SUPPLEMENTARY MATERIAL

Field-calibrated Hydrologic Engineering Center – River Analysis System modelling of Krueng Keureuto River flow

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The equations of hydrology process:

$$Q_p = \frac{A \cdot R_e}{3.6 \cdot 0.3T_p + T_{0.3}} \quad \text{(S1)}$$

$$T_p = t_g + 0.8t_r \quad \text{(S2)}$$

$$t_g = 0.4 + 0.0058L \text{ (for } L \geq 15 \text{ km)} \quad \text{(S3)}$$

$$t_g = 0.21L^{0.7} \text{ (for } L < 15 \text{ km)} \quad \text{(S4)}$$

$$T_{0.3} = at_g \quad \text{(S5)}$$

$$t_r = 0.5t_g \quad \text{(S6)}$$

where: Q_p = peak flood discharge ($m^3 \cdot s^{-1}$), A = watershed area (km^2), R_e = effective rainfall (mm), T_p = time from the start of the flood to the peak of the flood hydrograph (h), $T_{0.3}$ = time from the start of the flood to $0.3Q_p$ (h), t_g = time of concentration (h), t_r = time unit of rainfall (mm), a = watershed characteristic coefficient of 2, L = length of main river (km).

The baseflow value calculated using the GAMA I method:

$$Q_B = 0.4751A^{0.6444} \cdot D^{0.9430} \quad \text{(S7)}$$

where: Q_B = base flow ($m^3 \cdot s^{-1}$), A = watershed area (km^2), D = river network density ($km \cdot km^{-2}$).

Table S1. Results of steady flow simulation before and after calibration

Specification	Manning's *n* scenario	Observed discharge ($m^3 \cdot s^{-1}$)	Maximum river depth (m)	Deviation from observed depth (%)
Hydrometric measurement	–	16.42	2.70	field condition
Maximum Manning's *n*	0.15		3.42	26.67
Minimum Manning's *n*	0.07		2.36	13.33
Calibrated Manning's *n*	0.08		2.55	5.5

Explanation: Manning's *n* = roughness coefficient.

Source: own study.

