

IMPACT OF COPPER MINING ON THE BANJAR RIVER KANHA TIGER RESERVE

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INTRODUCTION

- Kanha Tiger Reserve was constituted & brought under Tiger Project for conservation of Swamp deer *Cervus duveceli branderi*.
- It is rare & endangered subspecies of endemic to Central India.
- Kanha Tiger Reserve is known world wide for its tigers.

Introduction Continued

- Panwar (1973), Kotwal & Parihar (1989), Rajesh Gopal & Shukla (2001), produced management plans of Kanha Tiger Reserve.
- Environmental impact of copper mines on the ecosystem of Kanha Tiger Reserve were not initiated.

Introduction continued

Kotwal & Parihar, (1989) without making any investigation took it for granted that “There is no external development threats what so, the Malanjkhand Copper Complexes have no impact on the Park”.

OBJECTIVE

Detection of copper metal in
the Banjar River water in
Kanha Tiger Reserve.

STUDY SITE

Constitution of Kanha Tiger Reserve

Zone	Area (Sq. Km.)	Legal Status	%
Core	940	National Park	100
Buffer	1009	Reserved Forests	40
		Revenue Area	60
Total	1949	Tiger Reserve	100

Biodiversity of Kanha

Flora / Fauna	Total No. of Species	No. of Threatened Species
Plants	626	1
Birds	268	11
Mammals	42	10
Reptiles	11	3

Banjar River

- Banjar River runs through buffer zone and forms western boundary of Park.
- Wild animals and Cattle are seen drinking water of Banjar River.
- Banjar is important source of water.
- Banjar River is a life line of Kanha.

Ramgarhi Barrage Banjar River

- Ramgarhi Barrage is constructed on Banjar River.
- Ramgarhi is at upstream from the point where Banjar enters the Kanha Tiger Reserve.
- Water is supply to the Copper Mines from Ramgarhi Barrage.

Malanjkhand Copper Mines

- Copper ores are excavated in open cast mines in the Malanjkhand Hills.
- Debris obtained from the crust is dumped as huge mass of heaps.
- Deposits of copper is found as a sulphide & carbonate ores and sometime in a free state.

Ores of Copper

Sulphide Ores	Chalcopyrite	CuFeS_2
	Chalcocite	Cu_2S
Carbonate Ores	Malachites	$\text{CuCO}_3\text{Cu}(\text{OH})_2$
	Azurite	$2\text{CuCO}_3 \cdot \text{Cu}(\text{OH})_2$

Ore Refining Plant & Tailing Dam

- The sulphide ores are concentrated in refining plant by oil floating process.
- The residual sand & water are drained in to the Tailing Dam by high current of water through pipelines.
- The waste water from the Tailing Dam is recycled for draining out waste material from the plant.

Leaching Plant

- Crude copper is recovered from the carbonate ores in the Leaching Plant.
- The ores are directly treated with dilute sulphuric acid to get copper sulphate Solution .
- Crude Copper is precipitated by displacement with Iron.
- The waste liquor is stored in the pits.

Karamsara Tank

- Karamsara Tank is small irrigation dam close to the mines, leaching plant and ore concentration plant.
- The Copper Mines, Leaching Plant, Ore Concentration Plant, & Tailing Dam are in the water-shed area of Banjar River.

METHODOLOGY

- Visual observations were made at Mines, Ore Refining & Leaching Plants, Karamsara Tank, Banjar River at Mukki in the Kanha National Park & Ramgarhi Barrage.
- Presence of water birds were counted at Banjar River at Mukki, Ramgarhi Barrage Tailing Dam and Karamsara Tank.

Methodology continued

- Samples of water collected from the Banjar River at Mukki, Ramgarhi Diversion, Tailing Dam & Karamsara Tank.
- Water sample of 500 ml was acidified with 2.5 ml concentrated nitric acid.
- Emission spectroscopy was used for detection and estimation of copper.

