

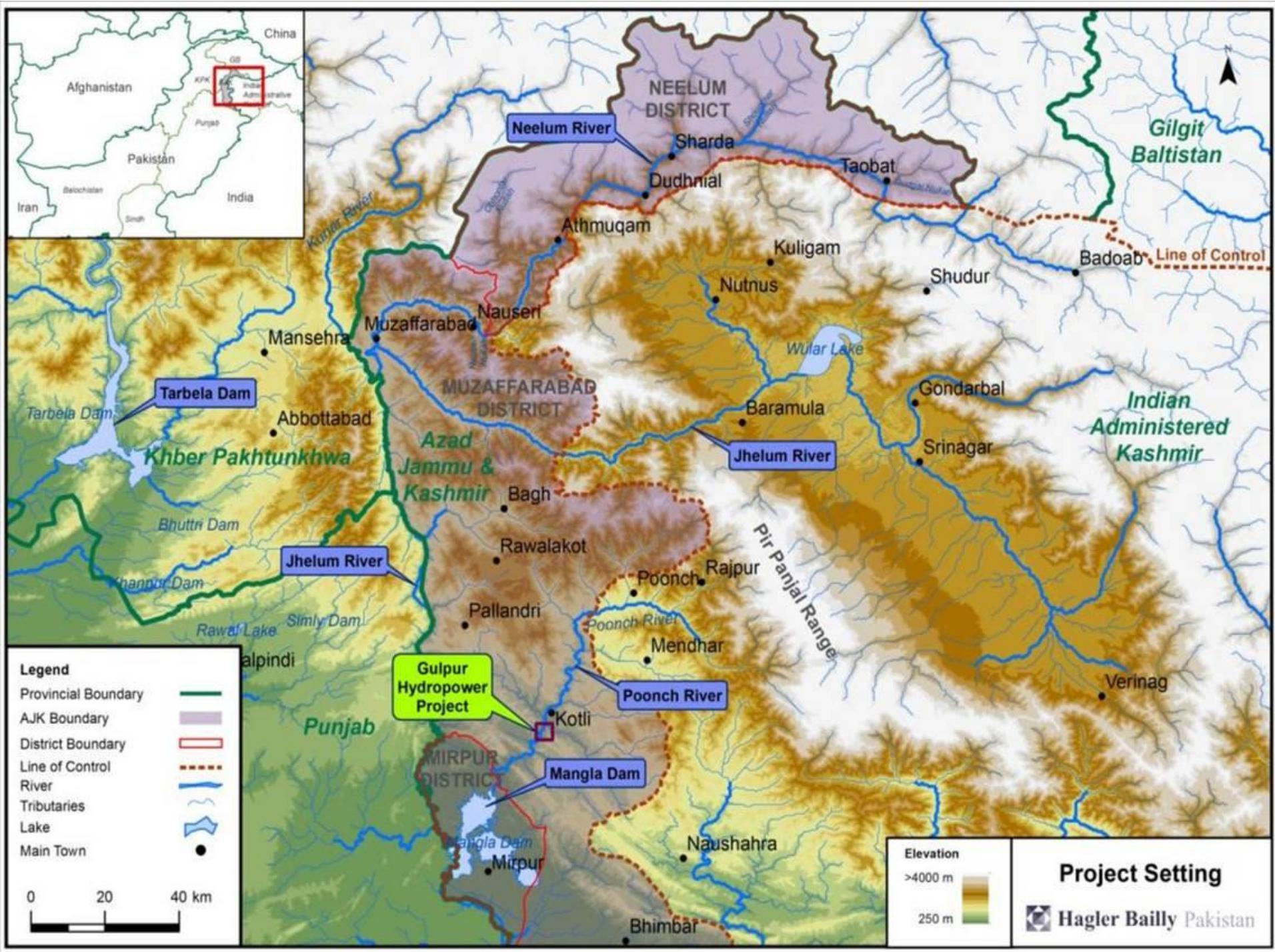
# **Integrated Sustainable Sediment Mining Plan for Poonch River Mahaseer National Park (PRMNP)**

