

Finding the best 'ways' with fish passes around dams.

Lower Mekong River Basin



Mekong Basin

Upper Catchment (Lancang River)

- China
- Myanmar

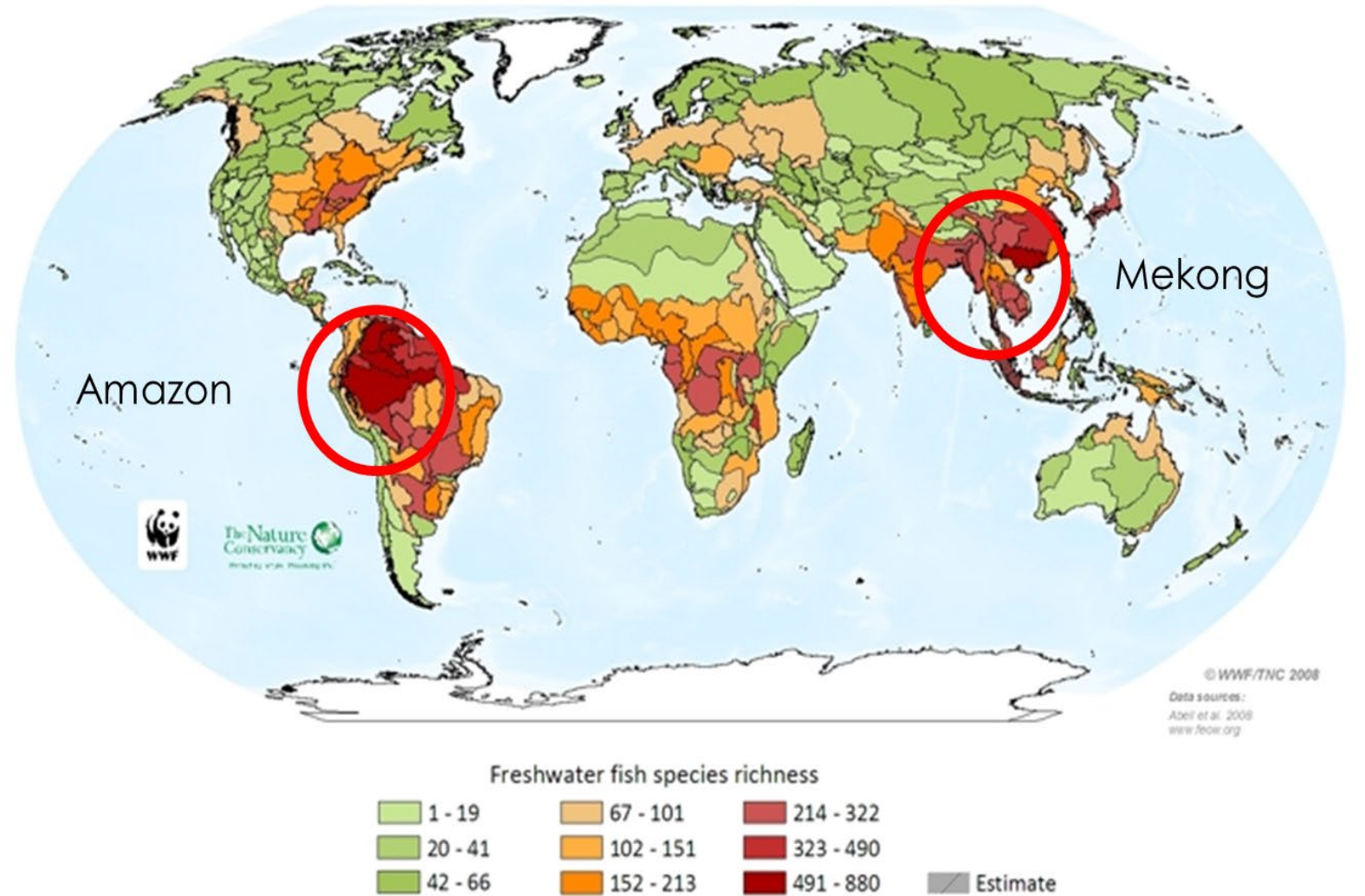
Lower Catchment (Mekong River)

