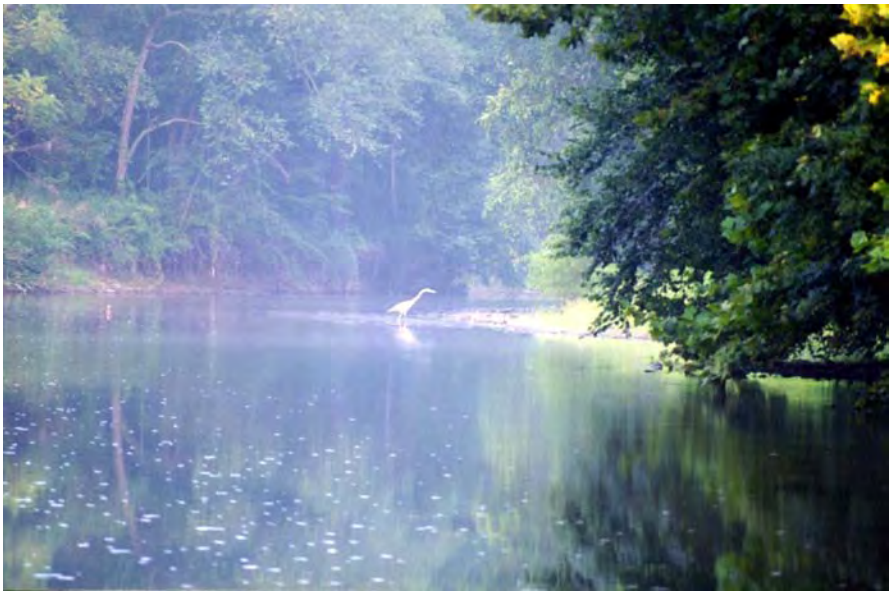
In Defense of Watersheds

Protecting your community from flooding without dams

Including CASE STUDY:
The Demise of Dark Hollow Dam



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Dedication

This book is dedicated to all those who have given something of themselves to protect the natural world.

The Beautiful Delaware River
The last major free flowing river east of the Mississippi – no dams along its entire main stem.

What is a Riverkeeper?

A Riverkeeper is a full-time, privately funded, non-governmental ombudsperson whose special responsibility is to be the public advocate for a water body. A Keeper's clients are the river resource and the citizens who fight to protect it.

The Delaware Riverkeeper's job is to advocate for the Delaware River and all of the tributaries and habitats of the watershed. Supported by a committed staff and volunteers, Delaware Riverkeeper Maya van Rossum monitors compliance with environmental laws, responds to citizen complaints and need for support, identifies problems which affect the Delaware and responds accordingly. Serving as a living witness to the condition of the ecosystem, the Riverkeeper is an advocate for the public's right to protect and defend the environment.

About the Delaware Riverkeeper Network

Established in 1988 upon the appointment of the Delaware Riverkeeper, the Delaware Riverkeeper Network (DRN) is a nonprofit membership organization affiliated with the American Littoral Society, a thirty-seven year old coastal conservation organization based in Sandy Hook, NJ. The Delaware Riverkeeper Network's professional staff and volunteers work throughout the entire Delaware River Watershed, which includes portions of Pennsylvania, New Jersey, Delaware and New York.

Operating on the belief that the best defense for our aquatic ecosystems lies with committed local individuals empowered with the information and tools to do the job of preserving our waterways; DRN empowers citizens to take more active roles in protecting the creeks and streams that flow through their neighborhoods. Volunteers and concerned individuals are given organizing, training, information, support, and the opportunity to participate in a full program of citizen action, water quality monitoring, and stream restoration. When necessary, the Delaware Riverkeeper Network initiates legal action to protect water quality and stream ecosystems.

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☐ Yes, I'd like to become a member of the Delaware Riverkeeper Network.

- ☐ General Membership is $35
- ☐ Family Membership is $50
- ☐ With any donation over $100 get a free Delaware Riverkeeper Tshirt

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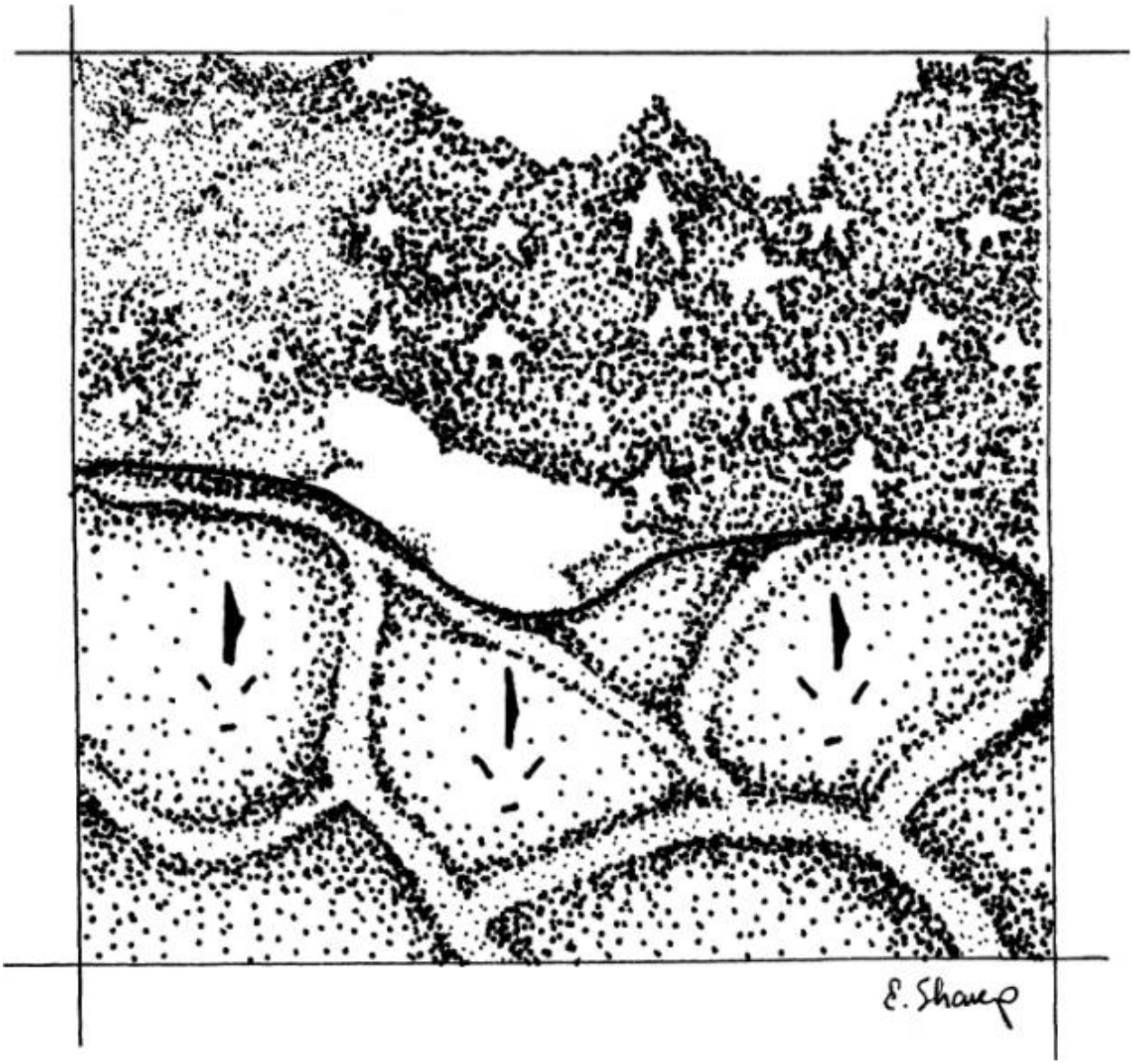
E. Sharp

In Defense of Watersheds

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Including CASE STUDY: The Demise of Dark Hollow Dam

Introduction

Everything we do on the land results in changes to the watershed. As communities grow, the landscape is transformed and our waterways bear testimony to these actions. In natural forests and meadows, rainwater is absorbed into vegetated soils, feeding plant life, recharging aquifers and wetlands and maintaining stream base flow and waterway health. After development, rainwater rushes off impervious surfaces such as parking lots, roads, rooftops, hard-packed and chemically treated turf lawns, playing fields, golf courses and unstable farm fields into detention basins and storm systems that dump it, untreated, directly into streams, wetlands, lakes, and rivers. As a result, this rainfall is lost as a resource for the long-term health of natural water systems.

These man-made changes to the land and the generally accepted and applied practices for handling the resulting stormwater runoff are causing floodwaters to rise, soil to erode and streambanks to crumble. Streambeds and drinking wells are running dry, critical aquatic and terrestrial habitats are being lost, and water quality and our quality of life are dangerously compromised. Worse yet, these destructive development patterns and stormwater management approaches have become standard land use practice.

Decision makers at the local, state, regional and federal level have been reacting to these self-imposed problems with damaging solutions that threaten to make matters worse. Dams, regional detention basins, extended and massive underground stormwater conduits, concrete flumes and channels to confine floodwaters, and levees are dominating as the recommended approach for addressing the many problems imposed by sprawling development, poor land management practices and inappropriate stormwater management. But these approaches have already been proven not to work.

The billions of dollars the government has spent on structural flood control projects over the years have not reduced national flood damages.[1] The Delaware River Watershed has been hit particularly hard over recent years, with federal disaster declarations in 1996, 1999 and 2001 as a result of flooding. And nonpoint source pollution, pollution washed from the land, remains the largest contributor to declining water quality nationwide and in the Delaware River watershed.

There is a better way. Preserving and restoring the balance provided by the natural hydrologic cycle when land is converted from one use to another effectively protects against flooding, drought, erosion, declining water quality and habitat loss. This approach to flood control and stormwater management must be integrated with land use practices that allow nature to work, naturally recharging rainwater, capturing and recovering stormwater, preserving wetlands and habitats, and protecting and restoring waterway health.

How can we change things?

People change things. In order to make a difference, people need to challenge what's wrong and offer better alternatives. While each situation is definitely unique, there are some strategies and tools that can make your efforts more effective and the outcome more successful.

If there is a proposal in your community to build a dam, levee, regional detention basin, or other structural solution to control flooding and reduce flood damages this handbook and case study will outline a series of tools, strategies, techniques and inspiration you need to mount a formidable challenge to the proposal, while still addressing the flood problems of concern.

Chapter 1

The End of One Era and the Dawn of Another

Chapter 1: The End of One Era and the Dawn of Another

A. Dam Building in the 21st Century

This history of dam building is written by Thomas Cahill, President of Cahill Associates. Thomas Cahill is the Principal Environmental Engineer and President of Cahill Associates of West Chester, PA. He has over 37 years of professional experience in water resources engineering, hydrology, hydraulics, natural resource planning, and environmental engineering. Mr. Cahill is nationally known as an expert and leader in the field of stormwater management and sustainable design. He has pioneered the use of innovative stormwater management techniques such as porous pavement and infiltration technologies. He has consulted on projects for the US Environmental Protection Agency, NJ Department of Environmental Protection, PA Department of Environmental Protection and Department of Conservation and Natural Resources, as well as numerous other public, private and municipal entities. His many published works include government guidance manuals as well as sustainable watershed management studies featuring hydrologic and chemical modeling based on a Geographic Information System.

Throughout time, we have been fascinated at the potential of damming mighty rivers, to harness the energy of flowing water and gravity, to satisfy our thirst in a needy community during dry periods, or to hold back raging floodwaters during times of too much rainfall. The early 20th Century is considered the period of large dam building in the US, when most of the major rivers, especially in the West, were the subject of intense planning and development by Federal agencies. Foremost in this effort was the Bureau of Reclamation, whose very name implies its basic mission; to reclaim land and water resources that otherwise would be "lost" to our society. As a part of our manifest destiny, which included clearing the forests, draining the swamps, and cultivating the grasslands, the very idea of building a dam on the local river seemed filled with promise of abundant water, protection from flood and possibly recreational opportunities that were simply not available in the mid-west and west.

When the best locations were developed, and the surrounding regions populated with corn, cotton, condos and golf courses, the nation looked to other problems that could be solved with a dam. The Corps of Engineers continued in the grand tradition of dam building for a series of primarily flood control and navigation-based impoundments, and special agencies such as the TVA linked dams with economic revitalization in a large, economically depressed mid-section of the country that lacked both commerce and transportation systems. In the Delaware River basin, several large dams were constructed in the name of flood control, other dams were built in the upper basin to capture and divert water to the adjacent Hudson River basin, and the cornerstone Tocks Island dam went through a protracted battle before it was rejected by the community.

During the 1950's, a series of hurricane-driven floods in the east brought attention to the severe problems of flooding on both smaller streams and larger rivers, and the dam lobby formulated

Public Law 566, to be implemented through the Soil Conservation Service (SCS) of the Department of Agriculture, in search of an expanded mission beyond soil conservation. The subsequent program built dozens of small dams, wet and dry, single and multi-purpose, throughout the east. The Neshaminy and Brandywine Creeks in southeast Pennsylvania were both recipients of this generosity, with the Federal government (through state agencies) underwriting the actual dam construction cost and local government acquiring the land.

When this program had begun to wind down, the tidal wave of land development began to sweep across the suburban landscape, changing cornfields to tract homes overnight, in what seemed to be an overwhelming exodus from the urban centers. The impact of this sprawl was felt on all natural systems, but none more so than the fine networks of small tributary streams that characterize the eastern rivers. The floods of muddy water from each newly stripped field raised a loud voice of concern, and the solution advanced to control this development runoff was a variation of the farm pond of the previous decades, not surprisingly advanced by the SCS. A simple earthen dam and impoundment, properly graded to intercept the runoff from the disturbed land and built with a control outlet that would detain the turbid runoff for a few hours, should be sufficient to prevent any increase in the rate of runoff from the parcel, considered by many to be the primary focus of concern in the downstream drainage.

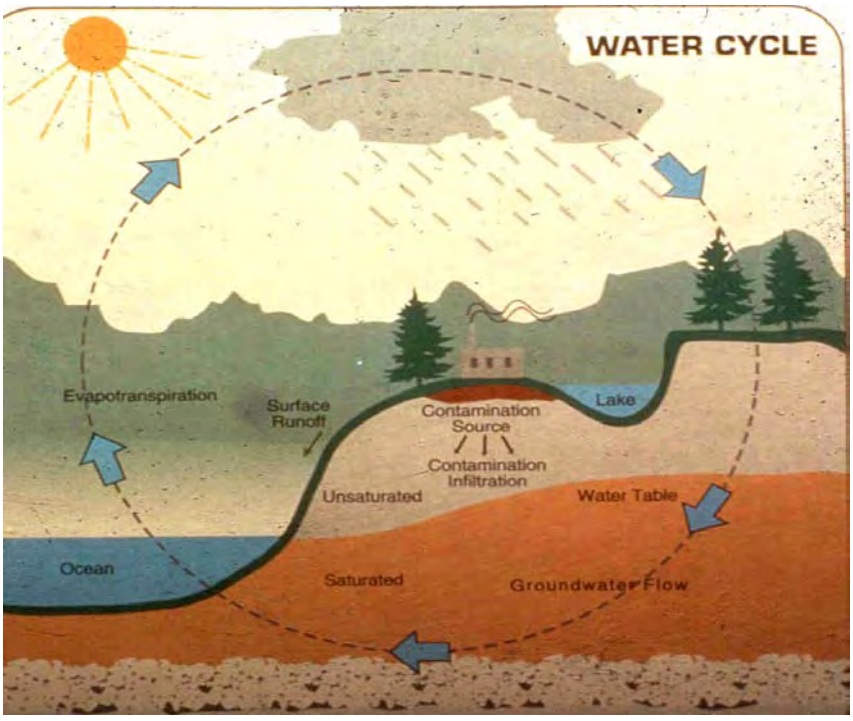
These dams were a mini-version of the large impoundment structures built in the previous decades, with the single purpose of rate control, and no suggestion that the impounded waters could or should be used for any other purpose. They do not reduce flooding downstream, we do not plan to drink from them or swim in them, and they frequently created an aesthetic intrusion in the built community. Increased runoff was still a nuisance and an undesired effect of land development, to be conveyed downstream as rapidly and completely as possible, although at a slower rate. However, the concept soon became reality in every community, with local regulations requiring similar structures for each and every new development. The era of dam building had finally run its course in the US, and promised to end in grand fashion, with thousands of orphan basins situated across the landscape by the beginning of the 21st century. The question we face now as a society, struggling to solve the stormwater impacts ignored in our current program that include both increased volume and decreased quality, is what do we do with these built systems to resolve the remaining problems. Can they be rebuilt to work better, do we replace them with something different on the same land, or do we look elsewhere in each and every drainage for “Better Management Practices”.

B. Stormwater Runoff, the Community Asset

To nature, stormwater runoff is a resource lost.

Rainfall is critical to the health of drinking water and natural ecosystems. Protection of the natural hydrologic cycle is the most effective protection against flooding, drought and degrading water quality due to nonpoint source pollution.

In the natural hydrologic cycle a proportionately small part of a rainfall runs off the land. Most of the precipitation is captured and gently released into the natural environment over time, thereby sustaining environmental health and equilibrium. In an undeveloped watershed, vegetation dampens the energy of rainfall before it hits the ground. A small portion of the water evaporates from the ground and the surface of the vegetation (i.e. leaves). In larger storms and in certain conditions, a portion may run off the land and eventually follow a natural path to the local stream. But the greatest portion of the rainfall in an undeveloped watershed is absorbed into the land where it is stored, taken up by the roots of vegetation, or recharged to the aquifer below. Water that returns to the sky as evapo-transpiration from vegetation, the land, and waterways returns again later as rainfall. This is the constantly renewing process of the natural hydrologic cycle.



The Natural Hydrologic Cycle

Rainfall circulating through the natural hydrologic cycle:

- ✓enters stream systems more slowly, thus preventing the large volume of stormwater that would otherwise be dumped on downstream communities causing increased flooding;
- ✓replenishes aquifers that supply base flow to our streams and creeks, ensuring needed flow throughout the year to sustain fish, wildlife, and other aquatic life;
- ✓replenishes aquifers that supply groundwater and surface drinking water supplies;
- ✓provides needed flow to sustain wetland and aquatic ecosystems;
- ✓is stored in soils and provides water to woodlands, farmlands, meadows and gardens.

C. Structural Detention Solutions Don't Work

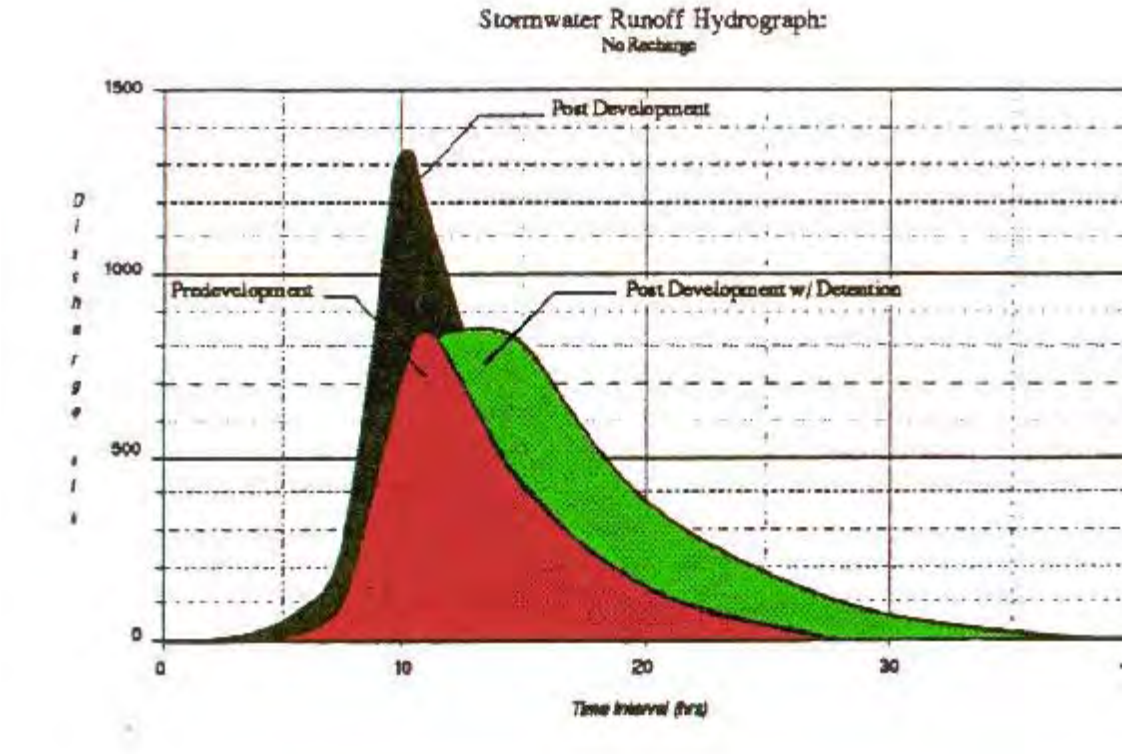
When land is developed, natural vegetation is removed and the land surface is remolded with heavy equipment. This is followed by construction of impervious surfaces including buildings, roadways, parking lots and turf lawnscapes. These changes prevent rainfall infiltration into the soil and remove the tremendous amount of evapotranspiration that trees and plants provide. The changes also destroy the mini-infiltration and evaporation basins nature provided in little depressions scattered across the landscape. The rainfall that was once captured and transferred through the natural hydrologic cycle, now washes from the land as damaging stormwater runoff.

Structural solutions focused on detaining rainfall and discharging it directly to the local creek, wetlands or other waterway, bypass the natural hydrologic cycle. Dams and detention basins, two of the most common modern stormwater management approaches, only focus on the peak flow of runoff. Detention basins are designed to collect and hold stormwater for a period of time and then release it directly into the local stream through a pipe sized to pass flows at what are calculated to be pre-development, or pre-determined, peak rates. Dams, similarly, only detain water temporarily. But these approaches fail to address the increased volume of runoff that results from development and they provide no opportunity for filtering out pollution that is collected as rainfall rushes over our developed, and pollution-laden landscapes.

And one of the most damaging results is increased flooding. By using the traditional detention-based approach, storm events cause a greater volume of water to be discharged to the stream system over a longer period of time and usually at a greater velocity than is the natural condition. This causes the stream to jump out of its banks more often, increasing the frequency of flooding and severity of existing flooding, while at the same time causing new flooding where once there was none.

These changes also bring a host of other physical impacts. The natural flow, streambed and ecosystems of the stream are forever changed. The combination of increased volume, velocity and duration that comes with storm events, coupled with lack of aquifer recharge, indelibly changes the hydrology and physical makeup (the geomorphology) of the stream and upset the

natural hydrologic cycle in a watershed. The downward spiral that results is killing the health of our waterways and the detention-based solutions that we have been using are only making matters worse.



Hydrograph showing increased volume from stormwater runoff.

1. How Have Detention Basins Made Matters Worse?

In order to understand why dams and basins are not the best solutions for our environments and communities, we need to understand one of the primary causes of the problem we are trying to address – detention basins.

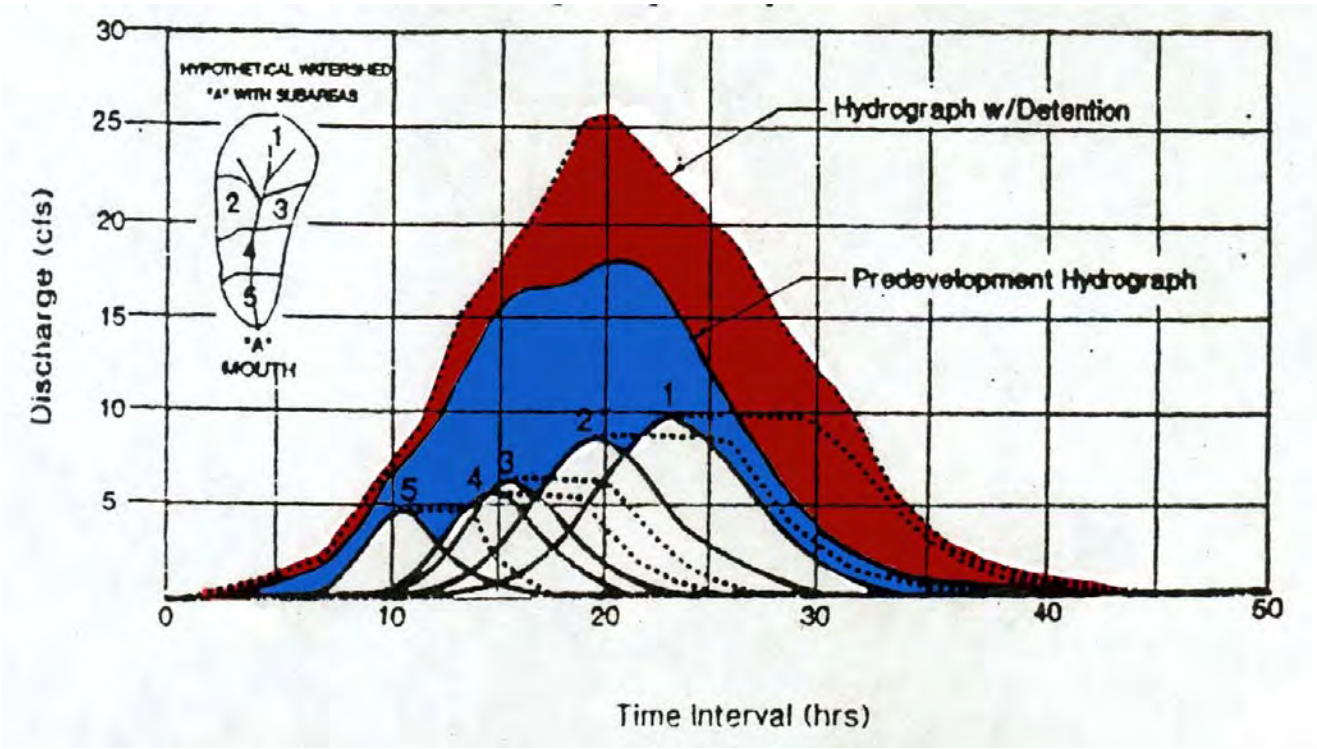
Detention basins have been the main strategy used to control stormwater from individual development sites. The result is that our developing watersheds are peppered with dozens to hundreds of detention basins all intended to address flooding from particular sites but in fact joining forces to exacerbate flooding for those who live downstream in the watershed. At the same time they are contributing to water quality degradation, habitat loss, and diminished quality of life. Because greater flooding has accompanied new development, we now see regional basins, dams, levees and other structures emerging as key strategies to try to control the floods. But this is just more of the same wrong approach. These structural solutions only place another band-aid over the stormwater problem. The result is more failure, more degradation and more flooding.

Just how does this happen?

a. VOLUME: There's too much and at the wrong time

A critical factor that is forgotten in the traditional detention basin/peak rate approach is the increased volume of runoff. Detention basins, and other strictly "peak rate" strategies for controlling runoff do nothing to decrease the greater quantity of runoff from a developed site or watershed. Despite the fact that the pre-development peak rate of runoff may be maintained (or even reduced), because there is an increasing VOLUME of runoff, the detention basin is directly contributing MORE water to our streams over a LONGER period of time thereby increasing and extending the peak flow in the creek.

The cumulative impacts of many detention basins operating in a watershed (as is the case in many recently developed or presently developing suburban communities) further compound flooding problems. The releases from the many basins extend the time over which peak flows from tributaries and detention systems merge, causing an increase in instream volume over a longer period of time.[2] The result is that downstream flooding is exacerbated -- flood flow is increased and extended. For example, while the predevelopment peak in the watershed may have lasted one hour, the post development peak may last 11 or 12 hours.[3] And dams do nothing to address this problem in developed watersheds. They too pass the increased volume of water over an extended period of time and while they may provide some peak reductions immediately downstream, on a watershed basis they can also contribute to extended periods of flooding.



Hydrograph showing cumulative effect of detention basins in a watershed

b. Water quantity/Hydrology impacts

One of the most dramatic and devastating impacts of increased stormwater runoff is flooding. Impervious cover eliminates the ability of the land to soak up and percolate rainfall. As a result, stormwater runoff volume increases and causes and exacerbates downstream flooding. Over 90% of the native vegetation in the United States has been destroyed or degraded, causing the historic diffuse overland flows to change to concentrated flows with increased runoff rates, forming more defined streambeds that carry higher and faster flood flows.[4]

In the Midwestern United States, recorded data shows that current discharges of runoff to streams may be 200 to 400 times greater than historic levels.[5] One study estimated that because of the increase in impervious cover in a watershed, a flood event that should be expected once in 100 years could occur once every 5 years when the impervious cover reaches 65%.[6]

> ***"As more and more land is cleared for development and paved over, there is less and less available to soak up excess water. ... The runoff has to go somewhere, and places that never flooded before are now at risk."***
>
> **James Lee Witt, former Director of FEMA**
> *"No One Safe from Flooding, FEMA Says", FEMA News Desk, April 1997*

The cost of flooding can be measured in dollars, in human misery and in environmental destruction. In dollars, the United States pays a high price through our taxes to repair flood-damaged properties. Over the past quarter century, approximately $140 billion in federal tax revenue has been spent preparing for and recovering from natural disasters, including floods, which account for most of the expenses.[7] In the same time period, the U.S. Army Corps of Engineers has spent more than $25 billion on flood control projects.[8] Other agencies, such as the Natural Resources Conservation Service (formerly the Soil Conservation Service) have also spent billions on flood control measures, including dams and floodproofing. Despite these expenditures, flood damages have increased. Long-term average annual flood damages, in constant dollars, are more than double what they were in the early 1900's.[9]

Definitions:

Two-year storm -- the 24-hour storm event that exceeds bankfull capacity and occurs on average once every 2 years (or has a 50% chance of occurring in a given year).

Ten Year storm -- the 24-hour storm event that exceeds bankfull capacity and occurs on average once every 10 years (or has a 10% chance of occurring in a given year).

One hundred year storm -- an extreme flood event that occurs on average once every 100 years (or statistically has a 1 in 100, or 1%, chance of occurring in a given year).

2000 Maryland Stormwater Design Manual, MDE, Volume I, glossary, draft, 1999

c. Frequent Flooding Continues

The damages that accompany the more frequent, smaller storms, are growing. The 2-year storm in a natural watershed produces a flood that fills the stream to the top of its banks ("bankfull flood").[10] In developing or urban watersheds, because of the increased volume of runoff, a more frequent storm can cause a bankfull flood while 2 to 5-year storm flows exceed the carrying capacity of the stream and consequently jump the stream's banks and can cause extensive flood damages. As a result, now the 2 to 5-year storms cause a lot of flood damage and channel erosion, and contribute significant levels of nonpoint source pollution.[11]

Most detention basins are designed to control only the 10 to 100-year frequency storms. Detention basins generally fail to impact the 2 to 5-year storm -- having pipes that pass those flows unchecked to the stream. While unchecked even by detention basins, these smaller storms cause many of the stormwater runoff problems that need to be addressed, particularly as development increases and damage caused by the smaller storms grows.

d. Groundwater and surface water robbed

One recent study demonstrated that a typical suburban-density development with the typical 23% impervious cover would deprive groundwater aquifers of over 40 million gallons of recharge per square mile annually.[12] When considered on a watershed basis, conventional development results in dramatic groundwater losses.

The Philadelphia PA--NJ metropolitan area ranks ninth in the nation on a list of the Top 20 Land Consuming Metropolitan Areas. For the 238,8000 acres of land developed in this area from 1982-1997, there has been a 33% increase in developed land while the population has increased at a lower rate, 28%, indicating sprawling development patterns. Much of the developed acreage is impervious, resulting in an estimated average yearly infiltration loss of 25.3 to 59.0 billion gallons of water. This tremendous loss of recharged water exacerbates recent drought conditions but causes chronic water shortages even in times of relatively normal precipitation.[13]

Increasing stormwater runoff and associated loss of rainfall infiltration also means reduced stream base flow. Reduced stream base flow results in less dilution of pollutants and therefore a greater concentration of pollutants in our stream systems -- the stream's assimilative capacity is compromised. The loss of water also stresses aquatic communities and streamside habitats.[14] This loss of base flow is why streams in many areas are drying up when rainfall is not plentiful -- and this can eventually destroy the life in and along the stream.

A Stream Gone Dry

Photo provided by Cahill Associates, West Chester, PA

The loss of groundwater that results from the peak rate/detention basin approach also negatively impacts drinking water supplies because wells will run dry if the static underground water level drops below the well intake and there will be less water stored in the underground aquifer upon which the wells can draw. As recharge decreases, the aquifer is eventually drawn down and, when stressed, may never recover to pre-stressed levels.

Surface water supplies are also impacted because the loss of base flow to lakes, reservoirs, streams and rivers causes drought conditions sooner and for longer periods of time than normally would occur in times of low rain fall. Drought conditions carry environmental and economic costs because less water is available and is of poorer quality. As a result aquatic ecosystems are compromised and so is their ability to sustain aquatic and riparian ecosystems and life. Economically the lack of water quantity and quality impacts potable water supplies as well as recreational, commercial and industrial users.

e. Water Polluted

The peak rate/detention basin approach fails to address the water quality impacts of stormwater runoff. Water that once infiltrated and was cleansed as it passed through the soil mantle is now discharged directly to streams. Runoff that once would have taken a meandering and more indirect path to the streams, providing additional opportunity for storage, infiltration, evaporation, and pollutant removal, is now given a direct route. The result is more and dirtier water directly entering the waterway over a longer period of time. The water quality impacts on streams can be devastating.

> "Converting a forest to homes on one acre lots can result in a 12-fold increase in nutrient loads"
>
> *"How much Development is Too Much for Streams, Rivers, Lakes, Tidal Waters and Wetlands?" Community and Environmental Defense Services, Maryland Line, MD.*

The nonpoint source pollution that is generated by stormwater runoff is persistent and invasive. Stormwater washes a myriad of pollutants from urban/suburban areas during a rain including: sediment, soils, nutrients (such as phosphorus and nitrogen), copper, zinc, and other heavy metals (including lead), fecal coliform, bacteria, hydrocarbons-oils-greases, atmospheric deposition, vehicle emissions, pavement deterioration, tire and brake pad dust, pet waste, chemicals and fertilizers with mixing agents and surfactants used in lawn care, road salts and de-icing chemicals and their agents, household chemicals, organic and inorganic debris and trash.

The effects of these pollutants include: sedimentation (or silting in) of streams and in-stream habitats; thermal stress; nutrient enrichment; oxygen depletion in surface water; toxic contamination of water supplies, aquatic life, and the food chain; pathogenic contamination of water supplies, fish, wildlife, and domestic animals.[15] Waterways used for recreation can become unsuitable and the quality of life for human communities decline with growing odors, algae blooms, aesthetic degradation and the psychological impacts of knowing a stream is polluted and its life destroyed.

TABLE 2-4
Six Pesticides Found Frequently in Stormwater Samples

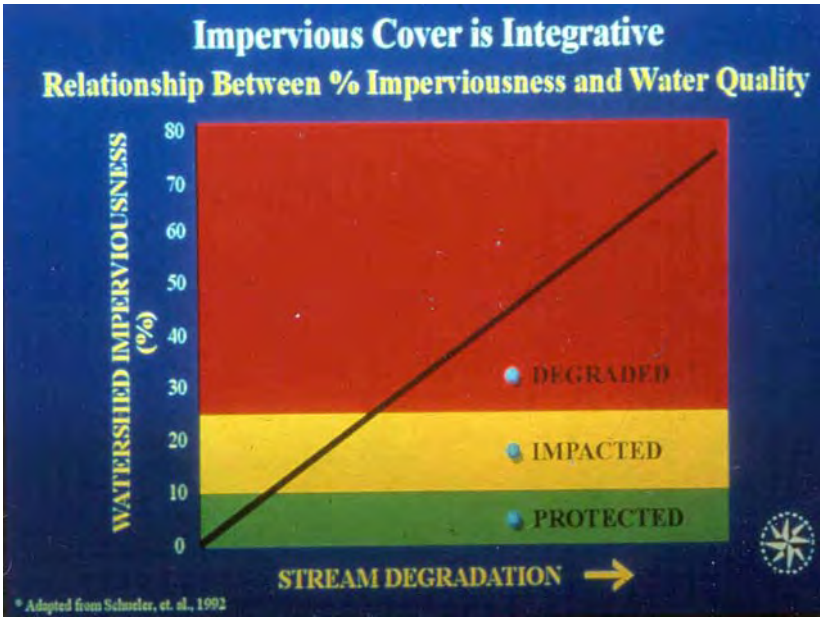
Pesticide Name	Human Health and/or Environmental Effects
2,4-D	Associated with lymphoma in humans; testicular toxicant in animals.
Chlorpyrifos	Moderately toxic to humans; neurotoxicant; can be highly toxic to birds, aquatic organisms, and wildlife.
Diazinon	Moderately toxic to humans; neurotoxicant; can be highly toxic to birds, aquatic organisms, and wildlife.
Dicamba	Neurotoxicant; reproductive toxicity in animals; association with lymphoma in some human studies.
MCPA (Methoxane)	Low toxicity to non-toxic in test animals, birds, and fish; suspected gastrointestinal, liver, and kidney toxicant.
MCPP (Mecoprop)	Slightly to moderately toxic; some reproductive effects in dogs; suspected cardiovascular, blood, gastrointestinal, liver, kidney, and neurotoxicant.

Reprinted from "Stormwater Strategies, Community Responses to Runoff Pollution," NRDC, May 1999, based on work by T.R. Schueler, Extoxnet and Environmental Defense Fund.

The impact of stormwater runoff caused by human development and deforestation is so pervasive and abundant that impervious surface coverage is emerging as a key environmental indicator that can be used to measure the prospects for the survival of a watershed's health. Research demonstrates a strong correlation between the imperviousness of a drainage basin and the health of its receiving stream.[16] Density of development and impervious surfaces in a completed development site directly impact water quality.[17] Degradation of streams and wetlands is clearly evident when impervious surface reaches 10%.[18] Some estimates are emerging as low as 8%. Watershed imperviousness of 4% (one house on every 2 acres) can cause impairment for sensitive aquatic species.[19] At 25% imperviousness, fish die. At 30% coverage, the degradation is severe.[20]

Definition: Impervious surface -- "those surfaces in the landscape that cannot infiltrate rainfall" such as building rooftops, pavement, sidewalks, driveways, and compacted earth or turf.

2000 Maryland Stormwater Design Manual, MDE, Volume I, glossary, draft, 1999.



Recent studies are finding that once impervious cover in a watershed exceeds 10% water quality and wetlands begin to decline sharply.[1]

Reprinted from "Impervious Surface Coverage, the Emergence of a Key Environmental Indicator", by Chester L. Arnold Jr., and C. James Gibbons, APA Journal, Spring 1996

The least costly and most effective best management practices ("BMPs") control pollutants at their sources[21] and the most expensive means of addressing nonpoint source pollution is to try to remove pollutants from the stream system after they are there.

The introduction of a dam to a watershed not only fails to provide needed protection from flood damages but it also introduces new threats and new harms to the watershed and its communities.

2. Dams Don't Solve Flooding: <u>Dangers Old and New!</u>

Like detention basins, dams do not address the volume of water that is causing increased downstream flooding. Flood control dams hold back water temporarily, whether they are wet dams that have a permanent pool or dry dams designed to pass the entire storm flow over a designated period of time. Either way, dams discharge this increased volume directly to the creek over a period of time.

Nature designed the floodplain to store floodwaters. Water does not flow uniformly, at a constant rate, out of a watershed. Under natural conditions, water backs up and spreads out across the floodplain. Structures located in the floodplain will always experience some level of flooding. And because the dam has extended the duration of the peak, it can also extend the duration of the flooding and flood damages for those structures.

While it is true that the immediate downstream floodplain from a dam may experience reduced inundation,[22] this effect decreases, sometimes dramatically, as you move downstream. So while some structures located just below the dam may receive some flood protection, all those still located in the floodplain will be exposed to flooding.

✓Because a dam alters the regulated floodplain, new areas can be opened up to development, where once it was prevented by floodplain regulations. This new development contributes more stormwater runoff and actually exacerbates the flooding problems downstream that are supposed to be addressed. New development below the dam brings with it new impervious surfaces and a changed landscape. The result is increased stormwater runoff that is then dumped on downstream communities. Because the dam opened up these new areas to development, it actually increases the total volume of runoff to the stream (i.e. the greater volume from above the dam, and now the new volume from the dam-induced floodplain development). Furthermore, reduction of the downstream floodplain and associated new development puts a new community of people in harm's way.

✓Alterations in stream flow imposed by a dam can cause the waterway to follow a new path. The result can be that floodwaters go where they never have previously.[23] The changed flow patterns can also cause remaining floodplains to be lost to streambank collapse. As a result, a dam may actually subject new areas and structures to flood damages.

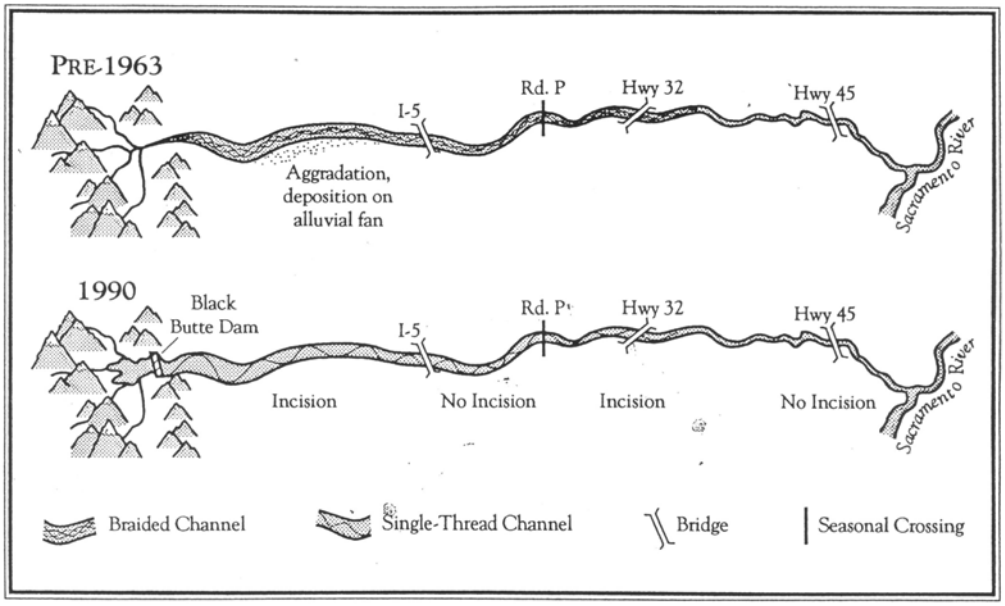


Fig. 16.5. Channel changes in lower Stony Creek following closure of Black Butte Dam. Note the conversion of a braided river to a single-channel, meandering river. (Modified from Kondolf and Swanson 1993.)

Jeffrey Mount, **California Rivers and Streams**, University of California Press, 1995, Fig. 16.5

✓As the waterway continues to flow downstream through developed areas, there are inevitably additions of stormwater from detention basins, stormwater systems, overland flow and other sources. These all contribute to the volume of water flowing into and through downstream communities causing downstream flood damages. And as a creek enters a larger waterway,

flood waters back up the mouth of the smaller creek causing flood levels to rise and flooded areas to increase — a phenomenon that an upstream dam on a creek cannot address.

✓Dams break -- bringing tremendous flooding and flood damages as well as serious and catastrophic loss of life and property. Also, the psychological stress of those who live below a dam and may not have time to evacuate can destroy a community's peace of mind.

And, the risk of dam failure may very well be increasing. Dams are designed based on the assumption that historic hydrological data (e.g. average annual flow, annual variability of flow, and seasonal distribution of flow) will continue unchanged into the future. But natural conditions do change.[24] Global warming itself is likely to significantly alter the seasonal and annual rainfall patterns, stream flow, snow melt, and watershed vegetation – thereby significantly altering the underlying assumptions upon which dams were constructed.[25]

Also, extreme weather events, not experienced historically and not accounted for in dam design, do happen; and it is these events that are most likely to bring with them catastrophic results, including loss of life. As a result, the risk of dam failure increases. Both historic and geological data indicate, "that even small changes in climate can cause major changes in the size of floods."[26] And, at the same time, the dam creates a false sense of security, giving the perception that continued development using current stormwater practices is appropriate. As a result, new development above the dam often continues unchecked. More stormwater runoff than accounted for in a dam's design contributes to the enhanced risk of dam failure.

3. And Dams Cost Us Plenty

Dams damage river systems.

a. Flows are changed.

Dams alter the natural and variable flow regimes of waterways.[27] Changes can include channel widening or narrowing, incision or aggradation of the channel, change in the channel pattern, an increase or decrease in the lateral migration of channels, bank collapse, changes in stream bottom sediments, and/or loss of riparian vegetation.[28] These changes can also cause damage to downstream structures, bridge abutments, roadbeds, and roadway buffers.[29]

> "Streamflow quantity and timing are critical components of water supply, water quality, and ecological integrity of river systems. Indeed, stream flow, which is strongly correlated with many critical physicochemical characteristics of rivers, such as water temperature, channel geomorphology, and habitat diversity, can be considered a 'master variable' that limits the distribution and abundance of riverine species and regulates the ecological integrity of flowing water systems."
>
> *"The Natural Flow Regime, A paradigm for river conservation and restoration", Poff, et. al., BioScience, Vol. 47, No. 11, December 1997*

Changing stream flow alters habitat dynamics and creates new conditions that might not be suitable/sustainable to the native biota.[30] For instance, flows are often a signal for important life stages including spawning, migration, egg hatching, and rearing movement to the floodplain for feeding or reproduction[31] and spring flows often help fingerling anadromous fish by carrying them to the ocean. The changed flow caused by dams can take away these important ecological

signals and alter habitats by changing the path, velocity and depth of the waterway flow.[32] Managed flow releases with sudden flow fluctuations can wash away deposited eggs or leave fish, crustaceans, and mollusks stranded out of water.[33] "Triggers" for fish activities, once synchronized to periods of low or high flow, can be altered.[34]

> Dams can adversely affect the health of []rivers and streams by altering flow regimes, changing water temperature and chemistry, modifying algal and macroinvertebrate communities, disrupting resident and migratory fish communities, altering channel geomorphology and sediment transport and impacting the abundance and diversity of physical habitats."
>
> Academy of Natural Sciences, *Manatawny Creek, Ecological Studies of Dam Removal*, www.acnatsci.org

b. Habitats and water quality are damaged.

Habitats located in the footprint of the dam, as well as upstream and downstream, are damaged. At the dam site, natural habitats are bulldozed, buried and built upon, and these losses to the stream and ecosystem can never be recovered or replaced. The existence of the dam after construction acts as a blockade for migrating aquatic life -- impeding movement of fish and disrupting resident, migratory and anadromous fish communities.[35]

Dams flood upstream lands, destroying the existing habitat and ecosystem as well as the social, cultural, aesthetic, historic, and archeological resources there. Mature forests, wetlands, and upstream ecosystems engulfed in a permanent inundation pool are indelibly destroyed. Forests, wetlands, farmland and other natural resources inundated periodically in a temporary inundation pool are irreparably changed, often for the worse. The floodplain above the dam is expanded, endangering nearby structures, areas and roadways and changing upland habitats into floodplain. When water backs up, permanently or temporarily, sediment drops out behind the dam, smothering stream bottom and other habitats. These sediments also often contain elevated levels of specific chemical contaminants such as trace metals, petroleum hydrocarbons or pesticides[36] that can be toxic to aquatic biota and cause fish kills downstream.[37] The temperature increases behind the dam from the sun upon the water, resulting from a lack of shade cover around a dam's inundation pool (temporary or permanent) change stream life habitat, change natural temperature fluctuations,[38] and contribute to reduced oxygen levels.[39] In the permanent pool of a wet dam, nutrients often build up and cause algae blooms and anaerobic conditions in waters that are then released to the stream below.

Downstream water quality and habitats are also harmed. Oxygen-depleted waters released from a dam's permanent pool reduce water quality downstream.[40] Nutrients and toxins[41] trapped behind the dam are also released to the stream below at elevated levels. Water quality below a dam is often lower than water quality in natural sections still in existence above the dam.[42] This degraded water quality can be toxic to aquatic biota and cause fish kills downstream.[43] This degraded water quality is also bad for human communities that rely upon and use the waterway, and can result in increased regulatory controls needed to maintain in-stream standards and uses.

Alteration of the floodplain (increased above the dam and decreased below the dam) impacts riparian habitats and wetlands. A healthy floodplain's ability to capture, absorb and infiltrate

high flow waters is important for maintaining riparian vegetation and adjacent wetlands. Reducing the inundation of the floodplain downstream from a dam reduces the amount of water infiltrated and the level of the local groundwater table. The result is that riparian vegetation and wetlands can be starved of needed water.[44]

Dams cause erosion of banks and alteration of the streambed, largely because of changed sediment movement within the stream system and loss of riparian vegetation.[45] Dams capture all but the finest sediments; sediment-depleted water can erode finer sediments downstream in an effort to correct this condition. [46] The clearer water that is discharged is "sediment starved" and can result in the stream removing sediments from the reach below the dam in an effort to correct this unnatural condition.[47] The result can be erosion[48] and downcutting or "channel incision"[49] of the downstream channel, also causing erosion on tributary streams trying to contend with the changed flow conditions. [50]

Also, the artificial regulation of stream flow by a dam reduces the natural peak flows that allow a stream to carry sediment. The result is the deposition of sediments where tributaries and other sediment inputs exceed the ability of the stream to carry sediments.[51] Therefore, the changed flow and/or path of the waterway changes how and where sediment builds up.[52]

Over time the designed storage capacity behind a dam can be rapidly lost due to sedimentation.[53] It is not uncommon that over-optimistic predictions are used regarding sedimentation data, resulting in storage areas filling in much more quickly than predicted,[54] reducing the dam's life[55] and incurring unexpected expense. In the Delaware River watershed, Bucks County's Core Creek Dam, Lake Luxembourg, on the Neshaminy Creek filled up its sedimentation pool, which was intended to accommodate 100 years of sediment, in just 9 years.[56]

Further, dams that have a permanent pool often make timed releases that, when on an unnatural schedule, change sediment movement, often eroding formerly stable sandbars downstream that were important habitats.[57] Rapidly fluctuating releases exacerbate these impacts.[58] In addition, removal of sediments by a dam can result in a coarsening of the streambed thereby reducing habitat availability for many aquatic species.[59] Further downstream, sedimentation and the lack of "flushing flows" due to flow regulation by a dam may allow fine sediments to cover important stream bottom habitats impacting life stages sensitive to sedimentation, e.g. eggs and larvae.[60] In addition, aquatic biotas are smothered.[61]

c. Dams upset the natural water balance of a watershed.

Dams with permanent pools also evaporate more water than the river did naturally. The result is a consumptive loss of water from the river system. And diversions of water from dams constructed for water supply remove water from that reach of the river and, depending on where and how it is used, the net loss of water could be depletive, adversely affecting the hydrologic balance of the waterway and its watershed.[62]

If a dam is built for water supply and out-of-basin diversion then the impacts are all the greater. This is especially true in regards to flow regime, which is altered so greatly that the stream becomes disconnected from the local hydrologic system, with little correlation between the amount of rainfall and the total annual flow in the stream. Maximum and minimum flows are

impacted and the result is the effective elimination of substantial minimum flows in many dammed rivers.[63]

4. Rivers Can't Be Confined

> *"Among the most important challenges in water management is living with the natural processes of river behavior. Though some monetary advantages are purchased by river 'improvement,' these gains must be weighed against the perpetual cost of maintenance, the permanent loss of hydrologic integrity, and the depreciation of aesthetic value. The culture of our civil society can afford consideration that goes beyond immediate monetary gratification. The natural river deserves our reverence as well as our engineering capacity."*
>
> Luna B. Leopold, **Water, Rivers and Creeks**, p. 165, University Science Books, 1997.

While structural solutions are often the preferred choice of some federal agencies such as the Army Corps of Engineers, the Natural Resources Conservation Service, and state agencies such as Departments of Transportation, they often attempt to control floods by confining the stream. Dams, levees, straightening the meanders of a stream, encasing sections in concrete, channelizing, lining the streambank with rock-filled gabion cages, and wing dams, are all solutions employed and actively being promoted today to provide local protection.[64] In the U.S., about 16,000 km of river channel have been straightened.[65] The results have been devastating to the streams and rivers and the attempts to control the stream eventually are futile, with flood damages continuing.

The most important point to remember is that these structural solutions harm the environment, they cannot stop all flooding, and there are other solutions that can provide effective flood protection while at the same time protecting our environment.

In fact, there is an active movement in some Delaware River watershed states to remove dams from waterways. For example, in Pennsylvania, the PA Fish and Boat Commission has removed over 60 dams and is actively seeking to remove more, mainly for the purpose of restoring fish migration pathways. And, organizations like the Delaware Riverkeeper Network (DRN) are also pulling together the resources, expertise and support necessary to supplement these dam removal efforts. In 2000, DRN worked with the Greater Pottstown Watershed Alliance, the Academy of Natural Sciences, and state and federal agencies to remove the Manatawny Dam, on a tributary of the Schuylkill River in Pennsylvania, and restore upstream floodplain areas.

Through coordination of efforts and pulling together of expertise, dams can be removed and streams successfully returned to their natural state. This movement is gaining momentum as old dams age and outdated flood control approaches, such as dam-building, are replaced with more effective, economical, and environmentally beneficial efforts to reduce flood damages.

Removal of orphan dam on Manatawny Creek, Pottstown, PA.

Volunteers planting streambank along Manatawny Creek after dam removal

When a dam or other obstruction is removed, the streambanks at the site and above and below should be restored to a naturally vegetated riparian buffer. This is also necessary when structures are removed from the floodplain, such as homes, businesses, or bridges.

Vegetation taking hold after streambank restoration, August 2002

The most effective way to address the problems of flooding is implementation of a comprehensive stormwater management program that addresses both future and existing development throughout the watershed by employing infiltration and other best management practices to stop runoff at its source, coupled with voluntary buyout of structures in the floodplain and a floodplain restoration program. Only by reducing floodwaters in conjunction with moving people out of the floodplain, can we truly begin to protect our communities.

A comprehensive stormwater plan includes at a minimum: voluntary buyouts for homes located in the 100-year floodplain and an adjacent buffer area; floodplain restoration; implementation of stormwater infiltration and conservation design on existing and new development; more stringent municipal and watershed-based ordinances that require infiltration FIRST and detention IF AND ONLY IF infiltration is not appropriate; municipal and watershed-based ordinances that encourage developers to preserve the natural properties of a site; retrofit of existing stormwater management systems to accommodate infiltration and vegetation when and where appropriate; and cooperative watershed-based, inter-municipal planning.

D. Effective Flood Control = Natural Systems

If we are to truly address the growing problems of flooding, drought and degraded water quality, we must look for a comprehensive approach that will address the real cause -- increased stormwater runoff. Stormwater runoff prevention, infiltration and best management practices (BMPs) are effective solutions for all of these stormwater runoff problems. Preventing stormwater runoff in the first place through sound land management practices that protect and restore vegetated landscapes and the environment's natural ability to infiltrate rainfall allows us to avoid the water quality and hydrologic impacts that runoff creates. Approaches that protect and restore infiltration of stormwater also recharge aquifers, filter out pollutants, reduce flooding and feed groundwater to streams during dry times. Stormwater BMPs include a variety of building, engineering and commonsense techniques that can effectively protect and enhance infiltration of rainfall and filter out nonpoint source pollution.

Infiltration practices protect and mimic nature – whether achieved by preserving natural conditions or creating systems designed to capture rainfall and promote its infiltration. Infiltration practices allow and encourage rainwater to percolate through the soil profile to infiltrate groundwater and recharge aquifers. The result is that infiltration practices prevent stormwater runoff before it starts, thereby reducing the volume of water that enters our streams and would otherwise cause and increase downstream flooding.

BAD

Conventional detention basin

GOOD

Infiltration trenches nestled in existing woodland

Protecting and restoring the natural absorbency of the land and using techniques which infiltrate water back into the ground is a comprehensive solution which addresses water quantity, water quality and habitat issues. Infiltration is the only known method of reducing runoff volumes, restoring groundwater recharge, augmenting stream flow and preserving the hydroperiod of downstream wetlands.[66] It is more effective than detention in controlling urban flooding and drainage problems and is a means of restoring compromised watersheds.[67]

Unlike any other approach to stormwater management, infiltration is capable of addressing many issues at once: controlling peak runoff flow and the quantity of water entering our stream systems; protecting stream base flow, stream channel stability, riparian plant communities and water quality; curbing streambank erosion; encouraging ground water recharge,[68] supporting ecosystem health, and contributing to the scenic beauty of stream valleys. Infiltration restores aquatic and wildlife habitats and biodiversity, enhances water quality, protects floodplains and streambanks, and adds to open space.[69] "Infiltration is not just a means of mitigating the hazardous aspects of stormwater; it is a means of reclaiming water resources and rehabilitating urban watersheds." [70]

Stormwater infiltration is the most effective stormwater strategy and one that can be accommodated through a large variety of BMPs that range from design and building techniques which protect natural areas to construction of large porous paving projects and green roof systems in urban and urbanizing areas.

> ***"Infiltration calls forth the natural powers of soil and vegetation to restore environmental health. By returning runoff to the earth, it eliminates pollutant discharge, eradicates floods, replenishes ground water supplies and restores aquatic habitats."***[71]

1. Infiltration reduces flooding by decreasing both stormwater runoff volume and peak flow rates

Much of the flooding experienced today is caused by a greater volume of water entering our stream systems over a longer period of time. Increasing runoff is directly correlated to decreasing infiltration of rainwater into the ground. Infiltration measures allow rainfall to recharge the natural soil-sponge that regulates the hydrologic balance of a watershed. Infiltration reduces flooding by eliminating excess runoff in a storm. Infiltration can reduce the peak rate and flow volume to pre-development conditions for 2-year storms up to 100-year storms.[72]

> "Infiltration is capable of reducing volume and peak rate of storm flow at the point of discharge and consistently downstream, eliminating all cases of aggravated urban flooding and drainage problems."
>
> Bruce K. Ferguson, **Stormwater Infiltration**, CRC Press, 1994, p.171.

Two-year storms are responsible for a good portion of the flooding and erosion which stormwater management tries to address. Because the force and volume of a 2-year storm increases as impervious surfaces increase, and because 95% of all rainfall in our region is delivered in storms smaller than 2-year storms (less than 3 inches), the need to address the 2-year storm grows as development and land use disturbance increases. Infiltration measures are designed to capture the increased runoff that results from development. By including infiltration

designs that at least address the 2-year events, we restore the bulk of the rainfall to the natural hydrologic cycle. Because infiltration BMPs and conservation design techniques put storm runoff volume back into the soil and prevent runoff impacts, they are very effective at controlling the smaller storms as well as the larger storms, and realizing the benefits of rainfall-turned-recharge.[73]

> "If our concern is keeping the water cycle in balance, storm size distribution data suggests using the 2-year frequency rainfall as the basis for the design of infiltration BMPs, rather than the larger 100-year storm. If an infiltration system is designed to prevent any increase in runoff volume resulting from new impervious surface during the 2-year rainfall, it can be designed to also mitigate the peak rate during the 100-year rainfall. This last fact regarding peak rates is important because typically regulations require that stormwater management structures mitigate the rate of runoff (peak rate), not the volume."
>
> Cahill Associates and Delaware Riverkeeper Network, *Upper and Middle Neshaminy Creek Watershed River Conservation Plan*, 2002, p. 4-73.

2. Infiltration improves our environment and communities

In addition to the flood control benefits, infiltration also provides a number of other environmental benefits, thus increasing its attractiveness as an alternative flood control solution. For example, on comparison, stormwater infiltration measures remove far greater levels of pollutants than traditional approaches to stormwater management. While traditional approaches actually exacerbate water quality problems and deliver more pollutants to our stream systems, infiltration utilizes and takes advantage of the physical, chemical and biological powers of soil to trap and transform pollutants before they can enter aquifers, streams, or wetlands.[74] The soil mantle "offers critical pollutant removal functions through physical processing (filtration), biological processing (various types of microbial action), and chemical processing (cation exchange capacity, other reactions)."[75]

Different soil types have varying pollutant removal capabilities. Coarse, sandy soils are not particularly good at removing pollutants from stormwater.[76] By comparison, soils such as clays can be very effective at pollution removal.[77] The bacteria, fungi, actinomycetes, and algae in natural soil are a part of its complex and valuable ecology that can help process and remove pollutants found in stormwater runoff[78], which is why it is so important to preserve the natural soil community with all of these properties intact. Similarly, plants provide substantial pollutant removal potential, through physical filtering, biological uptake of nutrients, and chemical interactions[79], which is why plant communities should be preserved and/or restored.

Keeping streams clean protects aquatic and riparian ecosystems and wetlands. Fish and macroinvertebrates, the base of the food chain, are directly benefited. Wildlife, birds and amphibians that rely on streams for food, water and habitat are also directly benefited. Protection of water quality also helps communities avoid more stringent water quality regulations, and associated clean up costs. And it helps protect the quality of drinking water for those who withdraw their drinking water downstream.

By reducing the volume of water that would otherwise be discharged to stream ecosystems, infiltration helps avoid and reduce streambank erosion and the additional sediment pollution this introduces to the waterway. Undermining of bridges, roads, and other infrastructure is also avoided and/or minimized.

By protecting and restoring natural hydrologic patterns and aquifer recharge, infiltration protects stream base flow, which is critical to protecting water quality and aquatic ecosystems. Infiltration also protects the hydrologic water source of surrounding wetlands and riparian ecosystems, critical to their continuing existence.

Because infiltration strategies emphasize protection of natural communities, including overstory trees and understory shrubs and ground covers, these strategies help maintain natural stream temperatures and provide natural cooling to the surrounding community. Additionally, these vegetated ecosystems are also important. And, tree ecosystems are proven to raise property values of nearby communities and homes by as much as 6 to 15 percent.[80]

There are only a few site conditions that discount infiltration as an option:[81] ✓Toxic wastes in industrial areas that would leach; ✓Saline deposits in arid areas that would leach; ✓Steep, unstable slopes; ✓Close proximity to basements, sensitive structural foundations, water supply wells or septic fields.

Infiltration is not generally recommended in highly industrialized areas unless there has been prior testing of the runoff for pollutants and the potential for soil and groundwater contamination has been appropriately considered.[82]

3. Accomplishing infiltration to reduce flooding

In order to effectively reduce flooding we need to first **protect** and second **restore** the natural hydrologic cycle in a watershed. This approach includes minimum disturbance techniques on new development as well as infiltration techniques on new and existing development.

PROTECTING THE HYDROLOGIC CYCLE in developing watersheds through minimum disturbance.

The most effective way to minimize stormwater runoff is to prevent it.[83]

The first line of defense is to protect land in its natural condition – protect it from any kind of disturbance including development, conservation, agriculture, or active recreation that requires vegetative and soil structure/grading changes. By protecting natural landscapes, land is allowed to infiltrate rainfall efficiently as nature intended, keeping the hydrologic cycle in balance. Protection can be accomplished through the purchase of open space, conservation easements, natural resource and wild land protection and restoration programs, deed restrictions and other emerging strategies. Public and private monies are quickly becoming more available for these

approaches. Land conservation organizations are another important resource for accomplishing the land protection goal.

To the extent that protecting natural lands from disturbance is not an option and development will be taking place, a minimum disturbance approach to preserve a site's natural infiltration capacity should be utilized. This approach minimizes the amount of land disturbed and the amount of impervious cover on a development site. It also addresses both the construction impacts as well as the long-term impacts of development and it reduces stormwater runoff while improving water quality and protecting habitat.

Naturally Vegetated Open Space at Baldpate Mountain Park, Hopewell Township, NJ
Once sought for a quarry operation, now forever protected as a nature preserve

A minimum disturbance approach promotes protection of natural infiltration using existing vegetative cover and undisturbed soils.[84] Natural resources including wetlands and wetland buffers, floodplains, forested areas, meadows, other intact vegetative communities (including trees, shrubs, herbaceous plants and grasses), riparian buffers, soils, steep slopes, natural depressions and other natural and unique features are inventoried and protected.[85]

A minimum disturbance approach requires that developers only clear the areas where building is intended and that the disturbance of soil be limited to carefully established distances from the proposed site structures and improvements.[86] Once an area has been disturbed, it should be restored to the greatest extent possible through soil renovation and by revegetating with native trees, shrubs and herbaceous plants. Native vegetation is better adapted to local climatic conditions and doesn't require as much watering or fertilization.

A significant portion of impervious cover found in many developed watersheds takes the form of compacted soils. This is compounded by soil manipulation and equipment travel, which physically compacts soils, further increasing stormwater runoff. A 1992 study found that compaction associated with site construction reduces infiltration rates of soils to nearly zero, that of asphalt.[87] A 2001 study found that soil disturbance during construction can change the soil infiltration rates so dramatically that the Hydrologic Soil Group classification or Runoff Curve Number may need to be adjusted for the design of stormwater control facilities for a development site.[88]

While revegetation of compacted soils with intact plant communities including trees, shrubs and herbaceous plants can restore compacted soils, the standard post-development lawn does not provide the kind of cover or root systems required to restore and encourage infiltration. Lawns generate significantly more stormwater runoff than meadow, scrub vegetation or forests.[89] Minimum disturbance also includes minimizing the amount of impervious cover placed on the site, i.e. limiting development activities to the size and location necessary. There are a number of ways to minimize impervious cover on a new development including, for example:[90]

✓Reduce and/or disconnect impervious areas;
✓Reduce building setbacks, in turn reducing the length of driveways and entry walks;
✓Reduce road widths;
✓Limit sidewalks to one side of the street;
✓Reduce parking area size;
✓Use cluster/open space design to maximize open space;
✓Reduce size of lawnscapes.

RESTORING THE HYDROLOGIC CYCLE in damaged watersheds.

To the extent prevention of stormwater runoff through minimum disturbance design is not possible, either because development has already occurred or because some disturbance of the site is required in order to achieve the proposed development, every effort should be made to restore natural function to damaged areas and to re-create opportunities to capture and infiltrate runoff as close to its point of origin as nature would.

When land is developed, even if minimum disturbance practices are employed, the landscape and its natural function are indelibly changed. In order to compensate for the loss of the natural landscape and its inherent water resource protection functions (the hydrologic cycle), a variety of stormwater best management practices (BMPs) can be employed. Considering our goal to first, protect and second, restore the natural stormwater patterns of an existing site, the most effective BMPs are those that restore natural systems or mimic nature by infiltrating rainfall.

When infiltration is not an option, BMPs can be used to reduce the peak rate of runoff and/or remove pollutants from runoff thereby improving the quality and reducing the velocity of the discharge.

Recommended reading:
Paving Our Way to Water Shortages, *How Sprawl Aggravates Drought,*
American Rivers, Natural Resources Defense Council, Smart Growth America, August, 2002.

Depending on specific site considerations, BMPs sometimes work best in a series. For example, source controls, followed by open conveyance swales (e.g. grassy swales) and/or native vegetation, followed by constructed wetlands, and/or a wet pond or infiltration basin, can provide multiple benefits (e.g. improving water quality and recharging groundwater) when single solutions are not effective.[91]

Vegetated Basin

Stormwater BMPs generally fall into two groups: living BMPs and structural BMPs. Living BMPs rely on plants to provide or enhance stormwater control. On the whole, living BMPs are more broadly beneficial because they achieve multiple purposes -- you get more bang for your buck. While preventing, managing and treating stormwater, living BMPs also provide habitat, enhance the local ecosystem, and enhance our quality of life. When creating living BMPs, care

must be taken to design with nature and to choose plants that are native and appropriate. Knowledgeable professionals and nurseries can guide this process. Factors that need to be considered include: inundation tolerance; pollution tolerance; salt tolerance; hardiness zones and aesthetics.

Structural BMPs require construction of a structure and use of non-living materials to capture runoff and encourage infiltration. Structural BMPs can be very effective for runoff control and providing water quality benefits but they lack the overall ecosystem benefits provided by systems that rely on, encourage and incorporate vegetation. Although, to a large extent, the ecological benefits of structural BMPs can be enhanced by incorporating plant life to the greatest extent possible.

Examples of BMPs that can restore the natural hydrologic cycle on new and existing development include:

✓infiltration basins;
✓porous pavement with recharge technology;
✓rooftop ponding, vegetated rooftops;
✓vegetated filter strips and buffers;
✓grassed swales;
✓filter strip, bio-retention filters;
✓bioretention facilities;
✓rain gardens;
✓interrupted parking lot areas employing infiltration trenches;
✓dry wells;
✓wet ponds and artificial or created wetlands;
✓depressed islands in parking lots with bioretention filters;
✓rain barrels

Effective and successful implementation of stormwater infiltration and best management practices requires considering and working with the existing conditions on a site. The amount of water that infiltrates into the ground (the "infiltration capacity") is determined by a variety of factors: the soils that are present; the duration and intensity of precipitation; the prior wetted condition of the soil; the amount and type of vegetation; soil mineralogy and texture; the land surface slope; and the geology underlying the soil.[92] Other factors including controlling the degree of soil compaction, the shape of soil particles and the amount of organic materials[93] are also important.

When existing conditions are not optimal, stormwater infiltration and best management practices can be designed to compensate for what is lacking. For example, some soils are better than others at infiltrating water and removing pollutants, so each infiltration method used must be designed to work with the soils on that particular site. The infiltration capabilities of poorly draining soils (for example soils classified as C or D soils) can be dramatically improved by reforestation.

Many infiltration practices are low cost, have less "hard" infrastructure and expensive engineering and have low to moderate maintenance requirements.[94] When properly sited, designed, installed, and maintained, infiltration and best management techniques are among the most efficient and least expensive means of reducing stormwater runoff and flooding.

All stormwater management facilities require maintenance, whether it is an infiltration best management practice or a more traditional detention basin system. It's a common misconception that best management practices require more maintenance than the traditional approach.

An effective and well-implemented inspection and maintenance program should ensure a long life for stormwater best management practices. When water quality and other community benefits associated with infiltration and best management practices are considered, the time and resources invested in inspection and maintenance is well worth it.

Left: Porous paving parking lot with recharge bed infiltrating stormwater from hurricane.

4. Floodplain restoration, a necessary part of the solution.

Nationwide, there exists about 10 million structures in the floodplain and adjacent flood prone areas.[95] The "Galloway Report", a report issued by a special commission headed by Army Corps of Engineers General Gerald Galloway after the 1993 Midwest floods, found that flood peaks are increasing in watersheds.[96] The report found that this is because floodplains are being eliminated. The report called for moving people out of risky areas and employing land use planning that recognizes that communities must live with floods rather than try to control them.[97]

A floodplain is the low, flat, periodically flooded area adjacent to rivers, lakes, and oceans.[98] Floodplains are subject to geomorphic (land shaping) and hydrologic (water flow) processes. [99] The floodplain is a sponge that absorbs water, filters it, and helps captured floodwater to infiltrate through the soil so that the groundwater aquifer below is replenished. A complex physical and biological system, the floodplain and its stream support a variety of natural resources. [100]

In their natural state, floodplains have substantial value.[101] Floodplains provide natural flood and erosion control. Floodplains vegetated with trees and shrubs can be four times as effective at retarding flood flows than grassy areas. [102] In their natural state, floodplains effectively store floodwaters, the vegetation physically reducing flood velocities and peak flow rates.

They filter out sediment and other pollutants from runoff helping to maintain water quality. Vegetated floodplains provide needed shade to streams thereby moderating instream temperatures for both water quality and habitat benefits.[103] Naturally vegetated floodplains are generally layered with leaf and organic matter that result in soils with high porosity and a greater capacity for holding water. [104] And floodplains contribute to sustaining groundwater by promoting infiltration and groundwater recharge.

Floodplains are complex, dynamic systems that contribute to the physical and biological support of water resources, living resources, and cultural resources.[105] They are home to many rare and endangered plants and animals, as well as sites of archeological and historical significance. Naturally vegetated floodplains provide breeding and feeding grounds for both fish and wildlife, they "create and enhance waterfowl habitat", and they "protect habitat for rare and endangered species."[106] And, floodplains provide aesthetic value and opportunity for people to enjoy the enrichment of a protected natural stream corridor.

The natural state of a floodplain is to be covered in native vegetation, to contain no structures, to be connected to the waterway and its wetlands, and to be left unobstructed. Floodplains need the overbank flows that the natural watershed's hydrology provides in order to remain healthy and in balance.[107]

Proper management of floodplains is important to preserve their value and to reduce losses caused by flooding.[108] When a floodplain is built on or compromised in any way, its ability to function is

Healthy, Functioning Floodplain

diminished and we are forced to devise alternative means of replacing those functions. There is simply no substitute for the floodplains' natural performance in protecting the environment and reducing flooding downstream.

Compromised Floodplain

The fill placed in the floodplain reduces the floodplains ability to convey stormwater, thereby increasing upstream flood elevations and increasing the "velocity of water traveling past the reduced flow area."[109] Floodplain development also:

- ✓Degrades water quality by removing vegetative communities and damaging floodplain soils which are important for filtering out nonpoint source pollution and providing shade necessary to maintain healthy instream water temperatures;
- ✓Destroys terrestrial, aquatic and critical riparian habitat by altering the natural ecosystems, vegetation and features necessary for providing food and habitat for resident and migratory species (including fish, macroinvertebrates, birds, amphibians, and other wildlife);
- ✓Degrades and destroys wetlands by altering the necessary hydroperiods, vegetation and soils critical to their existence;
- ✓Exacerbates/allows scouring and eroding of streambanks;
- ✓Compromises the floodplain's ability to infiltrate rainfall and recharge groundwater necessary for water supply, stream baseflow and healthy wetlands;
- ✓Deprives the human community of the aesthetic and recreational benefits natural stream corridors and associated riparian areas provide.

In "Bucks County Flood Recovery and Mitigation Study" prepared by the Delaware Valley Regional Planning Commission DVRPC) for the U.S. Department of Commerce, the impervious coverage that has accompanied floodplain development in central and lower Bucks County communities (sub-basin 2, DR) is identified as the cause of increased flood frequency and velocity in the Neshaminy Creek and Delaware River.[110] In 1996, storms and weather conditions led to flood conditions exacerbated by floodplain disturbance, channelization of small feeder creeks, increased stormwater runoff, structures in flood hazard areas, and lack of adequate stormwater controls in the contributing watersheds. In their study, DVRPC recommends 16 policies for floodplain management by municipalities. The policies favor nonstructural measures that focus on better floodplain management and land use regulations that keep people out of the floodplain and restore stream corridors to natural conditions. The report also recommends that wetlands, the 100-year floodplain, and the flood fringe that buffers the floodplain, should be off-limits to development and that existing structures be removed; and that all development in the watershed should limit impervious cover and increase stormwater infiltration practices so that the amount of total run-off can be reduced, thereby decreasing stormwater and flood flows.

The 100-year floodplain is the area along a waterway that is expected to be or has been inundated in a 100-year frequency flood. This means the 100-year flood has a one-in-one-hundred or one percent chance of being equaled or exceeded in any year. The 100-year frequency flood serves as the standard for most regulations.

Communities that are flood prone are eligible for National Flood Insurance Program (NFIP) protection. To participate in the NFIP, a municipality must enact regulations that meet the minimum floodplain management requirements established by FEMA.

Construction and development in all areas defined by FEMA as "flood prone" today must be regulated—that is, activity in areas subject to the 100-year flood. Buildings proposed to be built in the 100-year floodplain must either be elevated or floodproofed to or above the elevation of the 100-year flood.[111] Municipalities can have stricter regulations than the minimum requirements of the NFIP and they also must follow all State regulations such as floodplain management acts and environmental rules. Municipalities that enact stricter requirements than NFIP receive discounts on their flood insurance premiums.[112]

The NFIP defines "development" as "any manmade change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation, or drilling operations".[113] The intent of the NFIP regulations and local flood plain management ordinances concerning development in the floodplain is to reduce future flood damages.

A detailed study found 300 communities across the nation identified as repetitive loss communities because they contain at least one repetitive loss property.[114] A "repetitive loss target group property" is any property insured under the NFIP that: has had four or more paid flood losses of at least $1,000 each since 1978; 2 losses within 10 years that, when added together, equal or exceed the current value of the property; 3 or more losses that, when added together, equal or exceed the property's value. Although repetitive loss properties represent only 2% of all properties insured by the NFIP, they account for about 40% of all NFIP payments. According to FEMA, repetitive loss properties will amount to $200 million each year in claims payouts.[115]

Currently, FEMA is not only regulating new floodplain activity. Voluntary buyouts and floodplain restoration has become a national priority for FEMA and other government agencies.[116] The cost of repetitive loss properties being rebuilt in the floodplain with flood insurance monies, even if they are built according to existing flood mapping data, is becoming too expensive and environmentally destructive. And by funding buyouts of repetitive loss properties, the biggest chunk of flood damages can be eliminated permanently.

The most effective way to reduce flood damage is by removing a structure from the floodplain. By buying out properties that continually flood, many dollars can be saved AND the stream's floodplain can be restored to the function nature intended—to soak up rain, buffer runoff, and protect streambanks, in-stream and streamside habitats. Voluntary buyouts followed by restoration of the floodplain to its natural function is the only way to provide flood victims with

complete and permanent protection from future flood damages; and it is the only way that the environmental harm that is caused by floods can be eliminated.

In human terms, when structures are removed from the floodplain people who may have been exposed to danger are taken out of harm's way. The only sure way to save lives from floods is to get people away from the water's edge and let the river safely inundate the spongy open space nature intended for floodwaters.

Left: Citizen volunteers restoring a damaged section of stream in their community -- providing environmental benefit and community commitment

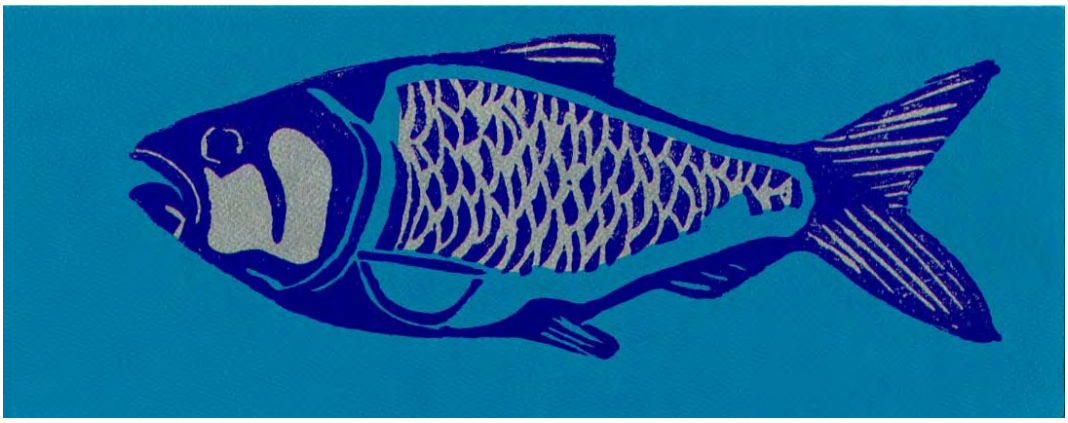
Riparian restoration using bioengineering techniques and native plants is a growing and active effort throughout the Delaware River basin. State and federal funds are being made available to nonprofits, government bodies, and agencies for restoration work. Communities, recognizing the health, safety and environmental benefits of riparian restoration are also investing dollars in such programs. Organizations such as the Delaware Riverkeeper Network are providing expertise and support services to communities, organizations and homeowners undertaking restoration projects. And the science of streambank restoration ecology is quickly advancing.

E. So What's the Solution?

Communities facing proposals to construct flood control dams, regional detention basins, levees, floodwalls, or similar projects focused on detaining floodwaters and moving them downstream have better alternatives. Stormwater infiltration and best management practices coupled with floodplain restoration including removal of structures from the floodplain, will provide a greater and more long-lived solution to flooding, while at the same time protecting and restoring our

environment and community quality of life. These better alternatives often cost less in construction, operation and maintenance, while enhancing property values.

Communities throughout the watershed facing draconian flood control measures are successfully challenging them and securing, instead, the more effective alternatives. Now that we've explored the problems and the solutions, let's talk strategy ….



A Share in the Delaware

Chapter 2

Step-by-Step to a Winning Strategy

E. Sharp

Chapter 2: Step-by-Step to a Winning Strategy

If you are faced with a proposal to build a dam a regional detention basin, levee, floodwall, or other major detention structure as a means of flood control in your community, the first thing to recognize is that there are other solutions. There are solutions that are as effective, or maybe more, than the proposed structure. These alternative solutions also protect the environment and the quality of life of communities living in that watershed. And, even if you can not demonstrate that the alternatives would be as effective for flood control as the proposed structure, the environmental costs, quality of life costs and potential loss of life costs are simply too great to justify the proposed structural solution. The key is to getting the community and the decisionmakers to understand this and to use whatever strategies you can to ensure they reach this conclusion. This chapter is a step-by-step guide to strategies that can help you reach this goal. Chapter 3 provides more details on the various tools discussed in this chapter.

A. Organize!

1. Know your target

It is most important that you identify early who the decisionmakers are that need to be influenced. In this group you want to include both those agencies and/or individuals who will actually be making the decisions on whether to build the proposed project or pursue another alternative, as well as identifying those political leaders and/or agency officials who will have to sign off on the project in some way. For example, if the project needs a permit from the Army Corps of Engineers in order to move forward, then the Army Corps permitting staff will be among your key targets; or if there is a state funding program that will be underwriting the project then the officials in that branch of government will also be among your key targets.

You should make sure you stay in constant communication with these folks, whether or not they seem to agree with your position or your tactics, they are the ones who need to know you are out there, to hear your position on the issue, and to be learning from the facts and data you are uncovering during your research and citizen action.

Techniques

1. Newspaper articles, legal notices, public meetings in your community can all be good sources of information regarding who is involved in the issue, who is making the decisions and considering public opinions, and the elected officials who care about the issue. Make sure you read every article and attend every meeting on the proposed project, searching for this kind of information.
2. As you conduct research on the project, including looking at agency files, you will find a wealth of information about officials and/or agencies that have to sign off on the project in one way or another in order for it to move forward.
3. Call all of the agencies and elected officials who you have identified as having some sort of interest in the project and ask them about their role in the project (including any regulatory or legal role they play in the process), and be sure to ask them if they know who else has an interest, stake and/or say in the project, and contact them as well.

2. Knowing your friends, knowing your enemies

a. The constituency (your friends, your allies, and those you can win over)

The first step in challenging a project that is threatening your community is to know your constituency. This may sound like politics, but that's because, in a way, it is. While not based on political affiliation or traditional party lines (indeed, sometimes strange bedfellows make the best alliances), organizing those who care about an issue requires that you know who they are and why they care.

Basic research needs to be done on the project or idea at hand: who will be affected by the project and who has an interest in it. Include in your investigations what organizations work in your region that might share concerns about the project such as concerns about environmental impacts, concerns about appropriate use of government and taxpayer funds, concerns about impacts to children, wildlife, noise or traffic. You should also identify those businesses that might have a stake in the outcome, those who might be hurt economically if the project moves forward. Cast as wide a net as possible and be sure to consider every angle.

Securing an article about the issue in the local newspaper and/or writing a letter to the editor on the matter, are some more proactive ways to make your issue public and spur public interest.

Once you have a handle on who cares, you will need to identify your target audiences and take action to reach out to them and to build your constituency. Here your goal will be to 1) convince others that the issue is important and warrants attention and 2) convince those who may not agree with your approach to re-think their position.

b. Know your enemy

The "enemy" is not what it traditionally sounds like. When attempting to influence the outcome of a situation, your enemy is not just the obvious—those who have an interest in seeing the project go the other way—but it may include a large number of people who have taken a position on the issue based on little to no information, or based upon misleading information they have received or believe. When people don't know the facts, they rely on conventional wisdom, what they hear or read in the newspaper or from their neighbor, or sometimes just what they want to believe.

Your job is not only to sort out who is "on the other side" of an issue from you, but to also determine whether some or all of them can be convinced otherwise. While it is important to invest energy in trying to inform and win over those individuals and organizations that can be reached, it is equally as important not to waste your energy and resources, and not to tip your hand, to those who you will never be able to reach. This is a tricky step in the process but is an important part of the strategy.

Going door to door in the project area to educate and get support

Your research needs to include finding out what organized opposition you will face, who/what interests are behind a project/idea, and who sits in the middle and can, with the right information, be won over.

Techniques:
Following are some techniques for gathering information on your constituency, your targets, your loyal opponents, and all those in between. You will find that this identification will be refined with your involvement over time.

1. Door-to-door canvassing in target neighborhoods (using a survey, letter or petition)
2. "Clipboard" canvassing at local events. We do not recommend standing outside a business such as a supermarket where people may be in a rush and are focused on a totally different outcome. Generally people exiting a business are focused on other issues and/or getting home and often will provide a signature just to get you off their back, not because they are genuinely interested or concerned. As a result you may be misled into believing you have larger support than is actually the case.
3. Walk-around canvassing in the project area. Sometimes just taking a walk in the area of the project asking people what they think of the proposal will spur people's interest and will help inform them about the proposal. You will likely learn things you didn't know and you can collect names and addresses.

4. Neighborhood chat. Organize a meeting at a neighbor's house to talk about the issue and invite your friends and neighbors. Be sure to get everyone in attendance to sign up so you can re-contact him or her later for future meetings.
5. Internet chat. Sometimes a local club or newspaper will sponsor a chat room for community issues, or you may already have a list-serve of contacts. This is a good place to post information and talk up the project. Because these services can be widely accessed and you don't know who is reading or forwarding your postings, refrain from posting confidential, sensitive or personal comments.
6. Bringing the subject up at meetings/get-togethers of other groups.

SAMPLE: Citizens Petition --Appendix

3. Get it together

You will need to get together with a few people who have strong interest in the issue first. These folks will probably become your core group of interested people although, through reaching out, you will attract others who will join as active members of your core group. It is very important to remember that you want to include as many active people as possible to get different perspectives and ideas (be diverse – avoid becoming a clique) and to spread around work (avoid burn out).

The Living Room: You can start by giving out flyers or making phone calls to your constituency inviting them to come to a meeting in someone's home to discuss the issues.
You should keep these living room meetings going throughout the life of your effort, holding them on a regular schedule (e.g. monthly). Bringing people together in a secure, supportive environment is essential. It's where strategies are born and camaraderie is developed. Try to keep these meetings just amongst those you totally trust (though that circle should expand) so you can brainstorm and be frank amongst yourselves. It is critical to have a well-rounded group with members who can set aside their own agendas and work together towards a common goal. This will pay off as the struggle heats up and at low points in the process.

It's not important at this point to formalize your alliance as an organization, with by-laws, officers, and mission statements. You don't want to bog the group down on these time-consuming and potentially conflict-inducing tasks. Your goal is to get a core group going who will be able to move the group towards action on your issue. You can decide later if you want to evolve into a political action committee, a non-profit organization, a municipal advisory committee, etc. However, you will need, within the first couple of get-togethers, to pick a name for your group or cause, and assign a contact phone number or two, an email address, and mailing address. The contacts can be existing home or business numbers. Your group's name should be easy to remember and should capture your main message. Remember, the opposition will eventually get hold of your contact information from press releases and your group's handouts so be sure you are comfortable using these numbers and addresses publicly.

You will need to:
- Start a mailing list and phone tree of core group members

- Identify the primary goal of the group
- Figure out the tasks to be accomplished
- Plan a strategy, brainstorm
- Work up a timeline of upcoming important dates and group activities
- Keep minutes, "to do" lists
- Form committees to carry out the work

SAMPLE Citizen Strategy Sessions – post card, agenda, checklist--Appendix

Signs announcing events should be short on text and easy to read

The Outing: You will need to attend a public meeting, perhaps a municipal or county meeting, where you can publicly bring up your issue. Your first public statement should be simple, to the point, and short and will need to be agreed to by the core group. You want to be sure to target a meeting where your issue has relevance – e.g. attend a meeting of the political or agency body that will ultimately decide on whether or not the project moves forward. If there aren't any meetings of this type yet, then attend a public outreach meeting your local elected official might be holding to drum up constituent support. The idea is to find an appropriate public forum in which to take your first public step out on the issue. If you truly can't find such a forum in

which to raise your issue, you may have to create your own public forum for delivering the message. (See below: First Public Meeting)

You will need:

- A press statement, typed on your letterhead with your group's name and contact information, which summarizes what you want to be quoted as saying.
- One person to make the statement or bring up the issue in the form of a statement or question, depending on what the forum allows.
- One or two people to speak with officials and/or the press at/after the meeting.
- Several core group members to hold private conversations with interested people after the meeting.
- Flyers about your next meeting or activity on letterhead with all contact information (remember this flyer will go to the general public, including your opposition.
- Sign-up sheet on clipboard to get contact information for interested people.

SAMPLE: Press statement--Appendix

Learn All About It: The work of gathering information about your issue needs to start as soon as you have people who can make the time to get it. As soon as you have enough of the basic facts, you need to make up a Fact Sheet that tells the general public the most basic information. The Fact Sheet must be well-researched and not sound like a "battle cry" but like a careful recitation of the facts. A wide range of folks will read these and you want to expand your constituency by establishing early on your credibility, a clear demonstration that what you say is factually accurate and to be trusted, and that you cannot be dismissed simply as some sort of fanatical group bent on dispensing rhetoric rather than real information, issues and alternative solutions. Use a simple, uncluttered format and typeface. Use your letterhead and include the group's contact information. A bright color that is used for all the group's Fact Sheets helps to make them instantly recognizable on a table. As time goes by, Fact Sheets can be made up on the various aspects of the issue and can be more sophisticated as the issue matures. These will be your handouts that you bring to every function.

SAMPLE: Fact Sheet--Appendix

Call to Action: In order to keep members of your core group as well as other concerned but perhaps lesser-interested citizens active, it is important to keep them involved. Assignments for research, outreach and phone calling are good for your core group but likely too much for most others. Creating action alerts that provide your interpretation of the facts and arguments and call upon concerned citizens to take some action in support of your position is a good way to build your group's strength in the minds of the decision makers, to keep people involved in an ongoing way, and to work towards getting the community more involved and committed to your position on the issue. You should not make up tasks simply to try to keep folks busy – people only want to take on action that is of value and they will only be willing to do so much, so be sure your action alerts call for needed actions only. Action alerts can be handed out at every public event, every living room meeting, and to folks who call in interested in the issue and wanting to get more involved. An action alert gives them a good place to start, quickly making them part of the

movement. Action alerts can accompany fact sheets but they certainly do not replace them. Action alerts include your position on the issue; fact sheets are intended to be a straightforward recitation of the facts.

SAMPLE: Action Alert--Appendix

First Public Meeting: You will need to plan a public meeting of your group. The purpose is to make your presence known, let people know who you are and what you want, alert your "opposition", and get press recognition. At your living room meeting, the core group should decide what you want to say and how to organize the evening. Remember, you want to draw in new people and you want to rev up "the troops". The meeting's agenda should include an introduction, a presentation of the facts, a question and answer period and a verbal wrap-up that reflects what was said by the speakers and the participants. It is best to designate one person to run the meeting and have a timed schedule that is followed. This "emcee" or another designee can be a spokesperson to the press afterwards. This spokesperson should rehearse a few succinct comments for the media before any public statement -- television interviewers always edit your comments down to one or two sentences, at most, and the press always likes it to-the-point.

You will need to leave the meeting with everyone knowing how they can get involved and what is going to happen next in the process. You may want to discuss strategies and provide action alerts as a handout at the end of the meeting, or you may decide that the presence of the opposition is too great and/or too organized for you to want to tip your hand about the strategies you are implementing. One way to gauge the friends among the audience is to have a petition or pre-prepared letter addressed to a key political decisionmaker that you ask attendees at the meeting to sign with their address and phone number as they enter. If they sign this public statement of their position it is likely they are genuinely a friend to your cause; if they don't you may want to be more careful about sharing strategic information at this meeting. The letter will also serve the purpose of a take-home action item for those in attendance who are still undecided or uncommitted on the issue.

Be sure you have your facts together and that you will have a strong showing from your supporters before taking the bold step of your own public meeting. You will want to invite the press and it is important that they see your movement has strong (or at least fair) support for your position. Decision makers and politicians will likely be following the press to help them determine their position on the issue, and they need to see your cause as a force to be reckoned with. In addition, the opposition will turn up and you need to be sure you are ready to address their challenges effectively. Handling your opposition's questions, statements and challenges effectively at the meeting will demonstrate to your supporters, to undecided but interested attendees, and the press that your position is strong, that you are confident in your position and your facts, and that you are likely to succeed in your challenge as a result of your firm commitment and command of the issue and facts.

The Delaware Riverkeeper fills in the media

You will need:

- A table at the entrance with one or two people to greet the public
- Sign-in sheet on the table
- Press statement
- Fact sheets – copies on table
- Prepared agenda – copies on table
- Flyer with date of next event/meeting (Remember -- do not publicize your core group meetings at this event as you do not want to tip off the opposition or invite in the other side to these important strategy sessions.)
- Letter to key political decisionmaker you ask attendees to sign and turn in
- One person to MC and be timekeeper
- One or two speakers to identify goals and most important issues
- Question and answer session, run by MC
- Call for committee sign-ups
- Wrap-up and call to action

SAMPLE: Meeting Sign-In Sheet, sample citizen letter--Appendix

4. Get the Word Out!

It is key to get the word out in a big way. No matter how strong your group is, you need to look even stronger and you need to always be expanding.

To reach lots of people, you need to go where they are, always making sure your name is prominent. Getting out in the community, especially where the project is located or the issue is

centered, is a must. Use all means at hand to spread the word – your imagination is the limit. Once you are beginning to get your name and cause known, you need to attract press coverage. The newspapers will write an article if they believe there is a "hook to the story." So keep on top of events, make reporters aware of upcoming meetings, impending decisions, new information that has been released or that you have discovered and use them to your advantage to secure press coverage. Don't be afraid to issue your own press release stating your organization's position on the issue, an upcoming but little known meeting, or to publicize some event or location where you will be.

Now that you are growing and organizing, you need to work through your strategy, pulling in more support along the way. You need to make it clear to the governmental and political decision makers that you are a force to be reckoned with and that you are in it for the long haul. Once you have pulled together a group of committed citizens you need to start flexing your muscles.

Your booth should be educational, interesting and can offer items for sale

TECHNIQUES:

1. Letter Campaign, Petition Drive
2. Take a booth at local fairs, community events to discuss the issue and hand out information

3. Issue a newsletter, fact sheets and action alerts
4. Press Alerts, press releases
5. Letters to the Editor
6. Attendance at local meetings to bring up the issue
7. Network with other organizations
8. Banners, signs
9. Stickers, buttons
10. Fun events

SAMPLE: Community Event Handout, Campaign letter,
Newsletter, Letter to Editor
Stickers--Appendix

Bright colors, direct message is best on big banners

5. Raising Money

Nobody likes the prospect of having to raise funds. Early on in your organizing, you may not need much and you shouldn't push the donation of money too early. Ask for money once your group can no longer carry the burden of incidental costs. Mailing, printing, using the tools listed previously, all costs money and eventually, you will need to raise it from your constituency.

While it may seem daunting, the first request for money to a community that knows you are working hard is often very successful. The first action you should take is simple: Just ask. You have your mailing list, you are out and about the community, and you have the opportunity to

ask. Put together a one-page simple letter saying what you need financial support for and send it out/hand it out. Then you can move on to fundraisers: an event at which you charge admission or ask for donations, candy sales, auctions, coin tosses, etc.

If you decide that your effort will be long term and you cannot hook up with a group that is already a non-profit organization, you at this point may consider forming your own non-profit organization. If you are going to need large sums of money for legal challenges, expert testimony, etc., you will be more successful at raising funds if the donations are tax-deductible. But, securing nonprofit status brings with it limitations on your actions, as well as additional workload, so it is not a decision to be made lightly. If you become a nonprofit organization your ability to lobby on proposed legislation will be severely curtailed, you will not be able to be involved in putting forth or supporting candidates for elected office, filings with the IRS will have to be made come tax time, and securing and responding to every donation will require strict adherence to IRS guidelines. If grants are secured those funds will have to be meticulously monitored and spent, timely grant reports and financial statements will also be necessary.

You do not have to be a nonprofit organization to secure donations for your campaign, but you have to make clear to donors that their donation is not tax deductible. If you can find a nonprofit interested enough to work with you on your issue you may be able to work with them to secure grant funding for the costs of your efforts, including experts and perhaps even lawyers (although many foundations choose not to fund litigation).

If you are going to be a political action committee, you won't be eligible for 501(c)3 status but you may successfully attract donations from people who want to affect the issue you are working on and the associated political process. And if you decide to hook up with a municipal or county committee at this point, you may gain support from a government entity (such as a municipal environmental action committee or environmental commission).

SAMPLE: Fundraising letter, Notice of fundraiser event--Appendix

Use your imagination to raise funds in a fun and rewarding way.

Left: set up of donated art work for a silent auction held during a fun, all day event called Riverkeeper Races featuring horse racing, children's games including pony rides, and a silent auction.

B. Making an Impact

By this time, you have active committees, you are meeting regularly, you have a newsletter and action alerts, and you have a lot to keep track of. You will need to keep orderly records of everything. Start a file system and keep inclusive files; make notes (with dates and names) of all phone conversations; keep a chronological correspondence file; keep documents organized; maintain a mailing list and a cc list for all correspondence. Share information with the core group, keeping everyone in touch with what's going on by email, phone conferences, regular mail, and by reports at monthly strategy meetings. To be effective, you need to stay tightly organized. This is a critical time in your group's development, and inner-group communication must be open and honest.

You will be researching your project throughout this process. You need to know everything you can and you must be more informed than your "opposition". You will need to turn over every stone, look in unlikely places for insight, ferret out facts, have folks in your group use their expertise to delve into specific issues. You will have to be assertive in using your rights and the public process to gain information. The old adage "information is power" is not a cliché.

The Public Process

You must participate in the public participation process at every stage. You will need to file public comment with the appropriate entities throughout the process, never missing an opportunity and creating as many new opportunities as possible. Develop a comprehensive "cc" list of all elected officials, agencies, organizations that you want involved and copy all comment to the entire list.

You will need to assert yourself into the process early, insisting that the decision makers employ an "iterative" planning process, an inclusive planning approach that includes the public as often, as early, and as effectively as possible so that the outcome of the process can change as input is integrated into the project's review. Fight for extra public meetings, hearings and input sessions and broad public input. You should try to get all written public comment periods extended as long as possible so that the public will have time to find out about it and file comments. All too often, an agency proposes a decision, the public comments, and then, quickly, the agency does what it planned to do before the public commented. You cannot accept this scenario.

You will need to attend all public meetings and hearings on the project and turn out as many people as possible to comment, give information, and ask questions. Public meetings and hearings held by the project sponsors or decisionmakers are the best venue for getting your ideas, opinions, and concerns the exposure they deserve. These meetings are also an excellent opportunity to show strength and public interest in the issues involved. Seize the moment!

If there is no public process open yet, don't be afraid to start your own. Write the decision makers with your concerns, position, questions and challenges and "cc" every agency that has to permit or fund the project, and "cc" all the politicians who represent the project area, local, State and Federal. Be sure to save your comments and resubmit them either as written, or in an updated form, once any formal public comment period is started. Your comments will not be

part of the official record unless submitted during the formal comment period. But you don't need that formal period to start making your voice heard and to start influencing the decisions that are being made.

If there is an ongoing study of the project/issue and a steering committee or review panel is appointed by the decision-making agency, try to get appointed to it. If you cannot get someone appointed, get to know someone who is on the committee and establish a line of communication and rapport. Or establish open communication with a sympathetic elected official or staff member who knows what's going on. Also, make sure you have a representative at every committee meeting to gather new facts, emerging findings, to gauge the direction things are headed and to, if possible, make your voice heard during or after committee meetings. You can't react or respond to the committee's decisions, actions or findings unless you know what is going on.

Verbal testimony should always accompany written comment

It is critical to try to keep on top of what is happening so that you can participate at key points in the process. For instance, if a closed-door meeting is being held, try to get into it. Remember, you are representing more than just yourself; you are representing a constituency with a goal. The public has rights under the law to participate in the decisions that are made that will affect their community and their environment. Know the law under which the project falls, and exercise your right to take part. If you cannot get into the meeting then use it as an opportunity

to get press coverage or assistance from your local elected officials – stating that it is inappropriate for the public to be shut out of such important meetings about such an important issue. A press release charging the decisionmakers with excluding the public (even if legally allowed) from meetings can be very powerful. Offering an elected official an opportunity to fight for more citizen participation in the public process is a good way to bring them into the issue and on to your side.

The key opportunities for making your ideas, viewpoints, and concerns known is at public hearings and meetings. Always take advantage of the opportunity to turn out as much of your constituency as possible and to put the project sponsors and decisionmakers on notice. Well thought out questions and comments are a must. Because verbal comments are usually limited to 3 to 5 minutes, different issues can be divided up into short comments to be presented by many people in order to cover everything. Of course, written testimony should always be submitted at hearings and the verbal comment used as a way to highlight the issues, ask questions, and make points publicly.

Hiring Professional Help

There are two types of professional assistance you may want and/or need to avail yourself of during the fight – technical expertise to review and comment on the technical aspects of the studies, data and documents that are issued; and legal expertise to ensure full access to your public process rights and to challenge an undesirable final agency decision if there are legal grounds.

Your decision to hire an expert/professional should carefully take into consideration your specific needs--sometimes all you need is a timely letter from a lawyer or technical consultant to open doors or impact a decision. Don't assume you must have expert assistance to have an impact or to be successful. Concerned and committed citizens have a tremendous capacity for learning the technical and legal aspects of an issue and putting that knowledge into action. Don't underestimate yourselves!

Independent expert review may be necessary if it looks as if the project is moving beyond agency planning and/or if a report or assessment has been issued with which you don't agree. But you need to make the decision to hire an expert carefully and consider the cost. There are some resource pools on which you can draw such as other organizations. And there are always generous professionals who will volunteer time and expertise to help in digesting information, deciphering reports, or strategizing action. Be sure to identify and reach out to all of these options when considering your decision.

Helping the professionals you employ by doing the "grunt work" or information gathering for them will cut costs and help develop a good working relationship. Remember that while they work for you, they are independent and should draw their own conclusions, so know who you are hiring and understand their perspective. Keep close track of costs and pay them on time.

Technical expertise:

Throughout the process it is important to take advantage of the technical expertise that your group members have, and for every member of the group to educate themselves about the

technical aspects of the debate as fully as possible. But, if the data and studies exceed the expertise of your existing membership or friends to your cause, you will need to seriously consider hiring a technical expert – engineers, hydrologists, or economists should be among those you consider. In addition, hiring an independent consultant that makes findings that support your position will strengthen your credibility with the decision makers, agencies and politicians. Don't try to direct your consultant on the findings that should be made, but make sure you hire an expert with the right expertise and values.

Legal Expertise:

If it becomes clear that: the public's input is not affecting the outcome or informing the decision making; that the agency is not following the law; that they are not giving the public access to documents, meetings and the public input process to which they are entitled; or that the decision they are making is obviously biased, then this may be the point to consider hiring an attorney. While hiring a lawyer should be the last resort in community input on a project/issue, sometimes it is the only way to push yourself into the process or stop a steamroller from moving ahead on a decision. You need to make the decision to hire an attorney carefully and consider the cost. There are some law clinics and organizations that provide some support or free service on certain issues.

Even if you don't think you will ultimately pursue legal action as part of your efforts, make sure you preserve your legal rights just in case. To this end you will need to make a comprehensive record that presents a challenge to every issue you may want to confront. It is critically important that all of this information is entered into the record in writing during the formal comment period. Not only will this preserve your right and opportunity to bring a legal challenge, but it also demonstrates to the decision makers that you are serious and that you know what you are doing.

Whenever submitting comments for the record be sure to raise every concern, to ask every question, to challenge every aspect of the matter you can – even if you decide not to challenge that aspect legally later, it is important to preserve your options; you never know which issue will be the key to your success. An attorney is not needed to draft or submit your public comments, you just need to be sure that as you move forward on your issue you are documenting every step as if you may need an attorney some time down the road. If an attorney is willing to take a look at your comments as you go along, don't turn them down, but don't feel obliged to secure legal input before you feel the time has come.

You will need to:

1. Participate fully in the public process, including filing comment and attending, in full force, all public meetings and hearings on the issue.
2. Build public interest by publicizing the issue through community newsletters, the media, signs, and associations.
3. Phone agency staff for information (requires time and perseverance)
4. Research federal, state, and local files (very time consuming and can be expensive to make copies--try to borrow a free portable copier to use at file reviews to save copying costs)
5. File information requests, e.g. Freedom of Information Act and Right to Know requests and read all the information you receive.

6. Research legal issues such as: National Environmental Policy Act (NEPA); Clean Water Act; Clean Air Act; Open Public Meetings Act; Open Public Records Act (NJ), Right to Know and Freedom of Information Acts; Federal Emergency Management Agency (FEMA) regulations and guidelines; State Open Space Protection Laws; Endangered Species Act; Stream Encroachment, Dam, Floodplain, Wetlands and Species Protection laws; and any other applicable federal and state environmental and conservation laws, etc.
7. Research project authorization and funding
8. Delve into the history of project/issue and who supports it
9. Consider securing an expert(s) and/or legal representation at key junctures in the debate.

SAMPLE: Sample FOIA letter--Appendix

Public Hearings should pull everyone out

Analyzing the Project and Developing Alternatives

The bulk of the work now will be analyzing the project and developing alternative ways to meet its goals. If you've been able to afford them, professionals will help with this all-important task. But, you should never stop brainstorming amongst your group members and seeking advice from like-minded organizations in pursuing this key piece of the challenge. Offering an alternative that accomplishes the goal of the project while at the same time protecting your issues of concern is an important strategy when it is possible. But, there will be projects where there is no alternative and your position is a simple statement that the costs (economic, environmental and community) of the project are too great to justify it. Keep open lines of communication with those on steering committees, staff, and agencies to beat the bushes for ideas and to keep abreast of developments that may expand available alternatives. Open doors to allow fresh thinking.

When developing alternatives, it is important to remember that you want to provide an alternative solution that addresses the problem effectively and provides a way out for the agency proposing the project as well as the politicians you are trying to win over to your side. It is often true that the project an agency is proposing is not the best way to solve a problem and is being

promoted because perhaps it was once an acceptable idea or could be easily funded or because it has some political clout or special interest behind it. Often, it is just an old project that has already been approved by one bureaucratic level of government, so it's "on the books". Alternatives are often not explored adequately or at all by the agencies. Even if it's not an old idea, there are many ways to accomplish a goal, and you need to identify those other alternatives that accomplish the stated goal and address your areas of concern. This is your job--to examine the problems, explore how to solve them, and insist that alternative means to the end goal are fully analyzed by the agencies involved.

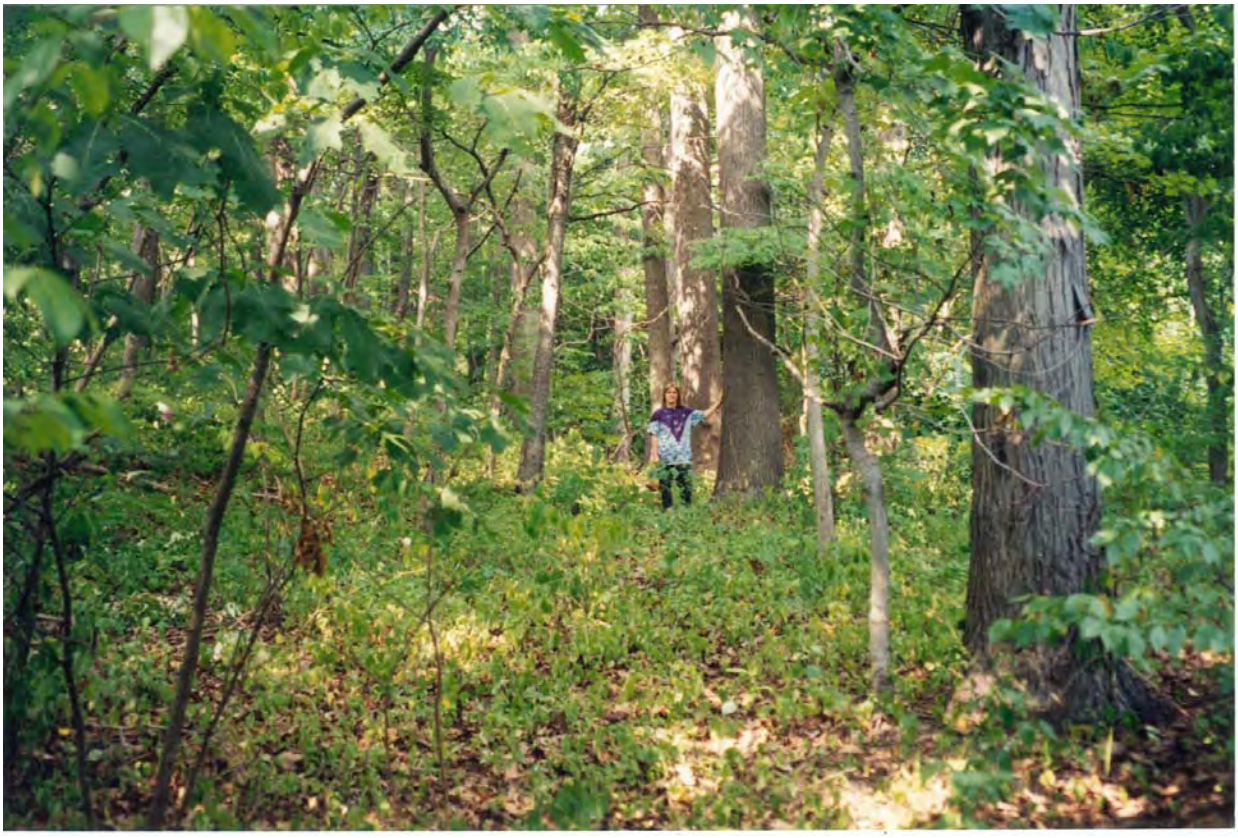
Suggesting alternatives does not mean you have to fully explore each alternative and provide conclusive findings, it means identifying plausible alternatives that the agencies and decision makers need to explore, gather data on, and compare with their recommended approach. Often the law pursuant to which the project is being proposed requires an alternative analysis or such an analysis is a requirement to receive permits needed for the project to move forward. Even if this is not the case, being able to argue that there are other, better alternatives can be key to winning the support of decision makers, politicians, the press and the public. But it is important to remember that it is possible there may not be any acceptable alternatives for the project being proposed, and in that case your strategy will have to focus on the negatives and lack of benefits of the proposal being pressed for.

Leave no stone unturned in your search for historic and prehistoric resources

You will need to:

1. Analyze data: cost/benefit ratio; environmental issues; social concerns; cultural, historical, and archeological issues; engineering.
2. Identify, and to the extent possible develop alternatives and insert them into the process.
3. Prepare and file comments on the project, copying the cc list. Remember, you don't have to fully develop the alternatives; you simply need to articulate that there are alternatives that were never considered and should be. But, the greater level of information you can provide to back your case that there are truly viable alternatives, the better your argument/position will be.
4. Take steps to secure access to requested public information and challenge inappropriate decisions or activities.
5. Identify missing and needed information, data, analyses and studies.
6. Identify and, if possible, submit all pertinent information.

SAMPLE: Written comment--Appendix



Old growth forest ecosystems are nature's water pumps and an irreplaceable treasure--
Make sure your alternative solution protects them

C. Stay the Course, Round the Turning Point, and Win

Staying active, committed and involved in the issue will probably feel like an endurance test. It is, in some ways, the most difficult aspect of any public debate because after a while the initial steam may be lost from the group or from the issue. But, when the activity associated with the public process and/or the commitment of your members dwindles, you will need to reenergize your group, and find ways to use the lag time to your benefit and to continue to build your strategies, resources and membership.

If you are waging a letter or petition campaign, re-double your efforts. When you have a healthy number of signed letters accumulated, it's a good idea to submit them in bulk for maximum effect, rather than mail them in piecemeal. Use this time to build your constituency. Reach out to other groups for support. Find and implement ways to raise needed funds for future efforts in your campaign. Living room strategy meetings, general membership meetings, your newsletter, action alerts, social events as well as fundraising events will help keep up the momentum. Research efforts, professional reviews, and data gathering all need to move ahead with purpose because you must remember that those who are proposing the project are working very hard all the time to move it ahead. Don't let the sense of a lull give you a false sense of security. Keep to your timeline and strategy. Use every opportunity to keep your issue in the public eye.

That being said, the may be times when the issue is genuinely out of your hands and publicly quiet. As long as you have done all your homework, the moment should be viewed as a rare opportunity to catch your breath. It can be exhausting for folks who are knee-deep in an issue to never stop. This is the perfect time to enjoy what you are trying to protect--take a canoe trip on the creek, go for a walk in the woods, have a backyard barbecue. Don't ignore the good things you are fighting for. And trying to force unneeded meetings or activities can backfire by making people feel as if they are wasting their time and you also risk poor turnout or half-hearted participation. Then when you really need people, they may not respond.

Inexplicably, sometimes an event occurs "out of the blue" that will have profound impact on your campaign. Such an event should be turned to your advantage in order to make sure that the impact helps your cause. Never underestimate the power of a serendipitous event. It could provide a key turning point that will bring your success. And it could provide a win-win situation for everyone.

Barring that windfall of circumstance, you will need to remain flexible in your strategy but focused on your goal in order to round the turning point of your battle. Once you have done everything you can to participate in the outcome, created a groundswell of public opinion for your position, informed the issues with your research and experts' analyses, and employed all legal tools, you will now need to drive it all home.

Develop a thick skin. It is inevitable, especially when it seems that you may attain your goal, that those who disagree with your position will become, clearly, your opponents. Sometimes people, in desperation, act unfairly and even in a mean-spirited and threatening way. They may attack your group, your funding sources, even individuals through personal threats. Be careful

and don't react in kind. Stay focused on the issue, debating the facts and figures, and always follow the high road. Most important, stay your course. When an opponent makes the debate personal, focusing energy on personalities or insubstantial and unrelated facts and issues, you should realize that this is a deliberate strategy to drain your energy and resources from the real issue and simply an attempt to get you to focus on unrelated matters, and/or to find a way to divert the attention of key decisionmakers and/or political leaders from the decision at hand. The other side will likely attempt this strategy at some point, or it may be their entire strategy if they are not able to master the facts, research, issues and strategies as effectively as you, or if they view you as a threat. Don't fall into their trap -- stay focused on your strategy.

People come together in a struggle

There is nothing that adequately describes the euphoria of winning your goal. All the blood, sweat and tears are forgotten and all the effort was worth it. A word of warning--don't celebrate prematurely. It's not that hard to snatch defeat from the jaws of victory. And it's unseemly to dance on a project's grave when there may be someone mourning the loss. Nonetheless, to reach a goal that truly benefits the community and the environment and to avoid the degradation that the project would have caused, is a great accomplishment, with real long-lasting value.

Beware of the backlash. There will always be negative fall-out, so be mentally prepared. And there's an odd phenomena that often appears -- a kind of internal post mortem that can be stressful. Once you are sure you've won, give credit where credit is due (and in some cases, shower it on officials who need it to remain resolved), thank those who made it possible, and have a big party.

While it is unthinkable that you will not be successful, you must "expect the best and plan for the worst". Even when things look dimmest, you must remember that it's not over 'til it's over and never give up. But if your goal is not realized, you need to know that it is always better to have participated than not. You raised awareness and improved the outcome in some way, even if not readily apparent. No energy spent on protecting our environment is wasted and, if nothing else, the people who fought are better people for it.

SAMPLE: Neshaminy News, Memorandum to public official, public statement, event postcard--Appendix

Chapter 3

Tools

E. Sharp

Chapter 3: Tools

There are many tools that can be used to accomplish your goal of affecting the decisions that are made in your community. Listed here are some that we have found to be most effective and some suggestions of how to make and use them. The Appendix contains samples you can tailor to your needs.

Fact Sheets

Fact Sheets are information pieces that lay out the basics on a subject. A fact sheet should present information succinctly, using an easy to read format and an economy of words. Rather than expressing opinion, a fact sheet should state facts, interpret data, and pass on information for the reader to absorb. The reader should be able to pick up a one or two sided fact sheet and be briefed on the issue addressed. Bright colors and larger type are attention-getters and make the sheet reader-friendly.

Sample: Fact Sheets--Appendix

Petition

A Petition is a one-page document that asks the public to sign a statement that represents a position or a call for action. The language of the Petition should be short, preferably one sentence, and unambiguous and should be directed to a decision-maker (agency, representative, elected body, institution) asking for action to be taken. There should be one line for each Petitioner to print his name and address, and to provide a signature. As a rule, only those who are the constituent base for the decision-maker should sign the Petition. Petitions work best when they are aimed at a specific goal with a limited time frame and pack more punch when the number of signers represents a majority of the constituent base. Getting names on a Petition is a good way to meet people and talk up your issues. It is easier to get names at large public events, like a community fair or event but going door to door with a Petition is a valuable outreach effort and can help you gain support for your cause. But Petitions do have limitations. They are not given the same level of credibility as individual letters, even if the letters are form letters, since a letter require more thought by the signer.

Sample: Petition--Appendix

Letter campaign

A letter campaign is an organized effort to get people to write a letter or sign a pre-printed letter that is then submitted to a decision-maker (agency, representative, elected body, institution). When asking people to write a letter of their own, a guideline for what a letter should include should be prepared. A list of points to be covered in the letter should be drawn up and put on a flyer with names and addresses of those to whom the letter should be sent. Copies should be sent to you as the organizing group so you can keep track of the quantity and source of the letters being submitted. An individual letter expressing a person's ideas in their own words is the most powerful means of registering an idea with a decision-maker. It doesn't matter if the letter is hand written or typed. If a form letter is used, it should be a one-page letter with a place for the signer's name, address, and signature. The letter should be short and to the point, asking for

specific action by the decision-maker. It is often a good strategy to have all the form letters kept by the organization and, once a good number is collected, they can then be handed in together to the decision-maker, perhaps at a press conference. Another approach is to print up postcards with a message that can then be mailed directly to the decision-maker. If you provide a stamp on the card, it will more likely get mailed. An artful card, bright color, or catchy message will make these cards more noticeable.

Sample: Pre-printed letter, Action Alert--Appendix

Questionnaire/survey/poll

A survey or questionnaire or "straw poll" is a question or series of questions that are put to people asking for their opinion or position on a subject. The question needs thoughtful framing and usually a yes/no or simple constructed answer choice. This is a good tool for gathering information from the public and for understanding local opinion and trends. Also, arming yourself with a clipboard and a sheet of paper with questions and a place for answers is a conversation-starter. A good way to engage people in dialog is to have prepared questions that you want them to answer. The answers can then be tallied and used internally by your organization or shared publicly or with targeted decision-makers. Asking the person queried to sign the questionnaire is optional. Signatures do give the questionnaire more credibility if you plan to share copies of the document with others but some people will not want to sign their name. This effort can be conducted by phone but with the advent of aggressive telemarketing, it is sometimes difficult to engage people on the phone. If you do use the phone, it's a good idea to call people who know who you or your organization or to send a notice first saying you will be calling.

Phone tree

A phone tree is a list of phone numbers for people in a group that is organized like a pyramid or the branches of a tree. There are a few numbers that are the first calls made to get a message out and each of those people has a list of numbers to call and each of those people has a list of numbers to call. A phone tree is a good way to get word out quickly and efficiently about an upcoming event or a piece of timely news. It is made all the easier by phone machines where you can just leave a message.

Email communications/Website

Email: Communicating by email is efficient, fast, and convenient. You can develop a list-serve that automatically sends your written message to everyone on your list. It definitely saves postage and paper and with one stroke you reach many people. The only caution is that your communications may not be private so be careful not to disclose information you don't want widely disseminated.

Website: Setting up a website for your group is a way to make your information very accessible. You can post ALERTS, news flashes, calls to action, schedules of events, and general information. It is important to keep your website up to date and try to set up links to the Internet that will make it easy for people to find you.

Banners/signs

Nothing impresses the general public more than a big banner. You can have one made fairly inexpensively these days or you can get canvas or a synthetic fabric and make one yourself. The banner should be easy to read at a distance and in simple bold colors--black and white or red and white works great. Use as few words as possible, remembering that the banner is meant to be read while a person is driving past or looking from a distance. A similar strategy is a message on lawn signs placed throughout the impacted community giving a simple message and a place to get additional information, either by phone or on the web.

Sample: Signs/Banners--Appendix

Stickers/buttons

Buttons and stickers are like little billboards. With a straightforward or catchy phrase that is easily understood, a button or sticker can be a way of advertising your ideas or position. When a person puts on a button, they are committing themselves to a position. Also, the person who reads the message is impressed. They are a great way to get name recognition or slogan recognition and can be a small fundraiser or thank you token when a person makes a donation. They can be bought inexpensively or a small sticker, the size of a button, can be made even more quickly and cheaply. Use a bright color with high contrast lettering such as bright yellow with black if you want the button noticed in a crowd. A crowd of people at a hearing all wearing the same stickers with a message has a similar visual effect to a crowd carrying signs (which most hearings will not allow into a hearing room). And people will often wear a sticker even if they are reticent to speak at a hearing – the result is that you are making a clear public statement by having buttons or stickers available for participants to wear, even if only a few actually speak on the record.

Bumper stickers are another way to express to the world a message you want delivered publicly. It is important to make sure that people will put them on their car if the goal is to have a high profile. Many people are reluctant to put anything on their car today, however, so investing in bumper stickers, which need to be the more expensive high quality plastic if you want them to last, should be thought through carefully.

Sample: Stickers/Bumpers--Appendix

Iterative Planning

Iterative Planning is a planning process that involves a wide range of "stakeholders" in the decision-making about an issue or plan early and often in the decision-making process. Iterative planning allows for the outcome of the process to have the opportunity to change at many points in the process. By contrast, linear planning sets out a goal and works towards it with only a few places where input can really have an impact on the final outcome. Iterative planning is being employed by some agencies today but usually the public has to lobby for the iterative planning method to be used. It is a good first statement for a group to make and is a good way to introduce decisionmakers and elected officials to your cause.

Fundraisers

Inevitably, you will need to raise money for your cause. There are many ways to do this--let your imagination run wild. Good models for how to raise money can be found in nonprofit organizations, firehouses, churches, and service organizations. Just remember that the first thing you should always do is to simply ask for a donation. By preparing a to the point but inspiring letter asking for money for a specific purpose, you can quickly raise a lot of money without much capital or time on your part.

Fundraising events are great for rallying people and, with time and energy, can raise considerable funds. But there is often an initial capital investment and/or overhead costs that must be considered when you plan such an event. Sometimes professional help is needed to pull off an event successfully. When you need money, nothing is worse than putting your heart and soul into an event that doesn't make money, even if you have a great time or get some press coverage.

Sample: Fundraising Letter--Appendix
Fundraising Event--Appendix

Private organization; nonprofit corporation

Some members of your group may want to consider registering as a nonprofit organization. While you can apply and register for nonprofit status using self help guides, if you can get a lawyer to set this up for you pro-bono, it will most likely be less painful and with greater assurance. It is important to realize that becoming a nonprofit or incorporating with the government will require administrative oversight and accounting. Paperwork and filing of forms in a timely way is critical. With different statuses come various restrictions on political activities and/or legislative lobbying.

Another option is to become an affiliate of an existing nonprofit organization, which will require less paperwork and organization. You will want to make sure that your policies and philosophies are well coordinated with the group with which you are affiliating. You will need to work out a system for how funds and mailing lists and membership are handled. If you do have nonprofit status, then in many cases you can attract donations more easily because the donations can be tax-deductible to the donor. Most foundations and some government grant awarding agencies require the recipients have nonprofit status.

Or you may want to remain a private organization or a loosely organized group without official government registered status. This is fine and may be the best choice for a short-lived group, a group that wants to be active politically, or if you want to maintain a low profile as a group.

Foundations/Grant support

There are many foundations, corporations, and groups that make grants to groups. Usually you have to have nonprofit status but not always. There are publications to guide you in identifying foundations and applying for funds. The Internet is rich with contacts. The key is to find out what the foundation funds to see if you fit into their mission. Grant applications are usually submitted on a pre-determined schedule and usually require an extensive application and a budget request. The rewards can be well worth the effort invested. Make sure you are comfortable with who you are getting the funding from. For instance, does a certain grant-giving

corporation fit in with your philosophical position? When you get a grant, remember, you are promising to deliver and you will need to file a report of what you do and how you did it, so good record keeping and bookkeeping is essential.

Expert pools, Attorneys and Law Clinics

There are many resources available for expert help. Usually these expert pools, law clinics, or advisors are busy and have many more requests for help than they can really attend to fully. However, don't let this deter you from asking. There is nothing to lose by asking although it will take some time to prepare information for the experts. Put together a concise summary of the issues involved and present it to the law clinic or expert group for consideration. Some watershed organizations provide an engineer or scientist to look over engineering or environmental issues. Some law clinics affiliated with universities will take on a case that fits the profile of the issues they are litigating. Some environmental attorneys or technical experts will take on a certain percentage of "pro bono" cases or take on cases on a sliding scale pay-as-you-go basis. On the whole, it is wise to invest in professional help when you need it, especially if it looks like you may end up in court or if want to challenge a permit. Volunteer time is essential for most of the "grunt work" and for the important organization, administrative, bookkeeping, fundraising, publicity and other tasks, but sometimes a professional is needed and is your best investment.

Public Relations

The importance of organized public outreach to the media cannot be overstressed. Making a clear and informed message to the public requires clear and straightforward press statements. It is helpful to pull together a list of press contacts to which you want to reach out every time you have a story to share. When releasing information or news to the media, there should be a printed statement that is emailed, faxed or mailed to all the newspapers and other media outlets (such as radio, television) with one or two people who have their phone numbers listed on the release as the press contacts. Try to keep your statements factual and concise. Your organization's position and opinions should be given as a quote from an individual representing your group. When writing your quotes and press releases, realize that it is one or two sentences that are catchy or clever that may end up being quoted in a news article.

Always remember that the press' job is to research the facts and get different points of view, not to speak for you. Having only a part of what you say quoted in a story or having your statement taken out of context can easily burn you. So, think carefully before speaking and try to follow your written statement. Also, research everything you say thoroughly and try to help the reporter understand the issues. When in doubt, don't guess on a fact, and instead suggest where the reporter can find the answer. When you are sure of an answer, be strong and straightforward with your statement. In this way, you will more likely get quoted correctly and your message on the issue will come across.

When working live on the radio or television, try to give yourself some calm preparation time and try to speak in short sentences that convey a lot in a few words. You usually only get a small quip or two on the air. If you are in a televised debate or on a talk show, just remember that you

are expressing your groups' viewpoint and you are speaking for a cause. By not focusing on your self-importance, you are less likely to get nervous.

Sample: Press Release--Appendix

The Law

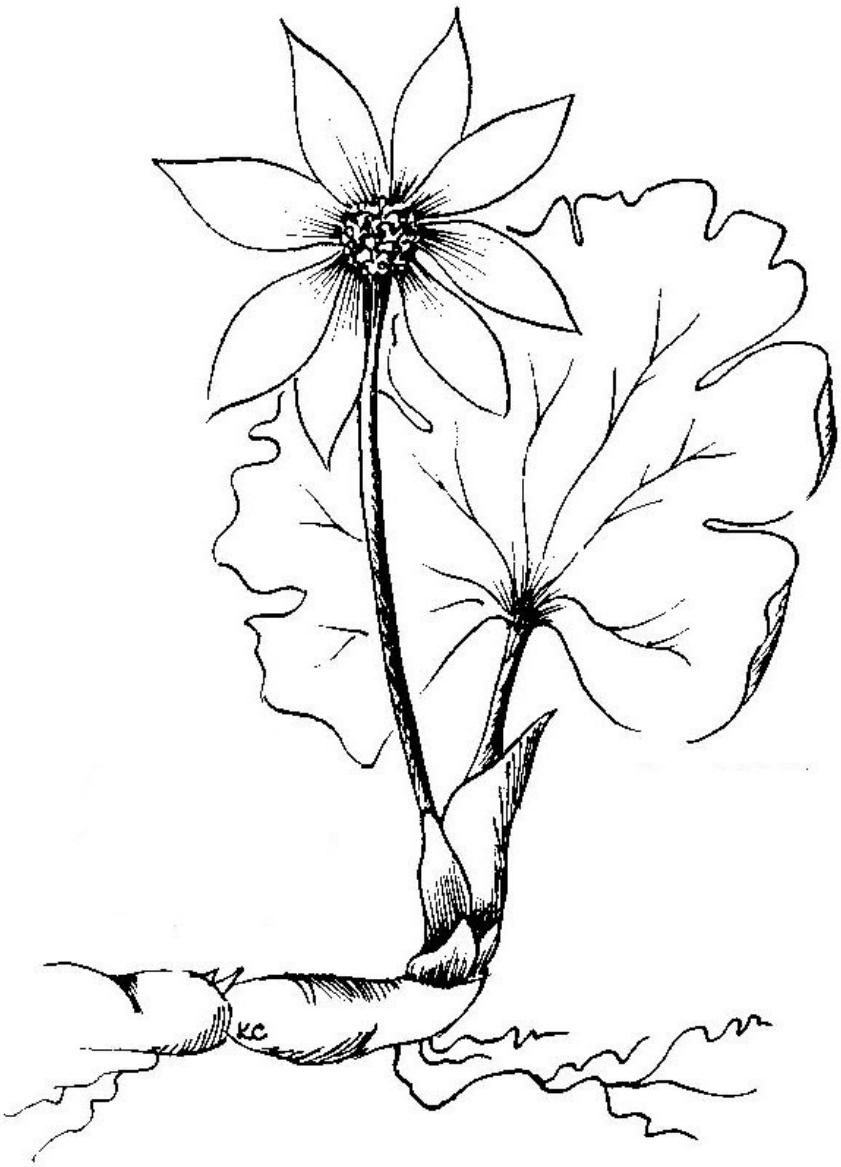
Construction of dams, detention basins, levees and the like require a variety of state and federal permits, reviews and approvals. Depending on the project, its location, project funding and project sponsors, different statutory and regulatory requirements will apply. It is important that you get a strong handle on the legal requirements that the project will have to fulfill, including permit requirements, environmental reviews, alternative analyses, and economic reviews.

The best place to begin in determining which laws apply is to look at the project file – the project file should give you a strong handle on the regulatory requirements the project faces. But, don't stop there. You will also want to call each of the federal and state environmental agencies that may have to review and/or sign off on the project including: Environmental Protection Agency, Army Corps of Engineers, Federal Emergency Management Agency, US Fish & Wildlife Service, state environmental protection agency, state fish and wildlife agency, and the state and federal historic preservation offices. Some of these agencies may have to formally sign off on, or permit, the project, others may be required to simply give advice and/or input. But, it is important to talk with representatives from each of these agencies in order to have a full and well-rounded picture of the laws that will apply. During these discussions be sure to ask about the Clean Water Act, the National Environmental Policy Act, the Clean Air Act (air pollution from construction may invoke Clean Air Act requirements), Endangered Species Act, and FEMA regulations,. Also, be sure to ask about applicable state laws.

Essentially, you want to identify and research each legal requirement the project will have to comply with. Environmentally you want to be sure to review laws and regulations focused on water quality, stream encroachment, wetlands protection, dam construction, floodplain development, species protection (animal and plant, specifically endangered and threatened species), sediment, flood control and public safety. Many of these laws will require the project sponsor to conduct alternatives analyses, cost benefit analyses, as well as identifying and articulating the environmental impacts. Many of these regulations will also articulate the minimum level of public participation the public is entitled to with regards to the proposal.

Once you have identified the statutes and regulations that apply, it is important to research them and to get a strong handle on what they require, their goals, and when they can be approved and when they can be denied. Your arguments against the proposal and for other alternatives should include discussion of the applicable laws and their requirements. You will also want to be sure that the public participation aspects of each law are being fulfilled to ensure you have every opportunity to state your position. A strong understanding of the law should play a critical role in all of your advocacy on the issue.

Sanguinaria canadensis; bloodroot



Kate Chichon

Chapter 4

The Anatomy of a Struggle:

The Demise of the Dark Hollow Dam

Chapter 4: The Anatomy of a Struggle:
The Demise of the Dark Hollow Dam

The flood of record hit the Neshaminy Creek in 1955 resulting from record rainfall and record high tides in the Delaware River. In 1966, the federal Natural Resources Conservation Service (then known as the Soil Conservation Service) put together a Plan with Bucks County to construct 10 impoundments in the basin in Bucks and Montgomery Counties for flood control, recreation, and water supply. Eight of these ten dams were built over the next decade and half. One dam in Montgomery County was eventually cancelled and the largest of the dams, Dark Hollow Dam planned for the mainstem of the Neshaminy Creek, was scrutinized carefully in the 1980's. After a hard look the agency charged with building the project, the Neshaminy Water Resources Authority (NWRA) and the County Commissioners, supported by the community, determined that the economic costs and environmental costs of the project didn't justify going forward. Stormwater management, floodplain protection, floodproofing and structure buyouts were offered by the NWRA as more effective alternatives to reduce flood damages in the Lower Neshaminy Creek.

At that time, the County's experts said that the most frequent storms would not be contained at all by the dam. These experts also determined that during the worst storms the dam would reduce floodwaters by only about 1.3 feet in flood-prone communities and even less in heavily populated areas further downstream. The experts endorsed non-structural solutions and a Stormwater Management Plan for the Neshaminy Watershed was commissioned (and completed by Bucks County in 1992 though never fully implemented).

After the decision to cancel the Dark Hollow Dam, the land that had been secured by the NWRA to accommodate the dam and its inundation pool (650+ acres) was made part of the Bucks County Park system, becoming a natural treasure known as Dark Hollow Park. Hikers, canoeists, birdwatchers, and fishing enthusiasts (the creek is trout-stocked by the PA Fish and Boat Commission) are among those who enjoy this linear park along the creek.

In 1996, heavy rainfall, as much as nine inches in four hours, caused the worst flooding for many years in the lower Neshaminy Creek and other area watersheds. NRCS contacted Bucks County telling them potential funding for construction of the Dark Hollow Dam was about to expire.

That led to better than 4 years of study, debate, analysis, public controversy and, finally, a better alternative than the proposed dam. The Dark Hollow Dam story is instructive in its predictable progression as a federal project, its surprising twists and turns, and the successful resolution of the problem it set out to solve. Above all, it’s a story of how public involvement, iterative planning, and the tough lessons of Mother Nature combined to direct an outcome of which no one would have dreamt when the project was first planned decades before.

A. Background

The Dark Hollow Dam was part of a larger flood control project similar to many built across the nation by the US Department of Agriculture's (USDA) Soil Conservation Service (SCS), now named the Natural Resources Conservation Service (NRCS). An SCS project entitled the Neshaminy Watershed Work Plan included a series of 10 dams on tributaries and the main stem of the Neshaminy Creek meant to provide flood control, recreation, and water supply resources for the region. Eight of the originally proposed ten dams were built in the Neshaminy Watershed based on a 1976 Environmental Impact Statement (EIS). The Dark Hollow Dam, the largest and the only one located on the mainstem, was the most controversial because of its size and potential impacts. Even back in the late 1970's, before more comprehensive environmental laws were adopted, the permanent lake that was originally proposed was found unacceptable by the Pennsylvania Fish Commission.

Eventually, plans for a lake were replaced by a "dry dam" concept, with the dam holding water temporarily during and after a storm. But critical dam-building momentum was lost by the time the project was re-thought, the local agency actually charged with building the federally funded dam (Neshaminy Water Resources Authority, NWRA) was sidetracked with other pressing projects, in themselves very controversial, and the Dark Hollow Dam got put on a back burner. The result was no action until the SCS approached the NWRA to complete the Watershed Work Plan in 1986. The NWRA hired experts to study the dam and a report was issued by Cahill Associates that the dam was not cost-beneficial and had numerous environmental costs.

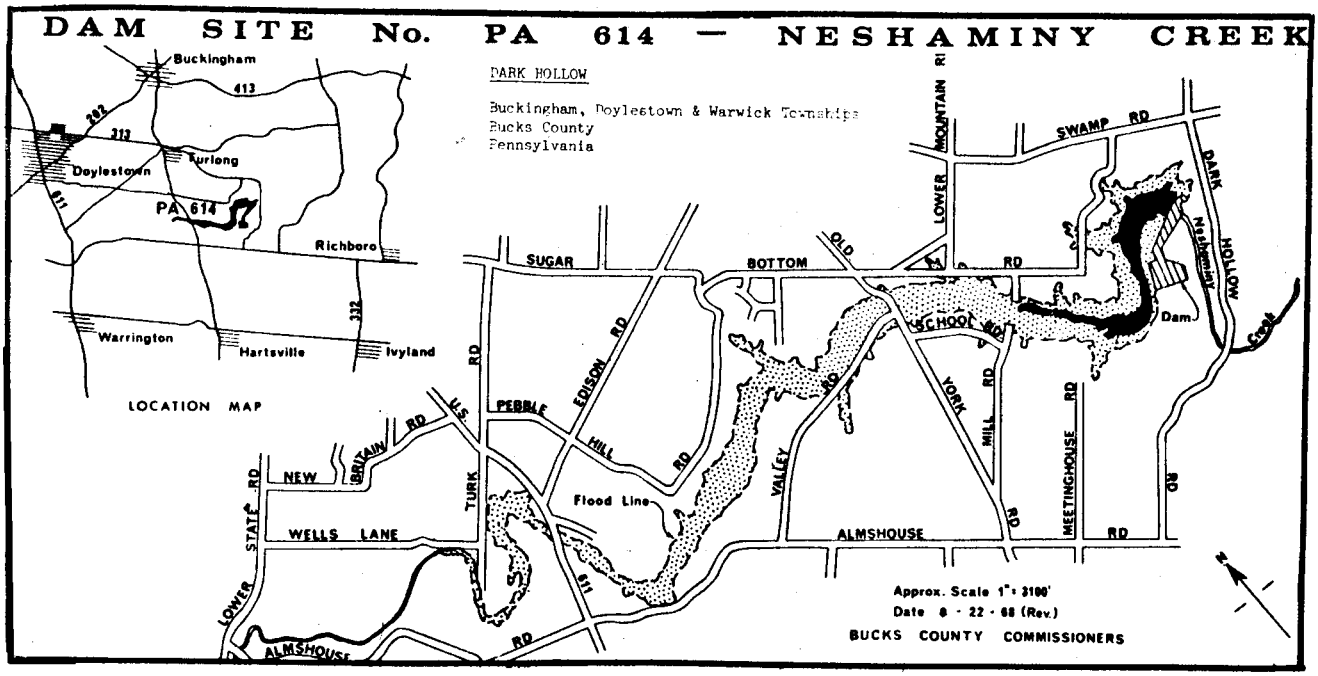
The NWRA cancelled the dam project and asked the Bucks County Commissioners to amend the Watershed Work Plan, eliminating the proposed Dark Hollow Dam. Unfortunately, one of the co-sponsors of the project, the Bucks Conservation District (BCD), did not agree to amending the Plan, so the County never officially "decommissioned" the Dark Hollow Dam. In turn, without full agreement of all the local sponsors, the SCS, NWRA, BCD, and the BC Commissioners, the dam could not be built. Management of the former dam site, comprising over 700 acres, was transferred to the Bucks County Parks department and was named Dark Hollow Park, serving as a nature preserve and passive park area. A canoe launch site on the creek and 2 parking areas were installed. The land originally slated for the dam's construction and inundation pool had been purchased with NWRA bonds for multi-use purposes including recreation, so the transfer was deemed legal. In the following years, the park became a favorite for birding, hiking, canoeing and fishing.

The NWRA prepared a Stormwater Management Plan for the Neshaminy Watershed under Pennsylvania's Act 167 as an alternative to constructing the dam to reduce flooding. The Plan involved all the municipalities in the watershed and the Bucks County Planning Commission, and endorsed the revamping of municipal regulations to address stormwater's water quantity (volume) and water quality impacts, with a goal of reducing flood flows in the creek.

Due to the County's takeover of the NWRA in 1989 (leaving the completion of the Act 167 plan in the hands of already over-burdened county staff), the Act 167 Stormwater Plan took several years to complete and was never fully implemented. With the development boom in central Bucks County, stormwater runoff continued to increase in volume and velocity without adequate

nonpoint source pollution controls and the quality of the Neshaminy Creek declined as flooding in streamside communities increased. More flood damages were inevitable since municipalities were continuing to build in the 100-year floodplain and stormwater management techniques were not addressing the volume of runoff that was rushing off the newly developed landscape.

Flooding became worse with these suburban-and-urbanizing impacts. The floods of 1996, while actually not as bad along the Neshaminy as in other parts of the County, were seen as a wake-up call for better flood and stormwater management. And they spurred the SCS, now the Natural Resource Conservation Service (NRCS), to approach the County again asking if they wanted to build the Dark Hollow Dam.



Map of proposed Dark Hollow Dam on Neshaminy Creek, Bucks County, PA

B. Resurrection

The Dark Hollow Dam proposal was renewed in the wake of the floods in 1996. The cry for something to be done by people who had experienced the horror and loss of flooding needed to be expressed and when the NRCS proposed to revive the Dark Hollow Dam project, it became a rallying point for those who were in need of relief.

It didn't matter that the one death that occurred in that flood was near the Delaware River on a creek that was not in the Neshaminy Watershed. It didn't matter that the worst of the flood

damages were in a southern portion of Bucks County that is not in the Neshaminy Watershed. A few proponents touted the Dam as a panacea, and the concept stuck.

When a public meeting was held in Southern Bucks County to discuss the flooding, everyone came out. It didn't matter that most of those present were from outside of the Neshaminy Watershed and so would not receive any flood-retarding benefits of a project in the Neshaminy Watershed. And it didn't matter that some of those who spoke reported the runoff from a huge shopping mall that had routed raging floodwaters to their homes, which are not even near a creek, much less in a floodplain.

Even the Bucks Conservation District representative who spoke at the meeting did not make it clear to the flood-shocked folks who were present that the Dark Hollow Dam was not pertinent to them because it was outside of their watershed, and that they needed to develop some other approach for their stormwater runoff and flooding problems. The stage was set and the Dark Hollow Dam quickly emerged in the flood aftermath as the silver bullet needed to stop the region's flooding. Not knowing any differently, many residents from the flooded areas became dam proponents and called on public officials to build it.

But Delaware Riverkeeper Network (Riverkeeper) and folks who cared about Dark Hollow and effective flood solutions were there, too. And people who had worked to defeat the Dark Hollow Dam years before had not disappeared. The history and the inherent problems of the dam approach were well known regionally and were part of public conscience. So the resurrection of the Dark Hollow Dam was also a resurrection of a conservation-minded and economically conservative constituency who had already seen the Dark Hollow Dam laid to rest and Dark Hollow Park dedicated in the late 1980's and were not about to sit idly by.

The NRCS wanted to quickly move ahead with getting approval from the local sponsors to build the Dam by updating flood damage data. Riverkeeper researched the NRCS regulations and (federal) Public Law 566 project approval procedures and found that an updated study of alternatives to the Dam was also required and we pressed this issue. The NRCS then announced that it would conduct an updated study of flood damages and alternative solutions to reduce the damages in order to get the project going again.

In a move clearly designed to deflect the energy of the community away from the Bucks County Commissioners, the Commissioners formed a Steering Committee in September 1997 that would oversee the new flood damage reduction study and insisted that the Dark Hollow Dam be one of the options considered.

The Steering Committee was comprised of four citizens and representatives from the BCD, the Commissioners and the NRCS. The findings and decisions of the Steering Committee had no binding or legal authority. While they were originally portrayed as being charged with recommending solutions to the decision makers, they quickly became merely a conduit for passing information from the public to the NRCS staff members conducting the regulatory required studies, data and documents.

C. What We Did and How We Did It

Identifying the Issues and the Opportunities for Input

Recognizing that the Dam project had a head of steam since it was still officially "on the books" of the NRCS, who would pay most of the cost to construct it and recognizing that the dam could look like a convenient quick answer to undiscerning decision makers (namely, elected officials), we had to insert ourselves into the process quickly. We made up our own plan of action and got busy. We pushed hard to make the Scope of Work for the study as inclusive as possible by contacting the director of NRCS in Pennsylvania, our Congressman, County Commissioners, and other decision makers. We requested to be put on the Study's Steering Committee. We attended every meeting that addressed the dam or flooding. We spoke up at every meeting asking questions and pointing out misinformation when it was offered We researched the facts and dug out old files and plans to study the issue. We made up a Fact Sheet that reviewed the history of the Dam project and raised the main issues involved. We spoke to the press and had press statements to hand out at meetings.

Getting It Together

We were not appointed to the Steering Committee but one known Dam opponent was appointed and one known Dam proponent was also appointed, along with other community representatives. The press started calling us for comment when the proposed Dam was in the news. People who questioned the idea of the dam started asking us about it. We began our citizen organizing efforts. We held living room meetings in the homes of people who were concerned about the proposed dam's negative impacts, and in the homes of residents who lived near the proposed dam site. These meetings were open to anyone interested and a core group of interested and committed folks quickly emerged. Meetings were announced with flyers handed out to local residents, through mailings to members of the Delaware Riverkeeper Network organization, and given to individuals who had contacted our

Logo depicting Neshaminy Creek's Dark Hollow created by Carol Stoddard specially for our new citizens group, the Neshaminy Preservation Coalition

organization in response to newspaper articles and letters to the editor we had written. After a while, when the core group emerged, invitations for strategy sessions were limited to only those we knew to be committed and interested.

A local organization of these residents was formed --the Neshaminy Preservation Coalition-- dedicated to reducing flood damage and stormwater in the Neshaminy Watershed and to protect Dark Hollow Park. We worked closely with this local group, coordinating all efforts together. The group allowed easy access for people who were interested but wanted a local way to get connected to the action.

We kept up with the Steering Committee. We contacted the agencies involved and asked to be included in all meetings and discussions and to be sent copies of all documents regarding the issue. We attended meetings where the scope of the study was set and the agency input was solicited. Sometimes we had to find out about these meetings through our developing "intelligence network", sometimes we were barred from attending and had to push our way in. We were persistent and not easily embarrassed when it came to being assertive. We demanded copies of minutes and attendance lists kept at all meetings.

We insisted on an iterative planning process, one that would allow for public input at every step, allowing that input to shape the study process and influence the subtle as well as obvious decision making. In response to our repeated calls for more public input and iterative planning, the County pledged to conduct an open process, hired a public information officer who would keep people informed, and the record for the study was opened for public comment and information for the entire period of study, allowing for a stream of comment to the Steering Committee, who then passed these on to either the Technical Committee, headed by the NRCS, or to other entities (or to nowhere but the record).

Ultimately we were not pleased with the process that was set up but we continued to call for more public input and to take advantage of the few expanded opportunities for input that had been created. One problem was that, early on, the public information officer seemed biased, even writing a letter to the editor challenging the positions put forth by Riverkeeper and other dam opponents. We took advantage of this inappropriate behavior to highlight the shortcomings of the public process that was being set up, and to point to the bias we believed was already held by some of the key decisionmakers on this issue (including NRCS representatives, the Bucks Conservation District, and the County Commissioner representative to the steering committee.)

We filed information requests with the entities involved. We studied and made up more fact sheets on specific aspects of the proposed dam and the alternatives to the dam. We studied the laws involved: NEPA, the Clean Water Act, the Watershed Manual which governs the NRCS, the Endangered Species Act, other environmental regulations, including Pennsylvania's State laws. We filed exhaustive comment/information early and often and built up a large cc list of all agencies and elected officials who would have a role to play in the final decision reached. We urged others to file comment as well through a public input campaign we carried out through our newsletter created specifically for this issue, our website, attendance at local fairs, and other outreach efforts.

Getting the Word Out, Building a Movement

We began our efforts with carefully crafting our message, the message we wanted to share with the public, the message we wanted our supporters to buy into, and the message we thought would win the day. Our message had a few aspects including:

- ✓A combination of stormwater infiltration, best management practices, voluntary buyouts and floodplain restoration would provide greater protection to flood victims.
- ✓The proposed dam was unlikely to receive the permits necessary for construction and so wasn't a real option.
- ✓The dam would not provide the level of protection needed by flood victims – with the dam residents would continue to experience dangerous and damaging levels of flooding, and there would be new flood problems where previously there was none.

These messages were repeated consistently throughout the entire debate.

In the meantime, the dam proponents were building support for the dam project, ignoring alternatives. We tried to spread our information in a wider circle. We worked to get information out and continued to build our constituency. We held a series of public information meetings around the affected watershed where we solicited ideas, gave out information, introduced alternative solutions to flooding such as stormwater management, and circulated sign-in sheets to get more interested people on our contact list, which was growing with our outreach efforts. We started a letter campaign where people were asked to sign a prepared letter against the proposed dam and for alternatives. We made up bumper stickers and got them out on cars.

Bumper Sticker

These were given to all who were interested in the issue.

For those interested in a softer touch, on the next page is a car window sticker we created focused on the preservation of Dark Hollow Park which would also be saved by our efforts.

Car window sticker, also can be worn on clothing

We kept up monthly and sometimes more frequent strategy meetings and brainstorming sessions of our core group and our strategy was always evolving with fresh input from very creative thinkers. We invited local municipal leaders who we knew were like-minded on the issue into the strategy sessions.

We invited members of the group that supported the proposed dam to meet with us and while we did have a dialog and try to work to identify common ground, our effort to reach out to them was ultimately unsuccessful. Our main message had been that if both sides called for stormwater infiltration and best management practices, then regardless of the outcome, there would be a good chance that these approaches would be part of the solution--that this would help us all, no matter what the final outcome on the decision. Despite the fact that it would help their community with or without the dam, the dam proponents refused to join with us on these issues, perhaps because they believed that joining our voice on this solution weakened their case for the dam.

We kept a line of communication open with the press and submitted opinion letters to the local papers. We met with the editorial boards of the area newspapers to share background information, our perspectives and opinions.

We participated as guest speakers in meetings held by other groups throughout the watershed discussing flooding problems and the proposed Dark Hollow Dam. Our goal was to bring the issue to the forefront regionally.

We drew public attention to the special features of Dark Hollow Park such as the mature trees, native vegetation, intact riparian buffers, its function as a wildlife sanctuary and the beauty of the creek itself. Nature walks, canoe trips, tree and plant identification excursions, all invited people to experience the Park as a unique county treasure which would be lost by the building of the proposed Dam.

Nature Walk on Neshaminy Creek led by naturalist David Benner

We attended community events and festivals, paying for the privilege of a public information booth from which we could spread our message, hand out our materials, and secure signatures against the Dam.

We got people out to any public meeting that was held about the issue. The diverse array of perspective, knowledge, and understanding of the issues, demonstrated by the questions asked and the testimony given by the public was impressive and it showed that the public process and our efforts to get the word out was working. We had prepared questions for folks who wanted to speak and make their position known for the record, but needed some assistance--at the same time, this helped insure that all substantive issues got on the record.

We called for a series of public meetings throughout the watershed to give the input and information needed to the Steering Committee and NRCS's Technical Team. Our recommendation for a series of meetings in each of the impacted communities was rejected and replaced with a series of two large public meetings, one upstream and one downstream, to gather public input on the flooding issue.

The informational public meetings (November, 1997) were thrown together by NRCS too quickly (they had put the study on a “fast track”) and they didn’t have much information to

present to the public, which frustrated many of those in attendance at the meeting in the Central Bucks area, who were filled with questions and concerns.

The meeting in the southern end of the County was attended by a large number of people who were still wedded to the idea that the dam was the answer to their prayers and not many questions were asked. The meeting consisted mostly of loud and enthusiastic cheers for the Dark Hollow Dam.

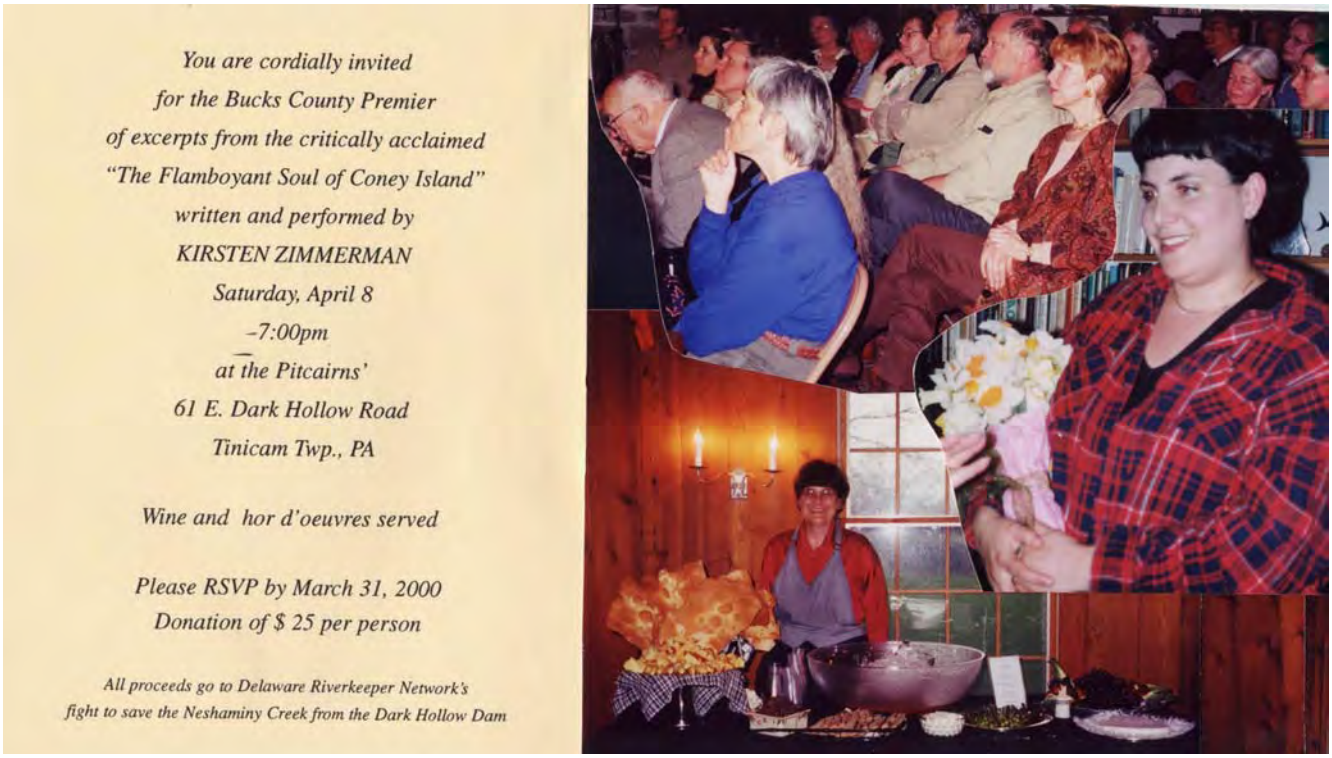
Unfortunately, at these public meetings, the local press picked up on the "Upper Bucks vs. Lower Bucks" angle and played that sensational tune for all it was worth, oversimplifying the issue as the "haves" upstream who want their pristine park against the "have-nots" in the "lower end" who don't want to drown in the next storm. The tone was indelibly set for the duration of (local) press reporting on the issue: "Dam or No Dam" rather than "What is the best way to reduce flood damages in the Neshaminy Watershed?".

This would be a long-standing and frustrating hurdle for us to overcome. The major daily paper for southern Bucks County was allied with a "build the Dam" mentality -– and their bias showed up not only in their editorials but in their reporting as well. And since it is a fact that you can't control what goes on in the public arena, sometimes people would make statements like "Some of those houses that get flooded are just shacks that were built as summer homes and never meant to be lived in year round". This is grist for sensational headlines such as "They are just shack-dwellers down there!".

We fought back by sticking to the real issues at hand, and trying to avoid arguments with the press and dam proponents. We also showed the local press that there were more substantial issues to consider by reaching out to other regional and more widely-read news establishments for more objective reporting and for more progressive opinion pieces.

We saw we had to get more folks to critically examine all that was involved in the issue and to understand that there are alternative ways to reduce flood damages. We had to build our constituency and make sure the decision makers recognized that those who were against the dam proposal were an equal if not greater force to consider. And we needed to reach those who knew nothing about the issue at all and inform them of the facts and the controversy.

We also had to raise money to finance our efforts. Being a non-profit, membership-supported organization, raising money is a constant challenge. Through membership, grants, fundraisers, appeals for funds, and through hundreds of hours of volunteer time on the part of concerned citizens and staff, we managed to cover our costs. It was a difficult task made more difficult because dam proponents were starting to attack our organization and our funding sources.



Stellar talent, incomparable venue, scrumptious refreshments—all donated to make a successful and entertaining fundraiser

Understanding the Process and Figuring Out How to Make an Impact

After we had successfully forced/cajoled NRCS into looking at other alternatives, a formal process for this was established. The NRCS laid out the procedure as follows: Address flooding in the Lower Neshaminy by gathering technical data and public input, then form a list of options as solutions. The options would then be narrowed down to a limited number of alternatives, which would receive further study. The Steering Committee, with input from the technical team formed of NRCS experts in various fields (i.e. archaeology, hydrology, etc.) would then recommend one of the alternatives as the best solution to the Bucks County Commissioners, who would vote on the choice. The Bucks Conservation District (BCD), as a local sponsor, and the NRCS, as the federal sponsor, both had to approve the final choice independently.

The NRCS wanted to move very quickly through this process with a minimum of study. For instance, they thought in the first several months of the study that they could simply update the cost/benefit analysis and recycle the original Environmental Impact Statement (EIS) for the Dark Hollow Dam from 1976. Our research told us that the National Environmental Policy Act (NEPA) would not allow such an outdated EIS to be used but nonetheless we had to prove our case through written argument and discussion with appropriate officials.

We identified the components of an EIS that were most significant for this project and delved into the details of these issues, gathered data from similar projects, and researched all the

pertinent regulations. Our insistence on detailed and updated data germinated and within about 6 months NRCS realized that they couldn't stick to their original schedule (approximately a one year study) and admitted that a new EIS would be required if the Dark Hollow Dam alternative was chosen.

Research and More Research

We redoubled our efforts to gather the data needed to develop alternatives and prove our point—that the proposed dam, in all studies to date, was proven not to reduce flood damages as much as stormwater management paired with the buyout of structures located in the floodplain would. We needed more information, more data. We conducted a series of file reviews at NRCS, BCD, and BCPC.

Once we started poking deeper into NRCS data in our quest for information, our access to documents under NRCS' control was closed. When we were denied access to records by the NRCS, we entered a protracted fight for information under the Freedom of Information Act. Support from a local law clinic was needed to pursue our rights and to secure ultimate release of the requested documents.

We began with a series of simple letter requests pursuant to the Freedom of Information Act, asking for, and asking again for, the requested documents. Eventually NRCS asserted that we were not entitled to the documents under the terms of the Freedom of Information Act, but failed, as required, to articulate what documents we were being denied or why, specifically, they were being denied. We requested information from NRCS regarding their procedure for denying our information requests.

At this time we also spoke with an attorney at a local law clinic and sought their assistance. The lawyer, following the appeal procedure, wrote to NRCS challenging the refusal to grant documents. After the appeal process (which was simply comprised of another written request) was concluded without our receiving the document, we filed a 60-day notice with the agency stating our intention to sue under the Freedom of Information Act for the documents.

We also used this opportunity to generate additional press attention on the issue, and to demonstrate how the agency was not responding to citizen concerns about the issue with the level of attention, interest and concern they should. This issue even resonated with the Lower Bucks newspaper that had not given us much positive press to date--they wrote an editorial supporting our request for public documents. Eventually NRCS agreed to release the public documents.

We helped other groups interested in specific issues to research them and submit information to the Steering Committee and to the agencies. For instance, the Native American Alliance of Bucks County had uncovered evidence of a Native American camp and burial site along the Neshaminy Creek in Dark Hollow Park and submitted this information to the State Historic Preservation Office. Evidence of prehistoric findings was also submitted by the farm's landowners to the Steering Committee.

Analyzing the Issues and Developing Alternative Solutions

While the NRCS seemed to be mired in past practices, the climate in which other federal agencies operated was definitely changing. The Clinton Administration was taking big steps in developing new, less structural, more preventive approaches to flooding. The United States Geologic Survey (USGS), the Federal Emergency Management Agency (FEMA), even the Army Corps of Engineers (ACE) were moving away from dam building and the ineffective structural projects that had dominated flood and stormwater control efforts for decades. As storms produced unprecedented damages, as dams and levees failed, and as national flood insurance costs skyrocketed, requiring billions of dollars in federal bailouts, the federal government began to re-think its old policies and solutions.

We researched these new policies and brought what was being done by other federal agencies to the attention of the County, the Steering Committee, and the NRCS – stressing our message that these agencies would not provide needed support to a dam alternative in the form of permits and even funding. Also, we vigorously publicized these policy shifts and pointed out how these changes were impacting the nation (through reference to national news stories, dam removals across the country, scientific reports, etc.) and how they could impact the decision-making process of how to reduce flood damages in the Neshaminy Watershed. This wave of change at the federal level was very helpful in the court of public opinion.

We also publicized nationally published reports and studies that support non-structural remedies to reduce flood damages. The Clinton Administration continued to build on the "Galloway Report" which began the re-thinking of the economics and safety problems that resulted from allowing re-building in the floodplain under the National Flood Insurance Program (NFIP). The cost of the NFIP and FEMA disaster relief became so great that federal bailouts had become the only way to keep the program afloat. The untenable approach of allowing repeatedly damaged structures to re-build in harm's way gathered momentum with every major storm. The shift in FEMA policy gave indirect support to the non-structural alternatives we were advocating.

Also, the National Wildlife Federation published a comprehensive report that exposed these spiraling costs as well as the repeated disasters and loss of life that result from allowing people to build and live in the floodplain. We worked with the authors to publicize the report and submitted it to the Steering Committee, the agencies involved, and NRCS.

Riverkeeper also took action to put solutions in place immediately in an attempt to avert flooding problems. In researching alternatives we discovered an Army Corps of Engineers (ACE) aquatic ecosystem restoration program that was going to Congress for funding in nominated watersheds. We nominated the Neshaminy Creek and as a result Southeastern Pennsylvania was listed as a priority watershed for funding from this ACE project. The County Administration, the NRCS, Steering Committee and other agencies were notified of this successful nomination.

Riverkeeper's nomination would make federal funds available for removing structures in the floodplain and for restoration and other non-structural projects in the floodplain and on streambanks for the improvement of aquatic life.

Native American Blessing of the Neshaminy Creek, a Community Event

Left: **Ed Fell, President, Native American Alliance of Bucks County**

The Movement Grows

By 1999, the DHD fight was in full swing. We used every opportunity we could to discuss the issues involved, trying to focus public attention on how to solve the flooding problems and reduce flood damages through more effective solutions. We kept writing public opinion pieces for the newspapers and urged others to do the same. We even made news ourselves, hosting a blessing of the Neshaminy Creek by the local Native American tribal organization. The event, attended by over 100 people in a snowstorm, was timed to coincide with, and be part of, the International Day of Action Against Dams and for Rivers and Life (March 14, 1999).

The event drew attention to the positive qualities of the Creek and Dark Hollow Park, where the event was held. It gave the local Native American organization, which was involved in the fight in order to protect ancestral lands, an opportunity to teach ancient ceremonial practices to the public. Perhaps most important, the blessing pulled together our group and gave us strength and appreciation of what we were fighting for — a real morale and energy booster. And it gave special protection to the Neshaminy, named by the Lenape people long ago as "place where we drink twice".

Trout fishing on the Neshaminy Creek, Dark Hollow Park

We made more fact sheets and action alerts covering various aspects of the issues and calling for continued public input. We canvassed the trout anglers on opening day of trout season on the creek (always well attended by many people) and thereafter. We asked these folks to sign letters, come out to meetings get involved. The proposed location of DHD and its inundation pool was in a popular trout-stocked area and a State agency had concerns that construction of the dam may jeopardize stocking at the location.

We contacted organizations with experience fighting federal projects for information and ideas. We networked with other groups for support. We reached out to the municipalities where the dam would be built to make sure they were well informed and knowledgeable about local impacts and costs. Both municipalities went on the record in opposition to the Dam and in favor of non-structural alternatives.

We never assumed that we knew it all. We continually researched and a cadre of "detectives" called us or emailed information and new ideas regularly. Professionals volunteered time and expertise to help us understand information and plot strategy. But we also invested in independent experts to review key documents, data, studies and findings from the NRCS. We filed new comments with the Steering Committee whenever we learned something new,

discovered data, or had a question that needed answering. The open record that the Steering Committee had set was very helpful as a tool to get new people involved since it was never too late to say your piece or ask a question. *Neshaminy News*, an issue-specific newsletter published regularly, newspaper coverage and broadcast news kept people informed and involved. The newsletter, put out in cooperation with the active Neshaminy Preservation Coalition, kept interested folks well connected to the action.

We stayed on top of the NRCS process and kept our elected officials and various agency staff informed and aware of us. We made special effort to keep in touch with the County Commissioners, who would ultimately cast the deciding vote on whether or not to build the dam and how to address flooding. We shared information with them and made sure they knew we represented a sizable portion of their constituency. We never saw the Commissioners (even those vocally against our position) as enemies but as potential allies who were open-minded. We also met on several occasions with our Congressional representative and State and local representatives to discuss the issues and gather information.

D. Nature Speaks

Flooding of the Neshaminy Creek during Hurricane Floyd

The Turning Point

But all the strategizing and community organizing in the world couldn't have yielded what nature dealt to the watershed in September 1999: Hurricane Floyd. Of all the events that impacted indelibly the course of this story, this awesome storm and the horrendous damage it brought to the Neshaminy and regional communities sealed the fate of the Dark Hollow Dam by illustrating the truth of what we had been trying to prove – the best way to protect flood victims is to move them out of harm's way.

Millions of dollars in flood damages resulted from Hurricane Floyd, which destroyed buildings, closed bridges and highways and generally wreaked havoc in the Neshaminy Watershed, as well as the entire region. This federally declared disaster brought millions of dollars to the watershed for buyouts of substantially destroyed homes. Those who signed up to sell their homes received fair market value and credit for several years of flood insurance premiums from the Hazard Mitigation Program, the State, the County, and other sources. Over 65 homes were bought and demolished in the first wave of funding.

Riverkeeper worked to further research the various sources of funding for the buyouts and quickly shared that information with county officials and other decision makers. We petitioned the State, FEMA, PEMA, the ACE, and elected officials to secure as much funding as possible so the maximum number of homes could be bought. We urged the decisionmakers to realize that they now had a politically defensible out – they could work hard for available emergency funding to move out the very same flood victims that were the target for the dam project. We carried on our efforts quietly, behind the scenes, in an effort not to politicize the buy-out program. From our viewpoint, elected officials, either on their own or with our assistance, recognized that by pursuing a strategy of buyouts, they could obviate the need for the dam and make their choice without having to cast a vote for or against the dam during this critical time. The County vigorously pursued funding, worked to cut through bureaucratic red tape, and put together a far-reaching buy-out program. The Congressional representative and other elected officials also worked to make the buy-out program a popular success.

We attended the very next County Commissioners meeting with a busload of people to support the buy-out program. And we spurred a letter writing campaign to support the buy-out strategy.

Maximizing Opportunity for a Win-Win

NRCS reassessed the scenarios they were studying as alternative solutions in their ongoing flood study – the buy-outs taking place were dramatically altering the cost-benefit picture of the dam by sharply reducing the level of benefits that could be claimed from a dam. In December 1999 they issued a preliminary report of their findings to the Steering Committee, which showed that a nonstructural solution (voluntary buy-outs and floodproofing) would benefit the most homeowners, be most cost effective, and have the least environmental impact.

We led an effort to encourage people to comment on the preliminary report while the NRCS technical team and the County finished the final report, narrowing the alternatives. We commented on the technical as well as policy issues in the report and encouraged others to do the same. While the nonstructural alternative put forth did not include the stormwater infiltration and best management practices we felt were critical, we recognized that endorsing the non-

structural option the NRCS had put forth was our best strategy at this point. Public reaction to the NRCS report findings was strong and fueled the controversy.

Spread the Word!

E. The Win-Win Outcome

After several tumultuous months the final report "Findings to Date for a Supplement to the Neshaminy Creek Watershed Plan", USDA, June 2000, was released. Riverkeeper commented publicly and put out a Fact Sheet summarizing the report's findings. The report concluded that a nonstructural approach to reducing flood damages in the Lower Neshaminy Creek, including buyouts, elevation and floodproofing, provides the greatest level of protection to the most people in the most cost-efficient way and could be accomplished in the shortest period of time. The nonstructural approach was designated in the report as the National Economic Development Plan, making it the priority option eligible for federal funding under PL-566. Riverkeeper issued a special fact sheet outlining the findings of the report and also issued press statements and issued letters to the editor. The findings of this report became the basics of our new *mantra* "The nonstructural alternative offers greater protection to a greater number of flood victims in a shorter period of time at lower cost".

Unfortunately, the Dark Hollow Dam was still listed in the report as an alternative, although it was not eligible for federal funds unless a number of special exceptions were granted by the agencies. In order to make the dam appear more cost-beneficial, the NRCS had paired the dam with the nonstructural approach to try to bootstrap up the dam's negativities with the overwhelmingly positive features of the nonstructural alternative. The problem for the NRCS was that even in this scenario the dam was still a losing proposition in terms of benefits

economically and otherwise, so it still was not named the preferred plan in terms of federal funding support. But, their bootstrapping reaffirmed our concerns that NRCS was working hard to justify the dam alternative and that we needed to remain vigilant and on our toes for other efforts to justify the dam. And, we realized that it was important to our future success to remove any consideration of the dam and we re-doubled efforts to ensure it was not a choice.
The division between those still clinging to the dam as a panacea and those who accepted and supported the nonstructural approach seemed irreparable at this point. Many of the early supporters of the dam alternative had suffered through Hurricane Floyd, accepted buyouts, and moved on. Others were in favor of floodproofing or elevating their homes above the floodplain since it became clear they would be better protected through this remedy than by the proposed upstream dam. But the die-hard dam supporters (their numbers greatly diminished) remained vocal, visible, vigilant, and committed to the dam solution. The public arguments escalated. In response, we revved up public awareness and input.

On July 18 and 19, 2000, NRCS held 2 public hearings on the final report. Riverkeeper made an all-out effort to get people to the hearings. We published and sent out an Alert, we called the newspapers, and we distributed 2500 flyers door-to-door asking people to come out. We hung banners publicizing the hearing and activated our phone and email network. It all worked to produce a tremendous turnout and a wave of newly filed comment letters. This time there were more people at the hearings supporting the nonstructural buyout approach and opposing the dam than there were in support of the Dark Hollow Dam alternative, even though it was coupled with buyouts in a combined alternative choice. In total, 3150 letters of comment were received by the Steering Committee.

In November 2000, a response document was published that responded to public comments. The response document continued to fuel our concerns that NRCS would still like to build the dam if they could find a way to justify it. Riverkeeper wrote a response to that document, to make our position clear on various issues. This was needed since several misconceptions/misrepresentations continued to prevail concerning environmental impacts; the benefits of the approaches studied; costs; the flood reduction effectiveness of an infiltration approach to stormwater management; and other unresolved issues. We kept a push going for input to the steering committee, the County Commissioners and local officials.

Throughout the County Steering Committee's tenure, the member representing the anti-dam pro-nonstructural solution actively researched data and contributed to the information that was considered by the Committee and agencies. This representative stayed intimately involved in the process, never missing any chance for input. Despite his efforts, he was still outnumbered by dam supporters including the one representative appointed for that position, a second that had been won over by the dam supporters, and agency representatives who had to date always been supportive of the dam option.

Even the County Commissioner representative, the one most needed to remain neutral, seemed to want to placate the dam supporters and displayed hostility to the dam opponent. Serving on this type of a Committee is very challenging and can be most difficult when one person seems to be going against the group. Without fortitude and exemplary commitment, many minority opinion committee members drop off in frustration. But by researching facts and digging up hard-to-find

data such as the difficulty and expense of removing electric towers that were in the inundation area of the proposed dam pool, ultimately this member was able to powerfully influence the Steering Committee decision-making process. This member's positive engagement illustrates how it is possible to serve in such a capacity and be successful in opening up other committee members' minds. In this case, it took not only courage and stamina, but also intelligent fact-finding and an ability to persuasively debate.

The NRCS representative was finally forced to take the position and make it clear that the NRCS' designated "preferred alternative", the nonstructural alternative, was the only one likely to ever get funding. In February 2001, the Steering Committee voted 4-2 to recommend the non-structural alternative for reducing flood damages. After a final round of public support, including Riverkeeper rallying people to attend County Commissioner meetings and to send in a last flurry of letters, the Bucks Conservation District Board voted for the nonstructural approach.

And finally, the Bucks County Commissioners endorsed this same position, but added to their decision the need to update the Act 167 Stormwater Management Plan for the Neshaminy Watershed to include stormwater infiltration and best management practices. The Commissioner's final decision demonstrated that while NRCS did not include the stormwater component to their recommended alternative, all of our work on this front had been heard and learned by key officials in the community. The Commissioners also voted to put a conservation easement on Dark Hollow Park so it could never be sold for development.

Riverkeeper offered support and assistance to the County in implementing the alternative and met with the County Administrator who would be carrying out the program.

The final step that sealed the fate of the doomed Dark Hollow Dam proposal was taken when the local sponsors, the Bucks County Commissioners and the Bucks Conservation District voted to officially amend the Neshaminy Watershed Work Plan in 2001. This replaced the defunct dam with the nonstructural approach as detailed in the Findings Report. The first funds have already been committed by the federal government to carry out the new Work Plan.

No one could have predicted the outcome of this long battle and certainly no one could have known all the twists and turns of this story. It is clear that public involvement, open-minded thinking, and intelligent analysis can change outdated policies and can stop a harmful project, replacing it with a better solution. After decades of controversy and unforgiving weather, an environmentally friendly nonstructural approach has been instituted to reduce flood damages in the Neshaminy. And the beautiful quiet mystery of Dark Hollow and its public park will forever remain for the people and the flora and fauna of this irreplaceable treasure.

The Neshaminy Creek at Dark Hollow
Depiction of a Section Now Saved from Dark Hollow Dam
Painting by Taylor Oughton

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