Lessons Learned in Multi-municipal Watershed-based Planning and Partnership Formation
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Extended Abstract/Paper:
Regional Planning in Pennsylvania – a difficult task!

With 2,633 independent municipalities and 67 counties – it is not surprising that the State of Pennsylvania experiences impediments to regional comprehensive planning, especially planning on a watershed basis. Watersheds abide by no political jurisdictions. In fact, within Southeastern Pennsylvania, it is not uncommon to observe municipalities spliced by ridge lines into multiple watersheds – sometimes containing the headwaters of one stream while a portion of the mainstem drainage of another.

Further complicating regional comprehensive planning in Pennsylvania was the adoption of the “Home Rule” charter in 1972. The Pennsylvania Home Rule Law states “A municipality which has a home rule charter may exercise any power to perform any function not denied by this Constitution, by its home rule charter or by the General Assembly at any time.” This law assigns the responsibility of local governance to the local community level, making the concept of regional planning a difficult sell.

The single largest impact on the health of a watershed is the degree of development – more specifically, the amount of impervious cover within the watershed area. The percentage of impervious cover within a drainage area has been identified as one of the primary indicators of watershed “health”. Often times within the Southeastern Pennsylvania watersheds, impervious cover is observed exceeding 26% watershed-wide. Numerous research efforts, studies and observations have indicated that a general categorization of watersheds has been widely applied to watershed management based on percent impervious cover. According to Schueler (1995), a watershed with more than 26% impervious cover will have highly unstable stream channels, water quality issues, bacterial pollution and poor stream biodiversity.

Land use management is performed through the separate roles of county and local governments under the Municipalities Planning Code, meaning that each municipality can make land use decisions regarding subdivisions and land development approval as though they were doing so in a vacuum. This fragmentation limits the ability to address water resource issues on a regional basis. Unfortunately, when it comes to water resources management – choices made at the individual municipal level can cause “ripple effects” experienced far beyond the municipal boundaries. The goal of taking a regional approach to watershed management is to encourage a level of coordination that will minimize such effects from continuing to be observed in the future as well as to develop coordinated strategies for addressing the effects of previous decisions.
Why is the Philadelphia Water Department interested in pursuing integrated planning initiatives on a “watershed” basis?

The Office of Watersheds (OOW) is a unit of the Philadelphia Water Department's Planning and Engineering Division. Formed in January 1999, the OOW integrates three historically separate programs: Combined Sewer Overflow, Stormwater Management, and Source Water Protection. The OOW is working to achieve viable and measurable improvements to the region's waterways by implementing planning and management strategies that foster good science, public involvement, and fiscal responsibility. The goal of the OOW is to meet regulatory requirements while enhancing the health and aesthetics of our environment.

The OOW’s Mission is to preserve and enhance the health of the region's watersheds through effective wastewater and stormwater services and the adoption of a comprehensive watershed management approach that achieves a sensible balance between cost and environmental benefit and is based on planning and acting in partnership with other regional stakeholders.

The OOW’s vision, "Green Cities – Clean Waters" is to unite the City of Philadelphia with its aquatic environment, creating a green legacy for future generations while incorporating a balance between ecology, economics, and equity.

Integrated Watershed Management Planning

The OOW developed their concept of regional watershed management planning after recognizing that, as the downstream most entity in each of the watersheds leading to the City of Philadelphia, they could not make measurable improvements to the waterways without support from upstream partners. PWD’s Integrated Watershed Management Planning (IWMP) process is based on a carefully developed approach to meeting the challenges of watershed management in an “urban” setting. The planning process also incorporates the best of existing municipal and conservation planning efforts (including River Conservation Plans, Open Space Plans, municipal Comprehensive Plans, etc.) as well as regulatory requirements and stakeholder goals.

