

Dec 12th, 11:00 AM - 12:40 PM

# Development of a comprehensive fish passage approach for floodplains of the lower mekong basin

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# Development of a comprehensive fish passage approach for floodplains of the Lower Mekong Basins



Oudom Phonekhampheng, Douangkham Singhanouvong, Garry Thorncraft, Lee Baumgartner, Tim Marsden, Craig Boys

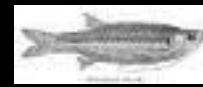
International Conference on  
River Connectivity (Fish Passage 2018)  
Albury, Australia



Department of  
Primary Industries



# Many fish species (over 850 species)....need to consider them all



# Social Importance of fish

LMB – approx 2.2 million tonnes per annum

About 2% of total world fish catch

## Importance of fish in sustenance diets

	Fish	Beef	Pork	Chicken
	kg/person/year	kg/person/year	kg/person/year	kg/person/year
Lao PDR	29 (48% animal protein)	5	6	5
Cambodia	37 (79% animal protein)	2	3	2

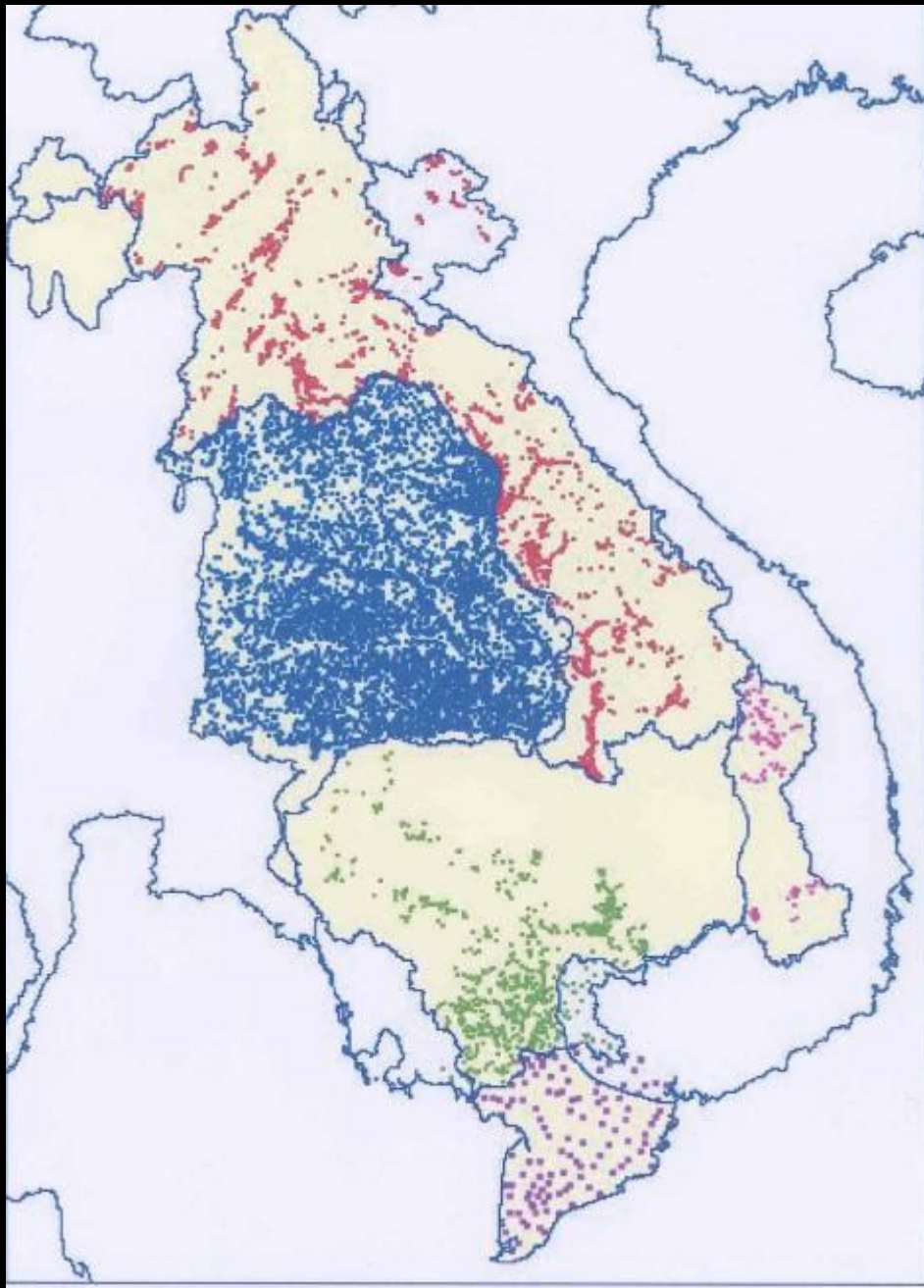




# The problem

Thousands of migration barriers  
Throughout the Lower Mekong  
Basin

Creating severe declines in  
commercial and sustenance  
Fisheries on floodplains



