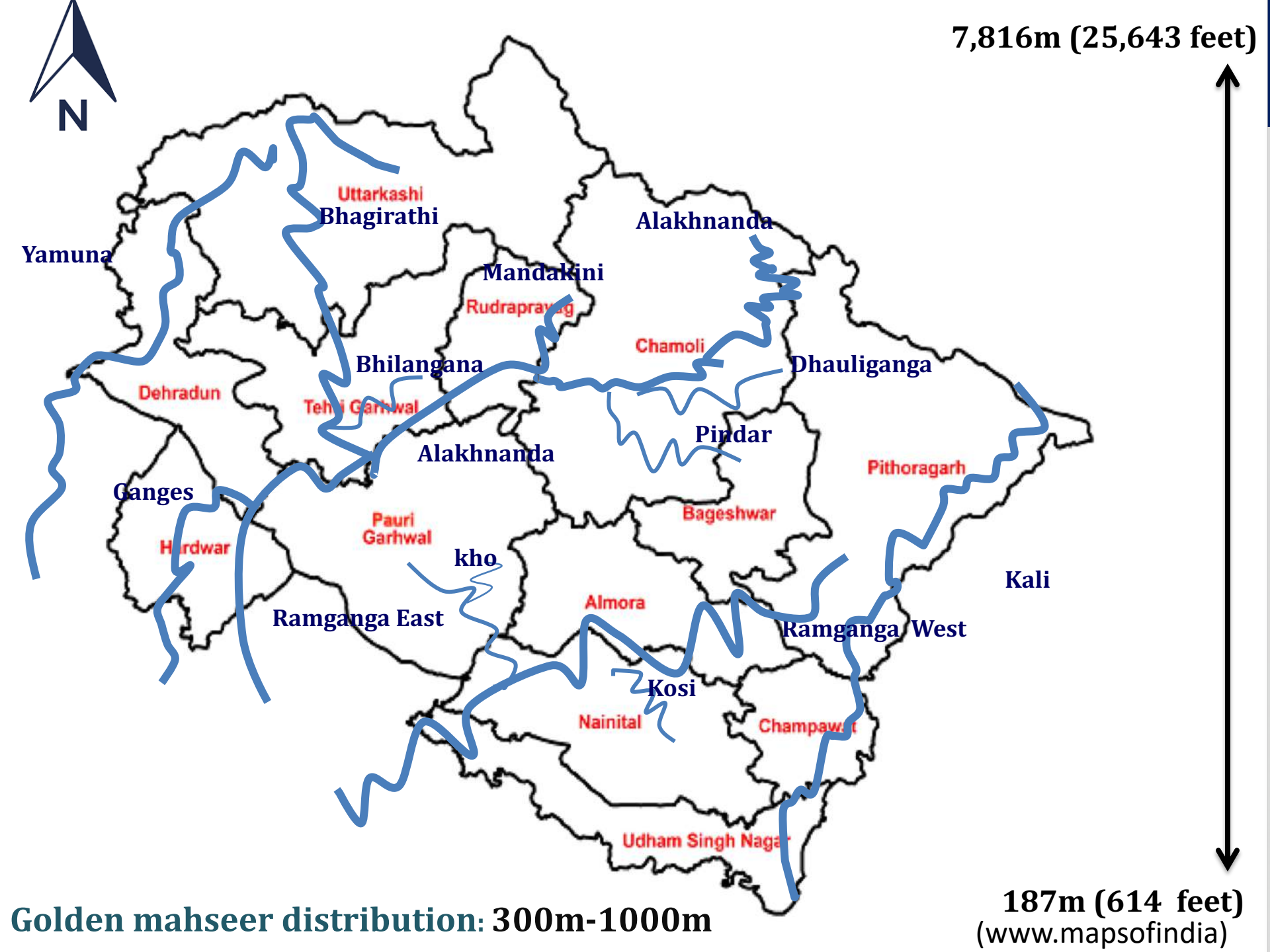
Distribution status of GOLDEN MAHSEER *Tor putitora* (Hamilton 1822) in Uttarakhand, India and way forward

