HYDROLOGY AND ITS UNCERTAINTIES- A CHALLENGE FOR HYDRO POWER DEVELOPERS

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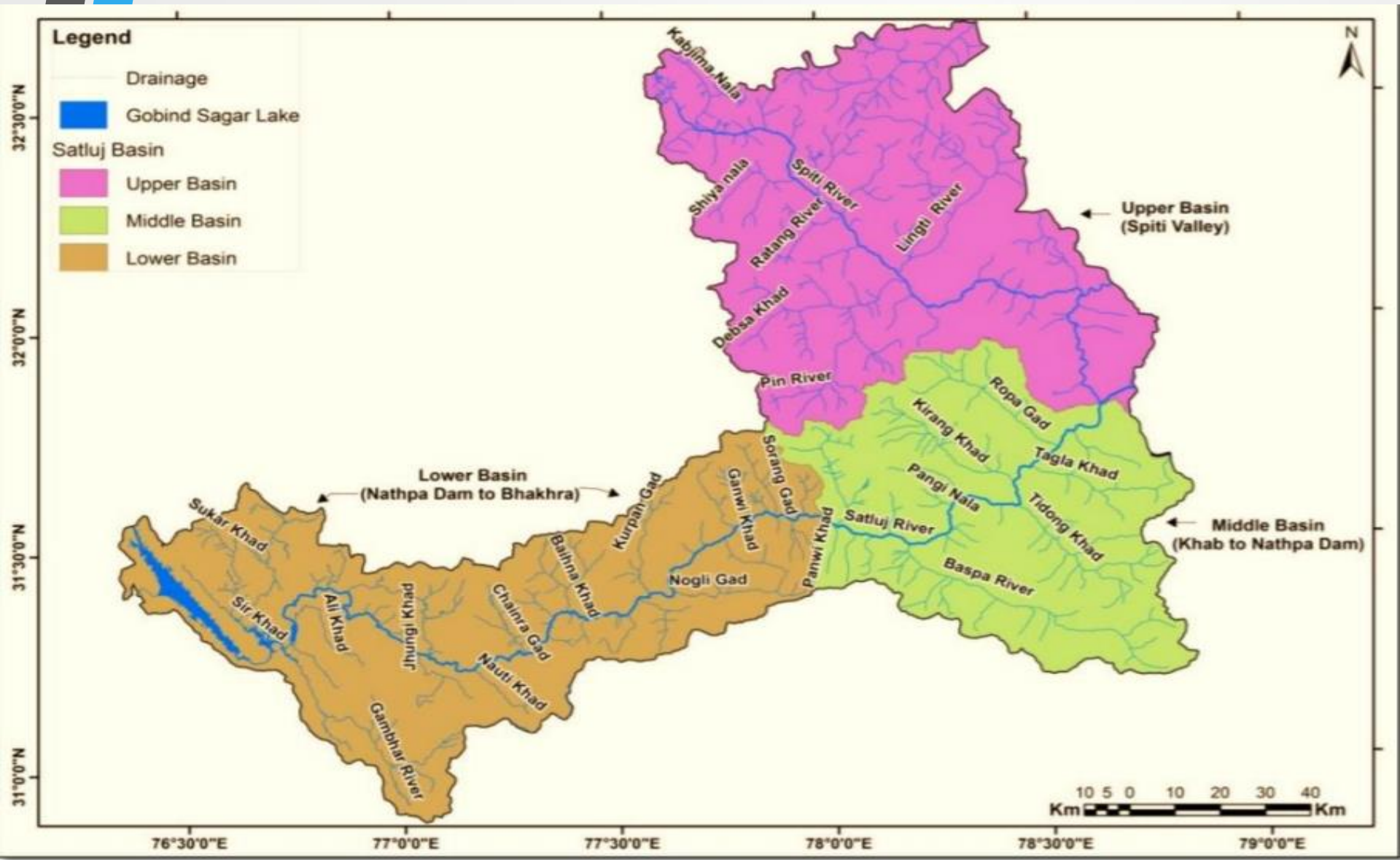
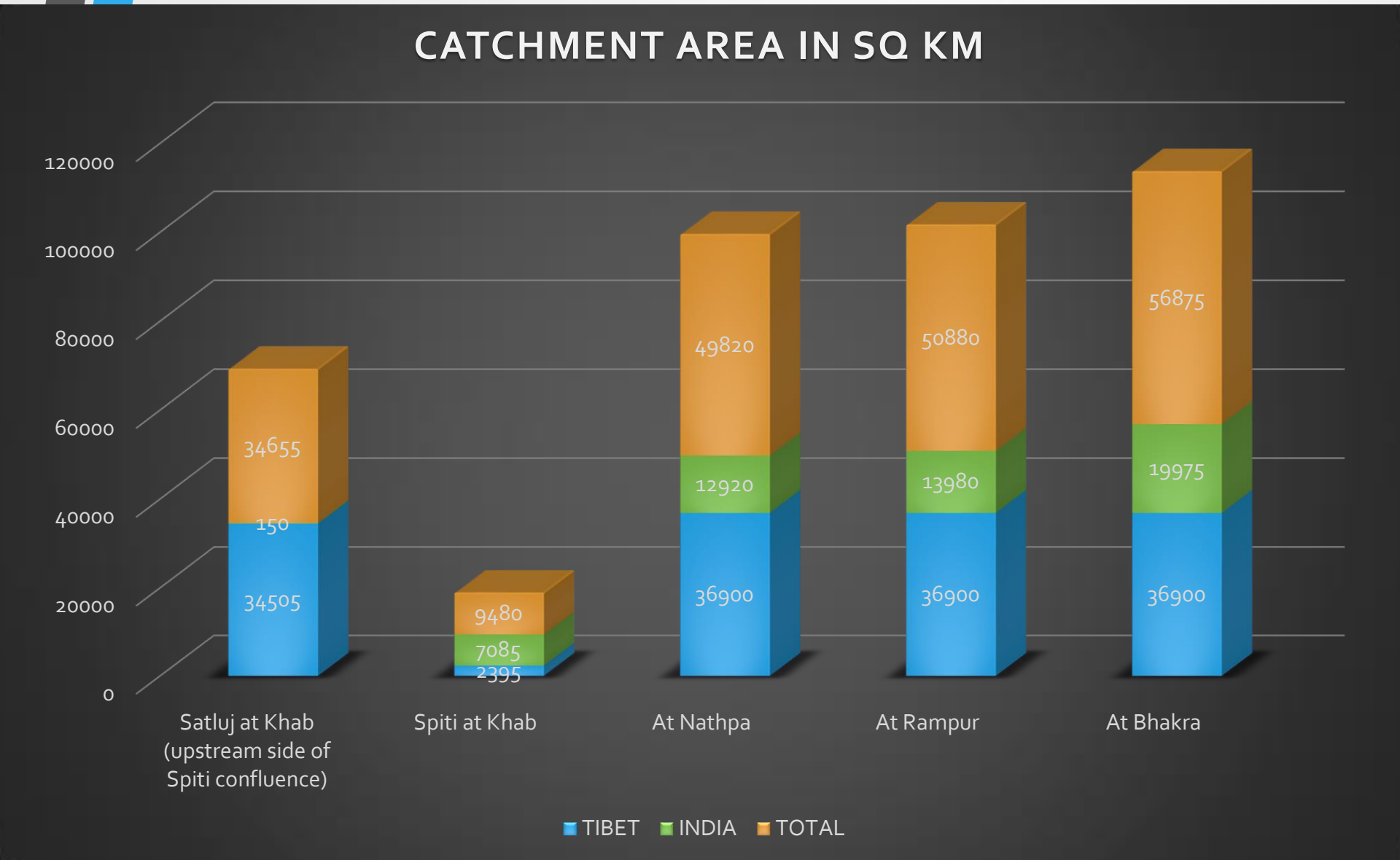
SATLUJ BASIN TRIBUTERIES-VAST EXPANSE OF CATCHMENT AREA



