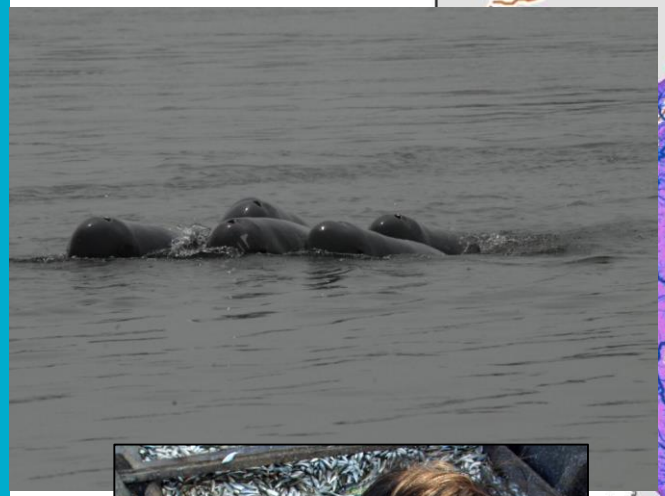
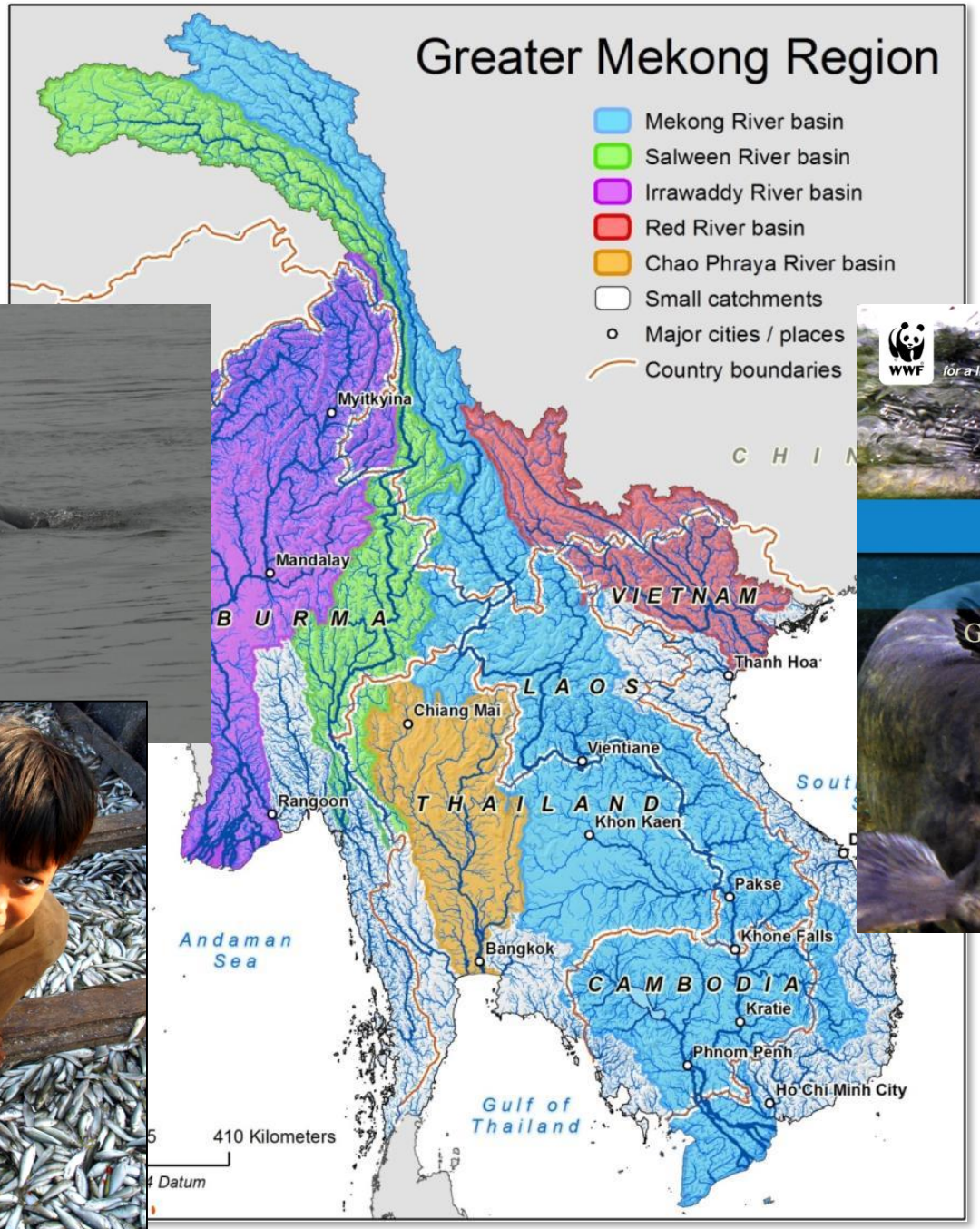
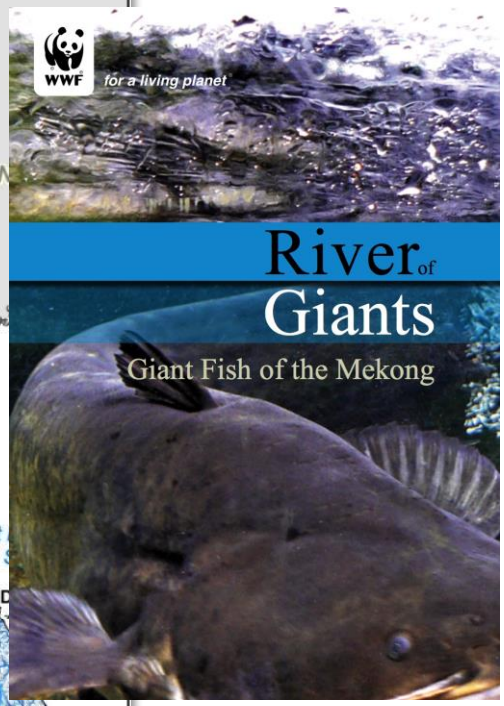
Resilient Asian Deltas

Marc Goichot
Lead Water
WWF Greater Mekong

Irrawaddy 388
fish species
(193 endemic)

