

SUPPLEMENTAL MATERIALS

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Partial Driftwood Rack at Gated Ogee Crest: Trapping Rate and Discharge Efficiency

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Driftwood appearance

Literature classifies four typical driftwood appearances in rivers, namely un-congested, semi-congested, congested, and hyper-congested (Braudrick et al. 1997, Ruiz-Villanueva et al. 2019).

For (i) un-congested transport, piece-to-piece contact between trunks happened rarely and trunks behaved independent of others, (ii) semi-congested transport occurred if individual trunks or small batches (three to five elements) moved, covering up to 1/3 of the wetted cross-section, (iii) congested transport appeared if trunks moved as a single batch occupying more than 1/3 of the wetted cross-section with a small spacing between trunks and may piece-to-piece contacts, and (iv) hyper-congested transport representing a batch of several vertical wood layers occupying the entire wetted cross-section. Wohl et al. (2019) showed an example of the river wood transport over a certain time period, where frequent un-congested driftwood was mobilized during numerous medium storm events, but including very few congested or hyper-congested wood appearances during extreme events. In reservoirs, the wood may accumulate and move under the influence of wind and local currents, for example generated by the spillway.

Box plots of trapping rate for tested configurations

The Figs. S1 to S2 show box plots of the trapping rates per driftwood supply mode and configuration:

- Figure S1 (sporadically arriving driftwood, without pier overhang) gives a representative overview of the trapping rates P for $b/L_M=0.60$ and various discharges (reference heads χ_R) as well as rack positions (1 to 4). Small values of P were observed for maximum discharges and racks mounted on the positions 1 and 2 (distant and intermediate).
- Figure S2 (congested driftwood appearance, without pier overhang) gives P in function of the rack position and χ_R , for $b/L_M=0.60$. Without rack (Fig. S2d), the average P was

around 0.70 to 0.80 for all tested χ_R . A distant partial rack (position 1, Fig. S2a) reduced P for $\chi_R=1$ to an average of around 0.35, whereas it was increased to around 0.90 for $\chi_R=0.33$.

- Figure S3 (various driftwood appearance, pier overhang and rack) shows the trapping rates P for the combined installation. As compared to the situation without pier overhang, an increased P occurred for all rack positions and relative heads.

References

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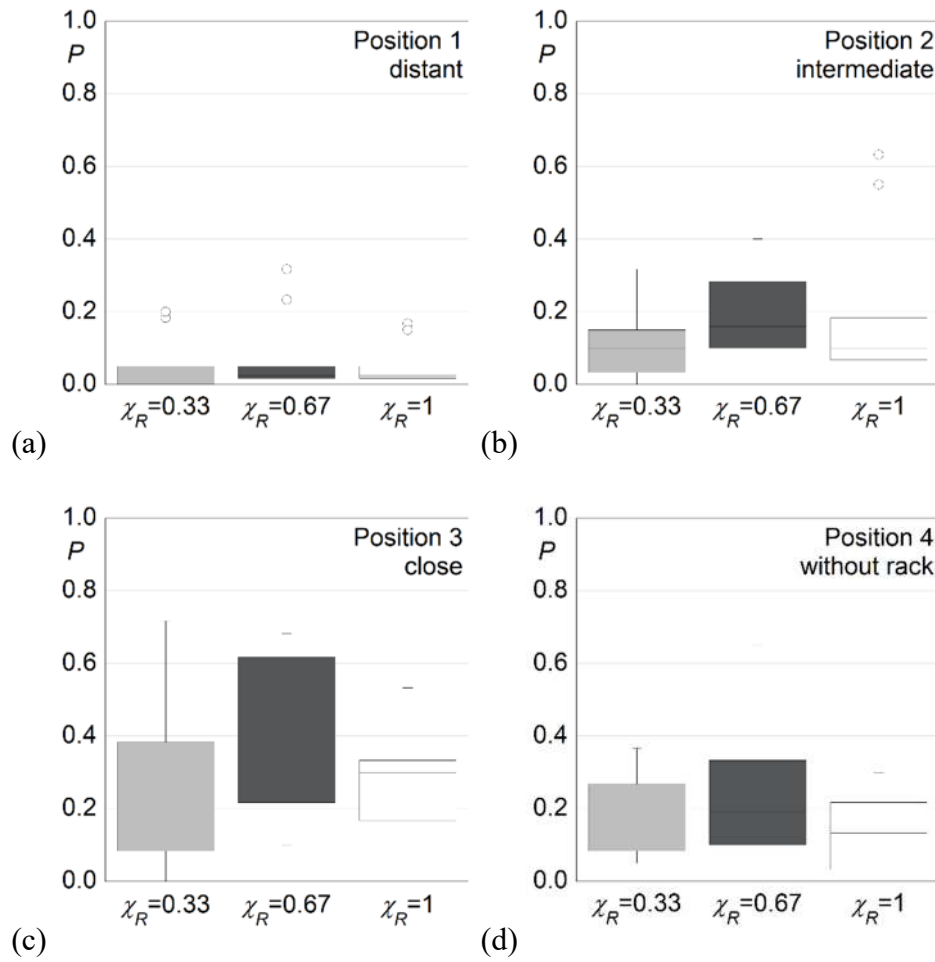


