Supplemental Data Set: An approach to measure parameter sensitivity

**Table 1** HSPF parameter descriptions

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Parameter | Units | Function of | Possible  Values1 | | Model Parameter Values | |
| Min | Max | LMR | LVW |
| PWATER | **LZSN** - Lower Zone Nominal Soil Moisture Storage | mm | Soils, climate | 50.8 | 381 | 162.56 | 127 |
| **INFILT** - Index to Infiltration Capacity | mm/hr | Soils, land use | 0.028 | 12.7 | 12.7 | 31.752 |
| **AGWRC** - Base groundwater recession | None | Base flow recession | 0.85 | 0.999 | 0.85 | 0.92 |
| **DEEPFR** - Fraction of GW inflow to deep recharge | None | Geology, Groundwater recharge | 0 | 0.5 | 0.45 | 0.72 |
| **UZSN** - Upper zone nominal soil moisture storage | mm | Surface soil conditions, land use | 1.27 | 50.8 | 20.32 | 12.7 |
| **IRC** - Interflow recession parameter | None | Soils, topography, land use | 0.3 | 0.85 | 0.75 | 0.45 |
| IWATER | **LSUR** - Length of overland flow | meters | Topography | 15.24 | 76.2 | 76.2 | 91.442 |
| **NSUR** - Manning’s n (roughness) for overland flow | None | Surface conditions, residue, etc. | 0.01 | 0.3 | 0.05 | 0.08 |
| **RETSC** - Retention (Interception) Storage capacity | mm | Retention potential of impervious surfaces | 2.54 | 12.7 | 2.54 | 2.54 |

1 Range of possible values for each model parameter (USEPA 2000)

2 Due to the local hydrologic characteristics, some parameters may have values beyond the recommended range (USEPA 2000).

**Table 2** Flow rates for each regime in the LMR and LVW watersheds

|  |  |  |  |
| --- | --- | --- | --- |
|  | Flow rates (m3/s) | | |
|  | Low (>60%) | Medium (10%-60%) | High (<10%) |
| LMR | <19 | 19-129 | >129 |
| LVW | <5 | 5-6 | >6 |

**Table 3** The ranking of the parameters in the LMR and LVW watersheds according to their sensitivities

|  |  |  |
| --- | --- | --- |
| **Parameter Sensitivity** | **Watershed Parameters** | |
| **LMR** | **LVW** |
| High | DEEPFR | INFILT |
|  | INFILT | DEEPFR |
|  | AGWRC | LZSN |
|  | UZSN | AGWRC |
|  | IRC | RETSC |
|  | LZSN | I-LSUR |
|  | RETSC | I-NSUR |
|  | I-LSUR | UZSN |
| Low | I-NSUR | IRC |