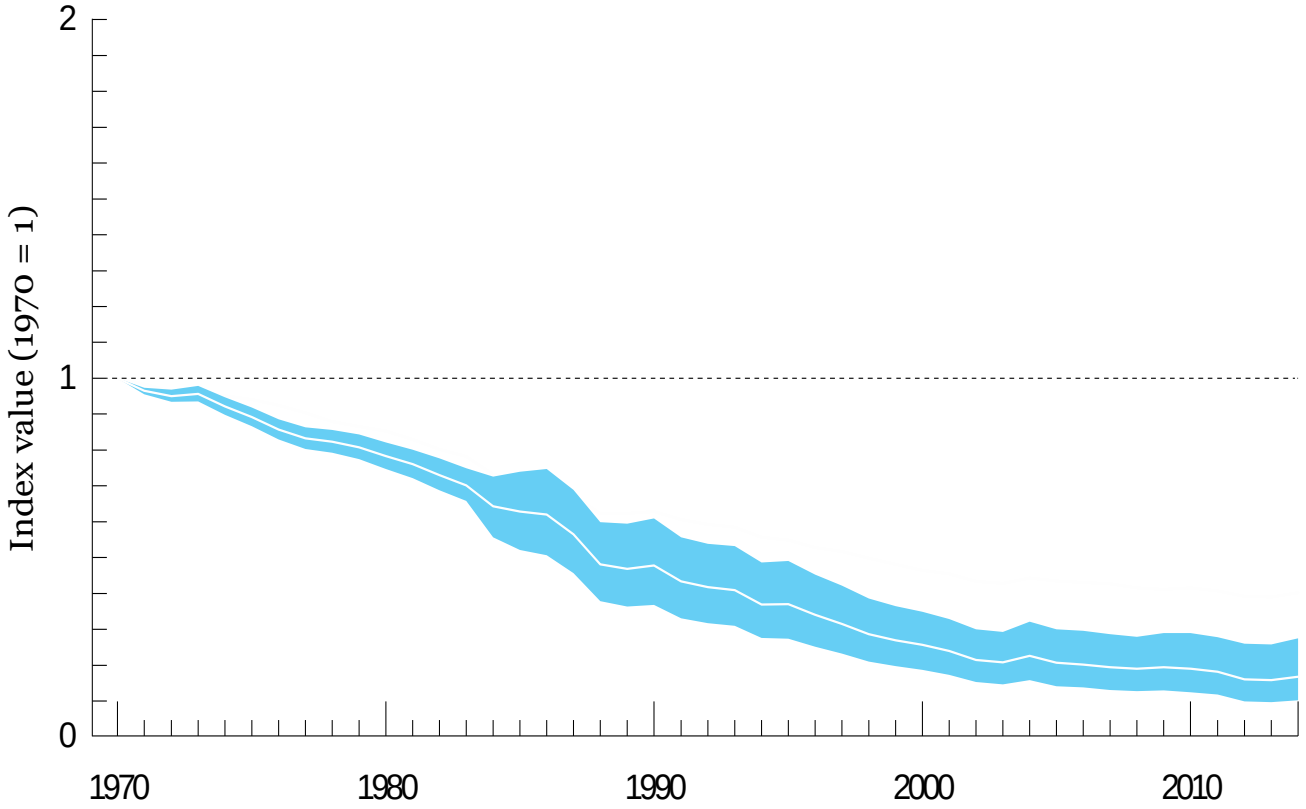






Mekong
850 fish species
165 long
distance
migrants

The Freshwater Living Planet Index 1970 to 2014 (83% abundance loss)



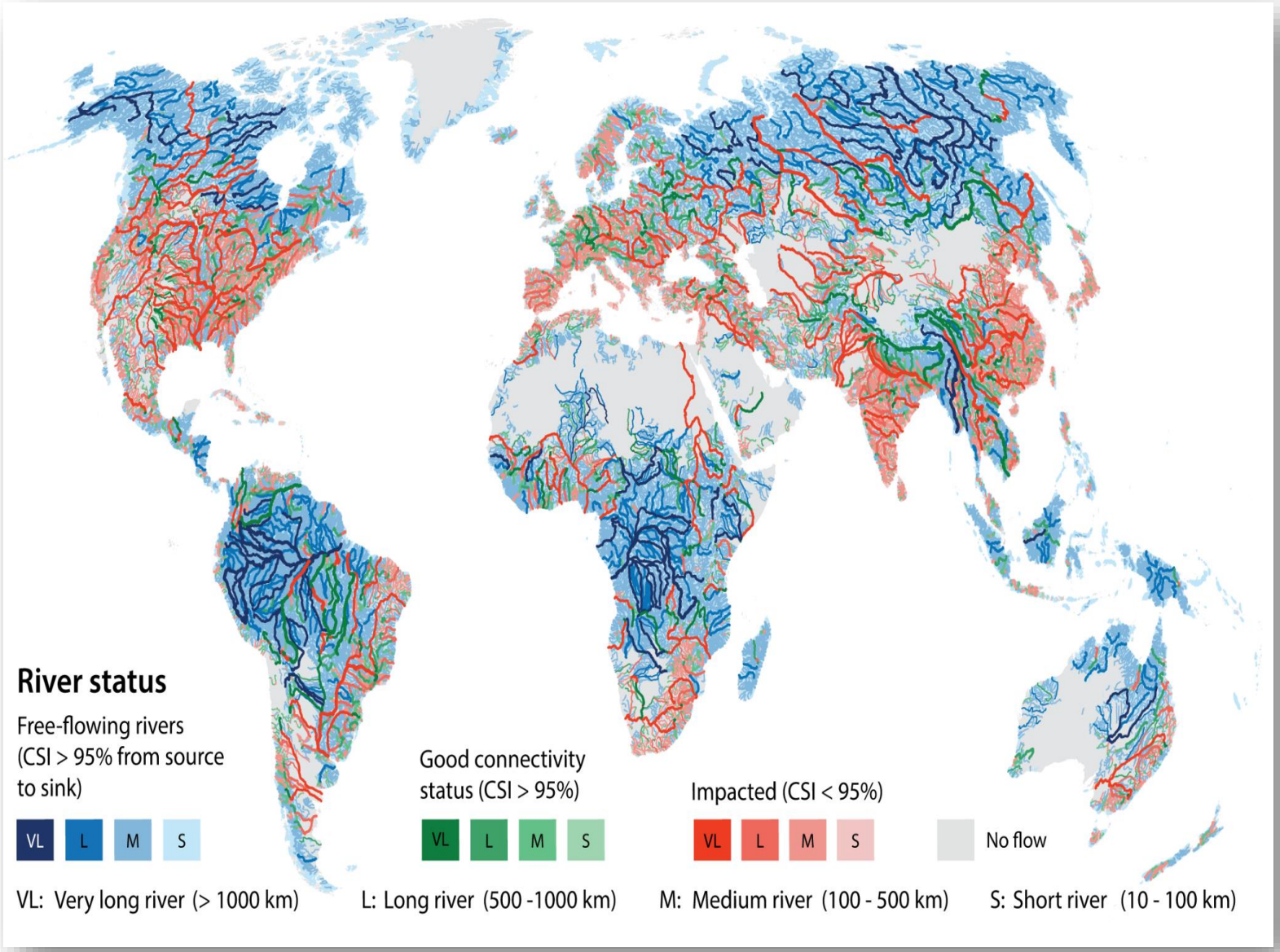
The average abundance of 3,358 freshwater populations representing 880 species monitored across the globe declined by 83%. The white line shows the index values and the shaded areas represent the statistical certainty surrounding the trend (range -73% to -90%)[1].

