

# USING SCENARIOS IN THE 3S RIVER BASIN

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CONSERVATION  
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# Sesan, Srepok, Sekong (3S) River Basin

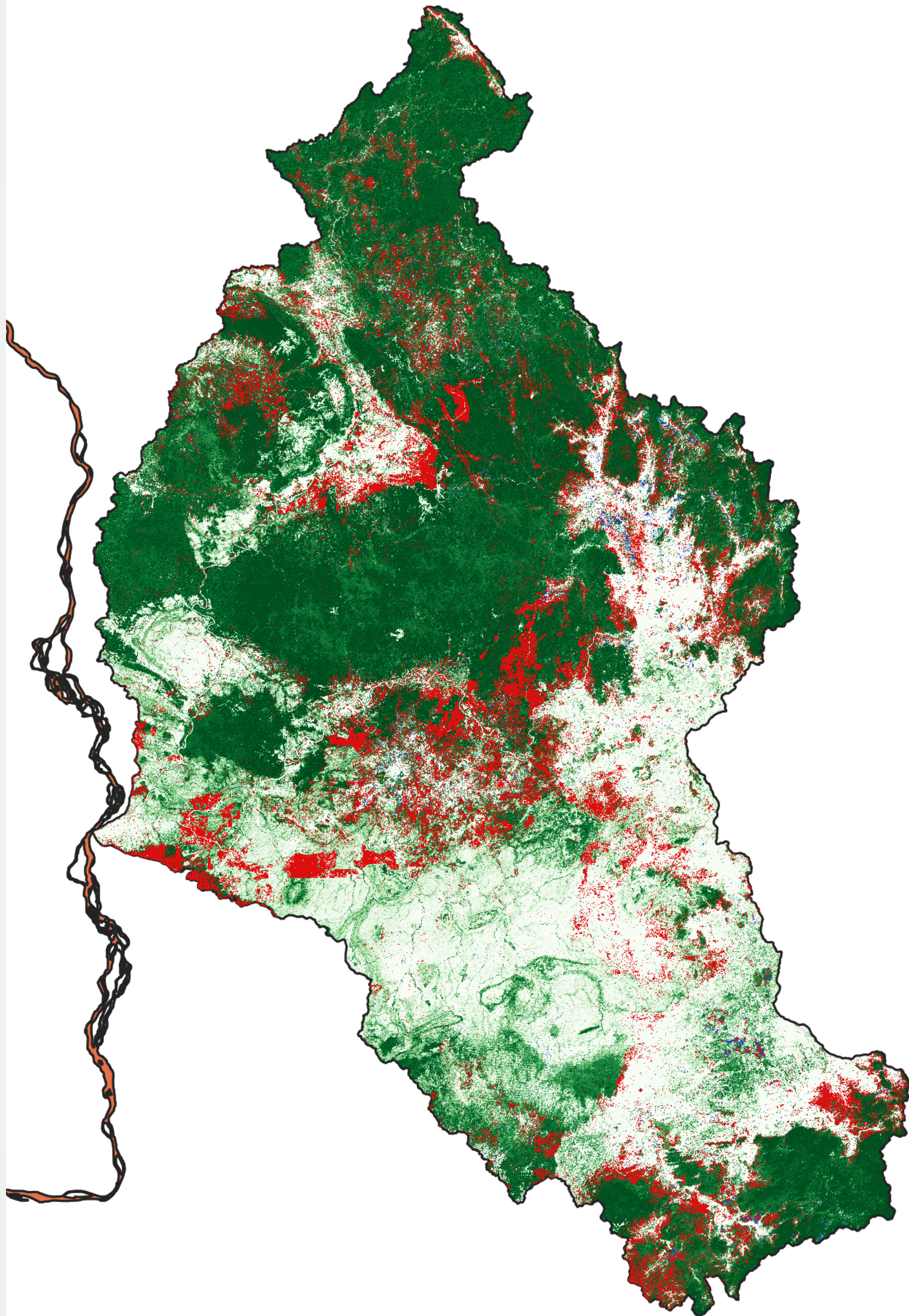


- A transboundary river basin, within a transboundary river basin
- ~3.4 million people, 24% in poverty
- 329 native fish; 17 endemic; 14 critically endangered or endangered
- Most important sub-basin for migratory fish;
- 10% Mekong River Basin area; ~25% flow; 15% sediment
- Sediment drives Tonle Sap Lake productivity, sustains the Mekong delta rice factory
- Numerous hydropower dams and future sites

