

**Appendix D: Impacted Stream Characteristics and Plan Criteria**  
(Sensitive and Non-Supporting found on the following pages)

<b>Subwatershed Category: IMPACTED Stream</b>	
Description:	Subwatershed has 10 to 25% impervious cover, and monitoring indicates a decline in physical, biological or water quality indicators. Subwatershed may be “best attainable” condition given previous disturbances.
Goal:	<ol style="list-style-type: none"> <li>1. Limit the degradation of stream habitat quality.</li> <li>2. Maintain “good” biological community (fishable/swimmable).</li> </ol>
Subwatershed Planning Objectives:	<ul style="list-style-type: none"> <li>• Reduce the frequency of post-development bankfull and subbankfull flooding.</li> <li>• Maintain channel stability.</li> <li>• Provide maximum removal of designated pollutants of concern (especially bacteria).</li> </ul>
Special Watershed Analyses:	<ul style="list-style-type: none"> <li>• Impervious cover mapping.</li> <li>• Mapping of sensitive areas.</li> <li>• Storm water and floodplain modeling.</li> <li>• Stream system monitoring using a rapid technique (e.g., Rapid Stream Assessment Technique (RSAT)). (Galli, 1996)</li> </ul>
Indicators of Success:	<ul style="list-style-type: none"> <li>• Biological and physical indicators of stream quality.</li> <li>• Meeting bacterial standards for dry weather contact recreation.</li> </ul>
Unique Stakeholders and Institutions:	<ul style="list-style-type: none"> <li>• Storm water utilities, local government agencies, neighborhood associations.</li> </ul>
Key Issues to Consider:	<ul style="list-style-type: none"> <li>• Are local development review, inspection or maintenance programs adequate to implement the program?</li> </ul>
Example Plan:	Johnson Creek Resources Management Plan, Portland OR.
<b>Subwatershed Plan Criteria: IMPACTED Stream</b>	
Watershed Planning	<ul style="list-style-type: none"> <li>• Set upper limit on watershed impervious area (approx. 25%).</li> <li>• Limit on-site impervious cover (ex. Low impact development, skinny streets, reduce parking ratios).</li> <li>• Utilize Traditional Neighborhood Development (TND) or Transit Oriented Development (TOD).</li> </ul>
Land Conservation	Identify and regulate development on or adjacent to steep slopes, wetlands, floodplain, forest conservation areas, and critical habitat areas.
Aquatic Buffers	<ul style="list-style-type: none"> <li>• Use standard three-zone stream buffer.</li> <li>• Restrict activity along streamside zone.</li> <li>• Design buffer crossings to allow storm and fish passage.</li> </ul>
Storm water Best Management Practices	<ul style="list-style-type: none"> <li>• Place strong emphasis on channel protection criteria (e.g., 1 year 24hour ED), as well as recharge and over bank flooding.</li> <li>• Disconnect impervious cover where appropriate.</li> <li>• Avoid hard conveyance systems.</li> <li>• Use regional Storm water ponds.*</li> </ul>
Non-storm water Discharges	<ul style="list-style-type: none"> <li>• Identify and correct illicit connections.</li> <li>• Reduce overflows and infiltration/inflow of sanitary sewage.</li> </ul>
Watershed Stewardship Programs	<ul style="list-style-type: none"> <li>• Promote low input lawn/auto care.</li> <li>• Increase watershed awareness through education (e.g., volunteer monitoring, stream walks).</li> <li>• Storm drain stenciling.</li> </ul>
Unique Tools	<ul style="list-style-type: none"> <li>• Cluster development.</li> <li>• Forest conservation.</li> <li>• Clearing and grading restrictions.</li> <li>• Bioengineering for channel stability.</li> </ul>

Source: “Program C: Basic Methods to Prepare Watershed Protection Plans,” Watershed Protection Institute Manual (provided at March 28 – April 1, 2005 training session). Section C, Center for Watershed Protection.

\*Note: Use of regional storm water ponds needs to be developed in conjunction with IDEM for most effective use.

<b>Subwatershed Category: SENSITIVE Stream</b>	
Description:	Subwatershed has less than 10% impervious cover, and stream is rated as high quality according to fish, macroinvertebrates, or habitat indicators. May be warm, cool, or cold water system. Given the low density, the watershed is generally not served by public sewer system.
Goal:	Maintain predevelopment stream biodiversity and channel stability.
Subwatershed Planning Objectives:	Maintain or enhance predevelopment stream habitat conditions with respect to: <ul style="list-style-type: none"> <li>• Recharge</li> <li>• Riparian condition</li> <li>• Hydrology</li> <li>• Channel stability</li> <li>• Stream temperature</li> </ul>
Special Watershed Analyses:	<ul style="list-style-type: none"> <li>• Mapping of existing and projection of future impervious cover.</li> <li>• Biological and habitat sampling.</li> <li>• Inventory of <b>riparian</b> condition/wetlands areas.</li> </ul>
Indicators of Success:	<ul style="list-style-type: none"> <li>• Health of single sensitive species such as trout, salmon or composite indicators such as <b>Index of Biological Integrity (IBI)</b>.</li> <li>• Meeting <b>impervious cover</b> targets.</li> <li>• Stable aquatic habitat – <b>stream morphology</b> and geometry.</li> </ul>
Unique Stakeholders and Institutions:	<ul style="list-style-type: none"> <li>• Anglers or stream stewardship organizations such as “Trout Unlimited.”</li> </ul>
Key Issues to Consider:	<ul style="list-style-type: none"> <li>• How much have historical watershed activities already degraded stream quality?</li> <li>• What is the appropriate reference to measure stream quality?</li> <li>• What are the political/economic impacts of resource protection (downzoning, land acquisition cost, etc)?</li> </ul>
Example Plan:	Upper Paint Branch Watershed Planning Study, Silver Spring, MD.
<b>Subwatershed Plan Criteria: SENSITIVE Stream</b>	
Watershed Planning	<ul style="list-style-type: none"> <li>• Limit watershed impervious cover to no more than 10% through <b>overlay zone</b>, special protection areas, <b>Transfer Development Rights (TDRs)</b> or other density control techniques.</li> <li>• Acquire or apply <b>conservation easements</b> to stream valley lands or other sensitive watershed areas.</li> </ul>
Land Conservation	<ul style="list-style-type: none"> <li>• Encourage infill and redevelopment.</li> <li>• Revitalize existing neighborhoods.</li> <li>• Identify and protect springs, seeps, known spawning areas, riparian wetlands.</li> <li>• Identify and prohibit development of steep slopes, wetlands, floodplain, forest <b>conservation areas</b>, and critical habitat areas.</li> <li>• Prohibit modification of stream channels.</li> <li>• Prohibit sewer trunk mains in stream valley.</li> </ul>
Aquatic Buffers	<ul style="list-style-type: none"> <li>• Apply widest buffer width (150 to 300’).</li> <li>• Emphasize greatest management restriction on stream-side zones.</li> <li>• Ensure that road crossings do not obstruct fish passages.</li> </ul>
Storm water Best Management Practices	<ul style="list-style-type: none"> <li>• Place restrictions on instream ponds (stormwater wetlands), and permanent pools to minimize thermal impacts.</li> <li>• Maximize recharge and channel protection.</li> <li>• Incorporate channel protection requirements into regulations by promoting infiltration and swales.</li> <li>• Require a responsible on-site ESC specialist.</li> <li>• Require construction site phasing.</li> </ul>
Non-storm water Discharges	<ul style="list-style-type: none"> <li>• Inspect septic systems and make necessary corrections.</li> <li>• Provide automotive product recycling centers.</li> <li>• Place restrictions on package treatment plants.</li> </ul>
Watershed Stewardship Programs	<ul style="list-style-type: none"> <li>• Emphasize stream protection through educational programs.</li> <li>• Promote stream habitat repair and reforestation of the riparian buffer.</li> <li>• Foster the use of “green” lawncare and autocare techniques.</li> <li>• Stress inspection and maintenance of stream protection infrastructure.</li> </ul>
Unique Tools	<ul style="list-style-type: none"> <li>• Land use acquisition/conservation techniques.</li> </ul>

<b>Subwatershed Category: NON-SUPPORTING Stream</b>	
Description:	Subwatershed has more than 25-30% impervious cover, and is not a candidate for stream restoration. The stream does not support a full range of designated uses and is characterized by unstable channels, poor to fair biological community and frequent failure to meet water contact recreation standards. The subwatershed is usually served by public sewer systems.
Goal:	<ol style="list-style-type: none"> <li>1. Minimize downstream pollutant loads.</li> <li>2. Alleviate downstream flooding.</li> <li>3. Improve aesthetic appeal/promote greenways.</li> </ol>
Subwatershed Planning Objectives:	<ul style="list-style-type: none"> <li>• Reduce stormwater &amp; sanitary sources of bacteria to meet water contact standards during dry weather.</li> <li>• Maintain water elevation of existing 100 year floodplain.</li> <li>• Meet pollutant reduction targets for new development and redevelopment.</li> </ul>
Special Watershed Analyses:	<ul style="list-style-type: none"> <li>• Bacteria source surveys.</li> <li>• Watershed stormwater quality monitoring.</li> <li>• Floodplain studies to identify flood-prone areas.</li> <li>• Stormwater pollutant load estimates (e.g. Simple Method, Schueler 1987).</li> <li>• Surveys of resident attitudes.</li> </ul>
Indicators of Success:	<ul style="list-style-type: none"> <li>• Favorable trends in designated water quality parameters.</li> <li>• Positive change in public awareness/attitudes.</li> <li>• Decreases in level of trash and debris in stream.</li> </ul>
Unique Stakeholders and Institutions:	<ul style="list-style-type: none"> <li>• Park authorities, Greenway advocates, Large industrial and commercial landowners.</li> </ul>
Key Issues to Consider:	<ul style="list-style-type: none"> <li>• Are there enough retrofit possibilities to engage in meaningful restoration?</li> <li>• To what extent do sanitary and/or combined sewers influence water quality?</li> <li>• How extensively has the existing stream channel been modified in the past?</li> </ul>
Example Plan:	Four Mile Run Watershed Management Program, Annandale, VA.
<b>Subwatershed Plan Criteria: NON-SUPPORTING Stream</b>	
Watershed Planning	<ul style="list-style-type: none"> <li>• No impervious cover cap.</li> <li>• Encourage infill and redevelopment.</li> <li>• Revitalize existing neighborhoods.</li> <li>• Advocate development of “brownfields” sites.</li> </ul>
Land Conservation	<ul style="list-style-type: none"> <li>• Retain/protect public recreation areas, existing forests, floodplain, road crossings and culverts.</li> <li>• Acquire land or obtain conservation easements of remaining unique habitat areas (wetlands, forests, springs, etc.).</li> </ul>
Aquatic Buffers	<ul style="list-style-type: none"> <li>• Manage the buffer as a greenway for recreation and flood protection.</li> <li>• Riparian management of publicly owned land.</li> <li>• Prevent encroachment/fill in 100 year floodplain.</li> <li>• Control non-native species in the buffer.</li> </ul>
Storm water Best Management Practices	<ul style="list-style-type: none"> <li>• Maximize removal for designated pollutant(s) of concern.</li> <li>• Design to prevent increased flooding from new development.</li> <li>• Provide floodproofing for existing structures already affected by flooding.</li> </ul>
Non-storm water Discharges	<ul style="list-style-type: none"> <li>• Identify and correct illicit connections</li> <li>• Manage stormwater “hotspots.”</li> </ul>
Watershed Stewardship Programs	<ul style="list-style-type: none"> <li>• Plan demonstration projects for watershed education.</li> <li>• Emphasize pet management.</li> <li>• Encourage homeowner education</li> <li>• Provide public access points to the stream.</li> <li>• Foster citizen monitoring, stream cleanups (litter), street sweeping.</li> </ul>
Unique Tools	<ul style="list-style-type: none"> <li>• Pollution prevention.</li> <li>• Outfall survey.</li> <li>• Floodplain management (floodproofing, insurance, and acquisition).</li> </ul>