- Laos
- Thailand
- Cambodia
- Vietnam



Importance of Mekong

- Diversity (480+ species and 40 families of fish)
- Endemic species
- Commercial value
- 2.2 million tonnes per annum for consumption
- 2% of worlds commercial fish catch
- Lao PDR 48% animal protein from fish
- Cambodia 79% animal protein from fish



Total number of FW Fish species

4 different agro-ecological zones

Lowland-near Mekong River



Upland-plateau areas



Floodplain- Seasonal wetland



Island-dominated riverine habitats



Why does fish movement matter?

- Complete life cycle
- Reproduction
- Maintain genetic diversity
- Maintain population
- Migration



Floodplain wetlands are rich in habitat and food and are important breeding and feeding sites for fish

Unproductive
Wetlands
~0.6 Million tonne

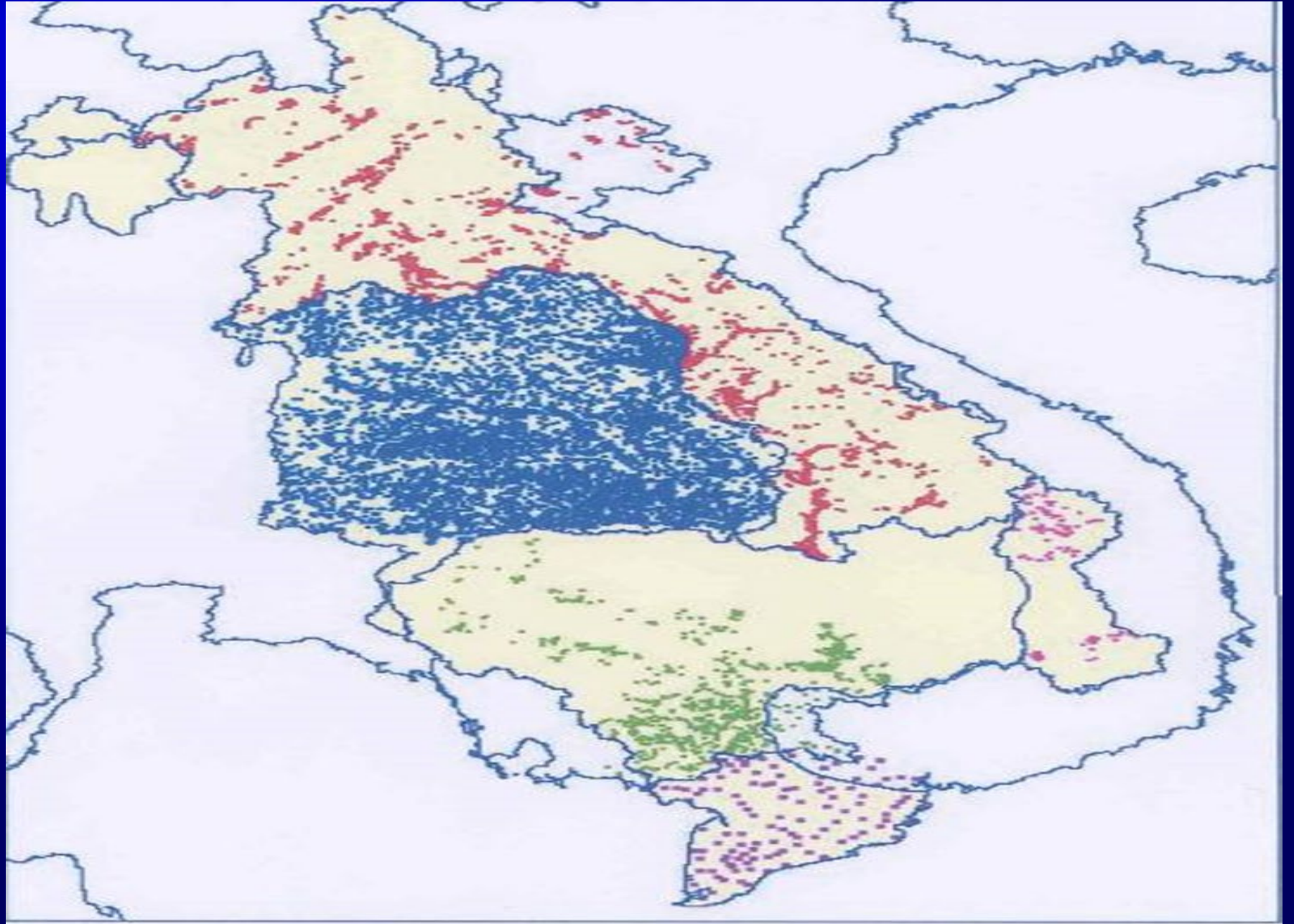


Productive
Wetlands
~2.3 Million tonne

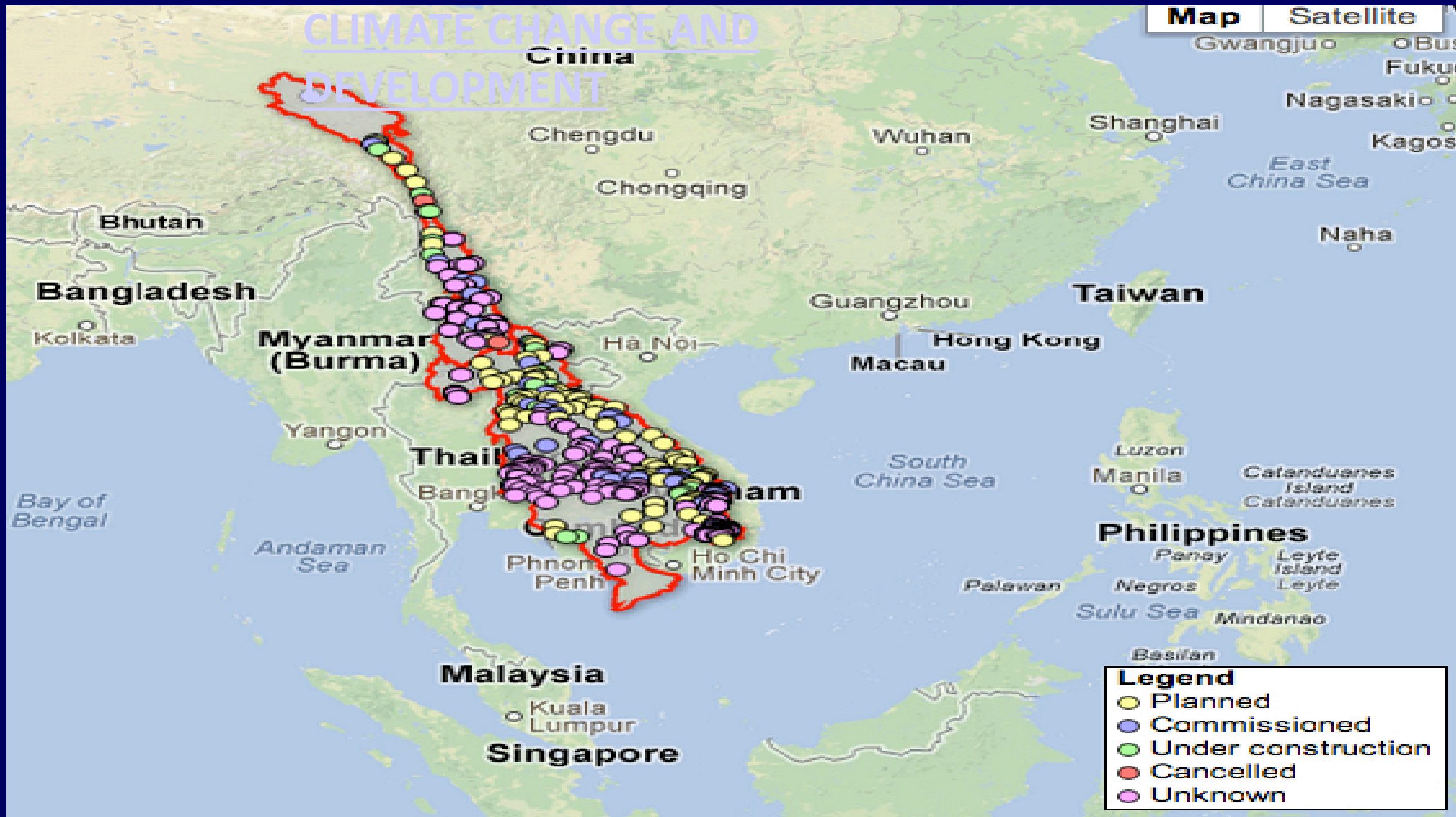


Problem?

- Thousands of migration barriers throughout the Lower Mekong Basin hindering fish passage
- 70% of Mekong fisheries are endangered



Map Of Mekong Dam Types of Barriers



Agricultural Research (CGIAR) and has worked in the Mekong since 2004.