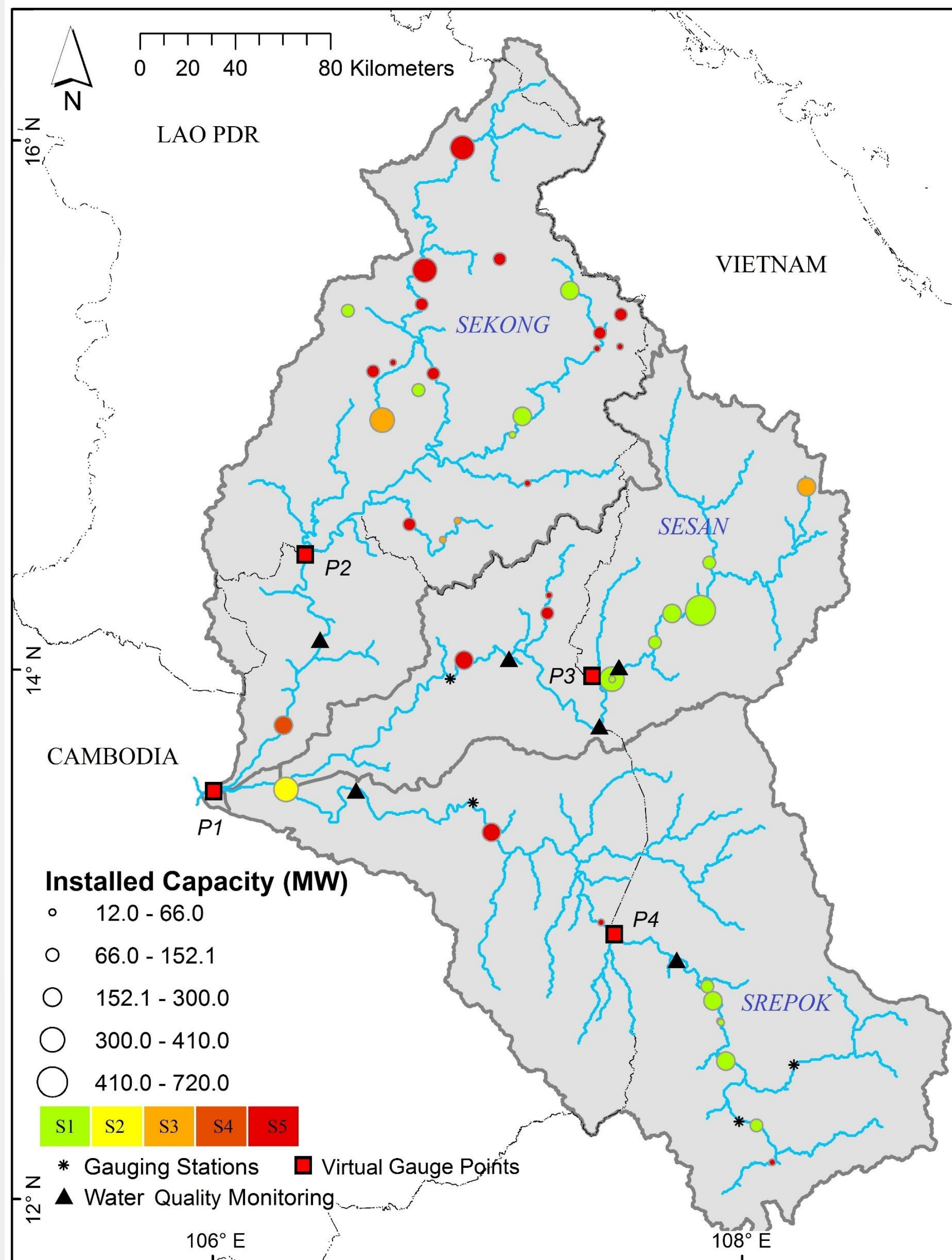


# Vietnam

- Sesan and Srepok River headwaters
- 3 million people
- Land clearance for coffee, soybean and pepper
- Almost full dam development
- Concerned about sediment supply to the delta



# Laos



- Sekong River headwaters
- Low population density
- High poverty and dependence on natural resources
- Low level of land clearance
- Increasing level of dam development
- Wants to be the 'battery of Asia'



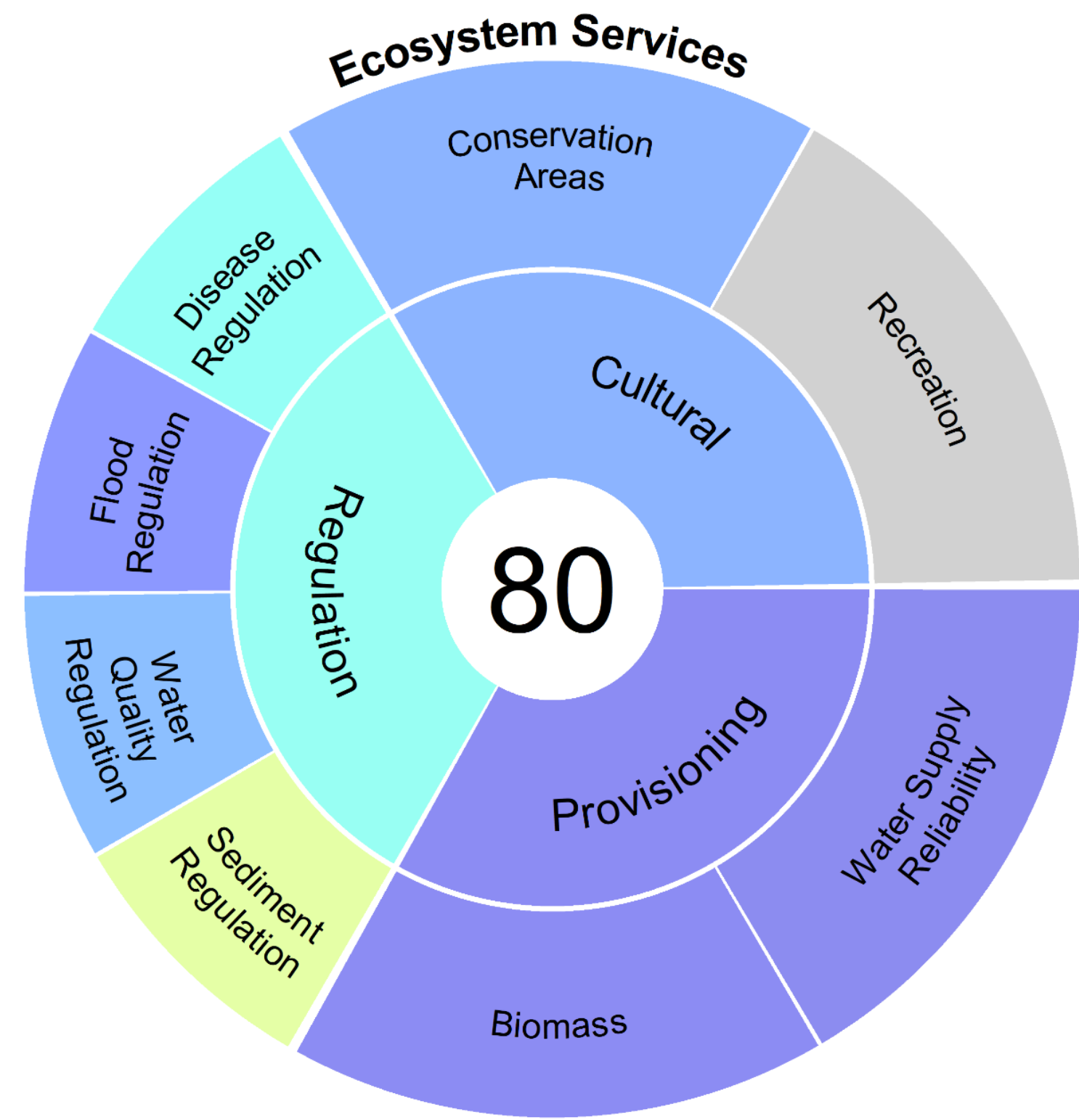
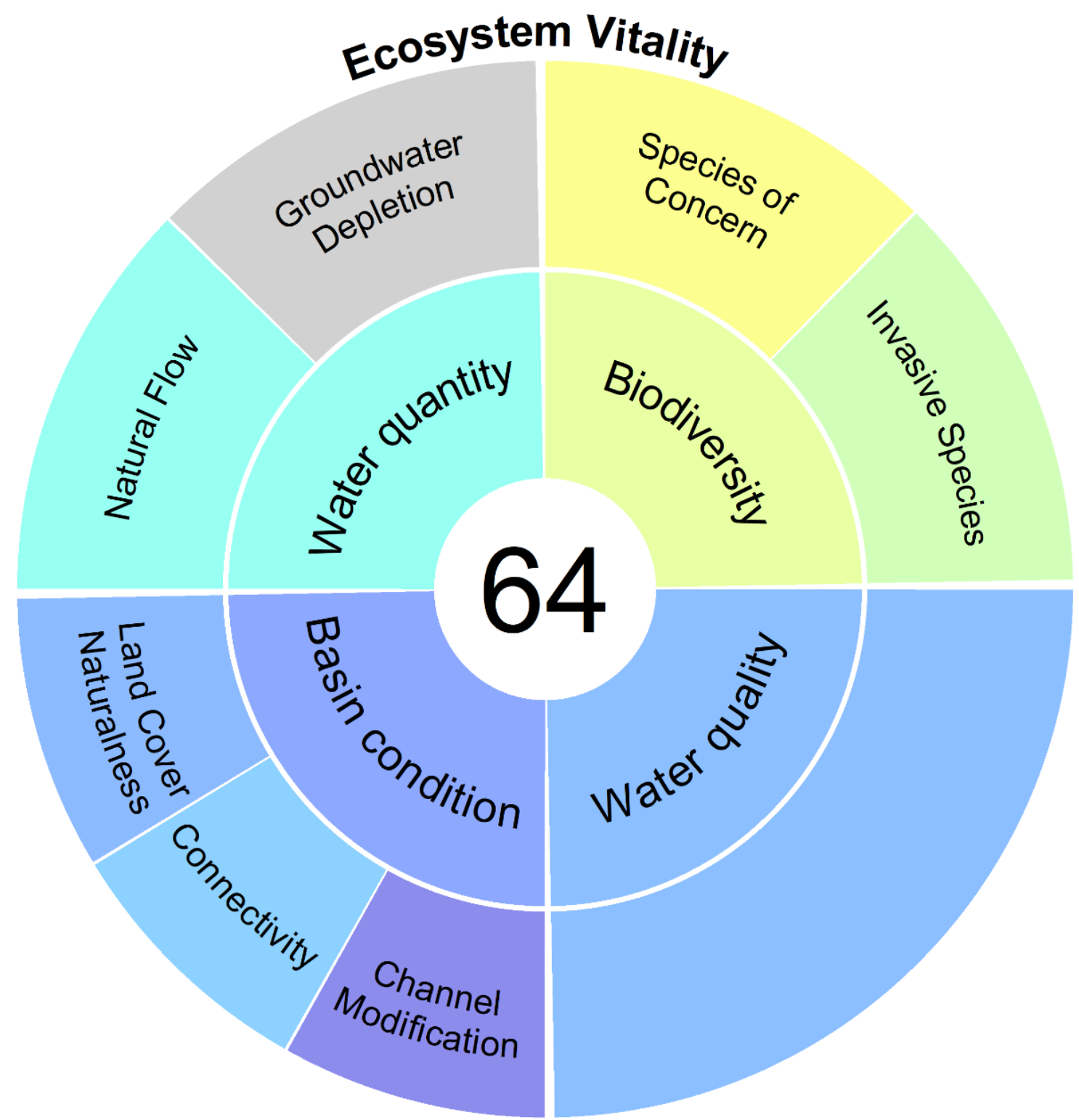
# Cambodia