Key

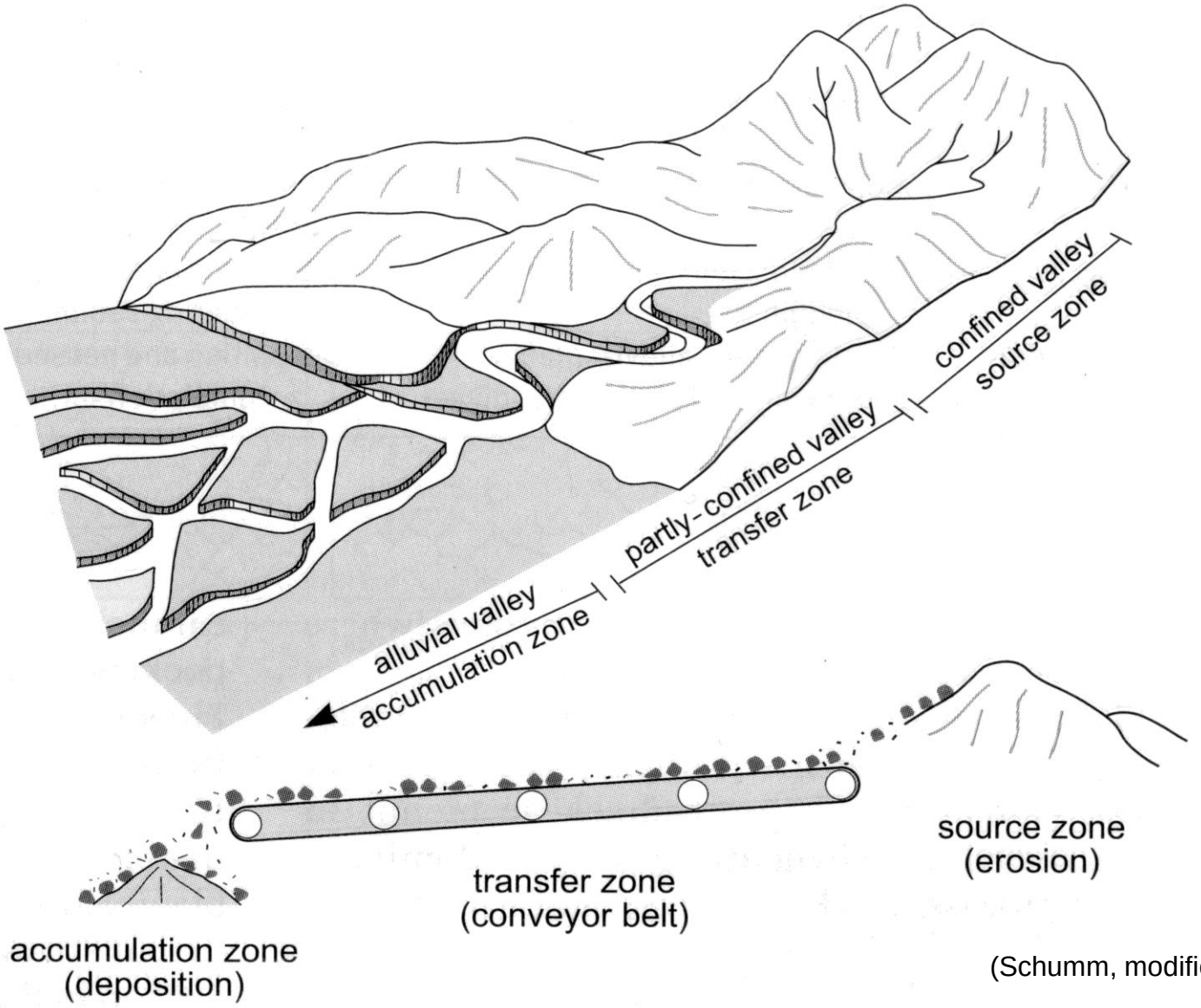
Freshwater Living Planet Index

Confidence limits

Connectivity status of word rivers



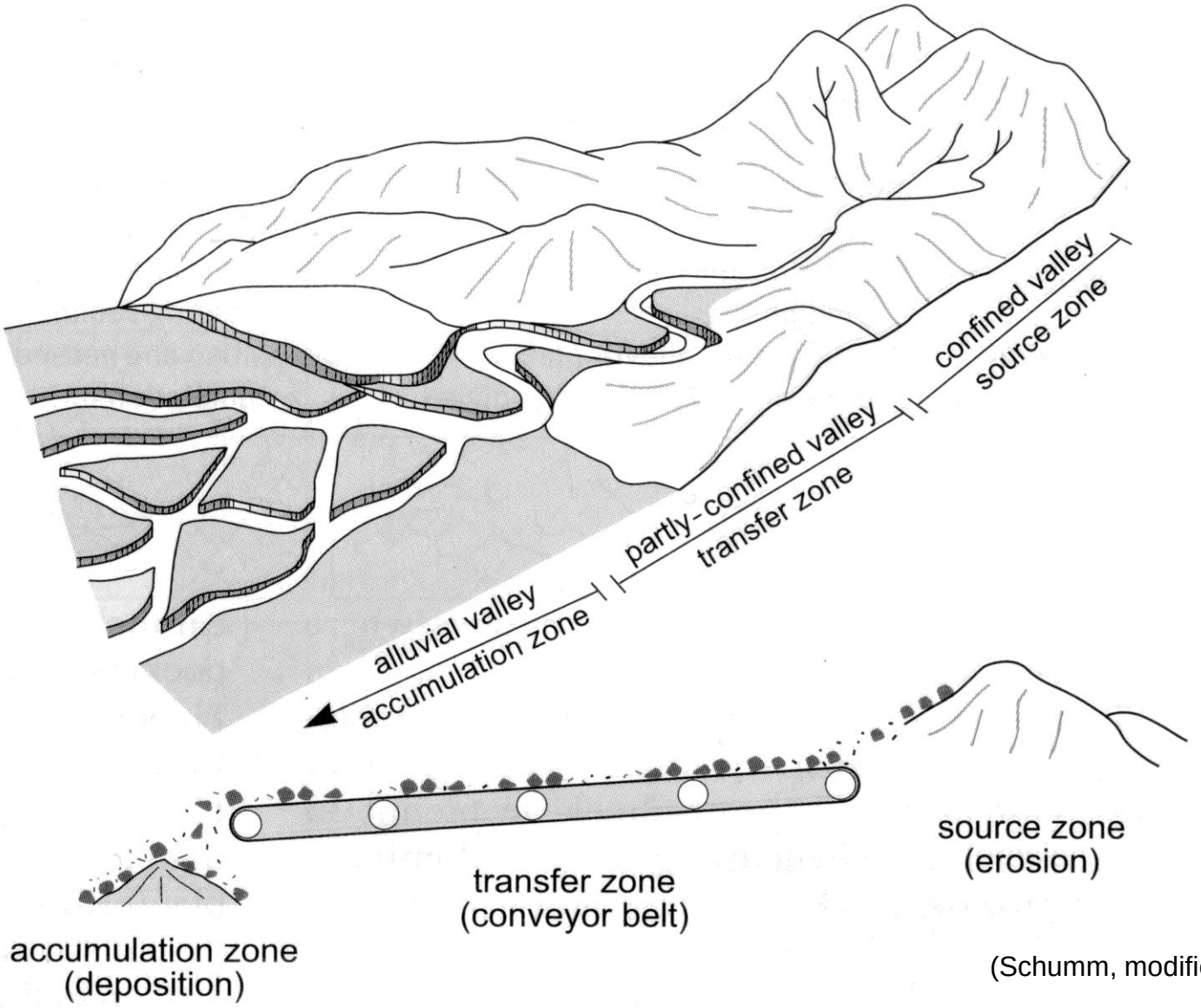
The 3 zones of a fluvial system



(Schumm, modified)

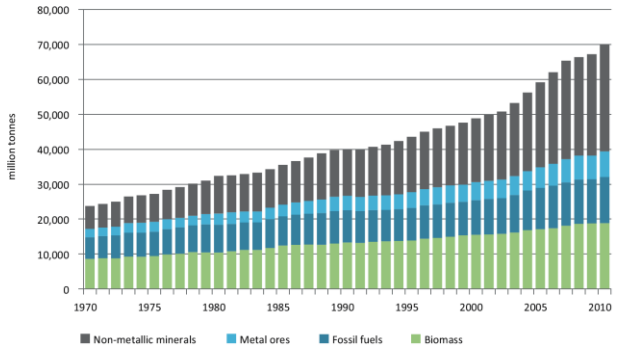

Gongguoqiao
Xiaowan
Manwan
Dachaoshan
Nuozhadu
Jinghong
Ganlanba
Mengsong
CHINA
VIETNAM
Hanoi
MYANMAR
Naypyidaw
Pak Beng
Luang Prabang
Xayaburi
LAOS
Vientiane
Pak Lay
Pak Chom
Sanakham
Mekong River
Ban Koum
Latsua
THAILAND
Thakho/Dan Sahong
Tonlé Sap Lake
Stung Treng
Bangkok
Sambor
Andaman Sea
CAMBODIA
Phnom Penh
South
Mekong dams
Existing
Under construction
Planned
100 km