364

The number of Dams in the Mekong Basin

241

COMPLETED

91

PLANNED

29

UNDER-CONSTRUCTION

3

CANCELLED

176

HYDROPOWER



185

IRRIGATION



3

OTHER



20

VIETNAM has the most
EXISTING HYDROPOWER
DAMS in the basin



61

LAOS has the most
PLANNED HYDROPOWER
DAMS in the basin



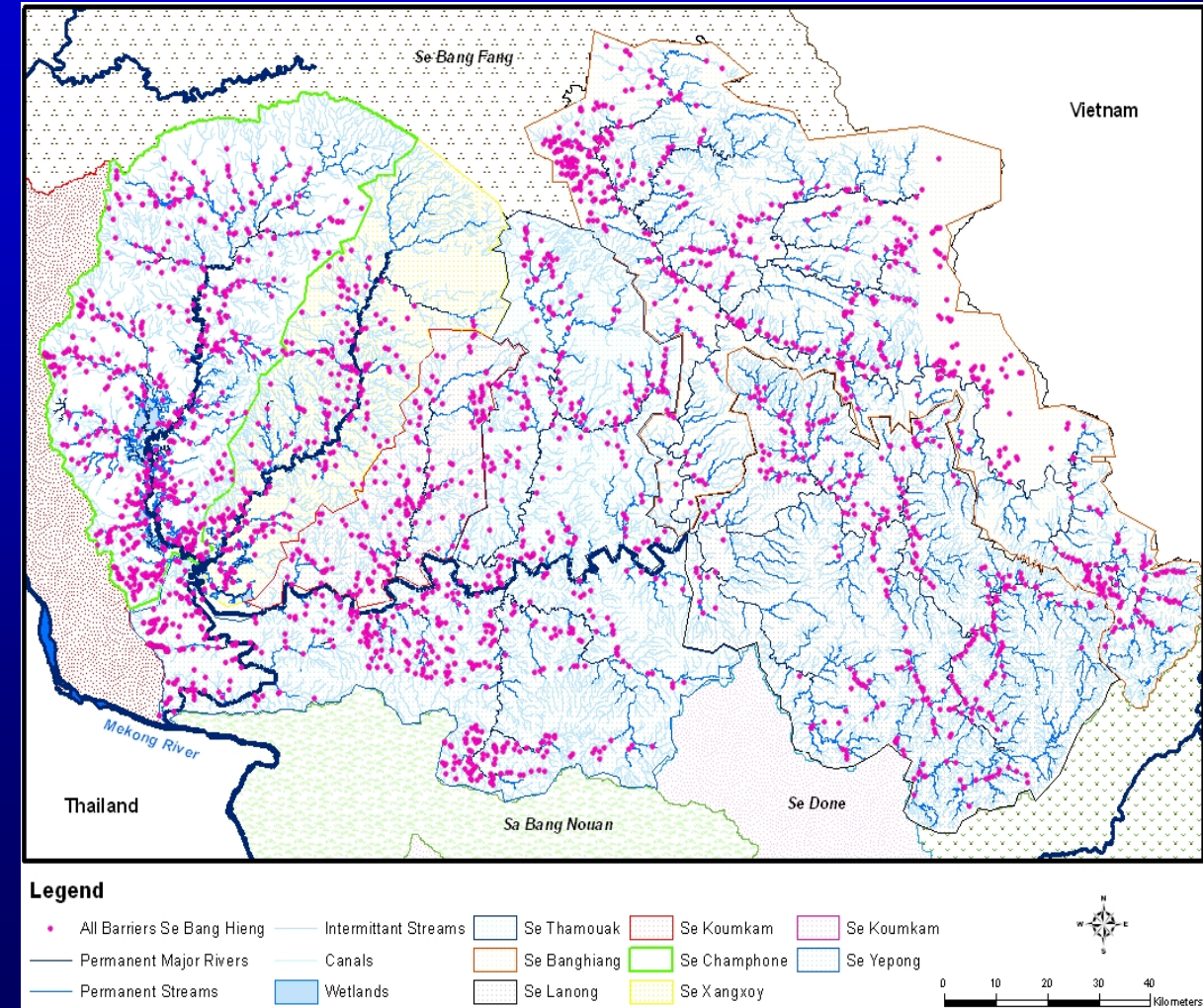
142

THAILAND has the most
EXISTING IRRIGATION
RESERVOIRS in the basin



Types of Barriers

- **Regulators**
- Regulators restrict fish access to most of the 200,000 km² of wetland in the Lower Mekong Basin



(Marsden et al. 2014)

Solution? Engineered structures

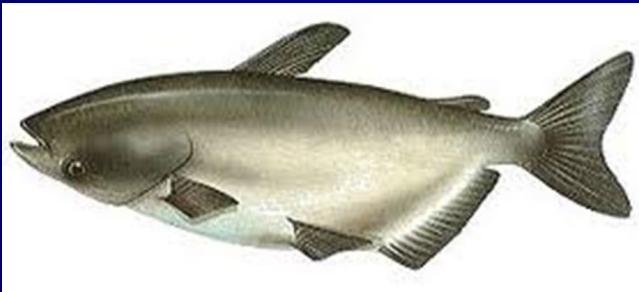
Design accounts for:

1. Ecological objectives
2. Hydrology of site (flow characteristics)
3. Swimming ability of local fish (fast, slow, strong, weak)
4. Design should be appropriate for the site (many to pick from, not all will be suitable)



Design Challenge 1– Target Species

- Large animals
- Endemic species
- Many different sizes and swimming abilities
- Difficult to design fish passes function for all



