

Population and Distribution of White-bellied Heron in Bhutan

Presented to the
College of Natural Resources, Lobesa
October 17, 2013

Jigme Dorji
d_jigme@hotmail.com





GLOBAL ENVIRONMENTAL FACILITY

Pusat
Hydropower



mm

PROJECT TITLE : THE PROTECTION OF WHITE-BELLIED HERON (ARDEA CYNICUS)
PROJECT BUDGET : US \$ 50,000/-
PROJECT AREA : PULITMOCHU BASIH (PULITMOCHU DISTRICT)

BENEFICIARIES

: PULITMOCHU 11111

COMMUNITIES

GEF FOCAL AREA

: WHITE BELLIED HERON CONSERVATION

DURATION

: DECEMBER, 2011 TO DECEMBER, 2014

GRANTEE

: ROYAL SOCIETY FOR PROTECTION OF NATURE



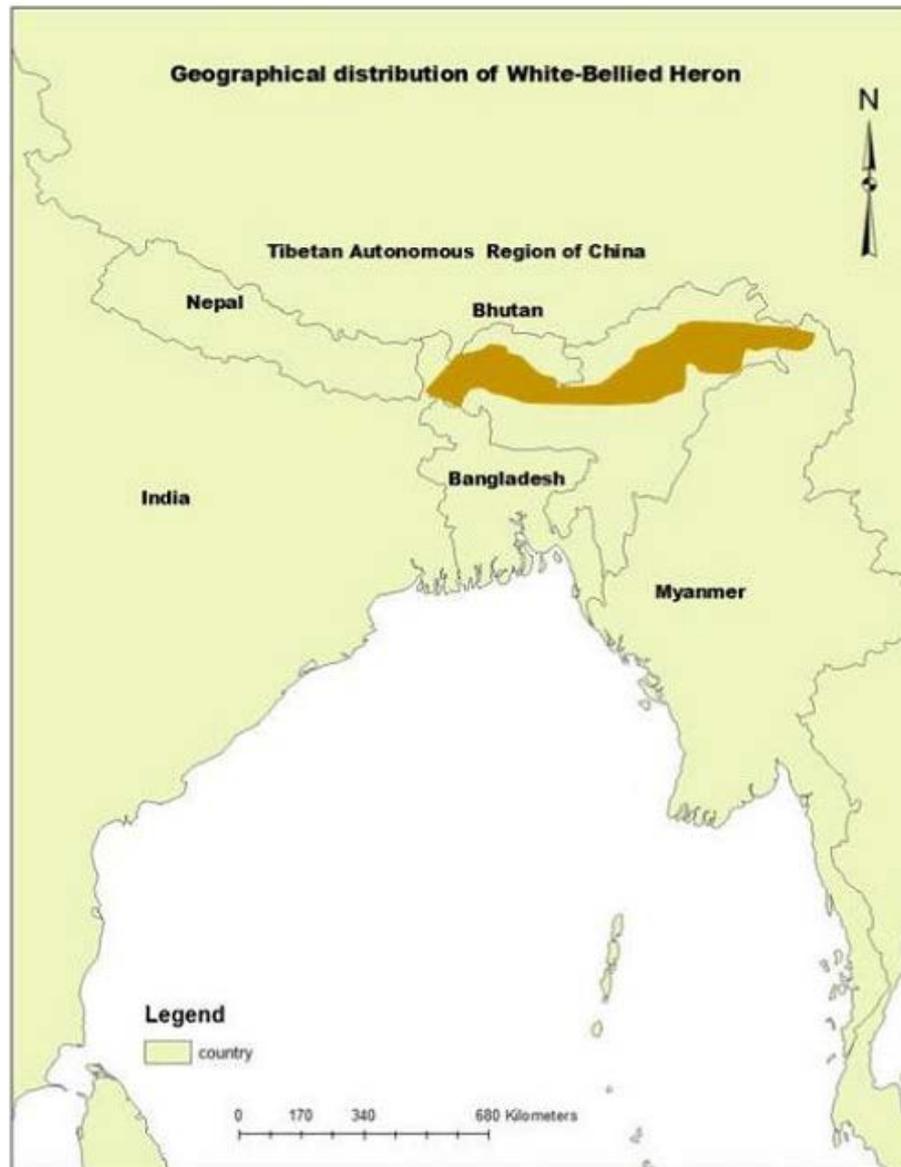
Background of the study

Rationale for my study:

- ❦ Confined to E. Himalayan foothills, non native
- ❦ Critically Endangered (IUCN Red List status)
- ❦ Small and rapidly declining population (50-249 matured individuals) (Birdlife International, 2011)
- ❦ Widespread habitat loss and human disturbance