The 3 zones of a fluvial system

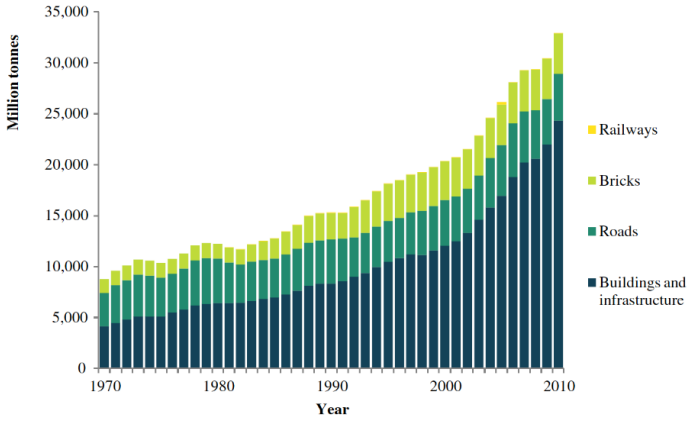


(Schumm, modified)

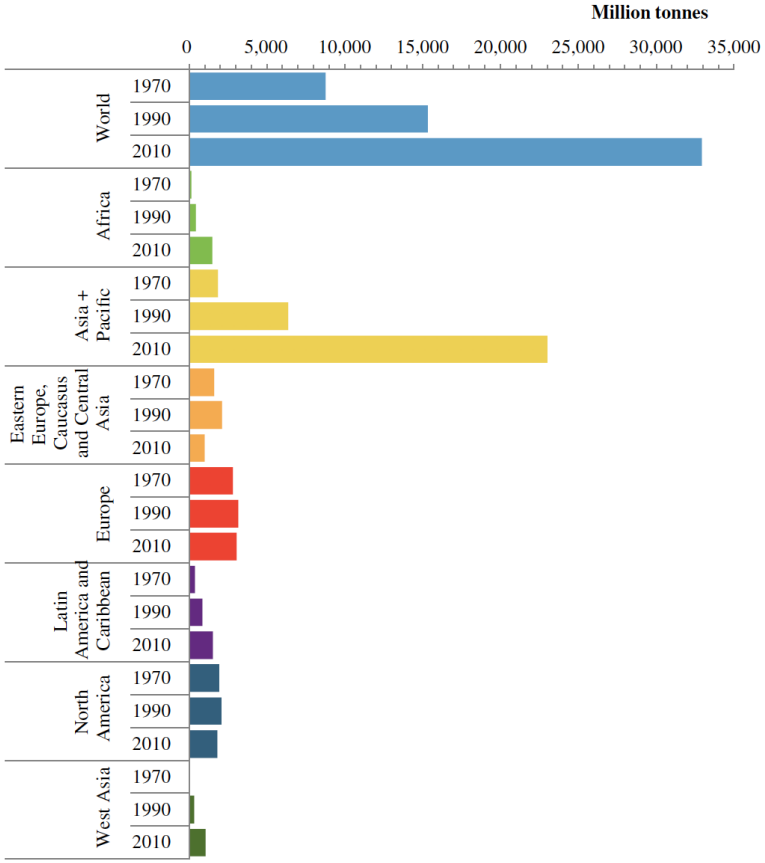
IMPACTS OF SAND MINING ON WORLD'S RIVERS



