

Figures

| Abb | Scale | Metric | Connectivity Type | Split Value | Delta k |
|-----|-------|-----------------------|-------------------|-------------|---------|
| cd | nws | Closest lake distance | long | 2776.81 | 0.27 |
| ll | nws | Average Link Length | long | 2237.34 | 0.19 |
| lc | focal | Lake Connection | long | NA | 0.17 |
| la | nws | Upstream lake area | lat | 153.50 | 0.16 |
| md | focal | Max Depth | NA | 19.81 | 0.15 |
| ll | iws | Average Link Length | long | 2177.08 | 0.14 |
| sd | nws | Stream density | lat | 10.40 | 0.13 |
| bf | iws | Baseflow | lat | 63.76 | 0.12 |
| sr | iws | Stream order ratio | long | 0.67 | 0.10 |
| cd | iws | Closest lake distance | long | 3773.61 | 0.05 |
| sr | nws | Stream order ratio | long | 0.47 | 0.05 |
| sd | iws | Stream density | lat | 4.43 | 0.03 |
| bf | nws | Baseflow | lat | 52.94 | 0.00 |

| Characteristic | Mean | LQ | UQ |
|---------------------|-------|-------|-------|
| Max Depth (m) | 12.95 | 9.20 | 21.34 |
| Ag Landuse (%) | 53.27 | 17.68 | 74.05 |
| TP (mg/L) | 0.04 | 0.02 | 0.11 |
| P Retention (%) | 0.46 | 0.24 | 0.59 |
| Secchi (m) | 1.50 | 0.90 | 2.40 |
| Residence Time (yr) | 0.63 | 0.20 | 1.80 |

| | sd | cd | bf | ll | sr | la |
|----|-------|-------|------|-------|-------|------|
| cd | 0.29 | NA | NA | NA | NA | NA |
| bf | -0.53 | -0.23 | NA | NA | NA | NA |
| ll | -0.24 | -0.05 | 0.13 | NA | NA | NA |
| sr | -0.26 | -0.12 | 0.17 | 0.29 | NA | NA |
| la | -0.11 | 0.00 | 0.17 | -0.02 | -0.27 | NA |
| md | -0.05 | -0.01 | 0.24 | -0.01 | -0.02 | 0.17 |

| metric | direction | k | connectivity | in_lake_processing | axis | connectivity type |
|-----------------------|-----------|--------|--------------|--------------------|-------------|-------------------|
| closest lake distance | lower | higher | lower | higher | lake-stream | long |
| average link length | lower | higher | lower | higher | stream | long |
| lakeconnection | DR_Stream | higher | lower | higher | lake | long |
| upstream lake area | lower | higher | lower | higher | lake | lat |
| stream density | higher | higher | lower | higher | stream | lat |
| baseflow | higher | higher | lower | higher | stream | lat |
| stream order ratio | higher | higher | lower | higher | stream | long |

