

Diadromous Fishes in the Lower Mekong Basin



Institute for Land,
Water and Society
Charles Sturt University

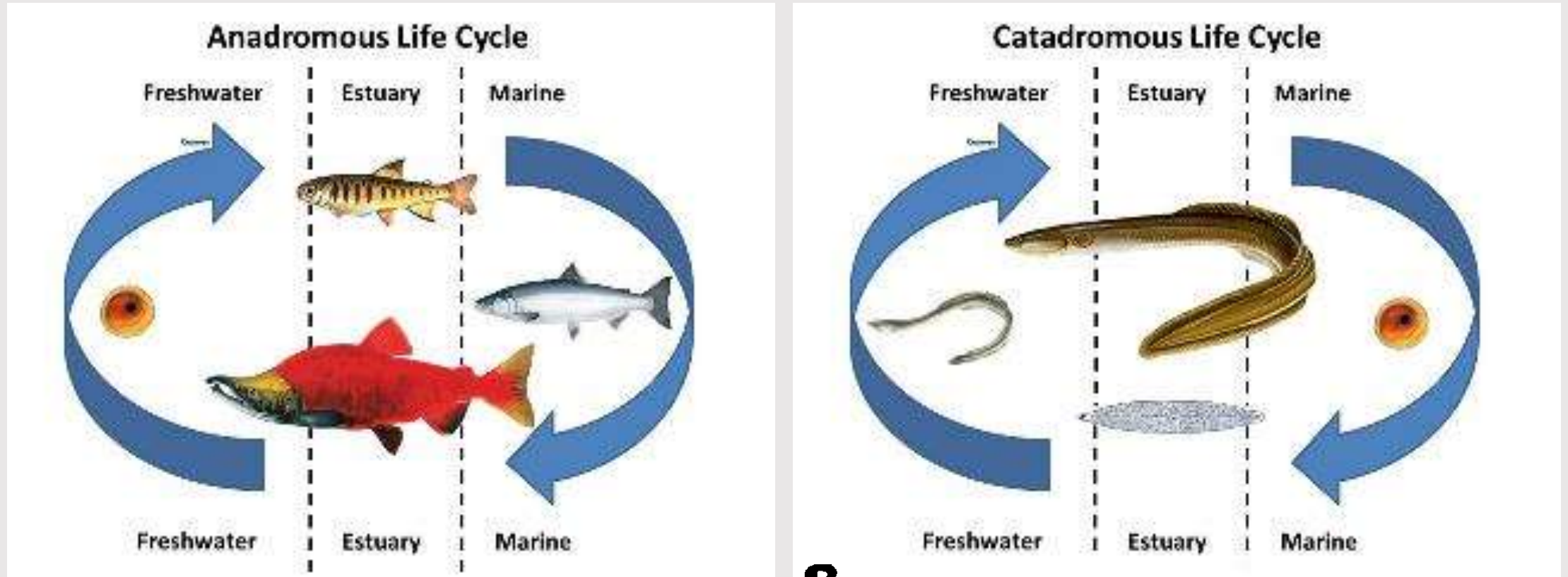
An V. Vu

Yangon, 01 October 2019

Supervisors: Lee Baumgartner, Wayne Robinson, Martin Mallen-Cooper, Julia Howitt, Ian Cowx

1. Introduction

Diadromous: migrate between the **Fresh** & **Marine**



Which Diadromous fish
in the Mekong River?



Otolith microchemistry

1. Introduction

Mekong River: 10th longest river in the world with 4,909 km: 2,198km in China & 2,711km through 5 countries



1. Introduction

4.4 million
tons of fish
production.

17 billion
\$US are the total
value of the fisheries

~1,200
Fish species.

80%
of people in the LMB depend directly
and indirectly on natural systems for
food security, livelihoods and
customs.



50 kg
of fish are consumed by a person a
year. Fish is the 2nd largest dietary
component (18%),

60 million
people live in the
Mekong basin.

2/3
of the rural population participate
in fishing to a certain extent for
food and employment.

1. Introduction

Fish migrations:

- Fish species diversity: ~1200 species
 - *Unknown status: 35%*
 - *Threatened species: 8%*
- **Migratory fishes: 37%** of total catch (SEA, 2010).
~ 600,000 tons/yr of migrant fish at risk.
- 3 fish migration systems:
 - Upper
 - Middle
 - Lower
- Spawning habitat
- Migrate all seasons of year.

Upper Fish Migration System:

- 262 species
- 0.06 mil tons/yr

Middle Fish Migration System:

- 386 species
- 0.9-1 mil tons/yr

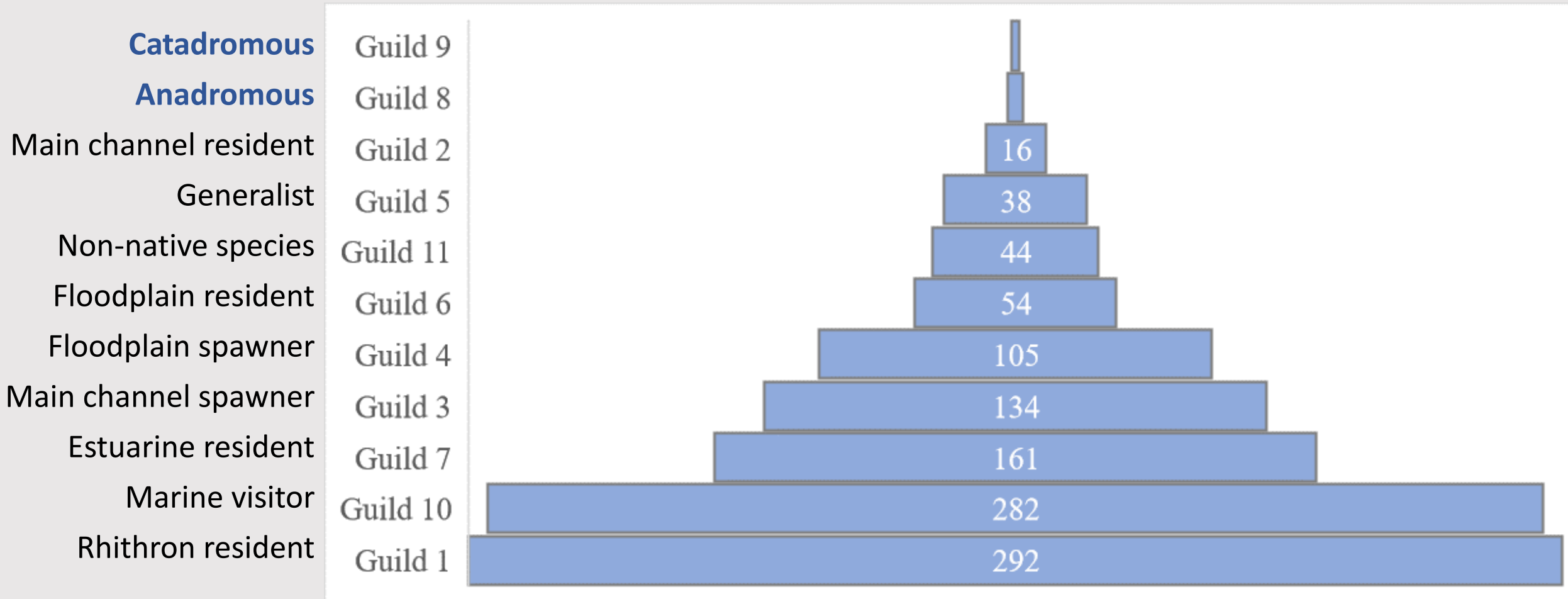
Lower Fish Migration System:

- 669 species
- 1.2-1.5 mil tons/yr



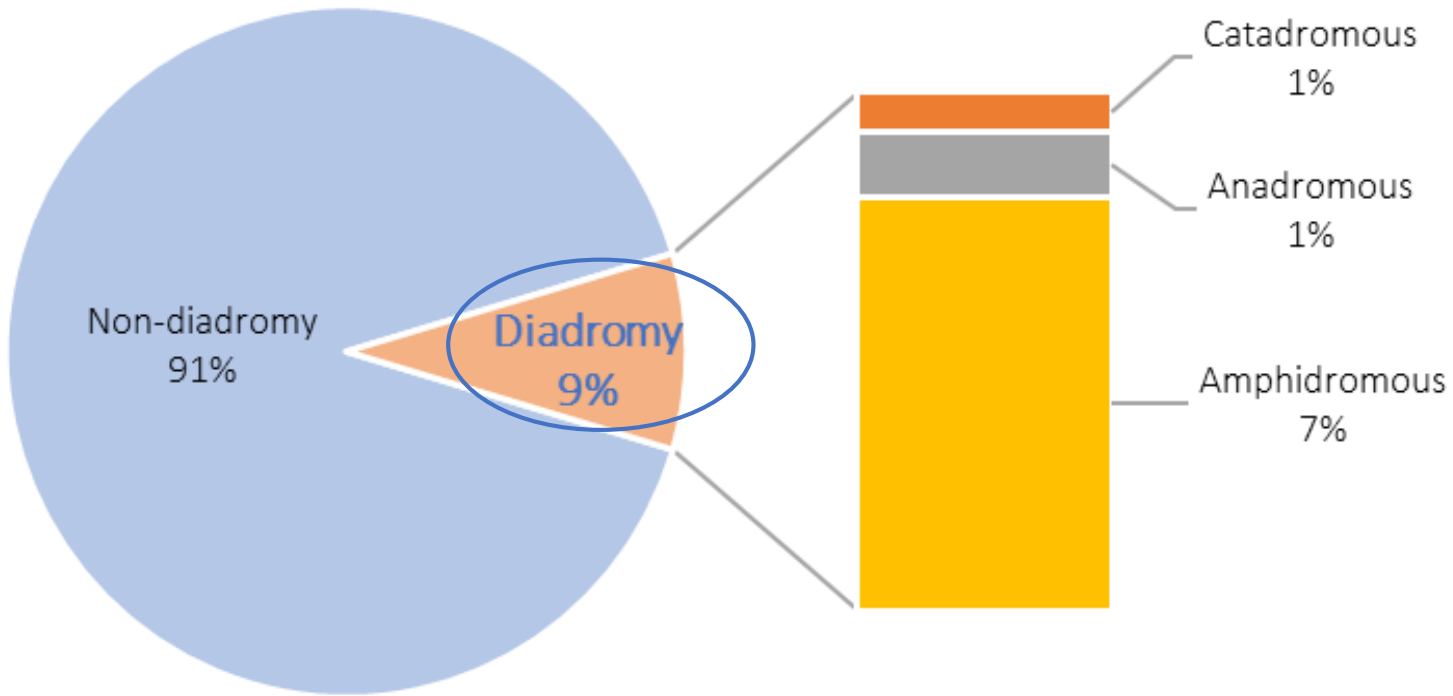
1. Introduction

Diadromous (*migrate between fresh and marine waters*): Anadromous + Catadromous
+ Amphidromous

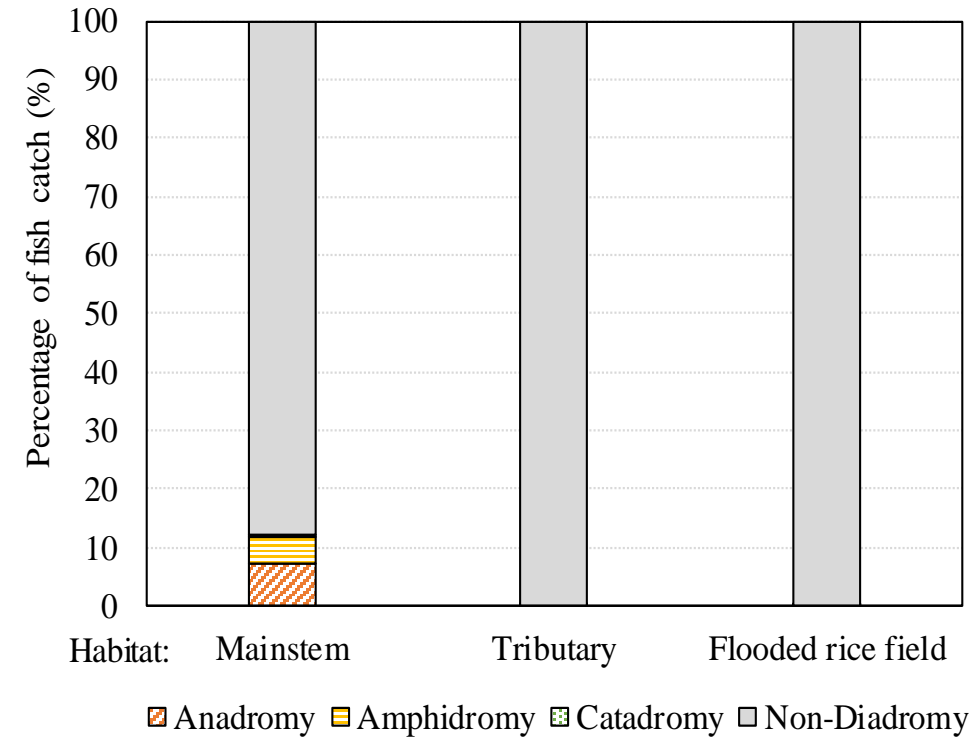


Number fish species by guild types in the Mekong River

2. Preliminary results



Proportion of Diadromous fish species

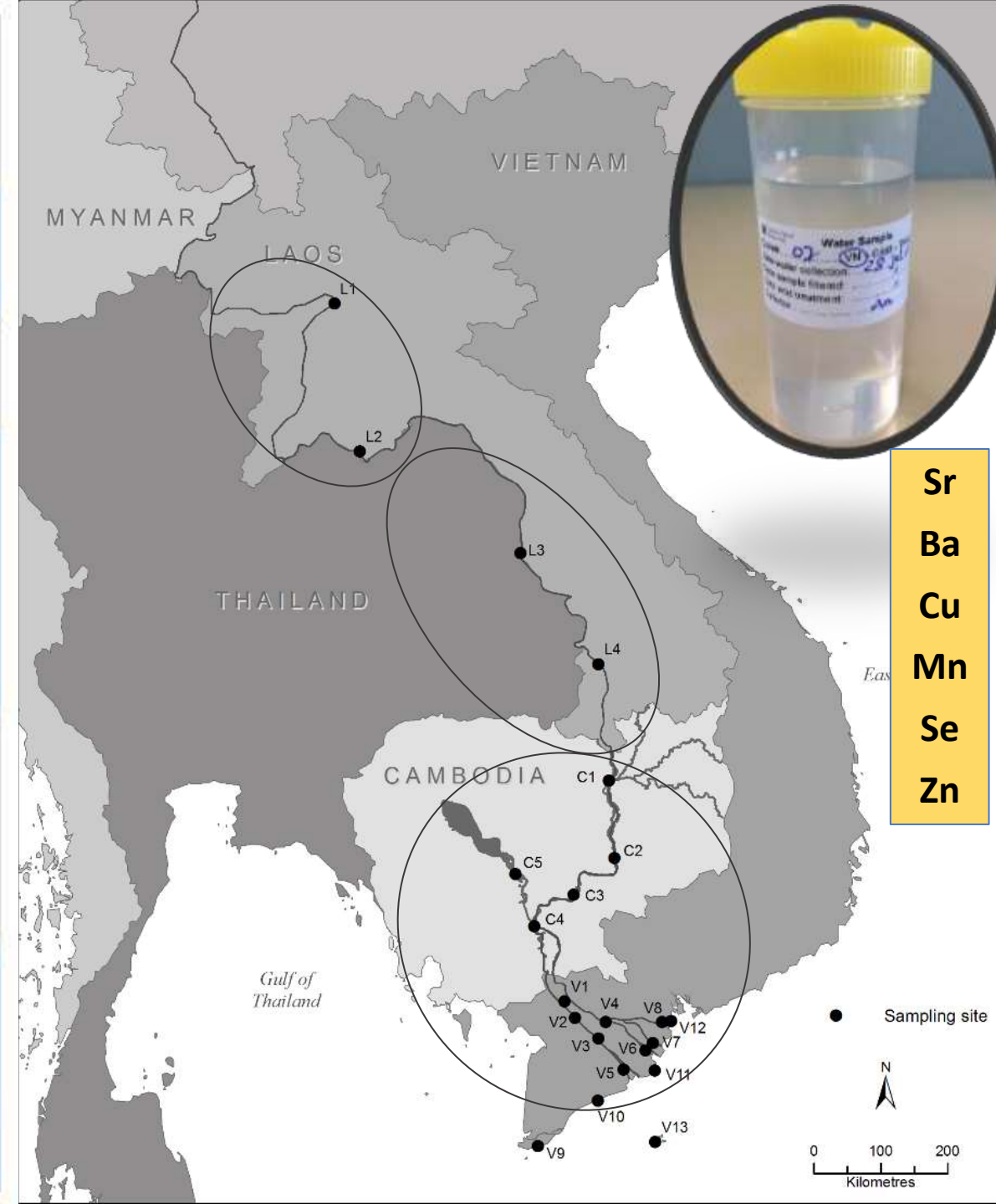


Proportion of Diadromous fish catch

- Very few species was confirmed.
- Other species: local knowledge/ elsewhere
→ Need to be confirmed