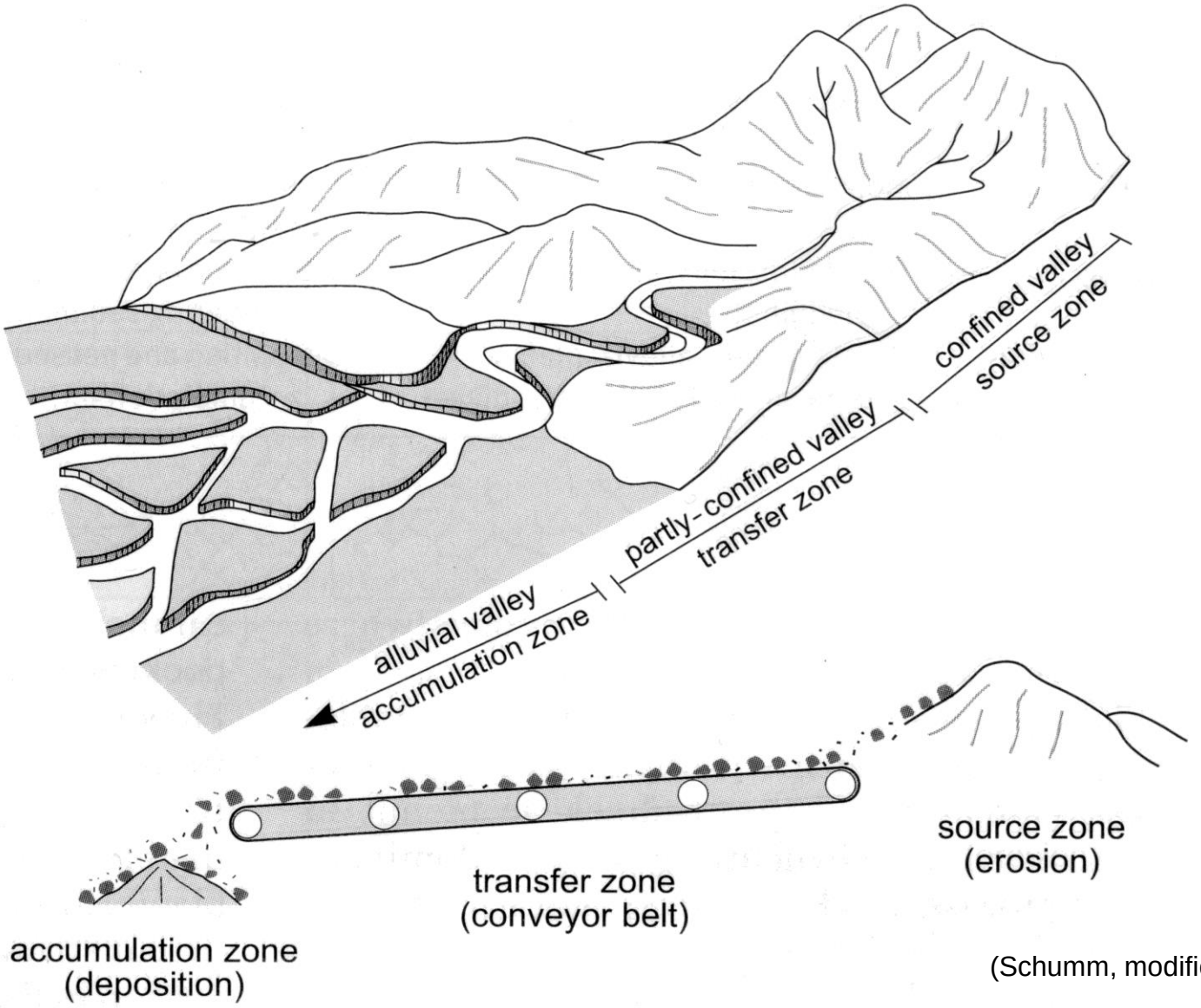
UNEP 2014



Miatto, 2016

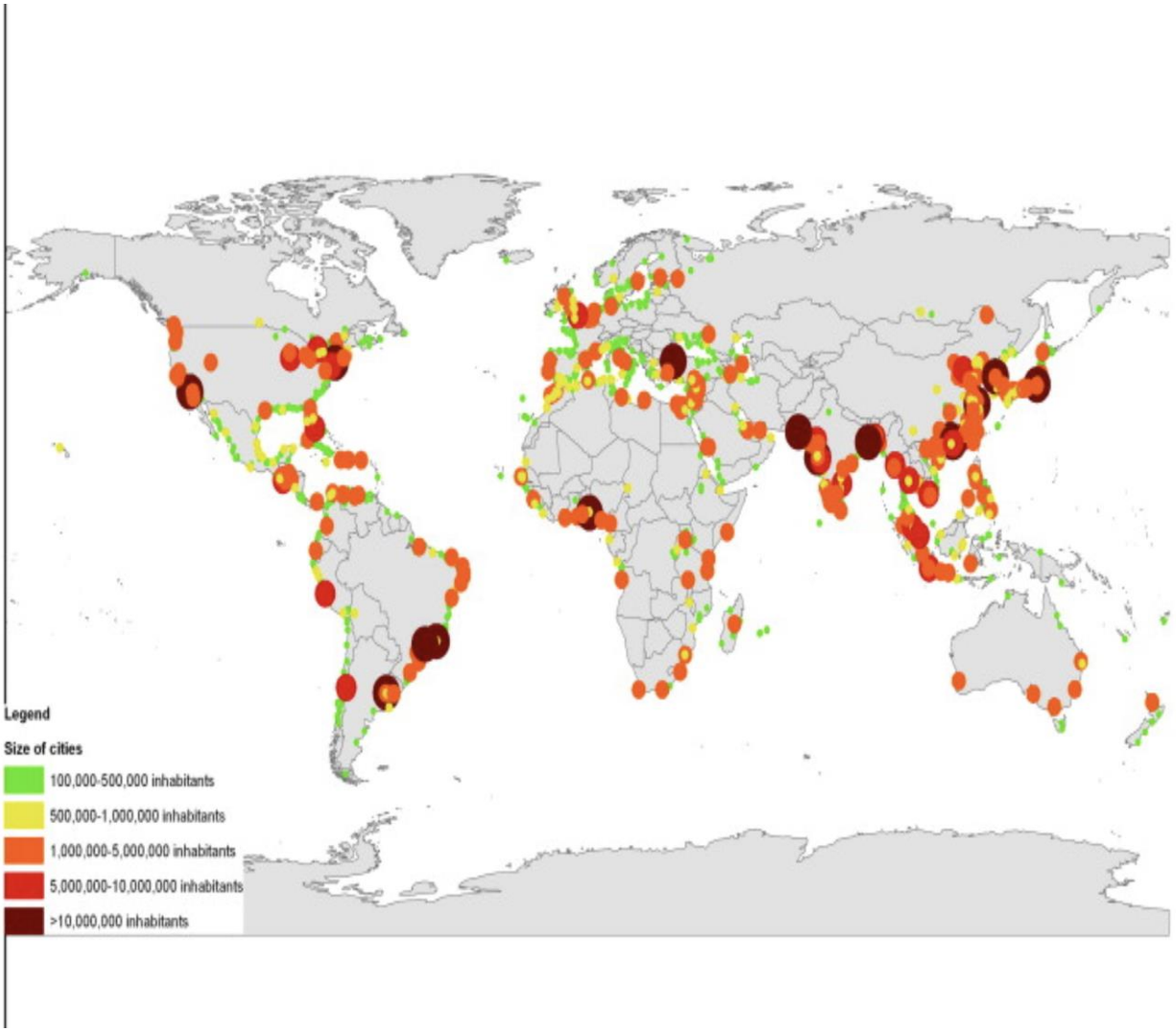


The 3 zones of a fluvial system



(Schumm, modified)

Worlds coastal Cities & Agglomerations



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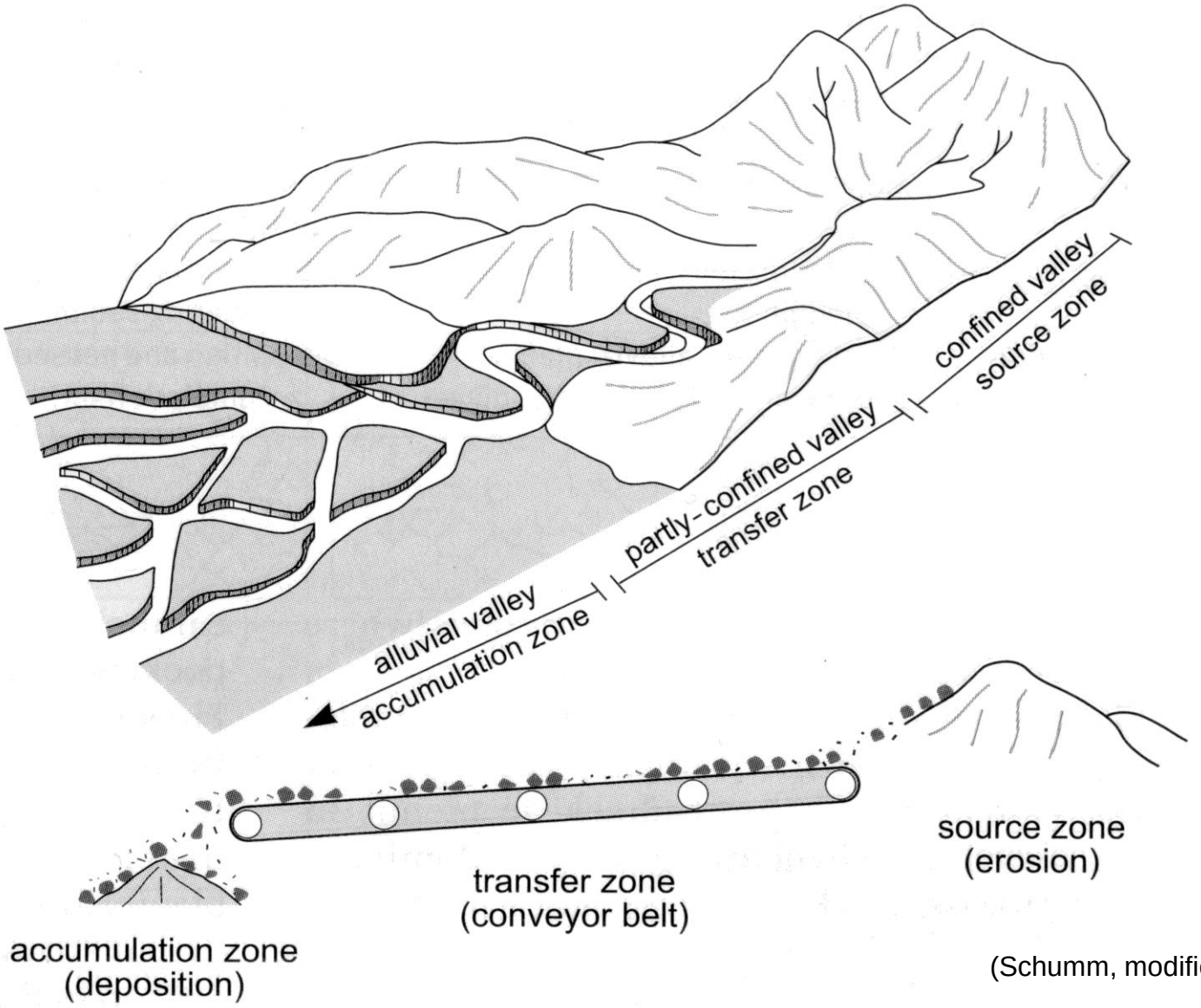