Design Challenges 2: Hydrology

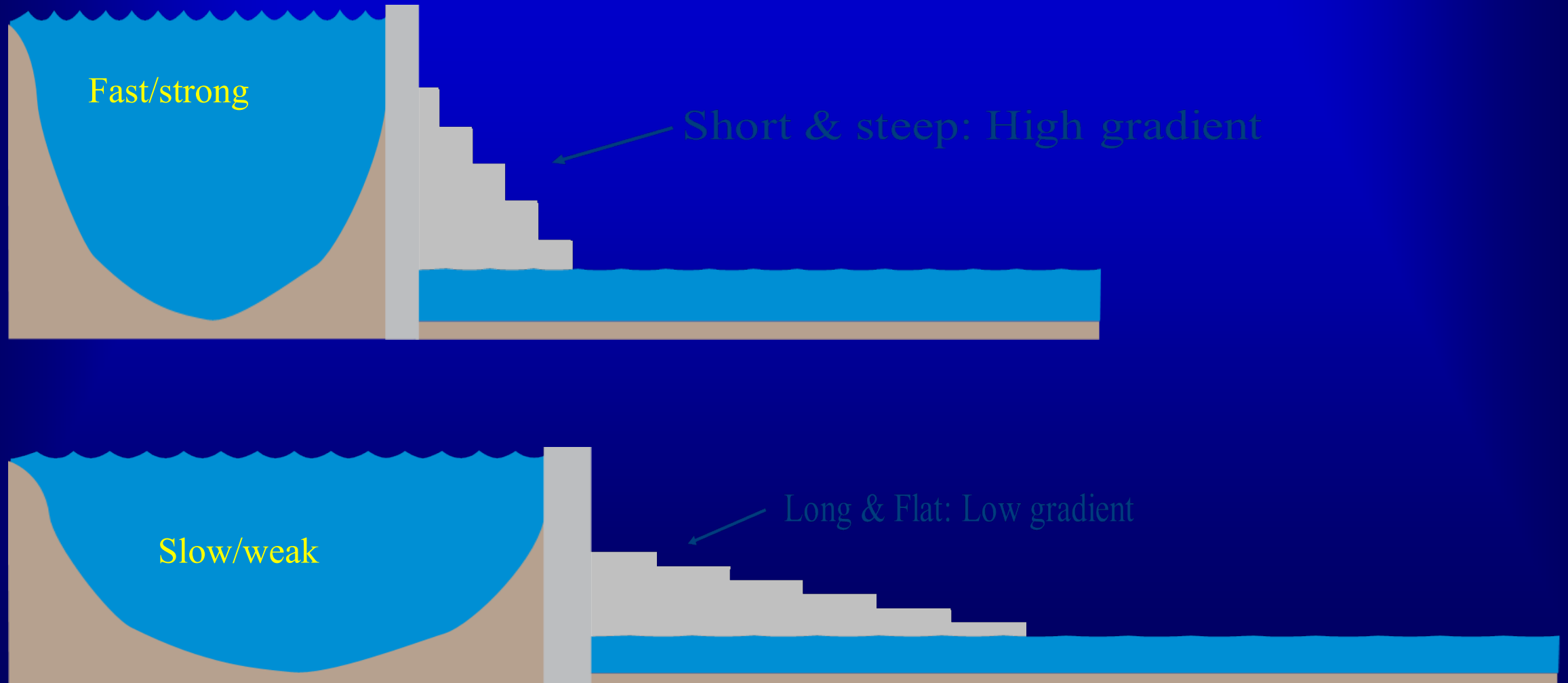


Wet season



Dry season

Design Challenge 3: Swimming ability



Challenges in form design

1. Rock ram fishway
2. Vertical slot fishway
3. Cone fishway