CATCHMENT AREA OF SATLUJ



GLACIERS OF TRIBUTARIES-BASPA

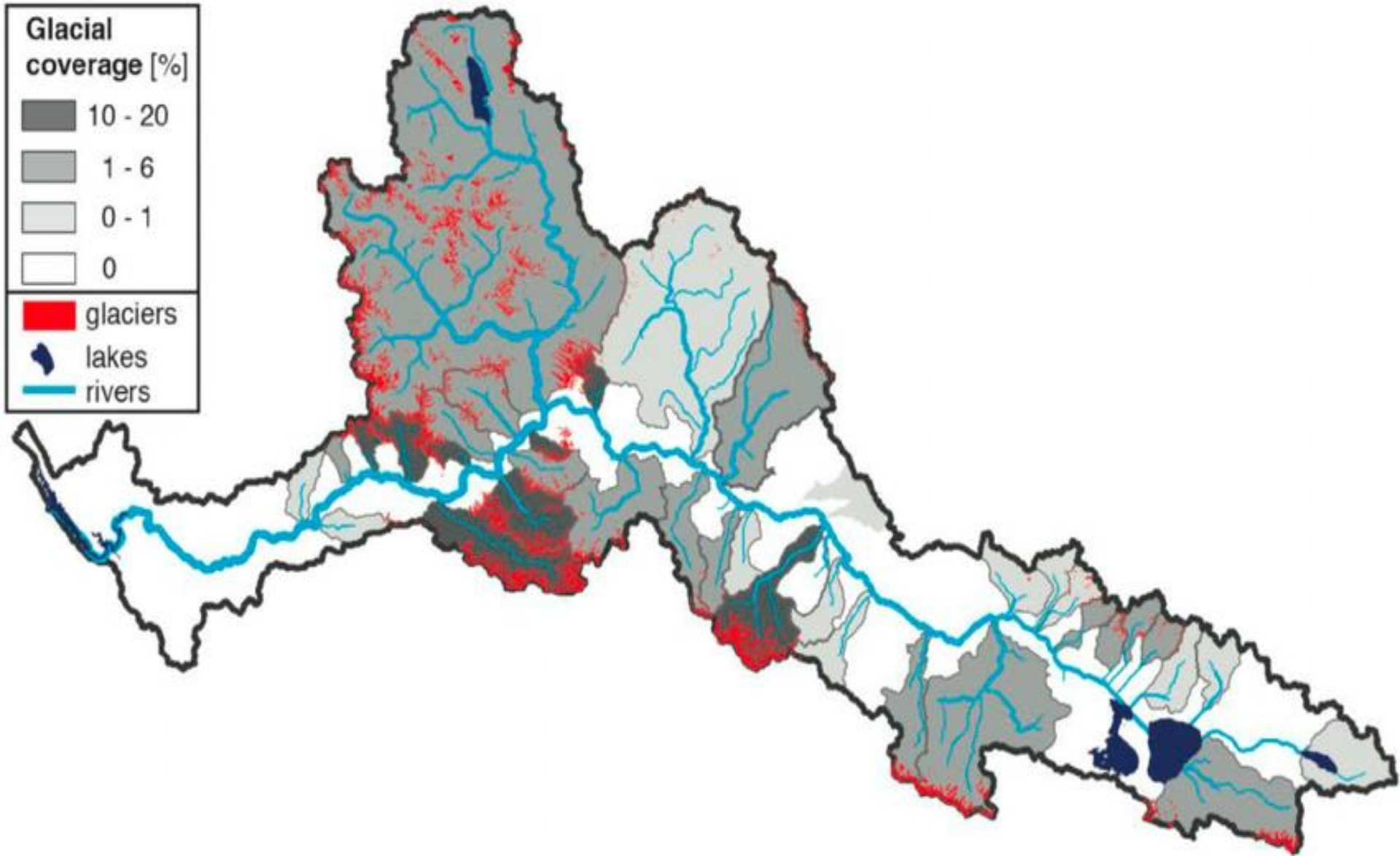
-30 Nos. Mapped Glaciers

-19% deglaciation observed from 1962 to 2001.

Glacier located around 5000m have shown 24 % loss as compared to 14% for those located on the altitude higher than 5400 m.

The Mean Altitude of the Glacier Terminus is shifted upward by 88m i.e. from 4482 to 4570.

GLACIAL COVERAGE FOR SATLUJ BASIN



GLACIERS OF TRIBUTARIES-SPITI

-188 Glaciers in 1962 have increased to 217 in 2001

-Result of Fragmentation of large sized Glaciers.

-Large sized Glaciers seems to be worst affected in the Basin

-Reducing trends large sized Glaciers may create scarcity of the Water in the Region in future.

HYDROLOGY OF RIVER SATLUJ

Estimated Average Annual Flow at dam site Nathpa is 9638 Million M3.

Hydrology controlled by Spring and Summer Snowmelt in the Himalayas and by the South Asian Monsoon.

Onset of the Summer Monsoon brings heavy Rains that often produce extensive Flooding Downstream

70% of Annual Generation at NJHPS achieved in Summer and Monsoon months.

Winter flow is substantially lower, since there is little Precipitation or Meltwater from the Himalayan Glaciers.

THE HYDROLOGY STUDIES FOR HYDRO ELECTRIC PROJECTS

- Finalized Hydrological Inflow Series.
- 90% Dependable Year is worked out using Statistical methods.
- Installed Capacity and Unit Size of Hydro Electric Project
- Design Energy and Secondary Energy

ADVANTAGES OF HYDRO POWER

- -Source of Clean, Renewable and Sustainable Energy
- -Environment Friendly Source
- -Reliable and Affordable
- -Longer Life

ADVANTAGES OF HYDRO POWER

- -High efficiency- over 90%
- -Less CDM Impacts

- -Multi Purpose Uses such as Irrigation, Fishery, Flood Control etc.

- -Adapting to Quick Responses


Overall Cost
Long Transmission lines
High Cost of Installation
Challenges
Infrastructure Developments
Long Gestation Period


Few Civil Contractors
Hydrological Uncertainties
Long term Climate Change effects
Various Compliances
Cumbersome and Time Taking Process for Various Clearances
Challenges

COMPLICATED COMPLIANCES REGARDING ENVIRONMANTAL RELEASES

(Latest practice for new Schemes)

DRY

- November to March
- 20% of monthly average flow observed during each of preceding 10-daily period

LEAN

- Oct, April and May
- 25% of monthly average flow observed during each of preceding 10-daily period