Global distribution of WBH



Objectives of the study

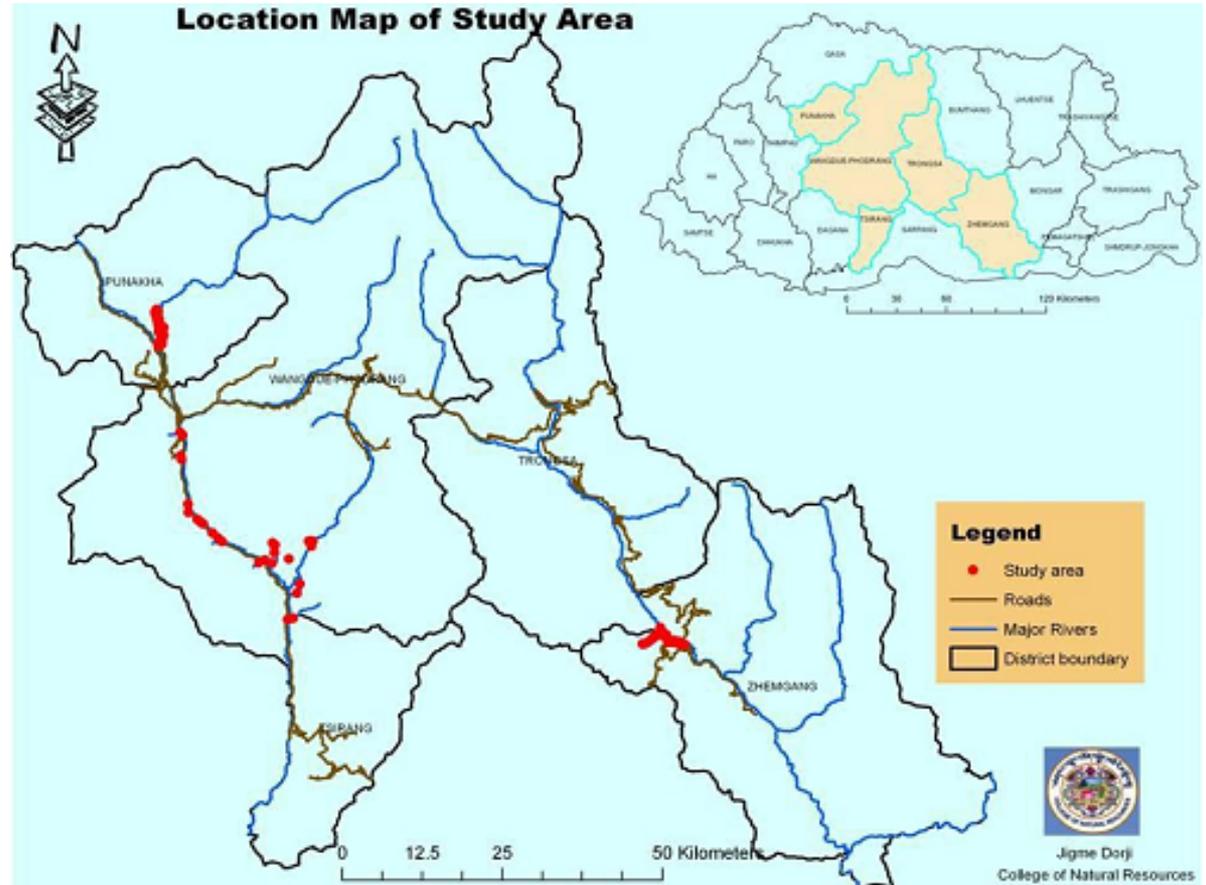
- To study population dynamic in Bhutan in relation to construction of hydropower plants in Punatsangchhu basins (pre and post construction phase)
 - Natural threats causing population decline
 - Anthropogenic threats causing population decline
- To assess change in distribution pattern of this species before and after construction of hydropower structure
 - Predict distribution in Bhutan using simple GIS models



Study area

Area 1:
Punatsangchu
Basin

Area 2:
Mangdechu Basin



Data collection method

Method 1: Field survey

Nonprobability sampling (purposive)

Transect survey

Total population count



Method 2: Questionnaire survey

Structured questions (90% closed – ended)