- Sekong, Sesan and Srepok
- Low population density
- High poverty and dependence on natural resources
- Rapid rate of land clearance, illegal logging and economic land concessions
- Seeking energy security
- Integral part of the productivity and diversity of the Tonle Sap fishery



# 3S FHI ASSESSMENT



# SCENARIOS

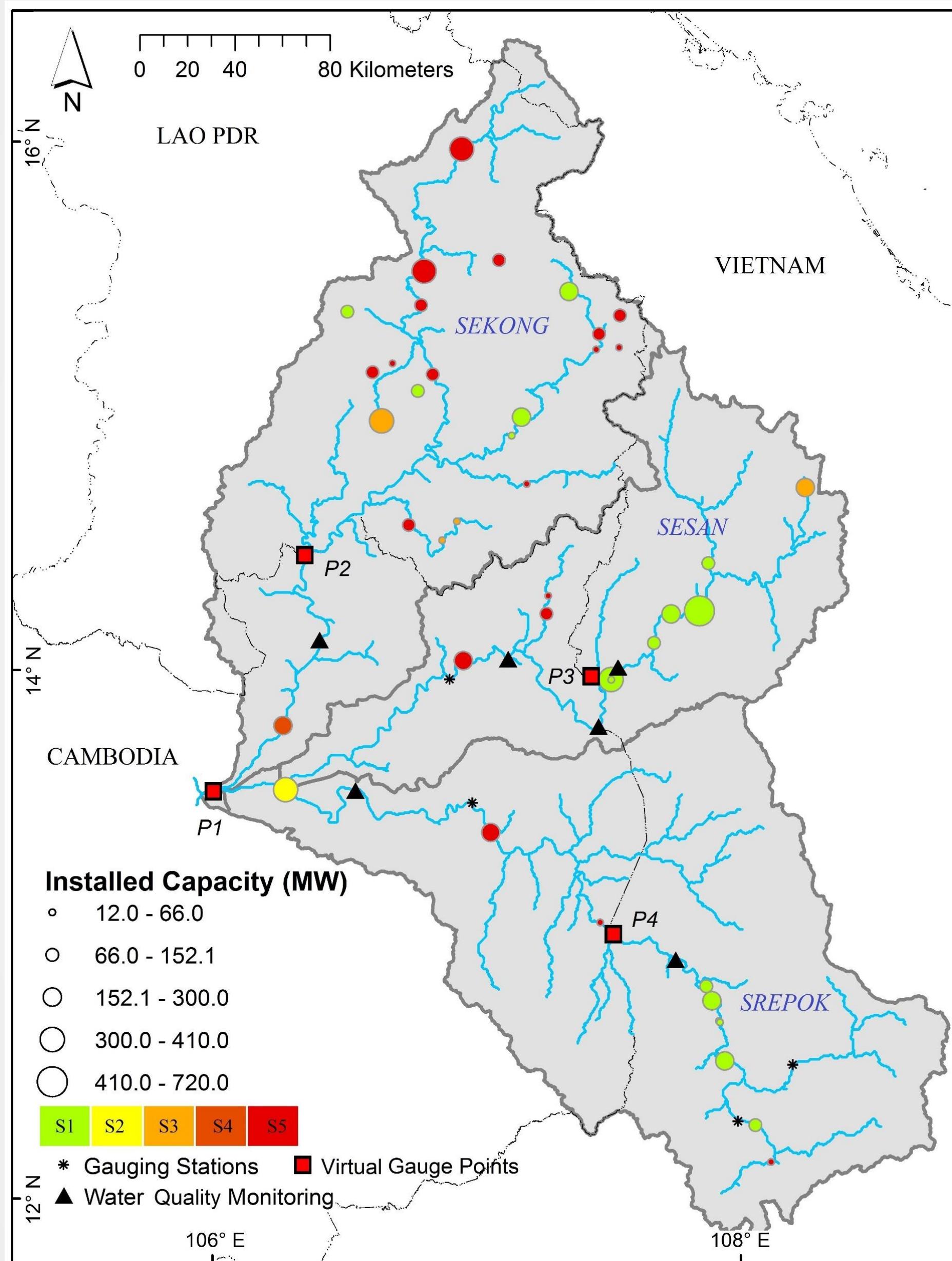
- Scenario planning, or scenario analysis, is a framework for exploring options and developing more robust plans in the face of irreducible uncertainty (Peterson et al. 2003)\*
- Highlight trade-offs between ecosystem services and proposed management or development plans to provide decision support
- Global climate change
- Land use change
- Water resource development



# 3S - Hydropower Development Scenarios

- Sekong (Viet Nam, Lao PDR, Cambodia)
- Sesan (Viet Nam, Cambodia)
- Srepok (Viet Nam, Cambodia)

- S1 - Dam development (65) Dec 2016
- S2 – Lower Sesan II (commissioned)
- S3 – Under construction (8)
- S4 – Lower Sekong
- S5 – Full development (111)





# INDICATORS USED IN SCENARIOS

## Ecosystem Vitality

- Deviation from the natural flow regime, modelled hydrological data, SWAT and HECRAS
- Flow connectivity, Dendritic Connectivity Index (Cote et al 2009)\*