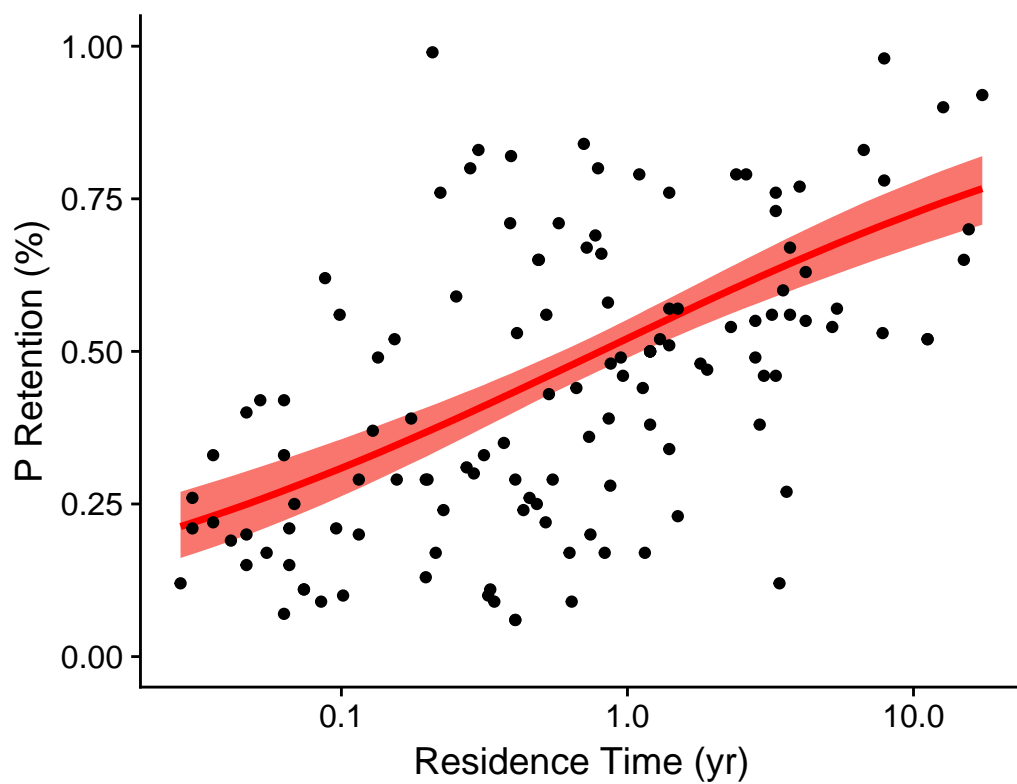


Figure 1: Median and central 95% interval estimates from the non-hierarchical model posterior relative to raw data.

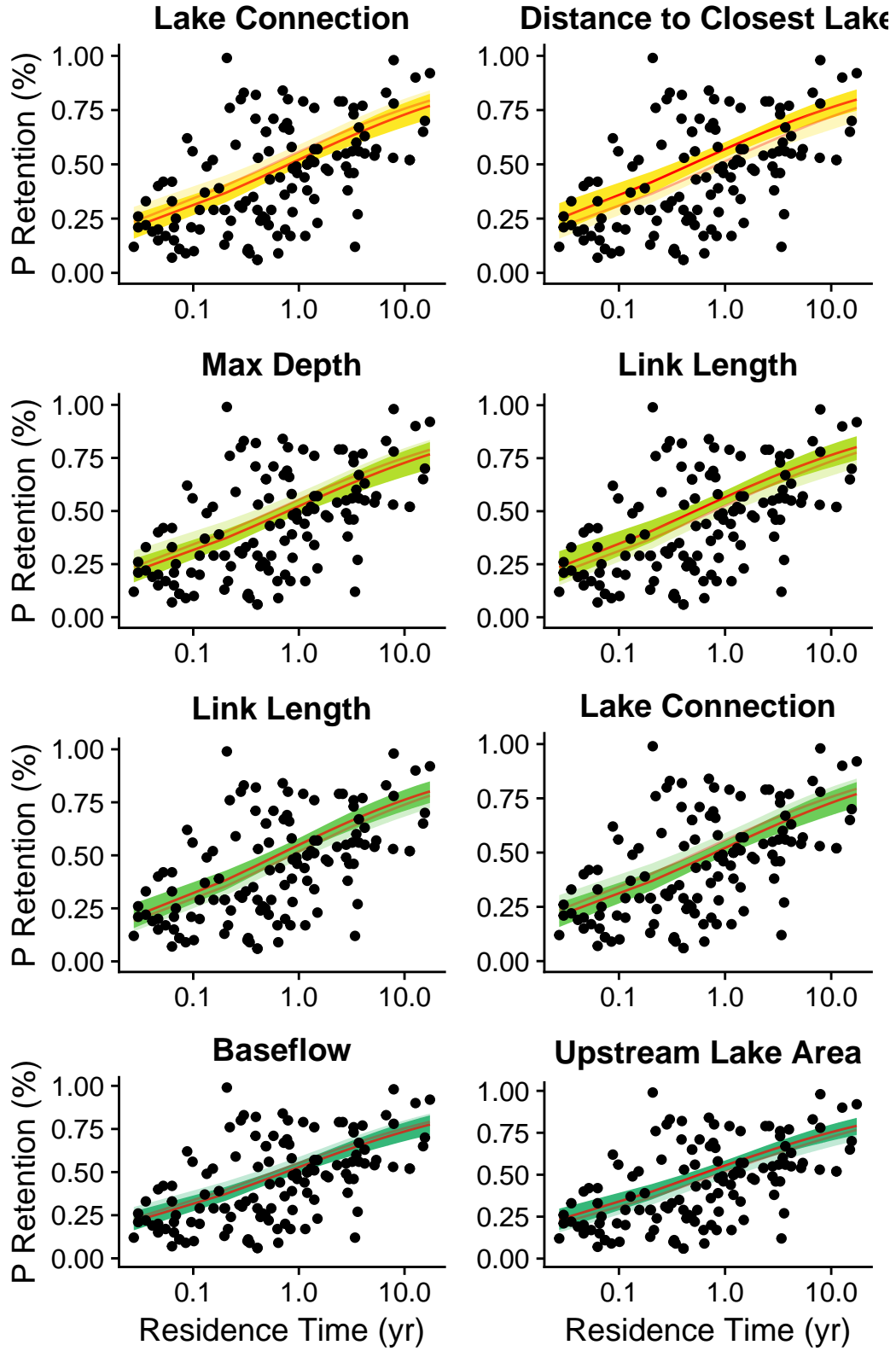


Figure 2: Median and central 95% interval estimates from the hierarchical model posteriors relative to raw data. Dark lines and shaded polygons represent the estimates from the lower of the two partition groups (see Table 1)

