Action Plan on Key Biodiversity Area (KBA) for Conservation of Golden Mahseer.

Pemagatshel Division

(2023-2033)

=Pemagatshel Forest Division
Department of Forests and Park Services
Ministry of Energy and Natural Resources

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Ministry of Energy and Natural Resources
Department of Forests and Park Services
Royal Government Endorsement and Approval

Action Plan on Key Biodiversity Area for Conservation of Golden Mahseer

1st July 2023 – 30th June 2033.

"In accordance with and as per the provisions of the Forest and Nature Conservation Act of Bhutan, 1995"

Submitted for Approval

Chief Forestry Officer
Pema Gatshel Forest Division

Forwarded for Approval

Chief Forestry Officer
Nature Conservation Division

Approved by

DIRECTOR
Department of Forests and Park Services

FOREWORD

Bhutan's rich biodiversity has been secured by the network of protected areas for the past many decades. However, the state of forests and biodiversity are equally rich beyond the protected areas in Bhutan. On the contrary, the areas beyond protected areas faces considerable threats from anthropogenic disturbances and economic development, and this poses risk to many globally threatened habitats and species found therein. Across the globe, such areas of conservation significance have been addressed by the "other effective area-based conservation measures" or OECMs, an area set aside towards achieving the long term and effective in-situ conservation of biodiversity outside of protected areas. OECMs complement protected areas through sustained, positive conservation outcomes, even though they may be managed primarily for other reasons.

The Key Biodiversity Areas (KBA) in Bhutan, at a global scale is part of the OECMs and is, therefore, adopted towards securing conservation of areas and species that are of conservation significance in Bhutan. Of the many potential KBA sites in the country, the Department has identified and prioritized 11 sites in various Divisional Forest Offices, that requires urgent conservation interventions. For these 11 sites, key interventions have been identified, and has been and is being presented in this conservation action plan as per the guidelines on KBA. The KBA sites classified will serve as in-situ conservation of biodiversity beyond the protected areas.

These classified KBAs are expected to bring in improved conservation outcomes, that are crucial for the functioning of the environment through the provision of essential ecosystem services. It is essential for the processes that support all life on Earth, including humans. These KBAs are expected to address the issues of biodiversity loss and ecosystem degradation due to threats such as pollution, overexploitation of natural resources, introduction of invasive species and habitat loss.

I am happy to note that we continue to prioritize conserving our natural resources, while balancing ourselves with the need to economically develop the nation. I applaud all concerned officials from the Department for coming up with this conservation action for the first set of KBAs classified in the country and wish you all success in implementing the actions.

(Lobzang Dorji)

Director

ACRONYMS

KBA	Key Biodiversity Area
BFL	Bhutan for Life
WWF	World Wildlife Fund
RGoB	Royal Government of Bhutan
DAO	Dzongkhag Agriculture Office
WMD	Watershed Management Division
NCD	Nature Conservation Division
RO	Range Office
E-Flow	Environmental Flow
TDS	Total Dissolve Solvent
PH	Potential of Hydrogen
OD	Dissolve Oxygen
DoFPS	Department of Forest and Park Services
DFO	Divisional Forest Office
BTFEC	Bhutan Trust Fund for Environment Conversation
UNDP	United Nation Development Program

TABLE OF CONTENT

CHAPTER 1: INTRODUCTION

1.1. Background (description of KBA site)

The Key Biodiversity Area (KBA) is an area identified for conservation and management that would contribute significantly to the global persistence of biodiversity. The Kerong river at Nganglam under Pemagatshel Dzongkhag was identified as KBA for conservation of Golden Mahseer (*Tor putitora*). The KBA covers 0.226 km^2 (22.61 Ha) with a linear distance of 22.8 km spanning from Dezama top to Drangmichu (Gongri) confluence. The river originates from Kerong village of Chokhorling Gewog and passes by Dezama village of Norbugang Gewog. The river is fed by about seven numerous tributaries streams WMD (2021) before entering Nganglam town. The river meanders through the heart of Thromdey area and finally feed as tributary river in Drangmichu river basin. Kerong river was observed to be under tremendous pressure due to various threat posed by illegal fishing, water pollution and habitat disturbance resulted due to expansion of settlement areas, industrial growth and various developmental activities.