## Ecosystem Services

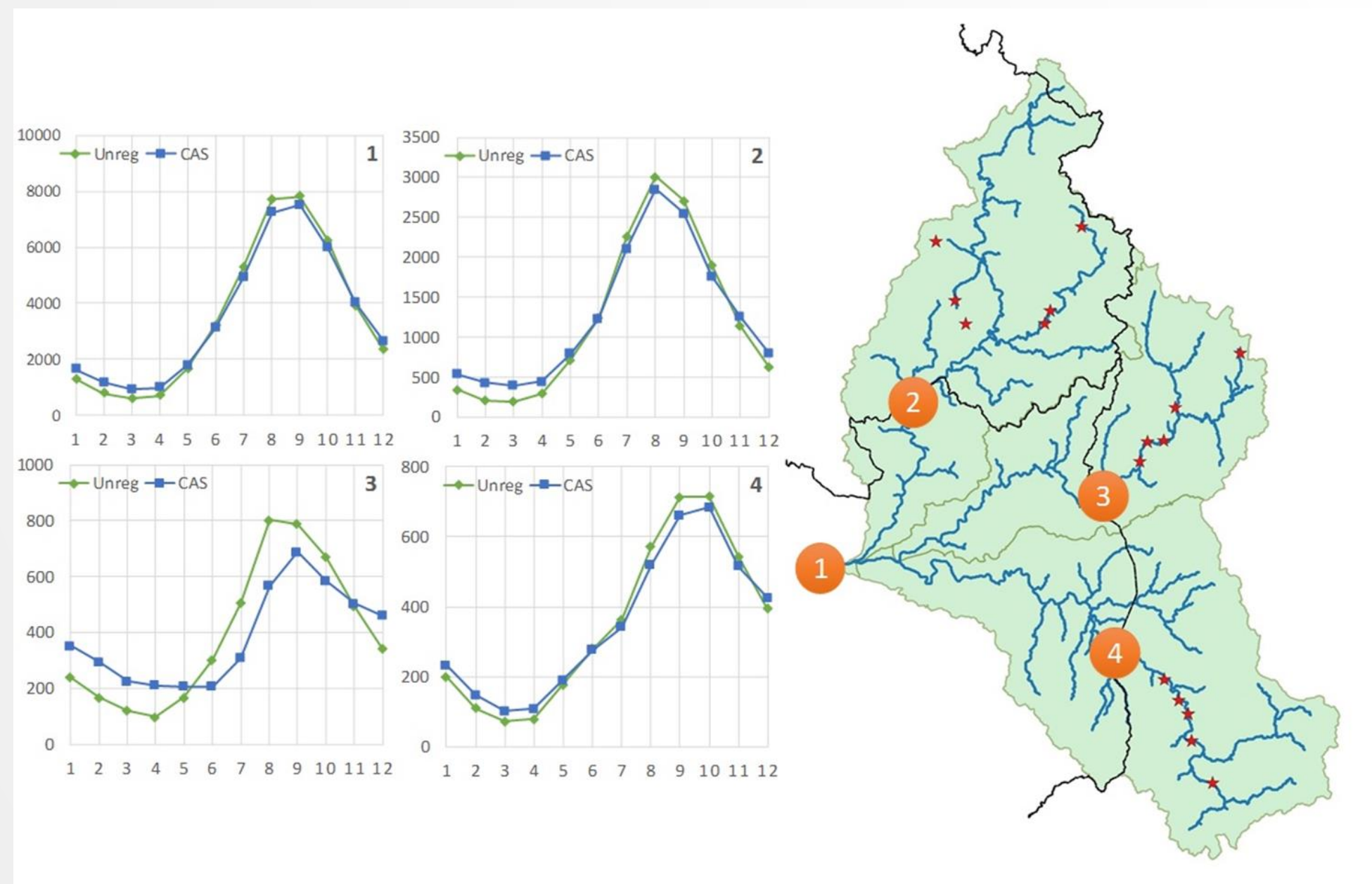
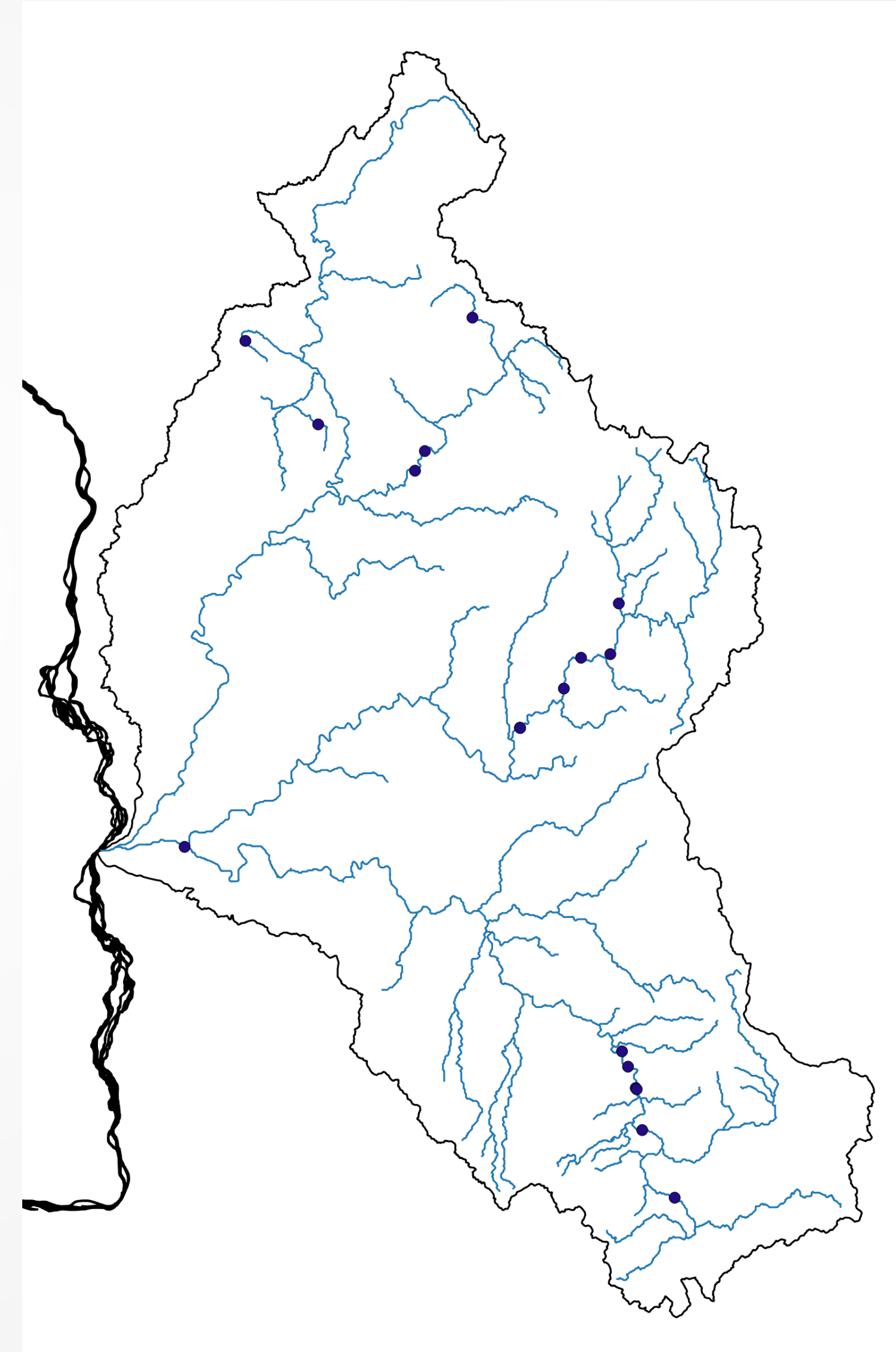
- Biomass for consumption, migratory species habitat weighted Connectivity Index
- Sediment regulation, derived from modelled sediment flow data (Wild & Loucks 2014)\*\*