In many states, numerous federal and state regulations and programs are aimed at improving the water quality and flow patterns in urban streams, while at the same time reducing flooding. Pennsylvania is no exception; the United States Environmental Protection Agency (USEPA) and the Pennsylvania Department of Environmental Protection (PADEP) have a complex regulatory framework for managing water resources with frequently overlapping demands and requirements. There are several major regulatory programs that contain significant elements related to water resources management in a watershed. These include:

The Clean Water Act, section 303 Total Maximum Daily Load (TMDL) process: seeks to improve water quality on impaired streams and water bodies. TMDLs involve collecting data in water bodies to determine point and non-point source pollution loads (quantity of pollution contributed to a stream by a single source or group of sources) and using the data to set maximum allowable loads from each of these sources. The goal of the program is to strengthen each state’s ability to meet clean water goals, to provide a listing of all polluted
waters, and to encourage cost-effective clean-up by guaranteeing that all sources of pollution are taken into account in the clean-up plans.

**NPDES Phase I and Phase II stormwater regulations**: seek to control pollution due to stormwater discharges from municipal separate storm sewer systems. Phase I of the stormwater program ordered that NPDES permit coverage was necessary for stormwater discharges from medium and large municipal separate storm sewer systems located in incorporated places or counties with populations of 100,000 or more and eleven categories of industrial activity, one of which is construction activity that disturbs five or more acres of land. This program addressed sources of stormwater runoff that had the greatest potential to negatively impact water quality. Phase II of the stormwater program expanded the coverage from Phase I to include required NPDES permit coverage for stormwater discharges from certain regulated small municipal separate storm sewer systems and construction activity disturbing between 1 and 5 acres of land. The goal of Phase II is to implement stormwater discharge management controls known as best management practices (BMPs).

**PA Act 537 sewage facilities planning**: seeks to protect and prevent contamination of groundwater and surface water by developing proper sewage disposal plans. It was enacted to correct existing sewage disposal problems and prevent future problems from occurring. To meet this objective, the law requires proper planning of all types of sewage systems, permitting of individual and community on-lot systems (septic systems) and uniform standards for on-lot systems. This will help to prevent malfunctioning sewage systems that can pose a threat to public health and the environment, and be very expensive to fix.

**PA Act 167 stormwater management planning**: seeks to address stormwater runoff quantity particularly in developing areas. Act 167, the Stormwater Management Act of 1978 requires each county in Pennsylvania to prepare and adopt a stormwater management plan for each designated watershed in the county. A Stormwater Management Plan provides a mechanism for municipalities within the watershed to plan for and manage increased runoff associated with possible future development and land use change. It is not the intent of this plan to solve existing flooding or runoff problems (although this is becoming more of an expectation through Act 167 products such as detention discharge rates related to basin location), but to identify them for future correction and assure that problems do not get worse.

**The Safe Drinking Water Act**: requirements for implementing source water protection programs under the Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) which targets a reduction of Cryptosporidium in drinking water sources.

Each of these programs provides guidelines and measures for implementation, which are transformed into a series of planning objectives within the watershed management planning process. Ultimately, an implementation plan is developed to addresses all regulatory components of these programs in a comprehensive and integrated manner.

IWMPs are built upon a solid, scientific foundation composed of water quality monitoring (wet and dry weather), macroinvertebrate and fish bioassessments, physical stream surveys (FGM) and computer simulated modeling of stormwater flows and pollutant loading. Based on these extensive physical, chemical and biological assessments, the plans explore the nature, causes, severity and opportunities for control of water quality impairments in the
watershed. They present logical and affordable pathways to restore and protect the beneficial and designated uses of the waters in a basin. The primary intent of the planning process is to improve the environmental health and safe enjoyment of the watershed by sharing resources and through cooperation among residents and other stakeholders. The goals of the initiative are to protect, enhance, and restore the beneficial uses of the waterway and its riparian areas.

The Philadelphia Water Department has committed to development of IWMPs for each of the five major tributary streams of the Schuylkill and Delaware Rivers that drain through the City of Philadelphia, including the Cobbs, Tookany/Tacony-Frankford, Wissahickon, Pennypack and Poquessing.

**Development of an IWMP:**
PWD’s OOW identified two main steps that must be taken before embarking on a large-scale planning initiative such as an IWMP. The first step includes the development of an inventory of existing plans, reports and monitoring data that must be gathered to serve as a basis for a watershed-wide characterization; the second step involves the development of a similar inventory of key stakeholder groups and initiatives in order to gain an understanding of the stakeholder base within the watershed area.