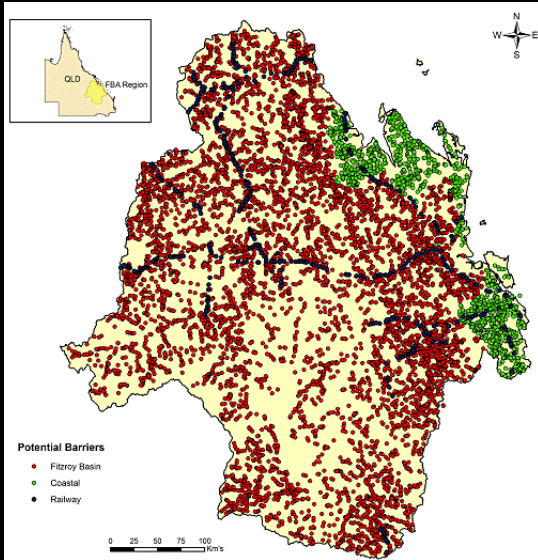
# The problem



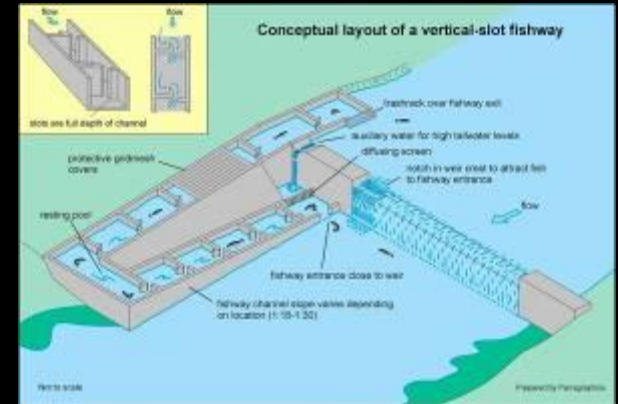




# Four stage project



Scope/research



Construct/Assess



Downstream

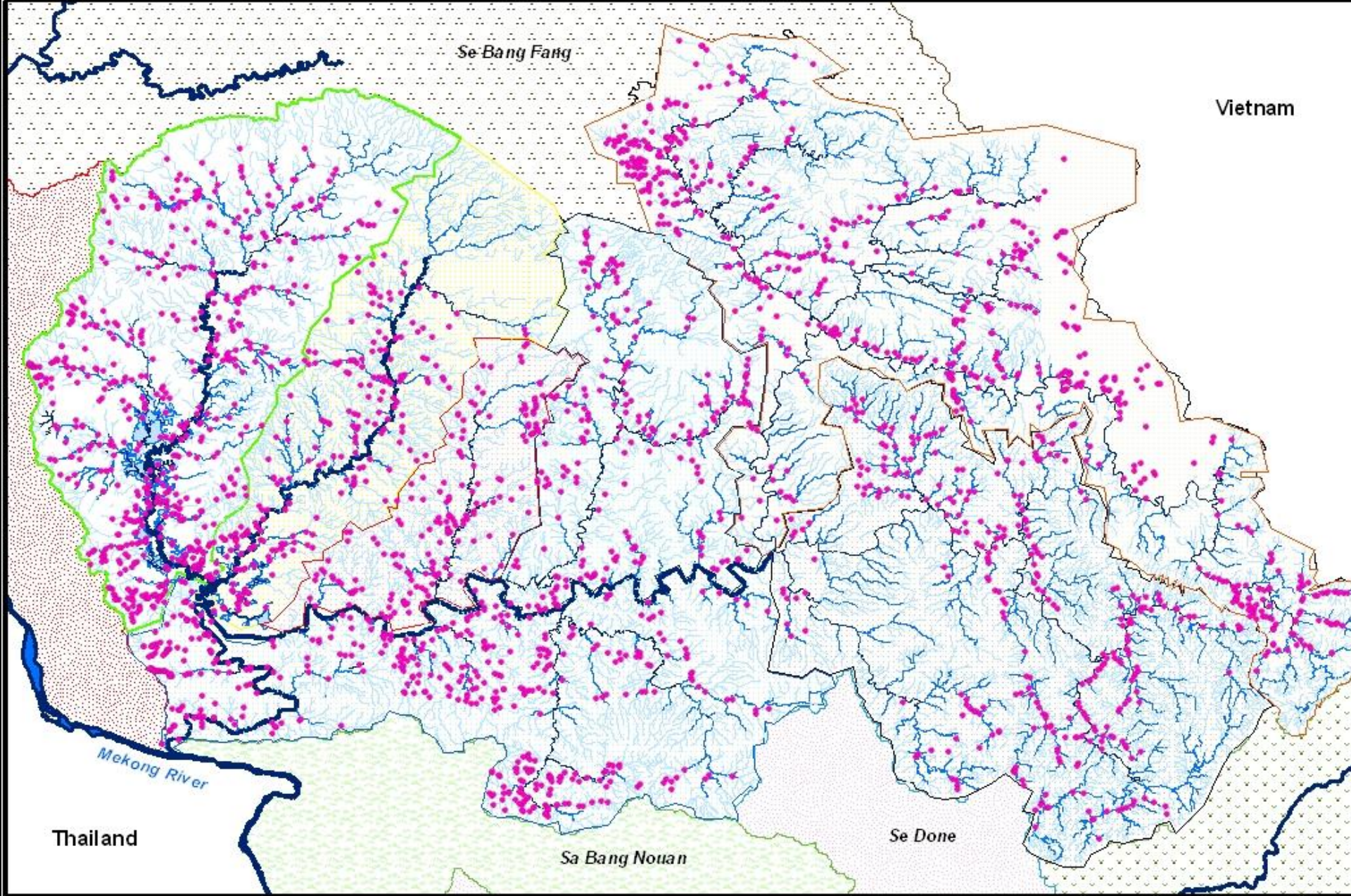


# Stage 1. GIS mapping of existing