\*DOI 10.1007/s10980-008-9283-y; \*\* DOI 10.1002/2014WR015457

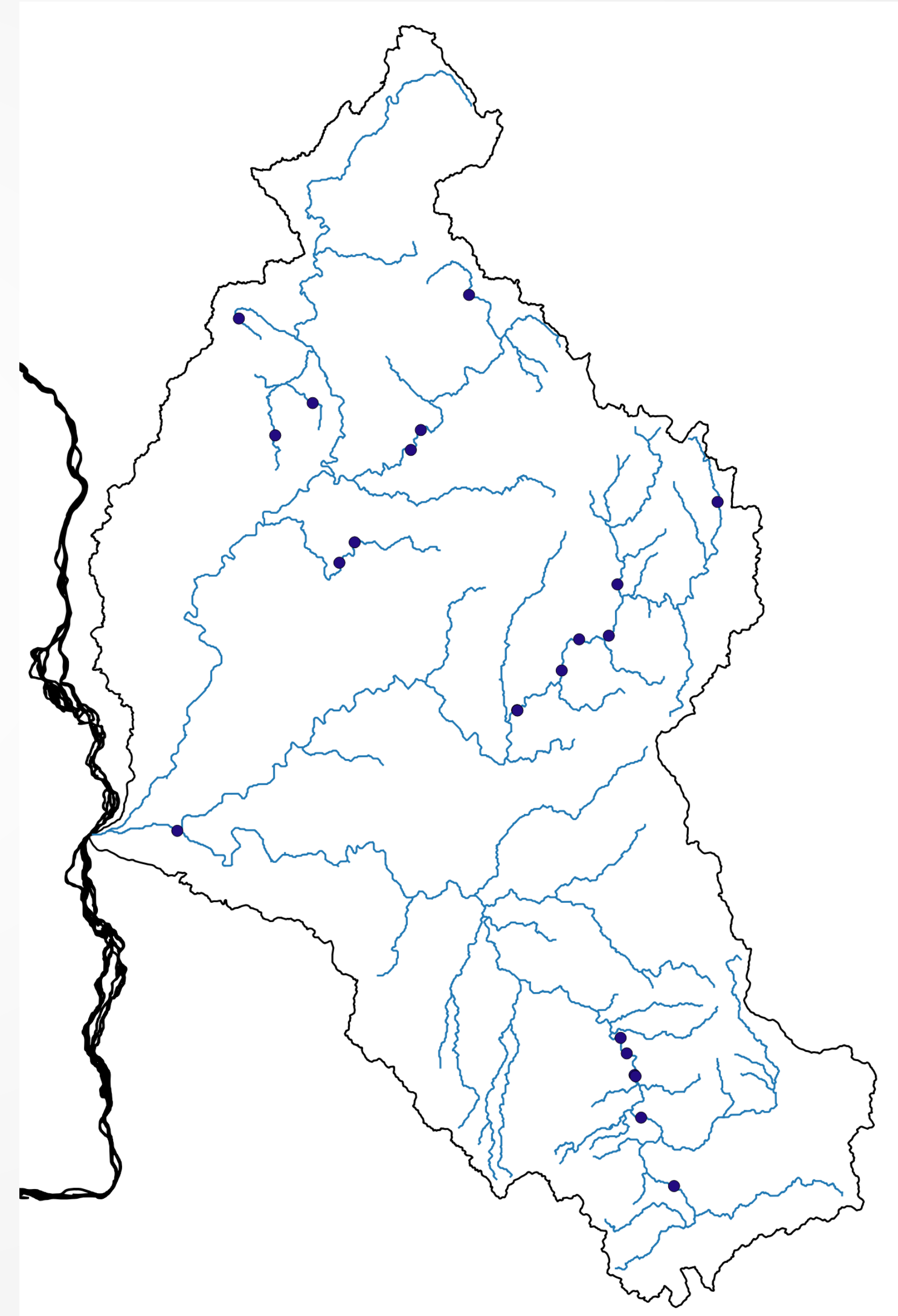
# Deviation from natural flow regime

	Dec 16	LS2	UC	Sekong	Full
Basin score	66	66			
Sekong (Lao/Kh)	70	70			
Sesan (Vn/Kh)	42	42			
Srepok (Vn/Kh)	54	54			



