

#EGU21-14018

# Impact assessment of structural barriers and flow regulation on the Ganga River morphology and ecology

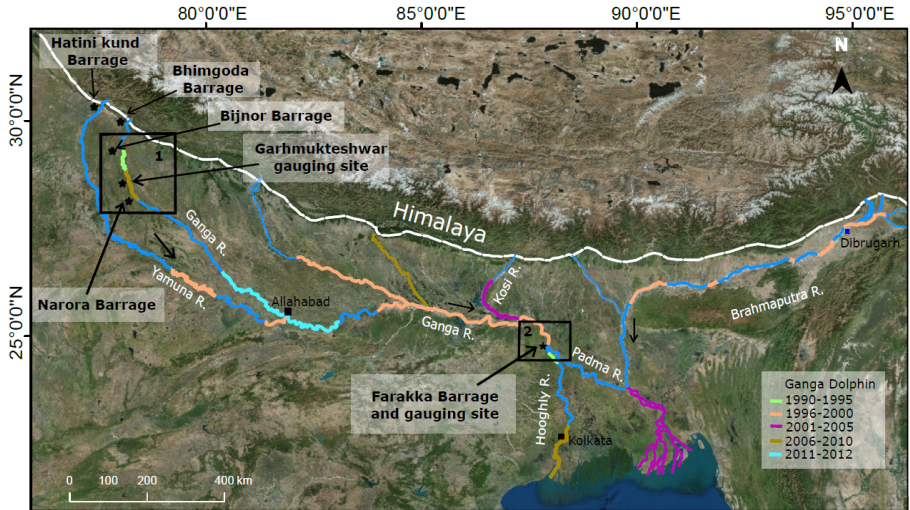
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# Motivation of the study



Distribution of the Ganga dolphins (*Platanista gangetica*) in the large Himalayan Rivers

# The Ganges dolphin (*Platanista gangetica*) statistics

## Middle Ganga reach

Reach	Year	Count	Density	References
Bijnor to Narora barrage (166 km)	1993/1995	22	0.13	Sinha et al., 2000
	1996	28	0.17	Sinha et al., 2000
	1998	35	0.21	Sinha et al., 2000
	2010	56	0.33	Sinha & Kannan, 2014
Garhmukteshwar to Narora barrage (85 km)	2012	30	0.36	Behra, Singh, Sagar, & De, 2014
Bijnor to Garhmukteshwar (83 km)	2015	31	0.37	Rai, 2019

