Spring Creek Phase 2 One Water Integrated Management Plan

Spring Creek Watershed Commission

January 16, 2019

Why One Water

- Considers the water cycle as an integrated system, recognizing the interconnectedness of surface water and groundwater supply, stormwater, wastewater, and energy.
- Breaks down silos of how current water is managed.
- Creates collaboration among water utilities, community and business leaders, industry, policy makers, academics, environmental advocates and conservationists.
- While the focus is **WATER** the goals are thriving local economies, community vitality and healthy ecosystems.

From nature to tap, from farms to food, from toilet back to stream, there is just one water cycle.



Defining Integrated Water Management The coordinated planning, development, protection, and management of water, land and related resources in a manner that fosters sustainable economic activity, improves or sustains environmental quality, ensures public health and safety, and provides for the sustainability of communities and ecosystems.

-- American Water Resources Association

One Water Planning Process

Define One Water Scope	Craft Vision and Objectives	Establish leadership and structure	Implement the plan
6			Track
Partners		Create framework or	objectives
Assess Needs		pian*	
and Opportunities		Develop financial strategies	
Engage Stakehold	lers		



Spring Creek Watershed Overview

- 146 Sq Miles Stream
- 173 Sq Miles Groundwater
- 86% water supply source is ground water
- Landuse (2014)
- 29% Agriculture
- 38% forested
- 26% developed
- 6 % vacant (quarries)

(Growth has transitions from residential and industrial to predominately residential, educational and commercial)

• Tributary to Bald Eagle Creek, which drains into the West Branch Susquehanna River

Designated Uses

Aquatic Life: High Quality Cold Water Fishery (HQ-CWF)

• Main stem Spring Creek - HQ-CWF, as are the following tributaries: upper Buffalo Run; upper Slab Cabin Run; Thompson Run; Galbraith Gap Run; McBride Gap Run; Markles Gap Run; lower Logan Branch

• All other tributaries are CWF

Segment	Designated Use	Cause	Indicator	Sources
Spring Creek (5.4 mi)	Aquatic Life: HQ- CWF	Siltation	Macroinvertebrate Surveys	Urban Stormwater
Spring Creek (4.9 mi)	Aquatic Life: HQ- CWF	Organic Enrichment/Low DO	Macroinvertebrate Surveys	Industrial Point Sources
Slab Cabin Run (9.9 mi)	Aquatic Life: HQ- CWF and CWF	Thermal Modifications and Siltation	Macroinvertebrate Surveys	Golf Courses, Agriculture and Urban Stormwater
Logan Branch (2.1 mi)	Aquatic Life: HQ- CWF and CWF	Metals Organic Enrichment/Low DO	Macroinvertebrate Surveys	Industrial Point Sources
Buffalo Run (1.2 mi)	Aquatic Life: HQ- CWF and CWF	Siltation	Macroinvertebrate Surveys	Urban Stormwater
UNT Conewago Creek (0.9 mi)	Aquatic Life: Trout Stocked Fishery	Organic Enrichment/TSS	Macroinvertebrate Surveys	Point Source

Causes of Impairments (2016 Integrated Report)

Municipality	2017	2000	% change 2010-17
Bellefonte Borough	6,308	6,424	2%
Benner Township	9,309	5,219	50.7%
Centre Hall Borough	1,251	1076	-1.1%
College Township	10,245	8,522	7.6%
Ferguson Township	19,316	14,100	9.2%
Halfmoon Township	2,793	2,359	4.7%
Harris Township	5,803	4,655	19.1%
Milesburg Borough	1,088	1,156	-3.1%
Patten Township	16,038	11,301	4.7%
Potter Township	3,593	3,333	2.2%
Spring Township	7,853	6,233	5.1%
State College Borough	42,430	38,434	.09%
Walker Township	4,721	3,194	6.5%
Total	130,748	106,006	

Population Change

Phase 1 Identified Issues

- Declining Stream Base Flow
- Increased Sedimentation
- Thermal Modifications
- Riparian Buffer Removal
- Declining Biotic Community
- Ineffective Stormwater Management
- Malfunctioning Stormwater Basins
- Lack of Sinkhole and Wellhead Protection
- No Sponge Recharge Area Protection
- Increased Impervious Cover
- Declining Groundwater Levels
- Poor Water Quality /Spring Contamination

Actions after Phase 1

- SCWC Environmental Controls (ongoing)
- USGS Hydrogeologic Setting and Conceptual Hydrologic Model (2005) with suggested future actions
- Water-Budget and Recharge-Area Simulations for Spring Creek (2000-2006)
- Water Resource Monitoring Project (Ongoing)
- Source Water and Wellhead Protection Plans (State College Borough, College Township, Walker Township, Bellefonte Borough)

Watershed Forum 10 Substantive Issues

- Unique Nature of the Watershed
- Growth, Development, and Existing and New Impacts
- Infrastructure
- Tourism and Recreation
- Agriculture
- Drinking Water
- Wastewater
- Mining
- Transportation
- PSU's Role

Challenge: New Ways of Coordinating Across Local, County, Regional, State and Federal Entities

31 Total

Water Suppliers	Wastewater	
State College Borough Water Authority	University Area Joint Authority	
Bellefonte Borough Water and Sewer Authority	Spring Benner Walker Joint Authority	
College Township Water Authority	Centre Potter Sewer Authority	
Benner Township Water Authority	Regional Planning	
PSU (Water and Sewer)	Centre Region Planning	
Walker Township Water Association	Nittany Valley Joint Planning Commission	
Milesburg Borough Water Authority	Lower Bald Eagle Planning	
Centre Hall Borough Water Authority	Penns Valley Region Planning	
PA DEP and EPA	Centre County Planning Commission and Transportation MPO	

Challenge: PA Water Law

- Various pieces of law interwoven together to manage water.
- Not well designed for future demands and emergency situations.
- Sources of PA water law include common law, interstate compacts regulating some parts of the Commonwealth, and statutes targeting specific water topics.
- Both surface and groundwater are legally managed separately under riparian law. Act 220 tries to address this issue.

https://www.springcreekwatershedatlas.org/singlepost/2018/01/16/An-Overview-of-Pennsylvania-Water-Law Challenge: Headwater Streams

- Municipal water withdrawals from scattered headwater well fields.
- Headwater flow supplement that could come from treated wastewater which is discharged downstream.
- Water use and discharge is not evenly dispersed throughout the watershed.

Public and Technical Process 2018

- April 18: PSU Law Public Forum
- July 10: 2nd Public Forum to Introduce One Water Concept and begin visioning
- August to November: Technical workgroup meetings to establish goals, metrics and desired outcomes
- December 4: 3rd Public Forum to review draft plan and gather input on the plan's implementation

Vision Statement

The vision for the Spring Creek Watershed is an integrated management of water resources in an environmentally, economically, and socially beneficial manner. This will foster a vibrant, prosperous watershed where natural and human communities thrive, and citizens embrace the value of our assets and sustain our resources now and for future generations. This vision, developed collaboratively with stakeholders, is accomplished through the mission of the Spring **Creek Watershed Commission**

Spring Creek Watershed Commission Mission Statement

- To implement the long-range vision for the watershed that represents a consensus of thoughts and ideals that are commonly shared by the people of the Spring Creek Watershed.
- To establish a leadership role within the watershed to advance and coordinate projects and programs that are consistent with the long-range vision of the Spring Creek Watershed, including conservation and enhancement of the exceptional wild trout resources it supports.
- To develop a long-range comprehensive Integrated Watershed Management Plan that relies on quality scientific data and a program of meaningful associated projects to conserve and enhance the quality of life within the Spring Creek Watershed.

1. Recognizes that the Spring Creek Watershed is worthy of conservation and careful stewardship.

Value Statements: Core principles the watershed communities' governments, residents, water utilities, and businesses wish to maintain

2. Conserve Spring Creek's cold water ecosystem including its exceptional wild trout fishery.

3. Provides a clear visual image of the watershed community that reflects the highest standards of design quality for public and private commercial, residential, institutional and industrial development in Spring Creek resulting in the conservation of water and the conservation and enhancement of its natural beauty, natural features and cultural heritage.

4. Promote buildings and public infrastructure development that are practical, sustainable, and in harmony with the environment and surrounding landscape.

5. Fosters a feeling of community spirit, community identity, and promotes a sense of full citizen participation, guaranteeing an opportunity for everyone to share in the duties and responsibilities that benefit the Spring Creek Watershed.

6. Provides cultural, recreational, and educational opportunities for the residents and visitors to the Spring Creek Watershed.

Guiding Principles For Decision Making

- Statements that articulate values and actions that support decision making.
- The following are draft principles that need to be vetted by the Spring Creek Watershed Commission

Guiding Principle 1:

Our one water plan is not an effort to change local government but to integrate management and leadership Our One Water Plan envisions an approach that will pull parties together in every aspect of the water arena in a way that goes beyond the interests of any one government agency or stakeholder and in a way that has never been done before. Decision-making that spans political boundaries is essential to fully implement watershed management and achieve established goals for the watershed.

Guiding Principle 2:

Our One Water Plan will strive for a systematic, watershedwide, science-based approach to watershed management; driven by the participating local governments, state and federal governments, water utilities, planning commissions, Penn State University, citizens, businesses and industry. It will involve a broad range of stakeholders to ensure an integrated approach to watershed management. A "bottom up" approach for water management—allowing the key discussions of major water resource issues, concerns, problems, goals and objectives and potential solutions to originate and be first fully vetted at the stakeholder level—is envisioned. Expanding involvement and collaboration at the ground-level creates greater buy-in and support at all levels of government.

Guiding Principle 3:

Our One Water Plan planning and implementation efforts will recognize local commitment and contribution. History shows us that when local water management programs and projects rely almost entirely on outside funding, they are unable to sustain themselves over time. Locally supported and funded technical, administrative, and outreach activities that leverage funding from multiple sources including local, state and federal sources will be key to ensuring local government capabilities and longterm success on both the local level and watershed scale. Guiding Principle 4:

Our One Water Plan will embrace the concept of multiple benefits based on measures of social, economic and environmental outcomes in the development and prioritization of implementation strategies and actions. Prioritized, multi-benefit projects provide value to more than one group or interest and address more than one environmental resource within a watershed. These types of projects are necessary to build the support of citizens and agencies, achieve water quality and quantity goals, and produce the environmental goods and advantages that a healthy watershed provides.

One Water Framework

- Goals are statements that describe the fundamental endpoints or outcomes we are aiming to achieve through activities across all sectors of management. Goal statements are expressed in broad aspirational terms.
- Objective are statements about desired outcomes and support the high-level goals.
- Metrics can be considered performance indicators. They can be considered benchmarks that can be measured to track how well we are achieving our desired outcomes. For example, "tons of sediment eliminated".
- Outcomes are specific changes we are trying to achieve. They should be measurable and realistic but challenging. If outcomes are unrealistic and too difficult to achieve, they may discourage people rather than motivate them. On the other hand, outcomes that are too easy to achieve can lead to complacency.

Goals 1: Protect, Enhance and Sustain Healthy and Resilient Coldwater Stream Ecosystems

Objective	Description	Suggested Metric (s)	Outcome(s)
Objective 1A: Protect Ecosystem Flows	Rivers, streams, wetlands and springs need certain amounts of water to support healthy aquatic ecosystems. Improve water quality and quantity for resiliency to ensure the capacity of the ecosystem to respond to a disturbance by resisting damage and recover quickly. This is especially critical given the unique and coldwater ecosystem supported by the Spring Creek Watershed and highlighted by the exceptional wild trout populations and fishery, which require cold, clean water to flourish. Management must consider the impacts of point and nonpoint discharges, development, stormwater, and water	 The Nature Conservancy Ecosystem Flow Recommendations Lbs of nitrogen, phosphorus and sediment reduced Number of miles of riparian buffers installed Miles of stream improved that meet criteria to be delisted from impairment Development of a proactive TMDL to determine maximum amount of pollutants allowed to occur in spring creek and tributaries in the future. 	Restore High, Seasonal and Low Stream Flows Maintain and improve existing hydrology Impaired stream sections improved to meet criteria for removal from impairment designation on 303D list Voluntary Total maximum Daily Loads Met.
	withdrawals.		

Goals 1: Protect, Enhance and Sustain Healthy and Resilient Coldwater Stream Ecosystems

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Objective 1B: Create Resilient Habitats

Stream habitat is one of the important factors that affect aquatic communities. This includes physical habitat and water quality. Based on the macroinvertebrate diversity and sensitivity to pollution, and wild trout population dynamics and densities, we gain an understanding of our streams' health. Degraded in-stream habitat often results from uncontrolled storm water runoff and uncontrolled runoff from cultivated agricultural land. Other reasons for poor stream habitat include altered stream flows, excess sediment, and a loss of surrounding trees and shrubs that help slow the erosion of the stream banks and provide shade to help maintain cool water temperatures during critical summer months. Chemicals and pollutants also negatively impact stream habitat/water quality.

- Index of Biological Integrity Scores
- DO, water temperature, sediment loads, stream channel surveys (fluvial geomorphology)
- Number of trout, biomass, sizes and redds
- Miles of riparian buffers installed
- % of impervious surface reduced

Diversity of macroinvertebrates.

Improved water quality and thermal regime

Wild trout populations at or above current levels.

Maintain and improve existing water quality, including water temperature and D.O.

Acres and/or # of Green Infrastructure

Goal 2: Maintain and improve water quality and quantity to sustainably meet the needs of the human community.

Objective2A: Maintain a reliable water supply for residents, agriculture, and industry	Protecting, maintaining, improving and developing new water supply sources and recharge/storage areas ensures a supply for future uses. Water management must consider the multiple uses of groundwater to ensure reliability. Recycled water can offer a reliable source that can displace a portion of the need for additional surface or groundwater withdrawals	% loss from water systems, #gallons of drinking water from new sources, % stormwater volume directed to recharge areas; % reduction in treatment costs	% water use served by recycled water # new large-scale storage areas developed
Objective 2B: Implement a water demand strategy	Water demand management involves the adoption of policies and investments by water utilities to achieve efficient water use by all members of the watershed community. This strategy requires a major paradigm shift from conventional supply management to the management of demand. The aim is to promote the use of the right quantity of water on the farm, industry, household, and by the watershed community as a whole.	 # of tributaries with water budgets # of critical supply areas identified, % critical contribution areas with practices/policies in place to support sustainable yield/withdrawal scenarios, # of effective ordinances/policies # gallons of water from natural systems, withdrawals per capita 	No exceedance of sustainable withdrawal rates. # of new sources to mitigate impact. % public water supply loss reduced. Maintain low flows at or above long- term monthly median flows at each of the 3 USGS gauges on Spring Creek and on tributaries while meeting daily drinking water needs

Goal 2: Maintain and improve water quality and quantity to sustainably meet the needs of the human community.

Objective 2C: Sustain and protect groundwater Groundwater accounts for 86% water supply in the Spring Creek Watershed. Aquifers provide critical storage to meet needs during droughts. The amount of groundwater in storage in each basin is dependent on the precipitation, recharge and the total extraction of all the wells. A groundwater management plan that is designed for the political, institutional, legal and technical specifics of the basin can help maintain the quality and quantity of the groundwater supply.

of BMP's to minimize recharge loss

of source water plans
updated,

of emergency water supply plans developed,

% change in well levels;

% flow in and out of the watershed

% deviation from historic baseflows

sustained well yields

ground water management plan

% attainment on meeting historic base flows

Goal 3: Integrate and Coordinate Management for Sustainability, Economic Growth, Recreation and Quality of Life

Objective3A: Implement an Integrated Water Management Network/Governance Model

This network would promote the coordinated development and management of water, land and related resources, to maximize environmental, economic and social results in an equitable manner without compromising the sustainability of the watershed. Participation would involve applying knowledge from various disciplines as well as the insights from diverse stakeholders to devise and implement efficient, equitable and sustainable solutions to water and development problems. Network members could include the Spring Creek Watershed Commission, municipal governments, water utilities, Penn State, state and federal agencies,

Build capacity of Spring Creek Watershed Commission to administer the network

Utilize Penn State to evaluate existing networks in other states or other governance options

Include MS4 Partnership and Central PA Source Water Protection Partnership Cross agency and cross scale interaction and communication

Administrative process implemented

Network charter in place

Goal 3: Integrate and Coordinate Management for Sustainability, Economic Growth, Recreation and Quality of Life

Objective 3B: Implement network subcommittee for technical support, data driven science, education and information exchange.

Diversity of membership includes #of members representing utility personnel, academia, diverse capabilities government employees (federal, state, #of educational events local), non-governmental organizations, industry Data driven science metrics representatives and consultants. Review, evaluate, and disseminate % economic growth information on best practices on integrated watershed % biological growth management. Encourage adoption of new advances and Centralized data sets applications for watershed management, develop workshops and organize/moderate technical discussion and educational events.

Science based collaboration Land Use plans coordinated Online searchable data base Goal 3: Integrate and Coordinate Management for Sustainability, Economic Growth, Recreation and Quality of Life

Objective 3C: Promote the value of the watershed's recreation, aesthetic and cultural assets Ecosystems provide recreational opportunities and cultural and aesthetic value. Communities rely on clean air, water, green space, and other natural amenities for economic sustainability and quality of life, yet their benefits are not always fully understood or considered in local decisions. Recreation and tourism associated with outdoor environments can play a huge role in local economies. Many citizens place high value on historically or culturally important landscapes because of their significance. However, human activities can stress natural areas where people recreate or visit cultural sites.

#of clean up events
of recreational users
cultural sites
of groups involved
% value of ecosystem services
Reenergize "Spring Creek Day"
% Recreational growth and
economic value

Stewardship



- Complete the final planning document with specific actions, milestones and timeline.
- Continue to convene the technical workgroup and expand participation to begin drafting an RFP for technical services.
- The expanded technical workgroups should develop a funding strategy to complete phase 3.
- Implement a speakers information series to begin addressing the 10 substantive issues identified through the law forum.
- Continue to improve the SCWC website to serve as a central clearinghouse for information.
- Continue to use the SCWC communications contractor to manage the website, coordinate speaker series logistics and additional services as needed.