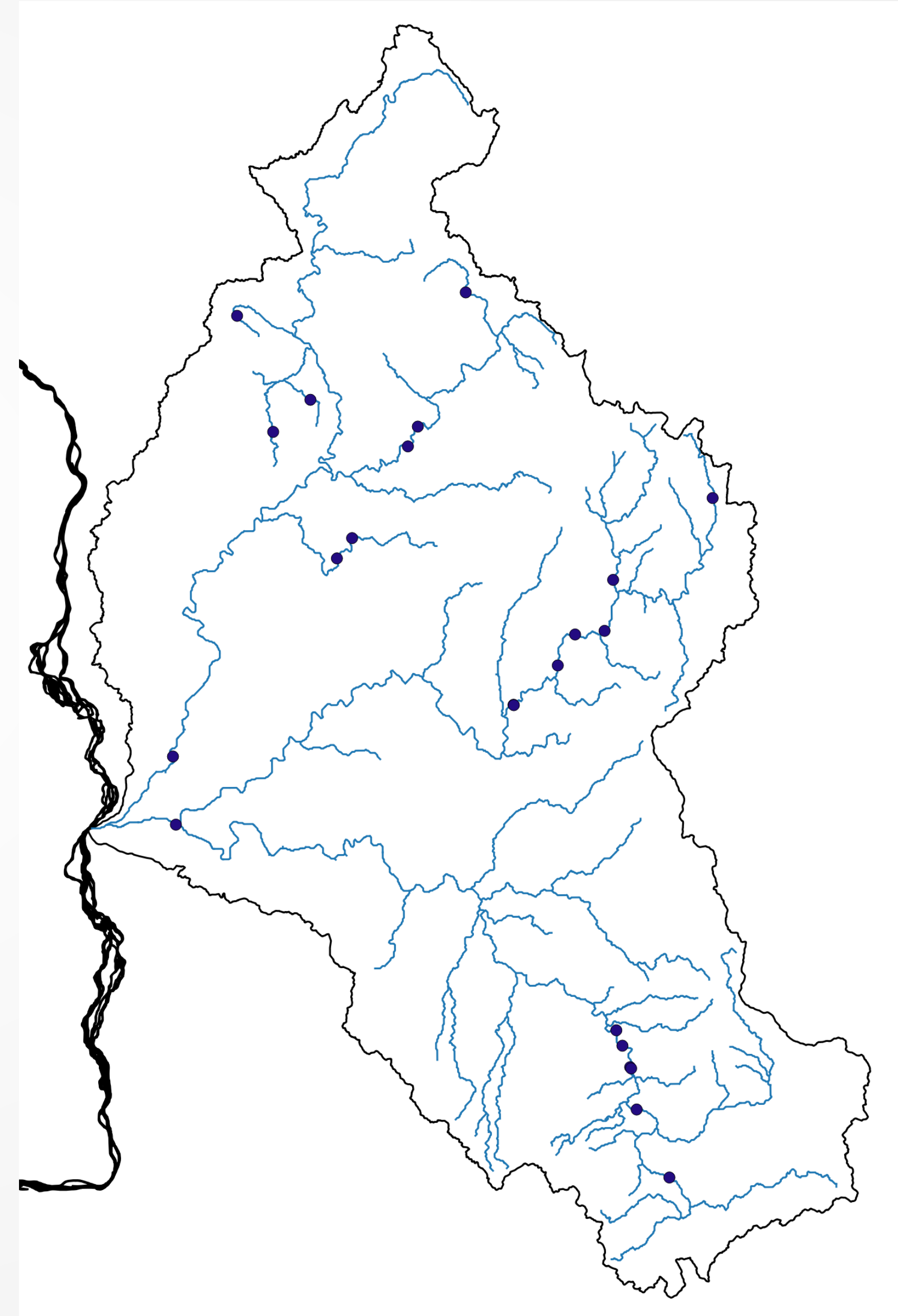
# Deviation from natural flow regime

	Dec 16	LS2	UC	Sekong	Full
Basin score	66	66	61		
Sekong (Lao/Kh)	70	70	<b>59</b>		
Sesan (Vn/Kh)	42	42	41		
Srepok (Vn/Kh)	54	54	54		



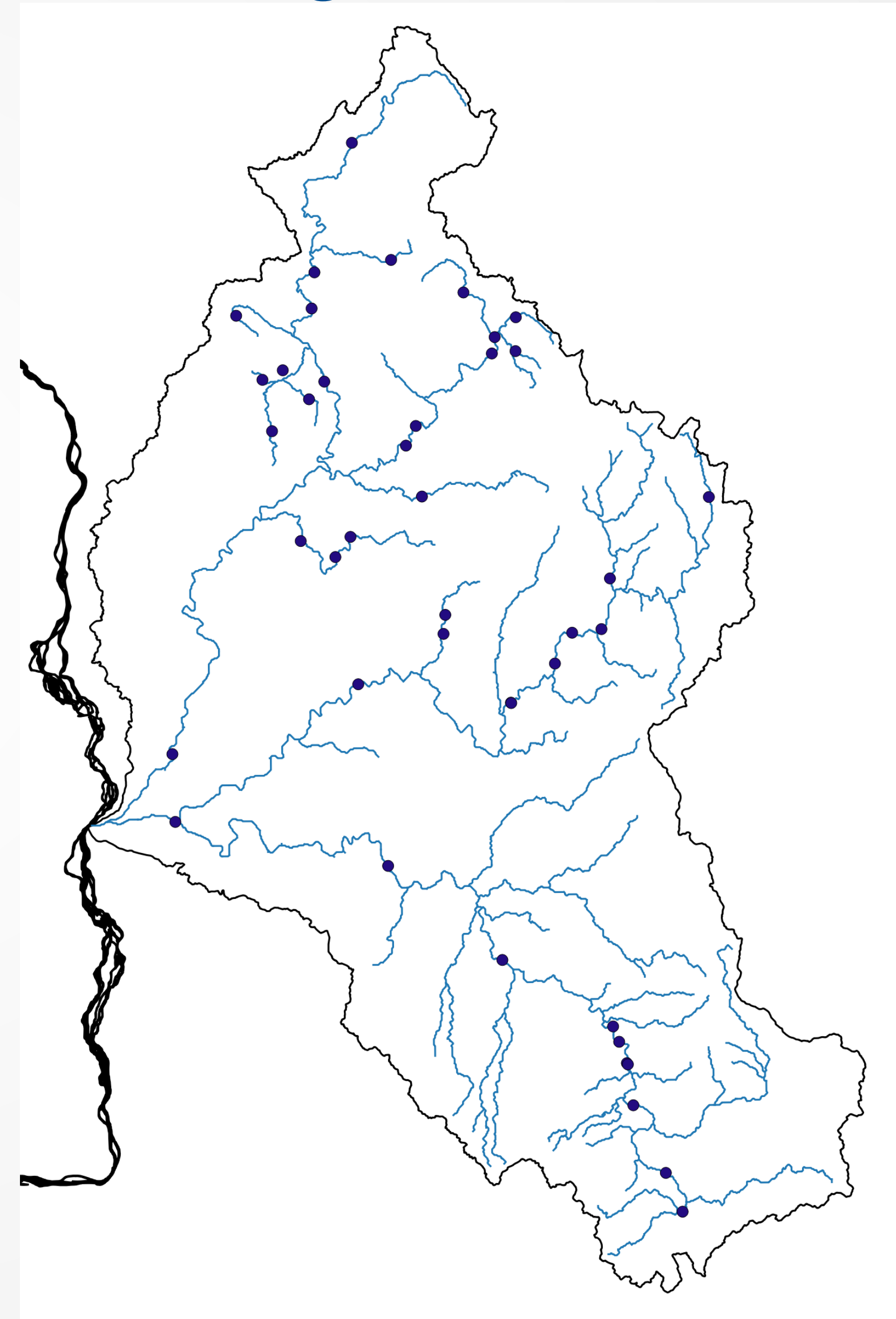
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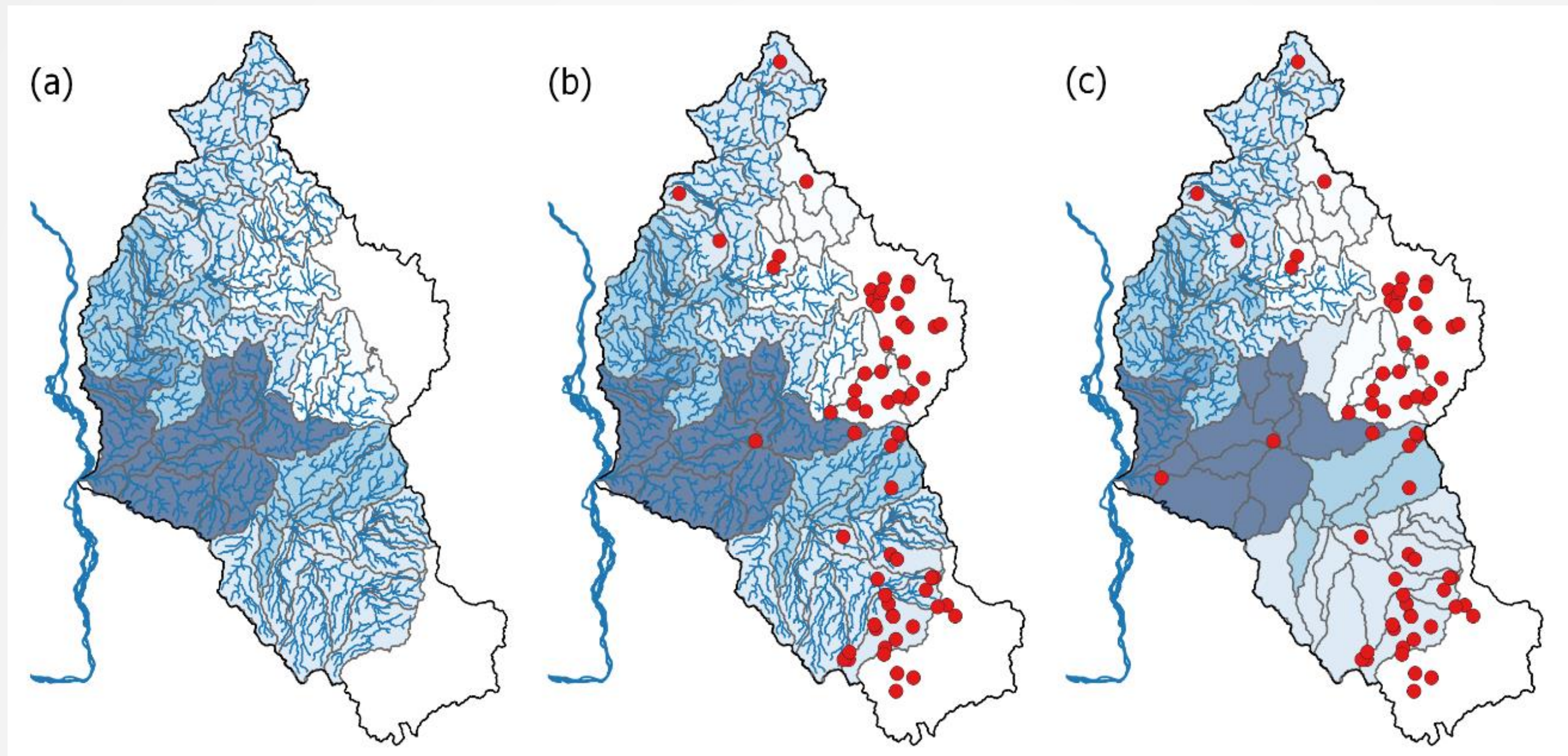