Bhawna Dhawan

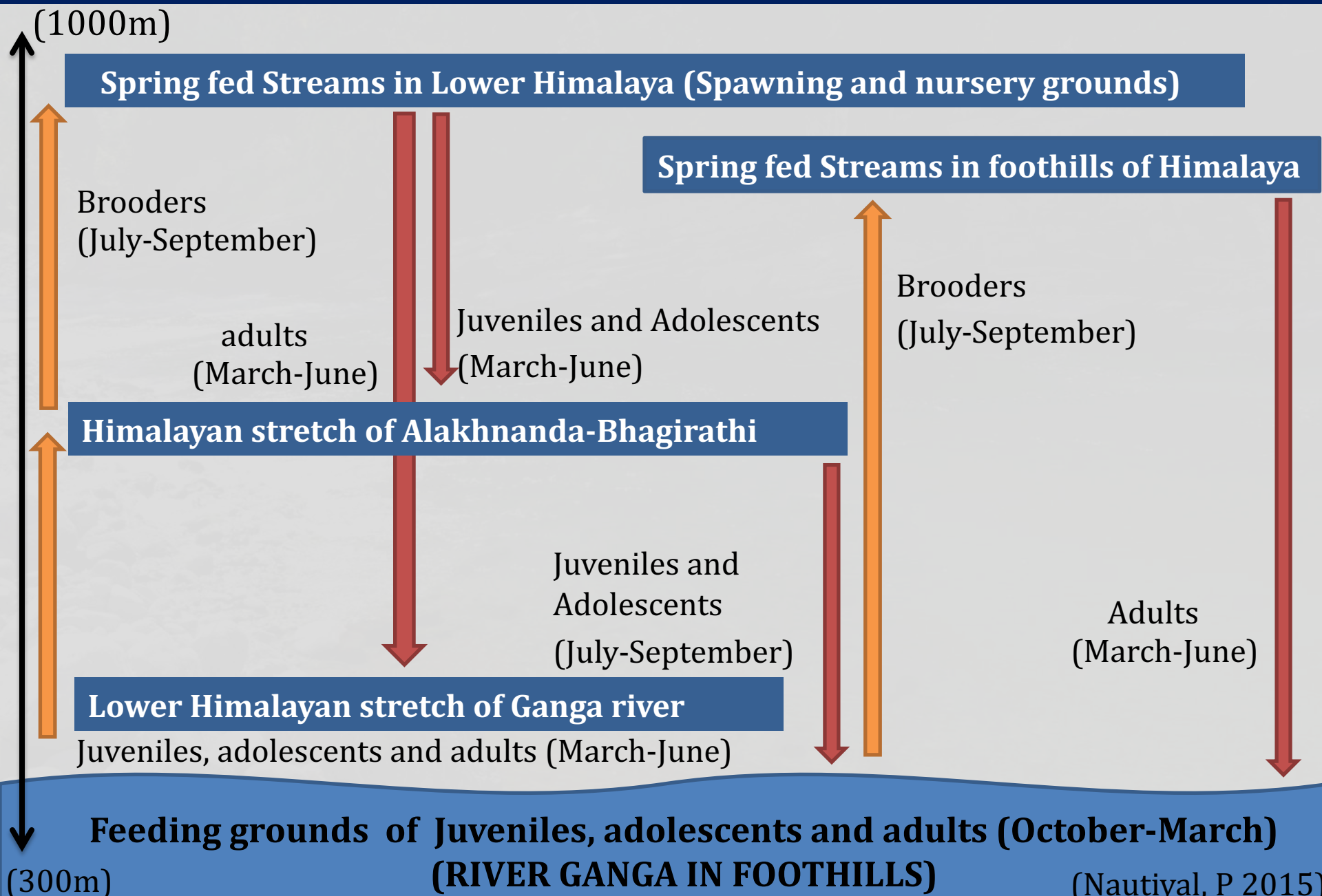
Junior Research Fellow

भारतीय वन्यजीव संस्थान
Wildlife Institute of India



Golden mahseer distribution: 300m-1000m

GOLDEN MAHSEER's MIGRATION



(Nautiyal, P 2015)

THREATS TO THE POPULATION

- **Indiscriminate fishing and over exploitation**
- **Habitat Degradation**
- **Habitat fragmentation**
- **Flow modification and diversion**

70 hydel projects are planned or underway in Alaknanda and Bhagirathi basins

(Wildlife Institute of India/REPORT/2015)

Study on ecology and migratory patterns of golden mahseer (*Tor putitora*) in river ganga using radio telemetry techniques

(Wildlife Institute of India, Dehradun /2017)

Project objectives:

(i) Investigate breeding migratory patterns
(ii) Habitat use of golden mahseer
(iii) Estimate the breeding and non-breeding home ranges
(iv) Estimate the Weighted Usable Area and flow requirement

Study Area:

1. **Kosi River, Ramnagar**
2. **Kohlu River; Kotdawar**
3. **Nayyar River (WWF, India)**

PRELIMINARY OBJECTIVE:

- To assess the golden mahseer distribution in Kosi river of Uttarakhand, western Himalaya
- Assessment of habitat condition and hydrology of golden mahseer habitat

SEASON:

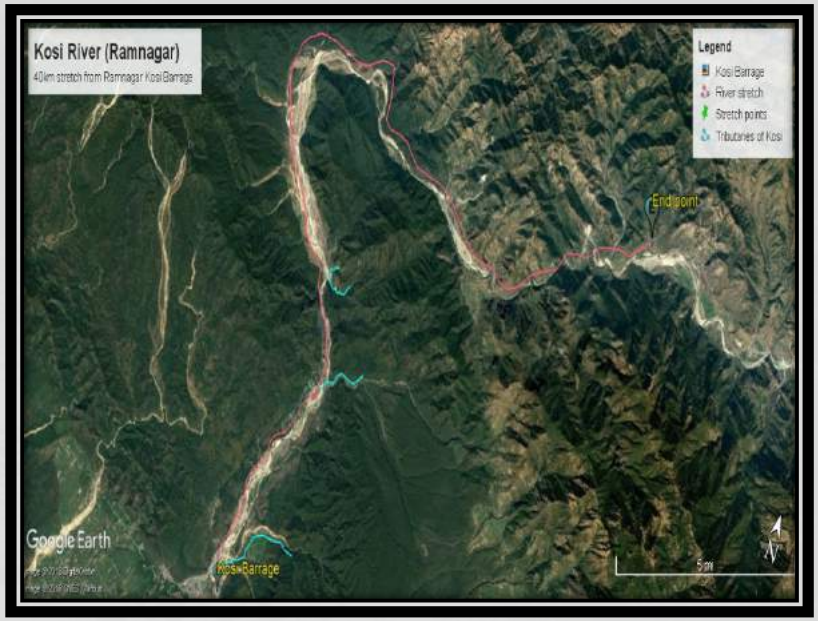
Study was conducted during the post-winter (March-April, 2018) and post-monsoon (October-November,2018) in Kosi

WORK DONE (objectives):

1. Habitat assessment
2. Hydrological characteristics
3. Study of golden mahseer abundance

STUDY AREA:

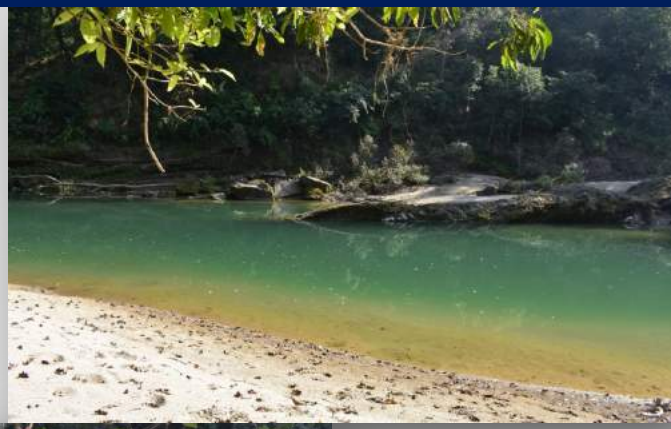
- **Kosi River in Ramnagar; Uttarakhand**

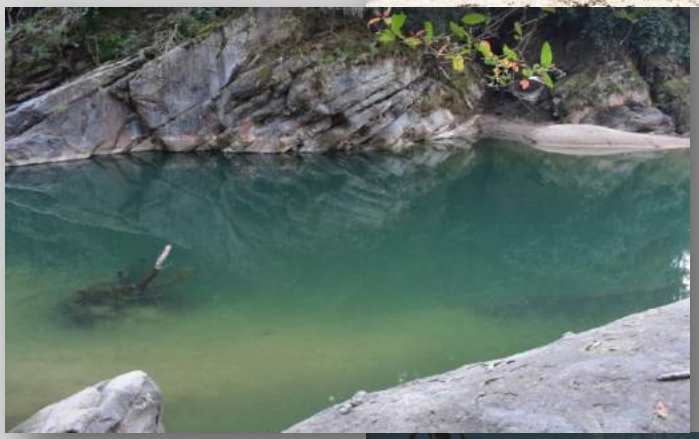


- **Origin :Budha Peenath Kashimool**
- **Location : 29^{0}50’51”N 79.32’42”E**
- **Stretches up to 250 km to Ramnagar ,**
- **Elevation : 345m.**

STUDY AREA:

- **Kohlu in Kotdawar ; Uttarakhand**



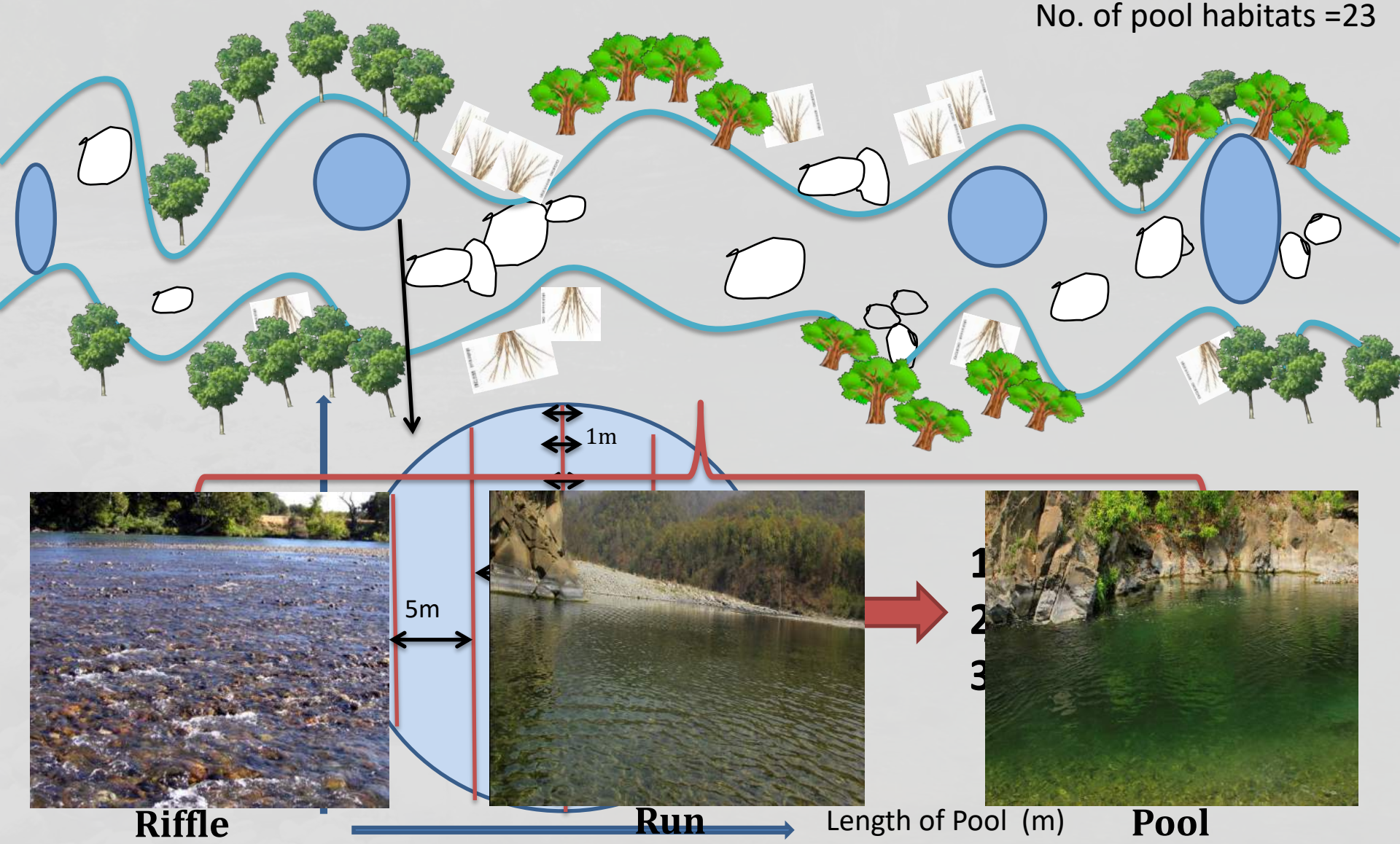


- **It flows through the Gharwal and Kumaon region of Himalaya;**
- **29°41′30.73″N,78°31′37.01″E**
- **Elevation is 320m.**
- **study stretch is about 14.5 km.**

Methodology

1.Habitat assessment

No. of pool habitats =23



Methodology

1.Depth (cm)	0-0.1	0.1-0.3	0.3-0.6	0.6-1.0	1.0-1.2	1.2-1.5	1.5-1.8	1.8-2.0	>2.0
2. Flow rate (m/s)	0-0.2	0.2-0.3	0.3-0.5	0.5-0.6	0.6-0.9	0.9-1.2	>1.2		

(Jowett, 1994)