Case Study Pak Peung Wetland Research Site



Pak Peung regulator



Pak Peung Fishway



Data collecting



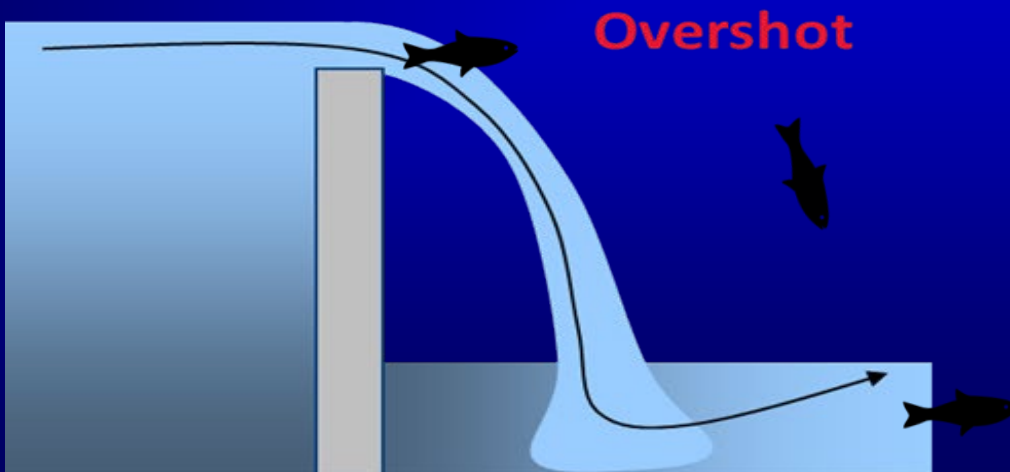
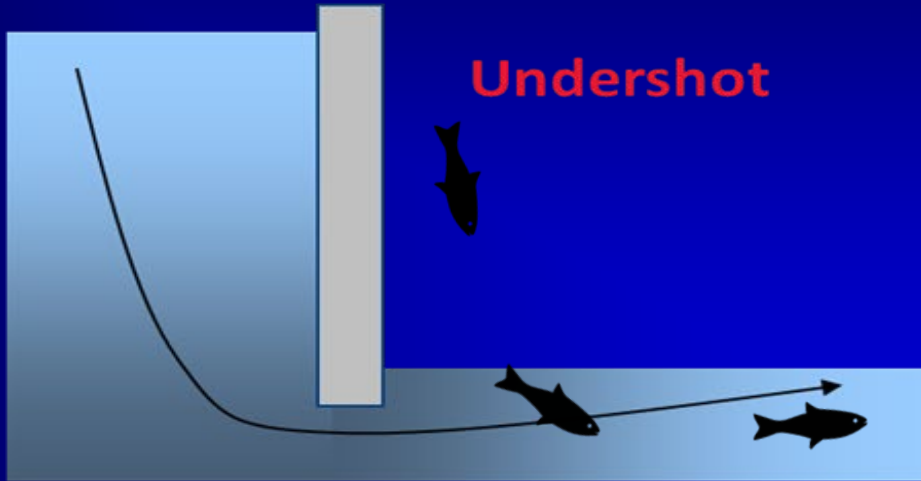
Pak Peung fishway monitoring results

