POTOMAC BASIN COMPREHENSIVE WATER RESOURCES PLAN
CONCEPT PAPER

VISION STATEMENT

Over 6 million people and diverse ecosystems depend on the interstate water resources of the Potomac Basin. Responsible management of this resource will require collaborative planning that bridges political boundaries. Development of an adaptive basin-wide comprehensive water resources plan would serve as a roadmap for the sustainable use of this interstate resource now and into the future.

PROJECT SUMMARY

This document outlines proposed efforts for developing a Potomac Basin comprehensive water resources plan. Modifications to this document are expected based on input from key stakeholders and the advisory committee. Subsequent sections of this document outline next steps, from establishing an oversight committee to gathering existing and developing new sources of data, to identifying and developing solutions to water resources problems in the Potomac Basin.

Development of the comprehensive plan may occur in four phases. A preliminary project timeline, objectives, and anticipated products are provided (Table 1). Modifications to Table 1 are expected based on input from project collaborators and key stakeholders. Scoping of the basin-wide plan, Phase I, is currently underway through the Middle Potomac Watershed Assessment with funding from the U.S. Army Corps of Engineers and The Nature Conservancy. Phase II, pending approval and funding to move forward with basin-wide comprehensive planning, is identification of water resources issues. Phase III and IV are identification of solutions for addressing water resources problems and development of the comprehensive plan document, respectively.

Table 1. Preliminary timeline, objectives, and anticipated products of the comprehensive planning process.

Funded	Phase	Objective	Timeline	Anticipated Products
Y	I	Scope Middle Potomac Watershed Assessment Task A-12	7/2010 – 12/2012	-Project goals -Advisory committee -Stakeholder workshops
N	II	Identify Water Resources Issues	1/2012 - 12/2013	-Collection of existing research and data -Interstate withdrawal database -Interstate consumptive use database -Groundwater availability assessment -Water resources issue prioritization - Computer-based evaluation tool creation -Documentation of water resources issues
N	III	Identify Solutions	1/2012 - 12/2013	-Evaluation tool implementation -Proposed solutions to identified issues
N	IV	Develop Water Resources Plan	1/2014 - 7/2014	-Basin-wide comprehensive plan

INTRODUCTION

A myriad of users, from plants to people, depend on the Potomac River, its tributaries, and associated land and groundwater resources. Current issues facing the basin include a lack of scientific understanding of basin-wide groundwater resources; the need for basin-wide integrated data sets like withdrawals and consumptive uses; the impact of potential climate change; water quality protection; increased impervious cover; stormwater management; drinking water resources protection; and planning for drought and flood events. The Interstate Commission on the Potomac River Basin (ICPRB) proposes to develop, in collaboration with existing state authorities, a Potomac Basin comprehensive water resources plan to address these and other issues towards the sustainable management of this interstate resource. As an interstate organization with significant scientific and collaborative experience throughout the Potomac Basin, ICPRB is ideally situated to spearhead this effort. To proactively address these and other stakeholder identified issues within an adaptive management framework, the time to act is now.

The ICPRB mission is to enhance, protect, and conserve the water and associated land resources of the Potomac River Basin and its tributaries through regional and interstate cooperation. As with many large basins, the Potomac River drainage area does not adhere to political boundaries. Management of the water resources across the multi-jurisdictional basin requires bridging jurisdiction differences in statutes, regulations, and priorities among others.