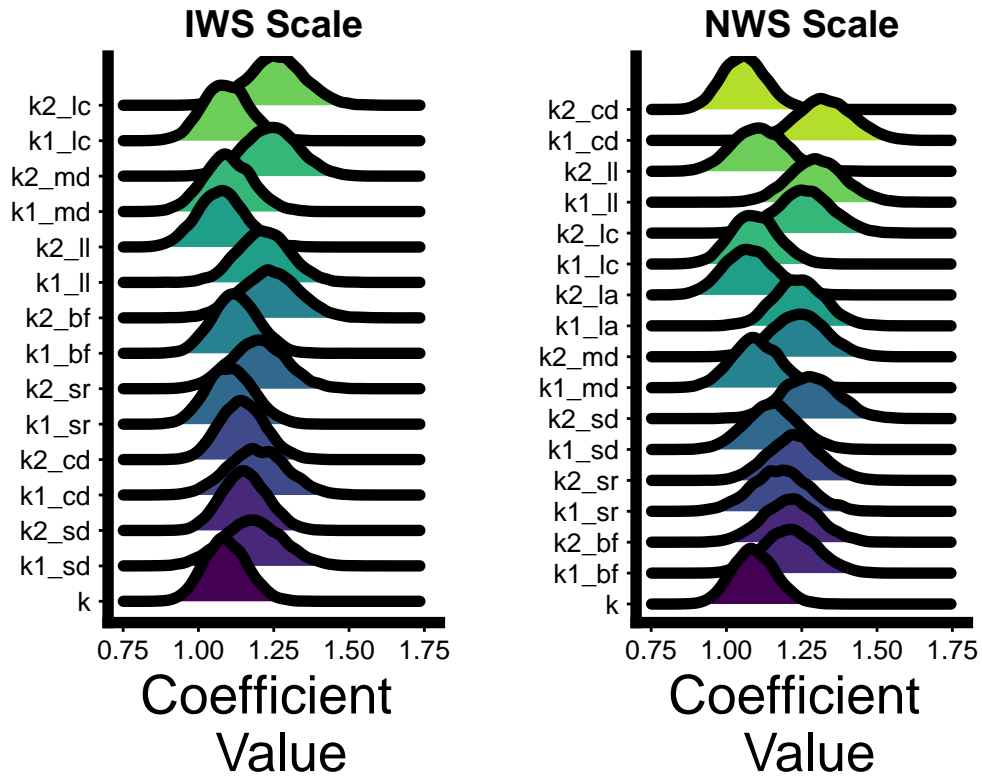


Figure 3: Distribution of Vollenweider's k in low and high connectivity partitions at the IWS and NWS scales.

