Impact of coal fired projects on biodiversity and ecosystem functions

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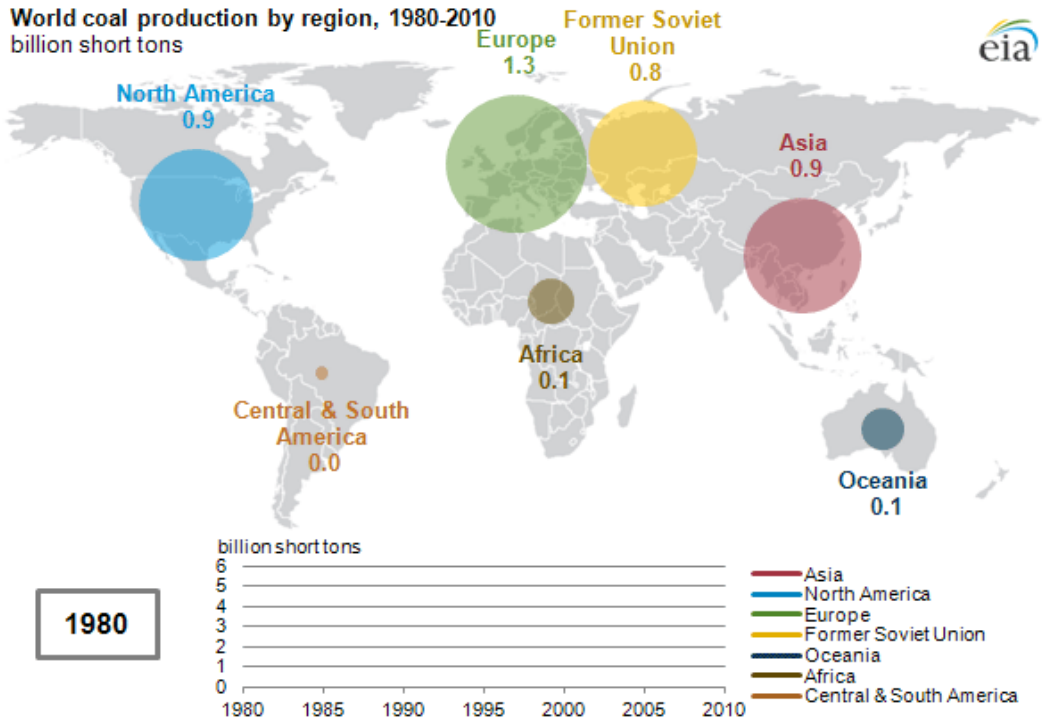
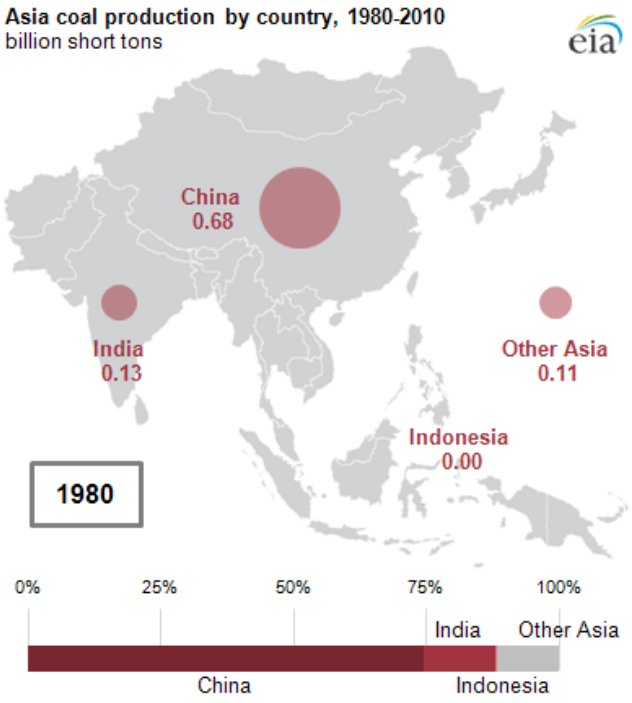
Coal based power is the most dominant form of energy