Kerong and Dezama community of Chokhorling Gewog, Menchu & Gashari community of Norbugang Gewog and Ronowoong community under Decheling Gewog are the five upstream communities that contributes significantly in water pollution either through means of direct or indirect threats. The estimated population of up-stream community is approximately around 2529. The KBA stretch runs through the heart of Nganglam town and it is observed as one of the main polluters since almost all drainages and sewerages systems of the Thromdey residences, factories, industries and automobile workshops are drained into Kerong river. The estimated floating population of the Thromdey area is about 7500. The detail household and population records that falls within KBA are detailed in (Table 1). The industrial growth and expansion of settlement area in Nganglam Thromdey are in rapid rise, owing to which the KBA site if not brought under suitable conservation regime shall impede in thriving the viable population of the endangered Golden Mahseer in Kerong river, the KBA site.

The trigger species of the KBA is Golden Mahseer (*Tor putitora)* commonly known as Tigers of the River. The species is listed as Endangered in IUCN Red List 2018 under criteria A2abcd and categorized as endangered freshwater fish species (Batt & Pandit,2016, Jha *et al*.,2018; Pinder *et al*., 2019). In Bhutan it is found in all major rivers and the species is expected to be present at an elevation as high as 1000 m during the spawning season. In Pemagatshel, Kerong river is one of the tributaries that is used as spawning ground by Golden Mahseer (Tshewang *et al*., 2018). The species migrate from Drangmichu river to the upstream tributary (Kerong river) during monsoon season and in winter they migrate downstream back to Drangmichu river. Six species of fishes were recorded within the stretch of KBA site in Kerong river based on the recent fish survey and assessment (Fish survey report, 2022) conducted for the development of KBA action plan. The presence absence information on species, individual count and abundancy are as detailed under (Table-2).

Table 1- Household and population estimate of the up-stream communities

Sl/no	Up-stream community	Gewog/Thromdey	Household	Estimated population
1	Nganglam Thromdey	Thromdey	190	7500
2	Dzema	Chokhorling	61	500
3	Kerong	Chokhorling	64	457
4	Gashari	Norbugang	155	1200
6	Menchu	Norbugang	90	300
5	Rongnawoong	Decheling	32	72

Table 2- Fish species and individual count in KBA site

Species	Count	pi	ln (Pi)	Pi*(lnPi)
Neolissochilus hexagonolepis	125	0.828	-0.189	-0.156
Barilius barna	2	0.013	-4.324	-0.057
Garra annandalei	7	0.046	-3.071	-0.142
Garra birostris	21	0.139	-1.973	-0.274
Psilorhynchus homaloptera	1	0.007	-5.017	-0.033
Tor putitora	1	0.007	-5.017	-0.033
	H'			**-0.697**