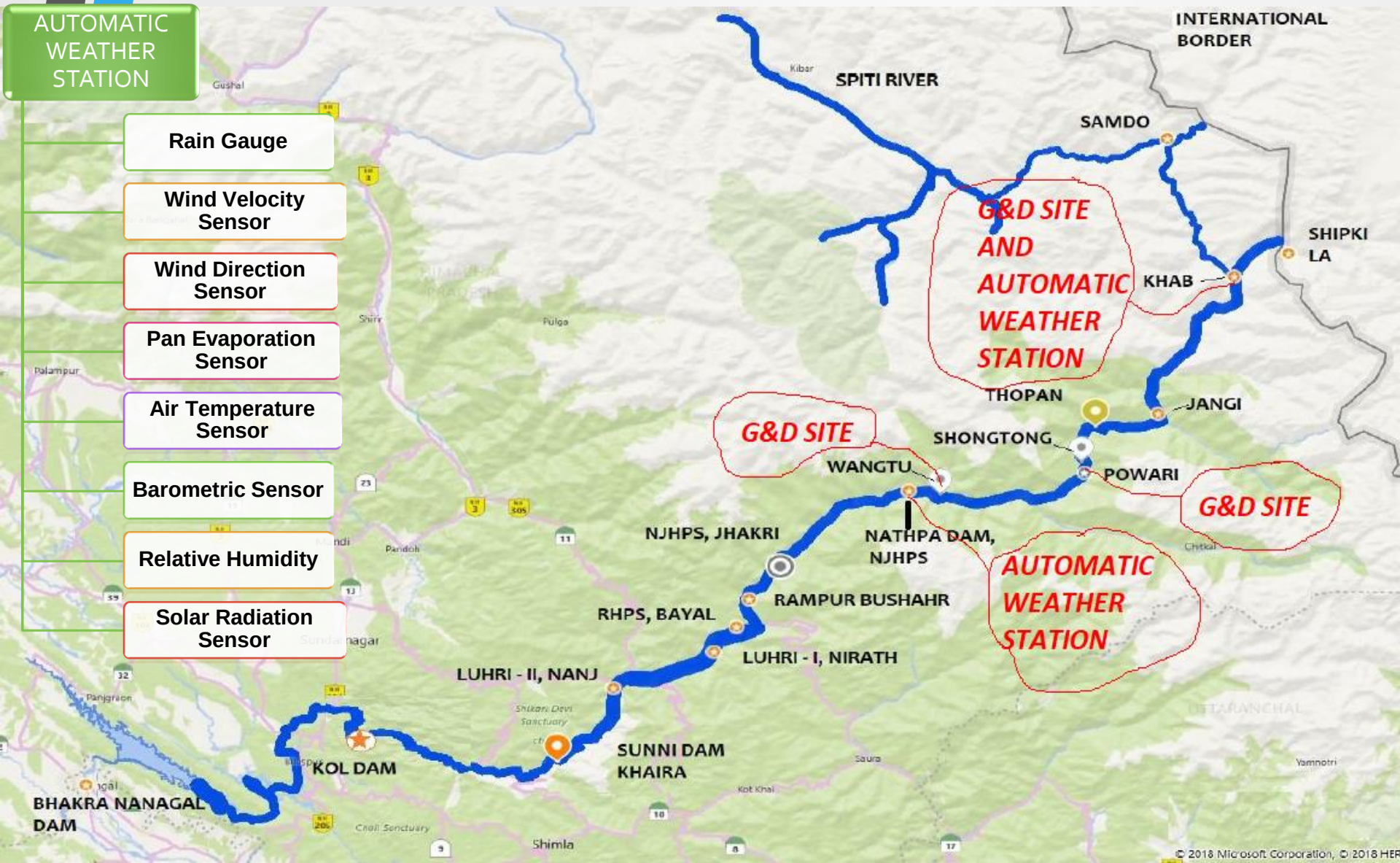
HIGH FLOW

- June to September
- 30% of monthly flow

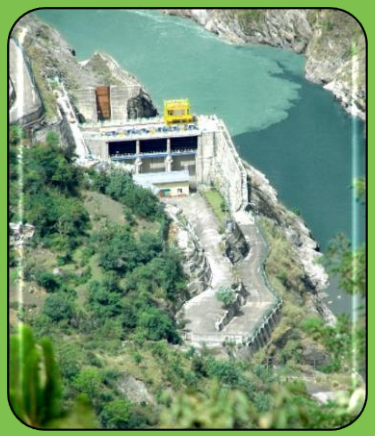
O&M STAGE- GENERATION TARGETS CHALLANGES

- Targets fixed on basis of Design Energy and Qualitative Experience
- Targets fixed on some Incremental Criteria over previous years Generation Figures
- No Mathematical or Scientific ‘Hydrology Forecasting System’

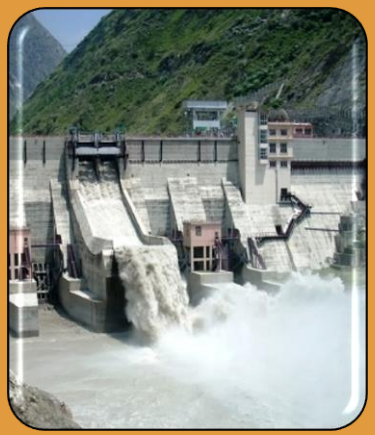
HYDRO-METEOROGICAL DATA COLLECTION AT NJHPS