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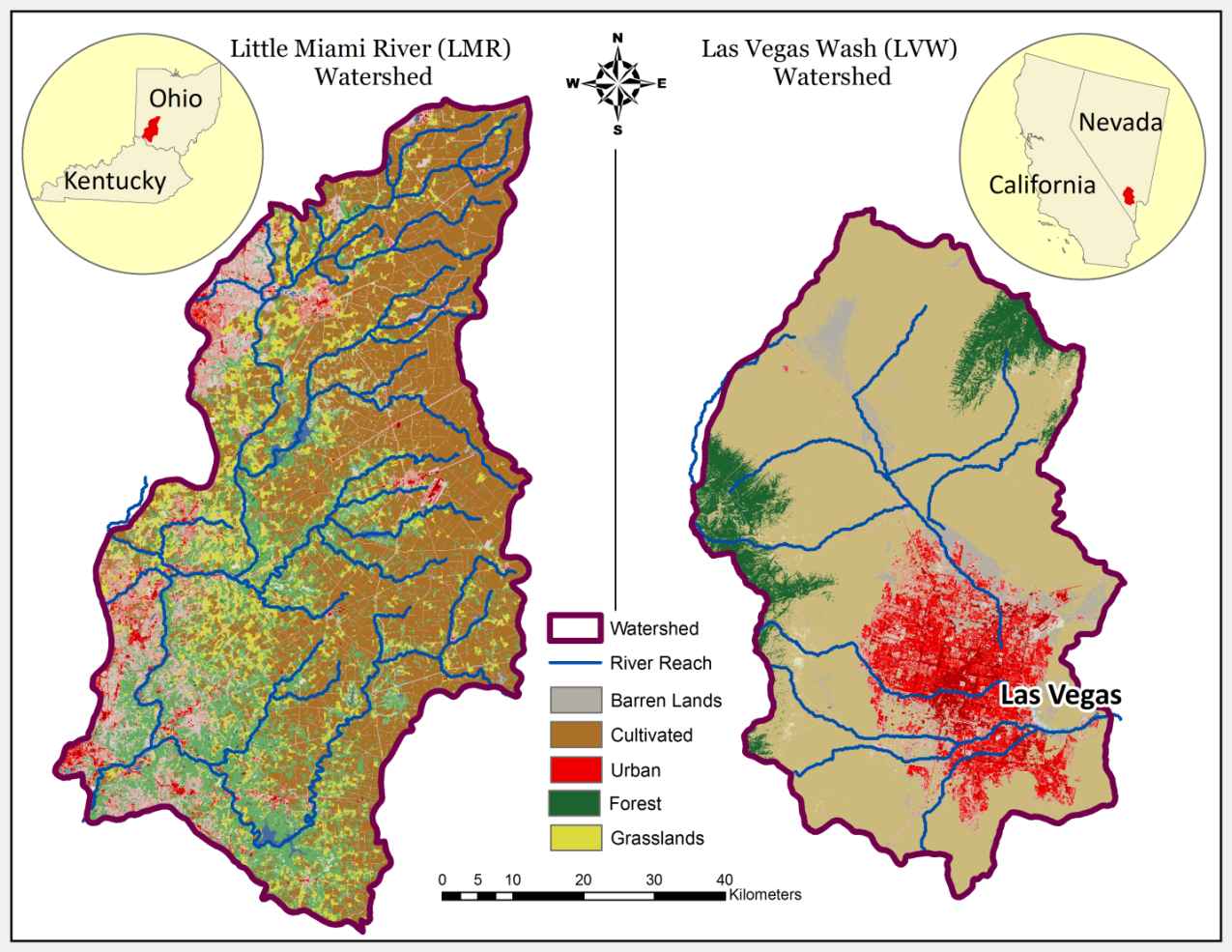
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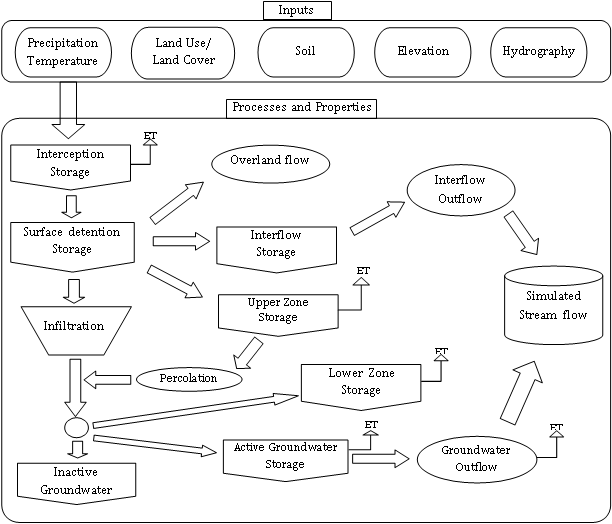
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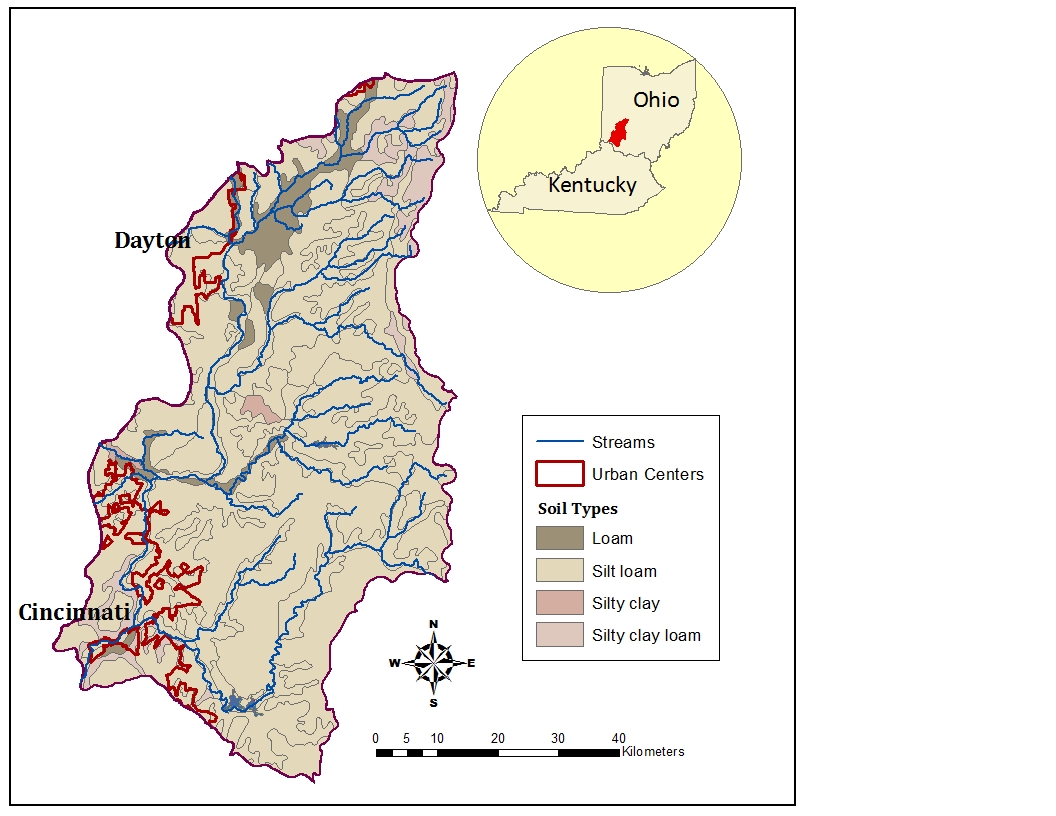
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**Fig. 1** Maps of the study areas: the LMR and LVW watersheds