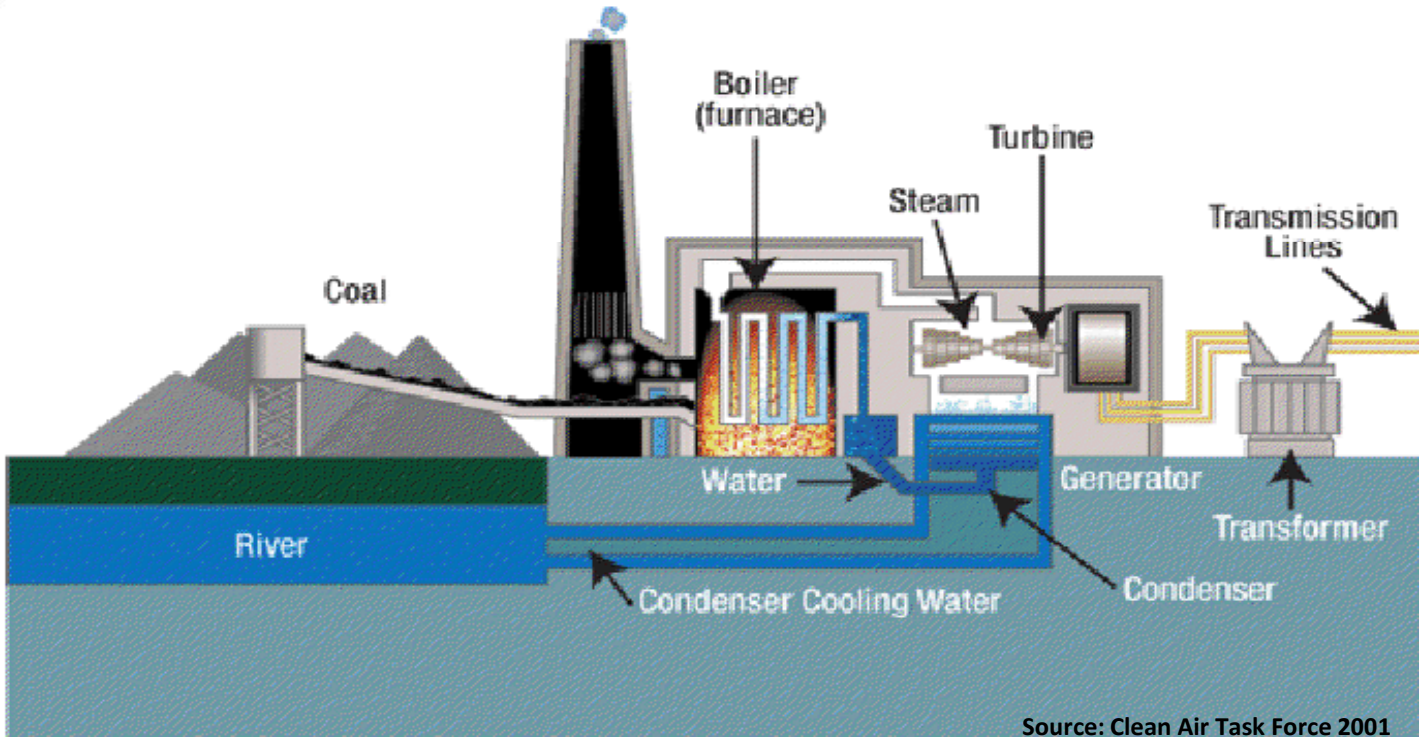
Coal has the largest global reserve (861 BT) that is sufficient reserves for the next 250 years

Cheaper per unit energy than oil/natural gas





Processes involved in harnessing coal based thermal power



Potential biodiversity impacts of mining activities

Stage	Activities	Potential biodiversity impact
Exploration	• Surveying • Drilling / trenching • Exploration camp development • Road construction	• Habitat loss / fragmentation • Disturbance to wildlife • Increased demand for local water resources • Increased colonisation and associated • species loss (also due to increased hunting)
Site preparation / mineral extraction	• Mine construction (vegetation removal, stripping of soils, etc.) • Mine infrastructure development (roads, powerlines, etc.) • Creation of waste piles	• Habitat loss / fragmentation • Chemical contamination of surface and ground waters • Declining species populations • Toxicity impacts to organisms • Altered landscapes • Increased erosion and siltation • Increased colonisation and associated • Species loss (also due to increased hunting)
Processing / smelting	• Processing / smelting of minerals	• Discharge of chemicals other wastes, emissions
Transport to final markets	• Packaging and transport of product	• Noise and dust disturbance • Emissions
Mine closure / post-operation	• Reseeding / revegetation • Re-contouring waste pits • Fencing off dangerous areas • Monitoring leakage	• Persistent contaminants in surface and ground waters • Persistent toxicity to organisms • Loss of original vegetation / biodiversity

[Source: adapted from World Resources Institute report (2004): Mining In Critical Ecosystems: Mapping the Risks]

Sources of impacts from coal fired projects

- Mining for coal supply / storage
- Internal transport systems
- Coal fired boilers
- Power generation
- Emissions

Emissions and wastes

Air:	• storage (dust ,VOC's.) • storage of waste from power plant • stack emissions • (NOx SOx dust , F)
water	• slag water (Hg, Cd, pac's, CN, total Hy metals) • sluice water • storage leachate • groundwater (coal/wastes) • rainwater • treatment plant • boiler feedwater treatment and sluice water
wastes	• fly ash storage and disposal sites • dust emissions from waste disposal site • rehabilitation of waste site

Land disturbance (exploration to extraction to transportation)