## Lower Ganga reach

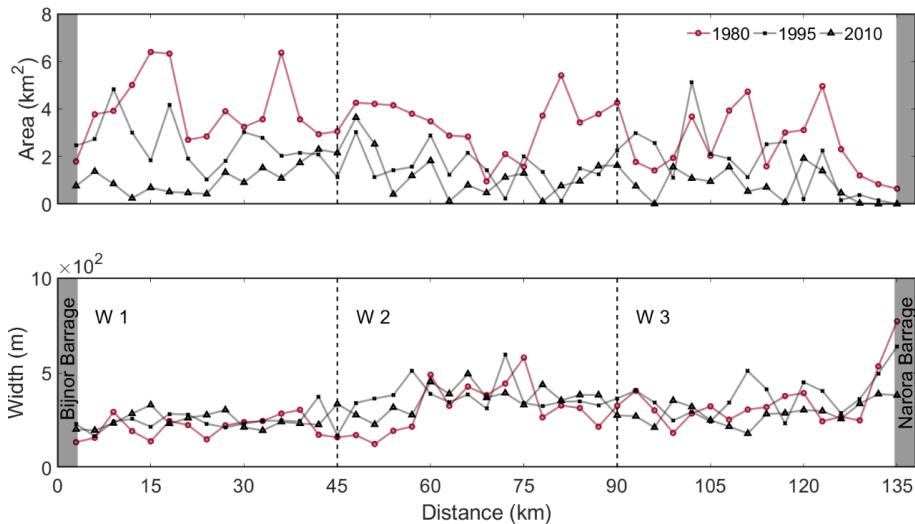
Source: Sinha 2000

Season	Year	Upstream from Barrage (3.5 km)		Downstream from Barrage (3.5 km)	
		Count	Density	Count	Density
Winter (January–March)	1992	2	0.6	2	0.6
	1993	2	0.6	1	0.3
	1994	7	2	2	0.6
	1996	0	0	0	0
Pre-monsoon (April–June)	1992	4	1.1	0	0
	1993	0	0	1	0.3
	1995	0	0	0	0
Monsoon (July–September)	1995	10	2.8	5	1.4
	1996	9	2.5	4	1.1
Post-monsoon (October–November)	1991	7	2	4	1.1
	1992	0	0	3	0.8
	1993	0	0	3	0.8

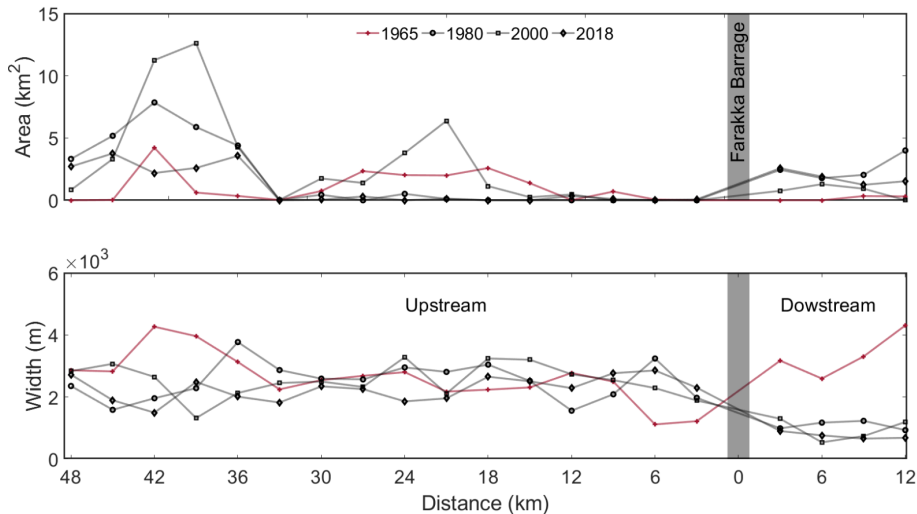
## Geomorphic preferences of the Ganges dolphins

- ❶ Wide straight channel (Sharma, 2010)
- ❷ Single channel with deep meanders (Behra et al., 2014; Biswas Boruah, 2000; Wakid, 2009).
- ❸ Confluences with eddy counter-currents (Behra et al., 2014 ; Sinha Sharma, 2003).
- ❹ Immediate downstream of sand bars at confluences (Sharma, 2010).

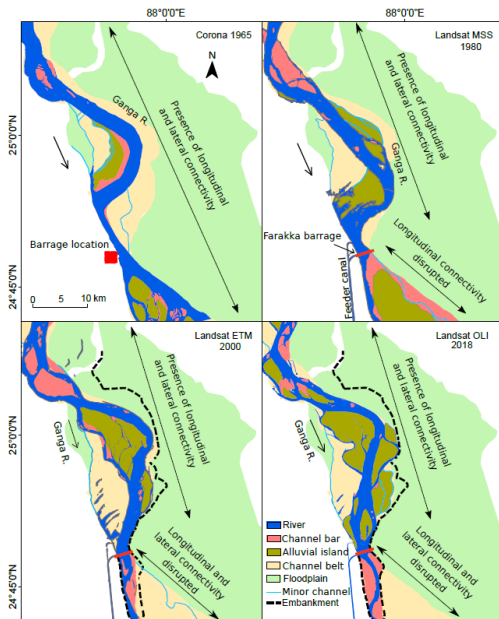
# Channel width and bar variation in the middle Ganga reach



# Channel width and bar variation in the lower Ganga reach



# Planform mapping of the lower Ganga reach



# Conclusion

Barrage operation alter the flow which in turn affects the channel width and bar area formation degrading the habitat quality.

Narrow and stable channels may have a high influence on the habitat preference of the Ganga River dolphins.