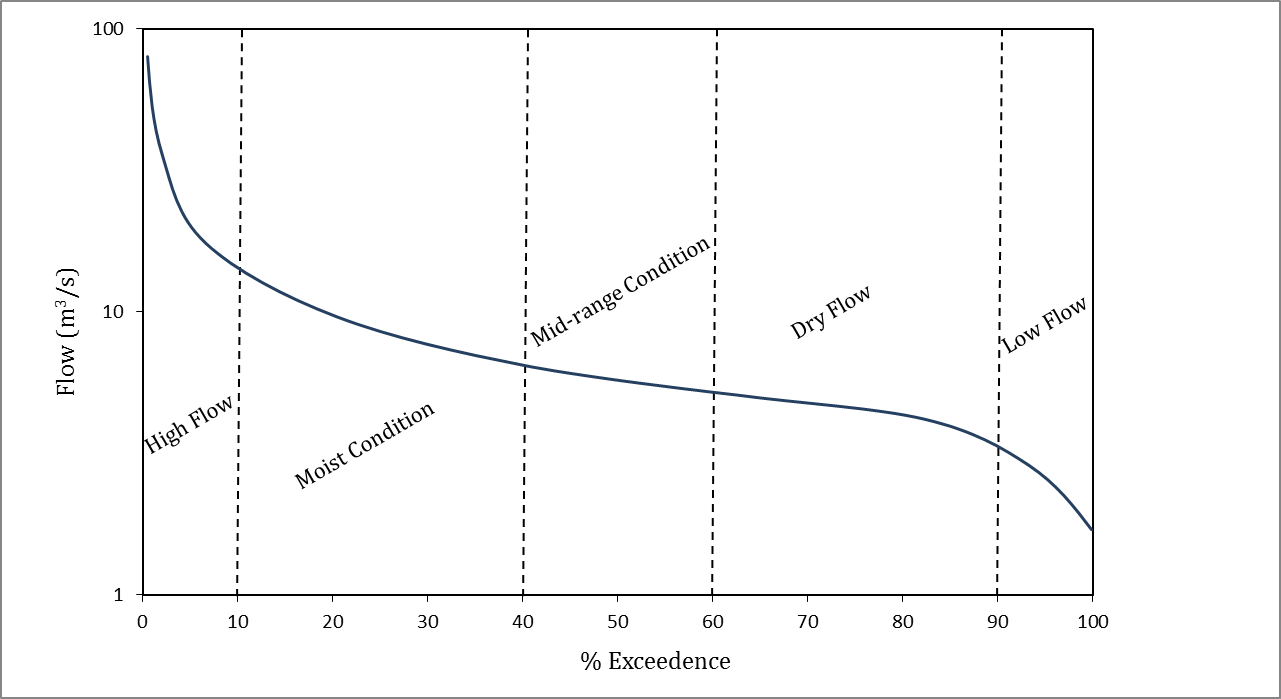
**Fig. 2** Conceptual model of HSPF hydrologic simulation