Accelerated erosion from hill top mining

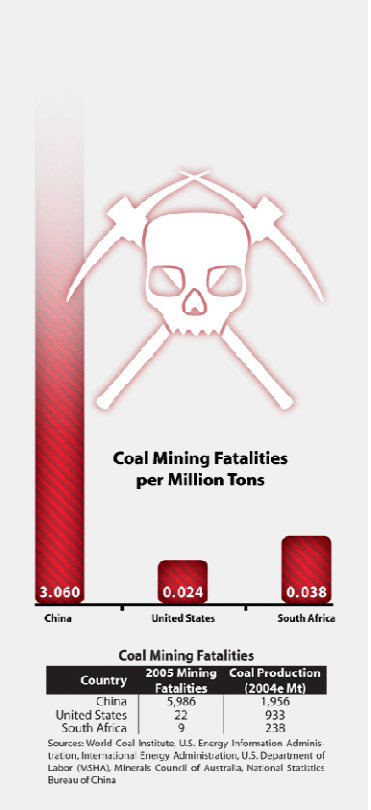
Impacts on biodiversity and habitats

Changes in hydrology and water pollution

Dust, noise and water pollution

Public health, livelihood and safety

http://www.guardian.co.uk/environment/2011/jul/14/india-coal-rush



Coal Mining Fatalities

Country	2005 Mining Fatalities	Coal Production (2004e Mt)
China	5,986	1,956
United States	22	933
South Africa	9	238

Sources: World Coal Institute, U.S. Energy Information Administration, International Energy Administration, U.S. Department of Labor (MSHA), Minerals Council of Australia, National Statistics Bureau of China

Major challenges for biodiversity and ecosystems services

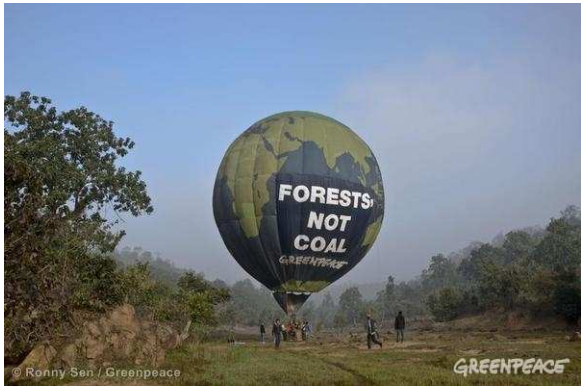
- Land take for mine and power plants from sensitive habitats
- Unprotected, high value ecosystems are most vulnerable to the impacts from mining.
- Inherent overlap between mining areas and important ecosystems

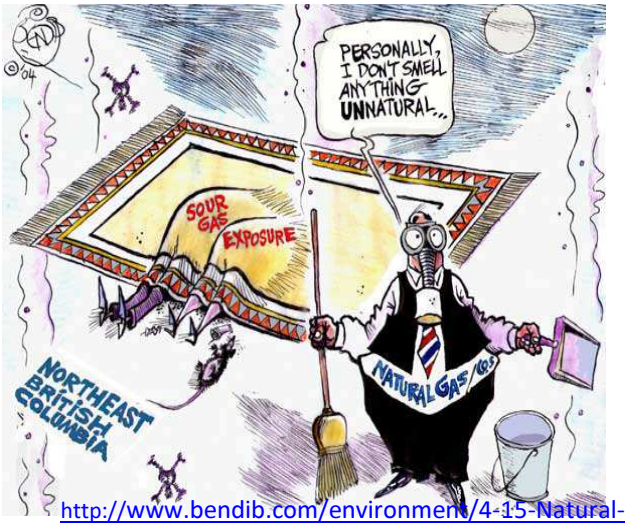
More than one third of the forests of Papua New Guinea and nearly half of the mangroves have already been allocated oil, gas, or mining concessions (WRI, 2003)

In the Philippines, more than half of all exploratory and mining concessions overlap with areas of high ecological Vulnerability (WRI, 2003)

90 per cent of India's coal today, has under its control over 200,000 ha of mine lease area which includes 55,000 ha of forest (CSE 2011).