1.2. KBA Map for conservation for Golden Mahseer in Kerong river

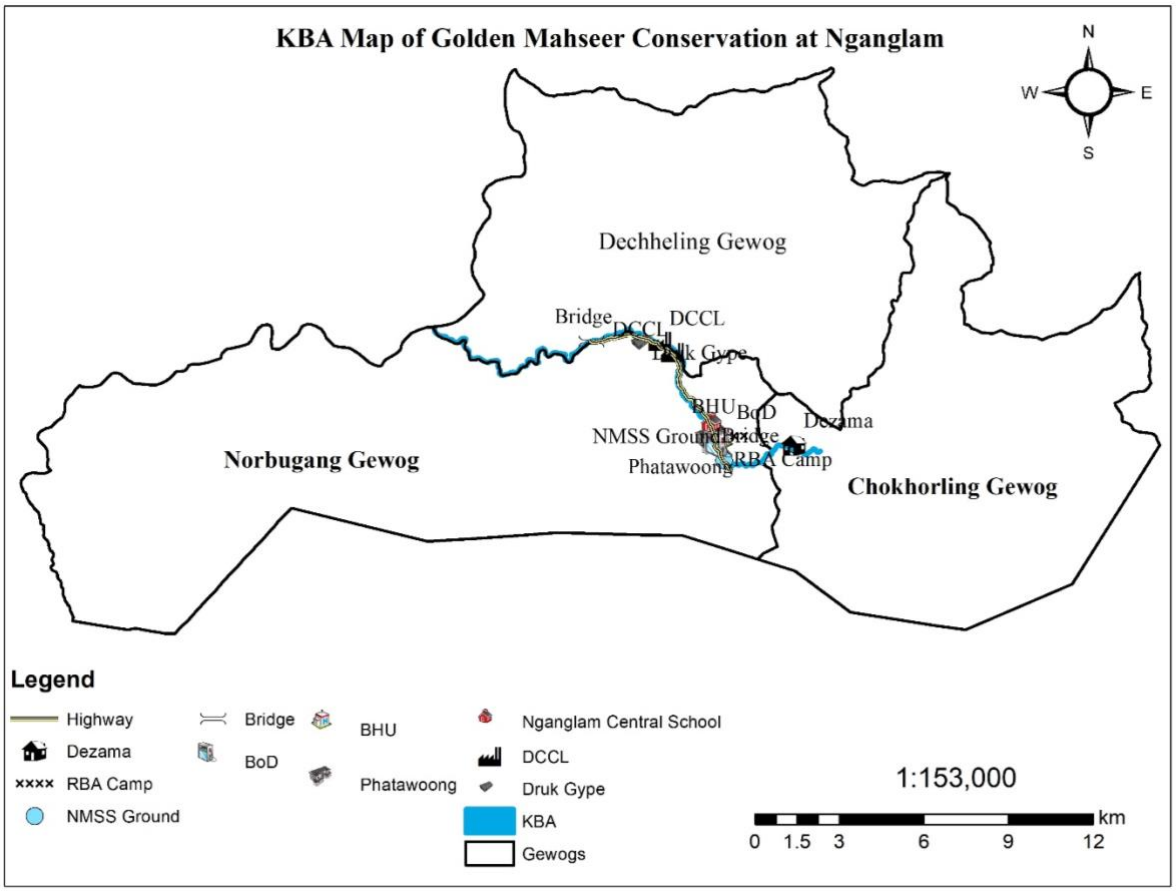

Figure 1- KBA map for Golden Mahseer conservation

CHAPTER 2: TREATS AND CHALLENGES

2.1. Threats

The Kerong KBA site in Nganglam is one of the tributary rivers of Drangmichu where the Golden Mahseer migrate upstream for spawning. The KBA area face numerous direct and indirect threats due to industrial growth and expansion of settlement areas in and around the Thromdey areas. Using Miradi threat ranking principle, the various threats identified were ranked based on score for three dimensions of scope, severity, and irreversibility, culminating to final score. Threats were ranked as Very high (score 11-16), high (score 7-11), medium (4-6) and low (<4). Water tapping, illegal fishing and water pollution are found to the most severe threat to conservation of Golden Mahseer followed by habitat disturbance falling under medium category. Climate change, unauthorized feeding and introduction of exotic fish species were the lowest ranked threats (Table 1).

Table 3- Direct threats to Golden Mahseer and its habitats and rank of threats as determined through Miradi Threat Ranking Principle

Threats \ Targets	Protection and conservation of species & i...	Enhancement/diversification of lo...	Summary Threat Rating
Illegal fishing	High	Low	Medium
Habitat disturbance	Medium		Low
Water trapping	High		Medium
Water pollution	High	Low	Medium
Introduction of exotic fish species	Low		Low
Unauthorized feeding	Low		Low
Climate change	Low		Low
Summary Target Ratings:	High	Low	Overall Project Rating: Medium

2.1.1. Illegal fishing

Illegal fishing in Kerong river is observed to be severe since the area especially the stretch that falls within the KBA site are easily accessible and within the reach for intrusion by illegal fishman. Most people do illegal fishing due to a lack of awareness of the legal provisions available for fishing and due to limited knowledge on conservation importance of such endangered species. Sustaining their livelihood and the commercial demands are also the driving force for illegal fishing as Nganglam town being one of the commercial hubs under Pemagatshel Dzongkhag.

The use of unauthorized fishing gear such as improvised electric shockers, cast nets, gill nets, river diversion, dynamite and poisoning were encountered during fishing patrolling and observed to have direct and immediate threat to the survival of fish that may lead to wipe up whole population. The use of improvised electric shockers is now common to all illegal

fishermen since it is easy to use with assumptions to catch more fish in a short duration of time. This method has detrimental effect not only to fish but entire aquatic ecosystem.

