Community Environmental Management

An Initiative Designed to Protect and Enhance our Natural Resources and Water Quality for use on a Watershed, Municipal, or Site-Specific Scale

Draft Guide

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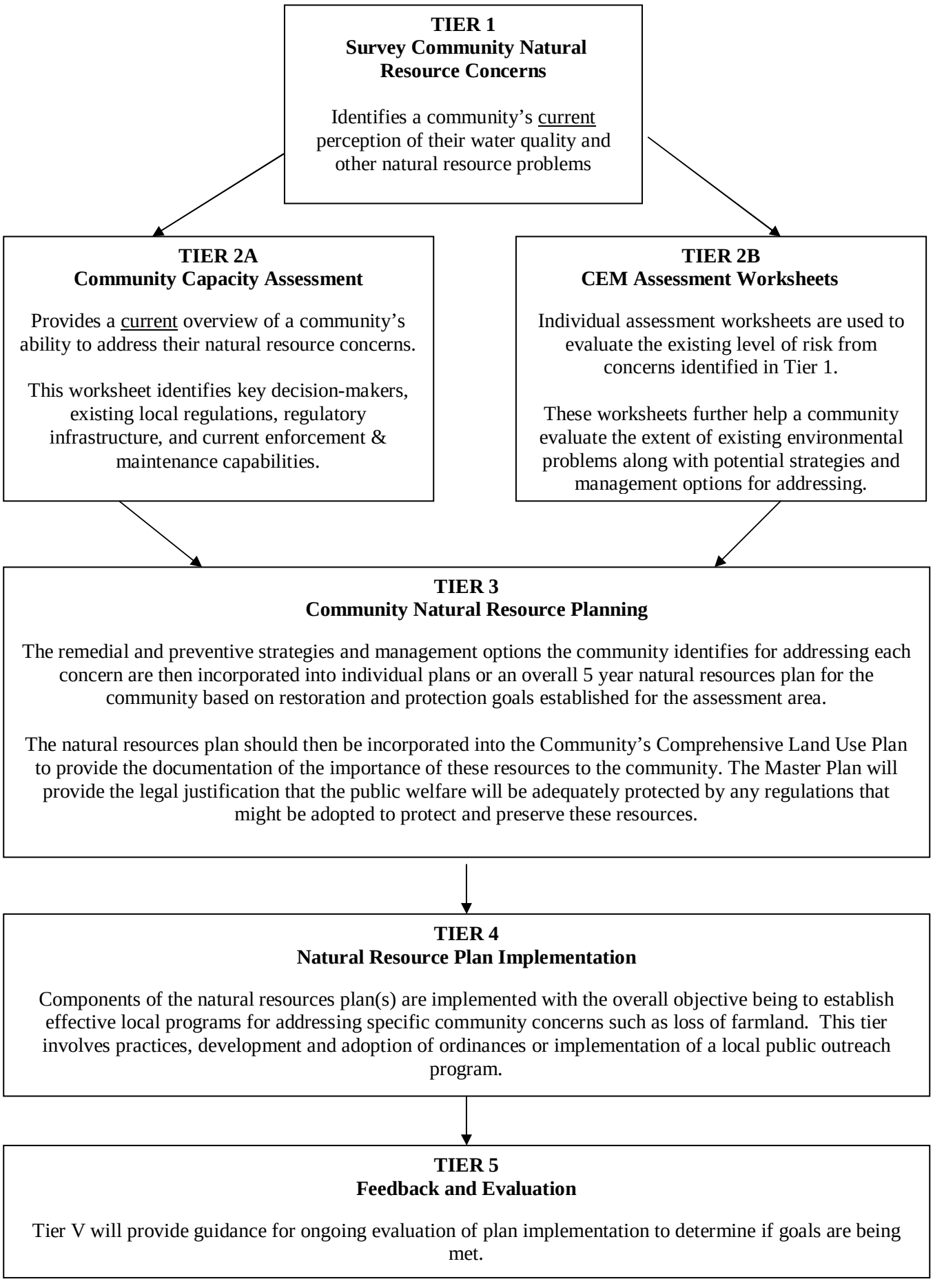
COMMUNITY ENVIRONMENTAL MANAGEMENT FLOW CHART



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Acknowledgements

Agencies and organizations involved in developing CEM

- New York State Department of Environmental Conservation (NYSDEC)
- New York State Soil and Water Conservation Committee (NYSSWCC)
- Erie County Soil and Water Conservation District
- Dutchess County Soil and Water Conservation District
- Upper Susquehanna Coalition
- New York State Department of State (NYSDOS)
- New York State Department of Health (NYSDOH)
- Cornell Cooperative Extension (CCE)
- The United States Department of Agriculture Natural Resources Conservation Service (USDA NRCS)

Preface

One of the basic, perhaps instinctual, desires people have is to surround themselves with a clean environment. We know the difference between sick and healthy without any formal training or scientific analysis. As we drive by areas that were once familiar to us as forest, farm or field, one has to pause and wonder if we have really made the right decision for the environment.

Free market capitalism and the "Lockean" theory of rights, implemented under the umbrella of Democracy, have guided America's socio-economic growth since its inception. The idea of mixing land, labor, investment and policy to create political, legal and financial structures where opportunities for personal gain are maximized is almost a uniquely American right. We have earned and maintained this right through exile, revolution and war.

These paragraphs summarize the "natural" simplicity and the "socio-economic" complexity we face as individuals and as part of American society when it comes to environmental decision-making. We all deeply desire to maximize our "potential" and have clean, comfortable and safe surroundings. These two ideals have long been viewed as opposing sides, winner take all. It is important to remember that this is not a zero sum game. Both sides can win. If we are going to find our "true" place, existing harmoniously in both worlds, we must ensure that both sides win. If not, the alternative leaves no clear winners and many clear losers.

Community Environmental Management or CEM is an attempt to shift the focus from planning's impact on the natural environment to the natural environment's impact on planning. This is not a subtle or semantic change, it is a fundamental change in the way we see our surroundings and ourselves. In the years to come, will we be able to look back and say, "I'm proud of the things we accomplished here."

Executive Summary

Since the founding of America, there have been many dramatic changes to the country's landscape. Land acquisitions, manifest destiny, land rushes, gold rushes, homesteading and war changed our geographic and demographic characteristics for the first 150 years of our existence. During the last 50 years or so however, we have experienced deeper, more fundamental changes to our society. Many people no longer live and work in the same place, the automobile shapes all aspects of our lives and shifting social and personal preferences have giving us a new landscape. All the aspects of this landscape share a common thread, they all require a larger footprint on the land.

As our influence and activities continue to spread, so too should our efforts in conservation, mitigation and remediation. We cannot ignore the fact that we are responsible for environmental stewardship. In New York State most of our environmental decision-making and activities are managed at the local level. Community Environmental Management or CEM is a non-regulatory statewide initiative designed to help local communities better summarize and understand the impacts of their environmental decisions, coordinate their efforts with existing Federal and State agencies/programs and use their authority and vision to create desired environmental outcomes.

CEM is a collaborative process requiring the commitment, expertise, support and guidance of local community members. CEM provides the framework, analysis, recommendations and justifications for creating environmental change, but local communities are responsible for making the change happen. Without a community's support, CEM becomes another planning exercise, addressing, but never attaining, it's goals and objectives.

The implementation of CEM's goals and objectives offers benefits for both the State and local communities. The State establishes a consistent environmental message for communities and can also steer them toward existing sources of assistance. Local communities may no longer need to rely on outside sources of assistance for establishing their environmental goals and can make better use of their existing resources through CEM. It is also a chance to address environmental concerns with preventative measures (typically much more cost effective) rather than react to problems as they arise.

CEM's goals and objectives are designed to be flexible and to work with a community's existing structure and social capital. CEM also complements other statewide initiatives, such as Agricultural Environmental Management (AEM). Both of these initiatives have multi-phased approaches that are designed to address environmental issues at both the macro and micro scale.

Environmental issues relating to nonpoint source pollution, natural resource conservation and drinking water supply protection form the core of CEM's structure. Through the use of various educational, assessment, technical and planning tools, CEM assists communities by finding specific (yet realistic) solutions relating to these issues.

The following steps describe the CEM process:

- Meet with local officials and community representatives. Is CEM needed and will it be supported?

- Use existing materials and CEM assessments to identify a community's current situation, perception and strategy for managing their water quality and natural resource issues.

- Identify areas of concern and evaluate CEM proposed strategies and management options for addressing them.

- Summarize the CEM strategies and management options the community identifies for addressing these concerns and incorporate them into individual plans or an overall natural resources plan.

- Incorporate these CEM derived plans into the community's master plan when and where applicable.

- Implement Plan(s).

- As the overall objective, establish effective local programs for addressing specific community concerns.

Much of the time and effort currently spent by planners, environmentalists, and governments is dedicated to finding solutions to the problems associated with our activities. When problems arise, they directly impact our ability to enjoy and protect our natural resources and water quality. Since most of our environmental management takes place at the local level, it is extremely important to establish effective local programs. These programs should be sustainable, mirror the community's vision, remember past history and take advantage of the resources and agencies that exist to help. The CEM process works within this framework to help guide community actions.

The goal of CEM is to assist efforts that will help prevent or remediate our impact on the environment while enhancing opportunities for future development.

Chapter 1 - Introduction

1.1 What Is CEM

Community Environmental Management or CEM is a multi-tiered initiative that uses a variety of educational, assessment, technical and planning tools to assist communities with addressing non-point source pollution and other related environmental issues. Addressing these issues involves changing the way communities think about, plan for and implement local programs/policies that impact natural resources and water quality. The group or individual facilitating a CEM initiative works to guide this change.

Many communities currently address environmental issues through a variety of plans including: open space, natural resource, flooding, transportation, water quality, comprehensive or master plans. But, there is often a lack of sound technical expertise on environmental issues available to communities when creating these plans. A CEM initiative can help fill in the gaps that often occur as part of a regular planning process. The impetus for creating CEM comes from various groups asking for guidance on how to impact this process. Every area being unique, CEM uses a flexible and locally led approach.

CEM is designed to work on a range of geographic scales such as site-specific, community, municipality or watershed. Municipal leaders, conservation boards, planners/planning boards, water quality committees or concerned landowners, can implement it. The overall objective is to establish effective local programs for addressing specific community concerns.

The basic structure of the CEM process is briefly as follows:

Tier 1 – Survey of Community Environmental Concerns (see page 51)
Identifies a community's current perception of their water quality and other natural resource problems. This is accomplished through a review of existing materials and a short worksheet and survey.

Tier 2A – Community Capacity Assessment (see page 74)
Provides a current overview of a community's ability to address their natural resource concerns. A worksheet identifies key decision-makers, existing local regulations, regulatory infrastructure, and current enforcement and maintenance capabilities.

Tier 2B – CEM Assessment Worksheets (see page 79)
Individual assessment worksheets are used to evaluate the existing level of risk from concerns identified in Tier 1. These worksheets further help a community evaluate the extent of existing environmental problems along with potential strategies and management options for addressing them.

Tier 3 – Community Natural Resource Planning (see page 345)

The remedial and preventive strategies and management options the community identifies for addressing each concern are then incorporated into individual plans or an overall 5 year natural resources plan for the community based on restoration and protection goals established for the assessment area.

The natural resources plan should then be incorporated into the Community's Comprehensive Land Use Plan to provide the documentation of the importance of these resources to the community. The Master Plan will provide the legal justification that the public welfare will be adequately protected by any regulations that might be adopted to protect and preserve these resources.

Tier 4 - Natural Resource Plan Implementation (under construction)

Components of the natural resources plan(s) are implemented with the overall objective being to establish effective local programs for addressing specific community concerns such as loss of farmland. This tier involves practices, development and adoption of ordinances or implementation of a local public outreach program.

Tier 5 – Feedback and Evaluation (under construction)

Tier V will provide guidance for ongoing evaluation of plan implementation to determine if goals are being met.

1.2 What Makes CEM Different

CEM focuses on local conservation efforts. Typically local planning efforts are focused on socio-economic concerns. Natural resources are often examined, but not in detail or they are sometimes seen as impediments to local progress. CEM attempts to shift our thinking from planning's impact on conservation to conservation's impact on planning.

CEM facilitates this shift by offering a wide range of strategies and management options for conservation at the local level. These strategies and options have been tested in diverse settings and are proven to be effective. Some communities may have already outlined these strategies and options as part of other initiatives, but lack the guidance and resources to properly implement them.

Working with a diverse group of partners, the CEM initiative attempts to streamline, manage and guide conservation efforts into effective local programs. None of the strategies and options recommended are new. CEM is simply a process. This process builds on the communities existing strengths and attempts to provide viable alternatives for addressing weaknesses and can improve connections to existing resources that are available to help.

1.3 Goals of the CEM Initiative

The goals developed through the CEM initiative will vary for each community. Many of the goals may be difficult to measure. Some goals will not have an immediate visible impact and many will only be reached at some point in the future. Although many of the goals may appear elusive, they are attainable and highly rewarding.

The goals of the CEM process are as follows:

- Local leaders will develop an increased understanding of why education and public outreach are important to conservation issues and practices.
- Key personnel and decision-makers involved in natural resource and water quality management will be identified and invited to participate in the CEM process.
- Local leaders will gain a more realistic evaluation of existing municipal and watershed conditions.
- Local leaders will be exposed to a variety of different strategies and management options that address conservation concerns.
- Existing sources of community assistance will be identified and exploited.
- Example conservation initiatives will be provided highlighting their structure and overall benefits.
- Conservation and natural resource plans will be developed that are tailored with specific municipal and watershed resources/issues in mind.
- Conservation and natural resource plans will be integrated with existing planning efforts to ensure their support and implementation.
- Local support for conservation initiatives will be increased.
- Municipalities or watersheds will benefit socially and environmentally from the implementation of effective and efficient local conservation programs.

1.4 How to Use This Guide

This guide has been written to assist CEM implementers to better understand the CEM process, local conditions and structures and how to impact change in their communities. There are two concepts to keep in mind when using this guide.

First, every area is unique with respect to environmental and social/political conditions. Understanding these conditions, even separately, is not an easy task. Understanding their inter-relationships is more confusing still. The process may be overwhelming at times. But, without this exploration, there can be no effective conservation programs at the local level. Many people around the world are struggling with this same issue. On the bright side, it appears that most people deeply and truly desire a clean, safe and comfortable

environment in which to live. We need to build on this support and find ways to environmentally, socially and politically make it happen.

Second, CEM can be used to impact these environmental and social/political conditions at many different scales. These scales are geographic, demographic and planning related. CEM initiatives can range from a single site to whole watersheds, from an individual to a multi-group consortium, from a single stand-alone plan to a watershed plan or master plan, and every combination in between. It is up to the CEM implementers to determine the size and scope of these scales. This will depend largely on local conditions and commitment, time restraints and available resources.

The organization and structure of CEM and this guide attempts to address these two key concepts. No guide can answer every question or take into account every possible situation that exists. We are relying on the fact that local people are best suited to make and implement local decisions. The flexibility and depth of information that CEM provides is a starting point. From that point forward, only local commitment and expertise can make the necessary changes for impacting the environmental initiatives covered under CEM and others.

1.5 How to Use the CEM Web Site

The CEM website found at http://www.ecswcd.org/html/cem.html contains CEM background information and worksheets. Anyone with Internet access can read, download and/or print out CEM materials quickly and easily. In the future we hope to provide a new and improved site with numerous links and additional materials about specific CEM strategies, management options and other agencies/programs that can aid with your efforts.

Chapter 2 - CEM Organization

CEM is loosely organized into five tiers. Does that mean that every initiative or individual project will go through all five tiers? Not necessarily. If you were working long-term with a municipality or other group, you would most likely go through all five tiers. There may be times when only very specific issues need to be addressed through CEM and only one of two worksheets get reviewed. There may be opportunities to impact master plans, create conservations zones or assist in conservation sub-division development or there may be opportunities to provide limited technical assistance and ideas. Whatever the depth and scope of your CEM initiative / CEM involvement is, there are real opportunities to bring about positive change to the way we perceive and manage our natural resources and water quality.

There are also many potential benefits and opportunities for the group or individuals involved with a CEM initiative or project. Here is a brief listing:

- Broadened & strengthened support for the groups and individuals involved
- A chance to work on the "Big Picture"
- Broadened Potential Funding Sources
- A chance to treat the "disease" rather than fighting symptoms
- Improved visibility and credibility in municipality, watershed and/or county
- Increased on the ground efforts
- A chance to use pervious developed data, protocols and strategies
- An opportunity to shift municipal, watershed and/or county's focus and priorities on environmental issues
- Better integration of plans and actions
- A chance to have a stronger voice within the state

CEM is designed to be a "toolbox" that can assist groups/individuals with reaping some of these potential benefits by providing the rough framework, analysis, recommendations and justifications for creating environmental change. How, when, why and where these tools get used is completely up to the group(s) seeking change. There are obvious limitations to any project that should be kept in mind. Time constraints, funding, personnel and expertise too name a few. Every CEM project and initiative will have to examine these factors and plan accordingly.

2.1 State-level Organization

Initiated by NYS DEC. Under NYSSWCC until June 30, 2004.

2.2 Organization of CEM at the Local Level

A CEM initiative is most likely be begin after some type of environmental issue(s) are identified. These issues may be brought before conservation districts, water quality committees, planning boards, conservation boards, consultants, watershed planners, landowners or some other groups/individuals. Depending on the size and scope of the issue, a CEM team should be assembled. This team should consist of individuals that have policy making, planning, land use, facilitating, natural resource, water quality and public outreach expertise. Without this full range of expertise many CEM goals and strategies may be hard to reach.

Many different groups and individuals can initiate the CEM process, but it is up to people at the local level to implement change. These people may be on conservation, planning, zoning, drainage, highway, recreation, land use, agricultural or other boards. Municipal leaders also need to be involved and actively support a CEM initiative since most often they are charged with making local level change to policy, planning and capital decision making.

Chapter 3 - CEM Methodology

The methodology behind CEM is quite simple. There is a diverse group of decision-makers, planners and other key personnel that could benefit from direct interaction with and the technical assistance of people with environmental expertise. (Bringing together a CEM team consisting of individuals with varied environmental expertise would provide a large amount of “environmental capital" to work with.) The materials provided by CEM and other related programs and initiatives can act as a framework or guide for this interaction. Ultimately, it is the interaction between these two groups that is critically important. Whether they choose to use CEM or some other mechanism to make “better” natural resource and/or water quality decisions is of lesser importance.

3.1 Environmental Issues and Resources

There is little disagreement that sprawl, degrading water/air quality and increased consumption of natural resources have a negative impact to our quality of life. Many of these issues can only be addressed at the local-level. Without effective locally led programs and initiatives these concerns will surely worsen. CEM and other related initiatives could be instrumental in examining, controlling and possibly reversing these trends.

There are many qualified and highly skilled agencies, companies and individuals working toward natural resource and water quality protection. The entire CEM initiative is indebted to many of these individuals and their efforts. The ideas incorporated into CEM have been gleaned from their efforts. CEM provides contact information about these resources and encourages their use.

CEM is by no means the only initiative that addresses environmental topics. We have tried to make our program a “one-stop” center for many of the environmental issues communities face. By doing this, we hope to send a clear and consistent message to local communities that there are many strategies and options for the handling of environmental issues. If a community is more comfortable working with other related materials, projects or programs we encourage and welcome their use as part of any type of planning process or a CEM initiative.

It is important to remember that CEM is not a faultfinding exercise. It’s intent is not political, regulatory or fragmentary. CEM should be used to enhance locally led efforts and have an overall positive impact in the community. Working together in an open and honest setting is critical to the success of any community-based project or initiative.

3.2 CEM and the Watershed Approach

CEM addresses non-point source pollution and other related environmental issues and the local community level. Some related programs like New York State's AEM (Agricultural Environmental Management) and EPA's NPDES Storm Water (MS4 Phase 2 Stormwater Program) address specific non-point source issues directly. Any initiative that addresses non-point source pollution is typically viewed as watershed-based initiative. Watersheds being the overall collector for non-point source pollution in a particular area. Everyone lives in a watershed regardless of his or her municipal, county, state or national boundaries.

Watersheds have a variety of hydrological and ecological functions. In short, watershed function is about how water moves, reacts and interacts with the physical environment. Since life on this planet relies on water, watersheds and their function impact all ecosystems and ultimately every living creature. Since almost all of our activities impact or alter the physical environment they also impact watershed function. What we call watershed management or watershed planning describes our activities aimed at understanding, controlling, enhancing and/or restoring watershed function.

Watershed planning can take many different forms. Any attempt to control, limit or understand our activities and their impacts could be part of a watershed plan. Other planning efforts and plans, including master, flood mitigation, stormwater, land use, agricultural, zoning, economic development, waterfront, drainage, etc., examine pieces that would be considered under a "full" watershed planning effort. Often these pieces are often examined separately because of existing planning structures and the sheer complexity of trying to examine all of these issues at once. Each community, it seems, has different boards, agencies and organizations setup to handle specific issues.

CEM acknowledges this existing community structure. It works with and within these pieces, but its overall premise remains holistic. Every question, strategy and management option recommended by CEM has been carefully chosen. They have all been chosen in a way that will hopefully guide and assist people with understanding and lowering our impact on natural resources and water quality.

Four informational pieces on the watershed approach are provided next:

3.2.1 Watershed Scoping Tool
3.2.2 Prioritizing Watersheds
3.2.3 Catskill Creek Watershed Strategy
3.2.4 Updating County Water Quality Strategies

Assessment Tool for Identifying and Prioritizing Natural Resource Concerns within a Watershed

Introduction

The attached watershed natural resources assessment tool provides worksheets for Local Working Groups and County Water Quality Coordinating Committees to use to identify priority natural resource concerns on a watershed basis. This assessment tool addresses the entire resource base (soil, air, water, plants and animals) for each predominant land use within a watershed.

The assessment tool can be used on a county (watershed) or community (sub-watershed) basis to identify geographic areas of concern and existing or potential natural resource impacts that need addressing. This assessment provides the foundation for a comprehensive evaluation of the condition of each watershed's natural resource base and thus can become the platform for making decisions about local priorities or policies for local delivery of conservation programs to landowners and communities within a watershed.

Watershed _____ **HUC #** _____ **Date** _____

WORKSHEET FOR IDENTIFYING NATURAL RESOURCE CONCERNS

IMPAIRMENTS / IMPACTS [1]	Significance Factors [2]			COMMENTS
	LEVEL OF CONCERN (H, M or L)	EXTENT OF IMPACT (H, M or L)	RESOLV-ABILITY (H, M or L)	
Floodplains				
encroachment into flood plain;				
increased threat of flooding (changes in land use & increase in % impervious areas);				
loss of flood plain functions (flood storage);				
changes in flooding frequency;				
other (list).				
River & Stream Corridors				
loss/degradation of riparian buffers;				
excessive stream bank erosion;				
barriers to fish movement(dams, culverts);				
altered or unstable stream channel(channel deeply incised);				
change in stream characteristics (riffle embeddedness , loss of in-stream fish cover, loss of stream invertebrates) ;				
loss of sediment transport capacity(braiding);				
withdraws affecting low flow habitat;				
increased stream temperatures;				
uncontrolled livestock access to streams;				
litter/debris along stream/riverbank or in channel;				
lack of public access for water based recreational opportunities;				
other (list).				

[1] Includes impacts to soil, water, air, plants, and animal resources for each land use along with economic and social considerations

[2] See attachment 1 for explanation of the significance factors

Wetlands (freshwater & tidal)				
degradation/loss of wetlands from filling;				
encroachment from incompatible land uses;				
loss of hydrology from draining or modification of adjacent uplands;				
fragmentation of landscape (loss of connectivity);				
invasive exotic plants (e.g. purple loosestrife);				
other (list).				
Lakes & Reservoirs				
eutrophication;				
shoreline erosion;				
beach closures;				
failing onsite systems;				
loss of recreational opportunities;				
other (list)				
Fish and Wildlife Habitat				
loss of / fragmentation of habitat (loss of connectivity);				
loss of native species;				
loss of biodiversity;				
increase in invasive, exotic and/or nuisance species;				
loss or reduction of threatened or endangered species;				
loss of sustainable cold or warm water fisheries;				
restricted passage that limits migration/movement of fish / aquatic species;				
other (list).				

Agricultural Land				
loss of prime, important, and unique farm land (critical mass concerns);				
urban/suburban infringement on farm land (neighbor relations, sound agricultural practices concerns);				
increasing numbers of CAFOs within watershed with inadequate land resource base;				
marginal farm profitability;				
inadequate water supply for farm needs;				
other (list).				
Farmstead				
odors from livestock operations (neighbor complaints);				
barnyards/feedlots close proximity to stream;				
lack of emergency spill response plans on farm (for manure, pesticides, petroleum products, etc.);				
poor herd health;				
inadequate pesticide mixing facilities.				
Cropland				
decline in soil quality;				
airborne chemical drift;				
pesticides being applied without regard to leaching or runoff potential;				
cropland erosion;				
excess nutrients;				
subsidence (oxidation of organic soil);				
application of bio-solids on cropland.				
Hayland/Pasture				
poor quality hayland or pastures (unmanaged sys.) ;				
lack of adequate livestock watering facilities.				

Forest Land				
loss of high value species;				
poor growth;				
lack of quality;				
disease and insect pests;				
encroachment/forest fragmentation;				
increased runoff from harvested areas;				
erosion from skid trails, landings, and logging roads;				
aesthetics of timber harvesting activities;				
overuse – recreation;				
loss of prime and important forest lands;				
loss of biodiversity;				
other (list).				
Mined Land				
visual blight/incompatible land uses;				
changes to surface and subsurface flow characteristics;				
surface water/ groundwater impacts;				
other (list).				
Open Space / Recreation Land				
loss of prime, important and unique farmland to development;				
loss of special viewscapes;				
loss of culturally and historically significantly areas;				
limited land-based or water-based recreational opportunities;				
loss of old growth forests;				
reduction in rare or unique habitat (Pine Barrens, bogs);				
other (list).				

Suburban / Urban Lands				
lack of town or village comprehensive land use plan that addresses natural resource protection and enhancement needs;				
lack of safe disposal/recycling of waste;				
inadequately sited salt & sand storage facilities;				
inadequate water supplies (rural fire protection or drinking water concerns);				
landfill leachate enters ground or surface water;				
inadequate plant cover (shade tree / urban forestry concerns);				
soils contaminated from heavy metals/toxins;				
odors from landfills / sewage treatment plants;				
other (list).				
Urban Runoff				
soil erosion from disturbed areas;				
roadbank erosion;				
increase in storm water runoff (due to increasing % impervious areas);				
inadequate storm water management controls;				
lack of O&M existing storm water BMPs;				
inadequate site design requirements for developments;				
urbanized streams;				
combined sewer overflows to surface waters;				
inadequate street maintenance (street sweeping, clean out of catch basins);				
inadequate storm water management;				
other (list).				
On-site Wastewater Treatment Systems				
systems failing due to improper siting, design or installation or due to a lack of maintenance;				
lack of access to or limited capacity of local waste treatment facilities results in illegal dumping of septage				
other (list).				

Drinking Water Sources				
public and/or private drinking water source contaminated;				
source water assessment completed, source(spring, well, river lake or reservoir) susceptible to possible contamination;				
inadequate or nonexistent local source water protection program;				
other (list).				
Coastal/Marine Resources				
nonpoint source pollution from marina operations				
deteriorating waterfronts;				
coastal dunes / shoreline erosion;				
direct discharges (direct dumping or pipeline discharges);				
beach closures;				
shellfish contamination;				
brown/red tides;				
hypoxia;				
thermal pollution;				
marine/beach debris;				
other (list).				

Attachment #1

SIGNIFICANCE FACTORS FOR ASSESSING THE CONDITION OF NATURAL RESOURCES WITHIN A WATERSHED

Level of Concern	Extent of Impact	Resolvability
• degree of problem identification & documentation • level of public concern / support for action • potential for offsite impact • value of the resource to be protected • public health or safety concern	• Watershed-wide, municipality-wide, or localized • % farms or landuse category impacted • severity of natural resource or water quality impact • degree of threat or sensitivity (vulnerability) of resource	• level of understanding of extent of problem, cause & effect relationships • degree of complexity • availability of programs to address • institutional constraints • local capacity to address • available technologies and methodologies • cost effectiveness (benefit/cost ratio) • level of management required • history of O&M on previously applied BMPs/conservation practice

PRIORITIZING WATERSHEDS FOR LOCALLY LED CONSERVATION

Potential level of Concern				
Watershed/Waterbody Factors	**low 1**	**2**	**3**	**high 4**
Water use classification (highest & best use)	D	C	B, C (T)	A, AA
Severity of water quality impact on classified use	threatened	stressed	impaired	precluded
Threat to public health	no present restriction on use	swimming temporarily banned, documented beach closures or boil water advisories	fishing advisory exists or intermittent presence of toxics affect use as public water supply	swimming, fishing and/or use as public water supply banned
Waterbody priority	not identified in County Water Quality Strategy	waterbody of local concern identified in county water quality strategy	filtered surface water supply or on DEC's Priority Waterbody List	unfiltered surface water supply, well head protection area or primary or principal aquifer
Potential economic impact if not addressed	no significant impact	local impact	regional or multi-county impact	state or multi-state impact
Public access factor	no public access	limited access for public use	moderate access for public use	extensive access for public use
Size of impacted waterbody	less than 1 miles stream; less than 10 acre lake/bay/estuary	between 1 and 5 miles streams; between 10 and 100 acres lake/bay/estuary	more than 5 miles but less than 10 miles stream; more than 100 acres but less than 1000 acres lake/bay/estuary	more than 10 miles stream; more than 1000 acre lake/bay/estuary

PRIORITIZING WATERSHEDS (con't.)

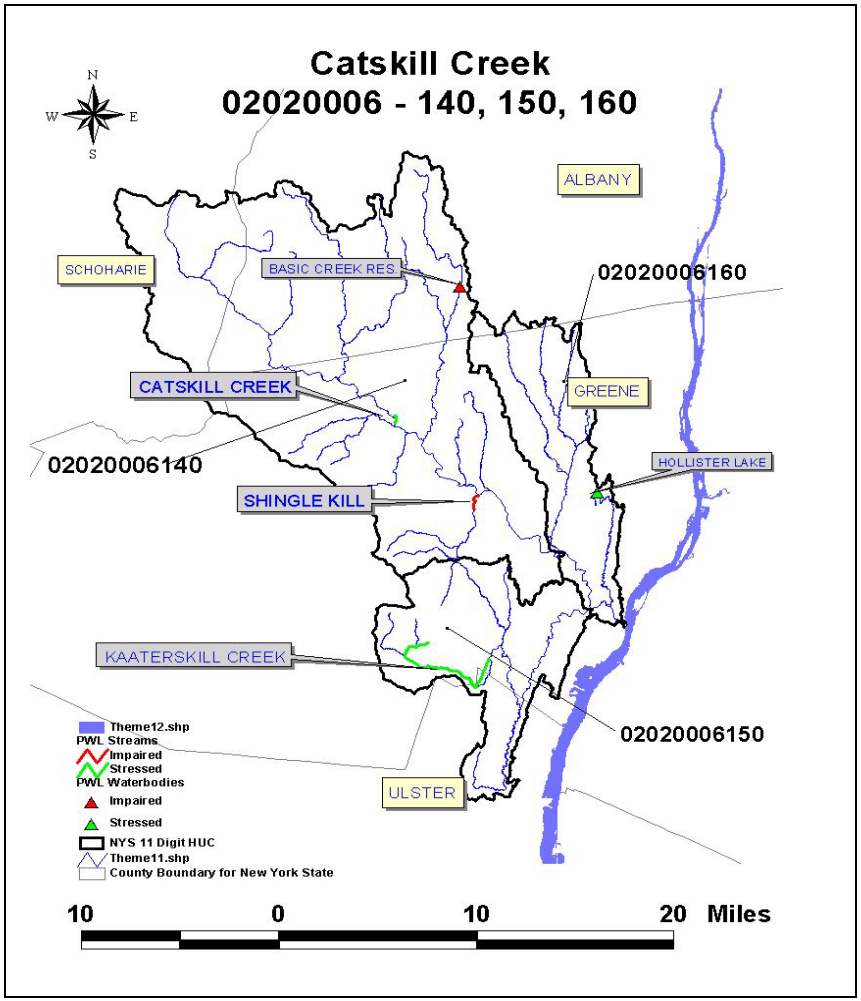
Potential Level of Concern				
Prior NPS planning efforts in the watershed	no previous studies or analysis have been conducted in the watershed	simple watershed analysis conducted by interdisciplinary team	river basin or similar studies performed or watershed water quality plan exists	comprehensive watershed plan recently prepared; implementation priorities clearly defined
Pollutant being addressed	pollutant not listed on PWL data sheet	pollutant not verified but suspected	secondary pollutant causing impact	primary pollutant causing impact
Level of documentation of NPS pollutant or sources	none	poor	fair	good
Federal, State or local NPS programs affecting land use activities in the watershed	none	local ordinance(s) addressing nps concerns source water assessment- low susceptibility to contamination	waterfront revitalization plan(s) 303d listed waterbody source water assessment- medium susceptibility	source water assessment- high susceptibility watershed rules & regulations TMDL being implemented
Number of resource concerns in the watershed *(i.e. flood control, farmland protection, rare and endangered species protection, wildlife habitat mgmt)*	one resource concern being addressed	two	three	four or more resource concerns being addressed

CATSKILL CREEK WATERSHED RESTORATION & PROTECTION STRATEGY

11 DIGIT HUCs #: 02020006-140, 02020006-150 & 02020006-160

WATERSHED AT A GLANCE

Sub-Basin:	Lower Hudson River
Major Waterbodies:	Basic Cr. Reservoir, Catskill , Potic and Kaaterskill Creek
Watershed Size:	415 mi^2
Primary Land Use:	Forested (80%) Agriculture (20%)
Major Communities:	Village of Catskill
Town(s):	Catskill, Cairo, Athens, Greenville, Durham, Westerlo, Rensselaerville
Key Watershed Group:	The Greene Co. SWCD and the Clearwater Chapter of Trout Unlimited are most actively involved.
Projected Watershed Changes (10 years):	It is expected that this watershed will remain primarily rural. Some urbanization is projected for the southern most portions.
Ecologically Significant Areas:	NYS DOS designated Hudson River Significant Tidal Areas.



Current Status and On-Going Efforts

Stream Corridors	At the current time, streambank erosion is considered the primary issue affecting water quality in the Catskill Creek. A 1985 assessment flagged 93 sites along the Catskill Creek as needing stabilization. Lack of funding continues to be the main obstacle in re-mediation.
On-Site Waste Water System	The municipal wastewater treatment facility in the Town of Greenville has been flag as needing upgrading. Lack of adequate funding remains an obstacle. It is suspected that other small-scale systems may also be contributing to elevated nutrient and pathogen levels, although no supporting documentation currently exists.
Stormwater Runoff	Stormwater runoff problems in the watershed are considered to be isolated. The Village of Catskill does have a CSO that contributes sewage-tainted runoff during large storm events.
Floodplains	Due to the natural topography of the area, flooding issues are present in several areas of the Catskill Creek watershed. Although there is currently no watershed based flood protection plans in effect, the GCSWCD is currently working with the Town of Catskill to develop a comprehensive flood management strategy.
Agriculture	Agriculture has been steadily declining in the Catskill Creek watershed – particularly animal agriculture operations. In 1998, AEM assessments of existing operations indicated that agriculture is not a significant threat to water quality in the watershed.
Wetlands	Overall, there appears to be little net loss of wetlands, however, wetland degradation is a widespread issue.
Lakes and Reservoirs	The Catskill Creek watershed contains several private, public and municipal impoundments. At the current time, North-South Lake is the only impoundment with a management strategy in effect. Hollister Lake has been identified by the Greene Co. SWCD as a high priority for needing a management plan to address aquatic vegetation.
Habitat and Biodiversity	The HREP is currently beginning to approach communities in the watershed to address biodiversity issues.
Coastal and Marine Resources	NYS DOS has identified the lower reaches of the Catskill Creek as a Hudson River Significant Tidal Habitat. It is an important spawning habitat for American shad, alewife, blueback herring, white perch, and small and large mouth bass. NYS DOS has put forth a number of recommendations for this area to protect the fisheries, including emergency spill plans, sound maintenance activities, and stormwater management recommendations. In addition, the lower portion of the Catskill Creek is involved with on-going efforts to revitalize waterfront areas.
Solid and Hazardous Waste Sources	The Catskill Creek watershed contains no active landfills. All past landfills have been closed following NYSDEC criteria for closure and monitoring. At the current time, all known hazardous waste sites are in various stages of remediation.
Roadways and Right-of-Ways	All salt storage facilities in the watershed are stored under well-designed sheds.

Restoration and Protection Opportunities

Resource Concern	Restoration Opportunities	Protection Opportunities
Stream Corridors	Seek grant funds for complete assessment of stream conditions in watershed.	Educate local decision-makers on stream health. Develop and implement a Stream Management Strategy for the Catskill Creek.
On-Site Wastewater Systems	Design and implement a program for sample testing of on-site systems.	Provide additional training to building inspectors and septic inspectors, particularly on soils. Provide education and outreach on proper septic siting. Develop a long-term septic maintenance program.
Stormwater Runoff	Work with Village of Catskill on alternatives to the existing CSO.	Develop and implement a Stormwater Management Plan for the watershed.
Floodplains	Implement infrastructure improvements (e.g. up-sizing culverts) particularly in the Hamlet of Palenville.	Develop a comprehensive stream management plan for the upper Kaaterskill Creek. Develop an education/outreach program for building inspectors, realtors, insurance agents, landowners and developers on floodplain regulations, site development, the National Flood Insurance Program, and flood proofing existing structures.
Agriculture	Evaluate the potential for increasing participation in USDA Farm Bill Programs for conservation.	Continue to work on a Farmland Protection Plan for Greene Co.
Wetlands		Conduct a comprehensive study of historical and existing wetlands in the watershed to establish a baseline record. Establish a wetland mitigation strategy for commercial/industrial development.
Lakes and Reservoirs	Work with the Village of Athens to conduct an assessment of the Hollister Lake watershed and seek funding assist in aquatic weed control.	Develop Lake Management Plans for all impoundments, particularly those that are used as water supplies. Enforce existing rules and regulations effecting development in these watersheds.
Habitat and Biodiversity	Assist the HREP in their biodiversity outreach program.	Work with NYSDEC and HREP in developing a watershed strategy for protecting critical habitats.
Coastal and Marine Resources	Work with NYS DEC and HREP in their goals to soften shorelines along the Hudson River. Enhance public awareness of the HR Estuary by using Stormwater Stenciling, particularly in the Village of Catskill.	Establish a boater education program to protect Submerged Aquatic Vegetation in the Estuary. Provide additional outreach and education to land-owners adjacent to the Hudson River on River Stewardship issues.
Solid and Hazardous Waste Sources		Further evaluate the impact of hazardous material sites and closed landfills on the watershed.
Roadways and Right-of-Ways		Work with Cornell Local Roads program to train local highways departments on environmentally friendly uses of abrasives and deicing materials.

Using Watershed Restoration and Protection Strategy (WRAPS) Approach to Update County Water Quality Strategies

Objective: To provide a method for conducting a locally led, watershed based, conservation needs assessment that can be used by County Water Quality Coordinating Committees (CWQCC) to identify nonpoint source pollution and other natural resource restoration and protection needs.

1. CWQCCs prioritize their watersheds for developing WRAPS using the attached matrix as a guide. (Note : The matrix could be used to prioritize sub-watersheds within a community)

2. Key WQCC members (SWCD, EMC, NRCS, regional DEC staff) fill in the attached "watershed assessment tool" that contains worksheets for identifying natural resource concerns for each land use within a priority watershed or sub-watershed.

3. Restoration and protection strategy prepared to address each resource concern in the priority watershed using the attached Catskill Creek template as an example.

4. Draft strategies reviewed with CWQCC and adjacent counties to ensure completeness and to develop consensus on future actions needed.

5. CWQCC then develops annual work plan for addressing concerns identified in each watershed strategy to enhance coordination of efforts between agencies, organizations, local governments and counties.

6. CWQCC provides annual report to county legislature on progress in addressing individual watershed needs.

*WRAPS implementation tools: AEM, CEM, HOME*A*SYST,etc.*

3.3 Watershed Planning Pitfalls and Tools

The Center for Watershed Protection's *Rapid Watershed Planning Handbook* preface lists 10 pitfalls of watershed plans. These are also some of same pitfalls that other planning efforts (including master planning) often face. They are worth mentioning and should be addressed at every stage of a CEM initiative.

- Plan is conducted at to large a scale.
- Plan is a one-time study rather than a long-term continuous management.
- Plan lacks local ownership and key stakeholder involvement.
- Plan does not address the issue of land change within the watershed.
- Budget for watershed plan insufficient.
- Plan focuses on the tools of watershed analysis rather than the outcome.
- Document was too long or complex.
- Plan does not assess adequacy of local program to implement recommendations.
- Plan recommendation(s) were too general.
- Plan had no requirements or meaning.

The *Rapid Watershed Planning Handbook* also lists eight tools for watershed protection. They are:

- Land Use & Watershed Planning
- Land Conservation
- Aquatic Buffers
- Better Site Design
- Erosion and Sediment Control
- Stormwater Best Management Practices (BMPs)
- Non-Stormwater Discharges
- Watershed Stewardship Programs

CEM incorporates these tools and others into its initiative. The question is how do we use and implement these tools and their components without falling into the ten pitfalls listed above?

3.4 Need for New Assessment & Planning Tools

As mentioned before, CEM is not trying to reinvent environmental planning or usurp the role of more traditional planning processes. There are many great programs and plans (including the *Rapid Watershed Planning Handbook*) that address non-point source pollution and other environmental issues. CEM has been specially designed to work with local communities in New York State. It has been designed to allow many existing groups (including soil and water

conservation districts, water quality committees, local planning and conservation boards, county planning and others) to work more efficiently and directly with local communities.

These groups have the environmental education, technical tools and expertise that many communities frequently lack. Many of these groups have been established to be the "environmental stewards" in their areas of influence. In addition to their environmental credentials these groups often have direct access to a variety of partners, new ideas, and funding opportunities typically not tapped by local communities. Direct interaction between these groups and local communities is perhaps the best way to address non-point source pollution and other environmental issues. CEM provides a framework that can facilitate, strengthen and guide this interaction.

3.5 Education and Outreach

The primary function of CEM is educational. It is extremely difficult for anyone to be fully versed on all the environmental, social and political issues faced by a community. Often times the environmental issues are the least examined and understood. CEM contains a wealth of background information (and hopes to provide more in future efforts) coupled with a logical step-by-step, issue to possible solution format on diverse environmental issues.

More important than the "textbook" education found in the CEM materials however is the "street" education gained by everyone involved with a CEM initiative. The "street" education is finding ways to working together so that everyone benefits. It's going over issues and ideas together. It's about finding solutions that can work at the local level.

Even if you go through the entire CEM process and the elusive implementation tier is not conducted, you have not failed. It may be that no amount of effort, expertise or money would bring about local change. That is important information that you and others need to know. Maybe the "seeds" of future efforts have been planted. Maybe lasting working relationships have been formed. At a minimum, you have a better understanding of how local communities work and function and they have a better understanding of natural resource and water quality issues.

3.6 Implementation

The primary focus of CEM is implementation. Without implementation, there can be no positive environmental change at the local level. CEM provides educational materials/resources and logically moves you from issues and concerns to possible strategies and management options for handling them.

CEM tries to present the best available strategies and options with varying timeframes, capital requirements and levels of complexity. CEM identifies individuals and agencies that can assist with local environmental initiatives. These efforts have a single focus, to make implementation as easy as possible for the establishment of effective local programs for addressing specific environmental and community concerns.

3.7 Advantages of a Tiered Approach

CEM is structured in tiers to provide a logical framework with a beginning (an issue or set of issues is identified) and an end (establishment of effective local programs that address the issue or issues.) Keeping in mind that our primary focus is on implementation, and getting there as easily as possible, CEM needs to be flexible. The five tiers also act as possible different starting points for a CEM initiative.

Many of the parts of a CEM initiative may already be researched, identified and/or in place. Some communities may only have questions about a particular issues or need help with the implementation phase of an existing project. You can enter any tier of CEM to begin a CEM initiative. The tiers are there to provide structure and guidance, but completing all five, in order, may not be necessary for your initiative.

Chapter 4 - Background Information

This chapter covers topics related to data collection and analysis. Data collection and analysis are important parts of any CEM initiative. Without the relevant data to work with, it may be difficult to determine existing conditions, make future recommendations and justify them. The data collection and analysis process will vary from area to area and topic to topic.

Some of this information will help you answer the questions in Tier 1 and some of the other data types listed (and most likely additional data types not listed) may be needed in subsequent tiers. It is listed here before Tier 1, to give you an idea of where to obtain data and some of its uses for CEM. The data may exist in a variety of forms including: plans, reports, tables, maps, GIS or other different forms. The two main types of data you will most likely need are those related to water quality and land use.

Always check with the following agencies first for your local data needs:

- USDA NRCS Offices
- County Soil and Water Conservation Districts
- County Planning or Conservation Offices
- Municipal (Planning) Offices
- Regional Planning Agencies

Some additional data sources:
USGS, USFWS, NOAA, USEPA, NYSDEC, NYSDOS, NYSDOT

4.1 Suitable Geographic Study Areas

Many of the environmental and water quality issues covered by CEM can be analyzed at a variety of geographic scales. Individual parcels of land, communities, municipalities, sub-watersheds and entire watersheds are suitable areas for a CEM initiative. However, since many of the strategies and management options recommended by CEM are functions of local government, they need to be involved in a way that can facilitate change.

4.2 Overview of Data Collection

Before beginning a CEM initiative, some preliminary data collection is necessary. The data will assist with responding to the questions asked in Tier 1 - Survey of Community Environmental Concerns. It can also be used to improve your understanding of the existing environmental, social and political factors in your geographic area of study.

Usually there is no shortage of data for a topic or area. The problem is finding, gathering and standardizing data into the form(s) you need. Depending on the geographic area being covered, your data collection efforts may include some or all of following:

- Water Quality*
- Planning Documents*
- Land Use / Land Cover*
- GIS & Mapping Data*
- Aerial Imagery*
- Zoning
- Tax Parcel Maps/Tables
- Flooding
- Census
- Highway and/or Right-of-Way
- Aquatic Resources
- Terrestrial Resources
- Cultural and/or Scenic Resources
- Agricultural Resources
- Wetlands
- Soil Information

* These sources of data will be covered in Sections 4.3 – 4.7. The other sources listed above will be addressed in Other Data Sources - Section 4.8.

The amount, quality and depth of data available for any given study area may vary significantly. Local groups and individuals will have the best idea of where to obtain data and how to use it. The data collection effort itself will give you a good idea of who currently uses the data and how the data might be better used, shared and analyzed. Information and idea exchange are critical to a CEM initiative and can build lasting relationships between municipalities, groups, individuals and agencies.

4.3 Water Quality Data

Water quality is often overlooked or taken for granted. There is an overall feeling that “someone else” is taking care of it or that existing regulations are enough to ensure unlimited clean water into the future. As we have painfully learned from past experience, we know that this is not the case. Every community needs to be actively involved with tracking, maintaining and enhancing their water quality. If they do not, water related costs will continue to rise, source water may become unavailable and there may be widespread contamination concerns.

One of the primary determinates of water quality for a particular area is land use. There is usually a direct correlation between the type and amount of land use for an area and its overall water quality. When you examine water quality issues, think of how local land use patterns fit into the equation.

4.3.1 NYS DEC's PWL Information

The New York State Department of Environmental Conservation has developed a list called the Priority Waterbodies List or PWL. The PWL is a list of surface waters determined by NYSDEC staff, with public input, to have their uses precluded, impaired, stressed or threatened. Local soil and water conservation districts should have this information on hand, because they use this list as a guide for various programs and projects. The list contains information that can assist your CEM efforts by giving you information about the specific problems faced by waters in your area. The problems sited include pollution, loss of habitat, sedimentation and other concerns and are listed in a waterbody by waterbody fashion.

Before the start of any CEM initiative it is recommended to review a copy of the PWL for your area of study. This will not only assist in answering some of the questions asked in Tier 1, but will also provide valuable insight into what some of the concerns in your area of study may be. To write and receive a copy of the PWL information for your county or area of study, send request to:

New York State Department of Environmental Conservation
Division of Water
Bureau of Water Assessment and Management
625 Broadway NW
Albany, NY 12233-3502
Telephone (518) 402-8179

Also visit http://www.dec.state.ny.us/website/dow/bwam/305b.html to view or download the New York State Water Quality Section 305b Report (October 2002) - Appendix C includes a summary listing of the Water Inventory / Priority Waterbodies List (PWL).

4.3.2 NYS DEC's Unified Watershed Assessment

The 1998 federal Clean Water Action Plan provided Section 319 funding to help states further their water quality restoration efforts. A key element of the plan requires each state to prepare a Unified Watershed Assessment (UWA). In developing the UWA, New York combined information from many sources to determine different categories that were assigned to each Hydrologic Unit Code (HUC) watershed throughout the state. For each (HUC) watershed, the following information is summarized in the matrix of Unified Watershed Assessment and Ranking Factors* and on the state UWA map*: general watershed Information, water quality factors and assessment and natural resource factors and assessment.

*Found at http://www.dec.state.ny.us/website/dow/uwa/uwarpt98.htm#Hydrologic

The information described above was considered together to create a Unified Watershed Assessment for each of the 8-digit HUC watersheds in New York. The final assessments represent an integration of the general watershed information; the water quality assessments, based on the water quality factors, and the natural resource assessments, based on the natural resource factors and priorities.

Before the start of any CEM initiative it is recommended to review the UWA information for your area of study. This will give you a snapshot of the overall ranking, quality and concerns in your areas' watershed. For more information about the UWA, how it was created and it's uses, please go to the following web site:

http://www.dec.state.ny.us/website/dow/uwa/uwarpt98.htm#Hydrologic

4.3.3 Drinking Water

The quality of New York State's drinking water is important to everyone who lives and works in the state whether they realize it or not. Many people take for granted the fact that they have clean, safe water to drink and use everyday. Keeping our water clean and safe into the future is everyone's responsibility.

There are two main ways drinking water is provided to the people of New York State. Some people are on larger municipal water systems and some people use individual wells for their water. The larger systems monitor and treat the water they deliver on a continual basis using strict governmental guidelines. The individual wells are left to the landowner or user to monitor and maintain.

The source water for both of these systems should be protected and enhanced when and wherever possible. There are many federal, state and local efforts underway that are striving to reach these goals. You can find information about drinking water and it's quality at the following websites:

http://www.health.state.ny.us/nysdoh/water/main.htm
http://www.health.state.ny.us/nysdoh/water/wellhead/wellfact.htm

The Wellhead Protection Program was created by the 1986 Amendments to the Safe Drinking Water Act. The DEC developed New York's Wellhead Protection Program, which was approved by the U.S. Environmental Protection Agency in 1990. The goal of the Wellhead Protection Program is to protect the ground water sources and wellhead areas that supply public drinking water systems from contamination. New York's approach to wellhead protection recognizes and includes the existing federal, state and county programs that protect groundwater and complements these programs through a combination of

activities and efforts using existing public and private agencies and organizations at all levels.

In October 1998, Governor Pataki transferred the administration of New York's Wellhead Protection Program from the DEC to the DOH. This transfer was initiated to improve program efficiency and compatibility with the DOH's Source Water Assessment Program. The 1996 Amendments to the federal Safe Drinking Water Act mandate that each state develop a Source Water Assessment Program. In New York, the Source Water Assessment Program is being developed and implemented by the DOH. Although the Wellhead Protection Program has been transferred to the DOH, the DEC retains the lead responsibility for several key programs that provide a foundation for wellhead and source water protection. The DOH will administer the Wellhead Protection Program in accordance with the EPA approved Wellhead Protection Program plan.

Under the Source Water Assessment Program, source water assessments will be completed for all sources of public drinking water, including surface water sources, which are used by public water systems. Source water assessments will provide information on the potential contaminant threats to public drinking water sources. Each assessment will include:

- A delineation of the aquifer and/or watershed area(s) contributing to the drinking water supply.

- An inventory of the potential contaminant sources within these defined areas that may pose a threat to the drinking water quality.

- An evaluation of the likelihood that the drinking water supply could become contaminated.

Completed source water assessments will provide a rational basis for future source water protection activities in wellhead and watershed areas because the source water assessments will identify the most significant threats of contamination to the source of public drinking water.

One of the underlying principals of the Source Water Assessment Program is to maximize use of existing information. As part of the source water assessment process, information related to wellhead protection efforts will be reviewed and utilized whenever possible. The Wellhead Protection Program includes developing a specific management plan for protecting the ground water resource. This may require a detailed delineation to determine where the ground water is coming from within an aquifer. The management plan may also include an inventory of possible sources of contamination that could affect the water quality of the ground water resource. The source water assessments will build

upon the delineations and contaminant inventories that were completed for public water systems under the Wellhead Protection Program.

The support and involvement of public water suppliers is vital to effective protection of public drinking water supplies. The DOH is encouraging local government, public water suppliers and local, state and federal agencies and groups that work with them to become involved in source water protection. You can become involved with source water protection in your wellhead area by working with your local health department. Small public water systems can receive technical advice from various sources, including the New York Rural Water Association. You can contact the New York Rural Water Association at:

http://www.nyruralwater.org/bulletins/wellhead_protection.pdf
or by contacting Mr. Steve Winkley at 1-888-NYRURAL.

For individuals with private wells there is a comprehensive program that exists for their source water protection. The program is called Home*A*Syst. The program's objective include:

- Identify pollution risks and health hazards found inside the home and around the property.

- Learn more about better home and property management, and where to find additional information.

- Develop a plan to safeguard the health and well being of the family, enhance the financial value of the home, and protect the environment from contamination. Identify pollution risks and health hazards found inside the home and around the property.

Additional information on Home*A*Syst can be found at:

http://www.human.cornell.edu/txa/extension/wq/homeasyst.cfm

For information on these and other source water protection programs in New York State please contact:

Jane Thapa
New York State Department of Health
Bureau of Public Water Supply Protection
Flanigan Square
547 River Street
Troy, NY 12180-2216
800-458-1158 extension 2-7713

Phone: 518-402-7713
Fax: 518-402-7599
E-Mail: jct02@health.state.ny.us

Before the start of any CEM initiative it is recommended that you review information about your drinking/source water in your area of study. This will not only assist in answering some of the questions asked in Tier 1, but will also provide valuable insight into what some of the concerns in your area of study may be.

4.4 GIS and Mapping

Geographic Information Systems (GIS) refer to various computer programs that can be used for the viewing, storing, manipulating, and analyzing of spatial information and databases. GIS uses a combination of points, lines and polygons with "real world" X/Y (example – latitude/longitude) coordinates to create virtual shapes that have areas, lengths, coordinates and other spatial attributes. Once these shapes are created, GIS then uses databases to store attribute information about these shapes.