Recent water resources legislation in the Potomac Basin jurisdictions include, but is not limited to, Maryland House Bill 1141, West Virginia Senate Bill No. 641, Pennsylvania Act 220, and Virginia's Title 9 Local and Regional Water Supply Planning Regulation. Maryland House Bill 1141 of 2006 requires the state to develop a general water resources program and local governments to develop Water Resources Elements (WREs) within comprehensive plans. A WRE is required for all counties and municipalities that exercise planning and zoning authority. The original legislative deadline for including WREs in local comprehensive plans was October 1, 2009. Similarly, Virginia's Local and Regional Water Supply Planning Regulation became effective on November 2, 2005 and requires development of local or regional water plans to "ensure that adequate and safe drinking water is available, encourage and protect all beneficial uses, encourage and promote alternative water sources, and promote conservation." In Pennsylvania, Act 220 of 2002 resulted in a State Water Plan and Water Atlas that included an assessment of various water-related issues. The initial State Water Plan was published in 2009 (PADEP 2009). The Statewide Water Resources Committee designated three Critical Water Planning Areas in January 2011 for which Critical Area Resource Plans are currently under development. Article 26 of Senate Bill No. 641, the Water Resources Protection and Management Act of West Virginia, also will result in a statewide management plan. The legislated completion date for the WV Statewide Water Resources Plan is November 2013. In 2010, WV Department of Environmental Protection (WVDEP) and ICPRB trained local planning agencies to participate in the statewide planning process.

Several historic and ongoing studies may form the basis of a Potomac Basin Comprehensive Water Resources Plan. The U.S. Army Corps of Engineers conducted a study in 1969 that focused primarily on water supply, flood control, and recreation needs. Subsequently, a Section 905(b) Analysis of the Middle Potomac Watershed utilized and expanded on the work of federal, state, local, and environmental organizations to develop potential restoration projects (U.S. Army Corps of Engineers 2004). Most recently, The Nature Conservancy (TNC) and the U.S. Army Corps of Engineers are funding the Middle Potomac Watershed Assessment. Utilizing the results of the previous assessments and concurrent studies by ICPRB and other organizations, i.e. U.S. Army Corps of Engineers (2010), the "comprehensive plan will make recommendations for actions to address identified problems and meet objectives set by the steering committee" (U.S. Army Corps of Engineers 2009b) utilizing a 50-70 year planning horizon. Recommended actions may include categories utilized by the U.S. Army Corps of Engineers (2004): watershed restoration planning for tributaries; hydrological, ecological, and chemical watershed model development; wetland creation, restoration, and enhancement; hydrologic and floodplain function restoration; stream habitat restoration and channel modification; beneficial use of dredged material; land acquisition; flood protection and management; and water supply and sustainable watershed management.

Addressing water resources issues towards the sustainable management of the Potomac Basin will include collaborative planning, adaptive management, and integrated water resources management (IWRM). Collaborative planning by the agencies and organizations responsible for water resources will strengthen relationships, improve communications, increase fiscal efficiency, and minimize redundancy. Moreover, collaboration will ensure that key issues are considered and addressed to manage this interstate resource. Adaptive management techniques will be required to manage the water resources now and in the future. As understanding of predicted future land use change, climate change, population change, and related issues is enhanced, management decisions should be assessed and revised appropriately.

The potential benefits of basin-wide sustainable water resources management utilizing an IWRM framework and adaptive management techniques are well documented. The Global Water Partnership states that "IWRM is a process which promotes the coordinated development and management of water, land, and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems." Further, Bolger et al. (2009) points out from the perspective of sustainable water infrastructure that:

> *"The 21st century definition of sustainable water infrastructure includes the traditional man-made or built infrastructure components and the natural infrastructure, such as rivers, lakes, streams, groundwater aquifers, floodplains, floodways, wetlands, and the watersheds that serve or are affected by water and wastewater systems. A sustainable water infrastructure integrates the traditional components with the protection and restoration of natural systems, conservation and efficiency, reuse and reclamation, and the active incorporation of new*

decentralized technologies, green infrastructure and low impact development to ensure the long-term reliability and resilience of our water resources. Sound practice will result in enhancing the triple bottom line of economic, social, and environmental sustainability."

STEPS TOWARD CREATION OF A BASIN-WIDE PLAN

A Critical Area Resource Plan, being conducted by ICPRB with funding from the PA Department of Environmental Protection (PADEP), in the Marsh and Rock creek watersheds of Adams County, PA, began in July 2010. The expected outcomes of the project are to identify and quantify the current and potential future water resources issues in the watersheds and develop recommendations for addressing the issues, utilizing a participatory process and an interdisciplinary oversight committee of key stakeholders. A comprehensive water resources plan in the Potomac Basin may follow a similar structure.

