monthly reports on management of Subgrant.	All documents pertaining to management of subgrant have been submitted to UNMO on quarterly basis up until 1 April 2021, when management of subgrant was transferred to Small Grant 112817. Subgrant organised project team meetings, including coordination of all activities related to field trips, health and safety measures, maintenance and calibration of electrodes for water quality monitoring, sign-off sheets for fieldwork, vehicle log book detailing use of vehicle in the past quarter including purpose of the trip and mileage, as well as servicing and repairs of the vehicle. Detailed financial reports were written quarterly and regularly submitted. All documentation related to organised workshops have been submitted, including seminar and dialogue session for the members of a hunting society and also educational activities, dissemination of materials implemented through the Institute for Schooling, education and fieldwork with young naturalists.
3.0	CAPACITY BUILDING AND PROJECT ADMINISTRATION	3.7	A complaint mechanism put in place and informations shared with local stakeholders.	Complaint mechanism has been put in place and information shared with stakeholders.
4.0	ALTUS: PARTNERSHIP AND SUBGRANT MANAGEMENT	4.1	Subgrant agreement signed between ALTUS and UNMO.	Subgrant agreement between Altus and UNMO had been signed on 9 January 2020.
4.0	ALTUS: PARTNERSHIP AND SUBGRANT MANAGEMENT	4.2	All deliverables available in English.	All deliverables during the project have been written or translated into English. This deliverable has been fully achieved.

Component		Deliverable		
#	Description	#	Description	Results for Deliverable
4.0	ALTUS: PARTNERSHIP AND SUBGRANT MANAGEMENT	4.3	All documents pertaining to organisation and coordination of project activities, fieldwork and transportation, submitted to UNMO.	This deliverable belongs to Component 4 related to management of subgrant. All documents pertaining to organisation and coordination of project activities, fieldwork and transportation have been submitted to UNMO on quarterly basis up until 1 April 2021, when management of subgrant was transferred to Small Grant 112817. Project activities were organised at team meetings, project coordination included coordination of all activities related to field trips, health and safety measures, maintenance and calibration of electrodes for water quality monitoring, sign-off sheets for fieldwork, vehicle log book detailing use of vehicle in the past quarter including purpose of the trip and mileage, as well as servicing and repairs of the vehicle. Detailed financial reports were written quarterly and regularly submitted. All documentation related to organised workshops have been submitted, including seminar and dialogue session for the members of a hunting society and also educational activities, dissemination of materials implemented through the Institute for Schooling, education and fieldwork with young naturalists.
4.0	ALTUS: PARTNERSHIP AND SUBGRANT MANAGEMENT	4.4	Minutes of monthly meetings to establish effective monitoring of project activities.	At frequent meetings of the project team, in order to effectively monitor workflow of the project, we discussed current issues and various impacts, planned implementation of project activities for the next period. We

Component		Deliverable		
#	Description	#	Description	Results for Deliverable
				<p>planned all activities at weekly, monthly and quarterly basis. This allowed us necessary flexibility to allow for any unforeseen circumstances and obstacles along the way. Dedication of the project team ensured that we successfully overcame all obstacles. Minutes from the monthly meetings helped us to keep track of all ongoing issues impeding smooth progression of project activities at a given timeline so that we could adjust our approach and act accordingly. This proved invaluable in dealing with unexpected and severe restriction imposed by the covid-19 pandemics, where we had to pay special attention to health and safety measures and protocols. Minutes have also greatly assisted us in write up of reports, data analysis and were used as a daily reminder of given schedules and tasks to be performed in effective micromanagement and implementation of project activities.</p>
4.0	ALTUS: PARTNERSHIP AND SUBGRANT MANAGEMENT	4.5	Comprehensive field report on annual water quality in the Lower Catchments of Neretva River.	<p>In order to assess the ecological situation and analyse water quality through planned monitoring program, testing was conducted every month from May 2020 to December 2021. Monitoring covered the complete cycles of seasonal variations. Sampling was conducted at river Neretva, its five tributaries and two large artificial lakes on Neretva. Aquatic ecosystems tested were: Lake Salakovac, Lake Mostar, and five rivers:</p>

Component		Deliverable		
#	Description	#	Description	Results for Deliverable
				Neretva, Radobolja, Buna, Bunica, Bregava and Trebizat. Parametres chosen are the most common ecological indicators of water quality and represent several different categories of waterway impairment: water temperature, dissolved oxygen, pH, electrical conductivity, total coliforms and Escherichia coli. Sampling was conducted at 39 sites in total across the researched area. A large amount of data was collected, which was statistically analysed. For microbiological analyses, two sites were selected at each river in order to avoid experimental bias and to collect representative samples across the research area. The sites were selected based on proximity to major microbiological pollution sources, before and after larger inhabited areas. Sampling was conducted in May and November 2021. Comprehensive report has been written up detailing all findings during the project.