**Characterization of the Watershed Area:**
As previously described, PWD implements a detailed monitoring program in each planning shed which includes chemical, biological and physical assessments to characterize the current state of the watershed and identify existing problems and their sources. A compendium document is produced following the analysis of all collected data; this document titled the Comprehensive Characterization Report (CCR) is shared with watershed partners for comments and feedback. These CCR documents are available on the partnership website at [www.phillyriverinfo.org](http://www.phillyriverinfo.org). The CCR assessment serves to document the watershed baseline prior to implementation of any plan recommendations, allowing for the measure of progress as implementation takes place upon completion of the plan.

**Watershed Partnerships:**
Stakeholder support is critical to the success of this type of regional planning initiative. A diversity of stakeholder perspectives must be involved with the development of each stage in the planning process in order to ensure that the plan is representative of stakeholder interests. This stakeholder buy-in is most critical to ensuring ultimate implementation of the plan. Recognizing this, PWD has helped to develop stakeholder watershed partnerships for each watershed where an IWMP is being initiated. At a minimum, a Watershed Partnership should be comprised of representatives from each of the following: federal, state, and local government agencies, industries, local businesses, nonprofit organizations and watershed residents, as well as any other interested stakeholders in the shed.

The Watershed Partnerships are designed to provide a forum for stakeholders to work together to develop strategies that embrace the dual focus of improving stream water quality and the quality of life within their communities. The Partnership is charged with driving the process and ensuring that the process remains representative of the diversity of stakeholder perspectives. The partnerships discuss priorities and the actions necessary to make the plan
successful. These actions become a part of the implementation strategy, and address the desire to improve the water and land environment through a number of avenues. The ultimate goal is to cultivate a partnership committed to implementing the plan once completed.

Plan Implementation
IWMPs are designed to serve as “living documents” – with a purpose of integrating the whole host of ongoing regulatory and non-regulatory planning processes and initiatives. PWD recognized that developing an implementation plan for the portion of a watershed outside of its jurisdiction would not be feasible. Recognizing that upstream municipalities and partners have their own set of regulations and initiatives to implement, often times with differing timelines and completion dates – the planning process does not prescribe a formal implementation schedule for the portion of the watershed outside of the City of Philadelphia. Instead, based on the identified water quality, quantity and ecological degradation issues within the watershed, a series of implementation options are identified and packaged together in a sort of “menu” format, made available to partners to implement piece by piece as funding becomes available. The “menu” format is shared with watershed partners in the form of Implementation Guidelines.

The Implementation Guidelines only contain options evaluated for applicability and feasibility within the watershed. These guidelines are arranged in groupings designed to achieve each of three “Targets” developed by the OOW planning team. The targets are defined as follows:

**Target A Dry Weather Water Quality and Aesthetics:** Focus on achieving water quality standards in the stream during dry weather flows (typically close to 65% of the time). Attainment of this target is based on the elimination of all dry weather discharges to the stream as well as removal of trash and litter from the waterway.

**Target B Healthy Living Resources:** Based on the improvement of in-stream conditions. Implementation projects are aimed at habitat improvements as well as measures to provide the opportunity for organisms to avoid high velocities during storms. Achievement of this target will increase the population, health, and diversity of benthic invertebrate and fish species within the stream.

**Target C Wet Weather Water Quality and Quantity:** Based on improvement of in-stream water quality during and after wet weather events. These implementation options aimed at achieving this target are designed to reduce quantity and/or improve quality of stormwater discharges.

The purpose of defining implementation “targets” is to keep focus on progress as implementation occurs. The concept is based on the fact that in these Southeastern Pennsylvania watersheds, it seems reasonable that Targets A and B would be achievable within the first 10 years of implementation – and by achieving these targets, quality of life and recreational benefits of the waterway will be restored for more than 65% of the time. Target C will be the most difficult to achieve as it means achieving water quality standards while it is raining. This target will require the use of adaptive management over the 20-year horizon to identify the appropriate mix of practices within the watershed that will achieve
this goal. The Implementation Guidelines provide information on location and degree to which implementation needs to occur in order to meet the targets specifically developed to guide partners outside of the City of Philadelphia.