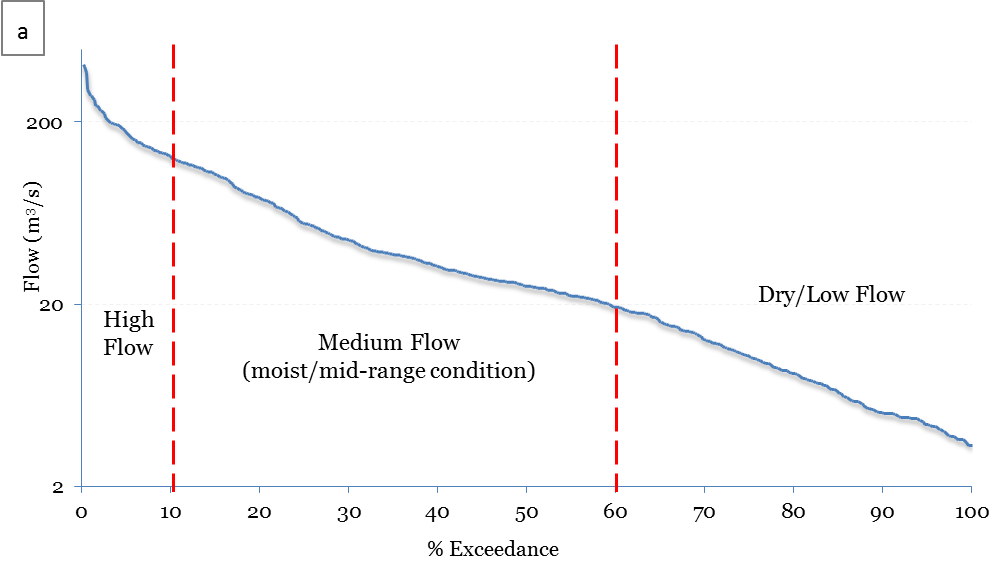
**Fig. 3** Major soil types of the LMR watershed