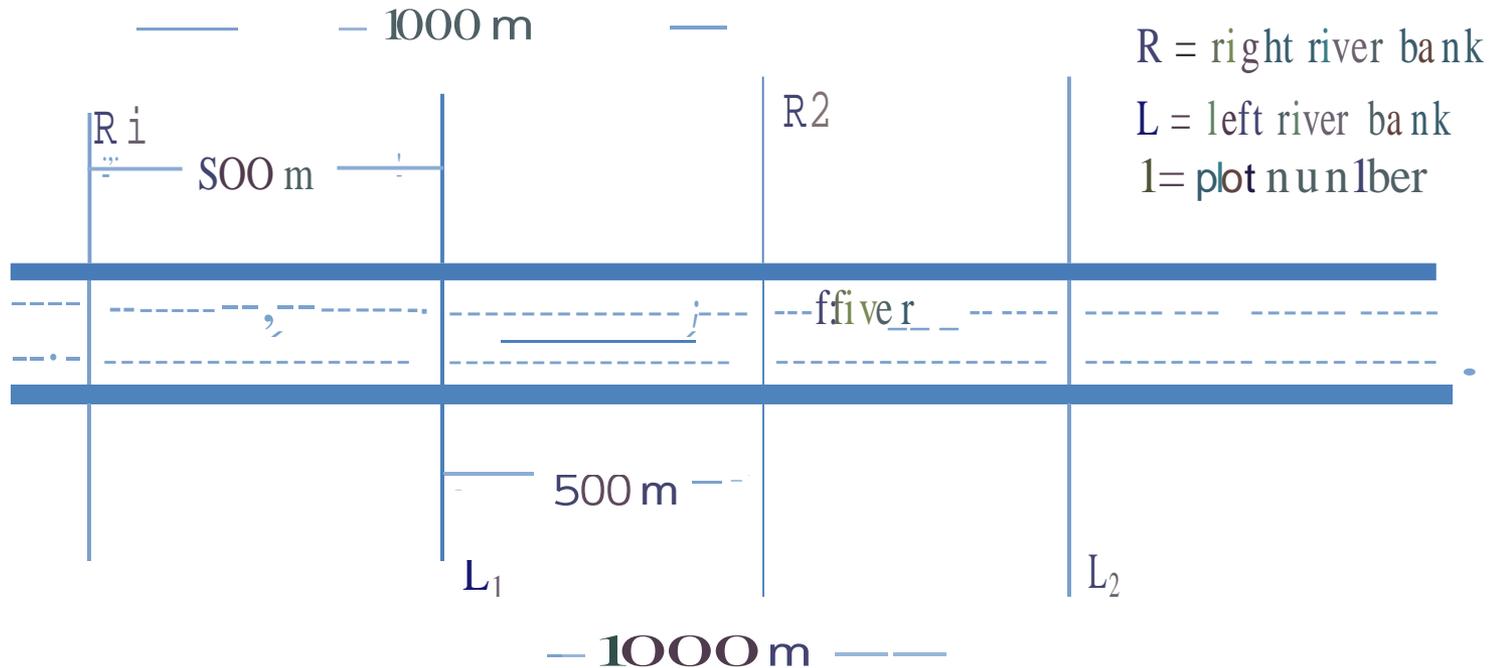
Household interview

All household within 500 m river buffer

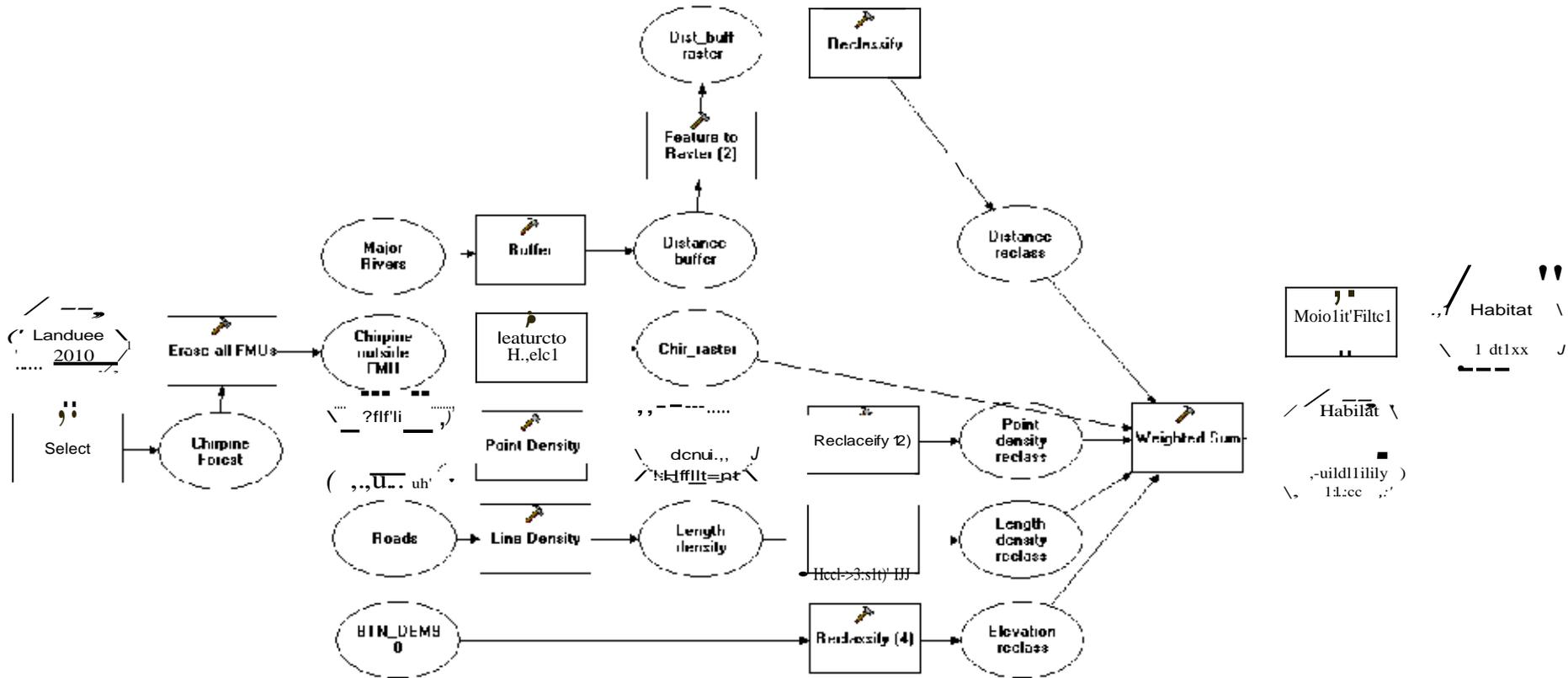


Transect survey

Sample plot design



Distribution mapping using simple GIS model

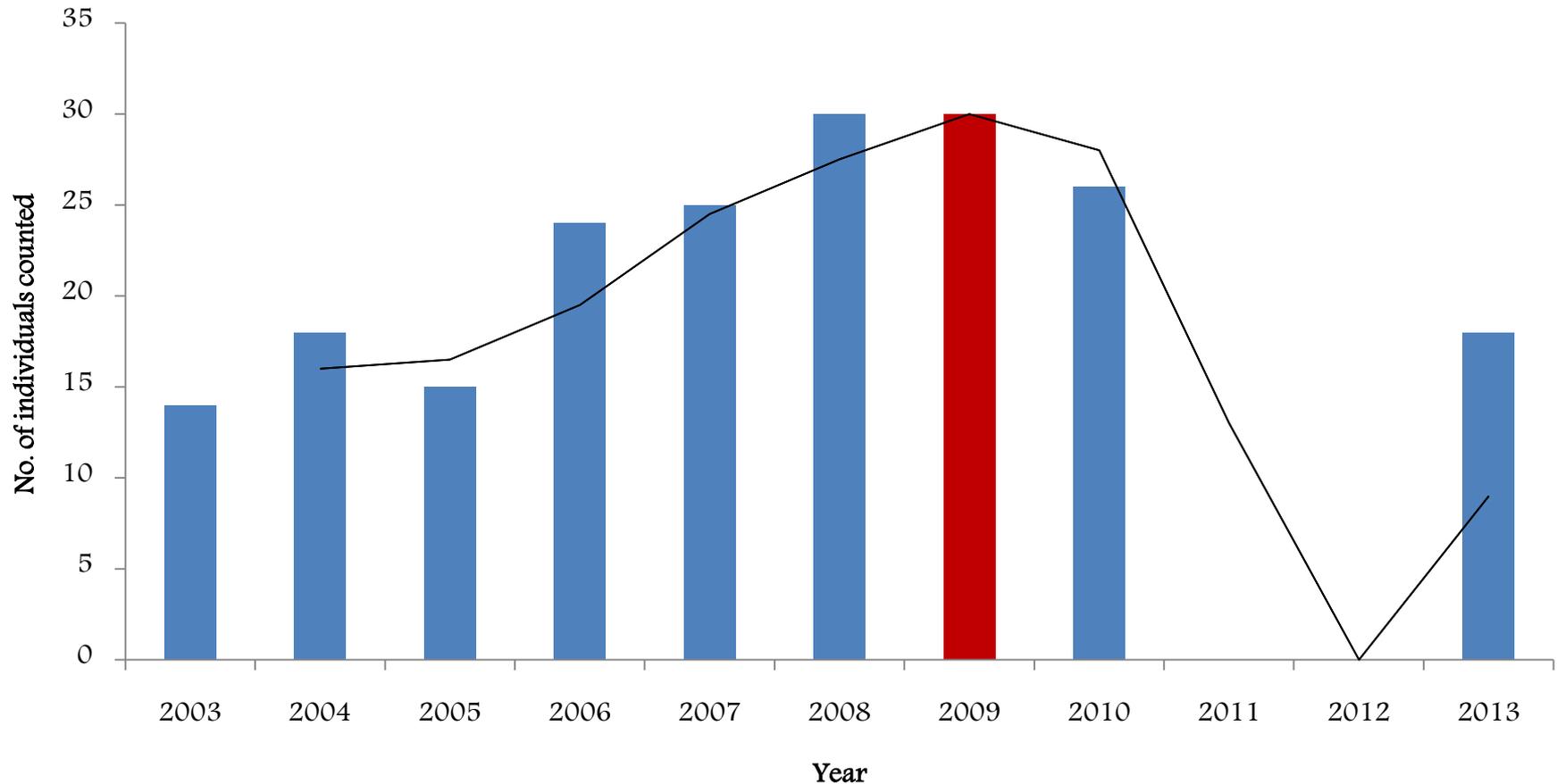


Result and Discussion

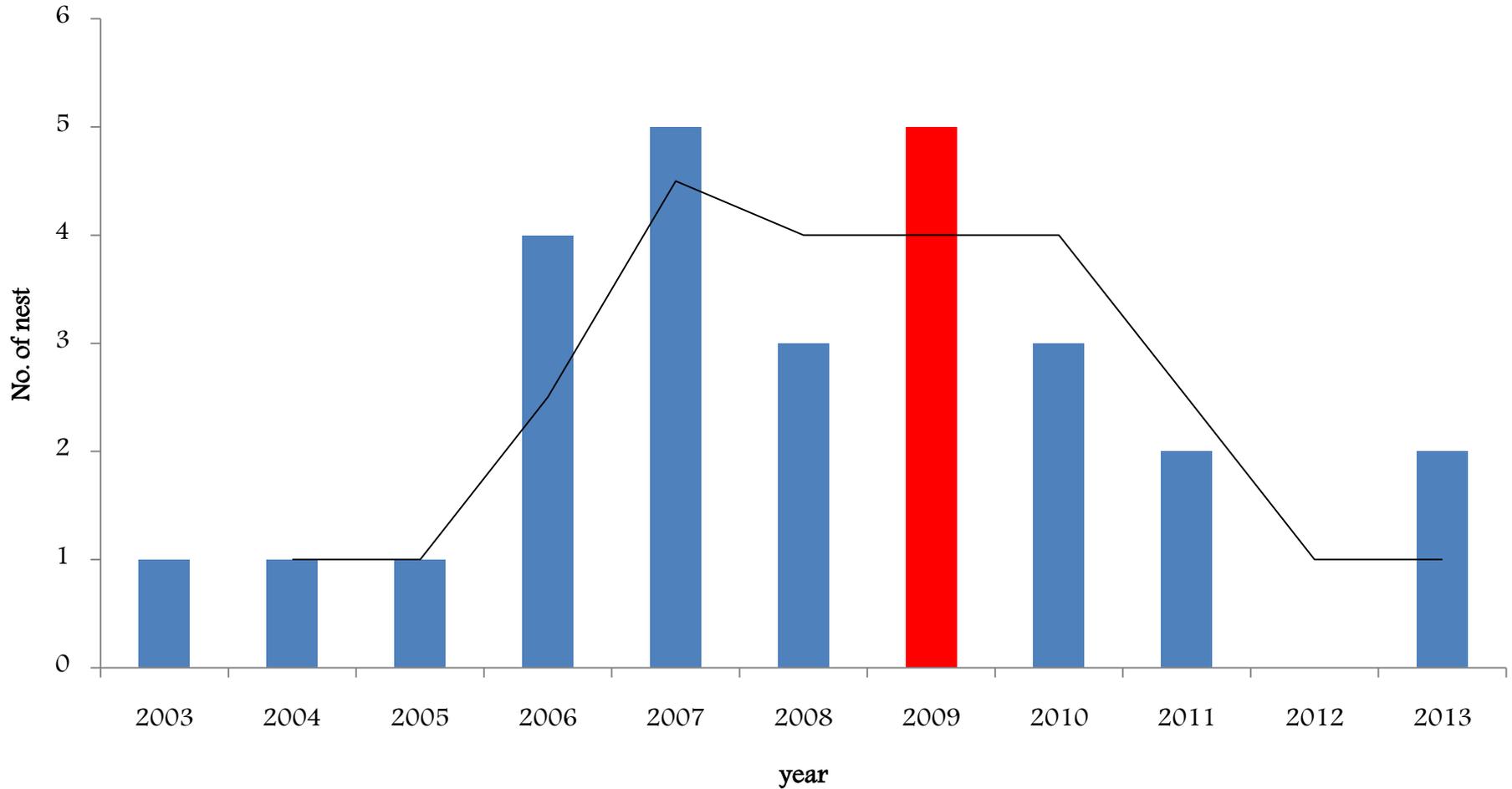
- Population trend:
 - Punatsangchhu active construction phase started in 2009
 - Prior to 2009, the population increased by an average of two individuals per year (2003–2009)
 - After 2009, the population decreased by an average of two individuals per year
 - The population trend is indicative of the impacts of disturbance caused by hydropower projects in Punatsangchhu basin



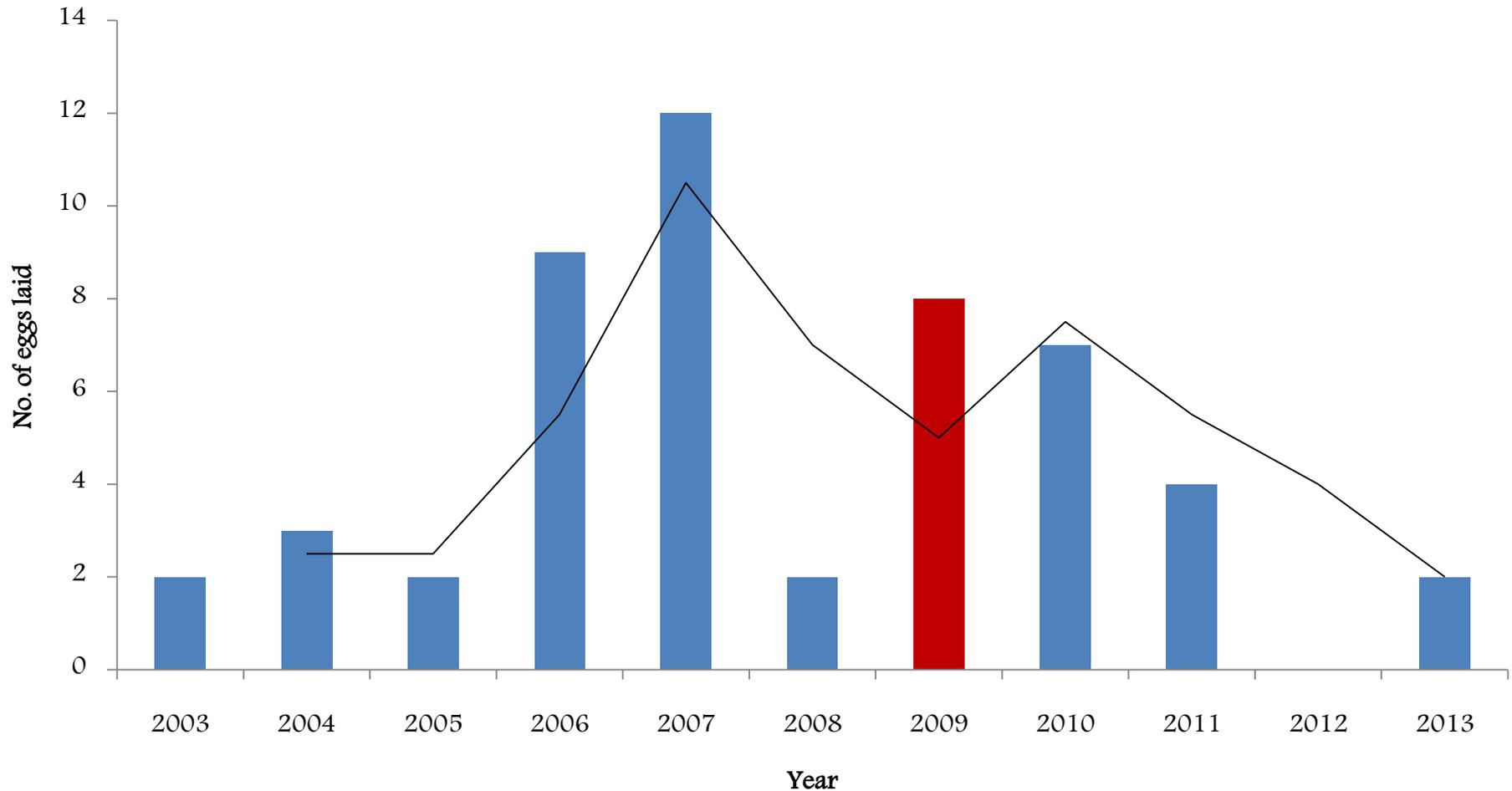
Population trend (2003 to 2013)



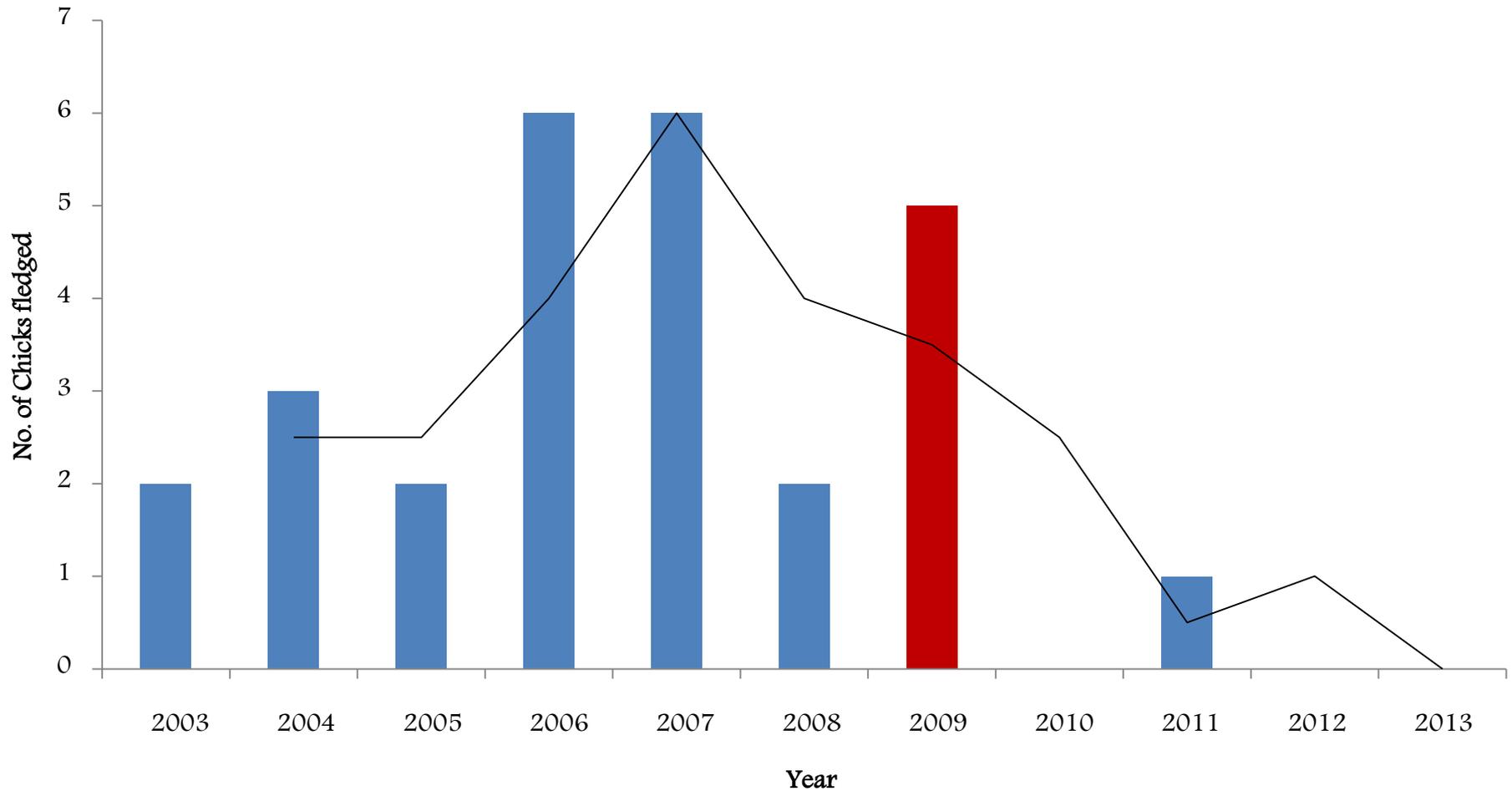
No. of nest (2003-2013)



No. of eggs laid (2003-2013)



No. of chicks fledged



Causes for population decline

- Natural causes
 - Change in river channel due to flooding
 - Coincidence of juvenile dispersal with the monsoon floods
 - Specialized habit



Causes of population decline contd.

