Habitat Monitoring of Indus Dolphins using Acoustic Networks

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Summary

Indus River Dolphin is one of the five freshwater endangered species in the world. It was declared as an Endangered Species on the IUCN Red list in 1996. Indus Dolphin suffers from various threats intended its habitat disturbance including; industrial waste discharged in Indus River, canal and fishing net entrapment, habitat disintegration and adverse climate impact; disturbing monsoon pattern and increasing shallow water temperature etc. Its population is continuously declining, at a rapid pace, based on the population observed via surveys conducted in 2001 (1200 individuals), 2006 (1550 to 1750 individuals) and 2011 (1452 individuals). Only a few hundred individuals are able to survive in the wild, may be, by modifying their survival strategies. Close proximity of human and negative effects of manmade developments are very vivid in the habitat disturbance of these freshwater cetaceans and unfortunate extinction of Yangtze River Dolphin; Baiji is witness to this unpleasant commotion. Yangtze River Dolphin is the first freshwater dolphin species to purely suffer from consequences of modern world development on the freshwater and an indication to heavily trigger attention of freshwater cetacean preservation. Based on the population decline trend of Indus Dolphin and number of encountered threats, it is certain that soon it will be on the list of functionally extinct species of freshwater like Yangtze River dolphin. The problem is that these developments and the side effects can’t cease exist and provide the species a perfect underwater environment but a balanced livelihood is possible through effort.

Water extraction and diversion of Indus River is an utmost requirement for an agricultural dependent country, hence coming up with a solution that adjusts agricultural requirements without disturbing species’ habitat seems to be an optimal option. This study is focused on canal entrapment threat encountered by Indus Dolphin, which is one of the factors to seriously disturb its population and habitat.

Problem Statement: Population of Indus Dolphin is dilapidating on yearly basis by the contribution of various threats. Canal entrapment is one of the serious threats causing population decline, habitat disturbance and disintegration of Indus Dolphin. According to WWF, 137 such entrapment cases have been witnessed since 1992 to 2012, causing fatality of 34 individuals during the rescue activities. However, actual number of incidents may exceed as such cases are usually not reported by the local communities, may be due to negligence. In reference to the entrapment cases, approximately 2 individuals per year face ill-fated death whereas consequent disturbance and irregularity is expected to be encountered by multiple individuals in the long run.

Objective: To propose a network that prevents canal entrapment of Indus Dolphin by diverting species using acoustic pingers installed on the canal openings (regulatory gates), a test bed implementation.
I. Observes acoustic behavior of Dolphin to bait, used for interrupting its swimming towards canal openings (regulatory gates).

II. Proposing conservation scheme based on the Dolphin acoustic observation via deployed architecture in order to prevent canal entrapment.

**Methodology:** The study will be based on the quantitative observation of the Indus River Dolphin with the deployment of Acoustic Network. In order to prevent canal entrapment, Indus Dolphin will be diverted on the way to prevent entering to canals with the help of acoustic pingers and bait. Quantitative analysis of the study will focus on measures and characteristics obtained from deployed network in terms of capturing Indus Dolphin’s acoustics. Deployed acoustic network will monitor reaction of Indus Dolphin to acoustic deterrence caused by pingers and attraction to bait. Acoustic response of Indus Dolphin will be captured by hydrophones to perform analysis on the obtained data. Based on the observation, a conservation scheme will be proposed to prevent canal entrapment of the species. Following are the objectives of the concerned study;

1. Preventing canal entrapment of Indus Dolphin by diverting species using acoustic pingers installed on the canal openings (regulatory gates).
2. Observing acoustic behavior of Dolphin to bait, used as an interruption to its swimming towards canal openings (regulatory gates).
3. Proposing a conservation scheme based on the obtained observation of Dolphin’s acoustics via deployed architecture so that canal entrapment can be prevented.

Based on the positive outcomes of the study, canal entrapment of Indus Dolphin can be avoided as a result reducing individual fatality rate and consequential habitat disturbance.