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

Good fishing guide has been created and printed, as an educational tool and a handy guide for all current and aspiring recreational fishermen, anglers and nature lovers as stakeholders. It was developed after two seasons of fieldwork, where we met many local fishermen and naturalists, listened to their complaints, advice and wishes for clean rivers and environment. After collecting data from the field, and having had numerous conversations with them, we developed this guide taking into account their interests and level of knowledge, whilst paying special attention to usefulness and useability of this guide.

Database on aquatic biodiversity has been created in word format in tabular form and is open to further content and design updates. Database will be submitted to CEPF in this form and upon approval by CEPF on Altus' and UNMO's websites. We included in the database, not only species observed during this project, but also other species confirmed to commonly populate this area. Database is organised as one document, divided into four parts. The first part lists fish species, followed by plants,

macrozoobenthos and other animals. The list is not exhaustive and is a base for future updates. The list contains common species name, latin name, family, distribution range in Neretva basin and conservation status on national/global IUCN Red list, if any.

Project brochure (pocket edition), listing project aims and objectives, fish species and flora in researched area. Brochure was distributed to schools through the Institute for Schooling and interested hunters and fishermen.

Laminated cards on plants and fish species, showing most common autochthonous and allochthonous species.

Monography on river Buna as the most significant fish nursery in Neretva River basin, important also for macroinvertebrate biodiversity, to be used as a textbook for university students.

Published scientific articles

Report on critical habitat / biodiversity assessment

Comprehensive water quality report and statistical data

Ichthyological reports

Botanical reports

Index of biodiversity

PORTFOLIO INDICATORS

Portfolio Indicator Number	Portfolio Indicator Description	Expected Numerical Contribution	Expected Contribution Description	Actual Numerical Contribution	Actual Contribution Description
2.1	Number of threatened freshwater species seeing status improved (i.e., short-term increase in population and/or breeding success)			4	Four threatened fish species found in Jasenica river were translocated into Neretva river during summer 2021, when large part of the river Jasenica dried up to severe heat and operation of reversible mHPP at its

Portfolio Indicator Number	Portfolio Indicator Description	Expected Numerical Contribution	Expected Contribution Description	Actual Numerical Contribution	Actual Contribution Description
					source. This should ensure that its numbers should at least be stable in the near and foreseeable future, as the breeding stock was enlarged. Four fish species were Leuciscus svallize (Heckel et Kner, 1858), Leuciscus cephalus albus (Bonaparte, 1838), Chondrostoma kneri (Heckel, 1843), Phoxinus phoxinus (Linneaus,1758). Stranded endemic Salmonid fry was also rescued at Bunica river source, however it was a sporadic activity.
2.4	Number of Freshwater KBAs in priority CMZ with improved information on biodiversity, shared with stakeholders			2	Key biodiversity areas: Trebizat River Tributary (BIH 09) and Neretva River (BIH07). Results of the project show which fish species are present in each of researched waterways, their abundance, distribution, numerousness and gender ratio with particular emphasis on endemic species. Impacts of HPPs on population structure have been examined. Scarce data on biodiversity of

Portfolio Indicator Number	Portfolio Indicator Description	Expected Numerical Contribution	Expected Contribution Description	Actual Numerical Contribution	Actual Contribution Description
					macroinvertebrates has been improved by this project, including calculation of biodiversity indices. Critical habitat / biodiversity assessment report completes data on significant freshwater habitats in the area which should be awarded priority conservation strategies. Information and knowledge on the plant species present in the area has also been enhanced through plant surveys and inventories conducted on assessed rivers, as well as thorough creation of database, which compiles knowledge on freshwater biodiversity of the area. Plant and fish galleries, Good fishing guide, project brochure and laminated cards, created as educational and informative tools, significantly improve information on biodiversity in the area. All project tools have been shared with stakeholders.
4.6	Number of KBAs for which information on plants is improved			2	Key biodiversity areas: Trebizat River Tributary (BIH 09) and Neretva River (BIH07).

