‘Fish festivals’ in the Garhwal Himalaya: conservation options amidst age-old practices

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Rivers provide ecological and socio-economic benefits despite being highly threatened ecosystems. They continue to face anthropogenic and natural stresses. The Aglar in the Indian Himalaya is an important tributary of the Yamuna River, and hosts the annual ‘fish festival’ of the region. Field studies have revealed that this festival could harm endemic/threatened fish species of the Aglar. Lethal methods such as the use of bleaching powder and electricity should be banned; instead angling and cast netting in a regulated way could be promoted.

Rivers provide important benefits to humans and support floral and faunal species[1]. However, anthropogenic and natural stressors continue to threaten these vital ecosystems[2]. Recent studies have discussed the various threats to rivers in the Indian Himalaya[3–6]. However, pressure from age-old practices such as ‘fish festivals’ has not been extensively studied. Fish festivals in the Indian Himalaya are either for recreational or religious purposes. Examples include the Indus festival of Ladakh and the Maund Mela (Maund: intoxicated state; Mela: festival) held annually on the Aglar River in Tehri-Garhwal district, Uttarakhand, India[7,8].

The Aglar is an important tributary of the Yamuna River. It originates from the forests of Dhanaulti and travels to Mussoorie, where it merges with the Yamuna. The Aglar supports abundant floral and faunal species (N. Gupta, unpublished data). Additionally, it is a breeding habitat for fish species such as the Endangered golden mahseer (*Tor putitora*), Near Threatened goonch (*Bagarius bagarius*), and red-finned mahseer (*Tor tor*), the Vulnerable common snow trout (*Schizothorax richardsonii*), and Indian trout species (N. Gupta, pers. obs.).

The Maund Mela occurs as three separate events on the Aglar spread over the months of June and July; where seven village groups participate in this festival[9]. The first event comprises a small group of local people (less than 100) visiting a stream in the town of Nainbagh and catching fish for sustenance. This is followed by the Raj (king) Maund, when over 4000 people arrive at the Aglar for fishing. During this event, participants spread timur (*Zanthoxylum armatum* DC) bark powder (more than 300 kg) in the river and prayers are offered accompanied by folk music and dance. The last fishing event is called the Chor (secret) Maund, primarily for the local people (about 500) living in the vicinity of the basin.

Field studies during this festival have revealed a worrying picture. Thirteen endemic/threatened fish species (adults, juveniles and fry) belonging to three orders and five families were captured on a large scale by the participants during the events.

Further, semi-structured interviews with 61 individuals (between 12 and 55 years of age, all males as women did not participate in the festival) to understand the history of the festival, fishing techniques used and economic benefits to local people during the festival provided valuable insights (Appendix 1).

Some respondents ($N = 19$) stated that the fish festival had been historically allowed by the last King of Tehri and hence is an ancient right, while others ($N = 9$) reported that the King himself opposed the festival, but withdrew his disapproval due to the growing support among locals for the event. Some respondents ($N = 14$) stated that the use of bleaching powder and electric current was rampant in the basin to catch fish. Respondents ($N = 19$) also mentioned that the festival provided many villagers an opportunity to earn approximately Rs 8500 per day. Group discussions with local village members also revealed a cultural and traditional association with this annual event.

Nonetheless, there are ecological issues associated with this festival. Among the fish species targeted by the participants, *Naziritor chelynoides*, *Schizothorax richardsonii*, *Tor putitora* and *Tor tor* are threatened according to the IUCN Red List of Threatened Species 2015. Additionally, the uncontrolled use of bleaching powder, electrofishing and timur bark powder has the potential to not only impact fish fauna, but other biota as well. For example, damage to herpetofaunal species such as the checkered keelback (*Xenochrophis piscator*), buff keelback (*Amphiesma stolatum*), Indian rat snake (*Ptyas mucosa*) and Asian toad (*Duttaphrynus melanostictus*) was recorded during the events. Further, timur is an important medicinal and economically valued plant species in the region therefore, its large-scale harvest before the festival could negatively affect its sustainability in the basin[7,8].

The present authors observed that the Chor Maund coincided with the arrival of the migratory fishes (i.e. golden mahseer, red-finned mahseer and common snow trout) to the Aglar from the Yamuna. Discussion with local village members ($N = 17$) revealed that the size and number of fish caught annually from the Aglar has declined over the past years. This could be because the arriving

Appendix 1. Fish festival survey questionnaire

1. What is the origin and history of this fish festival?
2. How many people attend this festival (local/outsiders)?
3. How many participants fish in the Aglar River during this festival?
4. What is the ratio of men to women participating in this festival?
5. Are there any economic benefits to local people during this festival?
6. What are the fishing techniques used in the region, apart from the festival days?

fish are captured during the Chor Maund before they can spawn in the Aglar.

The authors acknowledge that it is important to support age-old practices in the Indian Himalaya. However, a balance is required where local communities work together with conservation initiatives to protect the fish species of the region. Examining such festivals is therefore valuable because understanding their potential impacts on endemic fish provides an opportunity for their management. For example, opting more targeted methods such as cast netting (no gill netting) and angling compared to the use of destructive fishing methods could reduce the impacts of the festival on fish species[6].

Organizing the festival through a well-managed community-based initiative needs to be explored. For example, a modest 'fish conservation fee' could be levied on arriving participants, and the revenue generated could be utilized for local river and fish conservation measures and community development. However, utmost transparency in the management of such funds would be the key for the sustainability of such an initiative[4,5]. Recreational (catch-and-release) angling tourism could be promoted during the festival. This could bring economic benefits to some locals, and help in the protection of target fish species[5,10]. However, this leisure activity should follow ecological guidelines and be based on assistance from local stakeholders[11]. It is also vital that further field surveys are conducted in the Aglar to document the population status and distribution of fish species. In the long term, this will assist in informing policy-makers and spreading conservation awareness among local stakeholders for protecting the fish species[2].

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