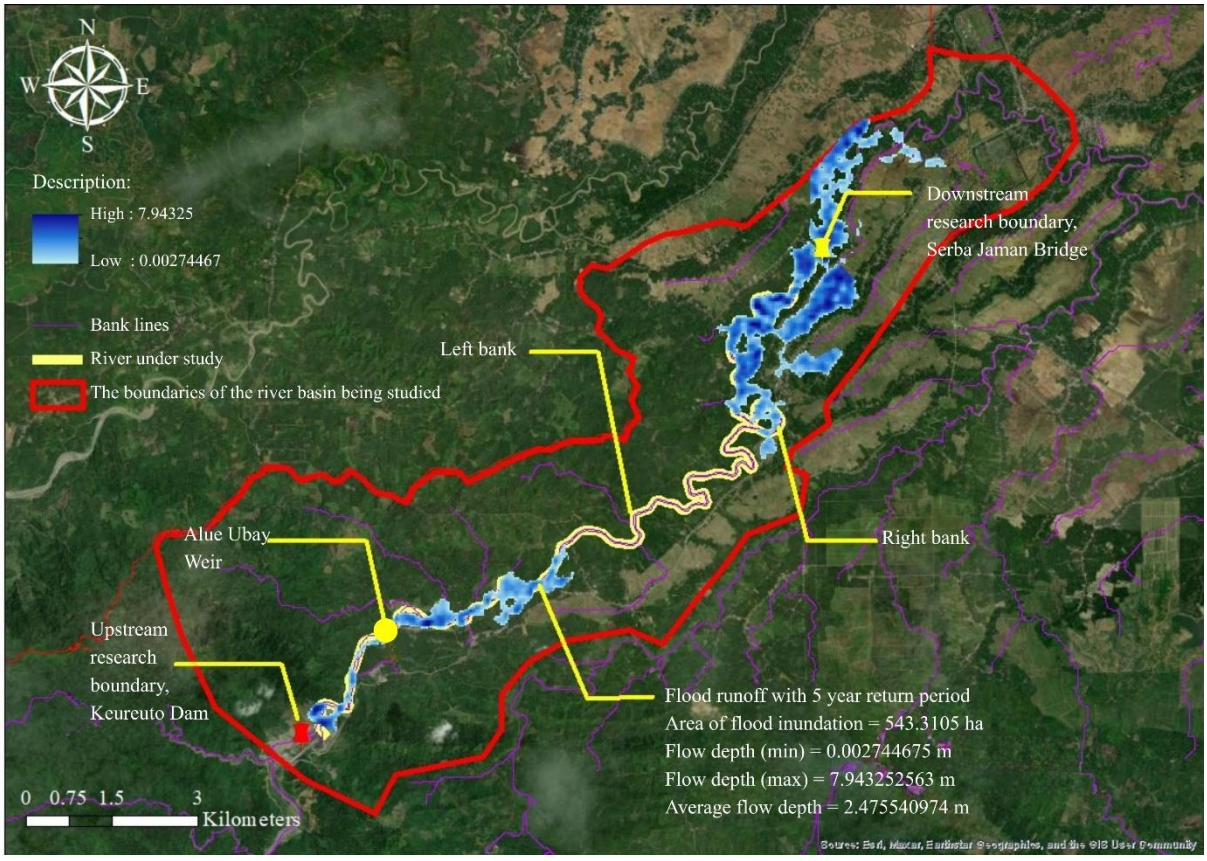

Fig. S1. Flood inundation maps for return periods of 5 years; min = minimum, max = maximum; source: own study

