

Rogun Hydropower Project

Revised Water Chapter

Riparian Consultations

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Istanbul, Türkiye

Project Management Group for Energy Facilities Construction
Under the President of the Republic of Tajikistan



Rogun HPP: Impacts on Water

Riparian Meeting Istanbul

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Scope of the presentation

This presentation: focus on impacts of the Project on water in the immediate area of the Project.

Transboundary effects presented in the next session
(Transboundary Cumulative Impact Assessment).

Aspects to be covered here:

1. Hydrology
2. Water quality
3. Sediments
4. Floods

1. Hydrology: Relevant characteristics of Rogun HPP

1. Dam	Height	m	335
	Crest elevation	m asl	1300
2. Reservoir	Overall length	km	70
	Area at FSL	km ²	159
	Elevation at FSL	m asl	1290
	Total volume	km³	13.3
	Drawdown		
	Minimum operation level (MOL)	m asl	1260
	Maximum drawdown	m	30
Live storage	km³	4.2 (Nurek: 4.2)	
Area at MOL 2	km ²	125	

1. Hydrology: Relevant characteristics of Rogun HPP

3. Hydrology	Catchment area (Komsomolobod)	km ²	29,500
	Average inflow yearly	m ³ /s	631
	monthly maximum (July)	m ³ /s	1,600
	monthly minimum (February)	m ³ /s	73
	Total annual inflow	km ³	20.1
	Floods:		
	2 years	m ³ /s	2,360
	10 years	m ³ /s	3,070
	100 years	m ³ /s	4,030
	PMF	m ³ /s	7,800