**Vaqar Zakaria**

December 4, 2020



**Hagler Bailly** Pakistan







پانچ تھریڈز





# Biodiversity Action Plan for Gulpur HPP

- Following IFC PS6, the BAP of Gulpur HPP was designed to achieve Net Gain in population of the Endangered Mahseer fish and Critically Endangered Kashmir Catfish as the project was located in Critical Habitat
- Illegal fishing and mining of sand, gravel and boulders was recognized as a major threat to fish populations
- In addition to control of illegal fishing, the BAP required preparation and implementation of a sustainable sediment mining plan to estimate the quantity of sediments that could be mined for meeting market requirements without compromising the objectives of the BAP



# Small-Scale River Based Mining



# Medium-Scale River Based Mining



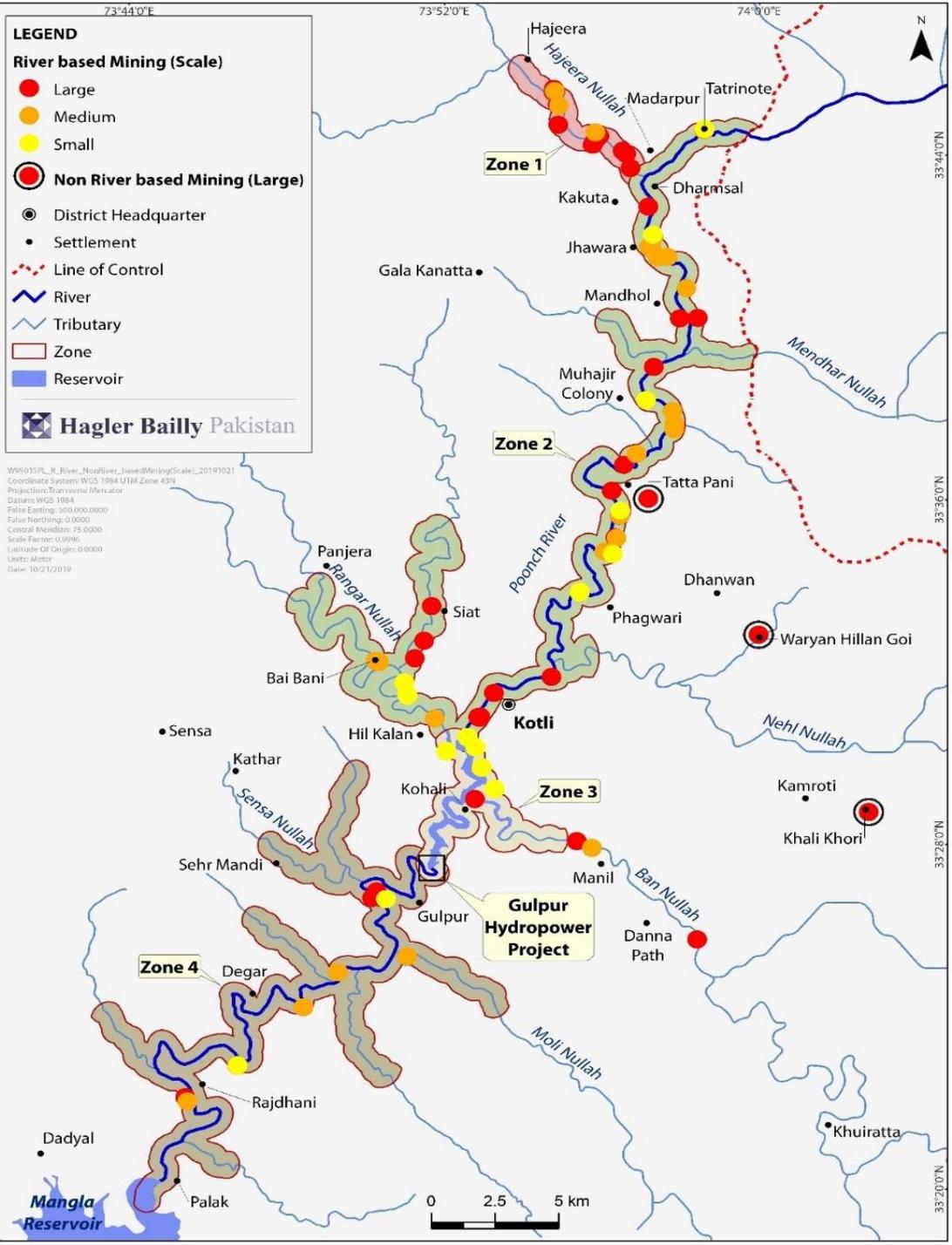
# Large-Scale River Based Mining



# Large-Scale Non- River Based Mining



# Existing Locations of Mining Operations in PRMNP



# Existing Management and Legislation

- Absence of monitoring and management framework
- No defined best practices for mining
- No demarcation of ecologically sensitive areas
- No permit system for mining activities, currently all mining activities are being carried out illegally



# Considerations for Management

Extraction Volume vs.  
Deposited Volume

Mode of Extraction  
(e.g. use of heavy  
machinery)

Ecologically Sensitive  
and Degraded Areas

Access and Relocation  
Concerns

Vulnerable Groups  
(Small-scale  
Operators)



# Estimated Quantity of Sediments Extracted Annually

Scale	Number of Operations	Quantity (Million Tonnes)			
		Sand	Gravel	Crushed Stone	Total
Small-Scale Mining	244	0.30	0.02	-	<b>0.32</b>