HYDROLOGY VARIATION: A CONCERN

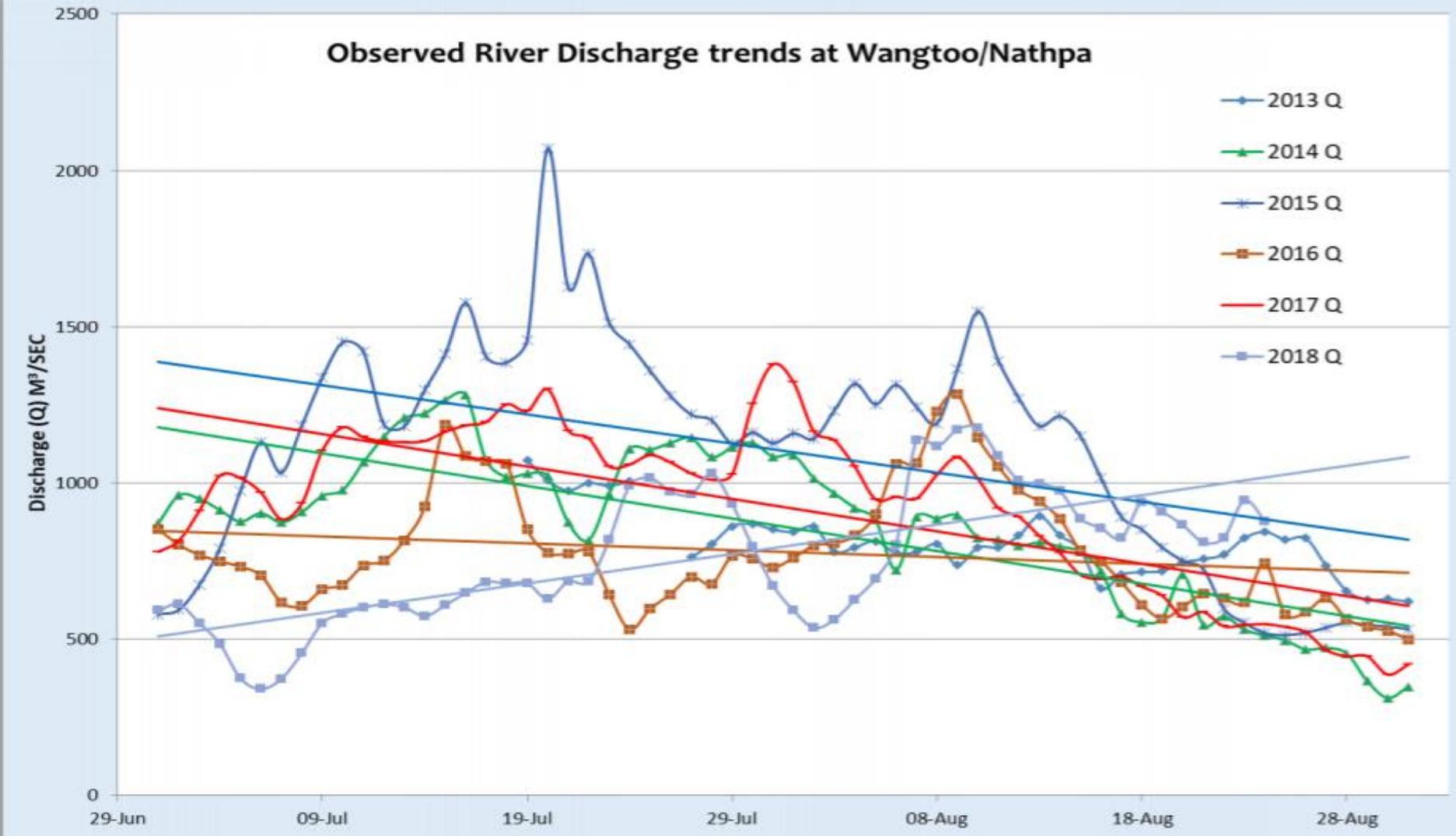


The usable Water Volume varies enormously from year to year, as River flow depends on actual Precipitation/Snowfall.