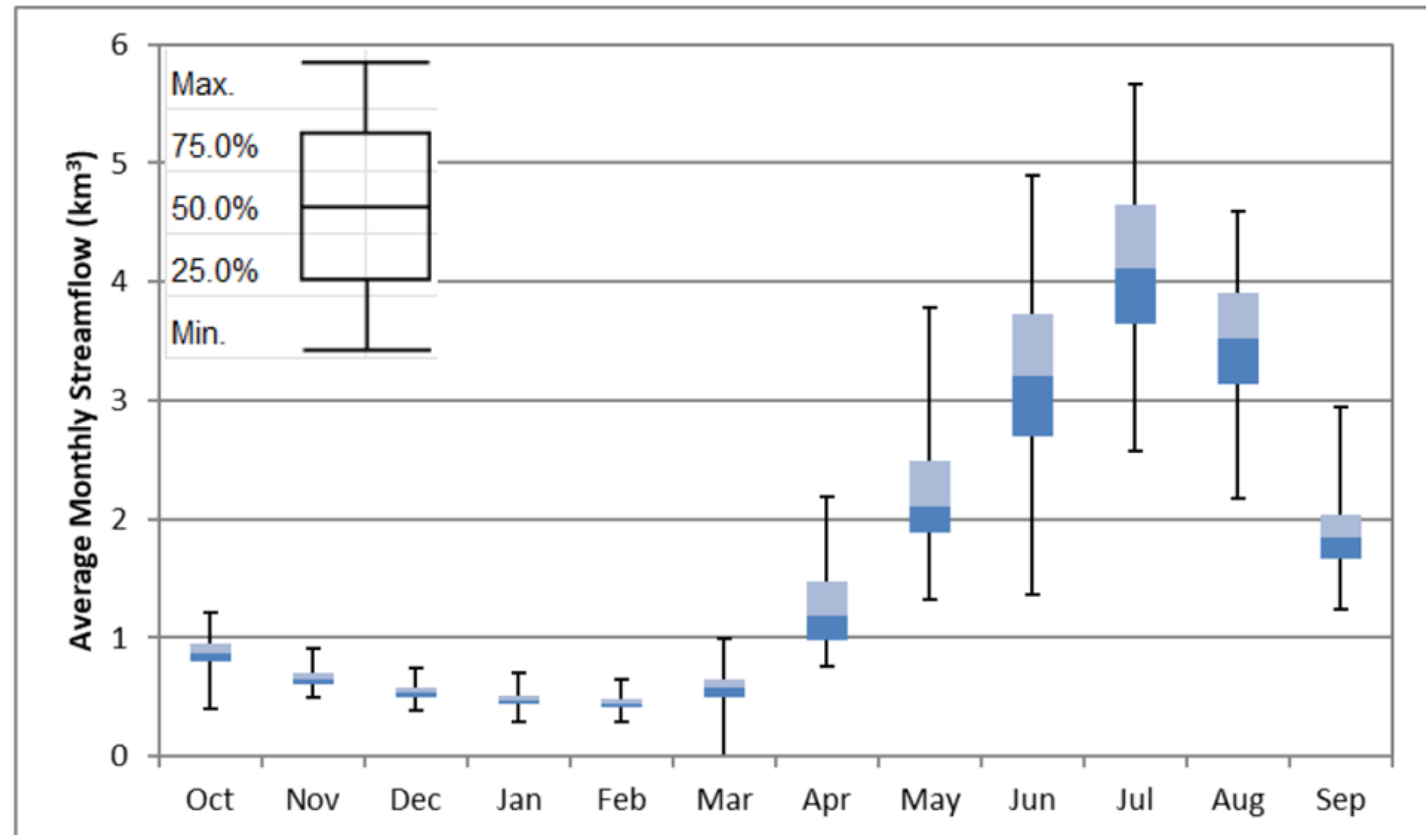
Hydrology: potential impacts

- A high dam forming a large reservoir has the potential to change flow conditions in the downstream area of the power plant, mainly seasonal distribution of flows.
- The 2014 studies had developed the project in a way as to show that it can be operated without changing downstream conditions.
- Hydrological modelling done as part of the updated ESAI included new data and basically confirmed the 2014 results.

Hydrological monitoring: relevant results

Yearly flow at Rogun HPP site:

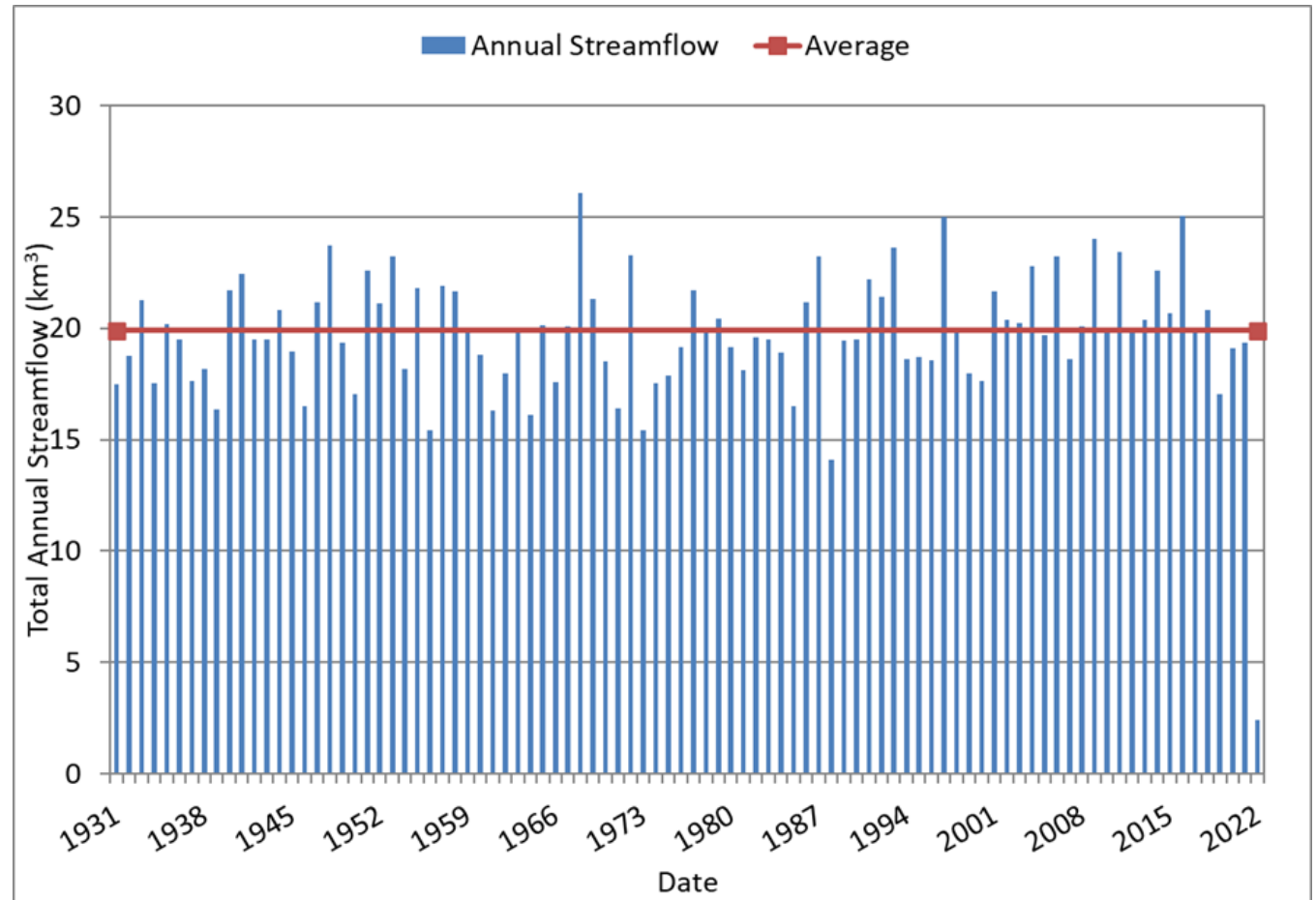
- marked seasonality (very low flows in winter, high flows in summer).
- Very marked year-to-year variation.
- Average yearly flow: 631 m³/s