3. Substratum

Bed rock

Small boulders

Sand

Cobbles

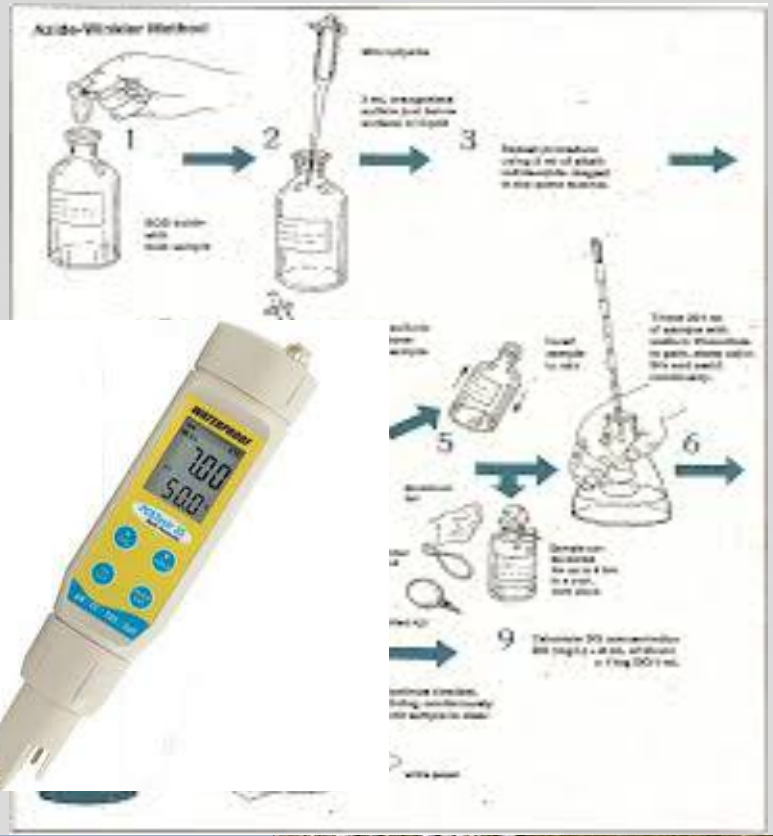
Gravel

(Bovee, 1982)

2. Hydrological characteristics

Water quality parameters:

1.Dissolved Oxygen



2. pH
3. Temperature
4. TDS
5. EC
6. Salinity

3. Fish population structure

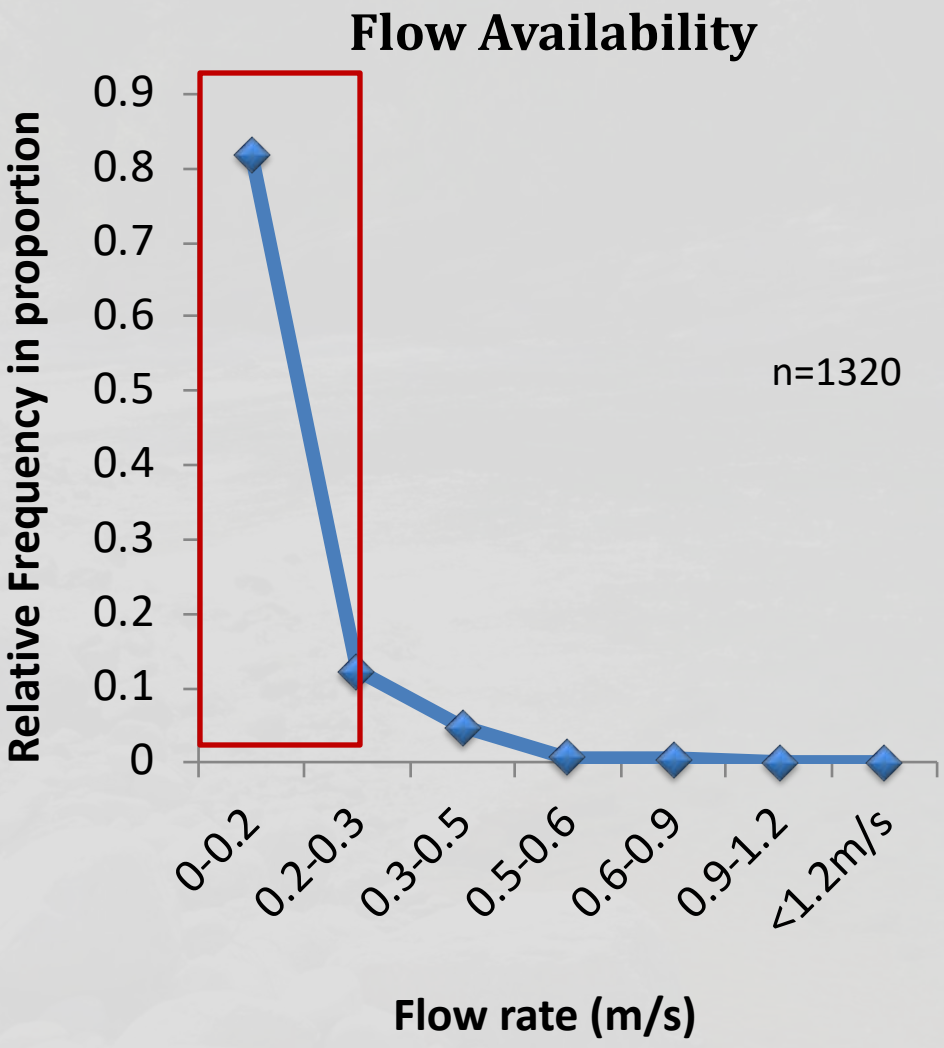
1. Underwater observation
2. Photographic evidences