Portfolio Indicator Number	Portfolio Indicator Description	Expected Numerical Contribution	Expected Contribution Description	Actual Numerical Contribution	Actual Contribution Description
					<p>Compiled data from surveys conducted on plant species present in the area have been completed. They include plant biodiversity assessments that have been conducted on the river Neretva (within the City of Mostar), and its tributaries, rivers Radobolja, Buna, Bunica, and Trebizat. Surveys show which riparian plant species are most commonly present in the area. River Neretva's riparian belt show typical Neretvian bushes and shrubbery. Database on freshwater biodiversity includes updated information on plants that have been commonly observed in wider research area. It includes latin name, common name, IUCN conservation status and National RedList status. Research results do not show significant differences between plant species present along rivers across the researched area. This project contributed to enhancing knowledge on plant species in the area.</p>

Portfolio Indicator Number	Portfolio Indicator Description	Expected Numerical Contribution	Expected Contribution Description	Actual Numerical Contribution	Actual Contribution Description
2.2	Number of priority CMZ where community stakeholders (e.g., fishers, farmers, etc.) receive economic benefits from adopting practices with positive impacts on biodiversity			2	<p>Catchment management zones: Trebizat drainage including Imotsko polje, Tributaries of Lower and Middle Neretva, Part of the Neretva upper catchment, Part of the Neretva upper catchment - eastern mid catchment.</p> <p>Good fishing guide as an instruction manual, educational activities and dissemination of knowledge should significantly improve adoption of biodiversity-friendly fishing practices across communities in Mostar, Salakovac, Buna, Blagaj, Kosor and Stolac. Breeding programs in fish farm Laks will be updated in line with our research data. Fishing practices have thus been improved throughout the region, which can also be utilised for development of ecotourism, as it is already a significant area of interest for the local communities and their economic development. Further development of ecotouristic activities will include various sports fishing competitions, which</p>

Portfolio Indicator Number	Portfolio Indicator Description	Expected Numerical Contribution	Expected Contribution Description	Actual Numerical Contribution	Actual Contribution Description
					are already in planning in cooperation of the Fishing Society and Mostar City Council. Particular areas of interest are Buna and Bunica.
2.0				800	KBA Neretva River (BIH07): improved management on 500 ha with increased efforts of cleaning litter from the river banks through organized actions by local communities, NGOs and authorities, awareness raising, ecotourism opportunities have been highlighted through adoption of more sustainable and biodiversity-friendly practices in sports fishing. Fish farm Laks which conducts regular restocking with selected fish species will adapt its breeding programs in line with research results, thus directly enhancing management of fish stock in Neretva and its tributaries. The focus of future restocking programs with Fishing Society will be placed on increasing endemic fish numbers,

Portfolio Indicator Number	Portfolio Indicator Description	Expected Numerical Contribution	Expected Contribution Description	Actual Numerical Contribution	Actual Contribution Description
					<p>which have been shown to be decreasing.</p> <p>KBA Trebizat (BIH09) improved management for 300 ha encompassing natural park "Kravica", due to enhanced knowledge on plant and fish species in the area. Information has been shared with management who will use them to enhance their ecotouristic offers and management activities.</p>

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
Neretva River	BIH07		500
Trebižat	BIH09		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
Bunica Source + Buna channels - delta of river Buna into Neretva	43	17	1,000	The size of the area refers to sources of rivers Buna and Bunica, their watercourses, as well as Buna's channels on the river Neretva where fishing takes place. Data from our research has significantly contributed to the City of Mostar revoking permits for planned construction of mHPPs at this site and completely deleting them from the Municipality's development strategy. Data significantly improved knowledge on biodiversity and water quality of the Bunica Rivers and especially its Source.

Benefits to Individuals

- **Structured Training:**

Number of Men Trained	Number of Women Trained	Topics of Training
180	20	Biodiversity of the lower catchment of Neretva River; critical habitats; index of macroinvertebrate biodiversity; state of ecosystems; population of fish species and water quality monitoring; microbiological analyses and water quality; impact of HPPs on Neretva, especially impacts on microclimate, increased humidity and high water temperatures in summer; fragmentation of fish populations; data on vegetation; endemic fish; coastal vegetation; fieldwork with emphasis on practical experience and good practices; good fishing practices; endemic plants; conservation of biodiversity; conservation and management of fresh water. Eight Biology students participated in project activities directly, seventeen benefited from seminars and enhanced knowledge.

