

Recreational fisheries in Uttarakhand

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The hill state of Uttarakhand in the western Indian Himalayan Region encompasses a landmass of 53,483 km² area, comprised of around 86% hills and 14% plains. Uttarakhand State is administratively set into two divisions, Kumaun and Garhwal, with a total of 13 districts. The unique landscape and terrain of the state gives rise to enormous natural aquatic resources in the form of 2,686 km of rivers and streams, 132 upland lakes (covering 297 ha) and 14,120 ha of man-made reservoirs^{1,2}. Improving utilisation of these water resources for angling and recreational fisheries is an obvious possibility for increasing employment opportunities and generating income for the livelihoods of hill people. The development of sport fisheries or recreational fisheries will equally help in conserving the aquatic flora and fauna by increasing understanding their mode of propagation and sustainability. At present, opportunities for angling and recreational fisheries in

the state are limited to certain pockets and a wider preferment of sport fisheries with passable investment and awareness campaigns in potential areas is imperative. Application of geo-informatics for mapping potential natural resources in the state can be of immense help in decision support for policy makers, aiding the suitable utilisation and management of water bodies for sport fisheries.

The availability of popular game fishes adapted to different thermal regimes of this hill state has given the region an enviable reputation in angling and recreation. Anglers come from different corners of the country as well as from abroad. Anglers are provided with a Fishing License for rod and line fishing with a nominal fee of INR 120 for foreign nationals and INR 80 for Indian nationals by the Uttarakhand Department of Fisheries on the day of their arrival. Research institutes



Tor putitora (photo credit: Gagan Bakshi).



Tehri dam is the highest in India.

such as ICAR-DCFR at Bhimtal have been instrumental in undertaking research programmes in species validation for mahseers and other cold water fishes of the Indian Himalayan Region using taxonomic tools such as morphometric identification, mitochondrial DNA markers, environmental DNA (eDNA) and DNA barcoding. Furthermore, concerted effort has been made by the scientists of the institute with the officers of the Uttarakhand Department of Fisheries, anglers, and fishing guides in identifying key angling sites to promote recreational fisheries in the state.

The sport fishes of Uttarakhand

Mahseer

The golden mahseer or Himalayan mahseer (*Tor putitora*) is the most popular game fish amongst anglers in India for its superlative fighting quality, known as the 'tiger in water'. Since angling was a favourite pursuit of the British, the lakes of the Kumaon hills were stocked with fish by Sir H. Ramsay during 1858 for sport fishing³. This fish is an endangered species of cyprinid and inhabits rapid streams, riverine pools, lakes and temple tanks in the Himalayan region. Mahseer belong to three genera, namely *Tor*, *Neolissochilus* and *Naziritor*. However, *Tor* constitutes the bulk of mahseer species. Efforts have been made to augment the population of mahseer in natural and manmade waters bodies through captive breeding and seed production. Altogether, three hatcheries for mahseer have been established in Uttarakhand, one operated by ICAR-DCFR Bhimtal, and two more at Satpuli and Tehri / Koteshwar under the aegis of the Uttarakhand Department of Fisheries.

Goonch angling

The group of *goonch* (in Hindi), *baghair* (in Bengali) and *baghmas* or *gorua* (in Assamese) are basically represented by two species namely *Bagarius yarrelli* and *B. bagarius*. These fishes belong to the order Siluriformes and family Sisoridae. At present they are considered to be 'vulnerable' on the IUCN Red List due to their over exploitation in the natural systems. The muscular build of the fish has given rise to the name 'giant devil catfish' and it is considered an ideal quest for an angler interested in a big catch. The home of the fish is the Western Ramganga River and Kali River in Uttarakhand, which flow through Nainital and Champawat districts. Goonch is less frequently observed on the baits of the anglers which



The goonch (photo credit: Camp the Himalaya).



Trout seed production at Bairangana.

may be attributed to a lack of information on their preferred habitat, food and feeding, migration pattern, and diurnal behaviour in the wild.

Brown trout angling

Enumerating the river resources showed a total combined length of 10,928 km of river network in the state of which 3,151 km has the potential to sustain suitable habitat for brown trout based on the criteria of elevation and the existing thermal conditions⁴. These rivers are within a temperature range below 16°C, are clear and well-oxygenated (6.0-9.5 mg/l), as well as being in sparsely populated areas. Some of the important stretches of river and their upstream areas harbouring the brown trout *Salmo trutta fario* have been reported as Nandakini, Pranmati Gad, Dhaul Ganga, Laisar Gad, Bhilangna River, Har Ki Dun, Pinder⁵; Asiganga, lake Dodi tal, Balkhila Gad, and Madhu Ganga⁴. Applying the tools of GIS in the present communication showed that the Nandakini, Dhaul Ganga West, Laisar Gad, Bhagirathi, Bhilangna, Asiganga, Pranmati Gad, Bal Ganga, Badiyar Gad, Gomati, Balasuti, and Pinder rivers situated in the northern part of Uttarakhand can provide potential ground for brown trout⁶. These river stretches may further be considered for establishing angling beats which can offer potential fishing spots for brown trout using catch and release practice. Although seed production of brown trout in the state is very small, attempts have been made at the trout hatchery of Bairangana to produce seed from 200 brown trout broodstock in recent years.

