

## DETERMINATION OF POLIHALI DAM IN-STREAM FLOW REQUIREMENTS



**PULE MOKEBE**

**LHDA**

**3<sup>rd</sup> April 2019**

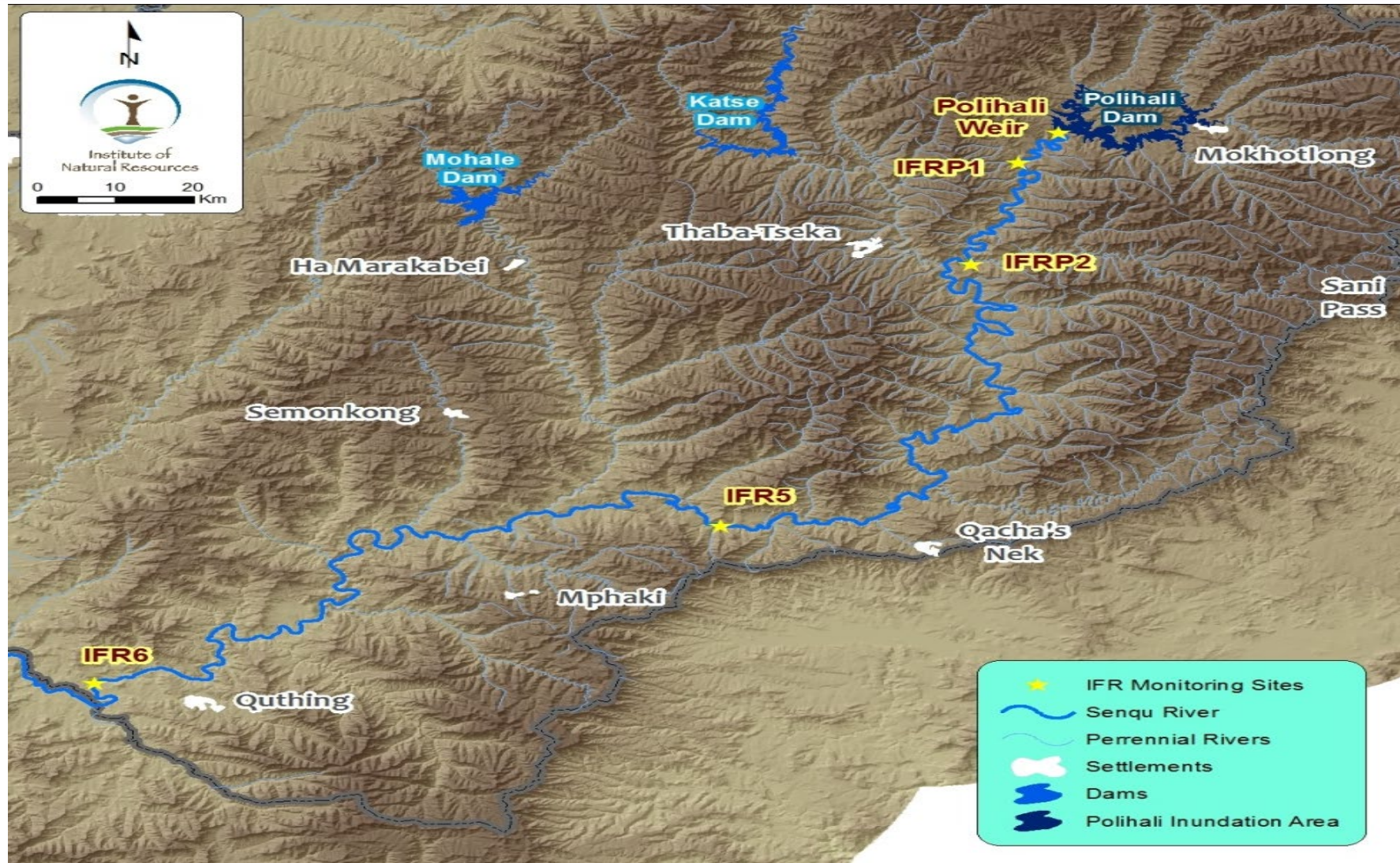
- Large Dams
- Obligation to keep the impacts to the minimum
- In-Stream Flow Requirement (IFR):
  - Riverine specialists;
  - Available literature & field measurements & observations