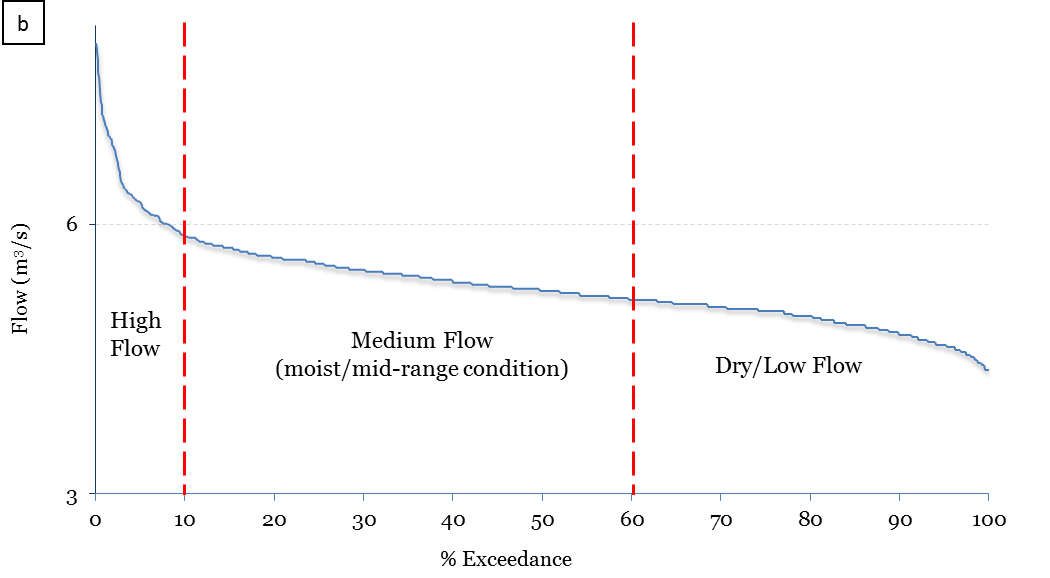


**Fig. 4** Major soil types of the LVW watershed

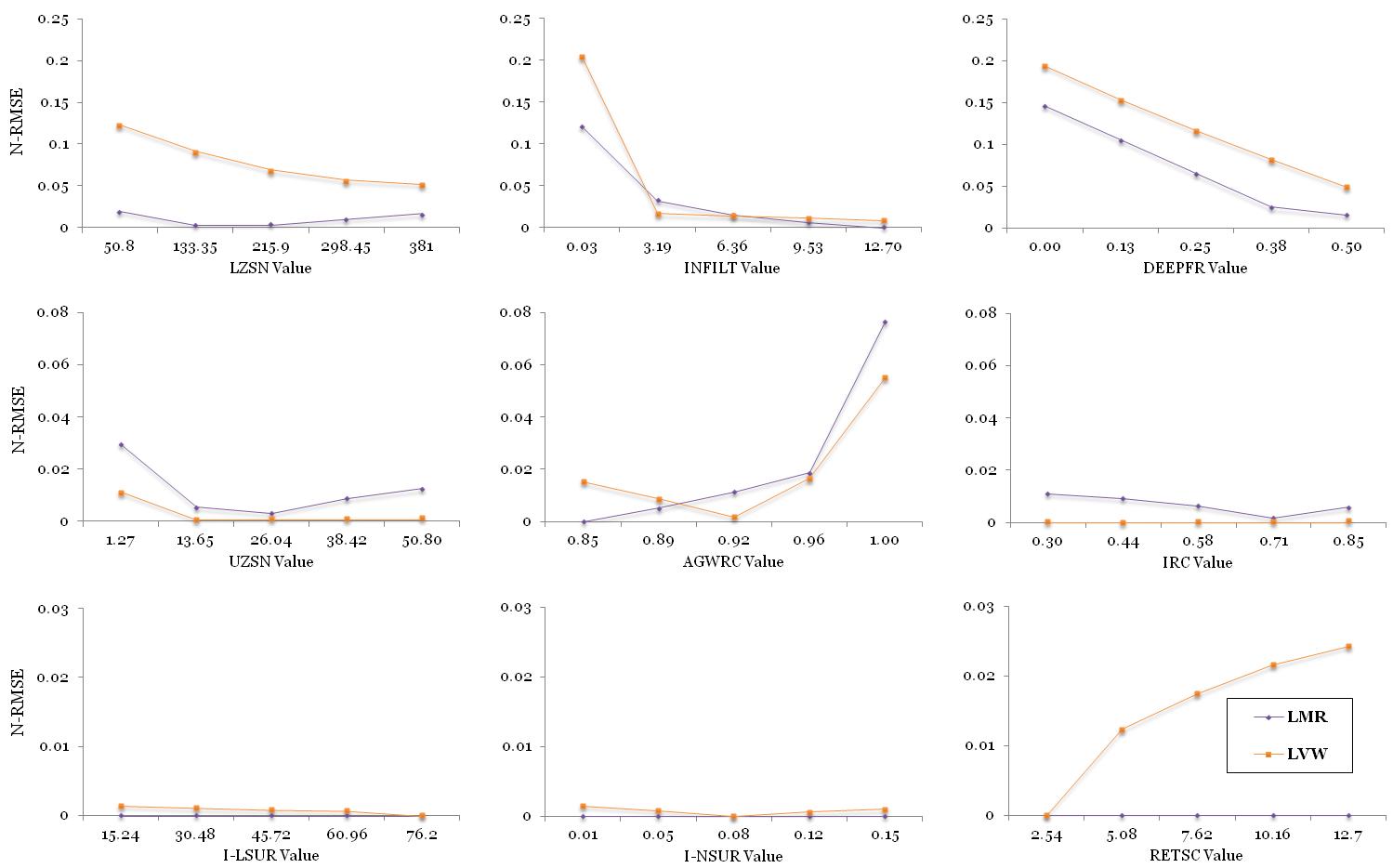