Phase I

Define Roles of Participating Organizations

The roles of the participating organizations need to be clearly defined and mutually agreed upon. Potential roles include project coordination, public participation, technical work, and report generation among others. Participating organizations (e.g. basin-states, non-profit organizations, academic institutions, local and regional agencies, utilities, federal agencies such as the U.S. Army Corps of Engineers, and ICPRB) bring extensive experience that should be incorporated for successful development of a basin-wide plan. ICPRB is an ideal organization for project coordination due to (1) frequent interaction with basin-wide stakeholders and commissioner representatives from each state and (2) the advantageous ability to look beyond political boundaries for basin-wide management. ICPRB is also well situated to conduct technical work based on a history of extensive analytical work across the basin. Determining the optimal roles and responsibilities of participating organizations will be a critical step in the initial process.

Establish Interdisciplinary Oversight Committee

An oversight committee will be established to advise, coordinate, and facilitate development of a Potomac River Basin comprehensive water resource plan. Members of the oversight committee may include representatives from local, county, state, and federal government agencies; representatives from water users and dischargers such as agricultural, public water supply, and industrial organizations; conservation and environmental organizations; and/or other persons with knowledge or interest in water resources planning and management in the Potomac Basin. Each sector will have a committee representative to ensure a manageable group size and representation of all stakeholder groups. A technical sub-committee also will be established to ensure utilization of the best available science.

Define Goals of Plan

As noted in the Middle Potomac Watershed Assessment Project Management Plan (U.S. Army Corps of Engineers 2009b), the purpose of the comprehensive plan is to "make recommendations for actions to address identified problems and meet objectives set by the steering committee." Input from the advisory committee and other stakeholders will be utilized to outline the plan's content and develop shared goals for the plan. The goals will form the basis of future efforts.

Phase II

Assess Water Resources Issues

The following are initial issues that may be important to assess and analyze at the basin level as part of the comprehensive planning process. Identification of additional topics and refinement of these topics is expected during the planning process.

Watershed Characterization and Data Gap Identification

With an oversight committee in place, goals clearly defined, and organizational roles clarified, work can begin to bring together existing water resources information. Because extensive characterization work has been completed in the Potomac Basin, collecting and synthesizing available information will be an essential first step. Ongoing research should also be incorporated. Data gaps and specific needs can then be prioritized. Apparent data gaps are listed below where applicable. Minimizing data gaps will provide a strong scientific foundation for problem identification and implementation of successful management efforts. By integrating and enhancing existing water resources studies in the basin, future management efforts can be prioritized with consideration of water availability and use, potential climate change, stormwater, water quality, drinking water source area protection, and flood and drought management.

Water Availability

At the basin scale, scientists and planners have a relatively clear understanding of surface water availability due to the network of long-term USGS flow gages. Funding for these gages, however, needs to be maintained to monitor availability under current and future conditions. Partnering with the USGS and other stakeholders to maintain the gage network will ensure continued availability of streamflow measurements for water management purposes.

An area of particular importance for future efforts is quantifying groundwater availability. This may include an assessment of groundwater resources, surface and ground water interaction, and the affects of karst geology on water resources. Although there are completed groundwater (Schultz et al. 2004; Schultz and Palmer 2008) and karst studies for the Potomac Basin, a complete understanding of these characteristics and the implications for water use and availability is still lacking. Efforts by other organizations to characterize the availability and characteristics of groundwater in the basin include

Maryland Department of the Environment's (MDE) fractured bedrock study; a coastal groundwater availability study conducted by MDE, USGS, and Maryland Department of Natural Resources' (MDNR); a groundwater characterization program by the Virginia Department of Environmental Quality (VADEQ); USGS groundwater model development in PA; and ongoing USGS karst related research. Collaboration between complementary studies will minimize redundancy and enhance overall productivity.