Medium-Scale Mining	37	0.26	0.07	0.18	<b>0.51</b>
Large-Scale Mining	45	0.05	0.17	1.84	<b>2.05</b>
Total of River-Based Mining	<b>326</b>	<b>0.60</b>	<b>0.27</b>	<b>2.02</b>	<b>2.88</b>
Large-Scale Non-River-Based Mining	3	-	-	0.36	<b>0.36</b>
<b>Grand Total</b>	<b>326</b>	<b>0.60</b>	<b>0.27</b>	<b>2.38</b>	<b>3.24</b>

The above estimates do not include quantities mined upstream of LoC



# Estimation of Sediment Yields and Patterns of Deposition

- A hydrological study and flood frequency analysis for the river was carried out
- Available data on suspended sediment flow in the river was analyzed
- Spatial variation of the erosion in the basin and total sediment yield was estimated using the Modified Universal Soil Loss Equation
- Flow of bedload sediment was estimated as a percentage of the suspended sediment
- With the operation of Gulpur Dam, most of the sediment will be trapped in the Gulpur reservoir
- A 1D HEC-RAS model was simulated to develop a profile of deposition of sediment in the reservoir from the Poonch River, as well as from the Bann and Rangar Nullahs



# Estimated Sand & Gravel Sediment Load, Mt/Yr

Sub-catchment Area	Sediment Load	Sand & Gravel Load (12% lower estimate)	Sand & Gravel Load (20% upper estimate)
<b>Upper Poonch excluding Nullahs Downstream LoC</b>	<b>4.5</b>	<b>0.54</b>	<b>0.99</b>
Hajeera Nullah	0.7	0.08	0.15
Mendhar Nullah	1.0	0.11	0.21
Nehl Nullah	0.6	0.07	0.14
<b>Cumulative Poonch at Head of Impoundment</b>	<b>6.8</b>	<b>0.81</b>	<b>1.5</b>
Bann Nullah	1.5	0.18	0.30
Rangar Nullah	1.1	0.13	0.20
Sensa Nullah	0.6	0.07	0.13
Moli Nullah	0.5	0.06	0.11
<b>Total at Gulpur</b>	<b>10.5</b>	<b>1.3</b>	<b>2.3</b>