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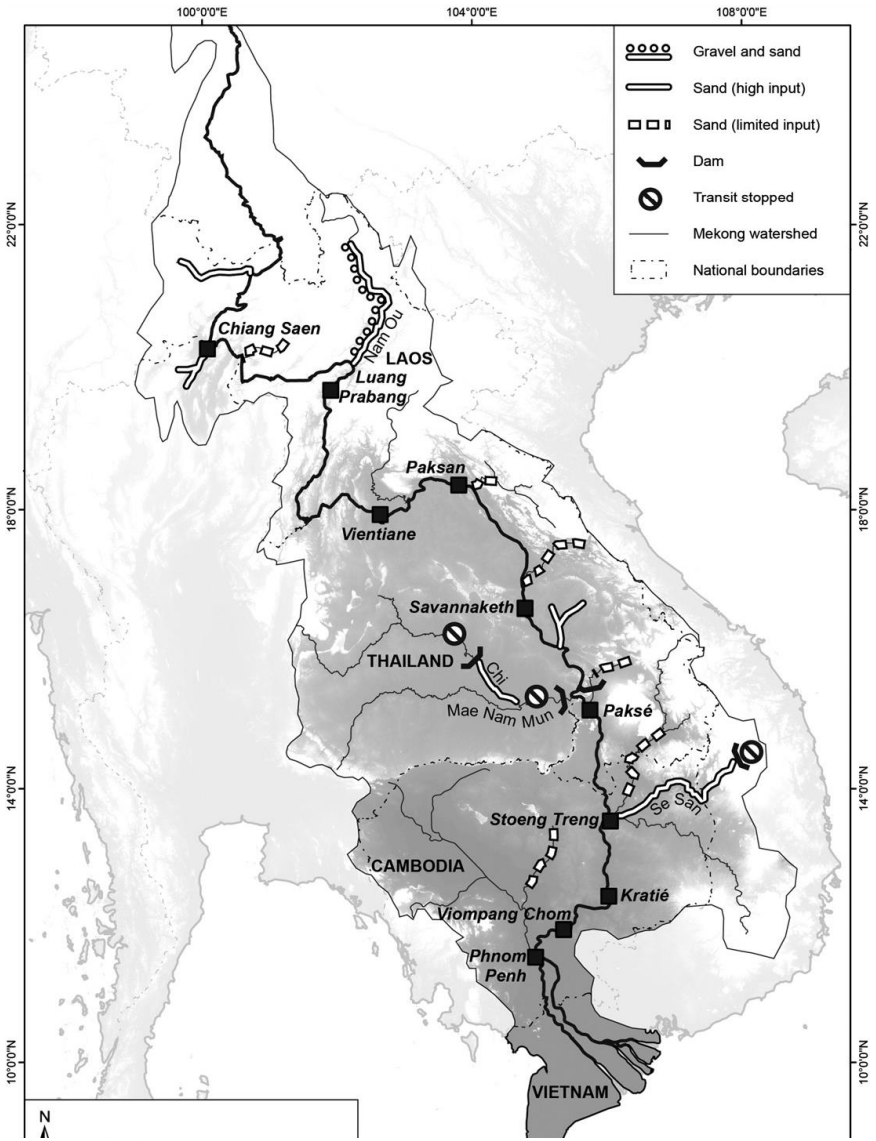
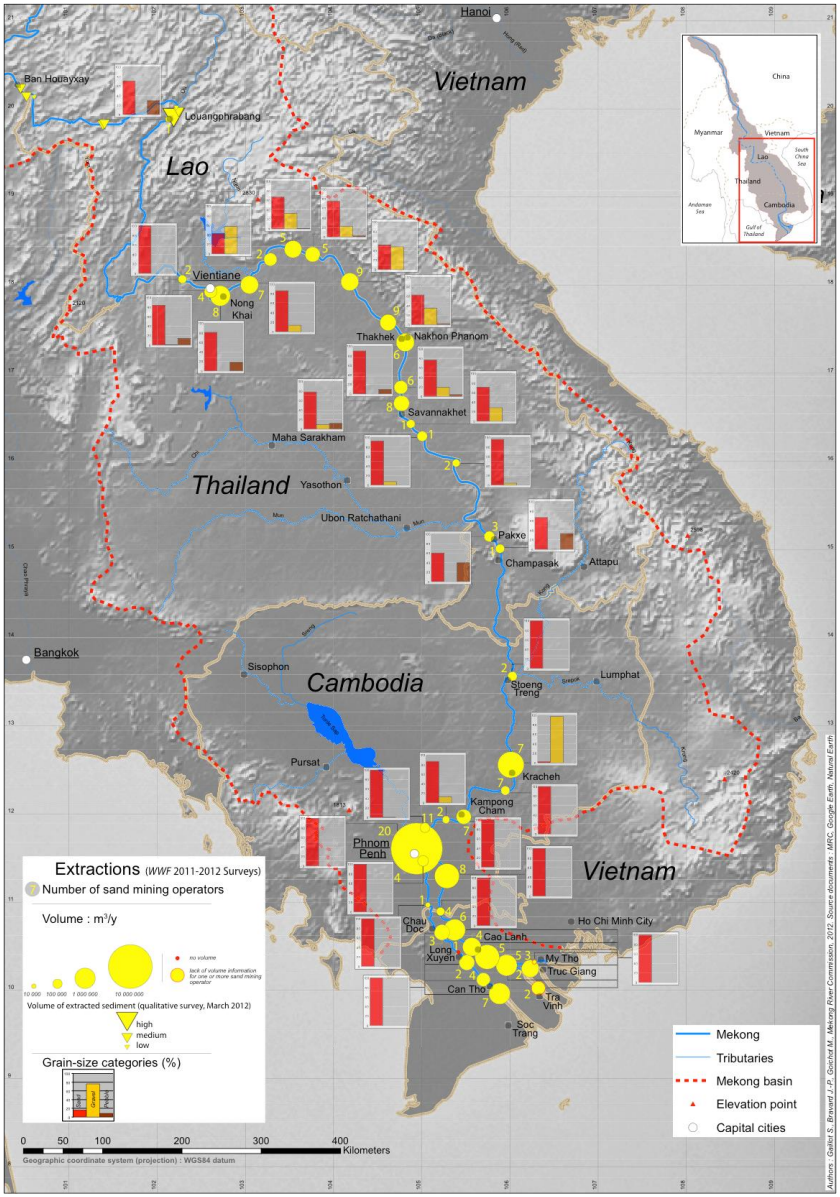
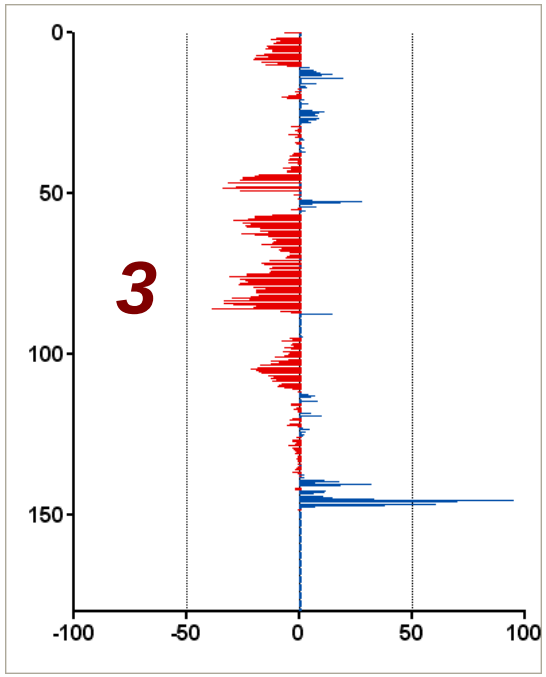
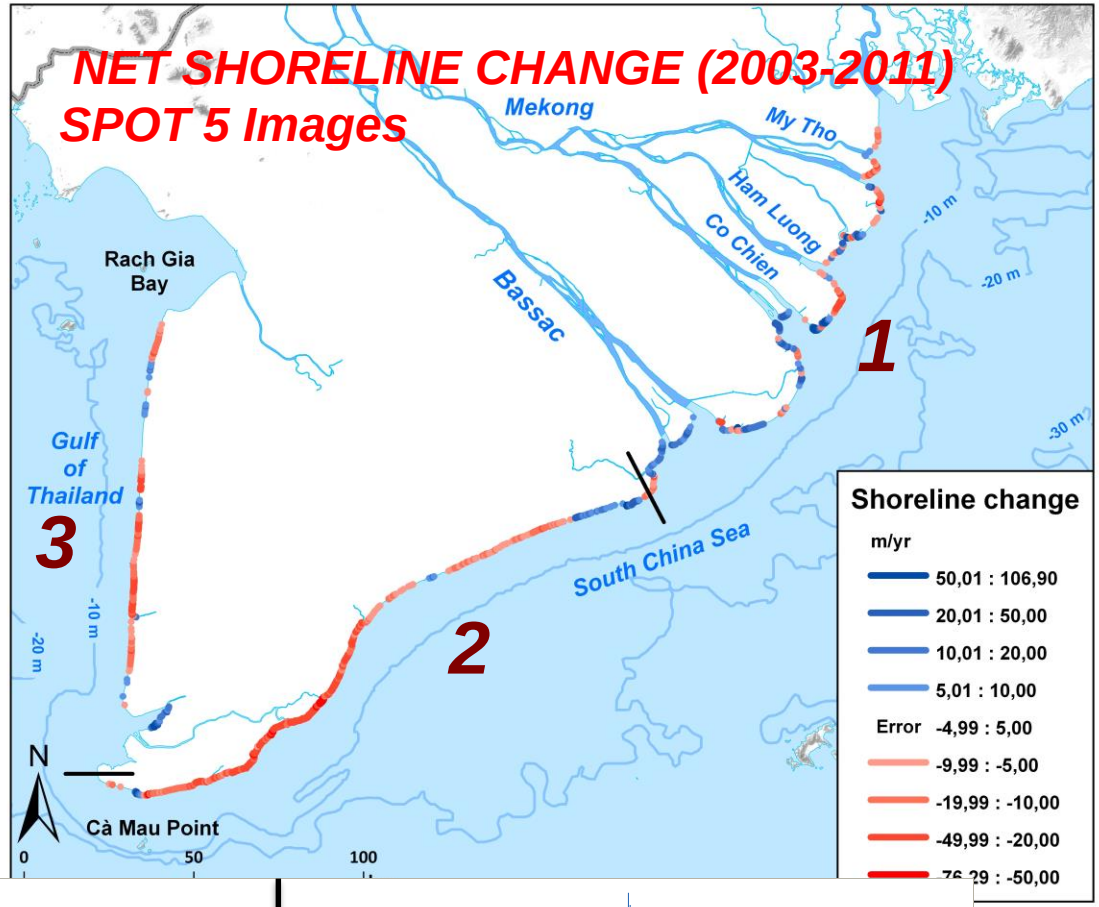