Broad recommendations made in the Implementation Guidelines are further evaluated and prioritized by PWD in order to develop a detailed Implementation Plan for the drainage area of the watershed within the City of Philadelphia. PWD has committed to developing and executing four sequential 5-year Implementation Plans for the City of Philadelphia portion of the drainage area within each planning shed. Thus far Implementation Plans have been developed for the Cobbs and Tookany/Tacony-Frankford Watersheds (available at www.phillyriverinfo.org); the plans have matching implementation timelines, running from 2006 through 2011. Annual implementation progress reports are being developed to illustrate implementation progress within each shed, and every five years an assessment will be performed to determine if progress has been made toward achieving the watershed goals. Adaptive management will be utilized as necessary at each 5-year planning interval to ensure that progress is being achieved.

**PWD’s Planning Track Record and Lessons Learned**
Each watershed has presented a new set of issues and opportunities to address and overcome. The following includes a description of each of the lessons learned in each watershed where the OOW has initiated an IWMP and Watershed Partnership.

**The Darby-Cobbs Watershed**
The IWMP for the Darby-Cobbs Watershed was the first to be initiated by the OOW in 1999. This initiative was intended to include the entire Darby-Cobbs drainage area – of more than 77 mi², covering portions of four counties and 31 municipalities. The Darby-Cobbs Watershed Partnership was created in an effort to connect residents, businesses, and government as neighbors and stewards of the watershed to help drive the newly initiated watershed planning process. As the first of the IWMPs to be initiated, the Darby-Cobbs served as the “litmus test” for this stakeholder based planning approach. At the time, there was not an established procedure for soliciting stakeholder interest, insight and/or support. Unfortunately, trial and error were a necessary part of the process used to develop such procedures.

Delaware County makes up the majority of the Darby-Cobbs drainage at almost 78% of the total. With more than 90% of the watershed area outside of the City of Philadelphia, stakeholders had a difficult time grasping PWD’s motivation for leading such an initiative. An Act 167 Stormwater Management Plan was scheduled to be initiated for this watershed in 2000 under the leadership of the Delaware County Planning Department. The OOW saw this as an opportunity for collaboration and synergy as the two efforts could focus on different aspects of the overall watershed planning goal.

Additionally, a grassroots organization was funded by the Pennsylvania Department of Conservation and Natural Resources (DCNR) for the creation of a watershed planning process called a River Conservation Plan (RCP). Though the RCP, Act 167 and IWMP were focused on the same geographic planning region, the initiatives themselves were quite
different. PWD saw the opportunity to collaborate on the production of these simultaneous initiatives, each focusing on different aspects of watershed and conservation planning. Unfortunately, one of the early lessons learned in this process was that a large entity such as PWD should pay close attention to not over-imposing on other initiatives; even when they are doing so in an effort to further the greater good. Within the Darby-Cobbs Partnership stakeholder assemblage, the perception became that the PWD was imposing on the process, taking on the presence of “an 800 lb gorilla”.

Since this watershed planning initiative was kicked-off prior to the unveiling of the NPDES Phase II regulations for MS4 municipalities, it was difficult to get Darby-Cobbs municipalities to see the value of investing time or resources in planning for water quality benefits when they had so many other pressing issues such as flooding and basic services to deal with on a day-to-day basis. As a result, municipal representation within the planning process was sparse. Municipal representation in a planning initiative such as an IWMP is critical to long-term success and implementation of recommendations of the plan. Soliciting interest from stakeholders representing the geographic regions furthest from the City of Philadelphia proved to be a particularly difficult task. It had become clear that PWD had “bitten off more than they could chew” in trying to create a plan for an area primarily outside its borders without sufficient stakeholder support. Rather than to continue to stretch resources out over this entire watershed area, PWD elected to focus on the Cobbs subshed for creation of the Integrated Watershed Management Plan.

Lessons Learned:
The Darby-Cobbs planning process provided PWD with a multitude of lessons learned in initiating a stakeholder planning process. It serves as a base set of data gathering and outreach procedures for initiating future IWMPs.