Fig S1. Trapping rates P for sporadically arriving driftwood for $b/L_M=0.60$, partial rack position

(a) 1, (b) 2, (c) 3, and (d) 4 (without rack).

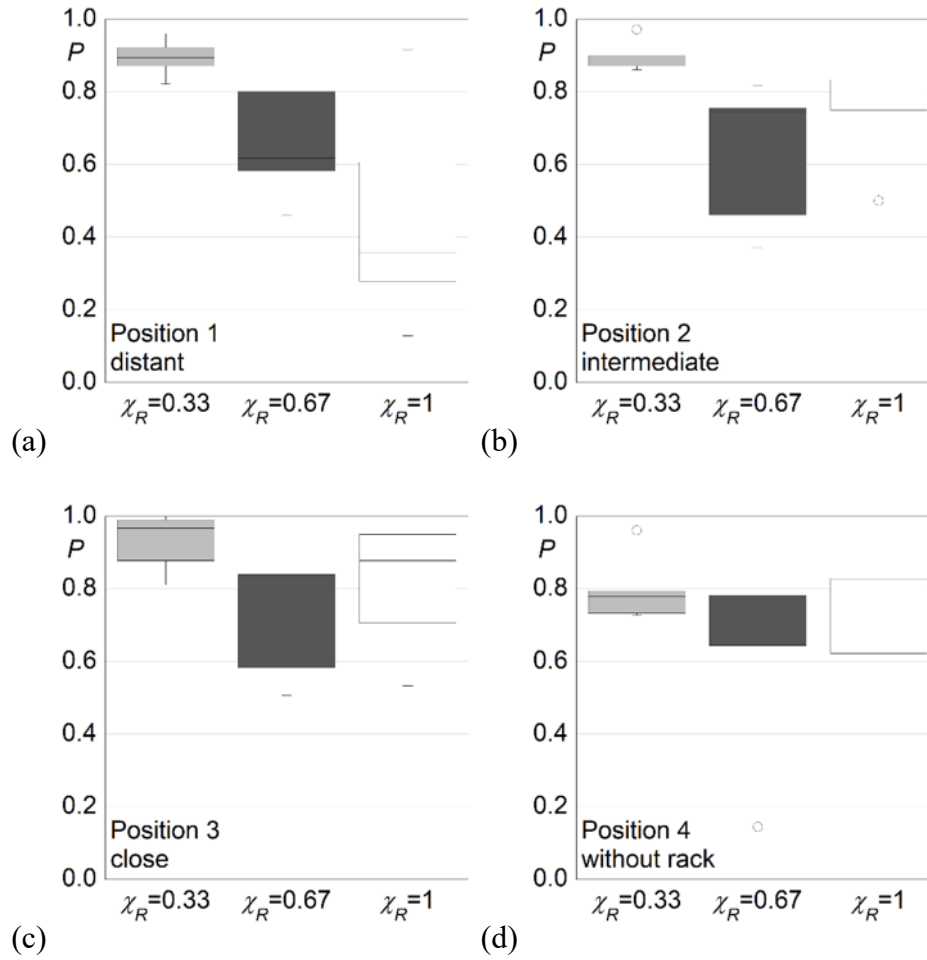


Fig S2. Trapping rates P for congested driftwood appearance for $b/L_M=0.60$, partial rack position

(a) 1, (b) 2, (c) 3, and (d) 4 (without rack).