- Anthropogenic causes:
 - Habitat destruction due to mining and quarry
 - Human disturbances
 - Fishing (direct competition for food)



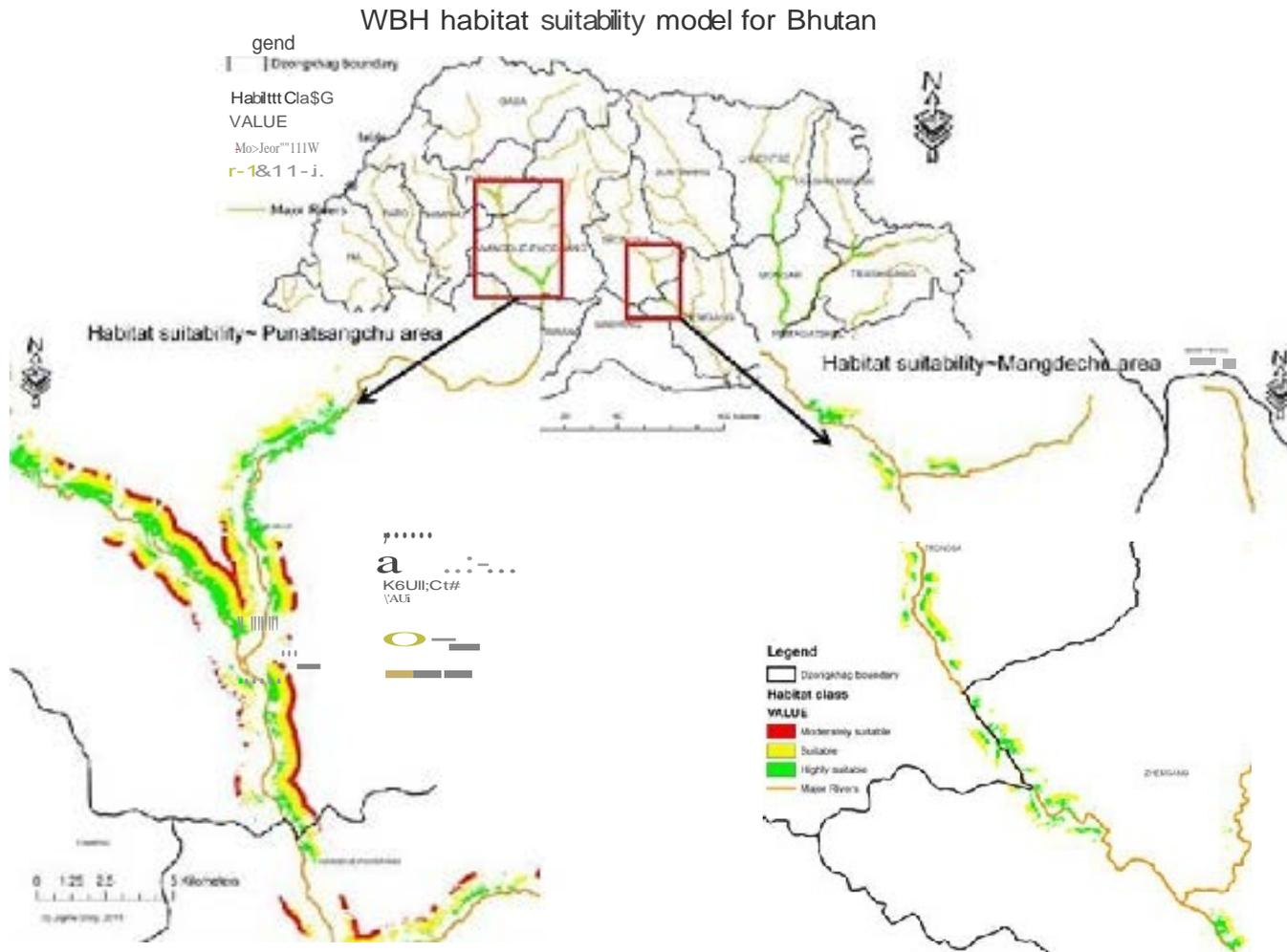
Distribution in Bhutan

Habitat availability and conditions

- 🦶 Available habitat ~ 347.95 sq.km (< 1% of TGA)
- 🦶 Dominant tree species ~ Chirpine (65% of tree cover)
- 🦶 Dominant land use types ~ Agriculture and secondary forest (60% and 24% of TLU)
- 🦶 Highly suitable habitat ~ 52% of TAH
- 🦶 Kurichu and Drangmachu projected as suitable habitat (cf. map next slide)



