Examining the barrier effects of mainstream dams to fish migration in the Mekong, with an integrated perspective to the design of mitigation measures

Conclusions from an independent

Expert Group Meeting

Vientiane, Lao PDR

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Key messages

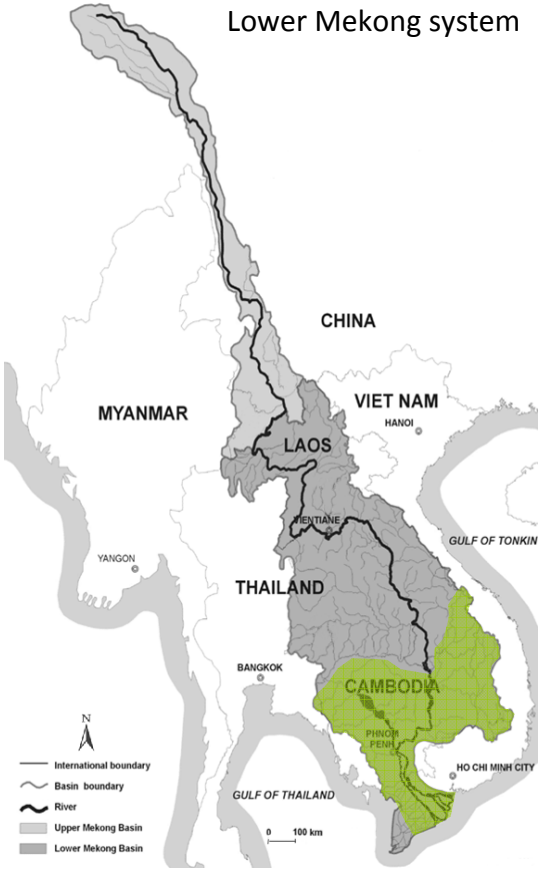
1. Mekong fisheries, migration, and dams
2. Mitigation – main conclusions from existing science
3. Mitigation – experience from specific technologies in other countries

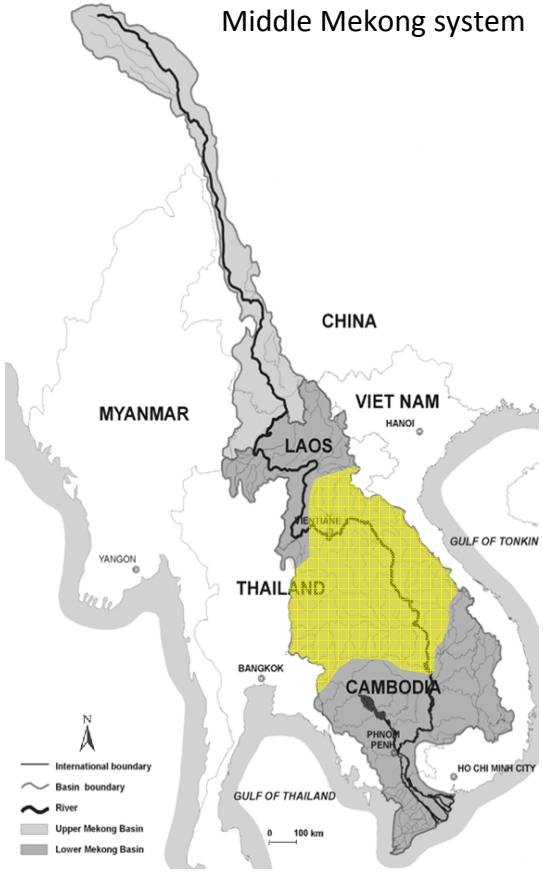
The Mekong has the world's largest inland fisheries

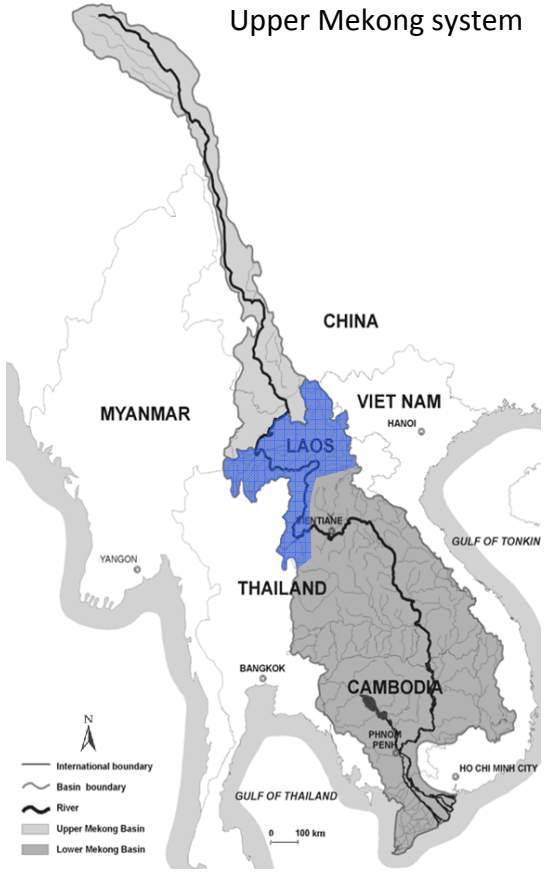
Lower Mekong
1-1.3million tonnes

Middle Mekong
0.9-1.2 million tonnes

Upper Mekong
60,000 tonnes







Mekong fisheries are valuable

US$

- > US$ 3 billion per annum

Income

- Tonle Sap - 80% of people fish
- Lao PDR > 50% fish; 80% in south (20% household income)

Nutrition

- 60 million people in LMB
- Fish – main source of animal protein + micro nutrients
- Per capita consumption 29-39 kg p.a.

Mekong fisheries are dependent on migration over large and short distances

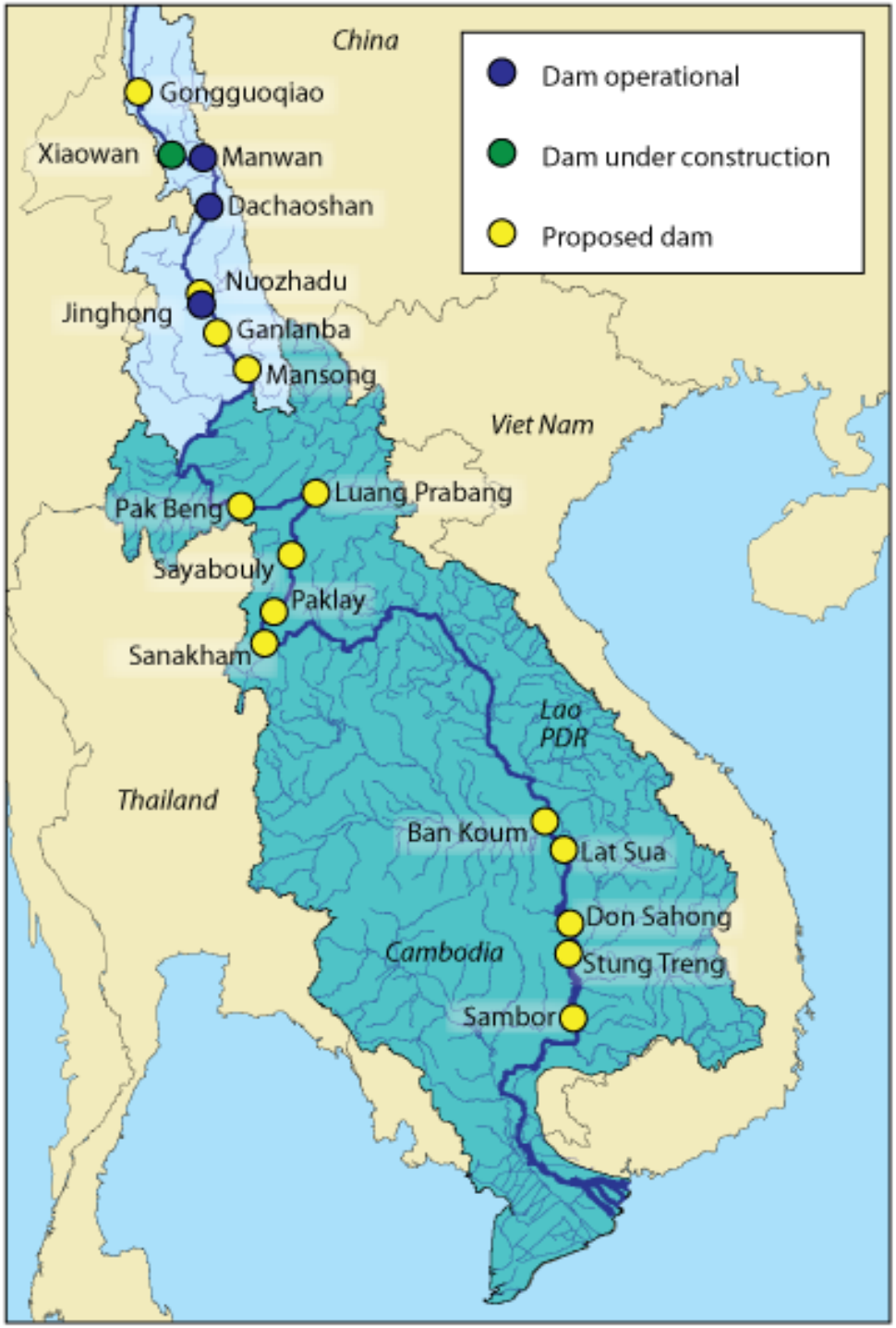
More than 70% of total fish catch in the lower Mekong basin (> 1.3 million tonnes worth US$2.5 billion) is dependent on long distance migrants