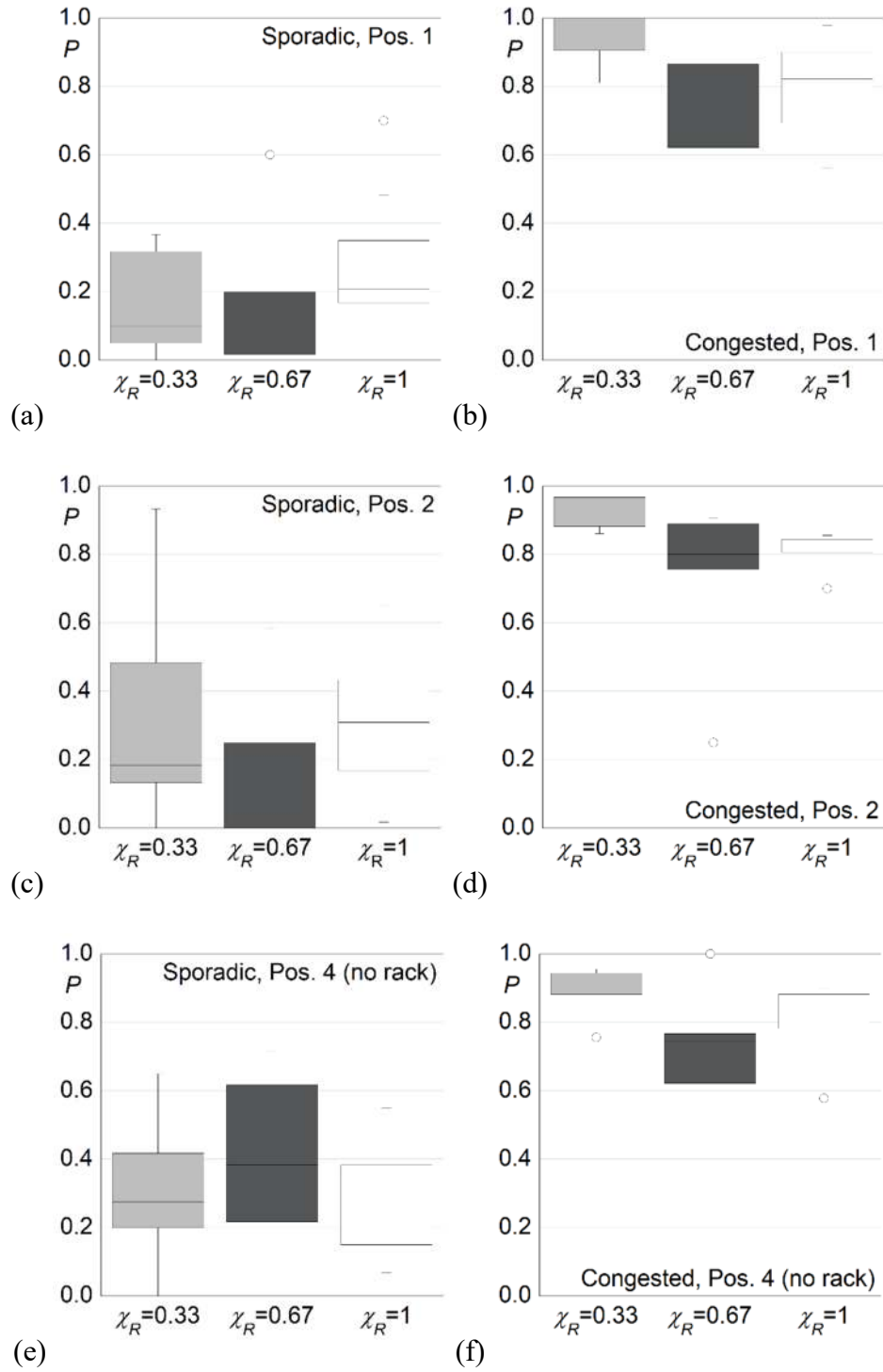


Fig S3. Trapping rates P for $b/L_M=0.60$ with pier overhang and partial rack: (a) sporadic appearance and position 1, (b) congested and pos. 1, (c) sporadic and pos. 2, (d) congested and pos. 2, (e) sporadic and pos. 4, and (f) congested and pos. 4.