2. Prelim

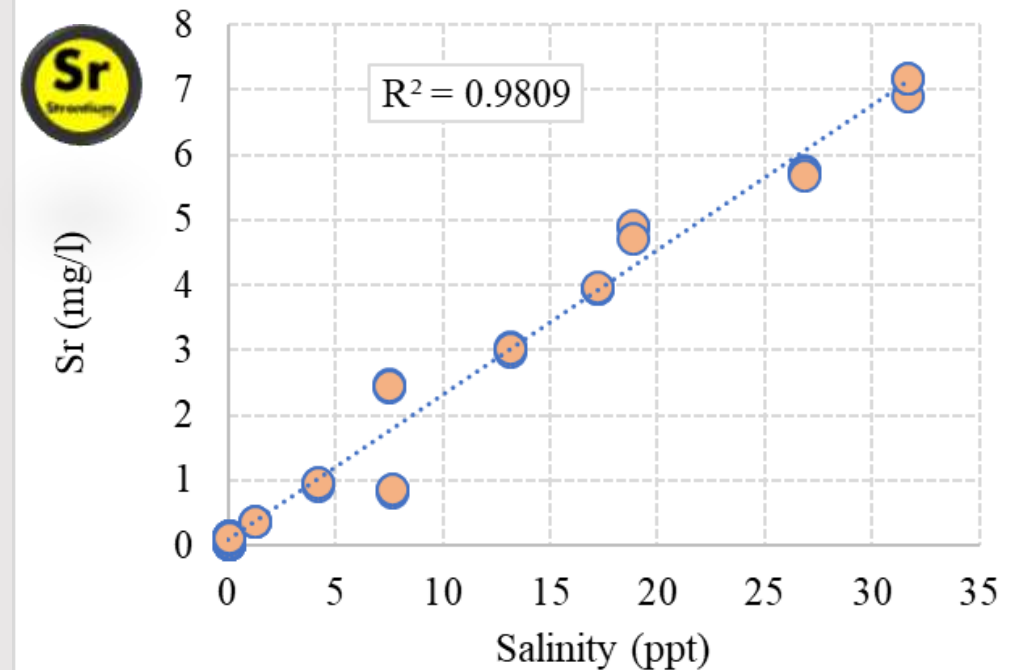
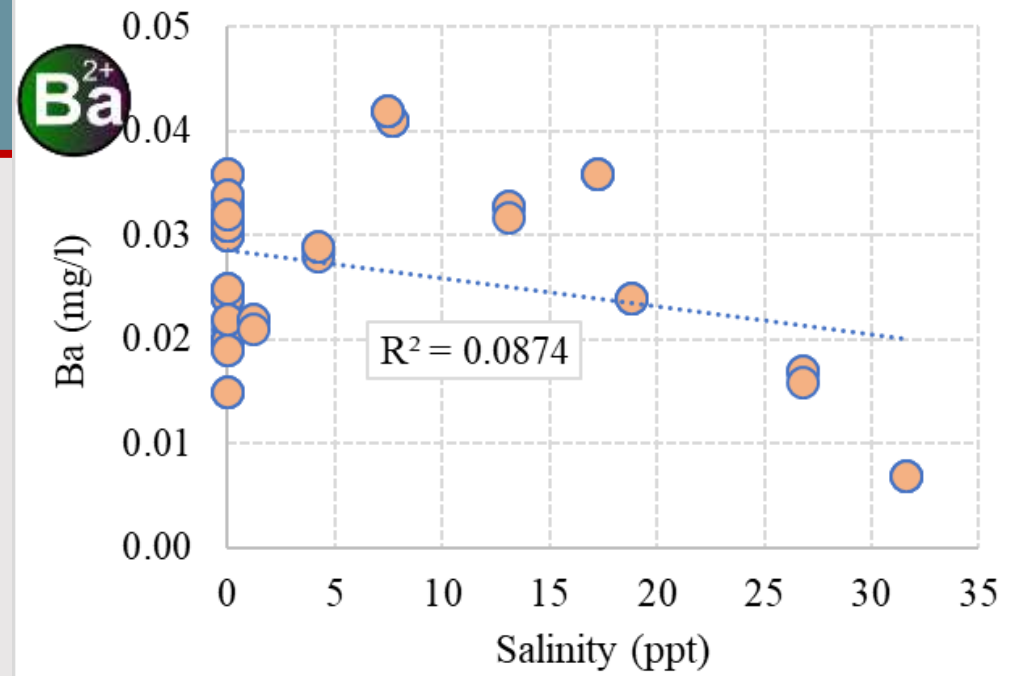
Water chemistry:



2. Preliminary results

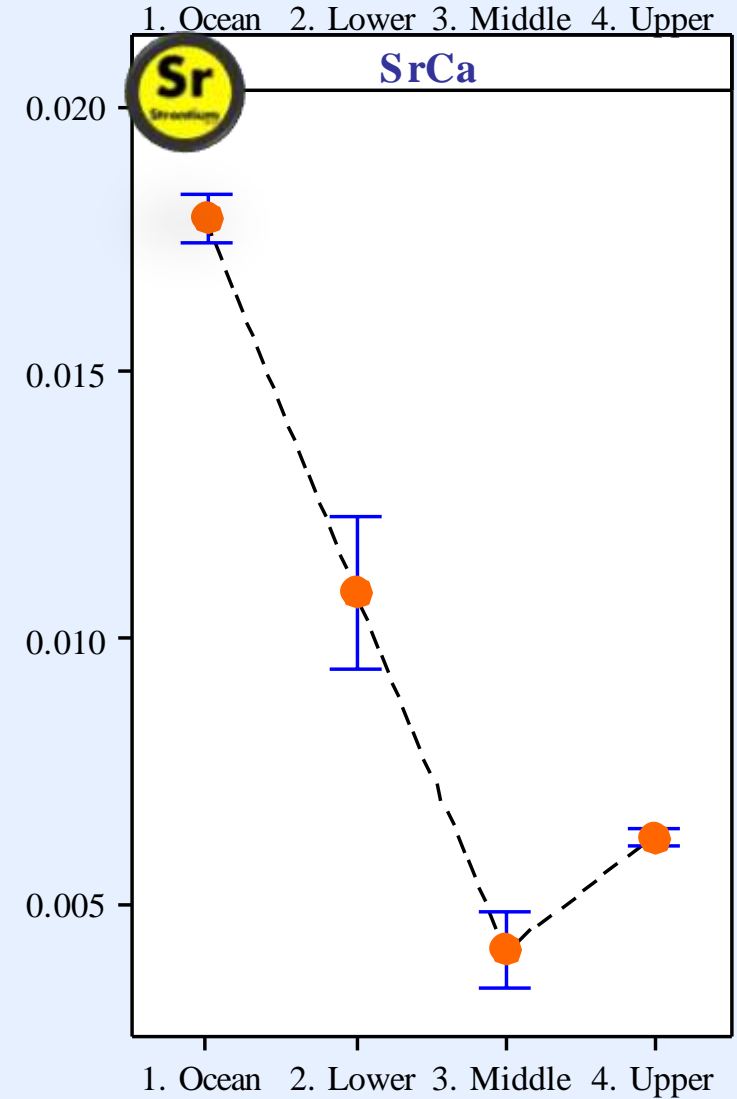
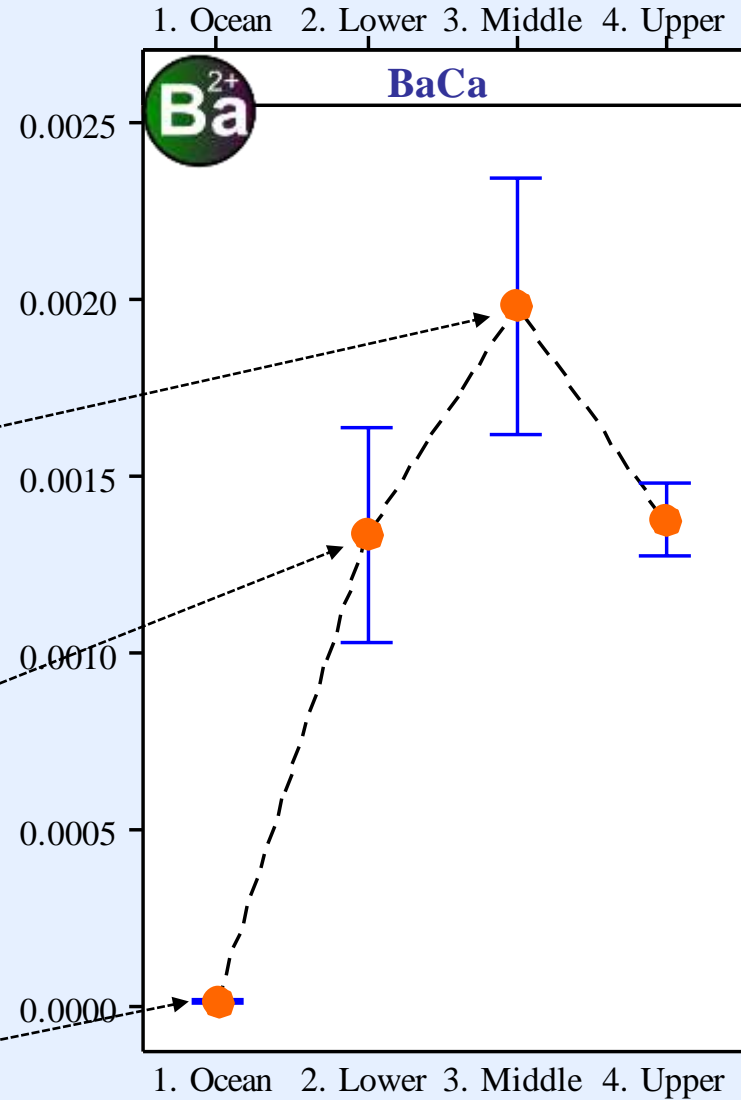
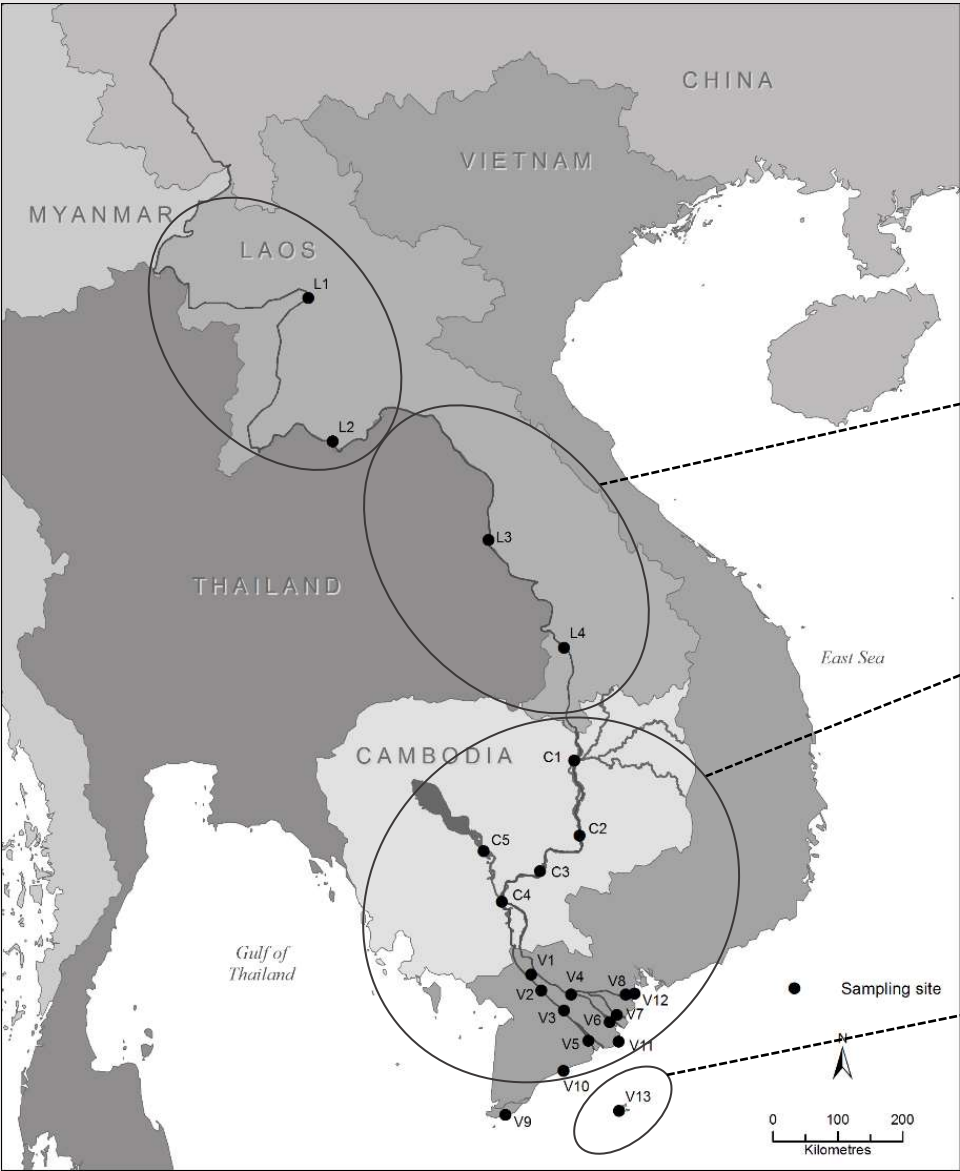
Relationship between elements and salinity in the LMB
(Pearson correlation)