# Estimated Boulder/Stone Deposits

River Reach	Deposits, Mt/Yr
Line of Control to Hajeera	0.08
Hajeera to Tatta Pani	0.10
Tatapani to Kotli	0.11
Kotli to Damsite	0.15
<b>Total</b>	<b>0.44</b>



# Sustainable or Not ?

- Annual quantity of boulders/stone mined from LoC to Gulpur Reservoir far exceeds estimate boulder and stone deposition
- Estimated extraction of sand & gravel is approximately 70% of the lower estimate of the sand and gravel load at Gulpur.
- Considering low deposition in the past decade, and expected decrease in flood frequency due to climate change, the current gravel extraction volumes are not sustainable
- Current demand for sand can be met from the quantity available from the river
- Limestone deposits in mountains in Nakial area in the Poonch Valley alone are sufficient to meet demand for gravel/aggregate for the next 100 years

Sediment	Sand & Gravel (Million Tonnes)	Boulders (Million Tonnes)	Total Sediment (Million Tonnes)
Annual Sediment Load	1.3- 2.3	0.4	2.3
Estimated Annual Extraction	0.9	2.4	3.2



# Recommended Extraction Limits

- The recommended extraction limits are based on 25% of the lower end of the mean annual sand and gravel loads, adjusted for available sediments in each river reach
- Overall, the suggested extraction limit for sand and gravel is approximately 0.5 million tonnes
- This limit does not account for the sediment load being mined across the LoC in Indian Administered Kashmir
- Stone and boulder extraction already exceeds annual deposition, which is why all but two operations must be shifted to non-river based mining operations
- The two operations that can be sustained in the 2 km stretch upstream from Gulpur Reservoir can extract up to 130, 000 tonnes of stone and boulder annually