1. Create an open and trust based process: Trust amongst stakeholders is critical to the success of this type of initiative. It is the responsibility of the lead entity in a planning process to make sure that stakeholders are clearly informed about all aspects of the process. This includes the investment of time spent explaining processes and decisions as necessary to eliminate confusion. In order to achieve trust – the planning process must provide for an open exchange of information in which all stakeholders are at the same level of awareness.

2. Do not impose on other efforts: The lead entity in a planning effort of this nature should perform an assessment of existing stakeholder groups and initiatives in order to identify opportunities for partnering of efforts, rather than allowing for the perception of competing efforts. It is important to make clear that all initiatives have value – and that by working in coordination – that synergy produced by the multitude of initiatives would be even more beneficial to the stakeholder base.

3. Do not “bite off more than you can chew”: It is important to recognize how far planning resources can be stretched. When initiating a process such as this, it can make sense to choose a model planning area within the larger watershed to perform the analyses, leaving the opportunity to later extrapolate information for the larger region.

4. Gain an understanding of municipal regulatory obligations; assisting municipalities to meet such obligations is the carrot that can be provided for continued participation in the planning process.
Tookany/Tacony-Frankford Watershed

Utilizing the “lessons learned” in the first year of planning (2000) in the Darby-Cobbs watershed, PWD initiated the second IWMP development process in the Tookany/Tacony-Frankford (TTF) Watershed. From its inception, this initiative was quite different from the Darby-Cobbs. This watershed area was much smaller (29 mi²) with only two counties (Montgomery and Philadelphia) and four municipalities within the drainage area. The City of Philadelphia occupies almost 52% of the watershed drainage. Due to the smaller drainage area, there were many fewer stakeholder groups to bring into the planning process making the start-up of the initiative considerably more manageable than the previous planning effort.

As with the Darby-Cobbs, a RCP was funded for the TTF watershed, but when funding was allocated for that program within the TTF, the watershed was actually split in half so that the Montgomery County portion of the watershed was funded to produce one RCP and the Philadelphia portion of the watershed was funded to produce another. Though it would appear that the splitting of these initiatives might have resulted in a divisive effect on the watershed stakeholder process, it did not. The two efforts were developed side-by-side and formed a somewhat symbiotic relationship as the production of each was mutually beneficial to all stakeholders. The TTF Watershed Partners realized that they shared interests with those both upstream and downstream.

Within the TTF Watershed, the RCP process was utilized to gather stakeholder insight on more of the quality of life and recreational aspects of the planning process, while the IWMP being developed simultaneously was focused on the more scientific water quality based aspects. The stakeholder goal setting process held for the RCPs was additionally adopted by the IWMP process – so that in the end there was a single set of watershed goals for the TTF.

This planning endeavor in the TTF Watershed took roughly 4 years to move from watershed characterization to plan completion. Upon completion of development of the IWMP for the TTF Watershed, the partnership eagerly began to consider the next phase in the process – implementation.

Lessons Learned

The TTF Watershed provided additional lessons learned in stakeholder based planning.

1. Identify energetic partners early on: this watershed planning process was really driven by a core set of dedicated stakeholders that were involved from the start.
2. Keep the core stakeholder group energized and excited: when a planning initiative is going to take multiple years of data collection, analysis, evaluation and approval – there is a tendency for stakeholders to lose interest in the process as they feel that there is no progress being made. It is critical to keep this group involved and interested in the process showing progress each time the group is convened, and keep their focus on the completion date.
3. Show early successes: one way to keep the stakeholders interested in the process during the lengthy planning phase is to begin implementing early projects as a way to illustrate successes on a small-scale basis. One way this was achieved in the TTF watershed was to utilize the services of the PWD Waterways Restoration Unit to
remove large debris from problematic “dump” sites within the watershed. This produced an immediate aesthetic improvement within the watershed showing PWD’s commitment to implementation and achieved immeasurable good will amongst stakeholders.

4. Municipal involvement is critical: one of the key factors leading to the success of the IWMP initiative within the TTF watershed was municipal investment in the process. From the inception of the planning process, the municipality that occupied the majority of the drainage area outside of the City of Philadelphia was a lead partner in driving the process, which legitimized the process for many other watershed stakeholders – including other municipalities within the drainage area.