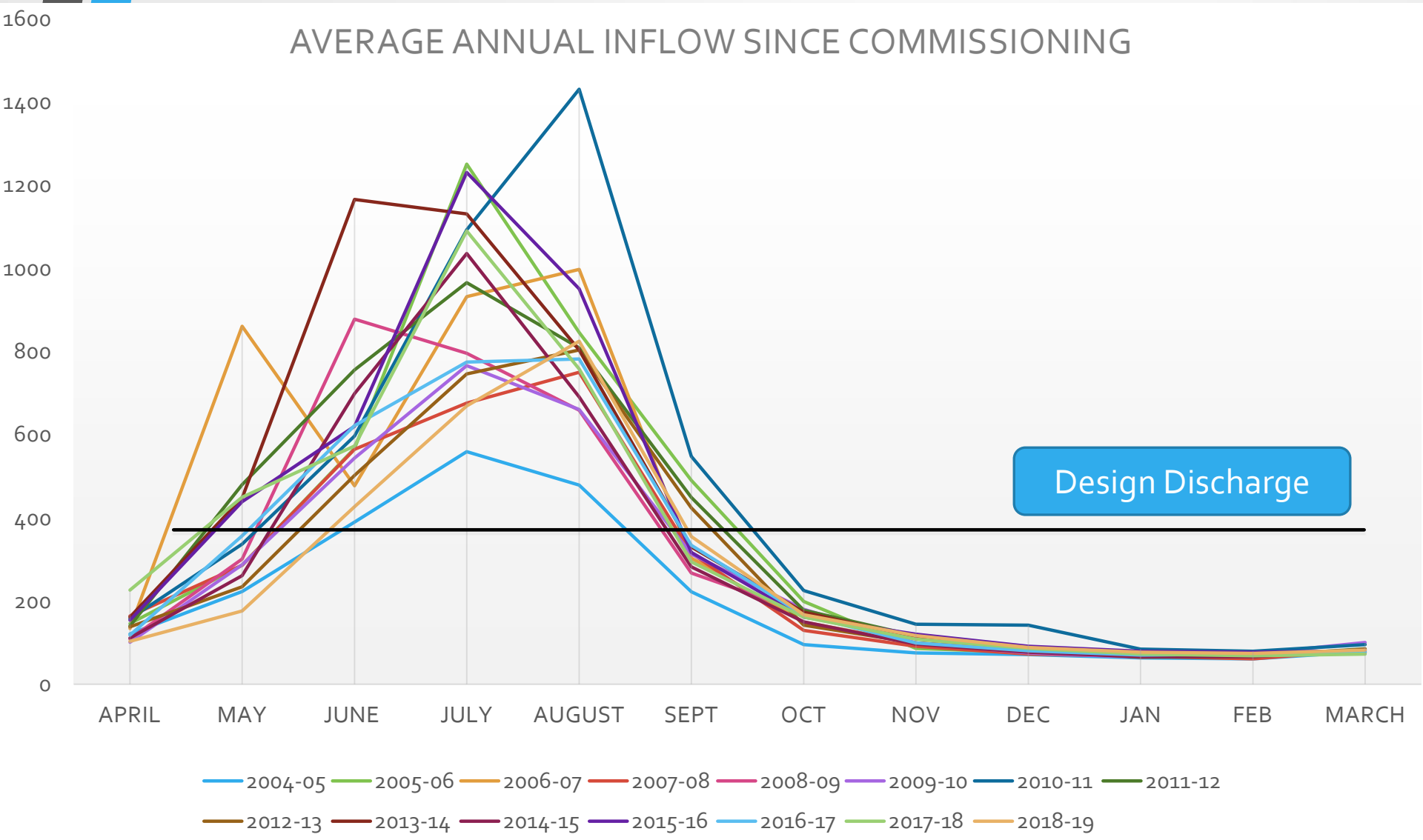


Other factors like Temperatures, Weather etc which are unpredictable and not studied for their quantitative effect on Inflows.

