

# Designing fish passage for golden Mahseer : Is it possible?



Kali Gandaki Hydro-dam, Nepal



A golden Mahseer (*Tor putitora*), Nepal

**Thanks to the International Financing Corporation  
(World Bank Group) for crafting such an original and  
interesting topic for discussion today.**





Source: S Sunuwar, Tor putitora from Arun River



Source: Arun Rana (T Limbu holding Mahseer from Seti)

So, we will learn a great deal,

- **Focusing on iconic endangered golden Mahseer in relation to the fish passages designing for easy connectivity across the up and down streams.**



Source: Arun Rana (Arun Rana, holding a catch from Karnali)



Golden Mahseer -- world renowned mega game fish in Himalayan rivers and lakes because of :

- Notable size reaching up to 2.75 m (9.0 ft) in length
- 54 kg (119 lb) in weight (Froese et. al 2012)
- Important to food, nutrition, socio-economic & ecological services to the world.



J. deWet van Ingen with record 120 lb Mahseer

Source: **Macdonald** (1948) Bombay Natural History Society

- Only few fish ladders & lifts are successful, mostly failure -- not serving the purpose of their construction.
- Largely, due to the inadequate attention on ecological, biological and behavioral requirements of iconic fish during passage designing.





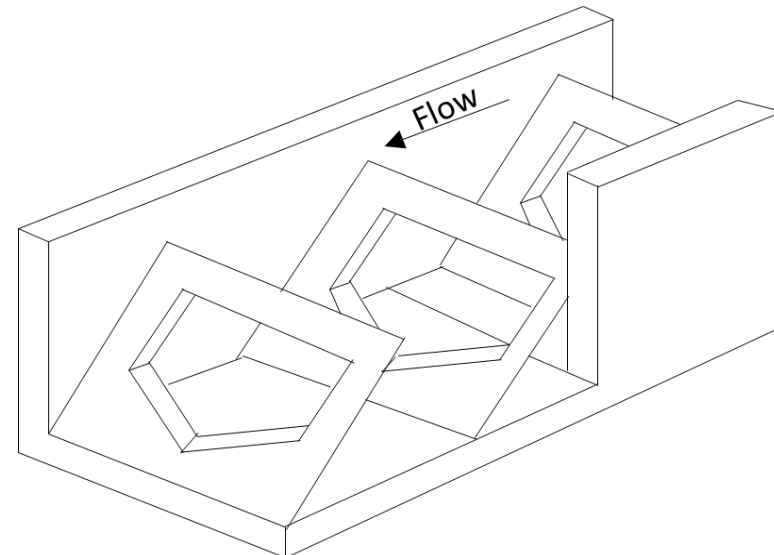
# Different types of fish passage



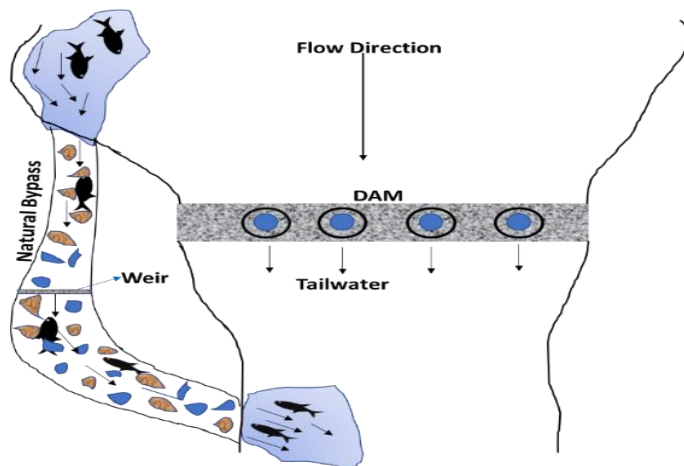
**Pool & Weir type fish passage**  
Bonneville Dam US (photo taken from:  
[theconstructor.org](http://theconstructor.org))