Preliminary results – late wet season

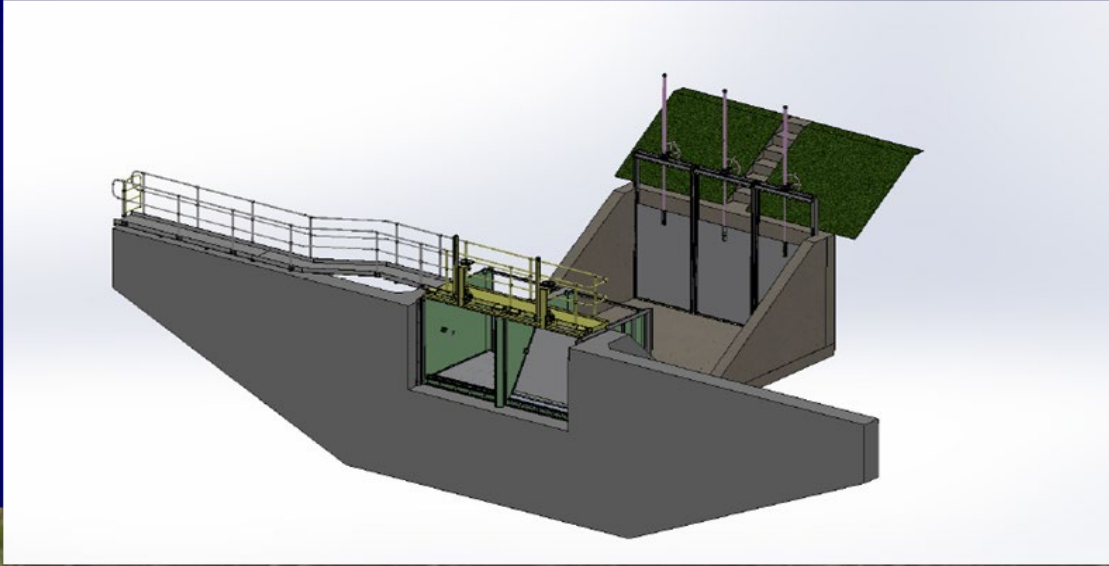
- 13,872 fish
- 102 species
- 23 days over a month



Pilot experiments in Australia and Lao PDR show that more fish are injured or killed by undershot weirs than overshot weirs



Upgrade existing gates and compare injury mortality rates



Conclusion

- Lower Mekong Basin significant for fish
- Many barriers to fish movement
- Engineered solutions:
different solutions for different challenges
- Monitoring important to ensure solutions
are effective
- Pak Peung Wetland study site case study
important to demonstrate problems and
solutions



Thank you for your time