# Deviation from natural flow regime

	Dec 16	LS2	UC	Sekong	Full
Basin score	66	66	61	61	<b>22</b>
Sekong (Lao/Kh)	70	70	59	59	<b>15</b>
Sesan (Vn/Kh)	42	42	41	41	41
Srepok (Vn/Kh)	54	54	54	54	43



# Impact of dams on connectivity and biomass

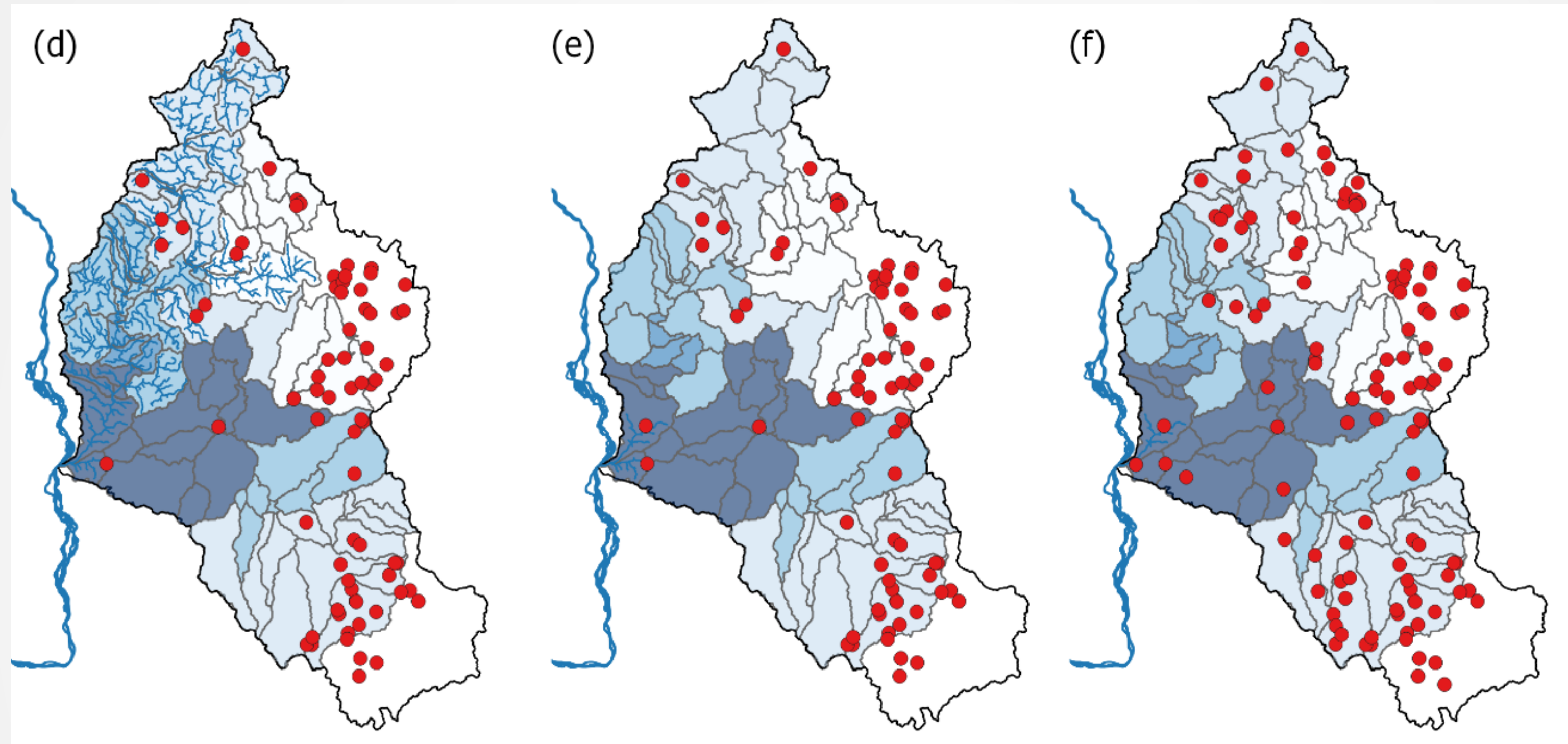


	NATURAL	EXISTING	+LOWER SESAN II
Connectivity	<b>100</b>	<b>78</b>	<b>38</b>
Biomass	<b>100</b>	<b>94</b>	<b>26</b>