**Fig.** 5 Flow regimes of a Flow Duration Curve (FDC)



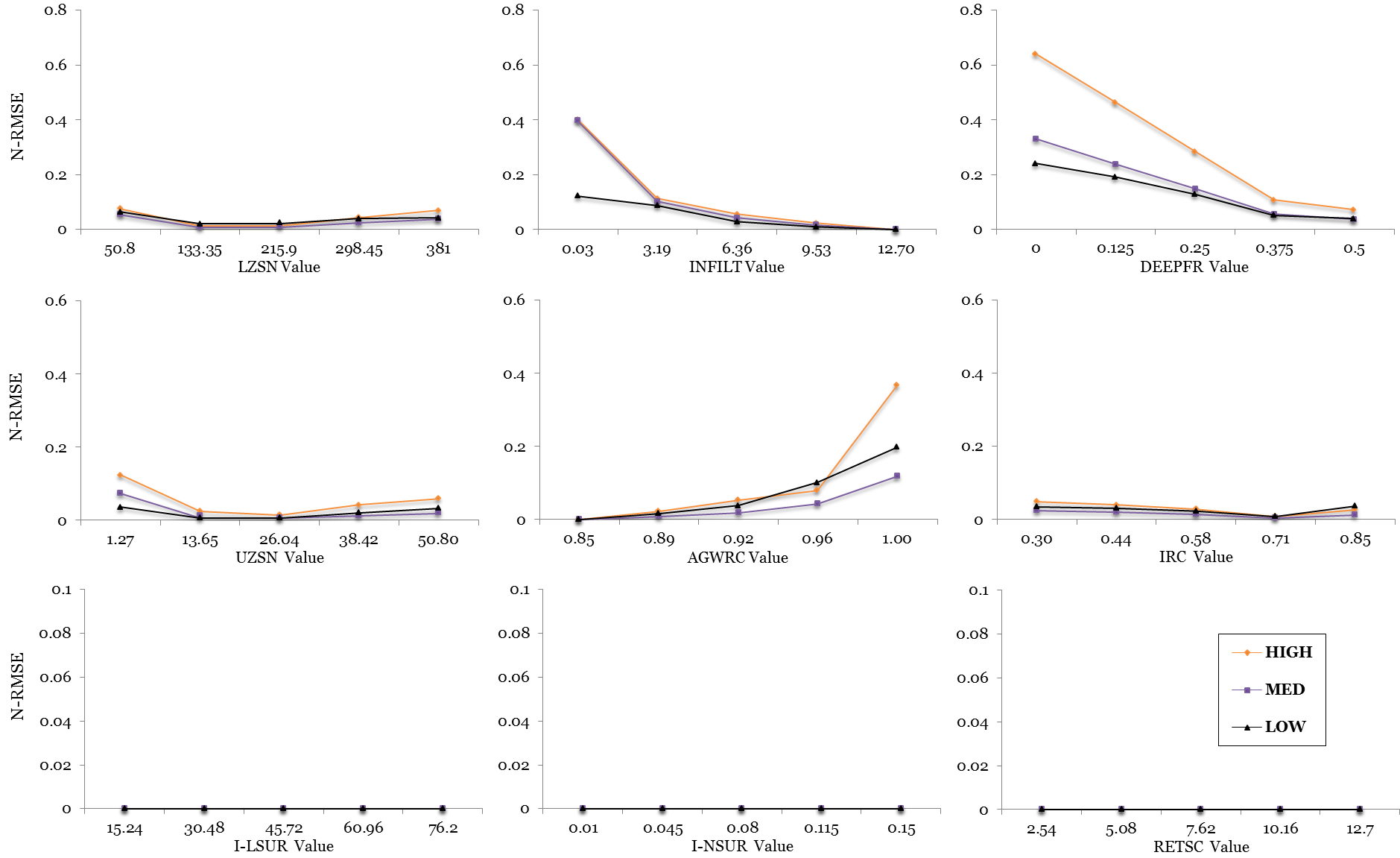


**Fig. 6**  Flow duration curves for