

IHA Appendix Attachment: From IHA Manual V7.1, Table 2. Summary of Environmental Flow Components (EFC) Parameters and their Ecosystem Influences

<b><u>EFC Type</u></b>	<b><u>Hydrologic Parameters</u></b>	<b><u>Ecosystem Influences</u></b>
1. Monthly low flows	<p>Mean or median values of low flows during each calendar month</p> <hr/> <p><i>Subtotal 12 parameters</i></p>	<ul style="list-style-type: none"> <li>• Provide adequate habitat for aquatic organisms</li> <li>• Maintain suitable water temperatures, dissolved oxygen, and water chemistry</li> <li>• Maintain water table levels in floodplain, soil moisture for plants</li> <li>• Provide drinking water for terrestrial animals</li> <li>• Keep fish and amphibian eggs suspended</li> <li>• Enable fish to move to feeding and spawning areas</li> <li>• Support hyporheic organisms (living in saturated sediments)</li> </ul>
2. Extreme low flows	<p>Frequency of extreme low flows during each water year or season</p> <p>Mean or median values of extreme low flow event:</p> <ul style="list-style-type: none"> <li>• Duration (days)</li> <li>• Peak flow (minimum flow during event)</li> <li>• Timing (Julian date of peak flow)</li> </ul> <hr/> <p><i>Subtotal 4 parameters</i></p>	<ul style="list-style-type: none"> <li>• Enable recruitment of certain floodplain plant species</li> <li>• Purge invasive, introduced species from aquatic and riparian communities</li> <li>• Concentrate prey into limited areas to benefit predators</li> </ul>
3. High flow pulses	<p>Frequency of high flow pulses during each water year or season</p> <p>Mean or median values of high flow pulse event:</p> <ul style="list-style-type: none"> <li>• Duration (days)</li> <li>• Peak flow (maximum flow during event)</li> <li>• Timing (Julian date of peak flow)</li> <li>• Rise and fall rates</li> </ul> <hr/> <p><i>Subtotal 6 parameters</i></p>	<ul style="list-style-type: none"> <li>• Shape physical character of river channel, including pools, riffles</li> <li>• Determine size of streambed substrates (sand, gravel, cobble)</li> <li>• Prevent riparian vegetation from encroaching into channel</li> <li>• Restore normal water quality conditions after prolonged low flows, flushing away waste products and pollutants</li> <li>• Aerate eggs in spawning gravels, prevent siltation</li> <li>• Maintain suitable salinity conditions in estuaries</li> </ul>

4. Small floods	<p>Frequency of small floods during each water year or season</p> <p>Mean or median values of small flood event:</p> <ul style="list-style-type: none"> <li>• Duration (days)</li> <li>• Peak flow (maximum flow during event)</li> <li>• Timing (Julian date of peak flow)</li> <li>• Rise and fall rates</li> </ul> <hr/> <p><i>Subtotal 6 parameters</i></p>	<p>Applies to small and large floods:</p> <ul style="list-style-type: none"> <li>• Provide migration and spawning cues for fish</li> <li>• Trigger new phase in life cycle (i.e insects)</li> <li>• Enable fish to spawn in floodplain, provide nursery area for juvenile fish</li> <li>• Provide new feeding opportunities for fish, waterfowl</li> <li>• Recharge floodplain water table</li> <li>• Maintain diversity in floodplain forest types through prolonged inundation (i.e. different plant species have different tolerances)</li> <li>• Control distribution and abundance of plants on floodplain</li> <li>• Deposit nutrients on floodplain</li> </ul>
5. Large floods	<p>Frequency of large floods during each water year or season</p> <p>Mean or median values of large flood event:</p> <ul style="list-style-type: none"> <li>• Duration (days)</li> <li>• Peak flow (maximum flow during event)</li> <li>• Timing (Julian date of peak flow)</li> <li>• Rise and fall rates</li> </ul> <hr/> <p><i>Subtotal 6 parameters</i></p> <hr/> <p><b>Grand total 34 parameters</b></p>	<p>Applies to small and large floods:</p> <ul style="list-style-type: none"> <li>• Maintain balance of species in aquatic and riparian communities</li> <li>• Create sites for recruitment of colonizing plants</li> <li>• Shape physical habitats of floodplain</li> <li>• Deposit gravel and cobbles in spawning areas</li> <li>• Flush organic materials (food) and woody debris (habitat structures) into channel</li> <li>• Purge invasive, introduced species from aquatic and riparian communities</li> <li>• Disburse seeds and fruits of riparian plants</li> <li>• Drive lateral movement of river channel, forming new habitats (secondary channels, oxbow lakes)</li> <li>• Provide plant seedlings with prolonged access to soil moisture</li> </ul>