- **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				
Salakovac	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Bosnia and Herzegovina	15	6
Trebizat	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Bosnia and Herzegovina	40	6
Stolac	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Bosnia and Herzegovina	72	41	
Blagaj-Buna	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Bosnia and Herzegovina	68	23	
Jasenica	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Bosnia and Herzegovina	35	0	

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			
Ilici	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Bosnia and Herzegovina	15	0				
Mostar	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Bosnia and Herzegovina	10	15				

Characteristics of "Other" Communities:

- Salakovac: Rural
- Stolac: Rural
- Blagaj-Buna: Rural
- Jasenica: Rural

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	
1	Zakon o prostornom uređenju ("Službene novine Hercegovačko-neretvanske županije", broj: 4/04); amendments in 2012 provided for zones for the	Local	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						

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

“Other” Topics Addressed by the Policy, Law or Regulation:

No.	Country/ Countries	Date Enacted/ Amended	Expected impact	Action Performed to Achieve the Enactment/ Amendment
1	Bosnia and Herzegovina	December 29, 2022	The changes foresee the deletion of the small hydropower plants Buna 1 and 2 from the existing Spatial Plan of the City of Mostar - likely to be fully revoked.	Our research data on ichthyofauna, water quality and critical habitats were used to support affiliated NGOs and citizens in fight to prevent construction of mHPPs

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
Fish farm "Laks"	Adjusting breeding programs and planned restocking in accordance with data on distribution and community structure of ichthyofauna in Neretva basin.	Bosnia and Herzegovina

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
Agency for Sustainable Development Altus Mostar	2018	Bosnia and Herzegovina	No	Collaboration of scientific field research, outreach activities and education
Fish farm Laks	2005	Bosnia and Herzegovina	No	Collaboration on ichthyological research and breeding programs, fieldwork stations for students
NGO Novi val	2015	Bosnia and Herzegovina	No	Collaboration on research and educational activities, fieldwork station for students

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
Salmo	obtusirostris	Soft-muzzled trout	EN	Rescuing fry stranded after autumn flood, obtaining data on numerosness, gender ratio and distribution in the area	Decreasing
Squalius	svallize	Neretva chub	VU	Obtained data on numerosness, gender ratio and distribution in the area. Joint efforts were made with Fishing Society to organize translocation of fish populations that were captured in parts of the river Jasenica after it dried up, to the river Neretva. This was one of the conservation efforts to save stranded fish species.	Decreasing
Chondrostoma	knerii	Dalmation nase	VU	Joint efforts were made with Fishing Society to organize translocation of fish populations that were captured in parts of the river Jasenica after it dried up, to the river Neretva. This was one of the conservation efforts to save stranded fish species. Obtained data on numerosness, gender ration and distribution in the area.	Decreasing
Anguilla	anguilla	European eel	CR	species monitoring	Decreasing

LESSONS LEARNED

The concept of the project and its design are very simple. The project focused on enhancing knowledge on freshwater biodiversity through research and fieldwork, as a baseline study focused on ichthyology. It is well known that ichthyological fieldwork is very demanding and challenging, professional equipment and expertise are necessary. It is impossible to predict size of a catch on a particular day. Research season for ichthyology was limited from April to October, and the fieldwork across a large area on large waterbodies that we worked on was very intense and demanding. If we were planning a similar project again, we would decrease the size of an area or plan our budget to be more cost effective.

Implementation of the project was smooth, in the most part owing to dedication, good cooperation and skills of our team members, as well as excellent collaboration with CEPF. That bond proved crucial when we encountered problems with rector of the university, who breached subgrant agreement. Support that we received from CEPF during those challenging times was what enabled us to implement all planned activities. It is also important not to devise activities and deliverables, implementation of which depends on expertise of one person. E.g., red list assessments were planned as deliverables, as one of the original team members had sufficient expertise to conduct them at least on the national/regional level. However, he had to leave the project before its finalization for personal reasons. Our own workload was very high, which allowed us little time for extra tasks. We embarked upon IUCN training and our level of expertise is now sufficient to attempt the assessment, but unfortunately, we are running out of time. Alternatively we could have made a provision in the budget which would allow us to hire an independent consultant with enough expertise to complete the assessment. If we had a chance to do another project at this level, the budget itself would be simpler and more flexible.