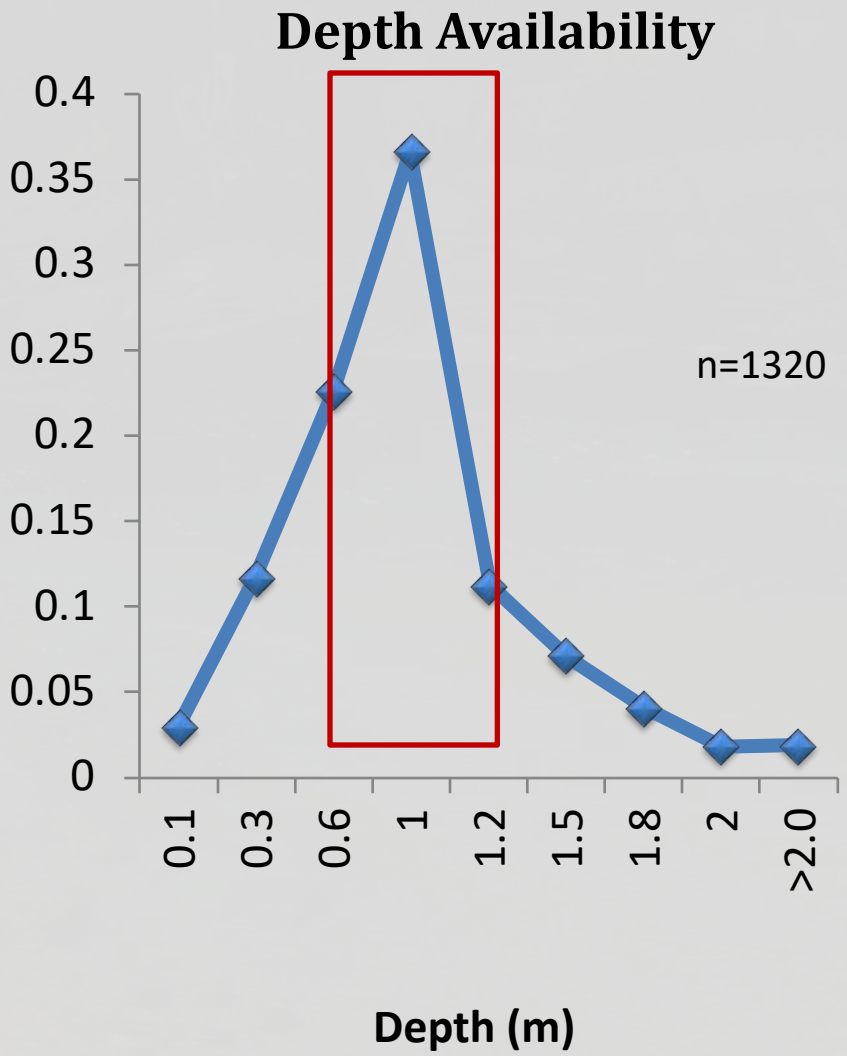
Results

Characteristics of Pool Habitat

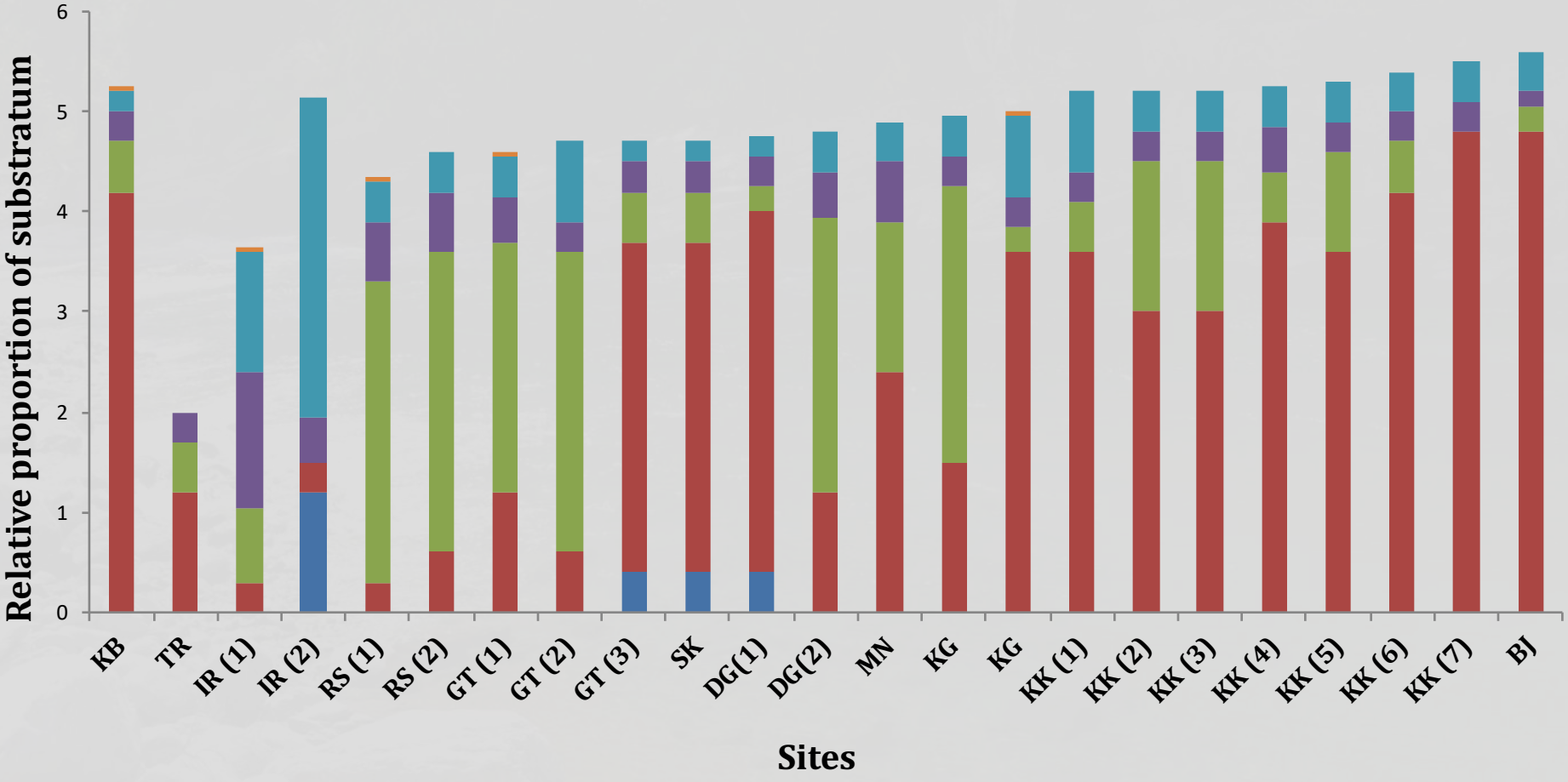
Site	width (m)	length (m)	area (m^2)	depth (m)	flow rate (m/s)	volume (m^3)
KB	35	20	700	0.96	0.16	674.8
TR	34.6	30	**1038**	0.46	0	477.48
IR (1)	28.66	20	573.2	0.71	0.5	404.6
IR (2)	22.7	20	454	1.15	0	522.1
RS (1)	13.25	25	331.25	0.84	0	277.79
RS (2)	10.66	20	213.2	0.95	0	202.54
GT (1)	15.8	35	553	0.79	0.16	440.74
GT (2)	**45.66**	25	1141.5	0.92	0	**1058.17**
GT (3)	17	25	425	0.77	0	327.25
SK	23.33	25	583.25	0.87	0	507.43
DG(1)	10.4	35	364	0.69	0	251.16
DG(2)	15.6	35	564	1.05	0	573.3
MN	17.66	25	441.5	0.82	0	362.03
KG	14	35	490	0.71	0.33	347.9
KG	11.6	30	348	0.99	0	344.5
KK (1)	11.2	35	392	1.17	**1.52**	470.4
KK (2)	11.66	25	290	0.78	1.23	226.2
KK (3)	8.33	25	208.25	**1.54**	0	320.71
KK (4)	12.2	**40**	488	1.05	0	512.4
KK (5)	11.5	25	287.5	1.3	0	373.8
KK (6)	11.2	25	280	0.86	0	240.8
KK (7)	8.77	35	484	1.06	0	532.4
BJ	5.75	30	172.5	0.5	0.513	86.25