infrastructure



# Team inspections





**Legend**

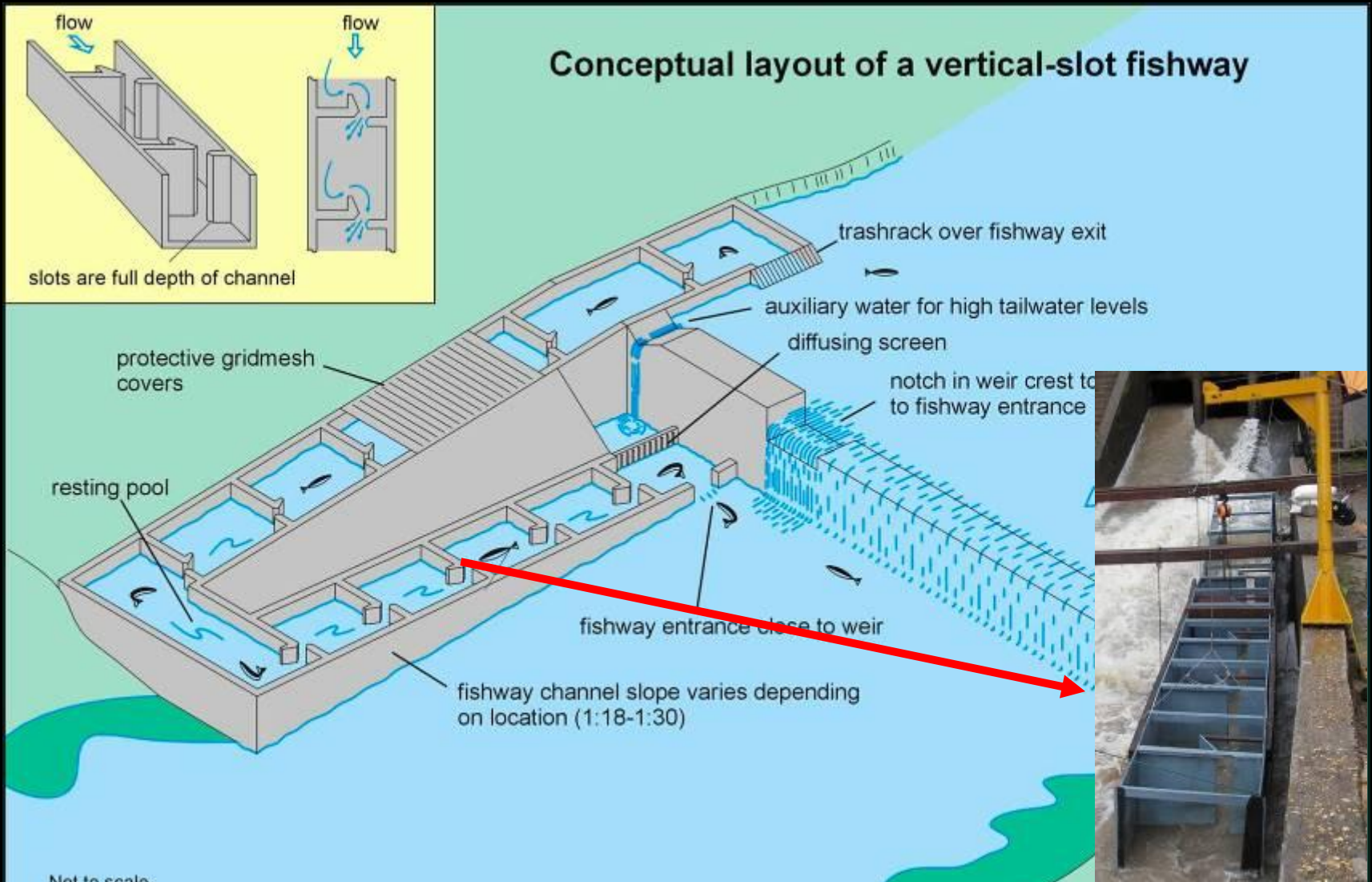
- All Barriers Se Bang Hieng
- Intermittant Streams
- Permanent Major Rivers
- Canals
- Se Thamouak
- Se Koumkam
- Se Banghiang
- Se Champhone
- Se Koumkam
- Se Yepong



