Finding New Pathways - Monitoring Fish Migration, A Mekong River Lifeline

Why is monitoring fish migration important?

Laos aims to become Southeast Asia's battery hub by 2030, exporting hydropower electricity to neighbouring countries. However, the construction of dams on the Mekong River and its tributaries threatens the vital fishery of the region. Over 70 million people in the Lower Mekong River Basin (LMB) rely on fish and rice as a primary food source. Fish

provides 81% of the population's protein intake in Cambodia and 48% in Laos. In Cambodia and the Mekong Delta in Vietnam alone, nearly 7 million people make their living through fisheries and aquaculture. The Mekong River hosts more than 1,100 species, including the world's largest freshwater fish. The Mekong River Commission (MRC) estimates the economic value of capture fisheries in the LMB to be approximately USD 11 billion per year. As the population of the LMB is expected to exceed 100 million by 2025, the reliance on fisheries is set to increase.

To mitigate the adverse impacts from hydropower on fish migration in the Mekong Region, fishways have been planned and built. Fish passages are designed to aid fish in migrating and passing barriers such as dams to reach their spawning and feeding grounds. **Monitoring passage effectiveness can provide early insights into dam impacts on migration, allowing timely adjustments to dam and passage operations.**



Figure 2: View on the Don Sahong Hydropowerplant from Cambodia

The MRC introduced the <u>Joint</u>
<u>Environmental Monitoring</u> (JEM)
programme to test the fish passage
monitoring methodology at the Don
Sahong Hydropower dam just

Testing the methodology at a Mekong River dam

above the southern border of Cambodia and Lao. The **Don Sahong** dam, located at the famous Khone Falls, the longest waterfalls in Southeast Asia, where the Mekong River drops by approximately 16 m over just a few kilometres, uses for fish passages modified natural fishways near the power station. While smaller channels are passable only during the rainy season, the Don Sahong main channel was passable whole year round prior to the dam construction. However, since construction, the Don Sahong Hydropower Company has attempted to mitigate the impacts on fish and fish migration by

modifying adjacent channels to enable fish migration throughout the year.



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First results: Most fish migrate back to Cambodia.

Monitoring results show that fish migration up from Cambodia in the rainy season is likely to happen towards the Don Sahong channel due to the high flow attraction. Most fish, however, did not migrate upstream through the Don Sahong modified fish passage and instead migrated back to Cambodia. This happened probably due to their inability to find the modified passage entrance located far away from the major flow (Figure 2).

The JEM programme recommended two technologies 1) Passive Integrated Transponders (PIT) and 2) Acoustic Technology. The pilot tests have shown that the acoustic technology has limited use in the region, especially in shallower channels near the power station. Several factors affected its suitability, including the noise level, uneven riverbed, and high level of air bubbles at Khone Falls areas.



Figure 3: Modified fish passages (green) and location of the Don Sahong Power Station (red circle).

Improved methods to expand monitoring.

For future fish passage construction at other dams, it is essential to obtain hydrological and hydropower operation and discharge data to define the minimum flow attraction for the fish passage. Also, it is important to conduct a pre-study on fish behaviour and harvesting rate before

developing the fish passage. There is no single method that fits all; therefore, the complementary use of PIT and acoustic tags to evaluate fish passage attractiveness is recommended.

The MRC's fish passage monitoring methods have been improved based on the testing results. Both the results and the updated monitoring methods were presented to the MRC and its member countries in November 2023, in Bangkok, Thailand. Feedback and recommendations from this meeting will be used for further improvement and finalization of the proposed fish passage monitoring methodologies.

The goal of the MRC and its member countries is to have the monitoring approach in place for future hydropower constructions to guide and inform sustainable development in the Lower Mekong River.





