11.0 POLICY CONSIDERATIONS AND RECOMMENDATIONS

It is recommended that Boone County and the cities of Ashland, Columbia, and Pierpont (hereafter, the Watershed's local governments) take the following actions to improve stormwater and groundwater management for protection of water resources and restoration of degraded areas. At a minimum, Boone County and its municipalities could adopt the latest version of American Public Works Association (APWA) Section 5600 stormwater design criteria and BMP Manual (APWA 2003). These manuals were written specifically for the Kansas City metro region, and therefore would be easy to adapt to conditions in Boone County. Other recommendations build on these documents, including public education, incentive programs, and water resource protection and restoration recommendations.

1. Adopt *APWA 5600 Storm Drainage Systems and Facilities* stormwater design criteria.

   APWA 5600 specifies application and design criteria for stormwater management, conveyance, detention, and natural stream protection. In particular, APWA 5600 includes guidance that will address problems noted in Boone County, including:

   a. Limiting stormwater discharges from developments to rates, volumes, and frequencies that prevent future flooding, limit erosion, and protect stream channel stability.
   b. Providing stream assessment guidance to quantify stream stability and potential impacts.
   c. Requiring developers to maintain stable stream channels and banks by designing stormwater outlets that will not destabilize stream channels and banks and by maintaining predevelopment discharge rate, energy, and flowlines. In addition, APWA 5600 provides guidance for designing non-erosive, indirect discharges into stream buffers. The Watershed's local governments should specify that this is the preferred practice.
   d. Recommending a systematic riparian buffer program with buffers planted with appropriate native vegetation that vary from 40 to 120 feet from the ordinary high water mark on both sides of the stream, depending on the size of the contributing drainage area,.
   e. Requiring that bridge utilities cross at locations and in a manner that preserves stream meander geometry and cross-sectional areas.
   f. Minimizing changes to existing channel and floodplain cross-sections and conveyance capacity.
   g. Maintaining channel roughness and energy dissipation (and habitat) with preserved or established native vegetation.
   h. Maintaining sediment transport capacity necessary for channel equilibrium.
   i. Specifying low-impact grade controls, flowing water energy management, and bioengineering to maintain channel plan and profile, and to protect and restore stream stability when infrastructure has or will otherwise impact stream stability.
   j. Allowing and encouraging low-impact design, such as conservation subdivisions and other "smart growth" practices, to minimize runoff as an alternative to detention basins.

2. Adopt the APWA *Manual of Best Management Practices for Stormwater Quality* (BMP Manual)

The BMP Manual would provide the Watershed's local governments with the tools to prevent future flooding and protect water quality, including a flexible framework for developers to estimate potential water quality impacts and increased runoff from development plans. The BMP Manual would also design a comprehensive stormwater management system that includes site design and dispersed, structural and non-structural best management practices for residential, commercial, and industrial developments. The "Level of Service Method" can be used to maintain or reduce predevelopment runoff volumes and pollutant loads by:

a. Encouraging and specifying preservation of upland and bottomland vegetation and infiltration capacity, through the use of riparian buffers and other practices.
b. Minimizing impervious surfaces and encouraging rainfall infiltration through the preservation or restoration of native vegetation and soil profiles.
c. Providing incentives to disconnect impervious surfaces in stormwater conveyance systems.
d. Infiltrating stormwater runoff at the source through engineered BMPs, which maintain groundwater hydrology and are highly effective pollutant filters.
e. Filtering runoff that cannot be infiltrated through dispersed filtration BMPs.
f. Presenting multiple wet detention options, including wet ponds, wetlands, and extended detention wetlands.
g. Providing detailed design guidance for structural and non-structural BMPs, including standard specifications and details for common BMPs and detailed planting and vegetation management guidance.
h. Specifying native vegetation for all BMPs to enhance pollutant removal through filtration and evapotranspiration.
i. Specifying holding times for further pollutant settling and evaporative water losses.

3. Adopt Additional Stormwater Management and Development Policies

APWA Section 5600 criteria may not be sufficient in all circumstances to stabilize stream channels and manage water quality, rates, and volumes entering streams and other water bodies. AES recommends that the Watershed's local governments adopt the following "Technical Policy Guideline for Stormwater Management" in all developments:

a. Require that any post-development release rates do not exceed the one-year predevelopment release rates for all storms with a frequency of greater than 10 years. Also require that rare events such as the 100-year storm should be released at no greater than the 10-year predevelopment release rates.
b. Enact a stream setback ordinance to codify the comprehensive buffer system recommended in APWA 5600. Design the setback zones in accordance with

APWA 5600 and the BMP Manual, but increase the minimum setback to 150 feet from the ordinary high water mark.