Our fieldwork was carried out impeccably, due to high level of enthusiasm and interest of team members. However, we very left with not enough needed expertise for deskwork, the amount of which proved to be much greater than we originally anticipated. Expert reports are needed for a high level donor such as CEPF.

Collaboration with university was very beneficial to both parties. Mechanism for subgrant functioning should be more clearly defined between the parties, to allow more direct protection to subgrantee.

The concept of the project and its design are very simple. The project focused on enhancing knowledge on freshwater biodiversity through research and fieldwork, as a baseline study focused on ichthyology. It is well known that ichthyological fieldwork is very demanding and challenging, professional equipment and expertise are necessary. It is impossible to predict size of a catch on a particular day. Research season for ichthyology was limited from April to October, and the fieldwork across a large area on large waterbodies that we worked on was very intense and demanding. If we were planning a similar project again, we would decrease the size of an area or plan our budget to be more cost effective.

Implementation of the project was smooth, in the most part owing to dedication, good cooperation and skills of our team members, as well as excellent collaboration with CEPF. That bond proved crucial when we encountered problems with rector of the university, who breached subgrant agreement. Support that we received from CEPF during those challenging times was what enabled us to implement all planned activities.

It is also important not to devise activities and deliverables, implementation of which depends on expertise of one person. E.g., red list assessments were planned as deliverables, as one of the original team members had sufficient expertise to conduct them at least on the national/regional level. However, he had to leave the project before its finalization for personal reasons. Our own workload was very high, which allowed us little time for extra tasks. We embarked upon IUCN training and our level of expertise is now sufficient to complete assessment, but unfortunately, we are running out of time. Alternatively we could have made a provision in the budget which would allow us to hire an independent consultant with enough expertise to complete the assessment. If we had a chance to do another project at this level, the budget itself would be simpler and more flexible.

The fieldwork was carried out impeccably, due to high level of enthusiasm and interest of staff. However, we collected a large amount of data which needed to be compiled and analysed and we found ourselves with a greater amount of deskwork than we originally anticipated. Expert reports are needed for a high- level donor such as CEPF.

Collaboration with university was very beneficial to both parties. Mechanism for subgrant functioning should be more clearly defined between the parties and allow more protection to subgrantee.

Altus has gained significant experience in project management, project coordination, reporting, and financial management.

Negative impact was pandemics and its restrictions, due to which were we not able to visit schools personally and organize presentations and workshops for students. However, this led us to turn to Institute for Schooling, establish collaboration with them, distribute our educational tools for schools through the Institute and also to hold a seminar for Biology teachers, which increased visibility of the project and dissemination of materials to a wider circle of stakeholders than originally planned.

SUSTAINABILITY/REPLICATION

The project has been designed with objective of long-term sustainability. It was planned that knowledge and obtained data will be shared with relevant stakeholders in order to diversify activities from the start. With this project we attempted to raise ecological awareness of stakeholders, especially those that are in direct and frequent contact with water and are avid water users, such as fishermen, hunters and naturalists, as well as local inhabitants for benefits of an entire community in general. Authorities, through the fishing societies that are in charge of water management will be able to take into account research data in creation of sustainable management plans. Collaboration with local NGOs has proved to be mutually beneficial for all concerned parties, providing opportunities to share knowledge and experience. During floral research we established cooperation with management of the Park „Kravica“, at river Trebizat. They expressed interest in using our data on vegetation in this area for their promotional material. High school students gained enhanced knowledge. Educational materials were distributed to schools through Institute for Schooling. University students gained practical and hand-on conservation and research experience in fieldwork, taxonomic determination, data analysis and write up of reports.

ENVIRONMENTAL AND SOCIAL SAFEGUARDS/STANDARDS

ADDITIONAL COMMENTS/RECOMMENDATIONS

Communication with CEPF has been excellent throughout the project. All CEPF staff that we came in contact with have always been very helpful, able to provide us with the right and timely information, ready to answer any question we had and to guide us to achieve the best possible outcomes in any situation. It was easy and flexible to schedule online meetings and receive help and any needed information on time.

ADDITIONAL FUNDING

Total Amount of Additional Funding Actually Secured (USD)	\$0.00
Breakdown of Additional Funding	

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.

Dzermal Bijedic University of Mostar, www.unmo.ba