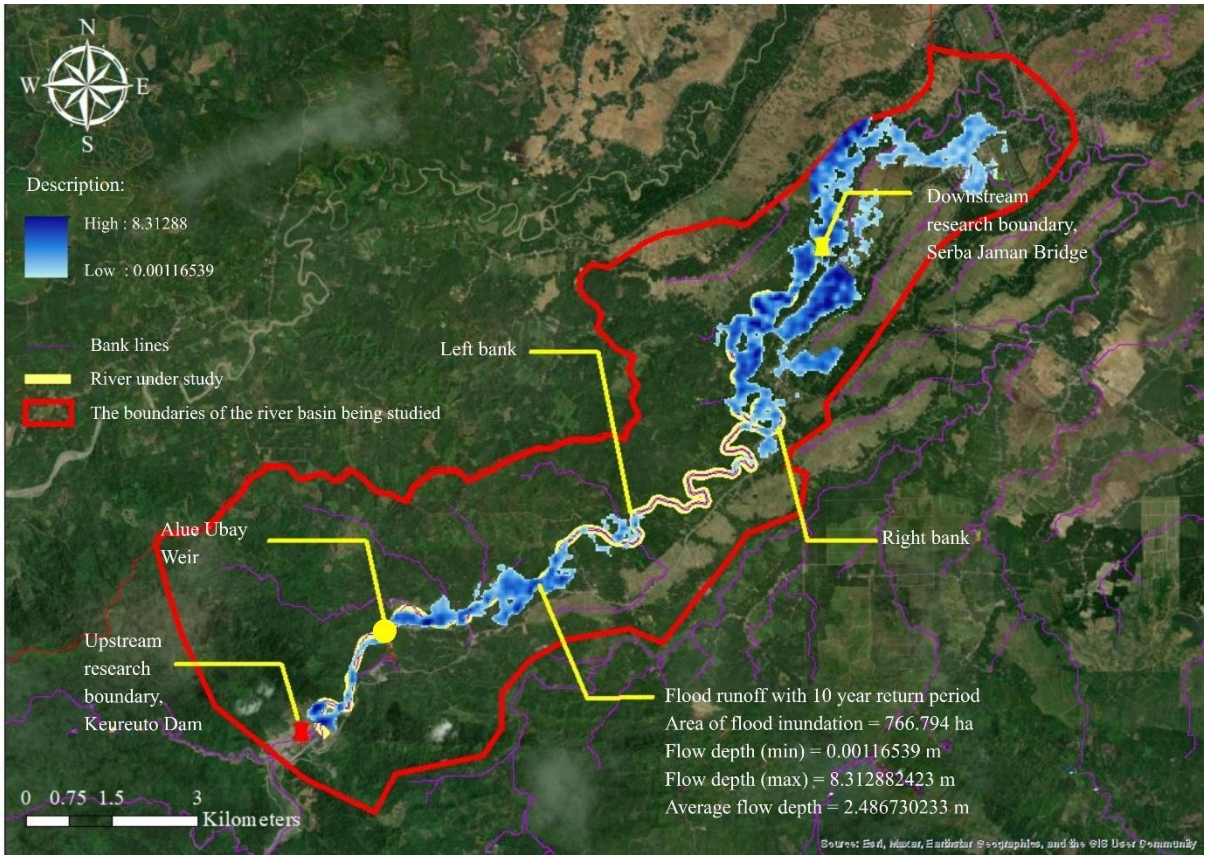

Fig. S2. Flood inundation maps for return periods of 10 years; min, max as in Fig. S1; source: own study

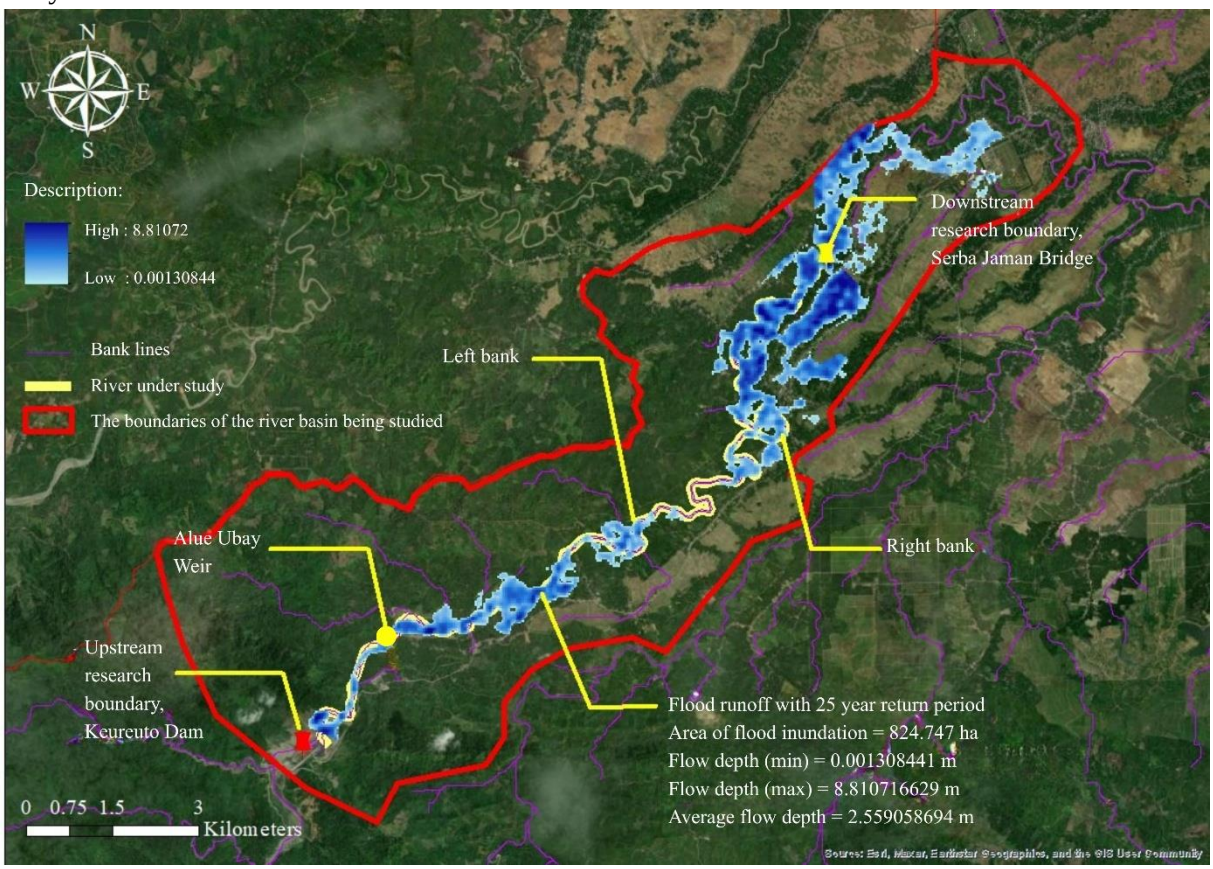

Fig. S3. Flood inundation maps for return periods of 25 years; min, max as in Fig. S1; source: own study