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# STUDY AREA



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## 1. Computer Simulation Modelling Approach

- Did not yield intended results - unrealistic

## 2. Historical Monitoring Data Approach

- Based on LHWP I Dams IFR
  - Katse Dam & Mohale Dam (10-12%)
  - Minimum IFR at 12% inflow
  - Regular monitoring of the downstream response
  - Adaptive management
  - Maximum of 18% inflow

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# IFR IMPACTS OF LHWP I DAM



Malibamats'o River upstream & downstream of Katse Dam

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## Design of Dam Outlet

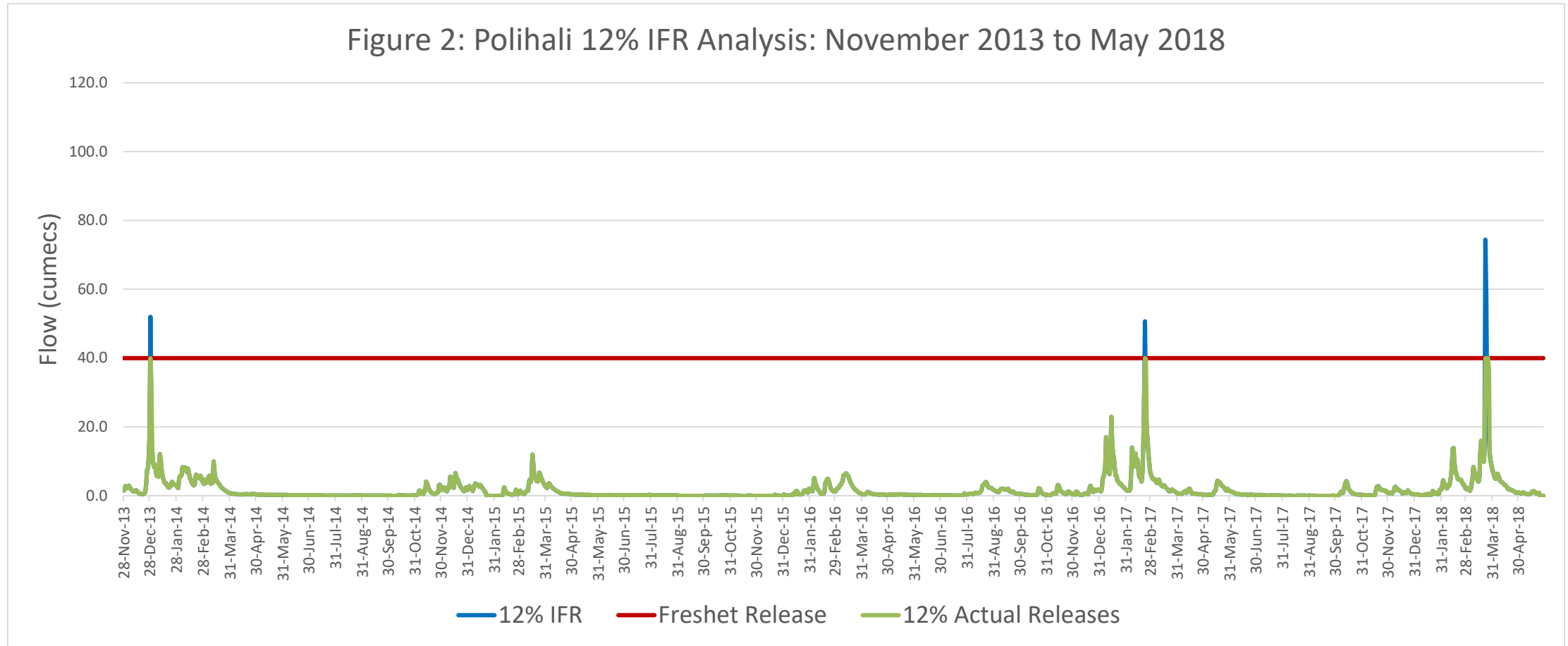
- Limiting outflows to maximum freshet release of 40 m<sup>3</sup>/s
- Flow hydrographs from Polihali Weir (November 2013 to May 2018).
- Volumetric equivalent of the desired IFR
- Freshet value of 40 cumecs, mostly within hydrograph