The most important function of any GIS is to manage the relationship between shapes and their attributes "automatically" for the user. This allows the user to interact with their data using either spatial or database attributes. This interchangeability enables GIS users to find, list, query, merge, overlay, clip, link, measure, dissolve, categorize, buffer, join and map spatial information.

For more information about what GIS is see:
http://www.gis.com/whatisgis/index.html

There are many different types of GIS software available. They range in price from free to thousands of dollars. Many county and local governments and their agencies already use some type of GIS. Many of these same organizations also create, gather and/or maintain a variety of GIS data. This data is often freely available to interested users. Always check with groups mentioned at the beginning of this chapter for the availability of GIS resources and data.

For more information on GIS, its software and data sources see:
http://www.nysgis.state.ny.us/gateway/mg/faq.htm

GIS and GIS formatted data are important tools for any CEM initiative. They can be used to create, combine and/or overlay many different layers of information representing environmental data in your project area. GIS assists users with locating and identifying areas with multiple attributes (which is much more difficult to do with traditional paper maps) such as forested wetland areas

within a particular floodplain, the ratio of impervious surface compared with land use type, or areas where prime farmland soils, active agriculture and parcel size is over 100 acres to list a few examples. GIS can be used to track and compare environmental changes over time. GIS can be used to create maps.

There are many existing sources of environmental and demographic GIS data that you may want to use for your CEM initiative. Much of this data may be readily available in your area; others may only have limited data sets. Your use of GIS will depend on your local resources and data. There are many local, state and federal organizations that provide access to a wide variety of data GIS data. Your CEM initiative would most likely benefit from using GIS and GIS data. Here are some introductory sources of GIS information and data sets:

http://www.nysgis.state.ny.us/gateway/mg/faq.htm
http://www.geodata.gov/
http://www.epa.gov/greenkit/mapping.htm
http://www.geographynetwork.com

Hardcopy maps can also be used for examining and understanding spatial relationships for your CEM initiative if using GIS is not feasible or key data sets cannot be found. Maps themselves are often used to make management and planning decisions. Information about soils, wetlands, recreational areas, public lands, land use, zoning, elevations, aerial photos, satellite imagery, conservation areas, landfills, streams, aquifers, wells, endangered plants/animals and a host of other features have been mapped for most areas. Using the information on existing maps can be a quick and easy way to examine your area of study.

Much of the relevant information for your area of study may have already been mapped in previous planning efforts. Municipal master, open space, natural resource inventory and other plans often have maps representing various environmental features. These maps have features that need to be examined under a CEM initiative, but these features are usually mapped on distinct separate maps.

It is much more difficult to locate specific areas and overlay different features when they are found on hardcopy maps. This is the main reason that GIS has become a commonplace tool in many work environments. I would encourage at least an attempt to use some form of GIS in your CEM analysis. It is an excellent tool for seeing spatial relationships and combining features to get the “big picture.” Many of the datasets mentioned in the remaining sections of this chapter exist in GIS form.

4.5 Land Use / Land Cover Data

Land use refers to human activities occurring on the land. Land use is an abstraction because it is difficult to visualize and express all the possible human uses for a particular parcel of land. Land cover refers to the vegetative and manmade features covering the land surface. Land cover is less abstract than land use because it is a visual inventory of features located on the land's surface. Land use and land cover are directly related and inseparable. This guide will refer to both interchangeably because of this relationship.

Land use / land cover information about you project area is extremely important for conducting a CEM initiative. This data can provide valuable information about natural resources and human development in your area and where they are located. Whether the data exists on paper maps or electronically in GIS (Geographic Information System) you will want to collect as much information as possible about past, present and future land use / land cover.

Municipal, countywide, watershed and many other plans often include some type of land use / land cover maps. Whenever possible the group(s) responsible for conducting these plans should request this data (if developed by consultants or other "outside" groups - they should also request all of the data used to create these plans and maps, hopefully in electronic form.) The data is derived from aerial photography or satellite images. If no data exists for your project area it is possible to develop your own land use /land cover data using these sources or you can use the datasets mentioned later in this section.

If electronic data exist about land use / land cover it will typically be in GIS form. This guide will cover some basic information about GIS in Section 4.7. The New York State GIS Clearing House at http://www.nysgis.state.ny.us can provide you with excellent information about general GIS issues, obtaining GIS data and answering GIS questions. They have also provided a listing, with links, to useful GIS software at http://www.nysgis.state.ny.us/gateway/mg/faq.htm.

4.5.1 National Land Cover (NLCD) Data

This land cover data set was produced as part of a cooperative project between the U.S. Geological Survey (USGS) and the U.S. Environmental Protection Agency (USEPA) to produce a consistent, land cover data layer for the conterminous U.S. based on 30-meter Landsat thematic mapper (TM) data. National Land Cover Data (NLCD) was developed from TM data acquired by the Multi-resolution Land Characterization (MRLC) Consortium. The MRLC Consortium is a partnership of federal agencies that produce or use land cover data. Partners include the USGS (National Mapping, Biological Resources, and Water Resources Divisions), USEPA, the U.S. Forest Service, and the National Oceanic and Atmospheric Administration.

The New York NLCD (last edited 07-06-2000) set was produced as part of a project area encompassing portions of Federal Region II, including the states of New Jersey and New York. This data set was produced under the direction of The MRLC Regional Land Cover Characterization Project of the USGS EROS Data Center (EDC), Sioux Falls, SD. Questions about the data set can be directed to the MRLC Regional Team at (605) 594-6114 or mrlc@edcmail.cr.usgs.gov.
Metadata -
http://edcftp.cr.usgs.gov/pub/edcuser/vogel/states/new_york_FGDC.txt

Data Sets -
http://edcftp.cr.usgs.gov/pub/edcuser/vogel/states/

4.5.2 USGS Land Use and Land Cover (LULC) Data

Land Use and Land Cover (LULC) data consists of historical land use and land cover classification data that was based primarily on the manual interpretation of 1970's and 1980's aerial photography. Secondary sources included land use maps and surveys. There are 21 possible categories of cover type. Along with the LULC files, associated maps are included which provide additional information on political units, hydrologic units, census county subdivisions, and Federal and State land ownership.

LULC data is available for the conterminous U.S. and Hawaii, but coverage is not complete for all areas. The data is based on 1:100,000- and 1:250,000-scale USGS topographic quadrangles. All LULC files are cast to the Universal Transverse Mercator (UTM) projection, and referenced to the North American Datum of 1983 (NAD83). The files are available in GIRAS (Geographic Information Retrieval and Analysis System) or CTG (Composite Theme Grid) format at http://edc.usgs.gov/products/landcover/lulc.html.

4.5.3 Gap Analysis Program (GAP)

Gap analysis is a scientific method for identifying the degree to which native species and natural communities are represented in our present-day mix of conservation lands. Those species and communities not adequately represented in the existing network of conservation lands constitute conservation "gaps." The purpose of the Gap Analysis Program (GAP) is to provide broad geographic information on the status of ordinary species (those not threatened with extinction or naturally rare) and their habitats in order to provide land managers, planners, scientists, and policy makers with the information they need to make better-informed decisions.

To achieve this, GAP is the first state- and national-level effort to complete the following:

- Map existing natural vegetation to the level of dominant or co-dominant plant species;
- Map predicted distribution of native vertebrate species;
- Map public land ownership and private conservation lands
- Show the current network of conservation lands;
- Compare distributions of any native vertebrate species, group of species, or vegetation communities of interest with the network of conservation lands;
- Provide an objective basis of information for local, state, and national options in managing biological resources.

For more information on GAP visit http://www.gap.uidaho.edu/.

Some additional sources of landuse / landcover data can be found at: http://www.nysgis.state.ny.us/reports/needs6.htm

A thorough examination of the land use / land cover in you area is important to a CEM initiative. The relationship between human activities (especially how and where we use the land's surface) and what impact that may or may not have on the natural environment is the primary focus CEM. As you become familiar with the land use / land cover for your study area, this relationship will most likely become clearer.

Land use / land cover information can help quantify the impact of human activities on the land's surface. It can also be used to visualize and measure the distances and relationships between physical features. Sometimes it is not the amount of a particular activity that is taking place, but where it is taking place that is of importance. As you answer questions on various worksheets or examine possible strategies / management options consider the land use / land cover of your study area into your responses.

4.6 Aerial Imagery

Aerial imagery is the wide category of data that includes images taken from above the earth's surface. These images are typically taken from airplanes or satellites using special photographic equipment. These images provide valuable information about the earth's surface features. They are particularly useful for tracking changes over time because many areas of the state have been photographed about once a decade for about the last century. Much of this information exists only in paper form, but there are efforts underway to convert these older images into electronic form.

4.6.1 Aerial Photography

Aerial photography is defined as any photography taken from the air. Typically, aerial photographs are taken with specialized, high-quality, large format cameras that point down vertically from the aircraft to the ground below. Orthophotography is derived from overlapping vertical aerial photography.

Many local USDA NRCS offices have hardcopy aerial photographs for their respective counties. These photographs typically cover the entire county and usually have been taken at various times. The newer (since about 1995) data collected by the USDA NRCS exists electronically as digital orthoimagery

4.6.2 Digital Orthoimagery

Digital Orthoimagery is a remotely sensed digital picture, stored in a raster data format. It is a georeferenced image prepared from a vertical photograph or other remotely sensed data in which displacement of objects due to sensor orientation and terrain relief have been removed. This allows the electronic images to be easily tiled together and used directly by most GIS systems. Once in GIS these images can be used as an overlay, backdrop or ground-truthing check for any other GIS data you have collected for your area of study. For more information on New York State's current digital orthoimagery program please use the following contact information:

General and Software Questions -
http://www.nysgis.state.ny.us/gateway/mg/faq.htm

Current Data Sets -
http://www.nysgis.state.ny.us/gateway/mg/download.htm

4.6.3 USGS Topographic Maps

Most USGS topographic maps are created using aerial imagery. Some topographic maps now use aerial imagery for their backgrounds. These maps represent features on the earth's surface using a standardized set of symbols and colors. This assists topographic map users because they do not have to do as much "interpretation" of these features as they would have to for a standard aerial image.

There are many sources of topographic maps and most electronic forms can be used directly by GIS systems. They can be useful tools for providing a "standardized" mapping reference for an area of any size and/or location. There is a problem however using topographic maps, many topographic maps do not get frequently updated and some maybe based on 50-year old+ data. Always

check the dates of the topographic maps you are using to give yourself an idea of how relevant these maps may or may not be for your area of study.

Aerial images can provide insight into the changes that have occurred in your area of study. They can also be used as reference layers and often are the most current dataset available that show features on the earth's surface. For these reasons you may want to collect and use some form of aerial imagery for your CEM initiative.

4.7 Planning Documents

Most county and municipal governments and their related agencies have a wide variety of existing plans and ongoing planning efforts. These plans and documents are created by various groups of professionals and experts. They offer invaluable insights and overviews of what is perceived as important or critical to a community's administration and residents. These documents also contain much of the relevant data and guidance you may need for your CEM initiative.

These plans and documents are filled with tables, maps, findings and recommendations for many different social, economic and environmental factors. The community to guide its future activities and decision-making then uses these plans. Some of the strategies and management options for water quality and natural resource issues recommended by CEM may be found in these documents as well.

Some examples of planning documents included:

- Water Quality Strategies
- Soil Surveys
- Master Plans
- Zoning Plans
- Agricultural Preservation Plans
- Countywide Plans
- Open Space plans
- Natural Resource Inventories
- Flood Mitigation Plans
- Stormwater Plans
- Build-out Plans

What separates a CEM initiative from these planning efforts? Our focus is solely on creating locally led solutions to environmental issues and concerns. CEM also offers a different format, by expanding on issues and offering multiple solutions to choose from. By working through the CEM process together, questions can be more easily answered and direct technical assistance provided.

You will want to use these existing plans and documents (and the information they contain especially if it can be obtained separately) as background information and guidance for your CEM initiative. Ultimately in later tiers of CEM, you may want to append some of these plans with new CEM derived plans. It is important to remember that CEM was not created to replace traditional planning efforts; it was created to enhance them.

4.8 Other Data

There are many additional types of data that can assist with your efforts when working with local communities. They are listed here because not all CEM efforts will need this data and not all communities may have this data readily available. These are still important data sets and they should be examined as needed to assist your CEM efforts. As mentioned earlier in this chapter, always check with the following agencies first for your local data needs:

- USDA NRCS Offices
- County Soil and Water Conservation Districts
- County Planning or Conservation Offices
- Municipal (Planning) Offices

Zoning
Zoning maps and zoning ordinances typically found at municipal planning offices. These will most likely vary for each municipality. For more information see NYS Department of State's Division of Local Governments Publications web site. http://www.dos.state.ny.us/lgss/list9.html

Tax Parcel Maps and Tables
Tax parcel maps and tables are typically found at county/municipal planning, taxation or assessment offices. If they exist in electronic for your area they may be in GIS and/or database form.

Flooding Information, GIS data and Maps
http://www.fema.gov/

Census Tables and Maps
http://www.census.gov/

Highway and/or Right-of-Way
Information regarding highway and/or right-of-way is usually found at municipal transportation, public works and/or highway departments. Information will most

likely vary for each municipality. For more general information see NYS Department of Transportations web site.
http://www.dot.state.ny.us

Aquatic & Terrestrial Resources
NYS Department of Environmental Conservation
http://www.dec.state.ny.us/

Cultural and/or Scenic Resources
NYS Parks, Recreation and Historic Preservation
http://nysparks.state.ny.us/

Agricultural Resources
NYS Department of Agriculture and Markets
http://www.agmkt.state.ny.us/index.html

Wetlands
NYS Department of Environmental Conservation
http://www.dec.state.ny.us/
US Fish and Wildlife Service
http://www.fws.gov/

Soil Information
State Soil Geographic Database (STATSGO)
http://www.ftw.nrcs.usda.gov/stat_data.html
Soil Survey Geographic (SSURGO) Database
http://www.ncgc.nrcs.usda.gov/branch/ssb/products/ssurgo/

Chapter 5 - Tier 1 Survey of Community Environmental Concerns

We have examined CEM's structure, methodology and some of the information that will most likely be necessary to guide communities through a CEM initiative. This has been done to prepare for the "big leap" ahead. That leap is actually going out into the field with CEM.

You may still have many questions/concerns at this point about CEM and your own role, involvement, resources, expertise and experience with facilitating a CEM initiative. The information and ideas covered by CEM are diverse and may take you into areas that are totally new to yourself and/or your agency. You may not be familiar working with elected officials or their representatives. You might think that this should be someone else's responsibility. You could be thinking that these issues are already being addressed at the local level and any intervention would just be medalling in their affairs. You may see this as just another planning effort destined to grow dusty on the shelves. Having gone through several CEM initiatives, I know these concerns entered my mind.

To ease these concerns I asked myself the following question. Do I think that local decision-making is the most important factor impacting agriculture, natural resources and water quality in New York State? My answer was then and still is - yes. What am I really doing about it? I had trouble thinking about how I made a tangible difference to the local decision-making process. I view CEM as an opportunity to make a difference, to help with the really hard work of changing the way people feel about, think about and plan for the natural environment. I can help show them that there are many options and resources able to assist in these efforts, we can change and we can develop win-win relationships that will help bring about a more sustainable future for ourselves and the environment.

5.1 Connecting with Local Communities

The first part of Tier 1 is connecting with local communities and their representatives. Many individuals and organizations that would initiate a CEM initiative most likely have many existing contacts with local community members. They probably have working relationships, partnership agreements and environmental stewardship responsibilities with local communities. Most would be involved with some type of watershed planning activities already. Connecting should be a logical extension of you and/or your agencies regular roles and responsibilities.

Connecting may be in one of the following ways:

- E-mail or call to you or your organization with a specific issue or set of issues that need addressing.
- A discussion about an area that has been identified as having some type of impairment or is under some type of stress.
- Already identified issue(s) or option(s) in an existing plan.
- CEM used as part of a larger initiative or funded project.
- As part of an ongoing effort in areas with known concerns.
- You're already an active participant and/or local decision-maker for your community and you think CEM would be a good tool to use as part of your future efforts.
- Any number of additional ways where CEM seems like the right fit for the community.

5.1.1 Skipping Tier 1 – The Handling of Specific Requests

If you receive a specific request for assistance in one of the areas covered by CEM you can go directly to the section in Chapter 6 that addresses that request. If you have been contacted for this type of assistance it is probably not necessary to contact local officials or try to move immediately into a full-blown CEM initiative. You may not want or need to do Tier 1 at this point. CEM has the flexibility to be a complete watershed management planning tool or a set of tools that address very specific/limited issues. It provides these tools with a strong focus on education and implementation. They are here to be used to promote CEM's goal. That goal is to establish effective local programs for addressing specific community concerns.

However, even if you are addressing only specific issues it still may be beneficial to have someone complete a Tier 1 worksheet in the future. Many of the topics covered by CEM are inter-related. The issue that is thought to be causing the concern may or may not be really be the primary issue that needs to be addressed. For example, municipal land use decisions impact almost every topic covered under CEM. Treating the symptoms is a step in the right direction, but treating the disease is better. The information collected in Tier 1 will also give you an improved perspective of your area and the issues that are perceived to be of concern. If we could get all of the municipalities in New York to fill out just Tier 1, we would have an excellent idea of where to focus our overall efforts.

5.1.2 Contacting Local Officials

Before you begin working in a particular area you will want to notify the local official(s) about the CEM process and its goals. You can met with (or call) them and provide them with sample materials and brochures. It is important to

let them know what's going on in their municipality and watershed. The last thing they need is to be blind-sided by recommendations that were obtained through an "outside" process for good or bad. They need to briefly understand what CEM offers and have a quick explanation of how CEM works. They will need to know how you became interested working in their area, that you are here to help and that this is a voluntary/non-regulatory effort. Almost all local officials will be glad to have your assistance. Some officials may even want to enter into more formal agreement(s) with you and/or your agency.

Once contacted the local official(s) can guide you to individuals and/or groups that will assist you with your CEM initiative. It makes it a lot easier to contact and work with these individuals and groups when you have the support of local officials. Municipal department supervisors, consultants, planning boards, conservation advisory boards, watershed coordinators, water quality committees, concerned citizens and other related parties will often be recommended for inclusion.

5.1.3 Local Support Team

Whoever is recommended to be part of your local CEM team will need a similar introduction to CEM that the local official(s) received. This will give you a chance to discuss roles/responsibilities and give you an idea of their expertise and what resources may be available for use as part of your CEM initiative. It is usually these individuals that truly understand the inner workings of their communities and have years of local experience to draw from. If "better" environmental decisions are going to be made and put into practice, it is these individuals that will make it happen. An open and honest working relationship with these individuals will be critical to your success.

5.2 Conducting the Survey of Community Environmental Concerns

The Survey of Community Environmental Concerns should take about an hour to complete. It will often be completed with planning boards, conservation advisory boards, town supervisors, town department supervisors, watershed coordinators and concerned citizens as mentions in the previous section. The sections noted below with * indicates that you may want to do some background data collection and analysis before answering them. If you are unable to answer questions or are unsure of the stated answer, don't worry. Those questions can be answered at a later time. Don't get caught up into the details at this point, these questions are asked to determine the generalized concerns and important issues in your area, the specifics are covered in Tiers 2 and 3.

Here is a listing and description of the sections (most are self-explanatory):

Contact Information – Provides basic contact information and also identifies the type of area being assessed.

* Current Land Use Information – Identifies the breakdown of current percentages for different land uses in your study area. Using GIS data will most likely provide the most accurate percentages. If you don't have GIS data you can make estimates as a group. It may also be insightful to make estimates as a group, and then check to see how your numbers compare to the GIS derived percentages.

* Important Waterbodies – Identifies any critical waterbodies in your study and identifies their recreational use(s).

Drinking Water Supply – Identifies the breakdown of percentages for the sources of drinking water for study area and if any aquifers are present.

* NYSDEC Priority Waterbodies – Identifies any NYSDEC PWL listed waterbodies and their impairments for your study area.

* NYSDOH Source Water Assessment Report – Identifies NYSDOH Source Water Assessment information for your study area.

Begin Community Assessment – Identifies how many people participated in conducting the Survey of Community Environmental Concerns and what significant land use changes are anticipated over the next five years.

Specific Issues -

- Farmland Protection
- Onsite Wastewater Treatment System Management
- Stormwater Management
- Flooding
- Drinking Water Source Protection
- Highway and Right of Way (ROW) Maintenance
- Sustainable Development
- Terrestrial Fish and Wildlife Habitat Management
- Aquatic Fish and Wildlife Habitat Management
- Marinas and Recreational Boating

Other Related Issues – Related issues, information, assessment tools or programs that you may want explore or promote.

Tier 1 - Worksheet

COMMUNITY ENVIRONMENTAL MANAGEMENT

TIER 1
SURVEY of COMMUNITY ENVIRONMENTAL CONCERNS

INSERT MAP OF PROJECT AREA HERE

CONTACT INFORMATION

Last Name: _____ First Name: _____
Title: _____
Entity/Organization Name: _____
Name of Municipality(s) in assessment area: _____
Address: _____City: _____
State: _____ Zip Code: _____County: _____
Phone Number: _____Fax: _____Email: _____

Please describe the type of area being assessed:

- ☐ Community/Municipality, Name _____
- ☐ Wellhead Protection Area, Name_____
- ☐ Watershed, Name_____
- ☐ Other (Please Specify) _____

CURRENT LAND USE INFORMATION

High Density Residential	_____%	Forest	_____%
Low Density Residential	_____%	Open Water	_____%
Commercial/Industrial/Transportation	_____%	Wetlands	_____%
Agricultural-pasture/hay	_____%	Quarries/strip mines/gravel pits	_____%
Agricultural-row crops/orchards	_____%		
Urban/recreational grasses (e.g. golf courses)	_____%		

IMPORTANT WATERBODIES

Significant waterbodies within area to be assessed, please list:

_____

_____

Do these waterbodies also provide significant fisheries and/or recreational benefits to the community? ☐ yes ☐ no ☐ unknown

Explain:

_____

_____

NYSDEC Priority Waterbodies List Summary Information

The New York State Department of Environmental Conservation's Division of Water maintains a Priority Waterbodies List (PWL) of waterbodies that have water quality impairments due to nonpoint sources of pollution. These lists can be obtained from your Regional NYSDEC Office. Summarize information from the PWL for your assessment area.

Segment ID And Location	Water Use Classification	Primary Use Affected	Severity of Impairment	Pollutant(s) of Concern	Suspected Source(s)

DRINKING WATER SUPPLY

1. Source of assessment area's drinking water supply:

Drilled well _____% Reservoir _____% Lake _____% River _____%

Spring _____ % Other, specify ( )_____%

2. Is the assessment area (whole or in part) located over an aquifer? Primary _____% Principal _____% Other _____% none _____

NYSDOH Source Water Assessment Report

The New York State Department of Health has conducted a susceptibility analysis of each source of water that is used to supply drinking water to the public. The analysis involved evaluating the likelihood that a source of public drinking water could become contaminated. Use the table below to summarize the potential sources of contamination for those public water supplies that the NYSDOH has determined to be most at risk within your assessment area.

SOURCE WATER ASSESSMENT RESULTS **Name of public drinking water supply_____** **Source (e.g. well, stream, lake, reservoir)_____**			
Potential Sources of Contamination	**Contaminates of Concern**	**Description**	**Potential Impact to Source Water Quality**

BEGIN COMMUNITY ASSESSMENT:

1. How many people participated?_____

2. Do you anticipate significant land use changes within your assessment area in the next 5 years? □ yes □ no □ unknown

If yes, please describe the type of land use changes you anticipate:

INSERT ANY ADDITIONAL MAPS AND/OR RELATED MATERIAL HERE

SUSTAINABLE DEVEOPMENT

"How can we ensure that development in our communities is sustainable and based on sound ecological principles?" The simple answer is that the tools and techniques for encouraging and facilitating sustainable development habits are available. The more difficult issue to cope with is that sustainability requires that our emphasis shift from "managing resources" to managing *ourselves,* and that we learn to live as part of nature rather than apart from it, and that our economics become a component of human ecology and intimately intertwined with nature. This set of worksheets begins to lay out the vision and raise questions that need to be addressed in terms of planning for a more sustainable future.

Issue	Yes	No	?	Level of Concern			Location(s)	
				H	M	L		
Growth is occurring without planning for environmental sustainability.								
Village centers abandoned in favor of strip development.								
Subdivisions designed and built without consideration of natural resource of the site.								**Recommended CEM Assessment Worksheet(s)**
Rural countryside left vulnerable to future development which could threaten natural entities that are valued by the town.								**Sustainable Development**
Sprawl (unplanned growth) • Loss/encroachment on farmland • Loss of open space and scenic amenities								

Additional Comments related to Sustainable Development:

FLOODING

In the past century, we have seen a rise in the amount of damage to public and private property from flooding. While it may be linked to climatic fluctuations (e.g. El Nino), it is most permanently affected by land use changes that have occurred as a result of development. For the most part, lack of understanding of ecosystem function, poor planning, and general indifference have jeopardized our safety when it comes to flooding. These land use changes are limiting the area that is available to manage these excessive flows, and as a result, life and property are at risk.

Issue	Yes	No	?	Level of Concern			Location(s)	
				H	M	L		
Storm sewers backing up								
Culverts and Bridges overtopped and damaged during storm events								**Recommended CEM Assessment Worksheet(s)**
Streams overtopping more frequently								
Failure of existing flood control structures								
Flooding of homes, businesses, public buildings and highways								**Flooding**
Community lacks consensus on flood management issues and what can be done to address them								**Related Worksheets: Stormwater**
Increased operating and maintenance costs for the existing flood management infrastructure								

Additional Comments related to Flooding:

HIGHWAY AND RIGHT OF WAY (ROW) MAINTENANCE

Our economy relies on effective transportation of goods and people along safe and convenient roads. Unfortunately, roads are often significant contributors to poor water quality. Runoff from natural rain events and melting snow washes over the landscape and picks up material as it travels along. As runoff flows over roadways, road construction sites, highway maintenance garages and road maintenance operations, it picks up sediment, heavy metals, oils, pesticides, herbicides, fertilizer, road salt and debris. These contaminants are transported into our streams, lakes, wetlands and rivers, impairing their water quality and decreasing their aesthetic value. This in turn can lead to a negative effect on tourism and the economy.

Issue	Yes	No	?	Level of Concern			Location(s)	
				H	M	L		
Streams flood over the road and/or flooding has removed road								**Recommended CEM Assessment Worksheet(s)**
Water overflows road at culvert or catch basins are backing up								
Erosion is occurring around culverts, or there has been culvert blowouts								
The bottom and/or sides of ditches are eroding or slumping								**Highway & Right of Way Maintenance**
We have mud flows and/or chronic black ice on roadways								
Muddy water is running off highway construction and/or maintenance sites								**Related Worksheets: Stormwater Management & Flooding**
We are concerned about how best to manage winter weather operations								
We are concerned about how best to manage vegetation along roadways								

Additional Comments related to Highway & ROW Maintenance:

STORMWATER MANAGEMENT

Either through lack of information about of ecosystem functions, poor planning, or just plain indifference to natural stormwater runoff processes, humans, through construction and development activities, have created a number of problems for themselves and nature. The first and perhaps most obvious problem is development in floodplains, putting life and possessions in jeopardy. Second, the development and urbanization of uplands has increased erosion and accelerated the runoff process altering natural resource patterns and increasing the flood hazard. Finally, many of civilization's contaminants are transported in stormwater runoff, which ultimately can enter and degrade the quality of streams, rivers, lakes, wetlands and estuaries.

Issue	Yes	No	?	Level of Concern			Location(s)	
				H	M	L		
Frequent overtopping of stream banks or Increase in frequency and duration of overtopping of ditches, culverts, roads or bridges								**Recommended CEM Assessment Worksheet(s)**
Decreased groundwater recharge and decreased stream base flows								**Stormwater Management**
Increased stream temperatures								**Related Worksheets: Highway & ROW & Flooding**
Unstable stream channels								
Water quality impairments								

Additional Comments related to Stormwater Management:

AQUATIC FISH AND WILDLIFE HABITAT MANAGEMENT

Aquatic fish and wildlife habitat encompasses many different types of natural features, including stream and river corridors, wetlands, lakes, ponds and reservoirs. Aquatic habitat is not only important to the fish and wildlife that inhabit them, but also to the people around them. The health of this habitat has a real impact on the quality of life, recreational value, and economic benefits in your community. As a result, it is important to maintain necessary habitats in order to maintain individual species, ecosystems, and biodiversity.

Issue	Yes	No	?	Level of Concern			Location(s)	
				H	M	L		
Loss of aquatic habitat in streams, rivers, lakes, ponds and reservoirs ___Loss of spawning areas ___Loss of feeding & growth habitat ___Loss of resting &shelter area ___Loss of winter habitat								**Recommended CEM Assessment Worksheet(s)** **Aquatic Fish & Wildlife Habitat Management** **Related Worksheets: Stormwater Management & Flooding**
There are barriers to migration for fish & other organisms in streams and rivers								
Degraded health of streams, rivers, lakes, ponds & reservoirs diminishing capacity to sustain/support aquatic species)								
Algae blooms and excessive weed growth								
Degraded wetland/vernal pool health								
Invasive Species								

Additional Comments related to Aquatic Fish & Wildlife Habitat Management:

TERRESTRIAL FISH AND WILDLIFE HABITAT MANAGEMENT

Terrestrial fish and wildlife habitat encompasses many different types of natural features, including forests, shrublands, grasslands, vernal pools, wetlands, early successional areas, and unique natural areas. Terrestrial habitat is not only important to the fish and wildlife that inhabit them, but also to the people around them. The health of this habitat has a real impact on the quality of life, recreational value, and economic benefits in your community. As a result, it is important to maintain necessary habitats in order to maintain individual species, ecosystems, and biodiversity

Issue	Yes	No	?	Level of Concern			Location(s)	
				H	M	L		
We have problems with nuisance wildlife ___Deer ___Geese ___Beaver _____Other(s)								**Recommended CEM Assessment Worksheet(s)** **Terrestrial Fish & Wildlife Habitat Management** **Related Worksheets: Sustainable Development**
Do you have health concerns about: ___Lyme disease ___West Nile Virus ___Rabies ___Chronic Wasting Disease								
Loss of recreational land and/or access (e.g. hunting, fishing, trapping, hiking, viewsheds)								
Invasive species are crowding out native species (e.g. Asian Longhorn Beetle, Phragmites, Purple Loosetrife, Japanese Knotweed, Mute Swans)								
Loss of types and number of species due to habitat loss and degradation[1]								
Loss of travel corridors for wildlife								
Loss of ecosystem function								

Additional Comments related to Terrestrial Fish & Wildlife Habitat Management:

ONSITE WASTEWATER TREATMENT SYSTEM MANAGEMENT

In New York State, local governments have the principal responsibility for controlling development activities through their planning and regulatory functions. This role carries with it the responsibility for ensuring that development is undertaken with public health and safety in mind, and in a manner that is compatible with the protection and enhancement of natural resources, especially water. As community development continues to increase, the number of sites with suitable soils, slopes, and sufficient area for septic systems can be expected to decrease. If sewers are not affordable, there will be greater demand for replacement of failed systems and design review for new systems. Federal and State technical standards do not fully consider all the natural resource impacts from developments that rely on septic systems. It is up to communities to take the initiative to manage the wastewater from these developments to protect themselves from decreased property values, possible public health problems, and reduced water quality.

Issue	Yes	No	?	Level of Concern			Location(s)	
				H	M	L		
Septic effluent is surfacing in yards and roadside ditches, or backing up into homes.								**Recommended CEM Assessment Worksheet(s)**
Septage transporters have insufficient access to permitted/approved waste treatment and disposal facilities .								
Algae blooms or weed growth are a nuisance.								**Onsite Wastewater Treatment System Management**
Questions about soil suitability and site limitation for onsite wastewater treatment.								
Old, outdated and/or non-compliant systems								

Additional Comments related to Onsite Wastewater Treatment System Management:

FARMLAND PROTECTION

Fertile soils take thousands of years to develop. Creating them takes a combination of climate, geology, biology and good luck. So far, no one has found a way to manufacture them. Thus, productive agricultural land is a finite and irreplaceable natural resource. Agricultural land also supplies products with little market value, but enormous cultural and ecological importance. Some are more immediate, such as social heritage, scenic views, open space and community character. Long-range environmental benefits include wildlife habitat, clean air and water, flood control, groundwater recharge and carbon sequestration. Yet, despite its importance to individual communities, the nation and the world, our farmland is at risk. It is imperiled by poorly planned development, especially in urban influenced areas, and by the complex forces driving conversion.

Issue	Yes	No	?	Level of Concern			Location(s)	
				H	M	L		
Unplanned or poorly planned suburban Development (sprawl)								**Recommended CEM Assessment Worksheet(s)**
Erosion of the local agricultural economy								
Public works projects (ex: post offices, schools) built on prime agricultural land when other alternatives exist								**Farmland Protection**
Decline in agricultural support infrastructure								
Closing of long standing farm operations								**Related Worksheets: Sustainable Development**
Neighbor complaints and lawsuits regarding routine farm operations								

Additional Comments related to Farmland Protection:

DRINKING WATER SOURCE PROTECTION 2 pages

Source Water is the water from rivers, streams, lakes and ground water that is used to supply communities with drinking water. Source water protection involves taking positive steps to manage potential sources of contamination and to prevent pollutants from reaching or contaminating sources of drinking water. Wellhead protection, for example, seeks to prevent the contamination of ground water that supplies public and private drinking water wells. Protecting the water source from contamination is often more efficient and cost-effective than treating drinking water later to make it safe to drink. The types of protection measures that a community can implement include local land use controls such as land acquisition and ordinances and other management tools such as contingency plans and public education initiatives. The protection activities that a community pursues will depend on the how susceptible to different types of contamination the water source is, as well as the resources identified or available for use in protection as specified in the source water protection plan.

Issue	Yes	No	?	Level of Concern			Location(s)	
				H	M	L		
Committee for Source Water Protection, Involving Local, State, and Federal Agencies and other interested parties has not been organized, or Coordination of Programs Addressing Source Water Resources (aquifer protection, drinking water watershed protection) is lacking								**Recommended CEM Assessment Worksheet(s)**
Drinking Water Contamination or Contamination Threat Insufficiently Characterized								
Available Information about Drinking Water Sources Does not Provide Basis for Effective Protection								**Drinking Water Source Protection**
Inventory of Practices or Potential Sources of Contamination is not Complete, so Protection Needs have not Been Identified								**For Private Water Supplies use Home*A*Syst**
Proposed Land Use Changes (or specific proposed projects) may Increase Potential for Impact on Drinking Water Source								
CONTINUED NEXT PAGE								

Security or Emergency Response Plan for Source Area Protection is Missing, Incomplete, or Inadequate								
Regulations or Existing Management Plans not Sufficient to Manage Source Water area & the Ability to enforce existing regulations lacking or unclear								**Recommended CEM Assessment Worksheet(s)**
Water Quantity Insufficient								**Drinking Water Source Protection**
								For Private Water Supplies use Home*A*Syst
Additional Comments related to Drinking Water Source Protection:								

MARINAS AND RECREATIONAL BOATING

Many people enjoy being "on the water." Fishing, sailing, racing and cruising are an integral parts of our state's recreational activities and economy. Keeping our marinas and waterways free from the potential negative impacts of these activities will ensure future recreational opportunities in the years to come.

Issue	Yes	No	?	Level of Concern			Location(s)	
				H	M	L		
Insufficient information on how to design and construct marinas and ports for water quality and habitat protection.								**Recommended CEM Assessment Worksheet(s)**
Known maintenance activity problems								
Improper Hazardous Material Handling, Transport and Storage								**Marinas and Recreational Boating**
Improper Disposal of Solid Waste								
Marina Runoff polluting waterways								**Related Worksheets: Stormwater Management**

Additional Comments related to Marinas and Recreational Boating:

OTHER RELATED ISSUES

Issue	Yes	No	?	Level of Concern			Location(s)	Assessment and/or Tools
				H	M	L		
Agricultural Runoff								**AEM Tier II Worksheets**
Contaminated Private Water Supply(s)								**Home*A*Syst**
Timber Harvesting Activities								**AEM Tier II Worksheet Forest Management**

5.3 Survey of Community Environmental Concerns Summary Findings

After completing the survey you and your team should have a clearer idea of the issues and concerns that you would like to address. You have discussed and prioritized these concerns. Based on your prioritization, you know where to start and have a good idea of the information that you need to collect and analyze. You have also identified key decision-makers and additional sources of assistance.

You can now distribute the Tier 2 worksheets that you have identified as part of your next efforts. This will give everyone a chance to explore the background information and resources provided by CEM regarding these topics. You may want to introduce additional related materials. You may want to involve other individuals and agencies with more experience and/or expertise. The direction you take from here is entirely up to you.

5.4 Defining Expectations, Commitment and Levels of Effort

A large part of the direction that your future CEM efforts will take involves defining expectations, commitment and levels of effort at this time. It is unrealistic to think that every issue can be addressed. It is also unrealistic to think that this will be fast moving and produce immediate results. As you move into Tiers 2 and 3 and start to examine which strategies and management options might work best in your community keep these things in mind.

Your own involvement should be examined and discussed with your CEM team. There are some difficult questions to attempt answering:

- How much assistance can you and/or your agency realistically offer?
- How can I keep involved without being over-involved?
- When will the community truly be able to move forward with CEM without me and/or my agencies support?
- Is there someone in the community that can act as a “spark plug” to get and keep things rolling?
- Are there critical times that they will really need my support?
- Who can I recommend to replace me if necessary?

There are no “right” answers to these questions. Simply be as open and honest as possible about your own expectations, commitment and level of effort. I can pretty much guarantee that any support you offer will be gladly accepted and can make a difference.

You can now move to Tier 2.

Chapter 6 - Tier 2 Specific Issues and Assessments

At this point, issues have already been identified and recommended for further examination. The Tier 2 worksheets are designed to educate and guide individuals (regardless of their level of experience or expertise with a specific issue) through a detailed examination of issues faced by their community. They have been complied by experts from across the state with years of experience addressing community needs. They have been designed specifically for the communities and the community structures of New York State. Their function is educational and their focus is on implementation. They have been condensed and consolidated to make the process as quick and easy as possible. They contain options that have a track record for success. They list additional resources for understanding and addressing community needs.

The worksheets use plain language. They attempt to phrase questions in a way that makes answering them easy. There are formatted in a logical order that guides you through a simplified process:

- Find out more about the issues.
- Answer some questions.
- Review the causes.
- Review the impacts.
- Review the strategies that can address the issues.
- Pick from a variety of management options ways you might like to address the issue.
- Discuss barriers that might have to be overcome to address the issue.
- Determine what community assistance may be needed to address the issue.

Once completed you are ready for the next Tiers.

The following sections that cover specific issues were designed with CEM's overall watershed-based approach in mind, but they can also be stand-alone worksheets. Not every community will examine all of the specific issues covered by CEM. By doing Tier 1 or addressing a specific inquiry, you should be able to determine which worksheet(s) are needed.

Tier 2A	Community Involvement/Roles Overview
6.1	Worksheet - Community Capacity Assessment

Tier 2B	Specific Issues and Assessments
6.4	Worksheet - Farmland Protection
6.5	Worksheet - Onsite Wastewater Treatment Management
6.6	Worksheet - Stormwater Management
6.7	Worksheet - Flooding
6.8	Worksheet - Drinking Water Source Protection
6.9	Worksheet - Highway & ROW Maintenance
6.10	Worksheet - Sustainable Development
6.11	Worksheet - Terrestrial F&W Habitat Management
6.12	Worksheet - Aquatic F&W Habitat Management
6.13	Worksheet - Marinas and Recreational Boating

In the future there may be additional worksheets on specific issues. Your guidance, feedback, opinions and needs will direct future efforts. If you have encountered or regularly work with other issues not covered by CEM and would like to see these issues put into worksheet format or have any other ideas for future materials, please let us know.

Potential Future Topics:
Forestry - Mining Operations - Transportation - Parks and Recreation
Stream Corridors & Stream Bank Stabilization -

Ideas:

6.1 Community Capacity Assessment

Some of the issues covered in Tier 2 are managed or handled by different groups or individuals in a community. They can assist your CEM efforts in the following ways:

- Determining how current environmental activities are being managed.
- Understanding how the community functions.
- Understanding inter/intra-community communication.
- Answering specific Tier 2B worksheet questions.
- Supporting, guiding and assisting future efforts.

The Community Capacity Assessment Worksheet works to assess a community's current ability to address water quality and other natural resource concerns by determining who these groups/individuals are, what is their area(s) of expertise, what training they have received, what efforts are currently underway and their status, who has regulatory authority over specific issues and who may be able to assist with a community's CEM efforts from outside of the community.

Sections of the Community Capacity Assessment Worksheet include:

- Local responsibilities
- Status of planning efforts
- Current regulatory authority
- Outside sources of assistance

After completing the Community Capacity Assessment Worksheet you will have a good idea of the community's infrastructure and staff. Some of the goals of CEM can be achieved simply by improving communications within these groups. Understanding the "players" and their roles will improve your ability to empower them. Ultimately enhancing everyone's efforts to bring about positive change.

Tier 2A - Community Capacity Assessment Worksheet

COMMUNITY ENVIRONMENTAL MANAGEMENT

COMMUNITY CAPACITY ASSESSMENT

(Assessing a community's current ability to address water quality and other natural resource concerns)

LOCAL RESPONSIBILITY

Please indicate in the table below who has responsibility in your community for addressing natural resource concerns:

Community Natural Resources Management Areas of Responsibility	**Boards and Departments Having Responsibility** (please list)	**Staff Available to Assist** (please identify by name) Technical	Inspection/Enforcement	**Expertise and/or Training Received** (Please describe)
Stormwater Management and Construction Erosion and Sedimentation Control				
Flood Mitigation				
Stream Corridor Protection				
On-site Wastewater Treatment System Management (septic systems)				
Highway and Right of Way Maintenance				
Natural Resource Protection				
Farmland Protection				
Drinking Water Supply Protection				
Sustainable Development				
Watershed Protection				
Marinas and Boat Launches				
Urban & Community Forestry				

STATUS OF PLANNING EFFORTS

Does the area being assessed have a Management Plan? □ yes □ no

If yes, does the plan address natural resource concerns? □ yes □ no

Have you updated the plan within the past 10 years? □ yes □ no

Do you plan to update the plan within the next 5 years? □ yes □ no

Does your community have GIS capability? □ yes □ no □ unknown

Please check which of the following maps been prepared for the area being assessed:

____Land use
____Water resources
____Landowner parcel/tax map
____Significant fish / wildlife habitats
____Zoning
____Prime and important farmlands
____Vegetative cover
____Scenic vistas/landscapes
____USGS topographical map
____Cultural, historic and archeological
____Greenway preservation map
____Soil suitability maps
____Geologic features
____Other (please specify)

CURRENT REGULATORY AUTHORITY

Local ordinances / regulations - please use "E" if existing and "UD" if under development:

___Wetlands protection
___Stormwater management
___Aquifer (wellhead) protection
___Scenic resources protection
___Construction site erosion and sediment control
___Floodplain management
___Stream corridor management
___Zoning (including overlay)
___Conservation provisions for development
___Site plan review requirements
___Fish and wildlife habitat protection
___Subdivision regulations
___Timber harvesting provisions
___Other (please explain)

OUTSIDE SOURCES OF ASSISTANCE

Which of the following groups does your community rely on for assistance?

Agencies, organizations and Private Sector Assistance	**Type of Assistance Received** (Please explain type of assistance being provided)		
	Informational	Technical assistance	Training
Consultant Engineer			
Environmental or Planning Consultant			
County Environmental Management Council			
County Soil & Water Conservation Districts			
Cornell Cooperative Extension			
County Dept. of Public Works			
County and/or Regional Dept. of Health			
County and/or Regional Planning			
County Water Quality Coordinating Committee			
NYS Dept. of State			
NYS Dept. of Environmental Conservation			
Other (please list)			

6.2 Accessing other Local Resources

After completing the Community Capacity Assessment Worksheet you may have found that there are many additional resources (inside and outside of the community) from which to build on. Getting them informed of and involved in your CEM efforts early on is the best way to achieve CEM's implementation later. Meet with or contact these individuals and explain how you're here to help. See if they would like to answer the questions on specific issue worksheets that they may be responsible for. As always, keep expectations, commitment and levels of effort for these groups and individuals in mind as you continue working through specific issues.

6.3 Working through Specific Issues

The Tier 2B worksheets have been formatted in a way that moves you quickly from education & identification - to plan - to action(s). They seek to act as a blueprint for your community's efforts. They are here to enhance existing programs and initiatives or help create new ones if needed.

Any additional information, ideas, programs, assessments or other materials on these issues is certainly welcome for inclusion as part of CEM. CEM is not about CEM. It is a toolkit that hopefully assists putting locally led environmental programs and initiatives in place. It has been developed solely to facilitate this process. The more tools we have to work with, the easier this task becomes.

The Tier 2B worksheets (and any additional materials you may want to provide) should be delivered in advance of filling them out. This will allow time for reading the introductory materials and the exploration of additional resources - if necessary. Without some background knowledge into the topics and issues some individuals may be unprepared to answer questions, make recommendations, or realize the importance/scope of the issue(s) covered.

The Tier 2B Worksheets contain the following sections:

Overview & Background Information –
Provides a brief overview of why the issue is important to the community and it's residents. It attempts to frame the issue within the context of both the natural environment and the community. It describes changes that have occurred in communities over time. It lists different management practices and applicable regulations. It summarizes how addressing issues can bring about social, economic and environmental benefits to a community.

Sources of Additional Support -
Lists various technical references used to create the worksheet. It lists websites, agencies, potential funding sources and other avenues of support of addressing the issue.

Issues -
Asks questions about the issue. It attempts to determine what issues the community is facing. These questions are similar to the summary questions asked in Tier 1.

Causes -
Lists the potential causes that may have created the issue or made it worse.

Impacts -
What real and tangible impacts is the community experiencing because of the issue.

Strategies -
A summary of the overall approach a community can take to address the issue.

Management Options -
A list of options, programs, recommendations and ideas that a community may have implemented (past or present) or have future interest in implementing to address the issue. CEM offers options for both the short and long term. Options that are low cost and higher priced. Options that are easy to implement and some that are more difficult. Options that need to be part of a larger plan or that could be their own project. The key here is diversity. CEM's flexibility and depth is summarized in these options. CEM has attempted to find the best working options available to address the issue. Hopefully there is an option(s) that fits for every community.

Barriers to Implementation -
What are or could be the barriers to implementation of the management options selected. What needs to be in place to put options into practice?

Community Assistance Needs -
What assistance a community needs to overcome the barriers to implementation or implement the options themselves.

Filling the worksheets out should be fairly straightforward. There are no hidden agendas or favoritism for one way of thinking over another. There is no blame assigned. There are no preferences for one management option over another. The worksheets simply try to define the issue and it's extent and offer solutions that have worked in other communities.

This guide contains summary information about each issue taken mostly from the Tier 2 worksheets themselves. It is here to act as a quick reference and summary of CEM's overall approach to addressing the issue. By familiarizing yourself with this summary information you may also find additional uses and situations where the worksheets might be useful. Each issue has been broken down into the following:

Environmental Significance Summary -
An overview of the specific issue and its relevance to important environmental and social factors.

Community Assistance Summary -
A list showing how the specific Tier 2B worksheets can assist communities.

Issues Summary -
A list of the main issues facing communities.

Strategies Summary -
A list of the major strategies for addressing specific community issues.

Community Benefit Summary-
A brief statement about the economic, social and environmental benefits that can be obtained by implementing some or all of the management options and strategies recommended in the Tier 2B worksheets.

6.4 Farmland Protection

Environmental Significance Summary:

Well-managed agricultural land supplies important non-market goods and services. Farmlands provide food and cover for wildlife, help control flooding, protect wetlands and watersheds, and maintain air quality. They can absorb and filter wastewater and provide groundwater recharge. New energy crops even have the potential to replace fossil fuels.

Converting farmland to development has detrimental long-term impacts on environmental quality. Water pollution from urban development is well documented. Development increases pollution of rivers and streams, as well as the risk of flooding. Paved roads and roofs collect and pass stormwater directly into drains instead of filtering it naturally through the soil. Septic systems for low-density subdivisions can add untreated wastes to surface water and groundwater, potentially yielding higher nutrient loads than livestock operations. Development often produces more sediment and heavy metal contamination than farming does and increases pollutants such as road salt, oil leaks from automobiles and runoff from lawn chemicals that can lead to groundwater contamination. It also decreases recharge of aquifers, lowers drinking water quality and reduces biodiversity in streams. Urban development is a significant cause of wetland loss.

Increased use of automobiles leads to traffic congestion and air pollution. Development fragments and often destroys wildlife habitat, and fragmentation is considered a principal threat to biodiversity. Keeping land available for agriculture while improving farm management practices offers the greatest potential to produce or regain environmental and social benefits while minimizing negative impacts. From wetland management to on-farm composting for municipalities, farmers are finding ways to improve environmental quality.

Community Assistance Summary:

- More fully understand farmland protection concepts and options.
- Assess where they are relative to implementing an effective farmland protection program.
- Identify farmland protection needs.
- Begin to map out a farmland protection strategy for the community based on where they are today.

Issues Summary:

- Unplanned or poorly planned suburban development (sprawl).
- Erosion of the local agricultural economy.
- Public works projects (ex: post offices, schools) built on prime agricultural land when other alternatives exist.
- Decline in agricultural support infrastructure.

- Closing of long standing farm operations.
- Neighbor complaints and lawsuits regarding routine farm operations.

Strategies Summary:

- Develop a farmland protection plan for your community.
- Increase public awareness of the importance of maintaining a viable agriculture industry within their community.
- Support farming and encourage its economic viability.
- Minimize conflicts between farmers and other rural residents.

Community Benefit Summary:

Saving farmland is an investment in community infrastructure and economic development. In addition, distinctive agricultural landscapes are often magnets for tourism. Agriculture contributes to local economies directly through sales, job creation, support services and businesses, and also by supplying lucrative secondary markets such as food processing. Planning for agriculture and protecting farmland provide flexibility for growth and development, offering a buffer against fragmented suburban development while supporting a diversified economic and environmental base.

Tier 2B – Farmland Protection Worksheet

Farmland Protection

Assessment Worksheet

Community Environmental Management

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CEM

Community Environmental Management

Community Environmental Management

Farmland Protection

- Assessment Worksheet -

Introduction

Why Save Farmland?*

Fertile soils take thousands of years to develop. Creating them takes a combination of climate, geology, biology and good luck. So far, no one has found a way to manufacture them. Thus, productive agricultural land is a finite and irreplaceable natural resource.

Agricultural land also supplies products with little market value, but enormous cultural and ecological importance. Some are more immediate, such as social heritage, scenic views, open space and community character. Long-range environmental benefits include wildlife habitat, clean air and water, flood control, groundwater recharge and carbon sequestration.

Yet, despite its importance to individual communities, the nation and the world, our farmland is at risk. It is imperiled by poorly planned development, especially in urban influenced areas, and by the complex forces driving conversion.

Agricultural land is desirable for building because it tends to be flat, well drained and generally is more affordable to developers than to farmers. As a result much more farmland is being converted than is necessary to provide housing for a growing population.

Fiscal & Economic Stability

Saving farmland is an investment in community infrastructure and economic development. In addition, distinctive agricultural landscapes are often magnets for tourism.

Agriculture contributes to local economies directly through sales, job creation, support services and businesses, and also by supplying lucrative secondary markets such as food processing. Planning for agriculture and protecting farmland provide flexibility for growth and development, offering a buffer against fragmented suburban development while supporting a diversified economic base.

Development imposes direct costs to communities, as well as indirect costs associated with the loss of rural lands and open space. Privately owned and managed agricultural land generates more in local tax revenues than it costs in services. Studies on municipal tax bills find that tax bills generally go up as communities become more developed. Even those communities with the most taxable commercial and industrial properties have higher-than-average taxes. Local governments are discovering that they cannot afford to pay the price of unplanned development.

* Condensed from American Farmland Trust Fact Sheet, *Why Save Farmland*, May 2002.

Environmental Quality

Well-managed agricultural land supplies important non-market goods and services. Farmlands provide food and cover for wildlife, help control flooding, protect wetlands and watersheds, and maintain air quality. They can absorb and filter wastewater and provide groundwater recharge. New energy crops even have the potential to replace fossil fuels.

Converting farmland to development has detrimental long-term impacts on environmental quality. Water pollution from urban development is well documented. Development increases pollution of rivers and streams, as well as the risk of flooding. Paved roads and roofs collect and pass stormwater directly into drains instead of filtering it naturally through the soil. Septic systems for low-density subdivisions can add untreated wastes to surface water and groundwater, potentially yielding higher nutrient loads than livestock operations. Development often produces more sediment and heavy metal contamination than farming does and increases pollutants such as road salt, oil leaks from automobiles and runoff from lawn chemicals that can lead to groundwater contamination. It also decreases recharge of aquifers, lowers drinking water quality and reduces biodiversity in streams. Urban development is a significant cause of wetland loss.

Increased use of automobiles leads to traffic congestion and air pollution. Development fragments and often destroys wildlife habitat, and fragmentation is considered a principal threat to biodiversity. Keeping land available for agriculture while improving farm management practices offers the greatest potential to produce or regain environmental and social benefits while minimizing negative impacts. From wetland management to on-farm composting for municipalities, farmers are finding ways to improve environmental quality.

Heritage & Community Character

To many people, the most compelling reasons for saving farmland are local and personal, and much of the political support for farmland protection is driven by grassroots community efforts. Sometimes the most important qualities are hardest to quantify – such as local heritage and sense of place. Farmland maintains scenic, cultural and historic landscapes. Their managed open spaces provide beautiful views and opportunities for hunting and fishing, horseback riding, skiing, dirt-biking and other recreational activities. Farms create identifiable and unique community character and add to the quality of life.

Finally, farming is an integral part of our heritage and our identity as a people. The ongoing relationship with the agricultural landscape connects us to our history and to the natural world. Our land is our legacy, both as we look back to the past and as we consider what we have of value to pass on to future generations. Public awareness of the multiple benefits of working lands has led to greater community appreciation of the importance of keeping land open for fiscal, economic and environmental reasons. As a result, people increasingly are challenging the perspective that new development is necessarily the most desirable use of agricultural land, especially in rural communities and communities undergoing transition from rural to suburban.

How This Worksheet Can Be Used To Assist A Community

This farmland protection worksheet can be used to help a community:

1) More fully understand farmland protection concepts and options
2) Assess where they are relative to implementing an effective farmland protection program
3) Identify farmland protection needs
4) Begin to map out a farmland protection strategy for the community based on where they are today

The worksheet includes:

Part 1 - Community Risk Assessment Factors

The more factors the community checks, the more prepared they will be to reduce the amount of farmland being lost.

Part 2 - Community Problems & Needs Assessment

This section assists communities in focusing on specific problems associated with the loss of farmland, the causes of the problems and the impacts. This part also enables a community to evaluate its capacity to address farmland protection through the identification of barriers it faces in implementing one option or another, and it allows for identification of assistance needed to overcome a specific barrier or obstacle.

Additional Resources

Technical References:

The following reference materials are also available to assist communites in New York State with their farmland protection efforts:

1) ***Farming on the Edge: Sprawling Development Threatens America's Best Farmland***, American Farmland Trust, Washington, DC – 2002
2) ***Action Guide: Agricultural & Farmland Protection for New York***, American Farmland Trust, Saratoga Springs, NY – 2000
3) ***Saving American Farmland: What Works***, American Farmland Trust, Washington, DC – 1997
4) ***Farmland Protection: Options for the 1990's,*** Empire State Chapter Soil & Water Conservation Society, Syracuse, NY – 1991
5) ***Disappearing Farmlands: A Citizens Guide to Agricultural Land Preservation,*** National Association of Counties Research Foundation, Washington, DC – 1980

Funding Assistance:

- NYS Department of Agriculture & Markets
  - State Agricultural and Farmland Protection Planning Grants for developing County Farmland Protection Plans.
  - Purchase of Development Rights Grants pay farmland owners for permanently protecting the land for agriculture.
- USDA Natural Resources Conservation Service
  - Farmland Protection Program provides matching funds to State, Tribal or local governments and non-governmental organizations with existing farmland protection programs to purchase conservation easements.

Websites:

- American Farmland Trust
  www.farmland.org
- NYS Department of Agriculture & Markets
  www.agmkt.state.ny.us/AP/agservices/farmprotect.html
- USDA Natural Resources Conservation Service
  www.nrcs.usda.gov/programs/farmbill/2002/

Community Environmental Management

- Farmland Protection Worksheet -

Part 1- Community Risk Assessment Factors

The following is a list of assessment factors communities can use to evaluate the health of agriculture within their community and their ability to support and retain farmland. The more factors that pertain to your community, the more prepared your community will be to reduce adverse environmental, social or economic impacts from the future loss of farmland.

Please check those factors that reflect the current status of agriculture in your community.

_ The public understands the importance of maintaining a viable agricultural industry in their community

_ The community supports preventing the loss of their best farmland through effective planning and smart growth that directs development to less productive land

_ There is limited potential for farmland being converted to non-farm uses

_ Most of the farmland being converted to non-farm uses is considered marginally suited for agriculture

_ Existing or planned sewer and water services do not extend onto farmland

_ The community's comprehensive land use plan addresses the need to protect and retain prime and important farmland

_ Incentives are provided to keep land in agriculture

_ Farmland is taxed at its agricultural value, instead of its potential for development

_ Agriculture is included in local economic development plans

_ Farmers have been made aware of the options they have besides selling their farmland for development

_ Most of the farmland in the community/watershed is enrolled in agricultural districts

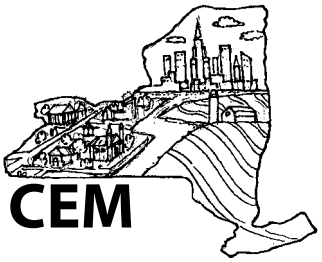
_ The community has attempted to minimize conflicts between farms and other rural residents

_ Farmers are participating in the State's Agricultural Environmental Management (AEM) Program that encourages farming practices that enhance the environmental benefits of farmland

_ A large percentage of land being farmed is owned by those farming and rented farmland involves long term leases that are based on a conservation plan

_ Farmers are or are planning to expand or make long -term investments in their farms

_ There is high potential for intergenerational transfer of farm ownership



Farmland Protection Worksheet

Part 2 – Problem & Needs Assessment

This assessment will help determine how the loss of farmland is impacting your community and your community's capacity for addressing these impacts.

Problems Associated with Loss of Farmland	Causes	Impacts	Remedial & Preventative Strategies
_ Loss of open space amenities	1. Unplanned or poorly planned suburban development (sprawl) 2. Local officials and the public believe farmland loss is inevitable and make no effort to mitigate the potential for loss 3. Public works projects (ex: post offices, schools) built on prime ag land when other alternatives exist	**Check those impacts that apply:** _ Loss of the most productive ag soils as these soils are also the most suitable to build on _ Increased property tax assessments due to leap frog development increasing the cost of providing public services _ Loss of groundwater recharge due to increase in paved areas _ Increased land use conflicts as homes are built next to farmland _ Increased nonpoint source pollution impacts due to stormwater runoff _ Loss of community heritage and sense of place _ Loss of wildlife habitat and biodiversity _ Loss of outdoor recreational opportunities such as fishing, hunting, cross-country skiing etc. _ Loss of scenic vistas	**Strategy:** Develop a farmland protection plan for your community **Strategy:** Increase public awareness of the importance of maintaining a viable ag industry within their community

Management Options (Indicate with a "✓" if community has implemented or use a "?" if community is interested)	Barriers to Implementation	Community Assistance Needs[1]
Options: _ Form an ag protection task force or committee to design a package of conservation techniques to protect farmland and sustain agriculture _ Conduct a technical analysis of the local farmland status including soil types and land usage to help determine which kinds of farmland should be preserved _ Review planning and zoning ordinances; make adjustments and pass reforms that address the needs of agriculture _ Coordinate local farmland preservation tools so local policies don't work at cross purposes (ex: ag. zoning can be undercut if the local capital improvement plan calls for the extension of sewer and water lines into prime farming areas) _ Provide for a flexible balance between preservation of farmland and the development of housing and industry (It's not the extent of development that undermines local agriculture initially, as much as "leapfrog" or "checkerboard" type development that leads to a domino effect)		
Options: _ Help the public understand the multiple benefits of agriculture to a community's quality of life using the AEM Ag & the Community Worksheet _ Prepare a historical view of the land and people of a community to help the public understand their local heritage and develop a sense of place _ Conduct an analysis to compare the cost of community (public) services required by ag land versus developed areas and the potential long-term fiscal impacts if extensive ag land is converted to urban uses.		

[1] List assistance needed: info/education, assessment/planning, BMP design/implementation, regulatory options, project funding, etc.

Problems Associated with Loss of Farmland	Causes	Impacts	Remedial & Preventative Strategy
_ Erosion of the local ag economy	1. Decline in ag support infrastructure 2. More marginal ag land being farmed 3. Less ag land being owned by farmers reducing the land available to sustain existing farms 4. Neighbor complaints and lawsuits regarding routine farm operations 5. Communities enacting ordinances to restrict ag activities	**Check those impacts that apply:** _ Farmers stop reinvesting in their farms _ Farmers have to travel greater distances for supplies and equipment repairs _ Farming marginal ag land results in more negative environmental impact and requires more conservation investment _ Reduced ability to grow fresh local food increasing dependence on imported ag products _ Farmers feel unwelcome in their own community	**Strategy:** Support farming and encourage its economic viability **Strategy:** Minimize conflicts between farmers and other rural residents

Management Options Indicate with a "√ " if community has implemented or use a "?" if community is interested	**Barriers to Implementation**	**Community Assistance Needs**
Options: _ Offer technical assistance to farmers in marketing and promotion. _ Permit roadside stands, greenhouses and pick-your-own operations. _ Allow seasonal operations to use off-site signs to attract customers. _ Establish a local farmers market. _ Promote agritourism. _ Include agriculture in local economic development plans. _ Extend economic incentives to improve ag support industries and encourage new ones. _ Increase farmer awareness of the options they have besides selling their farmland for development.		
Options: _ Establish agricultural protection zones. _ Encourage farmers to conduct an environmental assessment of their farms (AEM) and support conservation programs that share the costs with farmers who provide ecological goods and services such as wildlife habitat, groundwater recharge and scenic open space. _ Require setbacks on adjacent residentially zoned land _ Require agricultural nuisance notices as part of real estate transfers.		

6.5 Onsite Wastewater Treatment System Management

Environmental Significance Summary:

Septic systems and other onsite wastewater treatment systems (OWTS) serve residences, commercial businesses, and institutions in areas not yet reached, or physically or economically unreachable by sewers. Untreated sewage from over-used systems, poorly sited or under-designed systems, or clusters of marginally operating systems can degrade surface waters or groundwater. Discharging wastewater from septic systems and other onsite wastewater treatment systems directly to surface water is highly discouraged in New York and is only allowed with a State Pollution Discharge Elimination System (SPDES) permit.

Either through lack of understanding for soil limitations, poor planning or just plain indifference to wastewater treatment needs, humans through construction and developmental activities, have created a number of problems for themselves and the waters of the state. The first and perhaps most obvious problem is related to the over-development of coastal shorelands and lake fronts (without sewers) resulting in bathing beach closures, shellfish bed closures, other recreational water quality degradation, drinking water contamination, and decline in property values. A second problem is the degradation of individual private or community public water supply wells resulting in abandonment of the source, or the need for treatment or additional treatment of the water supply. Finally, many of society's contaminants can be transported in groundwater, which ultimately can enter and degrade the quality of streams, rivers, lakes, wetlands and estuaries. Even properly operated and maintained septic systems and the soils surrounding them remove little of the nitrates discharged to them. This can also result in surface water degradation and drinking water contamination.

Community Assistance Summary:

- More fully understand onsite wastewater treatment management concepts.
- Assess where your community stands relative to favoring onsite wastewater treatment systems or a municipal wastewater treatment plant with collection sewers.
- Identify wastewater treatment system management needs.
- Begin to map out an OWTS management strategy for the future.

Issues Summary:

- Septic effluent is surfacing in yards and roadside ditches, or backing up into homes.
- Septage transporters have insufficient access to permitted/approved waste treatment and disposal facilities.
- Algae blooms or weed growth are a nuisance.

- Questions about soil suitability and site limitation for onsite wastewater treatment.
- Old, outdated and/or non-compliant systems.

Strategies Summary:

- Ensure that OWTS siting and design considerations are factored into development plans for the community.
- Enhance your community's capacity for OWTS management.
- Ensure proper siting, design, installation and maintenance of OWTSs to protect water quality and public health.

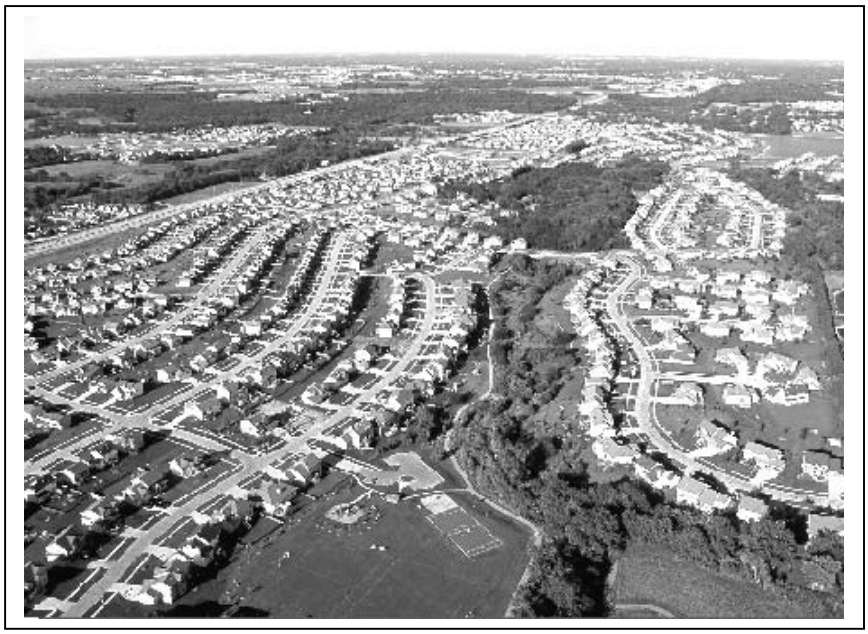
Community Benefit Summary:

As community development continues to increase, the number of sites with suitable soils, slopes, and sufficient area for septic systems can be expected to decrease. If sewers are not affordable, there will be greater demand for replacement of failed systems and design review for new systems. Federal and State technical standards do not fully consider all the natural resource impacts from developments that rely on septic systems. It is up to communities to take the initiative to manage the wastewater from these developments to protect themselves from decreased property values, possible public health problems, and reduced water quality.

Tier 2B – OWTS Worksheet

Onsite Wastewater Treatment System Management

Assessment Worksheet



Community Environmental Management

Acknowledgements

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and the Department of Environmental Conservation
are grateful to our partners who contributed to this worksheet including:**

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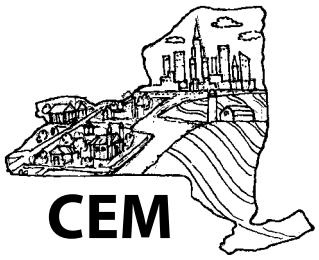

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Community Environmental Management

Community Environmental Management

Onsite Wastewater Treatment System Management

- Assessment Worksheet -

Introduction

Septic systems and other onsite wastewater treatment systems (OWTS) serve residences, commercial businesses, and institutions in areas not yet reached, or physically or economically unreachable by sewers. Untreated sewage from over-used systems, poorly sited or under-designed systems, or clusters of marginally operating systems can degrade surface waters or groundwater. Discharging wastewater from septic systems and other onsite wastewater treatment systems directly to surface water is highly discouraged in New York and is only allowed with a State Pollution Discharge Elimination System (SPDES) permit.

The great majority of residential sewage and wastewater discharged to onsite systems is discharged to a septic tank followed by a distribution box and leachfield. Treatment of wastewater depends on soil characteristics, land slope, depth of soil above the average high seasonal groundwater elevation, depth of soil above bedrock, and the amount and concentration of wastewater being discharged into the soil. The septic tank / leach field system provides the same level of treatment that a wastewater treatment plant with only primary (gravity settling) treatment facilities provides. Filtration and biological metabolism provides further treatment of residential wastewater only for the time and distance the wastewater travels through the soil surrounding the system prior to reaching groundwater or surface water. Non-soil-based treatment systems (the larger ones are also called package plants) can provide filtration, aeration and biological treatment of residential and commercial (non-industrial) wastewater where soil suitability for onsite systems is limited. These systems are "Engineered Systems" in *Appendix 75-A.10 of the Wastewater Treatment Standards - Individual Household Systems*. They require a Specific Waiver by the health unit having jurisdiction, and the last component of most designs will still be a soil absorption system of proper dimensions.

Either through ignorance of soils limitations, poor planning or just plain indifference to wastewater treatment needs, humans through construction and developmental activities, have created a number of problems for themselves and the waters of the state. The first and perhaps most obvious problem is related to the over-development of coastal shorelands and lake fronts (without sewers) resulting in bathing beach closures, shellfish bed closures, other recreational water quality degradation, drinking water contamination, and decline in property values. A second problem is the degradation of individual private or community public water supply wells resulting in abandonment of the source, or the need for treatment or additional treatment of the water supply. Finally, many of society's contaminants can be transported in groundwater, which ultimately can enter and degrade the quality of streams, rivers, lakes, wetlands and estuaries. Even properly operated and maintained septic systems and the soils surrounding them remove little of the nitrates discharged to them. This can also result in surface water degradation and drinking water contamination.

In New York State, local governments have the principal responsibility for controlling development activities through their planning and regulatory functions. This role carries with it the responsibility for ensuring that development is undertaken with public health and safety in mind, and in a manner that is compatible with the protection and enhancement of natural resources, especially water. As community development continues to increase, the number of sites with suitable soils, slopes, and sufficient area for septic systems can be expected to decrease. If sewers are not affordable, there will be greater demand for replacement of failed systems and design review for new systems. Federal and State technical standards do not fully consider all the natural resource impacts from developments that rely on septic systems. It is up to communities to take the initiative to manage the wastewater from these developments to protect themselves from decreased property values, possible public health problems, and reduced water quality. This OWTS worksheet can be employed in developing onsite wastewater management strategies for your community or watershed to protect public health, water quality and economic objectives.

Summary of Onsite Wastewater Management Practices

In all, 30 management practices have been evaluated for their effectiveness in controlling nonpoint source pollution (NPS). These practices are listed in Table 2 of the *Onsite Wastewater Treatment Systems Management Practices Catalogue for NPS Pollution Prevention and Water Quality Protection in New York State*. These management practices (MPs) can be broken down into two categories as follows:

Structural Practices

These management practices are either wastewater treatment systems or system components that usually require engineering design. Examples of structural practices include the Septic Tank and Absorption Field, Aerobic System and Soil Absorption Field, and Gravelless Absorption Systems.

Operational Practices

These practices involve changes in management, or improving the design, operation or maintenance of the system. Examples of operational practices include The Proper Use and Disposal of Household Hazardous Substances, Advocating Proper Design and Construction, Conservation Measures - High Efficiency Plumbing Devices, Inspection and Pumping, Administrative Control Mechanisms, and Operation and Maintenance of Standard Septic Tanks and Absorption Systems.

How This Worksheet Can Assist Your Community in Protecting Public Health & Natural Resources

The purpose of this worksheet is to assess the nature of onsite wastewater treatment problems in the community and to evaluate the community's ability to remediate existing septic system problems and to prevent their reoccurrence. This worksheet can be used to help your community to:

(1) more fully understand onsite wastewater treatment management concepts

(2) assess where your community stands relative to favoring onsite wastewater treatment systems or a municipal wastewater treatment plant with collection sewers

(3) identify wastewater treatment system management needs

(4) begin to map out an OWTS management strategy for the future

For help in filling out this worksheet and technical assistance on onsite wastewater management, it is recommended that the County Health Department or the NYS Department of Health District Office be contacted. For soils information regarding septic system suitability, contact your County Soil & Water Conservation District or USDA-NRCS.

Technical Resources

- LEAPE *"Locally-led Education & Action for Protecting the Environment,"* a program of Cornell Cooperative Extension and Sea Grant, Ithaca, 2002. Educational package for local governments interested in protecting water resources in their communities.
- U. S. Environmental Protection Agency (EPA*). "Onsite Wastewater Treatment Systems Manual"* Spring 2002 (EPA 625/R-00/008) Available on the EPA Website: http://www.epa.gov/ORD/NRMRL/Pubs/625R00008/625R00008.pdf
- *Onsite Wastewater Treatment Systems Management Practices Catalogue for Nonpoint Source Pollution Prevention & Water Quality Protection in NYS.* Updated annually. NYSDEC, Division of Water, 625 N. Broadway, Albany NY 12233-3508. Phone (518) 402-8248.
- 10NYCRR, Appendix 75-A: *"Wastewater Treatment Standards – Individual Household Systems"* and *NYS DOH Design Handbook*. Bureau of Community Sanitation and Food Protection, NYS Department of Health, 547 River Street, Room 515, Troy, NY 12180. Phone (518) 402-7600
- United States Environmental Protection Agency (EPA). *"Guidelines for Management of Onsite/Decentralized Wastewater Systems"* (2003). http://www.epa.gov/owm/decent/index.htm
- United States Environmental Protection Agency (EPA). *"Response to Congress on Use of Decentralized Wastewater Treatment Systems"* 1997.
- *"Watershed Behavior"* from the Center for Watershed Protection website: http://www.cwp.org
- Clark, Gregory Henton. *"The effect of bacterial additives on septic tank performance"* 1998. North Carolina State University --Thesis --Soil Science. 152 leaves: ill. ; 29 cm. Note: Thesis (M.S.) -- Includes bibliographical references (leaves 60-61). Includes vita. http://catalog.lib.ncsu.edu, then search by author. DH Hill Library Call Number: LD3921 Soil Sci. C5835.
- Governing Magazine/August 2001. Feature - S*eptic Tanks Focus on Wastewater: The Hazard of Ooze.* By Tom Arrandale. Copyright 2001, Congressional Quarterly, Inc. Abstract: *Seepage From Outmoded Septic Tanks is a Major Threat to Groundwater*. And it's not just a rural phenomenon. Go to http://www.governing.com, then "technology" and search using "septic tanks" and "ooze."
- Balmer, Candace. Northeast Rural Community Assistance Program. *"Wastewater Treatment Alternatives for Small Communities"*
- Cornell Local Government Program. *"The Guide to the Public Management of Private Septic Systems"* http://www.cardi.cornell.edu/clgp/septics_index.cfm
- New York State/Department of Environmental Conservation, Division of Water, Bureau of Water Permits. *"Design Standards For Wastewater Treatment Works Intermediate-sized Sewerage Facilities"*, 1988: http://www.dec.state.ny.us/website/dow/standards.pdf
- NYS Department of Environmental Conservation, Division of Water, Bureau of Water Permits. TOGS:1.2.4 *Individual Sewage Treatment System Discharges to Surface Waters*. 1990 http://www.dec.state.ny.us/website/dow/togs/tog_cont.htm
- NYS Department of Environmental Conservation, Division of Water, Bureau of Water Permits. General Permit (GP-95-01) *State Pollutant Discharge Elimination System (SPDES) Permit* http://www.dec.state.ny.us/website/dcs/permits/olpermits/interface.html

Community Environmental Management

OWTS Worksheet

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Part 1 - Community Risk Assessment Factors

The following is a list of activities communities are undertaking to improve their onsite wastewater treatment system (OWTS) management techniques and minimize pollution and other negative impacts resulting from improper OWTS management, such as beach closures. The more factors that apply to your community, the less likely you are to have adverse water quality impacts.

Please check all that pertain to your community:

— A maintenance, inspection, and enforcement program has been implemented for OWTS.

— Ground and surface water are protected from contamination by OWTS through land use planning, regulations and monitoring

— Areas where failing OWTS are contributing to water quality impairments have been identified

— Sensitive areas have been identified where septic systems are inappropriate

— Educational programs for home and business owners about proper use and maintenance of on-site systems have been provided

— Incentive programs are provided to help home and business owners maintain their systems properly

— Adequate facilities are available to treat and dispose of waste pumped out of on-site systems

— A strategy has been developed and implemented for bringing "legacy systems" into compliance.*

— A method for selecting appropriate alternative systems on sites that cannot support traditional septic systems has been developed and implemented

* Legacy Systems refer to systems built prior to or without compliance with current design standards

Part 2- Community Problem & Needs Assessment
This assessment will help to determine how extensive OWTS problems are in your community, and your community's capacity for addressing OWTS issues.

Problems Associated with Increased Stormwater Runoff	Causes	Impacts	Remedial & Preventative Strategies
Septic effluent is surfacing in yards and roadside ditches, or backing up into homes. ___ Yes ___ No **Problem frequency and duration** Explain: _____ _____ **Locations** List: _____ _____	1. Soil not suitable to treat the volume of effluent introduced. 2. Improperly installed systems (ex: soil compaction, improper grade or slope) 3. Failure to maintain OWTS results in failed systems (ex: leach field clogged) 4. Failure to upgrade septic system with an increase in inhabitants 5. Failure of a component on the existing OWTS	**Check all that apply:** ___ Offensive odor ___ Effluent contaminated with nutrients, pathogens and/or toxics can be carried into water bodies ___ Public health concerns	**Strategy:** Ensure proper siting, design, installation and maintenance of OWTSs to protect water quality and public health
Algae blooms or weed growth are a nuisance in the following: ___ Pond ___ Lake ___ Reservoir ___ Stream or River ___ Estuary or Coastal Embayment **Problem frequency and duration** Explain: _____ _____ **Locations** List: _____ _____	1. Soil not suitable to treat the volume of effluent introduced 2. Improperly installed systems (ex: soil shearing and compaction) 3. Failure to maintain OWTS results in failed systems (ex: leach field clogged) 4. Failure to upgrade septic system with an increase in inhabitants 5. Failure of a component on the existing OWTS 6. Direct discharges from OWTS into surface water 7. Seasonal outhouses are placed too close to waterbodies or in flood plain	___ Loss of property values ___ Loss of recreation and tourism ___ Loss of fisheries habitat ___ Public health concerns	Additional strategies for dealing with these two issues are continued on the following pages

Management Options Indicate with a "√ " if community has implemented or use a "?" if community is interested	Barriers to Implementation	Community Assistance Needs[1]
Options: ___ Require OWTS inspections upon property transfer. ___ Require OWTS upgrades whenever an increase in the number of inhabitants or occupants occurs. ___ Require developers to perform a site suitability analysis or refer to the community's existing soil suitability survey prior to design. ___ Develop upgrading requirements for legacy systems. ___ Enforce regulations that keep outhouses at least 100 feet away from waterbodies. ___ Review site plans during the planning process to ensure that OWTS are properly sited and designed. ___ Perform site inspections during and post-construction to ensure that OWTS are properly constructed or installed ___ Perform periodic inspections during the life of the system to ensure that OWTS receive proper maintenance, and that they are in compliance with applicable health codes and environmental regulations ___ Perform periodic inspections during the life of the system to ensure OWTS are functioning properly ___ Develop and implement a compliance enforcement strategy to ensure proper construction, installation and maintenance		

[1] List type of assistance needed: information/education; assessment/planning: BMP design/implementation; regulatory options; project funding; etc.

Problems Associated with Increased Stormwater Runoff	Causes	Impacts	Remedial & Preventative Strategies
			Strategy: Ensure that OWTS siting and design considerations are factored into development plans for the community Additional strategy continued on next page

Management Options Indicate with a "√ " if community has implemented or use a "**?**" if community is interested	Barriers to Implementation	Community Assistance Needs[2]
Options: ___ Map soil suitability and site limitations for planners to reference during site plan review (e.g. preventing their installation in hydric soils or wetlands). ___ Require developers to perform a site suitability analysis or refer to the community's existing soil suitability survey prior to design. ___ Review plans to ensure soils and selected OWTS are compatible during the planning process ___ Address OWTS siting requirements as part of the Master Plan ___ Perform community buildout analysis to ensure that current zoning provides for adequate lot size and soil suitability to handle septage loads based on maximum buildout. ___ Identify alternative types of OWTS when there are specific site constraints and soils limitations. ___ Identify sensitive areas where septic systems are inappropriate and use concepts such as overlay zones to protect sensitive or inappropriate areas (e.g. areas with steep slopes or shallow/tight soils) ___ Develop regulations requiring conservation planning and design to achieve clustering of development so that the remaining undeveloped land is available for the economically efficient and environmentally sound treatment of sewage through cluster or shared systems. ___ Ensure that site plan review and subdivision regulations specify siting requirements for OWTS ___ Work with the County Health Department to develop and implement a system for approving alternative systems on sites that cannot support traditional septic systems ___ Investigate opportunities for establishing sewer or management districts to fund the maintenance, rehabilitation or installation of OWTS. ___ Work with other communities in the watershed to develop an inter-municipal waste management plan. ___ Provide information about training in OWTS management to engineers, contractors and community officials responsible for making decisions about OWTS siting, installation and maintenance. ___ Identify and stop any direct discharges of septage to surface water or land surrounding surface water		

[2] List type of assistance needed: information/education; assessment/planning: BMP design/implementation; regulatory options; project funding; etc.

Problems Associated with Increased Stormwater Runoff	Causes	Impacts	Remedial & Preventative Strategies
			Strategy: Enhance your community's capacity for OWTS management.

Management Options Indicate with a "√ " if community has implemented or use a "**?**" if community is interested	Barriers to Implementation	Community Assistance Needs[3]
Options: ___ Implement a community-wide water conservation program to reduce the potential for overloading systems. ___ Develop and implement an education and outreach program that informs homeowners, businesses and municipal building managers about what they can do to keep their OWTS problem-free (e.g. separation of grey water, eliminating use of septic system maintenance chemicals, fixing leaks, pumpout scheduling) ___ Develop incentive programs to encourage homeowners and business owners to properly maintain their onsite systems (ex: vouchers and discounts for pumpouts). ___ Provide a sample schedule for regular pumpouts ___ Suggest options for treatment and future prevention when systems back up ___ Provide information about training in OWTS management to engineers, contractors and community officials responsible for making decisions about OWTS siting, installation and maintenance. ___ Certify contractors responsible for performing work with OWTS to ensure proper installation and maintenance and update it regularly. ___ Investigate opportunities for establishing sewer or management districts to fund the maintenance, rehabilitation or installation of OWTS where problems such as these occur. ___ Work with other communities in the watershed to develop an inter-municipal waste management plan. ___ Ensure that the code enforcement officer or other local official who is responsible for approving the selection, siting and design of an OWTS has received adequate training to perform this task. ___ Encourage contractors to obtain training in OWTS design, installation and maintenance, as well as stay informed about current advances in OWTS technology ___ Certify contractors responsible for performing work with OWTS to ensure proper installation and maintenance and update it regularly. ___ Encourage inter-municipal cooperation in managing OWTS (e.g. sharing of equipment, sharing of enforcement officers, formation of county or inter-municipal districts for watershed-wide management of wastewater) ___ Develop and implement a plan for volunteer monitoring of surface water quality and prevent contamination by OWTS of beaches and other recreational areas ___ Identify impacted waterbodies where OWTS are suspected sources of NPS contamination and conduct surveillance monitoring to verify sources		

[3] List type of assistance needed: information/education; assessment/planning: BMP design/implementation; regulatory options; project funding; etc.

Problems Associated with Increased Stormwater Runoff	Causes	Impacts	Remedial & Preventative Strategies
Septage transporters have insufficient access to permitted/approved waste treatment and disposal facilities ___ Yes ___ No	1. Lack of capacity at waste treatment and disposal facilities 2. Lack of access to waste treatment and disposal facilities	___ Lack of adequate wastewater treatment and disposal affects commercial development and property values ___ Transporters of waste are forced to travel great distances to facilities, increasing the cost of waste removal (pumpouts) ___ Frustrated disposal companies may resort to illegal dumping of septage	**Strategy:** Enhance your community's capacity for OWTS management.

Management Options Indicate with a "√ " if community has implemented or use a "**?**" if community is interested	Barriers to Implementation	Community Assistance Needs[4]
Options: ___ Make homeowners and developers aware of any current or projected capacity issue at waste treatment and disposal facilities, and open a dialogue regarding options ___ Identify and stop direct discharge of waste to land or water ___ Maximize ease of access to waste treatment and disposal facilities by working with their operators to discuss unloading schedules and hours of operation. ___ Determine when existing facilities will run out of capacity, and develop a plan to construct new facilities or explore other options (e.g. joining with other municipalities to pool resources and build a facility together).		

[4] List type of assistance needed: information/education; assessment/planning: BMP design/implementation; regulatory options; project funding; etc.

Problems Associated with Increased Stormwater Runoff	Causes	Impacts	Remedial & Preventative Strategies
Municipality Concerns Check all that apply: ___ Preventing groundwater supplies from being contaminated with pollutants associated with OWTS ___ Preventing surface water from being contaminated with pollutants associated with OWTS	1. Improperly designed, installed, and/or maintained OWTS 2. High density of development over aquifer recharge areas 3. Use of septic system maintenance chemicals	**Check all that apply:** ___ Bacterial contamination of drinking water ___ Nitrates in drinking water ___ Toxics in drinking water from septic system maintenance chemicals ___ There have been beach closures due to bacterial contamination. ___ Fishing and/or shellfishing beds have been closed due to bacterial contamination	**Strategy:** Enhance your community's capacity for OWTS management.

Management Options Indicate with a "√ " if community has implemented or use a "**?**" if community is interested	Barriers to Implementation	Community Assistance Needs[5]
Options: ___ Require special protections against septic effluent entering sole source aquifers. ___ Develop monitoring protocol and management plans for public water supplies. ___ Develop monitoring protocol and management plans for private water supplies, including those distributed by private water purveyors. ___ Help homeowners monitor their water supplies in areas where septage management is an issue ___ Regular testing of public wells for contamination ___ Increase setbacks for OWTS from water supply wells ___ Conduct a buildout analysis to determine potential housing densities in relation to protecting ground water drinking supplies ___ Implement a community-wide water conservation program to reduce the potential for overloading systems. ___ Identify areas where septic systems are inappropriate and use concepts such as overlay zones to protect environmentally sensitive or inappropriate areas (e.g. areas with steep slopes or shallow/tight soils) ___ Identify and stop direct discharge of waste to land or water ___ Encourage inter-municipal cooperation in managing OWTS (e.g. sharing of equipment, sharing of enforcement officers, formation of county or inter-municipal districts for watershed-wide management of wastewater)		

[5] List type of assistance needed: information/education; assessment/planning: BMP design/implementation; regulatory options; project funding; etc.

Community Environmental Management
Tier III
Strategies for Onsite Wastewater Treatment Systems (OWTS)

Strategy: Ensure that OWTS siting and design considerations are factored into development plans for the community.

- Map soil suitability and site limitations for onsite wastewater treatment.
- Identify alternative types of OWTS when there are specific site constraints and soils limitations.
- Promote and promulgate regulations requiring conservation planning and design to achieve clustering of development so that the remaining undeveloped land is available for the economically efficient and environmentally sound treatment of sewage through cluster or shared systems.
- OWTS siting requirements considered as part of the Master Plan
- Ensure that site plan review and subdivision regulations specify siting requirements for OWTS

Strategy: Enhance your community's capacity for OWTS management.

- Ensure that the code enforcement officer or other local official who is responsible for approving the selection, siting and design of an OWTS has received adequate training to perform this task.
- Encourage contractors to obtain training in OWTS design, installation and maintenance, as well as stay informed about current advances in OWTS technology
- Investigate opportunities for establishing sewer or management districts to fund the maintenance, rehabilitation or installation of OWTS.
- Encourage inter-municipal cooperation in managing OWTS (e.g. sharing of equipment, sharing of enforcement officers, formation of county or inter-municipal districts for watershed-wide management of wastewater)
- Develop and implement an education and outreach program that informs homeowners, businesses and municipal building managers about what they can do to keep their OWTS problem-free (e.g. separation of grey water, eliminating use of septic system maintenance chemicals, fixing leaks, pumpout scheduling)
- Provide incentives to encourage home and business owners to routinely maintain their OWTS
- Develop and implement a plan to monitor surface and ground water quality and prevent contamination by OWTS
- Implement a routine monitoring program to protect public health at beaches from failing OWTS
- Adopt a management strategy for proper treatment and disposal of septage.

Strategy: Ensure proper siting, design, installation and maintenance of OWTSs to protect water quality and public health.

- Ensure that OWTS are properly sited and designed.
- Ensure that OWTS are properly constructed or installed
- Ensure that OWTS receive proper maintenance.
- Periodically inspect OWTS to ensure they are functioning properly.
- Ensure OWTS are in compliance with applicable health codes and environmental regulations
- Develop upgrading requirements for legacy systems.

If you have any questions or comments on this draft worksheet, please contact:

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6.6 Stormwater Management

Environmental Significance Summary:

Stormwater is water from rain or melting snow that doesn't soak into the ground but runs off into waterways. It flows from rooftops, over paved areas and bare soil, and through sloped lawns while picking up a variety of materials on its way. As it flows, stormwater runoff collects and transports soil, animal waste, salt, pesticides, fertilizers, oil and grease, debris and other potential pollutants. The quality of runoff is affected by a variety of factors and depends on the season, local meteorology, geography and upon activities which lie in the path of the flow.

Stormwater gathers a variety of pollutants that are mobilized during runoff events. Polluted runoff degrades our lakes, rivers, wetland and other waterways runoff. Transported soil clouds the waterway and interferes with the habitat of fish and plant life. Nutrients such as phosphorus and nitrogen can promote the overgrowth of algae, deplete oxygen in the waterway and be harmful to other aquatic life. Toxic chemicals from automobiles, sediment from construction activities and careless application of pesticides, herbicides and fertilizers threaten the health of the receiving waterway and can kill fish and other aquatic life. Bacteria from animal wastes and illicit connections to sewerage systems can make nearby lakes and bays unsafe for wading, swimming and the propagation of edible shellfish. According to an inventory conducted by the United States Environmental Protection Agency (EPA), half of the impaired waterways are affected by urban/suburban and construction sources of stormwater runoff.

Significant improvements have been achieved in controlling pollutants that are discharged from sewage and wastewater treatment plants. Across the nation, attention is being shifted to other sources of pollution such as stormwater runoff. Stormwater management, especially in urban areas, is becoming a necessary step in seeking further reductions in pollution in our waterways and presents new challenges.

Community Assistance Summary:

- More fully understand stormwater management concepts.
- Assess the effectiveness of an existing stormwater management program.
- Identify stormwater management needs.
- Develop a stormwater management strategy to address identified needs.
- Meet NYS Phase 2 Stormwater requirements necessary for regulated small Municipal Separate Storm Sewer Systems (MS4s) in urbanized areas.

Issues Summary:

- Frequent overtopping of stream banks or Increase in frequency and duration of overtopping of ditches, culverts, roads or bridges.
- Decreased groundwater recharge and decreased stream base flows.
- Increased stream temperatures.
- Unstable stream channels.
- Water quality impairments.

Strategies Summary:

- Mitigate the impacts of increased stormwater flow and volume from developed and redeveloping areas.
- Reduce the impacts of increased storm water flow & volume from new development.
- Address erosion and sediment control needs resulting from construction activities.
- Enhance the quality of storm water runoff entering surface and groundwater.
- Enhance the infiltration of storm water runoff.
- Preserve the natural features of the site.
- Reduce the stormwater flow and volume from new developments.
- Involve and inform the public.
- Develop, fund and implement a local stormwater management program.

Community Benefit Summary:

Conserving and protecting the natural resources of a community is a vital underpinning to the quality of life in the community and its economic well-being. The correlation between natural resources degradation and economic decline and deterioration of the quality of life in a community is clear - stormwater runoff from development, whether from new or existing development, should be properly controlled and managed to protect community resources. The community, whether or not it is regulated for stormwater purposes, has a primary responsibility to ensure that stormwater runoff from the development it approves does not threaten public health or safety, public and private infrastructure, and real property.

Tier 2B – Stormwater Management Worksheet

Stormwater Management

Assessment Worksheet

Community Environmental Management

March 2004

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Community Environmental Management

Community Environmental Management

Stormwater Management

- Assessment Worksheet -

Introduction

Surface runoff, as a result of excessive rainfall, is a natural process. Surface runoff is nature's chisel, which has formed the landscape as we know it today. The landscape process involves the erosion of upland areas and the subsequent building of floodplains and wetlands. Without man's interference, this landscaping process is very slow with the underlying rock, soil and surface vegetation tending to resist the chisel. This process is normally so slow that changes are barely perceptible from decade to decade or even century to century.[1]

Either through ignorance of ecosystem functions, poor planning, or just plain indifference to natural stormwater runoff processes, humans, through construction and development activities, have created a number of problems for themselves and nature. The first and perhaps most obvious problem is development in floodplains, putting life and possessions in jeopardy. Second, the development and urbanization of uplands has increased erosion and accelerated the runoff process altering natural resource patterns and increasing the flood hazard. Finally, many of civilization's contaminants are transported in stormwater runoff, which ultimately can enter and degrade the quality of streams, rivers, lakes, wetlands and estuaries.

Through their planning and regulatory functions, local governments have the principal responsibility for controlling developmental activities in New York State. This role carries with it the responsibility for ensuring that developmental activities are undertaken with the safety of future inhabitants in mind, and in a manner that is compatible with the protection and enhancement of natural resources, including water resources.

The purpose of the stormwater worksheet is to assess the nature of a community's stormwater runoff problems, and evaluate the community's capacity to remediate existing problems and prevent their recurrence.

[1] "Maryland Interim Watershed Policy", Water Resources Administration, Department of Natural Resources, (Annapolis, MD 1977)

Summary of Stormwater Management Practices

Stormwater Management Practices (SMPs) have been designed to mimic pre-development hydrology in a watershed and remove society's contaminants from stormwater runoff while controlling erosion and sedimentation. SMPs can be broken down into three categories as follows:

Structural

Structural measures include, for example, such devices as sediment detention ponds to remove sediment from runoff during construction; extended detention ponds to control the volume and rate of runoff; wet ponds to control the volume and rate of runoff while achieving water quality enhancement benefits; and infiltration basins, to remove contaminants from runoff. The above are examples of commonly used structural SMPs. Examples of structural SMPs and how to design for their application on specific development sites can be found in the *New York State Stormwater Management Design Manual*[2] and *New York Standards and Specifications for Erosion and Sediment Control*.[3] Descriptions of SWPs, their purpose, effectiveness, limitations, etc., also may be found in the *Urban/Stormwater Runoff Management Practices Catalogue for Nonpoint Source Pollution Prevention in New York State.*[4]

Non-structural

Non-structural SMPs include, for example, grass swales and grass filter strips. Grass swales frequently are designed to intercept and slow down sheet flow from surrounding lands so as to detain stormwater runoff and facilitate infiltration. Descriptions of non-structural SWPs, their purpose, effectiveness, limitations, etc., may be found in the *Urban/Stormwater Runoff Management Practices Catalogue for Nonpoint Source Pollution Prevention in New York State.*

Administrative

Administrative practices include, for example, changes in land use regulations and development policies to encourage putting conservation design into development, better site design and low impact development all of which use natural features on the site to enhance the control and management of stormwater runoff. A discussion of administrative approaches may be found in *Reducing the Impacts of Stormwater Runoff From New Development.*[5]

No Adverse Impact[6]

As New York State, becomes increasingly more developed, flood damages can be expected to increase. Construction anywhere in the community can increase the risk of flooding to other properties, even those that have never been flooded in the past. Federal and State standards do not fully consider the impact of new development, so communities should implement a higher standard to protect themselves. The Association of State Floodplain Managers has developed and strongly recommends that communities adopt a No Adverse Impact (NAI) approach to development. The NAI will not only reduce flood losses, but also will save lives, protect property and reduce the amount of your tax dollars that are spent on recovery.

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[2] "New York State Stormwater Management Design Manual," NYS Dept. of Environmental Conservation, (Albany, NY 2003)

[3] "New York State Standards & Specifications for Erosion & Sediment Control," NYS Department of Environmental Conservation, (Albany NY 2003)

[4] "Urban/Stormwater Runoff Management Practices Catalogue for Nonpoint Source Pollution Prevention in New York State" (Albany, NY 2002)

[5] "Reducing the Impacts of Stormwater Runoff From New Development", NYS Department of Environmental Conservation (Albany, NY 1992)

[6] "No Adverse Impact," Association of State Floodplain Managers, (Madison, WI 2002)

As your community moves forward in building, planning, and policy creation relative to stormwater management, consider incorporating the NAI concept into your work. You can do this by making sure that the actions taken in the floodplain, and throughout the watershed, do not lead to adverse impacts on the property of others. Adverse impacts need to be mitigated to prevent transferring the problems to another property or community. The worksheets on stormwater management and flood mitigation provide strategies that can be employed in developing management programs for your community and watershed to achieve NAI objectives.

Community Benefits from a Natural Resources Management Approach

Conserving and protecting the natural resources of a community is a vital underpinning to the quality of life in the community and its economic well-being. The correlation between natural resources degradation and economic decline and deterioration of the quality of life in a community is clear. Stormwater runoff from development, whether from new or existing development, should be properly controlled and managed to protect community resources. The community, whether or not it is regulated for stormwater purposes, has a primary responsibility to ensure that stormwater runoff from the development it approves does not threaten public health or safety, public and private infrastructure, and real property. For many communities, this worksheet on stormwater management may be the initial step a community takes to reduce the impacts from stormwater runoff associated with development.

How This Worksheet Can Be Used To Assist A Community

This worksheet on stormwater management can be used to help a community:

1) More fully understand stormwater management concepts
2) Assess the effectiveness of an existing stormwater management program
3) Identify stormwater management needs
4) Develop a stormwater management strategy to address identified needs
5) Meet NYS Phase 2 Stormwater requirements necessary for regulated small Municipal Separate Storm Sewer Systems (MS4s) in urbanized areas

Linkage to Phase 2 Stormwater Regulations for Regulated MS4 Communities:

As mandated by the Clean Water Act, the U.S. Environmental Protection Agency has developed and is implementing a nationwide stormwater management permitting program under the National Pollutant Discharge Elimination System (NPDES). Many states, including New York, are approved NPDES permit issuing authorities and implement the federal stormwater regulations through EPA approved programs. Phase 1 of this program addresses stormwater runoff from:

(1) 'medium' and 'large' municipal separate storm sewer systems (MS4s) generally serving populations of 100,000 or greater;
(2) construction activity disturbing five acres or greater, and
(3) eleven categories of industrial activity including construction.

Phase 2 expands the program by requiring additional operators of 'small' MS4s in urbanized areas (i.e.: those less than 100,000 in population) and operators of construction sites throughout the State to implement programs and practices to control polluted runoff. The Phase 2 rule regulates two classes of stormwater discharges: (1) an operator of a small MS4s located in 'urbanized areas' as delineated by the Bureau of the Census, and (2) operators of construction activities disturbing one acre or more of land. The Phase 2 rule defines a 'small' MS4 stormwater management program as a program comprising six elements that, when implemented in concert, are expected to result in significant reductions in pollutants discharged into water bodies. The six program elements, termed "minimum control measures" are:

(1) Public education & outreach
(2) Public participation & involvement
(3) Illicit connection detection & elimination
(4) Construction site runoff

(5) Post-construction controls

(6) Good housekeeping & pollution prevention

This worksheet can be used to help a community understand the value of implementing these six minimum measures. Details on New York's Phase 2 program can be found on the DEC website noted at the end of this section.

The worksheet is broken down as follows:

Part 1 – *Community Risk Assessment Factors*

The more factors the community checks, the more prepared they will be to address stormwater runoff.

Part 2 – *Community Problems & Needs Assessment*

Assists communities in focusing on specific stormwater problems, the causes of the problem and impacts. This part also enables a community to evaluate its capacity to address stormwater problems through the identification of barriers it faces in implementing one option or another, and it allows for an identification of assistance needed to overcome a specific barrier or obstacle.

It is recommended that County Water Quality Coordinating Committees particularly the Soil & Water Conservation Districts assist communities and non-governmental organizations in completing this worksheet. Participation of the County Coordinating Committee and Districts can serve as a conduit for obtaining further information and technical assistance on stormwater management.

Additional Resources

The following reference materials are also available to assist communities with stormwater management:

Technical References:

*New York State Stormwater Management Design Manual, p*repared by The Center for Watershed Protection for the NYS Department of Environmental Conservation, Albany, NY 2001

New York Standards and Specifications for Erosion and Sediment Control, NYS Department of Environmental Conservation, Albany, NY 2003

Construction Management Practices Catalogue for Nonpoint Source Pollution Prevention in New York State, NYS Department of Environmental Conservation, Albany, NY 2002

Urban/Stormwater Runoff Management Practices Catalogue for Nonpoint Source Pollution Prevention in New York State, NYS Department of Environmental Conservation, Albany, NY 2002

Reducing the Impacts of Stormwater Runoff from New Development, NYS Department of Environmental Conservation, Albany, NY 1992

Stormwater Strategies: Community Responses to Runoff Pollution, Natural Resources Defense Council 1999

Educational Materials:

LEAPE – "Locally-led Education and Action for Protecting the Environment", A Program of Cornell Cooperative Extension and Sea Grant, Ithaca, NY 2003

NEMO – "Nonpoint Education for Municipal Officials", Connecticut Cooperative Extension, University of Connecticut, Storrs, CT 2001

Power Point Modules Prepared by the University of Buffalo Center for Integrated Waste Management for the NYS Department of Environmental Conservation and NYS Department of State, 2003:

Stormwater Runoff & Erosion Control for Local Elected Officials,

Stormwater Runoff & Erosion Control for Local Planning Board Members
Stormwater Runoff & Erosion Control for Plan Review and Compliance Personnel

Websites:

Center for Watershed Protection
www.cwp.org

NYS Department of Environmental Conservation, Division of Water
www.dec.state.ny.us/website/dow/mainpage.htm

CEM

Community Environmental Management

- Stormwater Management Worksheet -

Part 1- Community Risk Assessment Factors

The following is a list of activities communities are undertaking to improve their stormwater management techniques and minimize pollution and other negative impacts resulting from improper stormwater management, such as flooding. The more factors that apply to your community, the less likely you are to have adverse stormwater impacts from development.

Please check all that pertain to your community:

— The public is informed about the impacts that stormwater runoff can have on water quality and flooding.

— Community residents are involved in developing a stormwater program for their community or watershed.

— A program is developed and implemented to detect and eliminate illicit discharges and connections to the storm sewer system

— Erosion and sediment control (E&S) plans are developed and implemented for construction activities that disturb 1 or more acres.

— Stormwater pollution prevention plans (SWPPPs) are developed and implemented on disturbed sites 5 acres or more, or one acre or more, if located in a TMDL watershed or discharging to an impaired, 303(d) listed water, to address the downstream impacts of polluted runoff and increased volume of stormwater runoff

— Inspections are conducted of all construction sites to ensure E&S Plans or SWPP Plans are being properly implemented.

— An operation and maintenance plan for preventing or reducing stormwater pollution from municipal facilities and stormwater infrastructure has been implemented

— Existing wetlands are prevented from being filled or drained.

— New wetlands are constructed and/or damaged wetlands are restored to treat stormwater runoff and reduce flooding.

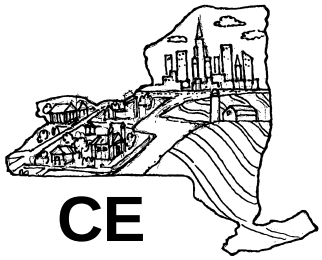
— Community is actively involved in watershed-wide planning and management of stormwater.

— Cumulative impacts of development on stormwater quality and quantity in the watershed are considered when reviewing the adequacy of stormwater management techniques being implemented in new developments.

— Reliable and accurate sources of technical expertise are utilized to review site plans for potential stormwater impacts.

— Community has implemented development policies that encourage developers to retain as much as possible the natural features of sites being developed.

— Community monitors their stormwater program to evaluate effectiveness.



Stormwater Management Worksheet

Part 2- Problem & Needs Assessment

This assessment will help to determine how extensive stormwater problems are in your community, and your community's capacity for addressing them.

Problems Associated with Stormwater Runoff	Causes	Impacts	Remedial & Preventative Strategies	
Frequent overtopping of stream banks ___Yes ___No **Frequency and duration of overtopping of ditches, culverts, roads or bridges** Explain: _____ _____ **Locations** List: _____ _____	1. Increase in rate and volume of runoff due to increased percentage of impermeable surface area in watershed from development. 2. Loss of wetlands that function to receive excess rainfall and release it slowly	**Check all that apply:** ___ Increased flooding and flood damages ___ Expansion of the floodplain **Magnitude and duration of flooding** Explain: _____ _____	**Strategies:** Mitigate the impacts of increased stormwater flow and volume from developed and redeveloping areas Reduce the impacts of increased storm water flow & volume from new development Address erosion and sediment control needs resulting from construction activities	

Management Options Indicate with a "Ö " if community has implemented or use a "**?**" if community is interested	Barriers to Implementation	Community Assistance Needs[7]
Options: ___ Utilize Maximum Extent Practicable (MEP) Standards that suit your community's needs on a site by site basis ___ Implement flood mitigation plan (see Flood Mitigation Worksheet) ___ Evaluate and retrofit existing storm water system by installing stormwater detention practices where applicable ___ Restore wetlands within the watershed to increase flood eduction benefits ___ Implement maintenance requirements for Stormwater Management Practices (SMPs) on new and existing development ___ Preserve existing wetlands in the watershed by utilizing conservation easements or regulations ___ Enact local stormwater management and erosion control ordinance ___ Minimize the percent of imperviousness allowed in new developments ___ Utilize Low Impact Development[8] principles to reduce runoff potential from new developments ___ Implement flood control design criteria[9] for sizing storm water detention and infiltration practices ___ Conduct build out analysis to assess cumulative impacts of future development in the watershed ___ Develop a monitoring program to inspect SMPs on construction sites to make sure they are functioning properly ___ Ensure Stormwater Pollution Prevention plans are implemented for new developments of five acres in size or more, or 1 acre or more in size, if located in a TMDL watershed or discharging to an impaired, 303(d) listed water ___ Work with other municipalities in the watershed to reduce the impacts of increased stormwater flow and volume from new development throughout the watershed		

[7] List type of assistance needed: info/education, assessment/planning, BMP design/implementation, regulatory options, project funding, etc.
[8] See NYSDEC publication: Reducing the Impacts of Stormwater Runoff From New Development
[9] See NYSDEC publication: New York State Stormwater Design Manual, October 2001

Problems Associated with Stormwater Runoff	Causes	Impacts	Remedial & Preventative Strategies	
Water quality impairments ___Yes ___No **Indicators of impairments** Check all that apply: ___ Muddy water running off construction sites ___ Sheens on surface water ___ Debris/litter washing off streets and parking lots ___ Stormwater impairments identified on the Priority Water bodies List (PWL) ___ Other: _____ _____	1. Pollutants from urbanized land run off in storm water (ex: sediments, toxic metal particles, pesticides and fertilizers, oil and grease, pathogens, excess nutrients, and trash) 2. Illicit storm-water discharges 3. Loss of wetlands that trap sediment and filter nutrients and toxic substances 4. Uncontrolled discharges from existing storm sewers result in high flow and velocity which erode stream banks	**Check all that apply:** ___ Excessive weed and algae growth in lakes, reservoirs and estuaries from excessive nutrients ___ Loss of lake, stream or reservoir capacity due to sedimentation ___ Loss of fish spawning habitat due to sedimentation ___ Contamination of shellfish beds ___ Contamination of ground and surface drinking water supplies from excess loading of pollutants ___ Beach closures due to high coliform levels ___ Increased stream flow and velocity increases sediment loading from stream bank erosion	**Strategies:** Inform the public of the risk that uncontrolled stormwater runoff poses to their waterbodies Involve the public in identifying potential water quality impairments from stormwater Develop and implement a program to detect illicit discharges Enhance the quality of stormwater runoff entering surface and groundwater Address erosion and sediment control needs during construction Reduce the impacts of increased stormwater flow and volume from new development Mitigate post construction stormwater impacts Implement “Good Housekeeping” practices Preserve natural resource features of the site being developed Utilize land use planning as a tool to prevent future stormwater problems	

Management Options Indicate with a "Ö " if community has implemented or use a "**?**" if community is interested	Barriers to Implementation	Community Assistance Needs[10]
Options: ___ Implement a storm drain stenciling program ___ Support a volunteer water quality monitoring program ___ Design and implement SMPs to treat stormwater runoff following guidance provided in the *NYS Stormwater Design Manual* ___ Facilitate community clean-up days to collect litter and debris from public lands, as well as toxic and hazardous materials from homes (ex: used oil, old paint, cleaning products) ___ Conduct informational campaigns to educate the public about nonpoint source stormwater pollution and what they can do at home to prevent it (ex: minimize fertilizer and pesticide use on lawns, clean up pet waste) ___ Evaluate the effectiveness of SMPs to be implemented for the protection of groundwater resources ___ Adopt an erosion control/stormwater management ordinance ___ Identify and correct illicit discharges ___ Implement a scheduled maintenance program for municipal stormwater systems (ex: catch basin cleanouts, street sweeping, ditch cleaning and seeding/mulching) ___ Identify watershed stormwater runoff and related nonpoint source pollution reduction needs ___ Develop an operations and maintenance program to reduce or prevent pollutant runoff from municipal operations ___ Develop watershed/wellhead protection plans for surface and groundwater drinking water sources that may be at risk from future land use development activities ___ Identify level of impairment for impacted surface and groundwater and map their locations ___ Develop clear requirements for long-term operation and maintenance of SMPs not only during the development phase, but also after construction is complete ___ Retrofit stormwater management practices where existing development is impairing water quality (ex: installing catch basin hoods to control floatable debris). ___ Restore wetlands that would enhance water quality (ex: filter out pollutants, trap sediment)		

[10] List assistance needed: info/education, assessment/planning, BMP design/implementation, regulatory options, project funding, etc.

Problems Associated with Stormwater Runoff	Causes	Impacts	Remedial & Preventative Strategies	
Decreased Groundwater Recharge and Decreased Stream Base Flows ___Yes ___No **Locations** List: _____ _____	1. Increase in rate and volume of surface runoff due to increased percentage of impermeable surface area in watershed	**Check all that apply:** ___ Reduced or depleted groundwater supplies during periods of drought ___ Degraded fisheries habitat due to lower stream flows	**Strategy:** Enhance the infiltration of storm water runoff **Strategy:** Preserve the natural features of the site **Strategy:** Reduce the stormwater flow and volume from new developments	
Increased Stream Temperatures ___Yes ___No **Locations** List: _____ _____	1. Heat from impermeable surfaces is transmitted to receiving waters during summer storm events	Degradation or loss of cold water fisheries habitat ___Yes ___No	**Strategy:** Enhance the quality of storm water runoff **Strategy:** Preserve the natural features of the site **Strategy:** Reduce the impacts of increased stormwater flow and volume from new developments	

Management Options Indicate with a "Ö " if community has implemented or use a "**?**" if community is interested	Barriers to Implementation	Community Assistance Needs[11]
Options: ___ Retrofit existing stormwater management system to maximize infiltration and groundwater recharge **Options:** ___ Restore riparian forest buffers in the watershed to slow the movement of stormwater and provide opportunity for infiltration and groundwater recharge **Options:** ___ Maximize groundwater recharge through the selection of storm water practices that encourage infiltration during the planning stage of development or redevelopment ___ Minimize amounts of impervious surface in new developments by encouraging the use of practices such as paver mats for driveways and parking lots ___ Minimize the amount of directly connected impervious surfaces in new developments (ex: bio-filters and filter areas)		
Options: ___ Reduce the amount of impermeable area where water can be heated before entering streams ___ Retrofit existing stormwater management system to maximize ground water infiltration and minimize heated runoff **Options:** ___ Revegetate stream banks with willows ___ Restore riparian forest buffers in the watershed to provide shade **Options:** ___ Maximize groundwater recharge through the selection of storm water practices that encourage infiltration during the planning stage of development or redevelopment ___ Minimize amounts of impervious surface in new developments by encouraging the use of practices such as paver mats for driveways and parking lots ___ Minimize the amount of directly connected impervious surfaces in new developments (ex: bio-filters and filter areas)		

[11] List assistance needed: info/education, assessment/planning, BMP design/implementation, regulatory options, project funding, etc.

Problems Associated with Stormwater Runoff	Causes	Impacts	Remedial & Preventative Strategies	
Unstable Stream Channels ___Yes ___No **Extent** Describe: _____ _____ **Locations** List: _____ _____	1. Increase in rate and volume of stormwater runoff from new and existing development results in streambank erosion and stream destabilization	**Check all that apply:** ___ Widening of steam channels ___ Braiding of stream channel ___ Down cutting (incising) or building up (aggradation) of stream bottom due to deposition of sediment in stream channel ___ Stream bank erosion ___ Degradation or loss of fisheries habitat	**Strategy:** Mitigate stormwater impacts from developed and redeveloping areas that contribute to stream channel destabilization **Strategy:** Reduce the impacts from an increase in the volume and rate of stormwater runoff associated with new development to minimize or eliminate stream bank erosion	

Management Options Indicate with a "Ö " if community has implemented or use a "**?**" if community is interested	Barriers to Implementation	Community Assistance Needs[12]
Options: ___ Identify and protect existing riparian forest buffers in the watershed that are vulnerable due to development pressure ___ Protect existing outfalls so they do not contribute to streambank or gully erosion ___ Reduce peak discharges **Options:** ___ Retrofit (upgrade) existing stormwater detention practices utilizing the NYS Channel Protection Design Criteria as a Maximum Extent Practicable (MEP) standard ___ Address cumulative impacts of increased runoff from development through comprehensive watershed planning **Note:** There are other factors that influence stream health besides stormwater. The Stream Corridor Protection Worksheet is reccommended for communities concerned about unstable stream channels.		

[12] List assistance needed: info/education, assessment/planning, BMP design/implementation, regulatory options, project funding, etc.

Concerns Associated with Stormwater Runoff	Associated Problems	Impacts	Remedial & Preventative Strategies	
Check all that apply: ___ A lack of community consensus on stormwater management issues and what can be done to address them ___ Meeting new stormwater requirements from state and federal mandates ___ Our community's designation as a MS4 and how we will meet the requirements ___ Receiving and providing the best information and training to people who make decisions about development and stormwater management ___ Implementing a stormwater program as an essential component of sustainable community development ___ Increased operating and maintenance costs for the existing stormwater infrastructure ___ Proper plan review for Stormwater Pollution Prevention Plans (SWPPP) for development ___ Confusion over local authority to address stormwater concerns	1. At present, the community is not implementing a stormwater management program 2. The community is experiencing development pressure and is having difficulty balancing economic development and growth with natural resource protection 3. The community does not have adequate resources to operate and maintain their stormwater infrastructure	Increased stormwater runoff causes adverse impacts on water quality and stream health resulting in the need for costly restoration and remediation	**Strategy:** Develop, fund and implement a local stormwater management program	

Management Options Indicate with a "Ö " if community has implemented or use a "**?**" if community is interested	Barriers to Implementation	Community Assistance Needs[13]
___ Provide training and information about regulatory updates to officials responsible for managing stormwater ___ Develop a checklist of site plan components the municipality requires for those interested in submitting a plan for development to cut down on the time it takes to review and approve an incomplete plan ___ Non-MS4 communities require developers to submit SWPPP for local review ___ Implement education program for developers, homeowners, businesses, highway superintendents, etc. ___ Involve the public in stormwater management policy development ___ Inform engineers, local officials and construction personnel about new Phase II requirements for stormwater management and erosion and sedimentation control on an ongoing basis ___ Review development rules and regulations in your community to utilize Low Impact Development and Conservation Site Design [4] ___ Develop agreements with County SWCDs, or employ an engineer, to help review stormwater management and erosion and sediment control plans for development ___ Ensure developers and contractors implement SWPPPs for all developments over one acre by inspecting and enforcing regulations, as well as use strategies such as site bonds to ensure compliance ___ Develop intermunicipal agreements to deal with nonpoint source pollution on a watershed level **Note:** It is recommended that you also complete the Sustainable Development Worksheet to further assess the balance of development, economic growth and natural resource protection in your community		

[13] List assistance needed: info/education, assessment/planning, BMP design/implementation, regulatory options, project funding, etc.

[4] See Center for Watershed Protection publication: Better Site Design: A Handbook for Changing Development Rules in Your Community

Community Environmental Management

COMMUNITY STORMWATER MANAGEMENT PROGRAM

Stormwater management is a complex issue, with many factors needing to be addressed. This outline lists six strategies with corresponding management options that if implemented will help communities minimize potential environmental impacts from stormwater runoff. These strategies directly relate to the six minimum measures required for Phase II MS4s.

Strategy: Plan and Implement a Public Education and Outreach Program

- Prepare an outreach and education plan that will enhance the public understanding of the impacts of stormwater polluted runoff on waterbodies, the pollutants of concern and their possible sources and what needs to be done to reduce stormwater pollution from new and existing developments
- Implement stormwater education programs for homeowners, businesses, developers, highway superintendents, town boards etc.
- Ensure local officials are trained on stormwater management (e.g. Code Enforcement Officers)

Strategy: Develop and Implement a Public Involvement/Participation Plan

- Form an advisory committee within the community and in cooperation with other communities
- Utilize intermunicipal agreements
- Seek out and establish list of stake holders who would like to be apprised of milestones and give input to decisions
- Provide a mechanism to ensure program accountability
- Encourage citizen volunteer programs to help implement stormwater management activities such as beach clean ups, litter pickups, stream and lake monitoring and field surveys, storm drain stenciling.

Strategy: Develop, Implement and Enforce a Program to Detect and Eliminate Illicit Discharges

- Develop and map the location of all outfalls
- Prohibit, through ordinance or other regulatory mechanism, illicit discharges into the storm sewer system and implement appropriate enforcement procedures and actions
- Develop and implement a program to detect and address non-stormwater discharges (i.e. irrigation water, failing septic systems, lawn watering residential car washing, dechlorinated swimming pool discharges etc) if determined to be a substantial contributor of pollutants to the system
- Inform public employees, businesses and the general public of the hazards associated with illegal and improper disposal of wastewater

<u>Strategy:</u> Develop, Implement and Enforce a Program to Control Runoff from Construction Sites by:

Addressing erosion and sediment control needs during construction

- Expand local subdivision regulations to cover erosion & sedimentation control
- Require erosion and sedimentation control plans for new developments disturbing 1 acre or more
- Train construction site operators about state and local stormwater management requirements
- Post bonds to ensure compliance by developers and contractors
- Conduct site inspections during construction to ensure E&S practices are installed and being properly maintained
- Enact local erosion and sediment control ordinance

Reducing the potential for stormwater runoff to pollute groundwater and surface water

- Identify existing ground and surface water resources in site plans
- Design and implement storm water management practices (SMPs) to treat stormwater runoff
- Evaluate effectiveness of SMP's to be implemented for potential impacts to groundwater as well as surface water
- Enact local stormwater management ordinance that requires water quality impacts of new development be addressed

Reducing the construction/post construction impacts of increased stormwater flow and volume from new development

- Require SMPs to reduce channel erosion, prevent over bank flooding and help control extreme floods
- Ensure implementation of stormwater pollution prevention plans (e.g. compliance checks, site bonds)
- Limit percent of imperviousness allowed per site
- Implement low-impact development SMPs that induce infiltration
- Implement conservation designed subdivision regulations
- Encourage infill development
- Establish a dedicated funding source (i.e. stormwater utility, permit fees).

<u>Strategy:</u> Mitigate Post Construction Stormwater Impacts from Existing and Redeveloped Areas

Reducing polluted runoff from existing and redeveloped areas

- Identify stormwater hot spots
- Retrofit existing stormwater management system
- Use maximum extent practicable (MEP) standards
- Restore wetlands in the watershed to enhance flood retention and water quality benefits
- Restore stream channels to their natural conditions where practicable
- Implement flood mitigation plan to reduce flooding damages from increased development in the watershed

- Implement a scheduled maintenance program for municipal stormwater system (i.e. cleanout of catch basins, street sweeping, etc.)

Strategy: Develop and Implement a Local Stormwater Pollution Prevention Program that:

Includes " good housekeeping practices" to reduce and prevent the discharge of pollutants from activities such as park maintenance, fleet and building maintenance, roadway maintenance, hydrologic and habitat modification and marina operations

- Examine municipal operations and alter actions where needed for pollution prevention
- Develop maintenance procedures for structural and nonstructural controls (e.g. reseeding of road ditches after sediment removal)
- Develop long term inspection procedures for structural and nonstructural controls
- Develop procedures for proper waste disposal and transfer (e.g. household hazardous waste collection days)
- Protect hazardous material storage areas

Preserves and utilizes natural features and processes of the site being developed[14]

- Retain existing riparian forest buffers and wetlands
- Protect sensitive areas
- Promote conservation designed development
- Promote low-impact development integrated SMPs for on-lot use
- Design SMPs considering aesthetics and passive recreation use

Utilizes land use planning as a tool to identify potential stormwater problems by evaluating the environmental impacts of future development and then mitigating for those impacts[14]

- Establish no adverse impact goal for new development in the community
- Implement a watershed approach to assess development impacts and identify pollution prevention needs
- Conduct build out analysis of watershed to identify cumulative downstream impacts
- Minimize percent of imperviousness allowed within the watershed or per site
- Identify existing wetlands, riparian forest buffers and environmentally sensitive areas in the watershed that provide flood retention and water quality benefits
- Update comprehensive plan to include provisions for protecting a community's natural resources while planning for growth
- Implement conservation and performance zoning
- Change development rules to allow developments to be built that conserve the natural amenities of the site
- Revise subdivision regulations to allow conservation site design principles to be used
- Identify for each watershed in the community, stormwater runoff and related nonpoint source pollution reduction needs
- Develop watershed/wellhead protection plans for community drinking water sources most at risk from future development activities

[14] For MS4s, these are not required, but recommended

6.7 Flooding

Environmental Significance Summary:

Flooding is a natural process, and is an integral part of the life and health of a stream. It is the means by which the landscape evolves. Precipitation runs off into streams, and during floods, the excess is then spread across the floodplain, dissipating the energy of the floodwaters and blanketing the floodplain with nutrient rich sediment. Historically, farmers have relied on this process to give them bountiful crops. Many species of fish rely on the flood to tell them when to start their migration to spawning habitat, and the floods themselves provide the habitat for them to do so. New features like gravel beds, channels and islands are scoured or formed. Many species of plants rely on floodwaters to carry their seeds to new areas, establishing new populations. All of these things result from the natural flooding process.

In the past century, we have seen a rise in the amount of damage to public and private property from flooding. While it may be linked to climatic fluctuations (e.g. El Nino), it is most permanently affected by land use changes that have occurred as a result of development. For the most part, lack of understanding of ecosystem function, poor planning, and general indifference have jeopardized our safety when it comes to flooding. These land use changes are limiting the area that is available to manage these excessive flows, and as a result, life and property are at risk.

The first and most obvious problem is development of floodplains, putting life and possessions in the path of a force of nature. Second, upland areas have been developed and urbanized. This brings an increase in the amount of impervious area, which in turn increases the amount of water that runs off, instead of infiltrating into the soil and recharging groundwater resources. This increase in water quantity and velocity has increased erosion and accelerated the runoff process, altering the natural resource patterns and increasing the flood hazard. Third, this increase in water volume and velocity increases the rate of erosion and transport of pollutants from urbanizing upland areas.

Community Assistance Summary:

- More fully understand flood management concepts.
- Assess where your community stands relative to education and land use laws that provide for the protection of wetlands and floodplains.
- Identify flood management needs.
- Begin to map out a flood management strategy for the future.

Issues Summary:

- Storm sewers backing up.
- Culverts and Bridges overtopped and damaged during storm events.
- Streams overtopping more frequently.
- Failure of existing flood control structures.
- Flooding of homes, businesses, public buildings and highways.
- Community lacks consensus on flood management issues and what can be done to address them.
- Increased operating and maintenance costs for the existing flood management infrastructure.

Strategies Summary:

- Modify susceptibility to flood damage and disruption.
- Modify flooding.
- Modify the impact of flooding on individuals and the community.
- Protect and restore the resources and functions of the floodplain.

Community Benefit Summary:

Effective flood management can provide significant economic benefits and cost savings. There are a variety of human activities that impact hydrology and intensify flood damages. Minimizing these activities will not only reduce the threats of flooding to people and property, it will also help reduce our impact to natural resources and water quality.

Tier 2B – Flooding Worksheet

CEM

Flooding

Tier 2 Worksheet

Community Environmental Management

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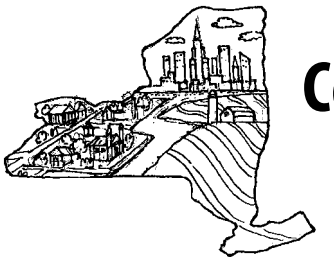

Community Environmental Management

Flooding

Tier 2 Assessment Worksheet

CEM Overview

Flooding is a natural process, and is an integral part of the life and health of a stream. It is the means by which the landscape evolves. Precipitation runs off into streams, and during floods, the excess is then spread across the floodplain, dissipating the energy of the floodwaters and blanketing the floodplain with nutrient rich sediment. Historically, farmers have relied on this process to give them bountiful crops. Many species of fish rely on the flood to tell them when to start their migration to spawning habitat, and the floods themselves provide the habitat for them to do so. New features like gravel beds, channels and islands are scoured or formed. Many species of plants rely on floodwaters to carry their seeds to new areas, establishing new populations. All of these things result from the natural flooding process.

In the past century, we have seen a rise in the amount of damage to public and private property from flooding. While it may be linked to climatic fluctuations (e.g. El Nino), it is most permanently affected by land use changes that have occurred as a result of development. For the most part, lack of understanding of ecosystem function, poor planning, and general indifference have jeopardized our safety when it comes to flooding. These land use changes are limiting the area that is available to manage these excessive flows, and as a result, life and property are at risk.

The first and most obvious problem is development of floodplains, putting life and possessions in the path of a force of nature. Second, upland areas have been developed and urbanized. This brings an increase in the amount of impervious area, which in turn increases the amount of water that runs off, instead of infiltrating into the soil and recharging groundwater resources. This increase in water quantity and velocity has increased erosion and accelerated the runoff process, altering the natural resource patterns and increasing the flood hazard. Third, this increase in water volume and velocity increases the rate of erosion and transport of pollutants from urbanizing upland areas.

In New York State, local governments through their planning and regulatory functions, have the principle responsibility for controlling development activities. This role carries with it the responsibility for ensuring that development activities are undertaken with public health and safety of future inhabitants in mind, and in a manner that is compatible with the protection and enhancement of natural resources, including water.

The purpose of this flooding worksheet is to assess the nature of flooding problems in the community and to evaluate the capacity of the community to remediate existing flooding problems and to prevent their reoccurrence. The following is intended to provide insight into the evolving subject of flood management.

Summary of Flood Management Practices

The Upper Susquehanna Coalition has partnered with the Water Resources Institute at Cornell University and developed a "Multiple Barrier Approach" (MBA) to address watershed issues that integrates planning and implementation to form a cohesive and effective unit. The MBA can be used to address flooding issues at the source, across the landscape, in the stream corridor, and outside the physical watershed in the policy and decision making process. By developing several management options at these different levels, the probability of success is increased, along with stakeholder interest.

Flooding is a complex issue, with many factors contributing to the problem. The Federal Emergency Management Agency's (FEMA) Federal Interagency Floodplain Management Task Force developed a list of "Strategies and Tools for Floodplain Management" in 1986 that outlines four main strategies for managing flooding and preventing flood damage in communities:

1. **Modify Susceptibility to Flood Damage and Disruption**
   These management options center on nonstructural measures, and are mostly policy based. They aim to prevent flood damage in the future, as well as mitigate existing problems.
2. **Modify Flooding**
   These are all structural measures that serve to both react to problems that already exist, as well as try to prevent new problems in the future.
3. **Modify the Impact of Flooding on Individuals in the Community**
   This strategy has the most effect on individual landowners. It uses awareness, as well as government aid to protect life and property.
4. **Protect and Restore the Resources and Functions of the Floodplain**
   Floodplains are sponges that in a natural state absorb excess water volume, and filter out pollutants. With increased development, a greater volume of water and pollutants needs to be absorbed and filtered. Unfortunately, with this development usually comes a loss of floodplains and their functionality. This strategy uses education and policy to protect this valuable resource.

How this Worksheet Can Assist your Community in Protecting Life, Property and Natural Resources

This worksheet can be used to help your community to:

1. More fully understand flood management concepts,
2. Assess where your community stands relative to education and land use laws that provide for the protection of wetlands and floodplains.
3. Identify flood management needs, and
4. Begin to map out a flood management strategy for the future.

For help in filling out this worksheet and technical assistance on flooding, it is recommended that you contact your County Soil and Water Conservation District, or area USDA-NRCS Conservationist. Most communities do not have a flood management plan. This worksheet can help your community determine its flood management needs.

Technical references available for communities in New York State to learn more about flood management are listed below.

- The New York State Department of Environmental Conservation's Bureau of Flood Protection has resources for:
    - Coastal Erosion Management and Flooding,
    - Dam Safety,
    - Flood Control Projects, and
    - Floodplain Management

  can be found at http://www.dec.state.ny.us/website/dow/bfp/bfp.htm, or by contacting the New York State Department of Environmental Conservation, Division of Water, Bureau of Flood Protection, 625 Broadway, Fourth Floor, Albany, NY 12233-3507, Phone: (518) 402-8151

- Information on the National Flood Insurance Program and the National Dam Safety Program can be found on the FEMA web site at http://www.fema.gov/, or by contacting FEMA Region II at FEMA Region II, 26 Federal Plaza, Suite 1307, New York, NY 10278-0001, Phone: (212) 680-3600, Fax: (212) 680-3681
- The American Rivers' Floodplain Protection Toolkit is a resource communities can use to protect floodplains and get management ideas. It can be found at http://www.amrivers.org/floodplainstoolkit/, or by contacting their Northeast Field Office at 20 Bayberry Road, Glastonbury, CT 06033, Phone: 860-652-9911, Fax: 860-652-9922, Email: lwildman@amrivers.org

Community Environmental Management

- Flooding Tier II Worksheet -

Part 1- Community Risk Assessment Factors

The following is a list of strategies many communities have used to improve their flood readiness and minimize flood damage. The more factors that apply to your Assessment Area, the less likely you are to have adverse flood impacts. Please check all of those you feel you are doing in your community.

Please check all that pertain to your community:

— Develop and/or update a flood mitigation plan.
— Ensure delineated floodplain boundaries are accurate and reflect changes due to development.
— Manage development along or within floodplains to facilitate proper floodplain function.
— Inform homeowners and businesses of existing and potential flooding risks and how their actions influence them.
— Preserve natural stream paths and prevent stream channels being constricted or altered.[1]
— Prevent wetlands from being filled or drained.
— Construct new wetlands and/or restore damaged wetlands.
— Enact and effectively enforce stormwater regulations.
— Regularly maintain existing stormwater infrastructure.
— Regularly inspect and maintain existing flood control structures.
— Actively involved in watershed-wide planning and management for flooding or stormwater mitigation.
— Realize the potential for future development in the watershed and plan for increased runoff that will result.
— Realize the potential for an increase in the amount of impervious area in the watershed due to development and plan for increased runoff that will result.
— Consider the cumulative impacts of development on flooding in watershed.
— Utilize reliable and accurate sources of technical expertise to review site plans for potential flooding impacts.

[1] Natural stream design does not reduce flooding; it restores the natural flood plain and promotes natural flooding.

Part 2- Community Problem & Needs Assessment

Part 2 of this assessment will help to determine how extensive flooding is in your community and what is your community's capacity for addressing flooding issues.

Problems Associated with Increased Flooding	Causes	Impacts	Remedial & Preventative Strategies
Storm sewers backing up **___Yes ___No** Locations (List): _____ _____	1. Increase in rate and volume of runoff due to increased % of impermeable surface area in watershed from development. 2. Loss of wetlands that function to receive excess rainfall and release it slowly. 3. Deposition of sediment decreases capacity of conveyances	**Check those impacts that apply:** ___Increased flooding and flood damages ___Expansion of the floodplain Magnitude and duration of the flooding (Explain): _____ _____	**<u>Strategy</u>:** Modify Susceptibility to Flood Damage and Disruption

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	**Barriers To Implementation**	**Community Assistance Needs[2]**
Options: __ Street sweeping __ Regularly maintain catch basins __ Properly size your storm sewer system and schedule review dates to make sure sizing keeps up with growth of development and increases in runoff in the watershed __ Educate about impervious area and infiltration. __ Proper sizing and installation of private stormwater conveyances __ Properly maintain storm sewers so that sediment deposition does not reduce their capacity. __ Implement a proper clearing and snagging program to remove debris blocking culverts and bridges. __ Modify subdivision and building rules and regulations to modify the required amount of impervious area (Road widths, curbing, etc.) __ Restrict filling and development of flood plains. __ Preserve the flood attenuation benefits of wetlands in the watershed __ Develop, implement and enforce a flood mitigation plan based on FEMA guidelines to prevent flood damage to buildings and infrastructure. __ Adopt, implement and enforce the updated New York State Model Floodplain Management Law locally. __ Provide flood hazard documentation, FEMA FIRM and historical flood data to the public. __ Consider flood hazards in the Master Plan and Land Use Regulations. __ Make sure the Planning and Zoning Boards refer to flood hazard data when developing land use policy and issuing approvals to development and redevelopment.		

[2] List type of assistance needed: information/education; assessment/planning: BMP design/implementation; regulatory options; project funding; etc.

Problems Associated with Increased Flooding	Causes	Impacts	Remedial & Preventative Strategies
Storm sewers backing up, continued			**Strategy**: Modify Flooding
			Strategy: Modify the Impact of Flooding on Individuals and the Community

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	Barriers To Implementation	Community Assistance Needs[3]
Options: __ Require developers and engineers to use stormwater BMPs outlined in the Blue Book and the Stormwater Management Design Manual. __ Protect of existing river and stream corridors and their floodplains from development. __ Develop a watershed land treatment program to reduce sediment and runoff from farming, timber harvesting, and construction activities. __ Develop a stormwater management program. __ Ensure proper function of man made diversions (e.g. bypass channels) through proper construction, inspection and maintenance. __ After installation, monitor flood and stormwater management structures to make sure they have not moved the flooding problem elsewhere.		
Options: __ Promote participation in and awareness of the flood insurance program __ Provide disaster assistance to the community, or make resources available to help them access other sources of disaster assistance __ Put a flood warning system in place and test it regularly __ Develop and update flood stage forecast maps available to the community, and train emergency personnel to use them __ Develop and test an emergency plan for the community to addresses flood emergencies __ Develop and test a flood emergency flood evacuation plan for the community __ Assemble an emergency response team trained in handling toxic and hazardous materials in flood situations (e.g. volunteer fire department) __ Assemble a water rescue team, or make sure one is available regionally __ Provide training and/or informational programs on flood damage prevention for municipal officials, planning and zoning, floodplain permit administrators, CEO, building inspectors, and homeowners __ Provide an approved list of contractors and consultants who are knowledgeable and trained in flood proofing, retrofitting and construction available to the public __ Offer tax adjustments for those who grant conservation easements or do not develop the land they own lies within a flood plain or wetlands __ Develop a program to purchase development rights or homes in flood plains		

[3] List type of assistance needed: information/education; assessment/planning: BMP design/implementation; regulatory options; project funding; etc.

Problems Associated with Increased Stormwater Runoff	Causes	Impacts	Remedial & Preventative Strategies
Culverts and Bridges overtopped and damaged during storm events **___Yes ___No**	1. Increase in rate and volume of runoff due to increased % of impermeable surface area in watershed from development. 2. Loss of wetlands that function to receive excess rainfall and release it slowly. 3. Deposition of sediment decreases capacity of conveyances	**Check those impacts that apply:** ___Increased flooding and flood damages ___Expansion of the floodplain Magnitude and duration of the flooding (Explain): _____ _____	**<u>Strategy</u>:** Modify Susceptibility to Flood Damage and Disruption

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	Barriers to Implementation	Community Assistance Needs
Options: __ Provide for floodplain flows when designing culverts and bridges __ Properly size culverts and bridges and schedule review dates to make sure sizing keeps up with growth of development and increases in runoff in the watershed __ Educate about impervious area and infiltration. __ Proper sizing and installation of private bridges and culverts __ Provide information about how to properly size and install private bridges and culverts to the public __ Properly maintain ditches, bridges and culverts so that sediment deposition does not reduce their capacity. __ Implement a proper clearing and snagging program to remove debris blocking culverts and bridges. __ Modify subdivision and building rules and regulations to modify the required amount of impervious area (Road widths, curbing, etc.) __ Protect wetlands and floodplains from development __ Information and education/technical assistance __ Develop a program to prevent flood damage to homes, businesses and public infrastructure __ Develop, implement and enforce a flood mitigation plan based on FEMA guidelines to prevent flood damage to buildings and infrastructure. __ Incorporate flood proofing requirements in building codes __ Acquire and or relocate homes and businesses out of the floodway __ Adopt growth management policies that discourage development and infrastructure improvements in the floodplain __ Develop a public information and outreach program that identifies homes at risk and provides owners with information on how to reduce flood damage __ Preserve the flood attenuation benefits of wetlands in the watershed __ Adopt, implement and enforce the updated New York State Model Floodplain Management Law locally. __ Consider flood hazards in the Master Plan and Land Use Regulations. __ Make sure the Planning and Zoning Boards refer to flood hazard data when developing land use policy and issuing approvals to development and redevelopment. __ Ensure proper review, sizing and installation of private bridges and culverts plans __ Identify where citizens can be directed if they have questions about how to properly size and install private bridges and culverts (e.g. Soil and Water Conservation Districts)		

Problems Associated with Increased Stormwater Runoff	Causes	Impacts	Remedial & Preventative Strategies
Culverts and Bridges overtopped and damaged during storm events, continued			**<u>Strategy</u>:** Modify Flooding
			<u>Strategy</u>: Modify the Impact of Flooding on Individuals and the Community

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	Barriers to Implementation	Community Assistance Needs
Options: __ Require developers and engineers to use stormwater BMPs outlined in the Blue Book and the Stormwater Management Design Manual. __ Protect of existing river and stream corridors and their floodplains from development. __ Develop a watershed land treatment program to reduce sediment and runoff from farming, timber harvesting, and construction activities. __ Develop a stormwater management program. __ Ensure proper function of bridges and culverts (e.g. bypass channels) through proper construction, inspection and maintenance. __ After installation, monitor flows to make sure they have not created flooding problems elsewhere. __ Provide information on dealing with nuisance beavers __ Prepare a management plan for dealing with ice jams		
Options: __ Promote participation in and awareness of the flood insurance program __ Provide disaster assistance to the community, or make resources available to help them access other sources of disaster assistance __ Put a flood warning system in place and test it regularly __ Develop and update flood stage forecast maps available to the community, and train emergency personnel to use them __ Develop and test an emergency plan for the community to addresses flood emergencies __ Develop and test a flood emergency flood evacuation plan for the community __ Assemble an emergency response team trained in handling toxic and hazardous materials in flood situations (e.g. volunteer fire department) __ Assemble a water rescue team, or make sure one is available regionally __ Provide training and/or informational programs on flood damage prevention for municipal officials, planning and zoning, floodplain permit administrators, CEO, building inspectors, and homeowners __ Provide an approved list of contractors and consultants who are knowledgeable and trained in flood proofing, retrofitting and construction available to the public __ Offer tax adjustments for those who grant conservation easements or do not develop the land they own lies within a flood plain or wetlands __ Develop a program to purchase development rights or homes in flood plains		

Problems Associated with Increased Stormwater Runoff	Causes	Impacts	Remedial & Preventative Strategies
			Strategy: Protect and Restore the Resources and Functions of the Floodplain

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	Barriers to Implementation	Community Assistance Needs
Options: __ Develop floodplain, wetland, stream corridor and coastal barrier resources regulations to preserve the flood attenuation benefits of wetlands in the watershed __ Work with communities in the watershed to prohibit the filling or draining of wetlands as a result of development or agriculture __ Adopt local wetland protection regulations __ Require necessary sign-offs by State and Federal wetland permitting agencies for proposed projects __ Develop, implement and enforce stream bank and/or shoreline setbacks to protect banks, and vegetation from development __ Develop and implement a policy for helping to obtain easements in flood hazard areas __ Develop and implement a policy for helping to transfer development rights from flood prone areas __ Minimize stormwater runoff impacts from an increase in development and impervious area in the watershed __ Address any specific places where changing land use practices contribute to flooding __ Develop and implement a watershed wide plan for stormwater that takes into consideration the cumulative impacts of changing land uses __ Plan for increased development and runoff in watershed culverts, bridges, and design them to pass the floodplain flow __ Enter into an intermunicipal agreement for the watershed wide control of runoff __ Coordinate or cooperate (outside of a formal agreement) with other communities in the watershed to address flooding issues		

Problems Associated with Increased Stormwater Runoff	Causes	Impacts	Remedial & Preventative Strategies
Streams overtopping more frequently **___Yes ___No** Locations (List): _____ _____	1. Increase in rate and volume of runoff due to increased % of impermeable surface area in watershed from development. 2. Loss of wetlands that function to receive excess rainfall and release it slowly. 3. Modification of stream channel	**Check those impacts that apply:** ___Increased flooding and flood damages ___Expansion of the floodplain Magnitude and duration of the flooding (Explain): _____ _____	**Strategy:** Modify Susceptibility to Flood Damage and Disruption **Strategy:** Modify Flooding

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	Barriers to Implementation	Community Assistance Needs
Options: __ Restrict filling and development of flood plains. __ Restrict construction of dikes and levees __ Develop floodplain management land use regulations __ Protect wetlands and floodplains in development and redevelopment policies __ Modify subdivision and building rules and regulations to modify the required amount of impervious area (Road widths, curbing, etc.) __ Develop a program to prevent flood damage to homes, businesses and public infrastructure __ Develop, implement and enforce a flood mitigation plan based on FEMA guidelines to prevent flood damage to buildings and infrastructure. __ Incorporate flood proofing requirements in building codes __ Acquire and or relocate homes and businesses out of the floodway __ Adopt growth management policies that discourage development and infrastructure improvements in the floodplain __ Develop a public information and outreach program that identifies homes at risk and provides owners with information on how to reduce flood damage __ Restrict modification to the stream channel (dredging, straightening, etc.) __ Preserve the flood attenuation benefits of wetlands in the watershed __ Minimize stream channel constrictions downstream (e.g., bridges, culverts, debris) __ Adopt, implement and enforce the updated New York State Model Floodplain Management Law locally. __ Adopt growth management policies that discourage development and infrastructure improvements in the floodplain		
__ Minimize stream channel and floodplain constrictions (e.g., constrictions due to bridges, culverts, debris) __ Provide information on dealing with nuisance beavers __ Prepare a management plan for dealing with ice jams		
There are other factors that influence flooding, such as stormwater and stream corridor management. We suggest you complete the Tier II Stormwater and Stream Corridor Management Worksheets to further assess your situation.		

Problems Associated with Increased Stormwater Runoff	Causes	Impacts	Remedial & Preventative Strategies
			Strategy: Protect and Restore the Resources and Functions of the Floodplain

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	**Barriers to Implementation**	**Community Assistance Needs**
Options: __ Develop floodplain, wetland, stream corridor and coastal barrier resources regulations to preserve the flood attenuation benefits of wetlands in the watershed __ Work with communities in the watershed to prohibit the filling or draining of wetlands as a result of development or agriculture __ Adopt local wetland protection regulations __ Require necessary sign-offs by State and Federal wetland permitting agencies for proposed projects __ Develop, implement and enforce stream bank and/or shoreline setbacks to protect banks, and vegetation from development __ Develop and implement a policy for helping to obtain easements in flood hazard areas __ Develop and implement a policy for helping to transfer development rights from flood prone areas __ Minimize stormwater runoff impacts from an increase in development and impervious area in the watershed __ Address any specific places where changing land use practices contribute to flooding __ Develop and implement a watershed wide plan for stormwater that takes into consideration the cumulative impacts of changing land uses __ Plan for increased development and runoff in watershed culverts, bridges, and design them to pass the floodplain flow __ Enter into an intermunicipal agreement for the watershed wide control of runoff __ Coordinate or cooperate (outside of a formal agreement) with other communities in the watershed to address flooding issues		

Problems Associated with Increased Stormwater Runoff	Causes	Impacts	Remedial & Preventative Strategies
Failure of existing flood control structures **___Yes ___No** Locations (List): _____ _____	1. Increase in rate and volume of runoff due to increased % of impermeable surface area in watershed from development. 2. Improper inspection and maintenance of flood control structures 3. Sedimentation behind flood control structures decreases capacity	**Check those impacts that apply:** ___Increased flooding and flood damages ___Threat of loss of life or property Magnitude and duration of the flooding (Explain): _____ _____	**Strategy:** Modify Susceptibility to Flood Damage and Disruption **Strategy:** Modify Flooding **Strategy:** Modify the Impact of Flooding on Individuals and the Community

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	Barriers to Implementation	Community Assistance Needs
Options: __ Make sure sedimentation from increased erosion in watershed does not result in decreased storage capacity of flood storage structures __ Properly construct and maintain flood control structures __ Ensure effective inspections and maintenance of flood control structures __ Assign responsibility for funding and maintenance of abandoned flood control structures __ Restrict filling and development of flood plains. __ Adopt, implement and enforce the updated New York State Model Floodplain Management Law locally.		
__ Ensure flood control structures sized to handle an increase in runoff volume from new development __ Ensure permanent flashboards (also called stop logs) are not in place on any dams __ Restore wetlands and habitat after dams are removed __ Develop a plan to reduce sediment deposition		
Options: __ Promote participation in and awareness of the flood insurance program __ Provide disaster assistance to the community, or make resources available to help them access other sources of disaster assistance __ Put a flood warning system in place and test it regularly __ Develop and test an emergency plan for the community to addresses flood emergencies __ Develop and test a flood emergency flood evacuation plan for the community __ Assemble an emergency response team trained in handling toxic and hazardous materials in flood situations (e.g. volunteer fire department) __ Assemble a water rescue team, or make sure one is available regionally __ Provide training and/or informational programs on flood damage prevention for municipal officials, planning and zoning, floodplain permit administrators, CEO, building inspectors, and homeowners		

Problems Associated with Increased Stormwater Runoff	Causes	Impacts	Remedial & Preventative Strategies
Flooding of homes, businesses, public buildings and highways **___Yes ___No** Extent (describe):_____ _____ Locations (list):_____ _____	1. Increase in rate and volume of runoff due to increased % of impermeable surface area in watershed from development. 2. Loss of wetlands that function to receive excess rainfall and release it slowly. 3. Deposition of sediment decreases capacity of conveyances 4. Nuisance flooding by beavers	**Check those impacts that apply:** ___Increased flooding and flood damages ___Threat of loss of life or property Magnitude and duration of the flooding (Explain): _____ _____	**<u>Strategy</u>:** Modify Susceptibility to Flood Damage and Disruption

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	Barriers to Implementation	Community Assistance Needs
Options: __ Accurately delineate boundaries of the floodplain __ Properly size your storm sewer system and schedule review dates to make sure sizing keeps up with growth of development and increases in runoff in the watershed __ Educate about impervious area and infiltration. __ Proper sizing and installation of private stormwater conveyances __ Properly maintain storm sewers so that sediment deposition does not reduce their capacity. __ Implement a proper clearing and snagging program to remove debris blocking culverts and bridges. __ Modify subdivision and building rules and regulations to decrease the required amount of impervious area (Road widths, curbing, etc.) __ Restrict filling and development of flood plains. __ Preserve the flood attenuation benefits of wetlands in the watershed __ Develop, implement and enforce a flood mitigation plan based on FEMA guidelines to prevent flood damage to buildings and infrastructure. __ Outline flood hazard areas on tax maps. __ Contact FEMA about discrepancies in floodplain mapping. __ Regularly review FEMA FIRM for accuracy. __ Adopt, implement and enforce the updated New York State Model Floodplain Management Law locally. __ Incorporate flood-proofing requirements for flood prone areas into building codes. __ Provide emergency high water access and egress routes __ Place utilities above selected flood protection elevations __ Require placement of bulk storage facilities above selected flood protection elevations __ Incorporate flood proofing requirements in building codes __ Provide flood hazard documentation, FEMA FIRM and historical flood data to the public. __ Consider flood hazards in the Master Plan and Land Use Regulations. __ Make sure the Planning and Zoning Boards refer to flood hazard data when developing land use policy and issuing approvals to development and redevelopment. __ Adopt growth management policies that discourage development and infrastructure improvements in the floodplain __ Develop a public information andoutreach program that identifies homes at risk and provides owners with information on how to reduce flood damage __ Sponsor a flood damage prevention education/outreach __ Inform homeowners and businesses currently located in flood prone areas of the risks as well as mitigation measures __ Educate real estate agents, mortgage lenders and insurance agents about flood hazards __ Provide a place where can the public go for historical flood information for their property __ Identify areas with basement flooding from high water tables[1]		

Problems Associated with Increased Stormwater Runoff	Causes	Impacts	Remedial & Preventative Strategies
Flooding of homes, businesses, public buildings and highways, continued			**Strategy**: Modify Flooding
			Strategy: Modify the Impact of Flooding on Individuals and the Community

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	Barriers to Implementation	Community Assistance Needs
Options: __ Protect of existing river and stream corridors and their floodplains from filling and development __ Develop a watershed land treatment program to reduce sediment and runoff from farming, timber harvesting, and construction activities. __ Develop a stormwater management program. __ Ensure proper function of man-made diversions (e.g. bypass channels) through proper construction, inspection and maintenance. __ After installation, monitor flood and stormwater management structures to make sure they have not moved the flooding problem elsewhere. __ Provide information regarding nuisance beavers __ Prepare a management plan for ice jams		
Options: __ Enforce effective regulations that prohibit development in the floodway __ Educate and encourage homeowners and businesses to participate in the flood insurance program __ Properly flood-proof buildings __ Manage nuisance flooding by beavers __ Promote participation in and awareness of the flood insurance program __ Provide disaster assistance to the community, or make resources available to help them access other sources of disaster assistance __ Implement flood warning system and test regularly __ Develop and update flood stage forecast maps available to the community, and train emergency personnel to use them __ Develop and test an emergency plan for the community to addresses flood emergencies __ Develop and test a flood emergency flood evacuation plan for the community __ Assemble an emergency response team trained in handling toxic and hazardous materials in flood situations (e.g. volunteer fire department) __ Assemble a water rescue team or make one available regionally __ Provide training and/or informational programs on flood damage prevention for municipal officials, planning and zoning, floodplain permit administrators, CEO, building inspectors, and homeowners __ Provide an approved list of contractors and consultants who are knowledgeable and trained in flood proofing, retrofitting and construction to the public __ Offer tax adjustments for those who grant conservation easements or do not develop the land they own lies within a flood plain or wetlands __ Develop a program to acquire and or relocate homes and businesses out of the floodway		

Problems Associated with Increased Stormwater Runoff	Causes	Impacts	Remedial & Preventative Strategies
			Strategy: Protect and Restore the Resources and Functions of the Floodplain

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	Barriers to Implementation	Community Assistance Needs
Options: __ Develop floodplain, wetland, stream corridor and coastal barrier resources regulations to preserve the flood attenuation benefits of wetlands in the watershed __ Work with communities in the watershed to prohibit the filling or draining of wetlands as a result of development or agriculture __ Adopt local wetland protection regulations __ Require necessary sign-offs by State and Federal wetland permitting agencies for proposed projects __ Develop, implement and enforce stream bank and/or shoreline setbacks to protect banks, and vegetation from development __ Develop and implement a policy for helping to obtain easements in flood hazard areas __ Develop and implement a policy for helping to transfer development rights from flood prone areas __ Minimize stormwater runoff impacts from an increase in development and impervious area in the watershed __ Address any specific places where changing land use practices contribute to flooding __ Develop and implement a watershed wide plan for stormwater that takes into consideration the cumulative impacts of changing land uses __ Plan for increased development and runoff in watershed culverts, bridges, and design them to pass the floodplain flow __ Enter into an intermunicipal agreement for the watershed wide control of runoff __ Coordinate or cooperate (outside of a formal agreement) with other communities in the watershed to address flooding issues		

Problems Associated with Increased Stormwater Runoff	Causes	Impacts	Remedial & Preventative Strategies
Our municipality is concerned about (please check all that apply): **___A lack of community consensus on flood management issues and what can be done to address them** **___Receiving and providing the best information and training to people who make decisions about development and flood management in our community (e.g. contractors, engineers, municipal officials)** **___Implementing a flood program as an essential component to sustainable community development** **___Increased operating and maintenance costs for the existing flood management infrastructure** **___Proper plan review for potential flood impacts on development.** **___Confusion over local authority to address flooding concerns**	1. At present community is not implementing a stormwater management program. 2. At present the community is not implementing a flood mitigation plan. 3. The community is experiencing development pressure, but is having difficulty balancing economic development and growth and natural resource protection needs (including wetlands, flood plains and water quantity). 4. Community does not have adequate resources in order to operate and maintain their stormwater infrastructure.	**Check those impacts that apply:** ___Increased flow and volume of stormwater, increases the adverse flooding impacts on the community, increasing the need for costly restoration and remediation.	**<u>Strategy</u>: Develop fund and implement a local flood mitigation program.**

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	Barriers to Implementation	Community Assistance Needs
__ Provide information about regulatory updates and training to officials responsible for flood mitigation __ Develop a checklist of site plan components to determine if the proposed project is in a flood hazard area __ Non-MS4 communities require developers to submit SWPPP for local review __ Implement education program for developers, homeowners, businesses, highway superintendents etc..on flood mitigation __ Involve the public in flood mitigation policy development __ Inform engineers, local officials and construction personnel about new Phase II requirements for stormwater management and erosion and sedimentation control on an ongoing basis __ Change development rules in your community to encourage developers to utilize model development principles[4] such as Low Impact Development and Conservation Site Design __ Ensure developers and contractors comply with the building codes and flood mitigation plans by inspecting and enforcing regulations, as well as use strategies such as site bonds to ensure compliance. __ Develop intermunicipal agreements to deal with flooding on a watershed level __ Develop a program to provide tax incentives, conservation easements, purchase of development rights, purchase or relocation of homes in the flood plain, and other strategies as necessary to prevent flood damages **We suggest you also complete the Land Use Planning Needs Worksheet to further assess the balance of development and economic growth in your community.**		

[1]There is no government assistance available to homeowners with groundwater flooding problems. Flood insurance only covers flood damage if the water enters your building from the surface. Groundwater flooding is the responsibility of the homeowner.
[2]A Floodplain Development Permit is required for the construction, replacement or alteration of any bridge, culvert or road crossing of a stream with a Special Flood Hazard Area (100-Year Floodplain) identified on a FEMA Flood Insurance Rate Map (FIRM). Contact your municipality for permit requirements and restrictions. Private bridges and culverts are the responsibility of the landowner. Flood insurance does not cover them, and landowners are at their own risk if they wash out and emergency vehicles cannot get across them to access the property, it is the fault of the landowner. If their bridge or culvert washes out, the damage caused by their travel downstream is the responsibility of the landowner as well.
[4] See Center for Watershed Protection publication: Better Site Design: A Handbook for Changing Development Rules in Your Community

Please fill in the location and type of the flood control structure, reasons they were constructed, and when they were constructed:

Location	Type[5]	Public or Private?	Reason Constructed (Check all that apply)					Is the Dam Still Functioning for the Use it Was Designed? (Y/N)
			Flooding threat to life or property	Control of floodwaters	Hydroelectric power	Fish and wildlife	Recreation	

[5] Indicate what type (dam, dike, engineered levee, earthen berm, etc.).

Date of Construction	**Date of Last Engineering Test**	**Is the Dam on the NYS DEC Inventory? (Y/N) (If yes, include Hazard Classification**	**How Frequently is There Uncontrolled Spillage, or are Emergency Spillways Utilized?**	**Has Development Occurred Downstream Since It Was Built? (Y/N)**

Community Environmental Management
TIER III: FLOOD MITIGATION STRATEGY DEVELOPMENT

Flooding is a complex issue, with many factors contributing to the problem. The Federal Emergency Management Agency's Federal Interagency Floodplain Management Task Force developed a list titled "Strategies and Tools for Floodplain Management" in 1986 that outlines four strategies for managing flooding and preventing flood damage in communities.

STRATEGY – Modify Susceptibility to Flood Damage and Disruption

- Floodplain management land use regulations
- Building codes
- Acquisition/relocation
- Development and redevelopment policies
- Information and education/technical assistance

STRATEGY – Modify Flooding

- Flood control structures; dams, levees, floodwalls etc.
- Channel alterations/dam removal
- Land treatment measures
- Stormwater management (e.g. on-site detention facilities)

STRATEGY – Modify the Impact of Flooding on Individuals and the Community

- Flood insurance
- Disaster assistance
- Information and education /emergency preparedness/training
- Tax adjustments

STRATEGY – Protect and Restore the Resources and Functions of the Floodplain

- Floodplain, wetland, stream corridor and coastal barrier resources regulations
- Land use planning
- Conservation easements
- Watershed management
- Tax adjustments
- Information and education

If you have any questions or comments on this draft worksheet, please contact:

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6.8 Drinking Water Source Protection

Environmental Significance Summary:

Source water protection is essential to preserve public health and sustain the local economy in many communities. In New York State, over 6 million citizens use public or private wells for their drinking water, and over 15 million drink water coming from surface water sources. The federal Safe Drinking Water Act Amendments of 1996 extended the focus of providing safe drinking to include source water protection for both surface water and ground water sources. Private wells are not regulated by either New York State or the federal government, but it may be relevant to include private wells in protection planning of a shared resource. In some cases, private wells are the sources for which protection is needed.

A community water system is what people typically think of as a public water system. Community systems serve people where they live at least six months of the year. The larger of these systems are run by or for municipalities, or private water companies. Some of the systems serve only a few apartments or mobile homes (at least 25 residents or 5 service connections to be regulated by New York State), while other systems are very large. There are also non-community water systems that include non-transient systems serving 25 or more people where they work or go to school, such as factories or schools. Transient non-community systems comprise the largest number of public water systems. These systems provide water service to customers who visit them on a transient basis, like hotels, motels, camps, stores and restaurants. All must meet extensive federal and state requirements to ensure that the water they serve is safe to drink. Other wells, located at homes and small businesses that do not meet the definition of a public water system, are considered private wells and are not regulated by either New York State or the federal government.

Some local governments have experience with water treatment and how to operate treatment plants or to contract with professionals to treat the water. Fewer have experience with how to meet the challenge of contamination prevention. Unless it becomes contaminated, drinking water has largely been out of sight and out of mind.

Community Assistance Summary:

- More fully understand the concepts of water and contaminant movement.
- Assess the area(s) supplying drinking water to your community.
- Identify management strategies to protect the water source area.
- Develop and implement a plan for protecting drinking water source area(s).

Issues Summary:

- Committee for Source Water Protection, Involving Local, State, and Federal Agencies and other interested parties has not been organized.
- Coordination of Programs Addressing Source Water Resources (aquifer protection, drinking water watershed protection) is lacking.
- Drinking Water Contamination or Contamination Threat Insufficiently characterized.
- Available Information about Drinking Water Sources Does not Provide Basis for Effective Protection.
- Inventory of Practices or Potential Sources of Contamination is not Complete, so Protection Needs have not Been Identified.
- Proposed Land Use Changes (or specific proposed projects) may Increase Potential for Impact on Drinking Water Source.
- Security or Emergency Response Plan for Source Area Protection is Missing, Incomplete, or Inadequate.
- Regulations or Existing Management Plans not Sufficient to Manage Source Water area & the ability to enforce existing regulations lacking or unclear.
- Water Quantity Insufficient.

Strategies Summary:

- Get all local interested parties involved in planning for source protection, whether regional, watershed or aquifer (or part of aquifer) approach can be considered when determining scope of protection needs.
- Use available information and determine what additional information will be needed to define protection needs.
- Evaluate current water quality and potential threats to water quality.
- Evaluate whether Planned or Potential Changes in Land Use may impact Drinking Water Source.
- Evaluate security and emergency response needs and prepare plan.
- Evaluate regulatory options for source protection
- Complete and Implement Source Water Management Plan at Appropriate Scale using actions appropriate for the geology, hydrology, and political situation of the source.

Community Benefit Summary:

In many cases, protection of the drinking water source has economic and environmental benefits in addition to maintaining or improving existing water quality issues. The assurance of a good, reliable source of drinking water is important to residents and businesses moving to a community, and for retaining current residents and businesses.

Tier 2B – Drinking Water Source Protection Worksheet

CEM Drinking Water Source Protection

Tier 2 Worksheet

Community Environmental Management

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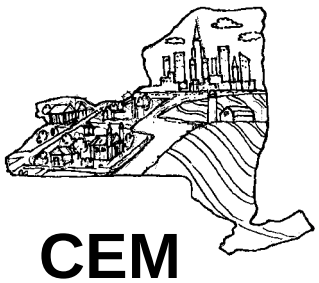

CEM

CEM

Community Environmental Management

Drinking Water Source Protection

Assessment Worksheet

Overview

Source Water is the water from rivers, streams, lakes and ground water that is used to supply communities with drinking water. Source water protection involves taking positive steps to manage potential sources of contamination and to prevent pollutants from reaching or contaminating sources of drinking water. Wellhead protection, for example, seeks to prevent the contamination of ground water that supplies public and private drinking water wells.

Protecting the water source from contamination is often more efficient and cost-effective than treating drinking water later to make it safe to drink. The types of protection measures that a community can implement include local land use controls such as land acquisition and ordinances and other management tools such as contingency plans and public education initiatives. The protection activities that a community pursues will depend on the how susceptible to different types of contamination the water source is, as well as the resources identified or available for use in protection as specified in the source water protection plan.

Source water protection is essential to preserve public health and sustain the local economy in many communities. In New York State, over 6 million citizens use public or private wells for their drinking water, and over 15 million drink water coming from surface water sources. The federal Safe Drinking Water Act Amendments of 1996 extended the focus of providing safe drinking to include source water protection for both surface water and ground water sources. Private wells are not regulated by either New York State or the federal government, but it may be relevant to include private wells in protection planning of a shared resource. In some cases, private wells are the sources for which protection is needed.

A community water system is what people typically think of as a public water system. Community systems serve people where they live at least six months of the year. The larger of these systems are run by or for municipalities, or private water companies. Some of the systems serve only a few apartments or mobile homes (at least 25 residents or 5 service connections to be regulated by New York State), while other systems are very large. There are also non-community water systems that include non-transient systems serving 25 or more people where they work or go to school, such as factories or schools. Transient non-community systems comprise the largest number of public water systems. These systems provide water service to customers who visit them on a transient basis, like hotels, motels, camps, stores and restaurants. All must meet extensive federal and state requirements to ensure that the water they serve is safe to drink. Other wells, located at homes and small businesses that do not meet the definition of a public water system, are considered private wells and are not regulated by either New York State or the federal government.

Some local governments have experience with water treatment and how to operate treatment plants or to contract with professionals to treat the water. Fewer have experience with how to meet the challenge of contamination prevention. Unless it becomes contaminated, drinking water has largely been out of sight and out of mind. This worksheet will help communities determine the appropriate questions to ask, and provide resources for how to find the answers.

A community may have a combination of public and private wells for which protection is desired and conditions for which a variety of legal and mechanical protection strategies may be needed. Several scenarios are described below:

A. Local government does not operate a public water system, most of the public uses private wells, with a few small community water systems like apartment buildings or other public systems like a school. Water may come from a single or multiple aquifers, which may be part of another source protection area.

B. A regional water authority or investor-owned utility serves the public, although some private wells use the same water resource. Development pressure may increase when water lines are extended. Water may come from surface water or wells tapping one or more aquifers. In order to protect water source, a lot of cooperation among government entities may be required.

C. Local government operates a public water system that serves the public within the municipality. The municipality may have the direct legal authority to adopt local zoning overlay zones or local ordinances to protect the water source in the municipality. Ordinances could also apply to private well source areas. Options can include land purchase or protection area easements can be bought from land owners.

D. Local government does not have jurisdiction over the source area because it is in another town or county. Cooperative agreements may serve to protect the water source.

Providing a safe supply of drinking water is accomplished through what is considered a multiple barrier approach. A barrier is provided by keeping the water safe at the source, using source water protection. Another barrier is provided by water treatment such as filtering or chlorination. Still another barrier is provided through monitoring, and ongoing evaluation of the quality of the water that is provided to people's homes and businesses. This worksheet focuses on Protection of the Drinking Water source through risk management, risk monitoring and compliance, as well as individual actions that can be taken to protect the water source.

Developing the Source Protection Plan

An effective source protection plan includes several steps. The area that the drinking water comes from must be defined, or delineated. An inventory of the known and potential sources of contamination within the watershed must be completed. The susceptibility of the source to contamination must be evaluated. The public must be involved in understanding the susceptibility of the source to contamination and identifying the management practices to implement to protect the drinking water resource. Management measures that address the particular situation of the local water source susceptibility, extent, and agency capabilities are evaluated, and drafted into a plan. Contingency planning for source protection includes evaluation of any contamination issues as well as how to address service interruptions. In addition to implementation of management practices, the protection plan should be periodically reviewed to ensure that it remains effective for protecting the source waters. Details about some of the protection planning steps are given below:

Delineating the source water area. In many parts of New York State, the source water areas that supply drinking water are not well characterized. In many cases, the details of well construction and sub-surface water bearing and confining layers are unknown or incomplete. For the purpose of completing an initial assessment for the Source Water Assessment Program (SWAP), an initial estimate of the source area was used. Before taking further steps, the accuracy of the delineated assessment area, and relevance to use as a protection area need to be confirmed. Steps to confirm the recharge area of the well include collecting additional information on the well and nearby wells, and may require additional borings to obtain information about the subsurface and aquifer. In some cases, there is enough available information to run a model to determine subsurface flow direction and the likely area that contributes recharge to the well. Still more information and sophisticated models are needed to distance the water will travel in a certain period of time. For example, a category for the distance the water may travel in two years can be used for the potential impact from microbiological contaminants. Different, longer times of travel would be used to evaluate potential impact from chemical contaminants.

Inventorying potential sources of contamination. An initial compilation of potential sources of contamination has been completed for public water systems in the SWAP assessments. The inventory is a list of possible contaminant sources within the delineated source water area(s). It is subject to change based on any changes in

the delineation of the source area, changes in prevalence of potential contaminants in the area, and refinement using details of actual rather than general practices in particular places or areas. For example, pesticides may be typically applied to a cornfield, but a particular cornfield may be pesticide-free.

The contaminant inventory includes a summary of land use practices in the assessment area which can impact water quality, discrete potential sources based on state or national Geographic Information Systems (GIS) coverages, and discrete sources identified during site inspections or sanitary surveys. The land use inventory of prevalence of potential sources of contamination is based on aerial images of land cover, with refinement based on local observations. Databases of regulated facilities such as factories or other permitted or registered facilities are queried to find out where the facilities are and what contaminants are present. The SWAP assessment considered potential contaminants of concern in categories that have been identified as a potential threat to drinking water quality, broken into groups based on common sources and similar fate and transport qualities in the environment. The prevalence of contaminants at the inventory of potential contaminant sources is used to develop prevalence ratings for each contaminant category.

Evaluating Source Sensitivity. Sensitivity is rated based on how easy it is for contaminants, if present, to reach a drinking water source. Surface waters bodies vary in sensitivity based on the type of water body and water flow at the intake. Ground water sensitivity is rated based on conditions of the aquifer and the integrity of the well itself as well as the types of soil, rocks, and vegetation in the recharge area, the section of land that receives precipitation and allows it to infiltrate an aquifer.

Determining the Source Susceptibility. The susceptibility of a drinking water source to contamination depends on the naturally occurring sensitivity of the source and the presence of contaminants in the source area that have the potential to deteriorate water quality. If no contaminant sources are present in the drinking water source area, then the susceptibility will be low, even for a sensitive source. If there is a high prevalence of potential sources of contamination in the drinking water source area, a medium susceptibility may be warranted, even if the source sensitivity is low because the water comes from a properly protected well in a confined aquifer.

Determining Appropriate Regulatory Controls. There are a variety of options for regulating control and access to protect sources of drinking water. They can range from buying land and restricting activities on the land, to public education campaigns, to enacting Watershed Rules and Regulations, additions to New York State Law. Local ordinances may be enacted to address issues within a municipality more easily than adding to State Law. It may involve considerable effort to get leaders of neighboring municipalities to work together to protect a drinking water source, but the cooperative effort may be most effective at reducing the potential for a drinking water source to become contaminated. Each situation should be evaluated to determine the applicable types of regulatory controls and the level at which they should enacted for source protection.

Involving the Public. Throughout the source protection plan development and implementation process, public involvement and education are critical. Frequent updates and outreach activities can bolster support for the protection plan and motivate the public to assist with protection through their own activities. Mandatory and voluntary measures must be carried out by individuals, local government, agriculture, businesses and citizen organizations. Therefore, these efforts will only succeed when local elected leaders enlist the broadest possible range of community support.

Planning for Contingencies The source protection plan should include plans for contingencies such as accidental or other contamination, as well as loss of supply for various reasons. Drought, or pipe or

other system failures, may cause reduced water availability to customers. Emergency provision of water supply should also be considered.

Implementing and Updating the Source Protection Plan An effective Source Water Protection Plan must include a schedule for implementation of any physical changes included in the plan. Appropriate regulations must be enacted. Periodic inspections of the source area must be completed on schedule to confirm that the provisions of the plan are in force, and that no new contamination threats have been added to the source area, such as new facilities, new drainage patterns, or changes in land use. The plan should include a periodic review process, maybe one year for the first review, and then 2 or more years for subsequent reviews. Ideally, a water system, municipality or organization is responsible for the ongoing upkeep of the enforcement and plan maintenance process.

Summary of Management Practices

A combination of legal, physical, education, and management practices is typically used for Source Protection. Legal actions range from enacting legislation to acquiring property or easements, or enforcing existing laws pertaining to contaminant threats.

Towns, small cities, and counties may possess or share the legal authority for enacting and enforcing protection measures that include: zoning and other land use controls; ability to restrict or stipulate requirements or controls for fixed source facilities that emit contaminants at a point source such as waste processing plants; health regulations including sanitary setbacks for septic tanks and sewer lines from drinking water wells; or authority to acquire land that provides protective zones around water sources.

Protection of drinking water sources has been done through New York State law, for over 100 years. These laws, known as Watershed Rules & Regulations, are in place for numerous surface water sources and several ground water sources across New York State. In cases where a water source spans numerous municipalities, enacting a state law may be the only regulatory action possible. Enacting any state law is a cumbersome process.

Best Management Practices have been developed that can reduce the risks posed by some of the types of home owner and business activities that can contaminate drinking water sources. These include management of: Septic Systems; Lawn and Garden Fertilizer; Pet waste; Large Scale Pesticide Application; Turf grass or Agricultural Fertilizer Application; Livestock and Poultry Waste; Sanitary and Combined Sewer Overflows; Underground Injection Wells; Storm water runoff; Small Quantity Chemical use; Underground or Aboveground Storage Tanks; Fencing; Filling or capping abandoned wells; and construction of riparian buffers. Details about these are available from a number of sources. Many are referenced below.

Community Benefits from Management

What Happens on the Land Affects the Water

Every waterbody in New York State has been classified according to its "best use." Surface water bodies used for drinking water are Class A or AA (for international waters). All ground water is classified as GA, or suitable for drinking. Each use has a set of standards associated with it that limit the concentrations of various contaminants (pollutants) that can be present in the water. A water quality problem exists where a classified use is negatively impacted. The effects can range from precluding a use (e.g. water unfit for drinking, swimming, etc.) to situations where the best use of a waterbody is threatened (e.g. changing land use patterns). Some pollutants of concern for drinking water that can result from land use activities within a watershed. The primary pollutants include pathogens, toxic

substances (pesticides and petroleum products), nutrients (phosphorus and nitrogen), and sediment. In any given watershed there are a number of potential sources of these pollutants such as agricultural, forestry and construction activities; land disposal of waste; and modifications to stream banks or stream channels; storm water runoff; septic systems and other activities. In addition, facilities that use chemicals such as factories or businesses, may be sources of permitted or unregulated discharge of contaminants to surface water or ground water.

Why Should You be Concerned?

The type of activities in the drinking water source area, along with the soils, topography, and location within an aquifer recharge area or watershed, affect the potential for contamination of drinking water.

How This Worksheet Can Assist Your Community in Protecting Public Health and Natural Resources

The purpose of this worksheet is to help the community identify the drinking water resources and activities in the source area that may be impacting or threatening the drinking water source. It further helps to identify specific activities and hydrologically sensitive areas on the landscape that may pose a potential concern to water quality.

This worksheet can be used to help your community to:

1. More fully understand the concepts of water and contaminant movement,
2. Assess the area(s) supplying drinking water to your community,
3. Identify management strategies to protect the water source area , and
4. Develop and implement a plan for protecting drinking water source area(s).

For help in filling out this worksheet and technical assistance on drinking water source protection, it is recommended that you contact your Local Health Department, County Soil and Water Conservation District, or other member of your local Water Quality Coordinating Committee. Other service providers such as New York Rural Water Association or consultants may be helpful in preparing a source protection plan.

Most communities do not currently have a formal drinking water source protection plan. This worksheet can help your community determine where the drinking water source area is, and how to plan and implement a protection program. For communities that already have implemented source water protection, the worksheet may show how residents can get more involved in source water protection, or to evaluate the existing plan for adequacy and effectiveness.

The worksheet is not a protection plan, but rather a process for evaluating the protection planning needs for a community's drinking water resources. The New York State Department of Health recommends the use of this worksheet by communities that are considering zoning changes, redevelopment, or who want to start implementing broad environmental management planning. The steps outlined for involving the community and making a source protection plan will help communities as they use a variety of management and regulatory controls to protect their drinking water. Consistent use of the worksheet process can ensure that the collected information and source protection plan will meet program requirements.

What this Worksheet does not cover

There are many aspects to management of Public Water Systems. These include repairs to existing facilities and pipes of the system, determinations as to whether any wells are under the direct influence of surface water, and whether the system can provide enough water and of good enough quality, to provide for proposed and possible future growth. These may be very important to the water system or municipality that is served by the water system, but are not adequately addressed by this Worksheet. The Local Health Department, whether the County Health Department or the District Office of the New York State Department of Health, can assist the water system or municipality with these issues.

Benefits of protection

In many cases, protection of the drinking water source has economic and environmental benefits in addition to maintaining or improving existing water quality issues. The assurance of a good, reliable source of drinking water is important to residents and businesses moving to a community, and for retaining current residents and businesses. Many source protection plans are done in conjunction with other environmental management goals such as wildlife habitat, stream bank protection, storm water management, on-site wastewater system management programs, and implementation of best management practices for homes, businesses, farms, and government agencies. These are addressed in other Community Environmental Management (CEM) Worksheets.

Technical References

Local Source Water Protection and Smart Growth In Rural New York: A Guide For Local Officials, New York Rural Water Association, http://www.nyruralwater.org

Groundwater Supply Source Protection: A Guide For Localities In Upstate New York, Schenectady County Planning Department in Cooperation with Capital District Regional Planning Commission and NYSDEC

NYSGIS data sharing cooperative, http://www.nysgis.state.ny.us

Preserving Natural Resources Through Local Environmental Laws: A Guidebook for Local Governments, Land Use Law Center, Pace University School of Law, Introduction by John R. Nolan.

Providing Safe Drinking Water: A Primer for Small Businesses and Organizations, Cornell Cooperative Extension, 2003

Various Guidance Documents for Source Water Assessments, New York State Department of Health

Protecting Drinking Water: A Workbook for Tribes, Water Education Foundation, available on-line at http://www.water-ed.org/specialprojects.asp#tribalbook.

Agricultural Environmental Management Guide, Watershed Site Evaluation Tier II Worksheet, available on line at http://www.agmkt.state.ny.us/SoilWater/home.html.

Consider the Source: A Pocket Guide to Protecting Your Drinking Water, United States Environmental Protection Agency, at http://www.epa.gov/safewater/protect/pdfs/swppocket.pdf.

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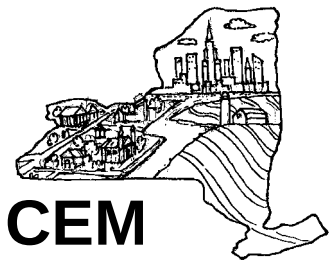
Handbook: Ground Water and Wellhead Protection, EPA/625/R-94/001 September 1994.

Seminar Publication: Wellhead Protection: A Guide for Small Communities, EPA/625/R-93/002, January 1993.

Locally-led Education and Action for Protecting the Environment, Cornell Cooperative Extension and Sea Grant, Version 1.2, 2003



Community Environmental Management

- Source Water Protection Tier II Worksheet -

Part 1- Community Risk Assessment Factors

The following is a list of strategies many communities have used to develop and implement source water protection and minimize pollution and other negative impacts on surface and ground water supplies used for drinking water. The more factors that apply to your community, the less likely you are to have adverse water quality impacts. Please rate all of those that pertain to your community.

Please rate all that pertain to your community:

- ❑ Drinking water resources, including streams, rivers, ponds, lakes and aquifers and their recharge areas are actively protected to ensure best use, long into the future
- ❑ Drinking water is of acceptable quality
- ❑ Drinking water is available in sufficient quantity
- ❑ Drinking water is of sufficient quantity even after electric power loss
- ❑ To prevent contamination of aquifer recharge and watershed protection areas, potential sources of contamination are actively managed within those areas
- ❑ Drinking water watershed has been characterized to confirm the recharge area and determined whether ground water is under the direct influence of surface water
- ❑ Public in recharge areas and water service areas understand the need for and process of protecting their drinking water source areas
- ❑ Appropriate people (decision-makers) are involved in drinking water source protection
- ❑ Interested citizens are involved in drinking water source protection
- ❑ Citizens and regulators work together to protect drinking water and other water resources in the community
- ❑ The Water System infrastructure is adequate to meet current conditions and can meet probable demand changes proposed for the near future

- Homeowners are advised to test their well water and forward results to a clearinghouse for tracking

- Watershed protection rules, such as zoning ordinances, inspections, or other ordinances are administered by the community

- The community has an emergency response plan that includes drinking water sources

Part 2- Community Problem & Needs Assessment

Part 2 of this assessment will help to identify drinking water source status is in your community and evaluate your community's capacity for implementing a source protection plan.

Problems Associated with Drinking Water Source Areas	Causes	Impacts	Remedial & Preventative Strategies
1) Committee for Source Water Protection is needed but has not been organized. **___Yes ___No** **2) Existing programs do not effectively Coordinate Protection of Source Water Resources (aquifer protection, drinking water watershed protection).** **___Yes ___No**	1. Agencies have different missions even though water resource interests or responsibilities overlap 2. Management needs for drinking water delivery different from drinking water source protection 3. Drinking water protection not identified as a primary issue in source water area	**Check those impacts that apply:** Resources and information from other agencies not utilized. Any existing source water protection plan is not supported by public or community decision-makers. Source Water Protection Plan has been developed but interest or funds for implementation have not been located	**Strategy:** Invite County Water Quality Coordinating Committee, if existing, and other agencies and individuals to scoping meeting for Source Water Issue identification. **Strategy:** Consider a regional, watershed or aquifer (or part of aquifer) approach when determining scope of protection needs. Suggested List of Invitees: □ Local Health Departments □ County Agencies, i.e. planners, Environmental Management Councils, others as appropriate □ Other State and Federal Agencies, e.g. Environmental Conservation, Dept. of State, Transportation □ Non-governmental agencies such as New York Rural Water Association □ Regional Groups □ Environmental or Citizen's Groups □ Rural Community Assistance Program □ Environment Finance Center □ Service Groups

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	**Barriers To Implementation[1]**	**Community Assistance Needs[2]**
Options: Recruit interested citizens, technical service providers, elected officials and government representatives to develop the Source Protection Plan, either stand-alone or as part of other water resource protection activities Identify conflicts in water resource use or goals for source water protection Identify other programs such as agricultural land uses, for which funding or management strategies may be available to address source protection. Publicize organization of committee and subsequent steps to keep the process open and informative to the public.		

[1]What are the financial, planning, political, educational, or other issues in your community that prevent you from addressing protection of your drinking water source(s)?

[2]What kinds of governmental or non-governmental organizational assistance would provide resources (professional assistance, references, materials or funds) to help the community address source water protection? This can be answered by brainstorming, or may be completed after investigating the possibilities.

1

Problems Associated with Drinking Water Source Areas	Causes	Impacts	Remedial & Preventative Strategies
Available Information about Drinking Water Sources Does not Provide Basis for Effective Protection	**Check Causes** 1. Need for detailed information not recognized 2. Limited resources to collect or analyze data 3. SWAP Assessment is only recently available and is limited in scope 4. Interest in protection for private wells in area so public well information is not sufficient	**Check those impacts that apply:** ___Source area is not well defined ___Potential Sources of Contamination in source area are not regulated ___Local agency does not have or does not know about their authority to enforce protection measures	**Strategy:** Use Committee Members, Source Water Assessment or other Resources to Obtain Additional Information on Drinking Water Resources to Begin Defining Protection Needs

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	**Barriers to Implementation**	**Community Assistance Needs**
Options: □ Use available maps (topographic, surficial geologic, soil, and hydrologic atlases) and well logs to estimate locations of aquifers and recharge areas, locate public and private wells within aquifers □ Map watershed and sub-watershed boundaries and locate all local water supply resources within those watersheds, pertinent to ground water source and recharge areas □ Identify potential for wells to be influenced by surface water induced recharge due to their proximity to a stream, river or lake □ Use well logs from nearby wells to model ground water flow to the well and use travel time estimates to delineate water source area □ Refine map of recharge areas of public water supply wells to further delineate zone of contribution, direction of groundwater flow and upgradient recharge areas for each well □ Develop preferential groundwater recharge area map for the community □ Hire consultant or explore potential for assistance from service providers (Local Health Department, Conservation District, New York Rural Water Association, Watershed Association, Cooperative Extension) or local university to map aquifers and recharge areas □ Identify present and future water quantity issues □ Use current or revise Priority Water Bodies List as appropriate to describe impacted or threatened water body		

Problems Associated with Drinking Water Source Areas	Causes	Impacts	Remedial & Preventative Strategies
Drinking Water Contamination Present ___Public and/or Private Water Sources Have Experienced Contamination or Contamination Seems Imminent **Describe Level of Contamination** ___Contamination Level Exceeds Maximum Contaminant Level ___Contamination Level > ½ of the Maximum Contaminant Level ___Contamination Level at Other Level of Concern ___Imminent Contaminant Threat has been Identified **Potential Contamination Threat Insufficiently Characterized** **___Yes ___No**	1. Practices and associated potential for impact by contaminant sources have been insufficiently or incorrectly characterized or uncontrolled 2. Barriers to Contamination not found or implemented 3. Development changes may add contaminants to area	**Check those impacts that apply:** ___Drinking water may be or become contaminated ___Because of contamination potential, expense to treat water or lowered quality of drinking water may be incurred ___Knowledge of contaminant sources may help to control them using BMP ”s or other methods ___Need to extend public water lines because of contaminated private wells, but that could incite growth ___Need to clean up contaminated sites	**Strategy:** Look for trends in water quality degradation related to activities in source area that may be controlled. Evaluate any identified potential sources of contamination and or future sources of contamination to characterize susceptibility of source area to particular contaminants. Review existing Contaminant Inventories and compare to current conditions in protection area

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	**Barriers to Implementation**	**Community Assistance Needs**
Options: □ Use Source Water Assessments and state-wide and local data to identify potential sources of contamination, preferably using Geographic Information Systems (GIS) to map locations with respect to drinking water resource □ Prepare development potential map showing areas likely to be developed and considering areas not likely to be developed due to physical constraints such as proximity to wetlands and streams, flood zones, hydric soils and steep slopes □ Determine susceptibility of source water resources to impacts from future growth □ Evaluate effectiveness of existing controls, such as local, state or federal regulations □ Conduct local inspections of source water area to confirm type and locations of potential contaminant sources		

Problems Associated with Drinking Water Source Areas	Causes	Impacts	Remedial & Preventative Strategies
Delineation of Protection Area, whether ground water recharge area or surface water basin, is not sufficiently refined to implement protection plan	Previous studies not done or not at sufficient detail to provide protection area delineation Decision to protect area resource rather than specific Public Water Supply well(s) means that protection area is not complete for the purpose of this protection effort.	**Check those impacts that apply:** An overstatement of the watershed or recharge area may mean that activities are restricted with no potential to benefit the source water quality and unnecessarily limiting economic impact in the area. The wrong area may be protected so the actual recharge area may remain vulnerable to contamination	**Strategy:** Carefully evaluate existing delineation to determine: How it was developed? The scale it was done at? Has the protection goal changed? (Protection of additional source waters added or any subtracted) Has additional information about the soils, geology, well or aquifer become available to assist with the delineation?

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	**Barriers to Implementation**	**Community Assistance Needs**
Options: □ Use technical services to determine if assessment area is useful for protection, and refine if needed □ Finalize the protection goals and determine whether the delineation is consistent with those goals		

Problems Associated with Drinking Water Source Areas	Causes	Impacts	Remedial & Preventative Strategies
Inventory of Practices or Potential Sources of Contamination is not Complete, so Protection Needs have not Been Identified	Inventory is not sufficient to identify potential impacts on drinking water quality or quantity. Existing Inventory either overstates or under represents the actual threats to drinking water quality.	**Check those impacts that apply:** ____Actual Contamination of drinking water or source area ____Potential for Contamination of drinking water or source area	**Strategy:** Evaluate measures for control of Potential Contaminant Sources to Reduce Susceptibility of Water Source to Contamination. These include: existing State and Federal Regulatory Programs for regulated practices, or Best Management Practices for otherwise unregulated agricultural, urban, and other land uses.

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	Barriers to Implementation	Community Assistance Needs
Options: □ Assist farmers, homeowners and businesses (restaurants, gas stations, campgrounds mobile home parks),that have their own drinking water systems to identify threats to groundwater , surface water and drinking water on their property by using assessment tools such as AEM worksheets, Home*A*Syst and "Providing Safe Drinking Water A Primer for Small Businesses and Organizations" □ Evaluate need for stricter land use controls for the zone of contribution of a well □ Implement a farmland protection program to keep prime farmland in agriculture and implement pest and nutrient management plans on farms as needed in resource area □ Assess need for land acquisition, purchase of development rights or conservation easement program to protect those groundwater resources most susceptible to future growth □ Explore the creation of zoning overlay districts for wellhead or watershed protection or if a community lacks zoning use ordinances to restrict incompatible activities □ Find out how SEQRA can be used to help protect source water areas by designating these areas as critical environmental areas requiring the preparation of environmental impact statements for projects in those areas		

Problems Associated with Drinking Water Source Areas	Causes	Impacts	Remedial & Preventative Strategies
Proposed Land Use Changes (or specific proposed projects) may Increase Potential for Impact on Drinking Water Source	Land use not regulated in source area, drinking water concerns not considered for local regulation	**Check those impacts that apply:** ___Development is planned in source area or in aquifer area where water quality or quantity may be impacted by development ___ Other land use changes raise the potential for negative impact on drinking water at the source	**Strategy: Address Potential Impact on Source Water Resource for All Planned or Potential Changes in Land Use**
Public not aware of source protection needs or is unwilling to allocate resources toward protection of source area	Need for public involvement not known or understood. Role of citizens in protection unclear	**Check those impacts that apply:** ____Opposition to source protection planning ____Lack of interest in source protection ____Interested citizens don't know how to begin source protection activities	**Strategy:** **Implement Public Education Program to Improve Public Knowledge of Protection Needs and Activities**

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	Barriers to Implementation	Community Assistance Needs
Options: □ Identify locations within source protection areas where development is most likely to occur or where farm operations are planning to expand □ Plan for future water needs by identifying and protecting future water source sites. □ Conduct build out analysis of the watershed or recharge area to determine risk of contamination if current zoning is fully implemented.		
Options: □ Meet with local officials, town board, planning board, etc. □ Invite service providers to give informative presentations □ Media Campaign, public service announcements □ Involve Senior Citizen or Youth Groups □ Hold Classes to Inform Citizens □ Use materials available on internet for source protection campaign □ Home*A*Syst or have Businesses us the Cornell Cooperative Extension program "Providing Safe Drinking Water"		

Problems Associated with Drinking Water Source Areas	Causes	Impacts	Remedial & Preventative Strategies
Regulations or Existing Management Plans not Sufficient to Manage Source Water area **Ability to enforce existing regulations lacking or unclear**	Need for Source Protection not Recognized Source Protection Plan not Completed or Inadequate Public Not Informed of Role in Source Protection	Source Area Susceptible to Contamination	Complete and Implement Source Water Management Plan at Appropriate Scale
Water Supply Issues exist such as Insufficient Quantity of Water	Development exceeds water availability Water use changes in source area such as new businesses or residences Short term problems like drought	____Water use restrictions _____Bar to new development	Determine cause of quantity problem Evaluate alternate sources of water

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	Barriers to Implementation	Community Assistance Needs
□ Obtain sufficient information about the source area to target efforts appropriately, especially where multiple activities are addressed □ Identify potential sources of contamination within the source area and develop plans to appropriately manage them. Some are addressed in CEM worksheets. • Enhance the quality of stormwater runoff • Ensure proper siting, design, installation and maintenance of OWTSs • Provide for stream corridor protection • Address highway right of way maintenance and deicing material storage • Consider other nonpoint source impacts i.e. agriculture • Permitted facility management • Implement sustainable development to minimize impact on water quality and quantity • Manage impacts on other natural resources □ Use appropriate regulatory processes for drinking water source protection, such as watershed rules or local ordinances, to allow for management of the resources □ Implement wide-spread use of water-saving devices □ Implement water conservation program, including identification of water losses and loss prevention □ Increase public awareness of need and steps in protection activities Involve affected parties in Planning and Implementation Processes		
□ Use education campaign to change water use patterns □ Investigate connection to other existing water system □ Evaluate need for and potential location of new drinking water source □ Develop new source for regional public water supply		

Problems Associated with Drinking Water Source Areas	Causes	Impacts	Remedial & Preventative Strategies
Security or Emergency Response Plan for Source Area Protection is Missing, Incomplete, or Inadequate	No plan required by any government agency Source Protection Area Not for Public Water System with Emergency Planning Requirements Emergency Plan does not address water source	**Emergency Planning not sufficient for response needs**	Evaluate security and emergency response needs and prepare plan. Practice response actions with involved agencies.
Source Protection Plan needs revision or updating to reflect changes in local conditions	Plan does not include provisions for continual review and revision	**Plan may become obsolete**	Include provisions for ongoing review of effectiveness of the protection plan and include protocols for plan revision into original plan

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	**Barriers to Implementation**	**Community Assistance Needs**
Options: □ Develop contingency plans to deal with spills, water supply contamination or service disruption □ Outline emergency plans for short or long term drinking water supply replacement due to contamination or physical damage to the supply system □ Coordinate efforts of water purveyors with those of civil defense, local emergency response, hazardous materials/spill cleanup, and local area disaster response networks.		
Options: □ Process for updating plan included in source water protection plan □ Timetable for periodic review in plan □ Responsible agency designated to review and update plan as needed		

Community Environmental Management
TIER III: DRINKING WATER SOURCE PROTECTION

Protecting local drinking water sources can be a good investment in your community. Source Protection is one of the barriers to contamination of drinking water. Each community has to evaluate the threats, sensitivity, and local issues to determine which sources to protect and how best to protect them. In some cases, the water utility can provide impetus for source protection. In other areas, private wells must be protected along with public water sources. Some water is currently contaminated or changing regulations may have revealed greater sensitivity of the drinking water source than was previously known. The desire to obtain waivers from government mandated treatment or sampling can also drive efforts to protect a source. Existing information such as Source Water Assessments and other studies can provide a starting point for planning source protection. Implementing a source protection plan may be most effective when done in conjunction with addressing other urgent environmental needs of the community.

STRATEGY –Get all local interested parties involved in planning for source protection, whether regional, watershed or aquifer (or part of aquifer) approach can be considered when determining scope of protection needs.

- Invite all parties who may be affected by changing zoning, land use, permitting, development rules.
- Local, regional, state and national government officials, as well as members of non-profit groups may have an interest.
- Publicize your efforts early and often, so the process seems apparent.
- Coordinate with long-term plans for the water utility/ies and private well supplies.

STRATEGY-Use available information and determine what additional information will be needed to define protection needs.

- Review Source Water Assessment for susceptibility.
- Get local topographic maps, hydrogeology information, and aerial photos.
- Use Committee Members to obtain additional information on drinking water resources and protection needs

STRATEGY- Evaluate current water quality and potential threats to water quality.

- Look for trends in water quality degradation related to activities in source area that may be controlled.
- Evaluate any potential sources of contamination related to existing contamination.
- Inspect the source area to determine whether potential sources of contamination are present in the watershed.
- Characterize susceptibility of source area to particular contaminants.
- Evaluate measures for control of potential contaminant sources to minimize risk of release to the protection area.
- Consider the need to use existing State and Federal Regulatory Programs to reduce potential impacts from regulated sources.

STRATEGY- Consider other Water Supply Issues that must be addressed before or along with source protection issues.

- Determine whether a Ground Water Under the Direct Influence of Surface Water (GWUDI) evaluation is needed, and if already done, whether the results are conclusive.
- Is planned development related to new or changes in use of existing source(s)?
- Are other planned or needed changes in systems operation such as storage tanks or changes in distribution likely to effect source(s)?
- Are there chronic or sporadic issues of water shortage.
- Are alternative sources of drinking water appropriate to use.

STRATEGY- Evaluate whether Planned or Potential Changes in Land Use may impact Drinking Water Source.

- What is the time line for response to ensure that the Drinking Water Source is not affected.
- What kind of mitigating efforts could be incorporated into any development or land use changes to minimize potential impacts.
- Are potential future sources impacted by development.

STRATEGY- Evaluate security and emergency response needs and prepare plan.

- Contingency plans should include natural as human disasters.
- Source protection is a component of emergency planning.
- Incorporate practice of response actions with involved agencies.

STRATEGY- Evaluate regulatory options for source protection

- Watershed Rules and Regulations are New York State option for Source Protection, but implementation process is lengthy.
- Local Ordinances can be easy when within a single municipality.
- Cooperation among local towns, villages, etc, may be easier than enacting a Watershed Rule.

STRATEGY-Complete and Implement Source Water Management Plan at Appropriate Scale using actions appropriate for the geology, hydrology, and political situation of the source.

- Decide who will be responsible for enforcement.
- Evaluate whether expenses may be shared with other parties to accomplish mutually complementary goals.
- Develop an implementation and funding schedule.
- Periodically review Source Water Management Plan for effectiveness and revise as needed.

6.9 Highway and Right of Way (ROW) Maintenance

Environmental Significance Summary:

Highways are the lifeblood of commerce. Our economy relies on effective transportation of goods and people along safe and convenient roads. Unfortunately, roads are often significant contributors to poor water quality. Runoff from natural rain events and melting snow washes over the landscape and picks up material as it travels along. As runoff flows over roadways, road construction sites, highway maintenance garages and road maintenance operations, it picks up sediment, heavy metals, oils, pesticides, herbicides, fertilizer, road salt and debris. These contaminants are transported into our streams, lakes, wetlands and rivers, impairing their water quality and decreasing their aesthetic value. This in turn can lead to a negative effect on tourism and the economy.

Community Assistance Summary:

- More fully understand highway and right-of-way management concepts.
- Assess how your community selects, implements and monitors best management practices (BMPs) for highway and right-of-way maintenance.
- Identify wastewater highway and right-of-way maintenance and operational management needs.
- Begin to map out a highway and right-of-way maintenance management strategy for the future.

Issues Summary:

- Streams flood over the road and/or flooding has removed road.
- Water overflows road at culvert or catch basins are backing up.
- Erosion is occurring around culverts, or there have been culvert blowouts.
- The bottom and/or sides of ditches are eroding or slumping.
- We have mud flows and/or chronic black ice on roadways.
- Muddy water is running off highway construction and/or maintenance sites.
- We are concerned about how best to manage winter weather operations.
- We are concerned about how best to manage vegetation along roadways.

Strategies Summary:

- Enhance the quality of stormwater runoff to surface and groundwater.
- Reduce the impacts of increased stormwater flow and volume from highway operations.
- Address stormwater management for construction site runoff.
- Preserve and utilize natural features and processes.

Community Benefit Summary:

Mobility comes with a price. Nearly 4 million miles of roadways and 200 million vehicles keep Americans moving, but it can have a devastating impact on the environment. Transportation related maintenance activities alone are a major source of water pollution and soil erosion. Minimizing the impacts of these activities will improve the quality of our transportation system (allowing increased economic and social opportunities), protect important natural resources and improve overall water quality.

Tier 2B – Highway & ROW Maintenance Worksheet

CEM

Highway and Right of Way Maintenance

Tier 2 Worksheet

Community Environmental Management

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Community Environmental Management

Highway and Right-of-Way Maintenance

Tier 2 Worksheet

CEM

Overview

Highways are the lifeblood of commerce. Our economy relies on effective transportation of goods and people along safe and convenient roads. Unfortunately, roads are often significant contributors to poor water quality. Runoff from natural rain events and melting snow washes over the landscape and picks up material as it travels along. As runoff flows over roadways, road construction sites, highway maintenance garages and road maintenance operations, it picks up sediment, heavy metals, oils, pesticides, herbicides, fertilizer, road salt and debris. These contaminants are transported into our streams, lakes, wetlands and rivers, impairing their water quality and decreasing their aesthetic value. This in turn can lead to a negative effect on tourism and the economy.

Either through ignorance of ecosystem functions, poor planning, or just plain indifference to natural stormwater runoff processes, humans, through construction and development activities, have created a number of problems for themselves and nature. Through their planning and regulatory functions, local governments have the responsibility for controlling how these activities are undertaken in New York State. This role carries with it the responsibility for ensuring that they are done with the safety of future inhabitants in mind, and in a manner that is compatible with the protection and enhancement of natural resources, including water resources.

The purpose of the highway and right-of-way maintenance worksheet is to assess the nature of their associated problems in the community and to evaluate the capacity of the community to remediate existing stormwater runoff problems as they relate to highway and right-of-way maintenance activities and to prevent their reoccurrence. The following is intended to provide insight into the evolving subject of highway and right-of-way maintenance.

Highway and right-of-way management is a complex issue, with many factors potentially contributing to the problem. This strategy list, taken from the Roadway and Right-of-Way Maintenance Management Practices Catalogue developed by the NYS NPS Management Practices Task Force (1994) outlines four strategies communities can use to manage the impacts of roadways and right-of-ways in their communities.

Enhance the Quality of Stormwater Runoff to Surface and Groundwater

This strategy mainly focuses on physical barriers and operational changes that would keep pollution from salt storage, equipment maintenance activities, vegetation maintenance, construction, and roadway maintenance activities. It also brings out the importance of identifying existing ground and surface water resources in site plans, designing and implementing SMPs to treat runoff, and evaluating the effectiveness of SMP's to be implemented for potential impacts to groundwater as well as surface water

Reduce the Impacts of Increased Stormwater Flow and Volume from Highway Operations

This strategy highlights the importance of effective maintenance, proper sizing and selection of SMPs, and how policy can be used to protect resources that help manage stormwater flows. It also mentions that an intermunicipal approach to managing these issues, which can be more effective and cost-efficient.

Address Stormwater Management for Construction Site Runoff

Construction site runoff is the most significant source of most sediment loading. Effective planning of construction sites, as well as proper selection, installation and maintenance of SMPs is the key to achieving this goal. Understanding and using the NYSDEC Stormwater Design Manual is an essential part of success.

Preserve and Utilize Natural Features and Processes

There are many natural features, such as wetlands and floodplains, which, if preserved can play a large role in mitigating the detrimental aspects of increased flows due to highway maintenance activities. It is beneficial to use them to your advantage, but be wary of overloading them and creating more problems that you started with.

How This Worksheet Can Assist Your Community in Protecting Public Safety and Natural Resources

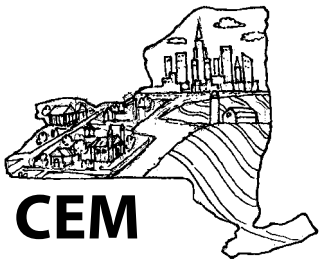
This worksheet can be used to help your community to:

1. More fully understand highway and right-of-way management concepts,
2. Assess how your community selects, implements and monitors best management practices (BMPs) for highway and right-of-way maintenance
3. Identify wastewater highway and right-of-way maintenance and operational management needs, and
4. Begin to map out a highway and right-of-way maintenance management strategy for the future.

For help in filling out this worksheet and technical assistance on onsite wastewater management, it is recommended that your County Soil and Water Conservation District or County Department of Public Works be contacted. Most communities do not have a set highway and right-of-way maintenance management plan. This worksheet can help your community determine its management needs.

Technical references available for communities in New York State to learn more about highway and right-of-way maintenance are listed below:

- Environmental Handbook for Transportation Operations: A Summary of the Environmental Requirements for Maintaining Highways and Transportation Systems. Prepared in July 2001 by the New York State Department of Transportation's Environmental Analysis Bureau. You can download a copy off the internet at: http://www.dot.state.ny.us/eab/manual/oprhbook.pdf, or you can contact them directly at (518) 457-5672.
- Roadway and Right-of-Way Maintenance Management Practices Catalogue for Nonpoint Source Pollution Prevention and Water Quality Protection in New York State. Prepared by the Roadway and Right-of-Way Maintenance Management Practices Subcommittee of the New York State Nonpoint Source Management Practices Task Force. June 1994
- Cornell Local Roads Program. For information, visit http://www.clrp.cornell.edu/. Additional information can be obtained by contacting them at 416 Riley-Robb Hall, Ithaca, NY 14853-5701, ph: (607) 255-8033, fax: (607) 255-4080
- Camp Road Maintenance Manual: A Guide for Landowners. Kennebec County Soil and Water Conservation District, with assistance from the Maine Department of Environmental Protection's Bureau of Land and Water Quality. Revised 2000



Community Environmental Management

– Highway and Right of Way Maintenance –

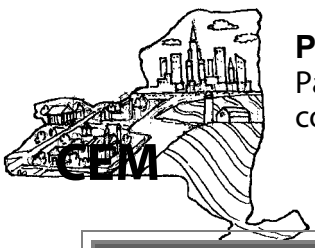
Tier II Worksheet

Part 1- Community Risk Assessment Factors

The following is a list of strategies many communities have used to improve their highway maintenance techniques and minimize pollution and other negative impacts such as salt and de-icing materials entering surface and groundwater supplies. The more factors that apply to your community, the less likely you are to have adverse water quality impacts. Please check all of those that pertain to your community.

Please check all that pertain to your community:

__ The highway maintenance employees are informed about the impacts polluted runoff can have on water quality, and what they can do to prevent it.
__ Design, construct and maintain shelters that prevent runoff from salt and de-icing materials from entering surface or groundwater
__ Implement operations plans that minimize potential for hazardous materials from equipment repair and maintenance from entering surface and groundwater
__ Develop and implement an operation and maintenance plan for preventing or reducing stormwater pollution from municipal facilities and stormwater infrastructure
__ Develop and implemented a program to detect and eliminate illicit discharges and connections to the storm sewer system
__ Develop and implement erosion and sediment control (E&S) plans for highway construction activities that disturb 1 or more acres.
__ Conduct inspections on all highway construction sites to ensure E&S plans are properly implemented.
__ Use reliable and accurate methods to properly size and construct bridges, ditches and culverts to prevent erosion, sedimentation and blowouts.
__ After cleaning out ditches, make sure banks are stabilized and re-seeded to prevent erosion
__ Prevent runoff from moving across roads, creating black ice and depositing sediment
__ Work with highway and municipal officials to discuss ways to reduce the amount of paved area, thereby cutting maintenance costs (e.g. decreasing road widths in subdivisions without sacrificing safety, make curb cuts, pervious pavers for overflow parking surfaces, bioretention in parking lots, opening the center of cul-de-sacs and use them to manage stormwater)
__ Require evaluation of soils before installing stormwater conduits to see if infiltration is an option
__ Establish maximum road and driveway slopes
__ Perform soil tests before applying fertilizer on municipal grounds
__ Use pesticides and herbicides by certified applicators only when application is necessary, and according to the label on municipal grounds



Part 2- Community Problem & Needs Assessment

Part 2 of this assessment will help to determine how extensive flooding is in your community and what is your community's capacity for addressing flooding issues.

Issues Associated with Highway Maintenance Activities	Causes	Impacts	Remedial & Preventative Strategies
Streams flood over the road and/or flooding has removed road **___Yes ___No** Locations (List): _____ _____	1. Increase in rate and volume of runoff due to increased per cent of impermeable surface area in watershed from development 2. Loss of wetlands that function to receive excess rainfall and release it slowly 3. Improper sizing of bridges and culverts	**Check those impacts that apply:** ___Increased flooding and flood damages, including increased costs of repairing infrastructure, and possible loss of human life ___Expansion of the floodplain Magnitude and duration of the flooding (Explain): _____ _____	**<u>Strategy</u>:** Reduce the Impacts of Increased Stormwater Flow and Volume from Highway Operations **<u>Strategy</u>:** Preserve and Utilize Natural Features and Processes

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	Barriers To Implementation	Community Assistance Needs[1]
Options: __ Minimize percent of imperviousness allowed within the watershed or per site (e.g. work with emergency services, the Planning Board and Town Board to reduce allowable road widths and paved overflow parking areas, as well as encourage curb cuts and bioretention) __ Retain existing wetlands, riparian forest buffers and environmentally sensitive areas in their right of ways to provide flood retention and water quality benefits __ Require all new and retrofit components of the public stormwater system be designed, constructed and maintained as per the NYSDEC Stormwater Design Manual to reduce channel erosion, prevent over bank flooding and help control extreme floods __ Require all new and retrofit components of stormwater systems on private lands that empty into surface water or municipal stormwater systems be designed, constructed and maintained as per the NYSDEC Stormwater Design Manual __ Retrofit existing stormwater management system __ Use maximum extent practicable (MEP) standards __ Implement flood mitigation plan to reduce damages when developing roadways		
Options: __ Retain existing wetlands, riparian forest buffers and environmentally sensitive areas in their right of ways to provide flood retention and water quality benefits __ Provide means for passing the floodplain flow when constructing bridges		
There are other factors that influence flooding, including stormwater and stream corridor management. If you have issues with flooding, we suggest you complete the Tier II Flood Management Worksheet to further assess your situation.		

[1] List type of assistance needed: information/education; assessment/planning: BMP design/implementation; regulatory options; project funding; etc.

Issues Associated with Highway Maintenance Activities	Causes	Impacts	Remedial & Preventative Strategies
Water overflows road at culvert or catch basins are backing up **___Yes ___No** Locations (List): _____ _____	1. Increase in rate and volume of runoff due to increased per cent of impermeable surface area in watershed from development 2. Improper sizing of stormwater conveyance system 3. Lack of maintenance of stormwater conveyance system 4. Loss of capacity of catch basins and culverts due to sediment deposition 5. Beaver dams 6. Landowner adjacent to right of way has modified the conveyance system.	**Check those impacts that apply:** ___Increased flooding and flood damages, including increased costs of repairing infrastructure ___Increased sediment loading in catch basins and conveyance system Magnitude and duration of the flooding (Explain): _____ _____	**Strategy**: Enhance the Quality of Stormwater Runoff to Surface and Groundwater **Strategy**: Reduce the Impacts of Increased Stormwater Flow and Volume from Highway Operations

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	**Barriers to Implementation**	**Community Assistance Needs**
Options: __ Develop, implement and enforce buffer restrictions that reduces the amount of sediment entering surface waters __ Ensure that work sites are planned, developed and maintained according to applicable State and Federal regulations __ Design and implement SMPs to treat runoff __ Design and implement an erosion and sediment control plan __ Implement public infrastructure maintenance program (e.g. street sweeping, catch basin and ditch cleanout) to maintain proper function and prevent loading of pollutants into the stormwater system __ Hydroseed or use other method to seed exposed soil in ditches after cleanout.		
Options: __ Minimize percent of imperviousness allowed within the watershed or per site (e.g. work with emergency services, the Planning Board and Town Board to reduce allowable road widths and paved overflow parking areas, as well as encourage curb cuts and bioretention) __ Implement low-impact SMPs that induce infiltration __ Retain existing wetlands, riparian forest buffers and environmentally sensitive areas in their right of ways to provide flood retention and water quality benefits __ Implement public infrastructure maintenance program (e.g. street sweeping, catch basin and ditch cleanout) to maintain proper function __ Hydroseed or use other method to seed exposed soil in ditches after cleanout. __ Develop, implement and enforce intermunicipal agreements to reduce or eliminate factors that increase erosion and sedimentation in the watershed __ Require all new and retrofit components of the public stormwater system be designed, constructed and maintained as per the NYSDEC Stormwater Design Manual to reduce channel erosion, prevent over bank flooding and help control extreme floods __ Require all new and retrofit components of stormwater systems on private lands that empty into surface water or municipal stormwater systems be designed, constructed and maintained as per the NYSDEC Stormwater Design Manual __ Retrofit existing stormwater management system __ Use maximum extent practicable (MEP) standards __ Implement flood mitigation plan to reduce damages when developing roadways __ Develop, implement and enforce buffer restrictions that slow stormwater flows		

Issues Associated with Highway Maintenance Activities	Causes	Impacts	Remedial & Preventative Strategies
Erosion is occurring around culverts, or there has been culvert blowouts **___Yes ___No** Locations (List): _____ _____	1. Increase in rate and volume of runoff due to increased percent of impermeable surface area in watershed from development 2. Improper sizing of stormwater conveyance system	**Check those impacts that apply:** ___Increased flooding and flood damages, including increased costs of repairing infrastructure ___Increased sediment loading from erosion Magnitude and duration of the flooding (Explain): _____ _____	**Strategy:** Enhance the Quality of Stormwater Runoff to Surface and Groundwater **Strategy:** Reduce the Impacts of Increased Stormwater Flow and Volume from Highway Operations

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	**Barriers to Implementation**	**Community Assistance Needs**
Options: __ Develop, implement and enforce buffer restrictions that prevent sediment from entering surface waters		
Options: __ Minimize percent of imperviousness allowed within the watershed or per site (e.g. work with emergency services, the Planning Board and Town Board to reduce allowable road widths and paved overflow parking areas, as well as encourage curb cuts and bioretention) __ Implement public infrastructure maintenance program (e.g. street sweeping, catch basin and ditch cleanout) to maintain proper function __ Require all new and retrofit components of the public stormwater system be designed, constructed and maintained as per the NYSDEC Stormwater Design Manual to reduce channel erosion, prevent over bank flooding and help control extreme floods __ Require all new and retrofit components of stormwater systems on private lands that empty into surface water or municipal stormwater systems be designed, constructed and maintained as per the NYSDEC Stormwater Design Manual __ Hydroseed or use other method to seed exposed soil in ditches after cleanout. __ Develop, implement and enforce intermunicipal agreements to reduce or eliminate factors that increase erosion and sedimentation in the watershed __ Retrofit existing stormwater management system __ Develop, implement and enforce buffer restrictions that slow stormwater flows		

Issues Associated with Highway Maintenance Activities	Causes	Impacts	Remedial & Preventative Strategies
The bottom and/or sides of ditches are eroding or slumping **___Yes ___No** Locations (List): _____ _____	1. Soils that ditches are located in are inappropriate 2. Increase in rate and volume of runoff due to increased per cent of impermeable surface area in watershed from development 3. Improper sizing of stormwater conveyance system 4. Improper maintenance of stormwater conveyance system 5. Improper slope stabilization 6. Ditch is an improper practice selection for drainage area size	**Check those impacts that apply:** ___Increased sediment loading from erosion ___Erosion impacting homeowners' property ___Safety in and around the road ditch	**Strategy:** Enhance the Quality of Stormwater Runoff to Surface and Groundwater **Strategy:** Reduce the Impacts of Increased Stormwater Flow and Volume from Highway Operations

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	**Barriers to Implementation**	**Community Assistance Needs**
Options: __ Implement public infrastructure maintenance program (e.g. street sweeping, catch basin and ditch cleanout) to maintain proper function and prevent loading of pollutants into the stormwater system __ Hydroseed or use other method to seed exposed soil in ditches after cleanout. __ Review soil characteristics before planning and constructing roads and their stormwater conveyance systems		
Options: __ Reshape ditches after cleanout to preserve capacity __ Assess ditches and analyze ditch geometry and drainage area size for compatibility __ Minimize percent of imperviousness allowed within the watershed or per site (e.g. work with emergency services, the Planning Board and Town Board to reduce allowable road widths and paved overflow parking areas, as well as encourage curb cuts and bioretention) __ Implement public infrastructure maintenance program (e.g. street sweeping, catch basin and ditch cleanout) to maintain proper function __ Require all new and retrofit components of the public stormwater system be designed, constructed and maintained as per the NYSDEC Stormwater Design Manual to reduce channel erosion, prevent over bank flooding and help control extreme floods __ Require all new and retrofit components of stormwater systems on private lands that empty into surface water or municipal stormwater systems be designed, constructed and maintained as per the NYSDEC Stormwater Design Manual __ Hydroseed or use other method to seed exposed soil in ditches after cleanout. __ Develop, implement and enforce intermunicipal agreements to reduce or eliminate factors that increase erosion and sedimentation in the watershed __ Retrofit existing stormwater management system __ Use maximum extent practicable (MEP) standards __ Develop, implement and enforce buffer restrictions that slow stormwater flows		

Issues Associated with Highway Maintenance Activities	Causes	Impacts	Remedial & Preventative Strategies
We have mud flows and/or chronic black ice on roadways **___Yes ___No** Extent (describe):_____ _____ Locations (list):_____ _____	1. Nearby slopes are not protected against slumping and lead to mud flows. 2. Soils that ditches are located in are inappropriate 3. High water table or subsurface flows 3. Improper maintenance of stormwater conveyance system. 4. Improper sizing of stormwater conveyance system 4. Increase in rate and volume of runoff due to increased per cent of impermeable surface area in watershed from development forces runoff and mud flows across streets	**Check those impacts that apply:** ___Increased damages, including increased costs of repairing infrastructure, and possible loss of human life ___Increased sediment loading from erosion ___Erosion impacting homeowners' property ___Increased sediment loading from erosion ___Safety and road closure issues	**<u>Strategy:</u>** Enhance the Quality of Stormwater Runoff to Surface and Groundwater **<u>Strategy</u>:** Reduce the Impacts of Increased Stormwater Flow and Volume from Highway Operations

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	**Barriers to Implementation**	**Community Assistance Needs**
Options: __ Hydroseed or use other method to seed exposed soil in ditches after cleanout. __ Develop, implement and enforce buffer restrictions that prevent sediment from entering surface waters __ Review soil characteristics before planning and constructing roads and their stormwater conveyance systems		
Options: __ Increase the subsurface drainage to minimize high water table or subsurface flows __ Minimize percent of imperviousness allowed within the watershed or per site (e.g. work with emergency services, the Planning Board and Town Board to reduce allowable road widths and paved overflow parking areas, as well as encourage curb cuts and bioretention) __ Require all new and retrofit components of the public stormwater system be designed, constructed and maintained as per the NYSDEC Stormwater Design Manual to reduce channel erosion, prevent over bank flooding and help control extreme floods __ Require all new and retrofit components of stormwater systems on private lands that empty into surface water or municipal stormwater systems be designed, constructed and maintained as per the NYSDEC Stormwater Design Manual __ Hydroseed or use other method to seed exposed soil in ditches after cleanout. __ Develop, implement and enforce intermunicipal agreements to reduce or eliminate factors that increase erosion and sedimentation in the watershed __ Develop, implement and enforce buffer restrictions that slow stormwater flows __ Review soil characteristics before planning and constructing roads and their stormwater conveyance systems __ Implement low-impact SMPs that induce infiltration		

Issues Associated with Highway Maintenance Activities	Causes	Impacts	Remedial & Preventative Strategies
Muddy water is running off highway construction and/or maintenance sites **___Yes ___No** Locations (List): _____ _____	1. Improper planning, installation and/or maintenance of SMPs 2. Lack of erosion and sediment control regulations and/or inspections at the local level	**Check those impacts that apply:** ___Increased sediment loading from erosion to receiving waterbody ___Increased nutrient loading to receiving waterbody	**<u>Strategy</u>:** Enhance the Quality of Stormwater Runoff to Surface and Groundwater **<u>Strategy:</u>** Address Stormwater Management for Construction Site Runoff

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	**Barriers to Implementation**	**Community Assistance Needs**
Options: __ Ensure that work sites are planned, developed and maintained according to applicable state and Federal regulations __ Design and implement and inspect SMPs to treat runoff __ Evaluate effectiveness of SMP's to be implemented for potential impacts to groundwater as well as surface water __ Hydroseed or use other method to seed exposed soil in ditches after cleanout. __ Develop, implement and enforce buffer restrictions that prevent sediment from entering surface waters Review soil characteristics before planning and constructing roads and their stormwater conveyance systems		
Options: __ Conduct site inspections during construction to ensure erosion and sedimentation practices are installed and being properly maintained on public and private roadways __ Expand local subdivision regulations to cover erosion and sedimentation control __ Review soil characteristics before planning and constructing roads and their stormwater conveyance systems __ Implement low-impact SMPs that induce infiltration __ Use maximum extent practicable (MEP) standards __ Hydroseed or use other method to seed exposed soil (e.g. on construction sites or in ditches after cleanout) __ Require all new and retrofit components of the public stormwater system be designed, constructed and maintained as per the NYSDEC Stormwater Design Manual to reduce channel erosion, prevent over bank flooding and help control extreme floods __ Require all new and retrofit components of stormwater systems on private lands that empty into surface water or municipal stormwater systems be designed, constructed and maintained as per the NYSDEC Stormwater Design Manual __ Post bonds to ensure compliance by developers and contractors on private roadways		

Target Highway Maintenance Activities	Concerns	Impacts	Remedial & Preventative Strategies
Our municipality is concerned about how best to manage winter weather operations **___Proper storage and maintenance of salt and other de-icing materials to prevent losses to runoff** **___Make roads safe without overusing or wasting salt and de-icing materials** **___Proper disposal of snow after plowing** **___Management of excess sediment left behind after spring snowmelt**	1. Wasted materials cost taxpayers money 2. Health and human safety (e.g. clean drinking water, safe roads during winter conditions) 3. Pollution impacts healthy aquatic ecosystems and can have an impact on tourism and biodiversity	**Check those impacts that apply:** ___When salt enters groundwater, it can migrate into drinking water wells and contaminate them ___When salt and de-icing materials enter surface water, it can be toxic to plants and animals, which can have an adverse impact on tourism, recreation and property values. ___When sand and grit enter surface water bodies, it contributes to turbidity and raises the bottom of the stream bed, both of which have an adverse impact on plants and animals. ___If snow is deposited into surface water bodies, it can lower the temperature of the water to the point where it kills plants and animals; and the salt and sand in the plowed snow can be toxic to plants and animals	**Strategy:** Enhance the Quality of Stormwater Runoff to Surface and Groundwater

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	**Barriers to Implementation**	**Community Assistance Needs**
Options: __ Make sure salt and de-icing materials are sheltered from the elements __ Make sure drainage from de-icing materials shelters are collected and treated before entering surface or groundwater __ Develop, implement and enforce buffer restrictions that prevent placement of salt and de-icing materials where they may enter surface water __ Develop and implement an operations plan for proper storage, handling and transfer of salt and de-icing materials __ Calibrate the distribution system on spreading equipment to make sure only the proper amount of salt and/or de-icing material is placed on road surfaces __ Develop and implement an operations plan that ensures salt and de-icing materials are spread only when needed __ Identify existing ground and surface water resources in site plans __ Make sure snow from plowing activities is not placed in streams, lakes, wetlands or any other sensitive area. __ Make sure snowmelt from snow stockpiles is treated before it enters streams, lakes, wetlands or any other sensitive area __ Implement public infrastructure maintenance program (e.g. street sweeping, catch basin and ditch cleanout) to maintain proper function and prevent loading of pollutants into the stormwater system		

Target Highway Maintenance Activities	Concerns	Impacts
Our municipality is concerned about how best to manage vegetation along roadways **___Proper use and distribution of pesticides, herbicides and fertilizers** **___Make roads safe without overusing or wasting pesticides, herbicides and fertilizers**	1. Wasted materials cost taxpayers money 2. Health and human safety (e.g. safe views and maneuvering along roads, clean drinking water) 3. Pollution impacts healthy aquatic ecosystems and can have an impact on tourism and biodiversity	**Check those impacts that apply:** ___Pesticides, herbicides and fertilizer enter groundwater, and migrate into drinking water wells, contaminating them ___Pesticides and herbicides enter surface water and are toxic to plants and animals ___Fertilizers enter surface water and cause increased plant and algae growth, which can have an adverse impact on tourism, recreation and property values ___Excess vegetation from clearing and mowing enter the stormwater system and are deposited into surface waters, contributing to BOD
Our municipality is concerned about how best to manage vehicle and equipment maintenance activities **___Proper disposal of waste and used engine fluids** **___Preventing polluted runoff from equipment maintenance facilities entering surface or groundwater** **___Perform site inspections to ensure proper storage of petroleum products and chemicals and prevent these compounds from entering surface and groundwater** **___Ensure equipment breakdowns and emergency repairs made away from maintenance facilities are performed in a manner that prevents pollution from entering surface and groundwater**	1. It costs more to remediate contaminated soil and water than to prevent contamination in the first place 2. Wasted materials cost taxpayers money 3. Health and human safety (e.g. safe working conditions for employees, clean drinking water) 4. Pollution impacts healthy aquatic ecosystems and can have an impact on tourism and biodiversity	**Check those impacts that apply:** ___Toxic and hazardous materials enter groundwater, and migrate into drinking water wells, contaminating them ___Toxic and hazardous materials enter surface water and are toxic to plants and animals, which can have an adverse impact on tourism, recreation and property values. ___Excess vegetation from clearing and mowing enter the stormwater system and are deposited into surface waters, contributing to BOD

Remedial & Preventative Strategies	Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	Barriers to Implementation	Community Assistance Needs
Strategy: Enhance the Quality of Stormwater Runoff to Surface and Groundwater	__ Use pesticides, herbicides, fertilizers only when necessary, and never immediately before a rain event __ Make sure highway maintenance personnel maintains certification for pesticide and herbicide application and attend the appropriate refresher courses __ Make sure vegetation that is removed does not enter the stormwater conveyance system (e.g. wood chips from downed branches placed in ditches or left along roadways)		
Strategy: Enhance the Quality of Stormwater Runoff to Surface and Groundwater	__ Ensure implementation of stormwater pollution prevention plans at municipal equipment repair facilities (e.g. compliance checks, emergency spill response plan) __ Develop and implement an operations plan for proper storage and transfer of hazardous materials __ Identify existing ground and surface water resources in site plans __ Make sure drainage from vehicle maintenance areas are collected and treated before entering surface or groundwater __ Develop, implement and enforce buffer restrictions that prevent placement of toxic and hazardous materials where they may enter surface water		
Strategy: Preserve and Utilize Natural Features and Processes	__ Protect sensitive areas near highways and in right of ways		

Community Environmental Management
TIER III: HIGHWAY AND RIGHT-OF-WAY MANAGEMENT STRATEGY DEVELOPMENT

Highway and right-of-way management is a complex issue, with many factors potentially contributing to the problem. This strategy list, taken from the Roadway And Right Of Way Maintenance Management Practices Catalogue developed by the NYS NPS Management Practices Task Force (1994) outlines three strategies communities can use to manage the impacts of roadways and right of ways in their communities.

Strategy: Enhance the Quality of Stormwater Runoff to Surface and Groundwater

- Make sure salt and de-icing materials are sheltered from the elements
- Make sure drainage from de-icing materials shelters are collected and treated before entering surface or groundwater
- Develop, implement and enforce buffer restrictions that prevent placement of salt and de-icing materials where they may enter surface water
- Develop and implement an operations plan for proper storage and transfer of salt and de-icing materials
- Calibrate the distribution system on spreading equipment to make sure only the proper amount of salt and/or de-icing material is placed on road surfaces
- Develop and implement an operations plan that ensured salt and de-icing materials are spread only when needed
- Ensure implementation of stormwater pollution prevention plans at municipal equipment repair facilities (e.g. compliance checks and emergency spill plans)
- Develop and implement an operations plan for proper storage and transfer of hazardous materials
- Make sure drainage from vehicle maintenance areas are collected and treated before entering surface or groundwater
- Develop, implement and enforce buffer restrictions that prevent placement of toxic and hazardous materials where they may enter surface water
- Ensure that work sites are planned, developed and maintained according to applicable state and Federal regulations
- Use pesticides, herbicides, fertilizers only when necessary, and never immediately before a rain event
- Make sure highway maintenance personnel maintains certification for pesticide and herbicide application and attend the appropriate refresher courses
- Make sure vegetation that is removed does not enter the stormwater conveyance system (e.g. wood chips from downed branches placed in ditches or left along roadways)
- Identify existing ground and surface water resources in site plans
- Design and implement SMPs to treat runoff
- Evaluate effectiveness of SMP's to be implemented for potential impacts to groundwater as well as surface water
- Make sure snow from plowing activities is not placed in streams, lakes, wetlands or any other sensitive area.
- Make sure snowmelt from snow stockpiles is treated before it enters streams, lakes, wetlands or any other sensitive area
- Implement public infrastructure maintenance program (e.g. street sweeping, catch basin and ditch cleanout) to maintain proper function and prevent loading of pollutants into the stormwater system
- Hydroseed or use other method to seed exposed soil (e.g. on construction sites or in ditches after cleanout)
- Develop, implement and enforce buffer restrictions that prevent sediment from entering surface waters
- Review soil characteristics before planning and constructing roads and their stormwater conveyance systems

Strategy: Reduce the Impacts of Increased Stormwater Flow and Volume from Highway Operations

- Implement low-impact SMPs that induce infiltration
- Minimize percent of imperviousness allowed within the watershed or per site (e.g. work with emergency services, the Planning Board and Town Board to reduce allowable road widths and paved overflow parking areas, as well as encourage curb cuts and bioretention)
- Retain existing wetlands, riparian forest buffers and environmentally sensitive areas in their right of ways to provide flood retention and water quality benefits
- Implement public infrastructure maintenance program (e.g. street sweeping, catch basin and ditch cleanout) to maintain proper function
- Require all new and retrofit components of the public stormwater system be designed, constructed and maintained as per the NYSDEC Stormwater Design Manual to reduce channel erosion, prevent over bank flooding and help control extreme floods
- Require all new and retrofit components of stormwater systems on private lands that empty into surface water or municipal stormwater systems be designed, constructed and maintained as per the NYSDEC Stormwater Design Manual
- Hydroseed or use other method to seed exposed soil (e.g. on construction sites or in ditches after cleanout)
- Develop, implement and enforce intermunicipal agreements to reduce or eliminate factors that increase erosion and sedimentation in the watershed
- Retrofit existing stormwater management system
- Implement flood mitigation plan to reduce damages when developing roadways
- Develop, implement and enforce buffer restrictions that slow stormwater flows
- Review soil characteristics before planning and constructing roads and their stormwater conveyance systems

Strategy: Address Stormwater Management for Construction Site Runoff

- Implement low-impact SMPs that induce infiltration
- Use maximum extent practicable (MEP) standards
- Hydroseed or use other method to seed exposed soil (e.g. on construction sites or in ditches after cleanout)
- Require all new and retrofit components of the public stormwater system be designed, constructed and maintained as per the NYSDEC Stormwater Design Manual to reduce channel erosion, prevent over bank flooding and help control extreme floods
- Require all new and retrofit components of stormwater systems on private lands that empty into surface water or municipal stormwater systems be designed, constructed and maintained as per the NYSDEC Stormwater Design Manual
- Post bonds to ensure compliance by developers and contractors on private roadways
- Conduct site inspections during construction to ensure erosion and sedimentation practices are installed and being properly maintained on public and private roadways
- Expand local subdivision regulations to cover erosion and sedimentation control
- Review soil characteristics before planning and constructing roads and their stormwater conveyance systems

Strategy: Preserve and Utilize Natural Features and Processes

- Retain existing wetlands, riparian forest buffers and environmentally sensitive areas in their right of ways to provide flood retention and water quality benefits
- Protect sensitive areas near highways and in right of ways
- Provide means for passing the floodplain flow when constructing bridges

If you have any questions or comments on this draft worksheet, please contact:

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6.10 Sustainable Development

Environmental Significance Summary:

Throughout most developing regions of New York State, the pattern of land development that is most threatening the natural resources and quality of life in many communities in the State is suburban sprawl: or simply “sprawl”. Sprawl is a pattern of land development that has made its most aggressive and dramatic advances into the countryside with the advent of the automobile and it has now become institutionalized through the use of many outdated zoning codes and other public policy initiatives that encourage sprawl.

Sprawl chews up agricultural lands, contributes to forest fragmentation, loss of biological diversity and fish and wildlife habitats, water quality degradation and air quality degradation. Uncontrolled sprawl simply is an unsustainable pattern of land development in that through the damage it inflicts on land resources, air and water, it compromises the ability of future generations to meet their needs.

Public policy initiatives that lead to sprawl include promoting the construction and expansion of highway infrastructure into the countryside, facilitating commercial strip development, construction of large lot housing subdivisions at the urban fringe, and locating government services, government office buildings, schools, etc., in the suburban fringe or beyond rather than in existing communities. Sprawl is accelerating at a much greater rate than actual population growth and its environmental, economic and social costs are enormous.

Community Assistance Summary:

- More fully understand sustainable development concepts and options.
- Assess where they are relative to implementing an effective sustainable development program.
- Identify sustainable development needs.
- Begin to map out a sustainable development strategy for the community based on where they are today.

Issues Summary:

- Growth is occurring without planning for environmental sustainability.
- Village centers abandoned in favor of strip development.
- Subdivisions designed and built without consideration of natural resource of the site.
- Rural countryside left vulnerable to future development which could threaten natural entities valued by the town.
- Sprawl (unplanned growth).
- Loss of farmland, open space and/or scenic amenities.

Strategies Summary:

- Make use of community's sense of identity and place to inspire environmental protection solutions and actions.
- Protect important conservation areas.
- Utilize soil survey information when planning development.
- Strengthen and protect community centers to reduce the spread of development into rural areas.
- Guide development in suburbs to promote livable and environmentally sensitive neighborhoods.
- Encourage preferred patterns of growth in the rural countryside.

Community Benefit Summary:

"How can we ensure that development in our communities is sustainable and based on sound ecological principles?" The simple answer is that the tools and techniques for encouraging and facilitating sustainable development habits are available. The more difficult issue to cope with is that sustainability requires that our emphasis shift from "managing resources" to managing *ourselves,* and that we learn to live as part of nature rather than apart from it, and that our economics become a component of human ecology and intimately intertwined with nature.

Tier 2B - Sustainable Development Worksheet

Sustainable Development

Assessment Worksheet

Community Environmental Management

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Community Environmental Management

Community Environmental Management

Sustainable Development

- Assessment Worksheet -

How This Worksheet Can Be Used To Assist A Community

This sustainable development worksheet can be used to help a community:

1) More fully understand sustainable development concepts and options
2) Assess where they are relative to implementing an effective sustainable development program
3) Identify sustainable development needs
4) Begin to map out a sustainable development strategy for the community based on where they are today

The worksheet includes:

Part 1 - Community Risk Assessment Factors

The more factors the community checks, the more prepared they will be to address sustainable development issues.

Part 2 - Community Problems & Needs Assessment

This section assists communities in focusing on specific problems associated with development, the causes of the problems and the impacts. This part also enables a community to evaluate its capacity to address sustainable development through the identification of barriers it faces in implementing one option or another, and it allows for identification of assistance needed to overcome a specific barrier or obstacle.

Additional Resources

Technical References:

The following reference materials are also available to assist communities in New York State with their sustainable development efforts:

1) ***Community Culture and the Environment: A Guide to Understanding a Sense of Place***, Environmental Protection Agency, Washington, DC – 2002
2) ***Growing Greener: Putting Conservation into Local Plans and Ordinances***, Natural Lands Trust, Washington, DC – 1999

3) ***Tools and Strategies: Protecting the Landscape and Shaping the Growth***, Regional Plan Association, New York, NY – 1990

4) ***Preserving Natural Resources Through Local Environmental Laws: A Guidebook for Local Governments,*** Land Use Law Center, Pace University School of Law, White Plains, NY – 2001

5) ***Implementing Creative Land Use Planning Techniques in your Town,*** Debra Mason and the George D. Aiken Resource Conservation & Development Council, Randolph, VT – 1995

6) ***Introduction to Environmental Planning for Local Decision-Makers,*** Department of Environmental Resources, Harrisburg, PA – 1977

7) ***Planning for Natural Resources: A Guide to Including Natural Resources in Local Comprehensive Planning,*** Department of Urban & Regional Planning, University of Wisconsin-Madison/Extension, Wisconsin Department of Natural Resources, 2002

8) ***Environmental Planning for Small Communities: A Guide for Local Decision-Makers,*** Environmental Protection Agency, Washington, DC, 1994

9) ***Greenway Connections: Greenway Compact Program and Guides for Dutchess County Communities,*** Dutchess County Planning and Development, Poughkeepsie, NY, 2000

Funding Assistance:

- NYS Department of Environmental Conservation
  - Water Quality Improvement Projects

Websites:

- Environmental Protection Agency
  www.epa.gov/smartgrowth/openspace.html
- **www.greeninfrastructure.net**
- **www.sustainable.org**

Community Environmental Management

Sustainable Development

Part 1- Community Risk Assessment Factors

The following is a list of strategies that are available to protect the environmental resources within a watershed, metropolitan region, or municipal assessment area. The more factors that apply to the assessment area, the greater the likelihood of achieving sustainability and not compromising the ability of future generations to meet their own needs.

Please check all those that apply to the assessment area:

___ A Conservation Advisory Committee or Conservation Advisory Board is established and active.

___ Primary and Secondary Conservation Areas (including critical habitat, prime farmland, drinking water sources, etc.) have been delineated in the community.

___ A map of Primary and Secondary Conservation Areas is included in the town's comprehensive plan.

___ Water and sewer infrastructure is precluded in Primary and Secondary Conservation Areas in the community.

___ The community has delineated primary growth areas outside of Primary and Secondary Conservation Areas.

___ The SEQR process is used effectively to protect Conservation Areas.

___ Regulations have been adopted requiring conservation design in subdivisions in Secondary Growth Areas.

___ Soil survey information is used to guide development.

___ A tree canopy conservation policy is established.

___ Impervious area restrictions are in place for new developments.

___ Rural development guidelines are established to protect open space and the character of the rural countryside.

___ The community is making a transition from the sprawl pattern of development to compact, mixed-use development.

___ New development contiguous to urban boundaries is organized as neighborhoods with the existing urban pattern.

___ Noncontiguous development is organized as towns and villages with their own urban edges, and planned for a jobs/housing balance, not as bedroom suburbs.

___ The community plans for a range of parks distributed within neighborhoods.

___ The community is becoming less car dependent and is encouraging and facilitating alternative transportation systems including walking, bicycling, and mass transit.

___ The community is establishing pedestrian friendly streets.

___ Infill development is encouraged and facilitated as an alternative to further outward expansion at the urban fringe.

___ Public buildings are sited within the village center.

___ The development and redevelopment of the community respects historical patterns, precedents, boundaries and cultural resources.

Sustainable Development Worksheet

Part 2 – Problem & Needs Assessment

This assessment will help determine how unsustainable development could be impacting your community and your community's capacity for addressing these impacts.

Problems Associated with Whole Town	Causes	Impacts	Remedial & Preventative Strategies	
___ Growth is occurring without planning for environmental sustainability	1. Land use decisions made in response to development proposals rather that by proactively looking at the town's overall landscape and natural resource conservation needs 2. Zoning put in place without provisions to protect soils, tree canopy, critical watersheds, drinking water supplies and natural resources 3. Traditional single-use, low-density zoning encourages commercial strip development and residential subdivisions rather than clustering development as neighborhoods and village centers	**Check those impacts that apply:** ___ Habitat fragmentation, loss of wildlife corridors ___ Fragmentation of farmland ___ Irreversible loss of prime soils ___ Loss of ecological functionality – e.g. wetlands ___ Disruption of natural cycles – e.g. flooding, fires ___ Loss of recreational opportunities ___ Loss of open space and scenic vistas ___ Loss of farmland ___ Water quality degradation ___ Drinking water quality threatened ___ Paved parking lots contribute to flooding and water quality degradation ___ Reduced quality of life due to increased traffic and reduced opportunities to walk or bike ___ Increased cost of new roads and water and sewer infrastructure, etc.	**Strategy:** Make use of community's sense of identity and place to inspire environmental protection solutions and actions **Strategy:** Protect important conservation areas *(Another strategy can be found on the next page.)*	

Management Options Indicate with a "✓" if community has implemented or use a "?" if community is interested	**Barriers to Implementation**	**Community Assistance Needs**
Options: ___ Define community characteristics, including governance, demographics, values, capacity for change, and local identity ___ Identify community goals and vision of the future ___ Identify cultural resources, historic buildings, scenic views, recreation areas and other areas significant to community culture or sense of place ___ Understand that the health and vibrancy of the natural environment affects the health and vibrancy of the community and vice versa **Options:** ___ Identify and map primary and secondary conservation areas: • Floodplains (see also: Aquatic Habitat and Flooding worksheets) • Wetlands (see also: Aquatic Habitat worksheet) • Stream corridors/buffers (see also: Aquatic Habitat worksheet) • Steep slopes and ridges • Aquifer recharge areas (see also: Source Water Protection worksheet) • Critical wildlife habitat (see also: Aquatic Habitat and Terrestrial Habitat worksheets) • Prime agricultural land (see also: Farmland Protection worksheet) ___ Incorporate map of conservation areas into comprehensive plan ___ Make more effective use of SEQR process to protect conservation areas from effects of siting and operation of new development ___ Increase effective use of (or establish) town Conservation Advisory Committee and work toward recognition as a Conservation Advisory Board		

Problems Associated with Whole Town	Causes	Impacts	Remedial & Preventative Strategies	
			Strategy: Utilize soil survey information when planning development	

Management Options Indicate with a "✓" if community has implemented or use a "?" if community is interested	**Barriers to Implementation**	**Community Assistance Needs**
Options: ___Utilize soil survey to map areas with potential concern in the following areas: • Erosion potential • Drainage (wetness, permeability) • Depth to bedrock • Soil bearing and sheer strength • Seasonal high water • Flood-prone areas • Shrink and swell potential • Corrosion potential ___ Conduct soil capability analysis to identify areas where different land uses can be accommodated and refine broad land use categories ___ Use soil information to predict areas where development is likely to be proposed in the future and where land use conflict is likely to occur ___ Implement soil-based zoning ___ Use soil surveys to guide municipal operations (planning pipeline construction, roadways, green belts, parks, etc.)		

Problems Associated with Village Centers	Causes	Impacts	Remedial & Preventative Strategy	
___ Village centers abandoned in favor of strip development	1. Consumption of land outside the village center for residential subdivisions and commercial strip development or shopping centers 2. Increased paved surface 3. Traffic congestion 4. Village center being abandoned rather than revitalized	**Check those impacts that apply:** ___ Loss of farmland ___ Fragmentation of forested lands ___ Encroachment into stream corridors and critical wildlife habitat ___ Erosion and sedimentation ___ Degradation of outdoor recreation based economy ___ Increased cost of new roads and water and sewer infrastructure, etc. ___ Increased flooding ___ Water quality degradation ___ Air quality impacts ___ Loss of unique village character	**Strategy:** Strengthen and protect community centers to reduce the spread of development into rural areas	

Management Options Indicate with a "√ " if community has implemented or use a "?" if community is interested	**Barriers to Implementation**	**Community Assistance Needs**
Options: ___ Encourage and facilitate infill development in urban priority areas ___ Identify priority expansion areas at the edges of town centers to strengthen and not detract from the center ___ Organize non-contiguous development as village centers with a jobs/housing balance ___ Look for opportunities to site new public buildings within the village center ___ Ensure village centers are desirable places to live by promoting walk able communities and building in the context of existing architecture ___ Implement an urban/community forestry program		

Problems Associated with Village Centers	Causes	Impacts	Remedial & Preventative Strategy	
___Subdivisions designed and built without consideration of natural resources of the site	1. Typical subdivisions divide up available land into home sites 2. Trees removed from home sites 3. Wetlands destruction 4. Insufficient erosion control	**Check those impacts that apply:** ___Loss of open space ___Wildlife habitat destroyed or fragmented ___Reduced passive outdoor recreation opportunities ___Degradation of air quality ___Degradation of water quality ___Increased flooding ___Water quality degradation due to loss of nature filtration ___Sedimentation fills in reservoirs and road ditches	**Strategy:** Guide development in suburbs to promote livable and environmentally-sensitive neighborhoods	

Management Options Indicate with a "√ " if community has implemented or use a "?" if community is interested	Barriers to Implementation	Community Assistance Needs
Options: ___ Re-evaluate zoning to provide for mixed-use development, where neighborhoods contain residences and businesses ___ Where commercial strip development exists, identify boundaries for strips and examine opportunities for filling in and diversifying strips ___ Update or adopt subdivision regulations and site plan review procedure to ensure complete natural resource assessment ___ Implement conservation subdivision design ___ Implement tree canopy conservation policy ___ Implement impervious area restrictions		

Problems Associated with Village Centers	Causes	Impacts	Remedial & Preventative Strategy	
___Rural countryside left vulnerable to future development which could threaten natural amenities that are valued by the town	1. Farms going out of business and farmland being sold to developers because soils are amenable to building 2. Open space and forested land being sold to developers 3. Zoning allows traditional subdivisions in rural areas or development along rural highways	**Check those impacts that apply:** ___Permanent loss of prime farmland ___Loss of rural character ___Loss of scenic vistas ___Loss of recreational opportunities ___Water quality threatened	**Strategy:** Encourage preferred patterns of growth in the rural countryside	

Management Options Indicate with a "√ " if community has implemented or use a "?" if community is interested	**Barriers to Implementation**	**Community Assistance Needs**
Options: ___ Identify areas where development would not be desirable/acceptable, including community priority areas, prime farmland, conservation areas and areas where soil qualities are not suitable ___ Examine cumulative impacts of development on watershed or aquifer recharge areas ___ Conduct fiscal analysis of current zoning ___ Guide development to ensure harmony with natural surroundings and community priorities ___ Require developers to identify open space system components before planning a subdivision ___ Adopt rural development guidelines that: minimize clearing of vegetation; retain stone walls and hedgerows; place buildings and access roads in tree lines, on mildly sloping ground or along the edges of fields; locate structures and septic systems more than 100 feet from streams or ponds to protect water quality; re-use farm roads or country lands; maintain or enhance scenic views ___ Adopt a local law that provides for conservation subdivisions with smaller lot sizes, shared utilities and preservation of open space ___Discourage strip development along roads in favor of constructing along side roads ___Consider an urban growth boundary		

Community Environmental Management

SUSTAINABLE DEVELOPMENT

Strategy: **Make use of community's sense of identity and place to inspire environmental protection solutions and actions**

- Define community characteristics, including governance, demographics, values, capacity for change, and local identity
- Identify community goals and vision of the future
- Identify cultural resources, historic buildings, scenic views, recreation areas and other areas significant to community culture or sense of place
- Understand that the health and vibrancy of the natural environment affects the health and vibrancy of the community and vice versa

Strategy: **Protect important conservation areas**

- Identify and map primary and secondary conservation areas
  - Floodplains — see also: Aquatic Habitat and Flooding worksheets
  - Wetlands — see also: Aquatic Habitat worksheet
  - Stream corridors/buffers — see also: Aquatic Habitat worksheet
  - Steep slopes and ridges
  - Aquifer recharge areas — see also: Source Water Protection worksheet
  - Critical wildlife habitat — see also: Aquatic Habitat and Terrestrial Habitat worksheet
  - Prime agricultural land — see also: Farmland Protection worksheet
- Incorporate map of conservation areas into comprehensive plan
- Make more effective use of SEQR process to protect conservation areas from effects of siting and operation of new development
- Increase effective use of (or establish) town Conservation Advisory Committee and work toward recognition as a Conservation Advisory Board

Strategy: **Utilize soil survey information when planning development**

- Utilize soil survey to map areas with potential concern in the following areas
  - Erosion potential
  - Drainage (wetness, permeability)
  - Depth to bedrock
  - Soil bearing and sheer strength
  - Seasonal high water
  - Flood-prone areas
  - Shrink and swell potential
  - Corrosion potential
- Conduct soil capability analysis to identify areas where different land uses can be accommodated and refine broad land use categories
- Use soil information to predict areas where development is likely to be proposed in the future and where land use conflict is likely to occur
- Implement soil-based zoning
- Use soil surveys to guide municipal operations (planning pipeline construction, roadways, green belts, parks, etc.)

Strategy: **Encourage preferred patterns of growth in the rural countryside**

- Identify areas where development would not be desirable, including community priority areas, prime farmland, conservation areas and areas where soil qualities are not suitable
- Identify areas where development would be desirable/acceptable
- Examine cumulative impacts of development on watershed or aquifer recharge areas
- Conduct fiscal analysis of current zoning

- Guide development to ensure harmony with natural surroundings and community priorities
    - Require developers to identify open space system components before planning a subdivision
    - Adopt rural development guidelines that: minimize clearing of vegetation; retain stone walls and hedgerows; place buildings and access roads in treelines, on mildly sloping ground or along the edges of fields; locate structures and septic systems more than 100 feet from streams or ponds to protect water quality; re-use farm roads or country lands; maintain or enhance scenic views
    - Adopt a local law that provides for conservation subdivisions with smaller lot sizes, shared utilities and preservation of open space
    - Discourage strip development along roads in favor of constructing along side roads
    - Consider an urban growth boundary

Strategy: **Guide development in suburbs to promote livable and environmentally-sensitive neighborhoods**

- Re-evaluate zoning to provide for mixed-use development, where neighborhoods contain residences and businesses
- Where commercial strip development exists, identify boundaries for strips and examine opportunities for filling in and diversifying strips
- Update or adopt subdivision regulations and site plan review procedure to ensure complete natural resource assessment
- Implement conservation subdivision design
- Implement tree canopy conservation policy
- Implement impervious area restrictions

Strategy: **Strengthen and protect community centers to reduce the spread of development into rural areas**

- Encourage and facilitate infill development in urban priority areas
- Identify priority expansion areas at the edges of town centers to strengthen and not detract from the center
- Organize non-contiguous development as village centers with a jobs/housing balance
- Look for opportunities to site new public buildings within the village center
- Ensure village centers are desirable places to live by promoting walkable communities and building in the context of existing architecture
- Implement an urban/community forestry program

6.11 Terrestrial Fish and Wildlife Habitat Management

Environmental Significance Summary:

Terrestrial fish and wildlife habitat encompasses many different types of natural features, including forests, shrublands, grasslands, vernal pools, wetlands, early successional areas, and unique natural areas. Terrestrial habitat is not only important to the fish and wildlife that inhabit them, but also to the people around them. The health of this habitat has a real impact on the quality of life, recreational value, and economic benefits in your community. As a result, it is important to maintain necessary habitats in order to maintain individual species, ecosystems, and biodiversity

In the past century, we have seen a decline in the amount and quality of fish and wildlife habitat. Land use changes are limiting the area available to support populations of species. Human population growth has increased the demand for open, forested or agricultural land to be converted to residential, commercial and industrial uses. As a result, fish and wildlife populations inhabiting these areas have had to move, adapt to the changes, or die out. The lack of understanding of ecosystem function, poor planning, and general indifference have allowed the demand for land use changes to jeopardize this resource.

Community Assistance Summary:

- More fully understand terrestrial fish and wildlife habitat management concepts.
- Assess where your community stands relative to education and land use laws that provide for the protection of terrestrial fish and wildlife habitat.
- Identify terrestrial fish and wildlife habitat management needs.
- Begin to map out a terrestrial fish and wildlife habitat management strategy for the future.

Issues Summary:

- We have problems with nuisance wildlife.
- Do you have health concerns about diseases.
- Loss of recreational land and/or access (e.g. hunting, fishing, trapping, hiking, viewsheds).
- Invasive species are crowding out native species.
- Loss of types and number of species due to habitat loss and degradation.
- Loss of travel corridors for wildlife.
- Loss of ecosystem function.

Strategies Summary:

- Protect terrestrial fish and wildlife habitat community-wide.
- Protect terrestrial fish and wildlife habitat at the project level.
- Restore terrestrial fish and wildlife habitat.
- Manage terrestrial fish and wildlife habitat.

Community Benefit Summary:

The biggest piece of the habitat management puzzle is the individual people living, working or recreating in your community. People are directly linked to and a part of the natural environment. There needs to be a shift from emphasizing resource management to educating people how their actions have a direct impact on the world around them. Simple backyard conservation techniques can enhance and protect terrestrial fish and wildlife habitat. Many times, these techniques can save the homeowner money and increase their property values, but they need to be made aware of them in order to reap the benefits.

Tier 2B - Terrestrial Habitat Management Worksheet

Terrestrial Fish and Wildlife Habitat Management

Tier 2 Worksheet

Community Environmental Management

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Community Environmental Management

- Terrestrial Fish and Wildlife Habitat Management Tier II Worksheet-

Overview

Terrestrial fish and wildlife habitat encompasses many different types of natural features, including forests, shrublands, grasslands, vernal pools, wetlands, early successional areas, and unique natural areas. Terrestrial habitat is not only important to the fish and wildlife that inhabit them, but also to the people around them. The health of this habitat has a real impact on the quality of life, recreational value, and economic benefits in your community. As a result, it is important to maintain necessary habitats in order to maintain individual species, ecosystems, and biodiversity

In the past century, we have seen a decline in the amount and quality of fish and wildlife habitat. Land use changes are limiting the area available to support populations of species. Human population growth has increased the demand for open, forested or agricultural land to be converted to residential, commercial and industrial uses. As a result, fish and wildlife populations inhabiting these areas have had to move, adapt to the changes, or die out. The lack of understanding of ecosystem function, poor planning, and general indifference have allowed the demand for land use changes to jeopardize this resource.

The Clean Water Act (CWA) (in various sections) directs us to "...restore and maintain the chemical, physical, and biological integrity of our nation's waters," and "to provide for the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water." In the recent past, we have seen many management plans and practices developed to curb water quality impacts. Too often, those plans and practices focused on the chemical integrity of water, and not the physical (habitat) and biological integrity. Looking at resources in a more holistic manner allows integration of the physical and biological quality of water resources. Management plans and practices need to look at the core issue, not symptoms. For example, nuisance wildlife is a problem in many areas. In the case of large animals like deer and bear, the hunting season can be lengthened or the number of hunting permits increased. The expanded hunting does not solve the problem, but rather puts a band-aid on a symptom. Humans feeding wildlife, disrupting the carrying capacity formula may cause the increase in population. Increased sightings may be a result of development infringing on previously undisturbed habitat. Resolving the core issue by restoring and protecting contiguous areas of habitat and educating citizens is what is needed.

It is also important for municipalities to monitor and assess planning, protection, and restoration actions. Too often we make the mistake of doing something on the ground that looks good on paper and then never following through to learn what works, and what doesn't work. Strategies should be implemented holistically on a landscape scale, across political boundaries, if possible. The CEM Assessment process helps you examine not only what is going on in your community, but also in other communities around you that may have an impact on your resources. CEM encourages communities to work together on these issues whenever possible, because fish and wildlife do not recognize intermunicipal borders.

The biggest piece of the habitat management puzzle is the individual people living, working or recreating in your community. People are directly linked to and a part of the natural environment. There needs to be a shift from emphasizing resource management to educating people how their actions have a direct impact on the world around them. Simple backyard conservation techniques can enhance and protect terrestrial fish and wildlife habitat. Many times, these techniques can save the homeowner money and increase their property values, but they need to be made aware of them in order to reap the benefits.

In New York State, local governments through their planning and regulatory functions, have the principle responsibility for controlling development activities. This role carries with it the responsibility for ensuring that development activities are undertaken with public health and safety of future inhabitants in mind, and in a manner that is compatible with the protection and enhancement of natural resources, including terrestrial fish and wildlife habitat.

The purpose of this worksheet is to assess the nature of habitat loss and degradation in your community and to evaluate the capacity your community has to remediate degraded or lost habitat and to prevent further loss or degradation. The following is intended to provide insight into the evolving subject of terrestrial fish and wildlife habitat management.

Summary of Terrestrial Fish and Wildlife Habitat Management Practices

The New York State Department of Environmental Conservation's Division of Fish, Wildlife and Marine Resources has developed a framework to address terrestrial fish and wildlife habitat issues that integrates planning and implementation to form a cohesive and effective unit. It can be used to address these issues across the landscape using the policy and decision making process. Habitat management is a complex issue, with many factors contributing to the problem. The following framework outlines the main strategies and management options you can use to minimize impacts to terrestrial fish and wildlife habitat in you community:

1. **Protect Terrestrial Fish and Wildlife Habitat**
   These management options can be performed on a community-wide or project level and are mainly nonstructural measures. They aim to guide policy and protect the structural integrity as well as the quality of the habitat.
2. **Restore Terrestrial Fish and Wildlife Habitat**
   These management options are both structural and nonstructural measures that serve to mitigate problems that already exist, as well as prevent new problems in the future.
3. **Manage Terrestrial Fish and Wildlife Habitat**
   These management practices cover five main topics:

   - Forests
   - Agricultural Land
   - Municipally-owned land
   - Highways and rights-of-way
   - Nuisance wildlife

   They aim to educate stakeholders in each of these areas about wise habitat management through both structural and nonstructural measures.

How this Worksheet Can Assist your Community in Protecting Terrestrial Fish and Wildlife Habitat

This worksheet can be used to help your community to:

1. More fully understand terrestrial fish and wildlife habitat management concepts,
2. Assess where your community stands relative to education and land use laws that provide for the protection of terrestrial fish and wildlife habitat.
3. Identify terrestrial fish and wildlife habitat management needs, and
4. Begin to map out a terrestrial fish and wildlife habitat management strategy for the future.

For help in filling out this worksheet and technical assistance on terrestrial fish and wildlife habitat, it is recommended that you contact your County Soil and Water Conservation District, New York State Department of Environmental Conservation Regional Office or your area's United States Department of Agriculture Natural Resources Conservation Service Conservationist. Most communities do not have a terrestrial fish and wildlife habitat management plan. This worksheet can help your community determine its terrestrial fish and wildlife habitat management needs.

Technical references available for communities in New York State to learn more about terrestrial fish and wildlife habitat are listed below.

- The New York State Department of Environmental Conservation's Division of Fish, Wildlife and Marine Resources includes:

  Bureaus
  - Fish and Wildlife Services
  - Fisheries
  - Habitat
  - Marine Resources and
  - Wildlife

  Division Programs
  - Hudson River Estuary Program
  - Hudson River National Estuarine Research Reserve
  - New York Natural Heritage Program

  They are in the process of incorporating and emphasizing a holistic, landscape scale program to deliver Division efforts. They strive to work with other Divisions within the Department of Environmental Conservation as well as other agencies, non-governmental agencies and partners to protect, maintain and restore fish and wildlife habitat across New York State. They look beyond political boundaries to deliver their programs on a landscape scale, such as basins and ecoregions across the State. Their web site can be found at: http://www.dec.state.ny.us/website/dfwmr/index.html, or by contacting the New York State Department of Environmental Conservation, Division of Fish, Wildlife and Marine Resources, Bureau of Habitat, 625 Broadway, Fifth Floor, Albany, NY 12233-4756, Phone: (518) 402-8151

- The New York Natural Heritage Program maintains databases on the known and potential locations of rare plants and animals, including those listed by New York State as endangered or threatened, and of significant habitats and vegetation types. For a list of those plants, animals, and habitats, which are documented for your assessment area in the Natural Heritage Program's databases, please contact the Information Resources Coordinator, NY Natural Heritage Program, NYS DEC, 625 Broadway, Albany, NY, 12233-4757.

Part 2- Community Problem & Needs Assessment

Part 2 of this assessment will help to determine how extensive **terrestrial fish and wildlife habitat management issues** are in your community and what is your community's capacity for addressing them.

Issues Associated with Terrestrial Fish and Wildlife Habitat Management	Causes	Impacts	Remedial & Preventative Strategies
Loss of or degraded terrestrial fish and wildlife habitat			
We have problems with nuisance wildlife ___Yes ___No Do you have any of the following: ___Deer eating crops and plantings ___Deer/car collisions ___Beaver causing flooding ___Numerous geese ___Turkey eating crops ___Habituated Bear ___Coyotes ___Pigeons ___Mute swans Do you have health concerns about: ___Lyme disease ___West Nile Virus ___Rabies ___Chronic Wasting Disease	1. Poorly planned development 2. Consolidation/loss of farmland 3. Road construction 4. Decrease in or limited access for hunting and trapping 5. Human population increase	**Check those impacts that apply:** ___Decline in wildlife population ___Decline in forest health (see also the Urban and Community Forestry worksheet) ___Increased economic loss (e.g. livestock, crops, property) ___Disease ___Decline in quality of life	**Strategy**: Protect terrestrial fish and wildlife habitat **Strategy**: Restore terrestrial fish and wildlife habitat **More Strategies can be found on the following page**

In order to assess the status of wildlife habitat within the assessment area, please indicate what types have been degraded (D) or lost (L):

___Forests
___Shrublands
___Grasslands
___Vernal pools[1]
___Unique natural areas
___Early successional areas
___Wetlands[1]

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	Barriers To Implementation	Community Assistance Needs[2]
Options: __ Inventory and map natural resources, including natural heritage elements, wetlands and streams (see also the Aquatic Fish and Wildlife Habitat Management Worksheet) (preferably electronically and in GIS) __ Develop an open space plan to guide protection and acquisition and include a component that focuses on natural communities and habitats __ Make provisions for conservation easements to protect important habitat __ Encourage clustering to maintain habitat and avoid fragmentation, and reduce the potential for nuisance wildlife problems __ Develop standards for environmental review of site plans __ Indicate the presence of wetlands and streams (see also the Aquatic Fish and Wildlife Habitat Management Worksheet) on site plans __ Avoid sensitive and/or important areas during the site planning process __ Contemplate land use decisions in a landscape context __ Assess and consider cumulative impacts of development on terrestrial resources __ Provide tax incentives for habitat conservation practices __ Avoid building new roads that increase roadkill and create barriers to wildlife movement		
Options: __ Develop partnerships to restore natural resources __ Promote/advocate/facilitate restoration of native habitats (e.g. stream corridors, grasslands, mowing regimes, eliminate exotics/invasives) – __ Reestablish connectivity and reduce hard abrupt edges between habitat types __ Restore large patches of habitat		

[1] Please see the Aquatic Fish and Wildlife Habitat Management Worksheet to address these needs.
[2] List type of assistance needed: information/education; assessment/planning: BMP design/implementation; regulatory options; project funding; etc.

Issues Associated with Terrestrial Fish and Wildlife Habitat Management	Causes	Impacts	Remedial & Preventative Strategies
Loss of or degraded terrestrial fish and wildlife habitat, continued			
We have problems with nuisance wildlife, continued			**Strategy**: Manage terrestrial fish and wildlife habitat

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	Barriers To Implementation	Community Assistance Needs[3]
Options: __ Manage municipal lands with habitat considerations in mind o Minimize the edge to interior ratio for forest and grassland interior species[4] (e.g. clear cuts, agricultural fields) o Park land vs. natural habitat (e.g. leave understory) __ Manage municipal highways and rights-of-way with habitat considerations in mind (see also the Highway Maintenance worksheet) o Place culverts to avoid beaver problems o __ Manage nuisance wildlife in collaboration with DEC o Use and keep current information on individuals licensed to handle nuisance wildlife o Deal with nuisance deer/deer damage by encouraging the public to apply for available permits through NYSDEC[5] o Encourage local communities to work with NYSDEC to organize a Citizen Task Force (CTF) to set deer population level objectives		
We suggest you also complete the CEM Highway Maintenance, and Aquatic Fish and Wildlife Resource Management Worksheets to further assess the issues in your community. Agricultural issues may be addressed by using AEM Worksheets.		

[3] List type of assistance needed: information/education; assessment/planning: BMP design/implementation; regulatory options; project funding; etc.

[4] The best way to do this is by increasing the size of natural areas or by minimizing the linear shape of human-created habitats. Small patches typically have a higher ratio of edge to interior habitat than very large patches with the same shape. Conversely, linear patches have a much higher proportion of edge to interior habitat than patches with the same area but more compact shape. Small or more highly dissected patches may provide little or no interior habitat.

[5] Deer Management Permits (DMPs) are used to manage deer in large geographic areas during deer hunting seasons. Deer Management Assistance Program (DMAP) permits are used to manage deer in small geographic areas, individual properties, or cooperatives during deer hunting season. Nuisance Deer Permits (NDPs) are used to reduce damage problems on individual properties while damage is occurring.

Issues Associated with Terrestrial Fish and Wildlife Habitat Management	Causes	Impacts	Remedial & Preventative Strategies
Loss of or degraded terrestrial fish and wildlife habitat			
Loss of recreational land and/or access (e.g. hunting, fishing, trapping, hiking, viewsheds) **___Yes ___No**	1. Poorly planned development 2. Loss of habitat 3. Changing attitudes about hunting, fishing and trapping (i.e. increase in posting of land) 4. Human population increase	1. Loss of revenue associated with recreational activities 2. Diminished quality of life 3. Disease	**Strategy:** Protect terrestrial fish and wildlife habitat **Strategy:** Restore terrestrial fish and wildlife habitat **More Strategies can be found on the following page**

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	Barriers To Implementation	Community Assistance Needs[6]
Options: __ Inventory and map natural resources, including natural heritage elements, wetlands and streams (see also the Aquatic Fish and Wildlife Habitat Management Worksheet) (preferably electronically and in GIS) __ Develop an open space plan to guide protection and acquisition and include a component that focuses on natural communities and habitats __ Make provisions for conservation easements to protect important habitat __ Work with land trusts __ Adapt taxing policies to promote land conservation __ Buy land __ Develop, implement and enforce buffer regulations for local, State, and Federal wetlands and hydrologically isolated wetlands (e.g. vernal pools) __ Encourage clustering to maintain habitat and avoid fragmentation, and reduce the potential for nuisance wildlife problems __ Develop overlay zones with corresponding natural resource protection/limitations on uses within the zones __ Indicate the presence of wetlands and streams (see also the Aquatic Fish and Wildlife Habitat Management Worksheet) on site plans __ Avoid sensitive and/or important areas during the site planning process __ Contemplate land use decisions in a landscape context __ Assess and consider cumulative impacts of development on terrestrial resources __ Provide tax incentives for habitat conservation practices		
Options: __ Develop partnerships to restore natural resources __ Promote/advocate/facilitate restoration of native habitats (e.g. stream corridors (see aquatic worksheet), grasslands, mowing regimes, eliminate exotics/invasives) __ Reestablish connectivity and reduce hard abrupt edges between habitat types __ Restore large patches of habitat		

[6] List type of assistance needed: information/education; assessment/planning: BMP design/implementation; regulatory options; project funding; etc.

Issues Associated with Terrestrial Fish and Wildlife Habitat Management	Causes	Impacts	Remedial & Preventative Strategies
Loss of or degraded terrestrial fish and wildlife habitat, continued			
Loss of recreational land and/or access (e.g. hunting, fishing, trapping, hiking, viewsheds), continued			**Strategy:** Manage terrestrial fish and wildlife habitat

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	Barriers To Implementation	Community Assistance Needs[7]
Options: __ Implement BMPs for forest practices to benefit fish and wildlife (see also the Urban and Community Forestry worksheet) __ Implement BMPs on agricultural lands to benefit fish and wildlife (see also the Farmland Protection worksheet, or the AEM program) __ Manage municipal lands with habitat considerations in mind o Minimize the edge to interior ratio for forest and grassland interior species[8] (e.g. clear cuts, agricultural fields) o Park land vs. natural habitat (e.g.leave understory) o Presence of rare species (plant and animal) o Presence of rare communities o Maintain riparian buffers o Manage for and plant native species __ Manage municipal highways and rights-of-way with habitat considerations in mind (see also the Highway Maintenance worksheet) o Provide herpetological tunnels o Control invasives along roads o Erect nest boxes		
We suggest you also complete the CEM Highway Maintenance, and Aquatic Fish and Wildlife Resource Management Worksheets to further assess the issues in your community. Agricultural issues may be addressed by using AEM Worksheets.		

[7] List type of assistance needed: information/education; assessment/planning: BMP design/implementation; regulatory options; project funding; etc.

[8] The best way to do this is by increasing the size of natural areas or by minimizing the linear shape of human-created habitats. Small patches typically have a higher ratio of edge to interior habitat than very large patches with the same shape. Conversely, linear patches have a much higher proportion of edge to interior habitat than patches with the same area but more compact shape. Small or more highly dissected patches may provide little or no interior habitat.

Issues Associated with Terrestrial Fish and Wildlife Habitat Management	Causes	Impacts	Remedial & Preventative Strategies
Loss of or degraded terrestrial fish and wildlife habitat			
Invasive species are crowding out native species (e.g. Asian Longhorn Beetle, Phragmites, Purple Loosetrife, Japanese Knotweed, Mute Swans) **___Yes ___No**	1. Planting or releasing non-native species 2. Lack of invasive species management 3. Poor construction practices (e.g. soil transport brings in seeds and roots of invasives)	1. Decline in native populations 2. Decline in native species 3. Decline in forest health (see Silviculture Worksheet) 4. Decrease in biodiversity 5. Change in community composition 6. Disease	**Strategy**: Protect terrestrial fish and wildlife habitat **Strategy**: Restore terrestrial fish and wildlife habitat **Strategy**: Manage terrestrial fish and wildlife habitat

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	Barriers To Implementation	Community Assistance Needs[9]
Options: __ Prevent the establishment of invasive species during the site planning and construction process		
Options: __ Develop partnerships to restore natural resources __ Promote/advocate/facilitate restoration of native habitats (e.g. stream corridors (see aquatic worksheet), grasslands, mowing regimes, eliminate exotics/invasives)		
Options: __ Implement BMPs for forest practices to benefit fish and wildlife (see also the Urban and Community Forestry worksheet) __ Implement BMPs on agricultural lands to benefit fish and wildlife (see also the Farmland Protection worksheet, or the AEM program) __ Manage municipal lands with habitat considerations in mind o Minimize the edge to interior ratio for forest and grassland interior species[10] (e.g. clear cuts, agricultural fields) o Park land vs. natural habitat (e.g.leave understory) o Presence of rare species (plant and animal) o Presence of rare communities o Manage for and plant native species __ Manage municipal highways and rights-of-way with habitat considerations in mind (see also the Highway Maintenance worksheet) o Control invasives along roads		
We suggest you also complete the CEM Highway Maintenance Worksheet to further assess the issues in your community. Agricultural issues may be addressed by using AEM Worksheets.		

[9] List type of assistance needed: information/education; assessment/planning: BMP design/implementation; regulatory options; project funding; etc.

[10] The best way to do this is by increasing the size of natural areas or by minimizing the linear shape of human-created habitats. Small patches typically have a higher ratio of edge to interior habitat than very large patches with the same shape. Conversely, linear patches have a much higher proportion of edge to interior habitat than patches with the same area but more compact shape. Small or more highly dissected patches may provide little or no interior habitat.

Issues Associated with Terrestrial Fish and Wildlife Habitat Management	Causes	Impacts	Remedial & Preventative Strategies
Loss of Biodiversity Leads to a Homogenized Landscape			
Loss of types and number of species due to habitat loss and degradation[11] **___Yes ___No** **Have you noticed a loss of:** **___Area sensitive species (wildlife that live in specific habitats, such as grasslands, interior forests, etc. Examples include the savannah sparrow, bobolink; ovenbird, wood thrush)** **___Loss or decline of amphibians** **___Loss of rare, threatened and/or endangered species** Locations (List): _____ _____	1. Poorly planned development 2. Loss of travel corridors 3. Fragmentation of habitat types 4. Reduction of patch size area 5. Abrupt edges 6. Road construction 7. Insensitive agricultural and silvicultural practices 8. Poor construction practices 9. Human population increase	**Check those impacts that apply:** ___Loss of species ___Decline in wildlife populations ___Disease ___Decrease in biodiversity ___Change in community composition ___Diminished quality of life	**Strategy**: Protect terrestrial fish and wildlife habitat **Strategy**: Restore terrestrial fish and wildlife habitat **More Strategies can be found on the following page**

[11] Degraded habitat includes abrupt edges between habitat types, fragmentation of habitat types, reduction of patch size area, and loss of travel corridors.

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	Barriers To Implementation	Community Assistance Needs[12]
Options: __ Inventory and map natural resources, including natural heritage elements, wetlands and streams (see also the Aquatic Fish and Wildlife Habitat Management Worksheet) (preferably electronically and in GIS) __ Develop an open space plan to guide protection and acquisition and include a component that focuses on natural communities and habitats __ Make provisions for conservation easements to protect important habitats __ Work with land trusts __ Adapt taxing policies to promote land conservation __ Use innovative acquisition approaches, such as buying less than fee title (e.g. conservation easements or other development rights, negotiating bargain sales or County tax sales) __ Buy land __ Develop, implement and enforce buffer regulations for local, State and Federal wetlands and hydrologically isolated wetlands (e.g. vernal pools) __ Encourage clustering to maintain habitat and avoid fragmentation, and reduce the potential for nuisance wildlife problems __ Develop overlay zones with corresponding natural resource protection/limitations on uses within the zones __ Develop standards for environmental review of site plans __ Conduct environmental review surveys at the appropriate time __ Indicate the presence of wetlands and streams (see also the Aquatic Fish and Wildlife Habitat Management Worksheet) on site plans __ Avoid sensitive and/or important areas during the site planning process __ Contemplate land use decisions in a landscape context __ Assess and consider cumulative impacts of development on terrestrial resources __ Provide tax incentives for habitat conservation practices __ Avoid building new roads that increase roadkill and create barriers to wildlife movement		
Options: __ Develop partnerships to restore natural resources __ Promote/advocate/facilitate restoration of native habitats (e.g. stream corridors (see aquatic worksheet), grasslands, mowing regimes, eliminate exotics/invasives) __ Reestablish connectivity and reduce hard abrupt edges between habitat types __ Restore large patches of habitat		

[12] List type of assistance needed: information/education; assessment/planning: BMP design/implementation; regulatory options; project funding; etc.

Issues Associated with Terrestrial Fish and Wildlife Habitat Management	Causes	Impacts	Remedial & Preventative Strategies
Loss of Biodiversity Leads to a Homogenized Landscape, continued			
Loss of types and number of species due to habitat loss and degradation, continued			**Strategy**: Manage terrestrial fish and wildlife habitat

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	Barriers To Implementation	Community Assistance Needs[13]
Options: __ Implement BMPs for forest practices to benefit fish and wildlife (see also the Urban and Community Forestry worksheet) __ Implement BMPs on agricultural lands to benefit fish and wildlife (see also the Farmland Protection worksheet, or the AEM program) __ Manage municipal lands with habitat considerations in mind o Minimize the edge to interior ratio for forest and grassland interior species[14] (e.g. clear cuts, agricultural fields) o Mowing regimes that balance grassland bird nesting with recreation and agricultural needs o Park land vs. natural habitat (e.g.leave understory) o Presence of rare species (plant and animal) o Presence of rare communities o Maintain riparian buffers o Manage for and plant native species __ Manage municipal highways and rights-of-way with habitat considerations in mind (see also the Highway Maintenance worksheet) o Provide herpetological tunnels o Mow narrow road shoulders o Erect nest boxes o Store salt and de-icing materials properly o Segregate waste, spoil and storage piles from wetland areas to make sure wetlands are not filled		
We suggest you also complete the CEM Highway Maintenance, and Aquatic Fish and Wildlife Resource Management Worksheets to further assess the issues in your community. Agricultural issues may be addressed by using AEM Worksheets.		

[13] List type of assistance needed: information/education; assessment/planning: BMP design/implementation; regulatory options; project funding; etc.

[14] The best way to do this is by increasing the size of natural areas or by minimizing the linear shape of human-created habitats. Small patches typically have a higher ratio of edge to interior habitat than very large patches with the same shape. Conversely, linear patches have a much higher proportion of edge to interior habitat than patches with the same area but more compact shape. Small or more highly dissected patches may provide little or no interior habitat.

Issues Associated with Terrestrial Fish and Wildlife Habitat Management	Causes	Impacts	Remedial & Preventative Strategies
Loss of Biodiversity Leads to a Homogenized Landscape			
Loss of connectivity necessary to maintain metapopulations[15] **___Yes ___No** **Do you have:** **___Loss of patch connections and travel corridors for wildlife** **___Fragmentation** Locations (List): _____ _____	1. Poorly planned development 2. Loss of travel corridors 3. Road construction 4. Human population increase 5. Insensitive agricultural and silvicultural practices	**Check those impacts that apply:** ___Loss of species ___Decline in populations ___Disease ___Diminished quality of life ___Change in community composition ___Decrease in biodiversity	**<u>Strategy</u>:** Protect terrestrial fish and wildlife habitat **<u>Strategy</u>:** Restore terrestrial fish and wildlife habitat **More Strategies can be found on the following page**

[15] Loss of connectivity impairs the ability of wildlife to travel between subpopulations in order to maintain the size and genetic diversity of the breeding population.

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	Barriers To Implementation	Community Assistance Needs[16]
Options: __ In Inventory and map natural resources, including natural heritage elements, wetlands and streams (see also the Aquatic Fish and Wildlife Habitat Management Worksheet) (preferably electronically and in GIS) __ Develop an open space plan to guide protection and acquisition and include a component that focuses on natural communities and habitats __ Make provisions for conservation easements to protect important habitats __ Work with land trusts __ Buy land __ Develop, implement and enforce buffer regulations for local, State and Federal wetlands and hydrologically isolated wetlands (e.g. vernal pools) __ Encourage clustering to maintain habitat and avoid fragmentation, and reduce the potential for nuisance wildlife problems __ Develop overlay zones with corresponding natural resource protection/limitations on uses within the zones __ Conduct environmental review surveys at the appropriate time __ Indicate the presence of wetlands and streams (see also the Aquatic Fish and Wildlife Habitat Management Worksheet) on site plans __ Avoid sensitive and/or important areas during the site planning process __ Contemplate land use decisions in a landscape context __ Assess and consider cumulative impacts of development on terrestrial resources __ Provide tax incentives for habitat conservation practices __ Avoid building new roads that increase roadkill and create barriers to wildlife movement		
Options: __ Develop partnerships to restore natural resources __ Promote/advocate/facilitate restoration of native habitats (e.g. stream corridors (see aquatic worksheet), grasslands, mowing regimes, eliminate exotics/invasives) __ Reestablish connectivity and reduce hard abrupt edges between habitat types __ Restore large patches of habitat		

[16] List type of assistance needed: information/education; assessment/planning: BMP design/implementation; regulatory options; project funding; etc.

Issues Associated with Terrestrial Fish and Wildlife Habitat Management	Causes	Impacts	Remedial & Preventative Strategies
Loss of Biodiversity Leads to a Homogenized Landscape, continued			
Loss of connectivity necessary to maintain metapopulations, continued			**Strategy**: Manage terrestrial fish and wildlife habitat

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	**Barriers To Implementation**	**Community Assistance Needs**[17]
Options: __ Implement BMPs for forest practices to benefit fish and wildlife (see also the Urban and Community Forestry worksheet) __ Implement BMPs on agricultural lands to benefit fish and wildlife (see also the Farmland Protection worksheet, or the AEM program) __ Manage municipal lands with habitat considerations in mind o Presence of rare species (plant and animal) o Presence of rare communities o Maintain riparian buffers __ Manage municipal highways and rights-of-way with habitat considerations in mind (see also the Highway Maintenance worksheet) o Provide herpetological tunnels o Erect nest boxes		
We suggest you also complete the CEM Highway Maintenance, and Aquatic Fish and Wildlife Resource Management Worksheets to further assess the issues in your community. Agricultural issues may be addressed by using AEM Worksheets.		

[17] List type of assistance needed: information/education; assessment/planning: BMP design/implementation; regulatory options; project funding; etc.

Issues Associated with Terrestrial Fish and Wildlife Habitat Management	Causes	Impacts	Remedial & Preventative Strategies
Loss of Biodiversity Leads to a Homogenized Landscape			
Loss of ecosystem function[18] **___Yes ___No**	1. Poorly planned development 2. Loss of travel corridors 3. Loss of habitat 4. Introduction of exotic and invasive species 5. Increase in human population	**Check those impacts that apply:** ___Loss of species ___Decline in wildlife populations ___Disease ___Decrease in biodiversity ___Change in community composition ___Diminished quality of life	**Strategy**: Protect terrestrial fish and wildlife habitat **Strategy**: Restore terrestrial fish and wildlife habitat **More Strategies can be found on the following page**

[18] Loss of ecosystem function creates problems associated with the loss of services that wildlife provide (e.g. pollination, decomposers, soil development, predator/prey relationships, insect control) for ecosystems and humans.

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	Barriers To Implementation	Community Assistance Needs[19]
Options: __ Inventory and map natural resources, including natural heritage elements, wetlands and streams (see also the Aquatic Fish and Wildlife Habitat Management Worksheet) (preferably electronically and in GIS) __ Develop an open space plan to guide protection and acquisition and include a component that focuses on natural communities and habitats. __ Make provisions for conservation easements to protect important habitats __ Buy land __ Develop, implement and enforce buffer regulations for local, State and Federal wetlands and hydrologically isolated wetlands (e.g. vernal pools) __ Develop overlay zones with corresponding natural resource protection/limitations on uses within the zones __ Conduct environmental review surveys at the appropriate time __ Indicate the presence of wetlands and streams (see also the Aquatic Fish and Wildlife Habitat Management Worksheet) on site plans __ Avoid sensitive and/or important areas during the site planning process __ Prevent the establishment of invasive species during the site planning and construction process __ Contemplate land use decisions in a landscape context __ Assess and consider cumulative impacts of development on terrestrial resources __ Avoid building new roads that increase roadkill and create barriers to wildlife movement		
Options: __ Develop partnerships to restore natural resources __ Promote/advocate/facilitate restoration of native habitats (e.g. stream corridors (see aquatic worksheet), grasslands, mowing regimes, eliminate exotics/invasives) __ Reestablish connectivity and reduce hard abrupt edges between habitat types __ Restore large patches of habitat		

[19] List type of assistance needed: information/education; assessment/planning: BMP design/implementation; regulatory options; project funding; etc.

Issues Associated with Terrestrial Fish and Wildlife Habitat Management	Causes	Impacts	Remedial & Preventative Strategies
Loss of Biodiversity Leads to a Homogenized Landscape, continued			
Loss of ecosystem function, continued			**Strategy**: Manage terrestrial fish and wildlife habitat

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	Barriers To Implementation	Community Assistance Needs[20]
Options: __ Implement BMPs for forest practices to benefit fish and wildlife (see also the Urban and Community Forestry worksheet) __ Implement BMPs on agricultural lands to benefit fish and wildlife (see also the Farmland Protection worksheet, or the AEM program) __ Manage municipal lands with habitat considerations in mind o Minimize the edge to interior ratio for forest and grassland interior species[21] (e.g. clear cuts, agricultural fields) o Mowing regimes o Park land vs. natural habitat (e.g.leave understory) o Presence of rare species (plant and animal) o Presence of rare communities o Maintain riparian buffers o Manage for and plant native species __ Manage municipal highways and rights-of-way with habitat considerations in mind (see also the Highway Maintenance worksheet) o Provide herpetological tunnels o Mow narrow road shoulders o Control invasives along roads o Erect nest boxes o Store salt and de-icing materials properly o Segregate waste, spoil and storage piles from wetland areas to make sure wetlands are not filled		
We suggest you also complete the CEM Highway Maintenance, and Aquatic Fish and Wildlife Resource Management Worksheets to further assess the issues in your community.		

[20] List type of assistance needed: information/education; assessment/planning: BMP design/implementation; regulatory options; project funding; etc.

[21] The best way to do this is by increasing the size of natural areas or by minimizing the linear shape of human-created habitats. Small patches typically have a higher ratio of edge to interior habitat than very large patches with the same shape. Conversely, linear patches have a much higher proportion of edge to interior habitat than patches with the same area but more compact shape. Small or more highly dissected patches may provide little or no interior habitat.

Issues Associated with Terrestrial Fish and Wildlife Habitat Management	Causes	Positive Benefits	Remedial & Preventative Strategies
Our municipality is concerned about (please check all that apply): **___How to best protect the highest quality terrestrial habitat before it gets degraded.** **___How to prioritize terrestrial resources for protection.** **___How to get the community and decision makers to recognize that high quality terrestrial resources provide quality of life, recreational and economic benefits to the community and take steps to preserve and protect them (e.g. hunting, birding, fishing, silviculture, clean water, wild plant collecting, community interactions and character, aesthetic intrinsic values).** **___How to receive and provide the best information and training to people who make decisions about development and terrestrial resources in our community (e.g. contractors, engineers, municipal officials).** **___There is confusion over local authority to address terrestrial resource concerns.** **___How to explain the beneficial services different terrestrial ecosystems provide (e.g. pollination, climate control, flood attenuation, soil development, clean air/water, erosion control, limit spread of disease, keep invasives at bay).**	1. At present community is not implementing a terrestrial natural resource management program and its associated plan. 2. The community is experiencing development pressure, but is having difficulty balancing economic development and growth and natural resource protection needs. 3. Community does not have adequate resources to enforce land use.	**Check those impacts that apply:** ___The preservation and enhancement of terrestrial resources has a positive effect on the local economy and property values. ___High quality of life. ___The preservation and enhancement of terrestrial resources positively impacts fish and wildlife, decreasing the need for costly restoration and remediation. ___Protection and enhancement of terrestrial resources perpetuates beneficial ecosystem services.	**Strategy:** Protect terrestrial fish and wildlife habitat **Strategy:** Restore terrestrial fish and wildlife habitat **More Strategies can be found on the following page**

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	Barriers To Implementation	Community Assistance Needs[22]
Options: __ Inventory and map natural resources, including natural heritage elements, wetlands and streams (see also the Aquatic Fish and Wildlife Habitat Management Worksheet) (preferably electronically and in GIS) __ Develop an open space plan to guide acquisition and include a component that focuses on natural communities and habitats. __ Make provisions for conservation easements to protect important habitat __ Work with land trusts __ Adapt taxing policies to promote land conservation __ Use innovative acquisition approaches, such as buying less than fee title (e.g. conservation easements or other development rights, negotiating bargain sales or County tax sales) __ Buy land __ Develop, implement and enforce buffer regulations for local, State and Federal wetlands and hydrologically isolated wetlands (e.g. vernal pools) __ Encourage clustering to maintain habitat and avoid fragmentation, and reduce the potential for nuisance wildlife problems __ Develop overlay zones with corresponding natural resource protection/limitations on uses within the zones __ Develop standards for environmental review of site plans __ Conduct environmental resource surveys at the appropriate time __ Indicate the presence of wetlands and streams (see also the Aquatic Fish and Wildlife Habitat Management Worksheet) on site plans __ Avoid sensitive and/or important areas during the site planning process __ Prevent the establishment of invasive species during the site planning and construction process __ Contemplate land use decisions in a landscape context __ Assess and consider cumulative impacts of development on aquatic resources __ Provide tax incentives for habitat conservation practices __ Avoid building new roads that increase roadkill and create barriers to wildlife movement		
Options: __ Develop partnerships to restore natural resources __ Promote/advocate/facilitate restoration of native habitats (e.g. stream corridors (see aquatic worksheet), grasslands, mowing regimes, eliminate exotics/invasives) __ Reestablish connectivity and reduce hard abrupt edges between habitat types __ Restore large patches of habitat		

[22] List type of assistance needed: information/education; assessment/planning: BMP design/implementation; regulatory options; project funding; etc.

Issues Associated with Terrestrial Fish and Wildlife Habitat Management	Causes	Positive Benefits	Remedial & Preventative Strategies
Our municipality is concerned about ___, continued			**Strategy:** Manage terrestrial fish and wildlife habitat

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	Barriers To Implementation	Community Assistance Needs[23]
Options: __ Implement BMPs for forest practices to benefit fish and wildlife (see also the Urban and Community Forestry worksheet) __ Implement BMPs on agricultural lands to benefit fish and wildlife (see also the Farmland Protection worksheet, or the AEM program) __ Manage municipal lands with habitat considerations in mind o Minimize the edge to interior ratio for forest and grassland interior species[24] (e.g. clear cuts, agricultural fields) o Mowing regimes that balance grassland bird nesting with recreation and agricultural needs o Park land vs. natural habitat (e.g.leave understory) o Presence of rare species (plant and animal) o Presence of rare communities o Maintain riparian buffers o Manage for and plant native species __ Manage municipal highways and rights-of-way with habitat considerations in mind (see also the Highway Maintenance worksheet) o Provide herpetological tunnels o Place culverts to avoid beaver problems o Mow narrow road shoulders o Control invasives along roads o Erect nest boxes o Store salt and de-icing materials properly o Segregate waste, spoil and storage piles from wetland areas to make sure wetlands are not filled __ Manage nuisance wildlife in collaboration with New York State Department of Environmental Conservation (NYSDEC) o Use and keep current information on individuals licensed to handle nuisance wildlife o Deal with nuisance deer/deer damage by encouraging the public to apply for available permits through NYSDEC[25] o Encourage local communities to work with NYSDEC to organize a Citizen Task Force (CTF) to set deer population level objectives		
We suggest you also complete the CEM Highway Maintenance, Aquatic Fish and Wildlife Resource Management, and Land Use Planning Needs Worksheets to further assess the issues in your community. Agricultural issues may be addressed by using AEM Worksheets.		

[23] List type of assistance needed: information/education; assessment/planning: BMP design/implementation; regulatory options; project funding; etc.

[24] The best way to do this is by increasing the size of natural areas or by minimizing the linear shape of human-created habitats. Small patches typically have a higher ratio of edge to interior habitat than very large patches with the same shape. Conversely, linear patches have a much higher proportion of edge to interior habitat than patches with the same area but more compact shape. Small or more highly dissected patches may provide little or no interior habitat.

[25] Deer Management Permits (DMPs) are used to manage deer in large geographic areas during deer hunting seasons. Deer Management Assistance Program (DMAP) permits are used to manage deer in small geographic areas, individual properties, or cooperatives during deer hunting season. Nuisance Deer Permits (NDPs) are used to reduce damage problems on individual properties while damage is occurring.

Community Environmental Management
TIER III: TERRESTRIAL FISH AND WILDLIFE HABITAT MANAGEMENT STRATEGY DEVELOPMENT

Terrestrial fish and wildlife habitat management is a complex issue, with many factors contributing to the topic. The following are three strategies for managing terrestrial fish and wildlife habitat and preventing damage to it in communities.

STRATEGY – Protect terrestrial fish and wildlife habitat

Community-Wide

- Inventory and map natural resources, including natural heritage elements, wetlands and streams (see also the Aquatic Fish and Wildlife Habitat Management Worksheet) (preferably electronically and in GIS)
- Develop an open space plan to guide protection and acquisition and include a component that focuses on natural communities and habitats
- Make provisions for conservation easements to protect important habitat
- Work with land trusts
- Adapt taxing policies to promote land conservation
- Use innovative acquisition approaches, such as buying less than fee title (e.g. conservation easements or other development rights, negotiating bargain sales or County tax sales)
- Buy land
- Develop, implement and enforce buffer regulations for local, State and Federal wetlands and hydrologically isolated wetlands (e.g. vernal pools)
- Develop overlay zones with corresponding natural resource protection/limitations on uses within the zones
- Contemplate land use decisions in a landscape context
- Assess and consider cumulative impacts of development on terrestrial resources

Project Level

- Encourage clustering to maintain habitat and avoid fragmentation, and reduce the potential for nuisance wildlife problems
- Develop standards for environmental review of site plans
- Conduct environmental resource surveys at the appropriate time
- Indicate the presence of wetlands and streams (see also the Aquatic Fish and Wildlife Habitat Management Worksheet) on site plans
- Avoid sensitive and/or important areas during the site planning process
- Prevent the establishment of invasive species during the site planning and construction process
- Provide tax incentives for habitat conservation practices
- Avoid building new roads that increase roadkill and create barriers to wildlife movement

STRATEGY – Restore terrestrial fish and wildlife habitat

- Develop partnerships to restore natural resources
- Promote/advocate/facilitate restoration of native habitats (e.g. stream corridors (see aquatic worksheet), grasslands, mowing regimes, eliminate exotics/invasives
- Reestablish connectivity and reduce hard abrupt edges between habitat types
- Restore large patches of habitat

STRATEGY – Manage terrestrial fish and wildlife habitat

- Implement BMPs for forest practices to benefit fish and wildlife (see also the Urban and Community Forestry worksheet)
- Implement BMPs on agricultural lands to benefit fish and wildlife (see also the Farmland Protection worksheet, or the AEM program)
- Manage municipal lands with habitat considerations in mind
  - Minimize the edge to interior ratio for forest and grassland interior species[26] (e.g. clear cuts, agricultural fields)
  - Mowing regimes that balance grassland bird nesting with recreation and agricultural needs
  - Park land vs. natural habitat (e.g. leave understory)
  - Presence of rare species (plant and animal)
  - Presence of rare communities
  - Maintain riparian buffers
  - Manage for and plant native species
- Manage municipal highways and rights-of-way with habitat considerations in mind (see also the Highway Maintenance worksheet)
  - Provide herpetological tunnels
  - Place culverts to avoid beaver problems
  - Mow narrow road shoulders
  - Control invasive species along roads
  - Erect nest boxes
  - Store salt and de-icing materials properly
  - Segregate waste, spoil and storage piles from wetland areas to make sure wetlands are not filled
- Manage nuisance wildlife in collaboration with New York State Department of Environmental Conservation (NYSDEC)
  - Use and keep current information on individuals licensed to handle nuisance wildlife
  - Deal with nuisance deer/deer damage by encouraging the public to apply for available permits through NYSDEC[27]
  - Encourage local communities to work with NYSDEC to organize a Citizen Task Force (CTF) to set deer population level objectives

[26] The best way to do this is by increasing the size of natural areas or by minimizing the linear shape of human-created habitats. Small patches typically have a higher ratio of edge to interior habitat than very large patches with the same shape. Conversely, linear patches have a much higher proportion of edge to interior habitat than patches with the same area but more compact shape. Small or more highly dissected patches may provide little or no interior habitat.

[27] Deer Management Permits (DMPs) are used to manage deer in large geographic areas during deer hunting seasons. Deer Management Assistance Program (DMAP) permits are used to manage deer in small geographic areas, individual properties, or cooperatives during deer hunting season. Nuisance Deer Permits (NDPs) are used to reduce damage problems on individual properties while damage is occurring.

6.12 Aquatic Fish and Wildlife Habitat Management

Environmental Significance Summary:

Aquatic fish and wildlife habitat encompasses many different types of natural features, including stream and river corridors, wetlands, lakes, ponds and reservoirs. Aquatic habitat is not only important to the fish and wildlife that inhabit them, but also to the people around them. The health of this habitat has a real impact on the quality of life, recreational value, and economic benefits in your community. As a result, it is important to maintain necessary habitats in order to maintain individual species, ecosystems, and biodiversity.

In the past century, we have seen a decline in the amount and quality of fish and wildlife habitat. Land use changes are limiting the area available to support populations of species. Human population growth has increased the demand for open, forested or agricultural land to be converted to residential, commercial and industrial uses. As a result, fish and wildlife populations inhabiting these areas have had to move, adapt to the changes, or die out. The lack of understanding of ecosystem function, poor planning, and general indifference have allowed the demand for land use changes to jeopardize this resource.

Community Assistance Summary:

- More fully understand aquatic fish and wildlife habitat management concepts.
- Assess where your community stands relative to education and land use laws that provide for the protection of aquatic fish and wildlife habitat.
- Identify aquatic fish and wildlife habitat management needs.
- Begin to map out an aquatic fish and wildlife habitat management strategy for the future.

Issues Summary:

- Loss of aquatic habitat in streams, rivers, lakes, ponds and reservoirs.
- Loss of spawning areas.
- Loss of feeding & growth habitat.
- Loss of resting & shelter area.
- Loss of winter habitat.
- There are barriers to migration for fish & other organisms in streams and rivers.
- Degraded health of streams, rivers, lakes, ponds & reservoirs diminishing capacity to sustain/support aquatic species).
- Algae blooms and excessive weed growth.
- Degraded wetland/vernal pool health.
- Invasive Species.

Strategies Summary:

- Protect and restore stream and river corridors.
- Protect and restore lakes, ponds and reservoirs.
- Protect and restore wetlands.

Community Benefit Summary:

The biggest piece of the habitat management puzzle is the individual people living, working or recreating in your community. People are directly linked to and are a part of the natural environment. There needs to be a shift from emphasizing resource management to educating people how their actions have a direct impact on the world around them. Simple backyard conservation techniques can enhance and protect aquatic fish and wildlife habitat. Many times, these techniques can save the homeowner money and increase their property values, but they need to be made aware of them in order to reap the benefits.

Tier 2B – Aquatic Fish & Wildlife Habitat Management Worksheet

Aquatic Fish and Wildlife Habitat Management

Tier 2 Worksheet

Community Environmental Management

Acknowledgements

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We also would like to thank our County Soil and Water Conservation District colleagues _____ and _____ for their review and comments.

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Community Environmental Management

- Aquatic Fish and Wildlife Habitat Management Tier II Worksheet-

Overview

Aquatic fish and wildlife habitat encompasses many different types of natural features, including stream and river corridors, wetlands, lakes, ponds and reservoirs. Aquatic habitat is not only important to the fish and wildlife that inhabit them, but also to the people around them. The health of this habitat has a real impact on the quality of life, recreational value, and economic benefits in your community. As a result, it is important to maintain necessary habitats in order to maintain individual species, ecosystems, and biodiversity.

In the past century, we have seen a decline in the amount and quality of fish and wildlife habitat. Land use changes are limiting the area available to support populations of species. Human population growth has increased the demand for open, forested or agricultural land to be converted to residential, commercial and industrial uses. As a result, fish and wildlife populations inhabiting these areas have had to move, adapt to the changes, or die out. The lack of understanding of ecosystem function, poor planning, and general indifference have allowed the demand for land use changes to jeopardize this resource.

The Clean Water Act (CWA) (in various sections) directs us to "...restore and maintain the chemical, physical, and biological integrity of our nation's waters," and "to provide for the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water." In the recent past, we have seen many management plans and practices developed to curb water quality impacts. Too often, those plans and practices focused on the chemical integrity of water, and not the physical (habitat) and biological integrity. Looking at resources in a more holistic manner allows integration of the physical and biological quality of water resources. Management plans and practices need to look at the core issue, not symptoms. For example, a stream in your municipality may have problems with bank erosion. Every so often, your highway department is charged with going in and dumping a load of stone to rip-rap the stream bank to get it stable. The rip-rap does not solve the bank erosion problem, but rather puts a band aid on a symptom. The sediment problem may stem from loss of riparian vegetation in the Town upstream, or increased stormwater runoff from a new development nearby. Resolving the core issue by restoring native riparian vegetation in the Town upstream, or managing the runoff before it reaches the stream is what's needed.

It is also important for municipalities to monitor and assess planning, protection, and restoration actions. Too often we make the mistake of doing something on the ground that looks good on paper and then never following through to learn what works, and what doesn't work. Strategies should be implemented holistically on a landscape scale, across political boundaries, if possible. The CEM Assessment process helps you examine not only what is going on in your community, but also in other communities around you that may have an impact on your resources. CEM encourages communities to work together on these issues whenever possible, because fish and wildlife do not recognize intermunicipal borders.

The biggest piece of the habitat management puzzle is the individual people living, working or recreating in your community. People are directly linked to and are a part of the natural environment. There needs to be a shift from emphasizing resource management to educating

people how their actions have a direct impact on the world around them. Simple backyard conservation techniques can enhance and protect aquatic fish and wildlife habitat. Many times, these techniques can save the homeowner money and increase their property values, but they need to be made aware of them in order to reap the benefits.

In New York State, local governments through their planning and regulatory functions, have the principle responsibility for controlling development activities. This role carries with it the responsibility for ensuring that development activities are undertaken with public health and safety of future inhabitants in mind, and in a manner that is compatible with the protection and enhancement of natural resources, including aquatic fish and wildlife habitat.

The purpose of this worksheet is to assess the nature of habitat loss and degradation in your community and to evaluate the capacity your community has to remediate degraded or lost habitat and to prevent further loss or degradation. The following is intended to provide insight into the evolving subject of aquatic fish and wildlife habitat management.

Summary of Aquatic Fish and Wildlife Habitat Management Practices

The New York State Department of Environmental Conservation's Division of Fish, Wildlife and Marine Resources has developed a framework to address aquatic fish and wildlife habitat issues that integrates planning and implementation to form a cohesive and effective unit. It can be used to address these issues across the landscape using the policy and decision making process. Habitat management is a complex issue, with many factors contributing to the problem. The following framework outlines the main strategies and management options you can use to minimize impacts to aquatic fish and wildlife habitat in your community:

1. **Protect Stream and River Corridors**
   These management options are both structural and nonstructural measures. They aim to protect the structural integrity of the corridor as well as the quality of the habitat. It applies to a wide variety of audiences from homeowners to policymakers.
2. **Restore Stream and River Corridors**
   These management options are both structural and nonstructural measures that serve to mitigate problems that already exist, as well as prevent new problems in the future.
3. **Protect Lakes, Ponds and Reservoirs**
   These management measures are largely for homeowners living near these bodies of water. By modifying how they use their land, they can protect aquatic fish and wildlife habitat as well as their property value.
4. **Restore Lakes, Ponds and Reservoirs**
   These are mainly structural measures that can be taken to mitigate problems that already exist, as well as prevent new problems in the future.
5. **Protect Wetlands**
   Wetlands are sponges that in a natural state absorb excess water volume, and filter out pollutants. With increased development, a greater volume of water and pollutants needs to be absorbed and filtered. Unfortunately, with this development usually comes a loss of wetlands and their functionality. This strategy uses education and policy to protect this valuable resource.
6. **Restore Wetlands**
   These are mainly structural measures that can be taken to mitigate problems that already exist, as well as prevent new problems in the future.

How this Worksheet Can Assist your Community in Protecting Aquatic Fish and Wildlife Habitat

This worksheet can be used to help your community to:

1. More fully understand aquatic fish and wildlife habitat management concepts,
2. Assess where your community stands relative to education and land use laws that provide for the protection of aquatic fish and wildlife habitat.
3. Identify aquatic fish and wildlife habitat management needs, and
4. Begin to map out an aquatic fish and wildlife habitat management strategy for the future.

For help in filling out this worksheet and technical assistance on aquatic fish and wildlife habitat, it is recommended that you contact your County Soil and Water Conservation District, New York State Department of Environmental Conservation Regional Office or your area's United States Department of Agriculture Natural Resources Conservation Service Conservationist. Most communities do not have an aquatic fish and wildlife habitat management plan. This worksheet can help your community determine its aquatic fish and wildlife habitat management needs.

Technical references available for communities in New York State to learn more about aquatic fish and wildlife habitat are listed below.

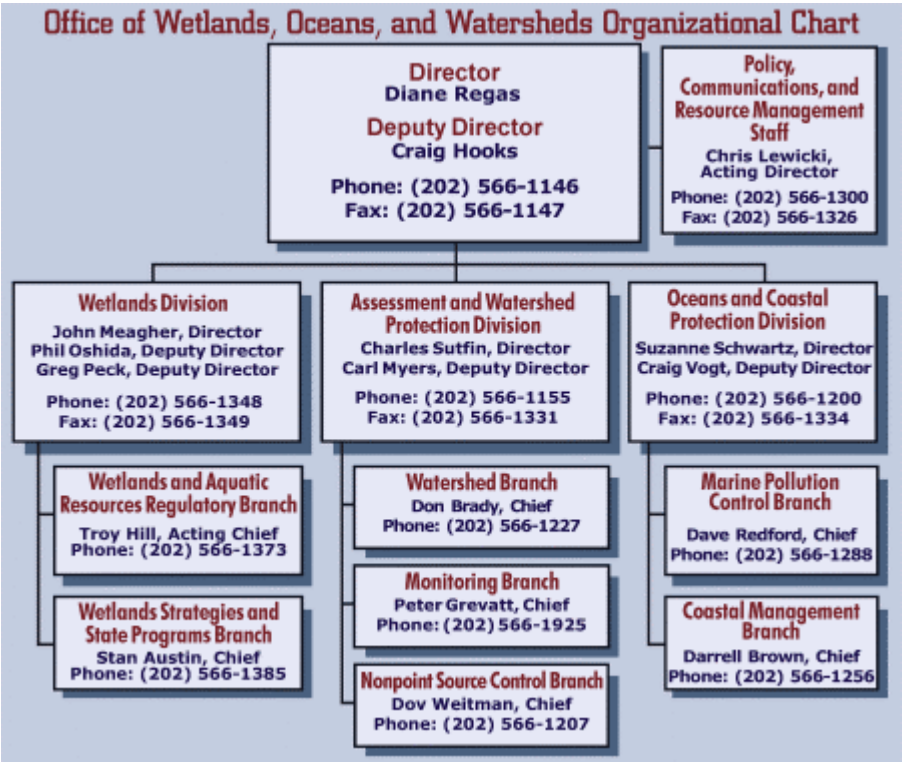
- The New York State Department of Environmental Conservation's Division of Fish, Wildlife and Marine Resources includes:

  Bureaus
  - Fish and Wildlife Services
  - Fisheries
  - Habitat
  - Marine Resources and
  - Wildlife

  Division Programs
  - Hudson River Estuary Program
  - Hudson River National Estuarine Research Reserve
  - New York Natural Heritage Program

  They are in the process of incorporating and emphasizing a holistic, landscape scale program to deliver Division efforts. They strive to work with other Divisions within the Department of Environmental Conservation as well as other agencies, non-governmental agencies and partners to protect, maintain and restore fish and wildlife habitat across New York State. They look beyond political boundaries to deliver their programs on a landscape scale, such as basins and ecoregions across the State. Their web site can be found at: http://www.dec.state.ny.us/website/dfwmr/index.html, or by contacting the New York State Department of Environmental Conservation, Division of Fish, Wildlife and Marine Resources, Bureau of Habitat, 625 Broadway, Fifth Floor, Albany, NY 12233-4756, Phone: (518) 402-8151

- The New York Natural Heritage Program maintains databases on the known and potential locations of rare plants and animals, including those listed by New York State as endangered or threatened, and of significant habitats and vegetation types. For a list of those plants, animals, and habitats which are documented for your assessment area in the Natural Heritage Program's databases, please contact the Information Resources Coordinator, NY Natural Heritage Program, NYS DEC, 625 Broadway, Albany, NY, 12233-4757.
- The United States Environmental Protection Agency's Office of Wetlands, Oceans and Watersheds has a great deal of information available on a variety of wetlands protection issues. Their wetlands information can be found on the web at: http://www.epa.gov/owow/wetlands/, or by telephone according to the directory below.



*Taken from the Environmental Protection Agency's Office of Wetlands, Oceans and Watersheds at http://www.epa.gov/owow/org.html

Community Environmental Management

- Aquatic Fish And Wildlife Habitat Management Tier II Worksheet -

Part 1- Community Risk Assessment Factors

The following is a list of strategies many communities have used to improve their ability to manage aquatic fish and wildlife habitat and minimize damage to it. The more factors that apply to your Assessment Area, the less likely you are to have adverse habitat impacts. Please check all of those you feel you are doing in your community.

Please check all that pertain to your community:

— We are protecting stream and river corridors
- o Maintain undisturbed riparian buffers
- o Establish stream and river setbacks
- o Develop, implement and enforce floodplain management land use regulations
- o Implement stormwater management practices
- o Maintain water budget in surface and groundwater (e.g. regulate withdrawals/diversions, no change in pulsing amount and timing)
- o Maintain thermal regime[1] (includes limiting damming and stormwater discharges, and maintain shading)
- o Maintain in-stream cover by limiting snagging and clearing (logs, sticks, rocks, etc.)
- o Maintain balanced sediment budget
- o Identify and protect rare, endangered and threatened aquatic species
- o Maintain natural channel form (e.g. limit gravel mining and hardened banks)
- o Develop a strategy for eliminating exotic species and preventing them from displacing native species
- o Ensure stream/river crossings (bridges/culverts) do not impede fish movement and downstream transport of sediment

— We are restoring stream and river corridors
- o Replace/install native buffers, including trees
- o Restore natural stream form
- o Mitigate barrier impacts (e.g. remove dams, install fish ladders, breach dams, perform water releases, fix culverts/bridge design to allow for fish movement and downstream transport of sediment)
- o Implement floodplain management practices
- o Implement stormwater management practices
- o Restore water budget
- o Restore in-stream habitat
- o Reduce excess sediment loads
- o Eliminate or control exotic species

[1] Temperature can be a limiting factor for trout populations. Certain activities (e.g. pond construction, stormwater discharges from impervious surfaces, and removal of riparian vegetation) can all increase stream temperature.

— We are protecting lakes, ponds and reservoirs
  - Prevent nutrient enrichment from onsite waste treatment systems (e.g. septics) and agricultural runoff
  - Prevent sediments and toxics (e.g. fertilizers, pesticides, oil) from entering stormwater
  - Maintain littoral (near shore) habitat and associated native aquatic vegetation
  - Maintain the riparian area/shoreline
  - Maintain water budget (e.g. no winter drawdown[2])
  - Develop a strategy for eliminating exotic species and preventing them from displacing native species
  - Minimize overwater structures (e.g. docks)

— We are restoring lakes, ponds and reservoirs
  - Control point and nonpoint sources of pollution (e.g. sediments, toxics, nutrients) from stormwater, onsite systems (septics) and agriculture by implementing BMPs on construction sites, farms, golf courses and lawns
  - Restore streams flowing into lakes, ponds and reservoirs
  - Soften shorelines (e.g. where possible use native vegetation for streambank stabilization rather than stone, concrete, or sheet piling)
  - Restore natural water budget (e.g. eliminate winter drawdown for vegetative control)
  - Eliminate or control exotic species
  - Re-establish natural native aquatic vegetation (e.g. reduce aquatic weed control)
  - Establish shoreline buffers

— We are protecting wetlands
  - Develop, implement and enforce buffer regulations for wetlands, including hydrologically isolated wetlands (e.g. vernal pools)
  - Maintain wetland buffers
  - Prevent filling, draining, changing water levels, introducing discharges (e.g. pollutant and direct stormwater discharges) and removing all vegetation (except selective cutting/fuel wood) in wetlands
  - Establish and implement a wetland education program
  - Develop a brochure to be included with each building permit application or site plan submittal for wetlands education purposes
  - Develop and make available a system for reporting wetlands violations
  - Maintain natural hydrology (no flooding, excavating or draining)
  - Prevent nutrient, toxics and sediment loading to wetlands beyond background levels (do not overload their filtering capacity)
  - Develop a strategy for eliminating exotic species and preventing them from displacing native species
  - Maintain wetland connectivity (e.g. when granting waivers or variances, do not isolate wetlands)
  - Make wetlands maps (State, Federal and local (where applicable)) available to the public, planning board, building inspector and code enforcement officer for review[3]
  - Maintain vegetative structure and the associated ecological community

— We are restoring wetlands
  - Restore natural hydrology by plugging ditches and restoring flows
  - Restore native vegetation
  - Remove fill
  - Remove exotic species
  - Establish and maintain buffers
  - Eliminate runoff, nutrients, toxics and sediments
  - Manage stormwater flows
  - Reestablish connectivity

[2] Winter drawdowns are detrimental, as they kill existing native vegetation in the littoral zone. If done early in the Fall they preclude the use of a littoral zone by amphibians. If done later, they can kill overwintering amphibians.
[3] A wetland map is not a substitute for a site visit.

nity Problem & Needs Assessment

Part 2 of this assessment will help to determine how extensive **aquatic fish and wildlife habitat management issues** are in your community and what your community's capacity is for addressing them.

Issues Associated with Aquatic Fish and Wildlife Habitat Management	Causes	Impacts	Remedial & Preventative Strategies
Loss of aquatic habitat in streams and rivers **___Yes ___No** **Do you have any knowledge of:** **___Loss of spawning areas** **___Loss of feeding and growth habitat** **___Loss of resting and shelter area** **___Loss of winter habitat** Locations (List): _____ _____	1. Removal of gravel from streams (private and commercial). 2. Increased sedimentation and erosion from stormwater, agriculture, road sanding, construction site runoff and cleaning roadside ditches. 3. Altered water flow from barriers, water withdrawal, stormwater, and floodplain alteration. 4. Loss of streamside buffers. 5. Loss of in-stream habitat (e.g. snagging, bulldozing, hardened banks, armoring of stream/river bed). 6. Competiiton from exotic species.	**Check those impacts that apply:** ___Loss of species ___Decline in populations ___Disease ___Decrease in biological diversity ___Change in community composition	**Strategy:** Protect Stream and River Corridors **Strategy:** Restore Stream and River Corridors

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	Barriers To Implementation	Community Assistance Needs[4]
Options: __ Maintain undisturbed riparian buffers __ Establish stream and river setbacks __ Develop, implement and enforce floodplain management land use regulations __ Implement stormwater management practices __ Maintain water budget in surface and groundwater (e.g. regulate withdrawals/diversions, no change in pulsing amount and timing) __ Maintain thermal regime[5] (includes limiting damming and stormwater discharges, and maintain shading) __ Maintain in-stream cover by limiting snagging and clearing (logs, sticks, rocks, etc.) __ Maintain balanced sediment budget __ Identify and protect rare, endangered and threatened aquatic species __ Maintain natural channel form (e.g. limit gravel mining and hardened banks) __ Ensure stream/river crossings (bridges/culverts) do not impede fish movement and downstream transport of sediment __ Develop a strategy for eliminating exotic species and preventing them from displacing native species		
Options: __ Replace/install native buffers, including trees __ Restore natural stream form __ Mitigate barrier impacts (e.g. remove dams, install fish ladders, breach dams, perform water releases, fix culverts/bridge design to allow for fish movement and sediment transport) __ Implement floodplain management practices __ Implement stormwater management practices __ Restore water budget __ Restore in-stream habitat __ Reduce excess sediment loads __ Eliminate or control exotic species		
We suggest you also complete the Mining Worksheet to further assess impacts on your community.		
We suggest you also complete the Stormwater Management Worksheet to further assess impacts on your community.		
We suggest you also complete the Flooding Management Worksheet to further assess impacts on your community.		

[4] List type of assistance needed: information/education; assessment/planning: BMP design/implementation; regulatory options; project funding; etc.

[5] Temperature can be a limiting factor for trout populations. Certain activities (e.g. pond construction, stormwater discharges from impervious surfaces, and removal of riparian vegetation) can all increase stream temperature.

Issues Associated with Aquatic Fish and Wildlife Habitat Management	Causes	Impacts	Remedial & Preventative Strategies
There are barriers to migration for fish and other organisms in streams and rivers ___Yes ___No	1. Dams, weirs, bridges, barriers and small/improperly installed culverts serve as in-stream barriers. 2. Altered water flow from barriers, water withdrawal, stormwater, and floodplain alteration.	**Check those impacts that apply:** ___Loss of species ___Decline in populations ___Disease ___Decrease in biological diversity ___Change in community composition	**Strategy:** Protect Stream and River Corridors **Strategy:** Restore Stream and River Corridors

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	Barriers To Implementation	Community Assistance Needs
Options: __ Maintain water budget in surface and groundwater (e.g. regulate withdrawals/diversions, no change in pulsing amount and timing) __ Maintain natural channel form (e.g. no gravel mining or hardened banks)		
Options: __ Restore natural stream form __ Mitigate barrier impacts (e.g. remove dams, install fish ladders, breach dams, perform water releases, fix culverts/bridge design to allow for fish movement and sediment transport) __ Implement floodplain management practices __ Restore water budget __ Restore in-stream habitat		
We suggest you also complete the Stormwater Management Worksheet to further assess impacts on your community.		
We suggest you also complete the Flooding Management Worksheet to further assess impacts on your community.		

Issues Associated with Aquatic Fish and Wildlife Habitat Management	Causes	Impacts	Remedial & Preventative Strategies
Degraded stream/river health (e.g. diminished capacity to sustain/support aquatic species) **___Yes ___No** Locations (List): _____ _____	1. Increased erosion and loading of sediment, toxics and nutrients from stormwater, agriculture, road sanding, construction site runoff and cleaning roadside ditches. 2. Increased water temperature. 3. Altered water flow from barriers, water withdrawal, stormwater, and floodplain alteration.	**Check those impacts that apply:** ___Loss of species ___Decline in populations ___Disease ___Fish kills ___Decrease in biological diversity ___Change in community composition	**Strategy:** Protect Stream and River Corridors **Strategy:** Restore Stream and River Corridors

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	Barriers to Implementation	Community Assistance Needs
Options: __ Maintain undisturbed riparian buffers __ Establish stream and river setbacks __ Develop, implement and enforce floodplain management land use regulations __ Implement stormwater management practices __ Maintain water budget in surface and groundwater (e.g. regulate withdrawals/diversions, no change in pulsing amount and timing) __ Maintain thermal regime[6] (includes limiting damming and stormwater discharges, and maintain shading) __ Maintain in-stream cover by limiting snagging and clearing (logs, sticks, rocks, etc.) __ Maintain balanced sediment budget __ Identify and protect rare, endangered and threatened aquatic species __ Maintain natural channel form (e.g. no gravel mining or hardened banks)		
Options: __ Replace/install native buffers, including trees __ Restore natural stream form __ Mitigate barrier impacts (e.g. remove dams, install fish ladders, breach dams, perform water releases, fix culverts/bridge design to allow for fish movement and sediment transport) __ Implement floodplain management practices __ Implement stormwater management practices __ Restore water budget __ Restore in-stream habitat __ Reduce excess sediment loads		
We suggest you also complete the Stormwater Management Worksheet to further assess impacts on your community.		
We suggest you also complete the Flooding Management Worksheet to further assess impacts on your community.		

[6] Temperature can be a limiting factor for trout populations. Certain activities (e.g. pond construction, stormwater discharges from impervious surfaces, and removal of riparian vegetation) can all increase stream temperature.

Issues Associated with Aquatic Fish and Wildlife Habitat Management	Causes	Impacts	Remedial & Preventative Strategies
Loss of aquatic habitat in lakes, ponds and reservoirs **___Yes ___No** **Do you have any knowledge of:** **___Cleaning away habitat including logs** **___Water depth – draw down, narrowing near shore habitat** **___Exotics crowding out native species** **___Loss of near shore habitat** **___Loss of deep water habitat due to sedimentation** Locations (List): _____ _____	1. Construction of docks, piers and boathouses. 2. Aquatic vegetation control. 3. Water level management. 4. Increased sedimentation and erosion from stormwater, agriculture, road sanding, construction site runoff and inflowing streams. 5. Import of exotic species which displace native species. 6. Filling of near and deep shore habitat. 7. Bulkheads displace your near shore habitat.	**Check those impacts that apply:** ___Loss of species ___Decline in populations ___Disease ___Decrease in biological diversity ___Change in community composition	**Strategy:** Protect Lakes, Ponds and Reservoirs **Strategy:** Restore Lakes, Ponds and Reservoirs

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	Barriers To Implementation	Community Assistance Needs
Options: __ Prevent sediments and toxics (e.g. fertilizers, pesticides, oil) from entering stormwater __ Maintain littoral (near shore) habitat and associated native aquatic vegetation __ Maintain the riparian area/shoreline __ Maintain water budget (e.g. no winter drawdown[7]) __ Develop a strategy for eliminating exotic species and preventing them from displacing native species __ Minimize overwater structures (e.g. docks)		
Options: __ Control point and nonpoint sources of pollution (e.g. sediments, toxics, nutrients) from stormwater, onsite systems (septics) and agriculture by implementing BMPs on construction sites, farms, golf courses and lawns __ Restore streams flowing into lakes, ponds and reservoirs __ Soften shorelines (e.g. where possible use native vegetation for streambank stabilization rather than stone, concrete, or sheet piling) __ Restore natural water budget (e.g. eliminate winter drawdown for vegetative control) __ Eliminate or control exotic species __ Re-establish natural native aquatic vegetation (e.g. reduce aquatic weed control) __ Establish shoreline buffers		
We suggest you also complete the Stormwater Management Worksheet to further assess impacts on your community.		

[7] Winter drawdowns are detrimental, as they kill existing native vegetation in the littoral zone. If done early in the Fall they preclude the use of a littoral zone by amphibians. If done later, they can kill overwintering amphibians.

Issues Associated with Aquatic Fish and Wildlife Habitat Management	Causes	Impacts	Remedial & Preventative Strategies
Degraded lake, pond, or reservoir health **___Yes ___No** **___Algae blooms and excessive weed growth** **___Toxics** Locations (List): _____ _____	1. On site septic systems failing because of soils, density/age of systems, and lack of maintenance.[8] 2. Increased loading of toxics and nutrients from stormwater, agriculture, roads, inflowing streams and lawns.	**Check those impacts that apply:** ___Loss of species ___Decreased populations ___Decline in biological diversity ___Change in community composition ___Disease ___Fish kills	**Strategy:** Protect Lakes, Ponds and Reservoirs **Strategy:** Restore Lakes, Ponds and Reservoirs

[8] Even septic systems that appear to be functional need to be pumped out approximately every five years to avoid getting solids in the leach field.

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	Barriers To Implementation	Community Assistance Needs
Options: __ Prevent nutrient enrichment from onsite waste treatment systems (e.g. septics) and agricultural runoff __ Prevent toxics (e.g. fertilizers, pesticides, oil) from entering stormwater __ Maintain water budget (e.g. no winter drawdown[9])		
Options: __ Control point and nonpoint sources of pollution (e.g. sediments, toxics, nutrients) from stormwater, onsite systems (septics) and agriculture by implementing BMPs on construction sites, farms, golf courses and lawns __ Establish shoreline buffers		
We suggest you also complete the Onsite Waste Treatment System Management Worksheet to further assess impacts on your community.		
We suggest you also complete the Stormwater Management Worksheet to further assess impacts on your community.		

[9] Winter drawdowns are detrimental, as they kill existing native vegetation in the littoral zone. If done early in the Fall they preclude the use of a littoral zone by amphibians. If done later, they can kill overwintering amphibians.

Issues Associated with Aquatic Fish and Wildlife Habitat Management	Causes	Impacts	Remedial & Preventative Strategies
Loss and degradation of wetland and vernal pool habitat **___Yes ___No**	1. Filling for development. 2. Increased sedimentation from stormwater, agriculture, road sanding, construction site runoff and inflowing streams. 3. Drainage for agricultural, commercial and residential purposes. 4. Mosquito control. 5. Fragmentation or loss of connectivity.	**Check those impacts that apply:** ___Decreased biological productivity in the food web ___Loss of natural nutrient cycling ___Loss of species ___Decreased populations ___Decline in biological diversity ___Change in community composition	**<u>Strategy</u>:** Protect Wetlands **<u>Strategy</u>:** Restore Wetlands

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	Barriers To Implementation	Community Assistance Needs
Options: __ Develop, implement and enforce wetland regulations for wetlands, including hydrologically isolated wetlands (e.g. vernal pools) __ Maintain wetland buffers __ Prevent filling, draining, changing water levels, introducing discharges (e.g. pollutant and direct stormwater discharges) and removing all vegetation (except selective cutting/fuel wood) in wetlands __ Establish and implement a wetland education program __ Develop a brochure to be included with each building permit application or site plan submittal for wetlands education purposes __ Develop and make available a system for reporting wetlands violations __ Maintain natural hydrology (no flooding, excavating or draining) __ Prevent nutrient, toxics and sediment loading to wetlands beyond background levels (do nt overload their filtering capacity) __ Develop a strategy for eliminating exotic species and preventing them from displacing native species __ Maintain wetland connectivity (e.g. when granting waivers or variances, do not isolate wetlands) __ Make wetlands maps (State, Federal and local (where applicable)) available to the public, planning board, building inspector and code enforcement officer for review[10] __ Maintain vegetative structure and the associated ecological community		
Options: __ Restore natural hydrology by plugging ditches and restoring flows __ Restore native vegetation __ Remove fill __ Remove exotic species __ Establish and maintain buffers __ Eliminate runoff, nutrients, toxics and sediments __ Manage stormwater flows __ Reestablish connectivity		
We suggest you also complete the Stormwater Management Worksheet to further assess impacts on your community.		

[10] A wetland map is not a substitute for a site visit.

Issues Associated with Aquatic Fish and Wildlife Habitat Management	Causes	Impacts	Remedial & Preventative Strategies
Degraded wetland and vernal pool health **___Yes ___No**	1. Increased erosion and loading of sediment, toxics and nutrients from stormwater, agriculture, road sanding, construction site runoff and cleaning roadside ditches. 2. Altered water levels. 3. Drainage for agricultural, commercial and residential purposes. 4. Mosquito control (e.g. chemical application) 5. Invasive species displacing native species	**Check those impacts that apply:** ___Decreased biological productivity in the food web ___Loss of natural nutrient cycling ___Loss of species ___Decreased populations ___Decline in biological diversity ___Change in community composition ___Fish kills ___Disease	**Strategy:** Protect Wetlands **Strategy:** Restore Wetlands

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	Barriers To Implementation	Community Assistance Needs
Options: __ Develop, implement and enforce wetland regulations for wetlands, including hydrologically isolated wetlands (e.g. vernal pools) __ Maintain wetland buffers __ Prevent filling, draining, changing water levels, introducing discharges (e.g. pollutant and direct stormwater discharges) and removing all vegetation (except selective cutting/fuel wood) in wetlands __ Establish and implement a wetland education program __ Develop a brochure to be included with each building permit application or site plan submittal for wetlands education purposes __ Develop and make available a system for reporting wetlands violations __ Maintain natural hydrology (no flooding, excavating or draining) __ Prevent nutrient, toxics and sediment loading to wetlands beyond background levels (do nt overload their filtering capacity) __ Develop a strategy for eliminating exotic species and preventing them from displacing native species __ Maintain wetland connectivity (e.g. when granting waivers or variances, do not isolate wetlands) __ Make wetlands maps (State, Federal and local (where applicable)) available to the public, planning board, building inspector and code enforcement officer for review[11] __ Maintain vegetative structure and the associated ecological community		
Options: __ Restore natural hydrology by plugging ditches and restoring flows __ Restore native vegetation __ Remove fill __ Remove exotic species __ Establish and maintain buffers __ Eliminate runoff, nutrients, toxics and sediments __ Manage stormwater flows __ Reestablish connectivity		
We suggest you also complete the Stormwater Management Worksheet to further assess impacts on your community.		

[11] A wetland map is not a substitute for a site visit.

Issues Associated with Aquatic Fish and Wildlife Habitat Management	Causes	Impacts	Remedial & Preventative Strategies
Loss of benefits to streams, rivers, lakes, ponds and reservoirs from loss/degradation of wetlands and vernal pools **___Yes ___No**	1. Filling for development. 2. Increased sedimentation from stormwater, agriculture, road sanding, construction site runoff and inflowing streams. 3. Drainage for agricultural, commercial and residential purposes. 4. Mosquito control. 5. Fragmentation or loss of connectivity.	**Check those impacts that apply:** ___Increased flooding and flood damages ___Decreased water quality ___Decreased erosion and sediment control ___Loss of aquatic species ___Loss of recreational opportunities	**Strategy:** Protect Wetlands **Strategy:** Restore Wetlands

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	Barriers To Implementation	Community Assistance Needs
Options: __ Develop, implement and enforce wetland regulations for wetlands, including hydrologically isolated wetlands (e.g. vernal pools) __ Maintain wetland buffers __ Prevent filling, draining, changing water levels, introducing dischages (e.g. pollutant and direct stormwater discharges) and removing all vegetation (except selective cutting/fuel wood)in wetlands __ Establish and implement a wetland education program __ Develop a brochure to be included with each building permit application or site plan submittal for wetlands education purposes __ Develop and make available a system for reporting wetlands violations __ Maintain natural hydrology (no flooding, excavating or draining) __ Prevent nutrient, toxics and sediment loading to wetlands beyond background levels (do nt overload their filtering capacity) __ Develop a strategy for eliminating exotic species and preventing them from displacing native species __ Maintain wetland connectivity (e.g. when granting waivers or variances, do not isolate wetlands) __ Make wetlands maps (State, Federal and local (where applicable)) available to the public, planning board, building inspector and code enforcement officer for review[12] __ Maintain vegetative structure and the associated ecological community		
Options: __ Restore natural hydrology by plugging ditches and restoring flows __ Restore native vegetation __ Remove fill __ Remove exotic species __ Establish and maintain buffers __ Eliminate runoff, nutrients, toxics and sediments __ Manage stormwater flows __ Reestablish connectivity		
We suggest you also complete the Stormwater Management Worksheet to further assess impacts on your community.		

[12] A wetland map is not a substitute for a site visit.

Issues Associated with Aquatic Fish and Wildlife Habitat Management	Causes	Positive Benefits	Remedial & Preventative Strategies
Our municipality is concerned about (please check all that apply): **___How to best protect the highest quality aquatic habitat before it gets degraded.** **___How to prioritize aquatic resources for protection.** **___How we can get the community and decision makers to recognize that high quality aquatic resources provide quality of life, recreational and economic benefits to the community and take steps to preserve and protect them.** **___Receiving and providing the best information and training to people who make decisions about development and aquatic resources in our community (e.g. contractors, engineers, municipal officials)** **___Confusion over local authority to address aquatic resource concerns** **___How to explain the importance of the biological productivity of wetlands and the effect it has on our economy to decision makers and the community.**	1. At present community is not implementing an aquatic resource management program and its associated plan. 2. The community is experiencing development pressure, but is having difficulty balancing economic development and growth and natural resource protection needs (including wetlands, flood plains and water quantity). 3. Community does not have adequate resources to enforce aquatic resource protection ordinances.	**Check those impacts that apply:** ___The preservation and enhancement of aquatic resources has a positive effect on the local economy and property values. ___High quality of life. ___The preservation and enhancement of aquatic resources positively impacts fish and wildlife, decreasing the need for costly restoration and remediation. ___Protection and enhancement of aquatic resources perpetuates beneficial ecosystem services.	**Strategy:** Protect Stream and River Corridors **Strategy:** Restore Stream and River Corridors **Strategy:** Protect Lakes, Ponds and Reservoirs **Strategy:** Protect Wetlands

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	Barriers to Implementation	Community Assistance Needs
Options: __ Develop, implement and enforce floodplain management land use regulations __ Identify and protect rare, endangered and threatened aquatic species		
Options: __ Implement floodplain management practices __ Implement stormwater management practices		
Options: __ Develop a strategy for eliminating exotic species and preventing them from displacing native species		
Options: __ Develop, implement and enforce wetland regulations for wetlands, including hydrologically isolated wetlands (e.g. vernal pools) __ Prevent filling, draining, changing water levels, introducing dischages (e.g. pollutant and direct stormwater discharges) and removing all vegetation (except selective cutting/fuel wood) in wetlands __ Establish and implement a wetland education program __ Develop a brochure to be included with each building permit application or site plan submittal for wetlands education purposes __ Develop and make available a system for reporting wetlands violations __ Develop a strategy for eliminating exotic species and preventing them from displacing native species __ Maintain wetland connectivity (e.g. when granting waivers or variances, do not isolate wetlands) __ Make wetlands maps (state Federal and local (where applicable) available to the public, planning board, building inspector and code enforcement officer for review[13]		
We suggest you also complete the Land Use Planning Needs Worksheet and to further assess the balance of development and economic growth in your community.		

[13] A wetland map is not a substitute for a site visit.

Community Environmental Management
TIER III: AQUATIC FISH AND WILDLIFE HABITAT MANAGEMENT STRATEGY DEVELOPMENT

Aquatic fish and wildlife habitat management is a complex issue, with many factors contributing to the topic. The following are six strategies for managing these resources in communities.

STRATEGY – Protect Stream and River Corridors

- Maintain undisturbed riparian buffers
- Establish stream and river setbacks
- Develop, implement and enforce floodplain management land use regulations
- Implement stormwater management practices
- Maintain water budget in surface and groundwater (e.g. regulate withdrawals/diversions, no change in pulsing amount and timing)
- Maintain thermal regime[14] (includes limiting damming and stormwater discharges, and maintain shading)
- Maintain in-stream cover by limiting snagging and clearing (logs, sticks, rocks, etc.)
- Maintain balanced sediment budget
- Identify and protect rare, endangered and threatened aquatic species
- Maintain natural channel form (e.g. limit gravel mining and hardened banks)
- Develop a strategy for eliminating exotic species and preventing them from displacing native species
- Ensure stream/river crossings (bridges/culverts) do not impede fish movement and downstream transport of sediment

STRATEGY – Restore Stream and River Corridors

- Replace/install native buffers, including trees
- Restore natural stream form
- Mitigate barrier impacts (e.g. remove dams, install fish ladders, breach dams, perform water releases, fix culverts/bridge design to allow for fish movement and downstream transport of sediment)
- Implement floodplain management practices
- Implement stormwater management practices
- Restore water budget
- Restore in-stream habitat
- Reduce excess sediment loads
- Eliminate or control exotic species

STRATEGY – Protect Lakes, Ponds and Reservoirs

- Prevent nutrient enrichment from onsite waste treatment systems (e.g. septics) and agricultural runoff
- Prevent sediments and toxics (e.g. fertilizers, pesticides, oil) from entering stormwater
- Maintain littoral (near shore) habitat and associated native aquatic vegetation
- Maintain the riparian area/shoreline
- Maintain water budget (e.g. no winter drawdown[15])
- Develop a strategy for eliminating exotic species and preventing them from displacing native species
- Minimize overwater structures (e.g. docks)

[14] Temperature can be a limiting factor for trout populations. Certain activities (e.g. pond construction, stormwater discharges from impervious surfaces, and removal of riparian vegetation) can all increase stream temperature.

[15] Winter drawdowns are detrimental, as they kill existing native vegetation in the littoral zone. If done early in the Fall they preclude the use of a littoral zone by amphibians. If done later, they can kill overwintering amphibians.

STRATEGY – Restore Lakes, Ponds and Reservoirs

- Control point and nonpoint sources of pollution (e.g. sediments, toxics, nutrients) from stormwater, onsite systems (septics) and agriculture by implementing BMPs on construction sites, farms, golf courses and lawns
- Restore streams flowing into lakes, ponds and reservoirs
- Soften shorelines (e.g. where possible use native vegetation for streambank stabilization rather than stone, concrete, or sheet piling)
- Restore natural water budget (e.g. eliminate winter drawdown for vegetative control)
- Eliminate or control exotic species
- Re-establish natural native aquatic vegetation (e.g. reduce aquatic weed control)
- Establish shoreline buffers

STRATEGY – Protect Wetlands

- Develop, implement and enforce buffer regulations for wetlands, including hydrologically isolated wetlands (e.g. vernal pools)
- Maintain wetland buffers
- Prevent filling, draining, changing water levels, introducing discharges (e.g. pollutant and direct stormwater discharges) and removing all vegetation (except selective cutting/fuel wood) in wetlands
- Establish and implement a wetland education program
- Develop a brochure to be included with each building permit application or site plan submittal for wetlands education purposes
- Develop and make available a system for reporting wetlands violations
- Maintain natural hydrology (no flooding, excavating or draining)
- Prevent nutrient, toxics and sediment loading to wetlands beyond background levels (do not overload their filtering capacity)
- Develop a strategy for eliminating exotic species and preventing them from displacing native species
- Maintain wetland connectivity (e.g. when granting waivers or variances, do not isolate wetlands)
- Make wetlands maps (State, Federal and local (where applicable)) available to the public, planning board, building inspector and code enforcement officer for review[16]
- Maintain vegetative structure and the associated ecological community

STRATEGY – Restore Wetlands

- Restore natural hydrology by plugging ditches and restoring flows
- Restore native vegetation
- Remove fill
- Remove exotic species
- Establish and maintain buffers
- Eliminate runoff, nutrients, toxics and sediments
- Manage stormwater flows
- Reestablish connectivity

[16] A wetland map is not a substitute for a site visit.

6.13 Marina & Recreational Boating

Environmental Significance Summary:

Marinas and recreational boating are very popular uses of coastal waters. The growth of recreational boating, along with the growth of coastal development in general, has led to a growing awareness of the need to protect the environmental quality of our waterways. Because marinas are located right at the water's edge, there is a strong potential for marina waters to become contaminated with pollutants generated from the various activities that occur at marinas, such as boat cleaning, fueling operations, and marine head discharge, or from the entry of storm water runoff from parking lots and hull maintenance and repair areas into marina basins.

Individual boats and marinas usually release only small amounts of pollutants. Yet, when multiplied by thousands of boaters and marinas, they can cause distinct water quality problems in lakes, rivers, and coastal waters. The U.S. Environmental Protection Agency has identified the following potential environmental impacts from boating and marinas: high toxicity in the water; increased pollutant concentrations in aquatic organisms and sediments; increased erosion rates; increased nutrients, leading to an increase in algae and a decrease in oxygen (eutrophication); and high levels of pathogens. In addition, construction at marinas can lead to the physical destruction of sensitive ecosystems and bottom-dwelling aquatic communities.

Water pollution from boating and marinas is linked to several sources. They include poorly flushed waterways, boat maintenance, discharge of sewage from boats, storm water runoff from marina parking lots, and the physical alteration of shoreline, wetlands, and aquatic habitat during the construction and operation of marinas.

Community Assistance Summary:

- Ensure that marinas and ports are designed and constructed to ensure water quality and habitat protection.
- Reduction of the day-to-day impacts of stormwater quality and volume from maintenance activities.
- Require and ensure proper hazardous material handling, transport and storage.
- Require and ensure proper disposal of solid waste.
- Develop and provide public education programs for boaters, marina owners and operators.

Issues Summary:

- Insufficient information on how to design and construct marinas and ports for water quality and habitat protection.
- Known maintenance activity problems.
- Improper Hazardous Material Handling, Transport and Storage.
- Improper Disposal of Solid Waste.
- Marina Runoff polluting waterways.

Strategies Summary:

- Design and construct marinas and ports for water quality and habitat protection.
- Reduce the day-to-day impacts of stormwater quality and volume from maintenance activities.
- Ensure proper hazardous material handling, transport and storage.
- Ensure proper disposal of solid waste.
- Develop and provide public education programs for boaters, marina owners and operators.

Community Benefit Summary:

Proper marina planning and an informed boating public will limit pollution from these sources, promote long-term economic benefits and environmental health, and help recreational boating to remain a fun-filled outdoor experience. Clean boats, clean boating habits, and clean marinas benefit the entire boating community as well as aquatic life.

Tier 2B – Marina & Recreational Boating Worksheet

CEM

Marinas and Recreational Boating

Tier 2 Worksheet

Community Environmental Management

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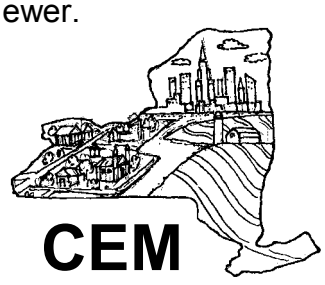
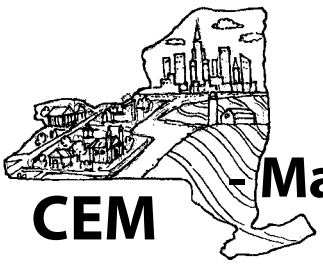
* Indicates an anticipated reviewer.





Community Environmental Management

- Marinas and Recreational Boating Tier II Worksheet -

Part 1- Community Risk Assessment Factors

The following is a list of strategies many communities have used to improve their operation and maintenance strategies to minimize pollution and other negative impacts from marinas and recreational boating. The more factors that apply to your community, the less likely you are to have adverse water quality impacts. Please check all of those that pertain to your community.

Please check all that pertain to your facility:

__ We require and ensure that marinas and ports are designed and constructed to ensure water quality and habitat protection.
__ We require the reduction of the day-to-day impacts of stormwater quality and volume from maintenance activities.
__ We require and ensure proper hazardous material handling, transport and storage.
__ We require and ensure proper disposal of solid waste.
__ We have developed and provide public education programs for boaters, marina owners and operators.

Part 2- Community Problem & Needs Assessment
Part 2 of this assessment will help to determine how extensive flooding is in your community and what is your community's capacity for addressing flooding issues.

This assessment has not yet been developed. We are consulting experts in the field to make sure our remedial and preventive strategies outlined in Tier III are sound. If they are, we will develop the Tier II accordingly. If you have any questions or comments on the Tier III strategies, please contact Rich Lewis at the New York State Department of Ag and Markets (518) 485-1470.

Community Environmental Management TIER III: MARINA AND RECREATIONAL BOATING MANAGEMENT STRATEGY DEVELOPMENT

Marina management is a complex issue, with many factors contributing to the problem. The United States Environmental Protection Agency has developed the publication "National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating" (EPA841-B-01-005, November 2001) that outlines strategies for managing marinas and recreational boating and preventing adverse water quality impacts that may result.

Strategy – Design and construct marinas and ports for water quality and habitat protection

- Design, construct and maintain marinas and associated channels so that they are not deeper than the surrounding navigable channels
- Retrofit facilities with poor circulation (e.g. wave attenuators, mechanical aerators)
- Design, construct and maintain facilities to keep water sections and basins connected and promote flow
- Maximize the benefits of entrance channels to promote flushing
- Promote flow through currents whenever possible
- Establish a hydrologic baseline before designing new or redeveloping marinas
- Model water quality changes for each development scenario
- Maintain an ongoing water quality monitoring program (e.g. rapid bioassessment techniques, chemical analysis)
- Establish a volunteer monitoring and/or cleanup program
- Perform a habitat baseline study before designing new or redeveloping marinas and emphasize awareness of exotic, invasive, threatened or endangered species, as well as functions of importance, such as spawning, nursery, feeding or migration areas.
- Work with interested parties to reclaim waterfront Brownfileds for habitat
- Use low impact development practices to minimize the effect of development on critical environmental areas.
- Use dry stack storage to minimize the area needed for boat storage.
- Preserve wetlands and natural shoreline features for shoreline protection and prevent erosion.
- Use native vegetation for plantings.
- Limit or eliminate use of breakwaters, bulkheads and sea walls, and use riprap instead where structural support is needed.
- Manage boating activities to decrease turbidity and physical destruction of shallow water habitat (e.g. restrict boater traffic in shallow water areas; establish and enforce no wake zones to decrease turbidity, shore erosion and damage in marinas)

Strategy: Reduce the day to day impacts of stormwater quality and volume from maintenance activities

- Perform boat repair and maintenance work inside enclosures that are self-contained or have closed systems for air and water.
- Where inside workspace is not available, blasting and sanding activities must take place in spray booths or tarp enclosures, and vacuum sanders must be used to collect dust and paint chips.
- Where inside workspace is not available, boat maintenance must take place in designated areas away from water and on impervious pads. No runoff from these operations may enter the water.
- Where any outside work is performed, make sure the area is thoroughly cleaned and debris and waste material is disposed of properly.
- Develop, implement and enforce restrictions on "do-it-yourself" maintenance to prevent water quality impairments.
- Design, construct and maintain BMPs for stormwater management to trap and treat any contaminated runoff from the site.
- Develop and implement a routine maintenance schedule for the facility that includes sweeping maintenance areas and parking lots regularly.
- Install or preserve and maintain buffers between maintenance and parking areas and the water.
- Preserve and remediate wetlands, as they are natural stormwater mitigation areas.
- Develop and implement a system to prevent and react to hazardous materials spills.
- If there are floor drains or catch basins near maintenance activities, seal them for the duration of the maintenance to prevent spills from quickly reaching water supplies.
- Wash boat hulls above the waterline by hand. Where practicable, remove boats from the water and clean them where debris can be captured and treated.
- Where practicable, buy and sell detergents and cleaning compounds that are less toxic.
- Prohibit hull scraping or paint removal while boats are afloat.
- Use and sell only long lasting and low toxicity or nontoxic antifouling paints.
- Minimize the impacts of wastewater from pressure washing.

Strategy: Ensure Proper Hazardous Material Handling, Transport and Storage

- Install and test automatic shutoffs on fuel lines and at hose nozzles to reduce chance of major spillage.
- Retrofit fuel nozzles that have a mechanism to hold the nozzle open during fueling without holding.
- Install personal watercraft floats at fuel docks to minimizing spillage while refueling.
- Develop and implement a testing and maintenance schedule for all tanks, lines and hoses associated with fueling operations.
- Develop and implement a spill monitoring program.
- Train employees to prevent, identify, contain, clean up and report spills.
- Provide easy to read signs at each fueling station, which explain proper fueling, spill prevention and reporting procedures.
- Provide easily identifiable and accessible containment equipment on site in case of spill.
- Write and implement a fuel spill recovery plan.
- Promote the installation and use of fuel/air separators on air vents or tank stems of inboard fuel tanks to reduce the amount of fuel spilled into surface waters during fueling.
- Display easy to read signs at fueling stations to discourage overfilling of fuel tanks.
- At each fueling station, provide absorptive pads and disposal receptacles for people to use to catch splash back and drips while fueling and when replacing the nozzle.
- Post easy to read signs to inform patrons and employees of the benefits of properly maintaining engines for fuel-efficient consumption, clean exhaust and fuel economy. Encourage them to routinely check engines for leaks.
- Develop, implement and enforce a plan for bilge water treatment for employees and patrons.
- Develop a system of checks to make sure all materials from spill cleanup are disposed of according to the law.
- Make sure liquid materials are stored in a place that prevents precipitation from entering the storage area, has enough capacity to contain spills, and does not have drains which would allow spills to travel out of the containment area.
- Store as little hazardous material as necessary on site.
- Provide clearly labeled, separate containers for the disposal of waste oils, fuels and other liquid wastes.
- Dispose of or recycle hazardous materials as per Federal, state and local regulations.
- Perform spill proof oil changes
- Use less toxic materials for maintenance whenever practicable
- If pesticides or fertilizer are used, store and distribute as indicated on the manufacturer's label.
- Prepare and implement a hazardous materials spill recovery plan and update it as operations change.
- Keep adequate spill response equipment on site and clearly labeled.

Strategy: Ensure Proper Disposal of Solid Waste

- Limit or prohibit marina patrons from performing hull maintenance while in the water.
- Prohibit material from hull maintenance activities from entering that water.
- Make sure covered garbage and recycling cans are provided in convenient locations, and that they are clearly labeled.
- Make sure patrons clean up any pet waste and post signs telling them how to dispose of it properly.
- Prohibit patrons from disposing of fish waste in the water.
- Provide fish cleaning stations and covered garbage cans.
- Compost fish waste, or collect fresh waste and sell as chum.
- Encourage catch and release fishing, reducing the amount of fish waste.
- Install pumpout facility compatible with the facility's needs (e.g. fixed point systems, dump stations for portable toilets, portable systems, dedicated slipside systems)
- Provide pumpouts at reasonable times and at a reasonable cost.
- Keep pumpout stations clean and easily accessible.
- Train staff to maintain pumpout stations and recognize failures or emergencies.
- Provide adequate restrooms on shore.
- If no pumpout facilities are available, declare the marina a "no discharge area".
- Make sure patrons clean up any pet waste and post signs telling them how to dispose of it properly.
- Post signs asking patrons not to feed waterfowl and other wildlife.
- Develop, adopt and enforce a policy to prohibit the use of Y-valves on boats and inland waters.
- Maintain a dedicated fund and issue a contract for pumpout and dump station repair and maintenance (applies to government-operated marinas, pumpout stations, and dump stations only).
- Regularly inspect and maintain sewage facilities.
- Disinfect suction connections on pumpout stations to prevent pathogen transfer.
- Maintain convenient, dry, clean and pleasant restroom facilities to encourage their use.

Strategy: Develop and Provide Public Education Programs for Boaters, Marina Owners and Operators

- Use signs to inform marina patrons of appropriate clean boating practices.
- Establish bulletin boards for environmental information and idea sharing
- Promote recycling and trash reduction programs
- Hand out pamphlets or fliers, send newsletters, and add inserts to bill mailings with information about how recreational boaters can protect the environment and have clean boating water
- Organize and present enjoyable environmental education meetings, presentations and demonstrations.
- Educate and train marina staff to do their jobs in an environmentally conscious manner and to be good role models for marina patrons
- Insert language into facility contracts that ensure tenants use certain areas and clean boating techniques when maintaining their boats. Use an environmental agreement that ensures that tenants will comply with the marina's best management practices.
- Have a clearly written environmental best management practices agreement for outside contractors to sign as a precondition to working on any boat at the marina.
- Participate with an organization that promotes clean boating practices, and which can help implement and enforce these strategies.
- Provide MARPOL placards to boaters.
- Storm drain stenciling
- Establish and educate marina patrons about rules governing fish cleaning.
- Educate boaters about good fish cleaning practices.
- Provide information about local waste collection and recycling programs.
- Hold clinics on safe fuel and bilge maintenance.
- Teach boaters how to fuel to minimize spills.
- Stock phosphate-free, nontoxic cleaners and environmentally friendly products.
- Place signs in water and label charts to alert boaters about sensitive habitats.

Chapter 7 - Tier 3 Community Natural Resource Planning

The remedial and preventive strategies and management options the community identifies for addressing each concern are then incorporated into individual plans or an overall 5 year natural resources plan for the community based on restoration and protection goals established for the assessment area.

The natural resources plan should then be incorporated into the Community's Comprehensive Land Use Plan to provide the documentation of the importance of these resources to the community. The Master Plan will provide the legal justification that the public welfare will be adequately protected by any regulations that might be adopted to protect and preserve these resources.

7.1 Risk and Problem Assessment Summary

Once you have gone through the worksheets for specific issues in your study area, I would re-examine expectations, commitment and levels of effort again. Make sure that the management options and strategies your community chooses to explore are realistic within these constraints. Review the Community Capacity Assessment Worksheet and determine who best can assist with future efforts.

The Risk and Problem Assessment Summary is a simple matrix style sheet included to help summarize and organize the findings from different worksheets. It can also act as an outline for future efforts. Some of the questions below (and any additional information) can be noted issue by issue.

- What potential management options and strategies have been selected?
- What are the critical problems we face as a community?
- Have barriers to implementation been identified and if so can they be addressed?
- Have the community's priorities shifted from what you though in Tier1?
- Do additional groups/individuals need to be involved?
- Are there overlapping issues or management options from several different worksheets?
- Are management options already in place and if so do they need additional support or invigoration?
- What are our short-term goals?
- What are our long-term goals?
- What is our number one priority?
- Will smaller separate plans work or does the community need an overall natural resources plan?

- Are the management options and strategies selected for further examination supported by the community's master plan?
- How can we maximize our existing programs and resources?

Tier 3 - Risk & Problem Assessment Summary Worksheet

COMMUNITY ENVIRONMENTAL MANAGEMENT

RISK & PROBLEM ASSESSMENT SUMMARY REPORT

(How your community's land use decisions and policies might be affecting natural resources and ultimately the quality of life for your residents.)

Community Environmental Management

RISK and PROBLEM ASSESSMENT
SUMMARY REPORT

Name of Community _____

This summary report gives you an idea on how your community's land use decisions and policies might be affecting your community's natural resources and ultimately the quality of life for your residents. The recommendations should serve only as a general guide to some of the key protection and restoration needs for your community.

CEM Worksheet	Items of Concern	Priority for Action	Restoration and/or Protection Recommendations	Possible Barriers to Implementation
1. Highway Right of Way Maintenance and Storage of Deicing Materials				
2. Flood Mitigation				
3. Stormwater Management				

CEM Worksheet	Items of Concern	Priority for Action	Restoration and/or Protection Recommendations	Possible Barriers to Implementation
4. On-site Wastewater Treatment System Management				
5. Resource Extraction (Mining)				
6. Marina Operations				
7. Construction and Development				
8. Aquatic Habitat Protection				

CEM Worksheet	Items of Concern	Priority for Action	Restoration and/or Protection Recommendations	Possible Barriers to Implementation
9. Terrestrial Habitat Protection				
10. Marine Resource Protection				
11. Drinking Water Supply Protection				
12. Farmland Protection				
13. Urban and Community Forestry				

7.2 Community Conservation Planning

A Community Conservation Plan is not intended as a substitute or replacement for a Comprehensive Plan. On the contrary, it is factored into and becomes an integral component of the Comprehensive Plan. Community conservation planning provides a process whereby communities and their citizens can, through the use of guidance documents, remediate existing environmental problems, and prevent environmental and natural resource problems related to future growth and development.

Community conservation planning provides a set of tools for looking at green space and natural resources in ways that, heretofore, have not been readily available in the comprehensive planning process. Owing to a lack of such tools and an understanding of those that do exist, open space resources, water quality, wildlife habitats, farmland, and greenways have suffered in most communities across New York State that have been subjected to pressures of growth and development.

The community conservation planning process proceeds with the underlying assumption that there are natural resource problems in your community which need to be addressed. It also proceeds with the identification of an individual or “sparkplug” who can provide leadership to get the “ball rolling” and take responsibility to see the process through to the completion and implementation of a Community Conservation Plan. It also calls for the formation of a planning team or steering committee. It is critical that the community’s elected officials, the planning board and zoning board of appeals, environmental council, and highway department be represented on the planning team. Community stakeholders selected from the public at large should also be appointed to the team.

Tier 3 - Community Conservation Planning Workbook

COMMUNITY ENVIRONMENTAL MANAGEMENT

CEM HANDBOOK FOR COMMUNITY CONSERVATION PLANNING

----- Draft -----

Prepared by the

CENTER FOR COMMUNITY ENVIRONMENTAL MANAGEMENT

in association with the

NEW YORK STATE SOIL AND WATER CONSERVATION COMMITTEE

NEW YORK ASSOCIATION OF CONSERVATION DISTRICTS

and the

NEW YORK STATE CONSERVATION DISTRICT EMPLOYEE'S ASSOCIATION

RECOGNIZING THE PROBLEM WE FACE

For many, there is a crisis of confidence in the way we are building our communities in New York State. People look around at the built evidence and see sprawl with its' associated traffic congestion and ugly strip development, and environmental problems including loss of farmlands, water quality degradation, loss of wildlife habitats and wildlife corridors, and loss of scenic amenities and green space.

Eroding soil from this construction site is transported in stormwater runoff and…..

…..eventually reaches and pollutes receiving waterbodies. Sediment is very destructive to fish and wildlife habitat, drinking water supplies and recreational amenities.

From about 1850 to 1940, when we were less wealthy than we are today, we built healthier communities that were compact and which provided for a sense of place and a strong sense of community. The small villages that we like so well, which, with their mixture of uses, i.e., shops, offices and apartments above shops and residences, all within walking distance of one-another were an expression of the principal pattern of development during this time period. Around 1940, this all began to change in response to the emergence of the automobile. For the past 60 years our dominant pattern of development, including the massive highway infrastructure, has been built largely to accommodate the automobile and the desire of people to have their own 'place in the country'. This, coupled with conventional zoning, has led to sprawl which has become very destructive of natural resources in many areas of the State. Sprawl is an inherently environmentally unsustainable pattern of development. With its huge infrastructure requirements, it is an economically inefficient pattern of development, which has

resulted in the needless degradation and loss of natural resources, it has contributed significantly to the economic decline of our inner cities, and it has contributed substantially to the loss of quality of life amenities for many and loss of sense of community. This has been a source of great frustration among many, including some developers with whom we entrust with the development of our communities, who question whether we can ever again build great communities.

This is not the way it has to turn out. We stand at a crossroads in the development of communities in the State. Either we modify our behavior and leave a legacy that we can be proud of or we don't. While it can not address all of the problems we currently face, this guidebook can help citizens and local officials plan for sustainable development and help put quality back into our communities which can be a source of great pride.

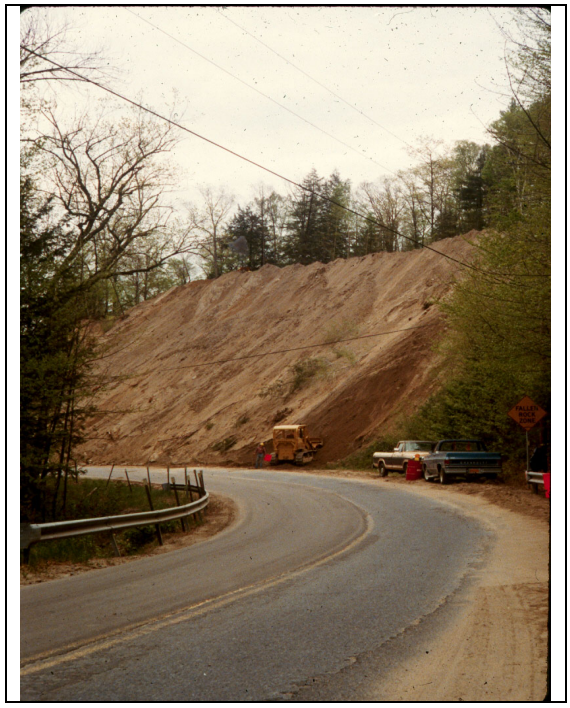
THE COMPREHENSIVE PLAN

Fundamental to the planning process is the Comprehensive Plan or Master Plan. The Comprehensive Plan sets forth community values by providing a vision of how citizens want their community to look twenty or thirty years in the future. For suburban or rural communities, the Comprehensive Plan typically seeks to preserve agricultural lands, water quality, rural character, open space, greenways, wildlife habitat, etc. But, when one examines zoning in most communities, it's as if the Comprehensive Plan does not exist. For example, conventional zoning which provides for a two acre zoning district, enables a house to be built on every two acres in that district, or a house on every five acres in areas zoned as five acres. Clearly, nothing could be more destructive to preserving farmland, wildlife habitat or other open space resources. Carving farmland into one, two or five acre zones simply does not preserve farmland, or open space, or rural character, and yet, the vast majority of communities in the State which have zoning have conventional zoning which typically works at cross purposes with the vision and goals set forth in their Comprehensive Plan. The problem with current land use planning is that in many instances natural resource protection tools and techniques are not widely used to achieve natural resource protection goals and objectives.

The CEM process is intended to provide the necessary tools and techniques to accomplish this task.

THE COMMUNITY CONSERVATION PLAN

A Community Conservation Plan is not intended as a substitute or replacement for a Comprehensive Plan. On the contrary, it is factored into and becomes an integral component of the Comprehensive Plan. Community conservation planning provides a process whereby communities and their citizens can, through the use of guidance documents, remediate existing environmental problems, and prevent environmental and natural resource problems related to future growth and development. Community conservation planning provides a set of tools for looking at green space and natural resources in ways that, heretofore, have not been readily available in the comprehensive planning process. Owing to a lack of such tools and an understanding of those that do exist, open space resources, water quality, wildlife habitats, farmland, and greenways have suffered in most communities across New York State that have been subjected to pressures of growth and development. The community conservation planning process proceeds with the underlying assumption that there are natural resource problems in your community which need to be addressed. It also proceeds with the identification of an individual or "sparkplug" who can provide leadership to get the "ball rolling" and take responsibility to see the process through to the completion and implementation of a Community Conservation Plan. It also calls for the formation of a planning team or steering committee. It is critical that the community's elected officials, the planning board and zoning board of appeals, environmental council, and highway department be represented on the planning team. Community stakeholders selected from the public at large should also be appointed to the team.



PREPARING A COMMUNITY CONSERVATION PLAN

Community conservation planning follows a five-tired approach:

Tier 1: Survey of Community Natural Resource Concerns

As part of the planning process, a community should undertake a problem assessment to take stock of natural resources assets in the community and determine the health and well-

being of these resources. This can be accomplished by using the Survey of Natural Resource Concerns Worksheet that can be found in the CEM Worksheets supplement to this guide. While a community may undertake the survey as a self-assessment, in New York State County Soil and Water Conservation Districts are well positioned to assist with the assessment. Owing to their natural resources expertise and knowledge about local resource issues, working with Soil and Water Conservation Districts is highly recommended. The Survey of Natural Resource Concerns Worksheet helps identify the level of concern and location of 1) water quality problems, 2) drinking water concerns, and 3) other natural resource concerns such as loss or decline of fish and/or wildlife species and/or habitats, loss or decline of biodiversity, loss of open space and scenic amenities, loss of and encroachment of development onto prime farmlands and more.

This water supply reservoir has fallen into disuse as a result of erosion and sedimentation due to road building for a subdivision that was never built upstream in the watershed.

Several other items should be examined during Tier 1. The Comprehensive (Master) Plan should be examined to determine if it has a well articulated vision as to how the community is to look like in 20 or 30 years into the future. The Comprehensive Plan also should be examined to determine if its goals and objectives support the vision. Implementation mechanisms such as zoning should be examined to determine if they provide the regulatory framework for delivering the vision and achieving stated goals and objectives. If after completing the Survey of Natural Resource Concerns it is concluded that there are natural resource issues that need to be addressed, then either the Comprehensive Plan is not being effectively implemented, goals and objectives for protecting specific natural resources do not exist, or the plan implementation mechanisms, such as the zoning regulations are inappropriate for achieving stated goals and delivering on the vision. If the Comprehensive Plan lacks goals and objectives for protecting natural resources, then an update of the Plan may be in order if that is the desire of community stakeholders. But, it is almost always desirable to supplement the Comprehensive Plan with a Community Conservation Plan because there usually are outstanding natural resource and environmental issues that need to be addressed in most communities.

Tier 2A: Environmental Assessment Worksheets

For each specific resource problem or concern identified and evaluated in Tier 1 above, there is a Community Environmental Management Worksheet. (See the CEM Worksheets supplements to the guide.) These worksheets, or a combination of them, can be used to further articulate the nature of a particular natural resource problem, identify it's cause(s), evaluate the impacts to the community, identify potential strategies and management options for addressing the problem, identify barriers to implementation, and identify what assistance a community might need to address a particular natural resource management issue. Assistance may take the form of information/education, assessment/planning, BMP design/implementation, design of regulations, and potential funding, etc. Following is a current list of Environmental Assessment Worksheets available:

Water Quality Protection and Restoration

- Flood Mitigation
- Stormwater Management/Erosion and Sediment Control
- Stream Corridor Management
- On-site Wastewater Management
- Highway Right-of-Way Maintenance and Salt Storage
- Marina Operations (under development)

Natural Resource Protection

- Wetlands Protection
- Forest Fragmentation
- Wildlife Corridors
- Rare & Endangered Species
- Bio-diversity
- Unique Geologic Features
- Scenic Vistas/Roads
- Historic/Cultural Resources
- Outdoor Recreation (passive & active)

Farmland Protection

Sustainable Development

- Criteria for sustainable growth and development
- Map of Potential Conservation Lands

Drinking Water Source Protection

Tier 2B: Community Capacity Assessment

Another component of the planning process is the Community Capacity Assessment. This assessment provides a current overview of the community's ability to address natural resource problems and issues. The assessment is accomplished by using a worksheet which identifies local administrators having responsibility for a specific resource area and their level of training or expertise. It also identifies existing regulatory arrangements, and current enforcement and maintenance capabilities. Appropriate members of the County Water Quality Coordinating Committee such as the county planner, county soil and water conservation technician, forester, cooperative extension agent, etc., can be called upon to participate on the planning team as needed.

Tier 3: The Community Conservation Plan

The results of the Tier 1 Survey of Natural Resource Concerns, the Tier 2A Environmental Assessments, and the Tier 2B Community Capacity Assessment should provide the basis for performing a SWOT Analysis. The SWOT Analysis provides a framework for examining the community's Strengths, Weaknesses, Opportunities and Threats as regards protection of natural resources. The SWOT Analysis can simply be a listing or summation of strengths, weaknesses, opportunities and threats in the community and for tailoring planning strategies and options for addressing specific natural resource issues. It provides direction for where emphasis is needed in planning for the correction or remediation of environmental problems or for preventing problems from occurring. The Tier 2A Environmental Worksheets provide a host of strategies and options to consider in developing the Community Conservation Plan. The results of the Tier 1, Tier 2, and SWOT Analysis can be summarized in the CEM Risk and Problem Assessment Summary Report which, in turn, can be presented to community officials and the public at large. The Summary Report becomes a critical component of the Community Conservation Plan. It will help prioritize environmental action initiatives over the next three to five years.

Mapping Potential Conservation Areas: A Key Component of the Community Conservation Plan

One of the most important steps a community can take in preparing a Community Conservation Plan is to conduct a natural resources inventory and from this inventory prepare a Map of Potential Conservation Areas. The Map of Potential Conservation Areas is prepared by superimposing on a parcel map (Figure 1) of the community both Primary and Secondary Conservation Areas. Primary Conservation Areas include critical resource features such as wetlands, floodplains, steep slopes over 25 % (See Figure 2). The Primary Conservation Areas in a community often are protected by state and/or local codes.

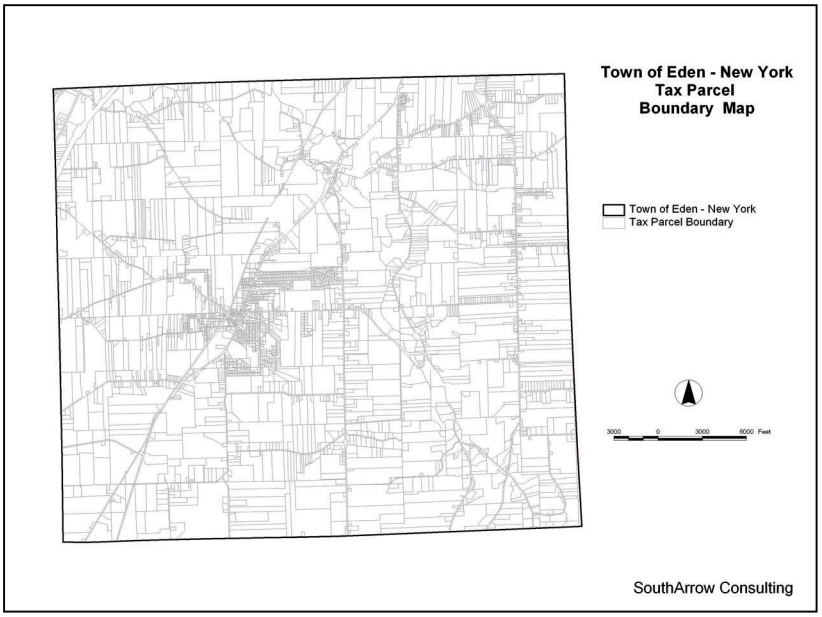


Figure 1. Tax parcel map. map. Town of Eden, NY NY.

The GIS mapping undertaken for the Town of Eden was made possible through a Section 319 grant from the NYS Department of Environmental Conservation to the Erie County Soil and Water Conservation District. SouthArrow Consulting in Buffalo NY was awarded the grant by the county to provide GIS and other planning services for the Town of Eden as part of a CEM pilot project.

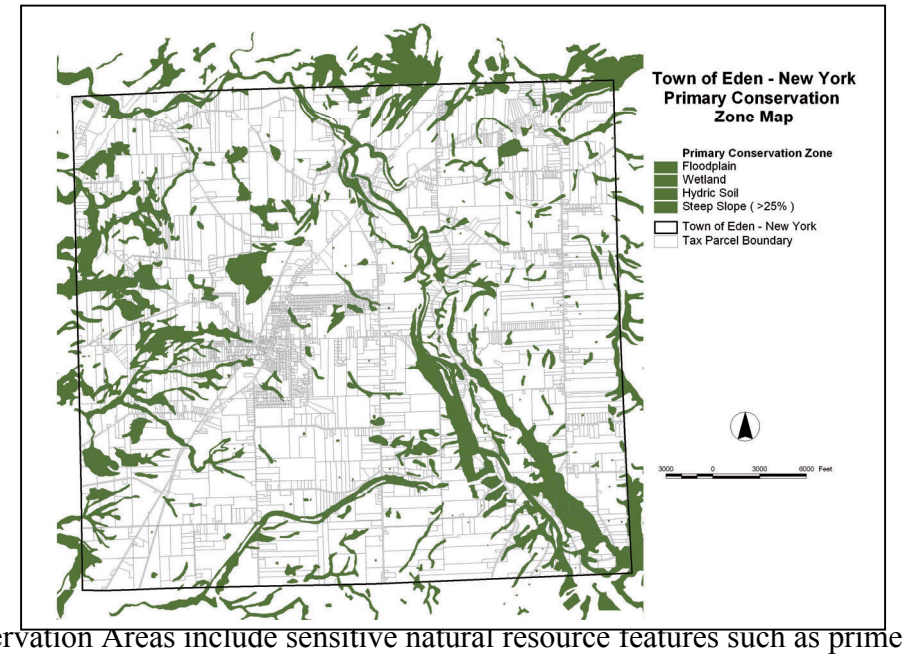


Figure 2. Primary Conservation Areas… wetlands, floodplains, and steep slopes.

Secondary Conservation Areas include sensitive natural resource features such as prime farmland, wildlife habitats, commercially viable forest lands, unique geological formations, historic features, scenic and viewsheds, wildlife corridors, stream corridors aquifer recharge

areas, or other greenway assets in the community (See Figures 3 and 4). Secondary Conservation Areas seldom are protected. Conventional zoning practices typically work at cross purposes with the protection of Secondary Conservation Areas. Subsequently, Secondary Conservation Areas are vulnerable to developmental pressures.

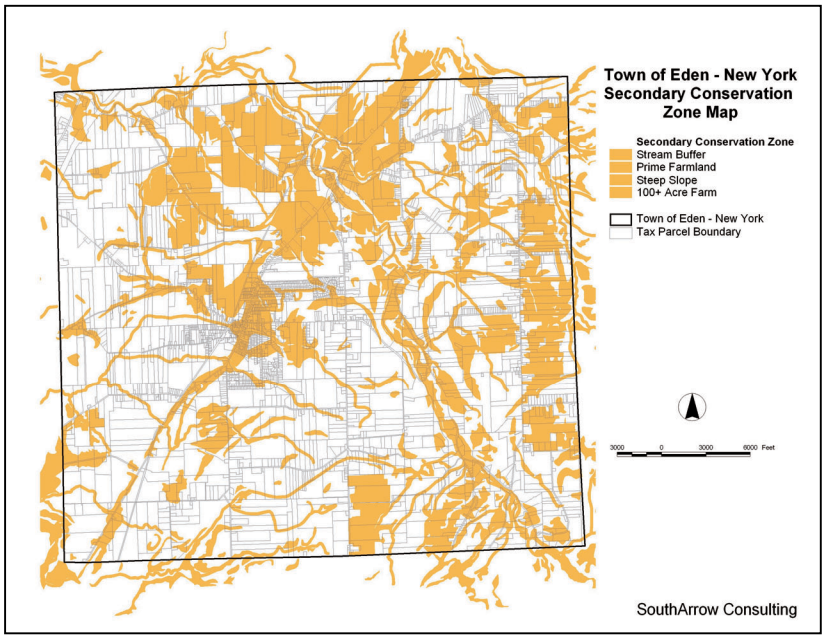


Figure 3. Secondary Conservation Areas… stream buffers, slopes from 15 to 25 %, prime farmland, 100+ acre farms.

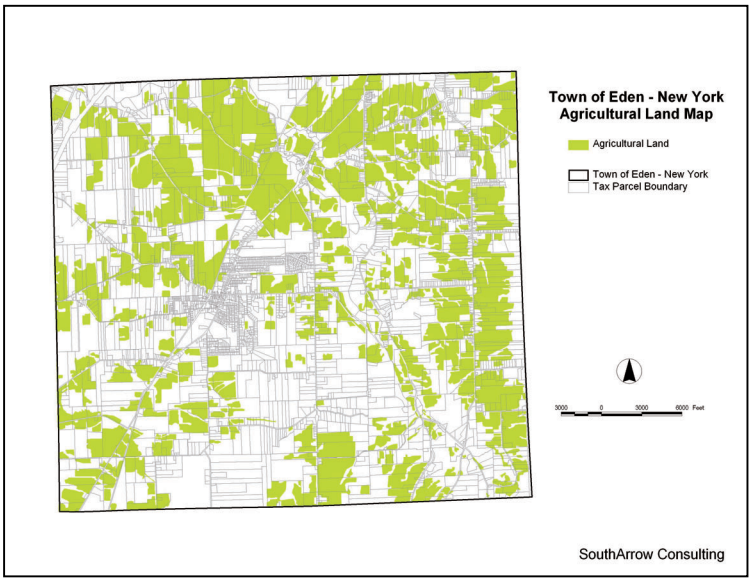


Figure 4. Secondary Conservation Areas… agricultural lands.

The Map of Potential Conservation Lands (Figure 5) consists of a composite of Primary and Secondary Conservation Areas. The map identifies for the community which lands may need to be protected from development and where density should otherwise be placed. The

map also lets developers know which lands the community may feel are important. It also shows where zoning changes may be needed if important natural resources in a community are to be protected. County Soil and Water Conservation Districts are well positioned to assist in the preparation of the Map of Potential Conservation Lands. The map also provides important natural resources and tax parcel information that can be the basis for designing a community-wide (or watershed-wide) interconnected trail system.

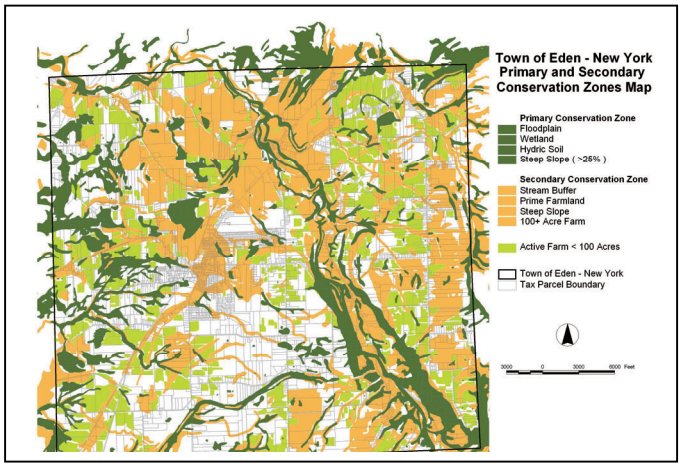


Figure 5. Map of Potential Conservation Lands…Town of Eden, NY.

Preparing a Map of Potential Conservation Lands provides a basis for designing development around Primary and Secondary natural resource features that a community believes are important rather than destroying those resource features. Conservation design of subdivisions, which provides for very low impact development, typically follows a four-step process as described in Growing Greener: Putting Conservation into Local Plans and Ordinances by Randall Arendt (See Figure 6 on next page). The Figure 6 schematics show a conventional subdivision with 32 lots and a conservation subdivision with the same number of lots. Adoption of conservation zoning provisions by local officials will be required if conservation subdivisions dominant pattern of development in the community.

It is up to elected officials in the community to adopt the Map of Potential Conservation Lands as an amendment to the Comprehensive Plan. Likewise, as strategies and options for addressing specific natural or environmental resource issues are developed as an outgrowth of the Tier 1, 2A and 2B assessments and the SWOT Analysis above, elected officials will have to give their endorsement to the strategies. The selected strategies and provisions for putting conservation into local plans and ordinances also should be incorporated into and become a part of the Comprehensive Plan.

Tier 4: Plan Implementation

Plan implementation involves setting a realistic time schedule to undertake and specific planning tasks and then setting the tasks into motion. As mentioned above, planning

strategies/options generally hinge on one or a combination of the following mechanisms: information/education, assessment/planning, BMP design/implementation, design of regulations, and potential funding.

Tier 5: Feedback

It is vitally important to keep track of implementation initiatives because only then will community stakeholders know if the goals of the Comprehensive Plan and the Community Conservation Plan are being achieved. If deficiencies occur and a particular strategy is not working, the strategy and selected option(s) may have to be revisited and re-examined. Adjustments to the process may be required.

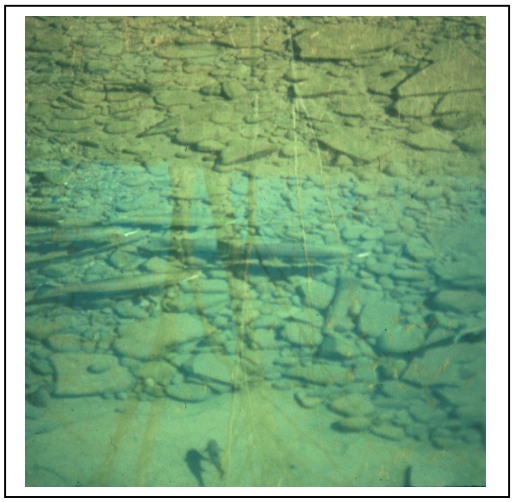
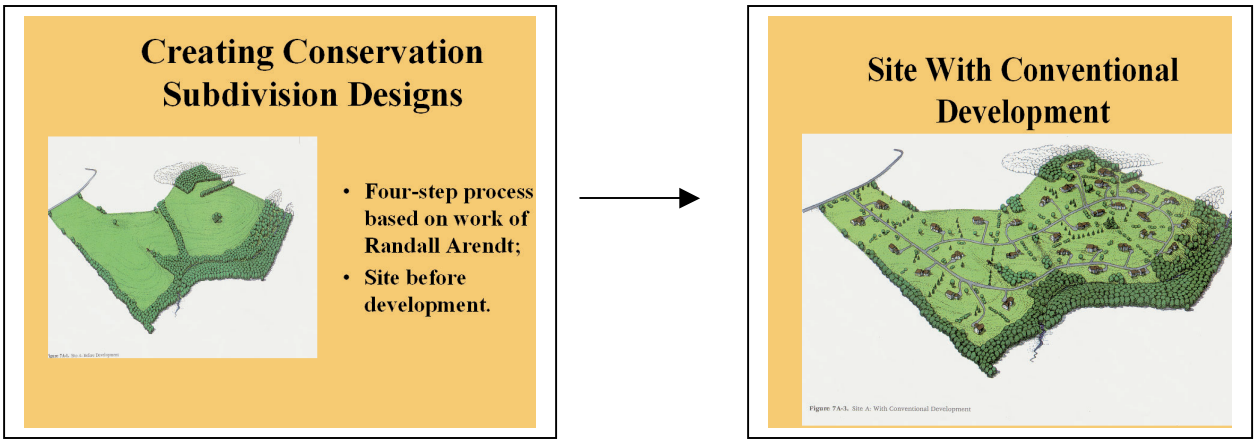
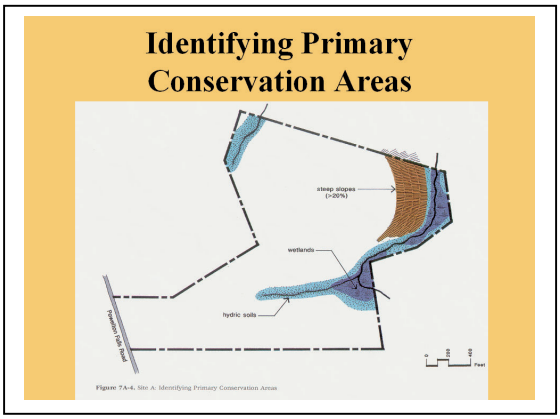
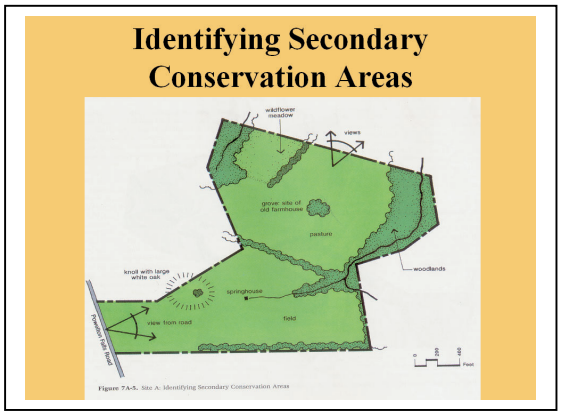
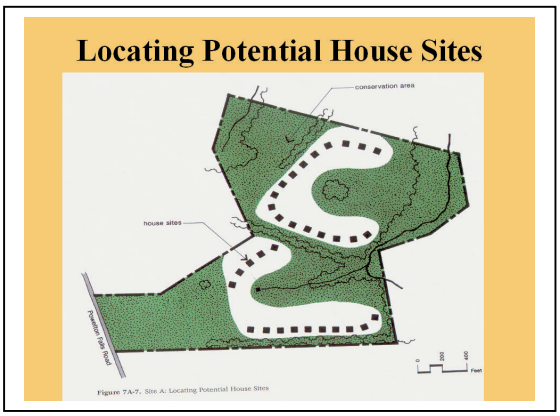


Figure 6. Schematic of Conservation Design Including Four-Step Process

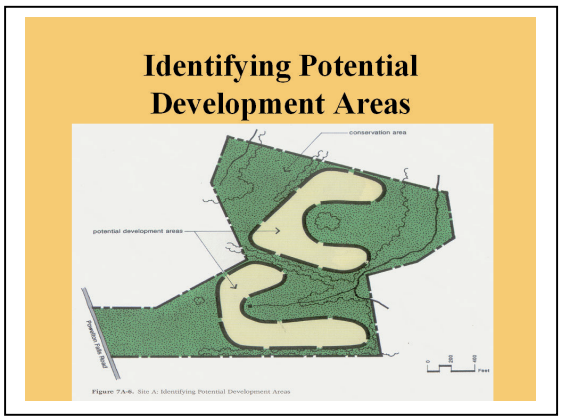




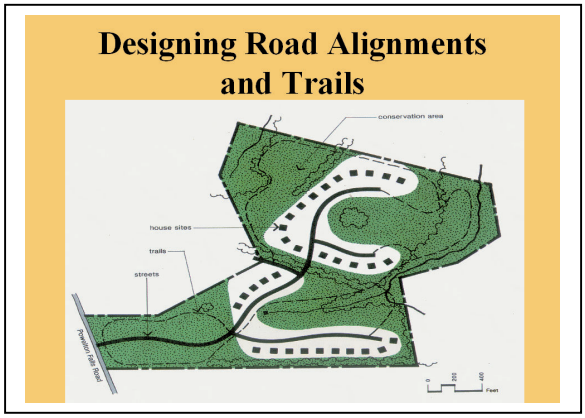




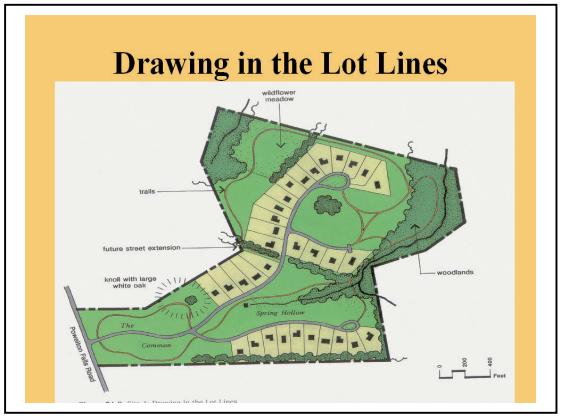
Step 2 of the Four-Step process.



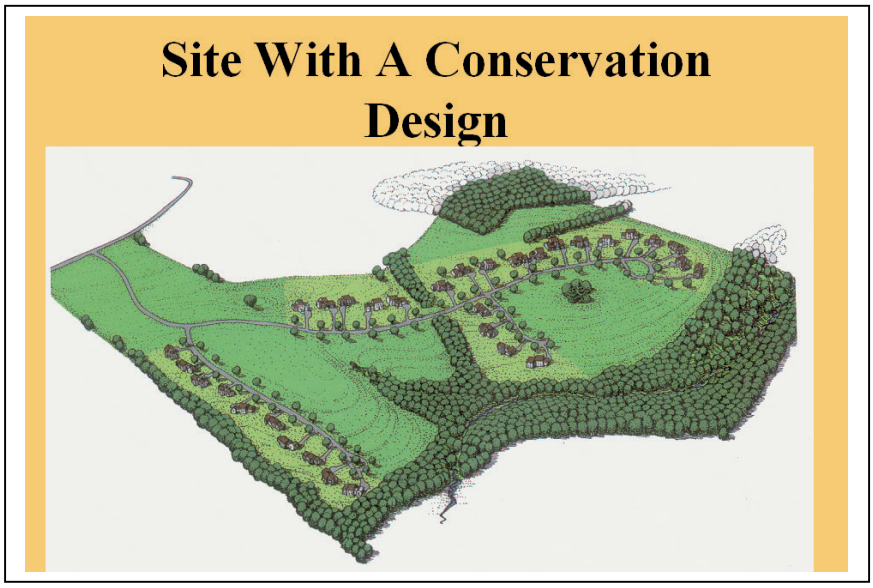
Step 1 of the Four-Step process.



Step 3 of the Four-Step process.



Step 4 of the Four-Step process.



WATERSHED PLANNING

It is to be noted that the process described above for preparing a Community Conservation Plan can be readily adapted to planning for the protection of natural resources within the NYS Framework for Local Watershed Management Plans. (See Attachment 2.)

Chapter 8 - Tier 4 Natural Resource Plan Implementation

Components of the natural resources plan(s) are implemented with the overall objective being to establish effective local programs for addressing specific community concerns such as loss of farmland. This tier involves practices, development and adoption of ordinances or implementation of a local public outreach program.

Under construction

Chapter 9 - Tier 5 Feedback and Evaluation

Tier V will provide guidance for ongoing evaluation of plan implementation to determine if goals are being met.

Under construction

R - Reference Materials

Local Open Space Planning Guide
Please download from
http://www.dos.state.ny.us/lgss/pdfs/openspaces.pdf

Community Culture and the Environment –
A Guide to Understanding a Sense of Place
(Publication # 842-B-01-003)
Please download from
http://www.epa.gov/ncepihom/index.htm