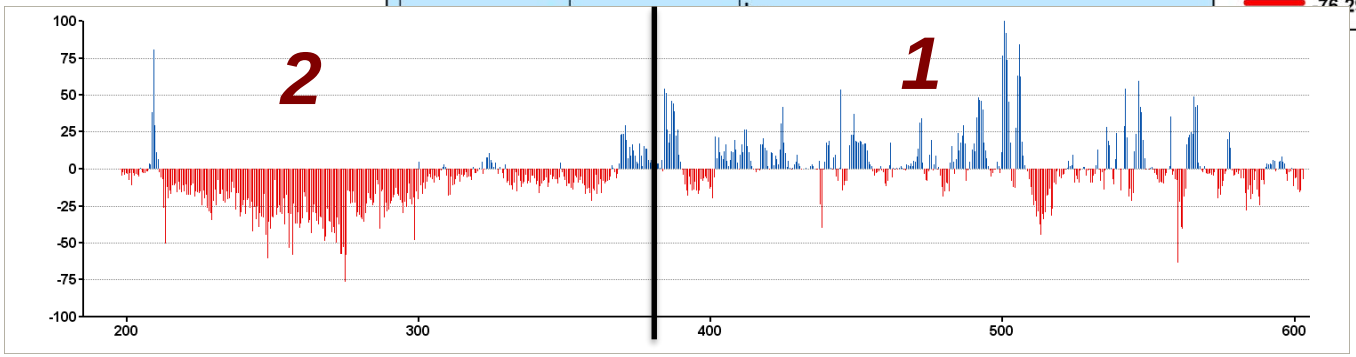


Bravard, J.P.,Goichot, M., Tronchère, H., 2013. An assessment of sediment-transport processes in the Lower Mekong River based on deposit grain sizes, the CM technique and flow-energy data. Geomorphology 207, 174–189.

Bravard J.P, Goichot M. Gaillot S. 2013 Geography of Sand and Gravel Mining in t e Lower Mekong River
EchoGéo 26