Outcome of poor EIAs: Environmental conflicts and protests



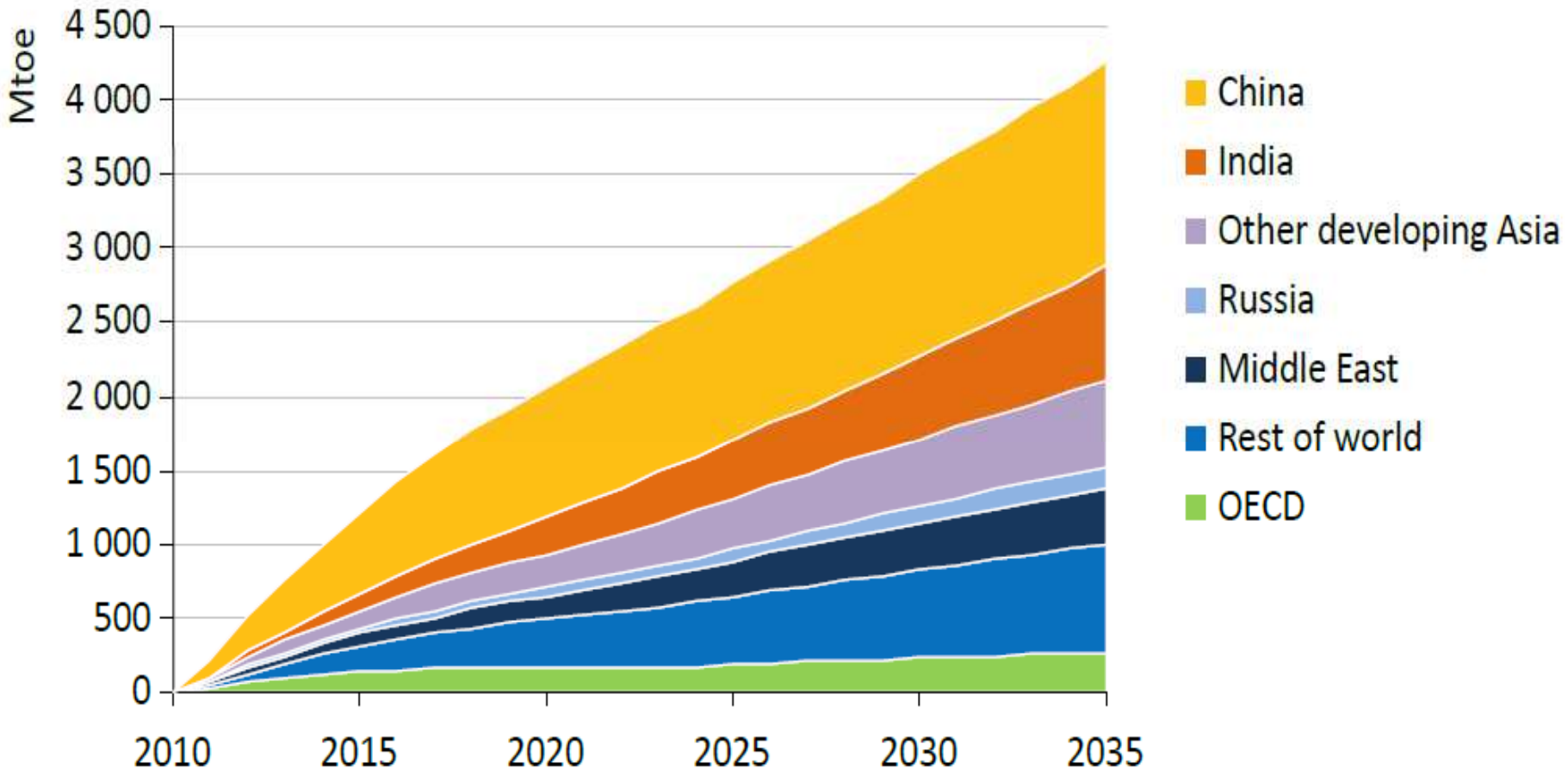


http://www.bendib.com/environment/4-15-Natural-Gas.jpg

http://www.flickr.com/photos/takver/6800552933/lightbox/

http://ecowatch.org/p/energy/coal-mining-pollution/page/2/

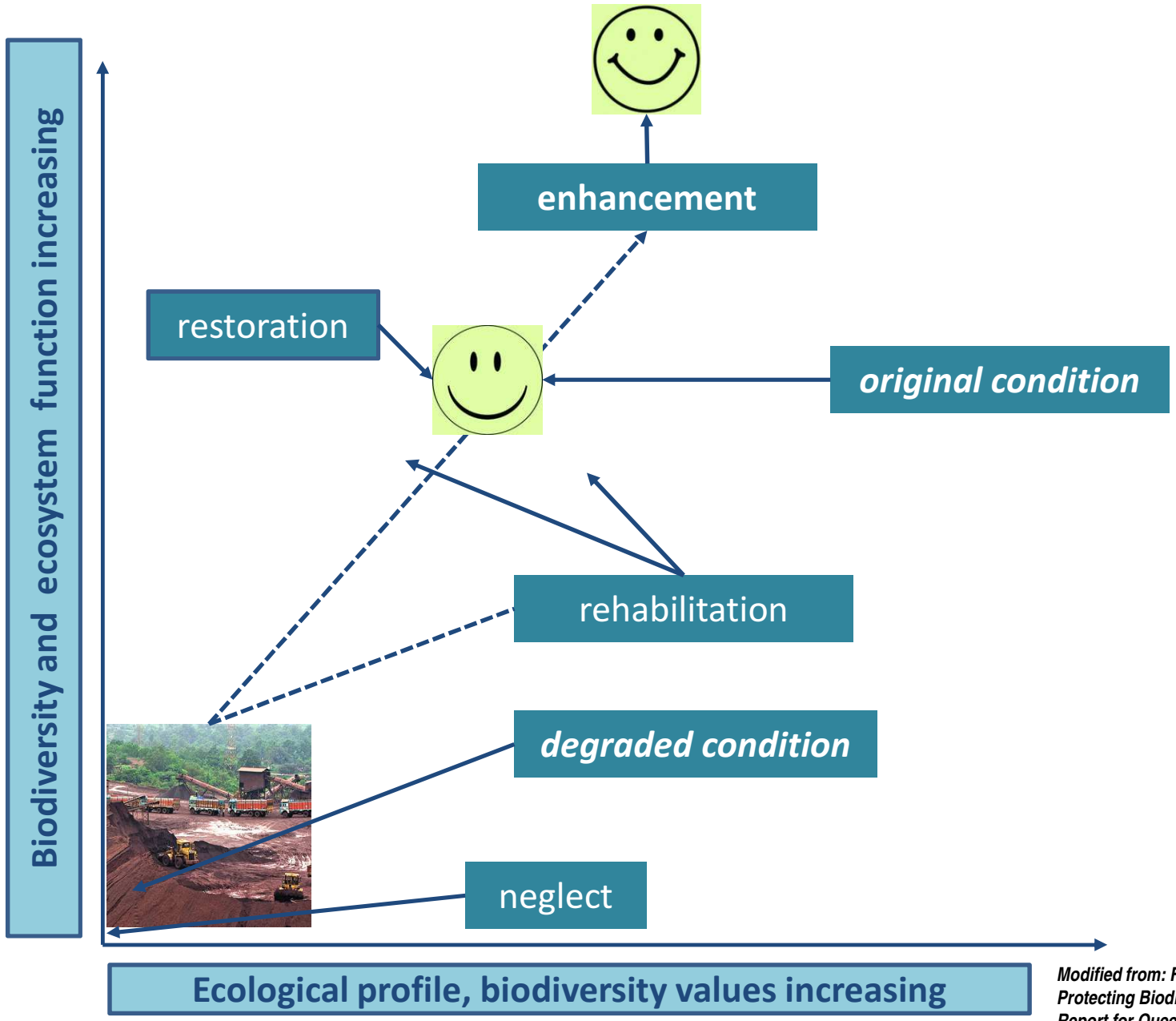
Global Energy Demand



(credit: International Energy Agency)

What can impact assessment offer ?

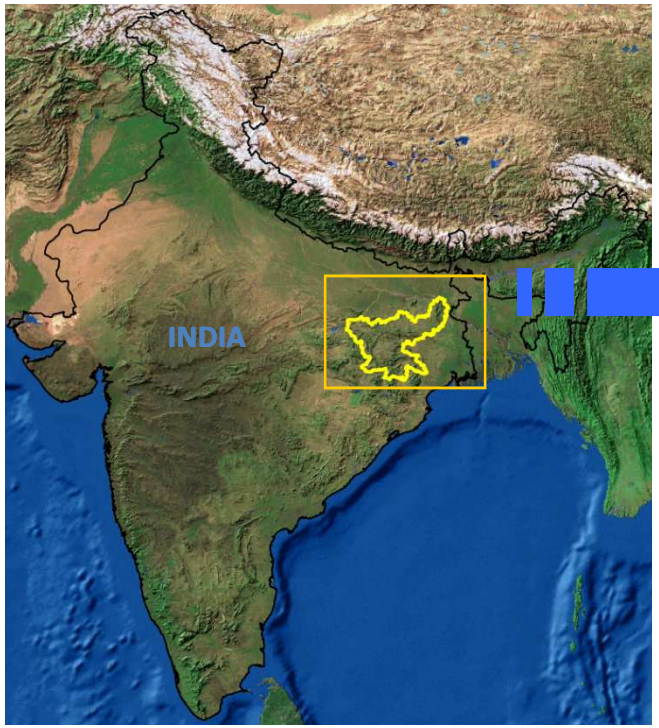
- Options that can avoid, reduce, compensate and offset impacts on biodiversity
- Better ecological approaches for landscapes reconstruction
- Innovative planning for projects to deliver enhancement benefits where feasible

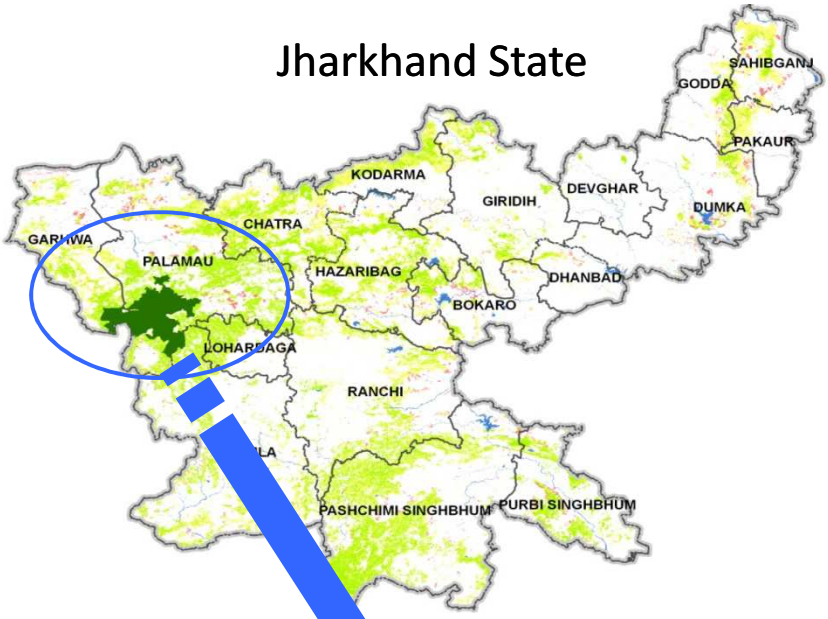


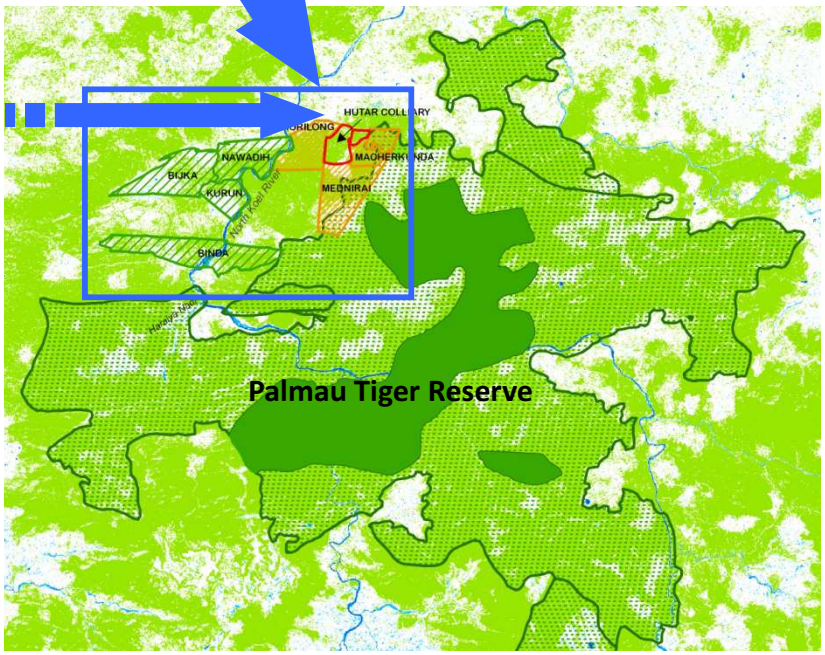
Modified from: FBA, 2008, Mining Coal and Protecting Biodiversity – a Solutions and Options Report for Queensland's Bowen Basin, Fitzory Basin Association Inc., Rockhampton

- Review technological options for reducing ecological foot print
- Futuristic sectoral planning for balancing conservation and growth
- Assessing landscape level impacts of multiple mines

Case example







Hurilong UG mining project

Coal field-Hutar coalfield

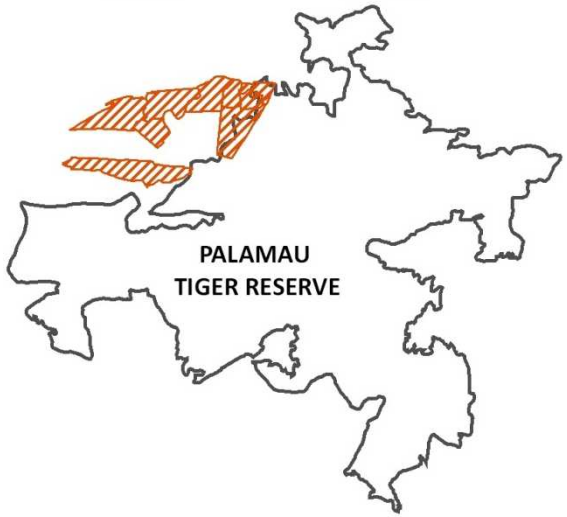
Size of the project-0.36 MTY

Life of the mine-9 years

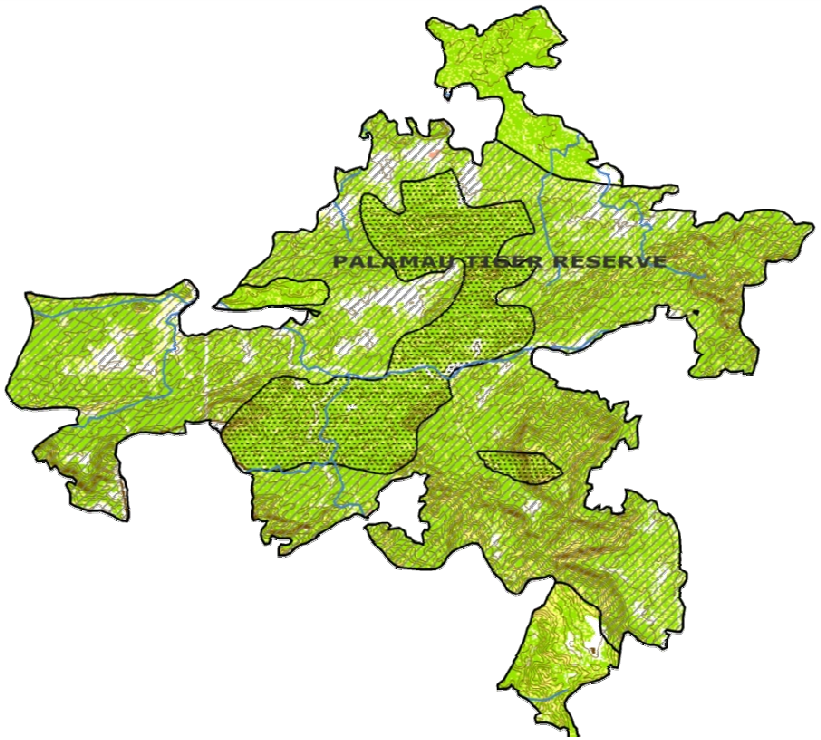
Lease hold area-790.27 ha of forest

Key issues

Mining zones and biodiversity zones overlay



Palamau Tiger Reserves encompassing the Betla National Park (226 sq km) and the Palamau Sanctuary (980 sq km) is the only Tiger Reserve in Jharkhand