**Vertical slot fish passage**  
(photo by: Larinier)



**Denil fish passage**



**Nature like fish passage**  
(Natural bypass fish passage)



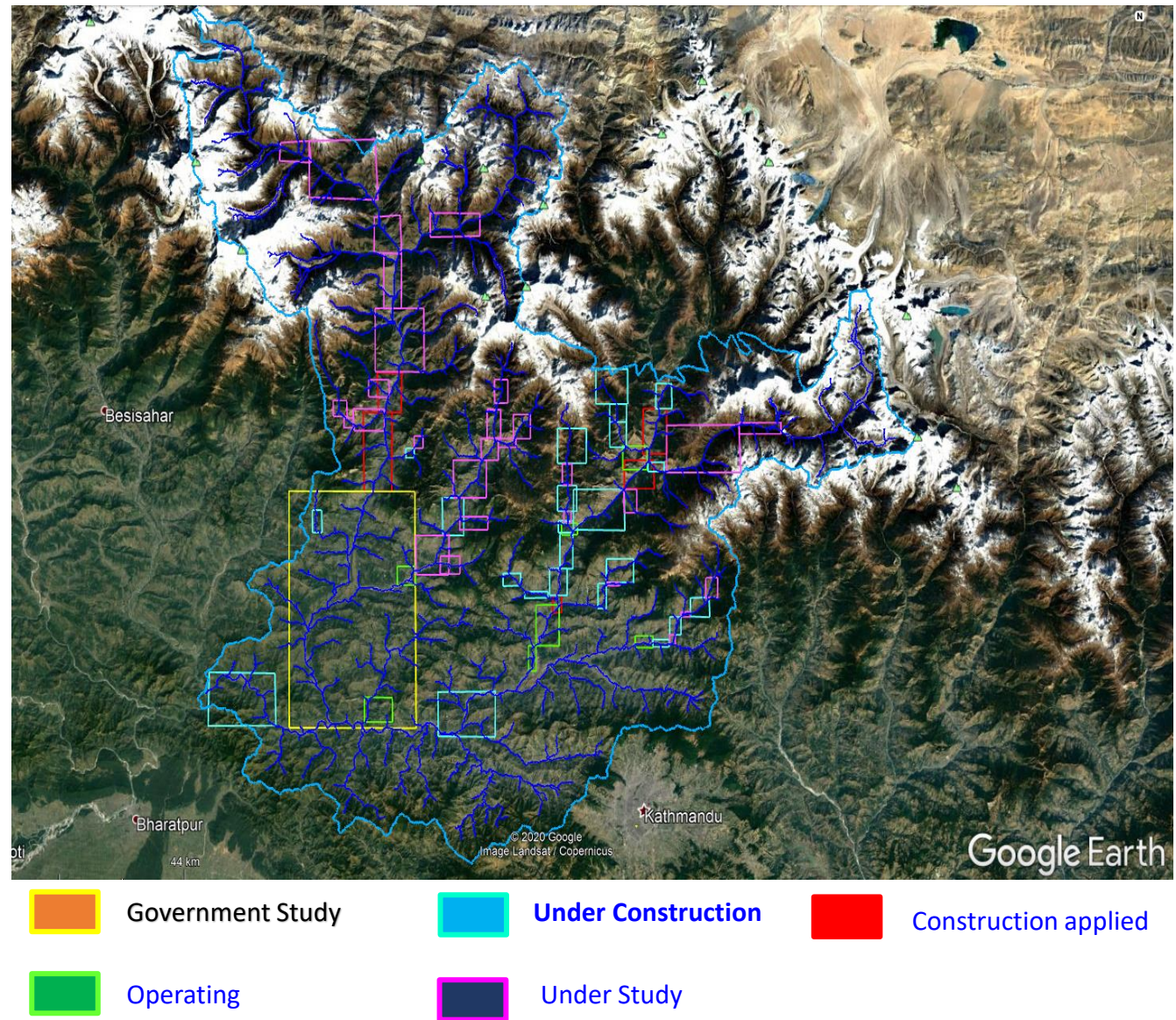
**Rock & Ramp fish passage** (photo by:  
[catchmentsolutions.com.au](http://catchmentsolutions.com.au))



**Fish lift at Safe Harbor Dam**  
(Photo by: Yu Xuezhong)



- The golden Mahseer thrive in between 13 - 30 °C, in cool water range, at an elevation from ~100 - 800 masl.
- -- suited altitude for hydro dam because of high velocity, gravitational flow & many economic reasons.
- Hydropower means opportunities. So, hundreds of dams are being constructed especially in Himalayas, recently.



**Hydropower Development in Trishuli River Basin**  
 (Photo source: Hydrolab, Nepal)

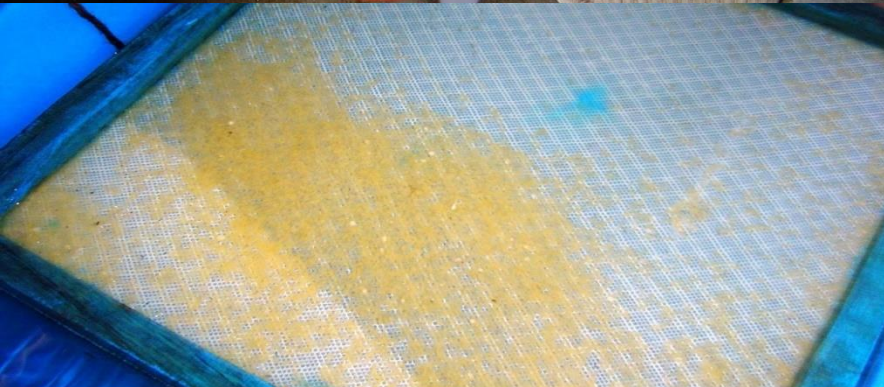


- Captive breeding and fry production of Golden Mahseer is taking place in Nepal.
- However, the IUCN has declared the migratory Golden Mahseer as an endangered species due to environmental degradation, fragmentation, overfishing & declining population.
- The challenge before us is-- how to keep hydropower production & free movement of wild golden Mahseer, one of the most precious gift of the nature.



(Ova releasing from gravid female, *Tor putitora*)





- So the questions posed to the golden Mahseer, fish passage experts, next generation scientists & all participants are:
- Is it possible to design fish passage for golden Mahseer ?



#	Question	Panelists	Panelists to ask
1	Why you think a fish passage is possible for Golden Mahseer?	2 panelists who answered Yes	2-3 panelists who answered YES
2	Why you think a fish passage is not possible for Golden Mahseer	2 panelists who answered No	2-3 panelists who answered NO
3	What aspects of the biology of the Golden Mahseer need to be considered for fish passage design?	2 panelists	Adrian Pinder Bhawna Dhawan J.A. Johnson
4	What type of fish ladder may be most appropriate and why?	1-2 panelists	Halvard Kaasa Toby Coe
5	What would be needed for downstream fish passage for Golden Mahseer?	1-2 panelists	Adrian Pinder Halvard Kaasa
6	Is fish passage needed and feasible for Golden Mahseer?	2 panelists	Anjana Shrestha Umesh Singh (Halvard Kaasa)
7	What do you see as the future for Golden Mahseer migration in Nepal?	2 panelists	Anjana Shrestha J.A. Johnson Adrian Pinder
8	What are the biggest problems that are likely to be faced designing and constructing effective fish passage (both upstream and downstream) for mahseer? General issues such as water availability, knowledge gaps and legislative / permitting issues rather than the specifics of the design	2 panelists	Toby Coe Bhawna Dhawan Umesh Singh