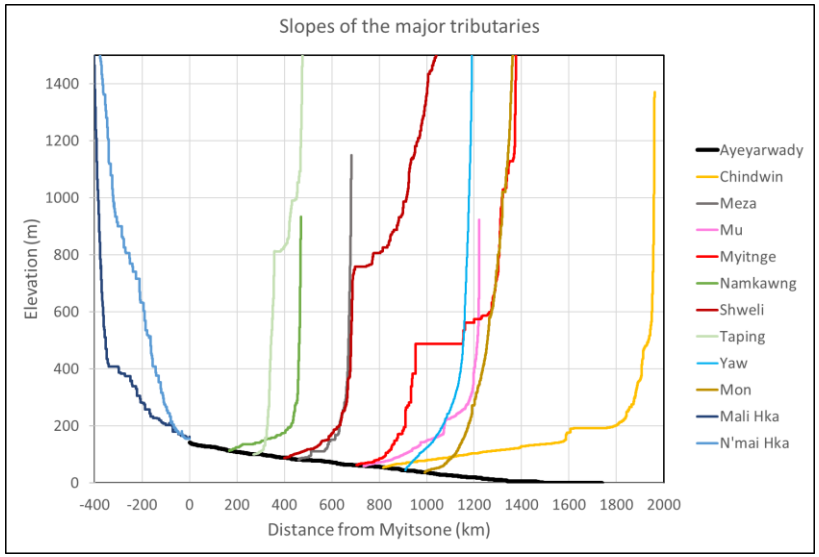


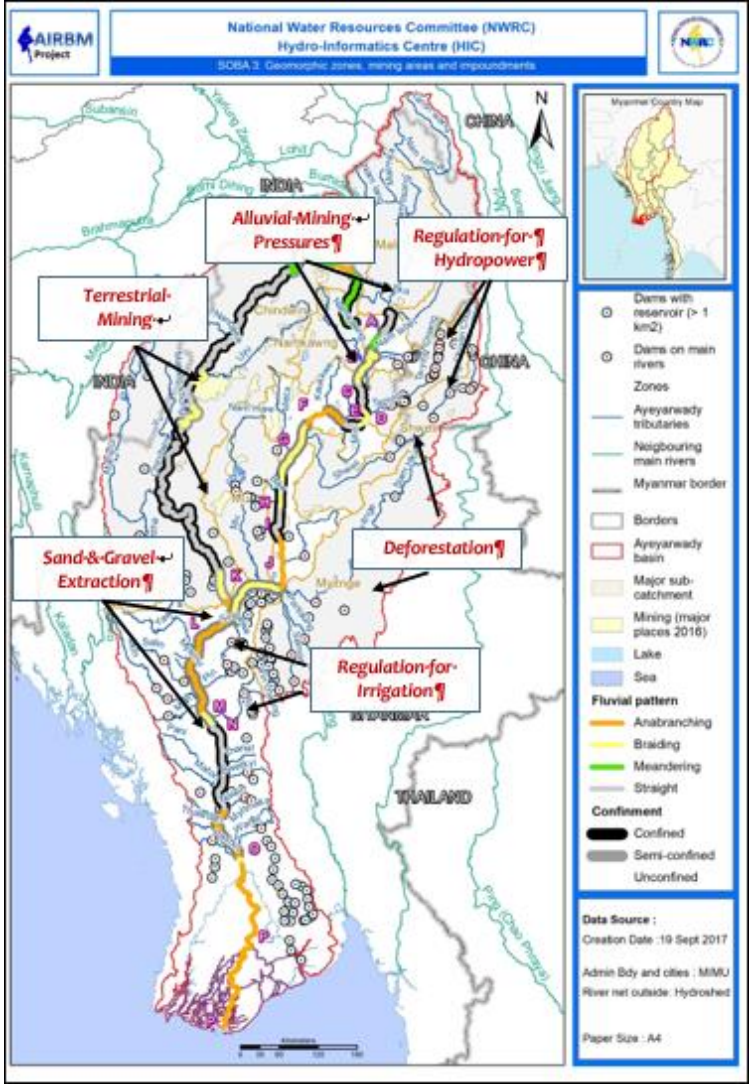


Edward J. Anthony, Guillaume Brunier, Manon Besset, Marc Goichot, Philippe Dussouillez & Van Lap Nguyen (2015): Linking rapid erosion of the Mekong River delta to human activities, Scientific Reports, 5:14745 | DOi: 10.1038/srep14745 https://www.nature.com/srep/

Specificities of Ayeyarwady

- Land use activities altering flow and sediment input
  - Changing the balance between sediment input and flow will change the river channel shape
- Reduction in peak flows a big risk
  - Low slope of river makes water height main driver of river energy
- Large increases in sediment input in middle reaches will ‘choke’ channel increasing flood levels & negative impacts to navigation
- Local removal of sand & gravel downstream destabilise banks & ‘starve’ delta

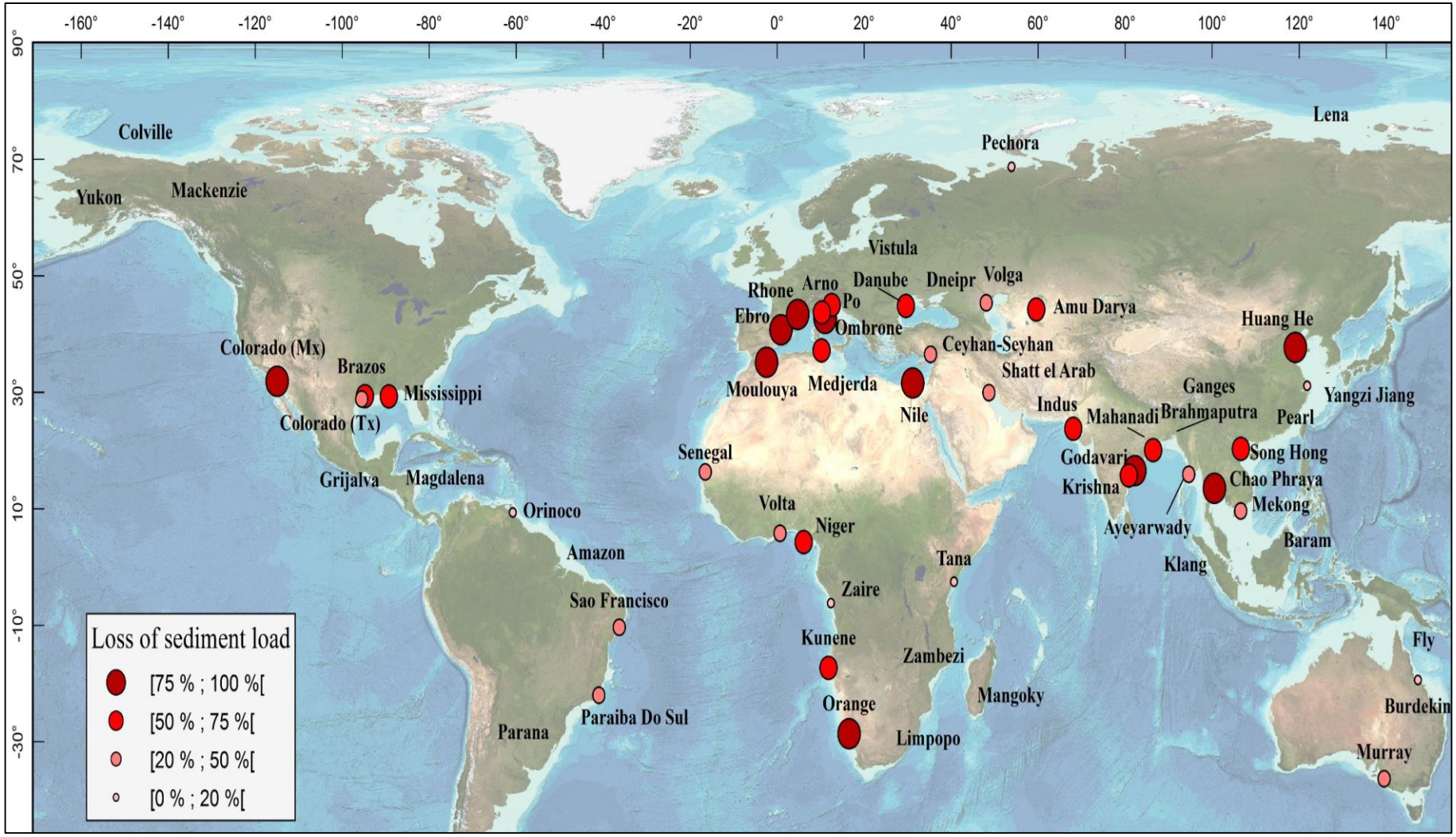




Lois Koehnken, Robin Gruel, Marc Goichot , Jean-Paul Bravard, Swe Hlaing Win (2017): Ayeyarwady State of the Basin Report: Sediments and Geomorphology) http://www.airbm.org/the-ayeyarwady-state-of-the-basin-assessment-soba/

Manon Besset, Edward J. Anthony, Philippe Dussouillez, Marc Goichot (2017): The impact of Cyclone Nargis on the Ayeyarwady (Irrawaddy) River delta shoreline and nearshore zone (Myanmar): Towards degraded delta resilience? , C. R. Geoscience 349 (2017) 238–247

World Large Deltas at Risk



Manon Besset, 2017

Asian Deltas at Risk

- Home to 400 million people & > 10 mega cities in Asia
- Most bio-diverse areas for freshwater & marine species on the globe: Mekong >450 & Yangtze host >300 fish species
- World's most productive ecosystems : fish & rice
- Asia's economic engine : e.g. 25% of Vietnam GDP & 30% of China GDP
- Most vulnerable to climate change (top 10 countries)

Asian Deltas are sinking faster than Sea Level Rise

>500M of the Most Marginalized are exposed to water stress, natural disasters & food insecurity	**Restoring delta resilience** is the single most effective climate adaptation strategy
Infrastructure, agriculture, fisheries and supply chains are exposed to increased water risks	**Reducing water risk** exposure in deltas is best return on investment opportunity
Delta Degradation = Loss of Species & Ecological Functions	Largest opportunity to **bend the global biodiversity curve** in terms of number of species at risk

Restore the natural resilience of the largest Asian deltas, as well as de-risking investments & social capital

Increased Political Action for Delta Resilience

- Joint resolution by heads of states
- Vision developed for each delta

Nature Based Solutions & Scale

- Sediment budgets - alternative sourcing
- Power sector vision
- Guidelines/safe

Redirect Financial Flows to Sustainable Practices at Scale

- USD 10 M seed fund & USD 5 bn portfolio of projects developed & financed

WWF for a living planet®

Stop the Asian Deltas from sinking !

For more information,