Biodiversity values

- A mix of lakes, rivers and valleys
- PA offers habitat for highly diverse predators/prey animal communities and large populations of tiger, leopard, striped hyena, wolf, India bison and elephants
- More than 170 species of birds 47 species of mammals
- About 970 species of plants including 139 medicinal plants

Hurilong Project involved 794 ha forests in Palamau Tiger Reserve

Wildlife Sanctuary

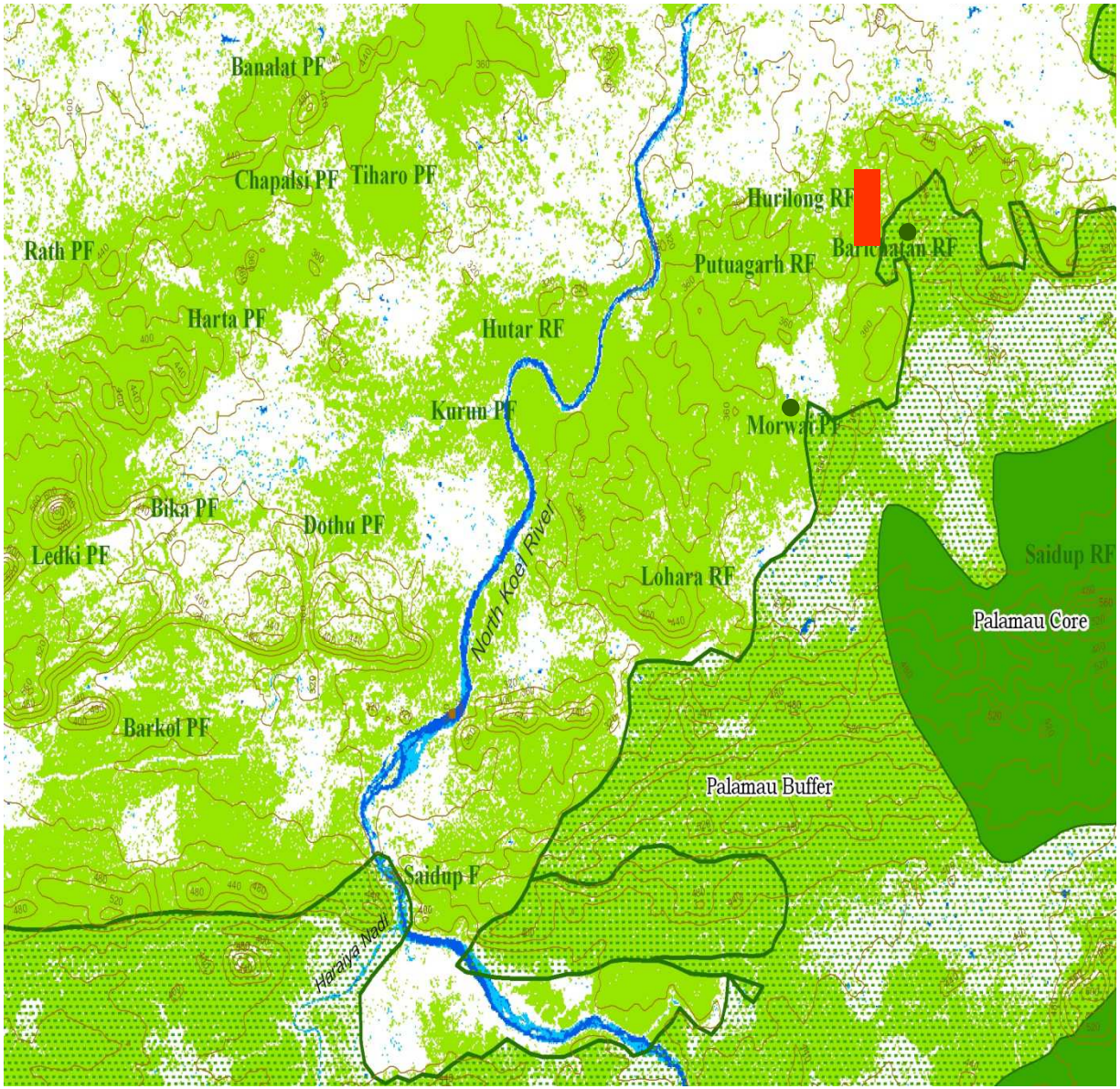
Barichattan -310.03 ha

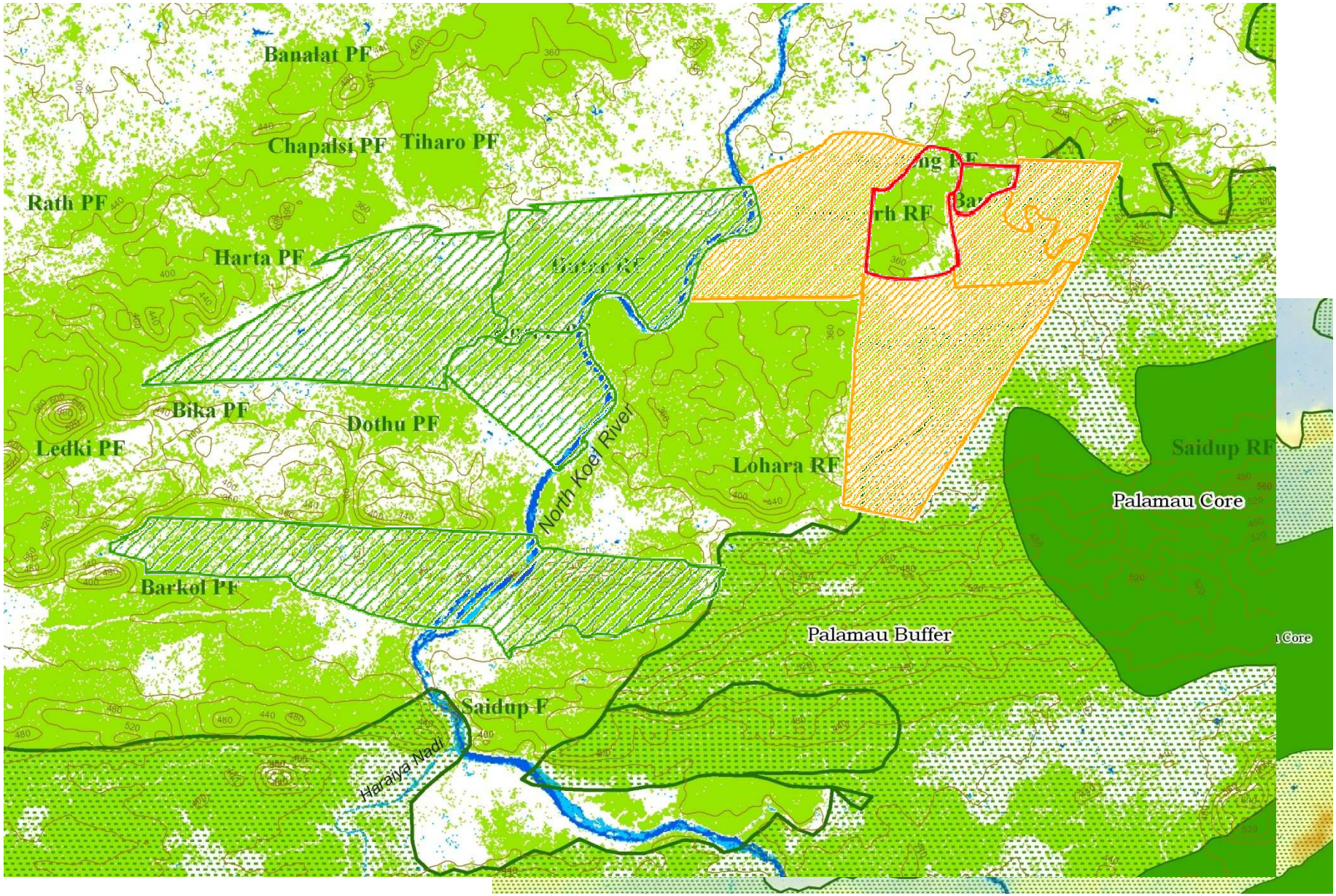
Morwai khurd-3.34ha

Morwai Kalan-8.58 ha

Extended Buffer

Hurilong -208.22 ha
Sindhorwa-264.00 ha




Banalat PF
Chapalsi PF
Tiharo PF
Rath PF
Harta PF
Bika PF
Dothu PF
Ledki PF
Barkol PF
North Koel River
Lohara RF
Saidup RF
Palamau Core
Palamau Buffer
Saidup F
Haraiya Nadi


Lankan
Barwadih
Chhencha
Babhanath
Musolmanpara
Banalat PF
Mayapur
Horilong
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Barichatan RF
Kusamtani
Rath PF
Putuagarh RF
HUTAR COLLIARY
Harta PF
Tiharo
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Anticipated impacts of future projects

- Blocks where exploration to be initiated form the corridor of wildlife of Palamau Tiger Reserve beyond the river Koel
- Mining in blocks that are yet to be explored have significant potential to damage the riverine ecosystem.
- Future explorations in some blocks (Bijka, Karun and Nawadih) are likely to come in way of the Tiger Reserve expansion.

Key recommendation

Environmental decision making emphasized the importance of reviewing the impacts following the cluster approach to assess the landscape level impacts