Threat Perception & Habitat Mapping Of Himalayan Salamander In Darjeeling Hills

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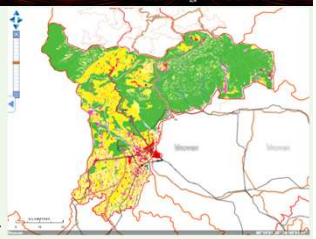
Abstract

The Himalayan Salamander, locally known as 'pani kukur' in Nepali or 'gorho' by the Ghorkas of North Bengal, is a critically endangered tailed amphibian protected under Schedule II of the Indian Wildlife (Protection) Act, 1972. As a keystone species of the lentic habitat in the Darjeeling hills, its dwindling population raises concerns about ecosystem stability and biodiversity loss. Urgent conservation efforts are imperative to ensure the survival and sustainable management of the species' habitat. This paper advocates for targeted initiatives to mitigate threats, raise awareness among local communities, and emphasize the significance of protecting this unique and endangered species for the broader ecological balance of the region.



Darjeeling & Kurseong District – Our Study Area

Problem Statement:

No recent data on threat assessment and distribution on Himalayan Salamander:

During our pilot survey we identified road kills and drying up of ponds and wetlands as the two major threats. Although a few salamander parks have been established for their conservation, they are not properly maintained. There is no recent survey to assess the threat for H.S. The last survey on distribution was done way back in 2014. The natural habitat of salamanders is shrinking and drying. Roadkill has also increased although no recent scientific survey is available regarding the issue.

Fig 1. Dry Wetland - with salamander larvae they are unable to move and subsequently die

Fig 2. Road killed salamander

Fig 3. Tumour affected Salamander Due to Pesticides

Objectives

- Threat perception survey of Himalayan Salamander Habitat
- Mapping of the salamander habitats using GIS. Satellite Images , Land Use Land Cover Images , Traffic & Terrain conditions to be studied

Fig 6: The Known Himalayan Salamander Habitats In Darjeeling Hills – Areas Studied.

Methodology

- Figuring out the salamander habitats from past research , news articles , resource person aware of the situations , and prior knowledge and mapping them.
- Use of various trusted map data such as traffic data from Google Maps, LULC from ISRO Bhuvan , Google Map Sattelite and Terrian Images to study each habitat
- Informal survey- discussion with researchers who were involved in the past survey assessment work with the species , and others aware of the issue

Fig4. Namthing Pokhri (lake) a salamander habitat

Fig 5. Same lake dried in March 2024

Results:

- LULC Mapping has been done for 2005-06 , 2011-12 , 2015-16 , 2016-2023
- Massive degradation of forest cover (essential for survival and breeding of the species) is observed especially in Mirik Subdivision Areas (a major breeding cluster)
- Road kill of Salamander was empically suggested due to presence of heavy / moderate traffic near many salamander hotspots
- Change of forest land to urban / rural buildups and agriculture suggests species degradation due to garbage , construction activities and ill effects of pesticides.
- Few sites have been hypothesis to have loss of the species due to the results obtain from map analysis and informal information collected from people who are aware of the situation.

Fig 6 . 2005 -2006

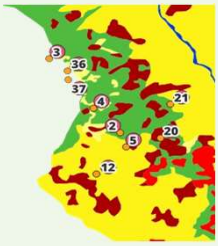


Fig 7. 2011-12

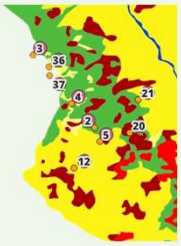


Fig 8 2015-16

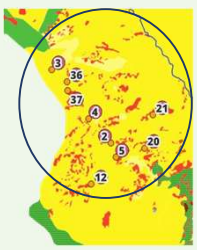


Fig 9 2016-2023

Drastic change in Land Use. From 2005 to 2016 the distribution of forest (green) , built-up(red & brown) , agriculture(yellow) was near constant in Salamander habitat at Mirik Sub-Division. By 2023 we can see Built-Up and Agriculture hogging the area.

Fig 10

Fig 11

Traffic in Salamander Habitat Suggesting Road Kill

Yellow: Medium Traffic Presence
Green : Low Traffic Presence

References:

Fig 1 , 2 , 5 was clicked by our mentor Prof. Dr. Asani Bhaduri
Fig 3 was from Status Survey conducted in the year 2007 by V.D. Hedge and K. Deuti, titled "Status Survey of Himalayan Salamander Tylototriton verrucosus Anderson in Darjeeling Hills."
Fig 6 was clicked by Swastik Guha Roy
All maps used was created by the authors of this projects with guidance from mentor. Base map in fig. 4 was OpenSourceMaps , the LULC (fig 6 – 9) was from ISRO Bhuvan and the traffic data was from Google Traffic Maps