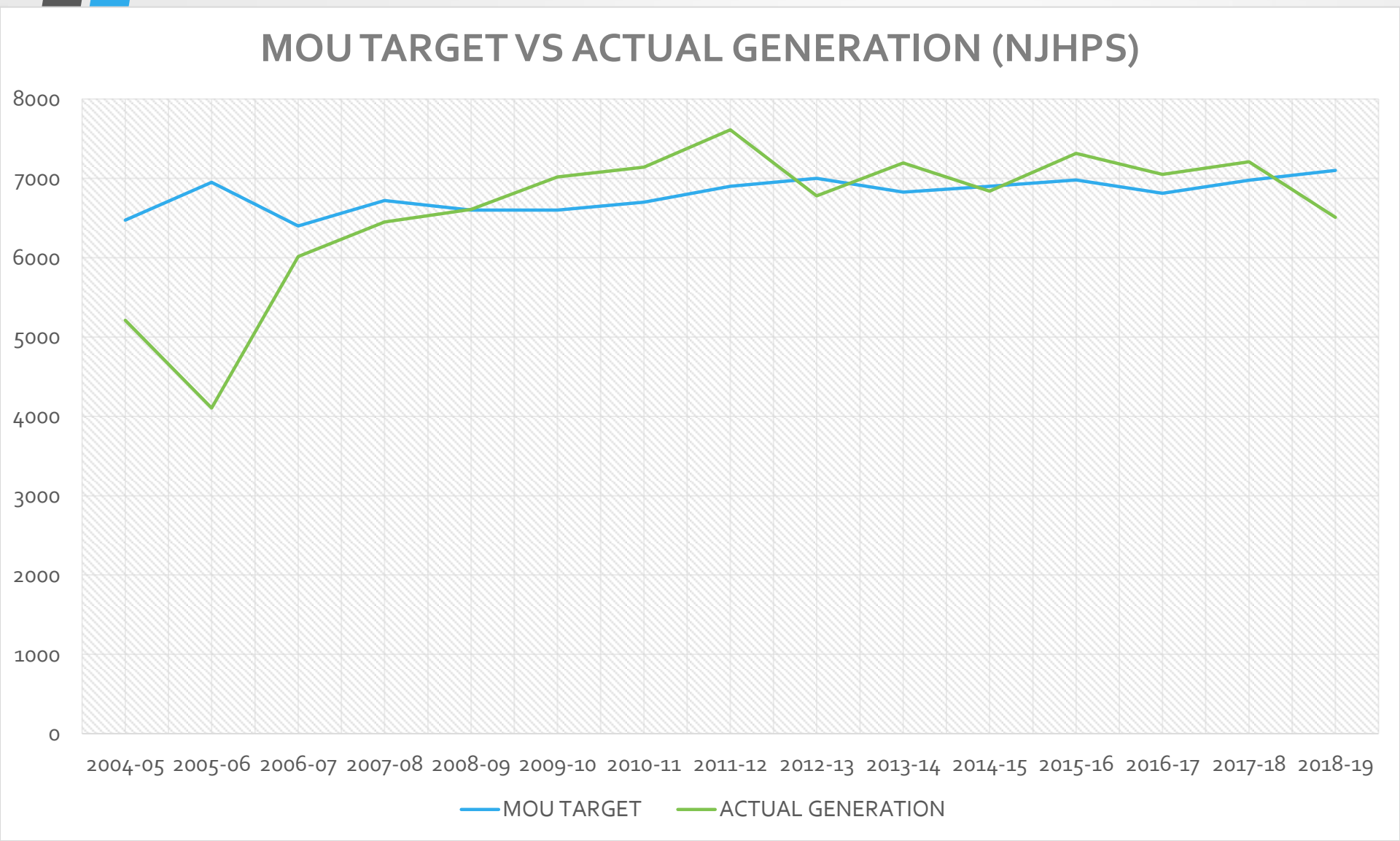
RIVER DISCHARGE- UNCERTAINTIES



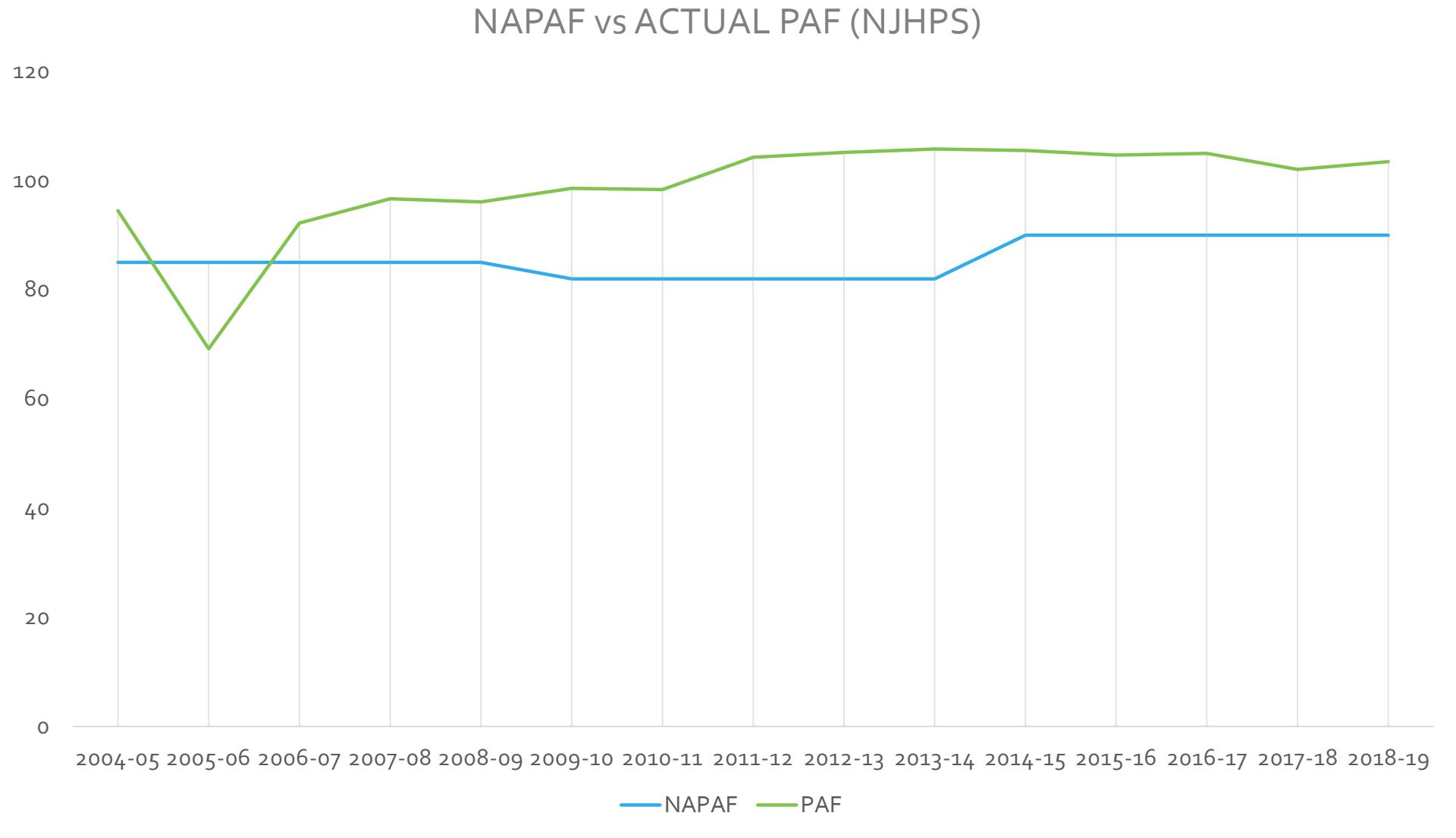
INFLOW TRENDS AT NJHPS



TARGET AND ACTUAL GENERATION