Water Use

Quantifying water use, and consumptive use (CU) in particular, is an essential step to sustainable water resources management because CU at any given location reduces the amount of water available for downstream use. All Potomac basin states are now collecting water use data. However, managing interstate water use in the Potomac Basin will require compiling the state data into a basin-wide water use database. An updatable database with withdrawal and CU data for the Potomac Basin would provide an invaluable tool for the sustainable management of water resources in the basin. As CU in the basin is better understood, innovative solutions may be developed to address this concern. Pennsylvania, for example, is constructing a treatment system on the West Branch of the Susquehanna River to remediate acid discharge from the former Barnes and Tucker mining operations. Waters from the mining operation were originally discharged to waterways in the Ohio and Susquehanna Basins, but the discharges have been diverted entirely to the Ohio Basin for remediation since 1973. By returning a portion of the mine drainage to the West Branch of the Susquehanna River, an activity originally approved by SRBC in 2006, the water will compensate for 10 million gallons per day of consumptive agricultural water use during the growing season (SRBC 2007).

Obtaining reliable CU estimates are particularly important. ICPRB conducted a water demand analysis, including CU estimates in 2000 (Steiner et al. 2000) and found that "The consumptive demand is forecast to increase to up to a third of the historic low flow by 2030… At the HUC 8 scale, two of the seven HUC regions evaluated may not have enough flow to meet current and predicted consumptive demand during a repeat of the lowest historical minimum flow (Monocacy and Middle Potomac Catoctin)."

As an example of the benefits of a CU database, the Susquehanna River Basin Commission (SRBC) developed a Consumptive Use Mitigation Plan (CUMP) to "present the state of CU in the Susquehanna basin, identify low flow mitigation needs, and introduce the Commission's plan for CU mitigation" based on a database of approved peak day CU and actual daily CU for regulated projects (SRBC 2008). Although ICPRB does not have the regulatory authority held by SRBC, CU data would facilitate the management decisions of its signatory jurisdictions. Reliably obtaining water use and CU data, particularly for those users not currently required to report, may require changes to the reporting regulations. However, it is a priority to avoid duplication in reporting requirements and minimize regulatory burdens. Working closely with each state will be necessary to determine appropriate next

steps. With a comprehensive withdrawal and CU database in place and an accurate quantification of surface and groundwater availability, the hydrologic impacts of various water uses can be estimated.

Utilizing the water use databases and the Ecological Limits of Hydrologic Alteration (ELOHA) flow-ecology relationships being developed for the Potomac Basin, development of a computer-based tool will facilitate sound decision-making regarding the effects of existing and proposed withdrawals on human and ecosystem needs. Scope of the tool is currently being developed as part of the Middle Potomac Watershed Assessment to inform withdrawal permitting decisions and promote maintaining environmental flows in the Potomac Basin. Additional funding will be required to complete the tool.

Potential Climate Change

Since 1900, Maryland's average annual temperature increased approximately 2°F. During the same period, average rainfall increased 10%. The number of major weather events is also increasing (12-20% across the Mid-Atlantic region) and the Maryland coastline has risen approximately 3-4 mm/yr (Williamson et al. 2008). Ongoing climate change work includes (1) USGS Virginia Water Science Center modeling of 18 climate change scenarios to determine sensitivity of flows to various factors and (2) the ICPRB COOP climate change study as part of the 2010 demand study.

Although there is uncertainty and conflicting predictions of how, specifically, the climate may change in the future, there is a need to plan for future alternative scenarios utilizing adaptive management techniques for comprehensive planning purposes. According to Brekke et al. (2009),

> *"Incorporation of adaptive management can build in flexibility and reevaluation of decisions that evolve over time in response to new information. The use of multiple scenarios in the context of robust/adaptive planning will enhance decision-making, particularly if the scenarios span a wide range of possible outcomes."*

The climate change module of the 2010 ICPRB COOP demand study may provide an integral resource for understanding expected future land and water uses, population growth, and the effects of potential climate change scenarios on water resources availability and use. Modeling divergent climate change scenarios allows scientists and researchers to define a range of possible future hydrologic effects.

Water Quality

The Potomac River and Chesapeake Bay watersheds face water quality impairments from various sources. Basin states submit an Integrated Report on water quality to the EPA every two years, fulfilling the state's 303(d) and 305(b) requirements under the U.S. Clean Water Act. Water quality issues from the Integrated Reports will be considered when prioritizing water bodies for future management efforts as part of the comprehensive water resource planning process. Implementing protection measures to improve water quality on impaired waterways within the Chesapeake Bay Watershed will have the added benefit of contributing to the success of the Chesapeake Bay TMDL. "Each state in the

Chesapeake Bay's watershed does not have the resources alone to collect all the necessary data and develop implementation plans to restore the Potomac (U.S. Army Corps of Engineers 2004)." By prioritizing management efforts with impaired water body classifications in mind, the Potomac Basin Comprehensive Water Resources Plan can facilitate efforts to address the multi-faceted problems facing this interstate water resource. Integration and prioritization of efforts may provide jurisdictions with access to a variety of funding sources in a focused manner, often in a time of constrained funding for initiatives.

Stormwater and Impervious Cover

Land use and land use change affect the quality and the quantity of water available for human and ecosystem use. The effects of development, in particular, include increased imperviousness, soil compaction, sedimentation, loss of vegetation, and loss of natural drainage patterns. The results of these changes include increased volume of runoff, peak flows, duration of discharge, temperature, and pollutant loadings (EPA 2009). Managing impervious cover and associated stormwater is critical to protecting the hydrologic regime of the Potomac River for human and ecosystem purposes.

Stormwater, impervious cover, and smart growth are issues currently being addressed in the Potomac Basin through various regulatory and voluntary avenues including federal, state, and local government. Examples of federal stormwater regulations include the Energy Independence Act of 2007 and the National Pollution Discharge Elimination System (NPDES) permitting program under the U.S. Clean Water Act. Under Section 438 of the Energy Independence and Security Act of 2007, federal agencies are required to reduce their stormwater impact on water resources by maintaining or restoring the pre-development site hydrology during development or re-development (EPA 2009). The NPDES Stormwater Program regulates stormwater discharges from municipal separate storm sewer systems (MS4s), construction activities, and industrial activities to prevent pollution transport. States may also have their own stormwater regulations such as Maryland's Stormwater Management Act of 2007 and the Virginia Stormwater Management Act of 2004 as well as being responsible for implementing the federal NPDES program. Often state programs require county or local stormwater controls, creating a combined federal, state, and local approach to stormwater management. Addressing stormwater issues in the Potomac will require adhering to these multiple layers of regulation. Engaging local managers in implementation of a basin-wide plan may prove problematic due to their inherently local focus and will require special attention as the process progresses. Time invested engaging local managers during the planning process will facilitate implementation of recommendations.

Existing investigations of the nature, extent, and impact of impervious cover should be integrated and enhanced at such a resolution as to be included in state stormwater management efforts, but should be informative and flexible for implementation at the local level. As part of the Middle Potomac Watershed Assessment, categorizations were developed to indicate the level of hydrologic alteration associated with ranges of impervious cover. Areas with less than 0.35% impervious cover were found to be least impacted, or contain "reference" conditions. Conversely, the largest impacts were found in

areas with greater than 10% impervious cover. Additional, finer resolution analyses with explicit variability by physiographic province, geology, precipitation regime, and other characteristics could inform development of scientifically-based stormwater management plans throughout the basin.

Source Water Protection

Drinking water quality needs to be protected for the residents of the Potomac Basin. To date, efforts have been made to prioritize source water protection areas across the basin (Weidner 2009); identify source area issues for suppliers across the basin (EPA); and to conduct source water assessments, including one for the District of Columbia whose assessment area covers 11,500 square miles of the Potomac Basin (Vann et al. 2004). Utilizing these and other resources, prioritization of management efforts in the Potomac Basin should include protection of drinking water resources.

Flood and Drought Management

The Potomac Basin-states and local planning agencies have developed hazard management plans to minimize negative effects of flooding, droughts, and other natural hazards. The comprehensive plan would integrate this information to identify basin-wide actions to minimize the effects of such hazards. For example, results from the 2004 Middle Potomac Watershed Assessment related to flooding issues were scheduled to focus on Martinsburg, West Virginia; Frederick, Maryland; and Alexandria, Virginia (U.S. Army Corps of Engineers 2004). The comprehensive plan may result in an evaluation of the status of these projects and a prioritized list of needs for future flood and drought control efforts.

Problem Identification

Water resources issues in the Potomac Basin are multi-faceted, including maintaining water supply for human and ecosystem use, achieving established water quality standards, protecting drinking water sources, and managing for droughts and floods. Utilizing the results of the Middle Potomac Watershed Assessment, collaborative technical analyses, and previous studies, issues and waterways of concern will be identified.

Phase III

Identification and Evaluation of Alternatives

Possible alternative actions will be identified to address water resources problems, taking into account any multi-jurisdictional regulatory differences. Evaluation criteria for proposed alternatives may include parameters such as those used in U.S. Army Corps of Engineers (2009a) (public safety, economic efficiency, environmental effects, and social effects) and will be developed in accordance with the Council on Environmental Quality's Federal Principles and Standards.

Recommendation of Practical Solutions

Under the guidance of the advisory committee, with input from the public, and utilizing the best available scientific information, recommended solutions will be developed and prioritized to sustainably manage the water resources in the Potomac Basin for human and ecosystem use.

Phase IV

Development of the Comprehensive Water Resources Plan Document

As a result of work conducted in Phase I-III, and incorporating comments from the advisory committee and the general public, the comprehensive plan will be prepared for the Potomac Basin.

CONCLUSIONS AND CHALLENGES

A water resources assessment in the Potomac Basin may face several challenges including issues of scale, regulatory differences across jurisdictions, and availability of funding. Recommendations developed as part of the assessment should be implementable at the local level, where action and implementation typically occur (e.g. zoning ordinances); however, general statewide principles should also be developed for implementation into state planning efforts. Recommendations should accommodate applicable federal, state, and local regulations. Collaborating with partners across the basin to meet common, interstate objectives towards the sustainable management of the basin's water resources will be a key aspect of success. Moreover, the proposed comprehensive water resources planning effort will utilize a participatory process to engage stakeholders throughout the basin. Encouraging stakeholder participation will facilitate the identification of water resources problems and the development of practical, implementable solutions. Working together will enhance the cost-effectiveness of the effort.

Although not unique to this project, the availability of funding will also be a challenge. Prior to establishment of the advisory committee and a clearly defined set of project goals, the project budget is difficult to estimate. Grants may be available to aid in the development and implementation of a comprehensive plan.[1] However, contributions from entities within the Potomac Basin would facilitate the plan's timely completion.

The comprehensive planning process as proposed is an adaptive process that can be tailored to successfully meet the project goals established by the oversight committee.

[1]Funding resources listed in the EPA's Handbook for Developing Watershed Plans to Restore and Protect Our Waters include: www.epa.gov/owow/funding.html; www.epa.gov/owow/nps/funding.html; www.epa.gov/watershedfunding; www.grassrootsfundraising.org/index.html; www.epa.gov/efinpage/guidebook/guidebooktp.htm .

Other possible funding sources include (1) grants available through H.R. 146 Subtitle F Section 9508 (SECURE Water Act as passed by the House March 25, 2009 – Water Availability Assessments section), USGS funding for National Water Census and (2) MD DNR Power Plant Research Project (PPRP)

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REFERENCES

Bolger, R., R. Monsma, and R. Nelson. 2009. Sustainable Water Systems: Step One - Redefining the Nation's Infrastructure Challenge. Aspen Institute.