Hydrological monitoring: relevant results

Total annual flow at Rogun HPP:

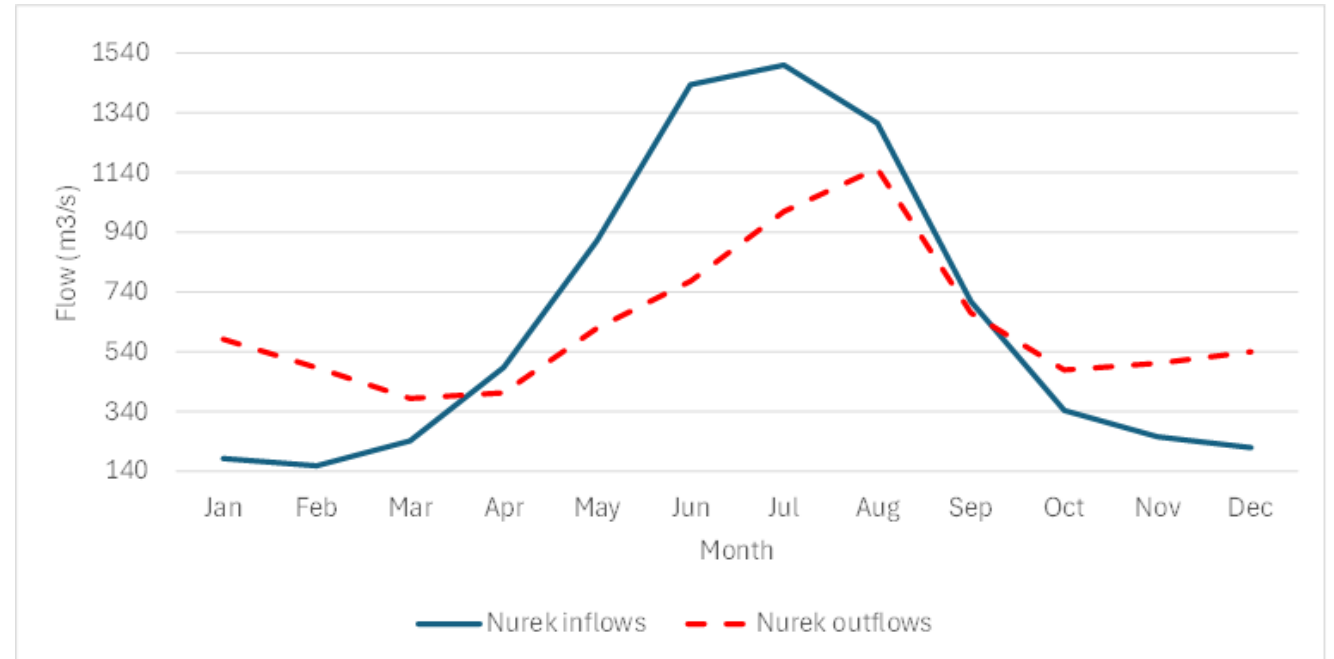
- Marked year-to-year validation
- Occasional very dry or very wet years
- Average yearly flow: 20.1 km³