Figure 2- *Pictorial evidences of threats pose on Golden Mahseer by illegal fishing*

2.1.2. Water tapping

Water tapping from river using water pump are very common and during our recent stakeholder consultation meeting and threat assessment exercises conducted on 8/12/2022, we found around 12 water pumps being installed inside the KBA. The automobile workshop, hoteliers and few other institutions were the entities involved in tapping waters from the rivers since they do not have adequate water source and supply for their domestic and commercial use in their firm. However, this issue if not resolved shall lead to habitat disturbance and mortality of the trigger species especially during the spawning season of Golden Mahseer, where the fingerling will be injured or killed while getting trapped in water pump. The growing population due to expansion of settlement area and industrial growth in Nganglam Thromdey is another driving force that contributes in tapping water source above and within the KBA since numerous tributaries stream were tapped as drinking water sources. Owing to which maintaining E-Flow of the Kerong river would be challenging in future unless proper planning and mitigation measures are not considered while taking up any developmental activities within the KBA site.

2.1.3. Water pollution

Water pollution are caused through point sources and non-point source. The point source pollutions in Kerong river are caused due to the effluent released directly into the river from automobile workshop, industries and factories. Dumping of solid waste and channelizing the sewerage directly into the river are few other apparent point sources pollution observed in the KBA area causing direct adverse effects on the habitat and life of the aquatic ecosystem. The Non-point sources pollutions are speculated to cause due to application of inorganic fertilizers and herbicides in upper stream communities; Kerong, Dezama, Menchu, Gashari and Ronowoong. The impact of river pollution is found negligible in the current scenario since the

water quality test conducted recently during biodiversity assessment on 16/08/2022 revealed that TDS, PH, DO and Salinity are observed to be in normal Range. However, the rapid industrial growth, expansion of settlement areas and emergent developmental activities will have serious adverse effects in the long run.

Table 4- Water test result of Kerong KBA site

Site location	Ph		TDS		Salinity		Conductivity	
	TV	NR	TV	NR	TV	NR	TV	NR
Kerongstong	8.7	7.35-7.45	163.0	300-500	102.0	< 1000	230.0	150-800
Gashariballey	8.7		139.0		87.3		195.3	
Nganglam town	8.6		115.0		72.6		161.7	
Dezama	8.4		86.5		54.9		121.5	
Average	**8.5**		**125.8**		**316.8**	**79.2**	**177.0**	
Note: TV- Test value, NR- Normal Range								

2.1.4. Habitat disturbance

The sediments from the higher water catchment areas are washed down during the precipitation and get deposited on the river/stream banks and floodplain which damages and disturbs spawning areas and holding areas of Golden Mahseer. Road widening and farm road construction are major sources of sediments that get dumped into the valleys and ultimately into the river system. Recreational activities such as high-end recreational fishing on the river, and picnicking along the riverbanks can produce ecosystem stresses (e.g., ecosystem degradation) and species stresses (such as species mortality and disturbance). Waste produced during recreational activities can also contribute to pollution cause disturbance to the fish.

2.1.5. Introduction of exotic fish species

The practice of exotic fish introduction in Bhutan are through aquaculture –food production and '*Tsethar* - on religious grounds. During the process of food production, there are cases of accidental escaping of fishes into nearby water bodies. As some of the fishes are aggressive and carnivorous, they feed on the native species. Thereby, causing fatal impacts. At the same time, they also compete for food and space. Thus, leading to the extinction of native species. In addition, the fishes released as '*Tsethar*' are never certified as disease-free.

2.1.6. Unauthorized feeding

Feeding wild animals is prohibited (RGoB, 2017) (amended 2020, 2021 & 2022). However, due to lack of awareness and out of compassion, people tend to feed fishes from nearby riverbanks and bridge points. There lies scientific evidence of such feeding practices causing negative impacts on the digestive system and reproductive capacity of aquatic biodiversity. In addition to the biological impacts, there is high probability of changing the dietary habits of the fishes, as they become dependent on easy external feeding. As a result, mahseers can be prone to easy predation/poisoning/catching thereby harming their wild population and could possibly affect the behavioural biology of the mahseers (Ullah et al. 2017).