Dams are a barrier to fish migration

Effect varies depending on: species + location + design + operation of dam

Impact of dams on mainstream is greater than impact of dams on tributaries

Dams that stop migration in the middle and lower LMB will have a greater impact on fish production than dams in the upper LMB



Mitigation – main conclusions from existing science

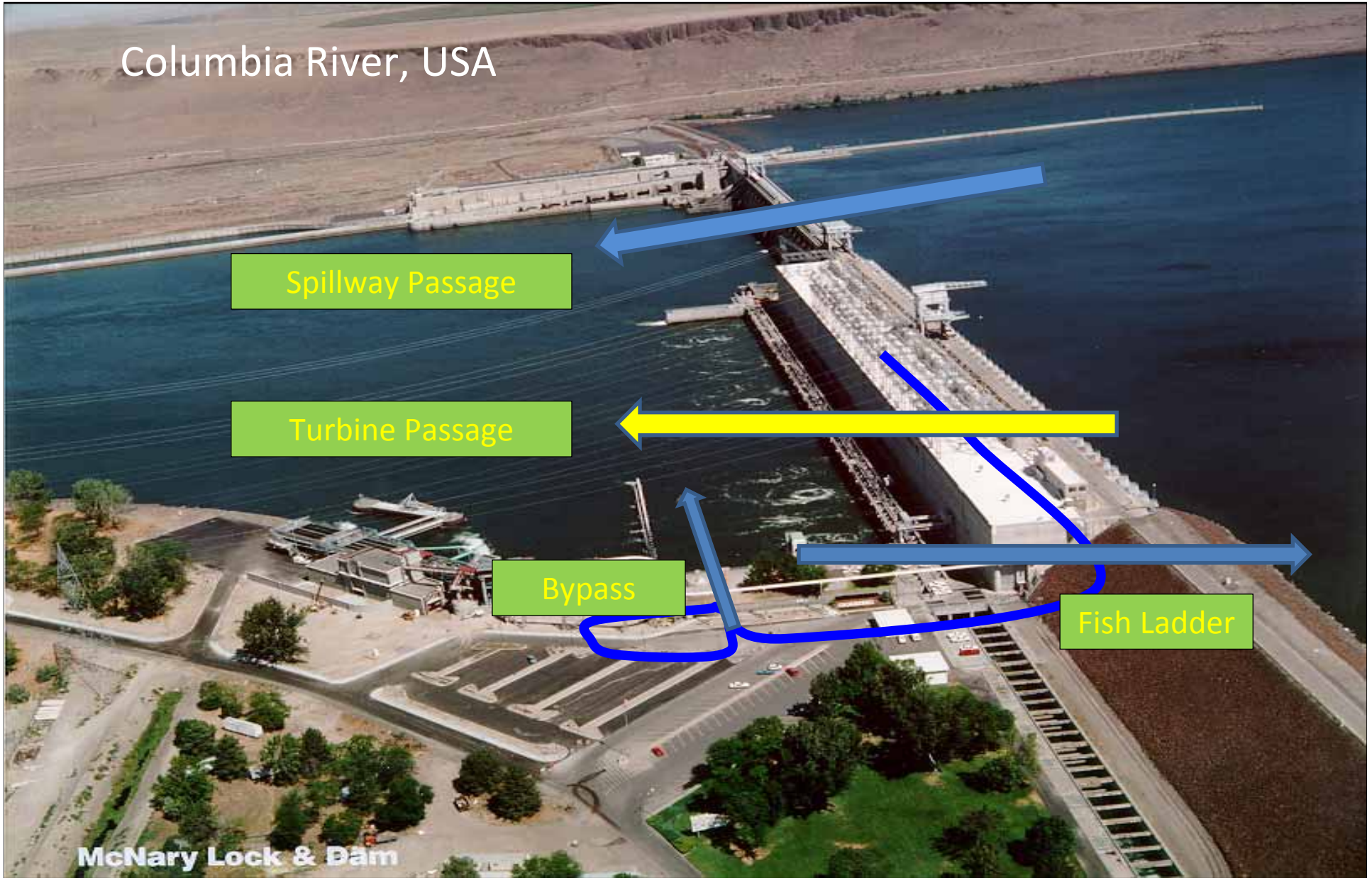
- Existing fish passage facilities cannot cope with large fish migrations and high species biodiversity – as found in the Mekong

- North America and Europe – 5-8 species (Salmonids)
- Mekong - 50 species (biomass 100x)

- Dams in the middle + lower part of LMB = major fisheries + economic + social impacts

- Best to address this issue by building dams higher in the basin – or on tributaries

Mitigation – learning from technologies in other countries



Mitigation – learning from technologies in other countries

Overview

- Each river fishery + dam is unique → specific management measures
- Existing specific designs - NO; existing concepts - YES.

Fish ladders and passages

- Tailor to: species, location, dam design and turbine type
- Understand fish biology

- # species high + biological information low =
  - # target species or
  - multiple strategies = high flow volumes by-passing turbines + multiple routes

- Columbia - dams managed for fish 1st priority - electricity 2nd priority

- Integrate mitigation and flexibility into dam design at start

Mitigation – learning from technologies in other countries

Turbines

- Survival through turbines = low-95%
- Survival through Kaplan > Francis turbines
- Survival small fish > large

- Fish friendly turbines – under development + untested

Reservoir fisheries

- Reservoir fisheries not equal to river fisheries

- When rivers large and dams downstream – poor compensation
- When rivers small and dams upstream – compensation better

- In south and south-east Asia – need fishery enhancement for high yield = added cost

Summary

- Mekong fisheries - critically important (nutrition + economy)
- >70% of benefit (US$2.5 billion) - dependent on mainstream migration
- Dams: stop migration → reduce production → economic loss + social deprivation
- Current knowledge
  - existing mitigation technology cannot handle scale of Mekong migration (6-10x species and 100x biomass)
  - dams in middle + lower LMB → major impacts on fisheries → economic + social costs
  - dams higher in the basin + tributaries = reduced impacts
- If dams built – develop specific mitigation from start (= dam design + operating procedures)
- Use existing concepts but not off-the-shelf designs