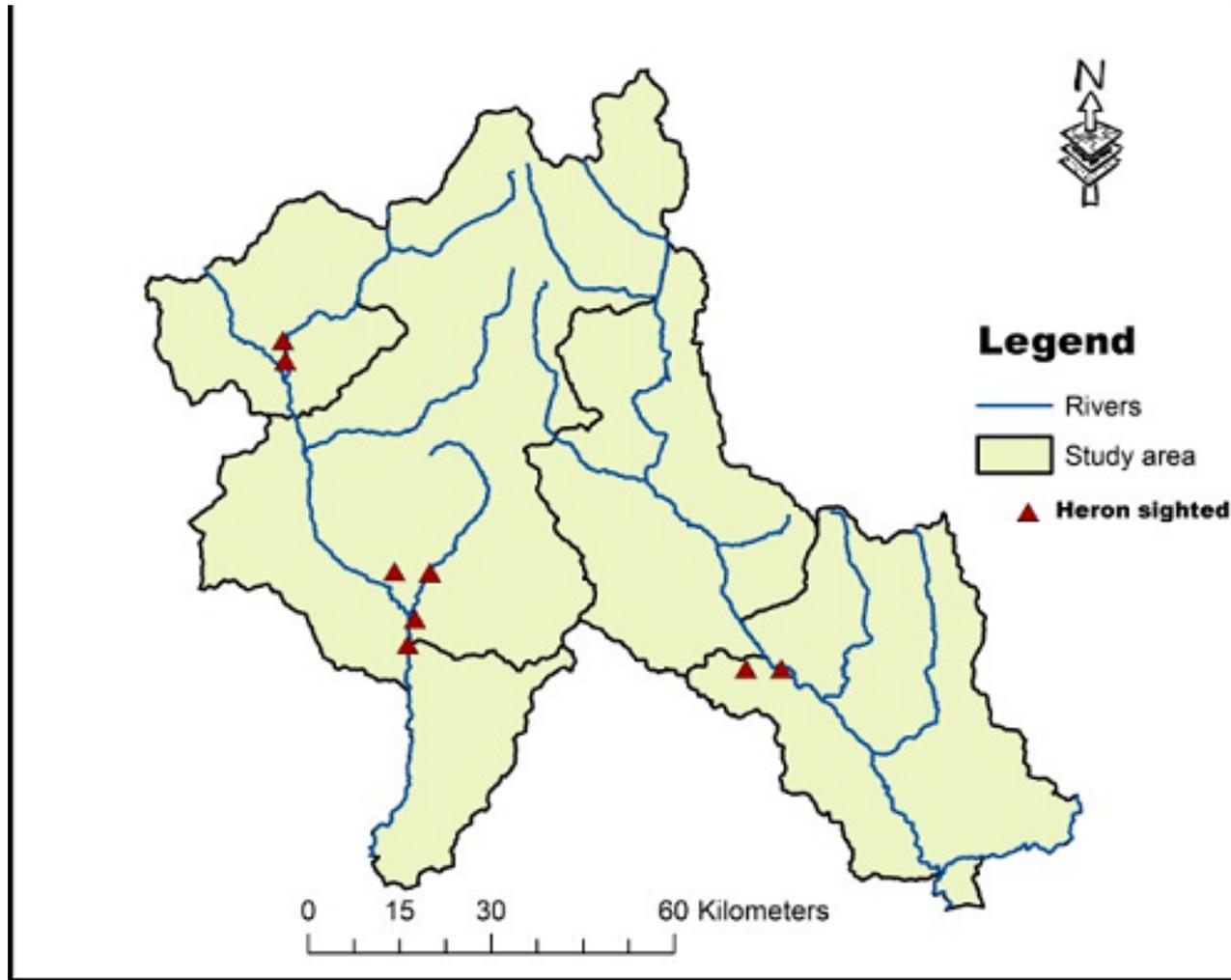
Distribution and habitat suitability map



Distribution before 2009



Current distribution



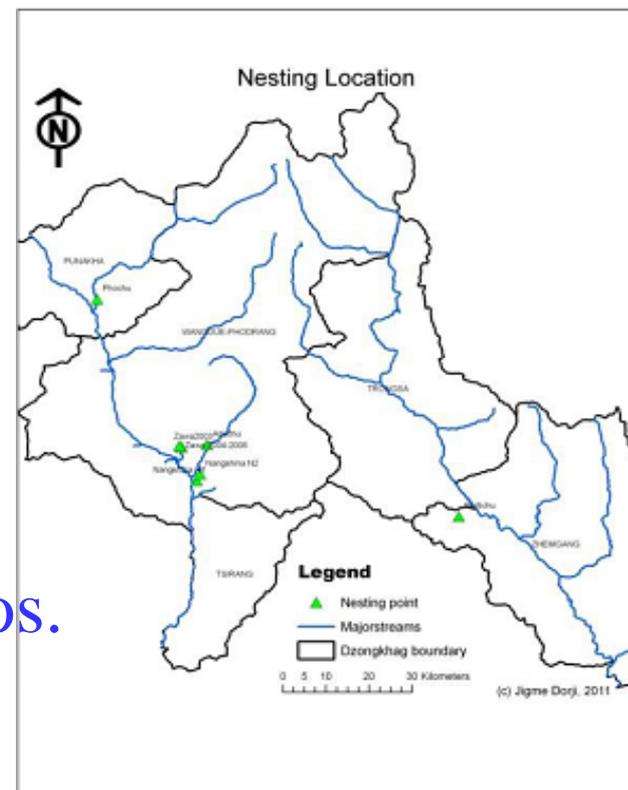
Some important factors

Nesting Areas:

- Distance to Feeding areas ~ 100 – 500 m
- Elevation ~ 620 – 1368 m
- Slope ~ 35 to 48 degrees

Nesting tree:

- Average diameter ~ 67.62 cm
- Average height ~ 29.50 m
- Average tree density/plot ~ 3.75 Nos.



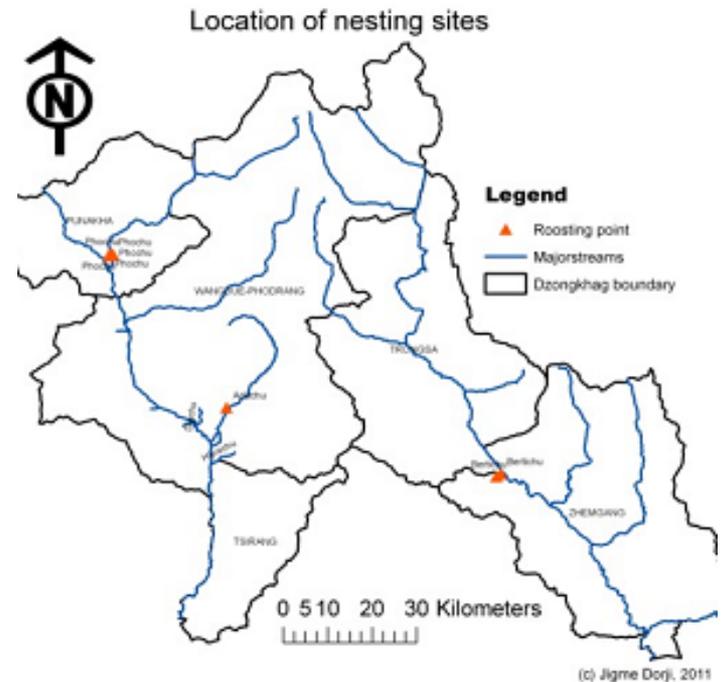
Some important factors

Roosting areas:

- Distance to feeding site ~ 0 – 1000 meters
- Elevation ~ 651 – 1375 meters
- Slope ~ 0 – 45 degrees

Roosting trees:

- Average diameter ~ 67.70 cm
- Average height ~ 28 m



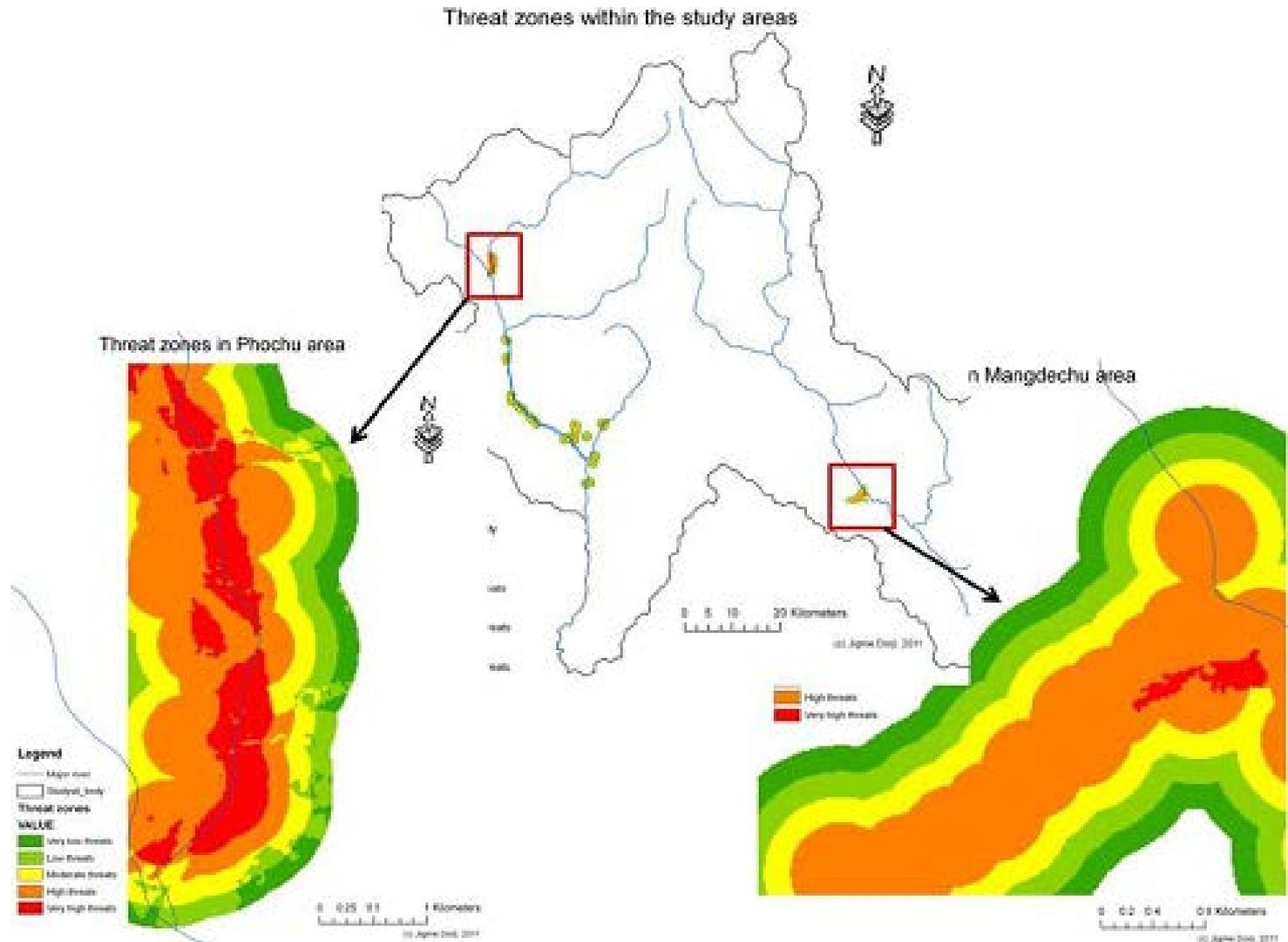
Threats factors

Prominent threats:

- 71% projected low to moderate threats (cf. map in next slide)
- Riverbed quarry and Livestock grazing significant habitat degradation factor ($p = .000$; $p = .000$ resp.)
- Logging and Forest fire are highly correlated and more intensive habitat degradation factor.
- Bridges, footpaths, and cattle movement are significant disturbance factors ($p = .000$; $p = .001$; $p = .000$ resp.)



Threats mapping



Local People's attitude

- 🦶 Awareness ~ 88% of respondent (N = 94)
- 🦶 Social value ~ 43% of the respondent
- 🦶 Cultural Value ~ 9% of the respondent
- 🦶 Support for conservation ~ 91% of the respondent
- 🦶 Communication by GO and NGO ~ 14% of respondent
(Forest ~ 2% and RSPN 12%)
- 🦶 Poaching is not evident



Conclusions

- ✿ Population trend shows the effect of hydropower project is evident in Punatsangchhu basin while Mandechhu river basin is unaffected
- ✿ The distribution pattern has slightly changed after the construction phase started in 2009 – less tolerance to disturbance



Recommendation

- 🦶 Study on post-breeding dispersal and year-round habitat occupancy (simple ring method)
- 🦶 Listing of species in the Schedule I of FNCA
- 🦶 Reassessment of countrywide population and distribution
- 🦶 Monitoring water quality within its used habitat
- 🦶 Fire line management during its nesting period



Acknowledgement

- The Rufford Small Grants Foundation for funding the second phase of my research (www.ruffordsmallgrants.org)
- The Royal Society for Protection of Nature for funding the initial research (www.rspnbhutan.org)
- Dr. Om Nath Katel for supervision
- All my co-researchers in the field
- The management of Royal Manas National Park for permission to undertake this research



Key references

- Inskipp, C., Inskipp, T., & Grimmett, R. (2007). *Birds of Bhutan*. New Delhi: Timeless Books.
- International, B. (2011, November 7). *Birdlife International*. Retrieved November 7, 2011, from Species factsheet: *Ardea insignis*. <http://www.birdlife.org>
- IUCN. (2003). *IUCN Red List of Threatened Species*. The IUCN Species Commission.
- Kushlan, J. A. (2007). *Conserving Herons, A Conservation Action Plan for the Herons of the World*. Arles, France: Heron Specialist Group and Station Biologique de la Tour du Valat.
- Kushlan, J. A., & Hafner, H. (2000). *Heron Conservation*. London: Academic Press.
- Kushlan, J. A., & Hancock, J. A. (2005). *The Herons*. Great Clarendon street, Oxford OX2 6DP: Oxford University Press.
- RSPN. (2011). *The Critically Endangered White-bellied Heron*. Thimphu, Bhutan: Royal Society for Protection of Nature.



Thank you