Hydrological monitoring: relevant results

Inflow and outflow at Nurek, present situation

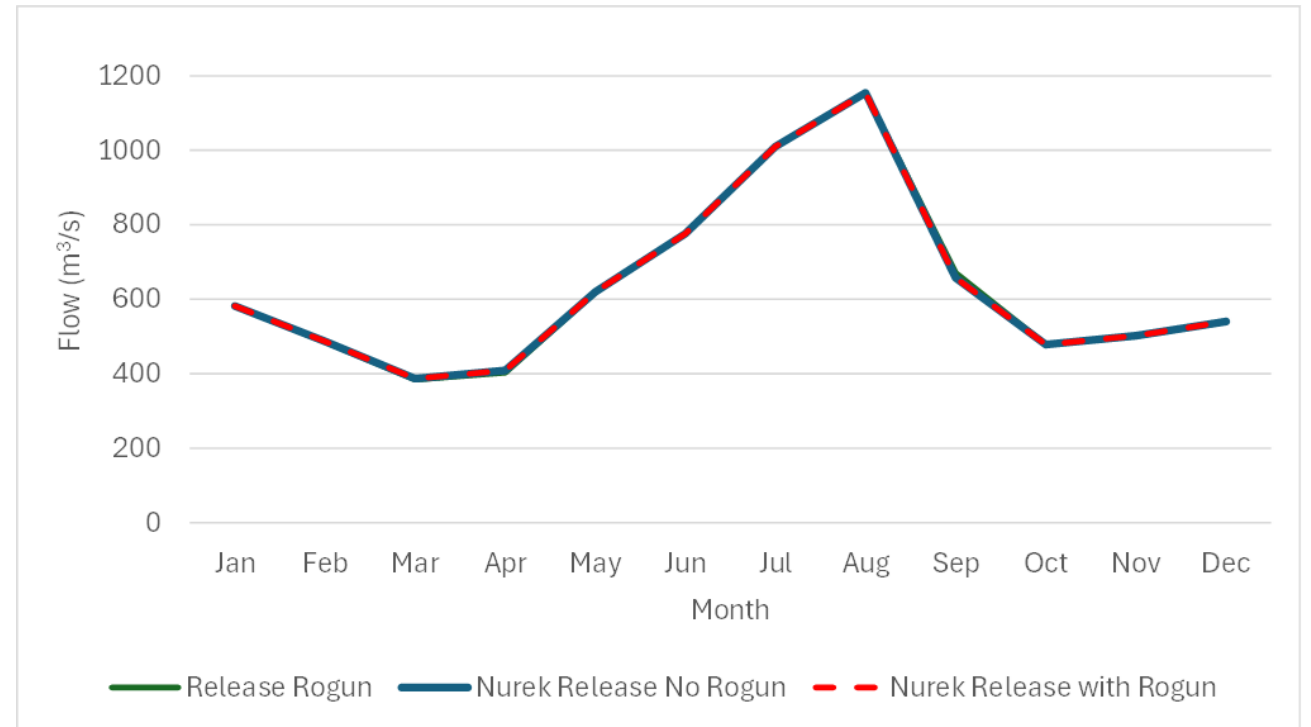
- Retention of water in summer (4.2 km³)
- Release of additional water in winter (4.2 km³)
- Red dotted line: flow situation downstream of Nurek
- With Rogun HPP in place, regulation will be done there



Hydrological monitoring: relevant results

Inflow and outflow at Nurek, situation with Rogun

- Rogun will do regulation
- Inflow to Rogun as shown on previous slide
- Outflow from Rogun = inflow to Nurek = outflow from Nurek
- Nurek will be operated as a near ROR power plant
- No change in the downstream flow situation due to Rogun HPP



Critical phase: reservoir filling

- Large reservoir: 13.3 km³
- Yearly flow in Vakhsh: 20 km³
 - In theory, reservoir could be filled in a very short time
 - This would cause considerable problems for downstream riparians
- Solution: Tajikistan will retain only the quantity of water allocated, but not used yet: 1.2 km³ per year on average
 - Reservoir filling will take about 14 years

Date	Reservoir capacity (km³)	Water Volume (km³)
1 Jan 2025	0.86	0.440
1 Jan 2026	1.317	1.317
1 Jan 2027	2.053	2.053
1 Jan 2028	3.240	3.240
1 Jan 2029	4.713	4.450
1 Jan 2030	6.883	5.660
1 Jan 2031	9.402	6.870
1 Jan 2032	13.300	8.080
1 Jan 2033	13.300	9.290
1 Jan 2034	13.300	10.500
1 Jan 2035	13.300	11.710
1 Jan 2036	13.300	12.920
1 Jan 2037	13.300	13.300