c. Add a Conservation Development classification to the zoning ordinance that specifies Conservation Development planning principles, and encourage alternative stormwater management systems by requiring conservation developments to provide a higher "Level of Service" than the recommendation in the BMP Manual.
d. Develop a stream restoration and maintenance program including floodplain restoration, stream buffers, and restoration practices to reduce down-cutting and to stabilize streambanks throughout the County. Restoration and maintenance practices could be adopted from APWA 5600, the BMP Manual, and other sources.
e. Enact a new zoning classification to preserve upland environments and other off-channel locations with the potential for stormwater detention. Protect hydric soil units (historic wetlands) and naturally occurring depressional storage areas from development and specify natural stormwater management facilities as permitted uses. Natural detention systems should be designed in accordance with the BMP Manual and linked to natural drainage ways or the man-made conveyance system as specified in APWA 5600 and the BMP Manual.
f. Develop cooperative agreements for municipalities within the County to effectively manage stormwater that flows in to or out of shared watersheds within the framework of a single watershed plan, using the criteria in recommendations 1, 2, and 3a for stormwater management and natural resource protection and restoration.

4. Public Education and Incentives

Public education and incentive programs could build support for new policies and help landowners and developers meet their obligations under the policies. AES recommends the following education efforts and incentive programs:

a. Use an annual "developers' forum" or other methods to educate landowners and developers about:
    - comprehensive buffer systems or ordinances and their own buffer requirements;
    - watershed-sensitive development strategies and how they can protect the area's valuable land and water resources; and
    - alternative stormwater management designs in the BMP Manual and other references that may eliminate the need for stormwater sewers and other costly infrastructure.
b. Promote awareness of natural resources and critical resource issues in the watershed through public education, volunteer stewardship activities in public parks, and through collaboration and partnership with local landowners, conservation groups, agencies, local colleges, and other stakeholders.

c. Establish a County-wide environmental stewardship and stormwater real estate transaction surcharge fee to generate an Environmental Stewardship Fund. This fund should be used, along with other revenue sources (e.g. capital investment funds, taxes, etc.) to create private-public partnerships with landowners to help restore, protect, and repair natural resources areas (streams, woodlands, wetlands, etc.). AES recommends a transaction fee of 0.05 percent to 0.2 percent of all real estate transactions in the County to establish this fund. The fund could be managed for "interest generation", as a professionally managed fund, and could be used to leverage other funds, land owner participation in land protection, stewardship, restoration and repair.
d. Consider creating other incentives, including stormwater credits for developments that exceed stormwater management requirements.
e. Provide incentives for private landowners to designate conservation, riparian corridor and drainage easements, and other land protection tools. One option is a density credit system that would reward Conservation Developments by allowing developers to transfer density to other more appropriate developments. The Watershed's local governments could also reduce impact fees for developments that employ BMPs and alternative stormwater management practices.
f. Provide training for financing of development to give the confidence that conservation developments are a good investment.
g. Provide training and planning on how to do conservation design, alternative stormwater management, and natural channel restoration for engineers.

5. Habitat and Biodiversity Preservation

Finally, many of the measures described above would preserve or restore scarce habitat as well as protect streams. AES recommends that the Watershed's local governments take the following additional measures that would further enhance habitat protection and biodiversity in the County:

a. Specify that development applications include a conservation plan that protects sensitive habitats and lands and provides land management and ecological restoration recommendations.
b. Require a Natural Resource Inventory with every development application, as commonly required in many municipalities throughout the U.S.
c. At minimum, require proof of wetland delineations where required by U.S. Army Corps of Engineers, and require identification and mapping of drained hydric soils, moderate to highly permeability topsoil and subsoil areas ($>10^{-4}$ cm-sec or .5 gallons/square foot/hour), and depressional areas that may be valuable stormwater management sites. Set the threshold for identification of these soils and depressional areas as being any site that provides greater than 0.1 acre-foot of storage.
d. Require applicants to delineate forests, prairies, steep slopes (12 percent grade or more), and erosive soils; e.g. loess and silty and sandy loams.
e. Require applicants to submit map overlays that may be combined with other environmental layers such as archeological and cultural resource mapping, water

table depth (in locations with high water tables), drainage features, and hydrology.

f. Wildlife habitat delineation may be optional as well.

g. Establish a "Core Natural Area Protection Plan" for the Watershed. Map "Core Natural Areas" that would be the highest priority areas for protection. Include all drainage areas, forested blocks, prairies, wetlands, restorable wetlands, and other key natural communities.

h. Initiate or work with a local land trust to work with private landowners to protect Core Natural Areas on their land and to help landowners realize tax benefits for protecting their lands. The land trust could be partially funded with the environmental stewardship and stormwater real estate transaction surcharge fee previously described.

i. Design and implement demonstration projects to show functioning stream buffers and riparian corridors, Conservation Developments, alternative stormwater management practices, and ecological restoration programs. Provide cost and performance data on these projects for use by others in the watershed and in the region.

j. Design proper and adequate training and funding for the Watershed's local governments so that staff are better able to assess the aforementioned measures.