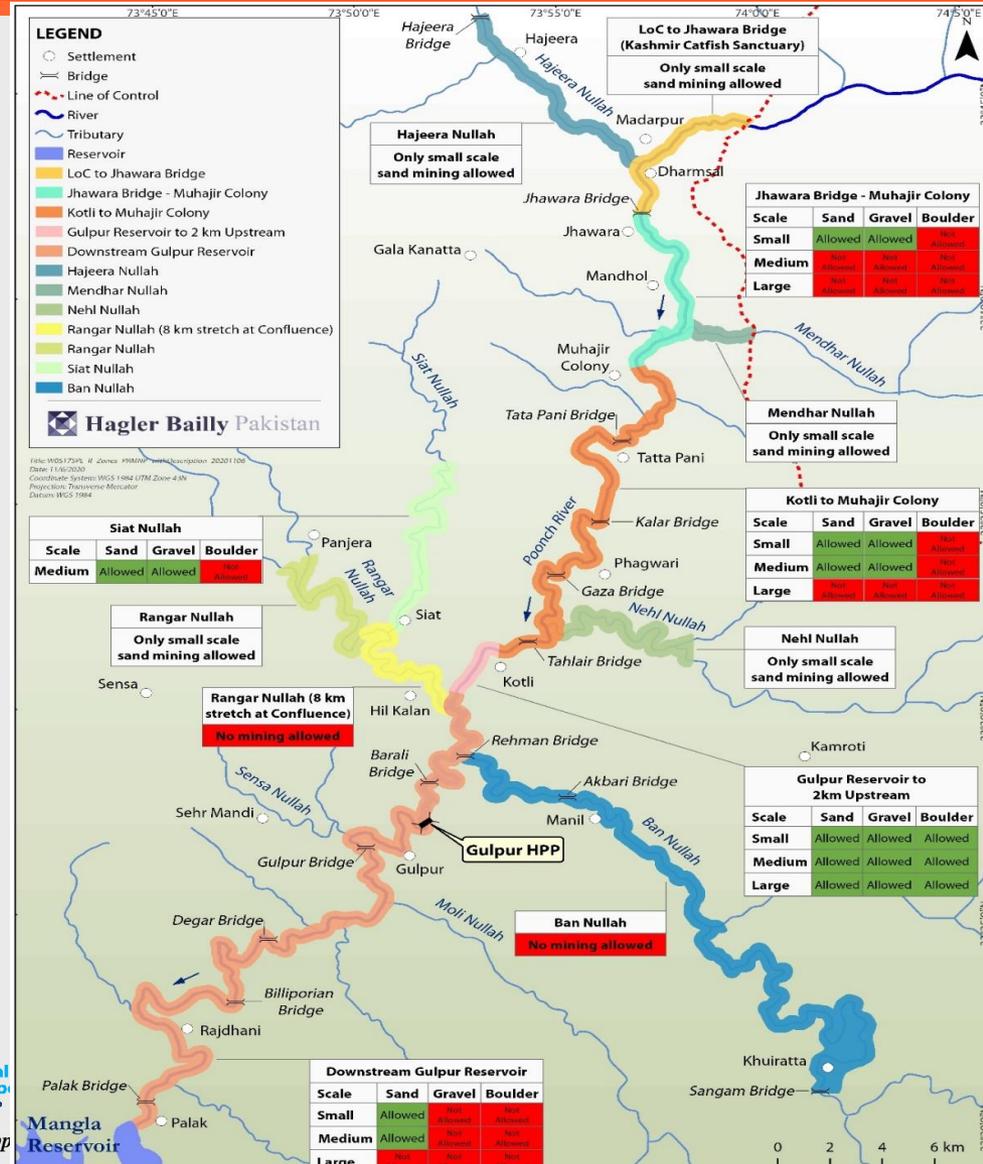
# Ecologically Sensitive Areas

- In addition to managing the quantity of sediments extracted and establishing best practices for mining, it is important to consider areas of ecological significance in the sediment management plan
- Ecologically important nullahs e.g. Rangar, Ban and Hajeera Nullah are overmined and degraded
- The stretch between LoC to Muhajir Colony provides moderate to highly suitable habitat for Kashmir Catfish



# Recommended Locations for Mining

- Small scale sand mining across PRMNP
- Small scale gravel mining between Jhawara Bridge and Muhajir Colony
- Existing large-scale stone and boulder mining operations to be shifted to non-river based locations- only two can be sustained in a short 2 km stretch upstream the Reservoir
- Medium scale gravel mining between Muhajir colony and Gulpur Reservoir but without excavators and crushers
- No mining in Ban nullah and most of Rangar Nullah
- No gravel mining downstream Reservoir due to insufficient sediment load



# Establish Clear Best Practice Guidelines

- No use of excavators through out the PRMNP apart from the 2km stretch upstream Gulpur Reservoir unto Kotli
- Limit instream extraction methods to best practice bar skimming, i.e., extraction of boulders, cobbles, sand and gravel from the surface of bars
- Locate extraction sites where the channel loses gradient or increases in width, and deposition occurs unrelated to regular bar-pool spacing in channel
- Protect banks and remedy erosion when it occurs
- Minimize access and egress points from the river
- Minimize activities that release fine sediment to the river, i.e., no washing, crushing, screening, stockpiling or plant operations should occur within the active channel
- Retain or allow reestablishment of a vegetation buffer at water edge and along the riverbanks
- Limit operations to the dry season