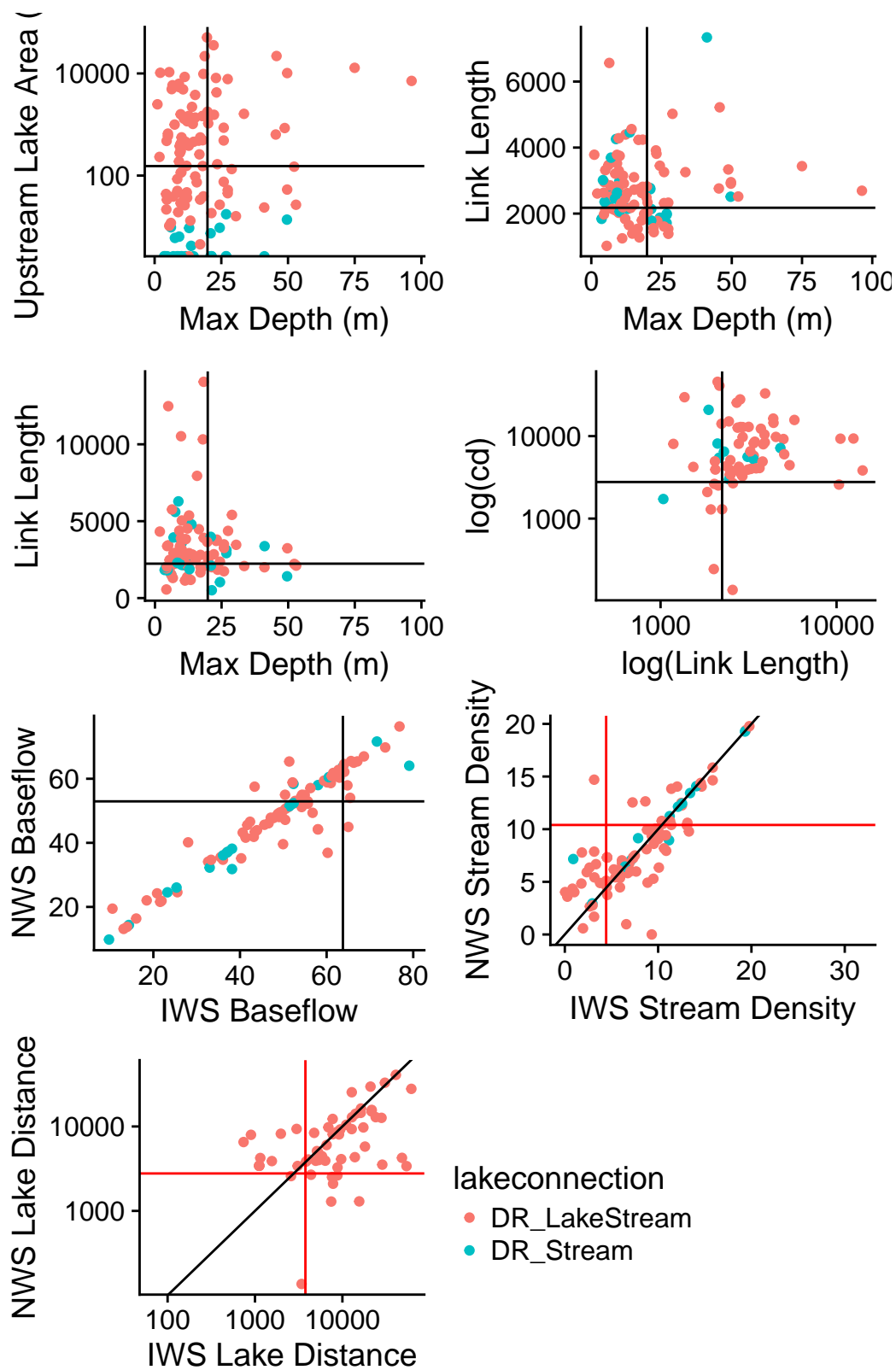


Figure 4: Exploratory plots

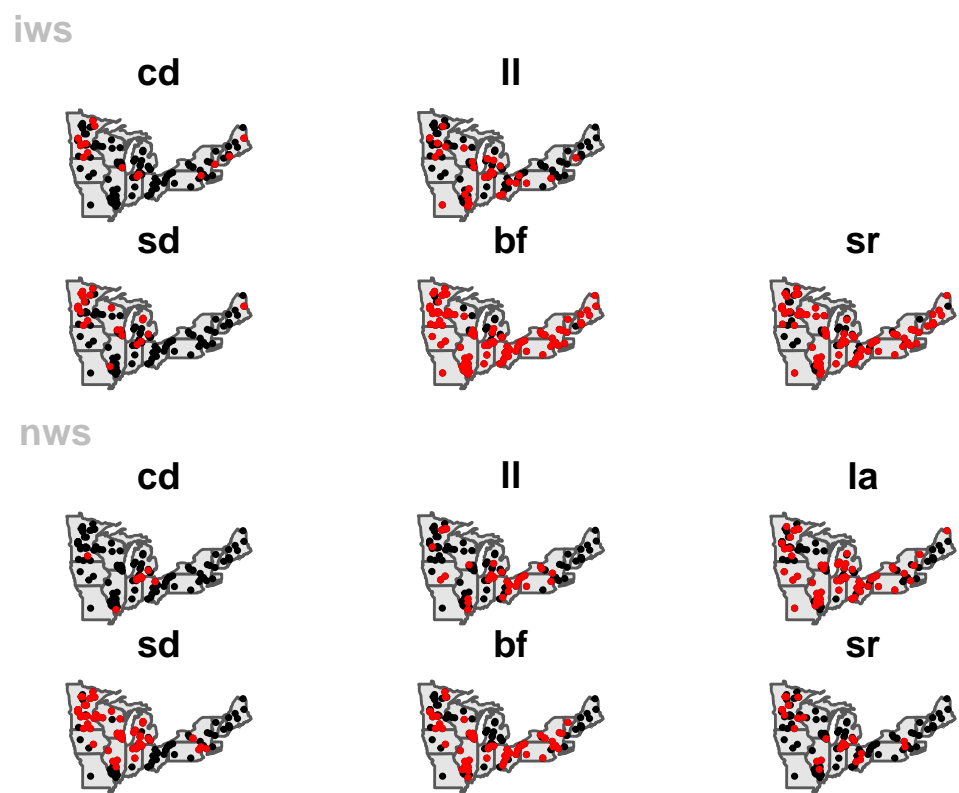


Figure 5: Map of lake connectivity partitions.