2.1.7. Climate change

Fishes in general are very susceptible to predicted impacts of climate change. Changes in water temperature, precipitation, and water availability, increase in frequency/intensity of storms and drought can affect numerous aspects of a fish's life history (World Fish Center, 2007). Climate change can affect patterns and timings of migration, and cause range shift and phenology of mahseers. Flash Floods because of Glacial Lake Outburst Flood (GLOF) and heavy downpours also cause a lot of fish mortality.

2.2. Challenges

Three broad challenges were also identified, which hinders the conservation of Golden mahseer and KBA sites.

2.2.1. Poor stakeholder coordination and engagement

Often key stakeholders come from different backgrounds and cultures, and hence have a diverse viewpoint, culmination of which result in developing holistic conservation programmes. Conduct of periodic stakeholder coordination meetings will help us identify key solutions to diverse challenges and issues through sharing diverse experiences, findings and consultation among different agencies. Thus, such stakeholder coordination meeting can address immediate pertinent issues required to be resolved and shall have impactful conservation actions for the conservation of Golden Mahseer.

2.2.2. Limited studies and data on Golden Mahseer

Although, potential spawning sites are identified, mapped and illegal fishing hotspot are observed and identified, there need proper documentation and adequate protection and management plan. Furthermore, information on ecology (habitat and feeding preferences), (upstream and downstream migration), and reproductive biology are completely lacking and needs in depth study. Similarly, baseline information on abundance, and population structure (prior to any major human interference) is necessary for the long-term monitoring and adaptive management.

2.2.3. Weak community engagement, community support and conservation ethics

Engagement of local communities are considered vital for the success of conservation programmes and community-based conservation is the future of biodiversity protection Local communities have been dependent on water and its resources since time immemorial through fishing, river water extraction, extraction of sands, boulders and other river-bed materials and collection of drift woods and often these actions are unsustainable. Of these, illegal fishing through the use of locally fabricated fishing gears has been a major issue. The communities are, therefore usually resource use centric than conservation centric, lacking the conservation ethics. Rolling out of programmes such as recreational fishing, legalized fishing for personal consumption by the communities are vital to effectively make the locals conservation stewards. Besides, it is also vital that the opportunity be created for enhancement of local livelihood of the resident communities and youth through outreach programs and engagement in recreational activities.

CHAPTER 3: INTERVENTION PLAN

3.1 Vision and Goal

Vision: Ensuring Conservation of Golden Mahseer and its habitat

Goal: To protect and conserve Golden Mahseer in Kerong River

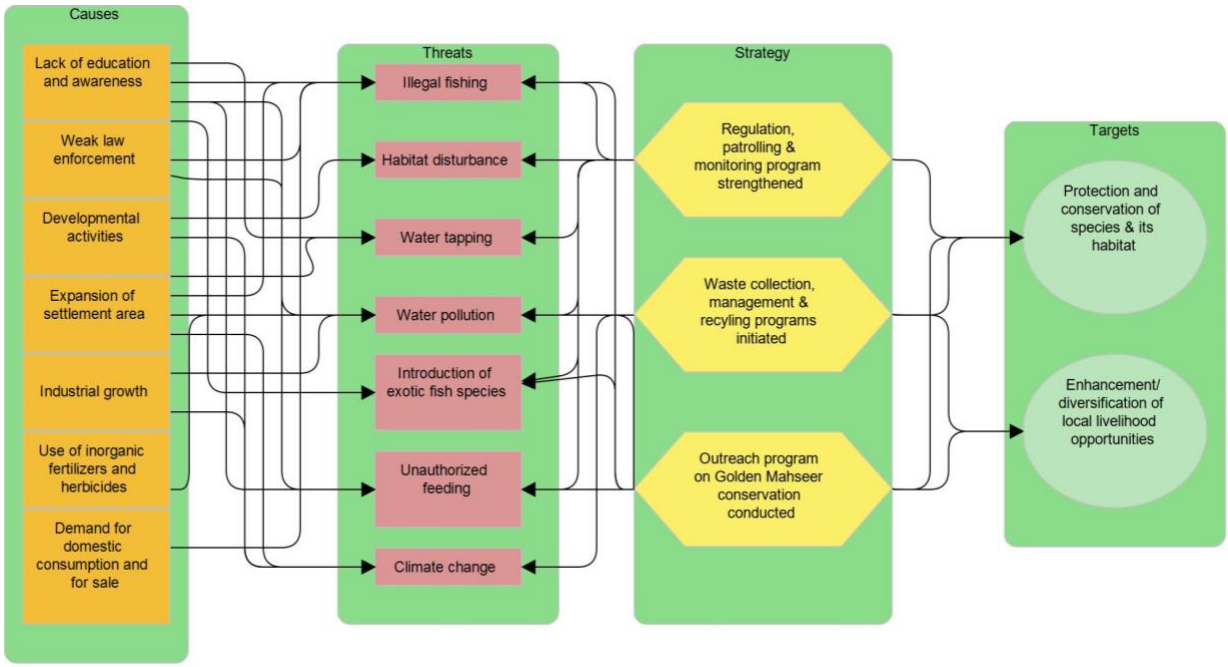

Figure 3- Conceptual framework for addressing Golden Mahseer conservation threats

3.2 Objectives

Objective 1: Protection and conservation of species and its habitat.
Golden Mahseers are migratory by its behaviour and thrives in warmer water during winter and migrates upper tributaries for spawning during summer, thus both winter and summer habitats are very crucial sites that require protection. In fulfilling this objective, two key strategies are identified:

I. Strengthening regulation, protection and monitoring program and
II. Initiating waste collection, management and recycling to conserve and protect key habitats of the Golden Mahseer.

Objective 2. Enhancement/diversification of local livelihood opportunities.
Community participation is key stake in any conservation programs since the end service user are the communities residing within the conservation areas. Therefore, in familiarizing the communities residing at upper-stream and within the KBA sites the following strategies were formulated in fulfilling the set objective.

I. Outreached program on Golden Mahseer conservation conducted
II. Initiating waste collection, management and recycling to conserve and protect key habitats of Golden Mahseer.

Table 5- Activity implementation plan and budget outlay in million

Objectives	Output	Action	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Sub-total
Objective 1. Protection and conservation of species and its habitat	Output 1.1. Protection of trigger species and habitat enhanced through regulation, patrolling & monitoring	Identify and map illegal fishing hotspot, key spawning site and overwintering areas of golden mahseer.	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15
		Intensify patrolling in key spawning site and illegal fishing hotspot.	0.01	0.01	0.01	0.01	0.05	0.05	0.05	0.02	0.02	0.02	0.25
		Restrict issuance of fishing permit during spawning season of Golden Mahseer (July to September)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Strengthen enforcement of waste regulation rules in consultation with Dzongkhag/Dungkhag administration	0.00	0.025	0.025	0.025	0.025	0.01	0.01	0.01	0.01	0.01	0.15
		Strengthen monitoring on unauthorized feeding & introduction of exotic fish species in KBA site.	0.015	0.015	0.015	0.00	0.00	0.00	0.015	0.015	0.00	0.00	0.075
		Strengthen monitoring and inspection to reduce habitat disturbance caused due to developmental activities.	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.5
		Coordinate with Dzongkhag/Dungkhag/Gewog administration to assess in ensuring minimum environment flow (E-Flow) from weirs in Kerong river.	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.01	0.04
		Coordinate and initiate prevention and control measures in consultation with Dungkhag/Thromdey/Gewog Administration to curb illegal water tapping using water pump.	0.025	0.025	0.000	0.000	0.000	0.025	0.00	0.00	0.00	0.03	0.1
Sub-total													**1.27**

Objectives	Output	Action	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Sub-total
Objective 2. Enhancement/ diversification of local livelihood opportunities	Output 2.1. Enhanced management of habitat through waste and pollution reduction	Coordinate with Dungkhag/Gewog administration and support for supplying segregated waste bins in strategic location of public places within the KBA stretch.	0.50	0.50	0.00	0.00	0.35	0.00	0.25	0.00	0.25	0.00	1.85
		Initiate identification of lubricant waste dumping site in collaboration with Dungkhag/Gewog administration	0.03	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.03	0.09
		Promote and support private entrepreneur in taking up waste reduction and recycling initiatives. Support procurement of waste compressor/ recycling machine.	0.50	0.50	0.50	0.00	0.00	0.50	0.00	0.00	0.00	0.50	2.5
		Support upstream communities; Kerong, Menchu, Gashari, Dezama & Ronowoong through agroforestry program	0.00	0.25	0.25	2.50	0.00	0.00	0.00	2.50	2.50	2.50	10.50
Sub-total													**14.94**
Objectives	**Output**	**Action**	**Y1**	**Y2**	**Y3**	**Y4**	**Y5**	**Y6**	**Y7**	**Y8**	**Y9**	**Y10**	**Sub-total**
Objective 2. Enhancement/ diversification of local livelihood opportunities	Output 2.2. Outreach programs on Golden Mahseer conservation conducted	Conduct awareness and educational programs to local communities, youth and institutions on conservation significance of Golden Mahseer.	0.35	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.20	0.8
		Conduct awareness program in up- stream communities in collaboration with DAO on adverse effect of inorganic fertilizers and herbicides applications.	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.2	0.35
		Conduct training to upstream communities on spring shed management.	0	0.13	0.15	0.00	0.00	0.15	0.00	0.00	0.00	0.15	0.575
		Conduct periodic stakeholder consultation meeting on waste management.	0.15	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.20	0.55

		Develop and managed lake at Nganglam M.S.S in collaboration with school management and Dungkhag	0	0	0.45	0	0	0.05	0	0	0.05	0	0.55
		Promote high-end recreational fishing site within in KBA engaging youth group of the native community.	0.00	0.00	0.00	0.00	0.50	0.00	0.00	0.00	0.00	0.30	0.80
		Conduct survey and assessment on fish diversity and abundance considering seasonal variation and time period. (Every after 2 years)	0.00	0.25	0.00	0.00	0.25	0.00	0.00	0.25	0.00	0.25	1.00
		Conduct studies on upstream and downstream migration period of Golden Mahseer in KBA site.	0.20	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.20	0.60
		Installation of signages on KBA & conservation significance of Golden Mahseer.	0.00	0.12	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.5	5.225
Sub-total													**3.74**
Grand Total													**19.95**

CHAPTER 4: MONITORING & EVLUATION

4.1 Funding and timeline

The total budget outlay based on the action plan is Nu. 19.95 million. Certain portion of the funding for ten years conservation action plan will be secured from RGoB and BFL, since most of the activities are aligned with BFL plan. However, funding from other donors like WWF, BTFEC, UNDP, Bhutan Foundation and other international donors will be sourced for providing fund support on cost sharing basis for promoting private entrepreneur for taking up innovative initiatives in managing waste and water pollution and for conducting research for conservation of the trigger species.

4.2 Implementation mechanism

At the field level, the Divisional Forest Office, Pemagatshel will be the lead agency for implementation of this conservation action plan, supported by Dungkhag administration, Gewog administration and Thromdey. The technical and policy matter support will be sought from NCD for the implementation of activities. Activities requiring administrative support will be conducted in consultation with Dungkhag, Gewog and Thromdey administration. All field-based activities such as surveys, monitoring, surveillances and community-based activities will be implemented by the Division in close consultation with the Range Offices.

4.3 Monitoring and Evaluation

The annual monitoring on key achievement of KBA action plan implantation will be coordinated by Chief Forestry Officer of the Divisional Forest Office in consultation with NCD and Dungkhag Administration during the periodic stakeholder consultation meeting. Biannual monitoring of the implemented activity will be carried out by the team from Divisional Forest Office. The monitoring of activity implementation as per the action plan will be executed by concern section heads in collaboration with the Range Officer.

Implementation of the plan will be monitored annually by NCD in collaboration with Division Office. For the activities requiring administrative and financial support, the Dungkhag administration in consultation with Gewog and Thromdey will conduct the monitoring in collaboration with Division Office. A mid-tern review of the plan will be carried out towards the end of five years plan period.

The activity progress will be monitored based on periodic reports submitted by field offices and through site visit during the time of activity implementation. The logical framework (Table- 6) will be used for monitoring and evaluation, based on the indicators provided. This conservation action plan is a living document and shall serve as guide in implementing the prescribed activities. Based on the changes in policy, departmental priorities and field situations, the planned action plans shall be subjected to change and the annual monitoring and mid-term review should consider any addition or deletion of the actions wherever necessary and felt relevant.

Table 6- Monitoring and Evaluation Logical Framework

Objectives	Action	Indicators	Baseline	Unit	Yearly target										Remarks
					Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	
Objective 1. Protection and conservation of species and its habitat	Identify and map illegal fishing hotspot, key spawning site and overwintering areas of golden mahseer.	No. of site area mapped as illegal fishing hotspot, spawning sites and overwintering areas	NA	No. of sites		3	2				1			1	
	Intensify patrolling in key spawning site and illegal fishing hotspot.	Nos. of SMART patrolling reports.	4	No. of patrolling	12	12	12	8	8	8	6	6	4	4	
	Restrict issuance of fishing permit during spawning season of Golden Mahseer (July to September)	Cross-check permit issue record	NA	No. of permit issued	0	0	0	0	0	0	0	0	0	0	
	Strengthen enforcement of waste regulation rules in consultation with Dzongkhag/Dungkhag administration	Nos. of incidence on waste offence	3	No. of times	3	3	3	3	3	2	2	2	2	2	
	Strengthen monitoring on unauthorized feeding & introduction of exotic fish species in KBA site.	No. of incidences	NA	No. of times	3	3	3	3	3	2	2	2	2	2	
	Strengthen monitoring and inspection to reduce habitat disturbance caused due to developmental activities.	Nos. of site inspection & monitoring report	NA	Nos. of reports	10	15	15	10	10	8	8	7	7	7	

	Coordinate with Dzongkhag/Dungkhag/Gewog administration to assess in ensuring minimum environment flow (E-Flow) from weirs in Kerong river.	Assess and measure E-Flow discharge volume in Kerong river	NA	No. of times	2		2		2		2		2		
	Coordinate and initiate prevention and control measures in consultation with Dungkhag/Thromdey/Gewog Administration to curb illegal water tapping using water pump.	No. of water tapping point reduced.	12 tapping points	No. of times	1	1	1							1	
	Conduct survey and assessment on fish diversity and abundance considering seasonal variation and time period. (Every after 2 years)	No. of assessment conducted	1 (Report on fish diversity for winter season conducted)	Nos. of reports		2		2		2		2		2	
	Conduct studies on upstream and downstream migration pattern of Golden Mahseer in KBA site.	No. of assessment conducted	NA	Nos. of reports	1		1		1		1		1		
Objective 2. Enhancement/diversification of local livelihood opportunities	Coordinate with Dungkhag/Gewog administration in supplying segregated waste bins in strategic location of public places within the KBA stretch.	No. of waste bins installed	NA	No. of waste bins		6	6	6	6						
	Initiate identification of lubricant waste dumping site in collaboration with Dungkhag/Gewog administration	Time in which site being identified and prepared for dumping lubricant waste	NA	Time period		Y2	Y3								

	Promote private entrepreneur in taking up waste reduction and recycling initiatives with cost sharing support in procuring waste compressor/ recycling machine.	No of machine suppled on cost sharing basis	NA	Time period		Y2	Y3			y6			y9		
	Conduct awareness and educational programs to local communities, youth and institutions on conservation significance of Golden Mahseer.	Assessment of target group's perception on conservation of KBA site	NA	Total nos. of target participants assessed		Y2			Y5					Y10	
	Conduct awareness program in up-stream communities in collaboration with DAO on adverse effect of inorganic fertilizers and herbicides applications and their corresponding indirect impact on river and aquatic life.	Assessment at up-stream community on reduction in use of inorganic fertilizers & herbicides	NA	Total nos. of household assessed			Y3			y6				Y10	
	Conduct periodic stakeholder consultation meeting on waste management.	Nos. of stakeholder meeting conducted & resolution drawn	NA	Nos. of meeting conducted	Y1	Y2		Y4			Y7			Y10	
	Promote high-end recreational fishing site within in KBA engaging youth group of the native community.	Time by which high-end recreational fishing operationalized.	NA	Time period					Y5		Y7			Y10	
	Installation of signages on KBA & conservation significance of Golden Mahseer.	Nos. of signages installed at strategic locations	NA	Nos.	2	2			1		1			1	

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