2. Water quality

Risks and potential impacts	Mitigation
<p>Construction activities: risk of water contamination</p> <ul style="list-style-type: none"> • Oils and lubricants • Concrete • Waste water 	<p>ESMP:</p> <ul style="list-style-type: none"> • Suitable storage and handling of materials • Relevant infrastructure • Waste water treatment plants ➤ Planning, implementation, monitoring and remedial actions where required
<p>Sediments: input of additional sediment into the river</p>	<p>Minimising erosion due to the project Sediment will be retained in Nurek reservoir</p>
<p>Change in water quality due to formation of a reservoir: risk of forming of anoxic conditions in deeper parts of the reservoir</p>	<ul style="list-style-type: none"> • Risk considered as small, as only small amounts of organic materials (vegetation) will be submerged, and reservoir will be gradually filled over a long period • Pre-impoundment reservoir area clearing

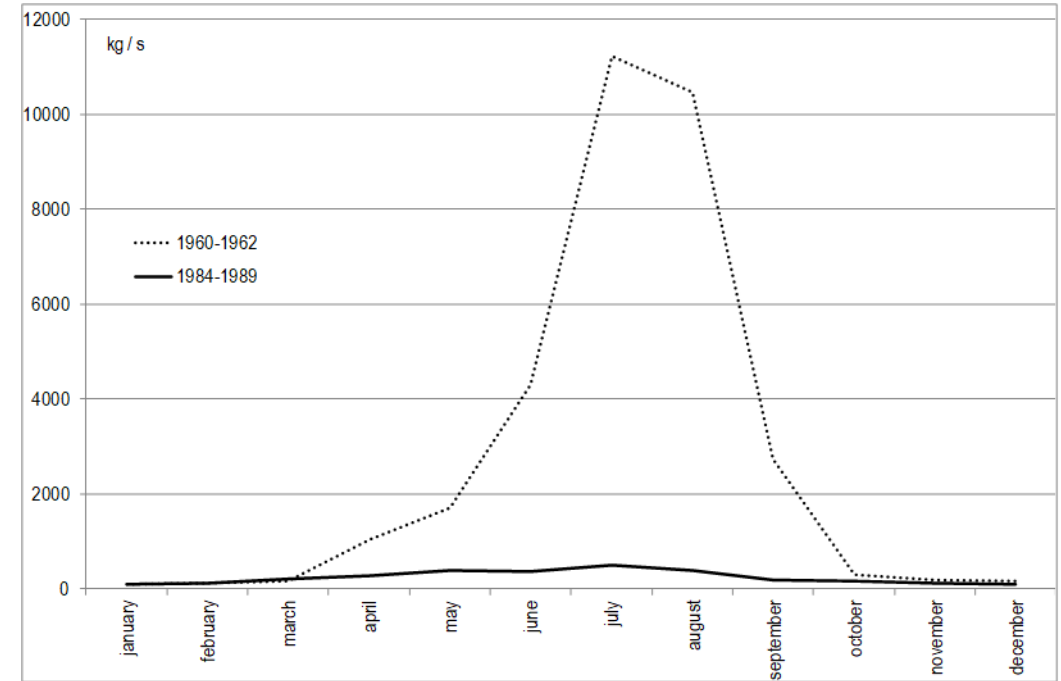
3. Sediment

Situation:

- Nurek retains all sediments
- Nurek reservoir is filling rapidly with sediment, negatively affecting its life span

Effect of Rogun:

- Will retain sediment
- This will increase the life span of Nurek by up to 100 years
- No difference in the downstream area
- Risk of increasing sediment input due to climate change



Sediment load at Tigrovaya Balka without and with Nurek

4. Floods

- Nurek is not designed for safely handling PMF
 - Rogun is designed for safely handling PMF
 - This protects Nurek
 - Considerable risk reduction for the downstream areas
 - To be dealt with in detail in the Dam Break Study and EPP (under preparation)
- average yearly flow: 631 m³/s
 - 2-year flood event: 2,360 m³/s
 - 5-year flood event: 2,780 m³/s
 - 10-year flood event: 3,070 m³/s
 - 20-year flood event: 3,360 m³/s
 - 100-year flood event: 4,030 m³/s
 - 1'000-year flood event: 4,950 m³/s
 - 10'000-year flood event: 5,970 m³/s
 - PMF (day): 7,800 m³/s
 - PMF (instantaneous peak) 8,160 m³/s

Thank you for your attention