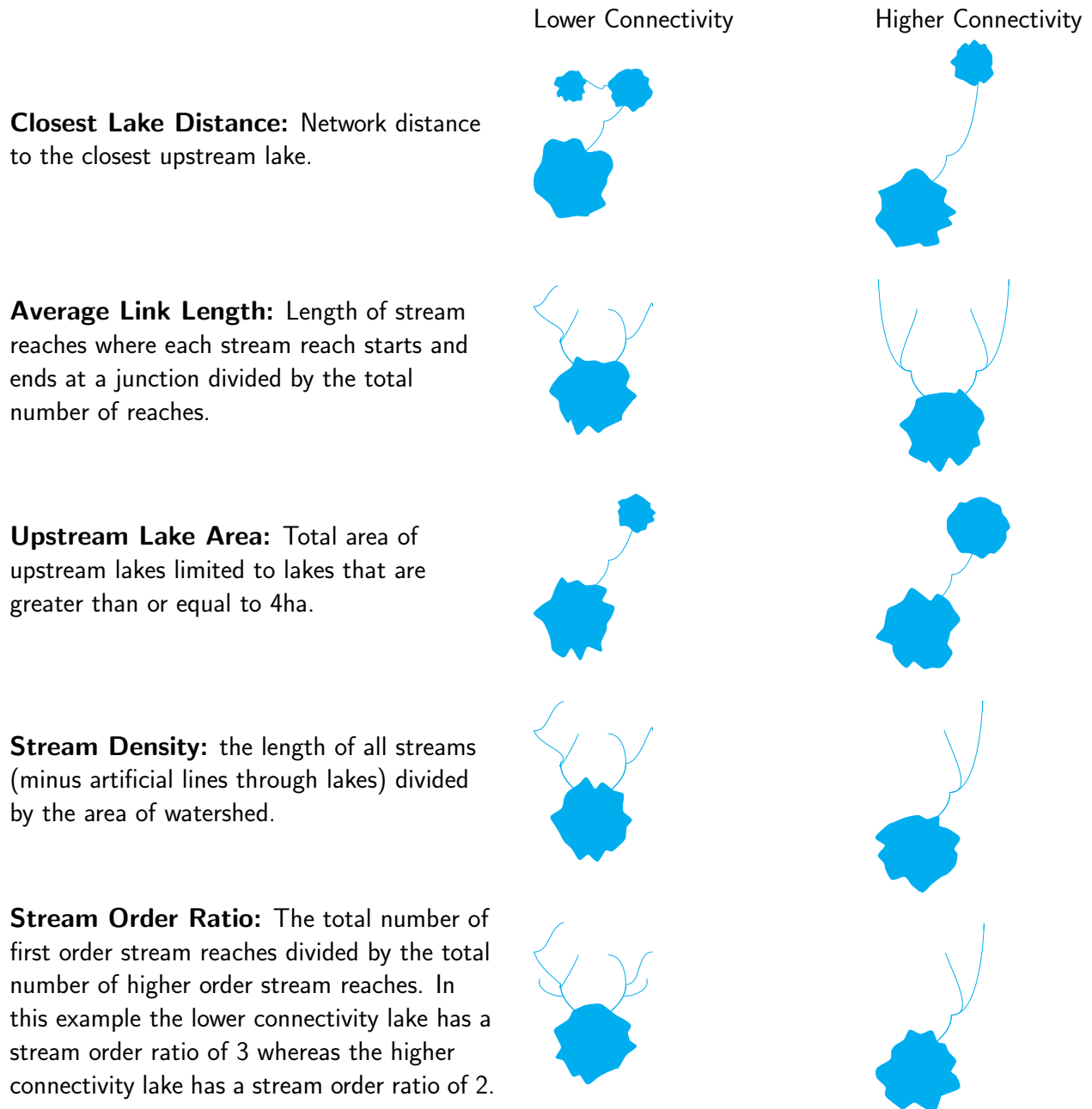


Figure 6: Connectivity metric box