- Dam location
- Connected stream
- Disconnected stream



# Impact of dams on connectivity and biomass



+UNDER CONSTRUCTION

+SEKONG

+FULL DEVELOPMENT

Connectivity

**36**

**25**

**6**

Biomass

**26**

**0.01**

**0.01**

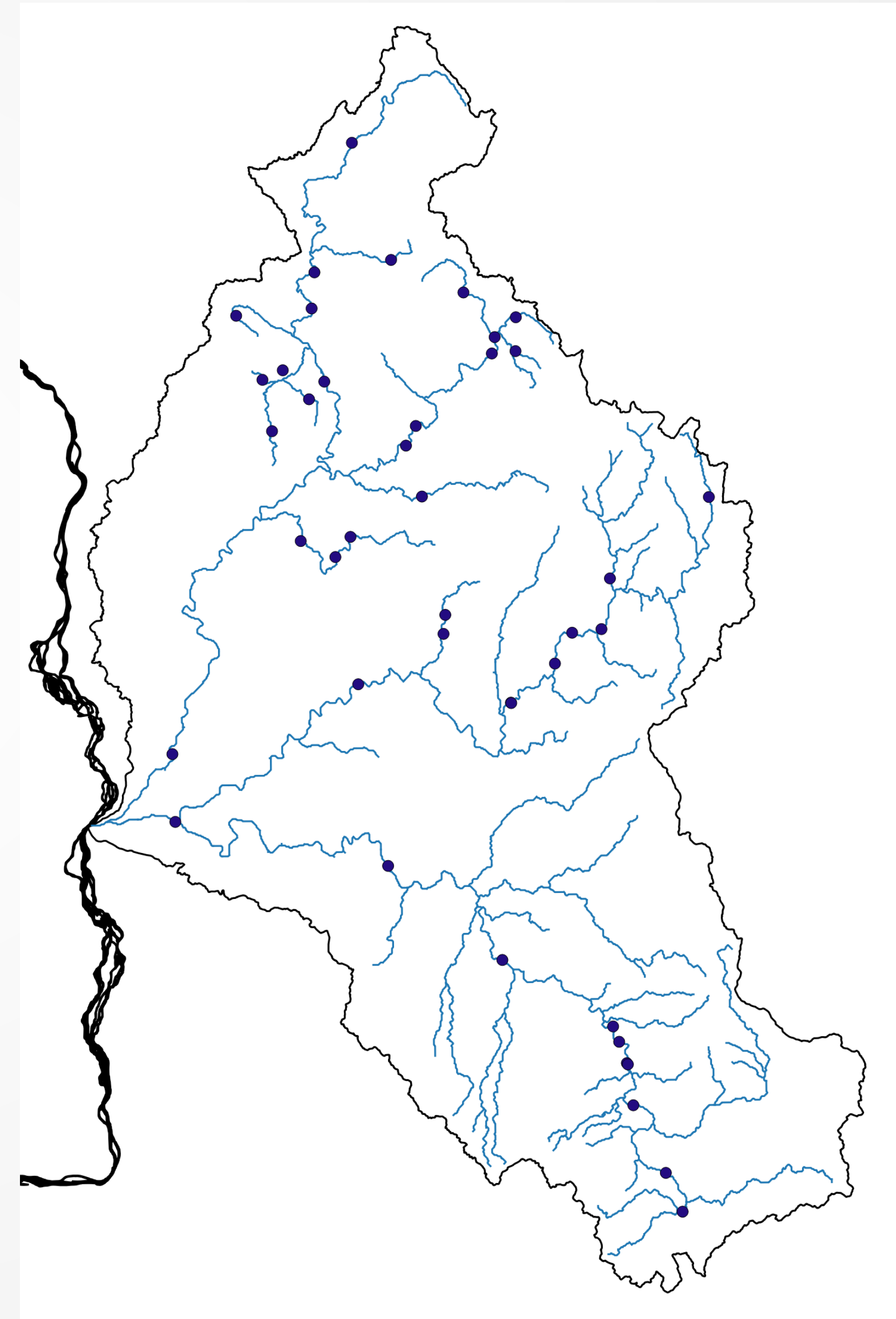






# Sediment regulation

	Dec 16	LS2	UC	Sekong	Full
Basin score	39	39	29	-	17



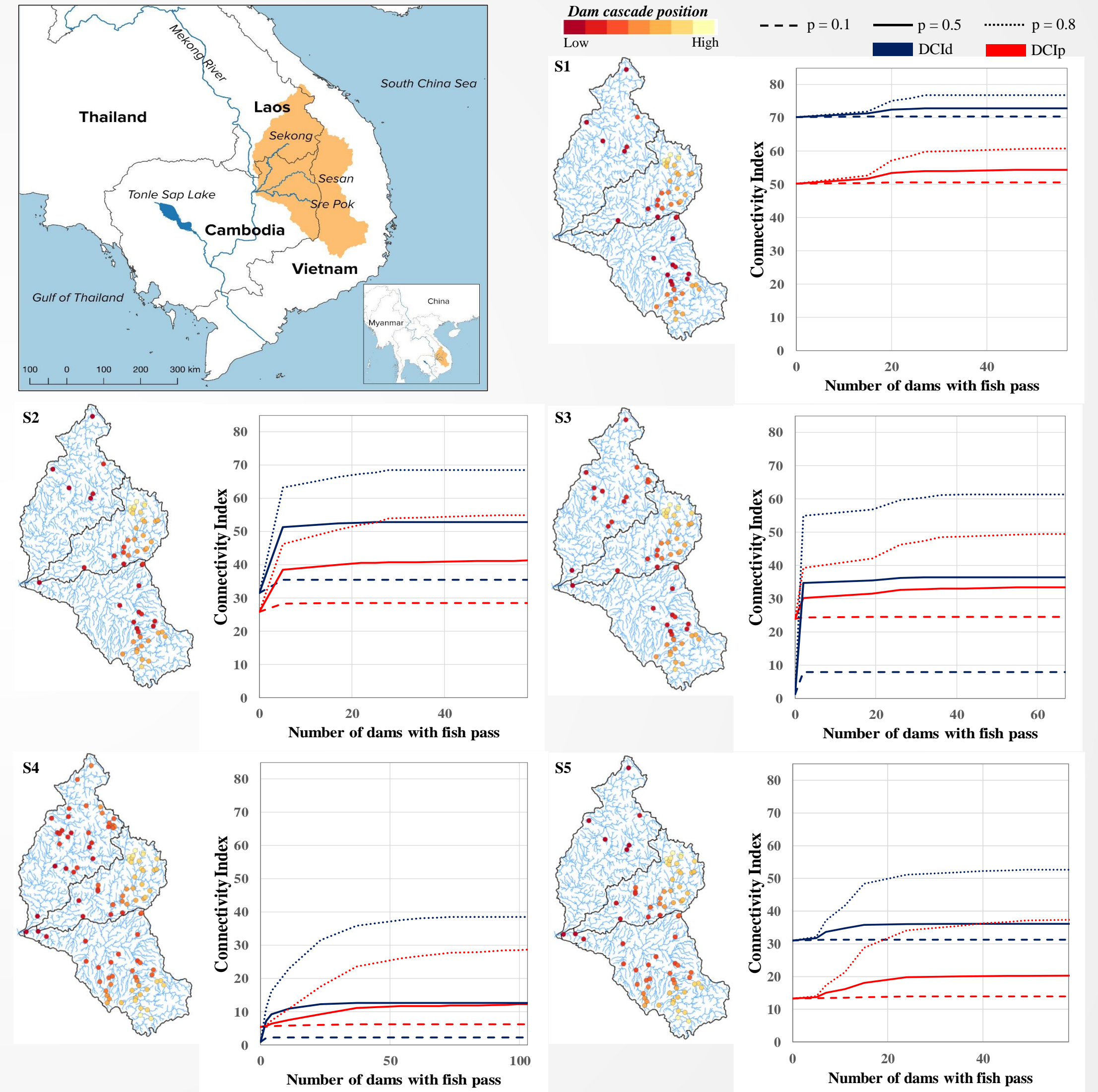
# Fish passage

- Fish pass completed in November 2017
- Reportedly attracting fish, but quantifiable data not yet available



# Fish passage

- Scenario assessment of a range of dam development scenarios and passability
- Read all about it in Shaad et al (2018)\*



\*DOI 10.1016/j.ecolind.2018.04.034



# The Future of Scenarios in the 3S

- Revising scenarios to better reflect reality
- Hydrological modelling being undertaken by NASA
- Assessing the lower Sesan II fish pass



# THANK YOU!

FOR ADDITIONAL INFORMATION

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