

Addressing Priority Knowledge Needs for Migratory Fishes

Research tools can help fill data gaps to inform Lower Mekong migratory fish management

Project Lead
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FISHBIO staff facilitating small group discussion at the 2018 knowledge needs workshop in Phnom Penh.

Project Background and Objectives

In 2018, a workshop sponsored by the USAID-supported Wonders of the Mekong Project convened fisheries professionals in Phnom Penh to identify priority knowledge needs and uncertainties for migratory fishes in Cambodia. A later publication (Loury et al. 2021) reviewed these needs along with relevant research tools and techniques to address each need, as summarized in this brief.

The purpose of this brief is to provide guidance for managers and researchers to select appropriate tools for addressing high-priority data needs for migratory fishes in Cambodia and the Lower Mekong Basin.

Key Points

- Research gaps related to the **population dynamics, biology, movement, and habitat** of Cambodia's migratory fishes make it difficult to effectively manage these economically and ecologically important species and address threats to their survival.
- A suite of **existing fisheries research tools** can be utilized to **fill these data gaps** and answer critical questions about migratory fish as part of an adaptive research and management framework.
- Coordinating the deployment of methods across large regions and sharing data can build **powerful long-term data sets** to effectively inform management.
- Prioritizing migratory fish research** and informed management can result in meaningful change to help these culturally and economically important species persist into the future.

Table 1. Matrix of priority knowledge needs for migratory fishes in Cambodia and potential tools and techniques for addressing those needs. The applicability of each tool for addressing a given need is rated on a scale of 0 to 5, with 0 being not applicable, and 5 being highly applicable. Tools with a score of 4 or 5 are recommended to receive first consideration during study design.

Research and Knowledge Needs	Fisheries-Dependent			Fisheries-Independent Sampling	Macro-/Microscopic Reproductive Studies	Captive Studies	Genetics and Molecular Tools	Otolith Microchemistry	Mark-Recapture and Tagging	Electronic Fish Counting Systems	Hydroacoustic Imaging Technology	Legend
	Fish-Catch Monitoring	Logbooks (Participatory)	Local Ecological Knowledge (LEK)									0 - Not Applicable
Population Abundance and Trends	4	5	4	5	1	0	3	1	3	5	3	1
Life Cycle and Life History	3	3	3	4	4	4	4	5	4	3	2	2
Migration Timing and Triggers	4	4	4	5	2	1	3	3	4	5	4	3
Migration Routes and Distances	3	3	3	4	2	1	3	4	5	4	2	4
Key Habitats and Spawning Areas	3	3	4	4	5	1	3	4	4	3	4	5 - Highly Applicable
Environment and Habitat Requirements	2	2	3	3	3	4	3	4	4	3	3	

Priority Knowledge Needs for Migratory Fishes

Applicable Tools

1. Understanding population abundances and trends (whether populations are increasing, decreasing, or stable) is critical information needed to manage fisheries at the species level.	Fisheries-independent surveys and fisheries-dependent sampling, particularly long-term monitoring.
2. The timing and characteristics of fish life cycles and life histories can be used to develop demographic models, establish effective harvest limits, and ensure management strategies are spatially and temporally appropriate (e.g. limiting fishing pressure during vulnerable time periods, such as spawning).	Otolith microchemistry, fisheries-independent sampling, macro- and microscopic reproductive studies, captive studies, genetic and molecular tools.
3. Knowledge of migration timing is necessary for effective temporal management, such as seasonal fisheries closures to reduce impacts during mass migrations, or ensuring habitat connectivity during key migration times. Knowledge of migration triggers is needed to understand how changes to discharge, temperature, or turbidity (such as through hydropower development) might affect migratory fish behavior, and how they can be minimized.	Fisheries-independent sampling, electronic fish counting systems, hydroacoustic imaging technology, mark-recapture techniques, fisheries-dependent sampling.
4. Understanding migration routes and distances is key to ensuring that river connectivity is retained between critical sites, and for determining the full extent of area that must be managed to sustain populations. This information is critical to inform hydropower placement and fish passageway design.	Mark-recapture and tagging techniques, electronic fish counting systems, otolith microchemistry, fisheries-independent surveys.
5. Understanding the environmental requirements that fishes need to survive (such as depth, flow, temperature, substrate, vegetation cover, and dissolved oxygen) can help ensure that key environmental conditions are preserved in the face of development or climate change. Identifying precise environmental characteristics of spawning sites or other key habitats can inform habitat restoration efforts.	Captive studies, mark-recapture and tagging techniques, otolith microchemistry.
6. The locations of key habitats and spawning areas must be known in order to protect and retain connectivity between essential habitats, and ensure that a necessary quality and quantity of habitat is protected. This information can be used to identify suitable locations for fish reserves or other management strategies.	Macro- and microscopic reproductive studies, otolith microchemistry, mark-recapture and tagging techniques, hydroacoustic imaging technology, fisheries independent sampling, local ecological knowledge.



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Tagged migratory Giant Barb (*Catlocarpio siamensis*).

Want more information?

For additional details, please refer to the following publication:

Loury, E.K., V.L. Elliott, S.M. Ainsley, I.G. Baird, L.J. Baumgartner, S. Chhuoy, D.J. Lee, P.B. Ngor, B. Touch, A.V. Vu, and Z.S. Hogan. 2021. Priority knowledge needs for management of migratory fish species in Cambodia. *Fisheries Management and Ecology*. DOI: 10.1111/fme.12483