RESULTS & DISCUSSION

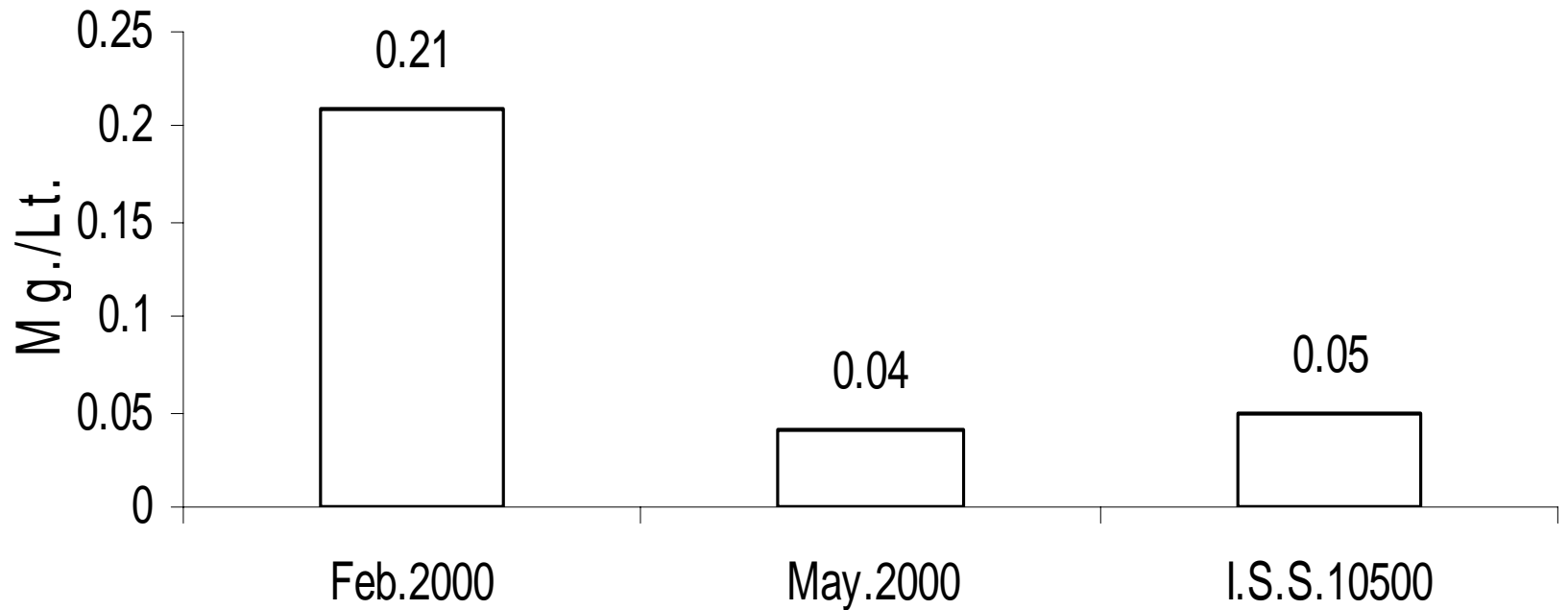


Fig.-1 Occurrence of Copper in Banjar River

Results & Discussion Continued

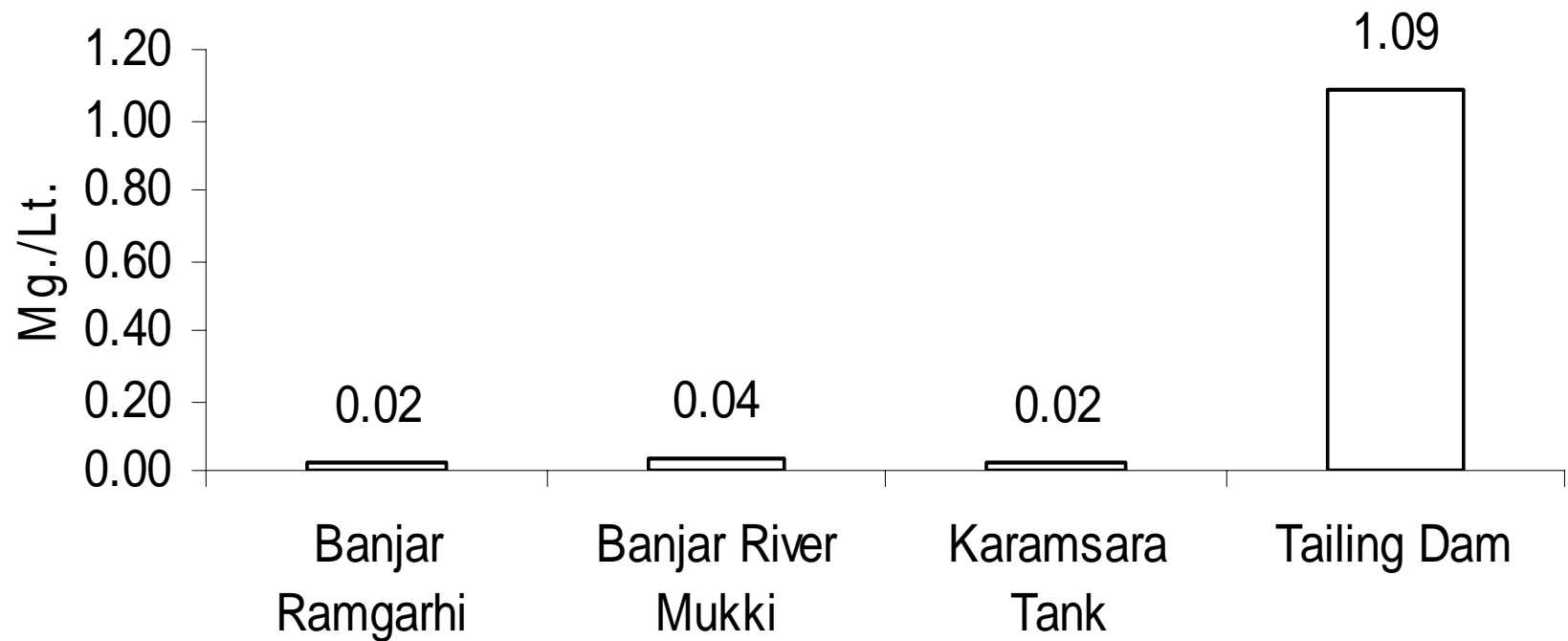


Fig. -2 Occurrence of copper in May 2000

Abundance of Water Birds

Habitat	No of Species	No of birds
Tailing Dam	5	90
Karamsara Tank	9	158
Ramghari Diversion	3	4
Banjar River N.P.	4	5

Impact of Copper Salt on Birds

Wild birds may suffer from:

- Gastro-enteritis
- Greenish discoloration of the mucosa
- Renal and hepatic de-generation (Lowenstine)

Recommendations

- This was a preliminary survey.
- For rigorous results at 95% desired level of confidence 40 samples may be required.
- For seasonal variations in copper content. Sampling may be done periodically at least 6 times in a year.

Recommendations Continued

- Analysis of other heavy metals & toxic elements may be done.
- Birds are good indicator of wetlands its monitoring may be done regularly.
- Fish has a high metabolic rate may be examined for presence of toxic elements.

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Thanks