# Ranking process



# Stage 2. Research effective mitigation options



Study Site

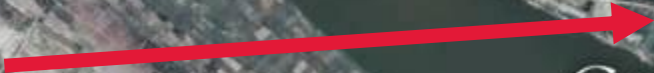








Regulator (Study site)



©2009 Google

Image © 2010 GeoEye

18°22'09.67" N 103°39'56.99" E elev 0m

Eye alt 6.90 km

Imagery Date: Feb 28, 2003

# Research different design aspects



# Different designs



# Different designs





# Stage 3. Construct a permanent fishway at the experimental site











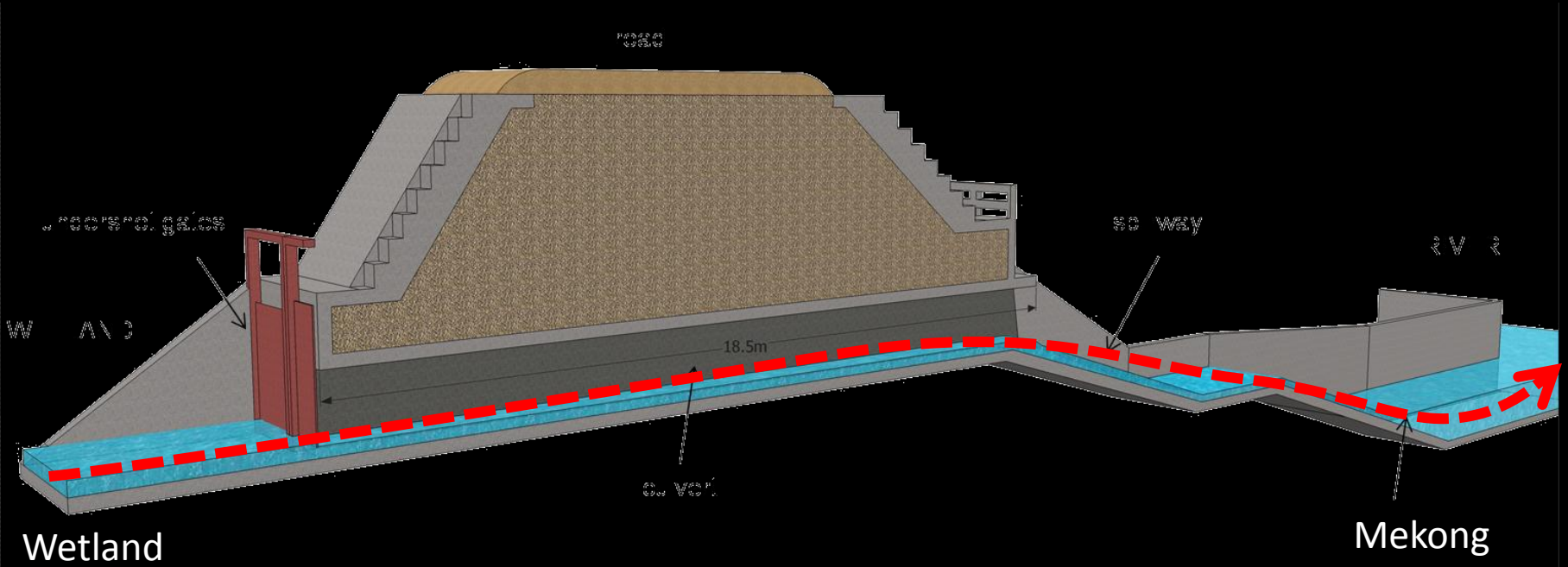
# Pak Peung Demonstration Fishway



# Stage 4. Return to the Mekong

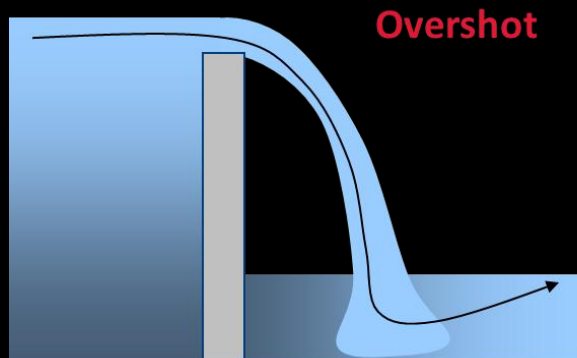
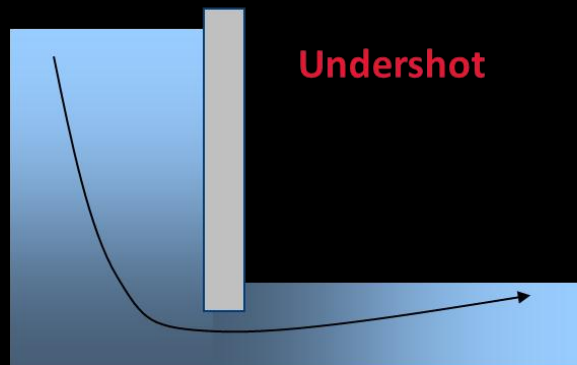


- To return to the Mekong fish must leave the wetland through undershot gates



# Fish welfare

- Pilot experiments in Australia and Laos PDR show that more fish are injured or killed by undershot weirs than overshoot weirs – BUT why were fish impacted?



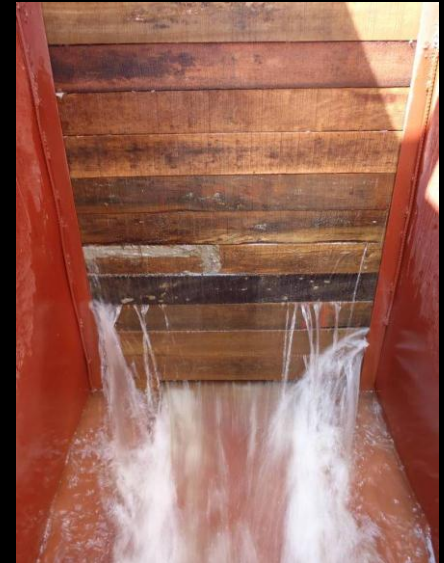
# Undershot fish mortality

- Nongteng pilot experiments



Overshot

Undershot



# Installation and testing of overshot Layflat gates

- ‘Fish-friendly’ overshot Layflat gates have successfully replaced undershot gates at over 50 sites in Australia;





- Experimental Layflat gate retro-fitted upstream of existing gates at Pak Peungn(demonstration site)



# Understanding how fish are injured - pressure



# Understanding how fish are injured - shear



Fish Delivered through tube

Pump generates high nozzle velocity

High velocity at nozzle to generate shear

Fish collected here

# Wider uptake by other stakeholders

- District, Provincial and National government agencies visiting demonstration sites, receiving briefings and exposed to social media interest
- Development agencies (ADB and WB) including fish passage mitigation in new projects (Northern and Southern Lao)
- But now need to demonstrate economic, social and environmental benefits – ongoing now!!

# Lessons learned

- Focus on upstream fish migration is not enough
- Need conceptual models to help understand system function
- Need to work in the field with actual migrating fish is the key
- Many species of fish (over 130) were attempting lateral migrations into wetlands (white/black/grey)
- Engage and employ villagers in all aspects of work
- Demonstration sites are very effective!!

# Lessons learned

- Good interaction with village/district/province/national government, but need to work on relationships with higher level policy development agencies in Lao PDR and across the region.

# Acknowledgements:

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The  
Murray-Darling  
Freshwater  
Research Centre

National, Provincial,  
District and local  
community participants  
in the project – local  
engagement in all  
aspects of the work  
crucial to the projects  
success