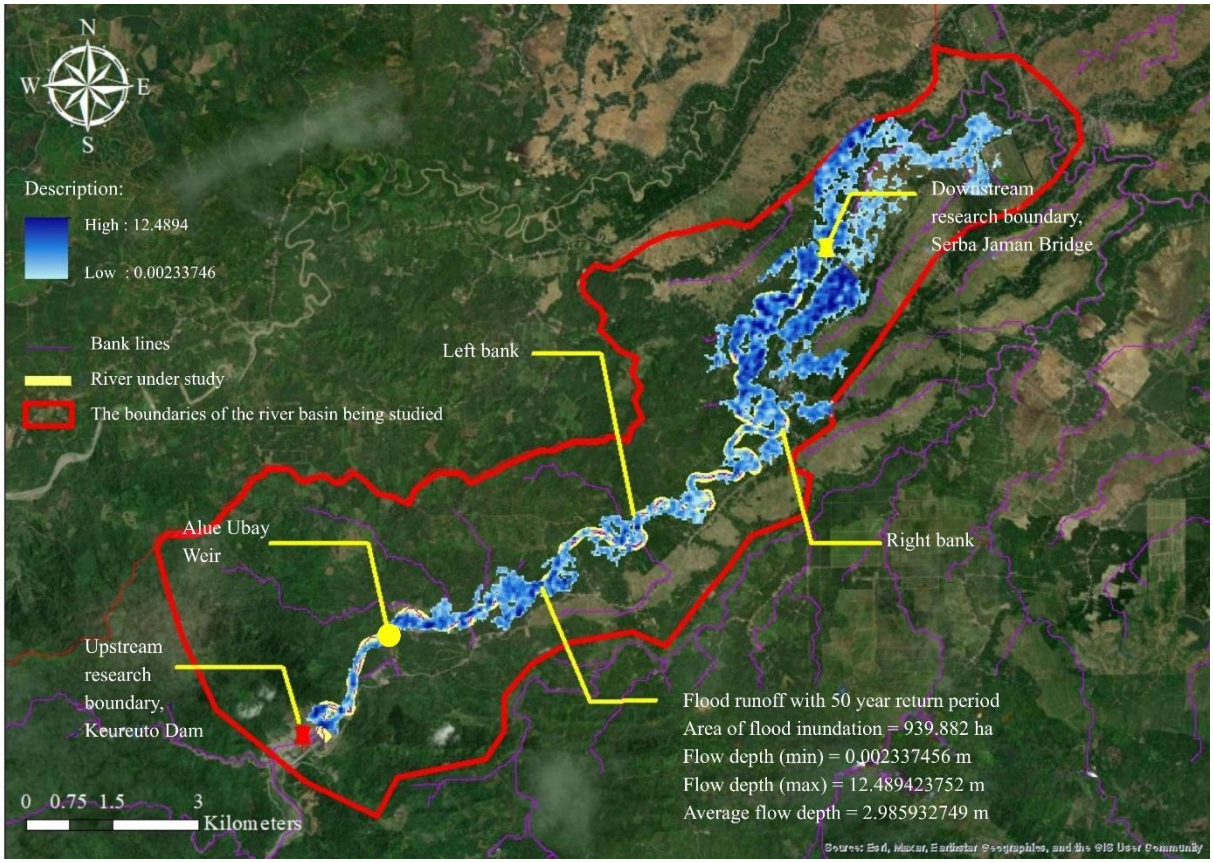

Fig. S4. Flood inundation maps for return periods of 50 years; min, max as in Fig. S1; source: own study