Brekke, L. D., J. E. Kiang, J. R. Olsen, R. S. Pulwarty, D. A. Raff, D. P. Turnipseed, R. S. Webb, and K. D. White. 2009. Climate Change and Water Resources Management - A Federal Perspective. Page 63. USGS, Reston, VA.

EPA. 2009. Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act. Page 61. EPA, Washington, CC. Retrieved from www.epa.gov/owow/nps/lid/section438.

PADEP. 2009. Commonwealth of Pennsylvania State Water Plan Principles. Page 82. Retrieved from http://www.pawaterplan.dep.state.pa.us/docs/Publications/3010-BK-DEP4222.pdf.

Schultz, C., and J. Palmer. 2008. Seasonal Steady-State Ground Water/Stream Flow Model of the Upper Monocacy River Basin. Page 46. Interstate Commission on the Potomac River Basin, Rockville, MD. Retrieved from http://www.potomacriver.org/cms/drinkingwaterdocs/NFWF_GWProject/NFWF_UpperMonoc_GWModelDocumentation_Sep-30-2008.pdf.

Schultz, C., D. Tipton, and J. Palmer. 2004. Annual and Seasonal Water Budgets for the Monocacy/Catoctin Drainage Area. Page 85. ICPRB, Rockville, MD. Retrieved from http://www.potomacriver.org/cms/publicationspdf/ICPRB04-4.pdf.

SRBC. 2007. Pennsylvania Agricultural Consumptive Water Use. Page 2. Information Sheet, SRBC. Retrieved from http://www.srbc.net/pubinfo/docs/Agricultural%20Water%20Use%20%281_07%29.PDF.

SRBC. 2008. Consumptive Use Mitigation Plan. Page 35. Susquehanna River Basin Commission, Harrisburg, PA. Retrieved from http://www.srbc.net/programs/docs/CUMP.pdf.

Steiner, R. C., E. R. Hagen, and J. Ducnuigeen. 2000. Water Supply Demands and Resource Analysis in the Potomac River Basin. Interstate Commission on the Potomac River Basin.

U.S. Army Corps of Engineers. 2004. Middle Potomac Watershed, Maryland, Pennsylvania, Virginia, West Virginia, District of Columbia - Section 905(b) (WRDA 86) Analysis. Page 43. Baltimore, MD.

U.S. Army Corps of Engineers. 2009a. Ohio River Basin Comprehensive Reconnaissance Report. Page 232. U.S. Army Corps of Engineers.

U.S. Army Corps of Engineers. 2009b. Middle Potomac River Watershed Assessment, Potomac River Sustainable Flow and Water Resources Analysis: Project Management Plan. U.S. Army Corps of Engineers, Baltimore, MD.

U.S. Army Corps of Engineers. 2010. Building Strong Collaborative Relationships for a Sustainable Water Resources Future. National Report: Responding to National Water Resources Challenges. Page 104. U.S. Army Corps of Engineers, Washington, DC. Retrieved November 1, 2010, from http://www.building-collaboration-for-water.org/.

Vann, D. T., R. Mandel, J. M. Miller, E. Hagen, A. Buda, and D. Cordalis. 2004. The District of Columbia Source Water Assessment. ICPRB, Rockville, MD.

Weidner, E. 2009. Potomac Watershed Priority Lands Strategy: Conserving Lands to Benefit Drinking Water Quality. Duke University. Retrieved from http://www.potomacdwspp.org/Meetings/Jul22-2009/Weidner_Report.pdf.

Williamson, S., C. Horin, M. Ruth, R. F. Weston, K. Ross, and D. Irani. 2008. Climate Change Impacts on Maryland and the Cost of Inaction: A Review and Assessment by the Center for Integrated Environmental Research (CIER) at the Unviersity of Maryland. Page 24. Maryland Commission on Climate Change. Retrieved from http://www.cier.umd.edu/climateadaptation/Chapter3.pdf.