	S‰	Ba	Ca	Cu	Mn	Se	Sr	Zn
S‰	1							
Ba	-0.296	1						
Ca	0.989	-0.269	1					
Cu	0.681	-0.135	0.708	1				
Mn	-0.324	0.346	-0.317	-0.027	1			
Se	0.693	-0.083	0.713	0.709	-0.232	1		
Sr	0.990	0.283	0.999	0.711	-0.321	0.718	1	
Zn	-0.085	0.031	-0.080	-0.102	-0.144	-0.099	-0.083	1



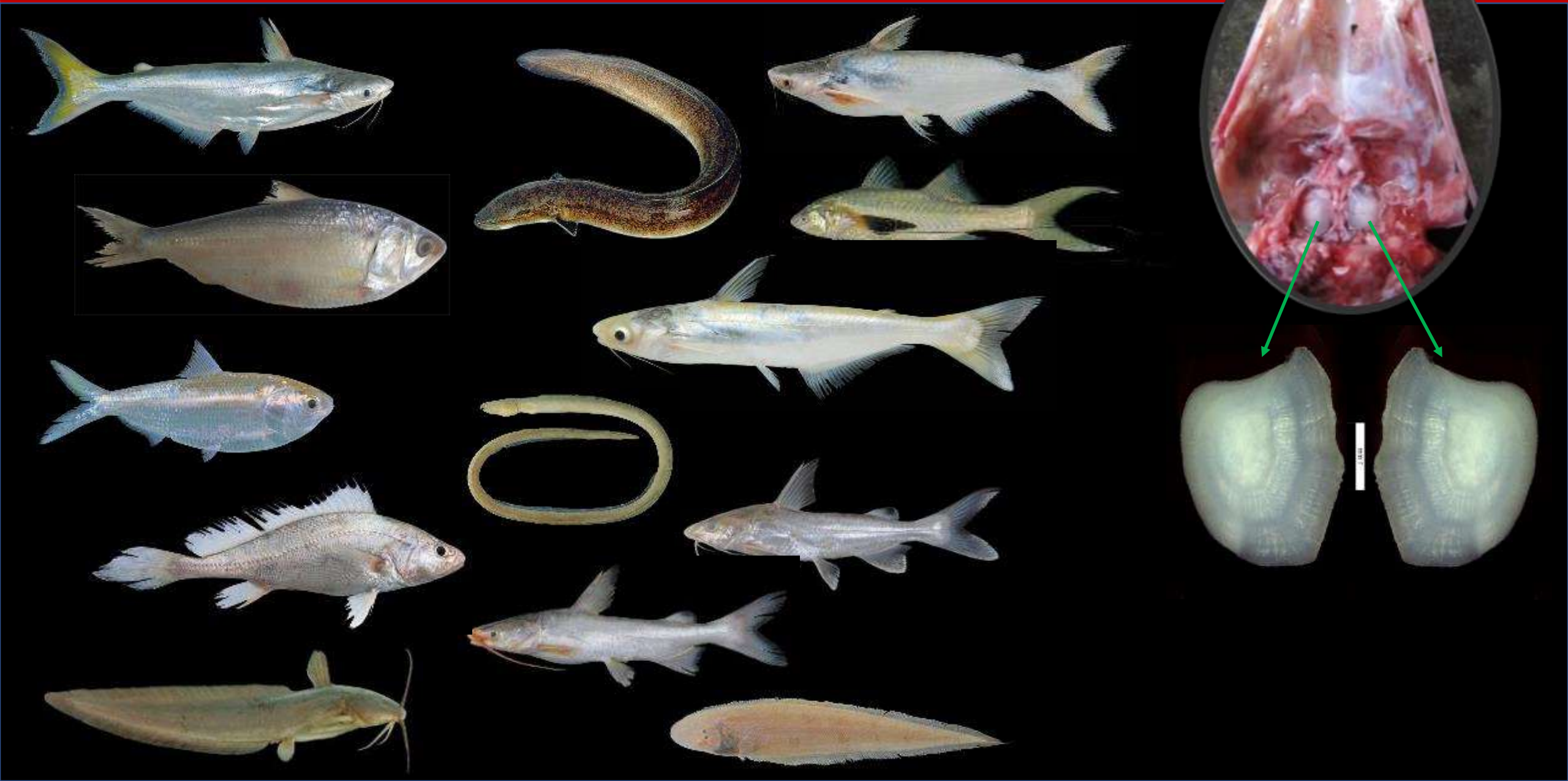
2. Preliminary results

Water chemistry:

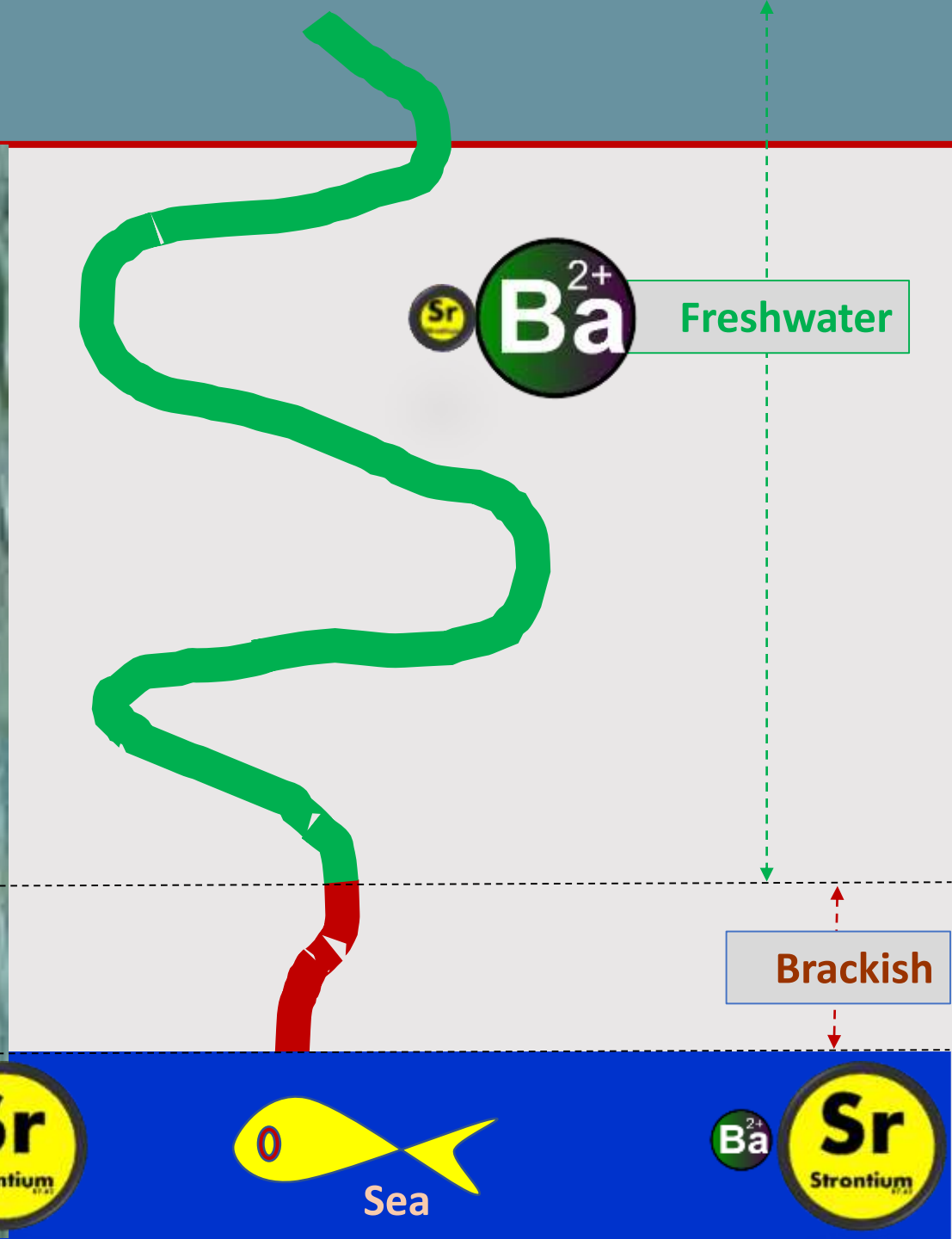
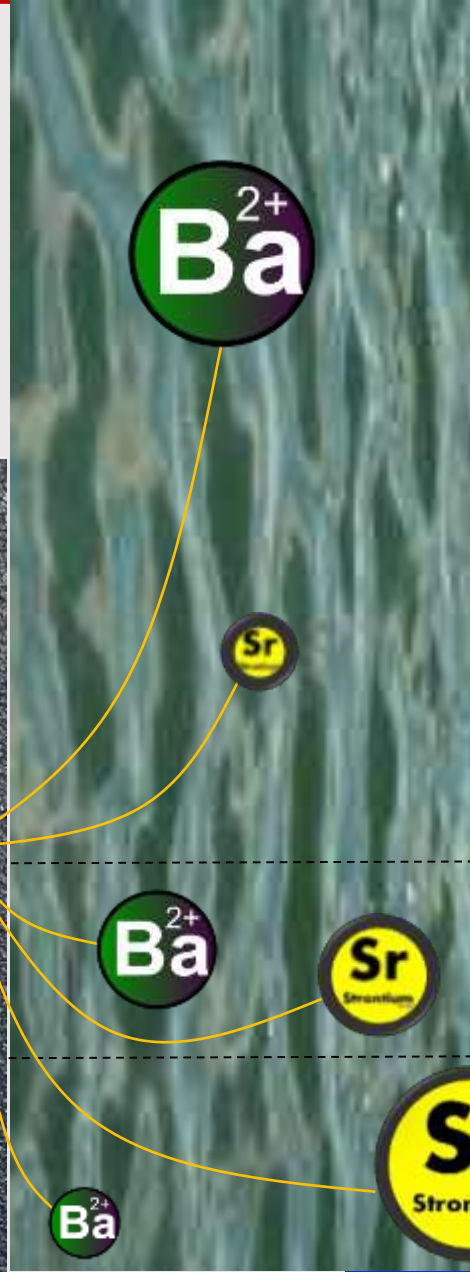


Water bodies

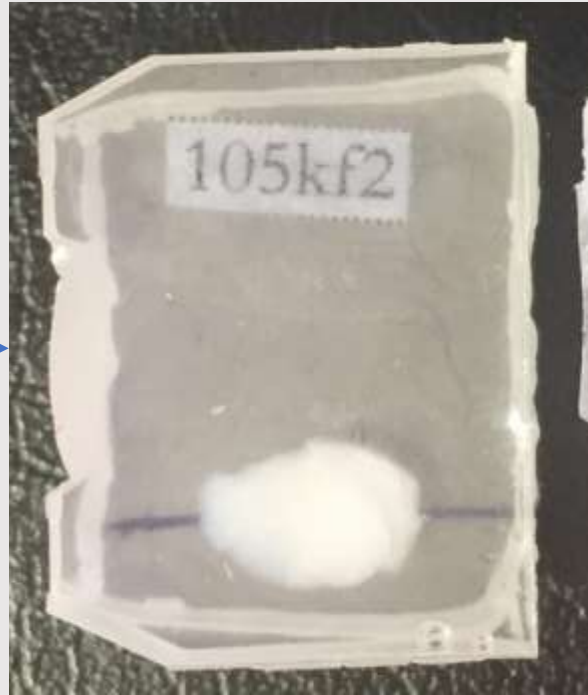
Otolith microchemistry



Otolith microchemistry



2. Preliminary results



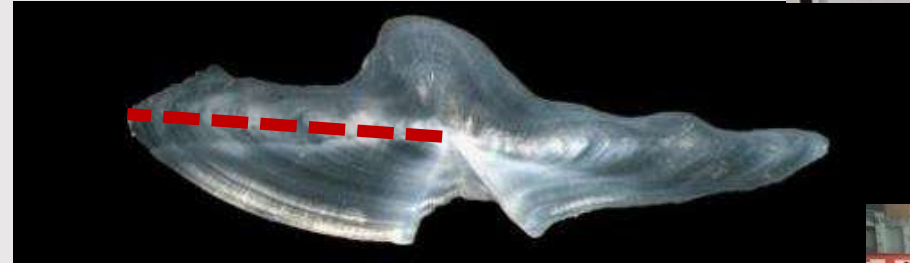
2. Preliminary results

Adelaide Microscopy
The University of Adelaide



Laser Ablation -
Inductively Coupled
Plasma Mass
Spectrometry
(LA – ICPMS):

