

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 your 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/>