Results: Habitat inventory





Substratum composition in pool habitats (post-winter), Kosi River



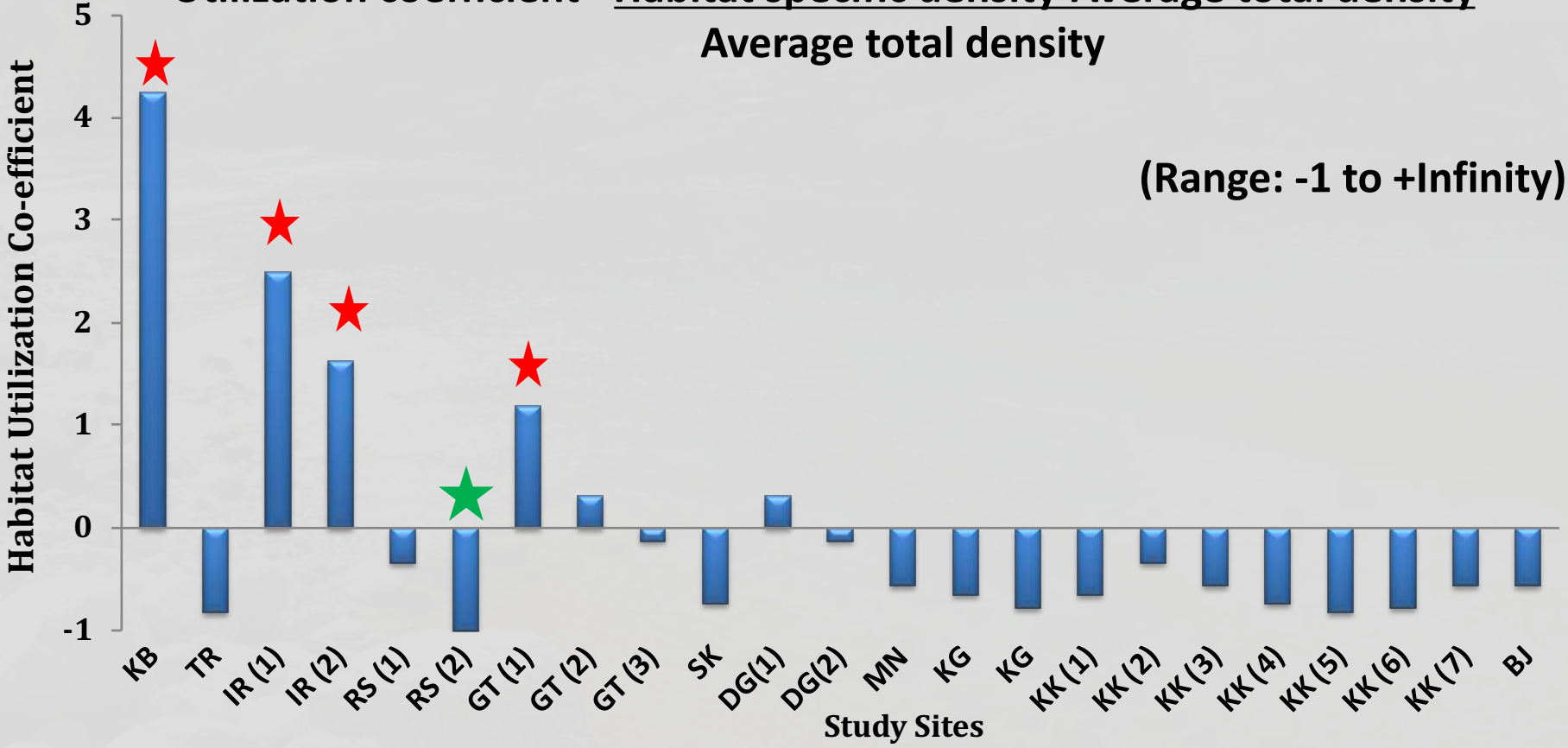
Results: Environmental variables (post-winter)

S.No.	Co- variates	Range	Mean
1.	DO (mg/L)	8.01-9.81	9.32 ± 0.49
2.	pH	8-8.9	9.11 ± 0.46
3.	Water temp (℃)	22-28	23.92±1.57
4.	EC (µ/S)	220-417	280.62±45.90
5.	Salinity (ppm)	108-210	138.96 ±25.14
6.	Flow (m/s)	0-1.52	0.19±0.41
7.	Length (m)	20-35	27.81 ± 5.61
8.	Breath (m)	5.75-45.66	17.24 ±10.04
9.	Area (sq. m)	172.5-1141.5	469.44 ± 237.40
10.	Volume (cu. m)	86.25-1058.17	411.77 ± 195.87
11.	Depth (m)	0.46-1.54	0.91 ± 0.24

Habitat utilization by golden mahseer in relation to the river stretch

Utilization coefficient= Habitat specific density-Average total density / Average total density

(Range: -1 to +Infinity)



(Schlosser,1991)

Fish Community structure

Labeo rohita

Chagunius chagunia

Tor chelynoides

Tor putitora

Labeo dero

Tor tor (?)

Labeo dyecheilus

Gara gotyla

Fish community structure

Barilius vagra

Barilius bendelises

Glyptothorax pectinopterus

Mascembalus armatus

Pethia chonconius

Puntius sophore

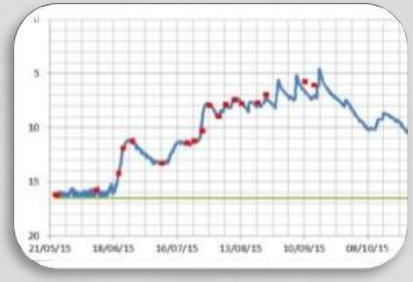
Xenotodon cancilia

Botia almora

Way forward

- **Habitat Inventory study related to distribution in different seasons; post monsoon, early winters and pre-monsoon in all field sites**
- **Gut analysis; to study resource partitioning among co-existing species**
- **Radio tagging, tracking the movement and migration of adult golden mahseer with radio telemetry tags**



Acknowledgement

- Director and Dean, WII
- Dr. J.A. Johnson, Scientist-E, WII
- Dr. K. Sivakumar, Scientist-F,WII
- Uttarakhand Forest Department
- The Corbett Foundation
- WWF, India
- Beautiful species and Nature
- Ministry of Agriculture and Forests, Royal Government of Bhutan
- WWF, Bhutan
- Fisheries Conservation Foundation
- Friends and Family

Thank you !!