Measure elements along a transect



Scanning X-ray
Fluorescence
Microscopy **(SXFM)**

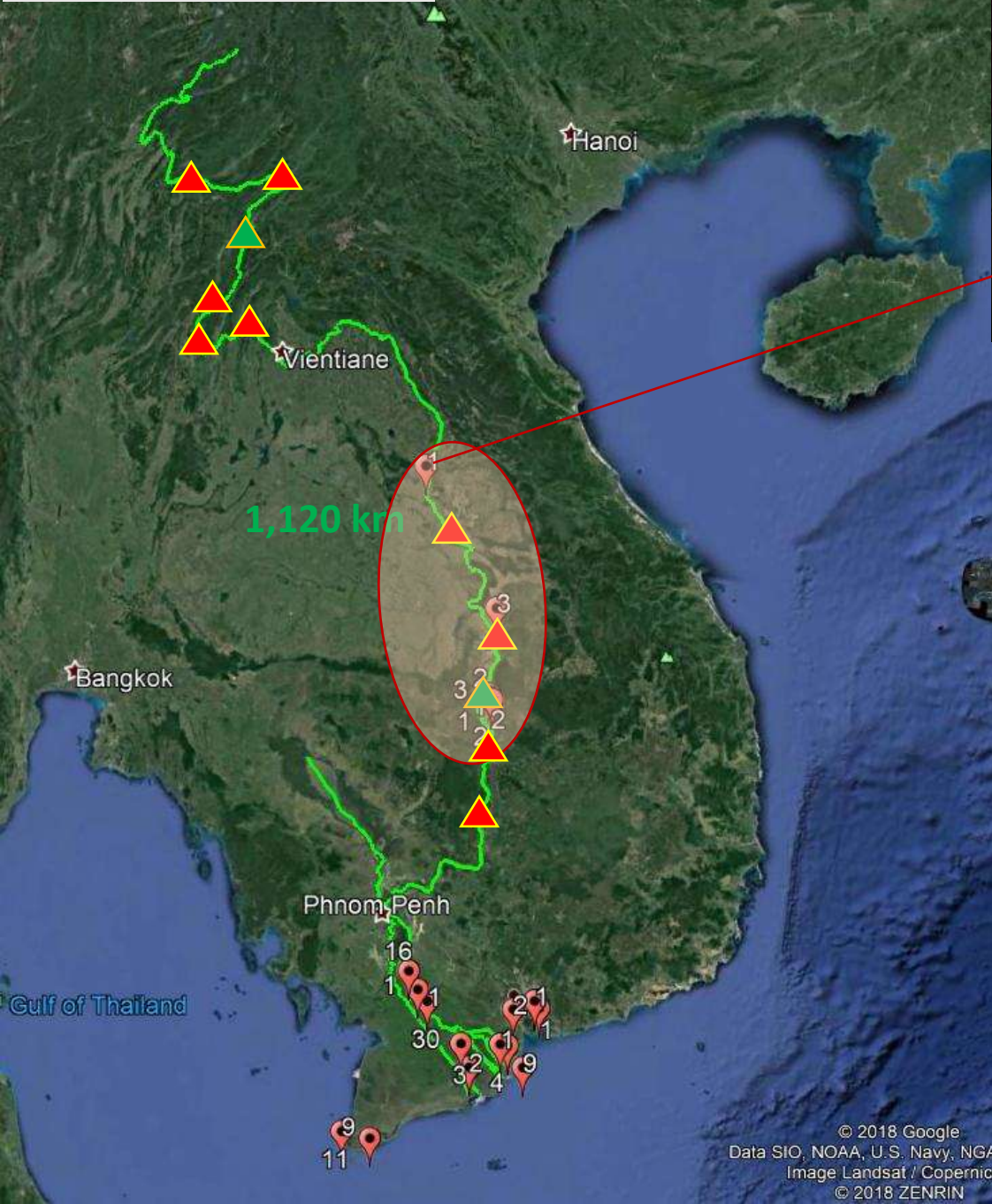
Measure elements on otolith plane



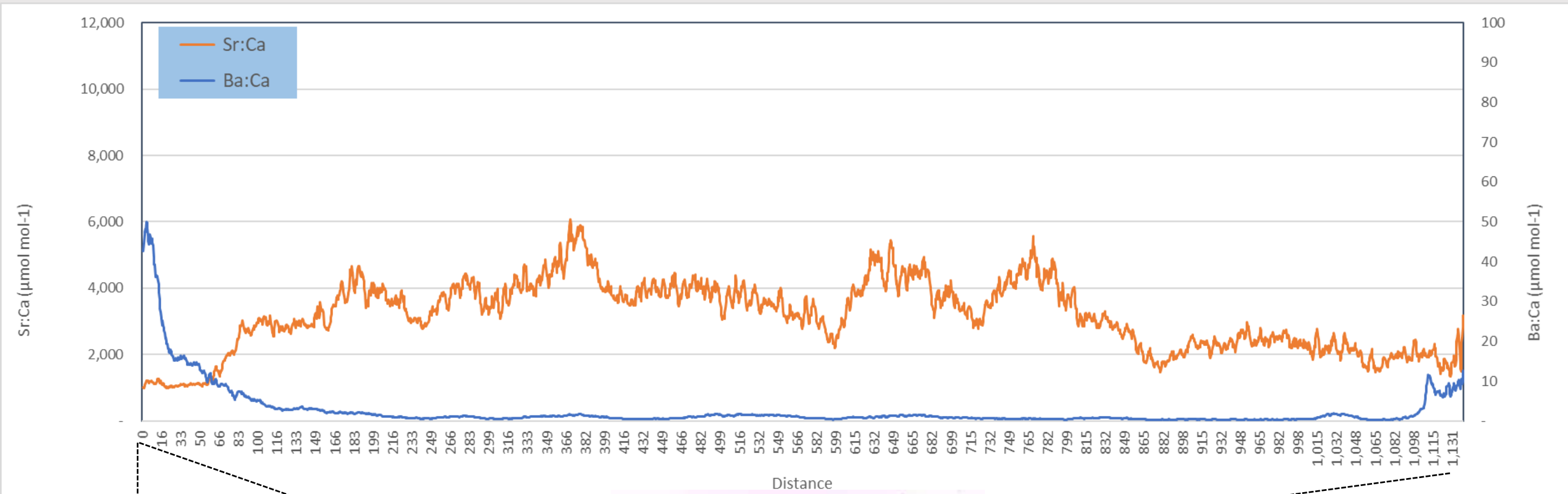
Australian Synchrotron



Pangasius krempfi:

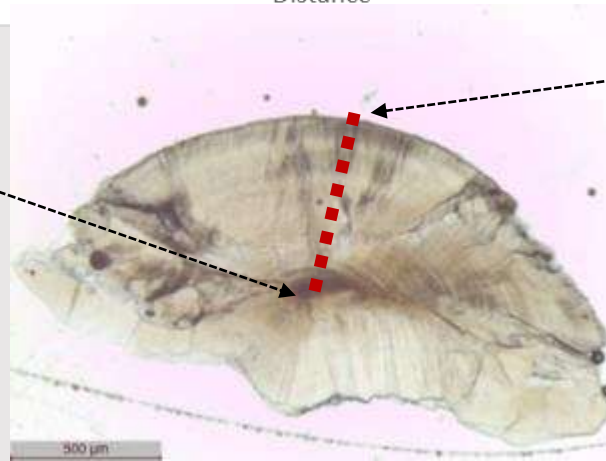


2. Preliminary results

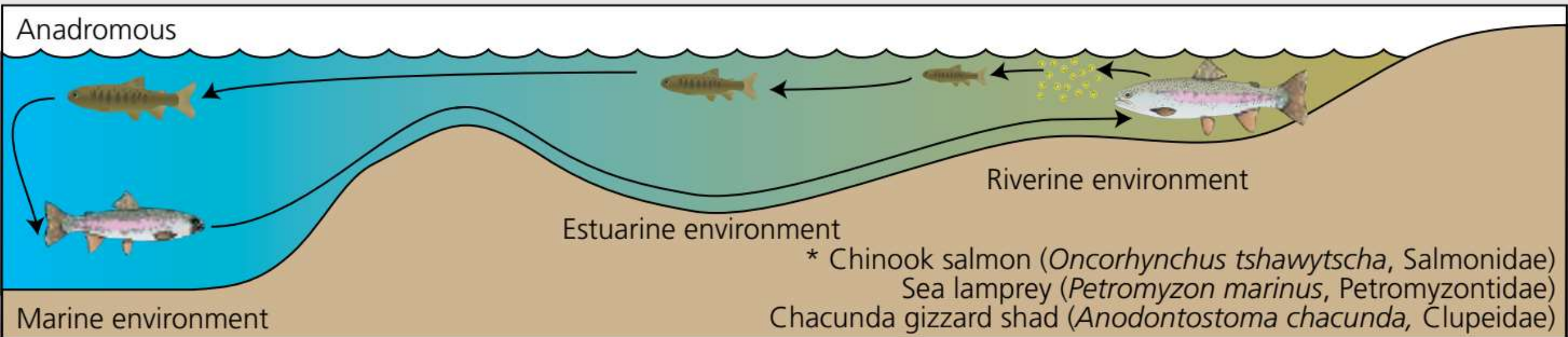
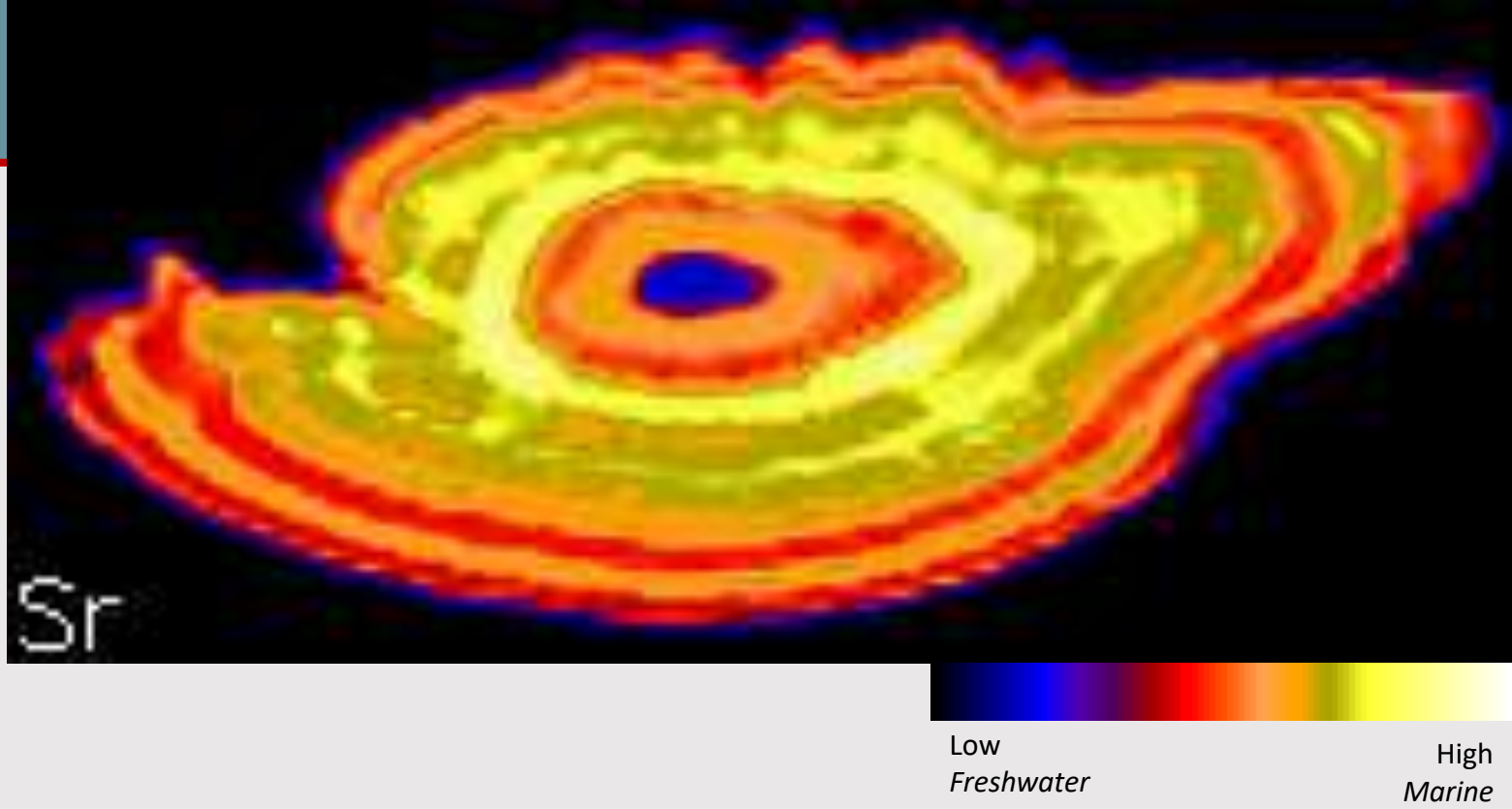
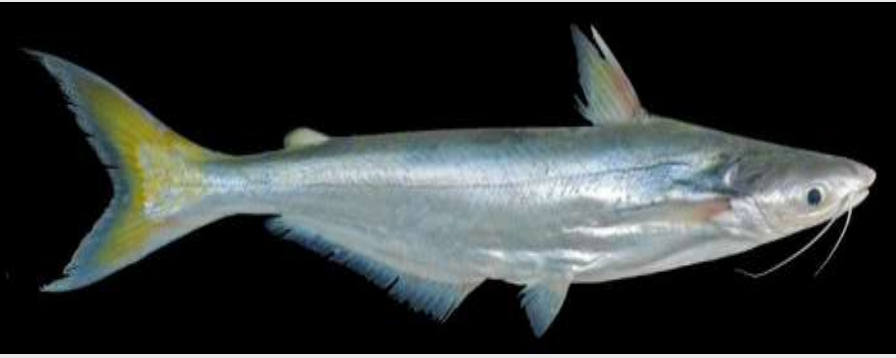