the (a) LMR watershed; (b) LVW watershed



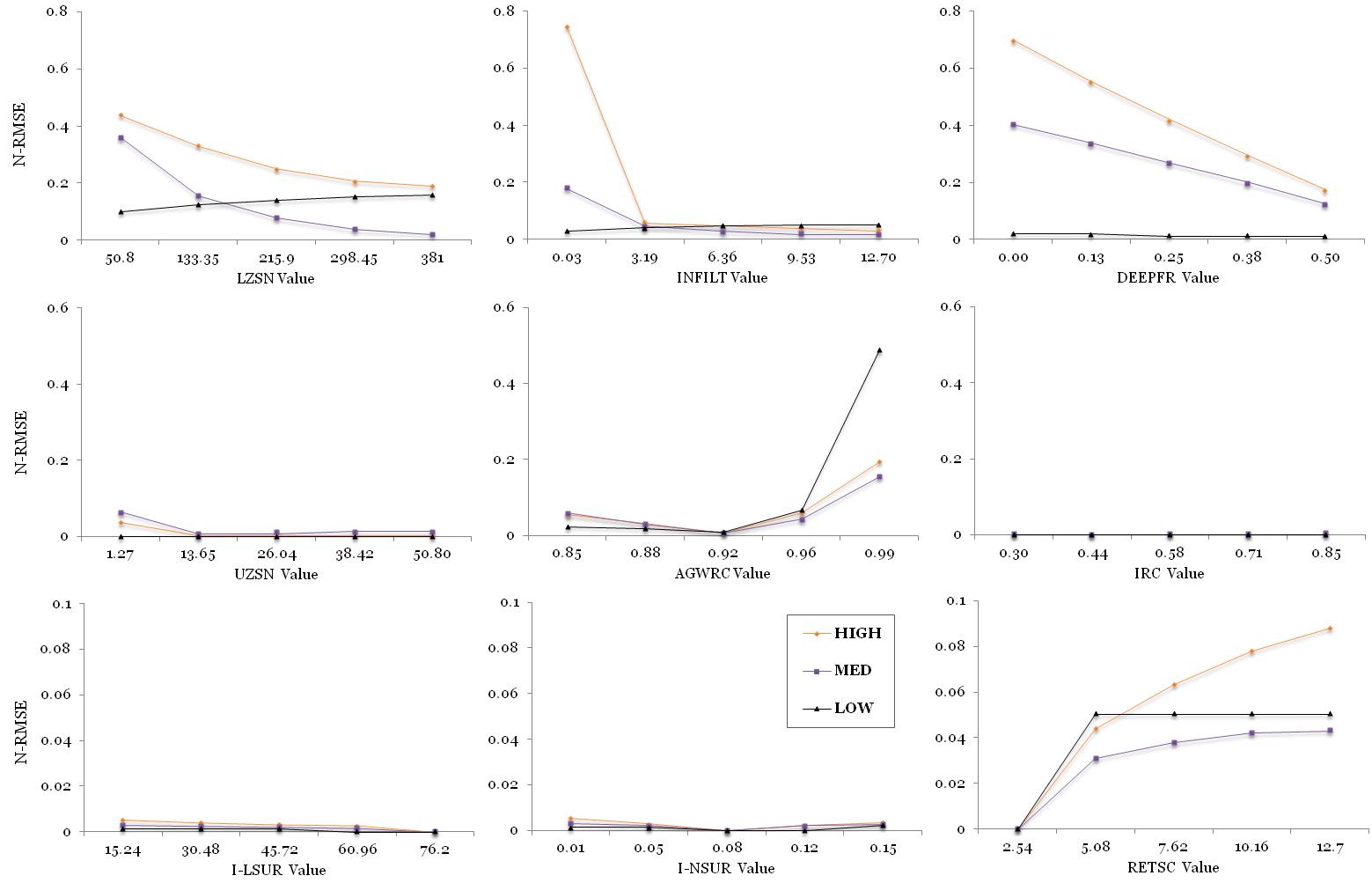
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