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# POLIHALI 12% IFR

Figure 2: Polihali 12% IFR Analysis: November 2013 to May 2018

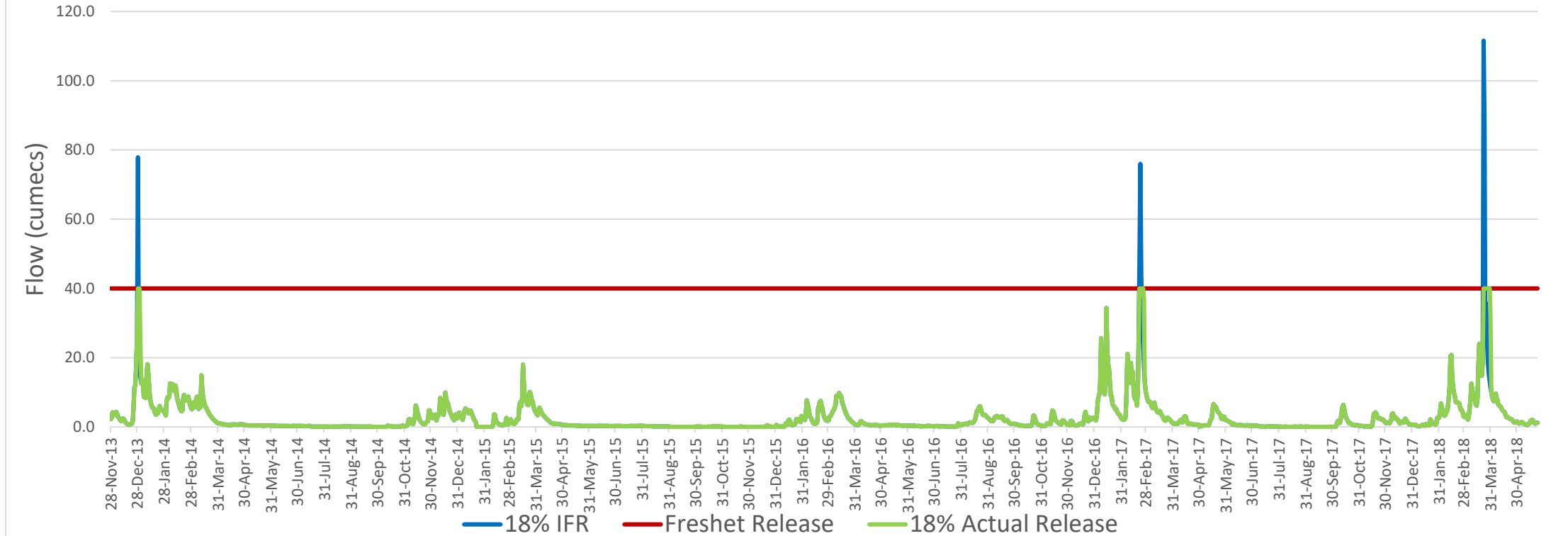


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# POLIHALI 18% IFR

Figure 3: Polihali 18% IFR Analysis: November 2013 to May 2018



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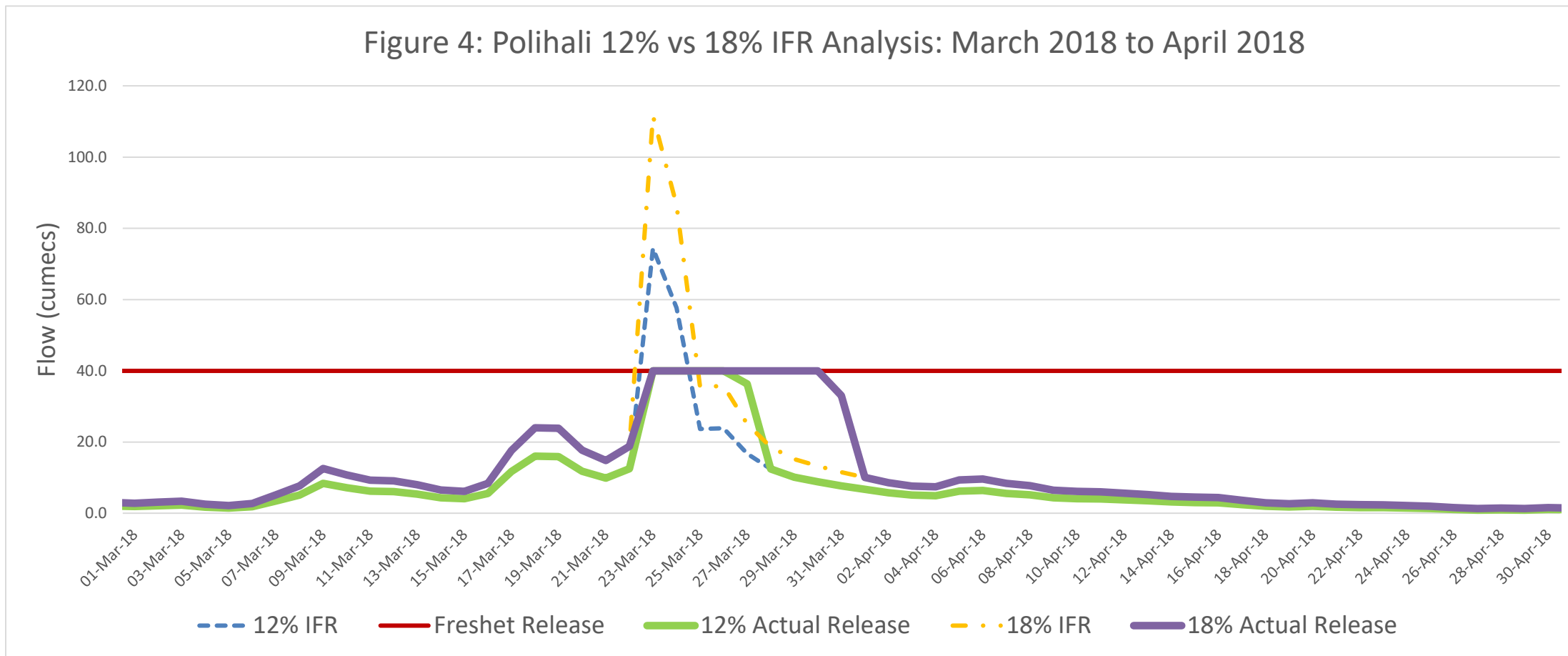




# COMPARATIVE ANALYSIS



Figure 4: Polihali 12% vs 18% IFR Analysis: March 2018 to April 2018



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# CONCLUSIONS

- IFR 12% MAR suitable (using historic information)
- Five upstream gauging stations to determine releases
- IFR system to operate over a full range of flows up to 40m<sup>3</sup>/s
- Monitor & track the adequacy/impact of flow release
- Polihali Dam outlet system designed for variable flow release

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A wide-angle photograph of a snowy mountain range at sunset. The sun is low on the horizon, casting a warm orange and yellow glow across the sky and the snow-covered peaks. The foreground shows a snow-covered slope with some dark, low-lying vegetation. The overall scene is serene and majestic.

**THANK YOU**