Born

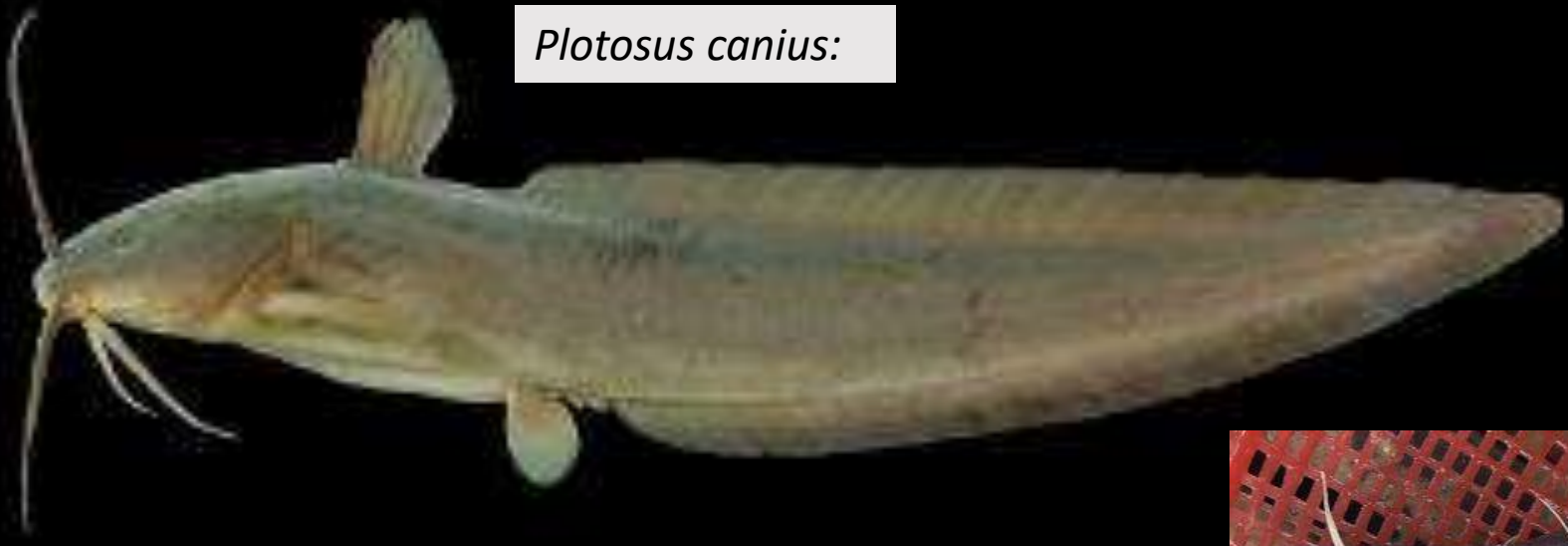
Captured
(Freshwater)



2. Preliminary results

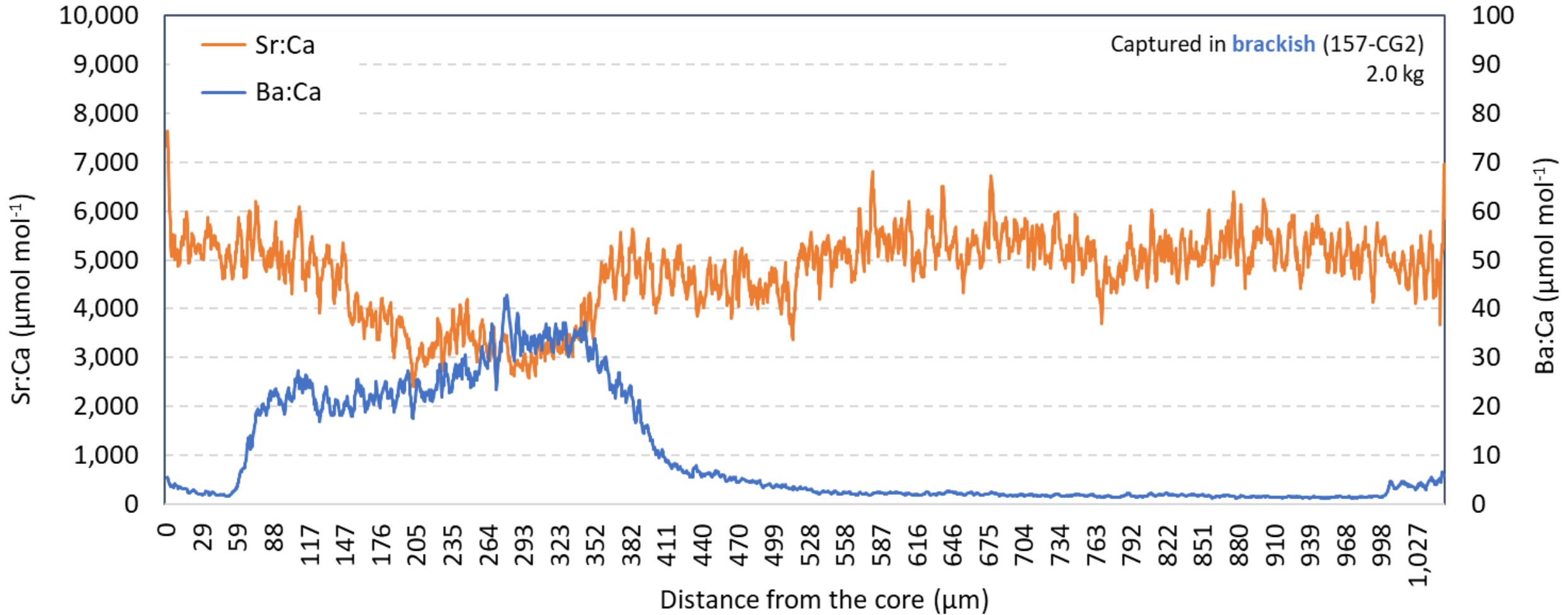
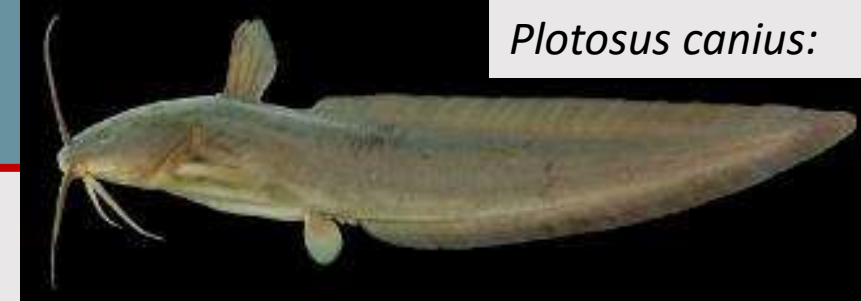


Plotosus canius:

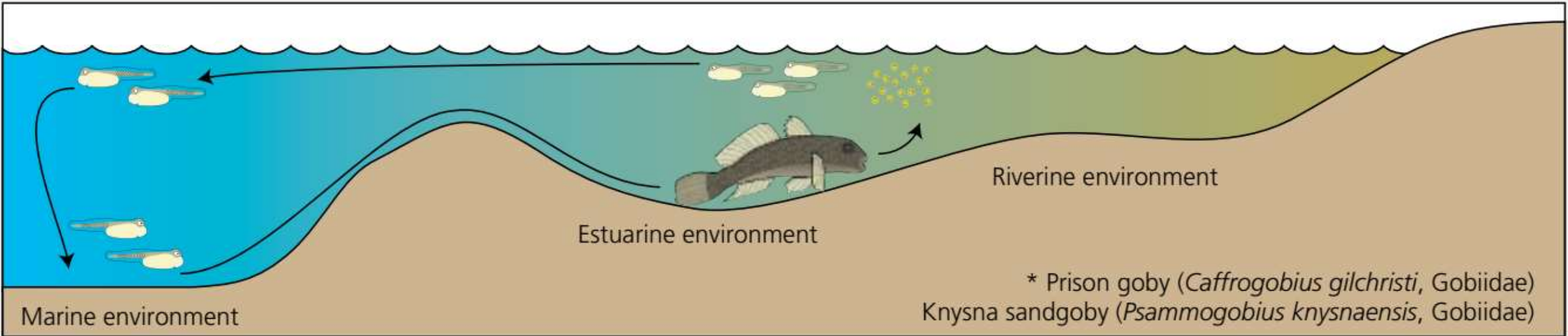
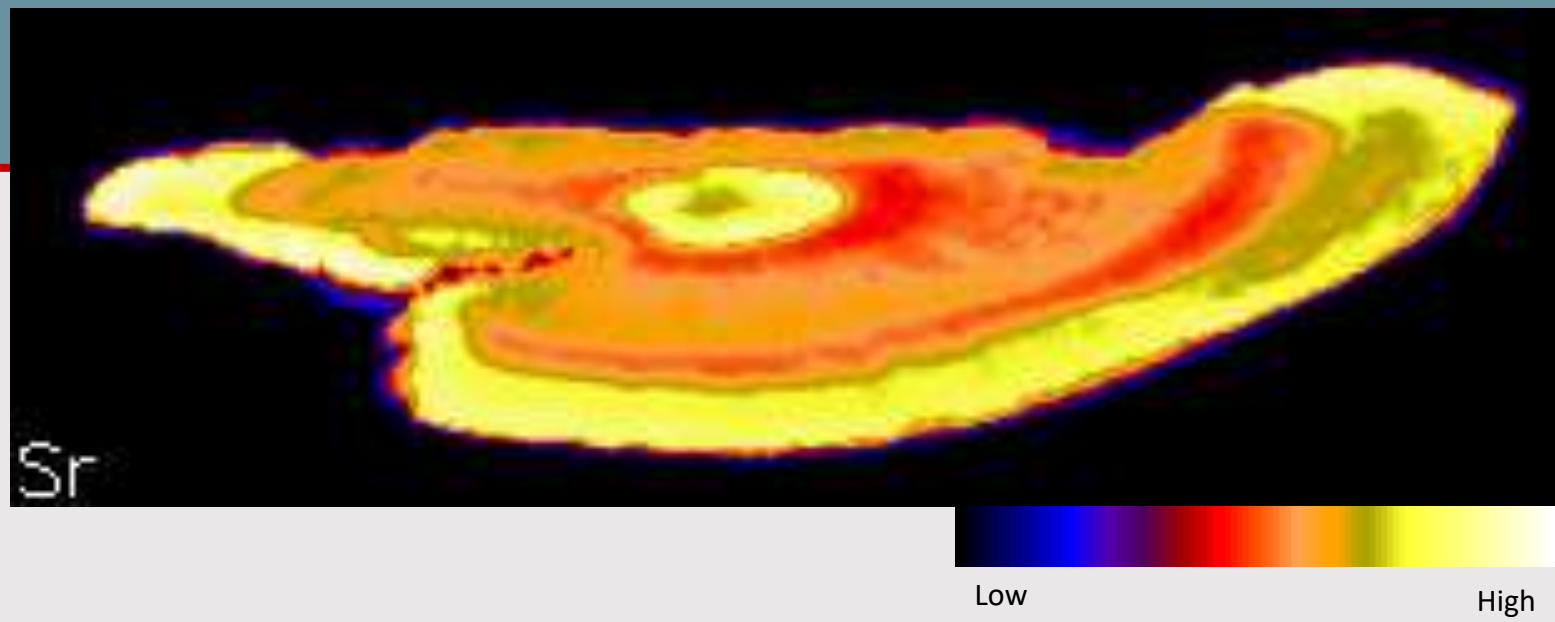


Irrawaddy River

2. Preliminary results



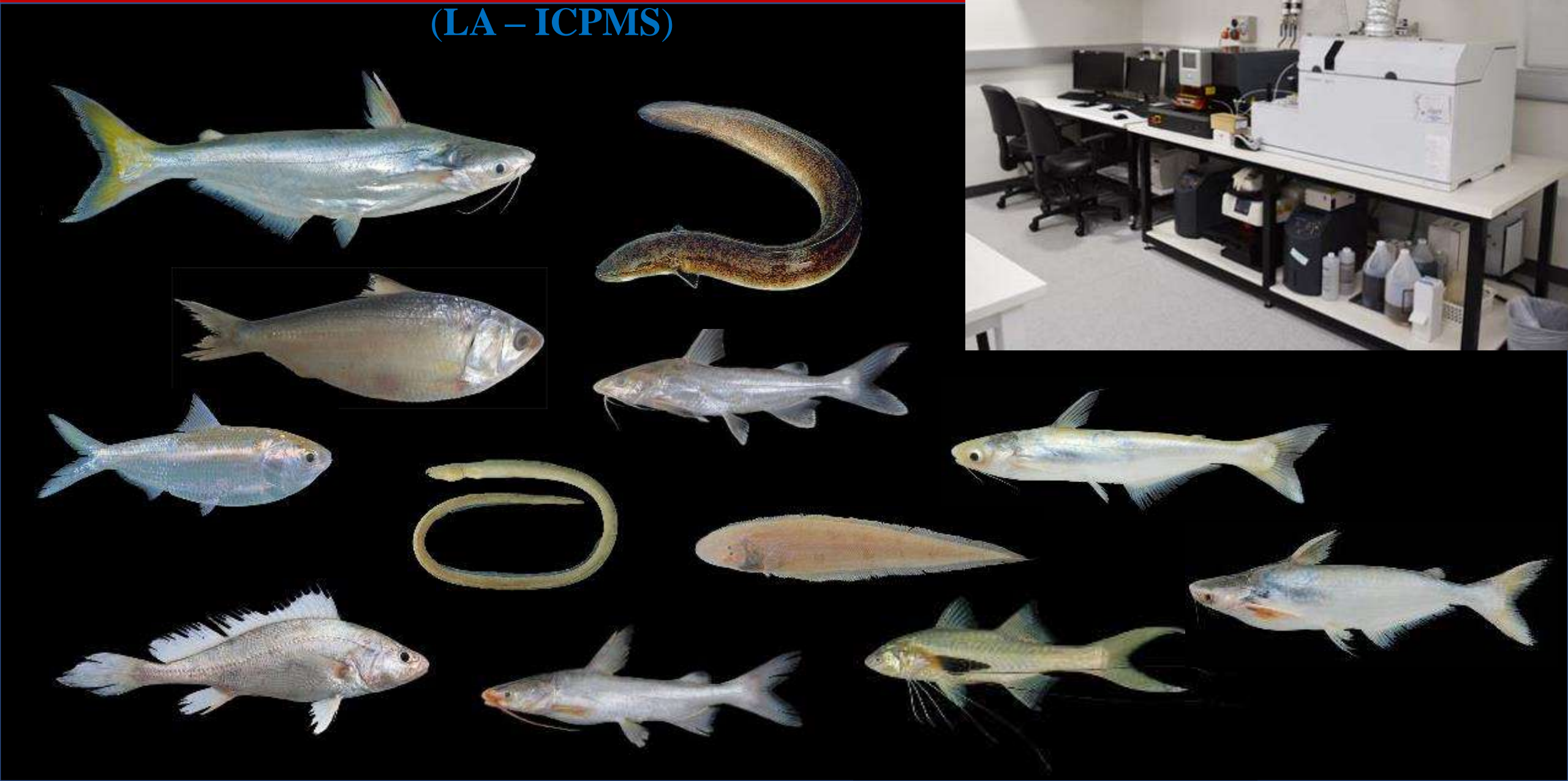
2. Preliminary results



Next step...

Laser Ablation - Inductively Coupled
Plasma Mass Spectrometry
(LA - ICPMS)

Adelaide Microscopy
The University of Adelaide



Acknowledgement

NSW Department of Primary Industries

Fisheries Research



IHE DELFT



Australia Awards
Scholarships



Institute for Land,
Water and Society
Charles Sturt University



NATIONAL GEOGRAPHIC



THANK YOU

THANK YOU