# Relocation of Existing Operations

Reach	Recommended Limit for Sediment Extraction of (tonnes per annum)	No. of Existing Operations			No. of Operations to be Relocated		
		Small	Medium	Large	Small	Medium	Large
LoC to Jhawara Bridge	5,000	-	4	1	0	4	1
Jhawara Bridge to Tata Pani Bridge	5,000	-	11	4	0	11	4
Tata Pani Bridge to Kalar Bridge	25,000	-	5	4	0	2	4
Kalar Bridge to Nehl Nullah	25,000	-	1	0	0	0	0
Nehl Nullah to 2 km upstream Reservoir	80,000	-	-	1	0	0	1
2 km upstream Gulpur Reservoir	130,000	-	-	6	0	0	4
Reservoir	0	104	-	-	104	-	-
Downstream Gulpur Reservoir	130,000	-	7	5	0	3	5
Ban Nullah	0	4	1	3	0	1	3
Rangar Nullah (including Siat tributary)	28,000	-	3	3	0	3	3
Hajeera Nullah	10,000	-	2	18	0	4	18
Mendhar Nullah	5,000	-	1	0	0	1	0
Sensa, Moli and other nullahs	5,000	-	-	-	-	-	-
<b>Total</b>	<b>453,000</b>	<b>108</b>	<b>35</b>	<b>45</b>	<b>104</b>	<b>29</b>	<b>43</b>



# Access Issues

- Access is not a concern for small scale miners
- Utilize existing access sites for medium scale and large-scale operations
- Large-scale non-river based mining operations should be required to submit Environment Impact Assessment (EIAs), including plans for establishing access to mining sites



# Support for Vulnerable Groups - Small Scale and Subsistence Miners

- Small-scale sand mining allowed across the PRMNP apart from Ban Nullah, and a 8km stretch of the Rangar Nullah
- Priority access to sand and gravel mining sites across the PRMNP
- Waiver of permit fees for 3-6 months after re-location
- Participatory management framework
- Efficient grievance redress mechanism



# Institutional Framework

Participatory management and monitoring system, involving:

- AJK Fisheries and Wildlife Department
- AJK Environment Protection Agency
- Mines and Minerals Development Department
- Local community representative i.e., Mahaseer Hifaziti Tanzeems
- Independent Monitoring and Evaluation



# Financial Mechanism

- MHTs may charge permit fee for medium-scale sand and gravel mining operators using tractor trolleys or jeeps for the transportation of sand and gravel
- A minimum amount of PKR 100 to 200 per month can be charged as permit fee from small scale mining operators (sand and gravel miners). Small scale mining operators may not be charged a permit fee for the initial 3-6 months of operation after re-location.
- The revenues collected from mining activities in the PRMNP should be distributed between AJK Wildlife and Fisheries Department and community organizations at the ratio of 20% and 80% respectively
- The revenues collected from the mining from forest land should be distributed between AJK Forests Department and Mineral Department at the ratio of 80% and 20% respectively
- The revenues collected from mining should be used for the betterment of the local communities and for supporting regulation of mining in Poonch River by the AJK Fisheries and Wildlife Department



# Risks and Way Forward

- **There was a huge resistance to stoppage of mining of boulders from influential owners of large-scale operations producing aggregate**
- **Continuing pressure from the Fisheries and Wildlife Department and the Environmental Protection Agency and attention from the highest level in the government over the last five years has helped in reduction of boulder mining in the river**
- **Some operations have already shifted to extraction of limestone in the mountain areas in Poonch Valley for production of aggregate**
- **Regulation and permitting of mining with community participation in the river is the key to success of the proposed sustainable mining**
- **Permitting and control of mining of sand and gravel by small and medium sized outfits will help in meeting community demand and protecting jobs of poor and vulnerable employed in operations**
- **The Management Committee of BAP will have to continuously monitor the level of mining and its impacts on the ecosystem and adjust extraction limits as needed**



A scenic view of a river flowing through a rocky canyon. The river is a vibrant turquoise color, contrasting with the dark grey and brown rocks. The surrounding hillsides are covered in lush green vegetation, including trees and shrubs. In the background, a dam is visible across the river. The text "Thank You" is overlaid in the center of the image in a large, white, sans-serif font.

Thank You