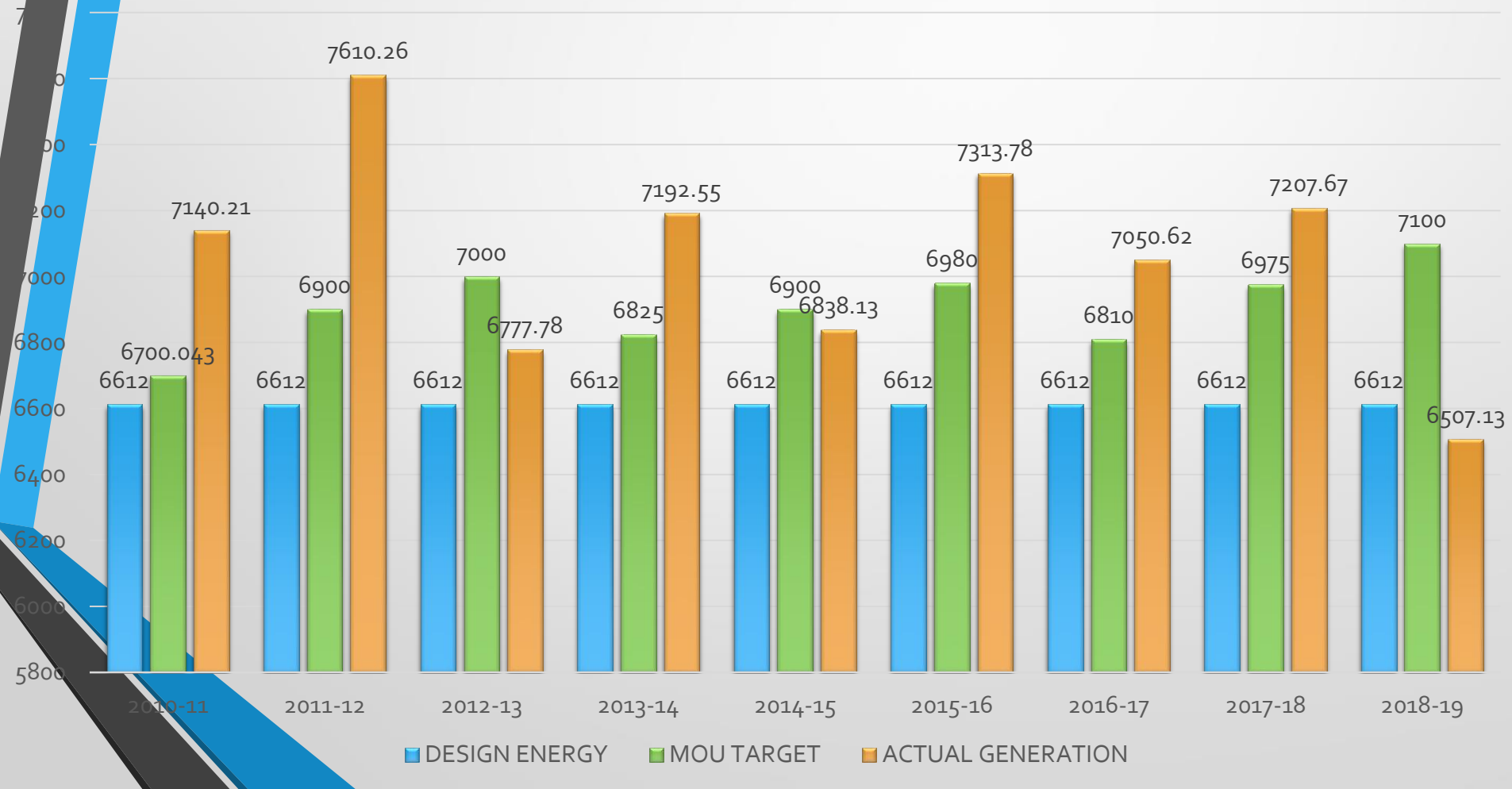


PLANT AVAILIBILITY FACTOR AT NJHPS



OVERALL COMPARISON

DESIGN ENERGY VS MOU TARGET VS ACTUAL GENERATION (NJHPS)



एसजेवीएन
SJVN

THANK YOU