Other fishes

Altogether, 64 fish species have been reported from the Garhwal region and 31 from the Kumaon region of Uttarakhand by Kumar (2002). This data was updated to a total of 132 species of fishes belonging to 67 genera, 27 families and 8 orders by Uniyal and Uniyal (2021). Apart from the fish groups mentioned above, the other game fishes encountered are cyprinids viz., *Raiamas bola*, *Labeo dyocheilus*, *Bangana dero*, *Barilius* spp., Schizothoracines and a few catfishes. These groups of fish are occasional catches that may be encountered while in search of the major game fishes.

Recreational hotspots in Uttarakhand

One of the best sites in the world for angling of golden mahseer is at Pancheshwar, at the confluence of the Saryu and Mahakali rivers. The Mahakali River demarcates the boundary between Nepal and India. Pancheshwar is located 35 km from Lohaghat town in Champawat District of Uttarakhand. Angling fests and competitions are organised every year in joint collaborations among angling camps, Kumaon Mandal Vikash Nigam (KMVN), and the Department of Tourism. Hatchery produced mahseer seed from ICAR-DCFR Bhimtal are also released at Pancheshwar from time to time to enhance the stock of endangered species. Many angling camps such as The Himalayan Outback, Camp the Himalaya, Pancheshwar Fishing Retreat and The Golden Cast are active in the region to provide logistical support and accommodation during the angling season. The best time to go

for fishing at Pancheshwar is before the arrival of monsoon and before onset of winter. Fish guides namely Mr Sanjeev Paroriya, Mr Shyam Gurung, Mr Roshan and Mr Hoshiyar Singh are true adventurers in the region who support visitors in their quest for mahseer and goonch. Other important angling sites for golden mahseer in Uttarakhand are Vanghat / Marchula along the Western Ramganga River; Vyasghat at the confluence of Ganga and Nayar rivers; and Ramnagar and Almora along Kosi River.

Vanghat is an excellent mahseer beat, located in Nainital district of Uttarakhand. This promising angling spot lies along the cascading Western Ramganga River that meanders through the verdant forest of Jim Corbett National Park. The mighty golden mahseer and giant devil catfish goonch have drawn avid anglers around the globe to Vanghat as witnessed by angler Mr Gagan Bakshi. Many eco-camps and resorts have been established in the vicinity to provide accommodation and fishing trips for visitors. September to May is the best time for fishing in the Western Ramganga River. Vanghat has a rich biodiversity in the form of exotic birds, butterflies, mammals, reptiles and other animals as the area is located within the national park. Angling can be done with the permission of Divisional Forest Officer in those locations where human threat is minimal.

Vyasghat can be another excellent option for angling golden mahseer. The search for mahseer starts from Devprayag, the confluence point of the Bhagirathi and Alaknanda rivers



Indian trout barb Raiamas bola.

situated 14 km upstream of Vyasghat. The route follows downstream for a stretch of 36 km over the Ganges. Similarly, 4-5 km of river is covered over the Nayar River from the confluence point.

Bhimtal based ICAR-DCFR collaborated with the Department of Fisheries, Department of Tourism and District Administration of Pauri Garhwal, Government of Uttarakhand in organising a three day interactive meet and angling competition among the anglers, fishing guides, farmers, officers, and scientists during 20-22 November 2020 with an objective to highlight Vyasghat as an important site for promoting mahseer angling on the global map, as well as to raise awareness on generating revenue and rural employment



Snow trout are an anglers' delight.

among the local people through eco-tourism. The programme also stressed undertaking other ancillary tourism activities such as rafting down the Ganges, trekking, bird watching, camping and sight-seeing in the hills, which have positive direct and indirect consequences towards the conservation of mahseer⁹. Banyan by the Ganges, a resort along the riverside with a picturesque background invites global tourists to spend a relaxing vacation where one can enjoy the thrill of taming the 'tiger of water'. September to November is the ideal time for fishing at Vyasghat as stated by the proprietor, Mr Manishankar Ghosh.

Ramnagar and Almora are two important mahseer angling locations along the Kosi River. Ramnagar is situated south of Jim Corbett National Park. The Kosi River forms the eastern boundary of the park down from Mohan Township (near Marchula) to Ramnagar. These two sites on the Kosi River are important habitats for the golden mahseer and other hill stream fishes such as *Naziritor chelynoides*, *Labeo dyocheilus*, and *Bangana dero*. One can also witness the catch of mahseer and other hill stream fishes at the Ramnagar market. Almora is a populated hill station of Uttarakhand and is known for its wildlife, culture, and cuisines. Anglers of Almora in association with ICAR-DCFR have made attempts to replenish the declining fish stock in the Kosi River with hatchery produced golden mahseer fingerlings. Both the areas are yet not fully organised for inviting avid anglers worldwide and the fishing is done on traditional lines. Many resorts and home stays are in the vicinity to provide accommodation and healthy food to the visitors here. People fish almost round the year except the peak monsoon season, as spoken by angler Mr Mohan Rayal.

The lakes of Uttarakhand namely Nainital, Bhimtal, Sattal, Naukuchiatal and Naldamayanti Tal are stocked with mahseer, and the fish is a major attraction for tourists. People offer the fish puffed rice, baked bread and biscuits, generating additional income for local vendors. The Lake Development Authority here takes care of the recreational amenities in the lakes for the benefit of tourists. Uttarakhand State is also known as Dev Bhoomi, as people believe the existence of God and Goddesses in every particle and henceforth make the holy land here a deity. This gives rise to many temple fish sanctuaries in the region. One of the exemplary examples is the Baijanath temple on the banks of the Gomti River in Bageshwar District where golden mahseer is conserved. Many such secluded mahseer sanctuaries can be witnessed on the Kosi River in the Kherna region and Ramganga River near Jim Corbett National Park. ICAR-DCFR has made a concerted effort in stocking these waters with young mahseer as a conservation measure and to support natural propagation of the fish. In addition, the confluence of rivers has also religious meaning in the Hindu tradition and is locally called *prayag*. Devotees across the country visit prayags with believe that a dip at the confluence cleanses the heart, mind and soul of a person and advances them closer to liberation or *mukti* (salvation). The panch (five) prayags are Vishnuprayag at the confluence of the Vishnu Ganga and Dhauliganga rivers; Nandaprayag at the confluence of the Alaknanda and Nandakini rivers; Karnaprayag at the confluence of the Alaknanda and Mandakini rivers; and Devprayag at the confluence of the Alaknanda and Bhagirathi rivers. All these prayags have a temple at the peak of the adjoining hills. The fish are not caught or disturbed in these confluences adjacent to the temples, which serve as natural reserves of fish and other aquatic biodiversity. These temple reserves are



Ranching of young mahseer at Pancheshwar.



A catch of golden mahseer at Vyasghat.



Participants of the interactive meet at Vyasghat.

not declared fish sanctuaries and are managed by the temple priest and devotees together through community participation. Such community-based conservation measures deserve recognition and concerted efforts need to be made to ensure the protection of fish species. These sanctuaries along the river stretches harbour healthy riverine fish populations and are an excellent way to prevent extinction of highly threatened fish species such as mahseer.



A winner receiving an award during the angling competition at Vyasghat.



Distribution of ICAR-DCFR hatchery produced mahseer young for ranching in the Kosi River at Almora in association with anglers.



A haul of hill stream fishes at Ramnagar market.

Conclusion

Recreational fishing is fishing for pleasure or competition is a popular leisure activity in the country. Today, recreational fishing is considered as an ecotourism activity, which is defined as “responsible travel to natural areas that conserves the environment, sustains the well-being of the local people, and involves interpretation and education”. Ecotourism can be a viable option in Uttarakhand as the state has numerous pristine destinations where fauna and cultural heritage are the primary attractions, and henceforth can provide viable income-generating options for economic development for local communities. Angling for mahseer, goonch, hill trout

A school of golden mahseer conserved in tanks of Baijnath temple.





Above: Origin of Ganga River at Devprayag. Below: Temples at river confluence point at Rudraprayag.



and other fish along with associated recreational avenues depends on healthy aquatic ecosystems. The ever-increasing population in the country imposes a significant pressure upon these inland water ecosystems including through destructive and illegal methods of fishing. However, the fish guides, resort and home stay owners are vigilant these days towards the poaching of fish on their respective beats as they are aware of the endangered status of the game fishes. Furthermore, active, and concerted efforts by the various public sector organisations have generated mass awareness at the rural front in conserving game fishes in their natural habitat for economic benefit. Commercial catch of these important game fishes by fishermen for consumption have been stopped and fishing is practiced solely on a catch and release basis by anglers. Fishing for recreation in these parts of Uttarakhand will enable future generations to experience destinations relatively untouched by human intervention, thus making them more passionate towards nature.

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