5. Do not give up on a municipality that is divided into multiple watershed drainage areas: often times when a municipality only has a small portion of its jurisdiction within the watershed drainage area undergoing a planning initiative, there is little incentive for the municipality to invest time and resources in the process. The key is to continue to identify incentives to bring these municipalities into the process and illustrate the value of their participation.

Wissahickon Planning
The Wissahickon Watershed Partnership was the third IWMP effort to be initiated by PWD, started in 2005. Like the Darby-Cobbs watershed, the Wissahickon has a large drainage area of roughly 64 mi² within two counties (Montgomery and Philadelphia) encompassing portions of 15 municipalities and the City of Philadelphia. The City of Philadelphia only accounts for 16.5% of the drainage area. However, this watershed was quite different from the previous two as all point source discharges were located in the upstream portion of the watershed outside of the City – and the Wissahickon Creek is a source water planning interest for PWD as the confluence of the Wissahickon Creek with the Schuylkill River is just above a drinking water intake.

Within the Wissahickon Creek Watershed there was a long history of planning, reporting and analysis – but unfortunately there was also a history of gathering momentum behind initiatives only to lose that momentum later in the process as the “planning” portion of the initiative seemed to drag on without any deliverables for partners to take hold of. Additionally complicating stakeholder relationships within this watershed was the establishment of Total Maximum Daily Loads (TMDL) for Nutrients and Siltation in 2001. These proved controversial, and the nutrient portion of the TMDL was newly in a state of flux by 2005 and under re-evaluation.

In order to gain a comprehensive understanding of watershed issues and stakeholder interests, the OOW initiated a new procedure as a part of the initiation of the Wissahickon Watershed Partnership – the “Key Person Interview” (KPI). KPIs have been utilized by the OOW in the past as a part of the RCP development process, but never before were they used from the inception of the stakeholder outreach process. An interview “script” was developed, which included a description of the IWMP process as well as what stakeholders will get out of the process. The scripts included a series of questions for the stakeholders regarding their experiences with previous planning initiatives as well as what their particular needs are. Within the Wissahickon Creek Watershed, each of the municipalities was
approached for participation in an interview, during which the OOW staff gathered information regarding specific needs that the IWMP process could seek to fill.

Lessons Learned
1. Be aware of the watershed history: When it comes to soliciting stakeholder interest for a planning initiative – it is critical that stakeholder outreach includes an assessment of previous initiatives so that one can learn from past “mistakes”. Within this watershed, it was clear that there needed to be a commitment to follow-through and implementation as the groups had been assembled in the past – but completion of the initiatives had never meant anything more than production of the plan itself.
2. Be honest and upfront about motives and interests: Within a watershed like the Wissahickon – with multiple opposing interests, creating an open and honest flow of information is critical. An example of this in the Wissahickon was when an incident occurred causing a fish kill. Rather than allowing for an unfortunate incident such as this to divide stakeholders, the Wissahickon Watershed Partnership utilized this opportunity to unite interests through collaborative information sharing, rather than pointing fingers and passing blame.
3. Share all data as collected and analyzed: As we had learned in previous watersheds, trust amongst stakeholders is critical. As such, all data and data collection processes are shared with stakeholders for evaluation and comment as the data becomes available.
4. Assess municipal interests and needs: In order to provide incentive for municipalities to participate in the planning process, an assessment of “municipal needs” should be conducted. With MS4 requirements at the forefront of municipal obligation, the development of workshops designed to assist municipalities in meeting these regulations was helpful.

Conclusions:
Watershed planning, and above all, implementation, cannot succeed without active, broad based stakeholder participation. PWD has initiated several watershed plans, each unique in its own way, and has gradually developed an approach to stakeholder participation and partnership building that is proving to be successful. Although the lessons learned presented above are applicable to most watersheds, perhaps the greatest lesson is that each watershed presents unique challenges, and requires flexibility and ingenuity in the approach to planning. This also means that the stakeholder partnership approach must be adapted to the conditions encountered, and no two stakeholder processes will likely be the same.

References: